

(1) tie LIMITED

- and -

(2) BILFINGER BERGER (UK) LIMITED

- and -

(3) SIEMENS plc

INFRACO CONTRACT

RELATING TO THE EDINBURGH TRAM NETWORK

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AGREEMENT

BETWEEN

(1) **tie LIMITED** a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh EH1 1YJ ("**tie**") which expression shall include its successors, permitted assignees and transferees; and

(2) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London EC1A 4EJ which expression shall include its successors, permitted assignees and transferees; and

(3) **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens Square, Frimley, Camberley, Surrey GU16 8QD which expression shall include its successors, permitted assignees and transferees,

and (2) and (3) shall together be "**the Infraco**" and each separately an "**Infraco Member**".

WHEREAS

A. Powers in respect of the design, construction, commissioning and operation of the Edinburgh Tram Network were conferred on CEC by the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006 which received Royal Assent on 8 May 2006 and 27 April 2006 respectively.

B. Pursuant to a notice published in the Official Journal of the European Union on 31 January 2006 with reference 2006/S 20-021872, **tie** invited expressions of interest from appropriately qualified parties to carry out and/or manage the design, construction, installation, commissioning, tram procurement, system integration, infrastructure maintenance, tram maintenance and supply of related equipment and materials, trams and related infrastructure in respect of the Edinburgh Tram Network.

C. By a competitive tendering process conducted in accordance with Law, **tie** has selected the Infraco to carry out the Infraco Works.

D. Under separate agreements, **tie** has appointed the SDS Provider to provide system design services under the terms of the SDS Agreement, the Tram Supplier to supply trams, capital spares and special tools under the terms of the Tram Supply Agreement, and the Tram

Maintainer to provide tram maintenance services and supply consumable spares under the terms of the Tram Maintenance Agreement.

E. **tie**, the Infraco, the SDS Provider, the Tram Supplier and the Tram Maintainer have respectively agreed to the novation of each of the SDS Agreement, the Tram Supply Agreement and the Tram Maintenance Agreement to the Infraco.

F. It is acknowledged that this Agreement aims to achieve a project vision (the "**Project Vision**") for the Edinburgh Tram Network. This Project Vision involves the development of a tramway which will stand favourable comparison with the best in Europe. The quality of the tramway provided will be appropriate to Edinburgh's status and role as a European capital city and its city centre's designation as a World Heritage Site. The tramway will integrate as far as possible with other transport modes to serve the existing fabric of the City of Edinburgh, and promote appropriate development and social inclusion. It is intended that this goal be achieved in a spirit of partnership, utilising modern design and construction methods and standards.

NOW IT IS AGREED AS FOLLOWS

PART 1 - PRELIMINARY MATTERS

1. DEFINITIONS AND INTERPRETATION

1.1 Schedule Part 1 (*Definitions and Interpretation*) shall govern all matters concerning definitions and interpretation.

2. TERM OF THE AGREEMENT

2.1 Subject to Clause 3 (*Conditions Precedent*), this Agreement shall come into effect on the Effective Date and subject to Clauses 2.2, 2.3 and 2.4 shall continue in effect until the earlier of:

2.1.1 the Expiry Date; and

2.1.2 the Termination Date.

2.2 Not less than 180 days prior to the Expiry Date, **tie** shall be entitled to serve a notice extending the duration of this Agreement for 5 years so that the Agreement continues in effect until the earlier of:

2.2.1 the Extended Expiry Date; and

2.2.2 the Termination Date.

2.3 If **tie** serves a notice pursuant to Clause 2.2:

2.3.1 the Agreement shall continue on the same terms as are in effect at the date of serving of such notice; and

2.3.2 the value of the extension shall be determined in accordance with Clause 80 (**tie** *Changes*) and such extension will be a Mandatory **tie** Change.

2.4 Not less than 180 days prior to the Extended Expiry Date, **tie** shall be entitled to serve a notice proposing an extension of the Term. If **tie** serves such a notice under this Clause 2.4:

2.4.1 **tie** and the Infraco shall negotiate in good faith to agree the terms of any amendment to this Agreement which will apply with effect from the day after the Extended Expiry Date for the duration of the period of such extension; and

2.4.2 the valuation of any extension shall be determined in accordance with Clause 80 (**tie** *Changes*); and

2.4.3 if **tie** and the Infraco agree the matters referred to in Clause 2.4.1 prior to the date when this Agreement would otherwise have expired, the Extended Expiry Date shall be extended to such date as may be agreed between **tie** and the Infraco, and with effect from the day after the Extended Expiry Date (being the date that would have occurred but for such extension), the Infraco shall perform its obligations under the terms of this Agreement as amended pursuant to this Clause 2.4.

2.5 **tie** may serve further notices proposing extensions to the duration of this Agreement up to a maximum total duration of 30 years and the provisions of Clause 2.4 shall apply *mutatis mutandis* to such further notices and any subsequently agreed extension.

3. CONDITIONS PRECEDENT

3.1 Except for the provisions of this Part 1 (*Preliminary Matters*), Clause 11 *(Novation of the SDS Agreement to the Infraco*), Clause 12 *(Novation of the Tram Supply Agreement to the Infraco*), Clause 13 (*Novation of the Tram Maintenance Agreement to the Infraco*), Clause 74 (*Bond, Parent Company Company Guarantees and Collateral Warranties*), Clause 76 *(Required Insurances*), Clause 77 (*Indemnity By Infraco, Liability and Sole Remedy*), Clause 97 (*Dispute Resolution Procedure*), Clause 101 (*Confidential Information*), Clause 102 (*Copyright and Intellectual Property*), Clause 106 *(Entire Agreement*), Clause 108 (*Variations to be in*

Writing), Clause 110 (*No Partnership or Agency*), Clause 111 (*Notice*), Clause 112 (*Invalid Terms*), Clause 113 (*Third Parties Rights)* and Clause 117 (*Applicable Law*), the obligations of the Parties under this Agreement shall be suspensively conditional upon the occurrence of the Commencement Date.

3.2 **tie** may by notice in writing to the Infraco waive any or all of the Conditions Precedent.

3.3 On the date that all of the Conditions Precedent (with the exception of any Conditions Precedent that have been expressly waived by **tie** in writing) have, in **tie's** opinion (acting reasonably) been satisfied, **tie** shall issue the CP Certificate.

3.4 The Infraco shall use its reasonable endeavours to satisfy or procure the satisfaction of the Conditions Precedent as soon as reasonably possible after the Effective Date.

3.5 In the event that the Commencement Date has not occurred by the date falling 3 months after the Effective Date (or such later date as may be agreed in writing between the Parties), **tie** may terminate this Agreement with immediate effect following the service of a notice to that effect on the the Infraco, and in which event, all provisions of this Agreement (other than Part 1 (*Preliminary Matters)*, Clause 77 (*Indemnity By Infraco, Liability and Sole Remedy*), Clause 97 (*Dispute Resolution Procedure*), Clause 101 *(Confidential Information*), Clause 102 (*Copyright and Intellectual Property*), Clause 106 (*Entire Agreement*), 108 (*Variations to be in Writing*), 110 (*No Partnership or Agency*), 111 *(Notices*), 112 (*Invalid Terms*), 113 (*Third Parties Rights*) and Clause 117 (*Applicable Law*)), shall cease to have effect and such termination shall be without prejudice to any accrued rights or obligations as at that date.

4. PRIORITY OF CONTRACT DOCUMENTS

4.1 NOT USED

4.2 In the event of any ambiguity or discrepancy between any provisions in the main body of this Agreement and those in any Part of the Schedule, or between the provisions of any Schedules, **tie's** Representative shall state in writing which provision shall take priority, which shall be deemed to be instructions issued pursuant to Clause 34.1. Provided always that, unless expressly stated otherwise by **tie**'s Representative the main body of the Agreement shall always take priority and the following order of priority will apply to Schedule Part 2 (*Employer's Requirements*) and Schedule Part 30 (*Infraco's Proposals*):

4.2.1 the Employer's Requirements; over

4.2.2 the Infraco's Proposals.

4.2A Notwithstanding Clause 4.2, if there is any ambiguity or discrepancy between the requirements set out in Schedule Part 44 (*EAL* Works) which the Infraco must comply with whilst carrying out works on the EAL Site and any provision of this Agreement the requirements set out in Schedule Part 44 (*EAL Works*) shall take precedence.

4.3 Nothing in this Agreement shall prejudice the Infraco's right to claim additional relief or payment pursuant to Schedule Part 4 (*Pricing*).

4.4 The Infraco confirms that it has studied in detail the Employer's Requirements and each document comprised therein and has satisfied itself that no discrepancies or errors exist within the Employer's Requirements or between it and the Infraco's Proposals. The Infraco acknowledges that it accepts all risks arising from any discrepancies, errors or omissions that subsequently appear within or between such documents and that, subject to Clause 4.2, 4.3 and 4.5, it shall not be entitled to make any claim against **tie** for an extension of time, additional payment, any relief or otherwise in respect of any such errors, discrepancies or omissions. The Infraco will notify **tie** forthwith upon becoming aware of a discrepancy or error within the Employer's Requirements or between the Employer's Requirements and the Infraco's Proposals. Where there is such discrepancy or error which cannot be resolved by the provisions of the Employer's Requirements, the Infraco shall as soon as reasonably practicable, and in any event within 5 Business Days, provide **tie** with proposals for resolving such discrepancy or error which comply with this Agreement.

4.5 Unless, within 10 Business Days of receipt by **tie** of the Infraco's proposals for resolving such discrepancy or error, **tie** notifies the Infraco requiring it to resolve the discrepancy in a different manner (which manner shall be binding but shall be reasonable in time and cost having regard to the Employer's Requirements and which shall be deemed to be instructions in accordance with Clause 34.1), the Infraco shall resolve the discrepancy in the manner proposed by it.

4.6 Subject to Clause 4.4, the Infraco shall review all documents, drawings or other subsequent information produced to amplify this Agreement and/or issued by **tie**, within 10 Business Days or such other period as is agreed by **tie** acting reasonably of the date of receipt of such documents, drawings or other subsequent information, and shall bring to the attention of **tie's** Representative any ambiguities or discrepancies, or requirements for further information arising from them. Save as otherwise stipulated in this Agreement and without prejudice to Infraco's express rights or remedies under this Agreement, failure to comply with this obligation shall prevent the Infraco from being entitled to an extension of time, additional payment, any relief or otherwise in respect of problems which would have been notified or

requests which would have been made had this obligation been complied with. Without prejudice to **tie's** express rights and remedies under this Agreement in relation to the consequences of the Infraco's failure to comply with this Clause 4.6, **tie** shall not be entitled to any remedy for breach of contract in respect of the Infraco's failure to comply with this Clause 4.6.

4.7 Clause 4.6 shall not apply to documents, drawings or other information to be considered under Schedule Part 14 (*Design Review and Design Management Plan*).

5. PROVISION AND INTERPRETATION OF INFORMATION

5.1 Subject to Clause 22 (*Adverse Physical Conditions and Artificial Obstructions*), Clause 64 (*Relief Events*) and Clause 65 (*Compensation Events*), the Infraco shall be deemed to have inspected and examined the Site and its surroundings and to have satisfied itself before the Effective Date as to:

5.1.1 the ground conditions on the Site including the climatic, geotechnical, ecological, environmental, hydrological, sub-soil and sub-surface conditions;

5.1.2 all relevant safety requirements and environmental matters;

5.1.3 the form and nature of the Site;

5.1.4 the nature of the materials (whether natural or otherwise) to be excavated;

5.1.5 the extent and nature and difficulty of the work and materials necessary for the completion of the Infraco Works;

5.1.6 the quality of any existing structures which will form part of or be associated with or will be adjacent to the Edinburgh Tram Network;

5.1.7 the risk of injury or damage to property adjacent to the Site and to occupiers of such property;

5.1.8 the possibility of interference by parties other than **tie**;

5.1.9 the precautions and the times and methods of working necessary to comply with Schedule Part 3 (*Code of Construction Practice and Code of Maintenance Practice*) and, in accordance with Good Industry Practice, minimise any nuisance or interference, whether public or private, being caused to any third parties;

5.1.10 use by third parties of any of the land which will form part of or will be adjacent to the Edinburgh Tram Network;

5.1.10.1 the means of communication with and restrictions of access to the Site;

5.1.10.2 the accommodation the Infraco may require; and

5.1.10.3 in general to have obtained for itself all necessary information as to risks, contingencies and all other circumstances influencing or affecting the Infraco Works.

The Infraco shall to the extent necessary for the carrying out of the Infraco Works take due and proper account of the above risks associated with carrying out the Infraco Works and, save where provided otherwise in this Agreement, the Infraco shall not be entitled to any extension of time, relief or to any additional payment on grounds of any misunderstanding or misinterpretation of any such matter, nor shall the Infraco be released from any of the risks accepted or obligations undertaken by the Infraco under this Agreement on the ground that the Infraco did not or could not have foreseen any matter which might affect or have affected the execution of the Infraco Works.

PART 2 - GENERAL OBLIGATIONS

6. PROJECT PARTNERING

6.1 The Parties agree to work in mutual co-operation to fulfil their agreed roles and responsibilities and apply their expertise to carry out and complete the Infraco Works in accordance with this Agreement.

6.2 **tie** and the Infraco shall procure that each **tie** Party and each Infraco Party (as appropriate) shall work in accordance with the principles set out in Clause 6.1.

6.3 Subject to Clause 6.4, each Party ("**First Party**") undertakes to co-operate with the other ("**Second Party**") in order to facilitate the performance of this Agreement and in particular the First Party shall:

6.3.1 approach all Permitted Variations on a collaborative and Open Book Basis;

6.3.2 use reasonable endeavours to avoid unnecessary complaints, disputes and claims against or with the Second Party;

6.3.3 comply with the provisions of the Dispute Resolution Procedure in relation to any such complaints, disputes and claims with or against the Second Party;

6.3.4 not interfere with the rights of the Second Party in performing its obligations under this Agreement, nor in any other way hinder or prevent the Second Party from performing those obligations or from enjoying the benefits of its rights;

6.3.5 take reasonable steps to mitigate any foreseeable losses and liabilities of the Second Party which are likely to arise out of any failure by the First Party to take any of the steps referred to in Clauses 6.3.2 to 6.3.4 (inclusive); and

6.3.6 take all reasonable steps to manage, minimise and mitigate all costs.

6.4 Nothing in Clause 6.3 shall:

6.4.1 interfere with the right of each of the Parties to arrange its affairs in whatever manner it considers fit (in compliance with Law) in order to exercise its rights and perform its obligations under this Agreement (in compliance with Law) and, in the case of **tie**, its duties and functions as a wholly owned subsidiary of CEC; or

6.4.2 relieve either Party from any obligation contained in this Agreement or from any obligation to pay any debt due and payable under this Agreement.

6.5 Senior representatives from the Parties shall meet on a quarterly basis (or as may be otherwise agreed by the Parties) to review:

6.5.1 any matter which has adversely affected or may adversely affect:

(a) the completion of the Infraco Works;

(b) the performance and presentation of the Edinburgh Tram Network;

(c) the functioning of the City of Edinburgh (including other modes of transport) and the people of Edinburgh, because of the carrying out of the Infraco Works; and/or

(d) the Infraco's ability to perform its obligations in terms of the Agreement;

6.5.2 any proposal from either Party to:

(a) minimise costs; and/or

(b) optimise the performance and quality of the Edinburgh Tram Network.

6.6 Either Party may propose measures to address the matters set out in Clause 6.5.1 and a determination of what measures (if any) should be undertaken by the Infraco and/or **tie** to address such matters shall be considered in accordance with and subject to each Party's existing rights, obligations and the existing contractual mechanisms under this Agreement including but not restricted to the rights, obligations and contractual mechanisms set out in Clause 64 *(Relief Events*), Clause 65 (*Compensation Events*), Clause 80 *(***tie** *Changes)*, Clause 81 (*Infraco Changes*), Clause 82 (*Small Works Changes*), Clause 83 (*Accommodation Works Changes*) and Clause 84 *(Qualifying Changes in Law)*.

6.7 Any proposal from either Party in terms of Clause 6.5.2 shall be reviewed in accordance with Clause 80 *(***tie** *Changes)*, Clause 81 (*Infraco Changes*) or Clause 82 (*Small Works Changes*) (as appropriate).

6.8 As required by **tie,** the Infraco shall procure the attendance of any of the Infraco Parties at the meetings described in Clause 6.5. The Infraco shall provide **tie** with reasonable notice of any regular progress meetings regarding performance of the Tram Supply Agreement and the Tram Maintenance Agreement and **tie** shall be entitled to attend such meetings where **tie** or **tie's** Representative have a right to attend such meetings (the Infraco using reasonable endeavours to secure such attendance) pursuant to the Tram Supply Agreement and the Tram Maintenance Agreement and, if **tie** reasonably requires to attend any other meeting, the Infraco shall use reasonable endeavours to facilitate such attendance.

6.9 The Infraco shall notify **tie** in writing no less than five Business Days prior to making any demand on any of the performance or reliability bonds held by the Infraco from sureties in respect of the performance of the Tram Supplier and Tram Maintainer.

7. DUTY OF CARE AND GENERAL OBLIGATIONS IN RELATION TO THE INFRACO WORKS

7.1 **tie** hereby appoints the Infraco in accordance with the terms of this Agreement and the Infraco hereby accepts full responsibility and agrees to carry out and complete the Infraco Works fully and faithfully in accordance with this Agreement.

7.2 Notwithstanding the specific responsibilities set out in Clause 7.3, the Infraco undertakes to **tie** that in carrying out and completing the Infraco Works it has exercised and undertakes to continue to exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent professional contractor experienced in carrying out works and services of a similar nature to the Infraco Works in connection with projects of a

similar scope and complexity. The Infraco acknowledges that **tie** will rely upon the skill, care and diligence of the Infraco in connection with all matters for which the Infraco is responsible under this Agreement.

7.3 The Infraco shall (each as distinct and separate obligations), and shall procure that the Infraco Parties, carry out and complete the Infraco Works:

7.3.1 in accordance with and so as to comply in all respects with this Agreement;

7.3.2 so as to enable the Edinburgh Tram Network to be designed, constructed, installed, tested and commissioned, and thereafter operated and maintained;

7.3.3 in accordance with the Infraco's quality management system and plans as developed in accordance with Clause 105 (*Health and Safety, Quality Assurance and Environmental Management System*);

7.3.4 so as to ensure compliance with the Employer's Requirements;

7.3.5 so as to ensure compliance with the Infraco's Proposals;

7.3.6 in accordance with **tie** and CEC Policies;

7.3.7 in accordance with the Code of Construction Practice,

7.3.7.1 in each Section insofar as construction, renewals and/or commissioning activities are taking place in that Section; and

7.3.7.2 in other areas where construction, renewals or commissioning activities whether relative to any Network Expansion, Permitted Variation or otherwise, are being carried out;

7.3.8 in accordance with the Code of Maintenance Practice in the undertaking of the Maintenance Services,

7.3.8.1 in each Section insofar as a Certificate of Sectional Completion has been issued which applies to that Section; and

7.3.8.2 in other areas where construction or commissioning activities whether relative to any Network Expansion, Permitted Variation or otherwise, have been completed;

7.3.9 so as to ensure compliance with the Tram Legislation;

7.3.10 so as to ensure compliance with all applicable Law, Land Consents and Consents;

7.3.11 so as to employ all reasonably practicable means to ensure that the environmental impacts are no worse than the residual impacts identified in the Environmental Statements and that such residual impacts are maintained during the Maintenance Services;

7.3.12 in compliance with all applicable environmental regulations and requirements;

7.3.13 in accordance with Good Industry Practice;

7.3.14 so as to ensure that the design of the Edinburgh Tram Network is buildable and maintainable;

7.3.15 so as to assist **tie** in relation to providing information that best value (pursuant to the Local Government (Scotland) Act 1973 as amended by the Local Government in Scotland Act 2003) has been secured in respect of the carrying out of the Infraco Works;

7.3.16 in such manner as not wilfully to detract from the image and reputation of **tie**, Transport Edinburgh Limited, CEC, the Scottish Ministers, Transport Scotland or the Edinburgh Tram Network;

7.3.17 in accordance with the OGC's "Excellence in Construction" initiative;

7.3.18 so as to ensure that sustainability is considered and discussed with **tie** in relation to energy consumption and the supply of materials from sustainable sources for the Edinburgh Tram Network. The Parties acknowledge that the execution of the Infraco Works in compliance with the Infraco Proposals (in relation to sustainability) meet the requirements of this provision;

7.3.19 in a manner that is not likely to be injurious to persons or property excluding any liability for persons or property injuriously affected by the Edinburgh Tram Network in so far as such liability does not arise as the result of either a breach of this Agreement or negligence on the part of the Infraco; and

7.3.20 using the Key Personnel.

7.4 The Infraco undertakes and warrants that the Infraco's Proposals shall meet the Employer's Requirements.

7.5 The Infraco shall (and shall procure that the Infraco Parties) use reasonable endeavours to ensure that in carrying out the Infraco Works, it:

7.5.1 maximises productivity by reference to Good Industry Practice as applicable to construction or maintenance as relevant;

7.5.2 minimises disruption to the city of Edinburgh;

7.5.3 maintains safety, and minimises the potential for accidents, and safeguards the Infraco Works;

7.5.4 safeguards efficiency in the obtaining of Consents; and

7.5.5 minimises costs.

7.6 The Infraco shall at all times keep itself fully informed about current professional and technical standards and about all matters relating to, or which might have a bearing on, the carrying out of the Infraco Works.

7.7 The Infraco's duties and obligations under or pursuant to this Agreement will not be released, diminished or in any other way affected by any independent inquiry into any matter which may be made or carried out by **tie** or by any firm, company or party on **tie's** behalf nor by any action or omission of any such firm, company or party whether or not such action or omission might give rise to any independent liability of such firm, company or party to **tie**.

7.8 The Infraco is deemed to have satisfied itself that it fully understands the scope and extent of the requirements in respect of the Infraco Works, and that it has sufficient information or will at the relevant time have sufficient information, to enable it to carry out the Infraco Works.

Background Information

7.9 Subject to the express provisions of this Agreement, the Infraco acknowledges that certain Background Information has been made available to it in relation to this Agreement. Subject to the express provisions of this Agreement, **tie** does not give any warranty or undertaking as to the completeness, currency, accuracy or fitness for any purpose of any of the Background Information and neither **tie**, any **tie** Parties, CEC, TEL nor any of their employees shall be liable to the Infraco in contract, delict (including breach of statutory duty), or otherwise as a result of:

7.9.1 any inaccuracy, error, defect, omission, unfitness for any purpose or inadequacy of any kind whatsoever in the Background Information; nor

7.9.2 any failure to make available to the Infraco any materials, documents, drawings, plans or other information relating to this Agreement;

provided that nothing in this Clause 7.9 shall exclude any liability in respect of any statements made or information provided fraudulently.

7.10 Subject to the express provisions of this Agreement, the Infraco acknowledges and confirms that it has conducted its own analysis and review of the Background Information and has before the execution of this Agreement, or upon receipt if received thereafter, satisfied itself as to the veracity, accuracy, reasonableness, scope, materiality, currency (where applicable) and completeness of all such Background Information upon which it places reliance.

Liaison

7.11 The Infraco shall (and shall procure that the Infraco Parties) liaise with **tie**, any **tie** Party, the Operator and any other parties as may reasonably be required by **tie** to facilitate the production, by such persons, of any information required from them, in order that the carrying out of the Infraco Works and its other obligations under this Agreement can be progressed according to the Programme. The Infraco shall (and shall procure that the Infraco Parties) liaise with **tie**, any **tie** Party, the Operator, and any other parties as may be reasonably required by **tie** as often as is necessary in order to ensure that the Infraco Works are carried out properly and in accordance with the terms of this Agreement.

7.12 The Infraco shall in relation to any proposed Permitted Variation, collaborate and liaise with **tie** throughout the carrying out of the Infraco Works to ensure due consideration is given to the type of materials and optimum and cost effective construction and maintenance methods, construction and maintenance programmes, and temporary works, as appropriate.

Provision of all Labour, Goods, Materials and Services

7.13 The Infraco shall, subject to the provisions of the Agreement, provide all labour, goods, materials, Infraco's Equipment, Temporary Works, transport to and from and in or about the Site, services and everything whether of a temporary or permanent nature required in and for the execution and completion of the Infraco Works so far as the necessity for providing the same is specified in the Agreement or could be reasonably foreseen therefrom by a contractor experienced in work of a similar nature, scope and complexity as the Infraco Works.

7.14 The Infraco shall take full responsibility for the adequacy, stability and safety of all site operations and methods of construction, installation and maintenance in relation to the Infraco Works.

Prohibited Materials

7.15 The Infraco undertakes and warrants to **tie** that it has not specified for use and undertakes that it shall not specify for use and shall ensure that there shall not be used in relation to the Infraco Works, any materials which at the time of specification, installation or commencement of use (as the case may be):

7.15.1 are known to be deleterious in the particular circumstances in which they are specified to be used (either to health and safety or to the durability of the Infraco Works); or

7.15.2 contravene any relevant standard or code of practice issued from time to time by the BSI Group or under a European directive relating to standards; or

7.15.3 do not accord with the guidelines contained in the edition of the publication "Good Practice in Selection of Construction Materials" (Ove Arup & Partners) current at the date of specification or commencement of use; or reinstallation; or

7.15.4 contravene Good Industry Practice.

7.16 The Infraco undertakes and warrants that on the date of use or installation on the Edinburgh Tram Network, any materials supplied as part of the Infraco Works shall be in accordance with Schedule Part 2 (*Employer's Requirements*).

Investigations and Surveys

7.17 The Infraco shall notify **tie** of any ground, physical, or geophysical investigations or archaeological or ecological surveys and other investigations or surveys which it intends to carry out before such investigations or surveys are carried out.

Abortive Works

7.18 As soon as reasonably practicable after the Infraco becomes aware that any element of the Infraco Works likely to be Abortive Work for any reason, the Infraco shall notify **tie** of:

7.18.1 the probable nature of the Abortive Work;

7.18.2 the cause of the Abortive Work being abortive;

7.18.3 the estimated effect of the Abortive Work in terms of cost, of time in completion of the Infraco Works and of any other matters in relation to the Agreement; and

7.18.4 any measures to be taken which may mitigate that effect.

7.19 The Infraco and **tie** shall jointly investigate, and **tie** shall determine the actual extent of any Abortive Work.

7.20 Payment by **tie** to the Infraco in respect of any Abortive Work which has been carried out by the Infraco shall be valued in accordance with Clause 80 (***tie*** *Changes*) and shall be paid by **tie** in accordance with Clause 67 (*Payment in respect of Applications for Milestone Payments*) provided always that no payment shall be due for Abortive Work to the extent it has resulted from any fault of the Infraco and/or any breach by the Infraco of its obligations under this Agreement.

Advanced Works Agreement

7.21 On the Commencement Date:

7.21.1 all work performed by the Infraco under the Mobilisation and Advanced Works Agreement shall be deemed to have been performed under this Agreement and the Mobilisation and Advanced Works Agreement shall terminate; and

7.21.2 subject to Clause 7.21.3, any claims which the Parties may have against each other under the Mobilisation and Advanced Works Agreement shall be deemed to be claims available to the Parties under this Agreement; and

7.21.3 to the extent that the Infraco has any entitlement to claim any additional time or costs in respect of Compensation Event (a) - (s) and (w) **tie** shall not be obliged in assessing such entitlements under Clause 65 (*Compensation Events*), to take account of any delay or costs to the extent that such delay or costs arose prior to the Commencement Date.

7.22 On the Commencement Date, all work performed by the Tram Supplier under the Tram Supply Advanced Works Agreement shall be deemed to have been performed under the Tram Supply Agreement and the Tram Supply Advanced Works Agreement shall terminate.

8. SYSTEM INTEGRATION

8.1 The Infraco shall ensure that the following key elements of the system integration of the Infraco Works are implemented:

8.1.1 insofar as identified within Schedule Part 2 (*Employers Requirements*), compliance with sub-system performance requirements as defined in Schedule Part 2 (*Employer's Requirements*) and to the extent not so identified in Schedule Part 2 (*Employer's*

Requirements), definition of sub-system performance requirements and demonstration by calculation that when such sub-systems are integrated they shall achieve the System Availability Target set out in Schedule Part 2 (*Employer's Requirements*) including the Operations Performance Specification during completion of construction, installation, re-installation or renewals;

8.1.2 management of technical interfaces including system wide issues such as electro-magnetic compatibility and stray current protection, noise, vibration and wheel/rail interface ensuring that each and every material issue arising is satisfactorily closed out following completion of construction, reinstallation or renewals and thereafter maintained as part of the Maintenance Services;

8.1.3 test management including the preparation of method statements, test scripts, the setting of pass/fail criteria, and analysis for commissioning and re-commissioning;

8.1.4 alignment of maintenance procedures with the operations procedures produced by the Operator to ensure they form a whole and safe system of work;

8.1.5 system activation following installation, reinstallation and renewals;

8.1.6 safety assurances and the Case for Safety are achieved at the issue of a Certificate of Sectional Completion and thereafter maintained and updated as required; and

8.1.7 preparation and updating of a requirements traceability matrix which shall have the ability to trace the requirements of the Employer's Requirements through the design process, the testing procedures and the operation of the Edinburgh Tram Network.

8.2 The Infraco shall during the carrying out of construction, installation, reinstatement or renewals be fully responsible for ensuring that the Trams and any engineer's works vehicles are fully integrated with the Infraco Works. The Infraco shall thereafter be fully responsible for maintaining that the Trams and any engineering works vehicles are fully integrated with the Edinburgh Tram Network.

8.3 The Infraco shall carry out and thereafter maintain all of the system integration activities described in Schedule Part 2 (*Employer's Requirements*) and Schedule Part 30 (*Infraco's Proposals*) the achievement of which is tracked in accordance with Clause 8.1.7.

8.4 The Infraco shall liaise with the Operator and **tie** as instructed by **tie** in relation to:

8.4.1 system operation and related design issues;

8.4.2 the Systems Acceptance Tests; and

8.4.3 operational defects.

8.5 The Infraco shall be responsible for ensuring that all elements of the design (which form part of the Infraco Works) relative to the Edinburgh Tram Network are compatible with system integration and the Infraco shall make qualified personnel available to ensure system integration throughout the Term.

8.6 As part of the Infraco Works, the Infraco shall be responsible for managing the configuration control of the Edinburgh Tram Network, specifically, but not exclusively controlling the introduction of software changes and hardware modifications through version control.

8.7 The Infraco shall procure in particular that the Tram Supplier and the Tram Maintainer comply with their obligations under the Tram Supply Agreement and the Tram Maintenance Agreement as set out in of the Schedule Part 39 (*Tram Supply Agreement and Tram Maintenance Agreement Obligations*) and shall notify **tie** of any breach of such obligations by the Tram Supplier or Tram Maintainer as soon as practicable after the Infraco becomes aware of any such breach.

9. TITLE

General Provisions

9.1 Subject to Clauses 9.6 and 9.7, the Infraco shall transfer or ensure that it procures the transfer of title to CEC in all materials, goods, and equipment intended to form part of the completed Edinburgh Tram Network and all Parts (including Spare Parts and Special Tools but excluding such spare parts owned by Infraco and brought on to the Site for the purposes of this Agreement) supplied or provided by the Infraco pursuant to this Agreement, as the case may be, on the later of:

9.1.1 payment (less any retention applicable) by **tie** to the Infraco of the price for such materials, goods, equipment and Parts (including Spare Parts and Special Tools) in accordance with this Agreement, and

9.1.2 delivery of such item to the Depot or such other part of the Site where the Infraco Works are being carried out;

and such title shall vest in CEC free and clear of all Security Interests and other third party rights of any nature. Subject to Clause 90 (Termination on Infraco Default), **tie** shall, and

shall procure that CEC shall, not take any action which would interfere with Infraco and the Infraco Parties use in the performance of the Infraco's obligations under this Agreement of the materials, goods, equipment and Parts in which title has passed to **tie** or CEC. If required, the Infraco shall at its own expense take all such steps and execute, and procure the execution of, all such instruments as **tie** may reasonably require to ensure that title so passes to CEC according to Law.

9.1.3 For the avoidance of doubt, an Insolvency Event in respect of one Infraco Member shall not absolve the other Infraco Member from its obligations in relation to the delivery of any goods, materials or equipment forming part of or required for the Infraco Works and in respect of which **tie** has made an advance payment to the Infraco, irrespective of how the Infraco Member determined such advance payment should be deployed.

9.2 Any materials, goods, and equipment intended to form part of the completed Edinburgh Tram Network and all Parts (including Spare Parts and Special Tools) in which title has passed to CEC which are at any time removed from the Edinburgh Tram Network will remain the property of CEC and the Infraco undertakes (and shall procure that the Infraco Parties so undertake) to the extent reasonably practicable, to clearly identify such materials, goods, and equipment and all Parts (including Spare Parts and Special Tools) as belonging to CEC and to keep all such Parts stored separately from any third party's property. The location of all such Parts shall be tracked in the Asset Management System at all times. Where, in the Infraco's reasonable opinion, it is necessary to dispose of any such materials, goods, equipment and Parts (including Spare Parts and Special Tools), the Infraco shall notify, and obtain the consent of, **tie (**such consent not to be unreasonably withheld) prior to such disposal. **tie** shall respond within 5 Business Days of receipt of such notification. Where **tie** has not responded within 5 Business Days, the Infraco may effect such disposal.

9.3 The Infraco shall at all times at its own expense label or otherwise clearly identify with a unique traceable coding system as being the property of CEC (and shall procure that Infraco Parties do likewise) any materials, goods, and equipment forming or intended to form part of the completed Edinburgh Tram Network and all Parts (including Spare Parts and Special Tools) in the Infraco's or any Infraco Party's possession or control in relation to which advance payment has been made and/or title has vested in CEC pursuant to this Agreement and the Infraco shall ensure that such items shall at all times in the Infraco's (or any Infraco Party's) possession or control be kept separate from the Infraco's or any third party's goods all to the extent that is agreed practicable by the Parties acting reasonably.

9.4 The Infraco shall incorporate provisions equivalent to those provided in Clauses 9.1 to 9.2 (mutatis mutandis) in every sub-contract in order to protect **tie** and CEC's interests in all supplies, materials, goods or equipment intended for the Infraco Works.

9.5 **tie** shall, at Infraco's request and where **tie** is satisfied that the Infraco has no equivalent contractual remedy, procure that CEC pursues any claim which CEC may have against the supplier of faulty or defective materials, goods, equipment and Parts in which title has vested in CEC and shall reimburse to Infraco all amounts recovered as a result of such claim subject to Infraco reimbursing the reasonable and proper costs incurred by CEC in pursuing the claim.

Title in the Trams

9.6 The Infraco shall procure that each Tram and item of Tram Related Equipment is supplied to **tie** free from all Security Interests, and other third party rights of any nature.

9.7 The Infraco shall procure that the Tram Supplier shall, pursuant to the Tram Supply Agreement, transfer title:

9.7.1 in each Tram, to CEC, on (i) delivery of that Tram to the Depot (or other designated delivery point in Edinburgh) and on the Certificate of Tram Commissioning being issued in respect of that Tram and in any event within twenty four hours of the successful completion of the Tram Commissioning Tests or (ii) by exception on an individual Tram basis, at the absolute discretion of **tie** and formalised in writing when a Tram is complete and a Factory Acceptance Test Certificate (as defined in the Tram Supply Agreement) has been issued pursuant to the Tram Supply Agreement;

9.7.2 to each item of the Tram Related Equipment to CEC, on the later of delivery of each item of the Tram Related Equipment to CEC and the Certificate of Tram Commissioning being issued in respect of the first Tram.

Interoperability and Warranty

9.8 The Infraco undertakes that all parts, components, systems, devices, equipment, software and mechanisms incorporated in the Edinburgh Tram Network and the Trams shall be at each Sectional Completion Date and thereafter be maintained so that they are:

9.8.1 fit for purpose, compatible and interoperable with each other; and

9.8.2 compliant with the Employer's Requirements

For the purposes of this Clause 9.8, "fit for purpose" in relation to any item means that it complies with the Employer's Requirements applicable to that item.

For the avoidance of doubt, this undertaking shall not apply to any items which are to be supplied to Infraco or any Infraco Party by or on behalf of **tie** or any **tie** Party.

9.9 The Infraco shall ensure that:

9.9.1 the relevant parts of the Edinburgh Tram Network (including all fare collection equipment except any Free Issue Fare Collection Equipment) are or will be Euro Compliant before any introduction of the single European currency in the United Kingdom and the Edinburgh Tram Network will not be affected by the introduction of the single European currency in the United Kingdom;

9.9.2 the Infraco's own internal systems and procedures are or will be Euro Compliant before the introduction of the single European currency in the United Kingdom and the Infraco Works will not be affected by the introduction of the single European currency in the United Kingdom; and

9.9.3 the relevant parts of the Edinburgh Tram Network (including all fare collection equipment except any fare collection equipment which is Free Issue Fare Collection Equipment to Infraco or any Infraco Party by or on behalf of **tie** or any **tie** Party) shall at all times throughout the Term be compliant with all Law applicable in relation to the Euro in the United Kingdom, including the rules on conversion, triangulation and rounding set out in EU Regulation Number 1103/97 and any subsequent or similar regulations or Law.

9.10 For the purposes of Clause 9.9 above "**Euro Compliant**" means that (i) the introduction of the Euro within the United Kingdom or any part thereof shall not affect the performance or functionality of any relevant items nor cause such items to malfunction, end abruptly, provide invalid results or adversely affect business, and (ii) all currency reliant and currency related functions (including all calculations concerning financial data) of any relevant items to enable the introduction and operation of the Euro, and (iii) in particular (but without limitation) each and every relevant item shall, to the extent it performs or relies upon currency related functions (including all calculations concerning financial data):

9.10.1 be able to perform all such functions in both the national currency of the United Kingdom and in Euros;

9.10.2 during any transition phase applicable to the United Kingdom, be able to deal with the dual denominations of the Euro and national currency of the United Kingdom;

9.10.3 recognise, accept, display and print all the Euro currency symbols and alphanumeric codes which may be adopted by any government and other European Union body in relation to the Euro;

9.10.4 incorporate protocols for dealing with rounding and currency conversion;

9.10.5 recognise data expressed in, and express any output data in, the national currency of the United Kingdom and the Euro; and

9.10.6 permit the input of data in Euros and display an outcome in Euros where such data, supporting **tie's** normal business practices, operates in Euros and/or the national currency in the UK.

9.11 Any malfunction or non-interopability of Free Issue Fare Collection Equipment or failure of **tie** or any **tie** Party to provide such Free Issue Fare Collection Equipment in accordance with the Programme shall be a Compensation Event under this Agreement provided that, in the case of malfunction or non-interopability Infraco has installed the equipment in accordance with the Employer's Requirements and the manufacturer's specifications. For the avoidance of doubt any instruction to remove or replace Free Issue Fare Collection Equipment shall be a **tie** Change provided such malfunction or non-interoperability has not been caused by the Infraco.

Availability of Trams and other goods and materials

9.12 Subject to the Tram Supplier transferring title to the Trams to CEC pursuant to the Tram Supply Agreement, and subject to Clause 90 (Termination on Infraco Default) **tie** shall, and shall procure that CEC shall, not take any action which would interfere with Infraco and the Infraco Parties use in the performance of the Infraco's obligations under this Agreement of the Trams and any materials, goods, and equipment in which title has passed to **tie** or CEC pursuant to this Agreement or the Tram Supply Agreement being available to the Infraco and the Infraco Parties for use in the performance of the Infraco's obligations under this Agreement.

10. DEVELOPMENT, REVIEW AND FINALISATION OF THE DELIVERABLES

10.1 The Infraco shall develop and finalise the Deliverables in accordance with the Programme and this Agreement, and **tie** shall review the Deliverables and procure that CEC reviews the

Deliverables (which shall include any amendment to any Submitted Item) in accordance with Schedule Part 14 (*Review Procedure and Design Management Plan*).

10.2 The Infraco shall submit any Deliverables associated with any Permitted Variations to **tie's** Representative for review pursuant to Schedule Part 14 (*Review Procedure and Design Management Plan*).

10.3 The Infraco shall allow **tie's** Representative, at any reasonable time, a reasonable opportunity to view any Deliverable at any stage of development, and this opportunity shall be made available to **tie's** Representative as soon as reasonably practicable following receipt of any written request from **tie's** Representative.

10.4 The Infraco shall establish and maintain an extranet which **tie**, any **tie** Parties and any other party reasonably required by **tie** may access remotely by computer (through an appropriate login/security regime) to view any Deliverables including any drawings comprised within the Deliverables and electronically store and/or print copies of such Deliverables.

10.5 The Infraco shall ensure that the Programme shall set out (and shall continue to set out) the manner and timing of each phase of the development and production of the Deliverables, the identity (where known) of the party producing the Deliverables, the order in which each Deliverable is to be submitted for review in accordance with the Review Procedure and the programme for uploading the Deliverables onto the extranet in accordance with Clause 10.3. , If at any time, **tie** considers that the Programme will not allow completion of the Infraco Works in accordance with this Agreement, then the Infraco shall make such adjustments as are necessary for that purpose.

10.6 The Infraco may, as necessary, update such Programme and shall submit the same from time to time to **tie's** Representative so that **tie** has at least 10 Business Days' notice (or such shorter period as may be agreed between the Parties) of any revision to the periods shown in the previous Programme and the Infraco shall submit to **tie's** Representative five copies of each draft Deliverable in hard copy form and one copy in agreed soft copy form (as appropriate to the format of the deliverable) no later than the end of the period shown in the Programme for that Deliverable.

10.7 Where **tie's** Representative does not consider that **tie** will be able to comply with the periods specified in Schedule Part 14 (*Review Procedure and Design Management Plan*) for indicating 'no objection' status or the making of objections in relation to any Deliverable because of the volume of documents to be received in accordance with the Submittal Programme, either the provisions of paragraph 1.4 of Schedule Part 14 (*Review Procedure and*

Design Management Plan) shall apply or **tie** may introduce an alternative timetable and the Infraco shall comply with such alternative timetable. Provided that, where **tie** is unable to comply with the time periods set out in Schedule Part 14 (*Review Procedure and Design Management Plan*) and such inability is not due to any breach of the Programme or this Agreement, omission or fault on the part of the Infraco, the introduction of an alternative timetable shall be a **tie** Change and the terms of Clause 80 (**tie** *Changes*) shall apply.

10.8 During the preparation of the Deliverables, **tie** and/or **tie's** Representative shall at its absolute discretion be entitled to call for a meeting to discuss the development of any Deliverable, and the Infraco shall give due consideration to any comments made by **tie** or **tie's** Representative at any such meetings. As soon as reasonably practicable following any such meeting, the Infraco will prepare and circulate to those attending the meeting, a report listing the Deliverables discussed and any comments made at such meeting.

10.9 If it should be found that any Deliverable does not fulfil the requirements of this Agreement, or the needs of any Approval Bodies, the Infraco shall amend the Deliverable. Such amendment shall be at the Infraco's cost except where such amendment is required in order for the Deliverable to meet the requirements of any Approval Bodies, where such requirements are:

10.9.1 inconsistent with or in addition to the Infraco Proposals or the Employer's Requirements;

10.9.2 not reasonable given the nature of the Approval Body; or

10.9.3 not reasonably foreseeable within the context of the Infraco's Proposals or the Employer's Requirements,

in which case such amendment shall be a Mandatory **tie** Change. All such amendments shall be made in accordance with Schedule Part 14 (*Review Procedure and Design Management Plan*) and shall ensure that the Deliverable shall satisfy the requirements of this Agreement and any Approval Bodies.

10.10 The Infraco shall provide **tie** with all Deliverables in accordance with the terms of this Agreement and where no timescale for provision of such Deliverables is specified in the Programme, such Deliverables shall be provided to **tie** as soon as reasonably practicable. The Infraco shall provide to **tie**, at no cost to **tie**, five copies of the agreed Deliverables in hard copy form and one copy in an agreed soft copy form (as appropriate to the format of the Deliverables).

10.11 In respect of any further copies of a particular Deliverable which **tie** may require, **tie** shall pay the Infraco the reasonable copying charges or other reasonable charges for the provision of the same to **tie**.

10.12 Subject to Infraco's express rights under this Agreement, the Infraco accepts all risks arising from any conflicts, ambiguities, discrepancies, errors or omissions that subsequently appear within or between any of the Deliverables, and the Infraco shall not be entitled to make any claim against **tie** for an extension of time, payment or otherwise in respect of any such conflicts, ambiguities, discrepancies, errors or omissions.

10.13 The Infraco shall within 12 Business Days notify **tie** upon becoming aware of any conflicts, ambiguities, discrepancies, errors or omissions within or between any of the Deliverables. Where there are any conflicts, ambiguities, discrepancies, errors or omissions, the Infraco shall provide with any such notification, its proposals for resolving such conflicts, ambiguities, discrepancies, errors or omissions in compliance with this Agreement. Such proposals could include the suggestion that no action is required. The Infraco shall proceed with its proposals to resolve any such conflicts, ambiguities, discrepancies, errors or omissions as soon as reasonably practicable. If the proposal from the Infraco is that no action is required or **tie** does not agree with the action proposed by the Infraco, **tie** may notify the Infraco, within 8 Business Days of the Infraco's notice, to resolve any conflicts, ambiguities, discrepancies, errors or omissions in a different manner (which notification shall be binding on the Infraco and shall be deemed to be instructions in accordance with Clause 34.1, but shall be reasonable in time and cost having regard to the Employer's Requirements).

10.14 The Infraco shall ensure that all Deliverables comply with the document control requirements specified at paragraph 3.1.2.1 of part A, and paragraph 3.1.2.1 of part B, of Schedule Part 3 (*Code of Construction Practice and Code of Maintenance Practice*).

10.15 The Infraco shall keep on Site or in the office or offices established pursuant to Clause 10.16 one copy (in paper or electronic format) of all drawings for construction and of all specifications and the same shall at all reasonable times be available for inspection and use by **tie's** Representative and by any other person authorised by it.

10.16 The Infraco shall establish at the Site and/or elsewhere an office or offices which shall be staffed during all normal business hours and at which shall be kept a complete, up-to-date and orderly documentary record of the performance of the Infraco Works, all transactions entered into by the Infraco in relation to any potential or actual Permitted Variations and information (including any transactional information) in relation to any claims for additional costs or expenses from the Infraco to **tie** arising in accordance with the terms of this Agreement

(including Compensation Events). To the extent necessary to verify any claim made by the Infraco under this Agreement, **tie**, **tie's** Representative or their duly authorised representatives shall during all normal business hours be permitted to inspect the same and to take copies and to use such copying facilities as are maintained at the place where the records are kept.

10.17 The Parties shall adhere to the requirements of the Design Management Plan in terms of timescales, packaging, sequencing and provision of information to support the design approval process.

10.18 If the Parties agree to and, following such agreement, **tie** instructs an early release of Issued for Construction Drawings, any subsequent changes required to such Issued for Construction Drawings which arise from the later stages of the Review Procedure shall be instructed as necessary by **tie** and implemented by the Infraco (and the SDS Provider) without a **tie** Change, save where the aggregate costs of any such changes exceeds one million, five hundred thousand pounds (£1,500,000) in which event such change shall be instructed as a Mandatory **tie** Change (provided that there will be no such Mandatory **tie** Change or inclusion of costs in the above cap where the change to the Issued for Construction Drawings is required as a consequence of the SDS Provider or the Infraco being in breach of their obligations in respect of design content or quality pursuant to the SDS Agreement or this Agreement).

PART 3 - NOVATION OF SDS AGREEMENT, TRAM SUPPLY AGREEMENT AND TRAM MAINTENANCE AGREEMENT, AND PROVISION OF TRAM MAINTENANCE SERVICES

11. NOVATION OF THE SDS AGREEMENT TO THE INFRACO

11.1 **tie** has entered into the SDS Agreement with the SDS Provider. It is one of the conditions precedent to this Agreement coming into full effect that the Infraco shall enter into and execute a novation agreement with **tie** and the SDS Provider in the form set out in Schedule Part 23 (*SDS Novation Agreement*). **tie** shall execute and shall procure the execution by the SDS Provider of such novation agreement.

11.2 On the last date of execution of the novation agreement referred to in Clause 11.1, **tie** and the Infraco shall execute a collateral warranty agreement from the SDS Provider which is in favour of **tie** in the form contained in Schedule Part 24 (*SDS Collateral Warranty in favour of **tie***).

11.3 The Infraco shall procure that the SDS Provider shall carry out and complete the SDS Services in accordance with the SDS Agreement. To the extent that the SDS Services are and have been carried out and completed in accordance with the SDS Agreement, Infraco will be deemed to

have complied with its obligations under this Agreement to procure that the SDS Provider in its capacity as an Infraco Party complies with the requirements of this Agreement.

11.4 The Infraco shall carry out all required management activities in order to manage the performance of the SDS Services and, subject to any express limitations or rights in relation to the performance of the SDS Services in this Agreement, the Infraco shall be wholly liable for the performance of the SDS Services.

11.5 The Infraco shall not amend the SDS Agreement (including the SDS Services) without the prior written approval of **tie** (such approval not to be unreasonably withheld or delayed) provided that **tie's** consent shall be deemed to have been given in relation to any amendment to the SDS Agreement (including the SDS Services) which is directly required as a result of any Permitted Variation in so far as such amendment has been raised by the Infraco as part of the process of approving such Permitted Variation in accordance with this Agreement.

11.6 As reasonably required by **tie**, the Infraco shall procure the attendance of the SDS Provider at any meeting in relation to the Infraco Works.

11.7 Subject to the provisions of the SDS Agreement, the Infraco shall use reasonable endeavours to procure that the SDS Provider shall perform any additional services which may be required and specifically instructed by **tie** in respect of the Edinburgh Tram Network and the requirement for any additional services shall be a **tie** Change in accordance with Clause 80 (**tie** *Changes*).

11.8 The Infraco shall not terminate in full the appointment of the SDS Provider without the prior written approval of **tie**, such approval not to be unreasonably withheld. If **tie** approves any such termination, a replacement designer shall be proposed by the Infraco in accordance with Clause 28 (*Sub-Letting and the Appointment of Sub-Contractors*).

11.9 If required by **tie,** on termination or expiry of this Agreement, the Infraco shall novate, assign or otherwise transfer the whole of the SDS Agreement as directed by **tie,** to:

11.9.1 **tie,** the Scottish Ministers, TEL, CEC, Transport Scotland or their successors with no worse financial standing than that of **tie**; or

11.9.2 to any other person whose obligations under the SDS Agreement are unconditionally and irrevocably guaranteed by a person falling within Clause 11.9.1.

In the case of such a novation or assignation, the Infraco shall be entitled, and **tie** shall assist the Infraco, to obtain a collateral warranty from the SDS Provider.

12. NOVATION OF THE TRAM SUPPLY AGREEMENT TO THE INFRACO

12A **tie** intends to enter into or has entered into a tram supply agreement with the Tram Supplier. It is one of the conditions precedent to this Agreement coming into full effect that the Infraco shall enter into and execute a novation agreement with **tie** and the Tram Supplier in the form set out in Schedule Part 17 (*Tram Supply Novation Agreement*). **tie** shall execute (if not already executed), and shall procure the execution by the Tram Supplier (if not already executed) of such novation agreement and the Tram Supply Agreement.

12.1 On the last date of execution of the novation agreement referred to in Clause 12A, **tie** and the Infraco shall, and the Infraco shall procure that the Tram Supplier shall, execute a collateral warranty agreement in favour of **tie** in the form contained in Schedule Part 18 (*Tram Supply Collateral Warranty in favour of **tie***) and the Infraco shall provide the same as executed to **tie** on that date.

12.2 The Infraco shall procure that the Tram Supplier shall carry out and complete the Tram Supply Obligations in accordance with the Tram Supply Agreement.

12.3 The Infraco shall carry out all required management activities in order to manage the performance of the Tram Supply Obligations subject to any express limitations in this Agreement and the Infraco shall be wholly liable for the performance of the Tram Supply Obligations.

12.4 The Infraco shall not amend the Tram Supply Agreement (including the Tram Supply Obligations) without the prior written approval of **tie** (such approval not to be unreasonably withheld or delayed) provided that **tie's** consent shall be deemed to have been given in relation to any amendment to the Tram Supply Agreement (including the Tram Supply Obligations) which is directly required as a result of any Permitted Variation in so far as such amendment has been raised by the Infraco as part of the process of approving such Permitted Variation in accordance with this Agreement.

12.5 As reasonably required by **tie**, the Infraco shall procure the attendance of the Tram Supplier at any meeting in relation to the Infraco Works.

12.6 Subject to the provisions of the Tram Supply Agreement, the Infraco shall use reasonable endeavours to procure that the Tram Supplier shall supply any additional Trams and/or spare parts and provide any additional services, which are required by **tie** in respect of the Edinburgh Tram Network and the requirement for any additional supply and/or services shall be a **tie** Change in accordance with Clause 80 (**tie** *Changes*).

12.7 Within 5 Business Days of becoming aware that the Tram Supplier's continuing defective performance under the Tram Supply Agreement entitles, or is likely to entitle, the Infraco to serve a termination notice pursuant to the Tram Supply Agreement or entitles or is likely to entitle **tie** to serve a termination notice pursuant to this Agreement, the Infraco shall notify **tie**, such notification to include:

12.7.1 a statement that the Infraco has, or is likely to have, an entitlement to serve a termination notice on the Tram Supplier pursuant to the Tram Supply Agreement;

12.7.2 the basis for and an explanation of the circumstances justifying such entitlement to serve the termination notice;

12.7.3 the actions, if any, that the Infraco has been able to take to rectify the Tram Supplier's defective performance;

12.7.4 the Infraco's proposal to deliver the Infraco Works with an alternative Tram Supplier or methodology for procuring an alternative Tram Supplier; and

12.7.5 any obligations Infraco is prevented from or restricted in performing.

12.8 **tie** shall review the Infraco's notification and within 5 Business Days **tie** shall respond to the Infraco stating that:

12.8.1 it consents to the termination of the Tram Supply Agreement; or

12.8.2 it wishes to agree a comprehensive plan which will have as its objective sustainable rectification (measured against agreed programme and production criteria over a set period) of the Tram Supplier's poor performance (the "**Tram Supply Rectification Plan**").

12.9 If **tie** notifies the Infraco of its intention to agree a Tram Supply Rectification Plan in accordance with Clause 12.8 above, the Parties, in such consultation with the Tram Supplier as the Parties may agree, shall negotiate in good faith and use their reasonable endeavours to agree the Tram Supply Rectification Plan, which shall set out:

12.9.1 the actions required to be taken by each of **tie**, the Infraco and the Tram Supplier in order to achieve the sustainable rectification (measured against an agreed revised programme and production criteria over a set period) of the Tram Supplier's poor performance;

12.9.2 any specific alternative terms or modifications to the terms of the Tram Supply Agreement;

12.9.3 any specific alternative terms or modifications to the terms of this Agreement;

such that neither Infraco or the Tram Supplier will be in breach of the Tram Supply Agreement or this Agreement if the Tram Supplier performs at that level.

12.10 If the Parties cannot agree the Tram Supply Rectification Plan within 60 Business Days of **tie** notifying the Infraco under Clause 12.9, then the Infraco shall be entitled to serve a termination notice on the Tram Supplier.

12.11 If **tie** notifies Infraco that it consents to the termination of the Tram Supply Agreement the Parties shall meet and agree in good faith a plan (the "**Tram Supply Termination Plan**") for the procurement of a replacement Tram Supplier, including agreement in relation to:

12.11.1 the timing of termination of the Tram Supply Agreement;

12.11.2 interim arrangements for the provision of services provided under the Tram Supply Agreement whilst a replacement Tram Supplier is being procured;

12.11.3 changes (if any) to be made to the Tram Supply Agreement for the re-procurement and consequential amendments to this Agreement as a result;

12.11.4 actions of **tie** and Infraco required to complete the procurement and the programme for implementing the procurement.

12.12 If **tie** notifies the Infraco that it wishes to agree a Tram Supply Rectification Plan or that it consents to the termination of the Tram Supply Agreement, provided that the Infraco is not in breach of any of its obligations regarding payment for the supply of Trams, the Infraco's obligations (including the application of liquidated damages for delay in the supply of Trams or as a result of a delay in the supply of Trams) specifically relating to the supply of Trams under this Agreement or which Infraco may be prevented in performing as a result of the Tram Supplier's failure to perform under the Tram Supply Agreement shall be suspended from the date Infraco serves a notice under Clause 12.7 until the Tram Supply Rectification Plan is agreed or a replacement Tram Supplier is appointed. Negotiation and implementation of a Tram Supply Rectification Plan or Tram Supply Termination Plan, shall be a **tie** Change under Clause 80 (**tie** *Changes*).

12.13 Amendments to this agreement agreed as part of a Tram Supply Rectification Plan or Tram Supply Termination Plan will be a Mandatory **tie** Change under this Agreement.

12.14 Under no circumstances shall the Infraco serve any notice to terminate the Tram Supply Agreement until such time as either:

12.14.1 **tie** has notified Infraco of its approval to such termination pursuant to Clause 12.8 above; or

12.14.2 the Parties have not been able to agree the Tram Supply Rectification Plan pursuant to Clause 12.9 above.

12.15 If required by **tie,** on termination or expiry of this Agreement, the Infraco shall novate, assign or otherwise transfer the whole or any part of the Tram Supply Agreement, as directed by **tie**, to:

12.15.1 **tie,** the Operator, the Scottish Ministers, TEL, CEC, Transport Scotland or their successors with no worse financial standing than that of **tie**; or

12.15.2 to any other person whose obligations under the Tram Supply Agreement are unconditionally and irrevocably guaranteed by a person falling within Clause 12.15.1.

In the case of such a novation or assignation, the Infraco shall be entitled, and **tie** shall assist the Infraco, to obtain a collateral warranty from the Tram Supplier.

13. NOVATION OF THE TRAM MAINTENANCE AGREEMENT TO THE INFRACO

13.1 **tie** intends to enter into or has entered into a tram maintenance agreement with the Tram Maintainer. It is one of the conditions precedent to this Agreement coming into full effect that the Infraco shall enter into and execute a novation agreement with **tie**, and the Tram Maintainer in the form set out in Schedule Part 20 (*Tram Maintenance Novation Agreement*). **tie** shall execute (if not already executed), and shall procure the execution by the Tram Maintainer (if not already executed) of such novation agreement and the Tram Maintenance Agreement.

13.2 On the last date of execution of the novation agreement referred to in Clause 13.1, **tie** and the Infraco shall, and the Infraco shall procure that the Tram Maintainer shall, execute a collateral warranty agreement in favour of **tie** in the form contained in Schedule Part 21 (*Tram Maintenance Collateral Warranty in favour of **tie***) and the Infraco shall provide the same as executed to **tie** on that date.

13.3 The Infraco shall procure that the Tram Maintainer shall carry out and complete the Tram Maintenance Services in accordance with the Tram Maintenance Agreement.

13.4 The Infraco shall carry out all required management activities in order to manage the performance of the Tram Maintenance Services and, subject to any express limitations in this Agreement, the Infraco shall be wholly liable for the performance of the Tram Maintenance Services.

13.5 The Infraco shall not amend the Tram Maintenance Agreement (including the Tram Maintenance Services) without the prior written approval of **tie** (such approval not to be unreasonably withheld or delayed) provided that **tie's** consent shall be deemed to have been given in relation to any amendment to the Tram Maintenance Agreement (including the Tram Maintenance Services) which is directly required as a result of any Permitted Variation in so far as such amendment has been raised by the Infraco as part of the process of approving such Permitted Variation in accordance with this Agreement.

13.6 As reasonably required by **tie**, the Infraco shall procure the attendance of the Tram Maintainer at any meeting in relation to the Infraco Works.

13.7 Subject to the provisions of the Tram Maintenance Agreement, the Infraco shall use reasonable endeavours to procure that the Tram Maintainer shall supply any additional spare parts and/or perform any additional services which are required by **tie** in respect of the Edinburgh Tram Network and the requirement for any additional supply and/or services shall be a **tie** Change in accordance with Clause 80 (**tie** *Changes*).

13.8 Within 5 Business Days of becoming aware that the Tram Maintainer's continuing defective performance under the Tram Maintenance Agreement entitles, or is likely to entitle, the Infraco to serve a termination notice pursuant to the Tram Maintenance Agreement or entitles or is likely to entitle **tie** to serve a termination notice pursuant to this Agreement, the Infraco shall notify **tie**, such notification to include:

13.8.1 a statement that the Infraco has, or is likely to have, an entitlement to serve a termination notice on the Tram Maintainer pursuant to the Tram Maintenance Agreement;

13.8.2 the basis for and an explanation of the circumstances justifying such entitlement to serve the termination notice;

13.8.3 the actions, if any, that the Infraco has been able to take to rectify the Tram Maintainer's defective performance;

13.8.4 the Infraco's proposal to deliver the Infraco Works with an alternative Tram Maintainer or methodology for procuring an alternative Tram Maintainer; and

13.8.5 any obligations Infraco is prevented from or restricted in performing.

13.9 **tie** shall review the Infraco's notification and within 5 Business Days **tie** shall respond to the Infraco stating that:

13.9.1 it consents to the termination of the Tram Maintenance Agreement; or

13.9.2 it wishes to agree a comprehensive plan which will have as its objective sustainable rectification (measured against agreed programme and production criteria over a set period) of the Tram Maintainer's poor performance (the "**Tram Maintenance Rectification Plan**").

13.10 If **tie** notifies the Infraco of its intention to agree a Tram Maintenance Rectification Plan in accordance with Clause 13.9 above, the Parties, in such consultation with the Tram Maintainer as the Parties may agree, shall negotiate in good faith and use their reasonable endeavours to agree the Tram Maintenance Rectification Plan, which shall set out:

13.10.1 the actions required to be taken by each of **tie**, the Infraco and the Tram Maintainer in order to achieve the sustainable rectification (measured against an agreed revised programme and production criteria over a set period) of the Tram Maintainer's poor performance;

13.10.2 any specific alternative terms or modifications to the terms of the Tram Maintenance Agreement;

13.10.3 any specific alternative terms or modifications to the terms of this Agreement;

such that neither Infraco or the Tram Maintainer will be in breach of the Tram Maintenance Agreement or this Agreement if the Tram Maintainer performs at that level.

13.11 If the Parties cannot agree the Tram Maintenance Rectification Plan within 60 Business Days of **tie** notifying the Infraco under Clause 13.9, then the Infraco shall be entitled to serve a termination notice on the Tram Maintainer.

13.12 If **tie** notifies Infraco that it consents to the termination of the Tram Maintenance Agreement the Parties shall meet and agree in good faith a plan (the "**Tram Maintenance Termination Plan**") for the procurement of a replacement Tram Maintainer, including agreement in relation to:

13.12.1 the timing of termination of the Tram Maintenance Agreement;

13.12.2 interim arrangements for the provision of services provided under the Tram Maintenance Agreement whilst a replacement Tram Maintainer is being procured;

13.12.3 changes (if any) to be made to the Tram Maintenance Agreement for the re-procurement and consequential amendments to this Agreement as a result; and

13.12.4 actions of **tie** and Infraco required to complete the procurement and the programme for implementing the procurement.

13.13 If **tie** notifies the Infraco that it wishes to agree a Tram Maintenance Rectification Plan or that it consents to the termination of the Tram Maintenance Agreement, provided that the Infraco is not in breach of any of its obligations regarding payment for the maintenance of Trams, the Infraco's obligations (including the application of liquidated damages for delay in the maintenance of Trams or as a result of a delay in the maintenance of Trams) specifically relating to the maintenance of Trams under this Agreement or which Infraco may be prevented in performing as a result of the Tram Maintainer's failure to perform under the Tram Maintenance Agreement shall be suspended from the date Infraco serves a notice under Clause 13.8 until the Tram Maintenance Rectification Plan is agreed or a replacement Tram Maintainer is appointed. Negotiation and implementation of a Tram Maintenance Rectification Plan or Tram Maintenance Termination Plan, shall be a **tie** Change under Clause 80 (**tie** *Changes*).

13.14 Amendments to this agreement agreed as part of a Tram Maintenance Rectification Plan or Tram Maintenance Termination Plan will be a Mandatory **tie** Change under this Agreement.

13.15 Under no circumstances shall the Infraco serve any notice to terminate the Tram Maintenance Agreement until such time as either:

13.15.1 **tie** has notified Infraco of its approval to such termination pursuant to Clause 13.9 above; or

13.15.2 the Parties have not been able to agree the Tram Maintenance Rectification Plan pursuant to Clause 13.10 above.

13.16 If required by **tie,** on termination or expiry of this Agreement, the Infraco shall novate, assign or otherwise transfer the whole or any part of the Tram Maintenance Agreement as directed by **tie**, to:

13.16.1 **tie,** the Operator, the Scottish Ministers, TEL, CEC, Transport Scotland or their successors with no worse financial standing than that of **tie**; or

13.16.2 to any other person whose obligations under the Tram Maintenance Agreement are unconditionally and irrevocably guaranteed by a person falling within Clause 13.16.1.

In the case of such a novation or assignation, the Infraco shall be entitled, and **tie** shall assist the Infraco, to obtain a collateral warranty from the SDS Provider.

14. TIE'S OBLIGATIONS

tie shall carry out and complete or procure the carrying out and completion of the works set out in Schedule Part 26 (***tie** Obligations*) (by no later than the date Infraco requires such works to be completed to allow it to comply with the Programme and achieve the Sectional Completion Dates by the Planned Sectional Completion Dates). Should **tie** fail to carry out these obligations in accordance with the Programme, such failure shall be deemed to be a Notified Departure.

PART 4 - INTERFACES

15. LOCAL CODES OF CONSTRUCTION PRACTICE

15.1 In the event that **tie** requires to establish a Local Code of Construction Practice, the Infraco shall:

15.1.1 provide **tie** with all reasonable assistance required by **tie** in establishing such Local Code of Construction Practice;

15.1.2 provide **tie** with all reasonable assistance required by **tie** in the identification and settlement of any issues that such party requires **tie** to take account of in such Local Code of Construction Practice and

15.1.3 provide **tie** with method statements for the execution of the Infraco Works that are relevant to the establishment of such Local Code of Construction Practice.

15.2 If compliance with Clause 15.1.1 or 15.1.2 or implementation of the Infraco Works in accordance with any Local Code of Construction Practice, causes any delay in the completion of the Infraco Works, or disruption to the Infraco's construction methodology or the Infraco to incur additional cost, such compliance or implementation shall be a Compensation Event to which Clause 65 applies.

15.3 If, in implementing the Infraco Works under any such Local Code of Construction Practice, the Infraco's performance against the Programme, its productivity, or its construction methodology has improved then this shall be a **tie** Change under Clause 80 (***tie*** *Changes*).

16. INTERFACE WITH NETWORK RAIL

16.1A The Infraco acknowledges that **tie** will enter into the Asset Protection Agreement with Network Rail in relation to the Edinburgh Tram Network.

16.1B The Infraco undertakes to comply with its obligations in relation to Clauses 16.1 to 16.73 (inclusive).

16.1 For the purposes of this Clause 16, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**APA Commencement Date**" means the last date of execution of the Asset Protection Agreement;

"**APA Consent**" means all approvals, permissions, consents, licences, certificates, registrations and authorisations (whether statutory or otherwise) which are required from time to time for the purposes of carrying out the APA Works, including such required in order to comply with any law and, for the avoidance of doubt, any consent required in respect of any Regulated Change shall be a **tie** Consent whilst any consent required from any third party to enter and remain upon that third party's land shall be dealt with under Clause 18 (*Land Consents, Permanent Land and Temporary Sites*);

"**APA Deliverable**" means any Deliverable relating to the design and construction of the APA Works;

"**APA Works Programme**" means the programme for the carrying out and completion of the APA Works;

"**APA Works**" **means** that part of the Infraco Works which are included in "the Works" as defined in the Asset Protection Agreement;

"**Bridge Agreement(s)**" means the respective agreements to be entered into between Network Rail and CEC and/or **tie** relating to the maintenance and responsibility for the bridges carrying the Edinburgh Tram Network over the Network at Carrick Knowe and Edinburgh Park;

"**Contractor's Assurance Case**" has the meaning given to that term in standard RT/LS/P/016;

"**Direct Costs**" **means** direct costs reasonably incurred by Network Rail in relation to the Edinburgh Tram Network which, for the avoidance of doubt, excludes any loss of production, loss of profit, loss of revenue, loss of contracts or any indirect or consequential loss;

"**Group Standards**" **means:**

(a) technical standards to which railway assets or equipment used on or as part of the Network must conform; and

(b) operating procedures with which the operators of railway assets must comply,

in each case as issued by the Rail Safety and Standards Board Limited and authorised pursuant to the Railway Group Standard Code;

"**Interfacing Project**" means the Airdrie-Bathgate Railway and Linked Improvements Project, the Edinburgh to Glasgow Electrification Project and any Edinburgh to Glasgow Route Enhancements or maintenance and renewals activities on the Network adjacent to the areas of the APA Works notified by Network Rail to **tie** on or before the date of the Asset Protection Agreement;

"**Network**" means the railway network of which Network Rail is the facility owner (as defined in section 17(6) of the Act);

"**Network Licence**" means the licence to operate the Network granted to Network Rail pursuant to section 8 of the Act;

"**Network Operation Issue**" shall have the meaning ascribed to it in the Asset Protection Agreement;

"**Network Rail Standard**" means a standards document (or the equivalent of such document) issued by Network Rail for its own use as amended by Network Rail from time to time in relation to the Network as a whole which applies to the performance of the APA Works;

"**Possession**" means planned safety arrangements which control or prevent the normal movement of rail traffic on the Network between defined locations and for a pre-defined period (including any speed restrictions);

"**Railway**" means the Network and Network Rail's operation of it;

"**Regulated Change**" shall have the meaning ascribed to it in the Asset Protection Agreement;

"**Sector**" means any one of the sectors A to N forming part of the APA Works and identified in Schedule 1 (*Functional Specification*) of the Asset Protection Agreement;

"**Stage Gate Four**" means the approval stage reached following Network Rail's Guide to Railway Investment Projects when approval in principal is required, as may be amended from time to time;

"**Standards**" means Group Standards, Network Rail Standards and any equivalent standards or any standards replacing or superseding any of them;

"**Taking Into Use**" means the act of taking into use of the APA Works or part thereof, and the taking out of use of other assets by Network Rail on the basis that Network Rail is satisfied that the assets in question have been inspected, tested and commissioned, as applicable, in accordance with the requirements set out in the Asset Protection Agreement and "Take Into Use" and "Taken Into Use" shall be construed accordingly;

"**Works Commencement Date**" means the latest of:

(a) the APA Commencement Date;

(b) the date upon which all APA Consents (subject to any waivers agreed between the **tie** and Network Rail) have been obtained;

(c) the date of completion of any preliminary works required to be carried out pursuant to Clause 3 of the Asset Protection Agreement;

(d) the date on which all the requirements of Clauses 7.4 (other than Clauses 7.4.3 and 7.4.6 to 7.4.9) and 9.2.1 of the Asset Protection Agreement have been satisfied; and

(e) the date of receipt of evidence confirming that CEC has taken out or has procured that **tie** has taken out the insurances required pursuant to the Asset Protection Agreement

and, for the purposes of paragraph (b) above, the requirement to obtain APA Consents in respect of the Regulated Change process is waived to the extent which will enable works commencement in respect of those Sectors which do not form part of the subject matter of the Regulated Change. Such APA Consents must be obtained prior to works commencement in respect of those Sectors which are the subject matter of the Regulated Change;

16.2 The Infraco acknowledges that, in relation to the APA Works, any consent, approval or agreement which is sought by or from **tie** or Network Rail shall be construed as requiring that such consent, approval or agreement shall not be unreasonably delayed or withheld. The

Infraco further acknowledges that Network Rail retains all discretion in relation to safety issues, and that nothing in the Asset Protection Agreement shall require Network Rail to give or procure the giving of any consent or approvals which are contrary to safety or the efficient operation of the railway or which would put Network Rail in breach of the law, the Network Licence or any Standard (subject to Clause 16.20). Where the Infraco has acted in compliance with the terms of the Infraco Contract, any such exercise of discretion by Network Rail which causes delay to the APA Works shall be a Compensation Event.

16.3 For the avoidance of doubt, where an APA Consent requires that a new agreement (arising after the Effective Date) is entered into with a third party, a **tie** Change will be required where the obligations under such agreement are to be treated as Third Party Obligations;

16.4 The Infraco shall provide **tie** with all reasonable assistance (which, for the avoidance of doubt, shall not include the provision of any undertakings, guarantees, collateral warranties (save as otherwise required under this Agreement) or indemnities) and such documentation as may be reasonably required by **tie** in relation to any Regulated Change process in respect of the Edinburgh Tram Network.

16.5 Prior to the commencement of the APA Works, the Infraco shall take all measures and carry out such protective works as may be necessary to protect the safety and continuity of the Railway or to protect any property belonging to Network Rail against instability or physical damage from anticipated ground movement due to the construction of the APA Works, or to prevent, address, alleviate or comply with any Network Operation Issue.

16.6 The Infraco shall produce construction methodology for and undertake measures during the execution of the Infraco Works which will minimise ground movement so far as is reasonably practicable and avoid ground movement which may be anticipated to cause physical damage (other than damage of a superficial nature) to property of Network Rail. If the Infraco anticipates that any Infraco Works, including ground consolidation works or soil movement is likely to cause such damage, it shall notify **tie** accordingly. The Infraco shall consult with **tie** in respect of the measures necessary to be taken and shall implement such required measures, such implementation to be at the cost of the Infraco.

16.7 The Infraco acknowledges that Network Rail may, following any safety incident in respect of the railway, take immediate action to rectify the safety issue. The Infraco shall not impede or interrupt Network Rail from undertaking such actions where such actions are in accordance with the Asset Protection Agreement. The Infraco shall immediately notify **tie** of any Network Rail proposal, action, or attempt to interrupt the APA Works or take any such action.

16.8 Subject to Clauses 16.72, 16.73, 77.2, 77.3, 77.7 and 77.8, the Infraco shall reimburse **tie** in respect of any losses reasonably incurred as a result of the Infraco failing to adhere to the requirements of Clauses 16.4 to 16.6.

16.9 The Infraco acknowledges that Network Rail has undertaken to **tie** to provide reasonable access to land in which Network Rail has an interest prior to the APA Works Commencement Date solely for the purposes of:

16.9.1 carrying out site surveys relating to the works and any protective works required under Clause 16.4 to 16.6 above;

16.9.2 carrying out a conditions and defects survey in respect of those parts of Network Rail property which are specified by **tie**; and

16.9.3 storage of materials on those areas notified by **tie** to the Infraco.

16.10 The Infraco shall notify **tie** of any plant equipment or materials which are intended to be stored on Network Rail's land for the purposes of **tie** obtaining Network Rail's written approval to such storage. Any such storage shall be at the sole risk of the Infraco and the Infraco shall take such security measures as **tie** considers reasonably necessary to prevent such materials being used to vandalise the Railway.

16.11 Network Rail shall (save as referred to in this clause 16.11) at all times have unlimited access to the land in which it has an interest for the purposes of monitoring the APA Works or addressing Network Operation Issues. The Infraco and **tie** acknowledge that Network Rail's rights of access in terms of the Asset Protection Agreement are subject to Network Rail using reasonable endeavours not to interfere, hinder or obstruct the carrying out of the APA Works by the Infraco, and to complying with any relevant safety requirements, rules or regulations. The Infraco shall immediately notify **tie** where it considers that Network Rail is failing to adhere to any of these obligations and, upon such notification, **tie** shall act under the Asset Protection Agreement in seeking to procure that Network Rail will adhere to the obligations.

16.12 The Infraco shall promptly notify **tie** of any information in relation to the APA Works which is reasonably required to be obtained from Network Rail in order to carry out the APA Works. The Infraco shall be responsible for any delay arising as a result of its failure to identify and notify **tie** of the need for such information.

16.13 The Infraco and **tie** acknowledge that Network Rail shall carry out or procure the carrying out of its obligations under the Asset Protection Agreement:

16.13.1 in accordance with Legal Requirements (as defined in the Asset Protection Agreement) and such other statutory requirements and mandatory standards as may be applicable to the rail industry from time to time (including the Safety Case (as defined in the Asset Protection Agreement));

16.13.2 in accordance with the terms of any APA Consents;

16.13.3 in a timely, economic and efficient manner, having regard at any particular time to Network Rail's obligations, purposes and duties as operator, renewer, maintainer and developer of the Network;

16.13.4 with that degree of skill, diligence and prudence which should be exercised by a skilled and experienced network operator and owner; and

16.13.5 in accordance with and subject to the terms of the Asset Protection Agreement.

The Infraco and **tie** further acknowledge that the standards set out in Clauses 16.13.1 to 16.13.4 are in descending order of priority so that in the event of any conflict between two or more of such standards Network Rail's obligation will be to act in accordance with the standard listed higher above.

16.14 The Infraco shall immediately notify **tie** in the event that Network Rail acts in a way which is not in accordance with Network Rail's obligations as described in Clause 16.13, or is otherwise acting in a manner which is of concern to the Infraco and, upon such notification, **tie** shall act under the Asset Protection Agreement in seeking to procure that Network Rail will adhere to its obligations; **tie** shall immediately notify and provide details to the Infraco in the event of Network Rail notifying **tie** of it becoming aware of any matter which will prevent or impede the carrying out of the APA Works.

16.15 The Infraco shall respond as soon as reasonably practicable to any request by **tie** for documentation or assistance to assist Network Rail in obtaining any consent necessary for the APA Works.

16.16 The Infraco shall prepare any APA Deliverable submission in line with its APA Works Programme and shall notify **tie** not less than 25 Business Days prior to any such submission.

16.17 Upon submittal of any APA Deliverable in relation to the APA Works, the Infraco shall provide a list of the Standards, legal requirements and other guidance and codes of practice which it has complied with in preparing such APA Deliverable, and shall ensure that any further information, data and documents that are reasonably required by **tie** are provided as

soon as reasonably practicable. The Infraco shall comply with any procedures and requirements notified by **tie** to the Infraco from time to time in relation to the submittal of APA Deliverables, whether or not consistent with Clause 10 (*Development, Review, and Finalisation of the Deliverables*).

16.18 Where an APA Deliverable is returned by **tie** and receives full approval, the Infraco shall be entitled to proceed with APA Works as specified in the APA Deliverable. Where any APA Deliverable is approved with comments, the relevant APA Works may proceed after the Works Commencement Date subject to the inclusion of the comments, and the Infraco shall record the means of achieving compliance with such comments in writing and promptly submit this to **tie**. In the event that approval is not received in respect of the APA Deliverable, the Infraco shall not act upon the APA Deliverable, but shall amend the APA Deliverable in accordance with comments received and shall resubmit the same.

16.19 The Infraco shall not commence detailed design of any part of the APA Works until **tie** has confirmed to the Infraco that Network Rail has approved all relevant APA Deliverables.

16.20 The Infraco shall, and shall procure that each of its subcontractors shall, meet the requirements of Network Rail's Link Up Accreditation for all relevant classes of APA Works to be carried out by the Infraco or the particular subcontractor. The Infraco shall, when required by the Infraco, demonstrate that both it and its subcontractors hold the relevant certificate from Network Rail confirming that it and its subcontractor has a Contractor's Assurance Case.

16.21 The Infraco shall design, procure and carry out each element of the APA Works in accordance with all Standards as at the date that such element of the APA Works passes Stage Gate Four and any change of Standards for safety reasons thereafter or such derogations from the Standards as Network Rail and/or the relevant Approval Bodies may approve or consent to in writing. The Infraco shall design, procure and carry out the APA Works in accordance with the requirements which Network Rail are entitled to stipulate to **tie** under the Asset Protection Agreement.

16.22 The Infraco shall ensure that design of the APA Works is such as to enable construction of the APA Works in a manner which minimises disruption to the Railway and enables future construction or maintenance to be carried out on the rail Network and which, as far as is reasonably possible, minimises costs and disruption to the rail Network during construction or maintenance.

16.23 The Infraco shall meet with Network Rail and/or **tie** as may reasonably be required on reasonable notice during the Term in respect of matters to which clauses 7.2.5, 7.4.3 and 8.13

of the Asset Protection Agreement refer but only in the event and to the extent that the Infraco otherwise has ongoing obligations under the Infraco Contract in respect of such matters or as may be agreed between the Parties acting reasonably.

16.24 Prior to commencing the construction of the APA Works, the Infraco and each subcontractor shall produce a quality plan, environmental plan, and a safety plan specific to the APA Works in order to satisfy the requirements of achieving a Network Rail Contractor Assurance Case.

16.25 The Infraco shall prepare, in accordance with any reasonable requirements which **tie** may have, any documentation required by Network Rail to enable Network Rail to obtain Consents necessary for the APA Works. Any modification of the design and construction process necessary to secure such consents can be obtained shall be a **tie** Change save to the extent that the need for such modification arises due to a failure by the Infraco to anticipate the requirements in question in breach of Clause 7.1.

16.26 Where Network Rail obtain a consent necessary for the APA Works, **tie** shall supply the Infraco with copies of the approved drawings together with supporting design and check certificates and contract documents for the Infraco's use during the carrying out of the APA Works.

16.27 Where **tie** are obliged to obtain a consent necessary for the APA Works, the Infraco shall provide all reasonable assistance (which for the avoidance of doubt, shall not include the provision of any undertakings, guarantees, collateral warranties (save as otherwise required under this Agreement) or indemnities) to **tie** in obtaining consents for which **tie** are responsible (and in maintaining those consents during the Term but in that case only in so far as referable to the proper requirements of the Independent Competent Person or otherwise arising from a Bridge Agreement (following notification of execution by **tie** under Clause 16.55.4) to the extent that the Infraco is not relieved from such obligations under Clause 16.45, in circumstances where the need for and nature of such assistance ought reasonably to be anticipated in the exercise of the level of skill, care and diligence referred to in Clause 7.1.

16.28 Following completion of any Sector in relation to the APA Works, the Infraco shall remove from and leave such completed Sector clear of plant equipment and materials not reasonably required in respect of the ongoing obligations of the Infraco in respect of the APA Works and site thereof.

16.29 The Infraco shall ensure that, during the Term, neither it nor any of its subcontractors shall interfere with the availability of suitable access and egress rights into and from Haymarket Depot for all necessary purposes at all times to the reasonable satisfaction of Network Rail.

16.30 The Infraco shall not and shall not allow or permit or submit anything to be done by it or any of its subcontractors, which would adversely affect the continuous operation of train refuelling equipment and fuel tanks at Haymarket Depot. The Infraco shall ensure that, during the Term, neither it nor any of its subcontractors shall interfere with the safe and suitable access to such equipment and fuels tanks for all necessary purposes at all times to the reasonable satisfaction of Network Rail.

16.31 The Infraco shall ensure that all elements of the APA Works which relate to new or existing over-bridges, under-bridges and foot-bridges will comply with the Standards (subject to Clause 16.20) and the requirements of HMRI.

16.32 The Infraco shall, prior to the commencement of the APA Works, carry out a condition and defects survey in respect of the land coloured pink in the plans set out in Schedule Part 8 of the Asset Protection Agreement.

16.33 The Infraco shall submit an APA Works Programme for approval in principle by **tie** and Network Rail prior to the APA Works Commencement Date and shall do so sufficiently in advance of such date so as to allow **tie** and Network Rail a reasonable period in which to provide their approval. Such APA Works Programme shall include:

16.33.1 all submission dates for approval of APA Deliverables;

16.33.2 submission data work package plans;

16.33.3 the proposed detailed possession plan;

16.33.4 details of all survey works;

16.33.5 works inspection and testing plans;

16.33.6 take-over and commissioning plans;

16.33.7 details of interaction with any Interfacing Projects and how these will affect the programme; and

16.33.8 verification of the critical path activities.

tie acknowledges that Network Rail is obliged in terms of the Asset Protection Agreement to both act reasonably and to co-operate in the planning and development of an APA Works Programme.

16.34 If this APA Works Programme is not sufficiently developed prior to the APA Works Commencement Date for approval, the Infraco shall, as soon as reasonably practicable, submit a full APA Works Programme in compliance with Clause 16.32 above, and shall liaise with **tie** in respect of revising such APA Works Programme until it is approved. The Infraco shall use reasonable endeavours to ensure that it has minimised the disruptive possession requirements in consultation with **tie** and Network Rail. The Infraco shall undertake the arrangements reasonably required by **tie** in respect of the interface of the APA Works with the Interfacing Projects through the agreed point(s) of contact notified by **tie.** The Infraco shall comply with the reasonable requirements of **tie** in respect of the procurement of necessary resources to facilitate the use of possessions on the dates identified in the APA Works Programme (as updated from time to time in accordance with this Clause 16 (*Interface with Network Rail*)).

16.35 The Infraco shall, where required by **tie**, produce a revised programme and possession dates where it becomes clear, in consultation with **tie**, that in the reasonable opinion of **tie** the progress of the APA Works is not sufficient to meet the previously agreed programme and possessions timetable.

16.36 The Infraco shall act with all due expedition in relation to consultation and development of plans which will affect the time table for Possessions. In the event that the Infraco is responsible for any delay which renders any Possession obsolete or insufficient for the purposes of the APA Works, the Infraco shall reimburse **tie** for all costs associated with the Possession(s) which are cancelled or not used as a result and the Infraco shall not be entitled to an extension of time, additional payment or relief in such circumstances.

16.37 The Infraco shall not commence any part of the APA Works prior to the APA Works Commencement Date.

16.38 Prior to undertaking each particular part of the APA Works, the Infraco shall:

16.38.1 obtain **tie's** prior written approval (not to be unreasonably withheld) to the APA Works Programme and method statement for the carrying out and completion of that particular part of the APA Works and any associated movement of materials, plant and equipment on or near the railway;

16.38.2 in relation to any APA Works to be undertaken in an area which is the subject of a Regulated Change process, await a notice to proceed from **tie** in respect of this part of the APA Works prior to commencing works in the areas which are subject to the Regulated Change. A **tie** Change shall occur if such a notice to proceed is not issued in accordance with the agreed APA Works Programme.

16.39 During the construction of the APA Works the Infraco shall:

16.39.1 take all steps required to ensure that the APA Works are carried out in a way that minimises disruption to the railway and any third party using it or having an interest in the land affected by the APA Works;

16.39.2 establish and maintain a robust procedure to ensure the safe access for all authorised personnel to the railway in connection with the Works;

16.39.3 not interfere, and ensure that no subcontractor interferes, with existing points of emergency access to the network without **tie** having obtained the prior agreement of Network Rail in writing;

16.39.4 submit in writing for the approval of **tie** (such approval not to be unreasonably withheld) any proposals for the provision of personnel to supervise Possessions or the APA Works;

16.39.5 carry out the APA Works efficiently at such times and in such a way as to minimise, in so far as is reasonably practicable, any interference with traffic operating on the rail network;

16.39.6 carry out the APA Works to the satisfaction of **tie** and Network Rail in respect of the protection, safety and efficient operation of the railway and the safety of persons and property on or near the railway;

16.39.7 procure that all materials and goods used in the APA Works shall be new, of good quality, suitable for their purpose, in compliance with all applicable Standards (subject to Clause 16.20) and not generally known in the railway industry to be deleterious at the time of incorporation;

16.39.8 maintain the APA Works until Completion of "the Works" as defined in the Asset Protection Agreement.

16.39.9 cause the APA Works to be completed with all reasonable dispatch and in any event by 30 June 2011, as such date may be extended with consent of **tie**;

16.39.10 arrange for the relocation to a suitable environment of any flora and fauna which is subject to conservation and which may be affected by the APA Works;

16.39.11 temporarily erect fencing to protect the network from trespass and vandalism to the reasonable satisfaction of **tie** and Network Rail;

16.39.12 provide for such barriers, supervision, and lighting of the APA Works as may be reasonably specified by **tie** as being necessary during the carrying out of the APA Works;

16.39.13 comply with the requirements of Network Rail with regard to Network Rail's signalling arrangements and the prevention of any adverse effects which may be caused by the lighting of the APA Works;

16.39.14 provide **tie** with reasonable notice in writing of any inspections or testing of the APA Works by the Infraco or its subcontractors and allow **tie** the opportunity to procure Network Rail attendance at such inspection, demonstration or testing;

16.39.15 notify **tie** in writing once it considers (a) a Sector has been completed is capable of being certified as completed and (b) the APA Works have been completed and are capable of being certified as being completed;

16.39.16 provide **tie** with such information at such times and in such form as **tie** may reasonably require about the APA Works to enable Network Rail to populate its asset register.

16.40 The Infraco shall consult with **tie** and Network Rail and prepare a Construction Phase Plan (as defined in the CDM Regulations) for the APA Works alone, and submit it to **tie**. The Infraco shall amend such plan to take account of any reasonable comments made by **tie** or passed on from Network Rail.

16.41 The Infraco shall prepare a relevant data manual for the APA Works alone to form part of the health and safety file for CDM purposes. The manual shall be finalised and passed to **tie** for onward delivery to Network Rail with such number of copies as Network Rail may reasonably require prior to completion of the APA Works.

16.42 The Infraco shall use reasonable endeavours to identify any relationship between the APA Works and Interfacing Projects which have been notified to it by **tie** or Network Rail. The Infraco shall mitigate and control the APA Works elements of such interface as far as is reasonably practicable.

16.43 The Infraco shall at its own cost make good any property of Network Rail which has been damaged or interfered with in during the course of the APA Works, and shall carry out any remedial work as may be required to ensure that the APA Works comply with the Asset Protection Agreement. The Infraco shall carry out any demonstrations or tests for any part of

the APA Works which are reasonably required by **tie** as a result of such damage, interference or remedial work under this Clause 16.42 at its own cost.

16.44 The Infraco acknowledges that Network Rail may require **tie** to suspend the carrying out of the APA Works when Network Rail has notified **tie** that such suspension is necessary in order to prevent, address, alleviate or comply with a Network Operation Issue (and that **tie** may in such an event instruct Infraco to suspend the APA Works to the extent necessary to comply with Network Rail's requirement; provided that Network Rail has complied with the restrictions upon it in this regard set out in clauses 10.2 and 10.3 of the Asset Protection Agreement. Any such suspension shall be a Compensation Event to the extent that such suspension has not been caused by any act or omission of the Infraco.

16.45 The Infraco shall from notification of execution of each Bridge Agreement by **tie** under Clause 16.55.4 until the expiry of the Term comply with the terms of each of the Bridge Agreements, save where the terms of such Bridge Agreement are inconsistent with the draft Bridge Agreement in the Schedule Part 27 Section B (*Asset Protection Agreement and Bridge Agreement*), and provided that:

16.45.1 reference in the Bridge Agreement to "in accordance with the Asset Protection Agreement" shall be construed for the purposes of this Clause 16.45 as being in accordance with Clause 16.1 of this Agreement;

16.45.2 the Infraco shall not be responsible for any costs of Network Rail arising under the Bridge Agreement;

16.45.3 Clause 16.20 shall apply to the Standards relevant to the Bridge Agreement;

16.45.4 if Network Rail exercise a right to fix apparatus under the Bridge Agreement, any impact on the Infraco shall be treated as a **tie** Change;

16.45.5 the Infraco shall incur no liability under the Bridge Agreement in respect of future railway alterations; and

16.45.6 for the avoidance of doubt, the liability of the Infraco in respect of the compliance with the Bridge Agreements remains subject to Clauses 77.2, 77.3, 77.7, 77.8, 16.72 and 16.73;

16.46 Prior to Network Rail taking any action or ordering any suspension envisaged to which Clause 16.44 would apply, **tie** shall involve the Infraco in consultation with itself and Network Rail in order to identify the best course of action in relation to the Network Operation Issue. **tie** shall

provide the Infraco with all information which it receives from Network Rail in relation to the Network Operation Issue, including updates in relation to the estimates of any duration of suspension, and shall notify the Infraco as soon as practicable once the APA Works can be resumed.

16.47 Where **tie** requires the Infraco to take any action as the result of an instruction from Network Rail in respect of a Network Operation Issue, the Infraco and **tie** acknowledge that Network Rail is entitled to issue instructions directly to the Infraco where **tie** is not available. The Infraco and **tie** acknowledge that, for these purposes, such direct instructions from Network Rail shall be treated as an instruction from **tie's** Representative under Clause 25 (***tie's Representative***).

16.48 The Infraco and **tie** shall exchange information and otherwise cooperate with each other in accordance with the reasonable requirements of Network Rail, so far as is necessary to enable Network Rail to review and revise its safety regime relating to maintenance, repair, improvement, alteration and operation of the Railway during the construction of the APA Works and for a period of 12 months following completion of the APA Works.

16.49 The Infraco acknowledges that Network Rail may inspect the APA Works (including ultrasonic examination of the operational track) at any time prior to the date of Taking Into Use and **tie** shall inform the Infraco of any areas requiring such attention and the level of priority for such work. The Infraco shall carry out such work within the time-scale specified within the Standards (subject to Clause 16.20). If the Infraco unreasonably fails to do so, it acknowledges that Network Rail is entitled to undertake such corrective or remedial work itself and recover the costs thereof from **tie** (subject to **tie** being entitled to recover such costs where the measures and/or timescales are determined to have been disproportionate or unnecessary under the Dispute Resolution Procedure as defined in the Asset Protection Agreement), and **tie** shall be entitled to recover such costs from the Infraco, subject to Clauses 77.2, 77.3, 77.7, 77.8, 16.72 and 16.73.

16.50 The Infraco shall comply with the reasonable requirements of Network Rail in respect of Taking Into Use of the APA Works to the extent that such are to be Taken Into Use, and to provide Network Rail with reasonable assistance in respect of these procedures and the procedures for certifying completion of a Sector of the APA Works and those applicable to completion of the APA Works as a whole.

16.51 Following completion of the APA Works, the Infraco will:

16.51.1 within two years (but not less than 18 months) of the completion of the APA Works, repeat the condition and defects survey required under Clause 16.32 in adherence with the access requirement and procedures agreed with Network Rail in relation to the APA Works;

16.51.2 make good any damage caused to Network Rail property by the carrying out and completion of the APA Works and, subject to intended alterations arising as a consequence of the APA Works, reinstate all Network Rail property so damaged to a condition substantially the same as existed at the APA Works Commencement Date as evidenced by the condition and defects survey; and

16.51.3 carry out and complete rectification and remedial works which may be necessary as a consequence of the Infraco or any subcontractor failing to carry out and complete the APA Works in accordance with the Asset Protection Agreement. In the event that the Infraco does not carry out such works within three months of completion of the APA works, it acknowledges that Network Rail may carry out such works and recover the costs thereof from **tie**, and **tie** shall be entitled to recover such costs from the Infraco.

16.52 The Infraco shall not use or operate or permit any third party to use or operate any operational Railway track (other than for testing as agreed with Network Rail and **tie**). The Infraco shall not, and shall procure that no other party shall, use or operate any of the APA Works or areas in which the Infraco has been working for commercial purposes.

16.53 The Infraco acknowledges that if, in consequence of the construction of the APA Works or existence of the APA Works, Network Rail incurs additional costs and expense in connection with the repair, maintenance, improvement, operation or alteration of the Railway which would not have been incurred but for the construction of the APA Works or existence of the APA Works, and in so far as such additional cost or expense arises as a result of Infraco's breach of the Infraco Contract, such additional cost or expense shall be paid by **tie** to Network Rail, and **tie** shall be entitled to recover such additional expense from the Infraco, provided that such additional expense is incurred prior to 1 April 2014 and subject to Clauses 77.2, 77.3, 77.7, 77.8, 16.72 and 16.73.

16.54 The Infraco acknowledges that in the event of acts of trespass or vandalism occurring on or from the Site (or on or from a bridge or its approaches under a Bridge Agreements(following notification of execution by **tie** under Clause 16.55.4)) which endangers the safety of the railway or the safety of Network Rail property or persons on or near the Railway, Network Rail may (subject to the terms of Clause 12.8 of the Asset Protection Agreement or Clause 2.11 of the Bridge Agreement, as the case may be) take immediate action at the cost of **tie** to

safeguard the Railway or such person or property. Where such actions are properly taken prior to the Completion of the Works (as defined in the Asset Protection Agreement) or, at any time in the case of a Bridge Agreement issue, and are necessary as a result of the Infraco's failure to implement security obligations in accordance with the Infraco Contract, the Infraco shall reimburse **tie** for any such costs, subject to Clauses 77.2, 77.3, 77.7, 77.8, 16.72, and 16.73.

16.55 From the date set for completion of the relevant Sector of the APA Works until (a) in the case of those parts of the APA Works that are to be Taken Into Use, the date that the relevant Sector or part thereof is Taken Into Use**; (**b) in the case of those parts of the APA Works which shall be the subject of any Bridge Agreement, the date of execution of the relevant Bridge Agreement**;** and (c) in the case of those parts of the APA Works which are not to be Taken Into Use or are not to be the subject of any Bridge Agreement, the date of completion of the APA Works as a whole (such parts of the APA Works being in each case hereinafter referred to as the "**Completed Areas**"):

16.55.1 To the extent that the APA Works were undertaken by the Infraco, the Infraco shall be responsible for maintaining such Completed Areas in good and substantial order and repair to the reasonable satisfaction of **tie** and shall secure these Completed Areas against acts of trespass or vandalism;

16.55.2 subject to the terms of the Agreement, the Infraco shall assume all risk and responsibility for loss, damage or destruction of the Completed Areas and for the costs of rectifying or reinstating such loss, damage or destruction (provided that the Infraco shall not be responsible for any loss, damage or destruction caused or arising as a result of the acts or omissions of Network Rail of any person for whom Network Rail is responsible);

16.55.3 the Infraco shall immediately notify **tie** if it considers that Network Rail is not providing access which is reasonably sufficient in order to undertake its obligations under this Clause 16.55.

16.55.4 **tie** will immediately notify the Infraco when any Bridge Agreement is executed and provide the Infraco with a certified true copy of the same.

16.56 Following the date of completion of any Sector, the Infraco shall be entitled to occupy and use such areas and maintain them subject always to the reasonable conditions of Network Rail. The right to occupy and use such areas shall subsist from:

16.56.1 the date of Sector completion for each Sector in respect of allowing the Infraco to secure the area, undertake reasonable inspection and rectify defects arising in respect of the completed Sector;

16.56.2 the date which is the later of (a) the date of completion of the APA Works as a whole and (b) the date upon which **tie** confirms to the Infraco that procedures are agreed between all relevant parties in respect of testing, commissioning and trial running of the passenger tramway (including driver training);

16.56.3 and until the Service Commencement Date;

The right to occupy and use is not granted for any other purpose unless expressly permitted under the Asset Protection Agreement.

16.57 Subject to clauses 77.2, 77.3, 77.7, 77.8, 16.72 and 16.73, the Infraco shall indemnify and keep indemnified **tie** from liability to Network Rail arising in any way directly out of the occupancy or use by the Infraco, or any act, failure or negligence or omission of the Infraco or any subcontractor in respect of any Completed Area.

16.58 Subject to Clauses 16.59 to 16.63 below, variations to the APA Works howsoever arising (each an "**APA Variation**") shall be dealt with in accordance with the provisions of Clause 80 (***tie*** *Changes*) and Clause 81 (*Infraco Changes*).

16.59 Where the Infraco reasonably believes that a variation is required to the APA Works (an "**Infraco APA Variation**"), it shall promptly notify **tie** of that fact and shall, as soon as is practicable thereafter, provide **tie** with full details of the reason why it considers that an Infraco APA Variation is required. The Infraco acknowledges that **tie** is required to notify Network Rail of any such variations and will use its reasonable endeavours to respond promptly to **tie** in respect of any queries which arise in relation to the variation proposal. Where it is agreed between **tie** and Network Rail that such Infraco APA Variation is required, then this shall be an Infraco Change.

16.60 The Infraco acknowledges that, in relation to any proposed variation of the APA Works, information is required by **tie** to provide Network Rail with details of the steps that the Infraco proposes to take in order to implement the variation, and that details of the Infraco's view of any APA Consents which must be obtained or amended for the purposes of the APA Variation must also be supplied. The Infraco shall promptly prepare and supply **tie** with any such information as soon as reasonably practicable, and in any event to allow **tie** to comply

with its obligations to Network Rail within the timescales set out in the Asset Protection Agreement.

16.61 As reasonably required by **tie**, the Infraco shall meet with **tie** and Network Rail to agree matters such as alterations to the APA Works Programme, the requirement for additional Possessions, the impact on Direct Costs and any amendments needed to the APA Works requirements in relation to an APA Variation following approval in principle by Network Rail of the same.

16.62 The Infraco shall as between Infraco and **tie** be responsible for any Direct Costs which Network Rail incurs in connection with any Infraco APA Variation. The Infraco shall within 15 Business Days pay to **tie** on behalf of Network Rail any such Direct Costs which are properly due and notified to the Infraco by **tie** with supporting vouching.

16.63 Where in terms of the provisions of Clause 80 (***tie** Changes*) and Clause 81 (*Infraco Changes*), as applicable, an APA Variation is to proceed and requires that additional APA Works are to be executed in respect of a Sector for which Sector completion has been certified, the Infraco shall undertake reasonable endeavours to ensure that a re-certification of that Sector can be undertaken by Network Rail once the APA Variation in question has been implemented.

16.64 The Infraco acknowledges the circumstances in clauses 3.6, 11.1 and 14 of the Asset Protection Agreement which entitle **tie** or CEC to recover from Network Rail Direct Costs and/or relief. The Infraco agrees to supply all information practicably obtainable in so far as reasonably required by **tie** within the timescale specified in the Asset Protection Agreement so as to enable **tie** to make a claim against Network Rail where such circumstances arise. In the event the **tie** should have been able to claim against Network Rail, but were unable to do so due to a failure of the Infraco to identify and/or provide information due as aforesaid in relation to the event to which the claim relates, the Infraco will not be able to make a claim against **tie** for costs, or make any claim under Clause 64 (*Relief Events*) or 65 (*Compensation Events*).

16.65 Where Infraco reasonably believes that a claim or action is required to be taken against Network Rail in association with the requirements of the APA Works, it shall immediately notify **tie** and provide all reasonable assistance in order to formulate and conduct such claim or action.

16.66 Subject to the terms of the Infraco Contract (including, without prejudice to the foregoing generality, Clauses 77.2, 77.3, 77.7, 77.8, 16.72, and 16.73) the Infraco shall indemnify and keep indemnified **tie** for all reasonable Direct Costs incurred during the Term in relation to

any negligence, breach of the Infraco Contract, act or omission of the Infraco in relation to electromagnetic interference originating from the APA Works and the effect thereof on Network Rail and the rail Network during and after construction of the APA Works which arises during the Term;

16.67 The Infraco shall give **tie** all reasonably required information in connection with any claim arising under the Asset Protection Agreement during the Term.

16.68 The Infraco acknowledges the events of termination arising under clause 21 of the Asset Protection Agreement, and shall immediately notify **tie** in the event that the Infraco considers that any event, act or omission has occurred which may entitle termination by either Network Rail or **tie** under that clause.

16.69 Subject to Clauses 16.72 and 16.73, the Infraco agrees to take such reasonable steps as are notified to it by **tie** or Network Rail to rectify any breaches, acts or omissions by the Infraco of its obligations under the Agreement which may entitle Network Rail to terminate the Asset Protection Agreement.

16.70 Subject to Clause 16.72 and 16.73, the Infraco acknowledges the circumstances in clauses 12.11 and 20 of the Asset Protection Agreement under which Network Rail may recover monies from CEC or **tie** , and undertakes when reasonably requested by **tie** to use reasonable endeavours to mitigate the circumstances under which Network Rail may make such a claim against **tie** or CEC.

16.71 **tie** and the Infraco each acknowledge that any notice, objection or communication to be given by the Infraco in relation to the APA Works, which may be required to be communicated to Network Rail, will necessarily involve a review by Network Rail in order to respond to such notice, objection or communication. **tie** and the Infraco shall act reasonably in giving such notice, objection or communication in order to allow Network Rail an adequate period for review and providing Network Rail with sufficient information to undertake such review.

16.72 Notwithstanding any other provision of the Infraco Contract, the Infraco's liability and extent of any obligations of any nature in respect of : (1) any failure to handback any part of the Network after the planned expiry of a Possession; or (2) any claim of any nature arising from the terms of any Track Access Agreement, Freight Access Agreement or any contract in any way incorporating the Depot Access Conditions or the Station Access Conditions (such terms having the meaning ascribed to them in the Asset Protection Agreement) shall be limited to £40,000 for each and every incident subject to an aggregate limit of £500,000 for all such liabilities, obligations or claims – and that subject to Clauses 77.2, 77.3, 77.7, 77.8, and 16.73.

16.73 Notwithstanding any other provision of the Infraco Contract, the Infraco's liability and extent of any obligations of any nature in respect of NR Immunisation shall be subject to an aggregate limit of £750,000 for all such liabilities, obligations or claims – and that subject to Clauses 77.2, 77.3, 77.7, 77.8 and16.72. This Clause 16.73 shall not apply to the elements of NR Immunisation costs referred to in the Schedule Part 4 Appendix J Paragraph 3 (*Pricing*).

17. INTERFACE WITH THE OPERATOR

Operator Events

17.1 Nothing in this Clause 17 (*Interface with the Operator*) shall modify or dilute the general or specific obligations of the Infraco which concern interface or co-operation with the Operator.

17.2 Subject to Clauses 17.3 and 17.4 in the event that any of the events or circumstances defined as Operator Events occur and to the extent that the Infraco can demonstrate to **tie's** satisfaction, **tie** acting reasonably, that there has been a resultant material adverse effect on the Infraco's ability to perform any of its obligations or exercise any of its rights pursuant to this Agreement the Operator Event shall be a Compensation Event and the Infraco shall be entitled to relief and/or compensation on the basis set out in Clause 65 (*Compensation Events*) in respect of such Operator Event provided that where Infraco has predominantly caused or materially contributed to the occurrence effect or duration of the Operator Event the compensation available to Infraco pursuant to Clause 65 (*Compensation Events*) shall be reduced to the extent of such causation or contribution.

17.3 If any Operator Event occurs, the Infraco shall:

17.3.1 notify **tie** and the Operator as soon as practicable after being on notice of the Operator Event (and in any case no later than 1 day after being on initial notice of the Operator Event) of the occurrence of the Operator Event and, as soon as reasonably practicable after such notification from the Infraco (and in any case no later than 2 Business Days after such notification or such longer period as agreed between the Parties), the Infraco shall notify **tie** and the Operator of the likely occurrence, severity (including additional costs) and duration of the Operator Event and any likely impact on the ability of the Infraco and/or any Infraco Party to perform its obligations in relation to the Infraco Works; and

17.3.2 NOT USED

17.3.3 be responsible for recording the effects of the Operator Event on the ability of the Infraco and/or any Infraco Party to perform its obligations in relation to the Infraco

Works and for providing **tie** with an accurate and comprehensive report on such effects of the Operator Event within 5 Business Days of being on notice of such Operator Event, such report to detail emerging additional costs and expected (or actual) duration of this Operator Event.

17.4 The Infraco shall take all reasonable measures to prevent and to mitigate any Operator Event from materially adversely affecting the proper performance of the Infraco Works (including the Maintenance Services) provided that the Infraco can do so without unreasonable inconvenience or cost.

17.5 **tie** shall arrange a meeting with the Operator, the Infraco, **tie** and **tie's** Representative to discuss and agree a plan for corrective measures necessary to address any Operator Event and to permit the Infraco to resume unrestricted (or the best, even if restricted, level of) performance of the Infraco Works within the shortest practicable time period. It shall be the **tie's** responsibility to obtain the Operator's cooperation with any corrective measures agreed by the Parties to be taken by the Infraco, whether temporary or permanent.

17.6 NOT USED

17.7 The Infraco shall be under a continuing obligation to report promptly, and in any event within 2 Business Days, upon becoming aware of same, to the Operator and to **tie** any incident, matter or operational irregularity which may precede the occurrence or indicate the existence of an Operator Event.

Design Input and Technical Requirements

17.8 In accordance with Schedule Part 14 (*Review Procedure*), the Infraco shall, from the Effective Date of this Agreement, take account of any comments from **tie** in relation to operational issues when refining its Design, Maintenance Plans, standards, procedures and safety documentation in accordance with Schedule Part 2 (*Employer's Requirements*) and when ensuring system integration in accordance with Clause 8 (*System Integration*). The Infraco shall as part of the Mobilisation Services comment on maintainability issues and provide review and support during the design and construction process, seeking to optimise the whole life asset cost. These comments shall be deliverable to the Operator in addition to **tie**.

Operation and Maintenance Procedures

17.9 The Infraco acknowledges that the Operator shall be responsible for Operator Maintenance of the Edinburgh Tram Network. The Infraco shall not obstruct the performance by the Operator of the Operator Maintenance. **tie** shall procure that the Operator does not obstruct the

performance by the Infraco or any Infraco Party of the Maintenance Services. The Infraco shall liaise with the Operator in relation to the Maintenance Services and Operator Maintenance.

17.10 Subject to Clause 17.10.3 Infraco acknowledges that **tie** and the Operator may agree from time to time to delegate to the Operator the exercise of **tie's** contractual rights under this Agreement. Where **tie** delegates the exercise of any of its contractual rights under this Agreement the provisions of this Clause 17.10 shall apply.

17.10.1 Subject to Clause 17.10.4, **tie** may from time to time by notice in writing to the Infraco, delegate the exercise of specific contractual rights to a suitable specified employee of the Operator (the "**Operator's Representative**").

17.10.2 The Infraco shall observe, and shall procure that any Infraco Parties observe, all reasonable instructions of Operator's Representative given in accordance with this Agreement.

17.10.3 The Operator's Representative shall have no authority to terminate this Agreement, make any claim for payment (under indemnity or otherwise), raise any claim, suit or action against the Infraco, instruct a **tie** Change, amend this Agreement nor to relieve the Infraco of any of its obligations under this Agreement.

17.10.4 **tie** may by notice in writing to the Infraco change the identity of the Operator's Representative. **tie** shall consult with the Infraco prior to the appointment of or replacement for Operator's Representative, taking account of the need for liaison and continuity in respect of this Agreement. Such appointment or change shall have effect on the date specified in the written notice.

17.10.5 During any period when an Operator's Representative has not been appointed (or when the Operator's Representative is unable through illness, incapacity or any other reason whatsoever to carry out or exercise his functions under this Agreement), **tie** shall carry out the functions which would otherwise be performed by the Operator's Representative.

17.10.6 Instructions given by the Operator's Representative under Clause 17.10 and 17.11 shall be in writing. Provided that if for any reason it is considered necessary to give any such instruction orally the Infraco shall comply therewith.

17.10.7 Any such oral instruction shall be confirmed in writing as soon as is possible under the circumstances. Provided that if the Infraco confirms in writing any such oral

instruction which confirmation is not contradicted in writing by the Operator's Representative or **tie's** Representative forthwith it shall be deemed to be an instruction in writing by the Operator's Representative.

17.10.8 Upon the written request of the Infraco, **tie's** Representative shall specify in writing under which of his duties and authorities the instruction is given.

17.10.9 **tie** shall procure that any Operator's Representative shall not exercise their delegated contractual rights in a way which is likely to interfere with the discharge of Infraco's obligations under this Agreement.

17.11 The Infraco shall:

17.11.1 promptly notify the Operator and **tie** of any requirement for Operator Maintenance of which the Infraco becomes aware; and

17.11.2 co-operate with the Operator in relation to the planning and execution of Operator Maintenance and Maintenance Services.

17.12 If, at any time after the Service Commencement Date, it appears likely to the Infraco that any planned works or activities (including Maintenance Services) to be carried out by the Infraco will necessitate interruption to or restriction of the Transport Services on the Edinburgh Tram Network, the Infraco (as appropriate) shall:

17.12.1 notify **tie** and the Operator not less than 42 days prior to such planned works or activities, and take all reasonable steps to support **tie** in notifying passengers as soon as reasonably practicable in advance of the carrying out of such planned works or activities, of the nature of such work and the likely disruption or restriction of the Transport Services; and

17.12.2 take all steps which are reasonably practicable to minimise the adverse consequences of such works or activities to passengers.

17.13 In the event of any unplanned works or activities (including Maintenance Services) to be carried out by the Infraco as a result of a system failure, breakdown or an emergency caused by a failure of the Infraco to comply with its obligations under this Agreements, the Infraco shall:

17.13.1 notify **tie** and the Operator as soon as possible of the nature of such works or activities and the likely disruption or restriction of the Transport Services;

17.13.2 take all reasonable steps to support **tie** in notifying passengers as soon as reasonably practicable of the nature of such works and activities and the likely disruption or restriction of the Transport Services; and

17.13.3 take all steps which are reasonably practicable to minimise the adverse consequences of such works and activities to passengers. Where **tie** considers that such works and activities will result in the Transport Services not being provided for any period, the Infraco shall take such steps that shall include support and, save in relation to any failure to provide the Tram Supply Obligations the Tram Maintenance Services, compensation to the Operator in providing an alternative means of transportation being in service as soon as reasonably practicable. For the purposes of this Clause 17.13.3, the Parties acknowledge that it will generally be reasonably practicable for the Operator to arrange for an alternative means of transportation to be in service within 90 minutes of becoming aware of the requirement for it.

DPOFA Changes

17.14 **tie** shall notify the Infraco of any proposed variation under the DPOFA which in **tie's** opinion (acting reasonably) may affect the Infraco's performance of its obligations or the exercise of its rights under this Agreement or increase the likelihood of a claim arising under Clause 17.33 and the Infraco shall respond with comments ("**DPOFA Change Response**") within 15 Business Days of being notified by **tie** of any proposed variation under DPOFA (a "**DPOFA Change**").

17.15 If in the DPOFA Change Response, Infraco have provided information in relation to or agreed with **tie's** assessment in relation to:

17.15.1 any adverse impact which the DPOFA Change will have on the Infraco Works or the ability of, or cost to the Infraco of performing its obligations under this Agreement, or the rights of Infraco under this Agreement or increase the likelihood of a claim arising under Clause 17.33; or

17.15.2 any valid reason why the Infraco would be entitled to refuse to implement any **tie** Change required as a result of the DPOFA Change in accordance with Clause 80.12

(being the "**DPOFA Adverse Impact**")

the Infraco shall provide **tie** and the Operator with a written report within 15 Business Days (or such longer period as the Parties acting reasonably agree) providing details of the DPOFA Adverse Impact and Infraco's proposals for avoiding or mitigating the DPOFA Adverse

Impact and any **tie** Changes which, in the opinion of the Infraco, acting reasonably, will be required as a result of the DPOFA Change ("**DPOFA Change Report**").

17.16 **tie** shall review the DPOFA Change Report promptly and if **tie**, acting reasonably, is satisfied that a modification to the proposed DPOFA Change is required to address any issue arising from the DPOFA Change Report, **tie** shall instruct such modification under the change provisions of the DPOFA and any change required to the Infraco Works shall be a Mandatory **tie** Change pursuant to Clause 80 (**tie** *Changes*).

17.17 Failure by the Infraco to respond as stipulated in Clauses 80 and 17.15 shall be a bar to any claim for relief or compensation under Clause 80 (**tie** Changes) or otherwise. Infraco shall not be entitled to refuse to perform its obligations which are affected by the DPOFA Change unless so entitled pursuant to Clause 80.12.

Safety

17.18

17.18.1 The Infraco shall provide a permanent representative for the Project Safety Certification Committee who shall be responsible for the Infraco's mandatory participation in and technical contribution to the Project Safety Certification Committee's output and the discharge of its responsibilities.

17.18.2 The Infraco's obligations with regard to safety shall encompass at a minimum:

17.18.2.1 participation on a compulsory basis in all liaison meetings with the Independent Competent Person, HMRI and Emergency Services;

17.18.2.2 the development and implementation of a safety management system (the "**Infraco Safety Management System**") which shall address without limitation:

(i) Infraco staff competency and its continual assessment;

(ii) training on all safety related issues;

(iii) safety procedures;

(iv) record keeping and audit;

(v) certification of materials and equipment;

(vi) frequency and mode of audit by **tie** of the Infraco Safety Management System;

(vii) incident response and management; and

(viii) continual improvement and best practice.

17.19 **tie** and the Operator shall be entitled to review the Infraco Safety Management System (and its implementation) at any time upon notice which is appropriate in the circumstances and in any case within no more than 3 days. For the avoidance of doubt, **tie** and the Operator shall be entitled to immediate access upon the occurrence of an incident.

17.20 It shall be the responsibility of the Infraco to undertake and complete verification, through agreed procedure, of the safety and service readiness of the Edinburgh Tram Network prior to service start-up every morning no later than one hour (or such other time as agreed between the Parties) prior to Transport Services commencing each day and to certify this status to **tie** and to the Operator in an agreed form.

17.21 In the event that the Operator can demonstrate to the Infraco that the Edinburgh Tram Network is not ready for service start up in accordance with Clause 17.19 or such other process as is agreed between the Parties, the Infraco shall notify **tie** and the Infraco shall rectify any deficiency in accordance with this Agreement which is preventing the commencement of Transport Services in accordance with this Agreement.

17.22 The Infraco shall liaise effectively with the Operator in co-ordination of health and safety issues at the Depot in accordance with the Depot Licence.

Maintenance

17.23 The Infraco shall give the Operator and **tie** a minimum of one month's prior notice in outline of any planned maintenance forming part of the Maintenance Services to be carried out on any part of the Edinburgh Tram Network, such initial notice to be followed by at least 14 days notice in detail and, in relation to Infrastructure Maintenance Services, 7 days notice of individual method statements relating to such works or activities anywhere on the Edinburgh Tram Network.

17.24 Not less than 6 months prior to the Planned Service Commencement Date, the Infraco shall provide **tie** and the Operator with a combined maintenance plan demonstrating how the effects of planned maintenance on the provision of Transport Services in accordance with Timetable shall be minimised, based upon the Maintenance Plan and, subject to a copy of the Operator

Maintenance Plan being supplied to the Infraco not less than 12 months prior to the Planned Service Commencement Date, the Operator Maintenance Plan. **tie** shall review such combined maintenance plan in accordance with Schedule Part 14 (*Review Procedure and Design Management Plan*).

Operational Interface and Operator Mobilisation

17.25 Following the Service Commencement Date subject to Clause 17.20, the day-to-day operation of the Edinburgh Tram Network shall be the responsibility of the Operator. To enable the efficient operation of the Edinburgh Tram Network, the Infraco shall provide technical advice where practicable to **tie** and to the Operator during normal working hours regarding the operational deployment and integration of the various components of the Edinburgh Tram Network which relate to the scope of work under this Agreement and any other non-confidential and non-financial information regarding their design, construction, standards, integration, operation and maintenance which the Operator and **tie** may reasonably request provided such request does not adversely impact on the delivery of the Infraco Works.

Facilities and Access

17.26 The Infraco shall in so far as reasonably practicable at all times provide to the Operator and **tie** such access to the places where the Infraco Works are being performed and the Tram testing facilities during the construction of the Infraco Works as the Operator may reasonably require and in accordance with Clause 17.27.

17.27 The Infraco acknowledges that the Operator and **tie** will require access to the Site, the places where the Infraco Works are being performed and the Tram testing facilities in order to prepare for the operation of the Edinburgh Tram Network . The Infraco agrees:

17.27.1 that it will co-operate with the Operator and **tie** and plan to avoid any interference with mobilisation by the Operator; and

17.27.2 that the presence of the Operator and **tie** on at such locations will not in any circumstances be treated as partial completion of the Infraco Works;

provided that such access shall not disrupt or interfere with the performance by Infraco or any Infraco Party of the Infraco Works and **tie** shall, and shall procure that the Operator shall, during any period when it or they have access to such locations, the Infraco Works and the Tram testing facilities, comply with all rules and regulations applicable to working at those premises for the safety of persons and convenience of the public.

17.28 Pursuant to Clause 17.23 **tie** agrees that where any damage is caused to the Infraco Works by the Operator or by **tie**, the repair of such damage shall not be part of the Infraco's obligations under this Agreement unless such damage results from fair wear and tear or from operations by the Operator or **tie** in accordance with the Operations and Maintenance Manual but where **tie** requires the Infraco to repair such damage, it will issue a **tie** Notice of Change in respect of such repair works.

System Acceptance

17.29 The Infraco shall ensure that at all times it works closely and effectively with the Operator in the performance by the Operator of the Operator's obligations and the performance by the Infraco of the Infraco's obligations pursuant to the Systems Acceptance Tests and the associated obligations on testing and commissioning set out in Schedule Part 2 (*Employer's Requirements*).

17.30 In the event that as a direct consequence of an Operator Event, the Infraco is unable to progress or is hindered in the performance of its obligations pursuant to the Systems Acceptance Tests and the associated obligations on testing and commissioning set out in Schedule Part 2 (*Employer's Requirements*), it shall notify **tie** and the Operator in writing as soon as practicable stating the reasons and the action required in order to remedy the situation.

Partnering

17.31 The Infraco shall use reasonable endeavours to work collaboratively with the Operator and **tie** shall procure that the Operator shall use reasonable endeavours to work collaboratively with the Infraco at all times in order to:

17.31.1 maximise productivity during the Infraco Works and minimise disruption for the public and third parties;

17.31.2 ensure the effective discharge of the Infraco's obligation to deliver complete system integration throughout the Infraco Works in accordance with Clause 8 (*System Integration*);

17.31.3 satisfy the levels of technical systems availability required following the Service Commencement Date to support the provision of the Transport Services

17.31.4 minimise and give best advance notice to one another and to **tie** of any interruption to Transport Services caused by any Operator Event, DPOFA Infraco Event or Infraco Default, maintenance (planned or unplanned) or third party incident;

17.31.5 not hinder proper performance of the Project Development Services, the Project Operations and all obligations under this Agreement;

17.31.6 mutually support adherence to the Programme and all related timelines and programmes;

17.31.7 report promptly to one another and to **tie** any proposed change permitted under the DPOFA (in the case of the Operator) or this Agreement (in the case of the Infraco), which is likely to or will have a material impact on the performance of any obligations owed to **tie** or the exercise of rights under this Agreement and/or the DPOFA (as appropriate) by the Infraco and/or the Operator during design, construction, operation or maintenance of the Edinburgh Tram Network, and to jointly inform **tie** regarding measures proposed to avoid or mitigate such impact; and

17.31.8 to use reasonable endeavours to agree and implement whenever appropriate measures to minimise the likelihood of disputes or claims arising from or in connection with the interface between the Operator's rights and obligations and the Infraco's rights and obligations pursuant to DPOFA and this Agreement respectively.

17.32 Subject to the provisions of Clauses 17.30, 77.3, 77.7 and 77.8, in the event that a DPOFA Infraco Event occurs, Infraco shall indemnify **tie** against any costs, claims, losses, liabilities or other expenditure (save to the extent incurred as a result of any act or omission of the Tram Supplier or Tram Maintainer in which case **tie's** rights under Clause 77 shall apply) ("**DPOFA Claims**") which **tie** is required to pay to the Operator pursuant to DPOFA, save that any element of DPOFA Claim arising by reason of any delay in the performance of the Infraco's obligations under this Agreement prior to Service Commencement Date shall be recovered by **tie** solely through the operation of Clause 62 (*Liquidated and Ascertained Damages*). Infraco shall not be liable indemnify **tie** against any DPOFA Claims to the extent the DPOFA Infraco Event giving rise to the DPOFA Claims has arisen as a result of an amendment to DPOFA not notified to Infraco in accordance with Clause 17.14.

17.33 Where, in this Agreement, the Infraco is required to liaise, co-operate, work with, meet or otherwise interface with the Operator, **tie** shall procure that the Operator shall liaise, co-operate, work with, meet or otherwise interface with the Infraco to enable the Infraco to comply with such obligations in relation to the Operator under this Agreement.

17.34 Where the Operator or **tie** have predominantly caused or materially contributed to the occurrence, effect or duration of a DPOFA Infraco Event the amount payable by Infraco as a result of a DPOFA Claim shall be reduced to the extent of such causation or contribution.

17.35 Where, in relation to the Tram Supply Agreement and as directed by the Infraco, the Tram Supplier is obliged to accept and act upon reasonable instructions from the Operator in respect of specific contractual rights including safety management, possession co-ordination and maintenance interaction, such instructions are likely to impede or delay the execution of works by the Tram Supplier then, on the Infraco's request, the Operator shall be required by **tie** under DPOFA to confirm them in writing to the Tram Supplier. In so far as the written instructions do not arise from an act or omission under this Agreement or under the Tram Supply Agreement or procedures by the Tram Supplier, the Infraco or the Tram Supplier (as relevant) shall not be liable for such non-execution or delay and liquidated damages shall not be applied. If the instructions or actions require the addition of works or duties or deliveries not included in the scope of the Tram Supply Agreement and where the Tram Supplier claims reasonable, substantiated economic compensation for such works from the Infraco in accordance with Clause 49 (*Compensation Event*) of the Tram Supply Agreement, this shall be a Compensation Event under this Agreement.

PART 5 - LAND ISSUES, CONSENTS AND SITE

18. LAND CONSENTS, PERMANENT LAND AND TEMPORARY SITES

18.1 **tie**:

18.1.1 warrants to the Infraco that it will grant access to the Permanent Land and Temporary Sites and provide Infraco with all necessary Land Consents in each case accordance with this Clause 18.

18.1.2 hereby grants a non-exclusive licence to the Infraco to enter and remain upon the Permanent Land for the duration of the Term and an exclusive licence to the Infraco to enter and remain upon the Designated Working Area for the duration of the time required (pursuant to Schedule Part 15 (*Programme*)) for completion of the Infraco Works to be executed on such Designated Working Area; and

18.1.3 shall provide the Infraco with all necessary Land Consents in relation to the Permanent Land for the duration of time required (pursuant to Schedule Part 15 (*Programme*)),

in either case only in so far as the same is required for the purposes of carrying out the Infraco Works. For the avoidance of doubt, the rights provided to the Infraco pursuant to this Clause 18.1 shall not confer nor be deemed to confer upon the Infraco a right of ownership, a lease or any other interest in the Permanent Land other than a right of access, egress or occupancy as is required for the purposes of carrying out the Infraco Works.

18.2 Subject to any rights to enter upon any Temporary Sites pursuant to Clauses 18.4 to 18.10 (inclusive) and any requirement to carry out Accommodation Works outwith the Permanent Land, the Infraco shall not design or construct any part of the Edinburgh Tram Network upon or otherwise encroach upon any land outwith the Permanent Land for the purposes of carrying out the Infraco Works without the prior written consent of **tie**.

18.3 In relation to the parts of the Permanent Land referred to in schedule 6 to each of the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006, the Infraco shall use such sites for the purposes set out in relation thereto in the said schedule 6.

18.4 Where the Infraco requires access to any Temporary Site for the purposes of carrying out the Infraco Works, it shall give **tie** not less than 40 days notice and at the same time as providing such notice, shall be required to provide to **tie**:

18.4.1 an estimate as to the amount of time that the Infraco will occupy such site; and

18.4.2 a breakdown of the use of such site in the form of a detailed programme of works.

18.5 **tie** shall, within 40 days of the notice issued by the Infraco pursuant to Clause 18.4 (or such longer period as may be referred to in such notice) provide access to the Infraco to the relevant Temporary Site for the purpose referred to in Clause 18.6, including the provision of any necessary Land Consents in relation thereto.

18.6 Without prejudice to any other term of this Agreement, the Infraco shall comply with the terms of schedule 7 of each of the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006 in relation to the purpose for which possession of any Temporary Site can be taken in accordance with Clauses 18.4 to 18.10 (inclusive).

18.7 The Infraco's possession of any Temporary Site pursuant to Clauses 18.4 to 18.10 (inclusive) shall be subject to an overriding obligation to minimise the period of any such possession.

18.8 Without prejudice to Clause 18.7, the Infraco shall not, without the prior written agreement of **tie**, remain in possession of any Temporary Site after the end of the period of 28 days following completion of the Infraco Works to that Temporary Site save where the Infraco has established a site office on such Temporary Site, when the period shall be 3 months.

18.9 The Infraco shall provide **tie** with as much notice as is reasonably practicable of its vacation of any Temporary Site in relation to which it has taken possession.

18.10 Before giving up possession of any Temporary Site, the Infraco shall remove all temporary works and restore the land to the reasonable satisfaction of the land owner (as notified to the Infraco by **tie**), provided that the Infraco shall not be required to replace a building removed on any Temporary Site in accordance with the Tram Legislation. For the avoidance of doubt, the Infraco shall:

18.10.1 not demolish a building or any part thereof without the consent of **tie**; and

18.10.2 provide **tie** with sufficient evidence (including a detailed record of the condition of the land both before and after the occupation of the Temporary Site) to show that it has complied with its restoration obligations under this Clause 18.10.

18.11 Without prejudice to the rights of access to be granted to Infraco by **tie** pursuant to Clause 18.1 and 18.5, Infraco shall comply with the requirements of Clause 18.17A and Schedule Part 13 (*Third Party Agreements*) when it is in occupation of the Permanent Land or any Temporary Site pursuant to this Clause 18 (*Land Consents, Permanent Land and Temporary Sites*).

18.12 For the purposes of performing the Maintenance Services, the Infraco shall provide **tie** and any relevant land owner with not less than 40 days notice of its intention to enter upon and take temporary possession of any land outwith the Permanent Land, provided that, the Infraco may not be entitled to request any land which is referred to in Clause 18.14 below. The requirement to give prior written notice set out in this Clause 18.12 shall not apply where any building fixing agreement entered into pursuant to this Agreement contains a right for Infraco or any Infraco Party to enter onto any land for the purposes of performing the Maintenance Services.

18.13 On the expiry of the 40 days notice referred to in Clause 18.12 above (or such longer notice period as is provided by the Infraco in the said notice), **tie** shall procure that the Infraco shall be entitled to take possession of such land in accordance with section 27(1) of either the Edinburgh Tram (Line One) Act 2006 or the Edinburgh Tram (Line Two) Act 2006 (as appropriate).

18.14 For the avoidance of doubt, the Infraco shall not be entitled to take possession of any land pursuant to Clause 18.12 where such land:

18.14.1 is more than 20 metres from any Infraco Works;

18.14.2 is not reasonably required for the purposes of, or in connection with the Maintenance Services;

18.14.3 involves taking possession of any house or garden belonging to a house; or

18.14.4 involves taking possession of any building (other than a house) if it is for the time being occupied.

18.15 Without prejudice to the obligations of **tie** to provide access to the Permanent Land or any Temporary Site to the extent set out in this Clause 18 (*Land Consents, Permanent Land and Temporary Sites*), the Infraco shall notify **tie** as soon as reasonably practicable on becoming aware of any Land Consents which may be required in order to carry out and complete the Infraco Works. For the avoidance of doubt, the Infraco shall be responsible for obtaining, at its own cost, any Land Consents required outwith the Permanent Land or Temporary Sites as aforesaid and, **tie** shall use reasonable endeavours to assist the Infraco to obtain such Land Consents provided that the costs of such assistance shall be paid by the Infraco to **tie**.

18.16 As required by **tie**, the Infraco shall use reasonable endeavours to assist **tie** to obtain any Land Consents, any amendments to existing Land Consents and any new Land Consents in respect of the Permanent Land and the Temporary Sites, including providing works programmes, providing any relevant information, and notifying land owners. Any reasonable costs associated with assisting **tie** shall be paid by **tie** to the Infraco.

18.17 The Infraco warrants that it shall not breach the terms of any Land Consent in respect of the Permanent Land or any Temporary Site with which it is issued by **tie** in accordance with this Agreement. If the Infraco breaches any term of any Land Consent, the Infraco shall be required to seek any amendment to the existing Land Consent or new Land Consent which may be required in order to carry out and complete the relevant Infraco Works. In the circumstances where a breach of the Land Consent has arisen because of the breach of this Agreement by the Infraco or a wilful act or wilful omission by the Infraco, the Infraco shall not be entitled to apply for an extension of time or any payment to the extent that such extension of time or payment is required as a direct result of the breach of the Land Consent caused by the Infraco or any Infraco Party. If the Infraco does not obtain the required amendment or new Land Consent, **tie** shall be entitled to recover the costs from the Infraco which are associated with **tie** obtaining such amendment or new Land Consent.

18.17A Without prejudice to the rights of access to be granted to Infraco by **tie** pursuant to Clause 18.1 and 18.5, the Infraco shall take all necessary steps in delivering the Infraco Works to ensure that neither **tie** nor CEC will be put in breach of their obligations to third parties pursuant to the third party undertakings and commitments contained in Schedule Part 13 Section B. If, in complying with this obligation:

18.17A.1 the Infraco incurs costs or suffers delay as a result of adverse impact on the Programme or unreasonable constraints on its construction methodology due to constraints or requirements in such third party undertakings and commitments which are materially different to the obligations under this Agreement and which could not reasonably have been foreseen by an experienced transport infrastructure contractor executing works in the operating environment of a major UK city;

18.17A.2 the Infraco is required to undertake minor works;

18.17A.3 works are required which are outwith the Base Date Design Information contained in Schedule Part 4 (*Pricing*);

then the circumstances under 18.17A.1 shall be a Compensation Event, any minor works required under 18.17A.2 shall be deemed to have been instructed by **tie** pursuant to Clause 83 (*Accommodation Works*) and 18.17A.3 shall be dealt with as a **tie** Change.

18.17B The Infraco undertakes to comply with its obligations in relation to Schedule Part 13 Section A (*Third Party Agreements*) and shall not cause **tie** or CEC to be in breach of such agreements (or to be unable to exercise their rights pursuant thereto) by reason of its failure to perform such obligations.

18.17C Before commencing any works pursuant to Clause 18.17A.3, the Infraco shall notify **tie** of its intention to execute such works. **tie** shall respond to such notification within 10 Business Days. If **tie** instructs such works in its response, such instruction shall constitute a Mandatory **tie** Change for the carrying out of such works. If **tie** does not instruct such **tie** Change in its response , the Infraco shall not carry out such works and shall not be in breach of any of its obligations under this Agreement as a result of not carrying out the works.

18.17D In the event that the Infraco considers and demonstrates to **tie**, acting reasonably, that it is impossible and not just more expensive to carry out any part of the Infraco Works without breaching its obligations to comply with the requirements of Third Party Obligations or its other obligations under Clause 18.17A, **tie** shall endeavour to obtain an appropriate amendment or deletion of the relevant third party requirements or constraint to remove such impossibility provided that Infraco has submitted supporting information on what measures it will use to minimise the effect of the Infraco Works on the third party in question and Infraco will not be required to continue to comply with such third party requirements. If **tie** cannot obtain the relevant amendment or deletion, **tie** shall instruct the Infraco pursuant to a **tie** Change.

18.18 If the Infraco suffers delay from failure on the part of **tie** to give possession or access in accordance with the terms of this Clause 18 (*Land Consents, Permanent Land and Temporary Sites*), such failure shall be a Compensation Event and the terms of Clause 65 (*Compensation Events*) shall apply.

18.19 Subject to Clause 18.23 and Clause 83 the Infraco shall provide or acquire at its own cost any additional access, land, rights or facilities outside the Permanent Land and the Temporary Sites being provided by **tie** in accordance with this Clause 18 (*Land Consents, Permanent Land and Temporary Sites*) for the purposes of the Infraco Works.

18.20 If having used reasonable endeavours to obtain access to land, rights or facilities outside the Permanent Land and the Temporary Sites required to allow it to carry out any part of the Accommodation Works, Infraco is refused or is unreasonably delayed access (or such access having been granted is subsequently withdrawn) to such land, rights or facilities sufficient to allow completion of the Accommodation Works Infraco shall serve a notice on **tie** (an "Accommodation Works Notice") which shall contain the following information:

18.20.1 the land, rights or facilities to which Infraco has been unable to gain access;

18.20.2 the steps taken to gain such access to land, rights or facilities;

18.20.3 the circumstances in which access has been withdrawn or denied; and

18.20.4 details of any other parts of the Infraco Works which can not be carried out in accordance with the Programme if the Accommodation Works are not completed.

18.21 Within 15 Business Days of receipt of an Accommodation Works Notice, **tie** may notify Infraco that it disputes the circumstances to which Clause 18.20 applied have occurred. If such a notice is served by **tie**, the Parties shall use reasonable endeavours to resolve such dispute within 10 Business Days of the service of such a notice, failing which either Party will be entitled to refer the matter for determination to the Dispute Resolution Procedure.

18.22 If **tie** does not dispute the Accommodation Works Notice pursuant to Clause 18.21, any delay or failure to obtain access to land, rights or facilities to which Clause 18.20 applies shall be a Compensation Event and the terms of Clause 65 (*Compensation Events*) shall apply and **tie's** Representative shall issue further instructions regarding the Accommodation Works Notice given pursuant to Clause 83 (*Accommodation Works Changes*).

19. CONSENTS AND TRAFFIC REGULATION ORDERS

19.1 Subject to Clause 19.2, **tie** shall:

19.1.1 obtain and maintain in effect all Temporary Traffic Regulation Orders ("**TTROs**") required for the execution of the Infraco Works prior to Service Commencement Date and all Traffic Regulation Orders with permanent effect required for the operation and maintenance of the Edinburgh Tram Network and shall call-off under existing TTROs, all at such times and for such periods as may be required to allow Infraco to carry out and complete the Infraco Works in accordance with the Programme and On Street Construction Works Methodology; and

19.1.2 obtain and maintain in effect all other Consents which are **tie** Consents.

19.2 The Infraco shall provide all supporting information necessary to enable **tie** to obtain a TTRO or call-off under an existing TTRO and all other reasonably necessary assistance and support to **tie** for the purposes of **tie's** activities pursuant Clause 19.1 in accordance with the Employer's Requirements.

In the event that the failure of the Infraco to provide assistance timeously and in accordance with the Employer's Requirements causes a delay in **tie** obtaining the relevant Temporary Traffic Regulation Order or Traffic Regulation Order, Infraco shall not be entitled to any relief or additional payment in respect of resultant delay or cost that Infraco or any Infraco Party may suffer as a result of the delay in obtaining the TRO or TTRO except where such failure arose as a result of a Notified Departure, **tie** Change or Compensation Event.

19.3 The Infraco shall obtain and maintain all Design Stage Consents, Construction and Maintenance Stage Consents and Temporary Traffic Regulation Orders (required after the Service Commencement Date) required for the performance and completion of the Infraco Works.

19.4 **tie** shall provide all reasonable assistance to the Infraco and Infraco Parties in obtaining and maintaining Consents for which the Infraco and/or the Infraco Parties are responsible. Where Infraco notifies **tie** in writing that it or the Infraco Parties are encountering difficulty in obtaining or maintaining a Consent, **tie** shall, where appropriate, provide support to the Infraco and/or the Infraco Parties by making representations to the relevant Approval Body, provided always that the Infraco (or the relevant Infraco Party) has submitted all required information relevant to the process of seeking the Consent in compliance with the Approval Body's timescales and requirements.

19.5 Infraco shall obtain and maintain in full force and effect the Design Stage Consents and the Construction and Maintenance Stage Consents.

19.5.1 The obtaining and maintaining of Design Stage Consents form part of the scope of services provided by the SDS Provider to the Infraco, save that where Infraco has elected to undertake designs itself or is procuring others to undertake such designs (that is to say Infraco Design), in which case Infraco is responsible for supporting the SDS Provider with relevant technical expertise in accordance with the SDS Agreement in order for SDS Provider to obtain the Design Stage Consents that relate to these elements of the design for the Infraco Works.

19.5.2 Subject to Clause 19.6 below, failure to obtain a Design Stage Consent (including Additional Consents) from the relevant Approval Body in respect of a design which the SDS Provider is responsible for preparing by the date on which it is shown as required in the Consents Programme included in the SDS Novation Agreement and/or Schedule Part 15 (*Programme*), shall be a Compensation Event.

19.5.3 The Infraco shall itself be responsible for obtaining the Construction and Maintenance Stage Consents.

19.6 Clause 19.5.2 shall apply following the inability of the SDS Provider to obtain (or maintain) a Design Stage Consent for which it is responsible and in accordance with the Consents Programme contained in the SDS Novation Agreement, provided that:

19.6.1 the Infraco:

(i) has informed **tie** of the reasons (if any) given by the relevant Approval Body for declining to issue or renew the Design Stage Consent by the programmed date and has provided appropriate supporting documentation to **tie**;

(ii) has informed **tie** as soon as practicable after it became aware that the Design Stage Consent may not be obtained or renewed by the programmed date;

(iii) has used reasonable endeavours to afford **tie** the opportunity to meet with the relevant Approval Body within 3 Business Days of notification pursuant to Clause 19.6.1(i) and (ii) with a view to resolving the situation and supported **tie** by its attendance at such meeting, accompanied by the SDS Provider;

(iv) has acted in order to mitigate the impact of the failure to obtain or renew the Consent;

19.6.2 the Infraco has taken all reasonable steps to manage the SDS Provider to ensure the SDS Provider obtains or renews the Design Stage Consents and ensures timely provision of adequate required information to the relevant Approval Body in accordance with the Consents Programme, the Design Delivery Programme, the agreed requirements of the Approval Body and the Design Management Plan as set out in Schedule Part 14 (*Review Procedure and Design Management Plan*);

19.6.3 where the Approval Body is CEC, the inability to obtain or renew the Consent is not the result of the Infraco reprogramming the Infraco Works or instructing the SDS Provider to reprioritise the Design Delivery Programme (save where such reprogramming or reprioritisation is the direct result of a **tie** Change, a Relief Event, a default by **tie** or a Compensation Event or has been agreed pursuant to Clause 19.16), such that CEC has insufficient time or information in which to respond to an altered timescale;

19.6.4 where the Approval Body is CEC and where CEC has failed to respond and comply with the timescale requirements set out in the Consents Programme, such failure has not been caused by incomplete or late submissions by the SDS Provider or the Infraco as required by the Consents Programme, Schedule Part 14 (*Review Procedure and Design Management Plan*), SDS Agreement (other than as a result of a Compensation Event, Relief Event, default by **tie** or **tie** Change);

19.6.5 the failure to obtain or renew the Consent is not a consequence of a failure of the SDS Provider to perform its obligations under the SDS Agreement in terms of the quality or content of the relevant design submissions and as required pursuant to the Consents Programme contained in Schedule Part 15 (*Programme*), Schedule Part 14 (*Review Procedure and Design Management Plan*) and, where relevant, Clause 10 (*Design Development and Finalisation*); and

19.6.6 the failure to obtain or renew a Design Stage Consent for Infraco's Design is not a consequence of a failure of the Infraco to provide all the necessary information timeously in accordance with Schedule Part 14 (*Review Procedure and Design Management Plan*) and with the Programme or a failure of the Infraco to provide adequate technical support to the SDS Provider pursuant to Clause 19.5.1 or a consequence of the content or quality of the Infraco Design but not, for avoidance of doubt, on the grounds of design principle, scope, form or specification where such design meets the Employer's Requirements and the Infraco Proposals.

19.7 Subject to Clause 19.6, Clause 19.5.2 shall apply where, and to the extent that, a Consent is sought and the relevant Approvals Body

19.7.1 requires changes to design which could not reasonably have been anticipated from the previous formal or informal consultations or communications with the Approvals Body; or

19.7.2 does not deliver the Consent within the period stated in the Consents Programme or such Consents Programme updated in accordance with these terms.

19.8 Clauses 19.6.3 and 19.6.4 shall not apply to a Consent where CEC is the Approval Body and where CEC, acting reasonably, has agreed in writing to a proposal from Infraco to changes in the sequencing, packaging, timescales, reprogramming or reprioritisation implemented by Infraco from the Consents Programme, the Design Delivery Programme and the Design Management Plan as set out in and the Schedule Part 14 (*Review Procedure and Design Management Plan*), provided that Infraco has provided reasonable advance notice to **tie** and to the Approvals Body including full details of the proposed changes.

19.9 Responsibility for obtaining, maintaining or renewing any Consent which is not specified in the Consents Programme ("**Additional Consent**") shall be allocated as follows:

19.9.1 where the Additional Consent is a Design Stage Consent, it shall be the responsibility of the Infraco to manage the SDS Provider in obtaining the Consent (to the extent that such Consent is the responsibility of the SDS Provider to obtain under the SDS Agreement), save for Consents which relate to design prepared by the Infraco itself in which case the Infraco shall be responsible for the Consent which, if appropriate, shall be dealt with as an Infraco Change;

19.9.2 where the Additional Consent is a Construction and Maintenance Stage Consent, it shall be the Infraco's responsibility and, if relevant, shall be dealt with as an Infraco Change;

19.9.3 where the Additional Consent is a **tie** Consent, **tie** shall be responsible for obtaining, maintaining or renewing it.

19.9.4 Where the Additional Consent is not a Design Stage Consent or a Construction and Maintenance Stage Consent and **tie** requires Infraco to obtain it, then **tie** shall instruct Infraco and such instruction shall be a **tie** Change.

The Parties shall provide all reasonable support to one another in relation to obtaining and maintaining such Additional Consents and each shall bear its own costs in obtaining any Additional Consent, save where the Additional Consent is required as a result of a **tie** Change, in which case the costs related to obtaining the Additional Consent shall be included in the valuation pursuant to Clause 80 (**tie** Change).

19.10 **tie** shall obtain the Network Rail Possessions required by Infraco to carry out and complete the Infraco Works in accordance with the Programme. The Infraco shall prepare and provide to **tie** in accordance with the Programme all required technical and design documentation necessary to enable **tie** to apply to Network Rail to obtain Consents for the booking or rebooking of possessions (which have been obtained by **tie** based on the Infraco Proposals) in accordance with the Programme. **tie** shall be responsible for the charge payable to Network Rail for possessions, save where new possessions are needed due to the Infraco's default or delay (save where such default or delay has been caused by a default by **tie**, a Compensation Event, Relief Event or a **tie** Change) in which event any associated charges shall be paid by the Infraco. Cancellation or alteration by Network Rail of possession dates, timings or duration with insufficient notice or replacement possessions shall be a Compensation Event.

19.11 The Infraco shall update the Consents Programme by each Reporting Period End Date showing progress and any Additional Consents to be obtained. **tie** shall be entitled to request information in relation to the progress of the application for any Design Stage and Construction and Maintenance Stage Consent and the Consent itself and the Infraco shall provide the same at no cost to **tie**.

19.12 The Infraco shall notify any relevant Approval Bodies, with a copy to **tie**, of the dates and times when the Infraco will require their services on the Site and shall be responsible for the co-ordination of their works if necessary with the remainder of the Infraco Works.

19.13 Where **tie's** authorisation or completion of documentation in respect of compliance with any Law is required, the Infraco shall furnish the relevant documentation to **tie** and, where possible, permit **tie** a period of 10 Business Days to authorise or complete it.

19.14 Except where otherwise provided in this Agreement and except in respect of **tie** Consents, the Infraco shall, or procure that the relevant Infraco Party shall, give all notices and pay all fees required to be given or paid in connection with the procurement of any Consent.

19.15 Without prejudice to the Infraco's obligations and rights under Clauses 18, 20, 32.1 and 32.2 and subject to **tie's** obligations to provide Land Consents in relation to the Permanent Land and the Temporary Sites pursuant to Clauses 18.1 and 18.5 and **tie's** obligations pursuant to

this Clause 19, if the carrying out of the Infraco Works or the remedying of any defects therein is likely to necessitate any interference with the rights of adjoining or neighbouring landowners, tenants or occupiers, then the Infraco shall use reasonable endeavours to obtain the prior written agreement of such landowners, tenants and/or occupiers on terms and conditions acceptable to the Infraco, acting reasonably. **tie** shall provide such reasonable assistance as requested by the Infraco in obtaining any such agreement. The Infraco shall comply with any conditions contained in any such agreement.

19.16 The Infraco may, upon reasonable notice to **tie**, request a change to the Consents Programme, in order to re-sequence or re-prioritise submissions in order to preserve the Programme (or to mitigate adverse impact upon it). In the event that the Infraco can demonstrate to **tie**, acting reasonably, that the change requested is necessary to prevent or mitigate the effect of a **tie** Change, a Relief Event, a Compensation Event or a Notified Departure or that such re-sequencing or re-prioritising does not create an increase or change in CEC's resourcing requirement or its work load per unit time in processing the relevant submissions, then **tie** shall approve such change within a timescale that is reasonable in the circumstances.

19.17 If having used reasonable endeavours, having acted in accordance with Good Industry Practice in relation to any construction methodology relevant to the granting of a Construction and Maintenance Stage Consent and having provided all necessary information required to obtain such Construction and Maintenance Stage Consent, Infraco is refused such Construction and Maintenance Stage Consent or the granting of such Construction and Maintenance Stage Consent is unreasonably delayed, then such refusal or delay shall be a Compensation Event to which Clause 65 (Compensation Event) shall apply.

19.18 Where the Infraco obtain an APA Consent, the Infraco shall forward two copies of such APA Consent to **tie**.

19.19 The Infraco shall not be entitled to any relief or compensation and the provisions of Clause 65 (Compensation Events) shall not apply in the event that Infraco Design is (i) not submitted to the SDS Provider in accordance with the Consents Programme and Schedule Part 14 (*Review Procedure and Design Management Plan*); or (ii) is rejected by the Approvals Body on grounds of content or quality but not, for avoidance of doubt, on the grounds of design principle, scope, form or specification where such design meets the Employer's Requirements and the Infraco Proposals.

20. BUILDING FIXING AGREEMENTS

20.1 The Infraco shall submit Proposals to **tie** at least 6 months (other than any revised Proposal referred to in Clause 20.3 in which case such Proposals shall be submitted to allow sufficient time for **tie** acting expeditiously to review and agree in order to comply with the Programme) prior to the date on which the Infraco proposes to install, maintain, modify or replace any relevant supporting infrastructure in order to comply with the Programme. The Infraco shall, prior to taking any action under Clause 20.4 or otherwise in relation to the installation, maintenance, modification or replacement of any relevant infrastructure, obtain **tie's** consent to the Proposals referred to in this Clause 20.1, which consent shall not be unreasonably withheld or delayed provided that if **tie** unreasonably withholds or delays such consent the Infraco shall be entitled to refer the matter to the Dispute Resolution Procedure.

20.2 Concurrently with the action under Clause 20.1 and subject to Clause 19 (*Consents and Traffic Regulation Orders*) the Infraco shall obtain all necessary Consents or approvals from the relevant planning authority for the installation of temporary poles as an alternative for every proposed building fixing, in order that Clause 20.9.1.2 can be implemented forthwith on said clause being utilised.

20.3 In the event that **tie** do not consent to the Proposals referred to in Clause 20.1, the Infraco shall submit revised Proposals to **tie** to install, maintain, modify or replace any relevant supporting infrastructure, in order to obtain **tie's** consent in accordance with Clause 20.1, in order to comply with the Programme.

20.4 In the event that **tie** gives its consent to the Proposals referred to in Clause 20.1, the Infraco shall obtain all necessary Consents or approvals from the relevant planning authority in accordance with Clause 19 (*Consents and Traffic Regulation Orders*).

20.5 Where it is agreed, pursuant to Clause 20.3, that a building fixing is to be used, modified or replaced, the Infraco shall:

20.5.1 at its own cost:

20.5.1.1 provide **tie** with all information **tie** reasonably requires in order to secure the consent of the Heritable Proprietor and any other relevant party to allow the Infraco to carry out a survey in order to ascertain whether the relevant building may safely support the loadings which will be imposed upon it by the building fixings (or modification or replacement thereof) to be attached

thereto for as long as may be required in connection with the Edinburgh Tram Network; and

20.5.1.2 carry out the relevant survey

to allow **tie** and Infraco to enter into or vary a Building Fixing Agreement with the Heritable Proprietor under Clause 20.6; and

20.5.2 at its own cost, by the date falling 90 Business Days before the date on which the building fixing (or modification or replacement thereof) is scheduled to be affixed in accordance with the Programme, provide **tie** with all information **tie** reasonably requires in order to secure the agreement of the Heritable Proprietor to allow the siting, modification or replacement (as the case may be) of building fixings in such locations as the Infraco has set out in the Proposals issued pursuant to Clause 20.1, which agreement shall be documented and set out in the form of a Building Fixing Agreement or a variation to the existing Building Fixing Agreement or in the form of a new Building Fixing Agreement, subject to any amendments that **tie** may agree.

20.6 Subject to Clause 20.11, the Parties shall enter into any Building Fixing Agreement required pursuant to Clause 20.5.2 and **tie** shall procure that CEC and the Heritable Proprietor enter into such Building Fixing Agreement.

20.7 If any Heritable Proprietor withholds consent as envisaged by Clause 20.5, **tie** may, at its own cost, utilise the procedure for application to the Sheriff Court pursuant to section 16(4) of either the Edinburgh Tram (Line One) Act 2006 or the Edinburgh Tram (Line Two) Act 2006 (as appropriate).

20.8 Where **tie** decides to use the procedure referred to in Clause 20.7, the Infraco will use all reasonable endeavours to assist **tie** in such proceedings and **tie** shall reimburse Infraco for its reasonably and directly incurred costs in complying with this obligation.

20.9 Where **tie** uses the procedure referred to in Clause 20.7, and the application is rejected by the Sheriff Court, in whole or in part, or where **tie** determines that the rejection is likely to be upheld by the Sheriff Court, the Infraco, as directed by **tie** (acting reasonably) shall:

20.9.1.1 where in Infraco's opinion (acting reasonably) there is sufficient time within the construction programme, submit alternative plans for affixation of building fixings to alternative buildings at or around the same location; or

20.9.1.2 where in Infraco's opinion (acting reasonably) there is not sufficient time within the construction programme to propose such alternative plans, install a temporary pole in accordance with Clause 20.3 provided Infraco has obtained the application or applications required in order to obtain all necessary Consents or approvals from the relevant planning authority in accordance with Clause 20.4; or

20.9.1.3 submit alternative plans for affixation of building fixings to alternative buildings at or around the same location and install foundations for a temporary pole in accordance with Clause 20.3.

For the purposes of this Clause 20.9, **tie** will review such alternative plans and then issue a **tie** Change which shall be a Mandatory **tie** Change and the provisions of Clause 80 (**tie** *Changes*) shall apply.

20.10 If a relevant Heritable Proprietor or other appropriate party serves notice on the Infraco prior to the Expiry Date pursuant to Law or pursuant to a Repairs Notice or Redevelopment Notice under a Building Fixing Agreement (each as defined therein), requiring the temporary removal of a building fixing, the Infraco shall, subject to obtaining any necessary Consents for such removal and the erection and use of a temporary pole to support OLE at that location, remove the relevant building fixing or any part thereof as required by the terms of the relevant notice and shall be entitled to support the OLE at that location by erecting a temporary pole provided that as soon as reasonably practicable upon completion of the third party's works in respect of which the notice was served the Infraco shall:

20.10.1 remove any temporary pole; and

20.10.2 thereafter support the OLE forming part of the Edinburgh Tram Network at that location by way of a building fixing and not by any other method.

For the purposes of this Clause 20.10 such removal shall be a Mandatory **tie** Change and the provisions of Clause 80 (**tie** *Changes*) shall apply.

20.11 If having undertaken a survey pursuant to Clause 20.5.1.2, the Infraco is reasonably of the opinion that the building to which a building fixing is to be attached, modified or replaced cannot safely support the loadings which will be imposed upon it by such building fixing (or modification or replacement thereof) for as long as may be required in connection with the Edinburgh Tram Network and there is no alternative building at or around the same location to which the building fixing could reasonably be attached, and the Infraco submits to **tie** the survey and report upon which such opinion is based and either:

20.11.1 **tie** confirms in writing to the Infraco that it does not dispute such opinion; or

20.11.2 it is determined by the Dispute Resolution Procedure that such opinion is correct,

then the Infraco shall be entitled to select the method for supporting the OLE at that location subject to obtaining all necessary Consents or approval from the relevant planning authority.

20.12 If, following compliance with Clauses 20.2, 20.4 and 20.9, having used reasonable endeavours (including application of Good Industry Practice) and provided all necessary information in a timely fashion required to obtain a Consent for any building fixings, the granting of such Consent to the Infraco is either refused or is delayed, such refusal or delay shall be a Compensation Event pursuant to Clause 65 (*Compensation Events*).

20.13 Clauses 20.7, 20.8, and 20.9 shall apply equally to circumstances where a Building Fixing Agreement is entered into but the successor to the whole or any part of the interest of the Heritable Proprietor in question refuses to honour the terms of the same or to enter into a fresh Building Fixing Agreement as to when a Heritable Proprietor withholds consent envisaged by Clause 20.5.

20.14 Subject to Clauses 77.2, 77.3, 77.7 and 77.8 (and where applicable Clauses 16.72 and 16.73), Infraco shall indemnify CEC during the Term in respect of any payments properly made pursuant to Clause 4 of any Building Fixing Agreement to the extent that liability to make such payment has arisen as a result of the Infraco's breach of its obligations under this Agreement.

21. NEW ROADS AND STREET WORKS ACT 1991 AND UTILITIES DIVERSION

21.1 In this Clause 21 (*New Roads and Street Works Act 1991 and Utilities Diversion*) "**NRSWA**" shall mean the New Roads and Street Works Act 1991.

21.2 NOT USED

21.3 All other expressions common to the Act and to this Clause 21 (*New Roads and Street Works Act 1991 and Utilities Diversion*) shall have the same meaning assigned to them by NRSWA.

21.4 The Infraco shall obtain any street works licence, road opening permits and any other consent, licence or permission (other than any Land Consents) under NRSWA that may be required for the carrying out of the Infraco Works on public roads and shall supply **tie** with copies thereof including details of any conditions or limitations imposed.

21.5 The Infraco shall be responsible for giving to any relevant utility any required notice (or advance notice where prescribed) of its proposal to commence any work. A copy of each such notice shall be given to **tie**. The Infraco shall use reasonable endeavours to assist **tie** and CEC in relation to the operation of NRSWA to recover contribution from, where appropriate, any relevant statutory undertaker.

21.6 If at any time during the Term works are carried out on the Permanent Land:

21.6.1 by or on behalf of a utility;

21.6.2 by the roads authority or any other third party authorised to carry out such works by the roads authority;

except in any case where the works are executed by Infraco or an Infraco Party pursuant to Infraco's obligations under this Agreement ("**Third Party Works**");

21.6.3 Infraco shall not be in breach of and shall be relieved of its obligations under this Agreement to the extent such breach is caused by such Third Party Works; and

21.6.4 where such Third Party Works do not meet the standards set in the Employer's Requirements to which Infraco is obliged to maintain the Infraco Works in accordance with Clause 52, Infraco shall be relieved of its obligations to meet the standards set in Schedule Part 2 (*Employer's Requirements*) in relation to such Third Party Works and shall not be obliged to repair, reinstate or otherwise maintain such works except if otherwise instructed by **tie**, in which case such instruction will be a **tie** Change provided that the Infraco notifies **tie** promptly upon becoming aware of the occurrence of such Third Party Works.

22. ADVERSE PHYSICAL CONDITIONS AND ARTIFICIAL OBSTRUCTIONS

22.1 NOT USED

22.2 If at any time prior to 3 weeks before the commencement of engineering and construction activities (as shown in the Programme) on the affected area of the Site, the Infraco identifies or has reason to believe that there is unexploded ordnance, unidentified utility apparatus not listed in the Utilities Information or adverse physical conditions, ground conditions, artificial obstructions and/or land which is contaminated (other than land which is contaminated by the Infraco) and is not listed in the Ground Condition Information, the Infraco shall as early as practicable give written notice thereof to **tie**.

22.3 When giving written notice in accordance with Clause 22.2, the Infraco shall give details of (i) any anticipated effects of such unexploded ordnance, unidentified utility apparatus not listed in the Utilities Information, adverse physical conditions, ground condition, artificial obstructions or land which is contaminated, (ii) the measures it has taken, is taking or is proposing to take, (iii) the associated estimated costs, and (iv) the extent of the anticipated delay in or interference with the carrying out of the Infraco Works.

22.4 Following receipt of the notice by **tie** pursuant to Clause 22.2, **tie's** Representative shall:

22.4.1 require the Infraco to investigate and report upon the practicality, cost and timing of alternative measures which may be available; and/or

22.4.2 give written consent to the measures notified by the Infraco under Clause 22.3 with or without modification; and/or

22.4.3 give written instructions as to how the unexploded ordnance, utility apparatus which is not identified in Schedule Part 41 (*Ground Conditions and Utilities Information*), adverse physical conditions, ground condition, artificial obstructions or land which is contaminated are to be dealt with

and **tie's** Representative shall either order a suspension under Clause 87 (*Suspension of Work*) or instruct a **tie** Change in respect of the work to be carried out under this Clause 22.4 as a Mandatory **tie** Change under Clause 80 (**tie** *Changes*).

22.5 Notwithstanding the provisions of Clause 5 (*Provision and Interpretation of Information*), the discovery by Infraco at any time following the date 3 weeks before the commencement of engineering and construction activities (as stated in the Programme) on the affected area of the Site:

(a) unexploded ordnance;

(b) utility apparatus which is not identified in Schedule Part 41 (*Ground Conditions and Utilities Information*) and which could not have, or the nature of which could not have, reasonably been foreseen from the use of and interpolation from the Utilities Information; or

(c) adverse physical conditions, ground conditions, artificial obstructions and/or land which is contaminated, where such contamination has not been included in the Contract Price Analysis which could not have or the nature of which could not have reasonably been foreseen from the use of and interpolation from the Ground Condition Information;

shall be a Compensation Event in accordance with Clause 65 (*Compensation Events*) provided that:

22.5.1 the Infraco demonstrates to the reasonable satisfaction of **tie's** Representative that the Infraco has used its reasonable endeavours to adjust the order and sequence in which the Infraco proposes to execute the Infraco Works in order to minimise the effects of the delay in, or if possible to avoid altogether any delay in, the progress by the Infraco of the Infraco Works; and

22.5.2 the Infraco demonstrates to the reasonable satisfaction of **tie's** Representative that the Infraco has used its reasonable endeavours to minimise and mitigate any extra costs incurred in relation to such adverse physical conditions, ground conditions, artificial obstructions, unexploded ordnance, unidentified utility apparatus or land which is contaminated; and

22.5.3 the Infraco demonstrates to the reasonable satisfaction of **tie's** Representative that any claim for additional time relates to timing implications which exceed those that are contained within the Programme in relation to the discovery of unexploded ordnance, unidentified utility apparatus, adverse physical conditions, ground conditions, artificial obstructions or land which is contaminated.

23. ACCESS TO THE INFRACO WORKS, THE SITE AND WORKSHOPS ETC.

23.1 **tie**, **tie's** Representative and any person authorised by **tie** or **tie's** Representative shall upon reasonable prior notice being given have access during normal working hours to the areas where the Infraco Works are being carried out and to the Site (so far as the same is under the Infraco's control) and to all workshops and places where work is being prepared or whence materials, manufactured articles, machinery and equipment (including the Trams) are being obtained for the Infraco Works (including the premises of any Infraco Party) and the Infraco shall afford every facility for and every assistance in obtaining such access or the right to such access provided that such access shall not disrupt or interfere with the performance by Infraco or any Infraco Party of the Infraco Works and **tie** shall, and shall procure that **tie's** Representative and any person authorised by **tie** or **tie's** Representative shall, during any period when it or they have access to the Site, the Infraco Works and the Tram testing facilities, comply with all rules and regulations applicable to working at those premises for the safety of persons and convenience of the public.

24. USE OF THE DEPOT

24.1 On completion of the construction of the Depot, the Infraco shall enter into and execute the Depot Licence in the form set out in Schedule Part 32 (*Depot Licence*).

24.2 Subject to the Infraco executing the Depot Licence and complying with and procuring the Infraco Parties' compliance with the obligations in this Clause 24 (*Use of the Depot*) and the Depot Licence, the Infraco and the Infraco Parties shall have the right to access and use those parts of the Depot which the Infraco and the Infraco Parties properly require to so use for the purpose of carrying out the Infraco Works (including the Maintenance Services) in accordance with this Agreement.

24.3 The Infraco agrees that:

24.3.1 the right to access and use the Depot granted pursuant to this Clause 24 (*Use of the Depot*) and the Depot Licence shall terminate on the earlier of the Termination Date or the Expiry Date; and

24.3.2 the Infraco's and the Infraco Parties' right to use such parts of the Depot shall not create any relationship of landlord and tenant.

24.4 Neither CEC nor **tie** give any warranty as to the condition or fitness for purpose of the Depot.

24.5 Subject to the exception set out in Clause 77.2, **tie** and CEC shall not be liable for the death of or injury to persons or damage to any property or for any losses, claims, demands, actions, proceedings, damages, costs or expenses or other liability incurred by the Infraco and/or the Infraco Parties or any person in the use of the Depot.

24.6 Nothing in this Clause 24 (*Use of the Depot*) or the Depot Licence shall restrict **tie's** and **tie** Parties' absolute right of access to any part of the Depot at any time provided that if such access disrupts or interferes with the performance by Infraco or any Infraco Party of the Infraco Works, such disruption or interference shall be a Compensation Event.

PART 6 - PERSONNEL

25. TIE'S REPRESENTATIVE

25.1 Subject to Clause 25.2, **tie's** Representative may exercise the authority of **tie** specified in the Agreement. **tie's** Representative shall:

25.1.1 be responsible for the day to day monitoring of the Infraco Works to be performed by the Infraco;

25.1.2 exercise such functions and powers of **tie** under this Agreement as **tie** may notify in writing to the Infraco from time to time; and

25.1.3 be the primary point of contact for the Infraco with **tie**;

and the Infraco shall observe, and shall procure that any Infraco Party observes, all reasonable instructions of **tie** and **tie's** Representative given in accordance with this Agreement. The Infraco shall not and shall procure that any Infraco Party shall not act upon any instruction from any other party unless confirmed by **tie** or **tie's** Representative in writing. If the Infraco or any Infraco Party shall receive any such instructions, the Infraco shall notify **tie** or **tie's** Representative immediately.

25.2 **tie** may by notice in writing to the Infraco from time to time, restrict the authority of **tie's** Representative and/or require **tie's** Representative to obtain the specific approval of **tie** before exercising any such authority. In the event of such restriction or requirement, the Infraco shall look to **tie** to exercise the relevant authority or to confirm that **tie** has given the relevant approval.

25.3 Except as expressly stated in the Agreement, **tie's** Representative shall have no authority to amend the Agreement nor to relieve the Infraco of any of its obligations under the Agreement.

25.4 **tie** may by notice in writing to the Infraco change the identity of **tie's** Representative. **tie** shall consult with the Infraco prior to the appointment of any replacement for **tie's** Representative, taking account of the need for liaison and continuity in respect of this Agreement. Such change shall have effect on the date specified in the written notice.

25.5 During any period when a **tie's** Representative has not been appointed (or when **tie's** Representative is unable through illness, incapacity or any other reason whatsoever to carry out or exercise his functions under this Agreement), **tie** shall carry out the functions which would otherwise be performed by **tie's** Representative.

25.6 No decision, act or omission of **tie** or **tie's** Representative shall, except as otherwise expressly provided in this Agreement:

25.6.1 in any way relieve or absolve the Infraco from, modify, or act as a waiver or personal bar of, any liability, responsibility, obligation or duty under this Agreement;

25.6.2 in the absence of an express written instruction or authorisation issued by **tie** under Clause 80 (**tie** *Changes*) constitute or authorise a variation; or

25.6.3 be construed as restricting or binding **tie** in any way save with regard to the specific project matters to which it relates.

25.7 Where **tie's** Representative is not a single named individual, **tie's** Representative shall within 7 days of the Effective Date notify to the Infraco in writing the name of the individual who will act on its behalf and assume the full responsibilities of **tie's** Representative under the Agreement. **tie's** Representative shall thereafter in like manner notify the Infraco of any replacement of the named individual.

25.8 **tie's** Representative may from time to time delegate any of the duties and authorities vested in **tie's** Representative, and **tie's** Representative may at any time revoke such delegation. Any such delegation:

25.8.1 shall be in writing and shall not take effect until such time as a copy thereof has been delivered to the Infraco or the Infraco's Representative; and

25.8.2 shall continue in force until such time as **tie's** Representative shall notify the Infraco in writing that the same has been revoked.

25.9 Instructions given by **tie's** Representative or by any person exercising delegated duties and authorities under Clause 25.8 shall be in writing. Provided that if for any reason it is considered necessary to give any such instruction orally the Infraco shall comply therewith.

25.10 Any such oral instruction shall be confirmed in writing as soon as is possible under the circumstances. Provided that if the Infraco confirms in writing any such oral instruction which confirmation is not contradicted in writing by **tie's** Representative forthwith it shall be deemed to be an instruction in writing by **tie's** Representative.

25.11 Upon the written request of the Infraco, **tie's** Representative or the person exercising delegated duties or authorities under Clause 25.8 shall specify in writing under which of his duties and authorities the instruction is given.

26. INFRACO'S SUPERINTENDENCE AND KEY PERSONNEL

26.1 The Infraco shall provide all necessary superintendence during the construction and completion of the Infraco Works. Such superintendence shall be given by sufficient persons having adequate knowledge of the operations to be carried out (including the methods and

techniques required, the hazards likely to be encountered and methods of preventing accidents) for the satisfactory and safe construction of the Infraco Works.

26.2 The Infraco's senior representative on the Site ("**Infraco's Representative**") must be approved by **tie**, for which purpose the Infraco shall first provide **tie** with full details of the experience and qualifications of the Infraco's Representative.

26.3 The Infraco shall ensure that, so long as the Infraco's Representative remains an employee or servant of the Infraco and is not incapacitated by illness or otherwise nor absent in consequence of his reasonable holiday entitlement, the Infraco's Representative shall undertake overall supervision of the Infraco Works for whatever time may be required to ensure the completion of the Infraco Works in accordance with the Agreement. The Infraco's Representative shall be responsible for the safety of all Infraco Works.

26.4 The Infraco's Representative shall:

26.4.1 act as the principal point of contact for **tie**, and **tie's** Representative in relation to all matters related to this Agreement;

26.4.2 have full authority to act on behalf of the Infraco for all purposes of this Agreement, and **tie** and **tie's** Representative shall be entitled to treat all instructions and directions of the Infraco's Representative as those of the Infraco; and

26.4.3 manage and co-ordinate the provision of the Infraco Works by the Infraco (and any Sub-Contractor) and the integration of provision of the Infraco Works with the tasks being performed by **tie's** internal team and the other advisers and contractors appointed by **tie** (where such tasks have been notified to the Infraco), and liaise with **tie's** Representative in relation to matters arising in relation to the Infraco Works.

26.5 The Infraco's Representative shall not be changed by the Infraco without the consent of **tie** to such change (which consent shall not be unreasonably withheld or delayed) and the Infraco shall provide **tie's** Representative with full details of the experience and qualifications of the proposed substitute Infraco's Representative. The Infraco shall take account of the need for liaison and continuity in respect of the provision of the Infraco Works in accordance with the Programme when any change is proposed.

26.6 The Infraco shall also nominate a deputy to the Infraco's Representative. During any period when the Infraco's Representative is unable through illness, incapacity, annual leave or any other reason whatsoever to carry out or exercise his functions under this Agreement, such

deputy shall carry out the functions which would otherwise be performed by the Infraco's Representative.

26.7 **tie** may at any time request the removal from the Infraco Works of the Infraco's Representative or his deputy for reasons of incompetence or gross misconduct and request the prompt appointment of a satisfactory substitute, approved by **tie** and the Infraco shall provide **tie's** Representative with full details of the experience and qualifications of the proposed substitute.

26.8 Any costs incurred by the Infraco in replacing the Infraco's Representative (in any circumstances) shall be borne by the Infraco.

26.9 The Infraco shall ensure that the Key Personnel shall have day-to-day responsibility for and be involved in the performance of the Infraco Works.

26.10 In addition to the Key Personnel, there shall at all times be a sufficient number of staff (including all relevant grades of supervisory staff) available for the provision of the Infraco Works in accordance with this Agreement. This obligation shall include ensuring that there are sufficient staff to cover periods of holiday, sickness and other absences, and anticipated and actual peaks in servicing the requirements for the Infraco Works.

26.11 The Infraco shall locate staff at such locations as the Infraco considers convenient for the Infraco Works, provided that:

26.11.1 the Infraco acknowledges that it will not be entitled to any reimbursement from **tie** in relation to the travel of any person to or from Edinburgh, or for the accommodation or subsistence of any person visiting Edinburgh; and

26.11.2 **tie** will require the Infraco to make the Key Personnel available for meetings in Edinburgh at such times as **tie** may, in its absolute discretion direct subject to reasonable advance notice of such meetings being given by **tie** to the Infraco.

26.12 The Infraco shall, and shall use reasonable endeavours to procure that the Tram Supplier and Tram Maintainer, ensures that there are no changes to the Key Personnel without **tie's** prior written consent (such consent not to be unreasonably withheld or delayed) and that any replacement persons shall be of at least equivalent status and ability to the person whom they replace.

26.13 The Infraco shall use all reasonable endeavours to ensure the continuity of the personnel assigned to perform the Infraco Works and shall select Key Personnel having careful regard to those persons' existing work load and other planned commitments.

26.14 The Infraco shall ensure that its Key Personnel shall:

26.14.1 have the level of skill, experience and authority appropriate to (i) the Infraco Works to which such staff are allocated, and (ii) the standards to be achieved pursuant to this Agreement; and

26.14.2 receive such training and supervision as is necessary to ensure the proper performance of this Agreement and compliance with all regulatory requirements appropriate to and required for the performance of the Infraco Works in accordance with this Agreement.

26.15 All Key Personnel should have a nominated deputy who shall be capable of fulfilling the duties of the person to whom they are deputising in the event of their absence and who shall be kept fully informed of project status in the relevant area.

26.16 The Infraco shall not, during the period of this Agreement, contract or retain as an adviser or consultant, any person currently or previously employed or engaged as appropriate in the previous 3 months by **tie** unless the prior written approval of **tie** has been obtained. For the avoidance of doubt, this Clause 26.16 shall not apply to the SDS Provider, the Tram Supplier and the Tram Maintainer.

26.17 The Infraco shall (and shall procure that the Key Personnel, its staff employed in the performance of the Infraco Works and the Infraco Parties) comply with all regulatory requirements appropriate to and required for the performance of the Infraco Works, **tie's** Drug and Alcohol Policy.

26.18 The Infraco shall not at the Depot or at any premises from where any Infraco Parties carry out the Infraco Works and/or any obligations under this Agreement at any time allow the consumption of, or work under, the influence of alcoholic liquors or drugs or give, sell or barter any alcoholic liquors or drugs or permit or suffer any such gift, sale or barter to be made by any Infraco Party.

27. REMOVAL OF INFRACO'S EMPLOYEES

27.1 The Infraco shall employ or cause to be employed in and about the construction and completion of the Infraco Works and in the superintendence thereof only persons who are careful, skilled and experienced in their several trades and callings. The Infraco shall ensure

that its site supervisors and operatives who are involved in carrying out the Infraco Works shall have CSCS (or equivalent) certification, if relevant to the works they are performing.

27.2 Notwithstanding the provisions of paragraph 6 of parts A and B of Schedule Part 3 (*Code of Construction Practice and Code of Maintenance Practice*), **tie's** Representative shall be at liberty to object to and require the Infraco to remove or cause to be removed from the Infraco Works any person employed thereon who in the opinion of **tie's** Representative mis-conducts himself or is incompetent or negligent in the performance of his duties or fails to conform with any particular provisions with regard to safety which may be set out in this Agreement or persists in any conduct which is prejudicial to safety or health, and such persons shall not be again employed upon the Infraco Works without the permission of **tie's** Representative.

27.3 Any costs incurred by the Infraco in removing, or causing to be removed, a person in accordance with this Clause 27 (*Removal of Infraco's Employees*) shall be borne by the Infraco.

28. SUB-LETTING AND THE APPOINTMENT OF SUB-CONTRACTORS

28.1 The Infraco shall not sub-contract the whole of the Infraco Works.

28.2 Subject to Clauses 28.3 and 28.4, the Infraco may sub-contract part of the Infraco Works with the prior written approval of **tie**, to a sub-contractor, supplier, sub-consultant, specialist and/or other party for performance of that specific part of the Infraco Works. The consent of **tie** shall be deemed to have been given to the appointment of the Tram Supplier, the SDS Provider and the Tram Maintainer. The consent of **tie** shall also be deemed to have been given to the appointment of the sub-contractors listed in Schedule Part 38 (*Approved Suppliers and Sub-Contractors and Trades*) and to the listed aspects of the Infraco Works and/or trades required for the Infraco Works in respect of which the Infraco may appoint a sub-contractor, sub-consultant, specialist and/or other party.

28.3 In respect of the Key Sub-Contractors not already approved and listed in Schedule Part 38 (*Approved Suppliers and Sub-Contractors and Trades*), the Infraco shall supply a reasonable level of relevant information (including curriculum vitae, information on relevant experience and technical capacity, insurance details and the methodology for provision of the sub-let works) required by **tie** to enable a decision to be made by **tie** on the suitability of the proposed Key Sub-Contractors to perform the relevant part of the Infraco Works. **tie's** decision on the use of and identity of any sub-contractor, supplier, sub-consultant, specialist and/or other party shall not be unreasonably withheld or delayed provided that **tie** is entitled to so withhold its decision if:

28.3.1 **tie** considers that the proposed Key Sub-Contractor has an unacceptable safety record;

28.3.2 such Key Sub-Contractor will not provide a collateral warranty in accordance with Clause 28.7 unless Infraco provides a collateral warranty in accordance with Clause 28.10;

28.4 The Infraco shall obtain **tie's** approval to the form of sub-contract for any work which is to be sub-contracted to each Key Sub-Contractor in advance of such sub-contract's execution. **tie** shall notify the Infraco of its approval within 10 Business Days of a request for such approval by the Infraco which approval may only be withheld by **tie** acting reasonably if:

28.4.1 the sub-contract does not in substance reflect the Infraco and the relevant Key Sub-Contractor as parties to such sub-contract, the provisions listed in Schedule Part 38 (*Approved Suppliers and Sub-Contractors and Trades*) Part II in so far as they relate to the work that is to be sub-contracted; or

28.4.2 the terms of the sub-contract will result in Infraco being unable to perform its obligations under this Agreement.

28.5 The Infraco shall, and shall procure that every Sub-Contractor shall, provide and employ in connection with the execution of the Infraco Works:

28.5.1 only such technical assistants as are skilled, experienced and assessed as competent for undertaking a specified range of activities in their respective occupations and, as appropriate, such sub-agents, foremen and leading hands as are competent to give proper supervision to the work they are required to supervise; and

28.5.2 such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely execution of the Infraco Works.

28.6 Notwithstanding the provisions of paragraph 6 of parts A and B of Schedule Part 3 (*Code of Construction Practice and Code of Maintenance Practice*), **tie's** Representative shall be at liberty after due warning in writing to require the Infraco to remove from the Infraco Works any employee of the Infraco and/or an employee of a Sub-Contractor who mis-conducts itself or is incompetent or negligent in the performance of its duties or fails to conform with any particular provisions with regard to safety which may be set out in the Agreement or persists in any conduct which is prejudicial to safety or health and such employee shall not be again employed upon the Infraco Works without the permission of **tie's** Representative.

28.7 Subject to Clause 28.10, the Infraco shall procure that every Key Sub-Contractor (excluding the Tram Supplier, the Tram Maintainer and the SDS Provider) provide to **tie** a collateral warranty prior to the date of execution of the relevant sub-contract:

28.7.1 in favour of **tie** in the form set out in part F of Schedule Part 8, (*Bonds, Parent Company Guarantees and Collateral Warranties*) with only such amendments as **tie** may approve such approval to be provided by **tie** within 10 Business Days of receipt of the proposed collateral warranty; and/or

28.7.2 in favour of CEC, EAL, TEL and Network Rail (in this case, where relevant to Network Rail infrastructure, the operational railway and railway assets or its safety case and emergency procedures) in respect of carrying out the Infraco Works in the form set out in part F of Schedule Part 8 (*Bonds, Parent Company Guarantees and Collateral Warranties*) or in the case of EAL in the form set out in Appendix 8 to Schedule Part 44 (*EAL Works*); or

28.7.3 where the form referred to in Clause 28.7.1 or 28.7.2 cannot be obtained, in a different form acceptable to both Parties acting reasonably and taking account of industry practice and in the case of a collateral warranty to be granted in favour of any person other than **tie**, the beneficiary's requirements.

28.8 NOT USED.

28.9 Subject to Schedule Part 4 (*Pricing*) the Infraco shall be and shall remain wholly liable to **tie** under this Agreement for carrying out and completing the Infraco Works including any part of the Infraco Works carried out by any Sub-Contractor.

28.10 In any case where the Infraco is unable to obtain a collateral warranty from a Key Sub-Contractor in accordance with Clause 28.7 and can demonstrate to **tie's** satisfaction that it has used reasonable endeavours to do so prior to entering into contract with such Key Sub-Contractor the Infraco shall, if so required by **tie**, expressly warrant the Key Sub-Contractor's works in the form as would have been granted by the Key Sub-Contractor with the exception of the cap on liability under such collateral warranty which shall be expressed in the same terms as the Infraco Collateral Warranty. The inability to provide the collateral warranty from the Key Sub-Contractor in the circumstances described in this sub-clause shall not constitute a breach of this Clause 28.

PART 7 - GENERAL CONSTRUCTION AND MAINTENANCE OBLIGATIONS

29. SETTING-OUT

29.1 Save in relation to the Tram Maintenance Services and the Tram Supply Obligations, until the issue of the Patent Defects Rectification Certificate in terms of Clause 46, the Infraco shall be responsible for the accurate setting-out of the Infraco Works and for the correctness of the position, levels, dimensions and alignment of all parts of the Infraco Works and for the provision of all necessary instruments, appliances and labour in connection therewith.

29.2 Save in relation to the Tram Maintenance Services and the Tram Supply Obligations, until the issue of the Patent Defects Rectification Certificate in terms of Clause 46, if at any time during the progress of the Infraco Works, any error shall appear or arise in the position, levels, dimensions or alignment of any part of the Infraco Works, the Infraco, on being required so to do by **tie's** Representative, shall at its own cost rectify such error to the satisfaction of **tie's** Representative (acting reasonably).

29.3 The checking of any setting-out or of any line or level by **tie's** Representative shall not in any way relieve the Infraco of its responsibility for the correctness thereof and the Infraco shall carefully protect and preserve all bench-marks, sight rails, pegs and other things used in setting out the Infraco Works.

30. SAFETY AND SECURITY

30.1 The Infraco shall throughout the execution and completion of the Infraco Works have full regard for the safety of all persons entitled to be upon the Site and shall keep the Site (so far as the same is under its control) and the Infraco Works, in an orderly state appropriate to the avoidance of danger to such persons.

30.2 The Infraco shall provide and maintain at its own cost all lights, guards, fencing, warning signs and watching when and where necessary, or required by **tie's** Representative (acting reasonably), or required in accordance with Schedule Part 3 (*Code of Construction Practice and Code of Maintenance Practice*), and/or in accordance with Good Industry Practice or by any statutory or other competent authority for the protection of the Infraco Works or for the safety of the public or others whilst minimising inconvenience.

30.3 The Infraco shall comply with, shall procure that the Infraco Parties shall comply with all their respective duties and obligations under all Law and requirements having the force of law relating to the health, safety and conduct of construction or maintenance operations.

30.4 The Infraco shall use reasonable endeavours to procure that other persons authorised to be on the Designated Working Area (so far as the same is under its control) comply with all their respective duties and obligations under all Law and requirements having the force of law relating to the health, safety and conduct of construction or maintenance operations.

31. CARE OF THE INFRACO WORKS

31.1 Save in respect of the Trams and Tram Related Equipment, the Infraco shall take full responsibility for the care of the Infraco Works from the Commencement Date until, in relation to each Section, the date of issue of a Certificate of Sectional Completion in relation to that Section.

31.2 In relation to each Section, from the date of issue of a Certificate of Sectional Completion in relation to that Section the provisions of Clause 52 (*Maintenance*) shall apply.

31.3 In the event of any loss or damage to the Infraco Works or part thereof while the Infraco is responsible for the care thereof in terms of Clause 31.1, the Infraco shall subject to Clauses 76.17, 76.18, 76.19A, 76.19B, 76.19C, 76.19 and 76.30 at its own cost rectify such loss or damage so that the Infraco Works conform in every respect, subject to Clause 76, with the provisions of this Agreement.

31.4 The Infraco shall take full responsibility for the care of the Trams and Tram Related Equipment from the Commencement Date until, in relation to each Tram and item of Tram Related Equipment, the date of issue of a Certificate Tram Commissioning in relation to that Tram.

31.5 In relation to each Tram and item of Tram Related Equipment from the date of issue of a Certificate of Tram Commissioning in relation to that Trams the Infraco shall comply with the provisions of Clause 52 (Maintenance).

31.6 In the event of any loss or damage to the Trams or the Tram Related Equipment while the Infraco is responsible for the care thereof in the terms of Clause 31.4, the Infraco shall, subject to Clause 76.17, 76.18, 76.19A, 76.19B, 76.19C, 76.19 and 76.30 at its own cost rectify such loss or damage so that the Trams or the Tram Related Equipment conform in every respect with the provisions of this Agreement. For avoidance of doubt, the Infraco shall have no responsibility in connection with damage to the Trams or Tram Related Equipment which is caused by vandalism occurring after the date of delivery to the Depot and the relevant Certificate of Tram Commissioning.

32. INTERFERENCE WITH TRAFFIC AND ADJOINING PROPERTIES

32.1 The Infraco shall comply with the requirements of Schedule Part 3 (*Code of Construction Practice and Code of Maintenance Practice*) with regard to the maintenance of access to properties, bus stops and bus services and the closure of roads.

32.2 The Infraco shall at all times seek to minimise any nuisance or inconvenience to or interference with the business or operations of the owners, tenants or occupiers of the Site or other premises upon or in the locality of the Site, to all bus operations and to the public generally, including measures to reduce the nuisance from noise, dust, smell, fumes and vibration during the carrying out of the Infraco Works. The Infraco shall comply with the requirements of Schedule Part 3 (*Code of Construction Practice and Code of Maintenance Practice*) in this regard.

33. AVOIDANCE OF DAMAGE TO ROADS AND BRIDGES

33.1 The Infraco shall use every reasonable means to prevent any of the roads or bridges communicating with or on the route to the Site from being subjected to extraordinary traffic within the meaning of the Roads (Scotland) Act 1984 by any traffic of the Infraco or any Infraco Party. In particular, the Infraco shall select routes and use vehicles and restrict and distribute loads so that any such extraordinary traffic as will inevitably arise from the moving of the Infraco's Equipment and materials or manufactured or fabricated articles from and to the Site shall be limited as far as reasonably possible and so that no unnecessary damage or injury may be occasioned to such roads and bridges.

33.2 The Infraco shall be responsible for and shall pay the cost of strengthening any bridges or altering or improving any road communicating with or on the route to the Site to facilitate the delivery of the Trams by the Tram Supplier and the installation of the Infraco's Equipment or Temporary Works required in the carrying out of the Infraco Works. Subject to Clauses 77.3, 77.7 and 77.8, the Infraco shall indemnify and keep indemnified **tie** against all claims for damage to any road or bridge communicating with or on the route to the Site caused by such movement including such claims as may be made by any competent authority directly against **tie** and/or CEC pursuant to any Law or other statutory instrument and shall negotiate and pay all claims arising solely out of such damage.

33.3 If, notwithstanding Clause 33.1, any damage occurs to any bridge or road communicating with or on the route to the Site arising from the delivery of the Trams by the Tram Supplier, materials or manufactured or fabricated articles being or intended to form part of the Infraco Works and/or the Temporary Works, the Infraco shall notify **tie's** Representative as soon as

the Infraco becomes aware of such damage or as soon as the Infraco receives any claim from the authority entitled to make such claim. **tie** shall not be liable for any costs, charges or expenses in respect thereof in relation thereto.

34. WORK TO BE TO SATISFACTION OF TIE

34.1 The Infraco shall construct and complete the Infraco Works in strict accordance with this Agreement and shall comply with and adhere strictly to **tie** and **tie's** Representative's instructions on any matter connected therewith (whether mentioned in this Agreement or not) provided that such instructions are given in accordance with the terms of this Agreement and will not cause Infraco to be in breach of this Agreement. The Infraco shall take instructions only from **tie**, **tie's** Representative, subject to Clause 25.8, from **tie's** Representative's duly appointed delegate or the Operator or Operator's Representative in accordance with 17.10.

34.2 The whole of the materials, Infraco's Equipment and labour to be provided by the Infraco under Clause 7 (*Duty of Care and General Obligations in Relation to the Infraco Works*) and the mode, manner and speed of construction of the Infraco Works are to be in accordance with this Agreement.

34.3 If in pursuance of Clause 34.1 (including for the avoidance of doubt any instructions of **tietie's** Representative, of **tie's** Representative's duly appointed delegate or of the Operator or Operator's Representative in accordance with 17.10 deemed to have been given pursuant or in accordance with Clause 34.1), **tie's** Representative shall issue instructions which involve the Infraco in delay or disrupt its arrangements or methods of construction or so as to cause the Infraco to incur cost then such instructions shall be a Compensation Event under Clause 65 (*Compensation Events*) except to the extent that either such instructions have been required as a consequence of the Infraco's breach of its obligations under this Agreement or such delay and/or extra cost result from the Infraco's default. If such instructions require any variation to any part of the Infraco Works, **tie** shall be deemed to have issued a **tie** Notice of Change requiring such variation, which **tie** Change shall be a Mandatory **tie** Change.

35. QUALITY OF MATERIALS AND WORKMANSHIP, SAMPLES AND TESTS

35.1 Save in relation to the Tram Supply Obligations and Tram Maintenance Services all materials and workmanship shall be the respective kinds described in this Agreement or where the Agreement is silent, to the standard proposed by the Infraco and reviewed in accordance with Schedule Part 14 (*Design Review and Design Management Plan*). Save in relation to the Tram Supply Obligations and Tram Maintenance Services all materials and workmanship shall be subjected to such tests as may be specified in this Agreement at the place of manufacture or

fabrication or preparation or on the Site or such other place or places. The Infraco shall undertake such testing and provide such assistance, instruments, machines, stores, labour and materials as are normally required for examining, measuring and testing any work and the quality, weight or quantity of any materials used, and shall supply samples of materials before incorporation or use in the Infraco Works for testing as may be selected and required by this Agreement, provided that in relation to the Tram Supply Obligations and Tram Maintenance Services all such materials and workmanship shall be the respective kinds and described and shall be subjected to such tests as may be specified in the Tram Supply Agreement and Tram Maintenance Agreement respectively.

35.2 All samples shall be supplied by the Infraco at its own cost.

35.3 The costs of making any test identified in this Agreement shall be borne by the Infraco. Subject to Clauses 36 and 35.4, in the event that the Infraco is required in accordance with Clause 35.1 to undertake any test which is not identified in this Agreement but is required by **tie**, the requirement to undertake such test shall be a **tie** Change.

35.4 In the event that the Infraco is required in accordance with Clause 35.1 to undertake any test which is not identified in this Agreement but is required by **tie** as a result of a breach by the Infraco of its obligations under this Agreement, then the costs of making such test shall be borne by the Infraco.

36. EXAMINATION OF WORK BEFORE COVERING UP

36.1 Save in relation to the Tram Maintenance Services and the Tram Supply Obligations, no work shall be covered up or put out of view without the consent of **tie's** Representative (acting reasonably), and the Infraco shall afford full opportunity for **tie's** Representative and any other parties authorised by **tie** to examine any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereon. Save in respect of unscheduled or reactive maintenance, the Infraco shall give no less than 48 hours notice to **tie's** Representative whenever any such work or foundations are ready or about to be ready for examination and **tie's** Representative shall within 48 hours of such notice, unless he considers it unnecessary and advises the Infraco accordingly, attend for the purpose of examining such work or of examining such foundations.

36.2 Save in relation to the Tram Maintenance Services and the Tram Supply Obligations, the Infraco shall uncover any part or parts of the Infraco Works or make openings in or through the same as **tie's** Representative may from time to time direct and shall reinstate and make good such part or parts to the satisfaction of **tie's** Representative (acting reasonably). If any

such part or parts have been covered up or put out of view after compliance with the requirements of Clause 36.1 and are found to have been carried out in accordance with the Agreement, the cost of uncovering, making openings in or through, reinstating and making good the same shall be borne by **tie** and Infraco will be entitled to include such costs in its next application for payment but in any other case all such costs shall be borne by the Infraco.

37. REMOVAL OF UNSATISFACTORY WORK AND MATERIALS

37.1 Save in relation to the Tram Supply Obligations and Tram Maintenance Services **tie's** Representative shall during the progress of the Infraco Works have power to instruct in writing:

37.1.1 the removal from the Site within such reasonable time or times specified in the instruction, of any materials which are not in accordance with the Agreement ; and/or

37.1.2 substitution of such materials with materials in accordance with the Agreement ; and/or

37.1.3 the removal and proper replacement (notwithstanding any previous test thereof or interim payment therefor) of any work which in respect of:

37.1.3.1 materials or workmanship; or

37.1.3.2 design by the Infraco for which the Infraco is responsible;

is not in accordance with the Agreement . After consultation with the Infraco and with the agreement of **tie**, **tie's** Representative may allow all or any of such materials, workmanship or design to remain and confirm this in writing to the Infraco (which shall not constitute a **tie** Change under Clause 80 (**tie** *Changes*)) and in which case the use of such materials in accordance with this Agreement shall not be a breach of this Agreement.

37.2 In the case of default on the part of the Infraco in carrying out such instruction, **tie** shall be entitled to carry out or procure the carrying out of such instruction, and all costs and expenses properly incurred by **tie** in relation to such default shall be recoverable from the Infraco by **tie** and may be deducted by **tie** from any monies due or to become due to the Infraco.

37.3 Failure of **tie** or **tie's** Representative to disapprove any work or materials shall not prejudice the power of **tie** or **tie's** Representative subsequently to take action under this Clause 37 (*Removal of Unsatisfactory Work and Materials*).

37.4 If any workmanship or materials are not in accordance with this Agreement, **tie's** Representative may issue such orders or directions under Clauses 35 (*Quality of Materials and Workmanship, Samples and Tests*) or Clause 36 (*Examination of Work Before Covering Up*) to test or open up for inspection as are reasonable in the circumstances to establish the likelihood or extent, as appropriate to the circumstances, of any further similar non-compliance.

37.5 To the extent that such orders or directions issued pursuant to Clause 37.4 are as a result of previous and repeated non-compliance, whatever the result of the test or opening up, and notwithstanding Clauses 35.3, 36.2 and 48 (*Infraco to Search*), the cost of such test or opening up and the cost of reinstatement shall be borne by the Infraco. The orders or directions shall not constitute **tie** Changes under Clause 80 (**tie** *Changes*) but shall, unless the test or inspection showed that the workmanship or materials were not in accordance with the Agreement, be a Relief Event under Clause 64 (*Relief Events*).

38. URGENT REPAIRS AND EMERGENCIES

38.1 In accordance with the provisions of paragraph 6 of parts A and B of Schedule 3 (*Code of Construction Practice and Code of Maintenance Practice*), if, in the opinion of **tie's** Representative (acting reasonably), any remedial or other work or repair is necessary by reason of any emergency, accident or failure or other event giving rise to an immediate threat to health and safety (including users and/or members of the public) during the carrying out of the Infraco Works, **tie's** Representative shall so inform the Infraco with confirmation in writing.

38.2 Thereafter, if the Infraco is unable or unwilling to carry out such work or repair in accordance with the appropriate time period identified in paragraph 6 of parts A and B of Schedule Part 3 (*Code of Construction Practice and Code of Maintenance Practice*), **tie** may itself carry out or procure the carrying out of the said work or repair.

38.3 If the work or repair so carried out by **tie** is work which the Infraco was liable to carry out at its own expense under the Agreement, all costs and expenses properly incurred by **tie** in relation to such work shall be recovered from the Infraco by **tie** and may be deducted from any monies due or to become due to the Infraco.

38.4 If the Infraco carries out such work or repair, the Infraco shall be paid in accordance with Clause 67 (*Payment in Respect of Applications for Milestone Payments*) or Clause 68 (*Payment in Respect of Maintenance Services*) the amount of any direct and demonstrable costs as may be reasonable except to the extent that such extra cost results from the Infraco's default.

39. FOSSILS AND ANTIQUITIES

39.1 All fossils, EAL Artefacts, antiquities, and other objects having artistic, historic or monetary value and human remains which may be found on or at the Site are or shall become, upon discovery, the absolute property of CEC or, in the case of the EAL Artefacts, EAL.

39.2 Upon discovery of any such item during the course of the Infraco Works, the Infraco shall:

39.2.1 immediately inform **tie's** Representative of such discovery;

39.2.2 take all steps not to disturb the object and, if necessary, cease any Infraco Works in so far as the carrying out of such Infraco Works would endanger the object or prevent or impede its excavation; and

39.2.3 take all necessary steps to preserve the object in the same position and condition in which it was found.

39.3 **tie** shall procure that **tie's** Representative promptly, and in any event within 3 Business Days of notice being given by the Infraco pursuant to Clause 39.2.1, issues an instruction to the Infraco specifying what action **tie's** Representative requires the Infraco to take in relation to such discovery.

39.4 The Infraco shall promptly and diligently comply with any instruction issued by **tie's** Representative referred to in Clause 39.3 and such instruction shall be a **tie** Change and Clause 80 (**tie** *Changes*) shall apply.

39.5 If directed by **tie's** Representative, the Infraco shall allow representatives of **tie** to enter the Site for the purposes of removal or disposal of such discovery provided that such entry shall be subject to **tie** complying with all relevant safety procedures, which shall include the Infraco's site rules and any reasonable directions with regard to site safety that may be issued by or on behalf of the Infraco's Representative from time to time.

40. ERRORS AND/OR OMISSIONS IN THE INFRACO WORKS

40.1 Subject to the limitation in respect of the duration of Infraco's liability for Patent Defects and latent defects under this Agreement if during the carrying out of the Infraco Works and/or where the Infraco has completed the Infraco Works, **tie** becomes aware of any error or omission in the carrying out of the Infraco Works or of any other breach of this Agreement by Infraco (except where such error, omission or breach has been caused by a Notified Departure, Compensation Event, Relief Event or **tie** Change in relation to the element of the works

affected by such Notified Departure, Compensation Event or Relief Event) **tie** shall notify the Infraco, who shall, at its own expense and in liaison with **tie**, rectify any error or omission or breach, or where this is agreed by **tie** to be impracticable or undesirable, take such other agreed steps to address the error or omission.

40.2 Any reasonable and demonstrable direct costs to **tie** associated with the Infraco remedying any such errors or omissions or breaches shall be paid by the Infraco to **tie**.

40.3 These arrangements shall in no respect diminish **tie's** ability to recover damages from the Infraco for losses incurred by **tie** consequent upon the error or omission or breach in question.

40.4 If and to the extent that the Infraco fails to carry out the necessary rectification and/or other agreed steps in accordance with Clause 40.1 to **tie's** reasonable satisfaction and/or within a reasonable period of time, **tie** shall be entitled to carry out such rectification and/or other agreed steps itself, or procure the carrying out by a third party of such rectification and/or other agreed steps at the Infraco's expense and shall recover any costs from the Infraco as a debt.

PART 8 - MILESTONE COMPLETION, TESTING AND COMMISSIONING

41. COMPLETION OF CONSTRUCTION MILESTONES AND CRITICAL MILESTONES

41.1 The Infraco shall give **tie's** Representative not less than 14 Business Days notice of the date upon which the Infraco considers that any of the Construction Milestones or Critical Milestones will be achieved and the associated tests to be undertaken in accordance with the Employer's Requirements carried out. **tie's** Representative shall be entitled to inspect the Infraco Works on the date or dates reasonably specified by the Infraco in accordance with this Clause 41.1, and to attend any of the tests to be carried out. The Infraco shall procure that such of its staff as **tie** may reasonably request shall accompany **tie's** Representative on any such inspection. If **tie's** Representative does not in accordance with this Clause 41.1 attend any tests, or does not carry out an inspection on the date or dates specified by the Infraco in Infraco's notice he shall be entitled, upon giving reasonable notice to the Infraco, to specify a new date or dates for his attendance at such tests or for the carrying out of such an inspection. **tie's** Representative's failure to attend such tests or to carry out such inspections (or rearranged inspections or tests) and the carrying out of such tests or inspections on the new dates notified by the **tie** Representative shall be a Compensation Event and Clause 65 shall apply.

41.2 Within 7 Business Days of any inspection made pursuant to Clause 41.1, **tie's** Representative shall notify the Infraco of any outstanding matters (including further evidence of achievement

of the Construction Milestone or Critical Milestone and the repetition of any of the tests which are required to be carried out and passed in accordance with the Employer's Requirements) which must be attended to before the relevant Construction Milestone or Critical Milestone will have been achieved in accordance with this Agreement. The Infraco shall attend to all such matters and shall, if necessary, give **tie** further notices in accordance with Clause 41.1 (but dealing only with matters raised in the notification under this Clause 41.2) so that the procedures in Clause 41.1 and this Clause 41.2 are repeated as often as may be necessary to ensure that all outstanding matters in relation to the Construction Milestone or Critical Milestone are attended to. Conduct of all tests, including repetitions, in accordance with the Employer's Requirements shall be at the cost and under the responsibility of the Infraco.

41.3 The Infraco shall notify **tie** when a Construction Milestone or a Critical Milestone has been achieved in accordance with this Agreement and **tie's** Representative shall issue the relevant Construction Milestone Completion Certificate or Critical Milestone Completion Certificate (as appropriate) to that effect stating the date upon which the Construction Milestone or Critical Milestone was achieved. The issue of a Construction Milestone Completion Certificate or Critical Milestone Completion Certificate shall, in the absence of manifest error, bad faith or fraud, be conclusive evidence for the purpose only of ascertaining that the Construction Milestone or Critical Milestone have been achieved on the date stated in such certificate.

42. COMPLETION AND CERTIFICATION OF TRAM MILESTONES

42.1 The Tram Milestones are as shown in Schedule 5 to the Tram Supply Agreement and as shown in the Programme.

42.2 Certification of tram vehicle delivery and tram vehicle commissioning and testing shall be carried out as stipulated pursuant to the Tram Supply Agreement. The issue of a Certificate of Tram Delivery and issue of a Certificate of Tram Commissioning by the Tram Inspector shall be deemed to be certification of the achievement of the relevant Construction Milestone or Critical Milestone under the Infraco Contract. The Tram Mobilisation Milestone shall be deemed to have been achieved on signature of the Tram Supply Agreement. All other Tram Milestones as set out in Schedule 5 to the Tram Supply Agreement and the Tram Maintenance Mobilisation Milestones will be certified as complete jointly by Infraco and the **tie** Representative when the activities referred to are complete in accordance with the Tram Supply Agreement and the Tram Maintenance Agreement and such certification shall be deemed to be achievement of a relevant Construction Milestone or Critical Milestone under the Infraco Contract.

43. TRAM INSPECTOR

43.1 NOT USED.

43.2 NOT USED

43.3 NOT USED.

43.4 Neither **tie** nor the Infraco shall, without the other's prior written approval (not to be unreasonably withheld or delayed):

43.4.1 terminate, repudiate or discharge the Tram Inspector Agreement or treat the same as having been terminated, repudiated or otherwise discharged;

43.4.2 waive, settle, compromise or otherwise prejudice any rights or claims which the other may from time to time have against the Tram Inspector; or

43.4.3 vary the terms of the Tram Inspector Agreement or the service performed or to be performed by the Tram Inspector.

43.5 The Parties shall comply with and fulfil their respective duties and obligations arising under the Tram Inspector Agreement.

43.6 The Parties agree to co-operate with each other generally in relation to all matters within the scope of or in connection with the Tram Inspector Agreement. All instructions and representations issued or made by either of the Parties to the Tram Inspector shall be simultaneously copied by that Party to the other and both Parties shall be entitled to attend all inspections undertaken by or meetings involving the Tram Inspector Agreement.

43.7 In the event of the Tram Inspector's appointment being terminated otherwise than following full performance, the Parties shall liaise and co-operate with each other in order to appoint a replacement consultant to act as the Tram Inspector as soon as reasonably practicable. The identity of any such replacement shall be as agreed by the Parties and the terms of his appointment shall, unless otherwise agreed, be as set out in the Tram Inspector Agreement.

43.8 In the event that, pursuant to Clause 43.7, it is necessary to appoint a replacement consultant, the Parties shall as soon as reasonably practicable, in compliance with all Law relating to procurement which is applicable to either Party, appoint a suitably qualified and experienced consultant to act as the Tram Inspector for the purpose of this Agreement.

43.9 In the event that the Parties fail to agree the identity and/or terms of a replacement Tram Inspector in accordance with Clause 43.7, within 60 days of the previous Tram Inspector's appointment being terminated, then either Party may refer the matter for determination under the Dispute Resolution Procedure.

43.10 **tie** shall be responsible for the cost of the appointment and services of the Tram Inspector.

44. NOTIFICATION OF SECTIONAL COMPLETION OF SECTIONS A, B, C AND D

44.1 The Infraco shall give **tie's** Representative not less than 14 Business Days notice of the dates when the relevant Systems Acceptance Tests are to be carried out and the date upon which the Infraco considers that each of Section A, Section B, Section C and Section D will be substantially completed, commissioned and will have satisfactorily passed the relevant Systems Acceptance Tests. **tie's** Representative shall inspect the Infraco Works on the date or dates reasonably specified by the Infraco in accordance with this Clause 44.1 and to attend any of the tests to be carried out. The Infraco shall procure that such of its staff as **tie** may reasonably request shall accompany **tie's** Representative on any such inspection.

44.2 Within 7 Business Days of any inspection made pursuant to Clause 44.1, **tie's** Representative shall notify the Infraco of any outstanding matters (including further evidence of achievement of substantial completion or commissioning and the repetition of any of the relevant System Acceptance Tests which are required to be carried out and passed in accordance with the Employer's Requirements) which must be attended to before the Section will have been substantially completed, tested and commissioned in accordance with this Agreement. The Infraco shall attend to all such matters and shall, if necessary, give **tie** further notices in accordance with Clause 44.1 (but dealing only with matters raised in the notification under this Clause 44.2) so that the procedures in Clause 44.1 and this Clause 44.2 are repeated as often as may be necessary to ensure that all outstanding matters in relation to the Section are attended to. Conduct of all tests, including repetitions, in accordance with the Employer's Requirements shall be at the cost and under the responsibility of the Infraco.

44.3 When a Section has been substantially completed, tested and commissioned in accordance with this Agreement, **tie's** Representative shall issue a Certificate of Sectional Completion to that effect stating the date upon which, the Section was substantially completed, tested and commissioned provided always that a Certificate of Sectional Completion shall not be issued:

44.3.1 in respect of Section B, unless a Certificate of Sectional Completion has already been issued in respect of Section A, except where **tie**, acting reasonably, decides otherwise; and

44.3.2 in respect of Section C, unless a Certificate of Sectional Completion has already been issued in respect of both Section A and Section B; and

44.3.3 in respect of Section D, unless a Certificate of Sectional Completion has been already issued in respect of Section A, Section B and Section C.

44.4 The issue of a Certificate of Sectional Completion shall, in the absence of manifest error, bad faith or fraud, be conclusive evidence for the purpose only of ascertaining that the Sectional Completion Date has occurred on the date stated in such certificate.

44.5 **tie** shall be entitled to apply a retention of 10% of any Milestone Payment payable on the issue of any Certificate of Sectional Completion for Sections A, B and C, if **tie** is not satisfied that all Consents (other than **tie** Consents) relating to the installation of the Infraco Works relevant to each Section have been obtained, are in full force and effect and are unconditional to the extent practicable at the particular stage of the Infraco Works, (unless where a Consent is conditional, such condition relates only to the passage of time) until such time as such Consents have been obtained.

44.5A The issue of the Certificate of Section Completion for Section D pursuant to Clause 45.3 (*Notification of Service Commencement*) shall be conditional upon **tie** being satisfied that all Design Stage Consents and Construction or Maintenance Stage Consents relating to the issue of the Certificate of Section Completion and required to enable **tie** to legally commence full operation of Edinburgh Tram Network for passenger service (the "**Necessary Consents**") have been obtained by the Infraco and are in full force and effect and are unconditional to the extent practicable at the particular stage of the Infraco Works or, if conditional, such conditionality relates only to the passage of time before the Necessary Consents comes into full force and effect.

The absence of any Necessary Consents (save for the reasons above) shall entitle **tie** to apply a retention of 10% of the relevant Milestone Payment until the Infraco has obtained all such outstanding Necessary Consents.

44.6 For the purposes of this Clause 44 (*Notification of Sectional Completion of Sections A, B, C and D*), 'substantial completion' shall mean successful testing and commissioning of the Section in accordance with the relevant System Acceptance Tests and the provision of all relevant documents all in accordance with Schedule Part 2 (*Employer's Requirements*). **tie's** Representative may at his absolute discretion issue a Certificate of Sectional Completion notwithstanding that minor items of work ("**Snagging**") and, in relation to the issue of a Certificate of Sectional Completion for Section D, Patent Defects remain to be completed, in

which event such incomplete work and/or commissioning and/or adjustment shall be completed by the Infraco in accordance with the provisions of Clause 46 (*Snagging and Patent Defects*). **tie** shall identify any such Snagging on a Snagging List.

45. NOTIFICATION OF SERVICE COMMENCEMENT

45.1 The Infraco shall give **tie's** Representative not less than 14 Business Days notice of the date upon which the Infraco considers that Section D will be substantially completed, commissioned and will have satisfactorily passed the Systems Acceptance Tests. **tie's** Representative shall inspect the Infraco Works on the date or dates reasonably specified by the Infraco in accordance with this Clause 45.1 and to attend any of the tests to be carried out. The Infraco shall procure that such of its staff as **tie** may reasonably request shall accompany **tie's** Representative on any such inspection.

45.2 Within 7 Business Days of any inspection made pursuant to Clause 45.1, **tie's** Representative shall notify the Infraco of any outstanding matters (including further evidence of achievement of substantial completion or commissioning and the repetition of any of the Systems Acceptance Tests which are required to be carried out and passed in accordance with the Employer's Requirements) which must be attended to before Section D will have been substantially completed, tested and commissioned in accordance with this Agreement. The Infraco shall attend to all such matters and shall, if necessary, give **tie** further notices in accordance with Clause 45.1 (but dealing only with matters raised in the notification under this Clause 45.2) so that the procedures in Clause 45.1 and this Clause 45.2 are repeated as often as may be necessary to ensure that all outstanding matters in relation to Section D are attended to. Conduct of all tests, including repetitions, in accordance with the Employer's Requirements shall be at the cost and under the responsibility of the Infraco.

45.3 When Section D has been substantially completed, tested and commissioned in accordance with this Agreement, **tie's** Representative shall issue a Certificate of Service Commencement to that effect stating the date upon which, Section D was substantially completed, tested and commissioned provided always that a Certificate of Service Commencement shall not be issued until **tie** has issued to the Infraco a Certificate of Sectional Completion in relation to each of Section A, Section B, Section C and Section D.

45.4 The issue of a Certificate of Service Commencement shall, in the absence of manifest error, bad faith or fraud, be conclusive evidence for the purpose only of ascertaining that the Service Commencement Date has occurred on the date stated in such certificate.

45.5 For the purposes of this Clause 45 (*Notification of Service Commencement*), 'substantial completion' shall mean successful testing and commissioning of Section D in accordance with T1, T2 and T3, the provision of all required Spare Parts, relevant documents and that the maintenance staff have been trained, all in accordance with Schedule Part 2 (*Employer's Requirements*). **tie's** Representative may at his absolute discretion issue a Certificate of Service Commencement notwithstanding that Snagging and Patent Defects remain to be completed, in which event such incomplete work and/or commissioning and/or adjustment shall be completed by the Infraco in accordance with the provisions of Clause 46 (*Snagging*). **tie** shall identify any such Snagging on a Snagging List.

46. SNAGGING AND PATENT DEFECTS

46.1 Any Snagging on a Snagging List shall be completed by the Infraco within 20 Business Days of receipt by the Infraco of such Snagging List. The scheduling of carrying out of Snagging shall be agreed between the Infraco and **tie** (in consultation with the Operator if appropriate) and if the Snagging cannot be completed within the said 20 Business Days, then **tie** (acting reasonably and taking into account long lead times) shall determine a longer period to enable completion.

46.2 All Snagging shall be carried out by the Infraco, at its own expense. In so far as this creates additional workload or support from the Operator, then any reasonable, direct costs associated with such additional workload or support shall be paid by the Infraco.

46.3 Save where prevented from doing so by reason of a Relief Event or a Compensation Event, or as otherwise agreed in writing with **tie**, if the Infraco fails to carry out any such Snagging in accordance with the agreed schedule, **tie** shall, by giving 5 days written notice, be entitled to carry out that Snagging itself or by using other contractors and **tie** shall be entitled to recover all reasonable direct costs and expenses properly incurred by **tie** in relation to such work from the Infraco and **tie** may deduct the same from any monies that are or may become due to the Infraco. For the avoidance of doubt, this shall not provide any relief to the Infraco from any liability of this Agreement.

46.4 When all Snagging has been completed, **tie's** Representative shall issue to the Infraco a Snagging Rectification Certificate stating the date on which the Infraco shall have completed its obligations to carry out such Snagging

46.5 Save as provided for under Clauses 46.6 to 46.9, the issue of a Snagging Rectification Certificate shall not be taken as relieving the Infraco from any liability arising out of or in any

way connected with the performance of its obligations under the Agreement other than in respect of Snagging.

46.6 The Infraco's liability in respect of Patent Defects related to any design, construction, installation and maintenance of the Infraco Works which took place prior to the issue of the Service Commencement Certificate shall cease upon the issue by **tie** of the Patent Defects Rectification Certificate pursuant to Clause 46.9 or when the Infraco shall have made all payments due pursuant to Clause 46.8 below.

46.7 The Infraco's liability in respect of Patent Defects which arise as a result of the carrying out of the Maintenance Services after the Service Commencement Date shall cease in accordance with Clause 96.7.

46.8 If any Patent Defects as mentioned in Clause 46.6 are identified by **tie** within the Patent Defect Notification Period such Patent Defects shall be notified by **tie** to the Infraco in a schedule of defects which **tie** shall deliver to the Infraco not later than 14 days prior to the expiry of the Patent Defect Notification Period.

46.9 The Infraco shall remedy any Patent Defects notified in accordance with this Clause 46.8 within a reasonable time after receipt of such schedule of defects notified by **tie** in accordance with Clause 46.8. Should the Infraco fail to remedy such Patent Defects **tie** may, upon giving 20 Business Days notice to the Infraco, carry out or engage other contractors to carry out the necessary remedial works and **tie** shall be entitled to recover all reasonable direct costs and expenses properly incurred from the Infraco and Clause 46.6 shall apply.

46.10 Within 10 Business Days of all Patent Defects which **tie** have required to be made good under Clause 46.8 having been made good, **tie** shall issue a Patent Defects Rectification Certificate which certificate shall be conclusive evidence that the Patent Defects to which such certificate applies to have been made good.

46.11 In the event of termination for any reason after Service Commencement Date, the provisions of Clause 95 (Transition on Termination or Expiry) and Clause 96 (Surveys Prior to Expiry Date) shall apply in relation to the Infraco's liability for Patent Defects.

47. ISSUE OF NETWORK CERTIFICATE AND RELIABILITY CERTIFICATE

47.1 The Infraco shall give **tie's** Representative not less than 14 Business Days notice of the dates when Systems Acceptance Tests T4 and T5 are to be carried out. **tie's** Representative shall inspect the Infraco Works on the date or dates reasonably specified by the Infraco in accordance with this Clause 47.1 and to attend any of the tests to be carried out. The Infraco

shall procure that such of its staff as **tie** may reasonably request shall accompany **tie's** Representative on any such inspection.

47.2 Within 7 Business Days of any inspection made pursuant to Clause 47.1, **tie's** Representative shall notify the Infraco of any outstanding matters (including further evidence of achievement of Systems Acceptance Tests T4 and T5 (as appropriate) and the repetition of Systems Acceptance Tests T4 and T5 (as appropriate) which must be attended to before Systems Acceptance Tests T4 and T5 (as appropriate) can be considered to have been passed in accordance with this Agreement. The Infraco shall attend to all such matters and shall, if necessary, give **tie** further notices in accordance with Clause 47.1 (but dealing only with matters raised in the notification under this Clause 47.2) so that the procedures in Clause 47.1 and this Clause 47.2 are repeated as often as may be necessary to ensure that all outstanding matters in relation to Systems Acceptance Tests T4 and T5 (as appropriate) are attended to. Conduct of all tests, including repetitions, in accordance with the Employer's Requirements shall be at the cost and under the responsibility of the Infraco.

47.3 When Systems Acceptance Test T4 has been passed in accordance with this Agreement, **tie's** Representative shall issue a Network Certificate to that effect stating the date upon which Systems Acceptance Test T4 was passed. The issue of a Network Certificate shall, in the absence of manifest error, bad faith or fraud, be conclusive evidence for the purpose only of ascertaining that Systems Acceptance Test T4 was passed on the date stated in such certificate.

47.4 When it is satisfied that Systems Acceptance Test T5 has been passed in accordance with this Agreement, **tie's** Representative shall issue a Reliability Certificate to that effect stating the date upon which, in its opinion, Systems Acceptance Test T5 was passed. The issue of a Reliability Certificate shall, in the absence of manifest error, bad faith or fraud, be conclusive evidence for the purpose only of ascertaining that Systems Acceptance Test T5 was passed on the date stated in such certificate.

47.5 For the avoidance of doubt, the issue of a Network Certificate and/or Reliability Certificate pursuant to this Clause 47.5 shall be conditional upon **tie** being satisfied that all Construction and Maintenance Stage Consents required for the issue of a Network Certificate and/or Reliability Certificate have been obtained, are in full force and effect and are unconditional save in circumstances where Clause 19.17 applies.

48. INFRACO TO SEARCH

48.1 The Infraco shall, if required by **tie's** Representative in writing during the carrying out of the Infraco Works, carry out such surveys, searches, tests or trials as may be necessary to

determine the cause of any defect or fault under the directions of **tie's** Representative. Unless the defect or fault is one for which the Infraco is liable under the Agreement, the cost of the surveys, searches, tests or trials carried out by the Infraco as aforesaid shall be borne by **tie**. If the defect or fault is one for which the Infraco is liable, the cost of the surveys, searches, tests or trials carried out as aforesaid shall be borne by the Infraco and the Infraco shall in such case repair, rectify and make good such defect or fault at its own expense.

49. NON-REMOVAL OF MATERIALS AND CONTRACTOR'S EQUIPMENT

49.1 Save where provided for in the Maintenance Plan, no Trams, engineers works vehicles, Spare Parts, Special Tools, Infraco's Equipment, Temporary Works, materials for Temporary Works or other goods or materials owned by the Infraco and brought on to the Site for the purposes of the Agreement and which continue to be required for the execution and completion of the Infraco Works shall be removed without the written consent of **tie's** Representative (which consent shall not unreasonably be withheld) except where the removal of any such items from Site concerns items belonging to a sub-contractor no longer engaged in the performance of the Infraco Works, in which case the Infraco shall be responsible for ensuring that the removal has no adverse effect on the progress of the Infraco Works or on the performance of its obligations under this Agreement.

49.2 Subject to the exception set out in Clause 77.2, and subject to Clauses 52.17 and 76, **tie** shall not at any time be liable for the loss of or damage to any Trams, engineers works vehicles, Spare Parts, Special Tools, Infraco's Equipment, Temporary Works, goods or materials.

49.3 Save where required for Maintenance Services, if the Infraco fails to remove any of the said Infraco's Equipment, Temporary Works, goods or materials in accordance with Schedule Part 3 (*Code of Construction Practice and Code of Maintenance Practice*) from a Section within such reasonable time after the issue of a Certificate of Sectional Commencement in respect of that Section as **tie's** Representative may allow, then **tie** may sell or otherwise dispose of such items. From the proceeds of the sale of any such items, **tie** shall be entitled to retain any costs or expenses incurred in connection with their sale and disposal before paying the balance (if any) to the Infraco.

PART 9 - SAFETY

50. CDM REGULATIONS 2007

50.1 In this Clause 50 (*CDM Regulations 2007*):

"**Regulations**" means the Construction (Design and Management) Regulations 2007 or any statutory re-enactment or amendment thereof for the time being in force;

"**CDM Coordinator**" and "**Principal Contractor**" mean the persons so described in the Regulations;

"**Health and Safety File**" means the file prepared by virtue of regulation 20(2) of the Regulations.

50.2 The terms used in this Clause 50 shall have the meaning ascribed to them in the Regulations unless the context otherwise requires.

50.3 Where and to the extent that the Regulations apply to the Infraco Works:

50.3.1 Turner & Townsend Management Solutions Limited is appointed CDM Coordinator and shall discharge the responsibilities and functions of a CDM Coordinator in terms of the Regulations in relation to the Infraco Works; and

50.3.2 the Infraco is appointed Principal Contractor in respect of the Infraco Works and shall discharge the responsibilities and functions of a Principal Contractor in terms of the Regulations in relation to the Infraco Works.

50.4 In relation to the Infraco Works, Infraco warrants and undertakes that:

50.4.1 it is competent to perform the duties imposed on it by the Regulations;

50.4.2 it has performed and fulfilled and will continue to perform and fulfil the duties imposed on it by the Regulations, in its capacity as the Principal Contractor;

50.4.3 it has allocated and will continue to allocate adequate resources to ensure that it performs and fulfils its duties under the Regulations properly; and

50.4.4 it has not started and will not start any construction work until a construction phase plan, in terms of the Regulations, has been prepared.

50.5 Any action under the Regulations taken by either the CDM Coordinator or the Principal Contractor and in particular any alteration or amendment to the Health and Safety File shall be deemed to be a **tie's** Representative's instruction pursuant to Clause 34 (*Work to be to Satisfaction of* **tie**) provided that the Infraco shall in no event be entitled to any additional payment and/or extension of time in respect of any such action to the extent that it results from any action, lack of action or default on the part of the Infraco.

50.6 If any such action of either the CDM Coordinator or the Principal Contractor could not in the Infraco's opinion reasonably have been foreseen by an experienced contractor the Infraco shall as early as practicable give written notice thereof to **tie's** Representative.

50.7 The Infraco shall continue to carry out its role as Principal Contractor in respect of the Infraco Works, notwithstanding that any other works are being carried out at the same time as the Infraco Works.

50.8 The Infraco shall provide any information required by the CDM Coordinator in relation to the CDM Regulations within 3 Business Days (where reasonably practicable), or such other period as may be agreed, of any request, or sooner where reasonably practicable (for the avoidance of doubt, this does not affect **tie's** responsibility in terms of the Regulations, to provide the pre-construction information).

50.9 Following the Service Commencement Date the Infraco shall comply with the Health and Safety File.

51. NOTICE OF ACCIDENTS AND LIAISON WITH THE EMERGENCY SERVICES

51.1 In the event of any notifiable accident or dangerous occurrence connected with the carrying out of the Infraco Works, the Infraco shall be responsible for reporting a notifiable accident or dangerous occurrence to **tie** and to the Health and Safety Executive or to the ORR (as the case may be in accordance with the Memorandum of Understanding between the Health and Safety Executive and ORR dated 1 April 2006) under the Reporting of Injuries and Diseases and Dangerous Occurrences Regulations 1995, unless the notifiable accident or dangerous occurrence is otherwise reported by an employer of workers on Site with a duty under the Reporting of Injuries and Diseases and Dangerous Occurrences Regulations 1995 to report accidents in which its employees are injured.

51.2 The Infraco shall liaise regularly with the Emergency Services, during the design, construction, testing and commissioning, operation and maintenance of the Edinburgh Tram Network. In particular, such regular liaison will include:

51.2.1 notification and clearance for temporary traffic management arrangements;

51.2.2 Edinburgh Tram Network design and implementation; and

51.2.3 the supply by the Infraco of training to a reasonable number of personnel of the Emergency Services (to be provided by the Infraco free of charge) to effect rescue procedures during construction, operation and maintenance.

PART 10 - MAINTENANCE SERVICES

52. MAINTENANCE

52.1 In relation to each Section, from the date of issue of a Certificate of Sectional Completion in relation to that Section and in relation to Trams, from the Tram Maintenance Commencement Date, the Infraco shall carry out all maintenance, repair, renewals and remedial works to the Edinburgh Tram Network as is necessary:

52.1.1 to maintain the Edinburgh Tram Network in accordance with the Maintenance Programme and the Maintenance Plan;

52.1.2 to ensure that all the requirements of the Maintenance Specification are met at all times;

52.1.3 to comply with those Operator Procedures as may be agreed between the Parties from time to time and that apply to the Maintenance Services;

52.1.4 ensure that **tie** is informed of any adverse impact of design, redesign or modification to the Infraco Works which is likely to have an adverse impact on maintenance effectiveness and subject to Clauses 80 (***tie*** *Change*) and 81 (*Infraco Changes*) to prevent such design, redesign or modification being undertaken if requested to do so by **tie**;

52.1.5 to ensure that no modification, maintenance or repair work to the Edinburgh Tram Network, Spare Parts or Special Tools within the scope of the Maintenance Services shall prejudice the Case for Safety;

52.1.6 so as not to prejudice the health or safety of, or unreasonably interfere with the proper performance of the duties of the Infraco, the Operator, employees and third parties or otherwise expose the Infraco and/or **tie** to liability under the Health and Safety at Work etc. Act 1974 or the Transport and Works Act 1992 or any other legislation relating to health and safety;

52.1.7 to maximise the extent to which the Edinburgh Tram Network is Available Infrastructure and the Trams are Available Trams and to minimise unplanned interruption to such availability;

52.1.8 to sustain the functionality of the component parts of Edinburgh Tram Network as built for a period not less than the relevant stipulated design life, if any, stipulated in the Employer's Requirements;

52.1.9 the Edinburgh Tram Network is handed back to **tie** on the Expiry Date or the Termination Date (whichever is earlier) in a condition consistent with the Infraco having complied with the requirements of this Clause 52 (*Maintenance*) provided that the Infraco shall not be in breach of this Clause 52.1.9 by reason of fair wear and tear or by reason of any work being required to which Clause 52.17 applies where there was not sufficient time between the damage occurring and the Expiry Date or Termination Date (as appropriate) to enable the Infraco to carry out such work; and

52.1.10 nothing in this Clause 52.1 shall impose any obligation on the Infraco to carry out any Operator Maintenance.

52.2 The Infraco shall work with the Operator to ensure the daily handover of the Edinburgh Tram Network to the Operator for operation which shall include the completion of a handover checklist confirming the extent to which the Edinburgh Tram Network is Available Infrastructure and the Trams are Available Trams.

52.3 The Infraco shall work with the Operator to ensure the daily handback of all or part of the Edinburgh Tram Network from the Operator to the Infraco following operation of the Edinburgh Tram Network and take into account any comments received from the Operator on the performance or condition of the Edinburgh Tram Network.

52.4 The Infraco shall carry out and complete the Infrastructure Maintenance Services in accordance with this Clause 52 (*Infrastructure Maintenance*) subject to its ability to sub-contract the Infrastructure Maintenance Services pursuant to Clause 28 (*Sub-Letting and the Appointment of Sub-Contractors*).

52.5 The Infraco shall, during the Mobilisation Period, carry out or procure that the Mobilisation Services are carried out on or before the date for the appropriate Mobilisation Milestone .

52.6 The Infraco shall carry out (or shall procure the carrying out of) all Maintenance Services in a safe manner and so that the Edinburgh Tram Network is capable of being operated in a safe and efficient manner free from any unreasonable risk to the health and well being of persons using or maintaining it and free from any reasonably avoidable risk of pollution, nuisance, interference or hazard.

52.7 During the Term, the Infraco shall be responsible for, without limitation providing, employing and training all staff necessary to perform the Maintenance Services in accordance with this Agreement and the total cost of providing those staff, the Maintenance Services (including the total cost of providing Spare Parts and Special Tools) is included in the Contract Price.

52.8 During the Mobilisation Period, the Infraco shall be responsible for, without limitation, providing all staff necessary to perform the Mobilisation Services in accordance with this Agreement, and the total cost of providing the Mobilisation Services is included in the Contract Price.

52.9 The Maintenance Services shall comprise only materials and goods which are of satisfactory quality and unless otherwise agreed in writing, the Infraco shall supply only new materials and goods, save where existing materials and goods have been satisfactorily repaired or reused by the Infraco in accordance with Good Industry Practice and, where applicable, as permitted under the Maintenance Plan.

Spare Parts and Special Tools

52.10 The Infraco shall be responsible for the provision of all Spare Parts and Special Tools necessary or required for the Maintenance Services. All such Spare Parts shall meet the technical and safety requirements of the Maintenance Specification. Special Tools to be provided pursuant to this Clause 52.10 shall, as a fundamental condition of this Agreement, be provided with a valid certificate of calibration (where appropriate). The Infraco shall notify **tie** as soon as reasonably practicable after becoming aware of any breach of warranty or supply of defective Spare Parts and Special Tools by the Tram Supplier or Tram Maintainer.

52.11 The Infraco shall also ensure that throughout the term of this Agreement all Special Tools which require calibration or testing in order that they shall be fit for their intended purpose shall have a valid test and/or calibration certificate (where appropriate), and the Infraco shall give to **tie** within 5 Business Days of any request by **tie** a copy of the current test or calibration certificate (where appropriate).

52.12 The Infraco shall acquire adequate stocks of such Spare Parts and Special Tools to ensure that there is always a Minimum Spare Parts Pool at the Depot and, in any case, sufficient Spare Parts and Special Tools to enable the Infraco to carry out (or procure the carrying out of) the Maintenance Services in accordance with this Agreement and manage reorder levels and lead times such that the stock of Spare Parts or Special Tools are maintained at or above the level of the Minimum Spare Parts Pool.

52.13 NOT USED

52.14 Every Reporting Period, the Infraco and **tie** shall review the level of the Minimum Spare Parts Pool in light of the requirements for Spare Parts in delivering the Maintenance Services pursuant to this Agreement and the Infraco shall make recommendations to **tie** in relation to any adjustments to be made to the Minimum Spare Parts Pool either in relation to the extent of the Minimum Spare Parts Pool or the quantity of any of the Spare Parts required to meet the Minimum Spare Parts Pool. **tie** shall review the Infraco's recommendations and where necessary consult further with the Infraco as to the adequacy of the Minimum Spare Parts Pool in the light of ongoing maintenance pursuant to the Maintenance Services and, subject to Clause 52.12 and the Infraco having taken such steps as are possible to rectify the situation, if **tie**, in its absolute discretion, is of the opinion that it would be appropriate to vary the Minimum Spare Parts Pool then such variation shall be a **tie** Change and the terms of Clause 80 *(***tie** *Changes)* shall apply.

Repairs

52.15 Subject to Clause 46, the Infraco shall effect the repair of all defects in, failures of or damage to the Edinburgh Tram Network excluding the Free Issue Fare Collection Equipment irrespective of cause. The Infraco shall effect all such repairs in a manner consistent with its obligations under this Agreement and in a manner which causes the minimum disruption to the operation of the Edinburgh Tram Network and to enable the Edinburgh Tram Network (excluding the Free Issue Fare Collection Equipment) to be Available Infrastructure and the Trams to be Available Trams.

52.16 The Infraco shall bear all of the costs of complying with Clause 52.15 to the extent that any damage to the Edinburgh Tram Network excluding the Free Issue Fare Collection Equipment is caused by:

52.16.1 a breach of this Agreement by the Infraco; and/or

52.16.2 NOT USED

52.16.3 any negligent act or negligent omission by the Infraco or any Infraco Party.

52.17 To the extent that any damage to the Edinburgh Tram Network excluding the Free Issue Fare Collection Equipment is not caused by:

52.17.1 a breach of this Agreement by the Infraco; and/or

52.17.2 NOT USED

52.17.3 any negligent act or negligent omission by the Infraco or any Infraco Party,

then **tie** shall bear the necessary, reasonable and demonstrable costs of the Infraco repairing such damage and any repairs in respect of such damage shall be a Mandatory **tie** Change and the terms of Clause 80 (**tie** *Changes*) shall apply.

52.18 All repairs to and replacements of the Edinburgh Tram Network excluding the Free Issue Fare Collection Equipment shall be carried out to a standard that restores the defective, failed or damaged part of the Edinburgh Tram Network excluding the Free Issue Fare Collection Equipment to a condition which meets the requirements of the Maintenance Specification (subject to normal wear and tear) and enables the Infraco to comply with its obligations under this Clause 52 (*Maintenance*).

52.19 Where necessary, the Infraco shall be entitled to carry out temporary repairs to the Edinburgh Tram Network excluding the Free Issue Fare Collection Equipment subject to obtaining the prior approval of HMRI, the Operator, **tie** and all appropriate regulatory authorities. All temporary repairs shall be fully repaired at the earliest opportunity and in any event as soon as reasonably practicable upon receipt of written notice from HMRI, **tie** or the Operator (as the case may be) stating that it no longer considers such temporary repairs to be safe and/or fit for their purpose.

52.20 In respect of any incident or failure affecting the Edinburgh Tram Network excluding the Free Issue Fare Collection Equipment, the Infraco shall provide such assistance, information and advice as the **tie** or Operator shall reasonably require, including such assistance as **tie** or Operator shall reasonably require in:

52.20.1 the Infraco attending the site of the occurrence to assess the cause of the problem, with a required response time of no more than 15 minutes between the hours of 6:01 am and 10:00 pm or 1 hour between the hours of 10:01 pm and 6:00 am from **tie's** or the Operator's request for attendance to a representative of the Infraco departing from the Depot or elsewhere to attend.

52.20.2 rectifying the problem where such rectification falls within the scope of the Maintenance Services;

52.20.3 implementing measures to overcome and/or mitigate the effect on operation of the Edinburgh Tram Network excluding the Free Issue Fare Collection Equipment;

52.20.4 implementing temporary repairs where such repairs fall within the scope of the Maintenance Services; and

52.20.5 recovering any part of the Edinburgh Tram Network (including the Trams but excluding the Free Issue Fare Collection Equipment) for repair (where such part of the Edinburgh Tram Network is moveable) where such repair falls within the scope of the Maintenance Services.

52.21 As soon as practicable following the completion of the repair, the Infraco shall prepare and provide a report which summarises the causes of such incident or failure and providing recommendations where applicable to avoid the repetition of such occurrence. To the extent that the incident or failure was not attributable to a breach of this Agreement by the Infraco or a negligent act or omission of the Infraco or any Infraco Party, the Infraco shall be entitled to recover the costs of complying with Clause 52.20 in accordance with Clause 52.17

52.22 Where the most efficient manner of dealing with such failure would be for repairs to be effected at the site of the failure, where such repairs fall within the scope of the Maintenance Services, the Infraco shall have available competent resources to carry out such repairs as can safely be carried out at the site.

52.23 If the Infraco reasonably believes or becomes aware that there is or may be:

52.23.1 a defect or in the case of reporting or control systems, an excess of alarms and fault annunciation in a Part which has been fitted in the Edinburgh Tram Network (including a Tram excluding the Free Issue Fare Collection Equipment) whether or not as part of the Maintenance Services; or

52.23.2 any other defect in relation to the Edinburgh Tram Network (including a Tram);

which may prejudice the safe or reliable operation of the Edinburgh Tram Network, the Infraco shall immediately on becoming aware of such defect notify **tie** and the Operator of such defect and provide a proposal as to the most effective course of action by which such defect can be rectified where such rectification falls within the scope of the Infrastructure Maintenance Services. The cost of such rectification shall be allocated in accordance with Clauses 52.16 and 52.17.

Additional System Availability

52.24 In circumstances where **tie** requires any Additional Available Infrastructure or Additional Available Trams for its own use, including but not limited to the training of drivers and

extended hours of operation for special events, it shall give the Infraco at least one week's notice of its requirements.

The Infraco shall confirm whether it is able to make available to **tie** any Additional Available Infrastructure or Available Trams requested by **tie**. If the Infraco confirms (such confirmation not to be unreasonably withheld) that it is able to make available to **tie** any such Additional Available Infrastructure or Available Trams, the Infraco shall be entitled to payment on the basis set out in Appendix B of Schedule Part 7 (*Maintenance Contract Price Analysis*). Such Additional Available Infrastructure or Available Trams shall be disregarded in relation to any calculations under Schedule Part 6 (*Maintenance Payment Regime*) and **tie's** remedy in the event of any deficiency in or failure to provide Additional Available Infrastructure or Available Trams shall be to apply deductions to payments on the basis set out in Appendix B of Schedule Part 7 (*Maintenance Contract Price Analysis*).

Operations and Maintenance Manual

52.25 The Infraco shall maintain and keep up to date the operations and maintenance manual and as built drawings and Spare Parts list (the "**Operations and Maintenance Manual**"**)**. The Infraco shall provide to **tie's** Representative an electronic copy of such manual and each successive update, free of charge, as soon as reasonably practicable after their production. The Infraco shall provide to **tie's** Representative draft integrated manuals of description and maintenance of all Edinburgh Tram Network components not less than 90 days before the part of the Edinburgh Tram Network into which they are incorporated commences public service. The Infraco shall keep such manuals up to date and provide to **tie's** Representative a copy of each successive update as soon as reasonably practicable after their production.

Control Room

52.26 The Infraco shall provide and maintain the facility for the communication of information, CCTV images and data from the Control Room to CEC's traffic and information centre, to facilitate:

52.26.1 information exchange;

52.26.2 the provision of public transport data;

52.26.3 the provision of real time passenger information;

52.26.4 road traffic monitoring;

52.26.5 incident detection and emergency diversions management;

52.26.6 co-ordination of traffic signals; and

52.26.7 co-ordination of variable messages to passenger information displays.

53. HAZARDOUS MATERIALS

53.1 The Infraco undertakes that it is and will remain during the term of this Agreement, or that any relevant Infraco Party is and will remain during the Term, appropriately qualified and experienced in and accredited for the purposes of carrying out work of the scope, type and complexity that is required in carrying out the Maintenance Services involving the handling of any Hazardous Materials incorporated in the Edinburgh Tram Network or any Part thereof and shall maintain an up to date register recording the location, volume, type, storage condition, and handling and disposal procedures for such Hazardous Materials.

53.2 The Infraco shall not use any Hazardous Materials in performing the Maintenance Services except where expressly permitted to do so by the Maintenance Specification, Law and Good Industry Practice, or otherwise with the express prior written consent of **tie**. If Hazardous Materials are used other than expressly in accordance with the Maintenance Specification, Law and Good Industry Practice, or with the prior written consent of **tie**, the Infraco shall ensure that all such Hazardous Materials used in the provision of the Maintenance Services are expressly identified in writing to **tie** and the Operator by reference to this Clause 53 (*Hazardous Materials*) with reference to the hazards attached to them and the procedures that the Infraco has for managing such hazards.

53.3 The Infraco shall ensure that all Maintenance Services performed under this Agreement which involve Hazardous Materials, including the removal, handling and disposal of those materials, are carried out in such a manner as to ensure compliance with all Law (including any advisory literature provided by the Health and Safety Commission or Executive). The Infraco shall inform **tie's** Representative of any Hazardous Materials, which do not form part of the Maintenance Services or which are encountered in the course of the Maintenance Services and shall submit its proposed method of operation and the precautions to be taken before commencing any work involving such Hazardous Materials. Such submission shall be a **tie** Change and the terms of Clause 80 *(***tie** *Changes)* shall apply. If the Infraco proposes to handle or dispose of such Hazardous Materials, it shall comply with Law (including any advisory literature provided by the Health and Safety Commission or Executive) and any additional precautions specified by **tie's** Representative as to their handling and disposal.

53.4 The Infraco acknowledges that it is aware that various health hazards may be encountered in performing the Maintenance Services (which may not be immediately apparent as deliberate and malicious concealment of such hazards may take place). The Infraco shall take all reasonably practicable precautions for the protection of the Infraco Parties, the **tie** Parties and any other person who may be affected by the Maintenance Services.

53.5 To the extent **tie** or any **tie** Party stores or uses Hazardous Materials at such area of the Depot as is under the responsibility of the Infraco pursuant to the Depot Licence, **tie's** Representative shall give reasonable to notice to the Infraco so that the appropriate entry may be made on the register maintained by the Infraco subject always to the Infraco Representative's ability to advise promptly that:

53.5.1 such storage or use is not appropriate on the grounds that it poses an unreasonable additional responsibility on Infraco, due to the intended use, nature or quantity of the Hazardous Materials in question; or

53.5.2 such storage or use does not relate to transport-related services of which the Infraco has experience

in which event **tie** shall remove such Hazardous Materials and/or indemnify the Infraco from all costs arising from the presence of such Hazardous Materials at the Depot.

54. RECORDS AND COMPUTER SYSTEMS

54.1 All the Technical Records for any part installed, replaced, overhauled or inspected by the Infraco or an Infraco Party must be:

54.1.1 written up, maintained and kept up to date at all times by the Infraco in electronic or hard copy form in accordance with the requirements of the Maintenance Specification and/or the Employer's Requirements;

54.1.2 retained by the Infraco for the longer of:

54.1.2.1 the Term; or

54.1.2.2 6 years from the date on which the Maintenance Services to which such Technical Records relate are provided; and

54.1.3 copied to **tie** within 10 Business Days of a request by **tie** for such Technical Records.

54.2 **tie** will be entitled from time to time to inspect and audit such Technical Records following reasonable notice to the Infraco. When carrying out any inspection or audit under this Clause 54.2, **tie** shall use reasonable endeavours to minimise any disruption caused to the provision of the Maintenance Services by the Infraco or any Infraco Party.

54.3 Further, for each part of the Edinburgh Tram Network the following details shall be retained by the Infraco for not less than 6 years after completion of the Maintenance Services and such details provided to **tie** in accordance with the provisions of this Clause 54.3:

54.3.1 the change control register maintained pursuant to Clause 79.2; and

54.3.2 all other quality control activity records as agreed with **tie** from time to time.

54.4 The Technical Records will be written up and maintained by the Infraco in respect of all Maintenance Services in accordance with this Agreement and Good Industry Practice. Such Technical Records will, subject to Clause 54.5 be stored in IFS system or as otherwise agreed between the Parties.

54.5 Upon any request by **tie** for any Technical Record, or upon handover of the Technical Records pursuant to Clause 95.1, the Infraco shall provide such Technical Records in any suitable non-proprietary format as may be reasonably specified by **tie**.

54.6 The Infraco shall:

54.6.1 use all reasonable endeavours to ensure that the computer systems, equipment and other systems of the Infraco used by the Infraco in carrying out the Maintenance Services including the Asset Management System, any computer systems, equipment, other systems and parts supplied by the Infraco, are at all times free from disabling or destructive programs or devices including, without limitation, bugs, virus or logic bombs, Trojan horses and analogous macros, programs or sub-routines; and

54.6.2 ensure that appropriate security systems are implemented and maintained to protect the integrity and security of the Asset Management System and such computer systems, equipment and other systems from security and IT risks including, without limitation, unauthorised access (both by persons external to the Infraco and the Infraco's employees, agents and subcontractors).

54.7 In the event of a breach of Clause 54.6 , the Infraco shall conduct a full and complete review of its computer systems, equipment and other systems (including the security arrangements relating to such systems) to identify the source of such disabling or destructive program or

device and, at its own costs and with the prior written approval of the Infraco (such approval not to be unreasonably withheld or delayed) take such action as may be necessary to immediately remedy the breach and additionally to ensure that such breach does not re-occur.

55. SURVEYS OF THE EDINBURGH TRAM NETWORK AND AUDITS OF MAINTENANCE PROCEDURES

55.1 **tie** may carry out or procure surveys of the Edinburgh Tram Network in accordance with Clause 96 (*Surveys Prior to Expiry Date*) and **tie** may audit the Maintenance Procedures pursuant to Clause 104 (*Information and Audit Access*).

55.2 Where following any audit of Maintenance Procedures **tie** identifies non-conformances in the implementation of the Maintenance Procedures the Infraco shall take such steps as are agreed between the Parties to remedy such shortcomings.

55.3 When carrying out any audit under Clause 55.1, **tie** shall (or shall procure that any auditor shall) use reasonable endeavours to minimise any disruption to the provision of the Maintenance Services by the Infraco. Each Party shall bear their own cost of such audits, except where Clause 55.2 applies, when Infraco shall bear **tie's** reasonable and demonstrable costs.

56. SERVICE PERFORMANCE AND QUALITY MONITORING

56.1 The Infraco shall comply with the provisions of Schedule Part 6 (*Maintenance Payment Regime*).

56.2 In addition to the provisions set out in Schedule Part 6 (*Maintenance Payment Regime*), the Infraco shall send such representatives as **tie** may reasonably require to a performance meeting every Reporting Period (which will be convened on not less than 2 Business Days' notice by **tie)** and such other meetings as **tie** may reasonably require from time to time to discuss the performance of the Maintenance Services in accordance with the Agreement.

56.3 The Infraco shall submit a Service Quality Report to **tie** no later than 3 Business Days following each Reporting Period End Date. For the avoidance of doubt, **tie** shall not be obliged to process an invoice submitted by the Infraco in the absence of the Service Quality Report pertaining to the relevant Reporting Period. The Infraco shall be responsible for ensuring that the data contained in the Service Quality Report is generated automatically and, to the extent practicable, electronically.

56.4 In addition to the Service Quality Reports to be submitted by the Infraco pursuant to Clause 56.3 above, the Infraco shall prepare and submit to **tie** an Annual Service Report pursuant to Clause 73 (*Best Value*).

56.5 The Infraco shall monitor its compliance with this Agreement in respect of the Maintenance Services, and the Parties shall comply with the following provisions:

56.5.1 no later than 3 months before the Planned Service Commencement Date and on each anniversary thereafter, the Infraco shall provide to **tie's** Representative its proposed Self-Monitoring Plan for the following 12 months;

56.5.2 the Self-Monitoring Plan shall be designed to underpin **tie's** best value obligations and the Infraco shall have full regard to the requirements of Clause 73 (*Best Value*) when preparing its Self-Monitoring Plan;

56.5.3 no later than the date falling 20 Business Days after receipt by **tie's** Representative of such proposed Self-Monitoring Plan, **tie** shall notify the Infraco in writing as to whether or not it considers the Self-Monitoring Plan to be acceptable for the purposes of this Agreement; and

56.5.4 where **tie** considers the relevant Self-Monitoring Plan to be acceptable, then the Self-Monitoring Plan shall be implemented by the Infraco for the relevant 12 months; or

56.5.5 where **tie** does not consider the relevant Self-Monitoring Plan to be acceptable, then the Parties shall use all reasonable endeavours to reach agreement as to the contents of the Self-Monitoring Plan; and

56.5.6 until such time as the Self-Monitoring Plan has been accepted by **tie**, the previous year's Self-Monitoring Plan shall remain in effect;

or, in default of such agreement, either Party may refer the matter for determination under the Dispute Resolution Procedure, and the Infraco shall implement the Self-Monitoring Plan as so agreed or determined.

56.6 The Infraco shall as soon as reasonably practicable provide **tie's** Representative with relevant particulars of failure to deliver the Maintenance Services. The Infraco shall co-operate with **tie** and provide such access as **tie** may reasonably require to enable **tie** at all reasonable times to observe, inspect and satisfy themselves (including by carrying out sample checks) as to the adequacy of the monitoring procedures implemented by the Infraco and the Infraco's compliance with this Agreement.

56.7 Subject to Clause 56.9, without prejudice to **tie's** other rights under this Agreement, if

56.7.1 at any time the Infraco has committed any material breach of its obligations under this Agreement; or

56.7.2 following the issue of the Reliability Certificate, in any Reporting Period where Infraco's performance is below the standard required to achieve the Minimum Performance Payment,

then **tie** may issue an Underperformance Warning Notice to the Infraco setting out the matter or matters giving rise to such notice and containing a reminder to the Infraco of the implications of such notice.

56.8 Following the service of an Under Performance Warning Notice in pursuant to Clause 56.7.2:

56.8.1 the Infraco shall within 10 Business Days of receipt of such Under Performance Warning Notice deliver to **tie** a plan setting out how the Infraco propose to remedy the issues which lead to the deductions leading to the service of such Under Performance Warning Notice and proposing a suitable timescale to remedy such issues (a "**Rectification Plan**");

56.8.2 the Parties will use reasonable endeavours to agree the contents of the Rectification Plan within 10 Business Days of receipt by **tie**; and

56.8.3 if the parties do not agree the Rectification Plan within 10 Business Days of receipt by **tie** either Party may refer the matter to the Dispute Resolution Procedure (provided that the Infraco may not refer or cause **tie** to refer the matter to the Dispute Resolution Procedure vexatiously to delay the agreement of a Rectification Plan).

56.9 **tie** shall not be entitled to serve:

56.9.1 more than one Under Performance Warning Notice in any Reporting Period;

56.9.2 an Under Performance Warning Notice pursuant to Clause 56.7.2 in any two consecutive Reporting Periods; or

56.9.3 a further Under Performance Warning Notice pursuant to 56.7.2 in respect of the same circumstances which led to the service of any previous Under Performance Warning Notice where the Infraco is using reasonable endeavours to comply with the terms of the Rectification Plan put in place to address the issues or circumstances which led to the service of a previous Under Performance Warning Notice

56.10 Without prejudice to **tie's** other rights under this Agreement, if the Infraco receives four or more Underperformance Warning Notices in any twelve (12) month period, **tie** may by notice to the Infraco increase the level of either **tie's** monitoring of the Infraco (including the employment by **tie** of additional performance monitoring officers), or (at **tie's** option) of the Infraco's monitoring of the Infraco's performance of its obligations under this Agreement, until such time as the Infraco shall have demonstrated to the reasonable satisfaction of **tie** that it will perform (and is capable of performing) its obligations under this Agreement, in which case the following provisions shall apply:

56.10.1 any such notice to the Infraco shall specify in reasonable detail the additional measures to be taken by **tie** or by the Infraco (as the case may be) in monitoring the performance of the Infraco;

56.10.2 if the Infraco (acting reasonably) objects to any of the specified measures on the grounds that they are excessive, it shall notify **tie** in writing, within 2 Business Days of the receipt of the notice, of the measures objected to (and of any changes necessary in order to prevent prejudice top the Infraco's performance of its obligations under this Agreement);

56.10.3 the measures to be taken by **tie** and the Infraco (as the case may be) shall be agreed between the Parties or, in the absence of agreement within 3 Business Days of **tie's** receipt of the Infraco's objection, be determined, at the referral of either Party, pursuant to the Dispute Resolution Procedure and on a basis which the relevant adjudicator considers reasonable having regard to the nature and seriousness of the breaches of this Agreement or circumstances leading to the issue of such Underperformance Warning Notices which have occurred, the likelihood of such breaches or circumstances recurring, the risks which would arise if such breaches or circumstances recurred, the level of culpability of the Infraco in relation to such breaches and circumstances and the actions being taken by the Infraco to prevent breaches of this Agreement or circumstances entitling **tie** to issue further Underperformance Warning Notices recurring; and

56.10.4 the Infraco shall bear its own costs and reimburse to **tie** on demand at all times from and against all reasonable costs and expenses incurred by or on behalf of **tie** in relation to such increased level of monitoring (including an appropriate sum in respect of general staff costs and overheads).

56.11 In the event that the Infraco Party responsible for any Underperformance Warning Notices is terminated, such Underperformance Warning Notices shall be automatically cancelled.

57. PERFORMANCE REVIEW

57.1 Following the end of each Performance Review Period, **tie** shall review and assess the performance of the Infraco on the basis set out in this Clause 57.

57.2 **tie** shall review the following:

57.2.1 the Infraco's historic performance under Schedule Part 6 (*Maintenance Payment Regime*);

57.2.2 whether the Infraco has complied with all of its obligations under this Agreement (and whether **tie** reasonably considers any breach(es) to have been both minor and infrequent); and

57.2.3 the Infraco's Maintenance Plan for the next Performance Review Period to jointly assess whether it is sufficiently robust to satisfy the Infraco, acting reasonably, that the Infraco will comply with its contractual obligations as stipulated in Clause 57.2.1 and 57.2.2 for the next Performance Review Period;

57.3 If any of the criteria set out at Clause 57.2 are not satisfied then **tie** may specify particular requirements in respect of those areas where the criteria set out at Clause 57.2 have not been satisfied, to be met by the Infraco by a specified date prior to the next Performance Review Date. If **tie** specifies such interim date then the provisions of this Clause 57 (*Performance Review*) will apply at the interim date, *mutatis mutandis*, as if that date was the original Performance Review Date (and as if the criteria set out at Clause 57.2 were the requirements specified by **tie** pursuant to this Clause 57.3).

58. TUPE AND HANDOVER

58.1 In this Clause 58 (*TUPE and Handover*) and Schedule Part 36 (*TUPE Information*) the following definitions shall apply:

"**Infraco Employees**" means any employee of the Infraco or Infraco Parties engaged in the performance of the Maintenance Services under this Agreement during the Termination Period;

"**New Provider**" means **tie** and/or any third party who takes over (or who the Infraco is notified will be taking over) the provision of some or all of the obligations of the Infraco under this Agreement;

"**Relevant Employee**" means any employee of the Infraco or an Infraco Party employed wholly or mainly in or assigned to the provision of the Maintenance Services under this Agreement as at the date of the Service Provision Change;

"**Service Provision Change**" means any termination, variation, amendment or other alteration of this Agreement which results in all or part of the Maintenance Services under this Agreement being provided by **tie** or by a third party;

"**Termination Period**" means either (i) the 12 month period ending on the Expiry Date or (ii) the period of any notice determining this Agreement prior to the Expiry Date;

"**TUPE Employees**" means any person whose contract of employment may be transferred to a successor contractor, operator or maintainer by virtue of the operation of Law (including the TUPE Regulations) or in respect of whom liabilities arising from the contract of employment or employment relationship may be transferred;

"**TUPE Information**" means the information in relation to the TUPE Employees specified in Schedule Part 36 (*TUPE Information*);

"**the TUPE Regulations**" means the Transfer of Undertakings (Protection of Employment) Regulations 2006.

58.2 NOT USED

58.3 The Infraco shall not, without the prior consent of **tie** (which shall not be unreasonably withheld or delayed), vary or purport or promise to vary, the terms or conditions (as amended from time to time) of employment of any Infraco Employee (including any promise to make any additional payment or provide any additional benefit) where such variation or addition takes effect in the Termination Period unless it is in the ordinary course of business.

58.4 NOT USED

58.5 Subject to Clause 58.6, the Infraco shall at the request of **tie** in the Termination Period provide the TUPE Information within 15 Business Days of such request and thereafter until termination or expiry of this Agreement update such information in accordance with the reasonable requests of **tie** subject to the Infraco's common law duties to their employees or under the Data Protection Act 1998. **tie** shall treat the TUPE Information as Confidential Information to which Clause 101 (*Confidential Information*) shall apply provided that **tie** shall only be permitted to use the TUPE Information for the purposes of conducting a tendering exercise for the appointment of a replacement service provider following a Service Provision

Change and shall only be entitled to disclose the TUPE Information to any tenderer pursuant to such exercise and subject to such tenderers accepting a confidentiality obligation in relation to such information equivalent to the obligations set out in Clause 101 (*Confidential Information*), mutatis mutandis.

58.6 The Infraco shall use its reasonable endeavours to ensure that it will be in a position to provide TUPE Information pursuant to Clause 58.5 in respect of the TUPE Employees who are not also Infraco Employees but, subject to the Infraco having used such reasonable endeavours, the Infraco's obligation to provide TUPE Information pursuant to Clause 58.5 in respect of such TUPE Employees shall be limited to the TUPE Information covering such TUPE Employees actually in the possession of or actually obtainable by the Infraco.

Establishment of hand-over procedure

58.7 During the Termination Period, the Infraco and **tie** both acting diligently and in good faith with a view to ensuring that there shall be no material deterioration or break in the provision of Maintenance Services, shall, at the cost of **tie**, establish appropriate handover procedures.

tie's obligations in relation to TUPE

58.8 **tie** shall within 20 Business Days of a request from the Infraco, provide the Infraco with such information as is requested by the Infraco in order to enable the Infraco to comply with its obligations under Regulation 13(2)(d) of the TUPE Regulations.

Continued technical support

58.9 For a period of six months after termination or expiry of this Agreement, the Infraco shall provide **tie** with such access as **tie** may reasonably require employees of Infraco having the appropriate knowledge and experience of the history of the Maintenance Services and associated technical matters for the following purposes:

58.9.1 general technical advice on subjects for which the Infraco was responsible pursuant to this Agreement; and

58.9.2 interpretation of maintenance history data, drawing modifications, regulations and the like.

tie shall reimburse the Infraco in respect of all reasonable and proper costs and expenses incurred by the Infraco in complying with this Clause 58 (*TUPE and Handover*)

Technical Records

58.10 Upon termination or expiry of this Agreement, the Infraco shall procure that **tie** is provided with an electronic copy of the Technical Records.

Deemed TUPE Transfer

58.11 **tie** and the Infraco acknowledge that in the event of a Service Provision Change, the TUPE Regulations may apply to such Service Provision Change. In the event that the TUPE Regulations do not apply to any Service Provision Change, the New Provider shall, with effect from the date of the Service Provision Change, offer employment to each Relevant Employee on like terms to the terms on which they would have become employed by the New Provider had the TUPE Regulations applied or, to the extent that it is not reasonably practicable to do so in respect of any such term, on terms which are not in such respect materially to the detriment of the Relevant Employee.

58.12 The New Provider shall treat the period of continuous service of each Relevant Employee or TUPE Employee with the Infraco or an Infraco Party up to the date of the Service Provision Change as continuous with such TUPE Employee's or Relevant Employee's service with the New Provider.

TUPE Transfer Indemnity

58.13 **tie** shall, or shall procure that any New Provider shall, indemnify the Infraco and any Infraco Party against any losses, costs, claims, demands, actions, fines, penalties, awards, liabilities and expenses (including reasonable legal expenses) incurred by the Infraco or any Infraco Party in connection with or as a result of:

58.13.1 any claim or demand by any TUPE Employee (whether in contract, delict, under statute, pursuant to Law or otherwise) arising directly or indirectly from any act, fault or omission of the New Provider in respect of any TUPE Employee on or after the date of termination of this Agreement or the ending of the provision in whole or in part of the obligations of the Infraco under this Agreement by the Infraco or any Infraco Party;

58.13.2 any failure by the New Provider to comply with its obligations under Regulation 13 of the TUPE Regulations;

58.13.3 any claim (including any individual entitlement of a TUPE Employee under or consequent on such claim) by any trade union or other body or person representing the

TUPE Employees arising from or connected with any failure by the New Provider to comply with any legal obligation to such trade union, body or person;

58.13.4 any change or proposed change in the terms and conditions of employment or working conditions of the TUPE Employees on or after their transfer to the New Provider, or to the terms and conditions of employment or working conditions of any person who would have been a TUPE Employee but for their resignation or decision to treat their employment as terminated under Regulation 4(9) of the Regulations on or before the Service Provision Change as a result of any such changes; and

58.13.5 the change of identity of employer occurring by virtue of the TUPE Regulations and/or this Agreement being significant and detrimental to any of the TUPE Employees, or to any person who would have been a TUPE Employee but for their resignation or decision to treat their employment as terminated under Regulation 4(9) of the Regulations as a result of the change in employer.

59. STEP-IN FOR HEALTH AND SAFETY AND ENVIRONMENTAL REASONS

59.1 The provisions of Clauses 59.1 to 59.5 (inclusive) shall apply if the Infraco is in breach of its obligations to provide the Infrastructure Maintenance Services under this Agreement, and **tie**, acting reasonably, considers action is required in connection with Infrastructure Maintenance Services because as a result of such breach (i) a serious risk exists to health or safety of persons or to the environment; or (ii) the safety of the general public is compromised.

59.2 If the circumstances set out in Clause 59 (*Step-In for Health and Safety and Environmental Reasons*) apply, **tie**, acting reasonably, may (without prejudice to its other rights under this Agreement) either:

59.2.1 if **tie** considers that there is sufficient time and that it is likely that the Infraco will be willing and able to provide assistance, require the Infraco by written notice to take such steps as **tie** consider necessary or expedient to mitigate or rectify such circumstances and the Infraco shall use its best endeavours to comply with **tie's** requirements as soon as reasonably practicable; and/or

59.2.2 if **tie** considers there is not sufficient time, or that the Infraco is not likely to be willing and/or able to take the necessary steps, take such steps as are necessary to remove or reduce such risk (either themselves or by engaging others to take any such steps).

59.3 If the Infraco:

59.3.1 does not confirm within 5 Business Days of a notice served pursuant to Clause 59.2 (or such shorter period as is specified by **tie** in the notice where **tie** (acting reasonably) considers there to be an emergency), that it is willing to take such steps as are referred to in Clause 59.2; or

59.3.2 fails to take the steps notified to it by **tie** pursuant to Clause 59.2 within such time as **tie**, acting reasonably, shall think fit,

then (without prejudice to Clause 59.2.1) **tie**, acting reasonably, may itself take, or engage others to take, such steps as they consider appropriate.

59.4 Where **tie** considers it to be necessary or expedient to do so, the steps which **tie** may take pursuant to this Clause 59 (*Step-In for Health and Safety and Environmental Reasons*) shall include the partial or total suspension of the right and obligation of the Infraco to perform the Maintenance Services but only for so long as the circumstances referred to in Clause 59 (*Step-In for Health and Safety and Environmental Reasons*) subsist.

59.5 Any reasonable and demonstrable costs, losses, expenses or damages incurred by the Infraco in taking such steps as are required by **tie** pursuant to this Clause 59 (*Step-In for Health and Safety and Environmental Reasons*) shall be borne by the Infraco.

59.6 The Infraco shall reimburse **tie** for any reasonable and demonstrable costs and expenses incurred by **tie** in acting pursuant to this Clause 59 (*Step-In for Health and Safety and Environmental Reasons*) where such action is necessary by reason of the Infraco's failure to act pursuant to Clause 59.3 or its breach of this Agreement and **tie** shall be entitled to deduct any such amounts from any amount payable to the Infraco under the provisions of this Agreement.

PART 11 - PROGRAMME

60. PROGRAMME

60.1 The Infraco shall progress the Infraco Works with due expedition and in a timely and efficient manner without delay, to achieve timeous delivery and completion of the Infraco Works (or any part thereof) and its other obligations under this Agreement in accordance with the Programme. Notwithstanding the generality of the foregoing, the Infraco shall complete the Infraco Works in each Section so as to enable the Certificate of Sectional Completion in respect of each Section or Certificate of Service Commencement (as appropriate) to be issued

in accordance with Clauses 44 (*Notification of Sectional Completion of Sections A, B, C*) and 45 (*Notification of Service Commencement*) by the Planned Service Commencement Date or the relevant Planned Sectional Completion Date.

60.2 The Infraco shall update the Programme in accordance with the requirements of Schedule Part 2 (*Employer's Requirements*).

60.3 The Infraco shall submit to **tie's** Representative for his acceptance any change to the Programme showing the revised order or manner in which the Infraco proposes to carry out the Infraco Works.

60.4 **tietie's** Representative shall within 5 Business Days after receipt of any revised programme from the Infraco:

60.4.1 accept the revised programme in writing; or

60.4.2 reject the revised programme in writing with reasons; or

60.4.3 request the Infraco to supply further information to clarify or substantiate the revised programme or to satisfy **tie's** Representative as to its reasonableness having regard to the Infraco's obligations under the Agreement.

Provided that if none of the above actions is taken within the said period of 10 Business Days, the Infraco shall issue a reminder to **tie** and if **tie** does not take any of the above actions within 5 Business Days of **tie's** receipt of such reminder, then **tie's** Representative shall be deemed to have accepted the revised programme as submitted.

60.5 The Infraco shall within 5 Business Days after receiving from **tie's** Representative any request under Clause 60.4.2 or within such further period as **tie's** Representative may allow, provide the further information requested, failing which the revised programme shall be deemed to be rejected.

60.6 Upon receipt of such further information, **tie's** Representative shall within a further 5 Business Days accept or reject the revised programme in accordance with Clauses 60.4 or 60.4.1. In the event that the revised programme is accepted, the revised programme shall form and become the Programme.

60.7 Should it appear to **tie's** Representative at any time that the actual progress of the Infraco Works does not conform with the Programme, **tie's** Representative shall be entitled to require the Infraco to produce a revised programme showing such modifications to the Programme as

may be necessary to ensure completion of the Infraco Works in each section by the relevant Planned Service Commencement Date. In such event the Infraco shall submit its revised programme within 10 Business Days or within such further period as **tie's** Representative may allow. Thereafter the provisions of Clauses 60.3 and 60.5 shall apply.

60.8 Acceptance by **tie's** Representative of the Infraco's programme in accordance with Clauses 60.3, 60.5 and 60.7 shall not relieve the Infraco of any of its duties or responsibilities under the Agreement.

60.9 The Infraco shall take all reasonable steps to mitigate the effects of any delay to the progress of the Infraco Works.

61. RATE OF PROGRESS AND ACCELERATION

Rate of Progress

61.1 If for any reason which does not entitle the Infraco to an extension of time, the rate of progress of the Infraco Works is at any time, in the reasonable opinion of **tie's** Representative, too slow to ensure substantial completion of any section by the Planned Sectional Completion Date for that Section, or any previously agreed revised time for completion agreed under Clause 61.2, **tie's** Representative shall notify the Infraco in writing and the Infraco shall thereupon take such steps as are necessary and to which **tie's** Representative may consent to expedite the progress so as substantially to complete the Section by the Planned Sectional Completion Date, such consent not to be unreasonably delayed or withheld. The Infraco shall not be entitled to any additional payment for taking such steps.

Acceleration

61.2 Where **tie** desires either:

61.2.1 a date for completion earlier than any Planned Sectional Completion Date current at the date of issue of the preliminary instruction under Clause 61.3; or

61.2.2 to have a Section or Sections completed by the relevant Planned Sectional Completion Date where, following delays or stoppage to programme for whatever reason, the Infraco Works would not be so completed in the absence of any acceleration or resequencing arrangements; or

61.2.3 to obviate the necessity for, or to order the cancellation of, or a reduction in the length of, any extension of time being fixed under Clause 64 (*Relief Events*) so that either the

Planned Service Commencement Date current at the date of preliminary instruction under Clause 61.3 is not extended or is not extended by the length of the extension of time that would otherwise have been given under Clause 64 (*Relief Events*);

tie's Representative may issue a preliminary instruction under Clause 61.3.

61.3 If **tie's** Representative issues a preliminary instruction to the Infraco to accelerate the carrying out or alter the sequence and timing of any work to be executed under the provisions of the Agreement, **tie's** Representative shall in such instruction set out the exact nature of the requirements of **tie** in regard to the Planned Service Commencement Date as referred to in Clause 61.2 for which the preliminary instruction has been issued.

61.4 If the Infraco makes a reasonable objection to such an instruction, the preliminary instruction shall either be withdrawn or so varied as to meet such objection and may then be re-issued by **tie's** Representative.

61.5 As soon as reasonably practicable after receipt of the preliminary instruction (or after receipt of a preliminary instruction re-issued under Clause 61.3) the Infraco shall inform **tie's** Representative in writing in respect of the proposed instruction:

61.5.1 of the amount of any additional cost to which the Infraco should be entitled as a result of compliance with the instruction when issued by **tie's** Representative subject to Clause 61.3; or

61.5.2 that it is not reasonably practicable to state such a sum and that the cost to **tie** of compliance by the Infraco will therefore have to be ascertained in accordance with Clause 80 (**tie** *Changes*); and

61.5.3 of the earlier date for completion which can become the Planned Service Commencement Date for all the purposes of the Agreement; or

61.5.4 of the extent to which an extension of time that would otherwise be fixed under Clause 64 (*Relief Events*) can be cancelled or reduced and the date for completion which as a result will be or become the Planned Service Commencement Date for all the purposes of the Agreement.

61.6 If on receipt of the information given to **tie's** Representative under Clause 61.4 **tie** wishes to pay the amount referred to in Clause 61.5.1 and to accept the new Planned Service Commencement Date stated by the Infraco pursuant to Clause 61.5.3, **tie** shall cause **tie's** Representative to issue an instruction:

61.6.1 confirming the details of the acceleration or alteration of sequence or timing required, and

61.6.2 fixing the new Planned Service Commencement Date and the amount to which Clause 61.5.1 refers shall be included as if it were a variation.

61.7 Following any instruction under Clause 61.6 the Infraco shall revise the Programme in accordance with the terms of Clause 60 (*Programme*).

Incentivisation Bonus

61.8 Within seven (7) days of the date programmed for completion of each Section in Schedule Part 15 and against the submission of a valid VAT invoice, **tie** shall pay the Infraco an incentivisation bonus with respect to the completion of each Section of the Infraco Works as follows:

61.8.1 Section A £1,200,000 (one million two hundred thousand)

61.8.2 Section B £1,200,000 (one million two hundred thousand)

61.8.3 Section C £1,200,000 (one million two hundred thousand)

61.8.4 Section D £1,200,000 (one million two hundred thousand)

except where Infraco has failed to achieve sectional completion by the Planned Sectional Completion Date and such failure is not due to a Compensation Event, Notified Departure, **tie** Change or Relief Event in which event such amounts will be paid within seven (7) days of issue by **tie** of the relevant Certificate of Sectional Completion.

62. LIQUIDATED AND ASCERTAINED DAMAGES

62.1 Liquidated and ascertained damages shall be recoverable by **tie** in respect of delay to Planned Sectional Completion Dates as follows:

62.1.1 if the Infraco fails to achieve completion of any of Section A, Section B, Section C or Section D by the Planned Sectional Completion Date for that Section, the Infraco shall pay to **tie** the sum prescribed in Clause 62.2 for that Section for every week (or pro-rated for each calendar day) which shall elapse between the Planned Sectional Completion Date and the actual Sectional Completion Date for that Section. The liquidated and ascertained damages in respect of Section A, Section B and Section C

shall be cumulative during any period in which there is delay to Planned Sectional Completion to two or more Sections.

62.1.2 liquidated and ascertained damages in respect of Section D shall only be payable in respect of a delay to achieving completion of Section D by the Planned Sectional Completion Date for Section D caused by events occurring after the Sectional Completion Date for Section C and during the carrying out of Section D.

62.2 The liquidated and ascertained damages payable by the Infraco (where the delay is attributable to Infraco solely or both Infraco and the Tram Supplier) attached to non completion of each Section are as follows:

62.2.1 Section A £20,000 per week;

62.2.2 Section B £23,000 per week;

62.2.3 Section C £195,000 per week; and

62.2.4 Section D £246,000 per week,

provided that Infraco shall not be liable for any liquidated and ascertained damages where the failure to complete any of Section A, Section B, Section C or Section D is caused solely by the failure of the Tram Supplier to achieve any Certificate of Tram Commissioning by the Agreed Tram Commissioning Date for that Tram as specified in the Tram Supply Agreement.

62.2A Subject to Clause 62.9.2, in the event that:

62.2A.1 the first Tram to be issued with a Certificate of Tram Commissioning is not issued with such certificate by the Agreed Tram Commissioning Date liquidated and ascertained damages shall be payable by Infraco at the rate of 1% of the Tram Price (as defined in the Tram Supply Agreement) for each period of seven days (with an apportionment on a time basis for each part period) by which the issue of such Certificate of Tram Commissioning is delayed after the Agreed Commissioning Date and until such a Certificate of Tram Commissioning is issued in respect of such Tram; and

62.2A.2 any other Tram to be issued with a Certificate of Tram Commissioning is not issued with such certificate by the Agreed Commissioning Date the Tram Supplier shall, in respect of each such Tram, liquidated and ascertained damages shall be payable by Infraco at the rate of 0.5% of the Tram Price (as defined in the Tram Supply

Agreement) for each period of seven days (with an apportionment on a time basis for each part period) by which the issue of such Certificate of Tram Commissioning is delayed after the Agreed Commissioning Date and until such a Certificate of Tram Commissioning is issued in respect of such Tram.

62.3 Subject to Clause 62.9, the total aggregated amount of any liquidated and ascertained damages payable by the Infraco to **tie** under this Clause 62 (*Liquidated and Ascertained Damages*) shall be limited to ten percent (10%) of the Construction Works Price and such cap shall exclude any liquidated and ascertained damages which are payable to **tie** under Clauses 62.2A and 62.6.

62.4 **tie** may:

62.4.1 deduct and retain the amount of any liquidated and ascertained damages becoming due under the provisions of Clause 62.1 from any sums due or which become due and payable to the Infraco; or

62.4.2 require the Infraco to pay such amount to **tie** forthwith.

If upon a subsequent or final review of the circumstances causing delay, **tie's** Representative grants a relevant extension or further extension of time in respect of the Planned Sectional Completion Date (in relation to Section A, Section B, Section C and Section D) or the Planned Service Commencement Date, **tie** shall no longer be entitled to apply liquidated and ascertained damages in respect of the period of such extension. Any sum in respect of such period which may already have been recovered under this Clause 62 (*Liquidated and Ascertained Damages*) shall be reimbursed forthwith to the Infraco. Interest shall be payable by **tie** on any amounts so reimbursed at a rate per annum equivalent to 2% above the base rate of The Royal Bank of Scotland plc current on the date upon which the liquidated and ascertained damages were actually paid by (by deduction or otherwise) the Infraco to **tie**, adjusted to reflect any changes to the rate during which the period over which the liquidated and ascertained damages were retained by **tie**.

62.5 If after liquidated and ascertained damages have become payable under Clause 62.1, **tie's** Representative orders a variation under Clause 80 (**tie** *Changes*) or any other situation outside the Infraco's control arises any of which in **tie's** Representative's opinion results in additional and further delay to that part of the Infraco Works:

62.5.1 **tie's** Representative shall so notify the Infraco and **tie** in writing; and

62.5.2 **tie's** further entitlement to liquidated and ascertained damages in respect of that part of the Infraco Works shall be suspended until **tie's** Representative notifies the Infraco and **tie** in writing that the additional and further delay has come to an end.

Such suspension shall not invalidate any entitlement to liquidated and ascertained damages which accrued before the period of additional and further delay started to run and, subject to any subsequent or final review of the circumstances causing delay, any monies already deducted from or paid by the Infraco as liquidated and ascertained damages under the provisions of this Clause 62 (*Liquidated and Ascertained Damages*) may be retained by **tie**.

Liquidated Damages for Weight

62.6 If a Tram exceeds the Maximum Tram Weight then the Infraco shall pay liquidated damages in respect of each such Tram of an amount calculated in accordance with said part 2 of Schedule Part 5 provided that if the amount that a Tram is overweight is equal to or more than an amount equal to five per cent (5%) of the Maximum Tram Weight, **tie** shall without prejudice to its other rights or remedies be entitled to reject the Tram.

General

62.7 The parties hereby acknowledge and confirm that the liquidated and ascertained damages payable pursuant to this Clause 62 (*Liquidated and Ascertained Damages*) at the rate and in respect of the circumstances set out in this Clause 62 (*Liquidated and Ascertained Damages*) represent a genuine pre-estimate of the loss that is anticipated to be suffered by **tie** consequent to a failure by the Infraco to comply with those obligations under this Agreement to which they relate. Neither party shall contend otherwise in any submission, claim or proceeding arising out of or in connection with this Agreement.

62.8 All sums payable by the Infraco to **tie** pursuant to this Clause 62 (*Liquidated and Ascertained Damages*) shall be paid as liquidated and ascertained damages for delay and not as a penalty. For the avoidance of doubt, the Infraco shall bear its own costs arising from delay caused by the Tram Supplier.

62.9 The recovery by **tie** of liquidated and ascertained damages under this Clause 62 (*Liquidated and Ascertained Damages*) shall not in any way relieve the Infraco from its obligation to complete the Infraco Works, nor from any of its other obligations or liabilities under the Agreement provided that

62.9.1 the liquidated and ascertained damages payable pursuant to this Clause 62.9 shall, subject to any rights to terminate pursuant to Clause 90 (*Termination on Infraco*

Default), be **tie's** sole and exclusive remedy and shall be in full and final satisfaction in respect of any claim arising from delay in achieving the Planned Sectional Completion Date for any of Section A, Section B, Section C and Section D;

62.9.2 the Infraco's liability in respect of liquidated damages for delay arising solely as a result of delay in delivering or commissioning of the Trams due to the acts or omissions of the Tram Supplier shall be limited to an aggregate amount of eleven percent (11%) of the Tram Price as defined in the Tram Supply Agreement.

62.10 In the event that at any time the amount representing liquidated damages, save in respect of liquidated damages for delay arising solely as a result of delay in delivering or commissioning of the Trams due to the acts or omissions of the Tram Supplier, exceeds the aggregate liability of the Infraco to **tie** for liquidated damages as described at Clause 62.3, whether paid or unpaid, **tie** may deliver to the Infraco a notice in writing requesting an increase in the Maximum Liquidated Damages ("**Liquidated Damages Cap Increment**"), which notification shall include **tie's** calculation of a proposed Liquidated Damages Cap Increment and indicate that failure to respond within 10 Business Days will constitute an Infraco Default entitling **tie** to terminate the Infraco Contract pursuant to Clause 62.11. The Infraco may respond in writing before the expiry of ten (10) Business Days from the date of such notification confirming its agreement to such Liquidated Damages Cap Increment and upon such agreement the Maximum Liquidated Damages shall be increased by the amount of the Liquidated Damages Cap Increment.

62.11 In the event that Infraco does not respond to **tie's** notification under Clause 62.10 within 10 Business Days of the date of the relevant notification or rejects **tie's** request, such lack of response or rejection shall constitute an Infraco Default and **tie** shall be entitled to issue a termination notice pursuant to Clause 90 (*Termination on Infraco Default).*

PART 12 - PROTESTOR ACTION, EXTENSIONS OF TIME AND COMPENSATION EVENTS

63. PROTESTOR ACTION

63.1 The Infraco shall use all reasonable endeavours as are necessary to protect:

63.1.1 the Edinburgh Tram Network as installed from protestor action during the period from the Commencement Date until the date of issue of the Certificate of Service Commencement; and

63.1.2 the Depot from protestor action during the period from the day after the date of issue of the Sectional Completion Certificate for Section A and the last day of the Term.

63.2 The Infraco shall be responsible for repairing, reinstating or making good any damage to the Infraco Works which is caused by or results from protestor action in accordance with Clauses 31 (at any time prior to the date of issue of the Certificate of Service Commencement) and pursuant to Clauses 52.16 and 52.17 (at any time following the date of issue of the Certificate of Service Commencement).

63.2.1 If the Edinburgh Tram Network or any part thereof is occupied by protestors at any time during the term of this Agreement, then the Infraco shall notify **tie** as soon as reasonably practicable of this occurrence.

63.2.2 **tie** shall procure that protestors are removed and may request the reasonable assistance of Infraco to remove protestors.

63.2.3 Where **tie** is given assistance in accordance with Clause 63.2.2 then, in respect of any protestor action, **tie** will indemnify Infraco in respect of any demonstrable costs, losses, liabilities, expenses and claims suffered by Infraco as a result of or in connection with the provision of such assistance.

64. RELIEF EVENTS

64.1 If and to the extent that a Relief Event is the direct cause of (i) a delay in achievement of the issue of a Certificate of Sectional Completion on or before the Planned Sectional Completion Date for a Section or a Certificate of Service Commencement on or before the Planned Service Commencement Date, or (ii) adversely effects Infraco's ability to perform any of its obligations under this Agreement (including its ability to perform the Maintenance Services), then the Infraco shall be entitled to apply for an extension of time or relief from performance of obligations. The Infraco's sole right to such extension of time or relief from performance of its obligations in connection with a Relief Event shall be as set out in this Clause 64 (*Relief Events*).

64.2 To obtain such extension of time or relief from performance, the Infraco must, as soon as practicable, and in any event within 20 Business Days after it first became aware that the Relief Event had caused or is likely to cause delay:

64.2.1 give to **tie** a notice of its claim for an extension of time or relief from performance and full details of the nature of the Relief Event, the date of occurrence and its likely duration;

64.2.2 include in any notice given under Clause 64.2.1 full details of the extension of time or relief claimed including:

64.2.2.1 the Infraco's estimate of the likely effect of such delay upon the Programme (if any) or the adverse effects on the performance of its obligations under this Agreement;

64.2.2.2 mitigation measures adopted and why unsuccessful; and

64.2.2.3 any acceleration or other measures which the Infraco could take to mitigate the effects of such delay or non-performance and, where applicable, an estimate of the costs thereof;

provided that where a Relief Event has a continuing effect or the Infraco is unable to determine whether the effect of the Relief Event will actually cause it not to be able to comply with its obligations under this Agreement, such that it is not practicable for the Infraco to submit full details in accordance with this Clause 64.2 then the Infraco shall instead submit to **tie**:

(a) a statement to that effect with reasons, together with interim written particulars (including details of the likely consequences of the Relief Event on the Infraco's ability to comply with its obligations under this Agreement and an estimate of the likelihood and likely extent of the delay or non-performance); and

(b) thereafter, further interim written particulars until the actual delay caused or non-performance (if any) is ascertainable, whereupon the Infraco shall as soon as reasonably practicable, submit to **tie** the items referred to in Clause 64.2.2.

64.2.3 demonstrate to the reasonable satisfaction of **tie** that:

64.2.3.1 Infraco and the Infraco Parties could not reasonably have avoided such occurrence or consequences by steps which they might reasonably be expected to have taken;

64.2.3.2 the Relief Event is the direct cause of the delay or non-performance; and

64.2.3.3 the Infraco is using reasonable endeavours to perform its obligations under this Agreement.

64.3 In the event that the Infraco has complied with its obligations under Clause 64.2, then (as applicable in the circumstances):

64.3.1 the Planned Service Commencement Date and/or the Planned Sectional Completion Dates shall be postponed by such time; and/or

64.3.2 Infraco shall be given relief from its obligations under this Agreement,

as shall be reasonable for such a Relief Event, taking into account the likely effect of delay and on Infraco's ability to perform its obligations under this Agreement and where appropriate the Programme shall be revised by the Infraco in accordance with Clauses 60.2 to 60.5 (inclusive).

64.4 In the event that information required by Clause 64.2 is provided after the dates referred to in that Clause, then the Infraco will not be entitled to any relief in respect of or during the period for which the information is delayed.

64.5 The Infraco shall notify **tie** if at any time it receives or becomes aware of any further information relating to the Relief Event, giving details of that information to the extent that such information is new or renders information previously submitted materially inaccurate or misleading.

64.6 If the Parties cannot agree the extent of the extension of time or relief required or **tie** disagrees that a Relief Event has occurred (or as to its consequences) or that the Infraco is entitled to any extension of time or relief from the performance of its obligations, either Party may refer the matter for determination in accordance with the Dispute Resolution Procedure.

64.7 **tie** shall, in assessing any delay, extension of time or relief for the purpose of this Clause 64 (*Relief Events*):

64.7.1 not take into account any event or cause of delay which is caused by any negligence, default, breach of contract or breach of statutory duty of the Infraco or any Infraco Parties; and

64.7.2 take into account an event or cause of delay only if and to the extent that the Infraco establishes to the satisfaction of **tie** that the Infraco has used its reasonable endeavours to adjust the order and sequence in which the Infraco proposes to execute the Infraco Works in such a manner as to minimise the effects of the delay in, or if possible to avoid altogether any delay in, the progress of the Infraco Works.

64.8 The Infraco shall not be entitled to and shall be deemed to have irrevocably waived any entitlement to any extension of time in respect of any failure by the Infraco to:

64.8.1 identify any long lead time works and/or order any long lead time materials; or

64.8.2 identify any enabling works which are required in order to commence any part of the Infraco Works; or

64.8.3 subject to Clause 19 manage any required interface with CEC in so far as this forms part of the Infraco Works; or

64.8.4 subject to Clause 19 manage the required interface with any Approval Body and/or third party where consent or approval for the Infraco Works is required at any stage of such works; or

64.8.5 identify any instructions which are required from **tie** in order to progress the Infraco Works in accordance with the Programme, provided that following the occurrence of a Relief Event nothing in this Clause 64.8 shall prevent any long lead times, enabling works, required interfaces with CEC, any Approval Body and/or third party, or instructions which are required from **tie** from being taken into account when considering extensions of time in accordance with Clause 64.

64.9 If the Infraco Works are delayed in circumstances other than those entitling the Infraco to an extension of time as set out in this Clause 64 (*Relief Events*), the Infraco shall inform **tie** at the earliest opportunity and shall give an estimate of the likely effect upon the Programme. In such circumstances, the Infraco at its own expense shall take such acceleration measures as are necessary to achieve the requirements of the Programme.

64.10 Notwithstanding the occurrence of a Relief Event, the Infraco shall continue to carry out the Infraco Works unless otherwise agreed in connection with this Clause 64 (*Relief Events*).

65. COMPENSATION EVENTS

65.1 If and to the extent that a Compensation Event:

65.1.1 is the direct cause of a delay in achievement of the issue of a Certificate of Sectional Completion on or before the Planned Sectional Completion Date for a Section or the Certificate of Service Commencement on or before the Planned Service Commencement Date (as appropriate); and/or

65.1.2 directly and adversely affects Infraco's ability to perform any of its obligations under this Agreement (including its ability to perform the Maintenance Services); and/or

65.1.3 causes the Infraco to incur costs beyond such costs which were reasonably anticipated to be incurred by the Infraco but for the occurrence of the Compensation Event;

then the Infraco shall be entitled to apply for an extension of time and/or relief from the performance of its obligations, and/or claim for additional costs under this Agreement. The Infraco's sole right to an extension of time and/or relief from the performance of its obligations and/or to claim costs in connection with a Compensation Event shall be as set out in this Clause 65 (*Compensation Events*).

65.2 To obtain such extension of time and/or relief from performance and/or claim for such costs, the Infraco must, as soon as practicable, and in any event within 20 Business Days after it first became aware that the Compensation Event had caused or is likely to cause delay, adversely affect the performance of Infraco's obligations, or cause the Infraco to incur additional costs:

65.2.1 give to **tie** a notice of its claim for an extension of time and/or costs and relief from performance of its obligations and full details of the nature of the Compensation Event, the date of occurrence and its likely duration (a "**Compensation Event Notice**");

65.2.2 include in any notice given under Clause 65.2.1 full details of the extension of time and relief required and/or any costs claimed including:

65.2.2.1 the Infraco's estimate of the likely effect of such delay upon the Programme (if any) or the adverse effects on the performance of its obligations under this Agreement;

65.2.2.2 details of the costs or losses which are not Indirect Losses;

65.2.2.3 mitigation measures adopted and why unsuccessful; and

65.2.2.4 any acceleration or other measures which the Infraco could take to mitigate the effects of such delay or non-performance and, where applicable, an estimate of the costs thereof;

provided that where a Compensation Event has a continuing effect or the Infraco is unable to determine whether the effect of the Compensation Event will actually cause it not to be able to comply with its obligations under this Agreement, such that it is not

practicable for the Infraco to submit full details in accordance with this Clause 65.2 then the Infraco shall submit to **tie**:

(a) a statement to that effect with reasons, together with interim written particulars of the items referred to at Clause 65.2.2 insofar as such items are available (including details of the likely consequences of the Compensation Event on the Infraco's ability to comply with its obligations under this Agreement and an estimate of the likelihood and likely extent of the delay or non-performance and the costs incurred); and

(b) thereafter, further interim written particulars as set out in Clause 65.2.2(a) until the actual delay caused and costs incurred or non-performance (if any) are ascertainable, whereupon the Infraco shall as soon as reasonably practicable, submit to **tie** the items referred to in Clause 65.2.2; and

65.2.3 demonstrate to the reasonable satisfaction of **tie** that:

65.2.3.1 subject to Clause 65.12, Infraco and the Infraco Parties could not reasonably have avoided such occurrence or consequences by steps which they might reasonably be expected to have taken;

65.2.3.2 the Compensation Event is the direct cause of the delay, inability to perform and/or the additional costs; and

65.2.3.3 the Infraco is using reasonable endeavours to perform its obligations under this Agreement.

65.2A1 **tie** shall complete a review of the notification and submissions made by the Infraco pursuant to Clauses 65.2.1 and 65.2.2 and shall notify the Infraco within 20 Business Days of receipt (or such other period as the Parties acting reasonably may agree in the light of the complexity of the Compensation Event Notice and further information expected pursuant to Clause 62.2.2(b)):

65.2A1.1 its agreement or otherwise on whether a Compensation Event has occurred;

65.2A1.2 its agreement or otherwise regarding the extension of time, additional costs and other relief sought by the Infraco and where **tie** does not agree such matters, **tietie's** assessment in relation to the Infraco's entitlement to extension of time, additional costs and relief;

65.2A1.3 what further information **tie** requires to enable evaluation (or its completion) of any element of the Infraco's Compensation Event Notice.

65.2A2 In the event that **tie** (acting reasonably) requires further information from Infraco pursuant to Clause 65.2A1.3 then Clauses 65.2A1.2 shall apply and **tie** shall complete its review of the further information and respond within 20 days of its receipt.

65.3 In the event that the Infraco has complied with its obligations under Clause 65.2.2, then (as applicable in the circumstances):

65.3.1 the Planned Service Commencement Date and/or the relevant Planned Sectional Completion Dates shall be postponed by such time; and/or

65.3.2 Infraco shall be given such relief from performance of its obligations under this Agreement

as shall be reasonable for such a Compensation Event , taking into account the likely effect of delay and on Infraco's ability to perform its obligations under this Agreement and where appropriate the Programme shall be revised by the Infraco in accordance with Clauses 60.2 to 60.5; and/or

65.3.3 the Infraco shall be paid the amount of any direct and demonstrable additional cost as may be reasonable in the circumstances of the Compensation Event (as agreed by the Parties or determined pursuant to the Dispute Resolution Procedure) , such payment to be made through the operation of Clause 67 (*Application for Milestone Payment*) and in relation to that proportion of the amount to which the Infraco is entitled which relates to additional costs expended in earlier Reporting Periods, payment shall be included in the next Application for Milestone Payment following **tie's** assessment in relation to the Infraco's entitlement to extension of time, additional costs and relief pursuant to Clause 65.2A1.2;

65.4 In the event that information required by Clause 64.2 is provided after the dates referred to in that Clause, then the Infraco will not be entitled to any relief in respect of or during the period for which the information is delayed.

65.5 The Infraco shall notify **tie** if at any time it receives or becomes aware of any further information relating to the Compensation Event, giving details of that information to the extent that such information is new or renders information previously submitted materially inaccurate or misleading.

65.6 If, following **tie's** review and notification pursuant to Clauses 65.2A1 and 65.2A2, the Infraco disagrees with the notification that no Compensation Event has occurred, either Party may refer the matter for determination in accordance with the Dispute Resolution Procedure.

65.7 If, following **tie's** review and notification pursuant to Clauses 65.2A1 and 65.2A2, the Parties have not agreed the extent of the extension of time, relief or the additional costs assessed and notified by **tie** within 10 Business Days of notification by **tie** of its assessment that a Compensation Event has occurred, either Party may refer the matter for determination in accordance with the Dispute Resolution Procedure.

65.8 **tie** shall, in assessing any delay or extension of time or costs or relief for the purpose of this Clause 65 (*Compensation Events*)

65.8.1 not take into account any event or cause of delay or costs which is caused by any negligence, default of breach of contract or breach of statutory duty of the Infraco or any of the Infraco Parties; and;

65.8.2 take into account an event or cause of delay or costs only if and to the extent that the Infraco establishes to the satisfaction of **tie** that the Infraco has used its reasonable endeavours to adjust the order and sequence in which the Infraco proposes to execute the Infraco Works in such a manner as to minimise the effects of the delay in, or if possible to avoid altogether any delay in, the progress of the Infraco Works and mitigate the costs.

65.9 The Infraco shall not be entitled to and shall be deemed to have irrevocably waived any entitlement to any extension of time and/or additional costs in respect of any failure by the Infraco to:

65.10.1 identify any long lead time works and/or order any long lead time materials; or

65.10.2 identify any enabling works which are required in order to commence any part of the Infraco Works; or

65.10.3 subject to Clause 19 manage the required interface with CEC in so far as this forms part of the Infraco Works; or

65.10.4 subject to Clause 19 manage any required interface with any Approval Body and/or third party where consent or approval for the Infraco Works is required at any stage of such works; or

65.10.5 identify any instructions which are required from **tie** in order to progress the Infraco Works in accordance with the Programme,

provided that following the occurrence of a Compensation Event nothing in this Clause 65.10 shall prevent any long lead times, enabling works, required interfaces with CEC, any Approval Body and/or third party, or instructions which are required from **tie** from being taken into account when considering extensions of time and/or additional costs in accordance with Clause 65 (*Compensation Events*).

65.10 If the Infraco Works are delayed in circumstances other than those entitling the Infraco to an extension of time or relief as set out in this Clause 65 (*Compensation Events*), the Infraco shall inform **tie** at the earliest opportunity and shall give an estimate of the likely effect upon the Programme. In such circumstances, the Infraco at its own expense shall take such acceleration measures as are necessary to achieve the requirements of the Programme.

65.11 Notwithstanding the occurrence of a Compensation Event, the Infraco shall continue to carry out the Infraco Works unless otherwise agreed in connection with this Clause 65 (*Compensation Events*).

65.12 Where a claim is made under this Clause 65 as a result of the occurrence of a SDS Compensation Event:

65.12.1 Clause 65.2.3.1 shall not apply to steps which might reasonably be expected to have been taken by the SDS Provider;

65.12.2 if the SDS Compensation Event is Compensation Event (t) there shall be deducted from any additional costs which Infraco is entitled to recover pursuant to Clause 65.2 the amount of liquidated damages recoverable from the SDS Provider pursuant to Clause 27.7 of the SDS Agreement (as amended by the SDS Novation Agreement)

65.13 If the SDS Compensation Event is Compensation Event (u), there shall be deducted from any additional costs which Infraco is entitled to recover pursuant to Clause 65.2, the full amount recoverable by Infraco (that is to say up to ten million pounds (£10,000,000) for each and every event) pursuant to the SDS Agreement and specifically Clause 27 (as amended by the SDS Novation Agreement) as a result of the occurrence of such Compensation Event.

PART 13 - PAYMENT AND TAXATION

66. PAYMENT OF THE CONTRACT PRICE

66.1 Subject to the terms of this Agreement, **tie** shall pay the Contract Price to the Infraco for the carrying out and completion of the Infraco Works.

66.2 Any application for payments of sums due in respect of Construction Milestones, Critical Milestones and Tram Milestones and any payment to be made in respect of Construction Milestones, Critical Milestones and Tram Milestones shall be made in accordance with the procedure set out in Clause 67 (*Payment in Respect of Applications for Milestone Payments*).

66.3 Any application for payments of sums due in respect of the Maintenance Services and any payment to be made in respect of Maintenance Services shall be made in accordance with the procedure set out in Clause 68 (*Payment in Respect of Maintenance Services*).

66.4 Until the issue of the Certificate of Service Commencement, any application for payments of sums due in respect of Permitted Variations or other costs or expenses which have been expressly approved by **tie** and/or to which the Infraco is entitled in accordance with this Agreement shall be made in accordance with the procedure set out in Clause 67 (*Payment in Respect of Applications for Milestone Payments*).

66.5 Subject to Clause 66.6, after the issue of the Certificate of Service Commencement, any application for payments of sums due in respect of Permitted Variations or other costs or expenses which have been expressly approved by **tie** and/or to which the Infraco is entitled in accordance with this Agreement shall be made in accordance with the procedure set out in Clause 68 (*Payment in Respect of Maintenance Services*).

66.6 Promptly following the issue of the Certificate of Service Commencement, **tie** shall prepare and issue a statement of final account which the Parties, acting reasonably, shall use reasonable endeavours to agree within forty five days of its issue. If and to the extent that the Parties, fail to agree the statement of final account within 45 days, either Party will be entitled to refer the matter to the Dispute Resolution Procedure for determination. In the absence of manifest error, and subject to Infraco's right to apply for further payment in accordance with this Clause, the agreed statement of final account shall be conclusive and binding on the Parties as regards all amounts due and paid pursuant to this Agreement in connection with the design, construction, installation, testing, commissioning and maintenance of the Infraco Works up to the date of issue of the Certificate of Service Commencement. The Infraco shall not be entitled to apply for any further payment regarding Infraco Works completed prior to

the date of the Certificate of Service Commencement after the date which falls three months after agreement of the statement of final account, except to the extent such further payment relates directly to latent defects caused by a deficiency in design produced by the SDS Provider (subject to Infraco's rights and obligations in respect of such latent defects under this Agreement) or relates to payments which are the subject of formal dispute resolution process pursuant to Clause 97 (*Dispute Resolution Procedure*) commenced no later than six months from the date of issue of the statement of final account by **tie**.

67. PAYMENT IN RESPECT OF APPLICATIONS FOR MILESTONE PAYMENTS

Application for Milestone Payments

67.1 The Infraco shall submit each Application for Milestone Payment, and/or an application for payment for any other fees, costs and/or expenses in respect of Permitted Variations or other costs or expenses which have been expressly approved by **tie** and/or to which the Infraco is entitled in accordance with this Agreement which are being claimed by the Infraco for the previous Reporting Period, to **tie's** Representative within 3 Business Days following each Reporting Period End Date provided that:

67.1.1 save in the case where the **tie** Representative has not issued a Construction Milestone Completion Certificate or a Critical Milestone Completion Certificate pursuant to Clause 41 without notifying a reason for not doing so within 10 Business Days of the date on which it is established that the relevant Construction Milestone or Critical Milestone has been achieved pursuant to Clause 41.3, the Infraco shall not submit an Application for Milestone Payment claiming payment in respect of a Construction Milestone or Critical Milestone for which **tie's** Representative has not issued a Construction Milestone Completion Certificate or a Critical Milestone Completion Certificate;

67.1.2 subject to Clause 67.1.1, the Infraco may submit an Application for Milestone Payment even if **tie's** Representative has not issued a Milestone Completion Certificate in respect of every Milestone which has been identified in that Application for Milestone Payment; and

67.1.3 NOT USED

67.1.4 subject to Clause 67.1.1, the Infraco may include an application for payment in respect of Milestones or Critical Milestones identified in a previous Application for Milestone Payment.

67.2 Each Application for Milestone Payment shall include any amounts properly due to be paid to the SDS Provider pursuant to the SDS Agreement. For the avoidance of doubt, such Applications for Milestone Payments may also include any payments properly due under the SDS Agreement in respect of the deliverables developed by the SDS Provider pursuant to clauses 4.6 and 4.7 of the SDS Novation Agreement.

67.3 NOT USED

67.4 Each Application for Milestone Payment and/or an application for payment for any other fees, costs and/or expenses in respect of Permitted Variations or other costs or expenses which have been expressly approved by **tie** and/or to which the Infraco is entitled in accordance with this Agreement shall:

67.4.1 set out the Milestones and Critical Milestones progressed in that Reporting Period and the Milestone Payment due in respect of the same;

67.4.2 set out any other agreed adjustments pursuant to a Permitted Variation; and

67.4.3 any other sums due to or from the Infraco under and/or arising out of this Agreement in accordance with its terms,

(together with reasonable supporting documentation establishing the basis of such sums being claimed).

67.5 **tie** shall procure that **tie's** Representative shall, subject to any clarifications as are in **tie's** opinion (acting properly and reasonably) necessary, certify by notice in writing (a "**Construction Interim Certificate**") to the Infraco that part of the sum claimed in the application for payment which is approved by **tie** and give reasons why any part of the sum claimed has not been certified and the value of the sums involved no later than 5 Business Days after the date on which application for payment was received by **tie**. If the Infraco fails to achieve the prescribed Environmental or Health and Safety Key Performance Indicators as set out in Schedule Part 40 (*Environmental and Health and Safety Key Performance Indicators*) in any Reporting Period, **tie** shall make a deduction of 1% (the "**EHS KPI Deduction**") from the value of the Construction Interim Certificate save where and to the extent that the Infraco demonstrates to **tie's** satisfaction that such failure to achieve the prescribed Environmental or Health and Safety Key Performance Indicators did not result from a deficiency in either the Construction Phase Health and Safety Plan or from a failure in its management, in accordance with Good Industry Practice, of health, safety, quality or environmental aspects of the Infraco Works. **tie** shall release the EHS KPI Deduction as soon

as the Infraco has satisfied **tie** that the Construction Phase Health and Safety Plan has been updated and that the cause or causes of the EHS KPI Deduction has or have been rectified.

67.6 The Infraco shall submit a valid VAT invoice to **tie** and payment will become due to the Infraco on receipt by **tie** of such valid VAT invoice (the "**Construction Payment Due Date**"). The final date for payment by **tie** to the Infraco of a valid VAT invoice shall be the date occurring 15 Business Days after the Construction Payment Due Date.

67.7 If the Infraco is late in submitting its application for payment to **tie** by more than 3 Business Days after the required timescales set out in Clause 67.1, payment in respect of any amount certified in a Construction Interim Certificate shall become due to the Infraco on the date of receipt of the relevant valid VAT invoice by **tie** in respect of the late application for payment, and the final date for payment by **tie** to the Infraco of such valid VAT invoice shall be the date occurring 15 Business Days after the first date of the Reporting Period following receipt of the valid VAT invoice.

67.8 NOT USED

67.9 The Infraco and **tie** acknowledge that:

67.9.1 a maximum of only one Application for Milestone Payment may be made under this Clause 67.9.1 in any Reporting Period; and

67.9.2 the amount to be specified for payment in any Construction Interim Certificate in respect of a Milestone or Critical Milestone shall not exceed the amount specified in Schedule Part 5 (*Pricing*) in relation to the achievement of the Milestone or Critical Milestone to which such Construction Interim Certificate relates.

Adjustment

67.10 Without prejudice to Clause 67.5, any Milestone Payments or Critical Milestone Payments set out in Schedule Part 5 (*Pricing*) shall not be adjusted except by the express written agreement of **tie** or where there has been a Permitted Variation.

67.11 NOT USED

67.12 NOT USED

67.13 NOT USED

Retention and Condition Precedent to Payment

67.14 If Infraco fails to procure a collateral warranty from a Key Sub-Contractor in accordance with Clause 28.7 (in circumstances where Clause 28.10 do not apply), **tie** shall be entitled to retain any payments due to be made by it to the Infraco in respect of work executed by such Key Sub-Contractor. This retention shall be released by **tie** upon the provision of such collateral warranty as requested by **tie**.

67.15 Following a request from **tie** in accordance with Clause 74.10, any payment to the Infraco shall (save as after mentioned) be conditional upon the Infraco having provided any collateral warranty requested by **tie** under Clause 74.7, provided that the inability to provide a collateral warranty pursuant to Clause 74.10 shall not be a reason for withholding payment if **tie** is satisfied that Infraco has used all reasonable endeavours to provide a collateral warranty as provided for in Clause 74.10.

68. PAYMENT IN RESPECT OF MAINTENANCE SERVICES

Maintenance Services Payment

68.1 Subject to the terms of this Agreement, in respect of the provision of the Maintenance Services, **tie** shall pay to the Infraco the Maintenance Services Payment calculated in accordance with Schedule Part 6 (*Maintenance Payment Regime*) together with any other fees, costs and/or expenses in respect of any repairs made pursuant to Clause 52 (*Maintenance*), adjustments pursuant to and Permitted Variations or any other sums due to the Infraco in terms of this Agreement.

Application for Payments

68.2 The Infraco shall submit each application for payment in respect of Maintenance Services or in respect of any other costs or expenses which have been expressly approved by **tie** and/or to which the Infraco is entitled in accordance with this Agreement for the previous Reporting Period, to **tie's** Representative within 3 Business Days following the Reporting Period End Date and following submission to **tie** of the Service Quality Report pursuant to Clause 56.3.

68.3 Each application for payment shall set out:

68.3.1 the Maintenance Services Payment claimed by the Infraco which has been calculated in accordance with Schedule Part 6 (*Maintenance Payment Regime*);

68.3.2 any repairs made pursuant to Clause 52 (*Maintenance*) including a breakdown of the costs;

68.3.3 any other agreed adjustments pursuant to a Permitted Variation; and

68.3.4 any other sums due to or from the Infraco under and/or arising out of this Agreement in accordance with its terms

(together with reasonable supporting documentation establishing the basis of such sums being claimed).

68.4 **tie** shall procure that **tie's** Representative shall, subject to any clarifications as are in **tie's** opinion (acting properly and reasonably) necessary, certify by notice in writing (a "**Maintenance Services Interim Certificate**") to the Infraco that part of the sum claimed in the application for payment which is approved by **tie** and give reasons why any part of the sum claimed has not been certified in the Maintenance Services Interim Certificate and the value of the sums involved no later than 5 Business Days after the date on which application for payment was received by **tie** in accordance with Clause 68.2.

68.5 The Infraco shall submit a valid VAT invoice to **tie** and payment will become due to the Infraco upon receipt by **tie** of such valid VAT invoice (the "**Maintenance Payment Due Date**"). The final date for payment by **tie** to the Infraco of a valid VAT invoice shall be the date occurring 15 Business Days after the Maintenance Payment Due Date.

68.6 If the Infraco is late in submitting its application for payment to **tie** by more than 3 Business Days after the required timescales set out in Clause 68.2, payment in respect of any amount certified in a Maintenance Services Interim Certificate shall become due to the Infraco on the date of receipt of the relevant valid VAT invoice by **tie** in respect of the late application for payment, and the final date for payment by **tie** to the Infraco of such valid VAT invoice shall be the date occurring 15 Business Days after the first date of the Reporting Period following receipt of the valid VAT invoice.

68.7 NOT USED.

Adjustment

68.8 Without prejudice to Clause 68.4, any Maintenance Services Payments shall not be adjusted except by the express written agreement of **tie** or where there has been a Permitted Variation.

68.9 NOT USED

68.10 NOT USED

68.11 NOT USED

Retention and Condition Precedent to Payment

68.12 If, Infraco fails to procure a collateral warranty from a Key Sub-Contractor in accordance with Clause 28.7 (in circumstances where Clause 28.10 do not apply), **tie** shall be entitled to retain any payments due to be made by it to the Infraco in respect of work executed by such Key Sub-Contractor. This retention shall be released by **tie** upon the provision of such collateral warranty as requested by **tie**.

68.13 Following a request from **tie** in accordance with Clause 74.10, any payment to the Infraco shall (save as after mentioned) be conditional upon the Infraco having provided any collateral warranty requested by **tie** under Clause 74.7, provided that the inability to provide a collateral warranty pursuant to Clause 74.10 shall not be a reason for withholding payment if **tie** is satisfied that Infraco has used all reasonable endeavours to provide a collateral warranty as provided for in Clause 74.7.

69. INTEREST ON LATE PAYMENTS AND SET-OFF

Interest on late payments

69.1 In the event of a failure by **tie** to make payment in accordance with Clause 67 (*Payment in Respect of Applications for Milestone Payments*) or Clause 68 (*Payment in Respect of Maintenance Services*), **tie** shall pay to the Infraco interest upon any payment not paid by the final date for payment at a rate per annum equivalent to 2 per cent (2%) above the base rate of The Royal Bank of Scotland plc current on the date upon which such payment first becomes overdue adjusted to reflect any changes to the rate during the period over which the payment remains overdue.

69.2 Pursuant to Clause 69.1 or otherwise in accordance with this Agreement, in the event that the Party to whom payment is due, suffers a demonstrable cost of currency exchange hedge as a result of an exchange rate fluctuation between the pound sterling and the Euro which is connected to late payments relating to the Tram Supply Agreement, then the Party due to make payment shall be liable for this amount to the Party to whom the payment is due.

Set-Off

69.3 Subject to Clause 69.4, **tie** may deduct any amount payable by the Infraco to **tie** (whether by way of damages or in respect of any loss or expense sustained by **tie** by reason of the Infraco's breach of this Agreement) from any other payment or payments due to be made to the Infraco by **tie** under this Agreement.

69.4 Any notice of intention to withhold payment shall be served by **tie** at least ten Business Days prior to the final date for payment calculated in accordance with Clause 67.6 or Clause 68.5 (as appropriate) and such notice shall state the sums being withheld and the detailed reason or detailed reasons for such withholding. Where an effective notice of intention to withhold payment is given, but on the matter being referred to the Dispute Resolution Procedure, it is decided that the whole or part of the amount should be paid, the decision shall be construed as requiring payment not later than:

69.4.1 7 days from the date of the decision; or

69.4.2 the date which, apart from the notice, would have been the final date for payment;

whichever is the later.

69.5 The Infraco shall be entitled to payment of interest as provided in Clause 69.1 in respect of the relevant part of any payments which have been withheld in accordance with Clause 69.3 but are subsequently determined as being payable by **tie** to the Infraco either by agreement between the Parties or a decision following a referral to the Dispute Resolution Procedure. The interest shall be calculated for the period between the date when the relevant part of the payment should have been paid but for the notice of intention to withhold payment and the date on which payment is made by **tie** in accordance with Clause 69.4.

69.6 The Infraco shall not be entitled to retain or set-off any amount owed to it by **tie** against any amount due to **tie** by it.

70. VALUE ADDED TAX

70.1 The Infraco shall be deemed to have allowed in its tender for the tax payable by it as a taxable person to the Commissioners of Customs and Excise being tax chargeable on any taxable supplies to **tie** which are to be made under the Agreement.

70.2 All certificates issued by **tie** or **tie's** Representative under Clauses 67.5 and 68.4 shall be net of Value Added Tax. In addition to the payments due under such certificates **tie** shall separately

identify and pay to the Infraco any Value Added Tax properly chargeable by the Infraco on the supply to **tie** of any goods and/or services by the Infraco under this Agreement.

70.3 If any dispute, difference or question arises between either **tie** or the Infraco and the Commissioners of Customs and Excise in relation to any tax chargeable or alleged to be chargeable in connection with this Agreement or the Infraco Works, each shall render to the other such support and assistance as may be necessary to resolve the dispute, difference or question.

70.4 Clause 97 (*Dispute Resolution Procedure*) shall not apply to any dispute, difference or question arising under this Clause 70 (*Value Added Tax*).

70.5 Where under this Agreement one Party is to reimburse or indemnify another Party in respect of any payment made or cost incurred by the other Party, the first Party shall also reimburse any VAT paid by the other Party in question which forms part of its payment made or cost incurred to the extent such VAT is not available for credit for the other Party in question (or for any person with whom the indemnified party is treated as a member of a group for VAT purposes) under sections 25 and 26 of the Value Added Tax Act 1994.

71. LABOUR TAX AND LANDFILL TAX FLUCTUATIONS

71.1 The rates and prices contained in Schedule Part 4 (*Pricing*) and the Contract Price Analysis shall be deemed to take account only of the levels and incidence in force on the Effective Date:

71.1.1 the taxes, levies, contributions, premiums or refunds (including national insurance contributions but excluding income tax and any levy payable under the Industrial Training Act 1982 or any statutory re-enactment or amendment thereof for the time being in force) which are by law payable by or to the Infraco or anyone carrying out any part of the Infraco Works under the instruction of the Infraco in respect of their workpeople engaged on the Infraco Works;

71.1.2 any landfill tax payable by the Infraco or anyone carrying out any part of the Infraco Works under the instruction of the Infraco pursuant to the Finance Act 1996 (sections 39-71 and Schedule 5) and the Landfill Tax Regulations 1996 or any statutory re-enactment or amendment thereof for the time being in force; and

71.1.3 any aggregate levy payable by the Infraco or anyone carrying out any part of the Infraco Works under the instruction of the Infraco pursuant to the Finance Act 2001 or any statutory re-enactment or amendment thereof for the time being in force;

and shall not take account of any level or incidence of the aforesaid matters foreseeable or known to take effect at some later date.

71.2 If after the Effective Date there shall occur any change in the level and/or incidence of any such taxes, levies, contributions, premiums or refunds, the Infraco shall so inform **tie's** Representative and the net increase or decrease shall be taken into account in arriving at the Contract Price. The Infraco shall supply the information necessary to support any consequent adjustment to the Contract Price. All certificates for payment issued after submission of such information shall take due account of the additions or deductions to which such information relates. If the Infraco fails to advise **tie** of any increase within 3 months, the Infraco shall lose its entitlement to claim for an adjustment to the Contract Price.

72. RETURNS OF LABOUR AND INFRACO'S EQUIPMENT

72.1 Save in relation to the Tram Supply Obligations, the Infraco shall, if required by **tie's** Representative, deliver to **tie's** Representative a return in such form and at such intervals as **tie's** Representative may reasonably prescribe showing in detail the numbers of the several classes of labour from time to time employed by the Infraco on the Site and such information respecting the Infraco's Equipment as **tie's** Representative may reasonably require. The Infraco shall procure that the Sub-Contractors observe the provisions of this Clause 72 (*Returns of Labour and Infraco's Equipment*).

73. BEST VALUE

73.1 The Infraco shall, throughout the Term and to the extent consistent with its obligations under the Agreement, make arrangements to secure continuous improvement in the way in which the Infraco Works are conducted having regard to the Project Vision and, a combination of economy, efficiency and effectiveness.

73.2 The Infraco agrees to undertake (or refrain from undertaking) such actions as **tie** shall reasonably request, and shall:

73.2.1 prepare and, support and assist **tie** (in compliance with Clause 104 (*Information and Audit Access*) in preparing best value performance plans and conducting best value reviews in relation to the Infraco Works;

73.2.2 comply with requests for information, data or other assistance made by **tie** in pursuance of its best value assessment; and

73.2.3 comply with all requests by **tie** to procure the attendance of specific officers or employees of the Infraco or Infraco Parties at any **tie** meetings at which the Infraco Works are to be discussed.

73.3 **tie** may undertake an annual customer satisfaction survey ("**tie Customer Satisfaction Survey**") in order to:

73.3.1 assess satisfaction among the public and passengers with the quality, efficiency and effectiveness of the Maintenance Services;

73.3.2 complement preparation of the Annual Service Report; and

73.3.3 monitor compliance by the Infraco with its obligations including its management of the Maintenance Services;

and the Infraco shall provide reasonable assistance to enable **tie** to undertake the **tie** Customer Satisfaction Survey.

73.4 Without prejudice to any other provision in the Agreement (and no later than 2 Reporting Periods prior to the end of any year), the Infraco shall, at its own cost, provide a written report (the "**Annual Service Report**") which shall review the quality and performance of all Maintenance Services measured during the relevant period and show the key issues to be addressed going forward, including customer feedback, operational and maintenance issues and improvement proposals. The customer feedback shall include the results of any **tie** Customer Satisfaction Survey carried out pursuant to Clause 73.3 provided that such results have been supplied to the Infraco not less than 4 weeks prior to the date on which the Annual Service Report is to be submitted to **tie**. The Infraco shall upon written request promptly provide supporting information to verify and audit the information and other material contained in the Annual Service Report (other than the **tie** Customer Satisfaction Survey).

73.5 **tie** may make comments on and/or objections and specify omissions in the supporting information or the Annual Service Report and in such case shall provide the Infraco with written comments and/or objections within 30 Business Days of receipt. In the absence of such **tie** comments or objections, the supporting information (or the Annual Service Report) shall be deemed to have been accepted by **tie**.

73.6 The Infraco shall, within 30 Business Days of receipt of **tie** comments and/or objections under Clause 73.5, make revisions having regard to such comments and/or objections and resubmit the information and report to **tie**. If the information and reports cannot be agreed by the Parties then the matter will be determined in accordance with the Dispute Resolution Procedure.

73.7 If, in **tie's** reasonable opinion, the provision and performance of the Maintenance Services could be more effective, efficient and economic having regard to the Annual Service Report and the **tie** Customer Satisfaction Survey, then **tie** may serve a **tie** Notice of Change pursuant to Clause 80 (***tie*** *Changes*) stating the desired nature and timing of the changes to the provision or performance of the Maintenance Services.

73.8 NOT USED

73.9 The preparation of best value performance plans will take into account the conclusions from the Annual Service Report and the **tie** Customer Satisfaction Surveys.

PART 14 - BOND, WARRANTIES, INSURANCES AND LIABILITIES

74. BOND, PARENT COMPANY COMPANY GUARANTEES AND COLLATERAL WARRANTIES

74.1 On the Effective Date, Infraco shall provide to **tie** a Performance Bond at the maximum amount of £23,000,000 substantially in the form of Schedule Part 8 (*Bonds, Parent Company Guarantees and Collateral Warranties*) and issued by a surety with a credit rating by Standard & Poors of A- or higher (to be evidenced to **tie**).

74.2 On the date on which **tie** issues the Reliability Certificate, the Performance Bond shall be released by **tie**. In the event that the issue of the Reliability Certificate is not expected to be achieved by the date which is twelve (12) months after the currently programmed date of issue for the Reliability Certificate, no later than one month prior to its expiry date the Infraco shall arrange, upon written request by **tie**, for an extension to the validity of the Performance Bond for a period of no less than three months.

74.3 The Infraco shall provide to **tie** (issued by a surety with a credit rating by Standard and Poors of A- or higher (to be evidenced by **tie**) substantially in the form of Schedule Part 8 (*Bonds, Parent Company Guarantees and Collateral Warranties*), no later than:

74.3.1 the Effective Date, a Retention Bond in the amount of £2,000,000 (Two Million Pounds Sterling);

74.3.2 the date on which the Certificate of Sectional Completion for Section A is issued, a Retention Bond in the amount of £4,000,000 (Four Million Pounds Sterling);

74.3.3 the date on which a Certificate of Sectional Completion for Section B is issued, a Retention Bond in the amount of £6,000,000 (Six Million Pounds Sterling);

74.3.4 the date on which a Certificate of Sectional Completion for Section C is issued, a Retention Bond in the amount of £8,000,000 (Eight Million Pounds Sterling);

74.3.5 the date on which a Certificate of Sectional Completion for Section D is issued, a Retention Bond in the amount of £10,000,000 Million Pounds Sterling);

74.3.6 the date on which a Network Certificate is issued, a Retention Bond in the amount of £6,600,000 (Six Million, Six Hundred Thousand Pounds Sterling);

74.3.7 if the Reliability Certficate has not been issued on or before such date, the date which is three months prior to the date referred to at Clause 7.1 of the Retention Bond, a replacement Retention Bond on identical terms to that being replaced, but with an expiry date no earlier than three months after the date referred to in Clause 7.1 of the Retention Bond (the "**New Expiry Date**");

74.3.8 if the Reliability Certficate has not been issued on or before such date, the date which is three months prior to the New Expiry Date of any Retention Bond, a replacement Retention Bond on identical terms to that being replaced, but with an expiry date no earlier than three months after the New Expiry Date of the relevant Retention Bond (and such date shall also be deemed to be a New Expiry Date for the purposes of this Clause 74.3.8).

74.4 The Retention Bond shall only be released by **tie**, in accordance with its terms:

74.4.1 in the case of the Retention Bond provided in accordance with clause 74.3.1, when a Retention Bond is provided by the Infraco to **tie** in accordance with clause 74.3.2;

74.4.2 in the case of the Retention Bond provided in accordance with clause 74.3.2, when a Retention Bond is provided by the Infraco to **tie** in accordance with clause 74.3.3;

74.4.3 in the case of the Retention Bond provided in accordance with clause 74.3.3, when a Retention Bond is provided by the Infraco to **tie** in accordance with clause 74.3.4;

74.4.4 in the case of the Retention Bond provided in accordance with clause 74.3.4, when a Retention Bond is provided by the Infraco to **tie** in accordance with clause 74.3.5;

74.4.5 in the case of the Retention Bond provided in accordance with clause 74.3.5, when a Retention Bond is provided by the Infraco to **tie** in accordance with clause 74.3.6;

74.4.6 in the case of the Retention Bond provided in accordance with clause 74.3.6, on issue of a Reliability Certificate.

74.5 In the event that the credit rating of the sureties providing the Retention Bond or the Performance Bond then in force falls to BBB+ or a lower rating by Standard & Poors, **tie** shall be entitled to request the Infraco to provide a replacement for such Retention Bond or Performance Bond (as appropriate), on identical terms to the Retention Bond or Performance Bond (as appropriate) being replaced, but provided by a surety with a credit rating by Standard & Poors of A- or higher and notified to **tie**. If **tie** does not respond to such notification within 2 Business Days, the surety is deemed to be approved.

74.6 Should the Infraco fail to provide a:

74.6.1 Retention Bond pursuant to Clause 74.5; or

74.6.2 Retention Bond in accordance with any of clauses 74.3.2 to 74.3.8; or

74.6.3 Retention Bond in accordance with Clause 74.3.1; or

74.6.4 Performance Bond in accordance with Clause 74.1; or

74.6.5 an extension of validity of any Retention Bond as per Clauses 74.3.7 or 74.3.8

such failure shall be a breach of this Agreement entitling **tie**, in the case of Clause 74.6.1 and 74.6.2, to:

74.6.6 call on the Retention Bond in force at the time of such failure by issuing a Demand Notice (as defined in the relevant Retention Bond); and

74.6.7 withhold payments due to the Infraco from **tie** under this Agreement, up to an amount equal to that amount which would have been stipulated under the relevant Retention Bond had the Infraco complied with its obligations to provide a Retention Bond under Clause 74.5 or any of Clauses 74.3.2 to 74.3.8 (as the case may be). Any sums withheld by **tie** from the Infraco pursuant to this Clause 74.6.6 will be returned by **tie** to the Infraco within 5 Business Days following compliance in full by the Infraco with its obligation to provide a Retention Bond pursuant to Clause 74.5 or any of Clauses 74.3.2 to 74.3.8 (as the case may be).

74.7 Notwithstanding the terms of the Retention Bond, any amount **tie** is entitled to demand under the Retention Bond in respect of:

74.7.1 failure by Infraco to perform or observe any of its duties and/or obligations arising under or in connection with this Agreement; and/or

74.7.2 breach of any provision of this Agreement;

will be reduced by an amount equal to the aggregate of all sums by which the Maximum Performance Payment has been reduced pursuant to the provisions of Schedule Part 6 (*Maintenance Payment Regime*) in respect of the failure or breach to which the demand under the Retention Bond relates.

74.8 NOT USED

74.9 As a Condition Precedent, the Infraco shall procure the execution and delivery to **tie**, of parent company guarantees, in the form set out in part D of Schedule Part 8 (*Bonds, Parent Company Guarantees and Collateral Warranties*) and, if there is a Change in Control, the Infraco shall, subject to Clause 4.4 of Part D of Schedule Part 8 (*Bonds, Parent Company Guarantees and Collateral Warranties*) procure the provision of a substitute parent company guarantee or credit enhancement instrument satisfactory to **tie** within 7 Business Days of **tie's** request.

74.10 Within thirty days of any written request from **tie** (or such longer period as the Parties, acting reasonably, may agree), the Infraco shall execute a collateral warranty (in the form set out in Part E of Schedule Part 8 (*Bonds, Parent Company Guarantees and Collateral Warranties*) or, in respect of the EAL Works, in the form set out in Appendix 8 to Schedule Part 44 (*EAL Works*)) or where such form is not acceptable, in a different form which is acceptable to both Parties (acting reasonably) provided that for the avoidance of doubt Infraco shall not in any circumstances be required to provide a collateral warranty with provisions relating to liability which is greater than that set out in Part E of Schedule Part 8 (*Bonds, Parent Company Guarantees and Collateral Warranties*) in favour of CEC, TEL and Network Rail, in respect of carrying out the Infraco Works and in favour of EAL in respect of carrying out the EAL Works.

75. WARRANTIES

75.1 Each Infraco Member hereby separately represents, warrants and undertakes to **tie** that to the best of its knowledge, information and belief:

75.1.1 the Infraco Member, the Infraco Member's Infraco Parties or any of their respective representatives or Affiliates or professional advisers or employees or anyone acting on behalf of any of them have not committed any Prohibited Act;

75.1.2 all information which has been given by the Infraco Member, the Infraco Member's Infraco Parties or any of their respective representatives or Affiliates or advisers or employees or anyone acting on behalf of any of them to any member, officer,

employee or adviser of **tie** was, when given true, complete and accurate in all material respects and there is no fact or matter not disclosed in writing to **tie** which:

75.1.2.1 renders any such information untrue, inaccurate or misleading; or

75.1.2.2 might, if disclosed, adversely affect the decision of anyone considering whether or not to contract with the Infraco;

75.1.3 NOT USED

75.1.4 neither the Infraco Member nor the Infraco Member's parent company is involved in any dispute with HM Revenue and Customs, the BundesFinanzAmt or LandesFinanzant, the European Commission, the Office of Fair Trading, or any other fiscal or regulatory authority in any jurisdiction concerning any matter which could materially and adversely affect the business of the Infraco Member or its ability to perform or the Infraco Works in any way;

75.1.5 the Infraco Member does not use any processes and is not engaged in any activities which involve the misuse of any confidential or proprietary information belonging to any third party;

75.1.6 no claim is presently being assessed and no litigation, arbitration or proceeding is in progress or, to the best of the knowledge and belief of the Infraco Member pending or threatened, against the Infraco Member or any of its management or assets which might have an adverse effect on the ability of the Infraco Member or the Infraco to perform the obligations in this Agreement;

75.1.7 there has been no material adverse change to the financial condition of the Infraco Member or the Infraco Member's parent company guarantor since the latest audited accounts prior to the Effective Date including any matter resulting in a downgrade of the Infraco Member's or the Infraco Member's parent company guarantor's credit rating with any commercially acknowledged independent rating agency reporting the construction sector in the UK or the Federal Republic of Germany; and

75.1.8 the performance of the Infraco Works does not create any situation in which a conflict of interest arises for the Infraco Member.

75.2 Each Infraco Member hereby represents, warrants and undertakes to **tie** to the best of its knowledge and belief that the Infraco's provision of any Deliverables and the use by **tie** of any

of the Deliverables provided to it as part of the Infraco Works has not infringed and shall not infringe any third party's Intellectual Property Rights;

75.3 Each of the warranties, representations and undertakings given under Clauses 75.1.1 to 75.2 shall be construed as a separate and independent warranty, representation and undertaking and shall not be limited or restricted by reference to or inference from any other terms of this Agreement.

75.4 The Infraco Member affected shall immediately disclose in writing to **tie** any event or circumstance which may arise or become known to it after the Effective Date which is materially inconsistent with any of the warranties, representations or undertakings given under Clauses 75.1.1 to 75.2 or which has or is likely to have a material adverse effect on the Infraco Works.

75.5 Each Infraco Member hereby separately represents, warrants and undertakes to **tie** that it:

75.5.1 is duly incorporated under the laws of England and Wales and has the power to own its own assets and carry on its own business; and

75.5.2 has full power and authority (and does not require the consent, authority or licence of any third party) to enter into and perform this Agreement which constitutes a valid and binding obligation on the Infraco in accordance with its terms; and

75.5.3 will not, by performing its obligations under this Agreement, be in breach of any undertaking, agreement or legal obligation of any nature in respect of any third party or of any applicable Law so as to have a material adverse effect on its ability to discharge its obligations under this Agreement;

76. REQUIRED INSURANCES

Required Insurances

76.1 Each Infraco Member shall, at its own cost, procure that each of the Required Insurances is taken out and comes into effect on the relevant date specified in each "Period of Insurance" set out in Part 1 of Schedule Part 11 (*Required Insurances*) and shall maintain the Required Insurances in full force and effect until the relevant date specified in each "Period of Insurance" set out in Part 1 of Schedule Part 11 (*Required Insurances*), provided that each such Required Insurance is available in the EU insurance market at commercially reasonable rates and on commercially reasonable terms to contractors of the same status as at the Effective Date and discipline as the Infraco Members.

76.2 Each Infraco Member shall procure that all Required Insurances shall:

76.2.1 be maintained in accordance with Part 1 of Schedule Part 11 (*Required Insurances*); and

76.2.2 be placed at all times with insurers authorised to carry out insurance business in the United Kingdom and confirmed in writing as acceptable by **tie** (such written acceptance not to be unreasonably withheld or delayed).

76.3 Neither Infraco Member shall make any material alteration to the terms of the Required Insurances (including material changes to the level of deductibles) without **tie's** prior approval (which approval shall not be unreasonably withheld). If any such material alteration to the Required Insurances is made, the Infraco shall complete the questionnaire set out in Part 3 of Schedule Part 11 (*Required Insurances*), duly endorsed by its insurance broker. If the insurer makes or attempts to make any material alteration or purports to withdraw cover, the Infraco Member shall promptly give notice of this to **tie**.

76.4 Each Infraco Member shall ensure that each of its insurance brokers gives **tie** as soon as reasonably practicable after any policy of Required Insurance is taken out, replaced or renewed, a letter of undertaking in the form set out in part 2 of Schedule Part 11 (*Required Insurances*).

76.5 Each Infraco Member shall provide satisfactory evidence to **tie** that the Required Insurances have been effected. Thereafter, each Infraco Member shall upon request produce to **tie** receipts for the payment of current insurance premiums or equivalent documentary evidence to confirm that such Required Insurances are being properly maintained, and on the anniversary of the Effective Date and on each subsequent anniversary thereof until the date of expiry or earlier termination, each Infraco Member shall complete an insurance questionnaire set out in part 3 of Schedule Part 11 (*Required Insurances*) in relation to the Required Insurances to be taken out by the Infraco and submit such completed questionnaire to **tie** as soon as reasonably practicable. If an Infraco Member defaults in insuring or continuing to maintain the Required Insurances, **tie** may insure against any risk in respect of which such default has occurred and recover any premiums from the Infraco as a debt immediately due and payable.

76.6 Each Infraco Member shall:

76.6.1 procure that the Required Insurances contain a waiver of subrogation against **tie**, any **tie** Party and the named insured parties as set out in part 1 of Schedule Part 11 (*Required Insurances*) save in respect of fraud or deliberate non-disclosure; and

76.6.2 where an Infraco Member is obliged to effect any Required Insurances, not bring any claim or action against **tie** (or any **tie** Party), in respect of any losses, damages, liabilities, costs, expenses and charges in circumstances where and to the extent that an Infraco Member could recover such losses, damages, costs, expenses and charges under such insurance, provided that, to avoid doubt, this Clause 76.6.2 shall not by itself prevent an Infraco Member from claiming against **tie** (or any **tie** Party) in respect of a breach of this Agreement by **tie** or any **tie** Party for any losses, damages, costs, expenses and charges arising from such breach not covered because of the level of deductibles under such insurance permitted by this Agreement or to the extent of such losses, damages, costs, expenses and charges exceeds the greater of the insurance placed or the minimum limit of indemnity required in respect of such insurance under part 1 of Schedule Part 11 (*Required Insurances*).

76.7 Neither Infraco Member shall take any action or fail to take any action or (insofar as it is reasonably within its power) permit or allow others to take or fail to take any action (in either case including failure to disclose any fact) as a result of which any of the Required Insurances may be rendered void, voidable, unenforceable, suspended or impaired in whole or in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

76.8 The supply to **tie** of any insurance policy or insurance certificate or renewal certificate or other evidence of compliance with this Clause 76 (*Required Insurances)* shall not imply, or be taken as, acceptance by **tie** that:

76.8.1 the extent of insurance cover is sufficient and its terms are satisfactory; or

76.8.2 in respect of any interests or parties not insured or any risks not insured against, an acceptance by **tie** that the same were uninsurable.

76.9 Neither failure to comply nor full compliance with the provisions of this Clause 76 (*Required Insurances*) shall relieve the Infraco Members of their liabilities and obligations under this Agreement.

76.10 Each Infraco Member shall apply any proceeds of any policies of insurance maintained in accordance with part 1 of Schedule Part 11 (*Required Insurances*) in satisfaction of the claim, demand, proceeding or liability in respect of which such proceeds are payable (unless already paid direct to the third party or employee by the insurer).

76.11 Each Infraco Member undertakes with **tie** in relation to the Required Insurances:

76.11.1 to comply with all requirements of the insurers; and

76.11.2 to give notice to **tie** immediately upon the happening of any event which will adversely affect any policy of insurance effected in accordance with this Clause 76 (*Required Insurances*), including the downgrading of the credit rating to A- or lower by Standard & Poors of any party providing any of the Required Insurances.

76.12 Save in relation to the Tram Supply Agreement and/or the Tram Maintenance Agreement in which cases Clause 76.12.1 will apply, the Infraco Members shall immediately inform **tie** in writing if any of the Required Insurances cease to be maintained and/or cease to be available in the EU insurance market at commercially reasonable rates and on commercially reasonable terms to contractors of the same status as at the Effective Date, and discipline as the Infraco Members. In this event, the Parties shall meet to discuss the means by which any risks previously covered by the Required Insurances should be managed, mitigated or controlled. Any increased or additional premium required by insurers by reason of the Infraco's own claims record or other acts, omissions, matters or things particular to the Infraco Members shall be deemed to be within commercially reasonable rates and terms.

76.12.1 In relation to the Tram Supply Agreement and/or the Tram Maintenance Agreement, the Infraco shall immediately inform **tie** in writing if any of the Required Insurances cease to be maintained and/or cease to be available in the EU insurance market at commercially reasonable rates provided that if the Infraco is procuring that the Tram Supplier and/or the Tram Maintainer (as appropriate) is maintaining such insurance at such rates, **tie** shall undertake in writing to reimburse the Infraco in respect of half of the net cost of such insurance to the Tram Supplier and/or the Tram Maintainer (as appropriate) above commercially reasonable rates. If **tie** undertakes in writing to reimburse the Infraco in respect of half of the net cost of such insurance to the Tram Supplier and/or the Tram Maintainer (as appropriate) above commercially reasonable rates or, if the Infraco procures that the Tram Supplier or Tram Maintainer (as appropriate) effects such insurance at or above commercially reasonable rates, the Infraco shall reimburse **tie** in respect of what the net cost of such insurance to the Tram Supplier or Tram Maintainer (as appropriate) would have been at commercially reasonable rates and terms, and the cost of maintaining any such insurance at rates above commercially reasonable rates by the Tram Supplier or Tram Maintainer (as appropriate) or by the Infraco shall be borne in equal proportions by the Infraco and **tie**.

76.13 Save in relation to the Tram Supply Agreement and/or the Tram Maintenance Agreement in which cases Clause 76.12.1 will apply, each Infraco Member shall fully co-operate with any measures reasonably required by **tie**, including (without limitation) completing any proposals for insurance and associated documents or maintaining such insurance at rates above commercially reasonable rates provided that if the Infraco Members are maintaining such insurance at such rates, **tie** shall pay to the Infraco Members the sum which is half of the additional cost to Infraco Members of maintaining such insurance above commercially reasonable rates.

76.13.1 Infraco shall procure that the Tram Supplier and/or the Tram Maintainer shall, fully co-operate with any measures reasonably required by **tie**, including (without limitation) completing any proposals for insurance and associated documents or maintaining such insurance at rates above commercially reasonable rates if **tie** undertakes in writing to reimburse the Infraco in respect of the net cost of such insurance to the Tram Supplier and/or the Tram Maintainer (as appropriate) above commercially reasonable rates or, if the Infraco procures that the Tram Supplier or Tram Maintainer (as appropriate) effects such insurance at or above commercially reasonable rates, reimbursing the Infraco in respect of what the net cost of such insurance to the Tram Supplier or Tram Maintainer (as appropriate) would have been at commercially reasonable rates and terms.

OCIP Insurances

76.14 The Infraco acknowledges that **tie** has taken out the OCIP Insurances and agrees to comply with the requirements of the insurers with whom the OCIP Insurances are placed and Infraco acknowledges that it is on notice of the form and content of OCIP Insurances. The Infraco agrees that it will intimate to **tie** any act, occurrence or failure which may:

76.14.1 lead to any claim being made under the OCIP Insurances; or

76.14.2 render any of the OCIP Insurances void, voidable, unenforceable, suspended or impaired in whole or in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

76.15 The Parties shall not take any action or fail to take any reasonable action or (insofar as it is reasonably within its power) permit or allow others to take or fail to take any action (including, in either case, failure to disclose any fact) as a result of which any of the OCIP Insurances may be rendered void, voidable, unenforceable, suspended or impaired in whole or

in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

76.16 Subject to Clause 76.19A, the Infraco shall bear all excesses and deductibles payable in respect of claims made under the OCIP Insurances and the Additional Insurances where any claim arising is due solely to the breach of this Agreement by the Infraco or negligent act or negligent omission of the Infraco or any of the Infraco Parties.

76.17 Subject to Clause 76.19A **tie** shall bear all excesses and deductibles payable in respect of claims made under the OCIP Insurances and the Additional Insurances where any claim arising is due solely to the breach of this Agreement by **tie** or negligent act or negligent omission of **tie** and from the date of issue of the Certificate of Service Commencement **tie** shall bear all excesses and deductibles relating to claims under the OCIP and Additional Insurances where such claims do not fall under Clause 76.16. Where **tie** is responsible for such excess and deductibles, **tie** shall pay to the Infraco the amount of any such applicable excess or deductible claimed by the Infraco in accordance with Clause 67 (*Payment in Respect of Applications for Milestone Payments*) or Clause 68 (*Payment in Respect of Maintenance Services*), as appropriate.

76.18 Subject to Clause 76.19A, 76.19B and 76.19C **tie** and the Infraco shall be responsible (but only up to the date of the Certificate of Sectional Completion for each Section in respect of Infrastructure Maintenance Services) for bearing all excesses and deductibles payable in equal proportions in respect of claims made under the OCIP Insurances and the Additional Insurances where any claim arising does not fall under Clauses 76.16 or 76.17. **tie** shall pay to the Infraco the amount of any such applicable excess or deductible claimed by the Infraco in accordance with Clause 67 (*Payment in Respect of Applications for Milestone Payments*) or Clause 68 (*Payment in Respect of Maintenance Services*).

76.19 **tie** shall maintain at its own cost the OCIP Insurances in full force and effect during the Term. If **tie** fails to maintain or makes any material alteration to the terms (including the level of deductibles) of the OCIP Insurances (or equivalent insurances) at any time during the Term, **tie** shall be responsible for funding replacement or reinstatement of the Infraco Works to the extent that such failure or alteration prevents or reduces the available insurance proceeds which would have otherwise been recoverable through a claim on the OCIP Insurances so as to fund the reinstatement and Infraco shall be relieved of any obligations regarding reinstatement until **tie** provides such funding.

76.19A If **tie** alters the OCIP Insurances so that the level of deductibles is increased under such insurance, **tie** shall in respect of any claim pay for and be responsible for any difference in the excess or deductibles arising from such alteration irrespective of the cause of the claim.

76.19B Where any excesses or deductibles occur as a result of a claim arising due to the breaches or negligent acts or omissions of both Parties, the Parties shall bear such excesses and deductibles in such portions as shall be fair and equitable in all the circumstances, including the extent to which the Parties' breaches or negligent acts or omissions contributed to such claim.

76.19C **tie** shall be liable for payment of any deductible under the OCIP Insurance and the Additional Insurance where claims are made in respect of acts of vandalism whilst Trams are stationed in the Depot or where being used for testing other than whilst under responsibility of the Tram Supplier. Upon the issue of the relevant Tram Commissioning Certificate, **tie** shall be responsible for all deductibles in respect of each Tram and Tram Related Equipment save where the claim arises from the breach of this Agreement or by negligence of the Infraco.

Additional Insurance

76.20 **tie** may ask the Infraco to take out and maintain any annual insurance from time to time in the names of the parties reasonably requested by **tie** (the "**Additional Insurance**"). If Additional Insurance is required, the terms of this Clause 76 (*Required Insurances*) including the provisions which are stated to apply to the "Required Insurances" shall apply with any appropriate adjustment to be agreed between the Parties. The Infraco shall, subject to Clause 76.23, procure that any Additional Insurance shall:

76.20.1 (if **tie** so requires) contain a provision that **tie** and/or any other party reasonably requested by **tie** is named as a co-insured party;

76.20.2 provide that any Additional Insurance shall continue in effect and unaltered for the benefit of the insured parties for at least ninety days after written notice by registered mail of any cancellation (including non-renewal), change, modification or lapse for any reason;

76.20.3 contain a provision that requires the insurer to send copies of all notices of cancellation or alteration or suspension or any other notices given under or in relation to the policy to **tie** promptly upon receiving any notices of cancellation or alteration or suspension or any other notices;

76.20.4 contain a provision that a notice of a claim given to the insurer by one of the insured parties under the policy shall, in the absence of manifest error, be accepted by the insurer as valid notification of a claim in respect of the interests of all insured parties;

76.20.5 contain a provision to the effect (on the basis of non-vitiation/severability) that all the provisions of any Additional Insurance shall operate as if there were a separate policy in effect (save in respect of the sums insured, limits of liability and excesses/deductibles which shall be at the levels stated) for each named insured and that non-compliance with any policy term, condition or warranty and/or misrepresentation or non disclosure of material information by the Infraco or any other co-insured will not affect the rights and/or interests of any co-insured party under any policies effected as Additional Insurance; and

76.20.6 ensure that the Additional Insurances are primary, and shall not be brought into contribution with any other policy or policies effected by or on behalf of any of the insured parties,

76.21 The Infraco shall supply **tie** with copies of every policy document, insurance certificate and renewal certificate relating to any Additional Insurance (or such other evidence of insurances as may be reasonably required by **tie**) and documentary evidence to the effect that the Required Insurances (other than any Additional Insurance) have been taken out and are being maintained as soon as it is available but in any event no later than 7 days (in respect of certificates) and sixty days (in respect of policies) after the inception of the relevant policies, together with evidence of payment of the premiums and any periodic renewal certificates.

76.22 The Infraco shall inform **tie** in writing as soon as reasonably practicable after it receives a claim or becomes aware of the occurrence of any event that may give rise to a claim under any Required Insurance (if related to the Edinburgh Tram Network) or Additional Insurance and will ensure that **tie** is kept fully informed of subsequent action and developments concerning the claim; such written information shall not be required in relation to any claim of less than £50,000 (as Indexed). The Infraco shall take such steps as are necessary or appropriate to ensure that each Infraco Party, in respect of any event or claim of a like nature arising out of or relating to the operation or responsibility of that Infraco Party, or any event or claim of which they become aware, takes in relation to the Infraco like action to that which the Infraco is required to take under this Clause 76.22 in relation to **tie**, and shall inform **tie** promptly of information thus received from any Infraco Party.

76.23 At each anniversary of the Effective Date, the Infraco shall provide **tie** with a summary of all claims made under the Required Insurances, where such claims arise out of this Agreement.

Such summary shall include date, circumstances, status and amounts paid and outstanding on each claim.

76.24 Without prejudice to any other provision of this Agreement, the Infraco undertakes to the extent it has the right to do so under the relevant policy that it will not (and that each of the Infraco Parties to the extent each respectively has the right to do so under the relevant policy will not) settle any OCIP Insurance or Additional Insurance claim above £50,000 (as Indexed) without the prior written agreement of **tie** (such agreement not to be unreasonably withheld or delayed).

76.25 The Infraco shall promptly inform **tie** in writing if any of the Additional Insurances cease to be maintained and/or cease to be available in the EU insurance market at commercially reasonable rates and on commercially reasonable terms to contractors of the same status, as at the date of **tie's** request to Infraco that it takes out the Additional Insurance, and discipline as the Infraco. In this event, the Parties shall meet to discuss the means by which any risks previously covered by the Additional Insurances should be managed, mitigated or controlled and any agreement shall be a **tie** Change. Any increased or additional premium required by insurers by reason of the Infraco's own claims record or other acts, omissions, matters or things particular to the Infraco shall be deemed to be within commercially reasonable rates and terms.

76.26 Any request from **tie** that Infraco maintains Additional Insurance shall be a Mandatory **tie** Change. Nothing in this Clause 76 shall oblige Infraco to maintain Additional Insurances on terms which are not available in the EU insurance market.

76.27 All insurance proceeds received under OCIP Insurance in respect of physical damage shall be applied to repair, reinstate and replace each part or parts of the Infraco Works in respect of which the proceeds were received. Subject to Clause 76.29, if such proceeds are recovered by **tie**, **tie** shall pay to Infraco the monies recovered, within 5 Business Days of receipt of such monies from the Insurers

76.28 Where a claim is made or proceeds of insurance are received or are receivable by **tie** under any OCIP Insurance in respect of physical damage and in respect of a single event (or a series of related events) in an amount in excess of £100,000:

76.28.1 the Infraco shall deliver as soon as practicable and in any event within 15 Business Days after the making of the claim a plan prepared by the Infraco for the carrying out of the works necessary ("**Reinstatement Works**") to repair, reinstate or replace ("**Reinstatement Plan**") the Infraco Works which are the subject of the relevant claim

or claims in accordance with Clause 76.27. The Reinstatement Plan shall set out the proposed terms and timetable upon which the Reinstatement Works are to be effected, the final terms of which shall be subject to the prior written approval of **tie**, which approval shall not be unreasonably delayed;

76.28.2 provided that **tie** is satisfied that the Reinstatement Plan will enable the Infraco to comply with Clause 76.27 within a reasonable timescale:

76.28.2.1 the Reinstatement Plan will be adopted;

76.28.2.2 the Infraco shall enter into the contractual arrangement to effect the Reinstatement Works;

76.28.2.3 **tie** agrees and undertakes that, subject to compliance by the Infraco with its obligations under this Clause, and provided that the Infraco procures that the Reinstatement Works are carried out and completed in accordance with the contractual arrangements referred to in Clause 76.28.2.2, it shall not exercise any right which it might otherwise have to terminate this Agreement;

76.28.2.4 **tie** undertakes to use reasonable endeavours to assist the Infraco in the carrying out of the Reinstatement Plan; and

76.29 Where insurance proceeds are to be used, in accordance with this Agreement, to repair, reinstate or replace the Infraco Works, the Infraco shall carry out the work in accordance with the Employer's Requirements so that on completion of the work, the provisions of the Agreement are complied with, unless the Infraco is otherwise instructed pursuant to a **tie** Change in which case **tie** shall retain the insurance proceeds.

76.30 Where the proper and reasonable costs of carrying out Reinstatement Works exceed the insured amount under the OCIP Insurances **tie** shall pay such excess to Infraco in accordance with Clause 67 (Payment in respect of Application for Milestone Payments) or Clause 68 (Payments in respect of Maintenance Services).

77. INDEMNITY BY INFRACO, LIABILITY AND SOLE REMEDY

77.1 Subject to Clauses 77.2, 77.3, 77.7 and 77.8, the Infraco shall indemnify **tie,** CEC and their respective officers, agents and employees ("**Indemnified Parties**") from and against any and all claims, suits, losses, liabilities damages, penalties, fines, forfeitures, and the costs and expenses incident thereto (including without limitation any legal costs of defence) which any

of the Indemnified Parties may hereafter incur, become responsible for, or pay out as a result of:

77.1.1 any of the Infraco's or any Infraco Party's negligent or wilful acts, or negligent or wilful omissions in the performance of the Infraco Works; and/or

77.1.2 breach by Infraco of any term or provision of this Agreement including any Law.

Such claims, suits, losses, liabilities damages, penalties, fines, forfeitures, and the costs and expenses shall include such claims, suits, losses, liabilities damages, penalties, fines, forfeitures, and the costs and expenses in respect of:

(a) death or injury to any person;

(b) loss of or damage to any property (up to OCIP cover level);

(c) loss of or damage to any part of the Infraco Works (up to OCIP cover level);

(d) causing **tie** and/or CEC to be in breach of any Law; or

(e) causing **tie** and/or CEC to be in breach of any of the DPOFA, the Tram Inspector Agreement, the Third Party Obligations and any other undertakings which have been given by **tie** and/or CEC to any third party and which have been notified to the Infraco in writing either (i) prior to the Effective Date; or (ii) at any time as a **tie** Change;

(f) a breach by Infraco of its obligations under Clause 18 (Land Consent, Permanent Land and Temporary Sites);

(g) causing **tie** and/or CEC to be in breach of any Land Consent relating to the Permanent Land or the Temporary Land; or

(h) infringement or alleged infringement of a third party's Intellectual Property Rights; or

For the avoidance of doubt, Infraco shall not be liable to indemnify the Indemnified Parties in respect of any claim arising from or in connection with a third party agreement or undertaking the terms of which had not been notified to the Infraco in writing prior to the Effective Date.

77.2 The exception referred to in Clauses 24.5, 49.2 and 77.1, which is the responsibility of **tie**, is death of, or injury to, persons or loss of or damage to property resulting from any act, omission, neglect, or breach of statutory duty by the Indemnified Parties or other contractors (not being employed by the Infraco or any Infraco Party) or for or in respect of any claims,

suits, losses, liabilities, damages, penalties, fines, forfeitures, and the costs and expenses, demands, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto.

77.3 The Infraco's liability to indemnify the Indemnified Parties under Clause 77.1 shall be reduced in proportion to the extent that the act, omission, neglect, or breach of statutory duty of the Indemnified Party or other contractors (not being the Infraco or any Infraco Party) may have contributed to the said death, injury, loss or damage.

77.4 Subject to Clause 78 and to the extent such liability is not insured under OCIP, the Required Insurances or the Additional Insurances, **tie** shall indemnify the Infraco against claims which arise as an unavoidable consequence of the Infraco carrying out the Infraco Works pursuant to and in full compliance with this Agreement.

77.5 The Infraco shall not be relieved of any liability under Clause 77.1 by reason of:

77.5.1 any approvals, comments, instructions, consents, attendance at meetings relating to the Infraco Works or advice from **tie** or Network Rail; or

77.5.2 the fact that any act or thing may have been done by **tie** or Network Rail themselves on behalf of the Infraco and/or in accordance with any requirement stipulated by **tie** or Network Rail.

77.6 Nothing in this Agreement shall exclude or limit the liability:

77.6.1 of either Party for:

77.6.1.1 death or personal injury caused by that Party's negligence or the negligence of anyone for whom that Party is vicariously liable; or

77.6.1.2 fraud or fraudulent misrepresentation;

77.6.2 NOT USED

provided that nothing in this Clause 77.6 shall confer on either Party rights or remedies that they would not otherwise have.

77.7 Notwithstanding anything to the contrary contained in this Agreement and/or the Retention Bond and the Performance Bond, the liability of the Infraco under or in connection with this Agreement or as a consequence of termination of this Agreement whether in contract or delict, in negligence, for breach of statutory duty or otherwise (including, for the avoidance of

doubt, pursuant to any indemnity) shall (other than in respect of personal injury or death) when aggregated with:

(i) payments (if any) made by the Guarantors (or either of them) to **tie** under the Parent Company Guarantees; and

(ii) payments (if any) made to CEC, Network Rail, EAL and TEL under the collateral warranties or any other collateral warranty granted by Infraco in accordance with this Agreement,

(iii) the total amount of deductions (stated as a positive amount) applied to the Maintenance Contract Price in accordance with Schedule Part 6 (*Maintenance Payment Regime*),

be limited to the Liability Cap provided always that the calculation of the quantum of such limitation

77.7.1 shall exclude the proceeds of the Retention Bond and the Performance Bond and any cash retention or proceeds of any bond provided pursuant to Clauses 96 ;and

77.7.2 shall exclude amounts paid to the Infraco under the OCIP Insurances, and/or any Additional Insurances;

77.7.3 does not relate to liabilities which are covered by the proceeds of the Required Insurances or would have been so covered had the Infraco complied with its obligations under this Agreement; and

77.7.4 does not relate to liabilities which would have been covered by the proceeds of the Required Insurances, the OCIP Insurances and/or any Additional Insurances but for the application of any deductible under such Required Insurances, the OCIP Insurances and/or any Additional Insurances.

77.8 Subject to Clause 77.6 and Clause 77.4 and save for payments expressly agreed as payable pursuant to Clause 88.8, neither Party shall be entitled to claim damages or loss (i) for breach of this Agreement (ii) in delict (including negligence), (iii) for breach of statutory duty or (iv) on any other basis whatsoever (including, for the avoidance of doubt pursuant to any indemnity) to the extent that such damages or loss claimed by that Party are for Indirect Losses suffered by that Party, any of the Indemnified Parties or an Infraco Party, as the case may be, provided that nothing in this Clause 77.8 shall affect either Party's liability to the other Party or to any of the Indemnified Parties, in respect of any claim, action, proceedings or

demand against such other Party or any of the Indemnified Parties by a third party in connection with any Indirect Losses suffered by that third party, save that the Infraco shall have no liability with regard to uninsured third party economic and consequential loss. except as provided specifically pursuant to Schedule Part 43 (*Reserve Account*). **tie** shall take responsibility for any claim made for uninsured third party economic and consequential loss against **tie** and the Indemnified Parties or made against the Infraco and the provisions of Schedule Part 43 (*Reserve Account*) shall apply.

77.9 The Infraco shall not be relieved or excused of any responsibility, liability or obligation under this Agreement by the appointment of any Infraco Party. The Infraco shall be responsible for the selection, performance, acts, defaults, omissions, breaches, delict and offences of any Infraco Party. All references in this Agreement to any act, default, omission, breach, delict or offence of the Infraco shall be construed to include any such act, default, omission, breach or delict of any Infraco Party.

77.10 The Parties acknowledge and agree that the only rights available to them to terminate this Agreement are those expressly set out in this Agreement and that neither Party shall be entitled to exercise a right to terminate or rescind or accept the repudiation of this Agreement under any other right whether arising in common law or statute or otherwise howsoever (other than for fraud or a fraudulent misrepresentation).

77.11 Both Parties acknowledge and agree that the express rights provided in this Agreement in relation to termination and the calculation and payment of amounts due following such termination are exclusive and are in place of (and not cumulative with) any other rights or remedies which might arise as a consequence of such termination or expiry. Each Party hereby waives all other rights and remedies arising from such termination, whether express or implied, arising by common law (including in delict), by statute or otherwise howsoever provided that nothing in this Clause 77.11 exclude the right of either Party to claim remedies expressly conferred on them by this Agreement.

77.12 Except in respect of usable material necessarily generated from the Permanent Land in the carrying out and completion of the Infraco Works or where otherwise stated in this Agreement the Infraco shall pay all tonnage and other royalties rent and other payments or compensation (if any) for getting stone sand, gravel, clay or other materials required for the Infraco Works.

Criminal Liability

77.13 Where the act or default of the Infraco or of any Infraco Parties, causes **tie** to commit an offence, the Infraco shall immediately take any measure necessary to ensure that that act or default, no longer causes **tie** to commit that offence.

77.14 Where **tie** reasonably suspects that such an act or default is about to take place and it reasonably believes that this will result in **tie** committing an offence, **tie** may issue an instruction to the Infraco to remedy the act or default forthwith and the Infraco shall comply with the said instruction.

Latent Defects Liability

77.15 Save in respect of any claims notified in writing to the Infraco by **tie** and in respect of which **tie** has invoked Clause 97 (*Dispute Resolution Procedure*) no later than 3 months after the expiry of the period of 12 years from the issue of the Reliability Certificate, the Parties agree that Infraco shall have no liability and no actions or proceedings shall be commenced against Infraco or either of the Infraco Members in respect of any latent defects in the Infraco Works after the period of 12 years from the issue of the Reliability Certificate.

78. CONDUCT OF CLAIMS

78.1 Subject always to the requirements of the Required Insurances, the OCIP Insurances and/or any Additional Insurance:

78.1.1 if **tie** receives any notice, demand, letter or other document concerning any claim from which it appears that **tie** is or may become entitled to indemnification under this Agreement ("**Claim**"), **tie** shall notify the Infraco as soon as reasonably practicable and shall supply a copy of the relevant Claim to the Infraco.

78.1.2 where it appears that **tie** is, or may become, entitled to indemnification from the Infraco in respect of the liability arising out of the act or omission which is the subject of the Claim, the Infraco shall take conduct of any defence, dispute, compromise or appeal of the Claim and of any incidental negotiations and shall be entitled to resist the Claim in the name of **tie** and **tie** will give the Infraco all reasonable co-operation, access and assistance for the purposes of considering and resisting such Claim.

78.2 In relation to any Claim subject to Clause 78.1.2:

78.2.1 the Infraco shall keep **tie** fully informed and consult with it about material elements of the conduct of the Claim;

78.2.2 the Infraco shall not bring the name of **tie** into disrepute; and

78.2.3 the Infraco shall not pay or settle such Claims without the prior written consent of **tie**, such consent not to be unreasonably withheld or delayed.

78.3 **tie** shall be free to take steps in the proceedings, pay or settle any Claim on such terms as it thinks fit (and without prejudice to its rights and remedies under this Agreement) if the Infraco fails to notify **tie** of its intention to conduct the relevant Claim within 20 Business Days of the notice from **tie** under Clause 78.1.1 above or the Infraco notifies **tie** that it does not intend to take conduct of the Claim.

78.4 NOT USED

78.5 If, in controlling and contesting any Claim, **tie** takes or fails to take any action in relation to such Claim which it might reasonably be expected to take or not take (as the case may be) which terminates or reduces any entitlement of the Infraco to recover any part of the Claim from any insurer under any of the Required Insurances, the OCIP Insurances and/or any Additional Insurance, the liability of the Infraco to indemnify **tie** in respect of such Claim shall be reduced by an amount equal to such part or, as the case may be, the amount of the reduction thereof (except in the case where **tie** could not reasonably have been expected to have known that the Infraco's entitlement could be so terminated or reduced).

78.6 If the Infraco pays to **tie** an amount in respect of an indemnity and **tie** subsequently recovers (whether by payment, discount, credit, saving, relief, other benefit or otherwise) a sum which is directly referable to the fact, matter, event or circumstances giving rise to the Claim, **tie** shall forthwith repay to the Infraco whichever is the lesser of:

78.6.1 an amount equal to the sum recovered (or the value of the saving or benefit obtained) less any out-of-pocket costs and expenses properly incurred by **tie** in recovering the same; and

78.6.2 the amount paid to **tie** by the Infraco in respect of the Claim under the relevant indemnity;

provided that **tie** shall use reasonable endeavours to pursue such recovery and provided further that the Infraco shall be repaid only to the extent that the amount of such recovery aggregated

with any sum recovered from the Infraco exceeds any loss sustained by **tie** in respect of the Claim.

78.7 In the event that the Infraco is entitled to be indemnified by **tie** pursuant to Clause 77.4 in respect of a claim, the provisions of Clause 78.1, 78.2, 78.5 and 78.6 shall apply as if references to "**tie**" were references to "Infraco" and vice versa.

PART 15 - CHANGES

79. MANAGEMENT OF VARIATIONS

79.1 Any variations proposed to the Infraco Works shall be dealt with as follows:

79.1.1 **tie** Changes shall be dealt with in accordance with Clause 80 (***tie** Changes*);

79.1.2 Infraco Changes shall be dealt with in accordance with Clause 81 (*Infraco Changes*);

79.1.3 Small Works Changes shall be dealt with in accordance with Clause 82 (*Small Works Changes*);

79.1.4 Accommodation Works Changes shall be dealt with in accordance with Clause 83 (*Accommodation Works Changes*);

79.1.5 Qualifying Changes in Law shall be dealt with in accordance Clause 84 (*Qualifying Changes in Law*);

79.1.6 Network Expansions shall be dealt with in accordance with Clause 86 (*Network Expansions*);

79.1.7 Labour tax and landfill tax fluctuations shall be dealt with in accordance with Clause 71 (*Labour Tax and Landfill Tax Fluctuations*); and

79.1.8 where applicable, Schedule Part 4 (*Pricing*).

79.2 The Infraco shall maintain a change control register which shall detail the status and give summary information on all withdrawn, pending and confirmed variations under this Agreement. The Infraco shall provide a copy of the change control register to **tie** and the Infraco shall provide updates of the change control register to **tie** every Reporting Period.

79.3 No variation ordered in accordance with this Agreement shall in any way vitiate or invalidate this Agreement.

80. TIE CHANGES

80.1 Unless expressly stated in this Agreement or as may otherwise be agreed by the Parties, **tie** Changes shall be dealt with in accordance with this Clause 80 (***tie** Changes*). If **tie** requires a **tie** Change, it must serve a **tie** Notice of Change on the Infraco.

80.2 A **tie** Notice of Change shall:

80.2.1 set out the proposed **tie** Change in sufficient detail to enable the Infraco to calculate and provide the Estimate in accordance with Clause 80.4 below;

80.2.2 subject to Clause 80.3, require the Infraco to provide **tie** within 18 Business Days of receipt of the **tie** Notice of Change with an Estimate, and specify whether any competitive quotes are required and;

80.2.3 set out how **tie** wishes to pay (where relevant) for the proposed **tie** Change.

80.2.4 set out any changes which **tie** believe are required to the terms of this Agreement and/or the SDS Contract to give effect to the proposed **tie** Change

80.3 If, on receipt of the **tie** Notice of Change, the Infraco considers (acting reasonably) that the Estimate required is too complex to be completed and returned to **tie** within 18 Business Days, then the Infraco shall, within 5 Business Days (during the period prior to issue of the Reliability Certificate) and within 10 Business Days (at any time after issue of the Reliability Certificate) of receipt of such **tie** Notice of Change, deliver to **tie** a request for a reasonable extended period of time for return of the Estimate, such extended period to be agreed by the Parties, both acting reasonably.

80.4 As soon as reasonably practicable, and in any event within 18 Business Days after having received a **tie** Notice of Change (or such longer period as may have been agreed by the Parties, pursuant to Clause 80.3 or as required by Clause 80.11), the Infraco shall deliver to **tie** the Estimate. The Estimate shall include the opinion of the Infraco (acting reasonably) in all cases on:

80.4.1 whether relief from compliance with any of its obligations under this Agreement is required during or as a result of the implementation of the proposed **tie** Change;

80.4.2 any impact on the performance of the Infraco Works and the performance of the Edinburgh Tram Network;

80.4.3 any impact on the Programme and any requirement for an extension of time;

80.4.4 any Consents, Land Consents and/or Traffic Regulation Orders (and/ or any amendment or revision required to existing Consents, Land Consents and/ or Traffic Regulation Orders) which are required in order to implement or as a result of the implementation of the proposed **tie** Change and any update of the Consents Programme which will be required as a result;

80.4.5 any new agreements with third parties which may be required to implement the **tie** Change;

80.4.6 any amendment required to the Agreement or the Key Subcontracts as a result of the implementation of the proposed **tie** Change;

80.4.7 the proposed method of delivery of the proposed **tie** Change;

80.4.8 proposals to mitigate the impact of the proposed **tie** Change;

80.4.9 confirmation of the changes to the terms of this Agreement and/or the SDS Contract proposed by **tie** and any further changes the terms of this Agreement and/or the SDS Contract necessary to give effect to the proposed **tie** Change; and

80.4.10 any increase or decrease in any sums due to be paid to the Infraco under this Agreement (including the value of any Milestone Payments and the scheduling of such Milestone Payments) in order to implement, and as a direct consequence of implementation of, the **tie** Change, such increase or, decrease to be calculated in accordance with this Clause 80.

80.5 Where the **tie** Change, in the opinion of the Infraco acting reasonably, impacts the ability to deliver the Maintenance Services in accordance with Clause 52 (Maintenance) the Estimate delivered pursuant to Clause 80.4 shall include any net increase or decrease in:

80.5.1 in the case of demonstrable impact (taking into account any impact of previously implemented **tie** or Infraco Changes) on routine maintenance activity:

80.5.1.1 the consequential change in labour resources and management time required for each affected maintenance element of the Infraco Works; and

80.5.1.2 the consequential change in materials, plant and equipment required; or

80.5.2 in the case of demonstrable impact (taking into account any impact of previously implemented **tie** or Infraco Changes) on renewals maintenance activity:

80.5.2.1 the scope of required renewals work or services and frequency of renewals;

80.5.2.2 the resulting change in labour resources and management time required for the renewal work; and

80.5.2.3 the resulting change in materials and plant and equipment (if any) used to effect the renewals.

80.6 The valuation of any **tie** Changes made in compliance with this Clause 80 (***tie** Changes*) shall be carried out as follows:

80.6.1 by measurement and valuation at the rates and prices for similar work in Appendix F to Schedule Part 4 (*Pricing*) or Schedule Part 7 (*Maintenance Contract Price Analysis*) as the case may be in so far as such rates and prices apply;

80.6.2 if such rates and prices do not apply, by measurement and valuation at rates and prices deduced therefrom insofar as it is practical to do so;

80.6.3 if such rates and prices do not apply and it is not practicable to deduce rates and prices therefrom, by measurement and/or valuation at fair rates and prices in accordance with Appendix G Schedule Part 4 (*Pricing*) and Appendix F Schedule Part 7 (*Maintenance Contract Price Analysis*);

80.6.4 if the value of the **tie** Change cannot properly be ascertained by measurement and/or valuation, the value of the resources and labour employed thereon, as appropriate and in accordance with Appendix G to Schedule Part 4 (*Pricing*) and Appendix F to Schedule Part 7 (*Maintenance Contract Price Analysis)*;

provided that where any **tie** Change would otherwise fall to be valued under Clauses 80.6.1 and 80.6.2 above, but the instruction therefor was issued at such a time or was of such content as to make it unreasonable for the alteration or addition to be so valued, the value of the **tie** Change shall be ascertained by measurement and/or valuation at fair rates and prices.

80.7 The Infraco shall include in the Estimate evidence demonstrating that:

80.7.1 the Infraco has used all reasonable endeavours to minimise (including by the use of competitive quotes where appropriate in the case of construction works and where reasonable in the circumstances that new or additional sub contractors are required to deliver the change in the case of Maintenance Services or where construction works

are undertaken during the maintenance phase) any increase in costs and to maximise any reduction of costs ;

80.7.2 the Infraco has, where required by **tie** and where appropriate and practicable, sought competitive quotes from persons other than the Infraco Parties in pursuance of its obligation under Clause 80.7.1 above;

80.7.3 the Infraco has investigated how to mitigate the impact of the **tie** Change; and

80.7.4 the proposed **tie** Change will, where relevant, be implemented in the most cost effective manner (taking into account the reasonable requirements of Infraco in relation to quality) including showing where reasonably practicable that when any expenditure is incurred, relevant Changes in Law that are reasonably foreseeable at the time of consideration of the specific **tie** Change and which relate to that **tie** Change have been taken into account by the Infraco.

80.8 If the Infraco does not intend to use its own resources to implement any proposed **tie** Change, it shall:

80.8.1 demonstrate that it is appropriate to subcontract the implementation of such **tie** Change; and

80.8.2 comply with Good Industry Practice with the objective of ensuring that it obtains best value for money when procuring any sub-contractor or Deliverable required in relation to the proposed **tie** Change.

80.9 As soon as reasonably practicable after **tie** receives the Estimate, the Parties shall discuss and agree the issues set out in the Estimate. From such discussions **tie** may modify the **tie** Notice of Change, In each case the Infraco shall subject to Clause 80.11, as soon as practicable, and in any event not more than 15 Business Days after receipt of such modification, notify **tie** of any consequential changes to the Estimate.

80.10 Subject to Clause 80.15, if the Parties cannot agree on the contents of the Estimate, then either Party may refer the Estimate for determination in accordance with the Dispute Resolution Procedure.

80.11 If a **tie** Change requires a change in respect of design work to be carried out by the SDS Provider under the SDS Contract or any other change to the SDS Contract, the cost of such change will be valued in accordance with the terms of the SDS Contract and Infraco shall be allowed such time to perform its obligations under this Clause 80 as may reasonably be

required to allow it to obtain information from the SDS Provider under the SDS Contract which Infraco may require in order to prepare an Estimate for such Change and any modifications thereto.

80.12 The Infraco shall not be obliged to implement any proposed **tie** Change where:

80.12.1 **tie** does not have the legal power or capacity to require the implementation of such proposed **tie** Change; or

80.12.2 NOT USED

80.12.3 implementation of such proposed **tie** Change would:

80.12.3.1 be contrary to Law;

80.12.3.2 not be technically feasible;

80.12.3.3 increase the risk of a non-compliance with this Agreement by the Infraco to the extent such risk is not capable of being addressed by relief from obligations given to the Infraco or by amendment to the terms of this Agreement;

80.12.3.4 be outwith the specific competence of the Infraco either in performing the activity required by the **tie** Change or in supervising an the Infraco Party to carry out the activity required by the **tie** Change;

80.12.3.5 where the **tie** Change is instructed after the completion of Section D, require Infraco to carry out work and/or services that are not transport infrastructure and maintenance related to be performed after completion of Section D; or

80.12.3.6 make the provision of the Maintenance Services by the Infraco financially unfeasible.

80.13 Subject to Clause 80.15, as soon as reasonably practicable after the contents of the Estimate have been agreed **tie** may:

80.13.1 issue a **tie** Change Order to Infraco,; or

80.13.2 except where the Estimate relates to a Mandatory **tie** Change, withdraw the **tie** Notice of Change, in which case Infraco shall be entitled to claim the reasonable additional

costs incurred by the Infraco in complying with this Clause 80 in relation to that **tie** Notice of Change including the cost of any abortive works where **tie** has instructed Infraco to commence works prior to the agreement of the Estimate.

Subject to Clause 80.15, for the avoidance of doubt, the Infraco shall not commence work in respect of a **tie** Change until instructed through receipt of a **tie** Change Order unless otherwise directed by **tie**.

80.14 Subject to Clause 80.15, if **tie** does not issue a **tie** Change Order in accordance with Clause 80.13.1, within 28 Business Days of the contents of the Estimate having been agreed or determined then the **tie** Notice of Change shall be deemed to have been withdrawn except where the Estimate relates to a Mandatory **tie** Change in which case **tie** will be deemed to have issued a **tie** Change Order.

80.15 Where an Estimate has been referred to the Dispute Resolution Procedure for determination, but it is deemed by **tie** (acting reasonably) that the proposed **tie** Change is urgent and/or has a potential significant impact on the Programme, subject to Infraco's right to refuse to carry out a **tie** Change under Clause 80.12 and save where such proposed **tie** Change includes work by the SDS Provider and where the valuation of such work is not agreed , **tie** may instruct Infraco to carry out the proposed **tie** Change prior to the determination or agreement of the Estimate by issuing a **tie** Change Order to that effect.

80.16 Where **tie** issues a **tie** Change Order under Clause 80.15, Infraco shall implement the **tie** Change, and prior to determination of the Estimate shall be entitled to claim Infraco's demonstrable costs in implementing the **tie** Change calculated in accordance with Clause 80.6.

80.17 As soon as reasonably practicable and in any event within 20 Business Days of issue of a **tie** Change Order, or such other period as the Parties may agree acting reasonably, Infraco shall update:-

80.17.1 the Programme in accordance with Clause 60;

80.17.2 Schedule Part 5 (*Milestone Payments*) in relation to Milestone Payments and/or Critical Milestone Payments in accordance with Clause 67.10;

80.17.3 the Maintenance Services Payments in accordance with Clause 68.8;

80.17.4 the Maintenance Services Performance Plan; and

80.17.5 any other previously accepted Deliverable

as may be required in accordance with the agreed Estimate or as may be required to implement the **tie** Change in accordance with this Agreement.

80.18 As soon as reasonably practicable and in any event within 20 Business Days of issue of a **tie** Change Order, or such other period as the Parties may agree acting reasonably, the Parties shall enter into any document to amend the terms and conditions of this Agreement as referred to in the agreed Estimate to which the **tie** Change Order relates.

Restrictions on Entitlements to Relief for tie Change

80.19 The Infraco shall not be entitled to any extension of time, payment or relief in respect of any **tie** Notice of Change affecting the construction of the Infraco Works or the delivery of the Maintenance Services if and to the extent that:

80.19.1 with regard to construction, it would be reasonable to expect Infraco to have prevented or materially reduced the requirement for such **tie** Change, given the information known to Infraco at the time; and

80.19.2 with regard to Infrastructure Maintenance Services, it would have been reasonable to expect the Infraco to have foreseen that a physical deficiency or defect in the Infraco Works would, despite continual planned maintenance, lead to the requirement for a **tie** Change which could have been prevented or materially reduced by earlier intervention by **tie** and Infraco has failed to report such deficiency or defect in the Infraco Works in a timely fashion to **tie.**

80.20 If, having received instructions from **tie** or **tie's** Representative, the Infraco consider that compliance with those instructions would amount to a **tie** Change, then the Infraco shall comply with the instruction and shall within 20 Business Days of any instructions being received, notify **tie** of the same, such notification to include an Estimate pursuant to Clauses 80.4 and 80.5. From the date of receipt by **tie** of such an Estimate, Clause 80.15 and 80.16 shall be deemed to apply *mutatis mutandis* to the work carried out by Infraco in complying with such instruction. If it is agreed by the Parties or determined pursuant to the Dispute Resolution Procedure that the instructions amount to a **tie** Change (either Party being entitled to refer the matter to the Dispute Resolution Procedure if the matter has not been agreed within 10 Business Days of the Estimate being received by **tie**) then the provisions of this Clause 80 (***tie** Changes*) shall apply to such instructions.

80.21 Any failure by the Infraco to notify **tie** within 20 Business Days of instructions being received that it considers compliance with such instructions from **tie** or **tie's** Representative would

amount to a **tie** Change shall constitute an irrevocable acceptance by the Infraco that any compliance with **tie's** or **tie's** Representative's instructions shall not constitute a **tie** Change under this Agreement.

Third Party Agreements

80.22 If **tie** wishes Infraco to perform any of the obligations contained in any third party agreement which are not set out in part A of Schedule Part 13 (*Third Party Agreements*) or to be responsible for ensuring that neither **tie** or CEC will be put in breach of their obligations to third parties other than to the extent that it is responsible by virtue of the operation of Clause 18.17A **tie** shall serve a notice on the Infraco (a "**TPA Change Notice**") which notice shall comply with the requirements of Clause 80.2. Subject to Clause 80.25, the provisions of this Clause 80 shall apply *mutatis mutandis* to any TPA Change Notice served by **tie**.

80.23 Following service by **tie** of a TPA Change Notice, the Parties shall negotiate in good faith and acting reasonably to agree the adjustment to the Contract Price, if any, appropriate to compensate Infraco for the Infraco accepting any additional responsibility or risk arising from the TPA Change Notice to the extent not reflected adequately through application of Clause 80.5.

Notified Departures

80.24 Where pursuant to paragraph 3.5 of Schedule Part 4 (*Pricing*) or pursuant to Clause 14 (***tie** Obligations*), **tie** is deemed to have issued a **tie** Notice of Change as a result of the occurrence of a Notified Departure, the provisions of this Clause 80 (***tie** Changes*) other than Clause 80.19 shall apply.

81. INFRACO CHANGES

81.1 If the Infraco becomes aware of the need or desirability for a variation to the Infraco Works, (which does not fall within any of the other categories listed in Clause 79.1, save for Clause 79.1.2) the Infraco shall notify **tie** of the reasons for such variation and make proposals for the proposed variation in writing. **tie** shall be free to accept or reject any proposed variation as **tie** thinks fit, (other than where the Infraco Change is necessary for Infraco to comply with a Change in Law which is not a Qualifying Change in Law, in which case **tie** shall accept such proposal or such other proposal as **tie** may reasonable require which does not increase the costs to the Infraco of complying with the relevant Change in Law) and **tie** shall determine whether such proposal is dealt with in accordance with Clause 81.2 or Clause 81.3.

81.2 If **tie** wishes to proceed with a variation proposed by the Infraco, **tie** shall serve a **tie** Notice of Change on the Infraco and Clause 80 shall be adhered to by **tie** and the Infraco in respect thereof, provided that:

81.2.1 **tie** may require that there be a reduction to the Contract Price if such change will result in lower costs for the Infraco; or

81.2.2 in the event of an anticipated increase to the costs of the Infraco resulting from any change requested by the Infraco pursuant to Clause 81.1, there shall be no variation to the Contract Price unless otherwise agreed by the Parties.

81.3 If Infraco considers that a change could effect a saving of £20,000 (as Indexed) or more, the Infraco shall propose such change in accordance with Clause 81.1 and the Infraco's proposal shall be accompanied by a value engineering report which shall include:

81.3.1 a whole life cost analysis in respect of each element of (i) the Infraco Works affected by the proposed change and/or (ii) any additional works proposed to be carried out in order to effect the proposed change;

81.3.2 option appraisals and reasoned arguments to demonstrate why any particular systems, plant, equipment, materials and the like should be selected in preference to others for incorporation into the Infraco Works, taking into account the operational life of the Edinburgh Tram Network; or

81.3.3 the Infraco's proposals for the lump sum reduction to the Contract Price in respect of such proposal.

tie may accept such proposal at its absolute discretion and its decision in this respect shall be final and binding. If the proposed change is accepted, the reduction to the Contract Price that is anticipated as arising as a result of such change shall be shared between **tie** and the Infraco on a 50:50 basis and the Infraco's share shall be added to the Contract Price after the saving has been made.

81.4 As soon as reasonably practicable and in any event within 20 Business Days of issue of acceptance by **tie** of an Infraco Change or such other period as the Parties may agree acting reasonably, Infraco shall update:-

81.4.1 the Programme in accordance with Clause 60;

81.4.2 the Maintenance Services Performance Plan; and

81.4.3 any other previously accepted Deliverable

as may be required in accordance with the agreed Infraco Change or as may be required to implement the Infraco Change in accordance with this Agreement.

82. SMALL WORKS CHANGES

82.1 In the event that **tie** or **tie's** Representative, by notice in writing to the Infraco, requests the Infraco to carry out any Small Works, the Infraco shall calculate the cost of them as follows:

82.1.1 the labour element shall be calculated in accordance with Schedule Part 4 (*Pricing*) or, where such rates are not applicable, in accordance with the rates which are fair and reasonable having regard to the nature of the Small Works requested;

82.1.2 the materials element shall be charged at the cost (excluding VAT) of the materials to the Infraco (net of all discounts) plus the percentage uplift as indicated in Schedule Part 4 (*Pricing*); and

82.1.3 the plant element shall be calculated in accordance with Schedule Part 4 (*Pricing*) or, where such rates are not applicable, in accordance with the rates which are fair and reasonable having regard to the nature of the Small Works requested; and

82.1.4 the Sub-Contractor element shall be charged at the cost (excluding VAT) plus the percentage uplift as indicated in the Schedule Part 4 (*Pricing*)

and as soon as reasonably practicable and no later than 5 Business Days, the Infraco shall confirm by notice in writing to **tie** (the "**Small Works Cost Notice**") the amount of such cost and the basis for, and inputs to, such calculation.

82.2 **tie** shall not request the Infraco to carry out any Small Works, the execution of which would require input from the SDS Provider, the Tram Supplier or the Tram Maintainer.

82.3 The Infraco and **tie** or **tie's** Representative shall agree the timing of any Small Works so as to minimise any inconvenience to **tie**, the Infraco or disruption to the Programme. The Infraco shall take all reasonable steps to minimise the duration of any Small Works.

82.4 If, at any time within 5 Business Days following receipt by **tie** of a Small Works Cost Notice pursuant to Clause 82.1, **tie** notifies the Infraco in writing that **tie** or **tie's** Representative wishes the Infraco to proceed with the Small Works to which the Small Works Cost Notice relates, the Infraco shall carry out and complete such Small Works in accordance with the said Small Works Cost Notice and the relevant request pursuant to Clause 82.1 from **tie** in

accordance with any timing agreed pursuant to Clause 82.3 but otherwise as soon as reasonably practicable.

82.5 Infraco shall not be obliged to implement a Small Works Change in the circumstances where Clause 80.12 would have applied had the Small Works Change been a **tie** Change.

82.6 As soon as reasonably practicable and in any event within 20 Business Days of issue of a Small Works Change, or such other period as the Parties may agree acting reasonably, Infraco shall update:

82.6.1 the Programme in accordance with Clause 60;

82.6.2 Schedule Part 4 (*Pricing*) in relation to Milestone Payments and/or Critical Milestone Payments in accordance with Clause 67.10;

82.6.3 the Maintenance Services Payment in accordance with Clause 68.8;

82.6.4 the Maintenance Services Performance Plan; and

82.6.5 any other previously accepted Deliverable

to take account of the Small Works Change and implement it in accordance with this Agreement.

83. ACCOMMODATION WORK CHANGES

83.1 In the event that **tie** or **tie's** Representative, by notice in writing to the Infraco, requests the Infraco to carry out any Accommodation Works, the Infraco shall calculate the cost of them as follows:

83.1.1 the labour element shall be calculated in accordance with Schedule Part 4 (*Pricing*) or, where such rates are not applicable, in accordance with the rates which are fair and reasonable having regard to the nature of the Accommodation Works requested;

83.1.2 the materials element shall be charged at the cost (excluding VAT) of the materials to the Infraco plus the percentage uplift as indicated in Schedule Part 4 (*Pricing*); and

83.1.3 the plant shall be calculated in accordance with the Schedule Part 4 (*Pricing*) or, where such rates are not applicable, in accordance with the rates which are fair and reasonable having regard to the nature of the Accommodation Works requested; and

83.1.4 the Sub-Contractor element shall be charged at cost (excluding VAT) plus the percentage uplift as indicated in the Pricing Schedule

and as soon as reasonably practicable and no later than 5 Business Days, the Infraco shall confirm by notice in writing to **tie** (the "**Accommodation Works Cost Notice**") the amount of such cost and the basis for, and inputs to, such calculation.

83.2 **tie** shall not require the Infraco to carry out any Accommodation Works the execution of which would require input from the SDS Provider. Any such instruction shall be given pursuant to Clause 80 (***tie** Changes*).

83.3 The Infraco and **tie** or **tie's** Representative shall agree the timing of any Accommodation Works so as to minimise any inconvenience to **tie** and/or the Infraco and/or disruption to the Programme. The Infraco shall take all reasonable steps to minimise the duration of any Accommodation Works. For the avoidance of doubt, the timing of any agreed Accommodation Works shall not be treated as forming part of the Programme and a separate programme for the completion of such Accommodation Works shall be agreed between **tie** and the Infraco (both Parties acting reasonably). For the avoidance of doubt, if any Relief Event or Compensation Event occurs and has an impact on the progress of the Accommodation Works, then any extension of time or relief granted in accordance with Clause 64 (*Relief Events*) or Clause 65 (*Compensation Events*) shall be granted in respect of the programme for the completion of the Accommodation Works not the Programme.

83.4 If, at any time within 5 Business Days following receipt by **tie** of an Accommodation Works Cost Notice pursuant to Clause 83.1, **tie** notifies the Infraco in writing that **tie** or **tie's** Representative wishes the Infraco to proceed with the Accommodation Works to which the Accommodation Works Cost Notice relates, the Infraco shall subject to Clause 18 carry out and complete such Accommodation Works in accordance with the said Accommodation Works Cost Notice and the relevant request pursuant to Clause 83.1 from **tie** in accordance with the programme agreed pursuant to Clause 83.3 but otherwise as soon as reasonably practicable.

83.5 Infraco shall not be obliged to implement an Accommodation Works Change in the circumstances where Clause 80.12 would have applied had the Accommodation Works Change been a **tie** Change.

83.6 As soon as reasonably practicable and in any event within 20 Business Days of issue of a Accommodation Works Change, or such other period as the Parties may agree acting reasonably, Infraco shall update:

83.6.1 the Programme in accordance with Clause 60;

83.6.2 Schedule Part 5 (*Milestone Payments*) in relation to Milestone Payments and/or Critical Milestone Payments in accordance with Clause 67.10; and

83.6.3 any other previously accepted Deliverable

to take account of the Accommodation Works Change and implement it in accordance with this Agreement.

84. QUALIFYING CHANGES IN LAW

84.1 If a Qualifying Change in Law occurs or is to occur, then either Party may write to the other to express an opinion on its likely effects, giving details of its opinion of:

84.1.1 any necessary change in the Infraco Works;

84.1.2 whether any changes are required to the terms of this Agreement to deal with the Qualifying Change in Law; or

84.1.3 whether relief from compliance with any obligations under this Agreement is required as a result of the Qualifying Change in Law;

in each case giving in full detail the procedure for implementing the Qualifying Change in Law. Responsibility for any costs of such implementation shall be dealt with in accordance with Clauses 84.2 and 84.3 below.

84.2 As soon as reasonably practicable after receipt of any notice from either Party under Clause 84.1 above, the Parties shall discuss and agree the issues referred to in Clause 84.1 above and any ways in which the Infraco can mitigate the effect of the Qualifying Change in Law and the Infraco shall:

84.2.1 provide evidence to **tie** that the Infraco has used and will continue to use all reasonable endeavours (including where appropriate and practicable the use of competitive quotes) to minimise any increase in costs and maximise any reduction in costs;

84.2.2 demonstrate how the effects of the Qualifying Change in Law will be mitigated;

84.2.3 demonstrate that the relevant changes will be implemented in the most cost effective manner.

84.3 As soon as reasonably practicable after the issues referred to in Clause 84.2 have been agreed between the Parties or determined pursuant to the Dispute Resolution Procedure, **tie** shall give a **tie** Notice of Change on the basis that an extension of time will be granted to the Infraco to perform its obligations under this Agreement, to the extent that such performance is affected by the Qualifying Change in Law and that any effect on the cost to the Infraco of performing its obligations under this Agreement of any Qualifying Change in Law shall be borne by **tie** and the provisions of Clause 80 (***tie** Changes*) shall apply except that the Infraco shall be obliged to implement and **tie** shall be obliged to instruct the change in all circumstances (except to the extent that such change is not necessary to implement the Qualifying Change in Law or where **tie** has instructed a **tie** Change in order to remove the requirement to comply with a Qualifying Change in Law). **tie** shall issue a **tie** Change Order once it has been agreed or determined pursuant to the Dispute Resolution Procedure. In assessing the value of any change, **tie** shall subject to Clause 84.4, pay the agreed or determined amount for each and every Qualifying Change in Law.

84.4 In accordance with Clause 84.3, payment shall be due from **tie** to the Infraco:

84.4.1 subject to Clauses 84.4.2, 84.4.3, 84.4.4 and 84.4.5, in respect of Qualifying Changes in Law the value of which when aggregated with the value of all previous Qualifying Changes in Law exceed a threshold of £150,000 in aggregate, the amount by which the value of such Qualifying Change in Law exceeds such threshold when aggregated with the value of all previous Qualifying Changes in Law;

84.4.2 where the threshold under Clause 84.4.1 has been exceeded, in respect of SDS Qualifying Changes in Law the value of which are above a threshold of £15,000 in respect of each and every event the amount by which the value of such Qualifying Change in Law exceeds such threshold;

84.4.3 where the threshold under Clause 84.4.1 has been exceeded, in respect of Tram Supply Qualifying Changes in Law the value of which are above a threshold of £30,000 in respect of each and every event the amount by which the value of such Qualifying Change in Law exceeds such threshold; and

84.4.4 in respect of Tram Maintenance Qualifying Changes in Law, for the first 5 years following the Service Commencement Date the value of which are above a threshold of £15,000 in respect of each and every event the amount by which the value of such Tram Maintenance Qualifying Change in Law exceeds such threshold up to an aggregate of £150,000 and thereafter any Tram Maintenance Qualifying Changes in Law will be dealt with as a Mandatory **tie** Change.

84.5 Except otherwise expressly provided in this Agreement, the Infraco shall be responsible for any increase in its costs and shall not be entitled to any relief from its obligations under this Agreement to the extent that the same is caused as a result of a General Change in Law at any time during the Term.

84.6 Where a General Change in Law raises a technical, design or performance issue that requires a revision of the delivery of the Tram Maintenance Services, the Infraco shall take all possible measures to ensure that the Edinburgh Tram Network is operating in accordance with the relevant Legislation, but will not be responsible for the cost and delivery implications of such General Change in Law beyond that for which the Tram Maintainer is responsible under the Tram Maintenance Agreement.

84.7 The Infraco shall be entitled to benchmark any costs and expenditure affected by a General Change in Law or likely to be affected by a forthcoming General Change in Law (the "**Benchmarking Exercise**") after the expiry of 3, 6 and 9 years following the Service Commencement Date.

84.8 The Benchmarking Exercise shall be undertaken by comparing the relevant elements of the costs and expenditure applicable to the Maintenance Services as set out in Schedule Part 7 (*Maintenance Contract Pricing Analysis*) prior to the affect of any General Change in Law (the "**Base Price**") with the actual or projected costs and expenditure applicable to the relevant elements of the Maintenance Services following such costs and expenditure being affected by any General Change in Law (the "**Adjusted Price**").

84.9 The Infraco shall provide the results of such Benchmarking Exercise to **tie** together with details of the extent to which the Adjusted Price differs from Base Price (the "**Benchmarking Information**").

84.10 **tie** shall agree or dispute the Benchmarking Information. **tie** may dispute the Benchmarking Information by notifying Infraco of the basis on which it disputes the Benchmark Information, including whether **tie** believes that there may be the need for a **tie** Change or other action under the Agreement to address the fact that the further provision of the Maintenance Services becoming not economically reasonable for **tie**. If notification is served by **tie**, the Parties shall use reasonable endeavours to resolve such dispute within 20 Business Days of receipt of notification by Infraco, failing which either Party will be entitled to refer the matter to the Dispute Resolution Procedure. In the event that **tie** does not agree or dispute the Benchmarking Information within 40 Business Days of receipt of the same from Infraco, **tie** shall be deemed to have agreed the Benchmarking Information.

84.11 Where the Benchmarking Information has been agreed or determined pursuant to Clause 84.10 and the Adjusted Price is higher than the Base Price then the relevant costs and expenditure applicable to the relevant elements of the Maintenance Service set out in Schedule Part 7 (*Maintenance Contract Pricing Analysis*) shall be increased by the amounts set out in the Benchmarking Information and such increase shall be a Mandatory **tie** Change.

85. PHASE 1B OPTION

85.1 Not later than 31 October 2008, the Infraco acknowledges that **tie** may, by providing the Infraco with a written notice, instruct that the Infraco prepare a proposal for the implementation of the Phase 1b Works on the basis of Schedule Part 37 (*Phase 1b Works*). If so instructed by **tie**, the Infraco shall carry out the Phase 1b Works and, subject to Clause 85.2, the provisions of this Agreement shall apply to the Phase 1b Works.

85.2 Any ambiguities or discrepancies in the Agreement which arise as a result of the notice to proceed in respect of the Phase 1b Works shall be resolved in accordance with Clause 4 *(Priority of Contract Documents)*, and any necessary changes to the Agreement shall be agreed between the Infraco and **tie**.

86. NETWORK EXPANSIONS

86.1 **tie** and the Infraco shall keep opportunities for Network Expansion under review throughout the Term.

86.2 From time to time during the Term, **tie** may propose to the Infraco a Network Expansion for development. To the extent that **tie** requests assistance from the Infraco in relation to the development of such Network Expansion:

86.2.1 the Infraco shall provide such services during the development of that Network Expansion and shall carry out any required design and/or any construction works and/or carry out any required maintenance, and the provisions of this Agreement and the Employer's Requirements (where applicable), shall apply to the development of that Network Expansion and any design and/or works and/or carry out any required maintenance; and

86.2.2 the carrying out of such services and any design and/or works and/or maintenance carried out by the Infraco in respect of such services shall be a **tie** Change.

86.3 **tie** may withdraw its request for the Infraco to such services and design and/or works and/or maintenance, and **tie** may continue with the development of such Network Expansion, either by itself or in conjunction with third parties.

86.4 Whether or not **tie** requests the Infraco to provide services and/or design and/or works and/or maintenance in relation to a proposed Network Expansion:

86.4.1 the Infraco shall provide access to such information, documents and records as may be reasonably requested by **tie** or the **tie** Parties in relation to the development of the proposed Network Expansion; and

86.4.2 **tie** and the Infraco will negotiate in good faith in relation to agreeing any amendments to this Agreement that are necessary in respect of the Network Expansion.

PART 16 - SUSPENSION, TERMINATION, EXPIRY AND HANDBACK

87. SUSPENSION OF WORK

87.1 The Infraco shall on the written order of **tie's** Representative suspend the progress of the Infraco Works or any part thereof for such time or times and in such manner as **tie's** Representative may consider necessary and shall during such suspension properly protect and secure the Infraco Works so far as is necessary in the opinion of **tie's** Representative. Except to the extent that such suspension is necessary by reason of breach of this Agreement by the Infraco and such breach is of such nature that would not permit continued performance of the Infraco Works without risk to the health and safety of any person or risk of substantial damage to property then if compliance with **tie's** Representative's instructions under this Clause 87 (*Suspension of Work*) involves the Infraco in delay or extra cost (including costs incurred in properly protecting and securing the work), such instructions shall be a Compensation Event and Clause 65 (*Compensation Events*) shall apply.

87.2 If the progress of the Infraco Works or any part thereof is suspended on the written order of **tie's** Representative and if permission to resume work is not given by **tie's** Representative within a period of six months from the date of suspension then the Infraco may unless such suspension is otherwise provided for in the Agreement or continues to be necessary by reason of some default on the part of the Infraco serve a written notice on **tie's** Representative requiring permission within 20 Business Days from the receipt of such notice to proceed with the Infraco Works or that part thereof in regard to which progress is suspended. If within the said 20 Business Days **tie's** Representative does not grant such permission, the Infraco by a further written notice so served may (but is not bound to) elect to treat the suspension where it

affects part only of the works as a Mandatory **tie** Change deleting such works from the Infraco Works or where it affects the whole Infraco Works, as a result of which the Infraco cannot perform any material part of its obligations under this Agreement for a continuous period of 45 Business Days, as a **tie** Default.

87.3 Upon termination of this Agreement on the grounds of **tie** Default pursuant to Clause 87.1:

87.3.1 **tie** shall be under the same obligations with regard to payment as if termination on the grounds of **tie** Default had occurred in accordance with the provisions of Clause 88 (*Termination or Suspension for **tie** Default*); and

87.3.2 the Infraco shall comply with Clause 94 (*Effects of Termination or Expiry*) and Clause 95 (*Transition on Termination or Expiry*).

88. TERMINATION OR SUSPENSION FOR TIE DEFAULT

88.1 If a **tie** Default has occurred and the Infraco wishes to terminate this Agreement the Infraco may serve a termination notice on **tie** and such termination notice shall be in accordance with this Clause 88.

88.2 The Infraco shall specify in the termination notice the type of the **tie** Default which has occurred entitling the Infraco to terminate.

88.3 Provided the Infraco has complied with Clauses 88.1 and 88.2, this Agreement shall terminate on the day falling thirty Business Days after the date on which **tie** receives the termination notice, unless, in the case of a **tie** Default capable of rectification, **tie** rectifies the **tie** Default within thirty Business Days of receipt of the termination notice.

88.4 Subject to Clause 87.3, the Infraco shall not be entitled to, and shall not purport to, terminate this Agreement or accept any repudiation of this Agreement, except as expressly provided in this Clause 88 (*Termination or Suspension for **tie** Default*) or Clause 91 (*Termination by Reason of Force Majeure*).

88.5 Upon expiry of the thirty Business Days notice referred to in Clause 88.3 and notwithstanding the provisions of Clause 49 (*Non-Removal of Materials and Contractor's Equipment*) the Infraco shall with all reasonable despatch remove from the Site all Infraco's Equipment. In the event of any failure so to do **tie** shall have like powers to those contained in Clause 49.3 to dispose of any Infraco's Equipment.

88.6 No compensation shall be payable by **tie** to the Infraco for termination of this Agreement in terms of this Clause 88 (*Termination or Suspension for **tie** Default*) whether under contract, delict (including negligence), breach of (or compliance with) statutory duty, restitution or otherwise but without prejudice to payments due under Clause 88.8.

88.7 On termination of this Agreement in terms of this Clause 88 (*Termination or Suspension for **tie** Default*), the Infraco shall comply with Clause 94 (*Effects of Termination or Expiry*) and Clause 95 (*Transition on Termination or Expiry*).

88.8 Upon termination of this Agreement pursuant to Clause 88.3 and following receipt of a valid VAT invoice, **tie** shall pay the Infraco within 30 Business Days of receipt of such VAT invoice (in so far as such amounts or items have not already been covered by payments on account made to the Infraco) the value of all work carried out prior to the date of termination and in addition:

88.8.1 the amounts payable in respect of any preliminary items so far as the work or service comprised therein has been carried out or performed and a proper proportion of any such items which have been partially carried out or performed;

88.8.2 the cost of materials or goods reasonably ordered for the Infraco Works which have been delivered to the Infraco or of which the Infraco is legally liable to accept delivery (such materials or goods becoming the property of **tie** upon such payment being made to the Infraco);

88.8.3 the reasonable cost of removal under Clause 88.5;

88.8.4 all other expenses properly, demonstrably and reasonably incurred by the Infraco arising from the termination of this Agreement including, without limitation, any amounts which the Infraco is required to pay to its subcontractors (including the Tram Supplier and the Tram Maintainer) in order to terminate any subcontracts relating to this Agreement (including the Tram Supply Agreement and the Tram Maintenance Agreement), provided such contracts have been entered into on reasonable commercial terms; and

88.8.5

88.8.5.1 in respect of any termination which occurs prior to the Service Commencement Date the loss of profit fixed at ten percent (10%) for civils and seventeen percent (17%) for track and systems calculated with reference to demobilisation costs; and

88.8.5.2 in respect of any termination which occurs after the Service Commencement Date a payment representing the amount to be paid to the Infraco for one Reporting Period in respect of full performance of the Infrastructure Maintenance Services as calculated in accordance with part A of Schedule Part 6 (*Maintenance Payment Regime*)

provided that:

(i) the Infraco shall use all reasonable endeavours to minimise and mitigate any costs referred to in this Clause 88.8 and **tie** shall not be liable to pay the Infraco for such costs to the extent that the Infraco has failed to use all reasonable endeavours to minimise or mitigate such costs or to the extent that such costs have arisen out of the Infraco's breach of this Agreement or any negligent act or omission by the Infraco or any act or omission by the Infraco which is intended to disrupt, frustrate or delay due performance under Clauses 95 and 96. Any payment to be made under this Clause 88.8 shall be treated as a final account and payment shall be made by **tie** in accordance with Clause 67 (*Payment in respect of Applications for Milestone Payments*) or Clause 68 (*Payment in respect of Maintenance Services*) (as appropriate); and

(ii) the Tram Supply Agreement and the Tram Maintenance Agreement shall be deemed to have been entered into on reasonable commercial terms.

88.9

88.9.1 If **tie** shall fail to pay the Infraco in full any amount properly due and payable under this Agreement by the final date for payment in accordance with the requirements of Clause 67 (*Payment in respect of Applications for Milestone Payments*) or Clause 68 (*Payment in respect of Maintenance Services*) (as appropriate) and no effective notice to withhold payment has been given by **tie** to the Infraco, the Infraco may, after giving **tie** ninety days' notice in writing of the same, stating the ground or grounds on which it is intended to suspend performance, suspend the performance of the Infraco Works until payment in full is made by **tie**.

88.9.2 Infraco shall be entitled to suspend performance of the Infraco Works in accordance with Clause 88.9.1 on 60 days notice where **tie** has failed to pay and CEC has failed to make payment of the relevant amount in accordance with the CEC Guarantee (for the avoidance of doubt such period of 60 days shall operate instead of the 90 day period in Clause 88.9.1).

89. VOLUNTARY TERMINATION BY TIE

89.1 Three years after the issue of the first Certificate of Service Commencement, **tie** may terminate this Agreement at any time and for whatever reason upon giving written notice to the Infraco that this Agreement shall terminate on the date falling six months after the date of service of such written notice.

89.2 Upon termination of the Infraco's employment pursuant to Clause 89.1,

89.2.1 **tie** shall be under the same obligations with regard to payment as if termination on the grounds of **tie** Default had occurred in accordance with the provisions of Clause 88 (*Termination or Suspension for **tie** Default*); and

89.2.2 the Infraco shall comply with Clause 94 (*Effects of Termination or Expiry*) and Clause 95 (*Transition on Termination or Expiry*).

90. TERMINATION ON INFRACO DEFAULT

90.1 In the event that an Infraco Default:

90.1.1 as stipulated pursuant to Infraco Default (c), (d), (e), (g) and (i) in Schedule Part 1 occurs then **tie** may after giving 7 Business Days notice in writing to the Infraco specifying the nature of the Infraco Default which has occurred, terminate this Agreement.

90.1.2 as stipulated pursuant to Infraco Default (a), (f), (g) (to the extent that the Underperformance Warning Notices have been issued pursuant to Clause 56.7.2) and (j) in Schedule Part 1 occurs **tie** may give notice in writing to the Infraco specifying the nature of the Infraco Default which has occurred (a "**Remediable Termination Notice**").

90.1.3 as stipulated pursuant to Infraco Default (b) in Schedule Part 1 occurs **tie** may give notice in writing to the Infraco specifying the nature of the Infraco Default which has occurred (an "**Insolvency Termination Notice**").

90.2 Following service of a Remediable Termination Notice by **tie** in accordance with Clause 90.1.2 the Infraco may submit a comprehensive rectification plan setting out how it intends to remedy the Infraco Default in respect of which the Remediable Termination Notice has been served to **tie** within 30 Business Days of the date of such notice (or such longer period as **tie** may agree to in its absolute discretion). **tie** shall consider such rectification plan and

determine, at **tie's** absolute discretion, within 10 Business Days of receipt whether the rectification plan is acceptable. If **tie** accepts the rectification plan, the Remediable Termination Notice shall no longer be effective and no further Remediable Termination Notice will be served by **tie** in respect of the relevant Infraco Default, provided that the Infraco complies in full with the terms of the rectification plan as accepted by **tie**. Any failure by Infraco to comply with the terms of such rectification plan shall entitle **tie** to terminate the Agreement on 5 Business Days written notice to the Infraco and there shall be no obligation on **tie** to consider any further rectification plan.

90.3 Following service of an Insolvency Termination Notice by **tie** in accordance with Clause 90.1.3 the Infraco Member not effected by the Insolvency Event may submit a comprehensive rectification plan setting out how it intends to continue to provide the Infraco Works without the other Infraco Member within 30 Business Days of the date of such notice (or such longer period as **tie** may agree to in its absolute discretion) **tie** shall consider such rectification plan and determine, acting reasonably, within 10 Business Days of receipt whether the rectification plan is acceptable.

90.4 If **tie** does not accept the rectification plan submitted by Infraco or Infraco does not (for any reason) submit a rectification plan within the 30 Business Day period (or such longer period as has been agreed by **tie**), **tie** may after giving 5 Business Days notice in writing to the Infraco terminate this Agreement.

90.5 For the avoidance of doubt, neither the submission of any rectification plan nor **tie's** consideration of it shall relieve the Infraco in any way from the due and proper performance of all of its obligations under this Agreement. Any expenditure or liability incurred by Infraco in preparing and submitting any rectification plan shall be to the account of the Infraco.

90.6 Following termination under this Clause 90, **tie** may enter upon the Infraco Works and any other parts of the Site and expel the Infraco therefrom without thereby avoiding the Agreement or releasing the Infraco from any of its obligations or liabilities under the Agreement.

90.7 Following termination in accordance with this Clause 90, where **tie** has entered upon the Infraco Works and any other parts of the Site as set out in Clause 90.1, **tie** may:

90.7.1 complete or carry out the Infraco Works itself; or

90.7.2 employ any other contractor to complete the Infraco Works.

and in the event of termination of this Agreement on the grounds of Infraco Default (b) may use for such completion any of the Infraco's Equipment, Temporary Works, goods and

materials on any part of the Site and shall continue to enjoy (i) its right to copy and use all drawings specifications and other documents made by or on behalf of the Infraco and (ii) all rights granted to **tie** pursuant to Clause 102 (*Copyright and Intellectual Property)*

90.8 In the event of termination of this Agreement on the grounds of Infraco Default (b):

90.8.1 **tie** may at any time sell any of the said Infraco Member's Equipment or Temporary Works and apply the proceeds of sale in or towards the satisfaction of any sums due or which may become due to it from the Infraco under the Agreement;

90.8.2 the Infraco agrees that an automatic assignation of all Key Subcontractor sub-contracts shall be effected by **tie** giving written notice of assignation to every Key Subcontractor as provided for in the relevant Key Subcontractor collateral warranty.

90.9 Where **tie** has entered upon the Infraco Works and any other parts of the Site, the Infraco shall, if so instructed by **tie's** Representative in writing within 7 days of such entry, use reasonable endeavours to assign to **tie** any agreement as soon as practicable which the Infraco may have entered into and which are, in **tie's** reasonable opinion, material to the completion of the Infraco Works for the supply of any goods or materials and/or for the carrying out of any work for the purposes of the Agreement.

90.10 The Infraco shall comply with Clause 94 (*Effects of Termination or Expiry*) and Clause 95 (*Transition on Termination or Expiry*).

90.11 No compensation shall be payable by **tie** to the Infraco for termination under this Clause 90 (*Termination on Infraco Default*) whether under contract, delict (including negligence), breach of (or compliance with) statutory duty, restitution or otherwise but without prejudice to payments due under Clause 90.15.

90.12 As soon as may be practicable after termination of this Agreement pursuant to Clause 90.1 the Parties shall agree as at the time of such termination:

90.12.1 the amount (if any) which has been reasonably earned and not yet paid pursuant to this Agreement by the Infraco in respect of work actually done by it under the Agreement; and

90.12.2 the value of any unused or partially used goods and materials which are under the control of **tie** or CEC by reason of such termination and for which the Infraco has not yet been paid.

90.13 If **tie** enters upon the Infraco Works and any other parts of the Site and expels the Infraco in accordance with this Clause 90 (*Termination on Infraco Default*), **tie** shall not be liable to pay the Infraco any money under the Agreement (whether in respect of amounts certified by **tie's** Representative or otherwise) including any sums determined under Clause 90.11 unless or until **tie's** Representative certifies that an amount is due to the Infraco under Clause 90.15.

90.14 **tie's** Representative shall, within 6 months of completion of the works and services to be performed by the Infraco as part of the Infraco Works (excluding Maintenance Services) up to and including the Service Commencement Date and remaining to be completed at termination, certify:

90.14.1 the costs of completing the Infraco Works, not including any amount calculated as due to the Infraco pursuant to Clause 90.12, up to and including the Service Commencement Date in accordance with the terms of this Agreement (whether or not the Infraco Works are completed under a separate contract) and all other costs and expenses properly incurred by **tie**, less such sum as would have been due to the Infraco if the Infraco had completed the Infraco Works up to and including the Service Commencement Date together with any proceeds of sale under Clause 90.8; and

90.14.2 the amount **tie** will spend on the Maintenance Services (whether or not such services are provided under a separate contract) less the amount **tie** would have paid to the Infraco for the Maintenance Services over the Term.

90.15 Should the aggregate of the amount as certified by **tie's** Representative pursuant to Clauses 90.14.1 and 90.14.2 be:

90.15.1 a positive amount, and such amount is still a positive amount after subtraction of any amount calculated pursuant to Clause 90.12 then such amount shall be a debt due to **tie** from the Infraco payable within 30 Business Days.

90.15.2 a negative amount, and is still a negative amount after the addition of any amount calculated pursuant to Clause 90.12 then such amount shall be a debt due to the Infraco from **tie** payable within 30 Business Days.

90.16 If at any time prior to the completion of the Infraco Works any sum as calculated under Clauses 90.14.1 and 90.14.2 is a positive amount, **tie's** Representative may issue an interim certificate to that effect notwithstanding that the Infraco Works have not been completed.

90.17 Every certificate issued by **tie's** Representative pursuant to this Clause 90 (*Termination on Infraco Default*) shall be sent to the Infraco with such detailed explanation as may be necessary.

90.18 Subject to Clause 77.10 and Clause 77.11 the provisions of this Clause 90 (*Termination on Infraco Default*) are without prejudice to any other rights and remedies of **tie** including where **tie** is obliged to curtail the Infraco Works or suspend their performance for a period.

90.19 The Infraco shall notify **tie** as soon as practicable and in any event within 2 Business Days of any presentation of any petition for the purpose of winding up either Infraco Member or its parent company guarantor or for an administration order or the opening of an equivalent process under the Insolvency Act 1986, the EC Insolvency Regulation 1346/2000 or the Bundesinsolvenzgesetz of 5 October 1994 (as amended) in circumstances where Clause 75.1.6 would apply.

91. TERMINATION BY REASON OF FORCE MAJEURE

91.1 Neither Party shall be entitled to bring a claim for a breach of obligations under this Agreement by the other Party or incur any liability to the other Party for any losses or damages incurred by that other Party to the extent that a Force Majeure Event occurs and such Party is directly prevented from carrying out such obligations by that Force Majeure Event provided that such prohibition on bringing a claim and exclusion of liability shall not operate if and to the extent that:

91.1.1 the Affected Party could, by the exercise of reasonable foresight and diligence, have prevented or reduced the effect of the Force Majeure Event; and

91.1.2 the Affected Party could, whether before or after the occurrence of the Force Majeure Event, have reduced or eliminated the resulting breach of its obligations under this Agreement by taking reasonable steps.

91.2 On the occurrence of a Force Majeure Event, the Affected Party shall notify the other Party as soon as reasonably practicable, specifying details of the Force Majeure Event and providing evidence of its effect on the obligations of the Affected Party and any action proposed to remove or mitigate its effect.

91.3 The Parties shall enter into *bona fide* discussions with a view to alleviating the effects of such Force Majeure Event as soon as reasonably practicable, and if the terms or measures to remove the effect of the Force Majeure Event cannot be agreed on or before the date falling 12 months after the date of the commencement of the Force Majeure Event or by the end of such

longer period as the Parties may have agreed, or such Force Majeure Event is continuing or its consequence remains such that the Affected Party is unable to comply with all or a material part of its obligations under this Agreement for a period of more than 12 months after the date of the commencement of the Force Majeure Event or by the end of such longer period as the Parties may have agreed, either Party shall have the option to terminate this Agreement by written notice to the other.

91.4 The Parties shall at all times following the occurrence of a Force Majeure Event use all reasonable endeavours to prevent and mitigate the effects of any delay to the performance of the Infraco Works and the Infraco shall at all times during which a Force Majeure Event is subsisting take all steps in accordance with Good Industry Practice to overcome or minimise the consequences of the Force Majeure Event.

91.5 The Affected Party shall notify the other party as soon as reasonably practicable after the Force Majeure Event ceases or no longer causes the Affected Party to be unable to comply with its obligations under this Agreement. Following such notification, this Agreement shall continue to be performed on the terms existing immediately prior to the occurrence of the Force Majeure Event.

91.6 The effects of a Force Majeure Event shall be dealt with under Clause 64 (*Relief Events*).

91.7 No compensation shall be payable by **tie** to the Infraco for termination of this Agreement in terms of this Clause 91 (*Termination by Reason of Force Majeure*) whether under contract, delict (including negligence), breach of (or compliance with) statutory duty, restitution or otherwise but without prejudice to payments due under Clause 91.7.

91.8 Upon termination of the Infraco's employment pursuant to Clause 91.3,

91.8.1 **tie** shall be under the same obligations with regard to payment as if termination on the grounds of **tie** default had occurred in accordance with the provisions of Clause 88 (*Termination or Suspension for **tie** Default*); and

91.8.2 the Infraco shall comply with Clause 94 (*Effects of Termination or Expiry*) and Clause 95 (*Transition on Termination or Expiry*).

92. TERMINATION FOR CORRUPT GIFTS AND FRAUD

92.1 The Infraco or anyone employed by it or acting on its behalf (including any Infraco Party) shall not commit any Prohibited Act.

92.2 If the Infraco, or anyone employed by it or acting on its behalf (including any Infraco Parties), commits any Prohibited Act, then **tie** shall be entitled to act in accordance with this Clause 92 (*Termination for Corrupt Gifts and Fraud*).

92.3 If a Prohibited Act is committed by the Infraco or by an employee of the Infraco not acting independently of the Infraco, then **tie** may terminate this Agreement by giving notice to the Infraco.

92.4 If a Prohibited Act is committed by an employee of the Infraco acting independently of the Infraco, then **tie** may give notice to the Infraco of termination and this Agreement will terminate, unless within thirty days of receipt of such notice the Infraco terminates that employee's employment and (if necessary) procures the performance of the relevant part of the Infraco Works by another person.

92.5 If a Prohibited Act is committed by anyone acting on behalf of the Infraco (excluding employees of the Infraco but including any Infraco Party, and their employees) and not acting independently of the Infraco, then **tie** may give notice to the Infraco of termination and this Agreement shall terminate.

92.6 If a Prohibited Act is committed by anyone acting on behalf of the Infraco (excluding employees of the Infraco but including any Infraco Party and their employees) and acting independently of the Infraco, then **tie** may give notice to the Infraco of termination and this Agreement will terminate, unless within thirty days of receipt of such notice the Infraco terminates that party's employment and procures the performance of the relevant part of the Infraco Works by another person.

92.7 Any notice of termination under this Clause 92 (*Termination for Corrupt Gifts and Fraud*) shall specify:

92.7.1 the nature of the Prohibited Act;

92.7.2 the identity of the person whom **tie** believes has committed the Prohibited Act; and

92.7.3 the date on which this Agreement will terminate, in accordance with the applicable provision of this Clause 92 (*Termination for Corrupt Gifts and Fraud*) .

92.8 No compensation shall be payable by **tie** to the Infraco for termination of this Agreement in terms of this Clause 92 (*Termination for Corrupt Gifts and Fraud*) whether under contract, delict (including negligence), breach of (or compliance with) statutory duty, restitution or otherwise but without prejudice to payments due under Clause 92.9.

92.9 Upon termination of the Infraco's employment pursuant to this Clause 92 (*Termination for Corrupt Gifts and Fraud*),;

92.9.1 **tie** shall be under the same obligations with regard to payment as if termination on the grounds of Infraco Default had occurred in accordance with the provisions of Clause 90 (*Termination on Infraco Default*); and

92.9.2 the Infraco shall comply with Clause 94 (*Effects of Termination or Expiry*) and Clause 95 (*Transition on Termination or Expiry*).

93. PERSISTENT BREACH

93.1 If at any time after the first Sectional Completion Date when the Infraco is performing Maintenance Services, whether or not in pursuance of Clause 52 (Maintenance), the same breach by the Infraco of any of its obligations under this Agreement (other than a breach for which **tie** has an express remedy under this Agreement) has occurred three or more times in any twelve month rolling period **tie** may serve a notice, which notice shall not be served vexatiously or in respect of a trivial breach ("**Persistent Breach Notice**") on the Infraco:

93.1.1 specifying that it is a Persistent Breach Notice;

93.1.2 giving reasonable details of the breach; and

93.1.3 stating that such breach is a breach which could reasonably be expected to cause detriment of **tie**, if it recurs frequently or continues, and may result in a termination of this Agreement.

93.2 If, following service of such a Persistent Breach Notice, the breach specified has continued or occurred a further twice after the date falling 30 days after the date of service of the Persistent Breach Notice and before the date falling 365 days after the date of service of such notice, then **tie** may serve another notice ("**Final Persistent Breach Notice**") on the Infraco:

93.2.1 specifying that it is a Final Persistent Breach Notice;

93.2.2 stating that the breach specified has been the subject of a prior Persistent Breach Notice within the period of 365 days prior to the date of service of the Final Persistent Breach Notice; and

93.2.3 stating that if such failure is not remedied within fifteen days or is remedied and occurs twice or more within the 180 day period after the date of service of the Final Persistent Breach Notice, this Agreement may be terminated with immediate effect.

93.3 Provided that for the purpose of this Clauses 93.1 and 93.2.3 respectively, a breach shall only be deemed to have:

93.3.1 occurred three or more times where it has occurred three or more times as a result of the same breach having been committed by (i) the same Infraco Party or (ii) any of Infraco, SDS Provider, Tram Supplier or Tram Maintainer.

93.3.2 occurred more than twice where it has occurred more than twice as a result of the same breach having been committed more than twice by (i) the same Infraco Party or (ii) any of Infraco, SDS Provider, Tram Supplier or Tram Maintainer.

93.4 Where following the service of a Persistent Breach Notice or Final Persistent Breach Notice as the case may be, the Infraco has terminated or procured the termination of the agreement regarding the party whose acts or omissions gave rise to the service of the Persistent Breach Notice or Final Persistent Breach Notice as the case may be, all Persistent Breach Notices or Final Persistent Breach Notices served under this Clause 93 shall be deemed to be cancelled for the purpose of this Clause 93 and Clause 90 but only in respect of the first three occasions on which the Infraco replaces a subcontractor following service of a Persistent Breach Notice or Final Persistent Breach Notice.

94. EFFECT OF TERMINATION OR EXPIRY

94.1 Subject to the provisions of Clauses 88 (*Termination or Suspension for **tie** Default*), 91 (*Termination by Reason of Force Majeure*) and Clause 94.3, the Infraco shall not have any other right or remedy against **tie** on termination of this Agreement.

94.2 Subject to any exercise by **tie** of its rights to perform, or to procure a third party to perform, the obligations of the Infraco and subject to the right of the Infraco to suspend pursuant to Clause 88.9, the Parties shall continue to perform their obligations under this Agreement, notwithstanding the giving of any notice of default or breach or termination notice, until the termination of this Agreement becomes effective.

94.3 Any termination or expiry of this Agreement shall not prejudice or affect the accrued rights or claims of either Party.

94.4 On expiry of this Agreement or any earlier termination of this Agreement for whatever reason, all Deliverables and any information provided by **tie** to the Infraco shall be returned to **tie,** save for any documents which are required to be retained by the Infraco as a matter of Law, in such event certified true copies of the relevant documents shall be provided.

94.5 This Agreement shall terminate automatically on the expiry of this Agreement unless it shall have been terminated earlier in accordance with the provisions of this Agreement. The Infraco shall not be entitled to any compensation on expiry of the Agreement.

94.6 Expiry or termination of the Agreement shall not affect each Party's respective obligations under, Clause 67 (*Payment in respect of Applications for Milestone Payments*), Clause 68 (*Payment in respect of Maintenance Services*), Clause 69 (*Interest on Late Payments and Set-Off*), Clause 76 (*Required Insurances*), Clause 77 (*Indemnity by Infraco, Liability and Sole Remedy*) Clause 88 *(Termination or Suspension for **tie** Default),* Clause 89 *(Voluntary Termination by **tie**),* Clause 90 (*Termination on Infraco Default*), Clause 91 (*Termination by Reason of Force Majeure*), Clause 92 (*Termination for Corrupt Gifts and Fraud*), Clause 94 (*Effects of Termination or Expiry*), Clause 95 (*Transition on Termination or Expiry*), Clause 96 (*Surveys prior to Expiry Date*), Clause 97 (*Dispute Resolution Procedure*), Clause 101 (*Confidential Information*), Clause 102 (*Copyright and Intellectual Property*) and Clause 104 (*Information and Audit Access*) and those obligations shall continue in full force and effect.

94.7 Should the expiry of this Agreement result in an early termination of the Tram Maintenance Agreement or Tram Supply Agreement, **tie** shall make payment to the Infraco in respect of any payment the Infraco is obliged to make to the Tram Maintainer or Tram Supplier in accordance with the Tram Maintenance Agreement or Tram Supply Agreement (as appropriate).

95. TRANSITION ON TERMINATION OR EXPIRY

95.1 12 months before the Expiry Date and again, as updated, on the Expiry Date or upon termination, the Infraco shall provide to **tie** the following information ("**Handback Package**"):

95.1.1 (so far as Infraco is permitted) a list of all contracts, permits, licences, Consents or other documents which are material to the operation of the Edinburgh Tram Network or which have a value in excess of £50,000 or in the case of expiry or termination of the Tram Maintenance Agreement, £5,000, (as Indexed) showing (as appropriate) the contract account number, name, address and telephone number of the parties, contract price, value, term and notice period for termination or expiry date;

95.1.2 a list of all computer systems used for the maintenance of the Edinburgh Tram Network together with a description of the systems and all passwords where applicable;

95.1.3 the Technical Records and spare parts usage;

95.1.4 a list of Assets forming part of the Edinburgh Tram Network with a value of more than £25,000 or in the case of expiry or termination of the Tram Maintenance Agreement, £2,500, (as Indexed) or which are otherwise key to the operation of the Edinburgh Tram Network;

95.1.5 the names and addresses of all insurers providing the Required Insurances along with the applicable policy members and other references;

95.1.6 a letter, in a form reasonably satisfactory to **tie**, authorising **tie** and its agents to request and to receive from the relevant insurers details of all claims paid or outstanding under the Required Insurances; and

95.1.7 the TUPE Information.

95.2 **tie** shall not disclose the terms of the Handback Package to any third party, other than:

95.2.1 to the extent in the public domain, or as required by the Law or in the course of conducting, prosecuting or defending any Dispute, or following a Termination Notice in accordance with clauses 95.2.2 and 95.2.3; or

95.2.2 for the purpose of seeking offers from third parties for the provision of any of the Tram Maintenance Services (subject to the provisions of Clause 102 (*Copyright and Intellectual Property*)) and/or the Infrastructure Maintenance Services or like services following the termination or expiry of this Agreement; or

95.2.3 to a Successor Infraco or its sub-contractors for the purpose of ensuring or assisting with continuity of the Tram Maintenance Services and/or the Infrastructure Maintenance Services following termination or expiry of this Agreement provided that the Successor Infraco is required to comply with confidentiality obligations equivalent to those set out in Clause 101 (*Confidential Information*).

95.3 The Infraco shall maintain and manage the business of providing the Tram Maintenance Services (as far as is commercially reasonable) and the Infrastructure Maintenance Services with the intent that **tie** or any Successor Infraco would be able to take over that business and secure continuity of the Infrastructure Maintenance Services on a going concern basis at any time following a Termination Notice until the Termination Date becomes effective and/or the Tram Maintenance Services on a going concern basis at any time following a Termination

Notice until the Termination Date (as defined in the Tram Maintenance Agreement) becomes effective.

95.4 Accordingly, following the service of a Termination Notice or in the six month period preceding the expiry of this Agreement, the Infraco shall (and shall procure that the Infraco Parties shall):

95.4.1 take all reasonable steps and co-operate fully with **tie** and any Successor Infraco so that continuation of the Tram Maintenance Services and/or the Infrastructure Maintenance Services after such termination or expiry is achieved with the minimum disruption and so as to prevent or mitigate any inconvenience or risk to health or safety of any **tie** Parties and members of the public;

95.4.2 liaise with **tie** and any Successor Infraco and provide reasonable assistance and advice concerning the Tram Maintenance Services and/or Infrastructure Maintenance Services and their transfer to **tie** or to such Successor Infraco;

95.4.3 allow **tie** and any Successors Infraco access (at reasonable times and on reasonable notice) to each part of the Edinburgh Tram Network provided that such access shall not disrupt or interfere with the performance by Infraco or any Infraco Party of the Infraco Works and **tie** shall, and shall procure that any Successor Infraco shall, during any period when it or they have access to the Edinburgh Tram Network, comply with all Law applicable to working at those premises for the safety of persons and convenience of the public;

95.4.4 provide to **tie** and to any Successor Infraco such non-commercially sensitive information concerning the Edinburgh Tram Network and the Tram Maintenance Services and/or Infrastructure Maintenance Services which is reasonably required for the efficient transfer of responsibility for performance of the Tram Maintenance Services and/or Infrastructure Maintenance Services;

95.4.5 at the request of **tie** and/or the Successor Infraco, save where otherwise expressly provided for under this Agreement, provide the originals of such documentation within 14 Business Days of such termination or the Expiry Date and, so far as the Infraco is permitted use reasonable endeavours to, assign any sub-contracts, guarantees and/or warranties, on either the termination or expiry date save for in the case of termination for Infraco Default (b), in which event the Infraco agrees that an automatic assignation of all Key Subcontractor sub-contracts shall be effected by **tie**

giving written notice of assignation to every Key Subcontractor as provided for in the relevant Key Subcontractor collateral warranty;

95.4.6 allow, or procure that the Infraco Parties shall allow, **tie** and any Successor Infraco such access to any employees engaged by the Infraco or such Infraco Party in the provision of the Tram Maintenance Services and/or Infrastructure Maintenance Services as **tie** or such Successor Infraco shall reasonably require for the purpose of informing and consulting with such employees over the terms and conditions on which their employment will be transferred (to the extent this is the case) to **tie** or any Successor Infraco or sub-contractor engaged by the Successor Infraco; and

95.4.7 on request, make the Handback Package available to **tie** or any Successor Infraco.

95.5 The Infraco shall use reasonable endeavours to facilitate the transfer of responsibility for the Tram Maintenance Services and/or Infrastructure Maintenance Services to a Successor Infraco or to **tie**, as the case may be, and the Infraco shall take no action at any time which is calculated or intended to prejudice or frustrate or make more difficult such transfer. In particular, but without limitation to the generality of the foregoing, the Infraco shall, during the final twelve months of the Term (where this expires by effluxion of time) or during the period following service of a Termination Notice, and whilst the same remains outstanding:

95.5.1 without prejudice to Clause 52.12, not allow levels of stocks and Spare Parts, Special Tools and other spares to fall to the level which might reasonably be expected to prejudice the continuing efficient operation and maintenance of the Edinburgh Tram Network in accordance with Good Industry Practice; and

95.5.2 observe and perform the provisions of Clause 58 (*TUPE and Handover*).

95.6 As soon as reasonably practicable after service of a Termination Notice or at least 90 days prior to the Expiry Date, the Infraco shall, by notice in writing to **tie**, provide (or procure that the relevant Infraco Parties provide) to **tie** and any nominated Successor Infraco an inventory of all Spare Parts, Special Tools, other spares, consumables and other items used in the Maintenance Services which do not form part of the Edinburgh Tram Network and permit **tie** or any Successor Infraco to inspect and examine the same. The Infraco and **tie** shall seek to agree the price for the spares, consumables and other items transferred under this Clause 95.6 but in the event of failure to agree such a price the same shall be determined by reference to the Dispute Resolution Procedure. Following agreement or determination of a price the Infraco shall (or shall procure that the relevant Infraco Party which owns the same shall) with effect from the date of payment of such price transfer to **tie**, or as it may nominate in writing

to the Infraco, all such Spare Parts, Special Tools, and other spares, consumables and other items as may be specified by a notice in writing from **tie** to the Infraco (other than those consumed or used in the normal course of the Tram Maintenance Services and/or Infrastructure Maintenance Services prior to such transfer).

95.7 NOT USED

95.8 The Infraco shall, to the extent required by this Agreement, handover the Assets to CEC, **tie** or a Successor Infraco, such handover to be in a timely and orderly fashion so as to preserve the technical and commercial integrity and goodwill and value of the Edinburgh Tram Network and to enable an efficient handover of the Infraco Works and subject to Clause 95.6 and 95.9, shall not be entitled to any payment in respect of the handover or any relinquishment of licence to use the Assets or perform the Infraco Works.

95.9 **tie** may request to purchase any assets owned by the Infraco which have been used in the performance of the Infraco Works or used in relation to the Edinburgh Tram Network. If the Parties agree a fair market value for any such assets, **tie** shall pay the agreed sum to the Infraco and the Infraco shall deliver such assets to **tie** as soon as reasonably practicable.

96. SURVEYS PRIOR TO EXPIRY DATE

96.1 Without prejudice to Clause 55 (*Surveys of the Edinburgh Tram Network and Audits of Maintenance Procedures*) and Clause 95 (*Transition on Termination or Expiry*), at any time after the issue of the Reliability Certificate if **tie** reasonably believes that the Infraco is in breach of its obligations under Clause 52, **tie** shall be entitled to carry out or procure a survey from a professionally qualified, competent and skilled person experienced in carrying out surveys of a similar nature, scope and complexity to those being procured ("**Condition Survey**") of the Edinburgh Tram Network to assess to what extent it has been and is being maintained by the Infraco in accordance with this Agreement, and in particular under Clause 52 (*Maintenance*), Schedule Part 2 (*Employer's Requirements*), Schedule Part 21 (*Tram Maintenance Agreement*). Where such Condition Surveys will impact upon the Infrastructure Maintenance Services or require the assistance of the Infraco, such Condition Surveys shall be carried out no more frequently than once every quarter.

96.2 **tie** shall notify the Infraco in writing a minimum of 10 Business Days in advance of the date they wish to commence a Condition Survey (or elements of such survey). **tie** shall consider in good faith any reasonable written request by the Infraco for the relevant Condition Survey to be carried out on a different date or dates if such request is made at least 5 Business Days prior to the notified date and the Infraco (acting reasonably) is able to demonstrate that carrying out

the relevant Condition Survey on the notified date would materially prejudice the Infraco's ability to provide the Maintenance Services.

96.3 When carrying out a relevant Condition Survey, **tie** shall (or shall procure that the surveyor shall) use reasonable endeavours to minimise any disruption caused to the provision of the Maintenance Services by the Infraco. The Infraco shall afford **tie** and the surveyor (free of charge) any reasonable assistance required by **tie** and/or the surveyor during the carrying out of the relevant Condition Survey. Subject to Clause 96.4.2, the cost of a Condition Survey and of restoring any damage resulting from the carrying out of the Condition Survey shall be borne by **tie**.

96.4 If, in the reasonable opinion of **tie**, a Condition Survey shows that the Infraco has not complied with or is not complying with its obligations under Clause 52 (*Maintenance*) other than in respect of maintenance work scheduled in the Maintenance Plan:

96.4.1 the Parties shall meet to discuss the Condition Survey and agree the:

96.4.1.1 rectification and/or maintenance work required to bring the condition of the Edinburgh Tram Network to the standard it would have been in if the Infraco had complied or was complying with its obligations under this Agreement, in particular under Clause 52 (*Maintenance*) (the "**Required Condition**");

96.4.1.2 period within which the Infraco must carry out such rectification and/or maintenance work taking into account maintenance work scheduled in the Maintenance Plan other than where such work has been unreasonably deferred; and

96.4.1.3 the likely cost of carrying out such rectification and/or maintenance work,

provided that if the Parties cannot agree the Required Condition, the period within which such work should be carried out or the likely cost of carrying out such rectification and/or maintenance work either Party will be entitled to refer the matter for determination to the Dispute Resolution Procedure.

96.4.2 **tie** shall be entitled to recover the cost of the relevant Condition Survey from the Infraco as a debt where the Conditions Survey shows a material non-compliance with the Infraco's obligations under Clause 52 (*Maintenance*).

96.4.3 Where the cost of remedying any non-compliance as established pursuant to 96.4.1.3 is likely to exceed £50,000, **tie** shall be entitled to require that the Infraco shall provide

within 20 Business Days of a written request from **tie** either (at Infraco's option) a cash deposit or a bond (substantially in the form of part C of Schedule Part 8 equal the lesser of (i) the value of the rectification and/or maintenance works necessary to meet the Required Condition; and (ii) £1,000,000. In the event that, where required by **tie**, Infraco do not provide such bond or cash retention within 20 Business Days **tie** shall be entitled to exercise automatic withholding from payments to Infraco until such time as the monies withheld pursuant to this provision equal the lesser of (i) the value of the rectification and/or maintenance works necessary to meet the Required Condition; and (ii) £1,000,000. The proceeds of any bond, retention or cash deposit made pursuant to this Clause 96.4.3 shall not count towards the Liability Cap pursuant to Clause 77.7.

96.4.4 In the event that the value of the rectification and/or maintenance works as established pursuant to Clause 96.4.1.3 necessary to meet the Required Condition is likely to exceed £1,000,000 **tie** may request Infraco to extend the value of the bond or cash deposit put in place pursuant to Clause 96.4.3 beyond £1,000,000. Should Infraco refuse to increase the value of the bond or cash deposit pursuant to Clause 96.4.3 beyond £1,000,000, **tie** shall be entitled to treat such refusal as an Infraco Default.

96.5 The Infraco shall carry out such rectification and/or maintenance work as is necessary to meet the Required Condition within the period agreed pursuant to Clause 96.4.1.2 and any costs it incurs in carrying out such rectification and/or maintenance work shall be to its own expense.

96.6 Where it has been agreed between the Parties acting reasonably that the rectification and/or maintenance work necessary to meet the Required Condition has been carried out by the Infraco or **tie** then, as soon as practicable (and any event within 10 Business Days of the date on which all such work has been carried out) **tie** shall pay to the Infraco any credit balance remaining on the cash deposit or serve a notice on the Infraco confirming completion of the rectification or maintenance works and that any bond put in place pursuant to Clause 96.4.3 may be released.

96.7 If and to the extent that the Infraco fails to carry out the necessary rectification and/or maintenance work as is necessary to meet the Required Condition within the period agreed pursuant to Clause 96.4.1.2, **tie** shall be entitled to carry out or procure the carrying out of such rectification and/or maintenance work necessary to meet the Required Condition and may make withdrawals from the retention or deposit provided pursuant to Clause 96.4.3 or may call against the bond provided pursuant to Clause 96.4.3 to recover its reasonable and demonstrable costs in carrying out or procuring the carrying out of such works.

96.8 In the event that the value of the retention, deposit or bond is insufficient to cover **tie** carrying out or procuring the carrying out of such rectification and/or maintenance work necessary to meet the Return Condition, **tie** shall be entitled to recover such shortfall from the Infraco as a debt.

PART 17 - MISCELLANEOUS

97. DISPUTE RESOLUTION PROCEDURE

97.1 The Parties agree that any Dispute shall be dealt with in accordance with the provisions set out in Schedule Part 9 (*Dispute Resolution Procedure*).

98. ASSIGNATION, CHANGE IN LEGAL STATUS AND CHANGES IN CONTROL

98.1 Without prejudice to Clause 28 (*Sub-Letting and the Appointment of Sub-Contractors*), the Infraco shall not assign, novate or otherwise transfer the whole or any part of the Agreement without the prior written agreement of **tie** and CEC.

98.2 In addition to and without prejudice to Clause 11 (*Novation of the SDS Agreement to the Infraco*), Clause 12 (*Novation of the Tram Supply Agreement to the Infraco*) and Clause 13 (*Novation of the Tram Maintenance Agreement to the Infraco)* **tie** shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

98.2.1 to the Scottish Ministers, CEC, or their statutory successors (enjoying full executive authority in their own right under public administrative law) in accordance with the Tram Legislation; or

98.2.2 NOT USED

98.2.3

(a) to TEL;

(b) or to any other person

in accordance with the Tram Legislation, and whose obligations under this Agreement are in both cases irrevocably guaranteed (in a form reasonably acceptable to the Infraco acting reasonably) by CEC or the Scottish Ministers; or

98.2.4 with the prior written consent of each Infraco Member, such consent shall be deemed not to be unreasonably withheld if the reason for withholding is an objection to the assignee from any of the Infraco's sureties pursuant to Clause 74.

99. NOT USED

100. SECURITY INTERESTS

100.1 The Infraco shall not create or agree to create any Security Interest over the Edinburgh Tram Network or part thereof or any Assets owned by **tie** or CEC or over this Agreement.

100.2 The Infraco shall not dispose of any right in respect of or interest in any Asset used in the Infraco Works or relating to the Edinburgh Tram Network if to do so would have a material adverse effect upon either the Edinburgh Tram Network, the rights in the Assets held by CEC, or the position of **tie** under this Agreement, whether or not this Agreement has terminated or expired provided always that restrictions in this Clause 100 (*Security Interests*) shall not apply in the case of:

100.2.1 disposals of redundant or obsolete Assets not required for the Edinburgh Tram Network provided that **tie** has procured CEC consent to such disposal, and CEC receives any proceeds associated with such disposal; or

100.2.2 disposals of property or assets where such property or assets are replaced by other property or assets comparable or superior as to type and function.

101. CONFIDENTIAL INFORMATION

101.1 Each Party:

101.1.1 shall treat all Confidential Information belonging to the other Party as confidential and safeguard it accordingly; and

101.1.2 shall not disclose any Confidential Information belonging to the other Party to any other person without the prior written consent of the other Party, except to such person and to such extent as may be necessary for the performance of this Agreement or except where disclosure is otherwise expressly permitted by the provisions of this Agreement.

101.2 Each Party shall take all necessary precautions to ensure that all Confidential Information obtained from the other Party under or in connection with the Agreement:

101.2.1 is given only to such of the staff, contractors, agents, subcontractors, consultants and professional advisors engaged by it in connection with this Agreement as is strictly necessary for the carrying out by that Party of its obligations under this Agreement; and

101.2.2 is treated as confidential and not disclosed (without prior approval) or used by any such staff, contractors, agents, subcontractors, consultants and professional advisors otherwise than for the purposes of this Agreement.

101.3 Where it is considered necessary in the opinion of the owner of the Confidential Information, the other Party shall ensure that its staff, contractors, agents, subcontractors, consultants and professional advisors sign a confidentiality undertaking before commencing work in connection with this Agreement.

101.4 Neither Party shall use any Confidential Information it receives from the other Party otherwise than for the purposes of this Agreement.

101.5 The provisions of Clauses 101.1 to 101.4 shall not apply to:

101.5.1 any information which is or becomes public knowledge (otherwise than by breach of this Clause 101 (*Confidential Information*);

101.5.2 any information which was in the possession of the receiving Party, without restriction as to its disclosure, before receiving it from the disclosing Party;

101.5.3 any information which is received from a third party who lawfully acquired it and who is under no obligation restricting its disclosure;

101.5.4 any information which is independently developed without access to the Confidential Information;

101.5.5 any disclosure pursuant to a statutory, legal or parliamentary obligation placed upon the Party making the disclosure, including any requirements for disclosure under FOISA, the Code, or the Environmental Information Regulations pursuant to Clauses 101.7 to 101.11 (inclusive);

101.5.6 NOT USED

101.5.7 any information which is required to be disclosed to that Party's insurers, financial advisers and/or legal advisers subject to Clauses 101.2 and 101.3;

101.5.8 any registration of information in respect of the Consents and any property registration required;

101.5.9 any disclosure of information by **tie** to TEL, CEC, any department, office or agency of the Scottish Executive, the Scottish Ministers, Transport Scotland, Partnerships UK Limited or the UK government where such Confidential Information is required to be disclosed by Law or where the disclosing Party, acting reasonably, needs to disclose such information in order to comply with the provisions of this Agreement;

101.5.10 NOT USED

101.5.11 any disclosure of Confidential Information obtained from the Infraco to any government department or any other local government authority or public authority equivalent in status to **tie** where such Confidential Information is required to be disclosed by Law or where the disclosing Party, acting reasonably, needs to disclose such information in order to comply with the provisions of this Agreement. All government departments or any other local government authority or public authority equivalent in status to **tie** receiving such Confidential Information shall be entitled to further disclose the Confidential Information to other government departments or any other local government authority or public authority equivalent in status to **tie** on the basis that the information is confidential and is not to be disclosed to a third party which is not part of any government department or any other local government authority or public authority equivalent in status to **tie** provided that in disclosing information under this Clause 101 (*Confidential Information*) **tie** discloses only the information which is necessary for the purpose concerned and requires that the information is treated in confidence and that a confidentiality undertaking is given where appropriate,

provided that in disclosing information under this Clause 101 (*Confidential Information*) **tie** discloses only the information which is necessary for the purpose concerned and requires that the information is treated in confidence and that a confidentiality undertaking is given where appropriate. **tie** shall be responsible to the Infraco for any abuse by the recipient in breach of such confidentiality obligation.

101.6 Nothing in this Clause 101 (*Confidential Information*) shall prevent either Party from using any techniques, ideas or know-how gained during the performance of this Agreement in the course of its normal business, to the extent that this does not result in a disclosure of Confidential Information or an infringement of Intellectual Property Rights including those rights expressed in Clause 102 (*Copyright and Intellectual Property*).

101.7 The Infraco acknowledges that **tie** is subject to the requirements of FOISA and the Environmental Information Regulations and shall assist and cooperate with **tie** (at **tie's** expense) to enable **tie** to comply with any Information disclosure requirements in relation to this Agreement. **tie** agrees that it shall comply with the terms of the Code in respect of the discharge of its obligations under FOISA.

101.8 The Infraco shall, and shall procure that the Infraco Parties shall:

101.8.1 transfer any Request for Information to **tie** as soon as practicable after receipt and in any event within 5 Business Days of receiving any Request for Information;

101.8.2 provide all reasonable assistance requested by **tie**, at **tie's** cost, in order to support **tie** and CEC with regard to any requirement from Scottish Ministers regarding their obligations pursuant to the Code;

101.8.3 provide all necessary assistance as reasonably requested by **tie** to enable **tie** to respond to a Request for Information relating to this Agreement within the time for compliance set out in section 10 of FOISA or regulation 5 of the Environmental Information Regulations.

101.9 **tie** shall be responsible for determining at its absolute discretion whether the Confidential Information and/or any other Information:

101.9.1 is exempt from disclosure in accordance with the provisions of the Code, FOISA or the Environmental Information Regulations; and

101.9.2 is to be disclosed in response to a Request for Information,

save that, where any Request for Information relates to Confidential Information disclosed by the Infraco under this Agreement, **tie** shall, where practicable, in advance of making any disclosure under FOISA or the Environmental Information Regulations notify the Infraco of such request and consult with the Infraco regarding all reasonable representations by the Infraco that such Confidential Information is exempt information.

101.10 In no event shall the Infraco respond directly to a Request for Information unless expressly authorised to do so by **tie**.

101.11 The Infraco acknowledges that **tie** may be obliged, pursuant to the Code, FOISA, or the Environmental Information Regulations to disclose Information:

101.11.1 without consulting with the Infraco; or

101.11.2 following consultation with the Infraco and having taken its views into account.

101.12 NOT USED

101.13 The Infraco acknowledges that any lists or schedules provided by it outlining Confidential Information are of indicative value only and that **tie** may nevertheless be obliged to disclose Confidential Information in accordance with Clause 101.7.

101.14 Any public relations material, press releases, public presentations or conference engagements in relation to this Agreement planned by the Infraco requires **tie's** prior written approval.

101.15 If a Party becomes required in circumstances contemplated by clauses 101.5.5, 101.5.9, 101.5.10 or 101.5.11 to disclose any Confidential Information, such Party shall give to the Party which owns such Confidential Information as much notice as is practical in the circumstances of such disclosure and shall co-operate with that other Party, having due regard to the other Party's views, and take such steps as the other Party may reasonably require in order to enable it to mitigate the effect of, or avoid the requirements for, any such disclosure.

102. COPYRIGHT AND INTELLECTUAL PROPERTY

102.1 All the Infraco IPR shall be owned by the Infraco and/or the Infraco Parties at all times.

102.2 The Infraco hereby:

102.2.1 assigns by way of future assignation to **tie** with full title guarantee the Project IPR which is created by it and used by the Infraco to carry out its obligations under this Agreement for all purposes for all of the residue of the term of such Intellectual Property Rights and all renewals or extensions thereof and together with all accrued causes of action in respect thereof, provided that **tie** shall grant a non-exclusive, perpetual, transferable and royalty-fee licence in such Project IPR to the Infraco to use, have used and sublicence such Project IPR without any restriction.

102.2.2 grants to **tie** a non-exclusive perpetual irrevocable royalty free licence to use such Infraco IPR which is contained in the Deliverables as may be necessary for **tie** to use in relation to the Infraco Works and the Maintenance Services and any extension of the Edinburgh Tram Network and undertakes to procure for **tie** a licence on the same terms as above in respect of any Project IPR created by the Infraco Parties.

102.2.3 grants to **tie**, with the prior written consent of the Infraco such consent not to be unreasonably withheld, the right to grant non-exclusive non-assignable sub-licences to third parties for such periods of time as **tie** may reasonably require and otherwise on the same terms as the licence granted to **tie** pursuant to Clause 102.2.2 above, to use the Infraco IPR referred to in that clause (other than in relation to Third Party Software and commercially available software which is subject to the provisions of Clause 102.9) in so far as is necessary or desirable for such third party to use such Infraco IPR in relation to the Infraco Works for the Edinburgh Tram Network, the Maintenance Services and any extension of the Edinburgh Tram Network.

102.2.4 **tie** acknowledges that the rights in and title to Project IPR created by the Infraco Parties shall remain vested in those parties.

102.3 For the avoidance of doubt, the persons to whom **tie** may grant sub-licences pursuant to Clause 102.2.3 above shall include:

102.3.1 any **tie** Party;

102.3.2 CEC and TEL;

102.3.3 the Operator and any party other than the Operator providing support to **tie** in relation to the Infraco Works, the Maintenance Services and the Edinburgh Tram Network;

102.3.4 any Successor Infraco and any party providing maintenance in relation to the Infraco Works and the Edinburgh Tram Network; and

102.3.5 any permitted assignee or transferee under this Agreement.

102.4 **tie** shall not exercise any of the rights licensed to it pursuant to this Clause 102 to design, construct, manufacture or commission or procure the same:

102.4.1 unless and until **tie** and the Infraco cannot agree a price and/or delivery time in relation to a Spare Part or Special Tool; or

102.4.2 unless a notice pursuant to Clause 12.8 has been served by the Infraco; or

102.4.3 unless **tie** has served a Final Persistent Breach Notice caused by the Tram Supplier.

102.5 The copyright of this Agreement and any data or software supplied to the Infraco by **tie**, shall remain solely with **tie**.

102.6 The Infraco shall at any time and from time to time hereafter at the request of **tie**, execute all such documents and do all such further acts as may be required in order to vest the rights referred to in Clause 102.2.1 in **tie**.

102.7 The Infraco waives any and all moral rights held or to be held by the Infraco in the Deliverables (save in relation to Infraco IPR contained in them) and the Project IPR assigned to **tie**.

102.8 **tie** shall not be entitled to adapt, reverse engineer, decompile, disassemble and/or modify the Tram Software in whole or in part except:

102.8.1 as permitted by Law; or

102.8.2 to the extent that such action is legitimately required for the purposes of integrating the operation of the Tram Software with the operation of other software or systems used by **tie** or **tie** Parties in connection with the Edinburgh Tram Network.

102.9 To the extent that any of the Deliverables are generated by or maintained on a computer or similar system, the Infraco shall use reasonable endeavours to procure for the benefit of **tie**, at no charge or at the lowest reasonable fee, the grant of a licence or sub-licence for any relevant Third Party Software (other than any commercially available standard software) on the same terms as the Infraco Software is licensed to **tie**, to enable **tie** or its nominee to access and otherwise use (subject to the payment by **tie** of the relevant fee, if any) such Deliverables in connection with this Agreement. As an alternative, the Infraco may provide such Deliverables in a format which may be read by software generally available at reasonable prices in the market at the relevant time or in hard copy format. The Infraco shall obtain for **tie** the right to use commercially generally available (standard) software incorporated into or used in the Infraco Works and provided as Deliverables on the standard licence terms granted with such software.

102.10 The Infraco shall ensure the back-up and storage in safe custody of the Deliverables in accordance with Good Industry Practice, as agreed with **tie** in advance, such agreement not to be unreasonably withheld or delayed.

102.11 For the purposes of this Clause 102 *(Copyright and Intellectual Property)*, "use" shall include the acts of copying, modifying, adapting or translating the material in question and/or incorporating them with other materials and the term "the right to use" shall be construed

accordingly. The Infraco shall not be liable or responsible for any modifications or adaptations made by **tie** or its licencees.

102.12 The provisions of this Clause 102 *(Copyright and Intellectual Property)* shall apply during the continuance of this Agreement and after its termination howsoever arising, and immediately following termination howsoever arising, the Infraco shall provide **tie** with:

102.12.1 a copy of the object code for the Third Party Software and the Infraco Software on media that is acceptable to **tie** (acting reasonably);

102.12.2 a copy of the source code for the Specially Written Software on media that is acceptable to **tie** (acting reasonably); and

102.12.3 a copy of all documentation, manuals and other technical information relating to the Third Party Software, the Specially Written Software and the Infraco Software that is reasonably required by **tie** to operate, manage and support the Third Party Software, the Specially Written Software and the Infraco Software.

102.13 The Infraco shall not publish any document or matter relating to the Infraco Works or this Agreement, either alone or in association with any other body or person, without the prior written consent of **tie**, which consent shall not be withheld unreasonably.

Software

102.14 In designing and creating Infraco Software forming part of the Deliverables, the Infraco shall ensure:

(a) that orderly auditable records of the progress of the development of the Infraco Software from the functional requirements to the final code are maintained, and that regular verification and testing occurs at each stage of the design process;

(b) that it shall produce, during the development of the Infraco Software comprehensive and accurate documentation including specifications, cause and effect charts and flowcharts are produced;

(c) that the documentation, access rights, details of configuration software and the like produced in accordance with (a) above, is such as to enable an appropriately qualified independent auditor (who is not involved in the original design) to:

(i) relate the Infraco Software to the performance of the relevant equipment under normal and fault conditions;

(ii) to verify its compliance with the functional requirements of that equipment;

(iii) to operate and reconfigure the Software without the assistance of the Infraco; and

(d) that the Infraco Software is designed, developed and documented following an industry-recognised standard, using recognised quality control methods.

102.15 Subject to the terms of any Third Party Software Licences, the Infraco shall to a reasonable extent, create or provide:

(a) coding and documentation, in machine readable form, of the final structure of the Infraco Software, and of the intermediate stages leading to it (i.e. source and object codes); and

(b) where **tie** so instructs, usable copies of any ancillary computer programs used to generate the code (such as compilers) provided that **tie** meet the costs of any additional Third Party Software Licences.

102.16 Where the Infraco is required to provide Infraco Software as part of a Deliverable under this Agreement it shall, within thirty (30) days of acceptance of the Infraco Software by **tie** place, or shall procure the placement of, a copy of the source code of the Infraco Software in escrow with the NCC Group of Manchester Technology Centre, Oxford Road, Manchester ("**NCC**") or such other escrow agent as the Parties may agree. The Parties shall enter into NCC's standard escrow agreement (provided that, in the case of Third Party Software, the Infraco shall procure that the owner of such software enters into such escrow agreement) for a single licensee (or if no such agreement exists, the appropriate standard agreement as stipulated by NCC). The cost of such source code deposit (including all renewal costs) shall be payable by Infraco.

Technical Library

102.17 The Infraco shall;

(a) as soon as reasonably practicable establish a secure, virtual electronic site for the storage of Deliverables other than the source code (the "**Technical Library**"). Such electronic site shall be capable of being accessed through a standard web browser. At **tie's** request, the Infraco will in addition also establish a physical site with paper copies of the Technical Library;

(b) as and when Deliverables (other than the source code) are produced or updated from time to time:

(i) where such Deliverables are produced or updated by the Infraco, promptly ensure that a copy of those Deliverables or its updated version is placed in the Technical Library; and

(ii) where such Deliverables are produced or updated by any Subcontractor, as soon as reasonably practical ensure that a copy of those Deliverables or their updated version(s) are placed in the Technical Library;

(c) establish an index, in a format approved by **tie**, of all Deliverables deposited in the Technical Library from time to time and update that index whenever any such Deliverables are deposited in the Technical Library;

(d) deliver one copy of the index and each update established under clause 102.17(c) to **tie**; and

(e) permit **tie** (or its nominee) to have access to the Technical Library from time to time during normal business hours, and following reasonable notice from **tie** (or its nominee) to the Infraco, for the purpose only of auditing its contents against the current index.

102.18 Within three Business Days of the earlier of the issue of the Reliability Certificate pursuant to Clause 47.4 or the termination of this Agreement, the Infraco shall hand over the Technical Library , and the secure access to it, to **tie** and the Infraco's obligations in relation to the further maintenance of the Technical Library shall cease. Should an audit of the contents of the Technical Library against the current index reveal that the index does not contain details of categories or types of Deliverables which should be contained within the Technical Library, **tie** may request and the Infraco grants access to **tie** to the Technical Library from time to time during business hours in order to audit the contents of the Technical Library to determine whether such categories and types of Deliverables are in fact contained within the Technical Library. Any such request shall be made with reasonable notice and shall indicate with reasonable clarity the Technical Information or the type of Deliverable which is required for review.

102.19 In relation to Tramco IPR and Tramco Project IPR, the provisions of Schedule Part 39 shall apply.

103. DATA PROTECTION

103.1 For the purpose of the following clauses, the term "**personal data**" shall have the meaning given to it in the Data Protection Act 1998.

103.2 The Infraco shall, in relation to any personal data relating to the performance of the Infraco Works in respect of which it is either the "data controller" or the "data processor" for the purposes of the Data Protection Act 1998, comply with the obligations of a "data controller" under the provisions of the seventh data protection principle as set out in Schedule 1 of that Act. In addition, the Infraco:

103.2.1 shall have at all material times (and shall use its reasonable endeavours to procure that all the Infraco Parties have or will have at all material times) the appropriate technical and organisational measures in place against unauthorised or unlawful processing of personal data and against accidental loss or destruction of, or damage to, personal data held or processed by it;

103.2.2 shall (and shall use its reasonable endeavours to procure that the Infraco Parties shall) take at all material times, all reasonable steps to ensure the integrity of any of its staff with access to personal data processed in connection with the Infraco Works;

103.2.3 shall act only on the instructions of **tie** in relation to the processing of any personal data in respect of which **tie** is the "data controller" for the purposes of that Act;

103.2.4 shall only obtain, hold, process, use, store and disclose such personal data as is necessary to perform its obligations under this Agreement; and

103.2.5 shall allow **tie** access to any relevant premises on reasonable notice to inspect its procedures referred to in Clause 103.2.1.

104. INFORMATION AND AUDIT ACCESS

104.1 The Infraco shall, in accordance with Good Industry Practice, keep and maintain:

104.1.1 all Deliverables;

104.1.2 all invoices, timesheets and expense claims for which the Infraco has sought or is seeking reimbursement under the provisions of this Agreement;

and shall keep the above items for at least six years following expiry or termination of this Agreement.

104.2 The items referred to in Clause 104.1 shall be kept in good order and in such form so as to be capable of audit (including by electronic means) by **tie's** Representative, **tie**, CEC, **tie's** auditors or CEC's auditors or any other third party. The Infraco shall make such records available for inspection by or on behalf of **tie's** Representative, **tie**, CEC, **tie's** auditors or CEC's auditors or any other third party at all reasonable times during normal working hours on not less than one Business Day's notice. Save where an Infraco Default has occurred and is continuing, the frequency of any audit or inspection pursuant to this Clause 104 shall be reasonable and **tie** shall, and shall procure that **tie's** Representative and any other agents or representatives shall, during any period when it or they have access to any premises of the Infraco or any Infraco Party, comply with all rules and regulations notified to **tie** applicable to working at those premises for the safety of persons and convenience of the public.

104.3 In addition to the requirements of Clause 104.1 and 104.2, the Infraco shall provide to **tie's** Representative, **tie**, CEC, **tie's** auditors, CEC's auditors or their successors, any other information, documents, records and the like in the possession of, or available to the Infraco (and to this end, the Infraco shall use all reasonable endeavours to procure that all such items in the possession of the Infraco Parties shall be available to it) as may be reasonably requested by **tie's** Representative, **tie**, CEC, **tie's** auditors or CEC's auditors for any purpose in connection with this Agreement and/or the Infraco Works.

104.4 The Infraco shall provide and shall procure that the Infraco Parties shall provide such assistance as **tie** may reasonably require from time to time, to enable **tie** and CEC to meet their obligations to provide reports and returns pursuant to Law, directions and guidance applicable to the passenger transport sector, and to carry out audits.

104.5 The Infraco shall comply, at its own cost, with any reasonable request by **tie** in respect of the recording, storage, keeping, disclosure, organisation, use, processing, dissemination, deletion or destruction of any records, data or information obtained by the Infraco as a result of carrying out the Infraco Works in so far as is in accordance with the HSQE System.

104.6 **tie** shall provide to the Infraco (subject to reasonable notice and relevant undertaking as to costs) such information within its possession or control with respect to the Edinburgh Tram Network as the Infraco may reasonably request to enable it to perform its obligations under this Agreement, provided that **tie** shall have no obligation to provide information with respect to which it is subject to an obligation of confidentiality (whether under any Law, at contract or otherwise).

104.7 The provisions of this Clause 104 (*Information and Audit Access*) shall apply during the continuance of this Agreement and after its expiry or termination howsoever arising.

105. HEALTH AND SAFETY, QUALITY ASSURANCE AND ENVIRONMENTAL MANAGEMENT SYSTEM

105.1 The Infraco shall operate:

105.1.1 a health and safety management system, the standard of which shall comply with OHSAS 18001 or HSG65;

105.1.2 a quality management system, the standard of which shall comply with BS EN ISO 9001:2000; and

105.1.3 an environmental management system, the standard of which shall comply with BS EN ISO 14001:2004;

which shall be known together as the "**HSQE System**".

105.2 The Infraco shall (and shall procure that the Infraco Parties) comply with the HSQE System and the Infraco shall develop appropriate management plans so as to ensure such compliance with the HSQE System.

105.3 If any Deliverable has not been prepared in accordance with the HSQE System, **tie's** Representative shall so inform the Infraco in writing giving reasons. If such non-compliance gives rise to a defect in the Infraco Works then the Infraco shall not be entitled to make any claim against **tie** for an extension of time or payment in respect of such defect.

105.4 Compliance with the HSQE System shall not relieve the Infraco from any of its other duties, obligations or liabilities under this Agreement.

105.5 The Infraco shall appoint (or shall procure the appointment of) an HSQE Manager as soon as reasonably practicable following the Effective Date. The identity of the HSQE Manager (and any replacement) shall be subject to the approval of **tie's** Representative (such approval not to be unreasonably withheld or delayed).

105.6 The HSQE Manager shall:

105.6.1 ensure the effective operation of the HSQE System described in this Clause 105 *(Health and Safety, Quality Assurance and Environmental System)*;

105.6.2 audit the HSQE System at regular intervals and report the findings of such audit to **tie's** Representative;

105.6.3 review the HSQE System at intervals agreed with **tie's** Representative to ensure its continued suitability and effectiveness; and

105.6.4 liaise with **tie's** Representative on all matters relating to the HSQE System.

106. ENTIRE AGREEMENT

106.1 Except where expressly provided otherwise in this Agreement, this Agreement constitutes the entire agreement between the Parties in connection with its subject matter and supersedes all prior representations, communications, negotiations and understandings including the PB Agreement, Weisbaden Agreement and Rutland Square Agreement and the 9th May 2008 Agreement, concerning the subject matter of this Agreement.

106.2 Each of the Parties confirms to the other that it has neither been induced to enter into this Agreement in reliance on, nor has it made, any representation or warranty except those contained or referred to in this Agreement.

106.3 Any representations or warranties other than those contained or referred to in this Agreement are superseded and extinguished by this Agreement.

106.4 The Parties agree that the PB Agreement, Weisbaden Agreement and Rutland Square Agreement and the 9th May 2008 Agreement shall terminate forthwith on the Commencement Date and neither Party shall have any liability in respect thereof from the date of such termination.

106.5 Each Party irrevocably and unconditionally waives all rights and remedies which it might otherwise have had in relation to any representations or warranties other than those contained or referred to in this Agreement save in respect of any fraudulent misrepresentation.

107. FURTHER ASSURANCE

107.1 Each Party shall at the reasonable request and cost of the other (save where it is expressly provided that the cost of such act or execution shall be for that Party's account) do any act or execute any document that may be necessary to give full effect to this Agreement.

108. VARIATIONS TO BE IN WRITING

108.1 No variation or alteration of any of the provisions of this Agreement shall be effective unless it is in writing and signed by both Parties.

109. WAIVERS

109.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement will operate as a waiver of it or of any other right or remedy nor will any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

109.2 The Parties agree that no waiver shall occur or be deemed to have occurred unless or until clear and unequivocal express waiver of a clearly identified default is contained in a written notice by the waiving Party to the other Party expressly for the purpose of effecting such waiver.

109.3 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by Law.

110. NO PARTNERSHIP OR AGENCY

110.1 Nothing in this Agreement shall be construed as creating a partnership between **tie** and the Infraco.

110.2 The Infraco shall not (and shall procure that the Infraco Parties shall not) act or purport to act as agent for **tie** in relation to any matter unless specifically authorised in writing under this Agreement by **tie**. The Infraco shall not be entitled to bind **tie** in any way or to create any liability or cause of action against **tie** and shall not hold itself out (and shall procure that no Infraco Party shall hold itself out) as having any such authority or power.

111. NOTICES

111.1 Any notice or notification required or authorised to be given under this Agreement by one Party to the other shall be:

111.1.1 in writing;

111.1.2 sent by one of the following methods:

111.1.2.1 pre-paid special or recorded delivery post or facsimile transmission addressed to the Party to which it is given at:

(i) in the case of notices given to **tie**: **tie** Limited, Citypoint, 65 Haymarket Terrace, Edinburgh, EH12 5HD, fax number 0131 622 8301 for the attention of: Tram Project Director, or such other address or fax number in the United Kingdom as **tie** may notify the Infraco from time to time for that purpose; or

(ii) in the case of notices given to the Infraco: Bilfinger Berger - Siemens Consortium, Lochside House, 3 Lochside Way, Edinburgh Park, Edinburgh EH12 9DT, fax number 0131 452 2518, for the attention of Scott McFadzen, or such other address or fax number in the United Kingdom as the Infraco may notify **tie** from time to time for that purpose; or

111.1.2.2 facsimile transmission addressed to the **tie's** Representative or the Infraco's Representative (as appropriate) at a facsimile number notified to the giving Party by the receiving Party for the service of notices under this Agreement from time to time; or

111.1.2.3 personal delivery into the hands of:

(i) in the case of notices given to **tie**, **tie's** Representative; or

(ii) in the case of notices given to the Infraco, the Infraco Representative;

111.1.3 be deemed duly served:

111.1.3.1 if sent by pre-paid special or recorded delivery post on proof of delivery; or

111.1.3.2 if sent via facsimile transmission or personal delivery, on the day of issue of the relevant fax confirmation receipt or such personal delivery (as appropriate), unless that day is not a Business Day or such delivery or transmission is made after 5:00pm on a Business Day in which case it shall be deemed duly served on the next Business Day thereafter.

112. INVALID TERMS

112.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

112.1.1 that term shall, to that extent, be deemed not to form part of this Agreement; and

112.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

112.2 Without prejudice to any other terms of this Agreement, the Parties shall promptly consult in good faith with a view to agreeing as soon as reasonably practicable one or more provisions in lieu of the invalid provision such as will, so far as is possible under any applicable Law, have the same commercial effect as the invalid provision would have had if it had not been unlawful, unenforceable or invalid.

113. THIRD PARTIES RIGHTS

113.1 It is expressly declared that no rights shall be conferred under this Agreement upon any person other than the Infraco, **tie** and, pursuant to Clause 9 (*Title*), Clause 77 (*Indemnity By Infraco, Liability and Sole Remedy*) and Clause 98(*Assignation, Change in Legal Status and Changes in Control*), CEC and, in the case of Clause 77, the Indemnified Parties (other than CEC and **tie)**. There shall not be created by this Agreement a jus quaesitum tertio in favour of any party whatsoever save for CEC by virtue of Clause 9 (*Title*) and Clause 20.14. For the avoidance of doubt, any Indemnified Party who is an officer, agent or employee of **tie** or CEC shall only be entitled to assert this entitlement through **tie** or CEC.

114. CONSENT AND APPROVAL

114.1 The giving of any consent or approval by or on behalf of **tie** shall not in any way relieve the Infraco of any of its obligations under this Agreement or of its duty to ensure the correctness, accuracy or suitability of the matter or thing which is the subject of the consent or approval.

114.2 Failure by **tie** to disapprove or object to any matter or thing shall not prejudice its power subsequently to take action under this Agreement in connection therewith, save where such disapproval or objection is to be made pursuant to Clause 12.8, Clause 13.8, Clause 41 (*Completion of Construction Milestones and Critical Milestones*), Clause 64 (*Relief Events*), Clause 65 (*Compensation Events*), Clause 80 (**tie** *Changes*) or Clause 90 (*Termination for Infraco Default*).

115. DISCRIMINATION

115.1 The Infraco shall not (and the Infraco shall insert a clause to this effect in each contract with any Infraco Party) unlawfully discriminate within the meaning and scope of the provisions of the Equal Pay Act 1970, the Sex Discrimination Act 1975, the Race Relations Act 1976, the Disability Discrimination Act 1995, the Employment Equality (Sexual Orientation) Regulations 2003 and the Employment Equality (Religion or Belief) Regulations 2003.

116. DEROGATIONS

116.1 The Infraco shall not, without the prior written consent of **tie** (acting reasonably), apply for any exemption or derogation from or dispensation under any applicable Law which would otherwise apply to the Infraco Works and including, without limitation, any exemption order under Section 47(3) of the Disability Discrimination Act 1995 or dispensations under the provisions of Section 10 of the Railways and Other Passenger Transport Systems (Approval of Works, Plant and Equipment) Regulations 1994 or any provisions which may replace, modify or supersede such provisions.

117. APPLICABLE LAW

117.1 This Agreement, any document completed or to be a completed in accordance with its provisions and any matter arising from this Agreement or any such document shall be governed by and construed in accordance with Scots law.

117.2 Subject to Clause 97 *(Dispute Resolution Procedure)*, the Parties hereby irrevocably submit to the exclusive jurisdiction of the Court of Session in relation to this Agreement, any such document and any such matter.

118. DUTY TO ACT REASONABLY

118.1 Wherever in this Agreement a Party is required to make any determination or to give any decisions, instructions, opinions or consents or to express satisfaction or approval or otherwise take any action, that Party shall act fairly and reasonably within the terms of this Agreement (save where this Agreement expressly states that **tie** is to have absolute discretion), and having regard to all the circumstances.

119. MITIGATION

119.1 In all cases where a Party seeks to establish or alleges a breach of this Agreement or a right to be indemnified or compensated or to be awarded costs in accordance with this Agreement, that Party shall be under a duty to take all reasonable measures to mitigate the loss which has occurred.

120. JOINT AND SEVERAL LIABILITY

120.1 Each Infraco Member enters into this Agreement on the basis of joint and several liability for the performance and discharge of all obligations, save for Clause 75 (*Warranties*) (but not including Clause 75.1.7), arising from or in connection with the Agreement.

121. NO DOUBLE RECOVERY

121.1 Neither Party to this Agreement shall:

121.1.1 be entitled to recover any amount from the other under this Agreement to the extent that it has previously recovered for the same loss or damage under the terms of this Agreement or otherwise; or

121.1.2 claim or purport to claim for the same loss or damage under more than one provision of this Agreement.

IN WITNESS WHEREOF these presents on this and the preceding 236 pages together with Schedule in Fourty Four parts (inclusive) which is annexed and signed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED** at Edinburgh on ~~13~~ 14 May 2008 by:

Authorised Signatory [redacted]

Full Name WILLIAM GALLACHER

Witness Signature [redacted]

Full Name JAMES McEWAN

Address CITYPOINT, 65 HAYMARKET TERRACE

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED** at Edinburgh on ~~15~~ 14 May 2008 by:

Director [redacted]

Full Name John Watson

Director [redacted]

Full Name GARY STEVE DALTON

CEC00036952_0245

EXECUTED for and on behalf of **SIEMENS PLC** at Edinburgh on 13/14 May 2008 by:

[redacted]

Authorised Signatory

Full Name

[redacted]

Authorised Signatory

Full Name MICHAEL FLYNN

CEC00036952_0246

THIS IS SCHEDULE PART 1 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 1

DEFINITIONS AND INTERPRETATION

1. Unless otherwise defined in this Agreement (including the recitals and the Schedules), save as the context otherwise requires, the following words and expressions shall have the meanings hereby ascribed to them:

"**Abortive Work**" means any work which cannot be used in relation to the Edinburgh Tram Network (but not including work occurring as part of the iterative process of design);

"**Access Permit**" has the meaning given in paragraph 3.4.1 of part A of Schedule Part 3 (*Code of Construction Practice and Code of Maintenance Practice*);

"**Access Permit Form**" has the meaning given in paragraph 3.4.2 of part A of Schedule Part 3 (*Code of Construction Practice and Code of Maintenance Practice*);

"**Accommodation Works**" means any works arising out of the compulsory purchase process (including the reinstatement of boundary walls, fences) or any other works **tie** are obliged to procure are carried out for third parties associated with the Edinburgh Tram Network

"**Accommodation Works Change**" means any Accommodation Works instructed by **tie** in accordance with Clause 83 (*Accommodation Works*) or which Infraco is required to carry out in accordance with Clause 18.17A.2;

"**Accommodation Works Notice**" has the meaning given in Clause 83 (*Accommodation Work Changes*);

"**Actual Milestone Date**" means the date on which a certificate in respect of a Milestone is issued in accordance with this Agreement;

"**Additional Available Infrastructure**" and "**Additional Available Tram**" means such level of additional availability which **tie** notifies to the Infraco pursuant to Clause 52.24 which is outwith the required Available Infrastructure and Available Tram and which is confirmed by the Infraco pursuant to Clause 52.24.

"**Additional Insurance**" has the meaning given in Clause 76.20;

"**Affected Party**" means a Party that is unable to comply with all or a material part of its obligations under this Agreement as a direct result of a Force Majeure Event;

"**Affiliates**" means, in relation to any person, any holding company or subsidiary of that person or any subsidiary of such holding company and "holding company" and "subsidiary" shall have the meaning given to them in section 736 of the Companies Act 1985 and its equivalent under the laws of the Federal Republic of Germany and the laws of Spain;

"**Agreement**" means Clauses 1 to 121 (inclusive) together with the Schedule in 44 Parts annexed thereto as may be amended from time to time in accordance with its terms;

"**Annual Service Report**" has the meaning given to it in Clause 73.4;

"**Application for Milestone Payment**" means the applications for payment from the Infraco to **tie** in respect of specific identified Milestones and specific identified Critical Milestones. Such applications for payment together with specific identified Milestones and Critical Milestones are set out for each Reporting Period in Schedule Part 5 (*Milestone Payments*);

"**Approval Bodies**" means any government agency or department, official or public statutory person, utilities, planning authorities, roads authorities, HMRI, HSE, Independent Competent Persons, BAA/EAL, Network Rail, SEPA, SNH, ORR, Historic Scotland, CAA and any other third parties who are to issue or provide Consents which may be required for the design, construction, installation, testing, commissioning, completion, opening, operation, maintenance, use or modification of the Edinburgh Tram Network;

"**Assets**" means all assets and rights to enable **tie**, CEC, TEL or their assignees or agents to own, operate, maintain and extend the Edinburgh Tram Network, including:

(a) any materials and equipment forming part of the Edinburgh Tram Network;

(b) any books and records (including the Operating and Maintenance Manual, health and safety manuals and other know how contained within the Project IPR and the Infraco IPR);and

(c) any Trams, Spare Parts, Special Tools and other assets (together with any warranties in respect of assets being transferred);

but excluding any assets and rights in respect of which **tie** or CEC is full, legal and beneficial owner by virtue of Clause 9 (*Title)*;

"**Asset Management System**" means the asset maintenance management and recording system described in Schedule Part 2 (*Employer's Requirements*);

"**Asset Protection Agreement**" means the agreement set out in Schedule Part 27 (*Asset Protection Agreement and Bridge Agreement)*;

"**Available Infrastructure**" means that the Edinburgh Tram Network is fully functional each Operating Day from half an hour before the First Tram is scheduled to leave the Depot until half an hour after the Last Tram is scheduled to return to the Depot, compliant in all material respects with the Employer's Requirements save for any defects to the infrastructure of the Edinburgh Tram Network that will not affect the safety or quality of operation of the Edinburgh Tram Network or its compliance with the Disability Discriminiation Act 1995 that has been advised to the Infraco and which does not constitute a restriction in the manner in which the Edinburgh Tram Network is to be operated;

"**Available Tram**" means a Tram that (i) fully complies with the Tram Maintenance Specification, save for Minor Defects (as defined in the Tram Maintenance Agreement), and (ii) is free from Material Defects (as defined in the Tram Maintenance Agreement);

"**BAA**" means BAA plc, a company incorporated under the Companies Act with registration number 1970855 and having its registered office at 130 Wilton Road, London, SW1V 1LQ which expression shall include its successors in title and assignees and any of its associated or subsidiary companies with interests at Edinburgh International Airport;

"**Background Information**" means all and any materials, documents, drawings, plans or other information in paper, electronic or any other form, relating in any way to this Agreement or the Tram Legislation (and the parliamentary process) and made available to the Infraco by **tie**, CEC and/or any of their respective members, officers, agents and/or advisers during the procurement competition relative to this Agreement or thereafter including the Ground Condition Information;

"**Base Case RPIX**" means RPIX as at 1 September 2007;

"**BT**" means British Telecommunications PLC, a company incorporated under the Companies Act with registered number 01800000 and having its registered office at 81 Newgate Street, London, EC1A 7AJ;

"**Business Day**" means any day other than a Saturday or Sunday, or a public holiday recognised by CEC;

"**Building Fixing Agreement**" means the agreement in the form set out in Schedule Part 33 (*Building Fixing Agreement);*

"**CAA**" means the Civil Aviation Authority;

"**Cable and Wireless**" means Cable and Wireless UK, a company incorporated under the Companies Act with registered number 01541957 and having its registered office at Lakeside House, Cain Road, Bracknell, Berkshire, RG12 1XL;

"**Case for Safety**" means all necessary documentation, information and other requirements for the issue of a safety certificate or a safety authorisation (as appropriate) by the Office of the Rail Regulation pursuant to the Railways and Other Guided Transport Systems (Safety) Regulations 2006;

"**CDM Co-ordinator**" has the meaning given in Clause 50.1;

"**CDM Regulations**" means the Construction (Design and Management) Regulations 2007 (SI 2007/320);

"**CEC**" means the City of Edinburgh Council;

"**CEC Guarantee**" means the guarantee granted by CEC in favour of Infraco of even date as the date of this Agreement;

"**Certificate of Sectional Completion**" means any certificate issued by **tie** in accordance with Clause 44.3;

"**Certificate of Service Commencement**" means the certificate issued by **tie** in accordance with Clause 45.3;

"**Certificate of Tram Commissioning**" means the certificate to be issued by the Tram Inspector in accordance with Clause 2.4.8 of Schedule Part 34 (*Tram Inspector Agreement)*;

"**Change in Control**" means any sale or disposal of any legal, beneficial or equitable interest in share capital comprising at least 30% of either Infraco Member, the sale of its business and assets or the transfer or acquisition of the ability to direct its management and control;

"**Change in Law**" means the coming into effect after the 7 August 2007 or, in relation to the Tram Supply Obligations and Tram Maintenance Obligations only, the 14 September 2007 of:

(a) Legislation, other than any Legislation which on the 7 August 2007 or, in relation to Legislation which affects the Tram Supply Obligations and Tram Maintenance Obligations only, the 14 September 2007 has been published:

(i) in a draft Bill as part of a Scottish Executive/Scottish Parliament or United Kingdom Government consultation paper;

(ii) in a Bill;

(iii) in draft subordinate Legislation within the meaning of section 21(1) of the Interpretation Act 1978; or

(iv) as a proposal in the Official Journal of the European Union.

(b) any Guidance or any changes to Guidance; or

(c) any applicable judgement of a relevant court of law which changes a binding precedent;

(d) any new requirement for any statutory Consent other than statutory Consents the need for which had been published on 7 August 2007;

"**Code of Construction Practice**" **or** "**CoCP**" means the code of construction practice set out at part A of Schedule 3 (*Code of Maintenance Practice and Code of Construction Practice*);

"**Code of Maintenance Practice**" means the code of maintenance practice set out at part B of Schedule 3 (*Code of Maintenance Practice and Code of Construction Practice*);

"**Code**" means the Scottish Ministers' Code of Practice on the Discharge of Functions by Public Authorities under the Freedom of Information (Scotland) Act 2002 as the same may be amended, varied or replaced from time to time;

"**Commencement Date**" means the date the CP Certificate has been issued or, if there are no Conditions Precedent, the Effective Date;

"**Compensation Event**" means:

(a) any breach by **tie,** the **tie** Representative or any **tie** Party of any of **tie's** obligations under this Agreement which adversely affects the performance of the Infraco Works;

(b) the failure of **tie** to give possession or access as referred to in Clause 18 (*Land Consents, Permanent Land and Temporary Sites*) or the refusal of any landowner or

occupier to allow the Infraco to exercise the rights of possession or access granted in accordance with this Agreement;

(c) the exercise by CEC of its discretion to temporarily stop up streets where the exercise of such discretion adversely affects the Infraco's performance of its obligations under this Agreement;

(d) execution of any Utilities Works or MUDFA Works;

(e) instructions by **tie's** Representative to which Clause 34.3 applies;

(f) failure by **tie** to obtain any Land Consent pursuant to Clause 18 (*Land Consents, Permanent Land and Temporary Sites*) (to the extent this is **tie's** responsibility)or any **tie** Consent;

(g) the discovery by the Infraco of unexploded ordnance, unidentified utility apparatus, adverse physical conditions, ground conditions, artificial obstructions and/or land which is contaminated in the circumstances described in Clause 22.5;

(h) protestor action directed against **tie** or a **tie** Party or the Edinburgh Tram Network which, save in respect of Tram Supply Protestor Action, lasts (or the impact of which lasts) for more than 14 days provided such protestor action has not arisen as a result of or been caused by an Infraco breach of its obligations under this Agreement or otherwise by any actions or omissions of the Infraco or Infraco Parties unrelated to the Edinburgh Tram Network provided that for the avoidance of doubt such protestor action shall be a Compensation Event as from the fifteenth day of its duration;

(i) Tram Supply Protestor Action which exceeds one day in duration;

(j) any breach by Network Rail of the Asset Protection Agreement or the Network Rail Agreement;

(k) the occurrence of any Operator Event;

(l) any damage to the Edinburgh Tram Network caused by vandalism;

(m) the malfunction or non-interoperability of free issue material pursuant to Clause 9.10;

(n) a breach by **tie** or any **tie** Party of any of its obligations under the Depot Licence which adversely affects the performance of the Infraco Works or any exercise of **tie's**

rights of access which disrupts or interferes with the Infraco Works in terms of Clause 24.6;

(o) **tie's** Representative's failure to attend the tests or to carry out the inspections (or rearranged inspections or tests) and the carrying out of such tests or inspections on the new dates notified by **tie's** Representative pursuant to Clause 41.1;

(p) compliance with **tie's** Representative's instructions under Clause 87 (*Suspension of Work*) which involves the Infraco in delay or extra cost (including costs incurred in properly protecting and securing the Infraco Works);

(q) any breach by the Tram Inspector of the Tram Inspector Agreement;

(r) any other event which is expressly stated as a Compensation Event in terms of this Agreement;

(s) the occurrence of a Relief Event which is the direct cause of the Infraco suffering delay of more than 3 months in delivering the Depot where such delay leads to a Compensation Event under the Tram Supply Agreement;

(t) save as excluded by Clause 19.19, failure of the SDS Provider to achieve the release of Issued for Construction Drawings by the date identified in the Programme for the release of such Issued for Construction Drawings;

(u) any material breach (as distinct from (t) above) by the SDS Provider of its obligations under the SDS Agreement or in delict in relation to the quality of the Deliverables under the SDS Agreement;

(v) Operator instructions or actions as stated in Clause 17.35 requiring the addition of works or services not included in the scope of the Tram Supply Agreement and where the Tram Supplier claims reasonable, substantiated economic compensation for such works or services from the Infraco in accordance with Clause 49 (*Compensation Event*) of the Tram Supply Agreement;

(w) in relation to the granting of Consents for building fixings, where the granting of such Consents is either refused or is delayed in accordance with Clause 20.12;

(x) delay arising between the date **tie** is notified of a Notified Departure and the actual date on which **tie** issue a **tie** Change Order in respect of such Notified Departure;

"**Conditions Precedent**" means the execution by the Infraco of the Tram Supply Novation Agreement, the Tram Maintenance Novation Agreement and the SDS Novation Agreement and the provision of those instruments required to be provided on the Effective Date by Clause 74 *(Bond, Parent Company Company Guarantees and Collateral Warranties*) and the agreed form of German legal opinions in respect of each Parent Company Guarantee;

"**Confidential Information**" means any information which has been designated as confidential by either Party in writing or that ought to be considered as confidential (however it is conveyed or on whatever media it is stored) including information which relates to the business, affairs, properties, assets, trading practices, goods, services, developments, trade secrets, Intellectual Property Rights, know-how, personnel of either Party, all personal data and sensitive personal data within the meaning of the Data Protection Act 1998;

"**Consents**" means, without limitation, all permissions, consents, approvals, non objections, certificates, permits, licences, agreements, statutory agreements and authorisations, Planning Permissions, temporary traffic regulation orders, building control approvals, building warrants, Access Permits, Permits to Work and all other necessary consents and agreements whether required by Law or the Tram Legislation or under contract provided that, subject to Clause 18.17, "**Consents**" shall not include any Land Consents or Building Fixing Agreements;

"**Consents Programme**" means the programme for submitting elements of the Design for approval by the relevant Approval Bodies set out in Schedule Part 15 (*Programme*), showing the time assumed for the issue of the relevant Consent by the Approval Body, period allowed in Schedule Part 14 (*Design Review and Design Management Plan*) for **tie** review and the date of issue of the Issued for Construction Drawings for each element of the Design as such programme may be amended from time to time in accordance with this Agreement;

"**Construction and Maintenance Stage Consent**" means the Consents listed in Table B below and any further Consents required to enable the construction of a design which has been fully consented, but excluding **tie** Consents.

Table B

Construction and Maintenance Stage Consents (indicative only)		
	Temporary Discharge Consents	
	Hoarding Licences	
	Obtaining and maintaining Building Warrants and subsequent certification	
	Testing, commissioning and service commencement permissions and certificates; Temporary Works Consents; Consents pursuant to Clause 21.4	

"**Construction Interim Certificate**" means any certificate to be issued by **tie** in accordance with Clause 67.5;

"**Construction Milestone**" means any milestone (other than any Critical Milestone) which has been identified and defined as a construction milestone in of Schedule Part 5 (*Milestone Payments*);

"**Construction Milestone Completion Certificate**" means any certificate in respect of achievement of a Construction Milestone issued by **tie's** Representative in accordance with Clause 41.3;

"**Construction Payment Due Date**" has the meaning given to it in Clause 67.6;

"**Construction Phase Health and Safety Plan**" means the plan proposed by the Infraco in accordance with the requirements of the CDM Regulations;

"**Construction Works Price**" means the construction works price included in Schedule Part 4 (*Pricing*) as may be varied from time to time in accordance with this Agreement;

"**Construction/Operational Panel**" has the meaning given to it in paragraph 19.1 of Schedule Part 9 (*Dispute Resolution Procedure*);"**Contract Price**" means the Contract Price made up of the elements shown in Schedule Part 4 (*Price*) as may be varied from time to time in accordance with this Agreement;

"**Contract Price Analysis**" means the analysis set out in section 2.5 of Schedule Part 4 (*Price);*

"**Control Centre**" means the control centre for the Edinburgh Tram Network to be provided by the Infraco pursuant to this Agreement and operated by the Operator pursuant to the DPOFA;

"**CP Certificate**" means the certificate to be issued by **tie** in accordance with Clause 3.3, confirming that each of the Conditions Precedent, if any, have been waived or satisfied;

"**Critical Milestone**" means any milestone which has been identified and defined as "critical" in respect of an Application for Milestone Payment in Schedule Part 5 (*Milestone Payments*);

"**Critical Milestone Completion Certificate**" means any certificate in respect of achievement of a Critical Milestone issued by **tie's** Representative in accordance with Clause 41.3;

"**Critical Milestone Payment**" means the payment to be made against the achievement of a Critical Milestone for an amount set out in Schedule Part 5 (*Milestone Payments*);

"**CSCS**" means Construction Skills Certification Scheme;

"**Deliverables**" all documents, information, reports, diagrams, pricing schedules, records, method statements, risk assessments, manuals, schedules, databases, reinforcement details, photographs, formulae, plans, designs, specifications, drawings (including as-built drawings), details, calculations, analysis, operation and maintenance manuals, software, data, data configuration designs, tools and details, software protocols, source and object codes, transport and other models and simulations, the outputs and reports based on any models, programmes and all other material created and/or provided by Infraco (and/or any Infraco Party or any other third party) in relation to the Infraco Works required to deliver the Infraco Works;

"**Depot**" means the depot at Gogar comprising maintenance facilities, stabling facilities, sidings, operations, cleaning, the Control Centre, storage facilities and accommodation for operational and maintenance staff;

"**Depot Licence**" means the licence in the form set out in Schedule Part 32 (*Depot Licence*) as executed by the Infraco, the Operator and Tram Maintainer;

"**Design**" means the design of the Edinburgh Tram Network;

"**Design Manual**" means the design manual issued by CEC from time to time;

"**Design Stage Consents**" means the Consents (in respect of Design produced by SDS Provider or Infraco Design) listed in Table A below and any further consents that the SDS

Provider is responsible for obtaining under the SDS Agreement, save for Construction and Maintenance Stage Consents.

Table A

Category	Type	Approval Body
Railways and Aviation	HMRI	HMRI
	Network Rail	Network Rail
	EAL/BAA/Aviation Consents (including EAL Permissions) and EAL Works Data to the extent that the same are deliverables under the SDS Agreement	EAL/BAA/CAA/NATS
Planning	Listed Building Consent	CEC Planning Authority
	Prior Approval	CEC Planning Authority
	Planning Permission	CEC Planning Authority
	Conservation Area Consent	CEC Planning Authority
	Scheduled Monument Consent	Scottish Executive & Historic Scotland
	Advertisement Consent	CEC Planning Authority
Traffic Management	Road Technical Approvals relating to structures, lighting, traffic signals, road markings, safety and geometry and drainage	CEC Roads Authority
Environment Ecological	Badger Licence	Scottish Natural Heritage
	Otter holt/disturbance licence	Scottish Natural Heritage
	Bat Licence	Scottish Natural Heritage
	Appropriate Assessment	Competent Authority
Drainage CAR	CAR General Binding Rules	SEPA
	CAR Registration	SEPA
	CAR Licence	SEPA
	Water/Wastewater Connection	Scottish Water
Construction	Discharge Consents to the extent related to design of the permanent works	SEPA
	Technical Approval	CEC Bridges/CEC Roads
	Building Warrant	CEC Building Standards
Radio	OFCOM licence	OFCOM
Design Consultation	Third party Design Consultation	Third parties
Undertakings	Undertakings to Parliament	Parliament and third parties
Agreements	Third parties approvals/consents	Third parties

"**Designated Working Area**" means any land, worksite or area of the public road which the Infraco occupies for the purposes of executing the Infraco Works;

"**Discriminatory Change in Law**" means a Change in Law, the terms of which apply expressly to:

(a) the Edinburgh Tram Network; and/or

(b) the Infraco, the Tram Supplier and/or the Tram Maintainer and not to other persons;

"**Dispute**" means any dispute, difference or unresolved claim between the Parties in connection with or arising from this Agreement;

"**Dispute Resolution Procedure**" means the procedure set out in Schedule Part 9 (*Dispute Resolution Procedure*);

"**DPOFA**" means the development, partnering and operating franchise agreement between **tie** and the Operator dated 14 May 2004 as amended by Minute of Variation dated 19 and 20 December 2007;

"**DPOFA Change**" has the meaning given in Clause 17 (*Interface with the Operator*);

"**DPOFA Change Response**" has the meaning given in Clause 17 (*Interface with the Operator*);

"**DPOFA Infraco Event**" means any breach (including any breach which results in an alteration to the Programme) by the Infraco of its obligations set out in this Agreement which (i) results in the Operator asserting any claim against **tie** for relief from the performance of its obligations, compensation or indemnification pursuant to the DPOFA; or (ii) results directly in a **tie** DPOFA Change;

"**Drawdown Notice**" has the meaning given in Schedule Part 44 (*EAL Works*);

"**Drawings**" means those plans and drawings containted in Schedule Part 31 (*Drawings*);

"**EAL**" means Edinburgh Airport Limited, a company incorporated under the Companies Acts with registered number SCO96623 and having its registered office at St Andrew's Drive, Glasgow Airport, Paisley, PA3 2SW;

"**EAL Artefacts**" has the meaning given to it in paragraph 21 of Appendix 5 Schedule Part 44 (*EAL Works)*;

"**EAL Lease**" means the lease from EAL (as landlord) to CEC (as tenant) dated 20 and 25 February 2008 (as may be amended from time to time)**;**

"**EAL Licence**" means the licence agreement between EAL and CEC dated 28 January 2008 and 25 February 2008, together with its schedule (as may be amended from time to time);

"**EAL Permissions**" means all:

(a) permits, licences, consents, approvals, permissions, warrants, relaxations which are required by any applicable Law; and

(b) any third party consents which require to be obtained,

for the carrying out of the EAL Works;

"**EAL Works**" has the meaning given in Schedule Part 44 (*EAL Works*);

"**EAL Works Data**" has the meaning given in Schedule Part 44 (*EAL Works*);

"**Earthworks Outline**" has the meaning ascribed to it in Schedule Part 4 (*Pricing*);

"**Easynet**" means Easynet Telecommunications Limited, a company incorporated under the Companies Act with registered number 02883980 and having its registered office at 44-46 Whitfield Street, London, W1T 2RJ;

"**Edinburgh Tram Network**" means the tramway which is to be designed, constructed and maintained in Edinburgh pursuant to this Agreement in Phase 1a (forming part of Line One and Line Two as described in the Tram Legislation) and, if the Phase 1b option set out in Clause 85 is exercised, Phase 1b, together with all associated works and facilities required pursuant to this Agreement including all civil engineering and track works, Trams, infrastructure, plant, machinery and equipment installed or used for the operation of such tramway;

"**Effective Date**" means the last date of execution of this Agreement;

"**EHS KPI Deduction**" has the meaning given in Clause 67.5;

"**EIA**" means environmental impact assessment;

"**EMC**" means electro magnetic current;

"**Emergency Services**" means Lothian and Borders Police, Lothian and Borders Fire Brigade, British Transport Police, Scottish Ambulance Services and HM Coastguard;

"**Employer's Requirements**" means the specification or specifications set out in Schedule Part 2 *(Employer's Requirements)* and any modification thereof or addition thereto as may be made from time to time in writing by **tie** or **tie's** Representative in accordance with this Agreement;

"**Environmental Information Regulations**" means the Environmental Information (Scotland) Regulations 2004, Scottish SI 2004/520;

"**Environmental Statements**" means the environmental statements supporting the Tram Legislation;

"**Estimate**" means the estimate to be provided by the Infraco pursuant to Clause 80 (**tie** *Change*);

"**Euro Compliant**" has the meaning given in Clause 9.10;

"**Expiry Date**" means (subject to **tie**'s right to extend in accordance with Clause 2) the date falling 10 years from the issue of the Certificate of Service Commencement;

"**Expiry Survey**" has the meaning given in Clause 96.1;

"**Extended Expiry Date**" means the date falling 15 years from the issue of the Certificate of Service Commencement or such later date as may be agreed between the Parties in accordance with Clause 2.4;

"**Final Persistent Breach Notice**" means a notice served by **tie** pursuant to Clause 93.2;

"**Financial Panel**" has the meaning given to it in paragraph 19.1 of Schedule Part 9 (*Dispute Resolution Procedure*);

"**First Party**" has the meaning given in Clause 6.3;

"**FOISA**" means the Freedom of Information (Scotland) Act 2002 and any subordinate legislation made under that Act from time to time together with any guidance and/or codes of practice issued by the Scottish Information Commissioner in relation to such legislation;

"**Force Majeure Event**" means the occurrence after the Effective Date of:

(a) war, civil war or armed conflict in the United Kingdom or the United Kingdom and Spain;

(b) nuclear, chemical or biological contamination unless the source or cause of the contamination is the result of actions by the Infraco or any Infraco Party; or

(c) pressure waves caused by devices travelling at supersonic speeds;

(d) exceptionally adverse weather conditions affecting shipment or transportation of Trams.

"**Forth Ports**" means Forth Ports PLC a company incorporated under the Companies Acts with registered number SC134741 and having its registered office at 1 Prince of Wales Dock, Leith, Edinburgh, EH6 7DX;

"**Free Issue Fare Collection Equipment**" means all fare collection equipment issued to Infraco or an Infraco Party by **tie** or a **tie** Party;

"**General Change in Law**" means a Change in Law which is not a Qualifying Change in Law;

"**Good Industry Practice**" means using standards, practices, methods and procedures conforming to Law and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably be expected from a large, reputable, professionally qualified, competent and skilled organisation experienced in carrying out activities of a similar nature, scope and complexity to those comprised in the Infraco Works and seeking in good faith to comply with its contractual duties and all duties owed by it;

"**Green Zone Working**" means the term applied to those works carried out on Network Rail infrastructure while traffic is still operating and staff are protected by means other than look-out;

"**Ground Condition Information**" means the materials, documents, surveys, analysis, drawings, plans or other information in paper or electronic, relating in any way to the ground and physical conditions at the Site as set out in Part A Schedule Part 41 (*Ground Conditions and Utilities Information*);

"**Guidance**" means any applicable guidance, policy, direction or determination issued by any Approval Body with which **tie**, CEC, the Infraco and/or the Infraco Parties are bound to comply, and shall include the **tie** and CEC Policies (set out in Schedule Part 32 (***tie** and CEC Policies*));

"**Handback Package**" means the information referred to in Clause 95 (*Transition on Termination or Expiry*), as updated by the Infraco from time to time in accordance with the provisions of Clause 95 (*Transition on Termination or Expiry*);

"**Hazardous Materials**" means any materials, Parts or systems generally known and accepted at the time of their use by the Infraco or any Infraco Party in performing the Maintenance Services to comprise or contain a toxic substance or other hazard to the safety or health of persons or safety of property;

"**Health and Safety File**" has the meaning given in Clause 50.1;

"**Heritable Proprietor**" means the heritable proprietor of a building, or where such building consists of a tenement or other flatted dwelling houses, the heritable proprietor of each flat or sub-unit;

"**Historic Scotland**" means an agency within the Scottish Executive Education Department which was established in April 1991 and having its principal office at Longmere House, Salisbury Place, Edinburgh, EH9 1SH;

"**HMRI**" means Her Majesty's Railway Inspectorate or its successor or equivalent regulatory body or person;

"**HSE**" means Health and Safety Executive;

"**HSQE Manager**" means the manager appointed in accordance with Clause 105.5;

"**HSQE**" has the meaning given in Clause 105.1;

"**Indemnified Parties**" has the meaning given to it in Clause 77.1;

"**Independent Competent Person**" means Mr. John Dolan or such other person appointed by **tie** to agree and oversee the implementation of all procedures and processes to comply with the provisions of the Railway and Other Guided Transport Systems (Safety) Regulations 2006 and to enable the testing, commissioning and operation of the ETN;

"**Indexed**" means in relation to an amount, the amount to be indexed multiplied by the value of RPIX at the Point of Indexation, divided by the Base Case RPIX;

"**Indirect Losses**" means any damage, cost, third party claim, expense or loss incurred by a Party to this Agreement or by any Infraco Parties or any of the Indemnified Parties as a consequence of a breach of this Agreement or a negligent act or omission which relates to

consequential or indirect loss or loss of profits or revenue, loss of use, loss of production or output, interruption or loss of business or business opportunity, loss of contract, loss of goodwill and whether or not the Party committing the breach knew, or ought to have known, that such indirect or consequential loss would be likely to be suffered as a consequence of such breach.

"**Information**" shall have the meaning given to it in Section 73 of FOISA;

"**Infraco Change**" means a change proposed by the Infraco in accordance with Clause 81.1 and approved by **tie** in accordance with Clause 80 (**tie** *Changes*) or Clause 81 (*Infraco Changes*);

"**Infraco Default**" means one of the following events:

(a) a breach by the Infraco of any of its obligations under this Agreement which materially and adversely affects the carrying out and/or completion of the Infraco Works;

(b) the occurrence of an Insolvency Event in relation to the Infraco or either of the Infraco Members;

(c) the Infraco fails to commence the Infraco Works within 90 days of the Commencement Date or permanently abandons the Infraco Works (or a material part of them) at any time;

(d) the Service Commencement Date or Sectional Completion Date (as appropriate) in respect of a Section is not achieved or is programmed to not be achieved (as set out in the Programme) on or before the date falling 12 months after the Planned Service Commencement Date or Planned Sectional Completion Date (as appropriate) except as a result of a Compensation Event, Relief Event, Force Majeure Event, **tie** Change, Accommodation Works Change, a Change in Law (where compliance with such Change in Law is the sole reason for the Infraco failure to achieve the relevant date) and any legitimate suspension of the Infraco Works by the Infraco pursuant to Clause 87 (*Suspension of Work*);

(e) the Infraco does not confirm its agreement in writing to a Liquidated Damages Cap Increment in accordance with Clause 62.10;

(f) a breach by the Infraco of its obligations to take out and maintain the Required Insurances which is not remedied by the Infraco within 10 days of written notice from **tie** to the Infraco specifying the relevant breach and requiring it to be remedied;

(g) the issue of four or more Underperformance Warning Notices in any 12 month period;

(h) NOT USED

(i) the Infraco has reported a change in the legal status of the Infraco or a Change in Control of the Infraco which is materially prejudicial to carrying out and completing the Infraco Works; or

(j) the Infraco has suspended the progress of the Infraco Works without due cause for 15 Business Days after receiving from **tie's** Representative a written notice to proceed.

"**Infraco's Design**" means any Design used by Infraco which SDS Provider is not responsible for producing pursuant to the SDS Agreement;

"**Infraco's Equipment**" means all plant, appliances or things of whatsoever nature required in or about the construction and completion of the Infraco Works but does not include materials or other things intended to form or forming part of the Infraco Works and does not include Assets;

"**Infraco IPR**" means:

(a) all Intellectual Property Rights in the Deliverables (including Intellectual Property Rights in relation to the Infraco Software) which were already existing and owned by, or licensed to, the Infraco and/or the Infraco Parties prior to the Effective Date;

(b) any modifications or developments of any of the Intellectual Property Rights referred to in paragraph (a) above which are generic in nature and not specific to the carrying out of the Infraco Works; and

(c) all Intellectual Property Rights in tram signalling systems, communication systems, SCADA systems and system integration programmes, methodologies or software

in all cases excluding Tramco IPR.

"**Infraco Party**" means each and any of the Infraco Member's employees, directors, officers, agents, professional advisors, consultants and contractors and its or their sub-contractors (of any tier) including the Sub-Contractors and shall include its or their directors, officers and

employees as they are involved in relation to the Infraco Works and "**Infraco Parties**" shall be construed accordingly;

"**Infraco's Proposals**" means the Infraco's proposals for implementation of the Infraco Works included in Schedule Part 30 (*Infraco Proposals*) as amended from time to time in accordance with this Agreement;

"**Infraco's Representative**" shall have the meaning given to it in Clause 26.2;

"**Infraco Safety Management System**" has the meaning given in Clause 17.18.2.2;

"**Infraco's Site Rules**" means the site rules prepared by the Infraco which are relevant to the Infraco Works;

"**Infraco Software**" means programs, the Intellectual Property Rights in which are:

(a) owned by the Infraco; and

(b) used by the Infraco to carry out its obligations under this Agreement.

"**Infraco Works**" means, as the context requires, the EAL Works and all or any of the works to be constructed and completed and/or services to be provided and/or the plant, machinery and equipment to be supplied and installed by the Infraco and which are necessary to deliver the Edinburgh Tram Network and to subsequently maintain it, all in accordance with this Agreement and the Employer's Requirements.

"**Infrastructure Maintenance Services**" means the ongoing maintenance of the Edinburgh Tram Network (excluding the Trams), supply of spares, Special Tools and the provision of any associated services and other obligations incumbent on the Infraco as described in this Agreement;

"**Infrastructure Maintenance Services Payment**" means the payment to be made to the Infraco in respect of the performance of the Infrastructure Maintenance Services in accordance with this Agreement. This payment shall be based on the sums set out in Schedule Part 4 (*Pricing*) and the final amount to be paid in each Reporting Period to the Infraco shall be calculated in accordance with Clause 68 (*Payment in Respect of Maintenance Services*) and part A of Schedule Part 6 (*Maintenance Payment Regime*).

"**Infrastructure Maintenance Plan**" means the maintenance plan to be prepared by the Infraco in relation to the Infrastructure Maintenance Services;

"**Initial Buildability Report**" means the report to be prepared by the Infraco in accordance with Schedule Part 2 (*Employer's Requirements*);

"**Insolvency Event**" means any of the following events in relation to a Party:

(a) the Party is unable to pay its debts as they fall due or is insolvent or admits (in writing) its inability to pay its debts as they fall due;

(b) the Party suspends for a period of two months making payments on all or any class of its debts or a moratorium is declared by the Party in respect of its indebtedness;

(c) the Party ceases business or announces an intention to do so;

(d) the following are entered into:

(i) a voluntary arrangement (other than a solvent one) for a composition of debts of the Party;

(ii) a scheme of arrangement in respect of the Party pursuant to the Insolvency Act 1986 or the Companies Act 1985; or

(iii) a material composition or arrangement (other than a solvent one) with the Party's creditors;

(e) either of the following:

(i) the winding-up of the Party (including passing a shareholders' resolution or the presentation of a petition by the Party for the purpose of winding up the Party); or

(ii) its administration (including where an application is made by the Party or petition is presented by the Infraco for, or any meeting of its directors or members resolves to make an application for, an administration order);

(f) an order for the winding-up or administration of the Party is made;

(g) any liquidator, judicial custodian, receiver, administrative receiver, administrator or the like is appointed in respect of any Party or any material part of the Party's assets;

(h) possession is taken of, or any distress, execution or other process (other than on the dependence of inhibition) is levied or enforced upon, any material part of the property

(whether real or personal) of the Party by or on behalf of any creditor or encumbrancer of the Party; or

(i) anything analogous to any of the events mentioned in paragraphs (a) to (h) above occurs in relation to the Party under the law of any relevant jurisdiction specifically the opening of insolvency proceedings pursuant to the EC Insolvency Regulation 1346/2000, the Insolvency Act 1986 or the Bundesinsolvenzgesetz of 5 October 1994 (as amended) or the equivalent under the laws of Spain;

"**Insolvency Termination Notice**" has the meaning given to it in Clause 90.1.3;

"**Intellectual Property Rights**" means any rights in or to any patent, design right, utility model, trade mark, brand name, service mark, trade name, business name, logo, invention (whether registered or unregistered), domain name, semi-conductor right, topography right, software designs and/or other materials, source code, copyright, moral right, know-how or rights in databases and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or for an extension , revival or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the law of Scotland or of any other jurisdictions;

"**Internal Resolution Procedure**" means the procedure described in paragraphs 9 and 10 of Schedule Part 9 (*Dispute Resolution Procedure*);

"**IPR**" means intellectual property rights;

"**Issued for Construction Drawings**" means those Deliverables necessary for the Infraco to commence construction of the relevant part of the Infraco Works and as shown on the Design Delivery Programme which have been fully approved by all Approval Bodies and in accordance with the Review Procedure;

"**Key Personnel**" means those staff identified as key personnel of the Infraco and/or any Infraco Parties in Schedule Part 12 (*Key Personnel*);

"**Key Sub-Contractor**" means any supplier or sub-contractor carrying out works falling within the categories set out in Schedule Part 38 (*Approved Suppliers and Sub-contractors (and Trades))* as may be amended from time to time;

"**Land Consents**" means all licences to occupy land, wayleaves and any other licences, permissions, rights of access and related consents in respect of land required for the Infraco

Works including rights of access and related consents in respect of land to which the EAL Lease and EAL Licence apply and all related Drawdown Notices;

"**Last Tram**" means each of the timetabled Trams which are the last to operate in passenger service on each route in each direction prior to the Edinburgh Tram Network shutting down for the night;

"**Late Tram**" means either:

(a) a Tram:

(i) that is in passenger carrying service; and

(ii) is arriving at Edinburgh Airport or departing from any other Monitoring Point; and

(iii) in the case of Edinburgh Airport its arrival, when compared to the Timetable, is more than 2 minutes (i.e. 120 seconds) late; or

(iv) its departure from any other Monitoring Point when compared to the Timetable is timed either more than 2 minutes (i.e. 120 seconds) late or more than 1 minute (i.e. 60 seconds) early; or

(b) where there is no Tram running in service at a Monitoring Point, contrary to the Timetable;

"**Law**" means:

(a) any applicable Legislation;

(b) any applicable Guidance; and

(c) any applicable judgment of a relevant court of law which is a binding precedent;

in each case in force in Scotland;

"**Legal Panel**" has the meaning given to it in paragraph 19.1 of Schedule Part 9 (*Dispute Resolution Procedure*);

"**Legislation**" means any Act or instruments of the Scottish Parliament or the United Kingdom Parliament or subordinate legislation within the meaning of section 21(1) of the Interpretation

Act 1978, any exercise of the Royal Prerogative, and any enforceable community right within the meaning of section 2 of the European Communities Act 1972, and any bye-laws of any local or other statutory authority;

"**Liability Cap**" means:

(i) Subject always to subparagraphs (ii) to (iv) below, in relation to:

(a) any claim brought or liability incurred by **tie** or the Indemnified Parties prior to the issue of the Reliability Certificate or within 6 months of the issue of the Reliability Certificate arising from or in connection with Infraco Works (other than Infrastructure Maintenance Services after the Service Commencement Date) carried out prior to the issue of the Reliability Certificate;

(b) latent defects and uncorrected Patent Defects;

(c) any third party claim made against **tie** or the Indemnified Parties for direct loss or damage made after the issue of the Relability Certificate and arising from or in connection with latent defects;

(d) liabilities owed by the Infraco connected with liquidated damages outstanding from settlement of final account after Service Commencement;

twenty percent (20%) of the Construction Works Price (including, the value of any **tie** Changes arising from Clause 80 (***tie*** *Changes*), Notified Departures, extensions to the Edinburgh Tram Network instructed through Clause 81 (*Infraco Changes*), Clause 85 (*Phase 1b*) or Clause 86 (*Network Expansions*) (the "**Construction Cap**"), subject to (A) in the case of any liability arising solely from the breach of contract or negligent acts or omissions of the SDS Provider, the SDS Liability Cap; and (B) in the case of any liability arising under (c) above, nine million pounds (£9,000,000);

(ii) subject to sub-paragraphs (iii) and (iv), in respect of claims brought against or liabilities incurred by **tie** or the Indemnified Parties to which paragraph (i) above does not apply, an amount of three million, five hundred thousand pounds (£3,5000,000) (in relation to Phase 1a), or the Maintenance Cap, whichever is lower;

(iii) In relation to liability arising solely from any act or omission of the Tram Supplier, an amount when aggregated with all previous claims equal to twenty percent (20%) of the Aggregate Tram Price and (excluding the proceeds of all insurance, bonds and cash

securities) as defined in the Tram Supply Agreement, such liability to be treated as outside the Construction Cap;

(iv) In relation to liability arising from any act or omission of the Tram Maintainer , an aggregate amount of eighteen and one half percent (18.5%) of the aggregate Maximum Performance Payment over the Term of and as defined in the Tram Maintenance Agreement and annually twenty two and one half percent (22.5%) of the aggregate Maximum Performance Payment as defined in the Tram Maintenance Agreement of the Tram Maintenance Services, (in the case of the aggregate cap only, excluding the proceeds of any insurance, bonds and cash securities) such liability to be treated as outside the Maintenance Cap;

"**Maintenance Cap**": means in relation to each year, the amount attributable to that year as calculated below:

(a) the cap for the mobilisation period and the first three years following the Service Commencement Date shall be calculated as follows:

$$\mathbf{MC} = \left(27\left(\frac{\mathrm{MP} + IMSP}{100}\right)\right)$$

where:

MP = the aggregate of payments made in respect of Mobilisation Milestones; and

IMSP = the Infrastructure Maintenance Service Payment to be made in respect of the first three full years following the final Service Commencement Date.

(b) for the fourth year the cap shall be calculated as follows:

$$\mathbf{AMC_4} = \mathrm{MC} + \left(27\left(\frac{IMSP}{100}\right)\right)$$

where:

MC = the maintenance cap calculated pursuant to sub-paragraph (a) above; and

IMSP = the Infrastructure Maintenance Service Payment to be made in respect of the fourth year.

provided that AMC_4 shall not exceed THREE MILLION FIVE HUNDRED THOUSAND POUNDS (£3,500,000).

(c) the cap for each subsequent year shall be calculated as follows:

$$\mathbf{AMC_n} = AMC_{(n-1)} + \left(27\left(\frac{IMSP}{100}\right)\right)$$

where:

n is the number of years following the Service Commencement Date

$AMC_{(n-1)}$ = the annual maintenance cap calculated for the immediately preceding year; and

IMSP = the Infrastructure Maintenance Service Payment to be made in respect of the year n.

provided that AMC_n shall not exceed THREE MILLION FIVE HUNDRED THOUSAND POUNDS (£3,500,000).

"**Line One**" means the tramway works as authorised by the Edinburgh Tram (Line One) Act 2006;

"**Line Two**" means the tramway works as authorised by the Edinburgh Train (Line Two) Act 2006;

"**LLAU**" means the limits of land to be temporarily acquired and used for the Edinburgh Tram Network;

"**Local Code of Construction Practice**" means a code of construction practice that is to be established by **tie** in respect of a party whose private or commercial interests are affected by the execution of the construction, installation, re-installation or renewal of the Edinburgh Tram Network;

"**LOD**" means the limits of deviation for the Edinburgh Tram Network;

"**Maintenance Contract Price**" means the maintenance contract price in respect of the Infrastructure Maintenance Services and the Tram Maintenance Services included in Schedule Part 4 (*Price*) as may be varied from time to time in accordance with this Agreement;

"**Maintenance Mobilisation Period**" means the period ending on the Service Commencement Date;

"**Maintenance Payment Due Date**" has the meaning given to it in Clause 68.5;

"**Maintenance Plan**" means the Infrastructure Maintenance Plan and the Tram Maintenance Plan and/or the Tram Maintainer's proposals for implementation of the Infrastructure Maintenance Services or Tram Maintenance Services respectively;

"**Maintenance Programme**" means the programme for carrying out the Maintenance Services as developed by the Infraco and amended from time to time in accordance with this Agreement;

"**Maintenance Services**" means the Infrastructure Maintenance Services and the Tram Maintenance Services;

"**Maintenance Services Interim Certificate**" means any certificate to be issued by **tie** in accordance with Clause 68.4;

"**Maintenance Services Payment**" means the Infrastructure Maintenance Services Payment and/or the Tram Maintenance Services Payment;

"**Maintenance Specification**" means the specification or specifications in respect of Trams, infrastructure and equipment set out in Section 40 of Schedule Part 2 *(Employer's Requirements)* and any modification thereof or addition thereto as may from time to time be approved in writing in accordance with this Agreement;

"**Mandatory tie Change**" means any addition, modification, reduction or omission in respect of the Infraco Works instructed in accordance with Clause 80 (**tie** *Changes*) which this Agreement specifically states will be a Mandatory **tie** Change;

"**Maximum Tram Weight**" means the maximum weight of a tare Tram of 55.85 tonnes;

"**Milestone**" means a Construction Milestone, a Critical Milestone, a Mobilisation Milestone, a Tram Milestone and/or a Tram Maintenance Mobilisation Milestone;

"**Milestone Completion Certificate**" means a Construction Milestone Completion Certificate, a Critical Milestone Completion Certificate, Mobilisation Milestone Completion Certificate and/or Tram Milestone Completion Certificate;

"**Milestone Payment**" means the payment to be made against the achievement of a Milestone for an amount set out in Schedule Part 5 (*Milestone Payments*);

"**Minimum Spare Parts Pool**" means the minimum level of each Spare Part or Special Tool to be held in the Spare Parts Pool as specified in the Infraco's Proposals;

"**Mobilisation and Advanced Works Agreement**" means the agreement entered into between **tie** and Infraco on 21 December 2007;

"**Mobilisation Milestone**" means any milestone relative to the Infrastructure Maintenance Services which has been identified and defined as a mobilisation milestone in Schedule Part 5 (*Milestone Payments*);

"**Mobilisation Milestone Completion Certificate**" means any certificate in respect of achievement of a Mobilisation Milestone issued by **tie's** Representative in accordance with Clause 41.3;

"**Mobilisation Period**" means the period commencing on the Effective Date and ending on the Service Commencement Date;

"**Monitoring Point**" means the locations where the arrival or departure of Trams is recorded for the purpose of calculating Tram punctuality for the purpose of part A of Schedule Part 6 (*Maintenance Payment Regime*), being:

(a) **Phase 1a:** for the purposes of monitoring arrival and departure: Edinburgh Airport;

(b) **Phase 1a:** for the purposes of measuring departure only:

(i) Edinburgh Park Station;

(ii) Haymarket;

(iii) Foot of the Walk;

(iv) Leith (Newhaven or Ocean Terminal according to service); and

(v) Picardy Place;

(c) **Phase 1b:** for the purposes of measuring departure only:

(a) Crewe Toll (northbound only); and

(b) Granton Square;

"**Mobilisation Services**" means the mobilisation services to be provided by the Infraco during the Mobilisation Period in accordance with this Agreement;

"**MUDFA Contract**" means the agreement dated 4 October 2006 and entered into between **tie** Limited and the MUDFA Contractor;

"**MUDFA Contractor**" means Alfred McAlpine Infrastructure Services Limited, a company incorporated under the Companies Act with registration number 00728599 and having its registered office at Kinnaird House, 1 Pall Mall East, London, SW1Y 5AZ, which expression shall include its permitted assignees or such other multi-utilities diversion framework agreement sub-contractor appointed by **tie** from time to time in relation to the Edinburgh Tram Network;

"**MUDFA Works**" means the works carried out by the MUDFA Contractor under its contract with **tie**;

"**Network Certificate**" means a certified issued in accordance with Clause 47.3;

"**Network Expansion**" means any expansion of the Edinburgh tram Network beyond Phase 1a and Phase 1b;

"**Network Rail**" means Network Rail Infrastructure Limited, a Company incorporated under the Companies Act with registered number 2904587 and having its registered office at 40 Melton Street, London, NW1 2EE;

"**Network Rail Agreement**" means the protective provisions agreement entered into among **tie**, CEC and Network Rail and dated 17 and 21 June 2005;

"**Notice of Adjudication**" has the meaning given in paragraph 16 of Schedule Part 9 (*Dispute Resolution Procedure*);

"**Notification**" has the meaning given in paragraph 10.1 of Schedule Part 9 (*Dispute Resolution Procedure*);

"**Notified Departure**" has the meaning given in Schedule Part 4 (*Pricing*);

"**NOx**" means nitrogen oxides;

"**NPV**" means net present value;

"**NR**" means Network Rail;

"**NRSWA**" shall have the meaing given in Clause 21 *(New Roads and Street Works Act 1991 and Utilities Division);*

"**NTL**" means NTL Limited, a company incorporated under the Companies Act with registered number 02586701 and having its registered office at 160 Grant Portland Street, London, W1W 5QA;

"**Ocean Terminal**" means Ocean Terminal Limited, a company incorporated under the Companies Act with registered number SC178696 and having its registered office at 1 Prince of Wales Dock, Leith, Edinburgh, EH6 7DX;

"**OCIP Insurances**" means the insurances taken out and maintained by **tie** referred to in Clause 76 (*Required Insurances*) and set out in Schedule Part 11 (*Required Insurances*) which may be amended and notified (as required) to the Infraco from time to time;

"**OGC**" means the Office of Government Commerce, an independent office of the Treasury which was established in April 2001 and having its principal office at Rosebury Court, St. Andrew's Business Park, Norwich, Norfolk, NR7 0HS;

"**OLE**" means overhead line equipment;

"**On Street Construction Works Methodology**" means the document of that name contained in Schedule Part 15 (*Programme*);

"**Open Book Basis**" means the availability and disclosure (consistent with operation of Clause 104 (*Information and Audit Access*)) of a reasonable level of data and calculations used by the Infraco to create and justify costings and financial analysis presented to **tie** which shall include any management costs and overheads of Infraco to the extent relevant, and capable of being identified as being attributable to such costings or financial analysis;

"**Operating Day**" means a 24 hour period starting from 3a.m. on each day when the Trams are timtabled to run;

"**Operations and Maintenance Manual**" means the manual to be prepared by the Infraco in accordance with Clause 52.25;

"**Operations Performance Specification**" means the specification included within Schedule Part 2 (*Employer's Requirements*);

"**Operator**" means Transdev Edinburgh Tram Limited, a company incorporated in Scotland under registered number SC267598 and having its registered office at Level 2, Saltire Court,

20 Castle Terrace, Edinburgh EH1 2ET, appointed by **tie** as operator under the DPOFA or its successor;

"**Operator Event**" means:

(a) any delay by the Operator in the performance of its obligations or exercise of its rights pursuant to DPOFA or in responding to any request from the Infraco to assist in relation to unforeseen damage to or interference with the Transport Services or minor obstruction on the Edinburgh Tram Network caused by any third party in so far as forming part of the Operator's responsibilities under DPOFA;

(b) any material failure or omission in the provision of the Project Development Services or the performance of the Project Operations by the Operator;

(c) any damage to or deficiencies in the Infraco Works caused directly and predominantly by the Operator; or

(d) any act or omission by the Operator which:

(i) prevents or interfere with the design, installation, integration, system acceptance, testing, commissioning, operation or maintenance of the Edinburgh Tram Network;

(ii) increases the Contract Price;

(iii) requires the Infraco to apply for a variation to the Infraco Works in accordance with Clause 81 (*Infraco Changes*); or

(iv) adversely impacts on the Infraco Works, the Maintenance Services, the Edinburgh Tram Network and/or whole life costs or handback obligations in terms of Clause 95 *(Transition on Termination or Expiry).*

"**Operator Maintenance**" means the maintenance of the Edinburgh Tram Network to be carried out by the Operator in accordance with the DPOFA;

"**Operator Maintenance Plan**" means the plan to be prepared by the Operator in relation to the performance of the Operator Maintenance and notified to the Parties from time to time;

"**Operator Procedures**" means those procedures in place to ensure the safe and efficient maintenance operation of the Edinburgh Tram Network, as agreed between the Parties from time to time and as contained in the Review Procedure;

"**Operator's Case for Safety**" means the case for safety that the Operator is required to maintain in respect of the operation of the Edinburgh Tram Network;

"**ORR**" means the Office of Rail Regulation, an independent statutory body established on 5 July 2004 under the Railways and Transport Safety Act 2003;

"**Panels**" has the meaning given to it in paragraph 19 of Schedule Part 9 (*Dispute Resolution Procedure*);

"**Part**" means any component or furnishing or equipment intended to form part of the completed Edinburgh Tram Network furnished within or relating to the Edinburgh Tram Network whether or not the same is installed on the Edinburgh Tram Network (including any Tram);

"**Party**" means each and any of the parties to this Agreement and "**Parties**" shall be construed accordingly;

"**Patent Defect**" means any defect, deficiency, shrinkage or other fault due to design, goods, materials, workmanship or services not being in accordance with this Agreement and which are (i) apparent from or would be revealed by a non-intrusive inspection of the Infraco Works or (ii) obvious during their ordinary intended use as stipulated in the Employer's Requirements or Infraco Proposals;

"**Patent Defect Notification Period**" means 24 months from the Service Commencement Date;

"**Patent Defects Rectification Certificate**" means the certificate issued by **tie** upon the Infraco completing its obligations to rectify Patent Defects in accordance with the terms of the Agreement;

"**Performance Bond**" means the performance bond to be provided by the Infraco pursuant to Clause 74.1 which shall be substantially in the form set out in Schedule Part 8 (*Bonds, Parent Company Guarantees and Collateral Warranties*) issued by a surety approved by **tie** in advance in writing, such approval not to be unreasonably withheld or delayed;

"**Performance Review Date**" means the date 3, 8, and (if applicable) 13 years after the Service Commencement Date;

"**Performance Review Period**" means the period between each Performance Review Date (and the period between the Service Commencement Date and the first Performance Review Date);

"**Permanent Land**" means the land shown highlighted in blue on the plans and drawings set out in Schedule Part 31 (*Drawings*);

"**Permits to Work**" means the permits to work issued by **tie** in accordance with paragraph 3.5 of part A, and paragraph 3.4 of part B, of Schedule Part 3 (*Code of Construction Practice and Code of Maintenance Practice*);

"**Permitted Variation**" means a **tie** Change, a Small Works Change, an Accommodation Works Change, an Infraco Change, a Mandatory **tie** Change and/or a Notified Departure which has been authorised to proceed in accordance with the provisions of this Agreement;

"**Persistent Breach Notice**" means a notice served by **tie** pursuant to Clause 93 (*Persistent Breach*);

"**Phase 1a**" means Edinburgh Airport to Newhaven (inclusive), together with the Depot at Gogar and the spur at Roseburn Junction;

"**Phase 1b**" means Roseburn Junction to Granton Square (inclusive);

"**Phase 1b Works**" means as the context requires, all or any of the works to be designed, constructed and completed and/or services to be provided and/or the plant, machinery and equipment to be supplied and installed by the Infraco in accordance with this Agreement and which are necessary to deliver Phase 1b, and to subsequently maintain Phase 1b all in accordance with the Employer's Requirements and this Agreement.

"**Planned Sectional Completion Date**" means each of the following programmed dates of sectional completion for the relevant Section in accordance with this Agreement of the Edinburgh Tram Network as may be amended from time to time in accordance with this Agreement:

(a) Section A (Depot) - 25 March 2010;

(b) Section B (Test Track) - 23 April 2010;

(c) Section C (Testing and Commissioning) - 17 January 2011;

(d) Section D - the date which falls 26 weeks after the issue of the Certificate of Section Completion in respect of Section C;

"**Planned Service Commencement Date**" means the date shown in the Programme as the Service Commencement Date as may be amended from time to time and in accordance with this Agreement;

"**Planning Permission**" means any planning permission, planning approval, approval of reserved matters, listed building consent, conservation areas consent and/or other consent or approval;

"**Point of Indexation**" shall be January each year to be applied annually as of 1st April each year;

"**Position Paper**" has the meaning given in paragraph 10.2 of Schedule Part 9 (*Dispute Resolution Procedure*);

"**Principal Contractor**" has the meaning given to it in the CDM Regulations;

"**Prior Approvals**" means approvals from CEC planning officers to the appearance of any structures and apparatus (whether temporary or permanent) forming part of the Infraco Works;

"**Programme**" means the programme set out in Schedule Part 15 (*Programme*) as developed and extended from time to time in accordance with this Agreement which shall include, the Maintenance Programme, the Consents Programme and Design Delivery Programme but shall exclude any programme developed in respect of the completion of any Accommodation Works Changes;

"**Prohibited Act**" means:

(a) offering, giving or agreeing to **tie**, the Scottish Executive, Transport Scotland, the Scottish Ministers, CEC or any **tie** Party or any other public body or any person owned or employed by any of them any gift or consideration of any kind as an inducement or reward:

(i) for doing or not doing (or for having done or not having done) any act in relation to the obtaining or performance of this Agreement; or

(ii) for showing or not showing favour or disfavour to any person in relation to this Agreement;

(b) paying commission or agreeing to pay commission to any person in connection with the award of this Agreement;

(c) committing any offence:

(i) under the Prevention of Corruption Acts 1889-1916 or section 68(2) of the Local Government (Scotland) Act 1973;

(ii) under any Law creating offences in respect of fraudulent acts; or

(iii) at common law in respect of fraudulent acts in relation to this Agreement or any other relevant agreement with **tie**, the Scottish Executive, Transport Scotland, the Scottish Ministers, CEC or any other public body; or

(d) defrauding or attempting to defraud or conspiring to defraud **tie**, CEC, the Scottish Executive, Transport Scotland, the Scottish Ministers or any other public body;

Any references within this Agreement to any "**Prohibited Act**" shall include acts outwith the United Kingdom and the references within the definition "**Prohibited Act**" to UK legislation shall be deemed to be amended to refer to legislation in other jurisdictions outside of the United Kingdom;

"**Project Development Services**" means the services to be provided by the Operator to **tie** pursuant to and described in the DPOFA as may be amended from time to time;

"**Project IPR**" means any Intellectual Property Rights arising out of, used in or created to implement the Infraco Works and produce Deliverables (including the "Specially Written Software" any asset management system and/or Works programming system) and for the extension of any Edinburgh Tram Network in accordance with this Agreement, but excluding any Infraco IPR contained in the Deliverables and excluding any Tramco Project IPR;

"**Project Operations**" means the performance of:

(a) the Transport Services on the Edinburgh Tram Network (including the operation of the Control Centre);

(b) the Operator Maintenance of the Edinburgh Tram Network; and

(c) all other obligations of the Operator under the DPOFA from time to time;

as may be varied from time to time;

"**Project Safety Certification Committee**" shall include representatives from **tie**, Transport Edinburgh Limited, CEC in its capacity as roads authority, the Infraco, the Operator, Lothian Buses, the SDS Provider, the Tram Supplier and the Tram Maintainer;

"**Project Vision**" has the meaning given in Recital F of this Agreement;

"**Proposals**" means, in relation to each section of OLE forming part of the Edinburgh Tram Network, the Infraco's proposals for the type of supporting infrastructure to be installed in relation thereto, together with any information or documentation which would be reasonably required by **tie** in order to properly evaluate such proposals;

"**Qualifying Change in Law**" means:

(a) a Discriminatory Change in Law; and/or

(b) a Specific Change in Law; and/or

(c) a Change in Law that requires any modification, adjustment or addition to the Infraco Works (as installed) after the Planned Service Commencement Date;

(d) any alteration or amendment to **tie** and CEC policies set out in Schedule Part 29 ***(tie** and CEC Policies)*;

"**Redevelopment Notice**" has the meaning given in the Building Fixing Agreement;

"**Red Zone Working**" means the term applied to those works carried out on Network Rail infrastructure while traffic is still operating and staff are protected by look-out;

"**Referral**" has the meaning given in paragraph 27 of Schedule Part 9 (*Dispute Resolution Procedure*;

"**Referring Party**" has the meaning given in paragraph 16 of Schedule Part 9 (*Dispute Resolution Procedure*);

"**Regulations**" has the meaning given in Clause 50.1;

"**Related Contract**" has the meaning given in paragraph 55 of Schedule Part 9 (*Dispute Resolution Procedure*);

"**Related Dispute**" has the meaning given in paragraph 55 of Schedule Part 9 (*Dispute Resolution Procedure*);

"**Reliability Certificate**" means a certificate issued by **tie** in accordance with Clause 47.4;

"**Relief Event**" means unless any of the following events arise (directly or indirectly) as a result of any act or omission of the Infraco and/or an Infraco Party:

(a) fire, explosion, lightning, tempest, flood (other than flood caused by bursting or overflowing of apparatus or pipes), earthquakes, or storm, ionising rariation, riot and civil commotion (which results in a Relief Event under the Tram Supply Agreement). For avoidance of doubt "flood" shall exclude flooding affecting any part of the Edinburgh Tram Network caused by weather or local conditions against which the Infraco, acting prudently and reasonably and in accordance with Good Industry Practice, should have protected the Edinburgh Tram Network;

(b) failure by any Utility to carry out works or provide services which they would ordinarily provide, save to the extent such failure arises from an exercise of rights by such party pursuant to an agreement with the Infraco;

(c) any accidental loss of or damage to a material part of the Infraco Works;

(d) protestor action directed against:

(i) **tie** or a **tie** Party or the Edinburgh Tram Network which lasts (or the impact of which lasts) for less than 14 days provided such protestor action has not arisen as a result of or been caused by an Infraco breach of its obligations under this Agreement or otherwise by any actions or omissions of the Infraco or Infraco Parties unrelated to the Edinburgh Tram Network; or

(ii) a third party unconnected with the Edinburgh Tram Network;

(e) any official or unofficial strike, lockout, go-slow or other industrial dispute generally:

(i) affecting the construction, civil engineering, in the United Kingdom in which a substantial number of the Infraco's employees participate; or

(ii) affecting the tram and/or tram manufacturing industry or a significant sector of it save where such events relate to the Tram Supplier's workforce or the workforce of any sub-contractor to the Tram Supplier, in which case they shall not qualify as a Relief Event;

(f) orders or directions from **tie's** Representative in respect of the removal of unsatisfactory work or materials referred to in Clause 37.5, which are referable to Clause 64 (*Relief Events*);

(g) the occurrence of a Force Majeure Event;

(h) an act of terrorism; or

(i) power failure or bursting or overflowing of apparatus or pipes except in each case where such failure, bursting or overflowing arises from the operations of the Infraco or from a failure of the Infraco's and/or an Infraco Party's plant or equipment and/or any part of the Edinburgh Tram Network itself.

"**Remediable Termination Notice**" has the meaning given in Clause 90.1.2;

"**Repairs Notice**" has the meaning given in the Building Fixing Agreement;

"**Reporting Period**" means a period of 28 days;

"**Reporting Period End Date**" means any of the dates set out in Schedule Part 35 (*Reporting Period End Dates*);

"**Request for Information**" shall have the meaning set out in FOISA and shall include any apparent request for information under FOISA, the Environmental Information Regulations or the Code;

"**Required Insurances**" means the insurances taken out and maintained by the Infraco Members set out in Schedule Part 11 (*Required Insurances*) as may be amended from time to time in accordance with this Agreement;

"**Responding Party**" has the meaning given to it in paragraph 17 of Schedule Part 9 (*Dispute Resolution Procedure*);

"**Retention Bond**" means a retention bond provided from time to time by the Infraco to **tie** pursuant to Clause 74 (*Bonds Parent Company Guarantees and Collateral Warranties*), and which shall be substantially in the form set out in Part B of Schedule Part 8 (*Bonds, Parent Company Guarantees and Collateral Warranties)* issued by a surety approved by **tie** in advance in writing, such approval not to be unreasonably withheld or delayed;

"**Review Procedure**" means the review procedure set out in Schedule Part 14 (*Design Review and Design Management Plan*);

"**RPIX**" means the general index of retail prices for all items excluding mortgage interest payments (Office of National Statistics: Series Identifier: CHMK) as published or any replacement thereof or, in the event such index ceases to exist, such other similar index as the Parties shall agree from time to time (or, if the Parties cannot so agree, as determined under the Dispute Resolution Procedure on the referral of either Party) provided that, if the basis of computation of such index shall have changed between the two relevant months, any official reconciliation between the two bases of computation published by a United Kingdom government department shall be binding on the Parties and, in the absence of such official reconciliation, such adjustment shall be made to the figure of such index for the second of those months to make it correspond as nearly as possible to the method of computation for the first of those months and such adjusted figure shall be considered for the purpose of this Agreement to the exclusion of the actual published figure;

"**Schedule of Rates**" means the rates specified in Schedule Part 4 (*Pricing*);

"**Schedules**" means the Schedule in 44 Parts annexed to the Agreement;

"**Scotland Gas Networks**" means Scotland Gas Networks PLC, a company incorporated under the Companies Act with registered number SC264065 and having its registered office at Inveralmond House, 200 Dunkeld Road, Perth, Perthshire, PH1 3AQ;

"**Scottish Environment Protection Agency**" or "**SEPA**" means a body established under the Environment Act 1995 and having its principal office at Erskine Court, Castle Business Park, Stirling, FK9 4TR;

"**Scottish Natural Heritage**" means a statutory agency whose remit is set out in sections 1, 2 and 3 of the Natural Heritage (Scotland) Act 1991 and having its principal office at 12 Hope Terrace, Edinburgh, EH9 5NP;

"**Scottish Power**" means SP Distribution Limited, a company incorporated under the Companies Act with registered number SC189125 and having its registered office at 1 Atlantic Quay, Glasgow, G2 8SP;

"**Scottish Water**" means Scottish Water Limited, a body established under the Water Industry (Scotland) Act 2002 and having its principal office at Castle House, 6 Castle Drive, Carnegie Campus, Dunfermline, Fife, KY11 8GG;

"**SDS Agreement**" means the agreement between the SDS Provider and **tie** dated 19 September 2005 set out in Schedule Part 22 (*SDS Agreement*) as may be amended by the SDS

Novation Agreement entered into in accordance with Clause 11.1 or from time to time with the approval of **tie** in accordance with this Agreement;

"**SDS Compensation Event**" means Compensation Events (t) and (u);

"**SDS Liability Cap**" means an aggregate amount of ten million pounds (£10,000,000) for each and every event, save in relation to liability for pollution or contamination which is restricted to an aggregate cap of ten million pounds (£10,000,000);

"**SDS Novation Agreement**" means the agreement entered into by the Infraco and the SDS Provider on the same date as the Agreement and included as Schedule Part 23.

"**SDS Provider**" means Parsons Brinckerhoff Limited, a company incorporated under the Companies Act with registration number 02554514 and having its registered office at Amber Court, William Armstrong Drive, Newcastle Business Park, Newcastle Upon Tyne, NE4 7YQ which expression shall include its permitted assignees;

"**SDS Provider Party**" means any sub-consultant, supplier, sub-contractor, specialist and/or any other party appointed by the SDS Provider in accordance with the SDS Agreement to perform any part of the SDS Services;

"**SDS Qualifying Change in Law**" means a Qualifying Change in Law under the SDS Agreement;

"**SDS Services**" means those services to be provided by the SDS Provider in terms of the SDS Agreement and shall exclude any design provided to the MUDFA Contractor in respect of utilities diversions;

"**Second Party**" has the meaning given in Clause 6.3

"**Section**" means any of Section A, Section B, Section C or Section D, all as may be amended from time to time in accordance with this Agreement;

"**Section A**" means completion of the Depot (including energisation) and the first Tram delivered to the Site and assembled and the completion of all tests required by the Employer's Requirements in relation to that Section;

"**Section B**" means completion of the test track (including energisation), assumed as Depot to the airport, and five Trams delivered to the Site and assembled with the first Tram to have completed the Tram Type Test and the remaining Trams to have completed the Tram Commissioning Routine Tests, such tests as described in the Employer's Requirements and the

completion of all tests required by the Employer's Requirements in relation to that Section, including those System Acceptance Tests required to enable the commencement of Driver Training;

"**Section C**" means the carrying out and completion of Phase 1a to Newhaven (including energisation) and the spur or delta at Roseburn Junction and the completion of all tests required by the Employer's Requirements in relation to that Section, including those System Acceptance Tests that must be successfully completed prior to shadow running as provided for in the Employer's Requirements;

"**Section D**" means the completion of shadow running and commencement of revenue service approval obtained and the completion of all tests required by the Employer's Requirements in relation to that Section, including those System Acceptance Tests that must be successfully completed to enable Service Commencement;

"**Section E**" completion of Phase 1b;

"**Section F**" means the carrying out and completion of T1, T2 and T3 in respect of Phase 1b;

"**Sectional Completion Date**" means the date of issue of a Certificate of Sectional Completion for the relevant Section in accordance with this Agreement;

"**Security Interest**" means any mortgage, pledge, lien, hypothecation, security interest or other charge or encumbrance or any other agreement or arrangement having substantially the same economic effect and includes any Security as defined in section 248(b) of the Insolvency Act 1986;

"**Self-Monitoring Plan**" means a detailed plan produced by the Infraco pursuant to Clause 56 setting out how it proposes to monitor its compliance with the Employer's Requirements and its obligations under this Agreement in a way which will enable: (i) the Infraco to produce the Service Quality Reports; (ii) **tie** to satisfy itself as to the level of the Infraco's compliance with the Employer's Requirements and its obligations under this Agreement in all respects; and (iii) the Parties to perform their respective responsibilities pursuant to and as described in Clause 103 (*Best Value*);

"**Service Commencement Date**" means the date of issue of the Certificate of Service Commencement in accordance with this Agreement;

"**Service Quality Report**" means the report to be submitted by the Infraco pursuant to Clause 56 (*Service Performance and Quality Monitoring*) in a form developed and containing the information agreed by the Parties;

"**Site**" means the lands or places on, under, in, or through which the Infraco Works are to be constructed including the Permanent Land and the Temporary Sites, any other lands or places covered by the Land Consents and/or land provided by **tie** for the purposes of the Agreement or any additional land or facilities provided by the Infraco pursuant to Clause 18.19, together with such other places as may be designated in the Agreement or subsequently agreed by the Parties as forming part of the Site;

"**Small Works**" means any change to the Infraco Works or additional works of a similar nature to, or related to, the Infraco Works having an individual cost not exceeding £10,000 (as Indexed) or as otherwise agreed between the Parties from time to time save where such works require the involvement of either the SDS Provider, the Tram Supplier or the Tram Maintainer;

"**Small Works Change**" means any Small Works instructed in accordance with Clause 82 (*Small Works Changes*);

"**Small Works Cost Notice**" has the meaning given in Clause 82 (*Small Works Changes*);

"**Snagging**" has the meaning given in Clause 44.6;

"**Snagging List**" means the list issued by **tie** in accordance with Clause 44.6;

"**Snagging Rectification Certificate**" means a certificate issued under Clause 46 (*Snagging*);

"**Spare Parts**" means such components, parts, consumables, equipment and furnishings as may reasonably be required from time to time to comply with the Infraco's obligations in terms of Clause 52 (*Maintenance*);

"**Spare Parts Pool**" means the pool of Spare Parts and Special Tools owned by **tie** and to be maintained by the Infraco in accordance with Clause 52 (*Maintenance*);

"**Special Tools**" means the special tools, hand tools and test equipment required to carry out maintenance of the Edinburgh Tram Network, listed in the Infraco's Proposals as the same may be varied from time to time by written agreement of the parties (such agreement not to be unreasonably withheld or delayed);

"**Specially Written Software**" means programs which are written by or on behalf of the Infraco specifically to enable the Infraco to carry out its obligations under this Agreement;

"**Specific Change in Law**" means any Change in Law which specifically applies to the provision of works the same as or similar to the Infraco Works but excluding the making, amendment or revocation of any Traffic Regulation Order;

"**Sub-Contractor**" any sub-contractor, sub-consultant, supplier, specialist and/or other party appointed in accordance with Clause 28 (*Subletting and the Appointment of Sub-Contractors)*, or otherwise approved by **tie**, and "Sub-Contract" is to be interpreted accordingly;

"**Submitted Item**" has the meaning given in paragraph 1.2 of Schedule Part 14 (*Review Procedure and Design Management Plan*);

"**Successor Infraco**" means any person or persons notified by **tie** to the Infraco as having been, or intended to be, appointed to complete any part of the Infraco Works and/or maintain any part of the Edinburgh Tram Network following termination or expiry of this Agreement;

"**Systems Acceptance Tests**" means the tests described in the Employer's Requirements including tests T1, T2, T3, T4 and/or T5, and the other testing and commissioning activities described in Schedule Part 2 (*Employer's Requirements*);

"**Systems Availability Target**" has the meaning given in Schedule Part 2 (*Employer's Requirements*);

"**Technical Library**" has the meaning given to it in Clause 102.17(a);

"**Technical Records**" means the technical records in respect of the Edinburgh Tram Network to be retained and updated in accordance with the Maintenance Specification and the Employer's Requirements;

"**Telewest**" means either or both of Telewest Limited and Telewest Communications;

"**Telewest Communications**" means Telewest Communications Group Limited, a company incorporated under the Companies Act with registered number 02514287 and having its registered office at 160 Great Portland Street, London, W1W 5QA;

"**Telewest Limited**" means Telewest Limited, a company incorporated under the Companies Act with registered number 03291383 and having its registered office at 160 Great Portland Street, London, W1W 5QA;

"**Temporary Works**" means all temporary works of every kind required in or about the construction and completion of the Infraco Works;

"**Temporary Sites**" means any of the sites shown highlighted in red on the plans set out in Schedule Part 31 (*Drawings*);

"**Term**" means the period from (and including) the Effective Date until (and including) the earlier of the Termination Date and the Expiry Date;

"**Termination Date**" means the date of early termination of this Agreement in accordance with Clauses 3 (*Conditions Precedent*), 88 (*Termination or Suspension for **tie** Default*), 89 (*Voluntary Termination by* **tie**), 90 (*Termination on Infraco Default*), 91 (*Termination by Reason of Force Majeure*), 92 (*Termination for Corrupt Gifts and Fraud*) or 93 (*Persistent Breach*);

"**Termination Notice**" means a notice to terminate this Agreement served by either Party in accordance with the terms of this Agreement;

"**T1**" means the post commissioning test described in section 23 of Schedule Part 2 (*Employer's Requirements*);

"**T2**" means performance test 1 described in section 23 of Schedule Part 2 (*Employer's Requirements*);

"**T3**" means the pre-operations test described in section 23 of Schedule Part 2 (*Employer's Requirements*);

"**T4**" means the network performance test described in section 23 of Schedule Part 2 (*Employer's Requirements*);

"**T5**" means the network reliability test described in section 23 of Schedule Part 2 (*Employer's Requirements*);

"**Test Track**" means that portion of the Infraco Works that will be utilised by the Infraco to test run Trams and systems and to train drivers and other staff;

"**Third Party Obligations**" means the obligations which Infraco is obliged to comply with under Clauses 18.17A and B and set out in Schedule Part 13 (*Third Party Agreements*) as that Schedule Part 13 may be amended from time to time as a result of a **tie** Change;

"**Third Party Software**" means programs, the Intellectual Property Rights in which are:

(a) owned by a third party; and

(b) used by the Infraco to carry out its obligations under this Agreement;

"**Thus**" means means Thus PLC, a company incorporated under the Companies Act with registered number SC 192666 and having its registered office at 1-2 Berkeley Square, 99 Berkeley Street, Glasgow, G3 7HR;

"**tie and CEC Polices**" means the policies included in Schedule Part 29 (**tie** *and CEC Policies*);

"**tie Change**" means any addition, modification, reduction or omission in respect of the Infraco Works instructed in accordance with Clause 80 (**tie** *Changes*) or any other event which this agreement specifically states will be a **tie** Change but which shall not include any Small Works Change or any Accommodation Works Change;

"**tie Change Order**" means the written confirmation issued by **tie** to proceed with a **tie** Change on the basis of an Estimate (as modified, if required);

"**tie Consents**" means securing the Traffic Regulation Orders and Temporary Traffic Regulation Orders in accordance with Clause 19.1 together with such other Consents that relate to the statutory authority to implement the Edinburgh Tram Network, but excluding all Design Stage Consents.

"**tie Customer Satisfaction Survey**" means the customer satisfaction survey produced annually (or with such other frequency as may be agreed between the Infraco and **tie**) in accordance with Clause 73.3;

"**tie Default**" means one of the following events:

(a) the failure of **tie** for more than 30 days following the final date for payment to pay to the Infraco an amount in excess of £250,000 which has been certified for payment pursuant to Clause 67.5 or Clause 68.4 except where **tie** has exercised contractual rights of set-off or retention as provided for in this Agreement, including pursuant to Clauses 37.2, 38.2, 38.3, 44.5, 45.5, 67.14, 67.15, 68.12, 68.13, 69.4, 96.4.3 or Schedule Part 43;

(b) a breach by **tie** of any of its material obligations under this Agreement which substantially frustrates or renders it impossible for the Infraco to perform any material

part of its obligations under this Agreement for a continuous period of 45 Business Days;

(c) an Insolvency Event in relation to **tie**;

(d) breach by **tie** of Clause 98; or

(e) Change in Law which makes completion of or carrying out of a material part of the Infraco Works either impossible or illegal

"**tie DPOFA Change**" means a change proposed by **tie** in accordance with the DPOFA;

"**tie's Drug and Alcohol Policy**" means the policy included in Schedule Part 29 (***tie** and CEC Policies);*

"**tie Notice of Change**" means a notice service by **tie** pursuant to Clause 80 (**tie** *Changes*), setting out the matters referred to in Clause 80;

"**tie Obligations**" means the obligations which **tie** is required to perform under this Agreement which are set out in Schedule Part 26;

"**tie Party**" means any advisers appointed by **tie** and/or any of **tie's** employees, agents, contractors and sub-contractors and its or their directors, officers and employees (but excluding the Infraco and/or any Infraco Party);

"**tie's Representative**" means the person or persons appointed by **tie** from time to time and notified to the Infraco;

"**Timetable**" means the timetable which is developed in accordance with Schedule Part 2 (*Employer's Requirements*) as may be amended from time to time;

"**TOC**" means (passenger) train operating company;

"**Traffic Regulation Orders**" means the traffic regulation orders required for the operation and maintenance of the Edinburgh Tram Network;

"**Tram Commissioning Routine Tests**" means together the site commissioning tests and the system integration tests to be carried out on the System and on each Tram as set out in section 23 of Schedule 2 (*Employer's Requirements*);

"**Tramco IPR**" means the Tram Supplier IPR as such term is defined in the Tram Supply Agreement and the Tram Maintainer IPR as such term is defined in the Tram Maintenance Agreement;

"**Tramco Project IPR**" means all Intellectual Property Rights created in the performance of the Tram Supplier's obligations pursuant to the Tram Supply Agreement and the Tram Maintainer's obligations pursuant to the Tram Maintenance Agreement relating to aesthetic and ergonomic detailed design and which are specific in nature to the performance of the Tram Supplier's obligations pursuant to the Tram Supply Agreement and the Tram Maintainer's obligations pursuant to the Tram Maintenance Agreement;

"**Trams**" means all or any of the tram vehicles for the Edinburgh Tram Network to be provided under the Tram Supply Agreement and maintained under the Tram Maintenance Agreement;

"**Tramstop**" means the places (including termini) at which fare paying passengers are permitted to board and/or leave Trams;

"**Tram Inspector**" means the person specified as such in the Tram Inspector Agreement;

"**Tram Inspector Agreement**" means the agreement between the Tram Inspector, **tie** and the Infraco for the inspection and certification of Trams which shall be substantially in the form set out in Schedule Part 34 (*Tram Inspector Agreement*);

"**Tram Legislation**" means the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006, which received Royal Assent on 8 May 2006 and 27 April 2006 respectively and which confer on CEC all requisite authorities and statutory powers to procure the construction, operation and maintenance of the Edinburgh Tram Network;

"**Tram Maintenance Commencement Date**" shall have the meaning given to it pursuant to the Tram Maintenance Agreement;

"**Tram Maintainer**" means the party appointed to carry out the Tram Maintenance Services in accordance with the Tram Maintenance Agreement;

"**Tram Maintenance Agreement**" means the agreement awarded to the Tram Maintainer in respect of the Tram Maintenance Services set out in Schedule Part 19 (*Tram Maintenance Agreement*) as may be amended from time to time with the approval of **tie** in accordance with this Agreement;

"**Tram Maintenance Plan**" means the maintenance plan to be prepared by the Tram Maintainer in accordance with the Tram Maintenance Agreement;

"**Tram Maintenance Qualifying Change in Law**" means a Qualifying Change in Law pursuant to the Tram Maintenance Agreement;

"**Tram Maintenance Services**" means the ongoing maintenance of the Trams, supply of consumable spares for the Trams, the provision of any associated services and other obligations incumbent on the Tram Maintainer (excluding the Tram Supply Obligations) as described in the Tram Maintenance Agreement;

"**Tram Maintenance Services Payment**" means the payment to be made to the Infraco in respect of the performance of the Tram Maintenance Services in accordance with this Agreement. This payment shall be based on the sums set out in Schedule Part 4 (*Price*) and the final amount to be paid in each Reporting Period to the Infraco shall be calculated in accordance with Clause 68 (*Payment in Respect of Maintenance Services*) and part B of Schedule Part 6 (*Maintenance Payment Regime*).

"**Tram Milestone**" means any milestone which has been identified and defined as a "tram milestone" in Schedule Part 5 (*Milestone Payments*);

"**Tram Milestone Completion Certificate**" means a certificate to be issued in respect of a milestone completed by the Tram Supplier;

"**Tram Related Equipment**" means the Spare Parts and Special Tools (which are required specifically in relation to the Trams) and the documentation, specifications, instructions, catalogues, spare parts list, training and maintenance manuals and log books and Tram Software listed in Part 2 of Schedule Part 2 (*Employer's Requirements*);

"**Tram Requirements Specification**" means Section 24 of Schedule Part 2 (*Employer's Requirements*);

"**Tram Software**" means the executable object code version of software relating to equipment installed on the Trams, which is supplied in machine readable form and already loaded upon the relevant piece of equipment or computer system to which it relates, including for the avoidance of doubt all software embedded in a hardware device which is installed on the Trams;

"**Tram Supplier**" means the party appointed by **tie** to carry out the Tram Supply Obligations in accordance with the Tram Supply Agreement;

"**Tram Supply Advance Works Agreement**" means the agreement entered into between **tie** and the Tram Supplier on 18 December 2007;

"**Tram Supply Agreement**" means the agreement awarded by to the Tram Supplier in respect of the Tram Supply Obligations set out in Schedule Part 16 (*Tram Supply Agreement*) as may be amended from time to time with the approval of **tie** in accordance with this Agreement;

"**Tram Supply Protestor Action**" means any action occurring in Edinburgh or whilst undertaking the delivery of trams within Scotland, directed against **tie** or a **tie** Party or the Edinburgh Tram Network which affects the performance of the Tram Supplier's obligations under the Tram Supply Agreement and has not arisen as a result of or been caused by the Tram Supplier's breach of its obligations under the Tram Supply Agreement or otherwise by any action or omission of the Tram Supplier unrelated to the Edinburgh Tram Network;

"**Tram Supply Qualifying Change in Law**" means a Qualifying Change in Law pursuant to the Tram Supply Agreement;

"**Tram Supply Obligations**" means the design, manufacture and supply of the Trams, and supply of documentation, capital spares, special tools and any associated equipment, the provision of services and other obligations incumbent on the Tram Supplier (excluding the Tram Maintenance Services) as described in the Tram Supply Agreement;

"**Tram Type Test**" means any of the Type Tests as defined in Schedule Part 16 (*Tram Supply Agreement*);

"**Transport Edinburgh Limited**" or "**TEL**" means Transport Edinburgh Limited a company incorporated under the Companies Act with registered number SC269639 and having its registered office at 55 Annandale Street, Edinburgh, EH7 4AZ;

"**Transport Scotland**" means an agency within the Scottish Executive Enterprise, Transport and Lifelong Learning Department which was established in January 2006 and having its principal office at Buchanan House, 58 Port Dundas Road, Glasgow, H4 0HF;

"**Transport Services**" means the public passenger transport services to be provided by the Operator on the Edinburgh Tram Network (or any part thereof) in accordance with the DPOFA;

"**TTROs**" means temporary traffic regulation orders;

"**TUPE Information**" has the meaning given in Clause 58.1

"**TVM**" means ticket vending machine (automatic or manual);

"**Underperformance Warning Notice**" means a notice issued to the Infraco by **tie** pursuant to Clause 56.7.2;

"**UTC**" means urban traffic control;

"**Utilities**" means BT, Easynet, NTL, Scottish Water, Scotland Gas Networks, Cable and Wireless, Forth Ports, Ocean Terminal, Scottish Power, Telewest and Thus and their successors, permitted assignees and transferees and "**Utility**" shall be construed accordingly;

"**Utilities Information**" means the data, information, plans, drawings, surveys, reports, renewals programmes, estimates, technical schedules contained in part B of Schedule Part 41 (*Ground Conditions and Utilities Information*) which relate to the existence, location, type, extent, use and serviceability of any utility apparatus or equipment;

"**Utilities Works**" means any works carried out, or to be carried out, by the Utilities or any other public utility company under contract with **tie** relative to the MUDFA Works;

"**Works Breakdown Structure**" or "**WBS**" means the works breakdown structure set out in Schedule Part 2 (*Employer's Requirements*);

"**Work Site**" means any work site within any part of the Infraco Works; and

"**Work Site Completion Certificate**" has the meaning given in paragraph 3.7.1 of part A of Schedule Part 3 (*Code of Construction Practice and Code of Maintenance Practice*).

"**9th May 2008 Agreement**" means the agreement of that date signed by **tie** Limited and both Infraco Members;

2. Unless the context requires otherwise:

2.1 words importing gender include masculine, feminine and neuter;

2.2 the singular includes the plural, and vice versa;

2.3 a reference to any Clause, Sub-Clause or Schedule is, except where it is expressly stated to the contrary, a reference to such Clause, Sub-Clause or Schedule to this Agreement;

2.4 a reference in any Schedule to any part, paragraph or sub-paragraph is, except where it is expressly stated to the contrary, a reference to such part, paragraph or sub-paragraph of that Schedule (as the case may be);

2.5 any reference to this Agreement or to any other document shall include any variation, amendment, or supplement to this Agreement or such other document as expressly permitted under the terms of this Agreement;

2.6 any reference to any enactment, draft enactment, order, regulation or other similar instrument (including any EU instrument) (whether specifically named or not) shall be construed as a reference to the enactment, order, regulation or instrument as amended, replaced, consolidated or re-enacted and shall include any orders, consents, regulations, legally binding codes of practice or subordinate legislation (within the meaning of section 21(1) of the Interpretation Act 1978) made thereunder;

2.7 a reference to a person includes individuals, firms, partnerships, bodies corporate, joint ventures, government departments and any organisation capable of suing or being sued and references to any of the same include the others and their successors and assignees and transferees;

2.8 the *ejusdem generis* rule does not apply and the meaning of general words is not to be restricted by any particular examples preceding or following those general words;

2.9 a reference to a time of day is a reference to the time in Scotland;

2.10 subject to the restrictions imposed by this Agreement on subcontracting, an obligation to do something includes an obligation to procure it to be done;

2.11 an obligation not to do something includes an obligation not to wilfully allow it to be done;

2.12 the word "**including**" means "**including without limitation**";

2.13 a reference to "**consent**" shall mean consent in writing;

2.14 the headings, contents lists and marginal notes in the Agreement shall not be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or of the Agreement;

2.15 The word "**cost**" and words "**direct cost**" or any phrase analogous thereto when used in the Agreement shall include all expenditure properly incurred or to be incurred

whether on or off the Site including overheads, finance and other charges properly allocatable thereto;

2.16 communications which under the Agreement are required to be "'in writing" may be handwritten, typewritten or printed and sent by hand, post, email, facsimile or other means resulting in a permanent record;

2.17 any reference to any Deliverable or course of action being reviewed, approved, agreed, consented to or otherwise processed in accordance with this Agreement, means that the provisions of Schedule Part 14 (*Review Procedure and Design Management Plan*) shall apply except where otherwise agreed in writing by **tie**; and

2.18 references to "traffic management" and "Temporary Traffic Regulation Orders" (TTROs) shall be deemed to include the requirements of EAL, Forth Ports and any other third party relating to road closures and procedures.

3. Where a Party comprises two or more persons:

3.1 any obligations on the part of that party contained or implied in this Agreement are deemed to be joint and several obligations on the part of those persons; and

3.2 references to that party include references to each and any of those persons.

4. The language of this Agreement is English. All 'as built' drawings, system integration documentation and technical data, operating and maintenance instructions and manuals, warranty documentation, Spare Parts information, identification labels, programmes and other written and printed matter required in respect of the Infraco Works and the subsequent operation and maintenance of the Edinburgh Tram Network which are to be provided by the Infraco in accordance with this Agreement, shall be in English.



THIS IS SCHEDULE PART 2 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 2

EMPLOYER'S REQUIREMENTS

Erratum to Version 4

Erratum	Date	Comments
001	24/04/08	Page 48: Section 2.15: The footnote "Damian has already instructed this change." – is to be ignored.
002	24/04/08	Page 90: Section 7: The footnote "The word maximum would allow no channels to be provided and still be compliant! Two channels ok as a minimum." – is to be ignored.
003	24/04/08	Page 147: Section 10.1.5: The reference in the last sentence to Schedule 32 is incorrect. It should read "The Noise and Vibration Policy is included in Schedule Part 29 (*tie and CEC Policies*)".
004	24/04/08	Page 174: Section 12.9 - The reference to Schedule 45 should refer to Schedule Part 40.
005	24/04/08	Page 209: Section 17.1: Last paragraph The reference to Section 32 should read Schedule Part 29. After Project Safety and Quality Interface Document add (40-91-PLA-002).
006	24/04/08	Page 273: Section 23.16.6 - Schedule 7 - Performance Regime is incorrect. This should now refer to Schedule Part 6.
007	24/04/08	Page 609: Section 40.1.2 – Final paragraph Performance payment regime – The reference to Schedule 7. This should now refer to Schedule Part 6.
008	24/04/08	Page 634: Section 40.2.4 Last line Reference to Clause 52 of Infraco should read as Clause 52.20.1.
009	24/04/08	Page 635: Section 40.2.4 Table 93 Fault Category 3 "Edqual Service elements in Schedule 7" should read "Equal Service elements in Schedule Part 6".
010	24/04/08	Page 645: Section 40.2.8 Last set of bullet points at bottom of page Reference to Schedule 7 Performance Measurement System should read as Schedule Part 6.
011	05/05/08	Page 40 Section 2.8 Table 2 reformatted to show entire contents (see attached)
012	05/05/08	Page 41 Section 2.8 Table 3 reformatted to show entire contents (see attached)
013	05/05/08	Page 42 Section 2.8 Table 4 reformatted to show entire contents (see attached)
014	05/05/08	Page 431 Section 29.14 Table 83 see updated version (see attached)
015	05/05/08	Page 610 Section 4.2.2 Table 89 see updated version (see attached)
016	05/05/08	Page 50 Section 2.16(b) 4th bullet - delete "Leith" and replace with "Ocean Terminal or Newhaven according to service"
017	05/05/08	Page 147 Section 10.1.7 - delete "Section 68 of the Edinburgh Tram Line Act 2006" and replace with "Section 63C of the Edinburgh Tram Line Act 2006"
018	05/05/08	Page 169 Section 12.8 Update reference to ISO 10005-1995 to ISO 10005-2005
019	05/05/08	Page 260 Section 23.13.3 - delete "Network" from section heading
020	05/05/08	Page 264 Section 23.14.3 - delete "Network" from section heading
021	05/05/08	Page 266 Section 23.15.3 - delete "Network" from section heading
022	05/05/08	Page 318 Section 24.5 Change reference to Schedule 22 of the Tram Supply Agreement to Schedule 23 of the Tram Supply Agreement
023	05/05/08	Page 318 Section 24.6 3rd paragraph should read "The Trams shall have a key suiting system that provides a logical hierarchy of access to cleaners, inspectors, drivers and maintenance staff. It shall not be part of the general suite but tram specific as detailed in Section 22.2.1 of these Employer's Requirements."

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Erratum	Date	Comments
024	05/05/08	Page 622 Section 40.2.2 Table 92 Structures SO3 and SO4 - delete "(if CEC own it)" from the comments column
025	05/05/08	Page 625 Section 40.2.2 Table 92 Structures S20 to S31 - insert "the Operator is responsible for cleaning and graffiti removal" to the comments column
026	05/05/08	Page 627 Section 40.2.2 Table 92 Retaining Walls W03 to W19 - insert "the Operator is responsible for cleaning and graffiti removal" to the comments column
027	05/05/08	Page 632 Section 40.2.4 Final paragraph headed "**Further Maintenance Activities"** - delete bullet "removal of graffiti" and bullet "cleaning"
028	05/05/08	Page 644 Section 40.2.8 Under heading "Reporting Period Review", 4th bullet relating to maintenance report, sub-bullets 1 and 2 - delete "including cleaning"
029	05/05/08	Page 646 Section 40.2.10 3rd paragraph - delete "operational phase" and replace with "Term"
030	05/05/08	Page 652 Section 40.2.19 - delete section and insert "Not used"
031	05/05/08	Page 652 Section 40.2.20 - delete bullets 1 to 4, and 6
032	05/05/08	Page 662 Section 40.3.9 1st paragraph - delete "will be established in detail during the tender process" and replace with "in the Tram Maintenance Agreement"
033	05/05/08	Page 665 Section 40.4.1 9th paragraph 3rd sentence - replace with "The Edinburgh Tram Network design shall be selected such that all equipment/systems used in the design shall continue to be available for the design life specified and that the Infraco shall give tie a minimum of 12 months notice where any supplier intends to cease supply of any component. The Infraco shall recommend a strategy for managing such obsolescence and effect replacement of such components where these fail."
034	05/05/08	Page 672 Section 40.5.2 6th bullet - amend to read "evidence of product whole life cycle experience to date in other service use"
035	05/05/08	Appendix 1 – ET Brand Guidelines as referred to in Section 5 (see attached)
036	13/05/08	Page 182 Section 12.12 - Add new sentence to paragraph 3 "The temporary traffic diversion modelling and assessment required to support the Infraco's Traffic Management Plan (TMP) and Work Site Strategy Plan (WSSP) shall be provided by tie (via traffic management consultants) during the Construction Works"
037	13/05/08	40.2.1 - 3rd sentence, delete "Pre-operational Period" and insert "Sectional Completion"
038	13/05/08	Table 90 - Roads, Defect Repairs, Tram Stops - insert "cleaning, graffiti and waste removal by CEC" in the comments column.
039	13/05/08	Table 90 - Signals, Tram Detection Loops - insert "2 hours (22:01-06:00)" in the minimum response time column.
040	13/05/08	Table 91 - Defect Reporting, Tram Stops - insert "cleaning, graffiti and waste removal shall be carried out by the Operator" in the comments column.
041	13/05/08	Table 91 - Removal of Obstructions on Tramway and Platform - insert "2 hours (22:01-06:00)" in the minimum response time column.
042	13/05/08	Table 94 - Pest Control - delete "cleaning of bird's droppings and" from the **tie** specific requirements box.

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Employer's Requirements

Erratum 011

Table 2 (Page 40 Section 2.8)

Network / Phasing	Service frequency commencing at:	Monday - Friday (trams per hour)					
		first tram 06:00	06:45	07:00	07:20	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Network / Phasing	Service frequency commencing at:	Saturday (trams per hour)					
		first tram 06:00	06:45	07:30	07:50	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Network / Phasing	Service frequency commencing at:	Sunday (trams per hour)					
		first tram 07:00	07:45	08:00	08:20	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Notes:

[a] from approx. 23:15 Trams run from the Airport - City Centre only

[b] from approx. 23:15 Trams run from Granton - City Centre only

[c] from approx. 23:15 Trams run from Newhaven - Haymarket continuing in service on TL2 to Gyle

Employer's Requirements

Erratum 012

Table 3 (Page 41 Section 2.8)

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8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario

Networking (Phasing) and Service Frequency commencing at:		06:00	06:45	07:00	07:20	07:45	09:45	15:45	19:00	19:45	23:15
1a	Airport to Ocean Terminal	0	6	8	8	8	6	6	8	6	6a
1a	Ocean Terminal to Airport	6	6	8	8	8	6	6	8	6	6
1a	Haymarket to Newhaven	0		6	8	8	6	6	8	6	6
1a	Newhaven to Haymarket	0		0	6	8	6	6	8d	6	6
1b	Airport to Ocean Terminal	0	6	8		8	6	6	8	6	6a
1b	Ocean Terminal to Airport	6	6	8		8	6	6	8	6	6
1b	Granton to Haymarket	0	6	8		8	6	6	8	6	6 b
1b	Haymarket to Granton	6	6	8		8	6	6	8	6	6c

Networking (Phasing) andService Frequency commencing at:		Saturday (trams per hour) first tram 06:00	06:45	07:30	07:50	08:15	18:30	18:50	19:15	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	8		8	8	6	6a	0
1a	Ocean Terminal to Airport	6	6	6	8		8	8	6	6	0
1a	Haymarket to Newhaven	0		6	8		8	8	6	6	0
1a	Newhaven to Haymarket	0		0	6		8	8d	6	6	0
1b	Airport to Ocean Terminal	0	6	6	8	8	8		6	6a	0
1b	Ocean Terminal to Airport	6	6	6	8	8	8		6	6	0
1b	Granton to Haymarket	0	6	6	8	8	8		6	6b	0
1b	Haymarket to Granton	6	6	6	6	8	8		6	6c	0

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Networking (Phasing) andService Frequency commencing at:		Sunday (trams per hour)									
		first tram 07:00	07:45	07:50	08:00	08:45	16:00	18:20	18:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6		6	6		6a	0
1a	Ocean Terminal to Airport	6	6	6	6		6	6		6	0
1a	Haymarket to Newhaven	0		6	6		6	6			0
1a	Newhaven to Haymarket	0		0	6		6	6d			0
1b	Airport to Ocean Terminal	0	6		6	6	6		6	6a	0
1b	Ocean Terminal to Airport	6	6		6	6	6		6	6	0
1b	Granton to Haymarket	0	6		6	6	6		6	6b	0
1b	Haymarket to Granton	6	6		6	6	6		6	6c	0

Notes:
a) from approx 23:15 trams run from Airport - St Andrew Sq only
b) from approx 23:15 trams run from Granton - St Andrew Sq only
c) from approx 23:15 Granton trams run from Newhaven - Haymarket continuing in service on to Gyle
d) from approx 19:20 (18:50 Saturdays and 18:20 Sundays) Haymarket trams running from Newhaven - Haymarket continue in service to Gyle

Note: The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Employer's Requirements

Erratum 013

Table 4 (Page 42 Section 2.8)

USB00000033_0009

Phase	Service Frequency commencing at:	Saturday (trams per hour) First tram 06:00	06:45	07:30	07:50	23:15	Last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6a	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6	6	6	6a	0
1b	Ocean Terminal to Airport	6	6	6	6	6	0
1b	Granton to Newhaven	0	6	6	6	6b	0
1b	Newhaven to Granton	6	6	6	6	6c	0

Employer's Requirements

Erratum 014

Table 83 (Page 431 Section 29.14)

Table 83 - Depot Plant and Equipment to be Provided (updated 020508)

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
1		Cleaning Equipment										
	1.1	Tram Cleaning Equipment	Equipment for cleaning of tram interiors	110V Industrial vacuum cleaning equipment, ≥ 2kW power Equipment to allow removal Floor polishing equipment	P	Generally used in stabling areas However can be used throughout the Depot	T	O	O	O	O	6
	1.2	Tram pressure washer	Industrial washer for general tram cleaning within the Depot including bogie washing	Self powered Hot water/steam - self heating Pressure variable up to ≥200 bar Flow rate ≥12 l/min Lance and hose ≥10m Detergents compatible with Tram external finishes	M	Throughout Depot	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.3	Infraco pressure washer	Removal Removal of fly posters General cleaning	Features as per Tram pressure washer Mobile towable bowser with capacity for up to one shift of cleaning Infraco to ensure interchangability with tram pressure washer Readily transportable on back of road-rail and other road vehicles	M	Across the ETN	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.4	Tram Washing Plant	Fixed plant for cleaning of Tram exterior	Unidirectional >15 tph continuously Minimised water consumption, maximised water recirculation controllable and monitored from Control Centre via SCADA system Self contained Pre-wet One pair application brushes Automatic end wash Two pair water wash brushes Dryer Operates from -5°C ambient external temperature within shelter Final details TBD with tram supplier ≥70% water recycling	F	Alongside main workshop	I	O	O	O	O	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Backflow prevention devices shall be installed. Treatment of wastewater to meet appropriate standards prior to connecting to site drainage system shall be provided.								
	1.5	Rail Groove Cleaning Equipment	P-way cleaning	Vacuum equipment to remove detritus/debris from grooved track including drain boxes and points Able to clean drains and gullies employing water jets Transportable on road/rail vehicle, lifted with crane or fork lift truck	M	Across the ETN	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Self powered for full shift Easy collection/disposal of detritus/debris								
	1.6	Parts washer	Infrastructure/Tram component cleaning & degreasing in dirty workshop	Able to wash components ≤100kg, ≤750mm diameter	F	Within dirty workshop	I	I/T	I	I	User	1
	1.7	Floor scrubber	Depot floor cleaning	Industrial vacuum/brush scrubber equipment Compatible with floor finishes	M	Within Depot building	T	T	T	T	T	1
2		Mechanical Handling										
	2.1	Shunter	Manouveuring Trams within workshop	Battery powered Road/rail capability Capable of towing/propelling single Trams Speed up to 3 km/h Local and remote control	M	Throughout Depot tracks Road capability to move between tracks on	T	O/T	I/T	O	User	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Charging facilities Coupler at each end		hardstanding						
	2.2	Tram lifting system and stands	Lifting Trams to allow routine maintenance and removal of bogie(s)	Fixed underfloor system providing flush floor when not in use. Ability to lift fully functional, unladen tram. Synchronised lift from single control panel. Ability to stop and lock lift at any vertical positionInterlocking to protect Tram in event of system/component failure. Manually positioned stands to be provided Interlocking with OLE if required.	F	Main workshop	I	T	T	T	T	1 set

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.3	Fixed high level access platforms	To allow access to all equipment mounted on Tram roof	Capable of providing access to all roof mounted equipment on tram Decking to prevent tools or small to components falling through Handrails and toeboards to prevent personnel/material falling Access/egress gates interlocked with OLE End protection	F	Main workshop	I	T	I	T	T	2 sets
	2.4	Overhead crane	Bridge type crane spanning 2 roads within the workshop to allow all material within main workshop to be transported up to and including size/weight of motor bogie	≥6.3 tonne capacity Vertical clearance <960 mm from hook (fully raised) to top of crane Traverses below OLE Interlocked with OLE Remote control using hand held device	F	Main workshop	I	T/I	T	T	User	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Multi-speed faciltiy - lift, traverse and travel Long and cross travel to cover all areas over the two roads								
	2.5	Mobile crane	Facilitate removal of miscellaneous equipment including bogie components within the dirty workshop	≥2t capacity Powered operation	M	Throughout workshops	T	T/I	T	T	Us er	1
	2.6	Bogie workstands	To allow dismounted bogies to be maintained	Allows bogie to be manoeuvred along the stub track in the dirty workshop Wheel locks Capable of supporting both trailer and motor bogie	M	Dirty workshop	T	T	T	T	T	1
	2.7	Other tram equipment stands	Various stands to allow items of equipment to be stored and readily maintained when dismounted from the Tram	Infraco to propose depending on tram design Expected to include stands for doors,	M	Throughout Depot	T	T	T	T	T	

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				windows, body panels etc…								
	2.8	Accommodation bogies	To allow Trams to be moved within workshop once bogies have been removed or the Tram has been split at any articulation	Allows Tram to be manoeuvred throughout the depot once any combination of bogies has been replaced Allows entire tram to be manoeuvred throughout the depot once any articulation has been split	M	Throughout Depot	T	T	T	T	T	
	2.9	Fork lift truck	Lifting and transporting miscellaneous equipment	Battery powered Charging facilities Road wheels >3 t lifting capacity Drum handling equipment Crane arm Capable of accessing	M	Throughout the Depot but limited to hard standing areas when outside	T & I	T/I	T & /I	T & I	User	1 plus 1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				all shelving and racking in stores- Infraco to demonstrate								
	2.10	Pallet truck	Lifting & Transporting equipment particularly in stores	Manually manoeuvred, hydraulic lifting the Infraco to propose requirements. Infraco to provide integrated solution	M	Throughout the Depot but limited to hard standing areas when outside	I	T/I	T/I	T	Us er	The Infraco to propose
	2.11	Hand trolleys	Transporting tools and spares	Unpowered the Infraco to propose requirements. Infraco to provide integrated solution	M	Throughout the Depot but limited to hard standing areas when outside	I	T/I	T/I	T	Us er	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.12	Infraco lifting slings	General slings for lifting infrastructure heavy components on system and in Depot building	Infraco to propose. Stand for storage	P	Use on system infrastructur e	I	I	I	I	I	The Infraco to propose
	2.13	Tram lifting slings	Specific lifting gear to allow all equipment to be removed and replaced.	Raised hook on overhead crane can be no more than 5390 mm ARL the Infraco to propose Stand for storage	M	Use in Depot building only	T	T	T	T	T	Tramco to propose
	2.14	Windscreen/window removal equipment	For use in replacing tram windscreens and side windows	Mobile stand capable to being used to access both windscreen and side windows Electrically powered vacuum beam with suckers adapted to windscreen design Audio/visual alarm in the event of suction loss	M	Use in Depot building only	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.15	Re-railing equipment	For use in re-railing trams out on the System	Variety of jacks/beams/slides to be proposed by the Infraco Airbags Slew locking devices Capable of being readily transported on the road/rail vehicle	M	Used any where on system including Tramstops	T	T	T	T	T	1 set
	2.15	Stop boards	To indicate the presence of equipment/personnel/trams on the tracks	The Infraco to propose requirements. Infraco to develop integrated solution	P	Throughout System	I	T/I	I	T/I	User	≥20
3		Workshop & Stores Furniture										
	3.1	Shelving and racking	Storage of spares and other material	Heavy duty The Infraco to propose requirements. The Infraco to develop integrated solution	F	Stores	I	T/I	I	T/I	User	The Infraco to propose
	3.2	Tram staging	for Tram inspections/repairs	The Infraco to propose any	M	Used within Depot	T	T	T	T	T	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				additional staging required		building						
	3.3	General staging	For infrastructure inspections/repairs	The Infraco to propose any additional staging required	M	Across Edinburgh Tram Network	I	I	I	I	I	The Infraco to propose
	3.4	Shelving	Storage of minor items/documents	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	Us er	The Infraco to propose
	3.5	Workbenches	Equipment maintenance	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	Us er	The Infraco to propose
	3.6	Cupboards	Storage of minor items/documents	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	Us er	The Infraco to propose
	3.7	COSHH cupboard	Storage of COSHH items	The Infraco to propose requirements. The	F	Dirty workshop	I	T/I	I	T/I	use r	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Infraco to develop integrated solution								
	3.8	Workshop stools	Personnel comfort when working	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	T/I	T/I	Us er	The Infraco to propose
4		Fixed Plant										
	4.1	Air conditioning maintenance equipment	Specialist tools for filling/emptying refrigerant	The Infraco to propose	F	Anywhere in Depot building	T/I	T/I	T/I	T/I	T/I	The Infraco to propose
	4.2	Tyre replacement equipment	Specialist tools for tyre splitting/removal/balancing /bearing replacement	The Infraco to propose	F	Dirty workshop	T	T	T	T	T	1
	4.3	Underfloor wheel lathe	In-situ reprofiling of Tram tyres	Capable of producing a range of wheel profiles. Tolerances to be agreed between the Infraco Swarf conveyed to skip for removal by means of forklift truck capable of turning all wheels on one Tram within	F	Within Depot building.	I	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				eight hour shift								
	4.4	Sand Plant	Refilling of Tram sanding equipment	Minimum silo capacity 30 tonnes Capable of receiving sand delivery directly from road vehicle Allows Tram driver to fill an empty tram within 5 minutes Rate of fill to be sustainable for 30 minutes. In no circumstances shall the interval between the filling of two Trams exceed 10 minutes The physical condition of the sand shall not deteriorate when stored Sand deliveries to a	F	Dedicated facility	T	O	O	O	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Tram shall stop automatically when the tram sand box is full Sand filling nozzles to be compatible with the sand filling inlets on the trams Signal interlocking to inhibit the movement of a tram if the sand filling nozzles are not returned to their correct storage position.								
	4.5	Machine tools	General machine tools required for maintenance	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Dirty workshop	I	T/I	T/I	T/I	User	The Infraco to propose
	4.6	Paint booth	Respraying of removable Tram panels	For use with water based paints integrated compressor	F	Outside workshop	T	T/I	T/I	T	User	1
	4.7	Pantograph	to calibrates and align	The Infraco to	F	Throughout	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
		maintenance & load test jig	tram pantograph off Tram roof	propose		workshops						
	4.8	Suspension setting equipment	To allow suspension to be set/shimmed without using tram lift	The Infraco to propose	M	Throughout workshops	T	T	T	T	T	1
	4.9	Diesel generator	Back up power source	Capable of connection to the depot LV switchboard and other plant requiring an external energy source. Capable of providing at least three day continuous operation.	M	Across network	*	I, T & O	I*	I		*To be rented by the Operator if and when required.
5		Hand & Mobile Tools										
	5.1	Infrastructure tools	Hand tools	The Infraco to propose	P	Across ETN	I	I	I	I	I	The Infraco to propose
	5.2	Tram tools	Hand tools	The Infraco to propose	P	Across ETN	T	T	T	T	T	Tramco to propose
6		Welding Shop Equipment										
	6.1	Ferrous welding equipment	General infrastructure repairs	The Infraco to propose requirements. Infraco	F	Dirty workshop	I	T/I	I	T/I	Us er	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				to develop integrated solution								
	6.2	Aluminium welding equipment	Specialist Tram and Tram shelter repairs	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Dirty workshop	I	T/I	I	T/I	Us er	The Infraco to propose
7		Battery Shop Equipment										
	7.1	Tram battery charger	To recharge Tram Batteries	The Infraco to propose	P	Battery room	T	T	T	T	T	The Infraco to propose
	7.2	Infrastructure battery chargers	To recharge various batteries used in power supply, control and comms equipment	The Infraco to propose and develop solution compatible with tram battery charger	P	Battery room	I	T	T	T	T	The Infraco to propose
8		Instrumentation and Test Equipment										
	8.1	Tram test equipment	To allow testing of measurement and testing of tram equipment	The Infraco to propose. Note any overlap with "Special Tools" to be highlighted. As a minimum, proposal to	M/P	The Infraco to propose	T	T	T	T	T	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				include; headlight tester, tools to allow event recorder to be downloaded and interrogated, tools to allow CCTV systems to be downloaded and interrogated, tools to allow PA and PID announcements to be re-configured.								
	8.2	Infrastructure and Fixed systems test equipment	To allow measurement and testing of infrastructure and fixed systems	The Infraco to propose. Note any overlap with "Special Tools" to be highlighted as a minimum, proposal to include; OLE height and stagger gauge, stray current data loggers, noise measurement equipment, ride measurement equipment, point	M/P	The Infraco to propose	I	I	I	I	I	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				setting detection equipment, ≥3 sets of live line testing equipment								
9		Infrastructure Maintenance Equipment										
	9.1	Portable P&C grinders	To dress points and crossings	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.2	Track welding equipment	to build up profiles/replace sections of track	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.3	Portable tamping equipment	To build up track ballast to realign track	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.3	Portable lighting equipment	To illuminate work/collision sites	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.4	Portable generators	To power site tools/lights	The Infraco to propose	P	On Site	I	I	I	I	I	2
	9.5	Track measuring Equipment	To allow track line and levels to be measured	The Infraco to propose	P	On site	I	I	I	I	I	1 set
10		Road Vehicles										

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	10.1	Road - rail vehicle	To move about the system carrying mobile equipment and personnel	Able to operate on UK roads Able to operate on all parts of the ETN To be equipped with demountable ≥2 man-basket to enable OLE inspection throughout the ETN Capable of towing a tram including ability to apply tram brakes from cab of road-rail vehicle Capable of having snow plough attached in both road and rail mode Crane with capacity ≥6t and a reach (reduced capacity) of at least 4m. Able to transport other equipment items as set out elsewhere in	M	Mobile throughout ETN and road network	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				this list Able to transport ≥3 personnel in cab Payload capability ≥10t This will make it a requirement that the driver has a LGV driving license. Powered winch with ≥8t pulling capacity								
	10.2	Other road vehicles	Miscellaneous vehicles to be proposed by Infraco	The Infraco to propose	M	Throughout road network	I	I	I	I	I	The Infraco to propose
	10.3	Road/rail trailer	Trailer with large man lift for OLE inspection/repairs	Capable of being towed to site by road/rail vehicle or truck	M	Throughout road network	I	I	I	I	I	1

Employer's Requirements

Erratum 015

Table 89 (Page 610 Section 4.2.2)

Table 89 – Infrastructure and Equipment Responsibilities Allocation Matrix
(updated 020508)

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Tram Stop Structure																
Platform surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Platform Inclined Approach		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Canopy		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Inside surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Internal Roof surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External Roof surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Integral Lighting		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Internal seating		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Stop Furnishings																
Stop Name Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Static Information Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Guard Rails/Barriers (as applicable)		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Lighting Columns		N/A	N/A	N/A	✗	✗	✗	✓	✗	✗	✓	✗	✗	✗	✗	✓
Lighting Lanterns		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Litter Bins		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External seating		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Platform Edge White Line		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Advertising Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Stop Equipment																
CCTV Cameras		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Public Address		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓

Loudspeakers																
Hearing Loops		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Passenger Information Displays		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Passenger Alarm/Help points		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Ticket Vending Machines (maintained & serviced by TEL)		N/A	N/A	N/A	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓
Drainage (Interface defined in Table 93)		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Trackside Equipments																
Stop Equipment Cabinets		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Stop Equipment Cabinet Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Traction Isolator Cabinets		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Traction Isolator Cabinet Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Point Control Cabinets		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Point Control Cabinet Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Point Heater Cabinets, Point Heaters & Controls		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Road Junction Cabinets		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗
Road Junction Cabinet Equipment		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗
Point Machines (including Manual Control)		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Contact Wire & Supports		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Poles		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Pole mounted Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Wall Fixings		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Wall fixed Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Tram Signal Heads (Roadside)		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✓

USB00000033_0036

Tram Signal Posts (Trackside)		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Signals Posts		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Detector Loops		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Lighting on OLE Masts		N/A	N/A	N/A	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trackside cable ducts		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trackside cables		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Cable drawpits		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Structures (Bridges, Retaining Walls etc)																
Over Bridges See Table 95 for split		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Under bridges See Table 95 for split		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Retaining walls		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Misc Structures		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Swept Path		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Swept Path Markings		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Track																
Trackwork		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Points & Crossings		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Track Drainage		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Field' Stray Current Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Sub Stations																
Sub Station Buildings		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Sub Station Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Sub Station Compounds		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Sub Station Parking Facilities		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Stray Current Monitoring Points		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Stray Current Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Earthing Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trams																
Free issue' tram mounted equipments		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Trams		N/A	N/A	N/A	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✓

Tram saloon & Drivers cabs		N/A	N/A	N/A	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✓
Radio																
Portable radios		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Radio Base stations		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Landscaping																
Soft landscaping		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Hard Landscaping		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓

Floor	Room No.	Description	User Competence Assessor	Used by			Cleaned by			Maintained by			Access Controlled by		
				Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**
Stores, Workshops and Maintenance Area															
Ground Floor Level		Stores Office Centrally located	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✔	✘
		Heavy Store (Infraco)		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Heavy store (Tramco)		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Visitors Entrance Hall	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
		Workshop Cleaners Room	n.a	✔	✔	✘	✘	✔	✘	✔	✘	✘	✔	✔	✘
		Light Store (Infraco)		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Light Store (Tramco)		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Infrastructure Workshop		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Dirty Workshop / Machine Shop		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Clean Workshop (Infraco)		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Clean workshop (Tramco)		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Lobby	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Male Toilets	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Male Showers	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Female Toilets	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Female Showers	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Staff Corridor	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✘
		Infrastructure Admin	n.a	✔	✘	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Maintenance (Tramco) Admin	n.a	✘	✔	✘	✘	✘	✔	✔	✘	✘	✘	✔	✘
		First Aid	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
		Switchroom		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Infrastructure Manager	n.a	✔	✘	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Maintenance (Tramco) Manager	n.a	✘	✔	✘	✘	✘	✔	✔	✘	✘	✘	✔	✘
		Store Room (Cleaners?)	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✘	✘	✘
		Staff Entrance Hall	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
		Drying Room	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✔	✘
		Tram Batteries		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Equipment Room		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		UPS Room		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘

Floor	Room No.	Description	User Competence Assessor	Used by			Cleaned by			Maintained by			Access Controlled by		
				Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**
		Compressor Room - Air tools		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Tram Maintenance Area		✘	✔	✔	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Maintenance Area Transit Zone		✔	✔	✔	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Inspection Pits		✘	✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘
First Floor office accommodation			n.a	✘	✘	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
Furnishings - Used, Cleaned, Maintained and Controlled as appropriate															
Chairs, Desks, Tables, Filing cabinets etc			**As Appropriate**	✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
Kitchen and Catering Equipment				✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
Reception Desk & Furnishings				✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
Control Room Furnishings				✘	✘	✔	✘	✘	✔	✔	✘	✔	✘	✘	✔
Lockers, Coat Rails etc				✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
Training Room furnishings (Projector, Screen etc)				✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
External															
Depot Yard				✘	✘	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
Depot Stabling Area				✘	✘	✔	✔	✔	✔	✔	✘	✘	✘	✘	✔
Electrical Sub Station				✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
Power Energy Building (Electric, Gas etc)				✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
Depot Car Park				✘	✘	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Miscellaneous																
Communication & Control links		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓

	LEGEND
	Provided by Tram Maintainer
	Provided by the Infraco
✓	Responsible
✗	Not Responsible

Employer's Requirements

Erratum 035

Appendix 1 – ET Brand Guidelines



BRAND GUIDELINES JANUARY 2008

Edinburgh Trams

USB0000033_0043

Edinburgh Trams

02 Forward

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Logo usage
Exclusion zone
Colours

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Marketing
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Web site
Pictograms

20 Section 3 The Tram
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Interior design

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Signs
Colours

25 Section 5 Uniforms

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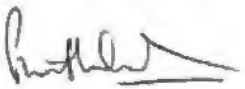
Welcome to the Edinburgh Trams brand.

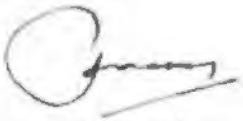
The Edinburgh Trams brand plays a crucial part in our communications with our customers and in creating a strong, memorable and recognisable image for the system. The brand has been specifically developed to sit alongside Lothian Buses as part of a co-ordinated presentation of public transport in Edinburgh.
For the strategy to succeed it is vital that all those involved in the delivery and service of the system adhere to the guidelines contained in this manual.
This will ensure that the Edinburgh Trams brand remains coherent and consistent. It is a well known fact that a well managed and consistently implemented brand helps inspire public confidence and trust.
By working within these guidelines you will help contribute to that process.

Phil Wheeler



Convener, Transport, Infrastructure and Environment
City of Edinburgh Council





Willie Gallaher
Chairman tie

David Mackay
Chairman TEL

USB00000033_0045

Introduction

The elements and architecture of the Edinburgh Trams brand draw heavily from the Lothian Buses identity. This is to reinforce the strategy that has been adopted to create a genuinely integrated public transport system for Edinburgh.

Colours, typography and graphics are consistent between the two modes and are immediately recognisable as 'family members'.

The contents of this manual define how the branding must be implemented if the integrity of the visual relationship between the two modes is to be maintained.

In essence the branding is clean, simple and easy to understand - precisely the values the tram service provides.



USB00000033_0046

Glossary

The key terms used in this document are as follows:

The Mark

A combination of the harlequins, the logotype and the red block.



The Logotype

The text of Edinburgh Trams set in Swiss 721BT. The logotype is used with the harlequins and the block in fixed relationships to form marks.



The Exclusion Zone

The minimum area around marks or logotypes that must be kept free of other graphic elements. This is to ensure that they are reproduced clearly and legibly without interference from other visual devices.



USB00000033_0047

Guide to using the Mark

This page describes how the mark and the red block should be used.

Some simple rules are:

1. Never extend the red block unless the extended width of the red block to the left is more than 2 times the width of the mark and the extensions bleed off the page or media as illustrated by the header above. The extension to the right edge of the media should be half the width of the mark.

2. The red block should never be reduced in height when part of the mark alone but can be extended in height when the width is extended subject to rule 1.

3. The height should only be extended if the block is to bleed off the page or media.



USB00000033_0048

Colour Glossary

To assist those who are involved in reproducing the Edinburgh Trams identity we have described here the primary specifications for print, screen and paint.

Print

PMS
This is short for the Pantone Matching System. This system is used to specify proprietary 'spot' colours. Spot colours are individually mixed for printing.

The letter 'C' after the colour number shows a colour's appearance on coated paper stock. The letter 'U' after the number shows a colour's appearance on uncoated paper stock.

CMYK
These initials represent the colours used in the four colour printing process: Cyan, Magenta, Yellow and Black (Kohl). Different combinations and percentages of these four colours are used to make matches to the 'spot' colours.

Screen

RGB
This is short for Red, Green, Blue the primary colours of light. RGB is used for reproduction on screens and electronic display systems.

Web
To make colours that can be reproduced on internet and intranet sites, Web safe colours should be specified. Web safe colours provide a greater degree of consistency than RGB colours when there is no control over the equipment used to view the site.

Paint

NCS
This is short for Natural Color System. NCS provides a wide range of colour specifications applicable to paints and other materials.

Other systems such as RAL and British Standard BS4800 have a limited number of Edinburgh Trams colour matches. Approval needs to be sought before using these systems.

USB00000033_0049

Typography

We have two fonts: Humanist 521BT for general use and Swiss 721 BT which is only used to create the Logotype.

Only Roman, Bold and Light versions of Humanist 521 should be used with italic versions as appropriate.

Humanist 521 BT

Roman **Aa**

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

Bold **Aa**

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

Light Aa

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

USB00000033_0050

Mark usage

The mark shown here is the only acceptable version to be used.

No other colours should be used and the mark should never be stretched or the proportions altered in any way.



USB00000033_0051

Mark usage

When using a single colour mark the version on the right shows how to reverse out of white while the version on the left demonstrates reversing from black or another colour.





USB00000033_0052

Mark usage

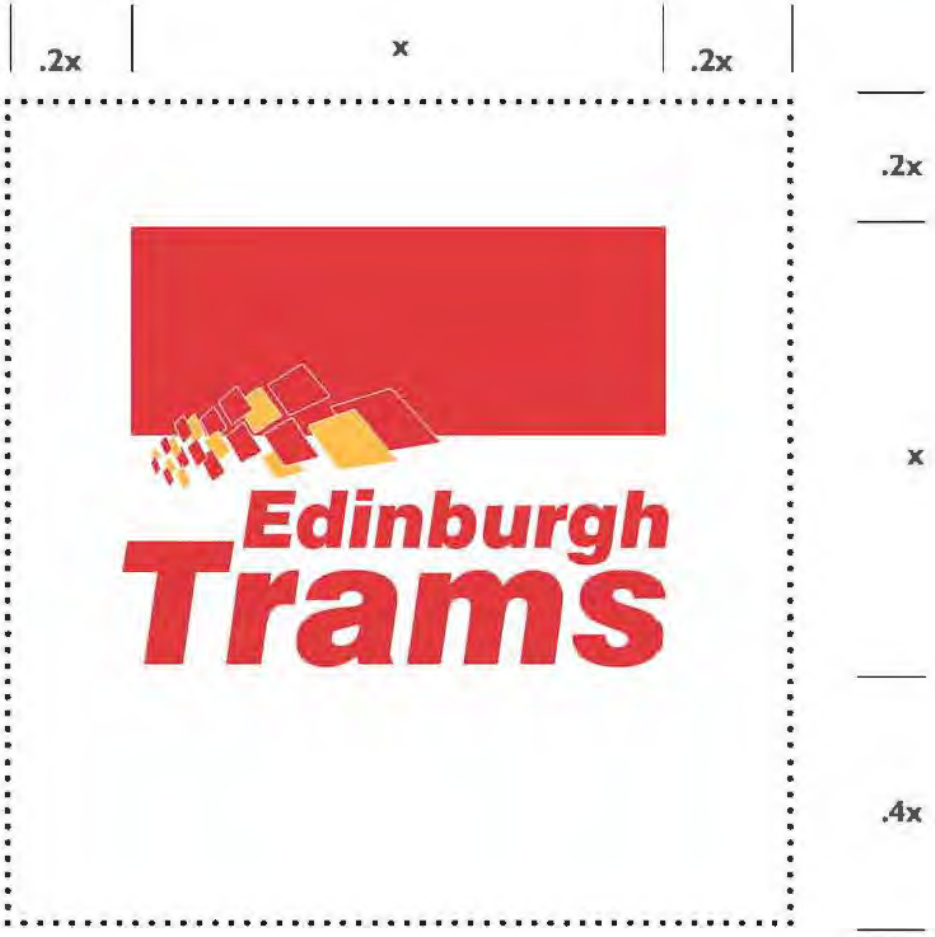
Another option when using a single colour mark, for example when positioned over an image as illustrated here, is to use a transparent mark.



USB00000033_0053

Exclusion Zone

The dotted line indicates the zone into which no other graphic devices should be placed.



USB0000033_0054

Colours

Three core colours make up the brand palette:
Red
Gold
Madder

In certain circumstances gold metallic ink in the form of PMS 873 can be used.

Print

Red	Gold	Madder
PMS 186	PMS 124	PMS 188
C 0% M 100% Y 81% K 4%	C 0% M 28% Y 100% K 6%	C 0% M 97% Y 100% K 50%

Screen

R 227 G 25 B 55	R 238 G 178 B 17	R 139 G 15 B 4

Web

R 227 G 25 B 55	R 238 G 178 B 17	R 139 G 15 B 4

USB00000033_0055

Stationery

Letterheads should follow the layout and formatting shown here. Guidance on fonts is provided in the typography section.



Edinburgh Trams

Mr G. McCluskey
19 Williams Street
Edinburgh
EH12 9QT

Edinburgh Trams Limited
City Point
Haymarket Terrace
Edinburgh
EH1 7YU

T : 0131 226 7896
F : 0131 226 7897

24th November 2007

Our ref: ETL/1234

Dear Mr McCluskey

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exercitation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat. Duis autem vel eum iriure dolor in hendrerit in vulputatevelit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi.

Yours sincerely

Andrew McKinnon

Operations Director

USB00000033_0056

Stationery

Business cards follow the same format as the letterhead.



USB0000033_0057

Edinburgh Trams

Marketing

The examples we show here illustrate the basic image and values the Edinburgh Tram brand should convey:

Clean

Simple

Easily understood



USB00000033_0058

Passenger information

Again information should follow the 3 basic rules:

Clean

Simple

Easily understood

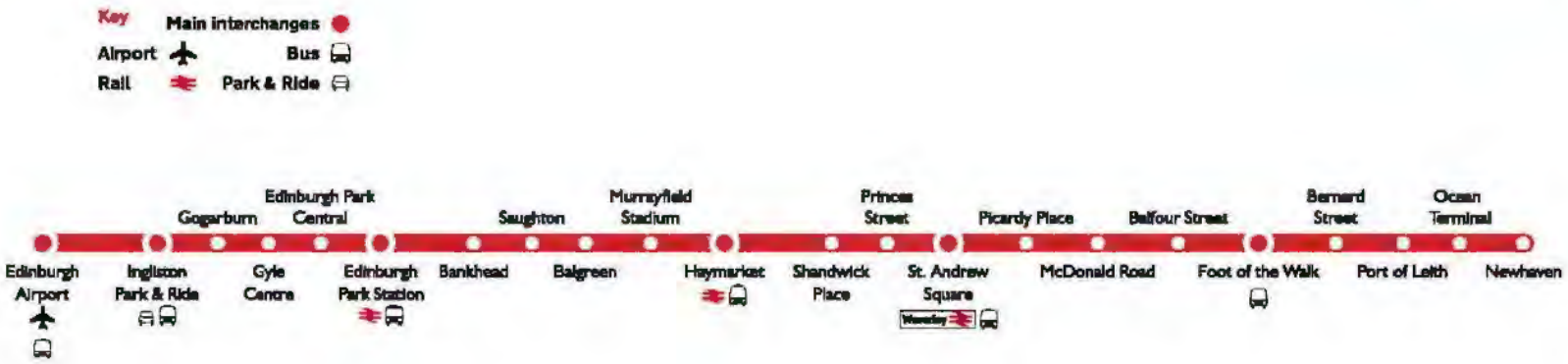


USB00000033_0059

Edinburgh Trams

Passenger information

Route map



USB0000033_0060

Web site

The web site should share the same layout and 'feel' as its sister site for Lothian Buses.

Consistency in navigation and layout help to reinforce the integrated transport concept.



USB00000033_0061

Edinburgh Trams

Pictograms



Informational pictograms



Statutory pictograms



Directional pictograms



USB0000033_0062

External design

Reinforcing the strategy of creating a visually integrated public transport system for Edinburgh, the tram livery draws from the Lothian Bus livery. Some modifications have been made in order to satisfy the Rail Vehicle Accessibility Regulations (RVAR) such as the red door colour that provides the required contrast of the doors from the tram body.

Colours follow the Brand palette with the exception of the 'gold' where, on the livery only, a gold vinyl is to be used as on Lothian Buses and not by using the specifications in this document.

Four designated advertising zones have been identified to control the revenue generating advertising presence that the business plan requires. Two trams have been allocated for 'all over' advertising and they will be subject to a strict, separate, design protocol.





USB00000033_0063

Interior

As with the exterior the tram interior will use some of the same colours and finishes to be found on the buses. These will have to be adapted to ensure compliance with RVAR as there are strict technical guidelines on issues such as colour contrast based on Light Reflection Factors which affects all the visible surfaces within the vehicle. Compliance with RVAR is a legal requirement and the end result will be determined in consultation with the DfT Mobility Unit.

The image opposite is an early iteration of the proposed tram interior and will be developed through the process described above.

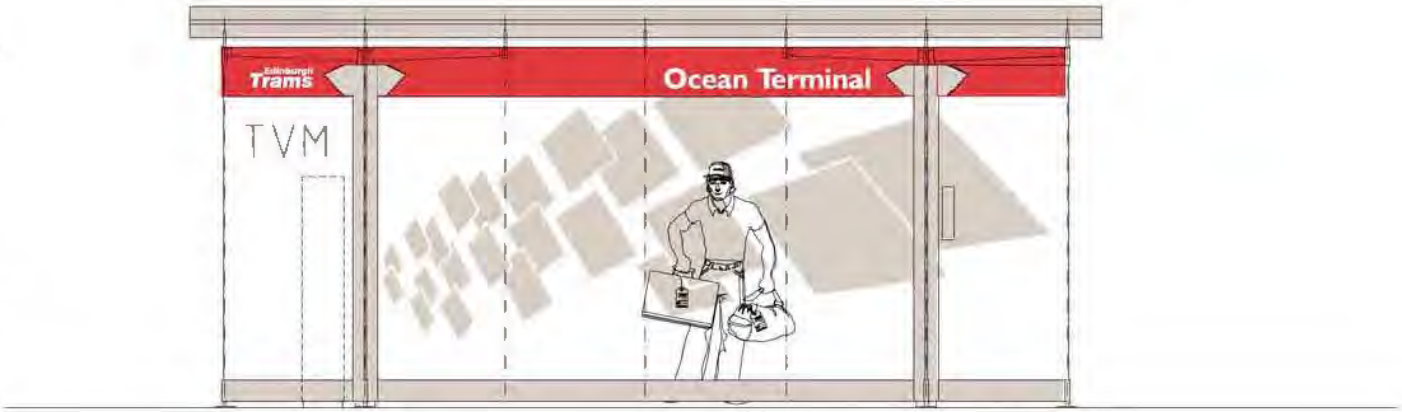


USB00000033_0064

Tram stops

The finishes of the tram stop elements are generally of a neutral colouration.
The introduction of the Edinburgh Trams' key red as a highlight colour should therefore be used sparingly and appropriately as indicated here. The red has been introduced as an integral, functioning part of the shelter structure and serves to carry the high level stop sign. Elsewhere the red is introduced as signage or through information points.

Subtle use of the harlequins can be made on such areas as glazing manifestation as illustrated here. A further example of using the branding in a functional, rather than superficial, way.



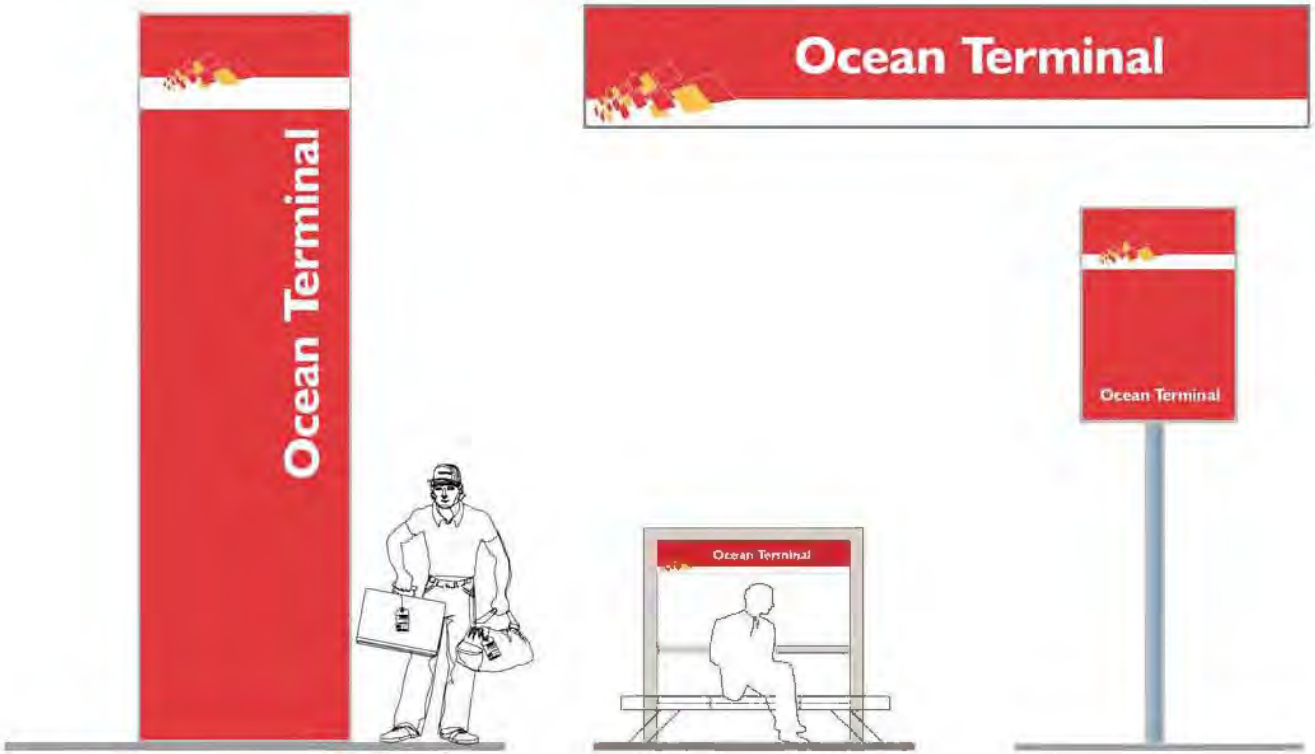


USB00000033_0065

Signage

The signage concept has been conceived to create strong, highly visible and legible points of reference and information.

As part of the tramstop elements they follow the principle of introducing the Edinburgh Trams key red in a controlled, functional manner whilst reinforcing the identity and aiding recognition.



USB00000033_0066

Edinburgh Trams

Colours

The red, madder and gold are freely available in a variety of finishes such as paint and powder coating by using the RAL specification here.



USB00000033_0067

Edinburgh Trams

Uniforms

To assist those who are involved in procuring the staff uniforms the following images are intended as a simple guide to make sure the image conveyed through the uniforms is consistent with other areas of the brand's application.

By keeping the uniforms neutral the key red can then be introduced as a detail. As with other elements of the system the red should be used sparingly as shown here.



USB00000033_0068

Name badges

Name badges follow the guidelines established for communications.



USB00000033_0069

Contacts

For assistance with any aspect of the contents of these guidelines please contact either:

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tie limited
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65 Haymarket Terrace
Edinburgh
EH12 5HD

Tel: 0131 622 8330
Fax: 0131 622 8301
e mail: jen.johnston@tramsforedinburgh.com

or

Iain Coupar
Marketing Director
Transport Edinburgh
55 Annandale Street
Edinburgh
EH7 4AZ

Tel: 0131 554 4494
Fax: 0131 554 3942
e mail: icoupar@transportedinburgh.com

USB00000033_0070

Document Management Sheet – Employer's Requirements

3.6	Version updated to include: 1) Legal alignment changes agreed on meeting at Tuesday 11.03.08 2) Technical adjustments by RK and AS 3) CEC changes that resulted from their review 4) Revised s26	14/03/08	14/03/08		
3.6a	Version updated to include: 5) Revised s28.13 6) Revised s23 7) Ref check – not complete. 8) Incorporation of DLA (SF) checks. 9) Depot Scope changes.	19/03/08	19/03/08	SH	
3.6b	Updated as per Pinsents comments 03.04.08	03.04.08		MC/SH	
3.6b	For issue	07.04.08	07.04.08	SH	GG/SB
4.0	Final	16.04.08	16.04.08	SH	GG/SB
Version	Summary	Date	Modified	Checked	Approved

Trams for Edinburgh

..connecting our Capital

Edinburgh Tram Network

Employer's Requirements

Edition: v4.0 April 2008

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V 4.0

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1 Introduction

1.1 Summary of Overall Scope

The Infraco shall be fully responsible for the works and services described in these Employer's Requirements and in the Agreement:

1.2 Infraco Works

Summary Scope of Infraco Works

Detailed requirements associated with the infrastructure and equipment for the Infraco Works are described within other Sections of these Employer's Requirements and the Agreement.

The scope defined within this section is limited to a summary of the principal elements of the Infraco Works:

- the supply of Trams in accordance with the Tram Supply Agreement;
- the provision of maintenance as defined in the Tram Maintenance Agreement and Section 40 (Maintenance) of these Employers Requirements;
- the provision of Trackwork - A total of approximately 18.8km and 5.5km (for phases 1a and 1b, respectively) of track kilometres, on street and off street trackform;
- the provision of Tramstops - A total of 22 Tramstops and 1 staff only Tramstop for Phase 1a, and 9 Tramstops for Phase 1b, together with associated infrastructure;
- the provision of Tramstop furniture, systems and equipment;
- the provision of interchange facilities as provided in the design information;
- the provision of points and crossings including point machines, their power supplies, point heating and the control thereof, detection and indication;
- the provision of traffic / tram signals;
- the provision of Tram detection system;
- the provision of all 11kv, 400volt and 230 volt power supplies;
- the provision of traction substations and d.c. traction distribution;
- the provision of OLE (Including all trackside isolators);

- the provision of supervisory control, and communication systems and sub-systems including all field, Tram (free issue for installation by Tram Supplier) network and central control and interface equipment;
- Develop and manage an EMC strategy that includes appropriate immunisation of all Third Party neighbouring systems including Network Rail.
- Accept delivery of fixed and portable Ticket Vending Machines from **tie** and then undertake the installation of such machines and the provision of the necessary supporting infrastructure (including power supplies, communication links and foundations). The maintenance of these machines is not within the scope of the Infraco;
- Provision of the Depot containing:
  - A depot building containing a maintenance workshop and associated workshops, offices, stores and equipment;
  - The Control Centre (First Floor) and associated equipment room (Ground Floor);
  - The Edinburgh Tram Network administration offices;
  - A depot yard and stabling area;
  - A traction power substation;
  - A building services transformer and associated works;
  - All necessary services and utility connections;
  - A boiler house;
  - Hard-standing for a diesel alternator; and
  - The Depot access road.
- Provision of Tram associated road works;
- Provision of traffic management;

- Provision of road furnishings;
- Provision of bridges, structures and retaining walls, including the necessary services and facilities e.g. lighting, drainage, fencing and guardrails, earthing and bonding etc.;
- Civil works including earthworks (inclusive of contamination removal, demolition, Site clearance, excavation, bridges and structures, all necessary temporary works and drainage;
- Demolition/modification of certain buildings as identified in the design phase.
- Relocating the War Memorial at Haymarket Junction (the Infraco shall be required to obtain confirmation from **tie** prior to such re-location that **tie** is satisfied that all relevant Consents have been obtained by the Infraco;
- Landscaping including, hard landscaping, soft landscaping, boundary treatments;
- Provision of lighting;
- Provision of signage;
- Provision of fencing;
- The provision of all temporary works and installations (to allow construction of the Edinburgh Tram Network and achievement of delivery of the Edinburgh Tram Network into service) including the provision of connections to appropriate power supplies.
- to carry out and/or manage to completion the design of the Edinburgh Tram Network, including the management coordination, and specification and implementation of the necessary works for the modification of the Urban Traffic Control System;
- to procure and install all materials and equipment, required for the complete operating Edinburgh Tram Network, as summarised and as further detailed within these Employer's Requirements;
- to supply documentation as defined within these Employer's Requirements, including design documentation, as-built documentation, statutory information, as-built information, maintenance documentation and training documentation;
- to energise the Edinburgh Tram Network including liaison with and management of all interested and affected parties;

- to provide access and support for driver training;
- to provide comprehensive management and technical and maintenance services and Deliverables to ensure that all of the above is delivered in full compliance with these Employer's Requirements.

1.3 Phase 1a Scope Statement Regarding Inclusion for the Phase 1b Option

Phase 1a shall meet these Employer's Requirements and provide full functionality as a standalone tram network. The scope for Phase 1a shall include the following elements in order to facilitate the addition of Phase 1b as an option instructed later under this Agreement.

1. The structure, earthworks and necessary works at Roseburn Junction shall include all sub-structure, structures, earthworks, ductwork, drainage and fitting out to bottom of rail fixing, including the provision for the OLE spur connection for Phase 1b from Phase 1a and OLE supports, for the delta connection of Phase 1b with Phase 1a. The structure, earthworks and works shall extend as a minimum such that the subsequent construction of Phase 2b does not interfere with the operation of Phase 2a except to the extent allowed by the possessions detailed below.

2. Plain line shall be installed along the Phase 1a route through the Roseburn Junction, however the Infraco shall ensure that the design and construction shall provide for the turnouts to be installed in a maximum of one 54 hour possession of the Phase 1a inbound and outbound tracks between Murrayfield and the Western end of Haymarket Yards turnback. Traction power supply sectioning shall allow the turnback of service trams throughout the possession. In addition, up to 28 normal night-time possessions shall be available for preparatory works and commissioning works.

3. The central supervisory, control and communications systems provided by the Infraco for Phase 1a shall have sufficient capacity and functionality to accommodate the incorporation of Phase 1b. This shall include all software, firmware, databases with the same control and indication functionality as for Phase 1a. All central control system hardware shall be provided to allow the connection of the Phase 1b infrastructure by means of cable connection alone.

4. The central supervisory, control and communications systems shall be designed and configured such that the commissioning of Phase 1b infrastructure shall be possible without material impact on the passenger services operating on Phase 1a or the operational Control Centre prior to assimilation of Phase 1b with Phase 1a.

5. Documentation, drawings, manuals, spare parts and training shall be provided for Phase 1a on a standalone basis, but shall be in the form that is expandable to accommodate Phase 1b as and when constructed..

2 Operations and Performance

2.1 Scope

The scope of this Section of the Employer's Requirements defines the Operations & Performance requirements applicable to the Edinburgh Tram Network (ETN) which the Infraco must comply with.

2.2 Network Description and Principles

The Edinburgh Tram Network will operate as a 'line-of-sight' tramway, with tramway signalling provided at road junctions and at tramway junctions where appropriate. A fleet of Trams will serve the ETN providing level boarding with low level platforms located along the routes.



Figure 1

For ease of reference, a diagram of the Edinburgh Tramway Network is shown in Figure 1 above.

The route in the city from Newhaven to Haymarket (approximately half of Phase 1a) and from West Granton Access to Granton Square (approximately a third of Phase 1b) runs mainly on-street with varying degrees of segregation. The Roseburn corridor (approximately two thirds of Phase 1b) is a segregated off-street alignment, shared with a combined footpath and cycleway. Most of the route between Haymarket and the Airport (the remaining half of Phase 1a) is segregated from road traffic.

The whole ETN will consist of double track.

The Depot, located at Gogar, will provide maintenance and stabling facilities for the entire fleet of Trams operating on the ETN. It will also contain the administration and management offices, including an operations and Control Centre, from where the ETN will be managed and maintained.

Transport Services shall be operated in accordance to a timetable, as agreed between the Operator and **tie**, to achieve reliable and consistent operation at the required tram frequencies.

Throughout these Employer's Requirements reference is made to three timetables that shall be progressively introduced in response to patronage demand growth. These are intended to allow for reliability growth and Operator familiarisation with the Edinburgh Tram Network. The following definitions shall apply:

- **Operational Timetable**

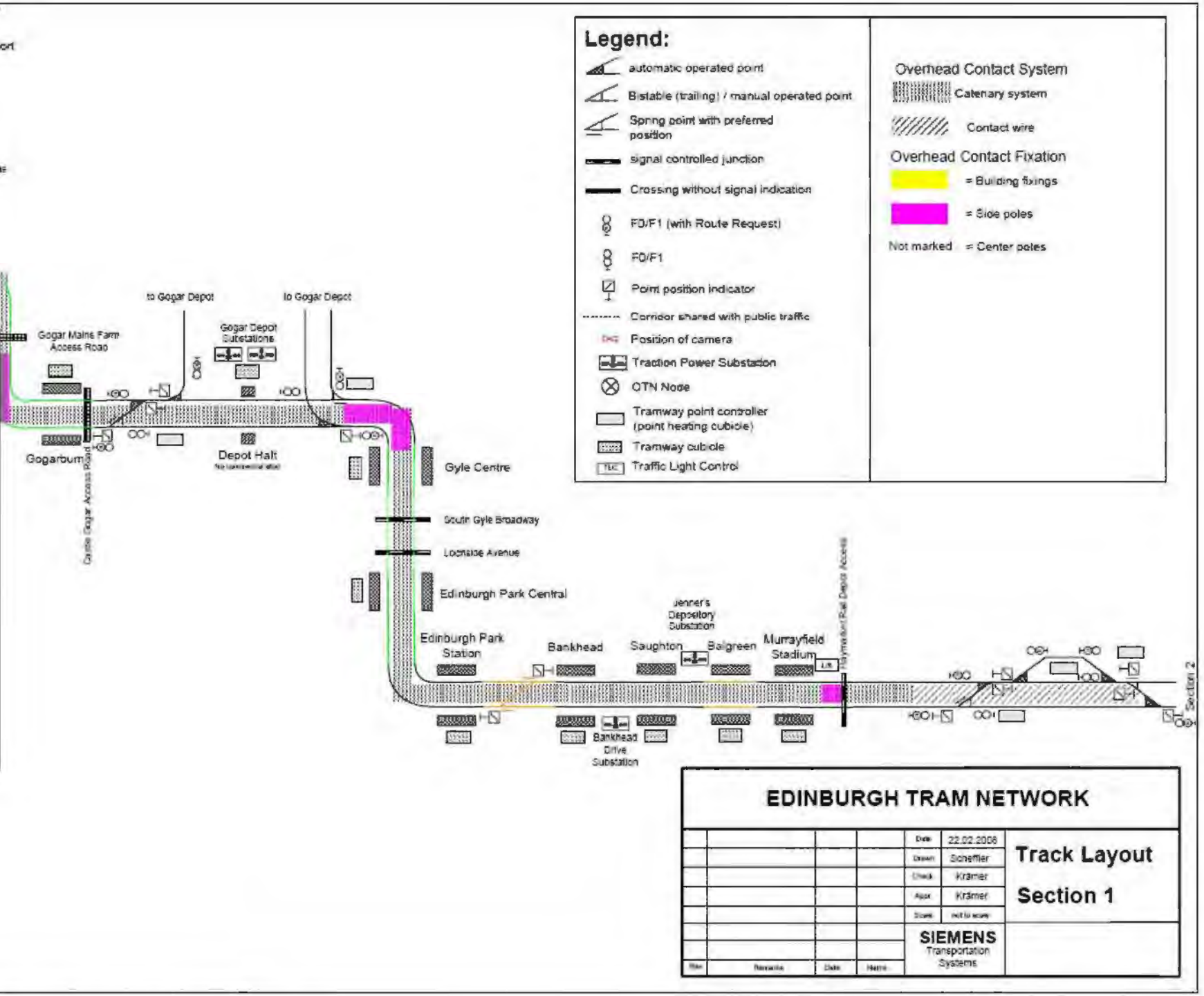
  A timetable developed by **tie**, which provides Trams at a frequency of twelve Trams per hour in each direction on the common section between Haymarket and Ocean Terminal. Six Trams per hour in each direction are operated on the sections between Haymarket and the Airport and between Ocean Terminal and Newhaven. For Phase 1b, Trams at a frequency of six trams per hour in each direction on the section between Haymarket and Granton square shall be operated. The Operational Timetable shall be in effect from the Service Commencement Date for a minimum of one year.

- **AM and PM Peak Enhanced Timetable:**

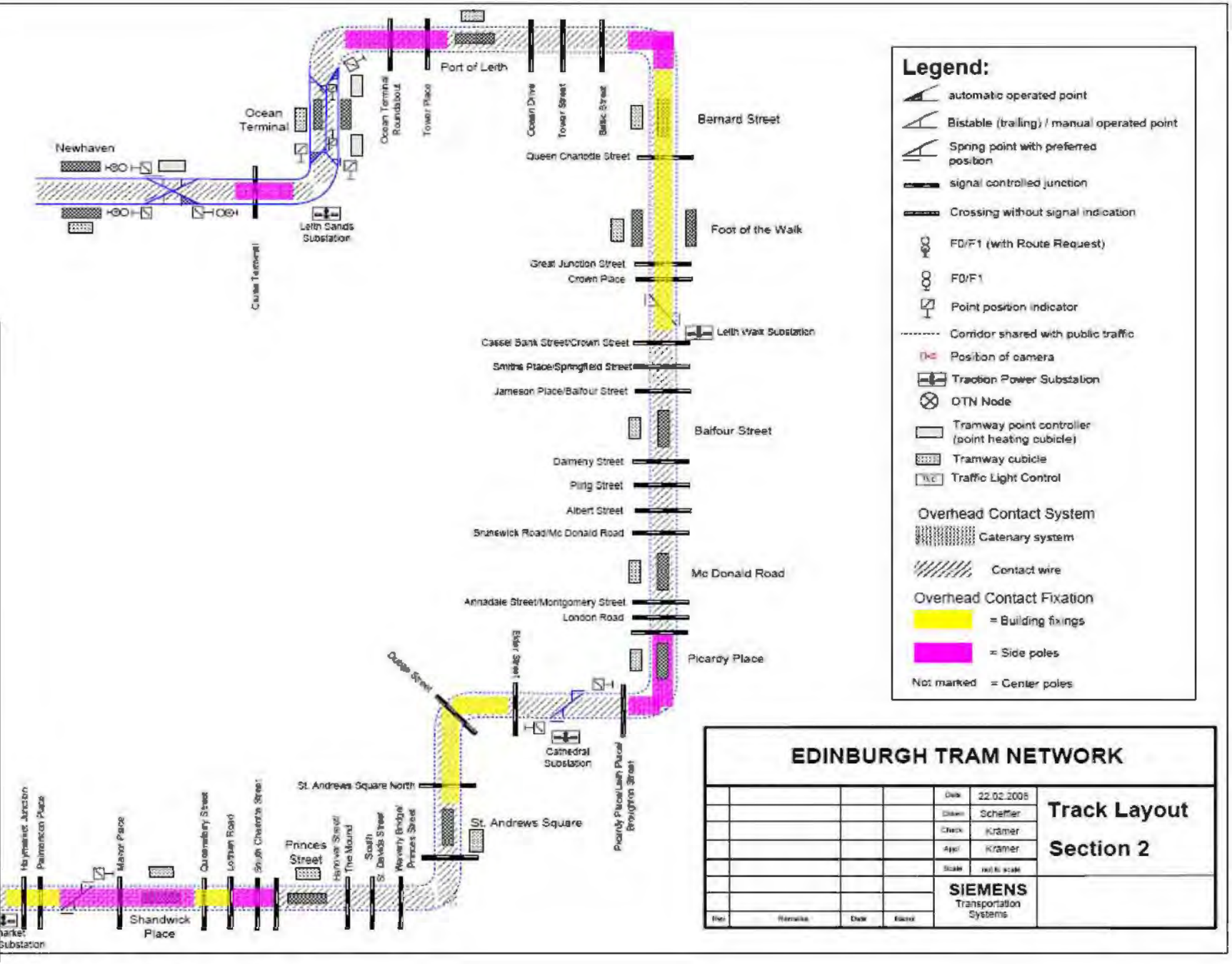
  A timetable developed by **tie**, which provides Trams during the AM and PM peaks at a frequency of sixteen Trams per hour in each direction on the common section between Haymarket and Ocean Terminal. For Phase 1b providing Trams at a frequency of eight trams per hour in each direction on the section between Haymarket and Granton square for the AM and PM peak times only, reverting to the Operational Timetable during the inter peak period. The AM and PM Peak Enhanced Timetable shall be introduced no earlier than one year after the Service Commencement Date and shall be operated for a minimum of six months.

- **Enhanced Timetable:**

  A timetable developed by **tie**, which provides Trams at a frequency of sixteen Trams per hour in each direction on the common section between Haymarket and Ocean Terminal. For Phase 1b providing Trams at a frequency of eight Trams per hour in each direction on the section between Haymarket and Granton square. The Enhanced Timetable shall be introduced no earlier than two years after the Service Commencement Date.



Phases 1a and 1b Network Diagram



Phases 1a and 1b Network Diagram

2.3 Specific Operations and Performance Requirements

2.4 Tramstop Location and Types

The Tramstop location and types are detailed in the following table. The acronyms given are provisional.

ID	Tramstop	Platform Style
	PHASE 1a	
AIR	Edinburgh Airport	1 Centre
IPR	Ingliston Park and Ride	2 Side
GBN	Gogarburn	2 Side
DEH	Depot Halt (Staff Only)	2 Side
GYL	Gyle Centre	2 Side
EDP	Edinburgh Park Central	2 Side
EPS	Edinburgh Park Station	2 Side
BNK	Bankhead	2 Side
SGT	Saughton	2 Side
BAL	Balgreen	2 Side
MUS	Murrayfield Stadium	2 Side
HAY	Haymarket	2 Side
SHP	Shandwick Place	1 Centre
PST	Princes Street	1 Centre
SAS	St Andrew Square	1 Centre
PPL	Picardy Place	1 centre
MDR	McDonald Road	1 Centre
BFS	Balfour Street	1 Centre
FOW	Foot of the Walk	2 Side
BER	Bernard Street	1 Centre
POL	Port of Leith	1 Centre
OCT	Ocean Terminal	1 Centre, 1 Side
NEW	Newhaven	2 Side

	PHASE 1b	
GRT	Granton	1 Centre
SSQ	Saltire Square	2 Side
CPK	Caroline Park	2 Side
WPN	West Pilton	2 Side
CTL	Crewe Toll (for Western General)	2 Side
TEL	Telford Road	2 Side
CRA	Craigleith	2 Side
RAV	Ravelston	2 Side
ROS	Rosebum	2 Side

Table 1 – Edinburgh Tram Phases 1a and 1b Network Tramstop Location and Details

2.5 Expansion (including Line 3)

The Infraco shall ensure that the ETN shall be designed to permit expansion to include the following elements:

- Phased implementation of the ETN and associated fleet increases (including the implementation of the Phase 1b Option);
- Addition of Phase 2 of the ETN (as shown in Figure 1), including provision of Lower Granton Road stop, to close the loop along the sea front between Newhaven and Granton Square using the powers in the Edinburgh Tram (Line One) Act 2006;
- Addition of Phase 3 of the ETN (as shown in Figure 1), including associated stops at Ingliston West, Ratho Bridge and Newbridge South, from Ingliston Park and Ride to Newbridge using the powers in the Edinburgh Tram (Line Two) Act 2006;
- Addition of Line Three (From the junction of Princes Street/South St. Andrew Street to Royal Infirmary);

Extensions to the ETN set out above are not currently covered by these Employer's Requirements. However, the ETN must be designed in such a way as not to impede this future expansion.

For the avoidance of doubt, the following are covered by these Employer's Requirements.

- Future frequency increases beyond the enhanced service frequency of 8 & 8 tph;
- Increased operating hours beyond the scheduled last Tram of 23:59 and before the scheduled first Tram at 06:00;
- Associated impacts of increased staff numbers from 361 initially anticipated up to a maximum of 403 e.g. accommodation at the Depot.

2.6 Depot Locations

The Edinburgh Tram Network Depot is located at Gogar and shall be capable of providing capacity for the stabling of 27 trams of 44m in length, clear of fouling points in the stabling area.

The Depot shall be capable of future expansion to provide the capacity required for the identified future service frequencies and/or the requirements for Line Three, such that the Depot can be extended to stable 36 Trams of 44m in length, clear of fouling points in the stabling area.

2.7 Service Patterns, Operating Hours and Frequencies

The ETN shall support a daily service, all year round. The proposed initial service patterns, operating hours and frequencies are as follows:

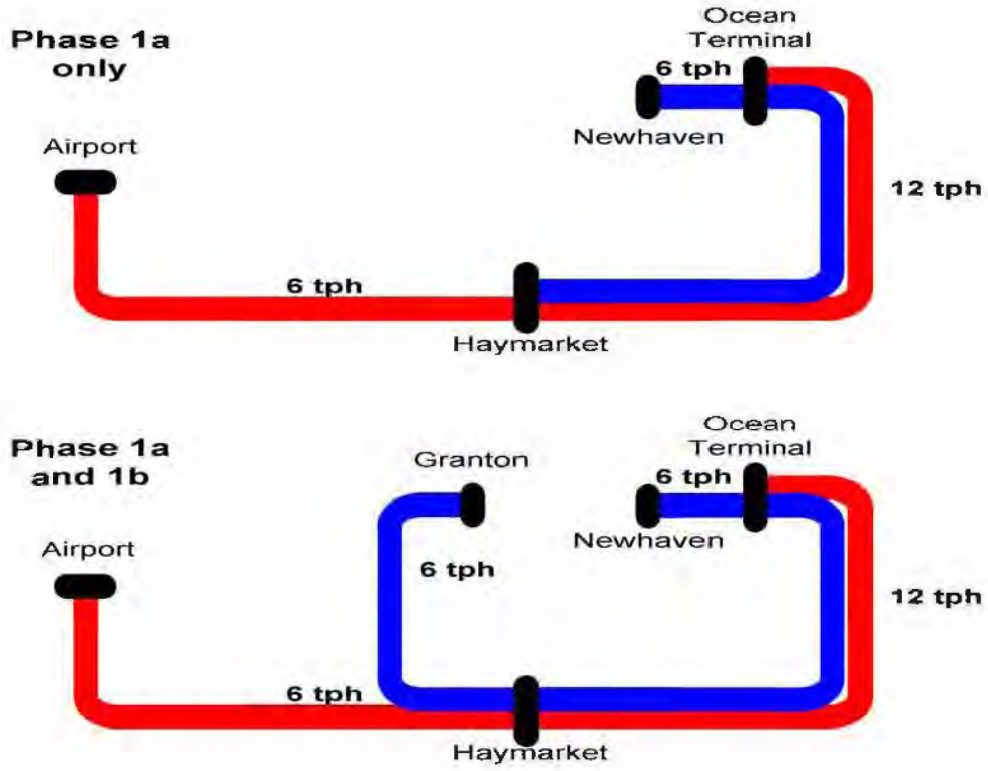


Figure 4 - Service Patterns for the Operational Timetable 6 & 6 Tram per hour scenario

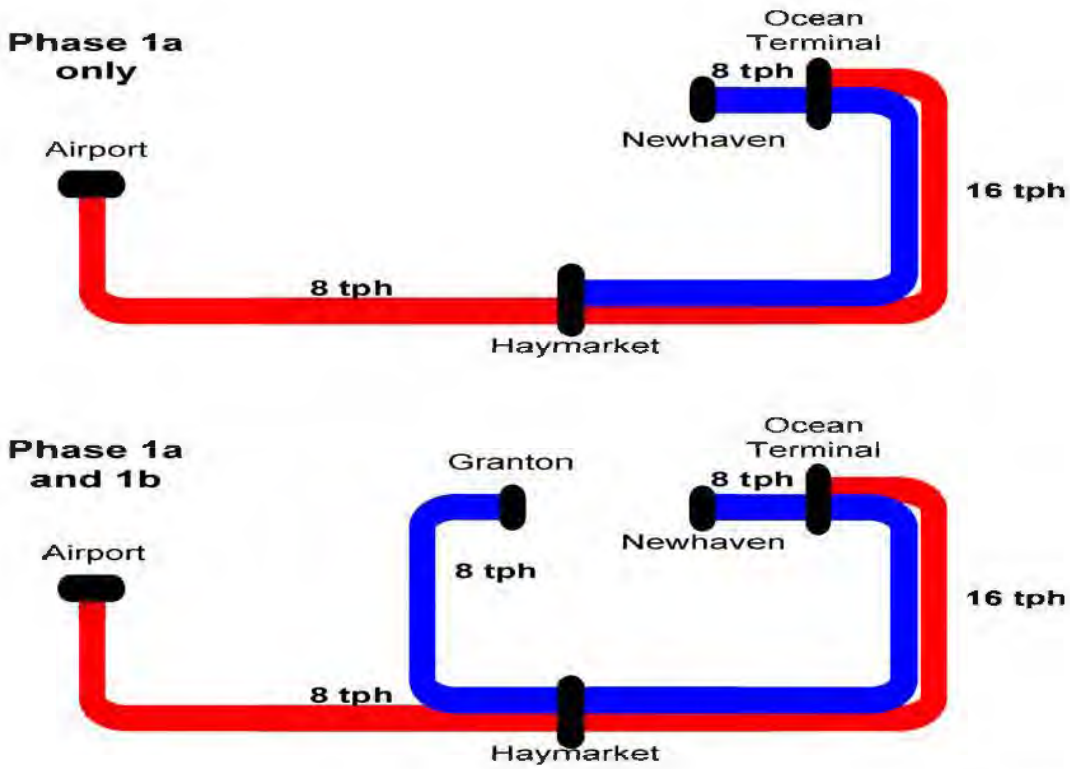


Figure 5 - Peak Service Patterns for the Enhanced AM & PM Peaks Timetable and the Enhanced Timetable 8 & 8 Tram per hour scenario

2.8 Operating Hours and Frequencies

The first and last Tram services and frequencies for 6 & 6 Tram per hour scenario are shown in Figure 4 - service patterns for the Operational Timetable 6 & 6 Tram per hour scenario and for 8 & 8 Tram per hour scenario in Figure 5.

These scenarios are based upon the following assumptions and conditions:

- The two balanced services combine to give a total of 12 or 16 Trams per hour per direction on the common section between Ocean Terminal and Haymarket are required during the daytime to replace withdrawn bus services (and therefore demand and capacity) on Leith Walk;
- For the purposes of ramping up/down service Short workings between Edinburgh Airport (Phase 1a) / Granton Square (Phase 1a & Phase 1b) or Haymarket (Phase 1a only) and St. Andrew Square are based on terminating Trams at St. Andrew Square. The location of the turnback is at York Place;
- Edinburgh Airport service Tram frequency is ramped up/down from Ocean Terminal. Granton Square (Phase 1a & Phase 1b) or Haymarket (Phase 1a only) service Tram frequency is ramped up/down from Newhaven;
- Trams going into service between Gogar Depot and Ocean Terminal/Newhaven will run "in service" from the Gyle (first tram Gyle to Ocean Terminal approx. 05:15 Monday to Saturday inclusive);
- Haymarket (Phase 1a only) or Granton Square (Phase 1a & Phase 1b) service Trams going out of service running between Newhaven and Gogar Depot will run "in service" as far as the Gyle;
- St. Andrew Square curtailed Trams going out of service running between St. Andrew Square and Gogar Depot will run "in service" as far as the Gyle;
- Edinburgh Airport service Trams going out of service will run "in service" from Ocean Terminal to Edinburgh Airport with a short "dead run" from Edinburgh Airport to Gogar Depot;

- The period of time between the last Tram returning to the depot at night and the first Tram leaving the Depot in the morning Monday to Saturday inclusive is anticipated to be 4hrs 30 min, although this may be subject to amendment. Work requiring possessions will have to be agreed with the Operator. Subject to agreed possessions, work may be allowed on the Edinburgh Tram Network infrastructure for 3 hours and 45 minutes, depending on location, each night and allowing time for the implementation and withdrawal of isolations and/or possessions; and

- The provision of Transport Services is based on the requirement to always have a Tram present at the Airport Tramstop.

Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable

1b	Airport to Ocean Terminal	0	6		6[a]	0
1b	Ocean Terminal to Airport	6	6		6	0
1b	Granton to Newhaven	0	6		6[b]	0
1b	Newhaven to Granton	6	6		6[c]	0

Note: The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

		Sunday (trams per hour)					
Network / Phasing	**Service frequency commencing at:**	first tram 07:00	07:45	08:00	08:20	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Notes:

[a] from approx 2 23:15 Trams run from the Airport - City Centre only

[b] from approx 2 23:15 Trams run from Granton - City Centre only

[c] from approx 2 23:15 Trams run from Newhaven - Haymarket continuing in service on TL2 to Gyle

First and last Tram services and frequencies for 6 & 6 tram per hour Operational Timetable

Table 3 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario

	Networking (Phasing) andService Frequency commencing at:	06:00	06:45	07:00	07:20	07:45	09:45	15:45	19:00	19:45
1a	Airport to Ocean Terminal	0	6	8	8	8	6	6	8	6
1a	Ocean Terminal to Airport	6	6	8	8	8	6	6	8	6
1a	Haymarket to Newhaven	0		6	8	8	6	6	8	6
1a	Newhaven to Haymarket	0		0	6	8	6	6	8d	6
1b	Airport to Ocean Terminal	0	6	8		8	6	6	8	6
1b	Ocean Terminal to Airport	6	6	8		8	6	6	8	6
1b	Granton to Haymarket	0	6	8		8	6	6	8	6
1b	Haymarket to Granton	6	6	8		8	6	6	8	6

Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario

Phase	Service Frequency commencing at:	Saturday (trams per hour) First tram 06:00	06:45	07:30	07:50	23:15
1a	Airport to Ocean Terminal	0	6	6	6	6a
1a	Ocean Terminal to Airport	6	6	6	6	6
1a	Haymarket to Newhaven	0	0	6	6	0
1a	Newhaven to Haymarket	0	0	0	6	0
1b	Airport to Ocean Terminal	0	6	6	6	6a
1b	Ocean Terminal to Airport	6	6	6	6	6
1b	Granton to Newhaven	0	6	6	6	6b
1b	Newhaven to Granton	6	6	6	6	6c

Table 5 - First and Last Tram Times for the Enhanced AM & PM Peak Timetable

Networking (Phasing) and Service Frequency commencing at:		Sunday (trams per hour) first tram 07:00	07:45	07:50	08:00	19:45	19:50	19:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6		6	6	6a	0
1a	Ocean Terminal to Airport	6	6	6	6		6	6	6	0
1a	Haymarket to Newhaven	0		6	6		6	6		0
1a	Newhaven to Haymarket	0		0	6		6	6c		0
1b	Airport to Ocean Terminal	0	6		6	6	6		6	6a	0
1b	Ocean Terminal to Airport	6	6		6	6	6		6	6	0
1b	Granton to Haymarket	0	6		6	6	6		6	6b	0
1b	Haymarket to Granton	6	6		6	6	6		6	6b	0

Notes:

a) from approx. 23:15 Trams run from Airport – St Andrew Sq. only.
b) from approx. 23:15 Trams run from Granton – St Andrew Sq. only.
c) from approx. 23:15 Granton Trams run from Newhaven – Haymarket continuing in service on to Gyle.
d) from approx. 19:20 (18:%0 Saturday and 18:20 Sundays) Haymarket Trams running from Newhaven – Haymarket continue in service to Gyle.

The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Table 6 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced Timetable

Network (phasing) and service frequency commencing at:		Monday - Friday (trams per hour)									
		06:00	06:45	07:00	07:20	07:45	19:00	19:20	19:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	8	8	8		8	8		8[a]	0
1a	Ocean Terminal to Airport	8	8	8	8		8	8		8	0
1a	Haymarket to Newhaven	0		8	8		8	8			0
1a	Newhaven to Haymarket	0		0	8		8	8[d]			0
1b	Airport to Ocean Terminal	0	8	8		8	8		8	8[a]	0
1b	Ocean Terminal to Airport	8	8	8		8	8		8	8	0
1b	Granton to Newhaven	0	4	4		8	8		4	4[b]	0
1b	Newhaven to Granton	4	4	8		8	4		4	4[c]	0

Network (phasing) and service frequency commencing at:		Saturday (trams per hour)									
		first tram 06:00	06:45	07:30	07:50	08:15	18:30	18:50	19:15	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	8	8	8		8	8		8[a]	0
1a	Ocean Terminal to Airport	8	8	8	8		8	8		8	0
1a	Haymarket to Newhaven	0		8	8		8	8			0
1a	Newhaven to Haymarket	0		0	8		8	8[d]			0
1b	Airport to Ocean Terminal	0	8	8		8	8		8	8[a]	0
1b	Ocean Terminal to Airport	8	8	8		8	8		8	8	0
1b	Granton to Newhaven	0	4	4		8	8		4	4[b]	0
1b	Newhaven to Granton	4	4	8		8	4		4	4[c]	0

Network (phasing) and service frequency commencing at:		Sunday (trams per hour)									
		first tram 07:00	07:45	07:50	08:00	08:45	18:00	18:20	18:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6		6	6		6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6		6	6		6	0
1a	Haymarket to Newhaven	0		6	6		6	6			0
1a	Newhaven to Haymarket	0		0	6		6	6[d]			0
1b	Airport to Ocean Terminal	0	6		6	6	6		6	6[a]	0
1b	Ocean Terminal to Airport	6	6		6	6	6		6	6	0
1b	Granton to Newhaven	0	6		6	6	6		6	6[b]	0
1b	Newhaven to Granton	6	6		6	6	6		6	6[c]	0

Note: The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Notes:

[a] from approx 23:15 trams run from Airport - St Andrew Sq only

[b] from approx 23:15 trams run from Granton - St Andrew Sq only

[c] from approx 23:15 Granton trams run from Newhaven - Haymarket continuing in service on to Gyle

[d] from approx 19:20 (18:50 Saturdays and 18:20 Sundays) Haymarket trams running from Newhaven - Haymarket continue in service to Gyle

2.9 Service Frequencies and Expansion

The design of the ETN shall support the Operational Timetable and Enhanced Timetable service frequencies set out in Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable, Table 3 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario and Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario. In addition to this, the ETN shall operate the same service pattern as set out in Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario above, but with the Trams per hour increased by 50% throughout without upgrade or loss of performance for up to a maximum of 2 hours between Ocean Terminal and Picardy Place, and indefinitely between Picardy Place and the Airport.

The service patterns for the ETN are defined as the Operational Timetable (as shown in Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable), the AM and PM Peak Enhanced Timetable (as shown in Table 3 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario) and the Enhanced Timetable (as shown in Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario).

A simulation indicating the power consumption of the ETN service patterns as defined above and considering the braking energy regeneratated by the Tram shall be performed during design phase.

2.10 Special Working and Degraded Operation

Special working is required at certain times of the year, as detailed in Table 8 - Reconfiguration of Service due to the Closure of Princes Street to allow for the short workings on the network routes, when sections of the ETN shall be closed to allow for example Hogmanay, the Edinburgh Festival and other special events and festivals.

The design of the ETN shall allow services to be turned back at the locations detailed in Table 7 - Turnback Locations. The precise chainages where turnbacks are to be installed is shown on the alignment drawings.

ID	Location
	PHASE 1a
EPS	Edinburgh Park Station
HAY	Haymarket Yards
SHP	Shandwick Place
PPL	Picardy Place
FOW	Foot of the Walk (Leith Walk)

OCT	Ocean Terminal
	PHASE 1b
CTL	Crewe Toll

Table 7 - Turnback Locations

Note that Trams may also be turned back at Gogar Depot, and the facility to allow this shall be provided by the Infraco.

The individual services will be reconfigured to operate using the tum-back facility nearest to the affected area. An example is the requirement to close Princes Street for Hogmanay. In this situation the services shall be reconfigured as detailed in Table 8 - Reconfiguration of Service due to the Closure of Princes Street.

Service alteration for Closure of Princes Street			
Original Route of Service	Affected Area	Trams / Hour	Revision
Between Airport and Ocean Terminal	Princes St. section closed	6 or 8	Services run between Airport and Shandwick Place. No service runs between Shandwick Place and Picardy Place. Services run between Picardy Place and Newhaven
Between Haymarket and Newhaven (Phase 1a only)	Princes St. section closed	6 or 8	No service runs between Haymarket and Picardy Place[a]. Services run between Picardy Place and Newhaven
Between Granton Square and Newhaven (Phase 1b)	Princes St. section closed	6 or 8	Services run between Granton Square and Shandwick Place. No service runs between Shandwick Place and Picardy Place. Services run between Picardy Place and Newhaven

a – Assumption that no services will run the short leg Haymarket to Shandwick Place when Princes Street is closed.

Table 8 - Reconfiguration of Service due to the Closure of Princes Street

2.11 Journey Time and Runtime

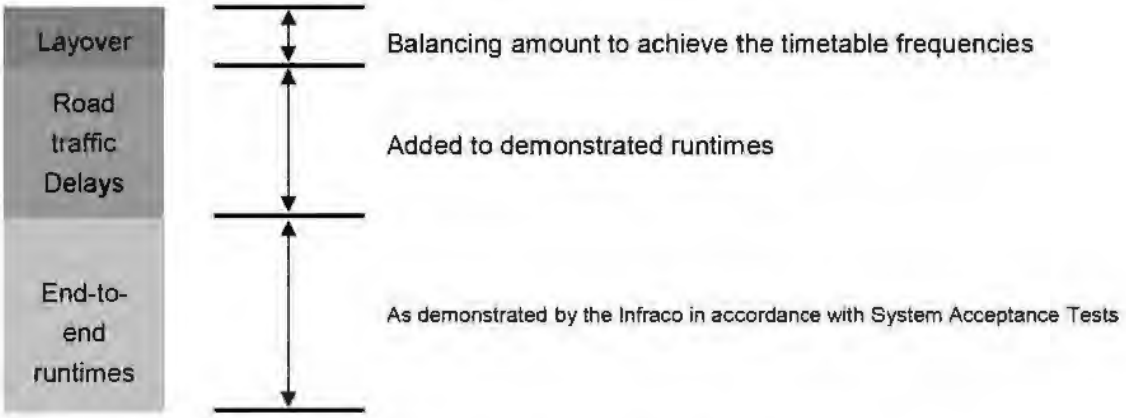


Figure 6 - Maximum Journey Times

The required maximum journey times for the Edinburgh Tram Network, quoted as operational journey time including dwell times of 25 seconds at each Tramstop, as defined during Preliminary design shall be as follows:

Phase 1a Airport to Ocean Terminal	in either direction including 25 secs dwells at Tramstops	42mins 18 secs
Phase 1b Granton Sq to Newhaven	in either direction including 25 secs dwells at Tramstops	39mins 26 secs

For the avoidance of doubt these are end to end journey times and the Infraco shall demonstrate during System Acceptance Tests defined in Section 23.18 (Testing and Commissioning) of these Employer's Requirements the trip times which can be achieved by the Trams running on the ETN infrastructure as developed and adjusted from the above base line in accordance with Section 2.12. These do not include layover time at the turnback stops as shall be agreed between the Operator and **tie** in order to develop the Operational Timetable.

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2.12 Journey Time and Runtime

The Infraco shall continue to develop and refine the runtime model as the design progresses and, at a frequency of no less than every three months or upon **tie**'s request, provide updated reports demonstrating that the maximum run times can be achieved. The Infraco shall also prepare a model of the electricity consumption linked to the run time model and shall use reasonable endeavours to optimise the system design and construction to minimise electricity usage.

Reference should be made to the Runtime Simulation Stage 3 Report (ref: ULE90130-SW-REP-00238-V3) for vehicle performance characteristics and actual driver operations.

The operational and modelling assumptions that shall be used in all modelling of runtime and operational timetables are set out in Table 9 - Operational and Modelling Assumptions.

Item	Value	Notes
Door Performance	12 seconds	Defined as the time for the doors to open and close including DDA requirements and passenger and driver reaction times.
Boarding and Alighting Time	13 seconds	Defined as the time between the doors being fully open and the sounding of the door closing tone.
Dwell Times	25 seconds a constant in modelling and during end to end journey time tests, to be refined for the purposes of the timetables to be Tramstop specific	Average dwell, made up of the door performance time and the boarding and alighting time
Loading	AW2 all seated 4 pass/m2 standing	
Gradient	+/- 8% Max. Note: This value is the maximum allowable gradient for track design.	Gradient data for the complete ETN has been developed in the design phase This identified major gradients at St. Andrew Square and the line alongside Gogar Depot

2.13 Operational Allowances and Rules for Timetabling

An operational allowance will be added to the end to end runtimes demonstrated through testing to meet those quoted in this section to ensure a robust Operational Timetable is constructed.

Requirement	Allowance
Operational Journey time allowance	Newhaven to Haymarket = 1.5 minutes Ocean Terminal to Airport = 1.5 minutes Newhaven to Granton Square = 45 secs (Phase 1b only)
Layover	4 minute minimum or 10% of timetabled runtime, whichever is the greater taken at the terminus for each end to end trip with the exception of the Airport Tramstop where a Tram is required to always be present. Crew change-over locations to be determined as the Operational Timetable is refined.

Table 10 - Operational Runtime Allowances

2.14 Miscellaneous Operational Requirements

2.15 Comfort Break Facilities

Facilities shall be available for driver comfort breaks at the nominated layover locations detailed in Table 11 - Layover Facilities

Location	Comments
Edinburgh Airport	Crew Change Facility[1]
Ocean Terminal	Normal Terminus
Granton Square	Normal Terminus
Haymarket	Crew Change Facility

Table 11 - Layover Facilities

[1] *Damian has already instructed this change.*

At these locations access shall be provided to a suitable toilet with hand washing facilities.

Crew Change Facility

A crew changing facility shall be provided adjacent to the Haymarket Tramstop. This facility shall provide tram crew with access to a toilet with hand washing facilities, a drinking water supply, suitable heating, power, lighting, drainage and connection to the telephone network.

2.16 Performance and Reliability

The design and construction of the ETN shall be demonstrated by RAMS analysis to enable the individual systems availability targets stated in these Employer's Requirements to be met. It shall enable an overall tram punctuality for System technical causes of at least 99% in accordance with the calculation of the Punctuality Service Element contained in Schedule 6 of the Agreement.
As measured on a 28 day basis at the following monitoring points along the route at least 99% of the Trams shall be no earlier than one minute and no greater than two minutes late, caused by technical failure, compared to the scheduled headway.

Monitoring points

a) Phase 1a: for the purposes of monitoring arrival and departure headways between Trams:

- Edinburgh Airport.

b) Phase 1a: for the purposes of measuring departure headways between Trams only:

- Edinburgh Park Station;
- Haymarket;
- Foot of the Walk;
- Leith; and
- Picardy Place.

c) Phase 1b: for the purposes of measuring departure headways between Trams only:

- Crewe Toll (northbound only); and
- Granton Square.

The performance mechanism for Infraco is contained within this Agreement. The design of the ETN shall be such that it allows the ETN to operate safely and effectively in all modes.

Normal Mode being that used to establish the operational timetable. Degraded Mode being restricted operation due to failures or disruption on the tramway or the adjacent highway network.

2.17 Network and Service Pattern

See table 2 – Service Patterns for the Operational Timetable 6 & 6 Tram per hour scenario and table 5 – Peak Service Patterns for the Enhanced AM & PM Peaks Timetable and table 6 – the Enhanced Timetable 8 & 8 Tram per hour scenario] for further information; for daily service patterns; and note that trams are to be co-ordinated between OCT and HAY to give an even headway pattern in both directions.

2.18 Layover s

The Operational Timetable and the Enhanced Timetable developed by the Operator and the Infraco's Proposals shall allow for the following:

- An operational Tram can always be present at the Airport Tramstop;
- Additional layovers to be added to the minimum values to deliver the required headways where appropriate. This additional layover maybe apportioned along the route; and
- The minimum layover requirements are as set out in these Employer's Requirements and these shall be apportioned at the terminus Tramstops only.

Allowance for perturbations that are not road traffic delays:

- These shall be apportioned along the route, as can be seen in Figure 6 - Maximum Journey Times.

2.19 Calculation of Minimum Round Trip Times

In this section, the minimum round trip times for each of the service options are calculated. The calculations add up the elements that are required to establish the round trip times, and the source of each element is stated.

Table 12 - Ocean Terminal – Edinburgh Airport Service (Phase 1a and Phase 1b)

OCT – AIR	
00:42:18	OCT - AIR (includes dwell time)[a]
00:04:52	AM junction delay (OCT - HAY)[b]
00:01:30	additional delay between HAY - AIR[c]
00:00:10	10 seconds on each leg for crossover at terminal Tramstop[d]
00:48:50	Total
AIR – OCT	
00:41:59	AIR - OCT (includes dwell time)[a]
00:06:01	AM junction delay (HAY - OCT)[b]
00:01:30	additional minutes of junction delay between AIR - HAY[c]
00:00:10	10 seconds on each leg for crossover at terminal Tramstop[d]
00:49:40	Total
Layovers	
00:04:55	Minimum layover at OCT end for Airport service[e]
00:10:00	Minimum layover at AIR end for Airport service[f]
00:07:30	Minimum layover at AIR end for Airport service[f]
00:14:55	Total min layover for 6 & 6 tram per hour scenario
00:12:25	Total min layover for 8 & 8 tram per hour scenario
01:53:25	Minimum round trip time for 6 & 6 tram per hour scenario
01:50:55	Minimum round trip time for 8 & 8 tram per hour scenario

Notes:

a Data from 'Edinburgh Tram Network Stage 3 Runtime Simulation Report' (Doc Ref: ULE90130-SW-REP-00238 v2).

b Data from 'Mott Macdonald Report - Traffic Interface Report' (Doc Ref: 0003048//REVC/241103). AM Junction delays between Haymarket and Leith Walk have been used as greater than PM delays.

c of additional junction delay between Haymarket and Edinburgh Airport.

d Estimate of additional time to move through the crossover at the terminus / turnback

e Layover calculated from Table 17 – Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario)

f Based on Headway of 10 or 7.5 minutes, from the requirement for Airport layover in Section 32.

Table 13 - Newhaven – Granton Square Service, (Phase 1b only)

NEW – GRT	
00:02:49	NEW – OCT (includes 25s dwell time)[a]
00:36:28	OCT – GRT (includes dwell time)[a]
00:04:52	AM junction delay (NEW - HAY)[b]
00:00:45	additional delay between HAY - GRT[c]
00:00:10	10s on each leg for crossover at terminal Tramstop[d]
00:45:04	Total

GRT – NEW	
00:37:00	GRT - OCT (includes dwell time)[a]
00:02:26	OCT - NEW (includes 25s dwell time)[a]
00:06:01	AM junction delay (NEW - HAY)[b]
00:00:45	additional delay between NEW - HAY[c]
00:00:10	10s on each leg for crossover at terminal Tramstop[d]
00:43:56	Total
00:04:15	Minimum layover at NEW end for Granton service[e]
00:04:07	Minimum layover at GRT end for Granton service[e]
00:08:22	Total min layover
01:37:22	Minimum round trip time

Notes:

[a] Data from 'Edinburgh Tram Network Stage 3 Runtime Simulation Report' (Doc Ref: ULE90130-SW-REP-00238v2).

[b] Data from 'Mott Macdonald Report - Traffic Interface Report' (Doc Ref: 0003048//REVC/241103)(AM Junction delays between Haymarket and Leith Walk have been used as greater than PM delays)

[c] Transdev estimate of additional junction delay between Haymarket and Granton Square.

[d] Transdev estimate of additional time to move through the crossover at the terminus / turnback

[e] Layover calculated from Table 17 – Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario).

Table 14 - Newhaven – Haymarket Service (Phase 1a only)

NEW - HAY	
00:02:49	NEW - OCT (includes 25 seconds dwell time)[a]
00:18:58	OCT - HAY (includes dwell time)[a]
00:04:52	AM junction delay (NEW - HAY)[b]
00:01:30	Additional delay between NEW - HAY
00:00:10	10 seconds on each leg for crossover at turnback[c]
00:00:54	Additional movement from HAY to turnback[e]
00:29:13	Total
HAY - NEW	
00:19:11	HAY - OCT (includes dwell time)[a]
00:02:51	OCT - NEW (includes 25 seconds dwell time)[a]
00:06:01	AM junction delay (HAY - NEW)[b]
00:01:30	Additional delay between HAY- NEW
	10 seconds on each leg for crossover at terminal
00:00:10	Tramstop[c]
00:00:54	Additional movement from turnback to HAY[e]
00:29:07	Total
00:04:00	Minimum layover at NEW end for Haymarket service[d]
00:04:00	Minimum layover at HAY end for Haymarket service[d]
00:08:00	Total min layover
01:06:20	Minimum round trip time

Notes:

a Data from 'Edinburgh Tram Network Stage 3 Runtime Simulation Report' (Doc Ref: ULE90130-SW-REP-00238v2).

b Data from 'Mott Macdonald Report - Traffic Interface Report' (Doc Ref: 0003048//REVC/241103). AM Junction delays between Haymarket and Leith Walk have been used as greater than PM delays.

c Transdev estimate of additional time to move through the crossover at the terminus / turnback

d Layover calculated from Table 17 – Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario)

e Transdev estimate of runtime between HAY and Haymarket Turnback (20kph over 300m = 5.6m/s over 300m = 54 seconds)

2.20 Summary to Establish Fleet Size

The minimum round trip times determined in Section 2.19 above are used in Tables 15 to 18 to determine the tram Peak Vehicle Requirement (PVR) and fleet size for Phase 1a & Phase 1b:

	OCT - AIR service	NER - HAY service	NER - GRS service
Service used on Phase	1a and 1b	1a only	1b only
Headway (min:sec)	10:00	10:00	10:00
Trams per hour	6	6	6
Minimum round trip time (hr:min:sec)	01:53:25	01:06:20	01:38:52
Actual round trip time needed to provide required headways and minimum layover (hr:min:sec)	02:00:00	01:10:00	01:40:00
Total additional layover to achieve headways (min:sec)	06:35	03:40	01:08
Peak number of trams	12	7	10

Table 15 - Number of Trams needed for each service (based on 6 & 6 Trams per hour scenario)

Network Option	1a	1a and 1b
PVR	19	22
Standby/maintenance/repair/training	3	3
Total tram fleet required	22	25

Table 16 - Number of Trams needed for each Phase (based on 6 & 6 Trams per hour scenario)

	OCT - AIR service	NEW - HAY service	NEW - GRT service
Service used on Phase	1a and 1b	1a only	1b only
Headway (min:sec)	07:30	07:30	07:30
Trams per hour	8	8	8
Minimum round trip time (hr:min:sec)	01:50:55	01:06:20	01:37:22
Actual round trip time needed to provide required headways & minimum layover (hr:min:sec)	01:52:30	01:07:30	01:37:30
Total additional layover to achieve headways (min:sec)	01:35	01:10	0:08
Peak number of trams	15	9	13

Table 17 - Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario)

Network Option	1a	1a and 1b
PVR	24	28
Standby/maintenance/repair/training	3	3
Total tram fleet required	27	31

Table 18 - Number of Trams needed for each Phase (based on 8 & 8 Trams per hour scenario)

2.21 Tram Fleet Kilometre Usage

The journey times and fleet sizes calculated above can be used to derive an approximate annual fleet and per Tram kilometre run of:

INITIAL OPERATING TIMETABLE

6tph	Daily	Days	Km	6tph	Daily	Days	Km
Weekdays	5531	261	1443591	Weekdays	7103	261	1853883
Saturdays	5363	52	278876	Saturdays	6950	52	361400
Sundays	5318	52	276536	Sundays	6815	52	354380
Total			**1999003**	**Total**			**2569663**
Per Tram 27 trams			**74037**	**Per Tram 27 trams**			**95173**
ENHANCED AM & PM PEAK SERVICE							
8tph	**Daily**	**Days**	**Km**	**8tph**	**Daily**	**Days**	**Km**
Weekdays	6217	261	1622596	Weekdays	7840	261	2046240
Saturdays	5363	52	320150	Saturdays	6950	52	361400
Sundays	5318	52	276536	Sundays	6815	52	354380
Total			**2219282**	**Total**			**2762020**
Per Tram 27 trams			**82196**	**Per Tram 31 trams**			**89097**
FLAT DAYTIME PEAK SERVICE							
8tph	**Daily**	**Days**	**Km**	**8tph**	**Daily**	**Days**	**Km**
Weekdays	7436	261	1940796	Weekdays	9347	261	2439567
Saturdays	7292	52	379184	Saturdays	9224	52	479648
Sundays	5318	52	276536	Sundays	6815	52	354380
Total			**2596516**	**Total**			**3273595**
Per Tram 27 trams			**96167**	**Per Tram 31 trams**			**105600**

Figure 7 – Operational Timetable

The principal assumptions are:

- 'Empty' running to and from the Depot is included;

3 General

3.1 Definitions

In these Employer's Requirements, Schedule 1 (Definitions and Interpretation) and the following definitions shall apply:

Table 19 - Definitions

Term	Definition
Act	An Act of Parliament or the Scottish Parliament following consideration and approval of a Bill
AFC	Automatic Fare Collection (see also TVM)
AIP	Approval in Principle for structures
ALARP	As low as reasonably practicable
Approval	(see Consent); also an approval of detail by an authority where consent is deemed to be granted by with prior conditions.
AutoCAD	Proprietary software used for engineering design
AW0 – AW5	Standard loading conditions for Tram Vehicles defined at Section 22.2.3
BRB	British Railways Board
BS	British Standard
CAA	Civil Aviation Authority
Case for Safety	All necessary documentation, information and other requirements pursuant to the Railways and Other Guided Transport Systems (Safety) Regulations 2006;
CAR	Corrective Action Report
CCTV	Closed Circuit Television
CIBSE	Chartered Institute of Building Services Engineers
CMS	Central Management System
COCP	Code of Construction Practice
COMP	Code of Maintenance Practice
Communications Plan	The Plan to be developed in accordance with the Employer's Requirements
COSHH	Control of Substances Hazardous to Health Regulations 1998
DAT	Delivery Acceptance Test
DCCB	Direct Current Circuit Breaker
DDA	Disability Discrimination Act
Developed	The enlarged Kinematic Envelope that takes into account all of the possible effects of

Term	Definition
Kinematic Envelope (DKE)	curvature, including superelevation of the track together with end and centre throw of the Tram. It is speed dependent and unique to a particular location at a given speed (See also Static Envelope, Dynamic Envelope and Kinematic Envelope) (See also RSPG Part 2 Section G – Guidance on Tramways).
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DSD	Drivers Safety Device
Dynamic Envelope	The Static Envelope enlarged to the maximum possible displacement of the Tram in motion on straight track. It takes into account suspension characteristics and allowances for maintenance and wear of Trams. (End and Centre throw is not included.) (See also Static Envelope, Kinematic Envelope and Developed Kinematic Envelope.) (See also RSPG Part 2 Section G – Guidance on Tramways)
EDMS	Electronic Document Management System
EIA	Environmental Impact Assessment
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMP	Environmental Management Plan
Enhanced Timetable	The Timetable described at Part 1a with 16 trams per hour Hay to Oct
ES	Environmental Statement
FAT	Factory Acceptance Test
GDPO	Town and Country Planning (General Development Procedure)(Scotland) Order 1992
GPR	Ground penetrating radar
Grandfather Rights	A longstanding right where the original reason and date of the granting of the right is unknown
GSN	Goal Structured Notation
HCI	Human Computer Interface
HF	Human Factors
HLM	High Level Model
HMRI	Her Majesty's Railway Inspectorate (or the appropriate approval regime in force)
HS	Historic Scotland
HSCB	High Speed Circuit Breaker
HVAC	Heating, Ventilating and Air Conditioning
ICP	Independent Competent Person
ISO	International Organisation for Standardisation
ITSO	Integrated Transport Smartcard Organisation - a non profit sharing, member owned organisation supported by the Department for Transport

Term	Definition
ItN	Invitation to Negotiate
JRC	Joint Revenue Committee
Kinematic Envelope (DKE)	The Dynamic Envelope enlarged to allow for the permitted tolerances in track gauge, alignment, level and cross-level and the dynamic and static effects of track wear. It is speed dependant. See also Static Envelope, Dynamic Envelope and Developed Kinematic Envelope. (See also RSPG Part 2 Section G – Guidance on Tramways)
LBC	Listed Building Consent
LHMP	Landscape and Habitat Management Plan
Lifecycle Replacement Plan	The Plan to be developed in accordance with the Employer's Requirements
Line 3	A planned extension of the Edinburgh Tram Network to the south east. Line 3 is not currently being progressed although some safeguarding provisions are required.
LRU	Line Replaceable Unit
LRV	Light Rail Vehicle
Maintainer	Infrastructure and Tram Vehicle maintenance
Markov Analysis	Reliability modelling method
MUDFA	Multi-Utilities Diversion Framework Agreement
MX	Proprietary software used for engineering design
NCR	Non Conformance Report
NR	Network Rail
OEM	Original Equipment Manufacturer
OLE	Overhead Line Equipment
Operational Timetable	The Timetable described at Table 2 – First and Last Trams for the 6 & 6 Tram per Hour Operational Timetable Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable - Hay to Oct
ORR	Office of Rail Regulation
ORS	Operational Radio System
OTMR	On Tram Monitoring and Recording
PA	Public Address System
Pan	Pantograph
PCC	Point Control Cabinet
PCS	Point Control System
PHC	Point Heating Cabinet
PHP	Passenger Help Point
PEHP	Passenger Emergency Help Point

Term	Definition
PID	Passenger Information Display
Prior Approval	Written approval by any approving body evidencing prior consent.
QA	Quality Assurance
Quality Management Plan	The Plan to be developed in accordance with the Employer's Requirements
RAMS	Reliability, Availability, Maintainability and Safety
RSPG	Railway Safety Principles and Guidance
RSP2	Ralilway Safety Publication 2 – Guidance on Tramways
RTPI	Real Time Passenger Information
RVAR	Rail Vehicle Accessibility Regulations
Safety Management Plan	The Plan to be developed in accordance with the Employer's Requirements
SAT	System Acceptance Test
SCADA	Supervisory, Control and Data Acquisition
SCC	Supervisory Control and Communications
SCT	Site Commissioning Test
SEPA	Scottish Environment Protection Agency
Shadow Running	Validation of the Operational Timetable without carrying passengers
SIT	System Integration Test
SP	Swept Path
SSSI	Site of Special Scientific Interest
STAG	Scottish Transport Assessment Guidance
Static Envelope	The maximum cross-section of Trams loaded or unloaded at rest on straight and level track, taking account of tolerances in the manufacture of the trams and the effects on the suspension of tram loading and tram loads arising from the wind and other weather. See also Dynamic Envelope, Kinematic Envelope, and Developed Kinematic Envelope. (See also RSPG Part 2 Section G – Guidance on Tramways)
Sub-System	An individual technical element e.g. communications, Tram etc.
SUC	Statutory Utility Company
SUDS	Sustainable Urban Drainage System ('soakaways')
The System	Collectively the technical sub-systems that together form the Edinburgh Tram Network.
System Interface	The interaction point between the sub-systems
Test Plan	The proposals developed by the Infraco for the structured and programmed testing of the components and the System

Term	Definition
Test T1 – T5	Formal Test requirements defined at Tests and Commissioning
TPDS	Tram Position and Detection System
Tramway Path	The area reserved for a moving tram in its environment. (See also RSP2 – Guidance on Tramways)
Transdev	"Transdev Edinburgh Tram Limited" (TETL) the Edinburgh Tram Network Operator
TRO	Traffic Regulation Order
TRY	Test Reference Year
TTRO	Temporary Traffic Regulation Order
TSS	Traction Sub-Station
TSS	Technical Support Services – advisors to **tie**.
TVM	Ticket Vending Machine (see also AFC)
UTC	Urban Traffic Control
UPS	Uninterruptible Power Supply
WBS	Work Breakdown Structure
WEBS	West of Edinburgh Busway Scheme

3.2 Infraco Services

3.3 General

This section provides a summary of the services that shall be required to be undertaken by the Infraco throughout the duration of the Infraco Works, or during particular stages of the Infraco Works, as appropriate.

3.4 Management and Technical Services

3.5 Summary of Deliverables

This section summarises the Deliverables that shall be provided by the Infraco. The Deliverables shall be provided in accordance with the requirements of the Agreement and shall be reviewed in accordance with the Review Procedure.

The Infraco shall complete the Deliverables set out hereunder, in the timescales agreed, and as identified in the Submittal Programme referred to.

In addition to the required Deliverables, this section also develops, where appropriate, the management and technical systems and services that shall be required to be provided by the Infraco to meet these Employer's Requirements. The Infraco shall develop and submit the following Deliverables for approval by **tie** in accordance with the Review Procedure.

Table 20 - Table showing Summary of Deliverables

Communications, Meetings and Reporting
Communications Plan
Meetings Schedule
Progress Photos
Progress Reports
Site Reports
Topics Register
Programme
Programme to include Design, Construction, Snagging, Commissioning, training, shadow running and opening to passenger service
Time Chainage Diagram
Management Plans
Construction Health and Safety Plan

Construction Plan
Construction Stage Environmental & Sustainability Management Plan(s)
Documentation associated with the completion of all research, surveys and inspections
Environmental Action Plan (EAP)
Infraco KPI Reporting
Infraco Performance Measurement
Network Rail Interface Plan
Overall Approvals Management Plan and Approvals Management Plan
Project Health & Safety File
Project Management Plan
Quality Forms (associated with the Project Safety and Quality Interface document)
Quality Management Plan
Research, Surveys and Inspections
Safety Forms associated with the Project Safety and Quality Interface document.
Safety Management Plan
Schedule of Internal Audits
System Safety Management Plan
Testing and Commissioning Plans
Training Plans

Design Deliverables

Earthing and Bonding Plan
Case for Safety for the Network or Geographical Sections as applicable
Design Stage Configuration Management Plan
Design Stage Verification & Validation Plan
Detailed Cause Consequence Analysis
Functional Hazard Analysis
Hazard Log & Risk Register
Interface Control Documents
Interface Schedules
List of Applicable Standards
Procurement Plan
Requirements Specification / Database
Scheme Plan
Road Network Plan of affected areas
System Architecture Specification
System Design Specification
System Design Test Specification
System Interface Management Plan
System Interface Register

Detailed drawings and other detailed design documentation

Archaeological & Heritage Mitigation Plan
Boundaries Treatment Management Plan
Construction Advice
Construction Site Drainage Plan
Initial and Final Buildability Reports
Landscape and Habitat Management Plan
Method of Working around Protected Species
Other construction advice as noted
Procedures for dealing with Unidentified Apparatus or Recorded Artificial Obstructions
Schedule 3 (Code of Construction Practice) Deliverables
Schedule and Conditional Surveys of Structures / Buildings Documentation (Dilapidation)
Strategy for controlling Invasive and Alien Species
Survey Photographs of Reinstatement Work
Temporary Works, Security and Fencing Arrangements Plan
Waste Management Plan

Cost Management

Actual / Planned / Forecast Spend Tables / Curves
Change Control Schedule and background information
Cost Loaded Programme / Earned Value Analysis based on WBS structure
Cost Report
Schedule of Compensation Events and background information
Value Management Estimates / Analysis

Risk

Commissioning Risk Control Report
Construction Risk Control Report
Infraco Assumptions Register
Infraco Risk Management Plan
Infraco Risk Register
Operational and Maintenance Report
Residual Risk Control Report
Risk Progress Reports

Traffic Management and TTROs

Access Control Permit Procedures
Access Control Permits and Permits to Work
Permits to Work and Utility Permits to Work Procedures
Traffic Management and Work Site Staging Plan
TTRO Obligations and Traffic Management Procedures

Method Statements
Method Statements
Schedule and Conditional Surveys of Structures / Buildings and Documentation (to avoid delay to the Service Commencement Date)
Survey Photographs of Reinstatement Work
Surveys of Structures which may affect Progress
Stakeholder Management Deliverables
Communications Log
Information for the **tie** monthly newsletter
Procurement Schedule
Traffic Routing Map
Weekly Newsletter
Weekly updates of Progress
Other Deliverables as defined below:
Asset Register
Documentation - As-built Design Drawings
Infrastructure Maintenance Plan
Maintenance Plan
O&M manuals
Overall Approvals Management Plan and Approvals Management Plan
Overall Test and Commissioning Plan
Simulation
Spare Parts manuals
Spare Parts, Tools & Test Equipment
Staffing Plan and Recruitment, Retention and Training Plan
System Acceptance
System Integration – including System Integration Plan

3.6 Design

3.6.1 General Obligations

The Infraco shall be responsible for the complete design of the Edinburgh Tram Network including the achievement of full compliance with the Employer's Requirements. The Infraco shall be responsible for achieving the following:

- The Deliverables necessary to enable the Edinburgh Tram Network to be procured, constructed, tested, commissioned and brought into commercial service and consistent with the requirements for training and Case for Safety (taking account of the need to fully co-ordinate these activities, including with other physically-related projects, so as to minimise overall disruption) to meet these Employer's Requirements and the Programme.
- The Infraco shall produce a tram service simulation that will demonstrate that its implementation of the design will achieve the required run times, power consumption and service performance where defined in these Employer's Requirements;
- The Infraco shall ensure that the design covers all aspects of the Edinburgh Tram Network and the associated works as defined in these Employer's Requirements;
- The Infraco shall approach the design and technical services in a structured manner using a recognised 'V' life cycle model with regard to the integration of design engineering, systems engineering and safety engineering activities;
- The Infraco shall be responsible for ensuring that there are no gaps and omissions in the specification and design of the Edinburgh Tram Network;
- The Infraco shall demonstrate that the design has properly considered and adopted the most advantageous whole life cost solutions;

3.6.2 Design Approach

The design approach shall be as set out in the SDS Agreement. The Infraco shall:

- Adopt, develop and adapt the SDS Management Plans covering Configuration Management and Verification and Validation.
- Undertake such supplementary safety analysis that will allow further development of the Case for Safety concurrent with any design undertaken to prove that the Edinburgh Tram Network is acceptably safe;

- Where any new technologies are proposed by the Infraco, submit reports and presentations analysing and assessing the options and justifying the final selections of technologies in terms of time, cost, quality, safety, risk and maintainability, for review by **tie**;
- Prepare and maintain the Risk and Hazard Log;
- Prepare and maintain the System Architecture Specification;
- Prepare and maintain the System Design Specification;
- Prepare and maintain the System Design Test Specification;
- Prepare and maintain the Functional Hazard Analysis;
- Prepare and maintain the Detailed Cause Consequence Analysis;
- Prepare and maintain the Requirements Specification / Database;
- Prepare and maintain the Scheme Plan;
- Prepare and maintain the Procurement Plan;
- Prepare and maintain the Interface Schedules;
- Prepare and maintain the Earthing and Bonding Plan;
- Prepare and maintain the detailed drawings and other detailed design documentation;

3.6.3 Transport Modelling

The Infraco shall procure that the SDS provider performs its obligations in respect of

- transport modelling as such obligations are set out in the SDS Agreement.
- detailed traffic junction design recognition and evaluation and wider area effect assessment;
- temporary traffic diversions and support to **tie** where reasonably required in respect of obtaining the Traffic Regulation Order including impact analysis as defined in section 12.12.

For detailed traffic signal modelling; Infraco shall provide adequate modelling upon which to baseits design.

3.6.4 Environmental

All equipment shall meet its required operational functionality in accordance with these Employer's Requirements. The Edinburgh Tram Network and its components shall take cognisance of, inter alia, the following factors: electrical interference, dust, vibration, supply voltage variations, radio signal variations, solar radiation, temperature, humidity, salt, mist, wind, precipitation, snow etc.

Table 21 shows average temperature and humidity conditions for the region. Based on the given information all equipment shall be suitable for a working life as defined in Design Life of these Employer's Requirements under maximum ambient temperature range from – 9° to + 28 ° C, unless otherwise agreed by tie.

Edinburgh (eastern Scotland)

Sunshine (average hours per day)		Temperatures								Precipitation and humidity				Wet days (more than 0.1 mm/0.004 in)	
		Average daily				Highest recorded		Lowest recorded		Relative humidity		Average monthly precipitation			
		minimum		maximum						900	x				
		°C	°F	°C	°F	°C	°F	°C	°F	%		mm	in		
Jan	2	1	34	6	42	14	57	-8	17	84		57	2	17	Jan
Feb	3	1	34	6	43	14	58	-9	15	83		39	2	15	Feb
March	4	2	36	8	46	20	68	-6	21	81		39	2	15	March
April	5	4	39	11	51	22	72	-4	25	75		39	2	14	April
May	6	6	43	14	56	24	76	-1	31	76		54	2	14	May
June	6	9	49	17	62	28	83	3	37	75		47	2	15	June
July	5	11	52	18	65	28	83	6	42	78		83	3	17	July
Aug	4	11	52	18	64	28	82	4	40	80		77	3	16	Aug
Sept	4	9	49	16	60	25	77	1	33	80		57	2	16	Sept
Oct	3	7	44	12	54	20	68	-2	28	82		65	3	17	Oct
Nov	2	4	39	9	48	19	67	-4	24	83		62	2	17	Nov
Dec	1	2	36	7	44	14	58	-7	20	84		57	2	18	Dec

Based on readings for 30 years at 55°55' N, 3°11' W, altitude 134 m/440 ft.

Where equipment is enclosed in equipment housings / enclosures the equipment contained therein shall be capable of operating at an external ambient temperature 15°C higher than the upper limit and at a temperature of 5°C lower than the figures in Table 21 taking into account any heat generated by the equipment.

All equipment housings / enclosures that contain electronic equipment shall be so equipped to minimise the occurrence of condensation within the enclosure.

The following data in Figures 8 & 9 are based on the Edinburgh Test Reference Year (TRY) as given by CIBSE. It is a synthesised weather year based on 20 years of record data. CIBSE recommend that this type of weather data be used for analysing energy use and overall environmental performance.

Temperature

Dry Bulb Temperature	MAX 26.7°C	MIN –10.1°C	MEAN 8.43°C
Wet Bulb Temperature	MAX 18.9°C	MIN –10.7°C	MEAN 6.82°C

Figure 8 - Dry Bulb Temperature Analysis 1: Number of Hours per Year That the Dry Bulb Temperature is Greater Than the Given Value

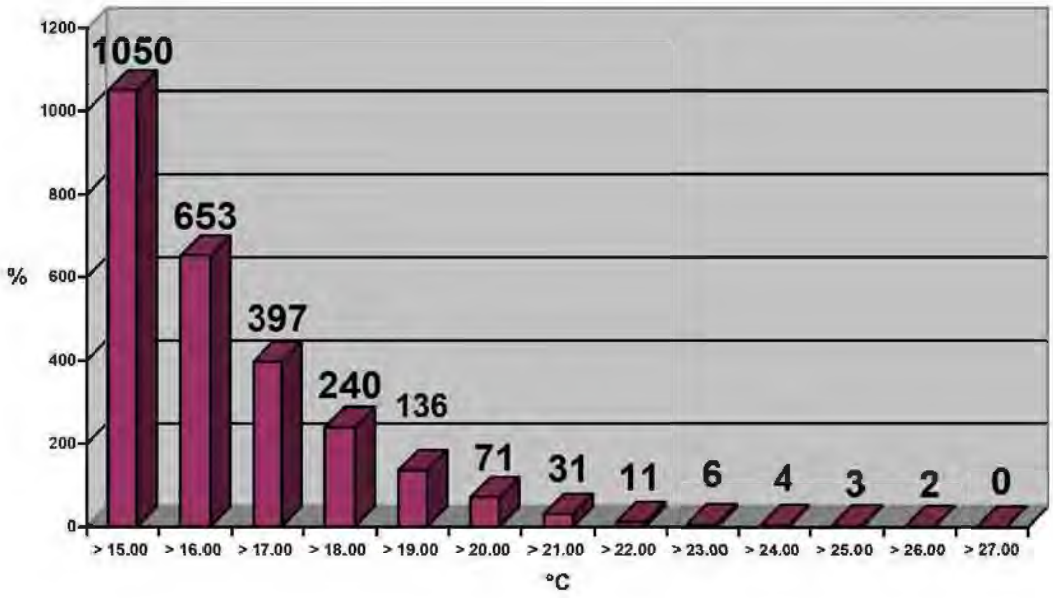
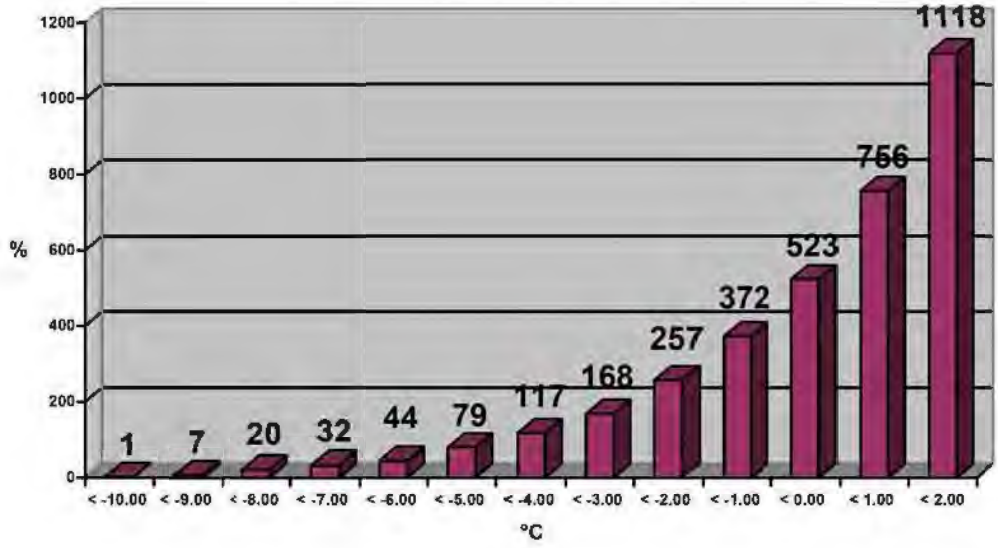


Figure 9 - Dry Bulb Temperature Analysis 2: Number of Hours per Year That the Dry Bulb Temperature is Less Than the Given Value



Wind Speed MAX 19.5m/s MIN 0m/s MEAN 4.6m/s

3.7 Construction-related Deliverables (Schedule 3 Requirements)

The following deliverables, from and with regard to *Schedule 3 (Code of Construction Practice and Code of Maintenance Practice)* are highlighted for submission in accordance with the Review Procedure:

- In accordance with Schedule 3 (Code of Construction Practice and Code of Maintenance Practice), the Infraco shall compile a schedule of all buildings, or other structures, which may be at risk of physical damage as a result of the Infraco Works. Furthermore records of the condition and surveys of any defects shall be prepared by the Infraco;

- Under Schedule 3 (Code of Construction Practice and Code of Maintenance Practice) there is a requirement for the Infraco to undertake works to address defects in existing structures, caused by the Infraco Works. Where such work is completed the Infraco shall be required to take appropriate photographs to fully demonstrate the quality of the reinstatement works;

3.8 Construction Advice and Buildability

The Infraco shall be required to develop a =Buildability Report in accordance with the Review Procedure.

The Infraco shall provide a Buildability Report in accordance with the Review Procedure, which shall address the following.

- The Infraco shall propose construction methods which shall be utilised in respect of the Infraco Works. The Infraco shall also advise **tie** on the time and cost implications of any alternative solutions proposed by the Infraco and which have been accepted by **tie**. The Infraco shall initiate the requirements for Temporary Works, and the programme for approvals for such Temporary Works and their execution.

- Notwithstanding the Infraco's obligations with respect to compliance with the third party agreements, the Infraco shall advise **tie** on the potential impact of the Infraco Works upon neighbouring occupiers and users of nearby roads, railways, buildings and airport facilities and the Infraco shall plan the execution of the Infraco Works in such a way as to minimise disruption and prevent nuisance.

- The Infraco shall advise **tie** on the provision and layout of the main site office and local Work Sector / Work Section facilities and services to be provided or secured by the Infraco. **tie**'s requirements for office accommodation at the main site office are expressed in this section.

The Infraco shall prepare, maintain and comply with plans, schedules and drawings that shall show the Infraco's proposals for temporary works, security and fencing arrangements throughout the duration of the Infraco Works ("Temporary Works, Security and Fencing Arrangements Plan").

3.9 Site Support Facilities for tie

The Infraco shall be responsible for the provision, servicing, maintenance and removal of the specified **tie** office accommodation and transport for the use of **tie** officers and staff

The Infraco shall provide and maintain fully serviced office accommodation and furnishings throughout the duration of the Infraco Works, in accordance with the following requirements:

- Office accommodation to accommodate 10 desks (Infraco supply) each with at least one secure lockable drawer, a swivel cloth upholstered chair. ;
- Three separate offices with a minimum working space of $16m^2$;
- 2 meeting rooms suitable for sitting up to 20 and 8 people respectively;
- Male and female toilets. Minimum area $3m^2$ each;
- Changing/Locker facilities;
- Kitchen facilities;
- Drying facilities;
- Male & Female shower room;
- Parking for up to 15 cars.

The Infraco shall prepare and submit an office layout based on the accommodation description set out below for approval by **tie**.

The Infraco shall integrate this accommodation with the Infraco's own accommodation and, subject to proposals which are acceptable to **tie**, the meeting rooms and welfare facilities may be shared by the Infraco.

3.9.1 Fittings and Furnishings

The Infraco shall also provide the following as minimum requirements:

General Office

- 7 x 4 drawer lockable metal filing cabinets
- 6 wall mounted notice board 1m high 1.5m wide
- 10 waste paper baskets
- 10 telephones connected to 2 lines
- 1 fax machine connected to a separate dedicated line
- 1 high output combined printer and photocopier capable of producing A4 and A3 black and white copies
- 10 connections to internet via broadband, all able to connect at same time
- 1 plan layout table 1 x 2 m
- 1 A0 drawing board and drafting equipment
- 10 desk lamps
- 10 letter tray/ filing baskets
- 2 m of book shelves at 6 of the desks
- 6 large white boards

Meeting Rooms

- Suitably sized tables and the requisite number of chairs for each of the two meeting rooms referred to above.

- 3 flip charts and flip chart paper as required and 1 large wall mounted white board in each meeting room

Changing / drying room

- Lockers c/w locks and keys for 30 people
- 4 chairs
- 30 coat pegs mounted on wall
- 1 boot pull.

General

- A security alarm system
- Access doors, fitted with five lever mortice locks and 6 sets of keys

3.9.2 Services

The Infraco shall provide, install and maintain all the services i.e. Gas, electric, water, drainage, telephone (two lines), broadband etc necessary to ensure effective occupation by **tie** of the accommodation for the duration of the Infraco Works

The Infraco shall provide install and maintain a printer/photocopier capable of producing A4 and A3 size black and white photocopies. The Infraco shall ensure that sufficient stocks of consumables (including paper and toner) are available at all times. Subject to acceptable proposals, the photocopier / fax may be shared by the Infraco and **tie**.

The Infraco shall provide tea, coffee, sugar fresh milk and a supply of drinking water for use by **tie** for the duration of the Infraco Works.

The Infraco shall arrange for the servicing and daily cleaning of the accommodation.

Toilet paper, paper towels, soap, and detergents shall be provided by the Infraco as required.

3.9.3 Equipment

The Infraco shall provide the following equipment for the exclusive use of **tie** throughout the duration of the Infraco Works:

- 10 x 10m long steel tape measures
- 10 x 50m long tape measures
- 10 x high output hand-held torches
- 2 approved electronic utility tracers for tracing/locating cables and pipes
- other consumables as may be required by **tie** (i.e. marker paint etc.).

The Infraco shall provide surveying/setting out equipment to **tie** as reasonably required, in connection with the Infraco Works.

3.9.4 Site Vehicles

The Infraco shall provide, licence, insure (comprehensive for any qualified driver together with any authorised passengers and the carriage of goods or samples), service and maintain four 4 wheeled road vehicles (suitable for the Edinburgh Tram Network) and visitor transport for the exclusive use of **tie**'s representative and staff to enable them to carry out their duties for the duration of the Agreement. The number and type shall be to the specific approval of **tie**.

The vehicles shall be delivered and maintained by the Infraco in good, roadworthy condition.

The Infraco shall provide fuel, oil and maintenance in conformity with the vehicle manufacturers' recommendations and shall clean the vehicles inside and outside as required by **tie**.

A suitable replacement vehicle shall be provided by the Infraco in the event any vehicle being out of service for more than 24 hours.

The Infraco shall ensure that each vehicle shall be fitted with approved warning beacons and any other safety equipment as required for work on roads or within the boundaries of the Edinburgh International Airport.

3.10 Spare Parts, Tools and Test Equipment

The Infraco shall be responsible for the provision, delivery, offloading and placing into stores of the necessary Spares Parts, Tools & Test Equipment.

Detailed requirements and deliverables in respect of the Spares Parts, tools and Test Equipment responsibilities are included in the Agreement.

3.11 Documentation

The Infraco shall be responsible for the provision of all as built / constructed / manufactured drawings, manufacturers information, test certification and other documentation to be provided inaccordance with the Agreement.

Detailed requirements and Deliverables in respect of the documentation responsibilities are included within the Agreement and the Maintenance section of these Employer's Requirements.

3.12 Training

The Infraco shall be responsible for all necessary initial training associated with the operation and maintenance of the Edinburgh Tram Network. Detailed requirements and deliverables in respect of the Training responsibilities are included within Section 40 (*Maintenance*) of these Employer's Requirements.

4 Use of Industry Standard Equipment

The Infraco shall base its system supply on Commercial Off the Shelf (COTS) equipment and software. The use of proprietary equipment and software which is not available on a COTS basis is prohibited unless prior written agreement has been obtained from **tie**, other than that which is specified in the Infraco Proposal.

This is to allow the maintenance, extension and modification of the ETN by third party suppliers and maintainers if necessary.

All electronic interfaces between subsystems shall use open standards and shall utilise non-proprietary protocol.

5 System Identity and Branding

A single system identity shall be applied to the ETN. This shall be developed by **tie** through a specialist contractor appointed by **tie**. The output of this contract with the specialist contractor shall be a documented set of design guidelines which shall be incorporated into these Employer's Requirements as Appendix 1 and which shall be complied with by the Infraco in respect of the Infraco Works. The design guidelines shall include the following elements:

- Logo and other elements of the ETN's graphic identity;
- Signage;
- Application of the systems identity to the following:
  - Ticket machines;
  - Stop furniture;
  - Passenger information;
  - Depot.
- Tram livery;
- Tram interior;
- Uniforms;
- Pictograms;
- Other aspects of the ETN which are visible to the public.

6 Design Life

The equipment and systems to be supplied for the Edinburgh Tram Network shall be designed and built by the Infraco to a standard that shall ensure the System as a whole is capable of continuous operation for a minimum period of 15 years from the Service Commencement Date for each Phase.

Individual items of Infrastructure and equipment shall have a design life as indicated in the table below. Where the design life for an item of equipment is not specified, a minimum of 15 years shall be assumed. All design lives are from the Service Commencement Date for each Phase.

Item of Equipment or System	Design Life
Trams	30 years
Structures	120 years
Track Bed	50 years
Track	25 years
Rails in Straight Lines	20 years
OLE	30 years
Power Cables	30 years
Substations and Substation Equipment	30 years
Tramstop Platforms	50 years
Tramstop Superstructure (including shelters and poles)	25 years
Tram Position and Detection equipment	15 years
Passenger Information Displays	10 years
Telephone Handsets	10 years
Telephone PABX	15 years
Voice recorder	15 years
PA Controller	10 years
Loudspeakers	15 years
Hand Portable Radio Handsets	5 years
Vehicle Mobile Radio Equipment	7 years

Item of Equipment or System	Design Life
Radio Base Station Equipment	15 years
Radio Masts and Antennae	15 years
Passenger Help Points	15 years
CCTV cameras	7 years
CCTV Digital Video Recorders	7 years
SCADA outstations	20 years
Fibre Optic Cabling and Patch Panels	25 years
Fibre Optic Switches, Routers, Hubs	15 years
Other communications equipment	15 years
Cabinets	25 years
UPS systems (excluding batteries)	15 years
Copper Communications Cables	25 years
Batteries (if employed)	4 years
Workstations including Monitors	5 years
Servers	5 years
Standard hand tools	5 years
Portable electrical tools	7 years

Table 22 - Equipment Design Life

7 Extensibility

Table 23 below sets out the assumptions being made in the design of Phase 1a and Phase 1b to allow Phases 2 and 3 to be added with minimum change, and also for future increase in service levels on Phase 1a/1b (over the "8+8" pattern) and for the addition on the proposed Line 3 (assumed routing Bridges-Princes St-Haymarket).

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
Track Layout	Roseburn Junction/Delta	Design for full delta	n/a		n/a	n/a
	Balgreen loop and crossover	Design for loop and crossover	n/a		n/a	n/a
	Granton Square	Design for interim terminus	Design for track continuation; build initial as over-run for terminus	n/a	n/a	n/a
	Newhaven	Design for interim terminus	Design for track continuation	n/a	n/a	n/a

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Ingliston Junction and P&R Tramstop	Make provision for Phase 3 and long-term aspirations	Alignment design not to preclude an allowance terminating Phase 3 service at Ingliston P&R and for East-West continuation from Phase 1	n/a	n/a	n/a
	Track alignment at Princes St/South St Andrew St Junction	Make Provision for Line 3	n/a	n/a	Alignment to allow pointwork and appropriate future traffic management(See CR078)	n/a
Modelling	Network modelling inc. for TSJs	To support 8+8 service	None	None	None	n/a
Traction Power	Traction Power Supply system (Substations/OLE/cabling)	To support 8+8 service +50% addition	Part of basic design	In basic design	Effectively in basic design, as an alternative use of the increased service design provision	n/a

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Definition of Power characteristics (and other parameters for modelling)	Full traction characteristic of the selected tram	n/a	n/a	n/a	n/a
Depot	Stabling sidings	Design for 35, build for 27	Inc. in 8 extra	Inc. in 8 extra	Not specifically included	n/a
	Workshop	8 Berths theoretical maximum; (practically:4 berths plus 2 service roads)	Initial design would accommodate	Initial design would accommodate	Not specifically included	n/a
	Depot staff accommodation	Numbers to be accommodated nominally match fleet that could be accommodated	Initial design would accommodate	Initial design would accommodate	Not included	n/a
	Depot car parking	See drawings	n/a	n/a	Not included	n/a
	Depot Control Centre	Design for 5 desks; provide 3	Design layout would accommodate	Initial provision would accommodate	Design layout would accommodate	n/a

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Depot stores	Design basis	Would accommodate	Would accommodate	Not included	n/a
						n/a
SCC	ODN capacity					
	General capacity	There is an initial +50% requirement above the calculated maximum usage	TBA	TBA	TBA	n/a
	Route coding capacity	3-digit route-coding included	Included in base	n/a	Included in base	n/a
	Radio system capacity	A minimum[2] of two channels at each base station	TBA	TBA	TBA	n/a
Roads	Traffic Signalled Junction design and modelling (inc. at temporary termini)	Phase 1a/1b only	Possibly ductwork at temporary termini	n/a	None	n/a

[2] *The word maximum would allow no channels to be provided and still be compliant! Two channels ok as a minimum.*

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Traffic Management layout at Princes St/South St Andrew St	Phase 1a only	n/a	n/a	None	n/a
	Traffic signalling ductwork	Design basis	n/a	n/a	n/a	Allowance in design at locations where additional signals might be provided
Tramway Ducting	Ductwork and access chambers	A minimum of 20% addition of the number of ducts	Initial design would accommodate	Initial design would accommodate	Initial design would accommodate	n/a
Utilities	Cross-track ducts	Where agreed with the SUCs, provision of secondary spare duct	n/a	n/a	n/a	Provision in design basis

Table 23 - Extensibility Assumptions

8 Standards

8.1 Principles

Where there is no relevant standard specified in the Agreement, the Infraco Works shall comply as a minimum with relevant current British or European Standards, DfT and/or Scottish Government Publications, Standards and Technical Memoranda or IEC/ISO Standards in accordance with the order of precedence set out in section 8.2.

The Infraco Works shall comply with the ORR Safety Publication 2 and with the requirements of HMRI. Where standards do not exist, the Infraco Works shall comply with Good Industry Practice and all relevant codes of practice and guidance notes. Materials or equipment provided shall be in accordance with regulations and standards appropriate to the United Kingdom or the country of manufacture, but only where in the opinion of **tie**, compliance with the regulations and standards appropriate to the country of manufacture ensures an equivalent or higher quality than the regulations and standards appropriate to the United Kingdom. In such situations, the onus will be on the Infraco to prove that they are of an equivalent or higher quality.

Where standards are specified in these Employer's Requirements, these shall include any successor or replacement standards, announced or in force before7 August 2007 and in relation to Tram Supply Obligations and Tram Maintenance Obligations only, 14 September 2007, which provide an equivalent or improved quality and standard.

The Infraco shall comply with standards reasonably required by the relevant Roads Authority, including any local standards and amendments to the Design Manual for Roads and Bridges.

The Infraco shall be responsible for identifying all proposed departures from standards: in these instances, the Infraco shall seek the formal approval of **tie**, and provide all details justifying the departure from standards.

The Infraco shall be responsible for making any necessary applications to the relevant Roads Authority for departure from standards and for complying with the resulting consequences, including those arising from the failure of an application for such departure.

The Infraco shall ensure that all materials, construction and workmanship comprised in the Infraco Works meet the requirements of the British or European standards relevant to the materials used. Materials used should have a British Board of Agrément Certificate wherever reasonably possible which identifies a lifespan for that material.

8.2 Hierarchy of Precedence.

The order of precedence shall be as follows:

1) Legislation;

2) Guidance;

3) Where not included in Guidance;

(i.) British Standards;

(ii.) Scottish Government standards and guidance;

(iii.) Local Authority standards (CEC);

(iv.) Statutory Utility standards;

(v.) International Industry standards.

8.3 The Infraco's Responsibilities

The Infraco in its system integrator role and as the system designer shall be responsible for:

- As appropriate, the development of, and compliance to, robust management processes in respect of compliance with Law and any other relevant standards or regulations included in the Agreement and section 8.2.
- The identification and selection of appropriate standards for all aspects of the Infraco Works
- The identification and definition of any application limits of such standards for all aspects and at all stages of the Infraco Works (such as design, construction, testing and commissioning, operation, and maintenance) in particular at the network, System and subsystem level.
- The identification and successful resolution of any conflicts within and between the obligations contained within this section 8 and Law.

8.3.1 Applicable Standards

Applicable standards are listed in the following table.

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare collection	OLE	SC & C	Tramstops	Depot	Trams
BS 8500 – 1: 2002	Concrete – Complementary British Standard to BS EN 206-1. Method for specifying and guidance for specifier	x	x	x			x		x	x	
BS 8500 – 2: 2002	Concrete – Complementary British Standard to BS EN 206-1. Specification for constituents material and concrete	x	x	x			x		x	x	
BRE Special Digest Nr 1	Concrete in aggressive ground.	x	x	x			x		x	x	
BS 4449: 1997	Specification for carbon steel bars for reinforcement of concrete	x	x	x			x		x	x	
BS 6744: 2001	Stainless steel bars for the reinforcement and use in concrete – Requirements and test methods	x	x	x			x		x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Pwr Collection	TIE	SC & C	Transhipm.	Depot	Trams
BS EN 10210 S355 J2H	Steelwork: Hollow sections	x					x				
BS EN 10025 S355J2G3	Steelwork: All other sections	x					x			x	
BS 5400 -	Steel, Concrete and Composite Bridges	x									
BS 5400 - Part 1: 1988	General Statement (see BD 15/92)	x									
BS 5400 Part 2: 1978	Specification for Loads (See BD 37/01)	x									
BS 5400 Part 3: 2000	Code of Practice for Design of Steel Bridges	x									
BS 5400 Part 4: 1990	Code of Practice for Design of Concrete Bridges (see IA.5 and BD 24/92)	x									
BS 5400 Part 5: 1979	Code of Practice for Design of Composite Bridges (see BD 16/82)	x									
BS 5400 Part 9: 1983	Bridge Bearings (see BD 20/92)	x									
BS 5400 Part 10: 1980	Code of Practice for Fatigue (see BD 9/81)	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	TIE	SC & C	Transtoyne	Depot	Trams
BS 5930: 1999	Code of Practice for Site Investigations	x	x	x					x	x	
BS 8666: 2000	Scheduling, Dimensioning, Bending and Cutting of Steel Reinforcement for Concrete	x	x	x			x		x	x	
BS EN 206-1: 2000	Concrete - Specification, performance, production and conformity (AMD 13189)	x	x	x			x		x	x	
BS 8500-1: 2002	Concrete – Complimentary British Standard to BS EN 206-1. Method of specifying and guidance for the specifier.	x	x	x			x		x	x	
BA 47/99 (Aug '99)	Waterproofing and Surfacing of Concrete Bridge Decks	x									
BA 41/98 (Feb '98)	The Design and Appearance of Bridges	x									
BA 42/96 (Nov '96)	The Design of Integral Bridges	x									
BA 55/00 (May '00)	The Assessment of Bridge Substructures & Foundations, Retaining Walls & Buried Structures	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	TIE	SC & C	Trams/Vehs	Depot	Trams
BA 57/95 (Aug '95)	Design For Durability	x									
BD 2/79 (Jun '88)	Technical Approval of Highway Structures on Motorways and other Trunk Roads, Part IV: Procedures for Lighting Columns	x		x							
BD 2/89 (Oct '89)	Technical approval of DTp highway structures on motorways and other trunk roads Part 1, General Procedures	x									
BD 7/81 (Aug '81)	Weathering steel for highway structures	x									
BD 9/81 (Dec '81)	Implementation of BS 5400 Pt 10, CP for fatigue	x									
BD 12/95 (Feb '96)	Design of Corrugated Steel Buried Structures with spans not exceeding 8m (including circular Arches)	x									
BD 13/90 (Feb '91)	Design of Steel Bridges Use of BS 5400: Part 3: 1982	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	TIE	SC & C	Transtuys	Depot	Trams
BD 15/92 (Dec '92)	General Principles for the Design and Construction of Bridges Use of BS 5400: Part 1: 1988	x									
BD 16/82 (Dec '82)	Design of composite bridges - Use of BS 5400 Pt 5: 1979 including Amendment No. 1 (Dec '87)	x									
BD 20/92 (Oct '92)	Bridge Bearings Use of BS 5400: Part 9: 1983	x									
BD 21/97 (Aug '97)	The Assessment of Highway Bridges and Structures Amendment No. 1 (Aug '97)	x									
BD 24/92 (Nov '92)	Design of Concrete Highway Bridges and Structures Use of BS 5400: Part 4: 1990 Including Interim Advice Note IA.5 July 1996	x									
BD 28/87 (Jul '87)	Early thermal cracking of concrete including Amendment No. 1 (Aug '89)	x									
BD 30/87 (Jul '87)	Backfilled retaining walls and bridge abutments	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Pwr Collection	OLE	SC & C	Transigns	Depot	Trams
BD 31/87 (Jan '88)	Buried concrete box type structures	x									
BD 33/94 (Nov '94)	Expansion Joints for Use in Highway Bridge Decks	x									
BD 37/01 (Aug '01)	Loads for Highway Bridges	x									
BD 42/00 (May '00)	Design of Embedded Retaining Walls and Bridge Abutments	x									
BD 43/90 (Apr '90)	Criteria and Material for the Impregnation of Concrete Highway Structures	x									
BD 44/95 (Jan '95)	The Assessment of Concrete Highway Bridges and Structures Including Interim Advice Note IA.4 July 1996.	x									
BD 47/99 (Aug '99)	Waterproofing and Surfacing of Concrete Bridge Decks	x									
BD 48/93 (Jun '93)	The Assessment and Strengthening of Highway Bridge Supports	x									
BD 49/93 (Jan '93)	Design Rules for Aerodynamic Effects on Bridges	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transigne	Depot	Trams
BD 52/93 (Apr '93)	The Design of Highway Bridge Parapets	x									
BD 56/96 (Nov '96)	The Assessment of Steel Highway Bridges and Structures	x									
BD 57/95 (Aug '95)	Design for Durability	x									
BD 58/94 (Nov '94)	The Design of Concrete Highway Bridges and Structures with External and Unbonded Prestressing	x									
BD 60/94 (Apr '94)	The Design of Highway Bridges for Vehicle Collision Loads (this does not apply to existing structures).	x									
BD 70/97 (Feb '97)	Strengthened/Reinforced Soils and Other Fills for Retaining Walls and Bridge Abutments (use of BS 8006:1995)	x									
BD 74/00 (May '00)	Foundations	x					x			x	
TD 9/93 (Jun '93)	Highway Link Design	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Pwr Collection	OLE	SC & C	Transigns	Depot	Trams
TD 27/96 (Aug '96)	Cross sections and headrooms	x									
ASO10	Railway sleepers – Jarrah, Karri and Wandoo.		x								
ASO11	Railway crossing timbers – Jarrah.		x								
BS EN 13674-1:2003	Specification for railway rails (partially replaces BS11)		x								
BS47	Fishplates for railway rails.		x								
BS EN 13043:2002	Aggregates for bituminous mixtures and surface treatments for roads.		x	x						x	
BS64	Specification for normal and high strength steel bolts and nuts for railways rail fishplates.		x								
BS729	Specification for hot dip galvanised coatings on iron and steel articles.		x								
BS EN 1097-3:1998	Testing aggregates. (partially replaces BS812)		x								

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transigns	Depot	Trams
BS970	Specification for wrought steels for mechanical and allied engineering purposes.		x								
BS1377	Methods of tests for soils for civil engineering purposes.	x	x	x			x			x	
BS3100 (withdrawn)	Specification for steel coatings for general engineering purposes.		x				x			x	
BS4921	Specification for sheradised coatings on iron and steel.		x				x			x	
BS EN 10270-1:2001	Specification for patented cold drawn steel wire for mechanical springs.		x								
BS6906	Methods of tests for geotextiles.		x								
BS EN 1562	Founding. Malleable cast irons.		x								
BS EN 1563	Founding. Spheroidal graphite cast iron.		x								
BS EN 13481-2	Performance requirements for fastening systems for concrete sleepers.		x								
BS EN 13481-3	Performance requirements for fastening systems for wooden sleepers.		x								

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	TMS	SC & C	Transigns	Depot	Trams
BS EN 10002 – 1	Tensile testing of metallic materials (method of test at ambient temperature).		x								
BS EN 10025	Hot rolled products of structural steels. General technical delivery conditions		x							x	
ENAAA-2	Railway applications – Track – Fastening Systems Part 2: Performance requirements for fastening system for concrete sleepers.		x								
ISO/R887	Plain washers for metric bolts, screws and nuts.		x								
RT/E/S/40045	Network Rail Standard Electric Points Heating.		x								
UIC605OR	Protection from corrosion – measures to be taken on direct current catenaries to reduce the risks on adjacent piping and cable systems.		x								
UIC860	Technical specification for the supply of rails.		x								

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Trainborne	Depot	Trams
UIC861-2	Standard sections for points rails adapted to the UIC54 and 60kg/m rail sections.		x								
UIC861-3	Standard 60kg/m rail profiles – types UIC60 and 60E.		x								
UIC863	Technical specification for the supply of non-treated track support (wooden sleepers for standard and broad-gauge track and crossing timbers).		x								
UIC863-1	Use of non-European timbers for the manufacture of sleepers.		x								
UIC864-1	Technical specification for the supply of sleeper screws.		x								
UIC864-2	Technical specification for the supply of steel track bolts.		x								
UIC864-3	Technical specification for the supply of spring steel washers for use in permanent way.		x								

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	TVM	SC & C	Transtuns	Depot	Trams
UIC864-4	Technical specification for the supply of fishplates or sections for fish-plates made of rolled steel.		x								
UIC864-5	Technical specification for the supply of rail seat pads.		x								
UIC864-6	Technical specification for the supply of baseplates and for sections for baseplates made of rolled steel.		x								
UIC864-7	Rolled profiles for baseplates for UIC rails.		x								
UIC864-8	Rolled profiles for fishplates for 54kg/m and 60kg/m rails.		x								
UIC866	Technical specification for the supply of cast manganese steel crossings for switch and crossing work.		x								
BS 1363-2:1995	13A plugs, sockets-outlets and adaptors. Part 2, Spec. for 13A switched and unswitched socket-outlets				x			x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	ITS	SC & C	Transform	Depot	Trams
BS 1363-4:1995	13A plugs, socket-outlets and adaptors. Part 4, Spec. for 13A fused connection units switched and unswitched				x			x	x	x	
BS 3573:1990	Polyolefin copper-conducted telecommunications cables							x	x	x	
BS 4533-102.1:1990	Luminaires. Particular requirements. Part 102.1 Fixed general purpose luminaires				x				x	x	
BS 4579-1:1970 (withdrawn, replaced by BS EN 61238-1)	Performance of mechanical and compression joints in electric cable and wire connectors. Part 1 Compression joints in copper conductors				x	x	x	x	x	x	
BS 4579-2:1973	Performance of mechanical and compression joints in electric cable and wire connectors. Part 2 Compression joints in nickel, iron and plated copper conductors				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transtops	Depot	Trams
BS 4662:1970 (withdrawn. replaced by BS 4662:2006)	Specification for boxes for the enclosure of electrical accessories				x	x	x	x	x	x	
BS 4737-4.1:1987	Intruder alarm systems in buildings. Part 4.1 Codes of practice. Code of practice for planning and installation				x				x	x	
BS 5225-1:1975	Photometric data for luminaires. Part 1 Photometric measurements				x				x	x	
BS 5225-3:1982	Photometric data for luminaires. Part 3 Method of photometric measurement of battery-operated emergency lighting luminaires				x				x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transtops	Depot	Trams
BS 5266-1:1999	Emergency lighting. Part 1 Code of practice for the emergency lighting of premises other than cinemas and certain other specified premises used for entertainment				X				X	X	
BS 5266-3:1981	Emergency lighting. Part 3 Specification for small power relays (electromagnetic) for emergency lighting applications up to and including 32A				X				X	X	
BS 5467:1997 (equivalen european harmonisation document to be provided)	Specification for 600/1000V and 1900/3300V armoured electric cables having thermosetting insulation				X		X		X	X	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Trainborne	Depot	Trams
BS 546:1950	2-pole and earthing-pin plugs, socket-outlets and socket-outlet adaptors. See also Supplement No 1:1960 Specification for plugs made of resilient material				x				x	x	
BS 5486-11:1989 (withdrawn, replaced by BS EN 60439)	Low-voltage switchgear and control gear assemblies. Part 11 Specification for particular requirements of fuseboards				(withdrawn, replaced by BS EN 60439)x			x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transtops	Depot	Trams
BS 5486-12:1989 (withdrawn, replaced by BS EN 60439)	Low-voltage switchgear and control gear assemblies. Part 12 Specification for particular requirements of type-tested miniature circuit-breaker boards				x			x	x	x	
BS 5499-1:2002	Graphical symbols and signs. Part 1 Safety signs, including fire safety signs. Specification for geometric shapes, colours and layout				x				x	x	
BS 5499-3:1990	Fire safety signs, notices and graphic symbols. Part 3 Specification for internally-illuminated fire safety signs				x			x	x	x	
BS 5499-5:2002	Graphical symbols and signs. Safety signs, including fire safety signs. Part 5 Signs with specific safety meanings				x			x	x	x	
BS 5649-2:1978	Lighting columns. Part 2 Dimensions and tolerances			x					x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transtoyne	Depot	Trams
BS 5649-5:1982	Lighting columns. Part 5 Specification for base compartments and cableways			X					X	X	
BS 5649-7:1985	Lighting columns. Part 7 Method for verification of structural design by calculation			X					X	X	
BS 5733:1995	Specification for general requirements for electrical accessories				X	X	X	X	X	X	
BS 5839-1:2002	Fire detection and alarm systems for buildings. Part 1 Code of practice for system design, installation, commissioning and maintenance				X				X	X	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6004:2000 (equivalen european harmonisatio n document to be provided)	Electric cables. PVC insulated, non-armoured cables for voltages up to and including 450/750V, for electric power, lighting and internal wiring				x	(pl eas e pro vid e eq uiv ale n eur op ea n har mo nis atio n doc um ent)x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distn	Fare Collection	OLE	SC & C	Transigns	Depot	Trams
BS 6121-2:1989 (withdrawn, replaced by BS EN 50262)	Mechanical cable glands. Part 2 Specification for polymeric glands				(withdrawn, replaced by BS EN 50262)x	x	x(withdrawn; refer to "Power")	x	x	x	
BS 6133:1995	Code of practice for safe operation of lead-acid stationary batteries								x	x	
BS 6290-2:1999	Lead-acid stationary cells and batteries. Part 2 Specification for the high-performance Plant positive type								x	x	

Specification No.	Specification Title	Simulators	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transtops	Depot	Trams
BS 6290-4:1997	Lead-acid stationary cells and batteries. Part 4 Specification for classifying valve regulated types								x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	TVM	SC & C	Transtops	Depot	Trams
BS 6346:1997 (equivalent european harmonisation document to be provided)	600/1000V and 1900/3300V armoured electric cables having PVC insulation				x(please provide equivalen european harmonisation doc	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transigns	Depot	Trams
BS 6651:1999 (withdrawn, replaced by BS EN 62305)	Code of Practice for protection of structures against lightning	x			(withdrawn, replaced by BS EN 62305)x	x	x(withdrawn; refer to "Power")	x	x	x	
BS 6701:1994	Code of Practice for installation of apparatus intended for connection to certain telecommunication systems				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Pwr Collection	E/E	SC & C	Transtops	Depot	Trams
BS 6724:1997 (equivalent european harmonisation document to be provided)	600/1000V and 1900/3300V armoured electric cables having thermosetting insulation and low emission of smoke and corrosive gases when affected by fire				x	x	x	x	x	x	
BS 7001:1988	Interchangeability and safety of a standardized luminaire supporting coupler								x	x	
BS 7211:1998 (equivalent european harmonisation document to be provided)	Thermosetting insulated cables (non-armoured) for electric power and lighting with low emission of smoke and corrosive gases when affected by fire				x	x	x	(refer to "Power")x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transitions	Depot	Trams
BS 7430:1998	Code of practice for earthing	x			x	x	x		x	x	
BS 7654:1997	Single phase street lighting fuses (cut-outs) for low-voltage public electricity distribution systems. 25A rating for highway power supplies and street furniture			x					x	x	
BS 7671:2001	Requirements for electrical installations. IEE Wiring Regulations. Sixteenth edition			x	x	x	x	x	x	x	
BS 7919:2001 (equivalent european harmonisation document to be provided)	Electric cables. Flexible cables rated up to 450/750V, for use with appliances and equipment intended for industrial and similar environments			x	x	x	x	x(refer to "Power")	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Pwr Collection	OLE	SC & C	Transtops	Depot	Trams
BS EN 12613:2001	Plastic warning devices for underground cables and pipelines with visual characteristics			x	x	x	x	x	x	x	
BS EN 40-1:1991	Lighting columns. Part 1 Definitions and terms			x					x	x	
BS EN 40-3-1:2000	Lighting columns. Part 3-1 Design and verification. Specification for characteristic loads			x					x	x	
BS EN 40-3-2:2000	Lighting columns. Part 3-2 Design and verification. Verification by testing			x					x	x	
BS EN 40-5:2002	Lighting columns. Part 5 Requirements for steel lighting columns			x					x	x	
BS EN 40-6:2002	Lighting columns. Part 6 Requirements for aluminium lighting columns			x					x	x	
BS EN 50085-1:1999	Cable trunking and cable ducting systems for electrical installations. Part 1 General requirements			x	x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Trainborne	Depot	Trams
BS EN 50085-2-3:2001	Part 2-3 Particular requirements for slotted cable trunking systems intended for installation in cabinets				x	x	x	x	x	x	
BS EN 50086-2-1:1996	Conduit systems for cable management. Part 2-1, Particular requirements. Rigid conduit systems				x	x	x	x	x	x	
BS EN 50171:2001	Central power supply systems				x	x	x	x	x	x	
BS EN 50173-1:2002	Information technology. Generic cabling systems. General requirements and office areas				x	x	x	x	x	x	
BS EN 50174-1:2001	Information technology. Cabling installation. Part 1 Specification and quality assurance				x	x	x	x	x	x	
BS EN 50174-2:2001	Information technology. Cabling installation. Part 2 Installation planning and practices inside buildings				x	x	x	x	x	x	
BS EN 50262:1999	Metric cable glands for electrical installations				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transtops	Depot	Trams
BS EN 50310:2000	Application of equipotential bonding and earthing in buildings with information technology equipment				x	x	x	x	x	x	
BS EN 54-10:2002	Fire detection and fire alarm systems. Part 10 Flame detectors. Point detectors				X				x	x	
BS EN 54-11:2001	Fire detection and fire alarm systems. Part 11 Manual call points				X				x	x	
BS EN 54-1:1996	Fire detection and fire alarm systems. Part 1 Introduction				X				x	x	
BS EN 54-2:1998	Fire detection and fire alarm systems. Part 2 Control and indicating equipment				X				x	x	
BS EN 54-3:2001	Fire detection and fire alarm systems. Part 3 Fire alarm devices. Sounders				X				x	x	
BS EN 54-4:1998	Fire detection and fire alarm systems. Part 4 Power supply equipment				X				x	x	
BS EN 54-5:2001	Fire detection and fire alarm systems. Part 5 Heat detectors. Point detectors				X	x		x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transform	Depot	Trams
BS EN 54-7:2001	Fire detection and fire alarm systems. Part 7 Smoke detectors. Point detectors using scattered light, transmitted light or ionization				X				x	x	
BS EN 55015:2001	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment							x	x	x	
BS EN 60051-1:1999	Direct acting indicating analogue electrical measuring instruments and their accessories. Part 1 Definitions and general requirements common to all parts				x				x	x	
BS EN 60081:1998	Double-capped fluorescent lamps. Performance specifications				x				x	x	
BS EN 60188:2001	High-pressure mercury vapour lamps. Performance specifications								x	x	
BS EN 60269-1:1999	Low-voltage fuses. Part 1 General requirements				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	I&LE	SC & C	Transtoyne	Depot	Trams
BS EN 60400:2000	Lamp holders for tubular fluorescent lamps and starter holders				x				x	x	
BS EN 60432-2:2000	Safety specification for incandescent lamps. Part 2 Tungsten halogen lamps for domestic and similar general lighting purposes				x				x	x	
BS EN 60439-1:1999	Specification for low-voltage switchgear and control gear assemblies. Part 1 Type-tested and partially type-tested assemblies				x	x		x	x	x	
BS EN 60439-2:2000	Specification for low-voltage switchgear and control gear assemblies. Part 2 Particular requirements for busbar trunking systems (busways)				x	x		x	x	x	
BS EN 60439-3:1991	Part 3 Particular requirements for low-voltage switchgear and control gear assemblies for installation in places where unskilled persons have access to their use.				x	x		x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Pwr Collection	OLE	SC & C	Transtops	Depot	Trams
BS EN 60439-4:1991	Part 4 Particular requirements for assemblies for construction sites (ACS)				x	x	x	x	x	x	
BS EN 60439-5:1996	Part 5 Particular requirements for assemblies intended to be installed outdoors in public places. Cable distribution cabinets (CDCs) for power distribution in networks				x	x	x	x	x	x	
BS EN 60454-1:1995	Pressure-sensitive adhesive tapes for electrical purposes. Part 1 General requirements				x	x	x	x	x	x	
BS EN 60529:1992	Degrees of protection provided by enclosures (IP code)				x	x	x	x	x	x	
BS EN 60598-1:2000	Luminaires. Part 1 General requirements and tests								x	x	
BS EN 60598-2-18:1994	Luminaires. Part 2-18. Particular requirements. Luminaires for swimming pools and similar applications								x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transtops	Depot	Trams
BS EN 60598-2-22:1999	Luminaires. Part 2-22. Particular requirements. Luminaires for emergency lighting								x	x	
BS EN 60598-2-23:1997	Luminaires. Part 2-23. Particular requirements. Extra low voltage lighting systems for filament lamps								x	x	
BS EN 60598-2-2:1997	Luminaires. Part 2-2. Particular requirements. Recessed luminaires								x	x	
BS EN 60598-2-3:2003	Luminaires. Part 2-3. Particular requirements. Luminaires for road and street lighting			x					x	x	
BS EN 60598-2-5:1998	Luminaires. Part 2-5. Particular requirements. Floodlights								x	x	
BS EN 60896-2:1996	Stationary lead-acid batteries. General requirements and methods of test. Part 2 Valve regulated types								x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Pwr Collection	OLE	SC & C	Trainborne	Depot	Trams
BS EN 60898-1:2003	Circuit-breakers for overcurrent protection for household and similar installations. Part 1 Circuit-breakers for a.c. operation				x	x		x	x	x	
BS EN 60898-2:2001	Part 2 Circuit-breakers for a.c. and d.c. operation				x	x	x	x	x	x	x
BS EN 60921:1991	Ballasts for tubular fluorescent lamps. Performance requirements				x	x	x	x	x	x	
BS EN 60923:1996	Auxiliaries for lamps. Ballasts for discharge lamps (excluding tubular fluorescent lamps). Performance requirements				x	x	x	x	x	x	
BS EN 60925:1991	Performance requirements for d.c. supplied electronic ballasts for tubular fluorescent lamps				x	x	x	x	x	x	
BS EN 60927:1997	Auxiliaries for lamps. Starting devices (other than glow starters). Performance requirements				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Trainborne	Depot	Trams
BS EN 60929:1992	a.c. supplied electronic ballasts for tubular fluorescent lamps. Performance requirements				x	x	x	x	x	x	
BS EN 60947-2:2003	Low-voltage switchgear and control gear. Part 2, Circuit-breakers				x	x	x	x	x	x	
BS EN 60947-3:1999	Part 3, Switches, disconnectors, switch-disconnect TBA ors and fuse-combination units				x	x	x	x	x	x	
BS EN 60947-4-1:2001	Part 4-1, Contactors and motor-starters. Electromechanical contactors and motor-starters				x	x	x	x	x	x	
BS EN 61008-1:1995	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs). Part 1 General rules				x	x	x	x	x	x	
BS EN 61008-2-1:1995	Part 2-1 Applicability of the general rules to RCCBs functionally independent of line voltage				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	TMS	SC & C	Transform	Depot	Trams
BS EN 61009-1:1995	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs). Part 1 General rules				x	x	x	x	x	x	
BS EN 61009-2-1:1995	Part 2-1 Applicability of the general rules to RCBOs functionally independent of line voltage				x	x	x	x	x	x	
BS EN 61048:1993	Capacitors for use in tubular fluorescent and other discharge lamp circuits. General and safety requirements				x	x	x	x	x	x	
BS EN 61049:1993	Capacitors for use in tubular fluorescent and other discharge lamp circuits. Performance requirements				x	x	x	x	x	x	
BS EN 61347-2-1:2001	Lamp control gear. Part 2-1 Particular requirements for starting devices (other than glow starters)				x	x	x	x	x	x	
BS EN 61347-2-3:2001	Lamp control gear. Part 2-3 Particular requirements for a.c. supplied electronic ballasts for fluorescent lamps				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Trainborne	Depot	Trams
BS EN 61347-2-7:2001	Lamp control gear. Part 2-7 Particular requirements for d.c. supplied electronic ballasts for emergency lighting				x	x	x	x	x	x	
BS EN 61347-2-8:2001	Lamp control gear. Part 2-8 Particular requirements for ballasts for fluorescent lamps				x	x	x	x	x	x	
BS EN 61347-2-9:2001	Lamp control gear. Part 2-9 Particular requirements for ballasts for discharge lamps (excluding fluorescent lamps)				x	x	x	x	x	x	
BS EN 61537:2002	Cable tray systems and cable ladder systems for cable management				x	x	x	x	x	x	
BS EN 61558-1:1998	Safety of power transformers, power supply units and similar devices. Part 1 General requirements and tests				x	x	x	x	x	x	
BS EN 61558-2-9:2003	Part 2-9 Particular requirements for transformers for Class III handlamps for tungsten filament lamps				x	x	x	x	x	x	
BS EN 62035:2000	Discharge lamps (excluding fluorescent lamps). Safety specifications				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transtops	Depot	Trams
BS EN 62040-1-1:2003	Uninterruptible power systems (UPS). Part 1-1 General and safety requirements for UPS used in operator access areas				x	x	x	x	x	x	
BS EN 62040-1-2:2003	Uninterruptible power systems (UPS). Part 1-2 General and safety requirements for UPS used in restricted access locations				x	x	x	x	x	x	
BS IEC 1008-2-2:1990	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCCBs). Part 2-2 Applicability of the general rules to RCCBs functionally dependent on line voltage				x	x	x	x	x	x	
BS 5489-1:2003	Code of Practice for the Design of Road Lighting				x	x	x	x	x	x	
GM/TT0146	Lighting of Railway Premises (Railway Group Standards)								x	x	
GI/RT7010	Lighting of Railway Premises (Railway Group Standards)								x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transtops	Depot	Trams
GI/GN7607	Guidance for Low Voltage Electrical Installations (Railway group guidance notes)				x	x	x	x	x	x	
GI/RT7007	Low Voltage Electrical Installations (Railway Group Standards)				x	x	x	x	x	x	
GPGLRP3	Good Practice – Lighting for Railway Premises				x			x	x	x	
										x	
EN50121 Pts 1-5	Railway applications electromagnetic compatibility				x	x	x	x	x	x	
2004/40/EC	European directive				x			x		x	
EN50128: 2001	Railway Applications – Communications, signalling and processing systems – software for railway control and protection systems.				(not applicable)x			x		x	

Specification No.	Specification Title	Signalling	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transtops	Depot	Trams
ENV50129: 1998	Safety related electronic systems for signalling.				(not applicaqble)x			x		x	
IEC61508: 1998	Functional safety of electrical/electronic/programmable electronic safety related systems.							x		x	
	Methods for assessing the safety integrity of safety related software of uncertain pedigree (SOUP), Health and Safety Executive				(not applicable)x			x		x	
	Edinburgh Tram Earthing Systems Policy	x	x		x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transtops	Depot	Trams
EN50128: 2001	Railway Applications – Communications, signalling and processing systems – software for railway control and protection systems.				(not applicable)x	x	x	x	x	x	
IEC61508: 1998	Functional safety of electrical/electronic/programmable electronic safety related systems.				(not applicable)x			x			
MPT 1331	Code of Practice for Radio Site Engineering							x			
MPT 1362	Code of Practice for installation of mobile radio equipment in land based vehicles							x			
MPT 1327	A Signalling Standard For Trunked Private Land Mobile Radio Systems (June 1997)							x			

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transtops	Depot	Trams
G1/RT7015	Railway Group Standard (Feb 2003)					x					
BS EN50126	Railway applications- The specification and demonstration of Dependency, Reliability, Availability, Maintainability and Safety,		x		x	x	x	x	x	x	x
BS EN50149	Railway applications – Fixed installation-Copper and Copper alloy grooved contact wire,						x				
BS EN50119	Railway applications - Fixed installation-electric traction-Overhead Lines.						x				
BS EN50206-2 –	Pantographs for Light Rail vehicles						x				
BS EN50125-1	Railway applications - Fixed installations, Environmental conditions						x				
BS EN50317,	Railway applications - Fixed installations, Requirements for and validation of measurements of dynamic interaction between pantograph and contact line						x				

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Trainborne	Depot	Trams
BS EN50151	Railway applications - Fixed installations, Special requirements for composite insulators						x				
BS EN50345	Railway applications - Fixed installations, Insulating synthetic rope assemblies for support of overhead contact lines						x				
BS EN50318	Railway applications - Fixed installations, validation of the simulation of dynamic interaction between pantograph and contact line						x				
BS EN 50122-1	Railway Applications – Fixed Installations Part 1: Protective provisions relating to electrical safety and earthing				x		x				
BS EN 50122-2	Railway Applications – Fixed Installations Part 2: Protective provisions against the effects of stray currents caused by d.c. traction systems				x						

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transtuns	Depot	Trams
BS EN 60146	Semiconductor convertors – General requirements and line commutated convertors				x						
BS EN 50123	Railway Installations – Fixed installations – d.c. switchgear				x						
IEC 850 (IEC 60850)	Supply voltages for traction systems										
BS 2618	British Standard Specification for Electrical Traction Equipment				(not applicable)x						
BS 6290	Batteries				x						
BS 7354	Battery Duty Calculations.				x						
CP 1013	Earthing.				x						
BRB Spec. DC 112	DC Power Cables.				x		x				

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Trainborne	Depot	Trams
BS 6360 (IEC 60228)	Cable Conductors.				x		x				
BS 6899 Type GP2	DC Power Cable Insulation.				x		x				
IEC 228 (BS 6360)	Conductors for Multicores.				x		x				
DMRB	The United Kingdom Design Manual for Roads and Bridges (as amended by any City of Edinburgh Council -specific requirements)	x		x							
TSM	Traffic Signs Manual			x							
MCDHW	The Manual of Contract Documents for Highway Works;			x							
SHW	Specification for Highway Works;			x							
HCD	Highway Construction Details.			x							
CEC	'Edinburgh Standards for Streets'.			x							
NRSWA	New Roads and Street Works Act 1991			x							

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transigns	Depot	Trams
CEC	Measures Necessary Where Apparatus is Affected by Major Works (Diversionary Works)			x							
CEC	Specification for the Reinstatement of Openings in Roads			x							
	Code of Practice for the Co-ordination of Street Work and Works for Road Purposes and Related Matters			x							
	Utility specific specifications (to be advised by each utility)			x							
RSPG Part 1, 1966	Railway Safety Principles and Guidance, Safety Principles	x	x	x	x	x	x	x	x	x	x
RSPG Part 2, Section G	2005, Railway Safety Principles and Guidance, Tramways	x	x	x	x	x	x	x	x	x	x
RVAR	Railway Vehicle Accessibility Regulations								x		x
GM/RC1500	1994-12, 2001-10 Code of Practice for EMC between the railway and its neighbourhood				x	x	x	x	x	x	x

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transigns	Depot	Trams
EN55013	Sound and television broadcast receivers and associated equipment. Radio disturbance characteristics. Limits and methods of measurements.							x		x	x
GE/RT8015, 2002	Electromagnetic compatibility between railway infrastructure and trains.										x
ECE 43	1990-08, Uniform Provisions Concerning the Approval of Safety Glazing and Glazing Materials (Rev1 08.1990).								x	X	x
prEN13129-3	2003-10, Railway Applications – Air conditioning for urban and suburban rolling stock – Part 1: Comfort parameters										x
BS EN 779	2002-12-05, Particulate air filters for general ventilation - Determination of the filtration performance									x	x
BS 857	1967-06-30, Specification for safety glass for land transport										x

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Pwr Collection	OLE	SC & C	Transtops	Depot	Trams
BS 6853 1999-01-15	Code of Practice for fire precautions in the design and construction of passenger carrying trains or European equivalent Standard										x
BS EN 50121-3-1 2000-12-15	Railway Applications - Electromagnetic compatibility - Rolling stock - Train and complete vehicle										x
BS EN 50125-1	Railway Applications – Environmental conditions for equipment										x
BS EN 50155-3-1 2000-12-15	Railway Applications – Electronic Equipment used on Rolling Stock										x
BS EN 50215 1999-09-15	Railway Applications - Testing of rolling stock after completion of construction and before entry into service										x
BS EN 60077-1 2002	Railway Applications – Electric Equipment for Rolling Stock										x

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Pwr Collection	OLE	SC & C	Transitions	Depot	Trams
prEN ISO 3095 1975-09	Acoustics; Measurement of noise emitted by rail bound vehicles										x
prEN ISO 3381 1976-02	Acoustics; Measurement of noise inside rail bound vehicles										x
EN 12663-2000	Railway applications, Structural requirements of railway vehicle bodies										x
EN 13749-2005	Methods of specifying structural requirements of bogie frames										x
VDV 164 1995-04	System for fault detection, fault registration and fault message (FERM) on guided public transport vehicles										x
IEC 60494-2, 2002-08	Railway applications - Rolling stock; Pantographs; Characteristics and tests - Part 2: Pantographs for metros and light rail vehicles						x				x

Table 24 - Applicable Standards

9 Geotechnical

Where the Infraco Works may affect geotechnical and geo-environmental features, including but not limited to, aquifers, ground water and surface watercourses, the Infraco shall comply with the requirements of relevant third parties, the Scottish Environment Protection Agency (SEPA) or other statutory consultees and environmental legislation.

The Infraco shall agree the criteria and methods for the identification, classification, treatment and disposal of material with SEPA, the relevant local environmental health authority or other relevant authority as appropriate. The Infraco shall obtain all necessary consents for the removal, disposal or re-use of materials. Materials not suitable for re-use shall be transported off Site to a licensed facility in accordance with the requirements of the applicable relevant authority and environmental legislation.

The Infraco shall not carry out works or activities which would result in any Site or any land licensed to the Infraco under the Agreement or any adjacent or adjoining property being classified as contaminated land under the Environmental Protection Act 1990, the Contaminated Land (Scotland) Regulations 2000, the Contaminated Land (Scotland) Regulations 2005 and the guidance contained in the Scottish Executive Statutory Guidance for the the Contaminated Land Regime, Edition 2 dated May 2006 and/or any similar environmental legislation, or that would preclude such a classification being removed.

The Infraco shall assess the risk of the ingress of landfill gases, coalfield gases and other hazardous ground gases and implement appropriate measures to mitigate such risks.

The Infraco Works shall be designed and constructed to accommodate reasonably foreseeable changes in the existing and potential future nature and level of ground water, where reasonably practicable.

10 Environment

10.1 Environmental Considerations

10.1.1 General

Environmental Statements have been prepared for Line One and Line Two in accordance with the standing orders of the Scottish Parliament, which require that projects approved by private Act of Parliament must be subject to Environmental Impact Assessment (EIA). EIA in Scotland is governed by the Environmental Impact Assessment (Scotland) Regulations 1999 (S.I. 1999 No. 1). The Environmental Impact Assessments (EIAs) have been undertaken to identify the construction and operational effects of building and operating a tram network in Edinburgh. Each assessment has been documented in a comprehensive Environmental Statement which describes:

- The design of the project and the way it will be constructed and operated;
- Its impacts on the physical, natural and human environment; and
- The measures that will be undertaken to minimise these impacts.

The Environmental Statements report the assessment of the following environmental topics which should be considered by the Infraco:

- The proposed scheme – including an explanation of the need for the scheme, alternatives considered, route alignment and infrastructure description, construction and operational activities;
- Approach to the EIA – summarising the legal requirements, scope and methods used in undertaking this EIA;
- Policy context – provides a review of compliance of Line One and Line Two to relevant national, regional and local policies;
- Traffic and transport;
- Land use - including potential impacts to the agricultural use of land along the route;
- Geology, soils and contamination – including references to hydrogeology and waste management;

- Landscape and visual amenity;
- Ecology and nature conservation;
- Surface water – including water quality and hydrology;
- Heritage - including archaeology;
- Socio-economic effects;
- Noise and vibration;
- Air quality - including local air quality (PM10, NO2), global air quality (CO2) and dust; and
- Cumulative impacts.

The Infraco shall ensure that the environmental impact caused by the Infraco Works shall be no worse than that contained in the Environmental Statements.

10.1.2 Freedom of Access to Environmental Information

The attention of the Infraco is drawn to the requirements of the Environmental Information (Scotland) Regulations 2004 (SSI 2004/520). This Statute permits public access to environmental information held by a Scottish public authority.

10.1.3 Relevant Legislation, Regulations and Guidance

The following are a series of project specific documentation governing various aspects of the environmental considerations of the Edinburgh Tram Network design, construction and operation.

10.1.4 Code of Construction Practice

A code of construction practice was prepared in consultation with the City of Edinburgh Council (CEC), Scottish Natural Heritage (SNH), the Scottish Environmental Protection Agency (SEPA) and Historic Scotland, in order to define **tie's** minimum standards of construction practice. Compliance with this code is a legal requirement of the Edinburgh Tram (Line One) and (Line Two) Acts (2006) under Section 66 and this code has been developed by **tie** and this developed version is included in Schedule 3 (Code of Construction Practice and Code of Maintenance Practice).

The Code of Construction Practice sets out policies, legislation and guidance relating to the impact of the proposed construction works on the environment and the amenity and safety of residents, businesses, the general public and the physical surroundings adjacent to the ETN. The Code of Construction Practice also provides a list of environmental protection measures to be implemented during the construction of the ETN.

10.1.5 tie's Noise and Vibration Policy

tie's Noise and Vibration Policy (NVP/001 V1.01) sets out the mitigation approach for noise and vibration impacts during the operation of the Tram in Edinburgh. Mitigation requirements relating to noise and vibration impacts during the construction of the ETN route are outlined in the Code of Construction Practice. Compliance with the Noise and Vibration Policy is a legal requirement under Section 66 of the Edinburgh Tram (Line One) and (Line Two) Acts (2006). Other legal requirements relating to noise insulation are set out in Sections 63, 64 and 65 of the respective Acts. The Noise and Vibration Policy is included in Schedule 32 (**tie** and CEC Policies).

10.1.6 The Tram Design Manual and Urban Design Briefs

A Design Manual and urban design briefs have been prepared for the ETN. Both sets are regarded as supplemental guides to deemed consent for Line One and Line Two under the section 11 (Class 29) of the General Permitted Development (Scotland) Order 1992.

Although permitted development status exists for the ETN it is nonetheless necessary to gain prior approval from the City of Edinburgh Council before the Infraco Works can commence. The Design Manual and urban design briefs are both designed as guides in informing both the design process and the prior approval process. It is therefore important that the Infraco gives appropriate consideration to the contents of the Design Manual and the briefs as major component in the integration of a tram design into the urban fabric of the City.

10.1.7 Landscape and Habitat Management Plan

The Landscape and Habitat Management Plan (LHMP) details the proposals for retention, protection and enhancement of existing planting and habitats, within the Roseburn Corridor. It also sets out details of replacement planting and habitat which are lost as a consequence of the development. The plan will be updated by the Infraco as new information on habitat, landscape proposals and Tram design becomes available. The plan will also include proposals for noise mitigation for properties adjacent to the ETN. Revisions to the LHMP will require to be approved by the City of Edinburgh Council Planning Authority. The procedure for updating the LHMP is set out within Section 68 of the Edinburgh Tram (Line One) Act (2006).

10.1.8 Badger Mitigation Plan

The Badger Mitigation Plan sets out the scope and form of the proposed mitigation measures for avoiding/ reducing adverse impacts on badgers within the Roseburn Corridor. The Plan will be updated by the Infraco as new information on badger social groups and the ETN design becomes available. Revisions to this Plan will be agreed with SNH, CEC and the Edinburgh and Lothians Badger Group (ELBG) and approved by the CEC Planning Authority.

In preparing the detailed environmental design and implementation (including maintenance and monitoring periods) proposals for landscape and ecology the Infraco will ensure that all commitments given in the Environmental Statement and arising from the Scottish parliamentary process relating to the Tram Legislation (including the detailed agreements following discussions with stakeholders) are met.

10.1.9 Protected Species Plan

The Protected Species Plan identifies the constraints governing how all protected species (predominantly located in the Gogarburn area) are to be dealt with.

10.1.10 Archaeological Requirements

All Infraco Works are to be carried out in compliance with the approved AHMP relevant to that location.

10.1.11 Landscape Design

The landscape design shall include, for construction, aftercare and maintenance / monitoring, ongoing for the whole Term. The detailed landscape design shall be in accordance with the environmental objectives, principles and requirements given in the Environmental Statements, to ensure that the Edinburgh Tram Network as constructed and operated is in compliance with the Environmental Statements, and any subsequent side agreements entered into between the CEC, **tie** and various third parties.

10.2 Ecological Design

The ecological design shall include, for construction, aftercare maintenance and monitoring:, the ecological mitigation proposals will cover the wholeTerm.

The ecological design shall be in accordance with the environmental objectives, principles and requirements given in the Environmental Statements, to ensure that the Edinburgh Tram Network as constructed and operated is in compliance with the Environmental Statements prepared for Parliament, and any subsequent side agreements entered into between the CEC, **tie** and various third parties (e.g. Scottish Natural Heritage, New Ingliston Limited, Edinburgh and Lothian Badger Group).

The updated and ongoing ecological surveys and mitigation works to be carried out by Infraco shall take into account seasonal constraints and variations and will accommodate ongoing relevant surveys begun by other parties (e.g. biological water quality monitoring). The Infraco shall ensure that the construction, maintenance and monitoring of the Infraco Works complies with all existing UK and EU Environmental legislation concerned with the protection of species and habitats including but not limited to:

- Wildlife and Countryside Act 1981 (as amended in particular by Variation of Schedules 1988, 1992 & 1998);
- The Conservation (Natural Habitats, & c.) Regulations 1994 (as amended);
- Protection of Badgers Act 1992; and
- Countryside and Rights of Way Act 2000 in so far as it extends to Scotland.

The Infraco shall not commence works within any part of the Site until the necessary update surveys of ecological interest in respect of that part of the Site have been undertaken and a survey report has been submitted to **tie**. Any relevant findings of such surveys shall be included into the Infraco's Landscape and Habitat Management Plan and the Construction Environmental Management Plan (CEMP).

The Infraco shall ensure that:

- Details of all species protected by Law and any structure or place used for shelter or protection by any such species protected by Law within the Site are kept confidential and not disclosed to any person except insofar as is essential for carrying out the Infraco Works; and

- All necessary current licenses, and named license holders, are available before the commencement of any Infraco Works, which may affect species protected by Law and or any structure or place used for shelter or protection by any such species protected by Law.

In the event that the Infraco identifies or becomes aware of any species protected by Law, or any structure or place used for shelter or protection by any species also protected by Law, which could be directly or indirectly affected by the Infraco Works and for which appropriate protection measures have not previously been agreed, the Infraco shall notify **tie** immediately and shall:

- Cease all Infraco Works that may adversely affect such species, structure or place;

- Provide Scottish Natural Heritage and **tie** with any further information of which the Infraco is aware relating to such species, structure or place as may be requested;

- Consult upon and agree mitigation and/or monitoring measures with Scottish Natural Heritage and **tie** in relation to such species, structure or place; and

- Obtain any necessary licenses to carry out the agreed measures.

The Infraco shall ensure that all construction work is carried out with due regard to the seasonal interests of any flora, fauna or habitat and in particular, all species listed for any degree of protection under Law. The Infraco shall make due allowance for the seasonal constraints in preparing the Programme.

10.3 Construction of Ecological Measures

10.3.1 General

Special ecological measures shall include but not be limited to the requirements for carrying out the Infraco Works:

- fencing;
- safe passage for wildlife;
- the location of nesting or roosting boxes;
- the location of habitat creation measures to be inspected;
- the known location of protected species, and
- the list of licenses obtained or required for working with or within the vicinity of Protected Species; and
- maintaining access to foraging and water.

10.3.2 Site Supervision of Landscape and Ecological Works

The Infraco shall ensure that the environmental Site works shall be inspected and monitored by Infraco's environmental clerk of works who will be supported by Infraco's landscape architect and ecologist, as necessary.

10.3.3 Landscape Works

Planting, seeding and aftercare works shall be carried out by the Infraco.

The Infraco will be responsible for locating all services routes prior to any landscape work being carried out.

10.3.4 Completion of the Planting Works and Completion of the Landscape and Ecological Aftercare Works

On practical completion of the landscape and ecological implementation works and on completion of the three years landscape and ecological aftercare works. The Infraco shall submit the required certificates and arrange a formal inspection of the Infraco Works with **tie**.

A separate inspection shall be arranged with relevant landowners for any areas of off-site planting.

10.3.5 Construction Environmental Management Plan (CEMP)

The Infraco shall prepare a Construction Environmental Management Plan (CEMP) including specific management / action plans or Method Statements, as necessary, to convey the required level of information for the following:

- Drainage features, including oil interceptors and pollution control valves, treatment of run-off, (including run-off volumes) and the location and appearance of any balancing ponds and/or swales, access or proposed access to the same;
- Carriageway surfacing;
- Working times;
- Noise reduction and abatement;
- Pollution control and contingency plan (see below);
- Discharge, land drainage and abstraction licenses to comply with EA requirements;
- Protection of retained vegetation;
- Maintenance e.g. de-icing;
- Sourcing of construction materials;

- Waste disposal, including disposal of construction waste, arisings, spoil, miscellaneous solids and liquids;
- Topsoil and subsoil handling (strip, storage, amelioration and re-use);
- Management and disposal of any excess soil or spoil arising from the works; and
- Site compounds.

The specific requirements of the pollution control and contingency plan are as follows:

- Compliance with the SEPA pollution prevention guidance;
- Identification and categorisation of surface waters vulnerable to Site works and an assessment of the earthworks that are likely to give rise to silty run off, the routes this is likely to take and the methods to prevent damage from silt;
- Precautions for handling of fuel, oil and other liquids during the works, in particular, near rivers, streams and watercourses;
- Requirements for pollution control equipment;
- How mud and dust will be controlled;
- How water supply boreholes and wells will be protected;
- The measures to be taken to protect watercourses and associated wildlife from, for example, chemical spillages or the introduction of sediment-laden run off; and
- Discharge criteria for suspended solids in run off from the Site during construction and proposals for monitoring and control.

11 Surveys

Surveys and investigations shall be undertaken by the Infraco as required to facilitate the design, construction and maintenance of the Edinburgh Tram Network.

Before commencing any Infraco Works (including investigations) where either the Infraco or **tie** considers there to be potential for a future claim from adjacent property owners or occupiers, the Infraco shall carry out a detailed condition inspection of the relevant properties and infrastructure which may be affected by the Infraco Works. If any such inspection is carried out, this shall be done in conjunction with the owners or occupiers concerned. A condition survey report shall then be prepared and agreed with the owner or occupier.

Condition survey reports prepared under the preceding paragraph shall include photographic evidence of the existing condition of the relevant property or infrastructure including evidence of critical dimensions such as existing crack widths.

The Infraco shall undertake sufficient surveys to prepare a topographical survey model. Relevant sections of the topographical survey model shall be updated by the Infraco at least every six months throughout the period of the Infraco Works, where work has been undertaken in relation to the sections concerned.

The topographical survey model shall include all Works as constructed and the Infraco shall include in each updated topographical survey model all then existing fixtures including:

- principal cabling;
- street furniture;
- structures and buildings;
- trackwork;
- drainage;
- power supply systems including OLE structures;
- ducting and draw pits.

These surveys shall include aspects concerned with:

- dimensions
- condition; and
- inspection for assessment.

The Infraco shall update the photographic records (excluding aerial photographs) and other such data contained in the topographical survey model at intervals of not less than six months.

The Infraco shall provide access to and copies of, when requested, all reports of investigations carried out as part of the Infraco Works.

12 Project Management Processes

12.1 Communication – General

The Infraco shall develop and maintain a "Communications Plan" and this shall be submitted to **tie** in accordance with the Review Procedure.

The Communications Plan shall illustrate how all the communication processes, activities and issues are to be managed, progressed and satisfactorily resolved. The Communications Plan shall detail how the Infraco will communicate with Sub-Contractors, the Operator, **tie**, the MUDFA Contractor, key stakeholders and third parties. The Communications Plan shall also include the intended processes for dealing with enquiries, particularly complaints, from all sources. The Infraco shall refer to the Stakeholder Services in this Section of the Employer's Requirements, in order to ensure that the Communications Plan includes all necessary requirements.

The Infraco shall implement all the requirements of the Communications Plan.

The Infraco shall liaise with the relevant parties to ensure that the Infraco is copied into all relevant communications that are generated by others, in order to ensure that any relevant construction related issues, such as Temporary Works and practical constraints, are identified and addressed.

12.1.1 Meetings

The Infraco shall work with **tie** to develop the meetings schedules and requirements for progress reporting throughout the duration of the Infraco Works. The following table provides an outline of the minimum requirements:

Meetings	Frequency	Chaired by / Minutes taken
Safety Meeting	Weekly	Infraco
Management Review Meetings	Two monthly	**tie**/Infraco alternately
Project Progress Meetings	Four weekly (Fortnightly prior to Site start)	**tie**

Meetings	Frequency	Chaired by / Minutes taken
Design and Planning Meetings	Fortnightly	Infraco
Stakeholder & Third Party Meetings	As required	**tie**
Site Meetings	Weekly	Infraco
Cost Review Meetings	Four weekly	**tie**
Risk Review Meetings	Four weekly	**tie**

Table 25 - Table showing meeting schedules

The primary purpose of these meetings shall be to enable the Infraco to advise on:

- Any safety issues;
- The current state of the programmed Infraco Works;
- Progress made in the various activities;
- Communication issues;
- Third party issues; and
- Commercial issues (Including change control).

The Infraco shall develop and maintain a comprehensive meetings schedule indicating those meetings which the Infraco shall chair and those meetings which the Infraco shall attend.

Prior to commencement on Site, progress meetings shall be held every two weeks. The purpose of these meetings shall be to review progress made by both Parties, and identify and agree actions required.

The Infraco shall provide an agenda, for all meetings to which they are designated as chair. The Infraco shall also provide appropriate documentation in advance of each of the meetings, as defined in the following sections, or otherwise as agreed with **tie**.

12.1.2 Progress Reporting

Progress reports shall be submitted by the Infraco to **tie** no later than three Business Days before each progress meeting.

The Infraco's progress reports shall contain comprehensive information and shall be structured in a manner which is commensurate with **tie**'s own reporting structure. The various sections of the progress reports shall require to be agreed with **tie**, but should include the following:

1. Executive Summary;
2. Health & Safety Report;
3. Quality & Environment;
4. Financial Summary Report; and
5. Project Performance / Programme.

Information provided within the progress reports shall include, but not be limited to, the following:

- Health & safety report including a summary of H&S records
- Summary financial information summarised from the separate cost report including summary and headline data on planned spend/actual spend, forecast spend and summary of costs for Compensation Events and future forecast.
- Planned versus actual resource summary;
- Physical progress against Milestones anticipated/required completion dates;

- Four weekly forecast of all activities;
- Eight weekly critical impact notice (including all information on any internal or external factor which may affect programme delivery);
- Labour histograms detailing planned, actual and forecast across all disciplines;
- The activities commenced or completed since the previous report and upon what dates;
- The expected remaining duration of all activities commenced but not completed;
- Any other additional activities with expected durations, methods, and resource requirements and sequence assumptions;
- Schedule and programme for the delivery of method statements, permits and isolations for the next four weeks;
- Any changes to expected durations, method, resource requirements and sequence assumptions;
- Forecast completion dates for all Infraco Works in each geographical section and intermediate geographical section including any slippage or advance upon the Planned Service Commencement Date and/or the Planned Sectional Completion Dates (as appropriate);
- Programme comparison between actual vs. planned;
- Schedule of information received;
- Schedule of outstanding information;
- Progress photographs;
- Top 10 opportunities; and
- Top 10 risks.

12.1.3 Progress Photos

The Infraco shall on a monthly basis throughout the period until the Service Commencement Date procure that photographs covering all of the Infraco Works are taken by a professional photographer whose appointment the Project shall be approved by **tie**, such approval not to be unreasonably withheld or delayed.

tie shall determine the scope of the photographs referred above.

The Infraco shall ensure that:

- A minimum of 50 digital colour photographs shall be taken on a monthly basis;
- All photos shall be provided in electronic format in a form to be agreed with **tie**;
- One set of 10 inch x 8 inch size prints shall be prepared from the colour photographs referred to above;
- All prints referred to above shall be presented in albums with individual clear plastic wallets and marked on the reverse side with the date that the photograph was taken, the name and address of the photographer, identification reference number and a brief description of Work being undertaken and the direction from which the photograph was taken;
- All prints and negatives shall be delivered to **tie** within two weeks of being taken; and
- Except where **tie** have provided their prior written consent, the photographs shall not be used for any purpose other than as set out in the Agreement.

The Infraco shall procure that all Intellectual Property in respect of the photographs vests in **tie**.

12.1.4 Site Meeting Report

A report shall be submitted by the Infraco to **tie** no later than one Business Day before each site meeting. The report shall include reference to any significant issues (associated with safety, programme, design, cost, planning and consultee aspects), which have arisen since the previous monthly progress report.

The site meeting report shall also identify actual manpower resources (labour returns), plant and equipment that have occurred on site, for the previous week.

12.1.5 Topic Register

It is **tie**'s intention to continue to develop and maintain a "Topics Register" for the Infraco Works. The Topics Register is used to record all issues as they arise that require to be specifically addressed. The record is then amended as appropriate to track the manner in which issues have been progressed or resolved to the satisfaction of **tie**. The Infraco is required to add to, or respond to issues as appropriate and attend regular review meetings at which the Topics Register shall be updated and actions assigned by **tie**.

The Infraco shall participate in the management of the Topics Register.

12.1.6 Work Breakdown Structure

An agreed Work Breakdown Structure is included in the Introduction of these Employer's Requirements. The Infraco shall adopt this WBS to ensure a recognised, structured analysis, by all parties, when interrogating the programme and cost analysis. The WBS may be further developed by the Infraco with the written consent of **tie**.

Accordingly there shall be a requirement for the Infraco to adopt all aspects of the WBS in the development of programme and cost documentation.

12.2 Programme Management

The Infraco shall undertake programme management including the implementation, regular updating and management of a fully detailed comprehensive Programme illustrating how the Infraco proposes to execute the whole of the Infraco Works in compliance with the Project Programme.

This Infraco Programme shall be prepared using Primavera software in a version compatible with that of **tie**.

This Programme shall be in Primavera P3e (Version 6 or otherwise as agreed with **tie**) format and accompanied by a time chainage programme illustrating the same information. The Programme shall be cost and resource loaded and coded to reflect the Infraco's WBS activities as detailed in section 39 of these Employer's Requirements.

The Infraco shall be responsible for liaising directly with **tie**, CEC (and other appropriate third parties) to maximise delivery of the ETN but minimise disruption to public transport and other services, and ensuring that any necessary diversion routes are agreed in recognised time periods prior to the commencement of Infraco works. The Infraco shall also take note of the constraints as identified in 39 of these Employer's Requirements.

The Programme shall be submitted to **tie** in accordance with the Review Procedure within a period which shall ensure that the Infraco Works can be progressed and monitored by the Infraco and **tie** against the details contained therein. The Programme shall clearly identify the following:

- the commencement, construction and completion constraints for all elements of the Infraco Works, separated into sectors by WBS code;
- all Milestones;
- the constraints, procedures, documentation and approvals specified in the Agreement;
- the Infraco manufacture and construction execution strategy, Infraco Works and site testing and commissioning, all constraints, procedures, documentation and approvals periods;
- seasonal constraints and constraints applied by CEC and other third party and statutory bodies as defined in the Agreement;
- the required design approvals and notices;
- all works to be undertaken by any Sub-Contractor;
- sufficient detail to illustrate the integration of the Deliverables with the proposed dates of possessions and the commencement and completion of construction for all elements of the Infraco Works, by WBS code;
- all other projects affecting the Infraco Works and how they are integrated into the Infraco Works. For example, any street works to be carried out by CEC, and works by or on behalf of all third parties (including landowners and developers);

- any witnessing, inspections, testing etc of the Infraco Works which requires to be carried out by third parties;
- long lead time materials and works;
- the identification and duration of all advance works, other than those already underway;
- the requirements and approval periods for traffic management, TROs, TTROs, and including any third party's requirements for notices and road closures;
- the commencement, completion dates and relationships of intermediate geographical section of the Infraco Works within each geographical section of the Infraco Works;
- the links and relationships between all activities and the justification of the underpinning logic;
- all design, manufacture and construction periods;
- the identification and timing of inputs and approvals required from **tie**, third parties, and any Approval Bodies are clearly identified; and
- the interface and relationship with the MUDFA Works;

The Programme shall meet the following minimum requirements:

- shall be in Primavera P3e (Version 6) for detailed implementation;
- shall follow and fully reflect the **tie**'s Work Breakdown Structure ("WBS") included within these Employer's Requirements.
- shall be cost and resource loaded down to coded activities;
- all resource reporting and progress reporting shall be coded to suit the activities contained within the WBS;
- records of time spent against activities shall be completed weekly against planned works as generated by Primavera;

- Any deviations shall be reported in the progress report and include notification of remedial actions for authorisation by **tie**;
- weekly records shall be collated and delivered to **tie** by 09:00hrs on the Tuesday following the week to which the records relate;
- the Programme shall also take into account programming input and attendance at meetings, both as required by **tie**; and
- the Programme shall also contain cost/spend tables and cumulative curves to match the achievement of major milestones and activities within the WBS.

The Infraco shall take into account the availability of alternative materials or components when developing the Programme. The Infraco shall identify those materials and components which require advance ordering and processing. Any advanced orders which are approved shall be identified and defined in the Programme.

The Infraco shall update the Programme every four weeks in line with **tie** reporting periods to take full account of the Infraco progress in completing the Infraco Works.

A hard and soft copy updated Programme and an Infraco Progress Report shall be submitted by the Infraco to **tie** no later than three Business Days before each four weekly progress meeting.

12.3 Time Chainage

The Infraco shall also produce, manage, develop and work in accordance with its Time Chainage Diagram.

The Time Chainage Diagram shall be submitted to **tie** in accordance with the Review Procedure to ensure that the Infraco Works can be progressed and monitored by the Infraco against the details contained therein but in any case, the Time Chainage Diagram shall be submitted not later than six weeks after the Commencement Date. The Time Chainage Diagram shall be updated regularly and be available for inspection or distribution on a monthly basis, during the course of the Infraco Works.

The Time Chainage Diagram shall fully reflect, accommodate and comply with the information detailed on the Programme.

12.4 Planning and Other Consents

The responsibility for the Consents is as set out in Clause 19 of the Agreement.

12.5 Project Management Plan

12.5.1 General

The Infraco shall submit and maintain a plan describing the approach to project management for the delivery of the complete scope of the Infraco Works. This project management plan shall include sections to clearly and separately describe the approach to the specific topics set out below.

12.5.2 Resource and Competence

A description of the procedures employed to ensure that the required resource and competence level throughout the duration of the Infraco Works shall be achieved.

12.5.3 Documentation

Identify key policies and procedures to deliver such works, infrastructure and equipment to programme, specification, budget and otherwise safely and efficiently and in a manner which is fully integrated with the activities of other relevant contractors.

The approach to the development of a suite of project specific documentation, indicating how they shall effectively be integrated with, and reflect, the Infraco's corporate procedures and policies (including any Joint venture or consortia procedures).

Templates that shall be used for the procurement and delivery of the service deliverables, which shall be required to be prepared by the Infraco.

Outline proposals covering the suite of required documentation including training, maintenance and operations manuals, as-built drawings, design Information, testing procedures and proposals, and certification and records (e.g. testing).

12.5.4 Regulations

Management arrangements and procedures for ensuring/monitoring compliance with all applicable Regulations (e.g. HMRI), Law, and the requirements of the Agreement and its Schedules.

12.5.5 Procedures

Details of internal procedures for decision making and review in your management team with particular emphasis on safety, programme, budget, quality, the management and control of non-compliance and the implementation of continuous improvement.

12.5.6 Proposals on reporting and controlling design information requirements

Procedures which shall be followed in obtaining outstanding consents and approvals for the works.

Definition of the process for managing the approvals interface with **tie**, HMRI, Planning Authority, Roads Authority, Network Rail, the Operator and third parties with whom agreements have been entered into.

12.5.7 Interface Plans

Given that successful co-operation between the Operator, Infraco, and **tie** is essential to the delivery of a successful project, a description of the key areas of this interface and details which demonstrate how this is successfully achieved.

Details of supply chain process/procedures, in particular provide details of the criteria for selection of sub-contractors/suppliers for this project.

Details of how the Tram Provider shall be managed.

Details regarding the commissioning and handover of the Edinburgh Tram Network or Geographical Sections thereof to the Operator shall be provided.

12.5.8 Design

Clear definition of the areas where the Infraco shall undertake design work and an explanation of where the Infraco believes this deviates from the previous design work done.

12.6 Construction Management Plan

The Infraco shall submit and maintain a Construction Plan relating to the Programme. This Construction Plan shall include sections to clearly and separately describe the approach to the specific topics set out below.

12.6.1 Mobilisation

Detailed mobilisation plan, to incorporate comprehensive details of all aspects of mobilisation including, but not limited to, number of work sites, the facilities on each, a general arrangement drawing of main sites, lay down areas, materials storage, welfare and car parking. This should detail timescales and immediate resource availability and should also provide details of the permissions required and assumptions made.

12.6.2 Plant

A description of the plant that will be used for the construction of the project and of how long the plant will be used. This should include description in relation to plant used for specialist purposes such as rail laying or wire stringing (these should be separately identified).

12.6.3 Sub-Contractors

Details of the sub-contractor management and control process during the construction phase, including how the performance of sub-contractors will be measured and reviewed and how sub-contractor compliance with standards will be assured.

12.6.4 Method Statements

A description of the process by which method statements shall be developed and approved, and a schedule summarising those method statements that are anticipated. An initial schedule shall be submitted in accordance with the Review Procedure and this shall be updated from time to time with agreement from **tie**.

12.6.5 Avoidance of Disruption

Description of the management process for ensuring that traffic disruption is kept to a minimum, particularly in relation to Traffic Management and TTRO requirements. Details of procedures of how unforeseen works (that are out with the area covered by the Temporary Traffic Restriction Order, but are necessary to complete the Infraco Works within the TTRO area) shall be dealt with.

Proposals for maintaining reasonable access to premises at all times and what measures The Infraco might employ when access is denied taking into account the requirements of the Disability Discrimination Act 1995.

Details of how it is proposed to liaise with all potentially affected third parties, and an assessment of the likely identities of such parties.

12.7 Network Rail Interface Plan

The Infraco shall submit and maintain a plan describing the approach to managing the ongoing interface requirements with Network Rail. The plan should identify the critical activities and the key risks associated with this interface and proposals to mitigate these risks. Notwithstanding the Infraco's responsibility of complying with the Agreement (including compliance with the Third Party Agreement and the Asset Protection Agreement) the Plan should address the following issues.

- A description of procedures for gaining access to Network Rail's infrastructure both in terms of the approval process and the physical access proposals;
- Confirmation, in terms of safety and in terms of undertaking the Infraco Works, the personnel utilised shall be appropriately qualified, skilled, experienced and adequate in quantity;
- The proposed Possession Strategy for works on or adjacent to Network Rail infrastructure, to include identification of Possessions & Isolations on Programme taking cognisance of lead time;
- Summary of the required method statements for principal construction activities associated with Works adjacent to Network Rail infrastructure;
- The proposals which allow access for Network Rail to maintain their infrastructure;
- Details as to how the Railway Group & Network Rail Line standards shall be complied with;
- Specific details of how Network Rail's infrastructure and rail vehicles shall be protected from injury/damage arising from the works activities;
- Details of how staff and any third parties shall be protected from injury from Network Rail's infrastructure or vehicles using it;
- The strategy for Red & Green Zone working;

- Proposals for competencies, making specific reference to management of the certification of personnel and operatives in accordance with the National Competency Control Agency "Sentinel" systems and procedures;

- A specific accident/incident procedure with regard to Network Rail infrastructure which details action to be taken, including the communications regime;

- Proposals for security and prevention of trespass onto site, especially onto adjacent Network Rail property;

- Proposals with regard to work in and around First Scotrail's Haymarket Depot and its associated stabling & sidings. There shall be a requirement to highlight proposals for ensuring access to Haymarket Depot is maintained for staff; road and rail vehicles, especially if rail vehicles require access/egress to the depot by road. There shall be a requirement to identify how First ScotRail operations shall not be restricted.

12.8 Quality Management

The Infraco shall undertake the Works fully in compliance with quality management processes and procedures referenced in ISO 9001 and ISO 9004.

The Infraco shall develop and maintain a Quality Plan to meet the requirements of ISO 10005 - 1995, and which fully defines all quality aspects of the Works. The Quality Plan shall be submitted in accordance with the Review Procedure. The Quality Plan shall demonstrate an integrated quality management system relating to the design, construction, testing and commissioning of the system and shall show how Infraco and its Sub-Contractors shall comply with the requirements of the Quality Plan.

The Infraco shall have all associated documentation readily available for internal review and review by **tie**. Regular internal audits shall be undertaken by the Infraco to ensure full compliance with ISO 9001 and ISO 9004 in accordance with Clause 5.1 of the Code of Construction Practice. The Infraco shall prepare and submit in accordance with the Review Procedure a "Schedule of Internal Audits" for agreement with **tie**. This shall define the planned nature and timing of the internal audits. Furthermore **tie** reserve the right to undertake external audits in accordance with paragraph 5.2 of the Code of Construction Practice and Code of Maintenance Practice.

The Infraco shall ensure that their management system for the Infraco Works is developed to ensure that it aligns with the requirements of the Tram Project Quality policy Statement (DEL.HSQE.103).

Quality control including materials and works on Site shall also be undertaken in accordance with the requirements of paragraph 3.2 of the Code of Construction Practice. The Infraco shall be required to comply with these Employer's Requirements including the completion of forms and other systems in order to assist **tie** in complying with **tie**'s own safety and quality management systems.

12.8.1 Document Standards and Control

All Deliverables that are shared with, or issued to, **tie** shall be posted and reside within **tie**'s document management system. The official version of any project document shall be the version that exists within **tie**'s document management system. Access shall be granted to **tie**'s document management system on a named basis, and access levels shall be determined by **tie**. The Infraco also agrees to abide by **tie**'s document management procedure as notified to Infraco from time-to-time.

Documents from external parties should be uploaded to the project extranet for processing by document control. The extranet will also be the official conduit for issuing project information. In exceptional circumstances where documents must be exchanged by email, only the Document Control team will receive and issue this information. They will then handle all appropriate processing and distribution.

Deliverables shall conform to the following standards:

Acceptable File Types

- MS Office Suite 2003;
- MS Project 2003;
- MS Visio 2003;
- Portable Document Format (PDF) – Fully-searchable (OCR) Acrobat Reader v7 compatible;
- Compressed Files/Folders – WinZip v10 compatible;
- Graphics – GIF, TIFF, JPG, JPEG, or BMP;
- Audio – Audio files should be saved in MP3 format;
- Video – WMV or MPEG format with WMV preferred;

- Drawings – DWG (inclusive of used templates) and DCF.

Acceptable File Sizes

In general, all files should be optimised to keep their size to a minimum. For email correspondence the maximum allowable attachment size is 10MB. Individual files in excess of 50MB are only acceptable with prior agreement from **tie**.

Project Applications

- Collaboration – SharePoint 2007 (hosted by **tie**);
- Project Planning – Primavera v6;
- Risk Management – Active Risk Manager (hosted by **tie**);
- Deliverables. In addition to Deliverables conforming to the above, they should specifically be supplied in complete, self-contained and fully editable formats.

Typical examples include;

- Drawing Deliverables should be supplied as complete DWG files (inclusive of used templates) as well as the DCF print snapshot;
- Documents should be in Word 2003 (or previous) format;
- Spreadsheets should be in Excel 2003 (or previous) format and include the associated macros, equations, and functions.

Illegal Characters

As a matter of best practice the following characters should not be used in filenames to minimise the risk of error in software applications:

&	¦	$
~	¬	£
*	^	?
%	; (semi-colon)	!
#	, (comma)	@
\	‘ (apostrophe)	=
/	’ (single quote)	
<	“	
>	. (dot)	
{	: (colon)	
}		

12.9 Infraco Performance Measurement

As part of the overall project reporting regime, a four weekly report incorporating performance against Key Performance Indicators (KPI) shall be required from the Infraco. These shall be project, as opposed to company, specific.

A fundamental consideration is that the KPIs agreed must be measurable and without dispute, thus they shall be fact based. The outputs shall be compared on a four weekly basis against both four weekly and rolling targets. A colour coded "traffic light" visual warning shall be used.

The KPIs agreed are split into a number of different areas. The following provides the breakdown of components within each of the areas. Deductions against the failure to achieve the agreed KPIs are set out in Schedule 45.

Table 26 – Table showing indication of Safety KPIs

Safety
Accident Frequency Rate (AFR)
Equivalent Fatality Rate (EFR)
Lost Time Accidents (LTA)
RIDDOR
Road Traffic Injuries
Road Traffic Damage (caused by Infraco actions)
Accident Investigations (late receipt)
HSE inspections, observations, improvement notices and prohibitions
Working at height
PPE – not using/not using correctly
Review of Accident Book entries
Possible 3rd Party specific (e.g. Network Rail)
NCRs
CARs (non-completion/late response or action)
Procedure compliance
Test failures (to include concrete and welding)
Safety Tours
Safety Inspections
Security
Achievement of programme
Snagging correction

Method Statements/Risk Assessments – failure to operate in compliance therewith
Late Possessions / Overruns
Reporting
Spills
Working hours contraventions
Complaints
Pollution – water courses; noise; light; dust; others
Trespass
COSHH contraventions
Signage and warning signage
Specific parameters may need to be devised relating to programme, performance, reporting and other specific issues that are important to **tie**.

The Infraco shall submit samples, manufacturers' literature, documentation and other such materials to demonstrate compliance with the Employer's Requirements, from time to time, for review by **tie**, in advance of the associated materials or equipment being procured. The Infraco shall prepare a Schedule of Procurement Proposals to identify all such proposed submissions and their timing for approval by **tie**.

12.10 Cost Management and Reporting

The Infraco shall carry out a pro-active role in cost management and reporting. A cost report shall be submitted by the Infraco to **tie** no later than 3 Business Days before each cost review meetings / or at a 4 weekly period, to be agreed with **tie**. In addition cost summary information shall be provided for inclusion in the Progress Reports.

The Infraco cost reports shall contain comprehensive information and shall be structured in a manner that is commensurate with **tie**'s own reporting structure. The cost reports shall be required to provide information, including the following:

- Executive summary and narrative on significant changes from the previous report;
- Actual / Planned / Forecast Spend Tables / Curves to match the achievement of major deliverables and activities within the Work Breakdown Structure;
- Change Control Schedule and background information;
- Schedule of Compensation Events and background information;
- Value management estimates / analysis;
- Schedule of status of completion of Construction Milestones and Critical Milestones;
- Copy of the progress statements included in Monthly Progress Monitor.

The Infraco shall also be required to provide value engineering estimates and reports. These reports shall be provided by Infraco from time to time, as proposed by the Infraco or as required by **tie**, for the purpose of achieving better value.

12.11 Risk Management

12.11.1 Project Objectives

tie is dedicated to ensuring that a consistent approach to risk management is adopted across the ETN, which shall enable an informed view of risk to be taken.

ETN project risk management's mission is "to successfully manage all risks to and opportunities for the project thus ensuring that a supported and fully functioning operational service is delivered within budget and on time.

The key drivers within this mission are to:

- Promote and support proactive management of risk and opportunity;
- Integrate risk awareness / management, and not risk aversion, into the project culture;
- Manage risk in accordance with best practice;
- Reduce risk exposure to acceptable levels;
- Capitalise on opportunities;
- Ensure that all identified risks are owned and managed by the party best able to manage them;
- Provide assurance and enhanced information to managers and stakeholders.

tie maintains a project risk management plan and risk register covering the strategic, project management and commercial aspects of the ETN and shall continue to do so throughout the Term and operation. **tie** seeks to have all service providers, including the Infraco, contributing towards this risk register.

12.11.2 Risk Deliverables

The Infraco shall provide various Deliverables, as described in this section, to assist **tie** in meeting **tie**'s risk management obligations associated with strategic, project management and commercial aspects of the ETN. The required procedures for managing hazards and risks associated with obligations associated with safety are not covered in this section.

The Infraco shall be responsible for the production, management, development, regular maintenance and necessary updating and distribution of the documentation included within the table below. The documentation shall be held by the Infraco in electronic format with hard and soft copies being made available as required.

Risk Documentation shall be submitted to **tie**, in paper copy and electronically, for their approval in accordance with the Review Procedure and the required dates and frequencies are included in the table below.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
The Infraco shall provide assurance that they shall manage design and construction risk to the satisfaction of **tie** and in order to fulfil the objectives described in12.11.1. As part of this obligation the Infraco shall be responsible for the production, development and maintenance of a Infraco Risk Management Plan ("IRMP") for the management of all risk aspects of the Edinburgh Tram Network throughout the Term. The IRMP shall focus on the risk factors related to the Infraco managed activities related to the Infraco Works for the delivery of the Edinburgh Tram Network including the risk deliverables noted below. The IRMP shall identify individuals and their responsibility in relation to risk.	Agree format and delivery date for the IRMP with **tie**'s designated risk manager within one month of the Commencement Date. The Infraco shall update and maintain the IRMP throughout the Term. The Infraco shall issue an update to the IRMP at least bi-annually throughout the Term.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
The Infraco shall be responsible for the development and maintenance of an Infraco Risk Register ("IRR"), to best present all capex, opex, lifecycle, programme and quality risks to the Edinburgh Tram Network. The IRR shall also detail the proposed and completed mitigation of such risks. The platform used shall include the ability to generate reports, highlight risks to **tie**, key programme and cost impacts. The Infraco shall be responsible for the identification of commercial risks associated with all interfaces related to the works and shall facilitate and coordinate the inputs from stakeholders and other parties requested by **tie** from time to time. The IRR shall include analysis of each risk in terms of 'likelihood' and 'impact' providing detail on the inherent risk significance and current residual risk significance. Each risk shall have a designated responsible owner and the Infraco shall provide dashboard type graphical summaries of the risk profile and management actions being taken to mitigate. The risks to be addressed should include technical, operational, infrastructure, interface, economic, legal and regulatory, organisational and environmental risks. The Infraco should review the IRR on a four weekly basis to ensure that it is current. The Infraco shall meet with **tie** on a four weekly basis in line with the tram period calendar to discuss the control of key risks by the Infraco.	Agree format assessment criteria, platform and delivery date with **tie**'s designated risk manager within one month of the Commencement Date. The Infraco shall update and maintain the IRR as required on a four weekly basis and shall distribute the IRR to **tie** on a four weekly basis throughout the Term. Assessment criteria must be compatible with **tie**'s own risk register and assessment criteria.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
It is recognised that the identification, monitoring and progress of risk shall be discussed at regular workshops. The Infraco shall provide to **tie** a schedule of and undertake workshops, regarding risk matters to assist **tie** in ensuring the effective management of risk in relation to the Edinburgh Tram Network, **tie**, the Operator and/or relevant suppliers should receive timely notification of these in order to be able to attend. It is noted that **tie** may routinely request to attend workshops in order to be able to evaluate Infraco's approach to and performance in relation to risk. Infraco shall also attend meetings and workshops with **tie**'s project and risk management team and other ETN suppliers, the Operator and service providers as instructed by **tie** to take part in update of existing project risk and identification of new risks. The representatives attending such workshops shall be qualified and shall have sufficient knowledge of the ETN project to be able to contribute pertinent information within these workshops.	Provide and agree workshop schedule for the coming 6 months within the risk progress report to **tie**'s designated risk manager within 2 months of the Commencement Date.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
The Infraco shall be responsible for the preparation and maintenance of a Commissioning Risk Control Report which shall detail the plans for mitigating risks associated with the commissioning of the Edinburgh Tram Network. This should cover commissioning, operational and design risks, but not limited to the trams, the tracks, the power supply and the tram depot. The Commissioning Risk Control Report shall concentrate primarily on the (commercial risk) associated with the commissioning process, but shall also refer to ongoing issues which also affect the construction and/or operation or part operation of the Edinburgh Tram Network .	Agree format of the Commissioning Risk Control Report to **tie**'s designated risk manager (as notified to the Infraco from time to time) within 6 month of the Commencement Date. Final report to be delivered at least 3-months prior to start of the Testing and Commissioning. The Infraco shall update the Commissioning Risk Control Report as required until the Service Commencement Date..
The Infraco shall be responsible for the preparation and maintenance of a Residual Risk Control Report ("RRCR") that will detail the plans for mitigating the risks arising from the construction and commissioning of the Edinburgh Tram Network, which are still of ongoing importance. The RRCR should clearly detail the areas of importance that could affect the ETN after the Service Commencement Date until the end of the Term. These areas could be associated with design, operational and defects factors. Risks to be noted in the RRCR may include, but shall not be limited to commercial risk associated with, snagging, claims, specification defects and other commercial concerns.	Agree format of RRCR with **tie**'s designated risk manager (as notified to the Infraco from time to time) within 12 months of the Commencement Date. Final report to be delivered at least three months prior to the Service Commencement Date. The Infraco shall update the RRCR as required throughout the Term.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
The Infraco shall prepare and maintain an Operational and Maintenance Risk Register ("OMRR") that will detail the identified risks associated with provision of the Maintenance Services in relation to the Edinburgh Tram Network and management actions being taken to mitigate. The Infraco shall liaise with its Sub-Contractors and the Operator and any other relevant party as required in relation to the creation, development and updating of the OMR	Agree format and assessment criteria of the OMRR with **tie**'s designated risk manager (as notified to the Infraco from time to time) within 12 months of the Commencement Date. First formal report to be delivered at least three months prior to the Service Commencement Date. The Infraco shall update the OMRR in line with the four weekly tram period calendar

Table 27 - Table showing required actions from the Infraco

12.12 Traffic Management / Temporary Traffic Regulation Orders (TTROs)

The Infraco shall be responsible for the preparation of a Traffic Management Plan (TMP) and Work Site Staging Plan (WSSP). The TMP and WSSP shall comply with instructions issued by **tie** and shall be drafted in consultation with **tie** and CEC. The Infraco shall be responsible for the preparation of a Traffic Management Plan (TMP) and Work Site Staging Plan (WSSP). The plans shall apply to all work required in connection with the Infraco and including wider area traffic management measures associated with the construction of the main works. The TMP and WSSP shall comply with instructions issued by **tie** and shall be drafted in consultation with **tie** and CEC.

The TMP and WSSP shall identify and account for interfaces with parallel works, including the MUDFA Works.

The TMP and WSSP shall also include all necessary survey work, temporary traffic diversion modelling, assessment and design which will take account of the works, network constraints and the traffic control requirements.

The design shall identify the required alterations to road layouts, regulatory changes to be enacted through TTRO, altered/additional traffic signal equipment, new traffic signal installations and advance/local road signage.

The design shall also determine the locations of temporary bus stops and taxi ranks, alterations to parking and access/servicing arrangements for residents and businesses in works areas.

The TMP and WSSP shall be submitted within four weeks of the Commencement Date by the Infraco to **tie** and CEC for approval in accordance with the Review Procedure and as detailed in the current CEC-**tie** Interface Protocol relating to TTROs (Protocol Ref: TECH – 01).

The TMP and WSSP submission packages shall be as described in the Protocol and the plans shall include temporary works method statements, and shall identify general traffic, bus and pedestrian diversionary routes, access routes for emergency vehicles, and alternative arrangements for bus stops, parking and loading. The plans shall also include assumptions registers, issues logs and any other means to ensure prompt resolution of issues which could affect the progress and economic execution of the Infraco Works.

Leaflets and other approved publicity material as reasonably required shall be prepared for the information of the public/stakeholders/media showing temporary traffic management arrangements and traffic diversions and how these will operate.

Prior to implementation the TMP and WSSP shall be presented for review and approval to the **tie**/CEC/ Police/TEL Traffic Management Review Panel (TMRP) in-line with the agreed protocols and timescales which include procedures to give stakeholders advanced notification of the proposed arrangements to be implemented during the works.

The TMP and WSSP shall also include all necessary drawings, diagrams and supporting information to show the mobilisation, erection and dismantling of Temporary Works, traffic and pedestrian management during any pre-diversion works and the Infraco Works, access to properties, details of fencing and security measures.

The Infraco shall update the TMP and WSSP every two weeks throughout the duration of the Infraco Works for review at fortnightly design meetings and every four weeks at stakeholder and third part meetings.

The Infraco shall be responsible for the preparation of draft TTROs which shall be submitted to **tie** for onward submission to CEC, in its capacity as Roads Authority, for approval, again as described in the current CEC-**tie** Interface Protocol relating to TTROs (Protocol Ref: TECH – 01). The submission packages shall be as described in the Protocol.

TTRO submissions will adhere to the programme detailed in the Protocol.

The Infraco shall also attend meetings in relation to the TTROs, as required by **tie**, including representations to the **tie** / CEC Roads Working Group Committee, which convenes quarterly.

The Infraco shall develop a set of requirements in relation to TTROs and traffic management, which shall be based on information supplied to the Infraco by **tie** and/or **tie** ("TTRO Obligations and Traffic Management Plan") and shall take account of the interface on traffic management that will be required in relation to the MUDFA Works.

The Infraco shall prepare and develop project-specific procedures for complying with the TTRO Obligations and Traffic Management Plan, and these procedures shall be submitted for approval by **tie** and CEC in sufficient time to avoid disruption to the Programme.

By appropriate induction, the Infraco shall ensure all site-based personnel, management staff, operatives and visitors are fully aware of and understand the procedures contained within these Employer's Requirements.

The designated project or site manager appointed by the Infraco shall be accountable for the implementation and compliance with these requirements and procedures.

The Infraco shall ensure that the overriding considerations expressed in these procedures and requirements shall be the safety of road users, minimising disruption caused by the Infraco Works, pedestrian management and ensuring that traffic and pedestrian disruption is kept to a minimum.

This shall include taking such measures as CEC, in its capacity as roads authority, may reasonably require.

The Infraco shall ensure that reasonable access to all business, residential premises and properties (having regard to Infraco's obligation to comply with the Programme) along the route of the Edinburgh Tram Network is maintained at all times. Infraco shall not be obliged by virtue of this provision to provide access which is more extensive than the access agreed in any Third Party Agreement.

12.13 Stakeholder Management

12.13.1 General

A Stakeholder and Communications Management Plan has been developed by **tie**. The Infraco shall comply with the requirements of this document.

The Infraco shall be, jointly with **tie**, accountable for minimising any possible adverse impact of the implementation of the Edinburgh Tram Network on stakeholders (both statutory and non statutory), local businesses and the general public.

12.13.2 Design

The Infraco shall incorporate the following requirements into the design in addition to any other requirements as defined:

- Securing, implementing and incorporating into the design all necessary Network Rail, BAA and other third party agreements;
- Assisting by providing all technical details relevant to the compulsory purchase order process and land acquisition process (including wayleaves and servitudes); including integration with **tie**'s stakeholder and GIS systems.
- Liaising with CEC, Scottish Executive, Historic Scotland, World Heritage Trust, Scottish Natural Heritage and others as required by **tie** in relation to the performance of the Infraco Works.

12.13.3 Liaison and Public Information

The Infraco shall appoint a liaison officer to manage all public relations, information and press related matters relating to the Infraco Works, who shall along with the necessary technical, commercial and other Infraco resource, liaise with **tie**, and if so requested by **tie**, with CEC, other statutory bodies, members of the public, local businesses, the press and the media as may be

necessary on all matters relating to the Infraco Works. Except where expressly stated in the Agreement, the Infraco shall not make any publicity or media statements or make any other formal disclosure of information regarding the Infraco Works without the prior approval of **tie**.

The liaison obligation referred to in the above paragraph shall include, but shall not be limited to the following matters:

- From time to time as directed by **tie**, Infraco shall be required to participate in business, stakeholder and community liaison groups, public meetings and consultation meetings as the progress of the Infraco Works dictate.

- From time to time as directed by **tie**, Infraco shall be required to provide proactive input, information and comment into information initiatives organised by or on behalf of **tie** and attending as requested by **tie** at any relevant consultation meetings

- As directed by **tie Infraco** will assist with the development and maintenance of, and adherence to, a communications protocol for dealing with all stakeholders, businesses and members of the public affected by the Infraco Works. In particular this will require strict adherence to timescales determined by **tie**

- Assisting with the development and maintenance of procedures developed by **tie** in relation to stakeholder management by way of the provision of information relating to the Infraco Works

- Provision of weekly updates to **tie** on the progress of the Infraco Works and all planned Infraco Works in a form reasonably requested by **tie**.

- Depending upon the type of communication, Infraco shall give **tie** a minimum of two weeks notice in advance of all plans for any formal communication with stakeholders, businesses and members of the public (e.g. for major customer works governed by the Customer Interaction Cycle far more weeks would be required). The form and content of such formal communication shall be subject to **tie**'s prior approval

- Provision to **tie** of all information reasonably requested by **tie** in respect of the Infraco Works planned in a form prescribed by **tie** and timescales and frequency agreed with **tie**.

- **tie** and Infraco will be jointly involved in the appointment of appropriately qualified "Tram Helpers". They will be directly managed by **tie,** but integrated into Infraco work areas and teams through joint induction and briefing; appropriate cross training; "Tram Helper" visibility in Infraco work areas; "Tram Helper" involvement in the direct management of stakeholder issues on site;

direct engagement by "Tram Helpers" or appropriate Infraco management and staff to assist in the resolution of on site issues; provision of appropriate Infraco uniform and equipment, etc. "Tram helpers" are to be recruited and in place four weeks prior to commencement of notification.

- Provision and use of approved branding materials, PPE kit and signage at all operational Work Sections. No such materials, kit or signage shall be erected at any Work Section without the prior approval of **tie**.

- The provision and distribution of traffic routing maps which conform to the terms of the TTROs for all areas affected by the Infraco Works in advance of the Infraco Works starting in any particular location as may be requested by **tie**. In the event that **tie** requires that such material is for public issue, public issue shall not occur before the form and content has been approved by **tie**. Infraco shall ensure that all public statements (including by way of media referred to in the sections below (customer care centre, website, weekly newsletter, monthly newsletter, call centre and communication log) in relation to the Infraco Works are consistent with (**tie**'s) Communications Strategy and integrated with **tie**'s systems and procedures.

12.13.4 Information Centre

The Infraco shall provide all information and documentation regarding the Infraco Works as may be reasonably required by **tie** in respect of the mobile and fixed information centres being operated jointly by **tie** and Infraco in relation to the Edinburgh Tram Network. The frequency of update and version control of information shall be subject to a process agreed with **tie**.

12.13.5 Website

The Infraco shall provide all information regarding the Infraco Works, reasonably requested by **tie**, in order to populate the website, which shall be maintained and operated by **tie** throughout the progress of the Infraco Works, in respect of the Edinburgh Tram Network. The frequency of update and version control of information shall be subject to a process agreed with **tie**.

12.13.6 Weekly Newsletter

The Infraco shall produce and publish weekly newsletters every Wednesday, detailing the Infraco Works to be undertaken in the forthcoming week and outlining, with appropriate maps, drawings and diagrams, the impact on the general public, businesses and in particular any alterations to road traffic circulation patterns required by the coming week's Infraco Works.

Each newsletter, the contents and format of which shall have the prior approval of **tie**, will also be issued, if requested by **tie**, by fax and email to: local and national newspapers and other news media, CEC, Lothian and Borders Police, the emergency services, to any party or parties requested by **tie** and to any other persons or organisations that have requested receipt of the newsletters.

The newsletters shall also be distributed door to door by the Infraco in affected locations and the Infraco shall advise **tie** when such distribution is occurring.

The Infraco shall monitor and record the distribution of newsletters, recording who is carrying out such distribution, the intended recipients etc, so as to enable **tie** to carry out its own audit and monitoring of such distribution. Infraco to ensure, by regular surveys that circulation data is accurate and up to date.

Sufficient free distribution take-away hard copies of these newsletters shall be delivered to and placed in the information centre by the Infraco before 08:00 every Thursday morning.

The Infraco is required to submit a draft of each issue of the newsletters to **tie** no later than midday on the Monday immediately preceding the proposed issue of the newsletters on the Wednesday. **tie** shall respond before 17.00 hours the same day.

12.13.7 tie Monthly Newsletter

The Infraco shall provide all information and assistance reasonably requested by **tie** in relation to the publication by **tie**, of a monthly newsletter in relation to the progress of and future plans for the Edinburgh Tram Network.

12.13.8 Customer Contact Centre

The telephone number, fax number and e-mail address of the call centre to be operated jointly by **tie** and Infraco in relation to the Edinburgh Tram Network (the "hotline") shall be publicised through the press and the weekly newsletter and clearly displayed on all appropriate PPE kit, site signage, hoardings and at other suitable locations within and throughout the vicinity of the Infraco Works. All letters, e-mails, customer queries shall be answered by Infraco within timescales, to be agreed in advance with **tie**.

12.13.9 Communication Log

All contacts, communications, complaints, comments and queries howsoever received by the Infraco shall be registered in a suitable electronic log (the "communication log").

The Communications Log shall be developed and maintained by Infraco in a manner that allows it to be fully integrated with **tie**'s Stakeholder Database and GIS systems. The communication log shall set out each contact under the type (e.g. General, Traffic, Safety, Vibration, Noise, Dirt, Disruption, Injury, Parking, Access, RTA, publicity, suggestions etc).

The method of approach shall also be logged (e.g. phone, direct, letter, email, etc.) as well as the time and date.

The log shall be so constructed such that statistical analysis of the different communications can be presented as part of the data to be provided to **tie**. It shall be a requirement that the Infraco shall deliver an "above average" customer satisfaction level, with criteria, frequency and method of assessment to be agreed by **tie**. In order to demonstrate this, there shall be a requirement for the Infraco (and as required **tie**) to undertake internal (and external) audits of the overall engagements with the stakeholders. All this information shall be summarised by the Infraco in its monthly progress report.

Infraco shall take such steps as are required to address any such contact, communication, complaint, comment or query in accordance with the response requirements set out in Table 28 - Notification Hierarchy and in line with the agreed enquiry management process.

To the extent that a stricter response requirement is otherwise required under the Agreement, the stricter response requirement shall apply.

To the extent that Table 26 provides for the recovery of any amount by **tie** from the Infraco, such amount may be deducted from any monies due to or to become due to the Infraco or, alternatively, may be recovered from the Infraco as a debt.

A record of all remedial actions taken shall be maintained.

In the event of the Infraco receiving a complaint, a follow up letter or electronic communication shall be passed to the complainant by the Infraco within 24 hours of their receipt of the complaint, outlining the complaint and details and timing of the remedial action being undertaken by the Infraco.

An up to date copy of the communications log shall be compiled daily by the Infraco, together with a report on the progress of any actions.

The communications log shall be inspected and signed daily by a nominated senior representative of the Infraco and shall be counter signed by the Infraco's Representative at least once per week.

The Infraco's Representative shall write a report to **tie** and/or the Nominated City Officer of CEC (as notified by **tie** from time to time) at a frequency determined by **tie** (at least once per month) containing a list of any breaches of the requirements as defined within this section and also Schedule 3 (Code of Construction Practice and Code of Maintenance Contract) occurring within the previous month, setting out:

- the nature of the breach;
- the duration of the breach;
- the action taken by the Infraco to mitigate the breach; and
- the steps taken to minimise the likelihood of a subsequent occurrence of the breach

Subject to the Infraco obtaining **tie**'s prior approval, a copy of each week's communication log shall be placed every Friday in the information centres, where it will remain until completion of the Infraco Works.

Any person, including representatives of **tie** and CEC's nominated representatives may freely inspect all deposited copies of the communications log during the normal opening hours of the information centres.

The version of communications log on public display should not breach any data protection legislation or other Law.

Copies of the communication log shall be forwarded to **tie**'s Representative and/or and CEC's Nominated City Officer once per week.

The master communication log shall be available for **tie**'s Representative and CEC's Nominated City Officer to inspect at any other time during normal working hours.

Level of Urgency	Category of Notification	Required Response Time
1	**High urgency** Involves an immediate threat to persons or property or the circumstances otherwise require immediate rectification.	Immediate action required. If response not completed by the Infraco within 4 hours, **tie** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Infraco.
2	**Medium urgency** No immediate threat to persons or property, but circumstances require rectification within 24 hours.	Remedial action requires to be completed within 24 hours. If the Infraco does not complete the required response within 24 hours, **tie** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Infraco.
3	**Issue requires rectification** but no immediate threat to persons or property and the circumstances do not otherwise require immediate rectification.	Timescales for rectification to be agreed between the Infraco and **tie**. In the event that the Infraco does not comply with the agreed timescales, **tie** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Infraco.

Table 28 - Notification Hierarchy

13 Permits / Approvals

The Infraco shall obtain all necessary permits and approvals prior to undertaking investigations or works on Site, in accordance with paragraph 3 of the Code of Construction Practice.

13.1 Method Statements

The Infraco shall prepare method statements in respect of all investigation and work activities, as detailed in this Section and paragraph 3.2 of the Code of Construction Practice and submit these in accordance with paragraph 3.3 of the Code of Construction Practice.

The Infraco shall produce a method statement entitled "Procedures for dealing with Unidentified Apparatus or Unrecorded Artificial Obstructions", which shall be submitted by Infraco in accordance with paragraph 3.3 of the Code of Construction Practice. This method statement shall contain procedures which shall confirm the processes for dealing with unforeseeable events or circumstances, the discovery of unidentified apparatus (including live services) or unrecorded artificial obstructions. The final version of the method statement and procedures shall be agreed with the relevant key third parties, Approval Bodies, the Utilities and the emergency services The method statement shall be updated and a final version produced which shall be finalised by the Infraco in accordance with paragraph 3.3 of the Code of Construction Practice.

13.2 Existing Structures Which May Affect Progress and relationship with Third Parties

The Infraco shall undertake works to address the condition of existing structures where such condition may affect the progress of the Infraco Works. Where such work is completed the Infraco shall take appropriate photographs to fully demonstrate the quality of the reinstatement works.

The Infraco shall undertake survey inspections associated with buildings and structures which may be at risk of physical damage as a result of the Infraco Works.

For such structures and buildings the Infraco shall compile an appropriate schedule of such buildings / structures, and produce surveys / records similar to those described under paragraph 18.2.1 of Schedule 3 (Code of Construction and Code of Maintenance Practice).

Early warning must be given to **tie** where any third party is, or is likely to start, acting unreasonably. In these situations, **tie** will seek to resolve any issues with the third party to assist Infraco.

13.3 Network Rail

The Infraco shall ensure that the requirements of the Network Rail GRIP process are implemented on the works for which they are responsible whilst working in accordance with all relevant Network Rail Group Standards.

The contract requirements for Network Rail with regard to health and safety are included within the Network Rail document NR/SP/OHS/008. The project specific requirements are identified within the Safety Clause Menu against the requirements of Network Rail document NR/SP/OHS/008 and indicated with 'ticks' in the contractor column sections 51 to 59 inclusive of the safety clause menu and any other requirements that the Infraco is proposing by virtue of his method of undertaking the Infraco Works. The safety clause menu shall be signed off by the Infraco to confirm its proposals.

The Infraco Works shall be undertaken as Third Party Works as identified within the Network Rail document (RT/LS/P/043).

14 Human Factors

The Infraco shall provide systems and working practices that are:

- As easy to use as possible;
- Unlikely to cause annoyance or stress to users of the Edinburgh Tram Network, whether members of the public, operators, or maintainers; and
- Likely to promote safety to all.

The Infraco shall systematically and comprehensively:

- identify all the human factors issues associated with the engineering of the Edinburgh Tram Network, using task analysis;
- determine which of these human factors issues pose the most significant risk to the efficiency, productivity, safety and health of the Edinburgh Tram Network; and
- describe the organisational arrangements and processes the Infraco intends to put in place to manage these significant human factors issues as part of the engineering of the Edinburgh Tram Network

The Infraco shall produce and maintain in accordance with the submittals schedule a human factors management plan, covering the requirements summarised above, and where appropriate, shall undertake human factors studies to recommend solutions.

Areas of particular concern are:

- The human computer interfaces in the Control Centre;
- The layout of the driver's cabs;
- The facilities to enable maintenance of equipment:
  - In the workshop and Depot;
  - At trackside;

- In substations;
- At the Tramstops; and
- In the Control Centre.

The Infraco shall adopt all applicable best practice and guidelines for human factors. In designing the environment in the Control Centre, the Infraco shall comply with BS EN 50126 and ISO 11064 "Ergonomic Design of Control Centres.

15 Reliability, Availability and Maintainability

15.1 Reliability and Availability

The Edinburgh Tram Network is made up of many different subsystems, most of which may affect the reliability of operation of the ETN as a whole. In respect of achieving and maintaining reliability, the Infraco shall design, construct and maintain the Edinburgh Tram Network in accordance with Good Industry Practice, subject to the reasonable constraints of cost. Where necessary, the ETN should be made resilient to single point equipment and cable failure by employing suitable levels of equipment/cable redundancy and duplication.

On equipment or cable failure, subsystems shall be designed in a fail-safe manner, with graceful degradation. Limited back-up facilities shall be provided to maintain services under specified partial failure conditions.

Defined below are the requirements for availability of individual subsystems (each of which is given a definition), and also the availability of individual components of the subsystems.

In addition to the above, the overall availability of the Edinburgh Tram Network and its subsystems must support the tram punctuality requirement that is set out in these Employer's Requirements. Consequently it may be necessary to increase the minimum requirements that are set out below, especially as the consequences of the actions that third parties may take, including delays caused by other road users, need to be included in the punctuality analysis for the Edinburgh Tram Network.

For all components and subsystems, assume a Mean Time to Repair (MTTR) of 4 hours.

Any downtime required for planned maintenance can be discounted from the determination of availability, provided that such maintenance can be reasonably undertaken at a time when the maintenance has no impact on the operation of the ETN. This will often be during overnight shut downs.

15.2 Traction Power System

Component or Subsystem	Minimum Availability
AC circuit breaker, where its availability is defined as the probability that it either fails to conduct electricity when commended to be closed.	99.99%
Transformer / rectifier where its availability is defined as the probability that it either fails to provide the nominal 750VDC when energised.	99.99%
DC circuit breakers and busbars, where its availability is defined as the probability that traction power is not available from the DCCB when commanded to be closed, provided that 750 VDC is available at from the rectifier	99.99%
Transformer / rectifier where its availability is defined as the probability that it fails to provide the nominal 750VDC when energised by the HV input.	99.99%
Substation battery and charger, where its availability is defined as the probability that control voltage is not available from the battery at any time during its normal operation, regardless of the state of the incoming LV supply	99.99%
Substation, where its availability is defined as the probability that 750VDC voltage is not available for the OLE when the substation is commanded to provide 750VDC	99.75%

Table 29 - Substation Equipment

Component or Subsystem	Minimum Availability
OLE System, where its availability is defined as the probability that in any linear km of the OLE system, trams are not able to operate at the normal operational speed due to defects in the OLE. This is based on an 8 hour incident once every 3 years, 20hr/day operation and (20 route-km plus depot, about 50 track-km)	99.99925% for each km

Table 30 – Overhead Line Equipment

15.3 Supervisory and Communications Systems.

Component or Subsystem	Minimum Availability
ODN node	99.99%
Fibre Optic Cabling	99.99%
Patch Panels and Connectors	99.99%
ODN network, where its availability is defined as the probability that any message from a given input to a node reaches its intended destination node correctly and could be transmitted onwards by that node.	99.99%

Table 31 - Operational Data Network

Component or Subsystem	Minimum Availability
Transponder (if used)	99.9%
Loop Detector	99.9%
TPDS Trackside Controller	99.9%
TPDS subsystem, where its availability is defined as the probability that any given tram has its position detected and passed to the signal controller and to Control Centre operators correctly, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional	99.75%

Table 32 - Tram Position and Detection System

Component or Subsystem	Minimum Availability
Passenger Information Display	99.9%
Local Controller (if required)	99.9%
PID subsystem, where its availability is defined as the probability that the appropriate message is displayed correctly at a given PID, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional	99.75%

Table 33 – Passenger Information Display

Component or Subsystem	Minimum Availability
Telephone Handset	99.9%
PABX	99.99%
Telephone network, where its availability is defined as the probability that any 30 second conversation between a given telephone and another given telephone is heard clearly and completely by the caller and the intended recipient, assuming that the ODN is fully functional.	99.75%

Table 34 – Telephone Network

Component or Subsystem	Minimum Availability
PA speaker	99.9%
PA controller	99.9%
Microphone and speaker	99.9%
PA subsystem, where its availability is defined as the probability that an operator can make an intended announcement clearly at a given platform, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional.	99.75%

Table 35 - Public Address System

Component or Subsystem	Minimum Availability
Base Station	99.95%
Mobile Handset (Tram, Vehicle, or Hand Held)	99.7%
Central Switch	99.99%
Operational Radio subsystem, where its availability is defined as the probability that a 10 second call (voice) or short data message can be received clearly by the intended recipient, assuming that the ODN is fully functional and that the hardware component of the Control Centre workstations is fully functional	99.75%

Table 36 - Operational Radio System

Component or Subsystem	Minimum Availability
Help / Emergency Help Point	99.9%
Help Point subsystem, where its availability is defined as the probability that a member of the public can contact the Control Centre operator and can carry out a Help Point conversation lasting 20 seconds, clearly and without interruption, assuming that the ODN is fully functional and that the PABX is fully functional	99.75%

Table 37 - Passenger Help / Passenger Emergency Help System

Component or Subsystem	Minimum Availability
CCTV camera	99.95%
Digital Video Recorder	99.95%
CCTV Matrix	99.95%
CCTV subsystem, where its availability is defined as the probability that an image is displayed correctly and in the specified sequence at the Control Centre, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional	99.9%
Recording and replay subsystem, where its availability is defined as the probability that an image is displayed from any given time in the past (within the recorded period) can be retrieved and displayed correctly, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional	99.9%

Table 38 - CCTV System

Component or Subsystem	Minimum Availability
SCADA RTU (including I/O cards and interface cards)	99.95%
SCADA subsystem, where its availability is defined as the probability is the lesser of (a) that an indicator is read correctly at the RTU, transmitted to the SCADA Master Station in the Control Centre, and displayed correctly on any SCADA display that is in use within four seconds: and (b) that a control is effectively transmitted to an outstation within two seconds, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional	99.75%

Table 39 - SCADA System

Component or Subsystem	Minimum Availability
Servers (if necessary, by use of hardware and software redundancy)	99.99%
Workstations	99.9%
Printers	99.5%
CCTV Matrix Controller	99.9%
LAN Switches, Routers and Hubs	99.99%

Table 40 - Central Control Equipment

15.4 Maintainability

The ETN and its components shall be designed with maintainability in mind. To this end, the following shall be observed:

- Important equipment shall be in a redundant configuration, so that a component may be replaced while standby equipment takes over its duty;
- Equipment shall be replaceable, if possible, as field replaceable units, so that defective components can be replaced without the need to power down the overall piece of equipment; and
- Equipment, particularly at trackside and on Tramstops, shall be positioned so that where possible it is accessible for maintenance or replacement without the necessity to halt tramway traffic or to close the Tramstop and without the need to use access equipment such as steps.

15.5 Supportability

The equipment selected for use on the Edinburgh Tram Network shall be selected so that:

- It has a long design life, as specified in section 6 of these Employer's Requirements.
- It shall be based on standard Commercial Off-the Shelf (COTS) equipment as far as appropriate, so that replacement parts may be easily obtained and integrated into the ETN without the necessity of resorting to the original subsystem or equipment suppliers.

16 Electromagnetic Compatibility

16.1 EMC Directive

On 20th July 2007 a new EMC Directive came into force in the European Union. Statutory Instrument 2006 No.3418 implements the new EMC Directive 2004/108/EC in UK law. The rules for the new EMC Directive have changed significantly from the old Directive (89/336/EEC). After 19th July 2009 declarations made will require appropriate "Technical Documentation". This means that the Declaration of Conformity made using the old conformance mechanisms will have to be updated to use "Technical Documentation". The Infraco must be aware of the relevance of the 19th July 2009 date and insist that suppliers provide documentation accordingly.

16.2 Essential Protection Requirements

The purpose of the EMC Directive is to ensure that electrical/electronic equipment does not cause or be susceptible to electromagnetic disturbance. The protection requirements required of all electrical/electronic equipment/systems/installations are as follows:

- the electromagnetic disturbance generated shall not exceed the level above which radio and telecommunications equipment or other equipment cannot operate as intended; and
- they shall have a level of immunity to the electromagnetic disturbance to be expected in their intended use which allows them to operate without unacceptable degradation of that intended use.

The Infraco must produce an Edinburgh Tram Network specific EMC strategy document in accordance with the Submittal Programme that clearly defines its strategy for achieving compliance with these essential protection requirements and shall submit it to **tie** for its approval.

17 Health, Safety, Quality and Environment

17.1 Quality Management

The Infraco shall undertake the Infraco Works fully in compliance with quality management processes and procedures referenced in ISO 9001 and ISO 9004.

The Infraco shall develop a Quality Plan to meet the requirements of ISO 10005 - 1995, and which fully defines all quality aspects of the Infraco Works. The Quality Plan shall be submitted in accordance with the Review Procedure. The Quality Plan shall demonstrate an integrated quality management system relating to the design, construction, testing, commissioning and maintenance of the Edinburgh Tram Network and shall show how Infraco and its Sub-Contractors shall comply with the requirements of the Quality Plan.

The Infraco shall have all associated documentation readily available for internal review and review by **tie**. Regular internal audits shall be undertaken by the Infraco to ensure full compliance with ISO 9001 and ISO 9004 in accordance with paragraph 5.1 of the Code of Construction Practice. The Infraco shall prepare and submit in accordance with the Review Procedure a "Schedule of Internal Audits" for agreement with **tie**. This shall define the planned nature and timing of the internal audits. Furthermore **tie** reserves the right to undertake external audits in accordance with paragraph 5.2 of the Code of Construction Practice.

The Infraco shall ensure that its management system for the Infraco Works is developed to ensure that it aligns with the requirements of the Tram Project Quality Policy Statement (DEL.HSQE.103).

Quality control including materials and works on Site shall also be undertaken by the Infraco in accordance with the requirements of paragraph 3.2 of the Code of Construction Practice and the Project Safety and Quality Interface Document. The Infraco shall be required to comply with the requirements of this document including the completion of forms and other systems in order to assist **tie** in complying with **tie's** own safety and quality management systems.

17.2 Health & Safety

17.2.1 Safety Management Plan

The Infraco shall submit a safety management plan that is over-arching with regard to safety and defines the management procedures that shall be put in place to ensure health and safety for the design, construction, testing, commissioning and maintenance of the Edinburgh Tram Network. This document shall be stand alone and separate from other safety deliverables such as health and safety plan, system safety management plan, case for safety development etc. The Safety Management Plan shall address all issues relating to the safety of the Infraco Works, staff and third parties, however specific details relating to the items below are required and shall be submitted by the Infraco in accordance with the Submittal Programme:

- The plan shall detail the approach and all management procedures relating to health and safety for the Edinburgh Tram Network;
- The plan shall show how the Infraco will ensure that its Sub-Contractors apply all relevant health and safety policies and procedures to all Sub-Contractors;
- Details of all interfaces associated with safety and the procedures of how these shall be managed. Interfaces shall include Roads Authorities, Health and Safety Executive; any other relevant statutory authorities, HMRI; Competent Person (ROGS); Network Rail; Police; Fire and Rescue Services; Ambulance Service; and all applicable Law;
- Proposed Safety Initiatives;
- How the Infraco proposes that a safety culture shall be cascaded and enforced throughout the team including with Sub-Contractors;
- Infraco proposals for how safety shall be incentivised throughout the team, including with Sub-Contractors;
- The emergency procedures which the Infraco propose to implement;
- Details of how the Infraco shall implement accident and incident reporting and promotion of an open culture;
- The Infraco's safety inspection & safety tour regime;

- An outline of the Infraco's procedures relating to safety for compliance with **tie**'s Drugs & Alcohol Policy and procedures and details of the Infraco's own similar policy and procedures;
- Details of any particular safety issues the Infraco considers would be significant and initial mitigation measures the Infraco considers necessary;
- Commissioning of the Edinburgh Tram Network;
- Driver Training on the Edinburgh Tram Network;
- Maintenance of the Edinburgh Tram Network.

17.2.2 Occupational Health & Safety Management System

The Infraco shall adopt an occupational health & safety management system consisting of the implementation and use of those processes and procedures referenced in BS 8800, OHSAS 18001-2007 and/or HSG 65 (Successful H&S Management).

17.2.3 Project Health & Safety Plan and Health & Safety File

The Infraco shall develop a construction phase plan and supply all necessary information for the Project Health & Safety File in accordance with the Construction (Design and Management) Regulations 2007 and L144 Managing Health and Safety in Construction and as described in the pre-construction information. The construction phase plan shall require to be submitted in accordance with the Review Procedure.

17.2.4 Interface with tie's Safety Systems

The Infraco shall ensure that the management system for the Infraco Works is developed to ensure that it aligns with the requirements of the Tram Project Safety Policy Statement (DEL.HSQE.105). Section 32 of the Agreement contains the Project Safety (and Quality) Interface Document. The Infraco shall be required to comply with the requirements of this document including the completion of forms and other systems in order to assist **tie** in complying with **tie**'s own safety and quality management systems.

17.2.5 System Safety Management Plan (SSMP)

The Infraco shall be responsible for the development of the SSMP.

The SSMP shall define the engineering process that shall ensure, and provide a record of, assurance that the tramway has achieved an acceptable level of performance. This is achieved through a staged "case for safety" submission (refer below) process to signify that safety has been engineered into the design of the Edinburgh Tram Network. The SSMP shall define the process, activities and requirements for the preparation for a "case for safety" at the relevant design stage. The SSMP shall also define the system safety management organisation and the strategy to achieve the individual hazard system safety targets. The SSMP is concerned with only with those hazards that could give rise to an increased level of risk to passengers, staff and the general public from the operating system. (All health and safety hazards related to the risk to workers, staff and the general public from the construction activities should be covered under the safety management plan.)

17.2.6 The Railways and Other Guided Transport Systems (Safety) Regulations 2006

The Edinburgh Tram Network shall be delivered in accordance with The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS).

The Infraco shall design and execute the Infraco Works using safety management and procedures to demonstrate that the Edinburgh Tram Network is safe to introduce into service as defined by the Safety Management System under ROGS. This shall also include the development of the Case for Safety to the satisfaction of the Competent Person and the Project Safety Certification Committee. These aspects form an integral part of the design of the Edinburgh Tram Network and are detailed in this section of these Employer's Requirements.

The Infraco shall undertake all Infraco Works in accordance with the written safety verification scheme requirements prepared by **tie**. Safety verification will be undertaken by **tie**. The Competent Person shall assure the process and its outputs. The Infraco shall allow **tie** and the Competent Person access to undertake safety verification activities, such as system safety audits. The Infraco shall develop a safety management system for when the Edinburgh Tram Network is operational which complies with the requirements of ROGS and other relevant legislation to the satisfaction of the Competent Person and **tie/TEL**.

Whilst there is no requirement in ROGS for projects such as the ETN to be notified to or given prior consent or approval by HMRI, HMRI have been involved in the development of the Edinburgh Tram

Network scheme to date and it is **tie**'s intention to continue this involvement. The Infraco shall assist **tie** in any liaison with the HMRI when requested to do so.

17.2.7 Health and Safety Management

The health and safety responsibilities and CDM/ROGs application are defined in the matrix below for each phase of the project.

Table 41 – Matrix showing Contractual Responsibilities – Health & Safety Management

		Infraco				Revenue
JDFA	**Pre Novation Design**	**Post Novation Design**	**Construction / Installation**	**Commissioning / Test running ***	**Shadow running**	**Operation**
DM Client.	CDM Client.	CDM Client.	CDM Client.	CDM Client.	-	-
	ROGS duty holder.	**ROGS duty holder.**	**ROGS duty holder.**	**ROGS duty holder. ****	**ROGS duty holder. ****	
	Adviser to **tie**.	Adviser to **tie**.	Adviser to **tie**.	Driver training. Inputting into hazard log.	Operator of tram system. Inputting into hazard log.	Operator of tram system.
signer.	Designer.	Designer.	-	-	-	-
	Managing hazard log.	Inputting into hazard log.				
ncipal contractor	-	-	-	-	-	-
	-	Design manager.	Principal contractor.	Principal contractor.	-	-
		Managing hazard log.	Managing hazard log.	Managing hazard log.		
	-	Designer.	Contractor.	Contractor.	-	-
		Inputting into hazard log.	Inputting into hazard log.	Inputting into hazard log.		
	-	-	-	-	-	**ROGS duty holder.**
	-	-	-	-	-	-
s – Construction ase Plan, Residual sk Register. alth & safety file iated.	Yes – Pre-construction information, Residual Risk Register. Health & safety file progressed.	Yes – Pre-construction information, Residual Risk Register. Health & safety file progressed.	Yes – Construction Phase Plan. Health & safety file progressed.	Yes – Construction Phase Plan. Health & safety file completed & handed over to TEL.	No – no longer construction work.	No.
.	Yes – Safety Verification Scheme. Appointment of	Yes – Safety Verification Scheme. NoNOs from ICP.	Yes – Safety Verification Scheme. NoNOs from ICP.	Yes – Safety Verification Scheme + Safety Management System.	Yes – Safety Verification Scheme + Safety Management System.	Yes – Safety Management System.

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	Person (ICP).					
TEMS						
MIS SMS – nstruction. S SMS – design.	**tie** SMS – safety verification. SDS SMS - design.	**tie** SMS – safety verification. Infraco SMS – design management. SDS SMS – design. Tramco SMS – design.	**tie** SMS – safety verification. Infraco SMS – construction/installation Tramco SMS – manufacture/installation.	**tie** SMS – safety verification. Infraco SMS – installation/operation. Tramco SMS – installation. Transdev SMS – operation.	**tie** SMS – safety verification. Infraco SMS - operation. Transdev SMS – operation.	TEL SMS. Transdev SMS - operation.

tage in phases once key milestones have been achieved e.g. the energisation of the OLE within the depot.
sume the role of **ROGS duty holder** during this phase.

es under the CDM Regulations

Responsibilities under the ROGS Regulations

17.3 Environmental Management

17.3.1 Environmental Management System

The Infraco shall adopt an environmental management system consisting of the implementation and use of those processes and procedures referenced in ISO 14001.

Documentation developed to meet the requirements of the environmental management system shall be submitted in accordance with the Review Procedure.

The Infraco shall ensure that the management system for the Infraco Works is developed to ensure that it aligns with the requirements of the Tram Project Environmental & Sustainability Policy Statement (DEL.HSQE.101).

17.3.2 Environmental and Sustainability Action Plan

The Infraco shall submit and maintain an Environmental & Sustainability Action Plan (EAP). This shall be based on SDS Environmental Mangement Plan and shall cover environmental issues for the duration of the Infraco Works, including design and construction stages. It shall describe the management process, procedures and interface requirements associated with meeting the Infraco's environmental responsibilities.

It shall then develop in detail the potential impacts on environmental resource, mitigation measures and responsibilities associated with all stages of the Infraco Works.

The EAP shall be prepared using the following sources of information.

- the Environmental Statements;
- The Design Manual;
- The Noise and Vibration Policy as contained within the Code of Maintenance Practice;
- The Code of Construction Practice;
- The Landscape and Habitat Management Plan for the Roseburn Corridor;
- The Badger Mitigation Plan for the Roseburn Corridor;
- Agreements made with statutory bodies; and

- Parliamentary agreements.

The EAP shall be amended by the Infraco to reflect any changes to the tramway design or engineering solutions and the results of surveys..

17.3.3 Construction Environmental Management Plan (CEMP)

The Infraco shall prepare a construction environmental management plan (CEMP) including method statements, as necessary, to convey the required level of information during the construction stage of the Infraco Works.

Site specific EMPs shall be prepared for each geographical section and intermediate geographical section as appropriate. These plans shall be produced by the Infraco prior to any works commencing on Site and must be reviewed by **tie** before work starts. The site specific EMPs must separately address the following sites and/or issues:

- Site accommodation, compound and offices and storage areas;
- Site clearance;
- Geographical sections and intermediate geographical sections of the Tram route;
- The Depot;
- Structures, such as sub-stations not already included in the above; and
- Road, cycleway and footway works, including drainage, signage and lighting.
- A series of site specific and topic related EMPs shall also be produced by the Infraco that shall address all the environmental issues, landscape, ecology etc. These shall cover the general control and protection measures for each topic as it relates to each of the site specific sections in the plan area. The Infraco shall have responsibility for the production, content and implementation of the Site Specific EMPs.
- The Infraco shall submit to **tie** the site specific EMPs 8 weeks prior to the commencement of the relevant section of the Infraco Works.

- **tie** shall comment on the plan(s) submitted, in accordance with the Review Procedure and agree the final plans prior to the commencement of any work on the relevant section or activity.

17.3.4 Requirement of Site Specific EMPs

The Infraco shall develop the site specific EMPs to include the following details:

- **A description of the works to be undertaken**
- List of all separate work activities that fall within the scope of the works.
- **A detailed programme of the construction activities**
- Proposed dates and sequence of the works (showing how environmental impacts are affected by potential changes to the Programme);
- Details of proposed normal working hours and intended start up and close down times; and
- Outline of any works which may require construction activities outside of normal working hours.
- **Location of the works, including a site plan, showing construction site boundaries**
- This shall show the position of plant and position of any sensitive receptors e.g. watercourses, local residents, etc.
- **Personnel access routes/points**
- Location plan of each access route/point;
- List of activities for which each access point is to be used
- **Vehicular access routes/points**
- Location plan of each access route/point;
- List of activities for which each access point is to be used
- **Equipment and plant to be used (including type, make and expected number)**
- **Method of delivery/removal of materials and plant**

- **Details of proposed site accommodation**
- **Details of how public right of way and access to property will be retained and managed**
- A list of Consents/permissions obtained or to be obtained for the works
- **External Consultation**
- A list of those notified of the works and the date notified
- A list of proposed notifications and dates
- **Significant environmental impacts relating to each activity.**
- (This should draw upon the definitions of significant impacts used in the Environmental Statement).
- **Significant environmental risks relating to each activity.**
- **Receptors which are likely to be affected by the works.**
- **On-site mitigating measures for each impact and risk.**

These will be transferred onto site management statements which will briefly state the key risks and mitigating measures which have been agreed. The site management statement will be attached to the construction method statement for the works to ensure that it is brought to the attention of all site staff. The Site Management Statement will be briefed out to all site based staff as a toolbox talk.

- **Monitoring proposals that shall include:**
- The receptors for which monitoring will be undertaken;
- Frequency of monitoring;
- Factors against which the monitoring results will be analysed;
- Threshold levels;

- Timescales within which results will be analysed;
- List of organisations/individuals to whom results will be distributed; and
- Actions to be taken in the event that thresholds are breached.

17.3.5 Permits to Work

Prior to being granted access to commence construction works, the Infraco shall complete and submit to **tie** for its autorisation, the required Permits to Work.

Further details of the Permits to Work process are included within the Code of Construction Practice, the Project Safety & Quality Interface Document and Section 39 of the Employer's Requirements.

18 Cabling and Ducting

This Section sets out the requirements with the Infraco must comply with in relation to cabling and ducting.

18.1 Cabling

All cables must be mechanically protected such that they cannot be accessed by the public without using tools to remove separate mechanical protection.

Cables and associated supports must be rated such that neither the cables nor the supports degrade due to thermal or mechanical stress during their design life.

Cables must operate satisfactorily under all foreseeable fault, and loading conditions.

Cables must operate satisfactorily under all foreseeable environmental conditions. This must include the effects of sunlight, dampness, temperature, and exposure to water. Cables must be selected to recognise risk that they may be submerged in water.

Cables must be designed to last for the durations that are set out in Table 22 - Equipment Design Life.

Cable terminations must not impose any stress on the cables, and sufficient spare length must be provided in all cables to permit foreseeable maintenance and repair work.

Cables must be identified in accordance with requirements agreed with **tie**.

Where joints in cables are required, and cannot be reasonably avoided, they must be located in draw pits and identified on the as-built drawings. Joints in draw pits must be both suitably supported and accessible. This may require draw pits that are larger than normal size to be used to contain cable joints.

All cables in all draw pits will be identified with a suitable label.

18.2 Ducts

Spare ducts shall be provided on all duct routes as follows:

Number of ducts in cable route	Minimum number of spare (unused) ducts	Minimum size of spare duct
2	0	N/A
3 or more	20% of the number of ducts	Maximum size of used ducts

Table 42 – Ducts

All ducts, and all individual ducts in banks of ducts, must contain draw ropes of sufficient mechanical integrity to enable additional new or replacement cables to be pulled through the duct.

All ducts, including ducts that are installed but not used for cables, must be free from debris and free from obstructions.

All installed ducts, including ducts that are installed but not used for cables, must not be crushed. All internal dimensions of the duct as built must never less than 90% of duct's nominal dimensions.

Ducts must be provided with drainage that is integrated with the specification of the cables used such that there is no foreseeable risk of degradation from any water that may be in the ducting system.

Ducts must be of sufficient mechanical integrity to protect both themselves and the cables contained in the ducts from all foreseeable damage, degradation and vandalism.

The bending radii of ducts must be integrated with the requirements of the cables to be installed such that the cables can be installed, replaced and terminated without damage.

Ducts must be provided in sufficient number and size to ensure that there is no degradation in the cables due to thermal effects or chafing of cables. It shall be possible to remove and replace any individual cable in the ducting system without the need to remove or significantly disturb any other cables from the system.

Cable ducts shall be installed with appropriate warning arrangement to anyone who may be undertaking excavation work that may damage the ducts. This may be achieved by the installation of plastic warning tape in the ground above the ducts.

Where cables are installed in segregated parts of the tramway, they shall not be installed in cable troughs unless specifically agreed by **tie**. Any proposals for the use of cable troughs must include:

- Locked lids or equivalent to minimise the risk of vandalism and/or theft;
- Where cable troughs form part of the walkway along the tram route, a proven design of locked lids that will eliminate any rocking of the lids must be used; and
- Troughs must be secured against any lateral movement.

For the avoidance of doubt, where cable troughs form part of a structure, the above requirements still apply.

Where ducts are used on the off street tramway, these are preferred to be placed under the walkway with draw pit covers forming part of the walkway.

Any slipping and/or tripping hazards associated with draw pits that are located in a walkway must be eliminated.

Some cables terminate in equipment on ballasted track. These include:

- traction return bonding connected to the rails;
- connections to loops; and
- possibly some connections to some Point Position Indicators.

These cables are to be installed such that the risk of damage to the cables due the activities of track maintenance equipment, vandalism and people walking on the track is minimised.

18.3 Duct Chambers and Draw pits

Duct chambers must be structurally sound and built to the requirements of the cabling network as specified in this section 18.

The design of the location of draw pits must such that they can be safely accessed without stopping the operation of the tramway or requiring a road closure, unless specifically agreed by **tie**.

The integration of draw pit covers into the surfacing in the surrounding area shall be included in the design. This will include the orientation and the surfacing of the cover.

Draw pit covers will be of a family, such that the number of different keys needed to lift draw pit covers is minimised.

The Infraco shall provide sufficient draw pit keys and access equipment to adequately operate and maintain the system.

18.4 Cable separation

Sufficient separation between cables must be provided in order to:

- ensure that any risk of damage to the insulation of the cables that could cause potential risks of energising other circuits is minimised. All cables carrying +750V dc must not be in physical contact with any other cables unless the cables are permanently bonded together,
- ensure that electromagnetic compatibility between cables is provided, and
- permit access to cables and any essential cable joints for maintenance purposes

18.5 Other requirements

Where cables are installed inside conducting items that are not earthed, such as OLE poles, the insulation and the mechanical protection of the cables must be sufficient to mitigate any associated hazards.

As built drawings will accurately identify:

- the cables that are contained in each duct, to aid cable location and fault finding; and
- the location of all draw pits and all duct runs.

19 Cabinets

This Section 19 sets out the requirements which the Infraco must comply with in relation to cabinets and the environmental conditions as defined in Section 3.6.4.

Cabinets, cubicles and equipment housings will be required in the following instances as a minimum:

- To house communications equipments at the Tramstops;
- To house SCADA equipment within substations;
- To house radio equipment at base stations; and
- To house points control, points indicator control, points heaters and Tram control equipment at rail junctions.

All cabinets that are located externally shall meet the following requirements:

- They shall provide an ingress protection rating of 55 (BS EN 60529 Specification for Degrees of Protection Provided by Enclosures) as a minimum;
- They shall be coated with materials that inhibit graffiti and assist with its removal;
- Equipment housing, enclosures, cable routes etc. shall allow for an increase of temperature caused by the equipment, whereby the housing itself shall not cause any harm to the functionality of the equipment or the temperature reached at the surface of the enclosure
- All cabinets shall provide an entry for cabling, with no cables visible or accessible without opening the cabinet;
- All cabinets are provided with a robust lock, satisfying the **tie** lock suiting requirements set out in these Employer's Requirements;
- The cabinet doors shall be equipped with a multi point locking mechanism that complies with the Edinburgh Tram Network security locking policy;
- In the event of the equipment cabinets being opened, an alarm shall be transmitted to the Supervisory Control and Data Acquisition system so that staff in the Control Centre can be alerted;

- The equipment contained within the cabinets shall be of a modular construction that shall allow rapid replacement should that become necessary;
- When the cabinet doors are open, they do not obstruct tramway operation, road vehicles, passengers or other members of the public; and
- Work can be carried out safely on the contents without affecting tramway operations or requiring temporary traffic management.

In addition, those cabinets located at Tramstops shall be designed to integrate visually with the Tramstop furniture. The external colour and appearance of the cabinets, shall match and complement the architectural finishes and materials of the structures of the Tramstop where the cabinet is to be mounted.

20 NOT USED

21 Utilities / MUDFA

Where Infraco is instructed by a **tie** Change to carry out utilities diversions, relocation or protective works to deliver the Edinburgh Tram Network the following shall apply.

The philosophy adopted for the MUDFA Works is to clear the ground of utilities such that the track can be installed in ground that has no live utilities within it. The MUDFA Works considers utilities that lie below the area of land that is described by the tram's DKE. It is assumed that the width of ground needed for the construction of the track slab is no more than the width of the tram's DKE.

Where utilities lie below 1200mm from the surface, they are left in-situ.

Where utilities occupy ground that is within 600mm of the existing road surface, they are removed and replaced.

Where utilities lie between these two limits, they are considered on a case by case basis. Generally, utilities that cross the tramway are protected (sleeved for example) and left in position. Where utilities run along the tramway, they are diverted and placed outside the tram's DKE.

Special arrangements are made for major utilities such as the HV cables and the service tunnel along Leith Walk.

Schedule 46 details specific locations and utility types which shall be either left in situ or be diverted by Infraco as a **tie** Change. Where utilities' scope decisions and responsibilities fall outside this schedule Infraco and tie shall jointly agree the most appropriate party (either MUDFA or Infraco) to undertake the diversion works.

The generic allocation of responsibility for relocating utilities is set out in Section 21 of these Employers Requirements. Infraco will only be responsible for relocating such utilities after receiving a **tie** Notice of Change instructing such relocation.

Tie will obtain designs for all utility diversion works and issue them to Infraco.

Infraco shall deliver the utilities diversion works instructed in accordance with designs provided.

Infraco shall ensure that the Programme as amended in accordance with Clause 80 contains adequate allowance for these utility diversion works.

Infraco responsibilities in respect of utilities diversions instructed as a **tie Change** shall also include:

1. Where diversion works are to be delivered by Statutory Utilities (SUs) supporting tie in the development and agreement of utilities diversions works package agreements with the SUCs. Such support mean supporting tie and providing all necessary information to enable tie to negotiate contracts for diversion works with SUCs, assembling and checking work package agreements, defining detailed scope, providing constructability advice and agreeing programme of works with SUC's and co coordinating such so that impact on programme for delivery of the Infraco Works is minimised, agreeing construction and delivery methodologies with SUCs, finalising the scope of Utilities diversion works and the boundary of responsibility between work to be delivered by Infraco and that of SUCs.
2. Providing all enabling, traffic management requirements, ancillary building, civil engineering, electrical and mechanical works in connection and all attendances required to enable SUCs to carry out and complete their works.
3. Coordinate the works of SUCs with each other and with that of the Infraco.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
Water	Connections	Connections to new mains will be required before old main can be decommissioned. This is part of the advance diversion scope of MUDFA.	If any connections are missed by MUDFA and subsequently identified by Infraco, they must be carried out at the time of Infraco. However, this risk is small as missed connections would usually lead to immediate customer complaints when the old service was decommissioned.	Note that this is not intended to be the primary mitigation of this risk. site investigation and planning should ensure that connections are identified and dealt with by MUDFA.
	Diversion (other than 800mm at Depot)	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out by (or at the same time as) Infraco. Extensive site investigation has been carried out to reduce this risk, but it cannot practically be eliminated.	
	Diversion of 800mm at Gogar Depot.	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out by (or at the same time as) Infraco.	There is little, if any, risk of encountering any other water service in the Gogar Depot area that has not been dealt with by MUDFA.
	External Protection	Part of the advance diversion scope of MUDFA.		Long longitudinal protection would not be acceptable for water mains

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	Insurance Pipes	Part of the advance diversion scope of MUDFA.		

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
Waste water	Diversions and manhole construction	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, or where the designs of works have been unable to be sufficiently progressed prior to MUDFA vacating the Work Sections, the diversions must be carried out by (or at the same time as) Infraco. Extensive site investigation has been / will be carried out to reduce this risk, but it cannot practically be eliminated.	Sewer design and agreement with SUC (Scottish Water) regarding treatment required to existing sewers is not currently complete and the programmed completion of the telecoms cabling works is such that existing services cannot be abandoned to allow the manhole and sewer construction works to be undertaken for significant periods of time after all the ducts and other utility diversions are complete. This may result in sewer diversion works to be undertaken after all other MUDFA programmed works in Work Sections are complete. Works may be undertaken by either MUDFA or Infraco.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	Internal Refurbishment	Part of the advance diversion scope of MUDFA.		
	External protection	Where crossing or short longitudinal - part of the advance diversion scope of MUDFA.	Where long longitudinal: would be relatively easy to incorporate into Infraco - for a section, excavation would be deeper with (e.g.) concrete placed - this would avoid double excavation by MUDFA and Infraco.	
	Connections to new sewers	Connections to new mains will be required before old main can be decommissioned. This is part of the advance diversion scope of MUDFA.	If any connections are missed by MUDFA and subsequently identified by Infraco, they must be carried out at the time of Infraco. However, this risk is small as missed connections would usually lead to immediate customer complaints or evidence of flooding when the old service was decommissioned.	This is not intended to be the primary mitigation of this risk: site investigation and planning should ensure that connections are identified and dealt with by MUDFA.
	Existing connections	An existing connection to an existing (and left in place) sewer may have to be repositioned. This would be part of the advance diversion scope of MUDFA.	A connection may not be identified at the time of MUDFA, and uncovered by Infraco. The connection must be repositioned at the time of Infraco.	

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	Manhole access level change (eg raise height of access cover)	St Andrews Square and North & South St Davids Street will be undertaken by MUDFA as part of the road realignment and construction works required to accommodate the proposed Traffic Regulation Order (TRO).	Manhole access level changes must be adjusted at the time of Infraco. Manhole lids to be flush with the finished road surface.	It will also mean that new manholes installed by MUDFA may have to be modified by Infraco.
	New Gully connections	St Andrews Square and North & South St Davids Street will be undertaken by MUDFA as part of the road realignment and construction works required to accommodate the proposed Traffic Regulation Order (TRO).	Infraco shall install road gulleys. These will have to be installed at the same time as the road construction is carried out.	If a new road gully is required at a place where the road level is not to be changed, MUDFA could install it. However this situation is unlikely, and for consistency and avoidance of confusion Infraco should probably do all of this.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
Telecoms	Protect	Where crossing or short longitudinal - part of the advance diversion scope of MUDFA. Where long longitudinal: would be part of the advance diversion scope of MUDFA allowing Infraco a "clear run". However would necessitate double - excavation of a long length of the tram foundation area.		Where long longitudinal: would be relatively easy to incorporate into Infraco - for a section, excavation would be deeper with (e.g.) concrete placed - this would avoid double excavation by MUDFA and Infraco*.
	Slew/Lower	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out as Infraco Works. Extensive site investigation has been carried out to reduce this risk, but it cannot practically be eliminated.	

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	Divert (inc manhole construction)	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out as Infraco Works. Extensive site investigation has been carried out to reduce this risk, but it cannot practically be eliminated.	
	Insurance Ducts	Part of the advance diversion scope of MUDFA.		
	Manhole access level change (eg raise height of access cover)	St Andrews Square and North & South St Davids Street will be undertaken by MUDFA as part of the road realignment and construction works required to accommodate the proposed Traffic Regulation Order (TRO).	Manhole access level changes must be adjusted at the time of Infraco. Manhole lids to be flush with the finished road surface.	This will also mean that new manholes installed by MUDFA may have to be modified by Infraco.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
Gas	Divert	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out as Infraco Works. Extensive site investigation has been carried out to reduce this risk, but it cannot practically be eliminated.	
	Protect	Part of the advance diversion scope of MUDFA.		Long longitudinal protection would not be acceptable for gas mains
	Insurance Pipes	Part of the advance diversion scope of MUDFA.		
	Connections	Connections to new mains will be required before old main can be decommissioned. This is part of the primary scope of MUDFA.	If any connections are missed by MUDFA and subsequently identified by Infraco, they must be carried out as part of Infraco Works. However, this risk is small as missed connections would usually lead to immediate customer complaints when the old service was decommissioned.	This is not intended to be the primary mitigation of this risk: site investigation and planning should ensure that connections are identified and dealt with by MUDFA.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
Electricity	Divert	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out as part of Infraco Works. Extensive site investigation has been / will be carried out to reduce this risk, but it cannot practically be eliminated.	
	Protect	Where crossing or short longitudinal - part of the advance diversion scope of MUDFA.	Where long longitudinal: would be relatively easy to incorporate into Infraco - for a section, excavation would be deeper with (e.g.) concrete placed - this would avoid double excavation by MUDFA and Infraco.	Where long longitudinal: would be part of the advance diversion scope of MUDFA allowing Infraco a "clear run". However would necessitate double - excavation of a long length of the tram foundation area.
	Insurance ducts	Part of the advance diversion scope of MUDFA.		

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	Domestic + Business connections	Connections to new cables will be required before old cable can be decommissioned. This is part of the primary scope of MUDFA.	If any connections are missed by MUDFA and subsequently identified by Infraco, they must be carried out as part of Infraco Works. However, this risk is small as missed connections would usually lead to immediate customer complaints when the old service was decommissioned.	This is not intended to be the primary mitigation of this risk: site investigation and planning should ensure that connections are identified and dealt with by MUDFA.
Street Furniture (eg street lighting, traffic lights, lighted bollards, bus stops, etc)	Existing power & telecoms Divert	St Andrews Square and North & South St Davids Street will be undertaken by MUDFA as part of the road realignment and construction works required to accommodate the proposed Traffic Regulation Order (TRO).	All existing power and telecoms diversions required must be carried out by (or at the same time as) Infraco. Depth of cover and the final road infrastructure alignment and construction to be finalised by and carried out by Infraco.	Extensive site investigation has been / will be carried out to reduce this risk, but it cannot practically be eliminated.
	Protect	St Andrews Square and North & South St Davids Street will be undertaken by MUDFA as part of the road realignment and construction works required to accommodate the proposed Traffic Regulation Order (TRO).	All existing power and telecoms diversions required must be carried out by (or at the same time as) Infraco. Depth of cover and the final road infrastructure alignment and construction to be finalised by and carried out by Infraco.	-

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	New connections	For future street furniture, appropriate ducting would be installed by MUDFA where (1) design details are available sufficiently in advance, (2) the road/tram alignment is formally finalised and (3) the future ground levels are such that new ducts can be buried beneath the existing ground level, without either excessively deep excavation or inadequate (or no) cover.	Where design is not available in time for MUDFA, or where future road levels do not facilitate advance installation, duct installation work must be carried out as part of Infraco Works.	
Other	SP transmission cables	If the design agreed with Scottish Power requires external protection beyond that provided by the track slab in that area, and if the design is available in good time, then MUDFA could undertake these works if required.	Infrastructure design will have to take account of the specific requirements to avoid diverting these cables. This will include special track slab construction (for Leith Walk) and careful bridge abutment/pier design (for 3 other areas). Should this design be impossible, the diversion work would be carried out by Scottish Power directly.	This would not be possible before 2008 (at the time of writing; lead time requires a notification before October in one year for work in the summer of the following year). Consultation between utilities and infrastructure design teams should facilitate this design.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	BT cables at A8 by Gogar		Infrastructure designs shall take account of the specific requirements to avoid diverting these cables.	This may include a deeper excavation for the tunnel under the A8 than had previously been envisaged, plus provision of temporary support for the cables during the construction of the tunnel. Should this design be impossible, the diversion work would be carried out under MUDFA terms and conditions. Consultation between utilities and infrastructure design teams should facilitate this design. Trial holes have been undertaken on behalf of BT to confirm the depth of the existing cables – the initial, informal, impression from BT is the cables are higher than anticipated which indicates the cables may not require diversion but incorporation into the infrastructure design.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	BT cables at Roseburn street		Infrastructure design will have to take account of the specific requirements to accommodate these cables. Infraco shall consider the design solution for cabling installation as part of the Infraco Works.	This will include careful bridge abutment/pier design. The cabling element of this work is to be carried out by BT following diversion works, and may impact on the Infraco programme. Consultation between utilities and infrastructure design teams should facilitate this design. Note: a design solution for the cables as part of the Infraco works has been agreed with BT.
	Utility work dependent on prior structures work, eg cables in bridge decks		Will require structures work to be completed before utility work can be sterted. Infraco shall complete any and all utility diversions, utility protections works etc. including design (by SDS) following (or at the same time as) the Structures are completed.	

Table 42a – Table showing the responsibility for diversion/protection work on the utilities for the Edinburgh Tram project

22 Locks and Key Suiting

22.1 General

The Edinburgh Tram Network will have many locks installed to provide a suitable level of secure access to equipment and rooms. The locks and keys used shall be integrated into appropriate key suiting families. The philosophy is to strike an appropriate balance between the following two extremes:

- A single fully integrated key suiting arrangement for the whole of the Edinburgh Tram Network;
- No suiting, with every lock needing a different key;

The Infraco shall propose key suiting arrangements that are subject to approval by **tie**. In developing the proposals, Infraco shall consider:

- The need for staff to be able to undertake their duties without having to carry large numbers of keys with then to access the places that their duties require;
- Future expansion of the Edinburgh Tram Network;
- Changes to the key suiting that are likely to be needed as the system matures, and any key suiting must bear be sufficiently flexible to enable such changes to be made; and
- The ongoing costs of providing keys to staff during the life of the Edinburgh Tram Network;

22.2 Key Suiting System

A key suiting system that is based by the Infraco on the following is likely to be acceptable to **tie**.

A stand alone suite of keys, hierarchically structured to provide access to equipment such as:

The suiting documentation will list all locks to be installed on the Edinburgh Tram Network, including any locks that are not proposed to be included in the suites. There should be 4 completely separate suiting systems, as set out below:

22.2.1 Tram

- The Infraco shall procure all keys that are required for operating each tram. It is anticipated that each tram driver will need to carry no more than two keys for each Tram in order to undertake their duties. One key would permit access onto the tram, into the cab, and enable the Tram to be driven. The second key would open any panels that the driver may need to access and may also provide for such tasks as locking doors out of use;

- A different key would permit staff such as cleaners to access the inside of the Tram and the Tram cabs, but would not enable the Tram to be driven;

- Tram Maintenance staff may also need additional keys to access sensitive or potentially dangerous equipment.

22.2.2 Substations and Power

A stand alone suite of keys, hierarchically structured to provide access to equipment such as:

- Isolator cabinets, to check the position of isolators and to fit isolation padlocks;

- Substation LV areas;

- Substation HV areas in substations;

- Isolators, to permit hand operation;

- Equipment within the substations may also have a multitude of locks that may be suited, depending on the Infraco maintenance philosophy.

Separate individual locks with a single key will be used for securing isolations. There will be no suiting whatsoever for these.

22.2.3 Depot and buildings

A stand alone suite of keys, hierarchically structured to provide access at doors in the Depot building and other buildings in the Depot area such as the Depot plant building. A low level key in this structure could be used for any trackside gates that are required along the alignment.

22.2.4 Signalling and Communication Equipment

A stand alone suite of keys, hierarchically structured, to provide access to all trackside cabinets, including:

- Points control;
- Points heating;
- Signalling and;
- Tramstop.

Isolator cabinets are substations are excluded from this suite because they are included in the substations and power suite of keys.

23 Testing and Commissioning

23.1 Systems Acceptance

23.1.1 Scope

This section of the Employer's Requirements is to define the systems acceptance requirements applicable to the Edinburgh Tram Network (ETN) which the Infraco must comply with.

23.1.2 General Description and Principles

The process for acceptance of the Edinburgh Tram Network set out in this document is designed to ensure that the ETN is delivered in an acceptably safe, compliant, and efficient manner. The objectives of the process are to ensure that system performance, integrity, reliability, availability, and safety are rigorously tested and that throughout all stages of the delivery process the many sub-systems and the overall System are validated and verified against **tie**'s requirements and applicable standards. The detailed sequence and scope of infrastructure testing and commissioning prior to System Acceptance Testing shall be programmed out and proposed by the Infraco.

The acceptance process is heavily dependent on the delivery of the planned service timetables, the Operational Timetable (see 2.8 of these Employer's Requirements) and the Enhanced Timetable (see 2.8 of these Employer's Requirements). Details regarding the tram service frequency, number of trams and the phased opening of the Edinburgh Tram Network are contained in 2.8 of these Employer's Requirements.

Pre-system acceptance testing includes both Factory Acceptance Tests (FATs), Site Acceptance Tests (SATs), Sub-system Integration Tests (SITs) and System Commissioning Tests (SCTs).

Once a Section of the ETN is physically completed and the System Integration Tests are satisfactorily completed then the formal acceptance process requires the Infraco to carry out and pass a series of System Acceptance Tests (SATS) in order to achieve Sectional Completion. These tests are:

Table 43 - Description of the Acceptance Tests

Test	Test Name	Test Description	Programme
T1	Post Commissioning Test	The test shall demonstrate and prove that each Section of the ETN in sequence is able to perform in an acceptably safe manner and deliver the required run times. Please refer to relevant section below. This is the gateway test to driver training.	Post Commissioning Test will immediately follow the successful commissioning of the nominated section and is a requirement for progressing into the Driver Training.
T2	Performance Test 1	After Section D has passed Test T1 then this test shall demonstrate and prove that Phase 1a of the ETN is able to perform satisfactorily to move into the three-month Shadow Running period. Please refer to relevant section below. This is the gateway test to shadow running.	Performance Test 1 will immediately preceed the Shadow Running period and is a requirement for progressing to this phase of the programme.
T3	Pre-operations Test	The test shall cover a seven day period during the latter part of the Shadow Running phase of the programme. The Test is the operation of the initial entry into service timetable and includes infrastructure, trams, and operations systems – Please refer to relevant section below.	Pre-operations Test shall immediately precede the Service Commencement Date.
T4	Network Performance Test	The Test shall be carried out over a 28 day period in Passenger Service to establish that the ETN can reliably operate the Operational Timetable – please refer to Please refer to relevant section below.	To be completed within twelve months of the Service Commencement Date.
T5	Network Reliability Test	Reliability Testing of certain sub-systems in Passenger Service – please	To be completed within twelve months of the Service

		refer to Please refer to relevant section below.	Commencement Date.

The Post Commissioning Test (T1), Performance Test 1 (T2) and Pre-operations Test (T3) have to be passed before the Edinburgh Tram Network (or Sections thereof) can open for passenger carrying service and are therefore to be scheduled during the test running and driver training and shadow running phases.

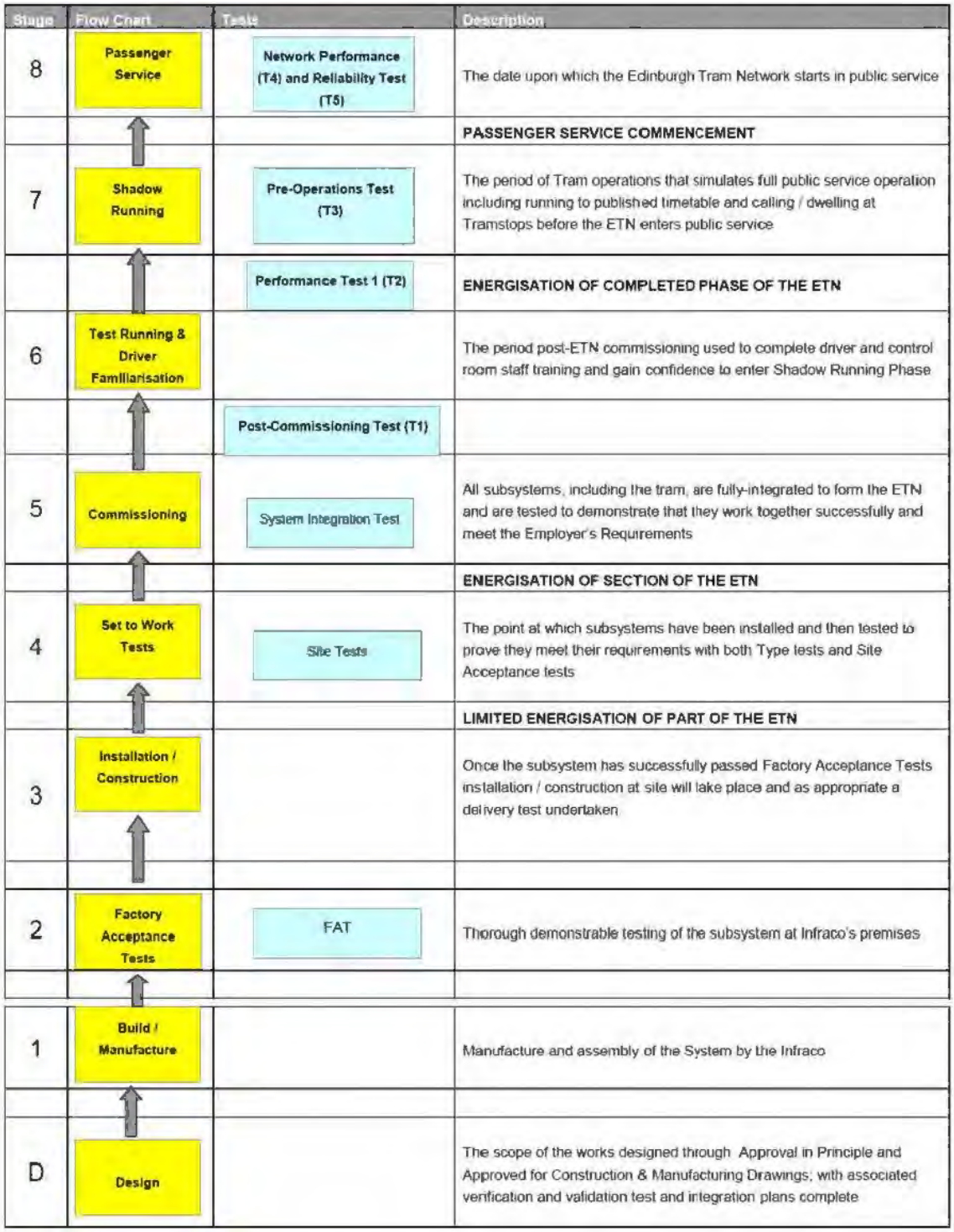
The Post Commissioning Tests (T1) can be undertaken in isolation for each Section.

Performance Test 1 (T2) and the Pre-operations Test (T3) can only be undertaken for that/those section(s) that are to be opened for passenger carrying service immediately thereafter.

The Network Performance (T4) and Network Reliability Test (T5) shall not be carried out until Passenger carrying Service has commenced on the whole Edinburgh Tram Network.

The figure on the next page shows the structure of the tests.

Figure 10 - Edinburgh Tram Network: Extract from System Life Cycle Model



23.2 Test Planning

The efficient programming of the tests is vital to the success of the system acceptance test process. Infraco shall, therefore, consider and incorporate, in a coordinated manner at each stage of the implementation of this process, the relevant documentation, the required tram availability and commissioning site availability and staff (from all concerned parties), into the overall Infraco test plan.

The Infraco shall prepare and present the Infraco test plan for review no later than six months after the Effective Date. The Infraco test plan shall describe how the Factory Acceptance Testing, Site Testing and Commissioning, Test Running and Driver Training and Shadow Running, as well as the Network Performance and Network Reliability tests are to be undertaken. The definition of these tests is shown in Figure 10. The programming of the tests shall be in accordance with the Programme as described in Section 39 of these Employer's Requirements. Infraco shall ensure that the PSCC and the Independent Competent Person (or the appropriate approval regime in force) are satisfied that the testing process is robust, comprehensive and satisfies all of the safety issues legislated and mandated for the system.

As the project evolves the Infraco Test Plan/Risk Register/Hazard Log shall be maintained by the Infraco. Infraco shall demonstrate that the issues raised in this log have been mitigated or that the tests have demonstrated the risk has been resolved. It is therefore important that the testing procedures and results are correlated with the Project Risk Register and Hazard Log.

23.3 Pre-Systems Acceptance Testing (before starting the systems acceptance process)

The following should be noted with regards to any tests to be undertaken:

- The individual test documentation / specifications shall be submitted to **tie** for acceptance in accordance with Schedule 14 (Review Procedure) and **tie**'s approval obtained before the test can take place;
- A notice period of at least seven working days shall be given to **tie** prior to any test in order that **tie**, and/or its representative(s), can arrange, at their option, to witness the test. The Operator's staff shall also be invited to witness all testing activities;
- Factory Acceptance Tests (FAT) and Site Acceptance Tests (SAT) test results shall be submitted to **tie** for review;

- **tie** reserves the right to be present during any of the tests to be undertaken; and
- Any such review will be undertaken in accordance with Schedule 14 (Review Procedure).

The following tests shall be carried out in advance of the systems acceptance testing sequence.

23.4 Factory Acceptance Tests (FAT)

23.4.1 Overview

Factory Acceptance Tests consist of a series of progressive activities all of which are undertaken at the sub-system manufacturer's premises.

Initial testing at the component manufacturer's premises of components to be used as part of a sub-system shall be undertaken to verify that the components behave as predicted in the design and satisfies the Employer's Requirements for that component.

Initial testing undertaken at the manufacturer's premises shall be undertaken to verify that the sub-system **or** component behaves as predicted in the design and meets the requirements of the design specification and provides correct functionality.

Once sub-systems or components have been successfully tested they shall be incrementally integrated and tested to verify that the sub-systems behave as predicted in the design and meet the requirements of the design specification and provide correct functionality.

Part of the FATs are first article inspections or type tests. These shall be undertaken on the first production item. This inspection shall verify that the Quality and functionality of the product is acceptable and that the manufacturers' quality control processes and procedures have been implemented.

The test specification(s) shall be produced by Infraco and shall be subject to acceptance in accordance with the Review Procedure. **tie** agreement to all proposed component, sub-system and Factory Acceptance Test specifications is required at least ten business days prior to the date of the component, sub-system and FAT tests identified above and any additional tests required by Infraco.

23.4.2 Pass Criteria

FAT testing shall demonstrate that the individual sub-systems or components and equipment fully meet the requirements and are suitable for the subsequent release from the factory environment, delivery to site and installation.

FATs demonstrate the integration of the modules and sub-systems under factory conditions and their reliable operation under cyclical testing.

As far as applicable the FAT will demonstrate that the sub-system or components has been successfully exercised through simulation, including a demonstration on how the alarm handling manages the worst case alarm flood. This test will be subject to tie approval.

23.5 Site Tests

23.5.1 Overview

The objective of site tests is to demonstrate that:

(a) Construction/installation activities have been completed correctly by demonstrating that the design specification and functionality of these Employer's Requirements have been achieved;

(b) The sub-systems, in isolation and before passengers are carried, function and behave at site as designed and tested in the FAT;

(c) The infrastructure sub-systems and the tram will then be integrated with each other insofar as is possible to prove that they collectively function and behave at Site as designed and tested in the FAT; and

(d) The ETN functions and behaves at Site as designed and tested in the FAT. This is defined as system commissioning tests and involves the integration of the infrastructure sub-systems and the tram.

The Independent Competent Person as defined under the ROGS Regulations, other regulatory bodies and the PSCC shall need to be satisfied that the ETN is safe to operate before commencement of system commissioning activities. In order to verify this it shall be necessary for the Infraco to address the issues raised by the Independent Competent Person, PSCC, HMRI (or the appropriate approval regime in force) and Approval Bodies. This may necessitate defining specific tests or incorporating additional Network Performance Test details into the suite of verification commissioning tests. Often the areas of interest to these bodies do not become clear until the majority of issues on the risk register and hazard log have been closed out. Typically these may include items such as:

- pedestrian collision, and the risk of a person being "run over " by a tram;
- gauging and possible entrapment of people in pedestrian areas;
- failed tram recovery;
- control room operational procedures; and
- Recovery from derailments, including rerailing a tram.

It is assumed that **tie** shall procure all electrical power and that a supply is available for the complete on site test procedures until commencement of passenger service.

23.6 Sub-system Integration Tests (SIT)

23.6.1 Overview

Sub-system Integration Tests cover items 23.5.1 of these Employer's Requirements. They shall be undertaken on Sections.

The Infraco shall produce the suite of SIT testing specifications for acceptance by **tie** no later than three months prior to the commencement of the tests through the Review Procedure.

23.6.2 Pass Criteria

The tests are passed when:

- Each sub-system, module or component of the system functions in isolation as designed and does not deviate from FAT results.

- All sub-systems for the given section of tramway are demonstrated to collectively perform in accordance with the operations and performance, and all of these Employer's Requirements.

23.7 System Commissioning and Integration Tests (SCT)

23.7.1 Overview

System Commissioning and Integration Tests shall be undertaken on Sections.

Such activities include the running of tram(s) over section(s) of the Edinburgh Tram Network for which Sub-system Integration Tests have been successfully completed. This will verify that the ETN behaves as predicted and as demonstrated as far as was practical in previous tests.

Infraco shall liaise with both **tie** and the Operator to ensure that sufficient competent operational personnel are available to conduct the required activities, including tram drivers and control room staff.

23.7.2 Pass Criteria

The tests are passed when:

- Each sub-system, module or component of the system functions collectively as designed and do not deviate from FAT results.

All sub-systems for the given section of tramway are demonstrated to collectively perform in accordance with the operations and performance, and all of the Employer's Requirements for a representative number of consecutive passes of a tram in each direction over the given section of the network.

- The integration testing shall include demonstrating that the control room systems and control centre equipment connected to a representative sample of the substation SCADA and other

equipment required for Tramstops can be effectively exercised under a robust simulation of trams progressing around the ETN.

23.8 System Acceptance Activities and System Acceptance Tests

The Infraco shall produce the suite of System Commissioning Test specifications for review by **tie** no later than three months before commencement of the tests. These will be reviewed in accordance with the Review Procedure

23.9 Operations and Maintenance Staff Training

The object of this series of activities is to complete driver, control room and maintenance staff training and provide said staff with greater system familiarisation, demonstrating competence to enter Shadow Running phase upon the passing both of the Post Commissioning and Performance Test 1 (T1 and T2). It therefore forms an integral part of the driver-route familiarisation and training programme.

Staff Training shall achieve the following objectives:

- Enables control room staff to gain experience running a tramway without passenger pressures;
- Allow operational staff to fulfil their duties; and
- Enables the drivers to gain route knowledge and familiarity with the trams and procedures without passenger pressures.

The activities undertaken during this phase are designed to demonstrate confidence in the system performance and system safety by means of passing the post commissioning test and performance test T1, and to gain approval of the Independent Competent Person, PSCC and HMRI. (or the appropriate approval regime in force) to progress to Shadow Running.

Infraco shall liaise with the Operator to undertake careful integration of the operational training programme and testing needs in order to avoid conflicts between operational requirements and the technical validation/verification. These comprise items 4, 5 and 6 of the system commissioning model in Figure 10 – Edinburgh Tram Network –Extract From System Lifecycle Model.

23.10 Shadow Running

The Shadow Running phase will last three months and shall:

- Build and validate the operating pattern up to the Service Commencement Date;
- Carry out any further emergency exercises;
- Demonstrate that the ETN can be safely operated in a routine manner and can recover from emergency situations and emerging perturbations;
- Resolve any issues in respect of operating practices;
- Demonstrate that reliability growth is being monitored and corrective action taken as necessary;
- Allow mileage accumulation to be carried out on the trams;
- Permit infrastructure and tram maintenance staff to familiarise themselves with the procedures, practices and operations regimes and to demonstrate competence development;
- Ensure experience is gained in the gathering and evaluation of the performance monitoring regime data in accordance with Schedule 7 of this Agreement; and
- Allow minor adjustments and tuning of systems.

This comprises item 7 of the system commissioning Model in Figure 10 – Edinburgh Tram Network – Extract From System Lifecycle Model.

The evaluation of Shadow Running is the pre-operations test (T3), the passing of which is the gateway to moving into operation, provided all necessary HMRI (or the appropriate approval regime in force) consents are obtained.

23.11 Final System Acceptance Tests in the Operations and Maintenance Phase

Within twelve months of opening the ETN to passenger service Infraco shall undertake and pass the Network Performance (T4) and Network Reliability Test (T5) (as described in Sections 23.16 and 23.17).

23.12 Emergency Exercises

The Infraco and the Operator shall prepare a plan for review by tie and the Competent Person and following approval of the plan, the Operator shall perform with support from the Infraco a series of exercises with the emergency services and other stakeholders such as Network Rail and BAA. The planning for these exercises will require close liaison by the Infraco and the Operator with the various emergency services. They will be planned to take place in the commissioning period, test running or in the shadow running phase. The nature of the exercises will require detailed planning with Fire, Police, and Ambulance services but are likely to include, as a minimum:

- A simulated road traffic accident at a major road junction;
- A major tram collision/derailment including emergency isolations; and
- A rescue of persons trapped underneath a tram.

23.13 Post Commissioning Test Specification – T1

This sub-section sets out the Performance Test assumptions applicable to all Performance Tests. Should the Infraco be able to prove to the reasonable satisfaction of tie's Representative that any of the Performance Test pass criteria have been exceeded by reason of a Performance exclusion then the test results will be amended to discount the effects of such Performance Test exclusions.

The following exclusions shall apply:

- Operator staff in the Control Room causing or significantly contributing to delays in the operation of the System;
- Failure to provide the correct number of trained Tram Drivers as defined in the DPOFA save where the failure is as a result of the Infraco's own failure in respect of its own obligations in the Agreement;
- Failure of the Tram Drivers to consistently drive the Trams to good industry practice;
- Failure to procure all electrical power that is required for the operation of the System. Periods when the electrical supply is not available will be discounted from the Test and the test period shall be extended by an equivalent period;

- A failure by the Operator to comply with the relevant parts of the Operations and Maintenance Manuals; and

- Damage caused by the Operator.

However, in no event shall any allowances or relief or Network Performance Test exclusion be granted to the Infraco where any delays or failure to pass the Network Performance Test has been caused or contributed by:

(a) Any default, breach or omission by the Infraco or its subcontractors;

(b) Infraco Defects or Snagging;

(c) Equipment undergoing modification or rectification by the Infraco and;

(d) TRAMCO's failure pursuant to the Tram Maintenance Contract.

The burden of proof shall be on the Infraco to show that such failures of the Operator were caused by reasons for which the Infraco was not responsible and for which the Operator should be properly accountable for by reason of the Operator's default, omission, negligence or breach of statutory duty. The Infraco shall develop and agree audit procedures with **tie**, and the Operator in respect of the Network Performance Test exclusions set out in this paragraph.

Dwell times at Tramstops shall be regulated; as set out in the Employer's Requirements.

23.13.1 Overview of Post Commissioning Test

This section describes the requirements for the Post Commissioning Tests, their execution, monitoring and completion. Post Commissioning Tests form part of the requirements for the final system acceptance.

23.13.2 Test Objectives

This Post Commissioning Test seeks to achieve the following objectives:

Prove that the system is capable of controlling an 'off-street' section of Edinburgh Tram Network in an acceptably safe manner; and

Prove that the system is capable of controlling an 'on-street' section of Edinburgh Tram Network in an acceptably safe manner.

23.13.3 Network Performance Test Description

The Post Commissioning Test is a multi part test, with each part of the test required to be passed in sequence before the entirety of the Post Commissioning Test can be passed. It cannot be conducted until Phase 1a of the Edinburgh Tram Network has been successfully commissioned.

23.13.4 Features

The Infraco shall demonstrate that Gogar Depot and Phase 1a of the Edinburgh Tram Network can be monitored and controlled in accordance with the Case for Safety.

Tests shall provide for:

- Demonstration of the run times as defined below.
- Forty end-to-end tram movements on the nominated section of which twenty are in each direction; and
- Trams will dwell at each Tramstop, and will exercise opening and closing of the doors at each Tramstop, the minimum period of doors being fully opened at each Tramstop will be 13 seconds.

The undertaking of the test shall essentially be an operational function led by Infraco but in conjunction with the Operator. Infraco shall manage the preparation for the tests with technical and maintenance support and monitoring by Infraco (along with representatives from **tie**).

For the demonstration of run time, the following conditions shall apply:

- Targets of the run time demonstrations shall be developed in accordance with Section 2.12 of the Employers Requirements and agreed between the parties from the agreed maximum journey times and associated assumptions detailed in Section 2.11 of the Employers Requirements during the design phase, as further details of tram performance and traffic lights are available;
- For avoiding of influences due to public traffic, run time demonstrations shall take place during night times only;
- tie will be responsible for the communication with local authorities like CEC, UTC or police;
- run time demonstration to be performed in both directions and shall include the following two demonstrations:
  - run allowing tram priority at each traffic junction along the route
  - run following the regulations and phasing of traffic lights under regular conditions
- Sufficient runs shall be carried out in both directions to provide a level of confidence that the target runtimes have been achieved as agreed in accordance with Section 2.12 of the Employers Requirements.
- Infraco shall undertake and pass the Post Commissioning Test (T1) before proceeding to the Performance Test 1 (T2).

tie shall be given thirty working days advance notice of the finalisation of the Post Commissioning Test plan and seven working days written notice of the Test commencement date.

23.13.5 Pass Criteria

Subject to the exclusions defined in23.13 above, the following shall define the pass criteria for the T1 test.

- All test results from previous tram and system and sub-system tests are to be available and signed off as accepted by **tie**, including all the closed out Snagging Rectification Certificates.
- The test shall have been successfully completed when:
  - At least 95% of the end-to-end tram movements are within the agreed target runtime; and
  - Acceptance of the Case for Safety and test results by the Independent Competent Person and where appropriate Her Majesty's Railway Inspectorate (or the appropriate approval regime in force) and approval or "No Objection to Proceed" respectively for full driver training has been obtained.

23.13.6 Monitoring and Reporting of Test Performance

Appropriate levels of observation by Infraco shall be conducted to satisfy **tie** that the auto-generation of reports from the systems is accurate.

23.14 Performance Test 1 Specification – T2

23.14.1 Overview

This section describes the requirements of Performance Test 1 and the proposals for its execution monitoring and completion. Performance Test 1 forms part of the requirements for the final System Acceptance.

23.14.2 Test Objectives

Performance Test 1 seeks to achieve the following objectives:

- Demonstrate that the Edinburgh Tram Network (or sections thereof) can be operated in an acceptably safe manner;

- Demonstrate that the completed Operator training programme has achieved an adequate competency to proceed in Shadow Running; and

- Demonstrate the mobilisation and competency of the maintenance teams provided by the Infraco.

23.14.3 Network Performance Test Description

Performance Test 1 builds upon Post Commissioning Test and cannot be undertaken until Post Commissioning Test has been passed.

23.14.4 Features

The Infraco shall demonstrate that the Edinburgh Tram Network can start Shadow Running and can be monitored and controlled in accordance with the Case for Safety.

Performance Test 1 shall provide for:

- Operation from 07:00 to 20:00 hrs on three consecutive days (none of which are Saturday, Sunday or Bank Holidays);
- The System will run to the Operational Timetable with headways extended by no more than 50%. For the avoidance of doubt, the trips scheduled for this test are the same as in the Operational Timetable as set out in Sections 2.11 and 2.12 of these Employer's Requirements; and
- Trams shall dwell at each Tramstop and shall exercise opening and closing of the doors at each Tramstop. The minimum period of doors being fully opened shall be 13 seconds at each Tramstop.
- The undertaking of the test shall be an operational function led by Infraco but in conjunction with the Operator. Infraco shall manage the preparation for the Tests with technical and maintenance support and monitoring by Infraco (along with representatives from **tie**).
- Infraco shall undertake and pass Test T2 before proceeding to the Shadow Running phase.
- **tie** shall be given twenty working days advance notice of the Performance Test 1 plan and seven working days written notice of the Test commencement date.

23.14.5 Pass Criteria

The following define the pass criteria for the T2 test.

All test results from previous tram and system and sub-system tests are to be available and signed off as accepted by **tie**. Any Defect Correction lists shall be available and agreed as being programmed to be remedied.

The test shall have been successfully completed when:

- At least 95% of the end-to-end tram movements meet the requirements of the Performance Regime in terms of Punctuality Service Element as defined in 2.16.
- Acceptance of the Case for Safety and test results by the PSCC , the Independent Competent Person and where appropriate Her Majesty's Railway Inspectorate (or relevant approval body) and their approval or 'Letter of No Objection to proceed" into Shadow Running.

23.14.6 Monitoring and Reporting of Test Performance

The primary data used to evaluate the test shall be automatically generated from the Supervisory Control & Communications performance monitoring sub system and validated independently.

23.15 Pre-Operations Test Specification – T3

23.15.1 Overview

This section describes the requirements of the Pre-Operations Test and the proposals for its execution monitoring and completion. The Pre-operations Test shall be conducted during the Shadow Running phase of the project and forms part of the requirements for the final System Acceptance.

23.15.2 Test Objectives

The Pre-operations Test seeks to prove that the Edinburgh Tram Network, or section thereof, in the event of sectional opening operates to a sustained level of performance determined by the Opening Timetable and the performance regime such that:

- The Operator can safely commence passenger carrying revenue earning service;
- The Infrastructure and Tram Maintainers can commence the Planned Maintenance proposed for passenger carrying revenue earning service; and
- The Edinburgh Tram Network passes the ride quality criteria in Tables 62 & 63 of the Employers Requirements.

23.15.3 Network Performance Test Description

Pre-operations Test is a four-part test upon successful completion of all parts of which the Edinburgh Tram Network or section(s) thereof can be opened to public service. The Pre-Operations test cannot be undertaken ahead of the successful completion and passing of the respective Performance Test 1.

23.15.4 Features

The Infraco shall demonstrate that the entire Edinburgh Tram Network or section(s) thereof can be operated to the defined levels of performance, reliability and availability and in accordance with the operational Case for Safety.

The Part 1 test shall comprise:

- Five consecutive days (none of which are Saturday, Sunday or Bank Holidays) of testing in accordance with the Operational Timetable. This test is to be undertaken no sooner than two weeks after commencement of the Shadow Running phase;

The Part 2 test shall comprise:

- Five consecutive days (none of which are Saturday, Sunday or Bank Holidays) of testing in accordance with the Enhanced Timetable, which cannot commence until two weeks from successful completion of the Part 1 test, and must be completed at least two weeks prior to the end of the Shadow Running phase, unless agreed otherwise by **tie**.

For both the Part 1 and Part 2 tests, trams shall dwell at each non-terminus Tramstop for a nominal 25 seconds and the doors shall normally remain closed.

The Part 3 test (which can be undertaken at any time during shadow running) shall comprise:

- One of the fleet of trams shall be selected by **tie** to be instrumented and monitored. The selected tram shall provide results for 100 journeys of the selected tram consecutively over all sections of the ETN;
- Measurement of lateral, longitudinal and vertical accelerations to be taken on the floor of the trailing cab of the tram.
- All tram journeys during the test period that provide data for this test shall be completed within a tolerance of plus or minus 10% of the journey times that are setout in the Operational Timetable;
- Analysis to be performed as follows:
    - For each journey between Tramstops a root mean square average of the combined lateral, longitudinal and vertical accelerations (RSS addition) is to be determined in accordance with ISO 2631.

The Part 4 test shall comprise:

- One tram from the fleet will be loaded to AW0
- Measurement of lateral, longitudinal and vertical accelerations to be taken on the floor of the trailing cab of the tram
- Entire Edinburgh Tram Network to be covered within 10% of the journey times that are setout in the Operational Timetable
- Load the tram to AW2 and repeat steps above; and
- Analysis to be performed as follows:
    - Select the greater of the results (AW0 or AW2) for each of the journeys to be used as a benchmark for each individual tram for any particular journey.

The undertaking of the test shall essentially be an operational function led by Infraco but in conjunction with the Operator. Infraco shall manage the preparation for the Tests with technical and maintenance support and monitoring by Infraco (along with representatives from **tie**).

Infraco shall undertake and pass Pre-operations Test before proceeding to the Service Commencement Date.

tie must be given thirty working days advance notice of the Performance Test 1 plan and seven working days written notice of the Test commencement date.

23.15.5 Pass Criteria

The following define the pass criteria for the T3 test.

All test results from previous tram and system and sub-system tests shall be available and signed off as accepted by **tie** including the clearance of all Defect Correction lists unless dispensation has been proposed by Infraco and agreed by tie acting reasonably.

23.15.6 Part 1 and 2 Pass Criteria

Each Pre-operations Test can only be successfully completed:

- As soon as 99% Punctuality Service Element as defined in chapter 2.16 has been achieved in accordance with the Infraco and Tram Maintainer performance regimes.

For the avoidance of doubt any delays caused by road traffic shall not be included in the delay measurement.

23.15.7 Part 3 and 4 Pass Criteria

Part 3 test can be deemed to be passed when none of the 100 journeys have an rms of the combined lateral, longitudinal and vertical accelerations exceeding 30mg.

Part 4 test can be deemed to have been passed when the instrumented tram from the fleet has attained a Ride Index equal to or less than as shown in the tables below in accordance with ISO 2631:

Speed	Wz Vertical	Wz Lateral
40 km/h	2,32	1,58
70 km/h	2,96	2,36

Table 44 - Ride Index in the Drivers Cab

Speed	Wz Vertical	Wz Lateral
40 km/h	2,24	1,64
70 km/h	2,82	2,28

Table 45 - Ride Index in the Passenger Compartment

23.15.8 Consents

This is in addition to passing the above tests.

All consents to achieve full passenger service must have been obtained and evidenced as part of Test T3.

23.15.9 Monitoring and Reporting of Test Performance

The primary data used to evaluate Parts 1 and 2 of this test shall be automatically generated from the Supervisory Control & Communications performance monitoring sub system and validated independently.

During the Pre-operations Test monitoring period Infraco will undertake audits, to the satisfaction of **tie**, of the collection and communication of fault and tram punctuality data against each of the performance indicators.

23.16 Network Performance Test Specification – T4

23.16.1 Overview

This section describes the requirements of Network Performance Test (T4) and the proposals for its execution monitoring and completion. Network Performance Test forms part of the requirements for the final System Acceptance.

The Test shall cover a 28 day consecutive period, which shall be undertaken after the Edinburgh Tram Network has entered Public Service until the Test is satisfactorily passed or, unless otherwise agreed by **tie**.

The Test is the operation of the complete ETN to the Operational Timetable each day for the duration of the test. The timetable used for the test shall be agreed with **tie**.

The undertaking of the test will be an operational function carried out by the Operator. Infraco shall manage the preparation for the Tests with technical and maintenance support and monitoring by Infraco (along with representatives from **tie**).

Infraco shall undertake and pass the Network Performance Test within twelve months after the Service Commencement Date of the whole Edinburgh Tram Network.

tie shall be given thirty working days advance notice of the Network Performance Test plan and seven working days written notice of the Pre-operations Test commencement date.

23.16.2 Pass Criteria

The test will measure the Punctuality Service Element over twenty-eight days.

The test shall be passed once the criteria stated in the Employer's Requirements Operational and Performance Section (Section 2) have been demonstrated to be met.

The Infraco may discount any one day from the calculation but shall not be a day on which a Special Demonstration shall be planned.

For the avoidance of doubt the exclusions in Section 23.13 shall apply.

23.16.3 Special Demonstrations

During the Network Performance Test a number of demonstrations will be performed, these are described in the following two sub-sections.

23.16.4 Substation and UPS Demonstrations

Infraco shall demonstrate that the system can operate with two of the traction supplies from a substation taken out of use, one at a time, for a period of two hours during the peak service. The substations concerned and the times for their disconnection will be selected by **tie**.

The disconnection of the substations and placing them into bypass will be undertaken in accordance with the Operator's normal procedures for such switching.

Operation of the Uninterruptible Power Supplies (UPS) at two tram stops for four hours shall also be demonstrated. During this period the electrical supply to the chosen tram stop UPS's shall be disconnected. The tram stop UPS's concerned and the time for their disconnection shall be chosen by **tie**.

The Infraco shall prepare a plan detailing the programme for the above events and include this in the test arrangements that will be submitted to **tie** in accordance with the review procedure.

23.16.5 Tram Change Over

The Infraco shall demonstrate, during peak hours, a Tram changeover by which a Tram in service shall be substituted with the "hot spare".

tie will give Infraco thirty minutes notice of this test.

23.16.6 Monitoring and Reporting of Test Performance

The Punctuality Service Element shall be obtained. The results for the previous day shall be ratified in accordance with the Performance Regime in Schedule 7 of this Agreement and the Operator Performance Regime under the DPOFA Agreement.

A meeting will take place daily where the performance up to that date is reviewed and any investigations concluded and data accepted. The meeting will be recorded and minutes distributed to each party by the meeting secretary within three working days.

During the Network Performance Test monitoring period **tie** may undertake audits of the collection and communication of fault data against each of the performance indicators.

23.16.7 Network Performance Test Timetable

The Enhanced Timetable delivering the ultimate capacity of the ETN as contracted shall be prepared by the Operator as that which shall be the ultimate timetable to be used in Passenger Service, proposed by the Infraco, and agreed by **tie**.

23.17 Network Reliability Test Specification – T5

23.17.1 Overview

This sub-section describes the requirements of Network Reliability Test and the proposals for execution, monitoring and achievement of System Acceptance.

Network Reliability Test is a set of sub-system reliability tests each measured over a twenty-eight day period. Each specified sub-system has its own specified target detailed within 23.17.2. The tests may start on the same date as T4 (on or after Service Commencement Date) and as each subsystem is individually demonstrated to meet its contractual target that subsystem reliability test is then considered completed. Network Reliability Test is only passed when all the sub-systems meet their targets.

The undertaking of the test will essentially be a maintenance function carried out by the Infraco. However, it requires Infraco management of the preparation for the Tests with technical support and monitoring by Infraco, (along with representatives from **tie** during the Test).

Infraco shall undertake and pass Network Reliability Test within twelve months after the Service Commencement Date of the whole Edinburgh Tram Network to pass Network Reliability Test.

If any part of the works or part of the ETN fails to pass Network Reliability Test then rectification, repair, modification or reinstatement of that part shall be undertaken. The defect correction period on that part of the system or any sub-system which fails the test shall be extended a further twelve months beyond the time of rectification, repair or modification. Infraco will propose and undertake the necessary remedial action and retest to achieve acceptance.

tie must be given 20 working days advance notice of the Network Reliability Test plan and fourteen working days written notice of the test commencement date.

23.17.2 Sub-Systems Subject to Network Reliability Test and Reliability targets

Table 46 - Network Reliability Test

TEST	TARGET VALUE
Tram Reliability	Please refer to Tram Supply Agreement.
Passenger Information Display System	As set out in the Employer's Requirements 99.75% availability over six consecutive Periods.
Passenger Help/Emergency Help Point System	As set out in the Employer's Requirements 99.75% availability over six consecutive Periods.
On Street Track & Formation	Achieves 99.995% availability over six consecutive Periods.
Off Street Track & Formation	Achieves 99.995% availability over six consecutive Periods.
Point Machines	Achieves 99.995% availability over two consecutive Periods.
Traction Switchgear	Achieves 99.99% availability over two consecutive Periods.
OLE Equipment	Achieves 99.999% availability over two consecutive Periods.
Earthing & Bonding	No reported stray current instances, or rail to earth voltages that exceed 60 volts as defined in the EN50122/1, for four consecutive Periods
Operational Radio	Achieves 99.75% availability over two consecutive Periods.
Operational Data Network	Achieves 99.99% availability over two consecutive Periods.
UTC Interface	Achieves 99.75% availability over four consecutive Periods.
Wheel/Rail Interface	No proven instances of Noise and Vibration exceedence have occurred in a six month periods
CCTV System	Achieves 99.9% availability over two consecutive Periods.
Tram Position Detection System	Achieves 99.9% availability over two consecutive Periods.
Traction SCADA System	Achieves 99.75% availability over two consecutive Periods.
Tramstop Lighting	Achieves 98.5% availability over two consecutive Periods.

23.17.3 NOT USED

23.17.4 Assumptions and Exclusions

General Exclusions and Assumptions

Should the Infraco be able to prove to the satisfaction of **tie** that any of the reliability tests would have been exceeded by means of one or more of the following exclusions then, in consultation with **tie**, the test results shall be amended to discount the effects of such proven Network Reliability Test exclusions.

The Network Reliability Test exclusions and Network Reliability Test assumptions set out in this section relate only to the Network Reliability Test and shall not be used or relied upon in any circumstances in any connection with any other test.

When the tests have commenced, neither **tie,** the Operator or Third Parties shall be entitled to interfere, interrupt or influence the tram operation or service or the tests in such a way that it disadvantages Infraco, or has an impact on the testing process, the results, or causes the non acceptance of the tests.

Operator Influences

Defects caused by the Operator's failure to:

Provide properly trained staff as defined in the DPOFA, exercising a reasonable duty of care to good industry practice.

Exclusions

The Infraco must demonstrate by reasoned argument that failures or loss of availability resulting from Operator actions were caused by reasons for which the Infraco was not responsible (eg Operating Manuals and supplier training). The Infraco shall develop and agree audit procedures with **tie** and the Operator in respect of the Network Reliability Test exclusions set out in this paragraph.

However, in no event shall any allowances or relief or Reliability Network Reliability Test exclusion be granted to the Infraco where any delays or failure to pass Network Reliability Test has been caused or contributed to by:

- Any default, breach or omission of the Infraco;
- Infraco defects; and
- Equipment undergoing repair, modification or rectification by the Infraco.

Realistic long term response times to repair defects shall be provided by Infraco during the period of the test.

It is assumed that **tie** shall procure all electrical power and that a supply is available for the tests.

Any failures resulting from inappropriate actions or omissions by the Operator or his contracted staff shall be discounted. as set out in the DPOFA .

For the avoidance of doubt, the impact of third party vandalism shall be excluded.

23.17.5 Monitoring & Reporting of Test Performance

The scoring of faults should be achieved by first reviewing the fault logs and performance reports using them as a filter to establish which faults need to go forward into the review. The review meeting will then be used to discuss and allocate the responsibility of faults under the performance regime.

The review meeting will take place daily where the performance of each system will be reviewed for the previous day. Representatives of Infraco, Tramco, **tie** and the Operator will attend this meeting. Each sub-system will be reviewed and agreement reached on all failures. The meeting will be recorded and the resulting daily report distributed to each party within 3 Business Days.

23.17.6 Audit Procedures

During the Network Reliability Test monitoring period, **tie** may undertake audits of the collection and communication of fault data against each of the sub-system tests and also audit the response times to rectification of notified faults.

23.17.7 Services in Connection with the Operator

The Operator shall be appointed separately by **tie** to provide various services in conjunction with the construction, commissioning and operation of the Edinburgh Tram Network. The Operator's Scope of Supply shall include the following:

Provision of representatives during the Construction, Commissioning and Operation stages to provide the Operator's Services, including liaison with the Infraco.

Observing and reporting on the acceptability of the proposed design and the quality of infrastructure, trams and equipment;

Supporting obtaining the necessary consents for commissioning and Public Operation;

Assisting Infraco in development of a Testing & Commissioning Plan (in conjunction with Infraco)

Appointment and training of staff in support of any commissioning process.

Notwithstanding the Operator's responsibilities described above, the Infraco responsibilities (associated with the interface with the Operator) shall include, but not be limited to, the following:

- providing support to obtain operational approvals and consents in respect of the Edinburgh Tram Network;
- providing technical support on systems integration
- providing technical support on the development of operational plans and management systems; and
- provide technical support with regard to operational interfaces with CEC traffic management systems. This shall include phasing sequence drawings of key junctions
- Preparing and submitting plans for driver training and the training of other operational staff. Undertaking training of the Operator's trainers (8-10 trainers) and control room staff (18-21 staff)
- Prepare and submit plans for maintenance and operations manuals
- Provide support required for System Acceptance, including the development of a Testing and Commissioning Plan;
- Work to mitigate any delays to the system construction and commissioning howsoever caused.

Comm. Model Ref	Infraco	Operator
	The following table represents a guide of the key responsibilities associated with the Infraco and the Operator during the various phases of the Life Cycle Model. Further details are provided within these Employer's Requirements and the DPOFA. The Infraco Contract (refer to the Code of Construction Practice) allows for the potential for Sectional Completion. Accordingly, where Sectional Completion was to apply, then it would follow that the (System Commissioning Model) stages for each Sectional Completion would apply at different times in the programme (e.g. possible to have "Shadow Running" ongoing for Section A, whilst "Commissioning" for Section B on-going). The listed responsibilities would equally apply to each Sectional stage. Items are listed under the most appropriate stage, but this does not exclude the associated activity from being required during other stages	
	GENERAL OBLIGATIONS	
	The general provision of all the technical and management services as defined within these Employer's Requirements. This shall include design, programming, installation, testing, system acceptance, training and maintenance. The Infraco shall be required to work closely with the Operator to successfully deliver the project.	Liaising and working closely (and timely) in partnership with the Infraco to meet the requirements of the Project associated with design, installation, system acceptance, delivery into service and maintenance, taking account of the Infraco's Scope of Supply. The Operator shall also be responsible for Operator Maintenance.

	Management and implementation of a liaison process, with the assistance of the Operator, to ensure that all parties are fully informed and resources arranged adequately.	Provision of staff resources during the Commissioning, Construction and Operation stages to provide the Operator's Services, including liaison with the Infraco. Provide and keep updated the training and recruitment plan describing the roles of each member of the Operations staff with specific instructions for the proper performance of their duties and training requirements.
		Ensuring that all relevant operational and maintenance subcontracts are in place and that appropriate subcontractor staff training programmes are implemented.
	Responsibility for adherence to the programme	Monitoring Progress
	Responsibility for complying with the functional and non-functional requirements as defined within these Employers Requirements.	Observing and commenting on the acceptability of the design and installation.
	Production of risk deliverables and register in accordance with these Employer's Requirements.	Provision of risk advice (from the Operator's viewpoint) to Infraco and commenting / liaising on risk documentation produced by Infraco.
	Under the CDM Regulations, the Infraco shall be responsible as Principal Contractor and shall comply with all associated CDM Responsibilities relating to the design and construction activities until Services Commencement Date (and beyond, where appropriate). Beyond the Services Commencement Date, the Infraco may be required to undertake certain elements of work (including maintenance) which fall within the remit of CDM Regulations. In such a scenario the Infraco would be responsible as Principal Contractor for the duration of such works.	As with any party working on a "CDM site", the Operator shall be responsible for complying with CDM Regulations and the Principal Contractors Safe Systems of working (e.g. permit to work system). Notwithstanding the Infraco's over-arching responsibility as Principal Contractor up to Services Commencement Date, once the network is energised (and trams begin to operate) the Operator shall have a key role in managing the "operational end" of systems (e.g. the Operator would be responsible for developing and managing a permit to isolate systems within the context of the over-arching Infraco's systems).

	There shall be a requirement for the Infraco to comply where appropriate with the Operators Systems and procedures associated with the Operator's responsibility to manage operational safety.	The Operator shall be responsible for Operational Safety. This shall include developing Operational Plans, timetables and Management Systems and Operating Procedures for the Operational Phase. Operational safety responsibilities shall, by definition, occur once any part of the system is energised (anticipated to be between Stages 4 and 5, "Set to Work Tests" and "Commissioning", respectively.
DD	DETAILED DESIGN STAGE	
	Completing the full design and meeting all the deliverables as defined within the SDS Providers Agreement with **tie**, which is being novated and which is included in Volume 7 of the Infraco ITN.	Observing and reporting on the acceptability of proposed designs against the Design Manual and the Employers Requirements and the ability of the proposals to meet operational objectives
	Obtaining all approvals and consents in respect of the Edinburgh Tram Network;	Supporting the obtaining of necessary consents for Commissioning and Public Operation (and any consents which are relevant to the Operator).
	Managing and undertaking all interfaces with CEC traffic management systems.	Assisting Infraco with the interfaces with CEC, which are relevant to the Operator.
	Developing and updating a Testing and Commissioning Plan (TCP) for each element of the System including programmes and procedures with controls and acceptance criteria.	Providing input to a Testing and Commissioning Plan (TCP) for each element of the System including programmes and procedures with controls and acceptance criteria.

	Assisting the Operator with the development of a process for the handover for Operational purposes of the infrastructure and equipment from Infraco.	Developing a process for the handover for Operational purposes of the infrastructure and equipment from Infraco.
	Scheduling, and coordinating with the Operator, driver training, and the training of other operational and maintenance staff. The scope of the training shall cover all aspects of maintenance (as defined within these Employer's Requirements) and all operations. The Infraco shall be responsible for developing coordinated Training Plans in accordance with section 40 (Maintenance) of these Employer's Requirements.	Assisting the Infraco in the development of coordinated Training Plans and the specification of training documentation requirements from Infraco and Sub-suppliers.
	Complying with, and undertaking internal audits, associated with the Code of Construction Practice	Reviewing Infraco's compliance with the Code of Construction Practice, associated with any operator related issues.
1	BUILD / MANUFACTURE	
	Managing and implementing the manufacture and assembly of the System in accordance with the general provision of all the technical and management services as defined within these Employer's Requirements	Observing and reporting on the quality and functionality of Infrastructure and Equipment provision / manufacture and its compliance with Specifications where it affects the operational objectives.
	Liaising with the Operator to address any associated issues, and where necessary rectifying any works.	
2	FACTORY ACCEPTANCE TESTS	
	Managing and implementing the Testing process in accordance with the TCP. FAT tests (initial tests and integrated testing) shall be undertaken to verify that the components / system behave as planned in the design, meet the requirements of the design specification and provides correct functionality.	Assisting and providing advice to Infraco to manage the Testing process in accordance with the TCP.
		Observation if necessary and appropriate of any factory acceptance tests on equipment to be provided.

3	INSTALLATION / CONSTRUCTION	
	Managing and implementing the installation and construction at the Site in accordance with the general provision of all the technical and management services as defined within these Employer's Requirements.	Observing and reporting on the quality and functionality of Infrastructure and Equipment provision and installation, and its compliance with Specifications where it affects the operational objectives
	Liaising with the Operator to address any associated issues, and where necessary rectifying any works.	
4	SET TO WORK TESTS	
	Managing and implementing the Testing process in accordance with the TCP. These site tests (System Integration Tests) in accordance with section 6 of Part 1c – Tram Testing and Commissioning of the Employer's Requirements shall be undertaken to demonstrate that the construction / installation has been undertaken satisfactorily and that the systems behave as intended in the design.	Assisting and providing advice to Infraco to manage the Testing process in accordance with the TCP
		In accordance with the TCP; witnessing and reporting on the implementation tests
		Attending Tests
		Managing the Operational Safety of the Testing and Commissioning process in support of Infraco once the system is energised and trams begin to operate. Develop a system of management of safety during testing and commissioning (including the training of staff and contingency provisions)
	Obtaining Consents and Approvals required to allow the system to be energised and trams to operate to the extent not the responsibility of **tie** under Clause 19.	Supporting the obtaining of Consents and Approvals for the system to be energised and trams to operate.
	Reviewing and commenting on the proposed Commissioning Phase Operating Procedures.	Developing Commissioning Phase Operating Procedures.

5	COMMISSIONING	
	Managing and implementing the Testing and Commissioning process in accordance with the TCP. This includes the site commissioning testing as defined within this Section at 23.20.1.	Assisting and providing advice to Infraco to manage the Testing and Commissioning process in accordance with the TCP
		In accordance with the TCP; witnessing and reporting on the implementation tests
		Attending Tests
		Managing the Operational Safety of the Testing and Commissioning process in support of Infraco once the system is energised. Develop a system of management of safety during testing and commissioning (including the training of staff and contingency provisions)
	Providing technical support on the development of operational plans, timetables and management systems and Operating Procedures; and	Developing Operational Plans, timetables and Management Systems and Operating Procedures for Operational Phase
	preparing and submitting plans, manuals & procedures for maintenance and operations in accordance with these Employer's Requirements, in time for System Energisation.	Reviewing and commenting on the acceptability of plans, manuals & procedures for maintenance and operations.
6	TEST RUNNING AND DRIVER FAMILIARISATION	
	Scheduling, and coordinating with the Operator, driver training and the training of other operational staff as part of the Commissioning activities prior to the start of Shadow Running. Implementing training plans including the undertaking of training of the Operator's trainers (8-10 trainers) and control room staff (18-21 staff).	Appointing and training of Operator staff and Operational rules and procedures training for Infraco. The Operator shall be responsible for training the drivers (utilising the training plans / information developed by Infraco and the Operator Trainers, who shall have been assessed as competent by Infraco on the operation of their systems and equipment).
	Demonstrating that the completed Operator training programme has produced a level of adequate	Assisting Infraco to demonstrate that the completed Operator training programme has

	competency to proceed to shadow running.	produced a level of adequate competency to proceed to shadow running.
T1	The implementation of the T1 Post Commissioning Test: follows successful commissioning of the nominated section, test to demonstrate and prove the system is able to perform in a safe manner and delivers the required end to end run times (these may be up to 5% greater than target runtimes).	Assisting and providing advice to Infraco to manage the Testing and Commissioning process in accordance with the TCP
T2	The implementation of the T2 Performance Test: precedes Shadow Running: test to demonstrate and prove the system is able to perform satisfactorily to move into the 3 month Shadow Running Period (The T2 Performance Test is performed over 3 days and 95% of runtimes must be within target runtime; whilst service headways may be increased by up to 50% of those of the operating timetable).	
		In accordance with the TCP; witnessing and reporting on the tests
		Attending Tests
		Managing the Operational Safety of the Testing and Commissioning process. Develop a system of management of safety during testing and commissioning (including the training of staff and contingency provisions)
	Infraco to review to prepare Go Live timetable to be tested during shadow running.	Operator to prepare the Opertional Timetable to be tested during shadow running.
	Obtaining Consents and Approvals required to allow the system to start shadow running to the extent not the responsibility of **tie** under Clause 19.	Supporting the obtaining of Consents and Approvals for the system to commence shadow running.

7	SHADOW RUNNING	
	Implementing the Shadow Running Phase to cover the requirements. Please refer to relevant section below.	
T3	Implementing the T3 Pre-Operations Test: precedes Service Commencement, the test is undertaken during the Shadow Running Period, the test is the operation of the initial entry into service timetable and includes infrastructure, trams and operations systems (T3 is over 2 x 5 days and 99% performance must be achieved).	In accordance with the TCP; witnessing and reporting on the tests
		Attending Tests
		Managing the Operational Safety of the Testing and Commissioning process
		Developing a system of management of safety during shadow running and public operation (including the training of staff and contingency provisions)
	Obtaining the necessary Consents and Approvals for Public Operation to the extent not the responsibility of **tie** under Clause 19.	Supporting the obtaining necessary consents for Public Operation
8	SERVICE COMMENCEMENT DATE	
	Infraco shall support the preparation for the T4 Network Performance Test with technical and maintenance support and monitoring. (T4 is over a 28 consecutive day period on a rolling basis in passenger service with the ultimate timetable in operation. 1 day in the period may be discounted. The test is to show that reliable operation is achieved.)	The Operator shall manage the preparation for the T4 Network Performance Test with technical and maintenance support and monitoring by the Infraco. The implementation of the T4 Network Performance Test.

	Demonstrations during the Network Performance Test e.g. sub-stations / UPS – demonstration of operation where a sub-station can be taken out of service for 2 hours during peak service.	
	Review, comment and provide support in preparation of the Test and Ultimate Timetables.	Preparation of an agreed Network Performance Test Operational Timetable and Enhanced Timetable as that which shall be the ultimate timetable to be used in Passenger Service.
	Infraco management for the preparation of the T5 Network Reliability Test with technical support and monitoring by Infraco.	The implementation of the T5 Network Reliability Test: the reliability testing of certain sub-systems in Passenger Service (within 12 months of opening).
	In accordance with the TCP; witness and report on the tests	Managing the Operational Safety of the Testing and Commissioning process. Develop a system of management of safety during testing and commissioning (including the training of staff and contingency provisions)

Table 47 - Table showing a guide of the key responsibilities associated with the Infraco and the Operator during the various phases of the Life Cycle Model

23.18 Tram Testing and Commissioning

23.18.1 Document Scope

The scope of this section of the document is to define the Tram Testing & Commissioning requirements that are applicable to all elements of the Edinburgh Tram Network (ETN).

23.18.2 General Requirements

This document defines the process for the testing and commissioning of the ETN that shall be carried out by the Tram Supplier together with the requirements of the Tram Tests that must be carried out to meet the Employer's Requirements and all relevant regulatory bodies as to the quality, performance and compliance of the Trams. It also identifies the tests to be carried out to meet the requirements for System Acceptance testing (involving Trams) of the completed Edinburgh Tram Network.

For certain of the type tests it may be acceptable to reference relevant tests previously undertaken on similar systems. The Tram Supplier will justify to the Tram Inspector all instances where this approach is applicable. This approach will only be possible in areas where there has not been anything other than very minor design changes. Where this approach is proposed, the final test reports and supporting data must be provided to allow the information to be assessed and accepted or rejected. It will be the Tram Supplier's responsibility to obtain any necessary permissions for the use of the test results and data concerned.

23.18.3 Test Plan

The Tram Supplier shall create and adhere to a Test Plan, which will comply with the requirements of EN50215 and encompass a logical build up of testing that leads to acceptance of the vehicles. The Test Plan shall include sufficient testing to demonstrate that all the Employer's Requirements have been met and to ensure that all relevant consents for passenger operation can be achieved from all relevant bodies. It must also be created in such a way as to maximise off-site testing.

The Tram Supplier shall carry out the Tram tests in accordance with this document, the Test Plan and the Tram commissioning and delivery programme. The Tram Supplier shall submit the Test Plan for agreement by the Infraco. Detailed Test Specifications for all tests shall also be submitted for agreement as part of the design scrutiny process and not less than eight weeks prior to the commencement of the tests.

The Test Plan shall be provided in Microsoft Project, together with any commentary, specifications and all results following completion of the Tram tests, in Microsoft Word/Excel format. The relevant supplied drawings shall be provided in electronic format and as hard copy. Test reports for each Tram Test shall be submitted, within two weeks following the completion of the Tram Test.

23.18.4 Tram Test Categories

The Tram Tests shall be divided into five discrete stages:

- Factory Acceptance Tests ("FAT")
- Delivery Acceptance Tests ("DAT")
- Site Commissioning Tests ("SCT")
- System Integration Tests ("SIT")
- System Acceptance Tests ("SAT")

With the exception of the Factory Acceptance Tests, which shall be carried out at the Tram Supplier's Factory, all other tests are to be carried out after the Trams are delivered to the Depot. All the tests are to be carried out by the Tram Supplier, except for the System Integration and System Acceptance Tests, which will be managed by Infraco.

Each category of Tram test can comprise two sub-categories:

- Type tests shall be performed to demonstrate that the vehicle design complies with the relevant section of these Employer's Requirements and all relevant Legislation and regulations;
- Routine tests shall be carried out on each vehicle prior to delivery/handover. The routine tests shall include the agreed measurements and checks to confirm the compliance of each Tram.

The Tram Supplier shall provide all necessary support to the Infraco during the testing and commissioning activities in Edinburgh, from the delivery of the first Tram and until the completion of the System Acceptance Tests. This will include input to the development of the necessary specifications and procedures. The support for the Tram tests to be undertaken in Edinburgh shall include, but be not be limited to, a testing manager and technicians (who will be based in Edinburgh throughout the delivery and testing of the trams), full logistics support for the despatch of urgent and routine spares during the testing process, documentation authors and administrative support for the production and control of test specifications, reports, and supporting documentation.

23.18.5 Test Certificates

Upon the successful completion of each of the Tram tests the Tram Inspector will issue the following test certification:

- Factory Acceptance Type Test Certificate;
- Factory Acceptance Routine Test Certificate;
- Certificate of Tram Delivery; and
- Site Commissioning Type Test Certificate.

Upon successful completion of all the tests for any individual Tram the Tram Inspector will issue the following test certification:

- Certificate of Tram Commissioning.

23.19 Factory Acceptance Tests (FAT)

Factory Acceptance Tests– This group of tests shall be undertaken at the Tram Supplier's Factory and upon successful completion the Tram Supplier will be issued with a Factory Acceptance Type Test Certificate and/or Factory Acceptance Routine Test Certificate by the Tram Inspector. The Factory Acceptance Tests shall be conducted in accordance with the Tram Manufacturing, Delivery Programme and the Test Plan. The FAT will be broken down into Factory Acceptance Type Tests and a series of Factory Acceptance Routine Tests and will comprise both static inspections and dynamic tests. The Factory Acceptance Type Tests shall be undertaken on a single Tram. This shall be the first Tram unless agreed otherwise in writing by the Tram Inspector.

Static inspections and tests shall be conducted at the Tram Supplier's Factory or at the sub-suppliers' premises during normal working hours during which the Tram Inspector will be entitled to inspect, examine and witness testing of all major systems, sections, apparatus, equipment, components, internal seating, fixtures and fittings and devices, including all structural, electrical, hydraulic and other major components and assemblies (except where the items concerned have been previously tested to the Tram Inspector's satisfaction and the appropriate test certificate issued).

Dynamic tests shall be conducted on the test track at the Tram Supplier's Factory or an alternative location subject to the Tram Inspectors agreement.

The Tram Inspector shall be given adequate prior notice of all tests. **tie** may, at its sole discretion, waive its right to attend or witness any test.

Whether or not the Tram Inspector is in attendance the Tram Supplier shall keep, and make available to the Tram Inspector on request, true and accurate records of the tests, the performance of the Tram during such tests, and any faults which developed or became apparent during the course of such tests.

The Tram Inspector may require evidence that the Tram has operated an agreed number of kilometres/hours in order to fulfil the requirements of the Test and Commissioning Plan under the agreed test track conditions without major faults or breakdown and has met the performance standards set out in this section throughout such period before issuing the Factory Acceptance Routine Test Certificate and/or Factory Acceptance Type Test Certificate. The distance travelled during the dynamic test on the test track will be limited and the main objective will be to check functions and performances not endurance, hence the distance travelled will relate to an agreed schedule to prove these functions.

The Factory Acceptance Routine Tests and the Factory Acceptance Type Tests referred to in the following tables shall include such examinations and tests as the Tram Inspector may reasonably require to satisfy himself that the Trams qualify or do not qualify for a Factory Acceptance Routine Test Certificate and/or and a Factory Acceptance Type Test Certificate. This will include but not be limited to; the checking of individual manufacturing and inspection records, module and sub-assembly tests including as-built dimensional checks where appropriate, for major items such as but not limited to bogie frames, wheel sets, traction and brake equipment.

The Tram Supplier shall make available to the Tram Inspector throughout the Factory Acceptance Routine Tests and/or Factory Acceptance Type Tests qualified staff and, where appropriate, its major sub-contractors to conduct, supervise and record the results of all such inspections, tests and examinations as are referred to in this document and to respond to all enquiries about the condition or performance of the Trams or its major sub-systems.

Table 48 - Factory Acceptance Tests: Static Type Tests

TEST	LOCATION	EN 50215 Reference	COMMENTS
Overall dimensional checks	Static test, at the Tram Supplier's Factory	8.1	To include external static envelope, internal dimensions, door widths and openings.
General examination and security check.	Static test, at the Tram Supplier's Factory		To establish accuracy and security of fixing of fixtures and fittings,
Coefficient of flexibility	Static test, at the Tram Supplier's Factory	8.2	Static test with a maximum cant of 100mm simulated. Horizontal and vertical flexibility.
Lifting ability	Static test, at the Tram Supplier's Factory	8.3	Body Lifting and major component removal. Bogie handling.
Tram weight	Static test, at the Tram Supplier's Factory	8.4	Tram and axle weights, including individual wheel and axle loading. Load testing of the complete vehicle and the checking of critical dimensions and clearances under a range of loading conditions. Suspension deflections and door entrance height measurement.
Sealing	Static test, at the Tram Supplier's Factory	8.5	Resistance of body structure to water ingress, humidity and snow.
Electrical insulation	Static test, at the Tram Supplier's Factory	8.6	High voltage insulation tests. Withstand and impedance of all cabling.
Bonding & return circuits	Static test, at the Tram Supplier's Factory	8.7	Continuity and integrity of all safety earth bonds and return current circuits.
Hydraulic system	Static test, at the Tram Supplier's Factory	8.9	Pumps and pipe-work. Pressure tests and leakage.
Braking System	Static test, at the Tram Supplier's Factory	8.10	Friction brake system

TEST	LOCATION	EN 50215 Reference	COMMENTS
Parking brake	Static test, at the Tram Supplier's Factory	8.11	Clamping force measurement
Auxiliary Power Supply	Static test, at the Tram Supplier's Factory	8.12	Power supplies and associated equipment.
Battery charging system	Static test, at the Tram Supplier's Factory	8.13.1	Batteries, battery chargers and associated equipment. Battery capacity for emergency working.
Auxiliary and control system	Static test, at the Tram Supplier's Factory	8.14	Vehicle control and management system. Software validation. Drivers' controls and instruments.
Doors	Static test, at the Tram Supplier's Factory	8.14.3	Passenger Doors, driver's doors. Emergency access and egress. Operation and timing.
Heating, ventilation & air-conditioning	Static test, at the Tram Supplier's Factory	8.14.4	System operation and effectiveness at the ambient conditions of the test location Thermostats, air flows. Hot/cold areas.
Lighting	Static test, at the Tram Supplier's Factory	8.14.5	Interior and exterior lighting.
Monitoring equipment	Static test, at the Tram Supplier's Factory	8.14.7	CCTV System, cameras and displays.
Event recorder	Static test, at the Tram Supplier's Factory	8.14.7	OTMR, (as far as practicable at the test location).
Communications and passenger information systems	Static test, at the Tram Supplier's Factory	8.14.7	Radios, PA, emergency communications (as far as practicable at the test location). Warning tones. Passenger information system. Passenger Emergency Help Points.
Configuration control	Static test, at the Tram Supplier's Factory	8.14.8	Determination of defined software and firmware status for all sub-systems. Modification status for all major and critical components and others as appropriate.

TEST	LOCATION	EN 50215 Reference	COMMENTS
Traction system	Static test, at the Tram Supplier's Factory	8.16	Motors, gearboxes, control equipment, power supplies and current collection.
Tram control system	Static test, at the Tram Supplier's Factory	8.16	Tram central control system and interfaces, fault monitoring and diagnostics.
Operability and maintainability	Static test, at the Tram Supplier's Factory	8.17	Verification of conformity with the proposed and agreed design. Operator and maintainer access to all appropriate areas.
Safety systems	Static test, at the Tram Supplier's Factory	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop. Emergency pushbutton, Track brakes. Horns/warning devices.
Windscreen washers, wipers and demisters	Static test, at the Tram Supplier's Factory	9.18	System operation and effectiveness, demisters.
Pantograph	Static test, at the Tram Supplier's Factory	9.12	Operation. Contact forces.
Sanding system	Static test, at the Tram Supplier's Factory		System operation. Sand delivery rate. Coherence between VTCU output and the correct sanding unit.
Flange lubrication system.	Static test, at the Tram Supplier's Factory	9.11	Set-up of equipment.
Visual examination of all client defined features	Static test, at the Tram Supplier's Factory	HMRI, RVAR	Interior layout, seating, livery and signage.
Emergency coupler	Static test, at the Tram Supplier's Factory		Check of mountings / space envelope. manual operation.

Table 49 - Factory Acceptance Tests: Dynamic Type Tests

TEST	LOCATION	EN50215 Reference	COMMENTS
Traction system performance	Dynamic test, at the Tram Supplier's Factory test track	9.1	Dynamic performance, acceleration and braking rates. Jerk rates. Current collection. Degraded modes. Speed attainment. Power consumption. Wheelslip correction and sanding. Simulated locked axle detection
Braking system	Dynamic test, at the Tram Supplier's Factory test track	9.3	Friction brake system, service and emergency deceleration rates and stopping distances. Dynamic brake operation and blending with friction brake, jerk rates. Wheelslide correction and sanding. Track brake operation.
Thermal capacity	Dynamic test, at the Tram Supplier's Factory test track	9.4	Temperature rise monitoring of traction, braking & auxiliary equipment during repeated duty cycles. Including degraded modes and emergency duty.
Motion resistance	Dynamic test, at the Tram Supplier's Factory test track	9.5	Demonstration/derivation of Tram resistance to motion.
Coupling test	Dynamic test, at the Tram Supplier's Factory test track	9.8	Coupled Tram operation with emergency couplers, as far as practical and subject to availability of two Trams.
Ride quality	Dynamic test, at the Tram Supplier's Factory test track	9.9	Assessment of Tram ride quality, (providing that the test is meaningful at this location).
Flange lubrication system.	Dynamic test, at the Tram Supplier's Factory test track	9.11	System operation.
Pantograph	Dynamic test, at the Tram Supplier's Factory test track	9.12	Operation, Functional check.

TEST	LOCATION	EN50215 Reference	COMMENTS
Electromagnetic compatibility	Dynamic test, at the Tram Supplier's Factory test track	9.14	Electromagnetic radiation and susceptibility of vehicle systems. See also EN 50121, within the constraints of the test track.
Voltage interruption and jump	Dynamic test, at the Tram Supplier's Factory test track	9.15	Reaction of traction/dynamic brake/auxiliary power systems to supply voltage interruptions jumps. Operation over the full-specified voltage range covered by the type test certificate of the traction and auxiliary equipment (as far as practicable at the test location).
Windscreen washers, wipers and demisters	Dynamic test, at the Tram Supplier's Factory test track	9.18	System operation and effectiveness, including demisters.
Tram control system	Dynamic test, at the Tram Supplier's Factory test track	9.19	Interfaces between traction, braking, auxiliary, control and safety systems. Tram management systems, displays and diagnostics.
Monitoring equipment	Dynamic test, at the Tram Supplier's Factory test track	9.19	CCTV System, cameras and displays.
Event recorder	Dynamic test, at the Tram Supplier's Factory test track	9.19	OTMR, (as far as practicable at the test location).
Communications & passenger information systems	Dynamic test, at the Tram Supplier's Factory test track	9.19	Radios, PA, emergency communications. Warning tones. Passenger information system as far as practicable at the test location.
Safety systems	Dynamic test, at the Tram Supplier's Factory test track	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop and speed inhibit. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer calibration.

TEST	LOCATION	EN50215 Reference	COMMENTS
Operability & maintainability	Dynamic test, at the Tram Supplier's Factory test track	8.17	Demonstration of degraded modes
Parking brake	Dynamic test, at the Tram Supplier's Factory test track	8.11	System operation and pull away test
Noise and vibration	Dynamic test, at the Tram Supplier's Factory test track	9.16	Noise and vibration measurements, as far as practicable at the test location.

Table 50 - Factory Acceptance Tests: Static Routine Tests

TEST	LOCATION	EN 50215 Reference	COMMENTS
Overall dimensional checks	Static test, at the Tram Supplier's Factory	8.1.2	Reduced overall dimension check.
General examination and security check.	Static test, at the Tram Supplier's Factory		To establish accuracy and security of fixing of fixtures and fittings.
Tram weight	Static test, at the Tram Supplier's Factory	8.4.3	Tram, and axle, weights.
Sealing	Static test, at the Tram Supplier's Factory	8.5.2	Resistance of body structure to water ingress
Electrical insulation	Static test, at the Tram Supplier's Factory	8.6	High voltage insulation tests. Withstand and impedance of all cabling.
Bonding and return circuits	Static test, at the Tram Supplier's Factory	8.7	Continuity & integrity of all safety earth bonds and return current circuits.
Hydraulic system	Static test, at the	8.9	Pumps and pipe-work. Pressure tests. Leakage.

TEST	LOCATION	EN 50215 Reference	COMMENTS
	Tram Supplier's Factory		
Braking System	Static test, at the Tram Supplier's Factory	8.10.2	Friction brake system functional test including parking brake
Auxiliary power supply	Static test, at the Tram Supplier's Factory	8.12.2	Power supplies and associated equipment.
Battery charging system	Static test, at the Tram Supplier's Factory	8.13.2	Batteries, battery chargers and associated equipment.
Auxiliary and control system	Static test at the Tram Supplier's Factory	8.14.1	Tram control and management system. Drivers' controls and instruments.
Doors	Static test, at the Tram Supplier's Factory	8.14.3	Passenger doors, driver's doors. Emergency access and egress. Operation & timing
Heating, ventilation and air-conditioning	Static test, at the Tram Supplier's Factory	8.14.4	System operation and effectiveness. Thermostats, air flows. Hot/cold areas. Duct sealing. Functional check
Lighting	Static test, at the Tram Supplier's Factory	8.14.5	Interior and exterior lighting. Functional check.
Monitoring equipment	Static test,at the Tram Supplier's Factory	8.14.7	CCTV System, cameras and displays.
Event recorder	Static test, at the Tram Supplier's Factory	8.14.7	OTMR, (as far as practicable at the test location).
Communications and passenger information systems	Static test, at the Tram Supplier's Factory	8.14.7	Radio, PA, emergency communications (as far as practicable). Warning tones. Passenger information system.
Configuration control	Static test, at the Tram Supplier's Factory	8.14.8	Verification of defined software and firmware status for all sub-systems. Modification status for all major and critical components and others as appropriate.

TEST	LOCATION	EN 50215 Reference	COMMENTS
Traction system	Static test, at the Tram Supplier's Factory	8.16	Motors, gearboxes, control equipment, power supplies and current collection.
Tram control system	Static test, at the Tram Supplier's Factory	8.16	Tram central control system and interfaces, fault monitoring and diagnostics.
Operability and maintainability	Static test, at the Tram Supplier's Factory	8.17	Fault handling, diagnostics and indications. Safety isolations.
Safety systems	Static test, at the Tram Supplier's Factory	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop. Emergency pushbutton, Track brakes. Horns/warning devices.
Windscreen washers, wipers and demisters	Static test, at the Tram Supplier's Factory	9.18	Functional check including demisters.
Pantograph	Static test, at the Tram Supplier's Factory	9.12	Operation. Contact forces
Sanding system	Static test, at the Tram Supplier's Factory		System operation. Sand delivery rate.
Flange lubrication system.	Static test, at the Tram Supplier's Factory	9.11	Set-up of equipment.
Visual examination of all client defined features	Static test, at the Tram Supplier's Factory		Interior layout, seating, livery and signage.

Table 51 - Factory Acceptance Tests: Dynamic Routine Tests

TEST	LOCATION	EN 50215 Reference	Comments
Traction system performance	Dynamic test, at the Tram Supplier's Factory test track	9.1.2	Dynamic performance, acceleration and braking rates. Current collection. Speed attainment. Wheelslip correction and sanding.
Braking system	Dynamic test, at the Tram Supplier's Factory test track	9.3.2	Friction brake system, service and emergency deceleration rates and stopping distances. Dynamic brake operation and blending with friction brake, Wheelslide correction and sanding. Track brake operation.
Flange lubrication system.	Dynamic test, at the Tram Supplier's Factory test track	9.11	System operation, as far as practicable.
Tram control system	Dynamic test, at the Tram Supplier's Factory test track	9.19	Interfaces between traction, braking, auxiliary, control and safety systems. Tram management systems, displays and diagnostics.
Monitoring equipment	Dynamic test, at the Tram Supplier's Factory test track	9.19	CCTV System, cameras and displays.
Event recorder	Dynamic test, at the Tram Supplier's Factory test track	9.19	OTMR, (as far as practicable at the test location).
Communications and passenger information systems	Dynamic test, at the Tram Supplier's Factory test track	9.19	PA, emergency communications. Warning tones. Passenger information system (as far as practicable at the test location).
Safety systems	Dynamic test, at the Tram Supplier's Factory test track	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop and speed inhibit. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer calibration.

23.20 Delivery Acceptance Tests (DAT)

These tests shall be carried out by the Tram Supplier upon the delivery of each Tram. They shall establish that the Tram has not been damaged or affected in any way by the delivery process and that it remains in the condition in which it was inspected prior to despatch from the Tram Supplier's factory. On satisfactory completion of the DAT the Tram Inspector will issue a Certificate of Tram Delivery.

TEST	LOCATION	EN 50215 Reference	Comments
Overall dimensional checks	Static test, at the Depot		Reduced to any parts or components which will been adjusted/removed during the transport.
General examination and security check.	Static test, at the Depot		To establish accuracy and security of fixing of all fixtures and fittings, transit damage. Visual inspection
Hydraulic system	Static test, at the Depot	8.9	Pumps and pipe-work. Visual inspection and checks for leakage.
Tram weight	Static test, at the Depot		Measurement of as-delivered tare weight, plus sand and fluids.

Table 52 – Table showing Delivery Acceptance Tests

23.20.1 Site Commissioning Tests

The Site Commissioning Type Tests shall be undertaken on the Tram(s) as appropriate, when they are delivered to the Depot and following the completion of the DAT. Upon successful completion the Tram Supplier will be issued with a Site Commissioning Type Test Certificate by the Tram Inspector. The tests shall comprises Static and Dynamic tests and will include, but not be limited to, the tests referred to in the tables on the following page.

For the avoidance of doubt the Tram Inspector shall not issue a Type Test Certificate even if by a lack or fault of the system infrastructure a test is failing or cannot be executed.

Table 53 – Site Commissioning Tests: Static Type Tests

TEST	LOCATION	EN 50215 Reference	Comments
Monitoring equipment	Static test, at the Depot	8.14.7	CCTV System, cameras and displays.
Tram location and detection system	Static test, at the Depot	8.14.7	Tram location and detection system.
Event recorder	Static test, at the Depot	8.14.7	OTMR
Communications and passenger information systems	Static test, at the Depot	8.14.7	Radios, PA, emergency communications. Warning tones. Passenger information system.
Noise.	Static test, at the Depot	8.18	Noise (outstanding from factory), internal & external. At same time as dynamic and performed on specified track section.
Safety systems	Static test, at the Depot	8.19	Brake control systems, emergency brake, passenger emergency. Driver's Deadman system, door safety loop. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer
Pantograph	Static test, at the Depot	9.12	Operation. Contact forces.
Electromagnetic compatibility	Static test, at the Depot	9.14	Electromagnetic radiation and susceptibility of Tram systems. Completion of the Tram FAT type test.

Table 54 – Site Commissioning Tests: Dynamic Type Tests

TEST	LOCATION	EN 50215 Reference	Comments
Traction system performance	Dynamic test, at designated test site	9.1.1	Dynamic performance, acceleration & braking rates. Jerk rates. Acceleration and control on gradients. Roll-back protection. Current collection. Speed attainment. Power consumption. Wheelslip correction and sanding. Emergency duty.
Braking system	Dynamic test, at designated test site	9.3.1	Friction brake system, service and emergency deceleration rates and stopping distances. Dynamic brake operation and blending with friction brake, jerk rates. Wheelslide correction and sanding. Track brake operation.
Thermal capacity	Dynamic test, at designated test site	9.4	Temperature rise monitoring of traction, braking and auxiliary equipment during repeated duty cycles. Including degraded modes and emergency duty.
Tram/track interaction	Dynamic test, at designated test site	9.8	Wheel rail interaction. Load testing of the complete vehicle and the checking of critical dimensions and clearances under a range of loading conditions. Suspension deflections and inter-vehicle clearances. Safety against derailment. Coupled Tram operation
Ride quality	Dynamic test, at designated test site	9.9	Assessment of Tram ride quality.
Kinematic gauging	Dynamic test, at designated test site	9.10	Dynamic performance, kinematics and gauging. Load testing of the complete vehicle and the checking of critical dimensions, swept path and clearances under load conditions. Suspension deflections. Pantograph sway,

TEST	LOCATION	EN 50215 Reference	Comments
Flange lubrication system.	Dynamic test, at designated test site	9.11	System operation.
Pantograph	Dynamic test, at designated test site	9.12	Included in Kinematic gauging
Electromagnetic compatibility	Dynamic test, at designated test site	9.14	Electromagnetic radiation and susceptibility of Tram systems.
Noise and vibration	Dynamic test, at designated test site	9.16	Noise and vibration tests performed on the specified section of track.
Safety Systems	Dynamic test, at designated test site	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop and speed inhibit. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer. Event Recorder (OTMR).
Tram location and detection system	Dynamic test, at designated test site	8.14.7	Tram location and detection system.
Operability and maintainability	Dynamic test, at designated test site	8.17	Coupling test and recovery.
Parking brake	Dynamic test, at steepest gradient	8.11	System operation, effectiveness on steepest available gradient.

The Site Commissioning Routine Tests shall be performed on each Tram and comprise static and dynamic tests. This shall comprise of a full functional test, both statically and dynamically, of the Tram, including inspection, examination or testing of all major systems, sections, apparatus, equipment, components, internal seating, fixtures and fittings and devices (including testing the same whilst in operation); with the further inclusion of electrical, hydraulic and other major components and assemblies, as far as practical, at the test location.

The Site Commissioning Routine Test will be designed to establish that each individual tram functions in accordance with the design. It is not intended that the routine test should be a full re-working of the either the type test or the factory tests merely confirmation through carefully targeted testing that the build was correct., It will confirm that it is in a suitable condition to operate safely on the system. Upon successful completion of the Routine Tests the Tram Supplier will be issued with a Certificate of Tram Commissioning by the Tram Inspector.

Whether or not the Tram Inspector is in attendance at a Site Commissioning Test, the Tram Supplier shall keep and make available to the Tram Inspector on request true and accurate records of the Site Commissioning Test conducted, the performance of the Tram during such tests and any faults which developed or became apparent during the course of such tests.

23.20.2 Re-Testing

The Tram Supplier shall, if requested by the Tram Inspector, undertake such further examinations and tests as the Tram Inspector may reasonably require to satisfy himself that a Tram and/or the Trams qualify for a Certificate of Tram Commissioning

23.20.3 Testing Support

The Operator shall make the following available where required by the Testing and Commissioning Plan, (and agreed by Infraco):

- Depot and workshop facilities at the Depot;
- Reasonable assistance from its drivers, maintenance and other staff; and
- Track, power supplies and other facilities, as agreed, to meet the needs of the Tram Testing and Commissioning Plan.

All parties involved and their respective representatives and staff shall:

- Observe such reasonable requirements as may be notified in writing by the Operator or to preserve health and safety, protect the Trams against damage and avoid unnecessary disruption to the Operator's operations.
- Use all reasonable endeavours to avoid risks to health and safety, damage to the Trams or unnecessary disruption to the Operator's operations.
- The Tram Supplier shall make available throughout the Tram Commissioning Tests qualified staff from the Tram Supplier's organisation and, where appropriate, its major sub-contractors to:
  - Conduct, supervise and record the results of all such inspections, tests and examinations as are referred to in this document; and
- Respond to all reasonable enquiries about the condition or performance of the Trams or the major systems, sections, apparatus, equipment, components, internal seating, fixtures and fittings and devices, including all structural, electrical, hydraulic and other major components and assemblies and to rectify any failures of the same.

Table 55 – Site Commissioning Tests: Static Routine Tests

TEST	LOCATION	EN 50215 Reference	Comments
Braking system	Static test, at the Depot	8.10.2	Friction brake system, including parking brake
Monitoring equipment	Static test, at the Depot	8.14.7	CCTV System, cameras and displays.
Event recorder	Static test, at the Depot	8.14.7	OTMR,
Tram location and detection system	Static test, at the Depot	8.14.7	Tram Location and Detection equipment.
Communications and passenger information	Static test, at the Depot	8.14.7	Radios, PA, emergency communications. Warning tones. Passenger information system.

TEST	LOCATION	EN 50215 Reference	Comments
systems			
Configuration control	Static test, at the Depot	8.14.8	Verification of defined software and firmware status for all sub-systems. Modification status for all major and critical components and others as appropriate.
Traction system	Static test, at the Depot	8.16	Motors, gearboxes, control equipment, power supplies and current collection.
Safety systems	Static test, at the Depot	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer.
Windscreen washers, wipers and demisters	Static test, at the Depot	9.18	System function
Pantograph	Static test at the Depot		Contact forces and operation.
Sanding system	Static test, at the Depot		System function.
Doors	Static test at the Depot		Cycle times.
Heating, ventilation and air-conditioning	Static test, at the Depot	8.14.4	Functional check

Table 56 – Site Commissioning Tests: Dynamic Routine Tests

TEST	LOCATION	EN 50215 Reference	Comments
Traction system performance	Dynamic test, at designated test site	9.1.2	Dynamic performance, acceleration & braking rates. Speed attainment. Operation through supply interruptions and at varying line voltages.
Braking system	Dynamic test, at designated test site	9.3.2	Friction brake system, service and emergency deceleration rates and stopping distances. Dynamic brake operation and blending with friction brake, sanding. Track brake operation.
Ride quality	Dynamic test, at designated test site	9.9.2	Subjective ride test to discern any obvious ride irregularity.
Flange lubrication system.	Dynamic test, at designated test site	9.11	System function.
Noise and vibration	Dynamic test, at designated test site	9.16.2	Subjective noise and vibration assessment to discern any obvious irregularity.
Tram control system	Dynamic test, at designated test site	9.19	Interfaces between traction, braking, auxiliary, control and safety systems. Tram management systems, displays and diagnostics.
Monitoring equipment	Dynamic test, at designated test site	9.19	CCTV System, cameras and displays.
Event recorder	Dynamic test, at designated test site	9.19	OTMR
Tram location and	Dynamic	9.19	Tram location equipment

TEST	LOCATION	EN 50215 Reference	Comments
detection system	test, at designated test site		
Communications and passenger information systems	Dynamic test, at designated test site	9.19	Radios, PA, emergency communications. Warning tones. Passenger information system (as appropriate).
Safety systems	Dynamic test, at designated test site	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman's system, door safety loop and speed inhibit. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer calibration.
Parking brake	Dynamic test, at designated test site	8.11	System function Part of braking test

23.21 System Integration Tests (SIT)

The System Integration Tests consist of tests carried out to prove that the ETN as a whole can function as intended. All infrastructure, operation and control systems shall be exercised during these tests. The Tram Supplier will provide reasonable input to the development of the SAT specifications as well as participation in, and support to, the tests whenever reasonable technical support is needed in reference to the Trams.

The System Integration Tests will include, but will not be limited to, the following:

- Comprehensive gauging and dimensional checks under a range of loading conditions;
- Run time tests;
- Interface checks to all items of workshop plant and equipment including the wheel lathe, Tram washing machine, sanding plant, cranes and hoists;
- Access and handling checks for all major items of equipment, sub-assemblies and major capital spares items;
- Validation of the radio communication system; and
- Validation of the tram position detector system.

The System Integration Tests will involve carrying out gauging runs over all parts of the ETN in order to establish that the Trams (when operating individually or in conjunction with other Trams) accord with the Tram Section and the agreed detailed interface arrangements in terms of the alignment geometry, clearances, loads, pantograph dynamics, wheel rail interface, traction power system, communications and route setting equipment, compliance with operational procedures and Tram performance values. In particular it shall be demonstrated that there is sufficient clearance between passing Trams on the Network and between Trams and other Network equipment and installations to ensure that the Trams can be operated safely and without damage to themselves and to the other parts of the System.

There shall be static and dynamic tests to verify that the pantograph conforms to the requirements of the Employer's Requirements.

There shall be a series of tests to demonstrate the ability of one Tram to recover another failed Tram, including on the most severe gradient on the ETN and potentially in a degraded mode.

The testing of the systems, including but not limited to; power supplies, overhead line, Depot equipment, and EMC tests will require the use of a number of Trams running at the same time.

Table 57 – System Integration Tests: Static Type Tests

TEST	LOCATION	EN 50215 Reference	Comments
Lifting ability	Static test, at the Depot	8.3	Body Lifting and major component removal. Bogie handling.
Battery charging system	Static test, at the Depot	8.13	Battery access for maintenance and topping up. Operation and suitability of external battery chargers.
Monitoring equipment	Static test, at the Depot	8.14.7	CCTV System, Interface with the Depot systems.
Event recorder	Static test, at the Depot	8.14.7	OTMR, Interface with the Depot systems.
Tram location and detection system	Static test, at the Depot	8.14.7	Tram location equipment.
Communications and passenger information systems	Static test, at the Depot	8.14.7	Radios, PA, emergency communications. Warning tones. Passenger information system. Interface with the Depot systems.
Traction system	Static test, at the Depot	8.16	Power supply interaction.
Operability and maintainability	Static test, at the Depot	8.17	Review and demonstration of accessibility and removal of components. Fault handling, diagnostics and indications. Safety issues.
Noise and vibration.	Static test, at the Depot	8.18	Noise and vibration levels, internal and external.
Pantograph	Static test, at	9.12	Operation. Contact forces.

TEST	LOCATION	EN 50215 Reference	Comments
	the Depot		
Sanding system	Static test, at the Depot		Refilling system. Verification that the fill level can be observed from inside the tram.
Flange lubrication system.	Static test, at the Depot	9.11	Refilling.
Visual examination of all client defined features	Static test, at the Depot	HMRI, RVAR	Interior layout, seating, livery and signage
Electromagnetic compatibility	Static test, at the Depot	9.14	Electromagnetic radiation and susceptibility of vehicle systems.

Table 58 – System Integration Tests: Dynamic Tests

TEST	LOCATION	EN 50215 Reference	Comments
Tram/track interaction	Dynamic test, at designated test site	9.8	Wheel rail interaction. Load testing of the complete vehicle and the checking of critical dimensions and clearances under a range of loading conditions. Suspension deflections and inter-vehicle clearances.
Kinematic gauging	Dynamic test, at designated test site	9.10	Dynamic performance, kinematics and gauging. Load testing of the complete vehicle and the checking of critical dimensions, swept path and clearances under a range of loading conditions. Suspension deflections. RVAR and HMRI requirements.
Platform gauging	Dynamic test, at designated test site	9.10	Platform stepping distance and heights, tare and loaded conditions. RVAR requirements.
Flange lubrication system.	Dynamic test, at designated test site	9.11	Effectiveness.
Pantograph	Dynamic test, at designated test site	9.12	Operation, contact forces, sway. OLE deflection.
Electromagnetic compatibility	Dynamic test, at designated test site	9.14	Electromagnetic radiation and susceptibility of vehicle systems.
Voltage interruption and jump	Dynamic test, at designated test site	9.15	Reaction of traction/dynamic brake/auxiliary power systems to supply voltage interruptions, jumps and short circuits. Operation over full-specified voltage range.
Noise and vibration.	Dynamic test, at designated test site	9.16	Noise and vibration levels.
Monitoring equipment	Dynamic test, at designated	9.19	CCTV System, cameras and displays.

TEST	LOCATION	EN 50215 Reference	Comments
	test site		
Tram location and detection system	Dynamic test, at designated test site	9.19	Tram location equipment, throughout the available route. Road junction and point motor control.
Communications and passenger information systems	Dynamic test, at designated test site	9.19	Radios, PA, emergency communications. Reception and effective communication with the Depot throughout the available route. Warning tones. Passenger information system
Operability and maintainability	Dynamic test, at designated test site	8.17	Review of all systems as required. Demonstration of degraded modes and recovery practices. Coupling test
Traction supply	Dynamic test, at designated test site		Sub-station load tests, sub-station outages. Regeneration. Overload protection, touch voltage and stray current tests.
Section run times	Dynamic test, throughout the System		Proving of the System infrastructure in stages as it becomes available to operate.

23.21.1 System Acceptance Testing

Tram testing will be undertaken in support of the system acceptance testing set out in these Employer's Requirements.

24 Trams

24.1 Scope

This section defines the requirements for Trams that are applicable to the Edinburgh Tram Network and with which the Infraco must comply.

24.2 General Technical Specification

The Trams shall be of a high quality in design and construction and comply with the following general design criteria:

- High safety standards including, but not limited to:
  - Compliance with Railway Safety Publication 2 - Guidance on Tramways, issued by the Office of the Rail Regulator;
  - Compliance with Rail Vehicle Accessibility Regulations, 1998;
- High reliability, minimum maintenance requirement and ease of repair;
- Proven design and technology;
- Low floor access;
- Easy to clean;
- Modern and attractive appearance;
- Low weight;
- Low environmental impact;
- Meets access requirements for the disabled;
- Minimum use of energy;
- The Trams will be required to have a minimum operating capability of at least 100,000 km per year; and

The Trams shall be designed to have a minimum service life in accordance with Section 6 of these Employer's Requirements.

The Trams shall be articulated in order to negotiate the track alignment. They will be fully bi-directional and capable of being driven from either end and shall have passenger doors on both sides. They will be capable of being operated by one person.

Normal service Trams shall comprise one vehicle, but shall be capable of running coupled together for the purpose of one Tram recovering another failed Tram from any point on the system.

The Tram should be designed and constructed in accordance with a Quality Plan (as prescribed under ISO9001), which should also include a delivery plan and a Test Plan.

A full-scale Tram mock-up shall be provided to demonstrate areas critical to operation and access as part of the formal design process and for use in public consultation. The mock-up shall include the entire cab and a representative portion of one saloon, including a vestibule with at least one operational pair of bi-parting doors and space reserved for wheelchair use. The mock-up shall show the exterior form and livery. The mock-up shall be weatherproof and shall be delivered to a location in Edinburgh designated by **tie.**

24.3 Wheel / Rail Interface

The Trams shall have a wheel profile and suspension characteristic that is compatible with the rail profiles used throughout the System in terms of risk of derailment, noise, wear and vibration. The wheel profile shall allow for flange running at crossings. The Tram will be designed to operate in conjunction with a track gauge of 1,435mm and a flange back-to-back dimension consistent with the rail types to be used on the Edinburgh Tram Network.

24.4 Tramway Path

Trams shall be compatible with the System track alignment and the geometric constraints as outlined in Section 26 of these Employer's Requirements, which gives the alignment criteria and the assumed Tram characteristics. From this the developed kinematic envelope ("DKE") calculations and any other information, to show compatibility with the alignment, shall be provided by the Infraco. The Trams shall negotiate the minimum radius horizontal and vertical curves, and maintain acceptable wheel flange wear.

Minimum clearances to existing structures, Tramstops, overhead line equipment structures and all other road furniture shall be maintained in accordance with the agreed DKE and it shall always be possible for one Tram to pass another, at any point on the system. The Infraco shall ensure that the Tram Supplier shall provide supporting information to enable a reduced DKE to be developed for use in locations where restricted speeds are or may require to be applied.

24.5 Supervisory, Control & Communications Systems

The Trams shall be fitted with equipment to automatically indicate their position to, and communicate with, a central control centre.

Additionally, a bus tracker box will be fitted.

A voice radio system will be permanently available between the driver and the central control centre. This equipment will be supplied by Infraco and will be free-issue to the Tram Supplier, to be installed and tested as part of the Tram manufacturing process.

The supply and integration of the free-issue equipment will be controlled through a system interface register, to be developed from Schedule 22 of the TSA and managed by Infraco.

All on-board systems with real-time clocks shall be updated and synchronised from a common source, throughout the working life of the Tram.

24.6 Depot Facilities

The Trams shall be maintained at the Depot and a system interface register shall be used to ensure that the Trams and the equipment provided for their routine maintenance and operation are compatible.

The Trams shall be compatible with a mechanised sand filling system at the Depot (see Section 29 of these Employer's Requirements), enabling the sand system on the Trams to be replenished within five minutes and by one driver alone. The Infraco shall ensure that the Tram Supplier shall provide a specification for the sand, and contact details for a UK-based commercial supplier of this sand.

The Trams shall have a key suiting system that provides a logical hierarchy of access to cleaners, inspectors, drivers and maintenance staff. It shall not be part of the same suite as detailed in Section 22 of these Employer's Requirements.

The Trams shall be supplied with a nominal 24VDC shore supply, socket compatible with battery charging equipment in the depot.

24.7 Electro-Magnetic Compatibility

The Trams and their sub-systems shall not generate excessive, nor be susceptible to, electro-magnetic interference and shall comply with EN 55013, EN 50121 and EN 50122 as appropriate.the requirements of the specification as detailed in section 16 of these Employer's Requirements.

24.8 Climate and Environment

The Trams shall operate normally in all climatic and environmental conditions found in the Edinburgh area on the proposed route, including operation in a marine environment having a saline atmosphere and being subject to fine wind-blown sand. This shall also include conditions where ice forms on the overhead line and wind speeds of up to 120km/h.

The Trams shall function, without deterioration in performance and for their whole design working life, within the weather conditions anticipated within the Edinburgh area as described elsewhere in Section 3.6.4 of these Employer's Requirements - taking into account the previously quoted wind speed. All equipment housings/enclosures that contain electronic equipment shall be so equipped to avoid the occurrence of condensation. The Trams shall be capable of being started up normally under the range of weather conditions as outlined above after no less than 72 hours of being left in the open in a shutdown condition.

24.9 Interface Management

The Infraco shall procure that the Tram Supplier participates in the interface engineering process. The Tram interfaces are identified in the TSA. The management of the interfaces will be carried out by Infraco using the system interface register.

24.10 Systems Assurance

The Infraco shall ensure that the Tram Supplier shall implement a System Assurance engineering process in accordance with the requirements of the Edinburgh Tram Network. This process shall cover all aspects of design, manufacture, integration, testing and commissioning of the Tram, and all interfaces with the system, to demonstrate compliance with the reliability, availability, maintainability and safety requirements of **tie**.

The Infraco shall ensure that the Tram Supplier shall follow the approach of BS EN 50126:1999 "Railway Applications – The specification and demonstration of RAMS".

The Infraco shall ensure that the Tram Supplier shall implement a reliability, availability and maintainability management process and will detail it in a Reliability, Availability and Maintainability Plan (RAMP).

The Infraco shall ensure that the Tram Supplier shall implement a System Safety Management Plan (SSMP), which shall define the process, activities and requirements for the preparation of a 'Case for Safety' during the design and handover stages of the project. The plan shall also define the system safety management organisation and the strategy to achieve the individual hazard system safety targets.

All foreseeable system safety hazards are to be identified, evaluated and recorded in a Hazard Log that will be managed and maintained throughout the project lifecycle. The Infraco shall ensure that the Tram Supplier shall implement a hazard management process to identify hazards through hazard analysis and the means to mitigate these hazards.

24.11 Noise and Vibration

Trams shall at all times meet the requirements of the tie Noise and Vibration Policy (NVP/001/V1.01). Trams shall operate as quietly as is reasonably possible. The proposed design shall incorporate wheel damping, side skirts with sound-deadening linings and resilient mounting of electrical equipment likely to generate noise. The Infraco shall ensure that the Tram Supplier shall provide the anticipated noise levels of the proposed Tram. Noise tests shall be carried out in Edinburgh to determine the frequency peaks generated, in particular by the wheels. The results of these tests shall be used to determine the type and extent of any tuned vibration dampers that should be fitted to the wheels.

24.12 Specific Technical Requirements

The Tram body shall be a nominal width of 2.65m externally. Note that external door sills may be required in order to comply with Rail Vehicle Accessibility Regulations.

The total Tram length shall be a nominal value of up to 44m.

The following loading conditions shall apply in this document:

- AW0 = Tram tare weight (empty car)
- AW1 = AW0 + full load of seated passengers
- AW2 = AW1 + weight of standing passengers at 4 persons/m^2

- AW3 = AW1 + weight of standing passengers at 5 persons/m_2
- AW4 = AW1 + weight of standing passengers at 6 persons/m_2
- AW5 = AW1 + weight of standing passengers at 8 persons/m^2

Where the mean passenger weight is taken to be 70.5kg.

The passenger capacity of the tram shall be at least 230 persons, of which a minimum of 80 shall be seated, on fixed seats. There shall in addition be provision for wheelchairs in accordance with Rail Vehicle Accessibility Regulations. There shall also be provision for luggage racks.

At least 66% of the floor area available for standing must be low-floor, with a height above rail level of between 300mm and 400mm. High floor areas shall be minimised. All doorways shall allow level boarding access at a height between 300-350mm above the top of the rail. The slope of the floor at the entrance shall be in accordance with disabled access regulations. Suitable means of adjustment shall be provided to compensate for wheel wear in order to remain within these limits.

The Tram shall have a maximum operating speed of up to 70km/h. However, a speed of 80km/h must be achievable, though not sustainable for a prolonged period.

The Tram structure will incorporate a strong and stiff underframe capable of supporting a buffing load in compliance with EN 12663 category V without permanent deformation. The structure shall not deform, crack, fracture, corrode or suffer loosening of rivets or bonding during the normal service life of the vehicle. It shall be, and remain, watertight against rain, passing through standing water and passing through the washing plant throughout its working life.

The tram structure shall be designed and tested to accommodate a passenger loading of AW5 as defined earlier in this clause.

All cavities in the floor structure, body sides and ceiling will be well drained and constructed in such a way that water does not collect and corrosion does not occur. Insulation material will fill all void spaces to minimise noise, vibration and heat loss.

The articulated joints will provide a wide gangway and resistance to vehicle climbing in the event of a collision. The articulation will require minimum maintenance and be capable of being dismantled to separate the Tram bodies with a minimum of equipment.

Where different metals are in contact, due regard shall be given to preventing the effects of dissimilar metal corrosion. All metal surfaces shall be treated to resist corrosion. All body panels will be interchangeable between vehicles and all exterior panels will be lined with water resistant, sound absorbing and heat insulating materials to minimise the possibility of resonance.

Easily replaceable energy absorption devices shall be provided at both ends of the Tram such that frontal and rearward collisions, at speeds up to 5 km/hr shall be fully absorbed without causing permanent deformation of the body structure. The front skirts and lower body side panels shall be mechanically fastened so as to allow easy replacement and shall be interchangeable between Trams. Each panel must be able to be replaced by one person in ten minutes.

The Trams shall be designed to be resistant to fire in accordance with the standard BS6853 Category 2, or the equivalent European Standard.

The maximum axle load at AW4 loading, and including all consumables, shall be 11.5 tonnes.

The windscreen shall be compliant to the equivalent International Regulation ECE 43 (Uniform Provisions Concerning the Approval of Safety Glazing and Glazing Materials (Rev1 08.1990). The windscreen and cab side windows shall consist of laminated glass panes made of safety glass. There should be no diffraction effects or colour distortions in the cab windows. Any glass screens dividing the driver's cab from the saloon shall be treated to minimise reflections. All internal glazing shall be made from safety glass.

The side windows (including the door windows) will be made from heat reflecting safety glass. The glazed area shall be maximised within the limits set by structural integrity, solar gain and passenger modesty. Passengers must have a clear view to the exterior whether seated or standing. Tinted windows shall be used to minimise dazzling.

The windows shall allow permeability for radio waves with frequencies for Global System for Mobile telecommunications, and other public-domain transmissions.

All windows, (including the driver's windscreen) shall be easily replaceable using standard methods and tooling available in the Depot. All glass surfaces must be replaceable within two hours and should be secured so as to be watertight and draught-proof. Bonded glass is not preferred, unless it can be demonstrated that the bonded glazed units can be easily interchanged in less than two hours. Bonding to a mechanically-fixed window frame, or securing using a rubber section, is preferred.

If the windows used are bonded, they should have a black, printed ceramic silk screen print to cover the bonding zone and protect the bonding material from ultra violet transmission, on which the ultra violet -Transmission should be less than 0,1% at 400-600 nm.

Opening hopper windows will be fitted throughout the passenger compartment. All interior glass surfaces in the Tram passenger compartments shall be fitted with Ultra Violet light reducing and shatter resisting film on the inside surface, which shall be easily replaceable as a maintenance task when required yet give good visibility when in place. This film shall also provide effective protection against damage to the glass by 'etching'-type graffiti.

24.13 Driver's Cab

The driver's cab shall be arranged so that at least 95% of adult persons can comfortably access the cab desk and all the controls located within the cab, whilst retaining the appropriate field of view out of the cab. The design of the cab shall be undertaken to good human factors practice.

The driver's cabs shall be air-conditioned and the temperature shall be thermostatically controllable by the driver. Air conditioning in both cabs shall be switched on or off from either cab. Temperature selection shall be only available from the cab in use.

An effective windscreen demisting system shall be fitted, suitable for the climatic conditions encountered in Edinburgh. The demisting system shall be able to clear the windows of condensation within ninety seconds of a cab being made operational.

The cab may extend to the full width of the Tram, and be separated from the passenger area by a glazed partition providing good passenger visibility through the cab windscreen. A mirror providing the driver with a view into the saloon (when sat at the controls) shall be provided.

An internal cab to saloon door is required, which must be lockable from the saloon side and cab side but capable of being opened at any time from inside the cab. The door must latch automatically when closed.

An inward opening, hinged and lockable external cab door may be provided. It shall be capable of being locked and unlocked from both inside and outside the cab.

The cab lighting level shall be 250-300 LUX at 1.0m above floor level. The driver shall have the control of switching this lighting on or off.

A generally translucent mesh fabric sunblind shall be provided, with an opaque strip extending 150mm up from the bottom edge. The blind must be able to be deployed by the driver whilst in the driving position. It need only be retractable at stops.

Cab windscreens and cab windows shall maximise the degree of all round vision available to the driver. A clear unobstructed view of the road/track ahead shall be provided with clear and unrestricted sight lines, particularly low down in front of the cab.

The partition between the Cab and Saloon and other glazing surfaces shall minimise the incidence of reflections at all times and in all expected environmental conditions. Blinds or curtains shall be provided to screen the saloon lighting from the cab at night.

The following features that relate to instruction of Tram drivers shall be provided:

- A Tram driver can be under instruction when a Tram is in passenger service, consequently it must be possible for an instructor and a driver to be inside the cab with the cab/saloon door closed, and the instructor must be comfortably and safely located in the cab.
- The instructor must be able to apply the Tram security brakes quickly.
- The instructor must be seated and secure in the cab to the extent that he can apply the brakes even when the Tram is performing unpredictably.
- The instructor's seat may be a portable item,supplied with the Tram.

The driver's seat, unless purpose-designed for a Tram, shall be a seat specifically designed for bus applications rather than for other vehicles such as heavy rail or heavy goods vehicles, as it must be capable of being adjusted frequently without any damage. The seat must be of ergonomic design, easy to clean and easily removable from the cab. The seat cushions shall be easily removable for cleaning.

The driver's seat must be easily adjustable so that 95% of adult persons may be seated comfortably with effective reach to the drivers' controls, and maintain unrestricted lines of sight through the windscreen.

Both cabs on each Tram shall provide stowage for:

- A points handle, typically a steel bar about 1m long (supplied by others). This must be placed so the driver can easily take it with him when leaving the cab, and so it must be stowed and un-

stowed without risk of damage to the cab finishes or equipment. When not in use it must be secured so as to prevent becoming a hazard in the event of an emergency stop or a collision.

- A first-aid box (supplied by others)
- A fire extinguisher to be supplied with the Tram.
- A place to hang a driver's coat, where it will not interrupt the view in any direction.
- A place to hold two A5 ring binders of timetables, information and procedures.
- A place to clip an A5 sheet of paper, which can be conveniently referred to by the driver (whilst at a Tram stop), and which does not obscure any controls or gauges.
- A hand lamp (supplied by others)

Provision shall be made within each cab to allow two operational personnel to separately and securely store personal effects

There shall be provision in each cab for a secure cash box (supplied by others). The dimensions of this are to be provided by **tie**.

There shall be charging points in each cab for a portable radio and a hand-held ticket machine.

The tram shall be fitted with holders in each cab for a destination board, for the purpose of indicating additional destinations of public interest. This board is to be placed in position by the driver so as to be seen from in front of the tram. The dimensions of the board are to be provided by **tie**.

24.14 Tram Controls

The layout of controls, switches and instrumentation shall be agreed with **tie** on the mock-up, by use of design submittals and the use of the mock-up. The desk panels shall be made of material that is wear resistant and free from reflections.

It shall be possible to drive the Tram from each cab. Insertion of the driver's key and the operation of one switch in either cab shall switch on all of the equipment needed to enable the Tram to be driven from that cab. Essential sub-systems shall not be separately switched.

The Tram acceleration and braking shall be controlled from a combined controller handle, incorporating a dead man safety device. This shall normally be locked out of use until released by the driver's key, which shall remain captive in the controller until the controller is placed in the off

position. It shall not be possible to operate the Tram with more than one controller in use at any one time.

The controller shall include a slow speed mode, for driving through the Tram washing plant.

The following controls shall be conveniently placed for the driver's free hand when the Tram is in motion:

First priority

- Audible warnings (bell, horn);
- Track brake (in addition to the emergency brake on the driver's controller);
- Indicators;
- Pantograph emergency drop.

Second priority

- Manual sand (in addition to the automatic sanding system);
- Windscreen washer and wiper controls;
- Headlamp dip/main beam;
- Panic Alarm;
- Tram punctuality display against timetable or headway.

The following controls shall be conveniently placed for use when the Tram is at a Tram stop:

- Door controls;
- Rear-view normal mode push-button;
- Tram Ready To Start (junction calling when at a Tramstop close to the junction);
- Hazard and marker lights;

- Air-conditioning and temperature controls;
- Saloon heating control;
- Fault reset push-button;
- Public Address controls;
- Radio controls;
- Cab light switch;
- Saloon lighting;
- Pantograph control;
- Windscreen demister.

At least one cab shall display an odometer calibrated in km. Both cabs shall display a speedometer calibrated in km/h and mph.

Windscreen wiper control shall be by means of a multi-position switch having intermittent, continuous slow and continuous fast positions. Wipers shall be self-parking to a position close to and parallel with the edge of the windscreen.

There shall also be a separate push button, which operates wipers and windscreen washers for as long as it is held down, and provides one additional sweep of the wipers after it is released.

Each cab shall be equipped with an indicator to inform the driver whether the Tram is running early or late, and by how much.

24.15 Rear View Equipment

Rear-views shall be provided by close circuit television equipment which shall function as follows:

The 'normal' view, displayed whenever the Tram is in motion, shall have two screens in the cab integrated into the desk: one on the left side of the desk and one its right. The images in them shall be the same as would be seen in mirrors.

The 'Tram stop' view shall be displayed in the time between the doors being enabled at a stop and all doors being proved closed. In this view, the monitor on the platform side (the side on which the doors are enabled) shall show the same as in normal view. The other monitor shall display the image from the rear camera on the platform side, to enable the driver to view passengers disembarking and embarking and to ensure that doors are clear before they are closed.

Note that the images of views back from the cab will be laterally inverted and those forward from the rear of the Tram will not.

A separate push button conveniently located on the cab desk shall provide the driver with a changeover facility from 'Tram stop' to 'normal mode' for as long as it is held down, to allow a driver to check that nothing is overtaking the Tram at an on-street stop whilst the doors are closing.

Closed circuit television images must remain clear enough to see a cyclist overtaking the Tram before the Tram sets off from an in-street Tram stop, even whilst it is raining, dark, under street lighting and there are car headlamps shining towards the cameras. The tram supplier will be required to demonstrate that the CCTV coverage allows drivers to effectively see all passengers boarding and alighting, as well as being sufficient for the needs of driving the tram on street.

The images from the cameras shall be displayed in the cab to the driver on colour flat-screens with manually adjustable brightness. Images on these screens shall be viewable by the driver under all ambient lighting and weather conditions and at as wide an angle as possible. Care shall be taken to ensure that 'flaring' of the image from brightly lit, wet, road surfaces is avoided. Special consideration shall be given to the use of this equipment in wet weather and poor lighting conditions, when it may be necessary to remove rain droplets or prevent them from forming on the camera lens.

Rain affects closed circuit television both by creating additional reflections from wet road surfaces and by settling on the camera housings themselves. The system must cope adequately with both.

24.16 Interior

Care and attention shall be given to provide a safe passenger environment. Passenger movement within the Tram shall be made as safe as practicable, and able-bodied passengers shall be able to move along the entire length of the passenger saloon of the Tram.

The free and safe movement and loading of passengers shall be facilitated by the incorporation of handrails, grab-poles and an interior free of tripping hazards and sharp corners throughout the Tram. The gangway width between seats shall be not less than 650mm. Hand-holds will be provided to maximise the use of standing space, particularly in vestibules and articulations.

Steps may be included to permit the movement of passenger's to or from areas where there is a difference in the height of the floor of the Tram. Steps shall not exceed 200mm in height and the quantity should be as few as possible. There shall be a minimum of 16 seats accessible to passengers without using steps.

All seats shall be at least 450mm wide, ergonomically designed, resistant to damage and soiling and have easily replaceable covers. The seats shall as far as possible not be placed on pedestals, i.e. shall not require a step up for passengers when taking a seat. Wherever practicable seats should be cantilevered from the vehicle side so as to leave a clear floor area to facilitate cleaning. Seat rows shall be pitched no closer than 752mm.

The non-slip, easy clean floor covering shall also continue up the vehicle sides and seat pedestals so that there are no corners that can act as dirt traps. The floor covering shall be hardwearing with minimal openings and continuous welded or seamless glued joints. The edges of the floor covering shall be sealed to prevent water penetration to the structure of the Tram.

The floor covering shall be highly resistant to staining from any source.

The actual floor area available for standing passengers shall be clearly identified. From this the total standing capacity shall be calculated, respecting Rail Vehicle Accessibility Regulations and the limitations of standing room in areas such as articulations. Seating shall generally be arranged transversely with minimum longitudinal seating.

The tram shall be fitted with luggage racks, distributed evenly about the vehicle and situated as close as practicable to the vestibules. The luggage racks shall occupy a floor space of up to $10m^2$ and extend the full height of the interior and have two intermediate shelves. At floor level a horizontal bar shall extend across the opening into the saloon to prevent objects rolling out of the luggage space. Luggage shall be effectively prevented from excessive movement out of the racks, either under high rates of braking or lateral acceleration. The luggage racks should be easily replaced by seating (or standing areas if appropriate) should **tie** require to do so.

The tram is to be provided with information screens so as to be visible from within most parts of the saloon. The screen should be able to display video information for events and places of public interest, and should also be able to display selected views from the closed-circuit television system. All passenger areas of Trams shall be provided with windows in all sidewalls to maximise visibility for passengers. This requirement shall also apply to draught screens and separation walls to the driver's cabs.

The Tram shall provide data on the number of passengers boarding and disembarking at each Tramstop. This data shall be easily downloaded each day when the tram returns to the Depot. Software to allow analysis of the data shall be provided.

The passenger counting facility shall be incorporated on 6 of the trams in the fleet only. It shall be possible, with minimum disruption to wiring looms, body panels and major equipment, to retro-fit passenger counting equipment should this be required after the vehicles have been delivered.

Passenger stop request buttons shall be provided in the saloon area in accordance with Rail Vehicle Accessibility Regulations.

Interior saloon lighting shall provide glare free, uniformly distributed illumination in passenger areas, to a level of between 280-350 lux. The lighting diffusers shall be easily cleanable.

Emergency internal lights must function after disconnection from the overhead power supply (at all operating temperatures) in accordance with the battery back-up and load-shedding requirements below. Emergency internal lighting shall provide a minimum illumination of 30 lux at floor level and shall be evenly distributed in each passenger area of the Tram. The operation shall be independent from the overhead line power supply. Uniformity of illumination shall not be less than a factor of 0.4 Headroom throughout the seating areas shall be at least 2.1m to ceiling.

There shall be litter bins provided at each vestibule on both sides of the tram, each being able to be filled with typical soft drink cans. The litter bins shall be easily emptied.

All passenger areas of Trams shall be provided with a heating and ventilation system that maintains a constant acceptable ambient temperature during transit between Tram stops and during boarding and alighting at Tram stops when operating in all prevailing climatic and environmental conditions on the proposed route.

The arrangement of heating devices shall prevent excessive draughts caused by high airflow rates, due to the even warm air distribution inside the Tram. With the appropriate arrangement of the

vents, the air inside the Tram shall be heated and distributed over a large area through natural convection. Pockets of hot and cold air shall be avoided.

The interior of each Tram shall be fitted with reserved spaces for on-board advertising and passenger information notices. These spaces shall allow cardboard panels, 210mm deep, to fit snugly into retaining grooves. A clear smooth surface at least 160mm deep shall be available between the grooves to allow for the fixing of vinyls. There shall be a route map above the inside of every passenger doorway. The Infraco shall ensure that the Tram Supplier shall produce and fix all notices required by law or the Safety Management System, and fix free-issue logos, route maps and other notices, using appropriate materials and attachment methods, against a schedule which shall be agreed by **tie** on the mock-up.

Trams shall be fitted with racks close to the vestibule areas for holding information leaflets and newspapers. The arrangement and design of these racks is to be agreed by **tie** on the mock-up.

Two night partitions shall be provided which are fully retractable and can be securely stowed when not in use. These partitions shall be located adjacent to the articulations on either side of the wheelchair area towards the centre of the tram.

This night partition should be included in the mock-up.

The function of these partitions shall be to enable the rearmost portion of the tram to be securely locked out of use by the on-board inspector in order to enable him to more closely supervise the passengers in the forward portion of the tram whilst retaining the wheelchair facilities, as required by RVAR.

The partitions themselves shall be simple to operate by one person in the range of 5th percentile female to 95th percentile male. It shall be possible to lock the partitions in either the stowed or fully deployed position using a key which is carried by the on-board inspector as part of his normal duties. It shall be possible to deploy and stow the partition within 2 minutes. When deployed or stowed the partition shall be robust enough to withstand a person falling against it without sustaining damage.

A key operated control, located such that it may be conveniently operated by the on-board inspector with the partition deployed, from either side of the partition, shall cause the lights in the rearmost (isolated) portion of the tram to be reduced to emergency lighting levels, and disable the external door pushbuttons in order to prevent passengers accessing this portion of the tram. Under all circumstances the crew entry functionality at the single end doors shall remain operable and it shall be possible to operate the emergency door release throughout the tram. Additionally the Passenger

Emergency Communication Units shall remain active in all parts of the tram. The activation of the key operated control shall be indicated in the active driving cab but shall not cause a fault alarm.

In order to assist with the design the following information gives the anticipated normal method of operation.

At a terminus where the partition is to be put in place:

- The passenger doors will be opened in the normal way to allow passengers to exit and enter the tram (at this point they may board at any point in the tram);
- The driver will close and remove the enable command from all doors before closing down the cab and walk to the other cab;
- The on-board inspector will move any passengers in the area to be closed off to the portion of the tram forward of the partition;
- The inspector will then secure the partition in place and operate the key switch to deactivate the rearmost door controls and dim the lights;
- The driver will activate the forward cab and enable the doors for passenger boarding in the normal manner prior to departing.

Consideration should be given to providing an indication on the side passenger information displays to indicate to intending passengers that boarding is at the forward end of the tram only.

Tram loading will be uneven when the partition is deployed. The implications on load compensation in traction and braking control of the tram shall be considered and should continue to function appropriately when this condition is in force.

Interior ceiling and coving panels should be securely retained, so that they do not fall onto the maintainer when the catch is released. All interior panels should be small enough to be handled and lifted by one person unaided.

The interior livery shall be developed as part of the system identity and branding package and is to incorporate the features set out in the Design Guidelines. Typically this shall include the following factors:

- Paint finishes should use the same colours as for the exterior;
- GRP interior panels / door interiors / lower finisher trim for bonded glazing shall be Blue RAL 5005;
- Roof / coves / sides laminates shall be the same colour as Perstorp PP5650U Cezanne;
- Seats and wheelchair backrests shall be covered in Holdsworth Edinburgh Tartan – W218ET (including priority moquette);
- Driver's seat covering shall be Black hide material;
- Floor colours shall be as per Taraflex Luna NT Lewis (Taraflex Red BEF 53/01) and Taraflex Polaris NT Arran (Taraflex Blue BEF 33/01);
- Floor covering weld cord – Yellow;
- Seat backs shall be in Lothian Blue; and
- Hand rails and stanchions shall be in Red RAL 3020.

Passenger seats shall be of a similar style to the Grammar Pratico 2845 Low backrest, as currently deployed on Lothian Buses.

24.17 Bogies

The vehicle will have a minimum of 66% adhesive weight on motored axles.

The bogies shall be of proven design and have been used successfully in another Tram project. The bogies will incorporate suspension systems to give a high-quality ride characteristic. The suspension system will be self-adjusting or adjustable for wheel wear so that ride heights can be closely maintained.

The ground clearance (from top of rail) fully laden with worn wheels shall not be less than 50mm to any part of the bogie structure except a track guard.

Each axle on the motor bogies will have a spring-applied friction brake. It shall be possible to release the spring-applied brake manually in the event of failure of the actuation system. Under normal operation the parking brake will release and apply automatically when the driver's controller is activated.

Each bogie shall have two electro-magnetic track-brakes, one suspended over each rail between the wheels.

The wheels shall incorporate resilience and damping in order to minimise noise and vibration. Tuned vibration absorbers will be fitted after carrying out tests to determine their most effective parameters.
Effective under-run protection arrangements shall be provided. The end bogies will carry adjustable track guards on their outer ends, to conform to Railway Safety Publication 2 – Guidance on Tramways, issued by the Office of the Rail Regulator requirements for under-run protection. The motor bogies will be interchangeable with each other.

Removal of components such as brake actuators, suspension units, etc. will be facilitated to allow on-site repair and replacement of major items such as motors or wheels to take place with the minimum of Tram down-time.

The ride comfort levels measured according to the ISO 2631 Standard on a ballasted straight and level track in good condition shall be no worse than:

Speed	Wz vertical	Wz lateral
40 km/h	2,32	1,58
70 km/h	2,96	2,36

Table 59 - Ride Comfort in the Driver's Cab

Speed	Wz vertical	Wz lateral
40 km/h	2,24	1,64
70 km/h	2,82	2,28

Table 60 - Ride Comfort in Passenger Compartment

At least two wheelsets of the Tram shall be equipped with flange lubrication equipment on all wheels. Both sides of the flange shall be lubricated. It shall be capable of being programmed to operate on the basis of either location, or of a time interval, or a combination of these.

24.18 Re-Railing

The Trams shall be capable of being returned to the running track in case of derailment with the minimum amount of equipment and in the shortest possible time. The Infraco ensure that the Tram Supplier shall indicate the best methods for re-railing and the equipment required, for all track forms used on the system.

If the Tram design includes suspended body sections, then articulation locks shall be procured by the Infraco from the Tram Supplier.

24.19 Propulsion Equipment

The Tram shall not export additional risk onto Network Rail infrastructure. In particular, the harmonic generation from the propulsion and control equipment shall not interfere with train-borne or trackside systems or other third party systems and infrastructure.

The traction equipment shall detect and automatically manage wheel slip and wheel slide, so as to maintain performance and stopping distances in all track conditions and without damage to the wheel treads. When slip or slide is detected sand will automatically be applied to the rails in front of the leading axle. Sanding must not take place due to spurious wheelslip/slide detected at flange running crossings, pointwork or sharply curved or transitional track. The traction equipment shall tolerate variations in wheel diameter.

The Trams will have the following performance when motoring, on straight and level track and with a nominal line voltage of 750V dc:

Speed (km/h)	Load	Performance	Notes
0 -> 30	Up to AW4	1.2 m/s^2	Instantaneous
0 -> 70	Up to AW4	0.8 m/s^2	Average

Table 61 - Tram Performance Levels

The effect of variation of the line voltage (within the prescribed system limits) on the Tram performance, shall be provided by the Tram Supplier on behalf of the Infraco. The maximum line current, and the conditions when it shall be demanded by the Tram, shall also be provided by the Tram Supplier on behalf of the Infraco.

The Trams shall provide safe operation on all gradients under degraded performance modes as imposed by the traction equipment. In particular, the Trams shall be able to complete any journey on the System with one complete traction drive unit isolated.

The traction and braking control system shall be optimised to provide smooth and low jerk values in starting from rest, acceleration, braking and stopping, on level track and on all gradients that are encountered, under all loading and environmental conditions, while protecting against unintended downhill movement.

The Tram may be fitted with a short-time rated emergency mode, with a higher tractive effort, to assist in recovering other Trams.

24.20 Braking Equipment

The Tram Braking Equipment shall be designed to comply with BS EN 13452 Part 1 except where stated below.

The service brake application shall be capable of retardation at an acceptable rate (as defined in Tables 3 and 4 of BS EN 13452 Part 1) at all specified laden conditions and the jerk rate shall be limited so as to not cause discomfort to standing passengers. The service brake shall normally consist of a regenerative electro-dynamic brake, (that as far as is practicable shall return the braking energy to the overhead line) and a friction brake. The electro-dynamic brake shall normally take precedence over the friction brake.

The regenerated voltage shall not exceed 900V. Should the overhead line become unreceptive, the braking energy shall be dissipated in naturally cooled resistors. Transition between regenerative and rheostatic modes shall be automatic, instantaneous and free from jerk. Braking distances and deceleration rates shall be unaffected by transitions during braking.

The brake resistors shall be protected from overheating. Malfunction of the dynamic brake system must be detected and recorded by the fault monitoring system.

Electro-dynamic and friction brakes shall be blended. In normal operation the friction brake will take over from the electric brake at a low speed. In addition, sand will be applied automatically during braking when triggered by the wheel slip/slide control system. Should the electro-dynamic brake be unavailable on any particular traction drive then the friction brake will be automatically applied to compensate, without jerk or loss of performance.

For emergency braking applications the jerk rate shall be limited without compromising emergency braking performance. The friction braking system should be capable of repeated full service or emergency brake applications.

The Tram parking brake shall be of sufficient performance for a Tram (whether laden or unladen) to hold without movement and for an indefinite period another unladen Tram without brakes on the steepest gradient on the Edinburgh Tram Network under all adhesion conditions.

The braking function and performance of the Tram shall be in accordance with Tables 3 and 4 of BS EN 13452 Part 1. The definitions of the braking modes given in these tables are as defined at Section 3.2 of the Standard.

When the Emergency brake is applied, the track brakes should be released immediately before the Tram comes to rest in order to minimise jerk to passengers.

All braking and jerk rates shall comply with the requirements defined in Standard EN 13452.

24.21 Run Time

The Trams will be capable of being operated continuously for twenty hours in each day.

A runtime simulation will be carried out by the Infraco to demonstrate the required end-to-end journey times. The Trams shall have sufficient performance and ratings to meet the requirements for these run times and end to end journey times. The inputs to the simulation shall be based on theoretical Tram performance validated by type test measurements with similar Trams in service elsewhere. The infrastructure and operational assumptions for the runtime shall include, but not be limited to:

- Alignment information, including speed restrictions due to geometry and sighting restrictions;
- Location of Tram stops and assumed dwell times;

- Speed restrictions due to the presence of pointwork;
- Service brake rates including agreed allowances for driver variation and technique, and varying adhesion conditions;
- Jerk rate and acceleration compliant with the requirements;
- Assumed delays due to operation in mixed traffic, which may be in the form of assumed speeds or time delays;
- Assumed delays due to the operation of the traffic-signal-controlled junctions, which may be in the form of assumed speeds or time delays;
- Tram loading;
- Wheel wear; and
- Traction system supply voltage.

24.22 High-Voltage Equipment

All Tram-borne high voltage equipment shall be adequately rated for operation at the line voltage. All high voltage equipment other than the pantograph will be securely enclosed in rigid, metal and earthed equipment cases.

The high-voltage sub-systems will be protected by high-speed circuit-breakers or fuses, which shall be enclosed so that their operation does not cause alarm or danger to persons standing near to the Tram. The length of electrically unprotected cabling between the pantograph and the protection devices shall be minimised.

Wherever feasible, there will be duplication of primary assemblies in order to minimise the potential for single-point failures. There will be a minimum of two self-contained traction groups, so that failure of a traction drive on one bogie does not immobilise the Tram.

24.23 Auxiliary Power Supply Systems

The auxiliary supply converter(s) shall start when fed from the overhead line, irrespective of the state of charge of the batteries.

The converter outputs for auxiliary supplies and battery charging derived from the overhead supply shall be isolated from the overhead supply to prevent any possibility of excessive voltages appearing on the low-voltage circuits.

The saloon heating units (if mounted in the saloon area) shall be provided with appropriate protection and insulation for the heating elements and their terminal connections.

The charging system for the batteries will be appropriate to the type and size of battery provided.

A suitable socket for connecting a 24V battery charging supply shall be provided.

The batteries shall be of a low maintenance type suitable for traction applications and enclosed in electrolyte-proof containers to contain environmental pollution in case of damage. There shall be absolutely no possibility of spillage from the batteries entering the passenger saloon or the cab. The battery enclosure shall be vented to prevent the build-up of gases.

In the event of loss of the 750V overhead supply, the batteries will allow all essential systems to operate for a minimum of thirty minutes. Certain critical functions will continue to operate for up to one hour from battery supply:

After ten minutes:

- The saloon lighting system shall revert to emergency lighting only.

For up to thirty minutes, the following systems shall remain in operation:

- Brake system;
- Public Address system ;
- Emergency lighting; and
- Door system.

For up to one hour the following systems shall remain operational:

- Pantograph;
- Minimum exterior lighting; and
- Radio communication system.

24.24 Faults and Diagnostic System

The Trams will have a condition and fault monitoring system integral with the vehicle control system, to give indication to the driver of the status of equipment and to allow control of degraded modes. Failures or events requiring maintenance intervention shall be recorded by an on-board system that shall retain all pertinent details after the Tram has been shut down, for downloading and analysis by maintenance staff. This system will have sufficient capacity to store such information at least for the interval between scheduled maintenance examinations, on a first-in, first-out basis. There shall be a visible indication that at least one day's worth of recording remains available.

The downloading of data shall be accomplished using a commonly available lap-top computer or related portable device. Any software or special equipment or licences required to download or analyse the data from the Trams shall be provided by the Tram Supplier.

The display for the driver shall also provide unambiguous information of the status of the Tram, and the severity of any faults present. In particular, the system shall continuously indicate one of the following fault states according to the condition of the Tram:

- Tram OK;
- Minor fault, report to control and continue;
- Major fault, report to control and continue in degraded mode;
- Major fault, Tram must be immediately taken out of service; and
- Major fault, Tram inoperative.

The Tram shall perform a self-check automatically whenever it is started up from a shut-down condition.

24.25 Sanding System

The Tram shall be equipped with a system, which deposits sand immediately ahead of the driven wheels in the direction of travel to rectify any poor adhesion conditions at the wheel/rail interface. The system shall be activated both automatically whenever wheelslip or wheelslide is detected, and manually when under control of the driver. Sand will also be automatically applied whenever the emergency or security brakes are used.

Sand shall be deposited on at least two locations on each rail per direction of travel. The rate of sand deposition shall be no more than that required to correct the poor adhesion. The automatic sanding system shall be inhibited when the Tram is stationary, unless activated manually. The sanding unit response time shall be effectively instantaneous.

The Tram-mounted sand boxes shall have sufficient capacity for a full day's service under all conditions of weather and loading.

The sand filler covers shall have seals to keep the sand content dry under all weather conditions, and when the vehicle is being washed.

A means of ascertaining the sand level in the sandboxes shall be provided, visible from within the Tram.

The Tram sandboxes shall be filled from outside of the Tram using a sand dispensing plant at the Depot. The sandbox arrangement will be compatible with the sand dispensing plant such that it is possible for the driver of the Tram to completely fill all the sandboxes in five minutes. In the event of failure of the plant, it shall also be possible to fill the sandboxes manually, and if any special equipment is required for this, the Infraco shall ensure that the Tram Supplier shall provide it.

24.26 Passenger Doors

The Tram will be equipped with at least four pairs of bi-parting sliding-plug doors, plus two single doors, on each side of the vehicle for the passenger saloon and one internal cab door per cab with a clear opening of not less than 610mm. The doors shall be equipped so that rainwater does not drip onto passengers when the doors are opened.

The passenger saloon doors shall be fitted on both sides of the vehicle in the low-floor area. The doors will be of the following characteristics:

- The double door clearance width shall not be less than: 1300 mm
- The double door clearance height shall not be less than: 2025 mm
- The closing force shall be: <200N
- The opening force shall be: <250N

The doors will be opened and closed by the driver or simply released by the driver so that the passengers will be able to open the doors themselves using door push buttons. The push buttons will be illuminated when they are activated. The doors shall stay open for a fixed time before closing automatically. A warning tone shall be sounded when the doors are released and a different tone shall sound to give warning of door closure.

Devices will be incorporated into the individual door control mechanisms, or in the leading edge of the door, to detect and protect against door obstruction. Slow or defective door mechanisms will be indicated to the driver by the vehicle fault management system. The driver shall be able to isolate any door by using the driver's key to operate an isolation switch local to each door. Such a door shall be secured from all forms of operation other than emergency release.

It shall be possible to open each door manually in case of emergency (including any door that has been isolated). An internal emergency handle will be provided at each door entrance. Operation of the handle shall cause an immediate application of the emergency brake and unlock the door such that it can then be moved open by hand after the vehicle is stationary. The emergency handle will only be able to be reset using the driver's key.

The door edges shall be fitted with weather-proof seals that are soft enough to allow a person's fingers to be withdrawn after the doors have closed. The seals shall be effective against all likely weather conditions and in the Tram washing plant and shall not offer a hand-hold to allow persons to ride on the outside of the Tram.

The Tram shall accept a door enable command from the driver when the Tram speed is below 10km/h, but the doors shall not become enabled until the Tram is at a standstill. If, having been enabled, the Tram speed then rises above 10km/h, the enable command shall automatically be cancelled.

The time from the Tram coming to rest to doors being fully open in response to a prompt passenger demand, plus the time from the driver pressing the door close button to the Tram moving off, shall be less than 12 seconds. This time shall include all necessary delays for RVAR-required tones. The doors themselves shall move from closed to fully open or vice versa in 3.5 seconds or less.

The door guidance mechanism shall not be a swing plug mechanism nor a folding door.

The following controls shall be fitted in each cab for driver control of the doors:

- Separate door-enable controls for the left and right sides. It must be possible to enable both sides simultaneously. The 'enable' buttons of the Tram should each be located on the appropriate side of the cab desk.

- One door 'open' button, which will open any doors previously enabled, but not opened by passengers, provided the Tram is at a stand still.

- One door 'close' button, which will close all doors that are open. This will be the normal mode of door closing at Tram stops other than termini.

- To prevent the doors being enabled on the wrong side, the door enable shall be interlocked and programmed with the correct side for the platform at each Tram stop along the route. This feature shall be capable of being over-ridden by the driver (for example, if the Tram uses an unusual platform at a terminus), but such over-ride shall require the driver to press at least one additional button, which shall not be located adjacent to the other door controls in the cab. It shall be possible to open all the doors when the Tram is in the Depot.

The door enabled indicator lights at the doors shall illuminate and the door enabled tone start, simultaneously with the door actually becoming available.

A door shall re-close automatically, with warning tone, if no obstacle is detected for twenty seconds (configurable). This will be the normal mode of door closing at termini.

When all doors are closed and traction is available, an audible signal, distinct from all other tones and quieter and less offensive than any alarm tone, shall sound in the cab in use. This is preferred to a lamp or other visual signal as the driver already has to view the platform and check ahead before moving off.

Unless a separate external cab door is provided, the door nearest each cab on each side (four doors in total) of the Tram shall be provided with local internal and external 'door open' and 'door close' switches operated by the driver's key. These shall be spring-loaded centre-off, turned one way to open and the other to close. Any door opened using a local switch shall be capable of being closed either using the appropriate local switch or the 'door close' button in any active cab. The purpose of these switches is to allow local control of the door by a driver who needs to leave and re-enter a passenger-carrying Tram, for example to operate points, at a place which is not a Tramstop. In addition, unless a separate cab door is provided, a separate control shall be provided in the cab to allow the Tram driver to open and close the nearside front passenger door separately from the cab. This is to allow the driver to open and close this door separately at the crew change halt at the Depot. An exterior emergency door release shall be incorporated to comply with the requirments of Railway Safety Publication 2,

The door-enabled tone required by Rail Vehicle Accessibility Regulations 1998 (as amended) shall be audible from both inside the Tram and on the platform. This may require an additional external sounder if, in order to be heard outside, the internal one is uncomfortably loud for passengers on the Tram.

24.27 Communication and Monitoring Systems (CCTV)

Spatial provision shall be made in the most appropriate part of the Tram for the operational radio system, driver control units and tram position and detection system equipment, including the associated cabling, support equipment, microphones, speakers, antennae and power supplies. The cabling shall be installed and tested by the Tram Supplier.

These sub-systems will be supplied by the Infraco as free-issue items to the Tram Supplier, and shall be installed and functionally tested during the Tram manufacturing process. The Infraco and Tram Supplier shall work with the suppliers of these sub-systems to define and agree the interface requirements.

The Tram shall be fitted with cab-to-cab intercom facilities. The intercom facility will also provide communication between all four cabs when two Trams are coupled during the recovery of a defective Tram. This facility shall be fully duplex and hands-free.

The Tram shall be fitted with internal cameras that record digital images covering:

- The whole of the saloon, (including the passenger help points) with sufficient clarity to enable individuals to be identified for evidential purposes; and
- The views ahead/back from the cabs.

The resolution of recorded images and recording speed of images shall be of a quality from which it would be capable of being reliably used as part of an accident investigation, and in respect of the saloon images shall be of a quality to enable a conviction in the event of illegal activity. Appropriate labelling in accordance with regulations governing the use of such equipment shall be put in place. The cameras shall be of a hemispherical type without any detectable direction of the camera view. Additional information, i.e. time, date, camera number and the Tram number will be added to every image recorded.

The recorded Closed Circuit Television images will be capable of being retained on the Tram for not less than 72 hours at which point the system will restart recording and erase the retained image. Minimum frame rate shall be 16fps, per camera. Consideration should be given to providing a push-button in the cab to enable the driver to add an index-point to the recorded images.

Closed Circuit Television images shall be taken from the Tram for subsequent retention and analysis. This shall be done using a removable data storage medium rather than by data transfer. It shall be readily apparent to the Tram driver and to maintenance staff when the storage medium is not present on the Tram. The data storage medium shall be retained by a secure locking device, that is not released by a Tram system key. All data storage devices shall be interchangeable between trams.

All software required for off-Tram viewing, editing and analysis, shall be procured by the Infraco from the Tram Supplier. This shall include any non-standard supporting hardware and any associated licences.

24.28 Event Recorder

The Tram shall include a data recorder capable of providing time, speed and distance information at 1.0m resolution or better for the last day's operations, and at 10.0m resolution or better for the last seven days' operations. Additionally, the start and end of the following events shall be recorded:

- Horn;
- Bell;
- Traction;
- Brake;
- Hazard brake;
- Safety brake;
- Track brake;
- Driver's Safety Device;
- Door enable left present;
- Door enable right present;
- Manual sand command present;
- Tram Ready to Start;

- Hazard lights;
- Left indicator;
- Right Indicator; and
- Passenger Help Point.

Software enabling event recorder download data to be interrogated and displayed in both graphical and tabular format shall be provided. The software shall also enable all of the data to be exported into Microsoft Excel for further analysis.

The data shall be recorded onto a secure, removable data storage medium. The data recorded shall include the Tram number and date. The data shall be retained and be retrievable at least until 48 hours after the Tram has been shut down. The data storage medium shall be retained by a secure locking device,that is not released by a Tram system key. All data storage devices shall be interchangeable between trams.

The Infraco shall ensure that the Tram Supplier shall indicate how the distance base of the recorder shall be recalibrated in normal usage.

24.29 Public Address System

Automatic, audible announcements for destination and stops shall be made by means of a digital voice announcement system. The Tram Supplier shall supply a copy of any necessary equipment and software needed to upload new and amended announcements or to alter the times and places at which announcements are made. The system should allow for a sound quality of RASTI 0.7, or better.

Additionally, the Tram shall be fitted with both internal and external public address systems, selectable individually by the driver, to allow the driver to make direct announcements.

The following are additional to the requirements of the Rail Vehicle Accessibility Regulations 1998 (as amended):

- Rail Vehicle Accessibility Regulations permit audible announcements between stops to be omitted where the run time between stops is less than two minutes. This option is to be used wherever possible.

- Where stops are omitted the system shall automatically allow for this without intervention of the driver.

- At a stop, in addition to the Rail Vehicle Accessibility Regulations requirement of announcing the next stop and destination, the equipment must also be capable of announcing the current stop. The form of the announcement to be provided initially shall be:

  "This is <name of current stop>. This Tram is for <name of destination>. The next stop is <name of next stop>."

It shall be initiated by the door enable, and there shall be a short delay so that the door-enable tone is finished before the announcement starts.

24.30 Passenger Information System

The Tram shall be fitted with six external destination displays, one at each end above the cab and two on each side, one near each end. The side displays should not be obscured by open doors. These displays shall be capable of displaying as a minimum a service number and the ultimate destination of the Tram. The displays should be legible from an oblique viewing angle.

In addition to the text indicating the destination of a tram on both the side and cab exterior displays an area immediately preceding the text shall be reserved for a single symbol. This symbol shall be displayed in an array of LEDs of the same size and resolution as that of a text character. The symbol shall be in a single colour which is the same as that of the text display. It shall be possible to display a variety of characters including simple geometric shapes and representative symbols (e.g. an aeroplane to indicate AIRPORT as the destination). It shall be possible to select an appropriate symbol during the programming of the system which will then appear on the display when the driver selects his route.

The purpose of this feature is to assist passengers with reading difficulties to ensure that they board a tram on the correct route for their requirements.

Internal saloon displays shall be used to show information concerning the next stop and additionally a "Tram Stopping" sign. They shall also display the local time, and should also be able to display public service information. The number and location of these displays shall be such that the information shall be easily visible to passengers within any part of the Tram.

The internal visual displays shall display, successively:

- Screen 1: Tram to
- Screen 2: <Destination>
- Screen 3: Next Stop
- Screen 4: <Next Stop>

Stepping to the next stop name shall take place on arrival at a stop once the doors are enabled. Where stops are omitted, the displays shall take account of this automatically without the intervention of the driver.

The size of the Passenger Information Display font shall conform to the requirements of the Rail Vehicle Access Regulations 1998 (as amende). The brightness of the displays shall compensate for ambient light quality.

After leaving the stop before a terminus, the external destination indicators shall change to show the destination of the next trip, so that the Tram arrives at the terminus with the correct next destination already displayed.

24.31 Passenger and Inspector Alarm System

Passenger alarm devices shall be located in the saloon area, at every door area and at the disabled passengers area. These devices shall allow communication with the driver and the location of the active device shall be indicated on the driver's display. The communication system shall be fully duplex.

Request 'Stop' buttons shall be provided and shall be compliant with Rail Vehicle Accessibility Regulations 1998 (as amended) and shall:

- Become operable when doors are proved closed at a Tramstop;
- When the first one is pressed, sound a single audible warning in the cab, illuminate a warning light in the cab and illuminate the Tram stopping indicators (required by the Rail Vehicle Accessibility Regulations) 1998 (as amended) in the saloon;
- No further audible warning in the cab from subsequent button pushes; and

- Be positioned such that they can be easily activated by any passenger intending to disembark, but should not be positioned such that they can be inadvertently activated by standing passengers.

Request stop from the wheelchair spaces shall:

- Illuminate a different warning light in the cab.
- Create a door open request for the nearest door, so it opens as soon as enabled.
- Override the automatic close on that door for the next opening.

All request stop indications shall be cancelled by the next door enable command.

Devices shall be provided that enable the on-board inspector, working within the saloon or on an adjacent platform, to alert the tram driver to an incident.

The handheld, pocket sized device to be carried by the on-board inspector shall have 2 modes of operation. Mode 1 will provide an alarm to the driver to indicate that the inspector is experiencing difficulties or feels under threat. Mode 2 will alert the driver to an immediate emergency e.g. the inspector is under physical attack.

When the inspector initiates a Mode 1 alarm the handheld device will operate silently. If a Mode 2 alarm is initiated a loud 'panic alarm' sound will be emitted from the handheld device in order to deter the attacker.

The inspector's device shall be stored in a charger/holder in the Depot Duty Room for Drivers and Inspectors and picked up by the inspector as he begins his duty on the tram. The Inspector's device shall be equipped with a mounting device and sized such that it can be conveniently and comfortably be carried on the ticket issuing machine shoulder strap. Each cab of the tram shall be equipped with a receiver capable of responding to all alarm Modes transmitted within range.
It shall be possible to replace either the handset or the receiver with a spare in the event of failure or loss.

The handheld device and related system shall operate satisfactorily in the electromagnetic environment which will be encountered on the Edinburgh Tram Network.

24.32 Hauling or Propelling a Defective Tram

An emergency coupler will be provided at each end of each Tram. It will be used only for hauling or propelling a defective Tram. The couplers will normally be concealed behind a removable cover. Coupling must be possible at all locations on the Edinburgh Tram Network.

An empty Tram shall be capable of both hauling and propelling (but not both simultaneously) another empty Tram, which is incapable of movement under its own power, between any two points.

As well as mechanical coupling, the following control facilities shall be provided on a coupled pair of Trams:

- Track brake control of both Trams from the cab in use, assuming that each Tram's batteries have sufficient charge;
- Through intercom between all cabs; and
- Through control and power to hazard lights, brake lights and marker lights.
- The intercom, marker lights, brake lights and hazard lights shall be operational on both Trams even if the Tram being assisted has no battery power available.
- The Tram will have a true reverse direction capability from a leading cab, to allow the uncoupling of one Tram from another. This will be enabled with the use of a sealed switch.

24.33 Exterior Details and Livery

The exterior livery shall be as set out in Section 5 of these Employer's Requirements.

The paint shall typically be water based and should allow for the application and removal of advertising vinyl coverings without damage.

The Infraco shall ensure that the repair methods for the Tram shall be defined by the Tram Supplier and shall not import undue risk with regard to the processes and materials used.

The external lighting shall comply with Her Majesty's Railway Inspectorate Railway Safety Publication, Part 2, The Road Vehicles Lighting Regulations, 1989 and the amendment 1994.

The external lighting shall consist of Light Emitting Diode (LED) arrays wherever practicable. and shall be composed of:

Facing forward

- Two white dip-able symmetric headlights;
- Two white front position lights (integrated in the headlight cluster)(side lights);
- One fixed white centre headlight located centrally above the windscreen;
- Two amber direction indicators; and
- Two end outline marker light (white, at high level).

Facing rearward

- Two red rear position lights (tail lights);
- Two red brake lights;
- Two high intensity rear fog lights (red);
- Two amber direction indicators; and
- Two end outline marker lights (red) (at high level).

Side Markers. Four, or more, amber LED combination lights down both sides working as:

- Side marker lights;
- Direction indicators; and
- Side reflectors.

The Tram exterior shall be designed so as to prevent surfing by any individual.

The Tram exterior finish shall allow for easy repair to accidental damage and severe attacks of graffiti. The finish shall allow for the easy application and removal, if required in the future, of special finishes for advertising, such as self-adhesive vinyl.

24.34 Roof-Mounted Equipment

Much of the electrical traction and auxiliary equipment will be housed in equipment cases located on the roof of the Tram. The equipment cases will be robust, weatherproof and suitable for storage and operation in an exposed position. All enclosures will minimise the risk of condensation, and provide adequate and effective ventilation for cooling where required. The normal working of the roof-mounted equipment shall not be adversely affected by dust, wind, rain, snow or ice.

Access to the equipment within the equipment cases will be quick and straight-forward for suitably qualified and trained staff, working from high-level platforms. Standing areas shall have non-slip surfaces. Due regard will be given to the safety requirements considering the location at height and the working voltage. Specific measures will be required to mitigate the risk from charged capacitors and batteries, and equipment likely to be at high temperature. All metal enclosures shall be suitably earthed to the vehicle structure.

All the roof-mounted assemblies shall be easily removable with the minimum amount of disruption to the Tram, to allow repair by replacement. The use of plugs and sockets to allow quick connection and disconnection of assemblies is preferred. Cabling and piping shall be protected from accidental damage.

As far as is practicable, the equipment will be equally divided between the two end sections of the Tram to equalise weight distribution.

The location of the pantograph will be determined by the layout of the Tram and shall be mounted above a bogie and as near to the centre of the Tram as possible.

24.35 Pantograph

Infraco shall ensure that the pantograph for the tram fleet shall be supplied by Tramco.

The governing specifications for the pantograph shall be BS EN 50206-2, BS EN 50119 and Railway Safety Publication 2 - Guidance on Tramways, issued by the Office of the Rail Regulator.

The wire height requirements shall be confirmed, including the operational wire heights within the depot buildings, over-bridges and high load route areas.

A single roof mounted pantograph shall be provided compatible with the Edinburgh Tram Network OLE.

Failure of any porcelain insulators on the lightning protection or other equipment shall not allow flexible cables to fall onto the vehicle roof.

The pantograph mechanism shall raise and lower using an electric drive system. In the event of failure or emergency situation, it shall be possible to lower the pantograph using a hand-crank operated from inside the Tram.

In developing the OLE design, the following pantograph / OLE characteristics have been assumed.

- Maximum wire height 6.8 m
- Minimum wire height 4.3 m
- Profile to be developed
- Overall Collector Head width 1850mm assumed
- Carbon length 1000mm minimum
- Collector Head Depth 250mm
- Along track length to be developed
- Head mass (to be as low as reasonably achievable)
  - (a) Carbon 13.0 kg assumed
  - (b) Metallised Carbon 15.0 kg assumed
- Articulation (frame) dynamic mass 12.0 / 16.0 kg
- Head suspension 12000 N / m
- Frame damping raising 60 / 100 N sec / m
- Frame damping lowering 60 / 100 N sec / m
- Head suspension damping 8 / 12 N sec / m
- Quasi-static contact force 90 N / 180 N
- Friction frame hinge 8 N / 10 N

25 Tramstops

This Section of the Employer's Requirements defines the Tramstop requirements applicable to the Edinburgh Tram Network which the Infraco must comply with.

25.1 General

The Edinburgh Tram Network shall have Tramstops provided at the locations shown in Figure 1 – Edinburgh Tram Phases 1a and 1b Network Diagram of these Employer's Requirements.

All elements of the Edinburgh Tram Network infrastructure shall be designed, manufactured and installed to provide a layout and a suite of furnishings reflecting a fully integrated system and shall be of an economical design and construction that shall reflect economy of use, maintenance, overhaul and renewal.

Provision shall be made, in the form of space, agreed fixing details, local cable routes for data, power and lighting (where appropriate) for a local termination point (Tramstop equipment cabinet), to be provided at all Tramstops.

The Tramstop design aesthetic shall extend to the design of the associated street furniture cabinets, trackside isolator cabinets, point control, point heater cubicles, road junction control cabinets, detector loop cabinets, etc. which shall be visually compatible with the Tramstop furniture. Particular note shall be paid to the requirements laid down in the Tram Design Manual to ensure compliance.

The emphasis on this co-ordination shall ensure an integrated design approach within the urban environment.

25.2 Tramstop Definition

Tramstops shall provide passengers waiting for, entering or leaving the tram system with safe, comfortable, environmentally friendly, informative, high quality access and egress facilities.

Tramstops shall be of the following three types:

- Island platform stops;
- Side platform stops; and
- Combined side and island platform stops.

Platforms shall be long enough to cater for nominal tram vehicles with the extreme distance between the outer edges of the end passenger doors of the vehicle of up to 38.13 m.

Side platform stops shall provide passengers with an effective circulation area and shall be a minimum of 3.0 metres wide. Island platform stops shall be a minimum of 4.0 metres wide unless otherwise agreed with **tie**. A stopping tolerance of plus/minus 2.0m shall be allowed for in the platform length.

All platforms shall contain a minimum clear unobstructed envelope.

The platform height shall match the requirements of the tram to ensure level access in accordance with RVAR (Rail Vehicle Accessibility Regulations).

The layout of architectural elements on the platform shall be arranged to provide the user with ease of access and passage on / off the trams.

Access routes serving the platform shall be appropriate for the level of pedestrian activity and be, where practical, a direct route from key passenger generators.

Key views and vistas of the City of Edinburgh shall not be unnecessarily interrupted.

Platforms shall provide passengers with a clear view of approaching trams.

Tramstops shall maintain consistency of alignment with the track.

A Tramstop shall be defined as:

- That area bounded by the rear of any platform structure and the track crossing points at either end; (or for central stops the external track edge between the track crossing points at either end);
- Including any underground service ductwork and cabinet specifically associated with the stop, outside this zone in the immediate vicinity;
- Including all dedicated access routes to the nearest public road or key passenger generator; and
- Including all structures, systems (including cabinet), finishes etc required to deliver the functionality of the Tramstop.

25.3 Tramstop Requirements

25.3.1 General

Tramstop architecture shall reflect a coordinated design consistent with the overall design aspirations as outlined in the Tram Design Manual and in the CEC Code of Practice for Access and Mobility and shall be subject to the approval of **tie**.

All components used in the construction of the Tramstop shall comply fully with relevant British and European Standards.

Tramstops shall be compliant with amongst others:

- The requirements of the Tram Design Manual;
- Railway Safety Publication 2 – Guidance on Tramways, issued by the Office of the Rail Regulator;
- Disability Discrimination Act requirements;
- The outcome of consultation with the Mobility and Access Committee for Scotland (MACS);
- The Department for Transport Inclusive Mobility Guide to Best Practice on Access on Pedestrian and Transport Infrastructure; and
- The Building Regulations (Part M).

Reference should also be made to:

- Mobility-impaired access and egress to and from each platform, the minimum width of ramps provided on the Edinburgh Tram Network System shall be 2.0m between handrails;
- Ramps, if required, shall have a maximum gradient of 1 in 20;
- No ramp shall be longer than 10m without the incorporation of a landing;
- Landings shall be no shorter than the width of the ramp; and

- Mobility impaired tram access/egress points shall be clearly defined within the platform finish if required by the tram design and consistent with tram stopping tolerances.

Tramstops shall be of a design that ensures the mobility impaired are able to use them and all parts thereof without hindrance or confusion. All walking routes approaching or within the Tramstop area shall be clear of any form of obstruction.

Provision shall be made for those who require to use canes e.g. inclusion of tapping rails. Guardrails shall be provided with handrails.

Where appropriate, Tramstops shall be provided with handrails, balustrades, and general platform furniture, other than seating, of a design that inhibits their use as seating or as a climbing medium.

Tactile surfacing shall be provided as appropriate e.g. at platform edges, stairs or ramps (if applicable), and at dropped kerbs.

25.3.2 Platform Surface

The general platform surface shall be in accordance with the Tram Design Manual and will vary dependant upon location, but in all instances provision shall be made for tactile strips (400mm wide) to assist the visually impaired along the platform edge. The platform edge shall have a suitable 65mm wide delineation of the white or alternative inset line to the leading edge of the line-side coping, or other equivalent visual feature.

Disabled boarding points shall be indicated, if required, by use of tactile material indicating the position of the relevant tram doors.

Platform surfaces shall have a nominal cross fall away from the platform edge of 1:40 to a slot drainage system. Platform drainage will be dependant upon local topographical criteria.

The platform top surfaces shall be slip resistant and durable. Transition zones shall be provided, free of trip hazards, which can be clearly differentiated by those who are visually impaired.

25.3.3 Tramstop Furniture and Equipment

All Tramstop furniture and equipment on the platforms shall be constructed of materials and finishes that are resistant to scratching and ensure the easy removal of graffiti.

Emphasis shall be given to the reduction of 'clutter' and where possible elements shall be combined to provide a dual functionality.

The Tramstop furniture and equipment shall be designed to allow easy replacement of damaged components without affecting equipment, lighting and seating.

Tramstop furniture and equipment shall be designed to support the passenger service without maintenance intervention that results in any form of disruption to the service during service hours. The equipment provided at each location shall be appropriate to that location to limit any unnecessary clutter at Tramstops.

Tramstop furniture and equipment shall be of a modular design based around simple geometric shapes and of modular construction to enable their rapid replacement.

Components and materials shall be of a quality suitable for use in a densely populated and marine environment.

The design of the Tramstop furniture and equipment shall ensure that minor inspection, repairs and maintenance, including lamp replacement, can be carried out during the operational day with the minimum of disruption to passengers, and without disruption to passenger services.

25.4 Description of Tramstop and Street Furniture

25.4.1 General

Each Tramstop shall include the following components:

- Passenger Shelter / Canopied Waiting Area;
- Passenger Help Point;
- Passenger Emergency Call Point;
- Closed Circuit Television Cameras;
- Real Time Passenger Information Display Bus Tracker Reporting (where identified);
- Braille assistance;

- Public Address;
- Information Panel;
- System Logo and Stop Name;
- A perch rail/seat; and
- Advertising panel (6 sheet) - if permitted by Planning Authority;
- Ticket Vending Machines;
- Lighting;
- Litter bins.

Equipment placed on platforms shall not prohibit passengers from having a clear view of an arriving tram.

25.4.2 Shelters and Canopied Waiting Areas

Each platform shall contain facilities to provide passengers with weather protection (e.g., wind, snow and rain) in the form of a canopy or shelter designed and constructed to provide maximum visual transparency with minimum visual impact, consistent with offering the required protection.

Tramstop shelters shall be of a modular design based around simple geometric shapes, providing the necessary requirements for passenger use and comfort. A clear uninhibited view of arriving trams shall be available to passengers from within the shelter area.

Tramstop shelters shall permit future easy alteration to the capacity in terms of volume of passengers and equipment to meet emerging needs.

Lighting within the shelter shall provide a minimum of 50 Lux evenly distributed (controlled by sensor).

All shelters shall be provided with adequate drainage facilities to ensure all rainwater is carried away into the Tramstop drainage system.

Side infill panels together with back panels shall be of toughened transparent glass to provide a light visual appearance and with the Roof panel of complementary quality to provide passengers with protection from the weather. The design shall be such that it provides a safe environment for passengers in the event that glass panels are missing from the shelter as a result of breakage. The design of the shelter shall also take account of access requirements for maintenance and repair purposes.

Side panels shall provide sufficient depth to give weather protection but not obstruct the safe use of the Passenger Emergency Call and Help Points and shall meet the requirements of the visually impaired.

Shelter roofs shall be profiled to prevent build up of litter / debris on the top surface. The shelter structure, roof and wall panels shall, as far as is possible, be made from proprietary components in order to facilitate ease of replacement and repair.

25.4.3 Tramstop Lighting Columns

Platforms shall be provided with a minimum illumination level of 30 Lux.

Lighting shall be low energy, avoid glare to tram drivers and road users, have good colour rendition and be provided throughout the whole of the area occupied by the Tramstop.

The Tramstop lighting shall differ from the adjacent urban and or city lighting and shall emphasise the presence of the Tramstop to enable passengers to identify the Tramstop from a distance. Consideration should be given to the requirement to make use of local ambient lighting (which may need to be enhanced) to avoid additional clutter at the Tramstop.

Access routes to the stops shall, wherever practical, use existing street lighting as the sole or primary means of illumination. Where this is not possible then lighting of a similar level to the local road lighting shall be provided.

All platform shelter / canopy lighting shall enhance security in the waiting area.

Tramstop lighting shall not conflict with the requirements for Closed Circuit Television coverage and shall permit the attachment of other stop furniture or equipments as required.

Hinged columns, hinging parallel to the track, shall be provided for ease of maintenance.

Tramstop emergency lighting facilities shall be provided in all shelters where the adjacent road lighting would be inadequate in the event of a Tramstop power supply failure.

25.4.4 Tramstop Name Signs

Each Tramstop shall include an illuminated pole mounted Logo, or more than one if there are more than one access points from a public road, or a sign incorporating the Edinburgh Tram Network corporate identity visible from a distance of 50m.

Each Tramstop shall be provided with Tramstop name signage as part of the general furniture arrangement on each platform.

Tramstop name signs shall be legible to tram-borne passengers as early as possible on their approach to the platform.

An appropriate number of stand-alone Tramstop name signs shall be provided along the length of each platform. The construction and materials shall form part of the "family" of components forming the Tramstop furniture.

The Tramstop name sign support structures shall be incorporated within the line of any guardrails, should these be provided, and into the advertising / information display.

The Tramstop name signs and Logo shall be illuminated and shall be displayed on the tram arrival side of the shelter as well as along the platform.

25.4.5 Advertising / Information Signs and Displays

A Real Time Passenger Information Display (double sided) shall be provided at each platform.

This shall take the form of a dynamic multi line visual display which is legible in all weather conditions to passengers having normal vision and standing at a distance of 10.0m away.

The Real Time Passenger Information Display shall comply with the requirements described in the Employer's Requirements.

Passenger information regarding the tram service and safety notices shall be provided at all Tramstops in both writing and Braille.

All passenger-operated equipment shall be provided with clear unambiguous operating instructions in both writing and Braille.

A suitably enclosed weatherproof map (part of the Tramstop furniture) of the local area, bearing the words 'You are Here', shall be located in each platform shelter.

A suitably enclosed weatherproof information display or displays (indicating the locations of adjacent bus stops and bus related information, hospitals, local amenities and places of interest) shall also be located at each platform access/egress position.

At appropriate key interchange locations (refer to 35.4.1 - Overview to the Passenger Information Display System), provision shall be made within the Tramstop layout to provide a bus tracker information panel, which shall be provided and installed by others.

25.4.6 Litter Bins

Litter bins, where provided, shall be stainless steel (Minimum Grade 304 to BS 5135) to facilitate easy cleaning and shall have a lockable removable bin liner.

The location of bins shall not obstruct the main passenger circulation routes and shall ensure convenience of use.

A minimum of two litter bins per platform shall be provided each positioned mid-point between the shelter and the end of the platforms.

Lockable access covers shall be provided and the bins shall be designed to limit entry and retention of liquids.

The bin size shall be determined on the basis of a single collection per day.

25.4.7 Public Address

Speakers shall be provided at each lighting pole location and within the shelter to enable passengers to receive messages without volume settings being high and causing nuisance outside the area of the platform.

Induction loops shall be provided within the central area around the shelter position.

Further details of the public address system are contained in Section 35.13.2 – Workstation Capabilities.

25.4.8 Tramstop CCTV

Closed Circuit Television (pan, tilt and zoom) digital colour cameras shall be provided on each platform to enable colour pictures to be displayed at the Control Centre and other Closed Circuit Television monitoring authorities.

The canopies / shelters, stop lighting and publicity / information displays shall not inhibit the Closed Circuit Television coverage of the Tramstop or platform.

The total number of cameras on each Tramstop shall be dictated by the physical restraints associated with each individual Tramstop, however, a minimum of one per platform shall be provided.

25.4.9 Passenger Help Points and Passenger Emergency Help Points

Tramstops will be provided with one combined Passenger Help Point and one Passenger Emergency Help Point on each platform, providing two-way (duplex) audio communication between a person located on the platform and the operator located at the Control Centre.

The Passenger Help Points / Passenger Emergency Help Points detailed arrangements shall be in accordance with Section 35.13.2 – Workstation Capabilities.

25.4.10 Guardrails, Handrails and Cycle Racks

Platform guardrails shall be provided to the rear of any platform where there is a potentially dangerous interface with passing road vehicles, Network Rail or a significant change in level.

Splashguards shall be provided in vulnerable locations.

Where provided, guardrails shall be set at 1150mm above platform level and comply with the requirements for the mobility impaired.

Cycle parking frames will be provided at each Tramstop, where this is appropriate. These will be positioned within view of the Closed Circuit Television surveillance system.

25.4.11 Seating

Bench seats (with integral arm rests and perforated seating structure) shall be positioned on each platform and within each shelter a perch rail / seat shall be provided, designed to prevent the retention of liquids. In all instances the under seat space shall be open to meet security requirements.

25.4.12 Ticket Vending Machines (TVMs)

Ticket vending machines shall be located within or adjacent to the shelters. The TVMs shall be positioned in an appropriately shaded location to assist users in reading the machine's visual display. Ticket vending machines will be supplied to the Infraco, as free issue, by TEL.

Infraco shall make provision for the power and communication cable routes, cables and draw wires from the Tramstop equipment cabinet to the proposed ticket vending machine locations.

Sufficient spare ways within the power and equipment cabinet to accommodate ticket vending machines and a local ticket vending machine network connection will be provided. Further details regarding ticket vending machines can be obtained in 36.5 of these Employer's Requirements.

25.5 Electrical (LV) and Communication Facilities

All Tramstop electrical (LV) and communication equipment shall be accommodated within a Tramstop equipment cabinet. LV supplies shall be provided to the equipment cabinet from which local electrical supplies to Tramstop equipment will be fed.

A 230V, 13A or equivalent socket shall be provided within the Tramstop equipment cabinet.

A 110V supply shall be provided at a suitable location on each platform for cleaning purposes.

All power requirements for the Tramstop infrastructure and adjacent infrastructure equipment will be sourced from the local Distribution Network Organisation supply. All power supplies shall be adequately rated to support the requirements of the Tramstop equipment.

25.6 Layover Facilities

Layover facilities shall be provided in accordance with Section 2.15.

26 Track

This Section of the Employer's Requirements defines the Track requirements applicable to the Edinburgh Tram Network which the Infraco must comply with.

26.1 Track Layout

The Infraco shall ensure that the track layout shall be in accordance with ETN Diagram at Figures 2 & 3 – Edinburgh Tram Phases 1a and 1b Network Diagram

26.2 Components

Trackwork components to be provided shall include, but are not limited to, the following:

- Rails (relate to Wheel / Rail interface: N.B. inc. hardness related to welding repair);
- Sleepers and points and crossing bearers;
- Turnouts;
- Points and points motors;
- Points baseplates and slippers;
- Points rollers;
- Crossings;
- Check rails and check rail fastening systems;
- Guard rails and guard rail fastening systems;
- Transition rails;
- Rail joints (fishplated and welded);
- Insulated rail joints;
- Isolatable rail joints and provisions for access to associated rail/cable connections;

- Rail movement joints;
- Rail fastening systems;
- Rail pads;
- Baseplates;
- Resilient baseplate systems;
- Rail embedment for street running track;
- Paved trackbed and concrete trackbed systems;
- Grooved rail drainage systems (including boxes);
- Buffer stops and vehicle arrestor systems;
- Ballast;
- Granular filtering;
- Granular blanketing;
- Geotextile membranes;
- Plastics membranes;
- Geosynthetic reinforcement;
- Provision and installation of signs and markers; and
- Grasstrack.

26.3 General Requirements

Tracks shall be designed and constructed for left-hand running under line of sight operation.

The maximum design speed shall be 80 km/h.

Where the Edinburgh Tram Network runs within an urban environment on non-segregated sections of tramway, the speed limit shall be the same as that for motor vehicle traffic.

The trackforms shall be applied as indicated at the documents System wide trackform Surface Finishes Version 3 ULE90130-SW-DRG-00069.PDF, ULE90130-SW-DRG-00070.PDF and ULE90130-SW-DRG-00071.PDF

The track shall facilitate ease of construction and minimise disruption to other road users and the public during the construction phase on all roads and across all junctions between Haymarket and Ocean Terminal via Princes Street.

The track shall minimise the potential for stray current and be in accordance with the requirements and codes of practice for stray current and the **tie** Earthing and Bonding Policy document. As the valid standard the EN 50122 shall be in force.

Ensure simplicity of overall maintenance and ease of rail replacement and relaying, minimising the disruption to other road users.

The track shall comply with the operational noise and vibration requirements as stated in the **tie** Noise and Vibration Policy. Detailed technical solutions will be determined during the Detailed Design Phase for areas identified as sensitive to Noise and Vibration. The assessment of these solutions shall be in line with the characteristics of the vehicles, the existing sub-structure and the structures adjacent to the track-bed.

The track shall integrate fully with roads, such that differences in roads surfaces, specifically finished levels and skid resistance, are minimised as far as is reasonably practicable.

The track shall integrate fully with surrounding area functionality and appearance, to ensure that hazards to pedestrians, the mobility impaired and cycle users are minimised as far as is reasonably practicable, and such that track surface finishes are in accordance with all design requirements, guidance and aspirations.

Adequate track formation shall be provided to facilitate the secure foundation for track installation.

The in-street track formation shall be of shallow design such that it permits minimum amount of public utility diversions and aids the high speed construction of the tramway.

The surface at pedestrian crossing points shall be level with the top of the running rails and surfaced in non-slip materials. These materials shall be chosen to be reasonably consistent with the character of the locality whilst providing clear indication to all users (including the visually impaired) of the correct point to cross the track and the extent of the Edinburgh Tram Network environment.

Track shall be a standard tramway track with steel rails set to Standard Gauge (1.435m) and shall be compatible with the Edinburgh Tram Network trams.

On ballasted sections of the route, road/rail equipment will be used for maintenance tasks such as tamping. These machines shall be equipped with suitably profiled wheels.

26.4 DKE, Structure Gauge and Clearances

The DKE adopted shall be the "Assumed Tram for Design", as presently defined in the SDS design documents.

Structure gauge and clearance drawings shall include the standards for staff maintenance walkways and tram evacuation walkways.

Adequate walkways are required throughout the route off-street. Appropriate signing shall be included to indicate the walkway.

26.5 Trackforms

Various trackforms, as presently shown in the SDS design documents, are required to suit the different domains in which the track lies along the route and in the Depot and sidings. The different trackforms provided shall comprise, but not necessarily be limited to:

- Flush-finished track in road areas and at Tramstops, including mixed operation with traffic of various kinds, or not; and with a variety of surface finishes;
- Track with grass flush finish;
- Track with plain concrete flush finish (e.g. in the depot and for certain structures, e.g. the A8 Underpass);
- Direct fixation track on structures;
- Ballasted track; and

- Special trackforms in the depot or at Tramstops.

The trackforms shall be designed and installed to take full account of the requirements for future maintenance of components, e.g. life-extension of rails by welding in situ, and the adjustment of the levels of rails and the adjacent surfaces, and of sectional renewal.

26.6 Specific Technical Requirements

Retention of alignment on small radius curves in the case of ballasted track where rails are continuously welded shall be considered. A minimum radius shall be established for the application of ballasted track, with an appropriate alternative trackform applied elsewhere.

For in-street track construction, and in the absence of sleepers or similar, a means of retaining the lateral and rotational position, such as tie-bars of the rail together with the track gauge shall be provided.

A standard trackform shall be provided which shall comprise a slab that shall be suitable for any of the road, pavior / block / sett and grass surface finishes. In effect the surface finishes shall be interchangeable without having necessarily to redesign or reconstruct the whole slab.

A special track form shall be used at sensitive locations to mitigate against ground borne noise and vibration. These locations will be identified by the Infraco in agreement with tie.

At the end of all terminating tracks, provision shall be made for a device for arresting Trams. These devices may include sliding friction or fixed type buffer stops, sand drags, architectural features such as planters, wheels stops or other means. The choice of such device(s) shall be made through risk analysis of the location, taking into account the risk to passengers, pedestrians and staff and to the vehicles and surrounding environment.

Rail shall be continuously welded wherever possible. The use of fish-plated joints shall be avoided although fishplated track may be proposed in the Depot to avoid the requirement for rail movement joints at turnouts.

26.7 The Wheel / Rail Interface

A report has been produced by SDS (ref: ULE 90130-SW-REP-00130 v3) which shall form the basis of development of this critical interface. The key factors will be recorded here.

26.8 Drainage

Drainage from trackwork shall be interfaced with the road and civils drainage systems. Adequate drainage within the trackwork system shall be provided such that the integrity of the installations is secure.

The Edinburgh Tram Network shall have a drainage system that, as a minimum, achieves accepted EU or BS standards and Good Industry Practice.

The drainage of all new bridge structures shall be positive and, unless otherwise required by the relevant local authority, all surface water shall be piped to the local storm water sewer systems by a defined drainage path.

Particular attention shall be paid to ensure that surface water drainage systems in the vicinity of traction substations and cable ducts are routed to avoid any risk of flooding of electrical equipment areas, point machine chambers, and the ducts themselves.

For on-street track, the track drainage system shall incorporate an insulated break from the storm water system.

Drainage proposals including any new flows into existing drains and the method of connection shall be approved by Scottish Water, SEPA and the City of Edinburgh Council Roads Department as appropriate.

26.9 Technical Requirements for Points and Crossings

All turnouts, crossings and interruptions to the continuity of the rail head shall be equipped with flange running sections or other design which minimises joint noise.

The design shall minimise flange squeal through tight radii and through junctions.

Points shall be provided with two movable blades so mounted to allow the use of magnetic track brakes and their safe passage through the point and crossing.

All points shall be freely trailable without damage to the blades or mechanism.

Points and crossings shall be designed so that they are capable of through stressing as required.

All points on the main line, likely at some time or another to be taken in the facing direction (including trailing, emergency crossovers), shall be equipped with detection and indication. Indication of trailing points likely to be taken at high speed shall be considered.

All points, when operated by hand lever, shall be capable of being thrown fully, by one throw of the lever, by a male or female person of slight build, without undue effort or strain. To this end, the maximum required effort to change the points shall not normally exceed 230Nm.

Some form of indication shall be incorporated into the mechanism to indicate that the point has thrown fully. Lever mechanisms requiring repeated operation to throw the points are not acceptable.

Efforts should be made to reduce friction and the effort to throw the points. Flange relief of the point tongues is one such feature.

Point tongue profiles and movement on all points shall conform to the same dimensions and tolerances.

Design tolerances shall be maintained in service with a relatively low level of attention.

Designs with potential for high wear rates or other high maintenance features are not acceptable.

Designs with the potential for lengthy infrastructure replacement periods are not acceptable, particularly in on-street areas.

Adequate, functional drainage must be provided to ensure that rail grooves and point machine pits are kept clear of rainwater, sand and rubbish from the street etc.

Pointwork in the depot site area shall be installed in a flush-finished trackform for 9 turnouts and 1 crossing at the beginning of the depot area. This flush-finished trackform will be designed for re-railing purposes only.

26.10 Technical Requirements for Point Operation

26.10.1 Point Machines and Mechanisms in General

All point machines, whether powered or not, shall be from the same family of machines and provided by the same supplier.

Point machines shall allow the points to be 'freely' trailable without damage to the blades or mechanism.

In street running track, point machines shall be installed between the rails of the track.

On ballasted track, in order to facilitate maintenance, they shall be installed to the side of the track, on the outside of a typical two track layout.

Point machines shall be capable of manual operation in a single throw by tram drivers using a removable point bar to be carried in the Tram drivers cab. Only one form of point bar shall be utilised on the system.

It shall be possible for the points to be changed by a male or female person of slight build, without undue effort or strain when the points are not affected by snow or ice. To this end, the maximum required effort to change the points shall not normally exceed 230Nm.

When operated by hand using the standard points operating bar, it shall not be possible to inadvertently partially throw the points, which shall always throw sufficiently to make the respective detection circuits at each lie of the points with a single movement of the lever.

A total number of 70 point operating bars shall be supplied.

All combinations of points and point machines shall be validated to demonstrate that:

- The machines shall exert sufficient force under all foreseeable circumstances to move the points blade into the required position;
- The points shall close and lock reliably under all foreseeable operating conditions;
- Detection settings shall have adequate maintenance tolerances to ensure that points detection setting testing shall be required no more than monthly on all points;
- The wheel/rail interface at the toes of the points shall be such that there is no derailment risk under all combinations of wheel wear, rail wear, and detection settings;
- Any tram driver shall be able to operate all points safely and without risk of injury; and

The enclosing case of the Point Machine shall be to Class IP 67 and be drained.

Point Machines shall not be overstressed in performing its duty. Efforts should be made to minimise friction and the effort to throw the points. Flange relief of the point tongues is one such feature and there are others such as PTFE slides and supporting rollers.

The flangeway in advance of the point tips shall not be less than 41mm. It shall be consistent with the wheel/rail interface report.

The amount by which nominally 'closed' point tongues may be open at their tips whilst still providing detection, shall be agreed as a part of the wheel/rail interface criteria.

Each Point Machine shall be clearly identified and robustly labelled.

Point Machines of all types and their drive and detector rods shall be insulated from the running rails and from the surrounding earth. Separate earthing connections for the drive motor (where fitted) and the machine case shall be provided.

Point Machines of all types shall normally not require maintenance more frequently than at three-monthly intervals although inspection may be carried out more frequently.

All Point Mechanisms shall incorporate at least one volt-free change-over contact in both the 'Normal' and 'Reverse' positions, in addition to those required for detection purposes.

In the case of Point Machines incorporating an over-centre device, it shall not be possible for the machine to be set in the 'null' position during powered or sprung operation, as applicable.

26.10.2 Specific Requirements for Motorised Point Machines

The Point Machines will operate from a 230Vac supply.

The Point Machine shall be capable of operating the two point tongues for the full throw required to provide the standard 'blades open' gap, to clear the backs of the flanges of the wheels. However, the throw shall not be so great as to flex the tongues further than necessary, thereby introducing unnecessary stress in the track components and load on the operating machine mechanism. This dimension 50mm,+5/-0mm will be finalised after the wheelset profile has been determined and the Wheel-Rail Interface Report has been finalised in the Detailed Design Phase.

26.10.3 Specific Requirements for Sprung Point Mechanisms

The Spring Point Mechanism shall be capable of being biased to effect a route to either lie of the points. The mechanism shall normally set the points in their 'Normal' position but by adjustment, they shall be capable of being set in the 'Reverse' position.

In both cases, it shall be possible to change the lie of the points using the standard points operating bar with an effort not exceeding 230Nm.

Only the incursion of a foreign body in the space between the point tongue and the stock rail shall prevent a satisfactory change in the lie of the points.

The lie of the points shall be continuously maintained in the 'Normal' (or if adjusted, 'Reverse') position by adequate spring pressure.

After having been forced across by the passage of a tram, the mechanism shall positively return the points to the 'Normal' position and provide the standard 'blades open' gap, to clear the backs of the flanges of the wheels.

If possible, by the rearrangement of components, the Spring Point Mechanism shall be convertible into a Bistable Point Mechanism for the avoidance of spares duplication.

26.10.4 Specific Requirements for Bistable (flip-flop) Point Mechanisms

The Bistable Point Mechanism shall be capable of being biased to effect a trailing route through either lie of the points, by use of a standard points operating bar. The mechanism shall normally retain the points in the position last trailed. However, by operation using the approved points operating bar, they shall be capable of being set in the alternative position.

Only the incursion of a foreign body in the space between the point tongue and the stock rail shall prevent a satisfactory change in the lie of the points.

The lie of the points will be continuously maintained in the position last trailed by adequate spring pressure.

After having been forced across by the passage of a tram, the mechanism shall positively leave both blades of the points held firmly across with the 'closed' point against the stock rail and provide the required 'blades open' gap, to clear the backs of the flanges of the wheels on the other side.

The amount by which nominally 'closed' point tongues may be open at their tips shall be within the same tolerances specified for points operated by powered Point Machines.

If possible, by the rearrangement of components, the Bistable Point Mechanism shall be convertible into a Spring Point Mechanism for the avoidance of spares duplication.

26.10.5 Specific Requirements for Hand-Operated Point Mechanisms (Point Levers)

Points operated by Hand-Operated Point Mechanisms shall normally be traversed in the facing direction subject to a 10 km/h track speed limit.

One throw of the lever shall fully throw the points to either 'Normal or 'Reverse' positions. Levers which require one or more attempts to complete the operation are not acceptable.

It shall not be possible to inadvertently partially throw the points, which shall always throw sufficiently to allow the respective 'points thrown' indication at each lie of the points to be given with a single movement of the lever.

Only the incursion of a foreign body in the space between the point tongue and the stock rail shall prevent a satisfactory change in the lie of the points.

After having been thrown, the mechanism shall positively leave both blades of the points held firmly across with the 'closed' point against the stock rail and provide the required 'blades open' gap to clear the backs of the flanges of the wheels on the other side.

The amount, by which nominally 'closed' point tongues may be open at their tips, shall be within the same tolerances specified for points operated by powered Point Machines.

26.11 Technical Requirements for Point Control and Indication

26.11.1 Detection

Where detection and indication is required, the mechanism shall be fitted with detection equipment capable of differentiating between a 'safe' and 'unsafe' gap. When closed, the detectors must be capable of detecting a minimum gap of 1.5mm although the 'unsafe' gap detection including a safety margin will be slightly greater than this at 2.5mm, +0/-0.5mm between the closed point tongue and the corresponding stock rail at each lie of the points. To be confirmed with wheel/rail interface criteria.

Each point tongue shall be independently detected through a separate mechanical connection to the point tongues, independent of the drive rod connection and as close as practicable to the tip of the tongue. Totally enclosed proximity switches are preferred for this duty.

26.11.2 Control

The Point Controller shall receive information from the Tram Position and Detection System (TPDS) and set the Points and Point Indicators and shall be driven by the output from the point detection.

The Point Controller shall acknowledge the requests from TPDS and make all the necessary safety checks before commanding the point machine to move the points.

When the Point Controller causes the Point Machines to change the points, it shall monitor the detection contacts in the associated Point Machine(s) to determine whether the points have fully thrown.

Once the points have been satisfactorily operated (i.e. been fully thrown), the Point Indicator shall show a sloping row of lights (or LED clusters), corresponding to the lie of the point to approaching trams. If the points have not fully thrown, a horizontal row of lights (or LED clusters) shall be displayed.

If an appropriate command has been set by personnel in the Control Centre, the Point Controller shall block any associated points requested by the tram on-board computer from its route code.

The Point Controller shall report to the adjacent Tram Position and Detection System and or SCADA when any of the following conditions apply:

- Failure of the Point Machine supply;
- Failure of the Point Indicator supply;
- Receipt of an indication of faulty point detection; and
- Failure of the Point Heaters supply.

When the relevant track circuits or mass detectors detect the presence of a tram in a prescribed area, the Point Controller will lock the points against any further signals to change them until the tram has left the prescribed area.

The Point Controller shall also afford the facility to set and control the associated points locally.

26.11.3 Indication

The lie of the points shall be indicated to trams approaching the toe of the points in a facing direction. Indication of trailing points likely to be taken at high speed shall also be considered. The specific requirements at each location are defined on the track layout diagram.

The basic technology and design of the point indicator shall be same as the tram signals. The colour shall not be white, red or green.

Point indicators shall exhibit the following standard aspects to drivers:

- Points set to left hand route: diagonal row of lights sloping upwards towards the left;
- Points set to right hand route: diagonal row of lights sloping upwards towards the right; and
- Points not detected: horizontal bar

The indicator shall be placed for visibility to the tram driver in the same basis as tram signals.

The means of illumination shall be by LEDs.

A minimum of five clusters in each row shall be provided.

All Point Indicators shall be located in agreement with the Operator and shall be co-located where relevant with tramway signals.

Each Point Indicator shall be clearly identified and robustly labelled.

The aspect shall be clearly visible in all weather conditions.

The Point Indicators shall normally not require maintenance more frequently than at three-monthly intervals although inspection may be carried out more frequently.

26.11.4 Control Cabinet

Controls to set and control the associated points locally shall be provided in a cabinet. These shall be operable while the relevant points are in direct view of the person operating them.

The Point Controller cabinet shall contain the power supply for the operation of the associated points and to all associated Point Indicators.

The Point Controller cabinet shall contain and control with an input from the SCADA system, the power supply to the point heaters mounted on the associated points.

The Point Controller shall not require maintenance more frequently than at six-monthly intervals although inspection may be carried out more frequently.

26.12 Indication of Hand Operated Point Mechanisms (Point Levers)

The lie of the points shall be indicated to trams approaching the toe of the points in a facing direction.

Upon the operating lever being thrown, a simple mechanical device will detect that the closing point tongue has closed to within the permitted tolerances specified above.

Detection of the fully thrown condition shall cause a mechanical indicator to display a corresponding indication to the tram driver. The indicator shall present an indication equivalent to that shown on lit indicators and be visible from the normal tram driver's operating position in the cab, when the tram is 5 metres to the rear of the point tips, in daylight and illuminated by the tram's headlights after dark. Failure to close the tongue to within this tolerance shall not allow the indicator to show a 'points thrown' indication. Both point tongues shall be detected, either individually or as a coupled pair.

26.13 Technical Requirements for Points Heating

Points heating systems will allow the efficient operation of points in low temperatures and shall be such that the components will not intrude into the surrounding infrastructure.

Points heating shall be electrically powered and shall be controlled automatically by sensing when the predefined temperatures for activation and deactivation have been reached.

Point Heating devices shall provide health status information via the SCADA to the Control Centre.

Point Heaters shall be capable of being manually activated and/or deactivated locally and from the Control Centre.

The locations at which point heating shall be provided will be agreed and shown on the track layout diagram.

Where more than one heater is controlled from a Point Controller, it shall energise each of them in sequence in order to limit the inrush current demanded.

The Point Controller shall monitor the local ambient temperature and humidity and control the supply to the point heaters accordingly.

The settings at which the point heaters are energised shall be adjustable within the limits of 0°C to + 5°C.

26.14 Tolerances

The following definition of construction and maintenance tolerances shall be developed and agreed between Infraco and **tie**.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Speed	Shared running	Maximum	kph		**50**	**50**	**50**
Speed	Segregated running	Maximum	kph		**80**	**80**	**80**
Speed	Depot	Maximum	kph		**15**	**15**	**20**

Table 62 - Speed assumptions and normal limitations

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Geometric element	Minimum length		m		**15**	**12**	**6**

Table 63 - Geometric Elements - Element lengths are tied to the tram length, specifically distance between bogies

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Horizontal radius - Minimum	Running lines	Slab track	m		50	30	25
Horizontal radius - Minimum	Depot lines		m		50	40	20
Horizontal radius curves	Distance between opposite flexure	Radii dependant - no transition curves	m	Considered minima dependant upon tram data	15	10	6

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Horizontal radius curves	Distance between opposite flexure	With transitions on adjacent opposite flexure curves	m	Exceptional to be considered individually (also refer wheelbase)	10	8	6
Horizontal radius curves	Distance between curves of opposite flexure	Turnouts - theoretical tangent points at switch toe to next tangent pt (of opposite flexure)	m	Considered minimums dependant upon tram data (wheelbase)	10	8	6
Horizontal radius curves	Distance between curves of opposite flexure	Turnouts - theoretical tan.pt. at switch toe to tan.pt. (of similar flexure)	m	Considered minimums dependant upon tram data (bogie axle ctrs)	5	3	2
Horizontal radius curves	Tramstops		m	Absolute minimums	Infinity	2000	1000

Table 64 - Horizontal Curves: Minimum requirements for horizontal curves including distances between similar and opposite flexure. Similar requirements also for horizontal curvature up to turnouts and through Tramstops.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Cant	Platforms		mm		0	0	0
Cant	Tangent track	Facilitate drainage	mm		0	15	15
Cant	Fixed Obtuse crossings		mm		0	15	30
Cant	Curves		mm	Subject to Tram	75	75	100
Cant	Plain line track – depot		mm		0	0	15

Table 65 – Cant: Maximum cant values

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Negative cant	Plain line		mm		0	15	15
Negative cant	Turnouts	Turnouts - when turnout is facing downhill on a grade	mm		0	0	15
Negative cant	Turnouts	Turnouts and acute diamond crossings	mm		0	0	15
Negative cant	Turnouts	Obtuse crossings in diamonds	mm		0	0	0

Table 66 - Negative Cant: Maximum allowable values which are particularly important with regard to turnouts and obtuse crossings.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Cant excess			mm	Subject to Tram	0	25	50

Table 67 - Cant Excess - Normally applied where slow speed running may be encountered, but does have some bearing in this concept.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Cant deficiency	Plain line		mm	Maximum	40	60	75
Cant deficiency	Plain line - Depot		mm		40	75	100
Cant deficiency	Through route of turnout	On tangent or curved track	mm		0	40	60
Cant deficiency	Turnout route		mm		40	60	75
Cant deficiency	Based on theoretical radius at switch toe	Cant deficiency based on theoretical radius formed by shortest wheel-base placed centrally at switch toe	mm		40	40	50
Cant deficiency - jerk	At switch toes Consider shortest wheelbase	Maximum permitted jerk rate at switch toes using theoretical radius formed by shortest wheel-base	m/s3	jerk = 0.2 m/s3	0.3	0.4	0.5
Cant deficiency - jerk	Plain line Consider shortest wheelbase	Maximum permitted jerk rate as a result of the geometry change and shortest wheel-base	m/s3		0.25	0.35	0.45

Table 68 - Cant Deficiency: Deficiency at the switch toe will require careful consideration, effectively setting speed restrictions. Particular impact on the criteria will be to assess jerk with reference to the shortest wheelbase.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Transition curves	Virtual Transition	Length basis	m	Subject to Tram	No use	1.8	1.8
Transition curves	Clothoid	Minimum length	m	Subject to Tram	15	10	6

Table 69 - Transition Curves - Dimensional requirements with some relationship to the tram dimensions

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Cant gradient	Cant gradient - Maximum permitted	RoCC may be overwritten by other minimums		Consider RoCC	RoCC	600	300
Cant gradient	Cant gradient - Minimum permitted				1500	2000	3000
Cant gradient	Switch toes				0	0	0
Cant gradient	Crossings and diamonds				0	0	0

Table 70 - Cant Gradient: Permitted maximums which, in effect, define twist parameters (dealt with later). Note: All the following apply only in the cases of applied cant on track on zero grade. For track on a grade or a vertical curve, where a twist in the track will arise from a horizontal curve, the maximum gradient that arises from applied cant must be less than the following limits (i.e. one in (value greater than following limits)) because an element of effective cant gradient will result from the combinations of horizontal curve and grade / vertical curve. In the latter cases the gradients that arise from applied cant are governed by the overall twist limits which are specified in table 78 below.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Rates of change – cant		Rate of change of cant	mm/s	Subject to Tram	35	55	68
Rates of change - cant def		Rate of change of cant deficiency - plain line	mm/s	Subject to Tram	35	55	68
Rates of change - cant def		Rate of change of cant deficiency - S&C	mm/s	Subject to Tram	35	55	80

Table 71 - Rates of change of cant (RoCC) & Rates of change of cant deficiency (RoCCD) - Rate of change in lateral acceleration.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Vertical alignment	Sag	Vertical curve radius - minimum	m	Subject to Tram	1000	625	500
Vertical alignment	Hog	Vertical curve radius - minimum	m	Subject to Tram	1000	625	500
Vertical alignment	Vertical acceleration		% of g		2	2	4
Vertical alignment	Turnouts and diamonds	Vertical curve radius. Proximity of vertical curve tangent point to switch toe and crossing of turnouts and diamonds.	m		15	10	6
Vertical alignment	Advance sws - xng & sws	Vertical curve radius	m		0	0	0
Vertical alignment		Minimum curve element length	m		20	15	10

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Vertical alignment	Instantaeneous change in grade		%		None	0.1	0.2
Vertical alignment	Grade distance between adjacent curves (similar flexure)	Preferred situation	m		None	None	None
Vertical alignment	Grade distance between vertical curves of opposite flexure	With combined average radius ***less than*** 3125m	m		15	10	6
Vertical alignment	Grade distance between vertical curves of opposite flexure	With combined average radius ***greater than*** 3125m.	m		15	10	0

Table 72 - Vertical Alignment - Some elements require consideration from the tram supplier, others refer again to element lengths

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Vertical geometry	Tramstops	Radius through tramstops (without exceeding gradient criteria)	m		Infinity	2000	1000

Table 73 - Vertical Geometry: Tramstop requirements

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Gradients			%		5.0	6.7	8.0
Gradients	Tramstops		%		1.0	2.0	2.5

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Gradients	Stabling	Maximum – includes locations where tram driver is routinely required to leave driving position	%		0.0	0.1	0.2
Gradients	Turnouts and junctions	Dependant upon twist and negative cant	%		0.2	3.0	6.5

Table 74 – Gradients: Maximum gradients in various locations

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Twist (as part of the design)	Short wave (over bogies)		$^0/_{00}$	Subject to Tram	1.5	2.0	3.3
Twist (as part of the design)	Long wave over length of vehicle	Project Tram geometric capability 10m @ 3mm $^0/_{00}$ + 10mm – i.e. 30+10 = 40 (or 4 $^0/_{00}$)	$^0/_{00}$	Subject to Tram	1.5	2.0	3.3

Table 75 - Twist

The above represents the limits on the overall twist in the track that is a summation of: any gradient arising from applied cant; effective combinations of horizontal curves and grades / vertical curves; and other twisting effects (e.g. resulting from induced crossfalls for road drainage).

Twist is introduced into the track whenever cant is applied and when track with zero cross-level has a combination of horizontal curvature and vertical curvature or gradient.

Such geometry creates a twist, which has to be negotiated by the tram vehicle. Clearly the tram has to be capable of handling such geometric situations. Certain manufacturers may define these criteria in their own way, an interpretation of which is indicated below.

Twist in the long wave is measured over the wheelbase (bogie centres); short wave being measured over the axle centres of the bogie. Short wave twist also leads to wheel un-loading, not, as yet, defined here.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Vert / Horiz alignment	Horizontal radius - 25	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	1600	1200	1000
Vert / Horiz alignment	Horizontal radius - 30	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	1333	1000	833
Vert / Horiz alignment	Horizontal radius - 40	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	1000	750	625
Vert / Horiz alignment	Horizontal radius - 50	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	800	600	500
Vert / Horiz alignment	Horizontal radius - 60	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	667	500	n/a
Vert / Horiz alignment	Horizontal radius - 80	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	500	n/a	n/a

Table 76 - Vertical/horizontal alignment combinations

Taking the comments above regarding twist, it can be seen the certain combinations of vertical and horizontal alignment can cause undesirable geometric situations. The tables below define, using a simple product rule, the limitations.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Track spacing	Plus allowance for DKE	Double track main line - track centres - side poles	mm	- 3100			
Track spacing	Plus allowance for DKE	Double track main line - track centres - centre poles	mm	- 3600			
Track spacing	Plus allowance for DKE	Depot tracks and sidings - track centres		TBA Subject to Tram			
Track spacing	Plus allowance for DKE	Depot tracks and sidings - track centres - working space		TBA Subject to Tram			

Table 77 - Track Spacing. Note: straight track on radii larger than 350 metres on fixed non-ballasted trackform

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Gauge	Track gauge				1435	1435	1435
Gauge	Track gauge widening				0	0	0
Gauge	Track gauge-flange-running			TBA Subject to Tram			
Gauge	Check flangeway			TBA Subject to Tram			

Table 78 – Gauge: Standard data that requires further review/approval

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Rail inclination		Inclination - Vertical street grooved rail		TBA			
Rail inclination		Inclination - Non grooved rail		TBA Subject to Tram			

Table 79 - Rail Inclination

27 Roads and Utilities

This Section of the Employer's Requirements defines the roads and utilities requirements applicable to the Edinburgh Tram Network with which the Infraco must comply.

27.1 General

The roads works and utilities shall consist of all the necessary road works and associated accommodation works required to fully integrate the Edinburgh Tram Network into the urban road environment, including those relevant areas that are not trafficked.

The road works, utilities and associated accommodation works shall be provided in accordance with the Design Manual for Roads and Bridges (DMRB), except as amended by the requirements of, or otherwise agreed with, the relevant authority including where such requirements are more onerous.

The roads and utility works shall include but not be limited to the following:

- Road and junctions (including all necessary off-alignment works);
- Site clearance;
- Safety barriers and fencing;
- Drainage works including track drainage;
- Earthworks;
- Surfacing;
- Road lighting;
- Traffic signage and road markings;
- Traffic signals and tram signals;
- Landscaping;
- Temporary and permanent traffic measures;
- All associated cable ducting required for the works;

- Depot access and utilities, including within the Depot;

- Utility diversion works where not carried out by MUDFA; and
- Removal of all redundant services and apparatus affecting the works.

The works shall take account of MUDFA.

27.2 System-Wide Requirements

The tram network shall be segregated from the road wherever feasible using a variety of means as appropriate to the features and constraints of the individual locations. These include the use of road markings and varying surface types for visual or textural delineation. The design of the segregation details shall optimise their effectiveness without significantly compromising safety and operational factors, including the operation of junctions and emergency and maintenance access.

27.3 General Requirements

All works shall be carried out in accordance with the provisions of the Tram Legislation. All works on adopted roads shall be to a standard to allow subsequent re- adoption by the Roads Authority.

Wide-area modelling of traffic impacts consequent to the design shall be provided as a pre-requisite to approval, and prior agreement with the City of Edinburgh Council on the Traffic Regulation Orders and Temporary Traffic Regulation Orders necessary to implement the design and complete the works.

In addition to roads that have been adopted by the Roads Authority, the route for the tramway also uses roads that are currently in private ownership. In all cases the owners of private roads shall be consulted and their input and approval sought during the design process. Road works within these areas shall be to the same standard as that used for the roads adopted by City of Edinburgh Council (similarly, new and extended roads shall follow the same process). Where third parties are affected by a new or extended road their inputs and approvals where necessary shall be sought during the consultation process.

27.4 Stray Current

Refer to Stray Current of these Employer's Requirements at section 32.

27.5 Roads

27.5.1 General

The general requirements for the design of the roadworks shall meet the relevant Standards set out in Section 3.6 of these Employer's Requirements with emphasis on the following:

- Design Manual for Roads and Bridges (DfT);
- City Development Transport – Development Quality Handbook – Movement and Development (CEC);
- Edinburgh Standards for Streets (CEC); and
- Tram Design Manual (CEC).

27.5.2 Roads Design

The roads and track alignment shall be integrated in a manner that best uses the available space and optimises the alignment of both systems. Horizontal clearances between kerb lines of roads and tram network structures shall be not less than those set out in the relevant Department for Transport technical memoranda and the Department for Transport publication "Roads and Traffic in Urban Areas" and shall meet the guidance in ORR RSP2.

The requirements for geographical sections of the design and construction shall be discussed and agreed with **tie** and the City of Edinburgh Council to determine the extent of the proposed re-modelling, roadworks and (temporary and/or permanent) traffic management.

All surfacing materials shall comply with the DMRB requirements and consider City of Edinburgh Council's preferences. The integration of the Edinburgh Tram Network alignment, road design and road markings shall minimise the risk of road vehicles skidding on the rails. The finished works shall meet the serviceability requirements, balanced with commercial, social and environmental considerations. In particular, the following factors shall be taken into account:

- Make the best use of existing infrastructure;
- The requirements of the promoter (**tie** and CEC);

- Minimise the disruption to traffic;
- Minimise the public perception of waste and unnecessary disruption;
- Minimise the construction cost;
- Maximise the maintainability;
- Minimise the construction time;
- Minimise the excavation, material usage and hence vehicle movements; and
- Meet the needs of properties fronting onto the route of the tramway.

The Roads Design shall include but not be limited to:

- Identification of constraints and provision of typical sections;
- Tram / road interface review in the light of outputs from the design process;
- Provision of integrated tram/road design model;
- Assessment of the impact of the track alignment on the road design and layout;
- Assessment of the impact of the OLE design on the road design and layout;
- Layout drawings including extent of the works;
- Drawings detailing discrete locations where the vertical track alignment deviates from existing ground levels, this will include cross-sections and contoured plans as required;
- Standard details;
- Drawings to show changes to existing car parking provisions along the route, for example at Rosebery House, Haymarket including new access;
- Access and general arrangement layout to the Depot at Gogar;

- Consultation with City of Edinburgh Council, Scottish Environment Protection Agency and Scottish Water during the initial drainage design process identifying potential outfall locations and surface water treatment requirements for both roads and tram;
- Location of existing surface water drainage networks and outline routing of surface water from track and road drainage over the entire route;
- Standard details of drainage connections, sand traps, manholes, etc.;
- Pedestrian guardrails and boundary fencing;
- Interpretation of outputs from the traffic modelling process;
- Identification of junctions where existing traffic signals may need modification. Identification of locations where new traffic signals may require to be installed;
- Preparation of information to support the Traffic Regulation Orders and Temporary Traffic Regulation Orders. This will be based on the roads design, or the latest road design available. Prior to submission for the Statutory Process the TROs will be reviewed against the latest design;
- Safety audits for all stages;
- Compliance with the approvals process;
- Layout drawings for tram / road interface at 1:500 scale;
- Final junction register;
- Integration of traffic and tram signalling systems determined by the traffic model and tram run-time simulation;
- Three-dimensional MX model for all roads design;
- Details including any special measures at specific locations;
- Detailed General Arrangement of new access to car park at Haymarket including any modifications to car park layout;

- General Arrangement and vertical alignment for new access road to the Depot at Gogar;
- 1:200 scale drawings for each junction;
- Detailed design of surface water drainage networks modelled using appropriate software;
- Detailed design of site clearance layout, boundary fencing, safety barrier and pedestrian guardrail, pavement, earthworks, signs and markings, kerbing, footways, traffic signal layouts and road lighting;
- Determination of the extent of modifications to existing traffic signals and new installation requirements. Preparation of a traffic signal equipment performance specification; and
- Links with the CEC UTC;
- Compliance with all side agreements entered into by CEC (whether final or in draft) with respect to the Parliamentary Tram Acts.

27.5.3 Road User Safety Audit

Road User Safety Audits shall be carried out as required by The City of Edinburgh Council and sufficient to demonstrate the integrity of the design process to HMRI (or the appropriate regime in force).

27.5.4 Cycleways

Where it is required that cycleways are provided as part of the Infraco Works these shall be designed and constructed in accordance with the relevant guidelines including:

- Design Manual for Roads and Bridges;
- City of Edinburgh Council "Roads Development Guidelines";
- Scottish Executive's "Cycle by Design"; and
- SUSTRANS "Cycle Friendly Infrastructure Guidelines for Planning and Design".

27.6 Drainage Including Track Drainage

All roads drainage shall be designed and constructed in accordance with The Design Manual for Roads and Bridges, Volume 4 and comply with The City of Edinburgh Council's requirements and the Scottish Environment Protection Agency standards. Where appropriate during the design process Scottish Water shall be consulted. The design parameters defined by these design codes and agreed by **tie** / CEC / SEPA / Scottish Water as being appropriate for the area and system shall be accommodated within the finished works.

At locations where the tramway drainage is connected to any other drainage system measures shall be taken to ensure that any by-products of the tram system are accounted for (e.g. provision of sand interceptors). Where necessary early involvement of the Scottish Environmental Protection Agency (SEPA) shall be sought to define and agree surface water outfall locations.

Provisions shall be included for the proper and effective drainage of grooved rails and point machine pits in road running track detailed in the relevant section of these Employer's Requirements.

Provision shall be made in trackwork for the interception of entrained debris in the system that drains surface water from grooved rails, to enable the easy collection and removal of detritus by means of planned maintenance.

Outlets from the grooved rail and point machine pit drains shall be connected directly to the roads drainage system. For on-street track, the track drainage system shall incorporate an insulated break from the storm water system.

Provision shall be made in trackwork for the effective drainage of the track structure on grass track, ballasted and other off-road running sections (except on bridges, viaducts and the like). Outlets from these drainage systems shall be connected to collector drains running alongside the track. Chambers for access to clean and maintain the collector drain pipes and for the interception and removal of entrained debris and detritus shall be incorporated in the collector system. Collector drain systems shall be connected to other systems or outfalls as appropriate for the local regime and existing drainage systems, and in accordance with the requirements of the relevant water utility, the Scottish Environmental Protection Agency, the roads authorities and all other authorities as appropriate.

The drainage of all new bridge structures shall be positive and, unless otherwise required by the relevant local authority, all surface water shall be piped to the local storm water sewer systems by a defined drainage path.

Particular attention shall be paid to ensure that surface water drainage systems in the vicinity of traction substations and cable ducts are routed to avoid any risk of flooding of electrical equipment areas, point machine chambers, and the ducts themselves.

27.7 Road Signs, Traffic Signals and Urban Traffic Control

Road signs shall comply with the Traffic Signs Regulations and General Directions 2002 and the Traffic Signs Manual. The works shall be consistent with the requirements stated in the Edinburgh Standards for Streets (CEC). The signage provided for the tramway and the mandatory road signs shall be considered holistically and measures shall be taken to avoid clutter that could lead to a confusing environment for road users.

The traffic and tram signalling systems shall support the run-time of the tramway whilst minimising the impact on other road users. It shall be fully integrated with the City of Edinburgh Council's urban traffic control system. A protocol will require to be developed with the City of Edinburgh Council regarding the installation and integration of the traffic and tram signals. The signalling system shall incorporate recent/current technological developments, as appropriate, to optimise the combined efficiency of the tram and traffic signals.

The traffic management system shall accommodate the direct and consequential impacts of the Tram system and will be subject to approval by **tie** and CEC Wide-area modelling of traffic impacts consequent to the design shall be provided as a pre-requisite to approval, and prior agreement with the City of Edinburgh Council to implement the design and complete the works.

27.8 Road Lighting and Road Furniture

The road lighting shall conform to the Council strategy on lighting applying current street lighting standards and the Tram Design Manual. The lighting columns and Overhead Line Equipment (OLE) poles shall be rationalised to minimise road clutter and ensure safety of all users. Similarly, the quantity and disposition of road furniture shall also be rationalised for visual and safety reasons. OLE is subject to prior approval of the CEC planning authority and is to be obtained through the design process.

Lighting and road furniture will require to conform with safety guidelines and pass all relevant stages of road safety audit which are to be undertaken within the road design for tram implementation.

27.9 Utilities

The Edinburgh Tram Network shall be designed and constructed such that there is a minimal requirement to divert existing public utilities.

The final alignment shall take cognisance of the need to avoid the diversion of utilities' system-critical apparatus such as high-voltage oil-filled cables, fibre-optic communication cables, and high-pressure gas mains, wherever possible. Any protection required to such utilities shall be instructed as a **tie** Change and follow the principles of Section 21.

Utility diversions that are not covered under the advance Multi Utilities Diversion Framework Agreement (MUDFA) including unknown apparatus that is found during the Infraco Works shall be instructed as a **tie** Change and follow the principles of Section 21.

27.10 OLE Poles

Location of Overhead Line Equipment poles will be designed so as to minimise the risk of traffic impact. Collision barriers shall be provided where there is a reasonably foreseeable risk of a collision between a road vehicle and an OLE pole. However, collision barriers are not the preferred solution and all reasonable mitigation efforts shall be made, and careful consideration given, in the location of poles to avoid the necessity for collision barriers. Should this not be achievable, the collision barriers shall be functional, practical and maintenance free with anti-climbing measures to prevent the public from climbing and standing on top of barriers. Details of such barriers shall be approved by the City of Edinburgh Council in their capacity as Roads Authority as well as for visual impact through the prior approvals process.

28 Structures

28.1 General

The Edinburgh Tram Network requires the construction, or modification to, a number of structures throughout its length. The work involved in the Edinburgh Tram Network will impact on bridges and retaining structures. This Section 28 sets out the requirements which the Infraco must comply with in relation to structures.

28.2 Structures List

The following is a list of the principal structures along the Edinburgh Tram Network.

Table 80 - Structures Schedule

Structure Ref.	Section	Structure Name	Description
S19	2A	Haymarket Station Viaduct	New underbridge
S18	1D	Leith Walk Railway Bridge	Existing underbridge over single railway line
S1	3A	Roseburn Terrace Bridge	Existing single span plate girder underbridge.
S2	3A	Coltbridge Viaduct	Existing three span masonry arch underbridge
S3	3A	St George's School Access Bridge	Existing single span masonry arch overbridge.
S4	3A	St George's School Footbridge	Single span steel truss footbridge
S5	3A	Ravelston Dykes Bridge	Existing single span masonry arch overbridge.
S6	3A	Craigleith Drive Bridge	Existing single span masonry arch underbridge.
S7	3A	Holiday Inn Access Bridge	Existing three span composite overbridge
S8	3A	Queensferry Road Bridge	Existing single span masonry arch overbridge.

Structure Ref.	Section	Structure Name	Description
S9	3A	Groathill Road South Bridge	Existing single span masonry arch underbridge.
S10	3A	Telford Road Bridge	Existing single span overbridge.
S12	3B	Crewe Road Gardens Bridge	Existing single span RC structure
S20	2A	Russell Road Bridge	New underbridge at Russell Road delta
W3	5A	Russell Road Retaining Wall One	New retaining wall required due to level difference.
W4	5A	Russell Road Retaining Wall Two	New retaining wall required due to level difference.
W18	5A	Murrayfield Tramstop Retaining Wall	
S21A	5A	Roseburn Street Bridge	New underbridge
S21B	5A	Murrayfield Stadium Retaining Wall	New retaining wall required due to level difference.
S21C	5A	Murrayfield Stadium Underpass	New underbridge
S21D	5A	Murrayfield Training Pitches Retaining Wall	New retaining wall required due to level difference.
S21E	5A	Water of Leith Bridge	New underbridge
S23	5B	Carrick Knowe Underbridge	New underbridge (Intersection Bridge)
S24	5B	Existing Saughton Road Bridge	Existing WEBS structure
S25	5B	Existing Broomhouse Road Bridge	Existing WEBS structure

Structure Ref.	Section	Structure Name	Description
S26	5B	South Gyle Access Road Bridge	New underbridge
W11	5B	Bankhead Drive Retaining Wall	New retaining wall required due to level difference.
S27	5C	Edinburgh Park Station Bridge	New underbridge (Intersection Bridge)
S28	5C	A8 Underpass	New underpass
W16	5C	A8 Retaining Wall	Now replaced by a slope.
W19	5C	Gyle Stop Retaining Wall	New retaining wall required due to level difference.
S32	6	Depot Access Bridge	New structure required to provide vehicular access from Gogar Burn roundabout to the new depot.
S29	7A	Gogar Burn Bridge	New underbridge
S33	7A	EARL Underbridge	No longer required.
W14	7A	Gogar Burn Retaining Wall One	New retaining wall required due to level difference.
W15	7A	Gogar Burn Retaining Wall Two	New retaining wall required due to level difference.
W100	3A	Roseburn Corridor Retaining Walls	
S17	1D	Tower Place Bridge	Existing underbridge at Leith Docks

Structure Ref.	Section	Structure Name	Description
S16	1D	Victoria Dock Entrance Bridge	Existing underbridge at Leith Docks
W1	1D	Lindsay Road Retaining Wall	Existing modular retaining wall adjacent to Lindsay Road.
S30	7A	Gogar Culvert One	New culvert
S31	7A	Gogar Culvert Two	New culvert
S34	7A	Gogar Culvert Three	New culvert
W8	5A	Baird Drive Retaining Wall	New retaining wall required due to level difference.
S22	5A	Balgreen Road Bridge	New underbridge
W9	5A	Balgreen Road Retaining Wall One	New retaining wall required due to level difference.

28.3 Proposed Structural Form

The approval for all structures and civil engineering works shall be in accordance with the Consents Programme and Schedule 14 (Design Management Plan). The proposals at all structures listed above shall be subject to review/acceptance by **tie** prior to application for consent being made to the City of Edinburgh Council, or Approval to Network Rail as appropriate.

28.4 Listed Structures

Due cognisance shall be taken by the Infraco of the historical status of any of the structures affected by the Infraco Works. Work on such structures will be subject to the relevant approval process, as described in the Consents Programme and Schedule 14 (Design Management Plan).

28.5 Vibration and Noise

Structures and civil engineering works shall be designed in accordance with tie's Noise and Vibration Policy at 10.1.5.

28.6 Bearings and Movement Joints

The design shall minimise the need for bearings and movement joints within all the structures. Integral structures shall be adopted where feasible.

Where bearings are required, either elastomeric or pot type bearings shall be used to accommodate the longitudinal and transverse translations and rotations while minimising lateral loads on sub-structures.

All bearings shall be replaceable under full live loading.

The use of movement joints shall be minimised, but where proposed they shall be easily maintainable and replaceable.

28.7 Design Life

The design life of all structures is set out in Section 6 (Design Life) of these Employer's Requirements.

28.8 Design Standards

All structures shall be designed in accordance with the appropriate design standards – See Section 8 (Standards) of these Employer's Requirements. Adopted design standards should be listed by the Infraco in the Approval in Principle Form 'A', or equivalent, submitted to tie for individual structures.

28.9 Structure Loading

Structures supporting the ETN shall be designed to carry 0.5RL loading as defined in the Design Manual for Roads and Bridges (DMRB and BS5400 Part 2). The maximum allowable tram axle load is determined in 24.12 of these Employer's Requirements.

During the design of structures due cognisance shall be given to the loadings imposed by construction and maintenance vehicles. Any constraints upon the operation of construction and maintenance vehicles shall be identified and advised to **tie**.

28.10 Rail Break

All elements shall be designed and provided to cater for tensile breakage of one rail at any location at ultimate limit state only. The other unbroken rails and the supporting structure shall resist the unbalanced force from a broken rail. The force resisted by any element shall be the lesser of:

- The force resulting from the rail and concrete deck temperatures and shrinkage, or
- The sum of the clip resistances between the movement joints bounding the break.

The effect of rail break shall be considered in conjunction with rail tensile temperature effects and the tram dynamic weight, centrifugal, nosing and braking and/or traction effects. The partial load factor shall be taken as 1.0.

28.11 Clearances

As a minimum, clearances shall be to RSPG 2 Tramways requirements.

Structural designs shall take due cognisance of the potential developed kinematic envelope of Trams that may be operated on the ETN.

28.12 Finishes

Finishes to all concrete components of the Infraco Works shall comply with the following:

• All buried and permanently submerged surfaces	F1, U1
• Pier tops, bearing shelves and hidden surfaces	F2, U2
• Parapet Coping, Exposed surfaces	F3, U3
• Main bridge deck	U4
• Special finishes – where deemed appropriate these are to be agreed with **tie** and all relevant authorities (e.g. CEC structures department) taking cognisance of all cost and construction impacts.	Note

Table 81 - Finishes

28.13 Protection

Structural steelwork shall be protected by a paint system in accordance with the appropriate standard. Steel surface preparation and the application of high performance paint coatings shall provide a design life to the first maintenance intervention in excess of twenty years. This requirement takes precedent over other standards.

The top surface of the any bridge deck shall be protected with a proprietary sprayed waterproofing system in accordance with BD 47/99.

All buried concrete surfaces shall receive two coats of bitumen; and Pavix (or equivalent) is to be applied to all concrete surfaces exposed to salt spray. A risk based assessment is to be undertaken for approval by **tie** to identify the extent of anti-graffiti treatment to be applied to exposed concrete surfaces.

28.14 Infrastructure Maintainability

The infrastructure shall be designed to minimise maintenance requirements. In particular the design should allow access which will not adversely impact systems operation of the Edinburgh Tram Network for the completion of routine work.

Structures will be subject to regular general inspections and a principal inspection at a frequency of every six years. The principal inspection shall entail amongst others a close visual inspection of all

elements of a structure. Details of the inspection and maintenance regimes are to be developed by Infraco and approved by **tie**. Maintenance Requirements are detailed further in Table 92 – Structures at Section 40 of these Employer's Requirements.

28.15 Provision for Inspection and Maintenance

Access to the underside of decks for inspection and maintenance shall be via vehicular-mounted inspection platforms operating from ground level, where access is feasible within contracted design parameters. For maintenance of metal parapets, for example, access shall be from the walkways. For bridges across Network Rail infrastructure it will be necessary to undertake such inspections in accordance with Network Rail requirements.

28.16 Bearings

Mechanical bearings shall be replaceable by jacking up the structure's deck a nominal amount, which minimises disruption and physical works. Where this is required, track will be designed such that only the bridge track is displaced. The bearings shall not require replacement for at least 50 years. Where bearings are provided, suitable inspection and maintenance galleries shall be provided.

Unauthorised access to these galleries shall be prevented through the incorporation of suitable measures.

No specific provisions shall be made for inspection and maintenance of the bearings on piers. Access to these bearings will be via a hydraulic access platform.

28.17 Expansion Joints

Bridge expansion joints shall be of the sealed type and provision shall be made to carry any water seeping through the joint into the deck drainage system. Expansion joints shall be easily maintained and replaced.

28.18 Earthing and Bonding

Structures shall be designed to comply with the Earthing and Bonding Policy at Earthing and Bonding of these Employer's Requirements.

28.19 Protection against Stray Current

Where trackform is an integral part of the structures, it shall be designed to comply with Stray Current Section 32 of these Employer's Requirements.

28.20 Third Party Relationships

28.20.1 Road Closure and Traffic Management

All Infraco Works affecting road traffic will be subject to the granting of permissions from relevant parties and may involve road closures or traffic management measures approved by CEC or the owner of the affected road. All such approvals are to be in place in advance of of any traffic impacts and comply with the requirements of Project Management Processes

In particular, the following works are expected to have a significant effect on traffic movements and may require particular consideration:

- Groathill Road Bridge and Craigleith Drive Bridge may require road closures for the duration of the Infraco Works;
- Construction of the abutments and new deck for Roseburn Terrace Bridge will require temporary closure of the A8 and partial workings within the carriageway;
- The construction of a structure, passing under the A8 to the east of Gogar roundabout, shall require significant traffic management to minimise disruption to traffic during construction. Additionally consideration will be required for the traffic impacts to the construction of the Depot Access Bridge and A8 retaining wall structures;
- Ocean Drive Bridge widening may require road closure for the duration of the Infraco Works;
- Roseburn Corridor Structures will be impacted an may require temporary traffic constraints (Ravelston Dykes Bridge, Holiday Inn Access Bridge, Queensferry Road Bridge, Telford Road Bridge, Crew Road Gardens Bridge;
- Tram bridges to be constructed over live roads may require some traffic constraints including Haymarket Station viaduct, Russell Road Bridge, Roseburn Street Viaduct, Balgreen Road Bridge, South Gyle Access Bridge.

28.20.2 Other Interested Parties

All relevant third parties shall be consulted by Infraco as required during the course of. In particular, this will include in relation to structures:

- Network Rail – noting particularly the Carricknowe and Edinburgh Park Bridges;
- Forth Ports;
- Edinburgh Airport Limited;
- Edinburgh Park Management Limited / New Edinburgh Limited; and
- Scottish Rugby Union.

28.20.3 Landscaping and Boundary Treatment

The Design Manual sets out the parameters of the design elements of the environmental mitigation measures to be implemented. The design guidance and requirements contained within the Design Manual shall be considered by the Infraco taking into account the CEC's own Development Quality Guidelines. (They include: Quality of Landscaping in New Developments, Biodiversity, Tree protection and Urban Forestry.)

A Landscape and Habitat Management Plan (LHMP) shall also be identified and prepared for the approval of **tie** and subsequent presentation to the CEC. It should be noted that there is a requirement for the LHMP applicable to the Roseburn Corridor to be specifically approved by the CEC Planning Committee.

A Boundaries Treatment Management Plan shall be created and updated by the Infraco to reflect emerging issues regarding boundary interface design matters between the track and adjoining ownerships. In general, all landscaping and boundary measures shall be in keeping with the surrounding environment and shall be consistent with the local character of the relevant area.

Where it is determined that fencing is required either to physically segregate the tram track or to separate the tram from other parties (for example Network Rail) the fencing shall be of a type and standard that provides the necessary separation and satisfy the requirements of the other party. In the case of Network Rail it must conform to their Group and Company Standards. The design will take into account concerns with respect to an individual having safety space in a fenced route.

Boundary treatments shall take cognisance of the need for appropriate noise mitigation measures, as well as other appropriate ecological works (e.g. badger mitigation) ensuring all Infraco Works have achieved all relevant approvals. In particular it is required that such boundary treatment and noise mitigation measures meet with the requirement to provide an end result which is no worse than the environmental impact assessment and presented in the Environmental Statement which was presented as part of the parliamentary submission.

29 Depot

29.1 Scope

This Section of the Employer's Requirements defines the Depot requirements applicable to the Edinburgh Tram Network (ETN) which the Infraco must comply with.

29.2 Depot, Buildings and Associated External Works

The Depot shall be of an economical design which reflects economy of use and maintenance in providing all the functionality required by **tie**.

The Depot shall provide the facilities to operate, service, repair and maintain a reliable passenger service.

29.3 The Site

The Depot site in Gogar is located in the vicinity of Edinburgh International Airport and has constraints imposed upon its design by the Civil Aviation Authority due to the proximity of the emergency runway at the airport. Factors to be accommodated in the design and construction of the Depot include height restrictions that shall necessitate detailed discussions with the aviation authorities.

29.4 Staff Halt

At a location to be agreed by **tie**, shelters shall be provided for the sole use of tram crew and other staff working on the Edinburgh Tram Network so as they can board the Trams. The staff halt shall comprise of shelters not less than 2.5m x 2m which shall provide weather protection. The staff halt will be linked to the Depot by a designated walking route leading to a controlled gate in the Depot boundary fence. The shelters shall be monitored by CCTV cameras, if they are not visible from the Depot Control Centre. The shelters will be provided with telephones providing a dedicated link to the Depot Control Centre.

The staff halt shall not introduce any speed restriction to the passage of Trams.

29.5 Drainage

The general site area shall be lowered to ensure that all structures are below the flight path. As a result of this excavation, both foul and surface water drainage may need to be pumped from the permanent works to off-site outfalls.

29.6 Access

Road access from the A8 Gogar roundabout link road shall provide both entry and exit for normal Depot operations traffic and also for delivery and egress of Trams with the minimum of impact on other facilities. Height restrictions on vehicle loads shall be verified in relation to the Airport operations. The link road giving access to the Depot may be extended by others and will cross the Tram route to the Airport, and the Depot entry track.

29.7 Utilities

Existing utilities and sewers crossing the Depot Site site shall be protected or re-located as appropriate and shall be instructed as a **tie** Change and follow the principles of Section 21.

29.8 Depot Site Layout

The configuration of the Depot and the use of the equipment contained therein shall minimise disturbance to neighbours.

Allowance shall be made in the site layout adjacent to the Depot building to accommodate temporary office facilities that may be needed during the construction, testing and commissioning phases of the Infraco Works. This shall include the provision of temporary electricity and water services.

The Depot site shall accommodate a zone within which the required accommodation can be located.

The Depot shall be secure and be provided with security systems as appropriate.

- The Depot shall have a suitably robust security fence 2.4m high shall enclose the Depot site with controlled entry points for Trams, vehicles and pedestrians. The security entry points shall be unmanned with security control systems providing the means of operation. These shall be centred on the Depot reception during normal office hours with transfer to the Control Centre at other times.

- The Depot shall incorporate two separate access points to the running lines.

- The entire Depot external operating area within the perimeter fence shall be provided with a comprehensive CCTV surveillance system, the images from which shall be displayed in real-time in the Control Centre. The cameras shall form part of the network CCTV system (refer to Section 35 (Supervisory Control and Communications Systems) of these Employer's Requirements. In particular a CCTV system shall be provided to view the Depot vehicular and

pedestrian entrances. It shall be integrated with the entry systems and shall be centred on the Depot reception during normal office hours with transfer to the Control Centre at other times.

The current reference design sets the Depot site below existing ground level and retaining structures shall be constructed as necessary along the A8 site boundary. These structures shall also form the ramp for the through track of the tram system to the Airport.

- The stabling area and its configuration shall be established by the combination of track requirements and the Depot building footprint. The Depot layout shall accommodate a minimum of 36 berths. The stabling facility shall be built to accommodate an initial 27 x 44m Trams. Adequate provision shall be made to allow cleaning personnel to move around berthed Trams.

- Set between the stabling roads shall be access paths alternately at least 1.0m and 2.0m wide with service points to provide facilities for Tram cleaning and minor maintenance on the 2.0m width paths.

- The desirable longitudinal gradient of all tracks within the Depot shall be zero. The absolute maximum longitudinal gradient shall be 0.4%. Cross-level gradient (cant) of all tracks shall be zero (see Section 26 (Track) of these Employer's Requirements).

- At the ends of any tracks that terminate, a Tram-arresting device shall be provided.

- A track shall be provided to enable Trams to be loaded and off loaded onto/from road transportation.

- A servicing track shall be provided complete with a tram wash plant and hand windscreen cleaning points. Road access shall be provided for detergent deliveries to the wash plant.

- The wash plant shall be located inside a shelter (the shelter need not extend the full length of the Tram being washed) – see Table 83 - Depot Plant and Equipment to be Provided of these Employer's Requirements, where the operating temperature range is set out. The facility will be provided with suitable devices to remove excess moisture from the washed vehicles. High quality results, at least as good as those achieved by Lothian Buses on their fleet, shall be delivered by this facility.

- Sand filling points within an enclosed structure shall be installed on the servicing track. The bulk sand silo (capacity at least 30t) and associated feeder equipment shall be located close by, along with the provision of road access for sand deliveries.

- A suitably drained bogie wash point shall be provided in the apron at the front of a Tram entry point to the workshop which allows demounted bogies to be easily manoeuvred in and out of the workshop. Plant used for this operation shall be transportable and housed within the main workshop. Power and water shall be provided to allow the tram pressure washer to be utilised at this location. Treatment of wastewater, to meet appropriate standards prior to connecting to the site drainage system, shall be provided.

- Car parking shall be provided for one third of the personnel employed on the Depot site. Within this provision, visitor car parking shall be provided close to the Depot entrance for no less than six vehicles.

- Servicing areas for external stores and containment of waste shall be provided.

- A sub-station for both traction power (main line and depot feeds) and domestic Depot supplies shall be provided.

- Due to the proximity of the Airport runway, planting and landscaping within the Depot site shall be restricted and consistent with CAA guidance to prevent bird strikes. Native species of plants shall be used where possible and shall be compatible with Tram operations.

- The Depot site shall be appropriately lit.

29.9 Depot Building

The following identify the principal features of the Depot building:

- The main Tram workshop, other workshops, stores, management, administration, operations and maintenance offices, staff welfare facilities (support accommodation) and the Control Centre for the complete Edinburgh Tram Network, shall be contained within a steel framed building clad in an insulated panel cladding system. The roof of the building shall be insulated to a suitable standard with the minimum number of penetrations.

- The building workshop shall accommodate a minimum of two tram maintenance roads, a wheel lathe road and a further tram service road.

- The support accommodation shall be arranged on two floors set to one side of the main tram maintenance workshop. The Control Centre shall be located at first floor level with the equipment room set below. A view of the depot external stabling area and tram entry/exit point shall be provided to Control Centre staff from within the Control Centre.

- The Depot shall be provided with the appropriate electricity supplies including 400V for individual items of workshop equipment both inside and outside the building, 230V for internal domestic use and 110V for small tools.

- Natural light in offices shall be maximised and all rooms shall be placed within the building in locations appropriate to their function. This shall be supplemented by artificial lighting consistent with the tasks undertaken and the hours of operation of the facility.

- Additional service space shall be provided for the accommodation of domestic services as well as for the accommodation and systems directly linked to the Tram operations.

- Full heating and ventilation will be provided throughout the building with air conditioning to the cControl Centre, equipment room, training and meeting rooms.

- Fire alarms and fire extinguishing systems shall be provided throughout the Depot building. Fire suppression shall be provided in the technical equipment room(s).

- Suitable office furniture shall be provided for all areas within the Depot building.

The following schedule of accommodation shall form the basis of the design for the office and welfare facilities attached to the Depot.

29.10 Schedule of Staff Numbers

The Depot shall accommodate the number of staff identified in the "Establishment with Expansion" column set out below.

Note: The locker rooms should have sufficient capacity for approximately 5% spare capacity on these numbers to cope with staff turnover and associated training overlap.			Max Number on duty in the Depot at one time	
Anticipated Job Title	**Establishment for Phase 1a/1b**	**Establishment with Expansion**	**Phase 1a/1b**	**With Expansion ratioed up**
OPERATIONS				
CORPORATE MANAGEMENT				
General Manager	1	1	1	1
Operations Manager	1	1	1	1
Commercial Manager	1	1	1	1
OPERATIONS				
Duty Managers	11	12	4	4
Operations Supervisor	9	9	2	2
Operations Assistant	1	1	1	1
Drivers	112	126	11	12

Anticipated Job Title	Establishment for Phase 1a/1b	Establishment with Expansion	Phase 1a/1b	With Expansion ratioed up
OPERATIONS				
Engineering Manager	1	1	1	1
Vehicle Engineer	1	1	1	1
Infrastructure Engineer	3	3	3	3
Safety and Standards Manager	1	1	1	1
Performance Regime Manager	1	1	1	1
Clerk	1	1	1	1
FINANCE				
Finance Manager	1	1	1	1
Accounts Assistant	2	2	2	2
Administration				
Secretaries	1	1	1	1
Admin. Staff	2	2	2	2

Anticipated Job Title	Establishment for Phase 1a/1b	Establishment with Expansion	Phase 1a/1b	With Expansion ratioed up
REVENUE PROTECTION STAFF				
Inspectors	112	126	11	11
Cashiers	1	1	1	1
Revenue Protection Manager	1	1	1	1
INFRASTRUCTURE / VEHICLE CLEANING				
Cleaning Manager	1	1	1	1
Cleaners	20	23	10	11
SUB TOTAL	**285**	**318**	**59**	**67**
TRAM MAINTENANCE				
Office Staff	3	3	3	3
Storeman	1	1	1	1
Technicians	30	34	15	16

Anticipated Job Title	Establishment for Phase 1a/1b	Establishment with Expansion	Phase 1a/1b	With Expansion ratioed up
SUB TOTAL	**34**	**38**	**19**	**21**
INFRASTRUCTURE MAINTENANCE				
Office Staff	4	4	4	4
Storeman	1	1	1	1
Technicians	37	42	18	20
SUB TOTAL	**42**	**47**	**23**	**25**
SUMMARY				
Operations	285	318	59	67
Tram Maintenance	34	38	19	21
Infrastructure Maintenance	42	47	23	25

Table 82 – Schedule of Staff Numbers

29.11 Accommodation (First floor)

The first floor is to be occupied by the Operator. The accommodation set out below is required as a minimum and must be related in all respects to the numbers of staff to be employed and based at the Depot as set out in Table 82 – Schedule of Staff Numbers, where not otherwise specified. Appropriate account is also to be taken by the Infraco of the maximum numbers of staff indicated as being on the premises at any one time in sizing toilets, messing facilities etc.

- A Control Centre to include the equipment as defined in paragraph 35.13 and allow a good ergonomic layout for the functions carried out therein.
- A room adjacent to the Control Centre, with sufficient space for the incorporation of the necessary furniture and technical equipment used to store and manage the handheld radios and ticketing equipment and their batteries, together with one desk space.
- A cash office adjacent to the Control Centre, with adequate space for two staff members and the associated equipment for cash counting and sorting, as well as a safe of an appropriate size.
- A viewing area shall be provided for visitors to view the Control Centre without disrupting the activity within.
- Windows shall be provided to provide a view into the tram workshop from the first floor. Suggested locations are adjacent to the Control Centre (if not inside, then integrated with the viewing area referred to above), adjacent to the engineering office, and in the viewing area.
- Adequate toilets and showers (Male, Female, Disabled).
- Access from the ground floor with at least two staircases and one lift (for disabled access and, unless other arrangements are available, for the lifting of equipment and furniture required on the first floor).
- One set of stairs is to give direct access between an external door (itself adjacent to the visitor's parking spaces) and the first floor. A reception area is to be provided at the first floor landing including an allowance for a reception desk and a minimum of four waiting chairs. A second set of stairs is to be adjacent to the Control Centre and provide a direct link, to a route from the staff parking/external access gate and the locker rooms, and to the walking routes onwards into the stabling sidings and to the access gate in the Depot fence to the staff halt on the main line.

- Office for the General Manager, sized for one person with meeting table for six people.
- Office for the Operations Manager, sized for two people. To be situated close to the Control Centre.
- Office for the Safety and Performance Managers, sized for two people.
- Engineering office, sized for three people, with meeting area for four people.
- Office for the Duty Manager and Supervisors, sized for three people.
- Office for the Finance and Commercial Managers, sized for two people.
- General office, sized for eight people.
- Messing facility, including limited self-service kitchen facility.
- Cleaning office and store.
- Interview room, close to the office of the Operations Manager.
- Meeting room for 10 people, close to the Reception.
- Two training rooms, one sized for 30 people and one for 15 people. The larger should be able to be subdivided, broadly in half. Note that this may be required to be on a permanent basis once the complete system is open for service.
- Space to locate the PABX and a computer server for the Operator.
- Locker Rooms, male and female in suitable proportion for the total relevant staff numbers and with an allowance for flexibility in recruitment. The design shall allow for flexibility in the division to allow for long-term changes in the proportions. The locker rooms should be placed conveniently for the Control Centre and messing facility. The space allowance for lockers should be based on two-thirds height/interleaved lockers.
- A store for uniforms and other small operational equipment.
- A records store.

- A location for photocopying.

29.12 Workshop General Requirements

- In the main workshop, all roads shall have traction power. The wheel lathe shall be placed in a central position to enable the workshop doors to be closed whilst the lathe is in operation;
- Gantry structures, for access to the Tram roof area from both sides, shall be provided for a minimum of two berths;
- Under-track pits shall be provided on no fewer than four tram maintenance berths incorporating access and egress stairs. Pits shall have adequate lighting, drainage and power tool sockets;
- 'Built-in' jacking points (i.e. lifting under the Tram bogies) shall be provided to one of the roads, which shall be provided with traction power, the pits containing this equipment shall be adequately drained;
- Battery charging equipment shall be provided for Tram batteries, fork lift trucks and all other battery powered equipment with associated ventilation equipment, in a dedicated area off the main workshop;
- Hydraulic and electronic workshop facilities, including bespoke test benches, shall be provided appropriate to the Trams. Fixed equipment, for the servicing and testing of hydraulic and electronic equipment shall be provided. The areas shall be capable of being separated from the main workshop area by closure of an industrial door; and
- Both heavy and light stores areas shall be provided complete with the necessary racking systems to suit the storage requirements of the spare parts required for all systems, equipment and Trams being supplied. Forklift truck access to these areas shall be provided. Stores are to be segregated between those required for the Tram Maintainer and those for Infraco.

29.13 Accommodation on Ground Floor

29.13.1 General Facilities

The ground floor is to be principally occupied by the Infraco. The accommodation requirements set out below is required as a minimum.

The design of the accommodation must be related in all respects to the numbers of relevant staff to be employed and based at the Depot as set out in Table 82 – Schedule of Staff Numbers, where not

otherwise specified. Appropriate account is also to be taken by the Infraco of the maximum numbers of staff indicated as being on the premises at any one time in sizing toilets, messing facilities etc.

The different spaces should be arranged grouped logically together and with respect to accesses etc. The workshop areas must also accommodate all relevant equipment listed in the Plant and Equipment Schedule – see Table 83 - Depot Plant and Equipment to be Provided.

- The equipment room shall be underneath the Control Centre. Necessary domestic plant rooms.
- A store for tram and infrastructure cleaning equipment.
- First aid room (suitable for all staff at the depot, accessible from the first floor and to an external vehicle access).

29.13.2 Facilities

- Staff access shall be arranged preferably, adjacent to the locker rooms and convenient for external access and with appropriate security.
- Adequate toilets and showers shall be provided (Male, Female, Disabled) serving both contractors.
- A messing facility, including limited self-service kitchen facility.
- Locker rooms, male and female in suitable proportion for the total relevant staff numbers and with an allowance for flexibility in recruitment. The design shall allow for flexibility in the division to allow for long-term changes in the proportions. The space allowance for lockers should be based on a full-height lockers for each relevant person. There should be dry locker rooms, sufficient for all Infraco staff, based on full-height lockers, and a drying room to include additional full-height lockers for all of the Infrastructure and Tram Maintenance staff.
- machine tool area, open to the tram workshop. This might be linked to the dirty workshop.

29.13.3 Tram Maintainer Specific Facilities

- A small store for workshop cleaning equipment.
- A location for a computer server for the Tram Maintainer.
- Tram Maintenance Managers Office, sized for one person with meeting area for four persons.

- Tram Maintenance General Office, sized for five persons.
- Tram Stores including office, small items store and large items store with access for fork-lift truck. The size of these shall be agreed with the relevant contractor.
- Battery store and charging area
- Clean workshop(s) for electronics and hydraulics
- Dirty workshop for bogie, with cross access track from the main vehicle workshop underneath the travelling crane; area could be linked with machine tool area

29.13.4 Infrastructure Maintainer Specific Facilities

- A location for a computer server for the Infrastructure Maintainer.
- Infrastructure Maintenance Manager's office, sized for one person with meeting area for four persons.
- Infrastructure Maintenance general office, sized for five persons.
- Infrastructure stores including small office, small items store and large items store with access for fork-lift truck. The size of these shall be agreed with the relevant contractor.
- Clean workshop for electronics
- Dirty workshop which could be the machine tool area.

29.14 Provisional Schedule of the Plant and Equipment

The plant and equipment to be provided and installed shall include, but not be limited to, the following:

Table 83 - Depot Plant and Equipment to be Provided

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
1		Cleaning Equipment										
	1.1	Tram Cleaning Equipment	Equipment for cleaning of tram interiors	110V Industrial vacuum cleaning equipment, ≥ 2kW power Equipment to allow removal Floor polishing equipment	P	Generally used in stabling areas However can be used throughout the Depot	T	O	O	O	O	6

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.2	Tram pressure washer	Industrial washer for general tram cleaning within the Depot including bogie washing	Self powered Hot water/steam - self heating Pressure variable up to ≥200 bar Flow rate ≥12 l/min Lance and hose ≥10m Detergents compatible with Tram external finishes	M	Throughout Depot	T	T	T	T	T	1
	1.3	Infraco pressure washer	Removal Removal of fly posters General cleaning	Features as per Tram pressure washer Mobile towable bowser with capacity for up to one shift of cleaning Infraco to ensure	M	Across the ETN	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				interchangability with tram pressure washer Readily transportable on back of road-rail and other road vehicles								

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.4	Tram Washing Plant	Fixed plant for cleaning of Tram exterior	Unidirectional >15 tph continuously Minimised water consumption, maximised water recirculation controllable and monitored from Control Centre via SCADA system Self contained Pre-wet One pair application brushes Automatic end wash Two pair water wash brushes	F	Alongside main workshop	I	O	O	O	O	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Dryer Operates from -5°C ambient external temperature within shelter Final details TBD with tram supplier ≥70% water recycling Backflow prevention devices shall be installed. Treatment of wastewater to meet appropriate standards prior to connecting to site drainage system shall be provided.								

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.5	Rail Groove Cleaning Equipment	P-way cleaning	Vacuum equipment to remove detritus/debris from grooved track including drain boxes and points Able to clean drains and gullies employing water jets Transportable on road/rail vehicle, lifted with crane or fork lift truck Self powered for full shift Easy collection/disposal of detritus/debris	M	Across the ETN	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.6	Parts washer	Infrastructure/Tram component cleaning & degreasing in dirty workshop	Able to wash components ≤100kg, ≤750mm diameter	F	Within dirty workshop	I	I/T	I	I	User	1
	1.7	Floor scrubber	Depot floor cleaning	Industrial vacuum/brush scrubber equipment Compatible with floor finishes	M	Within Depot building	T	T	T	T	T	1
2		Mechanical Handling										
	2.1	Shunter	Manouveuring Trams within workshop	Battery powered Road/rail capability Capable of towing/propelling single Trams Speed up to 3 km/h	M	Throughout Depot tracks Road capability to move	T	O/T	I/T	O	User	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Local and remote control Charging facilities Coupler at each end		between tracks on hardstanding						
	2.2	Tram lifting system and stands	Lifting Trams to allow routine maintenance and removal of bogie(s)	Fixed underfloor system providing flush floor when not in use. Ability to lift fully functional, unladen tram. Synchronised lift from single control panel. Ability to stop and lock lift at any vertical positionInterlocking to	F	Main workshop	I	T	T	T	T	1 set

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				protect Tram in event of system/component failure. Manually positioned stands to be provided Interlocking with OLE if required.								
	2.3	Fixed high level access platforms	To allow access to all equipment mounted on Tram roof	Capable of providing access to all roof mounted equipment on tram Decking to prevent tools or small to components falling through Handrails and toeboards to prevent	F	Main workshop	I	T	I	T	T	2 sets

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				personnel/material falling Access/egress gates interlocked with OLE End protection								
	2.4	Overhead crane	Bridge type crane spanning 2 roads within the workshop to allow all material within main workshop to be transported up to and including size/weight of motor bogie	≥6.3 tonne capacity Vertical clearance <960 mm from hook (fully raised) to top of crane Traverses below OLE Interlocked with OLE Remote control using hand held device Multi-speed faciltiy - lift, traverse and travel	F	Main workshop	I	T/I	T	T	User	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Long and cross travel to cover all areas over the two roads								
	2.5	Mobile crane	Facilitate removal of miscellaneous equipment including bogie components within the dirty workshop	≥2t capacity Powered operation	M	Throughout workshops	T	T/I	T	T	User	1
	2.6	Bogie workstands	To allow dismounted bogies to be maintained	Allows bogie to be manoeuvred along the stub track in the dirty workshop Wheel locks Capable of supporting	M	Dirty workshop	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				both trailer and motor bogie								
	2.7	Other tram equipment stands	Various stands to allow items of equipment to be stored and readily maintained when dismounted from the Tram	Infraco to propose depending on tram design Expected to include stands for doors, windows, body panels etc…	M	Throughout Depot	T	T	T	T	T	
	2.8	Accommodation bogies	To allow Trams to be moved within workshop once bogies have been removed or the Tram has been split at any articulation	Allows Tram to be manoeuvred throughout the depot once any combination of bogies has been replaced Allows entire tram to	M	Throughout Depot	T	T	T	T	T	

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				be manoeuvred throughout the depot once any articulation has been split								
	2.9	Fork lift truck	Lifting and transporting miscellaneous equipment	Battery powered Charging facilities Road wheels >3 t lifting capacity Drum handling equipment Crane arm Capable of accessing all shelving and racking in stores-Infraco to demonstrate	M	Throughout the Depot but limited to hard standing areas when outside	T & I	T/I	T/I	T	Us er	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.10	Pallet truck	Lifting & Transporting equipment particularly in stores	Manually manoeuvred, hydraulic lifting the Infraco to propose requirements. Infraco to provide integrated solution	M	Throughout the Depot but limited to hard standing areas when outside	I	T/I	T/I	T	User	The Infraco to propose
	2.11	Hand trolleys	Transporting tools and spares	Unpowered the Infraco to propose requirements. Infraco to provide integrated solution	M	Throughout the Depot but limited to hard standing areas when outside	I	T/I	T/I	T	User	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.12	Infraco lifting slings	General slings for lifting infrastructure heavy components on system and in Depot building	Infraco to propose. Stand for storage	P	Use on system infrastructur e	I	I	I	I	I	The Infraco to propose
	2.13	Tram lifting slings	Specific lifting gear to allow all equipment to be removed and replaced.	Raised hook on overhead crane can be no more than 5390 mm ARL the Infraco to propose Stand for storage	M	Use in Depot building only	T	T	T	T	T	Tramco to propose
	2.14	Windscreen/window removal equipment	For use in replacing tram windscreens and side windows	Mobile stand capable to being used to access both windscreen and side windows Electrically powered vacuum beam with	M	Use in Depot building only	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				suckers adapted to windscreen design Audio/visual alarm in the event of suction loss								
	2.15	Re-railing equipment	For use in rerailing trams out on the System	Variety of jacks/beams/slides to be proposed by the Infraco Airbags Slew locking devices Capable of being readily transported on the road/rail vehicle	M	Used any where on system including Tramstops	T	T	T	T	T	1 set
	2.15	Stop boards	To indicate the presence of equipment/personnel/tram	The Infraco to propose requirements. Infraco	P	Throughout System	I	T/I	I	T/I	User	≥20

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
			s on the tracks	to develop integrated solution								
3		Workshop & Stores Furniture										
	3.1	Shelving and racking	Storage of spares and other material	Heavy duty The Infraco to propose requirements. The Infraco to develop integrated solution	F	Stores	I	T/I	I	T/I	Us er	The Infraco to propose
	3.2	Tram staging	for Tram inspections/repairs	The Infraco to propose any additional staging required	M	Used within Depot building	T	T	T	T	T	The Infraco to propose
	3.3	General staging	For infrastructure inspections/repairs	The Infraco to propose any additional staging	M	Across Edinburgh Tram	I	I	I	I	I	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				required		Network						
	3.4	Shelving	Storage of minor items/documents	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose
	3.5	Workbenches	Equipment maintenance	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose
	3.6	Cupboards	Storage of minor items/documents	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	3.7	COSHH cupboard	Storage of COSHH items	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Dirty workshop	I	T/I	I	T/I	use r	The Infraco to propose
	3.8	Workshop stools	Personnel comfort when working	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	Us er	The Infraco to propose
4		Fixed Plant										
	4.1	Air conditioning maintenance equipment	Specialist tools for filling/emptying refrigerant	The Infraco to propose	F	Anywhere in Depot building	T/I	T/I	T/I	T/I	T/I	The Infraco to propose
	4.2	Tyre replacement equipment	Specialist tools for tyre splitting/removal/balancing /bearing replacement	The Infraco to propose	F	Dirty workshop	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	4.3	Underfloor wheel lathe	In-situ reprofiling of Tram tyres	Capable of producing a range of wheel profiles. Tolerances to be agreed between the Infraco Swarf conveyed to skip for removal by means of forklift truck capable of turning all wheels on one Tram within eight hour shift	F	Within Depot building.	I	T	T	T	T	1
	4.4	Sand Plant	Refilling of Tram sanding equipment	Minimum silo capacity 30 tonnes Capable of receiving sand delivery directly from road vehicle Allows Tram driver to	F	Dedicated facility	T	O	O	O	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				fill an empty tram within 5 minutes Rate of fill to be sustainable for 30 minutes. In no circumstances shall the interval between the filling of two Trams exceed 10 minutes The physical condition of the sand shall not deteriorate when stored Sand deliveries to a Tram shall stop automatically when								

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				the tram sand box is full Sand filling nozzles to be compatible with the sand filling inlets on the trams Signal interlocking to inhibit the movement of a tram if the sand filling nozzles are not returned to their correct storage position.								
	4.5	Machine tools	General machine tools required for maintenance	The Infraco to propose requirements. The Infraco to develop	F	Dirty workshop	I	T/I	T/I	T/I	User	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				integrated solution								
	4.6	Paint booth	Respraying of removable Tram panels	For use with water based paints integrated compressor	F	Outside workshop	T	T/I	T/I	T	Us er	1
	4.7	Pantograph maintenance & load test jig	to calibrates and align tram pantograph off Tram roof	The Infraco to propose	F	Throughout workshops	T	T	T	T	T	1
	4.8	Suspension setting equipment	To allow suspension to be set/shimmed without using tram lift	The Infraco to propose	M	Throughout workshops	T	T	T	T	T	1
	4.9	Diesel generator	Back up power source	Capable of connection to the depot LV switchboard and other plant requiring an external	M	Across network	*	I	I	I		*To be rented by the Operator if and when required.

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				energy source. Capable of providing at least three day continuous operation.								
5		Hand & Mobile Tools										
	5.1	Infrastructure tools	Hand tools	The Infraco to propose	P	Across ETN	I	I	I	I	I	The Infraco to propose
	5.2	Tram tools	Hand tools	The Infraco to propose	P	Across ETN	T	T	T	T	T	Tramco to propose
6		Welding Shop Equipment										
	6.1	Ferrous welding equipment	General infrastructure repairs	The Infraco to propose requirements. Infraco to develop integrated solution	F	Dirty workshop	I	T/I	I	T/I	Us er	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	6.2	Aluminium welding equipment	Specialist Tram and Tram shelter repairs	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Dirty workshop	I	T/I	I	T/I	User	The Infraco to propose
7		Battery Shop Equipment										
	7.1	Tram battery charger	To recharge Tram Batteries	The Infraco to propose	P	Battery room	T	T	T	T	T	The Infraco to propose
	7.2	Infrastructure battery chargers	To recharge various batteries used in power supply, control and comms equipment	The Infraco to propose and develop solution compatible with tram battery charger	P	Battery room	I	T	T	T	T	The Infraco to propose
8		Instrumentation and Test Equipment										

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	8.1	Tram test equipment	To allow testing of measurement and testing of tram equipment	The Infraco to propose. Note any overlap with "Special Tools" to be highlighted. As a minimum, proposal to include; headlight tester, tools to allow event recorder to be downloaded and interrogated, tools to allow CCTV systems to be downloaded and interrogated, tools to allow PA and PID announcements to be re-configured.	M/P	The Infraco to propose	T	T	T	T	T	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	8.2	Infrastructure and Fixed systems test equipment	To allow measurement and testing of infrastructure and fixed systems	The Infraco to propose. Note any overlap with "Special Tools" to be highlighted as a minimum, proposal to include; OLE height and stagger gauge, stray current data loggers, noise measurement equipment, ride measurement equipment, point setting detection equipment, ≥3 sets of live line testing	M/P	The Infraco to propose	I	I	I	I	I	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				equipment								
9		Infrastructure Maintenance Equipment										
	9.1	Portable P&C grinders	To dress points and crossings	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.2	Track welding equipment	to build up profiles/replace sections of track	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.3	Portable tamping equipment	To build up track ballast to realign track	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.3	Portable lighting equipment	To illuminate work/collision sites	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.4	Portable generators	To power site tools/lights	The Infraco to	P	On Site	I	I	I	I	I	2

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				propose								
	9.5	Track measuring Equipment	To allow track line and levels to be measured	The Infraco to propose	P	On site	I	I	I	I	I	1 set
10		Road Vehicles										
	10.1	Road - rail vehicle	To move about the system carrying mobile equipment and personnel	Able to operate on UK roads Able to operate on all parts of the ETN To be equipped with demountable ≥2 man-basket to enable OLE inspection throughout the ETN Capable of towing a tram including ability to apply tram brakes from cab of road-rail	M	Mobile throughout ETN and road network	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				vehicle Capable of having snow plough attached in both road and rail mode Crane with capacity ≥6t and a reach (reduced capacity) of at least 4m. Able to transport other equipment items as set out elsewhere in this list Able to transport ≥3 personnel in cab Payload capability ≥10t							

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				This will make it a requirement that the driver has a LGV driving license. Powered winch with ≥8t pulling capacity								
	10.2	Other road vehicles	Miscellaneous vehicles to be proposed by Infraco	The Infraco to propose	M	Throughout road network	I	I	I	I	I	The Infraco to propose
	10.3	Road/rail trailer	Trailer with large man lift for OLE inspection/repairs	Capable of being towed to site by	M	Throughout road	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				road/rail vehicle or truck		network						

29.15 Overhead Line Equipment

The Depot tracks shall be equipped with overhead line equipment. This will be in compliance with the Employer's Requirements for Overhead Line Equipment in Section 31.

Electrical and safety interlocking with the craneage and other plant and equipment shall be provided.

29.16 Depot Substation Buildings and Associated External Works

The requirements for the Depot substation building and associated external works are as follows:

- The Depot sub-station requirements and facilities shall accommodate the needs of the traction power loads within the Depot and to service the adjacent sections of main line, the Depot domestic supplies and the requirements of the Distribution Network Operator.
- A separate 11kV/400V LV transformer and distribution switchgear shall be accommodated fed from the main 11kV supply located in the Depot substation.
- The depot LV switchboard shall be capable of being energised from an external / mobile generator via socket and plug with an interlocked isolator. This shall provide 400 V ac supplies to essential services within the Depot complex.
- Provision shall be made for the switchboard generator apron and clear access to the connection point.

29.17 Depot Systems

29.17.1 Electrical Supplies

The power supply to the traction sub-station is described in Section 30 (Traction Power) of these Employer's Requirements.

Scope

The requirements on the Infraco shall include but not be limited to:

- Main (11kV) power transformer and LV switchboard;
- Sub-mains distribution and main equipment;
- Small power distribution;
- Power supply to mechanical plant and controls;
- Back-up supplies (fixed standby generator);
- Uninterruptible power supplies;
- Data distribution and information technology systems supplies (including operations IT systems);
- Fire protection system supplies;
- Power supplies to CCTV, security and access control systems supplies;
- Power supplies to lighting – internal and external, emergency lighting supplies;
- Cable containment;
- Lightning protection and Depot equipment earthing; and
- Commissioning of systems and training.

Auxiliary Power Supplies

Auxiliary supplies shall be provided with a suitably sized uninterruptible power supply. The uninterruptible power supply room shall be provided with cooling in order to maintain battery life (along with ventilation to offset hydrogen build-up if required).

110 Volt Power Supplies

Appropriate networks of 110 V shall be provided:

- 110 V power shall be distributed within the stabling area;
- 230 V/110 V transformers shall provide 110 V supplies throughout the workshops, the main LV switchroom, the plantroom, the wash plant and the sand filling plant.

Control Centre

Electrical supplies shall be configured such that in the event of a single failure there shall be no loss of data and no requirement for excessive actions on the part of the Control Centre staff.

A dual supply changeover arrangement, with high integrity circuit breakers is preferred to a single large uninterrupted power supply. The power changeover function shall not in itself cause the failure of any system so powered, the loss of information or an interruption to the availability to any sub-system for more than 20 seconds.

- Two, suitably sized uninterrupted power supplies shall be connected in parallel and supplied from the Depot substation to provide supplies to critical loads, i.e. Control Centre and equipment room supplies;
- The equipment room electrical systems to provide heating, ventilation, air conditioning, lighting, power and other building services to provide effective habitation for the centralised terminals of all sub systems deployed upon the Edinburgh Tram Network and the human/computer interfaces thereof shall be provided; and
- Lighting to equipment room shall be provided in accordance to CIBSE Codes. Emergency lighting within equipment room shall be at least 50% of normal to allow operations to be carried out even during mains failure.

An appropriate means of facilitating uninterrupted data and voice communication between the equipment room and Control Centre shall be provided for those sub-systems that are present at the operator workplaces, mimic diagrams, display banks and any emergency override facilities. Dedicated containment (and riser, depending on the room's orientation) for cabling between the two rooms shall be provided.

29.17.2 Specific Sub-System Technical Requirements

Access Control

A complete access control system shall be provided to relevant standards with a clearly defined access control strategy.

Controlled entry for pedestrians, Trams and road vehicles shall be provided with appropriate access control for each. Access control shall be switchable between a reception area (for daytime use) and the Control Centre. The Depot road entrance shall have two separate vehicle gates for entry and exit, and additionally a pedestrian gate on the footway. The vehicle gate shall be capable of being opened, and the pedestrian gate released, from either the Control Centre or the Depot reception, or by a member of staff presenting a security card to a reader at the gate.

The vehicle gate shall re-close once a vehicle has passed through. The pedestrian gate shall close automatically and re-lock when it closes. The vehicle exit gate shall open automatically when a vehicle approaches it from within the Depot.

Tram entry / exit locations shall be provided with manual gates, which shall normally be left open. At these gateways, there shall be a microwave or equivalent detector, which shall sound a single brief distinct audible warning in the Control Centre whenever the beam is interrupted by a person or larger object.

Intercoms shall be provided from each of the two entry gates (pedestrian and vehicle) to reception and Control Centre. There shall be two intercom positions on the same pole, one at convenient height for car drivers and one for heavy goods vehicle drivers, who shall be able to use them whilst in the driving seats of their vehicles. here shall be one security card reader at the lower position and one with the intercom at the pedestrian gate. Any equipment in centre of the road shall be removable if required to allow tram movement by road if designed to be through the same access. An intercom system shall operate in line with the access control system.

IT Systems

IT Systems including network cabling containment throughout the Depot building for the independent supply of IT systems shall be provided in accordance with Good Industry Practice.

- Data cabling shall be provided to appropriate standards;
- All equipment finishes shall be appropriate to area and type of use within the Depot building and shall be in materials with a long life in an environment that is in continuous use;
- All accessories used shall be from approved suppliers/manufacturers. Lifespan of finishes / accessories shall be verified with relevant supplier. Correctly (IP) rated items shall be installed as appropriate to the environment; and
- All materials used shall comply with their appropriate standards. Where necessary, finishes / accessories to carry the appropriate 'test pass' mark.

Data collection facilities shall be provided for the management of information provided by all relevant equipment including the underfloor wheel lathe, SCADA, wash plant etc.

Adequate data points shall be provided to enable data collection facilities to be connected.

Lighting

Natural light in offices shall be maximised and all rooms shall be placed within the building in locations appropriate to their function.

Office lighting shall be to CIBSE document 'Lighting Guide 7: Office Lighting'. The document encourages the maximum use of daylight in offices. Use of lighting controls (i.e. daylight sensing, presence detection) shall also be provided, hence saving energy by utilising daylight wherever and whenever possible.

Lighting in main workshop and other areas shall be placed such that light is given where required for work to take place, including when Trams are present. Each lighting element shall also be safely accessible for maintenance during the continuous operating hours with the OLE over one Tram berth isolated.

- Lighting shall be provided so as to provide the required lighting levels (to CIBSE Guides) even when Trams are occupying the workshop. Task lighting shall be provided by luminaires placed close to the task, also supported by portable lamps connected to local supplies;

- Appropriate switching and control strategies shall be implemented; and

- Verification of lighting levels shall be supported by lighting calculations and also by taking post-installation light meter readings.

29.17.3 Workshop Doors

Workshop Tram access doors shall be bi-parting, bi-folding with clear panels for through visibility. The doors shall be power-operated with push-button controls both inside and outside. The open and close button shall be press and hold whilst the door moves, rather than press and walk away to ensure door does not open or close onto an obstruction or person.

- A top-hung door with a bottom track shall be provided and allowed for when sizing the electric motor;

- The actuating mechanism shall be such that it can be maintained without the need to isolate the overhead line equipment;

- In the event of power or door operating equipment failure, it shall be possible for one person to operate the doors manually from ground level;

- The doors shall be provided with a suitably located insulated aperture to accommodate the live overhead line;

- Overdoor heaters, if proposed, shall operate only when doors open via interlinks and integral thermostats.

Door leaves shall be bonded to earth so that should they inadvertently come into contact with the overhead line equipment, the fault resistance shall be sufficiently low to ensure immediate circuit breaker trip without damage to doors or equipment.

29.17.4 Hazardous Material Storage

Facilities for the storage of hazardous materials and road access for their delivery and off loading shall be provided.

29.18 Equipment Room

29.18.1 Fire Alarms / Fire Extinguishing System

The equipment room shall have a means of locally activating the fire alarm via a wall-mounted panel.

The equipment room shall be fitted with smoke and temperature alarms.

The equipment room shall also be fitted with an automatic and manually operated extinguishing system, which shall not damage the equipment when activated. The extinguishing system chosen shall be designed subject to a risk assessment based on criticality etc.

In the event of the loss of the primary power supply, the alarm system shall function for a minimum of six hours. This system shall be integrated with the durations and functionality of all other UPS systems.

29.18.2 Heating and Ventilation

The equipment room shall be environmentally controlled to minimise the effects of room heating due to equipment dissipation.

The heat exchanger vents shall not be positioned over the work area of the maintainers nor directly above equipment cubicles, and shall be placed in position to minimise localised chilling effects.

The room shall be positively ventilated to prevent dust ingress.

All equipment fitted with fans shall ensure that fan failure shall not compromise system functionality.

29.18.3 Lighting

Lighting within the equipment room shall be either incandescent or fluorescent type fittings.

In the event of power failure, emergency lighting shall be fitted which shall operate for four hours and maintain the level of illumination in the room.

The lighting shall be positioned to illuminate the front and rear of the equipment cubicles, but not directly above equipment cubicles.

29.18.4 Cable / Conduit Entry

Cable routing shall be primarily through floor-recessed conduit.

The main cable entry / exit shall be via an aperture located in the floor, which provides entry or access for cables external to the Depot.

Cable access shall be through the equipment room ceiling.

Particular care shall be taken to ensure that electro-magnetic compatibility is not degraded when cables are closely located.

Cables shall be continuously screened through the wall / floor / ceiling apertures.

Appropriate strain relief or clamping shall be provided.

All cables and conduits shall be clearly marked with cable identifiers or suitable permanent marking which shall last for the expected lifespan of the cable or conduit.

29.18.5 Architectural Requirements

Equipment shall be laid out in the equipment room to afford easy accessibility.

Cubicle doors, when opened shall not impinge on access.

Appropriate 'safe' walkways shall be clearly identified on the floor of the room.

Equipment shall be placed such that cabling runs are minimised.

Antenna, low signal or high frequency cable runs shall be minimised and the equipment positioning optimised to ensure a majority of these runs are compliant.

The equipment room floor shall be sealed to minimise dust ingress into the equipment and the surface shall ensure that no static build-up occurs.

29.18.6 Security Requirements

In the event of security and access control system failure, this shall be logged accordingly and displayed to the Control Centre staff.

29.18.7 Equipment Room Furniture

The equipment room shall be furnished with modern ergonomic furniture to assist the maintainers and reduce fatigue.

There shall be two maintainer's desk positions in the room.

The design of the equipment room furniture shall include provision for the effective management of cabling, and equipment and maintenance power supply distribution.

Each desk position shall have personal storage of a minimum of three lockable drawers.

Positioning of storage shall not inhibit the work-envelope of the maintainer.

Additional tool storage locations shall be located in appropriate areas of the equipment room

29.19 Mechanical and Public Health

29.19.1 General

The mechanical and public health services works to be provided shall include the main Depot, and comprise heating, fresh air ventilation, toilet accommodation extract ventilation, specialist extract ventilation, comfort cooling systems, control systems, incoming natural gas supplies and distribution, fire alarm systems, fire suppression system, incoming mains water supplies, domestic hot water generation, domestic hot and mains water distribution, rainwater collection, waste and soil pipework systems, and underground surface water and foul drainage immediately local to the main Depot (connecting into main services systems).

29.19.2 Water

Cold water shall be provided to each stabling road.

Mains water shall be supplied to areas such as the vehicle workshop (and other special purpose workshops), plant room and wash plant. Backflow prevention devices shall be employed.

Domestic hot water shall be centrally generated and stored. The calorifiers and circulation plant shall be housed in the appropriate plant room.

29.19.3 Air Conditioning

Air conditioning shall be provided in the Control Centre, and all administration areas.

A 'free-cooling' system shall be provided for the equipment room.

Duplicate cooling systems, each capable of 100% duty, shall be installed to serve the Control Centre and equipment room.

29.19.4 Ventilation

Dedicated extractor systems shall be provided to suit specific items of equipment (i.e., lathes, paint spraying booths, vehicle battery charging and uninterrupted power supply system).

29.19.5 Drainage Pad

A drainage pad shall be provided adjacent to the pressure washer with a water and power supply for a pressure washer.

Treatment of wastewater to meet appropriate standards prior to connecting to site drainage system shall be provided.

29.19.6 Mechanical Systems

The systems shall be configured such that in the event of a single failure there shall be no loss of data and no requirement for excessive actions on the part of the Control Centre staff.

All centralised mechanical services plant shall be located in the plant room with sufficient space allocation for maintenance and / or plant removal. The only exception to this may be the heat rejection plant necessary for the air conditioning/comfort cooling installations, which are likely to located externally. Should equipment be required to be located externally the impact on the overall visual appearance of the Depot shall be considered.

30 Traction Power

The scope of this Section of the Employer's Requirements is to define the traction power (substations) requirements applicable to the Edinburgh Tram Network which the Infraco must comply with.

30.1 General Requirements

The provision of traction power shall be derived from a number of suitably located traction substations distributed around the Edinburgh Tram Network.

Each Edinburgh tram traction power substation shall include:

- The traction substation enclosure;
- The associated Scottish Power HV (11 kV) three-phase power supplies with associated HV switchboard, metering and local emergency tripping facility;
- 230V LV services with associated metering and distribution equipment for substation services i.e. lighting, small power etc;
- Traction substation transformer-rectifier/s and equipment;
- Traction dc switchboards;
- Feeder and bypass isolators;
- Substation earthing;
- Negative busbars
- Batteries / charger;
- SCADA interface marshalling panels or agreed equivalent;
- Associated internal power and control cabling; and
- Miscellaneous items to complete.

Substations shall be containerised at all locations where this is practicable.

Provision shall also be made for a 11 kV supply to the Depot services transformer.

30.2 Traction Substations

30.2.1 General

A sufficient number of traction substations (including a separate substation for the Depot) shall be provided, as described later in this Section 30.

The equipment to be provided for each of the eight traction substations for Phase 1a shall comprise:

- Appropriate HV supply arrangements from a Scottish Power circuit breaker (as part of their HV switchboard to be located in a separate section of the substation building);
- A single indoor transformer-rectifier unit;
- A 750 V dc switchboard with direct acting overload protection, impedance protection, earth fault protection and transfer tripping;
- A negative busbar cubicle;
- A tripping and closing battery and charger; and
- All associated internal power and control cabling, and earthing.

The layout and disposition of all equipment contained within all substations shall be identical where this is practical.

Separate personnel access shall be provided to the compartment housing LV control, protection and instrumentation equipment and associated multicore cabling terminations. This compartment shall be fully segregated from the HV / traction voltage compartments by means of a cage or similar. An access door shall be provided between the two compartments, with a locking system that is to be agreed with **tie**.

Two track feeder isolators with earthing function and a motorised bypass isolator shall be provided.

At all substations, control and indication information shall be provided to SCADA by suitable remote communication interface.

30.2.2 Russell Road Track Paralleling Hut (applicable to Phase 1b only)

Consideration shall be given to the provision of a Russell Road track paralleling hut, which shall be provided with similar equipment as all other substations, however an HV supply from Scottish Power will not be provided and the substation shall be used as a track paralleling hut in the first instance.

The design shall consider the future detailed provision for the installation of such an HV Supply, in configuration of the substation which shall be identical, as far as practicable, to all other substations to be provided within the Edinburgh Tram Network.

Cable ducts into the building shall be provided to enable the future installation of a HV Supply with the minimum of disturbance to the ongoing operation of the location.

30.2.3 Gogar Depot Substation

The equipment at the Depot traction and services substation shall comprise three HV supply cables from three Scottish Power circuit breakers, or ring main units feeding two indoor transformer-rectifier units for depot stabling traction and main line traction, and the other to the services transformer in the Depot building.

One four-panel 750V dc switchboard with direct acting overcurrent protection, relay overcurrent protection, thermal image, earth fault protection on three (two for the yard and one for the workshop) track feeder circuit breakers and direct acting reverse current protection on the rectifier circuit breaker. (Alternatively, a fused rectifier may be used, whereby no direct acting reverse current protection on the rectifier circuit breaker is needed at all. An isolator may be offered in place of a rectifier circuit breaker. If the fused rectifier option is chosen, then this will be fed from one rectifier transformer; a three panel 750V dc switchboard feeds the main line in the usual way as described above.

The whole of the Depot yard shall be earthed on the negative side including the workshop traction supplies.

The enclosure of the yard and workshop circuit breaker shall be solidly earthed, and also connected to the rectifier negative pole.

Two negative busbar cubicles (one for the yard rectifier and the other for the main line rectifier), a tripping and closing battery and charger, all associated internal power and control cabling, and earthing shall be provided.

In an annex segregated from the main enclosure for fire detection, two motorised track feeder isolators with motorised earthing function and a motorised load break bypass isolator with over-current detection and tripping relay shall be provided.

30.3 System Protection Settings

As well as complying with the **tie** requirements for as built documentation, all calculations used to determine protection settings shall be provided by the Infraco in a format allowing complete checking of methodology results without any additional sources of information.

30.4 Power System Design Principles

The 11 kV feeds to each traction substation shall be derived from and form part of the local Distribution Network Providers (Scottish Power) Network ring with a dedicated ring main unit or switchboard feeding the Edinburgh Tram Network the traction substation.

HV switchgear shall be provided to meet the requirements of the DNO (Scottish Power).

The 750 V dc traction power system shall provide a very high degree of reliability. Thus, small single-rectifier, substations shall be provided at close spacing, arranged to feed the 'in' and 'out' lines in permanent cross-connection between substations.

The OLE feeding shall be arranged so that the use of locally operated manual feeder isolators can facilitate the remote isolation and earthing of the overhead line; alternative solutions may also be offered.

Each traction substation shall also be configured so it can be isolated from the main line and bypassed without an impact on the Tram service.

The auxiliary switches of the bypass isolator shall, on the bypass isolator closing, re-configure the hard wire inter-tripping pilots to bypass the isolated substation. In the event of a fault, the over-current relay of the bypass isolator shall trip the feeding circuit breakers at both ends of the extended section, and give SCADA indication of the direction in which the fault current flow was detected. Other procedures for indication of fault location may also be offered.

Equipment located within the substations and the remote motorised isolators, including the earthing function, shall be controlled and monitored over the SCADA system.

11 kV supplies at the Depot and control centre will be taken from two 11 kV Scottish Power feeders, via a Scottish Power switchboard affording three 11 kV feeds to the Edinburgh Tram Network.

One feed shall supply the traction transformer-rectifier for the Depot yard, workshop and stabling area roads that have the track solidly earthed.

The second feed shall supply the traction transformer-rectifier for a normal main line feeding configuration.

The third feed shall supply the transformer, adequately-sized for the Depot and control centre LV ac services.

Maximum use of the standard traction transformer rectifier unit shall be achieved for the System by providing a high degree of reliability. This will be afforded by deriving traction supplies from two separate Scottish Power feeders at each substation.

In the particular case of the Depot, in the event of loss of the 400 V ac supply, essential equipment (principally the Control Centre) shall continue to function on UPS supplies and from a separate generator (see Section 29 (Depot) of these Employer's Requirements).

The 11 kV incoming supply to all traction substations shall be able to be individually tripped by the system controller located in the Control Centre via SCADA, and by staff locally by means of a dedicated 11kV trip push button to be located in each substation lobby.

The OLE shall also be able to be tripped in either direction by the system controller from the Control Centre via SCADA.

The OLE shall be able to be tripped in both directions simultaneously via a hard wire emergency mass trip button to be located in the Control Centre that shall trip all substations in the designed groups.

The OLE shall be able to be tripped locally in both directions simultaneously by means of an emergency push button located in each substation lobby.

The substations are named, referenced and located as shown below:

Table 84 - Substation Abbreviations

Substations	Nomenclature
Phase 1a	
Leith Sands Substation	LSE

Leith Walk Substation	LWE
Cathedral Substation	CAE
Haymarket Terrace Substation	HTE
Jenner's Depository Substation	JDE
Bankhead Drive Substation	BDE
Gogar Depot Substation	GDE
Ingliston Park and Ride Substation	IPE
Phase 1b	
Craigleith Substation	CGE
Granton Mains East Substation	GME
Granton Road Substation	GRE

The 750 V dc feeder circuit breakers at each substation shall be arranged to feed the OLE locally through manual feeder isolator / earth switches located in their own compartment of the traction substation. Motorised load break bypass isolators shall be provided in these compartments or at suitable location to link adjacent OLE sections in an emergency.

Intermediate sub-sectioning points shall be provided, comprising section isolators in trackside pillars (depot: pole mounted will be acceptable) to give operational flexibility during emergencies. With the exception of 'tail end' feeds, most sections of OLE shall be double end fed, and provided as second level protection with transfer tripping through private pilot cables.

30.5 Scottish Power Interface (DNO)

All Scottish Power 11 kV supplies connections, together with all associated protection, emergency tripping and tariff metering equipment shall be procured by the Infraco.

The provision of a separate Scottish Power LV supply connection for lighting and auxiliary services within the traction substation buildings, excluding the depot traction substation shall be procured by the Infraco.

The ratings and protection of the Scottish Power supplies shall be suitably co-ordinated with the characteristics of the power conversion equipment.

SCADA indications shall be made available and SCADA cable tails shall be provided for Scottish Power to wire into their equipment. A maximum number of up to 5 in-/output connections are to be considered as sufficient.

30.6 Multicore and Control Cabling

All necessary multicore and control cables within the substation, and LV ac supplies to the substation equipment, shall be provided.

Each substation LV ac supply shall be drawn from a suitably rated LV ac consumer unit.

The provision and installation of all the necessary intertripping pilot cables to and from the dc switchgear located within each substation shall be included.

Cables for all LV ac and LV dc protection, control, alarm and indications shall have copper conductor with XLPE or PVC insulation and an overall PVC oversheath and galvanized steel wire armour where cables are to be installed without armoured conduit or trunking or other adequate mechanical protection.

The conductors shall be plain annealed copper wire complying with BS EN 60447 – 2007 as applicable or equivalent and all cores shall be clearly identified by printed numbers at regular intervals.

The minimum conductor size shall be not less than seven strands of 0.67 mm diameter wire, or in the case of single wire conductors the minimum cross-sectional area shall be not normally be less than 2.5 mm^2. In special cases for light current installations single strand, annealed copper conductors with a cross-section of 1.5 mm^2 may be used but only with the specific written approval of tie.

All cable sheaths shall be free from defects and impervious to water.

Multicore and control cables shall be terminated in accordance with the manufacturer's recommendations and the cable cores shall be left long enough to be terminated without the addition of separate tails.

All detail diagrams shall be cross-referenced and shall show multicore cable schedule reference numbers to facilitate cable identification.

30.7 Transformer Rectifiers

30.7.1 General Arrangement

Each unit shall consist of a dry type, Class F AN cooled transformer to BS EN 60726. Each unit shall be suitable for environmental conditions E1 and ambient temperatures C1. The rectifier shall

comprise silicon diodes mounted on heat sinks, the whole to BS EN 60146, and cooled by natural circulation of air, enclosed in a cubicle with a rigidly constructed fabricated steel framework. The steel framework shall be completely clad in sheet steel to the extent as shall be consistent, by the provision of screened openings, with the requirements of natural cooling and ability to assess readily by direct vision from outside the cubicle any unhealthy condition of the major internally mounted components. Drip-proof top covers shall be fitted. The outer surfaces of the cubicles shall be Grey Shade 631 Semi Gloss to BS 381C 1996 or similar, e.g. RAL 7047. Adequate ventilation provision shall be made in the substation buildings without jeopardising the security of the building to ensure the equipment is able to perform correctly.

Alternatively, a separate close-coupled transformer cubicle may be offered. Substation floor area shall be considered at a premium, so an important consideration is compactness of layout without jeopardising operating and maintenance requirements.

All equipment shall comply with the requirements of BS EN 60076 and BS EN 60146, and the degree of enclosure shall be IP31 of BS EN 60529.

30.7.2 Rating

The rating of the transformer-rectifiers shall be declared as the 100 per cent continuous rated output at 750 V dc on all transformer tappings. Each combined unit shall have an overload rating according to the rating class of BS EN 60146 stated in the Schedules. The impulse voltage withstand rating shall be 75 kV for the nominal system voltage of 11 kV.

30.7.3 Voltage Regulation

The overall voltage regulation of each combined transformer - rectifier shall be 5 per cent with a tolerance of ±5 per cent of the regulation from 5 to 100 per cent rated load.

30.7.4 Voltage Ratio & Connections

The HV primary winding shall be delta connected, and two secondary windings, one star and one delta, arranged for series bridge rectifier operation in accordance with circuit diagram 12 of BS EN 60146 to produce 750 V dc at 100 per cent rated load and nominal tapping.

30.7.5 Voltage & Phase Tapping

Tappings shall be provided on the HV windings in order to make an off-circuit HV voltage selection, by means of bolted links.

30.7.6 Transformer Cores

The cores shall be built up of cold rolled grain oriented silicon steel sheets in accordance with the guaranteed maximum total loss stated in BS EN 10107. When a transformer is connected on the nominal tapping, and operating at rated voltage and frequency, the flux density at any point in the magnetic circuit shall not exceed 1.6 Tesla.

The magnetic circuit shall be insulated from all structural parts and be capable of withstanding a test voltage to the frame of 2 kV rms for one minute. A link shall be provided for earthing the magnetic circuit to the enclosure.

30.7.7 Performance Under External Short Circuit

The performance of the rectifier transformer under external short circuit conditions shall be in accordance with BS EN 60076 (BS 171 is withdrawn). In applying the values stated therein it is to be assumed that the voltage at the terminals of one side of the transformer is maintained at the full rated value for the duration of the short circuit when there is a short circuit between the phases or to earth on the other side of the transformer, or between poles on the rectifier output.

30.7.8 Losses

The no-load and load losses shall be as low as is consistent with reliability and economical use of materials.

30.7.9 HV Cable Terminations

A cable termination chamber for top or bottom entry shall be provided suitable for dry type terminations and the HV cable.

30.7.10 Diodes

The type of diode used shall have been proved in service and have an assessed reliability generally in accordance with valid and current European Standards ((actual BS 9300 seems not to standardise diodes for traction rectifiers)). A fuse-less design of diode bridge shall be provided. Alternatively fused diode bridges with monitored fuses in combination with fuse-less, but short circuit proof resistor/capacitor circuits may also be offered (refer to section30.7.11).

Each diode shall be capable of withstanding voltages having a peak value not less than 2.5 times the peak working reverse voltage rating.

Particular attention shall be paid to the method used for mounting the diodes, and it shall be possible to replace easily any individual diode without disturbing other components.

30.7.11 Surge Protection

Each rectifier shall be fitted with surge protection to ensure that the reverse voltage is shared equally across series connected diodes and bridges and that the voltage across individual diodes is limited to the peak transient reverse voltage rating of the diode.

In order to attenuate surge voltages caused by lightning strikes, pantograph arcing or similar effects, a surge protection circuit comprising two separately fused resistor/capacitor networks shall be provided. The design of the surge circuit shall be such that resonant effects with significant

harmonics present in the open circuit voltage are minimised. . Alternatively, a non-fused short-circuit proof resistor/capacitor circuit may also be offered.

Adequate protection against lightning and over-voltages, however caused shall be afforded to the substation equipment. The characteristics of all surge diverters to be used on the Edinburgh Tram Network shall be correctly co-ordinated with those of the rectifier surge circuits, so as to limit over-voltages to acceptable levels and minimise resonance effects.

30.7.12 Temperature Rise

The rectifier transformer temperature rise shall be limited to 800 K at rated output. The maximum operating temperature of any rectifier component, including busbars and connections, shall not exceed the limits permitted by BS EN 60146.

30.7.13 Protective Services

The following devices shall be provided:

- Diode heat sink and transformer winding over-temperature alarm and trip, with alarm contacts for SCADA indication and local alarm lamp indication (amber) or, alternatively, indicated on substation control & protection display;
- Surge circuit fuse failure alarm, operating for the failure of either or both circuits, with alarm contacts for SCADA indication and local alarm lamp indication (amber) or alternatively indicated on the substation control & protection display; if a non fused solution is provided (refer to Section 30.7.11 Surge Protection then no indication is required.
- A supply supervision device shall be provided to monitor the presence of the main supply to the transformer-rectifier and to give a supply failure alarm through the SCADA system; and
- An extreme inverse over-current/earth fault relay protection on the 11 kV incoming circuit for tripping the Scottish Power rectifier feeder circuit breaker, with alarm contacts for SCADA indication.

30.7.14 Instrumentation

Each rectifier shall be fitted with a shunt or dc current transducer with connection to an ammeter mounted on the front of the cubicle. Each rectifier shall be fitted with a fused voltage divider connected to a rectifier output voltmeter mounted alongside the ammeter.

The overall accuracy of the shunt / dc current transducer and ammeter, and of the voltage divider and voltmeter, shall be to Class Index 1.3.

Alternatively, this instrumentation may be located in the rectifier feeder cubicle of the DC switchgear or the values may be shown on substation control & protection displays.

All 750 V dc connections, relays and instruments and any stray current monitoring instruments shall be capable of withstanding the test voltage stipulated in BS EN 50124-1 2001.

30.7.15 Negative Isolation

The negative connection from each rectifier shall include a disconnection facility by means of an isolator, either as part of the rectifier or part of the negative busbar cubicle.

30.8 A.C. HV Switchgear

Provision is to be made for a 'Scottish Power' emergency trip facility (located in each substation lobby) to allow mobile tramway staff, who may not be authorised for access to the traction substations, to trip the Scottish Power in-feed to a substation in the event of a failure of the SCADA system.

30.9 D.C. Traction Supply Switchgear

30.9.1 General

The switchgear shall be of the high-speed air break type in accordance with BS EN 50123-2, suitable for use on a 750 V dc traction overhead line system, with floating track negative return circuit.

Circuit breakers shall be of the carriage-mounted 'withdrawable' type, within cubicles.

The switchboard shall comply with BS EN 50123 Part 6 and be capable of sustaining without damage, the electrical and mechanical stresses produced by fault conditions up to the prospective system short circuit rating.

The entire switchboard enclosure shall be insulated from earth and there shall be no inadvertent earthing of the switchboard other than via the main earth bar passing through the low impedance earth fault sensor.

Each cubicle shall be of rigid folded sheet steel construction suitable for all normal and fault conditions, and withstand repeatedly without distortion or failure, shocks caused by closing and opening impacts. Enclosures shall have a degree of protection to IP 31.

Removal of covers on any cubicle to permit access to components shall not cause exposure of live conductors in the adjacent cubicles.

The design of the cubicles shall ensure complete dispersion of ionised effluent from the circuit breaker to atmosphere without hazard to personnel or the possibility of establishing a conducting path to the switchboard frame.

The switchgear assembly shall be designed in compliance with, and have certified test reports to demonstrate compliance with clause 6.6.3 of BS EN 50123-6 1998. Front access doors to compartments with exposed metalwork connected to the primary circuit shall be insulated against arcing to the door (3 mm polycarbonate screen or equivalent) and have a fault rated flexible earth strap at the top of the door between door and cubicle frame. Hinges and door latches shall be substantial and keep engaging on door closure.

Outgoing cable boxes shall be suitably sized to accommodate the DC cables. Feeder cable boxes shall be furnished with a surge arrester coordinated with the OLE and rectifier surge protection ratings.

Other DC switchgear, proved and tested in similar applications providing same or similar functionality in compliance with relevant, current and valid European Standards may also be provided.

30.9.2 Busbars

The busbars shall be rigidly supported and fully insulated throughout their length, including tee-off connections and joints between adjacent chambers.

The busbars shall be completely enclosed in an earthed metal chamber, access to which shall be by means of bolted panels. Removal of these panels shall not give access to outgoing circuits. No small wiring or other equipment shall be mounted in busbar chambers.

Other solutions providing same or similar functionality and electrical safety may also be provided.

30.9.3 System Voltage and Fault Level

The normal system traction working voltage shall be taken as 750 V DC, with a tolerance in accordance with BS EN 50163.

The switchgear shall be capable of withstanding the electrical and mechanical stresses when clearing short circuit currents up to the maximum prospective level of the system, assuming that normal voltage will be maintained at the primary terminals of the rectifier transformer.

The switchgear shall be capable of interrupting the following currents:

- Terminal short circuits;
- Overhead line faults adjacent to a substation;
- Overhead line faults remote from substations, and including faults at the most distant point fed under the most onerous outage conditions tolerable;
- All values of traction load currents likely to be encountered in service, passing through the switchgear in either the forward or reverse direction; and
- Load currents of tramcar auxiliaries, under both starting and running conditions, passing through the switchgear in either the forward or reverse directions.

All electrical clearances in air and insulator creepage distances shall be adequate to withstand all specified steady state voltages and all transient voltages likely to arise in service.

30.9.4 Temperature Rise

Each current carrying component of the equipment supplied shall be capable of continuous operation at the specified ratings without exceeding the maximum temperature rises stated in the appropriate European Standard.

30.9.5 Circuit Breaker Isolation

Each complete circuit breaker together with its auxiliary switches and operating mechanism shall be arranged on a 'withdrawable' carriage to permit full accessibility for maintenance purposes and as a means of isolating the circuit.

Indication of circuit breaker 'open/closed' status, and circuit breaker position, shall be visible through a window in the cubicle access door or by other suitable means (e.g. after opening the cubicle access door and, in addition, on substation protection and control display)..

The circuit breaker carriage shall remain within the confines of the cubicle when in the service or isolated positions.

A positive stop shall be provided to indicate when the circuit breaker has been fully moved into the service position.

Mechanical interlocks shall be provided so that it is neither possible to withdraw the circuit breaker without having first tripped the operating mechanism, nor to replace the circuit breaker if in the closed position. Means shall also be provided to enable the circuit breaker to be operated electrically or by hand when in the isolated position. A padlocking facility shall be provided on the isolating handle aperture. The main isolating contacts of the fixed portion shall be equipped with shutters arranged automatically to cover all live parts on both busbar and outgoing circuits. Provision shall be made for padlocking each individual shutter in the closed position.

Secondary isolating contacts shall be provided as necessary and arranged so that when in the isolated position all auxiliary supplies to the circuit breaker carriage are still connected.

Facilities shall also be provided so that the circuit breaker and its associated electrical auxiliary circuits can be operated electrically when the carriage is completely withdrawn from the cubicle enclosure.

The circuit breaker carriage shall be equipped with suitable wheels for movement on normal floor surfaces and also to act as guides in conjunction with suitable alignment rails, pins and sockets to ensure correct and accurate engagement of the plug and socket contacts.

Steel ramps and tracks of suitable section and robust construction shall be provided for the movement of the carriage into and out of the stationary portion of the cubicle. The arrangement shall positively and accurately align the main and secondary plugs of the carriage with the respective stationary portion plugging contacts and during all movements under service conditions maintain such alignment and earthing contact. The ramps shall be designed to permit easy movement of the carriage between cubicle and floor without shock or damage to the equipment or floor.

Plugging or scraping contacts with copper current paths shall be provided to ensure a satisfactory and positive connection of the metalwork of the circuit breaker carriage to the switchboard earth bar established in the isolated position before any 750 V connections are made.

30.9.6 Circuit Breakers

All circuit breakers shall have a continuous current rating in accordance with BS EN 50123 and BS EN 60439 where applicable, shall be identical in arrangement and fully interchangeable with each other, where appropriate. Rectifier and feeder circuit breakers shall not be interchangeable, in -case Rectifier circuit breakers are provided (in case of Fused Rectifier diodes, Rectifier disconnectors are sufficient and to be provided).

The closing circuit shall contain an anti-pumping feature which shall prevent automatic re-closure should the closing signal be retained indefinitely either by operator action or resulting from a failure on the supervisory control system. The circuit breaker shall not respond to a close signal when open and a trip signal is present.

Closing and tripping circuits shall be capable of satisfactory operation within the limits of 70 per cent (tripping of feeder circuit breaker trip coils) 80 per cent (closing) and 120 per cent, of the rated dc auxiliary supply voltage.

The 'trip' coils of the dc rectifier circuit breakers shall, if needed (see above), take the form of 'under voltage release' coils after Network Rail practice, so that loss of auxiliary voltage will cause the rectifier circuit breaker to drop out, leaving the feeder breakers closed up as a track paralleling hut (TPH).

The circuit breaker shall be capable of being closed and tripped manually in the service position while still retaining its full fault making and breaking capacity. Under such manual operation it shall be possible to disconnect the auxiliary dc supply without interfering with the operation of the breaker.

Provision shall also be made for the slow manual closing of circuit breakers when withdrawn for maintenance purposes and one device for this purpose shall be provided per switchboard. The slow closing device shall be such that the moving portion of the circuit breaker can be halted at any point in the travel, to enable checks to be made at all points of the closing stroke.

Mechanical indicators shall be provided to show whether the circuit breaker is open or closed. An operations counter shall be fitted.

Shunt tripping coils shall be wired in series with circuit breaker auxiliary contacts arranged so that the supply to these coils is automatically cut off on completion of a successful operation.

All contacts shall be easily and quickly replaceable.

The arc chutes shall be so arranged that any emission of flame, hot gases or metal particles during operation of the circuit breaker will be contained within the cubicle and not cause damage. Arc-chutes shall be designed for convenient handling and removal during inspection and maintenance.

The design of the arc control chutes shall be such that erosion caused by the arc and emission of ionised effluent during operation of the circuit breaker is minimal. The materials used in them shall be non-hygroscopic.

Each circuit breaker carriage shall be fitted with a label holder and an easily removable blank white sandwich plastic label.

The front and rear of each cubicle shall display a prominent label showing the circuit identification by name and approved reference number.

30.9.7 Interlocks

A system of mechanical or electronic interlocks (substation control and protection) shall be provided which automatically imposes a fixed sequence of events designed to prevent mal-operation of the circuit breaker unit as a whole.

30.9.8 Protection Devices

Each feeder circuit breaker shall be fitted with a uni-directional series instantaneous overload device, with a calibration range chosen to be a standard for the system. It shall also be fitted with a multi-functional device to afford instantaneous, programmable and thermal image protection. Rate of rise protection is disallowed (may be a standard part of the multi function relay, provided it can be disabled) but impedance protection will be considered.

Each feeder circuit breaker shall be fitted with a line proving device to prove the circuit onto which the circuit breaker has been instructed to close is not faulted. The maximum current that may flow due to the 'line proving', in the event of a short circuit shall not exceed 40 amps. The relay that measures the residual resistance in the circuit and blocks the circuit breaker against closing shall have a setting range of 2 to 50 ohms as a minimum. In addition to blocking the circuit breaker from closing a SCADA indication shall also be given that the closing has been blocked.

A combined intertripping and earth fault protection scheme shall be provided. Each switchboard shall be equipped with a low impedance earth fault detector, arranged to initiate a local mass trip of all dc circuit breakers and to intertrip corresponding feeder breakers at adjacent substations for all causes of feeder CB tripping. 'Intertrip receive' protection relays or related control equipment shall be fitted with a manual reset flag or similar (e.g. display), showing when the protection is operated. Intertrip by-pass facilities shall be provided, by means of auxiliary switches in the substation bypass isolators reconfiguring automatically when the isolator is closed. Inter-trip, in/out of service, switches shall be provided in order to inhibit the intertripping when OLE is sub-sectioned. Provision shall be made for SCADA 'opening' of the feeder circuit breakers without causing a mass trip or intertrip.

Contacts shall be provided to give individual trip alarms from main and back-up protections through the SCADA system.

The SCADA system will include a remote trip facility. In order to maximise reliability, the incoming SCADA control signal for this facility shall be arranged not only to trip the appropriate local feeder circuit breaker but also to trip the corresponding feeder circuit breaker at the remote end of the OLE section via the intertripping pilot wire system.

Each circuit breaker shall be fitted with a push button and lamp (white) to provide a local trip 'circuit healthy' indication on demand with the breaker closed. The current path for this feature shall include the actual circuit breaker trip or actuation coil.

Additionally, a voltage operated relay fitted with a self reset flag indicator shall be provided to supervise the tripping supplies to the switchboard. Contacts shall be provided to give an alarm through the SCADA system.

Each outgoing d.c. feeder cable box shall be equipped with a surge diverter.

30.9.9 Control and Instrumentation

All equipment shall comply with relevant and valid European Standards.

Auxiliary control supply shall be from a floating LV d.c. supply. Individual panels shall have both polarities of the supply fused, or protected by magnetic circuit breakers.

Current measuring devices shall be fed from either shunts or transducers. All 750 V connections and associated relays and instruments shall be capable of withstanding the test voltages according to relevant and valid European Standards.

Main items to be included on each panel shall include:

- Circuit breaker control switch (open/close);
- Circuit breaker control selector switch (local/supervisory); and
- Indication lamps (open/closed - green/red).

All control and control selector switches shall be suitable for locking by means of a padlock. Indication lamps shall be of the LED type to ensure long life.

Each feeder circuit breaker panel shall be provided with an ammeter, of overall accuracy including the shunt to Class Index 1.5.

Each rectifier panel shall be provided with a voltmeter fed from the rectifier side of the circuit breaker, or the rectifier voltage transducer.

Alternatively, listed control and indication elements may also be provided by means of the substation protection and control units (e.g. display). In this case, therefore, padlocking is not applicable.

30.9.10 Overhead Line Emergency Trip

A facility to ensure the fail-safe hard wire emergency mass trip of traction substation dc circuit breakers by the system controllers shall be provided within the Control Centre.

Separate emergency trip push buttons shall be provided for the following two groups:

- Haymarket to Newhaven
- The rest of the Edinburgh Tram Network including the Depot,

This facility shall take the form of a suitably located and identified wall mounted box containing all equipment and push buttons necessary to provide this function.

The equipment to be provided in each traction substation and TP hut for this feature shall comprise a hold-in relay energised from the tripping batteries of the traction substation and a remote normally-closed contact in the Control Centre or other substation. The system shall be provided with trimming resistances to keep the relay current within limits for varying distances to the remote contact. The system is envisaged to be stable at up to 15 km with 1.5 sq mm pilot cores. The mass

trip relay shall have sufficient circuits to trip all feeder circuit breakers and dc rectifier circuit breakers. It is not envisaged to use the rectifier circuit breaker trip and an open link shall be provided in this circuit. Two further normally-open and normally-closed contacts shall be provided for use in cascading the trip to other traction substations in a similar manner.

Provision shall be made for an overhead line emergency trip facility (located in each substation lobby) to allow mobile tramway staff, who may not be authorised for access to the traction substations, to trip the overhead lines in both directions from a substation in the event of a failure of the SCADA system. The logic of this trip facility will be integrated in the central station controller of each substation.

30.9.11 Circuit and Busbar Earthing

Means shall be provided at each panel for applying a safety earthing device to busbar or circuit connections in order to comply with safety legislation. A dedicated earthing truck or other suitable earthing equipment, as needed for the installed equipment, shall be provided at each substation for such purposes.

30.9.12 Isolator Motorised Operation

Where motorised isolators are provided, operation of the feeder isolator and earth switch functions shall be from the substation tripping battery.

Operational commands shall be via SCADA signals hard wired from the SCADA outstation within the substation to relays in the isolator panel.

Both OLE feeder terminals shall have 'live line' detection arranged to inhibit opening of the feeder isolator and this detection shall be brought back to the Control Centre via SCADA.

It shall not be possible to earth a feeder unless the bypass and feeder isolator are both open.

It shall not be possible to close a feeder isolator unless both the earth has been removed and the adjacent bypass isolator is open.

It shall not be possible to close the bypass isolator unless both adjacent feeder isolators are open. SCADA position indication shall be provided for all switching elements in all positions.

In the event of loss of rectified Scottish Power LV supply the operation shall auto change over to a battery supply.

For isolators located in the Depot, this section is not applicable, because of manual operation.

30.9.13 Bypass Isolator Over-current Feature

The bypass isolator when closed shall reconfigure the 'pilot wire' inter-tripping between adjacent substations to bypass the substation in which the bypass isolator is accommodated.

In case protection of contact line cannot be provided by adjacent substations when bypass-isolator is closed, the bypass isolator shall have a 'line current' trip feature where the current passing through the bypass isolator is measured and operates one of two relays depending on the direction of current flow through the isolator to trip both remote substations in the event of detecting a current in excess of setting.

The setting range to be approved by **tie**.

The relays shall be powered from a dedicated battery with a minimum of four hours standby time.

This battery shall be supplied from the substation tripping battery supply. There shall be SCADA indication of loss of battery voltage.

30.10 Batteries and Chargers

30.10.1 Scope and System Voltage

One 100 per cent duty battery, 100 per cent duty charger and dc distribution board unit shall be provided for each traction substation, for the purposes of providing tripping, closing and control supplies for the 750 V dc and ac switchgear. The battery charger will be supplied from the Scottish Power LV ac supplies in the substation. Neither polarity shall be deliberately earthed and the supply shall function unaffected with either pole inadvertently earthed.

It is to be noted that such supplies for the Scottish Power 11 kV switchgear will be derived from a battery and charger to be supplied and installed by Scottish Power themselves (Electricity Supply Regulations requirement).

The nominal battery voltage, suitable for the switchgear, shall be in accordance with BS 2618. The charger supply shall be 230 V, single phase, 50 Hz, and the complete equipment shall be a manufacturer's standard product.

30.10.2 Batteries

The batteries shall be of the high performance type, and shall be designed for a life expectancy of at least ten years under the conditions of service likely to be encountered. Battery cases shall be of high impact polystyrene translucent plastic. The batteries shall be such that maintenance shall be required at not less than twelve month intervals.

30.10.3 Battery Duties

The rating of each battery shall be sufficient to meet the requirements of the most arduous duty cycle at any one of the substations including:

- The continuous standing load; and
- On the assumption the battery is charged to 80 per cent of its rated capacity and the charger supply is then lost, the battery shall then be able to supply the standing load for twenty-four hours and then have sufficient capacity to carry out the closure and tripping of a 750 V circuit breaker twelve times in quick succession.

30.10.4 Battery Accommodation

Each battery together with its associated charger and dc distribution load shall be accommodated in a single, self-contained, ventilated, sheet steel cubicle of rigid construction.

The cells shall be so mounted that ready access is provided to the tops of all cells for maintenance purposes. The battery enclosure internal metalwork shall be treated with electrolyte-resisting paint.

30.10.5 Battery Chargers

Each battery charger shall be of the automatic constant voltage type and shall be suitable for supplying the constant load and at the same time maintaining the battery in a fully charged condition while floating across the load and charger.

Arrangements shall be made such that, in the event of the battery becoming discharged, the rate at which recharging commences is as high as possible consistent with maintaining the automatic charging constant voltage feature and with the connections remaining undisturbed, as for normal service.

Each charger shall also incorporate a boost charge feature, which shall, after having been started, provide an automatically controlled high charge rate sufficient to restore a fully discharged battery to the fully charged state within twelve hours without excessive gassing or any form of damage to the

battery. The boost charge shall be initiated manually but reset to float automatically, and shall not cause damage to any connected equipment. Each charger shall be capable of automatically and continuously supply the constant load with the battery disconnected. Under such conditions, the charger shall still maintain the nominal system voltage without any damage to itself, and the ripple of dc output shall not exceed ±15 per cent.

30.10.6 Alarm Devices

The following shall be provided:

- Undervoltage detection equipment to give local indication (amber lamp) and supervisory alarm when the system voltage falls to below 80 per cent nominal. A time delay shall be incorporated to prevent initiation during temporary voltage dips;
- Charge fail detection equipment to give local indication (amber lamp) and supervisory alarm if the voltage from the charger falls below the nominal floating charge voltage. Blocking diodes shall be provided to prevent the battery voltage being supplied to the equipment, so that only the charger voltage is effective in causing the alarm. The device shall not operate on switching surges or transient loss of ac supply; and
- Earth fault detection equipment to give local indication (amber lamp) and supervisory alarm of the occurrence of an earth fault, and to give local discrimination between positive and negative faults.

The above alarms shall be given separate SCADA alarm channels.

30.10.7 Instrumentation

The following shall be provided:

- Charger output/output voltmeter;
- Output dc load ammeter; and
- Centre zero battery ammeter.

30.10.8 Battery Distribution Board

The following shall be provided:

- Provision for isolating the battery (withdrawing the main fuses);

- Main and subsidiary fuses in both polarities; and
- Subsidiary fuses to dc switchboards (three in Depot traction substation, one in each of the other substations), ac switchgear transformer rectifier units, feeder and bypass isolators, two spare circuits.

30.11 Earthing, Bonding, Surge Protection & Ancillary Equipment

30.11.1 Earthing Systems

Each substation shall be equipped by Scottish Power with an earth system for their equipment which may be available for connection to the Edinburgh Tram Network substation earthing system and equipment, but only by agreement between the parties.

A earthing installation at each traction substation shall also be provided capable of specified performance alone, without recourse to connection to the Scottish Power earth system. Where Scottish Power allows interconnection, the Edinburgh Tram Network earth system shall connect to the Scottish Power earth terminal via a disconnectable link.

The Edinburgh Tram Network earthing systems shall be constructed employing copper conductors, including all necessary junctions, connectors and supports. The installation shall comply with relevant, current and valid European Standards.

The earth systems shall comprise a continuous main earth bar installation, located where possible in the cable trench, and around the inside walls of the substation, with branch connections to equipment and metalwork.

Each earthing conductor shall either be solid copper with a minimum cross-sectional area of 80 mm2 or stranded PVC sheathed copper with a minimum cross-sectional area of 70 mm^2.

All joints and bonds shall be made by proven methods to the current carrying ability of the earth conductor and full details shall be submitted for **tie**'s approval.

Attention is drawn to manufacturers' instructions on the earthing of traction dc switchgear via to low impedance earth fault protection equipment.

An Edinburgh Tram Network local earth rod system, of resistance to earth less than 2 ohm, shall be provided at each traction substation and connected to the substation earth system through a

disconnection link by means of stranded PVC sheathed copper cable with a minimum cross-sectional area of 70 mm^2 per cable. The earth rod system shall be in a minimum of two near equal sections (~4 Ohm) each connected back to the substation earth system as described. The resistance between any point of the earth system and a group of earth rods shall not exceed 0.1 ohm. This assumes earth interconnection with the Scottish Power system.

30.11.2 Traction Negative Busbar System

A negative busbar, insulated from earth and mounted within a sheet steel enclosure, shall be provided at each traction substation. The enclosure shall also incorporate an off-load isolator for the connection cables to the rectifier negative terminal. The negative busbar shall provide the connection point for the outgoing negative feeder cables to the tram track. The enclosure shall be able to accommodate four 1000 square millimetre section aluminium cables to the running rails. The enclosure shall be arranged to facilitate visual inspection of the connections inside. The enclosure shall be provided with robust insulated terminals adjacent to the negative busbar for terminating the stray current monitoring cables. Alternative stray current monitoring system can also be provided whereas no stray current monitoring cables may be necessary.

In order to minimise the flow of stray return currents in the earth and buried services, the negative pole of the traction supply, comprising rectifiers, negative busbars, feeder cables and tram track, shall not be deliberately earthed at any point.

The traction negative busbar of each traction substation shall be connected to the substation earth bar either via a minimum of one BB HVL and two Alstom 'Interval of discharge' (Soule 2 RAY's) in parallel, or via an equivalent circuit (e.g. Siemens Sitras® SCD), to control the touch voltage of the traction negative circuit and provide a fault return path. These shall be accommodated within the sheet steel negative busbar enclosure or in a separate cubicle.

The metalwork of the negative busbar enclosure shall be connected to the substation earth system.

30.11.3 Surge Diverters

Adequate protection against lightning and atmospheric overvoltages shall be afforded to the substation equipment. The characteristics of all surge diverters shall be correctly co-ordinate with those of the rectifier surge circuits, so as to limit overvoltages to acceptable levels and minimise resonance effects.

The equipment connected to the OLE shall be protected against surges by surge diverters.

Each feeder isolator shall be equipped with a non-linear resistor gapless surge diverter connected positive pole to earth at the cable terminations in the substation. The surge diverters shall be of the zinc oxide type, enclosed in the dc feeder circuit breaker cable box.

The surge diverters shall be so designed and constructed to combine a high discharge capacity and low residual voltage with mechanical robustness.

30.11.4 Substation Ancillary Equipment

The following ancillary equipment shall be provided in each substation:

- 2 No. suitable sized and rated fire extinguishers of approved type and size;
- 1 No. fully-stocked first aid cabinet of approved type;
- 2 No. `Electric Shock' wall-mounted framed safety instruction cards;
- 1 No. substation operation diagram printed on a plastic medium and framed;
- 6 No. double-sided rigid plastic notices 100 mm x 600 mm with cord loop attachment, "Danger-Live";
- 12 No. double-sided rigid plastic notices 100 mm x 60 mm with cord loop attachment, "Caution - do not interfere with this apparatus"; and
- 4 No. key safes, approximately 150 mm x 250 mm of approved type.

Sufficient padlocks for all switchgear shall be provided. The structured key security system shall be agreed with **tie**.

All substation door access keys shall be in accordance with the structured key security system set out in Section 22 of these Employer's Requirements.

30.12 Cables & Accessories

30.12.1 General

All cables shall comply with the current applicable specifications of the relevant European Standard and the supplementary requirements of these Employer's Requirements.

30.12.2 Types of Cables

Categories of cables shall be allocated series of reference numbers as follows:

- HV supply cables (1000 series)
- 750 V dc traction cables (positive) (2000 series)
- 750 V dc traction cables ((negative) (3000 series)
- Stray current monitoring cables (4000 series)
- LV supply cables (5000 series)
- Pilot cables (dc transfer trip) (6000 series)
- Telecoms multipair cables (7000 series)
- Fibre optic cables (8000 series)

30.12.3 11kV A.C. Cable

AC cables shall be provided for the interconnection of the Scottish Power HV switchgear, the a.c. circuit breaker, and the transformer rectifier units.

The cables shall be in compliance with Scottish Power standard and may be three phase or single phase with sheaths connected also in accordance with Scottish Power standards.

30.12.4 Traction Supply Cables

Single core 750 V DC copper cables shall be used for the connection of rectifier (positive) to dc switchgear, and rectifier (negative) to negative busbars.

Cables from rectifiers to DC switchgear positive and negative busbars shall be dimensioned taking into account the rating of the transformer/ rectifier unit, including their overload class.

Negative cables may have a reduced insulation level commensurate with the reduced voltage withstand required.

The cables shall be manufactured in accordance with appropriate European Standards.

Conductors shall be stranded tinned copper wires to BS EN 60228.

The insulation shall be butyl rubber (BR) or ethylene propylene rubber (EPR) to BS 6899 type GP2.

Alternatively XLPE may be considered by **tie** with adequate reference application and justification.

Cables shall be anchored at terminations by mechanical plastic glands, where gland plates must be traversed, and if necessary supported by non-hygroscopic resin-bonded laminated wood, hardwood or similar non-metallic approved clamps.

Conductor terminations shall be by means of indented or annular-compressed tinned copper lugs, with heat-shrinkable tube oversheath.

Cable conductors shall be jointed with indented or annular compressed ferrules with an approved compression tool, the joint made up by an approved jointing kit and sheathed by an approved heat-shrinkable tube.

Compression tools shall be certified as calibrated, and shall only be used when within the calibration period.

Cables to be utilised within the permanent works shall be drummed up and provided to site to ensure maximum cable lengths are installed throughout to minimise the necessity for through joints.

30.12.5 Low Voltage Supply and Multicore Control Cables

The cable construction shall comply with European standards.

Cables shall have copper conductor with XLPE insulation, PVC oversheath and, where not installed with mechanical protection, galvanized steel wire armour.

The conductors shall be plain annealed copper wire complying with BS EN 60447 circular or shaped conductors. All cores shall be identified by phase colours, or in case of control cables, by printed numbers.

All sheaths shall be free from defects and impervious to water.

LV supply cables shall be terminated in accordance with the manufacturer's recommendations and the cable cores shall be left long enough to be terminated without the addition of separate tails.

Cables to be utilised within the permanent works shall be drummed up and provided to site to ensure maximum cable lengths are installed throughout to minimise the necessity for through joints.

31 Overhead Line Equipment

31.1 Scope

This Section of the Employer's Requirements defines the overhead line equipment (OLE) requirements that are applicable to the Edinburgh Tram Network which the Infraco must comply with.

31.2 General Requirements

The information provided in this section supplements any information provided in the Tram Design Manual and other documentation provided by **tie**.

Unless otherwise stipulated, all requirements pertaining to overhead line equipment shall be compliant with BS EN 50119.

31.3 Equipment Overview

Appearance of the overhead line equipment is of paramount importance throughout the Edinburgh Tram Network. The appearance must be appropriate to the location, and visual intrusion shall be minimised.

The type of equipment provided (including, for example, auto-tensioned, fixed termination, catenary support; central mast with balanced bracket arms, side masts with cantilever arms, span wire construction etc.) over each section of the Edinburgh Tram Network shall be appropriate to the area and to the tramway operating speed requirement in that location. The use of building fixings shall be maximised.

31.4 Electrical Power Characteristics

The overhead line equipment shall be energised at a nominal 750V in accordance with BS EN 50163: 2005: Railway Applications - Supply Voltages of Traction Systems.

The overhead line equipment system shall comply with the following electrical and operational parameters:

- System voltage;
- Conductor of suitable cross sectional area;

- Traction buried reinforcing DC cables;
- The required operational speeds; and
- All in-service loading conditions.

31.5 Environmental Considerations

The overhead line equipment system shall fully comply with the environmental criteria as set out in these Employer's Requirements.

31.5.1 Ice Loading

The conventional ice loading of 10mm radial shall be used when assessing the ice-loading on overhead conductors.

31.5.2 Pollution

The creepage path and creepage distance of insulators shall accommodate the implications of atmospheric pollution in accordance with EN 50119:2001, pollution level "medium", and for areas close to the sea, "heavy"..

31.6 Material for Equipment

Standard materials shall be used with the exception of the route sections from Newhaven Road to Ocean Drive and Caroline Park to Granton Square Tramstops, where stainless steel or aluminium material (for tubes and fittings) shall be provided.

If 'parafil' or an equivalent material is to be considered, rigorous quality control fully documented and certified measures for the application, installation and long-term maintenance of the material shall be implemented. These measures are subject to specific approval by **tie**.

31.7 Pole and Cantilever Tube Deflection Criteria

The deflection of poles, cantilever tubes and other structural elements under normal and transient loading conditions shall be such as to not detract from the minimum safety functionality or appearance of the overhead line equipment system.

31.8 Mechanical and Electrical Clearances

Mechanical and electrical clearances shall, as a minimum, be in accordance with BS EN 50119 and the guidelines specified in ORR's publication "Guidance on Tramways", Railway Safety Publication 2 (**"RSP 2"**). In addition, a 'safe working zone', shall be incorporated.

31.9 Contact Wire Gradient and Geometry

Contact wire gradients adopted shall take account of the planned tram operating speed in the area and shall follow BS EN 50119 requirements. The contact wire gradient shall be such that at all times and under all environmental and operating conditions, contact with the pantograph is maintained.

The overhead line equipment horizontal geometry shall be arranged so that the contact wire is always in contact with the working width of the pantograph under all environmental and operational conditions.

31.9.1 Contact Wire Height

The governing requirement for the establishment of rules for contact wire heights shall be as clause 5.2.8 of BS EN 50119. For safety considerations, in areas where tram path is shared with the public traffic the contact wire height and the profiling of the wire shall take into account:

- ORR's RSP2 requirement for minimum wire heights where a support has failed;
- Minimise the risk of contact with wire from people and/or objects on open top double decker buses, over-height road vehicles, window cleaners carrying ladders and any third party work;
- Activities associated with the Edinburgh festival, Christmas fun-fair on Princes Street, and similar public events; and
- Provide the necessary clearance for designated high-load routes.

31.10 Structural Integrity

All proposed structures within the overhead line equipment system shall be designed to comply fully with the design parameters and codes of practice specified for the project.

31.11 Electromagnetic Compatibility

The overhead line equipment shall comply with Electromagnetic Compatibility Section of these Employer's Requirements.

31.12 Dynamic Performance

The dynamic performance of the overhead line equipment/pantograph interface shall be in accordance with the requirements of Clause 5.2.1 of BS EN 50119.

The performance of the overhead line equipment/pantograph interface shall be validated by a full dynamic simulation study undertaken during the design phase. The governing specification for all design activities is BS EN 50119.

The study method shall be validated in accordance with the requirements of BS EN 50317 and BS EN 50318.

31.13 Design Life

The design life of the overhead line equipment is set out in Design Life of these Employer's Requirements.

31.14 Auto-Tensioned Equipment Types

31.14.1 Form of Equipment

Low visual impact equipment is required throughout the Edinburgh Tram Network. Thus, anywhere along the route of the Edinburgh Tram Network, where line speed and/or pantograph interaction with the overhead line equipment demands, auto tensioned trolley wire equipment will generally be the appropriate solution.

31.14.2 Conductors and Tensioning Devices

The overhead line equipment shall utilise a single contact wire system, with additional parallel (buried) feeders or catenary system outside the city centre where the messenger wire replaces the parallel feeders..

The contact wire size shall be confirmed by electrical modelling studies and by pantograph/ overhead line equipment dynamic modelling.

Should mechanically tensioned balance weight system be proposed, the tensioning device shall comprise a counterweights and pulleys system of discrete and compact design. For example, the counterweight stack must be incorporated inside the pole structure. The system shall utilise a fail-safe mechanism with vandal proof features.

31.14.3 Tension Lengths

The maximum tension length between anchor locations shall be chosen so as to minimise the number of anchor points but without undue drag, localised hard spots and overloading of the equipment.

31.14.4 Span Length

The pole positioning, and hence span length along the track, shall be chosen:

- To maximise the structure spacing to achieve economy;
- To maintain the technical parameters referred to elsewhere in this document, e.g. geometry, clearance, dynamic performance, etc;
- For visual and aesthetic appearance issues, in accordance with the Tram Design Manual, and
- The achievement of all relevant consents and approvals.

31.14.5 Parallel Feeders

Aerial parallel feeders shall not be permitted. All parallel feeders shall be buried, located in suitable ducts running along the tracks and with cross feeding to the overhead line equipment conductors at suitable intervals. Outside Edinburgh city centre other options, like catenary system may also be offered by the Infraco for approval by **tie**.

31.15 Fixed Termination Equipment Types

31.15.1 Form of Equipment

Fixed termination trolley wire equipment shall be considered as an appropriate and cost effective solution for highly sensitive areas and/or where lower operational running speeds are required.

31.15.2 Reduced Conductor Tension System

At junctions and sharp corners, where the operational speeds are limited by the track geometry, a variant of the fixed termination unsupported wire shall be considered which utilises a reduced conductor tension system.

31.16 Depot Equipment Type

In the Depot area, a fixed termination single contact wire system (supported or unsupported) shall be provided which shall accommodate the wire height constraints.

31.16.1 Equipment Support and Registration

Cantilevers

For both auto-tensioned and fixed termination systems the cantilevers shall consist of a horizontal registration tube insulated and hinged at the face of the pole, and supported by a tie wire.

As an option, fully insulated tubes and steady arms (glass fibre plastic or equivalent) may be proposed and offered for review by **tie**.

Cross Span Wire Supports

In Edinburgh city centre areas, as an alternative to cantilever on pole equipment option, the simple cross span wire support assembly may be considered. These can be constructed between poles or attached to suitable buildings, along the route of the Edinburgh Tram Network. The choice of material and the method of construction of cross span wires shall be subjected to the approval of the planning authority.

All fittings, clamps and accessories shall be standard proprietary items, capable of being sourced freely from the market.

For minimising the visual impact of the equipment the use of non-corroding material (particularly stainless steel) shall be considered by the Infraco.

Jumpers and Feeders

All feeders and jumpers shall be electrically and mechanically compatible with the environmental and operational conditions. The visual impact due to connecting buried feeder cables to overhead conductors shall be considered when selecting appropriate feeder pole locations.

Insulation

All overhead line equipment support and registration assemblies shall be double insulated or equivalent. Failure of any single insulator shall not create an unsafe condition.

Section Insulators

Apart from the entrance to the Depot maintenance workshop, all section insulators shall be of the 'make before break' type.

31.17 Overhead Line Equipment Poles and Equipment Enhancement

Where poles are provided, the shape and colour shall be considered as part of the visual approach. The objective shall be to minimise their overall visual impact. It should be noted that the Tram Design Manual identifies a preference for circular poles.

Consideration shall be given to individual replacement of building fixings by poles in the future, should building alterations require their removal on a temporary or permanent basis.

The appearance around the base of support poles is of importance in certain areas. Consideration shall be given to minimise the impact to and ease of replacement of poles if damaged, e.g., by errant road vehicles.

The paint finish, if painting is required, shall be fully applied at the manufacturers works. However, following installation on site, the paint finish may have to be re-applied in some areas. The paint system to be used shall be offered for approval by **tie**.

Special attention shall be given to avoid damage to painted surfaces during delivery and installation. Specific approval shall be sought to make good any damage to paint work, following installation on site and **tie** reserves the right to reject equipment on the grounds of damaged paintwork alone.

31.17.1 Combined OLE / Lighting Poles

An integrated design of overhead line equipment poles and street lighting is required. This shall seek to optimise the spacing of support poles and minimise visual intrusion of the OLE and road lighting as a whole. An appropriate electrical feeding and earthing scheme shall be provided. This shall minimise the additional components required to be attached to support poles and shall take account of the maintenance approach to be adopted for the road lighting. The general requirements

for bonding and earthing of the system are contained in Earthing and Bonding of these Employer's Requirements.

Poles carrying overhead wiring along Princes Street shall not interrupt axial views down the streets connecting to Princes Street, shall be located between tram lines and shall be placed at regular intervals.

It should be noted that the Tram Design Manual prohibits fixings for wiring to buildings or structures on the north side of Princes Street.

31.17.2 Anchor Bolts, Foundations and Ties

Tie-back anchors shall be permitted in the off-street sections of the Edinburgh Tram Network with adequate anti-climbing protection, the design of which shall be subject to specific approval by **tie**.

Any anchor bolt connections and fasteners shall be fully secured and vandal proofed.

31.17.3 Foundations

For the ease of construction and where applicable the preferred type of foundations shall be of side bearing concrete, cast in-situ. These shall be either mechanically or hand dug, depending on the access and limited space availability for plant and equipment. This type of foundation shall be provided in Edinburgh city centre and populated areas, particularly where underground utilities are closely spaced or not easily detectable.

In certain areas within the Edinburgh Tram Network where the track alignment and construction of the track slab permits, the overhead line equipment foundations may be incorporated within the track slab design.

31.17.4 Fixing to Masonry and Concrete Structures

There are a significant number of buildings, particularly within the World Heritage Site categorised for their architectural or heritage values.

Fixings to buildings listed in schedule 10 of each of the Edinburgh Tram (Line One) Act 2006 and Edinburgh Tram (Line Two) Act 2006 require full listed building consent.

31.18 Safe Working On The System

The configuration of the overhead line equipment shall take into account the project requirements for a safe working zone of 2.0m (measured horizontally from the near rail and also vertically above

the ground). All electrical and mechanical clearances shall comply BS EN 50119 and with the recommendations and guidance provided by HMRI RSP2.

31.19 Switching and Sectioning Requirements

31.19.1 Sectioning

The overhead line shall be divided by means of OLE section insulators into separate electrical sections and subsections, the lengths of which are determined by the locations of the traction substations and operational requirements.

31.19.2 Isolation Facilities

At substation feeder points, off-load, positive polarity, SCADA controlled, motor operated isolator/earth switches (termed 'feeder isolators') shall be provided to isolate and earth each overhead line section from its respective feeder cable. Additionally, positive polarity, SCADA controlled, motor operated load brake isolators (termed 'bypass isolators') shall be provided to interconnect adjacent overhead line sections when the intervening substation is out of service. These shall be connected across the line side of the two feeder isolators, and will normally be open. At key overhead line sectioning points, positive polarity manually operated isolator/earth switches (termed "section isolators") shall be provided to isolate sub-sections from other sub divisions of the section and (in some cases) earth the isolated section.

At the section insulator and the insulated rail joint between Depot and main line, a mechanically coupled double pole section isolator is to be provided to bypass the section insulator and insulated rail joint. The isolator is intended to be used solely to power the Depot and stabling and fans from the main line in the event of failure of the depot traction power supply. It is not intended to be used to power the main line from the depot stabling traction power supply.

31.20 Isolator Enclosures

Feeder isolators and bypass isolators shall be provided.

Section isolators shall be provided. For on-street sections these 'section isolators' shall be totally enclosed in trackside cubicles, referred to as 'section pillars'.

Section pillars shall be of stainless steel construction to IP 65, free-standing with a base set on a concrete foundation. The pillars shall be factory-built assemblies, of rationalised widths to suit the range of isolator numbers required per unit.

The enclosure shall be bonded to the tram track via an insulated 'earth' cable from an internal stainless steel stud, and the arrangements of which shall comply with Earthing and Bonding of these Employer's Requirements.

The isolator/earth switch 'earth' bar shall be bonded to the section pillar and connected to the tram track via suitable cable(s) additional to the above.

The dimensions of the pillars shall be the minimum compatible with standard creepage and clearance distances because physical clearances on the tramway are restricted.

An A4 size document holder shall be provided on the inside of the enclosure door.

The doors shall be outward opening through 180 degrees, hinged internally and fitted with stays. The doors shall be fitted with heavy-duty stainless steel locks operated by dedicated keys, which shall be provided in accordance with the operation and maintenance requirements for the **tie** structured key security system described in Section 22 of these Employer's Requirements.

It shall be possible to view the status of the isolator and any locking without opening the doors.

31.20.1 Paint Finish

The paint finish, if painting is required, shall be fully applied at the manufacturers works. However, following installation on site, the paint finish may have to be re-applied in some areas. The paint system to be used shall be offered for approval by **tie**.

Special attention shall be given to avoid damage to painted surfaces during delivery and installation. Specific approval shall be sought from **tie** to make good any damage to paint work, following installation on site and **tie** reserves the right to reject equipment on the grounds of damaged paintwork alone.

31.20.2 Labelling

Front panel legends, fitted centrally to the door consisting of approved 'Danger 750 V' - labels (black letters on a yellow background), and 'pillar description - reference number labels' with black letters on a polished stainless background, shall be provided on each pillar door.

31.20.3 Isolators

Isolators within an enclosure shall be arranged in groups where possible. The physical position of each isolator within each group shall correspond with the actual direction of the overhead line connected to it, and a standard layout shall be adopted throughout the system.

The isolator blades shall be of copper, and the isolator assembly and its insulation shall be suitable for the required current carrying capacity within the environment of the enclosure.

Feeder and section isolators and operating mechanisms shall be suitable for off-load breaking and fault making in respect of both 'closing' and 'earthing' operations. The operating mechanism for manual operation shall have a firm distinct stop in the operation at each stage of operation. It shall not be possible to move from closed to earth positions, or the reverse, without the operator coming to a definite halt at the 'open' position before moving to the earth position by a separate operator movement.

Bypass isolators and their operating mechanisms shall be suitable for on-load breaking and fault making in respect of 'closing' operations.

The construction of the isolator shall be such that live parts are fully shrouded from the operator, by 8 mm of polycarbonate or equivalent arc resistant material, whilst allowing the position of the isolator contacts to be clearly visible with the enclosure door open.

The isolator mechanism shall be such that it can be locked by means of a padlock in the closed, open or earthed position.

Each isolator mechanism shall be clearly labelled with its unique identifier reference code in accordance with the electrical nomenclature scheme.

31.21 Power Feeder, Reinforcing and Bonding Cables

31.21.1 Feeder Cables

Single core 750 V dc cables shall be used for:

- The connection of substations (positive) to the OLE;
- OLE parallel reinforcing cables;
- Negative cables from substation negative busbars to the track; and
- Negative track parallel cables and rail and track cross bonding cables.

OLE parallel reinforcing cables shall be sized in accordance with the design of the overall traction system.

Feeder cables shall be sized to match the rating of the OLE / reinforcing cable combination of each section.

Feeder cables from the traction substation feeder isolators to the OLE parallel reinforcing cable junctions shall be buried cable ducts running track side. A maximum of two cables may be carried per 150 mm diameter duct.

Cables for different circuits shall not share a common duct. The choice of cable material shall also minimise the number of bi-metallic cable joints.

Positive and negative cables shall not share a common duct.

Reinforcing cables shall be installed in buried ducts along the track. They shall run from OLE feeder point to feeder point with connections to the OLE via single core suitably rated copper cables to 'inbound' and 'outbound' lines. These feeds shall be at traction substations and maximum intervals of 450 m. Cables shall be drummed and supplied at maximum lengths to avoid and/or minimize cable through joints. Where joints cannot be avoided they shall be located in suitable cable drawpits or in neat, small dimension pillars of minimum intrusion on the streetscape. Joints between drum lengths of reinforcing cable, where no OLE connection is involved, may be in pillars or drawpits at the discretion and agreement as to specific installation method statements by **tie**. The insulation system employed at connection points shall meet the requirements of EN 50124-1 2001 to level 0.9 kV and OV4.

At nominal mid points between the OLE feeds and a maximum 250m from an OLE feed point there shall be suitably rated copper cross connections between the 'inbound' and 'outbound' OLE contact wires via the shortest practicable visually acceptable cable route. There shall be no joints in these cables.

Positive reinforcing and feeder cables shall be terminated in compression cable lugs of proprietary appropriate size and material for the cable used. Proprietary crimping tools designated for the cable lug to be crimped shall be used. Such crimping tools shall be under quality assurance control and within their calibration period. The appropriate flat stainless washer shall be used between cable lug and fixing bolt head. At all bi-metallic connections a suitable bi-metal connector piece shall be employed such that dissimilar metals are not connected other than by molecular fusion.

Feeder cables to the OLE shall be copper cored flexible, where required, installed in the OLE support poles in a neat and unobtrusive manner. As installed the cables shall meet the requirements for double insulation such that two distinct insulation layers can be identified to the

satisfaction of HMRI (or the appropriate regime in force). There shall be no joints between connection to the contact wire and the connection to the reinforcing cable(s).

The bi-polar section isolator at the eastern Depot entrance shall have one side of the positive pole cabled to the main line OLE parallel reinforcing cable by duplicate suitably rated cables. The other side of the positive pole shall be cabled to the Depot east isolator panel by duplicate suitably rated cables. The negative pole shall have suitable cables to each side of the isolator, one to each rail either side of the insulated rail joints.

Negative cables may have a reduced insulation level commensurate with the reduced voltage withstand required.

31.21.2 Track to Traction Substation (TSS) Negative Return Cables

Each of the four running rails in the vicinity of the TSS shall have a cable brought back to the negative busbar of the TSS.

A nominal one metre from the position on the running rails of the connections mentioned in the above, the cess running rail of each track shall be connected to the six-foot rail of the other track by a single cable. These are also classed as 'return' cables.

31.21.3 Rail to Rail and Track to Track Traction Cross Bonds

The rails of each track shall be connected together with a single suitably rated cable at suitable intervals.

At every second connection in the above, the six-foot rails of each track shall be connected together with a single suitably rated cable.

31.21.4 Running Rail Continuity Cables

Where 'along track continuity bonding' is required for negative return traction current return, 'along track' bonding cables shall be installed. Places requiring such bonding are:- Insulated rail joints to be normally bonded out, fishplated rail joints, rail sliding expansion joints (breathers), points and crossings, or other designated places.

'Along track bonding' shall comprise duplicate copper or steel cables as a minimum for each running rail to be so bonded.

31.21.5 General Requirements for Cables

All cables shall be terminated in compression cable lugs of proprietary appropriate size and material for the cable used. Proprietary crimping tools designated for the cable lug to be crimped shall be used. Such crimping tools shall be under quality assurance control and within their calibration period. The appropriate flat stainless washer shall be used between cable lug and fixing bolt head. All return cables shall be connected to the running rails via proprietary connector plates to connect with the running rails using duplicate 'Cembre' or equivalent connectors, by milled holes in the rail web with connector thimbles expanded into the holes on a spacing not less than that allowed by the track designer. Bolt and connection sizes shall be coordinated with the rating of the cable size to be connected. Simpler single 'Cembre' type connections (or similar approved) may be used for cross bonding cables and duplicated continuity cables mentioned in the above.

The cables shall be manufactured to European standards, appropriate to their application.

Cables shall be anchored at terminations by mechanical plastic glands, where gland plates must be traversed, and if necessary supported by non-hygroscopic resin-bonded laminated wood, hardwood or similar non-metallic approved clamps. Conductor terminations shall be by means of indented or annular-compressed lugs to suit the cable, with heat-shrinkable tube over-sheath.

Cable conductors shall be jointed with indented or annular compressed ferrules with an approved compression tool, the joint made up by an approved jointing kit and sheathed by an approved heat-shrinkable tube. Compression tools shall be certified as calibrated, and within the calibration period.

31.21.6 Cable Ducts

Power cables shall be laid in suitably sized UPVC/polyethylene cable ducts. Parallel reinforcing cables for the OLE will require a minimum of 200 mm diameter ducts.

Draw pits shall be sized to suit the particular cables installed within the cable run and shall facilitate the installation of the cables without damage to the cable. Particular attention shall be made to ensure the cable loop can be installed without damage to the cable when installing at mid point.

Suitable draw wires shall be installed in each of the ducts when they are laid, and the draw wires shall remain in the ducts after the installation of the cables to aid any future modification or repair work.

31.21.7 Installation of Cables

The arrangement of cables and all methods of laying and installation, including any special methods that may be necessary, shall be submitted by the Infraco for approval by **tie**.

Unless it has been agreed that the construction of cables is such as to permit laying at sub-zero temperatures, cable laying shall take place only when the ambient temperature is above 0°C and has been at this temperature for at least 24 hours, and approved special precautions have been taken to maintain the cable above this temperature to avoid risk of damage during handling. The recommendations of the cable manufacturer must also be taken into account.

All cables shall be installed with a bending radius not less than that recommended by the cable manufacturer.

Cable installation shall take account of the physical properties of the cables and the manufacturer's recommendations shall be clearly detailed on all cable pulling schedules.

All joints and terminations shall be made by proven methods to the current carrying ability of the cable and full details shall be provided to **tie**.

31.21.8 Surge Diverters

Surge diverters shall be positioned at the junction of each feed point and the OLE at traction substations on the OLE side of the isolator, and at over-bridges.

Surge diverters shall be of the gapless, metal oxide type with a rated discharge current of at least 10kA. The earthing terminal of the arrester will be connected to buried rods to provide an earthing resistance of less than 5 ohms. Surge arrestors' design, material and performance shall conform to the requirements of power supply specified standards for the Edinburgh Tram Network.

31.21.9 Bonding

The earthing and bonding requirements shall comply with **tie**'s Earthing and Bonding Policy (see Section 34 of these Employer's Requirements).

32 Stray Current

The ETN shall be designed in accordance with BS EN 50122-2.

In order to keep the stray currents caused by the traction return current as low as possible, permanent conductive connections between the return circuit and earth, including drainage diodes, are disallowed. The rail insulation against earth shall be at least five times better than recommended in BS EN 50122-2 before commencement of the Testing and Commissioning Phase.

Voltage limiting devices between return circuit and earth shall be dimensioned such, that they do not short-circuit the return circuit and earth during normal operation of the ETN, but ensure that accessible voltages do not exceed 60 V limit stated in RSP2 clause 183.

Where track substructures are steel-reinforced in longitudinal direction, a sufficient amount of reinforcement bars, i.e. at least four per track, shall be longitudinally interconnected by welding. At both sides of expansion gaps in the substructure, these bars shall have welded cross-connections and shall be interconnected in longitudinal direction by means of a conductor with suitable mechanical flexibility. This interconnected system shall not be connected to the return circuit at any point.

The Infraco must produce an Edinburgh Tram Network specific Stray Current Mitigation Strategy document that clearly defines its strategy for achieving as low as reasonably practicable protection requirements for the stray current effects and must submit such strategy to **tie** for their approval. Additionally, as part of that Stray Current Mitigation Strategy, the Infraco must produce a "Code of Practice for Stray Current Corrosion Control" and submit it to **tie** for their approval.

33 Low Voltage Architecture

The LV supplies shall be arranged by the Infraco with the DNO, and this shall also include all necessary metering equipment or agreements for provision of unmetered supplies. The LV supplies shall include all those required for illuminated road signs, other road furniture, street lighting, traffic signal controllers, points actuation, tram signals, communications equipment, and Tramstop equipment.

The LV supplies shall provide the necessary security of supply to achieve the overall ETN reliability requirements, for individual elements and as a whole.

The LV supplies shall allow cabinet sizes in areas of visual concern to be minimised.

Provision shall be made by the Infraco for the attachment of local generators at critical points in the ETNin the case of local supply outages (e.g. at Tramstops).

The system architecture provided by the Infraco shall take account of the known statistical history of local power outages such that the overall ETN system and subsystems availability is achieved.

In establishing the capacity and duration of any UPSs provided, the time that the Infraco maintenance staff may need to mobilise and install a temporary generator shall be considered by the Infraco and advised to **tie**. This time shall be demonstrated by the Infraco to **tie** during the commissioning period. **tie** shall give at least two weeks notice that the test may be required. **tie** may then require the test to be undertaken by the Infraco immediately with no further prior notice at a time and location to be determined by **tie**. This time shall be appropriately included in the overall availability analysis for the ETN.

LV power design by the Infraco shall take account of local system requirements e.g. for additional lighting and for specific loads, such as the passenger lift at Murrayfield Tramstop and drainage pumps where installed.

The LV architecture shall reflect the fact that isolated supplies will be required trackside and remote from Tramstops or substations at such as pointwork and signals at tramway junctions, and isolated TPDS cabinets.

Particular attention must be given by the Infraco to suitable redundancy for critical equipment such as drainage pumps and the communications systems.

LV supplies to substations shall be provided as part of the Infraco's arrangements with the DNO unless these supplies are provided from elsewhere.

Where UPSs are to be provided by the Infraco, careful consideration of appropriate loads to be supplied should be given by the Infraco. Automatic load-shedding schemes shall be considered where appropriate to support the required overall System availability.

Proposals for remote metering of substations shall be provided by the Infraco for the approval of **tie**.

34 Earthing and Bonding

The requirements for earthing and bonding are set out in the latest version of the document "System Earthing Policy", reference ULE90130-SW-REP-00071 and the Infraco shall comply with such requirements in respect of carrying out the Infraco Works.

35 Supervisory Control and Communications Systems

35.1 Scope

The scope of this section of the document is to define the Supervisory Control & Communications requirements that are applicable to the Edinburgh Tram Network (ETN).

It is split into three parts:

- Specific technical requirements of the various telecommunication subsystems;
- Components of those subsystems located at the Control Centre;
- Common considerations applying to these subsystems.

35.2 Specific Technical Requirements

This describes the various subsystems of the Supervisory Control and Communications System:

- The Tram Position and Detection Subsystem;
- The Passenger Information Display System;
- The Telephone Network;
- Operational Radio System;
- Passenger Help / Passenger Emergency Help Points;
- Closed Circuit Television (CCTV) System;
- Supervisory Control and Data Acquisition;
- Operational Data Network.

1.3 sets out considerations that apply to all Communications Subsystems that are included in 1.2.

The detailed interfaces between Infraco and Tramco shall be developed. Consequently the statements made in the ERs concerning the scope split between Infraco and Tramco may be subject to change.

35.3 Tram Position and Detection System

35.3.1 Overview

The Tram Position and Detection System shall provide the information needed to monitor the efficient and effective movement and to implement the overall regulation of trams running on the Edinburgh Tram Network. The Tram Position and Detection System shall include both tram borne and trackside equipment.

Each tram driver shall be responsible for safe tram operation using 'Line Of Sight' principles, with the Tram Position and Detection System identifying and setting the correct route ahead of the tram and providing tram signals.

The Tram Position and Detection System shall provide monitoring facilities to the Control Centre staff.

The Tram Position and Detection System shall collect the following data from each tram as is passes over the loops for transmission to the Control Centre in real time:

- Tram number;
- Tram run number;
- Tram destination;
- Driver staff identity number;
- Driver duty number; and
- Whether the Tram is in service or out of service.

The Tram Position and Detection System shall provide a number of functions which shall include:

- Tram identification;
- Tram position on network (outside of depot);

- Tram progress monitoring;
- Route setting;
- Processing of manual 'Tram ready to start' and automatic advance signal demand requests from trams;
- Provide demands to the Points Controllers to permit trams to safely traverse points junctions;
- Provide demands to the local Traffic Signal Controller(s) to permit trams to safely traverse tram/road crossings; and
- Tram signals to provide controlled entry to and exit from the depot berthing and maintenance facilities;
- Store data concerning the times each tram arrives at and departs from all of the Tramstops. This will be passed to the Central Data Recorder to allow the daily performance of the system to be calculated by the Performance Monitoring System.

The Tram Position and Detection System shall convert relevant Tram Position and Detection System data into a format to update the Real Time Passenger Information Display system.

On the approach of a tram to each Tramstop and at the termini, the Tram Position and Detection System shall provide updates to the Passenger Information Display system such that the Tramstop Passenger Information Displays are updated and display information as stated in 35.4.1.

On each day, the TPDS shall enter the details of journeys for the particular tram for each entire operating day into the tram on-board computer at the commencement of service. The tram driver shall input his own driver code and the tram diagram number for the day. Alternatively, the TPDS may transmit this data to the tram. Any change to this data e.g. as the result of an incident affecting the service shall be initiated by the driver.

The Tram Position and Detection System will include the ability to:

- Display to the Driver how early or late he/she is at each stop;
- Allow the Driver to issue 'Tram Ready-to-Start' commands at selected Tramstops;
- Allow the Driver, when his/her tram is on the approach to a diverging junction, to manually demand that the points move left or right by operating controls in the cab.

35.3.2 Technical Requirements

Key locations where Tram Position, Route Setting and Detection Equipment shall be provided shall include:

- At the approach to, and exit from, tramway/ road junctions;
- Entry to, and exit from, the Depot;
- At the approach to, and at, all Tramstops;
- At the approach to, and exit from, points and crossings.

Trackside Equipment at each of these locations shall be connected to the Edinburgh Tram Operational Data Network.

In the event that this Operational Data Network fails, the Trackside Tram Position and Detection System Equipment at each of these locations shall continue to operate autonomously until network connections are restored, at which point normal operations shall resume without Control Centre staff intervention.

The TPDS shall pass the times at which each tram arrives and leaves each Tramstop to the Performance Monitoring System (PMS), so that the PMS can calculate the operational performance of the Tram System according to specified algorithms.

Tramway signal heads shall be positioned at all signal controlled Track and Road Junctions and Pedestrian Crossings to allow optimum sighting for the tram driver. Local environmental conditions and the requirements of all interested parties, including that of HMRI (or the appropriate regime in place), shall be taken into consideration when choosing the positions of these signals.

Tramway signal heads shall display different proceed aspects for different routes if they are signalled separately. In such cases the Tram Position and Detection System shall pass the appropriate direction request to the road traffic signal controller as well as the point controller.
Tramway signal heads shall indicate the acceptance of the signal demand by the system to the tram drivers.

The lie of all facing points shall be detected and displayed by point indicators. These are in the scope of the Points Control System, and are described in the section of this document dealing with the Track. However, although Signals and Points Indicators shall be clearly distinguishable, they should also be in similar style, and it will require some co-ordination with the Points Controller supplier to ensure compatibility.

Tramway signal heads shall utilise Light Emitting Diodes (LED's) and not incandescent lamps.

At all signal controlled tram and road junctions there shall be an interface installed between the Edinburgh Tram Network Tram Position and Detection System and the local traffic Signal Controllers. All tram signals at signalled controlled tram and road junctions shall be driven directly by the Traffic Signal Controller, through demands from the Tram Position, Route Setting and Detection System. The Tram Position and Detection System/Urban Traffic Control System interface shall implement an agreed Tram Priority at each signal controlled junction.

Each Tram Position and Detection System/Urban Traffic Control System interface shall incorporate the facility for the initiation of a "tram proceed" signal in the event of either tram detection failure or local Urban Traffic Control System interface failure. This facility shall be available at all times for use by the Control Centre Staff. Trackside facilities for tram drivers to make manual requests of the UTC are not required. A foreseeable single point failure shall not cause a tram to be presented with a tram stop signal on the street that causes the tram to stop for more than 5 minutes. A FMEA analysis shall be produces within 8 months of contract close that satisfactorily demonstrates that the proposed solution meets this requirement.

The failure of the Tram Position and Detection System equipment at any signal-controlled road crossing shall initiate the immediate operation of the junction into a predetermined (adjustable) priority cycle sequence. All such failures shall be monitored, reported and logged to the Tram Control Centre via SCADA and passed to the PMS System.

The implementation of the detection system at Tramstops and other trackside locations will be permitted to use the Tram Position and Detection System hardware in lieu of a Supervisory Control and Data Acquisition Remote Termination Unit for the passage of alarms and indications, should this prove a more efficient use of hardware resources.

35.3.3 Tram-Borne Equipment

The Tram Position and Detection System shall include equipment to be installed on the trams. This equipment shall include:

- A Driver's Panel and keypad, to be installed in each cab;
- Communications equipment, to provide transmission of messages between the tram and the trackside equipment;
- Vehicle fault / maintenance indications / alarms transmission interface.

This equipment shall utilise the on-tram power supply.

All operations data messages etc. to or from the tram-borne Tram Position and Detection System shall be monitored and recorded in the equipment room for future reference or fault investigation.

35.4 Passenger Information Display System (PIDS)

35.4.1 Overview

Each Tramstop platform shall be equipped with a real time passenger information display system that shall be connected to the Control Centre by the Operational Data Network.

PIDs shall allow a limited selection of messages and free-form text to be displayed, at selected individual, selected groups or at all Tramstops on command from the Control Centre.

Each platform shall be equipped with at least one double-sided display; the display shall be in the form of a dynamic three line display.

Each display shall conform to the requirements of "DfT Inclusive Mobility - Guide to best practice in access to transport infrastructure". They shall each have the following characteristics:

- It shall be double sided;
- It shall be based on LED technology;
- Each side shall have three dynamic information lines, the third of which shall also provide a time display;

- Each line shall have at least 32 characters;
- Each character shall be at least 50 mm high;
- Characters shall be bright yellow on a black background;
- The PID shall adjust to ambient light levels making it legible in all weather and lighting conditions.

Each Passenger Information Display shall be sited so that it is visible to anyone standing within the Tramstop shelter, and from as much of the platform area as possible.

Passenger Information Displays shall also be provided at the following locations:

- Ingliston Park and Ride facility;
- Edinburgh Airport passenger terminal;
- Ocean Terminal Shopping Centre; and
- Haymarket Railway Station.

Alternative types of display may be used at these locations subject to agreement with **tie**.

At termini, the Passenger Information Displays shall display a departure time, which shall be the later of the scheduled departure time and the arrival time plus one minute. At other Tramstops, the Passenger Information Displays shall show variable messages including the destination and time to arrival (in minutes) of the next three tram service arrivals, or arrivals within the next 30 minutes, which ever is the less at the particular platform.

Tramstop Passenger Information Displays shall be able to display Lothian Buses 'BUSTRACKER' information as an overall capability. Real-Time data shall be provided over an internet connection by the client in an agreed format.

The following Tramstops shall have Passenger Information Displays that display the arrivals of both buses and trams at the Tramstop:

- Ocean Terminal
- Foot of the Walk
- Picardy Place
- Saint Andrew Square
- Princes Street
- Haymarket
- Edinburgh Park Station
- Airport
- Crewe Toll
- Granton

Passenger Information Displays on Tramstops, including those with bus/tram interchange facilities, shall be capable of prefacing the destination of the tram service being displayed by a two or three digit 'trip number' and of any required bus service by a three digit route number.

Each Passenger Information Display shall incorporate a digital time display (synchronised to the Edinburgh Tram Network time server derived from the Rugby Radio Clock or its successor or similar) as part of the display.

The colour and contrast of the lettering that is displayed by the Passenger Information Display shall fully take into account the requirements of the visually impaired. In particular DfT guidelines e.g. 'Inclusive Mobility - relating to provision for the visually impaired' and the requirements of Mobility and Access Committee for Scotland (MACS) shall be considered.

The Passenger Information Display System shall incorporate the necessary degree of redundancy and duplication to enable the systems availability targets to be achieved without losing the ability to handle faults and accept necessary upgrades.

The equipment shall be consistent with the design of the structural elements of the Tramstop.

The Passenger Information Displays shall have 3 line LEDs and configured as lines, scrolling functionality should be possible.

35.5 Telephone Network

35.5.1 Overview

The Edinburgh Tram Network shall be provided with a Telephone Network that shall provide two-way voice communications between all staff at fixed locations throughout the Edinburgh Tram Network. The main Operator interface with the Telephone Network shall be provided by an integrated workstation at each Control Centre staff position.

The Operator's interface shall be designed to carry out control functions in an ergonomically efficient manner.

The Telephone Network shall comprise of the following sub-systems:

- A central Private Automatic Branch Exchange (PABX):
- Public Switched Telephone Network;
- Depot extensions (via the Depot structured cabling scheme);
- Passenger Help / Emergency Help Points (via the Operational Data Network);
- Public Address System (via the Operational Data Network);
- Substation extensions (via the Operational Data Network); and
- A Voice Recorder;
- Control Centre Human Computer Interface (HCI) for the telephony services; and
- Call logging and maintenance facilities.

To facilitate management and maintenance of the PABX, it shall be provided with a maintainer's workstation, located in close proximity to the equipment.

The PABX shall provide:

- Digital call recording;
- Digital call logging;
- Maintenance and subscriber management; and
- All recording of the Telephone Network is to be digital to the current best medium.

All recording as described above should be carried out to the data recorders.

The Telephone Network shall include all PABX equipment, all necessary interfaces, configuration of the system elements, the connecting cables and management and diagnostic facilities.

The Telephone Network shall provide voice communications to external agencies including the emergency services and the urban traffic controllers.

The Telephone Network shall provide maintenance and administrative staff within the depot and substations telephone communications facilities appropriate to their needs.

35.5.2 Technical Requirements

The Telephone Network shall provide voice communication with all internal Edinburgh Tram Network organisation members and external parties but not with trams.

The Telephone Network and all associated components shall be of sufficient capacity to meet the current and future needs of the Edinburgh Tram Network.

All elements of the Telephone Network shall be designed to operate in an integrated manner.

The Telephone Network shall use the Operational Data Network for call routing to remote locations, e.g. Tramstops and traction power substations.

Suitable operator equipment shall be provided for the depot receptionist.

Suitable telephone handset equipment shall be provided for depot operational, administrative and maintenance staff.

Suitable telephone handset equipment shall be provided for traction power substations.

Access to the Public Switched Telephone Network shall be configurable at all telephones, including those within the depot and substations, in order to change call barring and security measures.

PABX equipment shall be located in the Equipment Room. A multi-pair tie cable shall be provided to interconnect the PABX with the depot structured cabling patch panel.

The Telephone Network shall be equipped with a Maintainers' Workstation, also situated in the Equipment Room, for network management and diagnostics.

The Maintainers' Workstation shall allow the:

- Display of system status and alarms;
- Download of call and system logs to removable media;
- Configuration of the Telephone Network;
- Management of subscribers;
- Provision for updating system software; and
- Reporting of real time status and alarms to external equipment.

35.6 Public Address System

35.6.1 Overview

Loudspeakers and Audio Loops located at each Tramstop platform shall form part of the Edinburgh Tram Network Public Address System. The Operational Data Network, details of which are contained in Section 35.6.1 shall connect the associated amplifiers/controllers to the Control Centre.

35.6.2 Technical Requirements

Each Tramstop shall constitute a zone.

An appropriate number of low output speakers shall be provided at each platform to prevent the possibility of announcement intrusion into adjoining properties, yet clearly audible without distortion on all areas of the platform. The speakers and their mountings shall be visually unobtrusive.

The Control Centre shall have the ability to make direct announcements to any Tramstop or groups of Tramstops, or turn off individual Tramstops or groups of Tramstops.

There shall be automatic switching between the volume setting for day / night time for each day of the week at the appropriate time of day.

Each Tramstop platform shall also be equipped with an audio loop to provide Public Address facilities for those who use hearing aids. The messages conveyed by these audio loops shall be identical to those issued by the standard Public Address equipment.

Park and Ride facilities shall be considered as a single Tramstop for Public Address purposes.

A 'library' of pre-recorded Public Address announcements shall be available to the Control Centre. Facilities shall be provided in the Control Centre for suitably trained operational staff to record additional announcements.

The approach and passing of 'Out of Service' trams shall be capable of initiating an automatic announcement at the stop advising passengers of the approach of the 'Out of Service' tram as it passes through the network.

35.7 Operational Radio System (ORS)

35.7.1 Overview

The ORS shall meet the mobile communications requirements for operation and maintenance requirements of the trams, and the tram network, and have sufficient capacity to meet the known future needs as defined in these Employer's Requirements.

An ORS shall be provided to enable safe and effective two-way communication enabling voice and data exchanges between the Control Centre staff and:

- Drivers on board an individual Tram, groups of Trams and/or all trams;
- Drivers of road and other support vehicles for the Edinburgh Tram Network; and
- Individually, or in groups, other mobile Edinburgh Tram Network operations and/or maintenance staff using hand portable equipment along the Edinburgh Tram Network and in the Depot.

Reliable voice communications shall be available throughout the length of the route, and to all areas used by operations or maintenance staff in the course of their duty so that messages of normal, priority or emergency status can be conveyed with high reliability.

The main operator interface with the ORS shall be provided by workstations installed in the Control Centre (for Control Centre staff), and tram mounted mobiles (for tram crews), road vehicle mounted mobiles and hand portable equipment for other mobile staff. Infraco shall supply 130 sets of radios with two spare batteries each and carrying cases. These sets will be supported by suitable re-charge racking and storage facilities.

The ORS shall comprise:

- A trunking controller;
- Sufficient base-stations to provide acceptable and reliable coverage to the satisfaction of **tie**;
- Integrated Control Centre operators' equipment;
- Mobile equipments for tram, road vehicle or hand-portable operation; and
- All communications links and configuration of the system.

35.7.2 General Requirements

The ORS shall use trunking technology capable of group and broadcast calls with normal or emergency priority.

Base-station equipment in close proximity to the Edinburgh Tram Network shall connect to the trunking controller via the Operational Data Network.

The radio system or two-way communication shall not be affected by the failure of the Control Centre systems or supplies.

The ORS shall operate within allocated frequencies administered by OfCom. Operating licences and consents for the ORS shall be obtained from OfCom and any other relevant authorities, e.g. Civil Aviation Authority (CAA). The Operator shall be required to hold all such licences and permits obtained.

Communication shall be reliable, continuous and free from interference as set out in the RAMsS section of this document.

The Operational Radio System shall have all voice communications digitally recorded by the central voice recorder. Recording of the Operational Radio System voice communications shall be integrated with recording of the Telephone Network.

All recording of the Operational Radio System is to be digital to the current best medium

35.7.3 Short Codes

The Operational Radio System shall be able to send 'short codes' to Trams. It shall be possible to send such short codes to individual trams, groups of trams or to all trams and shall be configurable by the Operator's administrator.

The short codes shall be:

Table 85 - Radio Short Codes

Status Message	Status Meaning	Control to Tram	Tram to Control
CHANGE	Change Active Unit		✓
ACK MESS	Status message acknowledge		✓
ACK CALL	Group Voice Call Acknowledge		✓
###-DEP	Departure from departure points, where ### is the three letter code for each departure Tramstop.		✓
DELAY	Delay to Report		✓
FAULT	Defect to Report		✓
NEWCREW	Crew Change Complete		✓
HELP	Police Required		✓ (see notes below)
EXIT	Depot Exit Request		✓
ENTRY	Depot Entry Request		✓
RELIEF	Crew Relief Request		✓
XO-DONE	Crossover / Turnback complete		✓
STABLED	Tram Stabled		✓
CREWGONE	Driver Leaving Tram – will report back		✓

ALL-STOP	Stop Immediately	✓	
STOPNEXT	Wait Next Stop	✓	
FIREMEN	Beware Fire Engines	✓	
FIREGONE	Fire Engines Clear	✓	

Notes

The 'HELP' code shall also be able to be sent from the hand portable and from the road vehicle radios; and

The emergency call functionality shall also require the use of short codes.

There shall be at least 30 codes.

The Operational Radio System including all mobiles radios and hand-portables shall be capable of being reconfigured by the Operator to operate with amended or additional status messages.

35.7.4 Physical Considerations

The Radio System Trunking Controller shall be installed in the Equipment Room. It shall communicate with either the maintainer's workstation or as a separate dedicated workstation, located in close proximity to the equipment.

All base station antennae shall be fitted with adequate surge protection measures.

Provision shall be made for charging racks sufficient for the for hand-portable radio equipment. Charging racks are to be located in the Control Centre.

All masts required to support base station equipment shall be capable of withstanding all foreseeable wind loading. They shall be fitted with anti-climb protection.

35.7.5 Radio Maintainers' Workstation

The Operational Radio System shall be equipped with a Radio Maintainers' Workstation for network management and diagnostics.

The Maintainers' Workstation shall allow the:

- Display of system status and alarms;
- Download of system logs to removable media;
- Configuration of the Operational Radio System;
- Subscriber management;
- Provision for updating system software;
- Reporting of real time status and alarms to external equipment; and

The Operational Radio System maintainers' workstation shall be situated in the Equipment Room.

Fault and downtime information shall be transmitted to the PMS system.

35.7.6 Road Vehicle Mobile Radio Equipment

The Operator and Maintainers will operate road vehicles requiring Operational Radio System mobile radio equipment. As a minimum all road vehicles shall be equipped with:

- Mobile transceiver;
- Cable harness, feeder and antenna;
- Display, keypad, speaker & microphone; and
- Necessary power supplies.

All road vehicle mobile equipment shall be equipped with a keypad and alphanumeric display unit and be capable of displaying and storing short data messages.

Road vehicle mobiles shall translate status codes into meaningful textural messages.

All vehicle mobiles shall be equipped with an emergency call facility.

35.7.7 Hand-Held Mobile Radio Equipment

Certain Operational and Maintenance staff will be mobile and require hand portable mobile radio equipment. As a minimum the equipment shall include one hundred and thirty sets of:

- Hand-held radios with battery;
- Carrying cases for the hand-held radios;
- Two spare batteries for each radio;
- All necessary operational accessories, such as lapel microphones; and
- Sufficient charging racks suitable for 230VAC 50Hz operation to ensure availability of fully charged radios.

As a minimum the handportable radio shall use batteries with a life of 10 hours when used with a 90%rx / 10%tx duty Cycle.

Battery chargers shall fully charge a battery in less than 4 hours.

All hand portable radios shall be weatherproof and suitable for continuous use on or about the person in the outdoor environment.

All hand portable mobile equipment shall be equipped with a keypad and alphanumeric display unit and be capable of displaying and storing short data messages.

Hand portable mobiles shall translate status codes into meaningful textural messages.

All hand portable mobiles shall be equipped with an emergency call facility. The hand portables shall operate effectively and clearly within the trams and along the route of the Edinburgh Tram Network.

35.7.8 Tram borne Radio Equipment

Radio equipment shall be fitted to each driver's cab to enable two-way voice communications between drivers and controllers at the depot.

The Operational Radio Network equipment fitted to the tram shall include, as a minimum:

- Mobile transceiver;
- Keypad and display compatible with MAP27 interface protocol;
- Radio antenna, to be mounted on the tram roof.

The above equipment shall be free issued to the Tram Supplier for installation.
This radio equipment will utilise equipment supplied by the Tram Supplier, including:

- Gooseneck microphone;
- Emergency call button or kick switch and interface to the ORS;
- All necessary interconnections between Operational Radio Equipment in both cabs provided; and
- All necessary interconnections to other on-tram systems including power supply.

All voice communications involving the tram driver shall be via a hands-free method incorporating the touch-screen console and the gooseneck microphone so as to minimise distraction of the driver from his/her driving responsibilities. The integration of these functions shall be undertaken by Infraco.

When the tram is required to change direction of travel; e.g. after arrival at a terminus, the tram driver shall not be required to make any input to the Operational Radio System as he/she takes up occupation of the 'now leading' cab and the 'Change' status message shall be automatically generated.

Tram radios shall translate status codes into meaningful textual messages and display these to the driver.

All radio calls received during on-board Public Address announcements shall be clearly indicated to the driver at the time of receipt.

All tram-borne radios shall be equipped with an emergency call facility.

35.7.9 Tram-Borne Interfaces

The interfaces for tram-borne Operational Radio Network equipment with other tram-borne systems shall include:

- Passenger Emergency Help Points;
- Public Address System; where the tram driver instigates an on-board Public Address, this shall take precedence over any incoming radio calls received during the duration of public address. The tram driver shall be alerted to the presence of an incoming radio call;
- Radio voice communications and an attack alarm shall be provided between the tram drivers and the inspectors on board each tram.

35.8 Passenger Help / Passenger Emergency Help Points

35.8.1 Overview

Each Tramstop platform shall be equipped with at least one Passenger Help / Passenger Emergency Help Point that shall be connected to the Control Centre by the Operational Data Network.

Each Passenger Help / Passenger Emergency Help Point shall be sited so that it is visible by the platform Closed Circuit Television camera.

Provision shall be provided for the connection of future additional Passenger Help/Passenger Emergency Help Points, as a minimum, at Ingliston Park and Ride facility.

All Passenger Help / Passenger Emergency Help Points System Equipment shall comply with the latest disability advice from the Department for Transport.

35.8.2 Technical Requirements

Each Passenger Help / Passenger Emergency Help Point shall be provided with a two-way speech connection between the user on the Tramstop platform and the Control Centre Staff.

Each Passenger Help / Passenger Emergency Help Point shall be clearly visible and signed, and mounted in a manner that restricts its vulnerability to vandalism.

Each Passenger Help / Passenger Emergency Help Point shall be capable of being activated in two modes, normal and emergency, and there shall be a clearly marked and separate activation button for each function. Initiation of a call at the Passenger Help / Passenger Emergency Help Point shall be by pushing the appropriate call button.

Initiation of a call shall initiate the immediate recording of the subsequent voice communication that shall be time and date related.

Initiation of a call at the Passenger Emergency Help Point shall also cause the relevant Closed Circuit Television camera to focus on the Passenger Help / Passenger Emergency Help Point, overriding any sequential scanning for that camera. The recording rate of the CCTV camera will be increased during the PEHP conversation to the rate specified at section 35.14.13 of these Employer's Requirements.

35.9 Closed Circuit Television

35.9.1 Overview

The Edinburgh Tram Network shall be provided with a digital colour Closed Circuit Television (CCTV) System.

The tram CCTV system shall interface to the City of Edinburgh Council citywide CCTV system as 35.9.2.

Each Tramstop platform shall be equipped with at least one Closed Circuit Television camera. Additional Closed Circuit Television cameras shall be provided if adequate coverage of the access and egress routes at Tramstops and park and ride facilities cannot be achieved using the platform Closed Circuit Television cameras. Additional Closed Circuit Television cameras shall be provided to give full coverage of Park and Ride facilities.

Images from the CCTV cameras shall be transmitted to a Digital Video Recorder where they shall be recorded and time-stamped.

The Closed Circuit Television System shall comply with the requirements outlined in the Home Office guidelines for digital CCTV and the related UK Police Guidance notes and shall provide clear images of 'evidential quality' under all weather and lighting conditions to be made available at the Control Centre for operational purposes and for the recording for evidential purposes.

The Edinburgh Tram Network Depot complex will be equipped with a digital CCTV System as part of the Depot Security System. This CCTV System shall be interfaced to the Passenger CCTV System detailed in this Section. The requirements for the Depot CCTV System are described in 29.8 - Depot Site Layout.

(Please note: As of 11/12/2007, the calculation of the number of CCTV cameras and the bandwidth required on the ODN – See 35.11 for a definition – is based on two cameras per Tramstop, plus ten cameras at the depot and none at Sub-stations. This gives a requirement for 54 new cameras. The ODN also needs to allow for 7 existing, plus two new, cameras at the Ingliston Park & Ride.

35.9.2 Technical Requirements

Cameras shall be of the dome type, vandal resistant and mounted on Tramstop infrastructure or special CCTV poles. The mounting arrangements for each camera shall ensure stability and limit any vibration to acceptable limits so as not to interfere with image quality.

CCTV cameras located at the Park and Ride facilities shall be positioned to cover all of the car park paths, locations identified for Ticket Vending Machines, shelters, buildings, any other structures and both pedestrian and vehicle access points.

The CCTV System at Park and Ride facilities shall provide a clear image of vehicles including the ability for operators to read their registration plates.

The CCTV viewing system shall normally cycle through a pre-defined list of camera images and carry this out over a pre-programmed time period.

All CCTV cameras shall be provided with pan, tilt and zoom facilities both automatically within preset limits and under manual control, and be programmed to zoom in on the Passenger Help / Passenger Emergency Help Point when they are used and to a Ticket Vending Machine location when a TVM alarm is initiated. The Control Centre Staff shall be able to override automatic operation and control the cameras.

The CCTV cameras shall incorporate configurable 'no-dwell' zones to ensure the privacy of adjacent buildings and shall be suitably adjusted at the time of camera installation.

The CCTV System shall be provided with appropriate electrical / electronic interfaces to facilitate the presentation of images to an Edinburgh Tram Network display located within the Lothian & Borders Police Centre, the Lothian Buses Control Centre (Annandale Street) and one located at the Edinburgh in View CCTV Centre. This interface will also enable the transmission of images from the CEC's CCTV system to the ETN such that an appropriate subset of the CEC's CCTV images can be viewed in the Control Centre.

These interfaces shall be physically located in the Equipment Room. They shall include the provision and installation of the necessary connections and extensions to the Tram communication system to provide the necessary interfaces to third parties, and shall remain under the control of the Edinburgh Tram Network.

The selection of individual images by any of the above mentioned third parties for their further interrogation on their local monitors shall only be provided following telephone authority being obtained by them from the Control Centre Operator and shall not inhibit the continued use or availability of images to the Control Centre Operator.

Facilities shall be provided to enable any images generated by cameras that are part of the other interconnected CCTV systems to be selected by the Control Centre Operator and displayed within the Control Centre. Facilities shall be provided to "screen print" images for expediency.

35.10 Supervisory Control and Data Acquisition

35.10.1 Overview

A Supervisory Control and Data Acquisition (SCADA) System shall be provided to monitor and control remote equipment.

The SCADA System shall comprise of a central host, which is used to scan the outlying equipment that is connected to Remote Terminal Units (RTUs) or "Intelligent Relays" shall regularly scan the attached equipment for status or to set/reset the associated controls and, in turn, will be scanned periodically by the central system. Alternatively, electronic subsystems like e.g. traction substation control & protection systems can be directly connected to overall SCADA by means of e.g. a databus or network connection.

The primary interface to the SCADA System shall be a diagram displayed to the Control Centre operators. The SCADA System shall transmit system data received, in real-time, from the RTUs to the mimic display.

The SCADA System will comprise four main functional elements as follows:

- Traction Power SCADA;
- Tramstop SCADA;
- Trackside SCADA; and
- Ticket Vending Machine alarm indications shall be transmitted via the SCADA system. Further details are contained in Employer's Requirements Integrated Fare Collection Section.

The current status of the Traction Power System as presented by the SCADA System shall be available as a display to the Control Centre Staff at all times.

35.10.2 General Requirements

The SCADA itself shall not be a safety critical system, however, it shall provide the facility for the Control Centre staff to make requests of remote equipment to execute actions on behalf of the Control Centre staff, and provide indications for sub-systems.

These sub-systems are:

- Safety related - the traction power control system and remote terminal at each substation;
- Security related - the Passenger Help / Passenger Emergency Help Points at each Tramstop together with the associated Closed Circuit Television camera; and
- Security related - The transmission of Intruder Alarms.

The SCADA system shall pass data relating to equipment failure to the Performance Monitoring System (PMS), to allow the PMS to calculate operational performance relating to equipment availability.

The implementation of the SCADA System at Tramstops and other trackside locations may use the Tram Position and Detection System hardware in lieu of a SCADA RTU for the passage of alarms and indications, should this prove to be more efficient option.

Each SCADA System RTU shall contain a minimum of 30% spare capacity for the future in addition to those specified in the sections below, for the addition of further controls and indications across the Edinburgh Tram Network.

At Tramstops the SCADA Remote Termination Units shall be housed in the Tramstop equipment cabinet with the other Tramstop Supervision, Control and Communication Equipment.

Within Substations the SCADA Control and Monitoring Modules shall be wall or cabinet mounted. SCADA Remote Termination Units shall also be installed within the Points Controller cabinet at all electrically heated points. Further details are contained in 26.11.2 of these Employer's Requirements.

It shall be assumed that the signals to be monitored and controlled by the SCADA system will be concentrated into an interface rack. Connection shall be made from the SCADA Modules to the interface rack.

Individual Tramstop systems control and communications equipments shall be designed to integrate with the Tramstop furniture wherever possible.

35.10.3 Traction Power SCADA

The Edinburgh Tram Network Traction Power Supply System has substations placed along the Edinburgh Tram Network as detailed in Employer's Requirements Traction Power (Substations) Section.

Each Traction Power Control Unit should provide as a minimum:

- 128 Digital Inputs;
- 16 Digital Outputs;
- 16 Analogue Inputs.

It shall be possible to put each substation into a bypass mode remotely by using SCADA, in order to guard against equipment and power failures or to allow maintenance.

The SCADA System shall contain a series of 'macros' that shall enable the Control Centre staff to isolate and earth all electrical sections between adjacent sub-stations or between a sub-station and the end of the Edinburgh Tram Network route by making no more than two mouse clicks, or equivalent, from the SCADA Human Computer Interface power diagram. This operation will initiate a sequence of switching operations, the progress and completion of which shall be indicated to the Control Centre staff via the SCADA Human Computer Interface power diagram. Should any operation in this sequence 'time out', or fail, a visual and audible alarm shall be generated to the Control Centre staff and the sequence be suspended by the system.

Facilities shall be provided to enable the switching sequences to be created, edited and deleted by a person with the appropriate rights of SCADA access to the system shall be provided.

The following SCADA System controls and indications provided for each substation shall include, but not be limited to:

- Fire Alarms;
- Equipment Over Temperature Alarms;
- Intruder Alarms;

- Low Voltage Power Supply Fault indication;
- DC power fault indication (e.g. output circuit failure, etc.);
- Over Voltage Trip Alarms;
- Under Voltage Trip Alarms (if Under Voltage Trips are generated);
- Line Live;
- Line Earthed;
- Stray current monitoring, if provided;
- Power data, volts and amps in real time;
- 'UPS status for communications equipment;
- Battery and Battery Charger Status;
- DNO indications;
- Status of all isolators; and
- Status of all circuit breakers and control of them.

The Edinburgh Tram Overhead Line Equipment shall be arranged such that it is possible to isolate all or parts of the overhead traction supply. Feeder and Bypass Isolators are located at the line side in electrical cabinets or within the nearest substation. Further details are available in Employer's Requirements Overhead Line and Pantograph Section.

The SCADA System controls and indications to and from these Isolators shall include:

- Control command for opening and closing of individual Bypass Feeders at each substation;
- Indication of all individual Feeder Isolator position (open / closed / earthed / indeterminate); and
- Indication and Control of all individual Bypass Isolators.

Where a Control Command is instigated by an Operator, the display shall ask him / her to confirm the action before proceeding. In any case, each Control Command shall be handled at the protocol level by a Request – Check – Confirm sequence to ensure that the possibility of the wrong control being performed is minimised. SW and HW interlocking may be realised in the traction power station by means of the substation control and protection system in each substation, which may also be required for local operation.

Information presented to the Operator shall be accurate under all feasible circumstances and shall include the status of all sub-section isolators. Manual input of the status of sub-section isolators may be proposed by Infraco with the appropriate risk analysis.

35.10.4 Tramstop SCADA

Tramstop Equipment shall be monitored by the Control Centre Operating staff via the SCADA System.

Such equipments shall include, but not be limited to:

- Operation of Passenger Help / Passenger Emergency Help Point and status;
- 'No-Break' Power Supply failure alarms;
- Communications Systems Status & Alarms;
- CCTV fault status;
- Public Address System volume level control, fault status and controls;
- Passenger Information Display fault status;
- Passenger Help/Passenger Emergency Help Point activation;
- Passenger Help/Passenger Emergency Help Point fault status;
- Tramstop equipment intruder alarms (including Fare Collection System Alarms – see below);
- Tramstop electrical supply status (including Tramstop lighting supplies).

Each Tramstop RTU should provide as a minimum:

- 64 Digital Inputs;
- 16 Digital Outputs;
- 4 Analogue Inputs.

35.10.5 Trackside SCADA

The SCADA System shall monitor trackside equipment as follows:

- Point Controls and Indications;
- Failure of Points to move within a given time of the request;
- Point Heater Controls and Indications (The Operator shall be able to command the heating of points in the event of the thermostatic control failing);
- Tram Wash equipment; and
- Sand replenishment equipment - inclusive of sand levels etc;
- Status of lift(s);
- Pumps.

It is possible that the Trackside SCADA system will share an RTU with the Tramstop SCADA system, and the trackside SCADA requirements will vary at different points along the alignment. The I/O counts are included within the Tramstop I/O count. However, note that an extra RTU will be necessary in the Depot for the specialised equipment there, for which the allowance below should be made:

- 64 Digital Inputs;
- 4 Analogue Inputs.

35.10.6 Fare Collection SCADA

Ticket Vending Machine Alarms shall be brought to the attention of the Control Centre Operating staff via the SCADA System.

The TVMs provided by **tie** shall contain normally closed relay contacts (contacts open on occurrence of fault) for the following alarms to the SCADA system, and shall include:

- TVM Vandal Alarm;
- TVM coin jam;
- TVM printer malfunction;
- TVM card unit malfunction;
- TVM tickets low;
- TVM Cash Vault(s) ¾ full;
- TVM doors open.

TVMs shall be procured by TEL and issued to Infraco for installation.

The I/O for the TVMs is already included in the count in the Tramstop SCADA.

35.11 Operational Data Network

35.11.1 Overview

An Operational Data Network (ODN) shall be provided to ensure two-way voice and data transmission to fixed locations along the entire Edinburgh Tram Network, with high reliability, availability and low latency.

The ODN shall provide the communications 'backbone' between Tramstops, substations, other remote equipment and the Depot, and shall convey data for a variety of applications including:

- Tram Positioning, Routing and Detection System;
- Passenger Information Displays;
- Telephone Network;
- Public Address;
- Operational Radio Network (optional);
- Passenger Help / Passenger Emergency Help Points;
- Closed Circuit Television;
- Point Control and Indication;
- Point Heating Control and Indication;
- Supervisory Control And Data Acquisition; and
- Ticket Vending Machines (separation of data shall be provided, one secure encoded stream for revenue, ticketing and fare collection data and the other for Ticket Vending Machine alarms, administration and management).

The ODN shall use a fibre optic transmission system. A multi-core fibre shall connect all ODN nodes.

The ODN shall include all master and outstation node equipment, interface cards, configuration of the system elements, the connecting cables and management and diagnostic facilities. Fibre optic repeaters between nodes shall not be employed.

The ODN Control Centre Node shall be equipped with sufficient communications capacity to allow the interconnection of all traction power substation nodes, Tramstop nodes point control nodes and Depot equipment.

Where appropriate, Depot subsystems shall be connected to the ODN via the secure Local Area Network.

The ODN shall support the emergency relocation of Control Centre staff to alternative location(s) served by the ODN following a Control Centre evacuation, where they will be able to continue operation of the Edinburgh Tram Network albeit in a degraded mode.

The ODN shall not be a safety critical system. However it shall convey safety or security related messages to and from the following sub-systems:

- Safety related - Traction Power Supervisory Control And Data Acquisition; and
- Security related - Passenger Help / Passenger Emergency Help Points and the associated Closed Circuit Television images;
- Security related - The transmission of Intruder Alarms.

The ODN shall provide a bandwidth sufficient for the satisfactory transfer of all data, telephone and other signals required for controlling, monitoring and communicating with equipment distributed throughout the Edinburgh Tram Network.

In addition, the associated ODN communications paths and power supplies shall themselves incorporate similar levels of redundancy / diversity.

The ODN shall be configured such that in the event of single failure there shall be no loss of data and no requirement for any immediate actions on the part of the Control Centre staff. It shall be configured so as to provide automatic re-routing in the event of failures such that any loss of facility is confined to that given locality and does not affect the operation of the transmission system and facilities at any other location.

The ODN shall incorporate the necessary degree of redundancy and duplication to enable the commitment to be achieved without losing the ability to handle faults and accept necessary upgrades.

Where there are connections or any exchange of data between subsystems, each system shall be such that any failure in another system shall not cause a failure of the system, (except in the functionality between the two systems concerned).

There shall be commonality of design between all types of ODN nodes.

The transmission latency of the ODN shall be such that it does not contribute any appreciable delay to any voice or data applications.

The ODN shall provide an expansion capability of 200% to allow for system growth or to enable further interfaces to be added or an increase in the bandwidth requirements of existing applications or known future enhancements of the Edinburgh Tram Network.

35.11.2 Location of Nodes

Remote ODN Nodes shall be located so that together they serve all locations along the alignment which require communications with the Control Centre, including Tramstops, substations, and points control and points heating cabinets. ODN nodes shall be provided at all Tramstops. Nodes shall also be provided at other locations if it not within the immediate vicinity of a Tramstop node.

Tramstop Nodes

Each Tramstop Node shall be equipped with communications interfaces to allow the interconnection of the following two-way voice or data services throughout the Edinburgh Tram Network:

- Digital Closed Circuit Television cameras and associated controls;
- Passenger Help / Passenger Emergency Help Points;
- Public Address;
- Ticket Vending Machines;
- Passenger Information Displays;
- Supervisory Control And Data Acquisition Remote Telemetry Units;
- Tram Position and Detection System Equipment; and
- Edinburgh Tram Network timeserver.

Where appropriate, a Tramstop Node shall be equipped with additional communications interfaces to allow the interconnection of the following two-way voice or data services throughout the Edinburgh Tram Network:

- Radio base station equipment or
- Other Control Centres e.g. Police. Fire, Ambulance and other Emergency Services, Traffic Control Centre.

Traction Power Substation Node

If required separately, a Substation Node shall be equipped with communications interfaces to allow the interconnection of the following two-way voice and data services throughout the Edinburgh Tram Network:

- Supervisory Control And Data Acquisition Remote Telemetry Units;
- Private Automatic Branch Exchanges extensions; and
- Edinburgh Tram Network timeserver.

Where appropriate, an ODN Substation Node shall be equipped with additional communications interfaces to allow the interconnection of the following two-way voice or data services throughout the Edinburgh Tram Network

- Digital Closed Circuit TV cameras and associated controls;
- Tram Position and Detection System equipment;
- Radio base station equipment or
- Other Control Centres e.g. Police.

Points Control Node

If required separately, a Points Cabinet Node shall be equipped with communications interfaces to allow the interconnection of the following two-way voice or data services throughout the Edinburgh Tram Network:

- Supervisory Control And Data Acquisition Remote Telemetry Units; and

- Tram Position and Detection System equipment.

Where appropriate, a Points Cabinet Node shall be equipped with additional communications interfaces to allow the interconnection of the following two-way voice or data services throughout the Edinburgh Tram Network:

- Radio base station equipment or
- Other Control Centres e.g. Police.

35.11.3 General Requirements

For all ODN nodes, the multi-core fibre shall be terminated at a fibre patch panel situated adjacent to the node.

Tramstop node equipment shall be mounted in the Tramstop Equipment Cabinet. Traction Power Substation node equipment shall be either rack or wall mounted dependent upon its location. Control Centre Node equipment shall be fitted within an equipment rack located in the Equipment Room.

The ODN shall be equipped with a Maintainers' Workstation (which may be shared with other subsystems) running a Network Management System for network management and diagnostics.

The Maintainers' Workstation shall allow the:

- Display of system status and alarms;
- Download of system logs to removable media;
- Configuration of the Operational Data Network;
- Provision for updating system software; and
- Reporting of real time status and alarms to external equipment.

The ODN maintainers' workstation shall be situated in the Equipment Room at the Control Centre.

35.12 Considerations applying to all Communications Subsystems

This sub-section details those considerations which apply to all the subsystems these are:

- Electrical Connections;
- Cabinets;
- Alarming of Faults.

35.12.1 Electrical Connections

All powered equipment described above, with the exception of the Passenger Information Display System and Ticket Vending Machine, shall be provided with a 'No-Break' power supply, via a UPS system, located in the nearest Tramstop Cabinet or Substation, as appropriate. LV Supplies will be in accordance with 33 these Employer's Requirements.

All electrical connections shall be made in such a way that the public shall not have access to any cabling. All cabling and wiring must comply with the Cabling and Ducting section of these Employer's Requirements.

The cable routes shall avoid close contact with, or interference from, high voltage electrical supplies and for this reason a 3.0 metre separation shall be achieved in any plane between any communication cable routes and high voltage electrical supplies.

Wherever practicable, communication between two or more items of trackside equipment and from trackside equipment to the Control Centre shall be by such means that permits minimal trackside cabling and an acceptable level of system integrity.

All powered equipment described in this section shall be provided with a connection to an earth. The earthing and bonding requirements are described in tie's Earthing and Bonding Policy Document.

35.12.2 Cabinets

All Tramstop control equipment, forming part of the subsystems, as described above, shall be mounted in cabinets located on or adjacent to the Tramstop platforms. Within substations, cabinets may be wall or floor-mounted as appropriate. The requirements on cabinets in general are detailed in 19 of these Employer's Requirements.

35.12.3 Alarming of Faults

It is essential that malfunctioning of equipment is brought to the attention of the operators, in a unified manner, as quickly as possible. This shall be achieved through the medium of the SCADA System.

Where possible, this may be achieved through network monitoring of the subsystems, and a connection between the network monitoring system and the SCADA system. Where this is not possible, it shall be achieved through a contact connected into an RTU connected in turn to the appropriate SCADA system.

35.13 Control Centre

This describes the components of the various subsystems described above are located in the Control centre. It divides those systems into:

- Those components within the Control Centre;
- Those components within the Equipment Room.

35.13.1 Control Centre - Overview

The Control Centre shall be the focal point for the control and operation of the Edinburgh Tram Network. Its purpose shall be to provide a working place for the operational employees to manage and coordinate day-to-day activities associated with system operations. The Control Centre shall be located on the first floor of the Depot building.

The Control Centre comprises of a number of workstations, at which Control Centre staff sit and use equipment to remotely control or retrieve data from the system. The operator interface shall be designed to carry out control functions in an ergonomically efficient manner.

These workstations are:

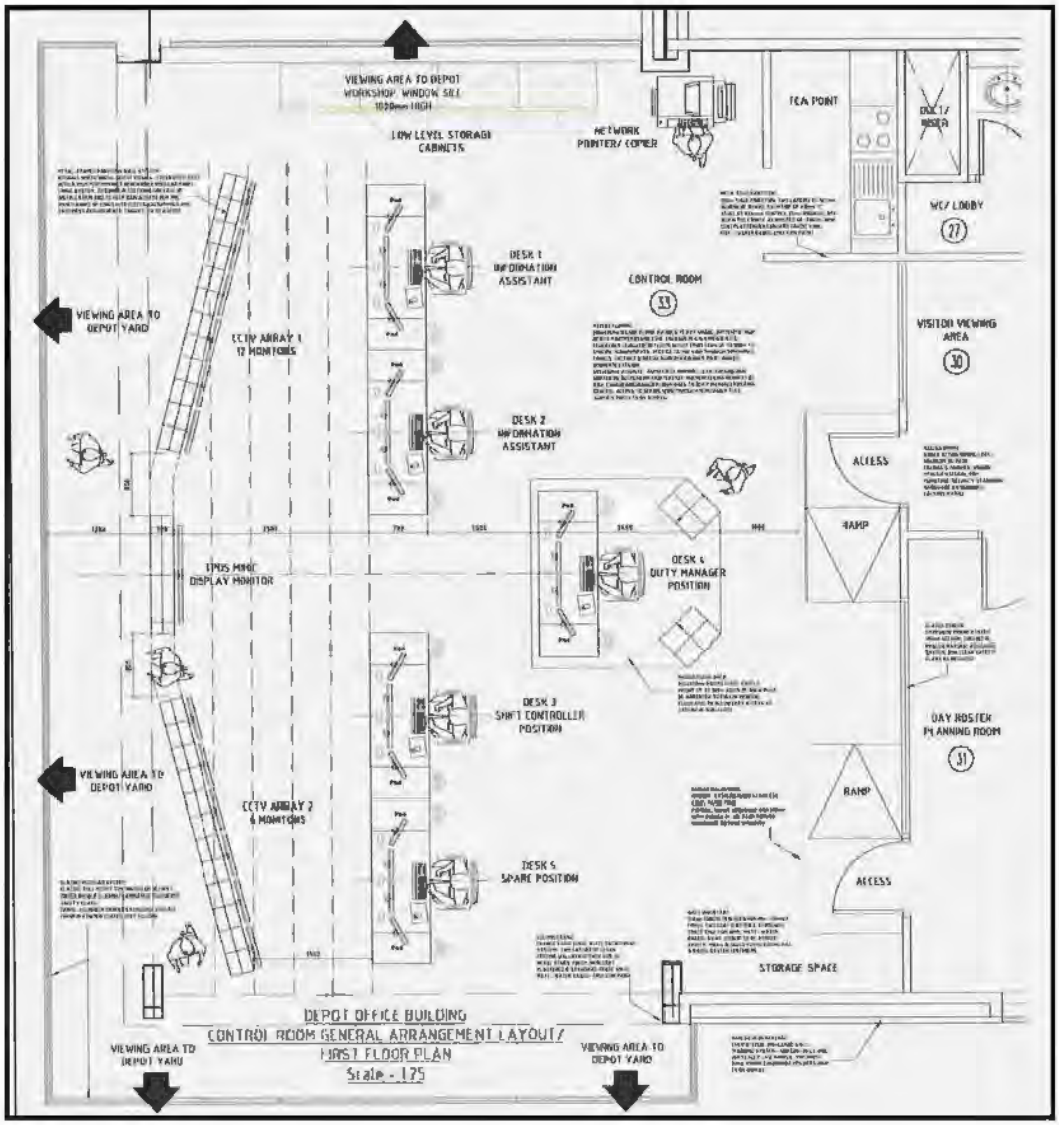
- The Duty Manager;
- The Shift Controller;
- The Information and Security Supervisor;

- There are also two workstations that have been identified for future expansion of the system.

A Monitor Matrix shall be provided, to be positioned either on the front wall or in close vicinity to the Control Centre desks. The matrix shall be of sufficient size to be viewed by all Control Centre staff.

A typical Control Centre Layout is shown in the diagram below. This shows the Control Centre with the addition of the two workstations that have been identified for future expansion.

Figure 11 - Typical Control Centre Layout



35.13.2 Workstation Capabilities

Each Control Centre Workstation shall have the capability to provide indication and control of all subsystems and services: however, it will normally be restricted by logon status to the duties normally associated with the position. The various control and monitoring capabilities are described by subsystem:

- Tram Position and Detection Subsystem;
- SCADA System;
- Operational Radio System;
- Passenger Information Displays;
- Public Address;
- Closed Circuit Television;
- Passenger Help / Passenger Emergency Help Point System;
- Telephone System.

There shall be at least three screens attached to each workstation. The three screens shall be able to form a continuous display. The status of the dynamic data shall be regularly updated, at a frequency of not less than once every five seconds.

Through the top-level diagram it shall be possible to access additional nested menus or screens to gain additional information from the subsystems and facilities.

The presentation of the menus and 'human computer interface', to the Control Centre operators, shall be subject to the approval of **tie**.

Each workstation shall be equipped with at least one keyboard, and some or all of a mouse, joystick, or touch screen capability to navigate around the screens. The keyboard (s) shall be retractable when not in use.

Differential alarm tones shall be provided for each of:

- Operational Radio Network normal calls;
- Operational Radio Network emergency calls;
- Passenger Help Point activation;
- Passenger Emergency Help Point activation;
- Internal and external telephones; and
- Emergency Telephone lines

Tram Position and Detection Subsystem

The Workstation shall present a diagrammatic representation of the entire Edinburgh Tram Network both as an overview display and a series of overlapping sectional displays

Each display shall provide the following as a minimum:

- Last known position of each tram;
- Run / Route number of each tram;
- Number of each tram;
- Punctuality of each tram;
- Driver staff identity for each tram;
- Tram in service / out of service;
- Tram destination; and
- Status of each tramway signal;
- Lie of points;
- Input a tram signal demand via the UTC system;

The Control Centre Workstation(s) controls are only intended for use when the system is disrupted, in emergencies, engineering works, equipment failure conditions, or at the run out and run in of trams to/form the depot. Under normal operating conditions the Tram Position and Detection System will automatically control signals, points and routing of the trams and without the intervention of Control Centre staff. They shall be designed in such a way as to not compromise the safe running of the tram system at any time.

SCADA System

The Workstation shall present a diagrammatic representation of the entire Edinburgh Tram Network both as an overview display and a series of overlapping sectional displays, upon which shall be displayed the control, monitoring and alarm functions associated with the following:

- Electrical Power Substation Equipment for each Electrical Supply Point, the actual position and status of circuit breakers and motorised section isolators;
- Tramstop Equipment;
- Trackside Equipment; and
- Vending Machine Alarms. Details available in Employer's Requirements, Integrated Fare Collection.

The controls and indications shall be displayed in real time and synchronised with the Edinburgh Tram Network Time system.

SCADA Alarms

All alarm events shall generate an alarm message, which shall be electronically logged and displayed to the targeted Control Centre operator.

Each alarm message shall identify the system that has generated it.

Each alarm message shall be assigned a priority level.

High priority alarms shall generate an audible tone.

Alarms shall be presented in a hierarchical manner, with sufficient gradation to ease handover between Control Centre staff.

The Control Centre staff shall have the facility to accept alarms individually or as a 'page' of alarms.

The alarm list shall have the facility to display alarms in chronological order, with the latest alarm first.

Each alarm entry shall include the date and time of occurrence, location and plant identity.

The silencing of alarms shall not inhibit the annunciation of further alarms nor constitute an acknowledgement of the alarm.

Alarm Sequence

Onset of Alarm

This shall be indicated by a flashing alarm message and sounding an audible alarm at the Workstation. There is also a simultaneous logging in the fault log and printing of the alarm on a printer situated in the equipment room.

Acknowledgement of the Alarm by the Control Centre Staff

The alarm message shall be steady, the audible alarms shall revert to a low level, and the acknowledgement shall be logged in the fault log and printed on a printer situated in the equipment room.

Acknowledgement of Reset of the Alarm by the Control Centre Staff

The reset alarm message shall be steady, the low level audible alarms shall cease, and the acknowledgement shall be logged in the fault log and printed on the Supervisory Control and Data Acquisition System printer situated in the Equipment Room.

Operational Radio System

The Workstation shall permit (preferably via a touch screen interface):

- Initiation / receipt of radio calls to any/all tram(s) and other vehicles fitted with the Operational Radio System;
- Initiation / receipt of radio calls to any/all portable radio handsets;

- Provides audible and visual alarms for emergency radio calls received. Such alarms shall be displayed so as to clearly differentiate between normal events and emergency events; and

- Use of 'short radio codes'.

Primary means of initiating radio calls to individual trams from the Control Centre staff shall be achieved by mouse click(s) on the relevant tram represented on the Tram Position Detection System display.

The attention of Control Centre staff to a tram making a radio call to the Control Centre shall be achieved by appropriate graphics symbols on both the Tram Position Detection System and Operational Radio System Human Computer Interfaces accompanied by an audible signal.

All Operational Radio System communications shall be via the Control Centre: direct calling between outstation radios is not required and shall not be available.

When an outstation user wishes to call the Control Centre, they shall insert a call request message. The Control Centre staff will then call them back.

When Control Centre staff call an outstation, the outstation radio shall 'ring' and the outstation operator shall answer the call and speak first.

All radio calls shall also be capable of being made and received via the Control Centre Workstations.
When an emergency call is received at the Control Centre, a distinct audible and visual alarm shall appear on the Workstation. It shall not be possible for a Control Centre member of staff to cancel an emergency call without answering it.

Nomenclature for tram radio call signs shall be the same as the tram number.

When Control Centre staff send a single voice message to all trams and request the tram drivers to acknowledge receipt, the radio system shall present a list of all trams and their status to the Control Centre staff via the Operational Radio System Human Computer Interface.

The status shall be coloured to identify:

- Trams that have acknowledged the message, in green;

- Trams that do not have active radios, in amber;

- Trams that have not acknowledged the message in red.

This will enable the Control Centre staff to identify any trams that have not acknowledged the call. A similar arrangement shall apply to status codes sent to trams.

The Operational Radio System shall support the emergency relocation of Control Centre staff to alternative location(s) served by the Operational Data Network following a Control Centre evacuation, where they will be able to continue operation of the Edinburgh Tram Network albeit in a degraded mode.

The system shall digitally record all outgoing and incoming radio messages.

Passenger Information Displays

The Passenger Information Display System shall be accessible to the Control Centre staff via the Control Centre Workstations.

Normally, the Platform Information Display System shall be automatically updated from the Tram Position Detection System. However, the Control Centre staff shall have the ability to display a selection of pre-recorded messages and free form text on individual Platform Information Displays or groups of displays.

Details and times of the application of pre-recorded messages and free form text shall be logged by the Central Data Recording System.

Public Address

The Control Centre staff shall have the ability to initiate and transmit direct announcements to individual Public Address System Platforms, zones or groups of zones via the Control Centre telecommunications console.

The Control Centre staff shall be able to alter the volume setting of individual Public Address System zones or groups of zones.

Details of all Control Centre staff interventions and direct announcements shall be logged by the Central Data Recording System.

Closed Circuit Television

Colour pictures shall be transmitted to the Control Centre from the Tramstops, substations, park & ride facility and surrounding areas.

The system shall normally display a continuous cycle of Closed Circuit Television. The system shall interrupt this cycle to automatically display the image of the location where a Passenger Help Point / Passenger Emergency Help Point is activated: this shall cause the relevant camera image to be transferred to the Control Centre Staff's local Closed Circuit Television display. This should be able to be overridden by the Control Centre staff. After termination of a Passenger Help / Passenger Emergency Help Point call, the associated Close Circuit Television Camera shall revert to the normal scanning sequence.

The Operator shall be able to select those images that are required to be displayed in predetermined viewing patterns on the Monitor Matrix at the front on the Control Centre near that of the support workplace. Priority of selection shall be adjustable, to be governed by the current Edinburgh Tram Network operating procedures. This shall be adjustable and the system shall allow new viewing patterns to be created, amended and deleted as required by the Control Centre staff to suit individual operational circumstances.

Operation of a Ticket Vending Machine alarm shall similarly cause the local Closed Circuit Television image to be automatically displayed on a pre-selected monitor in the Control Centre.

The selection of the camera for control shall cause the image to be transferred to the Control Centre Staff's local Closed Circuit Television display.

The Control Centre Staff shall have a joystick that shall allow control of the pan, tilt, zoom and focus camera attributes.

The Closed Circuit Television Graphical User Interface shall allow the Control Centre operator to switch any camera image to be recorded at high rate to the central data recorder, to be viewed on any monitor or his own workstation.

The control of the video switching shall be completely transparent to the user.

Location, time and date stamped recording facilities shall be activated if the emergency button is activated on a Passenger Help / Passenger Emergency Help Point, the image from the relevant camera shall be automatically routed to a designated screen in the Control Centre.

Video and textual information shall be displayed on the local display when swapped from the monitor matrix display and shall maintain camera identity, status and location.

All characters overlaid on a Closed Circuit Television image shall provide clearly legible letters and characters on a dark background. Character generation shall be separate from the video image such that the location of a camera failure can be clearly identified.

The Control Centre shall provide facilities to capture a video image displayed on the Control Centre operator's display and print the image via a high quality video printer.

Passenger Help / Passenger Emergency Help Point System

The Passenger Help / Passenger Emergency Help Points System shall be accessible to the Control Centre staff via the Control Centre Workstations for alarm presentation, and via the Control Centre telecommunications console for communication with the person initiating the alarm or help request. Activation of a Passenger Help / Passenger Emergency Help Point shall give an immediate flashing indication and associated audible alarm on all Control Centre staff workstations and the Control Centre Overview Display. If this is an Emergency Help point activation, the image of the associated CCTV camera shall be automatically called to the Monitor Matrix.

The alarm message shall be steady and the audible alarm shall be silenced upon acknowledgement by the Control Centre staff.

Upon termination by the Control Centre staff of a Passenger Help / Passenger Emergency Help Point call, the reset alarm message shall be steady.

Telephone System

There shall be a touch screen interface to the Telephone, (and Public Address and Passenger Help Point / Passenger Emergency Help Point sub-systems if not provided for otherwise) that provides for:

- Initiation / receipt of telephone calls to any / all users on the exchange provided;
- Priority and high integrity initiation / receipt of telephone calls to / from emergency services;
- Audible and visual alarms for Passenger Help Point / Passenger Emergency Help Point calls received; and
- Making of public address announcements at individual, grouped or all Tramstops and / or park & ride sites.

All Control Centre staff positions shall be identical, with functionality determined by user 'log-in'.
All voice communications to and from the Control Centre shall be recorded and be capable of being played back.

Recorded voice communications shall be stored as detailed in 35.14.14.

Emergency telephone lines shall be provided to allow contact with and from the organisations detailed in 35.13.4, regardless of any failure of the main Private Automatic Branch Exchange.

Such facilities need not necessitate individual handsets but may consider a single handset (on the relevant operator workplaces) with priority displays and call buttons.

The Workstation shall incorporate:

- Information displays: (Supervision of extensions and exchange lines);
- Call processing and routing: Traffic and console status; and
- Ability to provide user input via keyboard entry.

The Workstation shall provide:

- Interactive voice greetings and messaging;
- Advanced call monitoring;
- Line engaged signal;
- Waiting time or queuing status;
- Called / calling parties identity;
- Pre-programmed numbers;
- Hands-free / wireless operation;
- Time display, synchronised by the Time Server;
- Conference calling;
- Audio control;
- Programmable functions;
- A local loudspeaker;

- An adjustable ring tone;
- Public Address System Interface; and
- Number ID

35.13.3 Control Centre Philosophy

The Control Centre shall provide Control Centre staff, and especially the shift controller and duty manager, with clear visibility of the entrance and exit tracks and associated infrastructure of the Depot complex with the main tramway and at least one end of Depot shed tracks and stabling apron tracks.

All Workstations shall be of similar design to maintain the aesthetics of the Control Centre.

Each Control Centre Staff position shall be able to control the local lighting, so that screen light reflections shall be reduced.

The Control Centre shall provide positions for the following operations personnel:

Operations Duty Manager

The Duty Manager will be responsible for overall control of the Edinburgh Tram Network and the safety of its operation.

The Operations Duty Manager is required to 'book' Tramcrew on / off duty and needs to see crew before they take their turn of duty in order to be convinced that they are in an appropriate condition to commence duty. The Control Centre shall provide for this without the need for Tramcrew to enter the Control Centre.

The Duty Manager's workstation will be identical to all other workstations.

Operations Shift Controller

The shift controller is responsible for the minute by minute operation of the Edinburgh Tram Network ensuring service perturbation risks are minimised and Tramcrew are aware of the current state of the Edinburgh Tram Network.

Operations Information & Security Supervisor

The information & security supervisor provides support to the duty manager and shift controller by monitoring the positions of trams, monitoring and editing of Passenger Information Displays, monitoring of Closed Circuit Television and Passenger Help / Passenger Emergency Help Points. This post will also take the primary role in ensuring passenger information and security.

Duty Manager

The duty manager's work place shall be located such that he can clearly see and interact with all the operations of the Control Centre.

The duty manager's workplace shall provide facilities to monitor and control the following subsystems:

- Tram Position and Detection;
- Supervisory Control and Data Acquisition;
- Operational Radio System;
- Closed Circuit Television;
- Telephones.

Shift Controller

The operator workplace provided for the shift controller shall be a complete replica of that provided for the duty manager.

In addition, the shift controller shall be given clear visibility of the mimic display and the bank of CCTV displays located at the front of the Control Centre.

Information & Security Supervisor

The information and security supervisor workplace shall be identical to the other workstations.

Monitor Matrix

A monitor matrix shall be mounted either on the front wall or in close vicinity to the Control Centre desks. The matrix shall be of sufficient size to be viewed by all Control Centre staff.

It shall display CCTV images. Textual information shall be displayed on the displays to provide camera identity, status and location. Characters shall provide clearly legible letters and characters on a dark background. Character generation shall be separate from the video image such that the location of a camera failure can be clearly identified, and shall not be generated by the camera itself.

The Monitor Matrix shall cycle through a user-definable set of images over a period of time.

Positioning of the images or sequencing in the matrix shall reflect the geographical layout of the Edinburgh Tram Network. The sequencing and display time of these images shall be user configurable.

The Information and Security Operator shall be able to select those images that are required to be displayed in specified viewing patterns on Monitor Matrix. Priority of selection shall be adjustable, to be governed by the current Edinburgh Tram Network operating procedures. This shall be adjustable and the system shall allow new viewing patters to be created, amended and deleted as required by the Control Centre staff to suit individual operational circumstances.

When activated by the Passenger Help / Passenger Emergency Help Points System interface, the Monitor Matrix shall display the associated CCTV image for that Passenger Help/Passenger Emergency Help Point.

35.13.4 Emergency Telephone Lines

The Control Centre shall have dedicated 'direct' lines between itself and the following locations as a minimum:

- Fire Brigade Control Centre;
- Lothian & Borders Police Control Centre;
- Lothian Buses Control Centre (Annandale Street);
- Edinburgh in View CCTV Centre;

- Ambulance Control Centre;
- Airport Control Centre;
- Network Rail Edinburgh Waverley Power Signal Box;
- Network Rail Electrical Control Centre at Cathcart; and
- City of Edinburgh Urban Traffic Control.

The primary telephone interface providing these facilities shall be through the single integrated audio telecommunications device at each desk, with a secondary hand-held unit for back up. Multi facilities will not be acceptable.

Any incoming calls from emergency services shall be brought to the attention of the Control Centre staff, via messages on the display, audible alarms and / or indicators on the handsets.

All voice communications and messages critical to safe operation shall be recorded on the central data recording system.

All Control Centre communications between control-room staff shall also be recorded and stored for at least thirty-one days.

35.13.5 Local Area Network

All of the Workstations situated within the Control Centre shall be connected to a dual redundant Local Area Network, which shall in turn be connected to the Servers and Systems in the Equipment Room and thence to the Operational Data Network.

The Local Area Network cabling standard shall be category 5/5e or higher.

Each Control Centre staff position shall have two Local Area Network connections per Local Area Network and these shall be accessible through the floor mounted recessed sockets.

The Local Area Network shall accommodate the connection of further terminals for the requirements of future expansion of the Edinburgh Tram Network.

35.13.6 Control Centre Time Display

The Control Centre shall have one or more wall-mounted digital display clocks, mounted so that all Control Centre operators have full view of the displayed time.

These clocks shall show the day, date, hours, minutes and seconds.

The clocks shall be synchronised with the Rugby time signal or its successor or similar.

35.13.7 Safety Requirements

The Control Centre will not house safety critical systems, however, it will provide controls and indications for sub-systems that can be considered to be safety or security related.

These sub-systems are:

- Safety related - the Traction Power Control System and Supervisory Control and Data Acquisition at each substation;
- Security related - the Passenger Help / Passenger Emergency Help Point communications to each Tramstop; together with the associated Closed Circuit Television equipment; and
- Safety related - the Tram Position, Route Setting and Detection System.

35.13.8 Electrical Requirements

The equipment located in the Control Centre shall run from 230/240VAC 50Hz electrical supplies.

Appropriate switched mains sockets shall be located on the walls and in the floor area close to each Control Desk locations for miscellaneous mains powered equipment.

There shall be no 110VAC or 415VAC 50 Hz available in this room. Power tools which require 110VAC 50Hz shall utilise a step-down / isolation transformer to achieve this.

Each mains socket shall be rated for a current of 13A.

The Control Centre equipment shall be supported by the provision of Uninterruptible Power Supply / diverse electrical supplies, further details are available in the Employer's Requirements Depot Section. An Uninterruptible Power Supply mains distribution panel shall be available in the Control Centre to provide a fault tolerant supply for all the equipment in the room. The connection of the

equipment to the Uninterruptible Power Supply distribution panel shall be through a system which has the same standard three-pin plug and sockets as normal 240v supplies, but is differentiated from the normal supply by means of appropriate labels and/of colour.

The design shall include full details of the future capacity that shall be provided for Edinburgh Tram Network expansion, and the method proposed for the work necessary to incorporate, install and commission future extensions.

All Control Centre cables and equipment shall be identified by permanent labelling in an approved format as detailed in the overall system-wide requirements.

The system wiring shall be sized to permit a minimum of 35% increase in power consumption for any additional equipment added as part of future Edinburgh Tram Network enhancements.

The main cable entry shall be via an aperture located in the floor, which provides entry or access for cables into the equipment room.

Particular care shall be taken to ensure that Electro-Magnetic Compatibility is not degraded when cables are closely located.

Cables shall be continuously screened through the aperture in the floor.

Appropriate strain relief or clamping shall be provided.

All cables and conduits shall be clearly marked with cable identifiers or suitable permanent marking which shall last for the expected system lifespan.

Local cabling between the Control Centre and the Equipment Room ducts shall be such that new cabling shall be capable of being installed without disruption to the operations including impact on the connections to the workstations.

35.13.9 Logging

In addition to voice image and message recording, there are two additional log facilities:

- Fault log; and
- Day log.

Fault Log

An electronic fault log shall be created which shall log status messages from Supervisory Control and Data Acquisition and communications systems.

The fault log records all system faults for further investigation.

Data storage shall be provided which shall record data on a 'first in-first out' basis.

Data shall be backed up on a removable storage medium and the system shall automatically do this or notify the Control Centre operator that backup is required before overwriting.

Data shall be backed up on a removable storage medium and the system shall automatically do this or notify the Control Centre operator that backup is required before overwriting.

Fault reports shall be automatically generated.

Day Log

An electronic log of day-to-day operations shall be implemented, from which a hard copy can be generated.

35.13.10 Central Data Recording

The Control Centre shall have a means of digitally recording/replaying the following information:

- All Operational Radio System voice communications;
- All Telephone Network calls to or from the Control Centre;
- All calls via the emergency telephone lines;
- Public Address announcements;
- Closed Circuit Television images, (at variable speed controlled by the viewer);
- Textual changes to Passenger Information Display; and
- The data shall be stored on non-volatile memory storage for the purposes of review or incident investigation.

The Control Centre staff shall be able to replay the data recorder from each desk position.

Information shall be recorded in a tamper-proof manner to evidential standards and be retained for a minimum period of one month.

35.13.11 Printers

The Control Centre shall house local printers for the printing of logs of maintenance or diagnostic data or colour prints of Closed Circuit Television frames.

35.13.12 Control Centre Furniture

The Control Centre shall be furnished with modern ergonomic furniture to assist the Control Centre staff and reduce fatigue.

Each desk position shall have personal storage of a minimum of three lockable drawers. Positioning of storage shall not inhibit the work-envelopes of the Control Centre Staff.

Additional storage equipment shall be located to the sides of the Control Centre.

The design of the Control Centre furniture shall include provision for the effective management of cabling, and equipment and maintenance power supply distribution.

Each of the Control Centre staff shall have the following functionality:

- Computer / workstation with dual flat screen displays, plus retractable keyboard;
- Integrated audio communications device comprising of handset and headset for (Public Address, Operational Radio, Telephones and Passenger Help / Passenger Emergency Help Points). The Telephone System (PABX) and the Operational Radio System shall be provided separately;
- Emergency telephones;
- Local light dimming control;
- Joystick control, (movement zoom and focus of Closed Circuit Television Cameras;
- Pointing device such as a mouse or tracker ball and keyboard; and
- Passenger Help / Passenger Emergency Help Point identification display.

The integrity of Controls and Indications shall be commensurate with the extent to which safety depends upon their correct operation, in both normal and degraded modes.

35.13.13 Spare Capacity / System Expansion

Following installation of the initial Edinburgh Tram Network Control Centre System:

- All conduits, troughing, trunking, and apertures shall be only 50% full of cables;
- All multi-pin connectors shall have a minimum of 10% capacity available for expansion; and
- All multi-way termination blocks shall provide a minimum of 20% capacity for expansion.

35.14 Equipment Room

35.14.1 Overview

The Equipment Room shall be situated either directly adjacent to, or directly below the Control Centre. The primary purpose of the Equipment Room is to provide a location to house the bulk of equipment, which supports the operational monitoring, management and operation of the Edinburgh Tram Network.

The equipment shall primarily be contained in freestanding cabinets located in the Equipment Room. Cabling from the equipment exits from the cabinets and shall be routed to sub-systems located outside the Depot or routed through an aperture into the Control Centre.

Within the Equipment Room will be maintainer desks, which shall be used for maintaining equipment associated with the running of the system.

It is proposed that the Equipment Room shall house the servers which host the following systems (subject to the required performance, reliability, safety and maintainability characteristics):

- Tram Position and Detection subsystem;
- Passenger Information Display subsystem;
- Telephone Network Private Automatic Branch Exchange;
- Public Address subsystem;
- Operation Radio Network Trunking Controller and base station (if required);

- Passenger Help / Passenger Emergency Help Point subsystem;
- Closed Circuit Television subsystem;
- Matrix controller;
- Supervisory Control and Data Acquisition subsystem;
- Operational Data Network Control Central Node;
- Performance Monitoring System;
- Central Data Recording and Storage;
- Radio Clock;
- Security and Access Controller;
- Fire alarm system;
- Voice recording and playback;
- Printers (if required).

35.14.2 Maintainer's Positions

Where appropriate, a Maintainer's Workstation shall be provided for a subsystem, along with any printer. The maintainer's position shall be supplied with any additional diagnostic equipment that cannot be integrated into the maintainer's workstation as part of the suite of software. Any additional special adapters or cables and connectors shall also be provided.

35.14.3 Security and Access Control

The security and access control system shall be housed in the Equipment Room.

The security and access control system shall also monitor the entry and exit to the Equipment Room.

Abnormal or illegal entry messages shall be sent to the Control Centre. These actions shall also be logged in the central data recorder.

35.14.4 Layout

The layout of the Equipment Room shall not be detrimental to maintenance and movement of equipment.

The positioning of cabinets and equipment shall take into consideration the cable and conduit entries and exits into the room.

The maintainer's workstations shall be situated with a full view of the equipment.

35.14.5 Equipment Housings and Mounting

Where possible, the equipment shall be placed in sealed, lockable cabinets, which provide a minimum of IP34 sealing.

Where indicators or diagnostic light emitting diodes/displays are used on equipment the cabinets shall have a glass door to assist in easy viewing from the maintainer's workstation.

Wherever possible, equipment shall be rack mounted or modular to aid replacement and maintenance.

To assist with installation all cabinets and equipment shall be fitted with suitable craneage or lifting points.

35.14.6 Diagnostic, Maintenance or Offline Mode Indications

If the equipment in the Equipment Room is placed into a diagnostic, maintenance or offline mode, this shall be communicated to the Control Centre staff and shall not compromise system safety or the performance of other systems.

35.14.7 Equipment Power Supplies

All powered equipment shall be connected to an Uninterruptible Power Supply in an adjacent room. This shall deliver 230V a.c. 50 Hz or 400 V a.c. 50 Hz.

Switched mains sockets shall be located on the walls and in the floor area close to the equipment locations. Further details are available in the Employer's Requirements - Depot. There shall be provision for 110V a.c. 50Hz in this room to enable the connection of power tools and the sockets shall be clearly marked accordingly.

Each 230V ac 50Hz mains socket shall be rated for a current of 13A.

A Supply distribution panel shall be mounted to the wall to enable disconnection of supplies in the event of an emergency.

The system wiring shall be sized to permit a minimum of 25% increase in power consumption to accommodate additional equipment required for Edinburgh Tram Network expansion.

The power loading and performance characteristics of equipment shall be stated at the extremes of temperature, normal running and transient conditions.

35.14.8 Storage

The Equipment Room shall provide storage for both personal and vocational items. This shall be in the form of lockable cupboards and units.

All main data storage shall be carried out on servers or equipment located in the equipment room where access is restricted. All system or program data must be shown to be retrievable in the instance of a system re-build.

Adequate shelving and filing cabinets etc shall be provided to locate equipment, handbooks, files and storage of electronic data.

Printers and miscellaneous equipment shall be sited in the locale of the maintainers in order to afford easy access.

35.14.9 Spare Capacity / System Expansion

All conduits, troughing, trunking, or apertures shall be only 50% full of cables. All multi-way termination blocks shall provide a minimum of 20% capacity for expansion. All multi-pin connectors shall have a minimum of 10% capacity available for expansion.

Each cabinet shall only be populated up to 75% to provide additional space for system enhancements.

Cabinets containing equipment which may be affected by the future Edinburgh Tram Network enhancements shall have enough spare capacity to accommodate those changes or demonstrate that the expansion or upgrade can be achieved with the minimum amount of changes or use of personnel.

All patch panels and terminals shall have the capacity for equipment used by the future Edinburgh Tram Network enhancements.

35.14.10 Master Clock and System Clocks

Within the Equipment Room, a Master Clock System shall be installed.

The Master Clock shall source a time signal from the standard Rugby clock signal (or its successor) or similar and broadcast the time signal to all systems that require accurate time synchronisation.

The Master Clock shall broadcast the time signal over the Local Area Network or directly via wired connections to the appropriate equipment.

In the event of Rugby time signal failure the system shall continue to generate time signals based on an accurate battery-backed clock. In the event of Master Clock failure, each of the systems that require the Rugby time signal shall continue operating using their own local clock signal. The failure of the Master Clock shall be logged accordingly and displayed to the Control Centre staff.

The time shall be sent to each of the systems to allow logging to resolution of 10ms or better.

A digital display clock shall be situated in a position, which can be easily seen by the maintainers at their workstation position. The clock shall source its time from the master clock. It shall show the day, date, hours, minutes and seconds.

35.14.11 Performance Monitoring System

The Performance Monitoring System shall be connected to the equipment room Local Area Network and be accessible by all designated users with appropriate user group login and password protection.

It shall receive data from the Tram Position and Detection Subsystems and the SCADA systems, which will allow it automatically to calculate those measures of performance of the Tram Network that can be calculated automatically. The relevant Performance Measures are all of those measures that form Performance Measurement System, as set out in Schedule 6 to the Infraco Agreement. This system shall produce appropriate daily and other periodical reports in both paper and software format. The reports shall to provide a suitable audit trail for the calculation of the PMS. The detailed specification for this system shall be subject to further development with **tie** and subject to **tie**'s approval.

The Performance Monitoring System shall also be accessible remotely through a Local Area Network firewall, via the Internet.

35.14.12 Monitor Matrix Display Driver

The Monitor Matrix Controller shall receive data from the Closed Circuit Television System cameras and display the images onto the Matrix of displays in the Control Centre.

It shall be connected to the dual redundant Local Area Network and / or Closed Circuit Television System.

It shall have the capability of being expanded to accommodate the expansion of the Edinburgh Tram Network closed circuit television system.

35.14.13 Central Data Recording

The Central Data Recorder shall be housed in a cabinet separate to all other equipment. The cabinet shall be sealed and locked and have suitable tamperproof fittings. The door shall be fitted with an alarm to indicate when it has been opened, which shall be logged, printed, and displayed to the Control Centre staff.

The data shall be stored in secure manner such that no tampering can be achieved. The maintainers shall have easy access to the system in order to backup/archive data. The system shall have the capability of supporting connections to a Local Area Network based digital recording system held in the Equipment Room.

The system shall provide playback facilities within both the Control Centre and one of the administration offices.

All recorded Control Centre communications shall be time stamped to the nearest second, updated from the Edinburgh Tram Network Time Server in the Equipment Room. Recordings shall be archived to transportable media.

The archiving process shall not interrupt the recording process. The viewing of recorded Closed Circuit Television images shall not interrupt the recording of further Closed Circuit Television images.

The quality of data stored shall be suitable for legal interpretation and proceedings.

The data shall be stored on a system, which shall have the capacity to store at least thirty-one days worth of system communications, Closed Circuit Television images and text information.

Each camera shall be recorded at a minimum rate of 16 frames per second (fps): however, the images shall be recorded at a higher frame rate of 25 fps when:

- An Emergency Help point has been activated;
- A TVM alarm is detected;
- A designated zone has been entered;
- The Control Centre staff manually command the Closed Circuit Television image to be recorded.

The data shall be recorded in a circular buffer where the oldest data is overwritten by the latest data ('first in-first out') and is subject to the storage capacity of 31 days referred to above.

The data shall be stored in secure manner such that no tampering can occur.

The images shall be overlaid by security coding of time/date and location.

Freeze frame facilities shall be provided.

In the above cases, the system will interrogate the Operator at the end of every three minutes to determine whether or not the high recording rate should be continued.

The central data recorder shall provide conversion facilities to adjust the optimisation of the images but not the pictorial content.

The storage device shall provide an audible warning that the storage capacity is within 5% of capacity and that the Control Centre staff are required to archive data to a non-volatile medium.

The status of the data recorder shall be conveyed to Control Centre staff.

Each DVR shall be connected to the Operational Data Network, to allow images to be transferred between locations to allow remote viewing.

35.14.14 Voice Recording

The Equipment Room shall house a Local Area Network based digital recording system that shall record all voice communications both into and out of the Control Centre.

The Central Voice Recorder shall be housed in a cabinet separate to all other equipment.

The cabinet shall be sealed and locked and have suitable tamperproof fittings.

The door shall be fitted with an alarm to indicate when it has been opened, which shall be logged, printed, and displayed to the Control Centre staff.

The voice recordings shall be stored in a secure manner such that no tampering can be achieved. The maintainers shall have easy access to the system in order to backup / archive data.

The system shall provide playback facilities within both the Control Centre and in one of the administration offices.

All recorded Control Centre communications shall be time stamped to the nearest second, updated from the Time Server in the Equipment Room.

Recordings shall be archived to removable media.

The archiving process shall not interrupt the recording process.

The quality of data stored shall be suitable for legal interpretation and proceedings.

The voice recordings shall be stored on a system, which shall have the capacity to store at least thirty-one days worth of voice communications.

The data shall be recorded in a circular buffer where the oldest data is overwritten by the latest data ('first in-first out').

The data shall be stored in secure manner such that no tampering can be achieved.

The storage device shall provide an audible warning that the storage capacity is within 5% of capacity and that the Control Centre staff are required to archive data to a non-volatile medium.

The status of the voice recorder shall be conveyed to Control Centre staff.

35.14.15 Equipment Room Maintainer Desks

Two workstations shall be provided for the maintainers, which comprise a local display, 'man-machine interface' and keyboard to enable the interrogation of the server or other related equipment for diagnostic or maintenance purposes.

The Workstations in the Equipment Room shall be of similar design to their equivalents in the Control Centre but their users shall require a greater level of more detailed access. Such access shall be governed by password and user group membership.

The Equipment Room workstations shall comprise:

- Display, mouse and keyboard for interaction with the Tram Position and Detection System and Passenger Information Display sub-system, the Operational Radio System and the UTC sub-system, the latter via the Tram Position, Route Setting and Detection System;
- Touch screen interface to the Telephone Network, Public Address system, and Passenger Help/Passenger Emergency Help Point systems;
- Touch screen interface to the Operational Radio System;
- Displays and console for the selection and monitoring of Closed Circuit Television images from remotely located cameras;
- Display, mouse and keyboard for interaction with the Supervisory Control and Data Acquisition System; and
- Human computer interfaces for the purpose of archiving and retrieving logged data.

Each maintainer's position shall have two-off Local Area Network connections per Local Area Network and these shall be accessible through recessed sockets.

Each maintainer's position shall have a Telephone Network handset.

35.14.16 Equipment Room Local Area Network Requirements

Each of the maintainer's workstation computers situated within the Equipment Room shall be connected to a Local Area Network.

The Local Area Network cabling standard shall be category 5/5e or higher.

Each Equipment Room maintainer's positions shall have two Local Area Network connections that shall be accessible through recessed sockets.

The Equipment Room Local Area Network shall accommodate the connection of further terminals for the requirements of future Edinburgh tram Network expansion.

35.14.17 Other Systems

A repeat of the 'System Overview' display that is located in the Control Centre staff shall be made available on the Operator's Local area network, updated at least every 5 seconds. This is to enable **tie** to use this image for purposes such as for onward transmission to the TEL /Lothian Bus information centres and in the depot mess room to assist staff with timing crew changes.

36 Integrated Fare Collection

36.1 Scope

The scope of this Section of these Employer's Requirements is to define the integrated fare collection requirements that are applicable to the Edinburgh Tram Network.

36.2 Procurement

Ticket Vending Machines (TVMs) and Ticket Validators for installation at Tramstops will be 'free issued' by **tie** to the Infraco at the Depot. The Infraco shall be required to provide the necessary foundations, ducting, power supply and communications linkage to the TVM and Ticket Validator locations at the Tramstops. The Infraco shall be responsible for the installation of agreed quantities of TVMs and Ticket Validators at the agreed locations.

36.3 General Technical Specification

The hand held TVM docking stations shall be 'free issued' by **tie** to the Infraco at the Depot and the Infraco shall provide appropriate power and comms interface connections, together with appropriate racking to store and charge.

36.4 Integrated Fare Collection

tie/TEL shall be responsible for the Edinburgh Tram integrated fare collection system which shall provide passengers with tickets and ticket validation on and/or off Trams for multi modal seamless bus and Tram journeys within the confines of the Lothian Bus operational area for ticket sales and throughout the SESTRAN area for validation.

Static Ticket Vending Machines will be provided at Tramstops, and hand held ticket vending machines that can also validate tickets will be carried by an Inspector on board each Tram. The fare collection system shall consist of a number of items of equipment each providing elements of the overall System functionality.

These shall include:

- Ticket Vending Machines providing ticket purchasing facilities – these are to be provided separately to the Infraco by **tie** and 'free issued' for installation by the Infraco;
- Tramstop ticket Validators – these are to be provided separately to the Infraco by **tie** and 'free issued' for installation by the Infraco;

- Docking stations for hand-held ticket issuing and smart-card validation machines and associated support apparatus (including docking stations) – these are to be provided separately to the Infraco by **tie** and 'free issued' to the Infraco. The Infraco shall provide power and communications interface connections to the Depot local area network, together with appropriate racking to store and charge the hand held ticket machines.

The elements of the IFC system shall use the system wide communications backbone that shall be provided by Infraco to provide the wide area connections for data transfer and equipment control.

The Infraco shall provide connections for the Ticket Vending Machines and Ticket Validators to be connected locally to the communications network at Tramstops.

The Infraco shall provide a connection for the ticketing central management system to be connected to the communications network and local area operational network at the depot / operational control centre.

The Infraco shall provide for the ticketing central management system to be connected to the outside world by means of a secure IP address.

36.5 Ticket Vending Machines and Validators

36.5.1 General

There shall be a minimum of two TVMs per Tramstop. Exact numbers of TVMs and Ticket Validators are to be agreed for each Tramstop.

The Infraco shall include in the design of the Tramstops suitable foundations for the TVMs and the Ticket Validators and provide 230 volt ac power and communications links to the units as appropriate.

36.5.2 Docking Stations for Hand-Held Ticket Machines

Docking stations and chargers shall be 'free issued' by **tie** to the Infraco. The Infraco shall provide power and communications interface connections to the depot local area network, together with appropriate racking to store and charge the hand held ticket machines. These will be connected to the Central Management System.

Table 86 - Hand Held Ticket Machine Quantities

Equipment	Quantity	Comments
Docking Stations	*35*	As determined in the design and implementation phases

36.5.3 Equipment Interfaces

The following equipment interfaces are required to be provided by the Infraco:

Table 87 - System Interfaces

Interface	Interface with Discipline	Interface Definition	Interface Management
Central Management System	System wide	Integrated Fare Collection	Individual sub systems
Ticket Vending Machine	Tramstop / Buildings	Integration Fare Collection	Buildings
Ticket Vending Machine	Supervisory, Control and Communications System	Integrated Fare Collection	Supervisory, Control and Communications System
Smart Card Validators	Tramstop / Buildings	Integration Fare Collection	Buildings
Smart Card Validators	Supervisory, Control and Communications System	Integrated Fare Collection	Supervisory, Control and Communications System
Hand Held Ticket Machines	Central Internal Financial Control system and SC&C	Integrated Fare Collection	Integrated Fare Collection

The interfaces identified above will be further developed by the Infraco to include details of programme requirements for interface resolution. The detailed interfaces and management thereof will be carried out according to the system integration process for the Edinburgh Tram Network.

37 System Integration

37.1 Introduction

A tramway has many constituent parts and therefore integration is a crucial factor when designing, implementing and operating a successful tramway.

tie shall be provided by the Infraco with a totally integrated Edinburgh Tram Network with all systems, subsystems and interfaces working efficiently and harmoniously together as one and able to be operated and maintained in full compliance with the requirements of the Edinburgh Tram Network and appropriate Consents. To achieve this, the Infraco shall be responsible for successfully undertaking comprehensive co-ordination and system integration roles within the Infraco Works. The system integration responsibility shall exist throughout all phases of the Infraco Works.

This Section of the Employer's Requirements outlines these responsibilities and provides details of the extent of co-ordination and system integration.

37.2 Definitions

System Integration shall include the collation, identification, recording and management of all elements of the Infraco Works, including but not limited to, the project management, design, procurement, manufacturing, factory testing, delivery, offloading, erection, construction, equipping, testing, commissioning, system acceptance testing, shadow running, operation and maintenance of the ETN.

Such integration shall include both the 'hard' integration elements in terms of system and sub-system functionality etc and 'soft' integration elements associated with approvals and Consents, people interfaces, plans, processes and procedures, and land/property agreements.

Also included shall be the production and delivery of all associated documentation (training and maintenance manuals and "As Built" documentation), all spare parts and special tools etc to allow the safe and efficient fulfilment of all operation and maintenance obligations, including dependability criteria, for the projected life time of the Edinburgh Tram Network.

System interfaces shall mean where two or more main elements or subsystems meet or interact or are intended to meet or interact in a manner which is necessary for the expedient and necessary progress of the Infraco Works and the safe and efficient operation and maintenance of the Edinburgh Tram Network.

37.3 Principle

System Integration is a fundamental project requirement and shall include the efficient and effective leadership of the system engineering and associated processes, coordination of the processes for the design, implementation and bringing the Edinburgh Tram Network into public service, complete technical direction and configuration management of the existing system design and system and subsystem interfaces to facilitate the Infraco Works.

37.4 Inter-contract Integration, Integration of third party and free issue equipment

The Infraco shall be responsible for managing all activities required to ensure that the Edinburgh Tram Network is successfully integrated with the equipment and subsystems being provided by the Infraco Parties and others. This over-arching integration role shall include as a minimum the following activities:

- undertaking a design co-ordination system and subsystem development function between contracts;
- lead in the system integration of the ticketing machines, ticket validators and bus passenger information displays;
- lead in the system integration of the subsystems and equipment being provided under the ETN project together with, systems and equipment, such as the "free issue components" or as indicated by **tie**;
- provision of an integrated testing and commissioning plan; and
- implementation of an integrated testing and commissioning programme.

37.5 Formal Roles to be undertaken by the Infraco

37.5.1 System Design Authority

The Infraco shall be responsible for the management of the design and interface processes in respect of systems and equipment being provided under or supplied pursuant to this Agreement. The system design authority role shall be deemed to include leadership of the System engineering process, co-ordination of the design process, configuration management of the System design, System and subsystem interfaces and all associated documentation including general technical direction.

37.5.2 System Integrator

The Infraco shall perform the system integrator role with the aim of meeting the objectives of system integration as set out in this Section. This responsibility shall exist in all phases of the contract from initial requirements analysis, final sign-off of the ETN for operational use and during maintenance.

The Infraco shall be responsible for the practicalities of how the role of system integrator shall be executed, however as a minimum the role is deemed to include the management of the following activities:

- Systems assurance;
- Electromagnetic compatibility including stray current;
- Electromagnetic interference and any associated immunisation of Network Rail signalling systems or assets;
- Environmental issues – noise and vibration;
- System acceptance inclusive of testing and commissioning and training;
- Inter-contract integration;
- Third party issues and consents;
- System safety; and
- Verification and validation.

The Infraco shall:

- Produce a comprehensive system integration management plan, to be implemented and regularly updated by the Infraco throughout the duration of the Infraco Works. Such a plan shall form a fundamental part of the Infraco's overall operational & maintenance plan and design & implementation plan.
- Establish and document appropriate arrangements for the identification, management and monitoring of system integration at the scheme, system, and sub-system levels;

- Provide demonstrable assurance throughout the technical development, procurement and implementation of the ETN that the system and sub-systems form an integrated whole (both in terms of physical, functional and organisational fit, and the operation performance and dependability)

- Identify and integrate the System and all systems as defined in these Employer's Requirements. and equipment being provided under for the ETN project together with, subsystems and equipment provided by others as detailed in 37.4.

- Maintain the integrity of the scheme configuration; and

- Provide and demonstrate compliance and traceability between the scheme requirements and the design and implemented solution and evidence to support the phased and final cases for safety.

All Deliverables shall be:

- submitted in soft copy as required by **tie**;

- Produced in accordance with the ISO 9000 series and in a format approved by **tie**;

- Clearly written, without jargon, with terminology defined; figures, data, calculations and information used shall be clearly traceable and justified; all assumptions shall be stated and justified; and

- Be updated as necessary throughout the Term or as requested by **tie**.

38 Location Specific Requirements

The requirements set out in this section of the Employer's Requirements are mostly applied either system wide or common to particular elements throughout the ETN. The principal exceptions are in relation to the Depot, the Specific Agreements made during the Parliamentary process and the Third Party Agreements as detailed in Schedule 13 (Third Party Agreements). Specific requirements have been identified through the design process. These have been developed by the SDS Provider through the design process over the past years, in particular the following processes:

- The SDS design process, preliminary and detailed (still ongoing) including (in no specific order and not limited to;
- Initial briefing from **tie** and their designers from the Parliamentary stage on issues within the STAG drawings and that had arisen subsequently, either during or in parallel with the Parliamentary process;
- Consultation with CEC as Promoter/Undertaker, as Planning Authority and with their Transport function, including as Roads Authority;
- Consultation with Stakeholders, including major bodies such as BAA, RBS, New Edinburgh Limited, Network Rail and First Scotrail, Historic Scotland, the World Heritage Trust, Forth Ports, and the emergency services. Note that some of these have Agreements as referred to above, but that further consultation and the passage of time has identified additional, changed and/or more detailed requirements to those set out in the Agreements;
- Consultation with other affected landowners, who may not have specific design requirements built into Agreements, as referred to above;
- Consultation with the Operator and with **TEL** (including Lothian Buses);
- Consultation with HMRI;
- Consultation with other affected bodies such as SEPA, Scottish Power, and the other Utilities;
- Specific consultation with frontagers;
- Specific consultation with general interest groups, relating to e.g. environmental matters, disability issues and cycling;
- Consultations with those submitting planning applications along the tram route;

- Public consultation.

39 Project Programme

39.1 Introduction

This Section of the Employer's Requirements provides an account of the programme restrictions that will impact on the Programme. The Section also contains details of the format in which programmes should be submitted and how costs should be broken down in the Work Breakdown Sheet.

39.2 Key Dates

- Key dates in respect of the Edinburgh Tram Network and the provision of the works, services and supplies by the Infraco are set out below. The tram depot at Gogar shall be complete and commissioned ready to accept first tram delivery by the end of November 2009.

Delivery into service for Phase 1a and Phase 1b shall bein accordance with the Programme.

In addition to the Programme dates included above, there are further Programme restrictions within which Infraco must work. These are constraint dates which shall not necessarily affect the whole Works but may do so. Infraco shall take due cognisance of these and the Programme dates outlined above. The constraint dates are as listed below:

- Table of overall Programme Constraints;

Constraint	Dates
Embargos	August Embargo – from the first Sunday in August until the first Sunday in September Christmas Embargo – from the Thursday preceding the first Sunday in December until the first working day of the New Year annually
MUDFA	Latest revision of programme as agreed with **tie** through formal progress meetings.
Design	Latest revision of programme as agreed with **tie** through formal progress meetings.
Others	All other Constraints as shown in Schedule 13 – Third Party Agreements, Code of Construction Practice and Network Rail Possessions

Table 88 – Table of overall Programme Constraints

- Further working time restrictions are imposed on the Infraco by the Construction Code of Practice;
- Network Rail potential possession dates..

39.3 Basis for Programme

- Infraco shall base its programme on the project management requirements at 12 of these Employer's Requirements;
- The Work Breakdown Structure (WBS) for building and coding the programme that is to be used to develop the Infraco programme is that used in **tie**'s master programme;
- The P3e Activity Code Dictionary (Mandatory Codes as below); and

39.4 Third Party Agreements

Infraco shall include these constraints and obligations resulting from Schedule 13 – Third Party Agreements. Infraco shall demonstrate to **tie** that these constraints and obligations have been considered and resolved in the programme.

tie acknowledge their supporting role in the delivery of the obligations contained within these Third Party Agreements.

39.5 P3e Activity Code Dictionary (Mandatory Codes)

The following codes shall be used by the Infraco in the preparation and development of their programme. These codes can only be modified with the express permission of **tie**.

Activity Code		Description
Geographical Sections		
01	Section 01	Newhaven Road to Haymarket
02	Section 02	Haymarket Corridor
03	Section 03	Haymarket to Granton Square
04	Section 04	Granton Square to Newhaven Road – (Future Development)
05	Section 05	Roseburn Junction to Gogar
06	Section 06	Gogar Depot
07	Section 07	Gogar to Edinburgh Airport
08	Section 08	Ingliston Park & Ride to Newbridge – (Future Development)
Intermediate Geographical Sections		
01A		Newhaven Road (inclusive) to Foot of the Walk (exclusive)
01B		Foot of the Walk (inclusive) to McDonald Road (exclusive)
01C		McDonald Road (inclusive) to Princes Street West (exclusive)
01D		Princes Street West (inclusive) to Haymarket (exclusive)
02A		Haymarket (inclusive) - Roseburn Junction (inclusive)
03A		Roseburn Junction (exclusive) to Crewe Toll (inclusive)
03B		Crewe Toll (exclusive) to Caroline Park (inclusive)
03C		Caroline Park (exclusive) to Granton (inclusive)
04A		Granton (exclusive) to Lower Granton Road (inclusive) - Future Development
04B		Lower Granton Road (exclusive) to Newhaven Road (exclusive) - Future Development
05A		Roseburn Junction (exclusive) to Balgreen Road (inclusive)
05B		Balgreen Road (exclusive) to Edinburgh Park (inclusive)
05C		Edinburgh Park (exclusive) to Gogarburn (inclusive)
06A		Gogar Depot
07A		Gogarburn (exclusive) to Edinburgh Airport (inclusive)
08A		Ingliston Park & Ride to Newbridge North - Future Development

Sub-Section (Tram Stop)

00	Intermediate Section Wide
01	Depot
02	Depot Stop (exclusive) - Gogarburn (inclusive)
03	Gyle (exclusive) - Depot Stop (inclusive)
04	Gogarburn (exclusive) to Ingliston Park & Ride (inclusive)
05	Ingliston Park & Ride (exclusive) to Edinburgh Airport (inclusive)
06	Edinburgh Park Central (exclusive) - Gyle (inclusive)
07	Edinburgh Park Station (exclusive) - Edinburgh Park Central (inclusive)
08	Bankhead (exclusive) - Edinburgh Park Station (inclusive)
09	Saughton Road North (exclusive) - Bankhead (inclusive)
10	Balgreen Road (exclusive) - Saughton Road North (inclusive)
11	Murrayfield Stadium (exclusive) - Balgreen Road (inclusive)
12	Roseburn Junction (exclusive) to Murrayfield Stadium (inclusive)
13	Haymarket (inclusive) - Roseburn Junction (inclusive)
14	Shandwick Place (inclusive) - Haymarket (exclusive)
15	Princes Street West (inclusive) - Shandwick Place (exclusive)
16	St. Andrew's Square (exclusive) - Princes Street West (exclusive)
17	Picardy Place (inclusive) - St. Andrew's Square (exclusive)
18	McDonald Road (inclusive) - Picardy Place (exclusive)
19	Balfour Street (inclusive) - McDonald Road (exclusive)
20	Foot of the Walk (inclusive) - Balfour Street (exclusive)
21	Bernard Street (inclusive) - Foot of the Walk (exclusive)
22	Port of Leith (inclusive) - Bernard Street (exclusive)
23	Ocean Terminal (inclusive) – Port of Leith (exclusive)
24	Newhaven Road (inclusive) - Ocean Terminal (exclusive)
25	Roseburn Junction (exclusive) to Roseburn (inclusive)
26	Roseburn (exclusive) - Ravelston Dykes (inclusive)
27	Ravelston Dykes (exclusive) - Craigleith (inclusive)
28	Craigleith (exclusive) - Telford Road (inclusive)
29	Telford Road (exclusive) - Crewe Toll (inclusive)
30	Crewe Toll (exclusive) - West Pilton (inclusive)
31	West Pilton (exclusive) - Caroline Park (inclusive)
32	Caroline Park (exclusive) - Saltire Square (inclusive)
33	Saltire Square (exclusive) - Granton Square (inclusive)
34	St. Andrew's Square

Discipline Codes

ACCB	Accommodation and Boundary Works
APPR	Approvals
APPP	Prior Approvals – Detail Design
APPT	Technical Approvals – Detail Design
ARCH	Architecture
AUXI	Auxilliary Power
BLDS	Buildings
BRDG	Bridges
CECS	CEC Services
CHAR	Charette Changes
COMM	Commissioning
DASB	Design – As Builts
DEMO	Demolition
DEPO	Depot
DRAN	Drainage
EART	Earthworks / Embankments
ELEC	Electricity
ENVI	Environmental
GASS	Gas
GEOT	Geotechnical
HIGH	Highways
HMRI	Railway Inspectorate
JNCS	Junctions
LAND	Landscaping
LIGH	Lighting
MANA	Management
MECH	Mechanical
MILE	Milestones
MISC	Miscellaneous
MODL	Modelling
MULT	Multi-Discipline
NETR	Network Rail
OHLE	OHLE
OTHW	Other Works
PLAT	Platforms
POWR	Power (Traction)
ROAD	Roads / Paths / External Works

SEWR	Sewerage
SIGN	Signalling
STAK	Stakeholder
STRL	Street Lighting
STRU	Structures / Retaining Structures
SUBM	Submissions
SUBS	Sub-Stations
SURV	Surveys
SYSC	Systems Communications
SYSE	Systems Engineering
TELC	Telecoms (Including Data)
TRAM	Tram Vehicles
TRCK	Track
TRMS	Tram Stops
TROS	Traffic Order
TTRO	Temporary Traffic Order
TUNN	Underpasses / Tunnels
UTIL	Utilities
WATR	Water Supply

Phase Codes

D	DEVELOPMENT (Management)
L	LAND & PROPERTY (Management)
J	JRC (Management)
S	SDS DESIGN
ID	INFRACO DESIGN
M	MUDFA (Utilities - Construction)
A	ADVANCED WORKS (Construction)
I	INFRACO (Construction)
T	TRAMCO (Construction)
W	SYSTEM WIDE As Built Design
P	PROJECT WIDE

Scope Type Codes

O	Original Scope
A	Approved Change to Original Scope
U	Unapproved Change to Original Scope

Line Codes

00	Common
1a	Phase 1a - Airport to Newhaven Road
1b	Phase 1b - Roseburn Junction to Granton Square
02	Phase 02 - Granton Square to Newhaven Road
03	Phase 03 - Ingliston Park & Ride to Newbridge North - Future Development

40 Maintenance

40.1 Scope

The scope of this section is to define the maintenance requirements with which the Infraco must comply.

It is anticipated that the Edinburgh Tram Network will have been delivered, tested and commissioned and taken into operation in accordance with the other parts of these Employers Requirements.

The maintenance scope is to maintain the delivered Edinburgh Tram Network functionality for the Term according to this Section of the Employer's Requirements and the Agreement.

40.1.1 General

The Infraco maintenance responsibilities during the Term are detailed here and apply to both the Edinburgh Tram Network infrastructure and Trams. This section also details the Infraco's obligation to develop a maintenance strategy and plan for the Edinburgh Tram Network as a whole, for delivering a maintenance service. The strategy and plan shall include planned inspections and interventions, lifecycle replacement and response to unplanned equipment failures and damage for whatever reason. For the avoidance of doubt, in accordance with the Infraco Agreement, repair of damage due to accidents, vandalism, graffiti, theft, derailments, external influences, force majeure, and repair of damages due to improper handling or operation of the system, where this is not the responsibility of Infraco, entitles Infraco to payment for additional labour and material required in accordance with the Schedule of Agreed Prices.

In response to these requirements the Infraco shall develop a maintenance strategy to support and enable the Edinburgh Tram Network to maintain the performance standards, and a Maintenance Plan for all Infrastructure and Tram systems and elements under their responsibility, that make up the Edinburgh Tram Network. The Maintenance Plan shall be submitted to **tie** and reviewed and agreed in accordance with the Review Procedure.

The Infraco's performance in delivering effective maintenance will be measured, monitored and managed through a combination of the key performance indicators and availability criteria, and assessed by **tie** through a series of qualitative tests in accordance with the Agreement.

40.1.2 Overall Objectives

The main objective of the Edinburgh Tram Network is to provide a safe, reliable, punctual, clean, easily accessible, comfortable and environmentally friendly transport service.

The Maintenance Plan shall form part of the Infraco integrated management system. This shall also include the following objectives, procedures and processes:

- The Parties shall co-operate to achieve the aims under the Agreement;
- The Infraco shall demonstrate how it will meet the Employer's specific requirements under the Infraco Agreement, particularly the requirements for the availability of the ETN and defined sub-systems;
- The Infraco shall manage all their Infraco Parties to ensure they fulfil the requirements of their contracts;
- The Infraco shall ensure that the activities of all Infraco Parties do not compromise the operations, safety and life expectancy of the ETN;
- The Infraco shall set up and adhere to schedules and programmes for all planned work, including adherence to the relevant Operations & Maintenance Specifications and Manuals provided by Infraco;
- The Infraco shall in discharging its obligations minimise any downtime on the system for the Operator;
- The Infraco shall co-operate with **tie** and interfacing parties including the Operator, CEC, Network Rail shall co-operate and, in particular, shall support any obligations they respectively have under their safety management system;
- The Infraco shall be aware of, and be compliant with Law and standards governing operation and maintenance of tram network infrastructure, systems, equipment, and any changes thereto; and
- The Infraco shall establish and maintain lines of communication with all interfacing and affected parties by means of scheduled meetings, consultation, notices, and when required by tie publicity, in regard to maintenance works.

Each year the Infraco shall plan and undertake programmes to review and improve the levels of system availability, safety, performance, and delivery of the infrastructure and trams. The Infraco shall develop a performance improvement plan which shall be developed in conjunction with the Operator and shall be included in future issues of the infrastructure maintenance plan. Infraco shall update the Maintenance Plan in the light of operational experience and resubmit for approval in accordance with the Review Procedure in Schedule 14 of the Agreement.

The Infraco performance payment regime set out in Schedule 7 of the Agreement shall provide a financial incentive for Infraco to provide reliable systems and assets for operation and to undertake effective maintenance of the Edinburgh Tram Network.

40.2 Infrastructure Maintenance Requirements

40.2.1 Purpose

This Infrastructure Maintenance Requirements section identifies the output specification that the Infraco shall meet. This includes delivering planned preventative (cyclical), life cycle and corrective maintenance to the infrastructure of the Edinburgh Tram Network and all relevant plant and equipment for which Infraco is responsible. The Infrastructure Maintenance Plan, which shall be developed by Infraco in response to these Requirements, shall specify objective plans and specifications for maintenance from the pre-operational period and over the Term and shall contain a strategy complying with 40.2.4 of this Section. These Employer's Requirements may be reviewed as necessary during the operational period by agreement with **tie**. The Infrastructure Maintenance Requirements shall be read in conjunction with the other sections of these Employer's Requirements and with such 'as-built' technical documentation, design standards and Operation & Maintenance standards and manuals as are developed by the Infraco.

The Infrastructure Maintenance Plan shall be a fully controlled issue document. Updates shall be shown as a draft version until these are agreed by **tie**. It shall take into account all statutory, regulatory and contractual requirements in force at the time of issue.

40.2.2 Scope

The Infrastructure Maintenance Plan shall cover all maintenance activities, including but not exclusively, the response to unplanned equipment failures and damage for whatever reason, to the infrastructure, plant and equipment that make up the Edinburgh Tram Network. The following responsibilities matrix identifies the general scope for which the Infraco is responsible. The Infraco responsibility for Depot Plant and Equipment maintenance is identified in Table 83 - Depot Plant and Equipment to be Provided.

The Infraco detailed responsibilities in respect of road related obligations are contained in table 90 – Roads, structures in table 92 – Structures (as carried out by the Infraco or others) and landscaping (trees and vegetation).

Table 89 – Infrastructure and Equipment Responsibilities Allocation Matrix

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Tram Stop Structure																
Platform surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Platform Inclined Approach		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Canopy		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Inside surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Internal Roof surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External Roof surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Integral Lighting		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Internal seating		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Tram Stop Furnishings																
Stop Name Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Static Information Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Guard Rails/Barriers (as applicable)		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Lighting Columns		N/A	N/A	N/A	✗	✗	✗	✓	✗	✗	✓	✗	✗	✗	✗	✓
Lighting Lanterns		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Litter Bins		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External seating		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Platform Edge White Line		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Advertising Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Stop Equipment																
CCTV Cameras		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Public Address Loudspeakers		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Hearing Loops		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Passenger Information Displays		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Passenger Alarm/Help points		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Ticket Vending Machines (maintained & serviced by TEL)		N/A	N/A	N/A	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓
Drainage (Interface defined in Table 93)		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Trackside Equipments																
Stop Equipment Cabinets		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Stop Equipment Cabinet Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Traction Isolator Cabinets		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Traction Isolator Cabinet Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Point Control Cabinets		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Point Control Cabinet Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Point Heater Cabinets, Point Heaters & Controls		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Road Junction Cabinets		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗
Road Junction Cabinet Equipment		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗
Point Machines (including Manual Control)		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Contact Wire & Supports		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Poles		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Pole mounted Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Wall Fixings		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Wall fixed Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Tram Signal Heads (Roadside)		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✓
Tram Signal Posts (Trackside)		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Signals Posts		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Detector Loops		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Lighting on OLE Masts		N/A	N/A	N/A	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trackside cable ducts		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trackside cables		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Cable drawpits		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Structures (Bridges, Retaining Walls etc)																
Over Bridges See Table 95 for split		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Under bridges See Table 95 for split		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Retaining walls		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Misc Structures		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Swept Path		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Swept Path Markings		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Track																
Trackwork		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Points & Crossings		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Track Drainage		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Field' Stray Current Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Sub Stations																
Sub Station Buildings		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Sub Station Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Sub Station Compounds		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Sub Station Parking Facilities		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Stray Current Monitoring Points		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Stray Current Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Earthing Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trams																
Free issue' tram mounted equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trams		N/A	N/A	N/A	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✓
Tram saloon & Drivers cabs		N/A	N/A	N/A	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✓
Radio																
Portable radios		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Radio Base stations		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Landscaping																
Soft landscaping		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Hard Landscaping		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓

Floor	Room No.	Description	User Competence Assessor	Used by			Cleaned by			Maintained by			Access Controlled by		
				Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	Transdev
Stores, Workshops and Maintenance Area															
Ground Floor Level		Stores Office Centrally located	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✓	✗
		Heavy Store (Infraco)		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Heavy store (Tramco)		✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Visitors Entrance Hall	n.a	✓	✓	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓
		Workshop Cleaners Room	n.a	✓	✓	✗	✗	✓	✗	✓	✗	✗	✓	✓	✗
		Light Store (Infraco)		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Light Store (Tramco)		✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Infrastructure Workshop		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Dirty Workshop / Machine Shop		✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Clean Workshop (Infraco)		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Clean workshop (Tramco)		✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Lobby	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Male Toilets	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Male Showers	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Female Toilets	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Female Showers	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Staff Corridor	n.a	✓	✓	✓	✗	✗	✓	✓	✗	✗	✗	✗	✗
		Infrastructure Admin	n.a	✓	✗	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Maintenance (Tramco) Admin	n.a	✗	✓	✗	✗	✗	✓	✓	✗	✗	✗	✓	✗
		First Aid	n.a	✓	✓	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓
		Switchroom		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Infrastructure Manager	n.a	✓	✗	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Maintenance (Tramco) Manager	n.a	✗	✓	✗	✗	✗	✓	✓	✗	✗	✗	✓	✗
		Store Room (Cleaners?)	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗
		Staff Entrance Hall	n.a	✓	✓	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓
		Drying Room	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✓	✗
		Tram Batteries		✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Equipment Room		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		UPS Room		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Compressor Room - Air tools		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Tram Maintenance Area		✗	✓	✓	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Maintenance Area Transit Zone		✓	✓	✓	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Inspection Pits		✗	✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗
First Floor office accommodation			n.a	✗	✗	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓
Furnishings - Used, Cleaned, Maintained and Controlled as appropriate															
Chairs, Desks, Tables, Filing cabinets etc			As Appropriate	✗	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
Kitchen and Catering Equipment				✗	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
Reception Desk & Furnishings				✗	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
Control Room Furnishings				✗	✗	✓	✗	✗	✓	✓	✗	✓	✗	✗	✓
Lockers, Coat Rails etc				✗	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
Training Room furnishings (Projector, Screen etc)				✗	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
External															
Depot Yard				✗	✗	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓
Depot Stabling Area				✗	✗	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓
Electrical Sub Station				✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
Power Energy Building (Electric, Gas etc)				✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
Depot Car Park				✗	✗	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Miscellaneous																
Communication & Control links		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓

LEGEND	
	Provided by Tram Maintainer
	Provided by the Infraco
✓	Responsible
✗	Not Responsible

Table 90 – Roads

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
Defects reporting CLARENCE, walking surveys, etc	Rail and rail containment	Infraco			Sharing of information between CEC & Infraco call centres.
	Tram Stops	Infraco			
	Overhead Line Equipment	Infraco			
	Tram duct access chambers	Infraco			
	Tram vehicle detection loops	Infraco	-	-	
	Non-tram vehicle detection loops	CEC	1 working hour		All part of the routine 28 day inspection, work arising dealt with below
	Temporary tram signs	CEC	28 days	-	
	Coloured/textured surfacing for tram	CEC	28 days	-	
	All other road related defects	CEC	28 days	-	
Defect repairs	Rail and rail containment	Infraco			
	Tram Stops	Infraco			
	Overhead Line Equipment	Infraco			
	Tram duct access chambers	Infraco			
	Tram vehicle detection loops	Infraco			
	Temporary tram signs	Infraco			
	Coloured/textured surfacing for tram	CEC		3 months	Resurfacing only to be undertaken when it is agreed that it is required.
	All other road related defects	CEC	-	Emergency* (7 days) Non Emergency (3 months)	* Likely to result in injury (CEC liability, conscious decision by CEC on timescale)
Signals	Tram detection loops and cable to the UTC controller	Infraco		1hr	
	Traffic and tram signal equipment	CEC		4hrs	24 hr response already contracted by CEC.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	Traffic detection	CEC		4hrs	
	CEC Traffic Control Centre	CEC		5mins	Telephone contact with CEC Control Centre except when this is unmanned when Tram control will be able to make a junction call themselves.
Lighting	On OLE poles	Infraco		* 2hr	Response required when 6 or more adjacent lights fail.
	Platforms	Infraco		* 1hr	Response required when 2 or more adjacent lights fail.
	Street Lighting	CEC		* 2hr	Response required when 6 or more adjacent lights fail.
	All other illuminated road signs and bollards	CEC		28 days	
Winter Maintenance	Roads	CEC		* 2hrs	
	Cycleways/footways	CEC		* 2hrs	
	Platforms on-street	CEC		* 2hrs	
	Platforms off-street	Infraco		* 2hrs	
Removal of obstructions	On road/footway including non-segregated tramway path, platforms and platform ramps	CEC		* 1hr	May involve Lothian and Borders Police
	On tramway (segregated sections)	CEC		*1hr	
	On platform (segregated sections)	CEC		*1hr	
CCTV	For roads	CEC		28 days	
	For tram	Infraco		2 days	

Table 91 – Roseburn Corridor

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
Defects reporting CLARENCE, walking surveys, etc	Cycleway/footway	CEC	28 days		
	Retaining walls	CEC	28 days		
	Lighting	CEC	28 days		
	Embankment/cutting and its vegetation	CEC	28 days		
	Kick-rail	Infraco			Demarcation between areas
	Fencing – between cycleway/footway and tramway	Infraco			
	- all other fencing	CEC			
	Noise Barriers	Infraco			If required and do not form a part of the perimeter fencing.
	Grass track	Infraco			
	Drainage	Infraco			
	Tram Stops	Infraco			
	Overhead Line Equipment	Infraco			
	Tram duct access chambers	Infraco			
	Tram vehicle detection loops	Infraco			
	Temporary tram signs	Infraco			
	Coloured/textured surfacing for tram	Infraco			
Defect repairs	Cycleway/footway	CEC		Emergency* (7 days) Non Emergency (3 months)	
	Retaining walls	CEC			
	Lighting	CEC			

	Embankment/cutting and its vegetation	CEC			
	Kick-rail	Infraco			
	Fencing	Infraco			
	Noise Barriers	Infraco			
	Grass track	Infraco			
	Drainage	Infraco			
	Tram Stops	Infraco			
	Overhead Line Equipment	Infraco			
	Tram duct access chambers	Infraco			
	Tram vehicle detection loops	Infraco			
	Temporary tram signs	Infraco			
	Coloured/textured surfacing for tram	Infraco			
Winter Maintenance	Cycleways/footways	CEC		* 2hrs	
	Platforms	Infraco		* 2hrs	
Removal of obstructions	On cycleway/footway	CEC		* 1hr	May involve Lothian and Borders Police
	On tramway and platform	Infraco		* 1hr	
CCTV	At Tramstops	Infraco		2 days	

Table 92 – Structures

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
Structures	S01 Roseburn Terrace Bridge Existing structure to carry trams and cycles	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance (see Definitions below). Existing deck to be removed by the Infraco and fascia to be incorporated within new structure. The existing abutments will be retained to support the embankments but will not support the new bridge deck. Inspection report available. No major defects noted that would present a future maintenance liability.
	S02 Coltbridge Viaduct Existing structure to carry trams and cycleway	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) and assessed. The existing structure will carry the proposed tramway with a new steel walkway attached to the western elevation. Any defects noted during the inspection will be rectified by the Infraco during the construction of the walkway and new deck slab.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S03 St George School Access Bridge Existing road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance (if CEC own it). Infraco will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides vehicular access over the proposed tramway.
	S04 St George School footbridge Existing footbridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance (if CEC own it). CEC to be responsible for polycarbonate sheets. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides pedestrian access over the proposed tramway.
	S05 Ravelston Dykes Bridge Existing bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. TEL will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides vehicular access over the proposed tramway.
	S06 Craigleith Drive Bridge Existing bridge to carry trams and cycles	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. The structure have been inspected (report is available) and assessed. The structure has capacity to carry the proposed tramway. No major defects were noted.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S07 Holiday Inn Access Bridge Existing road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides vehicular access over the proposed tramway.
	S08 Queensferry Road Bridge Existing road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides vehicular access over the proposed tramway.
	S09 Groathill road South Bridge Existing bridge to carry trams	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. The structure have been inspected (report is available) and assessed. The structure has capacity to carry the proposed tramway. No major defects were noted.
	S10 Telford Road Bridge Existing road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides vehicular access over the proposed tramway.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S11 Drylaw Drive Bridge Existing bridge to be demolished				Structure to be demolished by the Infraco.
	S12 Crewe Road Gardens Bridge Existing road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. Structure to be extended by the Infraco over the proposed tramway. No inspection or assessment has been undertaken. A full set of construction drawings for the structure were provided.
	S16 Victoria dock Entrance Bridge Existing bridge carrying to carry trams and general traffic	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. An inspection of the structure was undertaken (inspection report is available), however, no assessment has been undertaken to date.
	S17 Tower Place Bridge Existing bridge carrying to carry trams and general traffic	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. An inspection of the structure was undertaken (inspection report is available), however, no assessment has been undertaken to date.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S18 Leith Walkway Railway Bridge Existing	Network Rail			The structure has been inspected and assessed (reports are available). The structure has capacity to carry the proposed tramway. The major defected noted during the inspection, leaking water main, has now been rectified. However, the next routine inspection should confirm that no adverse affects have occurred to the substructures.
	S19 Haymarket Station Viaduct New	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.
	S20 Russell Road Bridge New	Infraco			Infraco to be responsible for all maintenance.
	S21A Rosebum Street Bridge New	Infraco			Infraco to be responsible for all maintenance.
	S21B Murrayfield Stadium Retaining Wall New	Infraco			Infraco to be responsible for all maintenance.
	S21C Murrayfield Stadium Underpass New	Infraco			Infraco to be responsible for all maintenance.
	S21D Murrayfield Training Pitches R/W New	Infraco			Infraco to be responsible for all maintenance.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S21E Water of Leith Bridge New	Infraco			Infraco to be responsible for all maintenance.
	S22 Balgreen Road Bridge New	Infraco			Infraco to be responsible for all maintenance.
	S23 Carrick Knowe U/B New bridge carrying trams and cycles	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.
	S24 Saughton Road Bridge Existing WEBS bridge	Infraco			Infraco to be responsible for all maintenance. This structure was constructed as part of the WEBS project. Full construction drawings were supplied to ensure that the structure is integrated into the tram system without any modification. An assessment report confirming this is available.
	S25 Broomhouse Road Bridge Existing WEBS bridge	Infraco			Infraco to be responsible for all maintenance. This structure was constructed as part of the WEBS project. Full construction drawings were supplied to ensure that the structure is integrated into the tram system without any modification. An assessment report confirming this is available.
	S26 South Gyle Access Bridge New tram only bridge	Infraco			Infraco to be responsible for all maintenance.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S27 Edinburgh Park Station Bridge New tram only bridge	Infraco			Infraco to be responsible for all maintenance.
	S28 A8 Underpass New	Infraco			Infraco to be responsible for all maintenance.
	S29 Gogar Burn Bridge New	Infraco			Infraco to be responsible for all maintenance.
	S30-31-34 Gogar Culverts New	Infraco			Infraco to be responsible for all maintenance.
	S32 Depot Access Bridge New road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.
	S33 No longer required				
	W01 Lindsay Road Retaining Wall New	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.
	W02 Ferry Road Retaining Wall New	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.
	W03-04 Russell Road Retaining walls 1&2 New	Infraco			Infraco to be responsible for all maintenance.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	W08 Baird Drive Retaining wall New	Infraco			Infraco to be responsible for all maintenance.
	W09 Balgreen Road Retaining wall 1 New	Infraco			Infraco to be responsible for all maintenance.
	W11 Bankhead Drive Retaining. Wall New	Infraco			Infraco to be responsible for all maintenance.
	W14 & W15 Gogar Burn Retaining Walls New	Infraco			Infraco to be responsible for all maintenance.
	W16 A8 Retaining Wall New	Infraco			Infraco to be responsible for all maintenance.
	W17 Depot Internal Retaining Walls New	Infraco			Infraco to be responsible for all maintenance.
	W18 Murrayfield Tramstop Retaining Wall New	Infraco			Infraco to be responsible for all maintenance.
	W19 Gyle Stop Retaining Wall New	Infraco			Infraco to be responsible for all maintenance.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	W100 Roseburn Corridor Retaining. Structures New	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.

Clarification of terms used in Tables 89 to 92 inclusive of the Employers Requirements.

Tram Stop:
Shall comprise: shelters, lighting, passenger information, platform and ramps including the paving, kerbing/cope and soft landscaping, drainage, cleansing and waste removal, seats, cycle racks (where these are directly associated with the tramstop, ticket machines and waste bins).

Rail and Rail Containment

Shall comprise: the rail and rail drainage (up to the point where this ties in to existing road drainage), and the structural elements that contain its permanent placement, and any associated road repairs where these are a consequence of the tramway maintenance. In the case of Roseburn Corridor it shall also include the grass track, up to and including the kick-rail and fencing separating the tramway from the cycleway/footpath.

Overhead Line Equipment

Shall comprise: the pole, the overhead power line and any necessary equipment to allow the permanent placement of the overhead power line.

Tram duct access chambers

Shall comprise: chamber/manholes and permanent covers to access points to the tram related duct access points along the route.

Temporary tram signs

Shall comprise: traffic signs, including temporary speed restriction signs, which are erected from time to time for limited periods over and above permanent tram signs.

Coloured/textured surfacing for tram

Shall comprise: specialist coloured and textured surfacing, including skid-resistant and edge demarcation surfacing, which is laid specifically for hazards directly associated with the tram track over and above that required for general traffic.

Grass Track

Shall comprise: the rail and rail drainage and the structural elements that contain its permanent placement, and any associated repairs, all within the boundaries defined by kick-rails and/or fence/retaining walls.

Structures

"Day-to-day" maintenance of structures will comprise cosmetic treatments including cleaning, the removal of graffiti and localised repairs of paintwork where this is required as a result of graffiti removal.

"Structural maintenance" of any structures will comprise renewal of waterproofing and associated road surfacings; repairs to brickwork, masonry, concrete or steel; repairs to facings and cladding; repair and/or replacement of bearings; repairing 3rd party damage; and any other maintenance activity not mentioned in the "day-to-day" activities above. Where this will require the removal of the rails or its containment is required prior to the structural maintenance then this will be undertaken in all instances by Infraco and reinstated upon completion of the works.

Where activities are the obligation of the Infraco or the Infraco's Sub-contractors, or the Infraco is supporting other parties' roads, structures and Roseburn Corridor obligations, Infraco shall ensure that such obligations are fulfilled, to ensure the safety of the Edinburgh Tram Network is not degraded and that the ability of Infraco, Tram Maintainer, tie and the Operator to achieve their objectives is not frustrated.

40.2.3 Maintenance Approach

The approach to maintenance of the Edinburgh Tram Network (**"ETN"**) shall be as follows:

- All day to day maintenance and inspection activities and planned life cycle renewals and refurbishments shall be planned, organised, undertaken and safely handed back to the Operator in an operational condition as required by the Infrastructure Maintenance Plan and the specifications (against which the ETN is built) and procedures;

- All activities carried out under the scope of the Infrastructure Maintenance Plan shall be the responsibility of the Infraco manager responsible for the maintenance obligations;

- All day to day maintenance, inspection activities and life-cycle replacement works shall be carried out in accordance with agreed procedures and method statements, in the knowledge of, and in liaison with, the Operator;

- Infraco will maintain system interfaces (e.g. Wheel / Rail or Pantograph / OLE), to the best effect for the ETN as a whole.

- Maintenance and life-cycle replacement works shall be classified as planned or unplanned activities arising from condition assessment which has been determined by planned inspection and testing;

- Unplanned maintenance activities shall include rapid response to unplanned equipment failure and damage from whatever cause, and shall be monitored in accordance with the fault rectification times. The approach to each of these categories will be different but there shall be two managers (the Tram Maintainer and the Infraco, with one to be designated as the lead manager) liaising with the Operator's engineering manager, who are responsible for undertaking works in their area of responsibility. These managers shall be able to call upon the services of contractors to carry out all or part of these works.

40.2.4 Maintenance Strategy

Preventative Maintenance

The Infraco shall schedule interventions such that all components that make up the infrastructure shall be subject to checks, repairs and conditioning treatments in order to maximise the asset and component lives, and in advance of critical tolerances being reached which would have affected operation, or have reduced their performance in the service for which they were designed.

Two types of preventative maintenance shall be undertaken:

- Systematic preventative maintenance that follows a predetermined schedule based upon time, usage and data gained through operational and maintenance experience such as:
    - Condition inspection and safety checks; for example, grooves for excessive wear, damage, or debris;
    - Cleaning of equipment and drains;
    - Functional tests to reveal faults; and
    - Adjustments to enable optimum operation.
- Conditional preventive maintenance including carrying out planned inspections to establish if the performance or operation of infrastructure sub systems are within pre-determined measurable parameters such as:
    - Vibration and noise levels ;

- Temperature thresholds in substation transformers etc.;
- Wear limits on rail, and wire height and stagger, etc.;
- Including non-destructive testing as appropriate; and
- Points operation times and geometric limits.

The Infraco shall take the necessary corrective maintenance action arising as a consequence of the conditions where these are out of tolerance.

Reactive and Fault Correction Maintenance

The Infraco shall repair or change damaged or faulty equipment, following the observation of any failures and/or the occurence of incidents. This involves two kinds of intervention:

- Breakdown in service requiring specific intervention shall be limited to re-establishing safe, robust and sound operating conditions. This shall require a specific intervention, to be carried out by Infraco staff within the limits of the equipment and operating rules and procedures agreed with the Operator and **tie**.
- Repairs: this covers interventions that shall be undertaken following incidents or failures that occur in operation, potentially involving a longer stoppage of equipment including overhauls of parts of a sub-system or section of the line. This is an intervention of lasting character, carried out by maintenance staff or contractors. After repair, if equipment has been replaced, then it shall conform to its original specifications or such alternative standards as agreed with **tie**; or in the event that the equipment is reconditioned then it shall conform with allowable tolerances.

Response times for reactive and fault correcting maintenance will be based on the potential impact of the incident or failure. A response to an incident is to be initiated within the time limits specified in Clause 52 of the Agreement. Fault Correction times are detailed in the table on the following page.

Table 93 - Fault Correction Requirements

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description
1	1 hour to attend and make safe and functional. 2 hours to Breakdown Intervention	2 hours to attend and make safe and functional. Rectified by 07:30	Critical issue such as Health & Safety risk, or failure halting the operation of the tram network in whole or part thereof, failure of major system
2	2 hours	3 hours	Failure impacting the punctuality of the tram network, or having potential to impact.
3	8 hours	9 hours	Failure or incident not having immediate impact on network operation, but impacting the quality of the Transport Services as monitored by the Edqual Service elements in Schedule 7 of this Agreement
4	1 week	1 week	Failure or incident not impacting network operation, nor quality of the Transport Services as monitored by the Edqual Service elements in Schedule 7 of this Agreement
Tramstop lighting Fault	2 days	2 days	
Tramstop telephone Fault	3 days	3 days	
Fault causing the lift at Murrayfield Tramstop or depot to be out of operation	6 hours	6 hours	

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description
Tramstop electronic passenger information display Fault	2 days	2 days	
Tramstop PA system Fault	24 hours	24 hours	
Tramstop CCTV Fault	2 days	2 days	
Defect, fault or other disrepair that restricts access to all or part of a Tramstop or otherwise interferes with its use	1 day	1 day	
Defect, fault or disrepair causing a trip hazard at an Tramstop (including unintended changes of floor levels or protrusions from the floor of more than 25mm)	24 hours	24 hours	
Defect degrading system access to	6 days	6 days	

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description
below DDA requirements			
Broken glass at a Tramstop or the depot	2 hours	2 hours to attend, make safe and functional. Rectified by 07:30	
Overflowing / damaged gutter at a Tramstop or the depot	24 hours	24 hours	
Structural defect, fault or other disrepair at a Tramstop or the depot	28 days	28 days	
Any other defect, fault or other disrepair at a Tramstop or the depot (including in relation to shelters, seats, canopies, signage, cycle parking, litter bins and poster cases) but excluding blocked	5 days	5 days	

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description
drains, overgrown vegetation and fencing faults.			
Blocked drain other than on a street running section of the Edinburgh Tram Network System	24 hours	24 hours	
Blocked drain on a street running section of the Edinburgh Tram Network System	2 hours	By 07:30 if notified between 22:01 and 05:30	
Overgrown vegetation	3 days	3 days	
Defect, fault or disrepair fencing such that access to the track or buildings and equipment is not prevented	6 hours	6 hours	
Defect, fault or disrepair in respect of a Monitoring Point or any other	24 hours	24 hours	

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description
electronic monitoring equipment			
Structural defect, fault or disrepair other than at a Tramstop or the depot	28 days	28 days	
Any other defect, fault or disrepair other than at a Tramstop or the depot	2 days	2 days	

Note:

The foregoing table concentrates on elements not covered by the punctuality and qualitative criteria of the Performance Monitoring Regime set out in Schedule 6 to the Agreement.

The Infraco shall develop an electronic system for the management of reactive and faulting maintenance. The system shall be based upon the electronic Event Logger which will be situated in the Control Centre and shall enable the accurate analysis, reporting and logging of faults and other reactive maintenance requirements (including cleaning) including the time and date when they were reported and the time and date when they were cleared. Infraco shall manage all faults through to a satisfactory resolution and will provide a full record and audit trail including details of how the resolution was achieved and the time taken to achieve it. The full details of the system to be agreed with **tie** and shall form part of the asset management system as referred to in these Employer's Requirements.

Life Cycle Maintenance

The Infraco shall refurbish and replace elements of infrastructure before its performance deteriorates below the design, stated tolerances or equipment has become obsolete and/or is incurring disproportionately high maintenance costs as assessed by the Infraco and proposed to **tie**.

The initial lifecycle replacement plan will be based upon the manufacturer's stated design life, Infraco's previous experience, and assumptions on the impact of designed use.

Subsequent annual updates will take into account condition and reliability data gathered during the inspection, maintenance and operational use.

Further Maintenance Activities

In respect of the ETN, the Infraco shall in addition to preventive, life cycle and reactive maintenance undertake the:

- Removal of graffiti;
- Repair vandalism and accident damage; and
- Cleaning.

Repair of vandalism and accident damage and removal of graffiti will be undertaken by the Infraco and, where this is not caused by the Infraco or any of the Infraco Parties, the Infraco shall be entitled to payment for additional labour and material required in accordance with the Schedule of Agreed Prices.

40.2.5 Organisation, Training and Competency

Staffing Plan, Recruitment and Training Plan

The description of the Infraco organisation for all aspects of maintenance and all management and administrative support shall be set out in Infraco human resources plans (staffing plan and recruitment and training plan). These documents shall contain all details of:

- Organisational structure;
- Job descriptions and required competencies;
- Standard training courses;
- Compliance with all appropriate Law and regulations;
- and the procedures required to:
  - Recruit staff to fulfil the various employee roles and maintain the required establishment;
  - List the scope of items to be sub-contracted by the Infraco;
  - Monitor the performance and competency of maintenance staff whether direct labour or contractors; and
  - Secure and review the required competencies and associated training courses.

The maintenance documents submitted in draft form with the Infraco Proposals shall subsequently be developed and agreed with **tie** and Operator as part of the Infraco Works. This will include the identification of key staff. These documents shall be reviewed and updated when necessary, and at least annually.

It is to be expected that there will be an element of staff turn-over during the contract period. The Infraco shall include in the plan their process of ensuring quality is maintained and knowledge is managed and maintained. The proposed replacement of any key staff member of Infraco shall be notified to **tie** and to the Operator.

40.2.6 Quality, Health, Safety and Environmental

Health and Safety

For all matters relating to Health and Safety, Infraco shall produce and maintain a Safety Management Plan, which shall comply with the requirements of ISO18001 and be certified by an ISO approved body. The Safety Management Plan shall be reviewed and updated when necessary, and at least annually.

Environmental and Sustainability Management

For all matters relating to environmental and sustainability management Infraco shall produce an Environmental Management Plan. This shall set out the various environmental legal and regulatory requirements that Infraco shall comply with and the Infraco standards, processes and procedures that will enable compliance with such environmental, legal and regulatory requirements, to also meet its obligations under the various agreements to which it is a party, the **tie** Environmental and Sustainability policy and shall in all respects comply to the requirements of ISO 14001 and be certified by an ISO approved body.

The Environmental Management Plan shall be submitted to **tie** prior to completion of Section A on Site, and shall be reviewed and updated when necessary, and at least annually.

Quality

The Infraco HSQE Manager shall be responsible for providing a Quality Management Plan within the Quality Management System which shall comply with the requirements of ISO 9001 and be certified by an ISO approved body. The Quality Management Plan shall be available at least three months in advance of any maintenance activities commencing. The Infraco HSQE Manager shall be responsible for auditing and inspecting the requirements of all Infraco plans, processes and procedures.

The Quality Management Plan shall be submitted to **tie**, and shall be reviewed and updated when necessary, and at least annually.

Safety

The Infraco shall develop, to the satisfaction of **tie**, the Independent Competent Person as defined under the ROGs regulations, HMRI and other Approval Bodies, a generic safety management system for the commissioning and operation of the ETN that complies with the ROGs regulations.

The generic safety management system shall be capable of development to a full and final version prior to commencement of commissioning of the ETN.

The preliminary work on the safety management system will include the production of a safety justification framework document that will indicate the likely format and some of the detail of the eventual Case for Safety that the Operator, Infraco and Tram Maintainer will be required to present to, and gain approval from, the Competent Person as defined under the ROGs Regulations.

The framework document will be drafted in conjunction with the Operator and **tie** and in consultation with the Competent Person, as defined under the ROGs Regulations and other relevant Approval Bodies describing how system safety is achieved through system design supported by system maintenance and system operation. It shall embrace the following subject areas:

- Description of system design, maintenance and operation: Introductory section giving general description of the ETN, identification of safety responsibilities and reporting mechanisms;
- Arrangements during construction and initial access to the lines: organisation and management of working staff, safety, emergency arrangements, identification of staff, insurance, safety audit, arrangements for keeping and distributing records;
- Arrangements for testing and staff training: organisation and management of staff, safety arrangements including staff working on the tramway, emergency arrangements, identification of staff, insurance, fault analysis, safety audit, arrangements for keeping and distributing records;
- Infrastructure management: track, speed limits, public crossings (surface and bridges), fencing, Tramstop infrastructure, monitoring and reporting systems;
- Tram operation arrangements: operating arrangements including fitness and training of staff, certification of staff, tram preparation, defect repair and breakdown procedures and communications;
- Tramstop arrangements: access for contractors, control of access and vandalism and security;
- Tram maintenance arrangements: engineering and operational acceptance of tram vehicles, competence of staff engaged on maintenance, quality assurance, technical audit, monitoring, reporting of defects, procedure for imposing operating restrictions, acceptance of trams for the transport services;
- Infrastructure maintenance: inspection procedures, accreditation, control and monitoring, reporting procedures, emergency arrangements, communications, signage and warnings in the operating environment;
- Interfaces with other organisations: liaison with emergency services, HMRI and Roads authorities;

- Risk assessment: assessment of the risks associated with all aspects of the project operations including groups of people most at risk, severity of failure event and likelihood of event occurring;

- Health and safety policy: policy statement, monitoring arrangements, alcohol and drug policy including testing and disciplinary action; and

- Code of practice for working on or near the line;

- Control of safety critical work.

40.2.7 Liaison with tie and Other Parties on Maintenance Related Issues

Infraco Communications Plan

The Infraco shall create a Communications Plan (which shall be agreed with **tie** as part of the finalisation of the Infrastructure Maintenance Agreement) for all matters related to communications between the Infraco, the Operator, Tram Maintainer, **tie**, TEL, CEC and if required by **tie** other third parties.

A Communications Plan shall be submitted to **tie** prior to commencement on Site, and shall be reviewed and updated when necessary and at least annually.

The Infraco shall establish effective lines of communication with the Operator and **tie**, through the control centre and planning staff in order to plan maintenance activities around tram service requirements. The Infraco shall pay particular attention to communication in respect of the planning and undertaking of works having a direct impact on the operation of the ETN, the return to full service following completion of the maintenance and unplanned maintenance activities or repairs covering day to day operations and tie/third party long-term contractual matters.

The Infraco shall provide details of how effective lines of communication with the Operator and **tie** will be set up and maintained throughout the Term. This will include details of how key staff and expertise will be provided "on call" at all times to the Operator in the event of unforeseen breakdowns etc. Infraco shall after liasing with the Operator propose a process for system / equipment handover after the completion of maintenance activity to be agreed with **tie** and a programme of daily meetings to discuss punctuality performance (and associated deductions) and infrastructure availability.

The Communications Plan shall be aligned with that of the Operator and Tram Maintainer to ensure communication in critical areas, such as health and safety management, access arrangements for maintenance and response, and permits to work, are coordinated.

40.2.8 Reporting

Annual Review

Infraco shall prepare an annual review report, "The Annual Review Report". The content of the Annual Review Report shall be agreed with **tie** and address the following, as a minimum:

- Health and safety, environmental and quality annual performance reports and proposals for improvement;
- Annual report on planned, reactive and lifecycle maintenance activities carried out against programme, together with impact of shortfalls and proposals for recovery;
- Overall system performance, trends in condition or failures and recommendations based on learning though the process of delivering maintenance; and
- Summary and classification of complaints and significant events, together with actions taken / recommended.
- Recommendations based on learning though the process of delivering maintenance.

Infraco shall be responsible for arranging each year's Annual Review Meeting, to take place, as nearly as possible, twelve months after the previous year's Annual Review Meeting.

Infraco shall issue the meeting agenda and all required management reports and papers, as agreed with **tie**, no later than five working days in advance of each meeting.

Reporting period review

The reporting period review report shall include comprehensive details to cover as a minimum the following information for the relevant Reporting Period:

- Output from performance measurement system with associated performance deduction calculations as Schedule 7;
- Details of all events after associated with failures to provide Available Infrastructure and Available Trams;
- Health and safety, environmental and quality reports;

- Maintenance report showing progress against Annual Maintenance Plan and detailing the programme for the upcoming eight weeks, including;
    - A statement on planned maintenance, including cleaning, performance during the Reporting Period and any backlog;
    - Report on reactive and fault correcting maintenance, including cleaning, required during the Reporting Period, impact on Tram service, and any wider implications to the service and the Maintenance;
    - Any planned future works to be carried out within the eight week period, howsoever arising, which have the potential to disrupt the operation of the Edinburgh Tram Network service; and
    - Infrastructure condition, failures in the Period and mitigation undertaken in Period and with recommendations and actions to be taken, complaints and any significant events.

Infraco shall schedule the Four weekly Review Meetings no less than one month in advance of each meeting.

Infraco shall issue the meeting agenda and all required management reports and papers, as agreed with **tie**, later than five working days in advance of each meeting.

Records

Infraco shall maintain all records necessary for the effective delivery of the maintenance services. All records shall to be up to date within ten Business Days of the end of the relevant Reporting Period relating to the specific record. Records are to be the property of **tie**, access to the records will be afforded to **tie** within five days of a request being made. Records will be kept for the longer of the Term or 6 years from the day the maintenance service was performed.

The record details, including format, storage medium, recovery procedure, administration and access, are to be proposed within the draft Communication Plan, and discussed and agreed with **tie** in conjunction with the final Communications Plan.

The agreed method of communicating a request will be included within the Communications Plan.

40.2.9 Infrastructure Maintenance Plan - Overview

Infraco shall develop and deliver a Maintenance Plan that ensures that all the Infrastructure assets and equipment safely continue to meet their designed operational performance or specification, meet the availability targets identified within the Contract, and support the achievement of the performance regime.

40.2.10 Development of the Plan

An Infrastructure Maintenance Plan shall be developed by Infraco and submitted to **tie** prior to commencement of maintenance activities. This shall detail how maintenance will be delivered in response to the infrastructure maintenance requirements; where it is not possible to include elements of detail at the time, a development plan will be included, identifying exactly what information is outstanding, and when it will be provided.

The completed Infrastructure Maintenance Plan will be submitted by the date identified in the development plan and agreed with **tie**.

During the operational phase Infraco shall submit to **tie** an annual infrastructure maintenance plan for review and approval three months before the anniversary of the Service Commencement Date of the Edinburgh Tram Network or part thereof. The new plan will detail the planned and life cycle maintenance for the following year in order to provisionally approve planned works. The process of approval is to be agreed with **tie** during the tender stage.

Life Cycle Requirements

A Lifecycle Replacement Plan shall be included within the Infrastructure Maintenance Plan. This will detail all planned lifecycle replacement works over the Term.

The annual updates to the Infrastructure Maintenance Plan will include an updated Lifecycle Maintenance Plan detailing life cycle replacement works until the end of the maintenance period.

The planned maintenance strategy (including cyclical and life-cycle maintenance) should be such that the performance of the Edinburgh Tram Network should never fall below that of the designed operational performance or specification, within the Term.

Reactive Maintenance Requirements

The Infraco Maintenance Plan shall detail Infraco's assumptions on the volume and type of reactive maintenance likely to be experienced in the relevant period, and should detail how their resource planning has been prepared to respond to it.

Frequencies

The Infraco Maintenance Plan shall indicate the frequency and sequence to which maintenance will be undertaken; based upon statutory obligations, manufacturer's and best practice recommendations, Contractor's experience and operational performance and availability requirements.

Maintenance Codes

A standard Work Breakdown Structure, consistent with that defined for the construction phase, shall be established to identify maintenance tasks to various infrastructure sub-systems.

40.2.11 Tools

The Infraco shall maintain and replace as appropriate, a full set of tools sufficient for the maintenance of the ETN in good condition and calibrated where necessary.

40.2.12 Availability and Warranty

The availability requirement for the Edinburgh Tram Network is contained within the performance regime.

Lack of availability of key systems or the late running of trams due to failures which are the Infraco responsibility will give rise to the imposition of performance deductions from the fee payable under Schedule 6. Details of the performance regime are set out in the Schedule 6.

During any warranty period or extended warranty period associated with any part and during the Term (as set out in the Agreement), a robust process shall be in place to manage the return and replacement of parts thus contributing to optimal operational service, whilst optimising the management of warranty claims under the Agreement.

40.2.13 Asset Management System

An integrated asset maintenance management and recording system shall be provided and utilised by Infraco in order for data obtained from the tram and infrastructure sub-systems or other sources to be collated and analysed. This will enable the Infraco to assess safety and performance issues and to facilitate modifications and changes, where necessary, to the maintenance plan and working practices including the asset management system itself.

A computerised asset management system shall be established, in a form to be agreed with **tie**, to facilitate maintenance of the assets and allow data obtained from the infrastructure sub-systems, trams or other sources to be collated and analysed. This will include development of an asset register.. This will enable technical staff to assess safety and performance issues and to facilitate modifications and changes, where necessary, to the maintenance plan and working practices.

In addition to recording all the assets as they arrive on site, the asset management system shall record against each discrete item provided with a serial number:

- Its date of registration;
- Its location(s), including transfers from one site or equipment to another;
- Its maintenance history, with references etc.;
- Its fault history;
- Its maintenance prognosis (when maintenance is next due etc.); and
- Overdue inspection / maintenance.

The functional details of the asset management system will be integrated with the hard copies of the suite of operation and maintenance manuals and comply with the requirements specification for an asset management system.

40.2.14 Work Instructions

Infraco shall verify that they and all sub-contractors have carried out the necessary planning to undertake all proposed maintenance activities in accordance with the Infrastructure Maintenance Plan and all necessary risk assessments, method statements and work instructions.

For each maintenance activity type, detailed work instructions will be broken down against equipment type and artisan skill set to facilitate planning of the work. Each work instruction will provide a step by step breakdown of the work involved including information about how any equipment to be worked on should be accessed and / or made safe.

40.2.15 Minimum Spare Parts Holdings

In order to cover all planned infrastructure maintenance and arising corrective maintenance, sufficient spares shall be held by the Infrastructure Maintainer throughout the duration of the Infrastructure Maintenance Agreement to ensure that delays in completing planned or corrective maintenance are not experienced due to parts unavailability.

Infraco will provide details of its planned spares holding within the Infrastructure Maintenance Plan.

The Infrastructure Maintainer shall be required to maintain, at all times, a minimum holding of certain spare parts. The schedule of minimum spare parts holding will be developed by **tie** and Infraco as part of the finalisation of the Infrastructure Maintenance Agreement. The level of minimum spare parts holding will also be reviewed every year to ensure that it is appropriate on the basis of operational experience and Infraco's ongoing requirements.

For the avoidance of doubt, the initial stock / holding of spares shall be provided as part of the initial capital expenditure by Infraco. The Infraco maintainer shall be responsible for the replacement of any spare part used and the stock / holding shall be maintained at the same level, subject to adjustments approved by **tie**, based upon experience, once the ETN is operational. Where repair is to be undertaken in-situ, information shall be provided of any special facilities or equipment required. Where equipment is to be returned to the original equipment manufacturer (or any other organisation) for repair, it shall be demonstrated that the holding is sufficient to allow for predicted turnaround times.

Wherever reasonably practicable and where cost efficient the Infrastructure Maintainer shall source as many consumable spare parts and as much repair work from approved local suppliers in the interests of cost efficiency and minimisation of lead times.

40.2.16 Maintenance Records

All maintenance work performed shall be logged for record, monitoring and audit purposes. This shall be recorded in a log book and in the asset management system.

40.2.17 Indicative Scope

Infraco shall develop their Infrastructure Maintenance Plan to include all fixed Infrastructure and mobile equipment under their responsibility; this includes, but is not limited to those identified in table below.

The maintenance of Infrastructure shall generally be based on the recommendations of the manufacturer or designer, and as set out in the operating and maintenance manual. Specific additional requirements are listed in the second column.

Table 94 - Infrastructure Maintenance Plan Scope

System, Element or Service	tie Specific Requirements
Overhead Line Electrification	
Control and Communications Systems	The common failure reporting of the SCADA system, the log files of computers and the recording devices shall be used for the detection of failures in addition to fault reports provided by the Operator. As the Closed Circuit Television (CCTV) and the Public Address System (PA) at the Tramstops and in the depot area are crucial for the security of the site, their proper functioning shall be monitored. CCTV cameras need to be cleaned regularly and recording media made available. Quick repair of any faulty or damaged CCTV equipment shall be conducted to maintain Tramstop security. It is equally essential that the information given over the PA system be clear and audible, taking into account ambient noise level at Tramstops.
Power Supplies and Sub-Stations	
Tramstops	Regular maintenance is essential to ensure that features, which were designed to prevent crime and improve the environment, do not deteriorate and present opportunities for crime and raise fears for personal security. It is also crucial to ensure that Help Points are clearly signed and well lit so that their location is clear to passengers on the Tramstop. Therefore, the quick repair of faulty or damaged equipment is essential.
Pest Control	Special planned maintenance shall be considered for vermin

System, Element or Service	tie Specific Requirements
	control, pigeon shoots and the removal/ cleaning of birds' droppings and nests. These activities shall be scheduled as required and every six months intervals maximum throughout the ETN.
Depot Building and Yard	Special planned maintenance shall be considered for vermin control, Pigeon shoots and the removal/cleaning of birds' droppings and nests. These activities shall be scheduled as necessary and every six months intervals maximum. Infraco will ensure that safe, secure, access and use of the facilities is not impeded by adverse weather conditions such as snow and ice.
Lighting for Depot Building, Depot Yard, Tramstops, P&R Site, Control Centre and Offices	
Track Work and Roads	
Landscaping	A landscape and vegetation plan shall be developed and adhered to by Infraco to summarise the responsibilities and frequency and scope of the management of trees on, or closely adjacent to, the System (see Third Party Agreements (Schedule 13) and the Code of Maintenance Practice).
Structures	Regular drain clearing
Internal Workshop Equipment	This equipment should be supplied to Infraco with the corresponding operating instructions, which also contain instructions for proper maintenance.
External Workshop Equipment	
Infraco Road Vehicles	Maintenance of vehicles shall be in line with best practice and legislative requirements

40.2.18 Cleaning Maintenance Plan

Within the Infrastructure Maintenance Plan Infraco shall include a cleaning plan which shall detail the cleaning schedule for all infrastructures and equipment for which Infraco have responsibility. In addition to scheduled cleaning, if required by **tie**, Infraco shall provide a reactive cleaning service to respond to specific incidents causing litter or hazards. Where this requires additional material or labour, the scope and costs shall be agreed in advance in writing in accordance with the Agreement.

40.2.19 Track and Infrastructure Cleaning

The Infraco shall ensure that all locations for which Infraco has responsibility are kept free of rubbish and litter. The locations shall be cleaned in accordance with the location categories defined in any Regulations made under the Environmental Protection Act 1990. These categories are:

- Category 1 Walkways linking to public rights of way or road;
- Category 9 Railway embankments in urban areas.

The complete ETN shall be litter picked once every six months on average with the area within the Tramstop being litter picked every month.

Infraco cleaning of Tramstops shall be limited to the following:

- CCTV cameras;
- Passenger Information Displays; and
- Public Address speakers.

40.2.20 Depot Building and Yard, Offices and Car Park

Infraco shall ensure that all locations for which Infraco has responsibility are kept free of rubbish and litter. The areas within the Depot shall be cleaned in accordance with the frequencies stipulated in the Infrastructure Maintenance Plan, but no less than the following:

- Toilets – once a day;
- Canteen areas – once a day;
- Offices – once a day;
- Corridors and communal areas – once a day;
- Workshop area – once a day; and
- Car Park and Depot Yard – once a week.

40.2.21 Cleaning Records

All cleaning work performed shall be logged for record, monitoring and audit purposes. This shall be recorded in a log book and in the CMS.

40.3 Tram Maintenance Strategy

40.3.1 Purpose

The purpose of this tram maintenance section is to describe how Infraco shall procure that Tram Maintainer shall meet its obligations under the Tram Maintenance Agreement and its obligations under the Operators safety justification document in respect of maintenance and all references to Tram Maintainer responsibilities in this section shall be read as Infraco responsibilities and the Infraco shall have overall responsibility for the compliance. This includes the fleet of trams supplied under the Tram Supply Agreement and any relevant plant and equipment for which the Tram Maintainer is responsible. The final version of the Tram Maintenance Plan, to be developed by Tram Maintainer in response to these Employer's Requirements, will set out the specific objectives for the pre-operational period and the first twelve years of operation, following which this document may be reviewed. This Tram Maintenance section should be read in conjunction with the Tram Maintenance Agreement, and with such 'as-built' technical documentation and operation and maintenance manuals as shall be provided by the Tram Supplier.

The Tram Maintenance Plan shall be a fully controlled document. The Infraco shall procure that Tram Maintainer will take into account all mandatory requirements in force at the time of issue. It shall be updated annually allowing a three month review period to take cognisance of operational experience.

40.3.2 Scope

This Tram Maintenance section covers the maintenance activities for the following:

- Tram servicing & maintenance (planned activities);
- Tram repairs (unplanned activities); and
- Cleaning of the trams (primarily the responsibility of the Operator).

Where certain activities are the obligation of parties other than Tram Maintainer, the Tram Maintenance section will describe how the Tram Maintainer shall ensure that such maintenance obligations are fulfilled, so as to ensure the safety of the ETN, is not degraded and that the ability of the Operator to achieve its objectives is not frustrated.

Table 89 – Infrastructure and Equipment Responsibilities Allocation Matrix and Table 83 - Depot Plant and Equipment to be Provided identifies the scope for which the Tram Maintainer is responsible.

Overall Objectives

The overriding objective is to operate a safe, reliable, punctual, clean, easily accessible, comfortable, and environmentally friendly transport service which meets tie's expectations.

The Tram Maintenance Plan will be developed to deliver this objective by:

- Co-operation with Infraco to achieve the aims of the Tram Maintenance Agreement;
- Meeting the specific requirements under the Tram Maintenance Agreement, particularly the defined performance standards in respect of tram availability and reliability;
- Diligent management of subcontractors to ensure they fulfil the requirements of their subcontracts;
- Adherence to the relevant Operations and Maintenance Manuals;
- Setting up and adherence to schedules and programmes for all planned work;
- Co-operation with interfacing parties and in particular the support of any obligations they have under a 'Safety Case', 'Safety Management System' or Legislation;
- Awareness of, and compliance with, legislation, statutes, regulations, and standards governing the operation of the Tramway and any changes thereto. (This will include reviews to identify any necessary changes to any established operating procedures for Phases 1a and 1b); and
- Establishing and maintaining lines of communication with all interfacing and affected parties by means of scheduled meetings, public meetings and consultation. Each year the Tram Maintainer shall undertake programmes to improve the safety, performance, and delivery of the Tram service. These programmes shall be developed in the form of a performance improvement plan which shall be included in future issues of the Operations and/or Tram Maintenance Plan.

Maintenance Approach

The approach to maintenance of the Trams shall be as follows:

- All day to day maintenance and inspection activities and any "special works" are to be planned, organised, carried out and safely handed back to an operational status under the requirements of this Tram Maintenance section and Infraco and/or Operator procedures and regulations;

- All activities carried out under the control of the Tram maintenance plan are the responsibility of a named Tram Maintainer manager (or his named deputy) responsible for the maintenance obligation;

- Maintenance activities are classified as planned, or unplanned arising from condition determined from planned inspection and testing;

- The approach to each of these classifications will be different but essentially there will be two managers (Tram Maintainer and Infraco) liaising with the Operator's Engineering Manager, for carrying out the works in their area of responsibility with Infraco having overall responsibility. Subject to prior approval, these managers may call upon the services of approved sub-contractors to carry out some of these works; and

- Tram maintenance staff will have been trained to drive the Trams within the Depot and will do so when Operator drivers are unavailable to do so.

- The Tram Maintainer shall minimise the operational downtime of the tram vehicles or any other equipment under its control for maintenance.

Table 95 - Maintenance Plan

Maintenance Activity	Planned Frequency	Responsible Manager	Contracted out to External Supplier – Tenderer to complete
Inspection of Trams	Yes See Appendix 1	Tram Maintainer Manager	
Servicing of Trams	Yes See Appendix 1	Tram Maintainer Manager	
Maintenance & overhaul of Trams	Yes See Appendix 1	Tram Maintainer Manager	
Cleaning of trams Sanding, consumable replenishment	Yes See Appendix 1	Operator	N/A
Repairs as required to trams to deliver the timetable (including	Unplanned	Tram Maintainer Manager	

accident damage and vandalism repairs)			

40.3.3 Organisation, Training, and Competency

Staffing Plan, Recruitment & Training Plan

The description of the Tram Maintainer organisation for all aspects of the operation, maintenance, and all management and administrative support of Phases 1a and 1b shall be set out in the Tram Maintainer human resources plans, staffing plan and recruitment and training plan. These documents will contain details of:

- Job descriptions and required competencies; and
- Standard training courses;
- and the procedures required to:
  - effectively recruit staff to fulfil the various employee roles;
  - monitor their performance; and
  - secure and review the required competencies and associated training courses.

These documents shall be agreed with **tie** as part of the finalisation of the Tram Maintenance Agreement.

40.3.4 Quality, Health, Safety, & Environment

Health and Safety

For all matters relating to health and safety the Tram Maintainer shall produce a Safety Management Plan which shall be agreed with **tie** as part of the finalisation of the Tram Maintenance Agreement. This Plan shall set out all relevant or appropriate regulatory requirements that the Tram Maintainer has to comply with, and the Tram Maintainer standards and procedures that it will have to develop to comply with legislation. The Plan will also meet the obligations under the Tram Maintenance Agreement. The Safety Management Plan must not prejudice the Operator safety case. The Tram Maintainer shall operate complaint to ISO 18001.

Environment

For all matters relating to environmental management, the Tram Maintainer shall produce an Environmental Management Plan which shall be agreed with **tie** as part of the finalisation of the Tram Maintenance Agreement. This Plan shall set out all relevant and appropriate regulatory requirements that the Tram Maintainer shall comply with, and the Tram Maintainer Standards and Procedures that it will have to develop to comply with legislation. The Plan will also meet the obligations under the various Agreements. The Tram Maintainer shall operate in compliance within EN14001.

Quality

The Tram Maintainer shall be responsible for quality in so far as implementing the requirements of the above two plans in respect of auditing and inspecting the requirement of all Tram Maintainer plans and procedures. The Tram Maintainer shall operate to and achieve accreditation to ISO 9002.

40.3.5 Liaison with Promoter & Other Parties on Maintenance Related Issues

Communications Plan

The Tram Maintainer shall create a Communications Plan (which shall be agreed with **tie** as part of the finalisation of the Tram Maintenance Agreement) for all matters related to communications within Infraco, the Operator, and all relevant third parties and stakeholders.

It is critical that the Tram Maintainer establishes effective lines of communication with the Operator, through their Control Centre, in order to plan the maintenance activities around service requirements. This specifically relates to the withdrawal of Trams for planned preventative maintenance and returning of Trams for service following completion of these activities and unplanned maintenance activities or repairs.

The Tram maintainer will provide details of how effective lines of communication with the Tram Operator will be set up and maintained throughout the period of the Tram Maintenance Agreement. This will include details of how key staff and expertise will be provided 'on-call' at all times to the Operator in the event of unforeseen tram breakdowns etc. It will also include a system for Tram handover after the completion of Tram Maintenance activity and a programme of daily meetings to discuss punctuality performance (and associated deductions), tram defect status and future Tram utilisation.

40.3.6 Tram Servicing and Maintenance Plan

Fleet Overview

The Tram fleet for Phases 1a and 1b will consist initially of 27 Trams, each capable of carrying about 250 passengers.

The Trams will be maintained at a new purpose-built depot.

40.3.7 Maintenance Plan Overview

All planned and preventative inspection and maintenance shall be carried out using a programme that shall be agreed annually between **tie** and Infraco. A balanced programme is required for this type of rolling stock, enabling the most efficient use of Tram downtime.

Maintenance schedules and examination job titles in this document have been drawn from general experience of similar vehicle types, and do not relate to any particular vehicle. It should be noted that all exams, sequences and frequencies mentioned are indicative at this stage, and will be reviewed once further fleet and maintenance contractor details are known.

Unplanned repair activities are not included in this Tram Maintenance section but shall be provided by the Tram Maintainer in terms specified in the Tram Maintenance Agreement.

40.3.8 Maintenance Strategy

Tram Planned Preventative Maintenance

There are two types of preventative maintenance which are to be carried out:

- Systematic preventative maintenance which follows a predetermined schedule such as:
  - Condition inspection and safety checks;
  - Cleaning of equipment;
  - Functional tests to reveal faults; and
  - Adjustments to enable optimum operation.

- Conditional preventative maintenance consists of carrying out regular inspections to determine that the performance, or operation of, Tram sub-systems remain within pre-determined measurable parameters, such as:
  - Vibration and noise levels;
  - Temperature threshold; motors and cooling circuits, etc.;
  - Wear threshold; wheel diameter, suspension heights/clearances, and pantograph height, etc.; and
  - Door operation times.

Tram Corrective Maintenance

This type of maintenance entails repairing or changing faulty equipment, through observation of failures. It involves three kinds of intervention:

- Breakdown in service requiring specific intervention. Immediate repairs are to be carried out rapidly to clear the line as quickly as possible. This activity is limited to re-establishing sound operating conditions and assisting the Operator to re-establish operational headways. Unless a repair can be rapidly undertaken to ensure safe, normal operation of the affected Tram for the remainder of the day, the affected Tram should be withdrawn from service and returned to the Depot where a more permanent repair, under controlled conditions, may be carried out.
- Repairs. This covers interventions carried out following incidents or failures that occur in operation, or identified from routine maintenance activity, generally involving a longer stoppage of equipment including overhauls of an entire Tram or major Tram component or operating system. This is an intervention of lasting character, carried out by maintenance staff (or approved sub-contractors). After repair, the Tram must conform to its original specifications.
- Whilst not strictly a breakdown, the Tram Maintainer shall also be required to assist with the recovery of any Tram derailment occurring on the line and carry out the appropriate re-railing technique, irrespective of the cause of the derailment. The Tram Maintainer will advise the Operator of the safe condition, or otherwise, when re-railing of the Tram has been completed.

Further Maintenance Operations

Preventive maintenance and corrective maintenance must be complemented by:

- Operations that contribute to the good image of public transport (appearance and comfort) such as removal of graffiti and re-applying freshening up paintwork, that cannot be achieved by the Operator through routine cleaning methods; and
- Checks on wheel condition (profile and flats).

The final version of the Tram Maintenance Plan shall include the proposed programme for all Tram preventative maintenance and further maintenance operations.

The periodicity/interval and duration or all planned preventative maintenance activities shall be specified in the final version of the Tram maintenance plan. It is anticipated that most intervals will be fixed-time intervals based upon calculated scheduled service distances, to be specified by the Tram Supplier. If any activities are specifically based upon a kilometreage based interval, which cannot readily be related to elapsed time, this should be made clear in the proposal.

The various examination types, based on their interval shall be categorised by code letter and the activities to be undertaken shall be fully detailed. The information should be summarised in the form of a matrix or star/dot chart where the breakdown of exam type is shown labelled on one axis and equipment or sub-system to be worked on is labelled on the other axis.

The Tram Maintainer will also create a list of standard repair times for items that are susceptible to damage or failure in service, such as replacement of glazing, lower front skirts, pantograph etc. Where possible, standard durations for repair and fixed prices for these repairs shall be established.

Maintenance Codes

A standard set of maintenance codes should be established to identify maintenance tasks to various Tram sub-systems:

The following standard set of codes is proposed (and are used in the Star Charts) and should be developed further as the details of the Tram design and recommended maintenance approach are understood:

Table 96 - Star Charts

Code	Area
A	Sanding System
B	Brakes
C	Bodywork
E	Battery and Control Systems
F	Radio and communications systems
G	Pantograph
H	Heating and Ventilation
I	Interior Trim and Fittings
M	Electrical Machines
O	Doors
P	Electrical Traction Power Equipment
T	Mechanical Transmission
U	Underframe and Bogies
Z	Emergency Equipment

Maintenance star charts setting out the indicative periodicities for maintenance activities shall be developed as part of the Maintenance Plan.

These star charts are to be developed in line with the finalisation of the Tram Maintenance Agreement and Tram Supplier's recommendations.

40.3.9 Availability and Warranty

The availability requirement for phases 1a and 1b of the ETN will be established in detail during the tendering process. Where possible, at peak periods and for special events, all trams should be made available.

Any lack of availability will give rise to the imposition of availability deductions from the fee payable under the Tram Maintenance Agreement. Details of the availability performance regime are set out in the Tram Maintenance Agreement. This also sets out the requirement for a 'hot spare' Tram and for Trams to be available for training purposes outside of peak hours.

During the Warranty and Extended Warranty period (as set out in the Tram Supply Agreement) a robust process must be in place to manage the return and replacement of parts thus ensuring optimal operational service, whilst optimising the management of warranty claims under the Tram Supply Agreement.

40.3.10 Technical Management

An integrated, computer-based maintenance management and recording system (CMS) should be utilised in order for data obtained from the maintenance of the Trams or other sources to be collated and analysed. This will enable the technical team to assess safety and performance issues and to facilitate modifications and changes, where necessary, to the Tram Maintenance Plan and working practices.

The CMS shall also provide a real-time configuration management control system of the Trams by recording serial numbers of all components on the Trams. This record shall also be updated whenever components are exchanged or replaced during maintenance or repair of the Trams.

The CMS will need to be capable of interfacing with Infraco and/or **tie**'s systems to facilitate remote access to maintenance management data.

40.3.11 Work Instructions

In order for Infraco to be able to verify that the Tram Maintainer has carried out the necessary planning to undertake all proposed preventative maintenance activities in accordance with the Tram Maintenance Plan, details of the work activities shall be submitted for information only.

For each exam type detailed work instructions will be broken down against equipment type and artisan skill-set to facilitate planning of the work. Each work instruction will provide a step-by-step breakdown of the work involved including information about how any equipment to be worked on should be accessed and/or removed from the Tram.

Each work instruction should, as a minimum, include details of:

- Health and safety precautions;
- Key skills and competencies required to undertake the work;
- Consumable components to be replaced;
- Special tooling (if any);

- Particular Depot facilities required; and
- Agreed time to complete the task.

40.3.12 Minimum Spare Parts Holdings

In order to cover all planned Tram Preventative Maintenance and arising Corrective Maintenance, sufficient spares shall be held by the Tram maintainer throughout the duration of the Tram Maintenance Agreement to ensure that a Tram is seldom unavailable for service due to parts unavailability.

Spares fall into the following categories:

- Consumables (brake pads, filters, bulbs etc.);
- Line Replaceable Units (repair on site);
- Line Replaceable Units (return to OEM for repair); and
- All other equipment.

The Tram Maintainer shall provide details of its planned spares holding and into which of each of the above categories each item falls.

In order to facilitate a seamless transition of Tram Maintenance services from one Tram Maintainer to another on the expiry or earlier termination of the Tram Maintenance Agreement, the Tram Maintainer shall be required to maintain, at all times, a minimum holding of certain spare parts. The schedule of minimum spare parts holding will be developed by tie and the Tram Maintainer as part of the finalisation of the Tram Maintenance Agreement. The level of minimum spare parts holding will also be reviewed after three years to ensure that it is appropriate on the basis of operational experience and Infraco's ongoing requirements.
Failure to maintain the minimum spare parts holding will give rise to an availability deduction being made in respect of the maintenance fee.

Where repair is to be undertaken on site, information shall be provided of any special facilities or equipment required. Where equipment is to be returned to the original equipment manufacturer (or any other organisation) for repair, it shall be demonstrated that the holding is sufficient to allow for predicted turnaround times. Estimated lead times for all other spares shall also be provided.

Where line replaceable units (LRUs) are exchanged as part of normal Tram preventative maintenance (to be brought up to optimum condition off the vehicle), the appropriate work

instruction should be explicit regarding this fact and should also state the approved time for exchange of such components. The spares holding of LRUs should be sufficient to cater for this method of working.

Wherever possible the Tram maintainer shall source as many consumable spare parts and as much repair work from approved local suppliers in the interests of cost efficiency and minimisation of lead times.

40.3.13 Cleaning Maintenance Plan

Tram Cleaning

Internal and external cleaning of Trams is the responsibility of the Operator. This will also include the removal of graffiti, except where this cannot be removed by normal cleaning methods or requires replacement of the panel(s) concerned. In such cases the panels will be replaced or made good by the Tram Maintainer. This shall also include the replacement of window glazing due to damage by etching.

The Tram Maintainer must ensure that adequate quantities of interior and exterior body panels, glazing and window sealing materials are kept in stock to meet this obligation.

40.4 Maintainability, Maintenance and Spares

40.4.1 General

An asset register shall be produced by the Infraco and the Tram Maintainer and populated by them with equipment data, serial numbers etc. The asset register shall be available prior to the commencement of delivery of equipment and materials. All spares, tools and test equipment which are delivered as part of the Works, shall be entered in the asset register.

Performance, reliability, fault / failure data shall be available that enables analysis of the Edinburgh Tram Network for product improvement.

Data shall be presented to maintenance staff such that potential causes of faults / failures are clearly identified.

Hardware components shall be easily accessible and not require specialist equipment for their removal or replacement.

Connectors shall be used which permit fast and easy disconnection and replacement of faulty / failed components and prevent dirt and moisture ingress and are suitably supported and specified for the operating environment in which they are used.

Maintenance regimes, component replacement programmes and spares holding levels shall be determined through fault tree, cause-consequence and Markov analysis, as appropriate, and ratified through the verification and validation process.

Spares that have potential long lead times, or minimum order quantities, shall be identified and adequate quantities held on site in order to achieve the performance requirements of the system including repair times.

The Edinburgh Tram Network shall be designed to facilitate inspection, repair, maintenance and fault finding without interruption to the ETN operations and performance.

Spares provided shall be sufficient to ensure the continuous operation of the system from the date of the Edinburgh Tram Network handover to **tie**. These spares shall include provision for damage and vandalism. The Edinburgh Tram Network design shall be underwritten such that all equipment / system suppliers shall warrant that all equipment in the design shall be available for the design lives specified and that they shall give **tie** a minimum of twelve months notice where after that period they intend to cease supply of that component.

Equipment housings / enclosures and their contents, e.g. racks etc. shall not exceed 2.0m in height unless specifically agreed by with **tie**.

The lowest mounting point, plug-in group or terminal block shall not be less than 0.4m above floor level unless specifically agreed by with **tie**.

Cables shall be clearly identified at each end of the cable connections by clearly visible and indelible labels. Related drawings shall describe the labelling conventions.

The maximum use shall be made of readily available and fully proven 'industry standard' materials and components. These shall remain readily available for the projected life of the Edinburgh Tram Network and which shall be supported in the market place on an ongoing basis.

Provision for handling the possible obsolescence of any of the components during the projected life of the ETN without degrading the ongoing performance of the Edinburgh Tram Network shall be individually addressed prior to supply/construction.

The detailed arrangements for the delivery, storage, management, and control of spare parts shall be agreed between the Infraco, the Tram Maintainer and the Operator as part of the arrangements for the ongoing operation and maintenance of the ETN.

In addition, Infraco shall procure that an adequate supply of consumables and spares shall be available to support the testing, commissioning and shadow running.

The Infraco / Tram Maintainer shall establish and maintain a log of all such consumables and spares used during this process and an updated copy shall be presented with each monthly progress report.
Where cables are to be provided, they shall contain sufficient slack to permit reasonable disturbance during maintenance.

40.4.2 Structures and Civil Engineering

As the bulk of these features will be static, the quantity of spares shall include those items that may suffer attrition as a result of accidents and vandalism such as signage, bollards, etc., and any special features bespoke to the ETN.

If not readily available, small quantities of special surfaces, e.g. tactile paving, etc., shall be stocked but it is anticipated that common wearing surfaces will be repaired using materials commonly available to the trade.

40.4.3 Track

In respect of track and ancillaries, the levels and numbers of spare holdings of major replacement elements, such as rails, sleepers, switch half-sets and full-sets, and crossings – 'standard' supply and more importantly of bespoke design – are considered to be of critical importance. At least one point machine, point indicator and hand operated mechanism shall be provided. Additionally, quantities of small parts and day-to-day maintenance items, together with special equipment such as buffer stops, are to be provided, based on instructions contained in the maintenance manual and on forecast component lives. In proposing the numbers of all spares holdings, the objective will be to ensure, as far as will be reasonably practicable, uninterrupted operation of the tram services.

40.4.4 Training

An indicative training plan for all parties involved in the maintenance and operation of the Edinburgh Tram Network System shall be produced and submitted to **tie** within six months of the Commencement Date. This shall be updated as required thereafter and as a minimum, be submitted to **tie** every eight months.

40.4.5 Infrastructure and Trams

Training and Competency

Staff training and competency assessments shall be carried out in accordance with best practice. The requirements of the ROGs regulations for safety critical work shall be observed.

Training Plan

An indicative training plan for all staff of the Edinburgh Tram Network System shall be produced within six months of the Commencement Date.

Both operating and maintenance training courses shall be provided for all of the items of supply associated with the Edinburgh Tram Network, including the operation and maintenance of all specialist plant and tools provided or required. All training materials and classes shall be in the English language.

The training may take place either at an individual contractor's premises or, locally on the tramway system or at other facilities to be agreed with the Operator/Maintainer and made available by the training supplier. All these arrangements shall be with the prior agreement of the Operator/Maintainer. "Maintainer" in this Section regarding Training in maintenance and operation means both Infraco and Tram Maintainer.

A training plan shall be provided for each group of trainees (i.e. Operator and Maintainer) covering all the items of supply. The plan will set out in a logical manner the order, duration, location and the content of the training to be given, the type (i.e. classroom, practical hands on) and the scope (i.e. operation, routine maintenance, first line repair, second line repair etc).

The Training Plan shall take due account of the Operator's proposed operational plan and the maintainer's proposed maintenance plan and any manufacturer's or otherwise recommended maintenance intervals for the scope of equipment supplied as well as all manufacturer's maintenance intervals for the equipment provided.

The Training Plans will clearly set out the course objectives. These will ensure that:

- All appropriate grades of operational and maintenance staff are able to perform, in a proper, effective and safe manner all necessary scheduled and reasonably foreseeable unscheduled tasks in order to functionally operate, maintain, fault find and safely restore in the shortest time in the event of any failure, the full functionality of the systems and equipment forming the Edinburgh Tram Network.

- All appropriate operational and maintenance staff are able to comprehend environmental and operational conditions, safety concepts and the health and safety requirements when carrying out their duties.

- All appropriate operational and maintenance staff are able to correctly interpret and make proper correct safe and effective use of all operational electronic data, displays and printed/written documentation presented to them in the course of their duties.

- The competence of all of the trainees shall be certified in a format that is compliant with all of the obligations placed on the employers of the trainees.

- The Training Plans shall clearly set out the level of testing of trainees, and how the certification of trainees will be achieved and documented. It shall also set out the method of participant feedback to be used following the completion of the training. Where appropriate, the testing and certification process will be split where appropriate to ensure competency on particular items of equipment, systems and methods.

- The training plans shall be agreed with tie and the operator prior to the commencement of the training.

Training Material

Infraco will provide, inter alia, the following training materials appropriate to the individual training session.

- Twelve sets of all training material and two sets of the Training plans and trainer's course material and notes, together with copy discs, drawings and artwork shall be provided to enable the Operator/ Maintainer to provide future training courses for himself when necessary.

- All training material, including master discs, drawings and artwork, will be updated within four months of the completion of the training on the basis of the formal feedback from attendees and the Operator/ Maintainer of 'lessons learnt' and from its practical application on the tramway on a routine basis and shall reflect all changes made to the system such that the system and training are fully aligned.

- In the event of any of the systems or equipment supplied and installed having to be modified or amended or the maintenance requirements for the same being revised within the Warranty period, the training material shall be revised and updated to reflect the changes to equipment, components or procedures that have become necessary.

Training Costs

All relevant costs, including travel and accommodation, associated with the effective training of the Operator/Maintainer's staff, on site or remote, shall be at the expense of the training provider, including materials, classrooms and instructors, but excluding the time cost for the trainees.

40.4.6 Maintenance Training

All relevant costs associated with the effective training of the Operator/Maintainer's staff, on site or remote, shall be at the expense of the training provider, including materials, classrooms and instructors, but excluding the time cost for the trainees.

Training courses and materials shall be provided in line with the Training Plans. These shall cover all operations necessary for the maintenance, repair and renewal of all the infrastructure and equipment forming the ETN systems throughout its life including items such as fault diagnosis, replacement and repair of equipment, software maintenance, system structure, integration and interfaces and hardware and software set-up.

The training shall include training on all the specialist tools and test equipment and software required to maintain and operate the system.

The training shall be structured as set out in the training plan to cover the basic theory, system operation overview, routine maintenance, first line fault rectification, second line fault rectification, renewals and software maintenance.

The training documentation shall include reference to manufacturer's documentation and also include all documentation, drawings, and technical data required to provide a single reference for the items covered by the training. The documentation will include fault identification and rectification process flow charts to assist maintenance personnel in identifying and rectifying faults. The initially recommended periodicity of inspections, tests and routine maintenance or rectification processes shall include 'pass' or 'fail' criteria. In the case of a 'failed' test, the appropriate course of action, with remedies for such inspections, tests and maintenance shall be detailed. Course documents, course content and notes shall be submitted for approval by **tie**.

Risk assessments shall be carried out on all of the proposed maintenance methods and where found to be appropriate safe systems of work shall be included within the training material and training. COSHH assessments will be carried out on all substances to be used in the training and proposed for the maintenance of the equipments. All such documentation shall be submitted to **tie** for approval.

Personal Protective Equipment for course attendees shall be provided, as appropriate, by Infraco.

Testing and certification of the attendees shall be carried out. Upon completion of the training on each section of the equipments and systems, all attendees shall be required to pass a written and practical test for evaluation and certification purposes by the trainer to confirm that personnel are competent to carry out all necessary tasks. The certification process and documentation shall be submitted to **tie**. The individual results and certification shall be fully documented and presented to **tie** and the Operator / Maintainer for their records.

40.4.7 Operational Training

Sufficient Operational Training Courses shall be provided in line with the Training Plan for all the various grades of the Operator/Maintainer's staff, to ensure that safe and proper operation of the system can be achieved throughout its life, commencing with the formal take-over of the ETN.

The training shall be structured as set out in the training plan to cover the operation of the ETN under all operating conditions, including normal running and working in the many degraded modes, and in the recovery from degraded modes.

The training shall include operator familiarisation and functional training in conjunction with the Factory and Site Acceptance Tests of the integrated system and Control Centre systems.

The training shall provide comprehensive hands-on training on the equipment and systems for all operational equipment including trams.

This shall include the simulation of a service and all associated equipments and failures.

The training shall include full details of the functionality of the tramway and control systems.

The training documentation shall include reference to manufacturers' documentation and also include all documentation, drawings, and technical data required to provide a single reference for the items covered by the training. The documentation shall include fault identification process flow charts to assist the Operator / Maintainer in identifying faults and to assist in the deployment of the correct maintenance personnel.

40.5 Information Procedures, Records and Manuals

40.5.1 General

All designers, suppliers, installers and maintainers of the Edinburgh Tram Network shall provide comprehensive documentation in support of their works. Such documentation shall be prepared in

accordance with the contractual requirements, Employer's Requirements and any other relevant documentation.

This information will be included in the form of the Project Health and Safety File. The file will be divided into Sections and Volumes in a manner to be agreed with **tie**. Each Section will be numbered in sequence and may comprise more than one volume. The volumes shall be identified by an integrated sequential numbering system.

40.5.2 Information

Information to be provided shall include, but shall not necessarily be limited to:

- Product literature;
- Design parameters, specifications, data and drawings;
- Product specifications;
- Illustrated parts lists;
- Product usage and examples of use service;
- Whole life cycle evidence and documentation;
- Maintenance and fault finding;
- Spares management, product storage and handling; and
- Health and Safety considerations and documentation.

40.5.3 Operation and Maintenance Manuals Information

Infraco shall produce for the Edinburgh Tram Network operating instructions for the system as a whole and for all individual sub-systems consolidated into an overall suite of bespoke Operations and Maintenance Manuals. This data shall be produced in hard copy form and shall also be available as an on-line database to operations and maintenance personnel.

The Edinburgh Tram Network shall have maintenance instructions for the system as a whole and for all individual sub-systems consolidated into an overall suite of Operations and Maintenance Manuals.

This data shall be produced in hard copy form and available as an on-line database available to maintenance personnel. The technical documents and manuals shall be compiled electronically in a universal format such as XTML.

Maintenance instructions shall be available in hard copy form and for download to remote/portable diagnostics terminals.

The Operations Manuals and Maintenance Manuals shall be comprehensively indexed and cross-referenced. They shall meet all requirements of an ISO 9000 Quality Plan, ISO 14000 Environmental Plan and ISO 18000 Health and Safety Plan. They shall take into account the relevant legal requirements and customary practices existing in Scotland. They shall be of a quality at least as good as that outlined in the SDS Maintenance Documentation Specification (reference number ULE90130-SW-SPN-00064).

They shall be prepared in accordance with a uniform approach, combining together the contributions from different contributors. They shall be consistent in terms of the page layout, indexing, language, tense, person and methodology of maintenance of each item of equipment on the system in a clear and concise manner.

The Maintenance Manuals shall include initial planned maintenance schedules and all inspection and maintenance frequencies. These frequencies shall include, but not necessarily be limited to, post commissioning, daily, weekly, specific and periodic inspection and procedural activities. All such activities shall be fully co-ordinated and integrated to minimise the frequency of visits and thus the possible disruption of the tram service.

The contributors shall update the manuals' information at periods considered appropriate to their equipment and/or installation supply throughout during the contracted period of maintenance and/or warranty agreement. Notwithstanding such interim updates, a full review and update will be undertaken at the end of such maintenance and/or warranty agreement. Such updating material shall be carried out and provided by the appropriate maintainer.

The master copy of the Manuals shall be held electronically and be accessible via the Internet using an appropriate access permission regime. The access arrangements shall record who accesses individual sections and when.

The information to be included in the manuals from the relevant subcontractors through the Infraco and Tram Maintainer shall include, but not be limited to the following:

- System Overview (including explanation of manuals content)

Landscaping Manuals, comprising:

- Area Descriptions;
- Inspection and Maintenance Manual; and
- Planting Stock Lists.

Structures Manuals, comprising:

- Structures descriptions, etc.;
- Inspection and maintenance manual; and
- Illustrated parts list.

Power supply Mmanuals, comprising:

- Equipment Description and Operation Manual (how the equipment works);
- Maintenance Manual (including inspection and day-to-day maintenance procedures);
- Overhaul Manual; and
- Illustrated Parts List.

Overhead Line, Manuals, comprising:

- Equipment Description and Operation Manual (how the equipment works);
- Inspection and Maintenance Manual (including erection procedures, etc.);
- Overhaul Manual; and
- Illustrated Parts List.

Permanent Way Manuals, comprising:

- Equipment Description and Operation Manual (how the equipment works);

- Inspection and Maintenance Manual;
- Overhaul Manual; and
- Illustrated Parts List.

Tramstops Manuals, comprising:

- Tramstop descriptions, Lighting, Seating, Signs, etc.;
- Inspection and Maintenance Manual; and
- Illustrated Parts List;
- Supervisory Control and Communications Systems Manuals, comprising:
- Equipment Description and Operation Manual;
- Inspection and Maintenance Manual; and
- Illustrated Parts List.

Tram Manuals, comprising:

- Information to be included in a Drivers Handbook;
- Equipment Description and Operation Manual;
- Maintenance Manual (including inspection and day-to-day maintenance procedures);
- Overhaul Manual (larger overhauls are unlikely to be carried out by **tie** and this will be required by their eventual overhaul contractor); and
- Illustrated Parts List.
- A full suite of vehicle design drawings.

Gogar Maintenance Depot Manuals, comprising:

- Description of Depot and its Equipment (including road and on-track maintenance vehicles);
- Maintenance Manual (covering all equipment including integrated equipment maintenance schedule) under the following headings:
  - Fixed equipment;
  - Mobile equipment;
  - Portable equipment; and
  - Hand tools.
- Illustrated Parts Lists for each of the above.

Central Control Centre Manuals, comprising:

- Operational Procedures (these may be included in System Operation manuals);
- Equipment Description and Operation Manual; and
- Illustrated Parts List.

Signalling, including:

- Equipment Description and Operation;
- Inspection and Maintenance Manual; and
- Illustrated Parts List.

40.5.4 Asset Register

The Operations and Maintenance Manual shall be linked to an Asset Register within the computerised Asset Management System that shall be provided by the Infraco . This shall be populated with actual equipment data, serial numbers etc. This asset register shall be capable of being linked to a graphical information system (GIS) and include as-built, maintenance and other drawings and records.

Performance, reliability, fault/failure data shall be included, presented and made available to enable analysis for product improvement.

40.5.5 Provisional List of Operating Procedures and Standards

A – Operating Procedures (To be developed in conjunction with the Operator)

1. Permit to work;
2. Power switching and isolation;
3. Switching and Safety Interlocking with Inspection Platforms in Depot;
4. Track Safety;
5. Issue and use of Personal Protection Equipment;
6. First Aid;
7. Communication with OCC (Trackside);
8. Communication with OCC (Tram);
9. Depot & Yard Tram Movements & Parking;
10. Use of Wheel Lathe;
11. Lifting & Safe Handling;
12. Recording of Maintenance & Repair in Infraco Records System;
13. Risk Assessments (Safety, and Environment);
14. COSHH Risk Assessments;
15. Preparation and Approval of Method statements;
16. Materials Procurement & Control;
17. Waste Disposal;
18. Evacuation of Depot;

19. Detailed maintenance procedures (as supplied by the Tram Maintainer & Infraco);

20. Monitoring the medical condition of employees;

B – Infraco Standards (to be developed by Infraco prior to Section A completion)

1. Tram (pantograph parameters, door parameters, wheel profile, suspension/coupler heights & clearances, brake parameters and wear limits);

2. Tram Driver routine preparation;

3. Tram Cleaning;

4. Tram related Noise and Vibration (To be developed in conjunction with the Tram Maintainer);

5. Tram clearances with Tramstops (To be developed in conjunction with the Tram Maintainer).



THIS IS SCHEDULE PART 3 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 3

CODE OF CONSTRUCTION PRACTICE AND CODE OF MAINTENANCE PRACTICE

PART A - CODE OF CONSTRUCTION PRACTICE

1. MANAGEMENT SYSTEMS

1.1 The Infraco shall implement and comply with the following management systems:

1.1.1 a "quality management system" in accordance with ISO 9001;

1.1.2 a "safety management system" in accordance with OHSAS 18001 or HSG65; and

1.1.3 an "environmental management system" in accordance with ISO 14001.

2. INSTRUCTION AND TRAINING

2.1 The Infraco shall ensure that its employees, Sub-Contractors, agents and others on Site undertake a number of inductions. These shall comprise:

2.1.1 project-specific induction for the Infraco Works (provided by the Infraco); and

2.1.2 worksite and task-specific-induction including a method statement briefing and toolbox talk, (provided by the Infraco).

2.2 Any persons who have not received the induction, for example visitors, shall be escorted on Site by a competent inducted person.

2.3 The Infraco shall maintain induction and training records in order that **tie** can inspect them. These records shall identify the scope of the induction and training and the persons who received them.

3. SAFE SYSTEMS

3.1 **Risk Assessments**

3.1.1 The Infraco shall prepare risk assessments for all work activities being undertaken.

3.1.2 Each risk assessment shall include as a minimum the following details:

3.1.2.1 Document control

(a) document title and number;

(b) revision status;

(c) authorisation for use; and

(d) reference to supplementary documentation.

3.1.2.2 identification of any hazards;

3.1.2.3 identification of those who might be harmed, and how; and

3.1.2.4 an evaluation of the risks and, in relation to each risk, the control measures required to reduce the risk to an appropriate level.

3.2 **Method Statements**

3.2.1 The Infraco shall prepare method statements for all work activities which fall within the definition of "construction work" under the Construction (Design & Management) Regulations 2007. Each method statement shall relate to the relevant work location.

3.2.2 Categorisation of Method Statements

Method statements shall be categorised as detailed below:

CATEGORY	RISK	APPROVAL PROCESS
A1	**Low risk**. *Minimum implications on Human life or the Project*	***Prepared*** *by Contractor / Sub Contractor* ***Approved*** *by Contractor / Sub Contractor*
A2	**Medium risk**. *Possibly implications on Human life or the Project*	***Prepared*** *by Contractor / Sub Contractor* ***Approved*** *by Contractor / Sub Contractor* ***For Information tie*** *Ltd Project Manager*
A3	**High risk**. *Major implications on Human life or the Project.*	***Prepared & Approved*** *by Contractor/ Sub Contractor* ***Accepted*** *by* ***tie*** *Ltd HSQE Advisor* ***Accepted*** *by* ***tie*** *Ltd Project Manager*

3.2.3 Each method statement shall include as a minimum the following details:

3.2.3.1 Document control

(a) document title and number;

(b) revision status;

(c) contractor prepared and approved; and

(d) **tie** acceptance for use (as defined below).

3.2.3.2 Scope of work

3.2.3.3 Hazards identified

3.2.3.4 Public interface arrangements

3.2.3.5 Protection of existing infrastructure

3.2.3.6 Environmental protection arrangements

3.2.3.7 Plant, equipment and materials

3.2.3.8 Emergency procedures

3.2.4 The documentation referred to in paragraph 3.2.3 above shall be developed so that it is specific to the Infraco Works. The Infraco shall ensure that revisions and updates can be identified.

3.2.5 The Infraco shall issue a copy of its procedure for the production of method statements and risk assessments to **tie** for approval in accordance with the Review Procedure.

3.3 **Submission of Risk Assessments & Method Statements**

3.3.1 A 4-week "look ahead" schedule identifying the required scope of the Infraco Works shall be issued to **tie** by the Infraco. This schedule shall identify the relevant risk assessments and method statements which are required in respect of each such scope. **tie** shall identify which risk assessments and method statements require to be provided by the Infraco to **tie** based upon the

categorisation of method statements in accordance with paragraph 3.3.2 above.

3.3.2 The Infraco shall issue risk assessments and method statements to **tie** a minimum of 20 Business Days prior to the commencement of the Infraco Works which are the subject of the method statements and risk assessments.

3.3.3 The Infraco shall not undertake any Infraco Works for which a risk assessment or method statement has been requested without the agreement of **tie**.

3.3.4 **tie** shall supply a letter of acceptance with all requested and returned Method Statements and Risk Assessments, which are found to be acceptable for site use. No requested Method Statement work activities shall commence on site without this letter of acceptance.

3.3.5 Irrespective of whether or not **tie** has reviewed a risk assessment and method statement produced by the Infraco, the Infraco shall issue one copy of the risk assessment and method statement to **tie** for information purposes before any work shall commence.

3.4 **Permit to Commence Works**

3.4.1 The Infraco shall comply with **tie**'s system for controlling access to undertake work activities, which shall require the Infraco to obtain an approved permit to commence works from **tie** ("**Permit to Commence Works**") for each Work Site and agreed scope of construction works.

3.4.2 In so far as not otherwise submitted pursuant to this Agreement, the Infraco shall submit a form for each required Permit to Commence Works ("**Permit to Commence Works Form**") which is required, to **tie** a minimum of 5 Business Days in advance of the access being required.

3.4.3 The Infraco shall advise **tie** of the persons within its organisation who are competent to authorise the Permit to Commence Works Forms.

3.4.4 Each Permit to Commence Form shall identify the necessary licences, third party approvals and notifications that have been obtained / granted to enable the works to be undertaken, together with the specific control measures that require to be implemented under the Infraco's safety management system.

3.4.5 The Infraco's personnel who will implement the Permit to Commence procedure shall be required to undergo training by **tie.**

3.5 **Permits to Work**

3.5.1 The Infraco shall implement a "permit to work" system for the following activities as a minimum:

3.5.1.1 hot works;

3.5.1.2 entry into confined spaces;

3.5.1.3 work affecting services;

3.5.1.4 access to live facilities; and.

3.5.1.5 works on private land controlled by third parties.

The Infraco shall implement a procedure for managing third party permits to work

3.5.2 The Infraco shall issue a copy of its permit to work procedures to **tie** for approval in accordance with the Review Procedure.

3.5.3 The Infraco shall advise **tie** of the competent persons within its organisation who shall be competent to authorise permits to work.

3.6 **Personal Protective Equipment**

3.6.1 The Infraco shall provide all necessary personal protective equipment ("**PPE**") for its employees and provide them with all necessary information, instruction and training on its use.

3.6.2 The Infraco shall ensure that all persons on any Work Site (including any Infraco Parties and visitors) wear the necessary PPE.

3.6.3 **tie's** specific requirements for PPE with regard to particular tasks are as follows:

3.6.3.1 head protection conforming to BS 5240 or BS EN 397;

3.6.3.2 protective footwear complying with BS EN 345 (safety boots which provide ankle support and contain steel midsoles shall be required for works which are carried out on railway land);

3.6.3.3 yellow high visibility clothing to comply with BS EN 471:1994, Table 1, Class 2 or 3, which shall be worn at all times; the clothing shall comply with the requirements of Clause 4.2.3(b) in all cases; jackets with sleeves in accordance with Clause 4.2.4 and to Class 3 shall be worn on dual carriageway roads with a speed limit of 50 mph or above, unless operatives stay within the working space at all times; and

3.6.3.4 orange high visibility clothing complying with GO/RT 3279 shall be worn where any works are carried out on railway land.

3.7 **Work Site Completion Certificates**

3.7.1 The Infraco shall comply with **tie**'s system for certifying the completion of the relevant work activities within each Work Site, which shall require the Infraco to complete a completion certificate ("**Work Site Completion Certificate**") for each Work Site in relation to which the relevant Infraco Works have been completed.

3.7.2 The Work Site Completion Certificate shall be completed by the Infraco to identify and cross reference the quality control records, testing and commissioning records and any other relevant records identified within Schedule 2 (*Employer's Requirements*) and this Schedule 3 (*Code of Construction Practice*), together with details of any outstanding works which are required and the timescales for undertaking them.

4. REPORTING

4.1 The Infraco shall report the following information to **tie** within the same working day or 24 hours of the event occurring:

4.1.1 details of any accident or incident;

4.1.2 details of any environmental event; and

4.1.3 details of any visit by either the Health & Safety Executive or SEPA, together with details of any report issued or enforcement action that resulted.

4.2 The Infraco shall include the following information within its four weekly progress report which is to be provided to **tie** as part of the Infraco Works:

4.2.1 an update on any events referred to in paragraphs 4.1.1 to 4.1.3;

4.2.2 details of any near misses;

4.2.3 details of any accident investigation reports raised by the Infraco including details of corrective and preventative actions which have been taken;

4.2.4 the accident incident rate ("**AIR**") and accident frequency rate ("**AFR**") for the Infraco Works (including details of total hours worked and number of persons employed);

4.2.5 a summary of the monitoring and internal auditing activities undertaken by the Infraco in the period, including details of any corrective or preventative actions raised or closed out; and

4.2.6 details of the programme of monitoring and auditing planned for the subsequent four-weekly period.

5. AUDITING AND MONITORING

5.1 The Infraco shall be responsible for carrying out, auditing and monitoring of its site establishment and work activities.

5.2 **tie** shall undertake regular auditing and monitoring of the Infraco's activities and site establishment and documentation records, and the Infraco shall action any findings which are raised by **tie**.

6. NON-CONFORMANCE, COMPLAINTS AND DISCIPLINARY MATTERS

6.1 **tie** shall implement a process for recording and processing breaches by the Infraco of the requirements of this Schedule 3 (*Code of Construction Practice*) and complaints.

6.2 The Infraco shall take such steps as are required by **tie** to remedy any such infringement or address any such complaint and the following priority levels for action shall apply:

Level of Urgency	Category of Notification	Required Response Time
1	High urgency. Involves an immediate threat to persons or property or the circumstances otherwise require immediate rectification.	Immediate action required. If response not completed by the Infraco within 4 hours, **tie** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Infraco.
2	Medium urgency. No immediate threat to persons or property, but circumstances require rectification within 24 hours.	Remedial action requires to be completed within 24 hours. If the Infraco does not complete the required response within 24 hours, **tie** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Infraco.
3	Issue requires rectification, but no immediate threat to persons or property and the circumstances do not otherwise require immediate rectification.	Timescales for rectification to be agreed between the Infraco and **tie**. In the event that the Infraco does not comply with the agreed timescales, **tie** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Infraco.

If the Infraco fails to take any remedial action required by **tie** pursuant to the table above, **tie** shall be entitled to employ and pay other persons to carry out the same and all costs incurred by **tie** shall be recoverable from the Infraco by **tie** and may be deducted by **tie** from any monies due or to become due to the Infraco or, alternatively, recoverable from the Infraco as a debt.

6.3 Without prejudice to Clause 27 (*Removal of Infraco's Employees*) of the Agreement, **tie** shall implement a process for initiating disciplinary actions which could arise from complaints received in respect of Infraco staff or breach by any member of the Infraco's staff in respect of the requirements of Schedule 2 (*Employer's Requirements*) or this Schedule 3 (*Code of Construction Practice*). These comprise:

6.3.1 Black Card: issued for gross misconduct, or the aggregation of two Red Cards or three Yellow Cards - results in employment on the Edinburgh Tram project being terminated for the individuals involved.

6.3.2 Red Card: issued for serious misconduct, or the aggregation of two Yellow Cards.

6.3.3 Yellow Card: issued for misconduct.

7. IDENTIFICATION

7.1 The Infraco shall ensure that all site construction staff are easily identifiable to the public by use of photo identity cards.

7.2 The Infraco shall ensure that all site construction staff identify their employer by means of their company logo on their high visibility waistcoat / jacket and safety helmet.

8. HOURS OF WORKING

8.1 Normal maximum hours of permissible working for the Infraco Works shall be:

Monday – Friday **0700 – 1900 hours**

Saturday **0800 - 1300 hours**

8.2 These hours of work shall not apply to equipment which is required to operate continuously (e.g. for safety or environmental reasons) or to work undertaken within fully enclosed areas such as buildings.

8.3 **Work Outside Normal Hours**

8.3.1 In certain circumstances work outwith these hours may be undertaken with the prior approval of **tie** and CEC. These circumstances may include:-

8.3.1.1 Sunday and evening/night working on public roads and in the vicinity of the railway network, where such working is required to minimise disruption to other traffic; or

8.3.1.2 where, through consultation with local residents and businesses adjacent to the proposed Infraco Works to be undertaken outwith the normal hours of working, it is deemed by the Infraco acting reasonably and having due and proper regard to the said consultation to be less disruptive to those businesses and residents by having the Infraco working extended hours outwith the normal hours of working, or

8.3.1.3 where Infraco Works are taking place in areas where there are no residents adjacent to the proposed Infraco Works.

8.3.2 Application for prior approval must be made by the Infraco at least two weeks in advance.

8.4 Where Sunday or evening and night working has the potential to disturb nearby land users and occupiers, the Infraco shall notify such users and occupiers seven days in advance with a description of the work to be carried out, measures which will be taken to control noise or other disturbance, and proposed hours of working.

8.5 No works shall be undertaken between Haymarket at Magdala Crescent to Leith Walk Junction of London Road from and including the following dates:

Festival 03rd August 2008 until 07th September 2008;

Festival 02nd August 2009 until 06th September 2009;

Festival 01st August 2010 until 05th September 2010;

Christmas 07th December 2008 until 02nd January 2009;

Christmas 06th December 2009 until 04th January 2010; and

Christmas 05th December 2010 until 04th January 2011.

9. SITE ARRANGEMENTS

9.1 Site Housekeeping

9.1.1 A 'good housekeeping' policy shall be applied by the Infraco at all times; this shall include, but not necessarily be limited to, the following requirements:

9.1.1.1 all working areas, including offices, shall be kept in a clean and tidy condition;

9.1.1.2 all working areas shall be a no-smoking area; specific areas within the Site shall be designated as smoking areas and shall be equipped with containers for smoking waste; these shall not be located at the boundary of the Site and adjacent to neighbouring land;

9.1.1.3 open fires shall be prohibited at all times;

9.1.1.4 all necessary measures shall be taken to minimise the risk of fire and the Infraco shall comply with the requirements of the local fire authority;

9.1.1.5 radios (other than two-way radios used for the purposes of communication related to the Infraco Works) and other forms of audio equipment shall not be operated on the Site;

9.1.1.6 any waste susceptible to spreading by wind or liable to cause litter shall be stored in enclosed containers;

9.1.1.7 rubbish shall be removed at frequent intervals and the Site kept clean and tidy;

9.1.1.8 hoardings shall be frequently inspected, repaired and re-painted as necessary;

9.1.1.9 eating and drinking shall only permitted within the Infraco's designated welfare area;

9.1.1.10 adequate toilet facilities shall be provided for all Site staff;

9.1.1.11 food waste shall be removed frequently;

9.1.1.12 the Infraco's personnel (including any Sub-Contractors) shall be required to conform to a reasonable dress code;

9.1.1.13 any behaviour that is lewd or likely to cause offence shall not be permitted; and

9.1.1.14 wheel washing areas shall be brushed clean frequently.

9.1.2 The Infraco shall inspect all working areas at least weekly and shall provide a four weekly written report on compliance with paragraph 9.1.1 above. **tie**, **tie's** Representative or any other party authority by either of them may carry out inspections of the Site at any time without prior notice of time and place of the inspections. Access to all areas of the Infraco Works shall be given to visiting inspectors and the Infraco shall give inspectors all reasonable assistance during their Site inspection.

9.1.3 The Infraco shall register the project with the Considerate Constructors Scheme.

9.2 **Welfare**

9.2.1 The Infraco shall be responsible for ensuring that adequate welfare facilities are provided; adequate facilities shall comprise:

9.2.1.1 sufficient toilet facilities for all staff at readily accessible locations, including adequate supplies of toilet paper;

9.2.1.2 facilities for changing, storing and drying clothes, for heating water and for washing and drinking (the latter must have seating for each person and wipe-clean mess table tops);

9.2.1.3 washing facilities near every toilet facility and changing room; the washing facilities shall include a supply of hot and cold or warm water, soap or cleaning agent and towels or hot air drier;

9.2.1.4 clean, wholesome drinking water, clearly marked as such;

9.2.1.5 a means of heating food; and

9.2.1.6 rest facilities.

9.2.2 The Infraco shall keep all welfare facilities clean and shall not use them for the storage of materials, plant and other working equipment.

9.2.3 The Infraco shall provide suitable and sufficient fire fighting equipment for all on-site accommodation.

9.2.4 Where there is the possibility of female employees or visitors being present on the Site, the Infraco shall provide separate toilet, washing and changing facilities.

9.3 **Fencing and Hoardings**

9.3.1 The Infraco shall ensure that all working areas are sufficiently and adequately fenced to prevent the public and animals from straying on to the working area; hoardings shall be provided to suit the individual location by carrying out an appropriate risk assessment, but may be:

9.3.1.1 adjacent to a pedestrian route;

9.3.1.2 a modular wire mesh fence, a minimum of 1.8 metres in height, where appropriate for minimum security needs; or

9.3.1.3 a 2.4 m minimum height, plywood faced, timber framed boundary hoarding, of a surface density of not less than 7kg/m² or other hoarding providing equivalent security and noise attenuation, in the vicinity of noise sensitive neighbours;

9.3.1.4 in locations identified by **tie** a proprietary steel panelled hoarding system a minimum of 2.4m in height;

9.3.1.5 a 2.4m minimum height, plywood faced, timber framed boundary hoarding, of a surface density of not less than 7kg/m² together with a covered walkway over a pedestrian route;

9.3.1.6 adjacent to a live road carriageway;

9.3.1.7 as for a pedestrian route, but in conjunction with a vehicle restraint system which complies with containment level T1 and T2 of BS EN 1317 - 2:1998, where determined by the risk assessment;

9.3.1.8 in areas not adjacent to a live carriageway or pedestrian route;

9.3.1.9 as for a pedestrian route;

9.3.1.10 a post and wire fence 1.2m in height erected on the line of the Permanent Land;

9.3.1.11 other designs, where a particular level of risk mitigation appearance or acoustic rating is considered to be required and is agreed with **tie** and CEC; and

9.3.1.12 where the Infraco Works to be undertaken are of a minor nature, and subject to the approval of **tie**, barriers comprising post and planks or similar proprietary systems can be used.

All fencing and hoardings shall comply with Chapter 8 of the Traffic Sign Manual.

All access and egress to worksites shall be via designated positions within the fencing and hoardings, which shall remain closed and secured when not in use.

9.3.2 All fencing and hoardings that create poorly lit pedestrian routes shall have appropriate lighting fitted by the Infraco, and these shall be illuminated at all times when the adjacent street lighting is lit.

9.3.3 The Infraco shall ensure that the location and design of Site boundaries, hoarding and temporary structures on the public road shall permit adequate visibility at junctions and proper forward visibility along the roads in accordance with the National Roads Directorate advice notes and the requirements of CEC.

9.3.4 The Infraco shall ensure that where hoardings are provided, they are painted on the side facing away from the working area in a colour and style to be approved by **tie** and CEC, and that the public side of the hoarding carries signs which identify the project and give appropriate contact information for the Infraco.

The Infraco shall ensure that where fencing is provided the fence panels are covered by material that complies with the requirements of Loss Prevention Standard LPS 1215 *Flammability Requirements and Tests for LPCB Approval of Scaffolding Materials.* The material shall be printed in a colour and style to be approved by **tie** and CEC, and carries signs which identify the project.

9.3.5 All hoardings shall be maintained by the Infraco in a neat and tidy condition at all times, 24 hours, 7 days a week.

9.3.6 The Infraco shall be expressly prohibited from displaying or allowing to be displayed any advertisement or notice including illicit bill or fly posting on the hoardings. The Infraco shall ensure that all graffiti, fly posting or defacement to the hoardings is removed and made good or obscured within 24 hours.

9.3.7 An information board shall be provided by the Infraco at each working area detailing information on the work programme and estimated duration of the Infraco at that working area, together with the location of the information centre, the web address and a 24-hour telephone number for use by members

of the public who wish to lodge complaints or comments or additional information.

9.3.8 All fencing and hoarding shall be removed as soon as reasonably practicable after the completion of any part of the Infraco.

9.4 **Lighting and Visual Intrusion**

9.4.1 The Infraco shall site construction buildings, equipment and lighting so as to minimise visual intrusion and light spillage at nearby residential properties, in so far as is consistent with the safe and efficient operation of each Work Site. Lighting shall be removed as soon as is consistent with the safe and efficient operation of each Work Site.

9.4.2 Site lighting shall be positioned and directed by the Infraco so as to minimise nuisance to residents and to minimise distractions or confusion to passing drivers on adjoining public roads. This provision shall apply particularly to working areas where work after dark will be carried out and the Infraco shall provide appropriate lighting for these sites.

9.4.3 So far as is practicable, all power to temporary traffic signals, lighting and the like shall be taken by the Infraco from mains supplies rather than from portable generators. Where portable generators are used, industry best practice shall be followed to minimise noise and pollution from such generators.

9.4.4 The Infraco shall comply with the Institute of Lighting Engineers' document *Guidance Notes on Reduction of Light Pollution 2000* in so far as is reasonably practicable and applicable to the Infraco.

9.5 **Access and Loading**

9.5.1 The Infraco shall ensure that lorries shall enter and exit the Site in a forward direction at designated locations, except where space restriction does not permit this. If the reversing of vehicles into public spaces is required, then a responsible person observing the rear of the vehicle shall properly control the movement. The sounding of audible reversing alarms shall not be permitted outside normal working hours, except where this has been approved by **tie** and CEC in connection with Infraco Works permitted under paragraph 8.3

above). Entry and exit conditions shall be subject to prior approval by **tie**, CEC and the Lothian and Borders Police before implementation.

9.5.2 Access to and egress from the Site shall be carried out by initiating a left turn wherever reasonably practicable.

9.5.3 All loading and unloading of vehicles shall take place off the public road as far as is reasonably practicable.

9.6 **Security**

9.6.1 Adequate security shall be exercised by the Infraco to protect the public and prevent unauthorised entry to or exit from the Site. Site gates, where used, shall be closed and locked when there is no Site activity and Site security measures shall be implemented.

9.6.2 Site security cameras, where used, shall be placed in locations which will not unduly infringe upon the privacy of local residents.

9.7 **Living Accommodation**

9.7.1 No living accommodation shall be provided by the Infraco within any construction working area. Mess rooms, locker rooms, toilets and showers shall be permitted at Work Sites.

9.8 **Clearance of Site on Completion**

9.8.1 The Infraco shall clear and clean all utilities apparatus (where relevant to the Infraco Works), working areas and accesses as work proceeds and when no longer required for the carrying out of the Infraco Works.

9.8.2 All surplus soil and materials, rubbish, Temporary Works (including temporary roads and hardstandings), Infraco's Equipment, sheds, offices and temporary fencing shall be removed, post holes filled and the surface of the ground restored as near as practicable to its original condition, or to such condition as has previously been agreed with **tie** and CEC in accordance with this Agreement and/or the Specification (as appropriate).

9.9 **Pest Control**

9.9.1 The Infraco shall ensure that the risk of infestation by pests or vermin is minimised by adequate arrangements for the disposal of food waste or other material attractive to pests. If infestation occurs, the Infraco shall take such action to deal with it as required by **tie** and CEC.

10. REQUIREMENTS RELATING TO WORKS AFFECTING EDINBURGH AIRPORT

10.1 The Infraco shall comply with the requirements of Edinburgh Airport Limited in relation to aerodrome safeguarding, including those requirements included within the Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas) (Scotland) Direction 2003 (SEDD Circular 2/2003).

10.2 The Infraco shall have regard to, and comply (where relevant) with all BAA and CAA guidelines, including, (but not necessarily limited to):

10.2.1 CAP 168 Licensing of Aerodromes.

10.2.2 CAP 680 Aerodrome Bird Control.

10.2.3 CAA Safeguarding of Aerodromes Advice Note 1 (Safeguarding – An Overview).

10.2.4 CAA Safeguarding of Aerodromes Advice Note 2 (Lighting near Aerodromes).

10.2.5 CAA Safeguarding of Aerodromes Advice Note 4 (Cranes and Other Construction Issues).

10.2.6 BAA Standard Conditions for Aerodrome Safeguarding.

10.3 The Infraco shall prepare for approval by **tie** and Edinburgh Airport Limited a "Construction Management Strategy" as defined within CAA Safeguarding of Aerodromes Advice Note 4 (Cranes and Other Construction Issues). The Construction Management Strategy shall address as a minimum the following issues:

10.3.1 use of cranes or other tall construction equipment;

10.3.2 control of activities likely to produce dust or smoke clouds

10.3.3 the design of temporary lighting to avoid distracting pilots (see Advice Note 2);

10.3.4 storage of materials, particularly compliance with height limits;

10.3.5 control and disposal of waste, to prevent attraction of birds; and

10.3.6 site restoration, to prevent attraction of birds.

11. REQUIREMENTS RELATING TO WORKS AFFECTING THE RAILWAY

11.1 The Infraco shall comply with the requirements of Network Rail in relation to railway safeguarding.

11.2 The Infraco shall comply with all Network Rail standards and guidelines, including but not limited to "*Contract Requirements (NR/SP/OHS/008)*" including the Safety Clause Menu and "*Health and Safety Management of Third Party Works (RT/LS/P/043)*".

12. HEALTH & SAFETY REQUIREMENTS

12.1 Safety Signage

The Infraco shall be responsible for the provision of all safety signage required for the work activities being undertaken. Safety signage shall comply with the Health and Safety (Safety Signs and Signals) Regulations 1996.

12.2 Hazardous Substances

12.2.1 The Infraco shall maintain a register of safety data sheets for all materials and substances used.

12.2.2 The Infraco shall be responsible for undertaking "COSHH" assessments for materials and substances used or with which contact will be made on the Site.

12.2.3 The Infraco shall liaise with **tie** regarding proposals for storage of hazardous substances in open air, in buildings, within the workplace and the decanting, disposal of empty containers, tanks and cylinders.

12.3 **Electricity**

12.3.1 The Infraco shall use electrical tools and equipment which operate at a voltage no greater than 110V. Where there is a requirement to operate tools and equipment using a voltage greater than 110V, the approval of **tie** shall be obtained in writing.

12.3.2 Electrical tools shall be double insulated and used in conjunction with a RCD.

12.3.3 Tools shall be connected to a 240V supply via a portable 110V centre tapped transformer.

12.3.4 The lead between the 240V supply and the transformer shall be as short as is reasonably possible.

12.3.5 All temporary electrical systems shall possess a current inspection certificate.

12.3.6 All tools shall have passed an electrical safety test and shall be identified with a label which states the unique identification, the test date, the next test date and the organisation which carried out the electrical safety test.

12.4 **Provision and Use of Work Equipment**

12.4.1 The Infraco shall be responsible for ensuring the inspection of all work equipment. Records of inspections shall be retained at the Site.

12.4.2 Work equipment shall only be used by authorised personnel, who have received appropriate training and certification.

12.5 **Lifting Operations and Lifting Equipment**

12.5.1 The Infraco shall be responsible for ensuring that all lifting equipment is accompanied by current test and examination certificates.

12.5.2 Safe working loads shall be shown on all lifting equipment.

12.5.3 Lifting equipment and lifting operations shall only be used by authorised personnel, who have received appropriate training and certification.

12.6 **Height Gauges for Low Structures**

A height gauge in the form of a rigid "goal post" type structure shall be erected at:

12.6.1 all egress points from the worksites. The height that the cross bar is set to shall be dependent upon the minimum height of any obstruction that a vehicle will encounter on public or third party land; and

12.6.2 all access points to the worksites or in the proximity of an on site obstruction. The height to which the crossbar requires to be set shall be subject to review during the course of the Infraco Works to ensure that it takes cognisance of the ongoing Infraco Works.

The height gauge shall comprise a form that shall alert the driver of contact with the crossbar and shall be located in a position that shall enable the driver to take avoiding action prior to contacting any obstruction.

12.7 **Overhead Power Lines**

Where plant and equipment is working in the vicinity of an overhead power line, the distance between the plant and equipment and the overhead line should be at least:

12.7.1 15m (plus the length of the jib) if the lines are suspended from steel towers; or

12.7.2 9m (plus the length of the jib) if the lines are supported on wooden poles.

In cases where approach is likely, stout, distinctive barriers should be erected at ground level to prevent access. Where work is to take place close to overhead lines, detailed precautions should be discussed with the owner of the overhead lines. However, the responsibility for ensuring that precautions are adequate remains with the Infraco, not with the owner of the power lines.

In addition to the specific precautions required when working in the vicinity of overhead power lines, the following shall be undertaken:

12.7.3 barriers shall be erected at least 6m away, to prevent inadvertent approach by other site vehicles; and

12.7.4 crossing points shall be clearly marked beneath the lines by means of a rigid "goal post" structure at a height specified by the electrical supplier.

Storage of materials shall be prohibited in the area between the overhead lines and the ground-level barriers.

13. FIRE PREVENTION

13.1 The requirements of the document "*Fire Prevention on Construction Sites: The Joint Code of Practice on the Protection from Fire of Construction Sites and Buildings Undergoing Renovation* (published by the Construction Confederation and the Fire Protection Association) shall apply to the Infraco Works.

13.2 All temporary protective coverings shall comply with the requirements of the Loss Prevention Standard LPS 1207 'Fire Requirements for Protective Covering Materials'.

13.3 All scaffold cladding materials shall comply with the requirements of the Loss Prevention Standard LPS 1215 'Flammability Requirements for Scaffold Cladding Materials'.

13.4 The Infraco shall, as appropriate to the work activities, appoint "a fire marshall" who shall be responsible for day to day fire safety.

13.5 A permit to work shall be implemented for all "hot works".

13.6 The use of halogen lighting shall be prohibited.

14. FIRST AID

14.1 the Infraco shall be responsible for providing first aid provision for its personnel (including any Sub-Contractors) in accordance with the Health and Safety (First Aid) Regulations ("Regulations") 1981. This shall include the provision of:

14.1.1 a first aid box, the size of which shall be commensurate with the number of workers on Site; and

14.1.2 the required number of first aiders or appointed persons required by the Regulations.

15. INSPECTIONS

15.1 The Infraco shall be responsible for undertaking the statutory inspections required in terms of the Construction (Health, Safety and Welfare) Regulations 1996 that relate to the Infraco Works being carried out. The records of the inspections shall be retained on the Site.

16. ROADS AND FOOTPATHS, CYCLEWAYS AND BRIDLEWAYS

16.1 General

16.1.1 The Infraco shall submit to **tie** a statement setting out the proposed measures (including specified traffic routes) to be taken with respect to traffic and road safety for the duration of the Infraco Works, to enable the development including all relevant information in relation to the Infraco obtaining Temporary Traffic Regulation Orders ("**TTROs**") and the equivalent of such orders as are applicable to third parties (for example Edinburgh Airport Limited), for approval before the Infraco Works commence. The Infraco shall circulate the approved statement to all bodies identified by **tie** and CEC and any other bodies reasonably requested by **tie**.

16.1.2 The measures to be taken with respect to traffic and road safety shall include, but not necessarily be limited to:

16.1.2.1 use of TTROs; the Infraco shall consult with **tie,** CEC and other third parties on the arrangements for agreeing and implementing TTROs to facilitate road closures and the like; the use of TTROs shall take into account the requirement for, and availability of, suitable alternative routes;

16.1.2.2 use of temporary signing and lining where required by **tie** and CEC to identify places where construction is taking place;

16.1.2.3 use of temporary signing to restrict vehicle types and sizes and define routes for construction traffic;

16.1.2.4 use of appropriate temporary signing and lighting wherever the Infraco Works are in progress to ensure the safety of all road users; and

16.1.2.5 preparation and implementation of a programme agreed by Infraco with **tie** and CEC for road closures and temporary traffic signal arrangements.

16.2 **Temporary Road Closures And Diversions**

16.2.1 The Infraco shall finalise the arrangements for required closures and diversions of specified highways, footpaths and cycle ways with **tie** and CEC, BAA or any private landowner, to suit its Programme.

16.2.2 Before breaking up, closing or otherwise interfering with any street or footpath to which the public has access, the Infraco shall make such arrangements with **tie** and CEC as may be reasonably necessary to cause as little interference with the traffic in that street or footpath during the Infraco Works as shall be reasonably practicable.

16.2.3 Temporary road closures which result in the diversion of bus routes shall be agreed by the Infraco with the relevant bus operators who will in turn notify the Traffic Commissioner.

16.2.4 Pedestrian access to properties shall be maintained at all times where practicable, unless otherwise agreed with **tie** and CEC and the owners and tenants of affected properties. Access to and from public facilities shall be maintained at all times unless otherwise agreed with the relevant administrating bodies.

16.2.5 Wherever the Infraco Works interfere with the existing public or private roads or other ways over which there is a public or private right of way for any traffic, the Infraco shall construct diversion ways as necessary. The standard of construction and lighting shall be suitable in all respects for the class or classes of traffic using the existing ways and the widths of the diversions shall not be less than that of the existing way unless otherwise agreed with **tie** and CEC or the owner of the private road.

16.2.6 Diversion routes shall be constructed in advance of any interference with the existing ways, shall be kept as short as reasonably practicable and shall be maintained by the Infraco to provide adequately for the traffic flows. All diversion routes shall be removed and the road returned to **tie** and CEC as soon as is reasonably practical after completion of the Infraco Works. Liaison shall be undertaken with **tie** and CEC regarding any special events such as the Edinburgh Festival, Christmas, New Year, sporting events and filming which might interact with the diversions.

16.2.7 Adequate horizontal clearance of 0.6 metres minimum shall be provided from the kerb line, to avoid fouling by vehicles. The minimum headroom beneath any projection over the road shall be 5.3 metres.

16.3 **Parking Provision for Construction Traffic**

16.3.1 Areas and locations of parking provision for site and construction traffic shall be agreed by the Infraco with **tie** and CEC prior to the commencement of Infraco Works.

16.3.2 No daytime or overnight parking of site or construction vehicles outside any construction compounds or work sites shall be allowed except where the delivery or removal of materials is taking place at that location and with prior agreement with **tie** and CEC, as required under paragraph 8.3 above.

16.4 **Pedestrian Routes, Cycle Routes and Bridleways**

16.4.1 The Infraco shall ensure that all existing pedestrian routes, cycle routes and bridleways are maintained throughout the Infraco Works unless otherwise agreed with **tie** and CEC. Any temporary replacement footway or cycleway shall meet the following requirements:

16.4.1.1 all temporary and diverted footways, which replace footways which are currently accessible to wheelchairs and pushchairs, shall continue to be usable by such users where reasonably practicable and take into account DDA access requirements;

16.4.1.2 tactile paving shall be used where present on existing pedestrian facilities unless otherwise agreed with **tie** and CEC;

16.4.1.3 any temporary footways and cycle ways shall have uniform surfaces; there shall be no steps and any longitudinal gradients shall be suitable for the prevailing conditions, preferably 1 in 20 and no greater than 1 in 12; cross-falls shall be suitable for disposal of surface water run off, but ideally shall not exceed 1 in 30;

16.4.1.4 ramps shall be provided at all junctions of footways and cycle ways with carriageways; gradients shall be appropriate to the circumstances, not exceed 1 in 12, and the base of the ramps shall be flush with the carriageway; all temporary footways and cycle

way ramps shall be surfaced in non-slip material and kept free from mud and debris; the Infraco shall ensure that there is no ponding at any junction;

16.4.1.5 existing footway and cycle way widths shall be maintained where practicable; footway and cycle way widths shall not be reduced without the prior agreement and approval of CEC;

16.4.1.6 clear signing and protection measures shall be provided at all times for each pedestrian and cycle route or bridleway affected by the Infraco Works, in accordance with Chapter 8 of the Traffic Signs Regulations and General Directions 1981 and relevant safety legislation; the Infraco shall liaise and agree the signing requirements of all pedestrian and cycle routes affected by the Infraco Works with **tie** and CEC, and shall provide any additional signage and/or protection measures required and agreed with **tie** and CEC; and

16.4.1.7 headroom clearance over footways and cycle ways shall be appropriate for the circumstances and a minimum of 2.3 metres; a horizontal clearance of 0.6 metres shall be provided from the kerb line, where practicable, for any hoarding to avoid fouling by vehicles; the minimum headroom beneath any projection over the highway shall be 5.3 metres, but will be higher for abnormal load routes; where a path is a designated bridleway, headway clearance shall be appropriate for the circumstances and a minimum of 3.6 metres; all pedestrian routes diverted onto the carriageway shall be clearly defined by continuous barriers, constructed to the reasonable requirements of **tie** and CEC.

16.5 **Maintenance and Repair of the Road**

16.5.1 The Infraco shall carry out a pre-construction inspection and take photographs of the public roads, footpaths and cycle ways in the vicinity of the Site in conjunction with **tie** and CEC. The Infraco shall produce a report of the results of the joint inspection. The report shall establish the general road conditions within and in the vicinity of the Site, the residual life of the road and the level of reinstatement likely to be required in order to comply with the requirements of this Agreement, including the Specification. The

report shall be agreed and signed by both the Infraco, **tie** and CEC as appropriate.

16.5.2 The Infraco shall take every reasonable precaution to prevent its operations from unnecessarily damaging the roads and footpaths within the Site and in the vicinity of the Infraco Works.

16.5.3 The Infraco shall carry out all maintenance works as are necessary to maintain the roads and footpaths affected by the Infraco Works in a safe and serviceable condition to the reasonable satisfaction of CEC and **tie**.

16.5.4 Reinstatements of the road shall be carried out in accordance with the RAUC(S) "*Specification for the Reinstatement for Openings of Roads*", October 2003.

16.6 **Existing Street Furniture**

16.6.1 No street furniture or other features within the vicinity of the Site and the Infraco Works, but outwith the area covered by the Tram Legislation shall be unnecessarily disturbed or altered by the Infraco Works, except as expressly required by **tie** in accordance with this Agreement. Any damage to street furniture consequent upon construction activities connected with the Infraco Works shall be reported to **tie** and the appropriate owner or authority (unless the appropriate owner cannot be identified) immediately on discovery of the damage. Any damage shall be replaced or made good as soon as practicably possible and to the reasonable satisfaction of the owner of the street furniture or other feature.

16.6.2 Any street furniture or other obstructions outside the area to be occupied by the Infraco but which are required to be moved in order to gain access to the Site shall, subject to the prior consent of the owner thereof, be removed and reinstated or replaced as appropriate, on completion of the Infraco Works. Any costs associated therewith shall be borne by the Infraco, including the costs of reinstatement or replacement.

16.7 **Vehicle Movements and Access to the Site**

16.7.1 The Infraco and its Sub-Contractors and suppliers moving loads, construction plant, materials and spoil (including vehicles used for carrying such when

empty) shall limit the use of the public roads for such purposes as far as reasonably practicable.

16.7.2 All access routes shall be agreed with **tie** and CEC prior to the commencement of the relevant part of the Infraco Works.

16.7.3 Vehicles arriving or leaving the Site shall do so during the normal working hours as specified in paragraph 8.1 above, unless otherwise agreed with **tie** and CEC. Access (which is deemed to include both the route and entrance to any Work Site) by lorries shall be as agreed with **tie,** CEC and the Lothian and Borders Police. Access to and egress from the Site shall be carried out by initiating a left turn wherever reasonably practicable.

16.7.4 All vehicles operating on the Site shall be fitted with roof mounted yellow flashing beacons and reversing alarms.

16.7.5 The Infraco shall take all reasonable measures to ensure that delivery vehicles do not remain stationary on the road unnecessarily prior to entering the Site. In exceptional circumstances, for example where the Site is very constrained, it may be necessary to have the potential for a limited number of vehicles to stand on the road. The location of such standing areas their size and the duration of any standing periods shall be subject to prior agreement with **tie,** CEC and the Lothian and Borders Police.

16.7.6 The Infraco shall ascertain and comply with any restrictions in respect of abnormal load routes as they may affect access to the Site.

16.8 **Mud on Roads**

16.8.1 The Infraco shall take strict measures to minimise the spillage of mud and loose materials on roads arising from the Infraco Works and ensure that the roads are safe at all times. These shall include, but not necessarily be limited to:

16.8.1.1 the provision of easily cleaned hard standings for vehicles entering, parking and leaving the Site or construction compound;

16.8.1.2 the provision of wheel washing facilities at construction compounds and construction sites, including, where practicable, mechanical

wheel spinners, adequate provision for drainage via settlement tanks and regular maintenance of settlement tanks;

16.8.1.3 where mechanical wheel wash facilities are not practicable at construction sites, the use of manual techniques to ensure that the wheels of vehicles are clean prior to them leaving the construction site;

16.8.1.4 the use of mechanical road sweepers and surface flushing apparatus to clean the hard standing and to remove any mud or debris deposited by site vehicles on roads, footpaths, and in gullies or drains in the vicinity of the Site; the road sweepers or other equipment shall be readily available whenever the need for cleaning arises;

16.8.1.5 the loading and sheeting of vehicles are in such a manner as to prevent material falling off during their journey;

16.8.1.6 compliance with the requirements regarding the control of dust outlined in paragraph 19 below; and

16.8.1.7 compliance with the requirements regarding the control of waste water, mud, debris from wheel washing outlined in paragraph 21 below.

16.9 **Provision, Erection and Maintenance of Traffic Safety and Control (Traffic Safety Measures)**

16.9.1 The Infraco shall provide, erect and maintain such traffic signs, road markings, lamps, barriers and traffic control signals and such other measures as may be necessitated by the construction of the Infraco Works in accordance with the requirements of the Agreement and to the approval of **tie** and CEC. The Infraco shall not commence any work which affects the public road until all traffic safety measures necessitated by the work are fully operational.

16.9.2 The Infraco shall keep clean and legible at all times all traffic signs, road markings, lamps, barriers and traffic control signals and shall position, replace, reposition, cover or remove them as required by the progress of the Infraco Works and to the reasonable requirements of **tie** and CEC.

16.9.3 The Infraco shall ensure that all barriers, footpath space and temporary footpaths (including the requirement for kerb ramps where use has to be made of the carriageway) shall comply with the requirements of the document *Inclusive Mobility A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure* issued by the Mobility and Inclusion Unit of the Department for Transport.

16.9.4 So far as practicable, all power to temporary traffic signals and lighting shall be taken by the Infraco from mains supplies rather than from portable generators. Where portable generators are used all reasonable measures will be taken to minimise noise and pollution from such generators.

16.10 **Implementation of the Closure of Roads and Access to Frontages**

16.10.1 The Infraco shall not close any roads or private accesses until immediately before the area is required for construction in accordance with this Agreement and the Programme. The construction of the Infraco Works shall follow in the area of a temporary closure expeditiously and shall be carried out efficiently and in a continuous manner to ensure that all temporary closures are re-opened as quickly as possible.

16.10.2 The Infraco shall, in carrying out the Infraco Works, take all reasonable precautions to prevent or reduce any disturbance or inconvenience to the owners, tenants or occupiers of adjacent properties, and to the public generally. The owners, tenants or occupiers of affected properties shall be informed of the Infraco Works to be undertaken, their planned duration, road and access closures and alternative access routes (where required) in writing and by locally posted public notices at least one calendar month prior to work starting.

16.10.3 The Infraco shall render all necessary assistance to occupiers of premises affected by the Infraco Works so as to enable them to accept and send out deliveries to and from their premises during their normal working hours.

16.11 **Access for Emergency Vehicles**

16.11.1 The routes proposed by the Infraco for emergency service vehicles and personnel to gain access to the Site, the construction corridor and

neighbouring sites along the route shall be agreed by the Infraco with the emergency services and **tie** and CEC prior to the start of construction.

17. NOISE

17.1 Noise Control

17.1.1 The Infraco shall take all practicable measures to minimise nuisance from noise. The noise limits specified in this paragraph 17.1 or which may be otherwise agreed with CEC shall not be regarded as a licence to make noise up to the stated limit.

17.1.2 Subject to the specific requirements of CEC and other affected third parties the following minimum requirements shall be met:

17.1.2.1 during normal working hours, as defined in paragraph 8.1 above the maximum noise levels measured 1 metre from any occupied dwelling or other building used for residential purposes, generated by construction plant and equipment shall not exceed the following limit:

Monday to Friday (inc.) 0700-1900 hours	$L_{Aeq\ 12\ hour}$ 75 dB
Saturday 0800 - 1300 hours	$L_{Aeq\ 5\ hour}$ 75 dB

17.1.2.2 outside normal working hours, the following limits shall apply:

(a)

Period	Hours	Limit
Monday to Friday (inc.)	1900-2200	$L_{Aeq\ 3\ hours}$ 65 dB
Saturday	1300-2200	$L_{Aeq\ 9\ hour}$ 65 dB
Sunday & Bank Holidays	0800-2000	$L_{Aeq\ 12\ hours}$ 65 dB

17.1.2.3 the default noise limit for any night time (2200 hours (or 2000 hours on Sundays and Bank Holidays) to 0700 (or 0800 on Saturdays, Sundays and Bank Holidays)) construction work shall be $L_{Aeq\ 1\ hour}$ 55dB at residential buildings; higher noise levels may be permitted where ambient noise levels are higher.

17.1.2.4 the maximum noise levels measured 1 metre from any school, college or other teaching facility resulting from construction work shall not exceed the following limits:

At any time when occupied $L_{Aeq\ 1\ hour}$ 65 dB

17.1.2.5 the maximum noise level measured 1 metre from any office building or other building used for office purposes during normal working hours shall be as defined in paragraph 17.1.2.1 above.

17.1.3 In order to ensure that the best practicable means are used to meet the levels set out above, a programme of on-site monitoring by a suitably qualified practitioner shall be agreed between the Infraco, **tie** and CEC. This monitoring programme shall include the location and frequency of readings, and shall define to whom the results shall be made available. Monitoring shall be undertaken by the Infraco at locations identified in the Environmental Statements as those where mitigation measures may be necessary to avoid significant noise disturbance.

17.1.4 In exceptionally difficult circumstances, essential work causing noise above these limits may be permitted with the prior approval of **tie** and CEC. Where not otherwise required in accordance with this Agreement, application for prior approval must be made at least two weeks in advance of the relevant Infraco Works commencing, and shall be fully justified and kept to the minimum necessary. Conditions may be attached to any permission for such Infraco Works.

17.1.5 In the event that measurements indicate noise has exceeded the limits in paragraph 17.1.2 above of this clause, the Infraco shall stop the operation in a safe manner and take all practicable measures to prevent recurrence. If this does not enable the limits to be met, exceptional permission must be applied for under the terms of paragraph 17.1.4 above.

17.1.6 Without prejudice to the other requirements of this paragraph 17, the Infraco shall comply with the recommendations set out in BS 5228, '*Noise Control on Construction and Open Sites*'; insofar as these are reasonably practicable and applicable to the Infraco Works, and in particular with the following requirements:

17.1.6.1 all vehicles and mechanical plant used for the purpose of the work shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order;

17.1.6.2 all compressors and generators shall be 'sound reduced' models fitted with properly lined and sealed acoustic covers, which shall be kept closed whenever the machines are in use, and all pneumatic percussive tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers;

17.1.6.3 all machines in intermittent use shall be shut down in the intervening periods between work or throttled down to a minimum; noise emitting equipment which is required to run continuously shall be housed in a suitable acoustic enclosure (see BS5228 Part 1:1997, Figures B.1, B.2 and B.3 (or later issue));

17.1.6.4 stationary equipment with significant noise output shall be sited away from sensitive site boundaries as far as is practicable;

17.1.6.5 temporary noise barriers shall be used to reduce noise levels where appropriate and practicable; barriers shall be located as close to the plant as possible, and shall have a mass per unit area of at least $7kg/m^2$;

17.1.6.6 no deliveries shall arrive at the Site before 0700 hours;

17.1.6.7 the engines of all parked vehicles or vehicles waiting to enter any work area shall be switched off within two minutes of arrival; and

17.1.6.8 work compounds shall be laid out so that accesses and loading areas are located as far away from sensitive neighbours as practicably possible and so that temporary structures screen noisy areas where practicable.

17.1.7 Without prejudice to the requirements of this paragraph 17 set out above, the Infraco shall comply with the City of Edinburgh Department of Environmental and Consumer Service's document *Construction Site Noise: A Guide for Contractors*, August 2000 (or current issue, if subsequent amendments have been issued), and shall liaise with that department in accordance with the requirements therein.

17.2 **Communications Regarding Noise**

17.2.1 The Infraco shall give 7 days notice to local residents who may be adversely affected by noise from the proposed programme of Infraco Works, providing a description of the work to be carried out, measures that will be taken to control noise or other disturbance, and the proposed hours of working.

17.2.2 The Infraco shall provide **tie** and any other party requested by **tie** with a list of contacts who will be responsible for investigating and resolving noise issues in respect of the carrying out of the Infraco Works.

18. VIBRATION

18.1 **Vibration Control**

18.1.1 Subject to the specific requirements of **tie** and CEC, the following minimum requirements shall be met:

18.1.1.1 to protect residents and users of buildings from nuisance and harm the Infraco shall, as far as practicable, not exceed the Vibration Dose Values specified in BS6472:1992 as resulting in a 'low probability of adverse comment'; and

18.1.1.2 to protect buildings and other structures from physical damage, peak particle velocity levels shall not exceed 5mm/sec except for particularly sensitive buildings or structures where the level shall not exceed 3mm/sec.

18.1.2 If vibration levels are predicted to exceed the criteria specified in paragraph 18.1.1 above, then the Infraco shall procure that a suitably qualified practitioner undertakes monitoring during the activity and the Infraco shall adopt alternative methods of working to reduce vibration levels to those prescribed in above. The monitoring programme shall be agreed between the Infraco, **tie** and CEC. This programme shall include the location and frequency of readings and will identify to whom the results should be made available.

18.1.3 In order to ensure that these levels are not exceeded, a programme of on-site monitoring by a suitably qualified practitioner shall be agreed between the Infraco, **tie** and CEC. This programme shall include the location and

frequency of readings, and to whom the results should be made available and, as a minimum, shall cover all locations identified as 'significantly affected' in the Environmental Statement.

18.2 **Inspection of Buildings and Other Structures**

18.2.1 The Infraco shall be responsible for the compilation of a schedule of all buildings or other structures, including scheduled monuments and listed buildings that are located within the Site, or which are located directly adjacent to such Work Sites, which may be at risk of physical damage or damage caused by vibration generated during the Infraco Works. The said schedule is to be subject to agreement with CEC, CEC having the power to add, or subtract, buildings from the schedule as they deem fit. The agreed schedule is to be published in accordance with the requirements of Schedule 2 (*Employer's Requirements*). A notice of inclusion within the schedule is to be delivered to each scheduled building, attachment of a notice to the building shall be sufficient evidence that notice has been served. Subject to the granting to the Infraco of free and unhindered access to the building or structure, a record of the condition and survey of any defects in the building or structure shall be prepared prior to the commencement of any Infraco Works. Certified copies of the building record and condition survey shall be made available free of charge by the Infraco to the owners of the examined buildings or structures, on their presentation of proof of title to the building. The best practicable means shall be undertaken by the Infraco to avoid damage, or to minimise damage where it is unavoidable. The condition of the buildings and other structures listed in the schedule shall be monitored at reasonable intervals during the Infraco Works and for a period of one year after the completion of the said Infraco Works. The results of the aforesaid monitoring shall be made available free of charge by the Infraco to the owners of the examined buildings, on their presentation of proof of title to the building.

18.2.2 The results of this record of the conditions and survey of any defects shall be provided to **tie** and CEC, the property owner and occupier and, in the case of scheduled or listed features, to CEC and Historic Scotland by the Infraco.

18.2.3 Without prejudice to the provisions of Clause 36 (*Examination of Work Before Covering Up*), after the Infraco Works have been completed and at

any time up to two years after their completion, the owners of properties identified under paragraph 18.2.1 above may, upon providing reasonable evidence of damage, request that a second defects survey is undertaken. Any damage which is identified as being caused by the Infraco Works shall be repaired by the Infraco within a reasonable time of identification at the expense of the Infraco to the reasonable satisfaction of the property owner and so that the property is returned no worse than the standard of repair and stability existing before the Infraco Works commenced.

19. DUST AND AIR POLLUTION

19.1 Dust and Other Air Pollution

19.1.1 The Infraco shall take all necessary measures to avoid creating a dust nuisance during the Infraco Works.

19.1.2 Particular consideration shall be given by the Infraco to Infraco Works affecting the operations of Edinburgh Airport Limited. Details of the specific mitigation measures shall be included within the Construction Management Strategy identified under paragraph 10.3 above.

19.1.3 Measures to prevent dust shall include the following:

19.1.3.1 the provision of easily cleaned hardstandings for vehicles;

19.1.3.2 the enclosure of material stockpiles at all times and damping down of dusty materials, using water sprays during dry weather;

19.1.3.3 the hard surfacing of heavily used areas which will be kept clean by regular brushing and water spraying;

19.1.3.4 control of dust released from cutting or grinding of materials on the Site; any mobile crushing plant which is used during the Infraco Works shall be appropriately licensed and sited so as to minimise dust annoyance to any persons who may be liable to be affected by emissions; the Infraco shall notify SEPA in advance of any mobile crushing plant being brought onto the Site;

19.1.3.5 the complete sheeting of all vehicles carrying spoil and other dusty materials;

19.1.3.6 watering of unpaved surfaces and roads; and

19.1.3.7 a limit on vehicle speeds on unpaved surfaces of 20 kph.

19.1.4 Where dust generating Infraco Works (such as excavation and demolition) are undertaken close to buildings so that there is a potential for soiling of windows and ledges with dust, the Infraco shall clean such windows and ledges as frequently as is necessary (and as a minimum, at least once per week) during periods of dust generating work and on completion of the Infraco Works at that Work Site. The Infraco shall take precautions to prevent damage occurring as a consequence of cleaning works.

19.1.5 The Infraco shall take precautions to prevent the emission of smoke or fumes from construction vehicles, site plant and stored materials including volatile substances. Vehicles and plant shall be well maintained and measures shall be taken by the Infraco to ensure that engines and motors are not left running for long periods when not directly in use.

19.1.6 The engines of all parked vehicles or vehicles waiting to enter any work area shall be switched off within two minutes of arrival.

19.1.7 Work compounds shall be laid out by the Infraco so that accesses and loading areas are located as far away from sensitive neighbours as is practicably possible, and so that temporary structures screen noisy areas where practicable.

19.1.8 There shall be no burning of waste on the Site.

20. DISPOSAL OF WASTE AND CONTAMINATED MATERIALS

20.1 **Waste**

20.1.1 A waste management plan ("**WMP**") shall be developed in accordance with "*Site Waste Management Plans: Guidance for Contractors and Clients*" (DTI 2004). The Infraco shall be responsible for the preparation of the WMP to address all of the approvals and consents which require to be obtained and thereafter, the Infraco shall be responsible for the development of the WMP to document the control measures and mitigation measures that shall be implemented. The plan shall in particular identify:

20.1.1.1 responsibilities for waste management;

20.1.1.2 the types and quantities of waste materials likely to be generated;

20.1.1.3 measures to be taken to minimise generation of waste;

20.1.1.4 proposals for recycling and/or re-use;

20.1.1.5 measures to be adopted for management of waste on the Site including enclosure, segregation, secure storage, sorting for recovery, and other on-site handling;

20.1.1.6 proposed treatment and disposal routes; and

20.1.1.7 licensing arrangements.

20.1.2 The Infraco shall implement and comply with the WMP.

20.1.3 The Infraco shall undertake monthly audits to demonstrate compliance with Statutory Requirements and the WMP. The Infraco shall set out its audit programme in the WMP and shall provide copies of the audit report to **tie**.

20.1.4 Spoil or other waste materials arising from the Infraco Works shall be used, wherever reasonably practicable, in the Infraco Works.

20.1.5 The disposal of waste, including any surplus spoil, shall be managed by the Infraco, so far as is reasonably practicable, to maximise the environmental and development benefits from the use of surplus material to minimise the removal of surplus spoil from the Site and to reduce any adverse environmental effects of disposal.

20.2 **Contaminated Land and Materials**

20.2.1 The Infraco shall identify all areas within the Site where contaminated land, including land contaminated by invasive alien species listed in Part 2 of Schedule 9, of the Wildlife and Countryside Act 1981 (as amended), may be encountered. In each of these areas, the Infraco shall:

20.2.1.1 carry out appropriate additional site investigations as instructed by **tie** to the satisfaction of **tie** and CEC to determine the extent and type of contaminants present on the Site;

20.2.1.2 identify potential sources, pathways and receptors and assess the risk of harm to receptors;

20.2.1.3 liaise with **tie,** CEC and SEPA to address their reasonable requirements and to agree control or protection measures necessary for dealing with identified risks;

20.2.1.4 obtain any necessary licences for the storage, treatment and disposal of contaminated material (including dewatering discharge); and

20.2.1.5 ensure that removal and disposal of contaminated materials complies with a strict consignment note system and that delivery is to appropriately licensed disposal facilities.

20.2.2 The Infraco shall develop management procedures to be followed in the event that contaminated or hazardous materials are discovered on the Site during construction.

20.2.3 If the Infraco identifies contamination on the Site which has not been previously identified , no further development shall take place (except to the extent that would not disturb that contamination) until a site investigation has been carried out in accordance with paragraph 20.2.1 above.

20.2.4 The Infraco shall comply with the guidance in the Health & Safety Executive document "*Protection of Workers and the General Public during the Development of Contaminated Land*" (1991) and to the DEFRA document "*Helping to Prevent the Spread of Invasive Non-native Species, Horticultural Code of Practice*" (March 2005), in so far as this is reasonably practicable and applicable to the Infraco Works. Invasive alien species listed on Schedule 9, Part II of the Wildlife and Countryside Act 1981 as amended by the Nature Conservation (Scotland Act) 2004, will be treated in accordance with the Environmental Protection Act 1990. Japanese knotweed and giant hogweed and soils containing particles of these plants are regarded as controlled waste.

20.2.5 Appropriate precautions shall be taken if materials containing asbestos are encountered. The Infraco shall observe the exposure limits and measurement methods for asbestos, set out in the Health & Safety Executive Guidance

Note EH 10 (2001), and shall also comply with Health & Safety Executive "*Guideline Note MS13 - Asbestos*" (2005), the Health & Safety Commission document "*Approved Code of Practice and Guidance Note Work with Asbestos Insulation, Asbestos Coating and Asbestos Insulating Board*" (2002), in so far as these are applicable to the Infraco Works.

21. PROTECTION OF THE WATER ENVIRONMENT

21.1 Waste Water and Run-off

21.1.1 A construction site drainage plan ("**CSDP**") shall be prepared, in consultation with SEPA. The Infraco shall be responsible for the preparation of the CSDP to address all of the approvals and consents which require to be obtained. Thereafter, the Infraco shall be responsible for the development of the CSDP to document the control measures and mitigation measures that shall be implemented. The CSDP shall include measures to ensure that surface water runoff is contained and managed appropriately and that appropriate measures are taken to prevent inundation of the Site. "Sustainable Urban Drainage System" **(**"**SUDS**") measures shall be included within the Infraco Works where reasonably practicable and applicable, in accordance with Law and the guidance in:

21.1.1.1 "*Interim Code of Practice for SUDS*" (CIRIA 2004);

21.1.1.2 "*Sustainable Urban Drainage System – Design Manual for Scotland and Northern Ireland*" (CIRIA C521); and

21.1.1.3 "*Sustainable Urban Drainage Systems – Best Practice Manual*" (CIRIA C523).

21.1.2 The Infraco shall implement and comply with the CSDP.

21.1.3 The Infraco shall ensure that there shall be no washout from temporary construction laydown and storage areas into watercourses.

21.1.4 No water shall be discharged into watercourses, but shall be stored in settlement lagoons or tanks, or filtered prior to discharge, or discharged onto a grassy area to soak away.

21.1.5 Waste water and site discharges to surface water or sewer shall only be permitted where the effluent quality and discharge location is acceptable to SEPA or Scottish Water (as appropriate). Water Environment (Controlled Activities) (Scotland) Regulations 2005 ("**CAR**") discharge authorisation shall be obtained by the Infraco if required prior to discharge.

21.1.6 The Infraco shall ensure that all treatment facilities are regularly inspected and maintained and that a full record is kept of inspection, maintenance and other measures to maintain equipment performance.

21.1.7 Approval from SEPA shall be obtained by the Infraco prior to any excavation below the water table, including any site de-watering and discharge. Contact should be made with SEPA at least one month prior to the relevant operation to establish the level of CAR authorisation required. Cut-off ditches may be used to prevent water from entering excavations.

21.1.8 The Infraco shall comply with BS 6031: 1981 "*Code of Practice for Earthworks*", regarding the general control of site drainage is so far as this is applicable to the Infraco Works.

21.1.9 The Infraco shall ensure that areas of exposed ground and stockpiles are minimised to reduce silty runoff. Geotextiles or other equivalent measures shall be used by the Infraco where necessary to prevent silty run-off from soil mounds close to watercourses.

21.1.10 The Infraco shall ensure that any water that has come into contact with contaminated materials is disposed of in accordance with the requirements of SEPA or Scottish Water (as appropriate).

21.1.11 The Infraco shall take suitable precautions to prevent the entry of pollutants into any bodies of water, and report any incidents to SEPA and Scottish Water.

21.1.12 Procedures for responding to potentially polluting incidents or inundation of the site by floodwaters shall be implemented in accordance with SEPA guidance (with reference to paragraph 21.6 below).

21.1.13 Cementicious mixtures are highly alkaline and corrosive and shall be prevented from entering watercourses and drains. The Infraco shall make

suitable provision for washing out ready mix concrete lorries, skips, concrete pumps and the like.

21.2 **Storage of Polluting Materials**

21.2.1 The Infraco shall make provision to ensure that oil drums and containers or other potential contaminants stored on the Site are properly isolated and bunded and that no oil or other contaminants are allowed to reach watercourses or groundwater, including aquifers. Oil storage containers (both fixed and mobile) with a 200 litre capacity or greater shall be stored in compliance with the Water Environment (Oil Storage) (Scotland) Regulations 2006, where applicable. Drip trays and other secondary containment measures shall be used by the Infraco where necessary to prevent spills during refuelling and operation of small static and mobile equipment. Storage locations for such materials shall be positioned away from watercourses. All surface water or other contaminated water which accumulates in bunds shall be removed by the Infraco by manually controlled positive lift pumps, and not by means of a gravity drain.

21.2.2 Refuelling shall be carried out by the Infraco in a designated area which is away from watercourses and drains.

21.2.3 Spill response kits containing equipment appropriate to the quantity and types of materials present on site shall be available for use by the Infraco in the event of a fuel spillage. Personnel shall be trained in their use.

21.3 **Protection of Aquifers**

21.3.1 The Infraco shall have due regard for protection of underlying aquifers and adhere to the SEPA "*Groundwater Protection Policy for Scotland*". In all instances, measures to ensure appropriate protection of aquifers shall be undertaken, subject to prior approval of SEPA. Prior approval shall be sought by the Infraco in writing, prior to commencement of the relevant Infraco Works.

21.4 **Control and Management of Foul Drainage**

21.4.1 Where permanent facilities are not accessible foul water and sewage effluents produced by the construction workforce shall be contained by temporary foul

drainage facilities. A licensed contractor engaged by the Infraco shall dispose of all foul water collected off-site.

21.5 **Infraco Works in the Vicinity of Water**

21.5.1 The Infraco shall take suitable precautions to prevent the entry of pollutants, including sediments and dusts, into any bodies of water, and report any incidents to SEPA.

21.5.2 Crossings of watercourses shall be constructed by the Infraco so as not to impede the flow, obstruct the movement of floodwater or exacerbate erosion of the channel and banks and shall require CAR authorisation from SEPA.

21.5.3 In watercourses which support migratory fish, Infraco Works shall be avoided during upstream and downstream fish migration, spawning, incubation and hatching periods.

21.5.4 Where bankside habitat is temporarily affected, it shall be reinstated by the Infraco to its original form on completion of the Infraco Works at that Work Site.

21.5.5 Areas of bankside adjacent to working areas shall be fenced off during construction to prevent damage to the banksides.

21.5.6 Stripping of surface vegetation near water by the Infraco shall be kept to a minimum. Exposed surfaces shall be seeded or reinstated by the Infraco with vegetation, as soon as is practical after construction in that working area is complete.

21.5.7 Where culverting is required as Temporary Works, such culverting shall be subject to CAR authorisation from SEPA. Culverting that is so authorised shall be designed by the Infraco and constructed to permit the passage of fish and other aquatic fauna under normal flow conditions.

21.6 **Guidance**

21.6.1 The Infraco shall comply with all relevant SEPA "pollution prevention" guidelines, including, but not necessarily limited to:

21.6.1.1 PPG1 General guide to the prevention of water pollution.

21.6.1.2	PPG2	Above ground oil storage tanks.
21.6.1.3	PPG3	The use and design of oil separators.
21.6.1.4	PPG4	Disposal of sewage where no mains drainage is available.
21.6.1.5	PPG5	Works in, near or liable to affect watercourses.
21.6.1.6	PPG6	Working at construction and demolition sites.
21.6.1.7	PPG7	Refuelling facilities
21.6.1.8	PPG8	Storage and disposal of used oils.
21.6.1.9	PPG13	High pressure water and steam cleaners.
21.6.1.10	PPG18	Control of spillages and fire fighting runoff.
21.6.1.11	PPG19	Garages and vehicle service centres.
21.6.1.12	PPG21	Pollution incident response planning.
21.6.1.13	PPG22	Dealing with spillages on roads.
21.6.1.14	PPG23	Maintenance of structures over water.
21.6.1.15	PPG26	Pollution prevention storage and handling of drums and intermediate bulk containers.

21.7 **Water Environment (Controlled Activity) (Scotland) Regulations 2005**

Without prejudice to the foregoing terms of this paragraph 21, the Infraco shall comply with the terms of CAR where relevant to the Infraco Works.

22. ECOLOGY

22.1 Encroachment into Wildlife Areas

22.1.1 The Infraco shall take all reasonably practicable measures to minimise harm to and disturbance of wildlife caused by noise and vibration, dust and other air pollution, including:

22.1.1.1 minimising habitat loss by keeping the working corridor and extent of working areas to the minimum necessary for the Infraco Works; removal of habitats and new planting shall be undertaken in consultation with Scottish Natural Heritage ("**SNH**"), **tie** and CEC;

22.1.1.2 fencing off adjacent habitat to prevent unnecessary incursion or damage; staff shall be made aware of the need to avoid damage to adjacent retained areas;

22.1.1.3 the reinstatement or replacement of areas of habitat disturbed during construction in areas not required for the Infraco Works on completion of the Infraco Works in accordance with the Landscape and Habitat Management Plan ("**LHMP**"). The Infraco shall be responsible for the preparation of the LHMP to address all of the approvals and consents which require to be obtained and thereafter, the Infraco shall be responsible for the development of the LHMP to document the control measures and mitigation measures that shall be implemented ; and

22.1.1.4 compliance with the guidelines set out in British Standard (BSI *Code of Practice for Earthworks* (BS6031) in relation to soil stripping, storage and placing.

22.1.2 Approval shall be obtained by the Infraco from **tie**, SNH, SEPA, Scottish Executive Environment Group Wildlife Habitats Division ("**SEEG WHD**") and CEC, for detailed method statements for any Infraco Works proposed in designated sites, including Special Protection Areas (SPA)/Ramsar sites, Sites of Special Scientific Interest (SSSI), Sites of Interest for Nature Conservation (SINC) and Wildlife Sites.

22.1.3 Applications for approval shall be made by the Infraco at least one calendar month prior to relevant Infraco Works commencing.

22.2 **Protected Species**

22.2.1 In advance of any Infraco Works, the Infraco shall employ suitably qualified professionals to check all working areas and any land within 30 metres of the boundary of the working area (unless there is a boundary with a private third party within the 30 metres, in which case no checks shall be taken within the

private land), or 100m from any piling operations or use of explosives for the presence of species protected by statute. Where protected species are identified, appropriate mitigation measures shall be agreed in advance with the relevant authorities and any appropriate licences obtained in accordance with any requirements for licensing. The Infraco shall implement any mitigation measures agreed in accordance with this paragraph 22.2.1.

22.2.2 Where any habitat has to be cleared in the breeding bird season, typically March to June or July for most species, the habitat must be checked prior to removal for the presence of nesting wild birds, their nests and eggs and young. If found, no habitat shall be removed until nesting is complete, or unless other suitable mitigation is agreed in advance between the Infraco and SNH.

22.2.3 The Infraco shall be responsible for obtaining a licence from SNH for any work that may cause disturbance to a badger or involves the damage or destruction of a sett. Licence applications shall be made for any Infraco Works within 10m, heavy machinery operating within 30m, and for piling or use of explosives within 100m, and no Infraco Works shall proceed until the required licences are obtained. Alternative setts shall be provided in the event of and in advance of any loss.

22.2.4 The Infraco shall be responsible for obtaining a licence from SEEG WHD for any work which may cause disturbance to otters or involve damage or destruction to an otter holt or lying up site or if any Infraco Works are proposed within 30m of an otter holt or lying up site. Alternative holts or lying up sites shall be provided in the event of and in advance of any loss.

22.2.5 The Infraco shall be responsible for ensuring that all bridges and other built structures and mature and dead trees within the working area shall be checked by a licensed bat handler for their use by roosting or hibernating bats prior to felling or other potentially damaging operations. If found, mitigation measures shall be agreed between the Infraco and SNH and SEEGWHD and implemented, including review of the design to seek ways of avoiding loss of the roost. If avoidance is not possible, a licence shall be applied for by the Infraco from SEEG WHD for disturbance to a European Protected Species and / or destruction or damage to a breeding site or resting place. Alternative roost sites shall be provided in advance of any loss. Any loss of feeding

habitat shall be compensated for by new habitat creation as detailed in the LHMP. All mitigation measures for protected species shall be installed by the Infraco as early as possible during the construction process so that use can be established at an early stage.

22.2.6 Where appropriate use of mitigation measures by target species will be positively encouraged using a variety of techniques e.g. feeding.

22.2.7 Permanent mitigation structures for protected species including mammal fencing and tunnels and artificial badger setts shall be checked during construction and approved on completion by a suitably qualified ecologist and reported to SNH. Should these structures not be to the required standard specified, remedial measures shall be taken by the Infraco .

22.2.8 Mitigation shall aim to compensate for loss of foraging specifically for badgers through creation of appropriate grassland and scrub habitat wherever possible within the Limits of Deviation in the Tram Legislation in line with the Civil Aviation Authority Advice Note 3 – "*Potential Bird Hazards from Amenity Landscaping and Building Design*".

22.2.9 The Infraco's personnel and personnel engaged by any Sub-Contractors shall be briefed by a suitably qualified professional on measures for protected species as part of site induction.

22.3 **Protection of Mature Trees**

22.3.1 For the purposes of this paragraph, "trees" are defined as trees with a diameter of over 10cm girth at a height of 1.5 m above ground level.

22.3.2 Loss of trees shall be avoided as far as reasonably practicable. The Infraco shall comply with the guidelines set out in British Standard (BS) 5837:1991 "Trees in Relation to Construction" insofar as these are reasonably practicable and applicable to the Infraco Works.

22.3.3 All tree surgery operations shall comply with the British Standard (BS) 3998 "*Recommendations for Tree Work*" and a method statement addressing safety of workers and the public shall be prepared and implemented.

22.3.4 Felling shall be carried out in accordance with the Forestry Commission document "*Forest and Water Guidelines 2004*", which relates to the influence

that woodland and trees can have on the freshwater environment, insofar as this is reasonably practicable and to the extent that they are applicable to the Infraco Works.

22.3.5 Prior to felling, the Infraco shall procure that trees suitable as bat roosts are checked by a licensed bat handler for roosting and hibernating bats, and should any be identified, mitigation measures shall be agreed by the Infraco with SNH and SEEG WHD and the Infraco shall obtain any relevant licences.

22.3.6 Woody material generated shall be retained on the Site as far as is reasonably possible and used as part of habitat creation measures.

22.3.7 Adverse effects on all trees within or in the vicinity of the Site shall be minimised by the adoption of suitable mitigation measures. These may include, but shall not be limited to, the following:

22.3.7.1 selective removal of lower branches in an approved manner, to reduce mechanical damage by construction plant;

22.3.7.2 control of construction activities to minimise compaction of the ground beneath the entire canopy of the tree; no heavy materials or plant shall be stored, and construction traffic movements shall be controlled, by fencing or other means, so as to minimise vehicle movement within the canopy;

22.3.7.3 the use of matting around the root zone to minimise soil compaction; and

22.3.7.4 the use of chestnut paling around the trunk to prevent damage.

22.4 **Tree Replacement**

Where trees are removed, damaged or die as a consequence of the Infraco Works, they shall be replaced by the Infraco by at least 2 trees for every one removed, which replacement trees shall be of similar or approved size and in a location as close as possible to the original position. All tree planting shall be agreed with **tie** and CEC, and shall be in accordance with the LHMP. The supply, storage, handling, planting and maintenance of new planting shall be undertaken in accordance with the appropriate British Standards, including, but not necessarily limited to;

22.4.1 (BS5837) "Trees in Relation to Construction";

22.4.2 (BS3998) "Recommendations for Tree Works"; and

22.4.3 (BS4428) "Code of Practice for General Landscape Operations (excluding hard surfaces)".

22.5 **Control of Invasive and Alien Species**

22.5.1 If any invasive alien species listed in Schedule 9, Part II of the Wildlife and Countryside Act 1981 (as amended), are identified along the route, including Japanese Knotweed (*Fallopia japonica*), Giant Hogweed (*Heracleum mantegazzianum*) or Himalayan Balsam (*Impatiens glandulifera*), a strategy shall be developed and implemented by the Infraco prior to the commencement of the Infraco Works to manage their presence. The strategy will ensure appropriate treatment of invasive alien species in advance of construction in accordance with approved methodology and will prevent the spread of the species within and outside the development area. The soil containing these species or plants thereof shall be dealt with as contaminated material and disposed of in accordance with paragraph 20.2 above;

22.5.2 The Infraco shall comply with the strategy for the control of invasive and alien species.

23. **ARCHAEOLOGY AND CULTURAL HERITAGE**

23.1 **Archaeological and Heritage Mitigation Plan**

23.1.1 In advance of the commencement of the Infraco Works, an "Archaeological and Heritage Mitigation Plan" ("**AHMP**") shall be prepared. The Infraco shall be responsible for the preparation of the AHMP to address all of the approvals and consents which require to be obtained and thereafter, the Infraco shall be responsible for the development of the AHMP to document the control measures and mitigation measures that shall be implemented. The AHMP will identify the level of mitigation proposed at each site of archaeological or historic significance (as defined by statute and/or Historic Scotland), taking into account the measures outlined in the Environmental Statements. These may include:

23.1.1.1 prior archaeological evaluation by trial excavations;

23.1.1.2 a detailed photographic record prior to construction;

23.1.1.3 a watching brief during construction;

23.1.1.4 a detailed standing building survey and salvage;

23.1.1.5 archaeological excavation;

23.1.1.6 preservation in situ;

23.1.1.7 further documentary research and archiving; or

23.1.1.8 other such measures as may be approved.

23.1.2 The Infraco shall implement and comply with the AHMP.

23.1.3 No development within or immediately adjacent to an area which is, in the opinion of **tie** and CEC, of known or suspected archaeological importance, shall commence until a scheme to deal with any archaeological remains on the Site has been submitted to and approved by **tie** and CEC and implemented. The Infraco shall apply for prior approval at least two calendar months in advance of the relevant Infraco Works commencing.

23.1.4 No development within or adjacent to an area which is designated as a Scheduled Ancient Monument shall commence without the Infraco confirming whether Scheduled Monument Consent is required from Historic Scotland, and where necessary obtaining such consent. The AHMP shall identify the Scheduled Ancient Monuments and Listed Buildings which shall be affected, and shall outline the Infraco Works that can take place in proximity to them and will detail the necessary mitigation.

23.1.5 All records obtained through the mitigation shall be lodged with the National Monuments Record of Scotland ("**NMRS**").

23.1.6 The AHMP shall outline the appropriate procedures that shall be followed should any significant archaeological remains be found during the pre-construction excavations.

23.1.7 Any archaeological works carried out on the Site by the Infraco shall be undertaken by a suitably qualified investigating body acceptable to **tie** and

CEC. The results shall be provided to the property owner and occupier and, in the case of scheduled or listed features, to **tie,** CEC and Historic Scotland.

23.1.8 The Infraco shall take all reasonable precautions to prevent employees, any Sub-Contractors, their employees, or any other persons from removing or damaging any fossils, coins, articles of value or antiquity, structures or other remains or any other thing of archaeological or historical interest during investigations and during all the Infraco Works. The AHMP shall outline the legal obligations placed on those who discover portable antiquities or disturb human remains.

23.1.9 The Infraco shall appoint a suitably qualified professional person to record the condition of all scheduled and listed buildings and structures or parts thereof, within or adjacent to the construction working areas which are identified as at risk from physical damage or vibration. This will have been carried out in accordance with the Institute of Field Archaeologists Standards and Guidance. The results shall be provided to the property owner and occupier and in the case of scheduled or listed features, to CEC and Historic Scotland.

23.1.10 At least one month prior to commencement of the relevant excavation works, a copy of each survey undertaken under paragraph 23.1.9 above shall be provided by the Infraco to **tie**, the property owner and occupier and, in the case of scheduled or listed features, to **tie**, CEC and Historic Scotland.

23.1.11 After the Infraco Works have been completed and at any time up to two years after the opening of the tram, the above parties may, upon providing **tie** or the Infraco with reasonable evidence of damage, request that a second defects survey is undertaken. Any damage which is identified as being caused by the Infraco Works shall be repaired within a reasonable time of identification at the expense of the Infraco to the reasonable satisfaction of the property owner and such that the property is returned to the standard of repair and stability existing before the Infraco Works commenced.

23.2 **Guidance**

23.2.1 All archaeological investigations, watching briefs or other activities shall be carried out in accordance with the following guidance from the Institute of

Field Archaeologists, particularly – but not necessarily limited to standards and guidance for:

23.2.2 field evaluation;

23.2.3 excavation;

23.2.4 archaeological watching brief;

23.2.5 archaeological investigation and recording of standing buildings or structures;

23.2.6 collection, documentation conservation and research of archaeological materials;

23.2.7 the IFA policy statement on Environmental Protection;

23.2.8 the IFA Code of Conduct; and

23.2.9 the British Archaeologists and Developers Liaison Group Code of Practice.

PART B - CODE OF MAINTENANCE PRACTICE

1. MANAGEMENT SYSTEMS

1.1 The Infraco shall implement and comply with the following management systems:

1.1.1 a "quality management system" in accordance with ISO 9001;

1.1.2 a "safety management system" in accordance with ISO 18001 or HSG65; and

1.1.3 an "environmental management system" in accordance with ISO 14001.

2. INSTRUCTION AND TRAINING

2.1 The Infraco shall ensure that its employees, Sub-Contractors, agents and others on the Edinburgh Tram Network for whom the Infraco has responsibility undertake a number of inductions. These shall comprise:

2.1.1 specific induction for the Maintenance Services (provided by the Infraco);

2.1.2 worksite and task-specific-induction including a method statement briefing and toolbox talk, (provided by the Infraco).

2.2 Its employees, Sub-Contractors, agents and others on the Edinburgh Tram Network for whom the Infraco has responsibility who have not received the induction, for example visitors, shall be escorted on Edinburgh Tram Network non-public areas at all times by a competent inducted person and receive a site briefing.

2.3 The Infraco shall maintain induction and training records in order that the Operator and **tie** can inspect them. These records shall identify the scope of the induction and training and the persons who received them.

3. SAFE SYSTEMS

3.1 Risk Assessments

3.1.1 The Infraco shall prepare risk assessments for all work activities being undertaken by its employees, Sub-Contractors, agents and others on the Edinburgh Tram Network for whom the Infraco has responsibility.

3.1.2 Each risk assessment shall include as a minimum the following details:

3.1.2.1 Document control

(a) document title and number;

(b) revision status;

(c) authorisation for use; and

(d) reference to supplementary documentation.

3.1.2.2 identification of any hazards (as a minimum they should address the following – access to the work site, security of the work site, interface with the public, potential for vandalism, interface with the tram system and interface with traffic);

3.1.2.3 identification of those who might be harmed, and how; and

3.1.2.4 an evaluation of the risks and, in relation to each risk, the control measures required to reduce the risk to an appropriate level.

3.2 Method Statements

3.2.1 The Infraco shall prepare method statements for all maintenance activities to be carried out by Infraco**.**

3.2.2 Each method statement shall include as a minimum the following details:

3.2.3 Document control

(a) document title and number;

(b) revision status;

(c) authorisation for use; and

(d) reference to supplementary documentation.

3.2.3.1 General information

(a) description and scope of work;

(b) location and boundaries (including sketch or site plan if appropriate); and

(c) access routes for personnel and materials and equipment.

3.2.3.2 Resources

(a) number and competences of personnel (including function and role);

(b) contacts; and

(c) lines of communication.

3.2.3.3 Details of work activities

(a) detailed work sequence;

(b) plant, equipment and tools to be used;

(c) personal protective equipment required;

(d) delivery requirements;

(e) wastes produced, and means of disposal; and

(f) inspection and testing requirements, including details of:

(i) acceptance criteria;

(ii) quality control checklists and record forms to be used;

(iii) frequencies of inspections and testing; and

(iv) documentation which is required prior to the issue of a handover checklist in accordance with Clause 52.2 of the Agreement.

3.2.3.4 Specific control measures

(a) permits and authorisations required; and

(b) temporary amended systems, subject to agreement with the Operator through the appropriate change control arrangements as developed and agreed between the Infraco, **tie** and the Operator during the mobilisation phase.

3.2.3.5 Emergency procedures

(a) Evacuation and rescue from locations where Infraco and Subcontractors are performing Maintenance Services.

(b) Interface with the Operator / Control Centre and Emergency Services.

3.2.3.6 Supplementary documentation

(a) risk assessments; and

(b) COSHH assessments.

3.2.4 The documentation referred to in paragraph 3.2.2 above shall be developed so that it is specific to the Maintenance Services. The Infraco shall ensure that revisions and updates can be identified .

3.2.5 The Infraco shall issue a copy of its procedure for the production of method statements and risk assessments to **tie** for approval.

3.3 Access Permit

3.3.1 The Infraco shall comply with the Operator's system, as developed and agreed between the Infraco, **tie** and the Operator during the mobilisation phase, for controlling access to undertake work activities as notified to the Infraco by **tie**, which shall require the Infraco to obtain an approved access permit ("**Access Permit**") from **tie** for works that will necessitate interruption or restriction of the Transport Services and all that are safety related.

3.3.2 In so far as not otherwise submitted pursuant to this Agreement, the Infraco shall submit a form for each required Access Permit ("**Access Permit Form**") which is required, in accordance with Clause 17.12 of this Agreement to **tie** in advance of access being required. In the event of emergency works or essential unplanned Maintenance Services a reduced period of notice can be applied in accordance with Clause 17.13 of the Agreement.

3.3.3 The Infraco shall advise **tie** of the persons within its organisation who are competent to authorise the Access Permit Forms.

3.3.4 Each Access Permit Form shall identify the risk assessments, method statements and permits to work which have been raised under the Infraco's safety management system.

3.3.5 Each Access Permit Form shall identify any requirements for system interruption or isolation.

3.3.6 The Infraco shall agree with **tie** the "start work date and time" and "stop work date and time" for each work activity or group of work activities to be included in each Access Permit.

3.3.7 The Infraco shall identify within each Access Permit Form any special control measures which require to be implemented including:

3.3.7.1 requirement for a temporary speed restriction;

3.3.7.2 requirement for alteration or disablement of traffic signals ;

3.3.7.3 traffic management requirements under Chapter 8 of the UK traffic signs manual for segregating the work sites from the operational Edinburgh Tram Network or road traffic; and

3.3.7.4 requirement to undertake works outwith the conditions included within the noise and vibration policy referred to in the Tram Legislation.

3.3.7.5 Temporary modifications. These are subject to Change Control agreement with the Operator.

3.3.8 On completion of the work activity or group of work activities, or the "stop work time" (which ever is sooner) the Infraco shall return the relevant Access Permit to **tie** for cancellation.

3.3.9 The Infraco's authorised persons shall be required to undergo training by **tie** (with the input of the Operator) in the operation of the Access Permit system.

3.4 Permits to Work

3.4.1 The Infraco shall implement a "permit to work" system for the following activities as a minimum:

3.4.1.1 breaking the ground;

3.4.1.2 hot works;

3.4.1.3 entry into confined spaces;

3.4.1.4 work affecting services;

3.4.1.5 access to live facilities; and

3.4.1.6 works on private land controlled by third parties.

3.4.2 The Infraco shall implement a procedure for managing third party permits to work (for whom the Infraco has responsibility).

3.4.3 The Infraco shall issue a copy of its permit to work procedures to **tie** for approval.

3.4.4 The Infraco shall advise the Operator and **tie** of the competent persons within its organisation who shall be competent to authorise permits to work.

3.5 Personal Protective Equipment

3.5.1 The Infraco shall provide all necessary personal protective equipment ("**PPE**") for its employees and provide them with all necessary information, instruction and training on its use.

3.5.2 The Infraco shall ensure that all persons on Infraco's Work Site (including any representatives of the Operator, **tie** and visitors) wear the necessary PPE.

3.5.3 **tie**'s specific requirements for PPE with regard to particular tasks are as follows:

3.5.3.1 yellow high visibility clothing to comply with BS EN 471:1994, which shall be worn at all times when working on the Edinburgh Tram Network or roads.

3.5.3.2 orange high visibility clothing complying with GO/RT 3279 shall be worn where any works are carried out on railway land.

4. REPORTING

4.1 The Infraco shall report the following information to the Operator and **tie** within 24 hours and as soon as reasonably practicable of the event occurring:

4.1.1 details of any accident or incident which requires notification to the Health & Safety Executive (the Infraco shall copy all notifications in full to the Operator and to **tie**);

4.1.2 details of any environmental event which requires notification to the Scottish Environmental Protection Agency ("**SEPA**");

4.1.3 details of any visit by either the Health & Safety Executive or SEPA, together with details of any report issued or enforcement action that resulted; and

4.1.4 details of any incidents or near misses.

4.2 The Infraco shall report the following information to **tie** and, if requested by **tie**, to any other relevant third party on a four weekly reporting cycle:

4.2.1 details of any accident investigation reports raised by **tie** including details of corrective and preventative actions which have been taken;

4.2.2 the accident frequency rate ("**AFR**") for the Maintenance Services (including details of total hours worked and number of persons employed);

4.2.3 a summary of the monitoring and internal auditing activities undertaken by the Infraco in the period, including details of any corrective or preventative actions raised or closed out; and

4.2.4 details of the programme of monitoring and auditing planned for the subsequent four-weekly period.

5. AUDITING AND MONITORING

5.1 The Infraco shall be responsible for carrying out and recording, auditing and monitoring of its maintenance work activities.

5.2 **tie** any other party reasonably requested by **tie** may undertake auditing and monitoring of the Infraco's maintenance work activities, and the Infraco shall action any findings which are raised **tie** or the relevant other party.

6. NON-CONFORMANCE, COMPLAINTS AND DISCIPLINARY MATTERS

6.1 **tie** shall implement a process for recording and processing breaches by the Infraco of the requirements of this Part B of Schedule 3 (*Code of Construction Practice and Code of Maintenance Practice*) and complaints.

6.2 The following represent a backstop, the Infraco response times are detailed in clause 52 of the Infraco Agreement and the target correction times for these events are contained in Section 40 of the Employers Requirements.

6.3 The Infraco shall take such steps as are required by **tie** to remedy any such infringement or address any such complaint and the following priority levels for action shall apply:

Level of Urgency	**Category of Notification**	**Required Response Time**
1	High urgency. Involves an immediate threat to persons or property or the circumstances otherwise require immediate rectification.	Immediate action required as detailed in Clause 52 of the Agreement. If response is not initiated and actions commenced to resolve the issue by the Infraco within 4 hours, **tie** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Infraco .
2	Medium urgency. No immediate threat to persons or property, but there is an impact o n the	Remedial action requires to be initiated and actions commenced to resolve the issue within 24 hours. If the Infraco does not take

Level of Urgency	Category of Notification	Required Response Time
	delivery of the Transport Services, require rectification within 24 hours.	this action, **tie** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Infraco .

If the Infraco fails to take any remedial action required by **tie** pursuant to the table above, **tie** shall be entitled to employ and pay other persons to carry out the same and all costs incurred by **tie** shall be recoverable from the Infraco by **tie** and may be deducted by **tie** from any monies due or to become due to the Infraco or, alternatively, recoverable from the Infraco as a debt

7. IDENTIFICATION

7.1 The Infraco shall ensure that all staff undertaking Maintenance Services are easily identifiable to the public by use of photo identity cards.

7.2 The Infraco shall ensure that all personnel undertaking maintenance activities identify their employer by means of their company logo on their high visibility and protective clothing and, if applicable to be worn according to the task being completed, on their safety helmet.

8. SITE ARRANGEMENTS

8.1 Site Housekeeping

8.1.1 A 'good housekeeping' policy shall be applied by the Infraco at all times; this shall include, but not necessarily be limited to, the following requirements:

8.1.1.1 all working areas shall be kept in a clean and tidy condition;

8.1.1.2 all working areas shall be a no-smoking area; specific areas within the Site shall be designated as smoking areas and shall be equipped with containers for smoking waste; these shall not be located at the boundary of the Site and adjacent to neighbouring land;

8.1.1.3 open fires shall be prohibited at all times;

8.1.1.4 all necessary measures shall be taken to minimise the risk of fire and the Infraco shall comply with the requirements of the local fire authority;

8.1.1.5 radios (other than two-way radios used for the purposes of communication related to the Maintenance Services) and other forms of audio equipment shall not be operated on the Site;

8.1.1.6 any waste susceptible to spreading by wind or liable to cause litter shall be stored in enclosed containers;

8.1.1.7 rubbish shall be removed at frequent intervals and the Site kept clean and tidy;

8.1.1.8 eating and drinking shall only be permitted within the Infraco's designated welfare area unless required due to the specific nature and location of the works being undertaken, in which case appropriate arrangements must be made;

8.1.1.9 adequate toilet facilities shall be provided for all maintenance staff;

8.1.1.10 food waste shall be removed frequently;

8.1.1.11 the Infraco's personnel (including any Sub-Contractors) shall be required to conform to a reasonable dress code;

8.1.1.12 any behaviour that is lewd or likely to cause offence shall not be permitted; and adequate supervision must be provided by Infraco with swift follow-up and disciplinary action taken in accordance with the Infraco disciplinary procedure of any breaches;

8.1.2 The Infraco shall inspect all working areas weekly or as otherwise agreed and shall provide a four weekly written report on compliance with paragraph 8.1.1 above. **tie** or any other party authorised by it may at reasonable times visit the Site without prior notice of time and place of the visit. Access to all areas of the Maintenance Services shall be given to visiting inspectors and the Infraco shall give inspectors all reasonable assistance during their Site inspection.

8.2 Temporary Fencing

8.2.1 The Infraco shall ensure that where appropriate, all working areas are sufficiently and adequately protected to prevent the public and animals from straying on to the working area;, A risk assessment shall determine the need for any temporary fencing around work sites.

8.2.2 All temporary fencing shall comply with Chapter 8 of the Roadworks and temporary situations (2006) Part 1 and 2.

All access and egress to worksites shall be via designated positions within the temporary fencing, which shall remain closed and secured when not in use.

8.2.3 All temporary fencing that creates poorly lit pedestrian routes shall have appropriate lighting fitted by the Infraco, and these shall be illuminated at all times when the adjacent street lighting is lit.

8.2.4 The Infraco shall ensure that the location and design of temporary fencing and temporary structures on the public road shall permit adequate visibility at junctions and proper forward visibility along the roads in accordance with the National Roads Directorate advice notes and the requirements of CEC.

8.2.5 All temporary fencing shall be maintained by the Infraco in a neat and tidy condition at all times, 24 hours, 7 days a week responding within a maximum of 1 hour to any reported problems with the temporary fencing.

8.2.6 The Infraco shall be expressly prohibited from displaying or allowing to be displayed any advertisement or notice including illicit bill or fly posting on the temporary fencing. The Infraco shall ensure that all graffiti, fly posting or defacement to the temporary fencing is removed and made good or obscured within 24 hours.

8.2.7 All temporary fencing shall be removed as soon as reasonably practicable after the completion of any part of the Maintenance Services.

8.3 Lighting and Visual Intrusion

8.3.1 Site lighting shall be positioned and directed by the Infraco so as to minimise nuisance to residents and to minimise distractions or confusion to passing drivers on adjoining public roads. This provision shall apply particularly to

working areas where work after dark will be carried out and the Infraco shall provide appropriate lighting for these sites. Lighting shall be removed as soon as is consistent with the safe and efficient operation of each Work Site.

8.3.2 So far as is reasonably practicable, all power to temporary traffic signals, lighting and the like shall be taken from mains supplies rather than portable generators. Where portable generators are used to provide power to temporary traffic signals, lighting and the like the Infraco shall ensure Good Industry Practice is followed to minimise noise and pollution from such generators.

8.3.3 The Infraco shall comply with the Institute of Lighting Engineers' document *Guidance Notes on Reduction of Light Pollution 2000* in so far as is reasonably practicable and applicable to the Infraco .

8.4 Access and Loading

8.4.1 The Infraco shall ensure that lorries shall enter and exit the Site in a forward direction at designated locations, except where space restriction does not permit this. If the reversing of vehicles into public spaces is required, then a responsible person observing the rear of the vehicle shall properly control the movement. The sounding of audible reversing alarms shall not be permitted outside normal working hours, except where this has been approved by **tie** and CEC in connection with the Maintenance Services, such approval not unreasonably withheld. Entry and exit conditions shall be subject to prior approval by **tie**, CEC and the Lothian and Borders Police before implementation.

8.4.2 Access to and egress from the Site shall be carried out by initiating a left turn wherever reasonably practicable.

8.4.3 All loading and unloading of vehicles shall take place off the public road as far as is reasonably practicable.

8.5 **Living Accommodation**

8.5.1 No living accommodation shall be provided by the Infraco within any maintenance working area. Mess rooms, locker rooms, toilets and showers shall be permitted at designated positions agreed with **tie**.

8.6 Clearance of Maintenance Work Site on Completion

8.6.1 The Infraco shall clear and clean all working areas and accesses as work proceeds and when no longer required for the carrying out of the Maintenance Services.

8.6.2 All surplus materials, rubbish, Temporary Works, Infraco's Equipment, and temporary fencing shall be removed, and the surface of the ground restored as near as reasonably practicable to its original condition, or to such condition as has previously been agreed with **tie** in accordance with this Agreement.

8.7 Pest Control

8.7.1 The Infraco shall ensure that the risk of infestation by pests or vermin is minimised by adequate arrangements for the disposal of food waste or other material attractive to pests. If infestation occurs, the Infraco shall take such action to deal with it as required by **tie**.

9. REQUIREMENTS RELATING TO WORKS AFFECTING EDINBURGH AIRPORT

9.1 The Infraco shall have regard to, and comply (where relevant) with all BAA and CAA guidelines when working on or adjacent to Edinburgh Airport.

9.2 For Maintenance Services to be carried at Edinburgh airport, the Infraco shall prepare for approval by **tie** and any other party reasonably requested by **tie** a "Construction Management Strategy" as defined within CAA Safeguarding of Aerodromes Advice Note 4 (Cranes and Other Construction Issues). The Construction Management Strategy shall address as a minimum the following issues:

9.2.1 use of cranes or other tall construction equipment;

9.2.2 control of activities likely to produce dust or smoke clouds

9.2.3 the design of temporary lighting to avoid distracting pilots (see CAA Safeguarding of Aerodromes Advice Note 2 Lighting near Aerodromes);

9.2.4 storage of materials, particularly compliance with height limits;

9.2.5 control and disposal of waste, to prevent attraction of birds; and

9.2.6 site restoration, to prevent attraction of birds.

10. REQUIREMENTS RELATING TO WORKS AFFECTING THE RAILWAY

10.1 The Infraco, where working in proximity to Network Rail infrastructure, shall comply with the reasonable requirements of Network Rail necessary in relation to railway safeguarding and at all times keep **tie** and the Operator informed of any and all dealings with Network Rail.

11. REQUIREMENTS RELATING TO WORKS AFFECTING OTHER THIRD PARTIES

11.1 The Infraco shall comply with the reasonable requirements of other affected third parties in relation to procedural requirements e.g. notifications, implementation of Permit to Work systems as defined within Third Party Agreements or as may be reasonably required by **tie**.

12. ROADS AND FOOTPATHS, CYCLEWAYS AND BRIDLEWAYS

12.1 General

12.1.1 The measures to be taken with respect to traffic and road safety shall include, but not necessarily be limited to:

12.1.1.1 use of TTROs; the Infraco shall consult with **tie** and other third parties notified by **tie** on the arrangements for agreeing and implementing TTROs to facilitate road closures and the like; the use of TTROs shall take into account the requirement for, and availability of, suitable alternative routes;

12.1.1.2 use of temporary signing to restrict vehicle types and sizes and define routes for construction traffic;

12.1.1.3 use of appropriate temporary signing and lighting wherever the Maintenance Services are in progress to ensure the safety of all road users; and

12.1.1.4 preparation and implementation of a programme agreed by the Infraco with **tie** and CEC for road closures and temporary traffic signal arrangements.

12.2 Temporary Road Closures And Diversions

12.2.1 The Infraco shall finalise the arrangements for required closures and diversions of specified roads, footpaths and cycle ways with **tie**, the Operator, CEC and where roads, footpaths and cycle ways at Edinburgh Airport, BAA, any private landowner or relevant bus operator.

12.2.2 Before closing or otherwise interfering with any street or footpath to which the public has access, the Infraco shall make such arrangements with **tie**, and if requested by **tie**, with the Operator and CEC as may be reasonably necessary to cause as little interference with the traffic in that street or footpath during the Maintenance Services as shall be reasonably practicable.

12.2.3 Pedestrian access to properties shall be maintained at all times where reasonably practicable, unless otherwise agreed with **tie**, and if requested by **tie**, with the Operator and CEC and the owners and tenants of affected properties. Access to and from public facilities shall be maintained at all times unless otherwise agreed with the relevant administrating bodies.

12.2.4 Wherever the Maintenance Services interfere with the existing public or private roads or other ways over which there is a public or private right of way for any traffic, the Infraco shall construct diversion ways as necessary. The standard of construction and lighting shall be suitable in all respects for the class or classes of traffic using the existing ways and the widths of the diversions shall not be less than that of the existing way unless otherwise agreed with the Infraco, and, if requested by **tie**, with the Operator and CEC or the owner of the private road.

12.2.5 Such necessary diversion routes shall be constructed in advance of any interference with the existing ways, shall be kept as short as reasonably practicable and shall be maintained by the Infraco to provide adequately for the traffic flows. All diversion routes shall be removed and the road returned to **tie** and CEC as soon as is reasonably practical after completion of the Maintenance Services. Liaison shall be undertaken with **tie** and CEC regarding any special events such as the Edinburgh Festival, Christmas, New Year, sporting events and filming which might interact with the diversions.

12.2.6 Adequate horizontal clearance of 0.6 metres minimum shall be provided from the kerb line, to avoid fouling by vehicles. The minimum headroom beneath any projection over the road shall be 5.3 metres.

12.3 Parking Provision for Construction Traffic

12.3.1 Areas and locations of parking provision for site and construction traffic shall be agreed by the Infraco with **tie** and CEC prior to the commencement of the Maintenance Services.

12.4 Maintenance and Repair of the Road

12.4.1 The Infraco shall take every reasonable precaution to prevent its operations from unnecessarily damaging the roads and footpaths within the Site and in the vicinity of the Maintenance Services.

12.4.2 The Infraco shall carry out all Maintenance Services as are necessary to maintain the roads and footpaths affected by the Maintenance Services in a safe and serviceable condition to the reasonable satisfaction of **tie**, the Operator and CEC.

12.4.3 Reinstatements of the road shall be carried out in accordance with the RAUC(S) "*Specification for the Reinstatement for Openings of Roads*", October 2003.

12.5 Existing Street Furniture

12.5.1 No street furniture or other features within the vicinity of the Site and the Maintenance Services, but outwith the area covered by the Tram Legislation shall be unnecessarily disturbed or altered by the Maintenance Services. Any damage to street furniture consequent upon construction activities connected with the Maintenance Services shall be reported to **tie** and the appropriate owner or authority (unless the appropriate owner cannot be identified) immediately on discovery of the damage. Any damage shall be replaced or made good as soon as practicably possible and to the reasonable satisfaction of the owner of the street furniture or other feature.

12.5.2 Any street furniture or other obstructions outside the area to be occupied by the Infraco but which are required to be moved in order to gain access to the Maintenance Services shall, subject to the prior consent of the owner thereof,

be removed and reinstated or replaced as appropriate, on completion of the Maintenance Services. Any costs associated therewith shall be borne by the Infraco, including the costs of reinstatement or replacement.

12.6 Vehicle Movements and Access to the Site

12.6.1 The Infraco and its Sub-Contractors and suppliers moving loads, construction plant, materials and spoil (including vehicles used for carrying such when empty) shall limit the use of the public roads for such purposes as far as reasonably practicable.

12.6.2 All access routes shall be agreed with **tie** and CEC prior to the commencement of the relevant part of the Infraco Works.

12.6.3 Access (which is deemed to include both the route and entrance to any Work Site) by lorries shall be as agreed with **tie**, CEC and the Lothian and Borders Police. Access to and egress from the Site shall be carried out by initiating a left turn wherever reasonably practicable.

12.6.4 All vehicles operating on the Site shall be fitted with roof mounted yellow flashing beacons and reversing alarms and subject to Clause 8.4.1 these shall be used.

12.6.5 The Infraco shall take all reasonable measures to ensure that delivery vehicles do not remain stationary on the road unnecessarily prior to entering the Site. In exceptional circumstances, for example where the Site is very constrained, it may be necessary to have the potential for a limited number of vehicles to stand on the road. The location of such standing areas their size and the duration of any standing periods shall be subject to prior agreement with **tie,** CEC and the Lothian and Borders Police.

12.6.6 The Infraco shall ascertain and comply with any restrictions in respect of abnormal load routes as they may affect access to the Site.

12.7 Provision, Erection and Maintenance of Traffic Safety and Control (Traffic Safety Measures)

12.7.1 The Infraco shall provide, erect and maintain such traffic signs, road markings, lamps, barriers and traffic control signals and such other measures as may be necessitated by Maintenance Services in accordance with the requirements of the Agreement and to the approval of **tie**, the Operator and

CEC. The Infraco shall not commence any work which affects the public road until all traffic safety measures necessitated by the work are fully operational.

12.7.2 The Infraco shall keep clean and legible at all times all traffic signs, road markings, lamps, barriers and traffic control signals and shall position, replace, reposition, cover or remove them as required by the progress of the Maintenance Services and to the reasonable requirements of **tie**, the Operator and CEC.

12.7.3 The Infraco shall ensure that all barriers, footpath space and temporary footpaths (including the requirement for kerb ramps where use has to be made of the carriageway) shall comply with the requirements of the document *Inclusive Mobility A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure* issued by the Mobility and Inclusion Unit of the Department for Transport.

12.7.4 Where portable generators are used to provide power to temporary traffic signals, lighting and the like the Infraco shall ensure Good Industry Best practice be followed to minimise noise and pollution from such generators.

12.8 Implementation of the Closure of Roads and Access to Frontages

12.8.1 The Infraco shall not close any roads or private accesses until immediately before the area is required for undertaking the Maintenance Services in accordance with this Agreement and the Maintenance Programme. The Maintenance Services shall follow in the area of a temporary closure expeditiously and shall be carried out efficiently and in a continuous manner to ensure that all temporary closures are re-opened as quickly as possible.

12.8.2 The Infraco shall, in carrying out the Maintenance Services, take all reasonable precautions to prevent or reduce any disturbance or inconvenience to the owners, tenants or occupiers of adjacent properties, and to the public generally. The owners, tenants or occupiers of affected properties shall be informed of the Maintenance Services to be undertaken, their planned duration, road and access closures and alternative access routes (where required) in writing and by locally posted public notices at least one calendar month prior to work starting.

12.8.3 The Infraco shall render all necessary assistance to occupiers of premises affected by the Maintenance Services so as to enable them to accept and send out deliveries to and from their premises during their normal working hours.

12.9 Access for Emergency Vehicles

12.9.1 During Maintenance Services involving any likely disruption to roads and access routes the Infraco shall propose suitable access routes for emergency service vehicles and personnel to gain access to the Edinburgh Tram Network. These shall be agreed by the Infraco with **tie**, Emergency Services, the Operator and CEC prior to the start of the Maintenance Services.

13. NOISE

13.1 Noise Control

13.1.1 The Infraco shall take all reasonably practicable measures to minimise nuisance from noise.

13.2 Communications Regarding Noise

13.2.1 Except in the case of emergency work, the Infraco shall give seven days notice to local residents who may be adversely affected by noise from the proposed programme of Maintenance Services, providing a description of the work to be carried out, measures that will be taken to control noise or other disturbance, and the proposed hours of working.

14. VIBRATION

14.1 Vibration Control

14.1.1 The Infraco shall take all reasonably practicable measures to minimise damage caused due to vibration.

15. DUST AND AIR POLLUTION

15.1 Dust and Other Air Pollution

15.1.1 The Infraco shall take all necessary measures to avoid creating a dust nuisance during the Maintenance Services.

15.1.2 Particular consideration shall be given by the Infraco to works affecting the operations of Edinburgh Airport Limited. Details of the specific mitigation measures shall be included within the Construction Management Strategy identified under paragraph 9.2 above.

15.1.3 Measures to prevent dust shall include the following:

15.1.3.1 the hard surfacing of heavily used areas which will be kept clean by regular brushing and water spraying;

15.1.3.2 control of dust released from cutting or grinding of materials on the Maintenance Services;

15.1.3.3 the complete sheeting of all vehicles carrying dusty materials;

15.1.4 Where dust generating works are undertaken close to buildings so that there is soiling of windows and ledges with dust, the Infraco shall clean such windows and ledges as frequently as is necessary (and as a minimum, at least once per week) during periods of dust generating work and on completion of the Maintenance Services at that location. The Infraco shall take precautions to prevent damage occurring as a consequence of cleaning works.

15.1.5 The Infraco shall take precautions to prevent the emission of smoke or fumes from vehicles and plant. Vehicles and plant shall be well maintained and measures shall be taken by the Infraco to ensure that engines and motors are not left running for long periods when not directly in use.

16. DISPOSAL OF WASTE AND CONTAMINATED MATERIALS

16.1 Waste

16.1.1 A waste management plan ("**WMP**") shall be developed in accordance with "*Site Waste Management Plans: Guidance for Contractors and Clients*" (DTI 2004). The Infraco shall be responsible for the preparation of the WMP to address all of the approvals and consents which require to be obtained and the control measures and mitigation measures that shall be implemented. The WMP shall be subject to the approval of **tie**. The WMP shall in particular identify:

16.1.1.1 responsibilities for waste management;

16.1.1.2 the types and quantities of waste materials likely to be generated;

16.1.1.3 measures to be taken to minimise generation of waste;

16.1.1.4 proposals for recycling and/or re-use;

16.1.1.5 measures to be adopted for management of waste on the Site including enclosure, segregation, secure storage, sorting for recovery, and other on-site handling;

16.1.1.6 proposed treatment and disposal routes; and

16.1.1.7 licensing arrangements.

16.1.2 The Infraco shall implement and comply with the WMP.

16.1.3 The Infraco shall undertake monthly assessments to demonstrate compliance with Statutory Requirements and the WMP. The Infraco shall set out its assessment programme in the WMP and shall provide copies of the assessment report to the Operator and **tie**.

17. PROTECTION OF THE WATER ENVIRONMENT

17.1 Waste Water and Run-off

17.1.1 The Infraco shall ensure that by means of well maintained interceptors or other suitable means there shall be no contamination of run-off water by the Maintenance Services that makes its way into watercourses.

17.1.2 No water shall be discharged into watercourses, but shall be filtered prior to discharge, or discharged onto a grassy area to soak away.

17.1.3 Waste water and site discharges to surface water or sewer shall only be permitted where the effluent quality and discharge location is acceptable to SEPA or Scottish Water (as appropriate). Water Environment (Controlled Activities) (Scotland) Regulations 2005 ("CAR") discharge authorisation shall be obtained by the Infraco if required prior to discharge.

17.1.4 The Infraco shall take suitable precautions to prevent the entry of pollutants into any bodies of water, and report any incidents to SEPA and Scottish Water.

17.1.5 Procedures for responding to potentially polluting shall be implemented in accordance with SEPA guidance.

17.2 Storage of Polluting Materials

17.2.1 The Infraco shall make provision to ensure that oil drums and containers or other potential contaminants are properly isolated and bunded and that no oil or other contaminants are allowed to reach watercourses or groundwater, including aquifers. Oil storage containers (both fixed and mobile) with a 200 litre capacity or greater shall be stored in compliance with the Water Environment (Oil Storage) (Scotland) Regulations 2006 (where applicable). Drip trays and other secondary containment measures shall be used by the Infraco where necessary to prevent spills during refuelling and operation of small static and mobile equipment. Storage locations for such materials shall be positioned away from watercourses. All surface water or other contaminated water which accumulates in bunds shall be removed by the Infraco by manually controlled positive lift pumps, and not by means of a gravity drain.

17.2.2 Refuelling shall be carried out by the Infraco in a designated area which is away from watercourses and drains.

17.2.3 Spill response kits containing equipment appropriate to the quantity and types of materials present on site shall be available for use by the Infraco in the event of a fuel spillage. Personnel shall be trained in their use.

17.3 Works in the Vicinity of Water

17.3.1 The Infraco shall take suitable precautions to prevent the entry of pollutants, including sediments and dusts, into any bodies of water, and report any incidents to SEPA.

17.4 Water Environment (Controlled Activity) (Scotland) Regulations 2005

Without prejudice to the foregoing terms of this paragraph 17, the Infraco shall comply with the terms of CAR where relevant to the Infraco.

18. ECOLOGY

18.1 Encroachment into Wildlife Areas

18.1.1 The Infraco shall take all reasonably practicable measures to minimise harm to and disturbance of wildlife caused by noise and vibration, dust and other air pollution.

18.1.2 Approval shall be obtained by the Infraco from Scottish Natural Heritage, SEPA, Scottish Executive Environment Group Wildlife Habitats Division ("**SEEG WHD**") and CEC, for detailed method statements for any Maintenance Services proposed at designated sites, including Special Protection Areas ("**SPA**")/'Ramsar' sites, Sites of Special Scientific Interest ("**SSSI**"), Sites of Interest for Nature Conservation ("**SINC**") and wildlife sites.

18.1.3 Where reasonably practicable, applications for approval shall be made by the Infraco at least one calendar month prior to relevant Maintenance Services commencing.

18.2 Protected Species

18.2.1 In advance of any disruptive to the environment non-routine works, the Infraco shall employ suitably qualified professionals to check all working areas and any land within 30 metres of the boundary of the working area (unless there is a boundary with a private third party within the 30 metres, in which case no checks shall be taken within the private land) for the presence of species protected by statute. Where protected species are identified, appropriate mitigation measures shall be agreed between the Infraco and the relevant authorities.

18.2.2 Where any habitat has to be cleared in the breeding bird season, typically March to June or July for most species, the habitat must be checked by the Infraco prior to removal for the presence of nesting wild birds, their nests and eggs and young. If found, no habitat shall be removed until nesting is complete, or unless other suitable mitigation is agreed in advance between the Infraco and Scottish Natural Heritage.

18.2.3 The Infraco shall be responsible for obtaining a licence from Scottish Natural Heritage for any non-routine work that may cause disturbance to a badger or

involves the damage or destruction of a sett. Licence applications shall be made by the Infraco for any works within 10m, heavy machinery operating within 30m, and no works shall proceed until the required licences are obtained.

18.2.4 The Infraco shall be responsible for obtaining a licence from SEEG WHD for any non-routine work which may cause disturbance to otters or involve damage or destruction to an otter holt or lying up site or if any Maintenance Services are proposed within 30m of an otter holt or lying up site.

18.2.5 The Infraco shall be responsible for ensuring that all bridges and other built structures and mature and dead trees within the working area shall be checked by a licensed bat handler for their use by roosting or hibernating bats prior to felling or other potentially damaging operations. If found, mitigation measures shall be agreed between the Infraco, Scottish Natural Heritage and SEEG WHD and implemented, including review of the design to seek ways of avoiding loss of the roost. If avoidance is not possible, a licence shall be applied for by the Infraco from SEEG WHD for disturbance to a European Protected Species and / or destruction or damage to a breeding site or resting place. Alternative roost sites shall be provided in advance of any loss. Any permanent loss of feeding habitat shall be discussed between the Infraco and **tie** and agreement shall be reached as to how to compensate for by providing new habitat creation as detailed in the landscape and habitat management plan prepared and issued to the Infraco by **tie**.

18.2.6 Where appropriate use of mitigation measures by target species will be positively encouraged using a variety of techniques e.g. feeding.

18.2.7 The Infraco's personnel and personnel engaged by any Sub-Contractors shall be briefed by a suitably qualified professional on measures for protected species as part of site induction.

18.3 Protection of Mature Trees

18.3.1 For the purposes of this paragraph, "trees" are defined as trees with a diameter of over 10cm girth at a height of 1.5 m above ground level.

18.3.2 All tree surgery operations shall comply with the British Standard (BS) 3998 "*Recommendations for Tree Work*" and a method statement addressing safety of workers and the public shall be prepared by the Infraco and implemented.

18.3.3 Felling shall be carried out in accordance with the Forestry Commission document "*Forest and Water Guidelines 2004*", which relates to the influence that woodland and trees can have on the freshwater environment, insofar as this is reasonably practicable and to the extent that they are applicable to the Maintenance Services.

18.3.4 Prior to felling, the Infraco shall procure that trees suitable as bat roosts shall be checked by a licensed bat handler for roosting and hibernating bats, and should any be identified, mitigation measures shall be agreed by the Infraco with Scottish Natural Heritage and SEEG WHD and the Infraco shall obtain any relevant licences.

18.3.5 Woody material generated shall be retained on the site as far as is reasonably possible and used as part of habitat creation measures.

18.4 Control of Invasive and Alien Species

18.4.1 If any invasive alien species listed in Schedule 9, Part II of the Wildlife and Countryside Act 1981 (as amended), are identified along the route, including Japanese Knotweed (*Fallopia japonica*), Giant Hogweed (*Heracleum mantegazzianum*) or Himalayan Balsam (*Impatiens glandulifera*), the Infraco shall develop a strategy to manage their presence. The strategy will ensure appropriate treatment of invasive alien species in accordance with approved methodology and will prevent the spread of the species within and outside the Edinburgh Tram Network

18.4.2 The Infraco shall comply with the DEFRA document "*Helping to Prevent the Spread of Invasive Non-native Species, Horticultural Code of Practice*" (March 2005), in so far as this is reasonably practicable and applicable to the Maintenance Services. Invasive alien species listed on Schedule 9, Part II of the Wildlife and Countryside Act 1981 as amended by the Nature Conservation (Scotland Act) 2004, will be treated in accordance with the Environmental Protection Act 1990. Japanese knotweed and giant hogweed and soils containing particles of these plants are regarded as controlled waste.

THIS IS SCHEDULE PART 4 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 4

PRICING

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1.0 GENERALLY

1.1 The Infraco Construction Works Price is detailed in Appendix A to this Schedule Part 4.

1.2 The Construction Works Price is on a lump sum basis that is fixed until completion of the Infraco Works and not subject to variation except in accordance with the provisions of this Agreement.

1.3 This Part 4 of the Schedule sets out the various categories of items that may be subject to change, together with a mechanism for adjustment of the Contract Price including the Construction Works Price.

1.4 No provision within this Part 4 of the Schedule shall entitle the Infraco to more than one payment for any item or other entitlement under the Infraco Contract.

1.5 References to clause numbers in Part 4 of this Schedule are to clauses in the Infraco Contract unless otherwise stated.

1.6 All rates, lump sums and the like contained in this Schedule Part 4 are exclusive of Value Added Tax and are in Pounds Sterling.

2.0 DEFINITIONS USED IN THIS SCHEDULE

2.1 "**Archaeological Officer**" means the archaeological officer appointed by CEC from time to time.

2.2 The "**Base Case Assumptions**" means the Base Date Design Information, the Base Tram Information, the Pricing Assumptions and the Specified Exclusions.

2.3 The "**Base Date Design Information**" means the design information drawings issued to Infraco up to and including 25th November 2007 listed in Appendix H to this Schedule Part 4.

2.4 The "**Base Tram Information**" means the information contained in Tram Supplier's technical response in relation to the Employer's Requirements and in the Tram Supply Agreement (including, for the avoidance of doubt Schedule 23 of the Tram Supply Agreement (Tram Technical Information Data Version 11)

2.5 The "**Contract Price**" comprises capital expenditure and revenue expenditure as follows:

	£
Construction Works Price	238,607,664
SDS Price (as defined in the SDS Agreement and the Novation Agreement)	3,308,815
SDS Provisional Sums (as set out in Appendix 4 to SDS Novation Agreement)	
Extended Construction Support	1,000,000
Design Support Team	675,000
Tram Supply Price (as defined in the Tram Supply Agreement)	55,781,634
Infraco Maintenance Mobilisation	1,782,292
Tram Maintenance Mobilisation	2,275,806
Infraco Spare Parts	1,013,090
Total of capital expenditure	**£304,444,301**

Revenue expenditure comprises amounts payable to the Infraco from the Service Commencement Date.

2.6 "**Defined Provisional Sum**" means a sum included in the Construction Works Price which is provisional but for which Infraco has deemed to have made a provisional allowance for programming and planning (but not Preliminaries).

2.7 "**Issued for Construction Drawings**" shall have the meaning as used in Schedule Part 1 (*Definitions and Interpretations*).

2.8 A "**Notified Departure**" is where now or at any time the facts or circumstances differ in any way from the Base Case Assumptions save to the extent caused by a breach of contract by the Infraco, an Infraco Change or a Change in Law.

2.9 "**Pricing Assumptions**" means the assumptions in respect of the Contract Price as noted in Section 3.4 below.

2.10 "**Specified Exclusions**" means items for which Infraco has made no allowance within the Construction Works Price as noted in Section 3.3 below.

2.11 "**Traction Power Simulation Modelling**" means the technical modelling simulation prepared by the Infraco dated 2 April 2008, reference TSELEN2/484.01r04/STS.

2.12 An "**Undefined Provisional Sum**" means a sum included in the Construction Works Price which is provisional but for which Infraco has not deemed to have made due allowance for programming, planning and pricing Preliminaries.

3.0 CONSTRUCTION WORKS PRICE

3.1 The Construction Works Price is a lump sum, fixed and firm price for all elements of work required as specified in the Employer's Requirements as Schedule Part 2 and the Infraco Proposals as Schedule Part 31 and is not subject to variation except in accordance with the provisions of this Agreement.

3.2.1 It is accepted by **tie** that certain Pricing Assumptions have been necessary and these are listed and defined in Section 3.4 below. The Parties acknowledge that certain of these Pricing Assumptions may result in the notification of a Notified Departure immediately following execution of this Agreement. This arises as a consequence of the need to fix the Contract Price against a developing factual background. In order to fix the Contract Price at the date of this Agreement certain Pricing Assumptions represent factual statements that the Parties acknowledge represent facts and circumstances that are not consistent with the actual facts and circumstances that apply. For the avoidance of doubt, the commercial intention of the Parties is that in such circumstances the Notified Departure mechanism will apply.

3.3 Specified Exclusions from the Construction Works Price are:

a) Utilities diversions (including both the diversion of Utilities and the diversion of any other utilities) and protective works associated with utilities save for the Defined Provisional Sums for those utilities diversions that are to be undertaken by Infraco.

b) Work in connection with the St Andrew Square public realm project beyond the tram works. For the avoidance of doubt Tramstops, trackform, track bed, OHLE, road surface refurbishing, associated systems and link works together with any other work shown on the Base Case Design Information are included.

c) Ground conditions that require works that could not be reasonably foreseen by an experienced civil engineering contractor based on the ground conditions reports provided to BBS on 20th and 27th of November and 6th December 2007. Additionally the Constructions Works Price does not include for dealing with replacement of any materials below the earthworks outline or below ground obstructions/voids, soft material or any contaminated materials.

d) Bernard Street public realm project as information provided to Infraco on 28th November 2007.

3.3.1 In the event that the Infraco is required to carry out any of the Specified Exclusions, this shall be a Notified Departure.

3.4 Pricing Assumptions are:

1 The Design prepared by the SDS Provider will not (other than amendments arising from the normal development and completion of designs):

1.1 in terms of design principle, shape, form and/or specification be amended from the drawings forming the Base Date Design Information (except in respect of Value Engineering identified in Appendices C or D to this Schedule Part 4);

1.2 be amended from the scope shown on the Base Date Design Information and Infraco Proposals as a consequence of any Third Party Agreement (except in connection with changes in respect of Provisional Sums identified in Appendix B); and

1.3 be amended from the drawings forming the Base Date Design Information and Infraco Proposals as a consequence of the requirements of any Approval Body.

For the avoidance of doubt normal development and completion of designs means the evolution of design through the stages of preliminary to construction stage and excludes changes of design principle, shape and form and outline specification.

2 Design delivery by the SDS Provider has been aligned with the Infraco construction delivery programme as set out in Schedule Part 15 (*Programme*).

3 The Deliverables prepared by the SDS Provider prior to the date of this Agreement comply with the Infraco Proposals and the Employer's Requirements.

4 That the Design Delivery Programme as defined in the SDS Agreement is the same as the programme set out in Schedule Part 15 (*Programme*).

5 That the Infraco shall not suffer any loss and expense of whatever nature as a consequence of any matter identified in the "Assumptions and Constraints Report" in Appendix 2 of the SDS Novation Agreement, including without prejudice to the foregoing generality the following:

5.1 the modifications to the SDS Provider's design process and approvals and consents periods;

5.2 any assumptions or dependencies;

5.3 any matter identified as being at the risk of **tie** or subject to instruction from **tie**;

5.4 any instruction issued by **tie**;

5.5 subject to Clause 10.18, any acceleration (save where Infraco itself decides to accelerate); or

5.6 any strategy.

6 That the tram fleet shall comprise 27 Trams.

7 That the Trams meet the DKE parameters mentioned in the track alignment criteria document (ULE90130-SW-SPN-00001 v2.1).

8 There shall be no impact on the traction power supply system (as demonstrated by the power simulation modelling) as a consequence of a change to the input parameters used in the Traction Power Simulation Modelling.

9 Except for normal development and completion of designs (as defined in 1 above), there shall be no changes to the design resulting from the impact of the kinematic envelope of the Trams on the civils design.

10 The Urban Traffic Controls (UTC) will allow and have no adverse impact on the Tram operations including run time and punctuality of services as set out in the Employer’s Requirements.

11 That in carrying out the Infraco Works in accordance with this Agreement, it shall not be necessary to undertake any works outwith the "Earthworks Outline" (as

defined in paragraph 3.6 below). The Infraco shall not encounter any below ground obstructions or voids, soft material or any contamination however the price for excavation and earthworks is inclusive of any differences between differing sub-soils that may prevail within the Earthworks Outline.

12 Subject to paragraph 9 below, in respect of the highways work in Princes Street, Shandwick Place, Haymarket Junction and St Andrew Square, Infraco shall be required only to plane back the existing road structure to a sound base at the underside of the new surface course and replacement of surface course suitable for purpose to suit the revised road surface profile. Full depth reconstruction as the current designs in this area shall not be required.

13 In respect of the Highways and Drainage works at Picardy Place, London Road and York Place and St Andrew Square, Infraco shall only be obliged to carry out works to the extent shown on the Base Date Design Information.

14 Road construction shall be 35mm thin surface course on 55mm binder course on 110mm base course and 250mm type 1 sub-base.

15 The roads as reconstructed in accordance with the SDS design will be adopted by CEC and 'handed back' on or prior to Service Commencement and thereafter CEC shall undertake routine maintenance (sweeping, litter, salting, normal wear and tear and the like) at no cost to Infraco. However for the avoidance of doubt, Infraco remains responsible for any defects in design or construction.

16 Flexible footpath surfacing shall be 30mm HRA on 50mm DBM on 150mm Type 1 base.

17 In respect of footways provided the Infraco has used reasonable endeavours to protect existing kerbs and flags, during the carrying out of the Infraco Works, these existing kerbs and flags can be re-used where available and minimal reinstatement behind kerb lines is required i.e. not wall to wall.

18 Full footway reconstruction in Leith Walk is not required beyond the allowance made in areas where kerb lines are being re-sited.

19 That in respect of Tower Place Bridge, Victoria Dock Bridge and Lindsay Road retaining wall, Infraco shall only be obliged to carry out works to the extent shown in accordance with the Base Date Design Information.

20 That in respect of Morrison Supermarket at the Gyle the Infraco shall not be required to carry out any works in respect of the retaining wall.

21 That in respect of the Depot excavation works, (i) the volume of excavation shall be 80,000m^3, and (ii) the depot excavation will be handed over to Infraco pumped dry with a firm sound formation.

22 That in circumstances where, to maintain the Programme, the Infraco carries out works or procures materials or works prior to the issue of Issue for Construction drawings, no amendment to the works carried out, or works or materials procured shall be required as a consequence of the subsequent issue of the relevant Issue for Construction drawings.

23 That the Code of Construction Practice will be followed by Infraco except where relaxations from the hours of working outside the hours specified in the Code of

Construction Practice are specifically stated in Schedule Part 15 (*Programme*) and that CEC shall grant such relaxations in circumstances where the Infraco has submitted a competent application in order to achieve such relaxation.

24 That in relation to Utilities the MUDFA Contractor and/or Utility shall have completed the diversion of any utilities in accordance with the requirements of the Programme save for utilities diversions to be carried out by the Infraco pursuant to the expenditure of the Provisional Sums noted in Appendix B.

25 That the Possessions (as defined in Clause 16.1) shall be available as noted in the Programme at Schedule Part 15 (Programme).

26 Network Rail shall comply with its obligations under the Asset Protection Agreement and the Bridge Agreements as defined in Clause 16.1.

27 That, save to the extent that the Infraco fails to comply with its obligations under Clause 16 of this Agreement to provide information properly and reasonably requested in a full and timely manner to Network Rail in the process of developing the APA Works Programme, that neither the timing nor the terms of Network Rail's approval of the APA Works Programme shall adversely affect the Programme.

28 Trackslab depth is 385mm with formation condition of 10% CBR.

29 That there shall be no special floating track measures required for vibration

30 That no protective measures are required in relation to protected trees however new trees will be provided for any trees removed in accordance with the Environmental Management Plan.

31 That the Archaeological Officer shall not delay or disrupt the Infraco Works.

32 That the programming assumptions set out in Schedule Part 15 (*Programme*) remain true in all respects.

33 That third parties shall not carry out works which impact upon the Infraco Works.

34 That stray current protection proposals as contained within the Infraco Proposals shall be approved by all relevant Approval Bodies where Infraco has made a competent application .

35 That Consent shall be obtained (within a reasonable time having regard to the progress of the Infraco Works) for the use of Railway Ballast from Markle Mains Quarry.

36 Demolition or alteration of existing buildings shall only be required as follows:

Demolition

- Caledonian Ale House (Plot 33)
- Redpath McLean Office Russell Road (Plot 68)
- Simloch Property Roseburn Street (Plot 75)
- Viking International Roseburn Street (Plot 79)

- JB McLean lean-to Roseburn Street (Plot 92)
- National Car Rental Roseburn Street (Plot 103)
- Busy Bee Catering Balgreen Road (Plot 130)
- ATC Hut Stenhouse Drive (plot 150)

37 Asbestos shall not be discovered or identified in buildings to be demolished or altered.

38 All CCTV cameras and other road equipment will be connected back to the nearest Open Transport Network (OTN) node in either a sub-station or Tramstop.

39 That compliance with the Infraco's obligation pursuant to Clause 18.17B and under Schedule Part 13 Section A (Third Party Agreements) to give "due and proper cognisance to third party requirements" (and similar obligations such as to have "due and proper regard to such third party requirements") under the Third Party Agreements shall not cause any delay or disruption to the carrying out of the Infraco Works, on the basis that the Infraco shall have used reasonable endeavours to mitigate the impact of such compliance and that any such third party requirements could not reasonably have been foreseen by an experienced contractor executing works in the operating environment of a UK city.

40 That any conditions attaching to any licence or similar arrangement entered into between **tie** and a third party entered into pursuant to any agreement included in Schedule Part 13 Section A (Third Party Agreements) shall not cause any delay or disruption to the carrying out of the Infraco Works, on the basis that the Infraco shall provide all reasonable assistance to **tie** to ensure compliance at all times with any such conditions and shall use all reasonable endeavours to mitigate the impact of such conditions in the carrying out of the Infraco Works.

41 That the Standards (as defined in Clause 16.1):

(a) In relation to NR Immunisation (as defined in Appendix I to this Part 4 of the Schedule) shall be and shall be in the same terms as those which were in force on 12th October 2007; and

(b) In relation to the remainder of the APA Works (as defined in Clause 16.1) shall be and shall be in the same terms as those which were in force at the date of this Agreement.

42 That design support during the construction period will be provided by the SDS Provider.

43 The Public Realm Design Workbook will not introduce any new requirements into the Prior Approvals process which are in addition to the existing requirements set out in the Tram Design Manual and the City of Edinburgh Council‘s Standard for Streets.

3.5 The Contract Price has been fixed on the basis of inter alia the Base Case Assumptions noted herein. If now or at any time the facts or circumstances differ in any way from the Base Case Assumptions (or any part of them) such Notified Departure will be deemed to be a Mandatory **tie** Change requiring a change to the Employer's Requirements and/or the Infraco Proposals or otherwise requiring the Infraco to take account of the Notified Departure in the

Contract Price and/or Programme in respect of which **tie** will be deemed to have issued a **tie** Notice of Change on the date that such Notified Departure is notified by either Party to the other. For the avoidance of doubt **tie** shall pay to the Infraco, to the extent not taken into account in the Estimate provided pursuant to Clause 80.24.1, any additional loss and expense incurred by the Infraco as a consequence of the delay between the notification of the Notified Departure and the actual date (not the deemed date) that **tie** issues a **tie** Change Order, such payment to be made by **tie** following evaluation, agreement or determination of such additional loss and expense pursuant to Clause 65 (Compensation Events) as if the delay was itself a Compensation Event.

3.6 Earthworks Outline in this Schedule Part 4 means:

3.6.1 the finished earthworks levels and dimensions (prior to topsoiling) for the construction, where specified, of

(a) carriageway, hard shoulder, hard strip, footway, paved area, central reserve, verge, side slope;

(b) underside of (i) trackslab, (ii) grasstrack concrete, and (iii) ballast;

(c) sub-base;

(d) fill on sub-base material, base and capping;

(e) contiguous filer material, lightweight aggregate infill;

(f) surface water channels;

(g) landscape areas, environmental bunds.

In all cases of filter drains, except narrow filter drains, the Earthworks Outline shall be the top of the filter material.

3.6.2 Where capping or stabilisation to form capping is required by the design in cutting or embankment, the Earthworks Outline shall be as defined in paragraph 3.6.1 i.e. as the top of capping.

3.6.3 Where an embankment is required by the design to be surcharged, the Earthworks Outline shall be defined as in paragraph 3.6.1 and exclude the surcharge.

3.6.4 Where permanent storage or stockpiling of topsoil is required, the Earthworks Outline shall be as defined in paragraph 3.6.1 and exclude stored topsoil.

3.6.5 Where the ground has been subjected to the treatment in respect of ground improvement, mine workings, swallow holes and the like, for the purpose of the definition of Earthworks Outline the existing ground level shall be the level obtained on completion of any such treatment of the areas affected.

Sub-soil Level is defined as the level of the ground after the removal of topsoil.

Surcharge is defined as material placed for the purpose of loading for the periods specified in the design.

4.0 PROVISIONAL SUMS

4.1 Provisional Sums have been allowed for items listed in Appendix B.

4.2 These are in two tables. The first table represents Defined Provisional Sums. The second table represents Undefined Provisional Sums.

4.3 The procedure for the expenditure of the Provisional Sums is as set out in this section.

4.4 Provisional Sums requiring an instruction are those for which a "trigger date" has been identified in Tables 1 and 2 below. Where the "trigger date" is stated to be "not applicable", this is a Provisional Sum not requiring instruction.

4.5 Provisional Sums requiring Instruction

4.5.1 **tie** shall, in conjunction with (where reasonably requested by **tie**) the Infraco and the Infraco Parties, prepare the defined requirements and specification for Provisional Sums which require an instruction sufficiently ahead of Programme so as to achieve the **tie** Notice of Change by the date shown as the trigger date in Tables 1 and 2 below.

4.5.2 Not later than the dates set out in column entitled "trigger date" of the Provisional Sums Tables **tie** shall issue a **tie** Notice of Change instructing the works to which the Provisional Sums requiring Instruction apply, which **tie** Change shall be a Mandatory **tie** Change. Failure by **tie** to issue a **tie** Notice of Change in accordance with this paragraph shall be a Compensation Event to which Clause 65 applies

4.5.3 After agreement or determination of a **tie** Change for works to which a Provisional Sum applies, the Provisional Sum and, in the case of Defined Provisional Sums the provisional allowance for programming, planning and pricing Preliminaries shall be removed from the Contract Price and Milestone Schedule and the Programme and shall be replaced by the value of the **tie** Change and programme adjustment determined in accordance with Clause 80.

4.6 Provisional Sums not requiring an Instruction

4.6.1 Where work is carried out in respect of a Provisional Sum which is not a Provisional Sum requiring Instruction, the carrying out of such works will be deemed to be a **tie** Change.

4.6.2 After agreement or determination of the **tie** Change which is deemed to have occurred pursuant to paragraph 4.6.1, the Provisional Sum and, in the case of Defined Provisional Sums the provisional allowance for programming, planning and pricing Preliminaries shall be removed from the Contract Price and Milestone Schedule and the Programme and shall be replaced by the value of the **tie** Change and programme adjustment determined in accordance with Clause 80.

4.7 SDS Provisional Sums

4.7.1 In addition to the SDS Price Infraco shall be entitled to be paid and include in any Application for Milestone Payment amounts properly due to be paid to the SDS Provider pursuant to the SDS Agreement in respect of Extended Construction Support and Design Support Team notwithstanding the amount set out as SDS Provisional Sums in paragraph 2.5.

4.7.2 Infraco will be entitled to add a head office overhead and profit percentage of 10% to amounts payable to the SDS Provider under the SDS Agreement where such amounts when aggregated with amounts previously paid to the SDS Provider

exceed £5,000,000 but, for the avoidance of doubt, such percentage shall only be applied to the amount in excess of £5,000,000.

5.0 VALUE ENGINEERING (VE) THAT HAS BEEN TAKEN INTO FIRM PRICE

5.1 The Parties have agreed Value Engineering opportunities / savings as noted in Appendix C.

5.2.1 Subject to the provisions applying to Value Engineering opportunities which are Design to Cost these VE opportunities / savings are not simply targets but are fixed and firm reductions which are reflected in the Contract Price as at the date of this Agreement.

5.3 Infraco shall implement a Value Engineering opportunity provided that:

5.3.1 where the implementation of the Value Engineering opportunity requires instruction by **tie**, **tie** have issued such instruction (which shall be a **tie** Change) sufficiently ahead of the Programme to allow the Value Engineering opportunity to be realised;

5.3.2 the Value Engineering opportunity is technically feasible;

5.3.3 any Consents required for the implementation of the Value Engineering opportunity are obtained and designs Issued for Construction by the date set out in the Programme; and

5.3.4 any other Key Qualification applying to the Value Engineering opportunity have been achieved.

5.4 NOT USED.

5.5 To the extent that a Value Engineering opportunity is implemented:

5.5.1 the Employer's Requirements and Infraco Proposals shall be amended to take into account the changes to the Infraco Works as a result of such implementation;

5.6 To the extent that a Value Engineering opportunity is not implemented:

5.6.1 Infraco shall carry out the Infraco Works without the amendment to the Employer's Requirements and Infraco Proposals which would have been made had the Value Engineering opportunity been implemented; and

5.6.2 Infraco and **tie** shall agree amendments to the Schedule Part 5 (*Milestone Payments*)to increase the Contract Price by the saving applying to the Value Engineering opportunity set out in Appendix C and Infraco shall be entitled to include in its next Application for Payment and **tie** shall pay to Infraco the design costs incurred by Infraco in considering the Value Engineering opportunity up to a maximum amount of £25,000 per Value Engineering opportunity.

5.7 Where a Key Condition to achieving a Value Engineering opportunity is "Design to Cost":

5.7.1 before implementing the Value Engineering opportunity and sufficiently ahead of the Programme so as not to prejudice the delivery of the Value Engineering opportunity Infraco shall deliver to **tie** an Estimate setting out the net cost or saving of implementing the Value Engineering opportunity (including design costs); and

5.7.2 **tie** shall confirm within 10 Business Days of receipt of the Estimate if **tie** wishes Infraco to proceed with the Value Engineering opportunity.

5.7.3 If **tie** confirms that it wishes Infraco to proceed with the Value Engineering opportunity,

(a) the Employer's Requirements and Infraco Proposals shall be amended to take into account the changes to the Infraco Works as a result of such implementation; and

(b) Infraco and **tie** shall agree amendments to the Schedule Part 5 (Milestone Schedule) to amend the Contract Price by the difference (if any) between the saving applying to the Value Engineering opportunity set out in Appendix C and the actual saving set out in the Estimate provided to **tie** in accordance with paragraph 5.7.1 and Infraco shall be entitled to claim in its next Application for Payment and **tie** shall pay to Infraco the design costs incurred by Infraco in considering the Value Engineering opportunity up to a maximum amount of £25,000 per Value Engineering opportunity.

5.7.4 If **tie** confirms that it does not wish Infraco to proceed with the Value Engineering opportunity paragraph 5.6 shall apply. **tie** shall be deemed not to wish Infraco to proceed with a Value Engineering opportunity which is design to cost if it fails to respond to an Estimate in accordance with paragraph 5.7.2;

5.7.5 Infraco shall use reasonable endeavours to achieve the savings for each Value Engineering opportunity.

6.0 FURTHER VALUE ENGINEERING (VE)

6.1 Further Value Engineering opportunities / savings as noted in Appendix D

6.2 This further VE represents that which either one or both Parties is unable to commit to at this stage and will still be considered as a potential target. There are two sub-categories, those with an estimated saving carried to the summary and those as an unspecified item.

6.3 These will be adjusted by applying the provisions of Clause 80 (***tie** Changes*). For the avoidance of doubt, no VE that has already be considered by the Parties or that may subsequently be proposed by **tie** will be considered as a shared saving under Clause 81.3 (*Infraco Changes*).

7.0 UTILITIES DIVERSIONS TO BE CARRIED OUT BY INFRACO

7.1 Although **tie** has let the MUDFA Contract (Multiple Utilities Diversion Framework Arrangement) to carry out the diversion of utility apparatus in the path of the proposed tram route prior to Infraco Works, it will be necessary for some of these works to be delivered by Infraco for the reasons such as:

- they may be unrecorded and not discovered until the Infraco Works are commenced
- they may be discovered during the MUDFA Works but left to avoid a programme overlap or other technical reason
- they may be intrinsically linked to the Infraco Works

- they may require such significant reinstatement work that to carry out under MUDFA may result in significant abortive works

7.2.1 Where Infraco has been advised of the existence of utility apparatus in advance, whether identified to date or following discovery during the MUDFA Works, any adjustment to the Contract Sum will be made by applying the provisions of Clause 80 (***tie** Changes*).

7.3 Those identified to date are noted in Appendix F.

8.0 SCHEDULES OF RATES

8.1 Rates for certain items have been established for determining the value of **tie** Changes as noted in Appendix F.

8.2 The rates contained in the appendix F are inclusive of overheads and profit are to be used for the purpose of agreeing changes (positive and negative)

8.3 Rates for SDS are as noted in the SDS Agreement / SDS Novation Agreement which also set out the mechanism that shall apply in respect of any design associated with **tie** Changes.

9.0 ROADS RECONSTRUCTION

9.1 **tie** shall (and shall procure that CEC shall) support re-design proposals through the Development Workshop (as defined in the SDS Novation Agreement) which the SDS Provider may develop to align their design deliverables with Pricing Assumption 12.

9.2 The maximum aggregated entitlement for the Infraco shall be eight weeks in relation to a Notified Departure (including any relief, time or additional cost) concerning the combined effect of Pricing Assumption 12 and programming assumption 9.1.4.

9.3 The recovery of additional cost by the Infraco under Clause 80 (***tie** Change*) following a Notified Departure with regard to Pricing Assumption 12 shall be capped at an aggregate amount of £1,500,000 (one million five hundred thousand pounds), save with regard to any claim for additional cost arising from delay caused by the SDS Provider's redesign of any roads reconstruction or the requirement to revert to the SDS Provider's initial design for such roads reconstruction.

APPENDIX A

CONSTRUCTION WORKS PRICE ANALYSIS

A1 CONSTRUCTION WORKS PRICE ANALYSIS

Lump Sum Firm and Fixed Price		**£ 231,797,342**
Deduct Identified Value Engineering	**Taken To Firm Price**	**£ 9,965,006**
	(See Appendix C)	
Firm Price		**£ 221,832,336**
Deduct Further Value Engineering	**(see Appendix D)**	**£ 2,670,000**
Sub Total		**£ 219,162,336**
Add Defined Provisional Sums	**(see Appendix B)**	**£ 11,434,316**
Add Undefined Provisional Sums	**(see Appendix B)**	**£ 8,011,012**
Construction Works Price		**£ 238,607,664**

APPENDIX A2

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL
					£
	PRELIMINARIES AND GENERAL ITEMS				
	Contractual Requirements				
A110	Contractor's bond	sum	1.00	£1,317,093.79	**£1,317,093.79**
A120	Professional Indemnity Insurance	sum	1.00	£0.00	**£0.00**
A130	Marine Cargo Insurance	sum	1.00	£0.00	**£0.00**
A140	All other insurance required by the Contract	sum	1.00	£1,633,046.22	**£1,633,046.22**
A150	Administration of all insurances required under the Contract including but without limitation Employee's Compensation and Statutory Employee's Compensation Levy.	sum	1.00	£0.00	**£0.00**
A160	Progress Reporting in accordance with the Contract.	sum	1.00	£0.00	**£0.00**
	Specified Requirements				
	Accommodation for the Engineer's and Client's Staff; establish and remove				
A211.1	offices	sum	1.00	£82,309.91	**£82,309.91**
	Accommodation for the Engineer's and Client's Staff for Railway Systems and Operations and Maintenance Departments; establish and handover				
A211.2	offices	sum	1.00	£0.00	**£0.00**
A211.3	depot office	sum	1.00	£0.00	**£0.00**
	Accommodation for the Community Liaison Officers; establish and remove				
A211.4	offices	sum	1.00	£0.00	**£0.00**
	Accommodation for O&M maintenance staffs; establish and remove				
A211.5	container offices	sum	1.00	£0.00	**£0.00**
	Facilities for the O&M maintenance; establish and handover				
A211.6	diesel fuel station	sum	1.00	£0.00	**£0.00**
	Accommodation for the Engineer's and Client's Staff; maintain and operate				
A211.7	offices	wk	169.00	£1,900.51	**£321,186.78**
				Prelims and General Items - Page 1	**£3,353,636.70**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	Accommodation for the Engineer's and Client's staff for Tram Systems and Operations and Maintenance Departments; maintain and operate				
A211.8	offices	wk			
A211.9	depot office	wk			
	Accommodation for the Community Liaison Officers; maintain and operate				
A211.10	offices	wk			
	Accommodation for O&M maintenance staffs; maintain and operate				
A211.11	container offices	wk			
	Facilities for the O&M maintenance; maintain and operate				
A211.12	diesel fuel station	wk			
	Services for Engineer's and Client's Staff; establish and remove				
A221.1	transport vehicles	sum	1.00	£0.00	**£0.00**
	Services for Engineer's and Client's Staff; maintain and operate				
A221.2	transport vehicles	wk	169.00	£1,219.95	**£206,171.25**
	Services for Engineer's and Client's Staff; establish and remove				
A222.1	telephone	sum	1.00	£0.00	**£0.00**
A229.1	computing and networking facilities	sum	1.00	£0.00	**£0.00**
	Services for Engineer's and Client's Staff for Tram Systems and Operations and Maintenance Department; maintain and operate				
A222.2	telephone	sum	1.00	£0.00	**£0.00**
A229.2	computing and networking facilities	sum	1.00	£0.00	**£0.00**
	Prelims and General Items - Page 2				**£206,171.25**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	Services for community Liaison Officers; establish and remove				
A222.3	telephone	sum	1.00	£0.00	**£0.00**
A229.3	computing facilities	sum	1.00	£0.00	**£0.00**
	Services for Engineer's and Client's Staff; maintain and operate				
A222.4	telephone	wk			
A229.4	computing and networking facilities	wk			
	Services for Engineer's and Client's Staff for Railway Systems and Operations and Maintenance Department; maintain and operate				
A222.5	telephone	wk			
A229.5	computing and networking facilities	wk			
	Services for Community Liaison Officers; maintain and operate				
A222.6	telephone	wk			
A229.6	computing facilities	wk			
	Equipment for use by the Engineer's and Client's Staff; establish and handover				
A231.1	office equipment	sum	1.00	£0.00	**£0.00**
A233.1	surveying equipment	sum	1.00	£0.00	**£0.00**
A239.1	photographic equipment	sum	1.00	£0.00	**£0.00**
A239.2	safety equipment	sum	1.00	£0.00	**£0.00**
A239.3	audio and visual equipment	sum	1.00	£0.00	**£0.00**
	Equipment for use by the Engineer's and Client's Staff for Railway Systems and Operations and Maintenance Departments; establish and handover				
A231.2	office equipment	sum	1.00	£0.00	**£0.00**
A239.4	safety equipment	sum	1.00	£0.00	**£0.00**
	Prelims and General Items - Page 3				**£0.00**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	Equipment for use by the Community Liaison Officers; establish and handover				
A231.3	office equipment	sum	1.00	£0.00	**£0.00**
	Equipment for use by the Engineer's and Client's Staff; maintain and operate				
A231.4	office equipment	wk			
A233.2	surveying equipment	wk	169.00	£0.00	**£0.00**
A239.5	photographic equipment	wk	169.00	£112.61	**£19,031.33**
A239.6	safety equipment	wk			
A239.7	audio and visual equipment	wk			
	Equipment for use by the Engineer's and Client's Staff for Tramway Systems and Operations and Maintenance Departments; maintain and operate				
A231.5	office equipment	wk			
A239.8	safety equipment	wk			
	Equipment for use by the Community Liaison Officers; maintain and operate				
A231.6	office equipment	wk			
	Attendance upon the Engineer's and Client's Staff; establish and remove				
A241.1	drivers	sum	1.00	£0.00	**£0.00**
A250.1	testing of materials	sum	1.00	£0.00	**£0.00**
A260.1	testing of the works	sum	1.00	£0.00	**£0.00**
	Attendance upon the Engineer's and Client's Staff for Tram Systems and Operations and Maintenance Departments; establish and remove				
A249.1	general cleaning and tea services	sum	1.00	£0.00	**£0.00**
	Prelims and General Items - Page 4				**£19,031.33**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	Attendance upon the Engineer's and Client's Staff; maintain and operate				
A241.2	drivers	wk			
A250.2	testing of materials	wk			
A260.2	testing of the works	wk			
	Attendance upon the Engineer's and Client's Staff for Tram Systems and Operation and Maintenance Departments; maintain and operate				
A249.2	general cleaning and tea services	wk			
	Other Specified Requirements				
	General and special attendances for Project Contractors & Third Parties				
A710.1	TRAMCO	sum	1.00	£0.00	**£0.00**
A710.2	MUDFA	sum	1.00	£0.00	**£0.00**
A710.3	Advance Works Contractor	sum	1.00	£0.00	**£0.00**
A710.4	Network Rail	sum	1.00	£0.00	**£0.00**
A710.5	First Scotrail	sum	1.00	£0.00	**£0.00**
A710.6	Others (ref Schedule 13)	sum	1.00	£0.00	**£0.00**
	Environmental requirements and Environmental Monitoring and Assessment Programme; establish and remove				
A790.1	air pollution	sum	1.00	£0.00	**£0.00**
A790.2	noise pollution	sum	1.00	£0.00	**£0.00**
A790.3	water pollution	sum	1.00	£0.00	**£0.00**
	Prelims and General Items - Page 5				**£0.00**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	Environmental requirements and Environmental Monitoring and Assessment Programme; maintain, monitor and report				
A790.4	air pollution	wk			
A790.5	noise pollution	wk			
A790.6	water pollution	wk			
	Other requirements				
A790.7	quality management; establish, remove, maintain and operate	sum	1.00	£0.00	**£0.00**
A790.8	site cleaning; establish, remove maintain and operate	sum	1.00	£0.00	**£0.00**
A790.9	compliance of existing trees protection, treatment and transplantation requirements; establish, remove, maintain and operate	sum	1.00	£0.00	**£0.00**
A790.10	durability requirements; establish, remove, maitain and operate	sum	1.00	£0.00	**£0.00**
A790.11	reliability demonstration plan, establish, remove, maintain and operate	sum	1.00	£0.00	**£0.00**
A790.12	instrumentation and monitoring works for all elements of the Works; establish and remove	sum	1.00	£0.00	**£0.00**
A790.13	instrumentation and monitoring works for all elements of the Works; maintain, monitor, audit and report	wk			
A790.14	independent checking engineer	sum	1.00	£0.00	**£0.00**
A790.15	building services coordination team	sum	1.00	£0.00	**£0.00**
	Contractor's Requirements				
	Contractor's design costs	sum	1.00	£0.00	**£0.00**
A810.01	develop, complete and design of all outstanding works associated with Onboard Supervisory and Comms Equipment - Item Code A1(1)	sum	1.00	£0.00	**£0.00**
A810.02	develop, complete and design of all outstanding works associated with Track and Formation - Item Code B1	sum	1.00	£0.00	**£0.00**
A810.03	develop, complete and design of all outstanding works associated with Tamstops - Item Code B2	sum	1.00	£0.00	**£0.00**
	Prelims and General Items - Page 6				**£0.00**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
A810.04	develop, complete and design of all outstanding Architectural Builder's Works and Finishes Works - Item Code B3	sum	1.00	£0.00	**£0.00**
A810.05	develop, complete and design of all outstanding electrical and mechanical works - Item Code B3	sum	1.00	£0.00	**£0.00**
A810.06	develop, complete and design of all outstanding structural works - Item Code B3	sum	1.00	£0.00	**£0.00**
A810.07	develop, complete and design of all outstanding depot maintenance equipment works - Item Code B3	sum	1.00	£0.00	**£0.00**
A810.08	develop, complete and design of all outstanding highways works - Item Code B4	sum	1.00	£0.00	**£0.00**
A810.09	develop, complete and design of all outstanding Substation Building works - Item Code B5	sum	1.00	£0.00	**£0.00**
A810.10	develop, complete and design of all oustanding wayside equipment cabinet works - Item Code B5	sum	1.00	£0.00	**£0.00**
A810.11	develop, complete and design of all outstanding structure works cabinets - Item Code B6	sum	1.00	£0.00	**£0.00**
A810.12	develop, complete and design of all outstanding Supervisory and Control Systems works - Item Codes C, C1 and C2	sum	1.00	£0.00	**£0.00**
A810.13	develop, complete and design of all outstanding Tramstop Equipment works - Item Code C3	sum	1.00	£0.00	**£0.00**
A810.14	develop, complete and design of all outstanding Depot Equipment works - Item Code C4	sum	1.00	£0.00	**£0.00**
A810.15	develop, complete and design of all outstanding traction power system works - Item Code D1	sum	1.00	£0.00	**£0.00**
A810.16	develop, complete and design of all outstanding OHLE works - Item Code D2	sum	1.00	£0.00	**£0.00**
	Documentation and Manuals				
A810.17	prepare, submit and update Operation and Maintenance Manuals for all Civil and Building works	sum	1.00	£0.00	**£0.00**
A810.18	prepare, submit and update all Operation and Maintenance Manuals for Onboard Supervisory and Comms Equipment	sum	1.00	£0.00	**£0.00**
	Prelims and General Items - Page 7				**£0.00**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
A810.19	prepare, submit and update all Operation and Maintenance Manuals for Track and Formation works	sum	1.00	£0.00	**£0.00**
A810.20	prepare, submit and update Operation and Maintenance Manuals for depot maintenance equipment	sum	1.00	£0.00	**£0.00**
A810.21	prepare, submit and update Operation and Maintenance Manuals for all Supervisory and Control systems	sum	1.00	£0.00	**£0.00**
A810.22	prepare, submit and update Operation and Maintenance Manuals for all Tramstop Equipment	sum	1.00	£0.00	**£0.00**
A810.23	prepare, submit and update Operation and Maintenance Manuals for all Traction Power systems, equipment and works	sum	1.00	£0.00	**£0.00**
A810.24	prepare, submit and update Operation and Maintenance Manuals for all OHLE systems, equipment and works	sum	1.00	£0.00	**£0.00**
A810.25	prepare, maintain and submit necessary as-constructed drawings and survey records	sum	1.00	£0.00	**£0.00**
A810.26	prepare and submit Manufacturers' Design Warranties for all equipment installed as part of the Tram System	sum	1.00	£0.00	**£0.00**
A810.27	prepare, submit and update hazard analysis report for depot maintenance equipment	sum	1.00	£0.00	**£0.00**
A810.28	prepare, submit and update life cycle cost report for depot maintenance equipment	sum	1.00	£0.00	**£0.00**
A810.29	prepare and conduct training courses on operation and maintenance of depot maintenance equipment	sum	1.00	£0.00	**£0.00**
A810.30	prepare and conduct training courses on operation and maintenance of all Supervisory and Control Systems	sum	1.00	£0.00	**£0.00**
A810.31	prepare and conduct training courses on operation and maintenance of all Traction Power and OHLE systems	sum	1.00	£0.00	**£0.00**
A810.32	prepare and conduct training courses on operation and maintenance of all Tramstop Equipment	sum	1.00	£0.00	**£0.00**
	Prelims and General Items - Page 8				**£0.00**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	Supply, erect and remove on completion				
A821	offices - Main and Satellite	sum	1.00	£0.00	**£0.00**
A822	laboratories	sum	1.00	£0.00	**£0.00**
A823	cabins	sum	1.00	£0.00	**£0.00**
A824	stores and workshops	sum	1.00	£0.00	**£0.00**
A825	canteens and mess rooms	sum	1.00	£0.00	**£0.00**
	Supply, install and remove on completion				
A831	electricity supply	sum	1.00	£0.00	**£0.00**
A832	water supply	sum	1.00	£0.00	**£0.00**
A833	site communication facilities	sum	1.00	£0.00	**£0.00**
A834	temporary drainage and sewage disposal	sum	1.00	£0.00	**£0.00**
A271	**Temporary works**				
	The Contractor shall insert hereinafter such temporary works items and sums required to carry out the works under Section A of the Project.				
	Prelims and General Items - Page 9				**£0.00**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
A271	Temporary works (Cont'd)				
	Prelims and General Items - Page 10				£0.00

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	Contractor's Other Charges				
	The Contractor has entered hereunder any specific item of work or obligation or service or any other thing which is necessary for the execution of the Works, as required by the Contract, which has been omitted from or has not been separately itemised elsewhere within the Pricing Schedule and for which a separate charge is required. The Contractor shall insert hereinafter such additional items and pages as he deems necessary and include same on the Collection Summary Sheets				
	The unit of measurement for any Contractor's Other Charges shall be "sum".				
	Consortium Supervision	wk	169.00	£15,895.71	**£2,686,374.45**
	Consortium Office Hire	wk	169.00	£1,195.55	**£202,048.19**
	Consortium Office Maintenance	wk	169.00	£3,498.82	**£591,300.11**
	Consortium Surveying Instruments Maintenance	wk	169.00	£153.71	**£25,977.83**
	Consortium IT Equipment	wk	169.00	£1,804.65	**£304,986.18**
	Consortium Testing	wk	169.00	£3,609.31	**£609,974.18**
	Consortium Establish/Remove Offices	sum	1.00	£292,755.86	**£292,755.86**
	Consortium Establish/Remove Surveying Equipment	sum	1.00	£18,299.22	**£18,299.22**
	Consortium costs Incurred during facilitated negotiation phase	sum	1.00	£2,198,311.80	**£2,198,311.80**
	Prelims and General Items - Page 11				**£6,930,027.82**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	METHOD RELATED CHARGES				
	METHOD RELATED CHARGES				
A	**Site management and supervision**				
	Sub-Section 2A	sum	1.00	£0.00	**£0.00**
	Sub-Section 5A	sum	1.00	£0.00	**£0.00**
	Sub-Section 5B	sum	1.00	£0.00	**£0.00**
	Sub-Section 5C	sum	1.00	£0.00	**£0.00**
	Sub-Section 6	sum	1.00	£0.00	**£0.00**
	Sub-Section 7A	sum	1.00	£0.00	**£0.00**
	The Contractor shall insert hereinafter such additional items and pages as he deems necessary and include same on the Collection Summary Sheets				
	High Level Section A Establish Sections & Sites (fixed)	sum	1.00	£1,468,820.91	**£1,468,820.91**
	High Level Section A Supervision (Time Related)	sum	1.00	£2,722,909.01	**£2,722,909.01**
	High Level Section A Maintain Section Offices(Time Related)	wks	169.00	£3,338.23	**£564,160.76**
	Depot Subcontractor Section A Supervision	sum	1.00	£1,147,709.95	**£1,147,709.95**
	Depot Subcontractor Section A Establish Site Services Welfare etc.	sum	1.00	£272,581.11	**£272,581.11**
	Depot Subcontractor Section A Scaffolding & Misc Plant	sum	1.00	£717,318.72	**£717,318.72**
	Depot Subcontractor Section A Insurance & Bond	sum	1.00	£243,888.36	**£243,888.36**
	Depot Subcontractor Section A Establish and Maintain Compound	sum	1.00	£54,734.29	**£54,734.29**
	Depot Subcontractor Section A Non productive Labour	sum	1.00	£283,893.23	**£283,893.23**
	BB1 Section A Preliminaries	sum	1.00	£6,735,461.39	**£6,735,461.39**
	SC1 Section A Supervision (Time Related)	sum	1.00	£2,508,921.74	**£2,508,921.74**
	SC1 Section A Preliminaries (Fixed)	sum	1.00	£1,131,799.42	**£1,131,799.42**
	SC1 Section A Preliminaries (Time Related)	sum	1.00	£2,689,179.73	**£2,689,179.73**
	SC1 Section A Insurance & Bond	sum	1.00	£197,862.46	**£197,862.46**
	SC2 Section A Preliminaries (Fixed)	sum	1.00	£319,460.04	**£319,460.04**
	SC2 Section A Preliminaries (Time related)	sum	1.00	£1,432,030.43	**£1,432,030.43**

	SC2 Section A Provisional Sum for Landowner Compensation Payments for land taken outside wayleave during construction period	sum	1.00	£146,882.09	**£146,882.09**
			Method Related Charges - Page 1		**£22,637,613.65**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	PRELIMINARIES AND GENERAL ITEMS				
	Contractual Requirements				
A110	Contractor's bond	sum	1.00	£670,742.81	£670,742.81
A120	Professional Indemnity Insurance	sum	1.00	£0.00	£0.00
A130	Marine Cargo Insurance	sum	1.00	£0.00	£0.00
A140	All other insurance required by the Contract	sum	1.00	£881,247.16	£881,247.16
A150	Administration of all insurances required under the Contract including but without limitation Employee's Compensation and Statutory Employee's Compensation Levy.	sum	1.00	£0.00	£0.00
A160	Progress Reporting in accordance with the Contract.	sum	1.00	£0.00	£0.00
	Specified Requirements				
	Accommodation for the Engineer's and Client's Staff; establish and remove				
A211.1	offices	sum	1.00	£44,320.72	£44,320.72
	Accommodation for the Engineer's and Client's Staff for Railway Systems and Operations and Maintenance Departments; establish and handover				
A211.2	offices	sum	1.00	£0.00	£0.00
A211.3	depot office	sum	1.00	£0.00	£0.00
	Accommodation for the Community Liaison Officers; establish and remove				
A211.4	offices	sum	1.00	£0.00	£0.00
	Accommodation for O&M maintenance staffs; establish and remove				
A211.5	container offices	sum	1.00	£0.00	£0.00
	Facilities for the O&M maintenance; establish and handover				
A211.6	diesel fuel station	sum	1.00	£0.00	£0.00

	Accommodation for the Engineer's and Client's Staff; maintain and operate				
A211.7	offices	wk	169.00	£1,023.35	£172,946.73
			Prelims and General Items - Page 1		**£1,769,257.42**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	PRELIMINARIES AND GENERAL ITEMS				
	Accommodation for the Engineer's and Client's staff for Tram Systems and Operations and Maintenance Departments; maintain and operate				
A211.8	offices	wk			
A211.9	depot office	wk			
	Accommodation for the Community Liaison Officers; maintain and operate				
A211.10	offices	wk			
	Accommodation for O&M maintenance staffs; maintain and operate				
A211.11	container offices	wk			
	Facilities for the O&M maintenance; maintain and operate				
A211.12	diesel fuel station	wk			
	Services for Engineer's and Client's Staff; establish and remove				
A221.1	transport vehicles	sum			
	Services for Engineer's and Client's Staff; maintain and operate				
A221.2	transport vehicles	wk	169.00	£656.90	£111,015.29
	Services for Engineer's and Client's Staff; establish and remove				
A222.1	telephone	sum	1.00	£0.00	£0.00
A229.1	computing and networking facilities	sum	1.00	£0.00	£0.00
	Services for Engineer's and Client's Staff for Tram Systems and Operations and Maintenance Department; maintain and operate				
A222.2	telephone	sum	1.00	£0.00	£0.00
A229.2	computing and networking facilities	sum	1.00	£0.00	£0.00

				Prelims and General Items - Page 2	£111,015.29

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	PRELIMINARIES AND GENERAL ITEMS				
	Services for community Liaison Officers; establish and remove				
A222.3	telephone	sum	1.00	£0.00	£0.00
A229.3	computing facilities	sum	1.00	£0.00	£0.00
	Services for Engineer's and Client's Staff; maintain and operate				
A222.4	telephone	wk			
A229.4	computing and networking facilities	wk			
	Services for Engineer's and Client's Staff for Railway Systems and Operations and Maintenance Department; maintain and operate				
A222.5	telephone	wk			
A229.5	computing and networking facilities	wk			
	Services for Community Liaison Officers; maintain and operate				
A222.6	telephone	wk			
A229.6	computing facilities	wk			
	Equipment for use by the Engineer's and Client's Staff; establish and handover				
A231.1	office equipment	sum	1.00	£0.00	£0.00
A233.1	surveying equipment	sum	1.00	£0.00	£0.00
A239.1	photographic equipment	sum	1.00	£0.00	£0.00
A239.2	safety equipment	sum	1.00	£0.00	£0.00
A239.3	audio and visual equipment	sum	1.00	£0.00	£0.00
	Equipment for use by the Engineer's and Client's Staff for Railway Systems and Operations and Maintenance Departments; establish and handover				
A231.2	office equipment	sum	1.00	£0.00	£0.00
A239.4	safety equipment	sum	1.00	£0.00	£0.00
				Prelims and General Items - Page 3	£0.00

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	PRELIMINARIES AND GENERAL ITEMS				
	Equipment for use by the Community Liaison Officers; establish and handover				
A231.3	office equipment	sum	1.00	£0.00	£0.00
	Equipment for use by the Engineer's and Client's Staff; maintain and operate				
A231.4	office equipment	wk			
A233.2	surveying equipment	wk	169.00	£0.00	£0.00
A239.5	photographic equipment	wk	169.00	£60.64	£10,247.64
A239.6	safety equipment	wk			
A239.7	audio and visual equipment	wk			
	Equipment for use by the Engineer's and Client's Staff for Tramway Systems and Operations and Maintenance Departments; maintain and operate				
A231.5	office equipment	wk			
A239.8	safety equipment	wk			
	Equipment for use by the Community Liaison Officers; maintain and operate				
A231.6	office equipment	wk			
	Attendance upon the Engineer's and Client's Staff; establish and remove				
A241.1	drivers	sum	1.00	£0.00	£0.00
A250.1	testing of materials	sum	1.00	£0.00	£0.00
A260.1	testing of the works	sum	1.00	£0.00	£0.00
	Attendance upon the Engineer's and Client's Staff for Tram Systems and Operations and Maintenance Departments; establish and remove				
A249.1	general cleaning and tea services	sum	1.00	£0.00	£0.00
			Prelims and General Items - Page 4		**£10,247.64**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	PRELIMINARIES AND GENERAL ITEMS				
	Attendance upon the Engineer's and Client's Staff; maintain and operate				
A241.2	drivers	wk			
A250.2	testing of materials	wk			
A260.2	testing of the works	wk			
	Attendance upon the Engineer's and Client's Staff for Tram Systems and Operation and Maintenance Departments; maintain and operate				
A249.2	general cleaning and tea services	wk			
	Other Specified Requirements				
	General and special attendances for Project Contractors & Third Parties				
A710.1	TRAMCO	sum	1.00	£0.00	£0.00
A710.2	MUDFA	sum	1.00	£0.00	£0.00
A710.3	Advance Works Contractor	sum	1.00	£0.00	£0.00
A710.4	Network Rail	sum	1.00	£0.00	£0.00
A710.5	First Scotrail	sum	1.00	£0.00	£0.00
A710.6	Others (ref Schedule 13)	sum	1.00	£0.00	£0.00
	Environmental requirements and Environmental Monitoring and Assessment Programme; establish and remove				
A790.1	air pollution	sum	1.00	£0.00	£0.00
A790.2	noise pollution	sum	1.00	£0.00	£0.00
A790.3	water pollution	sum	1.00	£0.00	£0.00
	Environmental requirements and Environmental Monitoring and Assessment Programme; maintain, monitor and report				
A790.4	air pollution	wk			
A790.5	noise pollution	wk			
				Prelims and General Items - Page 5	**£0.00**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	PRELIMINARIES AND GENERAL ITEMS				
A790.6	water pollution	wk			
	Other requirements				
A790.7	quality management; establish, remove, maintain and operate	sum	1.00	£0.00	£0.00
A790.8	site cleaning; establish, remove maintain and operate	sum	1.00	£0.00	£0.00
A790.9	compliance of existing trees protection, treatment and transplantation requirements; establish, remove, maintain and operate	sum	1.00	£0.00	£0.00
A790.10	durability requirements; establish, remove, maitain and operate	sum	1.00	£0.00	£0.00
A790.11	reliability demonstration plan, establish, remove, maintain and operate	sum	1.00	£0.00	£0.00
A790.12	instrumentation and monitoring works for all elements of the Works; establish and remove	sum	1.00	£0.00	£0.00
A790.13	instrumentation and monitoring works for all elements of the Works; maintain, monitor, audit and report	wk			
A790.14	independent checking engineer	sum	1.00	£0.00	£0.00
A790.15	building services coordination team	sum	1.00	£0.00	£0.00
	Contractor's Requirements				
	Contractor's design costs	sum	1	£0.00	£0.00
A810.01	develop, complete and design of all outstanding works associated with Onboard Supervisory and Comms Equipment - Item Code A1(1)	sum	1.00	£0.00	£0.00
A810.02	develop, complete and design of all outstanding works associated with Track and Formation - Item Code B1	sum	1.00	£0.00	£0.00
A810.03	develop, complete and design of all outstanding works associated with Tamstops - Item Code B2	sum	1.00	£0.00	£0.00
A810.04	develop, complete and design of all outstanding Architectural Builder's Works and Finishes Works - Item Code B3	sum	1.00	£0.00	£0.00
A810.05	develop, complete and design of all outstanding electrical and mechanical works - Item Code B3	sum	1.00	£0.00	£0.00
			Prelims and General Items - Page 6		**£0.00**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	PRELIMINARIES AND GENERAL ITEMS				
A810.06	develop, complete and design of all outstanding structural works - Item Code B3	sum	1.00	£0.00	£0.00
A810.07	develop, complete and design of all outstanding depot maintenance equipment works - Item Code B3	sum	1.00	£0.00	£0.00
A810.08	develop, complete and design of all outstanding highways works - Item Code B4	sum	1.00	£0.00	£0.00
A810.09	develop, complete and design of all outstanding Substation Building works - Item Code B5	sum	1.00	£0.00	£0.00
A810.10	develop, complete and design of all oustanding wayside equipment cabinet works - Item Code B5	sum	1.00	£0.00	£0.00
A810.11	develop, complete and design of all outstanding structure works cabinets - Item Code B6	sum	1.00	£0.00	£0.00
A810.12	develop, complete and design of all outstanding Supervisory and Control Systems works - Item Codes C, C1 and C2	sum	1.00	£0.00	£0.00
A810.13	develop, complete and design of all outstanding Tramstop Equipment works - Item Code C3	sum	1.00	£0.00	£0.00
A810.14	develop, complete and design of all outstanding Depot Equipment works - Item Code C4	sum	1.00	£0.00	£0.00
A810.15	develop, complete and design of all outstanding traction power system works - Item Code D1	sum	1.00	£0.00	£0.00
A810.16	develop, complete and design of all outstanding OHLE works - Item Code D2	sum	1.00	£0.00	£0.00
	Documentation and Manuals				
A810.17	prepare, submit and update Operation and Maintenance Manuals for all Civil and Building works	sum	1.00	£0.00	£0.00
A810.18	prepare, submit and update all Operation and Maintenance Manuals for Onboard Supervisory and Comms Equipment	sum	1.00	£0.00	£0.00
A810.19	prepare, submit and update all Operation and Maintenance Manuals for Track and Formation works	sum	1.00	£0.00	£0.00
A810.20	prepare, submit and update Operation and Maintenance Manuals for depot maintenance equipment	sum	1.00	£0.00	£0.00
			Prelims and General Items - Page 7		**£0.00**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	PRELIMINARIES AND GENERAL ITEMS				
A810.21	prepare, submit and update Operation and Maintenance Manuals for all Supervisory and Control systems	sum	1.00	£0.00	£0.00
A810.22	prepare, submit and update Operation and Maintenance Manuals for all Tramstop Equipment	sum	1.00	£0.00	£0.00
A810.23	prepare, submit and update Operation and Maintenance Manuals for all Traction Power systems, equipment and works	sum	1.00	£0.00	£0.00
A810.24	prepare, submit and update Operation and Maintenance Manuals for all OHLE systems, equipment and works	sum	1.00	£0.00	£0.00
A810.25	prepare, maintain and submit necessary as-constructed drawings and survey records	sum	1.00	£0.00	£0.00
A810.26	prepare and submit Manufacturers' Design Warranties for all equipment installed as part of the Tram System	sum	1.00	£0.00	£0.00
A810.27	prepare, submit and update hazard analysis report for depot maintenance equipment	sum	1.00	£0.00	£0.00
A810.28	prepare, submit and update life cycle cost report for depot maintenance equipment	sum	1.00	£0.00	£0.00
A810.29	prepare and conduct training courses on operation and maintenance of depot maintenance equipment	sum	1.00	£0.00	£0.00
A810.30	prepare and conduct training courses on operation and maintenance of all Supervisory and Control Systems	sum	1.00	£0.00	£0.00
A810.31	prepare and conduct training courses on operation and maintenance of all Traction Power and OHLE systems	sum	1.00	£0.00	£0.00
A810.32	prepare and conduct training courses on operation and maintenance of all Tramstop Equipment	sum	1.00	£0.00	£0.00
	Supply, erect and remove on completion				
A821	offices - Main and Satellite	sum	1.00	£0.00	£0.00
A822	laboratories	sum	1.00	£0.00	£0.00
A823	cabins	sum	1.00	£0.00	£0.00
A824	stores and workshops	sum	1.00	£0.00	£0.00
A825	canteens and mess rooms	sum	1.00	£0.00	£0.00
			Prelims and General Items - Page 8		**£0.00**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	PRELIMINARIES AND GENERAL ITEMS				
	Supply, install and remove on completion				
A831	electricity supply	sum	1.00	£0.00	£0.00
A832	water supply	sum	1.00	£0.00	£0.00
A833	site communication facilities	sum	1.00	£0.00	£0.00
A834	temporary drainage and sewage disposal	sum	1.00	£0.00	£0.00
A271	**Temporary works**				
	The Contractor shall insert hereinafter such temporary works items and sums required to carry out the works under Section B of the Project.				
	Prelims and General Items - Page 9				**£0.00**

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Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	PRELIMINARIES AND GENERAL ITEMS				
A271	**Temporary works (Cont'd)**				

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	PRELIMINARIES AND GENERAL ITEMS				
	Contractor's Other Charges				
	The Contractor has entered hereunder any specific item of work or obligation or service or any other thing which is necessary for the execution of the Works, as required by the Contract, which has been omitted from or has not been separately itemised elsewhere within the Pricing Schedule and for which a separate charge is required. The Contractor shall insert hereinafter such additional items and pages as he deems necessary and include same on the Collection Summary Sheets				
	The unit of measurement for any Contractor's Other Charges shall be "sum".				
	Consortium Supervision	wk	169.00	£8,559.23	£1,446,509.32
	Consortium Office Hire	wk	169.00	£643.76	£108,795.18
	Consortium Office Maintenance	wk	169.00	£1,883.98	£318,392.37
	Consortium Surveying Instruments Maintenance	wk	169.00	£82.77	£13,988.06
	Consortium IT Equipment	wk	169.00	£971.74	£164,223.33
	Consortium Testing	wk	169.00	£1,943.48	£328,447.64
	Consortium Establish/Remove Offices	sum	1.00	£157,637.77	£157,637.77
	Consortium Establish/Remove Surveying Equipment	sum	1.00	£9,853.43	£9,853.43
	Prelims and General Items - Page 11				**£2,547,847.09**

Item Code	DESCRIPTION	UNIT	QTY	Unit Rate	TOTAL £
	METHOD RELATED CHARGES				
	METHOD RELATED CHARGES				
A	**Site management and supervision**				
	Sub-Section 1A	sum	1.00	£0.00	£0.00
	Sub-Section 1B	sum	1.00	£0.00	£0.00
	Sub-Section 1C	sum	1.00	£0.00	£0.00
	Sub-Section 1D	sum	1.00	£0.00	£0.00
	The Contractor shall insert hereinafter such additional items and pages as he deems necessary and include same on the Collection Summary Sheets				
	BB Section B Preliminaries (Fixed)	sum	1.00	£636,770.13	£636,770.13
	BB Section B Preliminaries (Time Related))	sum	1.00	£1,853,812.54	£1,853,812.54
	SC1 Section B Preliminaries	sum	1.00	Included	£0.00
	SC2 Section B Preliminaries	sum	1.00	£2,868,332.94	£2,868,332.94
	SC3 Section B Preliminaries (Fixed)	sum	1.00	£2,536,622.51	£2,536,622.51
	SC3 Section B Preliminaries (Time Related)	sum	1.00	£2,270,208.00	£2,270,208.00
	SC3 Section B Supervision (Time Related)	sum	1.00	£2,153,869.77	£2,153,869.77
	High Level Section B Establish Sections & Sites (fixed)	sum	1.00	£801,175.04	£801,175.04
	High Level Section B Packages Supervision	sum	1.00	£1,485,223.10	£1,485,223.10
	High Level Section B Maintain Section Offices(Time Related)	wks	169.00	£3,338.23	£564,160.76

				Method Related Charges - Page 1	**£15,170,174.79**

APPENDIX B

PROVISIONAL SUMS AND THE MECHANISM FOR THEIR ADJUSTMENT

1.0 Summary of Provisional Sums

1.1 The following tables summarises the Provisional Sums included within the Infraco Works:

1.2 Table 1 notes the Defined Provisional Sums for which Infraco has deemed to have made a provisional allowance for programming and planning. Preliminaries for Defined Provisional Sums has not been priced by Infraco and the appropriate Preliminaries required to carry out the Defined Provisional Sums will be valued in accordance with the spreadsheet contained in Appendix F herein.

1.3 Table 2 notes the Undefined Provisional Sums for which Infraco has not deemed to have made allowance for programming, planning and pricing Preliminaries.

2.0 Table 1 – Defined Provisional Sums

Item	Description of Provision Sum	trigger date	provisional duration	£
1	Pumped surface water outfall at A8 underpass (by depot)	01 June 08	6 months	£100,000
2	Scottish Power connections to the Depot and Ingliston Park & Ride	not applicable	Depot 2 weeks(Feb 09) IPR 2 weeks (Nov 09)	£750,000
3	Relocation of Ancient Monuments – this relates to those monuments noted on the route [SDS drawings ULE 90130-01-HRL 0003B, 6B, 7B, 10B, 12B, 13B, 14B, 15B & 24B refer] – it does not include cleaning and/or restoration	20 Business Day after BBS raise any queries in respect of issued information	Haymarket War Memorial 4 weeks (Mid Nov 08 – Mid Dec 08)	£53,700
4	Additional cost of Network Rail compliant ballast	20 Business Day after BBS provide spec.	26 months (Oct 08 – Nov 10)	£300,000
5	Extra over for revised alignment to Picardy Place, York Place and London Road junctions (see also next item)	01 January 09	23 months (March 09 – Jan 11)	£3,340,324
6	Extra over for major utility diversions Picardy Place, York Place and London Road junctions	01 January 09	23 months (March 09 – Jan 11)	£3,000,000
7	Extra over for shell grip at junctions	01 August 08	29 months (Aug 08 – Jan 11)	£319,343
	Carried forward			£7,863,367

Item	Description of Provision Sum	trigger date	duration	£
	Brought forward			£7,863,367
8	Allowance for Scottish Power connections to new street lights and new traffic signals	not applicable	29 months (Aug 08 – Jan 11)	£115,287
9	Allowance for demolition of existing Leith Walk substation (if required) [SDS drawings ULE 90130-01-SUB- 00023 rev 2, 00046 rev 1,00047 rev 1 and 00051 rev 1 refer]	20 Business Day after BBS raise any queries in respect of issued information	3 months (Aug 08 – Jan 11)	£55,662
10	Urban Traffic Controls [UTC] associated with the delivery of the alignment	01 August 08	29 months (Aug 08 – Jan 11)	£2,500,000
11	Scottish Power connections to Phase 1a sub-stations (8nr x £50,000)	not applicable	21 months(Nov 08 – July 10)	£400,000
12	Various Forth Ports requirements including the revised alignment of track at Casino Square, relocated tramstop, junction amendments and removal of 'kink' in alignment from Constitution Street, footpath on south side of Tower Place Bridge and Victoria Dock Bridge	01 October 08	25 months (Jan 09 – Jan 11)	£150,000
13	Forth Ports requirements at Ocean Terminal amendments	01 October 08	3 months (Aug 09 – Oct 09)	£350,000
	Total			**£11,434,316**

3.0 Table 2 – Undefined Provisional Sums

Item	Description of Provision Sum	Trigger date	£
1	Accommodation Works	not applicable	£1,000,000
2	Allowance for minor utility diversions	01 October 08	£750,000
3	PICOPS / COSS / Possession Protection Staff support when undertaking works adjacent or over the railway – see also 4b) below	not applicable	£755,307
4	Archaeological Officer – impact on productivity	not applicable	£405,755
5	Additional Crew Relief Facilities at Haymarket [SDS drawings ULE 90130-02-STP-000126 REV 1 and 000127 rev 1 refer]	20 Business Day after BBS raise any queries in respect of issued information	£49,950
6	Urban Traffic Controls [UTC] associated with the wider area impacts	01 January 10	£2,500,000
7	Forth Ports requirements for design and construction of by-pass road to adoptable standard	01 October 08	£400,000
8	Forth Ports requirements for Lindsay Road amendments	01 October 08	£1,750,000
9	Royal Bank of Scotland requirement for enhancement of Gogarburn Tramstop	01 October 08	£400,000
	Total		**£8,011,012**

4.0 Basis

a) Relocation of Ancient Monuments applies to those on the route only. Any works in respect of ancient monuments in George Street are undefined.

b) Any costs in connection with PICOPS / COSS / Possession Protection Staff as Network Rail possession support when undertaking works adjacent or over the railway in respect of item 3 of Table 2 above shall relate solely to the possessions planned at signature of the Infraco Contract. This possession support will be adjusted in the event that Network Rail varies the requirement for PICOPS / COSS or otherwise amends the possession arrangement. However if the possession is amended or extended due to Infraco over-running then any additional possession support will not be recoverable.

5.0 Requirement to co-operate

5.1 Infraco shall co-operate with **tie** in the provision of design and pricing information required to satisfy the requirements of the Forth Ports Agreement.

5.2 Infraco shall co-operate with **tie** in the provision of pricing information required to satisfy the requirements of the Royal Bank of Scotland Agreement in connection with Gogarburn Tramstop (outline design provided by others).

APPENDIX C

IDENTIFIED VALUE ENGINEERING [VE]

1.0 The following table summarises the agreed identified VE opportunities / savings which are fixed and firm reductions, save for the Key Qualifications noted:

Item	Description of Identified VE Saving	£	Notes	Key Qualifications
1	Delete depot pumping station / storm tanks by utilizing existing gravity system	-£193,526	**tie** may need to add in cost of a small pump	Subject to **tie** issuing an instruction to implement the VE opportunity. **tie** carries specification/acceptance risk and cost of additional pump
2	Build part of Depot now with provision to expand in the future / reduce size of car park facilities	-£230,000	Initial supply of 100 car parking places agreed	Subject to **tie** issuing an instruction to implement the VE opportunity.
3	Delete split vehicle accommodation system at Depot - requirement dependant on tram vehicle selection	-£27,500	Accommodation bodies are in Tram Suppliers offer	Subject to **tie** issuing an instruction to implement the VE opportunity.
4	Rationalise scope requirement Track Maintenance Equipment at Depot and consider renting	-£27,500		Subject to **tie** issuing an instruction to implement the VE opportunity.
5	Deletion of one pavement (inner) to Depot	-£36,000	Shown on latest site plan drawings	Subject to **tie** issuing an instruction to implement the VE opportunity.
6	Delete requirement for concrete apron to security fence at Depot	-£6,080		Subject to **tie** issuing an instruction to implement the VE opportunity.
	Carried forward	-£520,606		

Item	Description of Identified VE Saving	£	Notes	Key Qualifications
	Brought forward	-£520,606		
7	Consolidated VE items including those which result from changes to initial design driven by proximity to BAA runway and EARL decision as follows: • changes to initial Depot design driven by proximity to BAA runway (reduced bulk excavation) • reductions in structural loadings (gantry crane reduced in capacity and size impacting on building frame and envelope) • reduction in staff accommodation provision (reduced operational workforce reducing messing facilities, changing rooms, locker space, etc.) • reduction in fit out specification • reduction in domestic utility capacity (reduced building volume and accommodation provision)	-£2,200,000	Includes reductions in structural loadings (gantry crane reduced in capacity and size impacting on building frame and envelope), reductions in staff accommodation provision (reduced operational workforce reducing messing facilities, changing rooms,lock.	Design to cost but compliant with current technical/design info
8	Delete standby generator and substitute with hardstanding and power connection for portable generator	-£150,000		Subject to **tie** issuing an instruction to implement the VE opportunity.
9	Material recovery and reprocessing (Infraco); 2 options - reconstituted planings & Type 1R	-£500,000		Level of saving is subject to adjustment of quantity of this item based on the final design.
	Carried forward	-£3,370,606		

Item	Description of Identified VE Saving		Notes	Key Qualifications
	Brought forward	-£3,370,606		
10	Reduce kerb and associated re-instatement of pavement	-£100,000		Level of saving is subject to adjustment of quantity of this item based on the final design.
11	Reduce drainage run from guideway	-£100,000		Level of saving is subject to adjustment of quantity of this item based on the final design.
12	Edinburgh Park Viaduct various savings including use of cross heads to eliminate temp works,steel or concrete beams	-£1,470,000	This assumes continuation with 7 span structure	Subject to approval of NEL / CEC and subject to designing to cost
13	Carricknowe Bridge parapet – downgrade from P6 / P5 to N2 (reduce cost of parapet plus knock on effect on deck design / cost)	-£85,000		Subject to approval of design by Network Rail
	Carried forward	-£5,125,606		

Item	Description of Identified VE Saving	£	Notes	Key Qualifications
	Brought forward	-£5,125,606		
14	A8 Underpass – various initiatives	-£850,000	Changing to a contiguous piled wall/leaner designs	Subject to being able to design to cost
15	Roseburn Street Viaduct – various initiatives	-£1,375,000		Subject to approval of stakeholders – Network Rail and SRU and
16	Water of Leith initiatives	-£150,000		Subject to being Designed to Cost
17	Eight maintenance walkway structures – delete or reduce	-£250,000		Subject to being Designed to Cost
18	Class 7 material conversion	-£300,000		Level of saving is subject to adjustment of quantity of fill required by the final design.
19	Optimize the work site lengths wherever practical to ensure efficient construction outputs	-£300,000		Subject to programme development with CEC
20	Accept more disruption over shorter period to maximize efficiency of construction operations	-£100,000		Subject to programme development with CEC
21	Option to lease UPS provision from supplier rather than purchase	-£300,000		Subject to agreement of Operator
	Carried forward	-£8,750,606		

Item	Description of Identified VE Saving	£	Notes	Key Qualifications
	Brought forward	-£8,750,606		
22	PM integration including shared resources and co-location	-£500,000		Subject to BBS / **tie** agreeing savings in resources and facilities items from BBS and **tie** costs.
23	Noise attenuation (outside of Roseburn Corridor) 3,650m of fencing	-£50,000		Subject to property owners' claims.
24	Reduce ballasted track thickness from 300mm to 200mm	-£200,000		
25	Urban Traffic Controls (UTC) associated with wider area impacts	-464,400		subject to **tie** issuing an instruction to implement the related Unidentified Provisional Sum at Item 6 in Table 2
	Total	**-£9,965,006**		

APPENDIX D

FURTHER VALUE ENGINEERING [VE]

1.0 The following table summarises provisional further VE opportunities / savings:

Item	Description of Identified VE Saving		Key Qualifications
1	Further project management integration over 3 years	-£500,000	Joint target
2	SDS design scope economy, variation and reduction	-£500,000	Joint target
3	Tramstops – standard finishes to circa 20% - 30% of stops	-£500,000	Joint target
4	Picardy Place level flexing – MUDFA savings	-£500,000	**tie** led initiative
5	Picardy Place level flexing – construction savings	-£500,000	Joint initiative
6	Value engineer finishes on Edinburgh Park Viaduct and other structures	-£170,000	Subject to approval of NEL / CEC
	Total	**-£2,670,000**	

APPENDIX E

UTILITIES DIVERSIONS TO BE CARRIED OUT BY INFRACO

Please refer to Schedule Part 41 (*Ground Conditions and Utilities Information*)

APPENDIX F

SCHEDULE OF RATES

APPENDIX G

PROCESS FOR AGREEMENT OF VALUE OF TIE CHANGES

1.0 Generally

1.1 The valuation of any **tie** Changes shall be made in accordance with Clause 80.6

1.2 Where Clause 80.6.3 or 80.6.4 applies and to the extent that they apply to a **tie** Change then the valuation shall be on the basis of Actual Cost or estimated Actual Cost.

1.3 In respect of a valuation of any work under 1.2 the **tie** Representative shall apply head office overheads and profit percentages to the appropriate elements of Actual Cost as follows:

(a)	Civil Engineering works	10%
(b)	Systems and Track works	17%

In all cases where a **tie** Change is being valued in accordance with Clause 80.6, Site related overhead (Preliminaries) shall be valued and added as follows:

7.4% to be added to Actual Cost to cover the Consortium Preliminaries and associated elements as set out in Spreadsheet 1 in Appendix F.

If appropriate to the particular **tie** Change, any other Preliminaries elements, valued in accordance with the Spreadsheet 2 set out in Appendix F.

1.4 The amount of the overheads and profit percentage calculated as part of the valuation of Variations shall be added in the case where the valuation results in an addition and shall be deducted where the valuation results in an omission.

1.5 Where 1.2 above is the basis of the valuation of **tie** Changes then the following items shall not be included as Actual Costs under the Infraco Contract.

1. Costs not justified by the Infraco's accounts and records.
2. Costs not payable under the Infraco Contract.
3. Costs arising from the Infraco's Design errors.
4. Costs arising in respect of loss or damage except as provided for under the Agreement.
5. Costs which should have not been paid to a sub-contractor in accordance with the relevant sub-contract.
6. Costs arising from people who are part of the Head Office Overhead.

APPENDIX H

BASE DATE DESIGN INFORMATION

All of the Drawings available to Infraco up to and including 25th November 2007.

APPENDIX I

NETWORK RAIL IMMUNISATION

1. Words defined in Clause 16 or Part 1 of the Schedule shall have the same meaning in this Appendix I to Part 4 of the Schedule. Additionally, for the purposes of this Appendix I;

   1.1 "**Immunisation Programme**" shall mean the series of linked tasks, defined in the form of a Gantt chart in the Infraco's schedule of works, to be completed within a predetermined time that when executed to completion will result in NR Immunisation**;**

   1.2 "**Infraco's Immunisation Strategy**" shall mean the defined set of processes documented in the Infraco's NR EMC Strategy Plan; and

   1.3 "**NR Immunisation**" shall mean, in so far as indicated in Infraco's Immunisation Strategy as intended to be carried out on the Network, works to mitigate the potential effects to the Railway of electromagnetic interference due to effects of coupled energy or stray current from the operation of the Edinburgh Tram Network traction system.

2. The Infraco has agreed to undertake the NR Immunisation, including management of associated works, programme and approvals together with obligations in relation to the same set out in Clause 16 (*Interface with Network Rail)*, subject to Network Rail approving the Infraco Immunisation Strategy in writing before 31 July 2008. In the event that Network Rail have been unable to determine whether or not to approve the Infraco Immunisation Strategy by 31 July 2008 due to material delay on the part of the Infraco in the provision of relevant information reasonably required by Network Rail through **tie**, the deadline for approval specified in this paragraph shall be extended to such later date as the Parties, acting reasonably shall agree.

3. In the event that Network Rail approve the NR Immunisation prior to the deadline referred to in paragraph 2 above:

   3.1 Infraco shall procure the delivery of the NR Immunisation;

   3.2 subject to any liability in relation to NR Immunisation and associated Possessions being addressed under Clauses 16.72 or 16.73, **tie** shall pay to Infraco 100% of the cost of NR Immunisation subject to a cap for the total cost of such works of£3 million;

   3.3. Infraco and **tie** shall jointly to carry out value engineering investigations in respect of NR Immunisation;

   3.4 in the event that the actual cost of procuring the NR Immunisation is less than £3 million then **tie** shall (in the case of Infraco, in addition to sums paid or due to be paid under paragraph 3.2) pay one third of the difference between the actual cost and £3 million to both Network Rail and Infraco and be entitled to retain the remaining third of that difference;

   3.5 in so far as the cost of NR Immunisation exceeds £3 million, Infraco shall be responsible for 100% of the proportion of that cost in excess of £3 million but not exceeding £3.375 million;

   3.6 subject to any liability in relation to NR Immunisation and associated Possessions being addressed under Clauses 16.72 or 16.73, in so far as the cost of NR Immunisation exceeds £3.375 million but does not exceed £4.125 million, **tie** shall pay Infraco 50% of the

proportion of that cost in excess of £3.375 million in addition to all sums due to Infraco pursuant to paragraph 3.2;

3.7 subject to any liability in relation to NR Immunisation and associated Possessions (as defined in Clause 16) being addressed under Clauses 16.72 or 16.73, **tie** shall pay Infraco 100% of the cost of NR Immunisation in so far as the cost of such works exceeds £4.125 million.

4. The Infraco Immunisation Strategy is based on the Infraco or its sub-contractors carrying out all the works and supplying all equipment for the NR Immunisation.

5. Network Rail Costs as defined for the purposes of the Asset Protection Agreement shall be excluded in the calculation of the cost of the NR Immunisation for paragraph 3. All such Network Rail Costs shall be borne by **tie.**

6. Delays to NR Immunisation attributable to Network Rail shall be Compensation Events to the extent that such delays are not directly due to Infraco failure to comply with its obligations under this Agreement.

7. The Infraco's liability to **tie** in respect of or arising out of NR Immunisation shall be subject to the limitations as provided for in Clauses 16.72 and 16.73.

8. In the event that Network Rail do not accept the Infraco Immunisation Strategy by the deadline specified in paragraph 2 above, **tie** shall instruct the Infraco on how to proceed in respect of NR Immunisation and such instructions shall be Compensation Events and a **tie** Change (for any resulting additional or changed work required by **tie**) under the Infraco Contract.

9. In the event of paragraph 8 applying, the **tie** Change shall (subject to evaluation) omit an allowance of £2.2 million for NR Immunisation and add back any additional work to be undertaken to by the Infraco to support **tie** in delivering an alternative immunisation solution to mitigate the potential effects to the Railway of electromagnetic interference due to effects of coupled energy or stray current from the operation of the Edinburgh Tram Network traction system ("Alternative Solution").

10. In the event that the Infraco does not undertake the NR Immunisation or Alternative Solution works in full, all electromagnetic interference or corrosion due to effects of coupled energy or stray current from the operation of the Edinburgh Tram Network related obligations, in the Infraco Contract (including without prejudice to the foregoing Clause 16 and any relevant Third Party Agreements in Part 13 Section A of the Schedule) shall be the subject of a **tie** Change.

11. For the avoidance of doubt, **tie** shall pay to the Infraco, to the extent not taken into account in the **tie** Change arising pursuant to paragraph 8, any costs and expenses incurred as a consequence of the delay between the deadline specified in paragraph 2 and the actual date (and not the deemed date) that **tie** issue a **tie** Change Order. Such costs and expenses shall be evaluated pursuant to Clause 65 (*Compensation Events*) on the basis that such delay is itself a Compensation Event.

12. **tie** accepts that the Infraco may commence the work to deliver the NR Immunisation under the Mobilisation and Advance Works Agreement.

13. All sums due to Infraco pursuant to this Appendix I shall be paid in accordance with Clause 66 (*Payment of the Contract Price*) and not Clause 67 (*Payment in respect of Applications for Milestone Payments*).

Spreadsheet No 1 - Appendix 2 Schedule Part 4

DESCRIPTION	Section A £	Section B £	Total BB	Fixed Section A £	Fixed Section B £	Fixed Total BB	Time-Related Section A £	Time-Related Section B £	Time-Related Total BB
PRELIMINARIES AND GENERAL ITEMS									
Contractual Requirements Section A									
Contractor's bond	1,317,094		1,317,094				0		0
All other insurance required by the Contract	1,633,046		1,633,046				1,633,046		1,633,046
Accommodation for the Engineer's and Client's Staff; establish and remove offices	82,310		82,310				0		0
Accommodation for the Engineer's and Client's Staff; maintain and operate offices	321,187		321,187				0		0
Services for Engineer's and Client's Staff; maintain and operate transport vehicles	206,171		206,171				0		0
Equipment for use by the Engineer's and Client's Staff; maintain and operate photographic equipment	19,031		19,031				0		0
Consortium Supervision	2,686,374		2,686,374				2,686,374		2,686,374
Consortium Office Hire	202,048		202,048				202,048		202,048
Consortium Office Maintenance	591,300		591,300				591,300		591,300
Consortium Surveying Instruments Maintenance	25,978		25,978				25,978		25,978
Consortium IT Equipment	304,986		304,986				304,986		304,986
Consortium Testing	609,974		609,974				609,974		609,974
Consortium Establish/Remove Offices	292,756		292,756				0		0
Consortium Establish/Remove Surveying Equipment	18,299		18,299						0
Consortium costs Incurred during facilitated negotiation phase	2,198,312		2,198,312						0
Contractual Requirements - Section B									
Contractor's bond		670,743	670,743					0	0
All other insurance required by the Contract		881,247	881,247					881,247	881,247
Accommodation for the Engineer's and Client's Staff; establish and remove offices		44,321	44,321					0	0
Accommodation for the Engineer's and Client's Staff; maintain and operate offices		172,947	172,947					0	0
Services for Engineer's and Client's Staff; maintain and operate transport vehicles		111,015	111,015					0	0
Equipment for use by the Engineer's and Client's Staff; maintain and operate photographic equipment		10,248	10,248					0	0
Consortium Supervision		1,446,509	1,446,509					1,446,509	1,446,509
Consortium Office Hire		108,795	108,795					108,795	108,795
Consortium Office Maintenance		318,392	318,392					318,392	318,392
Consortium Surveying Instruments Maintenance		13,988	13,988					13,988	13,988
Consortium IT Equipment		164,223	164,223					164,223	164,223
Consortium Testing		328,448	328,448					328,448	328,448
Consortium Establish/Remove Offices		157,638	157,638					0	0
Consortium Establish/Remove Surveying Equipment		9,853	9,853						0
Subtotal	**10,508,867**	**4,438,367**	**14,947,235**	**0**	**0**	**0**	**6,053,707**	**3,261,603**	**9,315,310**
METHOD RELATED CHARGES									
High Level Section A Establish Sections & Sites (fixed)	1,468,821		1,468,821						0
High Level Section A Supervision (Time Related)	2,722,909		2,722,909				0		0
High Level Section A Maintain Section Offices(Time Related)	564,161		564,161				0		0
Depot Subcontractor Section A Supervision	1,147,710		1,147,710				0		0
Depot Subcontractor Section A Establish Site Services Welfare etc.	272,581		272,581						0
Depot Subcontractor Section A Scaffolding & Misc Plant	717,319		717,319				0		0
Depot Subcontractor Section A Insurance & Bond	243,888		243,888				0		0
Depot Subcontractor Section A Establish and Maintain Compound	54,734		54,734				0		0
Depot Subcontractor Section A Non productive Labour	283,893		283,893				0		0
BB1 Section A Preliminaries	6,735,461		6,735,461				0		0
SC1 Section A Supervision (Time Related)	2,508,922		2,508,922				0		0
SC1 Section A Preliminaries (Fixed)	1,131,799		1,131,799						0
SC1 Section A Preliminaries (Time Related)	2,689,180		2,689,180				0		0
SC1 Section A Insurance & Bond	197,862		197,862				0		0
SC2 Section A Preliminaries (Fixed)	319,460		319,460						0
SC2 Section A Preliminaries (Time related)	1,432,030		1,432,030				0		0
SC2 Section A Provisional Sum for Landowner Compensation Payments for land taken outside wayleave during construction	146,882		146,882						0
BB Section B Preliminaries (Fixed)		636,770	636,770						0
BB Section B Preliminaries (Time Related))		1,853,813	1,853,813					0	0
SC2 Section B Preliminaries		2,868,333	2,868,333					0	0
SC3 Section B Preliminaries (Fixed)		2,536,623	2,536,623						0
SC3 Section B Preliminaries (Time Related)		2,270,208	2,270,208					0	0
SC3 Section B Supervision (Time Related)		2,153,870	2,153,870					0	0
High Level Section B Establish Sections & Sites (fixed)		801,175	801,175						0
High Level Section B Packages Supervision		1,485,223	1,485,223					0	0
High Level Section B Maintain Section Offices(Time Related)		564,161	564,161					0	0
Subtotal	**22,637,614**	**15,170,175**	**37,807,788**				**0**	**0**	**0**
Grand Total (Gross Prelims)	**33,146,481**	**19,608,542**	**52,755,023**				**6,053,707**	**3,261,603**	**9,315,310**
Escalation (prelims pro-rata)							-2,045,890	-1,102,280	**-3,148,171**
Grand Total (Nett Prelims)	**33,146,481**	**19,608,542**	**52,755,023**				**4,007,817**	**2,159,323**	**6,167,139**
Construction Cost (=Total Contract Value less Prelims)									**83,239,714**
Prelims - %									**7.4%**

Note
The Prelims percentage shown above is to be added to cover all items marked in red as an addition to Actual Cost.

Spreadsheet No 2 - Appendix F Schedule Part 4

DESCRIPTION	Section A £	Section B £	Total BB	Fixed Section A £	Fixed Section B £	Fixed Total BB	Time-Related Section A £	Time-Related Section B £	Time-Related Total BB
PRELIMINARIES AND GENERAL ITEMS									
Contractual Requirements Section A									
Contractor's bond	1,317,094		**1,317,094**			**0**	1,317,094		**1,317,094**
All other insurance required by the Contract	1,633,046		**1,633,046**			**0**	1,633,046		**1,633,046**
Accommodation for the Engineer's and Client's Staff; establish and remove offices	82,310		**82,310**	82,310		**82,310**			**0**
Accommodation for the Engineer's and Client's Staff; maintain and operate offices	321,187		**321,187**			**0**	321,187		**321,187**
Services for Engineer's and Client's Staff; maintain and operate transport vehicles	206,171		**206,171**			**0**	206,171		**206,171**
Equipment for use by the Engineer's and Client's Staff; maintain and operate photographic equipment	19,031		**19,031**			**0**	19,031		**19,031**
Consortium Supervision	2,686,374		**2,686,374**			**0**	2,686,374		**2,686,374**
Consortium Office Hire	202,048		**202,048**			**0**	202,048		**202,048**
Consortium Office Maintenance	591,300		**591,300**			**0**	591,300		**591,300**
Consortium Surveying Instruments Maintenance	25,978		**25,978**			**0**	25,978		**25,978**
Consortium IT Equipment	304,986		**304,986**			**0**	304,986		**304,986**
Consortium Testing	609,974		**609,974**			**0**	609,974		**609,974**
Consortium Establish/Remove Offices	292,756		**292,756**	292,756		**292,756**			**0**
Consortium Establish/Remove Surveying Equipment	18,299		**18,299**	18,299		**18,299**			**0**
Consortium costs Incurred during facilitated negotiation phase	2,198,312		**2,198,312**	2,198,312		**2,198,312**			**0**
Contractual Requirements - Section B									
Contractor's bond		670,743	**670,743**			**0**		670,743	**670,743**
All other insurance required by the Contract		881,247	**881,247**			**0**		881,247	**881,247**
Accommodation for the Engineer's and Client's Staff; establish and remove offices		44,321	**44,321**		44,321	**44,321**			**0**
Accommodation for the Engineer's and Client's Staff; maintain and operate offices		172,947	**172,947**			**0**		172,947	**172,947**
Services for Engineer's and Client's Staff; maintain and operate transport vehicles		111,015	**111,015**			**0**		111,015	**111,015**
Equipment for use by the Engineer's and Client's Staff; maintain and operate photographic equipment		10,248	**10,248**			**0**		10,248	**10,248**
Consortium Supervision		1,446,509	**1,446,509**			**0**		1,446,509	**1,446,509**
Consortium Office Hire		108,795	**108,795**			**0**		108,795	**108,795**
Consortium Office Maintenance		318,392	**318,392**			**0**		318,392	**318,392**
Consortium Surveying Instruments Maintenance		13,988	**13,988**			**0**		13,988	**13,988**
Consortium IT Equipment		164,223	**164,223**			**0**		164,223	**164,223**
Consortium Testing		328,448	**328,448**			**0**		328,448	**328,448**
Consortium Establish/Remove Offices		157,638	**157,638**		157,638	**157,638**			**0**
Consortium Establish/Remove Surveying Equipment		9,853	**9,853**		9,853	**9,853**			**0**
Subtotal	**10,508,867**	**4,438,367**	**14,947,235**	**2,591,677**	**211,812**	**2,803,489**	**7,917,190**	**4,226,556**	**12,143,746**
METHOD RELATED CHARGES									
High Level Section A Establish Sections & Sites (fixed)	1,468,821		**1,468,821**	1,468,821		**1,468,821**			**0**
High Level Section A Supervision (Time Related)	2,722,909		**2,722,909**			**0**	2,722,909		**2,722,909**
High Level Section A Maintain Section Offices(Time Related)	564,161		**564,161**			**0**	564,161		**564,161**
Depot Subcontractor Section A Supervision	1,147,710		**1,147,710**			**0**	1,147,710		**1,147,710**
Depot Subcontractor Section A Establish Site Services Welfare etc.	272,581		**272,581**	272,581		**272,581**			**0**
Depot Subcontractor Section A Scaffolding & Misc Plant	717,319		**717,319**			**0**	717,319		**717,319**
Depot Subcontractor Section A Insurance & Bond	243,888		**243,888**			**0**	243,888		**243,888**
Depot Subcontractor Section A Establish and Maintain Compound	54,734		**54,734**	10,947		**10,947**	43,787		**43,787**
Depot Subcontractor Section A Non productive Labour	283,893		**283,893**			**0**	283,893		**283,893**
BB1 Section A Preliminaries	6,735,461		**6,735,461**	1,347,092		**1,347,092**	5,388,369		**5,388,369**
SC1 Section A Supervision (Time Related)	2,508,922		**2,508,922**			**0**	2,508,922		**2,508,922**
SC1 Section A Preliminaries (Fixed)	1,131,799		**1,131,799**	1,131,799		**1,131,799**			**0**
SC1 Section A Preliminaries (Time Related)	2,689,180		**2,689,180**			**0**	2,689,180		**2,689,180**
SC1 Section A Insurance & Bond	197,862		**197,862**			**0**	197,862		**197,862**
SC2 Section A Preliminaries (Fixed)	319,460		**319,460**	319,460		**319,460**			**0**
SC2 Section A Preliminaries (Time related)	1,432,030		**1,432,030**			**0**	1,432,030		**1,432,030**
SC2 Section A Provisional Sum for Landowner Compensation Payments for land taken outside wayleave during construction	146,882		**146,882**	146,882		**146,882**			**0**
BB Section B Preliminaries (Fixed)		636,770	**636,770**		636,770	**636,770**			**0**
BB Section B Preliminaries (Time Related))		1,853,813	**1,853,813**			**0**		1,853,813	**1,853,813**
SC2 Section B Preliminaries		2,868,333	**2,868,333**		573,667	**573,667**		2,294,666	**2,294,666**
SC3 Section B Preliminaries (Fixed)		2,536,623	**2,536,623**		2,536,623	**2,536,623**			**0**
SC3 Section B Preliminaries (Time Related)		2,270,208	**2,270,208**			**0**		2,270,208	**2,270,208**
SC3 Section B Supervision (Time Related)		2,153,870	**2,153,870**			**0**		2,153,870	**2,153,870**
High Level Section B Establish Sections & Sites (fixed)		801,175	**801,175**		801,175	**801,175**			**0**
High Level Section B Packages Supervision		1,485,223	**1,485,223**			**0**		1,485,223	**1,485,223**
High Level Section B Maintain Section Offices(Time Related)		564,161	**564,161**			**0**		564,161	**564,161**
Subtotal	**22,637,614**	**15,170,175**	**37,807,788**	**4,697,583**	**4,548,234**	**9,245,817**	**17,940,031**	**10,621,941**	**28,561,971**
Grand Total (Gross Prelims)	**33,146,481**	**19,608,542**	**52,755,023**	**7,289,259**	**4,760,046**	**12,049,306**	**25,857,221**	**14,848,496**	**40,705,717**
Escalation (covering all BB works)	-11,462,775	-6,366,135	**-17,828,910**	-2,520,785	-1,545,403	**-4,066,188**	-8,941,990	-4,820,732	**-13,762,722**
Grand Total (Nett Prelims)	**21,683,706**	**13,242,407**	**34,926,113**	**4,768,475**	**3,214,643**	**7,983,118**	**16,915,231**	**10,027,764**	**26,942,995**

Note Above Gross Prelims include 10% head office overhead and profit

THIS IS SCHEDULE PART 5 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

Infraco Contract - Schedule Part 5 (*Milestone Payment Schedule)*

Erratum Sheet

Spare Parts and Infrastructure Mobilisation amounts will be subject to indexation at the date of payment using RPIX to a maximum aggregate amount of £50,000.

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Morrison Construction Group | BILFINGER BERGER | SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year	2008											2008 Subtotal GBP
																Period	1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	
Project Total									**219,162,335.96**		**03-Mar-2008**	**16-Jul-2012**	**1601**	**2**	**48**		**38,200,000**	**2,500,000**	**5,076,410**	**1,822,260**	**3,111,288**	**3,605,594**	**5,305,566**	**8,342,828**	**9,029,611**	**3,854,412**	**83,305,072**
00 Mobilisation and Preliminaries									**91,307,464.19**		**14-Apr-2008**	**14-Jun-2011**	**1157**	**4**	**46**		**38,200,000**	**3,500,000**	**4,795,138**	**1,295,138**	**1,295,138**	**1,295,138**	**1,295,138**	**1,992,962**	**1,992,962**	**1,992,962**	**58,949,713**
	00A Mobilisation								**45,200,000.00**		**14-Apr-2008**	**14-Jun-2008**	**62**	**4**	**6**		**38,200,000**	**3,500,000**	**3,500,000**	-	-	-	-	-	-	-	**45,200,000**
		00A1 Mobilisation							**45,200,000.00**		**14-Apr-2008**	**14-Jun-2008**	**62**	**4**	**6**		**38,200,000**	**3,500,000**	**3,500,000**	-	-	-	-	-	-	-	**45,200,000**
			Mobilisation																								
				Mobilisation					**45,200,000.00**	**100%**	**14-Apr-08**	**14-Jun-08**	**62**	**4**	**6**		**38,200,000**	**3,500,000**	**3,500,000**	-	-	-	-	-	-	-	**45,200,000**
					00A	Contract Award	Mobilisation	0	38,200,000.00	84.5%	14-Apr-08	14-Apr-08	1	4	4		38,200,000	-	-	-	-	-	-	-	-	-	38,200,000
					00B	Period 1 Payment	Mobilisation	0	3,500,000.00	7.7%	14-May-08	14-May-08	1	5	5		-	3,500,000	-	-	-	-	-	-	-	-	3,500,000
					00C	Period 2 Payment	Mobilisation	0	3,500,000.00	7.7%	14-Jun-08	14-Jun-08	1	6	6		-	-	3,500,000	-	-	-	-	-	-	-	3,500,000
				Preliminaries					**30,774,220.52**	**100%**	**27-Apr-08**	**16-Jul-11**	**1176**	**5**	**46**		-	-	**539,899**	**539,899**	**539,899**	**539,899**	**539,899**	**539,899**	**1,027,884**	**1,027,884**	**6,323,043**
					Mth 1	Preliminaries Month 1	Prelims - BB	0	539,898.60	1.8%	27-Apr-08	24-May-08	28	5	5		-	-	-	-	539,899	-	-	-	-	-	-	-	539,899
					Mth 2	Preliminaries Month 2	Prelims - BB	0	539,898.60	1.8%	25-May-08	21-Jun-08	28	6	6		-	-	-	-	-	539,899	-	-	-	-	-	-	539,899
					Mth 3	Preliminaries Month 3	Prelims - BB	0	539,898.60	1.8%	22-Jun-08	19-Jul-08	28	7	7		-	-	-	-	-	-	539,899	-	-	-	-	-	539,899
					Mth 4	Preliminaries Month 4	Prelims - BB	0	539,898.60	1.8%	20-Jul-08	16-Aug-08	28	8	8		-	-	-	-	-	-	-	539,899	-	-	-	-	539,899
					Mth 5	Preliminaries Month 5	Prelims - BB	0	539,898.60	1.8%	17-Aug-08	13-Sep-08	28	9	9		-	-	-	-	-	-	-	-	539,899	-	-	-	539,899
					Mth 6	Preliminaries Month 6	Prelims - BB	0	539,898.60	1.8%	14-Sep-08	11-Oct-08	28	10	10		-	-	-	-	-	-	-	-	-	539,899	-	-	539,899
					Mth 7	Preliminaries Month 7	Prelims - BB	0	1,027,883.70	3.3%	12-Oct-08	08-Nov-08	28	11	11		-	-	-	-	-	-	-	-	-	-	1,027,884	-	1,027,884
					Mth 8	Preliminaries Month 8	Prelims - BB	0	1,027,883.70	3.3%	09-Nov-08	06-Dec-08	28	12	12		-	-	-	-	-	-	-	-	-	-	-	1,027,884	1,027,884
					Mth 9	Preliminaries Month 9	Prelims - BB	0	1,027,883.70	3.3%	07-Dec-08	03-Jan-09	28	13	13		-	-	-	-	-	-	-	-	-	-	-	-	1,027,884	1,027,884
					Mth 10	Preliminaries Month 10	Prelims - BB	0	1,027,883.70	3.3%	04-Jan-09	31-Jan-09	28	14	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 11	Preliminaries Month 11	Prelims - BB	0	1,027,883.70	3.3%	01-Feb-09	28-Feb-09	28	15	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 12	Preliminaries Month 12	Prelims - BB	0	1,027,883.70	3.3%	01-Mar-09	28-Mar-09	28	16	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 13	Preliminaries Month 13	Prelims - BB	0	1,027,883.70	3.3%	29-Mar-09	25-Apr-09	28	17	17		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 14	Preliminaries Month 14	Prelims - BB	0	1,027,883.70	3.3%	26-Apr-09	23-May-09	28	18	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 15	Preliminaries Month 15	Prelims - BB	0	1,027,883.70	3.3%	24-May-09	20-Jun-09	28	19	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 16	Preliminaries Month 16	Prelims - BB	0	1,027,883.70	3.3%	21-Jun-09	18-Jul-09	28	20	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 17	Preliminaries Month 17	Prelims - BB	0	1,027,883.70	3.3%	19-Jul-09	15-Aug-09	28	21	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 18	Preliminaries Month 18	Prelims - BB	0	1,027,883.70	3.3%	16-Aug-09	12-Sep-09	28	22	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 19	Preliminaries Month 19	Prelims - BB	0	1,027,883.70	3.3%	13-Sep-09	10-Oct-09	28	23	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 20	Preliminaries Month 20	Prelims - BB	0	1,027,883.70	3.3%	11-Oct-09	07-Nov-09	28	24	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 21	Preliminaries Month 21	Prelims - BB	0	1,027,883.70	3.3%	08-Nov-09	05-Dec-09	28	25	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 22	Preliminaries Month 22	Prelims - BB	0	1,027,883.70	3.3%	06-Dec-09	02-Jan-10	28	26	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 23	Preliminaries Month 23	Prelims - BB	0	1,027,883.70	3.3%	03-Jan-10	30-Jan-10	28	27	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 24	Preliminaries Month 24	Prelims - BB	0	1,027,883.70	3.3%	31-Jan-10	27-Feb-10	28	28	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 25	Preliminaries Month 25	Prelims - BB	0	1,027,883.70	3.3%	28-Feb-10	27-Mar-10	28	29	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 26	Preliminaries Month 26	Prelims - BB	0	1,027,883.70	3.3%	28-Mar-10	24-Apr-10	28	30	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 27	Preliminaries Month 27	Prelims - BB	0	1,027,883.70	3.3%	25-Apr-10	22-May-10	28	31	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 28	Preliminaries Month 28	Prelims - BB	0	1,027,883.70	3.3%	23-May-10	19-Jun-10	28	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 29	Preliminaries Month 29	Prelims - BB	0	487,985.11	1.6%	20-Jun-10	17-Jul-10	28	33	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 30	Preliminaries Month 30	Prelims - BB	0	487,985.11	1.6%	18-Jul-10	14-Aug-10	28	34	34		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 31	Preliminaries Month 31	Prelims - BB	0	487,985.11	1.6%	15-Aug-10	11-Sep-10	28	35	35		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 32	Preliminaries Month 32	Prelims - BB	0	487,985.11	1.6%	12-Sep-10	09-Oct-10	28	36	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 33	Preliminaries Month 33	Prelims - BB	0	296,944.70	1.0%	10-Oct-10	06-Nov-10	28	37	37		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 34	Preliminaries Month 34	Prelims - BB	0	296,944.70	1.0%	07-Nov-10	04-Dec-10	28	38	38		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 35	Preliminaries Month 35	Prelims - BB	0	296,944.70	1.0%	05-Dec-10	01-Jan-11	28	39	39		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 36	Preliminaries Month 36	Prelims - BB	0	296,944.70	1.0%	02-Jan-11	29-Jan-11	28	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 37	Preliminaries Month 37	Prelims - BB	0	296,944.70	1.0%	30-Jan-11	26-Feb-11	28	41	41		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 38	Preliminaries Month 38	Prelims - BB	0	296,944.70	1.0%	27-Feb-11	26-Mar-11	28	42	42		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 39	Preliminaries Month 39	Prelims - BB	0	296,944.70	1.0%	27-Mar-11	23-Apr-11	28	43	43		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 40	Preliminaries Month 40	Prelims - BB	0	296,944.70	1.0%	24-Apr-11	21-May-11	28	44	44		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 41	Preliminaries Month 41	Prelims - BB	0	296,944.70	1.0%	22-May-11	18-Jun-11	28	45	45		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 42	Preliminaries Month 42	Prelims - BB	0	296,944.70	1.0%	19-Jun-11	16-Jul-11	28	46	46		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00C Preliminaries - Siemens							**13,533,246.06**		**27-Apr-2008**	**16-Jul-2011**	**1176**	**5**	**46**		-	-	-	-	-	**232,162**	**232,162**	**232,162**	**232,162**	**232,162**	**232,162**	**442,001**	**442,001**	**442,001**	**2,718,978**
			00C1 Preliminaries - Siemens						**13,533,246.06**		**27-Apr-2008**	**16-Jul-2011**	**1176**	**5**	**46**		-	-	-	-	-	**232,162**	**232,162**	**232,162**	**232,162**	**232,162**	**232,162**	**442,001**	**442,001**	**442,001**	**2,718,978**
				Preliminaries																									
					Preliminaries				**13,533,246.06**	**100%**	**27-Apr-08**	**16-Jul-11**	**1176**	**5**	**46**		-	-	-	-	-	**232,162**	**232,162**	**232,162**	**232,162**	**232,162**	**232,162**	**442,001**	**442,001**	**442,001**	**2,718,978**
						Mth 1	Preliminaries Month 1	Prelims - S	0	232,162.21	1.7%	27-Apr-08	24-May-08	28	5	5		-	-	-	-	232,162	-	-	-	-	-	-	-	-	232,162
						Mth 2	Preliminaries Month 2	Prelims - S	0	232,162.21	1.7%	25-May-08	21-Jun-08	28	6	6		-	-	-	-	-	232,162	-	-	-	-	-	-	-	232,162
						Mth 3	Preliminaries Month 3	Prelims - S	0	232,162.21	1.7%	22-Jun-08	19-Jul-08	28	7	7		-	-	-	-	-	-	232,162	-	-	-	-	-	-	232,162
						Mth 4	Preliminaries Month 4	Prelims - S	0	232,162.21	1.7%	20-Jul-08	16-Aug-08	28	8	8		-	-	-	-	-	-	-	232,162	-	-	-	-	-	232,162
						Mth 5	Preliminaries Month 5	Prelims - S	0	232,162.21	1.7%	17-Aug-08	13-Sep-08	28	9	9		-	-	-	-	-	-	-	-	232,162	-	-	-	-	232,162
						Mth 6	Preliminaries Month 6	Prelims - S	0	232,162.21	1.7%	14-Sep-08	11-Oct-08	28	10	10		-	-	-	-	-	-	-	-	-	232,162	-	-	-	232,162
						Mth 7	Preliminaries Month 7	Prelims - S	0	442,001.46	3.3%	12-Oct-08	08-Nov-08	28	11	11		-	-	-	-	-	-	-	-	-	-	442,001	-	-	442,001
						Mth 8	Preliminaries Month 8	Prelims - S	0	442,001.46	3.3%	09-Nov-08	06-Dec-08	28	12	12		-	-	-	-	-	-	-	-	-	-	-	442,001	-	442,001
						Mth 9	Preliminaries Month 9	Prelims - S	0	442,001.46	3.3%	07-Dec-08	03-Jan-09	28	13	13		-	-	-	-	-	-	-	-	-	-	-	-	442,001	442,001
						Mth 10	Preliminaries Month 10	Prelims - S	0	442,001.46	3.3%	04-Jan-09	31-Jan-09	28	14	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 11	Preliminaries Month 11	Prelims - S	0	442,001.46	3.3%	01-Feb-09	28-Feb-09	28	15	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 12	Preliminaries Month 12	Prelims - S	0	442,001.46	3.3%	01-Mar-09	28-Mar-09	28	16	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 13	Preliminaries Month 13	Prelims - S	0	442,001.46	3.3%	29-Mar-09	25-Apr-09	28	17	17		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 14	Preliminaries Month 14	Prelims - S	0	442,001.46	3.3%	26-Apr-09	23-May-09	28	18	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 15	Preliminaries Month 15	Prelims - S	0	442,001.46	3.3%	24-May-09	20-Jun-09	28	19	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 16	Preliminaries Month 16	Prelims - S	0	442,001.46	3.3%	21-Jun-09	18-Jul-09	28	20	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 17	Preliminaries Month 17	Prelims - S	0	442,001.46	3.3%	19-Jul-09	15-Aug-09	28	21	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 18	Preliminaries Month 18	Prelims - S	0	442,001.46	3.3%	16-Aug-09	12-Sep-09	28	22	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 19	Preliminaries Month 19	Prelims - S	0	442,001.46	3.3%	13-Sep-09	10-Oct-09	28	23	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 20	Preliminaries Month 20	Prelims - S	0	442,001.46	3.3%	11-Oct-09	07-Nov-09	28	24	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 21	Preliminaries Month 21	Prelims - S	0	442,001.46	3.3%	08-Nov-09	05-Dec-09	28	25	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 22	Preliminaries Month 22	Prelims - S	0	442,001.46	3.3%	06-Dec-09	02-Jan-10	28	26	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 23	Preliminaries Month 23	Prelims - S	0	442,001.46	3.3%	03-Jan-10	30-Jan-10	28	27	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 24	Preliminaries Month 24	Prelims - S	0	442,001.46	3.3%	31-Jan-10	27-Feb-10	28	28	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 25	Preliminaries Month 25	Prelims - S	0	442,001.46	3.3%	28-Feb-10	27-Mar-10	28	29	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 26	Preliminaries Month 26	Prelims - S	0	442,001.46	3.3%	28-Mar-10	24-Apr-10	28	30	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 27	Preliminaries Month 27	Prelims - S	0	442,001.46	3.3%	25-Apr-10	22-May-10	28	31	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 28	Preliminaries Month 28	Prelims - S	0	442,001.46	3.3%	23-May-10	19-Jun-10	28	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 29	Preliminaries Month 29	Prelims - S	0	209,839.25	1.6%	20-Jun-10	17-Jul-10	28	33	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 30	Preliminaries Month 30	Prelims - S	0	209,839.25	1.6%	18-Jul-10	14-Aug-10	28	34	34		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 31	Preliminaries Month 31	Prelims - S	0	209,839.25	1.6%	15-Aug-10	11-Sep-10	28	35	35		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 32	Preliminaries Month 32	Prelims - S	0	209,839.25	1.6%	12-Sep-10	09-Oct-10	28	36	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 33	Preliminaries Month 33	Prelims - S	0	157,688.37	1.2%	10-Oct-10	06-Nov-10	28	37	37		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 34	Preliminaries Month 34	Prelims - S	0	157,688.37	1.2%	07-Nov-10	04-Dec-10	28	38	38		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 35	Preliminaries Month 35	Prelims - S	0	157,688.37	1.2%	05-Dec-10	01-Jan-11	28	39	39		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 36	Preliminaries Month 36	Prelims - S	0	157,688.37	1.2%	02-Jan-11	29-Jan-11	28	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 37	Preliminaries Month 37	Prelims - S	0	157,688.37	1.2%	30-Jan-11	26-Feb-11	28	41	41		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 38	Preliminaries Month 38	Prelims - S	0	157,688.37	1.2%	27-Feb-11	26-Mar-11	28	42	42		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 39	Preliminaries Month 39	Prelims - S	0	157,688.37	1.2%	27-Mar-11	23-Apr-11	28	43	43		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 40	Preliminaries Month 40	Prelims - S	0	157,688.37	1.2%	24-Apr-11	21-May-11	28	44	44		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 41	Preliminaries Month 41	Prelims - S	0	157,688.37	1.2%	22-May-11	18-Jun-11	28	45	45		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 42	Preliminaries Month 42	Prelims - S	0	157,688.37	1.2%	19-Jun-11	16-Jul-11	28	46	46		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00D Network Rail Immunisation							**3,000,000.00**		**27-Apr-2008**	**25-Apr-2009**	**364**	**5**	**17**		-	-	-	-	-	**230,769**	**230,769**	**230,769**	**230,769**	**230,769**	**230,769**	**230,769**	**230,769**	**230,769**	**2,076,923**
			00D1 Network Rail Immunisation						**3,000,000.00**		**27-Apr-2008**	**25-Apr-2009**	**364**	**5**	**17**		-	-	-	-	-	**230,769**	**230,769**	**230,769**	**230,769**	**230,769**	**230,769**	**230,769**	**230,769**	**230,769**	**2,076,923**
				Network Rail Immunisation																									
					Network Rail Immunisation				**3,000,000.00**	**100%**	**27-Apr-08**	**25-Apr-09**	**364**	**5**	**17**		-	-	-	-	-	**230,769**	**230,769**	**230,769**	**230,769**	**230,769**	**230,769**	**230,769**	**230,769**	**230,769**	**2,076,923**
						Mth 1	Network Rail Immunisation Month 1	NR Imm	0	230,769.23	7.7%	27-Apr-08	24-May-08	28	5	5		-	-	-	-	230,769	-	-	-	-	-	-	-	-	230,769
						Mth 2	Network Rail Immunisation Month 2	NR Imm	0	230,769.23	7.7%	25-May-08	21-Jun-08	28	6	6		-	-	-	-	-	230,769	-	-	-	-	-	-	-	230,769
						Mth 3	Network Rail Immunisation Month 3	NR Imm	0	230,769.23	7.7%	22-Jun-08	19-Jul-08	28	7	7		-	-	-	-	-	-	230,769	-	-	-	-	-	-	230,769
						Mth 4	Network Rail Immunisation Month 4	NR Imm	0	230,769.23	7.7%	20-Jul-08	16-Aug-08	28	8	8		-	-	-	-	-	-	-	230,769	-	-	-	-	-	230,769
						Mth 5	Network Rail Immunisation Month 5	NR Imm	0	230,769.23	7.7%	17-Aug-08	13-Sep-08	28	9	9		-	-	-	-	-	-	-	-	230,769	-	-	-	-	230,769
						Mth 6	Network Rail Immunisation Month 6	NR Imm	0	230,769.23	7.7%	14-Sep-08	11-Oct-08	28	10	10		-	-	-	-	-	-	-	-	-	230,769	-	-	-	230,769
						Mth 7	Network Rail Immunisation Month 7	NR Imm	0	230,769.23	7.7%	12-Oct-08	08-Nov-08	28	11	11		-	-	-	-	-	-	-	-	-	-	230,769	-	-	230,769
						Mth 8	Network Rail Immunisation Month 8	NR Imm	0	230,769.23	7.7%	09-Nov-08	06-Dec-08	28	12	12		-	-	-	-	-	-	-	-	-	-	-	230,769	-	230,769
						Mth 9	Network Rail Immunisation Month 9	NR Imm	0	230,769.23	7.7%	07-Dec-08	03-Jan-09	28	13	13		-	-	-	-	-	-	-	-	-	-	-	-	230,769	230,769
						Mth 10	Network Rail Immunisation Month 10	NR Imm	0	230,769.23	7.7%	04-Jan-09	31-Jan-09	28	14	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 11	Network Rail Immunisation Month 11	NR Imm	0	230,769.23	7.7%	01-Feb-09	28-Feb-09	28	15	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 12	Network Rail Immunisation Month 12	NR Imm	0	230,769.23	7.7%	01-Mar-09	28-Mar-09	28	16	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Mth 13	Network Rail Immunisation Month 13	NR Imm	0	230,769.23	7.7%	29-Mar-09	25-Apr-09	28	17	17		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00E SDS Interface							**3,800,000.00**		**27-Apr-2008**	**25-Apr-2009**	**364**	**5**	**17**		-	-	-	-	-	**292,308**	**292,308**	**292,308**	**292,308**	**292,308**	**292,308**	**292,308**	**292,308**	**292,308**	**2,630,769**
			00E1 SDS Interface						**3,800,000.00**		**27-Apr-2008**	**25-Apr-2009**	**364**	**5**	**17**		-	-	-	-	-	**292,308**	**292,308**	**292,308**	**292,308**	**292,308**	**292,308**	**292,308**	**292,308**	**292,308**	**2,630,769**
				SDS Interface																									
					SDS Interface				**3,800,000.00**	**100%**	**27-Apr-08**	**25-Apr-09**	**364**	**5**	**17**		-	-	-	-	-	**292,308**	**292,308**	**292,308**	**292,308**	**292,308**	**292,308**	**292,308**	**292,308**	**292,308**	**2,630,769**
						Mth 1	SDS Interface Month 1	SDS Int	0	292,307.69	7.7%	27-Apr-08	24-May-08	28	5	5		-	-	-	-	292,308	-	-	-	-	-	-	-	-	292,308
						Mth 2	SDS Interface Month 2	SDS Int	0	292,307.69	7.7%	25-May-08	21-Jun-08	28	6	6		-	-	-	-	-	292,308	-	-	-	-	-	-	-	292,308
						Mth 3	SDS Interface Month 3	SDS Int	0	292,307.69	7.7%	22-Jun-08	19-Jul-08	28	7	7		-	-	-	-	-	-	292,308	-	-	-	-	-	-	292,308
						Mth 4	SDS Interface Month 4	SDS Int	0	292,307.69	7.7%	20-Jul-08	16-Aug-08	28	8	8		-	-	-	-	-	-	-	292,308	-	-	-	-	-	292,308
						Mth 5	SDS Interface Month 5	SDS Int	0	292,307.69	7.7%	17-Aug-08	13-Sep-08	28	9	9		-	-	-	-	-	-	-	-	292,308	-	-	-	-	292,308

USB00000073_0003

Project: Edinburgh Tram Network
Subject: Milestone Payment Schedule
Currency: GBP

The Infrastructure Alliance — BILFINGER BERGER — SIEI

L1	L2	L3	L4	L5	Activity ID	Activity Name		Contract Value	% age	Programme Dates 15-Apr-08 Start Date	Programme Dates 15-Apr-08 End Date	Duration	Start Period	End Period	Year	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009 Subtotal	GBP
															Period	14	15	16	17	18	19	20	21	22	23	24	25	26	
															Period End	31-Jan-2009	28-Feb-2009	28-Mar-2009	25-Apr-2009	23-May-2009	20-Jun-2009	18-Jul-2009	15-Aug-2009	12-Sep-2009	10-Oct-2009	07-Nov-2009	05-Dec-2009	02-Jan-2010	
Project Total								219,162,335.96		03-Mar-2008	16-Jul-2011	1551	1	46		9,125,453	7,057,362	5,252,023	4,211,804	6,967,095	4,820,844	7,486,431	4,055,899	6,137,024	4,264,101	6,926,488	5,028,730	2,864,130	75,108,472
00 Mobilisation and Preliminaries								82,307,469.82		14-Apr-2008	16-Jul-2011	1187	1	46		1,992,962	1,992,962	1,992,962	1,992,962	1,469,885	1,469,885	1,469,885	1,469,885	1,469,885	1,469,885	1,469,885	1,469,885	1,469,885	21,200,815
	00A Mobilisation							45,200,000.00		14-Apr-2008	14-Jun-2008	62	4	6		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00A1 Mobilisation						45,200,000.00		14-Apr-2008	14-Jun-2008	62	4	6		-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Mobilisation																										
				Mobilisation				45,200,000.00	100%	14-Apr-08	14-Jun-08	62	4	6		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00A	Contract Award	Mobilisation	38,200,000.00	84.5%	14-Apr-08	14-Apr-08	1	4	4		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00B	Period 1 Payment	Mobilisation	3,500,000.00	7.7%	14-May-08	14-May-08	1	5	5		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00C	Period 2 Payment	Mobilisation	3,500,000.00	7.7%	14-Jun-08	14-Jun-08	1	6	6		-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Preliminaries				30,774,220.52	100%	27-Apr-08	16-Jul-11	1176	5	46		1,027,884	1,027,884	1,027,884	1,027,884	1,027,884	1,027,884	1,027,884	1,027,884	1,027,884	1,027,884	1,027,884	1,027,884	1,027,884	13,362,488
					Mth 1	Preliminaries Month 1	Prelims - BB	539,898.60	1.8%	27-Apr-08	24-May-08	28	5	5		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 2	Preliminaries Month 2	Prelims - BB	539,898.60	1.8%	25-May-08	21-Jun-08	28	6	6		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 3	Preliminaries Month 3	Prelims - BB	539,898.60	1.8%	22-Jun-08	19-Jul-08	28	7	7		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 4	Preliminaries Month 4	Prelims - BB	539,898.60	1.8%	20-Jul-08	16-Aug-08	28	8	8		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 5	Preliminaries Month 5	Prelims - BB	539,898.60	1.8%	17-Aug-08	13-Sep-08	28	9	9		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 6	Preliminaries Month 6	Prelims - BB	539,898.60	1.8%	14-Sep-08	11-Oct-08	28	10	10		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 7	Preliminaries Month 7	Prelims - BB	1,027,883.70	3.3%	12-Oct-08	08-Nov-08	28	11	11		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 8	Preliminaries Month 8	Prelims - BB	1,027,883.70	3.3%	09-Nov-08	06-Dec-08	28	12	12		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 9	Preliminaries Month 9	Prelims - BB	1,027,883.70	3.3%	07-Dec-08	03-Jan-09	28	13	13		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 10	Preliminaries Month 10	Prelims - BB	1,027,883.70	3.3%	04-Jan-09	31-Jan-09	28	14	14		1,027,884	-	-	-	-	-	-	-	-	-	-	-	-	1,027,884
					Mth 11	Preliminaries Month 11	Prelims - BB	1,027,883.70	3.3%	01-Feb-09	28-Feb-09	28	15	15		-	1,027,884	-	-	-	-	-	-	-	-	-	-	-	1,027,884
					Mth 12	Preliminaries Month 12	Prelims - BB	1,027,883.70	3.3%	01-Mar-09	28-Mar-09	28	16	16		-	-	1,027,884	-	-	-	-	-	-	-	-	-	-	1,027,884
					Mth 13	Preliminaries Month 13	Prelims - BB	1,027,883.70	3.3%	29-Mar-09	25-Apr-09	28	17	17		-	-	-	1,027,884	-	-	-	-	-	-	-	-	-	1,027,884
					Mth 14	Preliminaries Month 14	Prelims - BB	1,027,883.70	3.3%	26-Apr-09	23-May-09	28	18	18		-	-	-	-	1,027,884	-	-	-	-	-	-	-	-	1,027,884
					Mth 15	Preliminaries Month 15	Prelims - BB	1,027,883.70	3.3%	24-May-09	20-Jun-09	28	19	19		-	-	-	-	-	1,027,884	-	-	-	-	-	-	-	1,027,884
					Mth 16	Preliminaries Month 16	Prelims - BB	1,027,883.70	3.3%	21-Jun-09	18-Jul-09	28	20	20		-	-	-	-	-	-	1,027,884	-	-	-	-	-	-	1,027,884
					Mth 17	Preliminaries Month 17	Prelims - BB	1,027,883.70	3.3%	19-Jul-09	15-Aug-09	28	21	21		-	-	-	-	-	-	-	1,027,884	-	-	-	-	-	1,027,884
					Mth 18	Preliminaries Month 18	Prelims - BB	1,027,883.70	3.3%	16-Aug-09	12-Sep-09	28	22	22		-	-	-	-	-	-	-	-	1,027,884	-	-	-	-	1,027,884
					Mth 19	Preliminaries Month 19	Prelims - BB	1,027,883.70	3.3%	13-Sep-09	10-Oct-09	28	23	23		-	-	-	-	-	-	-	-	-	1,027,884	-	-	-	1,027,884
					Mth 20	Preliminaries Month 20	Prelims - BB	1,027,883.70	3.3%	11-Oct-09	07-Nov-09	28	24	24		-	-	-	-	-	-	-	-	-	-	1,027,884	-	-	1,027,884
					Mth 21	Preliminaries Month 21	Prelims - BB	1,027,883.70	3.3%	08-Nov-09	05-Dec-09	28	25	25		-	-	-	-	-	-	-	-	-	-	-	1,027,884	-	1,027,884
					Mth 22	Preliminaries Month 22	Prelims - BB	1,027,883.70	3.3%	06-Dec-09	02-Jan-10	28	26	26		-	-	-	-	-	-	-	-	-	-	-	-	1,027,884	1,027,884
					Mth 23	Preliminaries Month 23	Prelims - BB	1,027,883.70	3.3%	03-Jan-10	30-Jan-10	28	27	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 24	Preliminaries Month 24	Prelims - BB	1,027,883.70	3.3%	31-Jan-10	27-Feb-10	28	28	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 25	Preliminaries Month 25	Prelims - BB	1,027,883.70	3.3%	28-Feb-10	27-Mar-10	28	29	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 26	Preliminaries Month 26	Prelims - BB	1,027,883.70	3.3%	28-Mar-10	24-Apr-10	28	30	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 27	Preliminaries Month 27	Prelims - BB	1,027,883.70	3.3%	25-Apr-10	22-May-10	28	31	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 28	Preliminaries Month 28	Prelims - BB	1,027,883.70	3.3%	23-May-10	19-Jun-10	28	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 29	Preliminaries Month 29	Prelims - BB	487,985.11	1.6%	20-Jun-10	17-Jul-10	28	33	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 30	Preliminaries Month 30	Prelims - BB	487,985.11	1.6%	18-Jul-10	14-Aug-10	28	34	34		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 31	Preliminaries Month 31	Prelims - BB	487,985.11	1.6%	15-Aug-10	11-Sep-10	28	35	35		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 32	Preliminaries Month 32	Prelims - BB	487,985.11	1.6%	12-Sep-10	09-Oct-10	28	36	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 33	Preliminaries Month 33	Prelims - BB	296,944.70	1.0%	10-Oct-10	06-Nov-10	28	37	37		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 34	Preliminaries Month 34	Prelims - BB	296,944.70	1.0%	07-Nov-10	04-Dec-10	28	38	38		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 35	Preliminaries Month 35	Prelims - BB	296,944.70	1.0%	05-Dec-10	01-Jan-11	28	39	39		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 36	Preliminaries Month 36	Prelims - BB	296,944.70	1.0%	02-Jan-11	29-Jan-11	28	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 37	Preliminaries Month 37	Prelims - BB	296,944.70	1.0%	30-Jan-11	26-Feb-11	28	41	41		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 38	Preliminaries Month 38	Prelims - BB	296,944.70	1.0%	27-Feb-11	26-Mar-11	28	42	42		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 39	Preliminaries Month 39	Prelims - BB	296,944.70	1.0%	27-Mar-11	23-Apr-11	28	43	43		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 40	Preliminaries Month 40	Prelims - BB	296,944.70	1.0%	24-Apr-11	21-May-11	28	44	44		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 41	Preliminaries Month 41	Prelims - BB	296,944.70	1.0%	22-May-11	18-Jun-11	28	45	45		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 42	Preliminaries Month 42	Prelims - BB	296,944.70	1.0%	19-Jun-11	16-Jul-11	28	46	46		-	-	-	-	-	-	-	-	-	-	-	-	-	-
	00C Preliminaries - Siemens							13,533,246.06		27-Apr-2008	16-Jul-2011	1176	5	46		442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	5,746,019
		00C1 Preliminaries - Siemens						13,533,246.06		27-Apr-2008	16-Jul-2011	1176	5	46		442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	5,746,019
			Preliminaries																										
				Preliminaries				13,533,246.06	100%	27-Apr-08	16-Jul-11	1176	5	46		442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	442,001	5,746,019
					Mth 1	Preliminaries Month 1	Prelims - S	232,162.21	1.7%	27-Apr-08	24-May-08	28	5	5		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 2	Preliminaries Month 2	Prelims - S	232,162.21	1.7%	25-May-08	21-Jun-08	28	6	6		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 3	Preliminaries Month 3	Prelims - S	232,162.21	1.7%	22-Jun-08	19-Jul-08	28	7	7		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 4	Preliminaries Month 4	Prelims - S	232,162.21	1.7%	20-Jul-08	16-Aug-08	28	8	8		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 5	Preliminaries Month 5	Prelims - S	232,162.21	1.7%	17-Aug-08	13-Sep-08	28	9	9		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 6	Preliminaries Month 6	Prelims - S	232,162.21	1.7%	14-Sep-08	11-Oct-08	28	10	10		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 7	Preliminaries Month 7	Prelims - S	442,001.46	3.3%	12-Oct-08	08-Nov-08	28	11	11		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 8	Preliminaries Month 8	Prelims - S	442,001.46	3.3%	09-Nov-08	06-Dec-08	28	12	12		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 9	Preliminaries Month 9	Prelims - S	442,001.46	3.3%	07-Dec-08	03-Jan-09	28	13	13		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 10	Preliminaries Month 10	Prelims - S	442,001.46	3.3%	04-Jan-09	31-Jan-09	28	14	14		442,001	-	-	-	-	-	-	-	-	-	-	-	-	442,001
					Mth 11	Preliminaries Month 11	Prelims - S	442,001.46	3.3%	01-Feb-09	28-Feb-09	28	15	15		-	442,001	-	-	-	-	-	-	-	-	-	-	-	442,001
					Mth 12	Preliminaries Month 12	Prelims - S	442,001.46	3.3%	01-Mar-09	28-Mar-09	28	16	16		-	-	442,001	-	-	-	-	-	-	-	-	-	-	442,001
					Mth 13	Preliminaries Month 13	Prelims - S	442,001.46	3.3%	29-Mar-09	25-Apr-09	28	17	17		-	-	-	442,001	-	-	-	-	-	-	-	-	-	442,001
					Mth 14	Preliminaries Month 14	Prelims - S	442,001.46	3.3%	26-Apr-09	23-May-09	28	18	18		-	-	-	-	442,001	-	-	-	-	-	-	-	-	442,001
					Mth 15	Preliminaries Month 15	Prelims - S	442,001.46	3.3%	24-May-09	20-Jun-09	28	19	19		-	-	-	-	-	442,001	-	-	-	-	-	-	-	442,001
					Mth 16	Preliminaries Month 16	Prelims - S	442,001.46	3.3%	21-Jun-09	18-Jul-09	28	20	20		-	-	-	-	-	-	442,001	-	-	-	-	-	-	442,001
					Mth 17	Preliminaries Month 17	Prelims - S	442,001.46	3.3%	19-Jul-09	15-Aug-09	28	21	21		-	-	-	-	-	-	-	442,001	-	-	-	-	-	442,001
					Mth 18	Preliminaries Month 18	Prelims - S	442,001.46	3.3%	16-Aug-09	12-Sep-09	28	22	22		-	-	-	-	-	-	-	-	442,001	-	-	-	-	442,001
					Mth 19	Preliminaries Month 19	Prelims - S	442,001.46	3.3%	13-Sep-09	10-Oct-09	28	23	23		-	-	-	-	-	-	-	-	-	442,001	-	-	-	442,001
					Mth 20	Preliminaries Month 20	Prelims - S	442,001.46	3.3%	11-Oct-09	07-Nov-09	28	24	24		-	-	-	-	-	-	-	-	-	-	442,001	-	-	442,001
					Mth 21	Preliminaries Month 21	Prelims - S	442,001.46	3.3%	08-Nov-09	05-Dec-09	28	25	25		-	-	-	-	-	-	-	-	-	-	-	442,001	-	442,001
					Mth 22	Preliminaries Month 22	Prelims - S	442,001.46	3.3%	06-Dec-09	02-Jan-10	28	26	26		-	-	-	-	-	-	-	-	-	-	-	-	442,001	442,001
					Mth 23	Preliminaries Month 23	Prelims - S	442,001.46	3.3%	03-Jan-10	30-Jan-10	28	27	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 24	Preliminaries Month 24	Prelims - S	442,001.46	3.3%	31-Jan-10	27-Feb-10	28	28	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 25	Preliminaries Month 25	Prelims - S	442,001.46	3.3%	28-Feb-10	27-Mar-10	28	29	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 26	Preliminaries Month 26	Prelims - S	442,001.46	3.3%	28-Mar-10	24-Apr-10	28	30	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 27	Preliminaries Month 27	Prelims - S	442,001.46	3.3%	25-Apr-10	22-May-10	28	31	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 28	Preliminaries Month 28	Prelims - S	442,001.46	3.3%	23-May-10	19-Jun-10	28	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 29	Preliminaries Month 29	Prelims - S	209,839.25	1.6%	20-Jun-10	17-Jul-10	28	33	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 30	Preliminaries Month 30	Prelims - S	209,839.25	1.6%	18-Jul-10	14-Aug-10	28	34	34		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 31	Preliminaries Month 31	Prelims - S	209,839.25	1.6%	15-Aug-10	11-Sep-10	28	35	35		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 32	Preliminaries Month 32	Prelims - S	209,839.25	1.6%	12-Sep-10	09-Oct-10	28	36	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 33	Preliminaries Month 33	Prelims - S	157,688.37	1.2%	10-Oct-10	06-Nov-10	28	37	37		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 34	Preliminaries Month 34	Prelims - S	157,688.37	1.2%	07-Nov-10	04-Dec-10	28	38	38		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 35	Preliminaries Month 35	Prelims - S	157,688.37	1.2%	05-Dec-10	01-Jan-11	28	39	39		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 36	Preliminaries Month 36	Prelims - S	157,688.37	1.2%	02-Jan-11	29-Jan-11	28	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 37	Preliminaries Month 37	Prelims - S	157,688.37	1.2%	30-Jan-11	26-Feb-11	28	41	41		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 38	Preliminaries Month 38	Prelims - S	157,688.37	1.2%	27-Feb-11	26-Mar-11	28	42	42		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 39	Preliminaries Month 39	Prelims - S	157,688.37	1.2%	27-Mar-11	23-Apr-11	28	43	43		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 40	Preliminaries Month 40	Prelims - S	157,688.37	1.2%	24-Apr-11	21-May-11	28	44	44		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 41	Preliminaries Month 41	Prelims - S	157,688.37	1.2%	22-May-11	18-Jun-11	28	45	45		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 42	Preliminaries Month 42	Prelims - S	157,688.37	1.2%	19-Jun-11	16-Jul-11	28	46	46		-	-	-	-	-	-	-	-	-	-	-	-	-	-
	00D Network Rail Immunisation							3,000,000.00		27-Apr-2008	25-Apr-2009	364	5	17		230,769	230,769	230,769	230,769	-	-	-	-	-	-	-	-	-	923,077
		00D1 Network Rail Immunisation						3,000,000.00		27-Apr-2008	25-Apr-2009	364	5	17		230,769	230,769	230,769	230,769	-	-	-	-	-	-	-	-	-	923,077
			Network Rail Immunisation																										
				Network Rail Immunisation				3,000,000.00	100%	27-Apr-08	25-Apr-09	364	5	17		230,769	230,769	230,769	230,769	-	-	-	-	-	-	-	-	-	923,077
					Mth 1	Network Rail Immunisation Month 1	NR Imm	230,769.23	7.7%	27-Apr-08	24-May-08	28	5	5		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 2	Network Rail Immunisation Month 2	NR Imm	230,769.23	7.7%	25-May-08	21-Jun-08	28	6	6		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 3	Network Rail Immunisation Month 3	NR Imm	230,769.23	7.7%	22-Jun-08	19-Jul-08	28	7	7		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 4	Network Rail Immunisation Month 4	NR Imm	230,769.23	7.7%	20-Jul-08	16-Aug-08	28	8	8		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 5	Network Rail Immunisation Month 5	NR Imm	230,769.23	7.7%	17-Aug-08	13-Sep-08	28	9	9		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 6	Network Rail Immunisation Month 6	NR Imm	230,769.23	7.7%	14-Sep-08	11-Oct-08	28	10	10		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 7	Network Rail Immunisation Month 7	NR Imm	230,769.23	7.7%	12-Oct-08	08-Nov-08	28	11	11		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 8	Network Rail Immunisation Month 8	NR Imm	230,769.23	7.7%	09-Nov-08	06-Dec-08	28	12	12		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 9	Network Rail Immunisation Month 9	NR Imm	230,769.23	7.7%	07-Dec-08	03-Jan-09	28	13	13		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 10	Network Rail Immunisation Month 10	NR Imm	230,769.23	7.7%	04-Jan-09	31-Jan-09	28	14	14		230,769	-	-	-	-	-	-	-	-	-	-	-	-	230,769
					Mth 11	Network Rail Immunisation Month 11	NR Imm	230,769.23	7.7%	01-Feb-09	28-Feb-09	28	15	15		-	230,769	-	-	-	-	-	-	-	-	-	-	-	230,769
					Mth 12	Network Rail Immunisation Month 12	NR Imm	230,769.23	7.7%	01-Mar-09	28-Mar-09	28	16	16		-	-	230,769	-	-	-	-	-	-	-	-	-	-	230,769
					Mth 13	Network Rail Immunisation Month 13	NR Imm	230,769.23	7.7%	29-Mar-09	25-Apr-09	28	17	17		-	-	-	230,769	-	-	-	-	-	-	-	-	-	230,769
	00E SDS Interface							3,800,000.00		27-Apr-2008	25-Apr-2009	364	5	17		292,308	292,308	292,308	292,308	-	-	-	-	-	-	-	-	-	1,169,231
		00E1 SDS Interface						3,800,000.00		27-Apr-2008	25-Apr-2009	364	5	17		292,308	292,308	292,308	292,308	-	-	-	-	-	-	-	-	-	1,169,231
			SDS Interface																										
				SDS Interface				3,800,000.00	100%	27-Apr-08	25-Apr-09	364	5	17		292,308	292,308	292,308	292,308	-	-	-	-	-	-	-	-	-	1,169,231
					Mth 1	SDS Interface Month 1	SDS Int	292,307.69	7.7%	27-Apr-08	24-May-08	28	5	5		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 2	SDS Interface Month 2	SDS Int	292,307.69	7.7%	25-May-08	21-Jun-08	28	6	6		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 3	SDS Interface Month 3	SDS Int	292,307.69	7.7%	22-Jun-08	19-Jul-08	28	7	7		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 4	SDS Interface Month 4	SDS Int	292,307.69	7.7%	20-Jul-08	16-Aug-08	28	8	8		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 5	SDS Interface Month 5	SDS Int	292,307.69	7.7%	17-Aug-08	13-Sep-08	28	9	9		-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0004

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Mott MacDonald Group | BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name		Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
Project Total								219,162,335.96		03-Mar-2008	16-Jul-2011	1221	1	46	8,770,842	6,703,018	5,142,592	5,760,721	5,365,370	4,166,533	4,089,381	2,683,658	4,271,484	1,824,600	2,393,464	1,404,563	2,378,720	55,933,416
00 Mobilisation and Preliminaries								97,307,465.82		14-Apr-2008	14-Jun-2011	1157	4	46	1,469,885	1,469,885	1,469,885	1,469,885	1,469,885	1,469,885	697,824	697,824	697,824	697,824	454,633	454,633	454,633	12,974,508
	00A Mobilisation							45,200,000.00		14-Apr-2008	14-Jun-2008	62	4	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00A1 Mobilisation						45,200,000.00		14-Apr-2008	14-Jun-2008	62	4	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Mobilisation																									
				Mobilisation				45,200,000.00	100%	14-Apr-08	14-Jun-08	62	4	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00A	Contract Award	Mobilisation	38,200,000.00	84.5%	14-Apr-08	14-Apr-08	1	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00B	Period 1 Payment	Mobilisation	3,500,000.00	7.7%	14-May-08	14-May-08	1	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00C	Period 2 Payment	Mobilisation	3,500,000.00	7.7%	14-Jun-08	14-Jun-08	1	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00A2 Preliminaries						30,774,220.52	100%	27-Apr-08	16-Jul-11	1176	5	46	1,027,884	1,027,884	1,027,884	1,027,884	1,027,884	1,027,884	487,985	487,985	487,985	487,985	296,945	296,945	296,945	9,010,077
			Preliminaries																									
				Preliminaries				30,774,220.52	100%	27-Apr-08	16-Jul-11	1176	5	46	1,027,884	1,027,884	1,027,884	1,027,884	1,027,884	1,027,884	487,985	487,985	487,985	487,985	296,945	296,945	296,945	9,010,077
					Mth 1	Preliminaries Month 1	Prelims - BB	539,898.60	1.8%	27-Apr-08	24-May-08	28	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 2	Preliminaries Month 2	Prelims - BB	539,898.60	1.8%	25-May-08	21-Jun-08	28	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 3	Preliminaries Month 3	Prelims - BB	539,898.60	1.8%	22-Jun-08	19-Jul-08	28	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 4	Preliminaries Month 4	Prelims - BB	539,898.60	1.8%	20-Jul-08	16-Aug-08	28	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 5	Preliminaries Month 5	Prelims - BB	539,898.60	1.8%	17-Aug-08	13-Sep-08	28	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 6	Preliminaries Month 6	Prelims - BB	539,898.60	1.8%	14-Sep-08	11-Oct-08	28	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 7	Preliminaries Month 7	Prelims - BB	1,027,883.70	3.3%	12-Oct-08	08-Nov-08	28	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 8	Preliminaries Month 8	Prelims - BB	1,027,883.70	3.3%	09-Nov-08	06-Dec-08	28	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 9	Preliminaries Month 9	Prelims - BB	1,027,883.70	3.3%	07-Dec-08	03-Jan-09	28	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 10	Preliminaries Month 10	Prelims - BB	1,027,883.70	3.3%	04-Jan-09	31-Jan-09	28	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 11	Preliminaries Month 11	Prelims - BB	1,027,883.70	3.3%	01-Feb-09	28-Feb-09	28	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 12	Preliminaries Month 12	Prelims - BB	1,027,883.70	3.3%	01-Mar-09	28-Mar-09	28	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 13	Preliminaries Month 13	Prelims - BB	1,027,883.70	3.3%	29-Mar-09	25-Apr-09	28	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 14	Preliminaries Month 14	Prelims - BB	1,027,883.70	3.3%	26-Apr-09	23-May-09	28	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 15	Preliminaries Month 15	Prelims - BB	1,027,883.70	3.3%	24-May-09	20-Jun-09	28	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 16	Preliminaries Month 16	Prelims - BB	1,027,883.70	3.3%	21-Jun-09	18-Jul-09	28	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 17	Preliminaries Month 17	Prelims - BB	1,027,883.70	3.3%	19-Jul-09	15-Aug-09	28	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 18	Preliminaries Month 18	Prelims - BB	1,027,883.70	3.3%	16-Aug-09	12-Sep-09	28	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 19	Preliminaries Month 19	Prelims - BB	1,027,883.70	3.3%	13-Sep-09	10-Oct-09	28	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 20	Preliminaries Month 20	Prelims - BB	1,027,883.70	3.3%	11-Oct-09	07-Nov-09	28	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 21	Preliminaries Month 21	Prelims - BB	1,027,883.70	3.3%	08-Nov-09	05-Dec-09	28	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 22	Preliminaries Month 22	Prelims - BB	1,027,883.70	3.3%	06-Dec-09	02-Jan-10	28	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 23	Preliminaries Month 23	Prelims - BB	1,027,883.70	3.3%	03-Jan-10	30-Jan-10	28	27	27	1,027,884	-	-	-	-	-	-	-	-	-	-	-	-	-	1,027,884
					Mth 24	Preliminaries Month 24	Prelims - BB	1,027,883.70	3.3%	31-Jan-10	27-Feb-10	28	28	28	-	1,027,884	-	-	-	-	-	-	-	-	-	-	-	-	1,027,884
					Mth 25	Preliminaries Month 25	Prelims - BB	1,027,883.70	3.3%	28-Feb-10	27-Mar-10	28	29	29	-	-	1,027,884	-	-	-	-	-	-	-	-	-	-	-	1,027,884
					Mth 26	Preliminaries Month 26	Prelims - BB	1,027,883.70	3.3%	28-Mar-10	24-Apr-10	28	30	30	-	-	-	1,027,884	-	-	-	-	-	-	-	-	-	-	1,027,884
					Mth 27	Preliminaries Month 27	Prelims - BB	1,027,883.70	3.3%	25-Apr-10	22-May-10	28	31	31	-	-	-	-	1,027,884	-	-	-	-	-	-	-	-	-	1,027,884
					Mth 28	Preliminaries Month 28	Prelims - BB	1,027,883.70	3.3%	23-May-10	19-Jun-10	28	32	32	-	-	-	-	-	1,027,884	-	-	-	-	-	-	-	-	1,027,884
					Mth 29	Preliminaries Month 29	Prelims - BB	487,985.11	1.6%	20-Jun-10	17-Jul-10	28	33	33	-	-	-	-	-	-	487,985	-	-	-	-	-	-	-	487,985
					Mth 30	Preliminaries Month 30	Prelims - BB	487,985.11	1.6%	18-Jul-10	14-Aug-10	28	34	34	-	-	-	-	-	-	-	487,985	-	-	-	-	-	-	487,985
					Mth 31	Preliminaries Month 31	Prelims - BB	487,985.11	1.6%	15-Aug-10	11-Sep-10	28	35	35	-	-	-	-	-	-	-	-	487,985	-	-	-	-	-	487,985
					Mth 32	Preliminaries Month 32	Prelims - BB	487,985.11	1.6%	12-Sep-10	09-Oct-10	28	36	36	-	-	-	-	-	-	-	-	-	487,985	-	-	-	-	487,985
					Mth 33	Preliminaries Month 33	Prelims - BB	296,944.70	1.0%	10-Oct-10	06-Nov-10	28	37	37	-	-	-	-	-	-	-	-	-	-	296,945	-	-	-	296,945
					Mth 34	Preliminaries Month 34	Prelims - BB	296,944.70	1.0%	07-Nov-10	04-Dec-10	28	38	38	-	-	-	-	-	-	-	-	-	-	-	296,945	-	-	296,945
					Mth 35	Preliminaries Month 35	Prelims - BB	296,944.70	1.0%	05-Dec-10	01-Jan-11	28	39	39	-	-	-	-	-	-	-	-	-	-	-	-	296,945	-	296,945
					Mth 36	Preliminaries Month 36	Prelims - BB	296,944.70	1.0%	02-Jan-11	29-Jan-11	28	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 37	Preliminaries Month 37	Prelims - BB	296,944.70	1.0%	30-Jan-11	26-Feb-11	28	41	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 38	Preliminaries Month 38	Prelims - BB	296,944.70	1.0%	27-Feb-11	26-Mar-11	28	42	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 39	Preliminaries Month 39	Prelims - BB	296,944.70	1.0%	27-Mar-11	23-Apr-11	28	43	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 40	Preliminaries Month 40	Prelims - BB	296,944.70	1.0%	24-Apr-11	21-May-11	28	44	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 41	Preliminaries Month 41	Prelims - BB	296,944.70	1.0%	22-May-11	18-Jun-11	28	45	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 42	Preliminaries Month 42	Prelims - BB	296,944.70	1.0%	19-Jun-11	16-Jul-11	28	46	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	00C Preliminaries - Siemens							13,533,246.06		27-Apr-2008	16-Jul-2011	1176	5	46	442,001	442,001	442,001	442,001	442,001	442,001	209,839	209,839	209,839	209,839	157,688	157,688	157,688	3,964,431
		00C1 Preliminaries - Siemens						13,533,246.06		27-Apr-2008	16-Jul-2011	1176	5	46	442,001	442,001	442,001	442,001	442,001	442,001	209,839	209,839	209,839	209,839	157,688	157,688	157,688	3,964,431
			Preliminaries																									
				Preliminaries				13,533,246.06	100%	27-Apr-08	16-Jul-11	1176	5	46	442,001	442,001	442,001	442,001	442,001	442,001	209,839	209,839	209,839	209,839	157,688	157,688	157,688	3,964,431
					Mth 1	Preliminaries Month 1	Prelims - S	232,162.21	1.7%	27-Apr-08	24-May-08	28	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 2	Preliminaries Month 2	Prelims - S	232,162.21	1.7%	25-May-08	21-Jun-08	28	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 3	Preliminaries Month 3	Prelims - S	232,162.21	1.7%	22-Jun-08	19-Jul-08	28	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 4	Preliminaries Month 4	Prelims - S	232,162.21	1.7%	20-Jul-08	16-Aug-08	28	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 5	Preliminaries Month 5	Prelims - S	232,162.21	1.7%	17-Aug-08	13-Sep-08	28	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 6	Preliminaries Month 6	Prelims - S	232,162.21	1.7%	14-Sep-08	11-Oct-08	28	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 7	Preliminaries Month 7	Prelims - S	442,001.46	3.3%	12-Oct-08	08-Nov-08	28	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 8	Preliminaries Month 8	Prelims - S	442,001.46	3.3%	09-Nov-08	06-Dec-08	28	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 9	Preliminaries Month 9	Prelims - S	442,001.46	3.3%	07-Dec-08	03-Jan-09	28	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 10	Preliminaries Month 10	Prelims - S	442,001.46	3.3%	04-Jan-09	31-Jan-09	28	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 11	Preliminaries Month 11	Prelims - S	442,001.46	3.3%	01-Feb-09	28-Feb-09	28	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 12	Preliminaries Month 12	Prelims - S	442,001.46	3.3%	01-Mar-09	28-Mar-09	28	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 13	Preliminaries Month 13	Prelims - S	442,001.46	3.3%	29-Mar-09	25-Apr-09	28	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 14	Preliminaries Month 14	Prelims - S	442,001.46	3.3%	26-Apr-09	23-May-09	28	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 15	Preliminaries Month 15	Prelims - S	442,001.46	3.3%	24-May-09	20-Jun-09	28	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 16	Preliminaries Month 16	Prelims - S	442,001.46	3.3%	21-Jun-09	18-Jul-09	28	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 17	Preliminaries Month 17	Prelims - S	442,001.46	3.3%	19-Jul-09	15-Aug-09	28	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 18	Preliminaries Month 18	Prelims - S	442,001.46	3.3%	16-Aug-09	12-Sep-09	28	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 19	Preliminaries Month 19	Prelims - S	442,001.46	3.3%	13-Sep-09	10-Oct-09	28	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 20	Preliminaries Month 20	Prelims - S	442,001.46	3.3%	11-Oct-09	07-Nov-09	28	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 21	Preliminaries Month 21	Prelims - S	442,001.46	3.3%	08-Nov-09	05-Dec-09	28	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 22	Preliminaries Month 22	Prelims - S	442,001.46	3.3%	06-Dec-09	02-Jan-10	28	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 23	Preliminaries Month 23	Prelims - S	442,001.46	3.3%	03-Jan-10	30-Jan-10	28	27	27	442,001	-	-	-	-	-	-	-	-	-	-	-	-	-	442,001
					Mth 24	Preliminaries Month 24	Prelims - S	442,001.46	3.3%	31-Jan-10	27-Feb-10	28	28	28	-	442,001	-	-	-	-	-	-	-	-	-	-	-	-	442,001
					Mth 25	Preliminaries Month 25	Prelims - S	442,001.46	3.3%	28-Feb-10	27-Mar-10	28	29	29	-	-	442,001	-	-	-	-	-	-	-	-	-	-	-	442,001
					Mth 26	Preliminaries Month 26	Prelims - S	442,001.46	3.3%	28-Mar-10	24-Apr-10	28	30	30	-	-	-	442,001	-	-	-	-	-	-	-	-	-	-	442,001
					Mth 27	Preliminaries Month 27	Prelims - S	442,001.46	3.3%	25-Apr-10	22-May-10	28	31	31	-	-	-	-	442,001	-	-	-	-	-	-	-	-	-	442,001
					Mth 28	Preliminaries Month 28	Prelims - S	442,001.46	3.3%	23-May-10	19-Jun-10	28	32	32	-	-	-	-	-	442,001	-	-	-	-	-	-	-	-	442,001
					Mth 29	Preliminaries Month 29	Prelims - S	209,839.25	1.6%	20-Jun-10	17-Jul-10	28	33	33	-	-	-	-	-	-	209,839	-	-	-	-	-	-	-	209,839
					Mth 30	Preliminaries Month 30	Prelims - S	209,839.25	1.6%	18-Jul-10	14-Aug-10	28	34	34	-	-	-	-	-	-	-	209,839	-	-	-	-	-	-	209,839
					Mth 31	Preliminaries Month 31	Prelims - S	209,839.25	1.6%	15-Aug-10	11-Sep-10	28	35	35	-	-	-	-	-	-	-	-	209,839	-	-	-	-	-	209,839
					Mth 32	Preliminaries Month 32	Prelims - S	209,839.25	1.6%	12-Sep-10	09-Oct-10	28	36	36	-	-	-	-	-	-	-	-	-	209,839	-	-	-	-	209,839
					Mth 33	Preliminaries Month 33	Prelims - S	157,688.37	1.2%	10-Oct-10	06-Nov-10	28	37	37	-	-	-	-	-	-	-	-	-	-	157,688	-	-	-	157,688
					Mth 34	Preliminaries Month 34	Prelims - S	157,688.37	1.2%	07-Nov-10	04-Dec-10	28	38	38	-	-	-	-	-	-	-	-	-	-	-	157,688	-	-	157,688
					Mth 35	Preliminaries Month 35	Prelims - S	157,688.37	1.2%	05-Dec-10	01-Jan-11	28	39	39	-	-	-	-	-	-	-	-	-	-	-	-	157,688	-	157,688
					Mth 36	Preliminaries Month 36	Prelims - S	157,688.37	1.2%	02-Jan-11	29-Jan-11	28	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 37	Preliminaries Month 37	Prelims - S	157,688.37	1.2%	30-Jan-11	26-Feb-11	28	41	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 38	Preliminaries Month 38	Prelims - S	157,688.37	1.2%	27-Feb-11	26-Mar-11	28	42	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 39	Preliminaries Month 39	Prelims - S	157,688.37	1.2%	27-Mar-11	23-Apr-11	28	43	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 40	Preliminaries Month 40	Prelims - S	157,688.37	1.2%	24-Apr-11	21-May-11	28	44	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 41	Preliminaries Month 41	Prelims - S	157,688.37	1.2%	22-May-11	18-Jun-11	28	45	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 42	Preliminaries Month 42	Prelims - S	157,688.37	1.2%	19-Jun-11	16-Jul-11	28	46	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	00D Network Rail Immunisation							3,000,000.00		27-Apr-2008	25-Apr-2009	364	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00D1 Network Rail Immunisation						3,000,000.00		27-Apr-2008	25-Apr-2009	364	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Network Rail Immunisation																									
				Network Rail Immunisation				3,000,000.00	100%	27-Apr-08	25-Apr-09	364	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 1	Network Rail Immunisation Month 1	NR Imm	230,769.23	7.7%	27-Apr-08	24-May-08	28	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 2	Network Rail Immunisation Month 2	NR Imm	230,769.23	7.7%	25-May-08	21-Jun-08	28	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 3	Network Rail Immunisation Month 3	NR Imm	230,769.23	7.7%	22-Jun-08	19-Jul-08	28	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 4	Network Rail Immunisation Month 4	NR Imm	230,769.23	7.7%	20-Jul-08	16-Aug-08	28	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 5	Network Rail Immunisation Month 5	NR Imm	230,769.23	7.7%	17-Aug-08	13-Sep-08	28	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 6	Network Rail Immunisation Month 6	NR Imm	230,769.23	7.7%	14-Sep-08	11-Oct-08	28	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 7	Network Rail Immunisation Month 7	NR Imm	230,769.23	7.7%	12-Oct-08	08-Nov-08	28	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 8	Network Rail Immunisation Month 8	NR Imm	230,769.23	7.7%	09-Nov-08	06-Dec-08	28	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 9	Network Rail Immunisation Month 9	NR Imm	230,769.23	7.7%	07-Dec-08	03-Jan-09	28	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 10	Network Rail Immunisation Month 10	NR Imm	230,769.23	7.7%	04-Jan-09	31-Jan-09	28	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 11	Network Rail Immunisation Month 11	NR Imm	230,769.23	7.7%	01-Feb-09	28-Feb-09	28	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 12	Network Rail Immunisation Month 12	NR Imm	230,769.23	7.7%	01-Mar-09	28-Mar-09	28	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 13	Network Rail Immunisation Month 13	NR Imm	230,769.23	7.7%	29-Mar-09	25-Apr-09	28	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	00E SDS Interface							3,800,000.00		27-Apr-2008	25-Apr-2009	364	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00E1 SDS Interface						3,800,000.00		27-Apr-2008	25-Apr-2009	364	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			SDS Interface																									
				SDS Interface				3,800,000.00	100%	27-Apr-08	25-Apr-09	364	5	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 1	SDS Interface Month 1	SDS Int	292,307.69	7.7%	27-Apr-08	24-May-08	28	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 2	SDS Interface Month 2	SDS Int	292,307.69	7.7%	25-May-08	21-Jun-08	28	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 3	SDS Interface Month 3	SDS Int	292,307.69	7.7%	22-Jun-08	19-Jul-08	28	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 4	SDS Interface Month 4	SDS Int	292,307.69	7.7%	20-Jul-08	16-Aug-08	28	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 5	SDS Interface Month 5	SDS Int	292,307.69	7.7%	17-Aug-08	13-Sep-08	28	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0005

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Bilfinger Berger Group

BILFINGER BERGER

SIEI

L1	L2	L3	L4	L5	Activity ID	Activity Name		Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period
Project Total								219,162,335.96		03-Mar-2008	16-Jun-2011	1231	3	46
00 Mobilisation and Preliminaries								96,307,464.58		14-Apr-2008	16-Jun-2011	1162	4	46
	00A Mobilisation							45,200,000.00		14-Apr-2008	14-Jun-2008	62	4	6
		00A1 Mobilisation						45,200,000.00		14-Apr-2008	14-Jun-2008	62	4	6
			Mobilisation											
				Mobilisation				45,200,000.00	100%	14-Apr-08	14-Jun-08	62	4	6
					00A	Contract Award	Mobilisation	38,200,000.00	84.5%	14-Apr-08	14-Apr-08	1	4	4
					00B	Period 1 Payment	Mobilisation	3,500,000.00	7.7%	14-May-08	14-May-08	1	5	5
					00C	Period 2 Payment	Mobilisation	3,500,000.00	7.7%	14-Jun-08	14-Jun-08	1	6	6
			Preliminaries					30,774,220.52	100%	27-Apr-08	16-Jul-11	1176	5	46
					Mth 1	Preliminaries Month 1	Prelims - BB	539,898.60	1.8%	27-Apr-08	24-May-08	28	5	5
					Mth 2	Preliminaries Month 2	Prelims - BB	539,898.60	1.8%	25-May-08	21-Jun-08	28	6	6
					Mth 3	Preliminaries Month 3	Prelims - BB	539,898.60	1.8%	22-Jun-08	19-Jul-08	28	7	7
					Mth 4	Preliminaries Month 4	Prelims - BB	539,898.60	1.8%	20-Jul-08	16-Aug-08	28	8	8
					Mth 5	Preliminaries Month 5	Prelims - BB	539,898.60	1.8%	17-Aug-08	13-Sep-08	28	9	9
					Mth 6	Preliminaries Month 6	Prelims - BB	539,898.60	1.8%	14-Sep-08	11-Oct-08	28	10	10
					Mth 7	Preliminaries Month 7	Prelims - BB	1,027,883.70	3.3%	12-Oct-08	08-Nov-08	28	11	11
					Mth 8	Preliminaries Month 8	Prelims - BB	1,027,883.70	3.3%	09-Nov-08	06-Dec-08	28	12	12
					Mth 9	Preliminaries Month 9	Prelims - BB	1,027,883.70	3.3%	07-Dec-08	03-Jan-09	28	13	13
					Mth 10	Preliminaries Month 10	Prelims - BB	1,027,883.70	3.3%	04-Jan-09	31-Jan-09	28	14	14
					Mth 11	Preliminaries Month 11	Prelims - BB	1,027,883.70	3.3%	01-Feb-09	28-Feb-09	28	15	15
					Mth 12	Preliminaries Month 12	Prelims - BB	1,027,883.70	3.3%	01-Mar-09	28-Mar-09	28	16	16
					Mth 13	Preliminaries Month 13	Prelims - BB	1,027,883.70	3.3%	29-Mar-09	25-Apr-09	28	17	17
					Mth 14	Preliminaries Month 14	Prelims - BB	1,027,883.70	3.3%	26-Apr-09	23-May-09	28	18	18
					Mth 15	Preliminaries Month 15	Prelims - BB	1,027,883.70	3.3%	24-May-09	20-Jun-09	28	19	19
					Mth 16	Preliminaries Month 16	Prelims - BB	1,027,883.70	3.3%	21-Jun-09	18-Jul-09	28	20	20
					Mth 17	Preliminaries Month 17	Prelims - BB	1,027,883.70	3.3%	19-Jul-09	15-Aug-09	28	21	21
					Mth 18	Preliminaries Month 18	Prelims - BB	1,027,883.70	3.3%	16-Aug-09	12-Sep-09	28	22	22
					Mth 19	Preliminaries Month 19	Prelims - BB	1,027,883.70	3.3%	13-Sep-09	10-Oct-09	28	23	23
					Mth 20	Preliminaries Month 20	Prelims - BB	1,027,883.70	3.3%	11-Oct-09	07-Nov-09	28	24	24
					Mth 21	Preliminaries Month 21	Prelims - BB	1,027,883.70	3.3%	08-Nov-09	05-Dec-09	28	25	25
					Mth 22	Preliminaries Month 22	Prelims - BB	1,027,883.70	3.3%	06-Dec-09	02-Jan-10	28	26	26
					Mth 23	Preliminaries Month 23	Prelims - BB	1,027,883.70	3.3%	03-Jan-10	30-Jan-10	28	27	27
					Mth 24	Preliminaries Month 24	Prelims - BB	1,027,883.70	3.3%	31-Jan-10	27-Feb-10	28	28	28
					Mth 25	Preliminaries Month 25	Prelims - BB	1,027,883.70	3.3%	28-Feb-10	27-Mar-10	28	29	29
					Mth 26	Preliminaries Month 26	Prelims - BB	1,027,883.70	3.3%	28-Mar-10	24-Apr-10	28	30	30
					Mth 27	Preliminaries Month 27	Prelims - BB	1,027,883.70	3.3%	25-Apr-10	22-May-10	28	31	31
					Mth 28	Preliminaries Month 28	Prelims - BB	1,027,883.70	3.3%	23-May-10	19-Jun-10	28	32	32
					Mth 29	Preliminaries Month 29	Prelims - BB	487,985.11	1.6%	20-Jun-10	17-Jul-10	28	33	33
					Mth 30	Preliminaries Month 30	Prelims - BB	487,985.11	1.6%	18-Jul-10	14-Aug-10	28	34	34
					Mth 31	Preliminaries Month 31	Prelims - BB	487,985.11	1.6%	15-Aug-10	11-Sep-10	28	35	35
					Mth 32	Preliminaries Month 32	Prelims - BB	487,985.11	1.6%	12-Sep-10	09-Oct-10	28	36	36
					Mth 33	Preliminaries Month 33	Prelims - BB	296,944.70	1.0%	10-Oct-10	06-Nov-10	28	37	37
					Mth 34	Preliminaries Month 34	Prelims - BB	296,944.70	1.0%	07-Nov-10	04-Dec-10	28	38	38
					Mth 35	Preliminaries Month 35	Prelims - BB	296,944.70	1.0%	05-Dec-10	01-Jan-11	28	39	39
					Mth 36	Preliminaries Month 36	Prelims - BB	296,944.70	1.0%	02-Jan-11	29-Jan-11	28	40	40
					Mth 37	Preliminaries Month 37	Prelims - BB	296,944.70	1.0%	30-Jan-11	26-Feb-11	28	41	41
					Mth 38	Preliminaries Month 38	Prelims - BB	296,944.70	1.0%	27-Feb-11	26-Mar-11	28	42	42
					Mth 39	Preliminaries Month 39	Prelims - BB	296,944.70	1.0%	27-Mar-11	23-Apr-11	28	43	43
					Mth 40	Preliminaries Month 40	Prelims - BB	296,944.70	1.0%	24-Apr-11	21-May-11	28	44	44
					Mth 41	Preliminaries Month 41	Prelims - BB	296,944.70	1.0%	22-May-11	18-Jun-11	28	45	45
					Mth 42	Preliminaries Month 42	Prelims - BB	296,944.70	1.0%	19-Jun-11	16-Jul-11	28	46	46
	00C Preliminaries - Siemens							13,533,246.06		27-Apr-2008	16-Jul-11	1176	5	46
		00C1 Preliminaries - Siemens						13,533,246.06		27-Apr-2008	16-Jul-11	1176	5	46
			Preliminaries											
				Preliminaries				13,533,246.06	100%	27-Apr-08	16-Jul-11	1176	5	46
					Mth 1	Preliminaries Month 1	Prelims - S	232,162.21	1.7%	27-Apr-08	24-May-08	28	5	5
					Mth 2	Preliminaries Month 2	Prelims - S	232,162.21	1.7%	25-May-08	21-Jun-08	28	6	6
					Mth 3	Preliminaries Month 3	Prelims - S	232,162.21	1.7%	22-Jun-08	19-Jul-08	28	7	7
					Mth 4	Preliminaries Month 4	Prelims - S	232,162.21	1.7%	20-Jul-08	16-Aug-08	28	8	8
					Mth 5	Preliminaries Month 5	Prelims - S	232,162.21	1.7%	17-Aug-08	13-Sep-08	28	9	9
					Mth 6	Preliminaries Month 6	Prelims - S	232,162.21	1.7%	14-Sep-08	11-Oct-08	28	10	10
					Mth 7	Preliminaries Month 7	Prelims - S	442,001.46	3.3%	12-Oct-08	08-Nov-08	28	11	11
					Mth 8	Preliminaries Month 8	Prelims - S	442,001.46	3.3%	09-Nov-08	06-Dec-08	28	12	12
					Mth 9	Preliminaries Month 9	Prelims - S	442,001.46	3.3%	07-Dec-08	03-Jan-09	28	13	13
					Mth 10	Preliminaries Month 10	Prelims - S	442,001.46	3.3%	04-Jan-09	31-Jan-09	28	14	14
					Mth 11	Preliminaries Month 11	Prelims - S	442,001.46	3.3%	01-Feb-09	28-Feb-09	28	15	15
					Mth 12	Preliminaries Month 12	Prelims - S	442,001.46	3.3%	01-Mar-09	28-Mar-09	28	16	16
					Mth 13	Preliminaries Month 13	Prelims - S	442,001.46	3.3%	29-Mar-09	25-Apr-09	28	17	17
					Mth 14	Preliminaries Month 14	Prelims - S	442,001.46	3.3%	26-Apr-09	23-May-09	28	18	18
					Mth 15	Preliminaries Month 15	Prelims - S	442,001.46	3.3%	24-May-09	20-Jun-09	28	19	19
					Mth 16	Preliminaries Month 16	Prelims - S	442,001.46	3.3%	21-Jun-09	18-Jul-09	28	20	20
					Mth 17	Preliminaries Month 17	Prelims - S	442,001.46	3.3%	19-Jul-09	15-Aug-09	28	21	21
					Mth 18	Preliminaries Month 18	Prelims - S	442,001.46	3.3%	16-Aug-09	12-Sep-09	28	22	22
					Mth 19	Preliminaries Month 19	Prelims - S	442,001.46	3.3%	13-Sep-09	10-Oct-09	28	23	23
					Mth 20	Preliminaries Month 20	Prelims - S	442,001.46	3.3%	11-Oct-09	07-Nov-09	28	24	24
					Mth 21	Preliminaries Month 21	Prelims - S	442,001.46	3.3%	08-Nov-09	05-Dec-09	28	25	25
					Mth 22	Preliminaries Month 22	Prelims - S	442,001.46	3.3%	06-Dec-09	02-Jan-10	28	26	26
					Mth 23	Preliminaries Month 23	Prelims - S	442,001.46	3.3%	03-Jan-10	30-Jan-10	28	27	27
					Mth 24	Preliminaries Month 24	Prelims - S	442,001.46	3.3%	31-Jan-10	27-Feb-10	28	28	28
					Mth 25	Preliminaries Month 25	Prelims - S	442,001.46	3.3%	28-Feb-10	27-Mar-10	28	29	29
					Mth 26	Preliminaries Month 26	Prelims - S	442,001.46	3.3%	28-Mar-10	24-Apr-10	28	30	30
					Mth 27	Preliminaries Month 27	Prelims - S	442,001.46	3.3%	25-Apr-10	22-May-10	28	31	31
					Mth 28	Preliminaries Month 28	Prelims - S	442,001.46	3.3%	23-May-10	19-Jun-10	28	32	32
					Mth 29	Preliminaries Month 29	Prelims - S	209,839.25	1.6%	20-Jun-10	17-Jul-10	28	33	33
					Mth 30	Preliminaries Month 30	Prelims - S	209,839.25	1.6%	18-Jul-10	14-Aug-10	28	34	34
					Mth 31	Preliminaries Month 31	Prelims - S	209,839.25	1.6%	15-Aug-10	11-Sep-10	28	35	35
					Mth 32	Preliminaries Month 32	Prelims - S	209,839.25	1.6%	12-Sep-10	09-Oct-10	28	36	36
					Mth 33	Preliminaries Month 33	Prelims - S	157,688.37	1.2%	10-Oct-10	06-Nov-10	28	37	37
					Mth 34	Preliminaries Month 34	Prelims - S	157,688.37	1.2%	07-Nov-10	04-Dec-10	28	38	38
					Mth 35	Preliminaries Month 35	Prelims - S	157,688.37	1.2%	05-Dec-10	01-Jan-11	28	39	39
					Mth 36	Preliminaries Month 36	Prelims - S	157,688.37	1.2%	02-Jan-11	29-Jan-11	28	40	40
					Mth 37	Preliminaries Month 37	Prelims - S	157,688.37	1.2%	30-Jan-11	26-Feb-11	28	41	41
					Mth 38	Preliminaries Month 38	Prelims - S	157,688.37	1.2%	27-Feb-11	26-Mar-11	28	42	42
					Mth 39	Preliminaries Month 39	Prelims - S	157,688.37	1.2%	27-Mar-11	23-Apr-11	28	43	43
					Mth 40	Preliminaries Month 40	Prelims - S	157,688.37	1.2%	24-Apr-11	21-May-11	28	44	44
					Mth 41	Preliminaries Month 41	Prelims - S	157,688.37	1.2%	22-May-11	18-Jun-11	28	45	45
					Mth 42	Preliminaries Month 42	Prelims - S	157,688.37	1.2%	19-Jun-11	16-Jul-11	28	46	46
	00D Network Rail Immunisation							3,000,000.00		27-Apr-2008	25-Apr-2009	364	5	17
		00D1 Network Rail Immunisation						3,000,000.00		27-Apr-2008	25-Apr-2009	364	5	17
			Network Rail Immunisation											
				Network Rail Immunisation				3,000,000.00	100%	27-Apr-08	25-Apr-09	364	5	17
					Mth 1	Network Rail Immunisation Month 1	NR Imm	230,769.23	7.7%	27-Apr-08	24-May-08	28	5	5
					Mth 2	Network Rail Immunisation Month 2	NR Imm	230,769.23	7.7%	25-May-08	21-Jun-08	28	6	6
					Mth 3	Network Rail Immunisation Month 3	NR Imm	230,769.23	7.7%	22-Jun-08	19-Jul-08	28	7	7
					Mth 4	Network Rail Immunisation Month 4	NR Imm	230,769.23	7.7%	20-Jul-08	16-Aug-08	28	8	8
					Mth 5	Network Rail Immunisation Month 5	NR Imm	230,769.23	7.7%	17-Aug-08	13-Sep-08	28	9	9
					Mth 6	Network Rail Immunisation Month 6	NR Imm	230,769.23	7.7%	14-Sep-08	11-Oct-08	28	10	10
					Mth 7	Network Rail Immunisation Month 7	NR Imm	230,769.23	7.7%	12-Oct-08	08-Nov-08	28	11	11
					Mth 8	Network Rail Immunisation Month 8	NR Imm	230,769.23	7.7%	09-Nov-08	06-Dec-08	28	12	12
					Mth 9	Network Rail Immunisation Month 9	NR Imm	230,769.23	7.7%	07-Dec-08	03-Jan-09	28	13	13
					Mth 10	Network Rail Immunisation Month 10	NR Imm	230,769.23	7.7%	04-Jan-09	31-Jan-09	28	14	14
					Mth 11	Network Rail Immunisation Month 11	NR Imm	230,769.23	7.7%	01-Feb-09	28-Feb-09	28	15	15
					Mth 12	Network Rail Immunisation Month 12	NR Imm	230,769.23	7.7%	01-Mar-09	28-Mar-09	28	16	16
					Mth 13	Network Rail Immunisation Month 13	NR Imm	230,769.23	7.7%	29-Mar-09	25-Apr-09	28	17	17
	00E SDS Interface							3,800,000.00		27-Apr-2008	25-Apr-2009	364	5	17
		00E1 SDS Interface						3,800,000.00		27-Apr-2008	25-Apr-2009	364	5	17
			SDS Interface											
				SDS Interface				3,800,000.00	100%	27-Apr-08	25-Apr-09	364	5	17
					Mth 1	SDS Interface Month 1	SDS Int	292,307.69	7.7%	27-Apr-08	24-May-08	28	5	5
					Mth 2	SDS Interface Month 2	SDS Int	292,307.69	7.7%	25-May-08	21-Jun-08	28	6	6
					Mth 3	SDS Interface Month 3	SDS Int	292,307.69	7.7%	22-Jun-08	19-Jul-08	28	7	7
					Mth 4	SDS Interface Month 4	SDS Int	292,307.69	7.7%	20-Jul-08	16-Aug-08	28	8	8
					Mth 5	SDS Interface Month 5	SDS Int	292,307.69	7.7%	17-Aug-08	13-Sep-08	28	9	9

Year	2011													2011
Period	40	41	42	43	44	45	46	47	48	49	50	51	52	Subtotal
Period End	29-Jan-2011	26-Feb-2011	26-Mar-2011	23-Apr-2011	21-May-2011	18-Jun-2011	16-Jul-2011	13-Aug-2011	10-Sep-2011	08-Oct-2011	05-Nov-2011	03-Dec-2011	31-Dec-2011	GBP
	773,571	454,633	454,633	454,633	454,633	454,633	1,654,633	-	-	-	-	-	-	4,701,379
	454,633	454,633	454,633	454,633	454,633	454,633	454,633	-	-	-	-	-	-	3,182,431
	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	296,945	296,945	296,945	296,945	296,945	296,945	296,945	-	-	-	-	-	-	2,078,613
	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Murphy Services Group BILFINGER BERGER SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year Period Period End 1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	2008 7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
					Mth 6	SDS Interface Month 6	SDS Int	0	292,307.69	7.7%	14-Sep-08	11-Oct-08	28	10	10	-	-	-	-	-	-	-	-	-	292,308	-	-	-	292,308
					Mth 7	SDS Interface Month 7	SDS Int	0	292,307.69	7.7%	12-Oct-08	08-Nov-08	28	11	11	-	-	-	-	-	-	-	-	-	-	292,308	-	-	292,308
					Mth 8	SDS Interface Month 8	SDS Int	0	292,307.69	7.7%	09-Nov-08	06-Dec-08	28	12	12	-	-	-	-	-	-	-	-	-	-	-	292,308	-	292,308
					Mth 9	SDS Interface Month 9	SDS Int	0	292,307.69	7.7%	07-Dec-08	03-Jan-09	28	13	13	-	-	-	-	-	-	-	-	-	-	-	-	292,308	292,308
					Mth 10	SDS Interface Month 10	SDS Int	0	292,307.69	7.7%	04-Jan-09	31-Jan-09	28	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 11	SDS Interface Month 11	SDS Int	0	292,307.69	7.7%	01-Feb-09	28-Feb-09	28	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 12	SDS Interface Month 12	SDS Int	0	292,307.69	7.7%	01-Mar-09	28-Mar-09	28	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 13	SDS Interface Month 13	SDS Int	0	292,307.69	7.7%	29-Mar-09	25-Apr-09	28	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00F Incentivisation							4,800,000.00		25-Mar-2010	16-Jul-2011	479	29	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00F1 Incentivisation							4,800,000.00		25-Mar-2010	16-Jul-2011	479	29	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Incentivisation																									
			Incentivisation						4,800,000.00	100%	25-Mar-10	16-Jul-11	479	29	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Section A	Incentivisation	Incent	0	1,200,000.00	25.0%	25-Mar-10	25-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Section B	Incentivisation	Incent	0	1,200,000.00	25.0%	23-Apr-10	23-Apr-10	1	30	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Section C	Incentivisation	Incent	0	1,200,000.00	25.0%	17-Jan-11	17-Jan-11	1	40	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Section D	Incentivisation	Incent	0	1,200,000.00	25.0%	16-Jul-11	16-Jul-11	1	46	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01 Newhaven Road to Haymarket									38,658,945.36		15-Jul-2008	11-May-2011	970	7	42	-	-	-	-	-	-	-	25,015	149,127	314,863	681,207	770,408	606,872	2,547,492
01A Newhaven Road (inc.) to Foot of the Walk (exc.)									15,692,627.78		04-Sep-2008	17-Jan-2011	866	9	40	-	-	-	-	-	-	-	-	-	-	347,283	512,392	23,243	882,917
	01A1 Newhaven Road (inc.) to Ocean Terminal (exc.)								5,383,407.72		03-Nov-2008	24-Sep-2010	691	11	37	-	-	-	-	-	-	-	-	-	-	10,268	338,045	23,243	371,556
		Newhaven to Ocean Terminal																										
			E & M Installations						599,356.90	100%	21-Apr-10	05-Jul-10	76	30	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17000	Access for E&M wayside installation (01A)	SCC	1A	-	0.0%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16990	Access for visual inspection for E&M wayside installation (01A)	SCC	1A	-	0.0%	21-Apr-10	21-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17030	Access for visual inspection to cable pits for cable laying (01A)	SCC	1A	-	0.0%	21-Apr-10	21-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17040	Access to cable pits for cable laying (01A)	SCC	1A	-	0.0%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17050	Install Electrical Cables	SCC	1A	-	0.0%	24-May-10	07-Jun-10	15	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17060	Install Fibre Optic Cables	SCC	1A	222,504.72	37.1%	21-Jun-10	02-Jul-10	12	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17070	Install Signalling Wayside Equipment	SCC	1A	5,993.57	1.0%	08-Jun-10	21-Jun-10	14	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17050	Install Electrical Cables	SCC	1A	-	0.0%	24-May-10	07-Jun-10	15	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17020	Overhead Catenary Line	OLE	1A	185,429.30	30.9%	07-Jun-10	05-Jul-10	29	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17020	Overhead Catenary Line	OLE	1A	185,429.30	30.9%	07-Jun-10	05-Jul-10	29	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Lindsay Road Retaining Walls (W1)																										
			Retaining Wall						1,468,331.00	100%	05-Nov-08	22-Jun-09	230	11	21	-	-	-	-	-	-	-	-	-	-	-	145,365	-	145,365
					5	Wall B Contiguous Bored Piles	Structures	1A	145,364.77	9.9%	05-Nov-08	05-Dec-08	31	11	12	-	-	-	-	-	-	-	-	-	-	-	145,365	-	145,365
					5	Wall B Contiguous Bored Piles	Structures	1A	145,364.77	9.9%	06-Dec-08	05-Jan-09	31	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Wall B Contiguous Bored Piles	Structures	1A	145,364.77	9.9%	06-Jan-09	05-Feb-09	31	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Wall B Contiguous Bored Piles	Structures	1A	145,364.77	9.9%	06-Feb-09	05-Mar-09	28	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Wall B Contiguous Bored Piles	Structures	1A	145,364.77	9.9%	06-Mar-09	08-Apr-09	35	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1710	Wall A Reinforced Earth	Structures	1A	436,094.31	29.7%	09-Apr-09	09-May-09	31	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1710	Wall A Parapet Wall	Structures	1A	290,729.54	19.8%	10-May-09	22-Jun-09	45	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	1A	14,683.31	1.0%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Roadworks						686,957.86	100%	03-Nov-08	12-May-10	556	11	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1100	CH 0300 to 0700 - one half	Highways	1A	192,024.93	28.0%	03-Sep-09	03-Oct-09	31	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1100	CH 0300 to 0700	Highways	1A	128,016.62	18.6%	04-Oct-09	11-Nov-09	40	23	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	3,232.74	0.5%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1110	CH 0700 to 0850	Highways	1A	120,015.58	17.5%	03-Nov-08	30-Apr-09	179	11	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	1,212.28	0.2%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1090	CH 0000 to 0300 - One Half	Highways	1A	120,015.58	17.5%	02-Mar-10	02-Apr-10	32	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1090	CH 0000 to 0300	Highways	1A	120,015.58	17.5%	03-Apr-10	12-May-10	41	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	2,424.56	0.4%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (21)			-	0.0%		12-May-10																
		Trackwork Ch 0 - 265																										
			Trackwork						576,706.64	100%	29-Oct-09	01-Mar-10	124	24	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15970	Establish Traffic Management & Temp. Fencing	Track	1A	27,506.01	4.8%	29-Oct-09	02-Nov-09	5	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15980	Excavate box	Track	1A	-	0.0%	02-Nov-09	17-Nov-09	16	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15990	Excavate, lay and concrete ducts	Track	1A	-	0.0%	17-Nov-09	10-Dec-09	24	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16000	Excavate and construct OLE bases	Track - BB	1A	20,819.43	3.6%	17-Nov-09	10-Dec-09	24	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16010	Set Track (265m) - 60%	Track	1A	330,072.08	57.2%	12-Jan-10	15-Feb-10	35	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16010	Set Track (265m) - 40%	Track	1A	165,036.04	28.6%	12-Jan-10	15-Feb-10	35	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16020	Place upper concrete and cure	Track	1A	-	0.0%	15-Jan-10	18-Feb-10	35	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16030	Street Surface finishes	Track	1A	-	0.0%	19-Feb-10	26-Feb-10	8	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16040	Remove fencing and Traffic Management	Track	1A	27,506.01	4.8%	01-Mar-10	01-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	5,767.07	1.0%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Trackwork Ch 265 - 425																										
			Trackwork						348,200.23	100%	19-Jun-09	02-Sep-09	76	19	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15890	Establish Traffic Management & Temp. Fencing	Track	1A	16,607.40	4.8%	19-Jun-09	23-Jun-09	5	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15900	Excavate box	Track	1A	-	0.0%	23-Jun-09	01-Jul-09	9	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15910	Excavate, lay and concrete ducts	Track	1A	132,859.20	38.2%	01-Jul-09	14-Jul-09	14	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15920	Excavate and construct OLE bases	Track - BB	1A	12,570.22	3.6%	01-Jul-09	14-Jul-09	14	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15930	Set Track (160m)	Track	1A	166,074.00	47.7%	05-Aug-09	19-Aug-09	15	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15940	Place upper concrete and cure	Track	1A	-	0.0%	10-Aug-09	24-Aug-09	15	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15950	Street Surface finishes	Track	1A	-	0.0%	25-Aug-09	01-Sep-09	8	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15960	Remove fencing and Traffic Management	Track	1A	16,607.40	4.8%	02-Sep-09	02-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	3,482.00	1.0%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Trackwork Ch 425 - 475																										
			Trackwork						108,812.57	100%	26-Feb-09	06-Apr-09	40	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15810	Establish Traffic Management & Temp. Fencing	Track	1A	5,189.81	4.8%	26-Feb-09	27-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15820	Excavate box	Track	1A	-	0.0%	02-Mar-09	03-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15830	Excavate, lay and concrete ducts	Track	1A	31,138.88	28.6%	04-Mar-09	06-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15840	Excavate and construct OLE bases	Track - BB	1A	3,928.19	3.6%	04-Mar-09	06-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15850	Set Track (50m)	Track	1A	-	0.0%	20-Mar-09	26-Mar-09	7	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15860	Place upper concrete and cure	Track	1A	62,277.75	57.2%	25-Mar-09	31-Mar-09	7	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15870	Street Surface finishes	Track	1A	-	0.0%	01-Apr-09	03-Apr-09	3	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15880	Remove fencing and Traffic Management	Track	1A	5,189.81	4.8%	06-Apr-09	06-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	1,088.13	1.0%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Trackwork Ch 475 - 600																										
			Trackwork						272,031.43	100%	16-Dec-08	25-Feb-09	72	13	16	-	-	-	-	-	-	-	-	-	-	-	-	12,975	12,975
					A15730	Establish Traffic Management & Temp. Fencing	Track	1A	12,974.53	4.8%	16-Dec-08	17-Dec-08	2	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	12,975	12,975
					A15740	Excavate box	Track	1A	-	0.0%	18-Dec-08	07-Jan-09	21	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15750	Excavate, lay and concrete ducts	Track	1A	77,847.19	28.6%	08-Jan-09	19-Jan-09	12	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15760	Excavate and construct OLE bases	Track - BB	1A	9,820.49	3.6%	08-Jan-09	19-Jan-09	12	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15770	Set Track (125m)	Track	1A	-	0.0%	29-Jan-09	11-Feb-09	14	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15780	Place upper concrete and cure	Track	1A	155,694.38	57.2%	03-Feb-09	16-Feb-09	14	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15790	Street Surface finishes	Track	1A	-	0.0%	17-Feb-09	24-Feb-09	8	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15800	Remove fencing and Traffic Management	Track	1A	12,974.53	4.8%	25-Feb-09	25-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	2,720.31	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Trackwork Ch 600 - 700																										
			Trackwork						215,370.42	100%	03-Nov-08	15-Dec-08	43	11	14	-	-	-	-	-	-	-	-	-	-	-	10,268	192,681	10,268	213,217
					A15650	Establish Traffic Management & Temp. Fencing	Track	1A	10,268.02	4.8%	03-Nov-08	04-Nov-08	2	11	11	-	-	-	-	-	-	-	-	-	-	-	10,268	-	-	10,268
					A15660	Excavate box	Track	1A	-	0.0%	05-Nov-08	10-Nov-08	6	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15670	Excavate, lay and concrete ducts	Track	1A	-	0.0%	11-Nov-08	18-Nov-08	8	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15680	Excavate and construct OLE bases	Track - BB	1A	7,856.39	3.6%	11-Nov-08	18-Nov-08	8	12	12	-	-	-	-	-	-	-	-	-	-	-	7,856	-	-	7,856
					A15690	Set Track (100m)	Track	1A	-	0.0%	19-Nov-08	28-Nov-08	10	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15700	Place upper concrete and cure	Track	1A	184,824.29	85.8%	24-Nov-08	04-Dec-08	11	12	12	-	-	-	-	-	-	-	-	-	-	-	184,824	-	-	184,824
					A15710	Street Surface finishes	Track	1A	-	0.0%	05-Dec-08	12-Dec-08	8	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15720	Remove fencing and Traffic Management	Track	1A	10,268.02	4.8%	15-Dec-08	15-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	10,268	10,268
					Snagging	Snagging	Track	1A	2,153.70	1.0%				13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Trackwork Ch 700 - 850																										
			Trackwork						326,437.72	100%	15-Jan-10	29-Mar-10	74	27	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15570	Establish Traffic Management & Temp. Fencing	Track	1A	15,569.44	4.8%	15-Jan-10	19-Jan-10	5	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15580	Excavate box	Track	1A	-	0.0%	19-Jan-10	27-Jan-10	9	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15590	Excavate, lay and concrete ducts	Track	1A	124,555.50	38.2%	27-Jan-10	09-Feb-10	14	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15600	Excavate and construct OLE bases	Track - BB	1A	11,784.58	3.6%	27-Jan-10	09-Feb-10	14	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15610	Set Track (150m)	Track	1A	-	0.0%	02-Mar-10	15-Mar-10	14	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15620	Place upper concrete and cure	Track	1A	155,694.38	47.7%	05-Mar-10	18-Mar-10	14	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15630	Street Surface finishes	Track	1A	-	0.0%	19-Mar-10	26-Mar-10	8	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15640	Remove fencing and Traffic Management	Track	1A	15,569.44	4.8%	29-Mar-10	29-Mar-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	3,264.38	1.0%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Newhaven Road Tramstop																										
			Tramstop						328,067.08	100%	02-Mar-10	01-Sep-10	184	29	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					8	Civil and Building Works	Tramstops	1A	95,965.13	29.3%	02-Mar-10	15-Apr-10	45	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					8	Civil and Building Works	Tramstops	1A	95,965.13	29.3%	16-Apr-10	03-Jun-10	50	30	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	1,919.30	0.6%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					98	Order REC Supply	Trams Eq	1A	-	0.0%	16-Apr-10	16-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0007

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Extract 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					Mth 6	SDS Interface Month 6	SDS Int	0	292,307.69	7.7%	14-Sep-08	11-Oct-08	28	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 7	SDS Interface Month 7	SDS Int	0	292,307.69	7.7%	12-Oct-08	08-Nov-08	28	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 8	SDS Interface Month 8	SDS Int	0	292,307.69	7.7%	09-Nov-08	06-Dec-08	28	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 9	SDS Interface Month 9	SDS Int	0	292,307.69	7.7%	07-Dec-08	03-Jan-09	28	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 10	SDS Interface Month 10	SDS Int	0	292,307.69	7.7%	04-Jan-09	31-Jan-09	28	14	14	292,308	-	-	-	-	-	-	-	-	-	-	-	-	292,308
					Mth 11	SDS Interface Month 11	SDS Int	0	292,307.69	7.7%	01-Feb-09	28-Feb-09	28	15	15	-	292,308	-	-	-	-	-	-	-	-	-	-	-	292,308
					Mth 12	SDS Interface Month 12	SDS Int	0	292,307.69	7.7%	01-Mar-09	28-Mar-09	28	16	16	-	-	292,308	-	-	-	-	-	-	-	-	-	-	292,308
					Mth 13	SDS Interface Month 13	SDS Int	0	292,307.69	7.7%	29-Mar-09	25-Apr-09	28	17	17	-	-	-	292,308	-	-	-	-	-	-	-	-	-	292,308
					00F Incentivisation				4,800,000.00		25-Mar-2010	16-Jul-2011	479	29	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00F1 Incentivisation				4,800,000.00		25-Mar-2010	16-Jul-2011	479	29	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Incentivisation																							
					Incentivisation				4,800,000.00	100%	25-Mar-10	16-Jul-11	479	29	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Section A	Incentivisation	Incent	0	1,200,000.00	25.0%	25-Mar-10	25-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Section B	Incentivisation	Incent	0	1,200,000.00	25.0%	23-Apr-10	23-Apr-10	1	30	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Section C	Incentivisation	Incent	0	1,200,000.00	25.0%	17-Jan-11	17-Jan-11	1	40	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Section D	Incentivisation	Incent	0	1,200,000.00	25.0%	16-Jul-11	16-Jul-11	1	46	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					01 Newhaven Road to Haymarket				33,218,045.36		15-Jul-2008	11-May-2011	979	7	42	283,618	1,167,790	1,136,181	550,529	2,308,541	1,362,687	1,958,182	421,861	878,924	732,161	2,200,018	1,166,307	78,224	14,245,022
					01A Newhaven Road (inc.) to Foot of the Walk (exc.)				15,692,627.78		04-Sep-2008	17-Jan-2011	866	9	40	235,186	319,223	183,152	387,178	827,037	203,306	1,309,556	69,759	590,439	390,812	980,434	405,272	72,836	5,974,191
					01A1 Newhaven Road (inc.) to Ocean Terminal (exc.)				5,383,407.72		03-Nov-2008	24-Sep-2010	691	11	37	235,186	319,223	183,152	212,832	557,198	1,212	452,766	14,683	182,681	195,507	27,506	128,017	24,052	2,534,017
					Newhaven to Ocean Terminal																							
					E & M Installations				599,356.90	100%	21-Apr-10	05-Jul-10	76	30	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17000	Access for E&M wayside installation (01A)	SCC	1A	-	0.0%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16990	Access for visual inspection for E&M wayside installation (01A)	SCC	1A	-	0.0%	21-Apr-10	21-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17030	Access for visual inspection to cable pits for cable laying (01A)	SCC	1A	-	0.0%	21-Apr-10	21-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17040	Access to cable pits for cable laying (01A)	SCC	1A	-	0.0%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17050	Install Electrical Cables	SCC	1A	-	0.0%	24-May-10	07-Jun-10	15	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17060	Install Fibre Optic Cables	SCC	1A	222,504.72	37.1%	21-Jun-10	02-Jul-10	12	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17070	Install Signalling Wayside Equipment	SCC	1A	5,993.57	1.0%	08-Jun-10	21-Jun-10	14	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17050	Install Electrical Cables	SCC	1A	-	0.0%	24-May-10	07-Jun-10	15	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17020	Overhead Catenary Line	OLE	1A	185,429.30	30.9%	07-Jun-10	05-Jul-10	29	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17020	Overhead Catenary Line	OLE	1A	185,429.30	30.9%	07-Jun-10	05-Jul-10	29	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Lindsay Road Retaining Walls (W1)																							
					Retaining Wall				1,468,331.00	100%	05-Nov-08	22-Jun-09	230	11	21	145,365	145,365	145,365	145,365	436,094	-	290,730	14,683	-	-	-	-	-	1,322,966
					5	Wall B Contiguous Bored Piles	Structures	1A	145,364.77	9.9%	05-Nov-08	05-Dec-08	31	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Wall B Contiguous Bored Piles	Structures	1A	145,364.77	9.9%	06-Dec-08	05-Jan-09	31	12	14	145,365	-	-	-	-	-	-	-	-	-	-	-	-	145,365
					5	Wall B Contiguous Bored Piles	Structures	1A	145,364.77	9.9%	06-Jan-09	05-Feb-09	31	14	15	-	145,365	-	-	-	-	-	-	-	-	-	-	-	-	145,365
					5	Wall B Contiguous Bored Piles	Structures	1A	145,364.77	9.9%	06-Feb-09	05-Mar-09	28	15	16	-	-	145,365	-	-	-	-	-	-	-	-	-	-	-	-	145,365
					5	Wall B Contiguous Bored Piles	Structures	1A	145,364.77	9.9%	06-Mar-09	08-Apr-09	35	16	17	-	-	-	145,365	-	-	-	-	-	-	-	-	-	-	-	145,365
					A1710	Wall A Reinforced Earth	Structures	1A	436,094.31	29.7%	09-Apr-09	09-May-09	31	17	18	-	-	-	-	436,094	-	-	-	-	-	-	-	-	-	436,094
					A1710	Wall A Parapet Wall	Structures	1A	290,729.54	19.8%	10-May-09	22-Jun-09	45	18	20	-	-	-	-	-	-	290,730	-	-	-	-	-	-	-	290,730
					Snagging	Snagging	Structures	1A	14,683.31	1.0%				20	21	-	-	-	-	-	-	-	14,683	-	-	-	-	-	-	14,683
					Roadworks				686,957.86	100%	03-Nov-08	12-May-10	556	11	32	-	-	-	-	120,016	1,212	-	-	-	192,025	-	128,017	3,233	444,502
					A1100	CH 0300 to 0700 - one half	Highways	1A	192,024.93	27.9%	03-Sep-09	03-Oct-09	31	22	23	-	-	-	-	-	-	-	-	-	192,025	-	-	-	-	192,025
					A1100	CH 0300 to 0700	Highways	1A	128,016.62	18.6%	04-Oct-09	11-Nov-09	40	23	25	-	-	-	-	-	-	-	-	-	-	-	128,017	-	-	128,017
					Snagging	Snagging	Highways	1A	3,232.74	0.5%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	3,233	3,233
					A1110	CH 0700 to 0850	Highways	1A	120,015.58	17.5%	03-Nov-08	30-Apr-09	179	11	18	-	-	-	-	120,016	-	-	-	-	-	-	-	-	-	120,016
					Snagging	Snagging	Highways	1A	1,212.28	0.2%				18	19	-	-	-	-	-	1,212	-	-	-	-	-	-	-	1,212
					A1090	CH 0000 to 0300 - One Half	Highways	1A	120,015.58	17.5%	02-Mar-10	02-Apr-10	32	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1090	CH 0000 to 0300	Highways	1A	120,015.58	17.5%	03-Apr-10	12-May-10	41	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	2,424.56	0.4%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					CHI Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (21)				0.0%		12-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Trackwork Ch 0 - 265																							
					Trackwork				576,706.64	100%	29-Oct-09	01-Mar-10	124	24	30	-	-	-	-	-	-	-	-	-	-	27,506	-	20,819	48,325
					A15970	Establish Traffic Management & Temp. Fencing	Track	1A	27,506.01	4.8%	29-Oct-09	02-Nov-09	5	24	24	-	-	-	-	-	-	-	-	-	-	27,506	-	-	27,506
					A15980	Excavate box	Track	1A	-	0.0%	02-Nov-09	17-Nov-09	16	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15990	Excavate, lay and concrete ducts	Track	1A	-	0.0%	17-Nov-09	10-Dec-09	24	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16000	Excavate and construct OLE bases	Track - BB	1A	20,819.43	3.6%	17-Nov-09	10-Dec-09	24	25	26	-	-	-	-	-	-	-	-	-	-	-	-	20,819	20,819
					A16010	Set Track (265m) - 60%	Track	1A	330,072.08	57.2%	12-Jan-10	15-Feb-10	35	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16010	Set Track (265m) - 40%	Track	1A	165,036.04	28.6%	12-Jan-10	15-Feb-10	35	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16020	Place upper concrete and cure	Track	1A	-	0.0%	15-Jan-10	18-Feb-10	35	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16030	Street Surface finishes	Track	1A	-	0.0%	19-Feb-10	26-Feb-10	8	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16040	Remove fencing and Traffic Management	Track	1A	27,506.01	4.8%	01-Mar-10	01-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	5,767.07	1.0%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Trackwork Ch 265 - 425																							
					Trackwork				348,200.23	100%	19-Jun-09	02-Sep-09	76	19	23	-	-	-	-	-	-	162,037	-	182,681	3,482	-	-	-	348,200
					A15890	Establish Traffic Management & Temp. Fencing	Track	1A	16,607.40	4.8%	19-Jun-09	23-Jun-09	5	19	20	-	-	-	-	-	-	16,607	-	-	-	-	-	-	16,607
					A15900	Excavate box	Track	1A	-	0.0%	23-Jun-09	01-Jul-09	9	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15910	Excavate, lay and concrete ducts	Track	1A	132,859.20	38.2%	01-Jul-09	14-Jul-09	14	20	20	-	-	-	-	-	-	132,859	-	-	-	-	-	-	132,859
					A15920	Excavate and construct OLE bases	Track - BB	1A	12,570.22	3.6%	01-Jul-09	14-Jul-09	14	20	20	-	-	-	-	-	-	12,570	-	-	-	-	-	-	12,570
					A15930	Set Track (160m)	Track	1A	166,074.00	47.7%	05-Aug-09	19-Aug-09	15	21	22	-	-	-	-	-	-	-	-	166,074	-	-	-	-	166,074
					A15940	Place upper concrete and cure	Track	1A	-	0.0%	10-Aug-09	24-Aug-09	15	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15950	Street Surface finishes	Track	1A	-	0.0%	25-Aug-09	01-Sep-09	8	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15960	Remove fencing and Traffic Management	Track	1A	16,607.40	4.8%	02-Sep-09	02-Sep-09	1	22	22	-	-	-	-	-	-	-	-	16,607	-	-	-	-	16,607
					Snagging	Snagging	Track	1A	3,482.00	1.0%				22	23	-	-	-	-	-	-	-	-	-	3,482	-	-	-	3,482
					Trackwork Ch 425 - 475																							
					Trackwork				108,812.57	100%	26-Feb-09	06-Apr-09	40	15	18	-	5,190	35,067	67,468	1,088	-	-	-	-	-	-	-	-	108,813
					A15810	Establish Traffic Management & Temp. Fencing	Track	1A	5,189.81	4.8%	26-Feb-09	27-Feb-09	2	15	15	-	5,190	-	-	-	-	-	-	-	-	-	-	-	-	5,190
					A15820	Excavate box	Track	1A	-	0.0%	02-Mar-09	03-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15830	Excavate, lay and concrete ducts	Track	1A	31,138.88	28.6%	04-Mar-09	06-Mar-09	3	16	16	-	-	31,139	-	-	-	-	-	-	-	-	-	-	-	31,139
					A15840	Excavate and construct OLE bases	Track - BB	1A	3,928.19	3.6%	04-Mar-09	06-Mar-09	3	16	16	-	-	3,928	-	-	-	-	-	-	-	-	-	-	-	3,928
					A15850	Set Track (50m)	Track	1A	-	0.0%	20-Mar-09	26-Mar-09	7	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15860	Place upper concrete and cure	Track	1A	62,277.75	57.2%	25-Mar-09	31-Mar-09	7	16	17	-	-	-	62,278	-	-	-	-	-	-	-	-	-	62,278
					A15870	Street Surface finishes	Track	1A	-	0.0%	01-Apr-09	03-Apr-09	3	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15880	Remove fencing and Traffic Management	Track	1A	5,189.81	4.8%	06-Apr-09	06-Apr-09	1	17	17	-	-	-	5,190	-	-	-	-	-	-	-	-	-	5,190
					Snagging	Snagging	Track	1A	1,088.13	1.0%				17	18	-	-	-	-	1,088	-	-	-	-	-	-	-	-	-	1,088
					Trackwork Ch 475 - 600																							
					Trackwork				272,031.43	100%	16-Dec-08	25-Feb-09	72	13	16	87,668	168,669	2,720	-	-	-	-	-	-	-	-	-	-	-	259,057
					A15730	Establish Traffic Management & Temp. Fencing	Track	1A	12,974.53	4.8%	16-Dec-08	17-Dec-08	2	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15740	Excavate box	Track	1A	-	0.0%	18-Dec-08	07-Jan-09	21	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15750	Excavate, lay and concrete ducts	Track	1A	77,847.19	28.6%	08-Jan-09	19-Jan-09	12	14	14	77,847	-	-	-	-	-	-	-	-	-	-	-	-	77,847
					A15760	Excavate and construct OLE bases	Track - BB	1A	9,820.49	3.6%	08-Jan-09	19-Jan-09	12	14	14	9,820	-	-	-	-	-	-	-	-	-	-	-	-	9,820
					A15770	Set Track (125m)	Track	1A	-	0.0%	29-Jan-09	11-Feb-09	14	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15780	Place upper concrete and cure	Track	1A	155,694.38	57.2%	03-Feb-09	16-Feb-09	14	15	15	-	155,694	-	-	-	-	-	-	-	-	-	-	-	-	155,694
					A15790	Street Surface finishes	Track	1A	-	0.0%	17-Feb-09	24-Feb-09	8	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15800	Remove fencing and Traffic Management	Track	1A	12,974.53	4.8%	25-Feb-09	25-Feb-09	1	15	15	-	12,975	-	-	-	-	-	-	-	-	-	-	-	-	12,975
					Snagging	Snagging	Track	1A	2,720.31	1.0%				15	16	-	-	2,720	-	-	-	-	-	-	-	-	-	-	-	2,720
					Trackwork Ch 600 - 700																							
					Trackwork				215,370.42	100%	03-Nov-08	15-Dec-08	43	11	14	2,154	-	-	-	-	-	-	-	-	-	-	-	-	2,154
					A15650	Establish Traffic Management & Temp. Fencing	Track	1A	10,268.02	4.8%	03-Nov-08	04-Nov-08	2	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15660	Excavate box	Track	1A	-	0.0%	05-Nov-08	10-Nov-08	6	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15670	Excavate, lay and concrete ducts	Track	1A	-	0.0%	11-Nov-08	18-Nov-08	8	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15680	Excavate and construct OLE bases	Track - BB	1A	7,856.39	3.6%	11-Nov-08	18-Nov-08	8	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15690	Set Track (100m)	Track	1A	-	0.0%	19-Nov-08	28-Nov-08	10	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15700	Place upper concrete and cure	Track	1A	184,824.29	85.8%	24-Nov-08	04-Dec-08	11	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15710	Street Surface finishes	Track	1A	-	0.0%	05-Dec-08	12-Dec-08	8	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15720	Remove fencing and Traffic Management	Track	1A	10,268.02	4.8%	15-Dec-08	15-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	2,153.70	1.0%				13	14	2,154	-	-	-	-	-	-	-	-	-	-	-	-	-	2,154
					Trackwork Ch 700 - 850																							
					Trackwork				326,437.72	100%	15-Jan-10	29-Mar-10	74	27	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15570	Establish Traffic Management & Temp. Fencing	Track	1A	15,569.44	4.8%	15-Jan-10	19-Jan-10	5	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15580	Excavate box	Track	1A	-	0.0%	19-Jan-10	27-Jan-10	9	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15590	Excavate, lay and concrete ducts	Track	1A	124,555.50	38.2%	27-Jan-10	09-Feb-10	14	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15600	Excavate and construct OLE bases	Track - BB	1A	11,784.58	3.6%	27-Jan-10	09-Feb-10	14	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15610	Set Track (150m)	Track	1A	-	0.0%	02-Mar-10	15-Mar-10	14	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15620	Place upper concrete and cure	Track	1A	155,694.38	47.7%	05-Mar-10	18-Mar-10	14	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15630	Street Surface finishes	Track	1A	-	0.0%	19-Mar-10	26-Mar-10	8	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15640	Remove fencing and Traffic Management	Track	1A	15,569.44	4.8%	29-Mar-10	29-Mar-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	3,264.38	1.0%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Newhaven Road Tramstop																							
					Tramstop				328,067.08	100%	02-Mar-10	01-Sep-10	184	29	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					8	Civil and Building Works	Tramstops	1A	95,965.13	29.3%	02-Mar-10	15-Apr-10	45	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					8	Civil and Building Works	Tramstops	1A	95,965.13	29.3%	16-Apr-10	03-Jun-10	50	30	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	1,919.30	0.6%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					98	Order REC Supply	Trams Eq	1A	-	0.0%	16-Apr-10	16-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0008

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name				Contract Value	%age	Programme Dated 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					Mth 6	SDS Interface Month 6	SDS Int		0	292,307.69	7.7%	14-Sep-08	11-Oct-08	28	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 7	SDS Interface Month 7	SDS Int		0	292,307.69	7.7%	12-Oct-08	08-Nov-08	28	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 8	SDS Interface Month 8	SDS Int		0	292,307.69	7.7%	09-Nov-08	06-Dec-08	28	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 9	SDS Interface Month 9	SDS Int		0	292,307.69	7.7%	07-Dec-08	03-Jan-09	28	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 10	SDS Interface Month 10	SDS Int		0	292,307.69	7.7%	04-Jan-09	31-Jan-09	28	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 11	SDS Interface Month 11	SDS Int		0	292,307.69	7.7%	01-Feb-09	28-Feb-09	28	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 12	SDS Interface Month 12	SDS Int		0	292,307.69	7.7%	01-Mar-09	28-Mar-09	28	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 13	SDS Interface Month 13	SDS Int		0	292,307.69	7.7%	29-Mar-09	25-Apr-09	28	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	00F Incentivisation									4,800,000.00		25-Mar-2010	16-Jul-2011	479	29	46	-	1,200,000	1,200,000	-	-	-	-	-	-	-	-	-	1,200,000	3,600,000
		00F1 Incentivisation								4,800,000.00		25-Mar-2010	16-Jul-2011	479	29	46	-	1,200,000	1,200,000	-	-	-	-	-	-	-	-	-	1,200,000	3,600,000
			Incentivisation																											
			Incentivisation							4,800,000.00	100%	25-Mar-10	16-Jul-11	479	29	46	-	1,200,000	1,200,000	-	-	-	-	-	-	-	-	-	1,200,000	3,600,000
					Section A	Incentivisation	Incent		0	1,200,000.00	25.0%	25-Mar-10	25-Mar-10	1	29	29	-	1,200,000	-	-	-	-	-	-	-	-	-	-	-	1,200,000
					Section B	Incentivisation	Incent		0	1,200,000.00	25.0%	23-Apr-10	23-Apr-10	1	30	29	-	-	1,200,000	-	-	-	-	-	-	-	-	-	-	1,200,000
					Section C	Incentivisation	Incent		0	1,200,000.00	25.0%	17-Jan-11	17-Jan-11	1	40	39	-	-	-	-	-	-	-	-	-	-	-	-	1,200,000	1,200,000
					Section D	Incentivisation	Incent		0	1,200,000.00	25.0%	16-Jul-11	16-Jul-11	1	46	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	01 Newhaven Road to Haymarket									21,216,596.38		15-Jul-2008	11-May-2011	978	7	42	2,075,760	2,398,856	1,498,717	1,422,263	2,402,501	2,372,180	2,292,522	1,731,401	1,795,082	861,112	1,306,931	337,635	721,636	21,216,596
		01A Newhaven Road (inc.) to Foot of the Walk (exc.)								15,692,627.78		04-Sep-2008	17-Jan-2011	866	9	40	312,057	1,026,601	594,632	781,951	752,765	1,011,440	1,353,152	899,300	580,723	417,593	4,810	68,905	712,651	8,516,581
			01A1 Newhaven Road (inc.) to Ocean Terminal (exc.)							5,383,407.72		03-Nov-2008	24-Sep-2010	691	11	37	15,569	631,448	183,200	319,507	123,280	244,556	603,576	-	68,905	284,922	2,871	-	-	2,477,834
			Newhaven to Ocean Terminal																											
			E & M Installations							599,356.90	100%	21-Apr-10	05-Jul-10	76	30	33	-	-	-	-	-	-	599,357	-	-	-	-	-	-	599,357
					A17000	Access for E&M wayside installation (01A)	SCC	1A		-	0.0%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16990	Access for visual inspection for E&M wayside installation (01A)	SCC	1A		-	0.0%	21-Apr-10	21-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17030	Access for visual inspection to cable pits for cable laying (01A)	SCC	1A		-	0.0%	21-Apr-10	21-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17040	Access to cable pits for cable laying (01A)	SCC	1A		-	0.0%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17050	Install Electrical Cables	SCC	1A		-	0.0%	24-May-10	07-Jun-10	15	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17060	Install Fibre Optic Cables	SCC	1A		222,504.72	37.1%	21-Jun-10	02-Jul-10	12	33	33	-	-	-	-	-	-	222,505	-	-	-	-	-	-	222,505
					A17070	Install Signalling Wayside Equipment	SCC	1A		5,993.57	1.0%	08-Jun-10	21-Jun-10	14	32	33	-	-	-	-	-	-	5,994	-	-	-	-	-	-	5,994
					A17050	Install Electrical Cables	SCC	1A		-	0.0%	24-May-10	07-Jun-10	15	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17020	Overhead Catenary Line	OLE	1A		185,429.30	30.9%	07-Jun-10	05-Jul-10	29	32	33	-	-	-	-	-	-	185,429	-	-	-	-	-	-	185,429
					A17020	Overhead Catenary Line	OLE	1A		185,429.30	30.9%	07-Jun-10	05-Jul-10	29	32	33	-	-	-	-	-	-	185,429	-	-	-	-	-	-	185,429
			Lindsay Road Retaining Walls (W1)																											
			Retaining Wall							1,468,331.00	100%	05-Nov-08	22-Jun-09	230	11	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Wall B Contiguous Bored Piles	Structures	1A		145,364.77	9.9%	05-Nov-08	05-Dec-08	31	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Wall B Contiguous Bored Piles	Structures	1A		145,364.77	9.9%	06-Dec-08	05-Jan-09	31	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Wall B Contiguous Bored Piles	Structures	1A		145,364.77	9.9%	06-Jan-09	05-Feb-09	31	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Wall B Contiguous Bored Piles	Structures	1A		145,364.77	9.9%	06-Feb-09	05-Mar-09	28	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Wall B Contiguous Bored Piles	Structures	1A		145,364.77	9.9%	06-Mar-09	08-Apr-09	35	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1710	Wall A Reinforced Earth	Structures	1A		436,094.31	29.7%	09-Apr-09	09-May-09	31	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1710	Wall A Parapet Wall	Structures	1A		290,729.54	19.8%	10-May-09	22-Jun-09	45	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	1A		14,683.31	1.0%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Roadworks							686,957.86	100%	03-Nov-08	12-May-10	556	11	32	-	-	-	120,016	120,016	2,425	-	-	-	-	-	-	-	242,456
					A1100	CH 0300 to 0700 - one half	Highways	1A		192,004.93	28.0%	03-Sep-09	03-Oct-09	31	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1100	CH 0300 to 0700	Highways	1A		128,016.62	18.6%	04-Oct-09	11-Nov-09	40	23	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A		3,232.74	0.5%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1110	CH 0700 to 0850	Highways	1A		120,015.58	17.5%	03-Nov-08	30-Apr-09	179	11	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A		1,212.28	0.2%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1090	CH 0000 to 0300 - One Half	Highways	1A		120,015.58	17.5%	02-Mar-10	02-Apr-10	32	29	30	-	-	-	120,016	-	-	-	-	-	-	-	-	-	120,016
					A1090	CH 0000 to 0300	Highways	1A		120,015.58	17.5%	03-Apr-10	12-May-10	41	30	31	-	-	-	-	120,016	-	-	-	-	-	-	-	-	120,016
					Snagging	Snagging	Highways	1A		2,424.56	0.4%				31	32	-	-	-	-	-	2,425	-	-	-	-	-	-	-	2,425
					CHL Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (21)				-	0.0%		12-May-10																
			Trackwork Ch 0 - 265																											
			Trackwork							576,706.64	100%	29-Oct-09	01-Mar-10	124	24	30	-	495,108	27,506	5,767	-	-	-	-	-	-	-	-	528,381
					A15970	Establish Traffic Management & Temp. Fencing	Track	1A		27,506.01	4.8%	29-Oct-09	02-Nov-09	5	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15980	Excavate box	Track	1A		-	0.0%	02-Nov-09	17-Nov-09	16	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15990	Excavate, lay and concrete ducts	Track	1A		-	0.0%	17-Nov-09	10-Dec-09	24	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16000	Excavate and construct OLE bases	Track - BB	1A		20,819.43	3.6%	17-Nov-09	10-Dec-09	24	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16010	Set Track (265m) - 60%	Track	1A		330,072.08	57.2%	12-Jan-10	15-Feb-10	35	27	28	-	330,072	-	-	-	-	-	-	-	-	-	-	-	-	330,072
					A16010	Set Track (265m) - 40%	Track	1A		165,036.04	28.6%	12-Jan-10	15-Feb-10	35	27	28	-	165,036	-	-	-	-	-	-	-	-	-	-	-	-	165,036
					A16020	Place upper concrete and cure	Track	1A		-	0.0%	15-Jan-10	18-Feb-10	35	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16030	Street Surface finishes	Track	1A		-	0.0%	19-Feb-10	26-Feb-10	8	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16040	Remove fencing and Traffic Management	Track	1A		27,506.01	4.8%	01-Mar-10	01-Mar-10	1	29	29	-	-	27,506	-	-	-	-	-	-	-	-	-	-	-	27,506
					Snagging	Snagging	Track	1A		5,767.07	1.0%				29	30	-	-	-	5,767	-	-	-	-	-	-	-	-	-	5,767
			Trackwork Ch 265 - 425																											
			Trackwork							348,200.23	100%	19-Jun-09	02-Sep-09	76	19	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15890	Establish Traffic Management & Temp. Fencing	Track	1A		16,607.40	4.8%	19-Jun-09	23-Jun-09	5	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15900	Excavate box	Track	1A		-	0.0%	23-Jun-09	01-Jul-09	9	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15910	Excavate, lay and concrete ducts	Track	1A		132,859.20	38.2%	01-Jul-09	14-Jul-09	14	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15920	Excavate and construct OLE bases	Track - BB	1A		12,570.22	3.6%	01-Jul-09	14-Jul-09	14	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15930	Set Track (160m)	Track	1A		166,074.00	47.7%	05-Aug-09	19-Aug-09	15	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15940	Place upper concrete and cure	Track	1A		-	0.0%	10-Aug-09	24-Aug-09	15	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15950	Street Surface finishes	Track	1A		-	0.0%	25-Aug-09	01-Sep-09	8	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15960	Remove fencing and Traffic Management	Track	1A		16,607.40	4.8%	02-Sep-09	02-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A		3,482.00	1.0%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Trackwork Ch 425 - 475																											
			Trackwork							108,812.57	100%	26-Feb-09	06-Apr-09	40	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15810	Establish Traffic Management & Temp. Fencing	Track	1A		5,189.81	4.8%	26-Feb-09	27-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15820	Excavate box	Track	1A		-	0.0%	02-Mar-09	03-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15830	Excavate, lay and concrete ducts	Track	1A		31,138.88	28.6%	04-Mar-09	06-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15840	Excavate and construct OLE bases	Track - BB	1A		3,928.19	3.6%	04-Mar-09	06-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15850	Set Track (50m)	Track	1A		-	0.0%	20-Mar-09	26-Mar-09	7	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15860	Place upper concrete and cure	Track	1A		62,277.75	57.2%	25-Mar-09	31-Mar-09	7	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15870	Street Surface finishes	Track	1A		-	0.0%	01-Apr-09	03-Apr-09	3	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15880	Remove fencing and Traffic Management	Track	1A		5,189.81	4.8%	06-Apr-09	06-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A		1,088.13	1.0%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Trackwork Ch 475 - 600																											
			Trackwork							272,031.43	100%	16-Dec-08	25-Feb-09	72	13	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15730	Establish Traffic Management & Temp. Fencing	Track	1A		12,974.53	4.8%	16-Dec-08	17-Dec-08	2	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15740	Excavate box	Track	1A		-	0.0%	18-Dec-08	07-Jan-09	21	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15750	Excavate, lay and concrete ducts	Track	1A		77,847.19	28.6%	08-Jan-09	19-Jan-09	12	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15760	Excavate and construct OLE bases	Track - BB	1A		9,820.49	3.6%	08-Jan-09	19-Jan-09	12	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15770	Set Track (125m)	Track	1A		-	0.0%	29-Jan-09	11-Feb-09	14	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15780	Place upper concrete and cure	Track	1A		155,694.38	57.2%	03-Feb-09	16-Feb-09	14	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15790	Street Surface finishes	Track	1A		-	0.0%	17-Feb-09	24-Feb-09	8	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15800	Remove fencing and Traffic Management	Track	1A		12,974.53	4.8%	25-Feb-09	25-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A		2,720.31	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Trackwork Ch 600 - 700																											
			Trackwork							215,370.42	100%	03-Nov-08	15-Dec-08	43	11	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15650	Establish Traffic Management & Temp. Fencing	Track	1A		10,268.02	4.8%	03-Nov-08	04-Nov-08	2	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15660	Excavate box	Track	1A		-	0.0%	05-Nov-08	10-Nov-08	6	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15670	Excavate, lay and concrete ducts	Track	1A		-	0.0%	11-Nov-08	18-Nov-08	8	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15680	Excavate and construct OLE bases	Track - BB	1A		7,856.39	3.6%	11-Nov-08	18-Nov-08	8	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15690	Set Track (100m)	Track	1A		-	0.0%	19-Nov-08	28-Nov-08	10	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15700	Place upper concrete and cure	Track	1A		184,824.29	85.8%	24-Nov-08	04-Dec-08	11	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15710	Street Surface finishes	Track	1A		-	0.0%	05-Dec-08	12-Dec-08	8	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15720	Remove fencing and Traffic Management	Track	1A		10,268.02	4.8%	15-Dec-08	15-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A		2,153.70	1.0%				13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Trackwork Ch 700 - 850																											
			Trackwork							326,437.72	100%	15-Jan-10	29-Mar-10	74	27	31	15,569	136,340	155,694	15,569	3,264	-	-	-	-	-	-	-	-	326,438
					A15570	Establish Traffic Management & Temp. Fencing	Track	1A		15,569.44	4.8%	15-Jan-10	19-Jan-10	5	27	27	15,569	-	-	-	-	-	-	-	-	-	-	-	-	-	15,569
					A15580	Excavate box	Track	1A		-	0.0%	19-Jan-10	27-Jan-10	9	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15590	Excavate, lay and concrete ducts	Track	1A		124,555.50	38.2%	27-Jan-10	09-Feb-10	14	27	28	-	124,556	-	-	-	-	-	-	-	-	-	-	-	-	124,556
					A15600	Excavate and construct OLE bases	Track - BB	1A		11,784.58	3.6%	27-Jan-10	09-Feb-10	14	27	28	-	11,785	-	-	-	-	-	-	-	-	-	-	-	-	11,785
					A15610	Set Track (150m)	Track	1A		-	0.0%	02-Mar-10	15-Mar-10	14	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15620	Place upper concrete and cure	Track	1A		155,694.38	47.7%	05-Mar-10	18-Mar-10	14	29	29	-	-	155,694	-	-	-	-	-	-	-	-	-	-	-	155,694
					A15630	Street Surface finishes	Track	1A		-	0.0%	19-Mar-10	26-Mar-10	8	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15640	Remove fencing and Traffic Management	Track	1A		15,569.44	4.8%	29-Mar-10	29-Mar-10	1	30	30	-	-	-	15,569	-	-	-	-	-	-	-	-	-	-	15,569
					Snagging	Snagging	Track	1A		3,264.38	1.0%				30	31	-	-	-	-	3,264	-	-	-	-	-	-	-	-	-	3,264
			Newhaven Road Tramstop																											
			Tramstop							328,067.08	100%	02-Mar-10	01-Sep-10	184	29	36	-	-	-	95,965	-	159,942	2,559	-	68,905	696	-	-	-	328,067
					8	Civil and Building Works	Tramstops	1A		95,965.13	29.3%	02-Mar-10	15-Apr-10	45	29	30	-	-	-	95,965	-	-	-	-	-	-	-	-	-	-	95,965
					8	Civil and Building Works	Tramstops	1A		95,965.13	29.3%	16-Apr-10	03-Jun-10	50	30	32	-	-	-	-	-	95,965	-	-	-	-	-	-	-	-	95,965
					Snagging	Snagging	Tramstops	1A		1,919.30	0.6%				32	33	-	-	-	-	-	-	1,919	-	-	-	-	-	-	1,919
					98	Order REC Supply	Trams Eq	1A		-	0.0%	16-Apr-10	16-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0009

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Murrill Services College | BILFINGER BERGER | SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					Mth 6	SDS Interface Month 6	SDS Int	0	292,307.69	7.7%	14-Sep-08	11-Oct-08	28	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 7	SDS Interface Month 7	SDS Int	0	292,307.69	7.7%	12-Oct-08	08-Nov-08	28	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 8	SDS Interface Month 8	SDS Int	0	292,307.69	7.7%	09-Nov-08	06-Dec-08	28	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 9	SDS Interface Month 9	SDS Int	0	292,307.69	7.7%	07-Dec-08	03-Jan-09	28	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 10	SDS Interface Month 10	SDS Int	0	292,307.69	7.7%	04-Jan-09	31-Jan-09	28	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 11	SDS Interface Month 11	SDS Int	0	292,307.69	7.7%	01-Feb-09	28-Feb-09	28	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 12	SDS Interface Month 12	SDS Int	0	292,307.69	7.7%	01-Mar-09	28-Mar-09	28	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Mth 13	SDS Interface Month 13	SDS Int	0	292,307.69	7.7%	29-Mar-09	25-Apr-09	28	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00F Incentivisation							4,800,000.00		25-Mar-2010	16-Jul-2011	479	29	46	-	-	-	-	-	-	1,200,000	-	-	-	-	-	-	1,200,000
			00F1 Incentivisation						4,800,000.00		25-Mar-2010	16-Jul-2011	479	29	46	-	-	-	-	-	-	1,200,000	-	-	-	-	-	-	1,200,000
				Incentivisation																								
					Incentivisation				4,800,000.00	100%	25-Mar-10	16-Jul-11	479	29	46	-	-	-	-	-	-	1,200,000	-	-	-	-	-	-	1,200,000
					Section A	Incentivisation	Incent	0	1,200,000.00	25.0%	25-Mar-10	25-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Section B	Incentivisation	Incent	0	1,200,000.00	25.0%	23-Apr-10	23-Apr-10	1	30	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Section C	Incentivisation	Incent	0	1,200,000.00	25.0%	17-Jan-11	17-Jan-11	1	40	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Section D	Incentivisation	Incent	0	1,200,000.00	25.0%	16-Jul-11	16-Jul-11	1	46	46	-	-	-	-	-	-	1,200,000	-	-	-	-	-	-	1,200,000
01 Newhaven Road to Haymarket									26,139,961.16		15-Jul-2008	11-Mar-2011	970	7	42	318,938	-	-	-	-	-	-	-	-	-	-	-	-	318,938
	01A Newhaven Road (inc.) to Foot of the Walk (exc.)								15,692,627.78		04-Sep-2008	17-Jan-2011	866	9	40	318,938	-	-	-	-	-	-	-	-	-	-	-	-	318,938
		01A1 Newhaven Road (inc.) to Ocean Terminal (exc.)							5,383,407.72		03-Nov-2008	24-Sep-2010	691	11	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Newhaven to Ocean Terminal																										
				E & M Installations					599,356.90	100%	21-Apr-10	05-Jul-10	76	30	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17000	Access for E&M wayside installation (01A)	SCC	1A	-	0.0%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16990	Access for visual inspection for E&M wayside installation (01A)	SCC	1A	-	0.0%	21-Apr-10	21-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17030	Access for visual inspection to cable pits for cable laying (01A)	SCC	1A	-	0.0%	21-Apr-10	21-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17040	Access to cable pits for cable laying (01A)	SCC	1A	-	0.0%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17050	Install Electrical Cables	SCC	1A	-	0.0%	24-May-10	07-Jun-10	15	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17060	Install Fibre Optic Cables	SCC	1A	222,504.72	37.1%	21-Jun-10	02-Jul-10	12	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17070	Install Signalling Wayside Equipment	SCC	1A	5,993.57	1.0%	08-Jun-10	21-Jun-10	14	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17050	Install Electrical Cables	SCC	1A	-	0.0%	24-May-10	07-Jun-10	15	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17020	Overhead Catenary Line	OLE	1A	185,429.30	30.9%	07-Jun-10	05-Jul-10	29	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17020	Overhead Catenary Line	OLE	1A	185,429.30	30.9%	07-Jun-10	05-Jul-10	29	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Lindsay Road Retaining Walls (W1)																										
				Retaining Wall					1,468,331.00	100%	05-Nov-08	22-Jun-09	230	11	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Wall B Contiguous Bored Piles	Structures	1A	145,364.77	9.9%	05-Nov-08	05-Dec-08	31	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Wall B Contiguous Bored Piles	Structures	1A	145,364.77	9.9%	06-Dec-08	05-Jan-09	31	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Wall B Contiguous Bored Piles	Structures	1A	145,364.77	9.9%	06-Jan-09	05-Feb-09	31	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Wall B Contiguous Bored Piles	Structures	1A	145,364.77	9.9%	06-Feb-09	05-Mar-09	28	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Wall B Contiguous Bored Piles	Structures	1A	145,364.77	9.9%	06-Mar-09	08-Apr-09	35	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1710	Wall A Reinforced Earth	Structures	1A	436,094.31	29.7%	09-Apr-09	09-May-09	31	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1710	Wall A Parapet Wall	Structures	1A	290,729.54	19.8%	10-May-09	22-Jun-09	45	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	1A	14,683.31	1.0%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Roadworks					686,957.86	100%	03-Nov-08	12-May-10	556	11	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1100	CH 0300 to 0700 - one half	Highways	1A	192,024.93	28.0%	03-Nov-08	03-Oct-09	41	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1100	CH 0300 to 0700	Highways	1A	128,016.62	18.6%	04-Oct-09	11-Nov-09	40	23	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	3,232.74	0.5%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1110	CH 0700 to 0850	Highways	1A	120,015.58	17.5%	03-Nov-08	30-Apr-09	179	11	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	1,212.28	0.2%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1090	CH 0000 to 0300 - One Half	Highways	1A	120,015.58	17.5%	02-Mar-10	02-Apr-10	32	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1090	CH 0000 to 0300	Highways	1A	120,015.58	17.5%	03-Apr-10	12-May-10	41	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	2,424.56	0.4%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					CHI Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (21)			-	0.0%		12-May-10																	
			Trackwork Ch 0 - 265																										
				Trackwork					576,706.64	100%	29-Oct-09	01-Mar-10	124	24	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15970	Establish Traffic Management & Temp. Fencing	Track	1A	27,506.01	4.8%	29-Oct-09	02-Nov-09	5	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15980	Excavate box	Track	1A	-	0.0%	02-Nov-09	17-Nov-09	16	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15990	Excavate, lay and concrete ducts	Track	1A	-	0.0%	17-Nov-09	10-Dec-09	24	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16000	Excavate and construct OLE bases	Track - BB	1A	20,819.43	3.6%	17-Nov-09	10-Dec-09	24	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16010	Set Track (265m) - 60%	Track	1A	330,072.08	57.2%	12-Jan-10	15-Feb-10	35	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16010	Set Track (265m) - 40%	Track	1A	165,036.04	28.6%	12-Jan-10	15-Feb-10	35	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16020	Place upper concrete and cure	Track	1A	-	0.0%	15-Jan-10	18-Feb-10	35	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16030	Street Surface finishes	Track	1A	-	0.0%	19-Feb-10	26-Feb-10	8	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16040	Remove fencing and Traffic Management	Track	1A	27,506.01	4.8%	01-Mar-10	01-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	5,767.07	1.0%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Trackwork Ch 265 - 425																										
				Trackwork					348,200.23	100%	19-Jun-09	02-Sep-09	76	19	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15890	Establish Traffic Management & Temp. Fencing	Track	1A	16,607.40	4.8%	19-Jun-09	23-Jun-09	5	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15900	Excavate box	Track	1A	-	0.0%	23-Jun-09	01-Jul-09	9	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15910	Excavate, lay and concrete ducts	Track	1A	132,859.20	38.2%	01-Jul-09	14-Jul-09	14	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15920	Excavate and construct OLE bases	Track - BB	1A	12,570.22	3.6%	01-Jul-09	14-Jul-09	14	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15930	Set Track (160m)	Track	1A	166,074.00	47.7%	05-Aug-09	19-Aug-09	15	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15940	Place upper concrete and cure	Track	1A	-	0.0%	10-Aug-09	24-Aug-09	15	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15950	Street Surface finishes	Track	1A	-	0.0%	25-Aug-09	01-Sep-09	8	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15960	Remove fencing and Traffic Management	Track	1A	16,607.40	4.8%	02-Sep-09	02-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	3,482.00	1.0%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Trackwork Ch 425 - 475																										
				Trackwork					108,812.57	100%	26-Feb-09	06-Apr-09	40	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15810	Establish Traffic Management & Temp. Fencing	Track	1A	5,189.81	4.8%	26-Feb-09	27-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15820	Excavate box	Track	1A	-	0.0%	02-Mar-09	03-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15830	Excavate, lay and concrete ducts	Track	1A	31,138.88	28.6%	04-Mar-09	06-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15840	Excavate and construct OLE bases	Track - BB	1A	3,928.19	3.6%	04-Mar-09	06-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15850	Set Track (50m)	Track	1A	-	0.0%	20-Mar-09	26-Mar-09	7	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15860	Place upper concrete and cure	Track	1A	62,277.75	57.2%	25-Mar-09	31-Mar-09	7	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15870	Street Surface finishes	Track	1A	-	0.0%	01-Apr-09	03-Apr-09	3	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15880	Remove fencing and Traffic Management	Track	1A	5,189.81	4.8%	06-Apr-09	06-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	1,088.13	1.0%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Trackwork Ch 475 - 600																										
				Trackwork					272,031.43	100%	16-Dec-08	25-Feb-09	72	13	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15730	Establish Traffic Management & Temp. Fencing	Track	1A	12,974.53	4.8%	16-Dec-08	17-Dec-08	2	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15740	Excavate box	Track	1A	-	0.0%	18-Dec-08	07-Jan-09	21	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15750	Excavate, lay and concrete ducts	Track	1A	77,847.19	28.6%	08-Jan-09	19-Jan-09	12	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15760	Excavate and construct OLE bases	Track - BB	1A	9,820.49	3.6%	08-Jan-09	19-Jan-09	12	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15770	Set Track (125m)	Track	1A	-	0.0%	29-Jan-09	11-Feb-09	14	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15780	Place upper concrete and cure	Track	1A	155,694.38	57.2%	03-Feb-09	16-Feb-09	14	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15790	Street Surface finishes	Track	1A	-	0.0%	17-Feb-09	24-Feb-09	8	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15800	Remove fencing and Traffic Management	Track	1A	12,974.53	4.8%	25-Feb-09	25-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	2,720.31	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Trackwork Ch 600 - 700																										
				Trackwork					215,370.42	100%	03-Nov-08	15-Dec-08	43	11	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15650	Establish Traffic Management & Temp. Fencing	Track	1A	10,268.02	4.8%	03-Nov-08	04-Nov-08	2	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15660	Excavate box	Track	1A	-	0.0%	05-Nov-08	10-Nov-08	6	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15670	Excavate, lay and concrete ducts	Track	1A	-	0.0%	11-Nov-08	18-Nov-08	8	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15680	Excavate and construct OLE bases	Track - BB	1A	7,856.39	3.6%	11-Nov-08	18-Nov-08	8	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15690	Set Track (100m)	Track	1A	-	0.0%	19-Nov-08	28-Nov-08	10	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15700	Place upper concrete and cure	Track	1A	184,824.29	85.8%	24-Nov-08	04-Dec-08	11	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15710	Street Surface finishes	Track	1A	-	0.0%	05-Dec-08	12-Dec-08	8	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15720	Remove fencing and Traffic Management	Track	1A	10,268.02	4.8%	15-Dec-08	15-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	2,153.70	1.0%				13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Trackwork Ch 700 - 850																										
				Trackwork					326,437.72	100%	15-Jan-10	29-Mar-10	74	27	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15570	Establish Traffic Management & Temp. Fencing	Track	1A	15,569.44	4.8%	15-Jan-10	19-Jan-10	5	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15580	Excavate box	Track	1A	-	0.0%	19-Jan-10	27-Jan-10	9	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15590	Excavate, lay and concrete ducts	Track	1A	124,555.50	38.2%	27-Jan-10	09-Feb-10	14	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15600	Excavate and construct OLE bases	Track - BB	1A	11,784.58	3.6%	27-Jan-10	09-Feb-10	14	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15610	Set Track (150m)	Track	1A	-	0.0%	02-Mar-10	15-Mar-10	14	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15620	Place upper concrete and cure	Track	1A	155,694.38	47.7%	05-Mar-10	18-Mar-10	14	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15630	Street Surface finishes	Track	1A	-	0.0%	19-Mar-10	26-Mar-10	8	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15640	Remove fencing and Traffic Management	Track	1A	15,569.44	4.8%	29-Mar-10	29-Mar-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	3,264.38	1.0%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Newhaven Road Tramstop																										
				Tramstop					328,067.08	100%	02-Mar-10	01-Sep-10	184	29	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					8	Civil and Building Works	Tramstops	1A	95,965.13	29.3%	02-Mar-10	15-Apr-10	45	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					8	Civil and Building Works	Tramstops	1A	95,965.13	29.3%	16-Apr-10	03-Jun-10	50	30	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	1,919.30	0.6%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					98	Order REC Supply	Trams Eq	1A	-	0.0%	16-Apr-10	16-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0010

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Murray Service Group | BILFINGER BERGER | SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period
					A1680	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	01-Jun-10	15-Jun-10	15	32	32
					Snagging	Snagging	Tramstops	1A	639.77	0.2%				32	33
					A4288	Access for visual inspection for E&M Tram Stop installation (01A Newhaven Road)	Trams Eq	1A	-	0.0%	13-May-10	13-May-10	1	31	31
					A4289	Access for E&M Tram Stop installation (01A Newhaven Road)	Trams Eq	1A	-	0.0%	15-Jun-10	15-Jun-10	1	32	32
					A4290	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	15-Jun-10	20-Jul-10	36	32	34
					A4300	Install Telecon Equipment	Trams Eq	1A	-	0.0%	20-Jul-10	18-Aug-10	30	34	35
					A4310	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	20-Jul-10	25-Aug-10	37	34	35
					A4315	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	25-Aug-10	01-Sep-10	8	35	35
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%				35	36
			Leith Sands Substation												
				Substation					**453,135.87**	**100%**	**09-Feb-10**	**24-Sep-10**	**228**	**28**	**37**
					36	Order REC supply from Scottish Power	Subst - S	1A	-	0.0%	09-Feb-10	09-Feb-10	1	28	28
					6	Civil Engineering and Building Works	Subst - BB	1A	82,189.31	18.1%	02-Mar-10	15-Apr-10	45	29	30
					6	Completion of envelope	Subst - BB	1A	82,189.31	18.1%	16-Apr-10	03-Jun-10	49	30	32
					Snagging	Snagging	Subst - BB	1A	1,660.39	0.4%				32	33
					A5483	Access for visual inspection for E&M Substation installation (01A Leith Sands)	Subst - S	1A	-	0.0%	04-May-10	04-May-10	1	31	31
					A5480	Power Infeed from Public Net availabale inc HV cable	Subst - S	1A	-	0.0%	04-Jun-10	04-Jun-10	1	32	32
					A5484	Access for E&M Substation installation (01A Leith Sands)	Subst - S	1A	-	0.0%	04-Jun-10	04-Jun-10	1	32	32
					A5490	Install LV Power Supply and LV Power Equipment	Subst - S	1A	-	0.0%	04-Jun-10	24-Jun-10	21	32	33
					A5500	Installation of TPS Equipment	Subst - S	1A	-	0.0%	23-Jul-10	06-Sep-10	46	34	35
					A5510	Install Telecom and Scada	Subst - S	1A	-	0.0%	16-Aug-10	06-Sep-10	22	35	35
					A5520	Testing and Commissioning	Subst - S	1A	284,225.90	62.7%	06-Sep-10	24-Sep-10	19	35	36
					Snagging	Snagging	Subst - S	1A	2,870.97	0.6%				36	37
			01A2 Ocean Terminal (inc.) to Foot of the Walk (exc.)						**1,030,893.87**		**30-Sep-2010**	**17-Jan-2011**	**110**	**36**	**40**
			Ocean Terminal to Foot of the Walk												
				E & M Installations					**1,030,893.87**	**100%**	**30-Sep-10**	**17-Jan-11**	**110**	**36**	**40**
					A3883	Access for visual inspection for E&M wayside installation (01A)	SCC	1A	-	0.0%	30-Sep-10	30-Sep-10	1	36	36
					A3884	Access for E&M wayside installation (01A)	SCC	1A	-	0.0%	01-Nov-10	01-Nov-10	1	37	37
					A3885	Installation of poles and building fixings	SCC	1A	-	0.0%	01-Nov-10	17-Nov-10	17	37	38
					A3890	Overhead Catenary Line	OLE	1A	318,938.40	30.9%	18-Nov-10	17-Dec-10	30	38	39
					A3890	Overhead Catenary Line	OLE	1A	318,938.40	30.9%	18-Dec-10	17-Jan-11	32	39	40
					A3898	Access for visual inspection to cable pits for cable laying (01A)	SCC	1A	-	0.0%	30-Sep-10	30-Sep-10	1	36	36
					A3899	Access to cable pits for cable laying (01A)	SCC	1A	-	0.0%	01-Nov-10	01-Nov-10	1	37	37
					A3900	Install Electrical Cables	SCC	1A	-	0.0%	01-Nov-10	19-Nov-10	19	37	38
					A3910	Install Fibre Optic Cables	SCC	1A	382,708.12	37.1%	03-Dec-10	23-Dec-10	21	38	39
					A3920	Install Signalling Wayside Equipment	SCC	1A	10,308.94	1.0%	22-Nov-10	13-Dec-10	22	38	39
			01A3 Ocean Terminal (inc.) to Ocean Drive (exc.)						**6,020,081.21**		**04-Sep-2008**	**20-Dec-2010**	**838**	**9**	**39**
			Ocean Terminal Ch 850 - 1080												
				Roadworks					**185,882.71**	**100%**	**27-Jul-09**	**30-Sep-09**	**66**	**21**	**23**
					A15510	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	27-Jul-09	12-Aug-09	17	21	21
					A15520	Construct Kerb lines	Highways	1A	55,207.17	29.7%	30-Jul-09	19-Aug-09	21	21	22
					A15530	Reset Gullies	Highways	1A	-	0.0%	14-Aug-09	22-Sep-09	40	21	23
					A15540	Surface new channel	Highways	1A	-	0.0%	23-Sep-09	30-Sep-09	8	23	23
					A15550	Pavement Works	Highways	1A	128,816.72	69.3%	20-Aug-09	28-Sep-09	40	22	23
					A15560	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	20-Aug-09	28-Aug-09	9	22	22
					Snagging	Snagging	Highways	1A	1,858.83	1.0%				22	23
			Ocean Terminal to Rennies Isle Ch 1080 - 1410												
				Roadworks					**266,701.29**	**100%**	**27-May-10**	**11-Aug-10**	**77**	**32**	**34**
					A15450	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	27-May-10	16-Jun-10	21	32	32
					A15460	Construct Kerb lines	Highways	1A	79,210.28	29.7%	02-Jun-10	24-Jun-10	23	32	33
					A15470	Reset Gullies	Highways	1A	-	0.0%	16-Jun-10	03-Aug-10	49	32	34
					A15480	Surface new channel	Highways	1A	-	0.0%	04-Aug-10	11-Aug-10	8	34	34
					A15490	Pavement Works	Highways	1A	184,823.99	69.3%	25-Jun-10	11-Aug-10	48	33	34
					A15500	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	25-Jun-10	05-Jul-10	11	33	33
					Snagging	Snagging	Highways	1A	2,667.01	1.0%				33	34
			Rennies Isle to Casino Square Ch 1410 - 1880												
				Roadworks					**379,847.29**		**09-Dec-09**	**06-Apr-10**	**119**	**26**	**31**
					A15390	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	09-Dec-09	18-Jan-10	41	26	27
					A15400	Construct Kerb lines	Highways	1A	131,617.08	34.7%	14-Dec-09	28-Jan-10	46	26	27
					A15410	Reset Gullies	Highways	1A	-	0.0%	11-Jan-10	17-Mar-10	66	27	29
					A15420	Surface new channel	Highways	1A	131,617.08	34.7%	18-Mar-10	25-Mar-10	8	29	29
					A15430	Pavement Works	Highways	1A	112,814.64	29.7%	29-Jan-10	06-Apr-10	68	27	30
					A15440	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	29-Jan-10	08-Feb-10	11	27	28
					Snagging	Snagging	Highways	1A	3,798.47	1.0%				30	31
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (20)	Highways	1A	-	0.0%		06-Apr-10			30
			Ocean Terminal Ch 850 - 1080												
				Trackwork					**500,537.84**	**100%**	**23-Jul-09**	**05-Nov-09**	**106**	**21**	**25**
					A15310	Establish Traffic Management & Temp. Fencing	Track	1A	23,873.14	4.8%	23-Jul-09	24-Jul-09	2	21	21
					A15320	Excavate box	Track	1A	-	0.0%	27-Jul-09	12-Aug-09	17	21	21
					A15330	Excavate, lay and concrete ducts	Track	1A	-	0.0%	13-Aug-09	04-Sep-09	23	21	22
					A15340	Excavate and construct OLE bases	Track - BB	1A	18,069.70	3.6%	13-Aug-09	04-Sep-09	23	21	22
					A15350	Set Track (280m) - 50%	Track	1A	214,858.24	42.9%	15-Sep-09	22-Oct-09	38	23	24
					A15350	Set Track (280m) - 50%	Track	1A	214,858.24	42.9%	15-Sep-09	22-Oct-09	38	23	24
					A15360	Place upper concrete and cure	Track	1A	-	0.0%	18-Sep-09	27-Oct-09	40	23	24
					A15370	Street Surface finishes	Track	1A	-	0.0%	28-Oct-09	04-Nov-09	8	24	24
					A15380	Remove fencing and Traffic Management	Track	1A	23,873.14	4.8%	05-Nov-09	05-Nov-09	1	24	24
					Snagging	Snagging	Track	1A	5,005.38	1.0%				24	25
			Ocean Terminal to Rennies Isle Ch 1080 - 1410												
				Trackwork					**718,162.98**	**100%**	**25-May-10**	**30-Aug-10**	**98**	**32**	**36**
					A15230	Establish Traffic Management & Temp. Fencing	Track	1A	34,252.76	4.8%	25-May-10	26-May-10	2	32	32
					A15240	Excavate box	Track	1A	-	0.0%	27-May-10	16-Jun-10	21	32	32
					A15250	Excavate, lay and concrete ducts	Track	1A	205,516.58	28.6%	17-Jun-10	14-Jul-10	28	32	33
					A15260	Excavate and construct OLE bases	Track - BB	1A	25,926.09	3.6%	17-Jun-10	14-Jul-10	28	32	33
					A15270	Set Track (330m) - 50%	Track	1A	205,516.58	28.6%	16-Jul-10	16-Aug-10	32	33	35
					A15270	Set Track (330m) - 50%	Track	1A	205,516.58	28.6%	16-Jul-10	16-Aug-10	32	33	35
					A15280	Place upper concrete and cure	Track	1A	-	0.0%	21-Jul-10	19-Aug-10	30	34	35
					A15290	Street Surface finishes	Track	1A	-	0.0%	20-Aug-10	27-Aug-10	8	35	35
					A15300	Remove fencing and Traffic Management	Track	1A	34,252.76	4.8%	30-Aug-10	30-Aug-10	1	35	35
					Snagging	Snagging	Track	1A	7,181.63	1.0%				35	36
			Rennies Isle to Casino Square Ch 1410 - 1880												
				Trackwork					**1,022,838.18**	**100%**	**07-Dec-09**	**24-May-10**	**169**	**26**	**33**
					A15150	Establish Traffic Management & Temp. Fencing	Track	1A	48,784.24	4.8%	07-Dec-09	08-Dec-09	2	26	26
					A15160	Excavate box	Track	1A	-	0.0%	09-Dec-09	18-Jan-10	41	26	27
					A15170	Excavate, lay and concrete ducts	Track	1A	292,705.43	28.6%	19-Jan-10	25-Feb-10	38	27	28
					A15180	Excavate and construct OLE bases	Track - BB	1A	36,925.03	3.6%	19-Jan-10	25-Feb-10	38	27	28
					A15190	Set Track (470m) - 50%	Track	1A	292,705.43	28.6%	29-Mar-10	23-Apr-10	26	30	30
					A15190	Set Track (470m) - 50%	Track	1A	292,705.43	28.6%	24-Apr-10	10-May-10	18	30	31
					A15200	Place upper concrete and cure	Track	1A	-	0.0%	01-Apr-10	13-May-10	43	30	31
					A15210	Street Surface finishes	Track	1A	-	0.0%	14-May-10	21-May-10	8	31	31
					A15220	Remove fencing and Traffic Management	Track	1A	48,784.24	4.8%	24-May-10	24-May-10	1	32	32
					Snagging	Snagging	Track	1A	10,228.38	1.0%				32	33
			Victoria Dock Entrance Bridge (S16)												
				Bridge					**680,839.00**	**100%**	**04-Sep-08**	**08-Jul-10**	**673**	**9**	**34**
					131	Reprofile and Waterproof Deck (Dummy)	Structures	1A	337,015.31	49.5%	27-May-10	08-Jul-10	43	32	33
					12330	Permanent Diversion of Services (by Others)	Structures	1A	337,015.31	49.5%	04-Sep-08	29-Oct-08	56	9	11
					Snagging	Snagging	Structures	1A	6,808.39	1.0%				33	34
			Tower Place Bridge (S17)												
				Bridge					**1,937,179.00**	**100%**	**08-Oct-08**	**12-Apr-10**	**552**	**10**	**31**
					A1770	Piling	Structures	1A	174,346.11	9.0%	09-Apr-09	30-Apr-09	22	17	18
					A16050	Temporary Diversion of Services (by others)	Structures	1A	174,346.11	9.0%	08-Oct-08	03-Dec-08	57	10	12
					A16060	Temporary Platforms and Demolition	Structures	1A	174,346.11	9.0%	15-Jan-09	08-Apr-09	84	14	17
					Deck Finishes		Structures	1A	-	0.0%	23-Apr-09	23-Apr-09	1	17	17
					A16090	Permanent Diversion of Services (by others)	Structures	1A	24,346.11	1.3%	07-Dec-09	12-Feb-10	68	26	28
					A16100	Finishes	Structures	1A	24,346.11	1.3%	15-Feb-10	12-Apr-10	57	28	30
					South Widening		Structures	1A	-	0.0%	23-Apr-09	23-Apr-09	1	17	17
					A1760	Install Beams	Structures	1A	324,346.11	16.7%	15-Oct-09	15-Oct-09	1	24	24
					A31	Superstructure	Structures	1A	174,346.11	9.0%	16-Oct-09	04-Dec-09	50	24	25
					A16080	Substructure	Structures	1A	174,346.11	9.0%	20-Aug-09	14-Oct-09	56	22	24
					North Widening		Structures	1A	-	0.0%	23-Apr-09	23-Apr-09	1	17	17
					A11	Install Beams	Structures	1A	324,346.11	16.7%	30-Jun-09	30-Jun-09	1	20	20
					A101	Substructure	Structures	1A	174,346.11	9.0%	01-May-09	29-Jun-09	60	18	20
					A16070	Superstructure	Structures	1A	174,346.11	9.0%	01-Jul-09	19-Aug-09	50	20	22
					Snagging	Snagging	Structures	1A	19,371.79	1.0%				30	31
			Ocean Terminal Tram Stop												

Year: 2008
Period: 1
Period End: 02-Feb-2008

1	2	3	4	5	6	7	8	9	10	11	12	13	2008 Subtotal
02-Feb-2008	01-Mar-2008	29-Mar-2008	26-Apr-2008	24-May-2008	21-Jun-2008	19-Jul-2008	16-Aug-2008	13-Sep-2008	11-Oct-2008	08-Nov-2008	06-Dec-2008	03-Jan-2009	GBP
-	-	-	-	-	-	-	-	-	-	-	-	-	-

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

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Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Extract 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					A1680	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	01-Jun-10	15-Jun-10	15	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	639.77	0.2%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4288	Access for visual inspection for E&M Tram Stop installation (01A Newhaven Road)	Trams Eq	1A	-	0.0%	13-May-10	13-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4289	Access for E&M Tram Stop installation (01A Newhaven Road)	Trams Eq	1A	-	0.0%	15-Jun-10	15-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4290	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	15-Jun-10	20-Jul-10	36	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4300	Install Telecon Equipment	Trams Eq	1A	-	0.0%	20-Jul-10	18-Aug-10	30	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4310	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	20-Jul-10	25-Aug-10	37	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4315	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	25-Aug-10	01-Sep-10	8	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Leith Sands Substation																										
				Substation					453,135.87	100%	09-Feb-10	24-Sep-10	228	28	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					36	Order REC supply from Scottish Power	Subst - S	1A	-	0.0%	09-Feb-10	09-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					6	Civil Engineering and Building Works	Subst - BB	1A	82,189.21	18.1%	02-Mar-10	15-Apr-10	45	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					6	Completion of envelope	Subst - BB	1A	82,189.31	18.1%	16-Apr-10	03-Jun-10	49	30	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	1A	1,660.39	0.4%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5483	Access for visual inspection for E&M Substation installation (01A Leith Sands)	Subst - S	1A	-	0.0%	04-May-10	04-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5480	Power Infeed from Public Net available inc HV cable	Subst - S	1A	-	0.0%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5484	Access for E&M Substation installation (01A Leith Sands)	Subst - S	1A	-	0.0%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5490	Install LV Power Supply and LV Power Equipment	Subst - S	1A	-	0.0%	04-Jun-10	24-Jun-10	21	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5500	Installation of TPS Equipment	Subst - S	1A	-	0.0%	23-Jul-10	06-Sep-10	46	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5510	Install Telecom and Scada	Subst - S	1A	-	0.0%	16-Aug-10	06-Sep-10	22	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5520	Testing and Commissioning	Subst - S	1A	284,225.90	62.7%	06-Sep-10	24-Sep-10	19	35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	1A	2,870.97	0.6%				36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			01A2 Ocean Terminal (inc.) to Foot of the Walk (exc.)						1,030,893.87		30-Sep-2010	17-Jan-2011	110	36	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Ocean Terminal to Foot of the Walk																										
				E & M Installations					1,030,893.87	100%	30-Sep-10	17-Jan-11	110	36	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3883	Access for visual inspection for E&M wayside installation (01A)	SCC	1A	-	0.0%	30-Sep-10	30-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3884	Access for E&M wayside installation (01A)	SCC	1A	-	0.0%	01-Nov-10	01-Nov-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3885	Installation of poles and building fixings	SCC	1A	-	0.0%	01-Nov-10	17-Nov-10	17	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3890	Overhead Catenary Line	OLE	1A	318,938.40	30.9%	18-Nov-10	17-Dec-10	30	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3890	Overhead Catenary Line	OLE	1A	318,938.40	30.9%	18-Dec-10	17-Jan-11	32	39	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3898	Access for visual inspection to cable pits for cable laying (01A)	SCC	1A	-	0.0%	30-Sep-10	30-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3899	Access to cable pits for cable laying (01A)	SCC	1A	-	0.0%	01-Nov-10	01-Nov-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3900	Install Electrical Cables	SCC	1A	-	0.0%	01-Nov-10	19-Nov-10	19	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3910	Install Fibre Optic Cables	SCC	1A	382,708.12	37.1%	03-Dec-10	23-Dec-10	21	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3920	Install Signalling Wayside Equipment	SCC	1A	10,308.94	1.0%	22-Nov-10	13-Dec-10	22	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			01A3 Ocean Terminal (inc.) to Ocean Drive (exc.)						6,020,081.21		04-Sep-2008	20-Dec-2010	838	9	39	-	-	-	174,346	174,346	-	498,692	23,873	343,588	194,652	952,928	277,255	48,784	2,688,466
			Ocean Terminal Ch 850 - 1080																										
				Roadworks					185,882.71	100%	27-Jul-09	30-Sep-09	66	21	23	-	-	-	-	-	-	-	-	55,207	130,676	-	-	-	185,883
					A15510	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	27-Jul-09	21-Aug-09	17	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15520	Construct Kerb lines	Highways	1A	55,207.17	29.7%	30-Jul-09	19-Aug-09	21	21	22	-	-	-	-	-	-	-	-	55,207	-	-	-	-	55,207
					A15530	Reset Gullies	Highways	1A	-	0.0%	14-Aug-09	22-Sep-09	40	21	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15540	Surface new channel	Highways	1A	-	0.0%	23-Sep-09	30-Sep-09	8	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15550	Pavement Works	Highways	1A	128,816.72	69.3%	20-Aug-09	28-Sep-09	40	22	23	-	-	-	-	-	-	-	-	-	128,817	-	-	-	128,817
					A15560	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	20-Aug-09	28-Aug-09	9	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	1,858.83	1.0%				22	23	-	-	-	-	-	-	-	-	-	1,859	-	-	-	1,859
			Ocean Terminal to Rennies Isle Ch 1080 - 1410																										
				Roadworks					266,701.29	100%	27-May-10	11-Aug-10	77	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15450	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	27-May-10	16-Jun-10	21	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15460	Construct Kerb lines	Highways	1A	79,210.28	29.7%	02-Jun-10	24-Jun-10	23	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15470	Reset Gullies	Highways	1A	-	0.0%	16-Jun-10	03-Aug-10	49	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15480	Surface new channel	Highways	1A	-	0.0%	04-Aug-10	11-Aug-10	8	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15490	Pavement Works	Highways	1A	184,823.99	69.3%	25-Jun-10	11-Aug-10	48	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15500	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	25-Jun-10	05-Jul-10	11	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	2,667.01	1.0%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Rennies Isle to Casino Square Ch 1410 - 1880																										
				Roadworks					379,847.29		09-Dec-09	06-Apr-10	119	26	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15390	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	09-Dec-09	18-Jan-10	41	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15400	Construct Kerb lines	Highways	1A	131,617.08	34.7%	14-Dec-09	28-Jan-10	46	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15410	Reset Gullies	Highways	1A	-	0.0%	11-Jan-10	17-Mar-10	66	27	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15420	Surface new channel	Highways	1A	131,617.08	34.7%	18-Mar-10	25-Mar-10	8	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15430	Pavement Works	Highways	1A	112,814.64	29.7%	29-Jan-10	06-Apr-10	68	27	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15440	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	29-Jan-10	08-Feb-10	11	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	3,798.47	1.0%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Infrace Construction works to road re-instatement and fully re-opened to public (20)	Highways	1A	-	0.0%		06-Apr-10			30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Ocean Terminal Ch 850 - 1080																										
				Trackwork					500,537.84	100%	23-Jul-09	05-Nov-09	106	21	25	-	-	-	-	-	-	-	23,873	18,070	-	453,590	5,005	-	500,538
					A15310	Establish Traffic Management & Temp. Fencing	Track	1A	23,873.14	4.8%	23-Jul-09	24-Jul-09	2	21	21	-	-	-	-	-	-	-	23,873	-	-	-	-	-	23,873
					A15320	Excavate box	Track	1A	-	0.0%	27-Jul-09	12-Aug-09	17	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15330	Excavate, lay and concrete ducts	Track	1A	-	0.0%	13-Aug-09	04-Sep-09	23	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15340	Excavate and construct OLE bases	Track - BB	1A	18,069.70	3.6%	13-Aug-09	04-Sep-09	23	21	22	-	-	-	-	-	-	-	-	18,070	-	-	-	-	18,070
					A15350	Set Track (280m) - 50%	Track	1A	214,858.24	42.9%	15-Sep-09	22-Oct-09	38	23	24	-	-	-	-	-	-	-	-	-	-	214,858	-	-	-	214,858
					A15350	Set Track (280m) - 50%	Track	1A	214,858.24	42.9%	15-Sep-09	22-Oct-09	38	23	24	-	-	-	-	-	-	-	-	-	-	214,858	-	-	-	214,858
					A15360	Place upper concrete and cure	Track	1A	-	0.0%	18-Sep-09	27-Oct-09	40	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15370	Street Surface finishes	Track	1A	-	0.0%	28-Oct-09	04-Nov-09	8	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15380	Remove fencing and Traffic Management	Track	1A	23,873.14	4.8%	05-Nov-09	05-Nov-09	1	24	24	-	-	-	-	-	-	-	-	-	-	23,873	-	-	-	23,873
					Snagging	Snagging	Track	1A	5,005.38	1.0%				24	25	-	-	-	-	-	-	-	-	-	-	-	5,005	-	5,005
			Ocean Terminal to Rennies Isle Ch 1080 - 1410																										
				Trackwork					718,162.98	100%	25-May-10	30-Aug-10	98	32	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15230	Establish Traffic Management & Temp. Fencing	Track	1A	34,252.76	4.8%	25-May-10	26-May-10	2	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15240	Excavate box	Track	1A	-	0.0%	27-May-10	16-Jun-10	21	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15250	Excavate, lay and concrete ducts	Track	1A	205,516.58	28.6%	17-Jun-10	14-Jul-10	28	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15260	Excavate and construct OLE bases	Track - BB	1A	25,926.09	3.6%	17-Jun-10	14-Jul-10	28	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15270	Set Track (330m) - 50%	Track	1A	205,516.58	28.6%	16-Jul-10	16-Aug-10	32	33	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15270	Set Track (330m) - 50%	Track	1A	205,516.58	28.6%	16-Jul-10	16-Aug-10	32	33	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15280	Place upper concrete and cure	Track	1A	-	0.0%	21-Jul-10	19-Aug-10	30	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15290	Street Surface finishes	Track	1A	-	0.0%	20-Aug-10	27-Aug-10	8	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15300	Remove fencing and Traffic Management	Track	1A	34,252.76	4.8%	30-Aug-10	30-Aug-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	7,181.63	1.0%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Rennies Isle to Casino Square Ch 1410 - 1880																										
				Trackwork					1,022,838.18	100%	07-Dec-09	24-May-10	169	26	33	-	-	-	-	-	-	-	-	-	-	-	-	-	48,784	48,784
					A15150	Establish Traffic Management & Temp. Fencing	Track	1A	48,784.24	4.8%	07-Dec-09	08-Dec-09	2	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48,784	48,784
					A15160	Excavate box	Track	1A	-	0.0%	09-Dec-09	18-Jan-10	41	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15170	Excavate, lay and concrete ducts	Track	1A	292,705.43	28.6%	19-Jan-10	25-Feb-10	38	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15180	Excavate and construct OLE bases	Track - BB	1A	36,925.03	3.6%	19-Jan-10	25-Feb-10	38	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15190	Set Track (470m) - 50%	Track	1A	292,705.43	28.6%	29-Mar-10	23-Apr-10	26	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15190	Set Track (470m) - 50%	Track	1A	292,705.43	28.6%	24-Apr-10	10-May-10	18	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15200	Place upper concrete and cure	Track	1A	-	0.0%	01-Apr-10	13-May-10	43	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15210	Street Surface finishes	Track	1A	-	0.0%	14-May-10	21-May-10	8	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15220	Remove fencing and Traffic Management	Track	1A	48,784.24	4.8%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	10,228.38	1.0%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Victoria Dock Entrance Bridge (S16)																										
				Bridge					680,839.00	100%	04-Sep-08	08-Jul-10	673	9	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					131	Reprofile and Waterproof Deck (Dummy)	Structures	1A	337,015.31	49.5%	27-May-10	08-Jul-10	43	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					12330	Permanent Diversion of Services (by Others)	Structures	1A	337,015.31	49.5%	04-Sep-08	29-Oct-08	56	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	1A	6,808.39	1.0%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Tower Place Bridge (S17)																										
				Bridge					1,937,179.00	100%	08-Oct-08	12-Apr-10	552	10	31	-	-	-	174,346	174,346	-	498,692	-	174,346	-	498,692	174,346	-	1,694,769
					A1770	Piling	Structures	1A	174,346.11	9.0%	09-Apr-09	30-Apr-09	22	17	18	-	-	-	-	174,346	-	-	-	-	-	-	-	-	-	174,346
					A16050	Temporary Diversion of Services (by others)	Structures	1A	174,346.11	9.0%	08-Oct-08	03-Dec-08	57	10	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16060	Temporary Platforms and Demolition	Structures	1A	174,346.11	9.0%	15-Jan-09	08-Apr-09	84	14	17	-	-	-	174,346	-	-	-	-	-	-	-	-	-	-	174,346
					Deck Finishes		Structures	1A	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16090	Permanent Diversion of Services (by others)	Structures	1A	24,346.11	1.3%	07-Dec-09	12-Feb-10	68	26	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16100	Finishes	Structures	1A	24,346.11	1.3%	15-Feb-10	12-Apr-10	57	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Widening		Structures	1A	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1760	Install Beams	Structures	1A	324,346.11	16.7%	15-Oct-09	15-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	324,346	-	-	-	324,346
					A31	Superstructure	Structures	1A	174,346.11	9.0%	16-Oct-09	04-Dec-09	50	24	25	-	-	-	-	-	-	-	-	-	-	-	174,346	-	-	174,346
					A16080	Substructure	Structures	1A	174,346.11	9.0%	20-Aug-09	14-Oct-09	56	22	24	-	-	-	-	-	-	-	-	-	-	174,346	-	-	-	174,346
					North Widening		Structures	1A	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A11	Install Beams	Structures	1A	324,346.11	16.7%	30-Jun-09	30-Jun-09	1	20	20	-	-	-	-	-	-	-	324,346	-	-	-	-	-	-	324,346
					A101	Substructure	Structures	1A	174,346.11	9.0%	01-May-09	29-Jun-09	60	18	20	-	-	-	-	-	-	-	174,346	-	-	-	-	-	-	174,346
					A16070	Superstructure	Structures	1A	174,346.11	9.0%	01-Jul-09	19-Aug-09	50	20	22	-	-	-	-	-	-	-	-	174,346	-	-	-	-	-	174,346
					Snagging	Snagging	Structures	1A	19,371.79	1.0%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Ocean Terminal Tram Stop																										

USB00000073_0012

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group — BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					A1680	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	01-Jun-10	15-Jun-10	15	32	32	-	-	-	-	-	63,977	-	-	-	-	-	-	-	63,977
					Snagging	Snagging	Tramstops	1A	639.77	0.2%						-	-	-	-	-	-	640	-	-	-	-	-	-	640
					A4288	Access for visual inspection for E&M Tram Stop installation (01A Newhaven Road)	Trams Eq	1A	-	0.0%	13-May-10	13-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4289	Access for E&M Tram Stop installation (01A Newhaven Road)	Trams Eq	1A	-	0.0%	15-Jun-10	15-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4290	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	15-Jun-10	20-Jul-10	36	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4300	Install Telecon Equipment	Trams Eq	1A	-	0.0%	20-Jul-10	18-Aug-10	30	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4310	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	20-Jul-10	25-Aug-10	37	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4315	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	25-Aug-10	01-Sep-10	8	35	35	-	-	-	-	-	-	-	-	68,905	-	-	-	-	68,905
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%						-	-	-	-	-	-	-	-	-	696	-	-	-	696
		Leith Sands Substation																											
		Substation							453,135.87	100%	09-Feb-10	24-Sep-10	228	28	37	-	-	-	82,189	-	82,189	1,660	-	-	284,226	2,871	-	-	453,136
					36	Order REC supply from Scottish Power	Subst - S	1A	-	0.0%	09-Feb-10	09-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					6	Civil Engineering and Building Works	Subst - BB	1A	82,189.31	18.1%	02-Mar-10	15-Apr-10	45	29	30	-	-	-	82,189	-	-	-	-	-	-	-	-	-	82,189
					6	Completion of envelope	Subst - BB	1A	82,189.31	18.1%	16-Apr-10	03-Jun-10	49	30	32	-	-	-	-	-	82,189	-	-	-	-	-	-	-	82,189
					Snagging	Snagging	Subst - BB	1A	1,660.39	0.4%				32	33	-	-	-	-	-	-	1,660	-	-	-	-	-	-	-	1,660
					A5483	Access for visual inspection for E&M Substation installation (01A Leith Sands)	Subst - S	1A	-	0.0%	04-May-10	04-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5480	Power Infeed from Public Net available inc HV cable	Subst - S	1A	-	0.0%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5484	Access for E&M Substation installation (01A Leith Sands)	Subst - S	1A	-	0.0%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5490	Install LV Power Supply and LV Power Equipment	Subst - S	1A	-	0.0%	04-Jun-10	24-Jun-10	21	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5500	Installation of TPS Equipment	Subst - S	1A	-	0.0%	23-Jul-10	06-Sep-10	46	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5510	Install Telecom and Scada	Subst - S	1A	-	0.0%	16-Aug-10	06-Sep-10	22	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5520	Testing and Commissioning	Subst - S	1A	284,225.90	62.7%	06-Sep-10	24-Sep-10	19	35	36	-	-	-	-	-	-	-	-	-	284,226	-	-	-	284,226
					Snagging	Snagging	Subst - S	1A	2,870.97	0.6%				36	37	-	-	-	-	-	-	-	-	-	-	2,871	-	-	2,871
		01A2 Ocean Terminal (inc.) to Foot of the Walk (exc.)							1,030,893.87		30-Sep-2010	17-Jan-2011	110	36	40	-	-	-	-	-	-	-	-	-	-	-	-	711,955	711,955
		Ocean Terminal to Foot of the Walk																											
		E & M Installations							1,030,893.87	100%	30-Sep-10	17-Jan-11	110	36	40	-	-	-	-	-	-	-	-	-	-	-	-	711,955	711,955
					A3883	Access for visual inspection for E&M wayside installation (01A)	SCC	1A	-	0.0%	30-Sep-10	30-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3884	Access for E&M wayside installation (01A)	SCC	1A	-	0.0%	01-Nov-10	01-Nov-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3885	Installation of poles and building fixings	SCC	1A	-	0.0%	01-Nov-10	17-Nov-10	17	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3890	Overhead Catenary Line	OLE	1A	318,938.40	30.9%	18-Nov-10	17-Dec-10	30	38	39	-	-	-	-	-	-	-	-	-	-	-	-	318,938	318,938
					A3890	Overhead Catenary Line	OLE	1A	318,938.40	30.9%	18-Dec-10	17-Jan-11	32	39	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3898	Access for visual inspection to cable pits for cable laying (01A)	SCC	1A	-	0.0%	30-Sep-10	30-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3899	Access to cable pits for cable laying (01A)	SCC	1A	-	0.0%	01-Nov-10	01-Nov-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3900	Install Electrical Cables	SCC	1A	-	0.0%	01-Nov-10	19-Nov-10	19	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3910	Install Fibre Optic Cables	SCC	1A	382,708.12	37.1%	03-Dec-10	23-Dec-10	21	38	39	-	-	-	-	-	-	-	-	-	-	-	-	382,708	382,708
					A3920	Install Signalling Wayside Equipment	SCC	1A	10,308.84	1.0%	22-Nov-10	13-Dec-10	22	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	10,309	10,309
		01A3 Ocean Terminal (inc.) to Ocean Drive (exc.)							6,020,081.21		04-Sep-2008	20-Dec-2010	838	9	39	200,522	354,673	131,617	429,866	315,876	83,037	657,897	194,299	445,286	7,182	-	-	-	2,820,254
		Ocean Terminal Ch 850 - 1080																											
		Roadworks							185,882.71	100%	27-Jul-09	30-Sep-09	66	21	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15510	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	27-Jul-09	12-Aug-09	17	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15520	Construct Kerb lines	Highways	1A	55,207.17	29.7%	30-Jul-09	19-Aug-09	21	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15530	Reset Gullies	Highways	1A	-	0.0%	14-Aug-09	22-Sep-09	40	21	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15540	Surface new channel	Highways	1A	-	0.0%	23-Sep-09	30-Sep-09	8	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15550	Pavement Works	Highways	1A	128,816.72	69.3%	20-Aug-09	28-Sep-09	40	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15560	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	20-Aug-09	28-Aug-09	9	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	1,858.83	1.0%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ocean Terminal to Rennies Isle Ch 1080 - 1410																											
		Roadworks							266,701.29	100%	27-May-10	11-Aug-10	77	32	34	-	-	-	-	-	-	79,210	187,491	-	-	-	-	-	266,701
					A15450	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	27-May-10	16-Jun-10	21	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15460	Construct Kerb lines	Highways	1A	79,210.28	29.7%	02-Jun-10	24-Jun-10	23	32	33	-	-	-	-	-	-	79,210	-	-	-	-	-	-	-	79,210
					A15470	Reset Gullies	Highways	1A	-	0.0%	16-Jun-10	03-Aug-10	49	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15480	Surface new channel	Highways	1A	-	0.0%	04-Aug-10	11-Aug-10	8	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15490	Pavement Works	Highways	1A	184,823.99	69.3%	25-Jun-10	11-Aug-10	48	33	34	-	-	-	-	-	-	-	184,824	-	-	-	-	-	-	184,824
					A15500	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	25-Jun-10	05-Jul-10	11	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	2,667.01	1.0%				33	34	-	-	-	-	-	-	-	2,667	-	-	-	-	-	2,667
		Rennies Isle to Casino Square Ch 1410 - 1880																											
		Roadworks							379,847.29		09-Dec-09	06-Apr-10	119	26	31	131,617	-	131,617	112,815	3,798	-	-	-	-	-	-	-	-	379,847
					A15390	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	09-Dec-09	28-Jan-10	41	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15400	Construct Kerb lines	Highways	1A	131,617.08	34.7%	14-Dec-09	28-Jan-10	46	26	27	131,617	-	-	-	-	-	-	-	-	-	-	-	-	-	131,617
					A15410	Reset Gullies	Highways	1A	-	0.0%	11-Jan-10	17-Mar-10	66	27	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15420	Surface new channel	Highways	1A	131,617.08	34.7%	18-Mar-10	25-Mar-10	8	29	29	-	-	131,617	-	-	-	-	-	-	-	-	-	-	-	131,617
					A15430	Pavement Works	Highways	1A	112,814.64	29.7%	29-Jan-10	06-Apr-10	68	27	30	-	-	-	112,815	-	-	-	-	-	-	-	-	-	112,815
					A15440	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	29-Jan-10	08-Feb-10	11	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	3,798.47	1.0%				30	31	-	-	-	-	3,798	-	-	-	-	-	-	-	-	3,798
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (20)	Highways	1A	-	0.0%		06-Apr-10			30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ocean Terminal Ch 850 - 1080																											
		Trackwork							500,537.84	100%	23-Jul-09	05-Nov-09	106	21	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15310	Establish Traffic Management & Temp. Fencing	Track	1A	23,873.14	4.8%	23-Jul-09	24-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15320	Excavate box	Track	1A	-	0.0%	27-Jul-09	12-Aug-09	17	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15330	Excavate, lay and concrete ducts	Track	1A	-	0.0%	13-Aug-09	04-Sep-09	23	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15340	Excavate and construct OLE bases	Track - BB	1A	18,069.70	3.6%	13-Aug-09	04-Sep-09	23	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15350	Set Track (280m) - 50%	Track	1A	214,858.24	42.9%	15-Sep-09	22-Oct-09	38	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15350	Set Track (280m) - 50%	Track	1A	214,858.24	42.9%	15-Sep-09	22-Oct-09	38	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15360	Place upper concrete and cure	Track	1A	-	0.0%	18-Sep-09	27-Oct-09	40	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15370	Street Surface finishes	Track	1A	-	0.0%	28-Oct-09	04-Nov-09	8	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15380	Remove fencing and Traffic Management	Track	1A	23,873.14	4.8%	05-Nov-09	05-Nov-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	5,005.38	1.0%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ocean Terminal to Rennies Isle Ch 1080 - 1410																											
		Trackwork							718,162.98	100%	25-May-10	30-Aug-10	98	32	36	-	-	-	-	-	34,253	231,443	-	445,286	7,182	-	-	-	718,163
					A15230	Establish Traffic Management & Temp. Fencing	Track	1A	34,252.76	4.8%	25-May-10	26-May-10	2	32	32	-	-	-	-	-	34,253	-	-	-	-	-	-	-	-	-	34,253
					A15240	Excavate box	Track	1A	-	0.0%	27-May-10	16-Jun-10	21	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15250	Excavate, lay and concrete ducts	Track	1A	205,516.58	28.6%	17-Jun-10	14-Jul-10	28	32	33	-	-	-	-	-	-	205,517	-	-	-	-	-	-	-	205,517
					A15260	Excavate and construct OLE bases	Track - BB	1A	25,926.09	3.6%	17-Jun-10	14-Jul-10	28	32	33	-	-	-	-	-	-	25,926	-	-	-	-	-	-	-	25,926
					A15270	Set Track (330m) - 50%	Track	1A	205,516.58	28.6%	16-Jul-10	16-Aug-10	32	33	35	-	-	-	-	-	-	-	-	205,517	-	-	-	-	-	205,517
					A15270	Set Track (330m) - 50%	Track	1A	205,516.58	28.6%	16-Jul-10	16-Aug-10	32	33	35	-	-	-	-	-	-	-	-	205,517	-	-	-	-	-	205,517
					A15280	Place upper concrete and cure	Track	1A	-	0.0%	21-Jul-10	19-Aug-10	30	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15290	Street Surface finishes	Track	1A	-	0.0%	20-Aug-10	27-Aug-10	8	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15300	Remove fencing and Traffic Management	Track	1A	34,252.76	4.8%	30-Aug-10	30-Aug-10	1	35	35	-	-	-	-	-	-	-	-	34,253	-	-	-	-	-	34,253
					Snagging	Snagging	Track	1A	7,181.63	1.0%				35	36	-	-	-	-	-	-	-	-	-	7,182	-	-	-	7,182
		Rennies Isle to Casino Square Ch 1410 - 1880																											
		Trackwork							1,022,838.18	100%	07-Dec-09	24-May-10	169	26	33	-	329,630	-	292,705	292,705	48,784	10,228	-	-	-	-	-	-	974,054
					A15150	Establish Traffic Management & Temp. Fencing	Track	1A	48,784.24	4.8%	07-Dec-09	08-Dec-09	2	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15160	Excavate box	Track	1A	-	0.0%	09-Dec-09	18-Jan-10	41	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15170	Excavate, lay and concrete ducts	Track	1A	292,705.43	28.6%	19-Jan-10	25-Feb-10	38	27	28	-	292,705	-	-	-	-	-	-	-	-	-	-	-	292,705
					A15180	Excavate and construct OLE bases	Track - BB	1A	36,925.03	3.6%	19-Jan-10	25-Feb-10	38	27	28	-	36,925	-	-	-	-	-	-	-	-	-	-	-	36,925
					A15190	Set Track (470m) - 50%	Track	1A	292,705.43	28.6%	29-Mar-10	23-Apr-10	26	30	30	-	-	-	292,705	-	-	-	-	-	-	-	-	-	292,705
					A15190	Set Track (470m) - 50%	Track	1A	292,705.43	28.6%	24-Apr-10	10-May-10	18	30	31	-	-	-	-	292,705	-	-	-	-	-	-	-	-	292,705
					A15200	Place upper concrete and cure	Track	1A	-	0.0%	01-Apr-10	13-May-10	43	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15210	Street Surface finishes	Track	1A	-	0.0%	14-May-10	21-May-10	8	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15220	Remove fencing and Traffic Management	Track	1A	48,784.24	4.8%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	48,784	-	-	-	-	-	-	-	-	48,784
					Snagging	Snagging	Track	1A	10,228.38	1.0%				32	33	-	-	-	-	-	-	10,228	-	-	-	-	-	-	10,228
		Victoria Dock Entrance Bridge (S16)																											
		Bridge							680,839.00	100%	04-Sep-08	08-Jul-10	673	9	34	-	-	-	-	-	-	337,015	6,808	-	-	-	-	-	343,824
					131	Reprofile and Waterproof Deck (Dummy)	Structures	1A	337,015.31	49.5%	27-May-10	08-Jul-10	43	32	33	-	-	-	-	-	-	337,015	-	-	-	-	-	-	-	337,015
					12330	Permanent Diversion of Services (by Others)	Structures	1A	337,015.31	49.5%	04-Sep-08	29-Oct-08	56	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	1A	6,808.39	1.0%				33	34	-	-	-	-	-	-	-	6,808	-	-	-	-	-	6,808
		Tower Place Bridge (S17)																											
		Bridge							1,937,179.00	100%	08-Oct-08	12-Apr-10	552	10	31	-	24,346	-	24,346	19,372	-	-	-	-	-	-	-	-	68,064
					A1770	Piling	Structures	1A	174,346.11	9.0%	08-Apr-09	30-Apr-09	22	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16050	Temporary Diversion of Services (by others)	Structures	1A	174,346.11	9.0%	08-Oct-08	03-Dec-08	57	10	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16060	Temporary Platforms and Demolition	Structures	1A	174,346.11	9.0%	15-Jan-09	08-Apr-09	84	14	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Deck Finishes		Structures	1A	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16090	Permanent Diversion of Services (by others)	Structures	1A	24,346.11	1.3%	07-Dec-09	12-Feb-10	68	26	28	-	24,346	-	-	-	-	-	-	-	-	-	-	-	24,346
					A16100	Finishes	Structures	1A	24,346.11	1.3%	15-Feb-10	12-Apr-10	57	28	30	-	-	-	24,346	-	-	-	-	-	-	-	-	-	24,346
					South Widening		Structures	1A	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1760	Install Beams	Structures	1A	324,346.11	16.7%	15-Oct-09	15-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A31	Superstructure	Structures	1A	174,346.11	9.0%	16-Oct-09	04-Dec-09	50	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16080	Substructure	Structures	1A	174,346.11	9.0%	20-Aug-09	14-Oct-09	56	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Widening		Structures	1A	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A11	Install Beams	Structures	1A	324,346.11	16.7%	30-Jun-09	30-Jun-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A101	Substructure	Structures	1A	174,346.11	9.0%	01-May-09	29-Jun-09	60	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16070	Superstructure	Structures	1A	174,346.11	9.0%	01-Jul-09	19-Aug-09	50	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	1A	19,371.79	1.0%				30	31	-	-	-	-	19,372	-	-	-	-	-	-	-	-	19,372
		Ocean Terminal Tram Stop																											

USB00000073_0013

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group — BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					A1680	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	01-Jun-10	15-Jun-10	15	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	639.77	0.2%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4288	Access for visual inspection for E&M Tram Stop installation (01A Newhaven Road)	Trams Eq	1A	-	0.0%	13-May-10	13-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4289	Access for E&M Tram Stop installation (01A Newhaven Road)	Trams Eq	1A	-	0.0%	15-Jun-10	15-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4290	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	15-Jun-10	20-Jul-10	36	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4300	Install Telecon Equipment	Trams Eq	1A	-	0.0%	20-Jul-10	18-Aug-10	30	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4310	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	20-Jul-10	25-Aug-10	37	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4315	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	25-Aug-10	01-Sep-10	8	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Leith Sands Substation																										
		Substation							**453,135.87**	**100%**	**09-Feb-10**	**24-Sep-10**	**228**	**28**	**37**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					36	Order REC supply from Scottish Power	Subst - S	1A	-	0.0%	09-Feb-10	09-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					6	Civil Engineering and Building Works	Subst - BB	1A	82,189.31	18.1%	02-Mar-10	15-Apr-10	45	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					6	Completion of envelope	Subst - BB	1A	82,189.31	18.1%	16-Apr-10	03-Jun-10	49	30	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	1A	1,660.39	0.4%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5483	Access for visual inspection for E&M Substation installation (01A Leith Sands)	Subst - S	1A	-	0.0%	04-May-10	04-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5480	Power Infeed from Public Net available inc HV cable	Subst - S	1A	-	0.0%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5484	Access for E&M Substation installation (01A Leith Sands)	Subst - S	1A	-	0.0%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5490	Install LV Power Supply and LV Power Equipment	Subst - S	1A	-	0.0%	04-Jun-10	24-Jun-10	21	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5500	Installation of TPS Equipment	Subst - S	1A	-	0.0%	23-Jul-10	06-Sep-10	46	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5510	Install Telecom and Scada	Subst - S	1A	-	0.0%	16-Aug-10	06-Sep-10	22	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5520	Testing and Commissioning	Subst - S	1A	284,225.90	62.7%	06-Sep-10	24-Sep-10	19	35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	1A	2,870.97	0.6%				36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01A2 Ocean Terminal (inc.) to Foot of the Walk (exc.)							**1,030,893.87**		**30-Sep-2010**	**17-Jan-2011**	**110**	**36**	**40**	**318,938**	-	-	-	-	-	-	-	-	-	-	-	-	**318,938**
		Ocean Terminal to Foot of the Walk																										
		E & M Installations							**1,030,893.87**	**100%**	**30-Sep-10**	**17-Jan-11**	**110**	**36**	**40**	**318,938**	-	-	-	-	-	-	-	-	-	-	-	-	**318,938**
					A3883	Access for visual inspection for E&M wayside installation (01A)	SCC	1A	-	0.0%	30-Sep-10	30-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3884	Access for E&M wayside installation (01A)	SCC	1A	-	0.0%	01-Nov-10	01-Nov-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3885	Installation of poles and building fixings	SCC	1A	-	0.0%	01-Nov-10	17-Nov-10	17	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3890	Overhead Catenary Line	OLE	1A	318,938.40	30.9%	18-Nov-10	17-Dec-10	30	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3890	Overhead Catenary Line	OLE	1A	318,938.40	30.9%	18-Dec-10	17-Jan-11	32	39	40	318,938	-	-	-	-	-	-	-	-	-	-	-	-	318,938
					A3898	Access for visual inspection to cable pits for cable laying (01A)	SCC	1A	-	0.0%	30-Sep-10	30-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3899	Access to cable pits for cable laying (01A)	SCC	1A	-	0.0%	01-Nov-10	01-Nov-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3900	Install Electrical Cables	SCC	1A	-	0.0%	01-Nov-10	19-Nov-10	19	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3910	Install Fibre Optic Cables	SCC	1A	382,708.12	37.1%	03-Dec-10	23-Dec-10	21	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3920	Install Signalling Wayside Equipment	SCC	1A	10,308.94	1.0%	22-Nov-10	13-Dec-10	22	38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01A3 Ocean Terminal (inc.) to Ocean Drive (exc.)							**6,020,081.21**		**04-Sep-2008**	**20-Dec-2010**	**838**	**9**	**39**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ocean Terminal Ch 850 - 1080																										
		Roadworks							**185,882.71**	**100%**	**27-Jul-09**	**30-Sep-09**	**66**	**21**	**23**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15510	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	27-Jul-09	12-Aug-09	17	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15520	Construct Kerb lines	Highways	1A	55,207.17	29.7%	30-Jul-09	19-Aug-09	21	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15530	Reset Gullies	Highways	1A	-	0.0%	14-Aug-09	22-Sep-09	40	21	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15540	Surface new channel	Highways	1A	-	0.0%	23-Sep-09	30-Sep-09	8	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15550	Pavement Works	Highways	1A	128,816.72	69.3%	20-Aug-09	28-Sep-09	40	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15560	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	20-Aug-09	28-Aug-09	9	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	1,858.83	1.0%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ocean Terminal to Rennies Isle Ch 1080 - 1410																										
		Roadworks							**266,701.29**	**100%**	**27-May-10**	**11-Aug-10**	**77**	**32**	**34**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15450	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	27-May-10	16-Jun-10	21	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15460	Construct Kerb lines	Highways	1A	79,210.28	29.7%	02-Jun-10	24-Jun-10	23	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15470	Reset Gullies	Highways	1A	-	0.0%	16-Jun-10	03-Aug-10	49	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15480	Surface new channel	Highways	1A	-	0.0%	04-Aug-10	11-Aug-10	8	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15490	Pavement Works	Highways	1A	184,823.99	69.3%	25-Jun-10	11-Aug-10	48	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15500	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	25-Jun-10	05-Jul-10	11	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	2,667.01	1.0%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Rennies Isle to Casino Square Ch 1410 - 1880																										
		Roadworks							**379,847.29**		**09-Dec-09**	**06-Apr-10**	**119**	**26**	**31**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15390	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	09-Dec-09	18-Jan-10	41	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15400	Construct Kerb lines	Highways	1A	131,617.08	34.7%	14-Dec-09	28-Jan-10	46	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15410	Reset Gullies	Highways	1A	-	0.0%	11-Jan-10	17-Mar-10	66	27	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15420	Surface new channel	Highways	1A	131,617.08	34.7%	18-Mar-10	25-Mar-10	8	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15430	Pavement Works	Highways	1A	112,814.64	29.7%	29-Jan-10	06-Apr-10	68	27	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15440	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	29-Jan-10	08-Feb-10	11	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	3,798.47	1.0%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					CHL Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (20)	Highways	1A	-	0.0%		06-Apr-10			30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ocean Terminal Ch 850 - 1080																										
		Trackwork							**500,537.84**	**100%**	**23-Jul-09**	**05-Nov-09**	**106**	**21**	**25**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15310	Establish Traffic Management & Temp. Fencing	Track	1A	23,873.14	4.8%	23-Jul-09	24-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15320	Excavate box	Track	1A	-	0.0%	27-Jul-09	12-Aug-09	17	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15330	Excavate, lay and concrete ducts	Track	1A	-	0.0%	13-Aug-09	04-Sep-09	23	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15340	Excavate and construct OLE bases	Track - BB	1A	18,069.70	3.6%	13-Aug-09	04-Sep-09	23	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15350	Set Track (280m) - 50%	Track	1A	214,858.24	42.9%	15-Sep-09	22-Oct-09	38	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15350	Set Track (280m) - 50%	Track	1A	214,858.24	42.9%	15-Sep-09	22-Oct-09	38	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15360	Place upper concrete and cure	Track	1A	-	0.0%	18-Sep-09	27-Oct-09	40	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15370	Street Surface finishes	Track	1A	-	0.0%	28-Oct-09	04-Nov-09	8	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15380	Remove fencing and Traffic Management	Track	1A	23,873.14	4.8%	05-Nov-09	05-Nov-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	5,005.38	1.0%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ocean Terminal to Rennies Isle Ch 1080 - 1410																										
		Trackwork							**718,162.98**	**100%**	**25-May-10**	**30-Aug-10**	**98**	**32**	**36**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15230	Establish Traffic Management & Temp. Fencing	Track	1A	34,252.76	4.8%	25-May-10	26-May-10	2	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15240	Excavate box	Track	1A	-	0.0%	27-May-10	16-Jun-10	21	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15250	Excavate, lay and concrete ducts	Track	1A	205,516.58	28.6%	17-Jun-10	14-Jul-10	28	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15260	Excavate and construct OLE bases	Track - BB	1A	25,926.09	3.6%	17-Jun-10	14-Jul-10	28	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15270	Set Track (330m) - 50%	Track	1A	205,516.58	28.6%	16-Jul-10	16-Aug-10	32	33	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15270	Set Track (330m) - 50%	Track	1A	205,516.58	28.6%	16-Jul-10	16-Aug-10	32	33	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15280	Place upper concrete and cure	Track	1A	-	0.0%	21-Jul-10	19-Aug-10	30	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15290	Street Surface finishes	Track	1A	-	0.0%	20-Aug-10	27-Aug-10	8	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15300	Remove fencing and Traffic Management	Track	1A	34,252.76	4.8%	30-Aug-10	30-Aug-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	7,181.63	1.0%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Rennies Isle to Casino Square Ch 1410 - 1880																										
		Trackwork							**1,022,838.18**	**100%**	**07-Dec-09**	**24-May-10**	**169**	**26**	**33**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15150	Establish Traffic Management & Temp. Fencing	Track	1A	48,784.24	4.8%	07-Dec-09	08-Dec-09	2	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15160	Excavate box	Track	1A	-	0.0%	09-Dec-09	18-Jan-10	41	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15170	Excavate, lay and concrete ducts	Track	1A	292,705.43	28.6%	19-Jan-10	25-Feb-10	38	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15180	Excavate and construct OLE bases	Track - BB	1A	36,925.02	3.6%	19-Jan-10	25-Feb-10	38	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15190	Set Track (470m) - 50%	Track	1A	292,705.43	28.6%	29-Mar-10	23-Apr-10	26	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15190	Set Track (470m) - 50%	Track	1A	292,705.43	28.6%	24-Apr-10	10-May-10	18	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15200	Place upper concrete and cure	Track	1A	-	0.0%	01-Apr-10	13-May-10	43	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15210	Street Surface finishes	Track	1A	-	0.0%	14-May-10	21-May-10	8	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15220	Remove fencing and Traffic Management	Track	1A	48,784.24	4.8%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	10,228.38	1.0%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Victoria Dock Entrance Bridge (S16)																										
		Bridge							**680,839.00**	**100%**	**04-Sep-08**	**08-Jul-10**	**673**	**9**	**34**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					131	Reprofile and Waterproof Deck (Dummy)	Structures	1A	337,015.31	49.5%	27-May-10	08-Jul-10	43	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					12330	Permanent Diversion of Services (by Others)	Structures	1A	337,015.31	49.5%	04-Sep-08	29-Oct-08	56	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	1A	6,808.39	1.0%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Tower Place Bridge (S17)																										
		Bridge							**1,937,179.00**	**100%**	**08-Oct-08**	**12-Apr-10**	**552**	**10**	**31**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1770	Piling	Structures	1A	174,346.11	9.0%	09-Apr-09	30-Apr-09	22	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16050	Temporary Diversion of Services (by others)	Structures	1A	174,346.11	9.0%	08-Oct-08	03-Dec-08	57	10	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16060	Temporary Platforms and Demolition	Structures	1A	174,346.11	9.0%	15-Jan-09	08-Apr-09	84	14	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Deck Finishes		Structures	1A	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16090	Permanent Diversion of Services (by others)	Structures	1A	24,346.11	1.3%	07-Dec-09	12-Feb-10	68	26	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16100	Finishes	Structures	1A	24,346.11	1.3%	15-Feb-10	12-Apr-10	57	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Widening		Structures	1A	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1760	Install Beams	Structures	1A	324,346.11	16.7%	15-Oct-09	15-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A31	Superstructure	Structures	1A	174,346.11	9.0%	16-Oct-09	04-Dec-09	50	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16080	Substructure	Structures	1A	174,346.11	9.0%	20-Aug-09	14-Oct-09	56	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Widening		Structures	1A	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A11	Install Beams	Structures	1A	324,346.11	16.7%	30-Jun-09	30-Jun-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A101	Substructure	Structures	1A	174,346.11	9.0%	01-May-09	29-Jun-09	60	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16070	Superstructure	Structures	1A	174,346.11	9.0%	01-Jul-09	19-Aug-09	50	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	1A	19,371.79	1.0%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ocean Terminal Tram Stop																										

USB00000073_0014

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Morrison Construction Group | BILFINGER BERGER | SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year 2008 Period 1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
			Tramstop						**328,092.93**	**100%**	**27-Jul-09**	**20-Dec-10**	**512**	**21**	**39**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					14	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	27-Jul-09	25-Aug-09	30	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					14	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	26-Aug-09	26-Oct-09	63	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	1,938.69	0.6%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					178	Order REC Supply	Trams Eq	1A	-	0.0%	13-Aug-09	13-Aug-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4318	Access for visual inspection for E&M Tram Stop installation (01A Ocean Terminal)	Trams Eq	1A	-	0.0%	08-Sep-09	08-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1720	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	24-Sep-09	08-Oct-09	15	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	646.23	0.2%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4319	Access for E&M Tram Stop installation (01A Ocean Terminal)	Trams Eq	1A	-	0.0%	08-Oct-09	08-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4320	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	08-Oct-09	12-Nov-09	36	23	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6090	Installation of SIG-interlocking cubicle (2)	Trams Eq	1A	-	0.0%	22-Oct-09	12-Nov-09	22	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6100	Commissioning of SIG -interlocking cubicle	Trams Eq	1A	-	0.0%	14-Dec-10	20-Dec-10	7	39	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4330	Install Telecon Equipment	Trams Eq	1A	-	0.0%	12-Nov-09	11-Dec-09	30	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4340	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	12-Nov-09	18-Dec-09	37	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4350	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	18-Dec-09	08-Jan-10	22	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			01A4 Ocean Drive (inc.) to Constitution Street (exc.)						**1,079,801.02**		**01-May-2009**	**27-Jul-2010**	**453**	**18**	**35**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Casino Square to Baltic Street Ch 1850 - 1880																										
				Trackwork					**65,287.54**	**100%**	**23-Jul-09**	**08-Sep-09**	**48**	**21**	**23**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16110	Establish Traffic Management & Temp. Fencing	Track	1A	3,113.89	4.8%	23-Jul-09	24-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16120	Excavate box	Track	1A	-	0.0%	27-Jul-09	28-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16130	Excavate, lay and concrete ducts	Track	1A	-	0.0%	29-Jul-09	31-Jul-09	3	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16140	Excavate and construct OLE bases	Track - BB	1A	2,356.92	3.6%	29-Jul-09	31-Jul-09	3	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16150	Set Track (30m)	Track	1A	-	0.0%	20-Aug-09	25-Aug-09	6	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16160	Place upper concrete and cure	Track	1A	56,049.98	85.9%	25-Aug-09	28-Aug-09	4	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16170	Street Surface finishes	Track	1A	-	0.0%	31-Aug-09	07-Sep-09	8	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16180	Remove fencing and Traffic Management	Track	1A	3,113.89	4.8%	08-Sep-09	08-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	652.86	1.0%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Casino Square to Baltic Street Ch 1880 - 2110																										
				Trackwork					**500,537.84**	**100%**	**01-May-09**	**22-Jul-09**	**83**	**18**	**22**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15010	Establish Traffic Management & Temp. Fencing	Track	1A	23,873.14	4.8%	01-May-09	06-May-09	6	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15020	Excavate box	Track	1A	71,619.41	14.3%	06-May-09	20-May-09	15	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15030	Excavate, lay and concrete ducts	Track	1A	-	0.0%	20-May-09	10-Jun-09	22	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15040	Excavate and construct OLE bases	Track - BB	1A	18,069.70	3.6%	20-May-09	10-Jun-09	22	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15050	Set Track (230m) - 50%	Track	1A	95,492.55	19.1%	18-Jun-09	08-Jul-09	21	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15050	Set Track (230m) - 50%	Track	1A	95,492.55	19.1%	18-Jun-09	08-Jul-09	21	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15060	Place upper concrete and cure	Track	1A	167,111.97	33.4%	23-Jun-09	13-Jul-09	21	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15070	Street Surface finishes	Track	1A	-	0.0%	14-Jul-09	21-Jul-09	8	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15080	Remove fencing and Traffic Management	Track	1A	23,873.14	4.8%	22-Jul-09	22-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	5,005.38	1.0%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Roadworks					**185,882.71**	**100%**	**06-May-09**	**03-Jul-09**	**59**	**18**	**21**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15090	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	06-May-09	20-May-09	15	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15100	Construct Kerb lines	Highways	1A	55,207.17	29.7%	11-May-09	28-May-09	18	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15110	Reset Gullies	Highways	1A	-	0.0%	26-May-09	29-Jun-09	35	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15120	Surface new channel	Highways	1A	-	0.0%	29-Jun-09	03-Jul-09	5	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15130	Pavement Works	Highways	1A	-	0.0%	28-May-09	30-Jun-09	34	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15140	Street Lighting / Traffic Signals / Road Signs	Highways	1A	128,816.72	69.3%	28-May-09	08-Jun-09	12	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	1,858.83	1.0%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Cnt. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (19)	Highways	1A	-	0.0%		03-Jul-09				-	-	-	-	-	-	-	-	-	-	-	-	-
			Ocean Drive Tram Stop																										
				Tramstop					**328,092.93**	**100%**	**09-Dec-09**	**27-Jul-10**	**231**	**26**	**35**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					17	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	09-Dec-09	28-Jan-10	51	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					17	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	29-Jan-10	23-Mar-10	55	27	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	1,938.69	0.6%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					188	Order REC Supply	Trams Eq	1A	-	0.0%	11-Mar-10	11-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4358	Access for visual inspection for E&M Tram Stop installation (01A Ocean Drive)	Trams Eq	1A	-	0.0%	08-Apr-10	08-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1800	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	23-Apr-10	10-May-10	18	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	646.23	0.2%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4359	Access for E&M Tram Stop installation (01A Ocean Drive)	Trams Eq	1A	-	0.0%	10-May-10	10-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4360	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	10-May-10	15-Jun-10	37	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4370	Install Telecon Equipment	Trams Eq	1A	-	0.0%	15-Jun-10	13-Jul-10	29	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4380	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	15-Jun-10	20-Jul-10	36	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4390	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	20-Jul-10	27-Jul-10	8	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			01A5 Constitution Street (inc.) to Foot of the Walk (exc.)						**2,178,443.97**		**05-Feb-2010**	**09-Nov-2010**	**278**	**28**	**39**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Constitution Street Tram Stop																										
				Tramstop					**328,092.93**	**100%**	**15-Jun-10**	**09-Nov-10**	**148**	**32**	**39**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					20	Civil Engineering And Building Works	Tramstops	1A	95,965.13	29.2%	15-Jun-10	25-Jul-10	41	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					20	Civil Engineering And Building Works	Tramstops	1A	95,965.13	29.2%	26-Jul-10	14-Sep-10	52	34	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	1,938.69	0.6%				36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					198	Order REC Supply	Trams Eq	1A	-	0.0%	29-Jun-10	29-Jun-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4398	Access for visual inspection for E&M Tram Stop installation (01A Constitution Street)	Trams Eq	1A	-	0.0%	26-Jul-10	26-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1850	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	11-Aug-10	24-Aug-10	14	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	646.23	0.2%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4399	Access for E&M Tram Stop installation (01A Constitution Street)	Trams Eq	1A	-	0.0%	25-Aug-10	25-Aug-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4400	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	25-Aug-10	28-Sep-10	35	35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4410	Install Telecon Equipment	Trams Eq	1A	-	0.0%	29-Sep-10	26-Oct-10	28	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4420	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	29-Sep-10	02-Nov-10	35	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4430	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	03-Nov-10	09-Nov-10	7	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%				38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Baltic to Queen Charlotte Ch 2110 - 2340																										
				Trackwork					**500,537.84**	**100%**	**11-Jun-10**	**15-Sep-10**	**97**	**32**	**36**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14870	Establish Traffic Management & Temp. Fencing	Track	1A	23,873.14	4.8%	11-Jun-10	14-Jun-10	4	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14880	Excavate box	Track	1A	-	0.0%	15-Jun-10	28-Jun-10	14	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14890	Excavate, lay and concrete ducts	Track	1A	-	0.0%	29-Jun-10	16-Jul-10	18	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14900	Excavate and construct OLE bases	Track - BB	1A	18,069.70	3.6%	29-Jun-10	16-Jul-10	18	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14910	Set Track (230m) - 50%	Track	1A	119,365.69	23.8%	01-Jul-10	21-Jul-10	21	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14910	Set Track (230m) - 50%	Track	1A	119,365.69	23.8%	01-Jul-10	21-Jul-10	21	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14920	Place upper concrete and cure	Track	1A	190,985.10	38.2%	06-Jul-10	26-Jul-10	21	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14930	Street Surface finishes	Track	1A	-	0.0%	27-Jul-10	04-Aug-10	9	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14940	Remove fencing and Traffic Management	Track	1A	23,873.14	4.8%	15-Sep-10	15-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	5,005.38	1.0%				36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Queen Charlotte to Foot/Walk Ch 2340 - 2730																										
				Trackwork					**848,738.07**	**100%**	**05-Feb-10**	**10-Jun-10**	**126**	**28**	**32**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14630	Establish Traffic Management & Temp. Fencing	Track	1A	40,480.54	4.8%	05-Feb-10	09-Feb-10	5	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14640	Excavate box	Track	1A	121,441.62	14.3%	09-Feb-10	03-Mar-10	23	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14650	Excavate, lay and concrete ducts	Track	1A	-	0.0%	03-Mar-10	07-Apr-10	36	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14660	Excavate and construct OLE bases	Track - BB	1A	30,639.92	3.6%	03-Mar-10	07-Apr-10	36	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14680	Set Track (390m) - 50%	Track	1A	161,922.15	19.1%	21-Apr-10	26-May-10	36	30	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14680	Set Track (390m) - 50%	Track	1A	161,922.15	19.1%	21-Apr-10	26-May-10	36	30	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14690	Place upper concrete and cure	Track	1A	283,363.77	33.4%	26-Apr-10	01-Jun-10	37	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14700	Street Surface finishes	Track	1A	-	0.0%	02-Jun-10	09-Jun-10	8	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14710	Remove fencing and Traffic Management	Track	1A	40,480.54	4.8%	10-Jun-10	10-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	8,487.38	1.0%				32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Baltic to Queen Charlotte Ch 2110 - 2340																										
				Roadworks					**185,882.71**	**100%**	**15-Jun-10**	**11-Aug-10**	**58**	**32**	**35**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14950	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	15-Jun-10	28-Jun-10	14	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14960	Construct Kerb lines	Highways	1A	73,609.55	39.6%	18-Jun-10	05-Jul-10	18	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14970	Reset Gullies	Highways	1A	-	0.0%	02-Jul-10	05-Aug-10	35	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14980	Surface new channel	Highways	1A	-	0.0%	06-Aug-10	11-Aug-10	6	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14990	Pavement Works	Highways	1A	110,414.33	59.4%	06-Jul-10	06-Aug-10	32	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15000	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	06-Jul-10	14-Jul-10	9	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	1,858.83	1.0%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Queen Charlotte to Foot of the Walk Ch 2340 - 2730																										
				Roadworks					**315,192.43**	**100%**	**09-Feb-10**	**10-May-10**	**91**	**28**	**32**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14810	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	31,204.05	9.9%	09-Feb-10	03-Mar-10	23	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14820	Construct Kerb lines	Highways	1A	31,204.05	9.9%	12-Feb-10	12-Mar-10	29	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14830	Reset Gullies - 50%	Highways	1A	62,408.10	19.8%	26-Feb-10	26-Apr-10	60	28	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14830	Reset Gullies - 50%	Highways	1A	62,408.10	19.8%	26-Feb-10	26-Apr-10	60	28	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14840	Surface new channel	Highways	1A	-	0.0%	26-Apr-10	05-May-10	10	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14850	Pavement Works	Highways	1A	124,816.20	39.6%	12-Mar-10	10-May-10	60	29	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14860	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	12-Mar-10	23-Mar-10	12	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	3,151.92	1.0%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Cnt. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (18)	Highways	1A	-	0.0%		10-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0015

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Services Group BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Extract 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
						Tramstop			**328,092.93**	**100%**	**27-Jul-09**	**20-Dec-10**	**512**	**21**	**39**	-	-	-	-	-	-	-	-	**95,965**	**63,977**	**646**	**97,904**	-	**258,492**
					14	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	27-Jul-09	25-Aug-09	30	21	22	-	-	-	-	-	-	-	-	95,965	-	-	-	-	95,965
					14	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	26-Aug-09	26-Oct-09	63	24	25	-	-	-	-	-	-	-	-	-	-	-	95,965	-	95,965
					Snagging	Snagging	Tramstops	1A	1,938.69	0.6%				24	25	-	-	-	-	-	-	-	-	-	-	-	1,939	-	1,939
					178	Order REC Supply	Trams Eq	1A	-	0.0%	13-Aug-09	13-Aug-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4318	Access for visual inspection for E&M Tram Stop installation (01A Ocean Terminal)	Trams Eq	1A	-	0.0%	08-Sep-09	08-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1720	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	24-Sep-09	08-Oct-09	15	23	23	-	-	-	-	-	-	-	-	-	63,977	-	-	-	63,977
					Snagging	Snagging	Tramstops	1A	646.23	0.2%				23	24	-	-	-	-	-	-	-	-	-	-	646	-	-	646
					A4319	Access for E&M Tram Stop installation (01A Ocean Terminal)	Trams Eq	1A	-	0.0%	08-Oct-09	08-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4320	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	08-Oct-09	12-Nov-09	36	23	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6090	Installation of SIG-interlocking cubicle (2)	Trams Eq	1A	-	0.0%	22-Oct-09	12-Nov-09	22	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6100	Commissioning of SIG -interlocking cubicle	Trams Eq	1A	-	0.0%	14-Dec-10	20-Dec-10	7	39	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4330	Install Telecon Equipment	Trams Eq	1A	-	0.0%	12-Nov-09	11-Dec-09	30	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4340	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	12-Nov-09	18-Dec-09	37	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4350	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	18-Dec-09	08-Jan-10	22	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					01A4 Ocean Drive (inc.) to Constitution Street (exc.)				**1,079,801.02**					**18**	**35**	-	-	-	-	**95,493**	**202,094**	**358,097**	**31,203**	**64,169**	**653**	-	-	-	**751,708**
					Casino Square to Baltic Street Ch 1850 - 1880																									
					Trackwork				**65,287.54**	**100%**	**23-Jul-09**	**08-Sep-09**	**48**	**21**	**23**	-	-	-	-	-	-	-	**5,471**	**59,164**	**653**	-	-	-	**65,288**
					A16110	Establish Traffic Management & Temp. Fencing	Track	1A	3,113.89	4.8%	23-Jul-09	24-Jul-09	2	21	21	-	-	-	-	-	-	-	3,114	-	-	-	-	-	-	3,114
					A16120	Excavate box	Track	1A	-	0.0%	27-Jul-09	28-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16130	Excavate, lay and concrete ducts	Track	1A	-	0.0%	29-Jul-09	31-Jul-09	3	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16140	Excavate and construct OLE bases	Track - BB	1A	2,356.92	3.6%	29-Jul-09	31-Jul-09	3	21	21	-	-	-	-	-	-	-	2,357	-	-	-	-	-	-	2,357
					A16150	Set Track (30m)	Track	1A	-	0.0%	20-Aug-09	25-Aug-09	6	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16160	Place upper concrete and cure	Track	1A	56,049.98	85.9%	25-Aug-09	28-Aug-09	4	22	22	-	-	-	-	-	-	-	-	56,050	-	-	-	-	-	56,050
					A16170	Street Surface finishes	Track	1A	-	0.0%	31-Aug-09	07-Sep-09	8	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16180	Remove fencing and Traffic Management	Track	1A	3,113.89	4.8%	08-Sep-09	08-Sep-09	1	22	22	-	-	-	-	-	-	-	-	3,114	-	-	-	-	-	3,114
					Snagging	Snagging	Track	1A	652.88	1.0%				22	23	-	-	-	-	-	-	-	-	-	653	-	-	-	-	653
					Casino Square to Baltic Street Ch 1850 - 2110																									
					Trackwork				**500,537.84**	**100%**	**01-May-09**	**22-Jul-09**	**83**	**18**	**22**	-	-	-	-	**95,493**	**18,070**	**358,097**	**23,873**	**5,005**	-	-	-	-	**500,538**
					A15010	Establish Traffic Management & Temp. Fencing	Track	1A	23,873.14	4.8%	01-May-09	06-May-09	6	18	18	-	-	-	-	23,873	-	-	-	-	-	-	-	-	-	23,873
					A15020	Excavate box	Track	1A	71,619.41	14.3%	06-May-09	20-May-09	15	18	18	-	-	-	-	71,619	-	-	-	-	-	-	-	-	-	71,619
					A15030	Excavate, lay and concrete ducts	Track	1A	-	0.0%	20-May-09	10-Jun-09	22	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15040	Excavate and construct OLE bases	Track - BB	1A	18,069.70	3.6%	20-May-09	10-Jun-09	22	18	19	-	-	-	-	-	18,070	-	-	-	-	-	-	-	-	18,070
					A15050	Set Track (230m) - 50%	Track	1A	95,492.55	19.1%	18-Jun-09	08-Jul-09	21	19	20	-	-	-	-	-	-	95,493	-	-	-	-	-	-	-	95,493
					A15050	Set Track (230m) - 50%	Track	1A	95,492.55	19.1%	18-Jun-09	08-Jul-09	21	19	20	-	-	-	-	-	-	95,493	-	-	-	-	-	-	-	95,493
					A15060	Place upper concrete and cure	Track	1A	167,111.97	33.4%	23-Jun-09	13-Jul-09	21	20	20	-	-	-	-	-	-	167,112	-	-	-	-	-	-	-	167,112
					A15070	Street Surface finishes	Track	1A	-	0.0%	14-Jul-09	21-Jul-09	8	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15080	Remove fencing and Traffic Management	Track	1A	23,873.14	4.8%	22-Jul-09	22-Jul-09	1	21	21	-	-	-	-	-	-	-	23,873	-	-	-	-	-	-	23,873
					Snagging	Snagging	Track	1A	5,005.38	1.0%				21	22	-	-	-	-	-	-	-	-	5,005	-	-	-	-	5,005
					Roadworks				**185,882.71**	**100%**	**06-May-09**	**03-Jul-09**	**59**	**18**	**21**	-	-	-	-	-	**184,024**	-	**1,859**	-	-	-	-	-	**185,883**
					A15090	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	06-May-09	20-May-09	15	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15100	Construct Kerb lines	Highways	1A	55,207.17	29.7%	11-May-09	29-May-09	18	18	19	-	-	-	-	-	55,207	-	-	-	-	-	-	-	-	55,207
					A15110	Reset Gullies	Highways	1A	-	0.0%	26-May-09	29-Jun-09	35	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15120	Surface new channel	Highways	1A	-	0.0%	29-Jun-09	03-Jul-09	5	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15130	Pavement Works	Highways	1A	-	0.0%	28-May-09	30-Jun-09	34	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15140	Street Lighting / Traffic Signals / Road Signs	Highways	1A	128,816.72	69.3%	28-May-09	08-Jun-09	12	19	19	-	-	-	-	-	128,817	-	-	-	-	-	-	-	-	128,817
					Snagging	Snagging	Highways	1A	1,858.83	1.0%				20	21	-	-	-	-	-	-	-	1,859	-	-	-	-	-	1,859
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (19)	Highways	1A	-	0.0%		03-Jul-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Ocean Drive Tram Stop																									
					Tramstop				**328,092.93**	**100%**	**09-Dec-09**	**27-Jul-10**	**231**	**26**	**35**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					17	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	09-Dec-09	28-Jan-10	51	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					17	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	29-Jan-10	23-Mar-10	55	27	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	1,938.69	0.6%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					188	Order REC Supply	Trams Eq	1A	-	0.0%	11-Mar-10	11-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4358	Access for visual inspection for E&M Tram Stop installation (01A Ocean Drive)	Trams Eq	1A	-	0.0%	08-Apr-10	08-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1800	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	23-Apr-10	10-May-10	18	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	646.23	0.2%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4359	Access for E&M Tram Stop installation (01A Ocean Drive)	Trams Eq	1A	-	0.0%	10-May-10	10-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4360	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	10-May-10	15-Jun-10	37	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4370	Install Telecon Equipment	Trams Eq	1A	-	0.0%	15-Jun-10	13-Jul-10	29	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4380	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	15-Jun-10	20-Jul-10	36	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4390	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	20-Jul-10	27-Jul-10	8	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					01A5 Constitution Street (inc.) to Foot of the Walk (exc.)				**2,178,443.97**		**05-Feb-2010**	**09-Nov-2010**	**278**	**28**	**39**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Constitution Street Tram Stop																									
					Tramstop				**328,092.93**	**100%**	**15-Jun-10**	**09-Nov-10**	**148**	**32**	**39**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					20	Civil Engineering And Building Works	Tramstops	1A	95,965.13	29.2%	15-Jun-10	25-Jul-10	41	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					20	Civil Engineering And Building Works	Tramstops	1A	95,965.13	29.2%	26-Jul-10	14-Sep-10	52	34	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	1,938.69	0.6%				36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					198	Order REC Supply	Trams Eq	1A	-	0.0%	29-Jun-10	29-Jun-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4398	Access for visual inspection for E&M Tram Stop installation (01A Constitution Street)	Trams Eq	1A	-	0.0%	26-Jul-10	26-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1850	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	11-Aug-10	24-Aug-10	14	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	646.23	0.2%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4399	Access for E&M Tram Stop installation (01A Constitution Street)	Trams Eq	1A	-	0.0%	25-Aug-10	25-Aug-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4400	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	25-Aug-10	28-Sep-10	35	35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4410	Install Telecon Equipment	Trams Eq	1A	-	0.0%	29-Sep-10	26-Oct-10	28	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4420	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	29-Sep-10	02-Nov-10	35	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4430	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	03-Nov-10	09-Nov-10	7	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%				38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Baltic to Queen Charlotte Ch 2110 - 2340																									
					Trackwork				**500,537.84**	**100%**	**11-Jun-10**	**15-Sep-10**	**97**	**32**	**36**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14870	Establish Traffic Management & Temp. Fencing	Track	1A	23,873.14	4.8%	11-Jun-10	14-Jun-10	4	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14880	Excavate box	Track	1A	-	0.0%	15-Jun-10	28-Jun-10	14	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14890	Excavate, lay and concrete ducts	Track	1A	-	0.0%	29-Jun-10	16-Jul-10	18	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14900	Excavate and construct OLE bases	Track - BB	1A	18,069.70	3.6%	29-Jun-10	16-Jul-10	18	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14910	Set Track (230m) - 50%	Track	1A	119,365.69	23.8%	01-Jul-10	21-Jul-10	21	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14910	Set Track (230m) - 50%	Track	1A	119,365.69	23.8%	01-Jul-10	21-Jul-10	21	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14920	Place upper concrete and cure	Track	1A	190,985.10	38.2%	06-Jul-10	26-Jul-10	21	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14930	Street Surface finishes	Track	1A	-	0.0%	27-Jul-10	04-Aug-10	9	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14940	Remove fencing and Traffic Management	Track	1A	23,873.14	4.8%	15-Sep-10	15-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	5,005.38	1.0%				36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Queen Charlotte to Foot/Walk Ch 2340 - 2730																									
					Trackwork				**848,738.07**	**100%**	**05-Feb-10**	**10-Jun-10**	**126**	**28**	**32**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14630	Establish Traffic Management & Temp. Fencing	Track	1A	40,480.54	4.8%	05-Feb-10	09-Feb-10	5	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14640	Excavate box	Track	1A	121,441.62	14.3%	09-Feb-10	03-Mar-10	23	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14650	Excavate, lay and concrete ducts	Track	1A	-	0.0%	03-Mar-10	07-Apr-10	36	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14660	Excavate and construct OLE bases	Track - BB	1A	30,639.92	3.6%	03-Mar-10	07-Apr-10	36	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14680	Set Track (390m) - 50%	Track	1A	161,922.15	19.1%	21-Apr-10	26-May-10	36	30	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14680	Set Track (390m) - 50%	Track	1A	161,922.15	19.1%	21-Apr-10	26-May-10	36	30	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14690	Place upper concrete and cure	Track	1A	283,363.77	33.4%	26-Apr-10	01-Jun-10	37	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14700	Street Surface finishes	Track	1A	-	0.0%	02-Jun-10	09-Jun-10	8	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14710	Remove fencing and Traffic Management	Track	1A	40,480.54	4.8%	10-Jun-10	10-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	8,487.38	1.0%				32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Baltic to Queen Charlotte Ch 2110 - 2340																									
					Roadworks				**185,882.71**	**100%**	**15-Jun-10**	**11-Aug-10**	**58**	**32**	**35**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14950	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	15-Jun-10	28-Jun-10	14	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14960	Construct Kerb lines	Highways	1A	73,609.55	39.6%	18-Jun-10	05-Jul-10	18	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14970	Reset Gullies	Highways	1A	-	0.0%	02-Jul-10	05-Aug-10	35	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14980	Surface new channel	Highways	1A	-	0.0%	06-Aug-10	11-Aug-10	6	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14990	Pavement Works	Highways	1A	110,414.33	59.4%	06-Jul-10	06-Aug-10	32	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15000	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	06-Jul-10	14-Jul-10	9	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	1,858.83	1.0%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Queen Charlotte to Foot of the Walk Ch 2340 - 2730																									
					Roadworks				**315,192.43**	**100%**	**09-Feb-10**	**10-May-10**	**91**	**28**	**32**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14810	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	31,204.05	9.9%	09-Feb-10	03-Mar-10	23	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14820	Construct Kerb lines	Highways	1A	31,204.05	9.9%	12-Feb-10	12-Mar-10	29	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14830	Reset Gullies - 50%	Highways	1A	62,408.10	19.8%	26-Feb-10	26-Apr-10	60	28	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14830	Reset Gullies - 50%	Highways	1A	62,408.10	19.8%	26-Feb-10	26-Apr-10	60	28	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14840	Surface new channel	Highways	1A	-	0.0%	26-Apr-10	05-May-10	10	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14850	Pavement Works	Highways	1A	124,816.20	39.6%	12-Mar-10	10-May-10	60	29	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14860	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	12-Mar-10	23-Mar-10	12	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	3,151.92	1.0%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (18)	Highways	1A	-	0.0%		10-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0016

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group — BILFINGER BERGER — SIEI

Year															2010
Period															
Period End															
										27	28	29	30	31	32
										30-Jan-2010	27-Feb-2010	27-Mar-2010	24-Apr-2010	22-May-2010	19-Jun-2010

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period
				Tramstop					328,092.93	100%	27-Jul-09	20-Dec-10	512	21	39
					14	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	27-Jul-09	25-Aug-09	30	21	22
					14	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	26-Aug-09	26-Oct-09	63	24	25
					Snagging	Snagging	Tramstops	1A	1,938.69	0.6%				24	25
					178	Order REC Supply	Trams Eq	1A	-	0.0%	13-Aug-09	13-Aug-09	1	21	21
					A4318	Access for visual inspection for E&M Tram Stop installation (01A Ocean Terminal)	Trams Eq	1A	-	0.0%	08-Sep-09	08-Sep-09	1	22	22
					A1720	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	24-Sep-09	08-Oct-09	15	23	23
					Snagging	Snagging	Tramstops	1A	646.23	0.2%				23	24
					A4319	Access for E&M Tram Stop installation (01A Ocean Terminal)	Trams Eq	1A	-	0.0%	08-Oct-09	08-Oct-09	1	23	23
					A4320	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	08-Oct-09	12-Nov-09	36	23	25
					A6090	Installation of SIG-interlocking cubicle (2)	Trams Eq	1A	-	0.0%	22-Oct-09	12-Nov-09	22	24	25
					A6100	Commissioning of SIG -interlocking cubicle	Trams Eq	1A	-	0.0%	14-Dec-10	20-Dec-10	7	39	39
					A4330	Install Telecon Equipment	Trams Eq	1A	-	0.0%	12-Nov-09	11-Dec-09	30	25	26
					A4340	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	12-Nov-09	18-Dec-09	37	25	26
					A4350	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	18-Dec-09	08-Jan-10	22	26	27
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%				27	28
			01A4 Ocean Drive (inc.) to Constitution Street (exc.)						1,079,801.02		01-May-2009	27-Jul-2010	453	18	35
			Casino Square to Baltic Street Ch 1850 - 1880												
				Trackwork					65,287.54	100%	23-Jul-09	08-Sep-09	48	21	23
					A16110	Establish Traffic Management & Temp. Fencing	Track	1A	3,113.89	4.8%	23-Jul-09	24-Jul-09	2	21	21
					A16120	Excavate box	Track	1A	-	0.0%	27-Jul-09	28-Jul-09	2	21	21
					A16130	Excavate, lay and concrete ducts	Track	1A	-	0.0%	29-Jul-09	31-Jul-09	3	21	21
					A16140	Excavate and construct OLE bases	Track - BB	1A	2,356.92	3.6%	29-Jul-09	31-Jul-09	3	21	21
					A16150	Set Track (30m)	Track	1A	-	0.0%	20-Aug-09	25-Aug-09	6	22	22
					A16160	Place upper concrete and cure	Track	1A	56,049.98	85.9%	25-Aug-09	28-Aug-09	4	22	22
					A16170	Street Surface finishes	Track	1A	-	0.0%	31-Aug-09	07-Sep-09	8	22	22
					A16180	Remove fencing and Traffic Management	Track	1A	3,113.89	4.8%	08-Sep-09	08-Sep-09	1	22	22
					Snagging	Snagging	Track	1A	652.88	1.0%				22	23
			Casino Square to Baltic Street Ch 1880 - 2110												
				Trackwork					500,537.84	100%	01-May-09	22-Jul-09	83	18	22
					A15010	Establish Traffic Management & Temp. Fencing	Track	1A	23,873.14	4.8%	01-May-09	06-May-09	6	18	18
					A15020	Excavate box	Track	1A	71,619.41	14.3%	06-May-09	20-May-09	15	18	18
					A15030	Excavate, lay and concrete ducts	Track	1A	-	0.0%	20-May-09	10-Jun-09	22	18	19
					A15040	Excavate and construct OLE bases	Track - BB	1A	18,069.70	3.6%	20-May-09	10-Jun-09	22	18	19
					A15050	Set Track (230m) - 50%	Track	1A	95,492.55	19.1%	18-Jun-09	08-Jul-09	21	19	20
					A15050	Set Track (230m) - 50%	Track	1A	95,492.55	19.1%	18-Jun-09	08-Jul-09	21	19	20
					A15060	Place upper concrete and cure	Track	1A	167,111.97	33.4%	23-Jun-09	13-Jul-09	21	20	20
					A15070	Street Surface finishes	Track	1A	-	0.0%	14-Jul-09	21-Jul-09	8	20	21
					A15080	Remove fencing and Traffic Management	Track	1A	23,873.14	4.8%	22-Jul-09	22-Jul-09	1	21	21
					Snagging	Snagging	Track	1A	5,005.38	1.0%				21	22
				Roadworks					185,882.71	100%	06-May-09	03-Jul-09	59	18	21
					A15090	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	06-May-09	20-May-09	15	18	18
					A15100	Construct Kerb lines	Highways	1A	55,207.17	29.7%	11-May-09	28-May-09	18	18	19
					A15110	Reset Gullies	Highways	1A	-	0.0%	26-May-09	29-Jun-09	35	19	20
					A15120	Surface new channel	Highways	1A	-	0.0%	29-Jun-09	03-Jul-09	5	20	20
					A15130	Pavement Works	Highways	1A	-	0.0%	28-May-09	30-Jun-09	34	19	20
					A15140	Street Lighting / Traffic Signals / Road Signs	Highways	1A	128,816.72	69.3%	28-May-09	08-Jun-09	12	19	19
					Snagging	Snagging	Highways	1A	1,858.83	1.0%				19	20
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (19)	Highways	1A	-	0.0%		03-Jul-09		20	21
			Ocean Drive Tram Stop												
				Tramstop					328,092.93	100%	09-Dec-09	27-Jul-10	231	26	35
					17	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	09-Dec-09	28-Jan-10	51	26	27
					17	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	29-Jan-10	23-Mar-10	55	27	29
					Snagging	Snagging	Tramstops	1A	1,938.69	0.6%				29	30
					188	Order REC Supply	Trams Eq	1A	-	0.0%	11-Mar-10	11-Mar-10	1	29	29
					A4358	Access for visual inspection for E&M Tram Stop installation (01A Ocean Drive)	Trams Eq	1A	-	0.0%	08-Apr-10	08-Apr-10	1	30	30
					A1800	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	23-Apr-10	10-May-10	18	30	31
					Snagging	Snagging	Tramstops	1A	646.23	0.2%				31	32
					A4359	Access for E&M Tram Stop installation (01A Ocean Drive)	Trams Eq	1A	-	0.0%	10-May-10	10-May-10	1	31	31
					A4360	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	10-May-10	15-Jun-10	37	31	32
					A4370	Install Telecon Equipment	Trams Eq	1A	-	0.0%	15-Jun-10	13-Jul-10	29	32	33
					A4380	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	15-Jun-10	20-Jul-10	36	32	34
					A4390	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	20-Jul-10	27-Jul-10	8	34	34
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%				34	35
			01A5 Constitution Street (inc.) to Foot of the Walk (exc.)						2,178,443.97		05-Feb-2010	09-Nov-2010	278	28	39
			Constitution Street Tram Stop												
				Tramstop					328,092.93	100%	15-Jun-10	09-Nov-10	148	32	39
					20	Civil Engineering And Building Works	Tramstops	1A	95,965.13	29.2%	15-Jun-10	25-Jul-10	41	32	34
					20	Civil Engineering And Building Works	Tramstops	1A	95,965.13	29.2%	26-Jul-10	14-Sep-10	52	34	36
					Snagging	Snagging	Tramstops	1A	1,938.69	0.6%				36	37
					198	Order REC Supply	Trams Eq	1A	-	0.0%	29-Jun-10	29-Jun-10	1	33	33
					A4398	Access for visual inspection for E&M Tram Stop installation (01A Constitution Street)	Trams Eq	1A	-	0.0%	26-Jul-10	26-Jul-10	1	34	34
					A1850	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	11-Aug-10	24-Aug-10	14	34	35
					Snagging	Snagging	Tramstops	1A	646.23	0.2%				35	36
					A4399	Access for E&M Tram Stop installation (01A Constitution Street)	Trams Eq	1A	-	0.0%	25-Aug-10	25-Aug-10	1	35	35
					A4400	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	25-Aug-10	28-Sep-10	35	35	36
					A4410	Install Telecon Equipment	Trams Eq	1A	-	0.0%	29-Sep-10	26-Oct-10	28	36	37
					A4420	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	29-Sep-10	02-Nov-10	35	36	37
					A4430	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	03-Nov-10	09-Nov-10	7	37	38
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%				38	39
			Baltic to Queen Charlotte Ch 2110 - 2340												
				Trackwork					500,537.84	100%	11-Jun-10	15-Sep-10	97	32	36
					A14870	Establish Traffic Management & Temp. Fencing	Track	1A	23,873.14	4.8%	11-Jun-10	14-Jun-10	4	32	32
					A14880	Excavate box	Track	1A	-	0.0%	15-Jun-10	28-Jun-10	14	32	33
					A14890	Excavate, lay and concrete ducts	Track	1A	-	0.0%	29-Jun-10	16-Jul-10	18	33	33
					A14900	Excavate and construct OLE bases	Track - BB	1A	18,069.70	3.6%	29-Jun-10	16-Jul-10	18	33	33
					A14910	Set Track (230m) - 50%	Track	1A	119,365.69	23.8%	01-Jul-10	21-Jul-10	21	33	34
					A14910	Set Track (230m) - 50%	Track	1A	119,365.69	23.8%	01-Jul-10	21-Jul-10	21	33	34
					A14920	Place upper concrete and cure	Track	1A	190,985.10	38.2%	06-Jul-10	26-Jul-10	21	33	34
					A14930	Street Surface finishes	Track	1A	-	0.0%	27-Jul-10	04-Aug-10	9	34	34
					A14940	Remove fencing and Traffic Management	Track	1A	23,873.14	4.8%	15-Sep-10	15-Sep-10	1	36	36
					Snagging	Snagging	Track	1A	5,005.38	1.0%				36	36
			Queen Charlotte to Foot/Walk Ch 2340 - 2730												
				Trackwork					848,738.07	100%	05-Feb-10	10-Jun-10	126	28	32
					A14630	Establish Traffic Management & Temp. Fencing	Track	1A	40,480.54	4.8%	05-Feb-10	09-Feb-10	5	28	28
					A14640	Excavate box	Track	1A	121,441.62	14.3%	09-Feb-10	03-Mar-10	23	28	29
					A14650	Excavate, lay and concrete ducts	Track	1A	-	0.0%	03-Mar-10	07-Apr-10	36	29	30
					A14660	Excavate and construct OLE bases	Track - BB	1A	30,639.92	3.6%	03-Mar-10	07-Apr-10	36	29	30
					A14680	Set Track (390m) - 50%	Track	1A	161,922.15	19.1%	21-Apr-10	26-May-10	36	30	32
					A14680	Set Track (390m) - 50%	Track	1A	161,922.15	19.1%	21-Apr-10	26-May-10	36	30	32
					A14690	Place upper concrete and cure	Track	1A	283,363.77	33.4%	26-Apr-10	01-Jun-10	37	31	32
					A14700	Street Surface finishes	Track	1A	-	0.0%	02-Jun-10	09-Jun-10	8	32	32
					A14710	Remove fencing and Traffic Management	Track	1A	40,480.54	4.8%	10-Jun-10	10-Jun-10	1	32	32
					Snagging	Snagging	Track	1A	8,487.38	1.0%				32	32
			Baltic to Queen Charlotte Ch 2110 - 2340												
				Roadworks					185,882.71	100%	15-Jun-10	11-Aug-10	58	32	35
					A14950	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	15-Jun-10	28-Jun-10	14	32	33
					A14960	Construct Kerb lines	Highways	1A	73,609.55	39.6%	18-Jun-10	05-Jul-10	18	32	33
					A14970	Reset Gullies	Highways	1A	-	0.0%	02-Jul-10	05-Aug-10	35	33	34
					A14980	Surface new channel	Highways	1A	-	0.0%	06-Aug-10	11-Aug-10	6	34	34
					A14990	Pavement Works	Highways	1A	110,414.33	59.4%	06-Jul-10	06-Aug-10	32	33	34
					A15000	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	06-Jul-10	14-Jul-10	9	33	33
					Snagging	Snagging	Highways	1A	1,858.83	1.0%				34	35
			Queen Charlotte to Foot of the Walk Ch 2340 - 2730												
				Roadworks					315,192.43	100%	09-Feb-10	10-May-10	91	28	32
					A14810	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	31,204.05	9.9%	09-Feb-10	03-Mar-10	23	28	29
					A14820	Construct Kerb lines	Highways	1A	31,204.05	9.9%	12-Feb-10	12-Mar-10	29	28	29
					A14830	Reset Gullies - 50%	Highways	1A	62,408.10	19.8%	26-Feb-10	26-Apr-10	60	28	31
					A14830	Reset Gullies - 50%	Highways	1A	62,408.10	19.8%	26-Feb-10	26-Apr-10	60	28	31
					A14840	Surface new channel	Highways	1A	-	0.0%	26-Apr-10	05-May-10	10	31	31
					A14850	Pavement Works	Highways	1A	124,816.20	39.6%	12-Mar-10	10-May-10	60	29	31
					A14860	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	12-Mar-10	23-Mar-10	12	29	29
					Snagging	Snagging	Highways	1A	3,151.92	1.0%				31	32
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (18)	Highways	1A	-	0.0%		10-May-10			

2010														2010
33	34	35	36	37	38	39								Subtotal
17-Jul-2010	14-Aug-2010	11-Sep-2010	09-Oct-2010	06-Nov-2010	04-Dec-2010	01-Jan-2011								GBP
68,905	696	-	-	-	-	-								69,601
-	-	-	-	-	-	-								-
-	-	-	-	-	-	-								-
-	-	-	-	-	-	-								-

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER

SIFI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					Tramstop				**328,092.93**	**100%**	**27-Jul-09**	**20-Dec-10**	**512**	**21**	**39**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					14	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	27-Jul-09	25-Aug-09	30	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					14	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	26-Aug-09	26-Oct-09	63	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	1,938.69	0.6%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					178	Order REC Supply	Trams Eq	1A	-	0.0%	13-Aug-09	13-Aug-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4318	Access for visual inspection for E&M Tram Stop installation (01A Ocean Terminal)	Trams Eq	1A	-	0.0%	08-Sep-09	08-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1720	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	24-Sep-09	08-Oct-09	15	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	646.23	0.2%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4319	Access for E&M Tram Stop installation (01A Ocean Terminal)	Trams Eq	1A	-	0.0%	08-Oct-09	08-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4320	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	08-Oct-09	12-Nov-09	36	23	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6090	Installation of SIG-interlocking cubicle (2)	Trams Eq	1A	-	0.0%	22-Oct-09	12-Nov-09	22	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6100	Commissioning of SIG -interlocking cubicle	Trams Eq	1A	-	0.0%	14-Dec-10	20-Dec-10	7	39	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4330	Install Telecon Equipment	Trams Eq	1A	-	0.0%	12-Nov-09	11-Dec-09	30	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4340	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	12-Nov-09	18-Dec-09	37	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4350	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	18-Dec-09	08-Jan-10	22	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					01A4 Ocean Drive (inc.) to Constitution Street (exc.)				**1,079,801.02**		**01-May-2009**	**27-Jul-2010**	**453**	**18**	**35**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Casino Square to Baltic Street Ch 1850 - 1880																									
					Trackwork				**65,287.54**	**100%**	**23-Jul-09**	**08-Sep-09**	**48**	**21**	**23**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16110	Establish Traffic Management & Temp. Fencing	Track	1A	3,113.89	4.8%	23-Jul-09	24-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16120	Excavate box	Track	1A	-	0.0%	27-Jul-09	28-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16130	Excavate, lay and concrete ducts	Track	1A	-	0.0%	29-Jul-09	31-Jul-09	3	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16140	Excavate and construct OLE bases	Track - BB	1A	2,356.92	3.6%	29-Jul-09	31-Jul-09	3	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16150	Set Track (30m)	Track	1A	-	0.0%	20-Aug-09	25-Aug-09	6	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16160	Place upper concrete and cure	Track	1A	56,049.98	85.9%	25-Aug-09	28-Aug-09	4	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16170	Street Surface finishes	Track	1A	-	0.0%	31-Aug-09	07-Sep-09	8	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16180	Remove fencing and Traffic Management	Track	1A	3,113.89	4.8%	08-Sep-09	08-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	652.88	1.0%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Casino Square to Baltic Street Ch 1880 - 2110																									
					Trackwork				**500,537.84**	**100%**	**01-May-09**	**22-Jul-09**	**83**	**18**	**22**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15010	Establish Traffic Management & Temp. Fencing	Track	1A	23,873.14	4.8%	01-May-09	06-May-09	6	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15020	Excavate box	Track	1A	71,619.41	14.3%	06-May-09	20-May-09	15	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15030	Excavate, lay and concrete ducts	Track	1A	-	0.0%	20-May-09	10-Jun-09	22	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15040	Excavate and construct OLE bases	Track - BB	1A	18,069.70	3.6%	20-May-09	10-Jun-09	22	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15050	Set Track (230m) - 50%	Track	1A	95,492.55	19.1%	18-Jun-09	08-Jul-09	21	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15050	Set Track (230m) - 50%	Track	1A	95,492.55	19.1%	18-Jun-09	08-Jul-09	21	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15060	Place upper concrete and cure	Track	1A	167,111.97	33.4%	23-Jun-09	13-Jul-09	21	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15070	Street Surface finishes	Track	1A	-	0.0%	14-Jul-09	21-Jul-09	8	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15080	Remove fencing and Traffic Management	Track	1A	23,873.14	4.8%	22-Jul-09	22-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	5,005.38	1.0%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Roadworks				**185,882.71**	**100%**	**06-May-09**	**03-Jul-09**	**59**	**18**	**21**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15090	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	06-May-09	20-May-09	15	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15100	Construct Kerb lines	Highways	1A	55,207.17	29.7%	11-May-09	28-May-09	18	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15110	Reset Gullies	Highways	1A	-	0.0%	26-May-09	29-Jun-09	35	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15120	Surface new channel	Highways	1A	-	0.0%	29-Jun-09	03-Jul-09	5	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15130	Pavement Works	Highways	1A	-	0.0%	28-May-09	30-Jun-09	34	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15140	Street Lighting / Traffic Signals / Road Signs	Highways	1A	128,816.72	69.3%	28-May-09	08-Jun-09	12	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	1,858.83	1.0%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (19)	Highways	1A	-	0.0%		03-Jul-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Ocean Drive Tram Stop																									
					Tramstop				**328,092.93**	**100%**	**09-Dec-09**	**27-Jul-10**	**231**	**26**	**35**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					17	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	09-Dec-09	28-Jan-10	51	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					17	Civil Engineering and Building Works	Tramstops	1A	95,965.13	29.2%	29-Jan-10	23-Mar-10	55	27	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	1,938.69	0.6%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					188	Order REC Supply	Trams Eq	1A	-	0.0%	11-Mar-10	11-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4358	Access for visual inspection for E&M Tram Stop installation (01A Ocean Drive)	Trams Eq	1A	-	0.0%	08-Apr-10	08-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1800	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	23-Apr-10	10-May-10	18	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	646.23	0.2%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4359	Access for E&M Tram Stop installation (01A Ocean Drive)	Trams Eq	1A	-	0.0%	10-May-10	10-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4360	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	10-May-10	15-Jun-10	37	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4370	Install Telecon Equipment	Trams Eq	1A	-	0.0%	15-Jun-10	13-Jul-10	29	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4380	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	15-Jun-10	20-Jul-10	36	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4390	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	20-Jul-10	27-Jul-10	8	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					01A5 Constitution Street (inc.) to Foot of the Walk (exc.)				**2,178,443.97**		**05-Feb-2010**	**09-Nov-2010**	**278**	**28**	**39**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Constitution Street Tram Stop																									
					Tramstop				**328,092.93**	**100%**	**15-Jun-10**	**09-Nov-10**	**148**	**32**	**39**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					20	Civil Engineering And Building Works	Tramstops	1A	95,965.13	29.2%	15-Jun-10	25-Jul-10	41	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					20	Civil Engineering And Building Works	Tramstops	1A	95,965.13	29.2%	26-Jul-10	14-Sep-10	52	34	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	1,938.69	0.6%				36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					198	Order REC Supply	Trams Eq	1A	-	0.0%	29-Jun-10	29-Jun-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4398	Access for visual inspection for E&M Tram Stop installation (01A Constitution Street)	Trams Eq	1A	-	0.0%	26-Jul-10	26-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1850	Deliver and Install Shelter	Tramstops	1A	63,976.75	19.5%	11-Aug-10	24-Aug-10	14	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1A	646.23	0.2%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4399	Access for E&M Tram Stop installation (01A Constitution Street)	Trams Eq	1A	-	0.0%	25-Aug-10	25-Aug-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4400	Install LV Power Supply and LV Power Equipment	Trams Eq	1A	-	0.0%	25-Aug-10	28-Sep-10	35	35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4410	Install Telecon Equipment	Trams Eq	1A	-	0.0%	29-Sep-10	26-Oct-10	28	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4420	Install Station Control Equipment + AFC Equipment	Trams Eq	1A	-	0.0%	29-Sep-10	02-Nov-10	35	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4430	Package Test Tramstop	Trams Eq	1A	68,904.99	21.0%	03-Nov-10	09-Nov-10	7	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1A	696.01	0.2%				38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Baltic to Queen Charlotte Ch 2110 - 2340																									
					Trackwork				**500,537.84**	**100%**	**11-Jun-10**	**15-Sep-10**	**97**	**32**	**36**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14870	Establish Traffic Management & Temp. Fencing	Track	1A	23,873.14	4.8%	11-Jun-10	14-Jun-10	4	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14880	Excavate box	Track	1A	-	0.0%	15-Jun-10	28-Jun-10	14	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14890	Excavate, lay and concrete ducts	Track	1A	-	0.0%	29-Jun-10	16-Jul-10	18	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14900	Excavate and construct OLE bases	Track - BB	1A	18,069.70	3.6%	29-Jun-10	16-Jul-10	18	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14910	Set Track (230m) - 50%	Track	1A	119,365.69	23.8%	01-Jul-10	21-Jul-10	21	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14910	Set Track (230m) - 50%	Track	1A	119,365.69	23.8%	01-Jul-10	21-Jul-10	21	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14920	Place upper concrete and cure	Track	1A	190,985.10	38.2%	06-Jul-10	26-Jul-10	21	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14930	Street Surface finishes	Track	1A	-	0.0%	27-Jul-10	04-Aug-10	9	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14940	Remove fencing and Traffic Management	Track	1A	23,873.14	4.8%	15-Sep-10	15-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	5,005.38	1.0%				36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Queen Charlotte to Foot/Walk Ch 2340 - 2730																									
					Trackwork				**848,738.07**	**100%**	**05-Feb-10**	**10-Jun-10**	**126**	**28**	**32**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14630	Establish Traffic Management & Temp. Fencing	Track	1A	40,480.54	4.8%	05-Feb-10	09-Feb-10	5	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14640	Excavate box	Track	1A	121,441.62	14.3%	09-Feb-10	03-Mar-10	23	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14650	Excavate, lay and concrete ducts	Track	1A	-	0.0%	03-Mar-10	07-Apr-10	36	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14660	Excavate and construct OLE bases	Track - BB	1A	30,639.92	3.6%	03-Mar-10	07-Apr-10	36	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14680	Set Track (390m) - 50%	Track	1A	161,922.15	19.1%	21-Apr-10	26-May-10	36	30	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14680	Set Track (390m) - 50%	Track	1A	161,922.15	19.1%	21-Apr-10	26-May-10	36	30	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14690	Place upper concrete and cure	Track	1A	283,363.77	33.4%	26-Apr-10	01-Jun-10	37	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14700	Street Surface finishes	Track	1A	-	0.0%	02-Jun-10	09-Jun-10	8	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14710	Remove fencing and Traffic Management	Track	1A	40,480.54	4.8%	10-Jun-10	10-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1A	8,487.38	1.0%				32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Baltic to Queen Charlotte Ch 2110 - 2340																									
					Roadworks				**185,882.71**	**100%**	**15-Jun-10**	**11-Aug-10**	**58**	**32**	**35**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14950	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	-	0.0%	15-Jun-10	28-Jun-10	14	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14960	Construct Kerb lines	Highways	1A	73,609.55	39.6%	18-Jun-10	05-Jul-10	18	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14970	Reset Gullies	Highways	1A	-	0.0%	02-Jul-10	05-Aug-10	35	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14980	Surface new channel	Highways	1A	-	0.0%	06-Aug-10	11-Aug-10	6	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14990	Pavement Works	Highways	1A	110,414.33	59.4%	06-Jul-10	06-Aug-10	32	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15000	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	06-Jul-10	14-Jul-10	9	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	1,858.83	1.0%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Queen Charlotte to Foot of the Walk Ch 2340 - 2730																									
					Roadworks				**315,192.43**	**100%**	**09-Feb-10**	**10-May-10**	**91**	**28**	**32**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14810	Excavate for new channel and kerb line / remove existing kerbs	Highways	1A	31,204.05	9.9%	09-Feb-10	03-Mar-10	23	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14820	Construct Kerb lines	Highways	1A	31,204.05	9.9%	12-Feb-10	12-Mar-10	29	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14830	Reset Gullies - 50%	Highways	1A	62,408.10	19.8%	26-Feb-10	26-Apr-10	60	28	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14830	Reset Gullies - 50%	Highways	1A	62,408.10	19.8%	26-Feb-10	26-Apr-10	60	28	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14840	Surface new channel	Highways	1A	-	0.0%	26-Apr-10	05-May-10	10	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14850	Pavement Works	Highways	1A	124,816.20	39.6%	12-Mar-10	10-May-10	60	29	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14860	Street Lighting / Traffic Signals / Road Signs	Highways	1A	-	0.0%	12-Mar-10	23-Mar-10	12	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1A	3,151.92	1.0%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (18)	Highways	1A	-	0.0%		10-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0018

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Morrison Construction Group | BILFINGER BERGER | SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year 2008 Period 1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
					Crit. Milestone	tie Completion Approval - Newhaven Road to Foot of the Walk (6) (28)	Highways	1A	-	0.0%		10-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Section 1A Foot of the Walk to Newhaven Road (7) (32)	Highways	1A	-	0.0%		10-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-
		01B Foot of the Walk (inc.) to McDonald Road (exc.)							6,707,491.44		15-Jul-2008	31-Aug-2010	778	7	36	-	-	-	-	-	-	-	25,015	149,127	314,863	333,923	6,405	332,018	1,161,351
		01B1 Foot of the Walk (inc.) to McDonald Road (exc.)							1,253,398.89		30-Jun-2010	31-Aug-2010	63	33	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Foot of the Walk to Mcdonald Road																												
		E & M Installations							1,253,398.89	100%	30-Jun-10	31-Aug-10	63	33	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3770	Overhead Catenary Line - One Half	OLE	1B	254,260.82	20.3%	14-Jul-10	16-Aug-10	34	33	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3770	Overhead Catenary Line	OLE	1B	381,391.23	30.4%	14-Jul-10	16-Aug-10	34	33	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	1B	6,420.73	0.5%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3780	Install Electrical Cables	SCC	1B	151,303.21	12.1%	28-Jul-10	13-Aug-10	17	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3790	Install Fibre Optic Cables	SCC	1B	151,303.21	12.1%	28-Jul-10	13-Aug-10	17	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3800	Install Signalling Wayside Equipment	SCC	1B	151,303.21	12.1%	16-Aug-10	31-Aug-10	16	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3765	Installation of poles and building fixings	SCC	1B	151,303.21	12.1%	30-Jun-10	13-Jul-10	14	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3764	Access for E&M wayside installation (01B)	SCC	1B	-	0.0%	30-Jun-10	30-Jun-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3779	Access to cable pits for cable laying (01B)	SCC	1B	-	0.0%	28-Jul-10	28-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3779	Access to cable pits for cable laying (01B)	SCC	1B	-	0.0%	28-Jul-10	28-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3779	Access to cable pits for cable laying (01B)	SCC	1B	-	0.0%	28-Jul-10	28-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	1B	6,113.26	0.5%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01B2 Foot of the Walk (inc.) to Balfour Street (exc.)							2,856,799.16		15-Jul-2008	19-May-2010	674	7	32	-	-	-	-	-	-	-	25,015	149,127	314,863	333,923	6,405	253,845	1,083,178
		Foot of the Walk Tram Stop																												
		Tramstop							302,863.44	100%	06-Aug-08	15-Sep-09	406	8	24	-	-	-	-	-	-	-	-	-	86,599	86,599	1,749	-	174,947
					528	Order REC Supply	Trams Eq	1B	-	0.0%	30-Apr-09	30-Apr-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Construction		Trams Eq	1B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					50	Civil Engineering And Building Works	Tramstops	1B	86,598.68	28.6%	06-Aug-08	20-Sep-08	46	8	10	-	-	-	-	-	-	-	-	86,599	-	-	-	86,599
					50	Civil Engineering And Building Works	Tramstops	1B	86,598.68	28.6%	21-Sep-08	04-Nov-08	46	10	11	-	-	-	-	-	-	-	-	-	86,599	-	-	-	86,599
					Snagging	Snagging	Tramstops	1B	1,749.47	0.6%				11	12	-	-	-	-	-	-	-	-	-	-	1,749	-	-	1,749
					A2560	Deliver and Install Shelter	Tramstops	1B	57,732.45	19.1%	15-Jun-09	29-Jun-09	15	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1B	583.16	0.2%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4470	Package Test Tramstop	Trams Eq	1B	68,904.99	22.8%	08-Sep-09	15-Sep-09	8	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4440	Install LV Power Supply and LV Power Equipment	Trams Eq	1B	-	0.0%	29-Jun-09	04-Aug-09	37	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4450	Install Telecon Equipment	Trams Eq	1B	-	0.0%	04-Aug-09	01-Sep-09	29	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4460	Install Station Control Equipment + AFC Equipment	Trams Eq	1B	-	0.0%	04-Aug-09	08-Sep-09	36	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4439	Access for E&M Tram Stop installation (01B Foot of the Walk)	Trams Eq	1B	-	0.0%	29-Jun-09	29-Jun-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4438	Access for visual inspection for E&M Tram Stop installation (01B Foot of the Walk)	Trams Eq	1B	-	0.0%	28-May-09	28-May-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1B	696.01	0.2%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Leith Walk Substation																												
		Substation							436,755.87	100%	15-Jul-08	19-May-10	674	7	32	-	-	-	-	-	-	-	-	74,081	-	74,081	1,497	-	149,659
					146	Order REC supply from Scottish Power	Subst - S	1B	-	0.0%	15-Jul-08	15-Jul-08	1	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					176	Civil Engineering and Building Works	Subst - BB	1B	74,081.21	17.0%	06-Aug-08	12-Sep-08	38	8	9	-	-	-	-	-	-	-	-	74,081	-	-	-	-	74,081
					176	Completion of envelope	Subst - BB	1B	74,081.21	17.0%	13-Sep-08	04-Nov-08	54	9	11	-	-	-	-	-	-	-	-	-	-	74,081	-	-	74,081
					Snagging	Snagging	Subst - BB	1B	1,496.59	0.3%				11	12	-	-	-	-	-	-	-	-	-	-	-	1,497	-	1,497
					A5530	Power Infeed from Public Net available inc HV cable	Subst - S	1B	-	0.0%	05-Nov-08	05-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5550	Installation of TPS Equipment	Subst - S	1B	-	0.0%	16-Mar-10	28-Apr-10	44	29	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5540	Install LV Power Supply and LV Power Equipment	Subst - S	1B	-	0.0%	02-Mar-10	23-Mar-10	22	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5570	Testing and Commissioning	Subst - S	1B	284,225.90	65.1%	28-Apr-10	19-May-10	22	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5560	Install Telecom and Scada	Subst - S	1B	-	0.0%	07-Apr-10	28-Apr-10	22	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2639	Access for E&M Substation installation (01B Leith Walk)	Subst - S	1B	-	0.0%	05-Nov-08	05-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2638	Access for visual inspection for E&M Substation installation (01B Leith Walk)	Subst - S	1B	-	0.0%	06-Oct-08	06-Oct-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	1B	2,870.97	0.7%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Foot of the Walk Ch 0 - 100																												
		Trackwork							225,893.95	100%	12-Dec-08	30-Mar-09	109	13	18	-	-	-	-	-	-	-	-	-	-	-	-	3,692	3,692
			Phase 1						75,549.81	33.4%	12-Dec-08	06-Feb-09	57	13	16	-	-	-	-	-	-	-	-	-	-	-	-	3,692	3,692
					A12450	Establish Traffic Management & Temp. Fencing	Track	1B	3,692.07	1.6%	12-Dec-08	15-Dec-08	4	13	13	-	-	-	-	-	-	-	-	-	-	-	-	3,692	3,692
					A12460	Excavate box	Track	1B	-	0.0%	16-Dec-08	17-Dec-08	2	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12470	Excavate, lay and concrete ducts	Track	1B	-	0.0%	18-Dec-08	05-Jan-09	19	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12480	Excavate and construct OLE bases	Track - BB	1B	952.90	0.4%	18-Dec-08	05-Jan-09	19	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12500	Set Track (50m)	Track	1B	-	0.0%	21-Jan-09	28-Jan-09	8	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12510	Place upper concrete and cure	Track	1B	66,457.28	29.4%	26-Jan-09	02-Feb-09	8	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12520	Street Surface finishes	Track	1B	-	0.0%	03-Feb-09	05-Feb-09	3	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13510	Remove fencing and Traffic Management	Track	1B	3,692.07	1.6%	06-Feb-09	06-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	755.50	0.3%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2						75,549.81	33.4%	09-Feb-09	04-Mar-09	24	15	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12530	Establish Traffic Management & Temp. Fencing	Track	1B	3,692.07	1.6%	09-Feb-09	10-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12540	Excavate box	Track	1B	-	0.0%	11-Feb-09	12-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12550	Excavate, lay and concrete ducts	Track	1B	-	0.0%	13-Feb-09	17-Feb-09	5	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12560	Excavate and construct OLE bases	Track - BB	1B	952.90	0.4%	13-Feb-09	17-Feb-09	5	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12580	Set Track (50m)	Track	1B	-	0.0%	18-Feb-09	23-Feb-09	6	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12590	Place upper concrete and cure	Track	1B	66,457.28	29.4%	23-Feb-09	26-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12600	Street Surface finishes	Track	1B	-	0.0%	27-Feb-09	03-Mar-09	5	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13500	Remove fencing and Traffic Management	Track	1B	3,692.07	1.6%	04-Mar-09	04-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	755.50	0.3%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3						74,794.32	33.1%	05-Mar-09	30-Mar-09	26	16	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12610	Establish Traffic Management & Temp. Fencing	Track	1B	3,692.07	1.6%	05-Mar-09	06-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12620	Excavate box	Track	1B	-	0.0%	09-Mar-09	10-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12630	Excavate, lay and concrete ducts	Track	1B	-	0.0%	11-Mar-09	13-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12640	Excavate and construct OLE bases	Track - BB	1B	952.90	0.4%	11-Mar-09	13-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12660	Set Track (50m)	Track	1B	-	0.0%	16-Mar-09	19-Mar-09	4	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12670	Place upper concrete and cure	Track	1B	66,457.28	29.4%	19-Mar-09	24-Mar-09	6	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12680	Street Surface finishes	Track	1B	-	0.0%	25-Mar-09	27-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13490	Remove fencing and Traffic Management	Track	1B	3,692.07	1.6%	30-Mar-09	30-Mar-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	-	0.0%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Leith Walk Ch 100 - 350																												
		Trackwork							566,623.61	100%	31-Mar-09	26-Jun-09	88	17	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1st half						300,766.53	53.1%	31-Mar-09	14-May-09	45	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12690	Establish Traffic Management & Temp. Fencing	Track	1B	13,845.27	2.4%	31-Mar-09	01-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12700	Excavate box	Track	1B	-	0.0%	02-Apr-09	08-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12710	Excavate, lay and concrete ducts	Track	1B	-	0.0%	09-Apr-09	21-Apr-09	13	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12720	Excavate and construct OLE bases	Track - BB	1B	7,146.73	1.3%	09-Apr-09	21-Apr-09	13	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12740	Set Track (250m)	Track	1B	124,607.39	22.0%	22-Apr-09	06-May-09	15	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12750	Place upper concrete and cure	Track	1B	124,607.39	22.0%	27-Apr-09	11-May-09	15	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12760	Street Surface finishes	Track	1B	27,690.53	4.9%	12-May-09	14-May-09	3	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	2,869.21	0.5%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2nd half						265,857.08	46.9%	15-May-09	26-Jun-09	43	18	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13090	Excavate box	Track	1B	-	0.0%	15-May-09	21-May-09	7	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13100	Excavate, lay and concrete ducts	Track	1B	-	0.0%	22-May-09	03-Jun-09	13	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13130	Set Track	Track	1B	124,607.39	22.0%	04-Jun-09	17-Jun-09	14	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13140	Place upper concrete and cure	Track	1B	124,607.39	22.0%	09-Jun-09	22-Jun-09	14	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13150	Street Surface finishes	Track	1B	-	0.0%	23-Jun-09	25-Jun-09	3	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13160	Remove fencing and Traffic Management	Track	1B	13,845.27	2.4%	26-Jun-09	26-Jun-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	2,797.02	0.5%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Leith Walk Ch 350 - 600																												
		Trackwork							566,623.61	100%	31-Mar-09	26-Jun-09	88	17	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1st half						300,766.53	53.1%	31-Mar-09	14-May-09	45	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12690	Establish Traffic Management & Temp. Fencing	Track	1B	13,845.27	2.4%	31-Mar-09	01-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12700	Excavate box	Track	1B	-	0.0%	02-Apr-09	08-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12710	Excavate, lay and concrete ducts	Track	1B	-	0.0%	09-Apr-09	21-Apr-09	13	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12720	Excavate and construct OLE bases	Track - BB	1B	7,146.73	1.3%	09-Apr-09	21-Apr-09	13	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12740	Set Track (250m)	Track	1B	124,607.39	22.0%	22-Apr-09	06-May-09	15	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12750	Place upper concrete and cure	Track	1B	124,607.39	22.0%	27-Apr-09	11-May-09	15	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12760	Street Surface finishes	Track	1B	27,690.53	4.9%	12-May-09	14-May-09	3	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	2,869.21	0.5%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2nd half						265,857.08	46.9%	15-May-09	26-Jun-09	43	18	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13090	Excavate box	Track	1B	-	0.0%	15-May-09	21-May-09	7	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13100	Excavate, lay and concrete ducts	Track	1B	-	0.0%	22-May-09	03-Jun-09	13	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13130	Set Track	Track	1B	124,607.39	22.0%	04-Jun-09	17-Jun-09	14	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13140	Place upper concrete and cure	Track	1B	124,607.39	22.0%	09-Jun-09	22-Jun-09	14	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13150	Street Surface finishes	Track	1B	-	0.0%	23-Jun-09	25-Jun-09	3	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13160	Remove fencing and Traffic Management	Track	1B	13,845.27	2.4%	26-Jun-09	26-Jun-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	2,797.02	0.5%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Foot of the Walk Ch 0 - 100																												
		Roadworks							126,139.78	100%	01-Aug-08	15-Sep-08	46	8	11	-	-	-	-	-	-	-	-	25,015	75,046	25,015	1,263	-	-	126,240
					A12370	Establish Traffic Management & Temp. Fencing	Highways	1B	25,015.28	19.8%	01-Aug-08	05-Aug-08	5	8	8	-	-	-	-	-	-	-	-	25,015	-	-	-	-	-	-	25,015
					A12380	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	06-Aug-08	19-Aug-08	14	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12390	Construct Kerb lines	Highways	1B	-	0.0%	11-Aug-08	27-Aug-08	17	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0019

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year														
Period														
Period End														

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Extract 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					Crit. Milestone	tie Completion Approval - Newhaven Road to Foot of the Walk (6) (28)	Highways	1A	-	0.0%		10-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Section 1A Foot of the Walk to Newhaven Road (7) (32)	Highways	1A	-	0.0%		10-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					01B Foot of the Walk (inc.) to McDonald Road (exc.)				6,707,491.44		15-Jul-2008	31-Aug-2010	778	7	36	4,111	438,308	235,054	47,695	835,233	258,743	334,638	6,177	-	82,750	132,450	238,897	2,869	2,616,925
					01B1 Foot of the Walk (inc.) to McDonald Road (exc.)				1,253,398.89		30-Jun-2010	31-Aug-2010	63	33	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Foot of the Walk to McDonald Road																									
					E & M Installations				1,253,398.89	100%	30-Jun-10	31-Aug-10	63	33	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3770	Overhead Catenary Line - One Half	OLE	1B	254,260.82	20.3%	14-Jul-10	16-Aug-10	34	33	35	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3770	Overhead Catenary Line	OLE	1B	381,391.23	30.4%	14-Jul-10	16-Aug-10	34	33	35	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	1B	6,420.73	0.5%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3780	Install Electrical Cables	SCC	1B	151,303.21	12.1%	28-Jul-10	13-Aug-10	17	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3790	Install Fibre Optic Cables	SCC	1B	151,303.21	12.1%	28-Jul-10	13-Aug-10	17	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3800	Install Signalling Wayside Equipment	SCC	1B	151,303.21	12.1%	16-Aug-10	31-Aug-10	16	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3765	Installation of poles and building fixings	SCC	1B	151,303.21	12.1%	30-Jun-10	13-Jul-10	14	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3764	Access for E&M wayside installation (01B)	SCC	1B	-	0.0%	30-Jun-10	30-Jun-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3779	Access to cable pits for cable laying (01B)	SCC	1B	-	0.0%	28-Jul-10	28-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3779	Access to cable pits for cable laying (01B)	SCC	1B	-	0.0%	28-Jul-10	28-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3779	Access to cable pits for cable laying (01B)	SCC	1B	-	0.0%	28-Jul-10	28-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	1B	6,113.26	0.5%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					01B2 Foot of the Walk (inc.) to Balfour Street (exc.)				2,856,799.16		15-Jul-2008	19-May-2010	674	7	32	4,111	141,252	75,550	46,432	553,811	254,953	334,638	6,177	-	68,905	696	-	-	1,486,524
					Foot of the Walk Tram Stop																									
					Tramstop				302,863.44	100%	06-Aug-08	15-Sep-09	406	8	24	-	-	-	-	-	-	57,732	583	-	68,905	696	-	-	127,917
					528	Order REC Supply	Trams Eq	1B	-	0.0%	30-Apr-09	30-Apr-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Construction		Trams Eq	1B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					50	Civil Engineering And Building Works	Tramstops	1B	86,598.68	28.6%	06-Aug-08	20-Sep-08	46	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					50	Civil Engineering And Building Works	Tramstops	1B	86,598.68	28.6%	21-Sep-08	04-Nov-08	46	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1B	1,749.47	0.6%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2560	Deliver and Install Shelter	Tramstops	1B	57,732.45	19.1%	15-Jun-09	29-Jun-09	15	19	20	-	-	-	-	-	-	57,732	-	-	-	-	-	-	57,732
					Snagging	Snagging	Tramstops	1B	583.16	0.2%				20	21	-	-	-	-	-	-	-	583	-	-	-	-	-	-	583
					A4470	Package Test Tramstop	Trams Eq	1B	68,904.99	22.8%	08-Sep-09	15-Sep-09	8	22	23	-	-	-	-	-	-	-	-	-	68,905	-	-	-	-	68,905
					A4440	Install LV Power Supply and LV Power Equipment	Trams Eq	1B	-	0.0%	29-Jun-09	04-Aug-09	37	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4450	Install Telecon Equipment	Trams Eq	1B	-	0.0%	04-Aug-09	01-Sep-09	29	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4460	Install Station Control Equipment + AFC Equipment	Trams Eq	1B	-	0.0%	04-Aug-09	08-Sep-09	36	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4439	Access for E&M Tram Stop installation (01B Foot of the Walk)	Trams Eq	1B	-	0.0%	29-Jun-09	29-Jun-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4438	Access for visual inspection for E&M Tram Stop installation (01B Foot of the Walk)	Trams Eq	1B	-	0.0%	28-May-09	28-May-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1B	696.01	0.2%				23	24	-	-	-	-	-	-	-	-	-	-	696	-	-	696
					Leith Walk Substation																									
					Substation				436,755.87	100%	15-Jul-08	19-May-10	674	7	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					146	Order REC supply from Scottish Power	Subst - S	1B	-	0.0%	15-Jul-08	15-Jul-08	1	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					176	Civil Engineering and Building Works	Subst - BB	1B	74,081.21	17.0%	06-Aug-08	12-Sep-08	38	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					176	Completion of envelope	Subst - BB	1B	74,081.21	17.0%	13-Sep-08	04-Nov-08	54	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	1B	1,496.59	0.3%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5530	Power Infeed from Public Net available inc HV cable	Subst - S	1B	-	0.0%	05-Nov-08	05-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5550	Installation of TPS Equipment	Subst - S	1B	-	0.0%	16-Mar-10	28-Apr-10	44	29	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5540	Install LV Power Supply and LV Power Equipment	Subst - S	1B	-	0.0%	02-Mar-10	23-Mar-10	22	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5570	Testing and Commissioning	Subst - S	1B	284,225.90	65.1%	28-Apr-10	19-May-10	22	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5560	Install Telecom and Scada	Subst - S	1B	-	0.0%	07-Apr-10	28-Apr-10	22	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2639	Access for E&M Substation installation (01B Leith Walk)	Subst - S	1B	-	0.0%	05-Nov-08	05-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2638	Access for visual inspection for E&M Substation installation (01B Leith Walk)	Subst - S	1B	-	0.0%	06-Oct-08	06-Oct-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	1B	2,870.97	0.7%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Foot of the Walk Ch 0 - 100																									
					Trackwork				225,893.95	100%	12-Dec-08	30-Mar-09	109	13	18	953	141,252	75,550	4,448	-	-	-	-	-	-	-	-	-	222,202
					Phase 1				75,549.81	33.4%	12-Dec-08	06-Feb-09	57	13	16	953	70,149	755	-	-	-	-	-	-	-	-	-	-	71,858
					A12450	Establish Traffic Management & Temp. Fencing	Track	1B	3,692.07	1.6%	12-Dec-08	15-Dec-08	4	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12460	Excavate box	Track	1B	-	0.0%	16-Dec-08	17-Dec-08	2	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12470	Excavate, lay and concrete ducts	Track	1B	-	0.0%	18-Dec-08	05-Jan-09	19	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12480	Excavate and construct OLE bases	Track - BB	1B	952.90	0.4%	18-Dec-08	05-Jan-09	19	13	14	953	-	-	-	-	-	-	-	-	-	-	-	-	-	953
					A12500	Set Track (50m)	Track	1B	-	0.0%	21-Jan-09	28-Jan-09	8	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12510	Place upper concrete and cure	Track	1B	66,457.28	29.4%	26-Jan-09	02-Feb-09	8	14	15	-	66,457	-	-	-	-	-	-	-	-	-	-	-	-	66,457
					A12520	Street Surface finishes	Track	1B	-	0.0%	03-Feb-09	05-Feb-09	3	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13510	Remove fencing and Traffic Management	Track	1B	3,692.07	1.6%	06-Feb-09	06-Feb-09	1	15	15	-	3,692	-	-	-	-	-	-	-	-	-	-	-	-	3,692
					Snagging	Snagging	Track	1B	755.50	0.3%				15	16	-	-	755	-	-	-	-	-	-	-	-	-	-	-	755
					Phase 2				75,549.81	33.4%	09-Feb-09	04-Mar-09	24	15	17	-	71,102	3,692	755	-	-	-	-	-	-	-	-	-	75,550
					A12530	Establish Traffic Management & Temp. Fencing	Track	1B	3,692.07	1.6%	09-Feb-09	10-Feb-09	2	15	15	-	3,692	-	-	-	-	-	-	-	-	-	-	-	-	3,692
					A12540	Excavate box	Track	1B	-	0.0%	11-Feb-09	12-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12550	Excavate, lay and concrete ducts	Track	1B	-	0.0%	13-Feb-09	17-Feb-09	5	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12560	Excavate and construct OLE bases	Track - BB	1B	952.90	0.4%	13-Feb-09	17-Feb-09	5	15	15	-	953	-	-	-	-	-	-	-	-	-	-	-	-	953
					A12580	Set Track (50m)	Track	1B	-	0.0%	18-Feb-09	23-Feb-09	6	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12590	Place upper concrete and cure	Track	1B	66,457.28	29.4%	23-Feb-09	26-Feb-09	4	15	15	-	66,457	-	-	-	-	-	-	-	-	-	-	-	-	66,457
					A12600	Street Surface finishes	Track	1B	-	0.0%	27-Feb-09	03-Mar-09	5	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13500	Remove fencing and Traffic Management	Track	1B	3,692.07	1.6%	04-Mar-09	04-Mar-09	1	16	16	-	-	3,692	-	-	-	-	-	-	-	-	-	-	-	3,692
					Snagging	Snagging	Track	1B	755.50	0.3%				16	17	-	-	-	755	-	-	-	-	-	-	-	-	-	-	755
					Phase 3				74,794.32	33.1%	05-Mar-09	30-Mar-09	26	16	18	-	-	71,102	3,692	-	-	-	-	-	-	-	-	-	74,794
					A12610	Establish Traffic Management & Temp. Fencing	Track	1B	3,692.07	1.6%	05-Mar-09	06-Mar-09	2	16	16	-	-	3,692	-	-	-	-	-	-	-	-	-	-	-	3,692
					A12620	Excavate box	Track	1B	-	0.0%	09-Mar-09	10-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12630	Excavate, lay and concrete ducts	Track	1B	-	0.0%	11-Mar-09	13-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12640	Excavate and construct OLE bases	Track - BB	1B	952.90	0.4%	11-Mar-09	13-Mar-09	3	16	16	-	-	953	-	-	-	-	-	-	-	-	-	-	-	953
					A12660	Set Track (50m)	Track	1B	-	0.0%	16-Mar-09	19-Mar-09	4	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12670	Place upper concrete and cure	Track	1B	66,457.28	29.4%	19-Mar-09	24-Mar-09	6	16	16	-	-	66,457	-	-	-	-	-	-	-	-	-	-	-	66,457
					A12680	Street Surface finishes	Track	1B	-	0.0%	25-Mar-09	27-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13490	Remove fencing and Traffic Management	Track	1B	3,692.07	1.6%	30-Mar-09	30-Mar-09	1	17	17	-	-	-	3,692	-	-	-	-	-	-	-	-	-	-	3,692
					Snagging	Snagging	Track	1B	-	0.0%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Leith Walk Ch 100 - 350																									
					Trackwork				566,623.61	100%	31-Mar-09	26-Jun-09	88	17	21	-	-	-	20,992	276,905	127,477	138,453	2,797	-	-	-	-	-	-	566,624
					1st half				300,766.53	53.1%	31-Mar-09	14-May-09	45	17	19	-	-	-	20,992	276,905	2,869	-	-	-	-	-	-	-	-	300,767
					A12690	Establish Traffic Management & Temp. Fencing	Track	1B	13,845.27	2.4%	31-Mar-09	01-Apr-09	2	17	17	-	-	-	13,845	-	-	-	-	-	-	-	-	-	-	13,845
					A12700	Excavate box	Track	1B	-	0.0%	02-Apr-09	08-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12710	Excavate, lay and concrete ducts	Track	1B	-	0.0%	09-Apr-09	21-Apr-09	13	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12720	Excavate and construct OLE bases	Track - BB	1B	7,146.73	1.3%	09-Apr-09	21-Apr-09	13	17	17	-	-	-	7,147	-	-	-	-	-	-	-	-	-	-	7,147
					A12740	Set Track (250m)	Track	1B	124,607.39	22.0%	22-Apr-09	06-May-09	15	17	18	-	-	-	-	124,607	-	-	-	-	-	-	-	-	-	124,607
					A12750	Place upper concrete and cure	Track	1B	124,607.39	22.0%	27-Apr-09	11-May-09	15	18	18	-	-	-	-	124,607	-	-	-	-	-	-	-	-	-	124,607
					A12760	Street Surface finishes	Track	1B	27,690.53	4.9%	12-May-09	14-May-09	3	18	18	-	-	-	-	27,691	-	-	-	-	-	-	-	-	-	27,691
					Snagging	Snagging	Track	1B	2,869.21	0.5%				18	19	-	-	-	-	-	2,869	-	-	-	-	-	-	-	-	2,869
					2nd half				265,857.08	46.9%	15-May-09	26-Jun-09	43	18	21	-	-	-	-	-	124,607	138,453	2,797	-	-	-	-	-	-	265,857
					A13090	Excavate box	Track	1B	-	0.0%	15-May-09	21-May-09	7	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13100	Excavate, lay and concrete ducts	Track	1B	-	0.0%	22-May-09	03-Jun-09	13	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13130	Set Track	Track	1B	124,607.39	22.0%	04-Jun-09	17-Jun-09	14	19	19	-	-	-	-	-	124,607	-	-	-	-	-	-	-	-	124,607
					A13140	Place upper concrete and cure	Track	1B	124,607.39	22.0%	09-Jun-09	22-Jun-09	14	19	20	-	-	-	-	-	-	124,607	-	-	-	-	-	-	-	124,607
					A13150	Street Surface finishes	Track	1B	-	0.0%	23-Jun-09	25-Jun-09	3	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13160	Remove fencing and Traffic Management	Track	1B	13,845.27	2.4%	26-Jun-09	26-Jun-09	1	20	20	-	-	-	-	-	-	13,845	-	-	-	-	-	-	-	13,845
					Snagging	Snagging	Track	1B	2,797.02	0.5%				20	21	-	-	-	-	-	-	-	2,797	-	-	-	-	-	-	2,797
					Leith Walk Ch 350 - 600																									
					Trackwork				566,623.61	100%	31-Mar-09	26-Jun-09	88	17	21	-	-	-	20,992	276,905	127,477	138,453	2,797	-	-	-	-	-	-	566,624
					1st half				300,766.53	53.1%	31-Mar-09	14-May-09	45	17	19	-	-	-	20,992	276,905	2,869	-	-	-	-	-	-	-	-	300,767
					A12690	Establish Traffic Management & Temp. Fencing	Track	1B	13,845.27	2.4%	31-Mar-09	01-Apr-09	2	17	17	-	-	-	13,845	-	-	-	-	-	-	-	-	-	-	13,845
					A12700	Excavate box	Track	1B	-	0.0%	02-Apr-09	08-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12710	Excavate, lay and concrete ducts	Track	1B	-	0.0%	09-Apr-09	21-Apr-09	13	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12720	Excavate and construct OLE bases	Track - BB	1B	7,146.73	1.3%	09-Apr-09	21-Apr-09	13	17	17	-	-	-	7,147	-	-	-	-	-	-	-	-	-	-	7,147
					A12740	Set Track (250m)	Track	1B	124,607.39	22.0%	22-Apr-09	06-May-09	15	17	18	-	-	-	-	124,607	-	-	-	-	-	-	-	-	-	124,607
					A12750	Place upper concrete and cure	Track	1B	124,607.39	22.0%	27-Apr-09	11-May-09	15	18	18	-	-	-	-	124,607	-	-	-	-	-	-	-	-	-	124,607
					A12760	Street Surface finishes	Track	1B	27,690.53	4.9%	12-May-09	14-May-09	3	18	18	-	-	-	-	27,691	-	-	-	-	-	-	-	-	-	27,691
					Snagging	Snagging	Track	1B	2,869.21	0.5%				18	19	-	-	-	-	-	2,869	-	-	-	-	-	-	-	-	2,869
					2nd half				265,857.08	46.9%	15-May-09	26-Jun-09	43	18	21	-	-	-	-	-	124,607	138,453	2,797	-	-	-	-	-	-	265,857
					A13090	Excavate box	Track	1B	-	0.0%	15-May-09	21-May-09	7	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13100	Excavate, lay and concrete ducts	Track	1B	-	0.0%	22-May-09	03-Jun-09	13	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13130	Set Track	Track	1B	124,607.39	22.0%	04-Jun-09	17-Jun-09	14	19	19	-	-	-	-	-	124,607	-	-	-	-	-	-	-	-	124,607
					A13140	Place upper concrete and cure	Track	1B	124,607.39	22.0%	09-Jun-09	22-Jun-09	14	19	20	-	-	-	-	-	-	124,607	-	-	-	-	-	-	-	124,607
					A13150	Street Surface finishes	Track	1B	-	0.0%	23-Jun-09	25-Jun-09	3	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13160	Remove fencing and Traffic Management	Track	1B	13,845.27	2.4%	26-Jun-09	26-Jun-09	1	20	20	-	-	-	-	-	-	13,845	-	-	-	-	-	-	-	13,845
					Snagging	Snagging	Track	1B	2,797.02	0.5%				20	21	-	-	-	-	-	-	-	2,797	-	-	-	-	-	-	2,797
					Foot of the Walk Ch 0 - 100																									
					Roadworks				126,339.78	100%	01-Aug-08	15-Sep-08	46	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12370	Establish Traffic Management & Temp. Fencing	Highways	1B	25,015.28	19.8%	01-Aug-08	05-Aug-08	5	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12380	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	06-Aug-08	19-Aug-08	14	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12390	Construct Kerb lines	Highways	1B	-	0.0%	11-Aug-08	27-Aug-08	17	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0020

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group — BILFINGER BERGER

SIEI

Year														
Period														
Period End														

L1	L2	L3	L4	L5	Activity ID	Activity Name		Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					Crit. Milestone	tie Completion Approval - Newhaven Road to Foot of the Walk (6) (28)	Highways	1A	-	0.0%		10-May-10																
					Crit. Milestone	Commission Section 1A Foot of the Walk to Newhaven Road (7) (32)	Highways	1A	-	0.0%		10-May-10																
					01B Foot of the Walk (inc.) to McDonald Road (exc.)				6,707,491.44		15-Jul-2008	31-Aug-2010	778	7	36	86,599	1,749	321,300	221,135	308,109	162,095	402,966	622,418	796,425	6,421	-	-	-	2,929,215
					01B1 Foot of the Walk (inc.) to McDonald Road (exc.)				1,253,398.89		30-Jun-2010	31-Aug-2010	63	33	36	-	-	-	-	-	-	151,303	302,606	793,069	6,421	-	-	-	1,253,399
					Foot of the Walk to McDonald Road																								
					E & M Installations				1,253,398.89	100%	30-Jun-10	31-Aug-10	63	33	36	-	-	-	-	-	-	151,303	302,606	793,069	6,421	-	-	-	1,253,399
					A3770	Overhead Catenary Line - One Half	OLE	1B	254,260.82	20.3%	14-Jul-10	16-Aug-10	34	33	35	-	-	-	-	-	-	-	-	254,261	-	-	-	-	254,261
					A3770	Overhead Catenary Line	OLE	1B	381,391.23	30.4%	14-Jul-10	16-Aug-10	34	33	35	-	-	-	-	-	-	-	-	381,391	-	-	-	-	381,391
					Snagging	Snagging	OLE	1B	6,420.73	0.5%				35	36	-	-	-	-	-	-	-	-	-	6,421	-	-	-	6,421
					A3780	Install Electrical Cables	SCC	1B	151,303.21	12.1%	28-Jul-10	13-Aug-10	17	34	34	-	-	-	-	-	-	-	151,303	-	-	-	-	-	151,303
					A3790	Install Fibre Optic Cables	SCC	1B	151,303.21	12.1%	28-Jul-10	13-Aug-10	17	34	34	-	-	-	-	-	-	-	151,303	-	-	-	-	-	151,303
					A3800	Install Signalling Wayside Equipment	SCC	1B	151,303.21	12.1%	16-Aug-10	31-Aug-10	16	35	35	-	-	-	-	-	-	-	-	151,303	-	-	-	-	151,303
					A3765	Installation of poles and building fixings	SCC	1B	151,303.21	12.1%	30-Jun-10	13-Jul-10	14	33	33	-	-	-	-	-	-	151,303	-	-	-	-	-	-	-	151,303
					A3764	Access for E&M wayside installation (01B)	SCC	1B	-	0.0%	30-Jun-10	30-Jun-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3779	Access to cable pits for cable laying (01B)	SCC	1B	-	0.0%	28-Jul-10	28-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3779	Access to cable pits for cable laying (01B)	SCC	1B	-	0.0%	28-Jul-10	28-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3779	Access to cable pits for cable laying (01B)	SCC	1B	-	0.0%	28-Jul-10	28-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	1B	6,113.26	0.5%				34	35	-	-	-	-	-	-	-	-	6,113	-	-	-	-	6,113
					01B2 Foot of the Walk (inc.) to Balfour Street (exc.)				2,856,799.16		15-Jul-2008	19-May-2010	674	7	32	-	-	-	-	284,226	2,871	-	-	-	-	-	-	-	287,097
					Foot of the Walk Tram Stop																								
					Tramstop				302,863.44	100%	06-Aug-08	15-Sep-09	406	8	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					S28	Order REC Supply	Trams Eq	1B	-	0.0%	30-Apr-09	30-Apr-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Construction		Trams Eq	1B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					50	Civil Engineering And Building Works	Tramstops	1B	86,598.68	28.6%	06-Aug-08	20-Sep-08	46	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					50	Civil Engineering And Building Works	Tramstops	1B	86,598.68	28.6%	21-Sep-08	04-Nov-08	46	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1B	1,749.47	0.6%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2560	Deliver and Install Shelter	Tramstops	1B	57,732.45	19.1%	15-Jun-09	29-Jun-09	15	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1B	583.16	0.2%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4470	Package Test Tramstop	Trams Eq	1B	68,904.99	22.8%	08-Sep-09	15-Sep-09	8	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4440	Install LV Power Supply and LV Power Equipment	Trams Eq	1B	-	0.0%	29-Jun-09	04-Aug-09	37	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4450	Install Telecon Equipment	Trams Eq	1B	-	0.0%	04-Aug-09	01-Sep-09	29	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4460	Install Station Control Equipment + AFC Equipment	Trams Eq	1B	-	0.0%	04-Aug-09	08-Sep-09	36	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4439	Access for E&M Tram Stop installation (01B Foot of the Walk)	Trams Eq	1B	-	0.0%	29-Jun-09	29-Jun-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4438	Access for visual inspection for E&M Tram Stop installation (01B Foot of the Walk)	Trams Eq	1B	-	0.0%	28-May-09	28-May-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1B	696.01	0.2%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Leith Walk Substation																								
					Substation				436,755.87	100%	15-Jul-08	19-May-10	674	7	32	-	-	-	-	284,226	2,871	-	-	-	-	-	-	-	287,097
					146	Order REC supply from Scottish Power	Subst - S	1B	-	0.0%	15-Jul-08	15-Jul-08	1	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					176	Civil Engineering and Building Works	Subst - BB	1B	74,081.21	17.0%	06-Aug-08	12-Sep-08	38	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					176	Completion of envelope	Subst - BB	1B	74,081.21	17.0%	13-Sep-08	04-Nov-08	54	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	1B	1,496.59	0.3%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5530	Power Infeed from Public Net available inc HV cable	Subst - S	1B	-	0.0%	05-Nov-08	05-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5550	Installation of TPS Equipment	Subst - S	1B	-	0.0%	16-Mar-10	28-Apr-10	44	29	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5540	Install LV Power Supply and LV Power Equipment	Subst - S	1B	-	0.0%	02-Mar-10	23-Mar-10	22	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5570	Testing and Commissioning	Subst - S	1B	284,225.90	65.1%	28-Apr-10	19-May-10	22	31	31	-	-	-	-	284,226	-	-	-	-	-	-	-	-	284,226
					A5560	Install Telecom and Scada	Subst - S	1B	-	0.0%	07-Apr-10	28-Apr-10	22	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5639	Access for E&M Substation installation (01B Leith Walk)	Subst - S	1B	-	0.0%	05-Nov-08	05-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2638	Access for visual inspection for E&M Substation installation (01B Leith Walk)	Subst - S	1B	-	0.0%	06-Oct-08	06-Oct-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	1B	2,870.97	0.7%				31	32	-	-	-	-	-	2,871	-	-	-	-	-	-	-	2,871
					Foot of the Walk Ch 0 - 100																								
					Trackwork				225,893.95	100%	12-Dec-08	30-Mar-09	109	13	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1				75,549.81	33.4%	12-Dec-08	06-Feb-09	57	13	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12450	Establish Traffic Management & Temp. Fencing	Track	1B	3,692.07	1.6%	12-Dec-08	15-Dec-08	4	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12460	Excavate box	Track	1B	-	0.0%	16-Dec-08	17-Dec-08	2	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12470	Excavate, lay and concrete ducts	Track	1B	-	0.0%	18-Dec-08	05-Jan-09	19	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12480	Excavate and construct OLE bases	Track - BB	1B	952.90	0.4%	18-Dec-08	05-Jan-09	19	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12500	Set Track (50m)	Track	1B	-	0.0%	21-Jan-09	28-Jan-09	8	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12510	Place upper concrete and cure	Track	1B	66,457.28	29.4%	26-Jan-09	02-Feb-09	8	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12520	Street Surface finishes	Track	1B	-	0.0%	03-Feb-09	05-Feb-09	3	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13510	Remove fencing and Traffic Management	Track	1B	3,692.07	1.6%	06-Feb-09	06-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	755.50	0.3%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2				75,549.81	33.4%	09-Feb-09	04-Mar-09	24	15	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12530	Establish Traffic Management & Temp. Fencing	Track	1B	3,692.07	1.6%	09-Feb-09	10-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12540	Excavate box	Track	1B	-	0.0%	11-Feb-09	12-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12550	Excavate, lay and concrete ducts	Track	1B	-	0.0%	13-Feb-09	17-Feb-09	5	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12560	Excavate and construct OLE bases	Track - BB	1B	952.90	0.4%	13-Feb-09	17-Feb-09	5	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12580	Set Track (50m)	Track	1B	-	0.0%	18-Feb-09	23-Feb-09	6	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12590	Place upper concrete and cure	Track	1B	66,457.28	29.4%	23-Feb-09	26-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12600	Street Surface finishes	Track	1B	-	0.0%	27-Feb-09	03-Mar-09	5	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13500	Remove fencing and Traffic Management	Track	1B	3,692.07	1.6%	04-Mar-09	04-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	755.50	0.3%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3				74,794.32	33.1%	05-Mar-09	30-Mar-09	26	16	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12610	Establish Traffic Management & Temp. Fencing	Track	1B	3,692.07	1.6%	05-Mar-09	06-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12620	Excavate box	Track	1B	-	0.0%	09-Mar-09	10-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12630	Excavate, lay and concrete ducts	Track	1B	-	0.0%	11-Mar-09	13-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12640	Excavate and construct OLE bases	Track - BB	1B	952.90	0.4%	11-Mar-09	13-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12660	Set Track (50m)	Track	1B	-	0.0%	16-Mar-09	19-Mar-09	4	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12670	Place upper concrete and cure	Track	1B	66,457.28	29.4%	19-Mar-09	24-Mar-09	6	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12680	Street Surface finishes	Track	1B	-	0.0%	25-Mar-09	27-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13490	Remove fencing and Traffic Management	Track	1B	3,692.07	1.6%	30-Mar-09	30-Mar-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	-	0.0%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Leith Walk Ch 100 - 350																								
					Trackwork				566,623.61	100%	31-Mar-09	26-Jun-09	88	17	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1st half				300,766.53	53.1%	31-Mar-09	14-May-09	45	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12690	Establish Traffic Management & Temp. Fencing	Track	1B	13,845.27	2.4%	31-Mar-09	01-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12700	Excavate box	Track	1B	-	0.0%	02-Apr-09	08-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12710	Excavate, lay and concrete ducts	Track	1B	-	0.0%	09-Apr-09	21-Apr-09	13	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12720	Excavate and construct OLE bases	Track - BB	1B	7,146.73	1.3%	09-Apr-09	21-Apr-09	13	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12740	Set Track (250m)	Track	1B	124,607.39	22.0%	22-Apr-09	06-May-09	15	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12750	Place upper concrete and cure	Track	1B	124,607.39	22.0%	27-Apr-09	11-May-09	15	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12760	Street Surface finishes	Track	1B	27,690.53	4.9%	12-May-09	14-May-09	3	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	2,869.21	0.5%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					2nd half				265,857.08	46.9%	15-May-09	26-Jun-09	43	18	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13090	Excavate box	Track	1B	-	0.0%	15-May-09	21-May-09	7	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13100	Excavate, lay and concrete ducts	Track	1B	-	0.0%	22-May-09	03-Jun-09	13	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13130	Set Track	Track	1B	124,607.39	22.0%	04-Jun-09	17-Jun-09	14	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13140	Place upper concrete and cure	Track	1B	124,607.39	22.0%	09-Jun-09	22-Jun-09	14	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13150	Street Surface finishes	Track	1B	-	0.0%	23-Jun-09	25-Jun-09	3	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13160	Remove fencing and Traffic Management	Track	1B	13,845.27	2.4%	26-Jun-09	26-Jun-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	2,797.02	0.5%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Leith Walk Ch 350 - 600																								
					Trackwork				566,623.61	100%	31-Mar-09	26-Jun-09	88	17	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1st half				300,766.53	53.1%	31-Mar-09	14-May-09	45	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12690	Establish Traffic Management & Temp. Fencing	Track	1B	13,845.27	2.4%	31-Mar-09	01-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12700	Excavate box	Track	1B	-	0.0%	02-Apr-09	08-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12710	Excavate, lay and concrete ducts	Track	1B	-	0.0%	09-Apr-09	21-Apr-09	13	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12720	Excavate and construct OLE bases	Track - BB	1B	7,146.73	1.3%	09-Apr-09	21-Apr-09	13	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12740	Set Track (250m)	Track	1B	124,607.39	22.0%	22-Apr-09	06-May-09	15	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12750	Place upper concrete and cure	Track	1B	124,607.39	22.0%	27-Apr-09	11-May-09	15	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12760	Street Surface finishes	Track	1B	27,690.53	4.9%	12-May-09	14-May-09	3	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	2,869.21	0.5%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					2nd half				265,857.08	46.9%	15-May-09	26-Jun-09	43	18	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13090	Excavate box	Track	1B	-	0.0%	15-May-09	21-May-09	7	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13100	Excavate, lay and concrete ducts	Track	1B	-	0.0%	22-May-09	03-Jun-09	13	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13130	Set Track	Track	1B	124,607.39	22.0%	04-Jun-09	17-Jun-09	14	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13140	Place upper concrete and cure	Track	1B	124,607.39	22.0%	09-Jun-09	22-Jun-09	14	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13150	Street Surface finishes	Track	1B	-	0.0%	23-Jun-09	25-Jun-09	3	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13160	Remove fencing and Traffic Management	Track	1B	13,845.27	2.4%	26-Jun-09	26-Jun-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	2,797.02	0.5%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Foot of the Walk Ch 0 - 100																								
					Roadworks				126,339.78	100%	01-Aug-08	15-Sep-08	46	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12370	Establish Traffic Management & Temp. Fencing	Highways	1B	25,015.28	19.8%	01-Aug-08	05-Aug-08	5	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12380	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	06-Aug-08	19-Aug-08	14	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12390	Construct Kerb lines	Highways	1B	-	0.0%	11-Aug-08	27-Aug-08	17	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0021

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multiple Services Alliance — BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name		Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					Crit. Milestone	Ile Completion Approval - Newhaven Road to Foot of the Walk (6) (28)	Highways	1A	-	0.0%		10-May-10																
					Crit. Milestone	Commission Section 1A Foot of the Walk to Newhaven Road (7) (32)	Highways	1A	-	0.0%		10-May-10																
					01B Foot of the Walk (inc.) to McDonald Road (exc.)				6,707,491.44		15-Jul-2008	31-Aug-2010	778	7	36														
					01B1 Foot of the Walk (inc.) to McDonald Road (exc.)				1,253,398.89		30-Jun-2010	31-Aug-2010	63	33	36														
					Foot of the Walk to McDonald Road																								
					E & M Installations				1,253,398.89	100%	30-Jun-10	31-Aug-10	63	33	36														
					A3770	Overhead Catenary Line - One Half	OLE	1B	254,260.82	20.3%	14-Jul-10	16-Aug-10	34	33	35														
					A3770	Overhead Catenary Line	OLE	1B	381,391.23	30.4%	14-Jul-10	16-Aug-10	34	33	35														
					Snagging	Snagging	OLE	1B	6,420.73	0.5%				35	36														
					A3780	Install Electrical Cables	SCC	1B	151,303.21	12.1%	28-Jul-10	13-Aug-10	17	34	34														
					A3790	Install Fibre Optic Cables	SCC	1B	151,303.21	12.1%	28-Jul-10	13-Aug-10	17	34	34														
					A3800	Install Signalling Wayside Equipment	SCC	1B	151,303.21	12.1%	16-Aug-10	31-Aug-10	16	35	35														
					A3765	Installation of poles and building fixings	SCC	1B	151,303.21	12.1%	30-Jun-10	13-Jul-10	14	33	33														
					A3764	Access for E&M wayside installation (01B)	SCC	1B	-	0.0%	30-Jun-10	30-Jun-10	1	33	33														
					A3779	Access to cable pits for cable laying (01B)	SCC	1B	-	0.0%	28-Jul-10	28-Jul-10	1	34	34														
					A3779	Access to cable pits for cable laying (01B)	SCC	1B	-	0.0%	28-Jul-10	28-Jul-10	1	34	34														
					A3779	Access to cable pits for cable laying (01B)	SCC	1B	-	0.0%	28-Jul-10	28-Jul-10	1	34	34														
					Snagging	Snagging	SCC	1B	6,113.26	0.5%				34	35														
					01B2 Foot of the Walk (inc.) to Balfour Street (exc.)				2,856,799.16		15-Jul-2008	19-May-2010	674	7	32														
					Foot of the Walk Tram Stop																								
					Tramstop				302,863.44	100%	06-Aug-08	15-Sep-09	406	8	24														
					528	Order REC Supply	Trams Eq	1B	-	0.0%	30-Apr-09	30-Apr-09	1	18	18														
					Construction		Trams Eq	1B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17														
					50	Civil Engineering And Building Works	Tramstops	1B	86,598.68	28.6%	06-Aug-08	20-Sep-08	46	8	10														
					50	Civil Engineering And Building Works	Tramstops	1B	86,598.68	28.6%	21-Sep-08	04-Nov-08	46	10	11														
					Snagging	Snagging	Tramstops	1B	1,749.47	0.6%				11	12														
					A2560	Deliver and Install Shelter	Tramstops	1B	57,732.45	19.1%	15-Jun-09	29-Jun-09	15	19	20														
					Snagging	Snagging	Tramstops	1B	583.16	0.2%				20	21														
					A4470	Package Test Tramstop	Trams Eq	1B	68,904.99	22.8%	08-Sep-09	15-Sep-09	8	22	23														
					A4440	Install LV Power Supply and LV Power Equipment	Trams Eq	1B	-	0.0%	29-Jun-09	04-Aug-09	37	20	21														
					A4450	Install Telecon Equipment	Trams Eq	1B	-	0.0%	04-Aug-09	01-Sep-09	29	21	22														
					A4460	Install Station Control Equipment + AFC Equipment	Trams Eq	1B	-	0.0%	04-Aug-09	08-Sep-09	36	21	22														
					A4439	Access for E&M Tram Stop installation (01B Foot of the Walk)	Trams Eq	1B	-	0.0%	29-Jun-09	29-Jun-09	1	20	20														
					A4438	Access for visual inspection for E&M Tram Stop installation (01B Foot of the Walk)	Trams Eq	1B	-	0.0%	28-May-09	28-May-09	1	19	19														
					Snagging	Snagging	Trams Eq	1B	696.01	0.2%				23	24														
					Leith Walk Substation																								
					Substation				436,755.87	100%	15-Jul-08	19-May-10	674	7	32														
					146	Order REC supply from Scottish Power	Subst - S	1B	-	0.0%	15-Jul-08	15-Jul-08	1	7	7														
					176	Civil Engineering and Building Works	Subst - BB	1B	74,081.21	17.0%	06-Aug-08	12-Sep-08	38	8	9														
					176	Completion of envelope	Subst - BB	1B	74,081.21	17.0%	13-Sep-08	04-Nov-08	54	9	11														
					Snagging	Snagging	Subst - BB	1B	1,496.59	0.3%				11	12														
					A5530	Power Infeed from Public Net available inc HV cable	Subst - S	1B	-	0.0%	05-Nov-08	05-Nov-08	1	11	11														
					A5550	Installation of TPS Equipment	Subst - S	1B	-	0.0%	16-Mar-10	28-Apr-10	44	29	31														
					A5540	Install LV Power Supply and LV Power Equipment	Subst - S	1B	-	0.0%	02-Mar-10	23-Mar-10	22	29	29														
					A5570	Testing and Commissioning	Subst - S	1B	284,225.90	65.1%	28-Apr-10	19-May-10	22	31	31														
					A5560	Install Telecom and Scada	Subst - S	1B	-	0.0%	07-Apr-10	28-Apr-10	22	30	31														
					A2639	Access for E&M Substation installation (01B Leith Walk)	Subst - S	1B	-	0.0%	05-Nov-08	05-Nov-08	1	11	11														
					A2638	Access for visual inspection for E&M Substation installation (01B Leith Walk)	Subst - S	1B	-	0.0%	06-Oct-08	06-Oct-08	1	10	10														
					Snagging	Snagging	Subst - S	1B	2,870.97	0.7%				31	32														
					Foot of the Walk Ch 0 - 100																								
					Trackwork				225,893.95	100%	12-Dec-08	30-Mar-09	109	13	18														
					Phase 1				75,549.81	33.4%	12-Dec-08	06-Feb-09	57	13	16														
					A12450	Establish Traffic Management & Temp. Fencing	Track	1B	3,692.07	1.6%	12-Dec-08	15-Dec-08	4	13	13														
					A12460	Excavate box	Track	1B	-	0.0%	16-Dec-08	17-Dec-08	2	13	13														
					A12470	Excavate, lay and concrete ducts	Track	1B	-	0.0%	18-Dec-08	05-Jan-09	19	13	14														
					A12480	Excavate and construct OLE bases	Track - BB	1B	952.90	0.4%	18-Dec-08	05-Jan-09	19	13	14														
					A12500	Set Track (50m)	Track	1B	-	0.0%	21-Jan-09	28-Jan-09	8	14	14														
					A12510	Place upper concrete and cure	Track	1B	66,457.28	29.4%	26-Jan-09	02-Feb-09	8	14	15														
					A12520	Street Surface finishes	Track	1B	-	0.0%	03-Feb-09	05-Feb-09	3	15	15														
					A13510	Remove fencing and Traffic Management	Track	1B	3,692.07	1.6%	06-Feb-09	06-Feb-09	1	15	15														
					Snagging	Snagging	Track	1B	755.50	0.3%				15	16														
					Phase 2				75,549.81	33.4%	09-Feb-09	04-Mar-09	24	15	17														
					A12530	Establish Traffic Management & Temp. Fencing	Track	1B	3,692.07	1.6%	09-Feb-09	10-Feb-09	2	15	15														
					A12540	Excavate box	Track	1B	-	0.0%	11-Feb-09	12-Feb-09	2	15	15														
					A12550	Excavate, lay and concrete ducts	Track	1B	-	0.0%	13-Feb-09	17-Feb-09	5	15	15														
					A12560	Excavate and construct OLE bases	Track - BB	1B	952.90	0.4%	13-Feb-09	17-Feb-09	5	15	15														
					A12580	Set Track (50m)	Track	1B	-	0.0%	18-Feb-09	23-Feb-09	6	15	15														
					A12590	Place upper concrete and cure	Track	1B	66,457.28	29.4%	23-Feb-09	26-Feb-09	4	15	15														
					A12600	Street Surface finishes	Track	1B	-	0.0%	27-Feb-09	03-Mar-09	5	15	16														
					A13500	Remove fencing and Traffic Management	Track	1B	3,692.07	1.6%	04-Mar-09	04-Mar-09	1	16	16														
					Snagging	Snagging	Track	1B	755.50	0.3%				16	17														
					Phase 3				74,794.32	33.1%	05-Mar-09	30-Mar-09	26	16	18														
					A12610	Establish Traffic Management & Temp. Fencing	Track	1B	3,692.07	1.6%	05-Mar-09	06-Mar-09	2	16	16														
					A12620	Excavate box	Track	1B	-	0.0%	09-Mar-09	10-Mar-09	2	16	16														
					A12630	Excavate, lay and concrete ducts	Track	1B	-	0.0%	11-Mar-09	13-Mar-09	3	16	16														
					A12640	Excavate and construct OLE bases	Track - BB	1B	952.90	0.4%	11-Mar-09	13-Mar-09	3	16	16														
					A12660	Set Track (50m)	Track	1B	-	0.0%	16-Mar-09	19-Mar-09	4	16	16														
					A12670	Place upper concrete and cure	Track	1B	66,457.28	29.4%	19-Mar-09	24-Mar-09	6	16	16														
					A12680	Street Surface finishes	Track	1B	-	0.0%	25-Mar-09	27-Mar-09	3	16	16														
					A13490	Remove fencing and Traffic Management	Track	1B	3,692.07	1.6%	30-Mar-09	30-Mar-09	1	17	17														
					Snagging	Snagging	Track	1B	-	0.0%				17	18														
					Leith Walk Ch 100 - 350																								
					Trackwork				566,623.61	100%	31-Mar-09	26-Jun-09	88	17	21														
					1st half				300,766.53	53.1%	31-Mar-09	14-May-09	45	17	19														
					A12690	Establish Traffic Management & Temp. Fencing	Track	1B	13,845.27	2.4%	31-Mar-09	01-Apr-09	2	17	17														
					A12700	Excavate box	Track	1B	-	0.0%	02-Apr-09	08-Apr-09	7	17	17														
					A12710	Excavate, lay and concrete ducts	Track	1B	-	0.0%	09-Apr-09	21-Apr-09	13	17	17														
					A12720	Excavate and construct OLE bases	Track - BB	1B	7,146.73	1.3%	09-Apr-09	21-Apr-09	13	17	17														
					A12740	Set Track (250m)	Track	1B	124,607.39	22.0%	22-Apr-09	06-May-09	15	17	18														
					A12750	Place upper concrete and cure	Track	1B	124,607.39	22.0%	27-Apr-09	11-May-09	15	18	18														
					A12760	Street Surface finishes	Track	1B	27,690.53	4.9%	12-May-09	14-May-09	3	18	18														
					Snagging	Snagging	Track	1B	2,869.21	0.5%				18	19														
					2nd half				265,857.08	46.9%	15-May-09	26-Jun-09	43	18	21														
					A13090	Excavate box	Track	1B	-	0.0%	15-May-09	21-May-09	7	18	18														
					A13100	Excavate, lay and concrete ducts	Track	1B	-	0.0%	22-May-09	03-Jun-09	13	18	19														
					A13130	Set Track	Track	1B	124,607.39	22.0%	04-Jun-09	17-Jun-09	14	19	19														
					A13140	Place upper concrete and cure	Track	1B	124,607.39	22.0%	09-Jun-09	22-Jun-09	14	19	20														
					A13150	Street Surface finishes	Track	1B	-	0.0%	23-Jun-09	25-Jun-09	3	20	20														
					A13160	Remove fencing and Traffic Management	Track	1B	13,845.27	2.4%	26-Jun-09	26-Jun-09	1	20	20														
					Snagging	Snagging	Track	1B	2,797.02	0.5%				20	21														
					Leith Walk Ch 350 - 600																								
					Trackwork				566,623.61	100%	31-Mar-09	26-Jun-09	88	17	21														
					1st half				300,766.53	53.1%	31-Mar-09	14-May-09	45	17	19														
					A12690	Establish Traffic Management & Temp. Fencing	Track	1B	13,845.27	2.4%	31-Mar-09	01-Apr-09	2	17	17														
					A12700	Excavate box	Track	1B	-	0.0%	02-Apr-09	08-Apr-09	7	17	17														
					A12710	Excavate, lay and concrete ducts	Track	1B	-	0.0%	09-Apr-09	21-Apr-09	13	17	17														
					A12720	Excavate and construct OLE bases	Track - BB	1B	7,146.73	1.3%	09-Apr-09	21-Apr-09	13	17	17														
					A12740	Set Track (250m)	Track	1B	124,607.39	22.0%	22-Apr-09	06-May-09	15	17	18														
					A12750	Place upper concrete and cure	Track	1B	124,607.39	22.0%	27-Apr-09	11-May-09	15	18	18														
					A12760	Street Surface finishes	Track	1B	27,690.53	4.9%	12-May-09	14-May-09	3	18	18														
					Snagging	Snagging	Track	1B	2,869.21	0.5%				18	19														
					2nd half				265,857.08	46.9%	15-May-09	26-Jun-09	43	18	21														
					A13090	Excavate box	Track	1B	-	0.0%	15-May-09	21-May-09	7	18	18														
					A13100	Excavate, lay and concrete ducts	Track	1B	-	0.0%	22-May-09	03-Jun-09	13	18	19														
					A13130	Set Track	Track	1B	124,607.39	22.0%	04-Jun-09	17-Jun-09	14	19	19														
					A13140	Place upper concrete and cure	Track	1B	124,607.39	22.0%	09-Jun-09	22-Jun-09	14	19	20														
					A13150	Street Surface finishes	Track	1B	-	0.0%	23-Jun-09	25-Jun-09	3	20	20														
					A13160	Remove fencing and Traffic Management	Track	1B	13,845.27	2.4%	26-Jun-09	26-Jun-09	1	20	20														
					Snagging	Snagging	Track	1B	2,797.02	0.5%				20	21														
					Foot of the Walk Ch 0 - 100																								
					Roadworks				126,239.78	100%	01-Aug-08	15-Sep-08	46	8	11														
					A12370	Establish Traffic Management & Temp. Fencing	Highways	1B	25,015.28	19.8%	01-Aug-08	05-Aug-08	5	8	8														
					A12380	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	06-Aug-08	19-Aug-08	14	8	9														
					A12390	Construct Kerb lines	Highways	1B	-	0.0%	11-Aug-08	27-Aug-08	17	8	9														

USB00000073_0022

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Morrill Services Group BILFINGER BERGER SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year Period Period End 1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	2008 6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
					A12400	Reset Gullies	Highways	1B	-	0.0%	18-Aug-08	03-Sep-08	17	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12430	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	28-Aug-08	05-Sep-08	9	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12420	Pavement Works	Highways	1B	-	0.0%	28-Aug-08	12-Sep-08	16	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12410	Surface new channel	Highways	1B	-	0.0%	04-Sep-08	11-Sep-08	8	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12410	One Half of All Works	Highways	1B	75,045.83	59.4%	04-Sep-08	11-Sep-08	8	9	9	-	-	-	-	-	-	-	-	75,046	-	-	-	-	75,046
					A12440	Remove fencing and Traffic Management	Highways	1B	25,015.28	19.8%	15-Sep-08	15-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	25,015	-	-	-	25,015
					Snagging	Snagging	Highways	1B	1,263.40	1.0%				10	11	-	-	-	-	-	-	-	-	-	-	1,263	-	-	1,263
			Leith Walk Ch 350 - 100																									
			Roadworks						**315,849.45**		**16-Sep-08**	**28-Oct-08**	**43**	**10**	**12**	-	-	-	-	-	-	-	-	-	**203,249**	**109,442**	**3,158**	-	**315,849**
					A11970	Establish Traffic Management & Temp. Fencing	Highways	1B	109,441.84	34.7%	16-Sep-08	17-Sep-08	2	10	10	-	-	-	-	-	-	-	-	-	109,442	-	-	-	109,442
					A11980	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	18-Sep-08	01-Oct-08	14	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A11990	Construct Kerb lines	Highways	1B	93,807.29	29.7%	23-Sep-08	09-Oct-08	17	10	10	-	-	-	-	-	-	-	-	-	93,807	-	-	-	93,807
					A12000	Reset Gullies	Highways	1B	-	0.0%	30-Sep-08	16-Oct-08	17	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12030	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	10-Oct-08	20-Oct-08	11	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12020	Pavement Works	Highways	1B	-	0.0%	10-Oct-08	27-Oct-08	18	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12010	Surface new channel	Highways	1B	-	0.0%	17-Oct-08	24-Oct-08	8	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12040	Remove fencing and Traffic Management	Highways	1B	109,441.84	34.7%	28-Oct-08	28-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	109,442	-	-	109,442
					Snagging	Snagging	Highways	1B	3,158.49	1.0%				11	12	-	-	-	-	-	-	-	-	-	-	-	3,158	-	3,158
			Leith Walk Ch 350 - 600																									
			Roadworks						**315,849.45**		**29-Oct-08**	**11-Dec-08**	**44**	**11**	**14**	-	-	-	-	-	-	-	-	-	-	**62,538**	-	**250,153**	**312,691**
					A12050	Establish Traffic Management & Temp. Fencing	Highways	1B	62,538.19	19.8%	29-Oct-08	30-Oct-08	2	11	11	-	-	-	-	-	-	-	-	-	-	62,538	-	-	62,538
					A12060	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	31-Oct-08	13-Nov-08	14	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12070	Construct Kerb lines	Highways	1B	-	0.0%	05-Nov-08	21-Nov-08	17	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12080	Reset Gullies	Highways	1B	-	0.0%	12-Nov-08	28-Nov-08	17	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12110	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	24-Nov-08	03-Dec-08	10	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12100	Pavement Works	Highways	1B	187,614.57	59.4%	24-Nov-08	10-Dec-08	17	12	13	-	-	-	-	-	-	-	-	-	-	-	-	187,615	187,615
					A12090	Surface new channel	Highways	1B	-	0.0%	02-Dec-08	09-Dec-08	8	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12120	Remove fencing and Traffic Management	Highways	1B	62,538.19	19.8%	11-Dec-08	11-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	62,538	62,538
					Snagging	Snagging	Highways	1B	3,158.49	1.0%				13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (17)	Highways	1B	-	0.0%		11-Dec-08				-	-	-	-	-	-	-	-	-	-	-	-	-
			01B3 Balfour Street (inc.) to McDonald Road (exc.)						**1,473,221.38**		**27-Nov-2008**	**12-Aug-2010**	**624**	**23**	**35**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Balfour Street Ch 600 - 850																									
			Trackwork						**566,623.61**	**100%**	**24-Sep-09**	**10-Mar-10**	**168**	**23**	**30**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1st half						**300,766.53**	**53.1%**	**24-Sep-09**	**10-Mar-10**	**168**	**23**	**30**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12850	Establish Traffic Management & Temp. Fencing	Track	1B	13,845.27	2.4%	24-Sep-09	25-Sep-09	2	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12860	Excavate box	Track	1B	-	0.0%	28-Sep-09	02-Oct-09	5	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12870	Excavate, lay and concrete ducts	Track	1B	-	0.0%	05-Oct-09	14-Oct-09	10	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12880	Excavate and construct OLE bases	Track - BB	1B	7,146.73	1.3%	05-Oct-09	14-Oct-09	10	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12900	Set Track (250m)	Track	1B	124,607.39	22.0%	23-Oct-09	05-Nov-09	14	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12910	Place upper concrete and cure	Track	1B	124,607.39	22.0%	28-Oct-09	10-Nov-09	14	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12920	Street Surface finishes	Track	1B	27,690.53	4.9%	11-Nov-09	13-Nov-09	3	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	2,869.21	0.5%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					2nd half				**265,857.08**	**46.9%**	**16-Nov-09**	**10-Mar-10**	**115**	**25**	**30**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13250	Excavate box	Track	1B	-	0.0%	16-Nov-09	17-Nov-09	2	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13260	Excavate, lay and concrete ducts	Track	1B	-	0.0%	18-Nov-09	27-Nov-09	10	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13290	Set Track	Track	1B	124,607.39	22.0%	16-Feb-10	01-Mar-10	14	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13300	Place upper concrete and cure	Track	1B	124,607.39	22.0%	19-Feb-10	04-Mar-10	14	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13310	Street Surface finishes	Track	1B	-	0.0%	05-Mar-10	09-Mar-10	5	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13320	Remove fencing and Traffic Management	Track	1B	13,845.27	2.4%	10-Mar-10	10-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	2,797.02	0.5%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Pilrig / Iona Street Ch 850 - 950																									
			Trackwork						**226,649.44**																			
			1st half						**120,306.61**		**27-Nov-08**	**21-Jan-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12930	Establish Traffic Management & Temp. Fencing	Track	1B	5,538.11	4.6%	11-Mar-10	12-Mar-10	2	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12940	Excavate box	Track	1B	-	0.0%	15-Mar-10	16-Mar-10	2	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12950	Excavate, lay and concrete ducts	Track	1B	-	0.0%	17-Mar-10	19-Mar-10	3	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12960	Excavate and construct OLE bases	Track - BB	1B	2,858.69	2.4%	17-Mar-10	19-Mar-10	3	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12980	Set Track (100m)	Track	1B	49,842.96	41.4%	22-Mar-10	26-Mar-10	5	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12990	Place upper concrete and cure	Track	1B	49,842.96	41.4%	25-Mar-10	31-Mar-10	7	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13000	Street Surface finishes	Track	1B	11,076.21	9.2%	01-Apr-10	06-Apr-10	6	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	1,147.69	1.0%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Ne Completion Approval - MacDonald Road to Foot of the Walk (6) (27)	Track	1B	-	0.0%		06-Apr-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Section 1B MacDonald Road to Foot of the Walk (6) (33)	Track	1B	-	0.0%		06-Apr-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					2nd half				**106,342.83**		**13-Jan-09**	**27-Jan-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13330	Excavate box	Track	1B	-	0.0%	07-Apr-10	08-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13340	Excavate, lay and concrete ducts	Track	1B	-	0.0%	09-Apr-10	13-Apr-10	5	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13370	Set Track	Track	1B	49,842.96	46.9%	14-Apr-10	20-Apr-10	7	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13380	Place upper concrete and cure	Track	1B	49,842.96	46.9%	19-Apr-10	23-Apr-10	5	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13390	Street Surface finishes	Track	1B	-	0.0%	26-Apr-10	28-Apr-10	3	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13400	Remove fencing and Traffic Management	Track	1B	5,538.11	5.2%	29-Apr-10	29-Apr-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	1,118.81	1.1%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			McDonald / Brunswick Road Ch 950 - 1250																									
			Trackwork						**679,948.33**																			
			1st half						**360,919.84**		**27-Nov-08**	**21-Jan-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13010	Establish Traffic Management & Temp. Fencing	Track	1B	16,614.32	4.6%	30-Apr-10	04-May-10	5	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13020	Excavate box	Track	1B	-	0.0%	05-May-10	12-May-10	8	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13030	Excavate, lay and concrete ducts	Track	1B	-	0.0%	13-May-10	25-May-10	13	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13040	Excavate and construct OLE bases	Track - BB	1B	8,576.08	2.4%	13-May-10	25-May-10	13	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13060	Set Track (300m)	Track	1B	149,528.87	41.4%	01-Jun-10	16-Jun-10	16	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13070	Place upper concrete and cure	Track	1B	149,528.87	41.4%	04-Jun-10	21-Jun-10	18	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13080	Street Surface finishes	Track	1B	33,228.64	9.2%	22-Jun-10	24-Jun-10	3	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	3,443.06	1.0%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					2nd half				**319,028.49**		**13-Jan-09**	**27-Jan-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13410	Excavate box	Track	1B	-	0.0%	25-Jun-10	02-Jul-10	8	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13420	Excavate, lay and concrete ducts	Track	1B	-	0.0%	05-Jul-10	15-Jul-10	11	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13450	Set Track	Track	1B	149,528.87	46.9%	16-Jul-10	03-Aug-10	19	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13460	Place upper concrete and cure	Track	1B	149,528.87	46.9%	21-Jul-10	06-Aug-10	17	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13470	Street Surface finishes	Track	1B	-	0.0%	09-Aug-10	11-Aug-10	3	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13480	Remove fencing and Traffic Management	Track	1B	16,614.32	5.2%	12-Aug-10	12-Aug-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	3,356.43	1.1%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			01B4 Leith Walk Railway Bridge (518)						**1,124,072.01**																			**78,173**	**78,173**
			Balfour Street Ch 600 - 850																									
			Roadworks						**315,849.45**																			**78,173**	**78,173**
					A12130	Establish Traffic Management & Temp. Fencing	Highways	1B	78,172.74	24.8%	12-Dec-08	15-Dec-08	4	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	78,173	78,173
					A12140	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	16-Dec-08	12-Jan-09	28	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12150	Construct Kerb lines	Highways	1B	-	0.0%	19-Dec-08	20-Jan-09	33	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12160	Reset Gullies	Highways	1B	-	0.0%	09-Jan-09	27-Jan-09	19	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12190	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	21-Jan-09	29-Jan-09	9	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12180	Pavement Works	Highways	1B	156,345.48	49.5%	21-Jan-09	05-Feb-09	16	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12170	Surface new channel	Highways	1B	-	0.0%	28-Jan-09	04-Feb-09	8	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12200	Remove fencing and Traffic Management	Highways	1B	78,172.74	24.8%	06-Feb-09	06-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1B	3,158.49	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (18)	Highways	1B	-	0.0%		06-Feb-09				-	-	-	-	-	-	-	-	-	-	-	-	-
			Pilrig / Iona Street Ch 850 - 950																									
			Roadworks						**126,339.78**																				
					A12210	Establish Traffic Management & Temp. Fencing	Highways	1B	62,538.19	49.5%	09-Feb-09	10-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12220	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	11-Feb-09	24-Feb-09	14	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12230	Construct Kerb lines	Highways	1B	-	0.0%	16-Feb-09	04-Mar-09	17	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12240	Reset Gullies	Highways	1B	-	0.0%	23-Feb-09	11-Mar-09	17	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12270	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	05-Mar-09	13-Mar-09	9	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12260	Pavement Works	Highways	1B	-	0.0%	05-Mar-09	20-Mar-09	16	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12250	Surface new channel	Highways	1B	-	0.0%	12-Mar-09	19-Mar-09	8	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12280	Remove fencing and Traffic Management	Highways	1B	62,538.19	49.5%	23-Mar-09	23-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1B	1,263.40	1.0%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			McDonald / Brunswick Road Ch 950 - 1250																									
			Roadworks						**379,019.34**																				
					A12290	Establish Traffic Management & Temp. Fencing	Highways	1B	93,807.29	24.8%	24-Mar-09	25-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12300	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	26-Mar-09	13-Apr-09	19	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12310	Construct Kerb lines	Highways	1B	-	0.0%	31-Mar-09	21-Apr-09	22	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12320	Reset Gullies	Highways	1B	-	0.0%	07-Apr-09	28-Apr-09	22	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12350	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	22-Apr-09	30-Apr-09	9	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12340	Pavement Works	Highways	1B	187,614.57	49.5%	22-Apr-09	13-May-09	22	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12330	Surface new channel	Highways	1B	-	0.0%	29-Apr-09	12-May-09	14	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12360	Remove fencing and Traffic Management	Highways	1B	93,807.29	24.8%	14-May-09	14-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0023

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER | SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					A12400	Reset Gullies	Highways	1B	-	0.0%	18-Aug-08	03-Sep-08	17	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12430	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	28-Aug-08	05-Sep-08	9	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12420	Pavement Works	Highways	1B	-	0.0%	28-Aug-08	12-Sep-08	16	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12410	Surface new channel	Highways	1B	-	0.0%	04-Sep-08	11-Sep-08	8	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12410	One Half of All Works	Highways	1B	75,045.83	59.4%	04-Sep-08	11-Sep-08	8	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12440	Remove fencing and Traffic Management	Highways	1B	25,015.28	19.8%	15-Sep-08	15-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1B	1,263.40	1.0%				10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Leith Walk Ch 350 - 100																									
			Roadworks						**315,849.45**		**16-Sep-08**	**28-Oct-08**	**43**	**10**	**12**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A11970	Establish Traffic Management & Temp. Fencing	Highways	1B	109,441.84	34.7%	16-Sep-08	17-Sep-08	2	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					A11980	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	18-Sep-08	01-Oct-08	14	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					A11990	Construct Kerb lines	Highways	1B	93,807.29	29.7%	23-Sep-08	09-Oct-08	17	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12000	Reset Gullies	Highways	1B	-	0.0%	30-Sep-08	16-Oct-08	17	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12030	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	10-Oct-08	20-Oct-08	11	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12020	Pavement Works	Highways	1B	-	0.0%	10-Oct-08	27-Oct-08	18	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12010	Surface new channel	Highways	1B	-	0.0%	17-Oct-08	24-Oct-08	8	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12040	Remove fencing and Traffic Management	Highways	1B	109,441.84	34.7%	28-Oct-08	28-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1B	3,158.49	1.0%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Leith Walk Ch 350 - 600																									
			Roadworks						**315,849.45**		**29-Oct-08**	**11-Dec-08**	**44**	**11**	**14**	**3,158**	-	-	-	-	-	-	-	-	-	-	-	-	**3,158**
					A12050	Establish Traffic Management & Temp. Fencing	Highways	1B	62,538.19	19.8%	29-Oct-08	30-Oct-08	2	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12060	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	31-Oct-08	13-Nov-08	14	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12070	Construct Kerb lines	Highways	1B	-	0.0%	05-Nov-08	21-Nov-08	17	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12080	Reset Gullies	Highways	1B	-	0.0%	12-Nov-08	28-Nov-08	17	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12110	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	24-Nov-08	03-Dec-08	10	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12100	Pavement Works	Highways	1B	187,614.57	59.4%	24-Nov-08	10-Dec-08	17	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12090	Surface new channel	Highways	1B	-	0.0%	02-Dec-08	09-Dec-08	8	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12120	Remove fencing and Traffic Management	Highways	1B	62,538.19	19.8%	11-Dec-08	11-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1B	3,158.49	1.0%				13	14	3,158	-	-	-	-	-	-	-	-	-	-	-	-	3,158
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (17)	Highways	1B	-	0.0%		11-Dec-08				-	-	-	-	-	-	-	-	-	-	-	-	-
			01B3 Balfour Street (inc.) to McDonald Road (exc.)						**1,473,221.38**		**27-Nov-2008**	**12-Aug-2010**	**624**	**23**	**35**	-	-	-	-	-	-	-	-	-	**13,845**	**131,754**	**152,298**	**2,869**	**300,767**
			Balfour Street Ch 600 - 850																									
			Trackwork						**566,623.61**	**100%**	**24-Sep-09**	**10-Mar-10**	**168**	**23**	**30**	-	-	-	-	-	-	-	-	-	**13,845**	**131,754**	**152,298**	**2,869**	**300,767**
			1st half						**300,766.53**	**53.1%**	**24-Sep-09**	**10-Mar-10**	**168**	**23**	**30**	-	-	-	-	-	-	-	-	-	**13,845**	**131,754**	**152,298**	**2,869**	**300,767**
					A12850	Establish Traffic Management & Temp. Fencing	Track	1B	13,845.27	2.4%	24-Sep-09	25-Sep-09	2	23	23	-	-	-	-	-	-	-	-	-	13,845	-	-	-	13,845
					A12860	Excavate box	Track	1B	-	0.0%	28-Sep-09	02-Oct-09	5	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12870	Excavate, lay and concrete ducts	Track	1B	-	0.0%	05-Oct-09	14-Oct-09	10	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12880	Excavate and construct OLE bases	Track - BB	1B	7,146.73	1.3%	05-Oct-09	14-Oct-09	10	23	24	-	-	-	-	-	-	-	-	-	-	7,147	-	-	7,147
					A12900	Set Track (250m)	Track	1B	124,607.39	22.0%	23-Oct-09	05-Nov-09	14	24	24	-	-	-	-	-	-	-	-	-	-	124,607	-	-	124,607
					A12910	Place upper concrete and cure	Track	1B	124,607.39	22.0%	28-Oct-09	10-Nov-09	14	24	25	-	-	-	-	-	-	-	-	-	-	-	124,607	-	124,607
					A12920	Street Surface finishes	Track	1B	27,690.53	4.9%	11-Nov-09	13-Nov-09	3	25	25	-	-	-	-	-	-	-	-	-	-	-	27,691	-	27,691
					Snagging	Snagging	Track	1B	2,869.21	0.5%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	2,869	2,869
					2nd half				**265,857.08**	**46.9%**	**16-Nov-09**	**10-Mar-10**	**115**	**24**	**30**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13250	Excavate box	Track	1B	-	0.0%	16-Nov-09	17-Nov-09	2	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13260	Excavate, lay and concrete ducts	Track	1B	-	0.0%	18-Nov-09	27-Nov-09	10	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13290	Set Track	Track	1B	124,607.39	22.0%	16-Feb-10	01-Mar-10	14	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13300	Place upper concrete and cure	Track	1B	124,607.39	22.0%	19-Feb-10	04-Mar-10	14	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13310	Street Surface finishes	Track	1B	-	0.0%	05-Mar-10	09-Mar-10	5	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13320	Remove fencing and Traffic Management	Track	1B	13,845.27	2.4%	10-Mar-10	10-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	2,797.02	0.5%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Pilrig / Iona Street Ch 850 - 950																									
			Trackwork						**226,649.44**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1st half						**120,306.61**		**27-Nov-08**	**21-Jan-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12930	Establish Traffic Management & Temp. Fencing	Track	1B	5,538.11	4.6%	11-Mar-10	12-Mar-10	2	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12940	Excavate box	Track	1B	-	0.0%	15-Mar-10	16-Mar-10	2	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12950	Excavate, lay and concrete ducts	Track	1B	-	0.0%	17-Mar-10	19-Mar-10	3	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12960	Excavate and construct OLE bases	Track - BB	1B	2,858.69	2.4%	17-Mar-10	19-Mar-10	3	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12980	Set Track (100m)	Track	1B	49,842.96	41.4%	22-Mar-10	26-Mar-10	5	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12990	Place upper concrete and cure	Track	1B	49,842.96	41.4%	25-Mar-10	31-Mar-10	7	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13000	Street Surface finishes	Track	1B	11,076.21	9.2%	01-Apr-10	06-Apr-10	6	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	1,147.69	1.0%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Int Completion Approval - MacDonald Road to Foot of the Walk (6) (27)	Track	1B	-	0.0%		06-Apr-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Section 1B MacDonald Road to Foot of the Walk (6) (33)	Track	1B	-	0.0%		06-Apr-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					2nd half				**106,342.83**		**13-Jan-09**	**27-Jan-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13230	Excavate box	Track	1B	-	0.0%	07-Apr-10	08-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13340	Excavate, lay and concrete ducts	Track	1B	-	0.0%	09-Apr-10	13-Apr-10	5	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13370	Set Track	Track	1B	49,842.96	46.9%	14-Apr-10	20-Apr-10	7	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13380	Place upper concrete and cure	Track	1B	49,842.96	46.9%	19-Apr-10	23-Apr-10	5	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13390	Street Surface finishes	Track	1B	-	0.0%	26-Apr-10	28-Apr-10	3	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13400	Remove fencing and Traffic Management	Track	1B	5,538.11	5.2%	29-Apr-10	29-Apr-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	1,118.81	1.1%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			McDonald / Brunswick Road Ch 950 - 1250																									
			Trackwork						**679,948.33**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1st half						**360,919.84**		**27-Nov-08**	**21-Jan-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13010	Establish Traffic Management & Temp. Fencing	Track	1B	16,614.32	4.6%	30-Apr-10	04-May-10	5	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13020	Excavate box	Track	1B	-	0.0%	05-May-10	12-May-10	8	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13030	Excavate, lay and concrete ducts	Track	1B	-	0.0%	13-May-10	25-May-10	13	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13040	Excavate and construct OLE bases	Track - BB	1B	8,576.08	2.4%	13-May-10	25-May-10	13	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13060	Set Track (300m)	Track	1B	149,528.87	41.4%	01-Jun-10	16-Jun-10	16	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13070	Place upper concrete and cure	Track	1B	149,528.87	41.4%	04-Jun-10	21-Jun-10	18	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13080	Street Surface finishes	Track	1B	33,228.64	9.2%	22-Jun-10	24-Jun-10	3	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	3,443.06	1.0%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					2nd half				**319,028.49**		**13-Jun-09**	**27-Jan-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13410	Excavate box	Track	1B	-	0.0%	25-Jun-10	02-Jul-10	8	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13420	Excavate, lay and concrete ducts	Track	1B	-	0.0%	05-Jul-10	15-Jul-10	11	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13450	Set Track	Track	1B	149,528.87	46.9%	16-Jul-10	03-Aug-10	19	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13460	Place upper concrete and cure	Track	1B	149,528.87	46.9%	21-Jul-10	06-Aug-10	17	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13470	Street Surface finishes	Track	1B	-	0.0%	09-Aug-10	11-Aug-10	3	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13480	Remove fencing and Traffic Management	Track	1B	16,614.32	5.2%	12-Aug-10	12-Aug-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1B	3,356.43	1.1%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			01B4 Leith Walk Railway Bridge (S18)						**1,124,072.01**							-	**297,056**	**159,504**	**1,263**	**281,422**	**3,790**	-	-	-	-	-	**86,599**	-	**829,635**
			Balfour Street Ch 600 - 850																									
			Roadworks						**315,849.45**							-	**234,518**	**3,158**	-	-	-	-	-	-	-	-	-	-	**237,677**
					A12130	Establish Traffic Management & Temp. Fencing	Highways	1B	78,172.74	24.8%	12-Dec-08	15-Dec-08	4	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12140	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	16-Dec-08	12-Jan-09	28	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12150	Construct Kerb lines	Highways	1B	-	0.0%	19-Dec-08	20-Jan-09	33	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12160	Reset Gullies	Highways	1B	-	0.0%	09-Jan-09	27-Jan-09	19	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12190	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	21-Jan-09	29-Jan-09	9	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12180	Pavement Works	Highways	1B	156,345.48	49.5%	21-Jan-09	05-Feb-09	16	14	15	-	156,345	-	-	-	-	-	-	-	-	-	-	-	156,345
					A12170	Surface new channel	Highways	1B	-	0.0%	28-Jan-09	04-Feb-09	8	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12200	Remove fencing and Traffic Management	Highways	1B	78,172.74	24.8%	06-Feb-09	06-Feb-09	1	15	15	-	78,173	-	-	-	-	-	-	-	-	-	-	-	78,173
					Snagging	Snagging	Highways	1B	3,158.49	1.0%				15	16	-	-	3,158	-	-	-	-	-	-	-	-	-	-	-	3,158
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (16)	Highways	1B	-	0.0%		06-Feb-09				-	-	-	-	-	-	-	-	-	-	-	-	-
			Pilrig / Iona Street Ch 850 - 950																									
			Roadworks						**126,339.78**							-	**62,538**	**62,538**	**1,263**	-	-	-	-	-	-	-	-	**126,340**
					A12210	Establish Traffic Management & Temp. Fencing	Highways	1B	62,538.19	49.5%	09-Feb-09	10-Feb-09	2	15	15	-	62,538	-	-	-	-	-	-	-	-	-	-	-	62,538
					A12220	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	11-Feb-09	24-Feb-09	14	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12230	Construct Kerb lines	Highways	1B	-	0.0%	16-Feb-09	04-Mar-09	17	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12240	Reset Gullies	Highways	1B	-	0.0%	23-Feb-09	11-Mar-09	17	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12270	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	05-Mar-09	13-Mar-09	9	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12260	Pavement Works	Highways	1B	-	0.0%	05-Mar-09	20-Mar-09	16	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12250	Surface new channel	Highways	1B	-	0.0%	12-Mar-09	19-Mar-09	8	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12280	Remove fencing and Traffic Management	Highways	1B	62,538.19	49.5%	23-Mar-09	23-Mar-09	1	16	16	-	-	62,538	-	-	-	-	-	-	-	-	-	-	62,538
					Snagging	Snagging	Highways	1B	1,263.40	1.0%				16	17	-	-	-	1,263	-	-	-	-	-	-	-	-	-	-	1,263
			McDonald / Brunswick Road Ch 950 - 1250																									
			Roadworks						**379,019.34**							-	-	**93,807**	-	**281,422**	**3,790**	-	-	-	-	-	-	-	**379,019**
					A12290	Establish Traffic Management & Temp. Fencing	Highways	1B	93,807.29	24.8%	24-Mar-09	25-Mar-09	2	16	16	-	-	93,807	-	-	-	-	-	-	-	-	-	-	93,807
					A12300	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	26-Mar-09	13-Apr-09	19	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12310	Construct Kerb lines	Highways	1B	-	0.0%	31-Mar-09	21-Apr-09	22	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12320	Reset Gullies	Highways	1B	-	0.0%	07-Apr-09	28-Apr-09	22	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12350	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	22-Apr-09	30-Apr-09	9	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12340	Pavement Works	Highways	1B	187,614.57	49.5%	22-Apr-09	13-May-09	22	17	18	-	-	-	-	187,615	-	-	-	-	-	-	-	-	187,615
					A12330	Surface new channel	Highways	1B	-	0.0%	29-Apr-09	12-May-09	14	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12360	Remove fencing and Traffic Management	Highways	1B	93,807.29	24.8%	14-May-09	14-May-09	1	18	18	-	-	-	-	93,807	-	-	-	-	-	-	-	-	93,807

USB00000073_0024

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER

SIEI

Year														2010
Period														
Period End	27	28	29	30	31	32	33	34	35	36	37	38	39	Subtotal
	30-Jan-2010	27-Feb-2010	27-Mar-2010	24-Apr-2010	22-May-2010	19-Jun-2010	17-Jul-2010	14-Aug-2010	11-Sep-2010	09-Oct-2010	06-Nov-2010	04-Dec-2010	01-Jan-2011	GBP

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period
					A12400	Reset Gullies	Highways	1B	-	0.0%	18-Aug-08	03-Sep-08	17	9	9
					A12430	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	28-Aug-08	05-Sep-08	9	9	9
					A12420	Pavement Works	Highways	1B	-	0.0%	28-Aug-08	12-Sep-08	16	9	9
					A12410	Surface new channel	Highways	1B	-	0.0%	04-Sep-08	11-Sep-08	8	9	9
					A12410	One Half of All Works	Highways	1B	75,045.83	59.4%	04-Sep-08	11-Sep-08	8	9	9
					A12440	Remove fencing and Traffic Management	Highways	1B	25,015.28	19.8%	15-Sep-08	15-Sep-08	1	10	10
					Snagging	Snagging	Highways	1B	1,263.40	1.0%				10	11
			Leith Walk Ch 350 - 100												
				Roadworks					315,849.45		16-Sep-08	28-Oct-08	43	10	12
					A11970	Establish Traffic Management & Temp. Fencing	Highways	1B	109,441.84	34.7%	16-Sep-08	17-Sep-08	2	10	10
					A11980	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	18-Sep-08	01-Oct-08	14	10	10
					A11990	Construct Kerb lines	Highways	1B	93,807.29	29.7%	23-Sep-08	09-Oct-08	17	10	10
					A12000	Reset Gullies	Highways	1B	-	0.0%	30-Sep-08	16-Oct-08	17	10	11
					A12030	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	10-Oct-08	20-Oct-08	11	10	11
					A12020	Pavement Works	Highways	1B	-	0.0%	10-Oct-08	27-Oct-08	18	10	11
					A12010	Surface new channel	Highways	1B	-	0.0%	17-Oct-08	24-Oct-08	8	11	11
					A12040	Remove fencing and Traffic Management	Highways	1B	109,441.84	34.7%	28-Oct-08	28-Oct-08	1	11	11
					Snagging	Snagging	Highways	1B	3,158.49	1.0%				11	12
			Leith Walk Ch 350 - 600												
				Roadworks					315,849.45		29-Oct-08	11-Dec-08	44	11	14
					A12050	Establish Traffic Management & Temp. Fencing	Highways	1B	62,538.19	19.8%	29-Oct-08	30-Oct-08	2	11	11
					A12060	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	31-Oct-08	13-Nov-08	14	11	12
					A12070	Construct Kerb lines	Highways	1B	-	0.0%	05-Nov-08	21-Nov-08	17	11	12
					A12080	Reset Gullies	Highways	1B	-	0.0%	12-Nov-08	28-Nov-08	17	12	12
					A12110	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	24-Nov-08	03-Dec-08	10	12	12
					A12100	Pavement Works	Highways	1B	187,614.57	59.4%	24-Nov-08	10-Dec-08	17	12	13
					A12090	Surface new channel	Highways	1B	-	0.0%	02-Dec-08	09-Dec-08	8	12	13
					A12120	Remove fencing and Traffic Management	Highways	1B	62,538.19	19.8%	11-Dec-08	11-Dec-08	1	13	13
					Snagging	Snagging	Highways	1B	3,158.49	1.0%				13	14
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (17)	Highways	1B	-	0.0%		11-Dec-08			
			01B3 Balfour Street (inc.) to McDonald Road (exc.)						1,473,221.38		27-Nov-2008	12-Aug-2010	624	23	35
			Balfour Street Ch 600 - 850												
				Trackwork					566,623.61	100%	24-Sep-09	10-Mar-10	168	23	30
				1st half					300,766.53	53.1%	24-Sep-09	10-Mar-10	168	23	30
					A12850	Establish Traffic Management & Temp. Fencing	Track	1B	13,845.27	2.4%	24-Sep-09	25-Sep-09	2	23	23
					A12860	Excavate box	Track	1B	-	0.0%	28-Sep-09	02-Oct-09	5	23	23
					A12870	Excavate, lay and concrete ducts	Track	1B	-	0.0%	05-Oct-09	14-Oct-09	10	23	24
					A12880	Excavate and construct OLE bases	Track - BB	1B	7,146.73	1.3%	05-Oct-09	14-Oct-09	10	23	24
					A12900	Set Track (250m)	Track	1B	124,607.39	22.0%	23-Oct-09	05-Nov-09	14	24	24
					A12910	Place upper concrete and cure	Track	1B	124,607.39	22.0%	28-Oct-09	10-Nov-09	14	24	25
					A12920	Street Surface finishes	Track	1B	27,690.53	4.9%	11-Nov-09	13-Nov-09	3	25	25
					Snagging	Snagging	Track	1B	2,869.21	0.5%				25	26
				2nd half					265,857.08	46.9%	16-Nov-09	10-Mar-10	115	25	30
					A13250	Excavate box	Track	1B	-	0.0%	16-Nov-09	17-Nov-09	2	25	25
					A13260	Excavate, lay and concrete ducts	Track	1B	-	0.0%	18-Nov-09	27-Nov-09	10	25	25
					A13290	Set Track	Track	1B	124,607.39	22.0%	16-Feb-10	01-Mar-10	14	28	29
					A13300	Place upper concrete and cure	Track	1B	124,607.39	22.0%	19-Feb-10	04-Mar-10	14	28	29
					A13310	Street Surface finishes	Track	1B	-	0.0%	05-Mar-10	09-Mar-10	5	29	29
					A13320	Remove fencing and Traffic Management	Track	1B	13,845.27	2.4%	10-Mar-10	10-Mar-10	1	29	29
					Snagging	Snagging	Track	1B	2,797.02	0.5%				29	30
			Pilrig / Iona Street Ch 850 - 950												
				Trackwork					226,649.44						
				1st half					120,306.61		27-Nov-08	21-Jan-09			
					A12930	Establish Traffic Management & Temp. Fencing	Track	1B	5,538.11	4.6%	11-Mar-10	12-Mar-10	2	29	29
					A12940	Excavate box	Track	1B	-	0.0%	15-Mar-10	16-Mar-10	2	29	29
					A12950	Excavate, lay and concrete ducts	Track	1B	-	0.0%	17-Mar-10	19-Mar-10	3	29	29
					A12960	Excavate and construct OLE bases	Track - BB	1B	2,858.69	2.4%	17-Mar-10	19-Mar-10	3	29	29
					A12980	Set Track (100m)	Track	1B	49,842.96	41.4%	22-Mar-10	26-Mar-10	5	29	29
					A12990	Place upper concrete and cure	Track	1B	49,842.96	41.4%	25-Mar-10	31-Mar-10	7	29	30
					A13000	Street Surface finishes	Track	1B	11,076.21	9.2%	01-Apr-10	06-Apr-10	6	30	30
					Snagging	Snagging	Track	1B	1,147.69	1.0%				30	31
					Crit. Milestone	Ie Completion Approval - MacDonald Road to Foot of the Walk (6) (27)	Track	1B	-	0.0%		06-Apr-10			
					Crit. Milestone	Commission Section 1B MacDonald Road to Foot of the Walk (6) (33)	Track	1B	-	0.0%		06-Apr-10			
				2nd half					106,342.83		13-Jan-09	27-Jan-09			
					A13330	Excavate box	Track	1B	-	0.0%	07-Apr-10	08-Apr-10	2	30	30
					A13340	Excavate, lay and concrete ducts	Track	1B	-	0.0%	09-Apr-10	13-Apr-10	5	30	30
					A13370	Set Track	Track	1B	49,842.96	46.9%	14-Apr-10	20-Apr-10	7	30	30
					A13380	Place upper concrete and cure	Track	1B	49,842.96	46.9%	19-Apr-10	23-Apr-10	5	30	30
					A13390	Street Surface finishes	Track	1B	-	0.0%	26-Apr-10	28-Apr-10	3	31	31
					A13400	Remove fencing and Traffic Management	Track	1B	5,538.11	5.2%	29-Apr-10	29-Apr-10	1	31	31
					Snagging	Snagging	Track	1B	1,118.81	1.1%				31	32
			McDonald / Brunswick Road Ch 950 - 1250												
				Trackwork					679,948.33						
				1st half					360,919.84		27-Nov-08	21-Jan-09			
					A13010	Establish Traffic Management & Temp. Fencing	Track	1B	16,614.32	4.6%	30-Apr-10	04-May-10	5	31	31
					A13020	Excavate box	Track	1B	-	0.0%	05-May-10	12-May-10	8	31	31
					A13030	Excavate, lay and concrete ducts	Track	1B	-	0.0%	13-May-10	25-May-10	13	31	32
					A13040	Excavate and construct OLE bases	Track - BB	1B	8,576.08	2.4%	13-May-10	25-May-10	13	31	32
					A13060	Set Track (300m)	Track	1B	149,528.87	41.4%	01-Jun-10	16-Jun-10	16	32	32
					A13070	Place upper concrete and cure	Track	1B	149,528.87	41.4%	04-Jun-10	21-Jun-10	18	32	33
					A13080	Street Surface finishes	Track	1B	33,228.64	9.2%	22-Jun-10	24-Jun-10	3	33	33
					Snagging	Snagging	Track	1B	3,443.06	1.0%				33	34
				2nd half					319,028.49		13-Jan-09	27-Jan-09			
					A13410	Excavate box	Track	1B	-	0.0%	29-Jun-10	02-Jul-10	8	33	33
					A13420	Excavate, lay and concrete ducts	Track	1B	-	0.0%	05-Jul-10	15-Jul-10	11	33	33
					A13450	Set Track	Track	1B	149,528.87	46.9%	16-Jul-10	03-Aug-10	19	33	34
					A13460	Place upper concrete and cure	Track	1B	149,528.87	46.9%	21-Jul-10	06-Aug-10	17	34	34
					A13470	Street Surface finishes	Track	1B	-	0.0%	09-Aug-10	11-Aug-10	3	34	34
					A13480	Remove fencing and Traffic Management	Track	1B	16,614.32	5.2%	12-Aug-10	12-Aug-10	1	34	34
					Snagging	Snagging	Track	1B	3,356.43	1.1%				34	35
			01B4 Leith Walk Railway Bridge (S18)						1,124,072.01						
			Balfour Street Ch 600 - 850												
				Roadworks					315,849.45						
					A12130	Establish Traffic Management & Temp. Fencing	Highways	1B	78,172.74	24.8%	12-Dec-08	15-Dec-08	4	13	13
					A12140	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	16-Dec-08	12-Jan-09	28	13	14
					A12150	Construct Kerb lines	Highways	1B	-	0.0%	19-Dec-08	20-Jan-09	33	13	14
					A12160	Reset Gullies	Highways	1B	-	0.0%	09-Jan-09	27-Jan-09	19	14	14
					A12190	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	21-Jan-09	29-Jan-09	9	14	14
					A12180	Pavement Works	Highways	1B	156,345.48	49.5%	21-Jan-09	05-Feb-09	16	14	15
					A12170	Surface new channel	Highways	1B	-	0.0%	28-Jan-09	04-Feb-09	8	14	15
					A12200	Remove fencing and Traffic Management	Highways	1B	78,172.74	24.8%	06-Feb-09	06-Feb-09	1	15	15
					Snagging	Snagging	Highways	1B	3,158.49	1.0%				15	16
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (16)	Highways	1B	-	0.0%		06-Feb-09			
			Pilrig / Iona Street Ch 850 - 950												
				Roadworks					126,339.78						
					A12210	Establish Traffic Management & Temp. Fencing	Highways	1B	62,538.19	49.5%	09-Feb-09	10-Feb-09	2	15	15
					A12220	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	11-Feb-09	24-Feb-09	14	15	15
					A12230	Construct Kerb lines	Highways	1B	-	0.0%	16-Feb-09	04-Mar-09	17	15	16
					A12240	Reset Gullies	Highways	1B	-	0.0%	23-Feb-09	11-Mar-09	17	15	16
					A12270	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	05-Mar-09	13-Mar-09	9	16	16
					A12260	Pavement Works	Highways	1B	-	0.0%	05-Mar-09	20-Mar-09	16	16	16
					A12250	Surface new channel	Highways	1B	-	0.0%	12-Mar-09	19-Mar-09	8	16	16
					A12280	Remove fencing and Traffic Management	Highways	1B	62,538.19	49.5%	23-Mar-09	23-Mar-09	1	16	16
					Snagging	Snagging	Highways	1B	1,263.40	1.0%				16	17
			McDonald / Brunswick Road Ch 950 - 1250												
				Roadworks					379,019.34						
					A12290	Establish Traffic Management & Temp. Fencing	Highways	1B	93,807.29	24.8%	24-Mar-09	25-Mar-09	2	16	16
					A12300	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	26-Mar-09	13-Apr-09	19	16	17
					A12310	Construct Kerb lines	Highways	1B	-	0.0%	31-Mar-09	21-Apr-09	22	17	17
					A12320	Reset Gullies	Highways	1B	-	0.0%	07-Apr-09	28-Apr-09	22	17	18
					A12350	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	22-Apr-09	30-Apr-09	9	17	18
					A12340	Pavement Works	Highways	1B	187,614.57	49.5%	22-Apr-09	13-May-09	22	17	18
					A12330	Surface new channel	Highways	1B	-	0.0%	29-Apr-09	12-May-09	14	18	18
					A12360	Remove fencing and Traffic Management	Highways	1B	93,807.29	24.8%	14-May-09	14-May-09	1	18	18

USB00000073_0025

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER

SIEI

Year	2011													2011
Period	40	41	42	43	44	45	46	47	48	49	50	51	52	Subtotal
Period End	29-Jan-2011	26-Feb-2011	26-Mar-2011	23-Apr-2011	21-May-2011	18-Jun-2011	16-Jul-2011	13-Aug-2011	10-Sep-2011	08-Oct-2011	05-Nov-2011	03-Dec-2011	31-Dec-2011	GBP

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period
					A12400	Reset Gullies	Highways	1B	-	0.0%	18-Aug-08	03-Sep-08	17	9	9
					A12430	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	28-Aug-08	05-Sep-08	9	9	9
					A12420	Pavement Works	Highways	1B	-	0.0%	28-Aug-08	12-Sep-08	16	9	9
					A12410	Surface new channel	Highways	1B	-	0.0%	04-Sep-08	11-Sep-08	8	9	9
					A12410	One Half of All Works	Highways	1B	75,045.83	59.4%	04-Sep-08	11-Sep-08	8	9	9
					A12440	Remove fencing and Traffic Management	Highways	1B	25,015.28	19.8%	15-Sep-08	15-Sep-08	1	10	10
					Snagging	Snagging	Highways	1B	1,263.40	1.0%				10	11
				Leith Walk Ch 350 - 100											
				Roadworks					315,849.45		16-Sep-08	28-Oct-08	43	10	12
					A11970	Establish Traffic Management & Temp. Fencing	Highways	1B	109,441.84	34.7%	16-Sep-08	17-Sep-08	2	10	10
					A11980	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	18-Sep-08	01-Oct-08	14	10	10
					A11990	Construct Kerb lines	Highways	1B	93,807.29	29.7%	23-Sep-08	09-Oct-08	17	10	10
					A12000	Reset Gullies	Highways	1B	-	0.0%	30-Sep-08	16-Oct-08	17	10	11
					A12030	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	10-Oct-08	20-Oct-08	11	10	11
					A12020	Pavement Works	Highways	1B	-	0.0%	10-Oct-08	27-Oct-08	18	10	11
					A12010	Surface new channel	Highways	1B	-	0.0%	17-Oct-08	24-Oct-08	8	11	11
					A12040	Remove fencing and Traffic Management	Highways	1B	109,441.84	34.7%	28-Oct-08	28-Oct-08	1	11	11
					Snagging	Snagging	Highways	1B	3,158.49	1.0%				11	12
				Leith Walk Ch 350 - 600											
				Roadworks					315,849.45		29-Oct-08	11-Dec-08	44	11	14
					A12050	Establish Traffic Management & Temp. Fencing	Highways	1B	62,538.19	19.8%	29-Oct-08	30-Oct-08	2	11	11
					A12060	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	31-Oct-08	13-Nov-08	14	11	12
					A12070	Construct Kerb lines	Highways	1B	-	0.0%	05-Nov-08	21-Nov-08	17	11	12
					A12080	Reset Gullies	Highways	1B	-	0.0%	12-Nov-08	28-Nov-08	17	12	12
					A12110	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	24-Nov-08	03-Dec-08	10	12	12
					A12100	Pavement Works	Highways	1B	187,614.57	59.4%	24-Nov-08	10-Dec-08	17	12	13
					A12090	Surface new channel	Highways	1B	-	0.0%	02-Dec-08	09-Dec-08	8	12	13
					A12120	Remove fencing and Traffic Management	Highways	1B	62,538.19	19.8%	11-Dec-08	11-Dec-08	1	13	13
					Snagging	Snagging	Highways	1B	3,158.49	1.0%				13	14
					Cnt. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (17)	Highways	1B	-	0.0%		11-Dec-08			
				01B3 Balfour Street (inc.) to McDonald Road (exc.)					1,473,221.38		27-Nov-2008	12-Aug-2010	624	23	35
				Balfour Street Ch 600 - 850											
				Trackwork					566,623.61	100%	24-Sep-09	10-Mar-10	168	23	30
				1st half					300,766.53	53.1%	24-Sep-09	10-Mar-10	168	23	30
					A12850	Establish Traffic Management & Temp. Fencing	Track	1B	13,845.27	2.4%	24-Sep-09	25-Sep-09	2	23	23
					A12860	Excavate box	Track	1B	-	0.0%	28-Sep-09	02-Oct-09	5	23	23
					A12870	Excavate, lay and concrete ducts	Track	1B	-	0.0%	05-Oct-09	14-Oct-09	10	23	24
					A12880	Excavate and construct OLE bases	Track - BB	1B	7,146.73	1.3%	05-Oct-09	14-Oct-09	10	23	24
					A12900	Set Track (250m)	Track	1B	124,607.39	22.0%	23-Oct-09	05-Nov-09	14	24	24
					A12910	Place upper concrete and cure	Track	1B	124,607.39	22.0%	28-Oct-09	10-Nov-09	14	24	25
					A12920	Street Surface finishes	Track	1B	27,690.53	4.9%	11-Nov-09	13-Nov-09	3	25	25
					Snagging	Snagging	Track	1B	2,869.21	0.5%				25	26
				2nd half					265,857.08	46.9%	16-Nov-09	10-Mar-10	115	25	30
					A13250	Excavate box	Track	1B	-	0.0%	16-Nov-09	17-Nov-09	2	25	25
					A13260	Excavate, lay and concrete ducts	Track	1B	-	0.0%	18-Nov-09	27-Nov-09	10	25	25
					A13290	Set Track	Track	1B	124,607.39	22.0%	16-Feb-10	01-Mar-10	14	28	29
					A13300	Place upper concrete and cure	Track	1B	124,607.39	22.0%	19-Feb-10	04-Mar-10	14	28	29
					A13310	Street Surface finishes	Track	1B	-	0.0%	05-Mar-10	09-Mar-10	5	29	29
					A13320	Remove fencing and Traffic Management	Track	1B	13,845.27	2.4%	10-Mar-10	10-Mar-10	1	29	29
					Snagging	Snagging	Track	1B	2,797.02	0.5%				29	30
				Pilrig / Iona Street Ch 850 - 950											
				Trackwork					226,649.44						
				1st half					120,306.61		27-Nov-08	21-Jan-09			
					A12930	Establish Traffic Management & Temp. Fencing	Track	1B	5,538.11	4.6%	11-Mar-10	12-Mar-10	2	29	29
					A12940	Excavate box	Track	1B	-	0.0%	15-Mar-10	16-Mar-10	2	29	29
					A12950	Excavate, lay and concrete ducts	Track	1B	-	0.0%	17-Mar-10	19-Mar-10	3	29	29
					A12960	Excavate and construct OLE bases	Track - BB	1B	2,858.69	2.4%	17-Mar-10	19-Mar-10	3	29	29
					A12980	Set Track (100m)	Track	1B	49,842.96	41.4%	22-Mar-10	26-Mar-10	5	29	29
					A12990	Place upper concrete and cure	Track	1B	49,842.96	41.4%	25-Mar-10	31-Mar-10	7	29	30
					A13000	Street Surface finishes	Track	1B	11,076.21	9.2%	01-Apr-10	06-Apr-10	6	30	30
					Snagging	Snagging	Track	1B	1,147.69	1.0%				30	31
					Cnt. Milestone	Ne Completion Approval - MacDonald Road to Foot of the Walk (6) (27)	Track	1B		0.0%		06-Apr-10			
					Cnt. Milestone	Commission Section 1B MacDonald Road to Foot of the Walk (6) (33)	Track	1B	-	0.0%		06-Apr-10			
				2nd half					106,342.83		13-Jan-09	27-Jan-09			
					A13330	Excavate box	Track	1B	-	0.0%	07-Apr-10	08-Apr-10	2	30	30
					A13340	Excavate, lay and concrete ducts	Track	1B	-	0.0%	09-Apr-10	13-Apr-10	5	30	30
					A13370	Set Track	Track	1B	49,842.96	46.9%	14-Apr-10	20-Apr-10	7	30	30
					A13380	Place upper concrete and cure	Track	1B	49,842.96	46.9%	19-Apr-10	23-Apr-10	5	30	30
					A13390	Street Surface finishes	Track	1B	-	0.0%	26-Apr-10	28-Apr-10	3	31	31
					A13400	Remove fencing and Traffic Management	Track	1B	5,538.11	5.2%	29-Apr-10	29-Apr-10	1	31	31
					Snagging	Snagging	Track	1B	1,118.81	1.1%				31	32
				McDonald / Brunswick Road Ch 950 - 1250											
				Trackwork					679,948.33						
				1st half					360,919.84		27-Nov-08	21-Jan-09			
					A13010	Establish Traffic Management & Temp. Fencing	Track	1B	16,614.32	4.6%	30-Apr-10	04-May-10	5	31	31
					A13020	Excavate box	Track	1B	-	0.0%	05-May-10	12-May-10	8	31	31
					A13030	Excavate, lay and concrete ducts	Track	1B	-	0.0%	13-May-10	25-May-10	13	31	32
					A13040	Excavate and construct OLE bases	Track - BB	1B	8,576.08	2.4%	13-May-10	25-May-10	13	31	32
					A13060	Set Track (300m)	Track	1B	149,528.87	41.4%	01-Jun-10	16-Jun-10	16	32	32
					A13070	Place upper concrete and cure	Track	1B	149,528.87	41.4%	04-Jun-10	21-Jun-10	18	32	33
					A13080	Street Surface finishes	Track	1B	33,228.64	9.2%	22-Jun-10	24-Jun-10	3	33	33
					Snagging	Snagging	Track	1B	3,443.06	1.0%				33	34
				2nd half					319,028.49		13-Jan-09	27-Jan-09			
					A13410	Excavate box	Track	1B	-	0.0%	25-Jun-10	02-Jul-10	8	33	33
					A13420	Excavate, lay and concrete ducts	Track	1B	-	0.0%	05-Jul-10	15-Jul-10	11	33	33
					A13450	Set Track	Track	1B	149,528.87	46.9%	16-Jul-10	03-Aug-10	19	33	34
					A13460	Place upper concrete and cure	Track	1B	149,528.87	46.9%	21-Jul-10	06-Aug-10	17	34	34
					A13470	Street Surface finishes	Track	1B	-	0.0%	09-Aug-10	11-Aug-10	3	34	34
					A13480	Remove fencing and Traffic Management	Track	1B	16,614.32	5.2%	12-Aug-10	12-Aug-10	1	34	34
					Snagging	Snagging	Track	1B	3,356.43	1.1%				34	35
				01B4 Leith Walk Railway Bridge (S18)					1,124,072.01						
				Balfour Street Ch 600 - 850											
				Roadworks					315,849.45						
					A12130	Establish Traffic Management & Temp. Fencing	Highways	1B	78,172.74	24.8%	12-Dec-08	15-Dec-08	4	13	13
					A12140	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	16-Dec-08	12-Jan-09	28	13	14
					A12150	Construct Kerb lines	Highways	1B	-	0.0%	19-Dec-08	20-Jan-09	33	13	14
					A12160	Reset Gullies	Highways	1B	-	0.0%	09-Jan-09	27-Jan-09	19	14	14
					A12190	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	21-Jan-09	29-Jan-09	9	14	14
					A12180	Pavement Works	Highways	1B	156,345.48	49.5%	21-Jan-09	05-Feb-09	16	14	15
					A12170	Surface new channel	Highways	1B	-	0.0%	28-Jan-09	04-Feb-09	8	14	15
					A12200	Remove fencing and Traffic Management	Highways	1B	78,172.74	24.8%	06-Feb-09	06-Feb-09	1	15	15
					Snagging	Snagging	Highways	1B	3,158.49	1.0%				15	16
					Cnt. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (16)	Highways	1B		0.0%		06-Feb-09			
				Pilrig / Iona Street Ch 850 - 950											
				Roadworks					126,339.78						
					A12210	Establish Traffic Management & Temp. Fencing	Highways	1B	62,538.19	49.5%	09-Feb-09	10-Feb-09	2	15	15
					A12220	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	11-Feb-09	24-Feb-09	14	15	15
					A12230	Construct Kerb lines	Highways	1B	-	0.0%	16-Feb-09	04-Mar-09	17	15	16
					A12240	Reset Gullies	Highways	1B	-	0.0%	23-Feb-09	11-Mar-09	17	15	16
					A12270	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	05-Mar-09	13-Mar-09	9	16	16
					A12260	Pavement Works	Highways	1B	-	0.0%	05-Mar-09	20-Mar-09	16	16	16
					A12250	Surface new channel	Highways	1B	-	0.0%	12-Mar-09	19-Mar-09	8	16	16
					A12280	Remove fencing and Traffic Management	Highways	1B	62,538.19	49.5%	23-Mar-09	23-Mar-09	1	16	16
					Snagging	Snagging	Highways	1B	1,263.40	1.0%				16	17
				McDonald / Brunswick Road Ch 950 - 1250											
				Roadworks					379,019.34						
					A12290	Establish Traffic Management & Temp. Fencing	Highways	1B	93,807.29	24.8%	24-Mar-09	25-Mar-09	2	16	16
					A12300	Excavate for new channel and kerb line / remove existing kerbs	Highways	1B	-	0.0%	26-Mar-09	13-Apr-09	19	16	17
					A12310	Construct Kerb lines	Highways	1B	-	0.0%	31-Mar-09	21-Apr-09	22	17	17
					A12320	Reset Gullies	Highways	1B	-	0.0%	07-Apr-09	28-Apr-09	22	17	18
					A12350	Street Lighting / Traffic Signals / Road Signs	Highways	1B	-	0.0%	22-Apr-09	30-Apr-09	9	17	18
					A12340	Pavement Works	Highways	1B	187,614.57	49.5%	22-Apr-09	13-May-09	22	17	18
					A12330	Surface new channel	Highways	1B	-	0.0%	29-Apr-09	12-May-09	14	18	18
					A12360	Remove fencing and Traffic Management	Highways	1B	93,807.29	24.8%	14-May-09	14-May-09	1	18	18

USB00000073_0026

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year: 2008 Period: 1 Period End: 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
					Snagging	Snagging	Highways	1B	3,790.19	1.0%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Balfour Street Tram Stop																										
				Tramstop					302,863.44							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					538	Order REC Supply	Trams Eq	1B	-	0.0%	04-Feb-10	04-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Construction		Trams Eq	1B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					590	Civil Engineering And Building Works	Tramstops	1B	86,598.68	28.6%	28-Sep-09	15-Nov-09	49	23	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					590	Civil Engineering And Building Works	Tramstops	1B	86,598.68	28.6%	16-Nov-09	11-Jan-10	58	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1B	1,749.47	0.6%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2600	Deliver and Install Shelter	Tramstops	1B	57,732.45	19.1%	18-Mar-10	01-Apr-10	15	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1B	583.16	0.2%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4510	Package Test Tramstop	Trams Eq	1B	68,904.99	22.8%	15-Jun-10	22-Jun-10	8	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4480	Install LV Power Supply and LV Power Equipment	Trams Eq	1B	-	0.0%	01-Apr-10	10-May-10	40	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4490	Install Telecon Equipment	Trams Eq	1B	-	0.0%	10-May-10	08-Jun-10	30	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4500	Install Station Control Equipment + AFC Equipment	Trams Eq	1B	-	0.0%	10-May-10	15-Jun-10	37	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4479	Access for E&M Tram Stop installation (01B Balfour Street)	Trams Eq	1B	-	0.0%	01-Apr-10	01-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4478	Access for visual inspection for E&M Tram Stop installation (01B Balfour Street)	Trams Eq	1B	-	0.0%	02-Mar-10	02-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1B	696.01	0.2%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01C McDonald Road (inc.) to Princess Street West (exc.)									9,815,693.00							-	-	-	-	-	-	-	-	-	-	251,612	251,612	503,223
		01C1 McDonald Road (inc.) to Princess Street West (exc.)							1,501,588.02							-	-	-	-	-	-	-	-	-	-	-	-	-
			McDonald Road to Princess Street West																										
				E & M Installations					1,501,588.02							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3850	Overhead Catenary Line - One Half	OLE	1C	528,815.57	35.2%	10-Sep-10	29-Oct-10	50	35	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3850	Overhead Catenary Line	OLE	1C	352,543.72	23.5%	10-Sep-10	29-Oct-10	50	35	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	1C	8,902.62	0.6%				37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3860	Install Electrical Cables	SCC	1C	151,303.21	10.1%	24-Sep-10	21-Oct-10	28	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3870	Install Fibre Optic Cables	SCC	1C	151,303.21	10.1%	24-Sep-10	21-Oct-10	28	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3880	Install Signalling Wayside Equipment	SCC	1C	151,303.21	10.1%	22-Oct-10	22-Nov-10	32	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3845	Installation of poles and building fixings	SCC	1C	151,303.21	10.1%	16-Jul-10	09-Sep-10	56	33	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3844	Access for E&M wayside installation (01C)	SCC	1C	-	0.0%	16-Jul-10	16-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3859	Access to cable pits for cable laying (01C)	SCC	1C	-	0.0%	24-Sep-10	24-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3843	Access for visual inspection for E&M wayside installation (01C)	SCC	1C	-	0.0%	16-Jun-10	16-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3858	Access for visual inspection to cable pits for cable laying (01C)	SCC	1C	-	0.0%	21-Jul-10	21-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	1C	6,113.26	0.4%				38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01C2 McDonald Road (inc.) to Picardy Place (exc.)							2,761,174.77							-	-	-	-	-	-	-	-	-	-	251,612	251,612	503,223
			McDonald Road Tramstop																										
				Tramstop					204,634.14							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					600	Civil Engineering And Building Works	Tramstops	1C	56,590.90	27.7%	22-Jul-09	31-Aug-09	41	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					600	Civil Engineering And Building Works	Tramstops	1C	56,590.90	27.7%	01-Sep-09	24-Nov-09	86	22	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1C	1,143.25	0.6%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					548	Order REC Supply	Trams Eq	1C	-	0.0%	17-Sep-09	17-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2660	Deliver and Install Shelter	Tramstops	1C	37,727.26	18.4%	29-Oct-09	12-Nov-09	15	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1C	381.08	0.2%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2670	Install LV Power Supply and LV Power Equipment	Trams Eq	1C	-	0.0%	12-Nov-09	21-Jan-10	71	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2680	Package Test Tramstop	Trams Eq	1C	51,678.74	25.3%	25-Feb-10	04-Mar-10	8	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2673	Install Telecon Equipment	Trams Eq	1C	-	0.0%	21-Jan-10	18-Feb-10	29	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2675	Install Station Control Equipment + AFC Equipment	Trams Eq	1C	-	0.0%	21-Jan-10	25-Feb-10	36	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2669	Access for E&M Tram Stop installation (01C McDonald Road)	Trams Eq	1C	-	0.0%	12-Nov-09	12-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2668	Access for visual inspection for E&M Tram Stop installation (01C McDonald Road)	Trams Eq	1C	-	0.0%	13-Oct-09	13-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1C	522.01	0.3%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Leith Walk Ch 0 - 375																										
				Trackwork					1,113,837.68							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1st Half (Dummy)				591,705.15		27-Nov-08	21-Jan-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16190	Establish Traffic Management & Temp. Fencing	Track	1C	27,191.54	4.6%	22-Jul-09	23-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16200	Excavate box	Track	1C	-	0.0%	24-Jul-09	08-Sep-09	47	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16210	Excavate, lay and concrete ducts	Track	1C	81,574.62	13.8%	09-Sep-09	23-Sep-09	15	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16220	Excavate and construct OLE bases	Track - BB	1C	15,037.64	2.5%	09-Sep-09	23-Sep-09	15	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16230	Set Track (300m) - 50%	Track	1C	108,766.17	18.4%	12-Nov-09	30-Nov-09	19	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16230	Set Track (300m) - 50%	Track	1C	108,766.17	18.4%	01-Dec-09	05-Jan-10	37	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16240	Place upper concrete and cure	Track	1C	190,340.79	32.2%	17-Nov-09	08-Jan-10	53	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16250	Street Surface finishes	Track	1C	54,383.08	9.2%	11-Jan-10	13-Jan-10	3	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	5,645.14	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					2nd Half (Dummy)				522,132.53		13-Jan-09	27-Jan-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16330	Excavate box	Track	1C	-	0.0%	14-Jan-10	25-Jan-10	12	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16340	Excavate, lay and concrete ducts	Track	1C	244,723.87	46.9%	26-Jan-10	09-Feb-10	15	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16350	Set Track	Track	1C	-	0.0%	11-May-10	28-May-10	18	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16360	Place upper concrete and cure	Track	1C	244,723.87	46.9%	14-May-10	03-Jun-10	21	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16370	Street Surface finishes	Track	1C	-	0.0%	04-Jun-10	08-Jun-10	5	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16380	Remove fencing and Traffic Management	Track	1C	27,191.54	5.2%	09-Jun-10	09-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	5,493.24	1.1%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			London Road Ch 375 - 450																										
				Trackwork					222,767.54							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1st Half (Dummy)				118,341.03		27-Nov-08	21-Jan-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16260	Establish Traffic Management & Temp. Fencing	Track	1C	5,438.31	4.6%	10-Jun-10	11-Jun-10	2	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16270	Excavate box	Track	1C	-	0.0%	14-Jun-10	15-Jun-10	2	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16280	Excavate, lay and concrete ducts	Track	1C	-	0.0%	16-Jun-10	18-Jun-10	3	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16290	Excavate and construct OLE bases	Track - BB	1C	3,007.53	2.5%	16-Jun-10	18-Jun-10	3	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16300	Set Track (300m)	Track	1C	-	0.0%	21-Jun-10	24-Jun-10	4	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16310	Place upper concrete and cure	Track	1C	97,889.55	82.7%	24-Jun-10	29-Jun-10	6	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16320	Street Surface finishes	Track	1C	10,876.62	9.2%	30-Jun-10	02-Jul-10	3	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	1,129.03	1.0%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					2nd Half (Dummy)				104,426.51		13-Jan-09	27-Jan-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16390	Excavate box	Track	1C	-	0.0%	05-Jul-10	06-Jul-10	2	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16400	Excavate, lay and concrete ducts	Track	1C	-	0.0%	07-Jul-10	09-Jul-10	3	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16410	Set Track	Track	1C	-	0.0%	12-Jul-10	15-Jul-10	4	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16420	Place upper concrete and cure	Track	1C	97,889.55	93.7%	15-Jul-10	20-Jul-10	6	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16430	Street Surface finishes	Track	1C	-	0.0%	21-Jul-10	23-Jul-10	3	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16440	Remove fencing and Traffic Management	Track	1C	5,438.31	5.2%	26-Jul-10	26-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	1,098.65	1.1%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Leith Walk Ch 0 - 375																										
				Roadworks					1,016,612.85							-	-	-	-	-	-	-	-	-	-	-	251,612	251,612	503,223
					A13540	Dummy	Highways	1C	251,611.68	24.8%	31-Oct-08	30-Nov-08	31	11	12	-	-	-	-	-	-	-	-	-	-	251,612	-	251,612
					A13540	Dummy	Highways	1C	251,611.68	24.8%	01-Dec-08	31-Dec-08	31	12	13	-	-	-	-	-	-	-	-	-	-	-	251,612	251,612
					A13540	Dummy	Highways	1C	251,611.68	24.8%	01-Jan-09	31-Jan-09	31	13	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13540	Dummy	Highways	1C	251,611.68	24.8%	01-Feb-09	26-Mar-09	55	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	10,166.13	1.0%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (15)	Highways	1C	-	0.0%		26-Mar-09			18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			London Road Ch 375 - 450																										
				Roadworks					203,322.57							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13570	Dummy	Highways	1C	50,322.24	24.8%	27-Mar-09	30-Apr-09	35	16	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13570	Dummy	Highways	1C	50,322.24	24.8%	01-May-09	31-May-09	31	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13570	Dummy	Highways	1C	50,322.24	24.8%	01-Jun-09	30-Jun-09	30	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13570	Dummy	Highways	1C	50,322.24	24.8%	01-Jul-09	21-Jul-09	22	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	2,033.23	1.0%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01C3 Picardy Place (inc.) to St. Andrews Square (exc.)									3,098,429.43							-	-	-	-	-	-	-	-	-	-	-	-	-
			Picardy Place Ch 450 - 700																										
				Trackwork					746,600.00							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3 - 1st Half (Dummy)				160,825.95		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16450	Establish Traffic Management & Temp. Fencing	Track	1C	7,251.08	4.5%	15-Apr-10	16-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16460	Excavate box	Track	1C	-	0.0%	19-Apr-10	20-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16470	Excavate, lay and concrete ducts	Track	1C	-	0.0%	21-Apr-10	23-Apr-10	3	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16480	Excavate and construct OLE bases	Track - BB	1C	7,017.57	4.4%	21-Apr-10	23-Apr-10	3	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16490	Set Track (100m) - Picardy Place	Track	1C	-	0.0%	24-May-10	27-May-10	4	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16500	Place upper concrete and cure	Track	1C	130,519.40	81.2%	27-May-10	02-Jun-10	7	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16510	Street Surface finishes	Track	1C	14,502.16	9.0%	03-Jun-10	07-Jun-10	5	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	1,535.75	1.0%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3 - 2nd Half (Dummy)				139,235.34		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16520	Excavate box	Track	1C	-	0.0%	08-Jun-10	09-Jun-10	2	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16530	Excavate, lay and concrete ducts	Track	1C	-	0.0%	10-Jun-10	14-Jun-10	5	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16540	Set Track	Track	1C	-	0.0%	25-Jun-10	30-Jun-10	6	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16550	Place upper concrete and cure	Track	1C	-	0.0%	30-Jun-10	05-Jul-10	6	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16560	Street Surface finishes	Track	1C	130,519.40	93.7%	06-Jul-10	08-Jul-10	3	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16570	Remove fencing and Traffic Management	Track	1C	7,251.08	5.2%	09-Jul-10	09-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	1,464.86	1.1%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 4				446,547.71		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0027

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Services Group | BILFINGER BERGER

SIEI

Year														
Period														
Period End														

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Extract 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					Snagging	Snagging	Highways	1B	3,790.19	1.0%				18	19	-	-	-	-	-	-	3,790	-	-	-	-	-	-	3,790
		Balfour Street Tram Stop							302,863.44																			
			Tramstop						302,863.44							-	-	-	-	-	-	-	-	-	-	-	86,599	-	86,599
					538	Order REC Supply	Trams Eq	1B	-	0.0%	04-Feb-10	04-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Construction		Trams Eq	1B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					590	Civil Engineering And Building Works	Tramstops	1B	86,598.68	28.6%	28-Sep-09	15-Nov-09	49	23	25	-	-	-	-	-	-	-	-	-	-	86,599	-	86,599
					590	Civil Engineering And Building Works	Tramstops	1B	86,598.68	28.6%	16-Nov-09	11-Jan-10	58	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1B	1,749.47	0.6%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2600	Deliver and Install Shelter	Tramstops	1B	57,732.45	19.1%	18-Mar-10	01-Apr-10	15	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1B	583.16	0.2%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4510	Package Test Tramstop	Trams Eq	1B	68,904.99	22.8%	15-Jun-10	22-Jun-10	8	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4480	Install LV Power Supply and LV Power Equipment	Trams Eq	1B	-	0.0%	01-Apr-10	10-May-10	40	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4490	Install Telecon Equipment	Trams Eq	1B	-	0.0%	10-May-10	08-Jun-10	30	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4500	Install Station Control Equipment + AFC Equipment	Trams Eq	1B	-	0.0%	10-May-10	15-Jun-10	37	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4479	Access for E&M Tram Stop installation (01B Balfour Street)	Trams Eq	1B	-	0.0%	01-Apr-10	01-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4478	Access for visual inspection for E&M Tram Stop installation (01B Balfour Street)	Trams Eq	1B	-	0.0%	02-Mar-10	02-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1B	696.01	0.2%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	01C McDonald Road (inc.) to Princess Street West (exc.)								9,815,693.00							-	251,612	308,203	10,166	106,913	51,466	50,322	77,514	148,559	96,993	614,126	254,763	2,046	1,972,683
		01C1 McDonald Road (inc.) to Princess Street West (exc.)							1,501,588.02							-	-	-	-	-	-	-	-	-	-	-	-	-	-
			McDonald Road to Princess Street West																										
				E & M Installations					1,501,588.02							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3850	Overhead Catenary Line - One Half	OLE	1C	528,815.57	35.2%	10-Sep-10	29-Oct-10	50	35	37	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3850	Overhead Catenary Line	OLE	1C	352,543.72	23.5%	10-Sep-10	29-Oct-10	50	35	37	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	1C	8,902.62	0.6%				37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3860	Install Electrical Cables	SCC	1C	151,303.21	10.1%	24-Sep-10	21-Oct-10	28	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3870	Install Fibre Optic Cables	SCC	1C	151,303.21	10.1%	24-Sep-10	21-Oct-10	28	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3880	Install Signalling Wayside Equipment	SCC	1C	151,303.21	10.1%	22-Oct-10	22-Nov-10	32	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3845	Installation of poles and building fixings	SCC	1C	151,303.21	10.1%	16-Jul-10	09-Sep-10	56	33	35	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3844	Access for E&M wayside installation (01C)	SCC	1C	-	0.0%	16-Jul-10	16-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3859	Access to cable pits for cable laying (01C)	SCC	1C	-	0.0%	24-Sep-10	24-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3843	Access for visual inspection for E&M wayside installation (01C)	SCC	1C	-	0.0%	16-Jun-10	16-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3858	Access for visual inspection to cable pits for cable laying (01C)	SCC	1C	-	0.0%	21-Jul-10	21-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	1C	6,113.26	0.4%				38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01C2 McDonald Road (inc.) to Picardy Place (exc.)							2,761,174.77							-	251,612	251,612	10,166	50,322	50,322	50,322	77,514	58,624	96,612	-	203,084	1,524	1,101,715
			McDonald Road Tramstop																										
				Tramstop					204,634.14							-	-	-	-	-	-	-	-	56,591	-	-	94,318	1,524	152,433
					600	Civil Engineering And Building Works	Tramstops	1C	56,590.90	27.7%	22-Jul-09	31-Aug-09	41	21	22	-	-	-	-	-	-	-	-	56,591	-	-	-	-	56,591
					600	Civil Engineering And Building Works	Tramstops	1C	56,590.90	27.7%	01-Sep-09	24-Nov-09	86	22	25	-	-	-	-	-	-	-	-	-	-	56,591	-	-	56,591
					Snagging	Snagging	Tramstops	1C	1,143.25	0.6%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	1,143	1,143
					548	Order REC Supply	Trams Eq	1C	-	0.0%	17-Sep-09	17-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2660	Deliver and Install Shelter	Tramstops	1C	37,727.26	18.4%	29-Oct-09	12-Nov-09	15	24	25	-	-	-	-	-	-	-	-	-	-	37,727	-	-	37,727
					Snagging	Snagging	Tramstops	1C	381.08	0.2%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	381	381
					A2670	Install LV Power Supply and LV Power Equipment	Trams Eq	1C	-	0.0%	12-Nov-09	21-Jan-10	71	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2680	Package Test Tramstop	Trams Eq	1C	51,678.74	25.3%	25-Feb-10	04-Mar-10	8	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2673	Install Telecon Equipment	Trams Eq	1C	-	0.0%	21-Jan-10	18-Feb-10	29	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2675	Install Station Control Equipment + AFC Equipment	Trams Eq	1C	-	0.0%	21-Jan-10	25-Feb-10	36	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2669	Access for E&M Tram Stop installation (01C McDonald Road)	Trams Eq	1C	-	0.0%	12-Nov-09	12-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2668	Access for visual inspection for E&M Tram Stop installation (01C McDonald Road)	Trams Eq	1C	-	0.0%	13-Oct-09	13-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1C	522.01	0.3%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Leith Walk Ch 0 - 375																											
			Trackwork						1,113,837.68							-	-	-	-	-	-	-	27,192	-	96,612	-	108,766	-	232,570
				1st Half (Dummy)					591,705.15		27-Nov-08	21-Jan-09				-	-	-	-	-	-	-	27,192	-	96,612	-	108,766	-	232,570
					A16190	Establish Traffic Management & Temp. Fencing	Track	1C	27,191.54	4.6%	22-Jul-09	23-Jul-09	2	21	21	-	-	-	-	-	-	-	27,192	-	-	-	-	-	27,192
					A16200	Excavate box	Track	1C	-	0.0%	24-Jul-09	08-Sep-09	47	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16210	Excavate, lay and concrete ducts	Track	1C	81,574.62	13.8%	09-Sep-09	23-Sep-09	15	22	23	-	-	-	-	-	-	-	-	-	81,575	-	-	-	81,575
					A16220	Excavate and construct OLE bases	Track - BB	1C	15,037.64	2.5%	09-Sep-09	23-Sep-09	15	22	23	-	-	-	-	-	-	-	-	-	15,038	-	-	-	15,038
					A16230	Set Track (300m) - 50%	Track	1C	108,766.17	18.4%	12-Nov-09	30-Nov-09	19	25	25	-	-	-	-	-	-	-	-	-	-	108,766	-	-	108,766
					A16230	Set Track (300m) - 50%	Track	1C	108,766.17	18.4%	01-Dec-09	05-Jan-10	37	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16240	Place upper concrete and cure	Track	1C	190,340.79	32.2%	17-Nov-09	08-Jan-10	53	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16250	Street Surface finishes	Track	1C	54,383.08	9.2%	11-Jan-10	13-Jan-10	3	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	5,645.14	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				2nd Half (Dummy)					522,132.53		13-Jan-09	27-Jan-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16330	Excavate box	Track	1C	-	0.0%	14-Jan-10	25-Jan-10	12	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16340	Excavate, lay and concrete ducts	Track	1C	244,723.87	46.9%	26-Jan-10	09-Feb-10	15	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16350	Set Track	Track	1C	-	0.0%	11-May-10	28-May-10	18	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16360	Place upper concrete and cure	Track	1C	244,723.87	46.9%	14-May-10	03-Jun-10	21	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16370	Street Surface finishes	Track	1C	-	0.0%	04-Jun-10	08-Jun-10	5	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16380	Remove fencing and Traffic Management	Track	1C	27,191.54	5.2%	09-Jun-10	09-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	5,493.24	1.1%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		London Road Ch 375 - 450																											
			Trackwork						222,767.54							-	-	-	-	-	-	-	-	-	-	-	-	-	-
				1st Half (Dummy)					118,341.03		27-Nov-08	21-Jan-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16260	Establish Traffic Management & Temp. Fencing	Track	1C	5,438.31	4.6%	10-Jun-10	11-Jun-10	2	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16270	Excavate box	Track	1C	-	0.0%	14-Jun-10	15-Jun-10	2	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16280	Excavate, lay and concrete ducts	Track	1C	-	0.0%	16-Jun-10	18-Jun-10	3	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16290	Excavate and construct OLE bases	Track - BB	1C	3,007.53	2.5%	16-Jun-10	18-Jun-10	3	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16300	Set Track (300m)	Track	1C	-	0.0%	21-Jun-10	24-Jun-10	4	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16310	Place upper concrete and cure	Track	1C	97,889.55	82.7%	24-Jun-10	29-Jun-10	6	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16320	Street Surface finishes	Track	1C	10,876.62	9.2%	30-Jun-10	02-Jul-10	3	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	1,129.03	1.0%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				2nd Half (Dummy)					104,426.51		13-Jan-09	27-Jan-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16390	Excavate box	Track	1C	-	0.0%	05-Jul-10	06-Jul-10	2	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16400	Excavate, lay and concrete ducts	Track	1C	-	0.0%	07-Jul-10	09-Jul-10	3	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16410	Set Track	Track	1C	-	0.0%	12-Jul-10	15-Jul-10	4	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16420	Place upper concrete and cure	Track	1C	97,889.55	93.7%	15-Jul-10	20-Jul-10	6	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16430	Street Surface finishes	Track	1C	-	0.0%	21-Jul-10	23-Jul-10	3	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16440	Remove fencing and Traffic Management	Track	1C	5,438.31	5.2%	26-Jul-10	26-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	1,098.65	1.1%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Leith Walk Ch 0 - 375																											
			Roadworks						1,016,612.85							-	251,612	251,612	10,166	-	-	-	-	-	-	-	-	-	513,389
					A13540	Dummy	Highways	1C	251,611.68	24.8%	31-Oct-08	30-Nov-08	31	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13540	Dummy	Highways	1C	251,611.68	24.8%	01-Dec-08	31-Dec-08	31	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13540	Dummy	Highways	1C	251,611.68	24.8%	01-Jan-09	31-Jan-09	31	13	15	-	251,612	-	-	-	-	-	-	-	-	-	-	-	251,612
					A13540	Dummy	Highways	1C	251,611.68	24.8%	01-Feb-09	26-Mar-09	55	15	16	-	-	251,612	-	-	-	-	-	-	-	-	-	-	251,612
					Snagging	Snagging	Highways	1C	10,166.13	1.0%				16	17	-	-	-	10,166	-	-	-	-	-	-	-	-	-	10,166
					CrR: Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (15)	Highways	1C	-	0.0%		26-Mar-09			18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		London Road Ch 375 - 450																											
			Roadworks						203,322.57							-	-	-	-	50,322	50,322	50,322	50,322	2,033	-	-	-	-	203,323
					A13570	Dummy	Highways	1C	50,322.34	24.8%	27-Mar-09	30-Apr-09	35	16	18	-	-	-	-	50,322	-	-	-	-	-	-	-	-	50,322
					A13570	Dummy	Highways	1C	50,322.34	24.8%	01-May-09	31-May-09	31	18	19	-	-	-	-	-	50,322	-	-	-	-	-	-	-	50,322
					A13570	Dummy	Highways	1C	50,322.34	24.8%	01-Jun-09	30-Jun-09	30	19	20	-	-	-	-	-	-	50,322	-	-	-	-	-	-	50,322
					A13570	Dummy	Highways	1C	50,322.34	24.8%	01-Jul-09	21-Jul-09	22	20	21	-	-	-	-	-	-	-	50,322	-	-	-	-	-	50,322
					Snagging	Snagging	Highways	1C	2,033.23	1.0%				21	22	-	-	-	-	-	-	-	-	2,033	-	-	-	-	2,033
	01C3 Picardy Place (inc.) to St. Andrews Square (exc.)								3,098,429.43							-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Picardy Place Ch 450 - 700																											
			Trackwork						746,609.00							-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Phase 3 - 1st Half (Dummy)					160,825.95		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16450	Establish Traffic Management & Temp. Fencing	Track	1C	7,251.08	4.5%	15-Apr-10	16-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16460	Excavate box	Track	1C	-	0.0%	19-Apr-10	20-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16470	Excavate, lay and concrete ducts	Track	1C	-	0.0%	21-Apr-10	23-Apr-10	3	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16480	Excavate and construct OLE bases	Track - BB	1C	7,017.57	4.4%	21-Apr-10	23-Apr-10	3	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16490	Set Track (100m) - Picardy Place	Track	1C	-	0.0%	24-May-10	27-May-10	4	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16500	Place upper concrete and cure	Track	1C	130,519.40	81.2%	27-May-10	02-Jun-10	7	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16510	Street Surface finishes	Track	1C	14,502.16	9.0%	03-Jun-10	07-Jun-10	5	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	1,535.75	1.0%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Phase 3 - 2nd Half (Dummy)					139,235.34		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16520	Excavate box	Track	1C	-	0.0%	08-Jun-10	09-Jun-10	2	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16530	Excavate, lay and concrete ducts	Track	1C	-	0.0%	10-Jun-10	14-Jun-10	5	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16540	Set Track	Track	1C	-	0.0%	25-Jun-10	30-Jun-10	6	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16550	Place upper concrete and cure	Track	1C	-	0.0%	30-Jun-10	05-Jul-10	6	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16560	Street Surface finishes	Track	1C	130,519.40	93.7%	06-Jul-10	08-Jul-10	3	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16570	Remove fencing and Traffic Management	Track	1C	7,251.08	5.2%	09-Jul-10	09-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	1,464.86	1.1%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Phase 4					446,547.71		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0028

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year														
Period														
Period End														

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
						Snagging	Snagging	Highways	1B	3,790.19	1.0%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Balfour Street Tram Stop																											
				Tramstops						302,863.44							86,599	1,749	-	57,732	583	-	68,905	696	-	-	-	-	-	216,265
					538	Order REC Supply		Trams Eq	1B	-	0.0%	04-Feb-10	04-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Construction			Trams Eq	1B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					590	Civil Engineering And Building Works		Tramstops	1B	86,598.68	28.6%	28-Sep-09	15-Nov-09	49	23	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					590	Civil Engineering And Building Works		Tramstops	1B	86,598.68	28.6%	16-Nov-09	11-Jan-10	58	25	27	86,599	-	-	-	-	-	-	-	-	-	-	-	-	-	86,599
					Snagging	Snagging		Tramstops	1B	1,749.47	0.6%				27	28	-	1,749	-	-	-	-	-	-	-	-	-	-	-	1,749
					A2600	Deliver and Install Shelter		Tramstops	1B	57,732.45	19.1%	18-Mar-10	01-Apr-10	15	29	30	-	-	-	57,732	-	-	-	-	-	-	-	-	-	57,732
					Snagging	Snagging		Tramstops	1B	583.16	0.2%				30	31	-	-	-	-	583	-	-	-	-	-	-	-	-	-	583
					A4510	Package Test Tramstop		Trams Eq	1B	68,904.99	22.8%	15-Jun-10	22-Jun-10	8	32	33	-	-	-	-	-	-	68,905	-	-	-	-	-	-	-	68,905
					A4480	Install LV Power Supply and LV Power Equipment		Trams Eq	1B	-	0.0%	01-Apr-10	10-May-10	40	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4490	Install Telecon Equipment		Trams Eq	1B	-	0.0%	10-May-10	08-Jun-10	30	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4500	Install Station Control Equipment + AFC Equipment		Trams Eq	1B	-	0.0%	10-May-10	15-Jun-10	37	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4479	Access for E&M Tram Stop installation (01B Balfour Street)		Trams Eq	1B	-	0.0%	01-Apr-10	01-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4478	Access for visual inspection for E&M Tram Stop installation (01B Balfour Street)		Trams Eq	1B	-	0.0%	02-Mar-10	02-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Trams Eq	1B	696.01	0.2%				33	34	-	-	-	-	-	-	-	696	-	-	-	-	-	696
01C McDonald Road (inc.) to Princess Street West (exc.)										9,815,693.00							1,049,275	1,168,252	490,939	187,243	230,053	1,039,182	530,291	209,683	417,935	437,098	1,302,122	268,730	8,984	7,339,786
		01C1 McDonald Road (inc.) to Princess Street West (exc.)								1,501,588.02							-	-	-	-	-	-	-	-	151,303	-	1,183,966	160,206	6,113	1,501,588
			McDonald Road to Princess Street West																											
				E & M Installations						1,501,588.02							-	-	-	-	-	-	-	-	151,303	-	1,183,966	160,206	6,113	1,501,588
					A3850	Overhead Catenary Line - One Half		OLE	1C	528,815.57	35.2%	10-Sep-10	29-Oct-10	50	35	37	-	-	-	-	-	-	-	-	-	-	528,816	-	-	528,816
					A3850	Overhead Catenary Line		OLE	1C	352,543.72	23.5%	10-Sep-10	29-Oct-10	50	35	37	-	-	-	-	-	-	-	-	-	-	352,544	-	-	352,544
					Snagging	Snagging		OLE	1C	8,902.62	0.6%				37	38	-	-	-	-	-	-	-	-	-	-	-	8,903	-	8,903
					A3860	Install Electrical Cables		SCC	1C	151,303.21	10.1%	24-Sep-10	21-Oct-10	28	36	37	-	-	-	-	-	-	-	-	-	-	151,303	-	-	151,303
					A3870	Install Fibre Optic Cables		SCC	1C	151,303.21	10.1%	24-Sep-10	21-Oct-10	28	36	37	-	-	-	-	-	-	-	-	-	-	151,303	-	-	151,303
					A3880	Install Signalling Wayside Equipment		SCC	1C	151,303.21	10.1%	22-Oct-10	22-Nov-10	32	37	38	-	-	-	-	-	-	-	-	-	-	-	-	151,303	-	151,303
					A3845	Installation of poles and building fixings		SCC	1C	151,303.21	10.1%	16-Jul-10	09-Sep-10	56	33	35	-	-	-	-	-	-	-	151,303	-	-	-	-	-	-	151,303
					A3844	Access for E&M wayside installation (01C)		SCC	1C	-	0.0%	16-Jul-10	16-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3859	Access to cable pits for cable laying (01C)		SCC	1C	-	0.0%	24-Sep-10	24-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3843	Access for visual inspection for E&M wayside installation (01C)		SCC	1C	-	0.0%	16-Jun-10	16-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3858	Access for visual inspection to cable pits for cable laying (01C)		SCC	1C	-	0.0%	21-Jul-10	21-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		SCC	1C	6,113.26	0.4%				38	39	-	-	-	-	-	-	-	-	-	-	-	-	6,113	6,113
		01C2 McDonald Road (inc.) to Picardy Place (exc.)								2,761,174.77							353,490	250,369	51,679	522	-	280,361	114,259	104,457	1,099	-	-	-	-	1,156,236
			McDonald Road Tramstop																											
				Tramstop						204,634.14							-	-	51,679	522	-	-	-	-	-	-	-	-	-	52,201
					600	Civil Engineering And Building Works		Tramstops	1C	56,590.90	27.7%	22-Jul-09	31-Aug-09	41	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					600	Civil Engineering And Building Works		Tramstops	1C	56,590.90	27.7%	01-Sep-09	24-Nov-09	86	22	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Tramstops	1C	1,143.25	0.6%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					548	Order REC Supply		Trams Eq	1C	-	0.0%	17-Sep-09	17-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2660	Deliver and Install Shelter		Tramstops	1C	37,727.26	18.4%	29-Oct-09	12-Nov-09	15	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Tramstops	1C	381.08	0.2%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2670	Install LV Power Supply and LV Power Equipment		Trams Eq	1C	-	0.0%	12-Nov-09	21-Jan-10	71	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2680	Package Test Tramstop		Trams Eq	1C	51,678.74	25.3%	25-Feb-10	04-Mar-10	8	28	29	-	-	51,679	-	-	-	-	-	-	-	-	-	51,679
					A2673	Install Telecon Equipment		Trams Eq	1C	-	0.0%	21-Jan-10	18-Feb-10	29	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2675	Install Station Control Equipment + AFC Equipment		Trams Eq	1C	-	0.0%	21-Jan-10	25-Feb-10	36	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2669	Access for E&M Tram Stop installation (01C McDonald Road)		Trams Eq	1C	-	0.0%	12-Nov-09	12-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2668	Access for visual inspection for E&M Tram Stop installation (01C McDonald Road)		Trams Eq	1C	-	0.0%	13-Oct-09	13-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Trams Eq	1C	522.01	0.3%				29	30	-	-	-	522	-	-	-	-	-	-	-	-	522
			Leith Walk Ch 0 - 375																											
				Trackwork						1,113,837.68							353,490	250,369	-	-	-	271,915	5,493	-	-	-	-	-	-	881,268
					1st Half (Dummy)					591,705.15		27-Nov-08	21-Jan-09				353,490	5,645	-	-	-	-	-	-	-	-	-	-	-	359,135
					A16190	Establish Traffic Management & Temp. Fencing		Track	1C	27,191.54	4.6%	22-Jul-09	23-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16200	Excavate box		Track	1C	-	0.0%	24-Jul-09	08-Sep-09	47	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16210	Excavate, lay and concrete ducts		Track	1C	81,574.62	13.8%	09-Sep-09	23-Sep-09	15	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16220	Excavate and construct OLE bases		Track - BB	1C	15,037.64	2.5%	09-Sep-09	23-Sep-09	15	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16230	Set Track (300m) - 50%		Track	1C	108,766.17	18.4%	12-Nov-09	30-Nov-09	19	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16230	Set Track (300m) - 50%		Track	1C	108,766.17	18.4%	01-Dec-09	05-Jan-10	37	25	27	108,766	-	-	-	-	-	-	-	-	-	-	-	-	-	108,766
					A16240	Place upper concrete and cure		Track	1C	190,340.79	32.2%	17-Nov-09	08-Jan-10	53	25	27	190,341	-	-	-	-	-	-	-	-	-	-	-	-	-	190,341
					A16250	Street Surface finishes		Track	1C	54,383.08	9.2%	11-Jan-10	13-Jan-10	3	27	27	54,383	-	-	-	-	-	-	-	-	-	-	-	-	-	54,383
					Snagging	Snagging		Track	1C	5,645.14	1.0%				27	28	-	5,645	-	-	-	-	-	-	-	-	-	-	-	5,645
					2nd Half (Dummy)					522,132.53		13-Jan-09	27-Jan-09				-	244,724	-	-	-	271,915	5,493	-	-	-	-	-	-	522,133
					A16330	Excavate box		Track	1C	-	0.0%	14-Jan-10	25-Jan-10	12	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16340	Excavate, lay and concrete ducts		Track	1C	244,723.87	46.9%	26-Jan-10	09-Feb-10	15	27	28	-	244,724	-	-	-	-	-	-	-	-	-	-	-	-	244,724
					A16350	Set Track		Track	1C	-	0.0%	11-May-10	28-May-10	18	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16360	Place upper concrete and cure		Track	1C	244,723.87	46.9%	14-May-10	03-Jun-10	21	31	32	-	-	-	-	-	244,724	-	-	-	-	-	-	-	244,724
					A16370	Street Surface finishes		Track	1C	-	0.0%	04-Jun-10	08-Jun-10	5	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16380	Remove fencing and Traffic Management		Track	1C	27,191.54	5.2%	09-Jun-10	09-Jun-10	1	32	32	-	-	-	-	-	27,192	-	-	-	-	-	-	-	27,192
					Snagging	Snagging		Track	1C	5,493.24	1.1%				32	33	-	-	-	-	-	-	5,493	-	-	-	-	-	-	5,493
			London Road Ch 375 - 450																											
				Trackwork						222,767.54							-	-	-	-	-	8,446	108,766	104,457	1,099	-	-	-	-	222,768
					1st Half (Dummy)					118,341.03		27-Nov-08	21-Jan-09				-	-	-	-	-	8,446	108,766	1,129	-	-	-	-	-	118,341
					A16260	Establish Traffic Management & Temp. Fencing		Track	1C	5,438.31	4.6%	10-Jun-10	11-Jun-10	2	32	32	-	-	-	-	-	-	5,438	-	-	-	-	-	-	5,438
					A16270	Excavate box		Track	1C	-	0.0%	14-Jun-10	15-Jun-10	2	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16280	Excavate, lay and concrete ducts		Track	1C	-	0.0%	16-Jun-10	18-Jun-10	3	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16290	Excavate and construct OLE bases		Track - BB	1C	3,007.53	2.5%	16-Jun-10	18-Jun-10	3	32	32	-	-	-	-	-	3,008	-	-	-	-	-	-	-	3,008
					A16300	Set Track (300m)		Track	1C	-	0.0%	21-Jun-10	24-Jun-10	4	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16310	Place upper concrete and cure		Track	1C	97,889.55	82.7%	24-Jun-10	29-Jun-10	6	33	33	-	-	-	-	-	-	97,890	-	-	-	-	-	-	97,890
					A16320	Street Surface finishes		Track	1C	10,876.62	9.2%	30-Jun-10	02-Jul-10	3	33	33	-	-	-	-	-	-	10,877	-	-	-	-	-	-	10,877
					Snagging	Snagging		Track	1C	1,129.03	1.0%				33	34	-	-	-	-	-	-	-	1,129	-	-	-	-	-	1,129
					2nd Half (Dummy)					104,426.51		13-Jan-09	27-Jan-09				-	-	-	-	-	-	-	103,328	1,099	-	-	-	-	104,427
					A16390	Excavate box		Track	1C	-	0.0%	05-Jul-10	06-Jul-10	2	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16400	Excavate, lay and concrete ducts		Track	1C	-	0.0%	07-Jul-10	09-Jul-10	3	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16410	Set Track		Track	1C	-	0.0%	12-Jul-10	15-Jul-10	4	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16420	Place upper concrete and cure		Track	1C	97,889.55	93.7%	15-Jul-10	20-Jul-10	6	33	34	-	-	-	-	-	-	-	97,890	-	-	-	-	-	97,890
					A16430	Street Surface finishes		Track	1C	-	0.0%	21-Jul-10	23-Jul-10	3	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16440	Remove fencing and Traffic Management		Track	1C	5,438.31	5.2%	26-Jul-10	26-Jul-10	1	34	34	-	-	-	-	-	-	-	5,438	-	-	-	-	-	5,438
					Snagging	Snagging		Track	1C	1,098.65	1.1%				34	35	-	-	-	-	-	-	-	-	1,099	-	-	-	-	1,099
			Leith Walk Ch 0 - 375																											
				Roadworks						1,016,612.85							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13540	Dummy		Highways	1C	251,611.68	24.8%	31-Oct-08	30-Nov-08	31	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13540	Dummy		Highways	1C	251,611.68	24.8%	01-Dec-08	31-Dec-08	31	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13540	Dummy		Highways	1C	251,611.68	24.8%	01-Jan-09	31-Jan-09	31	13	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13540	Dummy		Highways	1C	251,611.68	24.8%	01-Feb-09	26-Mar-09	55	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Highways	1C	10,166.13	1.0%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					CR: Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (15)		Highways	1C	-	0.0%		26-Mar-09			18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			London Road Ch 375 - 450																											
				Roadworks						203,322.57							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13570	Dummy		Highways	1C	50,322.34	24.8%	27-Mar-09	30-Apr-09	35	16	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13570	Dummy		Highways	1C	50,322.34	24.8%	01-May-09	31-May-09	31	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13570	Dummy		Highways	1C	50,322.34	24.8%	01-Jun-09	30-Jun-09	30	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13570	Dummy		Highways	1C	50,322.34	24.8%	01-Jul-09	21-Jul-09	22	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Highways	1C	2,033.23	1.0%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01C3 Picardy Place (inc.) to St. Andrews Square (exc.)								3,098,429.43							21,753	71,275	428,567	135,042	229,531	758,821	416,032	105,226	265,533	437,098	118,156	108,524	2,871	3,098,429
			Picardy Place Ch 450 - 700																											
				Trackwork						746,609.00							-	-	-	14,269	-	145,022	139,306	1,465	7,018	435,065	4,465	-	-	746,609
					Phase 3 - 1st Half (Dummy)					160,825.95		23-Apr-09	23-Apr-09				-	-	-	14,269	-	145,022	1,536	-	-	-	-	-	-	160,826
					A16450	Establish Traffic Management & Temp. Fencing		Track	1C	7,251.08	4.5%	15-Apr-10	16-Apr-10	2	30	30	-	-	-	7,251	-	-	-	-	-	-	-	-	-	7,251
					A16460	Excavate box		Track	1C	-	0.0%	19-Apr-10	20-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16470	Excavate, lay and concrete ducts		Track	1C	-	0.0%	21-Apr-10	23-Apr-10	3	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16480	Excavate and construct OLE bases		Track - BB	1C	7,017.57	4.4%	21-Apr-10	23-Apr-10	3	30	30	-	-	-	7,018	-	-	-	-	-	-	-	-	-	7,018
					A16490	Set Track (100m) - Picardy Place		Track	1C	-	0.0%	24-May-10	27-May-10	4	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16500	Place upper concrete and cure		Track	1C	130,519.40	81.2%	27-May-10	02-Jun-10	7	32	32	-	-	-	-	-	130,519	-	-	-	-	-	-	-	130,519
					A16510	Street Surface finishes		Track	1C	14,502.16	9.0%	03-Jun-10	07-Jun-10	5	32	32	-	-	-	-	-	14,502	-	-	-	-	-	-	-	14,502
					Snagging	Snagging		Track	1C	1,535.75	1.0%				32	33	-	-	-	-	-	-	1,536	-	-	-	-	-	-	1,536
					Phase 3 - 2nd Half (Dummy)					139,235.34		23-Apr-09	23-Apr-09				-	-	-	-	-	-	137,770	1,465	-	-	-	-	-	139,235
					A16520	Excavate box		Track	1C	-	0.0%	08-Jun-10	09-Jun-10	2	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16530	Excavate, lay and concrete ducts		Track	1C	-	0.0%	10-Jun-10	14-Jun-10	5	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16540	Set Track		Track	1C	-	0.0%	25-Jun-10	30-Jun-10	6	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16550	Place upper concrete and cure		Track	1C	-	0.0%	30-Jun-10	05-Jul-10	6	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16560	Street Surface finishes		Track	1C	130,519.40	93.7%	06-Jul-10	08-Jul-10	3	33	33	-	-	-	-	-	-	130,519	-	-	-	-	-	-	130,519
					A16570	Remove fencing and Traffic Management		Track	1C	7,251.08	5.2%	09-Jul-10	09-Jul-10	1	33	33	-	-	-	-	-	-	7,251	-	-	-	-	-	-	7,251
					Snagging	Snagging		Track	1C	1,464.86	1.1%				33	34	-	-	-	-	-	-	-	1,465	-	-	-	-	-	1,465
					Phase 4					446,547.71		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	7,018	435,065	4,465	-	-	446,548

USB00000073_0029

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Murray Services Group | BILFINGER BERGER

SIEI

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					Snagging	Snagging	Highways	1B	3,790.19	1.0%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Balfour Street Tram Stop																										
			Tramstop						302,863.44							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					538	Order REC Supply	Trams Eq	1B	-	0.0%	04-Feb-10	04-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Construction		Trams Eq	1B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					590	Civil Engineering And Building Works	Tramstops	1B	86,598.68	28.6%	28-Sep-09	15-Nov-09	49	23	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					590	Civil Engineering And Building Works	Tramstops	1B	86,598.68	28.6%	16-Nov-09	11-Jan-10	58	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1B	1,749.47	0.6%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2600	Deliver and Install Shelter	Tramstops	1B	57,732.45	19.1%	18-Mar-10	01-Apr-10	15	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1B	583.16	0.2%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4510	Package Test Tramstop	Trams Eq	1B	68,904.99	22.8%	15-Jun-10	22-Jun-10	8	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4480	Install LV Power Supply and LV Power Equipment	Trams Eq	1B	-	0.0%	01-Apr-10	10-May-10	40	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4490	Install Telecon Equipment	Trams Eq	1B	-	0.0%	10-May-10	08-Jun-10	30	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4500	Install Station Control Equipment + AFC Equipment	Trams Eq	1B	-	0.0%	10-May-10	15-Jun-10	37	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4479	Access for E&M Tram Stop installation (01B Balfour Street)	Trams Eq	1B	-	0.0%	01-Apr-10	01-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4478	Access for visual inspection for E&M Tram Stop installation (01B Balfour Street)	Trams Eq	1B	-	0.0%	02-Mar-10	02-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1B	696.01	0.2%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	01C McDonald Road (inc.) to Princess Street West (exc.)								9,815,693.00							-	-	-	-	-	-	-	-	-	-	-	-	-
		01C1 McDonald Road (inc.) to Princess Street West (exc.)							1,501,588.02							-	-	-	-	-	-	-	-	-	-	-	-	-
			McDonald Road to Princess Street West																									
				E & M Installations					1,501,588.02							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3850	Overhead Catenary Line - One Half	OLE	1C	528,815.57	35.2%	10-Sep-10	29-Oct-10	50	35	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3850	Overhead Catenary Line	OLE	1C	352,543.72	23.5%	10-Sep-10	29-Oct-10	50	35	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	1C	8,902.62	0.6%				37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3860	Install Electrical Cables	SCC	1C	151,303.21	10.1%	24-Sep-10	21-Oct-10	28	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3870	Install Fibre Optic Cables	SCC	1C	151,303.21	10.1%	24-Sep-10	21-Oct-10	28	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3880	Install Signalling Wayside Equipment	SCC	1C	151,303.21	10.1%	22-Oct-10	22-Nov-10	32	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3845	Installation of poles and building fixings	SCC	1C	151,303.21	10.1%	16-Jul-10	09-Sep-10	56	33	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3844	Access for E&M wayside installation (01C)	SCC	1C	-	0.0%	16-Jul-10	16-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3859	Access to cable pits for cable laying (01C)	SCC	1C	-	0.0%	24-Sep-10	24-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3843	Access for visual inspection for E&M wayside installation (01C)	SCC	1C	-	0.0%	16-Jun-10	16-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3858	Access for visual inspection to cable pits for cable laying (01C)	SCC	1C	-	0.0%	21-Jul-10	21-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	1C	6,113.26	0.4%				38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	01C2 McDonald Road (inc.) to Picardy Place (exc.)								2,761,174.77							-	-	-	-	-	-	-	-	-	-	-	-	-
		McDonald Road Tramstop																										
			Tramstop						204,634.14							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					600	Civil Engineering And Building Works	Tramstops	1C	56,590.90	27.7%	22-Jul-09	31-Aug-09	41	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					600	Civil Engineering And Building Works	Tramstops	1C	56,590.90	27.7%	01-Sep-09	24-Nov-09	86	22	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1C	1,143.25	0.6%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					548	Order REC Supply	Trams Eq	1C	-	0.0%	17-Sep-09	17-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2660	Deliver and Install Shelter	Tramstops	1C	37,727.26	18.4%	29-Oct-09	12-Nov-09	15	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1C	381.08	0.2%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2670	Install LV Power Supply and LV Power Equipment	Trams Eq	1C	-	0.0%	12-Nov-09	21-Jan-10	71	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2680	Package Test Tramstop	Trams Eq	1C	51,678.74	25.3%	25-Feb-10	04-Mar-10	8	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2673	Install Telecon Equipment	Trams Eq	1C	-	0.0%	21-Jan-10	18-Feb-10	29	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2675	Install Station Control Equipment + AFC Equipment	Trams Eq	1C	-	0.0%	21-Jan-10	25-Feb-10	36	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2669	Access for E&M Tram Stop installation (01C McDonald Road)	Trams Eq	1C	-	0.0%	12-Nov-09	12-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2668	Access for visual inspection for E&M Tram Stop installation (01C McDonald Road)	Trams Eq	1C	-	0.0%	13-Oct-09	13-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1C	522.01	0.3%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Leith Walk Ch 0 - 375																										
			Trackwork						1,113,837.68							-	-	-	-	-	-	-	-	-	-	-	-	-	-
				1st Half (Dummy)					591,705.15		27-Nov-08	21-Jan-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16190	Establish Traffic Management & Temp. Fencing	Track	1C	27,191.54	4.6%	22-Jul-09	23-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16200	Excavate box	Track	1C	-	0.0%	24-Jul-09	08-Sep-09	47	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16210	Excavate, lay and concrete ducts	Track	1C	81,574.62	13.8%	09-Sep-09	23-Sep-09	15	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16220	Excavate and construct OLE bases	Track - BB	1C	15,037.64	2.5%	09-Sep-09	23-Sep-09	15	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16230	Set Track (300m) - 50%	Track	1C	108,766.17	18.4%	12-Nov-09	30-Nov-09	19	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16230	Set Track (300m) - 50%	Track	1C	108,766.17	18.4%	01-Dec-09	05-Jan-10	37	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16240	Place upper concrete and cure	Track	1C	190,340.79	32.2%	17-Nov-09	08-Jan-10	53	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16250	Street Surface finishes	Track	1C	54,383.08	9.2%	11-Jan-10	13-Jan-10	3	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	5,645.14	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				2nd Half (Dummy)					522,132.53		13-Jan-09	27-Jan-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16330	Excavate box	Track	1C	-	0.0%	14-Jan-10	25-Jan-10	12	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16340	Excavate, lay and concrete ducts	Track	1C	244,723.87	46.9%	26-Jan-10	09-Feb-10	15	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16350	Set Track	Track	1C	-	0.0%	11-May-10	28-May-10	18	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16360	Place upper concrete and cure	Track	1C	244,723.87	46.9%	14-May-10	03-Jun-10	21	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16370	Street Surface finishes	Track	1C	-	0.0%	04-Jun-10	08-Jun-10	5	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16380	Remove fencing and Traffic Management	Track	1C	27,191.54	5.2%	09-Jun-10	09-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	5,493.24	1.1%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		London Road Ch 375 - 450																										
			Trackwork						222,767.54							-	-	-	-	-	-	-	-	-	-	-	-	-	-
				1st Half (Dummy)					118,341.03		27-Nov-08	21-Jan-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16260	Establish Traffic Management & Temp. Fencing	Track	1C	5,438.31	4.6%	10-Jun-10	11-Jun-10	2	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16270	Excavate box	Track	1C	-	0.0%	14-Jun-10	15-Jun-10	2	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16280	Excavate, lay and concrete ducts	Track	1C	-	0.0%	16-Jun-10	18-Jun-10	3	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16290	Excavate and construct OLE bases	Track - BB	1C	3,007.53	2.5%	16-Jun-10	18-Jun-10	3	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16300	Set Track (300m)	Track	1C	-	0.0%	21-Jun-10	24-Jun-10	4	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16310	Place upper concrete and cure	Track	1C	97,889.55	82.7%	24-Jun-10	29-Jun-10	6	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16320	Street Surface finishes	Track	1C	10,876.62	9.2%	30-Jun-10	02-Jul-10	3	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	1,129.03	1.0%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				2nd Half (Dummy)					104,426.51		13-Jan-09	27-Jan-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16390	Excavate box	Track	1C	-	0.0%	05-Jul-10	06-Jul-10	2	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16400	Excavate, lay and concrete ducts	Track	1C	-	0.0%	07-Jul-10	09-Jul-10	3	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16410	Set Track	Track	1C	-	0.0%	12-Jul-10	15-Jul-10	4	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16420	Place upper concrete and cure	Track	1C	97,889.55	93.7%	15-Jul-10	20-Jul-10	6	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16430	Street Surface finishes	Track	1C	-	0.0%	21-Jul-10	23-Jul-10	3	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16440	Remove fencing and Traffic Management	Track	1C	5,438.31	5.2%	26-Jul-10	26-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	1,098.65	1.1%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Leith Walk Ch 0 - 375																										
			Roadworks						1,016,612.85							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13540	Dummy	Highways	1C	251,611.68	24.8%	31-Oct-08	30-Nov-08	31	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13540	Dummy	Highways	1C	251,611.68	24.8%	01-Dec-08	31-Dec-08	31	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13540	Dummy	Highways	1C	251,611.68	24.8%	01-Jan-09	31-Jan-09	31	13	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13540	Dummy	Highways	1C	251,611.68	24.8%	01-Feb-09	26-Mar-09	55	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	10,166.13	1.0%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					CHL Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (15)	Highways	1C	-	0.0%		26-Mar-09			18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		London Road Ch 375 - 450																										
			Roadworks						203,322.57							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13570	Dummy	Highways	1C	50,322.34	24.8%	27-Mar-09	30-Apr-09	35	16	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13570	Dummy	Highways	1C	50,322.34	24.8%	01-May-09	31-May-09	31	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13570	Dummy	Highways	1C	50,322.34	24.8%	01-Jun-09	30-Jun-09	30	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13570	Dummy	Highways	1C	50,322.34	24.8%	01-Jul-09	21-Jul-09	22	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	2,033.23	1.0%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	01C3 Picardy Place (inc.) to St. Andrews Square (exc.)								3,098,429.43							-	-	-	-	-	-	-	-	-	-	-	-	-
		Picardy Place Ch 450 - 700																										
			Trackwork						746,609.00							-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Phase 3 - 1st Half (Dummy)					160,825.95		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16450	Establish Traffic Management & Temp. Fencing	Track	1C	7,251.08	4.5%	15-Apr-10	16-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16460	Excavate box	Track	1C	-	0.0%	19-Apr-10	20-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16470	Excavate, lay and concrete ducts	Track	1C	-	0.0%	21-Apr-10	23-Apr-10	3	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16480	Excavate and construct OLE bases	Track - BB	1C	7,017.57	4.4%	21-Apr-10	23-Apr-10	3	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16490	Set Track (100m) - Picardy Place	Track	1C	-	0.0%	24-May-10	27-May-10	4	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16500	Place upper concrete and cure	Track	1C	130,519.40	81.2%	27-May-10	02-Jun-10	7	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16510	Street Surface finishes	Track	1C	14,502.16	9.0%	03-Jun-10	07-Jun-10	5	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	1,535.75	1.0%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Phase 3 - 2nd Half (Dummy)					139,235.34		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16520	Excavate box	Track	1C	-	0.0%	08-Jun-10	09-Jun-10	2	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16530	Excavate, lay and concrete ducts	Track	1C	-	0.0%	10-Jun-10	14-Jun-10	5	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16540	Set Track	Track	1C	-	0.0%	25-Jun-10	30-Jun-10	6	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16550	Place upper concrete and cure	Track	1C	-	0.0%	30-Jun-10	05-Jul-10	6	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16560	Street Surface finishes	Track	1C	130,519.40	93.7%	06-Jul-10	08-Jul-10	3	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16570	Remove fencing and Traffic Management	Track	1C	7,251.08	5.2%	09-Jul-10	09-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	1,464.86	1.1%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Phase 4					446,547.71		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0030

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Morrison Construction Group | BILFINGER BERGER | SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year: 2008 Period: Period End: 1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
					A16580	Establish Traffic Management & Temp. Fencing	Track	1C	-	0.0%	12-Jul-10	13-Jul-10	2	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16590	Excavate box	Track	1C	-	0.0%	14-Jul-10	21-Jul-10	8	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16600	Excavate, lay and concrete ducts	Track	1C	-	0.0%	22-Jul-10	07-Sep-10	48	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16610	Excavate and construct OLE bases	Track - BB	1C	7,017.57	1.6%	22-Jul-10	07-Sep-10	48	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16620	Set Track (150m)	Track	1C	195,779.10	43.8%	08-Sep-10	29-Sep-10	22	35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16630	Place upper concrete and cure	Track	1C	195,779.10	43.8%	13-Sep-10	04-Oct-10	22	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16640	Street Surface finishes	Track	1C	-	0.0%	05-Oct-10	07-Oct-10	3	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16650	Remove fencing and Traffic Management	Track	1C	43,506.47	9.7%	08-Oct-10	08-Oct-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	4,465.48	1.0%				36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				York Place Ch 700 - 850																								
				Trackwork					**445,535.07**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13660	Dummy	Track	1C	-	0.0%	20-Jan-10	22-Mar-10	62	27	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16660	Establish Traffic Management & Temp. Fencing	Track	1C	21,753.23	4.9%	20-Jan-10	21-Jan-10	2	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16670	Excavate box	Track	1C	-	0.0%	22-Jan-10	29-Jan-10	8	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16680	Excavate, lay and concrete ducts	Track	1C	65,259.70	14.6%	01-Feb-10	11-Feb-10	11	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16690	Excavate and construct OLE bases	Track - BB	1C	6,015.06	1.4%	01-Feb-10	11-Feb-10	11	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16700	Set Track (150m)	Track	1C	-	0.0%	12-Feb-10	26-Feb-10	15	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16710	Place upper concrete and cure	Track	1C	326,298.50	73.2%	17-Feb-10	03-Mar-10	15	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16720	Street Surface finishes	Track	1C	-	0.0%	04-Mar-10	08-Mar-10	5	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16730	Remove fencing and Traffic Management	Track	1C	21,753.23	4.9%	09-Mar-10	09-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	4,455.35	1.0%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				York Place Ch 850 - 1000																								
				Trackwork					**445,535.07**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13670	Dummy	Track	1C	-	0.0%	29-Apr-10	01-Jul-10	64	31	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16740	Establish Traffic Management & Temp. Fencing	Track	1C	21,753.23	4.9%	29-Apr-10	30-Apr-10	2	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16750	Excavate box	Track	1C	-	0.0%	04-May-10	11-May-10	8	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16760	Excavate, lay and concrete ducts	Track	1C	65,259.70	14.6%	12-May-10	24-May-10	13	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16770	Excavate and construct OLE bases	Track - BB	1C	6,015.06	1.4%	12-May-10	24-May-10	13	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16780	Set Track (150m)	Track	1C	-	0.0%	28-May-10	14-Jun-10	18	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16790	Place upper concrete and cure	Track	1C	326,298.50	73.2%	03-Jun-10	17-Jun-10	15	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16800	Street Surface finishes	Track	1C	-	0.0%	18-Jun-10	22-Jun-10	5	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16810	Remove fencing and Traffic Management	Track	1C	21,753.23	4.9%	23-Jun-10	23-Jun-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	4,455.35	1.0%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Picardy Place Tram Stop																								
				Tramstop					**204,634.14**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					610	Civil Engineering And Building Works	Tramstops	1C	56,590.90	27.7%	15-Apr-10	31-May-10	47	30	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					610	Civil Engineering And Building Works	Tramstops	1C	56,590.90	27.7%	01-Jun-10	16-Jul-10	47	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1C	1,143.25	0.6%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					558	Order REC Supply	Trams Eq	1C	-	0.0%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2720	Deliver and Install Shelter	Tramstops	1C	37,727.26	18.4%	06-Jul-10	20-Jul-10	15	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1C	381.08	0.2%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4550	Package Test Tramstop	Trams Eq	1C	51,678.74	25.3%	02-Nov-10	09-Nov-10	8	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4520	Install LV Power Supply and LV Power Equipment	Trams Eq	1C	-	0.0%	20-Jul-10	28-Sep-10	71	34	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4530	Install Telecon Equipment	Trams Eq	1C	-	0.0%	28-Sep-10	26-Oct-10	29	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4540	Install Station Control Equipment + AFC Equipment	Trams Eq	1C	-	0.0%	28-Sep-10	02-Nov-10	36	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4519	Access for E&M Tram Stop installation (01C Picardy Place)	Trams Eq	1C	-	0.0%	20-Jul-10	20-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4518	Access for visual inspection for E&M Tram Stop installation (01C Picardy Place)	Trams Eq	1C	-	0.0%	18-Jun-10	18-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1C	522.01	0.3%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Picardy Place Ch 450 - 700																								
				Roadworks					**-**	**0%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1				**-**	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13580	Dummy	Highways	1C	-	0.0%	20-Jan-10	16-Feb-10	28	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	-	0.0%				28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2				**-**	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13590	Dummy	Highways	1C	-	0.0%	17-Feb-10	14-Apr-10	57	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	-	0.0%				30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3				**-**	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13600	Dummy	Highways	1C	-	0.0%	15-Apr-10	11-Jun-10	58	30	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	-	0.0%				32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 4				**-**	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13610	Dummy	Highways	1C	-	0.0%	14-Jun-10	10-Sep-10	89	32	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	-	0.0%				35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 5				**-**	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13620	Dummy	Highways	1C	-	0.0%	11-Oct-10	14-Jan-11	96	37	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	-	0.0%				40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 6				**-**	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13630	Dummy	Highways	1C	-	0.0%	17-Jan-11	11-Mar-11	54	40	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	-	0.0%				42	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				York Place Ch 700 - 850																								
				Roadworks					**406,645.14**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13680	Dummy - 40%	Highways	1C	80,515.74	19.8%	20-Jan-10	28-Feb-10	40	27	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13680	Dummy	Highways	1C	120,773.61	29.7%	01-Mar-10	30-Mar-10	31	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13690	Dummy	Highways	1C	201,289.34	49.5%	31-Mar-10	28-Apr-10	29	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				York Place Ch 850 - 1000																								
				Roadworks					**406,645.14**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13700	Dummy - 50%	Highways	1C	80,515.74	19.8%	29-Apr-10	31-May-10	33	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13700	Dummy	Highways	1C	120,773.61	29.7%	01-Jun-10	09-Jul-10	40	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13710	Dummy	Highways	1C	201,289.34	49.5%	12-Jul-10	10-Sep-10	61	33	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (14)	Highways	1C	-	0.0%		10-Sep-10																
				Cathedral Substation																								
				Substation					**442,825.87**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					356	Civil Engineering and Building Works	Subst - BB	1C	77,085.86	17.4%	15-Apr-10	31-May-10	47	30	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					356	Completion of envelope	Subst - BB	1C	77,085.86	17.4%	01-Jun-10	16-Jul-10	47	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					346	Order REC supply from Scottish Power	Subst - S	1C	-	0.0%	24-Mar-10	24-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	1C	1,557.29	0.4%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5580	Power Infeed from Public Net available inc HV cable	Subst - S	1C	-	0.0%	19-Jul-10	19-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5600	Installation of TPS Equipment	Subst - S	1C	56,845.18	12.8%	06-Sep-10	15-Oct-10	40	35	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5590	Install LV Power Supply and LV Power Equipment	Subst - S	1C	56,845.18	12.8%	19-Jul-10	10-Sep-10	54	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5620	Testing and Commissioning	Subst - S	1C	-	0.0%	18-Oct-10	04-Nov-10	18	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5610	Install Telecom and Scada	Subst - S	1C	56,845.18	12.8%	27-Sep-10	15-Oct-10	19	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6120	Installation of SIG-interlocking cubicle	Subst - S	1C	56,845.18	12.8%	02-Aug-10	13-Aug-10	12	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6130	Commissioning of SIG -interlocking cubicle	Subst - S	1C	56,845.18	12.8%	23-Nov-10	29-Nov-10	7	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2839	Access for E&M substation installation (01C Cathredral)	Subst - S	1C	-	0.0%	19-Jul-10	19-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2838	Access for visual inspection forE&M substation installation (01C Cathredral)	Subst - S	1C	-	0.0%	17-Jun-10	17-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	1C	2,870.97	0.6%				38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				01C4 St. Andrews Square (inc.) to Princes Street West (exc.)					**2,454,500.78**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
				St Andrews Square to Waverley Bridge Ch 1000 - 1360																								
				Trackwork					**1,069,284.17**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13830	Dummy	Track	1C	-	0.0%	09-Sep-09	05-Jan-10	119	22	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16820	Establish Traffic Management & Temp. Fencing	Track	1C	52,207.76	4.9%	09-Sep-09	10-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16830	Excavate box	Track	1C	-	0.0%	11-Sep-09	01-Oct-09	21	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16840	Excavate, lay and concrete ducts	Track	1C	156,623.28	14.6%	02-Oct-09	02-Nov-09	32	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16850	Excavate and construct OLE bases	Track - BB	1C	14,436.14	1.4%	02-Oct-09	02-Nov-09	32	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16860	Set Track (360m)	Track	1C	417,662.08	39.1%	27-Nov-09	03-Feb-10	69	25	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16870	Place upper concrete and cure	Track	1C	365,454.32	34.2%	06-Jan-10	05-Feb-10	31	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16880	Sreet Surface finishes	Track	1C	-	0.0%	08-Feb-10	10-Feb-10	3	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16890	Remove fencing and Traffic Management	Track	1C	52,207.76	4.9%	11-Feb-10	11-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1C	10,692.84	1.0%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Roadworks					**975,948.34**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13520	Dummy - 40%	Highways	1C	386,475.54	39.6%	09-Sep-09	31-Oct-09	53	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13520	Dummy	Highways	1C	579,713.31	59.4%	01-Nov-09	05-Jan-10	67	24	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	9,759.48	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (13)	Highways	1C	-	0.0%		05-Jan-10																
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (12)	Highways	1C	-	0.0%		05-Jan-10																
				Princes Street West Tram Stop																								
				Tramstop					**204,634.14**							-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0031

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Services Group BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Extract 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					A16580	Establish Traffic Management & Temp. Fencing	Track	1C	-	0.0%	12-Jul-10	13-Jul-10	2	33	33														-
					A16590	Excavate box	Track	1C	-	0.0%	14-Jul-10	21-Jul-10	8	33	34														-
					A16600	Excavate, lay and concrete ducts	Track	1C	-	0.0%	22-Jul-10	07-Sep-10	48	34	35														-
					A16610	Excavate and construct OLE bases	Track - BB	1C	7,017.57	1.6%	22-Jul-10	07-Sep-10	48	34	35														-
					A16620	Set Track (150m)	Track	1C	195,779.10	43.8%	08-Sep-10	29-Sep-10	22	35	36														-
					A16630	Place upper concrete and cure	Track	1C	195,779.10	43.8%	13-Sep-10	04-Oct-10	22	36	36														-
					A16640	Street Surface finishes	Track	1C	-	0.0%	05-Oct-10	07-Oct-10	3	36	36														-
					A16650	Remove fencing and Traffic Management	Track	1C	43,506.47	9.7%	08-Oct-10	08-Oct-10	1	36	36														-
					Snagging	Snagging	Track	1C	4,465.48	1.0%				36	37														-
				York Place Ch 700 - 850																									
				Trackwork					**445,535.07**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13660	Dummy	Track	1C	-	0.0%	20-Jan-10	22-Mar-10	62	27	29														-
					A16660	Establish Traffic Management & Temp. Fencing	Track	1C	21,753.23	4.9%	20-Jan-10	21-Jan-10	2	27	27														-
					A16670	Excavate box	Track	1C	-	0.0%	22-Jan-10	29-Jan-10	8	27	27														-
					A16680	Excavate, lay and concrete ducts	Track	1C	65,259.70	14.6%	01-Feb-10	11-Feb-10	11	28	28														-
					A16690	Excavate and construct OLE bases	Track - BB	1C	6,015.06	1.4%	01-Feb-10	11-Feb-10	11	28	28														-
					A16700	Set Track (150m)	Track	1C	-	0.0%	12-Feb-10	26-Feb-10	15	28	28														-
					A16710	Place upper concrete and cure	Track	1C	326,298.50	73.2%	17-Feb-10	03-Mar-10	15	28	29														-
					A16720	Street Surface finishes	Track	1C	-	0.0%	04-Mar-10	08-Mar-10	5	29	29														-
					A16730	Remove fencing and Traffic Management	Track	1C	21,753.23	4.9%	09-Mar-10	09-Mar-10	1	29	29														-
					Snagging	Snagging	Track	1C	4,455.35	1.0%				30	31														-
				York Place Ch 850 - 1000																									
				Trackwork					**445,535.07**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13670	Dummy	Track	1C	-	0.0%	29-Apr-10	01-Jul-10	64	31	33														-
					A16740	Establish Traffic Management & Temp. Fencing	Track	1C	21,753.23	4.9%	29-Apr-10	30-Apr-10	2	31	31														-
					A16750	Excavate box	Track	1C	-	0.0%	04-May-10	11-May-10	8	31	31														-
					A16760	Excavate, lay and concrete ducts	Track	1C	65,259.70	14.6%	12-May-10	24-May-10	13	31	32														-
					A16770	Excavate and construct OLE bases	Track - BB	1C	6,015.06	1.4%	12-May-10	24-May-10	13	31	32														-
					A16780	Set Track (150m)	Track	1C	-	0.0%	28-May-10	14-Jun-10	18	32	32														-
					A16790	Place upper concrete and cure	Track	1C	326,298.50	73.2%	03-Jun-10	17-Jun-10	15	32	32														-
					A16800	Street Surface finishes	Track	1C	-	0.0%	18-Jun-10	22-Jun-10	5	32	33														-
					A16810	Remove fencing and Traffic Management	Track	1C	21,753.23	4.9%	23-Jun-10	23-Jun-10	1	33	33														-
					Snagging	Snagging	Track	1C	4,455.35	1.0%				33	34														-
				Picardy Place Tram Stop																									
				Tramstop					**204,634.14**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					610	Civil Engineering And Building Works	Tramstops	1C	56,590.90	27.7%	15-Apr-10	31-May-10	47	30	32														-
					610	Civil Engineering And Building Works	Tramstops	1C	56,590.90	27.7%	01-Jun-10	16-Jul-10	47	32	33														-
					Snagging	Snagging	Tramstops	1C	1,143.25	0.6%				33	34														-
					558	Order REC Supply	Trams Eq	1C	-	0.0%	24-May-10	24-May-10	1	32	32														-
					A2720	Deliver and Install Shelter	Tramstops	1C	37,727.26	18.4%	06-Jul-10	20-Jul-10	15	33	34														-
					Snagging	Snagging	Tramstops	1C	381.08	0.2%				34	35														-
					A4550	Package Test Tramstop	Trams Eq	1C	51,678.74	25.3%	02-Nov-10	09-Nov-10	8	37	38														-
					A4520	Install LV Power Supply and LV Power Equipment	Trams Eq	1C	-	0.0%	20-Jul-10	28-Sep-10	71	34	36														-
					A4530	Install Telecon Equipment	Trams Eq	1C	-	0.0%	28-Sep-10	26-Oct-10	29	36	37														-
					A4540	Install Station Control Equipment + AFC Equipment	Trams Eq	1C	-	0.0%	28-Sep-10	02-Nov-10	36	36	37														-
					A4519	Access for E&M Tram Stop installation (01C Picardy Place)	Trams Eq	1C	-	0.0%	20-Jul-10	20-Jul-10	1	34	34														-
					A4518	Access for visual inspection for E&M Tram Stop installation (01C Picardy Place)	Trams Eq	1C	-	0.0%	18-Jun-10	18-Jun-10	1	32	32														-
					Snagging	Snagging	Trams Eq	1C	522.01	0.3%				32	33														-
				Picardy Place Ch 450 - 700																									
				Roadworks					-	0%						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1				-	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13580	Dummy	Highways	1C	-	0.0%	20-Jan-10	16-Feb-10	28	27	28														-
					Snagging	Snagging	Highways	1C	-	0.0%				28	28														-
					Phase 2				-	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13590	Dummy	Highways	1C	-	0.0%	17-Feb-10	14-Apr-10	57	28	30														-
					Snagging	Snagging	Highways	1C	-	0.0%				30	30														-
					Phase 3				-	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13600	Dummy	Highways	1C	-	0.0%	15-Apr-10	11-Jun-10	58	30	32														-
					Snagging	Snagging	Highways	1C	-	0.0%				32	32														-
					Phase 4				-	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13610	Dummy	Highways	1C	-	0.0%	14-Jun-10	10-Sep-10	89	32	35														-
					Snagging	Snagging	Highways	1C	-	0.0%				35	35														-
					Phase 5				-	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13620	Dummy	Highways	1C	-	0.0%	11-Oct-10	14-Jan-11	96	37	40														-
					Snagging	Snagging	Highways	1C	-	0.0%				40	40														-
					Phase 6				-	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13630	Dummy	Highways	1C	-	0.0%	17-Jan-11	11-Mar-11	54	40	42														-
					Snagging	Snagging	Highways	1C	-	0.0%				42	42														-
				York Place Ch 700 - 850																									
				Roadworks					**406,645.14**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13680	Dummy - 40%	Highways	1C	80,515.74	19.8%	20-Jan-10	28-Feb-10	40	27	29														-
					A13680	Dummy	Highways	1C	120,773.61	29.7%	01-Mar-10	30-Mar-10	31	29	30														-
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				30	31														-
					Phase 2				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13690	Dummy	Highways	1C	201,289.34	49.5%	31-Mar-10	28-Apr-10	29	30	31														-
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				31	32														-
				York Place Ch 850 - 1000																									
				Roadworks					**406,645.14**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13700	Dummy - 50%	Highways	1C	80,515.74	19.8%	29-Apr-10	31-May-10	33	31	32														-
					A13700	Dummy	Highways	1C	120,773.61	29.7%	01-Jun-10	09-Jul-10	40	32	33														-
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				33	34														-
					Phase 2				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13710	Dummy	Highways	1C	201,289.34	49.5%	12-Jul-10	10-Sep-10	61	33	35														-
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				35	36														-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (14)	Highways	1C	-	0.0%		10-Sep-10				-	-	-	-	-	-	-	-	-	-	-	-	-
				Cathedral Sub Station																									
				Substation					**442,825.87**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					356	Civil Engineering and Building Works	Subst - BB	1C	77,085.86	17.4%	15-Apr-10	31-May-10	47	30	32														-
					356	Completion of envelope	Subst - BB	1C	77,085.86	17.4%	01-Jun-10	16-Jul-10	47	32	33														-
					346	Order REC supply from Scottish Power	Subst - S	1C	-	0.0%	24-Mar-10	24-Mar-10	1	29	29														-
					Snagging	Snagging	Subst - BB	1C	1,557.29	0.4%				33	34														-
					A5580	Power Infeed from Public Net available inc HV cable	Subst - S	1C	-	0.0%	19-Jul-10	19-Jul-10	1	34	34														-
					A5600	Installation of TPS Equipment	Subst - S	1C	56,845.18	12.8%	06-Sep-10	15-Oct-10	40	35	37														-
					A5590	Install LV Power Supply and LV Power Equipment	Subst - S	1C	56,845.18	12.8%	19-Jul-10	10-Sep-10	54	34	35														-
					A5620	Testing and Commissioning	Subst - S	1C	-	0.0%	18-Oct-10	04-Nov-10	18	37	37														-
					A5610	Install Telecom and Scada	Subst - S	1C	56,845.18	12.8%	27-Sep-10	15-Oct-10	19	36	37														-
					A6120	Installation of SIG-interlocking cubicle	Subst - S	1C	56,845.18	12.8%	02-Aug-10	13-Aug-10	12	34	34														-
					A6130	Commissioning of SIG -interlocking cubicle	Subst - S	1C	56,845.18	12.8%	23-Nov-10	29-Nov-10	7	38	38														-
					A2839	Access for E&M substation installation (01C Cathredral)	Subst - S	1C	-	0.0%	19-Jul-10	19-Jul-10	1	34	34														-
					A2838	Access for visual inspection forE&M substation installation (01C Cathredral)	Subst - S	1C	-	0.0%	17-Jun-10	17-Jun-10	1	32	32														-
					Snagging	Snagging	Subst - S	1C	2,870.97	0.6%				38	39														-
				01C4 St. Andrews Square (inc.) to Princes Street West (exc.)					**2,454,500.78**							-	-	**56,591**	-	**56,591**	**1,143**	-	-	**89,935**	**381**	**614,126**	**51,679**	**522**	**870,968**
				St Andrews Square to Waverley Bridge Ch 1000 - 1360																									
				Trackwork					**1,069,284.17**							-	-	-	-	-	-	-	-	**52,208**	-	**171,059**	-	-	**223,267**
					A13530	Dummy	Track	1C	-	0.0%	09-Sep-09	05-Jan-10	119	22	27														-
					A16820	Establish Traffic Management & Temp. Fencing	Track	1C	52,207.76	4.9%	09-Sep-09	10-Sep-09	2	22	22										52,208					-	52,208
					A16830	Excavate box	Track	1C	-	0.0%	11-Sep-09	01-Oct-09	21	22	23														-	-	-
					A16840	Excavate, lay and concrete ducts	Track	1C	156,623.28	14.6%	02-Oct-09	02-Nov-09	32	23	24												156,623			-	156,623
					A16850	Excavate and construct OLE bases	Track - BB	1C	14,436.14	1.4%	02-Oct-09	02-Nov-09	32	23	24												14,436			-	14,436
					A16860	Set Track (360m)	Track	1C	417,662.08	39.1%	27-Nov-09	03-Feb-10	69	25	28															-	-
					A16870	Place upper concrete and cure	Track	1C	365,454.32	34.2%	06-Jan-10	05-Feb-10	31	27	28															-	-
					A16880	Street Surface finishes	Track	1C	-	0.0%	08-Feb-10	10-Feb-10	3	28	28															-	-
					A16890	Remove fencing and Traffic Management	Track	1C	52,207.76	4.9%	11-Feb-10	11-Feb-10	1	28	28															-	-
					Snagging	Snagging	Track	1C	10,692.84	1.0%				28	29														-	-
				Roadworks					**975,948.34**							-	-	-	-	-	-	-	-	-	-	**386,476**	-	-	**386,476**
					A13520	Dummy - 40%	Highways	1C	386,470.54	39.6%	09-Sep-09	31-Oct-09	53	22	24												386,476			-	386,476
					A13520	Dummy	Highways	1C	579,713.31	59.4%	01-Nov-09	05-Jan-10	67	24	27															-	-
					Snagging	Snagging	Highways	1C	9,759.48	1.0%				27	28														-	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (13)	Highways	1C	-	0.0%		05-Jan-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (12)	Highways	1C	-	0.0%		05-Jan-10				-	-	-	-	-	-	-	-	-	-	-	-	-
				Princes Street West Tram Stop																									
				Tramstop					**204,634.14**							-	-	**56,591**	-	**56,591**	**1,143**	-	-	**37,727**	**381**	-	**51,679**	**522**	**204,634**

USB00000073_0032

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year																
Period																
Period End																
L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					A16580	Establish Traffic Management & Temp. Fencing	Track	1C	-	0.0%	12-Jul-10	13-Jul-10	2	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16590	Excavate box	Track	1C	-	0.0%	14-Jul-10	21-Jul-10	8	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16600	Excavate, lay and concrete ducts	Track	1C	-	0.0%	22-Jul-10	07-Sep-10	48	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16610	Excavate and construct OLE bases	Track - BB	1C	7,017.57	1.6%	22-Jul-10	07-Sep-10	48	34	35	-	-	-	-	-	-	-	-	7,018	-	-	-	-	7,018
					A16620	Set Track (150m)	Track	1C	195,779.10	43.8%	08-Sep-10	29-Sep-10	22	35	36	-	-	-	-	-	-	-	-	-	195,779	-	-	-	195,779
					A16630	Place upper concrete and cure	Track	1C	195,779.10	43.8%	13-Sep-10	04-Oct-10	22	36	36	-	-	-	-	-	-	-	-	-	195,779	-	-	-	195,779
					A16640	Street Surface finishes	Track	1C	-	0.0%	05-Oct-10	07-Oct-10	3	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16650	Remove fencing and Traffic Management	Track	1C	43,506.47	9.7%	08-Oct-10	08-Oct-10	1	36	36	-	-	-	-	-	-	-	-	-	43,506	-	-	-	43,506
					Snagging	Snagging	Track	1C	4,465.48	1.0%				36	37	-	-	-	-	-	-	-	-	-	-	4,465	-	-	4,465
					York Place Ch 700 - 850																								
					Trackwork				**445,535.07**							**21,753**	**71,275**	**348,052**	**-**	**4,455**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**445,535**
					A13660	Dummy	Track	1C	-	0.0%	20-Jan-10	22-Mar-10	62	27	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16660	Establish Traffic Management & Temp. Fencing	Track	1C	21,753.23	4.9%	20-Jan-10	21-Jan-10	2	27	27	21,753	-	-	-	-	-	-	-	-	-	-	-	-	-	21,753
					A16670	Excavate box	Track	1C	-	0.0%	22-Jan-10	29-Jan-10	8	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16680	Excavate, lay and concrete ducts	Track - BB	1C	65,259.70	14.6%	01-Feb-10	11-Feb-10	11	28	28	-	65,260	-	-	-	-	-	-	-	-	-	-	-	-	65,260
					A16690	Excavate and construct OLE bases	Track - BB	1C	6,015.06	1.4%	01-Feb-10	11-Feb-10	11	28	28	-	6,015	-	-	-	-	-	-	-	-	-	-	-	-	6,015
					A16700	Set Track (150m)	Track	1C	-	0.0%	12-Feb-10	26-Feb-10	15	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16710	Place upper concrete and cure	Track	1C	326,298.50	73.2%	17-Feb-10	03-Mar-10	15	28	29	-	-	326,298	-	-	-	-	-	-	-	-	-	-	-	326,298
					A16720	Street Surface finishes	Track	1C	-	0.0%	04-Mar-10	08-Mar-10	5	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16730	Remove fencing and Traffic Management	Track	1C	21,753.23	4.9%	09-Mar-10	09-Mar-10	1	29	29	-	-	21,753	-	-	-	-	-	-	-	-	-	-	-	21,753
					Snagging	Snagging	Track	1C	4,455.35	1.0%				30	31	-	-	-	-	4,455	-	-	-	-	-	-	-	-	4,455
					York Place Ch 850 - 1000																								
					Trackwork				**445,535.07**							**-**	**-**	**-**	**-**	**21,753**	**397,573**	**21,753**	**4,455**	**-**	**-**	**-**	**-**	**-**	**445,535**
					A13670	Dummy	Track	1C	-	0.0%	29-Apr-10	01-Jul-10	64	31	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16740	Establish Traffic Management & Temp. Fencing	Track	1C	21,753.23	4.9%	29-Apr-10	30-Apr-10	2	31	31	-	-	-	-	21,753	-	-	-	-	-	-	-	-	-	21,753
					A16750	Excavate box	Track	1C	-	0.0%	04-May-10	11-May-10	8	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16760	Excavate, lay and concrete ducts	Track	1C	65,259.70	14.6%	12-May-10	24-May-10	13	31	32	-	-	-	-	-	65,260	-	-	-	-	-	-	-	-	65,260
					A16770	Excavate and construct OLE bases	Track - BB	1C	6,015.06	1.4%	12-May-10	24-May-10	13	31	32	-	-	-	-	-	6,015	-	-	-	-	-	-	-	-	6,015
					A16780	Set Track (150m)	Track	1C	-	0.0%	28-May-10	14-Jun-10	18	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16790	Place upper concrete and cure	Track	1C	326,298.50	73.2%	03-Jun-10	17-Jun-10	15	32	32	-	-	-	-	-	326,298	-	-	-	-	-	-	-	-	326,298
					A16800	Street Surface finishes	Track	1C	-	0.0%	18-Jun-10	22-Jun-10	5	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16810	Remove fencing and Traffic Management	Track	1C	21,753.23	4.9%	23-Jun-10	23-Jun-10	1	33	33	-	-	-	-	-	-	21,753	-	-	-	-	-	-	-	21,753
					Snagging	Snagging	Track	1C	4,455.35	1.0%				33	34	-	-	-	-	-	-	-	4,455	-	-	-	-	-	4,455
					Picardy Place Tram Stop																								
					Tramstop				**204,634.14**							**-**	**-**	**-**	**-**	**-**	**56,590.90**	**57,112.90**	**38,870.51**	**381.08**	**-**	**-**	**51,678.74**	**-**	**204,634.14**
					610	Civil Engineering And Building Works	Tramstops	1C	56,590.90	27.7%	15-Apr-10	31-May-10	47	30	32	-	-	-	-	-	56,591	-	-	-	-	-	-	-	-	56,591
					610	Civil Engineering And Building Works	Tramstops	1C	56,590.90	27.7%	01-Jun-10	16-Jul-10	47	32	33	-	-	-	-	-	-	56,591	-	-	-	-	-	-	-	56,591
					Snagging	Snagging	Tramstops	1C	1,143.25	0.6%				33	34	-	-	-	-	-	-	-	1,143	-	-	-	-	-	1,143
					558	Order REC Supply	Trams Eq	1C	-	0.0%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2720	Deliver and Install Shelter	Tramstops	1C	37,727.26	18.4%	06-Jul-10	20-Jul-10	15	33	34	-	-	-	-	-	-	-	37,727	-	-	-	-	-	-	37,727
					Snagging	Snagging	Tramstops	1C	381.08	0.2%				34	35	-	-	-	-	-	-	-	-	381	-	-	-	-	381
					A4550	Package Test Tramstop	Trams Eq	1C	51,678.74	25.3%	02-Nov-10	09-Nov-10	8	37	38	-	-	-	-	-	-	-	-	-	-	-	51,679	-	51,679
					A4520	Install LV Power Supply and LV Power Equipment	Trams Eq	1C	-	0.0%	20-Jul-10	28-Sep-10	71	34	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4530	Install Telecon Equipment	Trams Eq	1C	-	0.0%	28-Sep-10	26-Oct-10	29	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4540	Install Station Control Equipment + AFC Equipment	Trams Eq	1C	-	0.0%	28-Sep-10	02-Nov-10	36	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4519	Access for E&M Tram Stop installation (01C Picardy Place)	Trams Eq	1C	-	0.0%	20-Jul-10	20-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4518	Access for visual inspection for E&M Tram Stop installation (01C Picardy Place)	Trams Eq	1C	-	0.0%	18-Jun-10	18-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1C	522.01	0.3%				32	33	-	-	-	-	-	-	522	-	-	-	-	-	-	522
					Picardy Place Ch 450 - 700																								
					Roadworks				**-**	**0%**						**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					Phase 1				**-**	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13580	Dummy	Highways	1C	-	0.0%	20-Jan-10	16-Feb-10	28	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	-	0.0%				28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2				**-**	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13590	Dummy	Highways	1C	-	0.0%	17-Feb-10	14-Apr-10	57	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	-	0.0%				30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3				**-**	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13600	Dummy	Highways	1C	-	0.0%	15-Apr-10	11-Jun-10	58	30	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	-	0.0%				32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 4				**-**	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13610	Dummy	Highways	1C	-	0.0%	14-Jun-10	10-Sep-10	89	32	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	-	0.0%				35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 5				**-**	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13620	Dummy	Highways	1C	-	0.0%	11-Oct-10	14-Jan-11	96	37	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	-	0.0%				40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 6				**-**	**0.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13630	Dummy	Highways	1C	-	0.0%	17-Jan-11	11-Mar-11	54	40	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1C	-	0.0%				42	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					York Place Ch 700 - 850																								
					Roadworks				**406,645.14**	**100%**						**-**	**-**	**80,516**	**120,774**	**203,323**	**2,033**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**406,645**
					Phase 1				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**				**-**	**-**	**80,516**	**120,774**	**2,033**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**203,323**
					A13680	Dummy - 40%	Highways	1C	80,515.74	19.8%	20-Jan-10	28-Feb-10	40	27	29	-	-	80,516	-	-	-	-	-	-	-	-	-	-	-	80,516
					A13680	Dummy	Highways	1C	120,773.61	29.7%	01-Mar-10	30-Mar-10	31	29	30	-	-	-	120,774	-	-	-	-	-	-	-	-	-	-	120,774
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				30	31	-	-	-	-	2,033	-	-	-	-	-	-	-	-	2,033
					Phase 2				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**				**-**	**-**	**-**	**-**	**201,289**	**2,033**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**203,323**
					A13690	Dummy	Highways	1C	201,289.34	49.5%	31-Mar-10	28-Apr-10	29	30	31	-	-	-	-	201,289	-	-	-	-	-	-	-	-	-	201,289
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				31	32	-	-	-	-	-	2,033	-	-	-	-	-	-	-	-	2,033
					York Place Ch 850 - 1000																								
					Roadworks				**406,645.14**	**100%**						**-**	**-**	**-**	**-**	**-**	**80,516**	**120,774**	**2,033**	**201,289**	**2,033**	**-**	**-**	**-**	**406,645**
					Phase 1				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**				**-**	**-**	**-**	**-**	**-**	**80,516**	**120,774**	**2,033**	**-**	**-**	**-**	**-**	**-**	**203,323**
					A13700	Dummy - 50%	Highways	1C	80,515.74	19.8%	29-Apr-10	31-May-10	33	31	32	-	-	-	-	-	80,516	-	-	-	-	-	-	-	-	80,516
					A13700	Dummy	Highways	1C	120,773.61	29.7%	01-Jun-10	09-Jul-10	40	32	33	-	-	-	-	-	-	120,774	-	-	-	-	-	-	-	120,774
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				33	34	-	-	-	-	-	-	-	2,033	-	-	-	-	-	2,033
					Phase 2				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**				**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**201,289**	**2,033**	**-**	**-**	**203,323**
					A13710	Dummy	Highways	1C	201,289.34	49.5%	12-Jul-10	10-Sep-10	61	33	35	-	-	-	-	-	-	-	-	201,289	-	-	-	-	201,289
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				35	36	-	-	-	-	-	-	-	-	-	2,033	-	-	-	2,033
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (14)	Highways	1C	-	0.0%		10-Sep-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Cathedral Substation																								
					Substation				**442,825.87**							**-**	**-**	**-**	**-**	**-**	**77,086**	**77,086**	**58,402**	**56,845**	**-**	**113,690**	**56,845**	**2,871**	**442,826**
					356	Civil Engineering and Building Works	Subst - BB	1C	77,085.86	17.4%	15-Apr-10	31-May-10	47	30	32	-	-	-	-	-	77,086	-	-	-	-	-	-	-	-	77,086
					356	Completion of envelope	Subst - BB	1C	77,085.86	17.4%	01-Jun-10	16-Jul-10	47	32	33	-	-	-	-	-	-	77,086	-	-	-	-	-	-	-	77,086
					346	Order REC supply from Scottish Power	Subst - S	1C	-	0.0%	24-Mar-10	24-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	1C	1,557.29	0.4%				33	34	-	-	-	-	-	-	-	1,557	-	-	-	-	-	1,557
					A5580	Power Infeed from Public Net available inc HV cable	Subst - S	1C	-	0.0%	19-Jul-10	19-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5600	Installation of TPS Equipment	Subst - S	1C	56,845.18	12.8%	06-Sep-10	15-Oct-10	40	35	37	-	-	-	-	-	-	-	-	-	-	56,845	-	-	-	56,845
					A5590	Install LV Power Supply and LV Power Equipment	Subst - S	1C	56,845.18	12.8%	19-Jul-10	10-Sep-10	54	34	35	-	-	-	-	-	-	-	-	-	56,845	-	-	-	-	56,845
					A5620	Testing and Commissioning	Subst - S	1C	-	0.0%	18-Oct-10	04-Nov-10	18	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5610	Install Telecom and Scada	Subst - S	1C	56,845.18	12.8%	27-Sep-10	15-Oct-10	19	36	37	-	-	-	-	-	-	-	-	-	-	56,845	-	-	-	56,845
					A6120	Installation of SIG-interlocking cubicle	Subst - S	1C	56,845.18	12.8%	02-Aug-10	13-Aug-10	12	34	34	-	-	-	-	-	-	-	56,845	-	-	-	-	-	-	56,845
					A6130	Commissioning of SIG -interlocking cubicle	Subst - S	1C	56,845.18	12.8%	23-Nov-10	29-Nov-10	7	38	38	-	-	-	-	-	-	-	-	-	-	-	-	56,845	-	56,845
					A2839	Access for E&M substation installation (01C Cathredral)	Subst - S	1C	-	0.0%	19-Jul-10	19-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2838	Access for visual inspection forE&M substation installation (01C Cathredral)	Subst - S	1C	-	0.0%	17-Jun-10	17-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	1C	2,870.97	0.6%				38	39	-	-	-	-	-	-	-	-	-	-	-	-	2,871	2,871
					01C4 St. Andrews Square (inc.) to Princes Street West (exc.)				**2,454,500.78**							**674,031**	**846,608**	**10,693**	**51,679**	**522**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1,583,533**
					St Andrews Square to Waverley Bridge Ch 1000 - 1360																								
					Trackwork				**1,069,284.17**							**-**	**835,324**	**10,693**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**846,017**
					A13530	Dummy	Track	1C	-	0.0%	09-Sep-09	05-Jan-10	119	22	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16820	Establish Traffic Management & Temp. Fencing	Track	1C	52,207.76	4.9%	09-Sep-09	10-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16830	Excavate box	Track	1C	-	0.0%	11-Sep-09	01-Oct-09	21	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16840	Excavate, lay and concrete ducts	Track	1C	156,623.28	14.6%	02-Oct-09	02-Nov-09	32	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16850	Excavate and construct OLE bases	Track - BB	1C	14,436.14	1.4%	02-Oct-09	02-Nov-09	32	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16860	Set Track (360m)	Track	1C	417,662.08	39.1%	27-Nov-09	03-Feb-10	69	25	28	-	417,662	-	-	-	-	-	-	-	-	-	-	-	-	417,662
					A16870	Place upper concrete and cure	Track	1C	365,454.32	34.2%	06-Jan-10	05-Feb-10	31	27	28	-	365,454	-	-	-	-	-	-	-	-	-	-	-	-	365,454
					A16880	Street Surface finishes	Track	1C	-	0.0%	08-Feb-10	10-Feb-10	3	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16890	Remove fencing and Traffic Management	Track	1C	52,207.76	4.9%	11-Feb-10	11-Feb-10	1	28	28	-	52,208	-	-	-	-	-	-	-	-	-	-	-	-	52,208
					Snagging	Snagging	Track	1C	10,692.84	1.0%				28	29	-	-	10,693	-	-	-	-	-	-	-	-	-	-	10,693
					Roadworks				**975,948.34**							**579,713**	**9,759**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**589,473**
					A13520	Dummy - 40%	Highways	1C	386,479.54	39.6%	09-Sep-09	31-Oct-09	53	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13520	Dummy	Highways	1C	579,713.31	59.4%	01-Nov-09	05-Jan-10	67	24	27	579,713	-	-	-	-	-	-	-	-	-	-	-	-	-	579,713
					Snagging	Snagging	Highways	1C	9,759.48	1.0%				27	28	-	9,759	-	-	-	-	-	-	-	-	-	-	-	9,759
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (13)	Highways	1C	-	0.0%		05-Jan-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (12)	Highways	1C	-	0.0%		05-Jan-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Princes Street West Tram Stop																								
					Tramstop				**204,634.14**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

USB00000073_0033

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					A16580	Establish Traffic Management & Temp. Fencing	Track	1C	-	0.0%	12-Jul-10	13-Jul-10	2	33	33														
					A16590	Excavate box	Track	1C	-	0.0%	14-Jul-10	21-Jul-10	8	33	34														
					A16600	Excavate, lay and concrete ducts	Track	1C	-	0.0%	22-Jul-10	07-Sep-10	48	34	35														
					A16610	Excavate and construct OLE bases	Track - BB	1C	7,017.57	1.6%	22-Jul-10	07-Sep-10	48	34	35														
					A16620	Set Track (150m)	Track	1C	195,779.10	43.8%	08-Sep-10	29-Sep-10	22	35	36														
					A16630	Place upper concrete and cure	Track	1C	195,779.10	43.8%	13-Sep-10	04-Oct-10	22	36	36														
					A16640	Street Surface finishes	Track	1C	-	0.0%	05-Oct-10	07-Oct-10	3	36	36														
					A16650	Remove fencing and Traffic Management	Track	1C	43,506.47	9.7%	08-Oct-10	08-Oct-10	1	36	36														
					Snagging	Snagging	Track	1C	4,465.48	1.0%				36	37														
					York Place Ch 769 - 850																								
					Trackwork				**445,535.07**																				
					A13660	Dummy	Track	1C	-	0.0%	20-Jan-10	22-Mar-10	62	27	29														
					A16660	Establish Traffic Management & Temp. Fencing	Track	1C	21,753.23	4.9%	20-Jan-10	21-Jan-10	2	27	27														
					A16670	Excavate box	Track	1C	-	0.0%	22-Jan-10	29-Jan-10	8	27	27														
					A16680	Excavate, lay and concrete ducts	Track	1C	65,259.70	14.6%	01-Feb-10	11-Feb-10	11	28	28														
					A16690	Excavate and construct OLE bases	Track - BB	1C	6,015.06	1.4%	01-Feb-10	11-Feb-10	11	28	28														
					A16700	Set Track (150m)	Track	1C	-	0.0%	12-Feb-10	26-Feb-10	15	28	28														
					A16710	Place upper concrete and cure	Track	1C	326,298.50	73.2%	17-Feb-10	03-Mar-10	15	28	29														
					A16720	Street Surface finishes	Track	1C	-	0.0%	04-Mar-10	08-Mar-10	5	29	29														
					A16730	Remove fencing and Traffic Management	Track	1C	21,753.23	4.9%	09-Mar-10	09-Mar-10	1	29	29														
					Snagging	Snagging	Track	1C	4,465.35	1.0%				30	31														
					York Place Ch 850 - 1000																								
					Trackwork				**445,535.07**																				
					A13670	Dummy	Track	1C	-	0.0%	29-Apr-10	01-Jul-10	64	31	33														
					A16740	Establish Traffic Management & Temp. Fencing	Track	1C	21,753.23	4.9%	29-Apr-10	30-Apr-10	2	31	31														
					A16750	Excavate box	Track	1C	-	0.0%	04-May-10	11-May-10	8	31	31														
					A16760	Excavate, lay and concrete ducts	Track	1C	65,259.70	14.6%	12-May-10	24-May-10	13	31	32														
					A16770	Excavate and construct OLE bases	Track - BB	1C	6,015.06	1.4%	12-May-10	24-May-10	13	31	32														
					A16780	Set Track (150m)	Track	1C	-	0.0%	28-May-10	14-Jun-10	18	32	32														
					A16790	Place upper concrete and cure	Track	1C	326,298.50	73.2%	03-Jun-10	17-Jun-10	15	32	32														
					A16800	Street Surface finishes	Track	1C	-	0.0%	18-Jun-10	22-Jun-10	5	32	33														
					A16810	Remove fencing and Traffic Management	Track	1C	21,753.23	4.9%	23-Jun-10	23-Jun-10	1	33	33														
					Snagging	Snagging	Track	1C	4,455.35	1.0%				33	34														
					Picardy Place Tram Stop																								
					Tramstop				**204,634.14**																				
					610	Civil Engineering And Building Works	Tramstops	1C	56,590.90	27.7%	15-Apr-10	31-May-10	47	30	32														
					610	Civil Engineering And Building Works	Tramstops	1C	56,590.90	27.7%	01-Jun-10	16-Jul-10	47	32	33														
					Snagging	Snagging	Tramstops	1C	1,143.25	0.6%				33	34														
					568	Order REC Supply	Trams Eq	1C	-	0.0%	24-May-10	24-May-10	1	32	32														
					A2720	Deliver and Install Shelter	Tramstops	1C	37,727.26	18.4%	06-Jul-10	20-Jul-10	15	33	34														
					Snagging	Snagging	Tramstops	1C	381.08	0.2%				34	35														
					A4550	Package Test Tramstop	Trams Eq	1C	51,678.74	25.3%	02-Nov-10	09-Nov-10	8	37	38														
					A4520	Install LV Power Supply and LV Power Equipment	Trams Eq	1C	-	0.0%	20-Jul-10	28-Sep-10	71	34	36														
					A4530	Install Telecon Equipment	Trams Eq	1C	-	0.0%	28-Sep-10	26-Oct-10	29	36	37														
					A4540	Install Station Control Equipment + AFC Equipment	Trams Eq	1C	-	0.0%	28-Sep-10	02-Nov-10	36	36	37														
					A4519	Access for E&M Tram Stop installation (01C Picardy Place)	Trams Eq	1C	-	0.0%	20-Jul-10	20-Jul-10	1	34	34														
					A4518	Access for visual inspection for E&M Tram Stop installation (01C Picardy Place)	Trams Eq	1C	-	0.0%	18-Jun-10	18-Jun-10	1	32	32														
					Snagging	Snagging	Trams Eq	1C	522.01	0.3%				32	33														
					Picardy Place Ch 450 - 700																								
					Roadworks				-	0%																			
					Phase 1				-	0.0%	**23-Apr-09**	**23-Apr-09**																	
					A13580	Dummy	Highways	1C	-	0.0%	20-Jan-10	16-Feb-10	28	27	28														
					Snagging	Snagging	Highways	1C	-	0.0%				28	28														
					Phase 2				-	0.0%	**23-Apr-09**	**23-Apr-09**																	
					A13590	Dummy	Highways	1C	-	0.0%	17-Feb-10	14-Apr-10	57	28	30														
					Snagging	Snagging	Highways	1C	-	0.0%				30	30														
					Phase 3				-	0.0%	**23-Apr-09**	**23-Apr-09**																	
					A13600	Dummy	Highways	1C	-	0.0%	15-Apr-10	11-Jun-10	58	30	32														
					Snagging	Snagging	Highways	1C	-	0.0%				32	32														
					Phase 4				-	0.0%	**23-Apr-09**	**23-Apr-09**																	
					A13610	Dummy	Highways	1C	-	0.0%	14-Jun-10	10-Sep-10	89	32	35														
					Snagging	Snagging	Highways	1C	-	0.0%				35	35														
					Phase 5				-	0.0%	**23-Apr-09**	**23-Apr-09**																	
					A13620	Dummy	Highways	1C	-	0.0%	11-Oct-10	14-Jan-11	96	37	40														
					Snagging	Snagging	Highways	1C	-	0.0%				40	40														
					Phase 6				-	0.0%	**23-Apr-09**	**23-Apr-09**																	
					A13630	Dummy	Highways	1C	-	0.0%	17-Jan-11	11-Mar-11	54	40	42														
					Snagging	Snagging	Highways	1C	-	0.0%				42	42														
					York Place Ch 769 - 850																								
					Roadworks				**406,645.14**	**100%**																			
					Phase 1				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13680	Dummy - 40%	Highways	1C	80,515.74	19.8%	20-Jan-10	28-Feb-10	40	27	29														
					A13680	Dummy	Highways	1C	120,773.61	29.7%	01-Mar-10	30-Mar-10	31	29	30														
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				30	31														
					Phase 2				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13690	Dummy	Highways	1C	201,289.34	49.5%	31-Mar-10	28-Apr-10	29	30	31														
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				31	32														
					York Place Ch 850 - 1000																								
					Roadworks				**406,645.14**	**100%**																			
					Phase 1				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13700	Dummy - 50%	Highways	1C	80,515.74	19.8%	29-Apr-10	31-May-10	33	31	32														
					A13700	Dummy	Highways	1C	120,773.61	29.7%	01-Jun-10	09-Jul-10	40	32	33														
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				33	34														
					Phase 2				**203,322.57**	**50.0%**	**23-Apr-09**	**23-Apr-09**																	
					A13710	Dummy	Highways	1C	201,289.34	49.5%	12-Jul-10	10-Sep-10	61	33	35														
					Snagging	Snagging	Highways	1C	2,033.23	0.5%				35	36														
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (14)	Highways	1C	-	0.0%		10-Sep-10																
					Cathedral Substation																								
					Substation				**442,825.87**																				
					356	Civil Engineering and Building Works	Subst - BB	1C	77,085.86	17.4%	15-Apr-10	31-May-10	47	30	32														
					356	Completion of envelope	Subst - BB	1C	77,085.86	17.4%	01-Jun-10	16-Jul-10	47	32	33														
					346	Order REC supply from Scottish Power	Subst - S	1C	-	0.0%	24-Mar-10	24-Mar-10	1	29	29														
					Snagging	Snagging	Subst - BB	1C	1,557.29	0.4%				33	34														
					A6580	Power Infeed from Public Net available inc HV cable	Subst - S	1C	-	0.0%	19-Jul-10	19-Jul-10	1	34	34														
					A5600	Installation of TPS Equipment	Subst - S	1C	56,845.18	12.8%	06-Sep-10	15-Oct-10	40	35	37														
					A5590	Install LV Power Supply and LV Power Equipment	Subst - S	1C	56,845.18	12.8%	19-Jul-10	10-Sep-10	54	34	35														
					A5620	Testing and Commissioning	Subst - S	1C	-	0.0%	18-Oct-10	04-Nov-10	18	37	37														
					A5610	Install Telecom and Scada	Subst - S	1C	56,845.18	12.8%	27-Sep-10	15-Oct-10	19	36	37														
					A6120	Installation of SIG-interlocking cubicle	Subst - S	1C	56,845.18	12.8%	02-Aug-10	13-Aug-10	12	34	34														
					A6130	Commissioning of SIG -interlocking cubicle	Subst - S	1C	56,845.18	12.8%	23-Nov-10	29-Nov-10	7	38	38														
					A2839	Access for E&M substation installation (01C Cathredral)	Subst - S	1C	-	0.0%	19-Jul-10	19-Jul-10	1	34	34														
					A2838	Access for visual inspection forE&M substation installation (01C Cathredral)	Subst - S	1C	-	0.0%	17-Jun-10	17-Jun-10	1	32	32														
					Snagging	Snagging	Subst - S	1C	2,870.97	0.6%				38	39														
					01C4 St. Andrews Square (inc.) to Princes Street West (exc.)				**2,454,500.78**																				
					St Andrews Square to Waverley Bridge Ch 1000 - 1360																								
					Trackwork				**1,069,284.17**																				
					A13530	Dummy	Track	1C	-	0.0%	09-Sep-09	05-Jan-10	119	22	27														
					A16820	Establish Traffic Management & Temp. Fencing	Track	1C	52,207.76	4.9%	09-Sep-09	10-Sep-09	2	22	22														
					A16830	Excavate box	Track	1C	-	0.0%	11-Sep-09	01-Oct-09	21	22	23														
					A16840	Excavate, lay and concrete ducts	Track	1C	156,623.28	14.6%	02-Oct-09	02-Nov-09	32	23	24														
					A16850	Excavate and construct OLE bases	Track - BB	1C	14,436.14	1.4%	02-Oct-09	02-Nov-09	32	23	24														
					A16860	Set Track (360m)	Track	1C	417,662.08	39.1%	27-Nov-09	03-Feb-10	69	25	28														
					A16870	Place upper concrete and cure	Track	1C	365,454.32	34.2%	06-Jan-10	05-Feb-10	31	27	28														
					A16880	Street Surface finishes	Track	1C	-	0.0%	08-Feb-10	10-Feb-10	3	28	28														
					A16890	Remove fencing and Traffic Management	Track	1C	52,207.76	4.9%	11-Feb-10	11-Feb-10	1	28	28														
					Snagging	Snagging	Track	1C	10,692.84	1.0%				28	29														
					Roadworks				**975,948.34**																				
					A13520	Dummy - 40%	Highways	1C	386,479.54	39.6%	09-Sep-09	31-Oct-09	53	22	24														
					A13520	Dummy	Highways	1C	579,713.31	59.4%	01-Nov-09	05-Jan-10	67	24	27														
					Snagging	Snagging	Highways	1C	9,759.48	1.0%				27	28														
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (13)	Highways	1C	-	0.0%		05-Jan-10																
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (12)	Highways	1C	-	0.0%		05-Jan-10																
					Princes Street West Tram Stop																								
					Tramstop				**204,634.14**																				

USB00000073_0034

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Morrison Construction Group | BILFINGER BERGER | SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name				Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year 2008 Period 1 Period End	1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
					630	Civil Engineering And Building Works	Tramstops	1C		56,590.90	27.7%	05-Feb-09	15-Mar-09	39	15	16																-
					630	Civil Engineering And Building Works	Tramstops	1C		56,590.90	27.7%	16-Mar-09	08-May-09	55	16	18																		-
					Snagging	Snagging	Tramstops	1C		1,143.25	0.6%				18	19																	-
					A2780	Deliver and Install Shelter	Tramstops	1C		37,727.26	18.4%	20-Jul-09	07-Sep-09	50	21	22																		-
					Snagging	Snagging	Tramstops	1C		381.08	0.2%				22	23																	-
					578	Order REC Supply	Trams Eq	1C		-	0.0%	08-Jun-09	08-Jun-09	1	19	19																		-
					A4630	Package Test Tramstop	Trams Eq	1C		51,678.74	25.3%	16-Nov-09	23-Nov-09	8	25	25																		-
					A4600	Install LV Power Supply and LV Power Equipment	Trams Eq	1C		-	0.0%	07-Sep-09	12-Oct-09	36	22	24																		-
					A4610	Install Telecon Equipment	Trams Eq	1C		-	0.0%	12-Oct-09	09-Nov-09	29	24	25																		-
					A4620	Install Station Control Equipment + AFC Equipment	Trams Eq	1C		-	0.0%	12-Oct-09	16-Nov-09	36	24	25																		-
					A4599	Access for E&M Tram Stop installation (01D Princess Street West)	Trams Eq	1C		-	0.0%	07-Sep-09	07-Sep-09	1	22	22																		-
					A4598	Access for visual inspection for E&M Tram Stop installation (01D Princess Street West)	Trams Eq	1C		-	0.0%	06-Aug-09	06-Aug-09	1	21	21																		-
					Snagging	Snagging	Trams Eq	1C		522.01	0.3%				25	26																	-
				St Andrews Square Tram Stop																													
				Tramstop						204,634.14																						
					620	Civil Engineering And Building Works	Tramstops	1C		56,590.90	27.7%	09-Sep-09	31-Oct-09	53	22	24																		-
					620	Civil Engineering And Building Works	Tramstops	1C		56,590.90	27.7%	01-Nov-09	12-Jan-10	74	24	27																		-
					Snagging	Snagging	Tramstops	1C		1,143.25	0.6%				27	28																	-
					A2750	Deliver and Install Shelter	Tramstops	1C		37,727.26	18.4%	07-Jan-10	21-Jan-10	15	27	27																		-
					Snagging	Snagging	Tramstops	1C		381.08	0.2%				27	28																	-
					568	Order REC Supply	Trams Eq	1C		-	0.0%	22-Oct-09	22-Oct-09	1	24	24																		-
					A4590	Package Test Tramstop	Trams Eq	1C		51,678.74	25.3%	01-Apr-10	09-Apr-10	9	30	30																		-
					A4560	Install LV Power Supply and LV Power Equipment	Trams Eq	1C		-	0.0%	21-Jan-10	25-Feb-10	36	27	28																		-
					A4570	Install Telecon Equipment	Trams Eq	1C		-	0.0%	25-Feb-10	25-Mar-10	29	28	29																		-
					A4580	Install Station Control Equipment + AFC Equipment	Trams Eq	1C		-	0.0%	25-Feb-10	01-Apr-10	36	28	30																		-
					A6150	Installation of SIG-interlocking cubicle	Trams Eq	1C		-	0.0%	04-Feb-10	25-Feb-10	22	28	28																		-
					A6160	Commissioning of SIG -interlocking cubicle	Trams Eq	1C		-	0.0%	23-Nov-10	29-Nov-10	7	38	38																		-
					A4559	Access for E&M Tram Stop installation (01C St. Andrews Square)	Trams Eq	1C		-	0.0%	21-Jan-10	21-Jan-10	1	27	27																		-
					A4558	Access for visual inspection for E&M Tram Stop installation (01C St. Andrews Square)	Trams Eq	1C		-	0.0%	22-Dec-09	22-Dec-09	1	26	26																		-
					Snagging	Snagging	Trams Eq	1C		522.01	0.3%				30	31																	-
					Crit. Milestone	be Completion Approval - MacDonald Road to Princes Street West (6) (26)	Trams Eq	1C		-	0.0%		09-Apr-10																					-
					Crit. Milestone	Commission Section 1C Princes Street West to MacDonald Road (6) (35)	Trams Eq	1C		-	0.0%		09-Apr-10																					-
				01D Princes Street (inc.) to Haymarket (exc.)						6,112,236.13																						
				01D1 Princes Street (inc.) to Haymarket (exc.)						1,234,307.42																						
				Princes Street (inc.) to Haymarket (exc.)																												
				E & M Installations						1,234,307.42																						
					A3810	Overhead Catenary Line - 20%	OLE	1D		123,350.30	10.0%	19-Apr-10	21-May-10	33	30	31																		-
					A3810	Overhead Catenary Line	OLE	1D		493,401.20	40.0%	19-Apr-10	21-May-10	33	30	31																		-
					Snagging	Snagging	OLE	1D		6,229.81	0.5%				31	32																	-
					A3820	Install Electrical Cables	SCC	1D		151,303.21	12.3%	04-May-10	19-May-10	16	31	31																		-
					A3830	Install Fibre Optic Cables	SCC	1D		151,303.21	12.3%	04-May-10	19-May-10	16	31	31																		-
					A3840	Install Signalling Wayside Equipment	SCC	1D		151,303.21	12.3%	20-May-10	07-Jun-10	19	31	32																		-
					A3805	Installation of poles and building fixings	SCC	1D		151,303.21	12.3%	05-Apr-10	16-Apr-10	12	30	30																		-
					A3804	Access for E&M wayside installation (01D)	SCC	1D		-	0.0%	05-Apr-10	05-Apr-10	1	30	30																		-
					A3819	Access to cable pits for cable laying (01D)	SCC	1D		-	0.0%	04-May-10	04-May-10	1	31	31																		-
					A3803	Access for visual inspection for E&M wayside installation (01D)	SCC	1D		-	0.0%	03-Mar-10	03-Mar-10	1	29	29																		-
					A3818	Access for visual inspection to cable pits for cable laying (01D)	SCC	1D		-	0.0%	31-Mar-10	31-Mar-10	1	30	30																		-
					Snagging	Snagging	SCC	1D		6,113.26	0.5%				32	33																	-
				01D2 Princes Street West (inc.) to Shandwick Place (exc.)						2,444,391.77																						
				Lothian Road Junction Ch 440 - 280																												
				Roadworks						139,764.85																						
				Phase 1						34,941.21		23-Apr-09	23-Apr-09																			
					A8250	Establish Traffic Management & Temp. Fencing	Highways	1D		17,295.90	49.5%	05-Jan-09	06-Jan-09	2	14	14																		-
					A8260	Take down permanent traffic signs / signals	Highways	1D		-	0.0%	07-Jan-09	13-Jan-09	7	14	14																		-
					A8270	Excavate traffic islands	Highways	1D		-	0.0%	14-Jan-09	16-Jan-09	3	14	14																		-
					A8280	Subbase	Highways	1D		-	0.0%	19-Jan-09	20-Jan-09	2	14	14																		-
					A8290	Temporary surfacing	Highways	1D		-	0.0%	21-Jan-09	23-Jan-09	3	14	14																		-
					A8300	Temporary Traffic signals / signs / white lines	Highways	1D		-	0.0%	26-Jan-09	30-Jan-09	5	14	14																		-
					A8310	Remove fencing and Traffic Management	Highways	1D		17,295.90	49.5%	02-Feb-09	02-Feb-09	1	15	15																		-
					Snagging	Snagging	Highways	1D		349.41	1.0%				15	16																	-
				Phase 2						34,941.21		23-Apr-09	23-Apr-09																			
					A8490	Establish Traffic Management & Temp. Fencing	Highways	1D		17,295.90	49.5%	03-Feb-09	04-Feb-09	2	15	15																		-
					A8500	Excavate North kerbline	Highways	1D		-	0.0%	05-Feb-09	06-Feb-09	2	15	15																		-
					A8510	Relay North kerbs	Highways	1D		-	0.0%	06-Feb-09	12-Feb-09	7	15	15																		-
					A8520	Reset Gullies	Highways	1D		-	0.0%	09-Feb-09	13-Feb-09	5	15	15																		-
					A8530	Plane out wearing course	Highways	1D		-	0.0%	16-Feb-09	17-Feb-09	2	15	15																		-
					A8540	Resurface road	Highways	1D		-	0.0%	23-Mar-09	25-Mar-09	3	16	16																		-
					A8550	Pavement (1m strip)	Highways	1D		-	0.0%	13-Feb-09	19-Feb-09	7	15	15																		-
					A8560	White Lines	Highways	1D		-	0.0%	26-Mar-09	26-Mar-09	1	16	16																		-
					A8570	Street Lighting / Road signs	Highways	1D		-	0.0%	13-Feb-09	23-Feb-09	11	15	15																		-
					A8670	Remove fencing and Traffic Management	Highways	1D		17,295.90	49.5%	27-Mar-09	27-Mar-09	1	16	16																		-
					Snagging	Snagging	Highways	1D		349.41	1.0%				16	17																	-
				Phase 3						34,941.21		23-Apr-09	23-Apr-09																			
					A8580	Establish Traffic Management & Temp. Fencing	Highways	1D		17,295.90	49.5%	30-Mar-09	31-Mar-09	2	17	17																		-
					A8590	Excavate South kerbline	Highways	1D		-	0.0%	01-Apr-09	02-Apr-09	2	17	17																		-
					A8600	Relay South kerbs	Highways	1D		-	0.0%	02-Apr-09	07-Apr-09	6	17	17																		-
					A8610	Reset Gullies	Highways	1D		-	0.0%	03-Apr-09	08-Apr-09	6	17	17																		-
					A8620	Plane out wearing course	Highways	1D		-	0.0%	09-Apr-09	09-Apr-09	1	17	17																		-
					A8630	Resurface road	Highways	1D		-	0.0%	13-Apr-09	15-Apr-09	3	17	17																		-
					A8640	Pavement (1m strip)	Highways	1D		-	0.0%	08-Apr-09	14-Apr-09	7	17	17																		-
					A8650	White Lines	Highways	1D		-	0.0%	16-Apr-09	16-Apr-09	1	17	17																		-
					A8660	Street Lighting / Road signs	Highways	1D		-	0.0%	08-Apr-09	16-Apr-09	9	17	17																		-
					A8665	Remove fencing and Traffic Management	Highways	1D		17,295.90	49.5%	17-Apr-09	17-Apr-09	1	17	17																		-
					Snagging	Snagging	Highways	1D		349.41	1.0%				17	18																	-
				Phase 4a						34,941.21		23-Apr-09	23-Apr-09																			
					A9000	Establish Traffic Management & Temp. Fencing	Highways	1D		17,295.90	49.5%	21-Oct-09	22-Oct-09	2	24	24																		-
					A9010	Excavat for new kerb lines & channel	Highways	1D		-	0.0%	23-Oct-09	28-Oct-09	6	24	24																		-
					A9020	Lay new kerbs	Highways	1D		-	0.0%	26-Oct-09	29-Oct-09	4	24	24																		-
					A9030	Reset Gullies	Highways	1D		-	0.0%	27-Oct-09	30-Oct-09	4	24	24																		-
					A9040	Surface new channels	Highways	1D		-	0.0%	02-Nov-09	05-Nov-09	4	24	24																		-
					A9050	Pavement	Highways	1D		-	0.0%	30-Oct-09	07-Jan-10	70	24	27																		-
					A9060	Rebuild Traffic Islands	Highways	1D		-	0.0%	06-Nov-09	26-Nov-09	21	24	25																		-
					A9080	Street Lighting / Road signs	Highways	1D		-	0.0%	20-Nov-09	26-Nov-09	7	25	25																		-
					A9130	Remove fencing and Traffic Management	Highways	1D		17,295.90	49.5%	08-Jan-10	08-Jan-10	1	27	27																		-
					Snagging	Snagging	Highways	1D		349.41	1.0%				27	28																	-
				Princes Street Ch 220 - 0, 1580 - 1360																												
				Roadworks						786,177.27																						
				North Channel						393,088.64		23-Apr-09	23-Apr-09																			
					A13940	Establish Traffic Management & Temp. Fencing	Highways	1D		19,457.89	5.0%	03-Feb-09	04-Feb-09	2	15	15																		-
					A13850	Excavate North kerbline	Highways	1D		38,915.77	9.9%	05-Feb-09	03-Mar-09	27	15	16																		-
					A13860	Relay North kerbs	Highways	1D		-	0.0%	12-Feb-09	21-Apr-09	69	15	17																		-
					A13870	Reset Gullies	Highways	1D		77,831.55	19.8%	19-Feb-09	28-Apr-09	69	15	18																		-
					A13880	Plane out wearing course	Highways	1D		77,831.55	19.8%	29-Apr-09	13-May-09	15	18	18																		-
					A13890	Resurface road	Highways	1D		77,831.55	19.8%	14-May-09	22-May-09	9	18	18																		-
					A13900	Pavement (1m strip)	Highways	1D		77,831.55	19.8%	19-Feb-09	28-Apr-09	69	15	18																		-
					A13910	White Lines	Highways	1D		-	0.0%	26-May-09	26-May-09	1	19	19																		-
					A13920	Street Lighting / Road signs	Highways	1D		-	0.0%	22-Apr-09	28-Apr-09	7	17	18																		-
					A13930	Remove fencing and Traffic Management	Highways	1D		19,457.89	5.0%	27-May-09	27-May-09	1	19	19																		-
					Snagging	Snagging	Highways	1D		3,930.89	1.0%				19	20																	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (11)	Highways	1D		-	0.0%		27-May-09																					-
				South Channel						393,088.64		23-Apr-09	23-Apr-09																			
					A13940	Establish Traffic Management & Temp. Fencing	Highways	1D		19,457.89	5.0%	03-Feb-09	04-Feb-09	2	15	15																		-
					A13950	Excavate South kerbline	Highways	1D		38,915.77	9.9%	05-Feb-09	03-Mar-09	27	15	16																		-
					A13960	Relay South kerbs	Highways	1D		38,915.77	9.9%	12-Feb-09	21-Apr-09	69	15	17																		-
					A13970	Reset Gullies	Highways	1D		38,915.77	9.9%	19-Feb-09	28-Apr-09	69	15	18																		-
					A13980	Plane out wearing course	Highways	1D		77,831.55	19.8%	29-Apr-09	13-May-09	15	18	18																		-
					A13990	Resurface road	Highways	1D		77,831.55	19.8%	18-Jun-09	29-Jul-09	42	19	21																		-
					A14000	Pavement (1m strip)	Highways	1D		77,831.55	19.8%	19-Feb-09	28-Apr-09	69	15	18																		-
					A14010	White Lines	Highways	1D		-	0.0%	30-Jul-09	30-Jul-09	1	21	21																		-
					A14020	Street Lighting / Road signs	Highways	1D		-	0.0%	22-Apr-09	28-Apr-09	7	17	18																		-
					A14030	Remove fencing and Traffic Management	Highways	1D		19,457.89	5.0%	31-Jul-09	08-Sep-09	40	21	22																		-
					Snagging	Snagging	Highways	1D		3,930.89	1.0%				22	23																	-
				Lothian Road Junction Ch 440 - 280																												
				Trackwork						229,199.95																						

USB00000073_0035

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year
Period
Period End

L1	L2	L3	L4	L5	Activity ID	Activity Name				Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					630	Civil Engineering And Building Works		Tramstops	1C	56,590.90	27.7%	05-Feb-09	15-Mar-09	39	15	16	-	-	56,591	-	-	-	-	-	-	-	-	-	56,591
					630	Civil Engineering And Building Works		Tramstops	1C	56,590.90	27.7%	16-Mar-09	08-May-09	55	16	18	-	-	-	-	56,591	-	-	-	-	-	-	-	-	56,591
					Snagging	Snagging		Tramstops	1C	1,143.25	0.6%				18	19	-	-	-	-	-	1,143	-	-	-	-	-	-	-	1,143
					A2780	Deliver and Install Shelter		Tramstops	1C	37,727.26	18.4%	20-Jul-09	07-Sep-09	50	21	22	-	-	-	-	-	-	-	-	37,727	-	-	-	-	37,727
					Snagging	Snagging		Tramstops	1C	381.08	0.2%				22	23	-	-	-	-	-	-	-	-	-	381	-	-	-	381
					578	Order REC Supply		Trams Eq	1C	-	0.0%	08-Jun-09	08-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4630	Package Test Tramstop		Trams Eq	1C	51,678.74	25.3%	16-Nov-09	23-Nov-09	8	25	25	-	-	-	-	-	-	-	-	-	-	-	51,679	-	51,679
					A4600	Install LV Power Supply and LV Power Equipment		Trams Eq	1C	-	0.0%	07-Sep-09	12-Oct-09	36	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4610	Install Telecon Equipment		Trams Eq	1C	-	0.0%	12-Oct-09	09-Nov-09	29	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4620	Install Station Control Equipment + AFC Equipment		Trams Eq	1C	-	0.0%	12-Oct-09	16-Nov-09	36	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4599	Access for E&M Tram Stop installation (01D Princess Street West)		Trams Eq	1C	-	0.0%	07-Sep-09	07-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4598	Access for visual inspection for E&M Tram Stop installation (01D Princess Street West)		Trams Eq	1C	-	0.0%	06-Aug-09	06-Aug-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Trams Eq	1C	522.01	0.3%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	522	522
		St Andrews Square Tram Stop																											
		Tramstop								204,634.14							-	-	-	-	-	-	-	-	-	-	56,591	-	-	56,591
					620	Civil Engineering And Building Works		Tramstops	1C	56,590.90	27.7%	09-Sep-09	31-Oct-09	53	22	24	-	-	-	-	-	-	-	-	-	-	56,591	-	-	56,591
					620	Civil Engineering And Building Works		Tramstops	1C	56,590.90	27.7%	01-Nov-09	12-Jan-10	74	24	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Tramstops	1C	1,143.25	0.6%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2750	Deliver and Install Shelter		Tramstops	1C	37,727.26	18.4%	07-Jan-10	21-Jan-10	15	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Tramstops	1C	381.08	0.2%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					568	Order REC Supply		Trams Eq	1C	-	0.0%	22-Oct-09	22-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4590	Package Test Tramstop		Trams Eq	1C	51,678.74	25.3%	01-Apr-10	09-Apr-10	9	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4560	Install LV Power Supply and LV Power Equipment		Trams Eq	1C	-	0.0%	21-Jan-10	25-Feb-10	36	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4570	Install Telecon Equipment		Trams Eq	1C	-	0.0%	25-Feb-10	25-Mar-10	29	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4580	Install Station Control Equipment + AFC Equipment		Trams Eq	1C	-	0.0%	25-Feb-10	01-Apr-10	36	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6150	Installation of SIG-interlocking cubicle		Trams Eq	1C	-	0.0%	04-Feb-10	25-Feb-10	22	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6160	Commissioning of SIG -interlocking cubicle		Trams Eq	1C	-	0.0%	23-Nov-10	29-Nov-10	7	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4559	Access for E&M Tram Stop installation (01C St. Andrews Square)		Trams Eq	1C	-	0.0%	21-Jan-10	21-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4558	Access for visual inspection for E&M Tram Stop installation (01C St. Andrews Square)		Trams Eq	1C	-	0.0%	22-Dec-09	22-Dec-09	1	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Trams Eq	1C	522.01	0.3%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	tie Completion Approval - MacDonald Road to Princes Street West (6) (26)		Trams Eq	1C	-	0.0%		09-Apr-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Section 1C Princes Street West to MacDonald Road (6) (35)		Trams Eq	1C		0.0%		09-Apr-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
	01D Princes Street (inc.) to Haymarket (exc.)									6,112,236.13							44,321	158,647	409,773	105,489	539,359	849,172	263,666	268,410	139,926	161,605	473,008	267,375	472	3,681,223
		01D1 Princes Street (inc.) to Haymarket (exc.)								1,234,307.42							-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Princes Street (inc.) to Haymarket (exc.)																											
		E & M Installations								1,234,307.42							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3810	Overhead Catenary Line - 20%		OLE	1D	123,350.30	10.0%	19-Apr-10	21-May-10	33	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3810	Overhead Catenary Line		OLE	1D	493,401.20	40.0%	19-Apr-10	21-May-10	33	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		OLE	1D	6,229.81	0.5%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3820	Install Electrical Cables		SCC	1D	151,303.21	12.3%	04-May-10	19-May-10	16	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3830	Install Fibre Optic Cables		SCC	1D	151,303.21	12.3%	04-May-10	19-May-10	16	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3840	Install Signalling Wayside Equipment		SCC	1D	151,303.21	12.3%	20-May-10	07-Jun-10	19	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3805	Installation of poles and building fixings		SCC	1D	151,303.21	12.3%	05-Apr-10	16-Apr-10	12	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3804	Access for E&M wayside installation (01D)		SCC	1D	-	0.0%	05-Apr-10	05-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3819	Access to cable pits for cable laying (01D)		SCC	1D	-	0.0%	04-May-10	04-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3803	Access for visual inspection for E&M wayside installation (01D)		SCC	1D	-	0.0%	03-Mar-10	03-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3818	Access for visual inspection to cable pits for cable laying (01D)		SCC	1D	-	0.0%	31-Mar-10	31-Mar-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		SCC	1D	6,113.26	0.5%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01D2 Princes Street West (inc.) to Shandwick Place (exc.)								2,444,391.77							17,296	148,758	351,959	78,221	521,342	839,283	147,926	228,853	32,563	21,799	38,534	212	-	2,426,746
		Lothian Road Junction Ch 440 - 280																											
		Roadworks								139,764.85							17,296	34,592	17,645	34,941	349	-	-	-	-	-	17,296	-	-	122,120
			Phase 1							34,941.21		23-Apr-09	23-Apr-09				17,296	17,296	349	-	-	-	-	-	-	-	-	-	-	34,941
					A8250	Establish Traffic Management & Temp. Fencing		Highways	1D	17,295.90	49.5%	05-Jan-09	06-Jan-09	2	14	14	17,296	-	-	-	-	-	-	-	-	-	-	-	-	17,296
					A8260	Take down permanent traffic signs / signals		Highways	1D	-	0.0%	07-Jan-09	13-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8270	Excavate traffic islands		Highways	1D	-	0.0%	14-Jan-09	16-Jan-09	3	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8280	Subbase		Highways	1D	-	0.0%	19-Jan-09	20-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8290	Temporary surfacing		Highways	1D	-	0.0%	21-Jan-09	23-Jan-09	3	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8300	Temporary Traffic signals / signs / white lines		Highways	1D	-	0.0%	26-Jan-09	30-Jan-09	5	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8310	Remove fencing and Traffic Management		Highways	1D	17,295.90	49.5%	02-Feb-09	02-Feb-09	1	15	15	-	17,296	-	-	-	-	-	-	-	-	-	-	-	17,296
					Snagging	Snagging		Highways	1D	349.41	1.0%				15	16	-	-	349	-	-	-	-	-	-	-	-	-	-	349
			Phase 2							34,941.21		23-Apr-09	23-Apr-09				-	17,296	17,296	349	-	-	-	-	-	-	-	-	-	34,941
					A8490	Establish Traffic Management & Temp. Fencing		Highways	1D	17,295.90	49.5%	03-Feb-09	04-Feb-09	2	15	15	-	17,296	-	-	-	-	-	-	-	-	-	-	-	17,296
					A8500	Excavate North kerbline		Highways	1D	-	0.0%	05-Feb-09	06-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8510	Relay North kerbs		Highways	1D	-	0.0%	06-Feb-09	12-Feb-09	7	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8520	Reset Gullies		Highways	1D	-	0.0%	09-Feb-09	13-Feb-09	5	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8530	Plane out wearing course		Highways	1D	-	0.0%	16-Feb-09	17-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8540	Resurface road		Highways	1D	-	0.0%	23-Mar-09	25-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8550	Pavement (1m strip)		Highways	1D	-	0.0%	13-Feb-09	19-Feb-09	7	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8560	White Lines		Highways	1D	-	0.0%	26-Mar-09	26-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8570	Street Lighting / Road signs		Highways	1D	-	0.0%	13-Feb-09	23-Feb-09	11	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8670	Remove fencing and Traffic Management		Highways	1D	17,295.90	49.5%	27-Mar-09	27-Mar-09	1	16	16	-	-	17,296	-	-	-	-	-	-	-	-	-	-	17,296
					Snagging	Snagging		Highways	1D	349.41	1.0%				16	17	-	-	-	349	-	-	-	-	-	-	-	-	-	349
			Phase 3							34,941.21		23-Apr-09	23-Apr-09				-	-	-	34,592	348	-	-	-	-	-	-	-	-	34,941
					A8580	Establish Traffic Management & Temp. Fencing		Highways	1D	17,295.90	49.5%	30-Mar-09	31-Mar-09	2	17	17	-	-	-	17,296	-	-	-	-	-	-	-	-	-	17,296
					A8590	Excavate South kerbline		Highways	1D	-	0.0%	01-Apr-09	02-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8600	Relay South kerbs		Highways	1D	-	0.0%	02-Apr-09	07-Apr-09	6	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8610	Reset Gullies		Highways	1D	-	0.0%	03-Apr-09	08-Apr-09	6	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8620	Plane out wearing course		Highways	1D	-	0.0%	09-Apr-09	09-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8630	Resurface road		Highways	1D	-	0.0%	13-Apr-09	15-Apr-09	3	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8640	Pavement (1m strip)		Highways	1D	-	0.0%	08-Apr-09	14-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8650	White Lines		Highways	1D	-	0.0%	16-Apr-09	16-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8660	Street Lighting / Road signs		Highways	1D	-	0.0%	08-Apr-09	16-Apr-09	9	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8665	Remove fencing and Traffic Management		Highways	1D	17,295.90	49.5%	17-Apr-09	17-Apr-09	1	17	17	-	-	-	17,296	-	-	-	-	-	-	-	-	-	17,296
					Snagging	Snagging		Highways	1D	349.41	1.0%				17	18	-	-	-	-	349	-	-	-	-	-	-	-	-	349
			Phase 4a							34,941.21		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	17,296	-	-	17,296
					A9000	Establish Traffic Management & Temp. Fencing		Highways	1D	17,295.90	49.5%	21-Oct-09	22-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	17,296	-	-	17,296
					A9010	Excavat for new kerb lines & channel		Highways	1D	-	0.0%	23-Oct-09	28-Oct-09	6	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9020	Lay new kerbs		Highways	1D	-	0.0%	26-Oct-09	29-Oct-09	4	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9030	Reset Gullies		Highways	1D	-	0.0%	27-Oct-09	30-Oct-09	4	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9040	Surface new channels		Highways	1D	-	0.0%	02-Nov-09	05-Nov-09	4	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9050	Pavement		Highways	1D	-	0.0%	30-Oct-09	07-Jan-10	70	24	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9060	Rebuild Traffic Islands		Highways	1D	-	0.0%	06-Nov-09	26-Nov-09	21	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9080	Street Lighting / Road signs		Highways	1D	-	0.0%	20-Nov-09	26-Nov-09	7	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9130	Remove fencing and Traffic Management		Highways	1D	17,295.90	49.5%	08-Jan-10	08-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Highways	1D	349.41	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Princes Street Ch 280 - 0, 1360 - 1360																											
		Roadworks								786,177.27							-	38,916	77,832	38,916	505,905	19,458	3,931	77,832	19,458	3,931	-	-	-	786,177
			North Channel							393,088.64		23-Apr-09	23-Apr-09				-	19,458	38,916	-	311,326	19,458	3,931	-	-	-	-	-	-	393,089
					A13840	Establish Traffic Management & Temp. Fencing		Highways	1D	19,457.89	5.0%	03-Feb-09	04-Feb-09	2	15	15	-	19,458	-	-	-	-	-	-	-	-	-	-	-	19,458
					A13850	Excavate North kerbline		Highways	1D	38,915.77	9.9%	05-Feb-09	03-Mar-09	27	15	16	-	-	38,916	-	-	-	-	-	-	-	-	-	38,916
					A13860	Relay North kerbs		Highways	1D	-	0.0%	12-Feb-09	21-Apr-09	69	15	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13870	Reset Gullies		Highways	1D	77,831.55	19.8%	19-Feb-09	28-Apr-09	69	15	18	-	-	-	-	77,832	-	-	-	-	-	-	-	-	77,832
					A13880	Plane out wearing course		Highways	1D	77,831.55	19.8%	29-Apr-09	13-May-09	15	18	18	-	-	-	-	77,832	-	-	-	-	-	-	-	-	77,832
					A13890	Resurface road		Highways	1D	77,831.55	19.8%	14-May-09	22-May-09	9	18	18	-	-	-	-	77,832	-	-	-	-	-	-	-	-	77,832
					A13900	Pavement (1m strip)		Highways	1D	77,831.55	19.8%	19-Feb-09	28-Apr-09	69	15	18	-	-	-	-	77,832	-	-	-	-	-	-	-	-	77,832
					A13910	White Lines		Highways	1D	-	0.0%	26-May-09	26-May-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13920	Street Lighting / Road signs		Highways	1D	-	0.0%	22-Apr-09	28-Apr-09	7	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13930	Remove fencing and Traffic Management		Highways	1D	19,457.89	5.0%	27-May-09	27-May-09	1	19	19	-	-	-	-	-	19,458	-	-	-	-	-	-	-	19,458
					Snagging	Snagging		Highways	1D	3,930.89	1.0%				19	20	-	-	-	-	-	-	3,931	-	-	-	-	-	-	3,931
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (11)		Highways	1D		0.0%		27-May-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
			South Channel							393,088.64		23-Apr-09	23-Apr-09				-	19,458	38,916	38,916	194,579	-	-	77,832	19,458	3,931	-	-	-	393,089
					A13940	Establish Traffic Management & Temp. Fencing		Highways	1D	19,457.89	5.0%	03-Feb-09	04-Feb-09	2	15	15	-	19,458	-	-	-	-	-	-	-	-	-	-	-	19,458
					A13950	Excavate South kerbline		Highways	1D	38,915.77	9.9%	05-Feb-09	03-Mar-09	27	15	16	-	-	38,916	-	-	-	-	-	-	-	-	-	38,916
					A13960	Relay South kerbs		Highways	1D	38,915.77	9.9%	12-Feb-09	21-Apr-09	69	15	17	-	-	-	38,916	-	-	-	-	-	-	-	-	-	38,916
					A13970	Reset Gullies		Highways	1D	38,915.77	9.9%	19-Feb-09	28-Apr-09	69	15	18	-	-	-	-	38,916	-	-	-	-	-	-	-	-	38,916
					A13980	Plane out wearing course		Highways	1D	77,831.55	19.8%	29-Apr-09	13-May-09	15	18	18	-	-	-	-	77,832	-	-	-	-	-	-	-	-	77,832
					A13990	Resurface road		Highways	1D	77,831.55	19.8%	18-Jun-09	29-Jul-09	42	19	21	-	-	-	-	-	-	77,832	-	-	-	-	-	-	77,832
					A14000	Pavement (1m strip)		Highways	1D	77,831.55	19.8%	19-Feb-09	28-Apr-09	69	15	18	-	-	-	-	77,832	-	-	-	-	-	-	-	-	77,832
					A14010	White Lines		Highways	1D	-	0.0%	30-Jul-09	30-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14020	Street Lighting / Road signs		Highways	1D	-	0.0%	22-Apr-09	28-Apr-09	7	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14030	Remove fencing and Traffic Management		Highways	1D	19,457.89	5.0%	31-Jul-09	08-Sep-09	40	21	22	-	-	-	-	-	-	-	-	19,458	-	-	-	-	19,458
					Snagging	Snagging		Highways	1D	3,930.89	1.0%				22	23	-	-	-	-	-	-	-	-	-	3,931	-	-	-	3,931
		Lothian Road Junction Ch 440 - 280																											
		Trackwork								229,199.95							-	75,250	67,292	4,364	-	-	-	17,868	24,895	212	17,868	21,239	212	-	229,200

USB00000073_0036

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name				Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					630	Civil Engineering And Building Works	Tramstops	1C		56,590.90	27.7%	05-Feb-09	15-Mar-09	39	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					630	Civil Engineering And Building Works	Tramstops	1C		56,590.90	27.7%	16-Mar-09	08-May-09	55	16	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1C		1,143.25	0.6%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2780	Deliver and Install Shelter	Tramstops	1C		37,727.26	18.4%	20-Jul-09	07-Sep-09	50	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1C		381.08	0.2%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					578	Order REC Supply	Trams Eq	1C		-	0.0%	08-Jun-09	08-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4630	Package Test Tramstop	Trams Eq	1C		51,678.74	25.3%	16-Nov-09	23-Nov-09	8	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4600	Install LV Power Supply and LV Power Equipment	Trams Eq	1C		-	0.0%	07-Sep-09	12-Oct-09	36	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4610	Install Telecon Equipment	Trams Eq	1C		-	0.0%	12-Oct-09	09-Nov-09	29	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4620	Install Station Control Equipment + AFC Equipment	Trams Eq	1C		-	0.0%	12-Oct-09	16-Nov-09	36	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4599	Access for E&M Tram Stop installation (01D Princess Street West)	Trams Eq	1C		-	0.0%	07-Sep-09	07-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4598	Access for visual inspection for E&M Tram Stop installation (01D Princess Street West)	Trams Eq	1C		-	0.0%	06-Aug-09	06-Aug-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1C		522.01	0.3%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			St Andrews Square Tram Stop																										
			Tramstop							204,634.14							94,318	1,524	-	51,679	522	-	-	-	-	-	-	-	-	148,043
					620	Civil Engineering And Building Works	Tramstops	1C		56,590.90	27.7%	09-Sep-09	31-Oct-09	53	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					620	Civil Engineering And Building Works	Tramstops	1C		56,590.90	27.7%	01-Nov-09	12-Jan-10	74	24	27	56,591	-	-	-	-	-	-	-	-	-	-	-	-	-	56,591
					Snagging	Snagging	Tramstops	1C		1,143.25	0.6%				27	28	-	1,143	-	-	-	-	-	-	-	-	-	-	-	1,143
					A2750	Deliver and Install Shelter	Tramstops	1C		37,727.26	18.4%	07-Jan-10	21-Jan-10	15	27	27	37,727	-	-	-	-	-	-	-	-	-	-	-	-	-	37,727
					Snagging	Snagging	Tramstops	1C		381.08	0.2%				27	28	-	381	-	-	-	-	-	-	-	-	-	-	-	381
					568	Order REC Supply	Trams Eq	1C		-	0.0%	22-Oct-09	22-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4590	Package Test Tramstop	Trams Eq	1C		51,678.74	25.3%	01-Apr-10	09-Apr-10	9	30	30	-	-	-	51,679	-	-	-	-	-	-	-	-	-	-	51,679
					A4560	Install LV Power Supply and LV Power Equipment	Trams Eq	1C		-	0.0%	21-Jan-10	25-Feb-10	36	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4570	Install Telecon Equipment	Trams Eq	1C		-	0.0%	25-Feb-10	25-Mar-10	29	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4580	Install Station Control Equipment + AFC Equipment	Trams Eq	1C		-	0.0%	25-Feb-10	01-Apr-10	36	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6150	Installation of SIG-interlocking cubicle	Trams Eq	1C		-	0.0%	04-Feb-10	25-Feb-10	22	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6160	Commissioning of SIG -interlocking cubicle	Trams Eq	1C		-	0.0%	23-Nov-10	29-Nov-10	7	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4559	Access for E&M Tram Stop installation (01C St. Andrews Square)	Trams Eq	1C		-	0.0%	21-Jan-10	21-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4558	Access for visual inspection for E&M Tram Stop installation (01C St. Andrews Square)	Trams Eq	1C		-	0.0%	22-Dec-09	22-Dec-09	1	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1C		522.01	0.3%				30	31	-	-	-	-	522	-	-	-	-	-	-	-	-	522
					Crit. Milestone	tie Completion Approval - MacDonald Road to Princes Street West (6) (26)	Trams Eq	1C		-	0.0%		09-Apr-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Section 1C Princes Street West to MacDonald Road (6) (35)	Trams Eq	1C		-	0.0%		09-Apr-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01D Princes Street (inc.) to Haymarket (exc.)								6,112,236.13							627,830	202,253	91,845	231,934	1,111,574	159,464	6,113	-	-	-	-	-	-	2,431,013
		01D1 Princes Street (inc.) to Haymarket (exc.)								1,234,307.42							-	-	-	151,303	919,358	157,533	6,113	-	-	-	-	-	-	1,234,307
		Princes Street (inc.) to Haymarket (exc.)																											
		E & M Installations								1,234,307.42							-	-	-	151,303	919,358	157,533	6,113	-	-	-	-	-	-	1,234,307
					A3810	Overhead Catenary Line - 20%	OLE	1D		123,350.30	10.0%	19-Apr-10	21-May-10	33	30	31	-	-	-	-	123,350	-	-	-	-	-	-	-	-	-	123,350
					A3810	Overhead Catenary Line	OLE	1D		493,401.20	40.0%	19-Apr-10	21-May-10	33	30	31	-	-	-	-	493,401	-	-	-	-	-	-	-	-	-	493,401
					Snagging	Snagging	OLE	1D		6,229.81	0.5%				31	32	-	-	-	-	-	6,230	-	-	-	-	-	-	-	6,230
					A3820	Install Electrical Cables	SCC	1D		151,303.21	12.3%	04-May-10	19-May-10	16	31	31	-	-	-	-	151,303	-	-	-	-	-	-	-	-	-	151,303
					A3830	Install Fibre Optic Cables	SCC	1D		151,303.21	12.3%	04-May-10	19-May-10	16	31	31	-	-	-	-	151,303	-	-	-	-	-	-	-	-	-	151,303
					A3840	Install Signalling Wayside Equipment	SCC	1D		151,303.21	12.3%	20-May-10	07-Jun-10	19	31	32	-	-	-	-	-	151,303	-	-	-	-	-	-	-	-	151,303
					A3805	Installation of poles and building fixings	SCC	1D		151,303.21	12.3%	05-Apr-10	16-Apr-10	12	30	30	-	-	-	151,303	-	-	-	-	-	-	-	-	-	-	151,303
					A3804	Access for E&M wayside installation (01D)	SCC	1D		-	0.0%	05-Apr-10	05-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3819	Access to cable pits for cable laying (01D)	SCC	1D		-	0.0%	04-May-10	04-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3803	Access for visual inspection for E&M wayside installation (01D)	SCC	1D		-	0.0%	03-Mar-10	03-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3818	Access for visual inspection to cable pits for cable laying (01D)	SCC	1D		-	0.0%	31-Mar-10	31-Mar-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	1D		6,113.26	0.5%				32	33	-	-	-	-	-	-	6,113	-	-	-	-	-	-	6,113
		01D2 Princes Street West (inc.) to Shandwick Place (exc.)								2,444,391.77							17,296	349	-	-	-	-	-	-	-	-	-	-	-	17,645
		Lothian Road Junction Ch 440 - 280																											
		Roadworks								139,764.85							17,296	349	-	-	-	-	-	-	-	-	-	-	-	17,645
			Phase 1							34,941.21		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8250	Establish Traffic Management & Temp. Fencing	Highways	1D		17,295.90	49.5%	05-Jan-09	06-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8260	Take down permanent traffic signs / signals	Highways	1D		-	0.0%	07-Jan-09	13-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8270	Excavate traffic islands	Highways	1D		-	0.0%	14-Jan-09	16-Jan-09	3	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8280	Subbase	Highways	1D		-	0.0%	19-Jan-09	20-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8290	Temporary surfacing	Highways	1D		-	0.0%	21-Jan-09	23-Jan-09	3	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8300	Temporary Traffic signals / signs / white lines	Highways	1D		-	0.0%	26-Jan-09	30-Jan-09	5	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8310	Remove fencing and Traffic Management	Highways	1D		17,295.90	49.5%	02-Feb-09	02-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D		349.41	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2							34,941.21		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8490	Establish Traffic Management & Temp. Fencing	Highways	1D		17,295.90	49.5%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8500	Excavate North kerbline	Highways	1D		-	0.0%	05-Feb-09	06-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8510	Relay North kerbs	Highways	1D		-	0.0%	06-Feb-09	12-Feb-09	7	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8520	Reset Gullies	Highways	1D		-	0.0%	09-Feb-09	13-Feb-09	5	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8530	Plane out wearing course	Highways	1D		-	0.0%	16-Feb-09	17-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8540	Resurface road	Highways	1D		-	0.0%	23-Mar-09	25-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8550	Pavement (1m strip)	Highways	1D		-	0.0%	13-Feb-09	19-Feb-09	7	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8560	White Lines	Highways	1D		-	0.0%	26-Mar-09	26-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8570	Street Lighting / Road signs	Highways	1D		-	0.0%	13-Feb-09	23-Feb-09	11	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8670	Remove fencing and Traffic Management	Highways	1D		17,295.90	49.5%	27-Mar-09	27-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D		349.41	1.0%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 3							34,941.21		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8580	Establish Traffic Management & Temp. Fencing	Highways	1D		17,295.90	49.5%	30-Mar-09	31-Mar-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8590	Excavate South kerbline	Highways	1D		-	0.0%	01-Apr-09	02-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8600	Relay South kerbs	Highways	1D		-	0.0%	02-Apr-09	07-Apr-09	6	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8610	Reset Gullies	Highways	1D		-	0.0%	03-Apr-09	08-Apr-09	6	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8620	Plane out wearing course	Highways	1D		-	0.0%	09-Apr-09	09-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8630	Resurface road	Highways	1D		-	0.0%	13-Apr-09	15-Apr-09	3	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8640	Pavement (1m strip)	Highways	1D		-	0.0%	08-Apr-09	14-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8650	White Lines	Highways	1D		-	0.0%	16-Apr-09	16-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8660	Street Lighting / Road signs	Highways	1D		-	0.0%	08-Apr-09	16-Apr-09	9	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8665	Remove fencing and Traffic Management	Highways	1D		17,295.90	49.5%	17-Apr-09	17-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D		349.41	1.0%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 4a							34,941.21		23-Apr-09	23-Apr-09				17,296	349	-	-	-	-	-	-	-	-	-	-	-	17,645
					A9000	Establish Traffic Management & Temp. Fencing	Highways	1D		17,295.90	49.5%	21-Oct-09	22-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9010	Excavat for new kerb lines & channel	Highways	1D		-	0.0%	23-Oct-09	28-Oct-09	6	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9020	Lay new kerbs	Highways	1D		-	0.0%	26-Oct-09	29-Oct-09	4	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9030	Reset Gullies	Highways	1D		-	0.0%	27-Oct-09	30-Oct-09	4	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9040	Surface new channels	Highways	1D		-	0.0%	02-Nov-09	05-Nov-09	4	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9050	Pavement	Highways	1D		-	0.0%	30-Oct-09	07-Jan-10	70	24	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9060	Rebuild Traffic Islands	Highways	1D		-	0.0%	06-Nov-09	26-Nov-09	21	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9080	Street Lighting / Road signs	Highways	1D		-	0.0%	20-Nov-09	26-Nov-09	7	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9130	Remove fencing and Traffic Management	Highways	1D		17,295.90	49.5%	08-Jan-10	08-Jan-10	1	27	27	17,296	-	-	-	-	-	-	-	-	-	-	-	-	-	17,296
					Snagging	Snagging	Highways	1D		349.41	1.0%				27	28	-	349	-	-	-	-	-	-	-	-	-	-	-	349
		Princes Street Ch 280 - 0, 1360 - 1360																											
		Roadworks								786,177.27							-	-	-	-	-	-	-	-	-	-	-	-	-	-
			North Channel							393,088.64		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13840	Establish Traffic Management & Temp. Fencing	Highways	1D		19,457.89	5.0%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13850	Excavate North kerbline	Highways	1D		38,915.77	9.9%	05-Feb-09	03-Mar-09	27	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13860	Relay North kerbs	Highways	1D		-	0.0%	12-Feb-09	21-Apr-09	69	15	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13870	Reset Gullies	Highways	1D		77,831.55	19.8%	19-Feb-09	28-Apr-09	69	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13880	Plane out wearing course	Highways	1D		77,831.55	19.8%	29-Apr-09	13-May-09	15	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13890	Resurface road	Highways	1D		77,831.55	19.8%	14-May-09	22-May-09	9	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13900	Pavement (1m strip)	Highways	1D		77,831.55	19.8%	19-Feb-09	28-Apr-09	69	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13910	White Lines	Highways	1D		-	0.0%	26-May-09	26-May-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13920	Street Lighting / Road signs	Highways	1D		-	0.0%	22-Apr-09	28-Apr-09	7	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13930	Remove fencing and Traffic Management	Highways	1D		19,457.89	5.0%	27-May-09	27-May-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D		3,930.89	1.0%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (11)	Highways	1D		-	0.0%		27-May-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			South Channel							393,088.64		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13940	Establish Traffic Management & Temp. Fencing	Highways	1D		19,457.89	5.0%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13950	Excavate South kerbline	Highways	1D		38,915.77	9.9%	05-Feb-09	03-Mar-09	27	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13960	Relay South kerbs	Highways	1D		38,915.77	9.9%	12-Feb-09	21-Apr-09	69	15	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13970	Reset Gullies	Highways	1D		38,915.77	9.9%	19-Feb-09	28-Apr-09	69	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13980	Plane out wearing course	Highways	1D		77,831.55	19.8%	29-Apr-09	13-May-09	15	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13990	Resurface road	Highways	1D		77,831.55	19.8%	18-Jun-09	29-Jul-09	42	19	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14000	Pavement (1m strip)	Highways	1D		77,831.55	19.8%	19-Feb-09	28-Apr-09	69	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14010	White Lines	Highways	1D		-	0.0%	30-Jul-09	30-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14020	Street Lighting / Road signs	Highways	1D		-	0.0%	22-Apr-09	28-Apr-09	7	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14030	Remove fencing and Traffic Management	Highways	1D		19,457.89	5.0%	31-Jul-09	08-Sep-09	40	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D		3,930.89	1.0%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Lothian Road Junction Ch 440 - 280																											
		Trackwork								229,199.95							-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0037

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name				Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					630	Civil Engineering And Building Works	Tramstops	1C		56,590.90	27.7%	05-Feb-09	15-Mar-09	39	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					630	Civil Engineering And Building Works	Tramstops	1C		56,590.90	27.7%	16-Mar-09	08-May-09	55	16	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1C		1,143.25	0.6%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2780	Deliver and Install Shelter	Tramstops	1C		37,727.26	18.4%	20-Jul-09	07-Sep-09	50	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1C		381.08	0.2%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					578	Order REC Supply	Trams Eq	1C		-	0.0%	08-Jun-09	08-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4630	Package Test Tramstop	Trams Eq	1C		51,678.74	25.3%	16-Nov-09	23-Nov-09	8	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4600	Install LV Power Supply and LV Power Equipment	Trams Eq	1C		-	0.0%	07-Sep-09	12-Oct-09	36	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4610	Install Telecon Equipment	Trams Eq	1C		-	0.0%	12-Oct-09	09-Nov-09	29	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4620	Install Station Control Equipment + AFC Equipment	Trams Eq	1C		-	0.0%	12-Oct-09	16-Nov-09	36	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4599	Access for E&M Tram Stop installation (01D Princess Street West)	Trams Eq	1C		-	0.0%	07-Sep-09	07-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4598	Access for visual inspection for E&M Tram Stop installation (01D Princess Street West)	Trams Eq	1C		-	0.0%	06-Aug-09	06-Aug-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1C		522.01	0.3%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			St Andrews Square Tram Stop																											
			Tramstop							204,634.14							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					620	Civil Engineering And Building Works	Tramstops	1C		56,590.90	27.7%	09-Sep-09	31-Oct-09	53	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					620	Civil Engineering And Building Works	Tramstops	1C		56,590.90	27.7%	01-Nov-09	12-Jan-10	74	24	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1C		1,143.25	0.6%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2750	Deliver and Install Shelter	Tramstops	1C		37,727.26	18.4%	07-Jan-10	21-Jan-10	15	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1C		381.08	0.2%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					568	Order REC Supply	Trams Eq	1C		-	0.0%	22-Oct-09	22-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4590	Package Test Tramstop	Trams Eq	1C		51,678.74	25.3%	01-Apr-10	09-Apr-10	9	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4560	Install LV Power Supply and LV Power Equipment	Trams Eq	1C		-	0.0%	21-Jan-10	25-Feb-10	36	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4570	Install Telecon Equipment	Trams Eq	1C		-	0.0%	25-Feb-10	25-Mar-10	29	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4580	Install Station Control Equipment + AFC Equipment	Trams Eq	1C		-	0.0%	25-Feb-10	01-Apr-10	36	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6150	Installation of SIG-interlocking cubicle	Trams Eq	1C		-	0.0%	04-Feb-10	25-Feb-10	22	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6160	Commissioning of SIG -interlocking cubicle	Trams Eq	1C		-	0.0%	23-Nov-10	29-Nov-10	7	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4559	Access for E&M Tram Stop installation (01C St. Andrews Square)	Trams Eq	1C		-	0.0%	21-Jan-10	21-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4558	Access for visual inspection for E&M Tram Stop installation (01C St. Andrews Square)	Trams Eq	1C		-	0.0%	22-Dec-09	22-Dec-09	1	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1C		522.01	0.3%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	tie Completion Approval - MacDonald Road to Princes Street West (6) (26)	Trams Eq	1C		-	0.0%		09-Apr-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Section 1C Princes Street West to MacDonald Road (6) (35)	Trams Eq	1C		-	0.0%		09-Apr-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01D Princes Street (inc.) to Haymarket (exc.)								6,112,236.13							-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01D1 Princes Street (inc.) to Haymarket (exc.)								1,234,307.42							-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Princes Street (inc.) to Haymarket (exc.)																												
		E & M Installations								1,234,307.42							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3810	Overhead Catenary Line - 20%	OLE	1D		123,350.30	10.0%	19-Apr-10	21-May-10	33	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3810	Overhead Catenary Line	OLE	1D		493,401.20	40.0%	19-Apr-10	21-May-10	33	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	1D		6,229.81	0.5%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3820	Install Electrical Cables	SCC	1D		151,303.21	12.3%	04-May-10	19-May-10	16	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3830	Install Fibre Optic Cables	SCC	1D		151,303.21	12.3%	04-May-10	19-May-10	16	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3840	Install Signalling Wayside Equipment	SCC	1D		151,303.21	12.3%	20-May-10	07-Jun-10	19	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3805	Installation of poles and building fixings	SCC	1D		151,303.21	12.3%	05-Apr-10	16-Apr-10	12	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3804	Access for E&M wayside installation (01D)	SCC	1D		-	0.0%	05-Apr-10	05-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3819	Access to cable pits for cable laying (01D)	SCC	1D		-	0.0%	04-May-10	04-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3803	Access for visual inspection for E&M wayside installation (01D)	SCC	1D		-	0.0%	03-Mar-10	03-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A3818	Access for visual inspection to cable pits for cable laying (01D)	SCC	1D		-	0.0%	31-Mar-10	31-Mar-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	1D		6,113.26	0.5%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01D2 Princes Street West (inc.) to Shandwick Place (exc.)								2,444,391.77							-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Lothian Road Junction Ch 440 - 280																												
		Roadworks								139,764.85							-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Phase 1								34,941.21		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8250	Establish Traffic Management & Temp. Fencing	Highways	1D		17,295.90	49.5%	05-Jan-09	06-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8260	Take down permanent traffic signs / signals	Highways	1D		-	0.0%	07-Jan-09	13-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8270	Excavate traffic islands	Highways	1D		-	0.0%	14-Jan-09	16-Jan-09	3	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8280	Subbase	Highways	1D		-	0.0%	19-Jan-09	20-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8290	Temporary surfacing	Highways	1D		-	0.0%	21-Jan-09	23-Jan-09	3	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8300	Temporary Traffic signals / signs / white lines	Highways	1D		-	0.0%	26-Jan-09	30-Jan-09	5	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8310	Remove fencing and Traffic Management	Highways	1D		17,295.90	49.5%	02-Feb-09	02-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D		349.41	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Phase 2								34,941.21		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8490	Establish Traffic Management & Temp. Fencing	Highways	1D		17,295.90	49.5%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8500	Excavate North kerbline	Highways	1D		-	0.0%	05-Feb-09	06-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8510	Relay North kerbs	Highways	1D		-	0.0%	06-Feb-09	12-Feb-09	7	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8520	Reset Gullies	Highways	1D		-	0.0%	09-Feb-09	13-Feb-09	5	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8530	Plane out wearing course	Highways	1D		-	0.0%	16-Feb-09	17-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8540	Resurface road	Highways	1D		-	0.0%	23-Mar-09	25-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8550	Pavement (1m strip)	Highways	1D		-	0.0%	13-Feb-09	19-Feb-09	7	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8560	White Lines	Highways	1D		-	0.0%	26-Mar-09	26-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8570	Street Lighting / Road signs	Highways	1D		-	0.0%	13-Feb-09	23-Feb-09	11	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8670	Remove fencing and Traffic Management	Highways	1D		17,295.90	49.5%	27-Mar-09	27-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D		349.41	1.0%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Phase 3								34,941.21		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8580	Establish Traffic Management & Temp. Fencing	Highways	1D		17,295.90	49.5%	30-Mar-09	31-Mar-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8590	Excavate South kerbline	Highways	1D		-	0.0%	01-Apr-09	02-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8600	Relay South kerbs	Highways	1D		-	0.0%	02-Apr-09	07-Apr-09	6	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8610	Reset Gullies	Highways	1D		-	0.0%	03-Apr-09	08-Apr-09	6	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8620	Plane out wearing course	Highways	1D		-	0.0%	09-Apr-09	09-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8630	Resurface road	Highways	1D		-	0.0%	13-Apr-09	15-Apr-09	3	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8640	Pavement (1m strip)	Highways	1D		-	0.0%	08-Apr-09	14-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8650	White Lines	Highways	1D		-	0.0%	16-Apr-09	16-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8660	Street Lighting / Road signs	Highways	1D		-	0.0%	08-Apr-09	16-Apr-09	9	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8665	Remove fencing and Traffic Management	Highways	1D		17,295.90	49.5%	17-Apr-09	17-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D		349.41	1.0%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Phase 4a								34,941.21		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9000	Establish Traffic Management & Temp. Fencing	Highways	1D		17,295.90	49.5%	21-Oct-09	22-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9010	Excavat for new kerb lines & channel	Highways	1D		-	0.0%	23-Oct-09	28-Oct-09	6	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9020	Lay new kerbs	Highways	1D		-	0.0%	26-Oct-09	29-Oct-09	4	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9030	Reset Gullies	Highways	1D		-	0.0%	27-Oct-09	30-Oct-09	4	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9040	Surface new channels	Highways	1D		-	0.0%	02-Nov-09	05-Nov-09	4	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9050	Pavement	Highways	1D		-	0.0%	30-Oct-09	07-Jan-10	70	24	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9060	Rebuild Traffic Islands	Highways	1D		-	0.0%	06-Nov-09	26-Nov-09	21	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9080	Street Lighting / Road signs	Highways	1D		-	0.0%	20-Nov-09	26-Nov-09	7	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A9130	Remove fencing and Traffic Management	Highways	1D		17,295.90	49.5%	08-Jan-10	08-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D		349.41	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Princes Street Ch 280 - 0, 1900 - 1360																												
		Roadworks								786,177.27							-	-	-	-	-	-	-	-	-	-	-	-	-	-
		North Channel								393,088.64		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13940	Establish Traffic Management & Temp. Fencing	Highways	1D		19,457.89	5.0%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13850	Excavate North kerbline	Highways	1D		38,915.77	9.9%	05-Feb-09	03-Mar-09	27	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13860	Relay North kerbs	Highways	1D		-	0.0%	12-Feb-09	21-Apr-09	69	15	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13870	Reset Gullies	Highways	1D		77,831.55	19.8%	19-Feb-09	28-Apr-09	69	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13880	Plane out wearing course	Highways	1D		77,831.55	19.8%	29-Apr-09	13-May-09	15	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13890	Resurface road	Highways	1D		77,831.55	19.8%	14-May-09	22-May-09	9	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13900	Pavement (1m strip)	Highways	1D		77,831.55	19.8%	19-Feb-09	28-Apr-09	69	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13910	White Lines	Highways	1D		-	0.0%	26-May-09	26-May-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13920	Street Lighting / Road signs	Highways	1D		-	0.0%	22-Apr-09	28-Apr-09	7	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13930	Remove fencing and Traffic Management	Highways	1D		19,457.89	5.0%	27-May-09	27-May-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D		3,930.89	1.0%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (11)	Highways	1D		-	0.0%		27-May-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		South Channel								393,088.64		23-Apr-09	23-Apr-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13940	Establish Traffic Management & Temp. Fencing	Highways	1D		19,457.89	5.0%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13950	Excavate South kerbline	Highways	1D		38,915.77	9.9%	05-Feb-09	03-Mar-09	27	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13960	Relay South kerbs	Highways	1D		38,915.77	9.9%	12-Feb-09	21-Apr-09	69	15	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13970	Reset Gullies	Highways	1D		38,915.77	9.9%	19-Feb-09	28-Apr-09	69	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13980	Plane out wearing course	Highways	1D		77,831.55	19.8%	29-Apr-09	13-May-09	15	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13990	Resurface road	Highways	1D		77,831.55	19.8%	18-Jun-09	29-Jul-09	42	19	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14000	Pavement (1m strip)	Highways	1D		77,831.55	19.8%	19-Feb-09	28-Apr-09	69	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14010	White Lines	Highways	1D		-	0.0%	30-Jul-09	30-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14020	Street Lighting / Road signs	Highways	1D		-	0.0%	22-Apr-09	28-Apr-09	7	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14030	Remove fencing and Traffic Management	Highways	1D		19,457.89	5.0%	31-Jul-09	08-Sep-09	40	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D		3,930.89	1.0%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Lothian Road Junction Ch 440 - 280																												
		Trackwork								229,199.95							-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0038

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year 2008 Period 1 Period End 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
					Phase 2 - 1st Half				**75,975.18**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8320	Establish Traffic Management & Temp. Fencing	Track	1D	3,503.53	4.6%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8330	Excavate box	Track	1D	-	0.0%	05-Feb-09	06-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8340	Excavate, lay and concrete ducts	Track	1D	-	0.0%	09-Feb-09	11-Feb-09	3	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8350	Excavate and construct OLE bases	Track - BB	1D	1,676.40	2.2%	09-Feb-09	11-Feb-09	3	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8370	Set Track (100m)	Track	1D	-	0.0%	16-Feb-09	19-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8380	Place upper concrete and cure	Track	1D	63,063.48	83.0%	19-Feb-09	24-Feb-09	6	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8390	Street Surface finishes	Track	1D	7,007.05	9.2%	25-Feb-09	27-Feb-09	3	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	724.72	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2 - 2nd Half				**67,274.79**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8410	Excavate box	Track	1D	-	0.0%	02-Mar-09	03-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8420	Excavate, lay and concrete ducts	Track	1D	-	0.0%	04-Mar-09	06-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8450	Set Track	Track	1D	-	0.0%	09-Mar-09	12-Mar-09	4	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8460	Place upper concrete and cure	Track	1D	-	0.0%	12-Mar-09	17-Mar-09	6	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8470	Street Surface finishes	Track	1D	63,063.48	93.7%	18-Mar-09	20-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8480	Remove fencing and Traffic Management	Track	1D	3,503.53	5.2%	23-Mar-09	23-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	707.78	1.1%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3a - 1st Half				**21,741.50**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8680	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	20-Apr-09	21-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8690	Excavate box	Track	1D	-	0.0%	22-Apr-09	22-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8700	Excavate, lay and concrete ducts	Track	1D	3,153.17	14.5%	23-Apr-09	24-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8710	Excavate and construct OLE bases	Track - BB	1D	502.92	2.3%	23-Apr-09	24-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8730	Set Track (30m)	Track	1D	-	0.0%	18-Jun-09	23-Jun-09	6	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8740	Place upper concrete and cure	Track	1D	15,765.87	72.5%	23-Jun-09	26-Jun-09	4	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8750	Street Surface finishes	Track	1D	2,102.12	9.7%	29-Jun-09	01-Jul-09	3	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	217.41	1.0%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3a - 2nd Half				**21,233.49**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8760	Excavate box	Track	1D	-	0.0%	02-Jul-09	02-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8770	Excavate, lay and concrete ducts	Track	1D	-	0.0%	03-Jul-09	06-Jul-09	4	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8800	Set Track	Track	1D	-	0.0%	09-Jul-09	14-Jul-09	6	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8810	Place upper concrete and cure	Track	1D	-	0.0%	14-Jul-09	17-Jul-09	4	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8820	Street Surface finishes	Track	1D	18,919.04	89.1%	20-Jul-09	22-Jul-09	3	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8830	Remove fencing and Traffic Management	Track	1D	2,102.12	9.9%	23-Jul-09	23-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	212.33	1.0%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 4 - 1st Half				**21,741.50**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8840	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	24-Jul-09	27-Jul-09	4	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8850	Excavate box	Track	1D	-	0.0%	28-Jul-09	28-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8860	Excavate, lay and concrete ducts	Track	1D	3,153.17	14.5%	29-Jul-09	30-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8870	Excavate and construct OLE bases	Track - BB	1D	502.92	2.3%	29-Jul-09	30-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8890	Set Track (30m)	Track	1D	15,765.87	72.5%	17-Sep-09	22-Sep-09	6	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8900	Place upper concrete and cure	Track	1D	-	0.0%	22-Sep-09	25-Sep-09	4	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8910	Street Surface finishes	Track	1D	2,102.12	9.7%	28-Sep-09	30-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	217.41	1.0%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 4 - 2nd half				**21,233.49**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8920	Excavate box	Track	1D	-	0.0%	01-Oct-09	01-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8930	Excavate, lay and concrete ducts	Track	1D	-	0.0%	02-Oct-09	05-Oct-09	4	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8960	Set Track	Track	1D	-	0.0%	06-Oct-09	09-Oct-09	4	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8970	Place upper concrete and cure	Track	1D	18,919.04	89.1%	09-Oct-09	14-Oct-09	6	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8980	Street Surface finishes	Track	1D	-	0.0%	15-Oct-09	19-Oct-09	5	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8990	Remove fencing and Traffic Management	Track	1D	2,102.12	9.9%	20-Oct-09	20-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	212.33	1.0%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Princes Street Ch 280 - 0, 1980 - 1350																										
		Trackwork							**1,289,249.70**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1						**1,289,249.70**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12760	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13770	Excavate box	Track	1D	189,190.44	14.7%	05-Feb-09	26-Mar-09	50	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13780	Excavate, lay and concrete ducts	Track	1D	-	0.0%	12-Feb-09	29-Apr-09	77	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13790	Excavate and construct OLE bases	Track - BB	1D	15,087.63	1.2%	12-Feb-09	29-Apr-09	77	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13810	Set Track (950m) - 1st Half	Track	1D	378,380.87	29.3%	31-Mar-09	17-Jun-09	79	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13810	Set Track (950m)	Track	1D	441,444.35	34.2%	31-Mar-09	17-Jun-09	79	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13830	Street Surface finishes	Track	1D	126,126.96	9.8%	23-Jun-09	30-Jul-09	38	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13820	Place Upper Concrete and Cure	Track	1D	126,126.96	9.8%	03-Apr-09	22-Jun-09	81	17	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	12,892.50	1.0%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01D3 Shandwick Place (inc.) to Haymarket (exc.)							**2,433,536.95**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Shandwick Place Tram Stop																											
			Tramstop						**566,420.67**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					588	Order REC Supply	Trams Eq	1D	-	0.0%	26-Nov-09	26-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2810	Deliver and Install Shelter	Tramstops	1D	106,134.62	18.7%	11-Feb-10	25-Feb-10	15	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1D	1,072.07	0.2%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4670	Package Test Tramstop	Trams Eq	1D	137,809.98	24.3%	10-May-10	17-May-10	8	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4640	Install LV Power Supply and LV Power Equipment	Trams Eq	1D	-	0.0%	25-Feb-10	01-Apr-10	36	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4650	Install Telecon Equipment	Trams Eq	1D	-	0.0%	01-Apr-10	30-Apr-10	30	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4660	Install Station Control Equipment + AFC Equipment	Trams Eq	1D	-	0.0%	01-Apr-10	10-May-10	40	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4639	Access for E&M Tram Stop installation (01D Shadwick Place)	Trams Eq	1D	-	0.0%	25-Feb-10	25-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4638	Access for visual inspection for E&M Tram Stop installation (01D Shadwick Place)	Trams Eq	1D	-	0.0%	26-Jan-10	26-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1D	1,392.02	0.2%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					640	Completion of Envelope	Tramstops	1D	159,201.94	28.1%	01-Nov-09	14-Jan-10	76	24	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					640	Civil Engineering And Building Works	Tramstops	1D	159,201.94	28.1%	11-Sep-09	31-Oct-09	51	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1D	1,608.10	0.3%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Haymarket Ch 1350 - 1125																												
		Roadworks							**109,191.29**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 1						**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6390	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	05-Jan-09	06-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6400	Remove island surfacing and exc. to formation	Highways	1D	-	0.0%	07-Jan-09	12-Jan-09	6	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6410	Construct Kerb lines	Highways	1D	-	0.0%	13-Jan-09	14-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6420	Move Gullies	Highways	1D	-	0.0%	15-Jan-09	16-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6430	Sub base	Highways	1D	-	0.0%	19-Jan-09	20-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6440	Roadbase/base course/wearing course/temp ramps	Highways	1D	-	0.0%	21-Jan-09	23-Jan-09	3	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6450	Pavement Works	Highways	1D	-	0.0%	15-Jan-09	21-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6460	White Lines	Highways	1D	-	0.0%	26-Jan-09	26-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6470	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	15-Jan-09	21-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6475	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	27-Jan-09	27-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	181.99	1.0%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 2						**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6480	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	29-Jan-09	29-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6490	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	30-Jan-09	02-Feb-09	4	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6500	Construct Kerb lines	Highways	1D	-	0.0%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6510	Reset Gullies	Highways	1D	-	0.0%	05-Feb-09	05-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6520	Surface new channel	Highways	1D	-	0.0%	06-Feb-09	06-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6540	Pavement Works	Highways	1D	-	0.0%	05-Feb-09	25-Feb-09	21	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6550	White Lines	Highways	1D	-	0.0%	09-Feb-09	09-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6560	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	05-Feb-09	09-Feb-09	5	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6565	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	12-Feb-09	12-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	181.99	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 4a						**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6730	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	30-Mar-09	31-Mar-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6740	Remove island surfacing and exc. to formation	Highways	1D	-	0.0%	01-Apr-09	07-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6750	Construct Kerb lines	Highways	1D	-	0.0%	08-Apr-09	14-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6760	Move Gullies	Highways	1D	-	0.0%	15-Apr-09	16-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6770	Sub base	Highways	1D	-	0.0%	17-Apr-09	21-Apr-09	5	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6780	Roadbase/base course/wearing course/temp ramps	Highways	1D	-	0.0%	23-Apr-09	27-Apr-09	5	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6790	Pavement Works	Highways	1D	-	0.0%	15-Apr-09	22-Apr-09	8	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6800	White Lines	Highways	1D	-	0.0%	28-Apr-09	28-Apr-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6810	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	15-Apr-09	23-Apr-09	9	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6775	Plane off wearing course	Highways	1D	-	0.0%	22-Apr-09	22-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6815	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	29-Apr-09	29-Apr-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	181.99	1.0%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phase 4b						**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6820	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	30-Apr-09	01-May-09	2	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6830	Remove island surfacing and exc. to formation	Highways	1D	-	0.0%	05-May-09	05-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6840	Construct Kerb lines	Highways	1D	-	0.0%	06-May-09	11-May-09	6	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6850	Move Gullies	Highways	1D	-	0.0%	12-May-09	13-May-09	2	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6860	Sub base	Highways	1D	-	0.0%	14-May-09	18-May-09	5	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6880	Roadbase/base course/wearing course/temp ramps	Highways	1D	-	0.0%	20-May-09	22-May-09	3	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0039

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Services Group | BILFINGER BERGER

SIEI

Year
Period
Period End

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					Phase 2 - 1st Half				**75,975.18**		**23-Apr-09**	**23-Apr-09**				-	**75,250**	**725**	-	-	-	-	-	-	-	-	-	-	**75,975**
					A8320	Establish Traffic Management & Temp. Fencing	Track	1D	3,503.53	4.6%	03-Feb-09	04-Feb-09	2	15	15	-	3,504	-	-	-	-	-	-	-	-	-	-	-	3,504
					A8330	Excavate box	Track	1D	-	0.0%	05-Feb-09	06-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8340	Excavate, lay and concrete ducts	Track	1D	-	0.0%	09-Feb-09	11-Feb-09	3	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8350	Excavate and construct OLE bases	Track - BB	1D	1,676.40	2.2%	09-Feb-09	11-Feb-09	3	15	15	-	1,676	-	-	-	-	-	-	-	-	-	-	-	1,676
					A8370	Set Track (100m)	Track	1D	-	0.0%	16-Feb-09	19-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8380	Place upper concrete and cure	Track	1D	63,063.48	83.0%	19-Feb-09	24-Feb-09	6	15	15	-	63,063	-	-	-	-	-	-	-	-	-	-	-	63,063
					A8390	Street Surface finishes	Track	1D	7,007.05	9.2%	25-Feb-09	27-Feb-09	3	15	15	-	7,007	-	-	-	-	-	-	-	-	-	-	-	7,007
					Snagging	Snagging	Track	1D	724.72	1.0%				15	16	-	-	725	-	-	-	-	-	-	-	-	-	-	-	725
					Phase 2 - 2nd Half				**67,274.79**		**23-Apr-09**	**23-Apr-09**				-	-	**66,567**	**708**	-	-	-	-	-	-	-	-	-	**67,275**
					A8410	Excavate box	Track	1D	-	0.0%	02-Mar-09	03-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8420	Excavate, lay and concrete ducts	Track	1D	-	0.0%	04-Mar-09	06-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8450	Set Track	Track	1D	-	0.0%	09-Mar-09	12-Mar-09	4	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8460	Place upper concrete and cure	Track	1D	-	0.0%	12-Mar-09	17-Mar-09	6	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8470	Street Surface finishes	Track	1D	63,063.48	93.7%	18-Mar-09	20-Mar-09	3	16	16	-	-	63,063	-	-	-	-	-	-	-	-	-	-	-	63,063
					A8480	Remove fencing and Traffic Management	Track	1D	3,503.53	5.2%	23-Mar-09	23-Mar-09	1	16	16	-	-	3,504	-	-	-	-	-	-	-	-	-	-	-	3,504
					Snagging	Snagging	Track	1D	707.78	1.1%				16	17	-	-	-	708	-	-	-	-	-	-	-	-	-	-	708
					Phase 3a - 1st Half				**21,741.50**		**23-Apr-09**	**23-Apr-09**				-	-	-	**3,656**	-	-	-	**17,868**	**217**	-	-	-	-	**21,741**
					A8680	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	20-Apr-09	21-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8690	Excavate box	Track	1D	-	0.0%	22-Apr-09	22-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8700	Excavate, lay and concrete ducts	Track	1D	3,153.17	14.5%	23-Apr-09	24-Apr-09	2	17	17	-	-	-	3,153	-	-	-	-	-	-	-	-	-	-	3,153
					A8710	Excavate and construct OLE bases	Track - BB	1D	502.92	2.3%	23-Apr-09	24-Apr-09	2	17	17	-	-	-	503	-	-	-	-	-	-	-	-	-	-	503
					A8730	Set Track (30m)	Track	1D	-	0.0%	18-Jun-09	23-Jun-09	6	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8740	Place upper concrete and cure	Track	1D	15,765.87	72.5%	23-Jun-09	26-Jun-09	4	20	20	-	-	-	-	-	-	-	15,766	-	-	-	-	-	-	15,766
					A8750	Street Surface finishes	Track	1D	2,102.12	9.7%	29-Jun-09	01-Jul-09	3	20	20	-	-	-	-	-	-	-	2,102	-	-	-	-	-	-	2,102
					Snagging	Snagging	Track	1D	217.41	1.0%				20	21	-	-	-	-	-	-	-	-	217	-	-	-	-	-	217
					Phase 3a - 2nd Half				**21,233.49**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	**21,021**	**212**	-	-	-	**21,233**
					A8760	Excavate box	Track	1D	-	0.0%	02-Jul-09	02-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8770	Excavate, lay and concrete ducts	Track	1D	-	0.0%	03-Jul-09	06-Jul-09	4	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8800	Set Track	Track	1D	-	0.0%	09-Jul-09	14-Jul-09	6	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8810	Place upper concrete and cure	Track	1D	-	0.0%	14-Jul-09	17-Jul-09	4	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8820	Street Surface finishes	Track	1D	18,919.04	89.1%	20-Jul-09	22-Jul-09	3	21	21	-	-	-	-	-	-	-	18,919	-	-	-	-	-	-	18,919
					A8830	Remove fencing and Traffic Management	Track	1D	2,102.12	9.9%	23-Jul-09	23-Jul-09	1	21	21	-	-	-	-	-	-	-	2,102	-	-	-	-	-	-	2,102
					Snagging	Snagging	Track	1D	212.33	1.0%				21	22	-	-	-	-	-	-	-	-	-	212	-	-	-	-	212
					Phase 4 - 1st half				**21,741.50**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	**3,656**	-	**17,868**	**217**	-	-	**21,741**
					A8840	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	24-Jul-09	27-Jul-09	4	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8850	Excavate box	Track	1D	-	0.0%	28-Jul-09	28-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8860	Excavate, lay and concrete ducts	Track	1D	3,153.17	14.5%	29-Jul-09	30-Jul-09	2	21	21	-	-	-	-	-	-	-	3,153	-	-	-	-	-	-	3,153
					A8870	Excavate and construct OLE bases	Track - BB	1D	502.92	2.3%	29-Jul-09	30-Jul-09	2	21	21	-	-	-	-	-	-	-	503	-	-	-	-	-	-	503
					A8890	Set Track (30m)	Track	1D	15,765.87	72.5%	17-Sep-09	22-Sep-09	6	23	23	-	-	-	-	-	-	-	-	-	15,766	-	-	-	-	15,766
					A8900	Place upper concrete and cure	Track	1D	-	0.0%	22-Sep-09	25-Sep-09	4	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8910	Street Surface finishes	Track	1D	2,102.12	9.7%	28-Sep-09	30-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	2,102	-	-	-	-	2,102
					Snagging	Snagging	Track	1D	217.41	1.0%				23	24	-	-	-	-	-	-	-	-	-	-	217	-	-	-	217
					Phase 4 - 2nd half				**21,233.49**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	**21,021**	**212**	-	**21,233**
					A8920	Excavate box	Track	1D	-	0.0%	01-Oct-09	01-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8930	Excavate, lay and concrete ducts	Track	1D	-	0.0%	02-Oct-09	05-Oct-09	4	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8960	Set Track	Track	1D	-	0.0%	06-Oct-09	09-Oct-09	4	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8970	Place upper concrete and cure	Track	1D	18,919.04	89.1%	09-Oct-09	14-Oct-09	6	23	24	-	-	-	-	-	-	-	-	-	-	18,919	-	-	-	18,919
					A8980	Street Surface finishes	Track	1D	-	0.0%	15-Oct-09	19-Oct-09	5	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8990	Remove fencing and Traffic Management	Track	1D	2,102.12	9.9%	20-Oct-09	20-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	2,102	-	-	-	2,102
					Snagging	Snagging	Track	1D	212.33	1.0%				24	25	-	-	-	-	-	-	-	-	-	-	-	212	-	212
		Princes Street Ch 280 - 0, 1980 - 1360																										
		Trackwork							**1,289,249.70**							-	-	**189,190**	-	**15,088**	**819,825**	**126,127**	**126,127**	**12,892**	-	-	-	-	**1,289,250**
					Phase 1				**1,289,249.70**		**23-Apr-09**	**23-Apr-09**				-	-	**189,190**	-	**15,088**	**819,825**	**126,127**	**126,127**	**12,892**	-	-	-	-	**1,289,250**
					A13760	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13770	Excavate box	Track	1D	189,190.44	14.7%	05-Feb-09	26-Mar-09	50	15	16	-	-	189,190	-	-	-	-	-	-	-	-	-	-	-	189,190
					A13780	Excavate, lay and concrete ducts	Track	1D	-	0.0%	12-Feb-09	29-Apr-09	77	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13790	Excavate and construct OLE bases	Track - BB	1D	15,087.63	1.2%	12-Feb-09	29-Apr-09	77	15	18	-	-	-	-	15,088	-	-	-	-	-	-	-	-	-	-	15,088
					A13810	Set Track (950m) - 1st Half	Track	1D	378,380.87	29.3%	31-Mar-09	17-Jun-09	79	17	19	-	-	-	-	-	-	378,381	-	-	-	-	-	-	-	-	378,381
					A13810	Set Track (950m)	Track	1D	441,444.35	34.2%	31-Mar-09	17-Jun-09	79	17	19	-	-	-	-	-	-	441,444	-	-	-	-	-	-	-	-	441,444
					A13830	Street Surface finishes	Track	1D	126,126.96	9.8%	23-Jun-09	30-Jul-09	38	20	21	-	-	-	-	-	-	-	126,127	-	-	-	-	-	-	-	126,127
					A13820	Place Upper Concrete and Cure	Track	1D	126,126.96	9.8%	03-Apr-09	22-Jun-09	81	17	20	-	-	-	-	-	-	126,127	-	-	-	-	-	-	-	-	126,127
					Snagging	Snagging	Track	1D	12,892.50	1.0%				21	22	-	-	-	-	-	-	-	-	12,892	-	-	-	-	12,892
		01D3 Shandwick Place (inc.) to Haymarket (exc.)							**2,433,536.95**							**27,025**	**9,889**	**57,814**	**27,269**	**18,017**	**9,889**	**115,740**	**39,557**	**107,363**	**139,807**	**434,473**	**267,163**	**472**	**1,254,476**
		Shandwick Place Tram Stop																											
		Tramstop							**566,420.67**							-	-	-	-	-	-	-	-	-	-	**159,202**	-	-	**159,202**
					S88	Order REC Supply	Trams Eq	1D	-	0.0%	26-Nov-09	26-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2810	Deliver and Install Shelter	Tramstops	1D	106,134.62	18.7%	11-Feb-10	25-Feb-10	15	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1D	1,072.07	0.2%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4670	Package Test Tramstop	Trams Eq	1D	137,809.98	24.3%	10-May-10	17-May-10	8	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4640	Install LV Power Supply and LV Power Equipment	Trams Eq	1D	-	0.0%	25-Feb-10	01-Apr-10	36	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4650	Install Telecon Equipment	Trams Eq	1D	-	0.0%	01-Apr-10	30-Apr-10	30	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4660	Install Station Control Equipment + AFC Equipment	Trams Eq	1D	-	0.0%	01-Apr-10	10-May-10	40	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4639	Access for E&M Tram Stop installation (01D Shadwick Place)	Trams Eq	1D	-	0.0%	25-Feb-10	25-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4638	Access for visual inspection for E&M Tram Stop installation (01D Shadwick Place)	Trams Eq	1D	-	0.0%	26-Jan-10	26-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1D	1,392.02	0.2%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					640	Completion of Envelope	Tramstops	1D	159,201.94	28.1%	01-Nov-09	14-Jan-10	76	24	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					640	Civil Engineering And Building Works	Tramstops	1D	159,201.94	28.1%	11-Sep-09	31-Oct-09	51	22	24	-	-	-	-	-	-	-	-	-	-	-	159,202	-	-	-	159,202
					Snagging	Snagging	Tramstops	1D	1,608.10	0.3%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Haymarket Ch 1250 - 1125																											
		Roadworks							**109,191.29**							**27,025**	**9,190**	**182**	**9,008**	**18,017**	**9,190**	**182**	**9,008**	-	**9,008**	**9,190**	**9,008**	**182**	**109,191**
					Phase 1				**18,198.55**		**23-Apr-09**	**23-Apr-09**				**18,017**	**182**	-	-	-	-	-	-	-	-	-	-	-	**18,199**
					A6390	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	05-Jan-09	06-Jan-09	2	14	14	9,008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9,008
					A6400	Remove island surfacing and exc. to formation	Highways	1D	-	0.0%	07-Jan-09	12-Jan-09	6	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6410	Construct Kerb lines	Highways	1D	-	0.0%	13-Jan-09	14-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6420	Move Gullies	Highways	1D	-	0.0%	15-Jan-09	16-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6430	Sub base	Highways	1D	-	0.0%	19-Jan-09	20-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6440	Roadbase/base course/wearing course/temp ramps	Highways	1D	-	0.0%	21-Jan-09	23-Jan-09	3	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6450	Pavement Works	Highways	1D	-	0.0%	15-Jan-09	21-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6460	White Lines	Highways	1D	-	0.0%	26-Jan-09	26-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6470	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	15-Jan-09	21-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6475	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	27-Jan-09	27-Jan-09	1	14	14	9,008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9,008
					Snagging	Snagging	Highways	1D	181.99	1.0%				14	15	-	182	-	-	-	-	-	-	-	-	-	-	-	-	182
					Phase 2				**18,198.55**		**23-Apr-09**	**23-Apr-09**				**9,008**	**9,008**	**182**	-	-	-	-	-	-	-	-	-	-	**18,199**
					A6480	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	28-Jan-09	29-Jan-09	2	14	14	9,008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9,008
					A6490	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	30-Jan-09	02-Feb-09	4	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6500	Construct Kerb lines	Highways	1D	-	0.0%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6510	Reset Gullies	Highways	1D	-	0.0%	05-Feb-09	05-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6520	Surface new channel	Highways	1D	-	0.0%	06-Feb-09	06-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6540	Pavement Works	Highways	1D	-	0.0%	05-Feb-09	25-Feb-09	21	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6550	White Lines	Highways	1D	-	0.0%	09-Feb-09	09-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6560	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	05-Feb-09	09-Feb-09	5	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6565	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	12-Feb-09	12-Feb-09	1	15	15	-	9,008	-	-	-	-	-	-	-	-	-	-	-	-	-	9,008
					Snagging	Snagging	Highways	1D	181.99	1.0%				15	16	-	-	182	-	-	-	-	-	-	-	-	-	-	-	182
					Phase 4a				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	**9,008**	**9,008**	**182**	-	-	-	-	-	-	-	**18,199**
					A6730	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	30-Mar-09	31-Mar-09	2	17	17	-	-	-	9,008	-	-	-	-	-	-	-	-	-	-	-	9,008
					A6740	Remove island surfacing and exc. to formation	Highways	1D	-	0.0%	01-Apr-09	07-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6750	Construct Kerb lines	Highways	1D	-	0.0%	08-Apr-09	14-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6760	Move Gullies	Highways	1D	-	0.0%	15-Apr-09	16-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6770	Sub base	Highways	1D	-	0.0%	17-Apr-09	21-Apr-09	5	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6780	Roadbase/base course/wearing course/temp ramps	Highways	1D	-	0.0%	23-Apr-09	27-Apr-09	5	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6790	Pavement Works	Highways	1D	-	0.0%	15-Apr-09	22-Apr-09	8	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6800	White Lines	Highways	1D	-	0.0%	28-Apr-09	28-Apr-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6810	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	15-Apr-09	23-Apr-09	9	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6775	Plane off wearing course	Highways	1D	-	0.0%	22-Apr-09	22-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6815	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	29-Apr-09	29-Apr-09	1	18	18	-	-	-	-	-	9,008	-	-	-	-	-	-	-	-	-	9,008
					Snagging	Snagging	Highways	1D	181.99	1.0%				18	19	-	-	-	-	-	-	182	-	-	-	-	-	-	-	182
					Phase 4b				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	**9,008**	**9,008**	**182**	-	-	-	-	-	-	**18,199**
					A6820	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	30-Apr-09	01-May-09	2	18	18	-	-	-	-	9,008	-	-	-	-	-	-	-	-	-	-	9,008
					A6830	Remove island surfacing and exc. to formation	Highways	1D	-	0.0%	05-May-09	05-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6840	Construct Kerb lines	Highways	1D	-	0.0%	06-May-09	11-May-09	6	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6850	Move Gullies	Highways	1D	-	0.0%	12-May-09	13-May-09	2	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6860	Sub base	Highways	1D	-	0.0%	14-May-09	18-May-09	5	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6880	Roadbase/base course/wearing course/temp ramps	Highways	1D	-	0.0%	20-May-09	22-May-09	3	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0040

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER | SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					Phase 2 - 1st Half				**75,975.18**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8320	Establish Traffic Management & Temp. Fencing	Track	1D	3,503.53	4.6%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8330	Excavate box	Track	1D	-	0.0%	05-Feb-09	06-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8340	Excavate, lay and concrete ducts	Track	1D	-	0.0%	09-Feb-09	11-Feb-09	3	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8350	Excavate and construct OLE bases	Track - BB	1D	1,676.40	2.2%	09-Feb-09	11-Feb-09	3	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8370	Set Track (100m)	Track	1D	-	0.0%	16-Feb-09	19-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8380	Place upper concrete and cure	Track	1D	63,063.48	83.0%	19-Feb-09	24-Feb-09	6	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8390	Street Surface finishes	Track	1D	7,007.05	9.2%	25-Feb-09	27-Feb-09	3	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	724.72	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2 - 2nd Half				**67,274.79**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8410	Excavate box	Track	1D	-	0.0%	02-Mar-09	03-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8420	Excavate, lay and concrete ducts	Track	1D	-	0.0%	04-Mar-09	06-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8450	Set Track	Track	1D	-	0.0%	09-Mar-09	12-Mar-09	4	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8460	Place upper concrete and cure	Track	1D	-	0.0%	12-Mar-09	17-Mar-09	6	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8470	Street Surface finishes	Track	1D	63,063.48	93.7%	18-Mar-09	20-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8480	Remove fencing and Traffic Management	Track	1D	3,503.53	5.2%	23-Mar-09	23-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	707.78	1.1%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3a - 1st Half				**21,741.50**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8680	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	20-Apr-09	21-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8690	Excavate box	Track	1D	-	0.0%	22-Apr-09	22-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8700	Excavate, lay and concrete ducts	Track	1D	3,153.17	14.5%	23-Apr-09	24-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8710	Excavate and construct OLE bases	Track - BB	1D	502.92	2.3%	23-Apr-09	24-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8730	Set Track (30m)	Track	1D	-	0.0%	18-Jun-09	23-Jun-09	6	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8740	Place upper concrete and cure	Track	1D	15,765.87	72.5%	23-Jun-09	26-Jun-09	4	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8750	Street Surface finishes	Track	1D	2,102.12	9.7%	29-Jun-09	01-Jul-09	3	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	217.41	1.0%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3a - 2nd Half				**21,233.49**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8760	Excavate box	Track	1D	-	0.0%	02-Jul-09	02-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8770	Excavate, lay and concrete ducts	Track	1D	-	0.0%	03-Jul-09	06-Jul-09	4	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8800	Set Track	Track	1D	-	0.0%	09-Jul-09	14-Jul-09	6	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8810	Place upper concrete and cure	Track	1D	-	0.0%	14-Jul-09	17-Jul-09	4	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8820	Street Surface finishes	Track	1D	18,919.04	89.1%	20-Jul-09	22-Jul-09	3	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8830	Remove fencing and Traffic Management	Track	1D	2,102.12	9.9%	23-Jul-09	23-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	212.33	1.0%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 4 - 1st Half				**21,741.50**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8840	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	24-Jul-09	27-Jul-09	4	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8850	Excavate box	Track	1D	-	0.0%	28-Jul-09	28-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8860	Excavate, lay and concrete ducts	Track	1D	3,153.17	14.5%	29-Jul-09	30-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8870	Excavate and construct OLE bases	Track - BB	1D	502.92	2.3%	29-Jul-09	30-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8890	Set Track (30m)	Track	1D	15,765.87	72.5%	17-Sep-09	22-Sep-09	6	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8900	Place upper concrete and cure	Track	1D	-	0.0%	22-Sep-09	25-Sep-09	4	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8910	Street Surface finishes	Track	1D	2,102.12	9.7%	28-Sep-09	30-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	217.41	1.0%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 4 - 2nd half				**21,233.49**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8920	Excavate box	Track	1D	-	0.0%	01-Oct-09	01-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8930	Excavate, lay and concrete ducts	Track	1D	-	0.0%	02-Oct-09	05-Oct-09	4	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8960	Set Track	Track	1D	-	0.0%	06-Oct-09	09-Oct-09	4	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8970	Place upper concrete and cure	Track	1D	18,919.04	89.1%	09-Oct-09	14-Oct-09	6	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8980	Street Surface finishes	Track	1D	-	0.0%	15-Oct-09	19-Oct-09	5	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8990	Remove fencing and Traffic Management	Track	1D	2,102.12	9.9%	20-Oct-09	20-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	212.33	1.0%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Princes Street Ch 280 - 0, 1980 - 1360																										
		Trackwork							**1,289,249.70**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1				**1,289,249.70**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13760	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13770	Excavate box	Track	1D	189,190.44	14.7%	05-Feb-09	26-Mar-09	50	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13780	Excavate, lay and concrete ducts	Track	1D	-	0.0%	12-Feb-09	29-Apr-09	77	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13790	Excavate and construct OLE bases	Track - BB	1D	15,087.63	1.2%	12-Feb-09	29-Apr-09	77	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13810	Set Track (950m) - 1st Half	Track	1D	378,380.87	29.3%	31-Mar-09	17-Jun-09	79	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13810	Set Track (950m)	Track	1D	441,444.35	34.2%	31-Mar-09	17-Jun-09	79	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13830	Street Surface finishes	Track	1D	126,126.96	9.8%	23-Jun-09	30-Jul-09	38	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13820	Place Upper Concrete and Cure	Track	1D	126,126.96	9.8%	03-Apr-09	22-Jun-09	81	17	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	12,892.50	1.0%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		01D3 Shandwick Place (inc.) to Haymarket (exc.)							**2,433,536.95**							**610,534**	**201,904**	**91,845**	**80,631**	**192,216**	**1,931**	-	-	-	-	-	-	**1,179,061**
		Shandwick Place Tram Stop																										
		Tramstop							**566,420.67**							**159,202**	**107,743**	**1,072**	-	**137,810**	**1,392**	-	-	-	-	-	-	**407,219**
					588	Order REC Supply	Trams Eq	1D	-	0.0%	26-Nov-09	26-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2810	Deliver and Install Shelter	Tramstops	1D	106,134.62	18.7%	11-Feb-10	25-Feb-10	15	28	28	-	106,135	-	-	-	-	-	-	-	-	-	-	-	106,135
					Snagging	Snagging	Tramstops	1D	1,072.07	0.2%				28	29	-	-	1,072	-	-	-	-	-	-	-	-	-	-	1,072
					A4670	Package Test Tramstop	Trams Eq	1D	137,809.98	24.3%	10-May-10	17-May-10	8	31	31	-	-	-	-	137,810	-	-	-	-	-	-	-	-	-	137,810
					A4640	Install LV Power Supply and LV Power Equipment	Trams Eq	1D	-	0.0%	25-Feb-10	01-Apr-10	36	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4650	Install Telecon Equipment	Trams Eq	1D	-	0.0%	01-Apr-10	30-Apr-10	30	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4660	Install Station Control Equipment + AFC Equipment	Trams Eq	1D	-	0.0%	01-Apr-10	10-May-10	40	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4639	Access for E&M Tram Stop installation (01D Shadwick Place)	Trams Eq	1D	-	0.0%	25-Feb-10	25-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4638	Access for visual inspection for E&M Tram Stop installation (01D Shadwick Place)	Trams Eq	1D	-	0.0%	26-Jan-10	26-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1D	1,392.02	0.2%				31	32	-	-	-	-	-	1,392	-	-	-	-	-	-	-	1,392
					640	Completion of Envelope	Tramstops	1D	159,201.94	28.1%	01-Nov-09	14-Jan-10	76	24	27	159,202	-	-	-	-	-	-	-	-	-	-	-	-	-	159,202
					640	Civil Engineering And Building Works	Tramstops	1D	159,201.94	28.1%	11-Sep-09	31-Oct-09	51	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1D	1,608.10	0.3%				27	28	-	1,608	-	-	-	-	-	-	-	-	-	-	-	1,608
		Haymarket Ch 1290 - 1125																										
		Roadworks							**109,191.29**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6390	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	05-Jan-09	06-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6400	Remove island surfacing and exc. to formation	Highways	1D	-	0.0%	07-Jan-09	12-Jan-09	6	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6410	Construct Kerb lines	Highways	1D	-	0.0%	13-Jan-09	14-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6420	Move Gullies	Highways	1D	-	0.0%	15-Jan-09	16-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6430	Sub base	Highways	1D	-	0.0%	19-Jan-09	20-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6440	Roadbase/base course/wearing course/temp ramps	Highways	1D	-	0.0%	21-Jan-09	23-Jan-09	3	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6450	Pavement Works	Highways	1D	-	0.0%	15-Jan-09	21-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6460	White Lines	Highways	1D	-	0.0%	26-Jan-09	26-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6470	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	15-Jan-09	21-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6475	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	27-Jan-09	27-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	181.99	1.0%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6480	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	29-Jan-09	29-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6490	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	30-Jan-09	02-Feb-09	4	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6500	Construct Kerb lines	Highways	1D	-	0.0%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6510	Reset Gullies	Highways	1D	-	0.0%	05-Feb-09	05-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6520	Surface new channel	Highways	1D	-	0.0%	06-Feb-09	06-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6540	Pavement Works	Highways	1D	-	0.0%	05-Feb-09	25-Feb-09	21	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6550	White Lines	Highways	1D	-	0.0%	09-Feb-09	09-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6560	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	05-Feb-09	09-Feb-09	5	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6565	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	12-Feb-09	12-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	181.99	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 4a				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6730	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	30-Mar-09	31-Mar-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6740	Remove island surfacing and exc. to formation	Highways	1D	-	0.0%	01-Apr-09	07-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6750	Construct Kerb lines	Highways	1D	-	0.0%	08-Apr-09	14-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6760	Move Gullies	Highways	1D	-	0.0%	15-Apr-09	16-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6770	Sub base	Highways	1D	-	0.0%	17-Apr-09	21-Apr-09	5	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6780	Roadbase/base course/wearing course/temp ramps	Highways	1D	-	0.0%	23-Apr-09	27-Apr-09	5	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6790	Pavement Works	Highways	1D	-	0.0%	15-Apr-09	22-Apr-09	8	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6800	White Lines	Highways	1D	-	0.0%	28-Apr-09	28-Apr-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6810	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	15-Apr-09	23-Apr-09	9	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6775	Plane off wearing course	Highways	1D	-	0.0%	22-Apr-09	22-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6815	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	29-Apr-09	29-Apr-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	181.99	1.0%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 4b				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6820	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	30-Apr-09	01-May-09	2	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6830	Remove island surfacing and exc. to formation	Highways	1D	-	0.0%	05-May-09	05-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6840	Construct Kerb lines	Highways	1D	-	0.0%	06-May-09	11-May-09	6	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6850	Move Gullies	Highways	1D	-	0.0%	12-May-09	13-May-09	2	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6860	Sub base	Highways	1D	-	0.0%	14-May-09	18-May-09	5	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6880	Roadbase/base course/wearing course/temp ramps	Highways	1D	-	0.0%	20-May-09	22-May-09	3	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0041

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multiple Services Alliance — BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					Phase 2 - 1st Half				**75,975.18**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8320	Establish Traffic Management & Temp. Fencing	Track	1D	3,503.53	4.6%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8330	Excavate box	Track	1D	-	0.0%	05-Feb-09	06-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8340	Excavate, lay and concrete ducts	Track	1D	-	0.0%	09-Feb-09	11-Feb-09	3	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8350	Excavate and construct OLE bases	Track - BB	1D	1,676.40	2.2%	09-Feb-09	11-Feb-09	3	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8370	Set Track (100m)	Track	1D	-	0.0%	16-Feb-09	19-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8380	Place upper concrete and cure	Track	1D	63,063.48	83.0%	19-Feb-09	24-Feb-09	6	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8390	Street Surface finishes	Track	1D	7,007.05	9.2%	25-Feb-09	27-Feb-09	3	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	724.72	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2 - 2nd Half				**67,274.79**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8410	Excavate box	Track	1D	-	0.0%	02-Mar-09	03-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8420	Excavate, lay and concrete ducts	Track	1D	-	0.0%	04-Mar-09	06-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8450	Set Track	Track	1D	-	0.0%	09-Mar-09	12-Mar-09	4	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8460	Place upper concrete and cure	Track	1D	-	0.0%	12-Mar-09	17-Mar-09	6	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8470	Street Surface finishes	Track	1D	63,063.48	93.7%	18-Mar-09	20-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8480	Remove fencing and Traffic Management	Track	1D	3,503.53	5.2%	23-Mar-09	23-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	707.78	1.1%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3a - 1st Half				**21,741.50**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8680	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	20-Apr-09	21-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8690	Excavate box	Track	1D	-	0.0%	22-Apr-09	22-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8700	Excavate, lay and concrete ducts	Track	1D	3,153.17	14.5%	23-Apr-09	24-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8710	Excavate and construct OLE bases	Track - BB	1D	502.92	2.3%	23-Apr-09	24-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8730	Set Track (30m)	Track	1D	-	0.0%	18-Jun-09	23-Jun-09	6	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8740	Place upper concrete and cure	Track	1D	15,765.87	72.5%	23-Jun-09	26-Jun-09	4	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8750	Street Surface finishes	Track	1D	2,102.12	9.7%	29-Jun-09	01-Jul-09	3	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	217.41	1.0%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3a - 2nd Half				**21,233.49**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8760	Excavate box	Track	1D	-	0.0%	02-Jul-09	02-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8770	Excavate, lay and concrete ducts	Track	1D	-	0.0%	03-Jul-09	06-Jul-09	4	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8800	Set Track	Track	1D	-	0.0%	09-Jul-09	14-Jul-09	6	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8810	Place upper concrete and cure	Track	1D	-	0.0%	14-Jul-09	17-Jul-09	4	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8820	Street Surface finishes	Track	1D	18,919.04	89.1%	20-Jul-09	22-Jul-09	3	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8830	Remove fencing and Traffic Management	Track	1D	2,102.12	9.9%	23-Jul-09	23-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	212.33	1.0%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 4 - 1st Half				**21,741.50**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8840	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	24-Jul-09	27-Jul-09	4	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8850	Excavate box	Track	1D	-	0.0%	28-Jul-09	28-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8860	Excavate, lay and concrete ducts	Track	1D	3,153.17	14.5%	29-Jul-09	30-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8870	Excavate and construct OLE bases	Track - BB	1D	502.92	2.3%	29-Jul-09	30-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8890	Set Track (30m)	Track	1D	15,765.87	72.5%	17-Sep-09	22-Sep-09	6	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8900	Place upper concrete and cure	Track	1D	-	0.0%	22-Sep-09	25-Sep-09	4	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8910	Street Surface finishes	Track	1D	2,102.12	9.7%	28-Sep-09	30-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	217.41	1.0%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 4 - 2nd half				**21,233.49**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8920	Excavate box	Track	1D	-	0.0%	01-Oct-09	01-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8930	Excavate, lay and concrete ducts	Track	1D	-	0.0%	02-Oct-09	05-Oct-09	4	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8960	Set Track	Track	1D	-	0.0%	06-Oct-09	09-Oct-09	4	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8970	Place upper concrete and cure	Track	1D	18,919.04	89.1%	09-Oct-09	14-Oct-09	6	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8980	Street Surface finishes	Track	1D	-	0.0%	15-Oct-09	19-Oct-09	5	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8990	Remove fencing and Traffic Management	Track	1D	2,102.12	9.9%	20-Oct-09	20-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	212.33	1.0%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Princes Street Ch 280 - 0, 1980 - 1360																								
					Trackwork				**1,289,249.70**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1				**1,289,249.70**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13760	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13770	Excavate box	Track	1D	189,190.44	14.7%	05-Feb-09	26-Mar-09	50	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13780	Excavate, lay and concrete ducts	Track	1D	-	0.0%	12-Feb-09	29-Apr-09	77	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13790	Excavate and construct OLE bases	Track - BB	1D	15,087.63	1.2%	12-Feb-09	29-Apr-09	77	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13810	Set Track (950m) - 1st Half	Track	1D	378,380.87	29.3%	31-Mar-09	17-Jun-09	79	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13810	Set Track (950m)	Track	1D	441,444.35	34.2%	31-Mar-09	17-Jun-09	79	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13830	Street Surface finishes	Track	1D	126,126.96	9.8%	23-Jun-09	30-Jul-09	38	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A13820	Place Upper Concrete and Cure	Track	1D	126,126.96	9.8%	03-Apr-09	22-Jun-09	81	17	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	12,892.50	1.0%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					01D3 Shandwick Place (inc.) to Haymarket (exc.)				**2,433,536.95**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Shandwick Place Tram Stop																								
					Tramstop				**566,420.67**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					588	Order REC Supply	Trams Eq	1D	-	0.0%	26-Nov-09	26-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2810	Deliver and Install Shelter	Tramstops	1D	106,134.62	18.7%	11-Feb-10	25-Feb-10	15	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1D	1,072.07	0.2%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4670	Package Test Tramstop	Trams Eq	1D	137,809.98	24.3%	10-May-10	17-May-10	8	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4640	Install LV Power Supply and LV Power Equipment	Trams Eq	1D	-	0.0%	25-Feb-10	01-Apr-10	36	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4650	Install Telecon Equipment	Trams Eq	1D	-	0.0%	01-Apr-10	30-Apr-10	30	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4660	Install Station Control Equipment + AFC Equipment	Trams Eq	1D	-	0.0%	01-Apr-10	10-May-10	40	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4639	Access for E&M Tram Stop installation (01D Shadwick Place)	Trams Eq	1D	-	0.0%	25-Feb-10	25-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4638	Access for visual inspection for E&M Tram Stop installation (01D Shadwick Place)	Trams Eq	1D	-	0.0%	26-Jan-10	26-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	1D	1,392.02	0.2%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					640	Completion of Envelope	Tramstops	1D	159,201.94	28.1%	01-Nov-09	14-Jan-10	76	24	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					640	Civil Engineering And Building Works	Tramstops	1D	159,201.94	28.1%	11-Sep-09	31-Oct-09	51	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	1D	1,608.10	0.3%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Haymarket Ch 1430 - 1125																								
					Roadworks				**109,191.29**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6390	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	05-Jan-09	06-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6400	Remove island surfacing and exc. to formation	Highways	1D	-	0.0%	07-Jan-09	12-Jan-09	6	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6410	Construct Kerb lines	Highways	1D	-	0.0%	13-Jan-09	14-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6420	Move Gullies	Highways	1D	-	0.0%	15-Jan-09	16-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6430	Sub base	Highways	1D	-	0.0%	19-Jan-09	20-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6440	Roadbase/base course/wearing course/temp ramps	Highways	1D	-	0.0%	21-Jan-09	23-Jan-09	3	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6450	Pavement Works	Highways	1D	-	0.0%	15-Jan-09	21-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6460	White Lines	Highways	1D	-	0.0%	26-Jan-09	26-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6470	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	15-Jan-09	21-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6475	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	27-Jan-09	27-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	181.99	1.0%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6480	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	29-Jan-09	29-Jan-09	2	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6490	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	30-Jan-09	02-Feb-09	4	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6500	Construct Kerb lines	Highways	1D	-	0.0%	03-Feb-09	04-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6510	Reset Gullies	Highways	1D	-	0.0%	05-Feb-09	05-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6520	Surface new channel	Highways	1D	-	0.0%	06-Feb-09	06-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6540	Pavement Works	Highways	1D	-	0.0%	05-Feb-09	25-Feb-09	21	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6550	White Lines	Highways	1D	-	0.0%	09-Feb-09	09-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6560	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	05-Feb-09	09-Feb-09	5	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6565	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	12-Feb-09	12-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	181.99	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 4a				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6730	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	30-Mar-09	31-Mar-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6740	Remove island surfacing and exc. to formation	Highways	1D	-	0.0%	01-Apr-09	07-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6750	Construct Kerb lines	Highways	1D	-	0.0%	08-Apr-09	14-Apr-09	7	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6760	Move Gullies	Highways	1D	-	0.0%	15-Apr-09	16-Apr-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6770	Sub base	Highways	1D	-	0.0%	17-Apr-09	21-Apr-09	5	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6780	Roadbase/base course/wearing course/temp ramps	Highways	1D	-	0.0%	23-Apr-09	27-Apr-09	5	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6790	Pavement Works	Highways	1D	-	0.0%	15-Apr-09	22-Apr-09	8	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6800	White Lines	Highways	1D	-	0.0%	28-Apr-09	28-Apr-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6810	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	15-Apr-09	23-Apr-09	9	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6775	Plane off wearing course	Highways	1D	-	0.0%	22-Apr-09	22-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6815	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	29-Apr-09	29-Apr-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	181.99	1.0%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 4b				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6820	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	30-Apr-09	01-May-09	2	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6830	Remove island surfacing and exc. to formation	Highways	1D	-	0.0%	05-May-09	05-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6840	Construct Kerb lines	Highways	1D	-	0.0%	06-May-09	11-May-09	6	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6850	Move Gullies	Highways	1D	-	0.0%	12-May-09	13-May-09	2	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6860	Sub base	Highways	1D	-	0.0%	14-May-09	18-May-09	5	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6880	Roadbase/base course/wearing course/temp ramps	Highways	1D	-	0.0%	20-May-09	22-May-09	3	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0042

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Morrison Construction Group | BILFINGER BERGER | SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year 2008 Period 0 Period End 02-Feb-2008	1 01-Mar-2008	2 29-Mar-2008	3 26-Apr-2008	4 24-May-2008	5 21-Jun-2008	6 19-Jul-2008	7 16-Aug-2008	8 13-Sep-2008	9 11-Oct-2008	10 08-Nov-2008	11 06-Dec-2008	12 03-Jan-2009	13	2008 Subtotal GBP
					A6890	Pavement Works	Highways	1D	-	0.0%	12-May-09	28-May-09	17	18	19															-
					A6900	White Lines	Highways	1D	-	0.0%	26-May-09	26-May-09	1	19	19															-
					A6910	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	12-May-09	20-May-09	9	18	18															-
					A6870	Plane off wearing course	Highways	1D	-	0.0%	19-May-09	19-May-09	1	18	18															-
					A6915	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	27-May-09	27-May-09	1	19	19															-
					Snagging	Snagging	Highways	1D	181.99	1.0%				19	20														-
					Phase 6b				**18,198.55**		**23-Apr-09**	**23-Apr-09**																		-
					A7240	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	30-Jul-09	31-Jul-09	2	21	21															-
					A7250	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	07-Sep-09	08-Sep-09	2	22	22															-
					A7260	Construct Kerb lines	Highways	1D	-	0.0%	09-Sep-09	15-Sep-09	7	22	23															-
					A7270	Reset Gullies	Highways	1D	-	0.0%	10-Sep-09	16-Sep-09	7	22	23															-
					A7280	Surface new channel	Highways	1D	-	0.0%	17-Sep-09	18-Sep-09	2	23	23															-
					A7290	Pavement Works	Highways	1D	-	0.0%	16-Sep-09	06-Oct-09	21	23	23															-
					A7310	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	16-Sep-09	24-Sep-09	9	23	23															-
					A7315	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	07-Oct-09	07-Oct-09	1	23	23															-
					Snagging	Snagging	Highways	1D	181.99	1.0%				23	24														-
					Phase 7				**18,198.55**		**23-Apr-09**	**23-Apr-09**																		-
					A7320	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	26-Oct-09	27-Oct-09	2	24	24															-
					A7330	Replace north junction kerb line	Highways	1D	-	0.0%	28-Oct-09	04-Nov-09	8	24	24															-
					A7340	Rebuild splitter island	Highways	1D	-	0.0%	05-Nov-09	12-Nov-09	8	24	25															-
					A7350	White Lines / Traffic Signals / Road Signs	Highways	1D	-	0.0%	28-Oct-09	02-Nov-09	6	24	24															-
					A7355	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	13-Nov-09	13-Nov-09	1	25	25															-
					Snagging	Snagging	Highways	1D	181.99	1.0%				25	26														-
					Torphichen Ch 1125 - 940																									
					Roadworks				**161,603.11**																					-
					Phase 3 - North Pavement				**53,867.70**		**23-Apr-09**	**23-Apr-09**																		-
					A7680	Establish Traffic Management & Temp. Fencing	Highways	1D	26,664.51	49.5%	19-Mar-10	22-Mar-10	4	29	29															-
					A7690	Replace north kerb line	Highways	1D	-	0.0%	23-Mar-10	06-Apr-10	15	29	30															-
					A7695	Remove fencing and Traffic Management	Highways	1D	26,664.51	49.5%	07-Apr-10	07-Apr-10	1	30	30															-
					Snagging	Snagging	Highways	1D	538.68	1.0%				30	31														-
					Phase 3 - South Pavement				**53,867.70**		**23-Apr-09**	**23-Apr-09**																		-
					A7700	Establish Traffic Management & Temp. Fencing	Highways	1D	26,664.51	49.5%	08-Apr-10	09-Apr-10	2	30	30															-
					A7710	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	12-Apr-10	13-Apr-10	2	30	30															-
					A7720	Construct Kerb lines	Highways	1D	-	0.0%	14-Apr-10	16-Apr-10	3	30	30															-
					A7730	Reset Gullies	Highways	1D	-	0.0%	19-Apr-10	20-Apr-10	2	30	30															-
					A7740	Surface new channel	Highways	1D	-	0.0%	21-Apr-10	21-Apr-10	1	30	30															-
					A7750	Pavement Works	Highways	1D	-	0.0%	19-Apr-10	27-Apr-10	9	30	31															-
					A7760	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	19-Apr-10	21-Apr-10	3	30	30															-
					A7765	Remove fencing and Traffic Management	Highways	1D	26,664.51	49.5%	22-Apr-10	22-Apr-10	1	30	30															-
					Snagging	Snagging	Highways	1D	538.68	1.0%	23-Apr-09	23-Apr-09	1	30	31															-
					Phase 3 - Splitter Island				**53,867.70**		**23-Apr-09**	**23-Apr-09**																		-
					A7770	Establish Traffic Management & Temp. Fencing	Highways	1D	26,664.51	49.5%	23-Apr-10	26-Apr-10	4	30	31															-
					A7780	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	27-Apr-10	28-Apr-10	2	31	31															-
					A7790	Construct Kerb lines	Highways	1D	-	0.0%	28-Apr-10	04-May-10	7	31	31															-
					A7800	Reset Gullies	Highways	1D	-	0.0%	29-Apr-10	05-May-10	7	31	31															-
					A7810	Surface new channel	Highways	1D	-	0.0%	06-May-10	06-May-10	1	31	31															-
					A7820	Pavement Works	Highways	1D	-	0.0%	05-May-10	26-May-10	22	31	32															-
					A7830	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	05-May-10	07-May-10	3	31	31															-
					A7835	Remove fencing and Traffic Management	Highways	1D	26,664.51	49.5%	14-May-10	14-May-10	1	31	31															-
					Snagging	Snagging	Highways	1D	538.68	1.0%	23-Apr-09	23-Apr-09	1	31	32															-
					West Maitland Ch 940 - 850																									
					Roadworks				**78,617.73**																					-
					Phase 1 - South Pavement				**39,308.86**		**23-Apr-09**	**23-Apr-09**																		-
					A7840	Establish Traffic Management & Temp. Fencing	Highways	1D	19,457.89	49.5%	06-Jan-10	07-Jan-10	2	27	27															-
					A7850	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	08-Jan-10	11-Jan-10	4	27	27															-
					A7860	Construct Kerb lines	Highways	1D	-	0.0%	11-Jan-10	14-Jan-10	4	27	27															-
					A7870	Reset Gullies	Highways	1D	-	0.0%	12-Jan-10	15-Jan-10	4	27	27															-
					A7880	Surface new channel	Highways	1D	-	0.0%	18-Jan-10	19-Jan-10	2	27	27															-
					A7885	Remove fencing and Traffic Management	Highways	1D	19,457.89	49.5%	20-Jan-10	20-Jan-10	1	27	27															-
					Snagging	Snagging	Highways	1D	393.09	1.0%				27	28														-
					Phase 1 - North Pavement				**39,308.86**		**23-Apr-09**	**23-Apr-09**																		-
					A7890	Establish Traffic Management & Temp. Fencing	Highways	1D	19,457.89	49.5%	21-Jan-10	22-Jan-10	2	27	27															-
					A7900	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	25-Jan-10	25-Jan-10	1	27	27															-
					A7910	Construct Kerb lines	Highways	1D	-	0.0%	26-Jan-10	27-Jan-10	2	27	27															-
					A7920	Reset Gullies	Highways	1D	-	0.0%	28-Jan-10	28-Jan-10	1	27	27															-
					A7930	Surface new channel	Highways	1D	-	0.0%	29-Jan-10	29-Jan-10	1	27	27															-
					A7935	Remove fencing and Traffic Management	Highways	1D	19,457.89	49.5%	01-Feb-10	01-Feb-10	1	28	28															-
					Snagging	Snagging	Highways	1D	393.09	1.0%				28	29														-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (10)	Highways	1D	-	0.0%		01-Feb-10																		-
					Crit. Milestone	Complete construction of permanent measures following TRO sign-off (22)	Highways	1D	-	0.0%		01-Feb-10																		-
					Crit. Milestone	tie Completion Approval - Haymarket to Princes Street West (5) (25)	Highways	1D	-	0.0%		01-Feb-10																		-
					Crit. Milestone	Commission Section 1D Haymarket to Princes Street West (5) (24)	Highways	1D	-	0.0%		01-Feb-10																		-
					Shandwick Ch 860 - 440																									
					Roadworks				**358,147.42**																					-
					Phase 1				**358,147.42**		**23-Apr-09**	**23-Apr-09**																		-
					A8180	Establish Traffic Management & Temp. Fencing	Highways	1D	106,369.78	29.7%	09-Sep-09	10-Sep-09	2	22	22															-
					A8190	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	11-Sep-09	06-Oct-09	26	22	23															-
					A8200	Construct Kerb lines	Highways	1D	-	0.0%	16-Sep-09	16-Oct-09	31	23	24															-
					A8210	Reset Gullies	Highways	1D	141,826.38	39.6%	30-Sep-09	20-Oct-09	21	23	24															-
					A8240	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	19-Oct-09	27-Oct-09	9	24	24															-
					A8230	Pavement Works	Highways	1D	-	0.0%	19-Oct-09	04-Jan-10	78	24	27															-
					A8220	Surface new channel	Highways	1D	-	0.0%	21-Oct-09	02-Nov-09	13	24	24															-
					A8245	Remove fencing and Traffic Management	Highways	1D	106,369.78	29.7%	05-Jan-10	05-Jan-10	1	27	27															-
					Snagging	Snagging	Highways	1D	3,581.47	1.0%				27	28														-
					Haymarket Ch 1250 - 1125																									
					Trackwork				**178,294.46**																					-
					Phase 3 - 1st Half				**30,196.52**		**23-Apr-09**	**23-Apr-09**																		-
					A6570	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	13-Feb-09	16-Feb-09	4	15	15															-
					A6580	Excavate box	Track	1D	-	0.0%	17-Feb-09	17-Feb-09	1	15	15															-
					A6590	Excavate, lay and concrete ducts	Track	1D	-	0.0%	18-Feb-09	19-Feb-09	2	15	15															-
					A6600	Excavate and construct OLE bases	Track - BB	1D	698.50	2.3%	18-Feb-09	19-Feb-09	2	15	15															-
					A6620	Set Track (54m)	Track	1D	-	0.0%	20-Feb-09	25-Feb-09	6	15	15															-
					A6630	Place upper concrete and cure	Track	1D	26,276.45	87.0%	25-Feb-09	02-Mar-09	6	15	16															-
					A6640	Street Surface finishes	Track	1D	2,919.61	9.7%	03-Mar-09	05-Mar-09	3	16	16															-
					Snagging	Snagging	Track	1D	301.97	1.0%				16	17														-
					Phase 3 - 2nd half				**28,722.97**		**23-Apr-09**	**23-Apr-09**																		-
					A6650	Excavate box	Track	1D	-	0.0%	06-Mar-09	06-Mar-09	1	16	16															-
					A6660	Excavate, lay and concrete ducts	Track	1D	-	0.0%	09-Mar-09	10-Mar-09	2	16	16															-
					A6690	Set Track	Track	1D	-	0.0%	13-Mar-09	18-Mar-09	6	16	16															-
					A6700	Place upper concrete and cure	Track	1D	-	0.0%	18-Mar-09	23-Mar-09	6	16	16															-
					A6710	Street Surface finishes	Track	1D	25,592.17	89.1%	24-Mar-09	26-Mar-09	3	16	16															-
					A6720	Remove fencing and Traffic Management	Track	1D	2,843.57	9.9%	27-Mar-09	27-Mar-09	1	16	16															-
					Snagging	Snagging	Track	1D	287.23	1.0%				16	17														-
					Phase 5 - 1st half				**30,196.52**		**23-Apr-09**	**23-Apr-09**																		-
					A6920	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	28-May-09	29-May-09	2	19	19															-
					A6940	Excavate box	Track	1D	-	0.0%	01-Jun-09	01-Jun-09	1	19	19															-
					A6950	Excavate, lay and concrete ducts	Track	1D	-	0.0%	02-Jun-09	03-Jun-09	2	19	19															-
					A6960	Excavate and construct OLE bases	Track - BB	1D	698.50	2.3%	02-Jun-09	03-Jun-09	2	19	19															-
					A6980	Set Track (54m)	Track	1D	-	0.0%	24-Jun-09	29-Jun-09	6	20	20															-
					A6990	Place upper concrete and cure	Track	1D	26,276.45	87.0%	29-Jun-09	02-Jul-09	4	20	20															-
					A7000	Street Surface finishes	Track	1D	2,919.61	9.7%	03-Jul-09	07-Jul-09	5	20	20															-
					Snagging	Snagging	Track	1D	301.97	1.0%				20	21														-
					Phase 5 - 2nd half				**29,490.96**		**23-Apr-09**	**23-Apr-09**																		-
					A7075	Remove fencing and Traffic Management	Track	1D	-	0.0%	29-Jul-09	29-Jul-09	1	21	21															-
					A7010	Excavate box	Track	1D	-	0.0%	08-Jul-09	08-Jul-09	1	20	20															-
					A7020	Excavate, lay and concrete ducts	Track	1D	-	0.0%	09-Jul-09	10-Jul-09	2	20	20															-
					A7050	Set Track	Track	1D	-	0.0%	15-Jul-09	20-Jul-09	6	20	21															-
					A7060	Place upper concrete and cure	Track	1D	26,276.45	89.1%	20-Jul-09	23-Jul-09	4	21	21															-
					A7070	Street Surface finishes	Track	1D	2,919.61	9.9%	24-Jul-09	28-Jul-09	5	21	21															-
					Snagging	Snagging	Track	1D	294.91	1.0%				21	22														-
					Phase 6a - 1st Half				**30,196.52**		**23-Apr-09**	**23-Apr-09**																		-
					A7080	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	30-Jul-09	31-Jul-09	2	21	21															-
					A7100	Excavate box	Track	1D	-	0.0%	07-Sep-09	07-Sep-09	1	22	22															-
					A7110	Excavate, lay and concrete ducts	Track	1D	-	0.0%	08-Sep-09	09-Sep-09	2	22	22															-

USB00000073_0043

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Services Group | BILFINGER BERGER

SIEI

Year
Period
Period End

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Extract 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					A6890	Pavement Works	Highways	1D	-	0.0%	12-May-09	28-May-09	17	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6900	White Lines	Highways	1D	-	0.0%	26-May-09	26-May-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6910	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	12-May-09	20-May-09	9	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6870	Plane off wearing course	Highways	1D	-	0.0%	19-May-09	19-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6915	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	27-May-09	27-May-09	1	19	19	-	-	-	-	-	9,008	-	-	-	-	-	-	-	9,008
					Snagging	Snagging	Highways	1D	181.99	1.0%				19	20	-	-	-	-	-	-	182	-	-	-	-	-	-	182
					Phase 6b				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	**9,008**	-	**9,008**	**182**	-	-	**18,199**
					A7240	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	30-Jul-09	31-Jul-09	2	21	21	-	-	-	-	-	-	-	9,008	-	-	-	-	-	-	9,008
					A7250	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	07-Sep-09	08-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7260	Construct Kerb lines	Highways	1D	-	0.0%	09-Sep-09	15-Sep-09	7	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7270	Reset Gullies	Highways	1D	-	0.0%	10-Sep-09	16-Sep-09	7	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7280	Surface new channel	Highways	1D	-	0.0%	17-Sep-09	18-Sep-09	2	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7290	Pavement Works	Highways	1D	-	0.0%	16-Sep-09	06-Oct-09	21	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7310	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	16-Sep-09	24-Sep-09	9	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7315	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	07-Oct-09	07-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	9,008	-	-	-	-	-	9,008
					Snagging	Snagging	Highways	1D	181.99	1.0%				23	24	-	-	-	-	-	-	-	-	-	-	182	-	-	-	182
					Phase 7				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	**9,008**	**9,008**	**182**	**18,199**
					A7320	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	26-Oct-09	27-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	9,008	-	-	-	-	9,008
					A7330	Replace north junction kerb line	Highways	1D	-	0.0%	28-Oct-09	04-Nov-09	8	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7340	Rebuild splitter island	Highways	1D	-	0.0%	05-Nov-09	12-Nov-09	8	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7350	White Lines / Traffic Signals / Road Signs	Highways	1D	-	0.0%	28-Oct-09	02-Nov-09	6	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7355	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	13-Nov-09	13-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	9,008	-	-	9,008
					Snagging	Snagging	Highways	1D	181.99	1.0%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	182	182
					Torphichen Ch 1125 - 940																									
					Roadworks				**161,603.11**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3 - North Pavement				**53,867.70**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7680	Establish Traffic Management & Temp. Fencing	Highways	1D	26,664.51	49.5%	19-Mar-10	22-Mar-10	4	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7690	Replace north kerb line	Highways	1D	-	0.0%	23-Mar-10	06-Apr-10	15	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7695	Remove fencing and Traffic Management	Highways	1D	26,664.51	49.5%	07-Apr-10	07-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	538.68	1.0%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3 - South Pavement				**53,867.70**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7700	Establish Traffic Management & Temp. Fencing	Highways	1D	26,664.51	49.5%	08-Apr-10	09-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7710	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	12-Apr-10	13-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7720	Construct Kerb lines	Highways	1D	-	0.0%	14-Apr-10	16-Apr-10	3	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7730	Reset Gullies	Highways	1D	-	0.0%	19-Apr-10	20-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7740	Surface new channel	Highways	1D	-	0.0%	21-Apr-10	21-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7750	Pavement Works	Highways	1D	-	0.0%	19-Apr-10	27-Apr-10	9	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7760	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	19-Apr-10	21-Apr-10	3	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7765	Remove fencing and Traffic Management	Highways	1D	26,664.51	49.5%	22-Apr-10	22-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	538.68	1.0%	23-Apr-09	23-Apr-09	1	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3 - Splitter Island				**53,867.70**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7770	Establish Traffic Management & Temp. Fencing	Highways	1D	26,664.51	49.5%	23-Apr-10	26-Apr-10	4	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7780	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	27-Apr-10	28-Apr-10	2	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7790	Construct Kerb lines	Highways	1D	-	0.0%	28-Apr-10	04-May-10	7	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7800	Reset Gullies	Highways	1D	-	0.0%	29-Apr-10	05-May-10	7	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7810	Surface new channel	Highways	1D	-	0.0%	06-May-10	06-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7820	Pavement Works	Highways	1D	-	0.0%	05-May-10	26-May-10	22	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7830	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	05-May-10	07-May-10	3	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7835	Remove fencing and Traffic Management	Highways	1D	26,664.51	49.5%	14-May-10	14-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	538.68	1.0%	23-Apr-09	23-Apr-09	1	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					West Maitland Ch 940 - 850																									
					Roadworks				**78,617.73**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1 - South Pavement				**39,308.86**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7840	Establish Traffic Management & Temp. Fencing	Highways	1D	19,457.89	49.5%	06-Jan-10	07-Jan-10	2	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7850	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	08-Jan-10	11-Jan-10	4	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7860	Construct Kerb lines	Highways	1D	-	0.0%	11-Jan-10	14-Jan-10	4	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7870	Reset Gullies	Highways	1D	-	0.0%	12-Jan-10	15-Jan-10	4	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7880	Surface new channel	Highways	1D	-	0.0%	18-Jan-10	19-Jan-10	2	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7885	Remove fencing and Traffic Management	Highways	1D	19,457.89	49.5%	20-Jan-10	20-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	393.09	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1 - North Pavement				**39,308.86**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7890	Establish Traffic Management & Temp. Fencing	Highways	1D	19,457.89	49.5%	21-Jan-10	22-Jan-10	2	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7900	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	25-Jan-10	25-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7910	Construct Kerb lines	Highways	1D	-	0.0%	26-Jan-10	27-Jan-10	2	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7920	Reset Gullies	Highways	1D	-	0.0%	28-Jan-10	28-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7930	Surface new channel	Highways	1D	-	0.0%	29-Jan-10	29-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7935	Remove fencing and Traffic Management	Highways	1D	19,457.89	49.5%	01-Feb-10	01-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	393.09	1.0%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (10)	Highways	1D	-	0.0%		01-Feb-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Complete construction of permanent measures following TRO sign-off (22)	Highways	1D	-	0.0%		01-Feb-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	tie Completion Approval - Haymarket to Princes Street West (5) (25)	Highways	1D	-	0.0%		01-Feb-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Section 1D Haymarket to Princes Street West (5) (34)	Highways	1D	-	0.0%		01-Feb-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Shandwick Ch 850 - 640																									
					Roadworks				**358,147.42**							-	-	-	-	-	-	-	-	**106,370**	-	**141,826**	-	-	**248,196**
					Phase 1				**358,147.42**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	**106,370**	-	**141,826**	-	-	**248,196**
					A8180	Establish Traffic Management & Temp. Fencing	Highways	1D	106,369.78	29.7%	09-Sep-09	10-Sep-09	2	22	22	-	-	-	-	-	-	-	-	106,370	-	-	-	-	-	106,370
					A8190	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	11-Sep-09	06-Oct-09	26	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8200	Construct Kerb lines	Highways	1D	-	0.0%	16-Sep-09	16-Oct-09	31	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8210	Reset Gullies	Highways	1D	141,826.38	39.6%	30-Sep-09	20-Oct-09	21	23	24	-	-	-	-	-	-	-	-	-	-	141,826	-	-	-	-	141,826
					A8240	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	19-Oct-09	27-Oct-09	9	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8230	Pavement Works	Highways	1D	-	0.0%	19-Oct-09	04-Jan-10	78	24	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8220	Surface new channel	Highways	1D	-	0.0%	21-Oct-09	02-Nov-09	13	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8245	Remove fencing and Traffic Management	Highways	1D	106,369.78	29.7%	05-Jan-10	05-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	3,581.47	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Haymarket Ch 1250 - 1125																									
					Trackwork				**178,294.46**							-	**699**	**57,632**	**589**	-	**699**	**29,196**	**29,498**	**993**	**29,196**	**29,498**	**295**	-	**178,294**
					Phase 3 - 1st Half				**30,196.52**		**23-Apr-09**	**23-Apr-09**				-	**699**	**29,196**	**302**	-	-	-	-	-	-	-	-	-	**30,197**
					A6570	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	12-Feb-09	16-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6580	Excavate box	Track	1D	-	0.0%	17-Feb-09	17-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6590	Excavate, lay and concrete ducts	Track	1D	-	0.0%	18-Feb-09	19-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6600	Excavate and construct OLE bases	Track - BB	1D	698.50	2.3%	18-Feb-09	19-Feb-09	2	15	15	-	699	-	-	-	-	-	-	-	-	-	-	-	-	-	699
					A6620	Set Track (54m)	Track	1D	-	0.0%	20-Feb-09	25-Feb-09	6	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6630	Place upper concrete and cure	Track	1D	26,276.45	87.0%	25-Feb-09	02-Mar-09	6	15	16	-	-	26,276	-	-	-	-	-	-	-	-	-	-	-	-	26,276
					A6640	Street Surface finishes	Track	1D	2,919.61	9.7%	03-Mar-09	05-Mar-09	3	16	16	-	-	2,920	-	-	-	-	-	-	-	-	-	-	-	-	2,920
					Snagging	Snagging	Track	1D	301.97	1.0%				16	17	-	-	-	302	-	-	-	-	-	-	-	-	-	-	302
					Phase 3 - 2nd half				**28,722.97**		**23-Apr-09**	**23-Apr-09**				-	-	**28,436**	**287**	-	-	-	-	-	-	-	-	-	**28,723**
					A6650	Excavate box	Track	1D	-	0.0%	06-Mar-09	06-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6660	Excavate, lay and concrete ducts	Track	1D	-	0.0%	09-Mar-09	10-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6690	Set Track	Track	1D	-	0.0%	13-Mar-09	18-Mar-09	6	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6700	Place upper concrete and cure	Track	1D	-	0.0%	18-Mar-09	23-Mar-09	6	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6710	Street Surface finishes	Track	1D	25,592.17	89.1%	24-Mar-09	26-Mar-09	3	16	16	-	-	25,592	-	-	-	-	-	-	-	-	-	-	-	-	25,592
					A6720	Remove fencing and Traffic Management	Track	1D	2,843.57	9.9%	27-Mar-09	27-Mar-09	1	16	16	-	-	2,844	-	-	-	-	-	-	-	-	-	-	-	-	2,844
					Snagging	Snagging	Track	1D	287.23	1.0%				16	17	-	-	-	287	-	-	-	-	-	-	-	-	-	-	287
					Phase 5 - 1st half				**30,196.52**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	**699**	**29,196**	**302**	-	-	-	-	-	**30,197**
					A6920	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	28-May-09	29-May-09	2	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6940	Excavate box	Track	1D	-	0.0%	01-Jun-09	01-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6950	Excavate, lay and concrete ducts	Track	1D	-	0.0%	02-Jun-09	03-Jun-09	2	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6960	Excavate and construct OLE bases	Track - BB	1D	698.50	2.3%	02-Jun-09	03-Jun-09	2	19	19	-	-	-	-	-	699	-	-	-	-	-	-	-	-	-	699
					A6980	Set Track (54m)	Track	1D	-	0.0%	24-Jun-09	29-Jun-09	6	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6990	Place upper concrete and cure	Track	1D	26,276.45	87.0%	29-Jun-09	02-Jul-09	4	20	20	-	-	-	-	-	-	26,276	-	-	-	-	-	-	-	-	26,276
					A7000	Street Surface finishes	Track	1D	2,919.61	9.7%	03-Jul-09	07-Jul-09	5	20	20	-	-	-	-	-	-	2,920	-	-	-	-	-	-	-	-	2,920
					Snagging	Snagging	Track	1D	301.97	1.0%				20	21	-	-	-	-	-	-	-	302	-	-	-	-	-	-	302
					Phase 5 - 2nd half				**29,490.96**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	**29,196**	**295**	-	-	-	-	**29,491**
					A7075	Remove fencing and Traffic Management	Track	1D	-	0.0%	29-Jul-09	29-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7010	Excavate box	Track	1D	-	0.0%	08-Jul-09	08-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7020	Excavate, lay and concrete ducts	Track	1D	-	0.0%	09-Jul-09	10-Jul-09	2	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7050	Set Track	Track	1D	-	0.0%	15-Jul-09	20-Jul-09	6	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7060	Place upper concrete and cure	Track	1D	26,276.45	89.1%	20-Jul-09	23-Jul-09	4	21	21	-	-	-	-	-	-	-	26,276	-	-	-	-	-	-	-	-	26,276
					A7070	Street Surface finishes	Track	1D	2,919.61	9.9%	24-Jul-09	28-Jul-09	5	21	21	-	-	-	-	-	-	-	2,920	-	-	-	-	-	-	-	-	2,920
					Snagging	Snagging	Track	1D	294.91	1.0%				21	22	-	-	-	-	-	-	-	-	295	-	-	-	-	-	295
					Phase 6a - 1st Half				**30,196.52**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	**699**	**29,196**	**302**	-	-	**30,197**
					A7080	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	30-Jul-09	31-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7100	Excavate box	Track	1D	-	0.0%	07-Sep-09	07-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7110	Excavate, lay and concrete ducts	Track	1D	-	0.0%	08-Sep-09	09-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0044

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year															2010
Period															
Period End															

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					A6890	Pavement Works	Highways	1D	-	0.0%	12-May-09	28-May-09	17	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6900	White Lines	Highways	1D	-	0.0%	26-May-09	26-May-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6910	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	12-May-09	20-May-09	9	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6870	Plane off wearing course	Highways	1D	-	0.0%	19-May-09	19-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6915	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	27-May-09	27-May-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	181.99	1.0%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 6b				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7240	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	30-Jul-09	31-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7250	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	07-Sep-09	08-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7260	Construct Kerb lines	Highways	1D	-	0.0%	09-Sep-09	15-Sep-09	7	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7270	Reset Gullies	Highways	1D	-	0.0%	10-Sep-09	16-Sep-09	7	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7280	Surface new channel	Highways	1D	-	0.0%	17-Sep-09	18-Sep-09	2	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7290	Pavement Works	Highways	1D	-	0.0%	16-Sep-09	06-Oct-09	21	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7310	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	16-Sep-09	24-Sep-09	9	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7315	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	07-Oct-09	07-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	181.99	1.0%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 7				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7320	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	26-Oct-09	27-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7330	Replace north junction kerb line	Highways	1D	-	0.0%	28-Oct-09	04-Nov-09	8	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7340	Rebuild splitter island	Highways	1D	-	0.0%	05-Nov-09	12-Nov-09	8	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7350	White Lines / Traffic Signals / Road Signs	Highways	1D	-	0.0%	28-Oct-09	02-Nov-09	6	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7355	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	13-Nov-09	13-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	181.99	1.0%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Torphichen Ch 1125 - 940																								
					Roadworks				**161,603.11**							-	-	**26,665**	**79,994**	**54,406**	**539**	-	-	-	-	-	-	-	**161,603**
					Phase 3 - North Pavement				**53,867.70**		**23-Apr-09**	**23-Apr-09**				-	-	**26,665**	**26,665**	**539**	-	-	-	-	-	-	-	-	**53,868**
					A7680	Establish Traffic Management & Temp. Fencing	Highways	1D	26,664.51	49.5%	19-Mar-10	22-Mar-10	4	29	29	-	-	26,665	-	-	-	-	-	-	-	-	-	-	-	26,665
					A7690	Replace north kerb line	Highways	1D	-	0.0%	23-Mar-10	06-Apr-10	15	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7695	Remove fencing and Traffic Management	Highways	1D	26,664.51	49.5%	07-Apr-10	07-Apr-10	1	30	30	-	-	-	26,665	-	-	-	-	-	-	-	-	-	-	26,665
					Snagging	Snagging	Highways	1D	538.68	1.0%				30	31	-	-	-	-	539	-	-	-	-	-	-	-	-	539
					Phase 3 - South Pavement				**53,867.70**		**23-Apr-09**	**23-Apr-09**				-	-	-	**53,329**	**539**	-	-	-	-	-	-	-	-	**53,868**
					A7700	Establish Traffic Management & Temp. Fencing	Highways	1D	26,664.51	49.5%	08-Apr-10	09-Apr-10	2	30	30	-	-	-	26,665	-	-	-	-	-	-	-	-	-	-	26,665
					A7710	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	12-Apr-10	13-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7720	Construct Kerb lines	Highways	1D	-	0.0%	14-Apr-10	16-Apr-10	3	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7730	Reset Gullies	Highways	1D	-	0.0%	19-Apr-10	20-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7740	Surface new channel	Highways	1D	-	0.0%	21-Apr-10	21-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7750	Pavement Works	Highways	1D	-	0.0%	19-Apr-10	27-Apr-10	9	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7760	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	19-Apr-10	21-Apr-10	3	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7765	Remove fencing and Traffic Management	Highways	1D	26,664.51	49.5%	22-Apr-10	22-Apr-10	1	30	30	-	-	-	26,665	-	-	-	-	-	-	-	-	-	-	26,665
					Snagging	Snagging	Highways	1D	538.68	1.0%	23-Apr-09	23-Apr-09	1	30	31	-	-	-	-	539	-	-	-	-	-	-	-	-	539
					Phase 3 - Splitter Island				**53,867.70**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	**53,329**	**539**	-	-	-	-	-	-	-	**53,868**
					A7770	Establish Traffic Management & Temp. Fencing	Highways	1D	26,664.51	49.5%	23-Apr-10	26-Apr-10	4	30	31	-	-	-	-	26,665	-	-	-	-	-	-	-	-	-	-	26,665
					A7780	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	27-Apr-10	28-Apr-10	2	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7790	Construct Kerb lines	Highways	1D	-	0.0%	28-Apr-10	04-May-10	7	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7800	Reset Gullies	Highways	1D	-	0.0%	29-Apr-10	05-May-10	7	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7810	Surface new channel	Highways	1D	-	0.0%	06-May-10	06-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7820	Pavement Works	Highways	1D	-	0.0%	05-May-10	26-May-10	22	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7830	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	05-May-10	07-May-10	3	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7835	Remove fencing and Traffic Management	Highways	1D	26,664.51	49.5%	14-May-10	14-May-10	1	31	31	-	-	-	-	26,665	-	-	-	-	-	-	-	-	-	26,665
					Snagging	Snagging	Highways	1D	538.68	1.0%	23-Apr-09	23-Apr-09	1	31	32	-	-	-	-	-	539	-	-	-	-	-	-	-	539
					West Maitland Ch 940 - 850																								
					Roadworks				**78,617.73**							**58,374**	**19,851**	**393**	-	-	-	-	-	-	-	-	-	-	**78,618**
					Phase 1 - South Pavement				**39,308.86**		**23-Apr-09**	**23-Apr-09**				**38,916**	**393**	-	-	-	-	-	-	-	-	-	-	-	**39,309**
					A7840	Establish Traffic Management & Temp. Fencing	Highways	1D	19,457.89	49.5%	06-Jan-10	07-Jan-10	2	27	27	19,458	-	-	-	-	-	-	-	-	-	-	-	-	-	19,458
					A7850	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	08-Jan-10	11-Jan-10	4	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7860	Construct Kerb lines	Highways	1D	-	0.0%	11-Jan-10	14-Jan-10	4	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7870	Reset Gullies	Highways	1D	-	0.0%	12-Jan-10	15-Jan-10	4	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7880	Surface new channel	Highways	1D	-	0.0%	18-Jan-10	19-Jan-10	2	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7885	Remove fencing and Traffic Management	Highways	1D	19,457.89	49.5%	20-Jan-10	20-Jan-10	1	27	27	19,458	-	-	-	-	-	-	-	-	-	-	-	-	-	19,458
					Snagging	Snagging	Highways	1D	393.09	1.0%				27	28	-	393	-	-	-	-	-	-	-	-	-	-	-	393
					Phase 1 - North Pavement				**39,308.86**		**23-Apr-09**	**23-Apr-09**				**19,458**	**19,458**	**393**	-	-	-	-	-	-	-	-	-	-	**39,309**
					A7890	Establish Traffic Management & Temp. Fencing	Highways	1D	19,457.89	49.5%	21-Jan-10	22-Jan-10	2	27	27	19,458	-	-	-	-	-	-	-	-	-	-	-	-	-	19,458
					A7900	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	25-Jan-10	25-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7910	Construct Kerb lines	Highways	1D	-	0.0%	26-Jan-10	27-Jan-10	2	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7920	Reset Gullies	Highways	1D	-	0.0%	28-Jan-10	28-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7930	Surface new channel	Highways	1D	-	0.0%	29-Jan-10	29-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7935	Remove fencing and Traffic Management	Highways	1D	19,457.89	49.5%	01-Feb-10	01-Feb-10	1	28	28	-	19,458	-	-	-	-	-	-	-	-	-	-	-	-	19,458
					Snagging	Snagging	Highways	1D	393.09	1.0%				28	29	-	-	393	-	-	-	-	-	-	-	-	-	-	393
					Crit. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (10)	Highways	1D	-	0.0%		01-Feb-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Complete construction of permanent measures following TRO sign-off (22)	Highways	1D	-	0.0%		01-Feb-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	tie Completion Approval - Haymarket to Princes Street West (5) (25)	Highways	1D	-	0.0%		01-Feb-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Section 1D Haymarket to Princes Street West (5) (34)	Highways	1D	-	0.0%		01-Feb-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Shandwick Ch 850 - 440																								
					Roadworks				**358,147.42**							**106,370**	**3,581**	-	-	-	-	-	-	-	-	-	-	-	**109,951**
					Phase 1				**358,147.42**		**23-Apr-09**	**23-Apr-09**				**106,370**	**3,581**	-	-	-	-	-	-	-	-	-	-	-	**109,951**
					A8180	Establish Traffic Management & Temp. Fencing	Highways	1D	106,369.78	29.7%	09-Sep-09	10-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8190	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	11-Sep-09	06-Oct-09	26	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8200	Construct Kerb lines	Highways	1D	-	0.0%	16-Sep-09	16-Oct-09	31	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8210	Reset Gullies	Highways	1D	141,826.38	39.6%	30-Sep-09	20-Oct-09	21	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8240	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	19-Oct-09	27-Oct-09	9	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8230	Pavement Works	Highways	1D	-	0.0%	19-Oct-09	04-Jan-10	78	24	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8220	Surface new channel	Highways	1D	-	0.0%	21-Oct-09	02-Nov-09	13	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8245	Remove fencing and Traffic Management	Highways	1D	106,369.78	29.7%	05-Jan-10	05-Jan-10	1	27	27	106,370	-	-	-	-	-	-	-	-	-	-	-	-	-	106,370
					Snagging	Snagging	Highways	1D	3,581.47	1.0%				27	28	-	3,581	-	-	-	-	-	-	-	-	-	-	-	3,581
					Haymarket Ch 1250 - 1125																								
					Trackwork				**178,294.46**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3 - 1st Half				**30,196.52**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6570	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	13-Feb-09	16-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6580	Excavate box	Track	1D	-	0.0%	17-Feb-09	17-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6590	Excavate, lay and concrete ducts	Track	1D	-	0.0%	18-Feb-09	19-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6600	Excavate and construct OLE bases	Track - BB	1D	698.50	2.3%	18-Feb-09	19-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6620	Set Track (54m)	Track	1D	-	0.0%	20-Feb-09	25-Feb-09	6	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6630	Place upper concrete and cure	Track	1D	26,276.45	87.0%	25-Feb-09	02-Mar-09	6	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6640	Street Surface finishes	Track	1D	2,919.61	9.7%	03-Mar-09	05-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	301.97	1.0%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3 - 2nd half				**28,722.97**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6650	Excavate box	Track	1D	-	0.0%	06-Mar-09	06-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6660	Excavate, lay and concrete ducts	Track	1D	-	0.0%	09-Mar-09	10-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6690	Set Track	Track	1D	-	0.0%	13-Mar-09	18-Mar-09	6	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6700	Place upper concrete and cure	Track	1D	-	0.0%	18-Mar-09	23-Mar-09	6	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6710	Street Surface finishes	Track	1D	25,592.17	89.1%	24-Mar-09	26-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6720	Remove fencing and Traffic Management	Track	1D	2,843.57	9.9%	27-Mar-09	27-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	287.23	1.0%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 5 - 1st half				**30,196.52**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6920	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	28-May-09	29-May-09	2	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6940	Excavate box	Track	1D	-	0.0%	01-Jun-09	01-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6950	Excavate, lay and concrete ducts	Track	1D	-	0.0%	02-Jun-09	03-Jun-09	2	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6960	Excavate and construct OLE bases	Track - BB	1D	698.50	2.3%	02-Jun-09	03-Jun-09	2	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6980	Set Track (54m)	Track	1D	-	0.0%	24-Jun-09	29-Jun-09	6	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6990	Place upper concrete and cure	Track	1D	26,276.45	87.0%	29-Jun-09	02-Jul-09	4	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7000	Street Surface finishes	Track	1D	2,919.61	9.7%	03-Jul-09	07-Jul-09	5	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	301.97	1.0%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 5 - 2nd half				**29,490.96**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7075	Remove fencing and Traffic Management	Track	1D	-	0.0%	29-Jul-09	29-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7010	Excavate box	Track	1D	-	0.0%	08-Jul-09	08-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7020	Excavate, lay and concrete ducts	Track	1D	-	0.0%	09-Jul-09	10-Jul-09	2	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7050	Set Track	Track	1D	-	0.0%	15-Jul-09	20-Jul-09	6	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7060	Place upper concrete and cure	Track	1D	26,276.45	89.1%	20-Jul-09	23-Jul-09	4	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7070	Street Surface finishes	Track	1D	2,919.61	9.9%	24-Jul-09	28-Jul-09	5	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	294.91	1.0%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 6a - 1st Half				**30,196.52**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7080	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	30-Jul-09	31-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7100	Excavate box	Track	1D	-	0.0%	07-Sep-09	07-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7110	Excavate, lay and concrete ducts	Track	1D	-	0.0%	08-Sep-09	09-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0045

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					A6890	Pavement Works	Highways	1D	-	0.0%	12-May-09	28-May-09	17	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6900	White Lines	Highways	1D	-	0.0%	26-May-09	26-May-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6910	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	12-May-09	20-May-09	9	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6870	Plane off wearing course	Highways	1D	-	0.0%	19-May-09	19-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6915	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	27-May-09	27-May-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	181.99	1.0%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 6b				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7240	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	30-Jul-09	31-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7250	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	07-Sep-09	08-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7260	Construct Kerb lines	Highways	1D	-	0.0%	09-Sep-09	15-Sep-09	7	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7270	Reset Gullies	Highways	1D	-	0.0%	10-Sep-09	16-Sep-09	7	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7280	Surface new channel	Highways	1D	-	0.0%	17-Sep-09	18-Sep-09	2	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7290	Pavement Works	Highways	1D	-	0.0%	16-Sep-09	06-Oct-09	21	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7310	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	16-Sep-09	24-Sep-09	9	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7315	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	07-Oct-09	07-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	181.99	1.0%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 7				**18,198.55**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7320	Establish Traffic Management & Temp. Fencing	Highways	1D	9,008.28	49.5%	26-Oct-09	27-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7330	Replace north junction kerb line	Highways	1D	-	0.0%	28-Oct-09	04-Nov-09	8	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7340	Rebuild splitter island	Highways	1D	-	0.0%	05-Nov-09	12-Nov-09	8	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7350	White Lines / Traffic Signals / Road Signs	Highways	1D	-	0.0%	28-Oct-09	02-Nov-09	6	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7355	Remove fencing and Traffic Management	Highways	1D	9,008.28	49.5%	13-Nov-09	13-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	181.99	1.0%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Torphichen Ch 1125 - 940																										
			Roadworks						**161,603.11**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3 - North Pavement				**53,867.70**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7680	Establish Traffic Management & Temp. Fencing	Highways	1D	26,664.51	49.5%	19-Mar-10	22-Mar-10	4	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7690	Replace north kerb line	Highways	1D	-	0.0%	23-Mar-10	06-Apr-10	15	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7695	Remove fencing and Traffic Management	Highways	1D	26,664.51	49.5%	07-Apr-10	07-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	538.68	1.0%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3 - South Pavement				**53,867.70**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7700	Establish Traffic Management & Temp. Fencing	Highways	1D	26,664.51	49.5%	08-Apr-10	09-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7710	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	12-Apr-10	13-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7720	Construct Kerb lines	Highways	1D	-	0.0%	14-Apr-10	16-Apr-10	3	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7730	Reset Gullies	Highways	1D	-	0.0%	19-Apr-10	20-Apr-10	2	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7740	Surface new channel	Highways	1D	-	0.0%	21-Apr-10	21-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7750	Pavement Works	Highways	1D	-	0.0%	19-Apr-10	27-Apr-10	9	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7760	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	19-Apr-10	21-Apr-10	3	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7765	Remove fencing and Traffic Management	Highways	1D	26,664.51	49.5%	22-Apr-10	22-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	538.68	1.0%	23-Apr-09	23-Apr-09	1	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3 - Splitter Island				**53,867.70**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7770	Establish Traffic Management & Temp. Fencing	Highways	1D	26,664.51	49.5%	23-Apr-10	26-Apr-10	4	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7780	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	27-Apr-10	28-Apr-10	2	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7790	Construct Kerb lines	Highways	1D	-	0.0%	28-Apr-10	04-May-10	7	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7800	Reset Gullies	Highways	1D	-	0.0%	29-Apr-10	05-May-10	7	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7810	Surface new channel	Highways	1D	-	0.0%	06-May-10	06-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7820	Pavement Works	Highways	1D	-	0.0%	05-May-10	26-May-10	22	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7830	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	05-May-10	07-May-10	3	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7835	Remove fencing and Traffic Management	Highways	1D	26,664.51	49.5%	14-May-10	14-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	538.68	1.0%	23-Apr-09	23-Apr-09	1	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		West Maitland Ch 940 - 850																										
			Roadworks						**78,617.73**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1 - South Pavement				**39,308.86**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7840	Establish Traffic Management & Temp. Fencing	Highways	1D	19,457.89	49.5%	06-Jan-10	07-Jan-10	2	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7850	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	08-Jan-10	11-Jan-10	4	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7860	Construct Kerb lines	Highways	1D	-	0.0%	11-Jan-10	14-Jan-10	4	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7870	Reset Gullies	Highways	1D	-	0.0%	12-Jan-10	15-Jan-10	4	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7880	Surface new channel	Highways	1D	-	0.0%	18-Jan-10	19-Jan-10	2	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7885	Remove fencing and Traffic Management	Highways	1D	19,457.89	49.5%	20-Jan-10	20-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	393.09	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1 - North Pavement				**39,308.86**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7890	Establish Traffic Management & Temp. Fencing	Highways	1D	19,457.89	49.5%	21-Jan-10	22-Jan-10	2	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7900	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	25-Jan-10	25-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7910	Construct Kerb lines	Highways	1D	-	0.0%	26-Jan-10	27-Jan-10	2	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7920	Reset Gullies	Highways	1D	-	0.0%	28-Jan-10	28-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7930	Surface new channel	Highways	1D	-	0.0%	29-Jan-10	29-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7935	Remove fencing and Traffic Management	Highways	1D	19,457.89	49.5%	01-Feb-10	01-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	393.09	1.0%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Cnt. Milestone	Completion of Infraco Construction works to road re-instatement and fully re-opened to public (10)	Highways	1D	-	0.0%		01-Feb-10																	
					Cnt. Milestone	Complete construction of permanent measures following TRO sign-off (22)	Highways	1D	-	0.0%		01-Feb-10																	
					Cnt. Milestone	tie Completion Approval - Haymarket to Princes Street West (5) (25)	Highways	1D	-	0.0%		01-Feb-10																	
					Cnt. Milestone	Commission Section 1D Haymarket to Princes Street West (5) (34)	Highways	1D	-	0.0%		01-Feb-10																	
		Shandwick Ch 850 - 440																										
			Roadworks						**358,147.42**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1				**358,147.42**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8180	Establish Traffic Management & Temp. Fencing	Highways	1D	106,369.78	29.7%	09-Sep-09	10-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8190	Excavate for new channel and kerb line / remove existing kerbs	Highways	1D	-	0.0%	11-Sep-09	06-Oct-09	26	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8200	Construct Kerb lines	Highways	1D	-	0.0%	16-Sep-09	16-Oct-09	31	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8210	Reset Gullies	Highways	1D	141,826.38	39.6%	30-Sep-09	20-Oct-09	21	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8240	Street Lighting / Traffic Signals / Road Signs	Highways	1D	-	0.0%	19-Oct-09	27-Oct-09	9	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8230	Pavement Works	Highways	1D	-	0.0%	19-Oct-09	04-Jan-10	78	24	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8220	Surface new channel	Highways	1D	-	0.0%	21-Oct-09	02-Nov-09	13	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8245	Remove fencing and Traffic Management	Highways	1D	106,369.78	29.7%	05-Jan-10	05-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	1D	3,581.47	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Haymarket Ch 1250 - 1125																										
			Trackwork						**178,294.46**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3 - 1st Half				**30,196.52**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6570	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	13-Feb-09	16-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6580	Excavate box	Track	1D	-	0.0%	17-Feb-09	17-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6590	Excavate, lay and concrete ducts	Track	1D	-	0.0%	18-Feb-09	19-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6600	Excavate and construct OLE bases	Track - BB	1D	698.50	2.3%	18-Feb-09	19-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6620	Set Track (54m)	Track	1D	-	0.0%	20-Feb-09	25-Feb-09	6	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6630	Place upper concrete and cure	Track	1D	26,276.45	87.0%	25-Feb-09	02-Mar-09	6	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6640	Street Surface finishes	Track	1D	2,919.61	9.7%	03-Mar-09	05-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	301.97	1.0%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 3 - 2nd half				**28,722.97**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6650	Excavate box	Track	1D	-	0.0%	06-Mar-09	06-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6660	Excavate, lay and concrete ducts	Track	1D	-	0.0%	09-Mar-09	10-Mar-09	2	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6690	Set Track	Track	1D	-	0.0%	13-Mar-09	18-Mar-09	6	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6700	Place upper concrete and cure	Track	1D	-	0.0%	18-Mar-09	23-Mar-09	6	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6710	Street Surface finishes	Track	1D	25,592.17	89.1%	24-Mar-09	26-Mar-09	3	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6720	Remove fencing and Traffic Management	Track	1D	2,843.57	9.9%	27-Mar-09	27-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	287.23	1.0%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 5 - 1st half				**30,196.52**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6920	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	28-May-09	29-May-09	2	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6940	Excavate box	Track	1D	-	0.0%	01-Jun-09	01-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6950	Excavate, lay and concrete ducts	Track	1D	-	0.0%	02-Jun-09	03-Jun-09	2	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6960	Excavate and construct OLE bases	Track - BB	1D	698.50	2.3%	02-Jun-09	03-Jun-09	2	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6980	Set Track (54m)	Track	1D	-	0.0%	24-Jun-09	29-Jun-09	6	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6990	Place upper concrete and cure	Track	1D	26,276.45	87.0%	29-Jun-09	02-Jul-09	4	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7000	Street Surface finishes	Track	1D	2,919.61	9.7%	03-Jul-09	07-Jul-09	5	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	301.97	1.0%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 5 - 2nd half				**29,490.96**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7075	Remove fencing and Traffic Management	Track	1D	-	0.0%	29-Jul-09	29-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7010	Excavate box	Track	1D	-	0.0%	08-Jul-09	08-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7020	Excavate, lay and concrete ducts	Track	1D	-	0.0%	09-Jul-09	10-Jul-09	2	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7050	Set Track	Track	1D	-	0.0%	15-Jul-09	20-Jul-09	6	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7060	Place upper concrete and cure	Track	1D	26,276.45	89.1%	20-Jul-09	23-Jul-09	4	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7070	Street Surface finishes	Track	1D	2,919.61	9.9%	24-Jul-09	28-Jul-09	5	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	294.91	1.0%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 6a - 1st Half				**30,196.52**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7080	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	30-Jul-09	31-Jul-09	2	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7100	Excavate box	Track	1D	-	0.0%	07-Sep-09	07-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7110	Excavate, lay and concrete ducts	Track	1D	-	0.0%	08-Sep-09	09-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0046

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Morrill Services Group BILFINGER BERGER SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year 2008 Period 1 Period End 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
					A7120	Excavate and construct OLE bases	Track - BB	1D	698.50	2.3%	08-Sep-09	09-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7140	Set Track (54m)	Track	1D	-	0.0%	23-Sep-09	25-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7150	Place upper concrete and cure	Track	1D	26,276.45	87.0%	28-Sep-09	30-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7160	Street Surface finishes	Track	1D	2,919.61	9.7%	01-Oct-09	05-Oct-09	5	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	301.97	1.0%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 6a - 2nd Half				**29,490.96**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7235	Remove fencing and Traffic Management	Track	1D	-	0.0%	23-Oct-09	23-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7170	Excavate box	Track	1D	-	0.0%	06-Oct-09	06-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7180	Excavate, lay and concrete ducts	Track	1D	-	0.0%	07-Oct-09	08-Oct-09	2	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7210	Set Track	Track	1D	-	0.0%	12-Oct-09	14-Oct-09	3	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7220	Place upper concrete and cure	Track	1D	26,276.45	89.1%	15-Oct-09	19-Oct-09	5	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7230	Street Surface finishes	Track	1D	2,919.61	9.9%	20-Oct-09	22-Oct-09	3	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	294.91	1.0%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Torphichen Ch 1125 - 940																									
				Trackwork					**265,012.44**																				
				Phase 1 - 1st Half					**105,083.90**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7360	Establish Traffic Management & Temp. Fencing	Track	1D		0.0%	30-Mar-09	31-Mar-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7380	Excavate box	Track	1D	-	0.0%	01-Apr-09	03-Apr-09	3	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7390	Excavate, lay and concrete ducts	Track	1D	15,240.34	14.5%	06-Apr-09	09-Apr-09	4	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7400	Excavate and construct OLE bases	Track - BB	1D	2,430.79	2.3%	06-Apr-09	09-Apr-09	4	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7420	Set Track (145m)	Track	1D	-	0.0%	30-Jun-09	07-Jul-09	8	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7430	Place upper concrete and cure	Track	1D	76,201.70	72.5%	03-Jul-09	10-Jul-09	8	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7440	Street Surface finishes	Track	1D	10,160.23	9.7%	13-Jul-09	15-Jul-09	3	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	1,050.84	1.0%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1 - 2nd Half				**102,628.56**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7515	Remove fencing and Traffic Management	Track	1D	-	0.0%	25-Sep-09	25-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7450	Excavate box	Track	1D	-	0.0%	16-Jul-09	20-Jul-09	5	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7460	Excavate, lay and concrete ducts	Track	1D	-	0.0%	21-Jul-09	24-Jul-09	4	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7490	Set Track	Track	1D	45,721.02	44.6%	09-Sep-09	16-Sep-09	8	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7500	Place upper concrete and cure	Track	1D	45,721.02	44.6%	14-Sep-09	21-Sep-09	8	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7510	Street Surface finishes	Track	1D	10,160.23	9.9%	22-Sep-09	24-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	1,026.29	1.0%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2 - 1st Half				**28,988.66**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7520	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	26-Oct-09	27-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7540	Excavate box	Track	1D	-	0.0%	28-Oct-09	28-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7550	Excavate, lay and concrete ducts	Track	1D	-	0.0%	29-Oct-09	30-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7560	Excavate and construct OLE bases	Track - BB	1D	670.56	2.3%	29-Oct-09	30-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7580	Set Track (40m)	Track	1D	-	0.0%	06-Nov-09	11-Nov-09	6	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7590	Place upper concrete and cure	Track	1D	25,225.39	87.0%	11-Nov-09	16-Nov-09	6	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7600	Street Surface finishes	Track	1D	2,802.82	9.7%	17-Nov-09	19-Nov-09	3	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	289.89	1.0%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2 - 2nd Half				**28,311.33**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7675	Remove fencing and Traffic Management	Track	1D	-	0.0%	20-Jan-10	20-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7610	Excavate box	Track	1D	-	0.0%	20-Nov-09	20-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7620	Excavate, lay and concrete ducts	Track	1D	-	0.0%	23-Nov-09	24-Nov-09	2	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7650	Set Track	Track	1D	-	0.0%	06-Jan-10	11-Jan-10	6	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7660	Place upper concrete and cure	Track	1D	25,225.39	89.1%	11-Jan-10	14-Jan-10	4	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7670	Street Surface finishes	Track	1D	2,802.82	9.9%	15-Jan-10	19-Jan-10	5	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	283.11	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				West Maitland Ch 940 - 850																									
				Trackwork					**128,924.97**																				
				Phases 2 & 3 - 1st Half					**65,224.49**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7940	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	02-Feb-10	03-Feb-10	2	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7960	Excavate box	Track	1D	-	0.0%	04-Feb-10	05-Feb-10	2	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7970	Excavate, lay and concrete ducts	Track	1D	-	0.0%	08-Feb-10	10-Feb-10	3	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7980	Excavate and construct OLE bases	Track - BB	1D	1,508.76	2.3%	08-Feb-10	10-Feb-10	3	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8000	Set Track (90m)	Track	1D	-	0.0%	11-Feb-10	16-Feb-10	6	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8010	Place upper concrete and cure	Track	1D	56,757.13	87.0%	16-Feb-10	19-Feb-10	4	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8020	Street Surface finishes	Track	1D	6,306.35	9.7%	22-Feb-10	24-Feb-10	3	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	652.24	1.0%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phases 2 & 3 - 2nd Half				**63,700.48**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8095	Remove fencing and Traffic Management	Track	1D	-	0.0%	18-Mar-10	18-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8030	Excavate box	Track	1D	-	0.0%	25-Feb-10	26-Feb-10	2	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8040	Excavate, lay and concrete ducts	Track	1D	-	0.0%	01-Mar-10	03-Mar-10	3	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8070	Set Track	Track	1D	-	0.0%	04-Mar-10	09-Mar-10	6	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8080	Place upper concrete and cure	Track	1D	56,757.13	89.1%	09-Mar-10	12-Mar-10	4	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8090	Street Surface finishes	Track	1D	6,306.35	9.9%	15-Mar-10	17-Mar-10	3	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	637.00	1.0%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Shandwick Place Ch 850 - 440																									
				Trackwork					**587,324.86**																				
				Phase 1					**587,324.86**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8100	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	09-Sep-09	10-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8110	Excavate box	Track	1D	-	0.0%	11-Sep-09	05-Oct-09	25	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8120	Excavate, lay and concrete ducts	Track	1D	86,186.75	14.7%	16-Sep-09	19-Oct-09	34	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8130	Excavate and construct OLE bases	Track - BB	1D	6,873.26	1.2%	16-Sep-09	19-Oct-09	34	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8150	Set Track (410m)	Track	1D	229,831.34	39.1%	15-Oct-09	26-Nov-09	43	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8170	Street Surface finishes	Track	1D	-	0.0%	23-Nov-09	18-Jan-10	57	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8175	Remove fencing and Traffic Management	Track	1D	201,102.43	34.2%	19-Jan-10	19-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8160	Place Upper Concrete and Cure	Track	1D	57,457.84	9.8%	20-Oct-09	05-Jan-10	78	24	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	5,873.25	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				02 Haymarket Corridor					**5,501,667.48**	**2.5%**																			
				02A Haymarket Corridor					**5,501,667.48**							-	-	-	-	**100,487**	-	**301,462**	**418,639**	**419,577**	-	**1,741,318**	**264,431**	**165,866**	**3,411,780**
				02A1 Haymarket Corridor					**861,248.57**							-	-	-	-	**100,487**	-	**301,462**	**418,639**	**419,577**	-	**1,741,318**	**264,431**	**165,866**	**3,411,780**
				Haymarket Corridor												-	-	-	-	-	-	-	-	-	-	-	-	-	-
				E & M Installations					**861,248.57**																				
					A4050	Overhead Catenary Line	OLE	2A	317,965.77	36.9%	04-Sep-09	25-Sep-09	22	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	2A	3,211.78	0.4%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4060	Install Electrical Cables	SCC	2A	133,667.58	15.5%	18-Sep-09	05-Oct-09	18	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4070	Install Fibre Optic Cables	SCC	2A	133,667.58	15.5%	18-Sep-09	05-Oct-09	18	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4080	Install Signalling Wayside Equipment	SCC	2A	133,667.58	15.5%	06-Oct-09	21-Oct-09	16	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4045	Installation of poles and building fixings	SCC	2A	133,667.58	15.5%	26-Aug-09	03-Sep-09	9	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4044	Access for E&M wayside installation (02A)	SCC	2A	-	0.0%	26-Aug-09	26-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4059	Access to cable pits for cable laying (02A)	SCC	2A	-	0.0%	18-Sep-09	18-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4043	Access for visual inspection for E&M wayside installation (02A)	SCC	2A	-	0.0%	24-Jul-09	24-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4058	Access visual inspection to cable pits for cable laying (02A)	SCC	2A	-	0.0%	19-Aug-09	19-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	2A	5,400.71	0.6%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				02A2 Haymarket (inc.) to Roseburn Junction (inc.)					**4,640,418.91**							-	-	-	-	**100,487**	-	**301,462**	**418,639**	**419,577**	-	**1,741,318**	**264,431**	**165,866**	**3,411,780**
				Haymarket Station Viaduct (S19)																									
				Bridge					**1,040,023.00**							-	-	-	-	**100,487**	-	**301,462**	**200,975**	**225,975**	-	-	**125,487**	**75,487**	**1,029,873**
					1138	Demolish Caledonian Ale House	Structures	2A	100,487.28	9.7%	01-Apr-08	28-Apr-08	28	4	5	-	-	-	-	100,487	-	-	-	-	-	-	-	-	-	100,487
					1139	Bankseat at Grid line 1	Structures	2A	100,487.28	9.7%	08-May-08	03-Jul-08	57	5	7	-	-	-	-	-	-	100,487	-	-	-	-	-	-	-	-	100,487
					192	Pier 2	Structures	2A	100,487.28	9.7%	15-May-08	26-Jun-08	43	5	7	-	-	-	-	-	-	100,487	-	-	-	-	-	-	-	-	100,487
					227	Pier 3	Structures	2A	100,487.28	9.7%	30-May-08	10-Jul-08	42	6	7	-	-	-	-	-	-	100,487	-	-	-	-	-	-	-	-	100,487
					498	Pier 4	Structures	2A	100,487.28	9.7%	13-Jun-08	24-Jul-08	42	6	8	-	-	-	-	-	-	-	100,487	-	-	-	-	-	-	-	100,487
					508	Pier 5	Structures	2A	100,487.28	9.7%	27-Jun-08	08-Aug-08	43	7	8	-	-	-	-	-	-	-	100,487	-	-	-	-	-	-	-	100,487
					560	Bankseat at Gridline 6	Structures	2A	100,487.28	9.7%	11-Jul-08	05-Sep-08	57	7	9	-	-	-	-	-	-	-	-	100,487	-	-	-	-	-	-	100,487
					570	Superstructure - First Pour	Structures	2A	125,487.28	12.1%	04-Jul-08	31-Aug-08	59	7	9	-	-	-	-	-	-	-	-	125,487	-	-	-	-	-	-	125,487
					570	Superstructure - Second Pour	Structures	2A	125,487.28	12.1%	01-Sep-08	14-Nov-08	76	9	12	-	-	-	-	-	-	-	-	-	-	-	-	125,487	-	-	125,487
					580	Finishes	Structures	2A	50,487.28	4.9%	17-Nov-08	08-Dec-08	22	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	50,487	-	50,487
					Snagging	Snagging	Structures	2A	10,150.23	1.0%				13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	2A	25,000.00	2.4%				13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	25,000	25,000
					Crit. Milestone	1st Completion Approval - Haymarket Corridor (4) (24)	Structures	2A	-	0.0%		08-Dec-08				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Haymarket to Roseburn Junction																									
				Trackwork					**2,509,192.99**							-	-	-	-	-	-	-	**217,665**	**193,602**	-	**1,741,318**	**138,944**	-	**2,291,528**
					550	Fencing	Track	2A	217,664.69	8.7%	12-Jun-09	14-Jul-09	33	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					263	Track Finishes	Track	2A	-	0.0%	17-Apr-09	11-Jun-09	56	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1119	CBM- Ducts	Track	2A	-	0.0%	26-Aug-08	25-Sep-08	31	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1129	Track Laying - 1 Third	Track	2A	652,994.08	26.0%	26-Sep-08	22-Oct-08	27	10	11	-	-	-	-	-	-	-	-	-	-	-	-	652,994	-	-	652,994
					1129	Track Laying - 1 Third	Track	2A	652,994.08	26.0%	26-Sep-08	22-Oct-08	27	10	11	-	-	-	-	-	-	-	-	-	-	-	-	652,994	-	-	652,994
					1129	Track Laying	Track	2A	435,329.38	17.3%	26-Sep-08	22-Oct-08	27	10	11	-	-	-	-	-	-	-	-	-	-	-	-	435,329	-	-	435,329
					1099	Bulk Excavation - Sub Base	Track	2A	217,664.69	8.7%	27-Jun-08	22-Jul-08	26	7	8	-	-	-	-	-	-	-	217,665	-	-	-	-	-	-	-	217,665
					1109	OLE Foundations - Drainage	Track - BB	2A	193,602.16	7.7%	23-Jul-08	25-Aug-08	34	8	9	-	-	-	-	-	-	-	-	-	193,602	-	-	-	-	-	193,602
					Snagging	Snagging	Track	2A	23,941.91	1.0%				11	12	-	-	-	-	-	-	-	-	-	-	-	23,942	-	23,942
					Highways	BoQ highway works	Track	2A	113,851.98	4.5%				11	12	-	-	-	-	-	-	-	-	-	-	-	113,852	-	113,852

USB00000073_0047

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER | SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Extract 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					A7120	Excavate and construct OLE bases	Track - BB	1D	698.50	2.3%	08-Sep-09	09-Sep-09	2	22	22	-	-	-	-	-	-	-	-	699	-	-	-	-	699
					A7140	Set Track (54m)	Track	1D	-	0.0%	23-Sep-09	25-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7150	Place upper concrete and cure	Track	1D	26,276.45	87.0%	28-Sep-09	30-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	26,276	-	-	-	26,276
					A7160	Street Surface finishes	Track	1D	2,919.61	9.7%	01-Oct-09	05-Oct-09	5	23	23	-	-	-	-	-	-	-	-	-	2,920	-	-	-	2,920
					Snagging	Snagging	Track	1D	301.97	1.0%				23	24	-	-	-	-	-	-	-	-	-	-	302	-	-	302
					Phase 6a - 2nd Half				**29,490.96**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	**29,196**	**295**	-	**29,491**
					A7235	Remove fencing and Traffic Management	Track	1D	-	0.0%	23-Oct-09	23-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7170	Excavate box	Track	1D	-	0.0%	06-Oct-09	06-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7180	Excavate, lay and concrete ducts	Track	1D	-	0.0%	07-Oct-09	08-Oct-09	2	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7210	Set Track	Track	1D	-	0.0%	12-Oct-09	14-Oct-09	3	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7220	Place upper concrete and cure	Track	1D	26,276.45	89.1%	15-Oct-09	19-Oct-09	5	24	24	-	-	-	-	-	-	-	-	-	-	26,276	-	-	26,276
					A7230	Street Surface finishes	Track	1D	2,919.61	9.9%	20-Oct-09	22-Oct-09	3	24	24	-	-	-	-	-	-	-	-	-	-	2,920	-	-	2,920
					Snagging	Snagging	Track	1D	294.91	1.0%				24	25	-	-	-	-	-	-	-	-	-	-	-	295	-	295
			Torphicen Ch 1125 - 940																									
			Trackwork						**265,012.44**							-	-	-	**17,671**	-	-	**86,362**	**1,051**	-	**101,602**	**1,697**	**28,028**	**290**	**236,701**
			Phase 1 - 1st Half						**105,083.90**		**23-Apr-09**	**23-Apr-09**				-	-	-	**17,671**	-	-	**86,362**	**1,051**	-	-	-	-	-	**105,084**
					A7360	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	30-Mar-09	31-Mar-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7380	Excavate box	Track	1D	-	0.0%	01-Apr-09	03-Apr-09	3	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7390	Excavate, lay and concrete ducts	Track	1D	15,240.34	14.5%	06-Apr-09	09-Apr-09	4	17	17	-	-	-	15,240	-	-	-	-	-	-	-	-	-	15,240
					A7400	Excavate and construct OLE bases	Track - BB	1D	2,430.79	2.3%	06-Apr-09	09-Apr-09	4	17	17	-	-	-	2,431	-	-	-	-	-	-	-	-	-	2,431
					A7420	Set Track (145m)	Track	1D	-	0.0%	30-Jun-09	07-Jul-09	8	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7430	Place upper concrete and cure	Track	1D	76,201.70	72.5%	03-Jul-09	10-Jul-09	8	20	20	-	-	-	-	-	-	76,202	-	-	-	-	-	-	76,202
					A7440	Street Surface finishes	Track	1D	10,160.23	9.7%	13-Jul-09	15-Jul-09	3	20	20	-	-	-	-	-	-	10,160	-	-	-	-	-	-	10,160
					Snagging	Snagging	Track	1D	1,050.84	1.0%				20	21	-	-	-	-	-	-	-	1,051	-	-	-	-	-	1,051
					Phase 1 - 2nd Half				**102,628.56**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	**101,602**	**1,026**	-	-	**102,629**
					A7515	Remove fencing and Traffic Management	Track	1D	-	0.0%	25-Sep-09	25-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7450	Excavate box	Track	1D	-	0.0%	16-Jul-09	20-Jul-09	5	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7460	Excavate, lay and concrete ducts	Track	1D	-	0.0%	21-Jul-09	24-Jul-09	4	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7490	Set Track	Track	1D	45,721.02	44.6%	09-Sep-09	16-Sep-09	8	22	23	-	-	-	-	-	-	-	-	-	45,721	-	-	-	45,721
					A7500	Place upper concrete and cure	Track	1D	45,721.02	44.6%	14-Sep-09	21-Sep-09	8	23	23	-	-	-	-	-	-	-	-	-	45,721	-	-	-	45,721
					A7510	Street Surface finishes	Track	1D	10,160.23	9.9%	22-Sep-09	24-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	10,160	-	-	-	10,160
					Snagging	Snagging	Track	1D	1,026.29	1.0%				23	24	-	-	-	-	-	-	-	-	-	-	-	1,026	-	1,026
					Phase 2 - 1st Half				**28,988.66**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	**671**	**28,028**	**290**	**28,989**
					A7520	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	26-Oct-09	27-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7540	Excavate box	Track	1D	-	0.0%	28-Oct-09	28-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7550	Excavate, lay and concrete ducts	Track	1D	-	0.0%	29-Oct-09	30-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7560	Excavate and construct OLE bases	Track - BB	1D	670.56	2.3%	29-Oct-09	30-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	671	-	-	671
					A7580	Set Track (40m)	Track	1D	-	0.0%	06-Nov-09	11-Nov-09	6	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7590	Place upper concrete and cure	Track	1D	25,225.39	87.0%	11-Nov-09	16-Nov-09	6	25	25	-	-	-	-	-	-	-	-	-	-	-	25,225	-	25,225
					A7600	Street Surface finishes	Track	1D	2,802.82	9.7%	17-Nov-09	19-Nov-09	3	25	25	-	-	-	-	-	-	-	-	-	-	-	2,803	-	2,803
					Snagging	Snagging	Track	1D	289.89	1.0%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	290	290
					Phase 2 - 2nd Half				**28,311.33**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7675	Remove fencing and Traffic Management	Track	1D	-	0.0%	20-Jan-10	20-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7610	Excavate box	Track	1D	-	0.0%	20-Nov-09	20-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7620	Excavate, lay and concrete ducts	Track	1D	-	0.0%	23-Nov-09	24-Nov-09	2	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7650	Set Track	Track	1D	-	0.0%	06-Jan-10	11-Jan-10	6	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7660	Place upper concrete and cure	Track	1D	25,225.39	89.1%	11-Jan-10	14-Jan-10	4	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7670	Street Surface finishes	Track	1D	2,802.82	9.9%	15-Jan-10	19-Jan-10	5	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	283.11	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			West Maitland Ch 940 - 850																									
			Trackwork						**128,924.97**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Phases 2 & 3 - 1st Half						**65,224.49**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7940	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	02-Feb-10	03-Feb-10	2	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7960	Excavate box	Track	1D	-	0.0%	04-Feb-10	05-Feb-10	2	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7970	Excavate, lay and concrete ducts	Track	1D	-	0.0%	08-Feb-10	10-Feb-10	3	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7980	Excavate and construct OLE bases	Track - BB	1D	1,508.76	2.3%	08-Feb-10	10-Feb-10	3	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8000	Set Track (90m)	Track	1D	-	0.0%	11-Feb-10	16-Feb-10	6	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8010	Place upper concrete and cure	Track	1D	56,757.13	87.0%	16-Feb-10	19-Feb-10	4	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8020	Street Surface finishes	Track	1D	6,306.35	9.7%	22-Feb-10	24-Feb-10	3	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	652.24	1.0%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phases 2 & 3 - 2nd Half				**63,700.48**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8095	Remove fencing and Traffic Management	Track	1D	-	0.0%	18-Mar-10	18-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8030	Excavate box	Track	1D	-	0.0%	25-Feb-10	26-Feb-10	2	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8040	Excavate, lay and concrete ducts	Track	1D	-	0.0%	01-Mar-10	03-Mar-10	3	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8070	Set Track	Track	1D	-	0.0%	04-Mar-10	09-Mar-10	6	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8080	Place upper concrete and cure	Track	1D	56,757.13	89.1%	09-Mar-10	12-Mar-10	4	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8090	Street Surface finishes	Track	1D	6,306.35	9.9%	15-Mar-10	17-Mar-10	3	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	637.00	1.0%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Shandwick Place Ch 850 - 440																									
			Trackwork						**587,324.86**							-	-	-	-	-	-	-	-	-	-	**93,060**	**229,831**	-	**322,891**
			Phase 1						**587,324.86**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	**93,060**	**229,831**	-	**322,891**
					A8100	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	09-Sep-09	10-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8110	Excavate box	Track	1D	-	0.0%	11-Sep-09	05-Oct-09	25	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8120	Excavate, lay and concrete ducts	Track	1D	86,186.75	14.7%	16-Sep-09	19-Oct-09	34	23	24	-	-	-	-	-	-	-	-	-	-	86,187	-	-	86,187
					A8130	Excavate and construct OLE bases	Track - BB	1D	6,873.26	1.2%	16-Sep-09	19-Oct-09	34	23	24	-	-	-	-	-	-	-	-	-	-	6,873	-	-	6,873
					A8150	Set Track (410m)	Track	1D	229,831.34	39.1%	15-Oct-09	26-Nov-09	43	24	25	-	-	-	-	-	-	-	-	-	-	-	229,831	-	229,831
					A8170	Street Surface finishes	Track	1D	-	0.0%	23-Nov-09	18-Jan-10	57	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8175	Remove fencing and Traffic Management	Track	1D	201,102.43	34.2%	19-Jan-10	19-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8160	Place Upper Concrete and Cure	Track	1D	57,457.84	9.8%	20-Oct-09	05-Jan-10	78	24	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	5,873.25	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			02 Haymarket Corridor						**5,501,667.48**	**2.5%**						**10,150**	**317,895**	**229,342**	**7,808**	**25,000**	**-**	**217,665**	**-**	**193,920**	**585,910**	**204,724**	**80,673**	**142,873**	**2,015,960**
			02A Haymarket Corridor						**5,501,667.48**							**10,150**	**317,895**	**229,342**	**7,808**	**25,000**	**-**	**217,665**	**-**	**193,920**	**585,910**	**204,724**	**80,673**	**142,873**	**2,015,960**
			02A1 Haymarket Corridor						**861,248.57**							**-**	**-**	**-**	**3,212**	**-**	**-**	**-**	**-**	**133,668**	**585,301**	**133,668**	**5,401**	**-**	**861,249**
			Haymarket Corridor																									
			E & M Installations						**861,248.57**							**-**	**-**	**-**	**3,212**	**-**	**-**	**-**	**-**	**133,668**	**585,301**	**133,668**	**5,401**	**-**	**861,249**
					A4050	Overhead Catenary Line	OLE	2A	317,965.77	36.9%	04-Sep-09	25-Sep-09	22	22	23	-	-	-	-	-	-	-	-	-	317,966	-	-	-	317,966
					Snagging	Snagging	OLE	2A	3,211.78	0.4%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	3,212	-	-	-	-	-	-	-	-	-	3,212
					A4060	Install Electrical Cables	SCC	2A	133,667.58	15.5%	18-Sep-09	05-Oct-09	18	23	23	-	-	-	-	-	-	-	-	-	133,668	-	-	-	133,668
					A4070	Install Fibre Optic Cables	SCC	2A	133,667.58	15.5%	18-Sep-09	05-Oct-09	18	23	23	-	-	-	-	-	-	-	-	-	133,668	-	-	-	133,668
					A4080	Install Signalling Wayside Equipment	SCC	2A	133,667.58	15.5%	06-Oct-09	21-Oct-09	16	23	24	-	-	-	-	-	-	-	-	-	-	133,668	-	-	133,668
					A4045	Installation of poles and building fixings	SCC	2A	133,667.58	15.5%	26-Aug-09	03-Sep-09	9	22	22	-	-	-	-	-	-	-	-	133,668	-	-	-	-	133,668
					A4044	Access for E&M wayside installation (02A)	SCC	2A	-	0.0%	26-Aug-09	26-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4059	Access to cable pits for cable laying (02A)	SCC	2A	-	0.0%	18-Sep-09	18-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4043	Access for visual inspection for E&M wayside installation (02A)	SCC	2A	-	0.0%	24-Jul-09	24-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4058	Access visual inspection to cable pits for cable laying (02A)	SCC	2A	-	0.0%	19-Aug-09	19-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	2A	5,400.71	0.6%				24	25	-	-	-	-	-	-	-	-	-	-	-	5,401	-	5,401
			02A2 Haymarket (inc.) to Roseburn Junction (inc.)						**4,640,418.91**							**10,150**	**317,895**	**229,342**	**4,596**	**25,000**	**-**	**217,665**	**-**	**60,253**	**609**	**71,056**	**75,273**	**142,873**	**1,154,711**
			Haymarket Station Viaduct (S19)																									
			Bridge						**1,040,023.00**							**10,150**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**10,150**
					1138	Demolish Caledonian Ale House	Structures	2A	100,487.28	9.7%	01-Apr-08	28-Apr-08	28	4	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1139	Bankseat at Grid line 1	Structures	2A	100,487.28	9.7%	08-May-08	03-Jul-08	57	5	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					192	Pier 2	Structures	2A	100,487.28	9.7%	15-May-08	26-Jun-08	43	5	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					227	Pier 3	Structures	2A	100,487.28	9.7%	30-May-08	10-Jul-08	42	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					498	Pier 4	Structures	2A	100,487.28	9.7%	13-Jun-08	24-Jul-08	42	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					508	Pier 5	Structures	2A	100,487.28	9.7%	27-Jun-08	08-Aug-08	43	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					560	Bankseat at Gridline 6	Structures	2A	100,487.28	9.7%	11-Jul-08	05-Sep-08	57	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					570	Superstructure - First Pour	Structures	2A	125,487.28	12.1%	04-Jul-08	31-Aug-08	59	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					570	Superstructure - Second Pour	Structures	2A	125,487.28	12.1%	01-Sep-08	14-Nov-08	76	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					580	Finishes	Structures	2A	50,487.28	4.9%	17-Nov-08	08-Dec-08	22	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	2A	10,150.23	1.0%				13	14	10,150	-	-	-	-	-	-	-	-	-	-	-	-	10,150
					3rd Party	Third Party Sign-off	Structures	2A	25,000.00	2.4%				13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					CrR: Milestone	tie Completion Approval - Haymarket Corridor (4) (24)	Structures	2A	-	0.0%		08-Dec-08				-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Haymarket to Roseburn Junction																									
			Trackwork						**2,508,192.99**							-	-	-	-	-	-	**217,665**	-	-	-	-	-	-	**217,665**
					550	Fencing	Track	2A	217,664.69	8.7%	12-Jun-09	14-Jul-09	33	19	20	-	-	-	-	-	-	217,665	-	-	-	-	-	-	217,665
					263	Track Finishes	Track	2A	-	0.0%	17-Apr-09	11-Jun-09	56	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1119	CBM- Ducts	Track	2A	-	0.0%	26-Aug-08	25-Sep-08	31	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1129	Track Laying - 1 Third	Track	2A	652,994.08	26.0%	26-Sep-08	22-Oct-08	27	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1129	Track Laying - 1 Third	Track	2A	652,994.08	26.0%	26-Sep-08	22-Oct-08	27	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1129	Track Laying	Track	2A	435,329.38	17.3%	26-Sep-08	22-Oct-08	27	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1099	Bulk Excavation - Sub Base	Track	2A	217,664.69	8.7%	27-Jun-08	22-Jul-08	26	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1109	OLE Foundations - Drainage	Track - BB	2A	193,602.16	7.7%	23-Jul-08	25-Aug-08	34	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	2A	23,941.91	1.0%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	BoQ highway works	Track	2A	113,851.98	4.5%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0048

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					A7120	Excavate and construct OLE bases	Track - BB	1D	698.50	2.3%	08-Sep-09	09-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7140	Set Track (54m)	Track	1D	-	0.0%	23-Sep-09	25-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7150	Place upper concrete and cure	Track	1D	26,276.45	87.0%	28-Sep-09	30-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7160	Street Surface finishes	Track	1D	2,919.61	9.7%	01-Oct-09	05-Oct-09	5	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	301.97	1.0%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 6a - 2nd Half				**29,490.96**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					A7235	Remove fencing and Traffic Management	Track	1D	-	0.0%	23-Oct-09	23-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7170	Excavate box	Track	1D	-	0.0%	06-Oct-09	06-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7180	Excavate, lay and concrete ducts	Track	1D	-	0.0%	07-Oct-09	08-Oct-09	2	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7210	Set Track	Track	1D	-	0.0%	12-Oct-09	14-Oct-09	3	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7220	Place upper concrete and cure	Track	1D	26,276.45	89.1%	15-Oct-09	19-Oct-09	5	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7230	Street Surface finishes	Track	1D	2,919.61	9.9%	20-Oct-09	22-Oct-09	3	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	294.91	1.0%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-
				Torphicen Ch 1125 - 940																								
			Trackwork						**265,012.44**							**28,028**	**283**	-	-	-	-	-	-	-	-	-	-	**28,311**
				Phase 1 - 1st Half					**105,083.90**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					A7360	Establish Traffic Management & Temp. Fencing	Track	1D		0.0%	30-Mar-09	31-Mar-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7380	Excavate box	Track	1D	-	0.0%	01-Apr-09	03-Apr-09	3	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7390	Excavate, lay and concrete ducts	Track	1D	15,240.34	14.5%	06-Apr-09	09-Apr-09	4	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7400	Excavate and construct OLE bases	Track - BB	1D	2,430.79	2.3%	06-Apr-09	09-Apr-09	4	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7420	Set Track (145m)	Track	1D	-	0.0%	30-Jun-09	07-Jul-09	8	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7430	Place upper concrete and cure	Track	1D	76,201.70	72.5%	03-Jul-09	10-Jul-09	8	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7440	Street Surface finishes	Track	1D	10,160.23	9.7%	13-Jul-09	15-Jul-09	3	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	1,050.84	1.0%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1 - 2nd Half				**102,628.56**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					A7515	Remove fencing and Traffic Management	Track	1D	-	0.0%	25-Sep-09	25-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7450	Excavate box	Track	1D	-	0.0%	16-Jul-09	20-Jul-09	5	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7460	Excavate, lay and concrete ducts	Track	1D	-	0.0%	21-Jul-09	24-Jul-09	4	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7490	Set Track	Track	1D	45,721.02	44.6%	09-Sep-09	16-Sep-09	8	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7500	Place upper concrete and cure	Track	1D	45,721.02	44.6%	14-Sep-09	21-Sep-09	8	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7510	Street Surface finishes	Track	1D	10,160.23	9.9%	22-Sep-09	24-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	1,026.29	1.0%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2 - 1st Half				**28,988.66**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					A7520	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	26-Oct-09	27-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7540	Excavate box	Track	1D	-	0.0%	28-Oct-09	28-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7550	Excavate, lay and concrete ducts	Track	1D	-	0.0%	29-Oct-09	30-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7560	Excavate and construct OLE bases	Track - BB	1D	670.56	2.3%	29-Oct-09	30-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7580	Set Track (40m)	Track	1D	-	0.0%	06-Nov-09	11-Nov-09	6	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7590	Place upper concrete and cure	Track	1D	25,225.39	87.0%	11-Nov-09	16-Nov-09	6	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7600	Street Surface finishes	Track	1D	2,802.82	9.7%	17-Nov-09	19-Nov-09	3	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	289.89	1.0%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2 - 2nd Half				**28,311.33**		**23-Apr-09**	**23-Apr-09**				**28,028**	**283**	-	-	-	-	-	-	-	-	-	-	**28,311**
					A7675	Remove fencing and Traffic Management	Track	1D		0.0%	20-Jan-10	20-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7610	Excavate box	Track	1D	-	0.0%	20-Nov-09	20-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7620	Excavate, lay and concrete ducts	Track	1D	-	0.0%	23-Nov-09	24-Nov-09	2	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7650	Set Track	Track	1D	-	0.0%	06-Jan-10	11-Jan-10	6	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7660	Place upper concrete and cure	Track	1D	25,225.39	89.1%	11-Jan-10	14-Jan-10	4	27	27	25,225	-	-	-	-	-	-	-	-	-	-	-	-	25,225
					A7670	Street Surface finishes	Track	1D	2,802.82	9.9%	15-Jan-10	19-Jan-10	5	27	27	2,803	-	-	-	-	-	-	-	-	-	-	-	-	2,803
					Snagging	Snagging	Track	1D	283.11	1.0%				27	28	-	283	-	-	-	-	-	-	-	-	-	-	-	283
				West Maitland Ch 940 - 850																								
			Trackwork						**128,924.97**							-	**64,572**	**63,716**	**637**	-	-	-	-	-	-	-	-	**128,925**
				Phases 2 & 3 - 1st Half					**65,224.49**		**23-Apr-09**	**23-Apr-09**				-	**64,572**	**652**	-	-	-	-	-	-	-	-	-	**65,224**
					A7940	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	02-Feb-10	03-Feb-10	2	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7960	Excavate box	Track	1D	-	0.0%	04-Feb-10	05-Feb-10	2	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7970	Excavate, lay and concrete ducts	Track	1D	-	0.0%	08-Feb-10	10-Feb-10	3	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7980	Excavate and construct OLE bases	Track - BB	1D	1,508.76	2.3%	08-Feb-10	10-Feb-10	3	28	28	-	1,509	-	-	-	-	-	-	-	-	-	-	-	1,509
					A8000	Set Track (90m)	Track	1D	-	0.0%	11-Feb-10	16-Feb-10	6	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8010	Place upper concrete and cure	Track	1D	56,757.13	87.0%	16-Feb-10	19-Feb-10	4	28	28	-	56,757	-	-	-	-	-	-	-	-	-	-	-	56,757
					A8020	Street Surface finishes	Track	1D	6,306.35	9.7%	22-Feb-10	24-Feb-10	3	28	28	-	6,306	-	-	-	-	-	-	-	-	-	-	-	6,306
					Snagging	Snagging	Track	1D	652.24	1.0%				28	29	-	-	652	-	-	-	-	-	-	-	-	-	-	652
					Phases 2 & 3 - 2nd Half				**63,700.48**		**23-Apr-09**	**23-Apr-09**				-	-	**63,063**	**637**	-	-	-	-	-	-	-	-	-	**63,700**
					A8095	Remove fencing and Traffic Management	Track	1D	-	0.0%	18-Mar-10	18-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8030	Excavate box	Track	1D	-	0.0%	25-Feb-10	26-Feb-10	2	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8040	Excavate, lay and concrete ducts	Track	1D	-	0.0%	01-Mar-10	03-Mar-10	3	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8070	Set Track	Track	1D	-	0.0%	04-Mar-10	09-Mar-10	6	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8080	Place upper concrete and cure	Track	1D	56,757.13	89.1%	09-Mar-10	12-Mar-10	4	29	29	-	-	56,757	-	-	-	-	-	-	-	-	-	-	56,757
					A8090	Street Surface finishes	Track	1D	6,306.35	9.9%	15-Mar-10	17-Mar-10	3	29	29	-	-	6,306	-	-	-	-	-	-	-	-	-	-	6,306
					Snagging	Snagging	Track	1D	637.00	1.0%				29	30	-	-	-	637	-	-	-	-	-	-	-	-	-	637
				Shandwick Place Ch 850 - 440																								
			Trackwork						**587,324.86**							**258,560**	**5,873**	-	-	-	-	-	-	-	-	-	-	**264,434**
				Phase 1					**587,324.86**		**23-Apr-09**	**23-Apr-09**				**258,560**	**5,873**	-	-	-	-	-	-	-	-	-	-	**264,434**
					A8100	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	08-Sep-09	10-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8110	Excavate box	Track	1D	-	0.0%	11-Sep-09	05-Oct-09	25	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8120	Excavate, lay and concrete ducts	Track	1D	86,186.75	14.7%	16-Sep-09	19-Oct-09	34	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8130	Excavate and construct OLE bases	Track - BB	1D	6,873.26	1.2%	16-Sep-09	19-Oct-09	34	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8150	Set Track (410m)	Track	1D	229,831.34	39.1%	15-Oct-09	26-Nov-09	43	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8170	Street Surface finishes	Track	1D	-	0.0%	23-Nov-09	18-Jan-10	57	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8175	Remove fencing and Traffic Management	Track	1D	201,102.43	34.2%	19-Jan-10	19-Jan-10	1	27	27	201,102	-	-	-	-	-	-	-	-	-	-	-	-	201,102
					A8160	Place Upper Concrete and Cure	Track	1D	57,457.84	9.8%	20-Oct-09	05-Jan-10	78	24	27	57,458	-	-	-	-	-	-	-	-	-	-	-	-	57,458
					Snagging	Snagging	Track	1D	5,873.25	1.0%				27	28	-	5,873	-	-	-	-	-	-	-	-	-	-	-	5,873
			02 Haymarket Corridor						**5,501,667.48**	**2.5%**						**71,056**	**2,871**	-	-	-	-	-	-	-	-	-	-	**73,927**
			02A Haymarket Corridor						**5,501,667.48**							**71,056**	**2,871**	-	-	-	-	-	-	-	-	-	-	**73,927**
				02A1 Haymarket Corridor					**861,248.57**							-	-	-	-	-	-	-	-	-	-	-	-	-
				Haymarket Corridor																								
				E & M Installations					**861,248.57**							-	-	-	-	-	-	-	-	-	-	-	-	-
					A4050	Overhead Catenary Line	OLE	2A	317,965.77	36.9%	04-Sep-09	25-Sep-09	22	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	2A	3,211.78	0.4%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4060	Install Electrical Cables	SCC	2A	133,667.58	15.5%	18-Sep-09	05-Oct-09	18	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4070	Install Fibre Optic Cables	SCC	2A	133,667.58	15.5%	18-Sep-09	05-Oct-09	18	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4080	Install Signalling Wayside Equipment	SCC	2A	133,667.58	15.5%	06-Oct-09	21-Oct-09	16	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4045	Installation of poles and building fixings	SCC	2A	133,667.58	15.5%	26-Aug-09	03-Sep-09	9	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4044	Access for E&M wayside installation (02A)	SCC	2A	-	0.0%	26-Aug-09	26-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4059	Access to cable pits for cable laying (02A)	SCC	2A	-	0.0%	18-Sep-09	18-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4043	Access for visual inspection for E&M wayside installation (02A)	SCC	2A	-	0.0%	24-Jul-09	24-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4058	Access visual inspection to cable pits for cable laying (02A)	SCC	2A	-	0.0%	19-Aug-09	19-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	2A	5,400.71	0.6%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				02A2 Haymarket (inc.) to Roseburn Junction (inc.)					**4,640,418.91**							**71,056**	**2,871**	-	-	-	-	-	-	-	-	-	-	**73,927**
				Haymarket Station Viaduct (S19)																								
				Bridge					**1,040,023.00**							-	-	-	-	-	-	-	-	-	-	-	-	-
					1138	Demolish Caledonian Ale House	Structures	2A	100,487.28	9.7%	01-Apr-08	28-Apr-08	28	4	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1139	Bankseat at Grid line 1	Structures	2A	100,487.28	9.7%	08-May-08	03-Jul-08	57	5	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					192	Pier 2	Structures	2A	100,487.28	9.7%	15-May-08	26-Jun-08	43	5	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					227	Pier 3	Structures	2A	100,487.28	9.7%	30-May-08	10-Jul-08	42	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					498	Pier 4	Structures	2A	100,487.28	9.7%	13-Jun-08	24-Jul-08	42	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					508	Pier 5	Structures	2A	100,487.28	9.7%	27-Jun-08	08-Aug-08	43	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					560	Bankseat at Gridline 6	Structures	2A	100,487.28	9.7%	11-Jul-08	05-Sep-08	57	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					570	Superstructure - First Pour	Structures	2A	125,487.28	12.1%	04-Jul-08	31-Aug-08	59	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					570	Superstructure - Second Pour	Structures	2A	125,487.28	12.1%	01-Sep-08	14-Nov-08	76	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					580	Finishes	Structures	2A	50,487.28	4.9%	17-Nov-08	08-Dec-08	22	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	2A	10,150.23	1.0%				13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	2A	25,000.00	2.4%				13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	tie Completion Approval - Haymarket Corridor (4) (24)	Structures	2A	-	0.0%		08-Dec-08				-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Haymarket to Roseburn Junction																								
			Trackwork						**2,508,192.99**							-	-	-	-	-	-	-	-	-	-	-	-	-
					550	Fencing	Track	2A	217,664.69	8.7%	12-Jun-09	14-Jul-09	33	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					263	Track Finishes	Track	2A	-	0.0%	17-Apr-09	11-Jun-09	56	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1119	CBM- Ducts	Track	2A	-	0.0%	26-Aug-08	25-Sep-08	31	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1129	Track Laying - 1 Third	Track	2A	652,994.08	26.0%	26-Sep-08	22-Oct-08	27	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1129	Track Laying - 1 Third	Track	2A	652,994.08	26.0%	26-Sep-08	22-Oct-08	27	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1129	Track Laying	Track	2A	435,329.38	17.3%	26-Sep-08	22-Oct-08	27	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1099	Bulk Excavation - Sub Base	Track	2A	217,664.69	8.7%	27-Jun-08	22-Jul-08	26	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1109	OLE Foundations - Drainage	Track - BB	2A	193,602.16	7.7%	23-Jul-08	25-Aug-08	34	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	2A	23,941.91	1.0%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	BoQ highway works	Track	2A	113,851.98	4.5%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0049

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Murray Scottish College — BILFINGER BERGER — SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					A7120	Excavate and construct OLE bases	Track - BB	1D	698.50	2.3%	08-Sep-09	09-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7140	Set Track (54m)	Track	1D	-	0.0%	23-Sep-09	25-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7150	Place upper concrete and cure	Track	1D	26,276.45	87.0%	28-Sep-09	30-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7160	Street Surface finishes	Track	1D	2,919.61	9.7%	01-Oct-09	05-Oct-09	5	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	301.97	1.0%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 6a - 2nd Half				**29,490.96**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7235	Remove fencing and Traffic Management	Track	1D	-	0.0%	23-Oct-09	23-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7170	Excavate box	Track	1D	-	0.0%	06-Oct-09	06-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7180	Excavate, lay and concrete ducts	Track	1D	-	0.0%	07-Oct-09	08-Oct-09	2	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7210	Set Track	Track	1D	-	0.0%	12-Oct-09	14-Oct-09	3	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7220	Place upper concrete and cure	Track	1D	26,276.45	89.1%	15-Oct-09	19-Oct-09	5	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7230	Street Surface finishes	Track	1D	2,919.61	9.9%	20-Oct-09	22-Oct-09	3	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	294.91	1.0%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Torphichen Ch 1125 - 940																									
				Trackwork					**265,012.44**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1 - 1st Half				**105,083.90**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7360	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	30-Mar-09	31-Mar-09	2	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7380	Excavate box	Track	1D	-	0.0%	01-Apr-09	03-Apr-09	3	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7390	Excavate, lay and concrete ducts	Track	1D	15,240.34	14.5%	06-Apr-09	09-Apr-09	4	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7400	Excavate and construct OLE bases	Track - BB	1D	2,430.79	2.3%	06-Apr-09	09-Apr-09	4	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7420	Set Track (145m)	Track	1D	-	0.0%	30-Jun-09	07-Jul-09	8	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7430	Place upper concrete and cure	Track	1D	76,201.70	72.5%	03-Jul-09	10-Jul-09	8	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7440	Street Surface finishes	Track	1D	10,160.23	9.7%	13-Jul-09	15-Jul-09	3	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	1,050.84	1.0%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1 - 2nd Half				**102,629.56**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7515	Remove fencing and Traffic Management	Track	1D	-	0.0%	25-Sep-09	25-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7450	Excavate box	Track	1D	-	0.0%	16-Jul-09	20-Jul-09	5	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7460	Excavate, lay and concrete ducts	Track	1D	-	0.0%	21-Jul-09	24-Jul-09	4	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7490	Set Track	Track	1D	45,721.02	44.6%	09-Sep-09	16-Sep-09	8	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7500	Place upper concrete and cure	Track	1D	45,721.02	44.6%	14-Sep-09	21-Sep-09	8	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7510	Street Surface finishes	Track	1D	10,160.23	9.9%	22-Sep-09	24-Sep-09	3	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	1,026.29	1.0%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2 - 1st Half				**28,988.66**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7520	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	26-Oct-09	27-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7540	Excavate box	Track	1D	-	0.0%	28-Oct-09	28-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7550	Excavate, lay and concrete ducts	Track	1D	-	0.0%	29-Oct-09	30-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7560	Excavate and construct OLE bases	Track - BB	1D	670.56	2.3%	29-Oct-09	30-Oct-09	2	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7580	Set Track (40m)	Track	1D	-	0.0%	06-Nov-09	11-Nov-09	6	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7590	Place upper concrete and cure	Track	1D	25,225.39	87.0%	11-Nov-09	16-Nov-09	6	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7600	Street Surface finishes	Track	1D	2,802.82	9.7%	17-Nov-09	19-Nov-09	3	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	289.89	1.0%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 2 - 2nd Half				**28,311.33**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7675	Remove fencing and Traffic Management	Track	1D	-	0.0%	20-Jan-10	20-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7610	Excavate box	Track	1D	-	0.0%	20-Nov-09	20-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7620	Excavate, lay and concrete ducts	Track	1D	-	0.0%	23-Nov-09	24-Nov-09	2	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7650	Set Track	Track	1D	-	0.0%	06-Jan-10	11-Jan-10	6	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7660	Place upper concrete and cure	Track	1D	25,225.39	89.1%	11-Jan-10	14-Jan-10	4	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7670	Street Surface finishes	Track	1D	2,802.82	9.9%	15-Jan-10	19-Jan-10	5	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	283.11	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				West Maitland Ch 940 - 850																									
				Trackwork					**128,924.97**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phases 2 & 3 - 1st Half				**65,224.49**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7940	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	02-Feb-10	03-Feb-10	2	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7960	Excavate box	Track	1D	-	0.0%	04-Feb-10	05-Feb-10	2	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7970	Excavate, lay and concrete ducts	Track	1D	-	0.0%	08-Feb-10	10-Feb-10	3	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A7980	Excavate and construct OLE bases	Track - BB	1D	1,508.76	2.3%	08-Feb-10	10-Feb-10	3	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8000	Set Track (90m)	Track	1D	-	0.0%	11-Feb-10	16-Feb-10	6	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8010	Place upper concrete and cure	Track	1D	56,757.13	87.0%	16-Feb-10	19-Feb-10	4	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8020	Street Surface finishes	Track	1D	6,306.35	9.7%	22-Feb-10	24-Feb-10	3	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	652.24	1.0%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phases 2 & 3 - 2nd Half				**63,700.48**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8095	Remove fencing and Traffic Management	Track	1D	-	0.0%	18-Mar-10	18-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8030	Excavate box	Track	1D	-	0.0%	25-Feb-10	26-Feb-10	2	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8040	Excavate, lay and concrete ducts	Track	1D	-	0.0%	01-Mar-10	03-Mar-10	3	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8070	Set Track	Track	1D	-	0.0%	04-Mar-10	09-Mar-10	6	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8080	Place upper concrete and cure	Track	1D	56,757.13	89.1%	09-Mar-10	12-Mar-10	4	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8090	Street Surface finishes	Track	1D	6,306.35	9.9%	15-Mar-10	17-Mar-10	3	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	637.00	1.0%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Shandwick Place Ch 850 - 440																									
				Trackwork					**587,324.86**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Phase 1				**587,324.86**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8100	Establish Traffic Management & Temp. Fencing	Track	1D	-	0.0%	09-Sep-09	10-Sep-09	2	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8110	Excavate box	Track	1D	-	0.0%	11-Sep-09	05-Oct-09	25	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8120	Excavate, lay and concrete ducts	Track	1D	86,186.75	14.7%	16-Sep-09	19-Oct-09	34	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8130	Excavate and construct OLE bases	Track - BB	1D	6,873.26	1.2%	16-Sep-09	19-Oct-09	34	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8150	Set Track (410m)	Track	1D	229,831.34	39.1%	15-Oct-09	26-Nov-09	43	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8170	Street Surface finishes	Track	1D	-	0.0%	23-Nov-09	18-Jan-10	57	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8175	Remove fencing and Traffic Management	Track	1D	201,102.43	34.2%	19-Jan-10	19-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8160	Place Upper Concrete and Cure	Track	1D	57,457.84	9.8%	20-Oct-09	05-Jan-10	78	24	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	1D	5,873.25	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				02 Haymarket Corridor					**5,501,857.48**	**2.5%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
				02A Haymarket Corridor					**5,501,667.48**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
				02A1 Haymarket Corridor					**861,248.57**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Haymarket Corridor																									
				E & M Installations					**861,248.57**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4050	Overhead Catenary Line	OLE	2A	317,965.77	36.9%	04-Sep-09	25-Sep-09	22	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	2A	3,211.78	0.4%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4060	Install Electrical Cables	SCC	2A	133,667.58	15.5%	18-Sep-09	05-Oct-09	18	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4070	Install Fibre Optic Cables	SCC	2A	133,667.58	15.5%	18-Sep-09	05-Oct-09	18	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4080	Install Signalling Wayside Equipment	SCC	2A	133,667.58	15.5%	06-Oct-09	21-Oct-09	16	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4045	Installation of poles and building fixings	SCC	2A	133,667.58	15.5%	26-Aug-09	03-Sep-09	9	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4044	Access for E&M wayside installation (02A)	SCC	2A	-	0.0%	26-Aug-09	26-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4059	Access to cable pits for cable laying (02A)	SCC	2A	-	0.0%	18-Sep-09	18-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4043	Access for visual inspection for E&M wayside installation (02A)	SCC	2A	-	0.0%	24-Jul-09	24-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4058	Access visual inspection to cable pits for cable laying (02A)	SCC	2A	-	0.0%	19-Aug-09	19-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	2A	5,400.71	0.6%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				02A2 Haymarket (inc.) to Roseburn Junction (inc.)					**4,640,418.91**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Haymarket Station Viaduct (519)																									
				Bridge					**1,040,023.00**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1138	Demolish Caledonian Ale House	Structures	2A	100,487.28	9.7%	01-Apr-08	28-Apr-08	28	4	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1139	Bankseat at Grid line 1	Structures	2A	100,487.28	9.7%	08-May-08	03-Jul-08	57	5	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					192	Pier 2	Structures	2A	100,487.28	9.7%	15-May-08	26-Jun-08	43	5	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					227	Pier 3	Structures	2A	100,487.28	9.7%	30-May-08	10-Jul-08	42	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					498	Pier 4	Structures	2A	100,487.28	9.7%	13-Jun-08	24-Jul-08	42	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					508	Pier 5	Structures	2A	100,487.28	9.7%	27-Jun-08	08-Aug-08	43	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					560	Bankseat at Gridline 6	Structures	2A	100,487.28	9.7%	11-Jul-08	05-Sep-08	57	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					570	Superstructure - First Pour	Structures	2A	125,487.28	12.1%	04-Jul-08	31-Aug-08	59	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					570	Superstructure - Second Pour	Structures	2A	125,487.28	12.1%	01-Sep-08	14-Nov-08	76	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					580	Finishes	Structures	2A	50,487.28	4.9%	17-Nov-08	08-Dec-08	22	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	2A	10,150.23	1.0%				13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	2A	25,000.00	2.4%				13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	ile Completion Approval - Haymarket Corridor (4) (24)	Structures	2A	-	0.0%		08-Dec-08				-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Haymarket to Roseburn Junction																									
				Trackwork					**2,509,192.99**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					550	Fencing	Track	2A	217,664.69	8.7%	12-Jun-09	14-Jul-09	33	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					263	Track Finishes	Track	2A	-	0.0%	17-Apr-09	11-Jun-09	56	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1119	CBM- Ducts	Track	2A	-	0.0%	26-Aug-08	25-Sep-08	31	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1129	Track Laying - 1 Third	Track	2A	652,994.08	26.0%	26-Sep-08	22-Oct-08	27	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1129	Track Laying - 1 Third	Track	2A	652,994.08	26.0%	26-Sep-08	22-Oct-08	27	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1129	Track Laying	Track	2A	435,329.38	17.3%	26-Sep-08	22-Oct-08	27	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1099	Bulk Excavation - Sub Base	Track	2A	217,664.69	8.7%	27-Jun-08	22-Jul-08	26	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1109	OLE Foundations - Drainage	Track - BB	2A	193,602.16	7.7%	23-Jul-08	25-Aug-08	34	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	2A	23,941.91	1.0%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	BoQ highway works	Track	2A	113,851.98	4.5%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0050

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year Period Period End	2008 1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	2008 6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
					Snagging	Snagging	Track	2A	1,150.02	0.0%				11	12		-	-	-	-	-	-	-	-	-	-	-	1,150	-	1,150
		Haymarket Terrace Substation																												
			Substation						746,724.87								-	-	-	-	-	-	-	-	-	-	-	-	-	-
					336	Completion of envelope	Subst - BB	2A	227,515.86	30.5%	01-Feb-09	23-Mar-09	52	15	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					336	Civil Engineering and Building Works	Subst - BB	2A	227,515.86	30.5%	09-Dec-08	31-Jan-09	54	13	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	2A	4,596.28	0.6%				16	17		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					326	Order REC supply from Scottish Power	Subst - S	2A	-	0.0%	17-Nov-08	17-Nov-08	1	12	12		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5630	Power Infeed from Public Net available inc HV cable	Subst - S	2A	-	0.0%	24-Mar-09	24-Mar-09	1	16	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5650	Installation of TPS Equipment	Subst - S	2A	71,056.48	9.5%	26-Oct-09	08-Dec-09	44	24	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5640	Install LV Power Supply and LV Power Equipment	Subst - S	2A	71,056.48	9.5%	12-Oct-09	02-Nov-09	22	24	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5670	Testing and Commissioning	Subst - S	2A	71,056.48	9.5%	08-Dec-09	11-Jan-10	35	26	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5660	Install Telecom and Scada	Subst - S	2A	71,056.48	9.5%	16-Nov-09	08-Dec-09	23	25	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2699	Access for E&M Substation installation (02A Haymarket Terrace)	Subst - S	2A	-	0.0%	24-Mar-09	24-Mar-09	1	16	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2698	Access for visual inspection for E&M Substation installation (02A Haymarket Terrace)	Subst - S	2A	-	0.0%	20-Feb-09	20-Feb-09	1	15	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	2A	2,870.97	0.4%				27	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Haymarket Station Tram Stop																												
			Tramstop						344,478.05								-	-	-	-	-	-	-	-	-	-	-	-	90,379	90,379
					135	Civil Engineering and Building Works	Tramstops	2A	90,378.97	26.2%	23-Oct-08	15-Dec-08	54	11	13		-	-	-	-	-	-	-	-	-	-	-	-	90,379	90,379
					135	Civil Engineering and Building Works	Tramstops	2A	90,378.97	26.2%	16-Dec-08	05-Feb-09	53	13	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	2A	1,825.84	0.5%				15	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2480	Deliver and Install Shelter	Tramstops	2A	60,252.65	17.5%	10-Aug-09	24-Aug-09	15	21	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	2A	608.61	0.2%				22	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Trams Eq	2A	25,000.00	7.3%	23-Mar-09	12-May-09	51	16	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					488	Order REC Supply	Trams Eq	2A	-	0.0%	26-Jun-09	26-Jun-09	1	20	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4710	Package Test Tramstop	Trams Eq	2A	75,272.67	21.9%	02-Nov-09	09-Nov-09	8	24	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4680	Install LV Power Supply and LV Power Equipment	Trams Eq	2A	-	0.0%	24-Aug-09	28-Sep-09	36	22	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4690	Install Telecon Equipment	Trams Eq	2A	-	0.0%	28-Sep-09	26-Oct-09	29	23	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4700	Install Station Control Equipment + AFC Equipment	Trams Eq	2A	-	0.0%	28-Sep-09	02-Nov-09	36	23	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6170	Installation of SIG-interlocking cubicle	Trams Eq	2A	-	0.0%	07-Sep-09	28-Sep-09	22	22	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6180	Commissioning of SIG -interlocking cubicle	Trams Eq	2A	-	0.0%	22-Oct-09	28-Oct-09	7	24	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4679	Access for E&M Tram Stop installation (02A Haymarket Station)	Trams Eq	2A	-	0.0%	24-Aug-09	24-Aug-09	1	22	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4678	Access for visual inspection for E&M Tram Stop installation (02A Haymarket Station)	Trams Eq	2A	-	0.0%	23-Jul-09	23-Jul-09	1	21	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	2A	760.33	0.2%				25	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-
05 Roseburn Junction to Gogar									90,128,525.18	22.9%							-	-	-	-	-	281,272	182,789	1,372,497	1,319,944	2,610,877	1,732,142	3,525,368	896,641	11,921,530
	05A Roseburn Junction (exc.) to Balgreen Road (inc.)								19,029,806.39								-	-	-	-	-	109,040	123,372	582,944	782,714	687,148	404,978	912,319	688,012	4,290,526
		05A1 Roseburn Junction (exc.) to Balgreen Road (inc.)							1,149,116.30								-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Roseburn Junction (exc.) to Balgreen Road (inc.)																											
				E & M Installations					1,149,116.30								-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4090	Overhead Catenary Line - One Half	OLE	5A	363,956.63	31.7%	10-Sep-10	09-Nov-10	61	35	38		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4090	Overhead Catenary Line	OLE	5A	242,637.75	21.1%	10-Sep-10	09-Nov-10	61	35	38		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5A	2,450.89	0.2%				38	39		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4100	Install Electrical Cables	SCC	5A	133,667.58	11.6%	24-Sep-10	11-Oct-10	18	36	37		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4110	Install Fibre Optic Cables	SCC	5A	133,667.58	11.6%	24-Sep-10	11-Oct-10	18	36	37		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4120	Install Signalling Wayside Equipment	SCC	5A	133,667.58	11.6%	12-Oct-10	27-Oct-10	16	37	37		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4085	Installation of poles and building fixings	SCC	5A	133,667.58	11.6%	17-Aug-10	09-Sep-10	24	35	35		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4084	Access for E&M wayside installation (05A)	SCC	5A	-	0.0%	17-Aug-10	17-Aug-10	1	35	35		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4099	Access to cable pits for cable laying (05A)	SCC	5A	-	0.0%	24-Sep-10	24-Sep-10	1	36	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4083	Access for visual inspection for E&M wayside installation (05A)	SCC	5A	-	0.0%	15-Jul-10	15-Jul-10	1	33	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4098	Access for visual inspection to cable pits for cable laying (05A)	SCC	5A	-	0.0%	25-Aug-10	25-Aug-10	1	35	35		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	5A	5,400.71	0.5%				37	38		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05A2 Roseburn Junction (exc.) to Murrayfield (inc.)							5,997,066.36								-	-	-	-	-	99,651	104,594	345,624	421,227	204,245	339,255	104,594	104,594	1,723,785
			Russel Road Underbridge (S20)																											
				Bridge					1,185,158.00								-	-	-	-	-	-	-	293,327	117,331	-	234,661	-	-	645,319
					103	Excavation	Structures	5A	117,330.64	9.9%	08-May-08	31-Jul-08	85	5	8		-	-	-	-	-	-	-	117,331	-	-	-	-	-	117,331
					103	Piling	Structures	5A	175,995.96	14.9%	08-May-08	31-Jul-08	85	5	8		-	-	-	-	-	-	-	175,996	-	-	-	-	-	175,996
					238	Bases	Structures	5A	117,330.64	9.9%	01-Aug-08	12-Sep-08	43	8	9		-	-	-	-	-	-	-	-	117,331	-	-	-	-	117,331
					429	Abutments	Structures	5A	58,665.32	5.0%	01-Sep-08	31-Oct-08	61	9	11		-	-	-	-	-	-	-	-	-	-	58,665	-	-	58,665
					429	Wing Walls	Structures	5A	175,995.96	14.9%	01-Sep-08	31-Oct-08	61	9	11		-	-	-	-	-	-	-	-	-	-	175,996	-	-	175,996
					439	Deck	Structures	5A	234,661.28	19.8%	27-Oct-08	19-Jan-09	85	11	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					439	Parapets	Structures	5A	175,995.96	14.9%	27-Oct-08	19-Jan-09	85	11	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					449	Bridge Finishes	Structures	5A	117,330.64	9.9%	03-Nov-08	09-Feb-09	99	11	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	11,851.58	1.0%				15	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Russell Road Bridge (S20) (4)	Structures	5A	-	0.0%		09-Feb-09					-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Russell Road Retaining Walls (W3 and W4)																											
				Retaining Wall					2,038,153.00								-	-	-	-	-	99,651	-	-	199,302	99,651	-	-	-	398,604
					107	Site Clearance	Structures	5A	99,651.07	4.9%	15-May-08	12-Jun-08	29	5	6		-	-	-	-	-	99,651	-	-	-	-	-	-	-	99,651
					250	Demolish Existing Buildings	Structures	5A	199,302.15	9.8%	13-Jun-08	22-Aug-08	71	6	9		-	-	-	-	-	-	-	-	199,302	-	-	-	-	199,302
					338	Temporary Access Road	Structures	5A	-	0.0%	18-Aug-08	05-Sep-08	19	9	9		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					348	Bored Piling	Structures	5A	99,651.07	4.9%	08-Sep-08	26-Sep-08	19	9	10		-	-	-	-	-	-	-	-	-	99,651	-	-	-	99,651
					370	Pile Caps	Structures	5A	199,302.15	9.8%	17-Nov-08	12-Jan-09	57	12	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					659	Retaining Wall	Structures	5A	199,302.15	9.8%	13-Jan-09	16-Mar-09	63	14	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					669	Waterproofing	Structures	5A	199,302.15	9.8%	17-Mar-09	14-Apr-09	29	16	17		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					679	Imported Fill - 50%	Structures	5A	199,302.15	9.8%	31-Mar-09	18-Jun-09	80	17	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					679	Imported Fill	Structures	5A	298,953.22	14.7%	31-Mar-09	18-Jun-09	80	17	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					689	Parapet	Structures	5A	298,953.22	26.0%	29-May-09	02-Jul-09	35	19	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					699	Road Reinstate	Structures	5A	199,302.15	17.3%	03-Jul-09	07-Aug-09	36	20	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	20,131.53	1.8%	23-Apr-09	23-Apr-09	1	17	17		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	2.2%				19	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Murrayfield Tram Stop Retaining Wall (W18)																											
				Retaining Wall					1,056,507.00								-	-	-	-	-	-	104,594	52,297	104,594	104,594	104,594	104,594	104,594	679,862
					108	Site Clearance	Structures	5A	52,297.10	4.4%	29-May-08	25-Jun-08	28	6	7		-	-	-	-	-	-	52,297	-	-	-	-	-	-	52,297
					182	Foundations	Structures	5A	52,297.10	4.4%	26-Jun-08	16-Jul-08	21	7	7		-	-	-	-	-	-	52,297	-	-	-	-	-	-	52,297
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	52,297.10	4.4%	10-Jul-08	31-Jul-08	22	7	8		-	-	-	-	-	-	-	52,297	-	-	-	-	-	52,297
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Aug-08	31-Aug-08	31	8	9		-	-	-	-	-	-	-	-	104,594	-	-	-	-	104,594
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Sep-08	30-Sep-08	30	9	10		-	-	-	-	-	-	-	-	-	104,594	-	-	-	104,594
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Oct-08	31-Oct-08	31	10	11		-	-	-	-	-	-	-	-	-	-	104,594	-	-	104,594
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Nov-08	30-Nov-08	30	11	12		-	-	-	-	-	-	-	-	-	-	-	104,594	-	104,594
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Dec-08	31-Dec-08	31	12	13		-	-	-	-	-	-	-	-	-	-	-	-	104,594	104,594
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Jan-09	23-Jan-09	24	13	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					418	Coping	Structures	5A	104,594.19	9.9%	26-Jan-09	13-Feb-09	19	14	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					440	Steps	Structures	5A	104,594.19	9.9%	26-Jan-09	27-May-09	122	14	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					428	Handrail	Structures	5A	52,297.10	5.0%	16-Feb-09	27-Feb-09	12	15	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	10,565.07	1.0%				19	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Roseburn Junction to Murrayfield Trackwork (470m)																											
				Trackwork					1,226,604.83								-	-	-	-	-	-	-	-	-	-	-	-	-	-
					540	Fencing	Track	5A	107,874.32	8.8%	03-Feb-10	16-Feb-10	14	28	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					253	Track Finishes	Track	5A	-	0.0%	12-Jan-10	02-Feb-10	22	27	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1049	CBM- Ducts	Track	5A	161,811.48	13.2%	14-Aug-09	27-Aug-09	14	21	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1059	Track Laying ROJ - MUR - 1 Half	Track	5A	431,497.27	35.2%	04-Dec-09	11-Jan-10	39	25	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1059	Track Laying ROJ - MUR	Track	5A	377,560.12	30.8%	04-Dec-09	11-Jan-10	39	25	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1029	Bulk Excavation - Sub Base	Track	5A	-	0.0%	03-Jul-09	16-Jul-09	14	20	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1039	OLE Foundations - Drainage	Track - BB	5A	35,704.89	2.9%	17-Jul-09	13-Aug-09	28	20	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5A	11,257.05	0.9%				28	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	BoQ Highway works	Track	5A	99,890.70	8.1%				21	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5A	1,009.00	0.1%				22	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Murrayfield Tram Stop																											
				Tramstop					490,643.53								-	-	-	-	-	-	-	-	-	-	-	-	-	-
					105	Civil Engineering and Building Works	Tramstops	5A	144,642.91	29.5%	15-Dec-09	31-Jan-10	48	26	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					105	Civil Engineering and Building Works	Tramstops	5A	144,642.91	29.5%	01-Feb-10	29-Mar-10	58	28	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5A	2,922.08	0.6%				31	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2030	Deliver and Install Shelter	Tramstops	5A	96,428.61	19.7%	28-Apr-10	12-May-10	15	31	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5A	974.03	0.2%				31	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Trams Eq	5A	25,000.00	5.1%				34	35		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					228	Order REC Supply	Trams Eq	5A	-	0.0%	16-Mar-10	16-Mar-10	1	29	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5110	Package Test Tramstop	Trams Eq	5A	15,054.53	3.1%	23-Jul-10	29-Jul-10	7	34	34		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5080	Install LV Power Supply and LV Power Equipment	Trams Eq	5A	15,054.53	3.1%	13-May-10	17-Jun-10	36	31	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5090	Install Telecon Equipment	Trams Eq	5A	15,054.53	3.1%	18-Jun-10	15-Jul-10	28	32	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5100	Install Station Control Equipment + AFC Equipment	Trams Eq	5A	15,054.53	3.1%	18-Jun-10	22-Jul-10	35	32	34		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6270	Installation of SIG-interlocking cubicle	Trams Eq	5A	15,054.53	3.1%	27-May-10	16-Jun-10	21	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6280	Commissioning of SIG -interlocking cubicle	Trams Eq	5A	-	0.0%	28-Oct-10	03-Nov-10	7	37	37		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5079	Access for E&M Tram Stop installation (05A Murrayfield)	Trams Eq	5A	-	0.0%	13-May-10	13-May-10	1	31	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5078	Access for visual inspection for E&M Tram Stop installation (05A Murrayfield)	Trams Eq	5A	-	0.0%	13-Apr-10	13-Apr-10	1	30	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5A	760.33	0.2%				34	35		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05A3 Murrayfield (exc.) to Balgreen Road (inc.)							11,883,623.73								-	-	-	-	-	9,389	18,778	237,320	361,487	482,902	65,722	807,724	583,418	2,566,741

USB00000073_0051

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER | SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Extract 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					Snagging	Snagging	Track	2A	1,150.02	0.0%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Haymarket Terrace Substation																											
			Substation						746,724.87							-	227,516	227,516	4,596	-	-	-	-	-	-	71,056	-	142,113	672,797
					336	Completion of envelope	Subst - BB	2A	227,515.86	30.5%	01-Feb-09	23-Mar-09	52	15	16	-	227,516	-	-	-	-	-	-	-	-	-	-	-	227,516
					336	Civil Engineering and Building Works	Subst - BB	2A	227,515.86	30.5%	09-Dec-08	31-Jan-09	54	13	15	-	227,516	-	-	-	-	-	-	-	-	-	-	-	227,516
					Snagging	Snagging	Subst - BB	2A	4,596.28	0.6%				16	17	-	-	-	4,596	-	-	-	-	-	-	-	-	-	4,596
					326	Order REC supply from Scottish Power	Subst - S	2A	-	0.0%	17-Nov-08	17-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5630	Power Infeed from Public Net available inc HV cable	Subst - S	2A	-	0.0%	24-Mar-09	24-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5650	Installation of TPS Equipment	Subst - S	2A	71,056.48	9.5%	26-Oct-09	08-Dec-09	44	24	26	-	-	-	-	-	-	-	-	-	-	-	71,056	-	71,056
					A5640	Install LV Power Supply and LV Power Equipment	Subst - S	2A	71,056.48	9.5%	12-Oct-09	02-Nov-09	22	24	24	-	-	-	-	-	-	-	-	-	71,056	-	-	-	71,056
					A5670	Testing and Commissioning	Subst - S	2A	71,056.48	9.5%	08-Dec-09	11-Jan-10	35	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5660	Install Telecom and Scada	Subst - S	2A	71,056.48	9.5%	16-Nov-09	08-Dec-09	23	25	26	-	-	-	-	-	-	-	-	-	-	-	71,056	-	71,056
					A2699	Access for E&M Substation installation (02A Haymarket Terrace)	Subst - S	2A	-	0.0%	24-Mar-09	24-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2698	Access for visual inspection for E&M Substation installation (02A Haymarket Terrace)	Subst - S	2A	-	0.0%	20-Feb-09	20-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	2A	2,870.97	0.4%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Haymarket Station Tram Stop																											
			Tramstop						344,478.05							-	90,379	1,826	-	25,000	-	-	-	60,253	609	-	75,273	760	254,099
					135	Civil Engineering and Building Works	Tramstops	2A	90,378.97	26.2%	23-Oct-08	15-Dec-08	54	11	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					135	Civil Engineering and Building Works	Tramstops	2A	90,378.97	26.2%	16-Dec-08	05-Feb-09	53	13	15	-	90,379	-	-	-	-	-	-	-	-	-	-	-	90,379
					Snagging	Snagging	Tramstops	2A	1,825.84	0.5%				15	16	-	-	1,826	-	-	-	-	-	-	-	-	-	-	1,826
					A2480	Deliver and Install Shelter	Tramstops	2A	60,252.65	17.5%	10-Aug-09	24-Aug-09	15	21	22	-	-	-	-	-	-	-	-	60,253	-	-	-	-	60,253
					Snagging	Snagging	Tramstops	2A	608.61	0.2%				22	23	-	-	-	-	-	-	-	-	-	609	-	-	-	609
					3rd Party	Third Party Sign-off	Trams Eq	2A	25,000.00	7.3%	23-Mar-09	12-May-09	51	16	18	-	-	-	-	25,000	-	-	-	-	-	-	-	-	25,000
					488	Order REC Supply	Trams Eq	2A	-	0.0%	26-Jun-09	26-Jun-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4710	Package Test Tramstop	Trams Eq	2A	75,272.67	21.9%	02-Nov-09	09-Nov-09	8	24	25	-	-	-	-	-	-	-	-	-	-	-	75,273	-	75,273
					A4680	Install LV Power Supply and LV Power Equipment	Trams Eq	2A	-	0.0%	24-Aug-09	28-Sep-09	36	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4690	Install Telecon Equipment	Trams Eq	2A	-	0.0%	28-Sep-09	26-Oct-09	29	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4700	Install Station Control Equipment + AFC Equipment	Trams Eq	2A	-	0.0%	28-Sep-09	02-Nov-09	36	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6170	Installation of SIG-interlocking cubicle	Trams Eq	2A	-	0.0%	07-Sep-09	28-Sep-09	22	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6180	Commissioning of SIG -interlocking cubicle	Trams Eq	2A	-	0.0%	22-Oct-09	28-Oct-09	7	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4679	Access for E&M Tram Stop installation (02A Haymarket Station)	Trams Eq	2A	-	0.0%	24-Aug-09	24-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4678	Access for visual inspection for E&M Tram Stop installation (02A Haymarket Station)	Trams Eq	2A	-	0.0%	23-Jul-09	23-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	2A	760.33	0.2%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	760	760
05 Roseburn Junction to Gogar									50,124,525.18	22.5%						4,992,994	3,766,165	1,418,766	1,656,763	1,902,154	1,619,781	1,879,859	1,407,113	2,723,864	503,151	1,274,432	443,611	536,411	24,125,062
	05A Roseburn Junction (exc.) to Balgreen Road (inc.)								19,029,806.39							838,720	528,132	391,835	505,405	426,936	1,073,422	673,930	576,770	694,750	175,815	452,315	-	-	6,338,031
		05A1 Roseburn Junction (exc.) to Balgreen Road (inc.)							1,149,116.30							-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Roseburn Junction (exc.) to Balgreen Road (inc.)																											
				E & M Installations					1,149,116.30							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4090	Overhead Catenary Line - One Half	OLE	5A	363,956.63	31.7%	10-Sep-10	09-Nov-10	61	35	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4090	Overhead Catenary Line	OLE	5A	242,637.75	21.1%	10-Sep-10	09-Nov-10	61	35	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5A	2,450.89	0.2%				38	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4100	Install Electrical Cables	SCC	5A	133,667.58	11.6%	24-Sep-10	11-Oct-10	18	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4110	Install Fibre Optic Cables	SCC	5A	133,667.58	11.6%	24-Sep-10	11-Oct-10	18	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4120	Install Signalling Wayside Equipment	SCC	5A	133,667.58	11.6%	12-Oct-10	27-Oct-10	16	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4085	Installation of poles and building fixings	SCC	5A	133,667.58	11.6%	17-Aug-10	09-Sep-10	24	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4084	Access for E&M wayside installation (05A)	SCC	5A	-	0.0%	17-Aug-10	17-Aug-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4099	Access to cable pits for cable laying (05A)	SCC	5A	-	0.0%	24-Sep-10	24-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4083	Access for visual inspection for E&M wayside installation (05A)	SCC	5A	-	0.0%	15-Jul-10	15-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4098	Access for visual inspection to cable pits for cable laying (05A)	SCC	5A	-	0.0%	25-Aug-10	25-Aug-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	5A	5,400.71	0.5%				37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05A2 Roseburn Junction (exc.) to Murrayfield (inc.)							5,997,066.36							714,554	274,222	211,154	219,434	-	602,850	334,518	235,007	261,702	1,009	-	-	-	2,854,449
			Russel Road Underbridge (S20)																											
				Bridge					1,185,158.00							410,657	117,331	11,852	-	-	-	-	-	-	-	-	-	-	539,839
					103	Excavation	Structures	5A	117,330.64	9.9%	08-May-08	31-Jul-08	85	5	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					103	Piling	Structures	5A	175,995.96	14.9%	08-May-08	31-Jul-08	85	5	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					238	Bases	Structures	5A	117,330.64	9.9%	01-Aug-08	12-Sep-08	43	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					429	Abutments	Structures	5A	58,665.32	5.0%	01-Sep-08	31-Oct-08	61	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					429	Wing Walls	Structures	5A	175,995.96	14.9%	01-Sep-08	31-Oct-08	61	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					439	Deck	Structures	5A	234,661.28	19.8%	27-Oct-08	19-Jan-09	85	11	14	234,661	-	-	-	-	-	-	-	-	-	-	-	-	234,661
					439	Parapets	Structures	5A	175,995.96	14.9%	27-Oct-08	19-Jan-09	85	11	14	175,996	-	-	-	-	-	-	-	-	-	-	-	-	175,996
					449	Bridge Finishes	Structures	5A	117,330.64	9.9%	03-Nov-08	09-Feb-09	99	11	15	-	117,331	-	-	-	-	-	-	-	-	-	-	-	117,331
					Snagging	Snagging	Structures	5A	11,851.58	1.0%				15	16	-	-	11,852	-	-	-	-	-	-	-	-	-	-	11,852
					Cnt. Milestone	Completion of Russell Road Bridge (S20) (4)	Structures	5A		0.0%		09-Feb-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Russell Road Retaining Walls (W3 and W4)																											
				Retaining Wall					2,038,153.00							199,302	-	199,302	219,434	-	498,255	323,953	199,302	-	-	-	-	-	1,639,549
					107	Site Clearance	Structures	5A	99,651.07	4.9%	15-May-08	12-Jun-08	29	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					250	Demolish Existing Buildings	Structures	5A	199,302.15	9.8%	13-Jun-08	22-Aug-08	71	6	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					338	Temporary Access Road	Structures	5A	-	0.0%	18-Aug-08	05-Sep-08	19	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					348	Bored Piling	Structures	5A	99,651.07	4.9%	08-Sep-08	26-Sep-08	19	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					370	Pile Caps	Structures	5A	199,302.15	9.8%	17-Nov-08	12-Jan-09	57	12	14	199,302	-	-	-	-	-	-	-	-	-	-	-	-	199,302
					659	Retaining Wall	Structures	5A	199,302.15	9.8%	13-Jan-09	16-Mar-09	63	14	16	-	-	199,302	-	-	-	-	-	-	-	-	-	-	199,302
					669	Waterproofing	Structures	5A	199,302.15	9.8%	17-Mar-09	14-Apr-09	29	16	17	-	-	-	199,302	-	-	-	-	-	-	-	-	-	199,302
					679	Imported Fill - 50%	Structures	5A	199,302.15	9.8%	31-Mar-09	18-Jun-09	80	17	19	-	-	-	-	-	199,302	-	-	-	-	-	-	-	199,302
					679	Imported Fill	Structures	5A	298,953.22	14.7%	31-Mar-09	18-Jun-09	80	17	19	-	-	-	-	-	298,953	-	-	-	-	-	-	-	298,953
					689	Parapet	Structures	5A	298,953.22	26.0%	29-May-09	02-Jul-09	35	19	20	-	-	-	-	-	-	298,953	-	-	-	-	-	-	298,953
					699	Road Reinstate	Structures	5A	199,302.15	17.3%	03-Jul-09	07-Aug-09	36	20	21	-	-	-	-	-	-	-	199,302	-	-	-	-	-	199,302
					Snagging	Snagging	Structures	5A	20,131.53	1.8%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	20,132	-	-	-	-	-	-	-	-	-	20,132
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	2.2%				19	20	-	-	-	-	-	-	25,000	-	-	-	-	-	-	25,000
			Murrayfield Tram Stop Retaining Wall (W18)																											
				Retaining Wall					1,056,507.00							104,594	156,891	-	-	-	104,594	10,565	-	-	-	-	-	-	376,645
					108	Site Clearance	Structures	5A	52,297.10	4.4%	29-May-08	25-Jun-08	28	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					182	Foundations	Structures	5A	52,297.10	4.4%	26-Jun-08	16-Jul-08	21	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	52,297.10	4.4%	10-Jul-08	31-Jul-08	22	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Aug-08	31-Aug-08	31	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Sep-08	30-Sep-08	30	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Oct-08	31-Oct-08	31	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Nov-08	30-Nov-08	30	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Dec-08	31-Dec-08	31	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Jan-09	23-Jan-09	24	13	14	104,594	-	-	-	-	-	-	-	-	-	-	-	-	104,594
					418	Coping	Structures	5A	104,594.19	9.9%	26-Jan-09	13-Feb-09	19	14	15	-	104,594	-	-	-	-	-	-	-	-	-	-	-	104,594
					440	Steps	Structures	5A	104,594.19	9.9%	26-Jan-09	27-May-09	122	14	19	-	-	-	-	-	-	104,594	-	-	-	-	-	-	104,594
					428	Handrail	Structures	5A	52,297.10	5.0%	16-Feb-09	27-Feb-09	12	15	15	-	52,297	-	-	-	-	-	-	-	-	-	-	-	52,297
					Snagging	Snagging	Structures	5A	10,565.07	1.0%				19	20	-	-	-	-	-	-	10,565	-	-	-	-	-	-	10,565
			Roseburn Junction to Murrayfield Trackwork (470m)																											
				Trackwork					1,226,604.83							-	-	-	-	-	-	-	-	35,705	261,702	1,009	-	-	-	298,416
					540	Fencing	Track	5A	107,874.32	8.8%	03-Feb-10	16-Feb-10	14	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					253	Track Finishes	Track	5A	-	0.0%	12-Jan-10	02-Feb-10	22	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1049	CBM- Ducts	Track	5A	161,811.48	13.2%	14-Aug-09	27-Aug-09	14	21	22	-	-	-	-	-	-	-	-	161,811	-	-	-	-	161,811
					1059	Track Laying ROJ - MUR - 1 Half	Track	5A	431,497.27	35.2%	04-Dec-09	11-Jan-10	39	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1059	Track Laying ROJ - MUR	Track	5A	377,560.12	30.8%	04-Dec-09	11-Jan-10	39	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1029	Bulk Excavation - Sub Base	Track	5A	-	0.0%	03-Jul-09	16-Jul-09	14	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1039	OLE Foundations - Drainage	Track - BB	5A	35,704.89	2.9%	17-Jul-09	13-Aug-09	28	20	21	-	-	-	-	-	-	-	35,705	-	-	-	-	-	35,705
					Snagging	Snagging	Track	5A	11,257.05	0.9%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	BoQ Highway works	Track	5A	99,890.70	8.1%				21	22	-	-	-	-	-	-	-	-	99,891	-	-	-	-	99,891
					Snagging	Snagging	Track	5A	1,009.00	0.1%				22	23	-	-	-	-	-	-	-	-	-	1,009	-	-	-	1,009
			Murrayfield Tram Stop																											
				Tramstop					490,643.53							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					105	Civil Engineering and Building Works	Tramstops	5A	144,642.91	29.5%	15-Dec-09	31-Jan-10	48	26	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					105	Civil Engineering and Building Works	Tramstops	5A	144,642.91	29.5%	01-Feb-10	29-Mar-10	58	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5A	2,922.08	0.6%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2030	Deliver and Install Shelter	Tramstops	5A	96,428.61	19.7%	28-Apr-10	12-May-10	15	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5A	974.03	0.2%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Trams Eq	5A	25,000.00	5.1%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					228	Order REC Supply	Trams Eq	5A	-	0.0%	16-Mar-10	16-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5110	Package Test Tramstop	Trams Eq	5A	15,054.53	3.1%	23-Jul-10	29-Jul-10	7	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5080	Install LV Power Supply and LV Power Equipment	Trams Eq	5A	15,054.53	3.1%	13-May-10	17-Jun-10	36	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5090	Install Telecon Equipment	Trams Eq	5A	15,054.53	3.1%	18-Jun-10	15-Jul-10	28	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5100	Install Station Control Equipment + AFC Equipment	Trams Eq	5A	15,054.53	3.1%	18-Jun-10	22-Jul-10	35	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6270	Installation of SIG-interlocking cubicle	Trams Eq	5A	15,054.53	3.1%	27-May-10	16-Jun-10	21	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6280	Commissioning of SIG -interlocking cubicle	Trams Eq	5A	-	0.0%	28-Oct-10	03-Nov-10	7	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5079	Access for E&M Tram Stop installation (05A Murrayfield)	Trams Eq	5A	-	0.0%	13-May-10	13-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5078	Access for visual inspection for E&M Tram Stop installation (05A Murrayfield)	Trams Eq	5A	-	0.0%	13-Apr-10	13-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5A	760.33	0.2%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05A3 Murrayfield (exc.) to Balgreen Road (inc.)							11,883,623.73							124,166	253,910	180,681	285,972	426,936	470,572	339,412	341,763	433,048	174,806	452,315	-	-	3,483,582

USB00000073_0052

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year														
Period														
Period End														

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					Snagging	Snagging		Track	2A	1,150.02	0.0%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Haymarket Terrace Substation																											
				Substation						746,724.87							71,056	2,871	-	-	-	-	-	-	-	-	-	-	-	73,927
					336	Completion of envelope		Subst - BB	2A	227,515.86	30.5%	01-Feb-09	23-Mar-09	52	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					336	Civil Engineering and Building Works		Subst - BB	2A	227,515.86	30.5%	09-Dec-08	31-Jan-09	54	13	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Subst - BB	2A	4,596.28	0.6%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					326	Order REC supply from Scottish Power		Subst - S	2A	-	0.0%	17-Nov-08	17-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5630	Power Infeed from Public Net available inc HV cable		Subst - S	2A	-	0.0%	24-Mar-09	24-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5650	Installation of TPS Equipment		Subst - S	2A	71,056.48	9.5%	26-Oct-09	08-Dec-09	44	24	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5640	Install LV Power Supply and LV Power Equipment		Subst - S	2A	71,056.48	9.5%	12-Oct-09	02-Nov-09	22	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5670	Testing and Commissioning		Subst - S	2A	71,056.48	9.5%	08-Dec-09	11-Jan-10	35	26	27	71,056	-	-	-	-	-	-	-	-	-	-	-	-	71,056
					A5660	Install Telecom and Scada		Subst - S	2A	71,056.48	9.5%	16-Nov-09	08-Dec-09	23	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2699	Access for E&M Substation installation (02A Haymarket Terrace)		Subst - S	2A	-	0.0%	24-Mar-09	24-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2698	Access for visual inspection for E&M Substation installation (02A Haymarket Terrace)		Subst - S	2A	-	0.0%	20-Feb-09	20-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Subst - S	2A	2,870.97	0.4%				27	28	-	2,871	-	-	-	-	-	-	-	-	-	-	2,871
			Haymarket Station Tram Stop																											
				Tramstop						344,478.05							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					135	Civil Engineering and Building Works		Tramstops	2A	90,378.97	26.2%	23-Oct-08	15-Dec-08	54	11	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					135	Civil Engineering and Building Works		Tramstops	2A	90,378.97	26.2%	16-Dec-08	05-Feb-09	53	13	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Tramstops	2A	1,825.84	0.5%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2480	Deliver and Install Shelter		Tramstops	2A	60,252.65	17.5%	10-Aug-09	24-Aug-09	15	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Tramstops	2A	608.61	0.2%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off		Trams Eq	2A	25,000.00	7.3%	23-Mar-09	12-May-09	51	16	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					488	Order REC Supply		Trams Eq	2A	-	0.0%	26-Jun-09	26-Jun-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4710	Package Test Tramstop		Trams Eq	2A	75,272.67	21.9%	02-Nov-09	09-Nov-09	8	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4680	Install LV Power Supply and LV Power Equipment		Trams Eq	2A	-	0.0%	24-Aug-09	28-Sep-09	36	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4690	Install Telecon Equipment		Trams Eq	2A	-	0.0%	28-Sep-09	26-Oct-09	29	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4700	Install Station Control Equipment + AFC Equipment		Trams Eq	2A	-	0.0%	28-Sep-09	02-Nov-09	36	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6170	Installation of SIG-interlocking cubicle		Trams Eq	2A	-	0.0%	07-Sep-09	28-Sep-09	22	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6180	Commissioning of SIG -interlocking cubicle		Trams Eq	2A	-	0.0%	22-Oct-09	28-Oct-09	7	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4679	Access for E&M Tram Stop installation (02A Haymarket Station)		Trams Eq	2A	-	0.0%	24-Aug-09	24-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4678	Access for visual inspection for E&M Tram Stop installation (02A Haymarket Station)		Trams Eq	2A	-	0.0%	23-Jul-09	23-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Trams Eq	2A	760.33	0.2%				25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			05 Roseburn Junction to Gogar							50,128,625.18	22.5%						4,375,232	677,861	345,374	2,409,531	1,312,567	324,359	1,083,950	263,072	1,778,578	265,063	631,900	611,995	2,451	14,081,932
			05A Roseburn Junction (exc.) to Balgreen Road (inc.)							19,029,806.39							3,385,543	358,922	11,257	315,265	369,560	181,485	245,951	243,278	1,778,578	265,063	631,900	611,995	2,451	8,401,249
			05A1 Roseburn Junction (exc.) to Balgreen Road (inc.)							1,149,116.30							-	-	-	-	-	-	-	-	133,668	-	401,003	611,995	2,451	1,149,116
			Roseburn Junction (exc.) to Balgreen Road (inc.)																											
				E & M Installations						1,149,116.30							-	-	-	-	-	-	-	-	133,668	-	401,003	611,995	2,451	1,149,116
					A4090	Overhead Catenary Line - One Half		OLE	5A	363,566.63	31.7%	10-Sep-10	09-Nov-10	61	35	38	-	-	-	-	-	-	-	-	-	-	-	-	363,567	-	363,567
					A4090	Overhead Catenary Line		OLE	5A	242,637.75	21.1%	10-Sep-10	09-Nov-10	61	35	38	-	-	-	-	-	-	-	-	-	-	-	242,638	-	242,638
					Snagging	Snagging		OLE	5A	2,450.89	0.2%				38	39	-	-	-	-	-	-	-	-	-	-	-	-	2,451	2,451
					A4100	Install Electrical Cables		SCC	5A	133,667.58	11.6%	24-Sep-10	11-Oct-10	18	36	37	-	-	-	-	-	-	-	-	-	133,668	-	-	133,668
					A4110	Install Fibre Optic Cables		SCC	5A	133,667.58	11.6%	24-Sep-10	11-Oct-10	18	36	37	-	-	-	-	-	-	-	-	-	133,668	-	-	133,668
					A4120	Install Signalling Wayside Equipment		SCC	5A	133,667.58	11.6%	12-Oct-10	27-Oct-10	16	37	37	-	-	-	-	-	-	-	-	-	133,668	-	-	133,668
					A4085	Installation of poles and building fixings		SCC	5A	133,667.58	11.6%	17-Aug-10	09-Sep-10	24	35	35	-	-	-	-	-	-	-	-	133,668	-	-	-	-	133,668
					A4084	Access for E&M wayside installation (05A)		SCC	5A	-	0.0%	17-Aug-10	17-Aug-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4099	Access to cable pits for cable laying (05A)		SCC	5A	-	0.0%	24-Sep-10	24-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4083	Access for visual inspection for E&M wayside installation (05A)		SCC	5A	-	0.0%	15-Jul-10	15-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4098	Access for visual inspection to cable pits for cable laying (05A)		SCC	5A	-	0.0%	25-Aug-10	25-Aug-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		SCC	5A	5,400.71	0.5%				37	38	-	-	-	-	-	-	-	-	-	-	5,401	-	5,401
			05A2 Roseburn Junction (exc.) to Murrayfield (inc.)							5,997,066.36							809,057	252,517	11,257	144,643	96,429	34,005	15,055	30,109	25,760	-	-	-	-	1,418,832
			Russel Road Underbridge (S20)																											
				Bridge						1,185,158.00							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					103	Excavation		Structures	5A	117,330.64	9.9%	08-May-08	31-Jul-08	85	5	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					103	Piling		Structures	5A	175,995.96	14.9%	08-May-08	31-Jul-08	85	5	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					238	Bases		Structures	5A	117,330.64	9.9%	01-Aug-08	12-Sep-08	43	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					429	Abutments		Structures	5A	58,665.32	5.0%	01-Sep-08	31-Oct-08	61	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					429	Wing Walls		Structures	5A	175,995.96	14.9%	01-Sep-08	31-Oct-08	61	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					439	Deck		Structures	5A	234,661.28	19.8%	27-Oct-08	19-Jan-09	85	11	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					439	Parapets		Structures	5A	175,995.96	14.9%	27-Oct-08	19-Jan-09	85	11	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					449	Bridge Finishes		Structures	5A	117,330.64	9.9%	03-Nov-08	09-Feb-09	99	11	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Structures	5A	11,851.58	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Cnt. Milestone	Completion of Russell Road Bridge (S20) (4)		Structures	5A		0.0%		09-Feb-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Russell Road Retaining Walls (W3 and W4)																											
				Retaining Wall						2,038,153.00							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					107	Site Clearance		Structures	5A	99,651.07	4.9%	15-May-08	12-Jun-08	29	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					250	Demolish Existing Buildings		Structures	5A	199,302.15	9.8%	13-Jun-08	22-Aug-08	71	6	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					338	Temporary Access Road		Structures	5A	-	0.0%	18-Aug-08	05-Sep-08	19	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					348	Bored Piling		Structures	5A	99,651.07	4.9%	08-Sep-08	26-Sep-08	19	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					370	Pile Caps		Structures	5A	199,302.15	9.8%	17-Nov-08	12-Jan-09	57	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					659	Retaining Wall		Structures	5A	199,302.15	9.8%	13-Jan-09	16-Mar-09	63	14	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					669	Waterproofing		Structures	5A	199,302.15	9.8%	17-Mar-09	14-Apr-09	29	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					679	Imported Fill - 50%		Structures	5A	199,302.15	9.8%	31-Mar-09	18-Jun-09	80	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					679	Imported Fill		Structures	5A	298,953.22	14.7%	31-Mar-09	18-Jun-09	80	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					689	Parapet		Structures	5A	298,953.22	26.0%	29-May-09	02-Jul-09	35	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					699	Road Reinstate		Structures	5A	199,302.15	17.3%	03-Jul-09	07-Aug-09	36	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Structures	5A	20,131.53	1.8%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off		Structures	5A	25,000.00	2.2%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Murrayfield Tram Stop Retaining Wall (W18)																											
				Retaining Wall						1,056,507.00							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					108	Site Clearance		Structures	5A	52,297.10	4.4%	29-May-08	25-Jun-08	28	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					182	Foundations		Structures	5A	52,297.10	4.4%	26-Jun-08	16-Jul-08	21	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					217	Reinforced Earth Wall - One Seventh Length		Structures	5A	52,297.10	4.4%	10-Jul-08	31-Jul-08	22	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					217	Reinforced Earth Wall - One Seventh Length		Structures	5A	104,594.19	8.8%	01-Aug-08	31-Aug-08	31	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					217	Reinforced Earth Wall - One Seventh Length		Structures	5A	104,594.19	8.8%	01-Sep-08	30-Sep-08	30	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					217	Reinforced Earth Wall - One Seventh Length		Structures	5A	104,594.19	8.8%	01-Oct-08	31-Oct-08	31	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					217	Reinforced Earth Wall - One Seventh Length		Structures	5A	104,594.19	8.8%	01-Nov-08	30-Nov-08	30	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					217	Reinforced Earth Wall - One Seventh Length		Structures	5A	104,594.19	8.8%	01-Dec-08	31-Dec-08	31	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					217	Reinforced Earth Wall - One Seventh Length		Structures	5A	104,594.19	8.8%	01-Jan-09	23-Jan-09	24	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					418	Coping		Structures	5A	104,594.19	9.9%	26-Jan-09	13-Feb-09	19	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					440	Steps		Structures	5A	104,594.19	9.9%	26-Jan-09	27-May-09	122	14	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					428	Handrail		Structures	5A	52,297.10	5.0%	16-Feb-09	27-Feb-09	12	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Structures	5A	10,565.07	1.0%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Roseburn Junction to Murrayfield Trackwork (470m)																											
				Trackwork						1,226,604.83							809,057	107,874	11,257	-	-	-	-	-	-	-	-	-	-	928,189
					540	Fencing		Track	5A	107,874.32	8.8%	03-Feb-10	16-Feb-10	14	28	28	-	107,874	-	-	-	-	-	-	-	-	-	-	-	107,874
					253	Track Finishes		Track	5A	-	0.0%	12-Jan-10	02-Feb-10	22	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1049	CBM- Ducts		Track	5A	161,811.48	13.2%	14-Aug-09	27-Aug-09	14	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1059	Track Laying ROJ - MUR - 1 Half		Track	5A	431,497.27	35.2%	04-Dec-09	11-Jan-10	39	25	27	431,497	-	-	-	-	-	-	-	-	-	-	-	-	-	431,497
					1059	Track Laying ROJ - MUR		Track	5A	377,560.12	30.8%	04-Dec-09	11-Jan-10	39	25	27	377,560	-	-	-	-	-	-	-	-	-	-	-	-	-	377,560
					1029	Bulk Excavation - Sub Base		Track	5A	-	0.0%	03-Jul-09	16-Jul-09	14	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1039	OLE Foundations - Drainage		Track - BB	5A	35,704.89	2.9%	17-Jul-09	13-Aug-09	28	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Track	5A	11,257.05	0.9%				28	29	-	-	11,257	-	-	-	-	-	-	-	-	-	11,257
					Highways	BoQ Highway works		Track	5A	99,890.70	8.1%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Track	5A	1,009.00	0.1%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-
			Murrayfield Tram Stop																											
				Tramstop						490,643.53							-	144,643	-	144,643	96,429	34,005	15,055	30,109	25,760	-	-	-	-	490,644
					105	Civil Engineering and Building Works		Tramstops	5A	144,642.91	29.5%	15-Dec-09	31-Jan-10	48	26	28	-	144,643	-	-	-	-	-	-	-	-	-	-	-	-	144,643
					105	Civil Engineering and Building Works		Tramstops	5A	144,642.91	29.5%	01-Feb-10	29-Mar-10	58	28	30	-	-	-	144,643	-	-	-	-	-	-	-	-	-	-	144,643
					Snagging	Snagging		Tramstops	5A	2,922.08	0.6%				31	32	-	-	-	-	-	2,922	-	-	-	-	-	-	-	2,922
					A2030	Deliver and Install Shelter		Tramstops	5A	96,428.61	19.7%	28-Apr-10	12-May-10	15	31	31	-	-	-	-	96,429	-	-	-	-	-	-	-	-	96,429
					Snagging	Snagging		Tramstops	5A	974.03	0.2%				31	32	-	-	-	-	-	974	-	-	-	-	-	-	-	974
					3rd Party	Third Party Sign-off		Trams Eq	5A	25,000.00	5.1%				34	35	-	-	-	-	-	-	-	-	25,000	-	-	-	-	25,000
					228	Order REC Supply		Trams Eq	5A	-	0.0%	16-Mar-10	16-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5110	Package Test Tramstop		Trams Eq	5A	15,054.53	3.1%	23-Jul-10	29-Jul-10	7	34	34	-	-	-	-	-	-	-	15,055	-	-	-	-	-	15,055
					A5080	Install LV Power Supply and LV Power Equipment		Trams Eq	5A	15,054.53	3.1%	13-May-10	17-Jun-10	36	31	32	-	-	-	-	-	15,055	-	-	-	-	-	-	-	-	15,055
					A5090	Install Telecon Equipment		Trams Eq	5A	15,054.53	3.1%	18-Jun-10	15-Jul-10	28	32	33	-	-	-	-	-	-	15,055	-	-	-	-	-	-	-	15,055
					A5100	Install Station Control Equipment + AFC Equipment		Trams Eq	5A	15,054.53	3.1%	18-Jun-10	22-Jul-10	35	32	34	-	-	-	-	-	-	-	15,055	-	-	-	-	-	-	15,055
					A6270	Installation of SIG-interlocking cubicle		Trams Eq	5A	15,054.53	3.1%	27-May-10	16-Jun-10	21	32	32	-	-	-	-	-	15,055	-	-	-	-	-	-	-	-	15,055
					A6280	Commissioning of SIG -interlocking cubicle		Trams Eq	5A	-	0.0%	28-Oct-10	03-Nov-10	7	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5079	Access for E&M Tram Stop installation (05A Murrayfield)		Trams Eq	5A	-	0.0%	13-May-10	13-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5078	Access for visual inspection for E&M Tram Stop installation (05A Murrayfield)		Trams Eq	5A	-	0.0%	13-Apr-10	13-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging		Trams Eq	5A	760.33	0.2%				34	35	-	-	-	-	-	-	-	-	760	-	-	-	-	760
			05A3 Murrayfield (exc.) to Balgreen Road (inc.)							11,883,623.73							2,576,486	106,405	-	170,622	273,131	147,480	230,897	213,169	1,619,150	265,063	230,897	-	-	5,833,300

USB00000073_0053

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER

SIEI

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period
					Snagging	Snagging	Track	2A	1,150.02	0.0%				11	12
			Haymarket Terrace Substation												
				Substation					746,724.87						
					336	Completion of envelope	Subst - BB	2A	227,515.86	30.5%	01-Feb-09	23-Mar-09	52	15	16
					336	Civil Engineering and Building Works	Subst - BB	2A	227,515.86	30.5%	09-Dec-08	31-Jan-09	54	13	15
					Snagging	Snagging	Subst - BB	2A	4,596.28	0.6%				16	17
					326	Order REC supply from Scottish Power	Subst - S	2A	-	0.0%	17-Nov-08	17-Nov-08	1	12	12
					A5630	Power Infeed from Public Net available inc HV cable	Subst - S	2A	-	0.0%	24-Mar-09	24-Mar-09	1	16	16
					A5650	Installation of TPS Equipment	Subst - S	2A	71,056.48	9.5%	26-Oct-09	08-Dec-09	44	24	26
					A5640	Install LV Power Supply and LV Power Equipment	Subst - S	2A	71,056.48	9.5%	12-Oct-09	02-Nov-09	22	24	24
					A5670	Testing and Commissioning	Subst - S	2A	71,056.48	9.5%	08-Dec-09	11-Jan-10	35	26	27
					A5660	Install Telecom and Scada	Subst - S	2A	71,056.48	9.5%	16-Nov-09	08-Dec-09	23	25	26
					A2699	Access for E&M Substation installation (02A Haymarket Terrace)	Subst - S	2A	-	0.0%	24-Mar-09	24-Mar-09	1	16	16
					A2698	Access for visual inspection for E&M Substation installation (02A Haymarket Terrace)	Subst - S	2A	-	0.0%	20-Feb-09	20-Feb-09	1	15	15
					Snagging	Snagging	Subst - S	2A	2,870.97	0.4%				27	28
			Haymarket Station Tram Stop												
				Tramstop					344,478.05						
					135	Civil Engineering and Building Works	Tramstops	2A	90,378.97	26.2%	23-Oct-08	15-Dec-08	54	11	13
					135	Civil Engineering and Building Works	Tramstops	2A	90,378.97	26.2%	16-Dec-08	05-Feb-09	53	13	15
					Snagging	Snagging	Tramstops	2A	1,825.84	0.5%				15	16
					A2480	Deliver and Install Shelter	Tramstops	2A	60,252.65	17.5%	10-Aug-09	24-Aug-09	15	21	22
					Snagging	Snagging	Tramstops	2A	608.61	0.2%				22	23
					3rd Party	Third Party Sign-off	Trams Eq	2A	25,000.00	7.3%	23-Mar-09	12-May-09	51	16	18
					488	Order REC Supply	Trams Eq	2A	-	0.0%	26-Jun-09	26-Jun-09	1	20	20
					A4710	Package Test Tramstop	Trams Eq	2A	75,272.67	21.9%	02-Nov-09	09-Nov-09	8	24	25
					A4680	Install LV Power Supply and LV Power Equipment	Trams Eq	2A	-	0.0%	24-Aug-09	28-Sep-09	36	22	23
					A4690	Install Telecon Equipment	Trams Eq	2A	-	0.0%	28-Sep-09	26-Oct-09	29	23	24
					A4700	Install Station Control Equipment + AFC Equipment	Trams Eq	2A	-	0.0%	28-Sep-09	02-Nov-09	36	23	24
					A6170	Installation of SIG-interlocking cubicle	Trams Eq	2A	-	0.0%	07-Sep-09	28-Sep-09	22	22	23
					A6180	Commissioning of SIG -interlocking cubicle	Trams Eq	2A	-	0.0%	22-Oct-09	28-Oct-09	7	24	24
					A4679	Access for E&M Tram Stop installation (02A Haymarket Station)	Trams Eq	2A	-	0.0%	24-Aug-09	24-Aug-09	1	22	22
					A4678	Access for visual inspection for E&M Tram Stop installation (02A Haymarket Station)	Trams Eq	2A	-	0.0%	23-Jul-09	23-Jul-09	1	21	21
					Snagging	Snagging	Trams Eq	2A	760.33	0.2%				25	26
05 Roseburn Junction to Gogar									90,128,525.18	22.9%					
	05A Roseburn Junction (exc.) to Balgreen Road (inc.)								19,029,806.39						
		05A1 Roseburn Junction (exc.) to Balgreen Road (inc.)							1,149,116.30						
			Roseburn Junction (exc.) to Balgreen Road (inc.)												
				E & M Installations					1,149,116.30						
					A4090	Overhead Catenary Line - One Half	OLE	5A	363,956.63	31.7%	10-Sep-10	09-Nov-10	61	35	38
					A4090	Overhead Catenary Line	OLE	5A	242,637.75	21.1%	10-Sep-10	09-Nov-10	61	35	38
					Snagging	Snagging	OLE	5A	2,450.89	0.2%				38	39
					A4100	Install Electrical Cables	SCC	5A	133,667.58	11.6%	24-Sep-10	11-Oct-10	18	36	37
					A4110	Install Fibre Optic Cables	SCC	5A	133,667.58	11.6%	24-Sep-10	11-Oct-10	18	36	37
					A4120	Install Signalling Wayside Equipment	SCC	5A	133,667.58	11.6%	12-Oct-10	27-Oct-10	16	37	37
					A4085	Installation of poles and building fixings	SCC	5A	133,667.58	11.6%	17-Aug-10	09-Sep-10	24	35	35
					A4084	Access for E&M wayside installation (05A)	SCC	5A	-	0.0%	17-Aug-10	17-Aug-10	1	35	35
					A4099	Access to cable pits for cable laying (05A)	SCC	5A	-	0.0%	24-Sep-10	24-Sep-10	1	36	36
					A4083	Access for visual inspection for E&M wayside installation (05A)	SCC	5A	-	0.0%	15-Jul-10	15-Jul-10	1	33	33
					A4098	Access for visual inspection to cable pits for cable laying (05A)	SCC	5A	-	0.0%	25-Aug-10	25-Aug-10	1	35	35
					Snagging	Snagging	SCC	5A	5,400.71	0.5%				37	38
		05A2 Roseburn Junction (exc.) to Murrayfield (inc.)							5,997,066.36						
			Russel Road Underbridge (S20)												
				Bridge					1,185,158.00						
					103	Excavation	Structures	5A	117,330.64	9.9%	08-May-08	31-Jul-08	85	5	8
					103	Piling	Structures	5A	175,995.96	14.9%	08-May-08	31-Jul-08	85	5	8
					238	Bases	Structures	5A	117,330.64	9.9%	01-Aug-08	12-Sep-08	43	8	9
					429	Abutments	Structures	5A	58,665.32	5.0%	01-Sep-08	31-Oct-08	61	9	11
					429	Wing Walls	Structures	5A	175,995.96	14.9%	01-Sep-08	31-Oct-08	61	9	11
					439	Deck	Structures	5A	234,661.28	19.8%	27-Oct-08	19-Jan-09	85	11	14
					439	Parapets	Structures	5A	175,995.96	14.9%	27-Oct-08	19-Jan-09	85	11	14
					449	Bridge Finishes	Structures	5A	117,330.64	9.9%	03-Nov-08	09-Feb-09	99	11	15
					Snagging	Snagging	Structures	5A	11,851.58	1.0%				15	16
					Crit. Milestone	Completion of Russell Road Bridge (S20) (4)	Structures	5A	-	0.0%		09-Feb-09			
			Russell Road Retaining Walls (W3 and W4)												
				Retaining Wall					2,038,153.00						
					107	Site Clearance	Structures	5A	99,651.07	4.9%	15-May-08	12-Jun-08	29	5	6
					250	Demolish Existing Buildings	Structures	5A	199,302.15	9.8%	13-Jun-08	22-Aug-08	71	6	9
					338	Temporary Access Road	Structures	5A	-	0.0%	18-Aug-08	05-Sep-08	19	9	9
					348	Bored Piling	Structures	5A	99,651.07	4.9%	08-Sep-08	26-Sep-08	19	9	10
					370	Pile Caps	Structures	5A	199,302.15	9.8%	17-Nov-08	12-Jan-09	57	12	14
					659	Retaining Wall	Structures	5A	199,302.15	9.8%	13-Jan-09	16-Mar-09	63	14	16
					669	Waterproofing	Structures	5A	199,302.15	9.8%	17-Mar-09	14-Apr-09	29	16	17
					679	Imported Fill - 50%	Structures	5A	199,302.15	9.8%	31-Mar-09	18-Jun-09	80	17	19
					679	Imported Fill	Structures	5A	298,953.22	14.7%	31-Mar-09	18-Jun-09	80	17	19
					689	Parapet	Structures	5A	298,953.22	26.0%	29-May-09	02-Jul-09	35	19	20
					699	Road Reinstate	Structures	5A	199,302.15	17.3%	03-Jul-09	07-Aug-09	36	20	21
					Snagging	Snagging	Structures	5A	20,131.53	1.8%	23-Apr-09	23-Apr-09	1	17	17
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	2.2%				19	20
			Murrayfield Tram Stop Retaining Wall (W16)												
				Retaining Wall					1,056,507.00						
					108	Site Clearance	Structures	5A	52,297.10	4.4%	29-May-08	25-Jun-08	28	6	7
					182	Foundations	Structures	5A	52,297.10	4.4%	26-Jun-08	16-Jul-08	21	7	7
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	52,297.10	4.4%	10-Jul-08	31-Jul-08	22	7	8
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Aug-08	31-Aug-08	31	8	9
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Sep-08	30-Sep-08	30	9	10
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Oct-08	31-Oct-08	31	10	11
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Nov-08	30-Nov-08	30	11	12
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Dec-08	31-Dec-08	31	12	13
					217	Reinforced Earth Wall - One Seventh Length	Structures	5A	104,594.19	8.8%	01-Jan-09	23-Jan-09	24	13	14
					418	Coping	Structures	5A	104,594.19	9.9%	26-Jan-09	13-Feb-09	19	14	15
					440	Steps	Structures	5A	104,594.19	9.9%	26-Jan-09	27-May-09	122	14	19
					428	Handrail	Structures	5A	52,297.10	5.0%	16-Feb-09	27-Feb-09	12	15	15
					Snagging	Snagging	Structures	5A	10,565.07	1.0%				19	20
			Roseburn Junction to Murrayfield Trackwork (470m)												
				Trackwork					1,226,604.83						
					540	Fencing	Track	5A	107,874.32	8.8%	03-Feb-10	16-Feb-10	14	28	28
					253	Track Finishes	Track	5A	-	0.0%	12-Jan-10	02-Feb-10	22	27	28
					1049	CBM- Ducts	Track	5A	161,811.48	13.2%	14-Aug-09	27-Aug-09	14	21	22
					1059	Track Laying ROJ - MUR - 1 Half	Track	5A	431,497.27	35.2%	04-Dec-09	11-Jan-10	39	25	27
					1059	Track Laying ROJ - MUR	Track	5A	377,560.12	30.8%	04-Dec-09	11-Jan-10	39	25	27
					1029	Bulk Excavation - Sub Base	Track	5A	-	0.0%	03-Jul-09	16-Jul-09	14	20	20
					1039	OLE Foundations - Drainage	Track - BB	5A	35,704.89	2.9%	17-Jul-09	13-Aug-09	28	20	21
					Snagging	Snagging	Track	5A	11,257.05	0.9%				28	29
					Highways	BoQ Highway works	Track	5A	99,890.70	8.1%				21	22
					Snagging	Snagging	Track	5A	1,009.00	0.1%				22	23
			Murrayfield Tram Stop												
				Tramstop					490,643.53						
					105	Civil Engineering and Building Works	Tramstops	5A	144,642.91	29.5%	15-Dec-09	31-Jan-10	48	26	28
					105	Civil Engineering and Building Works	Tramstops	5A	144,642.91	29.5%	01-Feb-10	29-Mar-10	58	28	30
					Snagging	Snagging	Tramstops	5A	2,922.08	0.6%				31	32
					A2030	Deliver and Install Shelter	Tramstops	5A	96,428.61	19.7%	28-Apr-10	12-May-10	15	31	31
					Snagging	Snagging	Tramstops	5A	974.03	0.2%				31	32
					3rd Party	Third Party Sign-off	Trams Eq	5A	25,000.00	5.1%				34	35
					228	Order REC Supply	Trams Eq	5A	-	0.0%	16-Mar-10	16-Mar-10	1	29	29
					A5110	Package Test Tramstop	Trams Eq	5A	15,054.53	3.1%	23-Jul-10	29-Jul-10	7	34	34
					A5080	Install LV Power Supply and LV Power Equipment	Trams Eq	5A	15,054.53	3.1%	13-May-10	17-Jun-10	36	31	32
					A5090	Install Telecon Equipment	Trams Eq	5A	15,054.53	3.1%	18-Jun-10	15-Jul-10	28	32	33
					A5100	Install Station Control Equipment + AFC Equipment	Trams Eq	5A	15,054.53	3.1%	18-Jun-10	22-Jul-10	35	32	34
					A6270	Installation of SIG-interlocking cubicle	Trams Eq	5A	15,054.53	3.1%	27-May-10	16-Jun-10	21	32	32
					A6280	Commissioning of SIG -interlocking cubicle	Trams Eq	5A	-	0.0%	28-Oct-10	03-Nov-10	7	37	37
					A5079	Access for E&M Tram Stop installation (05A Murrayfield)	Trams Eq	5A	-	0.0%	13-May-10	13-May-10	1	31	31
					A5078	Access for visual inspection for E&M Tram Stop installation (05A Murrayfield)	Trams Eq	5A	-	0.0%	13-Apr-10	13-Apr-10	1	30	30
					Snagging	Snagging	Trams Eq	5A	760.33	0.2%				34	35
		05A3 Murrayfield (exc.) to Balgreen Road (inc.)							11,883,623.73						

Year	2011													2011
Period	40	41	42	43	44	45	46	47	48	49	50	51	52	Subtotal
Period End	29-Jan-2011	26-Feb-2011	26-Mar-2011	23-Apr-2011	21-May-2011	18-Jun-2011	16-Jul-2011	13-Aug-2011	10-Sep-2011	08-Oct-2011	05-Nov-2011	03-Dec-2011	31-Dec-2011	GBP

USB00000073_0054

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Morrill Services Group | BILFINGER BERGER | SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name				Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008 Subtotal
																	Period	1	2	3	4	5	6	7	8	9	10	11	12	13	GBP
																	Period End	02-Feb-2008	01-Mar-2008	29-Mar-2008	26-Apr-2008	24-May-2008	21-Jun-2008	19-Jul-2008	16-Aug-2008	13-Sep-2008	11-Oct-2008	08-Nov-2008	06-Dec-2008	03-Jan-2009	
						Roseburn Street Viaduct (S21A)																										
						Bridge				**1,748,455.00**																						
					10751	Remove Scotrail Oil Tanks	Structures	5A		-	0.0%	29-Aug-08	29-Aug-08	1	9	9		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					109	Bankseat at Grid line A	Structures	5A		127,966.53	7.3%	20-Jan-09	21-Apr-09	92	14	17		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					172	Pier B	Structures	5A		127,966.53	7.3%	20-Jan-09	20-May-09	121	14	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					207	Pier C	Structures	5A		127,966.53	7.3%	31-Mar-09	04-Jun-09	66	17	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					398	Pier D	Structures	5A		127,966.53	7.3%	15-Apr-09	18-Jun-09	65	17	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					408	Pier E	Structures	5A		127,966.53	7.3%	29-Apr-09	02-Jul-09	65	18	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					420	Bankseat at Gridline F	Structures	5A		127,966.53	7.3%	29-May-09	02-Jul-09	35	19	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					430	Structural steelwok	Structures	5A		341,244.09	19.5%	12-Jun-09	23-Jul-09	42	19	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					729	Deck Concrete	Structures	5A		426,555.11	24.4%	24-Jul-09	23-Oct-09	92	21	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					739	Finishes	Structures	5A		170,622.05	9.8%	26-Oct-09	20-Apr-10	177	24	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A		17,234.55	1.0%				30	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A		25,000.00	1.4%				30	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Murrayfield Retaining Walls (S21B)																										
						Retaining Wall				**1,496,667.00**								-	-	-	-	-	-	218,543	291,390	291,390	-	-	364,238	1,165,560
					110	Site Clearance	Structures	5A		72,847.52	4.9%	25-Jun-08	22-Jul-08	28	7	8		-	-	-	-	-	-	72,848	-	-	-	-	-	-	72,848
					197	Demolition	Structures	5A		72,847.52	4.9%	09-Jul-08	22-Jul-08	14	7	8		-	-	-	-	-	-	72,848	-	-	-	-	-	-	72,848
					378	Foundations	Structures	5A		72,847.52	4.9%	23-Jul-08	13-Aug-08	22	8	8		-	-	-	-	-	-	72,848	-	-	-	-	-	-	72,848
					388	Reinforced Earth Wall - One Third	Structures	5A		291,390.07	19.5%	07-Aug-08	31-Aug-08	25	8	9		-	-	-	-	-	-	-	291,390	-	-	-	-	-	291,390
					388	Reinforced Earth Wall - One Third	Structures	5A		291,390.07	19.5%	01-Sep-08	30-Sep-08	30	9	10		-	-	-	-	-	-	-	-	291,390	-	-	-	-	291,390
					388	Reinforced Earth Wall - One Third	Structures	5A		364,237.58	24.3%	01-Oct-08	18-Dec-08	80	10	13		-	-	-	-	-	-	-	-	-	-	-	-	364,238	364,238
					400	Coping	Structures	5A		72,847.52	4.9%	19-Dec-08	22-Jan-09	35	13	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					410	Handrail	Structures	5A		218,542.55	14.6%	23-Jan-09	05-Feb-09	14	14	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10760	Murrayfield Stadium Accomodation Works	Structures	5A		-	0.0%	02-Jun-08	25-Aug-08	85	6	9		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A		14,716.67	1.0%				15	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A		25,000.00	1.7%				15	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Murrayfield Stadium Underpass (S21C)																										
						Underpass				**214,675.00**								-	-	-	-	-	9,389	18,778	18,778	18,778	37,556	65,722	18,778	26,897	214,675
					112	Site Clearance	Structures	5A		9,388.91	4.4%	09-Jun-08	20-Jun-08	12	6	6		-	-	-	-	-	9,389	-	-	-	-	-	-	-	9,389
					187	Temporary Works - Demolition	Structures	5A		18,777.83	8.7%	23-Jun-08	18-Jul-08	26	7	7		-	-	-	-	-	-	18,778	-	-	-	-	-	-	18,778
					358	Earthworks	Structures	5A		18,777.83	8.7%	21-Jul-08	01-Aug-08	12	8	8		-	-	-	-	-	-	-	18,778	-	-	-	-	-	18,778
					368	Base	Structures	5A		18,777.83	8.7%	05-Aug-08	18-Aug-08	14	8	9		-	-	-	-	-	-	-	-	18,778	-	-	-	-	18,778
					380	Walls	Structures	5A		37,555.65	17.5%	19-Aug-08	15-Sep-08	28	9	10		-	-	-	-	-	-	-	-	-	37,556	-	-	-	37,556
					390	Roof	Structures	5A		46,944.56	21.9%	16-Sep-08	13-Oct-08	28	10	11		-	-	-	-	-	-	-	-	-	-	46,945	-	-	46,945
					709	Parapet Walls	Structures	5A		18,777.83	8.7%	07-Oct-08	27-Oct-08	21	10	11		-	-	-	-	-	-	-	-	-	-	18,778	-	-	18,778
					719	Finishes	Structures	5A		18,777.83	8.7%	28-Oct-08	10-Nov-08	14	11	12		-	-	-	-	-	-	-	-	-	-	-	18,778	-	18,778
					Snagging	Snagging	Structures	5A		1,896.75	0.9%				12	13		-	-	-	-	-	-	-	-	-	-	-	-	1,897	1,897
					3rd Party	Third Party Sign-off	Structures	5A		25,000.00	11.6%				12	13		-	-	-	-	-	-	-	-	-	-	-	-	25,000	25,000
					Crit. Milestone	Completion of Murrayfield Stadium Underpass (S21C) (6)	Structures	5A		-	0.0%		10-Nov-08					-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Murrayfield Retaining Walls (S21D)																										
						Retaining Wall				**736,943.00**								-	-	-	-	-	-	-	-	-	-	-	70,482	140,965	211,447
					10760	Murrayfield Stadium Accomodation Works (dummy)	Structures	5A		-	0.0%	02-Jun-08	25-Aug-08	85	6	9		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10760	Completion of SRU Murrayfield Accommodation works	Structures	5A		-	0.0%	02-Jun-08	25-Aug-08	85	6	9		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of SRU Murrayfield Accommodation works (9)	Structures	5A		-	0.0%		25-Aug-08					-	-	-	-	-	-	-	-	-	-	-	-	-	-
					111	Site Clearance	Structures	5A		35,241.18	4.8%	28-Oct-08	10-Nov-08	14	11	12		-	-	-	-	-	-	-	-	-	-	-	35,241	-	35,241
					438	Foundations	Structures	5A		35,241.18	4.8%	11-Nov-08	02-Dec-08	22	12	12		-	-	-	-	-	-	-	-	-	-	-	35,241	-	35,241
					448	Reinforced Earth Wall	Structures	5A		140,964.71	19.1%	25-Nov-08	31-Dec-08	37	12	13		-	-	-	-	-	-	-	-	-	-	-	-	140,965	140,965
					448	Reinforced Earth Wall	Structures	5A		140,964.71	19.1%	01-Jan-09	28-Feb-09	59	13	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					448	Reinforced Earth Wall	Structures	5A		140,964.71	19.1%	01-Mar-09	07-May-09	69	16	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					450	Coping	Structures	5A		-	0.0%	08-May-09	29-May-09	22	18	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					460	Handrail	Structures	5A		211,447.07	28.7%	01-Jun-09	12-Jun-09	12	19	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A		7,119.43	1.0%				19	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A		25,000.00	3.4%				19	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Water of Leith Bridge (S21E)																										
						Bridge				**1,220,469.00**								-	-	-	-	-	-	-	-	-	-	-	-	-	-
					113	Leaf Pier - Construct Cofferdam	Structures	5A		59,175.72	4.8%	08-May-09	04-Sep-09	120	18	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					113	Leaf Pier - Install Piles/Excavation	Structures	5A		236,702.86	19.4%	08-May-09	04-Sep-09	120	18	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					113	Leaf Pier - Trim Piles	Structures	5A		59,175.72	4.8%	08-May-09	04-Sep-09	120	18	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					113	Leaf Pier - Extract Cofferdam	Structures	5A		59,175.72	4.8%	08-May-09	04-Sep-09	120	18	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					639	End Supports	Structures	5A		118,351.43	9.7%	07-Sep-09	30-Sep-09	24	22	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					649	Superstructure - Steel Beams	Structures	5A		355,054.29	29.1%	01-Oct-09	06-Jan-10	98	23	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					649	Superstructure - Concrete Deck	Structures	5A		177,527.15	14.5%	01-Oct-09	06-Jan-10	98	23	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					649	Superstructure - Completion	Structures	5A		118,351.43	9.7%	01-Oct-09	06-Jan-10	98	23	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A		11,954.69	1.0%				27	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A		25,000.00	2.0%				27	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Baird Drive Retaining Walls (W8)																										
						Retaining Wall				**1,061,745.00**								-	-	-	-	-	-	-	-	51,319	153,957	-	718,464	51,319	975,059
					114	Site Clearance	Structures	5A		51,318.88	4.8%	22-Aug-08	04-Sep-08	14	9	9		-	-	-	-	-	-	-	-	51,319	-	-	-	-	51,319
					458	Foundations	Structures	5A		153,956.63	14.5%	05-Sep-08	25-Sep-08	21	9	10		-	-	-	-	-	-	-	-	-	153,957	-	-	-	153,957
					468	Reinforced Earth Wall - 1 Third	Structures	5A		205,275.51	19.3%	19-Sep-08	20-Nov-08	63	10	12		-	-	-	-	-	-	-	-	-	-	-	205,276	-	205,276
					468	Reinforced Earth Wall	Structures	5A		513,188.78	48.3%	19-Sep-08	20-Nov-08	63	10	12		-	-	-	-	-	-	-	-	-	-	-	513,189	-	513,189
					470	Coping	Structures	5A		51,318.88	4.8%	21-Nov-08	12-Dec-08	22	12	13		-	-	-	-	-	-	-	-	-	-	-	-	51,319	51,319
					480	Handrail	Structures	5A		51,318.88	4.8%	15-Dec-08	09-Jan-09	26	13	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A		10,367.45	1.0%				14	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Baird Drive Retained Embankment - (W8) (5)	Structures	5A		-	0.0%		09-Jan-09					-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A		25,000.00	2.4%				14	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Balgreen Road Bridge (S22) and Retaining Walls (W9)																										
						Bridge & Retaining Wall				**1,995,003.00**								-	-	-	-	-	-	-	-	-	-	-	-	-	-
					115	Balgreen Road Bridge (S22) - Dummy Activity	Structures	5A		420,038.19	21.1%	25-Feb-09	12-Jan-10	322	15	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					115	Balgreen Road Bridge (S22) - Dummy Activity	Structures	5A		420,038.19	21.1%	25-Feb-09	12-Jan-10	322	15	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					115	Balgreen Road Bridge (S22) - Dummy Activity	Structures	5A		420,038.19	21.1%	25-Feb-09	12-Jan-10	322	15	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					115	Balgreen Road Bridge (S22) - Dummy Activity	Structures	5A		420,038.19	21.1%	25-Feb-09	12-Jan-10	322	15	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					115	Balgreen Road Reatining Wall (S22) - Dummy Activity	Structures	5A		245,400.21	12.3%	25-Feb-09	12-Jan-10	322	15	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A		19,450.03	1.0%				27	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A		25,000.00	1.3%				27	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A		25,000.00	1.3%				27	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Balgreen Rd Retaining wall (W9) (7)	Structures	5A		-	0.0%		12-Jan-10					-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Balgreen Road Bridge (S22) (8)	Structures	5A		-	0.0%		12-Jan-10					-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Murrayfield to Balgreen Road Trackwork (1006m)																										
						Trackwork				**2,650,456.29**								-	-	-	-	-	-	-	-	-	-	-	-	-	-
					530	Tracklaying	Track	5A		1,616,278.62	61.0%	04-Aug-10	09-Sep-10	37	34	35		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					243	CBM - Ducts	Track	5A		230,896.95	8.7%	02-Jun-10	29-Jun-10	28	32	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					989	Track Finishes	Track	5A		-	0.0%	10-Sep-10	16-Sep-10	7	35	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					999	Fencing	Track	5A		230,896.95	8.7%	17-Sep-10	13-Oct-10	27	36	37		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1009	Bulk Excavation - Sub Base	Track	5A		230,896.95	8.7%	07-Apr-10	30-Apr-10	24	30	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1019	OLE Foundations - Drainage	Track - BB	5A		76,423.65	2.9%	04-May-10	01-Jun-10	29	31	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5A		24,094.88	0.9%				35	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Track	5A		25,000.00	0.9%				35	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	BoQ Highway works	Track	5A		213,808.62	8.1%				35	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5A		2,159.68	0.1%				35	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Section 5A Roseburn Junction to Balgreen Road (3) (29)	Track	5A		-	0.0%		13-Oct-10					-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Balgreen Road Tram Stop																										
						Tramstop				**308,546.57**								-	-	-	-	-	-	-	-	-	-	-	-	-	-
					117	Civil Engineering and Builders Work	Tramstops	5A		77,039.41	25.0%	16-Feb-09	31-Mar-09	44	15	17		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					117	Civil Engineering and Builders Work	Tramstops	5A		77,039.41	25.0%	01-Apr-09	19-May-09	50	17	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5A		1,556.35	0.5%				18	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2300	Deliver and Install Shelter	Tramstops	5A		51,359.61	16.6%	03-Jul-09	17-Jul-09	15	20	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5A		518.78	0.2%				20	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Tramstops	5A		25,000.00	8.1%				23	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					328	Order REC Supply	Trams Eq	5A		-	0.0%	21-May-09	21-May-09	1	18	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5150	Package Test Tramstop	Trams Eq	5A		18,818.17	6.1%	28-Sep-09	05-Oct-09	8	23	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5120	Install LV Power Supply and LV Power Equipment	Trams Eq	5A		18,818.17	6.1%	17-Jul-09	24-Aug-09	39	20	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5130	Install Telecon Equipment	Trams Eq	5A		18,818.17	6.1%	24-Aug-09	21-Sep-09	29	22	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5140	Install Station Control Equipment + AFC Equipment	Trams Eq	5A		18,818.17	6.1%	24-Aug-09	28-Sep-09	36	22	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5119	Access for E&M Tram Stop installation (05A Balgreen Road)	Trams Eq	5A		-	0.0%	17-Jul-09	17-Jul-09	1	20	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5118	Access for visual inspection for E&M Tram Stop installation (05A Balgreen Road)	Trams Eq	5A		-	0.0%	17-Jun-09	17-Jun-09	1	19	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5A		760.33	0.2%				23	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Jenners Depository Substation																										
						Substation				**450,663.87**								-	-	-	-	-	-	-	-	-	-	-	-	-	-
					296	Completion of envelope	Subst - BB	5A		80,965.67	18.0%	01-Apr-09	19-May-09	50	17	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					296	Civil Engineering and Building Works	Subst - BB	5A		80,965.67	18.0%	16-Feb-09	31-Mar-09	44	15	17		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	5A		1,635.67	0.4%				18	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					286	Order REC supply from Scottish Power	Subst - S	5A		-	0.0%	26-Jan-09	26-Jan-09	1	14	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0055

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Extract 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
						Roseburn Street Viaduct (S21A)																							
						Bridge			**1,748,455.00**							-	-	-	**127,967**	**127,967**	**255,933**	**255,933**	**341,244**	-	-	**426,555**	-	-	**1,535,598**
					10751	Remove Scotrail Oil Tanks	Structures	5A	-	0.0%	29-Aug-08	29-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					109	Bankseat at Grid line A	Structures	5A	127,966.53	7.3%	20-Jan-09	21-Apr-09	92	14	17	-	-	-	127,967	-	-	-	-	-	-	-	-	127,967
					172	Pier B	Structures	5A	127,966.53	7.3%	20-Jan-09	20-May-09	121	14	18	-	-	-	-	127,967	-	-	-	-	-	-	-	-	127,967
					207	Pier C	Structures	5A	127,966.53	7.3%	31-Mar-09	04-Jun-09	66	17	19	-	-	-	-	-	127,967	-	-	-	-	-	-	-	127,967
					398	Pier D	Structures	5A	127,966.53	7.3%	15-Apr-09	18-Jun-09	65	17	19	-	-	-	-	-	127,967	-	-	-	-	-	-	-	127,967
					408	Pier E	Structures	5A	127,966.53	7.3%	29-Apr-09	02-Jul-09	65	18	20	-	-	-	-	-	-	127,967	-	-	-	-	-	-	127,967
					420	Bankseat at Gridline F	Structures	5A	127,966.53	7.3%	29-May-09	02-Jul-09	35	19	20	-	-	-	-	-	-	127,967	-	-	-	-	-	-	127,967
					430	Structural steelwok	Structures	5A	341,244.09	19.5%	12-Jun-09	23-Jul-09	42	19	21	-	-	-	-	-	-	-	341,244	-	-	-	-	-	341,244
					729	Deck Concrete	Structures	5A	426,555.11	24.4%	24-Jul-09	23-Oct-09	92	21	24	-	-	-	-	-	-	-	-	-	-	426,555	-	-	426,555
					739	Finishes	Structures	5A	170,622.05	9.8%	26-Oct-09	20-Apr-10	177	24	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	17,234.55	1.0%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	1.4%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Murrayfield Retaining Walls (S21B)																							
						Retaining Wall			**1,495,667.00**							**72,848**	**218,543**	**39,717**	-	-	-	-	-	-	-	-	-	-	**331,107**
					110	Site Clearance	Structures	5A	72,847.52	4.9%	25-Jun-08	22-Jul-08	28	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					197	Demolition	Structures	5A	72,847.52	4.9%	09-Jul-08	22-Jul-08	14	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					378	Foundations	Structures	5A	72,847.52	4.9%	23-Jul-08	13-Aug-08	22	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					388	Reinforced Earth Wall - One Third	Structures	5A	291,390.07	19.5%	07-Aug-08	31-Aug-08	25	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					388	Reinforced Earth Wall - One Third	Structures	5A	291,390.07	19.5%	01-Sep-08	30-Sep-08	30	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					388	Reinforced Earth Wall - One Third	Structures	5A	364,237.58	24.3%	01-Oct-08	18-Dec-08	80	10	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					400	Coping	Structures	5A	72,847.52	4.9%	19-Dec-08	22-Jan-09	35	13	14	72,848	-	-	-	-	-	-	-	-	-	-	-	-	-	72,848
					410	Handrail	Structures	5A	218,542.55	14.6%	23-Jan-09	05-Feb-09	14	14	15	-	218,543	-	-	-	-	-	-	-	-	-	-	-	-	218,543
					10760	Murrayfield Stadium Accomodation Works	Structures	5A	-	0.0%	02-Jun-08	25-Aug-08	85	6	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	14,716.67	1.0%				15	16	-	-	14,717	-	-	-	-	-	-	-	-	-	-	14,717
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	1.7%				15	16	-	-	25,000	-	-	-	-	-	-	-	-	-	-	25,000
						Murrayfield Stadium Underpass (S21C)																							
						Underpass			**214,675.00**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					112	Site Clearance	Structures	5A	9,388.91	4.4%	09-Jun-08	20-Jun-08	12	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					187	Temporary Works - Demolition	Structures	5A	18,777.83	8.7%	23-Jun-08	18-Jul-08	26	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					358	Earthworks	Structures	5A	18,777.83	8.7%	21-Jul-08	01-Aug-08	12	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					368	Base	Structures	5A	18,777.83	8.7%	05-Aug-08	18-Aug-08	14	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					380	Walls	Structures	5A	37,555.65	17.5%	19-Aug-08	15-Sep-08	28	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					390	Roof	Structures	5A	46,944.56	21.9%	16-Sep-08	13-Oct-08	28	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					709	Parapet Walls	Structures	5A	18,777.83	8.7%	07-Oct-08	27-Oct-08	21	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					719	Finishes	Structures	5A	18,777.83	8.7%	28-Oct-08	10-Nov-08	14	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	1,896.75	0.9%				12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	11.6%				12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Murrayfield Stadium Underpass (S21C) (6)	Structures	5A	-	0.0%		10-Nov-08				-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Murrayfield Retaining Walls (S21D)																							
						Retaining Wall			**736,943.00**							-	-	**140,965**	-	**140,965**	**211,447**	**32,119**	-	-	-	-	-	-	**525,496**
					10760	Murrayfield Stadium Accomodation Works (dummy)	Structures	5A	-	0.0%	02-Jun-08	25-Aug-08	85	6	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10760	Completion of SRU Murrayfield Accommodation works	Structures	5A	-	0.0%	02-Jun-08	25-Aug-08	85	6	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of SRU Murrayfield Accommodation works (9)	Structures	5A	-	0.0%		25-Aug-08				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					111	Site Clearance	Structures	5A	35,241.18	4.8%	28-Oct-08	10-Nov-08	14	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					438	Foundations	Structures	5A	35,241.18	4.8%	11-Nov-08	02-Dec-08	22	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					448	Reinforced Earth Wall	Structures	5A	140,964.71	19.1%	25-Nov-08	31-Dec-08	37	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					448	Reinforced Earth Wall	Structures	5A	140,964.71	19.1%	01-Jan-09	28-Feb-09	59	13	16	-	-	140,965	-	-	-	-	-	-	-	-	-	-	-	140,965
					448	Reinforced Earth Wall	Structures	5A	140,964.71	19.1%	01-Mar-09	07-May-09	69	16	18	-	-	-	-	140,965	-	-	-	-	-	-	-	-	140,965
					450	Coping	Structures	5A	-	0.0%	08-May-09	29-May-09	22	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					460	Handrail	Structures	5A	211,447.07	28.7%	01-Jun-09	12-Jun-09	12	19	19	-	-	-	-	-	211,447	-	-	-	-	-	-	-	-	211,447
					Snagging	Snagging	Structures	5A	7,119.43	1.0%				19	20	-	-	-	-	-	-	7,119	-	-	-	-	-	-	7,119
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	3.4%				19	20	-	-	-	-	-	-	25,000	-	-	-	-	-	-	25,000
						Water of Leith Bridge (S21E)																							
						Bridge			**1,220,469.00**							-	-	-	-	-	-	-	-	**414,230**	**118,351**	-	-	**532,581**
					113	Leaf Pier - Construct Cofferdam	Structures	5A	59,175.72	4.8%	08-May-09	04-Sep-09	120	18	22	-	-	-	-	-	-	-	-	59,176	-	-	-	-	59,176
					113	Leaf Pier - Install Piles/Excavation	Structures	5A	236,702.86	19.4%	08-May-09	04-Sep-09	120	18	22	-	-	-	-	-	-	-	-	236,703	-	-	-	-	236,703
					113	Leaf Pier - Trim Piles	Structures	5A	59,175.72	4.8%	08-May-09	04-Sep-09	120	18	22	-	-	-	-	-	-	-	-	59,176	-	-	-	-	59,176
					113	Leaf Pier - Extract Cofferdam	Structures	5A	59,175.72	4.8%	08-May-09	04-Sep-09	120	18	22	-	-	-	-	-	-	-	-	59,176	-	-	-	-	59,176
					639	End Supports	Structures	5A	118,351.43	9.7%	07-Sep-09	30-Sep-09	24	22	23	-	-	-	-	-	-	-	-	-	118,351	-	-	-	118,351
					649	Superstructure - Steel Beams	Structures	5A	355,054.29	29.1%	01-Oct-09	06-Jan-10	98	23	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					649	Superstructure - Concrete Deck	Structures	5A	177,527.15	14.5%	01-Oct-09	06-Jan-10	98	23	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					649	Superstructure - Completion	Structures	5A	118,351.43	9.7%	01-Oct-09	06-Jan-10	98	23	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	11,954.69	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	2.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Baird Drive Retaining Walls (W8)																							
						Retaining Wall			**1,061,745.00**							**51,319**	**35,367**	-	-	-	-	-	-	-	-	-	-	-	**86,686**
					114	Site Clearance	Structures	5A	51,318.88	4.8%	22-Aug-08	04-Sep-08	14	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					458	Foundations	Structures	5A	153,956.63	14.5%	05-Sep-08	25-Sep-08	21	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					468	Reinforced Earth Wall - 1 Third	Structures	5A	205,275.51	19.3%	19-Sep-08	20-Nov-08	63	10	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					468	Reinforced Earth Wall	Structures	5A	513,188.78	48.3%	19-Sep-08	20-Nov-08	63	10	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					470	Coping	Structures	5A	51,318.88	4.8%	21-Nov-08	12-Dec-08	22	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					480	Handrail	Structures	5A	51,318.88	4.8%	15-Dec-08	09-Jan-09	26	13	14	51,319	-	-	-	-	-	-	-	-	-	-	-	-	-	51,319
					Snagging	Snagging	Structures	5A	10,367.45	1.0%				14	15	-	10,367	-	-	-	-	-	-	-	-	-	-	-	10,367
					Crit. Milestone	Completion of Baird Drive Retained Embankment - (W8) (5)	Structures	5A	-	0.0%		09-Jan-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	2.4%				14	15	-	25,000	-	-	-	-	-	-	-	-	-	-	-	25,000
						Balgreen Road Bridge (S22) and Retaining Walls (W9)																							
						Bridge & Retaining Wall			**1,995,003.00**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					116	Balgreen Road Bridge (S22) - Dummy Activity	Structures	5A	420,038.19	21.1%	25-Feb-09	12-Jan-10	322	15	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					115	Balgreen Road Bridge (S22) - Dummy Activity	Structures	5A	420,038.19	21.1%	25-Feb-09	12-Jan-10	322	15	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					115	Balgreen Road Bridge (S22) - Dummy Activity	Structures	5A	420,038.19	21.1%	25-Feb-09	12-Jan-10	322	15	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					115	Balgreen Road Bridge (S22) - Dummy Activity	Structures	5A	420,038.19	21.1%	25-Feb-09	12-Jan-10	322	15	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					115	Balgreen Road Reatining Wall (S22) - Dummy Activity	Structures	5A	245,400.21	12.3%	25-Feb-09	12-Jan-10	322	15	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	19,450.03	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	1.3%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	1.3%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Balgreen Rd Retaining wall (W9) (7)	Structures	5A	-	0.0%		12-Jan-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Balgreen Road Bridge (S22) (8)	Structures	5A	-	0.0%		12-Jan-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Murrayfield to Balgreen Road Trackwork (1006m)																							
						Trackwork			**2,650,456.29**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					530	Tracklaying	Track	5A	1,616,278.62	61.0%	04-Aug-10	09-Sep-10	37	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					243	CBM - Ducts	Track	5A	230,896.95	8.7%	02-Jun-10	29-Jun-10	28	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					989	Track Finishes	Track	5A	-	0.0%	10-Sep-10	16-Sep-10	7	35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					999	Fencing	Track	5A	230,896.95	8.7%	17-Sep-10	13-Oct-10	27	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1009	Bulk Excavation - Sub Base	Track	5A	230,896.95	8.7%	07-Apr-10	30-Apr-10	24	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1019	OLE Foundations - Drainage	Track - BB	5A	76,423.65	2.9%	04-May-10	01-Jun-10	29	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5A	24,094.88	0.9%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Track	5A	25,000.00	0.9%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	BoQ Highway works	Track	5A	213,808.62	8.1%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5A	2,159.68	0.1%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Section 5A Roseburn Junction to Balgreen Road (3) (29)	Track	5A	-	0.0%		13-Oct-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Balgreen Road Tram Stop																							
						Tramstop			**308,546.57**							-	-	-	**77,039**	**77,039**	**1,556**	**51,360**	**519**	**18,818**	**56,455**	**25,760**	-	-	**308,547**
					117	Civil Engineering and Builders Work	Tramstops	5A	77,039.41	25.0%	16-Feb-09	31-Mar-09	44	15	17	-	-	-	77,039	-	-	-	-	-	-	-	-	-	-	77,039
					117	Civil Engineering and Builders Work	Tramstops	5A	77,039.41	25.0%	01-Apr-09	19-May-09	50	17	18	-	-	-	-	77,039	-	-	-	-	-	-	-	-	-	77,039
					Snagging	Snagging	Tramstops	5A	1,556.35	0.5%				18	19	-	-	-	-	-	1,556	-	-	-	-	-	-	-	-	1,556
					A2300	Deliver and Install Shelter	Tramstops	5A	51,359.61	16.6%	03-Jul-09	17-Jul-09	15	20	20	-	-	-	-	-	-	51,360	-	-	-	-	-	-	-	51,360
					Snagging	Snagging	Tramstops	5A	518.78	0.2%				20	21	-	-	-	-	-	-	-	519	-	-	-	-	-	-	519
					3rd Party	Third Party Sign-off	Trams Eq	5A	25,000.00	8.1%				23	24	-	-	-	-	-	-	-	-	-	-	25,000	-	-	25,000
					328	Order REC Supply	Trams Eq	5A	-	0.0%	21-May-09	21-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5150	Package Test Tramstop	Trams Eq	5A	18,818.17	6.1%	28-Sep-09	05-Oct-09	8	23	23	-	-	-	-	-	-	-	-	18,818	-	-	-	-	18,818
					A5120	Install LV Power Supply and LV Power Equipment	Trams Eq	5A	18,818.17	6.1%	17-Jul-09	24-Aug-09	39	20	22	-	-	-	-	-	-	-	18,818	-	-	-	-	-	-	18,818
					A5130	Install Telecon Equipment	Trams Eq	5A	18,818.17	6.1%	24-Aug-09	21-Sep-09	29	22	23	-	-	-	-	-	-	-	-	18,818	-	-	-	-	-	18,818
					A5140	Install Station Control Equipment + AFC Equipment	Trams Eq	5A	18,818.17	6.1%	24-Aug-09	28-Sep-09	36	22	23	-	-	-	-	-	-	-	-	18,818	-	-	-	-	-	18,818
					A5119	Access for E&M Tram Stop installation (05A Balgreen Road)	Trams Eq	5A	-	0.0%	17-Jul-09	17-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5118	Access for visual inspection for E&M Tram Stop installation (05A Balgreen Road)	Trams Eq	5A	-	0.0%	17-Jun-09	17-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5A	760.33	0.2%				23	24	-	-	-	-	-	-	-	-	-	-	760	-	-	760
						Jenners Depository Substation																							
						Substation			**450,663.87**							-	-	-	**80,966**	**80,966**	**1,636**	-	-	-	-	-	-	-	**163,567**
					296	Completion of envelope	Subst - BB	5A	80,965.67	18.0%	01-Apr-09	19-May-09	50	17	18	-	-	-	-	80,966	-	-	-	-	-	-	-	-	-	80,966
					296	Civil Engineering and Building Works	Subst - BB	5A	80,965.67	18.0%	16-Feb-09	31-Mar-09	44	15	17	-	-	-	80,966	-	-	-	-	-	-	-	-	-	-	80,966
					Snagging	Snagging	Subst - BB	5A	1,635.67	0.4%				18	19	-	-	-	-	-	1,636	-	-	-	-	-	-	-	-	1,636
					286	Order REC supply from Scottish Power	Subst - S	5A	-	0.0%	26-Jan-09	26-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0056

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER | SIEL

Year														
Period														
Period End														

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
						Roseburn Street Viaduct (S21A)																								
						Bridge			**1,748,455.00**							-	-	-	**170,622**	**42,235**	-	-	-	-	-	-	-	-	**212,857**
					10751	Remove Scotrail Oil Tanks	Structures	5A	-	0.0%	29-Aug-08	29-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					109	Bankseat at Grid line A	Structures	5A	127,966.53	7.3%	20-Jan-09	21-Apr-09	92	14	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					172	Pier B	Structures	5A	127,966.53	7.3%	20-Jan-09	20-May-09	121	14	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					207	Pier C	Structures	5A	127,966.53	7.3%	31-Mar-09	04-Jun-09	66	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					398	Pier D	Structures	5A	127,966.53	7.3%	15-Apr-09	18-Jun-09	65	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					408	Pier E	Structures	5A	127,966.53	7.3%	29-Apr-09	02-Jul-09	65	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					420	Bankseat at Gridline F	Structures	5A	127,966.53	7.3%	29-May-09	02-Jul-09	35	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					430	Structural steelwok	Structures	5A	341,244.09	19.5%	12-Jun-09	23-Jul-09	42	19	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					729	Deck Concrete	Structures	5A	426,555.11	24.4%	24-Jul-09	23-Oct-09	92	21	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					739	Finishes	Structures	5A	170,622.05	9.8%	26-Oct-09	20-Apr-10	177	24	30	-	-	-	170,622	-	-	-	-	-	-	-	-	-	170,622
					Snagging	Snagging	Structures	5A	17,234.55	1.0%				30	31	-	-	-	-	17,235	-	-	-	-	-	-	-	-	17,235
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	1.4%				30	31	-	-	-	-	25,000	-	-	-	-	-	-	-	-	25,000
						Murrayfield Retaining Walls (S21B)																								
						Retaining Wall			**1,496,667.00**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					110	Site Clearance	Structures	5A	72,847.52	4.9%	25-Jun-08	22-Jul-08	28	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					197	Demolition	Structures	5A	72,847.52	4.9%	09-Jul-08	22-Jul-08	14	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					378	Foundations	Structures	5A	72,847.52	4.9%	23-Jul-08	13-Aug-08	22	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					388	Reinforced Earth Wall - One Third	Structures	5A	291,390.07	19.5%	07-Aug-08	31-Aug-08	25	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					388	Reinforced Earth Wall - One Third	Structures	5A	291,390.07	19.5%	01-Sep-08	30-Sep-08	30	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					388	Reinforced Earth Wall - One Third	Structures	5A	364,237.58	24.3%	01-Oct-08	18-Dec-08	80	10	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					400	Coping	Structures	5A	72,847.52	4.9%	19-Dec-08	22-Jan-09	35	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					410	Handrail	Structures	5A	218,542.55	14.6%	23-Jan-09	05-Feb-09	14	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10760	Murrayfield Stadium Accomodation Works	Structures	5A	-	0.0%	02-Jun-08	25-Aug-08	85	6	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	14,716.67	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	1.7%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Murrayfield Stadium Underpass (S21C)																								
						Underpass			**214,675.00**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					112	Site Clearance	Structures	5A	9,388.91	4.4%	09-Jun-08	20-Jun-08	12	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					187	Temporary Works - Demolition	Structures	5A	18,777.83	8.7%	23-Jun-08	18-Jul-08	26	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					358	Earthworks	Structures	5A	18,777.83	8.7%	21-Jul-08	01-Aug-08	12	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					368	Base	Structures	5A	18,777.83	8.7%	05-Aug-08	18-Aug-08	14	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					380	Walls	Structures	5A	37,555.65	17.5%	19-Aug-08	15-Sep-08	28	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					390	Roof	Structures	5A	46,944.56	21.9%	16-Sep-08	13-Oct-08	28	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					709	Parapet Walls	Structures	5A	18,777.83	8.7%	07-Oct-08	27-Oct-08	21	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					719	Finishes	Structures	5A	18,777.83	8.7%	28-Oct-08	10-Nov-08	14	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	1,896.75	0.9%				12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	11.6%				12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Murrayfield Stadium Underpass (S21C) (6)	Structures	5A	-	0.0%		10-Nov-08																	
						Murrayfield Retaining Walls (S21D)																								
						Retaining Wall			**736,943.00**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10760	Murrayfield Stadium Accomodation Works (dummy)	Structures	5A	-	0.0%	02-Jun-08	25-Aug-08	85	6	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10760	Completion of SRU Murrayfield Accommodation works	Structures	5A	-	0.0%	02-Jun-08	25-Aug-08	85	6	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of SRU Murrayfield Accommodation works (9)	Structures	5A	-	0.0%		25-Aug-08				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					111	Site Clearance	Structures	5A	35,241.18	4.8%	28-Oct-08	10-Nov-08	14	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					438	Foundations	Structures	5A	35,241.18	4.8%	11-Nov-08	02-Dec-08	22	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					448	Reinforced Earth Wall	Structures	5A	140,964.71	19.1%	25-Nov-08	31-Dec-08	37	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					448	Reinforced Earth Wall	Structures	5A	140,964.71	19.1%	01-Jan-09	28-Feb-09	59	13	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					448	Reinforced Earth Wall	Structures	5A	140,964.71	19.1%	01-Mar-09	07-May-09	69	16	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					450	Coping	Structures	5A	-	0.0%	08-May-09	29-May-09	22	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					460	Handrail	Structures	5A	211,447.07	28.7%	01-Jun-09	12-Jun-09	12	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	7,119.43	1.0%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	3.4%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Water of Leith Bridge (S21E)																								
						Bridge			**1,220,469.00**							**650,933**	**36,955**	-	-	-	-	-	-	-	-	-	-	-	**687,888**
					113	Leaf Pier - Construct Cofferdam	Structures	5A	59,175.72	4.8%	08-May-09	04-Sep-09	120	18	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					113	Leaf Pier - Install Piles/Excavation	Structures	5A	236,702.86	19.4%	08-May-09	04-Sep-09	120	18	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					113	Leaf Pier - Trim Piles	Structures	5A	59,175.72	4.8%	08-May-09	04-Sep-09	120	18	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					113	Leaf Pier - Extract Cofferdam	Structures	5A	59,175.72	4.8%	08-May-09	04-Sep-09	120	18	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					639	End Supports	Structures	5A	118,351.43	9.7%	07-Sep-09	30-Sep-09	24	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					649	Superstructure - Steel Beams	Structures	5A	355,054.29	29.1%	01-Oct-09	06-Jan-10	98	23	27	355,054	-	-	-	-	-	-	-	-	-	-	-	-	355,054
					649	Superstructure - Concrete Deck	Structures	5A	177,527.15	14.5%	01-Oct-09	06-Jan-10	98	23	27	177,527	-	-	-	-	-	-	-	-	-	-	-	-	177,527
					649	Superstructure - Completion	Structures	5A	118,351.43	9.7%	01-Oct-09	06-Jan-10	98	23	27	118,351	-	-	-	-	-	-	-	-	-	-	-	-	118,351
					Snagging	Snagging	Structures	5A	11,954.69	1.0%				27	28	-	11,955	-	-	-	-	-	-	-	-	-	-	-	11,955
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	2.0%				27	28	-	25,000	-	-	-	-	-	-	-	-	-	-	-	25,000
						Baird Drive Retaining Walls (W8)																								
						Retaining Wall			**1,061,745.00**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1114	Site Clearance	Structures	5A	51,318.88	4.8%	22-Aug-08	04-Sep-08	14	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					458	Foundations	Structures	5A	153,956.63	14.5%	05-Sep-08	25-Sep-08	21	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					468	Reinforced Earth Wall - 1 Third	Structures	5A	205,275.51	19.3%	19-Sep-08	20-Nov-08	63	10	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					468	Reinforced Earth Wall	Structures	5A	513,188.78	48.3%	19-Sep-08	20-Nov-08	63	10	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					470	Coping	Structures	5A	51,318.88	4.8%	21-Nov-08	12-Dec-08	22	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					480	Handrail	Structures	5A	51,318.88	4.8%	15-Dec-08	09-Jan-09	26	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	10,367.45	1.0%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Baird Drive Retained Embankment - (W8) (5)	Structures	5A	-	0.0%		09-Jan-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	2.4%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Balgreen Road Bridge (S22) and Retaining Walls (W9)																								
						Bridge & Retaining Wall			**1,995,003.00**							**1,925,553**	**69,450**	-	-	-	-	-	-	-	-	-	-	-	**1,995,003**
					115	Balgreen Road Bridge (S22) - Dummy Activity	Structures	5A	420,038.19	21.1%	25-Feb-09	12-Jan-10	322	15	27	420,038	-	-	-	-	-	-	-	-	-	-	-	-	420,038
					115	Balgreen Road Bridge (S22) - Dummy Activity	Structures	5A	420,038.19	21.1%	25-Feb-09	12-Jan-10	322	15	27	420,038	-	-	-	-	-	-	-	-	-	-	-	-	420,038
					115	Balgreen Road Bridge (S22) - Dummy Activity	Structures	5A	420,038.19	21.1%	25-Feb-09	12-Jan-10	322	15	27	420,038	-	-	-	-	-	-	-	-	-	-	-	-	420,038
					115	Balgreen Road Reatining Wall (S22) - Dummy Activity	Structures	5A	245,400.21	12.3%	25-Feb-09	12-Jan-10	322	15	27	245,400	-	-	-	-	-	-	-	-	-	-	-	-	245,400
					Snagging	Snagging	Structures	5A	19,450.03	1.0%				27	28	-	19,450	-	-	-	-	-	-	-	-	-	-	-	19,450
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	1.3%				27	28	-	25,000	-	-	-	-	-	-	-	-	-	-	-	25,000
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	1.3%				27	28	-	25,000	-	-	-	-	-	-	-	-	-	-	-	25,000
					Crit. Milestone	Completion of Balgreen Rd Retaining wall (W9) (7)	Structures	5A	-	0.0%		12-Jan-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Balgreen Road Bridge (S22) (8)	Structures	5A	-	0.0%		12-Jan-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Murrayfield to Balgreen Road Trackwork (1006m)																								
						Trackwork			**2,650,456.23**							-	-	-	-	**230,897**	**76,424**	**230,897**	-	**1,616,279**	**265,063**	**230,897**	-	-	**2,650,456**
					530	Tracklaying	Track	5A	1,616,278.62	61.0%	04-Aug-10	09-Sep-10	37	34	35	-	-	-	-	-	-	-	-	1,616,279	-	-	-	-	1,616,279
					243	CBM - Ducts	Track	5A	230,896.95	8.7%	02-Jun-10	29-Jun-10	28	32	33	-	-	-	-	-	-	230,897	-	-	-	-	-	-	230,897
					989	Track Finishes	Track	5A	-	0.0%	10-Sep-10	16-Sep-10	7	35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					999	Fencing	Track	5A	230,896.95	8.7%	17-Sep-10	13-Oct-10	27	36	37	-	-	-	-	-	-	-	-	-	-	230,897	-	-	230,897
					1009	Bulk Excavation - Sub Base	Track	5A	230,896.95	8.7%	07-Apr-10	30-Apr-10	24	30	31	-	-	-	-	230,897	-	-	-	-	-	-	-	-	-	230,897
					1019	OLE Foundations - Drainage	Track - BB	5A	76,423.65	2.9%	04-May-10	01-Jun-10	29	31	32	-	-	-	-	-	76,424	-	-	-	-	-	-	-	-	76,424
					Snagging	Snagging	Track	5A	24,094.88	0.9%				35	36	-	-	-	-	-	-	-	-	-	24,095	-	-	-	24,095
					3rd Party	Third Party Sign-off	Track	5A	25,000.00	0.9%				35	36	-	-	-	-	-	-	-	-	-	25,000	-	-	-	25,000
					Highways	BoQ Highway works	Track	5A	213,808.62	8.1%				35	36	-	-	-	-	-	-	-	-	-	213,809	-	-	-	213,809
					Snagging	Snagging	Track	5A	2,159.68	0.1%				35	36	-	-	-	-	-	-	-	-	-	2,160	-	-	-	2,160
					Crit. Milestone	Commission Section 5A Roseburn Junction to Balgreen Road (3) (29)	Track	5A	-	0.0%		13-Oct-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Balgreen Road Tram Stop																								
						Tramstop			**308,546.57**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					117	Civil Engineering and Builders Work	Tramstops	5A	77,039.41	25.0%	16-Feb-09	31-Mar-09	44	15	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					117	Civil Engineering and Builders Work	Tramstops	5A	77,039.41	25.0%	01-Apr-09	19-May-09	50	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5A	1,556.35	0.5%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2300	Deliver and Install Shelter	Tramstops	5A	51,359.61	16.6%	03-Jul-09	17-Jul-09	15	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5A	518.78	0.2%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Trams Eq	5A	25,000.00	8.1%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					328	Order REC Supply	Trams Eq	5A	-	0.0%	21-May-09	21-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5150	Package Test Tramstop	Trams Eq	5A	18,818.17	6.1%	28-Sep-09	05-Oct-09	8	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5120	Install LV Power Supply and LV Power Equipment	Trams Eq	5A	18,818.17	6.1%	17-Jul-09	24-Aug-09	39	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5130	Install Telecon Equipment	Trams Eq	5A	18,818.17	6.1%	24-Aug-09	21-Sep-09	29	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5140	Install Station Control Equipment + AFC Equipment	Trams Eq	5A	18,818.17	6.1%	24-Aug-09	28-Sep-09	36	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5119	Access for E&M Tram Stop installation (05A Balgreen Road)	Trams Eq	5A	-	0.0%	17-Jul-09	17-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5118	Access for visual inspection for E&M Tram Stop installation (05A Balgreen Road)	Trams Eq	5A	-	0.0%	17-Jun-09	17-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5A	760.33	0.2%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Jenners Depository Substation																								
						Substation			**450,663.87**							-	-	-	-	-	**71,056**	-	**213,169**	**2,871**	-	-	-	-	**287,097**
					296	Completion of envelope	Subst - BB	5A	80,965.67	18.0%	01-Apr-09	19-May-09	50	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					296	Civil Engineering and Building Works	Subst - BB	5A	80,965.67	18.0%	16-Feb-09	31-Mar-09	44	15	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	5A	1,635.67	0.4%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					286	Order REC supply from Scottish Power	Subst - S	5A	-	0.0%	26-Jan-09	26-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0057

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Murrayfield Consortium — BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
						Rosebum Street Viaduct (S21A)																								
						Bridge			**1,748,455.00**																				
					10751	Remove Scotrail Oil Tanks	Structures	5A	-	0.0%	29-Aug-08	29-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					109	Bankseat at Grid line A	Structures	5A	127,966.53	7.3%	20-Jan-09	21-Apr-09	92	14	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					172	Pier B	Structures	5A	127,966.53	7.3%	20-Jan-09	20-May-09	121	14	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					207	Pier C	Structures	5A	127,966.53	7.3%	31-Mar-09	04-Jun-09	66	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					398	Pier D	Structures	5A	127,966.53	7.3%	15-Apr-09	18-Jun-09	65	17	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					408	Pier E	Structures	5A	127,966.53	7.3%	29-Apr-09	02-Jul-09	65	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					420	Bankseat at Gridline F	Structures	5A	127,966.53	7.3%	29-May-09	02-Jul-09	35	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					430	Structural steelwok	Structures	5A	341,244.09	19.5%	12-Jun-09	23-Jul-09	42	19	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					729	Deck Concrete	Structures	5A	426,555.11	24.4%	24-Jul-09	23-Oct-09	92	21	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					739	Finishes	Structures	5A	170,622.05	9.8%	26-Oct-09	20-Apr-10	177	24	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	17,234.55	1.0%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	1.4%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Murrayfield Retaining Walls (S21B)																								
						Retaining Wall			**1,496,667.00**																				
					110	Site Clearance	Structures	5A	72,847.52	4.9%	25-Jun-08	22-Jul-08	28	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					197	Demolition	Structures	5A	72,847.52	4.9%	09-Jul-08	22-Jul-08	14	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					378	Foundations	Structures	5A	72,847.52	4.9%	23-Jul-08	13-Aug-08	22	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					388	Reinforced Earth Wall - One Third	Structures	5A	291,390.07	19.5%	07-Aug-08	31-Aug-08	25	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					388	Reinforced Earth Wall - One Third	Structures	5A	291,390.07	19.5%	01-Sep-08	30-Sep-08	30	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					388	Reinforced Earth Wall - One Third	Structures	5A	364,237.58	24.3%	01-Oct-08	18-Dec-08	80	10	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					400	Coping	Structures	5A	72,847.52	4.9%	19-Dec-08	22-Jan-09	35	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					410	Handrail	Structures	5A	218,542.55	14.6%	23-Jan-09	05-Feb-09	14	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10760	Murrayfield Stadium Accomodation Works	Structures	5A	-	0.0%	02-Jun-08	25-Aug-08	85	6	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	14,716.67	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	1.7%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Murrayfield Stadium Underpass (S21C)																								
						Underpass			**214,675.00**																				
					112	Site Clearance	Structures	5A	9,388.91	4.4%	09-Jun-08	20-Jun-08	12	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					187	Temporary Works - Demolition	Structures	5A	18,777.83	8.7%	23-Jun-08	18-Jul-08	26	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					358	Earthworks	Structures	5A	18,777.83	8.7%	21-Jul-08	01-Aug-08	12	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					368	Base	Structures	5A	18,777.83	8.7%	05-Aug-08	18-Aug-08	14	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					380	Walls	Structures	5A	37,555.65	17.5%	19-Aug-08	15-Sep-08	28	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					390	Roof	Structures	5A	46,944.56	21.9%	16-Sep-08	13-Oct-08	28	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					709	Parapet Walls	Structures	5A	18,777.83	8.7%	07-Oct-08	27-Oct-08	21	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					719	Finishes	Structures	5A	18,777.83	8.7%	28-Oct-08	10-Nov-08	14	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	1,896.75	0.9%				12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	11.6%				12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Murrayfield Stadium Underpass (S21C) (6)	Structures	5A	-	0.0%		10-Nov-08																		
						Murrayfield Retaining Walls (S21D)																								
						Retaining Wall			**736,943.00**																				
					10760	Murrayfield Stadium Accomodation Works (dummy)	Structures	5A	-	0.0%	02-Jun-08	25-Aug-08	85	6	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10760	Completion of SRU Murrayfield Accommodation works	Structures	5A	-	0.0%	02-Jun-08	25-Aug-08	85	6	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of SRU Murrayfield Accommodation works (9)	Structures	5A	-	0.0%		25-Aug-08																		
					111	Site Clearance	Structures	5A	35,241.18	4.8%	28-Oct-08	10-Nov-08	14	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					438	Foundations	Structures	5A	35,241.18	4.8%	11-Nov-08	02-Dec-08	22	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					448	Reinforced Earth Wall	Structures	5A	140,964.71	19.1%	25-Nov-08	31-Dec-08	37	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					448	Reinforced Earth Wall	Structures	5A	140,964.71	19.1%	01-Jan-09	28-Feb-09	59	13	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					448	Reinforced Earth Wall	Structures	5A	140,964.71	19.1%	01-Mar-09	07-May-09	69	16	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					450	Coping	Structures	5A	-	0.0%	08-May-09	29-May-09	22	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					460	Handrail	Structures	5A	211,447.07	28.7%	01-Jun-09	12-Jun-09	12	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	7,119.43	1.0%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	3.4%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Water of Leith Bridge (S21E)																								
						Bridge			**1,220,469.00**																				
					113	Leaf Pier - Construct Cofferdam	Structures	5A	59,175.72	4.8%	08-May-09	04-Sep-09	120	18	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					113	Leaf Pier - Install Piles/Excavation	Structures	5A	236,702.86	19.4%	08-May-09	04-Sep-09	120	18	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					113	Leaf Pier - Trim Piles	Structures	5A	59,175.72	4.8%	08-May-09	04-Sep-09	120	18	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					113	Leaf Pier - Extract Cofferdam	Structures	5A	59,175.72	4.8%	08-May-09	04-Sep-09	120	18	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					639	End Supports	Structures	5A	118,351.43	9.7%	07-Sep-09	30-Sep-09	24	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					649	Superstructure - Steel Beams	Structures	5A	355,054.29	29.1%	01-Oct-09	06-Jan-10	98	23	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					649	Superstructure - Concrete Deck	Structures	5A	177,527.15	14.5%	01-Oct-09	06-Jan-10	98	23	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					649	Superstructure - Completion	Structures	5A	118,351.43	9.7%	01-Oct-09	06-Jan-10	98	23	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	11,954.69	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	2.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Baird Drive Retaining Walls (W8)																								
						Retaining Wall			**1,061,745.00**																				
					114	Site Clearance	Structures	5A	51,318.88	4.8%	22-Aug-08	04-Sep-08	14	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					458	Foundations	Structures	5A	153,956.63	14.5%	05-Sep-08	25-Sep-08	21	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					468	Reinforced Earth Wall - 1 Third	Structures	5A	205,275.51	19.3%	19-Sep-08	20-Nov-08	63	10	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					468	Reinforced Earth Wall	Structures	5A	513,188.78	48.3%	19-Sep-08	20-Nov-08	63	10	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					470	Coping	Structures	5A	51,318.88	4.8%	21-Nov-08	12-Dec-08	22	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					480	Handrail	Structures	5A	51,318.88	4.8%	15-Dec-08	09-Jan-09	26	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	10,367.45	1.0%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Baird Drive Retained Embankment - (W8) (5)	Structures	5A	-	0.0%		09-Jan-09																		
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	2.4%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Balgreen Road Bridge (S22) and Retaining Walls (W9)																								
						Bridge & Retaining Wall			**1,995,003.00**																				
					115	Balgreen Road Bridge (S22) - Dummy Activity	Structures	5A	420,038.19	21.1%	25-Feb-09	12-Jan-10	322	15	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					115	Balgreen Road Bridge (S22) - Dummy Activity	Structures	5A	420,038.19	21.1%	25-Feb-09	12-Jan-10	322	15	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					115	Balgreen Road Bridge (S22) - Dummy Activity	Structures	5A	420,038.19	21.1%	25-Feb-09	12-Jan-10	322	15	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					115	Balgreen Road Bridge (S22) - Dummy Activity	Structures	5A	420,038.19	21.1%	25-Feb-09	12-Jan-10	322	15	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					115	Balgreen Road Reatining Wall (S22) - Dummy Activity	Structures	5A	245,400.21	12.3%	25-Feb-09	12-Jan-10	322	15	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5A	19,450.03	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	1.3%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5A	25,000.00	1.3%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Balgreen Rd Retaining wall (W9) (7)	Structures	5A	-	0.0%		12-Jan-10																		
					Crit. Milestone	Completion of Balgreen Road Bridge (S22) (8)	Structures	5A	-	0.0%		12-Jan-10																		
						Murrayfield to Balgreen Road Trackwork (1006m)																								
						Trackwork			**2,650,456.29**																				
					530	Tracklaying	Track	5A	1,616,278.62	61.0%	04-Aug-10	09-Sep-10	37	34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					243	CBM - Ducts	Track	5A	230,896.95	8.7%	02-Jun-10	29-Jun-10	28	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					989	Track Finishes	Track	5A	-	0.0%	10-Sep-10	16-Sep-10	7	35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					999	Fencing	Track	5A	230,896.95	8.7%	17-Sep-10	13-Oct-10	27	36	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1009	Bulk Excavation - Sub Base	Track	5A	230,896.95	8.7%	07-Apr-10	30-Apr-10	24	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1019	OLE Foundations - Drainage	Track - BB	5A	76,423.65	2.9%	04-May-10	01-Jun-10	29	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5A	24,094.88	0.9%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Track	5A	25,000.00	0.9%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	BoQ Highway works	Track	5A	213,808.62	8.1%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5A	2,159.68	0.1%				35	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Section 5A Roseburn Junction to Balgreen Road (3) (29)	Track	5A	-	0.0%		13-Oct-10																		
						Balgreen Road Tram Stop																								
						Tramstop			**308,546.57**																				
					117	Civil Engineering and Builders Work	Tramstops	5A	77,039.41	25.0%	16-Feb-09	31-Mar-09	44	15	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					117	Civil Engineering and Builders Work	Tramstops	5A	77,039.41	25.0%	01-Apr-09	19-May-09	50	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5A	1,556.35	0.5%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2300	Deliver and Install Shelter	Tramstops	5A	51,359.61	16.6%	03-Jul-09	17-Jul-09	15	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5A	518.78	0.2%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Tramstops	5A	25,000.00	8.1%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					328	Order REC Supply	Trams Eq	5A	-	0.0%	21-May-09	21-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5150	Package Test Tramstop	Trams Eq	5A	18,818.17	6.1%	28-Sep-09	05-Oct-09	8	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5120	Install LV Power Supply and LV Power Equipment	Trams Eq	5A	18,818.17	6.1%	17-Jul-09	24-Aug-09	39	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5130	Install Telecon Equipment	Trams Eq	5A	18,818.17	6.1%	24-Aug-09	21-Sep-09	29	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5140	Install Station Control Equipment + AFC Equipment	Trams Eq	5A	18,818.17	6.1%	24-Aug-09	28-Sep-09	36	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5119	Access for E&M Tram Stop installation (05A Balgreen Road)	Trams Eq	5A	-	0.0%	17-Jul-09	17-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5118	Access for visual inspection for E&M Tram Stop installation (05A Balgreen Road)	Trams Eq	5A	-	0.0%	17-Jun-09	17-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5A	760.33	0.2%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Jenners Depository Substation																								
						Substation			**450,663.87**																				
					296	Completion of envelope	Subst - BB	5A	80,965.67	18.0%	01-Apr-09	19-May-09	50	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					296	Civil Engineering and Building Works	Subst - BB	5A	80,965.67	18.0%	16-Feb-09	31-Mar-09	44	15	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	5A	1,635.67	0.4%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					286	Order REC supply from Scottish Power	Subst - S	5A	-	0.0%	26-Jan-09	26-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0058

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Morrison Construction Group | BILFINGER BERGER | SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year: 2008 Period: Period End: 1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
					A5830	Power Infeed from Public Net available inc HV cable	Subst - S	5A	-	0.0%	20-May-09	20-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5850	Installation of TPS Equipment	Subst - S	5A	71,056.48	15.8%	11-Jun-10	23-Jul-10	43	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5840	Install LV Power Supply and LV Power Equipment	Subst - S	5A	71,056.48	15.8%	27-May-10	18-Jun-10	23	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5870	Testing and Commissioning	Subst - S	5A	71,056.48	15.8%	23-Jul-10	13-Aug-10	22	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5860	Install Telecom and Scada	Subst - S	5A	71,056.48	15.8%	02-Jul-10	23-Jul-10	22	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2279	Access for E&M Substation installation (05A Jenners Depository)	Subst - S	5A	-	0.0%	20-May-09	20-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2278	Access for visual inspection for E&M Substation installation (05A Jenners Depository)	Subst - S	5A	-	0.0%	20-Apr-09	20-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	5A	2,870.97	0.6%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05B Balgreen Road (exc.) to Edinburgh Park (inc.)									**20,041,708.91**							-	-	-	-	-	-	57,694	522,628	537,231	1,246,267	1,238,189	1,591,709	77,039	5,270,757
	05B1 Balgreen Road (exc.) to Edinburgh Park (inc.)								**2,443,916.41**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Balgreen Road to Edinburgh Park																												
			E & M Installations						**2,443,916.41**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line	OLE	5B	471,201.73	19.3%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5B	19,038.45	0.8%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4140	Install Electrical Cables	SCC	5B	133,667.58	5.5%	02-Dec-09	09-Feb-10	70	25	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4150	Install Fibre Optic Cables	SCC	5B	133,667.58	5.5%	02-Dec-09	09-Feb-10	70	25	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4160	Install Signalling Wayside Equipment	SCC	5B	133,667.58	5.5%	10-Feb-10	07-Apr-10	57	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4125	Installation of poles and building fixings	SCC	5B	133,667.58	5.5%	28-Sep-09	16-Nov-09	50	23	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4124	Access for E&M wayside installation (05B)	SCC	5B	-	0.0%	28-Sep-09	28-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4139	Access to cable pits for cable laying (05B)	SCC	5B	-	0.0%	02-Dec-09	02-Dec-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4123	Access for visual inspection for E&M wayside installation (05B)	SCC	5B	-	0.0%	27-Aug-09	27-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4138	Access for visual inspection to cable pits for cable laying (05B)	SCC	5B	-	0.0%	30-Oct-09	30-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	5B	5,400.71	0.2%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05B2 Balgreen Road (exc.) to Saughton Road North (inc.)									**5,009,394.54**							-	-	-	-	-	-	-	-	417,745	456,129	124,602	304,086	-	1,302,562
	Carrick Knowe Bridge (S23)																													
		Bridge							**548,408.76**							-	-	-	-	-	-	-	-	32,259	96,778	96,778	64,519	-	290,334
			Possessions								**23-Apr-09**	**23-Apr-09**																		
					11	Establishment	Structures	5B	-	0.0%	21-Aug-08	09-May-09	262	9	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					12	Temporary Fencing	Structures	5B	-	0.0%	21-Aug-08	27-Aug-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					13	Haul Roads	Structures	5B	-	0.0%	21-Aug-08	27-Aug-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					24	Possessions 1 (12hrs)	Structures	5B	-	0.0%	28-Aug-08	28-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					C14	Remove Crash Deck and Barriers	Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					B14	Erect Network Rail Safety Barrier	Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15	Possessions 2 (12hrs)	Structures	5B	-	0.0%	29-Aug-08	29-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					C13	Possessions 4 (12hrs)	Structures	5B	-	0.0%	09-May-09	09-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Abutment - Excavate and Blind				**64,518.68**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	32,259	-	-	-	-	32,259
					35	North Abutment	Structures	5B	32,259.34	50.0%	28-Aug-08	03-Feb-09	160	9	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					16	Blinding	Structures	5B	32,259.34	50.0%	10-Sep-08	10-Sep-08	1	9	9	-	-	-	-	-	-	-	-	32,259	-	-	-	-	-	32,259
					96	Temporary Support to Railway Lines	Structures	5B	-	0.0%	28-Aug-08	03-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					106	Excavate	Structures	5B	-	0.0%	04-Sep-08	09-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Abutment - Base Construction				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	32,259	-	-	-	32,259
					7	Concrete	Structures	5B	32,259.34	100.0%	23-Sep-08	23-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	32,259	-	-	-	-	32,259
					37	Steel fixing	Structures	5B	-	0.0%	11-Sep-08	22-Sep-08	12	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					87	Shuttering	Structures	5B	-	0.0%	16-Sep-08	22-Sep-08	7	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Abutment - Abutment Wall				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	32,259	-	-	32,259
					29	Concrete	Structures	5B	32,259.34	100.0%	21-Oct-08	21-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	32,259	-	-	-	32,259
					38	Shutter rear face	Structures	5B	-	0.0%	24-Sep-08	30-Sep-08	7	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					58	Steelfixing	Structures	5B	-	0.0%	03-Oct-08	14-Oct-08	12	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					128	Shutter front face	Structures	5B	-	0.0%	13-Oct-08	20-Oct-08	8	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Abutment - Ballast Wall				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A10	Ballast Wall	Structures	5B	32,259.34	100.0%	28-Jan-09	03-Feb-09	7	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Abutment - Wing Walls				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	32,259	-	-	32,259
					69	S23 Carricknowe bridge Backfill	Structures	5B	32,259.34	100.0%	07-Nov-08	13-Nov-08	7	11	12	-	-	-	-	-	-	-	-	-	-	-	32,259	-	-	-	32,259
					A14060	S23 Carricknowe bridge Wing Walls	Structures	5B	-	0.0%	14-Nov-08	25-Nov-08	12	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14070	S23 Carricknowe bridge Parapet Beams	Structures	5B	-	0.0%	21-Jan-09	27-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14080	S23 Carricknowe bridge Backfill	Structures	5B	-	0.0%	26-Nov-08	27-Nov-08	2	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14090	S23 Carricknowe bridge Wing Walls	Structures	5B	-	0.0%	09-Dec-08	18-Dec-08	10	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Abutment - Excavate and Blind				**64,518.68**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	32,259	-	-	-	32,259
					23	South Abutment	Structures	5B	32,259.34	50.0%	04-Sep-08	10-Feb-09	160	9	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					116	Blinding	Structures	5B	32,259.34	50.0%	17-Sep-08	17-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	32,259	-	-	-	-	32,259
					206	Temporary Support to Railway Lines	Structures	5B	-	0.0%	04-Sep-08	10-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					236	Excavate	Structures	5B	-	0.0%	11-Sep-08	16-Sep-08	6	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Abutment - Base Construction				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	32,259	-	-	-	32,259
					97	Concrete	Structures	5B	32,259.34	100.0%	08-Oct-08	08-Oct-08	1	10	10	-	-	-	-	-	-	-	-	-	32,259	-	-	-	-	32,259
					177	Steel fixing	Structures	5B	-	0.0%	23-Sep-08	02-Oct-08	10	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					237	Shuttering	Structures	5B	-	0.0%	01-Oct-08	07-Oct-08	7	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Abutment - Abutment Wall				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	32,259	-	-	32,259
					688	Concrete	Structures	5B	32,259.34	100.0%	31-Oct-08	31-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	32,259	-	-	-	32,259
					698	Shutter rear face	Structures	5B	-	0.0%	09-Oct-08	15-Oct-08	7	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					708	Steelfixing	Structures	5B	-	0.0%	15-Oct-08	24-Oct-08	10	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					718	Shutter front face	Structures	5B	-	0.0%	23-Oct-08	30-Oct-08	8	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14040	Strike Shutters and Cure	Structures	5B	-	0.0%	03-Nov-08	14-Nov-08	12	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Abutment - Ballast Wall				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14050	Ballast Wall	Structures	5B	32,259.34	100.0%	04-Feb-09	10-Feb-09	7	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Abutment - Wing Walls				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	32,259	-	-	32,259
					89	S23 Carricknowe bridge Backfill	Structures	5B	32,259.34	100.0%	17-Nov-08	21-Nov-08	5	12	12	-	-	-	-	-	-	-	-	-	-	-	32,259	-	-	-	32,259
					A14100	S23 Carricknowe bridge Wing Walls	Structures	5B	-	0.0%	26-Nov-08	08-Dec-08	13	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14110	S23 Carricknowe bridge Parapet Beams	Structures	5B	-	0.0%	14-Jan-09	20-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1012	S23 Carricknowe bridge Backfill	Structures	5B	-	0.0%	09-Dec-08	10-Dec-08	2	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1015	S23 Carricknowe bridge Wing Walls	Structures	5B	-	0.0%	19-Dec-08	13-Jan-09	26	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Reinforced Concrete Deck				**64,518.68**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					31	Superstructure	Structures	5B	32,259.34	50.0%	03-Nov-08	30-Mar-09	148	11	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					104	Permanent Formwork	Structures	5B	32,259.34	50.0%	06-Jan-09	22-Jan-09	17	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					285	Deck Reinforcement	Structures	5B	-	0.0%	23-Jan-09	06-Feb-09	15	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					246	Deck Shuttering	Structures	5B	-	0.0%	06-Jan-09	09-Feb-09	35	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					27	Concrete Diaphragms	Structures	5B	-	0.0%	20-Jan-09	20-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					247	Concrete Deck	Structures	5B	-	0.0%	27-Jan-09	27-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					257	Concrete Parapet Beam	Structures	5B	-	0.0%	10-Feb-09	10-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Deck Finishes				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					728	S23 Carricknowe Bridge Waterproofing (inc. deck curing)	Structures	5B	32,259.34	100.0%	11-Feb-09	24-Feb-09	14	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					59	S23 Carricknowe Bridge Expansion Joints	Structures	5B	-	0.0%	25-Feb-09	25-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					70	S23 Carricknowe Bridge Parapet Rails	Structures	5B	-	0.0%	26-Feb-09	04-Mar-09	7	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					80	S23 Carricknowe Bridge Walkway Constructon	Structures	5B	-	0.0%	17-Mar-09	30-Mar-09	14	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Pre cast Concrete Beams				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	32,259	-	-	32,259
					32	Bearings	Structures	5B	32,259.34	100.0%	03-Nov-08	04-Nov-08	2	11	11	-	-	-	-	-	-	-	-	-	-	32,259	-	-	-	32,259
					63	Possession 3 (16hrs)	Structures	5B	-	0.0%	02-Jan-09	02-Jan-09	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					93	Place Beams	Structures	5B	-	0.0%	02-Jan-09	03-Jan-09	2	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					193	Erect Crash Deck	Structures	5B	-	0.0%	05-Jan-09	05-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Run On Run Off Slabs				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					34	Backfill and cast slab south	Structures	5B	32,259.34	100.0%	28-Jan-09	06-Feb-09	10	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					275	Backfill and cast slab north	Structures	5B	-	0.0%	03-Feb-09	12-Feb-09	10	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Trackwork						**32,259.34**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					44	Containment Slabs	Structures	5B	-	0.0%	05-Mar-09	16-Mar-09	12	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					45	Fix Rails	Structures	5B	32,259.34	100.0%	19-Mar-09	30-Mar-09	12	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			E & M Installations						**359,272.16**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					64	OLE Supports	OLE	5B	32,259.34	8.1%	31-Mar-09	09-Apr-09	10	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					75	Catenary Cables	OLE	5B	32,259.34	8.1%	13-Apr-09	22-Apr-09	10	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					265	OLE Supports and Catenary over Tracks	OLE	5B	32,259.34	8.1%	11-May-09	11-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					94	Possessions 4 (12hrs)	OLE	5B	-	0.0%	09-May-09	09-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5B	6,842.89	1.7%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	OLE	5B	25,000.00	6.3%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Construct Carricknowe Bridge (S23) (3)	OLE	5B		0.0%		11-May-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							Highways	5B	267,944.74	67.1%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	5B	2,706.51	0.7%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Saughton Road Bridge (S24)																													
		Bridge							-	0%						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					121	Existing Structure	Structures	5B	-	0.0%	03-Jun-08	03-Jun-08	1	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ballasted Track 1160m																													
		Trackwork							**2,438,501.19**							-	-	-	-	-	-	-	-	-	359,351	18,443	239,567	-	617,361

USB00000073_0059

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name		Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					A5830	Power Infeed from Public Net available inc HV cable	Subst - S	5A	-	0.0%	20-May-09	20-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5850	Installation of TPS Equipment	Subst - S	5A	71,056.48	15.8%	11-Jun-10	23-Jul-10	43	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5840	Install LV Power Supply and LV Power Equipment	Subst - S	5A	71,056.48	15.8%	27-May-10	18-Jun-10	23	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5870	Testing and Commissioning	Subst - S	5A	71,056.48	15.8%	23-Jul-10	13-Aug-10	22	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5860	Install Telecom and Scada	Subst - S	5A	71,056.48	15.8%	02-Jul-10	23-Jul-10	22	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2279	Access for E&M Substation installation (05A Jenners Depository)	Subst - S	5A	-	0.0%	20-May-09	20-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2278	Access for visual inspection for E&M Substation installation (05A Jenners Depository)	Subst - S	5A	-	0.0%	20-Apr-09	20-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging			2,870.97	0.6%				34	35														
					05B Balgreen Road (exc.) to Edinburgh Park (inc.)				**20,041,708.91**							**3,965,097**	**2,232,063**	**923,183**	**1,149,654**	**990,886**	**490,140**	**90,110**	**15,055**	**1,301,939**	-	**449,790**	**154,478**	**95,858**	**11,858,252**
					05B1 Balgreen Road (exc.) to Edinburgh Park (inc.)				**2,443,916.41**							-	-	-	-	-	-	-	-	-	-	**133,668**	-	**133,668**
					Balgreen Road to Edinburgh Park																								
					E & M Installations				**2,443,916.41**							-	-	-	-	-	-	-	-	-	-	**133,668**	-	**133,668**
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line	OLE	5B	471,201.73	19.3%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5B	19,038.45	0.8%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4140	Install Electrical Cables	SCC	5B	133,667.58	5.5%	02-Dec-09	09-Feb-10	70	25	28	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4150	Install Fibre Optic Cables	SCC	5B	133,667.58	5.5%	02-Dec-09	09-Feb-10	70	25	28	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4160	Install Signalling Wayside Equipment	SCC	5B	133,667.58	5.5%	10-Feb-10	07-Apr-10	57	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4125	Installation of poles and building fixings	SCC	5B	133,667.58	5.5%	28-Sep-09	16-Nov-09	50	23	25	-	-	-	-	-	-	-	-	-	-	133,668	-	133,668
					A4124	Access for E&M wayside installation (05B)	SCC	5B	-	0.0%	28-Sep-09	28-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4139	Access to cable pits for cable laying (05B)	SCC	5B	-	0.0%	02-Dec-09	02-Dec-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4123	Access for visual inspection for E&M wayside installation (05B)	SCC	5B	-	0.0%	27-Aug-09	27-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4138	Access for visual inspection to cable pits for cable laying (05B)	SCC	5B	-	0.0%	30-Oct-09	30-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	5B	5,400.71	0.2%				30	31														
					05B2 Balgreen Road (exc.) to Saughton Road North (inc.)				**5,009,394.54**							**803,230**	**1,639,671**	**329,681**	**445,644**	**326,145**	**34,549**	-	-	-	-	-	-	**3,578,922**
					Carrick Knowe Bridge (S23)																								
					Bridge				**548,408.76**							**32,259**	**193,556**	-	**32,259**	-	-	-	-	-	-	-	-	**258,075**
					Possessions				-		**23-Apr-09**	**23-Apr-09**																	
					11	Establishment	Structures	5B	-	0.0%	21-Aug-08	09-May-09	262	9	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					12	Temporary Fencing	Structures	5B	-	0.0%	21-Aug-08	27-Aug-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					13	Haul Roads	Structures	5B	-	0.0%	21-Aug-08	27-Aug-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					24	Possessions 1 (12hrs)	Structures	5B	-	0.0%	28-Aug-08	28-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					C14	Remove Crash Deck and Barriers	Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					B14	Erect Network Rail Safety Barrier	Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15	Possessions 2 (12hrs)	Structures	5B	-	0.0%	29-Aug-08	29-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					C13	Possessions 4 (12hrs)	Structures	5B	-	0.0%	09-May-09	09-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Abutment - Excavate and Blind				**64,518.68**		**23-Apr-09**	**23-Apr-09**				-	**32,259**	-	-	-	-	-	-	-	-	-	-	**32,259**
					35	North Abutment	Structures	5B	32,259.34	50.0%	28-Aug-08	03-Feb-09	160	9	15	-	32,259	-	-	-	-	-	-	-	-	-	-	32,259
					16	Blinding	Structures	5B	32,259.34	50.0%	10-Sep-08	10-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					96	Temporary Support to Railway Lines	Structures	5B	-	0.0%	28-Aug-08	03-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					106	Excavate	Structures	5B	-	0.0%	04-Sep-08	09-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Abutment - Base Construction				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					7	Concrete	Structures	5B	32,259.34	100.0%	23-Sep-08	23-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					37	Steel fixing	Structures	5B	-	0.0%	11-Sep-08	22-Sep-08	12	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					87	Shuttering	Structures	5B	-	0.0%	16-Sep-08	22-Sep-08	7	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Abutment - Abutment Wall				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					28	Concrete	Structures	5B	32,259.34	100.0%	21-Oct-08	21-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					38	Shutter rear face	Structures	5B		0.0%	24-Sep-08	30-Sep-08	7	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					58	Steelfixing	Structures	5B		0.0%	03-Oct-08	14-Oct-08	12	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					128	Shutter front face	Structures	5B		0.0%	13-Oct-08	20-Oct-08	8	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Abutment - Ballast Wall				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	**32,259**	-	-	-	-	-	-	-	-	-	-	**32,259**
					A10	Ballast Wall	Structures	5B	32,259.34	100.0%	28-Jan-09	03-Feb-09	7	14	15	-	32,259	-	-	-	-	-	-	-	-	-	-	32,259
					North Abutment - Wing Walls				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					69	S23 Carricknowe bridge Backfill	Structures	5B	32,259.34	100.0%	07-Nov-08	13-Nov-08	7	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14060	S23 Carricknowe bridge Wing Walls	Structures	5B	-	0.0%	14-Nov-08	25-Nov-08	12	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14070	S23 Carricknowe bridge Parapet Beams	Structures	5B	-	0.0%	21-Jan-09	27-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14080	S23 Carricknowe bridge Backfill	Structures	5B	-	0.0%	26-Nov-08	27-Nov-08	2	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14090	S23 Carricknowe bridge Wing Walls	Structures	5B	-	0.0%	09-Dec-08	18-Dec-08	10	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Abutment - Excavate and Blind				**64,518.68**		**23-Apr-09**	**23-Apr-09**				-	**32,259**	-	-	-	-	-	-	-	-	-	-	**32,259**
					23	South Abutment	Structures	5B	32,259.34	50.0%	04-Sep-08	10-Feb-09	160	9	15	-	32,259	-	-	-	-	-	-	-	-	-	-	32,259
					116	Blinding	Structures	5B	32,259.34	50.0%	17-Sep-08	17-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					206	Temporary Support to Railway Lines	Structures	5B	-	0.0%	04-Sep-08	10-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					236	Excavate	Structures	5B	-	0.0%	11-Sep-08	16-Sep-08	6	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Abutment - Base Construction				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					97	Concrete	Structures	5B	32,259.34	100.0%	08-Oct-08	08-Oct-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					177	Steel fixing	Structures	5B	-	0.0%	23-Sep-08	02-Oct-08	10	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					237	Shuttering	Structures	5B	-	0.0%	01-Oct-08	07-Oct-08	7	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Abutment - Abutment Wall				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					689	Concrete	Structures	5B	32,259.34	100.0%	31-Oct-08	31-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					698	Shutter rear face	Structures	5B		0.0%	09-Oct-08	15-Oct-08	7	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					708	Steelfixing	Structures	5B		0.0%	15-Oct-08	24-Oct-08	10	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					718	Shutter front face	Structures	5B		0.0%	23-Oct-08	30-Oct-08	8	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14040	Strike Shutters and Cure	Structures	5B		0.0%	03-Nov-08	14-Nov-08	12	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Abutment - Ballast Wall				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	**32,259**	-	-	-	-	-	-	-	-	-	-	**32,259**
					A14050	Ballast Wall	Structures	5B	32,259.34	100.0%	04-Feb-09	10-Feb-09	7	15	15	-	32,259	-	-	-	-	-	-	-	-	-	-	32,259
					South Abutment - Wing Walls				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					89	S23 Carricknowe bridge Backfill	Structures	5B	32,259.34	100.0%	17-Nov-08	21-Nov-08	5	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14100	S23 Carricknowe bridge Wing Walls	Structures	5B	-	0.0%	26-Nov-08	08-Dec-08	13	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14110	S23 Carricknowe bridge Parapet Beams	Structures	5B	-	0.0%	14-Jan-09	20-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1012	S23 Carricknowe bridge Backfill	Structures	5B	-	0.0%	09-Dec-08	10-Dec-08	2	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1015	S23 Carricknowe bridge Wing Walls	Structures	5B	-	0.0%	19-Dec-08	13-Jan-09	26	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Reinforced Concrete Deck				**64,518.68**		**23-Apr-09**	**23-Apr-09**				**32,259**	-	-	**32,259**	-	-	-	-	-	-	-	-	**64,519**
					31	Superstructure	Structures	5B	32,259.34	50.0%	03-Nov-08	30-Mar-09	148	11	17	-	-	-	32,259	-	-	-	-	-	-	-	-	-	32,259
					104	Permanent Formwork	Structures	5B	32,259.34	50.0%	06-Jan-09	22-Jan-09	17	14	14	32,259	-	-	-	-	-	-	-	-	-	-	-	-	32,259
					285	Deck Reinforcement	Structures	5B	-	0.0%	23-Jan-09	06-Feb-09	15	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					246	Deck Shuttering	Structures	5B	-	0.0%	06-Jan-09	09-Feb-09	35	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					27	Concrete Diaphragms	Structures	5B	-	0.0%	20-Jan-09	20-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					247	Concrete Deck	Structures	5B	-	0.0%	27-Jan-09	27-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					257	Concrete Parapet Beam	Structures	5B	-	0.0%	10-Feb-09	10-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Deck Finishes				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	**32,259**	-	-	-	-	-	-	-	-	-	-	**32,259**
					728	S23 Carricknowe Bridge Waterproofing (inc. deck curing)	Structures	5B	32,259.34	100.0%	11-Feb-09	24-Feb-09	14	15	15	-	32,259	-	-	-	-	-	-	-	-	-	-	32,259
					59	S23 Carricknowe Bridge Expansion Joints	Structures	5B	-	0.0%	25-Feb-09	25-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					70	S23 Carricknowe Bridge Parapet Rails	Structures	5B	-	0.0%	26-Feb-09	04-Mar-09	7	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					80	S23 Carricknowe Bridge Walkway Constructon	Structures	5B	-	0.0%	17-Mar-09	30-Mar-09	14	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Pre cast Concrete Beams				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					32	Bearings	Structures	5B	32,259.34	100.0%	03-Nov-08	04-Nov-08	2	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					63	Possession 3 (16hrs)	Structures	5B	-	0.0%	02-Jan-09	02-Jan-09	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					93	Place Beams	Structures	5B	-	0.0%	02-Jan-09	03-Jan-09	2	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					193	Erect Crash Deck	Structures	5B	-	0.0%	05-Jan-09	05-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Run On Run Off Slabs				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	**32,259**	-	-	-	-	-	-	-	-	-	-	**32,259**
					34	Backfill and cast slab south	Structures	5B	32,259.34	100.0%	28-Jan-09	06-Feb-09	10	14	15	-	32,259	-	-	-	-	-	-	-	-	-	-	32,259
					275	Backfill and cast slab north	Structures	5B	-	0.0%	03-Feb-09	12-Feb-09	10	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Trackwork				**32,259.34**							-	-	-	**32,259**	-	-	-	-	-	-	-	-	**32,259**
					44	Containment Slabs	Structures	5B	-	0.0%	05-Mar-09	16-Mar-09	12	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					45	Fix Rails	Structures	5B	32,259.34	100.0%	19-Mar-09	30-Mar-09	12	16	17	-	-	-	32,259	-	-	-	-	-	-	-	-	-	32,259
					E & M Installations				**399,272.15**							-	-	-	**64,519**	**300,204**	**34,549**	-	-	-	-	-	-	**399,272**
					64	OLE Supports	OLE	5B	32,259.34	8.1%	31-Mar-09	09-Apr-09	10	17	17	-	-	-	32,259	-	-	-	-	-	-	-	-	-	32,259
					75	Catenary Cables	OLE	5B	32,259.34	8.1%	13-Apr-09	22-Apr-09	10	17	17	-	-	-	32,259	-	-	-	-	-	-	-	-	-	32,259
					265	OLE Supports and Catenary over Tracks	OLE	5B	32,259.34	8.1%	11-May-09	11-May-09	1	18	18	-	-	-	-	32,259	-	-	-	-	-	-	-	-	32,259
					94	Possessions 4 (12hrs)	OLE	5B	-	0.0%	09-May-09	09-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5B	6,842.89	1.7%				18	19	-	-	-	-	-	6,843	-	-	-	-	-	-	-	6,843
					3rd Party	Third Party Sign-off	OLE	5B	25,000.00	6.3%				18	19	-	-	-	-	-	25,000	-	-	-	-	-	-	-	25,000
					Cnt. Milestone	Completion of Construct Carricknowe Bridge (S23) (3)	OLE	5B	-	0.0%		11-May-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	5B	267,944.74	67.1%				17	18	-	-	-	-	267,945	-	-	-	-	-	-	-	267,945
					Snagging	Snagging	Highways	5B	2,706.51	0.7%				18	19	-	-	-	-	-	2,707	-	-	-	-	-	-	-	2,707
					Saughton Road Bridge (S24)																								
					Bridge				-	0%						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					121	Existing Structure	Structures	5B	-	0.0%	03-Jun-08	03-Jun-08	1	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Ballasted Track 1160m																								
					Trackwork				**2,438,501.19**							-	**1,317,620**	**239,567**	**239,567**	**24,385**	-	-	-	-	-	-	-	**1,821,140**

USB00000073_0060

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group — BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					A5830	Power Infeed from Public Net available inc HV cable	Subst - S	5A	-	0.0%	20-May-09	20-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5850	Installation of TPS Equipment	Subst - S	5A	71,056.48	15.8%	11-Jun-10	23-Jul-10	43	32	34	-	-	-	-	-	-	-	71,056	-	-	-	-	-	71,056
					A5840	Install LV Power Supply and LV Power Equipment	Subst - S	5A	71,056.48	15.8%	27-May-10	18-Jun-10	23	32	32	-	-	-	-	-	-	71,056	-	-	-	-	-	-	71,056
					A5870	Testing and Commissioning	Subst - S	5A	71,056.48	15.8%	23-Jul-10	13-Aug-10	22	34	34	-	-	-	-	-	-	-	71,056	-	-	-	-	-	71,056
					A5860	Install Telecom and Scada	Subst - S	5A	71,056.48	15.8%	02-Jul-10	23-Jul-10	22	33	34	-	-	-	-	-	-	-	71,056	-	-	-	-	-	71,056
					A2279	Access for E&M Substation installation (05A Jenners Depository)	Subst - S	5A	-	0.0%	20-May-09	20-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2278	Access for visual inspection for E&M Substation installation (05A Jenners Depository)	Subst - S	5A	-	0.0%	20-Apr-09	20-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging			2,870.97	0.6%				34	35									2,871					2,871
					05B Balgreen Road (exc.) to Edinburgh Park (inc.)				**20,041,708.91**							**90,552**	**286,672**	**70,938**	**2,094,266**	**153,471**	**142,873**	**73,927**	-	-	-	-	-	-	**2,912,700**
					05B1 Balgreen Road (exc.) to Edinburgh Park (inc.)				**2,443,916.41**							-	**267,335**	-	**2,018,475**	**24,439**	-	-	-	-	-	-	-	-	**2,310,249**
					Balgreen Road to Edinburgh Park																									
					E & M Installations				**2,443,916.41**							-	**267,335**	-	**2,018,475**	**24,439**	-	-	-	-	-	-	-	-	**2,310,249**
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	282,721	-	-	-	-	-	-	-	-	-	282,721
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	282,721	-	-	-	-	-	-	-	-	-	282,721
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	282,721	-	-	-	-	-	-	-	-	-	282,721
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	282,721	-	-	-	-	-	-	-	-	-	282,721
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	282,721	-	-	-	-	-	-	-	-	-	282,721
					A4130	Overhead Catenary Line	OLE	5B	471,201.73	19.3%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	471,202	-	-	-	-	-	-	-	-	-	471,202
					Snagging	Snagging	OLE	5B	19,038.45	0.8%				30	31	-	-	-	-	19,038	-	-	-	-	-	-	-	-	19,038
					A4140	Install Electrical Cables	SCC	5B	133,667.58	5.5%	02-Dec-09	09-Feb-10	70	25	28	-	133,668	-	-	-	-	-	-	-	-	-	-	-	133,668
					A4150	Install Fibre Optic Cables	SCC	5B	133,667.58	5.5%	02-Dec-09	09-Feb-10	70	25	28	-	133,668	-	-	-	-	-	-	-	-	-	-	-	133,668
					A4160	Install Signalling Wayside Equipment	SCC	5B	133,667.58	5.5%	10-Feb-10	07-Apr-10	57	28	30	-	-	-	133,668	-	-	-	-	-	-	-	-	-	133,668
					A4125	Installation of poles and building fixings	SCC	5B	133,667.58	5.5%	28-Sep-09	16-Nov-09	50	23	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4124	Access for E&M wayside installation (05B)	SCC	5B	-	0.0%	28-Sep-09	28-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4139	Access to cable pits for cable laying (05B)	SCC	5B	-	0.0%	02-Dec-09	02-Dec-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4123	Access for visual inspection for E&M wayside installation (05B)	SCC	5B	-	0.0%	27-Aug-09	27-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4138	Access for visual inspection to cable pits for cable laying (05B)	SCC	5B	-	0.0%	30-Oct-09	30-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	5B	5,400.71	0.2%				30	31	-	-	-	-	5,401	-	-	-	-	-	-	-	-	5,401
					05B2 Balgreen Road (exc.) to Saughton Road North (inc.)				**5,009,394.54**							-	-	**51,360**	**19,337**	**56,455**	**760**	-	-	-	-	-	-	**127,911**
					Carrick Knowe Bridge (S23)																									
					Bridge				**548,408.76**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Possessions				-		**23-Apr-09**	**23-Apr-09**																		
					11	Establishment	Structures	5B	-	0.0%	21-Aug-08	09-May-09	262	9	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					12	Temporary Fencing	Structures	5B	-	0.0%	21-Aug-08	27-Aug-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					13	Haul Roads	Structures	5B	-	0.0%	21-Aug-08	27-Aug-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					24	Possessions 1 (12hrs)	Structures	5B	-	0.0%	28-Aug-08	28-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					C14	Remove Crash Deck and Barriers	Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					B14	Erect Network Rail Safety Barrier	Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15	Possessions 2 (12hrs)	Structures	5B	-	0.0%	29-Aug-08	29-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					C13	Possessions 4 (12hrs)	Structures	5B	-	0.0%	09-May-09	09-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Abutment - Excavate and Blind				**64,518.68**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					35	North Abutment	Structures	5B	32,259.34	50.0%	28-Aug-08	03-Feb-09	160	9	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					16	Blinding	Structures	5B	32,259.34	50.0%	10-Sep-08	10-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					96	Temporary Support to Railway Lines	Structures	5B	-	0.0%	28-Aug-08	03-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					106	Excavate	Structures	5B	-	0.0%	04-Sep-08	09-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Abutment - Base Construction				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					7	Concrete	Structures	5B	32,259.34	100.0%	23-Sep-08	23-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					37	Steel fixing	Structures	5B	-	0.0%	11-Sep-08	22-Sep-08	12	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					87	Shuttering	Structures	5B	-	0.0%	16-Sep-08	22-Sep-08	7	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Abutment - Abutment Wall				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					28	Concrete	Structures	5B	32,259.34	100.0%	21-Oct-08	21-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					38	Shutter rear face	Structures	5B	-	0.0%	24-Sep-08	30-Sep-08	7	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					58	Steelfixing	Structures	5B	-	0.0%	03-Oct-08	14-Oct-08	12	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					128	Shutter front face	Structures	5B	-	0.0%	13-Oct-08	20-Oct-08	8	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Abutment - Ballast Wall				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A10	Ballast Wall	Structures	5B	32,259.34	100.0%	28-Jan-09	03-Feb-09	7	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Abutment - Wing Walls				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					69	S23 Carrickknowe bridge Backfill	Structures	5B	32,259.34	100.0%	07-Nov-08	13-Nov-08	7	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14060	S23 Carrickknowe bridge Wing Walls	Structures	5B	-	0.0%	14-Nov-08	25-Nov-08	12	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14070	S23 Carrickknowe bridge Parapet Beams	Structures	5B	-	0.0%	21-Jan-09	27-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14080	S23 Carrickknowe bridge Backfill	Structures	5B	-	0.0%	26-Nov-08	27-Nov-08	2	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14090	S23 Carrickknowe bridge Wing Walls	Structures	5B	-	0.0%	09-Dec-08	18-Dec-08	10	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Abutment - Excavate and Blind				**64,518.68**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					23	South Abutment	Structures	5B	32,259.34	50.0%	04-Sep-08	10-Feb-09	160	9	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					116	Blinding	Structures	5B	32,259.34	50.0%	17-Sep-08	17-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					206	Temporary Support to Railway Lines	Structures	5B	-	0.0%	04-Sep-08	10-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					236	Excavate	Structures	5B	-	0.0%	11-Sep-08	16-Sep-08	6	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Abutment - Base Construction				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					97	Concrete	Structures	5B	32,259.34	100.0%	08-Oct-08	08-Oct-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					177	Steel fixing	Structures	5B	-	0.0%	23-Sep-08	02-Oct-08	10	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					237	Shuttering	Structures	5B	-	0.0%	01-Oct-08	07-Oct-08	7	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Abutment - Abutment Wall				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					689	Concrete	Structures	5B	32,259.34	100.0%	31-Oct-08	31-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					698	Shutter rear face	Structures	5B	-	0.0%	09-Oct-08	15-Oct-08	7	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					708	Steelfixing	Structures	5B	-	0.0%	15-Oct-08	24-Oct-08	10	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					718	Shutter front face	Structures	5B	-	0.0%	23-Oct-08	30-Oct-08	8	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14040	Strike Shutters and Cure	Structures	5B	-	0.0%	03-Nov-08	14-Nov-08	12	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Abutment - Ballast Wall				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14050	Ballast Wall	Structures	5B	32,259.34	100.0%	04-Feb-09	10-Feb-09	7	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Abutment - Wing Walls				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					89	S23 Carrickknowe bridge Backfill	Structures	5B	32,259.34	100.0%	17-Nov-08	21-Nov-08	5	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14100	S23 Carrickknowe bridge Wing Walls	Structures	5B	-	0.0%	26-Nov-08	08-Dec-08	13	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14110	S23 Carrickknowe bridge Parapet Beams	Structures	5B	-	0.0%	14-Jan-09	20-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1012	S23 Carrickknowe bridge Backfill	Structures	5B	-	0.0%	09-Dec-08	10-Dec-08	2	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1015	S23 Carrickknowe bridge Wing Walls	Structures	5B	-	0.0%	19-Dec-08	13-Jan-09	26	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Reinforced Concrete Deck				**64,518.68**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					31	Superstructure	Structures	5B	32,259.34	50.0%	03-Nov-08	30-Mar-09	148	11	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					104	Permanent Formwork	Structures	5B	32,259.34	50.0%	06-Jan-09	22-Jan-09	17	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					285	Deck Reinforcement	Structures	5B	-	0.0%	23-Jan-09	06-Feb-09	15	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					246	Deck Shuttering	Structures	5B	-	0.0%	06-Jan-09	09-Feb-09	35	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					27	Concrete Diaphragms	Structures	5B	-	0.0%	20-Jan-09	20-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					247	Concrete Deck	Structures	5B	-	0.0%	27-Jan-09	27-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					257	Concrete Parapet Beam	Structures	5B	-	0.0%	10-Feb-09	10-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Deck Finishes				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					728	S23 Carrickknowe Bridge Waterproofing (inc. deck curing)	Structures	5B	32,259.34	100.0%	11-Feb-09	24-Feb-09	14	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					59	S23 Carrickknowe Bridge Expansion Joints	Structures	5B	-	0.0%	25-Feb-09	25-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					70	S23 Carrickknowe Bridge Parapet Rails	Structures	5B	-	0.0%	26-Feb-09	04-Mar-09	7	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					80	S23 Carrickknowe Bridge Walkway Constructon	Structures	5B	-	0.0%	17-Mar-09	30-Mar-09	14	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Pre cast Concrete Beams				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					32	Bearings	Structures	5B	32,259.34	100.0%	03-Nov-08	04-Nov-08	2	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					63	Possession 3 (16hrs)	Structures	5B	-	0.0%	02-Jan-09	02-Jan-09	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					93	Place Beams	Structures	5B	-	0.0%	02-Jan-09	03-Jan-09	2	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					193	Erect Crash Deck	Structures	5B	-	0.0%	05-Jan-09	05-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Run On Run Off Slabs				**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					34	Backfill and cast slab south	Structures	5B	32,259.34	100.0%	28-Jan-09	06-Feb-09	10	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					275	Backfill and cast slab north	Structures	5B	-	0.0%	03-Feb-09	12-Feb-09	10	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Trackwork				**32,259.34**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					44	Containment Slabs	Structures	5B	-	0.0%	05-Mar-09	16-Mar-09	12	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					45	Fix Rails	Structures	5B	32,259.34	100.0%	19-Mar-09	30-Mar-09	12	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					E & M Installations				**399,272.15**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					64	OLE Supports	OLE	5B	32,259.34	8.1%	31-Mar-09	09-Apr-09	10	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					75	Catenary Cables	OLE	5B	32,259.34	8.1%	13-Apr-09	22-Apr-09	10	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					265	OLE Supports and Catenary over Tracks	OLE	5B	32,259.34	8.1%	11-May-09	11-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					94	Possessions 4 (12hrs)	OLE	5B	-	0.0%	09-May-09	09-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5B	6,842.89	1.7%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	OLE	5B	25,000.00	6.3%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Construct Carrickknowe Bridge (S23) (3)	OLE	5B	-	0.0%		11-May-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	5B	267,944.74	67.1%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	5B	2,706.51	0.7%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Saughton Road Bridge (S24)																									
					Bridge				-	0%						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					121	Existing Structure	Structures	5B	-	0.0%	03-Jun-08	03-Jun-08	1	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Ballasted Track 1160m																									
					Trackwork				**2,438,501.19**							-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0061

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					A5830	Power Infeed from Public Net available inc HV cable	Subst - S	5A	-	0.0%	20-May-09	20-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5890	Installation of TPS Equipment	Subst - S	5A	71,056.48	15.8%	11-Jun-10	23-Jul-10	43	32	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5840	Install LV Power Supply and LV Power Equipment	Subst - S	5A	71,056.48	15.8%	27-May-10	18-Jun-10	23	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5870	Testing and Commissioning	Subst - S	5A	71,056.48	15.8%	23-Jul-10	13-Aug-10	22	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5860	Install Telecom and Scada	Subst - S	5A	71,056.48	15.8%	02-Jul-10	23-Jul-10	22	33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2279	Access for E&M Substation installation (05A Jenners Depository)	Subst - S	5A	-	0.0%	20-May-09	20-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2278	Access for visual inspection for E&M Substation installation (05A Jenners Depository)	Subst - S	5A	-	0.0%	20-Apr-09	20-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	5A	2,870.97	0.6%				34	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05B Balgreen Road (exc.) to Edinburgh Park (inc.)									**20,041,708.91**							-	-	-	-	-	-	-	-	-	-	-	-	-
	05B1 Balgreen Road (exc.) to Edinburgh Park (inc.)								**2,443,916.41**							-	-	-	-	-	-	-	-	-	-	-	-	-
		Balgreen Road to Edinburgh Park																										
			E & M Installations						**2,443,916.41**							-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line - One Sixth	OLE	5B	282,721.04	11.6%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4130	Overhead Catenary Line	OLE	5B	471,201.73	19.3%	17-Nov-09	01-Apr-10	136	25	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5B	19,038.45	0.8%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4140	Install Electrical Cables	SCC	5B	133,667.58	5.5%	02-Dec-09	09-Feb-10	70	25	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4150	Install Fibre Optic Cables	SCC	5B	133,667.58	5.5%	02-Dec-09	09-Feb-10	70	25	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4160	Install Signalling Wayside Equipment	SCC	5B	133,667.58	5.5%	10-Feb-10	07-Apr-10	57	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4125	Installation of poles and building fixings	SCC	5B	133,667.58	5.5%	28-Sep-09	16-Nov-09	50	23	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4124	Access for E&M wayside installation (05B)	SCC	5B	-	0.0%	28-Sep-09	28-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4139	Access to cable pits for cable laying (05B)	SCC	5B	-	0.0%	02-Dec-09	02-Dec-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4123	Access for visual inspection for E&M wayside installation (05B)	SCC	5B	-	0.0%	27-Aug-09	27-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4138	Access for visual inspection to cable pits for cable laying (05B)	SCC	5B	-	0.0%	30-Oct-09	30-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	5B	5,400.71	0.2%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	05B2 Balgreen Road (exc.) to Saughton Road North (inc.)								**5,009,394.54**							-	-	-	-	-	-	-	-	-	-	-	-	-
		Carrick Knowe Bridge (S23)																										
			Bridge						**548,408.76**							-	-	-	-	-	-	-	-	-	-	-	-	-
				Possessions					-		23-Apr-09	23-Apr-09																	
					11	Establishment	Structures	5B	-	0.0%	21-Aug-08	09-May-09	262	9	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					12	Temporary Fencing	Structures	5B	-	0.0%	21-Aug-08	27-Aug-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					13	Haul Roads	Structures	5B	-	0.0%	21-Aug-08	27-Aug-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					24	Possessions 1 (12hrs)	Structures	5B	-	0.0%	28-Aug-08	28-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					C14	Remove Crash Deck and Barriers	Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					B14	Erect Network Rail Safety Barrier	Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A15	Possessions 2 (12hrs)	Structures	5B	-	0.0%	29-Aug-08	29-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					C13	Possessions 4 (12hrs)	Structures	5B	-	0.0%	09-May-09	09-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				North Abutment - Excavate and Blind					**64,518.68**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					35	North Abutment	Structures	5B	32,259.34	50.0%	28-Aug-08	03-Feb-09	160	9	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					16	Blinding	Structures	5B	32,259.34	50.0%	10-Sep-08	10-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					96	Temporary Support to Railway Lines	Structures	5B	-	0.0%	28-Aug-08	03-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					106	Excavate	Structures	5B	-	0.0%	04-Sep-08	09-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				North Abutment - Base Construction					**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					7	Concrete	Structures	5B	32,259.34	100.0%	23-Sep-08	23-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					37	Steel fixing	Structures	5B	-	0.0%	11-Sep-08	22-Sep-08	12	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					87	Shuttering	Structures	5B	-	0.0%	16-Sep-08	22-Sep-08	7	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				North Abutment - Abutment Wall					**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					28	Concrete	Structures	5B	32,259.34	100.0%	21-Oct-08	21-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					38	Shutter rear face	Structures	5B	-	0.0%	24-Sep-08	30-Sep-08	7	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					58	Steelfixing	Structures	5B	-	0.0%	03-Oct-08	14-Oct-08	12	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					128	Shutter front face	Structures	5B	-	0.0%	13-Oct-08	20-Oct-08	8	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				North Abutment - Ballast Wall					**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					A10	Ballast Wall	Structures	5B	32,259.34	100.0%	28-Jan-09	03-Feb-09	7	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				North Abutment - Wing Walls					**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					69	S23 Carricknowe bridge Backfill	Structures	5B	32,259.34	100.0%	07-Nov-08	13-Nov-08	7	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14060	S23 Carricknowe bridge Wing Walls	Structures	5B	-	0.0%	14-Nov-08	25-Nov-08	12	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14070	S23 Carricknowe bridge Parapet Beams	Structures	5B	-	0.0%	21-Jan-09	27-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14080	S23 Carricknowe bridge Backfill	Structures	5B	-	0.0%	26-Nov-08	27-Nov-08	2	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14090	S23 Carricknowe bridge Wing Walls	Structures	5B	-	0.0%	09-Dec-08	18-Dec-08	10	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				South Abutment - Excavate and Blind					**64,518.68**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					23	South Abutment	Structures	5B	32,259.34	50.0%	04-Sep-08	10-Feb-09	160	9	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					116	Blinding	Structures	5B	32,259.34	50.0%	17-Sep-08	17-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					206	Temporary Support to Railway Lines	Structures	5B	-	0.0%	04-Sep-08	10-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					236	Excavate	Structures	5B	-	0.0%	11-Sep-08	16-Sep-08	6	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				South Abutment - Base Construction					**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					97	Concrete	Structures	5B	32,259.34	100.0%	08-Oct-08	08-Oct-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					177	Steel fixing	Structures	5B	-	0.0%	23-Sep-08	02-Oct-08	10	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					237	Shuttering	Structures	5B	-	0.0%	01-Oct-08	07-Oct-08	7	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				South Abutment - Abutment Wall					**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					688	Concrete	Structures	5B	32,259.34	100.0%	31-Oct-08	31-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					698	Shutter rear face	Structures	5B	-	0.0%	09-Oct-08	15-Oct-08	7	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					708	Steelfixing	Structures	5B	-	0.0%	15-Oct-08	24-Oct-08	10	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					718	Shutter front face	Structures	5B	-	0.0%	23-Oct-08	30-Oct-08	8	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14040	Strike Shutters and Cure	Structures	5B	-	0.0%	03-Nov-08	14-Nov-08	12	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				South Abutment - Ballast Wall					**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					A14050	Ballast Wall	Structures	5B	32,259.34	100.0%	04-Feb-09	10-Feb-09	7	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				South Abutment - Wing Walls					**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					89	S23 Carricknowe bridge Backfill	Structures	5B	32,259.34	100.0%	17-Nov-08	21-Nov-08	5	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14100	S23 Carricknowe bridge Wing Walls	Structures	5B	-	0.0%	26-Nov-08	08-Dec-08	13	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14110	S23 Carricknowe bridge Parapet Beams	Structures	5B	-	0.0%	14-Jan-09	20-Jan-09	7	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1012	S23 Carricknowe bridge Backfill	Structures	5B	-	0.0%	09-Dec-08	10-Dec-08	2	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1015	S23 Carricknowe bridge Wing Walls	Structures	5B	-	0.0%	19-Dec-08	13-Jan-09	26	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Superstructure - Reinforced Concrete Deck					**64,518.68**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					31	Superstructure	Structures	5B	32,259.34	50.0%	03-Nov-08	30-Mar-09	148	11	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					104	Permanent Formwork	Structures	5B	32,259.34	50.0%	06-Jan-09	22-Jan-09	17	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					285	Deck Reinforcement	Structures	5B	-	0.0%	23-Jan-09	06-Feb-09	15	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					246	Deck Shuttering	Structures	5B	-	0.0%	06-Jan-09	09-Feb-09	35	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					27	Concrete Diaphragms	Structures	5B	-	0.0%	20-Jan-09	20-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					247	Concrete Deck	Structures	5B	-	0.0%	27-Jan-09	27-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					257	Concrete Parapet Beam	Structures	5B	-	0.0%	10-Feb-09	10-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Superstructure - Deck Finishes					**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					728	S23 Carricknowe Bridge Waterproofing (inc. deck curing)	Structures	5B	32,259.34	100.0%	11-Feb-09	24-Feb-09	14	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					59	S23 Carricknowe Bridge Expansion Joints	Structures	5B	-	0.0%	25-Feb-09	25-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					70	S23 Carricknowe Bridge Parapet Rails	Structures	5B	-	0.0%	26-Feb-09	04-Mar-09	7	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					80	S23 Carricknowe Bridge Walkway Constructon	Structures	5B	-	0.0%	17-Mar-09	30-Mar-09	14	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Superstructure - Pre cast Concrete Beams					**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					32	Bearings	Structures	5B	32,259.34	100.0%	03-Nov-08	04-Nov-08	2	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					63	Possession 3 (16hrs)	Structures	5B	-	0.0%	02-Jan-09	02-Jan-09	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					93	Place Beams	Structures	5B	-	0.0%	02-Jan-09	03-Jan-09	2	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					193	Erect Crash Deck	Structures	5B	-	0.0%	05-Jan-09	05-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Superstructure - Run On Run Off Slabs					**32,259.34**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					34	Backfill and cast slab south	Structures	5B	32,259.34	100.0%	28-Jan-09	06-Feb-09	10	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					275	Backfill and cast slab north	Structures	5B	-	0.0%	03-Feb-09	12-Feb-09	10	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Trackwork						**32,259.34**							-	-	-	-	-	-	-	-	-	-	-	-	-
					44	Containment Slabs	Structures	5B	-	0.0%	05-Mar-09	16-Mar-09	12	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					45	Fix Rails	Structures	5B	32,259.34	100.0%	19-Mar-09	30-Mar-09	12	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			E & M Installations						**399,272.16**							-	-	-	-	-	-	-	-	-	-	-	-	-
					64	OLE Supports	OLE	5B	32,259.34	8.1%	31-Mar-09	09-Apr-09	10	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					75	Catenary Cables	OLE	5B	32,259.34	8.1%	13-Apr-09	22-Apr-09	10	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					265	OLE Supports and Catenary over Tracks	OLE	5B	32,259.34	8.1%	11-May-09	11-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					94	Possessions 4 (12hrs)	OLE	5B	-	0.0%	09-May-09	09-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5B	6,842.89	1.7%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	OLE	5B	25,000.00	6.3%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Cnt. Milestone	Completion of Construct Carricknowe Bridge (S23) (3)	OLE	5B	-	0.0%		11-May-09				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	5B	267,944.74	67.1%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	5B	2,706.51	0.7%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Saughton Road Bridge (S24)																										
			Bridge						-	0%						-	-	-	-	-	-	-	-	-	-	-	-	-
					121	Existing Structure	Structures	5B	-	0.0%	03-Jun-08	03-Jun-08	1	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ballasted Track 1160m																										
			Trackwork						**2,438,501.19**							-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0062

Project: Edinburgh Tram Network
Subject: Milestone Payment Schedule
Currency: GBP

The Murray Services Group BILFINGER BERGER SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name		Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year / Period / Period End	2008 1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	2008 7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
					1534	OLE Foundations - Drainage	Track - BB	5B	18,443.11	0.8%	23-Sep-08	23-Oct-08	31	10	11											18,443			18,443
					1533	Earthworks - Subbase	Track	5B	359,350.96	14.7%	26-Aug-08	22-Sep-08	28	9	10										359,351					359,351
					1609	Bottom Ballast - Ducts	Track	5B	239,567.31	9.8%	24-Oct-08	25-Nov-08	33	11	12												239,567			239,567
					1619	Track laying - 50%	Track	5B	718,701.92	29.5%	16-Jan-09	13-Feb-09	29	14	15															-
					1619	Track laying	Track	5B	598,918.27	24.6%	16-Jan-09	13-Feb-09	29	14	15															-
					1629	Top Ballast	Track	5B	239,567.31	9.8%	16-Feb-09	06-Mar-09	19	15	16															-
					1639	Fencing & Trackside Finishes	Track	5B	239,567.31	9.8%	09-Mar-09	08-Apr-09	31	16	17															-
						Snagging	Snagging	Track	5B	24,385.01	1.0%				17	18														-
					Concrete Slab Track 99om																									
					Trackwork				1,307,406.53																					
					1544	OLE Foundations - Drainage - Ducts	Track - BB	5B	9,380.55	0.7%	15-Sep-08	16-Oct-08	32	10	11															9,381
					1543	Earthworks- Subbase - 50%	Track	5B	192,742.79	14.7%	28-Jul-08	12-Sep-08	47	8	9															192,743
					1543	Earthworks- Subbase	Track	5B	192,742.79	14.7%	28-Jul-08	12-Sep-08	47	8	9															192,743
					1659	Track laying - 50%	Track	5B	385,485.58	29.5%	02-Dec-08	20-Jan-09	50	12	14															-
					1659	Track laying - 50%	Track	5B	385,485.58	29.5%	02-Dec-08	20-Jan-09	50	12	14															-
					1679	Fencing & Finishes	Track	5B	128,495.19	9.8%	21-Jan-09	05-Feb-09	16	14	15															-
						Snagging	Snagging	Track	5B	13,074.07	1.0%				15	16														-
					Saughton Road North Tram Stop																									
					Tramstop				283,546.57																					
					123	Civil Engineering and Building Works	Tramstops	5B	77,039.41	27.2%	21-Jan-09	28-Feb-09	39	14	16															-
					123	Civil Engineering and Building Works	Tramstops	5B	77,039.41	27.2%	01-Mar-09	22-Apr-09	54	16	17															-
					Snagging	Snagging	Tramstops	5B	1,556.35	0.5%				17	18														-
					A2080	Deliver and Install Shelter	Tramstops	5B	51,359.61	18.1%	16-Feb-10	02-Mar-10	15	28	29															-
					Snagging	Snagging	Tramstops	5B	518.78	0.2%				29	30														-
					248	Order REC Supply	Trams Eq	5B	-	0.0%	05-Jan-10	05-Jan-10	1	27	27															-
					A5190	Package Test Tramstop	Trams Eq	5B	18,818.17	6.6%	13-May-10	20-May-10	8	31	31															-
					A5160	Install LV Power Supply and LV Power Equipment	Trams Eq	5B	18,818.17	6.6%	02-Mar-10	07-Apr-10	37	29	30															-
					A5170	Install Telecon Equipment	Trams Eq	5B	18,818.17	6.6%	07-Apr-10	06-May-10	30	30	31															-
					A5180	Install Station Control Equipment + AFC Equipment	Trams Eq	5B	18,818.17	6.6%	07-Apr-10	13-May-10	37	30	31															-
					A5159	Access for E&M Tram Stop installation (05B Saughton Road North)	Trams Eq	5B	-	0.0%	02-Mar-10	02-Mar-10	1	29	29															-
					A5158	Access for visual inspection for E&M Tram Stop installation (05B Saughton Road North)	Trams Eq	5B	-	0.0%	29-Jan-10	29-Jan-10	1	27	27															-
						Snagging	Trams Eq	5B	760.33	0.3%				31	32														-
					05B3 Saughton Road North (exc.) to South Gyle Access (inc.)				4,589,921.67														57,694	25,577		299,634		274,413		657,319
					Bankhead Drive Substation																									
					Substation				449,846.04																					
					266	Completion of envelope	Subst - BB	5B	80,965.67	18.0%	01-Mar-09	17-Apr-09	49	16	17															-
					266	Civil Engineering and Building Works	Subst - BB	5B	80,965.67	18.0%	16-Jan-09	28-Feb-09	44	14	16															-
					Snagging	Snagging	Subst - BB	5B	817.84	0.2%				17	18														-
					256	Order REC supply from Scottish Power	Subst - S	5B	-	0.0%	12-Dec-08	12-Dec-08	1	13	13															-
					A5880	Power Infeed from Public Net available inc HV cable	Subst - S	5B	-	0.0%	20-Apr-09	20-Apr-09	1	17	17															-
					A5900	Installation of TPS Equipment	Subst - S	5B	71,056.48	15.8%	28-Apr-10	11-Jun-10	45	31	32															-
					A5890	Install LV Power Supply and LV Power Equipment	Subst - S	5B	71,056.48	15.8%	14-Apr-10	06-May-10	23	30	31															-
					A5920	Testing and Commissioning	Subst - S	5B	71,056.48	15.8%	11-Jun-10	01-Jul-10	21	32	33															-
					A5910	Install Telecom and Scada	Subst - S	5B	71,056.48	15.8%	20-May-10	11-Jun-10	23	31	32															-
					A2259	Access for E&M Substation installation (05B Bankhead Drive)	Subst - S	5B	-	0.0%	20-Apr-09	20-Apr-09	1	17	17															-
					A2258	Access for visual inspection for E&M Substation installation (05B Bankhead Drive)	Subst - S	5B	-	0.0%	19-Mar-09	19-Mar-09	1	16	16															-
						Snagging	Subst - S	5B	2,870.97	0.6%				32	33														-
					Bankhead Retaining Wall (W11)																									
					Retaining Wall				83,271.17														57,694	25,577						83,271
					127	Retaining Wall Construction	Structures	5B	57,694.23	69.3%	11-Jun-08	08-Jul-08	28	6	7								57,694	-						57,694
					Snagging	Snagging	Structures	5B	576.94	0.7%				7	8								-	577						577
					3rd Party	Third Party Sign-off	Structures	5B	25,000.00	30.0%				7	8								-	25,000						25,000
					Broomhouse Road Bridge (S25)																									
					Bridge				-																					
					125	Existing Structure	Structures	5B	-	0.0%	12-Dec-08	14-Jul-09	215	13	20															-
					South Gyle Access Tram Stop																									
					Tramstop				283,546.57																					
					129	Civil Engineering and Building Works	Tramstops	5B	77,039.41	27.2%	16-Jan-09	28-Feb-09	44	14	16															-
					129	Civil Engineering and Building Works	Tramstops	5B	77,039.41	27.2%	01-Mar-09	17-Apr-09	49	16	17															-
					Snagging	Snagging	Tramstops	5B	1,556.35	0.5%				17	18														-
					A2230	Deliver and Install Shelter	Tramstops	5B	51,359.61	18.1%	19-Oct-09	02-Nov-09	15	24	24															-
					Snagging	Snagging	Tramstops	5B	518.78	0.2%				24	25														-
					318	Order REC Supply	Trams Eq	5B	-	0.0%	07-Sep-09	07-Sep-09	1	22	22															-
					A5230	Package Test Tramstop	Trams Eq	5B	18,818.17	6.6%	26-Jan-10	02-Feb-10	8	27	28															-
					A5200	Install LV Power Supply and LV Power Equipment	Trams Eq	5B	18,818.17	6.6%	02-Nov-09	08-Dec-09	37	24	26															-
					A5210	Install Telecon Equipment	Trams Eq	5B	18,818.17	6.6%	08-Dec-09	19-Jan-10	43	26	27															-
					A5220	Install Station Control Equipment + AFC Equipment	Trams Eq	5B	18,818.17	6.6%	08-Dec-09	26-Jan-10	50	26	27															-
					A5199	Access for E&M Tram Stop installation (05B South Gyle)	Trams Eq	5B	-	0.0%	02-Nov-09	02-Nov-09	1	24	24															-
					A5198	Access for visual inspection for E&M Tram Stop installation (05B South Gyle)	Trams Eq	5B	-	0.0%	01-Oct-09	01-Oct-09	1	23	23															-
						Snagging	Trams Eq	5B	760.33	0.3%				28	29														-
					South Gyle Access Bridge (S26)																									
					Bridge				779,382.04																	299,634				299,634
					156	Substructure - Extend Piles	Structures	5B	149,817.10	19.2%	13-Jun-08	08-Oct-08	118	6	10											149,817				149,817
					156	Substructure - Construct Pile Cap	Structures	5B	149,817.10	19.2%	13-Jun-08	08-Oct-08	118	6	10											149,817				149,817
					276	Superstructure - Concrete Deck	Structures	5B	224,725.64	28.8%	09-Oct-08	08-Jan-09	92	10	14															-
					276	Superstructure - Run On Slabs	Structures	5B	224,725.64	28.8%	09-Oct-08	08-Jan-09	92	10	14															-
						Snagging	Structures	5B	5,296.56	0.7%				14	15														-
						3rd Party	Third Party Sign-off	Structures	5B	25,000.00	3.2%				14	15														-
					Saughton Road North to South Gyle Access Trackwork (1260m)																									
					Trackwork				2,593,875.85																			274,413		274,413
					510	OLE Foundations - Drainage - Ducts	Track - BB	5B	20,033.03	0.7%	14-Nov-08	07-Jan-09	55	12	14															-
					223	Earthworks and Subbase	Track	5B	274,413.46	9.2%	04-Nov-08	13-Nov-08	10	11	12													274,413			274,413
					919	Track laying - 25%	Track	5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14																	-
					919	Track laying - 25%	Track	5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14																	-
					919	Track laying - 25%	Track	5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14																	-
					919	Track laying	Track	5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14																	-
					939	Fencing & Trackside Finishes	Track	5B	274,413.46	9.2%	16-Jan-09	19-Feb-09	35	14	15																	-
					13000	Delay Start to Maintain Guided Busway	Track	5B	-	0.0%	03-Nov-08	03-Nov-08	1	11	11																	-
						Snagging	Track	5B	27,920.89	0.9%				14	15																-
						Highways	Highways BoQ works	Highways	5B	199,769.45	6.7%				13	14																-
						Snagging	Snagging	Highways	5B	2,017.87	0.1%				14	15																-
					05B4 South Gyle Access (exc.) to Edinburgh Park Station (inc.)				2,160,659.20																258,079		12,560	516,159	774,238	77,039	1,638,076
					South Gyle Access to Edinburgh Park Station Trackwork (790m)																									
					Trackwork				1,877,112.63																					
					500	OLE Foundations - Drainage	Track - BB	5B	12,560.39	0.7%	18-Aug-08	30-Sep-08	44	9	10													12,560			12,560
					213	Earthworks and Subbase	Track	5B	258,079.33	13.7%	25-Jul-08	15-Aug-08	22	8	8										258,079						258,079
					859	Ducts and Bottom Ballast	Track	5B	516,158.65	27.5%	01-Oct-08	22-Oct-08	22	10	11														516,159			516,159
					879	Track laying	Track	5B	602,185.09	32.1%	23-Oct-08	19-Nov-08	28	11	12															602,185		602,185
					889	Top Ballast	Track	5B	172,052.88	9.2%	20-Nov-08	04-Dec-08	15	12	12															172,053		172,053
					899	Fencing and Trackside finishes	Track	5B	172,052.88	9.2%	05-Dec-08	09-Jan-09	36	12	14																	-
						Snagging	Snagging	Track	5B	17,505.95	0.9%				14	15																-
						Highways	Highways BoQ works	Highways	5B	125,252.28	6.7%				13	14																-
						Snagging	Snagging	Highways	5B	1,265.17	0.1%				14	15																-
					Edinburgh Park Station Tram Stop																									
					Tramstop				283,546.57																				77,039	77,039
					132	Civil Engineering and Builderworks	Tramstops	5B	77,039.41	27.2%	20-Nov-08	31-Dec-08	42	12	13															77,039	77,039
					132	Civil Engineering and Builderworks	Tramstops	5B	77,039.41	27.2%	01-Jan-09	05-Mar-09	65	13	16															-
					Snagging	Snagging	Tramstops	5B	1,556.35	0.5%				16	17														-
					A2140	Deliver and Install Shelter	Tramstops	5B	51,359.61	18.1%	22-Apr-09	07-May-09	16	17	18															-
					Snagging	Snagging	Tramstops	5B	518.78	0.2%				18	19														-
					278	Order REC Supply	Trams Eq	5B	-	0.0%	10-Mar-09	10-Mar-09	1	16	16															-
					A5270	Package Test Tramstop	Trams Eq	5B	15,054.53	5.3%	17-Jul-09	24-Jul-09	8	20	21															-
					A5240	Install LV Power Supply and LV Power Equipment	Trams Eq	5B	15,054.53	5.3%	07-May-09	12-Jun-09	37	18	19															-
					A5250	Install Telecon Equipment	Trams Eq	5B	15,054.53	5.3%	12-Jun-09	10-Jul-09	29	19	20															-
					A5260	Install Station Control Equipment + AFC Equipment	Trams Eq	5B	15,054.53	5.3%	12-Jun-09	17-Jul-09	36	19	20															-
					A6290	Installation of SIG-interlocking cubicle	Trams Eq	5B	15,054.53	5.3%	21-May-09	11-Jun-09	22	18	19															-
					A6300	Commissioning of SIG -interlocking cubicle	Trams Eq	5B	-	0.0%	08-Apr-10	14-Apr-10	7	30	30															-
					A5239	Access for E&M Tram Stop installation (05B Edinburgh Park Station)	Trams Eq	5B	-	0.0%	07-May-09	07-May-09	1	18	18															-
					A5238	Access for visual inspection for E&M Tram Stop installation (05B Edinburgh Park Station)	Trams Eq	5B	-	0.0%	07-Apr-09	07-Apr-09	1	17	17															-
						Snagging	Trams Eq	5B	760.33	0.3%				30	31														-
					05B5 Edinburgh Park Station (exc.) to Edinburgh Park				5,837,817.09																238,972	119,486	477,943	597,429	238,972	-	1,672,801
					Edinburgh Park Tram Stop																									
					Tramstop				206,507.16																					
					166	Civil Engineering and Building Works	Tramstops	5B	77,039.41	37.3%	09-Sep-09	31-Oct-09	53	22	24															-

USB00000073_0063

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					1534	OLE Foundations - Drainage	Track - BB	5B	18,443.11	0.8%	23-Sep-08	23-Oct-08	31	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1533	Earthworks - Subbase	Track	5B	359,350.96	14.7%	26-Aug-08	22-Sep-08	28	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1609	Bottom Ballast - Ducts	Track	5B	239,567.31	9.8%	24-Oct-08	25-Nov-08	33	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1619	Track laying - 50%	Track	5B	718,701.92	29.5%	16-Jan-09	13-Feb-09	29	14	15	-	718,702	-	-	-	-	-	-	-	-	-	-	-	718,702
					1619	Track laying	Track	5B	598,918.27	24.6%	16-Jan-09	13-Feb-09	29	14	15	-	598,918	-	-	-	-	-	-	-	-	-	-	-	598,918
					1629	Top Ballast	Track	5B	239,567.31	9.8%	16-Feb-09	06-Mar-09	19	15	16	-	-	239,567	-	-	-	-	-	-	-	-	-	-	239,567
					1639	Fencing & Trackside Finishes	Track	5B	239,567.31	9.8%	09-Mar-09	08-Apr-09	31	16	17	-	-	-	239,567	-	-	-	-	-	-	-	-	-	239,567
					Snagging	Snagging	Track	5B	24,385.01	1.0%				17	18	-	-	-	-	24,385	-	-	-	-	-	-	-	-	24,385
			Concrete Slab Track 980m																										
			Trackwork						**1,307,406.53**							**770,971**	**128,495**	**13,074**	-	-	-	-	-	-	-	-	-	-	**912,540**
					1544	OLE Foundations - Drainage - Ducts	Track - BB	5B	9,380.55	0.7%	15-Sep-08	16-Oct-08	32	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1543	Earthworks- Subbase - 50%	Track	5B	192,742.79	14.7%	28-Jul-08	12-Sep-08	47	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1543	Earthworks- Subbase	Track	5B	192,742.79	14.7%	28-Jul-08	12-Sep-08	47	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1659	Track laying - 50%	Track	5B	385,485.58	29.5%	02-Dec-08	20-Jan-09	50	12	14	385,486	-	-	-	-	-	-	-	-	-	-	-	-	385,486
					1659	Track laying - 50%	Track	5B	385,485.58	29.5%	02-Dec-08	20-Jan-09	50	12	14	385,486	-	-	-	-	-	-	-	-	-	-	-	-	385,486
					1679	Fencing & Finishes	Track	5B	128,495.19	9.8%	21-Jan-09	05-Feb-09	16	14	15	-	128,495	-	-	-	-	-	-	-	-	-	-	-	128,495
					Snagging	Snagging	Track	5B	13,074.07	1.0%				15	16	-	-	13,074	-	-	-	-	-	-	-	-	-	-	13,074
			Saughton Road North Tram Stop																										
			Tramstop						**283,546.57**							-	-	**77,039**	**77,039**	**1,556**	-	-	-	-	-	-	-	-	**155,635**
					123	Civil Engineering and Building Works	Tramstops	5B	77,039.41	27.2%	21-Jan-09	28-Feb-09	39	14	16	-	-	77,039	-	-	-	-	-	-	-	-	-	-	77,039
					123	Civil Engineering and Building Works	Tramstops	5B	77,039.41	27.2%	01-Mar-09	22-Apr-09	54	16	17	-	-	-	77,039	-	-	-	-	-	-	-	-	-	77,039
					Snagging	Snagging	Tramstops	5B	1,556.35	0.5%				17	18	-	-	-	-	1,556	-	-	-	-	-	-	-	-	1,556
					A2080	Deliver and Install Shelter	Tramstops	5B	51,359.61	18.1%	16-Feb-10	02-Mar-10	15	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5B	518.78	0.2%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					248	Order REC Supply	Trams Eq	5B	-	0.0%	05-Jan-10	05-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5190	Package Test Tramstop	Trams Eq	5B	18,818.17	6.6%	13-May-10	20-May-10	8	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5160	Install LV Power Supply and LV Power Equipment	Trams Eq	5B	18,818.17	6.6%	02-Mar-10	07-Apr-10	37	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5170	Install Telecon Equipment	Trams Eq	5B	18,818.17	6.6%	07-Apr-10	06-May-10	30	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5180	Install Station Control Equipment + AFC Equipment	Trams Eq	5B	18,818.17	6.6%	07-Apr-10	13-May-10	37	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5159	Access for E&M Tram Stop installation (05B Saughton Road North)	Trams Eq	5B	-	0.0%	02-Mar-10	02-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5158	Access for visual inspection for E&M Tram Stop installation (05B Saughton Road North)	Trams Eq	5B	-	0.0%	29-Jan-10	29-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5B	760.33	0.3%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			05B3 Saughton Road North (exc.) to South Gyle Access (inc.)						**4,589,921.67**							**2,864,561**	**334,649**	**158,005**	**158,005**	**2,374**	-	-	-	-	-	**51,360**	**519**	**18,818**	**3,588,291**
			Bankhead Drive Substation																										
			Substation						**449,846.04**							-	-	**80,966**	**80,966**	**818**	-	-	-	-	-	-	-	-	**162,749**
					266	Completion of envelope	Subst - BB	5B	80,965.67	18.0%	01-Mar-09	17-Apr-09	49	16	17	-	-	-	80,966	-	-	-	-	-	-	-	-	-	80,966
					266	Civil Engineering and Building Works	Subst - BB	5B	80,965.67	18.0%	16-Jan-09	28-Feb-09	44	14	16	-	-	80,966	-	-	-	-	-	-	-	-	-	-	80,966
					Snagging	Snagging	Subst - BB	5B	817.84	0.2%				17	18	-	-	-	-	818	-	-	-	-	-	-	-	-	818
					256	Order REC supply from Scottish Power	Subst - S	5B	-	0.0%	12-Dec-08	12-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5880	Power Infeed from Public Net available inc HV cable	Subst - S	5B	-	0.0%	20-Apr-09	20-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5900	Installation of TPS Equipment	Subst - S	5B	71,056.48	15.8%	28-Apr-10	11-Jun-10	45	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5890	Install LV Power Supply and LV Power Equipment	Subst - S	5B	71,056.48	15.8%	14-Apr-10	06-May-10	23	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5920	Testing and Commissioning	Subst - S	5B	71,056.48	15.8%	11-Jun-10	01-Jul-10	21	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5910	Install Telecom and Scada	Subst - S	5B	71,056.48	15.8%	20-May-10	11-Jun-10	23	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2259	Access for E&M Substation installation (05B Bankhead Drive)	Subst - S	5B	-	0.0%	20-Apr-09	20-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2258	Access for visual inspection for E&M Substation installation (05B Bankhead Drive)	Subst - S	5B	-	0.0%	19-Mar-09	19-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	5B	2,870.97	0.6%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Bankhead Retaining Wall (W11)																										
			Retaining Wall						**83,271.17**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					127	Retaining Wall Construction	Structures	5B	57,694.23	69.3%	11-Jun-08	08-Jul-08	28	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5B	576.94	0.7%				7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5B	25,000.00	30.0%				7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Broomhouse Road Bridge (S25)																										
			Bridge						-							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					125	Existing Structure	Structures	5B	-	0.0%	12-Dec-08	14-Jul-09	215	13	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			South Gyle Access Tram Stop																										
			Tramstop						**283,546.57**							-	-	**77,039**	**77,039**	**1,556**	-	-	-	-	-	**51,360**	**519**	**18,818**	**226,332**
					129	Civil Engineering and Building Works	Tramstops	5B	77,039.41	27.2%	16-Jan-09	28-Feb-09	44	14	16	-	-	77,039	-	-	-	-	-	-	-	-	-	-	77,039
					129	Civil Engineering and Building Works	Tramstops	5B	77,039.41	27.2%	01-Mar-09	17-Apr-09	49	16	17	-	-	-	77,039	-	-	-	-	-	-	-	-	-	77,039
					Snagging	Snagging	Tramstops	5B	1,556.35	0.5%				17	18	-	-	-	-	1,556	-	-	-	-	-	-	-	-	1,556
					A2230	Deliver and Install Shelter	Tramstops	5B	51,359.61	18.1%	19-Oct-09	02-Nov-09	15	24	24	-	-	-	-	-	-	-	-	-	-	51,360	-	-	51,360
					Snagging	Snagging	Tramstops	5B	518.78	0.2%				25	25	-	-	-	-	-	-	-	-	-	-	-	519	-	519
					318	Order REC Supply	Trams Eq	5B	-	0.0%	07-Sep-09	07-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5230	Package Test Tramstop	Trams Eq	5B	18,818.17	6.6%	26-Jan-10	02-Feb-10	8	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5200	Install LV Power Supply and LV Power Equipment	Trams Eq	5B	18,818.17	6.6%	02-Nov-09	08-Dec-09	37	24	26	-	-	-	-	-	-	-	-	-	-	-	-	18,818	18,818
					A5210	Install Telecon Equipment	Trams Eq	5B	18,818.17	6.6%	08-Dec-09	19-Jan-10	43	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5220	Install Station Control Equipment + AFC Equipment	Trams Eq	5B	18,818.17	6.6%	08-Dec-09	26-Jan-10	50	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5199	Access for E&M Tram Stop installation (05B South Gyle)	Trams Eq	5B	-	0.0%	02-Nov-09	02-Nov-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5198	Access for visual inspection for E&M Tram Stop installation (05B South Gyle)	Trams Eq	5B	-	0.0%	01-Oct-09	01-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5B	760.33	0.3%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			South Gyle Access Bridge (S26)																										
			Bridge						**779,382.04**							**449,451**	**30,297**	-	-	-	-	-	-	-	-	-	-	-	**479,748**
					156	Substructure - Extend Piles	Structures	5B	149,817.10	19.2%	13-Jun-08	08-Oct-08	118	6	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					156	Substructure - Construct Pile Cap	Structures	5B	149,817.10	19.2%	13-Jun-08	08-Oct-08	118	6	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					276	Superstructure - Concrete Deck	Structures	5B	224,725.64	28.8%	09-Oct-08	08-Jan-09	92	10	14	224,726	-	-	-	-	-	-	-	-	-	-	-	-	224,726
					276	Superstructure - Run On Slabs	Structures	5B	224,725.64	28.8%	09-Oct-08	08-Jan-09	92	10	14	224,726	-	-	-	-	-	-	-	-	-	-	-	-	224,726
					Snagging	Snagging	Structures	5B	5,296.56	0.7%				14	15	-	5,297	-	-	-	-	-	-	-	-	-	-	-	5,297
					3rd Party	Third Party Sign-off	Structures	5B	25,000.00	3.2%				14	15	-	25,000	-	-	-	-	-	-	-	-	-	-	-	25,000
			Saughton Road North to South Gyle Access Trackwork (1260m)																										
			Trackwork						**2,992,875.85**							**2,415,110**	**304,352**	-	-	-	-	-	-	-	-	-	-	-	**2,719,462**
					510	OLE Foundations - Drainage - Ducts	Track - BB	5B	20,033.03	0.7%	14-Nov-08	07-Jan-09	55	12	14	20,033	-	-	-	-	-	-	-	-	-	-	-	-	20,033
					223	Earthworks and Subbase	Track	5B	274,413.46	9.2%	04-Nov-08	13-Nov-08	10	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					919	Track laying - 25%	Track	5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14	548,827	-	-	-	-	-	-	-	-	-	-	-	-	548,827
					919	Track laying - 25%	Track	5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14	548,827	-	-	-	-	-	-	-	-	-	-	-	-	548,827
					919	Track laying - 25%	Track	5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14	548,827	-	-	-	-	-	-	-	-	-	-	-	-	548,827
					919	Track laying	Track	5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14	548,827	-	-	-	-	-	-	-	-	-	-	-	-	548,827
					939	Fencing & Trackside Finishes	Track	5B	274,413.46	9.2%	16-Jan-09	19-Feb-09	35	14	15	-	274,413	-	-	-	-	-	-	-	-	-	-	-	274,413
					13000	Delay Start to Maintain Guided Busway	Track	5B	-	0.0%	03-Nov-08	03-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5B	27,920.89	0.9%				14	15	-	27,921	-	-	-	-	-	-	-	-	-	-	-	27,921
					Highways	Highways BoQ works	Highways	5B	199,769.45	6.7%				13	14	199,769	-	-	-	-	-	-	-	-	-	-	-	-	199,769
					Snagging	Snagging	Highways	5B	2,017.87	0.1%				14	15	-	2,018	-	-	-	-	-	-	-	-	-	-	-	2,018
			05B4 South Gyle Access (exc.) to Edinburgh Park Station (inc.)						**2,160,659.20**							**297,305**	**18,771**	**77,039**	**1,556**	**51,360**	**30,628**	**30,109**	**15,055**	-	-	-	-	-	**521,823**
			South Gyle Access to Edinburgh Park Station Trackwork (700m)																										
			Trackwork						**1,877,112.63**							**297,305**	**18,771**	-	-	-	-	-	-	-	-	-	-	-	**316,076**
					500	OLE Foundations - Drainage	Track - BB	5B	12,560.39	0.7%	18-Aug-08	30-Sep-08	44	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					213	Earthworks and Subbase	Track	5B	258,079.33	13.7%	25-Jul-08	15-Aug-08	22	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					859	Ducts and Bottom Ballast	Track	5B	516,158.65	27.5%	01-Oct-08	22-Oct-08	22	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					879	Track laying	Track	5B	602,185.09	32.1%	23-Oct-08	19-Nov-08	28	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					899	Top Ballast	Track	5B	172,052.88	9.2%	20-Nov-08	04-Dec-08	15	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					899	Fencing and Trackside finishes	Track	5B	172,052.88	9.2%	05-Dec-08	09-Jan-09	36	12	14	172,053	-	-	-	-	-	-	-	-	-	-	-	-	172,053
					Snagging	Snagging	Track	5B	17,505.95	0.9%				14	15	-	17,506	-	-	-	-	-	-	-	-	-	-	-	17,506
					Highways	Highways BoQ works	Highways	5B	125,252.28	6.7%				13	14	125,252	-	-	-	-	-	-	-	-	-	-	-	-	125,252
					Snagging	Snagging	Highways	5B	1,265.17	0.1%				14	15	-	1,265	-	-	-	-	-	-	-	-	-	-	-	1,265
			Edinburgh Park Station Tram Stop																										
			Tramstop						**283,546.57**							-	-	**77,039**	**1,556**	**51,360**	**30,628**	**30,109**	**15,055**	-	-	-	-	-	**205,747**
					132	Civil Engineering and Builderworks	Tramstops	5B	77,039.41	27.2%	20-Nov-08	31-Dec-08	42	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					132	Civil Engineering and Builderworks	Tramstops	5B	77,039.41	27.2%	01-Jan-09	05-Mar-09	65	13	16	-	-	77,039	-	-	-	-	-	-	-	-	-	-	77,039
					Snagging	Snagging	Tramstops	5B	1,556.35	0.5%				16	17	-	-	-	1,556	-	-	-	-	-	-	-	-	-	1,556
					A2140	Deliver and Install Shelter	Tramstops	5B	51,359.61	18.1%	22-Apr-09	07-May-09	16	17	18	-	-	-	-	51,360	-	-	-	-	-	-	-	-	51,360
					Snagging	Snagging	Tramstops	5B	518.78	0.2%				18	19	-	-	-	-	-	519	-	-	-	-	-	-	-	519
					278	Order REC Supply	Trams Eq	5B	-	0.0%	10-Mar-09	10-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5270	Package Test Tramstop	Trams Eq	5B	15,054.53	5.3%	17-Jul-09	24-Jul-09	8	20	21	-	-	-	-	-	-	-	15,055	-	-	-	-	-	15,055
					A5240	Install LV Power Supply and LV Power Equipment	Trams Eq	5B	15,054.53	5.3%	07-May-09	12-Jun-09	37	18	19	-	-	-	-	-	15,055	-	-	-	-	-	-	-	15,055
					A5250	Install Telecon Equipment	Trams Eq	5B	15,054.53	5.3%	12-Jun-09	10-Jul-09	29	19	20	-	-	-	-	-	-	15,055	-	-	-	-	-	-	15,055
					A5260	Install Station Control Equipment + AFC Equipment	Trams Eq	5B	15,054.53	5.3%	12-Jun-09	17-Jul-09	36	19	20	-	-	-	-	-	-	-	15,055	-	-	-	-	-	15,055
					A6290	Installation of SIG-interlocking cubicle	Trams Eq	5B	15,054.53	5.3%	21-May-09	11-Jun-09	22	18	19	-	-	-	-	-	15,055	-	-	-	-	-	-	-	15,055
					A6300	Commissioning of SIG -interlocking cubicle	Trams Eq	5B	-	0.0%	08-Apr-10	14-Apr-10	7	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5239	Access for E&M Tram Stop installation (05B Edinburgh Park Station)	Trams Eq	5B	-	0.0%	07-May-09	07-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5238	Access for visual inspection for E&M Tram Stop installation (05B Edinburgh Park Station)	Trams Eq	5B	-	0.0%	07-Apr-09	07-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5B	760.33	0.3%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			05B5 Edinburgh Park Station (exc.) to Edinburgh Park						**5,837,817.09**							-	**238,972**	**358,457**	**544,449**	**611,007**	**424,963**	**60,001**	-	**1,301,939**	-	**398,430**	**20,292**	**77,039**	**4,035,549**
			Edinburgh Park Tram Stop																										
			Tramstop						**206,507.16**							-	-	-	-	-	-	-	-	-	-	-	-	**77,039**	**77,039**
					166	Civil Engineering and Building Works	Tramstops	5B	77,039.41	37.3%	09-Sep-09	31-Oct-09	53	22	24	-	-	-	-	-	-	-	-	-	-	77,039	-	-	77,039

USB00000073_0064

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

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Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name		Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					1534	OLE Foundations - Drainage	Track - BB	5B	18,443.11	0.8%	23-Sep-08	23-Oct-08	31	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					1533	Earthworks - Subbase	Track	5B	359,350.96	14.7%	26-Aug-08	22-Sep-08	28	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					1609	Bottom Ballast - Ducts	Track	5B	239,567.31	9.8%	24-Oct-08	25-Nov-08	33	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					1619	Track laying - 50%	Track	5B	718,701.92	29.5%	16-Jan-09	13-Feb-09	29	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					1619	Track laying	Track	5B	598,918.27	24.6%	16-Jan-09	13-Feb-09	29	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					1629	Top Ballast	Track	5B	239,567.31	9.8%	16-Feb-09	06-Mar-09	19	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					1639	Fencing & Trackside Finishes	Track	5B	239,567.31	9.8%	09-Mar-09	08-Apr-09	31	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5B	24,385.01	1.0%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Concrete Slab Track 590m																									
			Trackwork						**1,307,406.53**							-	-	-	-	-	-	-	-	-	-	-	-	-
					1544	OLE Foundations - Drainage - Ducts	Track - BB	5B	9,380.55	0.7%	15-Sep-08	16-Oct-08	32	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					1543	Earthworks- Subbase - 50%	Track	5B	192,742.79	14.7%	28-Jul-08	12-Sep-08	47	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-
					1543	Earthworks- Subbase	Track	5B	192,742.79	14.7%	28-Jul-08	12-Sep-08	47	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-
					1659	Track laying - 50%	Track	5B	385,485.58	29.5%	02-Dec-08	20-Jan-09	50	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					1659	Track laying - 50%	Track	5B	385,485.58	29.5%	02-Dec-08	20-Jan-09	50	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					1679	Fencing & Finishes	Track	5B	128,495.19	9.8%	21-Jan-09	05-Feb-09	16	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5B	13,074.07	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Saughton Road North Tram Stop																									
			Tramstop						**283,546.57**							-	-	**51,360**	**19,337**	**56,455**	**760**	-	-	-	-	-	-	**127,911**
					123	Civil Engineering and Building Works	Tramstops	5B	77,039.41	27.2%	21-Jan-09	28-Feb-09	39	14	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					123	Civil Engineering and Building Works	Tramstops	5B	77,039.41	27.2%	01-Mar-09	22-Apr-09	54	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5B	1,556.35	0.5%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2080	Deliver and Install Shelter	Tramstops	5B	51,359.61	18.1%	16-Feb-10	02-Mar-10	15	28	29	-	-	51,360	-	-	-	-	-	-	-	-	-	51,360
					Snagging	Snagging	Tramstops	5B	518.78	0.2%				29	30	-	-	-	519	-	-	-	-	-	-	-	-	-	519
					248	Order REC Supply	Trams Eq	5B	-	0.0%	05-Jan-10	05-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5190	Package Test Tramstop	Trams Eq	5B	18,818.17	6.6%	13-May-10	20-May-10	8	31	31	-	-	-	-	18,818	-	-	-	-	-	-	-	-	18,818
					A5160	Install LV Power Supply and LV Power Equipment	Trams Eq	5B	18,818.17	6.6%	02-Mar-10	07-Apr-10	37	29	30	-	-	-	18,818	-	-	-	-	-	-	-	-	18,818
					A5170	Install Telecon Equipment	Trams Eq	5B	18,818.17	6.6%	07-Apr-10	06-May-10	30	30	31	-	-	-	-	18,818	-	-	-	-	-	-	-	-	18,818
					A5180	Install Station Control Equipment + AFC Equipment	Trams Eq	5B	18,818.17	6.6%	07-Apr-10	13-May-10	37	30	31	-	-	-	-	18,818	-	-	-	-	-	-	-	-	18,818
					A5159	Access for E&M Tram Stop installation (05B Saughton Road North)	Trams Eq	5B	-	0.0%	02-Mar-10	02-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5158	Access for visual inspection for E&M Tram Stop installation (05B Saughton Road North)	Trams Eq	5B	-	0.0%	29-Jan-10	29-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5B	760.33	0.3%				31	32	-	-	-	-	-	760	-	-	-	-	-	-	-	760
			05B3 Saughton Road North (exc.) to South Gyle Access (inc.)						**4,589,921.67**							**37,636**	**18,818**	**760**	**-**	**71,056**	**142,113**	**73,927**	**-**	**-**	**-**	**-**	**-**	**344,312**
			Bankhead Drive Substation																									
			Substation						**449,846.04**							-	-	-	-	**71,056**	**142,113**	**73,927**	-	-	-	-	-	**287,097**
					266	Completion of envelope	Subst - BB	5B	80,965.67	18.0%	01-Mar-09	17-Apr-09	49	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					266	Civil Engineering and Building Works	Subst - BB	5B	80,965.67	18.0%	16-Jan-09	28-Feb-09	44	14	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	5B	817.84	0.2%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					256	Order REC supply from Scottish Power	Subst - S	5B	-	0.0%	12-Dec-08	12-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5880	Power Infeed from Public Net available inc HV cable	Subst - S	5B	-	0.0%	20-Apr-09	20-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5900	Installation of TPS Equipment	Subst - S	5B	71,056.48	15.8%	28-Apr-10	11-Jun-10	45	31	32	-	-	-	-	-	71,056	-	-	-	-	-	-	-	71,056
					A5890	Install LV Power Supply and LV Power Equipment	Subst - S	5B	71,056.48	15.8%	14-Apr-10	06-May-10	23	30	31	-	-	-	-	-	71,056	-	-	-	-	-	-	-	71,056
					A5920	Testing and Commissioning	Subst - S	5B	71,056.48	15.8%	11-Jun-10	01-Jul-10	21	32	33	-	-	-	-	-	-	71,056	-	-	-	-	-	-	71,056
					A5910	Install Telecom and Scada	Subst - S	5B	71,056.48	15.8%	20-May-10	11-Jun-10	23	31	32	-	-	-	-	-	-	71,056	-	-	-	-	-	-	71,056
					A2259	Access for E&M Substation installation (05B Bankhead Drive)	Subst - S	5B	-	0.0%	20-Apr-09	20-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2258	Access for visual inspection for E&M Substation installation (05B Bankhead Drive)	Subst - S	5B	-	0.0%	19-Mar-09	19-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	5B	2,870.97	0.6%				32	33	-	-	-	-	-	-	2,871	-	-	-	-	-	-	2,871
			Bankhead Retaining Wall (W11)																									
			Retaining Wall						**83,271.17**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					127	Retaining Wall Construction	Structures	5B	57,694.23	69.3%	11-Jun-08	08-Jul-08	28	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5B	576.94	0.7%				7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5B	25,000.00	30.0%				7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Broomhouse Road Bridge (S25)																									
			Bridge						**-**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					125	Existing Structure	Structures	5B	-	0.0%	12-Dec-08	14-Jul-09	215	13	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			South Gyle Access Tram Stop																									
			Tramstop						**283,546.57**							**37,636**	**18,818**	**760**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**57,215**
					129	Civil Engineering and Building Works	Tramstops	5B	77,039.41	27.2%	16-Jan-09	28-Feb-09	44	14	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					129	Civil Engineering and Building Works	Tramstops	5B	77,039.41	27.2%	01-Mar-09	17-Apr-09	49	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5B	1,556.35	0.5%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2230	Deliver and Install Shelter	Tramstops	5B	51,359.61	18.1%	19-Oct-09	02-Nov-09	15	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5B	518.78	0.2%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					318	Order REC Supply	Trams Eq	5B	-	0.0%	07-Sep-09	07-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5230	Package Test Tramstop	Trams Eq	5B	18,818.17	6.6%	26-Jan-10	02-Feb-10	8	27	28	-	18,818	-	-	-	-	-	-	-	-	-	-	18,818
					A5200	Install LV Power Supply and LV Power Equipment	Trams Eq	5B	18,818.17	6.6%	02-Nov-09	08-Dec-09	37	24	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5210	Install Telecon Equipment	Trams Eq	5B	18,818.17	6.6%	08-Dec-09	19-Jan-10	43	26	27	18,818	-	-	-	-	-	-	-	-	-	-	-	-	18,818
					A5220	Install Station Control Equipment + AFC Equipment	Trams Eq	5B	18,818.17	6.6%	08-Dec-09	26-Jan-10	50	26	27	18,818	-	-	-	-	-	-	-	-	-	-	-	-	18,818
					A5199	Access for E&M Tram Stop installation (05B South Gyle)	Trams Eq	5B	-	0.0%	02-Nov-09	02-Nov-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5198	Access for visual inspection for E&M Tram Stop installation (05B South Gyle)	Trams Eq	5B	-	0.0%	01-Oct-09	01-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5B	760.33	0.3%				28	29	-	-	760	-	-	-	-	-	-	-	-	-	-	760
			South Gyle Access Bridge (S26)																									
			Bridge						**779,382.04**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					156	Substructure - Extend Piles	Structures	5B	149,817.10	19.2%	13-Jun-08	08-Oct-08	118	6	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					156	Substructure - Construct Pile Cap	Structures	5B	149,817.10	19.2%	13-Jun-08	08-Oct-08	118	6	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					276	Superstructure - Concrete Deck	Structures	5B	224,725.64	28.8%	09-Oct-08	08-Jan-09	92	10	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					276	Superstructure - Run On Slabs	Structures	5B	224,725.64	28.8%	09-Oct-08	08-Jan-09	92	10	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5B	5,296.56	0.7%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5B	25,000.00	3.2%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Saughton Road North to South Gyle Access Trackwork (1260m)																									
			Trackwork						**2,993,875.85**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1510	OLE Foundations - Drainage - Ducts	Track - BB	5B	20,033.03	0.7%	14-Nov-08	07-Jan-09	55	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					223	Earthworks and Subbase	Track	5B	274,413.46	9.2%	04-Nov-08	13-Nov-08	10	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					919	Track laying - 25%	Track	5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					919	Track laying - 25%	Track	5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					919	Track laying - 25%	Track	5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					919	Track laying	Track	5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					939	Fencing & Trackside Finishes	Track	5B	274,413.46	9.2%	16-Jan-09	19-Feb-09	35	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					13000	Delay Start to Maintain Guided Busway	Track	5B	-	0.0%	03-Nov-08	03-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5B	27,920.89	0.9%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	5B	199,769.45	6.7%				13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	5B	2,017.87	0.1%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			05B4 South Gyle Access (exc.) to Edinburgh Park Station (inc.)						**2,160,659.20**							-	-	-	-	**760**	-	-	-	-	-	-	-	**760**
			South Gyle Access to Edinburgh Park Station Trackwork (700m)																									
			Trackwork						**1,877,112.63**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1500	OLE Foundations - Drainage	Track - BB	5B	12,560.39	0.7%	18-Aug-08	20-Sep-08	44	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					213	Earthworks and Subbase	Track	5B	258,079.33	13.7%	25-Jul-08	15-Aug-08	22	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					859	Ducts and Bottom Ballast	Track	5B	516,158.65	27.5%	01-Oct-08	22-Oct-08	22	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					879	Track laying	Track	5B	602,185.09	32.1%	23-Oct-08	19-Nov-08	28	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					889	Top Ballast	Track	5B	172,052.88	9.2%	20-Nov-08	04-Dec-08	15	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					899	Fencing and Trackside finishes	Track	5B	172,052.88	9.2%	05-Dec-08	09-Jan-09	36	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5B	17,505.95	0.9%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	5B	125,252.28	6.7%				13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	5B	1,265.17	0.1%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Edinburgh Park Station Tram Stop																									
			Tramstop						**283,546.57**							-	-	-	-	**760**	-	-	-	-	-	-	-	**760**
					132	Civil Engineering and Builderworks	Tramstops	5B	77,039.41	27.2%	20-Nov-08	31-Dec-08	42	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					132	Civil Engineering and Builderworks	Tramstops	5B	77,039.41	27.2%	01-Jan-09	05-Mar-09	65	13	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5B	1,556.35	0.5%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2140	Deliver and Install Shelter	Tramstops	5B	51,359.61	18.1%	22-Apr-09	07-May-09	16	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5B	518.78	0.2%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					278	Order REC Supply	Trams Eq	5B	-	0.0%	10-Mar-09	10-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5270	Package Test Tramstop	Trams Eq	5B	15,054.53	5.3%	17-Jul-09	24-Jul-09	8	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5240	Install LV Power Supply and LV Power Equipment	Trams Eq	5B	15,054.53	5.3%	07-May-09	12-Jun-09	37	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5250	Install Telecon Equipment	Trams Eq	5B	15,054.53	5.3%	12-Jun-09	10-Jul-09	29	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5260	Install Station Control Equipment + AFC Equipment	Trams Eq	5B	15,054.53	5.3%	12-Jun-09	17-Jul-09	36	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6290	Installation of SIG-interlocking cubicle	Trams Eq	5B	15,054.53	5.3%	21-May-09	11-Jun-09	22	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6300	Commissioning of SIG -interlocking cubicle	Trams Eq	5B	-	0.0%	08-Apr-10	14-Apr-10	7	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5239	Access for E&M Tram Stop installation (05B Edinburgh Park Station)	Trams Eq	5B	-	0.0%	07-May-09	07-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5238	Access for visual inspection for E&M Tram Stop installation (05B Edinburgh Park Station)	Trams Eq	5B	-	0.0%	07-Apr-09	07-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5B	760.33	0.3%				30	31	-	-	-	-	760	-	-	-	-	-	-	-	-	760
			05B5 Edinburgh Park Station (exc.) to Edinburgh Park						**5,837,817.09**							**52,916**	**519**	**18,818**	**56,455**	**760**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**129,468**
			Edinburgh Park Tram Stop																									
			Tramstop						**206,507.16**							**52,916**	**519**	**18,818**	**56,455**	**760**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**129,468**
					166	Civil Engineering and Building Works	Tramstops	5B	77,039.41	37.3%	09-Sep-09	31-Oct-09	53	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0065

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

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SIEI

									Programme Dated 15-Apr-08					2011														2011
														40	41	42	43	44	45	46	47	48	49	50	51	52	Subtotal
L1	L2	L3	L4	L5	Activity ID	Activity Name		Contract Value	%age	Start Date	End Date	Duration	Start Period	End Period	29-Jan-2011	26-Feb-2011	26-Mar-2011	23-Apr-2011	21-May-2011	18-Jun-2011	16-Jul-2011	13-Aug-2011	10-Sep-2011	08-Oct-2011	05-Nov-2011	03-Dec-2011	31-Dec-2011	GBP
					1534	OLE Foundations - Drainage	Track - BB 5B	18,443.11	0.8%	23-Sep-08	23-Oct-08	31	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1533	Earthworks - Subbase	Track 5B	359,350.96	14.7%	26-Aug-08	22-Sep-08	28	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1609	Bottom Ballast - Ducts	Track 5B	239,567.31	9.8%	24-Oct-08	25-Nov-08	33	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1619	Track laying - 50%	Track 5B	718,701.92	29.5%	16-Jan-09	13-Feb-09	29	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1619	Track laying	Track 5B	598,918.27	24.6%	16-Jan-09	13-Feb-09	29	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1629	Top Ballast	Track 5B	239,567.31	9.8%	16-Feb-09	06-Mar-09	19	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1639	Fencing & Trackside Finishes	Track 5B	239,567.31	9.8%	09-Mar-09	08-Apr-09	31	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track 5B	24,385.01	1.0%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Concrete Slab Track 590m																									
			Trackwork					**1,307,406.53**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1544	OLE Foundations - Drainage - Ducts	Track - BB 5B	9,380.55	0.7%	15-Sep-08	16-Oct-08	32	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1543	Earthworks- Subbase - 50%	Track 5B	192,742.79	14.7%	28-Jul-08	12-Sep-08	47	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1543	Earthworks- Subbase	Track 5B	192,742.79	14.7%	28-Jul-08	12-Sep-08	47	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1659	Track laying - 50%	Track 5B	385,485.58	29.5%	02-Dec-08	20-Jan-09	50	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1659	Track laying - 50%	Track 5B	385,485.58	29.5%	02-Dec-08	20-Jan-09	50	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1679	Fencing & Finishes	Track 5B	128,495.19	9.8%	21-Jan-09	05-Feb-09	16	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track 5B	13,074.07	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Saughton Road North Tram Stop																									
			Tramstop					**283,546.57**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					123	Civil Engineering and Building Works	Tramstops 5B	77,039.41	27.2%	21-Jan-09	28-Feb-09	39	14	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					123	Civil Engineering and Building Works	Tramstops 5B	77,039.41	27.2%	01-Mar-09	22-Apr-09	54	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops 5B	1,556.35	0.5%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2080	Deliver and Install Shelter	Tramstops 5B	51,359.61	18.1%	16-Feb-10	02-Mar-10	15	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops 5B	518.78	0.2%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					248	Order REC Supply	Trams Eq 5B	-	0.0%	05-Jan-10	05-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5190	Package Test Tramstop	Trams Eq 5B	18,818.17	6.6%	13-May-10	20-May-10	8	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5160	Install LV Power Supply and LV Power Equipment	Trams Eq 5B	18,818.17	6.6%	02-Mar-10	07-Apr-10	37	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5170	Install Telecon Equipment	Trams Eq 5B	18,818.17	6.6%	07-Apr-10	06-May-10	30	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5180	Install Station Control Equipment + AFC Equipment	Trams Eq 5B	18,818.17	6.6%	07-Apr-10	13-May-10	37	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5159	Access for E&M Tram Stop installation (05B Saughton Road North)	Trams Eq 5B	-	0.0%	02-Mar-10	02-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5158	Access for visual inspection for E&M Tram Stop installation (05B Saughton Road North)	Trams Eq 5B	-	0.0%	29-Jan-10	29-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq 5B	760.33	0.3%				31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			05B3 Saughton Road North (exc.) to South Gyle Access (inc.)					**4,589,921.67**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Bankhead Drive Substation																									
			Substation					**449,846.04**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					266	Completion of envelope	Subst - BB 5B	80,965.67	18.0%	01-Mar-09	17-Apr-09	49	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					266	Civil Engineering and Building Works	Subst - BB 5B	80,965.67	18.0%	16-Jan-09	28-Feb-09	44	14	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB 5B	817.84	0.2%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					256	Order REC supply from Scottish Power	Subst - S 5B	-	0.0%	12-Dec-08	12-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5880	Power Infeed from Public Net available inc HV cable	Subst - S 5B	-	0.0%	20-Apr-09	20-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5900	Installation of TPS Equipment	Subst - S 5B	71,056.48	15.8%	28-Apr-10	11-Jun-10	45	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5890	Install LV Power Supply and LV Power Equipment	Subst - S 5B	71,056.48	15.8%	14-Apr-10	06-May-10	23	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5920	Testing and Commissioning	Subst - S 5B	71,056.48	15.8%	11-Jun-10	01-Jul-10	21	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5910	Install Telecom and Scada	Subst - S 5B	71,056.48	15.8%	20-May-10	11-Jun-10	23	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2259	Access for E&M Substation installation (05B Bankhead Drive)	Subst - S 5B	-	0.0%	20-Apr-09	20-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2258	Access for visual inspection for E&M Substation installation (05B Bankhead Drive)	Subst - S 5B	-	0.0%	19-Mar-09	19-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S 5B	2,870.97	0.6%				32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Bankhead Retaining Wall (W11)																									
			Retaining Wall					**83,271.17**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					127	Retaining Wall Construction	Structures 5B	57,694.23	69.3%	11-Jun-08	08-Jul-08	28	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures 5B	576.94	0.7%				7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures 5B	25,000.00	30.0%				7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Broomhouse Road Bridge (S25)																									
			Bridge					-							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					125	Existing Structure	Structures 5B	-	0.0%	12-Dec-08	14-Jul-09	215	13	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			South Gyle Access Tram Stop																									
			Tramstop					**283,546.57**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					129	Civil Engineering and Building Works	Tramstops 5B	77,039.41	27.2%	16-Jan-09	28-Feb-09	44	14	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					129	Civil Engineering and Building Works	Tramstops 5B	77,039.41	27.2%	01-Mar-09	17-Apr-09	49	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops 5B	1,556.35	0.5%				17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2230	Deliver and Install Shelter	Tramstops 5B	51,359.61	18.1%	19-Oct-09	02-Nov-09	15	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops 5B	518.78	0.2%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					318	Order REC Supply	Trams Eq 5B	-	0.0%	07-Sep-09	07-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5230	Package Test Tramstop	Trams Eq 5B	18,818.17	6.6%	26-Jan-10	02-Feb-10	8	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5200	Install LV Power Supply and LV Power Equipment	Trams Eq 5B	18,818.17	6.6%	02-Nov-09	08-Dec-09	37	24	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5210	Install Telecon Equipment	Trams Eq 5B	18,818.17	6.6%	08-Dec-09	19-Jan-10	43	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5220	Install Station Control Equipment + AFC Equipment	Trams Eq 5B	18,818.17	6.6%	08-Dec-09	26-Jan-10	50	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5199	Access for E&M Tram Stop installation (05B South Gyle)	Trams Eq 5B	-	0.0%	02-Nov-09	02-Nov-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5198	Access for visual inspection for E&M Tram Stop installation (05B South Gyle)	Trams Eq 5B	-	0.0%	01-Oct-09	01-Oct-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq 5B	760.33	0.3%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			South Gyle Access Bridge (S26)																									
			Bridge					**779,382.04**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					156	Substructure - Extend Piles	Structures 5B	149,817.10	19.2%	13-Jun-08	08-Oct-08	118	6	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					156	Substructure - Construct Pile Cap	Structures 5B	149,817.10	19.2%	13-Jun-08	08-Oct-08	118	6	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					276	Superstructure - Concrete Deck	Structures 5B	224,725.64	28.8%	09-Oct-08	08-Jan-09	92	10	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					276	Superstructure - Run On Slabs	Structures 5B	224,725.64	28.8%	09-Oct-08	08-Jan-09	92	10	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures 5B	5,296.56	0.7%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures 5B	25,000.00	3.2%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Saughton Road North to South Gyle Access Trackwork (1260m)																									
			Trackwork					**2,993,875.85**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					510	OLE Foundations - Drainage - Ducts	Track - BB 5B	20,033.03	0.7%	14-Nov-08	07-Jan-09	55	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					223	Earthworks and Subbase	Track 5B	274,413.46	9.2%	04-Nov-08	13-Nov-08	10	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					919	Track laying - 25%	Track 5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					919	Track laying - 25%	Track 5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					919	Track laying - 25%	Track 5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					919	Track laying	Track 5B	548,826.92	18.3%	21-Nov-08	15-Jan-09	56	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					939	Fencing & Trackside Finishes	Track 5B	274,413.46	9.2%	16-Jan-09	19-Feb-09	35	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					13000	Delay Start to Maintain Guided Busway	Track 5B	-	0.0%	03-Nov-08	03-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track 5B	27,920.89	0.9%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways 5B	199,769.45	6.7%				13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways 5B	2,017.87	0.1%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			05B4 South Gyle Access (exc.) to Edinburgh Park Station (inc.)					**2,160,699.20**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
			South Gyle Access to Edinburgh Park Station Trackwork (790m)																									
			Trackwork					**1,877,112.63**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					200	OLE Foundations - Drainage	Track - BB 5B	12,560.39	0.7%	18-Aug-08	30-Sep-08	44	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					213	Earthworks and Subbase	Track 5B	258,079.33	13.7%	25-Jul-08	15-Aug-08	22	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					859	Ducts and Bottom Ballast	Track 5B	516,158.65	27.5%	01-Oct-08	22-Oct-08	22	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					879	Track laying	Track 5B	602,185.09	32.1%	23-Oct-08	19-Nov-08	28	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					889	Top Ballast	Track 5B	172,052.88	9.2%	20-Nov-08	04-Dec-08	15	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					899	Fencing and Trackside finishes	Track 5B	172,052.88	9.2%	05-Dec-08	09-Jan-09	36	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track 5B	17,505.95	0.9%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways 5B	125,252.28	6.7%				13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways 5B	1,265.17	0.1%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Edinburgh Park Station Tram Stop																									
			Tramstop					**283,546.57**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					132	Civil Engineering and Builderworks	Tramstops 5B	77,039.41	27.2%	20-Nov-08	31-Dec-08	42	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					132	Civil Engineering and Builderworks	Tramstops 5B	77,039.41	27.2%	01-Jan-09	05-Mar-09	65	13	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops 5B	1,556.35	0.5%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2140	Deliver and Install Shelter	Tramstops 5B	51,359.61	18.1%	22-Apr-09	07-May-09	16	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops 5B	518.78	0.2%				18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					278	Order REC Supply	Trams Eq 5B	-	0.0%	10-Mar-09	10-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5270	Package Test Tramstop	Trams Eq 5B	15,054.53	5.3%	17-Jul-09	24-Jul-09	8	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5240	Install LV Power Supply and LV Power Equipment	Trams Eq 5B	15,054.53	5.3%	07-May-09	12-Jun-09	37	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5250	Install Telecon Equipment	Trams Eq 5B	15,054.53	5.3%	12-Jun-09	10-Jul-09	29	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5260	Install Station Control Equipment + AFC Equipment	Trams Eq 5B	15,054.53	5.3%	12-Jun-09	17-Jul-09	36	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6290	Installation of SIG-interlocking cubicle	Trams Eq 5B	15,054.53	5.3%	21-May-09	11-Jun-09	22	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6300	Commissioning of SIG -interlocking cubicle	Trams Eq 5B	-	0.0%	08-Apr-10	14-Apr-10	7	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5239	Access for E&M Tram Stop installation (05B Edinburgh Park Station)	Trams Eq 5B	-	0.0%	07-May-09	07-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5238	Access for visual inspection for E&M Tram Stop installation (05B Edinburgh Park Station)	Trams Eq 5B	-	0.0%	07-Apr-09	07-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq 5B	760.33	0.3%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			05B5 Edinburgh Park Station (exc.) to Edinburgh Park					**5,837,817.09**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Edinburgh Park Tram Stop																									
			Tramstop					**206,507.16**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					166	Civil Engineering and Building Works	Tramstops 5B	77,039.41	37.3%	09-Sep-09	31-Oct-09	53	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0066

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Murphy Group BILFINGER BERGER SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year 2008 Period 0 Period End 02-Feb-2008	1 01-Mar-2008	2 29-Mar-2008	3 26-Apr-2008	4 24-May-2008	5 21-Jun-2008	6 19-Jul-2008	7 16-Aug-2008	8 13-Sep-2008	9 11-Oct-2008	10 08-Nov-2008	11 06-Dec-2008	12 03-Jan-2009	13	2008 Subtotal GBP
					166	Civil Engineering and Building Works	Tramstops	5B	77,039.41	37.3%	01-Nov-09	09-Dec-09	40	24	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5B	1,556.35	0.8%				26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2110	Deliver and Install Shelter	Tramstops	5B	51,359.61	24.9%	12-Jan-10	26-Jan-10	15	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5B	518.78	0.3%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					268	Order REC Supply	Trams Eq	5B	-	0.0%	16-Nov-09	16-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5310	Package Test Tramstop	Trams Eq	5B	18,818.17	9.1%	07-Apr-10	14-Apr-10	8	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5280	Install LV Power Supply and LV Power Equipment	Trams Eq	5B	18,818.17	9.1%	26-Jan-10	02-Mar-10	36	27	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5290	Install Telecon Equipment	Trams Eq	5B	18,818.17	9.1%	02-Mar-10	30-Mar-10	29	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5300	Install Station Control Equipment + AFC Equipment	Trams Eq	5B	18,818.17	9.1%	02-Mar-10	07-Apr-10	37	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5279	Access for E&M Tram Stop installation (05B Edinburgh Park)	Trams Eq	5B	-	0.0%	26-Jan-10	26-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5278	Access for visual inspection for E&M Tram Stop installation (05B Edinburgh Park)	Trams Eq	5B	-	0.0%	25-Dec-09	25-Dec-09	1	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5B	760.33	0.4%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Edinburgh Park Station to Edinburgh Park Trackwork (854m)																													
	Trackwork								**2,029,182.52**							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					490	OLE Foundations - Drainage	Track - BB	5B	13,577.94	0.7%	24-Apr-09	22-May-09	29	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					203	Earthworks- Subbase	Track	5B	185,991.35	9.2%	08-Apr-09	24-Apr-09	17	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					829	Track Formation - Ducts	Track	5B	185,991.35	9.2%	22-May-09	16-Jun-09	26	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					839	Track laying	Track	5B	743,965.38	36.7%	08-Jul-09	08-Sep-09	63	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					839	Track laying	Track	5B	557,974.04	27.5%	08-Jul-09	08-Sep-09	63	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					849	Track Finishes	Track	5B	-	0.0%	09-Sep-09	29-Sep-09	21	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					869	Fencing	Track	5B	185,991.35	9.2%	30-Sep-09	13-Oct-09	14	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5B	18,924.16	0.9%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	5B	135,399.30	6.7%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	5B	1,367.67	0.1%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Edinburgh Park Station Bridge (527) Disruptive Possessions																													
	Bridge								**2,748,172.54**							-	-	-	-	-	-	-	-	**238,972**	**119,486**	**477,943**	**597,429**	**238,972**	-	**1,672,801**
		Establishment							-		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					41	Establishment	Structures	5B	-	0.0%	05-Aug-08	23-May-09	292	8	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					42	Temporary Fencing	Structures	5B	-	0.0%	05-Aug-08	05-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					363	Haul Roads	Structures	5B	-	0.0%	06-Aug-08	12-Aug-08	7	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					184	Possession 1 (12hrs)	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14	Remove Protection Barrier and Crash deck	Structures	5B	-	0.0%	14-May-09	14-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14120	Possession 2 (12hrs)	Structures	5B	-	0.0%	14-Aug-08	14-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14130	Network Rail Protection Barrier	Structures	5B	-	0.0%	13-Aug-08	14-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12	Possession 5 (12hrs)	Structures	5B	-	0.0%	23-May-09	23-May-09	1	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		North Approach Ramp - Base Construction							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	**119,486**	-	-	-	-	-	**119,486**
					758	Steelfixing	Structures	5B	119,485.76	100.0%	11-Aug-08	14-Aug-08	4	8	8	-	-	-	-	-	-	-	-	119,486	-	-	-	-	-	-	119,486
					479	Shuttering	Structures	5B	-	0.0%	13-Aug-08	15-Aug-08	3	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1101	Concrete	Structures	5B	-	0.0%	18-Aug-08	18-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		North Approach Ramp - Wall Construction							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	**119,486**	-	-	-	-	**119,486**
					768	Steelfixing	Structures	5B	119,485.76	100.0%	21-Aug-08	26-Aug-08	6	9	9	-	-	-	-	-	-	-	-	-	119,486	-	-	-	-	-	119,486
					579	Shuttering	Structures	5B	-	0.0%	27-Aug-08	02-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1111	Concrete	Structures	5B	-	0.0%	03-Sep-08	03-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					292	Ballast Wall	Structures	5B	-	0.0%	04-Sep-08	10-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					513	Cladding	Structures	5B	-	0.0%	11-Sep-08	17-Sep-08	7	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		North Approach Ramp - Excavation							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	**119,486**	-	-	-	-	-	**119,486**
					426	Excavation	Structures	5B	119,485.76	100.0%	06-Aug-08	07-Aug-08	2	8	8	-	-	-	-	-	-	-	-	119,486	-	-	-	-	-	-	119,486
					267	Blinding	Structures	5B	-		08-Aug-08	08-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		North Approach Ramp - Reinforced Earth Wall							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	**119,486**	-	-	-	**119,486**
					748	Mass Concrete Footing	Structures	5B	119,485.76	100.0%	26-Sep-08	29-Sep-08	4	10	10	-	-	-	-	-	-	-	-	-	-	119,486	-	-	-	-	119,486
					469	Place Fill	Structures	5B	-	0.0%	13-Oct-08	27-Oct-08	15	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					101	Build Wall units	Structures	5B	-	0.0%	13-Oct-08	27-Oct-08	15	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					212	Place Coping Units	Structures	5B	-	0.0%	28-Oct-08	03-Nov-08	7	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		South Approach Ramp - Reinforced Earth Wall							**238,971.53**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	**119,486**	**119,486**	-	-	**238,972**
					122	South Abutment	Structures	5B	119,485.76	50.0%	11-Aug-08	17-Oct-08	68	8	11	-	-	-	-	-	-	-	-	-	-	-	119,486	-	-	-	119,486
					738	Mass Concrete Footing	Structures	5B	119,485.76	50.0%	24-Sep-08	25-Sep-08	2	10	10	-	-	-	-	-	-	-	-	-	-	119,486	-	-	-	-	119,486
					459	Place Fill	Structures	5B	-	0.0%	26-Sep-08	10-Oct-08	15	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14160	Build Wall units	Structures	5B	-	0.0%	26-Sep-08	10-Oct-08	15	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A102	Place Coping Units	Structures	5B	-	0.0%	13-Oct-08	17-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Abutment - Excavation							-		**08-Jan-10**	**08-Jan-10**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					436	Excavation	Structures	5B	-	0.0%	11-Aug-08	12-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					277	Blinding	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Abutment - Base Construction							-		**08-Jan-10**	**08-Jan-10**				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					778	Steelfixing	Structures	5B	-	0.0%	15-Aug-08	20-Aug-08	6	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					589	Shuttering	Structures	5B	-	0.0%	19-Aug-08	21-Aug-08	3	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A111	Concrete	Structures	5B	-	0.0%	22-Aug-08	22-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Abutment - Wall Construction							**119,485.76**		**08-Jan-10**	**08-Jan-10**				-	-	-	-	-	-	-	-	-	-	**119,486**	-	-	-	**119,486**
					788	Steelfixing	Structures	5B	-	0.0%	27-Aug-08	01-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					599	Shuttering	Structures	5B	-	0.0%	02-Sep-08	08-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1121	Concrete	Structures	5B	-	0.0%	09-Sep-08	09-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					322	Ballast Wall	Structures	5B	-	0.0%	10-Sep-08	16-Sep-08	7	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					523	Cladding	Structures	5B	119,485.76	100.0%	17-Sep-08	23-Sep-08	7	10	10	-	-	-	-	-	-	-	-	-	-	119,486	-	-	-	-	119,486
		Pier 1							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	119,486	-	-	-	-	**119,486**
					19	Pier 1	Structures	5B	119,485.76	100.0%	06-Aug-08	09-Oct-08	65	8	10	-	-	-	-	-	-	-	-	-	-	119,486	-	-	-	-	119,486
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					81	Concrete	Structures	5B	-	0.0%	19-Aug-08	19-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					191	Steel fixing	Structures	5B	-	0.0%	11-Aug-08	15-Aug-08	5	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					201	Shuttering	Structures	5B	-	0.0%	13-Aug-08	18-Aug-08	6	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					202	Steel fixing	Structures	5B	-	0.0%	29-Sep-08	03-Oct-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					383	Shuttering	Structures	5B	-	0.0%	06-Oct-08	09-Oct-08	4	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					393	Concrete	Structures	5B	-	0.0%	06-Oct-08	09-Oct-08	4	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					360	Excavation	Structures	5B	-	0.0%	06-Aug-08	07-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					800	Blinding	Structures	5B	-	0.0%	08-Aug-08	08-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Pier 2							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	**119,486**	-	-	**119,486**
					194	Pier 2	Structures	5B	119,485.76	100.0%	11-Aug-08	16-Oct-08	67	8	11	-	-	-	-	-	-	-	-	-	-	-	-	119,486	-	-	-	119,486
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					120	Excavation	Structures	5B	-	0.0%	11-Aug-08	12-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					290	Blinding	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					241	Concrete	Structures	5B	-	0.0%	26-Aug-08	26-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					251	Steel fixing	Structures	5B	-	0.0%	18-Aug-08	22-Aug-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					261	Shuttering	Structures	5B	-	0.0%	20-Aug-08	25-Aug-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					232	Steel fixing	Structures	5B	-	0.0%	06-Oct-08	10-Oct-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					403	Shuttering	Structures	5B	-	0.0%	13-Oct-08	16-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					413	Concrete	Structures	5B	-	0.0%	13-Oct-08	16-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Pier 3							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	**119,486**	-	-	**119,486**
					359	Pier 3	Structures	5B	119,485.76	100.0%	14-Aug-08	23-Oct-08	71	8	11	-	-	-	-	-	-	-	-	-	-	-	-	119,486	-	-	-	119,486
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					810	Blinding	Structures	5B	-	0.0%	18-Aug-08	18-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					820	Excavation	Structures	5B	-	0.0%	14-Aug-08	15-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					211	Concrete	Structures	5B	-	0.0%	02-Sep-08	02-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					221	Steel fixing	Structures	5B	-	0.0%	25-Aug-08	29-Aug-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					231	Shuttering	Structures	5B	-	0.0%	27-Aug-08	01-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					222	Steel fixing	Structures	5B	-	0.0%	13-Oct-08	17-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A103	Shuttering	Structures	5B	-	0.0%	20-Oct-08	23-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A113	Concrete	Structures	5B	-	0.0%	20-Oct-08	23-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Pier 4							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	**119,486**	-	-	**119,486**
					174	Pier 4	Structures	5B	119,485.76	100.0%	19-Aug-08	30-Oct-08	73	9	11	-	-	-	-	-	-	-	-	-	-	-	-	119,486	-	-	-	119,486
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					850	Excavation	Structures	5B	-	0.0%	19-Aug-08	20-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					860	Blinding	Structures	5B	-	0.0%	21-Aug-08	21-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					331	Concrete	Structures	5B	-	0.0%	09-Sep-08	09-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					341	Steel fixing	Structures	5B	-	0.0%	01-Sep-08	05-Sep-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					351	Shuttering	Structures	5B	-	0.0%	03-Sep-08	08-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					242	Steel fixing	Structures	5B	-	0.0%	20-Oct-08	24-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A123	Shuttering	Structures	5B	-	0.0%	27-Oct-08	30-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A133	Concrete	Structures	5B	-	0.0%	27-Oct-08	30-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0067

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year
Period
Period End

L1	L2	L3	L4	L5	Activity ID	Activity Name		Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					166	Civil Engineering and Building Works	Tramstops	5B	77,039.41	37.3%	01-Nov-09	09-Dec-09	40	24	26	-	-	-	-	-	-	-	-	-	-	-	-	77,039	77,039
					Snagging	Snagging	Tramstops	5B	1,556.35	0.8%				26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2110	Deliver and Install Shelter	Tramstops	5B	51,359.61	24.9%	12-Jan-10	26-Jan-10	15	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5B	518.78	0.3%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					268	Order REC Supply	Trams Eq	5B	-	0.0%	16-Nov-09	16-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5310	Package Test Tramstop	Trams Eq	5B	18,818.17	9.1%	07-Apr-10	14-Apr-10	8	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5280	Install LV Power Supply and LV Power Equipment	Trams Eq	5B	18,818.17	9.1%	26-Jan-10	02-Mar-10	36	27	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5290	Install Telecon Equipment	Trams Eq	5B	18,818.17	9.1%	02-Mar-10	30-Mar-10	29	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5300	Install Station Control Equipment + AFC Equipment	Trams Eq	5B	18,818.17	9.1%	02-Mar-10	07-Apr-10	37	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5279	Access for E&M Tram Stop installation (05B Edinburgh Park)	Trams Eq	5B	-	0.0%	26-Jan-10	26-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5278	Access for visual inspection for E&M Tram Stop installation (05B Edinburgh Park)	Trams Eq	5B	-	0.0%	25-Dec-09	25-Dec-09	1	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5B	760.33	0.4%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Edinburgh Park Station to Edinburgh Park Trackwork (854m)																									
					Trackwork				**2,029,182.52**							-	-	-	**185,991**	**13,578**	**185,991**	-	-	**1,301,939**	-	**321,391**	**20,292**	-	**2,029,183**
					490	OLE Foundations - Drainage	Track - BB	5B	13,577.94	0.7%	24-Apr-09	22-May-09	29	17	18	-	-	-	-	13,578	-	-	-	-	-	-	-	-	13,578
					203	Earthworks- Subbase	Track	5B	185,991.35	9.2%	08-Apr-09	24-Apr-09	17	17	17	-	-	-	185,991	-	-	-	-	-	-	-	-	-	185,991
					829	Track Formation - Ducts	Track	5B	185,991.35	9.2%	22-May-09	16-Jun-09	26	18	19	-	-	-	-	-	185,991	-	-	-	-	-	-	-	-	185,991
					839	Track laying	Track	5B	743,965.38	36.7%	08-Jul-09	08-Sep-09	63	20	22	-	-	-	-	-	-	-	-	743,965	-	-	-	-	743,965
					839	Track laying	Track	5B	557,974.04	27.5%	08-Jul-09	08-Sep-09	63	20	22	-	-	-	-	-	-	-	-	557,974	-	-	-	-	557,974
					849	Track Finishes	Track	5B	-	0.0%	09-Sep-09	29-Sep-09	21	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					869	Fencing	Track	5B	185,991.35	9.2%	30-Sep-09	13-Oct-09	14	23	24	-	-	-	-	-	-	-	-	-	-	185,991	-	-	185,991
					Snagging	Snagging	Track	5B	18,924.16	0.9%				24	25	-	-	-	-	-	-	-	-	-	-	-	18,924	-	18,924
					Highways	Highways BoQ works	Highways	5B	135,399.30	6.7%				23	24	-	-	-	-	-	-	-	-	-	-	135,399	-	-	135,399
					Snagging	Snagging	Highways	5B	1,367.67	0.1%				24	25	-	-	-	-	-	-	-	-	-	-	-	1,368	-	1,368
					Edinburgh Park Station Bridge (527) Disruptive Possessions																									
					Bridge				**2,748,172.54**							-	**238,972**	**358,457**	**358,457**	**119,486**	-	-	-	-	-	-	-	-	**1,075,372**
					Establishment				-		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					41	Establishment	Structures	5B	-	0.0%	05-Aug-08	23-May-09	292	8	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					42	Temporary Fencing	Structures	5B	-	0.0%	05-Aug-08	05-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					363	Haul Roads	Structures	5B	-	0.0%	06-Aug-08	12-Aug-08	7	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					184	Possession 1 (12hrs)	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14	Remove Protection Barrier and Crash deck	Structures	5B	-	0.0%	14-May-09	14-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14120	Possession 2 (12hrs)	Structures	5B	-	0.0%	14-Aug-08	14-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14130	Network Rail Protection Barrier	Structures	5B	-	0.0%	13-Aug-08	14-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12	Possession 5 (12hrs)	Structures	5B	-	0.0%	23-May-09	23-May-09	1	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Approach Ramp - Base Construction				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					758	Steelfixing	Structures	5B	119,485.76	100.0%	11-Aug-08	14-Aug-08	4	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					479	Shuttering	Structures	5B	-	0.0%	13-Aug-08	15-Aug-08	3	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1101	Concrete	Structures	5B	-	0.0%	18-Aug-08	18-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Approach Ramp - Wall Construction				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					768	Steelfixing	Structures	5B	119,485.76	100.0%	21-Aug-08	26-Aug-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					579	Shuttering	Structures	5B	-	0.0%	27-Aug-08	02-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1111	Concrete	Structures	5B	-	0.0%	03-Sep-08	03-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					292	Ballast Wall	Structures	5B	-	0.0%	04-Sep-08	10-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					513	Cladding	Structures	5B	-	0.0%	11-Sep-08	17-Sep-08	7	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Approach Ramp - Excavation				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					426	Excavation	Structures	5B	119,485.76	100.0%	06-Aug-08	07-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					267	Blinding	Structures	5B			08-Aug-08	08-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Approach Ramp - Reinforced Earth Wall				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					748	Mass Concrete Footing	Structures	5B	119,485.76	100.0%	26-Sep-08	29-Sep-08	4	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					469	Place Fill	Structures	5B	-	0.0%	13-Oct-08	27-Oct-08	15	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					101	Build Wall units	Structures	5B	-	0.0%	13-Oct-08	27-Oct-08	15	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					212	Place Coping Units	Structures	5B	-	0.0%	28-Oct-08	03-Nov-08	7	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Approach Ramp - Reinforced Earth Wall				**238,971.53**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					122	South Abutment	Structures	5B	119,485.76	50.0%	11-Aug-08	17-Oct-08	68	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					738	Mass Concrete Footing	Structures	5B	119,485.76	50.0%	24-Sep-08	25-Sep-08	2	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					459	Place Fill	Structures	5B	-	0.0%	26-Sep-08	10-Oct-08	15	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14160	Build Wall units	Structures	5B	-	0.0%	26-Sep-08	10-Oct-08	15	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A102	Place Coping Units	Structures	5B	-	0.0%	13-Oct-08	17-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Abutment - Excavation				-		**08-Jan-10**	**08-Jan-10**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					436	Excavation	Structures	5B	-	0.0%	11-Aug-08	12-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					277	Blinding	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Abutment - Base Construction				-		**08-Jan-10**	**08-Jan-10**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					778	Steelfixing	Structures	5B	-	0.0%	15-Aug-08	20-Aug-08	6	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					589	Shuttering	Structures	5B	-	0.0%	19-Aug-08	21-Aug-08	3	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A111	Concrete	Structures	5B	-	0.0%	22-Aug-08	22-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Abutment - Wall Construction				**119,485.76**		**08-Jan-10**	**08-Jan-10**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					788	Steelfixing	Structures	5B	-	0.0%	27-Aug-08	01-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					599	Shuttering	Structures	5B	-	0.0%	02-Sep-08	08-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1121	Concrete	Structures	5B	-	0.0%	09-Sep-08	09-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					322	Ballast Wall	Structures	5B	-	0.0%	10-Sep-08	16-Sep-08	7	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					523	Cladding	Structures	5B	119,485.76	100.0%	17-Sep-08	23-Sep-08	7	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 1				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					19	Pier 1	Structures	5B	119,485.76	100.0%	06-Aug-08	09-Oct-08	65	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					81	Concrete	Structures	5B	-	0.0%	19-Aug-08	19-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					191	Steel fixing	Structures	5B	-	0.0%	11-Aug-08	15-Aug-08	5	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					201	Shuttering	Structures	5B	-	0.0%	13-Aug-08	18-Aug-08	6	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					202	Steel fixing	Structures	5B	-	0.0%	29-Sep-08	03-Oct-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					383	Shuttering	Structures	5B	-	0.0%	06-Oct-08	09-Oct-08	4	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					393	Concrete	Structures	5B	-	0.0%	06-Oct-08	09-Oct-08	4	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					360	Excavation	Structures	5B	-	0.0%	06-Aug-08	07-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					800	Blinding	Structures	5B	-	0.0%	08-Aug-08	08-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 2				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					194	Pier 2	Structures	5B	119,485.76	100.0%	11-Aug-08	16-Oct-08	67	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					120	Excavation	Structures	5B	-	0.0%	11-Aug-08	12-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					290	Blinding	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					241	Concrete	Structures	5B	-	0.0%	26-Aug-08	26-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					251	Steel fixing	Structures	5B	-	0.0%	18-Aug-08	22-Aug-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					261	Shuttering	Structures	5B	-	0.0%	20-Aug-08	25-Aug-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					232	Steel fixing	Structures	5B	-	0.0%	06-Oct-08	10-Oct-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					403	Shuttering	Structures	5B	-	0.0%	13-Oct-08	16-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					413	Concrete	Structures	5B	-	0.0%	13-Oct-08	16-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 3				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					359	Pier 3	Structures	5B	119,485.76	100.0%	14-Aug-08	23-Oct-08	71	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					810	Blinding	Structures	5B	-	0.0%	18-Aug-08	18-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					820	Excavation	Structures	5B	-	0.0%	14-Aug-08	15-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					211	Concrete	Structures	5B	-	0.0%	02-Sep-08	02-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					221	Steel fixing	Structures	5B	-	0.0%	25-Aug-08	29-Aug-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					231	Shuttering	Structures	5B	-	0.0%	27-Aug-08	01-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					222	Steel fixing	Structures	5B	-	0.0%	13-Oct-08	17-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A103	Shuttering	Structures	5B	-	0.0%	20-Oct-08	23-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A113	Concrete	Structures	5B	-	0.0%	20-Oct-08	23-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 4				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					174	Pier 4	Structures	5B	119,485.76	100.0%	19-Aug-08	30-Oct-08	73	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					850	Excavation	Structures	5B	-	0.0%	19-Aug-08	20-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					860	Blinding	Structures	5B	-	0.0%	21-Aug-08	21-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					331	Concrete	Structures	5B	-	0.0%	09-Sep-08	09-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					341	Steel fixing	Structures	5B	-	0.0%	01-Sep-08	05-Sep-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					351	Shuttering	Structures	5B	-	0.0%	03-Sep-08	08-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					242	Steel fixing	Structures	5B	-	0.0%	20-Oct-08	24-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A123	Shuttering	Structures	5B	-	0.0%	27-Oct-08	30-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A133	Concrete	Structures	5B	-	0.0%	27-Oct-08	30-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0068

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Murray Services Group BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					166	Civil Engineering and Building Works	Tramstops	5B	77,039.41	37.3%	01-Nov-09	09-Dec-09	40	24	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5B	1,556.35	0.8%				26	27	1,556	-	-	-	-	-	-	-	-	-	-	-	-	1,556
					A2110	Deliver and Install Shelter	Tramstops	5B	51,359.61	24.9%	12-Jan-10	26-Jan-10	15	27	27	51,360	-	-	-	-	-	-	-	-	-	-	-	-	-	51,360
					Snagging	Snagging	Tramstops	5B	518.78	0.3%				27	28	-	519	-	-	-	-	-	-	-	-	-	-	-	519
					268	Order REC Supply	Trams Eq	5B	-	0.0%	16-Nov-09	16-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5310	Package Test Tramstop	Trams Eq	5B	18,818.17	9.1%	07-Apr-10	14-Apr-10	8	30	30	-	-	-	18,818	-	-	-	-	-	-	-	-	18,818
					A5280	Install LV Power Supply and LV Power Equipment	Trams Eq	5B	18,818.17	9.1%	26-Jan-10	02-Mar-10	36	27	29	-	-	18,818	-	-	-	-	-	-	-	-	-	18,818
					A5290	Install Telecon Equipment	Trams Eq	5B	18,818.17	9.1%	02-Mar-10	30-Mar-10	29	29	30	-	-	-	18,818	-	-	-	-	-	-	-	-	18,818
					A5300	Install Station Control Equipment + AFC Equipment	Trams Eq	5B	18,818.17	9.1%	02-Mar-10	07-Apr-10	37	29	30	-	-	-	18,818	-	-	-	-	-	-	-	-	18,818
					A5279	Access for E&M Tram Stop installation (058 Edinburgh Park)	Trams Eq	5B	-	0.0%	26-Jan-10	26-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5278	Access for visual inspection for E&M Tram Stop installation (058 Edinburgh Park)	Trams Eq	5B	-	0.0%	25-Dec-09	25-Dec-09	1	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5B	760.33	0.4%				30	31	-	-	-	-	760	-	-	-	-	-	-	-	-	760
Edinburgh Park Station to Edinburgh Park Trackwork (854m)																												
	Trackwork								**2,029,182.52**							-	-	-	-	-	-	-	-	-	-	-	-	-
					490	OLE Foundations - Drainage	Track - BB	5B	13,577.94	0.7%	24-Apr-09	22-May-09	29	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					203	Earthworks- Subbase	Track	5B	185,991.35	9.2%	08-Apr-09	24-Apr-09	17	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					829	Track Formation - Ducts	Track	5B	185,991.35	9.2%	22-May-09	16-Jun-09	26	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					839	Track laying	Track	5B	743,965.38	36.7%	08-Jul-09	08-Sep-09	63	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					839	Track laying	Track	5B	557,974.04	27.5%	08-Jul-09	08-Sep-09	63	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					849	Track Finishes	Track	5B	-	0.0%	09-Sep-09	29-Sep-09	21	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					869	Fencing	Track	5B	185,991.35	9.2%	30-Sep-09	13-Oct-09	14	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5B	18,924.16	0.9%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	5B	135,399.30	6.7%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	5B	1,367.67	0.1%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Edinburgh Park Station Bridge (527) Disruptive Possessions																												
	Bridge								**2,748,172.54**							-	-	-	-	-	-	-	-	-	-	-	-	-
		Establishment							-		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					41	Establishment	Structures	5B	-	0.0%	05-Aug-08	23-May-09	292	8	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					42	Temporary Fencing	Structures	5B	-	0.0%	05-Aug-08	05-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					363	Haul Roads	Structures	5B	-	0.0%	06-Aug-08	12-Aug-08	7	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					184	Possession 1 (12hrs)	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14	Remove Protection Barrier and Crash deck	Structures	5B	-	0.0%	14-May-09	14-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14120	Possession 2 (12hrs)	Structures	5B	-	0.0%	14-Aug-08	14-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14130	Network Rail Protection Barrier	Structures	5B	-	0.0%	13-Aug-08	14-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12	Possession 5 (12hrs)	Structures	5B	-	0.0%	23-May-09	23-May-09	1	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		North Approach Ramp - Base Construction							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					758	Steelfixing	Structures	5B	119,485.76	100.0%	11-Aug-08	14-Aug-08	4	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					479	Shuttering	Structures	5B	-	0.0%	13-Aug-08	15-Aug-08	3	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1101	Concrete	Structures	5B	-	0.0%	18-Aug-08	18-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		North Approach Ramp - Wall Construction							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					768	Steelfixing	Structures	5B	119,485.76	100.0%	21-Aug-08	26-Aug-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					579	Shuttering	Structures	5B	-	0.0%	27-Aug-08	02-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1111	Concrete	Structures	5B	-	0.0%	03-Sep-08	03-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					292	Ballast Wall	Structures	5B	-	0.0%	04-Sep-08	10-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					513	Cladding	Structures	5B	-	0.0%	11-Sep-08	17-Sep-08	7	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		North Approach Ramp - Excavation							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					426	Excavation	Structures	5B	119,485.76	100.0%	06-Aug-08	07-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					267	Blinding	Structures	5B			08-Aug-08	08-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		North Approach Ramp - Reinforced Earth Wall							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					748	Mass Concrete Footing	Structures	5B	119,485.76	100.0%	26-Sep-08	29-Sep-08	4	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					469	Place Fill	Structures	5B	-	0.0%	13-Oct-08	27-Oct-08	15	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					101	Build Wall units	Structures	5B	-	0.0%	13-Oct-08	27-Oct-08	15	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					212	Place Coping Units	Structures	5B	-	0.0%	28-Oct-08	03-Nov-08	7	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		South Approach Ramp - Reinforced Earth Wall							**238,971.53**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					122	South Abutment	Structures	5B	119,485.76	50.0%	11-Aug-08	17-Oct-08	68	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					738	Mass Concrete Footing	Structures	5B	119,485.76	50.0%	24-Sep-08	25-Sep-08	2	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					459	Place Fill	Structures	5B	-	0.0%	26-Sep-08	10-Oct-08	15	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14160	Build Wall units	Structures	5B	-	0.0%	26-Sep-08	10-Oct-08	15	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A102	Place Coping Units	Structures	5B	-	0.0%	13-Oct-08	17-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Abutment - Excavation							-		**08-Jan-10**	**08-Jan-10**				-	-	-	-	-	-	-	-	-	-	-	-	-
					436	Excavation	Structures	5B	-	0.0%	11-Aug-08	12-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					277	Blinding	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Abutment - Base Construction							-		**08-Jan-10**	**08-Jan-10**				-	-	-	-	-	-	-	-	-	-	-	-	-
					778	Steelfixing	Structures	5B	-	0.0%	15-Aug-08	20-Aug-08	6	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					589	Shuttering	Structures	5B	-	0.0%	19-Aug-08	21-Aug-08	3	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A111	Concrete	Structures	5B	-	0.0%	22-Aug-08	22-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Abutment - Wall Construction							**119,485.76**		**08-Jan-10**	**08-Jan-10**				-	-	-	-	-	-	-	-	-	-	-	-	-
					788	Steelfixing	Structures	5B	-	0.0%	27-Aug-08	01-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					599	Shuttering	Structures	5B	-	0.0%	02-Sep-08	08-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1121	Concrete	Structures	5B	-	0.0%	09-Sep-08	09-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					322	Ballast Wall	Structures	5B	-	0.0%	10-Sep-08	16-Sep-08	7	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					523	Cladding	Structures	5B	119,485.76	100.0%	17-Sep-08	23-Sep-08	7	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Pier 1							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					19	Pier 1	Structures	5B	119,485.76	100.0%	06-Aug-08	09-Oct-08	65	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					81	Concrete	Structures	5B	-	0.0%	19-Aug-08	19-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					191	Steel fixing	Structures	5B	-	0.0%	11-Aug-08	15-Aug-08	5	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					201	Shuttering	Structures	5B	-	0.0%	13-Aug-08	18-Aug-08	6	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					202	Steel fixing	Structures	5B	-	0.0%	29-Sep-08	03-Oct-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					383	Shuttering	Structures	5B	-	0.0%	06-Oct-08	09-Oct-08	4	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					393	Concrete	Structures	5B	-	0.0%	06-Oct-08	09-Oct-08	4	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					360	Excavation	Structures	5B	-	0.0%	06-Aug-08	07-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					800	Blinding	Structures	5B	-	0.0%	08-Aug-08	08-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Pier 2							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					194	Pier 2	Structures	5B	119,485.76	100.0%	11-Aug-08	16-Oct-08	67	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					120	Excavation	Structures	5B	-	0.0%	11-Aug-08	12-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					290	Blinding	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					241	Concrete	Structures	5B	-	0.0%	26-Aug-08	26-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					251	Steel fixing	Structures	5B	-	0.0%	18-Aug-08	22-Aug-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					261	Shuttering	Structures	5B	-	0.0%	20-Aug-08	25-Aug-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					232	Steel fixing	Structures	5B	-	0.0%	06-Oct-08	10-Oct-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					403	Shuttering	Structures	5B	-	0.0%	13-Oct-08	16-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					413	Concrete	Structures	5B	-	0.0%	13-Oct-08	16-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Pier 3							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					359	Pier 3	Structures	5B	119,485.76	100.0%	14-Aug-08	23-Oct-08	71	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					810	Blinding	Structures	5B	-	0.0%	18-Aug-08	18-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					820	Excavation	Structures	5B	-	0.0%	14-Aug-08	15-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					211	Concrete	Structures	5B	-	0.0%	02-Sep-08	02-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					221	Steel fixing	Structures	5B	-	0.0%	25-Aug-08	29-Aug-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					231	Shuttering	Structures	5B	-	0.0%	27-Aug-08	01-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					222	Steel fixing	Structures	5B	-	0.0%	13-Oct-08	17-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A103	Shuttering	Structures	5B	-	0.0%	20-Oct-08	23-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A113	Concrete	Structures	5B	-	0.0%	20-Oct-08	23-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Pier 4							**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					174	Pier 4	Structures	5B	119,485.76	100.0%	19-Aug-08	30-Oct-08	73	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					850	Excavation	Structures	5B	-	0.0%	19-Aug-08	20-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					860	Blinding	Structures	5B	-	0.0%	21-Aug-08	21-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					331	Concrete	Structures	5B	-	0.0%	09-Sep-08	09-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					341	Steel fixing	Structures	5B	-	0.0%	01-Sep-08	05-Sep-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					351	Shuttering	Structures	5B	-	0.0%	03-Sep-08	08-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					242	Steel fixing	Structures	5B	-	0.0%	20-Oct-08	24-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A123	Shuttering	Structures	5B	-	0.0%	27-Oct-08	30-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A133	Concrete	Structures	5B	-	0.0%	27-Oct-08	30-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0069

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					166	Civil Engineering and Building Works	Tramstops	5B	77,039.41	37.3%	01-Nov-09	09-Dec-09	40	24	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5B	1,556.35	0.8%				26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2110	Deliver and Install Shelter	Tramstops	5B	51,359.61	24.9%	12-Jan-10	26-Jan-10	15	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5B	518.78	0.3%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					268	Order REC Supply	Trams Eq	5B	-	0.0%	16-Nov-09	16-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5310	Package Test Tramstop	Trams Eq	5B	18,818.17	9.1%	07-Apr-10	14-Apr-10	8	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5280	Install LV Power Supply and LV Power Equipment	Trams Eq	5B	18,818.17	9.1%	26-Jan-10	02-Mar-10	36	27	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5290	Install Telecon Equipment	Trams Eq	5B	18,818.17	9.1%	02-Mar-10	30-Mar-10	29	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5300	Install Station Control Equipment + AFC Equipment	Trams Eq	5B	18,818.17	9.1%	02-Mar-10	07-Apr-10	37	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5279	Access for E&M Tram Stop installation (05B Edinburgh Park)	Trams Eq	5B	-	0.0%	26-Jan-10	26-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5278	Access for visual inspection for E&M Tram Stop installation (05B Edinburgh Park)	Trams Eq	5B	-	0.0%	25-Dec-09	25-Dec-09	1	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5B	760.33	0.4%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Edinburgh Park Station to Edinburgh Park Trackwork (854m)																									
					Trackwork				**2,029,182.52**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					490	OLE Foundations - Drainage	Track - BB	5B	13,577.94	0.7%	24-Apr-09	22-May-09	29	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					203	Earthworks- Subbase	Track	5B	185,991.35	9.2%	08-Apr-09	24-Apr-09	17	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					829	Track Formation - Ducts	Track	5B	185,991.35	9.2%	22-May-09	16-Jun-09	26	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					839	Track laying	Track	5B	743,965.38	36.7%	08-Jul-09	08-Sep-09	63	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					839	Track laying	Track	5B	557,974.04	27.5%	08-Jul-09	08-Sep-09	63	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					849	Track Finishes	Track	5B	-	0.0%	09-Sep-09	29-Sep-09	21	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					869	Fencing	Track	5B	185,991.35	9.2%	30-Sep-09	13-Oct-09	14	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5B	18,924.16	0.9%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	5B	135,399.30	6.7%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	5B	1,367.67	0.1%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Edinburgh Park Station Bridge (527) Disruptive Possessions																									
					Bridge				**2,748,172.54**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Establishment				-		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					41	Establishment	Structures	5B	-	0.0%	05-Aug-08	23-May-09	292	8	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					42	Temporary Fencing	Structures	5B	-	0.0%	05-Aug-08	05-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					363	Haul Roads	Structures	5B	-	0.0%	06-Aug-08	12-Aug-08	7	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					184	Possession 1 (12hrs)	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14	Remove Protection Barrier and Crash deck	Structures	5B	-	0.0%	14-May-09	14-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14120	Possession 2 (12hrs)	Structures	5B	-	0.0%	14-Aug-08	14-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14130	Network Rail Protection Barrier	Structures	5B	-	0.0%	13-Aug-08	14-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A12	Possession 5 (12hrs)	Structures	5B	-	0.0%	23-May-09	23-May-09	1	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Approach Ramp - Base Construction				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					758	Steelfixing	Structures	5B	119,485.76	100.0%	11-Aug-08	14-Aug-08	4	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					479	Shuttering	Structures	5B	-	0.0%	13-Aug-08	15-Aug-08	3	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1101	Concrete	Structures	5B	-	0.0%	18-Aug-08	18-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Approach Ramp - Wall Construction				**119,485.76**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					768	Steelfixing	Structures	5B	119,485.76	100.0%	21-Aug-08	26-Aug-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					579	Shuttering	Structures	5B	-	0.0%	27-Aug-08	02-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1111	Concrete	Structures	5B	-	0.0%	03-Sep-08	03-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					292	Ballast Wall	Structures	5B	-	0.0%	04-Sep-08	10-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					513	Cladding	Structures	5B	-	0.0%	11-Sep-08	17-Sep-08	7	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Approach Ramp - Excavation				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					426	Excavation	Structures	5B	119,485.76	100.0%	06-Aug-08	07-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					267	Blinding	Structures	5B	-		08-Aug-08	08-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					North Approach Ramp - Reinforced Earth Wall				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					748	Mass Concrete Footing	Structures	5B	119,485.76	100.0%	26-Sep-08	29-Sep-08	4	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					469	Place Fill	Structures	5B	-	0.0%	13-Oct-08	27-Oct-08	15	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					101	Build Wall units	Structures	5B	-	0.0%	13-Oct-08	27-Oct-08	15	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					212	Place Coping Units	Structures	5B	-	0.0%	28-Oct-08	03-Nov-08	7	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					South Approach Ramp - Reinforced Earth Wall				**238,971.53**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					122	South Abutment	Structures	5B	119,485.76	50.0%	11-Aug-08	17-Oct-08	68	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					738	Mass Concrete Footing	Structures	5B	119,485.76	50.0%	24-Sep-08	25-Sep-08	2	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					459	Place Fill	Structures	5B	-	0.0%	26-Sep-08	10-Oct-08	15	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14160	Build Wall units	Structures	5B	-	0.0%	26-Sep-08	10-Oct-08	15	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A102	Place Coping Units	Structures	5B	-	0.0%	13-Oct-08	17-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Abutment - Excavation				-		**08-Jan-10**	**08-Jan-10**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					436	Excavation	Structures	5B	-	0.0%	11-Aug-08	12-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					277	Blinding	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Abutment - Base Construction				-		**08-Jan-10**	**08-Jan-10**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					778	Steelfixing	Structures	5B	-	0.0%	15-Aug-08	20-Aug-08	6	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					589	Shuttering	Structures	5B	-	0.0%	19-Aug-08	21-Aug-08	3	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A111	Concrete	Structures	5B	-	0.0%	22-Aug-08	22-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Abutment - Wall Construction				**119,485.76**		**08-Jan-10**	**08-Jan-10**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					788	Steelfixing	Structures	5B	-	0.0%	27-Aug-08	01-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					599	Shuttering	Structures	5B	-	0.0%	02-Sep-08	08-Sep-08	7	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1121	Concrete	Structures	5B	-	0.0%	09-Sep-08	09-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					322	Ballast Wall	Structures	5B	-	0.0%	10-Sep-08	16-Sep-08	7	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					523	Cladding	Structures	5B	119,485.76	100.0%	17-Sep-08	23-Sep-08	7	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 1				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					19	Pier 1	Structures	5B	119,485.76	100.0%	06-Aug-08	09-Oct-08	65	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					81	Concrete	Structures	5B	-	0.0%	19-Aug-08	19-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					191	Steel fixing	Structures	5B	-	0.0%	11-Aug-08	15-Aug-08	5	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					201	Shuttering	Structures	5B	-	0.0%	13-Aug-08	18-Aug-08	6	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					202	Steel fixing	Structures	5B	-	0.0%	29-Sep-08	03-Oct-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					383	Shuttering	Structures	5B	-	0.0%	06-Oct-08	09-Oct-08	4	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					393	Concrete	Structures	5B	-	0.0%	06-Oct-08	09-Oct-08	4	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					360	Excavation	Structures	5B	-	0.0%	06-Aug-08	07-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					800	Blinding	Structures	5B	-	0.0%	08-Aug-08	08-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 2				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					194	Pier 2	Structures	5B	119,485.76	100.0%	11-Aug-08	16-Oct-08	67	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					120	Excavation	Structures	5B	-	0.0%	11-Aug-08	12-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					290	Blinding	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					241	Concrete	Structures	5B	-	0.0%	26-Aug-08	26-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					251	Steel fixing	Structures	5B	-	0.0%	18-Aug-08	22-Aug-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					261	Shuttering	Structures	5B	-	0.0%	20-Aug-08	25-Aug-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					232	Steel fixing	Structures	5B	-	0.0%	06-Oct-08	10-Oct-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					403	Shuttering	Structures	5B	-	0.0%	13-Oct-08	16-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					413	Concrete	Structures	5B	-	0.0%	13-Oct-08	16-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 3				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					359	Pier 3	Structures	5B	119,485.76	100.0%	14-Aug-08	23-Oct-08	71	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					810	Blinding	Structures	5B	-	0.0%	18-Aug-08	18-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					820	Excavation	Structures	5B	-	0.0%	14-Aug-08	15-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					211	Concrete	Structures	5B	-	0.0%	02-Sep-08	02-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					221	Steel fixing	Structures	5B	-	0.0%	25-Aug-08	29-Aug-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					231	Shuttering	Structures	5B	-	0.0%	27-Aug-08	01-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					222	Steel fixing	Structures	5B	-	0.0%	13-Oct-08	17-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A103	Shuttering	Structures	5B	-	0.0%	20-Oct-08	23-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A113	Concrete	Structures	5B	-	0.0%	20-Oct-08	23-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 4				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					174	Pier 4	Structures	5B	119,485.76	100.0%	19-Aug-08	30-Oct-08	73	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					850	Excavation	Structures	5B	-	0.0%	19-Aug-08	20-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					860	Blinding	Structures	5B	-	0.0%	21-Aug-08	21-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					331	Concrete	Structures	5B	-	0.0%	09-Sep-08	09-Sep-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					341	Steel fixing	Structures	5B	-	0.0%	01-Sep-08	05-Sep-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					351	Shuttering	Structures	5B	-	0.0%	03-Sep-08	08-Sep-08	6	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					242	Steel fixing	Structures	5B	-	0.0%	20-Oct-08	24-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A123	Shuttering	Structures	5B	-	0.0%	27-Oct-08	30-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A133	Concrete	Structures	5B	-	0.0%	27-Oct-08	30-Oct-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0070

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Morrison Construction Group | BILFINGER BERGER | SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	Programme Dated 15-Apr-08 End Date	Duration	Start Period	End Period	Year 2008 Period 1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
					Pier 5				**119,485.76**		**23-Apr-09**	**23-Apr-09**	1	**17**	**17**	-	-	-	-	-	-	-	-	-	**119,486**	-	-	**119,486**
					349	Pier 5	Structures	5B	119,485.76	100.0%	06-Aug-08	06-Nov-08	93	8	11	-	-	-	-	-	-	-	-	-	119,486	-	-	119,486
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					830	Excavation	Structures	5B	-	0.0%	06-Aug-08	07-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					840	Blinding	Structures	5B	-	0.0%	08-Aug-08	08-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					271	Concrete	Structures	5B	-	0.0%	16-Sep-08	16-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					291	Steel fixing	Structures	5B	-	0.0%	08-Sep-08	12-Sep-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					321	Shuttering	Structures	5B	-	0.0%	10-Sep-08	15-Sep-08	6	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					262	Steel fixing	Structures	5B	-	0.0%	27-Oct-08	31-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					443	Shuttering	Structures	5B	-	0.0%	03-Nov-08	06-Nov-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					453	Concrete	Structures	5B	-	0.0%	03-Nov-08	06-Nov-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 6				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 6	Pier 6	Structures	5B	119,485.76	100.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					890	Excavation	Structures	5B	-	0.0%	11-Aug-08	12-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					900	Blinding	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					361	Concrete	Structures	5B	-	0.0%	23-Sep-08	23-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					371	Steel fixing	Structures	5B	-	0.0%	15-Sep-08	19-Sep-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					381	Shuttering	Structures	5B	-	0.0%	17-Sep-08	22-Sep-08	6	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					252	Steel fixing	Structures	5B	-	0.0%	03-Nov-08	07-Nov-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					423	Shuttering	Structures	5B	-	0.0%	10-Nov-08	13-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					433	Concrete	Structures	5B	-	0.0%	10-Nov-08	13-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 7				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 7	Pier 7	Structures	5B	119,485.76	100.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					870	Excavation	Structures	5B	-	0.0%	14-Aug-08	15-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					880	Blinding	Structures	5B	-	0.0%	18-Aug-08	18-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					391	Concrete	Structures	5B	-	0.0%	30-Sep-08	30-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					401	Steel fixing	Structures	5B	-	0.0%	22-Sep-08	26-Sep-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					591	Shuttering	Structures	5B	-	0.0%	24-Sep-08	29-Sep-08	6	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					272	Steel fixing	Structures	5B	-	0.0%	10-Nov-08	14-Nov-08	5	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					463	Shuttering	Structures	5B	-	0.0%	17-Nov-08	20-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					473	Concrete	Structures	5B	-	0.0%	17-Nov-08	20-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span South Ramp to Pier 1				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	**119,486**	-	**119,486**
					601	Fix Bearings	Structures	5B	-	0.0%	20-Oct-08	20-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					611	Temporary Beam Supports	Structures	5B	-	0.0%	10-Oct-08	16-Oct-08	7	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					621	Place Beams	Structures	5B	-	0.0%	17-Oct-08	17-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					631	Deck Reinforcement	Structures	5B	-	0.0%	29-Oct-08	18-Nov-08	21	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					641	Permanent Formwork	Structures	5B	-	0.0%	20-Oct-08	28-Oct-08	9	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					651	Deck Shuttering	Structures	5B	-	0.0%	20-Oct-08	21-Nov-08	33	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					661	Cast Diaphragm	Structures	5B	-	0.0%	03-Nov-08	03-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					671	Cast Deck	Structures	5B	-	0.0%	10-Nov-08	10-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					681	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	24-Nov-08	24-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	119,486	-	119,486
					Superstructure - Span Pier 1 to Pier 2				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	**119,486**	-	**119,486**
					431	Fix Bearings	Structures	5B	-	0.0%	20-Oct-08	20-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					411	Temporary Beam Supports	Structures	5B	-	0.0%	10-Oct-08	16-Oct-08	7	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					421	Place Beams	Structures	5B	-	0.0%	17-Oct-08	17-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					461	Deck Reinforcement	Structures	5B	-	0.0%	10-Nov-08	28-Nov-08	19	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					441	Permanent Formwork	Structures	5B	-	0.0%	29-Oct-08	06-Nov-08	9	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					451	Deck Shuttering	Structures	5B	-	0.0%	29-Oct-08	03-Dec-08	36	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					471	Cast Diaphragm	Structures	5B	-	0.0%	12-Nov-08	12-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					481	Cast Deck	Structures	5B	-	0.0%	19-Nov-08	19-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					491	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	04-Dec-08	04-Dec-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	119,486	-	119,486
					Superstructure - Span Pier 2 to Pier 3				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					521	Fix Bearings	Structures	5B	-	0.0%	13-Jan-09	13-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					501	Temporary Beam Supports	Structures	5B	-	0.0%	24-Oct-08	30-Oct-08	7	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					511	Place Beams	Structures	5B	-	0.0%	12-Jan-09	12-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					551	Deck Reinforcement	Structures	5B	-	0.0%	22-Jan-09	11-Feb-09	21	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					531	Permanent Formwork	Structures	5B	-	0.0%	13-Jan-09	21-Jan-09	9	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					541	Deck Shuttering	Structures	5B	-	0.0%	13-Jan-09	16-Feb-09	35	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					561	Cast Diaphragm	Structures	5B	-	0.0%	27-Jan-09	27-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					571	Cast Deck	Structures	5B	-	0.0%	03-Feb-09	03-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					581	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	17-Feb-09	17-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 3 to Pier 4				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					691	Fix Bearings	Structures	5B	-	0.0%	12-Jan-09	12-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					701	Temporary Beam Supports	Structures	5B	-	0.0%	05-Jan-09	09-Jan-09	5	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					711	Place Beams	Structures	5B	-	0.0%	10-Jan-09	10-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					721	Deck Reinforcement	Structures	5B	-	0.0%	02-Feb-09	20-Feb-09	19	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					731	Permanent Formwork	Structures	5B	-	0.0%	22-Jan-09	30-Jan-09	9	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					741	Deck Shuttering	Structures	5B	-	0.0%	22-Jan-09	25-Feb-09	35	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					751	Cast Diaphragm	Structures	5B	-	0.0%	05-Feb-09	05-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					761	Cast Deck	Structures	5B	-	0.0%	12-Feb-09	12-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					771	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	26-Feb-09	26-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					592	Possession 4 (16hrs)	Structures	5B	-	0.0%	31-Dec-08	31-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					910	Possession 3 (16hrs)	Structures	5B	-	0.0%	24-Dec-08	24-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 6 to Pier 7				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					881	Fix Bearings	Structures	5B	-	0.0%	02-Feb-09	03-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					861	Temporary Beam Supports	Structures	5B	-	0.0%	16-Jan-09	23-Jan-09	8	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					871	Place Beams	Structures	5B	-	0.0%	30-Jan-09	02-Feb-09	4	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					911	Deck Reinforcement	Structures	5B	-	0.0%	20-Feb-09	12-Mar-09	21	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					891	Permanent Formwork	Structures	5B	-	0.0%	11-Feb-09	19-Feb-09	9	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					901	Deck Shuttering	Structures	5B	-	0.0%	11-Feb-09	17-Mar-09	35	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					921	Cast Diaphragm	Structures	5B	-	0.0%	25-Feb-09	25-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					931	Cast Deck	Structures	5B	-	0.0%	04-Mar-09	04-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					941	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	18-Mar-09	18-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Structure - Span Pier 7 to North Ramp				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					971	Fix Bearings	Structures	5B	-	0.0%	02-Feb-09	03-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					951	Temporary Beam Supports	Structures	5B	-	0.0%	23-Jan-09	30-Jan-09	8	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					961	Place Beams	Structures	5B	-	0.0%	30-Jan-09	02-Feb-09	4	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1001	Deck Reinforcement	Structures	5B	-	0.0%	11-Feb-09	03-Mar-09	21	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					981	Permanent Formwork	Structures	5B	-	0.0%	02-Feb-09	10-Feb-09	9	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					991	Deck Shuttering	Structures	5B	-	0.0%	02-Feb-09	06-Mar-09	33	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1011	Cast Diaphragm	Structures	5B	-	0.0%	16-Feb-09	16-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1021	Cast Deck	Structures	5B	-	0.0%	23-Feb-09	23-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1031	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	09-Mar-09	09-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 4 to Pier 5				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1011	Fix Bearings	Structures	5B	-	0.0%	20-Feb-09	23-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1021	Temporary Beam Supports	Structures	5B	-	0.0%	05-Feb-09	12-Feb-09	8	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1031	Place Beams	Structures	5B	-	0.0%	19-Feb-09	20-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1041	Deck Reinforcement	Structures	5B	-	0.0%	12-Mar-09	01-Apr-09	21	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1051	Permanent Formwork	Structures	5B	-	0.0%	03-Mar-09	11-Mar-09	9	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1061	Deck Shuttering	Structures	5B	-	0.0%	03-Mar-09	06-Apr-09	35	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1071	Cast Diaphragm	Structures	5B	-	0.0%	17-Mar-09	17-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1081	Cast Deck	Structures	5B	-	0.0%	24-Mar-09	24-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1091	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	07-Apr-09	07-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 5 to Pier 6				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					791	Fix Bearings	Structures	5B	-	0.0%	20-Feb-09	23-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					781	Temporary Beam Supports	Structures	5B	-	0.0%	12-Feb-09	19-Feb-09	8	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					801	Place Beams	Structures	5B	-	0.0%	19-Feb-09	20-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					821	Deck Reinforcement	Structures	5B	-	0.0%	03-Mar-09	23-Mar-09	21	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					811	Permanent Formwork	Structures	5B	-	0.0%	20-Feb-09	02-Mar-09	11	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					831	Deck Shuttering	Structures	5B	-	0.0%	20-Feb-09	26-Mar-09	35	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					841	Cast Diaphragm	Structures	5B	-	0.0%	06-Mar-09	06-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					851	Cast Deck	Structures	5B	-	0.0%	13-Mar-09	13-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1001	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	27-Mar-09	27-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Deck Finishes				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					282	Waterproofing	Structures	5B	-	0.0%	03-Apr-09	15-Apr-09	13	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					483	Expansion Joints	Structures	5B	-	0.0%	16-Apr-09	28-Apr-09	13	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0071

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Services Group | BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Programme Dates 15-Apr-08 End Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					Pier 5				**119,485.76**		**23-Apr-09**	**23-Apr-09**	**1**	**17**	**17**	-	-	-	-	-	-	-	-	-	-	-	-	-
					349	Pier 5	Structures	5B	119,485.76	100.0%	06-Aug-08	11-Nov-08	93	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					830	Excavation	Structures	5B	-	0.0%	06-Aug-08	07-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-
					840	Blinding	Structures	5B	-	0.0%	08-Aug-08	08-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-
					271	Concrete	Structures	5B	-	0.0%	16-Sep-08	16-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					291	Steel fixing	Structures	5B	-	0.0%	08-Sep-08	12-Sep-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-
					321	Shuttering	Structures	5B	-	0.0%	10-Sep-08	15-Sep-08	6	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					262	Steel fixing	Structures	5B	-	0.0%	27-Oct-08	31-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					443	Shuttering	Structures	5B	-	0.0%	03-Nov-08	06-Nov-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					453	Concrete	Structures	5B	-	0.0%	03-Nov-08	06-Nov-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 6				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	**119,486**	-	-	-	-	-	-	-	-	**119,486**
					Pier 6	Pier 6	Structures	5B	119,485.76	100.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	119,486	-	-	-	-	-	-	-	-	119,486
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					890	Excavation	Structures	5B	-	0.0%	11-Aug-08	12-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-
					900	Blinding	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-
					361	Concrete	Structures	5B	-	0.0%	23-Sep-08	23-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					371	Steel fixing	Structures	5B	-	0.0%	15-Sep-08	19-Sep-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					381	Shuttering	Structures	5B	-	0.0%	17-Sep-08	22-Sep-08	6	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					252	Steel fixing	Structures	5B	-	0.0%	03-Nov-08	07-Nov-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					423	Shuttering	Structures	5B	-	0.0%	10-Nov-08	13-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					433	Concrete	Structures	5B	-	0.0%	10-Nov-08	13-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 7				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	**119,486**	-	-	-	-	-	-	-	-	**119,486**
					Pier 7	Pier 7	Structures	5B	119,485.76	100.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	119,486	-	-	-	-	-	-	-	-	119,486
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					870	Excavation	Structures	5B	-	0.0%	14-Aug-08	15-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-
					880	Blinding	Structures	5B	-	0.0%	18-Aug-08	18-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-
					391	Concrete	Structures	5B	-	0.0%	30-Sep-08	30-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					401	Steel fixing	Structures	5B	-	0.0%	22-Sep-08	26-Sep-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					591	Shuttering	Structures	5B	-	0.0%	24-Sep-08	29-Sep-08	6	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					272	Steel fixing	Structures	5B	-	0.0%	10-Nov-08	14-Nov-08	5	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					463	Shuttering	Structures	5B	-	0.0%	17-Nov-08	20-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					473	Concrete	Structures	5B	-	0.0%	17-Nov-08	20-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span South Ramp to Pier 1				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					601	Fix Bearings	Structures	5B	-	0.0%	20-Oct-08	20-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					611	Temporary Beam Supports	Structures	5B	-	0.0%	10-Oct-08	16-Oct-08	7	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					621	Place Beams	Structures	5B	-	0.0%	17-Oct-08	17-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					631	Deck Reinforcement	Structures	5B	-	0.0%	29-Oct-08	18-Nov-08	21	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					641	Permanent Formwork	Structures	5B	-	0.0%	20-Oct-08	28-Oct-08	9	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					651	Deck Shuttering	Structures	5B	-	0.0%	20-Oct-08	21-Nov-08	33	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					661	Cast Diaphragm	Structures	5B	-	0.0%	03-Nov-08	03-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					671	Cast Deck	Structures	5B	-	0.0%	10-Nov-08	10-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					681	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	24-Nov-08	24-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 1 to Pier 2				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-
					431	Fix Bearings	Structures	5B	-	0.0%	20-Oct-08	20-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					411	Temporary Beam Supports	Structures	5B	-	0.0%	10-Oct-08	16-Oct-08	7	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					421	Place Beams	Structures	5B	-	0.0%	17-Oct-08	17-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					461	Deck Reinforcement	Structures	5B	-	0.0%	10-Nov-08	28-Nov-08	19	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					441	Permanent Formwork	Structures	5B	-	0.0%	29-Oct-08	06-Nov-08	9	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					451	Deck Shuttering	Structures	5B	-	0.0%	29-Oct-08	03-Dec-08	36	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					471	Cast Diaphragm	Structures	5B	-	0.0%	12-Nov-08	12-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					481	Cast Deck	Structures	5B	-	0.0%	19-Nov-08	19-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					491	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	04-Dec-08	04-Dec-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 2 to Pier 3				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	**119,486**	-	-	-	-	-	-	-	-	-	-	**119,486**
					521	Fix Bearings	Structures	5B	-	0.0%	13-Jan-09	13-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					501	Temporary Beam Supports	Structures	5B	-	0.0%	24-Oct-08	30-Oct-08	7	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					511	Place Beams	Structures	5B	-	0.0%	12-Jan-09	12-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					551	Deck Reinforcement	Structures	5B	-	0.0%	22-Jan-09	11-Feb-09	21	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					531	Permanent Formwork	Structures	5B	-	0.0%	13-Jan-09	21-Jan-09	9	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					541	Deck Shuttering	Structures	5B	-	0.0%	13-Jan-09	16-Feb-09	35	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					561	Cast Diaphragm	Structures	5B	-	0.0%	27-Jan-09	27-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					571	Cast Deck	Structures	5B	-	0.0%	03-Feb-09	03-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					581	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	17-Feb-09	17-Feb-09	1	15	15	-	119,486	-	-	-	-	-	-	-	-	-	-	119,486
					Superstructure - Span Pier 3 to Pier 4				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	**119,486**	-	-	-	-	-	-	-	-	-	-	**119,486**
					691	Fix Bearings	Structures	5B	-	0.0%	12-Jan-09	12-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					701	Temporary Beam Supports	Structures	5B	-	0.0%	05-Jan-09	09-Jan-09	5	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					711	Place Beams	Structures	5B	-	0.0%	10-Jan-09	10-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					721	Deck Reinforcement	Structures	5B	-	0.0%	02-Feb-09	20-Feb-09	19	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					731	Permanent Formwork	Structures	5B	-	0.0%	22-Jan-09	30-Jan-09	9	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					741	Deck Shuttering	Structures	5B	-	0.0%	22-Jan-09	25-Feb-09	35	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					751	Cast Diaphragm	Structures	5B	-	0.0%	05-Feb-09	05-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					761	Cast Deck	Structures	5B	-	0.0%	12-Feb-09	12-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					771	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	26-Feb-09	26-Feb-09	1	15	15	-	119,486	-	-	-	-	-	-	-	-	-	-	119,486
					592	Possession 4 (16hrs)	Structures	5B	-	0.0%	31-Dec-08	31-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-
					910	Possession 3 (16hrs)	Structures	5B	-	0.0%	24-Dec-08	24-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 6 to Pier 7				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	**119,486**	-	-	-	-	-	-	-	-	-	**119,486**
					881	Fix Bearings	Structures	5B	-	0.0%	02-Feb-09	03-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					861	Temporary Beam Supports	Structures	5B	-	0.0%	16-Jan-09	23-Jan-09	8	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					871	Place Beams	Structures	5B	-	0.0%	30-Jan-09	02-Feb-09	4	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					911	Deck Reinforcement	Structures	5B	-	0.0%	20-Feb-09	12-Mar-09	21	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					891	Permanent Formwork	Structures	5B	-	0.0%	11-Feb-09	19-Feb-09	9	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					901	Deck Shuttering	Structures	5B	-	0.0%	11-Feb-09	17-Mar-09	35	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					921	Cast Diaphragm	Structures	5B	-	0.0%	25-Feb-09	25-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					931	Cast Deck	Structures	5B	-	0.0%	04-Mar-09	04-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					941	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	18-Mar-09	18-Mar-09	1	16	16	-	-	119,486	-	-	-	-	-	-	-	-	-	119,486
					Structure - Span Pier 7 to North Ramp				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	**119,486**	-	-	-	-	-	-	-	-	-	**119,486**
					971	Fix Bearings	Structures	5B	-	0.0%	02-Feb-09	03-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					951	Temporary Beam Supports	Structures	5B	-	0.0%	23-Jan-09	30-Jan-09	8	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					961	Place Beams	Structures	5B	-	0.0%	30-Jan-09	02-Feb-09	4	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1001	Deck Reinforcement	Structures	5B	-	0.0%	11-Feb-09	03-Mar-09	21	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					981	Permanent Formwork	Structures	5B	-	0.0%	02-Feb-09	10-Feb-09	9	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					991	Deck Shuttering	Structures	5B	-	0.0%	02-Feb-09	06-Mar-09	33	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1011	Cast Diaphragm	Structures	5B	-	0.0%	16-Feb-09	16-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1021	Cast Deck	Structures	5B	-	0.0%	23-Feb-09	23-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1031	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	09-Mar-09	09-Mar-09	1	16	16	-	-	119,486	-	-	-	-	-	-	-	-	-	119,486
					Superstructure - Span Pier 4 to Pier 5				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	**119,486**	-	-	-	-	-	-	-	-	**119,486**
					1011	Fix Bearings	Structures	5B	-	0.0%	20-Feb-09	23-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					1021	Temporary Beam Supports	Structures	5B	-	0.0%	05-Feb-09	12-Feb-09	8	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					1031	Place Beams	Structures	5B	-	0.0%	19-Feb-09	20-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					1041	Deck Reinforcement	Structures	5B	-	0.0%	12-Mar-09	01-Apr-09	21	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					1051	Permanent Formwork	Structures	5B	-	0.0%	03-Mar-09	11-Mar-09	9	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					1061	Deck Shuttering	Structures	5B	-	0.0%	03-Mar-09	06-Apr-09	35	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					1071	Cast Diaphragm	Structures	5B	-	0.0%	17-Mar-09	17-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					1081	Cast Deck	Structures	5B	-	0.0%	24-Mar-09	24-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					1091	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	07-Apr-09	07-Apr-09	1	17	17	-	-	-	119,486	-	-	-	-	-	-	-	-	119,486
					Superstructure - Span Pier 5 to Pier 6				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	**119,486**	-	-	-	-	-	-	-	-	-	**119,486**
					791	Fix Bearings	Structures	5B	-	0.0%	20-Feb-09	23-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					781	Temporary Beam Supports	Structures	5B	-	0.0%	12-Feb-09	19-Feb-09	8	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					801	Place Beams	Structures	5B	-	0.0%	19-Feb-09	20-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					821	Deck Reinforcement	Structures	5B	-	0.0%	03-Mar-09	23-Mar-09	21	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					811	Permanent Formwork	Structures	5B	-	0.0%	20-Feb-09	02-Mar-09	11	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					831	Deck Shuttering	Structures	5B	-	0.0%	20-Feb-09	26-Mar-09	35	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					841	Cast Diaphragm	Structures	5B	-	0.0%	06-Mar-09	06-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					851	Cast Deck	Structures	5B	-	0.0%	13-Mar-09	13-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					1001	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	27-Mar-09	27-Mar-09	1	16	16	-	-	119,486	-	-	-	-	-	-	-	-	-	119,486
					Superstructure - Deck Finishes				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	**119,486**	-	-	-	-	-	-	-	**119,486**
					282	Waterproofing	Structures	5B	-	0.0%	03-Apr-09	15-Apr-09	13	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-
					483	Expansion Joints	Structures	5B	-	0.0%	16-Apr-09	28-Apr-09	13	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0072

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Murray Services Group | BILFINGER BERGER | SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					Pier 5				**119,485.76**		**23-Apr-09**	**23-Apr-09**	**1**	**17**	**17**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					349	Pier 5	Structures	5B	119,485.76	100.0%	06-Aug-08	11-Nov-08	93	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					830	Excavation	Structures	5B	-	0.0%	06-Aug-08	07-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					840	Blinding	Structures	5B	-	0.0%	08-Aug-08	08-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					271	Concrete	Structures	5B	-	0.0%	16-Sep-08	16-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					291	Steel fixing	Structures	5B	-	0.0%	08-Sep-08	12-Sep-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					321	Shuttering	Structures	5B	-	0.0%	10-Sep-08	15-Sep-08	6	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					262	Steel fixing	Structures	5B	-	0.0%	27-Oct-08	31-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					443	Shuttering	Structures	5B	-	0.0%	03-Nov-08	06-Nov-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					453	Concrete	Structures	5B	-	0.0%	03-Nov-08	06-Nov-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 6				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 6	Pier 6	Structures	5B	119,485.76	100.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					890	Excavation	Structures	5B	-	0.0%	11-Aug-08	12-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					900	Blinding	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					361	Concrete	Structures	5B	-	0.0%	23-Sep-08	23-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					371	Steel fixing	Structures	5B	-	0.0%	15-Sep-08	19-Sep-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					381	Shuttering	Structures	5B	-	0.0%	17-Sep-08	22-Sep-08	6	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					252	Steel fixing	Structures	5B	-	0.0%	03-Nov-08	07-Nov-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					423	Shuttering	Structures	5B	-	0.0%	10-Nov-08	13-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					433	Concrete	Structures	5B	-	0.0%	10-Nov-08	13-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 7				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 7	Pier 7	Structures	5B	119,485.76	100.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					870	Excavation	Structures	5B	-	0.0%	14-Aug-08	15-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					880	Blinding	Structures	5B	-	0.0%	18-Aug-08	18-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					391	Concrete	Structures	5B	-	0.0%	30-Sep-08	30-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					401	Steel fixing	Structures	5B	-	0.0%	22-Sep-08	26-Sep-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					591	Shuttering	Structures	5B	-	0.0%	24-Sep-08	29-Sep-08	6	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					272	Steel fixing	Structures	5B	-	0.0%	10-Nov-08	14-Nov-08	5	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					463	Shuttering	Structures	5B	-	0.0%	17-Nov-08	20-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					473	Concrete	Structures	5B	-	0.0%	17-Nov-08	20-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span South Ramp to Pier 1				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					601	Fix Bearings	Structures	5B	-	0.0%	20-Oct-08	20-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					611	Temporary Beam Supports	Structures	5B	-	0.0%	10-Oct-08	16-Oct-08	7	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					621	Place Beams	Structures	5B	-	0.0%	17-Oct-08	17-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					631	Deck Reinforcement	Structures	5B	-	0.0%	29-Oct-08	18-Nov-08	21	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					641	Permanent Formwork	Structures	5B	-	0.0%	20-Oct-08	28-Oct-08	9	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					651	Deck Shuttering	Structures	5B	-	0.0%	20-Oct-08	21-Nov-08	33	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					661	Cast Diaphragm	Structures	5B	-	0.0%	03-Nov-08	03-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					671	Cast Deck	Structures	5B	-	0.0%	10-Nov-08	10-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					681	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	24-Nov-08	24-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 1 to Pier 2				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					431	Fix Bearings	Structures	5B	-	0.0%	20-Oct-08	20-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					411	Temporary Beam Supports	Structures	5B	-	0.0%	10-Oct-08	16-Oct-08	7	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					421	Place Beams	Structures	5B	-	0.0%	17-Oct-08	17-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					461	Deck Reinforcement	Structures	5B	-	0.0%	10-Nov-08	28-Nov-08	19	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					441	Permanent Formwork	Structures	5B	-	0.0%	29-Oct-08	06-Nov-08	9	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					451	Deck Shuttering	Structures	5B	-	0.0%	29-Oct-08	03-Dec-08	36	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					471	Cast Diaphragm	Structures	5B	-	0.0%	12-Nov-08	12-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					481	Cast Deck	Structures	5B	-	0.0%	19-Nov-08	19-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					491	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	04-Dec-08	04-Dec-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 2 to Pier 3				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					521	Fix Bearings	Structures	5B	-	0.0%	13-Jan-09	13-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					501	Temporary Beam Supports	Structures	5B	-	0.0%	24-Oct-08	30-Oct-08	7	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					511	Place Beams	Structures	5B	-	0.0%	12-Jan-09	12-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					551	Deck Reinforcement	Structures	5B	-	0.0%	22-Jan-09	11-Feb-09	21	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					531	Permanent Formwork	Structures	5B	-	0.0%	13-Jan-09	21-Jan-09	9	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					541	Deck Shuttering	Structures	5B	-	0.0%	13-Jan-09	16-Feb-09	35	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					561	Cast Diaphragm	Structures	5B	-	0.0%	27-Jan-09	27-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					571	Cast Deck	Structures	5B	-	0.0%	03-Feb-09	03-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					581	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	17-Feb-09	17-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 3 to Pier 4				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					691	Fix Bearings	Structures	5B	-	0.0%	12-Jan-09	12-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					701	Temporary Beam Supports	Structures	5B	-	0.0%	05-Jan-09	09-Jan-09	5	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					711	Place Beams	Structures	5B	-	0.0%	10-Jan-09	10-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					721	Deck Reinforcement	Structures	5B	-	0.0%	02-Feb-09	20-Feb-09	19	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					731	Permanent Formwork	Structures	5B	-	0.0%	22-Jan-09	30-Jan-09	9	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					741	Deck Shuttering	Structures	5B	-	0.0%	22-Jan-09	25-Feb-09	35	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					751	Cast Diaphragm	Structures	5B	-	0.0%	05-Feb-09	05-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					761	Cast Deck	Structures	5B	-	0.0%	12-Feb-09	12-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					771	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	26-Feb-09	26-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					592	Possession 4 (16hrs)	Structures	5B	-	0.0%	31-Dec-08	31-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					910	Possession 3 (16hrs)	Structures	5B	-	0.0%	24-Dec-08	24-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 6 to Pier 7				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					881	Fix Bearings	Structures	5B	-	0.0%	02-Feb-09	03-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					861	Temporary Beam Supports	Structures	5B	-	0.0%	16-Jan-09	23-Jan-09	8	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					871	Place Beams	Structures	5B	-	0.0%	30-Jan-09	02-Feb-09	4	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					911	Deck Reinforcement	Structures	5B	-	0.0%	20-Feb-09	12-Mar-09	21	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					891	Permanent Formwork	Structures	5B	-	0.0%	11-Feb-09	19-Feb-09	9	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					901	Deck Shuttering	Structures	5B	-	0.0%	11-Feb-09	17-Mar-09	35	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					921	Cast Diaphragm	Structures	5B	-	0.0%	25-Feb-09	25-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					931	Cast Deck	Structures	5B	-	0.0%	04-Mar-09	04-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					941	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	18-Mar-09	18-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Structure - Span Pier 7 to North Ramp				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					971	Fix Bearings	Structures	5B	-	0.0%	02-Feb-09	03-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					951	Temporary Beam Supports	Structures	5B	-	0.0%	23-Jan-09	30-Jan-09	8	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					961	Place Beams	Structures	5B	-	0.0%	30-Jan-09	02-Feb-09	4	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1001	Deck Reinforcement	Structures	5B	-	0.0%	11-Feb-09	03-Mar-09	21	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					981	Permanent Formwork	Structures	5B	-	0.0%	02-Feb-09	10-Feb-09	9	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					991	Deck Shuttering	Structures	5B	-	0.0%	02-Feb-09	06-Mar-09	33	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1011	Cast Diaphragm	Structures	5B	-	0.0%	16-Feb-09	16-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1021	Cast Deck	Structures	5B	-	0.0%	23-Feb-09	23-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1031	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	09-Mar-09	09-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 4 to Pier 5				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1011	Fix Bearings	Structures	5B	-	0.0%	20-Feb-09	23-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1021	Temporary Beam Supports	Structures	5B	-	0.0%	05-Feb-09	12-Feb-09	8	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1031	Place Beams	Structures	5B	-	0.0%	19-Feb-09	20-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1041	Deck Reinforcement	Structures	5B	-	0.0%	12-Mar-09	01-Apr-09	21	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1051	Permanent Formwork	Structures	5B	-	0.0%	03-Mar-09	11-Mar-09	9	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1061	Deck Shuttering	Structures	5B	-	0.0%	03-Mar-09	06-Apr-09	35	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1071	Cast Diaphragm	Structures	5B	-	0.0%	17-Mar-09	17-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1081	Cast Deck	Structures	5B	-	0.0%	24-Mar-09	24-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1091	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	07-Apr-09	07-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 5 to Pier 6				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					791	Fix Bearings	Structures	5B	-	0.0%	20-Feb-09	23-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					781	Temporary Beam Supports	Structures	5B	-	0.0%	12-Feb-09	19-Feb-09	8	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					801	Place Beams	Structures	5B	-	0.0%	19-Feb-09	20-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					821	Deck Reinforcement	Structures	5B	-	0.0%	03-Mar-09	23-Mar-09	21	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					811	Permanent Formwork	Structures	5B	-	0.0%	20-Feb-09	02-Mar-09	11	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					831	Deck Shuttering	Structures	5B	-	0.0%	20-Feb-09	26-Mar-09	35	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					841	Cast Diaphragm	Structures	5B	-	0.0%	06-Mar-09	06-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					851	Cast Deck	Structures	5B	-	0.0%	13-Mar-09	13-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1001	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	27-Mar-09	27-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Deck Finishes				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					282	Waterproofing	Structures	5B	-	0.0%	03-Apr-09	15-Apr-09	13	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					483	Expansion Joints	Structures	5B	-	0.0%	16-Apr-09	28-Apr-09	13	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0073

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multiff Services Group | BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					Pier 5				**119,485.76**		**23-Apr-09**	**23-Apr-09**	**1**	**17**	**17**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					349	Pier 5	Structures	5B	119,485.76	100.0%	06-Aug-08	06-Nov-08	93	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					830	Excavation	Structures	5B	-	0.0%	06-Aug-08	07-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					840	Blinding	Structures	5B	-	0.0%	08-Aug-08	08-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					271	Concrete	Structures	5B	-	0.0%	16-Sep-08	16-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					291	Steel fixing	Structures	5B	-	0.0%	08-Sep-08	12-Sep-08	5	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					321	Shuttering	Structures	5B	-	0.0%	10-Sep-08	15-Sep-08	6	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					262	Steel fixing	Structures	5B	-	0.0%	27-Oct-08	31-Oct-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					443	Shuttering	Structures	5B	-	0.0%	03-Nov-08	06-Nov-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					453	Concrete	Structures	5B	-	0.0%	03-Nov-08	06-Nov-08	4	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 6				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 6	Pier 6	Structures	5B	119,485.76	100.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					890	Excavation	Structures	5B	-	0.0%	11-Aug-08	12-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					900	Blinding	Structures	5B	-	0.0%	13-Aug-08	13-Aug-08	1	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					361	Concrete	Structures	5B	-	0.0%	23-Sep-08	23-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					371	Steel fixing	Structures	5B	-	0.0%	15-Sep-08	19-Sep-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					381	Shuttering	Structures	5B	-	0.0%	17-Sep-08	22-Sep-08	6	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					252	Steel fixing	Structures	5B	-	0.0%	03-Nov-08	07-Nov-08	5	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					423	Shuttering	Structures	5B	-	0.0%	10-Nov-08	13-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					433	Concrete	Structures	5B	-	0.0%	10-Nov-08	13-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 7				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Pier 7	Pier 7	Structures	5B	119,485.76	100.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Excavation and Blinding		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					870	Excavation	Structures	5B	-	0.0%	14-Aug-08	15-Aug-08	2	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					880	Blinding	Structures	5B	-	0.0%	18-Aug-08	18-Aug-08	1	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Base Construction		Structures	5B	-	0.0%	28-Aug-08	29-Aug-08	2	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					391	Concrete	Structures	5B	-	0.0%	30-Sep-08	30-Sep-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					401	Steel fixing	Structures	5B	-	0.0%	22-Sep-08	26-Sep-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					591	Shuttering	Structures	5B	-	0.0%	24-Sep-08	29-Sep-08	6	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Columns		Structures	5B	-	0.0%	23-Apr-09	23-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					272	Steel fixing	Structures	5B	-	0.0%	10-Nov-08	14-Nov-08	5	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					463	Shuttering	Structures	5B	-	0.0%	17-Nov-08	20-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					473	Concrete	Structures	5B	-	0.0%	17-Nov-08	20-Nov-08	4	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span South Ramp to Pier 1				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					601	Fix Bearings	Structures	5B	-	0.0%	20-Oct-08	20-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					611	Temporary Beam Supports	Structures	5B	-	0.0%	10-Oct-08	16-Oct-08	7	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					621	Place Beams	Structures	5B	-	0.0%	17-Oct-08	17-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					631	Deck Reinforcement	Structures	5B	-	0.0%	29-Oct-08	18-Nov-08	21	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					641	Permanent Formwork	Structures	5B	-	0.0%	20-Oct-08	28-Oct-08	9	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					651	Deck Shuttering	Structures	5B	-	0.0%	20-Oct-08	21-Nov-08	33	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					661	Cast Diaphragm	Structures	5B	-	0.0%	03-Nov-08	03-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					671	Cast Deck	Structures	5B	-	0.0%	10-Nov-08	10-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					681	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	24-Nov-08	24-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 1 to Pier 2				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					431	Fix Bearings	Structures	5B	-	0.0%	20-Oct-08	20-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					411	Temporary Beam Supports	Structures	5B	-	0.0%	10-Oct-08	16-Oct-08	7	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					421	Place Beams	Structures	5B	-	0.0%	17-Oct-08	17-Oct-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					461	Deck Reinforcement	Structures	5B	-	0.0%	10-Nov-08	28-Nov-08	19	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					441	Permanent Formwork	Structures	5B	-	0.0%	29-Oct-08	06-Nov-08	9	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					451	Deck Shuttering	Structures	5B	-	0.0%	29-Oct-08	03-Dec-08	36	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					471	Cast Diaphragm	Structures	5B	-	0.0%	12-Nov-08	12-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					481	Cast Deck	Structures	5B	-	0.0%	19-Nov-08	19-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					491	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	04-Dec-08	04-Dec-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 2 to Pier 3				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					521	Fix Bearings	Structures	5B	-	0.0%	13-Jan-09	13-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					501	Temporary Beam Supports	Structures	5B	-	0.0%	24-Oct-08	30-Oct-08	7	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					511	Place Beams	Structures	5B	-	0.0%	12-Jan-09	12-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					551	Deck Reinforcement	Structures	5B	-	0.0%	22-Jan-09	11-Feb-09	21	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					531	Permanent Formwork	Structures	5B	-	0.0%	13-Jan-09	21-Jan-09	9	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					541	Deck Shuttering	Structures	5B	-	0.0%	13-Jan-09	16-Feb-09	35	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					561	Cast Diaphragm	Structures	5B	-	0.0%	27-Jan-09	27-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					571	Cast Deck	Structures	5B	-	0.0%	03-Feb-09	03-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					581	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	17-Feb-09	17-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 3 to Pier 4				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					691	Fix Bearings	Structures	5B	-	0.0%	12-Jan-09	12-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					701	Temporary Beam Supports	Structures	5B	-	0.0%	05-Jan-09	09-Jan-09	5	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					711	Place Beams	Structures	5B	-	0.0%	10-Jan-09	10-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					721	Deck Reinforcement	Structures	5B	-	0.0%	02-Feb-09	20-Feb-09	19	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					731	Permanent Formwork	Structures	5B	-	0.0%	22-Jan-09	30-Jan-09	9	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					741	Deck Shuttering	Structures	5B	-	0.0%	22-Jan-09	25-Feb-09	35	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					751	Cast Diaphragm	Structures	5B	-	0.0%	05-Feb-09	05-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					761	Cast Deck	Structures	5B	-	0.0%	12-Feb-09	12-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					771	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	26-Feb-09	26-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					592	Possession 4 (18hrs)	Structures	5B	-	0.0%	31-Dec-08	31-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					910	Possession 3 (16hrs)	Structures	5B	-	0.0%	24-Dec-08	24-Dec-08	1	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 6 to Pier 7				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					881	Fix Bearings	Structures	5B	-	0.0%	02-Feb-09	03-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					861	Temporary Beam Supports	Structures	5B	-	0.0%	16-Jan-09	23-Jan-09	8	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					871	Place Beams	Structures	5B	-	0.0%	30-Jan-09	02-Feb-09	4	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					911	Deck Reinforcement	Structures	5B	-	0.0%	20-Feb-09	12-Mar-09	21	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					891	Permanent Formwork	Structures	5B	-	0.0%	11-Feb-09	19-Feb-09	9	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					901	Deck Shuttering	Structures	5B	-	0.0%	11-Feb-09	17-Mar-09	35	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					921	Cast Diaphragm	Structures	5B	-	0.0%	25-Feb-09	25-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					931	Cast Deck	Structures	5B	-	0.0%	04-Mar-09	04-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					941	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	18-Mar-09	18-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Structure - Span Pier 7 to North Ramp				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					971	Fix Bearings	Structures	5B	-	0.0%	02-Feb-09	03-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					951	Temporary Beam Supports	Structures	5B	-	0.0%	23-Jan-09	30-Jan-09	8	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					961	Place Beams	Structures	5B	-	0.0%	30-Jan-09	02-Feb-09	4	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1001	Deck Reinforcement	Structures	5B	-	0.0%	11-Feb-09	03-Mar-09	21	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					981	Permanent Formwork	Structures	5B	-	0.0%	02-Feb-09	10-Feb-09	9	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					991	Deck Shuttering	Structures	5B	-	0.0%	02-Feb-09	06-Mar-09	33	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1011	Cast Diaphragm	Structures	5B	-	0.0%	16-Feb-09	16-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1021	Cast Deck	Structures	5B	-	0.0%	23-Feb-09	23-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1031	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	09-Mar-09	09-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 4 to Pier 5				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1011	Fix Bearings	Structures	5B	-	0.0%	20-Feb-09	23-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1021	Temporary Beam Supports	Structures	5B	-	0.0%	05-Feb-09	12-Feb-09	8	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1031	Place Beams	Structures	5B	-	0.0%	19-Feb-09	20-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1041	Deck Reinforcement	Structures	5B	-	0.0%	12-Mar-09	01-Apr-09	21	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1051	Permanent Formwork	Structures	5B	-	0.0%	03-Mar-09	11-Mar-09	9	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1061	Deck Shuttering	Structures	5B	-	0.0%	03-Mar-09	06-Apr-09	35	16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1071	Cast Diaphragm	Structures	5B	-	0.0%	17-Mar-09	17-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1081	Cast Deck	Structures	5B	-	0.0%	24-Mar-09	24-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1091	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	07-Apr-09	07-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Span Pier 5 to Pier 6				**119,485.76**	**100.0%**	**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					791	Fix Bearings	Structures	5B	-	0.0%	20-Feb-09	23-Feb-09	4	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					781	Temporary Beam Supports	Structures	5B	-	0.0%	12-Feb-09	19-Feb-09	8	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					801	Place Beams	Structures	5B	-	0.0%	19-Feb-09	20-Feb-09	2	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					821	Deck Reinforcement	Structures	5B	-	0.0%	03-Mar-09	23-Mar-09	21	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					811	Permanent Formwork	Structures	5B	-	0.0%	20-Feb-09	02-Mar-09	11	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					831	Deck Shuttering	Structures	5B	-	0.0%	20-Feb-09	26-Mar-09	35	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					841	Cast Diaphragm	Structures	5B	-	0.0%	06-Mar-09	06-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					851	Cast Deck	Structures	5B	-	0.0%	13-Mar-09	13-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1001	Cast Parapet Beams	Structures	5B	119,485.76	100.0%	27-Mar-09	27-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Superstructure - Deck Finishes				**119,485.76**		**23-Apr-09**	**23-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					282	Waterproofing	Structures	5B	-	0.0%	03-Apr-09	15-Apr-09	13	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					483	Expansion Joints	Structures	5B	-	0.0%	16-Apr-09	28-Apr-09	13	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0074

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Morrison Construction Group | BILFINGER BERGER | SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year / Period / Period Ending	1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
					493	Parapet Rails	Structures	5B	-	0.0%	03-Mar-09	28-Apr-09	57	16	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					503	Walkway Construction	Structures	5B	119,485.76	100.0%	24-Apr-09	22-May-09	29	17	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Trackwork					**238,971.53**	**50%**	**16-Apr-09**	**30-Apr-09**					-	-	-	-	-	-	-	-	-	-	-	-	-	-
					258	Trackwork	Structures	5B	-	0.0%	16-Apr-09	30-Apr-09	15	17	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					339	Containment Slabs	Structures	5B	119,485.76	50.0%	16-Apr-09	29-Apr-09	14	17	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					90	S27 Edinburgh Park Station bridge - Fix Rails	Structures	5B	119,485.76	50.0%	24-Apr-09	30-Apr-09	7	17	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
				E & M Installations					**537,943.93**	**100%**	**01-May-09**	**24-May-09**					-	-	-	-	-	-	-	-	-	-	-	-	-	-
					51	M & E Works	SCC	5B	119,485.76	22.2%	01-May-09	24-May-09	24	18	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					52	OLE Supports	SCC	5B	119,485.76	22.2%	01-May-09	06-May-09	6	18	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					373	Catenary Cables	SCC	5B	119,485.76	22.2%	07-May-09	13-May-09	7	18	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14140	Possession 5 (12hrs)	SCC	5B	-	0.0%	23-May-09	23-May-09	1	18	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14150	OLE Supports and Catenary over Tracks	OLE	5B	119,485.76	22.2%	24-May-09	24-May-09	1	19	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5B	35,000.88	6.5%				19	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5B	25,000.00	4.6%				19	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Edinburgh Park Station Bridge (2)			-	0.0%		24-May-09		19	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
05C	**Edinburgh Park (exc.) to Gogarburn (inc.)**								**11,057,009.87**								-	-	-	-	-	172,232	1,722	266,925	-	677,463	88,975	1,021,340	131,589	2,360,247
	05C1	**Edinburgh Park (exc.) to Gogarburn (inc.)**							**1,277,740.18**								-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Edinburgh Park to Depot																												
			E & M Installations						**638,870.09**	**100%**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4170	Overhead Catenary Line	OLE	5C	365,146.23	57.2%	24-May-10	29-Jun-10	37	32	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5C	3,688.35	0.6%				33	34		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4180	Install Electrical Cables	SCC	5C	-	0.0%	24-May-10	16-Jun-10	24	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4190	Install Fibre Optic Cables	SCC	5C	-	0.0%	24-May-10	16-Jun-10	24	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4200	Install Signalling Wayside Equipment	SCC	5C	267,335.16	41.8%	17-Jun-10	09-Jul-10	23	32	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4165	Installation of poles and building fixings	SCC	5C	-	0.0%	28-Apr-10	12-May-10	15	31	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4164	Access for E&M wayside installation (05C)	SCC	5C	-	0.0%	28-Apr-10	28-Apr-10	1	31	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4179	Access to cable pits for cable laying (05C)	SCC	5C	-	0.0%	24-May-10	24-May-10	1	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4163	Access for visual inspection for E&M wayside installation (05C)	SCC	5C	-	0.0%	26-Mar-10	26-Mar-10	1	29	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4178	Access for visual inspection to cable pits for cable laying (05C)	SCC	5C	-	0.0%	21-Apr-10	21-Apr-10	1	30	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	5C	2,700.36	0.4%				33	34		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Depot to Gogarburn																												
			E & M Installations						**638,870.09**	**100%**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16930	Overhead Catenary Line	OLE	5C	365,146.23	57.2%	04-Jan-10	18-Jan-10	15	27	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5C	3,688.35	0.6%				27	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16960	Install Electrical Cables	SCC	5C	-	0.0%	04-Jan-10	13-Jan-10	10	27	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16970	Install Fibre Optic Cables	SCC	5C	-	0.0%	04-Jan-10	13-Jan-10	10	27	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16980	Install Signalling Wayside Equipment	SCC	5C	267,335.16	41.8%	14-Jan-10	25-Jan-10	12	27	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16920	Installation of poles and building fixings Section 5c Edin.Park Central to Gogarburn	SCC	5C	-	0.0%	14-Dec-09	18-Dec-09	5	26	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16910	Access for E&M wayside installation (05C)	SCC	5C	-	0.0%	14-Dec-09	14-Dec-09	1	26	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16950	Access to cable pits for cable laying (05C)	SCC	5C	-	0.0%	04-Jan-10	04-Jan-10	1	27	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16900	Access for visual inspection for E&M wayside installation (05C)	SCC	5C	-	0.0%	11-Nov-09	11-Nov-09	1	25	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16940	Access for visual inspection to cable pits for cable laying (05C)	SCC	5C	-	0.0%	18-Nov-09	18-Nov-09	1	25	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	5C	2,700.36	0.4%				27	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
	05C2	**Edinburgh Park (exc.) to Gyle (inc.)**							**2,464,477.36**								-	-	-	-	-	172,232	1,722	266,925	-	193,132	88,975	889,751	-	1,612,737
		Edinburgh Park to Gyle Trackwork (760m)																												
			Trackwork						**1,812,810.79**	**100%**							-	-	-	-	-	-	-	266,925	-	193,132	88,975	889,751	-	1,438,782
					140	Earthworks and Subbase	Track	5C	266,925.17	14.7%	08-Jul-08	05-Aug-08	29	7	8		-	-	-	-	-	-	-	266,925	-	-	-	-	-	266,925
					183	OLE Foundations - Drainage	Track - BB	5C	15,181.55	0.8%	06-Aug-08	16-Sep-08	42	8	10		-	-	-	-	-	-	-	-	-	15,182	-	-	-	-	15,182
					779	Track Formation and Ducts	Track	5C	177,950.11	9.8%	17-Sep-08	08-Oct-08	22	10	10		-	-	-	-	-	-	-	-	-	177,950	-	-	-	-	177,950
					789	Track laying sub-section 06 Edin Park Central to Gyle - 40%	Track	5C	355,900.23	19.6%	06-Nov-08	04-Dec-08	29	11	12		-	-	-	-	-	-	-	-	-	-	-	355,900	-	-	355,900
					789	Track laying sub-section 06 Edin Park Central to Gyle - 60%	Track	5C	533,850.34	29.4%	06-Nov-08	04-Dec-08	29	11	12		-	-	-	-	-	-	-	-	-	-	-	533,850	-	-	533,850
					799	Track Finishes	Track	5C	177,950.11	9.8%	05-Dec-08	21-Jan-09	48	12	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					809	Road Crossings	Track	5C	88,975.06	4.9%	09-Oct-08	05-Nov-08	28	10	11		-	-	-	-	-	-	-	-	-	-	88,975	-	-	-	88,975
					819	Fencing	Track	5C	177,950.11	9.8%	22-Jan-09	12-Feb-09	22	14	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5C	18,128.11	1.0%				15	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Gyle Tram Stop																												
			Tramstop						**477,711.97**	**100%**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					141	Civil Engineering and Building Works	Tramstops	5C	84,329.16	17.7%	05-Dec-08	31-Jan-09	58	12	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					141	Civil Engineering and Building Works	Tramstops	5C	84,329.16	17.7%	01-Feb-09	19-Mar-09	48	15	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5C	1,703.62	0.4%				16	17		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2170	Deliver and Install Shelter	Tramstops	5C	56,219.44	11.8%	29-May-09	12-Jun-09	15	19	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5C	567.87	0.1%				19	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					298	Order REC Supply	Trams Eq	5C	-	0.0%	15-Apr-09	15-Apr-09	1	17	17		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5350	Package Test Tramstop	Trams Eq	5C	18,818.17	3.9%	24-Aug-09	31-Aug-09	8	22	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5320	Install LV Power Supply and LV Power Equipment	Trams Eq	5C	18,818.17	3.9%	12-Jun-09	17-Jul-09	36	19	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5330	Install Telecon Equipment	Trams Eq	5C	18,818.17	3.9%	17-Jul-09	17-Aug-09	32	20	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5340	Install Station Control Equipment + AFC Equipment	Trams Eq	5C	18,818.17	3.9%	17-Jul-09	24-Aug-09	39	20	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5319	Access for E&M Tram Stop installation (05C Gyle)	Trams Eq	5C	-	0.0%	12-Jun-09	12-Jun-09	1	19	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5318	Access for visual inspection for E&M Tram Stop installation (05C Gyle)	Trams Eq	5C	-	0.0%	13-May-09	13-May-09	1	18	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5C	760.33	0.2%				22	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Trams Eq	5C	172,784.43	36.2%				21	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5C	1,745.30	0.4%				22	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Gyle Tram Stop Retaining Wall (W16)																												
			Retaining Wall						**173,954.60**	**100%**							-	-	-	-	-	172,232	1,722	-	-	-	-	-	-	173,955
					139	Wall Construction	Structures	5C	172,232.28	99.0%	23-May-08	20-Jun-08	29	5	6		-	-	-	-	-	172,232	-	-	-	-	-	-	-	172,232
					Snagging	Snagging	Structures	5C	1,722.32	1.0%				6	7		-	-	-	-	-	-	1,722	-	-	-	-	-	-	1,722
	05C3	**Gyle (exc.) to Depot Stop (inc.)**							**5,542,024.07**								-	-	-	-	-	-	-	-	-	484,332	-	-	-	484,332
		A8 Underpass (W28)																												
			Underpass						**2,575,179.14**	**100%**							-	-	-	-	-	-	-	-	-	484,332	-	-	-	484,332
					143	Phase 1 - Break Down Piles	Structures	5C	242,165.78	9.4%	08-Aug-08	10-Oct-08	64	8	10		-	-	-	-	-	-	-	-	-	242,166	-	-	-	242,166
					143	Phase 1	Structures	5C	242,165.78	9.4%	08-Aug-08	10-Oct-08	64	8	10		-	-	-	-	-	-	-	-	-	242,166	-	-	-	242,166
					519	Phase 2 - Break Down Piles	Structures	5C	242,165.78	9.4%	10-Nov-08	10-Feb-09	93	12	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					519	Phase 2	Structures	5C	242,165.78	9.4%	10-Nov-08	10-Feb-09	93	12	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					529	Phase 3 - Break Down Piles	Structures	5C	242,165.78	9.4%	11-Feb-09	05-May-09	84	15	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					529	Phase 3	Structures	5C	242,165.78	9.4%	11-Feb-09	05-May-09	84	15	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					539	Phase 4 - Break Down Piles	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					539	Phase 4	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					549	Subway Construction - Excavate	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					549	Subway Construction	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5C	24,461.19	0.9%				20	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of A8 Gogar Underpass (W28) (1)			-	0.0%		14-Jul-09		19	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	5C	127,769.54	5.0%				19	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	5C	1,290.60	0.1%				20	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Depot Access Bridge (S32)																												
			Bridge						**1,626,319.05**	**100%**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	15-Jul-09	15-Aug-09	32	20	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	16-Aug-09	15-Sep-09	31	22	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	16-Sep-09	15-Oct-09	30	23	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	16-Oct-09	15-Nov-09	31	24	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	402,916.88	24.8%	16-Nov-09	15-Dec-09	30	25	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	134,305.63	8.3%	16-Dec-09	07-Jan-10	24	26	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5C	14,651.52	0.9%				27	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Gyle to Depot Stop Trackwork (562m)																												
			Trackwork						**1,340,525.88**	**100%**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					478	Track Laying	Track	5C	789,536.56	58.9%	16-Mar-10	21-May-10	67	29	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2380	Track Finishes	Track	5C	-	0.0%	24-May-10	17-Jun-10	25	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2390	Fencing and Reinstatements	Track	5C	131,589.43	9.8%	18-Jun-10	02-Jul-10	15	32	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1069	Bulk Excavation	Track	5C	131,589.43	9.8%	08-Jan-10	25-Jan-10	18	27	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1079	Drainage and OLE Foundations	Track - BB	5C	11,226.35	0.8%	26-Jan-10	25-Feb-10	31	27	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1089	Track Formation and Ducts	Track	5C	263,178.85	19.6%	26-Feb-10	15-Mar-10	18	28	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5C	13,405.26	1.0%				33	34		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		A8 Retaining Walls (W16)																												
			Retaining Wall						**-**	**0%**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					125	Soil Nailing	Structures	5C	-	0.0%	02-Jun-08	13-Oct-08	134	6	11		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5C	-	0.0%				11	12		-	-	-	-	-	-	-	-	-	-	-	-	-	-
	05C4	**Depot Stop (exc.) to Gogarburn (inc.)**							**1,772,768.26**								-	-	-	-	-	-	-	-	-	-	-	131,589	131,589	263,179
		Depot Stop to Gogarburn Trackwork (562m)																												
			Trackwork						**1,469,586.01**	**100%**							-	-	-	-	-	-	-	-	-	-	-	131,589	131,589	263,179
					148	Ramp Wall out of depot (details unknown)	Track	5C	131,589.43	9.0%	14-Oct-08	24-Nov-08	42	11	12		-	-	-	-	-	-	-	-	-	-	-	131,589	-	-	131,589
					A2330	Track Finishes	Track	5C	-	0.0%	22-Jul-09	17-Aug-09	27	21	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2340	Fencing and Reinstatements	Track	5C	131,589.43	9.0%	18-Aug-09	01-Sep-09	15	22	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					749	Drainage and OLE Foundations	Track - BB	5C	11,226.35	0.8%	12-Dec-08	27-Jan-09	47	13	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					759	Track Formation and Ducts	Track	5C	131,589.43	9.0%	28-Jan-09	12-Feb-09	16	14	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					769	Track Laying - 50%	Track	5C	394,768.28	26.9%	08-Jun-09	21-Jul-09	44	19	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0075

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Murray Service Group | BILFINGER BERGER | SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Extract 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					493	Parapet Rails	Structures	5B	-	0.0%	03-Mar-09	28-Apr-09	57	16	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					503	Walkway Construction	Structures	5B	119,485.76	100.0%	24-Apr-09	22-May-09	29	17	18	-	-	-	-	119,486	-	-	-	-	-	-	-	-	119,486
				Trackwork					**238,971.53**	**50%**	**16-Apr-09**	**30-Apr-09**				-	-	-	-	**238,972**	-	-	-	-	-	-	-	-	**238,972**
					258	Trackwork	Structures	5B	-	0.0%	16-Apr-09	30-Apr-09	15	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					339	Containment Slabs	Structures	5B	119,485.76	50.0%	16-Apr-09	29-Apr-09	14	17	18	-	-	-	-	119,486	-	-	-	-	-	-	-	-	119,486
					90	S27 Edinburgh Park Station bridge - Fix Rails	Structures	5B	119,485.76	50.0%	24-Apr-09	30-Apr-09	7	17	18	-	-	-	-	119,486	-	-	-	-	-	-	-	-	119,486
				E & M Installations					**537,943.93**	**100%**	**01-May-09**	**24-May-09**				-	-	-	-	**238,972**	**238,972**	**60,001**	-	-	-	-	-	-	**537,944**
					51	M & E Works	SCC	5B	119,485.76	22.2%	01-May-09	24-May-09	24	18	19	-	-	-	-	-	119,486	-	-	-	-	-	-	-	-	119,486
					52	OLE Supports	SCC	5B	119,485.76	22.2%	01-May-09	06-May-09	6	18	18	-	-	-	-	119,486	-	-	-	-	-	-	-	-	119,486
					373	Catenary Cables	SCC	5B	119,485.76	22.2%	07-May-09	13-May-09	7	18	18	-	-	-	-	119,486	-	-	-	-	-	-	-	-	119,486
					A14140	Possession 5 (12hrs)	SCC	5B	-	0.0%	23-May-09	23-May-09	1	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14150	OLE Supports and Catenary over Tracks	OLE	5B	119,485.76	22.2%	24-May-09	24-May-09	1	19	19	-	-	-	-	-	-	119,486	-	-	-	-	-	-	-	119,486
					Snagging	Snagging	OLE	5B	35,000.88	6.5%				19	20	-	-	-	-	-	-	-	35,001	-	-	-	-	-	-	35,001
					3rd Party	Third Party Sign-off	Structures	5B	25,000.00	4.6%				19	20	-	-	-	-	-	-	-	25,000	-	-	-	-	-	-	25,000
					Crit. Milestone	Completion of Edinburgh Park Station Bridge (2)			-	0.0%		24-May-09		19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	05C Edinburgh Park (exc.) to Gogarburn (inc.)								**11,057,009.87**							**189,176**	**1,005,970**	**103,748**	**1,704**	**484,332**	**56,219**	**1,115,819**	**815,288**	**727,174**	**327,336**	**372,326**	**289,133**	**440,553**	**5,928,779**
		05C1 Edinburgh Park (exc.) to Gogarburn (inc.)							**1,277,740.18**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Edinburgh Park to Depot																										
				E & M Installations					**638,870.09**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4170	Overhead Catenary Line	OLE	5C	365,146.23	57.2%	24-May-10	29-Jun-10	37	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5C	3,688.35	0.6%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4180	Install Electrical Cables	SCC	5C	-	0.0%	24-May-10	16-Jun-10	24	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4190	Install Fibre Optic Cables	SCC	5C	-	0.0%	24-May-10	16-Jun-10	24	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4200	Install Signalling Wayside Equipment	SCC	5C	267,335.16	41.8%	17-Jun-10	09-Jul-10	23	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4165	Installation of poles and building fixings	SCC	5C	-	0.0%	28-Apr-10	12-May-10	15	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4164	Access for E&M wayside installation (05C)	SCC	5C	-	0.0%	28-Apr-10	28-Apr-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4179	Access to cable pits for cable laying (05C)	SCC	5C	-	0.0%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4163	Access for visual inspection for E&M wayside installation (05C)	SCC	5C	-	0.0%	26-Mar-10	26-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4178	Access for visual inspection to cable pits for cable laying (05C)	SCC	5C	-	0.0%	21-Apr-10	21-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	5C	2,700.36	0.4%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Depot to Gogarburn																										
				E & M Installations					**638,870.09**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16930	Overhead Catenary Line	OLE	5C	365,146.23	57.2%	04-Jan-10	18-Jan-10	15	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5C	3,688.35	0.6%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16960	Install Electrical Cables	SCC	5C	-	0.0%	04-Jan-10	13-Jan-10	10	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16970	Install Fibre Optic Cables	SCC	5C	-	0.0%	04-Jan-10	13-Jan-10	10	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16980	Install Signalling Wayside Equipment	SCC	5C	267,335.16	41.8%	14-Jan-10	25-Jan-10	12	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16920	Installation of poles and building fixings Section 5c Edin.Park Central to Gogarburn	SCC	5C	-	0.0%	14-Dec-09	18-Dec-09	5	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16910	Access for E&M wayside installation (05C)	SCC	5C	-	0.0%	14-Dec-09	14-Dec-09	1	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16950	Access to cable pits for cable laying (05C)	SCC	5C	-	0.0%	04-Jan-10	04-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16900	Access for visual inspection for E&M wayside installation (05C)	SCC	5C	-	0.0%	11-Nov-09	11-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16940	Access for visual inspection to cable pits for cable laying (05C)	SCC	5C	-	0.0%	18-Nov-09	18-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	5C	2,700.36	0.4%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05C2 Edinburgh Park (exc.) to Gyle (inc.)							**2,464,477.36**							**177,950**	**262,279**	**102,457**	**1,704**	-	**56,219**	**19,386**	-	**229,239**	**2,506**	-	-	-	**851,740**
			Edinburgh Park to Gyle Trackwork (760m)																										
				Trackwork					**1,812,810.79**	**100%**						**177,950**	**177,950**	**18,128**	-	-	-	-	-	-	-	-	-	-	**374,028**
					140	Earthworks and Subbase	Track	5C	266,925.17	14.7%	08-Jul-08	05-Aug-08	29	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					183	OLE Foundations - Drainage	Track - BB	5C	15,181.55	0.8%	06-Aug-08	16-Sep-08	42	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					779	Track Formation and Ducts	Track	5C	177,950.11	9.8%	17-Sep-08	08-Oct-08	22	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					789	Track laying sub-section 06 Edin Park Central to Gyle - 40%	Track	5C	355,900.23	19.6%	06-Nov-08	04-Dec-08	29	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					789	Track laying sub-section 06 Edin Park Central to Gyle - 60%	Track	5C	533,850.34	29.4%	06-Nov-08	04-Dec-08	29	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					799	Track Finishes	Track	5C	177,950.11	9.8%	05-Dec-08	21-Jan-09	48	12	14	177,950	-	-	-	-	-	-	-	-	-	-	-	-	-	177,950
					809	Road Crossings	Track	5C	88,975.06	4.9%	09-Oct-08	05-Nov-08	28	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					819	Fencing	Track	5C	177,950.11	9.8%	22-Jan-09	12-Feb-09	22	14	15	-	177,950	-	-	-	-	-	-	-	-	-	-	-	-	177,950
					Snagging	Snagging	Track	5C	18,128.11	1.0%				15	16	-	-	18,128	-	-	-	-	-	-	-	-	-	-	-	18,128
			Gyle Tram Stop																										
				Tramstop					**477,711.97**	**100%**						-	**84,329**	**84,329**	**1,704**	-	**56,219**	**19,386**	-	**229,239**	**2,506**	-	-	-	**477,712**
					141	Civil Engineering and Building Works	Tramstops	5C	84,329.16	17.7%	05-Dec-08	31-Jan-09	58	12	15	-	84,329	-	-	-	-	-	-	-	-	-	-	-	-	84,329
					141	Civil Engineering and Building Works	Tramstops	5C	84,329.16	17.7%	01-Feb-09	19-Mar-09	48	15	16	-	-	84,329	-	-	-	-	-	-	-	-	-	-	-	84,329
					Snagging	Snagging	Tramstops	5C	1,703.62	0.4%				16	17	-	-	-	1,704	-	-	-	-	-	-	-	-	-	-	1,704
					A2170	Deliver and Install Shelter	Tramstops	5C	56,219.44	11.8%	29-May-09	12-Jun-09	15	19	19	-	-	-	-	-	56,219	-	-	-	-	-	-	-	-	56,219
					Snagging	Snagging	Tramstops	5C	567.87	0.1%				19	20	-	-	-	-	-	-	568	-	-	-	-	-	-	-	568
					298	Order REC Supply	Trams Eq	5C	-	0.0%	15-Apr-09	15-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5350	Package Test Tramstop	Trams Eq	5C	18,818.17	3.9%	24-Aug-09	31-Aug-09	8	22	22	-	-	-	-	-	-	-	-	18,818	-	-	-	-	18,818
					A5320	Install LV Power Supply and LV Power Equipment	Trams Eq	5C	18,818.17	3.9%	12-Jun-09	17-Jul-09	36	19	20	-	-	-	-	-	-	-	18,818	-	-	-	-	-	-	18,818
					A5330	Install Telecon Equipment	Trams Eq	5C	18,818.17	3.9%	17-Jul-09	17-Aug-09	32	20	22	-	-	-	-	-	-	-	-	18,818	-	-	-	-	-	18,818
					A5340	Install Station Control Equipment + AFC Equipment	Trams Eq	5C	18,818.17	3.9%	17-Jul-09	24-Aug-09	39	20	22	-	-	-	-	-	-	-	-	18,818	-	-	-	-	-	18,818
					A5319	Access for E&M Tram Stop installation (05C Gyle)	Trams Eq	5C	-	0.0%	12-Jun-09	12-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5318	Access for visual inspection for E&M Tram Stop installation (05C Gyle)	Trams Eq	5C	-	0.0%	13-May-09	13-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5C	760.33	0.2%				22	23	-	-	-	-	-	-	-	-	-	760	-	-	-	760
					Highways	Highways BoQ works	Trams Eq	5C	172,784.43	36.2%				21	22	-	-	-	-	-	-	-	-	172,784	-	-	-	-	172,784
					Snagging	Snagging	Trams Eq	5C	1,745.30	0.4%				22	23	-	-	-	-	-	-	-	-	-	1,745	-	-	-	1,745
			Gyle Tram Stop Retaining Wall (W16)																										
				Retaining Wall					**173,954.60**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					139	Wall Construction	Structures	5C	172,232.28	99.0%	23-May-08	20-Jun-08	29	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5C	1,722.32	1.0%				6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05C3 Gyle (exc.) to Depot Stop (inc.)							**5,542,024.07**							-	**484,332**	-	-	**484,332**	-	**1,096,433**	**25,752**	**268,611**	**268,611**	**268,611**	**268,611**	**402,917**	**3,568,209**
			A8 Underpass (W28)																										
				Underpass					**2,575,179.14**	**100%**						-	**484,332**	-	-	**484,332**	-	**1,096,433**	**25,752**	-	-	-	-	-	**2,090,848**
					143	Phase 1 - Break Down Piles	Structures	5C	242,165.78	9.4%	08-Aug-08	10-Oct-08	64	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					143	Phase 1	Structures	5C	242,165.78	9.4%	08-Aug-08	10-Oct-08	64	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					519	Phase 2 - Break Down Piles	Structures	5C	242,165.78	9.4%	10-Nov-08	10-Feb-09	93	12	15	-	242,166	-	-	-	-	-	-	-	-	-	-	-	-	242,166
					519	Phase 2	Structures	5C	242,165.78	9.4%	10-Nov-08	10-Feb-09	93	12	15	-	242,166	-	-	-	-	-	-	-	-	-	-	-	-	242,166
					529	Phase 3 - Break Down Piles	Structures	5C	242,165.78	9.4%	11-Feb-09	05-May-09	84	15	18	-	-	-	-	242,166	-	-	-	-	-	-	-	-	-	-	242,166
					529	Phase 3	Structures	5C	242,165.78	9.4%	11-Feb-09	05-May-09	84	15	18	-	-	-	-	242,166	-	-	-	-	-	-	-	-	-	-	242,166
					539	Phase 4 - Break Down Piles	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20	-	-	-	-	-	-	-	242,166	-	-	-	-	-	-	-	242,166
					539	Phase 4	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20	-	-	-	-	-	-	-	242,166	-	-	-	-	-	-	-	242,166
					549	Subway Construction - Excavate	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20	-	-	-	-	-	-	-	242,166	-	-	-	-	-	-	-	242,166
					549	Subway Construction	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20	-	-	-	-	-	-	-	242,166	-	-	-	-	-	-	-	242,166
					Snagging	Snagging	Structures	5C	24,461.19	0.9%				20	21	-	-	-	-	-	-	-	24,461	-	-	-	-	-	-	24,461
					Crit. Milestone	Completion of A8 Gogar Underpass (W28) (1)			-	0.0%		14-Jul-09		19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	5C	127,769.54	5.0%				19	20	-	-	-	-	-	-	127,770	-	-	-	-	-	-	-	127,770
					Snagging	Snagging	Highways	5C	1,290.60	0.1%				20	21	-	-	-	-	-	-	-	1,291	-	-	-	-	-	-	1,291
			Depot Access Bridge (S32)																										
				Bridge					**1,626,319.05**	**100%**						-	-	-	-	-	-	-	-	**268,611**	**268,611**	**268,611**	**268,611**	**402,917**	**1,477,362**
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	15-Jul-09	15-Aug-09	32	20	22	-	-	-	-	-	-	-	-	268,611	-	-	-	-	-	268,611
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	16-Aug-09	15-Sep-09	31	22	23	-	-	-	-	-	-	-	-	-	268,611	-	-	-	-	268,611
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	16-Sep-09	15-Oct-09	30	23	24	-	-	-	-	-	-	-	-	-	-	268,611	-	-	-	268,611
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	16-Oct-09	15-Nov-09	31	24	25	-	-	-	-	-	-	-	-	-	-	-	268,611	-	-	268,611
					144	Dummy Activity	Structures	5C	402,916.88	24.8%	16-Nov-09	15-Dec-09	30	25	26	-	-	-	-	-	-	-	-	-	-	-	-	402,917	-	402,917
					144	Dummy Activity	Structures	5C	134,305.63	8.3%	16-Dec-09	07-Jan-10	24	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5C	14,651.52	0.9%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Gyle to Depot Stop Trackwork (562m)																										
				Trackwork					**1,340,525.88**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					478	Track Laying	Track	5C	789,536.56	58.9%	16-Mar-10	21-May-10	67	29	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2380	Track Finishes	Track	5C	-	0.0%	24-May-10	17-Jun-10	25	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2390	Fencing and Reinstatements	Track	5C	131,589.43	9.8%	18-Jun-10	02-Jul-10	15	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1069	Bulk Excavation	Track	5C	131,589.43	9.8%	08-Jan-10	25-Jan-10	18	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1079	Drainage and OLE Foundations	Track - BB	5C	11,226.35	0.8%	26-Jan-10	25-Feb-10	31	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1089	Track Formation and Ducts	Track	5C	263,178.85	19.6%	26-Feb-10	15-Mar-10	18	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5C	13,405.26	1.0%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			A8 Retaining Walls (W16)																										
				Retaining Wall					-	**0%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					145	Soil Nailing	Structures	5C	-	0.0%	02-Jun-08	13-Oct-08	134	6	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5C	-	0.0%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		05C4 Depot Stop (exc.) to Gogarburn (inc.)							**1,772,768.26**							**11,226**	**259,359**	**1,291**	-	-	-	-	-	**789,537**	**229,324**	**56,219**	**103,715**	**20,522**	**37,636**	**1,508,829**
			Depot Stop to Gogarburn Trackwork (562m)																										
				Trackwork					**1,469,586.01**	**100%**						**11,226**	**259,359**	**1,291**	-	-	-	-	-	**789,537**	**144,995**	-	-	-	-	**1,206,407**
					148	Ramp Wall out of depot (details unknown)	Track	5C	131,589.43	9.0%	14-Oct-08	24-Nov-08	42	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2330	Track Finishes	Track	5C	-	0.0%	22-Jul-09	17-Aug-09	27	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2340	Fencing and Reinstatements	Track	5C	131,589.43	9.0%	18-Aug-09	01-Sep-09	15	22	22	-	-	-	-	-	-	-	-	131,589	-	-	-	-	-	131,589
					749	Drainage and OLE Foundations	Track - BB	5C	11,226.35	0.8%	12-Dec-08	27-Jan-09	47	13	14	11,226	-	-	-	-	-	-	-	-	-	-	-	-	-	11,226
					759	Track Formation and Ducts	Track	5C	131,589.43	9.0%	28-Jan-09	12-Feb-09	16	14	15	-	131,589	-	-	-	-	-	-	-	-	-	-	-	-	131,589
					769	Track Laying - 50%	Track	5C	394,768.28	26.9%	08-Jun-09	21-Jul-09	44	19	21	-	-	-	-	-	-	-	394,768	-	-	-	-	-	-	394,768

USB00000073_0076

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Murray Services Group | BILFINGER BERGER | SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					493	Parapet Rails	Structures	5B	-	0.0%	03-Mar-09	28-Apr-09	57	16	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					503	Walkway Construction	Structures	5B	119,485.76	100.0%	24-Apr-09	22-May-09	29	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Trackwork					**238,971.53**	**50%**	**16-Apr-09**	**30-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					258	Trackwork	Structures	5B	-	0.0%	16-Apr-09	30-Apr-09	15	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					339	Containment Slabs	Structures	5B	119,485.76	50.0%	16-Apr-09	29-Apr-09	14	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					90	S27 Edinburgh Park Station bridge - Fix Rails	Structures	5B	119,485.76	50.0%	24-Apr-09	30-Apr-09	7	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				E & M Installations					**537,943.93**	**100%**	**01-May-09**	**24-May-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					51	M & E Works	SCC	5B	119,485.76	22.2%	01-May-09	24-May-09	24	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					52	OLE Supports	SCC	5B	119,485.76	22.2%	01-May-09	06-May-09	6	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					373	Catenary Cables	SCC	5B	119,485.76	22.2%	07-May-09	13-May-09	7	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14140	Possession 5 (12hrs)	SCC	5B	-	0.0%	23-May-09	23-May-09	1	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14150	OLE Supports and Catenary over Tracks	OLE	5B	119,485.76	22.2%	24-May-09	24-May-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5B	35,000.88	6.5%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5B	25,000.00	4.6%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of Edinburgh Park Station Bridge (2)			-	0.0%		24-May-09		19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				05C Edinburgh Park (exc.) to Gogarburn (inc.)					**11,057,009.87**							**899,137**	**32,267**	**263,179**	**-**	**789,537**	**-**	**764,071**	**19,794**	**-**	**-**	**-**	**-**	**-**	**2,767,984**
				05C1 Edinburgh Park (exc.) to Gogarburn (inc.)					**1,277,740.18**							**632,481**	**6,389**	**-**	**-**	**-**	**-**	**632,481**	**6,389**	**-**	**-**	**-**	**-**	**-**	**1,277,740**
				Edinburgh Park to Depot																									
				E & M Installations					**638,870.09**	**100%**						**-**	**-**	**-**	**-**	**-**	**-**	**632,481**	**6,389**	**-**	**-**	**-**	**-**	**-**	**638,870**
					A4170	Overhead Catenary Line	OLE	5C	365,146.23	57.2%	24-May-10	29-Jun-10	37	32	33	-	-	-	-	-	-	365,146	-	-	-	-	-	-	365,146
					Snagging	Snagging	OLE	5C	3,688.35	0.6%				33	34	-	-	-	-	-	-	-	3,688	-	-	-	-	-	3,688
					A4180	Install Electrical Cables	SCC	5C	-	0.0%	24-May-10	16-Jun-10	24	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4190	Install Fibre Optic Cables	SCC	5C	-	0.0%	24-May-10	16-Jun-10	24	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4200	Install Signalling Wayside Equipment	SCC	5C	267,335.16	41.8%	17-Jun-10	09-Jul-10	23	32	33	-	-	-	-	-	-	267,335	-	-	-	-	-	-	267,335
					A4165	Installation of poles and building fixings	SCC	5C	-	0.0%	28-Apr-10	12-May-10	15	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4164	Access for E&M wayside installation (05C)	SCC	5C	-	0.0%	28-Apr-10	28-Apr-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4179	Access to cable pits for cable laying (05C)	SCC	5C	-	0.0%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4163	Access for visual inspection for E&M wayside installation (05C)	SCC	5C	-	0.0%	26-Mar-10	26-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4178	Access for visual inspection to cable pits for cable laying (05C)	SCC	5C	-	0.0%	21-Apr-10	21-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	5C	2,700.36	0.4%				33	34	-	-	-	-	-	-	-	2,700	-	-	-	-	-	2,700
				Depot to Gogarburn																									
				E & M Installations					**638,870.09**	**100%**						**632,481**	**6,389**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**638,870**
					A16930	Overhead Catenary Line	OLE	5C	365,146.23	57.2%	04-Jan-10	18-Jan-10	15	27	27	365,146	-	-	-	-	-	-	-	-	-	-	-	-	-	365,146
					Snagging	Snagging	OLE	5C	3,688.35	0.6%				27	28	-	3,688	-	-	-	-	-	-	-	-	-	-	-	-	3,688
					A16960	Install Electrical Cables	SCC	5C	-	0.0%	04-Jan-10	13-Jan-10	10	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16970	Install Fibre Optic Cables	SCC	5C	-	0.0%	04-Jan-10	13-Jan-10	10	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16980	Install Signalling Wayside Equipment	SCC	5C	267,335.16	41.8%	14-Jan-10	25-Jan-10	12	27	27	267,335	-	-	-	-	-	-	-	-	-	-	-	-	267,335
					A16920	Installation of poles and building fixings Section 5c Edin.Park Central to Gogarburn	SCC	5C	-	0.0%	14-Dec-09	18-Dec-09	5	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16910	Access for E&M wayside installation (05C)	SCC	5C	-	0.0%	14-Dec-09	14-Dec-09	1	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16950	Access to cable pits for cable laying (05C)	SCC	5C	-	0.0%	04-Jan-10	04-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16900	Access for visual inspection for E&M wayside installation (05C)	SCC	5C	-	0.0%	11-Nov-09	11-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16940	Access for visual inspection to cable pits for cable laying (05C)	SCC	5C	-	0.0%	18-Nov-09	18-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	5C	2,700.36	0.4%				27	28	-	2,700	-	-	-	-	-	-	-	-	-	-	-	-	2,700
				05C2 Edinburgh Park (exc.) to Gyle (inc.)					**2,464,477.36**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
				Edinburgh Park to Gyle Trackwork (760m)																									
				Trackwork					**1,812,810.79**	**100%**						**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					140	Earthworks and Subbase	Track	5C	266,925.17	14.7%	08-Jul-08	05-Aug-08	29	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					183	OLE Foundations - Drainage	Track - BB	5C	15,181.55	0.8%	06-Aug-08	16-Sep-08	42	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					779	Track Formation and Ducts	Track	5C	177,950.11	9.8%	17-Sep-08	08-Oct-08	22	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					789	Track laying sub-section 06 Edin Park Central to Gyle - 40%	Track	5C	355,900.23	19.6%	06-Nov-08	04-Dec-08	29	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					789	Track laying sub-section 06 Edin Park Central to Gyle - 60%	Track	5C	533,850.34	29.4%	06-Nov-08	04-Dec-08	29	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					799	Track Finishes	Track	5C	177,950.11	9.8%	05-Dec-08	21-Jan-09	48	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					809	Road Crossings	Track	5C	88,975.06	4.9%	09-Oct-08	05-Nov-08	28	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					819	Fencing	Track	5C	177,950.11	9.8%	22-Jan-09	12-Feb-09	22	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5C	18,128.11	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Gyle Tram Stop																									
				Tramstop					**477,711.97**	**100%**						**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					141	Civil Engineering and Building Works	Tramstops	5C	84,329.16	17.7%	05-Dec-08	31-Jan-09	58	12	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					141	Civil Engineering and Building Works	Tramstops	5C	84,329.16	17.7%	01-Feb-09	19-Mar-09	48	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5C	1,703.62	0.4%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2170	Deliver and Install Shelter	Tramstops	5C	56,219.44	11.8%	29-May-09	12-Jun-09	15	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5C	567.87	0.1%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					298	Order REC Supply	Trams Eq	5C	-	0.0%	15-Apr-09	15-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5350	Package Test Tramstop	Trams Eq	5C	18,818.17	3.9%	24-Aug-09	31-Aug-09	8	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5320	Install LV Power Supply and LV Power Equipment	Trams Eq	5C	18,818.17	3.9%	12-Jun-09	17-Jul-09	36	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5330	Install Telecon Equipment	Trams Eq	5C	18,818.17	3.9%	17-Jul-09	17-Aug-09	32	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5340	Install Station Control Equipment + AFC Equipment	Trams Eq	5C	18,818.17	3.9%	17-Jul-09	24-Aug-09	39	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5319	Access for E&M Tram Stop installation (05C Gyle)	Trams Eq	5C	-	0.0%	12-Jun-09	12-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5318	Access for visual inspection for E&M Tram Stop installation (05C Gyle)	Trams Eq	5C	-	0.0%	13-May-09	13-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5C	760.33	0.2%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Trams Eq	5C	172,784.43	36.2%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5C	1,745.30	0.4%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Gyle Tram Stop Retaining Wall (W16)																									
				Retaining Wall					**173,954.60**	**100%**						**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					139	Wall Construction	Structures	5C	172,232.28	99.0%	23-May-08	20-Jun-08	29	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5C	1,722.32	1.0%				6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				05C3 Gyle (exc.) to Depot Stop (inc.)					**5,542,024.07**							**265,895**	**25,878**	**263,179**	**-**	**789,537**	**-**	**131,589**	**13,405**	**-**	**-**	**-**	**-**	**-**	**1,489,483**
				A8 Underpass (W28)																									
				Underpass					**2,575,179.14**	**100%**						**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					143	Phase 1 - Break Down Piles	Structures	5C	242,165.78	9.4%	08-Aug-08	10-Oct-08	64	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					143	Phase 1	Structures	5C	242,165.78	9.4%	08-Aug-08	10-Oct-08	64	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					519	Phase 2 - Break Down Piles	Structures	5C	242,165.78	9.4%	10-Nov-08	10-Feb-09	93	12	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					519	Phase 2	Structures	5C	242,165.78	9.4%	10-Nov-08	10-Feb-09	93	12	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					529	Phase 3 - Break Down Piles	Structures	5C	242,165.78	9.4%	11-Feb-09	05-May-09	84	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					529	Phase 3	Structures	5C	242,165.78	9.4%	11-Feb-09	05-May-09	84	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					539	Phase 4 - Break Down Piles	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					539	Phase 4	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					549	Subway Construction - Excavate	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					549	Subway Construction	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5C	24,461.19	0.9%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Completion of A8 Gogar Underpass (W28) (1)			-	0.0%		14-Jul-09		19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	5C	127,769.54	5.0%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	5C	1,290.60	0.1%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Depot Access Bridge (S32)																									
				Bridge					**1,626,319.05**	**100%**						**134,306**	**14,652**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**148,957**
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	15-Jul-09	15-Aug-09	32	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	16-Aug-09	15-Sep-09	31	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	16-Sep-09	15-Oct-09	30	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	16-Oct-09	15-Nov-09	31	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	402,916.88	24.8%	16-Nov-09	15-Dec-09	30	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	134,305.63	8.3%	16-Dec-09	07-Jan-10	24	26	27	134,306	-	-	-	-	-	-	-	-	-	-	-	-	134,306
					Snagging	Snagging	Structures	5C	14,651.52	0.9%				27	28	-	14,652	-	-	-	-	-	-	-	-	-	-	-	-	14,652
				Gyle to Depot Stop Trackwork (562m)																									
				Trackwork					**1,340,525.88**	**100%**						**131,589**	**11,226**	**263,179**	**-**	**789,537**	**-**	**131,589**	**13,405**	**-**	**-**	**-**	**-**	**-**	**1,340,526**
					478	Track Laying	Track	5C	789,536.56	58.9%	16-Mar-10	21-May-10	67	29	31	-	-	-	-	789,537	-	-	-	-	-	-	-	-	-	789,537
					A2380	Track Finishes	Track	5C	-	0.0%	24-May-10	17-Jun-10	25	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2390	Fencing and Reinstatements	Track	5C	131,589.43	9.8%	18-Jun-10	02-Jul-10	15	32	33	-	-	-	-	-	-	131,589	-	-	-	-	-	-	131,589
					1069	Bulk Excavation	Track	5C	131,589.43	9.8%	08-Jan-10	25-Jan-10	18	27	27	131,589	-	-	-	-	-	-	-	-	-	-	-	-	-	131,589
					1079	Drainage and OLE Foundations	Track - BB	5C	11,226.35	0.8%	26-Jan-10	25-Feb-10	31	27	28	-	11,226	-	-	-	-	-	-	-	-	-	-	-	-	11,226
					1089	Track Formation and Ducts	Track	5C	263,178.85	19.6%	26-Feb-10	15-Mar-10	18	28	29	-	-	263,179	-	-	-	-	-	-	-	-	-	-	-	263,179
					Snagging	Snagging	Track	5C	13,405.26	1.0%				33	34	-	-	-	-	-	-	-	13,405	-	-	-	-	-	13,405
				A8 Retaining Walls (W16)																									
				Retaining Wall					**-**	**0%**						**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					149	Soil Nailing	Structures	5C	-	0.0%	02-Jun-08	13-Oct-08	134	6	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5C	-	0.0%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				05C4 Depot Stop (exc.) to Gogarburn (inc.)					**1,772,768.26**							**760**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**760**
				Depot Stop to Gogarburn Trackwork (562m)																									
				Trackwork					**1,469,586.01**	**100%**						**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					148	Ramp Wall out of depot (details unknown)	Track	5C	131,589.43	9.0%	14-Oct-08	24-Nov-08	42	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2330	Track Finishes	Track	5C	-	0.0%	22-Jul-09	17-Aug-09	27	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2340	Fencing and Reinstatements	Track	5C	131,589.43	9.0%	18-Aug-09	01-Sep-09	15	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					749	Drainage and OLE Foundations	Track - BB	5C	11,226.35	0.8%	12-Dec-08	27-Jan-09	47	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					759	Track Formation and Ducts	Track	5C	131,589.43	9.0%	28-Jan-09	12-Feb-09	16	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					769	Track Laying - 50%	Track	5C	394,768.28	26.9%	08-Jun-09	21-Jul-09	44	19	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0077

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Murrill Edwards College | BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					493	Parapet Rails	Structures	5B	-	0.0%	03-Mar-09	28-Apr-09	57	16	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					503	Walkway Construction	Structures	5B	119,485.76	100.0%	24-Apr-09	22-May-09	29	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Trackwork				**238,971.53**	**50%**	**16-Apr-09**	**30-Apr-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					258	Trackwork	Structures	5B	-	0.0%	16-Apr-09	30-Apr-09	15	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					339	Containment Slabs	Structures	5B	119,485.76	50.0%	16-Apr-09	29-Apr-09	14	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					90	S27 Edinburgh Park Station bridge - Fix Rails	Structures	5B	119,485.76	50.0%	24-Apr-09	30-Apr-09	7	17	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					E & M Installations				**537,943.93**	**100%**	**01-May-09**	**24-May-09**				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					51	M & E Works	SCC	5B	119,485.76	22.2%	01-May-09	24-May-09	24	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					52	OLE Supports	SCC	5B	119,485.76	22.2%	01-May-09	06-May-09	6	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					373	Catenary Cables	SCC	5B	119,485.76	22.2%	07-May-09	13-May-09	7	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14140	Possession 5 (12hrs)	SCC	5B	-	0.0%	23-May-09	23-May-09	1	18	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A14150	OLE Supports and Catenary over Tracks	OLE	5B	119,485.76	22.2%	24-May-09	24-May-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5B	35,000.88	6.5%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3rd Party	Third Party Sign-off	Structures	5B	25,000.00	4.6%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Cnt. Milestone	Completion of Edinburgh Park Station Bridge (2)			-	0.0%		24-May-09		19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					05C Edinburgh Park (exc.) to Gogarburn (inc.)				**11,057,009.87**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					05C1 Edinburgh Park (exc.) to Gogarburn (inc.)				**1,277,740.18**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Edinburgh Park to Depot																									
					E & M Installations				**638,870.09**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4170	Overhead Catenary Line	OLE	5C	365,146.23	57.2%	24-May-10	29-Jun-10	37	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5C	3,688.35	0.6%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4180	Install Electrical Cables	SCC	5C	-	0.0%	24-May-10	16-Jun-10	24	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4190	Install Fibre Optic Cables	SCC	5C	-	0.0%	24-May-10	16-Jun-10	24	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4200	Install Signalling Wayside Equipment	SCC	5C	267,335.16	41.8%	17-Jun-10	09-Jul-10	23	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4165	Installation of poles and building fixings	SCC	5C	-	0.0%	28-Apr-10	12-May-10	15	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4164	Access for E&M wayside installation (05C)	SCC	5C	-	0.0%	28-Apr-10	28-Apr-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4179	Access to cable pits for cable laying (05C)	SCC	5C	-	0.0%	24-May-10	24-May-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4163	Access for visual inspection for E&M wayside installation (05C)	SCC	5C	-	0.0%	26-Mar-10	26-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4178	Access for visual inspection to cable pits for cable laying (05C)	SCC	5C	-	0.0%	21-Apr-10	21-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	5C	2,700.36	0.4%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Depot to Gogarburn																									
					E & M Installations				**638,870.09**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16930	Overhead Catenary Line	OLE	5C	365,146.23	57.2%	04-Jan-10	18-Jan-10	15	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	5C	3,688.35	0.6%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16960	Install Electrical Cables	SCC	5C	-	0.0%	04-Jan-10	13-Jan-10	10	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16970	Install Fibre Optic Cables	SCC	5C	-	0.0%	04-Jan-10	13-Jan-10	10	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16980	Install Signalling Wayside Equipment	SCC	5C	267,335.16	41.8%	14-Jan-10	25-Jan-10	12	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16920	Installation of poles and building fixings Section 5c Edin.Park Central to Gogarburn	SCC	5C	-	0.0%	14-Dec-09	18-Dec-09	5	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16910	Access for E&M wayside installation (05C)	SCC	5C	-	0.0%	14-Dec-09	14-Dec-09	1	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16950	Access to cable pits for cable laying (05C)	SCC	5C	-	0.0%	04-Jan-10	04-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16900	Access for visual inspection for E&M wayside installation (05C)	SCC	5C	-	0.0%	11-Nov-09	11-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A16940	Access for visual inspection to cable pits for cable laying (05C)	SCC	5C	-	0.0%	18-Nov-09	18-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	5C	2,700.36	0.4%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					05C2 Edinburgh Park (exc.) to Gyle (inc.)				**2,464,477.36**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Edinburgh Park to Gyle Trackwork (760m)																									
					Trackwork				**1,812,810.79**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					140	Earthworks and Subbase	Track	5C	266,925.17	14.7%	08-Jul-08	05-Aug-08	29	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					183	OLE Foundations - Drainage	Track - BB	5C	15,181.55	0.8%	06-Aug-08	16-Sep-08	42	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					779	Track Formation and Ducts	Track	5C	177,950.11	9.8%	17-Sep-08	08-Oct-08	22	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					789	Track laying sub-section 06 Edin Park Central to Gyle - 40%	Track	5C	355,900.23	19.6%	06-Nov-08	04-Dec-08	29	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					789	Track laying sub-section 06 Edin Park Central to Gyle - 60%	Track	5C	533,850.34	29.4%	06-Nov-08	04-Dec-08	29	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					799	Track Finishes	Track	5C	177,950.11	9.8%	05-Dec-08	21-Jan-09	48	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					809	Road Crossings	Track	5C	88,975.06	4.9%	09-Oct-08	05-Nov-08	28	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					819	Fencing	Track	5C	177,950.11	9.8%	22-Jan-09	12-Feb-09	22	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5C	18,128.11	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Gyle Tram Stop																									
					Tramstop				**477,711.97**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					141	Civil Engineering and Building Works	Tramstops	5C	84,329.16	17.7%	05-Dec-08	31-Jan-09	58	12	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					141	Civil Engineering and Building Works	Tramstops	5C	84,329.16	17.7%	01-Feb-09	19-Mar-09	48	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5C	1,703.62	0.4%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2170	Deliver and Install Shelter	Tramstops	5C	56,219.44	11.8%	29-May-09	12-Jun-09	15	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5C	567.87	0.1%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					298	Order REC Supply	Trams Eq	5C	-	0.0%	15-Apr-09	15-Apr-09	1	17	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5350	Package Test Tramstop	Trams Eq	5C	18,818.17	3.9%	24-Aug-09	31-Aug-09	8	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5320	Install LV Power Supply and LV Power Equipment	Trams Eq	5C	18,818.17	3.9%	12-Jun-09	17-Jul-09	36	19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5330	Install Telecon Equipment	Trams Eq	5C	18,818.17	3.9%	17-Jul-09	17-Aug-09	32	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5340	Install Station Control Equipment + AFC Equipment	Trams Eq	5C	18,818.17	3.9%	17-Jul-09	24-Aug-09	39	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5319	Access for E&M Tram Stop installation (05C Gyle)	Trams Eq	5C	-	0.0%	12-Jun-09	12-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5318	Access for visual inspection for E&M Tram Stop installation (05C Gyle)	Trams Eq	5C	-	0.0%	13-May-09	13-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5C	760.33	0.2%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Trams Eq	5C	172,784.43	36.2%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5C	1,745.30	0.4%				22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Gyle Tram Stop Retaining Wall (W16)																									
					Retaining Wall				**173,954.60**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					139	Wall Construction	Structures	5C	172,232.28	99.0%	23-May-08	20-Jun-08	29	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5C	1,722.32	1.0%				6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					05C3 Gyle (exc.) to Depot Stop (inc.)				**5,542,024.07**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8 Underpass (W28)																									
					Underpass				**2,575,179.14**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					143	Phase 1 - Break Down Piles	Structures	5C	242,165.78	9.4%	08-Aug-08	10-Oct-08	64	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					143	Phase 1	Structures	5C	242,165.78	9.4%	08-Aug-08	10-Oct-08	64	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					519	Phase 2 - Break Down Piles	Structures	5C	242,165.78	9.4%	10-Nov-08	10-Feb-09	93	12	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					519	Phase 2	Structures	5C	242,165.78	9.4%	10-Nov-08	10-Feb-09	93	12	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					529	Phase 3 - Break Down Piles	Structures	5C	242,165.78	9.4%	11-Feb-09	05-May-09	84	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					529	Phase 3	Structures	5C	242,165.78	9.4%	11-Feb-09	05-May-09	84	15	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					539	Phase 4 - Break Down Piles	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					539	Phase 4	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					549	Subway Construction - Excavate	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					549	Subway Construction	Structures	5C	242,165.78	9.4%	06-May-09	14-Jul-09	70	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5C	24,461.19	0.9%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Cnt. Milestone	Completion of A8 Gogar Underpass (W28) (1)			-	0.0%		14-Jul-09		19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	5C	127,769.54	5.0%				19	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	5C	1,290.60	0.1%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Depot Access Bridge (S32)																									
					Bridge				**1,626,319.05**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	15-Jul-09	15-Aug-09	32	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	16-Aug-09	15-Sep-09	31	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	16-Sep-09	15-Oct-09	30	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	268,611.26	16.5%	16-Oct-09	15-Nov-09	31	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	402,916.88	24.8%	16-Nov-09	15-Dec-09	30	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					144	Dummy Activity	Structures	5C	134,305.63	8.3%	16-Dec-09	07-Jan-10	24	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5C	14,651.52	0.9%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Gyle to Depot Stop Trackwork (562m)																									
					Trackwork				**1,340,525.88**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					478	Track Laying	Track	5C	789,536.56	58.9%	16-Mar-10	21-May-10	67	29	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2380	Track Finishes	Track	5C	-	0.0%	24-May-10	17-Jun-10	25	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2390	Fencing and Reinstatements	Track	5C	131,589.43	9.8%	18-Jun-10	02-Jul-10	15	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1069	Bulk Excavation	Track	5C	131,589.43	9.8%	08-Jan-10	25-Jan-10	18	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1079	Drainage and OLE Foundations	Track - BB	5C	11,226.35	0.8%	26-Jan-10	25-Feb-10	31	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1089	Track Formation and Ducts	Track	5C	263,178.85	19.6%	26-Feb-10	15-Mar-10	18	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5C	13,405.26	1.0%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A8 Retaining Walls (W16)																									
					Retaining Wall				-	**0%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					148	Soil Nailing	Structures	5C	-	0.0%	02-Jun-08	13-Oct-08	134	6	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	5C	-	0.0%				11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					05C4 Depot Stop (exc.) to Gogarburn (inc.)				**1,772,768.26**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Depot Stop to Gogarburn Trackwork (562m)																									
					Trackwork				**1,469,586.01**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					148	Ramp Wall out of depot (details unknown)	Track	5C	131,589.43	9.0%	14-Oct-08	24-Nov-08	42	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2330	Track Finishes	Track	5C	-	0.0%	22-Jul-09	17-Aug-09	27	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2340	Fencing and Reinstatements	Track	5C	131,589.43	9.0%	18-Aug-09	01-Sep-09	15	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					749	Drainage and OLE Foundations	Track - BB	5C	11,226.35	0.8%	12-Dec-08	27-Jan-09	47	13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					759	Track Formation and Ducts	Track	5C	131,589.43	9.0%	28-Jan-09	12-Feb-09	16	14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					769	Track Laying - 50%	Track	5C	394,768.28	26.9%	08-Jun-09	21-Jul-09	44	19	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0078

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

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L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year / Period / Period End	1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
					769	Track Laying	Track	5C	394,768.28	26.9%	08-Jun-09	21-Jul-09	44	19	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					288	Earthworks and Subbase	Track	5C	131,589.43	9.0%	25-Nov-08	11-Dec-08	17	12	13		-	-	-	-	-	-	-	-	-	-	-	-	131,589	131,589
					Snagging	Snagging	Track	5C	13,405.26	0.9%				21	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	5C	127,769.54	8.7%				14	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	5C	1,290.60	0.1%				15	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Gogarburn Tram Stop																										
				Tramstop					**303,182.24**	**100%**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					149	Civil Engineering and Building Works	Tramstops	5C	84,329.16	27.8%	15-Jul-09	31-Aug-09	48	20	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					149	Civil Engineering and Building Works	Tramstops	5C	84,329.16	27.8%	01-Sep-09	14-Oct-09	45	22	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5C	1,703.62	0.6%				24	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2200	Deliver and Install Shelter	Tramstops	5C	56,219.44	18.5%	14-Sep-09	28-Sep-09	15	23	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5C	567.87	0.2%				23	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					308	Order REC Supply	Trams Eq	5C	-	0.0%	31-Jul-09	31-Jul-09	1	21	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5390	Package Test Tramstop	Trams Eq	5C	18,818.17	6.2%	08-Dec-09	15-Dec-09	8	26	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5360	Install LV Power Supply and LV Power Equipment	Trams Eq	5C	18,818.17	6.2%	28-Sep-09	02-Nov-09	36	23	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5370	Install Telecon Equipment	Trams Eq	5C	18,818.17	6.2%	02-Nov-09	01-Dec-09	30	24	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5380	Install Station Control Equipment + AFC Equipment	Trams Eq	5C	18,818.17	6.2%	02-Nov-09	08-Dec-09	37	24	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5359	Access for E&M Tram Stop installation (05C Gogarburn)	Trams Eq	5C	-	0.0%	28-Sep-09	28-Sep-09	1	23	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5358	Access for visual inspection for E&M Tram Stop installation (05C Gogarburn)	Trams Eq	5C	-	0.0%	27-Aug-09	27-Aug-09	1	22	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5C	760.33	0.3%				26	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
			06 Gogar Depot						**12,837,514.03**	**5.7%**							-	-	-	-	-	-	-	-	**185,376**	**913,200**	**2,195,309**	**2,224,516**	**194,060**	**5,712,462**
			06A Gogar Depot						**12,967,064.68**	**5.9%**							-	-	-	-	-	-	-	-	**185,376**	**913,200**	**2,195,309**	**2,224,516**	**194,060**	**5,712,462**
				06A1 Gogar Depot					**12,967,064.68**								-	-	-	-	-	-	-	-	**185,376**	**913,200**	**2,195,309**	**2,224,516**	**194,060**	**5,712,462**
					Depot																								
						Earthworks			**556,128.98**	**100%**							-	-	-	-	-	-	-	-	-	-	**556,129**	-	-	**556,129**
					1149	Earth Works Depot - Depot Area	Depot Structu	6A	185,376.33	33.3%	02-Jun-08	13-Oct-08	134	6	11		-	-	-	-	-	-	-	-	-	-	185,376	-	-	185,376
					1149	Earth Works Depot - Car Park	Depot Structu	6A	185,376.33	33.3%	02-Jun-08	13-Oct-08	134	6	11		-	-	-	-	-	-	-	-	-	-	185,376	-	-	185,376
					1149	Earth Works Depot - Shunting area	Depot Structu	6A	185,376.33	33.3%	02-Jun-08	13-Oct-08	134	6	11		-	-	-	-	-	-	-	-	-	-	185,376	-	-	185,376
						Trackwork			**992,567.30**	**100%**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					204	Track Laying Depot	Track	6A	122,830.20	12.4%	14-Jan-09	05-Jun-09	143	14	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					204	Track Laying Depot	Track	6A	122,830.20	12.4%	14-Jan-09	05-Jun-09	143	14	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					204	Track Laying Depot	Track	6A	122,830.20	12.4%	14-Jan-09	05-Jun-09	143	14	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	6A	9,925.67	1.0%				20	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Depot Building			**5,561,289.83**	**100%**							-	-	-	-	-	-	-	-	-	**556,129**	**1,297,634**	**2,224,516**	-	**4,078,279**
					A17170	Foundations - Column Foundations	Depot Structu	6A	185,376.33	3.3%	07-Jul-08	22-Sep-08	78	7	10		-	-	-	-	-	-	-	-	-	185,376	-	-	-	-	185,376
					A17170	Foundations - Ground Beams	Depot Structu	6A	185,376.33	3.3%	07-Jul-08	22-Sep-08	78	7	10		-	-	-	-	-	-	-	-	-	185,376	-	-	-	-	185,376
					A17170	Foundations - OLE Foundations	Depot Structu	6A	185,376.33	3.3%	07-Jul-08	22-Sep-08	78	7	10		-	-	-	-	-	-	-	-	-	185,376	-	-	-	-	185,376
					A17180	Substructure and Superstructure - Primary GLs 20-10	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11		-	-	-	-	-	-	-	-	-	-	185,376	-	-	-	185,376
					A17180	Substructure and Superstructure - Primary - GLs 10-1	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11		-	-	-	-	-	-	-	-	-	-	185,376	-	-	-	185,376
					A17180	Substructure and Superstructure - Secondary - GLs 20-10	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11		-	-	-	-	-	-	-	-	-	-	185,376	-	-	-	185,376
					A17180	Substructure and Superstructure - Secondary - GLs 10-1	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11		-	-	-	-	-	-	-	-	-	-	185,376	-	-	-	185,376
					A17190	Pits - Wheel Lathe	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	27-Oct-08	56	9	11		-	-	-	-	-	-	-	-	-	-	185,376	-	-	-	185,376
					A17190	Pits - Floor Jack	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	27-Oct-08	56	9	11		-	-	-	-	-	-	-	-	-	-	185,376	-	-	-	185,376
					A17190	Pits - Inspection	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	27-Oct-08	56	9	11		-	-	-	-	-	-	-	-	-	-	185,376	-	-	-	185,376
					A17200	Sub/Sup - First Fl Slab GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12		-	-	-	-	-	-	-	-	-	-	-	185,376	-	-	185,376
					A17200	Sub/Sup - First Fl Slab GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12		-	-	-	-	-	-	-	-	-	-	-	185,376	-	-	185,376
					A17200	Sub/Sup - Sub Blockwork GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12		-	-	-	-	-	-	-	-	-	-	-	185,376	-	-	185,376
					A17200	Sub/Sup - Sub Blockwork GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12		-	-	-	-	-	-	-	-	-	-	-	185,376	-	-	185,376
					A17200	Sub/Sup - Sevice Ducts GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12		-	-	-	-	-	-	-	-	-	-	-	185,376	-	-	185,376
					A17200	Sub/Sup - Service Ducts GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12		-	-	-	-	-	-	-	-	-	-	-	185,376	-	-	185,376
					A17200	Sub/Sup - Drainage GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12		-	-	-	-	-	-	-	-	-	-	-	185,376	-	-	185,376
					A17200	Sub/Sup - Drainage GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12		-	-	-	-	-	-	-	-	-	-	-	185,376	-	-	185,376
					A17200	Sub/Sup - Service Troughs GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12		-	-	-	-	-	-	-	-	-	-	-	185,376	-	-	185,376
					A17200	Sub/Sup - Service Troughs GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12		-	-	-	-	-	-	-	-	-	-	-	185,376	-	-	185,376
					A17200	Sub/Sup - Ground Fl Slab GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12		-	-	-	-	-	-	-	-	-	-	-	185,376	-	-	185,376
					A17200	Sub/Sup - Ground Fl Slab GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12		-	-	-	-	-	-	-	-	-	-	-	185,376	-	-	185,376
					A17210	Building Envelope - Roof Cladding	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Blockwork	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Wall Cladding	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Translucent Panels	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Louvres	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Sup Drainage	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Curtain Walling	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Ext Doors	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Procurement			**185,376.33**	**100%**							-	-	-	-	-	-	-	-	**185,376**	-	-	-	-	**185,376**
					1159	Steel Work Fabrication	Structures	6A	185,376.33	100.0%	05-Jun-08	03-Sep-08	91	6	9		-	-	-	-	-	-	-	-	185,376	-	-	-	-	185,376
						Building Services			**185,376.33**	**100%**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1249	Building Services Installation	Depot Structu	6A	185,376.33	100.0%	12-Dec-08	14-Jul-09	215	13	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1259	Building Services Commissioning	Depot Structu	6A	-		06-Feb-09	12-Aug-09	188	15	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Fitting Out & Finishes			**370,752.66**	**100%**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1269	Fitting out and Finishes - Ground Floor	Depot Structu	6A	185,376.33	50.0%	12-Dec-08	12-Aug-09	244	13	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1269	Fitting out and Finishes - First Floor	Depot Structu	6A	185,376.33	50.0%	12-Dec-08	12-Aug-09	244	13	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
						E & M Workshop Equipment Installation			**2,278,697.00**	**100%**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2545	Installation of workshop equipment	SCC	6A	375,985.01	16.5%	13-Aug-09	25-Feb-10	197	21	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2544	Access for E&M workshop equipment	SCC	6A	-	0.0%	13-Aug-09	13-Aug-09	1	21	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2542	Access for visual inspection forE&M workshop equipment	SCC	6A	-	0.0%	15-Jul-09	15-Jul-09	1	20	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4220	Install Electrical Cables	SCC	6A	375,985.01	16.5%	10-Sep-09	25-Sep-09	16	22	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4230	Install Fibre Optic Cables	SCC	6A	375,985.01	16.5%	10-Sep-09	25-Sep-09	16	22	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4240	Install Signalling Wayside Equipment	SCC	6A	375,985.01	16.5%	28-Sep-09	13-Oct-09	16	23	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4205	Installation of poles and building fixings - 50%	SCC	6A	375,985.01	16.5%	13-Jul-09	26-Aug-09	45	20	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4205	Installation of poles and building fixingsb - 50%	SCC	6A	375,985.01	16.5%	13-Jul-09	26-Aug-09	45	20	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4204	Access for E&M Depot installation	SCC	6A	-	0.0%	13-Jul-09	13-Jul-09	1	20	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4219	Access to cable pits for cable laying (Depot)	SCC	6A	-	0.0%	10-Sep-09	10-Sep-09	1	22	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4203	Access for visual inspection for E&M Depot installation	SCC	6A	-	0.0%	11-Jun-09	11-Jun-09	1	19	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4218	Access for visual inspection to cable pits for cable laying (Depot)	SCC	6A	-	0.0%	11-Aug-09	11-Aug-09	1	21	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	6A	22,786.97	1.0%				28	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Gogar Depot - Edinburgh Airport (1) - TEST TRACK (30)			-	0.0%		25-Feb-10					-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Gogar Depot Building (0) (31)			-	0.0%		25-Feb-10					-	-	-	-	-	-	-	-	-	-	-	-	-
						Inspection & Handover			**256,530.88**	**100%**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2550	Inspection and Testing	SCC	6A	256,530.88	100.0%	26-Feb-10	25-Mar-10	28	28	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-
						Substation			**926,328.61**	**100%**							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					316	Civil Engineering and Building Works - Weatherright	Subst - BB	6A	147,960.65	16.0%	14-Jul-08	10-Feb-09	212	7	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					316	Civil Engineering and Building Works - Plant & equipment	Subst - BB	6A	73,980.32	8.0%	14-Jul-08	10-Feb-09	212	7	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					316	Civil Engineering and Building Works - Service Connections	Subst - BB	6A	24,660.11	2.7%	14-Jul-08	10-Feb-09	212	7	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	6A	2,490.92	0.3%				15	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					306	Order REC supply from Scottish Power	Subst - S	6A	-	0.0%	07-Oct-08	07-Oct-08	1	10	10		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5930	Power Infeed from Public Net available inc HV cable	Subst - S	6A	-	0.0%	11-Feb-09	11-Feb-09	1	15	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5950	Installation of TPS Equipment	Subst - S	6A	134,092.85	14.5%	08-Dec-09	02-Feb-10	57	26	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5940	Install LV Power Supply and LV Power Equipment	Subst - S	6A	134,092.85	14.5%	23-Nov-09	15-Dec-09	23	25	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5970	Testing and Commissioning	Subst - S	6A	134,092.85	14.5%	02-Feb-10	22-Feb-10	21	28	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5960	Install Telecom and Scada	Subst - S	6A	134,092.85	14.5%	12-Jan-10	02-Feb-10	22	27	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6330	Installation of SIG-interlocking cubicle	Subst - S	6A	134,092.85	14.5%	08-Dec-09	29-Dec-09	22	26	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6340	Commissioning of SIG -interlocking cubicle	Subst - S	6A	-	0.0%	29-Dec-09	05-Jan-10	8	26	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2519	Access for E&M Substation installation (06A Depot)	Subst - S	6A	-	0.0%	11-Feb-09	11-Feb-09	1	15	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2518	Access for visual inspection for E&M Substation installation (06A Depot)	Subst - S	6A	-	0.0%	12-Jan-09	12-Jan-09	1	14	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	6A	6,772.37	0.7%				28	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Gogar Depot Access Roads																										
						Roadworks			**1,568,164.00**	**100%**							-	-	-	-	-	-	-	-	-	**357,071**	**341,546**	-	**194,060**	**892,677**
					1179	North Side - Capping & Drainage	Highways	6A	178,535.47	11.4%	28-Jul-08	29-Sep-08	64	8	10		-	-	-	-	-	-	-	-	-	178,535	-	-	-	-	178,535
					1179	North Side	Highways	6A	178,535.47	11.4%	28-Jul-08	29-Sep-08	64	8	10		-	-	-	-	-	-	-	-	-	178,535	-	-	-	-	178,535
					1189	South Side	Highways	6A	341,546.12	21.8%	30-Sep-08	27-Oct-08	28	10	11		-	-	-	-	-	-	-	-	-	-	341,546	-	-	-	341,546
					1199	Finishes - Lighting	Highways	6A	38,812.06	2.5%	28-Oct-08	10-Aug-09	287	11	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1199	Finishes - Landscaping	Highways	6A	38,812.06	2.5%	28-Oct-08	10-Aug-09	287	11	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1199	Finishes	Highways	6A	77,624.12	5.0%	28-Oct-08	10-Aug-09	287	11	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1209	Car Park & Hardstanding - Surface Water Drainage	Highways	6A	124,198.59	7.9%	09-Sep-08	07-May-09	241	9	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1209	Car Park & Hardstanding - External Services	Highways	6A	186,297.88	11.9%	09-Sep-08	07-May-09	241	9	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1219	Track & Stabling Area - OLE Foundations	Highways	6A	77,624.12	5.0%	09-Sep-08	16-Dec-08	99	9	13		-	-	-	-	-	-	-	-	-	-	-	-	-	77,624	77,624
					1219	Track & Stabling Area	Highways	6A	116,436.18	7.4%	09-Sep-08	16-Dec-08	99	9	13		-	-	-	-	-	-	-	-	-	-	-	-	-	116,436	116,436
					1229	Shunting Area - OLE Foundations	Highways	6A	58,218.09	3.7%	23-Sep-08	13-Jan-09	113	10	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0079

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					769	Track Laying	Track	5C	394,768.28	26.9%	08-Jun-09	21-Jul-09	44	19	21	-	-	-	-	-	-	-	394,768	-	-	-	-	-	394,768
					288	Earthworks and Subbase	Track	5C	131,589.43	9.0%	29-Nov-08	11-Dec-08	17	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5C	13,405.26	0.9%				21	22	-	-	-	-	-	-	-	-	13,405	-	-	-	-	13,405
					Highways	Highways BoQ works	Highways	5C	127,769.54	8.7%				14	15	-	127,770	-	-	-	-	-	-	-	-	-	-	-	127,770
					Snagging	Snagging	Highways	5C	1,290.60	0.1%				15	16	-	-	1,291	-	-	-	-	-	-	-	-	-	-	1,291
					Gogarburn Tram Stop																								
					Tramstop				**303,182.24**	**100%**						-	-	-	-	-	-	-	84,329	56,219	103,715	20,522	37,636	302,422
					149	Civil Engineering and Building Works	Tramstops	5C	84,329.16	27.8%	15-Jul-09	31-Aug-09	48	20	22	-	-	-	-	-	-	-	84,329	-	-	-	-	84,329
					149	Civil Engineering and Building Works	Tramstops	5C	84,329.16	27.8%	01-Sep-09	14-Oct-09	45	22	24	-	-	-	-	-	-	-	-	-	84,329	-	-	84,329
					Snagging	Snagging	Tramstops	5C	1,703.62	0.6%				24	25	-	-	-	-	-	-	-	-	-	-	1,704	-	1,704
					A2200	Deliver and Install Shelter	Tramstops	5C	56,219.44	18.5%	14-Sep-09	28-Sep-09	15	23	23	-	-	-	-	-	-	-	-	56,219	-	-	-	56,219
					Snagging	Snagging	Tramstops	5C	567.87	0.2%				23	24	-	-	-	-	-	-	-	-	-	568	-	-	568
					308	Order REC Supply	Trams Eq	5C	-	0.0%	31-Jul-09	31-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5390	Package Test Tramstop	Trams Eq	5C	18,818.17	6.2%	08-Dec-09	15-Dec-09	8	26	26	-	-	-	-	-	-	-	-	-	-	-	18,818	18,818
					A5360	Install LV Power Supply and LV Power Equipment	Trams Eq	5C	18,818.17	6.2%	28-Sep-09	02-Nov-09	36	23	24	-	-	-	-	-	-	-	-	-	18,818	-	-	18,818
					A5370	Install Telecon Equipment	Trams Eq	5C	18,818.17	6.2%	02-Nov-09	01-Dec-09	30	24	25	-	-	-	-	-	-	-	-	-	-	18,818	-	18,818
					A5380	Install Station Control Equipment + AFC Equipment	Trams Eq	5C	18,818.17	6.2%	02-Nov-09	08-Dec-09	37	24	26	-	-	-	-	-	-	-	-	-	-	-	18,818	18,818
					A5359	Access for E&M Tram Stop installation (05C Gogarburn)	Trams Eq	5C	-	0.0%	28-Sep-09	28-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5358	Access for visual inspection for E&M Tram Stop installation (05C Gogarburn)	Trams Eq	5C	-	0.0%	27-Aug-09	27-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5C	760.33	0.3%				26	27	-	-	-	-	-	-	-	-	-	-	-	-	-
06 Gogar Depot									**12,967,064.68**	**5.5%**						**1,677,071**	**246,601**	**2,491**	**-**	**310,496**	**368,491**	**799,527**	**535,927**	**767,652**	**751,970**	**375,985**	**-**	**353,180**	**6,189,391**
06A Gogar Depot									**12,967,064.68**	**5.5%**						**1,677,071**	**246,601**	**2,491**	**-**	**310,496**	**368,491**	**799,527**	**535,927**	**767,652**	**751,970**	**375,985**	**-**	**353,180**	**6,189,391**
	06A1 Gogar Depot								**12,967,064.68**							**1,677,071**	**246,601**	**2,491**	**-**	**310,496**	**368,491**	**799,527**	**535,927**	**767,652**	**751,970**	**375,985**	**-**	**353,180**	**6,189,391**
		Depot																										
			Earthworks						**556,128.98**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1149	Earth Works Depot - Depot Area	Depot Structu	6A	185,376.33	33.3%	02-Jun-08	13-Oct-08	134	6	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					1149	Earth Works Depot - Car Park	Depot Structu	6A	185,376.33	33.3%	02-Jun-08	13-Oct-08	134	6	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					1149	Earth Works Depot - Shunting area	Depot Structu	6A	185,376.33	33.3%	02-Jun-08	13-Oct-08	134	6	11	-	-	-	-	-	-	-	-	-	-	-	-	-
			Trackwork						**992,567.30**	**100%**						-	-	-	-	-	**368,491**	**614,151**	**9,926**	-	-	-	-	-	**992,567**
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20	-	-	-	-	-	-	122,830	-	-	-	-	-	-	122,830
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20	-	-	-	-	-	-	122,830	-	-	-	-	-	-	122,830
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20	-	-	-	-	-	-	122,830	-	-	-	-	-	-	122,830
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20	-	-	-	-	-	-	122,830	-	-	-	-	-	-	122,830
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20	-	-	-	-	-	-	122,830	-	-	-	-	-	-	122,830
					204	Track Laying Depot	Track	6A	122,830.20	12.4%	14-Jan-09	05-Jun-09	143	14	19	-	-	-	-	-	122,830	-	-	-	-	-	-	-	122,830
					204	Track Laying Depot	Track	6A	122,830.20	12.4%	14-Jan-09	05-Jun-09	143	14	19	-	-	-	-	-	122,830	-	-	-	-	-	-	-	122,830
					204	Track Laying Depot	Track	6A	122,830.20	12.4%	14-Jan-09	05-Jun-09	143	14	19	-	-	-	-	-	122,830	-	-	-	-	-	-	-	122,830
					Snagging	Snagging	Track	6A	9,925.67	1.0%				20	21	-	-	-	-	-	-	-	9,926	-	-	-	-	-	9,926
			Depot Building						**5,561,289.83**	**100%**						**1,483,011**	-	-	-	-	-	-	-	-	-	-	-	-	**1,483,011**
					A17170	Foundations - Column Foundations	Depot Structu	6A	185,376.33	3.3%	07-Jul-08	22-Sep-08	78	7	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17170	Foundations - Ground Beams	Depot Structu	6A	185,376.33	3.3%	07-Jul-08	22-Sep-08	78	7	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17170	Foundations - OLE Foundations	Depot Structu	6A	185,376.33	3.3%	07-Jul-08	22-Sep-08	78	7	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17180	Substructure and Superstructure - Primary GLs 20-10	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17180	Substructure and Superstructure - Primary - GLs 10-1	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17180	Substructure and Superstructure - Secondary - GLs 20-10	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17180	Substructure and Superstructure - Secondary - GLs 10-1	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17190	Pits - Wheel Lathe	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	27-Oct-08	56	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17190	Pits - Floor Jack	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	27-Oct-08	56	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17190	Pits - Inspection	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	27-Oct-08	56	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - First Fl Slab GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - First Fl Slab GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Sub Blockwork GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Sub Blockwork GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Sevice Ducts GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Service Ducts GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Drainage GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Drainage GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Service Troughs GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Service Troughs GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Ground Fl Slab GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Ground Fl Slab GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Roof Cladding	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	185,376	-	-	-	-	-	-	-	-	-	-	-	-	185,376
					A17210	Building Envelope - Blockwork	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	185,376	-	-	-	-	-	-	-	-	-	-	-	-	185,376
					A17210	Building Envelope - Wall Cladding	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	185,376	-	-	-	-	-	-	-	-	-	-	-	-	185,376
					A17210	Building Envelope - Translucent Panels	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	185,376	-	-	-	-	-	-	-	-	-	-	-	-	185,376
					A17210	Building Envelope - Louvres	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	185,376	-	-	-	-	-	-	-	-	-	-	-	-	185,376
					A17210	Building Envelope - Sup Drainage	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	185,376	-	-	-	-	-	-	-	-	-	-	-	-	185,376
					A17210	Building Envelope - Curtain Walling	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	185,376	-	-	-	-	-	-	-	-	-	-	-	-	185,376
					A17210	Building Envelope - Ext Doors	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	185,376	-	-	-	-	-	-	-	-	-	-	-	-	185,376
			Procurement						**185,376.33**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1159	Steel Work Fabrication	Structures	6A	185,376.33	100.0%	05-Jun-08	03-Sep-08	91	6	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Building Services						**185,376.33**	**100%**						-	-	-	-	-	-	**185,376**	-	-	-	-	-	**185,376**
					1249	Building Services Installation	Depot Structu	6A	185,376.33	100.0%	12-Dec-08	14-Jul-09	215	13	20	-	-	-	-	-	-	185,376	-	-	-	-	-	-	185,376
					1259	Building Services Commissioning	Depot Structu	6A	-		06-Feb-09	12-Aug-09	188	15	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Fitting Out & Finishes						**370,752.66**	**100%**						-	-	-	-	-	-	-	**370,753**	-	-	-	-	**370,753**
					1269	Fitting out and Finishes - Ground Floor	Depot Structu	6A	185,376.33	50.0%	12-Dec-08	12-Aug-09	244	13	21	-	-	-	-	-	-	-	185,376	-	-	-	-	-	185,376
					1269	Fitting out and Finishes - First Floor	Depot Structu	6A	185,376.33	50.0%	12-Dec-08	12-Aug-09	244	13	21	-	-	-	-	-	-	-	185,376	-	-	-	-	-	185,376
			E & M Workshop Equipment Installation						**2,278,697.00**	**100%**						-	-	-	-	-	-	-	-	**751,970**	**751,970**	**375,985**	-	-	**1,879,925**
					A2545	Installation of workshop equipment	SCC	6A	375,985.01	16.5%	13-Aug-09	25-Feb-10	197	21	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2544	Access for E&M workshop equipment	SCC	6A	-	0.0%	13-Aug-09	13-Aug-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2542	Access for visual inspection forE&M workshop equipment	SCC	6A	-	0.0%	15-Jul-09	15-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4220	Install Electrical Cables	SCC	6A	375,985.01	16.5%	10-Sep-09	25-Sep-09	16	22	23	-	-	-	-	-	-	-	-	375,985	-	-	-	375,985
					A4230	Install Fibre Optic Cables	SCC	6A	375,985.01	16.5%	10-Sep-09	25-Sep-09	16	22	23	-	-	-	-	-	-	-	-	375,985	-	-	-	375,985
					A4240	Install Signalling Wayside Equipment	SCC	6A	375,985.01	16.5%	28-Sep-09	13-Oct-09	16	23	24	-	-	-	-	-	-	-	-	-	375,985	-	-	375,985
					A4205	Installation of poles and building fixings - 50%	SCC	6A	375,985.01	16.5%	13-Jul-09	26-Aug-09	45	20	22	-	-	-	-	-	-	-	-	375,985	-	-	-	375,985
					A4205	Installation of poles and building fixingsb - 50%	SCC	6A	375,985.01	16.5%	13-Jul-09	26-Aug-09	45	20	22	-	-	-	-	-	-	-	-	375,985	-	-	-	375,985
					A4204	Access for E&M Depot installation	SCC	6A	-	0.0%	13-Jul-09	13-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4219	Access to cable pits for cable laying (Depot)	SCC	6A	-	0.0%	10-Sep-09	10-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4203	Access for visual inspection for E&M Depot installation	SCC	6A	-	0.0%	11-Jun-09	11-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4218	Access for visual inspection to cable pits for cable laying (Depot)	SCC	6A	-	0.0%	11-Aug-09	11-Aug-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	6A	22,786.97	1.0%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Gogar Depot - Edinburgh Airport (1) - TEST TRACK (30)			-	0.0%		25-Feb-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Gogar Depot Building (0) (31)			-	0.0%		25-Feb-10				-	-	-	-	-	-	-	-	-	-	-	-	-
			Inspection & Handover						**256,530.88**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2550	Inspection and Testing	SCC	6A	256,530.88	100.0%	26-Feb-10	25-Mar-10	28	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Substation						**926,328.61**	**100%**						-	**246,601**	**2,491**	-	-	-	-	-	-	-	-	-	**268,186**	**517,278**
					316	Civil Engineering and Building Works - Weathertight	Subst - BB	6A	147,960.65	16.0%	14-Jul-08	10-Feb-09	212	7	15	-	147,961	-	-	-	-	-	-	-	-	-	-	-	147,961
					316	Civil Engineering and Building Works - Plant & equipment	Subst - BB	6A	73,980.32	8.0%	14-Jul-08	10-Feb-09	212	7	15	-	73,980	-	-	-	-	-	-	-	-	-	-	-	73,980
					316	Civil Engineering and Building Works - Service Connections	Subst - BB	6A	24,660.11	2.7%	14-Jul-08	10-Feb-09	212	7	15	-	24,660	-	-	-	-	-	-	-	-	-	-	-	24,660
					Snagging	Snagging	Subst - BB	6A	2,490.92	0.3%				15	16	-	-	2,491	-	-	-	-	-	-	-	-	-	-	2,491
					306	Order REC supply from Scottish Power	Subst - S	6A	-	0.0%	07-Oct-08	07-Oct-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5930	Power Infeed from Public Net available inc HV cable	Subst - S	6A	-	0.0%	11-Feb-09	11-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5950	Installation of TPS Equipment	Subst - S	6A	134,092.85	14.5%	08-Dec-09	02-Feb-10	57	26	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5940	Install LV Power Supply and LV Power Equipment	Subst - S	6A	134,092.85	14.5%	23-Nov-09	15-Dec-09	23	25	26	-	-	-	-	-	-	-	-	-	-	-	134,093	-	134,093
					A5970	Testing and Commissioning	Subst - S	6A	134,092.85	14.5%	02-Feb-10	22-Feb-10	21	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5960	Install Telecom and Scada	Subst - S	6A	134,092.85	14.5%	12-Jan-10	02-Feb-10	22	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6330	Installation of SIG-interlocking cubicle	Subst - S	6A	134,092.85	14.5%	08-Dec-09	29-Dec-09	22	26	26	-	-	-	-	-	-	-	-	-	-	-	134,093	-	134,093
					A6340	Commissioning of SIG -interlocking cubicle	Subst - S	6A	-	0.0%	29-Dec-09	05-Jan-10	8	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2519	Access for E&M Substation installation (06A Depot)	Subst - S	6A	-	0.0%	11-Feb-09	11-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2518	Access for visual inspection for E&M Substation installation (06A Depot)	Subst - S	6A	-	0.0%	12-Jan-09	12-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	6A	6,772.37	0.7%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Gogar Depot Access Roads																										
			Roadworks						**1,568,164.00**	**100%**						**194,060**	-	-	-	**310,496**	-	-	**155,248**	**15,682**	-	-	-	-	**675,487**
					1179	North Side - Capping & Drainage	Highways	6A	178,535.47	11.4%	28-Jul-08	29-Sep-08	64	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1179	North Side	Highways	6A	178,535.47	11.4%	28-Jul-08	29-Sep-08	64	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1189	South Side	Highways	6A	341,546.12	21.8%	30-Sep-08	27-Oct-08	28	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1199	Finishes - Lighting	Highways	6A	38,812.06	2.5%	28-Oct-08	10-Aug-09	287	11	21	-	-	-	-	-	-	-	38,812	-	-	-	-	-	38,812
					1199	Finishes - Landscaping	Highways	6A	38,812.06	2.5%	28-Oct-08	10-Aug-09	287	11	21	-	-	-	-	-	-	-	38,812	-	-	-	-	-	38,812
					1199	Finishes	Highways	6A	77,624.12	5.0%	28-Oct-08	10-Aug-09	287	11	21	-	-	-	-	-	-	-	77,624	-	-	-	-	-	77,624
					1209	Car Park & Hardstanding - Surface Water Drainage	Highways	6A	124,198.59	7.9%	09-Sep-08	07-May-09	241	9	18	-	-	-	-	124,199	-	-	-	-	-	-	-	-	124,199
					1209	Car Park & Hardstanding - External Services	Highways	6A	186,297.88	11.9%	09-Sep-08	07-May-09	241	9	18	-	-	-	-	186,298	-	-	-	-	-	-	-	-	186,298
					1219	Track & Stabling Area - OLE Foundations	Highways	6A	77,624.12	5.0%	09-Sep-08	16-Dec-08	99	9	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1219	Track & Stabling Area	Highways	6A	116,436.18	7.4%	09-Sep-08	16-Dec-08	99	9	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1229	Shunting Area - OLE Foundations	Highways	6A	58,218.09	3.7%	23-Sep-08	13-Jan-09	113	10	14	58,218	-	-	-	-	-	-	-	-	-	-	-	-	58,218

USB00000073_0080

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER

SIEI

Year														
Period														
Period End														

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					769	Track Laying	Track	5C	394,768.28	26.9%	08-Jun-09	21-Jul-09	44	19	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					288	Earthworks and Subbase	Track	5C	131,589.43	9.0%	29-Nov-08	11-Dec-08	17	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5C	13,405.26	0.9%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	5C	127,769.54	8.7%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	5C	1,290.60	0.1%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Gogarburn Tram Stop																									
				Tramstop					**303,182.24**	**100%**						**760**	-	-	-	-	-	-	-	-	-	-	-	**760**
					149	Civil Engineering and Building Works	Tramstops	5C	84,329.16	27.8%	15-Jul-09	31-Aug-09	48	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					149	Civil Engineering and Building Works	Tramstops	5C	84,329.16	27.8%	01-Sep-09	14-Oct-09	45	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5C	1,703.62	0.6%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2200	Deliver and Install Shelter	Tramstops	5C	56,219.44	18.5%	14-Sep-09	28-Sep-09	15	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5C	567.87	0.2%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					308	Order REC Supply	Trams Eq	5C	-	0.0%	31-Jul-09	31-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5390	Package Test Tramstop	Trams Eq	5C	18,818.17	6.2%	08-Dec-09	15-Dec-09	8	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5360	Install LV Power Supply and LV Power Equipment	Trams Eq	5C	18,818.17	6.2%	28-Sep-09	02-Nov-09	36	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5370	Install Telecon Equipment	Trams Eq	5C	18,818.17	6.2%	02-Nov-09	01-Dec-09	30	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5380	Install Station Control Equipment + AFC Equipment	Trams Eq	5C	18,818.17	6.2%	02-Nov-09	08-Dec-09	37	24	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5359	Access for E&M Tram Stop installation (05C Gogarburn)	Trams Eq	5C	-	0.0%	28-Sep-09	28-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5358	Access for visual inspection for E&M Tram Stop installation (05C Gogarburn)	Trams Eq	5C	-	0.0%	27-Aug-09	27-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5C	760.33	0.3%				26	27	760	-	-	-	-	-	-	-	-	-	-	-	-	760
06 Gogar Depot									**12,967,064.68**	**5.5%**						**859**	**778,264**	**286,090**	-	-	-	-	-	-	-	-	-	**1,065,212**
	06A Gogar Depot								**12,967,064.68**	**5.5%**						**859**	**778,264**	**286,090**	-	-	-	-	-	-	-	-	-	**1,065,212**
		06A1 Gogar Depot							**12,967,064.68**							**859**	**778,264**	**286,090**	-	-	-	-	-	-	-	-	-	**1,065,212**
			Depot																									
				Earthworks					**556,128.98**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1149	Earth Works Depot - Depot Area	Depot Structu	6A	185,376.33	33.3%	02-Jun-08	13-Oct-08	134	6	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1149	Earth Works Depot - Car Park	Depot Structu	6A	185,376.33	33.3%	02-Jun-08	13-Oct-08	134	6	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1149	Earth Works Depot - Shunting area	Depot Structu	6A	185,376.33	33.3%	02-Jun-08	13-Oct-08	134	6	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Trackwork					**992,567.30**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					204	Track Laying Depot	Track	6A	122,830.20	12.4%	14-Jan-09	05-Jun-09	143	14	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					204	Track Laying Depot	Track	6A	122,830.20	12.4%	14-Jan-09	05-Jun-09	143	14	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					204	Track Laying Depot	Track	6A	122,830.20	12.4%	14-Jan-09	05-Jun-09	143	14	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	6A	9,925.67	1.0%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Depot Building					**5,561,289.83**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17170	Foundations - Column Foundations	Depot Structu	6A	185,376.33	3.3%	07-Jul-08	22-Sep-08	78	7	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17170	Foundations - Ground Beams	Depot Structu	6A	185,376.33	3.3%	07-Jul-08	22-Sep-08	78	7	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17170	Foundations - OLE Foundations	Depot Structu	6A	185,376.33	3.3%	07-Jul-08	22-Sep-08	78	7	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17180	Substructure and Superstructure - Primary GLs 20-10	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17180	Substructure and Superstructure - Primary - GLs 10-1	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17180	Substructure and Superstructure - Secondary - GLs 20-10	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17180	Substructure and Superstructure - Secondary - GLs 10-1	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17190	Pits - Wheel Lathe	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	27-Oct-08	56	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17190	Pits - Floor Jack	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	27-Oct-08	56	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17190	Pits - Inspection	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	27-Oct-08	56	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - First Fl Slab GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - First Fl Slab GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Sub Blockwork GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Sub Blockwork GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Sevice Ducts GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Service Ducts GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Drainage GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Drainage GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Service Troughs GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Service Troughs GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Ground Fl Slab GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Ground Fl Slab GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Roof Cladding	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Blockwork	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Wall Cladding	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Translucent Panels	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Louvres	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Sup Drainage	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Curtain Walling	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Ext Doors	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Procurement					**185,376.33**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1159	Steel Work Fabrication	Structures	6A	185,376.33	100.0%	05-Jun-08	03-Sep-08	91	6	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Building Services					**185,376.33**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1249	Building Services Installation	Depot Structu	6A	185,376.33	100.0%	12-Dec-08	14-Jul-09	215	13	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1259	Building Services Commissioning	Depot Structu	6A	-		06-Feb-09	12-Aug-09	188	15	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Fitting Out & Finishes					**370,752.66**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1269	Fitting out and Finishes - Ground Floor	Depot Structu	6A	185,376.33	50.0%	12-Dec-08	12-Aug-09	244	13	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1269	Fitting out and Finishes - First Floor	Depot Structu	6A	185,376.33	50.0%	12-Dec-08	12-Aug-09	244	13	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				E & M Workshop Equipment Installation					**2,278,697.00**	**100%**						-	**375,985**	**22,787**	-	-	-	-	-	-	-	-	-	**398,772**
					A2545	Installation of workshop equipment	SCC	6A	375,985.01	16.5%	13-Aug-09	25-Feb-10	197	21	28	-	375,985	-	-	-	-	-	-	-	-	-	-	375,985
					A2544	Access for E&M workshop equipment	SCC	6A	-	0.0%	13-Aug-09	13-Aug-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2542	Access for visual inspection forE&M workshop equipment	SCC	6A	-	0.0%	15-Jul-09	15-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4220	Install Electrical Cables	SCC	6A	375,985.01	16.5%	10-Sep-09	25-Sep-09	16	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4230	Install Fibre Optic Cables	SCC	6A	375,985.01	16.5%	10-Sep-09	25-Sep-09	16	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4240	Install Signalling Wayside Equipment	SCC	6A	375,985.01	16.5%	28-Sep-09	13-Oct-09	16	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4205	Installation of poles and building fixings - 50%	SCC	6A	375,985.01	16.5%	13-Jul-09	26-Aug-09	45	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4205	Installation of poles and building fixingsb - 50%	SCC	6A	375,985.01	16.5%	13-Jul-09	26-Aug-09	45	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4204	Access for E&M Depot installation	SCC	6A	-	0.0%	13-Jul-09	13-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4219	Access to cable pits for cable laying (Depot)	SCC	6A	-	0.0%	10-Sep-09	10-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4203	Access for visual inspection for E&M Depot installation	SCC	6A	-	0.0%	11-Jun-09	11-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4218	Access for visual inspection to cable pits for cable laying (Depot)	SCC	6A	-	0.0%	11-Aug-09	11-Aug-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	6A	22,786.97	1.0%				28	29	-	-	22,787	-	-	-	-	-	-	-	-	-	-	22,787
					Crit. Milestone	Commission Gogar Depot - Edinburgh Airport (1) - TEST TRACK (30)			-	0.0%		25-Feb-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Commission Gogar Depot Building (0) (31)			-	0.0%		25-Feb-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Inspection & Handover					**256,530.88**	**100%**						-	-	**256,531**	-	-	-	-	-	-	-	-	-	**256,531**
					A2650	Inspection and Testing	SCC	6A	256,530.88	100.0%	26-Feb-10	25-Mar-10	28	28	29	-	-	256,531	-	-	-	-	-	-	-	-	-	256,531
				Substation					**926,328.61**	**100%**						-	**402,279**	**6,772**	-	-	-	-	-	-	-	-	-	**409,051**
					316	Civil Engineering and Building Works - Weathertight	Subst - BB	6A	147,960.65	16.0%	14-Jul-08	10-Feb-09	212	7	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					316	Civil Engineering and Building Works - Plant & equipment	Subst - BB	6A	73,980.32	8.0%	14-Jul-08	10-Feb-09	212	7	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					316	Civil Engineering and Building Works - Service Connections	Subst - BB	6A	24,660.11	2.7%	14-Jul-08	10-Feb-09	212	7	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	6A	2,490.92	0.3%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					306	Order REC supply from Scottish Power	Subst - S	6A	-	0.0%	07-Oct-08	07-Oct-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5930	Power Infeed from Public Net available inc HV cable	Subst - S	6A	-	0.0%	11-Feb-09	11-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5950	Installation of TPS Equipment	Subst - S	6A	134,092.85	14.5%	08-Dec-09	02-Feb-10	57	26	28	-	134,093	-	-	-	-	-	-	-	-	-	-	134,093
					A5940	Install LV Power Supply and LV Power Equipment	Subst - S	6A	134,092.85	14.5%	23-Nov-09	15-Dec-09	23	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5970	Testing and Commissioning	Subst - S	6A	134,092.85	14.5%	02-Feb-10	22-Feb-10	21	28	28	-	134,093	-	-	-	-	-	-	-	-	-	-	134,093
					A5960	Install Telecom and Scada	Subst - S	6A	134,092.85	14.5%	12-Jan-10	02-Feb-10	22	27	28	-	134,093	-	-	-	-	-	-	-	-	-	-	134,093
					A6330	Installation of SIG-interlocking cubicle	Subst - S	6A	134,092.85	14.5%	08-Dec-09	29-Dec-09	22	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6340	Commissioning of SIG -interlocking cubicle	Subst - S	6A	-	0.0%	29-Dec-09	05-Jan-10	8	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2519	Access for E&M Substation installation (06A Depot)	Subst - S	6A	-	0.0%	11-Feb-09	11-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2518	Access for visual inspection for E&M Substation installation (06A Depot)	Subst - S	6A	-	0.0%	12-Jan-09	12-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	6A	6,772.37	0.7%				28	29	-	-	6,772	-	-	-	-	-	-	-	-	-	-	6,772
			Gogar Depot Access Roads																									
				Roadworks					**1,568,164.00**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1179	North Side - Capping & Drainage	Highways	6A	178,535.47	11.4%	28-Jul-08	29-Sep-08	64	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1179	North Side	Highways	6A	178,535.47	11.4%	28-Jul-08	29-Sep-08	64	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1189	South Side	Highways	6A	341,546.12	21.8%	30-Sep-08	27-Oct-08	28	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1199	Finishes - Lighting	Highways	6A	39,812.06	2.5%	28-Oct-08	10-Aug-09	287	11	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1199	Finishes - Landscaping	Highways	6A	39,812.06	2.5%	28-Oct-08	10-Aug-09	287	11	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1199	Finishes	Highways	6A	77,624.12	5.0%	28-Oct-08	10-Aug-09	287	11	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1209	Car Park & Hardstanding - Surface Water Drainage	Highways	6A	124,198.59	7.9%	09-Sep-08	07-May-09	241	9	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1209	Car Park & Hardstanding - External Services	Highways	6A	186,297.88	11.9%	09-Sep-08	07-May-09	241	9	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1219	Track & Stabling Area - OLE Foundations	Highways	6A	77,624.12	5.0%	09-Sep-08	16-Dec-08	99	9	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1219	Track & Stabling Area	Highways	6A	116,436.18	7.4%	09-Sep-08	16-Dec-08	99	9	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1229	Shunting Area - OLE Foundations	Highways	6A	58,218.09	3.7%	23-Sep-08	13-Jan-09	113	10	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0081

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER

SIEI

Year															2011
Period															
Period End															

L1	L2	L3	L4	L5	Activity ID	Activity Name		Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					769	Track Laying	Track	5C	394,768.28	26.9%	08-Jun-09	21-Jul-09	44	19	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					288	Earthworks and Subbase	Track	5C	131,589.43	9.0%	25-Nov-08	11-Dec-08	17	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	5C	13,405.26	0.9%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	5C	127,769.54	8.7%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	5C	1,290.60	0.1%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-
				Gogarburn Tram Stop																								
				Tramstop					**303,182.24**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-
					149	Civil Engineering and Building Works	Tramstops	5C	84,329.16	27.8%	15-Jul-09	31-Aug-09	48	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-
					149	Civil Engineering and Building Works	Tramstops	5C	84,329.16	27.8%	01-Sep-09	14-Oct-09	45	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5C	1,703.62	0.6%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2200	Deliver and Install Shelter	Tramstops	5C	56,219.44	18.5%	14-Sep-09	28-Sep-09	15	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	5C	567.87	0.2%				23	24	-	-	-	-	-	-	-	-	-	-	-	-	-
					308	Order REC Supply	Trams Eq	5C	-	0.0%	31-Jul-09	31-Jul-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5390	Package Test Tramstop	Trams Eq	5C	18,818.17	6.2%	08-Dec-09	15-Dec-09	8	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5360	Install LV Power Supply and LV Power Equipment	Trams Eq	5C	18,818.17	6.2%	28-Sep-09	02-Nov-09	36	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5370	Install Telecon Equipment	Trams Eq	5C	18,818.17	6.2%	02-Nov-09	01-Dec-09	30	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5380	Install Station Control Equipment + AFC Equipment	Trams Eq	5C	18,818.17	6.2%	02-Nov-09	08-Dec-09	37	24	26	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5359	Access for E&M Tram Stop installation (05C Gogarburn)	Trams Eq	5C	-	0.0%	28-Sep-09	28-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5358	Access for visual inspection for E&M Tram Stop installation (05C Gogarburn)	Trams Eq	5C	-	0.0%	27-Aug-09	27-Aug-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	5C	760.33	0.3%				26	27	-	-	-	-	-	-	-	-	-	-	-	-	-
06 Gogar Depot									**12,967,064.68**	**5.9%**						-	-	-	-	-	-	-	-	-	-	-	-	-
06A Gogar Depot									**12,967,064.68**	**5.9%**						-	-	-	-	-	-	-	-	-	-	-	-	-
	06A1 Gogar Depot								**12,967,064.68**							-	-	-	-	-	-	-	-	-	-	-	-	-
		Depot																										
				Earthworks					**556,128.98**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-
					1149	Earth Works Depot - Depot Area	Depot Structu	6A	185,376.33	33.3%	02-Jun-08	13-Oct-08	134	6	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					1149	Earth Works Depot - Car Park	Depot Structu	6A	185,376.33	33.3%	02-Jun-08	13-Oct-08	134	6	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					1149	Earth Works Depot - Shunting area	Depot Structu	6A	185,376.33	33.3%	02-Jun-08	13-Oct-08	134	6	11	-	-	-	-	-	-	-	-	-	-	-	-	-
				Trackwork					**992,567.30**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20	-	-	-	-	-	-	-	-	-	-	-	-	-
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20	-	-	-	-	-	-	-	-	-	-	-	-	-
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20	-	-	-	-	-	-	-	-	-	-	-	-	-
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20	-	-	-	-	-	-	-	-	-	-	-	-	-
					154	Trackwork Depot	Track	6A	122,830.20	12.4%	14-Oct-08	10-Jul-09	270	11	20	-	-	-	-	-	-	-	-	-	-	-	-	-
					204	Track Laying Depot	Track	6A	122,830.20	12.4%	14-Jan-09	05-Jun-09	143	14	19	-	-	-	-	-	-	-	-	-	-	-	-	-
					204	Track Laying Depot	Track	6A	122,830.20	12.4%	14-Jan-09	05-Jun-09	143	14	19	-	-	-	-	-	-	-	-	-	-	-	-	-
					204	Track Laying Depot	Track	6A	122,830.20	12.4%	14-Jan-09	05-Jun-09	143	14	19	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	6A	9,925.67	1.0%				20	21	-	-	-	-	-	-	-	-	-	-	-	-	-
				Depot Building					**5,561,289.83**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-
					A17170	Foundations - Column Foundations	Depot Structu	6A	185,376.33	3.3%	07-Jul-08	22-Sep-08	78	7	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17170	Foundations - Ground Beams	Depot Structu	6A	185,376.33	3.3%	07-Jul-08	22-Sep-08	78	7	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17170	Foundations - OLE Foundations	Depot Structu	6A	185,376.33	3.3%	07-Jul-08	22-Sep-08	78	7	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17180	Substructure and Superstructure - Primary GLs 20-10	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17180	Substructure and Superstructure - Primary - GLs 10-1	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17180	Substructure and Superstructure - Secondary - GLs 20-10	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17180	Substructure and Superstructure - Secondary - GLs 10-1	Depot Structu	6A	185,376.33	3.3%	05-Aug-08	13-Oct-08	70	8	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17190	Pits - Wheel Lathe	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	27-Oct-08	56	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17190	Pits - Floor Jack	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	27-Oct-08	56	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17190	Pits - Inspection	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	27-Oct-08	56	9	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - First Fl Slab GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - First Fl Slab GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Sub Blockwork GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Sub Blockwork GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Sevice Ducts GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Service Ducts GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Drainage GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Drainage GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Service Troughs GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Service Troughs GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Ground Fl Slab GLs 20-10	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17200	Sub/Sup - Ground Fl Slab GLs 10-1	Depot Structu	6A	185,376.33	3.3%	02-Sep-08	24-Nov-08	84	9	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Roof Cladding	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Blockwork	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Wall Cladding	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Translucent Panels	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Louvres	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Sup Drainage	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Curtain Walling	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					A17210	Building Envelope - Ext Doors	Depot Structu	6A	185,376.33	3.3%	04-Sep-08	22-Jan-09	141	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-
				Procurement					**185,376.33**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-
					1159	Steel Work Fabrication	Structures	6A	185,376.33	100.0%	05-Jun-08	03-Sep-08	91	6	9	-	-	-	-	-	-	-	-	-	-	-	-	-
				Building Services					**185,376.33**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-
					1249	Building Services Installation	Depot Structu	6A	185,376.33	100.0%	12-Dec-08	14-Jul-09	215	13	20	-	-	-	-	-	-	-	-	-	-	-	-	-
					1259	Building Services Commissioning	Depot Structu	6A	-		06-Feb-09	12-Aug-09	188	15	21	-	-	-	-	-	-	-	-	-	-	-	-	-
				Fitting Out & Finishes					**370,752.66**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-
					1269	Fitting out and Finishes - Ground Floor	Depot Structu	6A	185,376.33	50.0%	12-Dec-08	12-Aug-09	244	13	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					1269	Fitting out and Finishes - First Floor	Depot Structu	6A	185,376.33	50.0%	12-Dec-08	12-Aug-09	244	13	21	-	-	-	-	-	-	-	-	-	-	-	-	-
				E & M Workshop Equipment Installation					**2,278,697.00**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-
					A2545	Installation of workshop equipment	SCC	6A	375,985.01	16.5%	13-Aug-09	25-Feb-10	197	21	28	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2544	Access for E&M workshop equipment	SCC	6A	-	0.0%	13-Aug-09	13-Aug-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2542	Access for visual inspection forE&M workshop equipment	SCC	6A	-	0.0%	15-Jul-09	15-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4220	Install Electrical Cables	SCC	6A	375,985.01	16.5%	10-Sep-09	25-Sep-09	16	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4230	Install Fibre Optic Cables	SCC	6A	375,985.01	16.5%	10-Sep-09	25-Sep-09	16	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4240	Install Signalling Wayside Equipment	SCC	6A	375,985.01	16.5%	28-Sep-09	13-Oct-09	16	23	24	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4205	Installation of poles and building fixings - 50%	SCC	6A	375,985.01	16.5%	13-Jul-09	26-Aug-09	45	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4205	Installation of poles and building fixingsb - 50%	SCC	6A	375,985.01	16.5%	13-Jul-09	26-Aug-09	45	20	22	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4204	Access for E&M Depot installation	SCC	6A	-	0.0%	13-Jul-09	13-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4219	Access to cable pits for cable laying (Depot)	SCC	6A	-	0.0%	10-Sep-09	10-Sep-09	1	22	22	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4203	Access for visual inspection for E&M Depot installation	SCC	6A	-	0.0%	11-Jun-09	11-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4218	Access for visual inspection to cable pits for cable laying (Depot)	SCC	6A	-	0.0%	11-Aug-09	11-Aug-09	1	21	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	6A	22,786.97	1.0%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-
					Cnt. Milestone	Commission Gogar Depot - Edinburgh Airport (1) - TEST TRACK (30)			-	0.0%		25-Feb-10				-	-	-	-	-	-	-	-	-	-	-	-
					Cnt. Milestone	Commission Gogar Depot Building (0) (31)			-	0.0%		25-Feb-10				-	-	-	-	-	-	-	-	-	-	-	-
				Inspection & Handover					**256,530.88**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-
					A2550	Inspection and Testing	SCC	6A	256,530.88	100.0%	26-Feb-10	25-Mar-10	28	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-
				Substation					**926,328.61**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-
					316	Civil Engineering and Building Works - Weathertight	Subst - BB	6A	147,960.65	16.0%	14-Jul-08	10-Feb-09	212	7	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					316	Civil Engineering and Building Works - Plant & equipment	Subst - BB	6A	73,980.32	8.0%	14-Jul-08	10-Feb-09	212	7	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					316	Civil Engineering and Building Works - Service Connections	Subst - BB	6A	24,660.11	2.7%	14-Jul-08	10-Feb-09	212	7	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	6A	2,490.92	0.3%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-
					306	Order REC supply from Scottish Power	Subst - S	6A	-	0.0%	07-Oct-08	07-Oct-08	1	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5930	Power Infeed from Public Net available inc HV cable	Subst - S	6A	-	0.0%	11-Feb-09	11-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6950	Installation of TPS Equipment	Subst - S	6A	134,092.85	14.5%	08-Dec-09	02-Feb-10	57	26	28	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5940	Install LV Power Supply and LV Power Equipment	Subst - S	6A	134,092.85	14.5%	23-Nov-09	15-Dec-09	23	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5970	Testing and Commissioning	Subst - S	6A	134,092.85	14.5%	02-Feb-10	22-Feb-10	21	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5960	Install Telecom and Scada	Subst - S	6A	134,092.85	14.5%	12-Jan-10	02-Feb-10	22	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6330	Installation of SIG-interlocking cubicle	Subst - S	6A	134,092.85	14.5%	08-Dec-09	29-Dec-09	22	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6340	Commissioning of SIG -interlocking cubicle	Subst - S	6A	-	0.0%	29-Dec-09	05-Jan-10	8	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2519	Access for E&M Substation installation (06A Depot)	Subst - S	6A	-	0.0%	11-Feb-09	11-Feb-09	1	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2518	Access for visual inspection for E&M Substation installation (06A Depot)	Subst - S	6A	-	0.0%	12-Jan-09	12-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	6A	6,772.37	0.7%				28	29	-	-	-	-	-	-	-	-	-	-	-	-	-
		Gogar Depot Access Roads																										
				Roadworks					**1,568,164.00**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-
					1179	North Side - Capping & Drainage	Highways	6A	178,535.47	11.4%	28-Jul-08	29-Sep-08	64	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					1179	North Side	Highways	6A	178,535.47	11.4%	28-Jul-08	29-Sep-08	64	8	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					1189	South Side	Highways	6A	341,546.12	21.8%	30-Sep-08	27-Oct-08	28	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					1199	Finishes - Lighting	Highways	6A	38,812.06	2.5%	28-Oct-08	10-Aug-09	287	11	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					1199	Finishes - Landscaping	Highways	6A	38,812.06	2.5%	28-Oct-08	10-Aug-09	287	11	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					1199	Finishes	Highways	6A	77,624.12	5.0%	28-Oct-08	10-Aug-09	287	11	21	-	-	-	-	-	-	-	-	-	-	-	-	-
					1209	Car Park & Hardstanding - Surface Water Drainage	Highways	6A	124,198.59	7.9%	09-Sep-08	07-May-09	241	9	18	-	-	-	-	-	-	-	-	-	-	-	-	-
					1209	Car Park & Hardstanding - External Services	Highways	6A	186,297.88	11.9%	09-Sep-08	07-May-09	241	9	18	-	-	-	-	-	-	-	-	-	-	-	-	-
					1219	Track & Stabling Area - OLE Foundations	Highways	6A	77,624.12	5.0%	09-Sep-08	16-Dec-08	99	9	13	-	-	-	-	-	-	-	-	-	-	-	-	-
					1219	Track & Stabling Area	Highways	6A	116,436.18	7.4%	09-Sep-08	16-Dec-08	99	9	13	-	-	-	-	-	-	-	-	-	-	-	-	-
					1229	Shunting Area - OLE Foundations	Highways	6A	58,218.09	3.7%	23-Sep-08	13-Jan-09	113	10	14	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0082

Project: Edinburgh Tram Network
Subject: Milestone Payment Schedule
Currency: GBP

The Morrison Construction Group | BILFINGER BERGER | SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year	2008											2008 Subtotal
																Period	1	2	3	4	5	6	7	8	9	10	11	12	13	
																Period End	02-Feb-2008	01-Mar-2008	29-Mar-2008	26-Apr-2008	24-May-2008	21-Jun-2008	19-Jul-2008	16-Aug-2008	13-Sep-2008	11-Oct-2008	08-Nov-2008	06-Dec-2008	03-Jan-2009	GBP
					1229	Shunting Area	Highways	6A	135,842.21	8.7%	23-Sep-08	13-Jan-09	113	10	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1239	Handover to trackworks resource	Highways	6A	-	0.0%	13-Jan-09	13-Jan-09	1	14	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	6A	15,681.64	1.0%				21	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Cogar Depot E & M Installations						85,852.78	100%							-	-	-	-	-	-	-	-	-	-	-	-	-	-
				E & M Installations					85,852.78	100%							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4210	Overhead Catenary Line	OLE	6A	84,994.25	99.0%	27-Aug-09	11-Dec-09	107	22	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	6A	858.53	1.0%				26	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
07 Cogar to Edinburgh Airport									11,129,563.68	5.1%							-	-	-	54,027	546	-	42,872	-	257,232	171,488	-	251,926	38,011	816,101
	07A Cogarburn (exc.) to Edinburgh Airport (inc.)								11,129,563.68								-	-	-	54,027	546	-	42,872	-	257,232	171,488	-	251,926	38,011	816,101
		07A1 Cogarburn (exc.) to Edinburgh Airport (inc.)							1,610,933.20								-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Cogarburn to Edinburgh Airport E & M Installations																											
				E & M Installations					1,610,933.20	100%							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4250	Overhead Catenary Line - One Third	OLE	7A	424,061.42	26.3%	16-Feb-10	23-Apr-10	67	28	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4250	Overhead Catenary Line - One Third	OLE	7A	318,046.06	19.7%	16-Feb-10	23-Apr-10	67	28	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4250	Overhead Catenary Line	OLE	7A	318,046.06	19.7%	16-Feb-10	23-Apr-10	67	28	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	7A	10,708.62	0.7%				30	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4260	Install Electrical Cables	SCC	7A	133,667.58	8.3%	02-Mar-10	06-Apr-10	36	29	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4270	Install Fibre Optic Cables	SCC	7A	133,667.58	8.3%	02-Mar-10	06-Apr-10	36	29	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4280	Install Signalling Wayside Equipment	SCC	7A	133,667.58	8.3%	07-Apr-10	12-May-10	36	30	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4245	Installation of poles and building fixings	SCC	7A	133,667.58	8.3%	19-Jan-10	15-Feb-10	28	27	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4244	Access for E&M wayside installation (07A)	SCC	7A	-	0.0%	19-Jan-10	19-Jan-10	1	27	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4259	Access to cable pits for cable laying (07A)	SCC	7A	-	0.0%	02-Mar-10	02-Mar-10	1	29	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4243	Access for visual inspection for E&M wayside installation (07A)	SCC	7A	-	0.0%	04-Dec-09	04-Dec-09	1	25	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4258	Access for visual inspection to cable pits for cable laying (07A)	SCC	7A	-	0.0%	29-Jan-10	29-Jan-10	1	27	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	7A	5,400.71	0.3%				30	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07A2 Cogarburn (exc.) to Inglishton Park & Ride (inc.)							6,446,487.55								-	-	-	54,027	546	-	42,872	-	257,232	171,488	-	251,926	376	778,466
			Cogarburn Underbridge (S29)																											
				Bridge					866,100.00	100%							-	-	-	-	-	-	42,872	-	257,232	171,488	-	214,360	-	685,951
					159	Temporary Access Roads-Bulk Excavation-Piling Platform	Structures	7A	42,871.95	5.0%	13-Jun-08	04-Jul-08	22	6	7		-	-	-	-	-	-	42,872	-	-	-	-	-	-	-	42,872
					179	East Abutment-Piles and Columns	Structures	7A	128,615.85	14.9%	07-Jul-08	26-Aug-08	51	7	9		-	-	-	-	-	-	-	-	128,616	-	-	-	-	-	-	128,616
					189	East Abutment-Reinforced Earth	Structures	7A	85,743.90	9.9%	27-Aug-08	16-Sep-08	21	9	10		-	-	-	-	-	-	-	-	-	85,744	-	-	-	-	-	85,744
					199	East Abutment-Parapets and Run on Slabs	Structures	7A	85,743.90	9.9%	27-Nov-08	21-Jan-09	56	12	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					209	West Abutment-Piles and Columns	Structures	7A	128,615.85	14.9%	14-Jul-08	02-Sep-08	51	7	9		-	-	-	-	-	-	-	-	128,616	-	-	-	-	-	-	128,616
					219	West Abutment-Reinforced Earth	Structures	7A	85,743.90	9.9%	17-Sep-08	07-Oct-08	21	10	10		-	-	-	-	-	-	-	-	-	85,744	-	-	-	-	-	85,744
					229	West Abutment-Parapets and Run on Slabs	Structures	7A	85,743.90	9.9%	19-Dec-08	11-Feb-09	55	13	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					239	Bridge Deck	Structures	7A	171,487.80	19.8%	08-Oct-08	04-Dec-08	58	10	12		-	-	-	-	-	-	-	-	-	-	-	-	-	171,488	-	171,488
					13041	Treat area of contaminated land (Dummy duration)	Structures	7A	42,871.95	5.0%	13-May-08	10-Nov-08	182	5	12		-	-	-	-	-	-	-	-	-	-	-	-	-	42,872	-	42,872
					Snagging	Snagging	Structures	7A	8,661.00	1.0%				15	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Cogarblton Culvert No1 (S30)																											
				Culvert					37,942.21	100%							-	-	-	-	-	-	-	-	-	-	-	-	37,567	376	37,942
					160	Temporary Access Roads-Divert Flows-Bulk Excavation	Structures	7A	-	0.0%	02-Sep-08	26-Sep-08	25	9	10		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					249	Precast Culvert Units	Structures	7A	-	0.0%	29-Sep-08	03-Oct-08	5	10	10		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					259	Reinforced Concrete Apron and Wingwalls	Structures	7A	-	0.0%	06-Oct-08	31-Oct-08	26	10	11		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					269	Backfill and Finishes	Structures	7A	37,566.54	99.0%	03-Nov-08	17-Nov-08	15	11	12		-	-	-	-	-	-	-	-	-	-	-	-	-	37,567	-	37,567
					Snagging	Snagging	Structures	7A	375.67	1.0%				12	13		-	-	-	-	-	-	-	-	-	-	-	-	-	376	376
			Cogarburn to Inglishton Park & Ride Trackwork (1750m)																											
				Trackwork					4,734,567.21	100%							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					162	Earthworks and Subbase	Track	7A	464,525.45	9.8%	12-Feb-09	20-Mar-09	37	15	16		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1990	Top Ballast	Track	7A	464,525.45	9.8%	22-Oct-09	20-Nov-09	30	24	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2020	Fencing & Trackside Finishes	Track	7A	464,525.45	9.8%	23-Nov-09	25-Jan-10	64	25	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					399	Drainage and OLE Foundations - 50%	Track - BB	7A	464,525.45	9.8%	23-Mar-09	12-May-09	51	16	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					399	Drainage and OLE Foundations - 50%	Track - BB	7A	506,492.50	10.7%	23-Mar-09	12-May-09	51	16	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					409	Bottom Balast and Ducts - 30%	Track	7A	464,525.45	9.8%	13-May-09	01-Jul-09	50	18	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					409	Bottom Balast and Ducts - 70%	Track	7A	696,788.17	14.7%	13-May-09	01-Jul-09	50	18	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					419	Track Laying - 60%	Track	7A	696,788.17	14.7%	22-Jul-09	21-Oct-09	92	21	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					419	Track Laying - 40%	Track	7A	464,525.45	9.8%	22-Jul-09	21-Oct-09	92	21	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	7A	47,345.67	1.0%				26	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Inglishton Park and Ride Tram Stop																											
				Tramstop					287,921.57	100%							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					163	Civil Engineering and Building Works	Tramstops	7A	78,663.63	27.3%	29-Jul-09	28-Oct-09	92	21	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					163	Civil Engineering and Building Works	Tramstops	7A	78,663.63	27.3%	29-Jul-09	28-Oct-09	92	21	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	7A	1,589.16	0.6%				24	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1940	Deliver and Install Shelter	Tramstops	7A	52,442.42	18.2%	23-Nov-09	08-Dec-09	16	25	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	7A	529.72	0.2%				26	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					218	Order REC Supply	Trams Eq	7A	-	0.0%	12-Oct-09	12-Oct-09	1	24	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5430	Package Test Tramstop	Trams Eq	7A	18,818.17	6.5%	02-Mar-10	09-Mar-10	8	29	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5400	Install LV Power Supply and LV Power Equipment	Trams Eq	7A	18,818.17	6.5%	08-Dec-09	26-Jan-10	50	26	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5410	Install Telecon Equipment	Trams Eq	7A	18,818.17	6.5%	26-Jan-10	23-Feb-10	29	27	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5420	Install Station Control Equipment + AFC Equipment	Trams Eq	7A	18,818.17	6.5%	26-Jan-10	02-Mar-10	36	27	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5399	Access for E&M Tram Stop installation (07A Inglston Park+Ride)	Trams Eq	7A	-	0.0%	08-Dec-09	08-Dec-09	1	26	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5398	Access for visual inspection for E&M Tram Stop installation (07A Inglston Park+Ride)	Trams Eq	7A	-	0.0%	06-Nov-09	06-Nov-09	1	24	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	7A	760.33	0.3%				29	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Inglston Park and Ride Substation																											
				Substation					465,384.08	100%	08-Jul-09	06-Apr-10	273	20	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					226	Completion of envelope	Subst - BB	7A	82,803.11	17.8%	01-Sep-09	28-Oct-09	59	22	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					226	Civil Engineering and Building Works	Subst - BB	7A	82,803.11	17.8%	29-Jul-09	31-Aug-09	34	21	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	7A	1,672.79	0.4%				24	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					216	Order REC supply from Scottish Power	Subst - S	7A	-	0.0%	08-Jul-09	08-Jul-09	1	20	20		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5980	Power Infeed from Public Net available inc HV cable	Subst - S	7A	-	0.0%	29-Oct-09	29-Oct-09	1	24	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6000	Installation of TPS Equipment	Subst - S	7A	73,781.01	15.9%	02-Feb-10	16-Mar-10	43	28	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5990	Install LV Power Supply and LV Power Equipment	Subst - S	7A	73,781.01	15.9%	29-Oct-09	19-Nov-09	22	24	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6020	Testing and Commissioning	Subst - S	7A	73,781.01	15.9%	16-Mar-10	06-Apr-10	22	29	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6010	Install Telecom and Scada	Subst - S	7A	73,781.01	15.9%	23-Feb-10	16-Mar-10	22	28	29		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1969	Access for E&M Substation installation (07A Ingistion Park and Ride)	Subst - S	7A	-	0.0%	29-Oct-09	29-Oct-09	1	24	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1968	Access for visual inspection for E&M Substation installation (07A Inglistion Park and Ride)	Subst - S	7A	-	0.0%	29-Sep-09	29-Sep-09	1	23	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	7A	2,981.05	0.6%				29	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Cogarblton to Inglishton Park & Ride Enabling Works																											
				Enabling Works					54,572.49	0%	03-Mar-08	10-Apr-08	39	3	5		-	-	-	54,027	546	-	-	-	-	-	-	-	-	-	54,572
					A2000	Site and Vegetation Clearance			-	0.0%	03-Mar-08	10-Apr-08	39	3	4		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2000	Highways BoQ works	Highways	7A	54,026.77	99.0%	03-Mar-08	10-Apr-08	39	3	4		-	-	-	54,027	-	-	-	-	-	-	-	-	-	-	54,027
					Snagging	Snagging	Highways	7A	545.72	1.0%				4	5		-	-	-	-	546	-	-	-	-	-	-	-	-	-	546
			Cogarburn to Inglishton Park & Ride Tram Test																											
				Tram Testing					-	0%	24-Apr-10	13-May-10	20	30	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6380	Track Testing of Tram			-	0.0%	24-Apr-10	13-May-10	20	30	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07A3 Inglishton Park & Ride (exc.) to Edinburgh Airport (inc.)							3,072,142.93		03-Mar-2008	25-Jun-2010	845	3	34		-	-	-	-	-	-	-	-	-	-	-	-	-	37,635	37,635
			Inglishton Park & Ride to Edinburgh Airport Enabling Works																											
				Enabling Works					-	0%	03-Mar-08	25-Apr-08	54	3	4		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1920	Construct New Hotel Car Park			-	0.0%	31-Mar-08	25-Apr-08	26	4	4		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1930	Site and Vegetation Clearance			-	0.0%	03-Mar-08	10-Apr-08	39	3	4		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Cogarburn Retaining Wall (W14)																											
				Retaining Wall					383,212.00	100%							-	-	-	-	-	-	-	-	-	-	-	-	-	-
					167	Gogarburn Retaining Wall (W14) - Ph 1	Structures	7A	151,751.95	39.6%	20-Oct-08	23-Feb-09	127	11	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					167	Gogarburn Retaining Wall (W14) - Ph 2	Structures	7A	227,627.93	59.4%	20-Oct-08	23-Feb-09	127	11	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	7A	3,832.12	1.0%				16	17		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Cogarburn Culvert No2 (S31)																											
				Culvert					38,011.20	100%	29-Sep-08	16-Dec-08	79	10	14		-	-	-	-	-	-	-	-	-	-	-	-	-	37,635	37,635
					165	Divert Flows-Bulk Excavation	Structures	7A	-	0.0%	29-Sep-08	07-Oct-08	9	10	10		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					309	Precast Culvert Units	Structures	7A	-	0.0%	08-Oct-08	14-Oct-08	7	10	11		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					319	Reinforced Concrete Apron and Wingwalls	Structures	7A	-	0.0%	03-Nov-08	28-Nov-08	26	11	12		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					329	Backfill and Finishes	Structures	7A	37,634.85	99.0%	02-Dec-08	16-Dec-08	15	12	13		-	-	-	-	-	-	-	-	-	-	-	-	-	37,635	-	37,635
					Snagging	Snagging	Structures	7A	376.35	1.0%				13	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Cogarburn Culvert No3 (S34)																											
				Culvert					83,367.66	100%	08-Oct-08	27-Jan-09	112	10	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					196	Divert Flows-Bulk Excavation	Structures	7A	-	0.0%	08-Oct-08	15-Oct-08	8	10	11		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					279	Precast Culvert Units	Structures	7A	-	0.0%	16-Oct-08	22-Oct-08	7	11	11		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					289	Reinforced Concrete Apron and Wingwalls	Structures	7A	-	0.0%	02-Dec-08	12-Jan-09	42	12	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					299	Backfill and Finishes	Structures	7A	82,542.24	99.0%	13-Jan-09	27-Jan-09	15	14	14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	7A	825.42	1.0%				14	15		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Inglishton Park & Ride to Edinburgh Airport Trackwork (833m)																											
				Trackwork					2,279,630.50	100%	02-Jul-09	25-Jan-10	208	20	28		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					168	Earthworks and Subbase	Track	7A	221,114.11	9.7%	02-Jul-09	22-Jul-09	21	20	21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1910	Top Ballast	Track	7A	221,114.11	9.7%	04-Dec-09	17-Dec-09	14	25	26		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					369	Drainage and OLE Foundations	Track - BB	7A	19,976.32	0.9%	23-Jul-09	08-Sep-09	48	21	22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					379	Bottom Ballast and Ducts	Track	7A	221,114.11	9.7%	09-Sep-09	30-Sep-09	22	22	23		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0083

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Morrison Services Group BILFINGER BERGER

SIEI

Year														
Period							2009							2009
Period End	14	15	16	17	18	19	20	21	22	23	24	25	26	Subtotal
	31-Jan-2009	28-Feb-2009	28-Mar-2009	25-Apr-2009	23-May-2009	20-Jun-2009	18-Jul-2009	15-Aug-2009	12-Sep-2009	10-Oct-2009	07-Nov-2009	05-Dec-2009	02-Jan-2010	GBP

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Extract 15-Apr-08 Start Date	Finish Date	Duration	Start Period	End Period												
					1229	Shunting Area	Highways	6A	135,842.21	8.7%	23-Sep-08	13-Jan-09	113	10	14	135,842	-	-	-	-	-	-	-	-	-	-	-	135,842
					1239	Handover to trackworks resource	Highways	6A	-	0.0%	13-Jan-09	13-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	6A	15,681.64	1.0%				21	22	-	-	-	-	-	-	-	-	15,682	-	-	15,682
					Gogar Depot E & M Installations																						
					E & M Installations				**85,852.78**	**100%**						-	-	-	-	-	-	-	-	-	-	84,994	**84,994**
					A4210	Overhead Catenary Line	OLE	6A	84,994.25	99.0%	27-Aug-09	11-Dec-09	107	22	26	-	-	-	-	-	-	-	-	-	-	84,994	84,994
					Snagging	Snagging	OLE	6A	858.53	1.0%				26	27	-	-	-	-	-	-	-	-	-	-	-	-
07 Gogar to Edinburgh Airport									**11,129,563.68**	**5.1%**																
07A Gogarburn (exc.) to Edinburgh Airport (inc.)									**11,129,563.68**							**168,662**	**465,949**	**473,186**	**3,832**	**971,018**	**-**	**1,161,314**	**221,114**	**102,779**	**221,114**	**1,401,444**	**1,868,253**	**273,557**	**7,332,223**
	07A1 Gogarburn (exc.) to Edinburgh Airport (inc.)								**1,610,933.20**							**168,662**	**465,949**	**473,186**	**3,832**	**971,018**	**-**	**1,161,314**	**221,114**	**102,779**	**221,114**	**1,401,444**	**1,868,253**	**273,557**	**7,332,223**
		Gogarburn to Edinburgh Airport E & M Installations														-	-	-	-	-	-	-	-	-	-	-	-	-
			E & M Installations						**1,610,933.20**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-
					A4250	Overhead Catenary Line - One Third	OLE	7A	424,061.42	26.3%	16-Feb-10	23-Apr-10	67	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4250	Overhead Catenary Line - One Third	OLE	7A	318,046.06	19.7%	16-Feb-10	23-Apr-10	67	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4250	Overhead Catenary Line	OLE	7A	318,046.06	19.7%	16-Feb-10	23-Apr-10	67	28	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	7A	10,708.62	0.7%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4260	Install Electrical Cables	SCC	7A	133,667.58	8.3%	02-Mar-10	06-Apr-10	36	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4270	Install Fibre Optic Cables	SCC	7A	133,667.58	8.3%	02-Mar-10	06-Apr-10	36	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4280	Install Signalling Wayside Equipment	SCC	7A	133,667.58	8.3%	07-Apr-10	12-May-10	36	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4245	Installation of poles and building fixings	SCC	7A	133,667.58	8.3%	19-Jan-10	15-Feb-10	28	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4244	Access for E&M wayside installation (07A)	SCC	7A	-	0.0%	19-Jan-10	19-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4259	Access to cable pits for cable laying (07A)	SCC	7A	-	0.0%	02-Mar-10	02-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4243	Access for visual inspection for E&M wayside installation (07A)	SCC	7A	-	0.0%	04-Dec-09	04-Dec-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4258	Access for visual inspection to cable pits for cable laying (07A)	SCC	7A	-	0.0%	29-Jan-10	29-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	7A	5,400.71	0.3%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-
		07A2 Gogarburn (exc.) to Inglishton Park & Ride (inc.)							**6,446,487.55**							**85,744**	**85,744**	**473,186**	**-**	**971,018**	**-**	**1,161,314**	**-**	**82,803**	**-**	**1,401,444**	**541,568**	**52,442**	**4,855,264**
			Gogarburn Underbridge (S29)																									
				Bridge					**866,100.00**	**100%**						**85,744**	**85,744**	**8,661**	-	-	-	-	-	-	-	-	-	-	**180,149**
					159	Temporary Access Roads-Bulk Excavation-Piling Platform	Structures	7A	42,871.95	5.0%	13-Jun-08	04-Jul-08	22	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
					179	East Abutment-Piles and Columns	Structures	7A	128,615.85	14.9%	07-Jul-08	26-Aug-08	51	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-
					189	East Abutment-Reinforced Earth	Structures	7A	85,743.90	9.9%	27-Aug-08	16-Sep-08	21	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					199	East Abutment-Parapets and Run on Slabs	Structures	7A	85,743.90	9.9%	27-Nov-08	21-Jan-09	56	12	14	85,744	-	-	-	-	-	-	-	-	-	-	-	85,744
					209	West Abutment-Piles and Columns	Structures	7A	128,615.85	14.9%	14-Jul-08	02-Sep-08	51	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-
					219	West Abutment-Reinforced Earth	Structures	7A	85,743.90	9.9%	17-Sep-08	07-Oct-08	21	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					229	West Abutment-Parapets and Run on Slabs	Structures	7A	85,743.90	9.9%	19-Dec-08	11-Feb-09	55	13	15	-	85,744	-	-	-	-	-	-	-	-	-	-	85,744
					239	Bridge Deck	Structures	7A	171,487.80	19.8%	08-Oct-08	04-Dec-08	58	10	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					13041	Treat area of contaminated land (Dummy duration)	Structures	7A	42,871.95	5.0%	13-May-08	10-Nov-08	182	5	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	7A	8,661.00	1.0%				15	16	-	-	8,661	-	-	-	-	-	-	-	-	-	8,661
			Gogarburn Culvert No1 (S30)																									
				Culvert					**37,942.21**	**100%**						-	-	-	-	-	-	-	-	-	-	-	-	-
					160	Temporary Access Roads-Divert Flows-Bulk Excavation	Structures	7A	-	0.0%	02-Sep-08	26-Sep-08	25	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					249	Precast Culvert Units	Structures	7A	-	0.0%	29-Sep-08	03-Oct-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-
					259	Reinforced Concrete Apron and Wingwalls	Structures	7A	-	0.0%	06-Oct-08	31-Oct-08	26	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-
					269	Backfill and Finishes	Structures	7A	37,566.54	99.0%	03-Nov-08	17-Nov-08	15	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	7A	375.67	1.0%				12	13	-	-	-	-	-	-	-	-	-	-	-	-	-
			Gogarburn to Inglishton Park & Ride Trackwork (1750m)																									
				Trackwork					**4,734,567.21**	**100%**						-	-	**464,525**	-	**971,018**	-	**1,161,314**	-	-	-	**1,161,314**	**464,525**	-	**4,222,696**
					162	Earthworks and Subbase	Track	7A	464,525.45	9.8%	12-Feb-09	20-Mar-09	37	15	16	-	-	464,525	-	-	-	-	-	-	-	-	-	-	464,525
					A1990	Top Ballast	Track	7A	464,525.45	9.8%	22-Oct-09	20-Nov-09	30	24	25	-	-	-	-	-	-	-	-	-	-	-	464,525	-	464,525
					A2020	Fencing & Trackside Finishes	Track	7A	464,525.45	9.8%	23-Nov-09	25-Jan-10	64	25	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					399	Drainage and OLE Foundations - 50%	Track - BB	7A	464,525.45	9.8%	23-Mar-09	12-May-09	51	16	18	-	-	-	-	464,525	-	-	-	-	-	-	-	-	464,525
					399	Drainage and OLE Foundations - 50%	Track - BB	7A	506,492.50	10.7%	23-Mar-09	12-May-09	51	16	18	-	-	-	-	506,492	-	-	-	-	-	-	-	-	506,492
					409	Bottom Balast and Ducts - 30%	Track	7A	464,525.45	9.8%	13-May-09	01-Jul-09	50	18	20	-	-	-	-	-	-	464,525	-	-	-	-	-	-	464,525
					409	Bottom Balast and Ducts - 70%	Track	7A	696,788.17	14.7%	13-May-09	01-Jul-09	50	18	20	-	-	-	-	-	-	696,788	-	-	-	-	-	-	696,788
					419	Track Laying - 60%	Track	7A	696,788.17	14.7%	22-Jul-09	21-Oct-09	92	21	24	-	-	-	-	-	-	-	-	-	-	696,788	-	-	696,788
					419	Track Laying - 40%	Track	7A	464,525.45	9.8%	22-Jul-09	21-Oct-09	92	21	24	-	-	-	-	-	-	-	-	-	-	464,525	-	-	464,525
					Snagging	Snagging	Track	7A	47,345.67	1.0%				26	27	-	-	-	-	-	-	-	-	-	-	-	-	-
			Inglishton Park and Ride Tram Stop																									
				Tramstop					**287,921.57**	**100%**						-	-	-	-	-	-	-	-	-	-	**157,327**	**1,589**	**52,442**	**211,359**
					163	Civil Engineering and Building Works	Tramstops	7A	78,663.63	27.3%	29-Jul-09	28-Oct-09	92	21	24	-	-	-	-	-	-	-	-	-	-	78,664	-	-	78,664
					163	Civil Engineering and Building Works	Tramstops	7A	78,663.63	27.3%	29-Jul-09	28-Oct-09	92	21	24	-	-	-	-	-	-	-	-	-	-	78,664	-	-	78,664
					Snagging	Snagging	Tramstops	7A	1,589.16	0.6%				24	25	-	-	-	-	-	-	-	-	-	-	-	1,589	-	1,589
					A1940	Deliver and Install Shelter	Tramstops	7A	52,442.42	18.2%	23-Nov-09	08-Dec-09	16	25	26	-	-	-	-	-	-	-	-	-	-	-	-	52,442	52,442
					Snagging	Snagging	Tramstops	7A	529.72	0.2%				26	27	-	-	-	-	-	-	-	-	-	-	-	-	-
					218	Order REC Supply	Trams Eq	7A	-	0.0%	12-Oct-09	12-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5430	Package Test Tramstop	Trams Eq	7A	18,818.17	6.5%	02-Mar-10	09-Mar-10	8	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5400	Install LV Power Supply and LV Power Equipment	Trams Eq	7A	18,818.17	6.5%	08-Dec-09	26-Jan-10	50	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5410	Install Telecon Equipment	Trams Eq	7A	18,818.17	6.5%	26-Jan-10	23-Feb-10	29	27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5420	Install Station Control Equipment + AFC Equipment	Trams Eq	7A	18,818.17	6.5%	26-Jan-10	02-Mar-10	36	27	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5399	Access for E&M Tram Stop installation (07A Inglisten Park+Ride)	Trams Eq	7A	-	0.0%	08-Dec-09	08-Dec-09	1	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5398	Access for visual inspection for E&M Tram Stop installation (07A Ingliston Park+Ride)	Trams Eq	7A	-	0.0%	06-Nov-09	06-Nov-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	7A	760.33	0.3%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-
			Inglisten Park and Ride Substation																									
				Substation					**465,384.08**	**100%**	**08-Jul-09**	**06-Apr-10**	**273**	**20**	**30**	-	-	-	-	-	-	-	-	**82,803**	-	**82,803**	**75,454**	-	**241,060**
					226	Completion of envelope	Subst - BB	7A	82,803.11	17.8%	01-Sep-09	28-Oct-09	59	22	24	-	-	-	-	-	-	-	-	-	-	82,803	-	-	82,803
					226	Civil Engineering and Building Works	Subst - BB	7A	82,803.11	17.8%	29-Jul-09	31-Aug-09	34	21	22	-	-	-	-	-	-	-	-	82,803	-	-	-	-	82,803
					Snagging	Snagging	Subst - BB	7A	1,672.79	0.4%				25	25	-	-	-	-	-	-	-	-	-	-	1,673	-	1,673
					216	Order REC supply from Scottish Power	Subst - S	7A	-	0.0%	08-Jul-09	08-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5980	Power Infeed from Public Net available inc HV cable	Subst - S	7A	-	0.0%	29-Oct-09	29-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6000	Installation of TPS Equipment	Subst - S	7A	73,781.01	15.9%	02-Feb-10	16-Mar-10	43	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5990	Install LV Power Supply and LV Power Equipment	Subst - S	7A	73,781.01	15.9%	29-Oct-09	19-Nov-09	22	24	25	-	-	-	-	-	-	-	-	-	-	73,781	-	-	73,781
					A6020	Testing and Commissioning	Subst - S	7A	73,781.01	15.9%	16-Mar-10	06-Apr-10	22	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6010	Install Telecom and Scada	Subst - S	7A	73,781.01	15.9%	23-Feb-10	16-Mar-10	22	28	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1969	Access for E&M Substation installation (07A Inglistion Park and Ride)	Subst - S	7A	-	0.0%	29-Oct-09	29-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1968	Access for visual inspection for E&M Substation installation (07A Inglistion Park and Ride)	Subst - S	7A	-	0.0%	29-Sep-09	29-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	7A	2,981.05	0.6%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-
			Gogarburn to Inglishton Park & Ride Enabling Works																									
				Enabling Works					**54,572.49**	**0%**	**03-Mar-08**	**10-Apr-08**	**39**	**3**	**5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2000	Site and Vegetation Clearance			-	0.0%	03-Mar-08	10-Apr-08	39	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2000	Highways BoQ works	Highways	7A	54,026.77	99.0%	03-Mar-08	10-Apr-08	39	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	7A	545.72	1.0%				4	5	-	-	-	-	-	-	-	-	-	-	-	-	-
			Gogarburn to Inglishton Park & Ride Tram Test																									
				Tram Testing					**-**	**0%**	**24-Apr-10**	**13-May-10**	**20**	**30**	**31**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6380	Track Testing of Tram			-	0.0%	24-Apr-10	13-May-10	20	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		07A3 Inglishton Park & Ride (exc.) to Edinburgh Airport (inc.)							**3,072,142.93**		**03-Mar-2008**	**25-Jun-2010**	**845**	**3**	**34**	**82,919**	**380,205**	**-**	**3,832**	**-**	**-**	**-**	**221,114**	**19,976**	**221,114**	**-**	**1,326,685**	**221,114**	**2,476,959**
			Inglishton Park & Ride to Edinburgh Airport Enabling Works																									
				Enabling Works					**-**	**0%**	**03-Mar-08**	**25-Apr-08**	**54**	**3**	**4**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1920	Construct New Hotel Car Park			-	0.0%	31-Mar-08	25-Apr-08	26	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1930	Site and Vegetation Clearance			-	0.0%	03-Mar-08	10-Apr-08	39	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Gogarburn Retaining Wall (W14)																									
				Retaining Wall					**383,212.00**	**100%**						-	**379,380**	-	**3,832**	-	-	-	-	-	-	-	-	-	**383,212**
					167	Gogarburn Retaining Wall (W14) - Ph 1	Structures	7A	151,751.95	39.6%	20-Oct-08	23-Feb-09	127	11	15	-	151,752	-	-	-	-	-	-	-	-	-	-	-	151,752
					167	Gogarburn Retaining Wall (W14) - Ph 2	Structures	7A	227,627.93	59.4%	20-Oct-08	23-Feb-09	127	11	15	-	227,628	-	-	-	-	-	-	-	-	-	-	-	227,628
					Snagging	Snagging	Structures	7A	3,832.12	1.0%				16	17	-	-	-	3,832	-	-	-	-	-	-	-	-	3,832
			Gogarburn Culvert No2 (S31)																									
				Culvert					**38,011.20**	**100%**	**29-Sep-08**	**15-Dec-08**	**79**	**10**	**14**	**376**	-	-	-	-	-	-	-	-	-	-	-	-	**376**
					165	Divert Flows-Bulk Excavation	Structures	7A	-	0.0%	29-Sep-08	07-Oct-08	9	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					309	Precast Culvert Units	Structures	7A	-	0.0%	08-Oct-08	14-Oct-08	7	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					319	Reinforced Concrete Apron and Wingwalls	Structures	7A	-	0.0%	03-Nov-08	28-Nov-08	26	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					329	Backfill and Finishes	Structures	7A	37,634.85	99.0%	02-Dec-08	16-Dec-08	15	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	7A	376.35	1.0%				13	14	376	-	-	-	-	-	-	-	-	-	-	-	-	376
			Gogarburn Culvert No3 (S34)																									
				Culvert					**83,367.66**	**100%**	**08-Oct-08**	**27-Jan-09**	**112**	**10**	**15**	**82,542**	**825**	-	-	-	-	-	-	-	-	-	-	-	**83,368**
					196	Divert Flows-Bulk Excavation	Structures	7A	-	0.0%	08-Oct-08	15-Oct-08	8	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					279	Precast Culvert Units	Structures	7A	-	0.0%	16-Oct-08	22-Oct-08	7	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					289	Reinforced Concrete Apron and Wingwalls	Structures	7A	-	0.0%	02-Dec-08	12-Jan-09	42	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					299	Backfill and Finishes	Structures	7A	82,542.24	99.0%	13-Jan-09	27-Jan-09	15	14	14	82,542	-	-	-	-	-	-	-	-	-	-	-	-	82,542
					Snagging	Snagging	Structures	7A	825.42	1.0%				14	15	-	825	-	-	-	-	-	-	-	-	-	-	-	825
			Inglishton Park & Ride to Edinburgh Airport Trackwork (833m)																									
				Trackwork					**2,279,630.50**	**100%**	**02-Jul-09**	**25-Jan-10**	**208**	**20**	**28**	-	-	-	-	-	-	-	**221,114**	**19,976**	**221,114**	-	**1,326,685**	**221,114**	**2,010,003**
					168	Earthworks and Subbase	Track	7A	221,114.11	9.7%	02-Jul-09	22-Jul-09	21	20	21	-	-	-	-	-	-	-	221,114	-	-	-	-	-	221,114
					A1910	Top Ballast	Track	7A	221,114.11	9.7%	04-Dec-09	17-Dec-09	14	25	26	-	-	-	-	-	-	-	-	-	-	-	-	221,114	221,114
					369	Drainage and OLE Foundations	Track - BB	7A	19,976.32	0.9%	23-Jul-09	08-Sep-09	48	21	22	-	-	-	-	-	-	-	-	19,976	-	-	-	-	19,976
					379	Bottom Ballast and Ducts	Track	7A	221,114.11	9.7%	09-Sep-09	30-Sep-09	22	22	23	-	-	-	-	-	-	-	-	-	221,114	-	-	-	221,114

USB00000073_0084

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Service Group | BILFINGER BERGER | SIEI

Year														
Period														
Period End														

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					1229	Shunting Area	Highways	6A	135,842.21	8.7%	23-Sep-08	13-Jan-09	113	10	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1239	Handover to trackworks resource	Highways	6A	-	0.0%	13-Jan-09	13-Jan-09	1	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	6A	15,681.64	1.0%				21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Gogar Depot E & M Installations																								
					E & M Installations				**85,852.78**	**100%**						**859**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**859**
					A4210	Overhead Catenary Line	OLE	6A	84,994.25	99.0%	27-Aug-09	11-Dec-09	107	22	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	OLE	6A	858.53	1.0%				26	27	859	-	-	-	-	-	-	-	-	-	-	-	-	859
					07 Gogar to Edinburgh Airport				**11,129,563.68**	**5.1%**						**778,050**	**175,282**	**342,526**	**1,459,043**	**180,416**	**30,109**	**15,055**	**760**	**-**	**-**	**-**	**-**	**-**	**2,981,240**
					07A Gogarburn (exc.) to Edinburgh Airport (inc.)				**11,129,563.68**							**778,050**	**175,282**	**342,526**	**1,459,043**	**180,416**	**30,109**	**15,055**	**760**	**-**	**-**	**-**	**-**	**-**	**2,981,240**
					07A1 Gogarburn (exc.) to Edinburgh Airport (inc.)				**1,610,933.20**							**-**	**133,668**	**-**	**1,327,489**	**149,777**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1,610,933**
					Gogarburn to Edinburgh Airport E & M Installations																								
					E & M Installations				**1,610,933.20**	**100%**						**-**	**133,668**	**-**	**1,327,489**	**149,777**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1,610,933**
					A4250	Overhead Catenary Line - One Third	OLE	7A	424,061.42	26.3%	16-Feb-10	23-Apr-10	67	28	30	-	-	-	424,061	-	-	-	-	-	-	-	-	-	424,061
					A4250	Overhead Catenary Line - One Third	OLE	7A	318,046.06	19.7%	16-Feb-10	23-Apr-10	67	28	30	-	-	-	318,046	-	-	-	-	-	-	-	-	-	318,046
					A4250	Overhead Catenary Line	OLE	7A	318,046.06	19.7%	16-Feb-10	23-Apr-10	67	28	30	-	-	-	318,046	-	-	-	-	-	-	-	-	-	318,046
					Snagging	Snagging	OLE	7A	10,708.62	0.7%				30	31	-	-	-	-	10,709	-	-	-	-	-	-	-	-	10,709
					A4260	Install Electrical Cables	SCC	7A	133,667.58	8.3%	02-Mar-10	06-Apr-10	36	29	30	-	-	-	133,668	-	-	-	-	-	-	-	-	-	133,668
					A4270	Install Fibre Optic Cables	SCC	7A	133,667.58	8.3%	02-Mar-10	06-Apr-10	36	29	30	-	-	-	133,668	-	-	-	-	-	-	-	-	-	133,668
					A4280	Install Signalling Wayside Equipment	SCC	7A	133,667.58	8.3%	07-Apr-10	12-May-10	36	30	31	-	-	-	-	133,668	-	-	-	-	-	-	-	-	-	133,668
					A4245	Installation of poles and building fixings	SCC	7A	133,667.58	8.3%	19-Jan-10	15-Feb-10	28	27	28	-	133,668	-	-	-	-	-	-	-	-	-	-	-	133,668
					A4244	Access for E&M wayside installation (07A)	SCC	7A	-	0.0%	19-Jan-10	19-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4259	Access to cable pits for cable laying (07A)	SCC	7A	-	0.0%	02-Mar-10	02-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4243	Access for visual inspection for E&M wayside installation (07A)	SCC	7A	-	0.0%	04-Dec-09	04-Dec-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A4258	Access for visual inspection to cable pits for cable laying (07A)	SCC	7A	-	0.0%	29-Jan-10	29-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	SCC	7A	5,400.71	0.3%				30	31	-	-	-	-	5,401	-	-	-	-	-	-	-	-	5,401
					07A2 Gogarburn (exc.) to Inglishton Park & Ride (inc.)				**6,446,487.55**							**531,219**	**18,818**	**185,198**	**77,522**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**812,758**
					Gogarburn Underbridge (S29)																								
					Bridge				**866,100.00**	**100%**						**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					159	Temporary Access Roads-Bulk Excavation-Piling Platform	Structures	7A	42,871.95	5.0%	13-Jun-08	04-Jul-08	22	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					179	East Abutment-Piles and Columns	Structures	7A	128,615.85	14.9%	07-Jul-08	26-Aug-08	51	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					189	East Abutment-Reinforced Earth	Structures	7A	85,743.90	9.9%	27-Aug-08	16-Sep-08	21	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					199	East Abutment-Parapets and Run on Slabs	Structures	7A	85,743.90	9.9%	27-Nov-08	21-Jan-09	56	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					209	West Abutment-Piles and Columns	Structures	7A	128,615.85	14.9%	14-Jul-08	02-Sep-08	51	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					219	West Abutment-Reinforced Earth	Structures	7A	85,743.90	9.9%	17-Sep-08	07-Oct-08	21	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					229	West Abutment-Parapets and Run on Slabs	Structures	7A	85,743.90	9.9%	19-Dec-08	11-Feb-09	55	13	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					239	Bridge Deck	Structures	7A	171,487.80	19.8%	08-Oct-08	04-Dec-08	58	10	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					13041	Treat area of contaminated land (Dummy duration)	Structures	7A	42,871.95	5.0%	13-May-08	10-Nov-08	182	5	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	7A	8,661.00	1.0%				15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Gogarburn Culvert No1 (S30)																								
					Culvert				**37,942.21**	**100%**						**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					160	Temporary Access Roads-Divert Flows-Bulk Excavation	Structures	7A	-	0.0%	02-Sep-08	26-Sep-08	25	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					249	Precast Culvert Units	Structures	7A	-	0.0%	29-Sep-08	03-Oct-08	5	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					259	Reinforced Concrete Apron and Wingwalls	Structures	7A	-	0.0%	06-Oct-08	31-Oct-08	26	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					269	Backfill and Finishes	Structures	7A	37,566.54	99.0%	03-Nov-08	17-Nov-08	15	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	7A	375.67	1.0%				12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Gogarburn to Inglishton Park & Ride Trackwork (1750m)																								
					Trackwork				**4,734,567.21**	**100%**						**511,871**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**511,871**
					162	Earthworks and Subbase	Track	7A	464,525.45	9.8%	12-Feb-09	20-Mar-09	37	15	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1990	Top Ballast	Track	7A	464,525.45	9.8%	22-Oct-09	20-Nov-09	30	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2020	Fencing & Trackside Finishes	Track	7A	464,525.45	9.8%	23-Nov-09	25-Jan-10	64	25	27	464,525	-	-	-	-	-	-	-	-	-	-	-	-	464,525
					399	Drainage and OLE Foundations - 50%	Track - BB	7A	464,525.45	9.8%	23-Mar-09	12-May-09	51	16	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					399	Drainage and OLE Foundations - 50%	Track - BB	7A	506,492.50	10.7%	23-Mar-09	12-May-09	51	16	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					409	Bottom Balast and Ducts - 30%	Track	7A	464,525.45	9.8%	13-May-09	01-Jul-09	50	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					409	Bottom Balast and Ducts - 70%	Track	7A	696,788.17	14.7%	13-May-09	01-Jul-09	50	18	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					419	Track Laying - 60%	Track	7A	696,788.17	14.7%	22-Jul-09	21-Oct-09	92	21	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					419	Track Laying - 40%	Track	7A	464,525.45	9.8%	22-Jul-09	21-Oct-09	92	21	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	7A	47,345.67	1.0%				26	27	47,346	-	-	-	-	-	-	-	-	-	-	-	-	47,346
					Inglishton Park and Ride Tram Stop																								
					Tramstop				**287,921.57**	**100%**						**19,348**	**18,818**	**37,636**	**760**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**76,563**
					163	Civil Engineering and Building Works	Tramstops	7A	78,663.63	27.3%	29-Jul-09	28-Oct-09	92	21	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					163	Civil Engineering and Building Works	Tramstops	7A	78,663.63	27.3%	29-Jul-09	28-Oct-09	92	21	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	7A	1,589.16	0.6%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1940	Deliver and Install Shelter	Tramstops	7A	52,442.42	18.2%	23-Nov-09	08-Dec-09	16	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	7A	529.72	0.2%				26	27	530	-	-	-	-	-	-	-	-	-	-	-	-	530
					218	Order REC Supply	Trams Eq	7A	-	0.0%	12-Oct-09	12-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5430	Package Test Tramstop	Trams Eq	7A	18,818.17	6.5%	02-Mar-10	09-Mar-10	8	29	29	-	-	18,818	-	-	-	-	-	-	-	-	-	18,818
					A5400	Install LV Power Supply and LV Power Equipment	Trams Eq	7A	18,818.17	6.5%	08-Dec-09	26-Jan-10	50	26	27	18,818	-	-	-	-	-	-	-	-	-	-	-	-	18,818
					A5410	Install Telecon Equipment	Trams Eq	7A	18,818.17	6.5%	26-Jan-10	23-Feb-10	29	27	28	-	18,818	-	-	-	-	-	-	-	-	-	-	-	18,818
					A5420	Install Station Control Equipment + AFC Equipment	Trams Eq	7A	18,818.17	6.5%	26-Jan-10	02-Mar-10	36	27	29	-	-	18,818	-	-	-	-	-	-	-	-	-	-	18,818
					A5399	Access for E&M Tram Stop installation (07A Inglipton Park+Ride)	Trams Eq	7A	-	0.0%	08-Dec-09	08-Dec-09	1	26	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5398	Access for visual inspection for E&M Tram Stop installation (07A Inglipton Park+Ride)	Trams Eq	7A	-	0.0%	06-Nov-09	06-Nov-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	7A	760.33	0.3%				29	30	-	-	-	760	-	-	-	-	-	-	-	-	-	760
					Inglipton Park and Ride Substation																								
					Substation				**465,384.08**	**100%**	**08-Jul-09**	**06-Apr-10**	**273**	**20**	**30**	**-**	**-**	**147,562**	**76,762**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**224,324**
					226	Completion of envelope	Subst - BB	7A	82,803.11	17.8%	01-Sep-09	28-Oct-09	59	22	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					226	Civil Engineering and Building Works	Subst - BB	7A	82,803.11	17.8%	29-Jul-09	31-Aug-09	34	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - BB	7A	1,672.79	0.4%				24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					216	Order REC supply from Scottish Power	Subst - S	7A	-	0.0%	08-Jul-09	08-Jul-09	1	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5980	Power Infeed from Public Net available inc HV cable	Subst - S	7A	-	0.0%	29-Oct-09	29-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6000	Installation of TPS Equipment	Subst - S	7A	73,781.01	15.9%	02-Feb-10	16-Mar-10	43	28	29	-	-	73,781	-	-	-	-	-	-	-	-	-	-	73,781
					A5990	Install LV Power Supply and LV Power Equipment	Subst - S	7A	73,781.01	15.9%	29-Oct-09	19-Nov-09	22	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6020	Testing and Commissioning	Subst - S	7A	73,781.01	15.9%	16-Mar-10	06-Apr-10	22	29	30	-	-	-	73,781	-	-	-	-	-	-	-	-	-	73,781
					A6010	Install Telecom and Scada	Subst - S	7A	73,781.01	15.9%	23-Feb-10	16-Mar-10	22	28	29	-	-	73,781	-	-	-	-	-	-	-	-	-	-	73,781
					A1969	Access for E&M Substation installation (07A Inglistion Park and Ride)	Subst - S	7A	-	0.0%	29-Oct-09	29-Oct-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1968	Access for visual inspection for E&M Substation installation (07A Inglistion Park and Ride)	Subst - S	7A	-	0.0%	29-Sep-09	29-Sep-09	1	23	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Subst - S	7A	2,981.05	0.6%				29	30	-	-	-	2,981	-	-	-	-	-	-	-	-	-	2,981
					Gogarburn to Inglishton Park & Ride Enabling Works																								
					Enabling Works				**54,572.49**	**0%**	**03-Mar-08**	**10-Apr-08**	**39**	**3**	**5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					A2000	Site and Vegetation Clearance			-	0.0%	03-Mar-08	10-Apr-08	39	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2000	Highways BoQ works	Highways	7A	54,026.77	99.0%	03-Mar-08	10-Apr-08	39	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	7A	545.72	1.0%				4	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Gogarburn to Inglishton Park & Ride Tram Test																								
					Tram Testing				**-**	**0%**	**24-Apr-10**	**13-May-10**	**20**	**30**	**31**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					A6380	Track Testing of Tram			-	0.0%	24-Apr-10	13-May-10	20	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					07A3 Inglishton Park & Ride (exc.) to Edinburgh Airport (inc.)				**3,072,142.93**		**03-Mar-2008**	**25-Jun-2010**	**845**	**3**	**34**	**246,831**	**22,796**	**157,327**	**54,032**	**30,639**	**30,109**	**15,055**	**760**	**-**	**-**	**-**	**-**	**-**	**557,549**
					Inglishton Park & Ride to Edinburgh Airport Enabling Works																								
					Enabling Works				**-**	**0%**	**03-Mar-08**	**25-Apr-08**	**54**	**3**	**4**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					A1920	Construct New Hotel Car Park			-	0.0%	31-Mar-08	25-Apr-08	26	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1930	Site and Vegetation Clearance			-	0.0%	03-Mar-08	10-Apr-08	39	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Gogarburn Retaining Wall (W14)																								
					Retaining Wall				**383,212.00**	**100%**						**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					167	Gogarburn Retaining Wall (W14) - Ph 1	Structures	7A	151,751.95	39.6%	20-Oct-08	23-Feb-09	127	11	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					167	Gogarburn Retaining Wall (W14) - Ph 2	Structures	7A	227,627.93	59.4%	20-Oct-08	23-Feb-09	127	11	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	7A	3,832.12	1.0%				16	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Gogarburn Culvert No2 (S31)																								
					Culvert				**38,011.20**	**100%**	**29-Sep-08**	**15-Dec-08**	**79**	**10**	**14**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					165	Divert Flows-Bulk Excavation	Structures	7A	-	0.0%	29-Sep-08	07-Oct-08	9	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					309	Precast Culvert Units	Structures	7A	-	0.0%	08-Oct-08	14-Oct-08	7	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					319	Reinforced Concrete Apron and Wingwalls	Structures	7A	-	0.0%	03-Nov-08	28-Nov-08	26	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					329	Backfill and Finishes	Structures	7A	37,634.85	99.0%	02-Dec-08	16-Dec-08	15	12	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	7A	376.35	1.0%				13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Gogarburn Culvert No3 (S34)																								
					Culvert				**83,367.66**	**100%**	**08-Oct-08**	**27-Jan-09**	**112**	**10**	**15**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					196	Divert Flows-Bulk Excavation	Structures	7A	-	0.0%	08-Oct-08	15-Oct-08	8	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					279	Precast Culvert Units	Structures	7A	-	0.0%	16-Oct-08	22-Oct-08	7	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					289	Reinforced Concrete Apron and Wingwalls	Structures	7A	-	0.0%	02-Dec-08	12-Jan-09	42	12	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					299	Backfill and Finishes	Structures	7A	82,542.24	99.0%	13-Jan-09	27-Jan-09	15	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Structures	7A	825.42	1.0%				14	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Inglishton Park & Ride to Edinburgh Airport Trackwork (833m)																								
					Trackwork				**2,279,630.50**	**100%**	**02-Jul-09**	**25-Jan-10**	**208**	**20**	**28**	**246,831**	**22,796**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**269,627**
					168	Earthworks and Subbase	Track	7A	221,114.11	9.7%	02-Jul-09	22-Jul-09	21	20	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1910	Top Ballast	Track	7A	221,114.11	9.7%	04-Dec-09	17-Dec-09	14	25	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					369	Drainage and OLE Foundations	Track - BB	7A	19,976.32	0.9%	23-Jul-09	08-Sep-09	48	21	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					379	Bottom Ballast and Ducts	Track	7A	221,114.11	9.7%	09-Sep-09	30-Sep-09	22	22	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0085

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER

SIEI

Year	2011													2011
Period	40	41	42	43	44	45	46	47	48	49	50	51	52	Subtotal
Period End	29-Jan-2011	26-Feb-2011	26-Mar-2011	23-Apr-2011	21-May-2011	18-Jun-2011	16-Jul-2011	13-Aug-2011	10-Sep-2011	08-Oct-2011	05-Nov-2011	03-Dec-2011	31-Dec-2011	GBP

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period
					1229	Shunting Area	Highways	6A	135,842.21	8.7%	23-Sep-08	13-Jan-09	113	10	14
					1239	Handover to trackworks resource	Highways	6A	-	0.0%	13-Jan-09	13-Jan-09	1	14	14
					Snagging	Snagging	Highways	6A	15,681.64	1.0%				21	22
					Gogar Depot E & M Installations										
					E & M Installations				**85,852.78**	**100%**					
					A4210	Overhead Catenary Line	OLE	6A	84,994.25	99.0%	27-Aug-09	11-Dec-09	107	22	26
					Snagging	Snagging	OLE	6A	858.53	1.0%				26	27
					07 Gogar to Edinburgh Airport				**11,129,563.68**	**5.1%**					
					07A Gogarburn (exc.) to Edinburgh Airport (inc.)				**11,129,563.68**						
					07A1 Gogarburn (exc.) to Edinburgh Airport (inc.)				**1,610,933.20**						
					Gogarburn to Edinburgh Airport E & M Installations										
					E & M Installations				**1,610,933.20**	**100%**					
					A4250	Overhead Catenary Line - One Third	OLE	7A	424,061.42	26.3%	16-Feb-10	23-Apr-10	67	28	30
					A4250	Overhead Catenary Line - One Third	OLE	7A	318,046.06	19.7%	16-Feb-10	23-Apr-10	67	28	30
					A4250	Overhead Catenary Line	OLE	7A	318,046.06	19.7%	16-Feb-10	23-Apr-10	67	28	30
					Snagging	Snagging	OLE	7A	10,708.62	0.7%				30	31
					A4260	Install Electrical Cables	SCC	7A	133,667.58	8.3%	02-Mar-10	06-Apr-10	36	29	30
					A4270	Install Fibre Optic Cables	SCC	7A	133,667.58	8.3%	02-Mar-10	06-Apr-10	36	29	30
					A4280	Install Signalling Wayside Equipment	SCC	7A	133,667.58	8.3%	07-Apr-10	12-May-10	36	30	31
					A4245	Installation of poles and building fixings	SCC	7A	133,667.58	8.3%	19-Jan-10	15-Feb-10	28	27	28
					A4244	Access for E&M wayside installation (07A)	SCC	7A	-	0.0%	19-Jan-10	19-Jan-10	1	27	27
					A4259	Access to cable pits for cable laying (07A)	SCC	7A	-	0.0%	02-Mar-10	02-Mar-10	1	29	29
					A4243	Access for visual inspection for E&M wayside installation (07A)	SCC	7A	-	0.0%	04-Dec-09	04-Dec-09	1	25	25
					A4258	Access for visual inspection to cable pits for cable laying (07A)	SCC	7A	-	0.0%	29-Jan-10	29-Jan-10	1	27	27
					Snagging	Snagging	SCC	7A	5,400.71	0.3%				30	31
					07A2 Gogarburn (exc.) to Inglishton Park & Ride (inc.)				**6,446,487.55**						
					Gogarburn Underbridge (S29)										
					Bridge				**866,100.00**	**100%**					
					159	Temporary Access Roads-Bulk Excavation-Piling Platform	Structures	7A	42,871.95	5.0%	13-Jun-08	04-Jul-08	22	6	7
					179	East Abutment-Piles and Columns	Structures	7A	128,615.85	14.9%	07-Jul-08	26-Aug-08	51	7	9
					189	East Abutment-Reinforced Earth	Structures	7A	85,743.90	9.9%	27-Aug-08	16-Sep-08	21	9	10
					199	East Abutment-Parapets and Run on Slabs	Structures	7A	85,743.90	9.9%	27-Nov-08	21-Jan-09	56	12	14
					209	West Abutment-Piles and Columns	Structures	7A	128,615.85	14.9%	14-Jul-08	02-Sep-08	51	7	9
					219	West Abutment-Reinforced Earth	Structures	7A	85,743.90	9.9%	17-Sep-08	07-Oct-08	21	10	10
					229	West Abutment-Parapets and Run on Slabs	Structures	7A	85,743.90	9.9%	19-Dec-08	11-Feb-09	55	13	15
					239	Bridge Deck	Structures	7A	171,487.80	19.8%	08-Oct-08	04-Dec-08	58	10	12
					13041	Treat area of contaminated land (Dummy duration)	Structures	7A	42,871.95	5.0%	13-May-08	10-Nov-08	182	5	12
					Snagging	Snagging	Structures	7A	8,661.00	1.0%				15	16
					Gogarburn Culvert No1 (S30)										
					Culvert				**37,942.21**	**100%**					
					160	Temporary Access Roads-Divert Flows-Bulk Excavation	Structures	7A	-	0.0%	02-Sep-08	26-Sep-08	25	9	10
					249	Precast Culvert Units	Structures	7A	-	0.0%	29-Sep-08	03-Oct-08	5	10	10
					259	Reinforced Concrete Apron and Wingwalls	Structures	7A	-	0.0%	06-Oct-08	31-Oct-08	26	10	11
					269	Backfill and Finishes	Structures	7A	37,566.54	99.0%	03-Nov-08	17-Nov-08	15	11	12
					Snagging	Snagging	Structures	7A	375.67	1.0%				12	13
					Gogarburn to Inglishton Park & Ride Trackwork (1750m)										
					Trackwork				**4,734,567.21**	**100%**					
					162	Earthworks and Subbase	Track	7A	464,525.45	9.8%	12-Feb-09	20-Mar-09	37	15	16
					A1990	Top Ballast	Track	7A	464,525.45	9.8%	22-Oct-09	20-Nov-09	30	24	25
					A2020	Fencing & Trackside Finishes	Track	7A	464,525.45	9.8%	23-Nov-09	25-Jan-10	64	25	27
					399	Drainage and OLE Foundations - 50%	Track - BB	7A	464,525.45	9.8%	23-Mar-09	12-May-09	51	16	18
					399	Drainage and OLE Foundations - 50%	Track - BB	7A	506,492.50	10.7%	23-Mar-09	12-May-09	51	16	18
					409	Bottom Balast and Ducts - 30%	Track	7A	464,525.45	9.8%	13-May-09	01-Jul-09	50	18	20
					409	Bottom Balast and Ducts - 70%	Track	7A	696,788.17	14.7%	13-May-09	01-Jul-09	50	18	20
					419	Track Laying - 60%	Track	7A	696,788.17	14.7%	22-Jul-09	21-Oct-09	92	21	24
					419	Track Laying - 40%	Track	7A	464,525.45	9.8%	22-Jul-09	21-Oct-09	92	21	24
					Snagging	Snagging	Track	7A	47,345.67	1.0%				26	27
					Inglishton Park and Ride Tram Stop										
					Tramstop				**287,921.57**	**100%**					
					163	Civil Engineering and Building Works	Tramstops	7A	78,663.63	27.3%	29-Jul-09	28-Oct-09	92	21	24
					163	Civil Engineering and Building Works	Tramstops	7A	78,663.63	27.3%	29-Jul-09	28-Oct-09	92	21	24
					Snagging	Snagging	Tramstops	7A	1,589.16	0.6%				24	25
					A1940	Deliver and Install Shelter	Tramstops	7A	52,442.42	18.2%	23-Nov-09	08-Dec-09	16	25	26
					Snagging	Snagging	Tramstops	7A	529.72	0.2%				26	27
					218	Order REC Supply	Trams Eq	7A	-	0.0%	12-Oct-09	12-Oct-09	1	24	24
					A5430	Package Test Tramstop	Trams Eq	7A	18,818.17	6.5%	02-Mar-10	09-Mar-10	8	29	29
					A5400	Install LV Power Supply and LV Power Equipment	Trams Eq	7A	18,818.17	6.5%	08-Dec-09	26-Jan-10	50	26	27
					A5410	Install Telecon Equipment	Trams Eq	7A	18,818.17	6.5%	26-Jan-10	23-Feb-10	29	27	28
					A5420	Install Station Control Equipment + AFC Equipment	Trams Eq	7A	18,818.17	6.5%	26-Jan-10	02-Mar-10	36	27	29
					A5399	Access for E&M Tram Stop installation (07A Inglston Park+Ride)	Trams Eq	7A	-	0.0%	08-Dec-09	08-Dec-09	1	26	26
					A5398	Access for visual inspection for E&M Tram Stop installation (07A Inglston Park+Ride)	Trams Eq	7A	-	0.0%	06-Nov-09	06-Nov-09	1	24	24
					Snagging	Snagging	Trams Eq	7A	760.33	0.3%				29	30
					Inglishton Park and Ride Substation										
					Substation				**465,384.08**	**100%**	**08-Jul-09**	**06-Apr-10**	**273**	**20**	**30**
					226	Completion of envelope	Subst - BB	7A	82,803.11	17.8%	01-Sep-09	28-Oct-09	59	22	24
					226	Civil Engineering and Building Works	Subst - BB	7A	82,803.11	17.8%	29-Jul-09	31-Aug-09	34	21	22
					Snagging	Snagging	Subst - BB	7A	1,672.79	0.4%				24	25
					216	Order REC supply from Scottish Power	Subst - S	7A	-	0.0%	08-Jul-09	08-Jul-09	1	20	20
					A5980	Power Infeed from Public Net available inc HV cable	Subst - S	7A	-	0.0%	29-Oct-09	29-Oct-09	1	24	24
					A6000	Installation of TPS Equipment	Subst - S	7A	73,781.01	15.9%	02-Feb-10	16-Mar-10	43	28	29
					A5990	Install LV Power Supply and LV Power Equipment	Subst - S	7A	73,781.01	15.9%	29-Oct-09	19-Nov-09	22	24	25
					A6020	Testing and Commissioning	Subst - S	7A	73,781.01	15.9%	16-Mar-10	06-Apr-10	22	29	30
					A6010	Install Telecom and Scada	Subst - S	7A	73,781.01	15.9%	23-Feb-10	16-Mar-10	22	28	29
					A1969	Access for E&M Substation installation (07A Inglistion Park and Ride)	Subst - S	7A	-	0.0%	29-Oct-09	29-Oct-09	1	24	24
					A1968	Access for visual inspection for E&M Substation installation (07A Inglistion Park and Ride)	Subst - S	7A	-	0.0%	29-Sep-09	29-Sep-09	1	23	23
					Snagging	Snagging	Subst - S	7A	2,981.05	0.6%				29	30
					Gogarburn to Inglishton Park & Ride Enabling Works										
					Enabling Works				**54,572.49**	**0%**	**03-Mar-08**	**10-Apr-08**	**39**	**3**	**5**
					A2000	Site and Vegetation Clearance			-	0.0%	03-Mar-08	10-Apr-08	39	3	4
					A2000	Highways BoQ works	Highways	7A	54,026.77	99.0%	03-Mar-08	10-Apr-08	39	3	4
					Snagging	Snagging	Highways	7A	545.72	1.0%				4	5
					Gogarburn to Inglishton Park & Ride Tram Test										
					Tram Testing				**-**	**0%**	**24-Apr-10**	**13-May-10**	**20**	**30**	**31**
					A6380	Track Testing of Tram			-	0.0%	24-Apr-10	13-May-10	20	30	31
					07A3 Inglishton Park & Ride (exc.) to Edinburgh Airport (inc.)				**3,072,142.93**		**03-Mar-2008**	**25-Jun-2010**	**845**	**3**	**34**
					Inglishton Park & Ride to Edinburgh Airport Enabling Works										
					Enabling Works				**-**	**0%**	**03-Mar-08**	**25-Apr-08**	**54**	**3**	**4**
					A1920	Construct New Hotel Car Park			-	0.0%	31-Mar-08	25-Apr-08	26	4	4
					A1930	Site and Vegetation Clearance			-	0.0%	03-Mar-08	10-Apr-08	39	3	4
					Gogarburn Retaining Wall (W14)										
					Retaining Wall				**383,212.00**	**100%**					
					167	Gogarburn Retaining Wall (W14) - Ph 1	Structures	7A	151,751.95	39.6%	20-Oct-08	23-Feb-09	127	11	15
					167	Gogarburn Retaining Wall (W14) - Ph 2	Structures	7A	227,627.93	59.4%	20-Oct-08	23-Feb-09	127	11	15
					Snagging	Snagging	Structures	7A	3,832.12	1.0%				16	17
					Gogarburn Culvert No2 (S31)										
					Culvert				**38,011.20**	**100%**	**29-Sep-08**	**16-Dec-08**	**79**	**10**	**14**
					165	Divert Flows-Bulk Excavation	Structures	7A	-	0.0%	29-Sep-08	07-Oct-08	9	10	10
					309	Precast Culvert Units	Structures	7A	-	0.0%	08-Oct-08	14-Oct-08	7	10	11
					319	Reinforced Concrete Apron and Wingwalls	Structures	7A	-	0.0%	03-Nov-08	28-Nov-08	26	11	12
					329	Backfill and Finishes	Structures	7A	37,634.85	99.0%	02-Dec-08	16-Dec-08	15	12	13
					Snagging	Snagging	Structures	7A	376.35	1.0%				13	14
					Gogarburn Culvert No3 (S34)										
					Culvert				**83,367.66**	**100%**	**08-Oct-08**	**27-Jan-09**	**112**	**10**	**15**
					196	Divert Flows-Bulk Excavation	Structures	7A	-	0.0%	08-Oct-08	15-Oct-08	8	10	11
					279	Precast Culvert Units	Structures	7A	-	0.0%	16-Oct-08	22-Oct-08	7	11	11
					289	Reinforced Concrete Apron and Wingwalls	Structures	7A	-	0.0%	02-Dec-08	12-Jan-09	42	12	14
					299	Backfill and Finishes	Structures	7A	82,542.24	99.0%	13-Jan-09	27-Jan-09	15	14	14
					Snagging	Snagging	Structures	7A	825.42	1.0%				14	15
					Inglishton Park & Ride to Edinburgh Airport Trackwork (833m)										
					Trackwork				**2,279,630.50**	**100%**	**02-Jul-09**	**25-Jan-10**	**208**	**20**	**28**
					168	Earthworks and Subbase	Track	7A	221,114.11	9.7%	02-Jul-09	22-Jul-09	21	20	21
					A1910	Top Ballast	Track	7A	221,114.11	9.7%	04-Dec-09	17-Dec-09	14	25	26
					369	Drainage and OLE Foundations	Track - BB	7A	19,976.32	0.9%	23-Jul-09	08-Sep-09	48	21	22
					379	Bottom Ballast and Ducts	Track	7A	221,114.11	9.7%	09-Sep-09	30-Sep-09	22	22	23

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Project:	Edinburgh Tram Network
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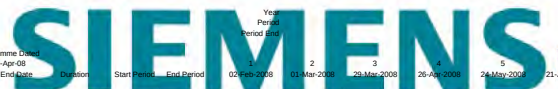

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year Period Period End 1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	2008 7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
					389	Track Laying IPR to AIR - 50%	Track	7A	663,342.34	29.1%	22-Oct-09	03-Dec-09	43	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					389	Track Laying IPR to AIR - 50%	Track	7A	663,342.34	29.1%	22-Oct-09	03-Dec-09	43	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2350	Fencing & Trackside Finishes	Track	7A	221,114.11	9.7%	18-Dec-09	25-Jan-10	39	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	7A	22,536.54	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	7A	25,716.74	1.1%				26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	7A	259.77	0.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Edinburgh Airport Tram Stop																									
				Tramstop					**287,921.57**	**100%**	**04-Dec-09**	**25-Jun-10**	**204**	**25**	**34**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					169	Civil Engineering and Building Works	Tramstops	7A	157,327.26	54.6%	04-Dec-09	18-Mar-10	105	25	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	7A	1,589.16	0.6%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1880	Deliver and Install Shelter	Tramstops	7A	52,442.42	18.2%	23-Mar-10	07-Apr-10	16	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	7A	529.72	0.2%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					208	Order REC Supply	Trams Eq	7A	-	0.0%	09-Feb-10	09-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5470	Package Test Tramstop	Trams Eq	7A	15,054.53	5.2%	18-Jun-10	25-Jun-10	8	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5440	Install LV Power Supply and LV Power Equipment	Trams Eq	7A	15,054.53	5.2%	07-Apr-10	13-May-10	37	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5450	Install Telecon Equipment	Trams Eq	7A	15,054.53	5.2%	13-May-10	11-Jun-10	30	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5460	Install Station Control Equipment + AFC Equipment	Trams Eq	7A	15,054.53	5.2%	13-May-10	18-Jun-10	37	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6360	Installation of SIG-interlocking cubicle	Trams Eq	7A	15,054.53	5.2%	21-Apr-10	05-May-10	15	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6370	Commissioning of SIG -interlocking cubicle	Trams Eq	7A	-	0.0%	13-May-10	19-May-10	7	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5439	Access for E&M Tram Stop installation (07A Edingburgh Airport)	Trams Eq	7A	-	0.0%	07-Apr-10	07-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5438	Access for visual inspection for E&M Tram Stop installation (07A Edingburgh Airport)	Trams Eq	7A	-	0.0%	08-Mar-10	08-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	7A	760.33	0.3%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Preliminaries (tie)																									
					Crit. Milestone	tie Completion Approval - Gogar to Edinburgh Airport (1) (23)		0	-	0.0%		30-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Construction complete Line 1a (36)		0	-	0.0%		06-Mar-11				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Delivery of 1st Tram (37)		0	-	0.0%		02-Mar-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Delivery of 5th Tram (38)		0	-	0.0%		02-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Delivery of 27th Tram (39)		0	-	0.0%		12-Dec-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Acceptance of Shadow Running Safety Management System by ICP (40)		0	-	0.0%		09-Jan-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Acceptance of Passenger Service Safety Management System by ICP (41)		0	-	0.0%		09-Jan-11				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Acceptance of Journey Time Requirement Met (42)		0	-	0.0%		09-Jan-11				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Wheel / Rail Interface (43)		0	-	0.0%		02-Mar-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	RAMS Acceptance (44)		0	-	0.0%		09-Jan-11				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10																							

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

BILFINGER BERGER

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Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
					389	Track Laying IPR to AIR - 50%	Track	7A	663,342.34	29.1%	22-Oct-09	03-Dec-09	43	24	25	-	-	-	-	-	-	-	-	-	-	-	663,342	-	663,342
					389	Track Laying IPR to AIR - 50%	Track	7A	663,342.34	29.1%	22-Oct-09	03-Dec-09	43	24	25	-	-	-	-	-	-	-	-	-	-	-	663,342	-	663,342
					A2350	Fencing & Trackside Finishes	Track	7A	221,114.11	9.7%	18-Dec-09	25-Jan-10	39	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	7A	22,536.54	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	7A	25,716.74	1.1%				26	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	7A	259.77	0.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Edinburgh Airport Tram Stop																									
				Tramstop					**287,921.57**	**100%**	**04-Dec-09**	**25-Jun-10**	**204**	**25**	**34**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					169	Civil Engineering and Building Works	Tramstops	7A	157,327.26	54.6%	04-Dec-09	18-Mar-10	105	25	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	7A	1,589.16	0.6%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1880	Deliver and Install Shelter	Tramstops	7A	52,442.42	18.2%	23-Mar-10	07-Apr-10	16	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	7A	529.72	0.2%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					208	Order REC Supply	Trams Eq	7A	-	0.0%	09-Feb-10	09-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5470	Package Test Tramstop	Trams Eq	7A	15,054.53	5.2%	18-Jun-10	25-Jun-10	8	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5440	Install LV Power Supply and LV Power Equipment	Trams Eq	7A	15,054.53	5.2%	07-Apr-10	13-May-10	37	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5450	Install Telecon Equipment	Trams Eq	7A	15,054.53	5.2%	13-May-10	11-Jun-10	30	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5460	Install Station Control Equipment + AFC Equipment	Trams Eq	7A	15,054.53	5.2%	13-May-10	18-Jun-10	37	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6360	Installation of SIG-interlocking cubicle	Trams Eq	7A	15,054.53	5.2%	21-Apr-10	05-May-10	15	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6370	Commissioning of SIG -interlocking cubicle	Trams Eq	7A	-	0.0%	13-May-10	19-May-10	7	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5439	Access for E&M Tram Stop installation (07A Edingburgh Airport)	Trams Eq	7A	-	0.0%	07-Apr-10	07-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5438	Access for visual inspection for E&M Tram Stop installation (07A Edingburgh Airport)	Trams Eq	7A	-	0.0%	08-Mar-10	08-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	7A	760.33	0.3%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Preliminaries (tie)																									
					Crit. Milestone	tie Completion Approval - Gogar to Edinburgh Airport (1) (23)		0	-	0.0%		30-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Construction complete Line 1a (36)		0	-	0.0%		06-Mar-11				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Delivery of 1st Tram (37)		0	-	0.0%		02-Mar-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Delivery of 5th Tram (38)		0	-	0.0%		02-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Delivery of 27th Tram (39)		0	-	0.0%		12-Dec-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Acceptance of Shadow Running Safety Management System by ICP (40)		0	-	0.0%		09-Jan-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Acceptance of Passenger Service Safety Management System by ICP (41)		0	-	0.0%		09-Jan-11				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Acceptance of Journey Time Requirement Met (42)		0	-	0.0%		09-Jan-11				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Wheel / Rail Interface (43)		0	-	0.0%		02-Mar-10				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	RAMS Acceptance (44)		0	-	0.0%		09-Jan-11				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10																							

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

BILFINGER BERGER

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Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
					389	Track Laying IPR to AIR - 50%	Track	7A	663,342.34	29.1%	22-Oct-09	03-Dec-09	43	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					389	Track Laying IPR to AIR - 50%	Track	7A	663,342.34	29.1%	22-Oct-09	03-Dec-09	43	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2350	Fencing & Trackside Finishes	Track	7A	221,114.11	9.7%	18-Dec-09	25-Jan-10	39	26	27	221,114	-	-	-	-	-	-	-	-	-	-	-	-	221,114
					Snagging	Snagging	Track	7A	22,536.54	1.0%				27	28	-	22,537	-	-	-	-	-	-	-	-	-	-	-	22,537
					Highways	Highways BoQ works	Highways	7A	25,716.74	1.1%				26	27	25,717	-	-	-	-	-	-	-	-	-	-	-	-	25,717
					Snagging	Snagging	Highways	7A	259.77	0.0%				27	28	-	260	-	-	-	-	-	-	-	-	-	-	-	260
			Edinburgh Airport Tram Stop																									
				Tramstop					**287,921.57**	**100%**	**04-Dec-09**	**25-Jun-10**	**204**	**25**	**34**	**-**	**-**	**157,327**	**54,032**	**30,639**	**30,109**	**15,055**	**760**	**-**	**-**	**-**	**-**	**-**	**287,922**
					169	Civil Engineering and Building Works	Tramstops	7A	157,327.26	54.6%	04-Dec-09	18-Mar-10	105	25	29	-	-	157,327	-	-	-	-	-	-	-	-	-	-	157,327
					Snagging	Snagging	Tramstops	7A	1,589.16	0.6%				29	30	-	-	-	1,589	-	-	-	-	-	-	-	-	-	1,589
					A1880	Deliver and Install Shelter	Tramstops	7A	52,442.42	18.2%	23-Mar-10	07-Apr-10	16	29	30	-	-	-	52,442	-	-	-	-	-	-	-	-	-	52,442
					Snagging	Snagging	Tramstops	7A	529.72	0.2%				30	31	-	-	-	-	530	-	-	-	-	-	-	-	-	530
					208	Order REC Supply	Trams Eq	7A	-	0.0%	09-Feb-10	09-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5470	Package Test Tramstop	Trams Eq	7A	15,054.53	5.2%	18-Jun-10	25-Jun-10	8	32	33	-	-	-	-	-	-	15,055	-	-	-	-	-	-	15,055
					A5440	Install LV Power Supply and LV Power Equipment	Trams Eq	7A	15,054.53	5.2%	07-Apr-10	13-May-10	37	30	31	-	-	-	-	15,055	-	-	-	-	-	-	-	-	15,055
					A5450	Install Telecon Equipment	Trams Eq	7A	15,054.53	5.2%	13-May-10	11-Jun-10	30	31	32	-	-	-	-	-	15,055	-	-	-	-	-	-	-	15,055
					A5460	Install Station Control Equipment + AFC Equipment	Trams Eq	7A	15,054.53	5.2%	13-May-10	18-Jun-10	37	31	32	-	-	-	-	-	15,055	-	-	-	-	-	-	-	15,055
					A6360	Installation of SIG-interlocking cubicle	Trams Eq	7A	15,054.53	5.2%	21-Apr-10	05-May-10	15	30	31	-	-	-	-	15,055	-	-	-	-	-	-	-	-	15,055
					A6370	Commissioning of SIG -interlocking cubicle	Trams Eq	7A	-	0.0%	13-May-10	19-May-10	7	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5439	Access for E&M Tram Stop installation (07A Edingburgh Airport)	Trams Eq	7A	-	0.0%	07-Apr-10	07-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5438	Access for visual inspection for E&M Tram Stop installation (07A Edingburgh Airport)	Trams Eq	7A	-	0.0%	08-Mar-10	08-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	7A	760.33	0.3%				33	34	-	-	-	-	-	-	-	760	-	-	-	-	-	760
			Preliminaries (tie)																									
					Crit. Milestone	tie Completion Approval - Gogar to Edinburgh Airport (1) (23)		0	-	0.0%		30-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Construction complete Line 1a (36)		0	-	0.0%		06-Mar-11				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Delivery of 1st Tram (37)		0	-	0.0%		02-Mar-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Delivery of 5th Tram (38)		0	-	0.0%		02-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Delivery of 27th Tram (39)		0	-	0.0%		12-Dec-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Acceptance of Shadow Running Safety Management System by ICP (40)		0	-	0.0%		09-Jan-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Acceptance of Passenger Service Safety Management System by ICP (41)		0	-	0.0%		09-Jan-11				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Acceptance of Journey Time Requirement Met (42)		0	-	0.0%		09-Jan-11				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Wheel / Rail Interface (43)		0	-	0.0%		02-Mar-11				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	RAMS Acceptance (44)		0	-	0.0%		09-Jan-11				-	-	-	-	-	-	-	-	-	-	-	-	-
					10																							

USB00000073_0089

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

BILFINGER BERGER

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Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name			Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
					389	Track Laying IPR to AIR - 50%	Track	7A	663,342.34	29.1%	22-Oct-09	03-Dec-09	43	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					389	Track Laying IPR to AIR - 50%	Track	7A	663,342.34	29.1%	22-Oct-09	03-Dec-09	43	24	25	-	-	-	-	-	-	-	-	-	-	-	-	-
					A2350	Fencing & Trackside Finishes	Track	7A	221,114.11	9.7%	18-Dec-09	25-Jan-10	39	26	27	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Track	7A	22,536.54	1.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-
					Highways	Highways BoQ works	Highways	7A	25,716.74	1.1%				26	27	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Highways	7A	259.77	0.0%				27	28	-	-	-	-	-	-	-	-	-	-	-	-	-
			Edinburgh Airport Tram Stop																									
				Tramstop					**287,921.57**	**100%**	**04-Dec-09**	**25-Jun-10**	**204**	**25**	**34**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					169	Civil Engineering and Building Works	Tramstops	7A	157,327.26	54.6%	04-Dec-09	18-Mar-10	105	25	29	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	7A	1,589.16	0.6%				29	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					A1880	Deliver and Install Shelter	Tramstops	7A	52,442.42	18.2%	23-Mar-10	07-Apr-10	16	29	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Tramstops	7A	529.72	0.2%				30	31	-	-	-	-	-	-	-	-	-	-	-	-	-
					208	Order REC Supply	Trams Eq	7A	-	0.0%	09-Feb-10	09-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5470	Package Test Tramstop	Trams Eq	7A	15,054.53	5.2%	18-Jun-10	25-Jun-10	8	32	33	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5440	Install LV Power Supply and LV Power Equipment	Trams Eq	7A	15,054.53	5.2%	07-Apr-10	13-May-10	37	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5450	Install Telecon Equipment	Trams Eq	7A	15,054.53	5.2%	13-May-10	11-Jun-10	30	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5460	Install Station Control Equipment + AFC Equipment	Trams Eq	7A	15,054.53	5.2%	13-May-10	18-Jun-10	37	31	32	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6360	Installation of SIG-interlocking cubicle	Trams Eq	7A	15,054.53	5.2%	21-Apr-10	05-May-10	15	30	31	-	-	-	-	-	-	-	-	-	-	-	-	-
					A6370	Commissioning of SIG -interlocking cubicle	Trams Eq	7A	-	0.0%	13-May-10	19-May-10	7	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5439	Access for E&M Tram Stop installation (07A Edingburgh Airport)	Trams Eq	7A	-	0.0%	07-Apr-10	07-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-
					A5438	Access for visual inspection for E&M Tram Stop installation (07A Edingburgh Airport)	Trams Eq	7A	-	0.0%	08-Mar-10	08-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-
					Snagging	Snagging	Trams Eq	7A	760.33	0.3%				33	34	-	-	-	-	-	-	-	-	-	-	-	-	-
			Preliminaries (tie)																									
					Crit. Milestone	tie Completion Approval - Gogar to Edinburgh Airport (1) (23)		0	-	0.0%		30-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Construction complete Line 1a (36)		0	-	0.0%		06-Mar-11				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Delivery of 1st Tram (37)		0	-	0.0%		02-Mar-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Delivery of 5th Tram (38)		0	-	0.0%		02-May-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Delivery of 27th Tram (39)		0	-	0.0%		12-Dec-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Acceptance of Shadow Running Safety Management System by ICP (40)		0	-	0.0%		09-Jan-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Acceptance of Passenger Service Safety Management System by ICP (41)		0	-	0.0%		09-Jan-11				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Acceptance of Journey Time Requirement Met (42)		0	-	0.0%		09-Jan-11				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	Wheel / Rail Interface (43)		0	-	0.0%		02-Mar-10				-	-	-	-	-	-	-	-	-	-	-	-	-
					Crit. Milestone	RAMS Acceptance (44)		0	-	0.0%		09-Jan-11				-	-	-	-	-	-	-	-	-	-	-	-	-
					10																							

USB00000073_0090

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

BILFINGER BERGER

SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08 Start Date	Programme Dated 15-Apr-08 End Date	Duration	Start Period	End Period	Year Period Period End	1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	2008 6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP

USB00000073_0091

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

BILFINGER BERGER

SIEI

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

BILFINGER BERGER

SIEI

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Miller Services Group BILFINGER BERGER

SIEI

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year	2011	2011
														Period	40	41	42	43	44	45	46	47	48	49	50	51	52	Subtotal
														Period End	29-Jan-2011	26-Feb-2011	26-Mar-2011	23-Apr-2011	21-May-2011	18-Jun-2011	16-Jul-2011	13-Aug-2011	10-Sep-2011	08-Oct-2011	05-Nov-2011	03-Dec-2011	31-Dec-2011	GBP

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group | BILFINGER BERGER | SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year Period Period End	2008 02-Feb-2008	01-Mar-2008	2 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
Project Total							**95,781,633.91**		**12-May-2008**	**04-Jan-2011**	0120	**5**	**45**		-	-	-	-	11,008,325	1,100,832	148,002	-	-	-	1,651,249	9,687,326	-	**23,595,734**
02 Mobilisation and Preliminaries							**95,781,633.91**		**12-May-2008**	**13-Jan-2011**	**1**	**5**	**45**		-	-	-	-	11,008,325	1,100,832	148,002	-	-	-	1,651,249	9,687,326	-	**23,595,734**
	00A Mobilisation						**11,008,324.98**		**12-May-2008**	**12-May-2008**	**1**	**5**	**5**		-	-	-	-	11,008,325	-	-	-	-	-	-	-	-	**11,008,325**
		00A1 Mobilisation					**11,008,324.98**		**12-May-2008**	**12-May-2008**	**1**	**5**	**5**		-	-	-	-	11,008,325	-	-	-	-	-	-	-	-	**11,008,325**
			Mobilisation																									
				Mobilisation			**11,008,324.98**	**100%**	**12-May-08**	**12-May-08**	**1**	**5**	**5**		-	-	-	-	**11,008,325**	-	-	-	-	-	-	-	-	**11,008,325**
					10	Contract Award	11,008,324.98	100.0%	12-May-08	12-May-08	1	5	5		-	-	-	-	11,008,325	-	-	-	-	-	-	-	-	11,008,325
				Pre-delivery Activities			**30,131,318.61**	**100%**	**10-Jun-08**	**20-Jan-10**	**590**	**6**	**27**		-	-	-	-	-	1,100,832	148,002	-	-	-	1,651,249	9,687,326	-	**12,587,409**
					1	Approval of Preliminary Design (Pre-Works Development Services)	1,100,832.50	3.7%	10-Jun-08	10-Jun-08	1	6	6		-	-	-	-	-	1,100,832	-	-	-	-	-	-	-	1,100,832
					1A	Depot Equipment	148,001.81	0.5%	10-Jul-08	10-Jul-08	1	7	7		-	-	-	-	-	-	148,002	-	-	-	-	-	-	148,002
					2	Delivery of Mock-Up (Pre-Works Development Services)	-	0.0%	17-Nov-08	17-Nov-08	1	12	12		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3	Approval of Final Design/Mock-Up (Pre-Works Development Services)	1,651,248.75	5.5%	03-Nov-08	03-Nov-08	1	11	11		-	-	-	-	-	-	-	-	-	-	1,651,249	-	-	1,651,249
					4	Obtaining Approvals and Consents for Tram (Pre-Works Development Services)	-	0.0%	05-May-09	05-May-09	1	18	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Commencement of Tram Works	9,687,325.98	32.2%	25-Nov-08	25-Nov-08	1	12	12		-	-	-	-	-	-	-	-	-	-	-	9,687,326	-	9,687,326
					6	Completion of 1st Tramset of bodyshells	3,302,497.49	11.0%	02-Jun-09	02-Jun-09	1	19	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					7	Completion of 1st Tramset of bogies	3,302,497.49	11.0%	10-Nov-09	10-Nov-09	1	25	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					8	Completion of assembly of 1st Tram	3,302,497.49	11.0%	25-Nov-09	25-Nov-09	1	25	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					9	Completion of factory based type testing	3,852,913.74	12.8%	05-Jan-10	05-Jan-10	1	27	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10	Delivery of Preliminary Tram Maintenance Manuals	3,302,497.49	11.0%	12-Jan-10	12-Jan-10	1	27	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10A	Depot Equipment - Delivery	481,005.87	1.6%	20-Jan-10	20-Jan-10	1	27	27		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00B Delivery & Commissioning of Trams					**9,137,827.83**		**09-Apr-2010**	**04-Feb-2011**	**302**	**30**	**41**		-	-	-	-	-	-	-	-	-	-	-	-	-	-
			00B1 Delivery & Commissioning of Trams				**9,137,827.83**		**09-Apr-2010**	**04-Feb-2011**	**302**	**30**	**41**		-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Delivery & Commissioning of Trams																								
					Delivery & Commissioning of Trams		**9,137,827.83**	**100%**	**09-Apr-10**	**04-Feb-11**	**302**	**30**	**41**		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					11	Delivery of 1st Tram	1,651,248.75	18.1%	09-Apr-10	09-Apr-10	1	30	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					11A	Depot Equipment - Acceptance Test	74,000.90	0.8%	20-Apr-10	20-Apr-10	1	30	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					12	Commissioning of 1st Tram	1,651,248.75	18.1%	04-Jun-10	04-Jun-10	1	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					13	Delivery of 2nd Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					14	Commissioning of 2nd Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					15	Delivery of 3rd Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					16	Commissioning of 3rd Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					17	Delivery of 4th Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					18	Commissioning of 4th Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					19	Delivery of 5th Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					20	Commissioning of 5th Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					21	Delivery of 6th Tram	110,083.25	1.2%	15-Jun-10	15-Jun-10	1	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					22	Commissioning of 6th Tram	110,083.25	1.2%	05-Jul-10	05-Jul-10	1	33	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					23	Delivery of 7th Tram	110,083.25	1.2%	15-Jun-10	15-Jun-10	1	32	32		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					24	Commissioning of 7th Tram	110,083.25	1.2%	05-Jul-10	05-Jul-10	1	33	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					25	Delivery of 8th Tram	110,083.25	1.2%	15-Jul-10	15-Jul-10	1	33	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					25A	Depot Equipment - Certificate of Reliability	37,000.45	0.4%	20-Jul-10	20-Jul-10	1	34	34		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					26	Commissioning of 8th Tram	110,083.25	1.2%	04-Aug-10	04-Aug-10	1	34	34		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					27	Delivery of 9th Tram	110,083.25	1.2%	15-Jul-10	15-Jul-10	1	33	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					28	Commissioning of 9th Tram	110,083.25	1.2%	04-Aug-10	04-Aug-10	1	34	34		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					29	Delivery of 10th Tram	110,083.25	1.2%	15-Jul-10	15-Jul-10	1	33	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					30	Commissioning of 10th Tram	110,083.25	1.2%	04-Aug-10	04-Aug-10	1	34	34		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					31	Delivery of 11th Tram	110,083.25	1.2%	16-Aug-10	16-Aug-10	1	35	35		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					32	Commissioning of 11th Tram	110,083.25	1.2%	03-Sep-10	03-Sep-10	1	35	35		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					33	Delivery of 12th Tram	110,083.25	1.2%	16-Aug-10	16-Aug-10	1	35	35		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					34	Commissioning of 12th Tram	110,083.25	1.2%	03-Sep-10	03-Sep-10	1	35	35		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					35	Delivery of 13th Tram	110,083.25	1.2%	15-Sep-10	15-Sep-10	1	36	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					36	Commissioning of 13th Tram	110,083.25	1.2%	05-Oct-10	05-Oct-10	1	36	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					37	Delivery of 14th Tram	110,083.25	1.2%	15-Sep-10	15-Sep-10	1	36	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					38	Commissioning of 14th Tram	110,083.25	1.2%	06-Oct-10	05-Oct-10	1	36	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					39	Delivery of 15th Tram	110,083.25	1.2%	15-Sep-10	15-Sep-10	1	36	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					40	Commissioning of 15th Tram	110,083.25	1.2%	05-Oct-10	05-Oct-10	1	36	36		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					41	Delivery of 16th Tram	110,083.25	1.2%	15-Oct-10	15-Oct-10	1	37	37		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					42	Commissioning of 16th Tram	110,083.25	1.2%	04-Nov-10	04-Nov-10	1	37	37		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					43	Delivery of 17th Tram	110,083.25	1.2%	15-Oct-10	15-Oct-10	1	37	37		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					44	Commissioning of 17th Tram	110,083.25	1.2%	04-Nov-10	04-Nov-10	1	37	37		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					45	Delivery of 18th Tram	110,083.25	1.2%	15-Oct-10	15-Oct-10	1	37	37		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					46	Commissioning of 18th Tram	110,083.25	1.2%	04-Nov-10	04-Nov-10	1	37	37		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					47	Delivery of 19th Tram	110,083.25	1.2%	15-Nov-10	15-Nov-10	1	38	38		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					48	Commissioning of 19th Tram	110,083.25	1.2%	03-Dec-10	03-Dec-10	1	38	38		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					49	Delivery of 20th Tram	110,083.25	1.2%	15-Nov-10	15-Nov-10	1	38	38		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					50	Commissioning of 20th Tram	110,083.25	1.2%	03-Dec-10	03-Dec-10	1	38	38		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					51	Delivery of 21st Tram	110,083.25	1.2%	15-Nov-10	15-Nov-10	1	38	38		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					52	Commissioning of 21st Tram	110,083.25	1.2%	03-Dec-10	03-Dec-10	1	38	38		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					53	Delivery of 22nd Tram	110,083.25	1.2%	15-Dec-10	15-Dec-10	1	39	39		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					54	Commissioning of 22nd Tram	110,083.25	1.2%	04-Jan-11	04-Jan-11	1	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					55	Delivery of 23rd Tram	110,083.25	1.2%	15-Dec-10	15-Dec-10	1	39	39		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					56	Commissioning of 23rd Tram	110,083.25	1.2%	04-Jan-11	04-Jan-11	1	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					57	Delivery of 24th Tram	110,083.25	1.2%	15-Dec-10	15-Dec-10	1	39	39		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					58	Commissioning of 24th Tram	110,083.25	1.2%	04-Jan-11	04-Jan-11	1	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					59	Delivery of 25th Tram	110,083.25	1.2%	17-Jan-11	17-Jan-11	1	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					60	Commissioning of 25th Tram	110,083.25	1.2%	04-Feb-11	04-Feb-11	1	41	41		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					61	Delivery of 26th Tram	110,083.25	1.2%	17-Jan-11	17-Jan-11	1	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					62	Commissioning of 26th Tram	110,083.25	1.2%	04-Feb-11	04-Feb-11	1	41	41		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					63	Delivery of 27th Tram	110,083.25	1.2%	17-Jan-11	17-Jan-11	1	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					64	Commissioning of 27th Tram	110,083.25	1.2%	04-Feb-11	04-Feb-11	1	41	41		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00C Post Tram Delivery Activities					**5,504,162.49**		**02-Dec-2009**	**05-Jun-2011**	**551**	**25**	**45**		-	-	-	-	-	-	-	-	-	-	-	-	-	-
			00C1 Post Tram Delivery Activities				**5,504,162.49**		**02-Dec-2009**	**05-Jun-2011**	**551**	**25**	**45**		-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Post Tram Delivery Activities																								
					Post Tram Delivery Activities		**5,504,162.49**	**100%**	**02-Dec-09**	**05-Jun-11**	**551**	**25**	**45**		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					65	Delivery of Spares	1,100,832.50	20.0%	24-Apr-10	24-Apr-10	1	30	30		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					66	Delivery of all final Documentation	1,100,832.50	20.0%	05-Jun-11	05-Jun-11	1	45	45		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					67	Delivery of Special Tools	550,416.25	10.0%	02-Mar-11	02-Mar-11	1	42	42		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					68	Completion of Driver Training	550,416.25	10.0%	12-Jul-10	12-Jul-10	1	33	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					69	Completion of Maintainer Training	550,416.25	10.0%	12-Jul-10	12-Jul-10	1	33	33		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					70	Completion of Integrated System Testing	550,416.25	10.0%	02-Dec-09	02-Dec-09	1	25	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					71	Commencement of Shadow Running	550,416.25	10.0%	07-Feb-11	07-Feb-11	1	41	41		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					72	Opening for Passenger Carrying Service	550,416.25	10.0%	05-May-11	05-May-11	1	44	44		-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0095

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Actual Consortium | BILFINGER BERGER

SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
Project Total							**55,781,623.91**		**12-May-2008**	05-Jun-2013	1820	5	45	-	-	-	-	-	**3,302,497**	-	-	-	-	-	**7,155,411**	-	**10,457,909**
00 Mobilisation and Preliminaries							**55,781,623.91**		**12-May-2008**	12-May-2008	1	5	5	-	-	-	-	-	3,302,497	-	-	-	-	-	7,155,411	-	10,457,909
	00A Mobilisation						**11,008,324.98**		**12-May-2008**	**12-May-2008**	**1**	**5**	**5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00A1 Mobilisation					**11,008,324.98**		**12-May-2008**	**12-May-2008**	**1**	**5**	**5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Mobilisation																								
				Mobilisation			**11,008,324.98**	**100%**	**12-May-08**	**12-May-08**	**1**	**5**	**5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					0	Contract Award	11,008,324.98	100.0%	12-May-08	12-May-08	1	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Pre-delivery Activities			**30,131,318.61**	**100%**	**10-Jun-08**	**20-Jan-10**	**590**	**6**	**27**	-	-	-	-	-	**3,302,497**	-	-	-	-	-	**6,604,995**	-	**9,907,492**
					1	Approval of Preliminary Design (Pre-Works Development Services)	1,100,832.50	3.7%	10-Jun-08	10-Jun-08	1	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1A	Depot Equipment	148,001.81	0.5%	10-Jul-08	10-Jul-08	1	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					2	Delivery of Mock-Up (Pre-Works Development Services)	-	0.0%	17-Nov-08	17-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3	Approval of Final Design/Mock-Up (Pre-Works Development Services)	1,651,248.75	5.5%	03-Nov-08	03-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					4	Obtaining Approvals and Consents for Tram (Pre-Works Development Services)	-	0.0%	05-May-09	05-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Commencement of Tram Works	9,687,325.98	32.2%	25-Nov-08	25-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					6	Completion of 1st Tramset of bodyshells	3,302,497.49	11.0%	02-Jun-09	02-Jun-09	1	19	19	-	-	-	-	-	3,302,497	-	-	-	-	-	-	-	3,302,497
					7	Completion of 1st Tramset of bogies	3,302,497.49	11.0%	10-Nov-09	10-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	3,302,497	-	3,302,497
					8	Completion of assembly of 1st Tram	3,302,497.49	11.0%	25-Nov-09	25-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	3,302,497	-	3,302,497
					9	Completion of factory based type testing	3,852,913.74	12.8%	05-Jan-10	05-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10	Delivery of Preliminary Tram Maintenance Manuals	3,302,497.49	11.0%	12-Jan-10	12-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10A	Depot Equipment - Delivery	481,005.87	1.6%	20-Jan-10	20-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	00B Delivery & Commissioning of Trams						**9,137,827.83**		**09-Apr-2010**	**04-Feb-2011**	**302**	**30**	**41**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00B1 Delivery & Commissioning of Trams					**9,137,827.83**		**09-Apr-2010**	**04-Feb-2011**	**302**	**30**	**41**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Delivery & Commissioning of Trams																								
				Delivery & Commissioning of Trams			**9,137,827.83**	**100%**	**09-Apr-10**	**04-Feb-11**	**302**	**30**	**41**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					11	Delivery of 1st Tram	1,651,248.75	18.1%	09-Apr-10	09-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					11A	Depot Equipment - Acceptance Test	74,000.90	0.8%	20-Apr-10	20-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					12	Commissioning of 1st Tram	1,651,248.75	18.1%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					13	Delivery of 2nd Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					14	Commissioning of 2nd Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					15	Delivery of 3rd Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					16	Commissioning of 3rd Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					17	Delivery of 4th Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					18	Commissioning of 4th Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					19	Delivery of 5th Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					20	Commissioning of 5th Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					21	Delivery of 6th Tram	110,083.25	1.2%	15-Jun-10	15-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					22	Commissioning of 6th Tram	110,083.25	1.2%	05-Jul-10	05-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					23	Delivery of 7th Tram	110,083.25	1.2%	15-Jun-10	15-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					24	Commissioning of 7th Tram	110,083.25	1.2%	05-Jul-10	05-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					25	Delivery of 8th Tram	110,083.25	1.2%	15-Jul-10	15-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					25A	Depot Equipment - Certificate of Reliability	37,000.45	0.4%	20-Jul-10	20-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					26	Commissioning of 8th Tram	110,083.25	1.2%	04-Aug-10	04-Aug-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					27	Delivery of 9th Tram	110,083.25	1.2%	15-Jul-10	15-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					28	Commissioning of 9th Tram	110,083.25	1.2%	04-Aug-10	04-Aug-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					29	Delivery of 10th Tram	110,083.25	1.2%	15-Jul-10	15-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					30	Commissioning of 10th Tram	110,083.25	1.2%	04-Aug-10	04-Aug-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					31	Delivery of 11th Tram	110,083.25	1.2%	16-Aug-10	16-Aug-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					32	Commissioning of 11th Tram	110,083.25	1.2%	03-Sep-10	03-Sep-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					33	Delivery of 12th Tram	110,083.25	1.2%	16-Aug-10	16-Aug-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					34	Commissioning of 12th Tram	110,083.25	1.2%	03-Sep-10	03-Sep-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					35	Delivery of 13th Tram	110,083.25	1.2%	15-Sep-10	15-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					36	Commissioning of 13th Tram	110,083.25	1.2%	05-Oct-10	05-Oct-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					37	Delivery of 14th Tram	110,083.25	1.2%	15-Sep-10	15-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					38	Commissioning of 14th Tram	110,083.25	1.2%	05-Oct-10	05-Oct-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					39	Delivery of 15th Tram	110,083.25	1.2%	15-Sep-10	15-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					40	Commissioning of 15th Tram	110,083.25	1.2%	05-Oct-10	05-Oct-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					41	Delivery of 16th Tram	110,083.25	1.2%	15-Oct-10	15-Oct-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					42	Commissioning of 16th Tram	110,083.25	1.2%	04-Nov-10	04-Nov-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					43	Delivery of 17th Tram	110,083.25	1.2%	15-Oct-10	15-Oct-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					44	Commissioning of 17th Tram	110,083.25	1.2%	04-Nov-10	04-Nov-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					45	Delivery of 18th Tram	110,083.25	1.2%	15-Oct-10	15-Oct-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					46	Commissioning of 18th Tram	110,083.25	1.2%	04-Nov-10	04-Nov-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					47	Delivery of 19th Tram	110,083.25	1.2%	15-Nov-10	15-Nov-10	1	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					48	Commissioning of 19th Tram	110,083.25	1.2%	03-Dec-10	03-Dec-10	1	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					49	Delivery of 20th Tram	110,083.25	1.2%	15-Nov-10	15-Nov-10	1	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					50	Commissioning of 20th Tram	110,083.25	1.2%	03-Dec-10	03-Dec-10	1	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					51	Delivery of 21st Tram	110,083.25	1.2%	15-Nov-10	15-Nov-10	1	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					52	Commissioning of 21st Tram	110,083.25	1.2%	03-Dec-10	03-Dec-10	1	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					53	Delivery of 22nd Tram	110,083.25	1.2%	15-Dec-10	15-Dec-10	1	39	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					54	Commissioning of 22nd Tram	110,083.25	1.2%	04-Jan-11	04-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					55	Delivery of 23rd Tram	110,083.25	1.2%	15-Dec-10	15-Dec-10	1	39	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					56	Commissioning of 23rd Tram	110,083.25	1.2%	04-Jan-11	04-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					57	Delivery of 24th Tram	110,083.25	1.2%	15-Dec-10	15-Dec-10	1	39	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					58	Commissioning of 24th Tram	110,083.25	1.2%	04-Jan-11	04-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					59	Delivery of 25th Tram	110,083.25	1.2%	17-Jan-11	17-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					60	Commissioning of 25th Tram	110,083.25	1.2%	04-Feb-11	04-Feb-11	1	41	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					61	Delivery of 26th Tram	110,083.25	1.2%	17-Jan-11	17-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					62	Commissioning of 26th Tram	110,083.25	1.2%	04-Feb-11	04-Feb-11	1	41	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					63	Delivery of 27th Tram	110,083.25	1.2%	17-Jan-11	17-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					64	Commissioning of 27th Tram	110,083.25	1.2%	04-Feb-11	04-Feb-11	1	41	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	00C Post Tram Delivery Activities						**5,504,162.49**		**02-Dec-2009**	**05-Jun-2011**	**551**	**25**	**45**	-	-	-	-	-	-	-	-	-	-	-	**550,416**	-	**550,416**
		00C1 Post Tram Delivery Activities					**5,504,162.49**		**02-Dec-2009**	**05-Jun-2011**	**551**	**25**	**45**	-	-	-	-	-	-	-	-	-	-	-	**550,416**	-	**550,416**
			Post Tram Delivery Activities																								
				Post Tram Delivery Activities			**5,504,162.49**	**100%**	**02-Dec-09**	**05-Jun-11**	**551**	**25**	**45**	-	-	-	-	-	-	-	-	-	-	-	**550,416**	-	**550,416**
					65	Delivery of Spares	1,100,832.50	20.0%	24-Apr-10	24-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					66	Delivery of all final Documentation	1,100,832.50	20.0%	05-Jun-11	05-Jun-11	1	45	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					67	Delivery of Special Tools	550,416.25	10.0%	02-Mar-11	02-Mar-11	1	42	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					68	Completion of Driver Training	550,416.25	10.0%	12-Jul-10	12-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					69	Completion of Maintainer Training	550,416.25	10.0%	12-Jul-10	12-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					70	Completion of Integrated System Testing	550,416.25	10.0%	02-Dec-09	02-Dec-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	550,416	-	550,416
					71	Commencement of Shadow Running	550,416.25	10.0%	07-Feb-11	07-Feb-11	1	41	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					72	Opening for Passenger Carrying Service	550,416.25	10.0%	05-May-11	05-May-11	1	44	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0096

Project: Edinburgh Tram Network
Subject: Milestone Payment Schedule
Currency: GBP

The Actis Capital Group | BILFINGER BERGER | SIE

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year	2010												2010 Subtotal
														Period End	27	28	29	30	31	32	33	34	35	36	37	38	39	
															30-Jan-2010	27-Feb-2010	27-Mar-2010	24-Apr-2010	22-May-2010	19-Jun-2010	17-Jul-2010	14-Aug-2010	11-Sep-2010	09-Oct-2010	06-Nov-2010	04-Dec-2010	01-Jan-2011	GBP
Project Total							**55,781,633.91**		**12-May-2008**	**05-Jun-2011**	**1120**	**5**	**45**		**7,636,417**	**-**	**-**	**2,826,082**	**440,333**	**2,311,748**	**1,651,249**	**367,250**	**440,333**	**660,499**	**660,499**	**660,499**	**330,250**	**17,885,161**
00 Mobilisation and Preliminaries							**55,781,633.91**		**12-May-2008**	**12-May-2008**	**1**	**5**	**5**		**7,636,417**	**-**	**-**	**2,826,082**	**440,333**	**2,311,748**	**1,651,249**	**367,250**	**440,333**	**660,499**	**660,499**	**660,499**	**330,250**	**17,885,161**
	00A Mobilisation						**11,008,324.98**		**12-May-2008**	**12-May-2008**	**1**	**5**	**5**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		00A1 Mobilisation					**11,008,324.98**		**12-May-2008**	**12-May-2008**	**1**	**5**	**5**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
			Mobilisation																									
				Mobilisation			**11,008,324.98**	**100%**	**12-May-08**	**12-May-08**	**1**	**5**	**5**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
					0	Contract Award	11,008,324.98	100.0%	12-May-08	12-May-08	1	5	5		-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Pre-delivery Activities			**30,131,318.61**	**100%**	**10-Jun-08**	**20-Jan-10**	**590**	**6**	**27**		**7,636,417**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**7,636,417**
					1	Approval of Preliminary Design (Pre-Works Development Services)	1,100,832.50	3.7%	10-Jun-08	10-Jun-08	1	6	6		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1A	Depot Equipment	148,001.81	0.5%	10-Jul-08	10-Jul-08	1	7	7		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					2	Delivery of Mock-Up (Pre-Works Development Services)	-	0.0%	17-Nov-08	17-Nov-08	1	12	12		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3	Approval of Final Design/Mock-Up (Pre-Works Development Services)	1,651,248.75	5.5%	03-Nov-08	03-Nov-08	1	11	11		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					4	Obtaining Approvals and Consents for Tram (Pre-Works Development Services)	-	0.0%	05-May-09	05-May-09	1	18	18		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Commencement of Tram Works	9,687,325.98	32.2%	25-Nov-08	25-Nov-08	1	12	12		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					6	Completion of 1st Tramset of bodyshells	3,302,497.49	11.0%	02-Jun-09	02-Jun-09	1	19	19		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					7	Completion of 1st Tramset of bogies	3,302,497.49	11.0%	10-Nov-09	10-Nov-09	1	25	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					8	Completion of assembly of 1st Tram	3,302,497.49	11.0%	25-Nov-09	25-Nov-09	1	25	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					9	Completion of factory based type testing	3,852,913.74	12.8%	05-Jan-10	05-Jan-10	1	27	27		3,852,914	-	-	-	-	-	-	-	-	-	-	-	-	3,852,914
					10	Delivery of Preliminary Tram Maintenance Manuals	3,302,497.49	11.0%	12-Jan-10	12-Jan-10	1	27	27		3,302,497	-	-	-	-	-	-	-	-	-	-	-	-	3,302,497
					10A	Depot Equipment - Delivery	481,005.87	1.6%	20-Jan-10	20-Jan-10	1	27	27		481,006	-	-	-	-	-	-	-	-	-	-	-	-	481,006
	00B Delivery & Commissioning of Trams						**9,137,827.83**		**09-Apr-2010**	**04-Feb-2011**	**302**	**30**	**41**		**-**	**-**	**-**	**1,725,250**	**440,333**	**2,311,748**	**550,416**	**367,250**	**440,333**	**660,499**	**660,499**	**660,499**	**330,250**	**8,147,079**
		00B1 Delivery & Commissioning of Trams					**9,137,827.83**		**09-Apr-2010**	**04-Feb-2011**	**302**	**30**	**41**		**-**	**-**	**-**	**1,725,250**	**440,333**	**2,311,748**	**550,416**	**367,250**	**440,333**	**660,499**	**660,499**	**660,499**	**330,250**	**8,147,079**
			Delivery & Commissioning of Trams																									
				Delivery & Commissioning of Trams			**9,137,827.83**	**100%**	**09-Apr-10**	**04-Feb-11**	**302**	**30**	**41**		**-**	**-**	**-**	**1,725,250**	**440,333**	**2,311,748**	**550,416**	**367,250**	**440,333**	**660,499**	**660,499**	**660,499**	**330,250**	**8,147,079**
					11	Delivery of 1st Tram	1,651,248.75	18.1%	09-Apr-10	09-Apr-10	1	30	30		-	-	-	1,651,249	-	-	-	-	-	-	-	-	-	1,651,249
					11A	Depot Equipment - Acceptance Test	74,000.90	0.8%	20-Apr-10	20-Apr-10	1	32	30		-	-	-	74,001	-	-	-	-	-	-	-	-	-	74,001
					12	Commissioning of 1st Tram	1,651,248.75	18.1%	04-Jun-10	04-Jun-10	1	32	32		-	-	-	-	-	1,651,249	-	-	-	-	-	-	-	1,651,249
					13	Delivery of 2nd Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31		-	-	-	-	110,083	-	-	-	-	-	-	-	-	110,083
					14	Commissioning of 2nd Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32		-	-	-	-	-	110,083	-	-	-	-	-	-	-	110,083
					15	Delivery of 3rd Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31		-	-	-	-	110,083	-	-	-	-	-	-	-	-	110,083
					16	Commissioning of 3rd Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32		-	-	-	-	-	110,083	-	-	-	-	-	-	-	110,083
					17	Delivery of 4th Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31		-	-	-	-	110,083	-	-	-	-	-	-	-	-	110,083
					18	Commissioning of 4th Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32		-	-	-	-	-	110,083	-	-	-	-	-	-	-	110,083
					19	Delivery of 5th Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31		-	-	-	-	110,083	-	-	-	-	-	-	-	-	110,083
					20	Commissioning of 5th Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32		-	-	-	-	-	110,083	-	-	-	-	-	-	-	110,083
					21	Delivery of 6th Tram	110,083.25	1.2%	15-Jun-10	15-Jun-10	1	32	32		-	-	-	-	-	110,083	-	-	-	-	-	-	-	110,083
					22	Commissioning of 6th Tram	110,083.25	1.2%	05-Jul-10	05-Jul-10	1	33	33		-	-	-	-	-	-	110,083	-	-	-	-	-	-	110,083
					23	Delivery of 7th Tram	110,083.25	1.2%	15-Jun-10	15-Jun-10	1	32	32		-	-	-	-	-	110,083	-	-	-	-	-	-	-	110,083
					24	Commissioning of 7th Tram	110,083.25	1.2%	05-Jul-10	05-Jul-10	1	33	33		-	-	-	-	-	-	110,083	-	-	-	-	-	-	110,083
					25	Delivery of 8th Tram	110,083.25	1.2%	15-Jul-10	15-Jul-10	1	33	33		-	-	-	-	-	-	110,083	-	-	-	-	-	-	110,083
					25A	Depot Equipment - Certificate of Reliability	37,000.45	0.4%	20-Jul-10	20-Jul-10	1	34	34		-	-	-	-	-	-	-	37,000	-	-	-	-	-	37,000
					26	Commissioning of 8th Tram	110,083.25	1.2%	04-Aug-10	04-Aug-10	1	34	34		-	-	-	-	-	-	-	110,083	-	-	-	-	-	110,083
					27	Delivery of 9th Tram	110,083.25	1.2%	15-Jul-10	15-Jul-10	1	33	33		-	-	-	-	-	-	110,083	-	-	-	-	-	-	110,083
					28	Commissioning of 9th Tram	110,083.25	1.2%	04-Aug-10	04-Aug-10	1	34	34		-	-	-	-	-	-	-	110,083	-	-	-	-	-	110,083
					29	Delivery of 10th Tram	110,083.25	1.2%	15-Jul-10	15-Jul-10	1	33	33		-	-	-	-	-	-	110,083	-	-	-	-	-	-	110,083
					30	Commissioning of 10th Tram	110,083.25	1.2%	04-Aug-10	04-Aug-10	1	34	34		-	-	-	-	-	-	-	110,083	-	-	-	-	-	110,083
					31	Delivery of 11th Tram	110,083.25	1.2%	16-Aug-10	16-Aug-10	1	35	35		-	-	-	-	-	-	-	-	110,083	-	-	-	-	110,083
					32	Commissioning of 11th Tram	110,083.25	1.2%	03-Sep-10	03-Sep-10	1	35	35		-	-	-	-	-	-	-	-	110,083	-	-	-	-	110,083
					33	Delivery of 12th Tram	110,083.25	1.2%	16-Aug-10	16-Aug-10	1	35	35		-	-	-	-	-	-	-	-	110,083	-	-	-	-	110,083
					34	Commissioning of 12th Tram	110,083.25	1.2%	03-Sep-10	03-Sep-10	1	35	35		-	-	-	-	-	-	-	-	110,083	-	-	-	-	110,083
					35	Delivery of 13th Tram	110,083.25	1.2%	15-Sep-10	15-Sep-10	1	36	36		-	-	-	-	-	-	-	-	-	110,083	-	-	-	110,083
					36	Commissioning of 13th Tram	110,083.25	1.2%	05-Oct-10	05-Oct-10	1	36	36		-	-	-	-	-	-	-	-	-	110,083	-	-	-	110,083
					37	Delivery of 14th Tram	110,083.25	1.2%	15-Sep-10	15-Sep-10	1	36	36		-	-	-	-	-	-	-	-	-	110,083	-	-	-	110,083
					38	Commissioning of 14th Tram	110,083.25	1.2%	05-Oct-10	05-Oct-10	1	36	36		-	-	-	-	-	-	-	-	-	110,083	-	-	-	110,083
					39	Delivery of 15th Tram	110,083.25	1.2%	15-Sep-10	15-Sep-10	1	36	36		-	-	-	-	-	-	-	-	-	110,083	-	-	-	110,083
					40	Commissioning of 15th Tram	110,083.25	1.2%	05-Oct-10	05-Oct-10	1	36	36		-	-	-	-	-	-	-	-	-	110,083	-	-	-	110,083
					41	Delivery of 16th Tram	110,083.25	1.2%	15-Oct-10	15-Oct-10	1	37	37		-	-	-	-	-	-	-	-	-	-	110,083	-	-	110,083
					42	Commissioning of 16th Tram	110,083.25	1.2%	04-Nov-10	04-Nov-10	1	37	37		-	-	-	-	-	-	-	-	-	-	110,083	-	-	110,083
					43	Delivery of 17th Tram	110,083.25	1.2%	15-Oct-10	15-Oct-10	1	37	37		-	-	-	-	-	-	-	-	-	-	110,083	-	-	110,083
					44	Commissioning of 17th Tram	110,083.25	1.2%	04-Nov-10	04-Nov-10	1	37	37		-	-	-	-	-	-	-	-	-	-	110,083	-	-	110,083
					45	Delivery of 18th Tram	110,083.25	1.2%	15-Oct-10	15-Oct-10	1	37	37		-	-	-	-	-	-	-	-	-	-	110,083	-	-	110,083
					46	Commissioning of 18th Tram	110,083.25	1.2%	04-Nov-10	04-Nov-10	1	37	37		-	-	-	-	-	-	-	-	-	-	110,083	-	-	110,083
					47	Delivery of 19th Tram	110,083.25	1.2%	15-Nov-10	15-Nov-10	1	38	38		-	-	-	-	-	-	-	-	-	-	-	110,083	-	110,083
					48	Commissioning of 19th Tram	110,083.25	1.2%	03-Dec-10	03-Dec-10	1	38	38		-	-	-	-	-	-	-	-	-	-	-	110,083	-	110,083
					49	Delivery of 20th Tram	110,083.25	1.2%	15-Nov-10	15-Nov-10	1	38	38		-	-	-	-	-	-	-	-	-	-	-	110,083	-	110,083
					50	Commissioning of 20th Tram	110,083.25	1.2%	03-Dec-10	03-Dec-10	1	38	38		-	-	-	-	-	-	-	-	-	-	-	110,083	-	110,083
					51	Delivery of 21st Tram	110,083.25	1.2%	15-Nov-10	15-Nov-10	1	38	38		-	-	-	-	-	-	-	-	-	-	-	110,083	-	110,083
					52	Commissioning of 21st Tram	110,083.25	1.2%	03-Dec-10	03-Dec-10	1	38	38		-	-	-	-	-	-	-	-	-	-	-	110,083	-	110,083
					53	Delivery of 22nd Tram	110,083.25	1.2%	15-Dec-10	15-Dec-10	1	39	39		-	-	-	-	-	-	-	-	-	-	-	-	110,083	110,083
					54	Commissioning of 22nd Tram	110,083.25	1.2%	04-Jan-11	04-Jan-11	1	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					55	Delivery of 23rd Tram	110,083.25	1.2%	15-Dec-10	15-Dec-10	1	39	39		-	-	-	-	-	-	-	-	-	-	-	-	110,083	110,083
					56	Commissioning of 23rd Tram	110,083.25	1.2%	04-Jan-11	04-Jan-11	1	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					57	Delivery of 24th Tram	110,083.25	1.2%	15-Dec-10	15-Dec-10	1	39	39		-	-	-	-	-	-	-	-	-	-	-	-	110,083	110,083
					58	Commissioning of 24th Tram	110,083.25	1.2%	04-Jan-11	04-Jan-11	1	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					59	Delivery of 25th Tram	110,083.25	1.2%	17-Jan-11	17-Jan-11	1	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					60	Commissioning of 25th Tram	110,083.25	1.2%	04-Feb-11	04-Feb-11	1	41	41		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					61	Delivery of 26th Tram	110,083.25	1.2%	17-Jan-11	17-Jan-11	1	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					62	Commissioning of 26th Tram	110,083.25	1.2%	04-Feb-11	04-Feb-11	1	41	41		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					63	Delivery of 27th Tram	110,083.25	1.2%	17-Jan-11	17-Jan-11	1	40	40		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					64	Commissioning of 27th Tram	110,083.25	1.2%	04-Feb-11	04-Feb-11	1	41	41		-	-	-	-	-	-	-	-	-	-	-	-	-	-
	00C Post Tram Delivery Activities						**5,504,162.49**		**02-Dec-2009**	**05-Jun-2011**	**551**	**25**	**45**		**-**	**-**	**-**	**1,100,832**	**-**	**-**	**1,100,832**	**-**	**-**	**-**	**-**	**-**	**-**	**2,201,665**
		00C1 Post Tram Delivery Activities					**5,504,162.49**		**02-Dec-2009**	**05-Jun-2011**	**551**	**25**	**45**		**-**	**-**	**-**	**1,100,832**	**-**	**-**	**1,100,832**	**-**	**-**	**-**	**-**	**-**	**-**	**2,201,665**
			Post Tram Delivery Activities																									
				Post Tram Delivery Activities			**5,504,162.49**	**100%**	**02-Dec-09**	**05-Jun-11**	**551**	**25**	**45**		**-**	**-**	**-**	**1,100,832**	**-**	**-**	**1,100,832**	**-**	**-**	**-**	**-**	**-**	**-**	**2,201,665**
					65	Delivery of Spares	1,100,832.50	20.0%	24-Apr-10	24-Apr-10	1	30	30		-	-	-	1,100,832	-	-	-	-	-	-	-	-	-	1,100,832
					66	Delivery of all final Documentation	1,100,832.50	20.0%	05-Jun-11	05-Jun-11	1	45	45		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					67	Delivery of Special Tools	550,416.25	10.0%	02-Mar-11	02-Mar-11	1	42	42		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					68	Completion of Driver Training	550,416.25	10.0%	12-Jul-10	12-Jul-10	1	33	33		-	-	-	-	-	-	550,416	-	-	-	-	-	-	550,416
					69	Completion of Maintainer Training	550,416.25	10.0%	12-Jul-10	12-Jul-10	1	33	33		-	-	-	-	-	-	550,416	-	-	-	-	-	-	550,416
					70	Completion of Integrated System Testing	550,416.25	10.0%	02-Dec-09	02-Dec-09	1	25	25		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					71	Commencement of Shadow Running	550,416.25	10.0%	07-Feb-11	07-Feb-11	1	41	41		-	-	-	-	-	-	-	-	-	-	-	-	-	-
					72	Opening for Passenger Carrying Service	550,416.25	10.0%	05-May-11	05-May-11	1	44	44		-	-	-	-	-	-	-	-	-	-	-	-	-	-

USB00000073_0097

Project: Edinburgh Tram Network
Subject: Milestone Payment Schedule
Currency: GBP

The Mott MacDonald Group | BILFINGER BERGER

SIEI

Year
Period
Period End

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
Project Total							**55,781,633.91**		**12-May-2008**	**05-Jun-2011**	**1126**	**5**	**45**	**660,499**	**880,666**	**550,416**	**-**	**550,416**	**1,100,832**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3,742,830**
00 Mobilisation and Preliminaries							**55,781,633.91**		**12-May-2008**	**13-May-2008**	**1**	**5**	**5**	**660,499**	**880,666**	**550,416**	**-**	**550,416**	**1,100,832**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3,742,830**
	00A Mobilisation						**11,008,324.98**		**12-May-2008**	**12-May-2008**	**1**	**5**	**5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00A1 Mobilisation					**11,008,324.98**		**12-May-2008**	**12-May-2008**	**1**	**5**	**5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Mobilisation																								
				Mobilisation			**11,008,324.98**	**100%**	**12-May-08**	**12-May-08**	**1**	**5**	**5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					0	Contract Award	11,008,324.98	100.0%	12-May-08	12-May-08	1	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Pre-delivery Activities			**30,131,318.61**	**100%**	**10-Jun-08**	**20-Jan-10**	**590**	**6**	**27**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1	Approval of Preliminary Design (Pre-Works Development Services)	1,100,832.50	3.7%	10-Jun-08	10-Jun-08	1	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					1A	Depot Equipment	148,001.81	0.5%	10-Jul-08	10-Jul-08	1	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					2	Delivery of Mock-Up (Pre-Works Development Services)	-	0.0%	17-Nov-08	17-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					3	Approval of Final Design/Mock-Up (Pre-Works Development Services)	1,651,248.75	5.5%	03-Nov-08	03-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					4	Obtaining Approvals and Consents for Tram (Pre-Works Development Services)	-	0.0%	05-May-09	05-May-09	1	18	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					5	Commencement of Tram Works	9,687,325.98	32.2%	25-Nov-08	25-Nov-08	1	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					6	Completion of 1st Tramset of bodyshells	3,302,497.49	11.0%	02-Jun-09	02-Jun-09	1	19	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					7	Completion of 1st Tramset of bogies	3,302,497.49	11.0%	10-Nov-09	10-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					8	Completion of assembly of 1st Tram	3,302,497.49	11.0%	25-Nov-09	25-Nov-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					9	Completion of factory based type testing	3,852,913.74	12.8%	05-Jan-10	05-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10	Delivery of Preliminary Tram Maintenance Manuals	3,302,497.49	11.0%	12-Jan-10	12-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					10A	Depot Equipment - Delivery	481,005.87	1.6%	20-Jan-10	20-Jan-10	1	27	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	00B Delivery & Commissioning of Trams						**9,137,827.83**		**09-Apr-2010**	**04-Feb-2011**	**302**	**30**	**41**	**660,499**	**330,250**	-	-	-	-	-	-	-	-	-	-	-	**990,749**
		00B1 Delivery & Commissioning of Trams					**9,137,827.83**		**09-Apr-2010**	**04-Feb-2011**	**302**	**30**	**41**	**660,499**	**330,250**	-	-	-	-	-	-	-	-	-	-	-	**990,749**
			Delivery & Commissioning of Trams																								
				Delivery & Commissioning of Trams			**9,137,827.83**	**100%**	**09-Apr-10**	**04-Feb-11**	**302**	**30**	**41**	**660,499**	**330,250**	-	-	-	-	-	-	-	-	-	-	-	**990,749**
					11	Delivery of 1st Tram	1,651,248.75	18.1%	09-Apr-10	09-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					11A	Depot Equipment - Acceptance Test	74,000.90	0.8%	20-Apr-10	20-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					12	Commissioning of 1st Tram	1,651,248.75	18.1%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					13	Delivery of 2nd Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					14	Commissioning of 2nd Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					15	Delivery of 3rd Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					16	Commissioning of 3rd Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					17	Delivery of 4th Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					18	Commissioning of 4th Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					19	Delivery of 5th Tram	110,083.25	1.2%	10-May-10	10-May-10	1	31	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					20	Commissioning of 5th Tram	110,083.25	1.2%	04-Jun-10	04-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					21	Delivery of 6th Tram	110,083.25	1.2%	15-Jun-10	15-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					22	Commissioning of 6th Tram	110,083.25	1.2%	05-Jul-10	05-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					23	Delivery of 7th Tram	110,083.25	1.2%	15-Jun-10	15-Jun-10	1	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					24	Commissioning of 7th Tram	110,083.25	1.2%	05-Jul-10	05-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					25	Delivery of 8th Tram	110,083.25	1.2%	15-Jul-10	15-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					25A	Depot Equipment - Certificate of Reliability	37,000.45	0.4%	20-Jul-10	20-Jul-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					26	Commissioning of 8th Tram	110,083.25	1.2%	04-Aug-10	04-Aug-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					27	Delivery of 9th Tram	110,083.25	1.2%	15-Jul-10	15-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					28	Commissioning of 9th Tram	110,083.25	1.2%	04-Aug-10	04-Aug-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					29	Delivery of 10th Tram	110,083.25	1.2%	15-Jul-10	15-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					30	Commissioning of 10th Tram	110,083.25	1.2%	04-Aug-10	04-Aug-10	1	34	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					31	Delivery of 11th Tram	110,083.25	1.2%	16-Aug-10	16-Aug-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					32	Commissioning of 11th Tram	110,083.25	1.2%	03-Sep-10	03-Sep-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					33	Delivery of 12th Tram	110,083.25	1.2%	16-Aug-10	16-Aug-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					34	Commissioning of 12th Tram	110,083.25	1.2%	03-Sep-10	03-Sep-10	1	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					35	Delivery of 13th Tram	110,083.25	1.2%	15-Sep-10	15-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					36	Commissioning of 13th Tram	110,083.25	1.2%	05-Oct-10	05-Oct-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					37	Delivery of 14th Tram	110,083.25	1.2%	15-Sep-10	15-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					38	Commissioning of 14th Tram	110,083.25	1.2%	05-Oct-10	05-Oct-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					39	Delivery of 15th Tram	110,083.25	1.2%	15-Sep-10	15-Sep-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					40	Commissioning of 15th Tram	110,083.25	1.2%	05-Oct-10	05-Oct-10	1	36	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					41	Delivery of 16th Tram	110,083.25	1.2%	15-Oct-10	15-Oct-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					42	Commissioning of 16th Tram	110,083.25	1.2%	04-Nov-10	04-Nov-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					43	Delivery of 17th Tram	110,083.25	1.2%	15-Oct-10	15-Oct-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					44	Commissioning of 17th Tram	110,083.25	1.2%	04-Nov-10	04-Nov-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					45	Delivery of 18th Tram	110,083.25	1.2%	15-Oct-10	15-Oct-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					46	Commissioning of 18th Tram	110,083.25	1.2%	04-Nov-10	04-Nov-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					47	Delivery of 19th Tram	110,083.25	1.2%	15-Nov-10	15-Nov-10	1	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					48	Commissioning of 19th Tram	110,083.25	1.2%	03-Dec-10	03-Dec-10	1	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					49	Delivery of 20th Tram	110,083.25	1.2%	15-Nov-10	15-Nov-10	1	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					50	Commissioning of 20th Tram	110,083.25	1.2%	03-Dec-10	03-Dec-10	1	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					51	Delivery of 21st Tram	110,083.25	1.2%	15-Nov-10	15-Nov-10	1	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					52	Commissioning of 21st Tram	110,083.25	1.2%	03-Dec-10	03-Dec-10	1	38	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					53	Delivery of 22nd Tram	110,083.25	1.2%	15-Dec-10	15-Dec-10	1	39	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					54	Commissioning of 22nd Tram	110,083.25	1.2%	04-Jan-11	04-Jan-11	1	40	40	110,083	-	-	-	-	-	-	-	-	-	-	-	-	110,083
					55	Delivery of 23rd Tram	110,083.25	1.2%	15-Dec-10	15-Dec-10	1	39	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					56	Commissioning of 23rd Tram	110,083.25	1.2%	04-Jan-11	04-Jan-11	1	40	40	110,083	-	-	-	-	-	-	-	-	-	-	-	-	110,083
					57	Delivery of 24th Tram	110,083.25	1.2%	15-Dec-10	15-Dec-10	1	39	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					58	Commissioning of 24th Tram	110,083.25	1.2%	04-Jan-11	04-Jan-11	1	40	40	110,083	-	-	-	-	-	-	-	-	-	-	-	-	110,083
					59	Delivery of 25th Tram	110,083.25	1.2%	17-Jan-11	17-Jan-11	1	40	40	110,083	-	-	-	-	-	-	-	-	-	-	-	-	110,083
					60	Commissioning of 25th Tram	110,083.25	1.2%	04-Feb-11	04-Feb-11	1	41	41	-	110,083	-	-	-	-	-	-	-	-	-	-	-	110,083
					61	Delivery of 26th Tram	110,083.25	1.2%	17-Jan-11	17-Jan-11	1	40	40	110,083	-	-	-	-	-	-	-	-	-	-	-	-	110,083
					62	Commissioning of 26th Tram	110,083.25	1.2%	04-Feb-11	04-Feb-11	1	41	41	-	110,083	-	-	-	-	-	-	-	-	-	-	-	110,083
					63	Delivery of 27th Tram	110,083.25	1.2%	17-Jan-11	17-Jan-11	1	40	40	110,083	-	-	-	-	-	-	-	-	-	-	-	-	110,083
					64	Commissioning of 27th Tram	110,083.25	1.2%	04-Feb-11	04-Feb-11	1	41	41	-	110,083	-	-	-	-	-	-	-	-	-	-	-	110,083
	00C Post Tram Delivery Activities						**5,504,162.49**		**02-Dec-2009**	**05-Jun-2011**	**551**	**25**	**45**	-	**550,416**	**550,416**	-	**550,416**	**1,100,832**	-	-	-	-	-	-	-	**2,752,081**
		00C1 Post Tram Delivery Activities					**5,504,162.49**		**02-Dec-2009**	**05-Jun-2011**	**551**	**25**	**45**	-	**550,416**	**550,416**	-	**550,416**	**1,100,832**	-	-	-	-	-	-	-	**2,752,081**
			Post Tram Delivery Activities																								
				Post Tram Delivery Activities			**5,504,162.49**	**100%**	**02-Dec-09**	**05-Jun-11**	**551**	**25**	**45**	-	**550,416**	**550,416**	-	**550,416**	**1,100,832**	-	-	-	-	-	-	-	**2,752,081**
					65	Delivery of Spares	1,100,832.50	20.0%	24-Apr-10	24-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					66	Delivery of all final Documentation	1,100,832.50	20.0%	05-Jun-11	05-Jun-11	1	45	45	-	-	-	-	-	1,100,832	-	-	-	-	-	-	-	1,100,832
					67	Delivery of Special Tools	550,416.25	10.0%	02-Mar-11	02-Mar-11	1	42	42	-	-	550,416	-	-	-	-	-	-	-	-	-	-	550,416
					68	Completion of Driver Training	550,416.25	10.0%	12-Jul-10	12-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					69	Completion of Maintainer Training	550,416.25	10.0%	12-Jul-10	12-Jul-10	1	33	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					70	Completion of Integrated System Testing	550,416.25	10.0%	02-Dec-09	02-Dec-09	1	25	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					71	Commencement of Shadow Running	550,416.25	10.0%	07-Feb-11	07-Feb-11	1	41	41	-	550,416	-	-	-	-	-	-	-	-	-	-	-	550,416
					72	Opening for Passenger Carrying Service	550,416.25	10.0%	05-May-11	05-May-11	1	44	44	-	-	-	-	550,416	-	-	-	-	-	-	-	-	550,416

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group. BILFINGER BERGER SIEMENS

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEI

	Year
	Period
	Period End

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08					2009												2009
									Start Date	End Date	Duration	Start Period	End Period	14	15	16	17	18	19	20	21	22	23	24	25	26	Subtotal
														31-Jan-2009	28-Feb-2009	28-Mar-2009	25-Apr-2009	23-May-2009	20-Jun-2009	18-Jul-2009	15-Aug-2009	12-Sep-2009	10-Oct-2009	07-Nov-2009	05-Dec-2009	02-Jan-2010	GBP

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER

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Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08					2010												2010
									Start Date	End Date	Duration	Start Period	End Period	27	28	29	30	31	32	33	34	35	36	37	38	39	Subtotal
														30-Jan-2010	27-Feb-2010	27-Mar-2010	24-Apr-2010	22-May-2010	19-Jun-2010	17-Jul-2010	14-Aug-2010	11-Sep-2010	09-Oct-2010	06-Nov-2010	04-Dec-2010	01-Jan-2011	GBP

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEI

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEMENS

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIFI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
Project Total							**1,782,292.00**		**14-Apr-2008**	16-Jul-2011	1189	4	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
00 Mobilisation & Milestone Completion							**1,782,292.00**		**14-Apr-2008**	16-Jul-2011	1189	4	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	00A Mobilisation & Milestone Completion						**1,782,292.00**		**14-Apr-2008**	**16-Jul-2011**	**1189**	**4**	**46**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00A1 Mobilisation & Milestone Completion					**1,782,292.00**		**14-Apr-2008**	**16-Jul-2011**	**1189**	**4**	**46**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Mobilisation & Milestone Completion																								
				Mobilisation & Milestone Completion			**1,782,292.00**	**100%**	**14-Apr-08**	**16-Jul-11**	**1189**	**4**	**46**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00A	Contract Award	267,343.80	15.0%	14-Apr-08	14-Apr-08	1	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00B	Section A Complete	356,458.40	20.0%	25-Mar-10	25-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00C	Section B Complete	445,573.00	25.0%	23-Apr-10	23-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00D	Section C Complete	623,802.20	35.0%	17-Jan-11	17-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00E	Section D Complete	89,114.60	5.0%	16-Jul-11	16-Jul-11	1	46	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER

SIFI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
Project Total							**1,782,292.00**		**14-Apr-2008**	**16-Jul-2011**	**1189**	**4**	**46**	-	-	**356,458**	**445,573**	-	-	-	-	-	-	-	-	**802,031**
00 Mobilisation & Milestone Completion							**1,782,292.00**		**14-Apr-2008**	**16-Jul-2011**	**1189**	**4**	**46**	-	-	**356,458**	**445,573**	-	-	-	-	-	-	-	-	**802,031**
	00A Mobilisation & Milestone Completion						**1,782,292.00**		**14-Apr-2008**	**16-Jul-2011**	**1189**	**4**	**46**	-	-	**356,458**	**445,573**	-	-	-	-	-	-	-	-	**802,031**
		00A1 Mobilisation & Milestone Completion					**1,782,292.00**		**14-Apr-2008**	**16-Jul-2011**	**1189**	**4**	**46**	-	-	**356,458**	**445,573**	-	-	-	-	-	-	-	-	**802,031**
			Mobilisation & Milestone Completion																								
				Mobilisation & Milestone Completion			**1,782,292.00**	**100%**	**14-Apr-08**	**16-Jul-11**	**1189**	**4**	**46**	-	-	**356,458**	**445,573**	-	-	-	-	-	-	-	-	**802,031**
					00A	Contract Award	267,343.80	15.0%	14-Apr-08	14-Apr-08	1	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-
					00B	Section A Complete	356,458.40	20.0%	25-Mar-10	25-Mar-10	1	29	29	-	-	356,458	-	-	-	-	-	-	-	-	-	356,458
					00C	Section B Complete	445,573.00	25.0%	23-Apr-10	23-Apr-10	1	30	30	-	-	-	445,573	-	-	-	-	-	-	-	-	445,573
					00D	Section C Complete	623,802.20	35.0%	17-Jan-11	17-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-
					00E	Section D Complete	89,114.60	5.0%	16-Jul-11	16-Jul-11	1	46	46	-	-	-	-	-	-	-	-	-	-	-	-	-

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIFI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
Project Total							**1,782,292.00**		**14-Apr-2008**	**16-Jul-2011**	**1189**	**4**	**46**	**623,802**	-	-	-	-	-	**89,115**	-	-	-	-	-	-	**712,917**
00 Mobilisation & Milestone Completion							**1,782,292.00**		**14-Apr-2008**	**16-Jul-2011**	**1189**	**4**	**46**	**623,802**	-	-	-	-	-	**89,115**	-	-	-	-	-	-	**712,917**
	00A Mobilisation & Milestone Completion						**1,782,292.00**		**14-Apr-2008**	**16-Jul-2011**	**1189**	**4**	**46**	**623,802**	-	-	-	-	-	**89,115**	-	-	-	-	-	-	**712,917**
		00A1 Mobilisation & Milestone Completion					**1,782,292.00**																				
			Mobilisation & Milestone Completion																								
				Mobilisation & Milestone Completion			**1,782,292.00**	**100%**	**14-Apr-08**	**16-Jul-11**	**1189**	**4**	**46**	**623,802**	-	-	-	-	-	**89,115**	-	-	-	-	-	-	**712,917**
					00A	Contract Award	267,343.80	15.0%	14-Apr-08	14-Apr-08	1	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00B	Section A Complete	356,458.40	20.0%	25-Mar-10	25-Mar-10	1	29	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00C	Section B Complete	445,573.00	25.0%	23-Apr-10	23-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00D	Section C Complete	623,802.20	35.0%	17-Jan-11	17-Jan-11	1	40	40	623,802	-	-	-	-	-	-	-	-	-	-	-	-	623,802
					00E	Section D Complete	89,114.60	5.0%	16-Jul-11	16-Jul-11	1	46	46	-	-	-	-	-	-	89,115	-	-	-	-	-	-	89,115

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEMENS

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEI

Year														
Period														
Period End														

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEI

	Year
	Period
	Period End

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08					2010										2010
									Start Date	End Date	Duration	Start Period	End Period	27	28	29	30	31	32	33	34	35	36	37	38	39	Subtotal
														30-Jan-2010	27-Feb-2010	27-Mar-2010	24-Apr-2010	22-May-2010	19-Jun-2010	17-Jul-2010	14-Aug-2010	11-Sep-2010	09-Oct-2010	06-Nov-2010	04-Dec-2010	01-Jan-2011	GBP

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEI

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dates 15-Apr-08 Start Date	Programme Dates 15-Apr-08 End Date	Duration	Start Period	End Period	Year	Period	Period End	2008 1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
Project Total							**2,275,806.32**		**06-Nov-2008**	13-Jan-2011	798	11	40				-	-	-	-	-	-	-	-	-	-	**317,475**	-	-	**317,475**
02 Tram Maintenance Mobilisation							**2,275,806.32**		**06-Nov-2008**	**13-Jan-2011**	**798**	**11**	**40**				-	-	-	-	-	-	-	-	-	-	**317,475**	-	-	**317,475**
	00A Tram Maintenance Mobilisation						**2,275,806.32**		**06-Nov-2008**	**13-Jan-2011**	**798**	**11**	**40**				-	-	-	-	-	-	-	-	-	-	**317,475**	-	-	**317,475**
		00A1 Tram Maintenance Mobilisation					**2,275,806.32**		**06-Nov-2008**	**13-Jan-2011**	**798**	**11**	**40**				-	-	-	-	-	-	-	-	-	-	**317,475**	-	-	**317,475**
			Tram Maintenance Mobilisation																											
				Tram Maintenance Mobilisation			**2,275,806.32**	**100%**	**06-Nov-08**	**13-Jan-11**	**799**	**11**	**40**				-	-	-	-	-	-	-	-	-	-	**317,475**	-	-	**317,475**
					00A	Demonstration to tie of completion of review of Tram Supplier Tram design and Infraco Depot design to e	317,474.98	14.0%	06-Nov-08	06-Nov-08	1	11	11				-	-	-	-	-	-	-	-	-	-	317,475	-	-	317,475
					00B	Finalisation of any changes agree by tie to the Tram Maintenance Specification and maintenance Specifi	423,299.97	18.6%	08-Mar-09	08-Mar-09	1	16	16				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00C	Finalisation of maintenance team training and recruitment plan including competence assessment	423,299.97	18.6%	06-Nov-09	06-Nov-09	1	24	24				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00D	Completion of mobilisation of maintenance team management and administrative staff to depot	423,299.97	18.6%	05-Feb-10	05-Feb-10	1	28	28				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00E	Delivery to the depot of all Tram maintainer procured spares, special tools,equipment, and all computer	317,474.98	14.0%	08-Apr-10	08-Apr-10	1	30	30				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00F	Complete mobilisation of maintenance team technican to Depot	211,649.99	9.3%	06-Nov-10	06-Nov-10	1	37	37				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00G	Completion of maintenance team training in accordance with training and recruitment plan and all require	105,824.99	4.7%	13-Jan-11	13-Jan-11	1	40	40				-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00H	Demonstration of non conformance to aclient audit to demonstrate readiness for the delivery of the tram n	53,481.45	2.4%	08-Jan-11	08-Jan-11	1	40	40				-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER

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Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
Project Total							**2,275,806.32**		**06-Nov-2008**	**13-Jan-2011**	**799**	**11**	**40**	-	-	**423,300**	-	-	-	-	-	-	-	**423,300**	-	-	**846,600**
00 Tram Maintenance Mobilisation							**2,275,806.32**		**06-Nov-2008**	**13-Jan-2011**	**799**	**11**	**40**	-	-	**423,300**	-	-	-	-	-	-	-	**423,300**	-	-	**846,600**
	00A Tram Maintenance Mobilisation						**2,275,806.32**		**06-Nov-2008**	**13-Jan-2011**	**799**	**11**	**40**	-	-	**423,300**	-	-	-	-	-	-	-	**423,300**	-	-	**846,600**
		00A1 Tram Maintenance Mobilisation					**2,275,806.32**		**06-Nov-2008**	**13-Jan-2011**	**799**	**11**	**40**	-	-	**423,300**	-	-	-	-	-	-	-	**423,300**	-	-	**846,600**
			Tram Maintenance Mobilisation																								
				Tram Maintenance Mobilisation			**2,275,806.32**	**100%**	**06-Nov-08**	**13-Jan-11**	**799**	**11**	**40**	-	-	**423,300**	-	-	-	-	-	-	-	**423,300**	-	-	**846,600**
					00A	Demonstration to tie of completion of review of Tram Supplier Tram design and Infraco Depot design to e	317,474.98	14.0%	06-Nov-08	06-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00B	Finalisation of any changes agree by tie to the Tram Maintenance Specification and maintenance Specif	423,299.97	18.6%	08-Mar-09	08-Mar-09	1	16	16	-	-	423,300	-	-	-	-	-	-	-	-	-	-	423,300
					00C	Finalisation of maintenance team training and recruitment plan including competence assessment	423,299.97	18.6%	06-Nov-09	06-Nov-09	1	24	24	-	-	-	-	-	-	-	-	-	-	423,300	-	-	423,300
					00D	Completion of mobilisation of maintenance team management and administrative staff to depot	423,299.97	18.6%	05-Feb-10	05-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00E	Delivery to the depot of all Tram maintainer procured spares, special tools,equipment, and all computer	317,474.98	14.0%	08-Apr-10	08-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00F	Complete mobilisation of maintenance team technican to Depot	211,649.99	9.3%	06-Nov-10	06-Nov-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00G	Completion of maintenance team training in accordance with training and recruitment plan and all require	105,824.99	4.7%	13-Jan-11	13-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00H	Demonstration of non conformance to aclient audit to demonstrate readiness for the delivery of the tram s	53,481.45	2.4%	08-Jan-11	08-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
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The Multi Service Group BILFINGER BERGER

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Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dates 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
Project Total							**2,275,806.32**		**06-Nov-2008**	**13-Jan-2011**	**799**	**11**	**40**	**-**	**423,300**	**-**	**317,475**	**-**	**-**	**-**	**-**	**-**	**-**	**211,650**	**-**	**-**	**952,425**
00 Tram Maintenance Mobilisation							**2,275,806.32**		**06-Nov-2008**	**13-Jan-2011**	**799**	**11**	**40**	**-**	**423,300**	**-**	**317,475**	**-**	**-**	**-**	**-**	**-**	**-**	**211,650**	**-**	**-**	**952,425**
	00A Tram Maintenance Mobilisation						**2,275,806.32**		**06-Nov-2008**	**13-Jan-2011**	**799**	**11**	**40**	**-**	**423,300**	**-**	**317,475**	**-**	**-**	**-**	**-**	**-**	**-**	**211,650**	**-**	**-**	**952,425**
		00A1 Tram Maintenance Mobilisation					**2,275,806.32**		**06-Nov-2008**	**13-Jan-2011**	**799**	**11**	**40**	**-**	**423,300**	**-**	**317,475**	**-**	**-**	**-**	**-**	**-**	**-**	**211,650**	**-**	**-**	**952,425**
			Tram Maintenance Mobilisation																									
				Tram Maintenance Mobilisation			**2,275,806.32**	**100%**	**06-Nov-08**	**13-Jan-11**	**799**	**11**	**40**	**-**	**423,300**	**-**	**317,475**	**-**	**-**	**-**	**-**	**-**	**-**	**211,650**	**-**	**-**	**952,425**
					00A	Demonstration to tie of completion of review of Tram Supplier Tram design and Infraco Depot design to e	317,474.98	14.0%	06-Nov-08	06-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00B	Finalisation of any changes agree by tie to the Tram Maintenance Specification and maintenance Specifi	423,299.97	18.6%	08-Mar-09	08-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00C	Finalisation of maintenance team training and recruitment plan including competence assessment	423,299.97	18.6%	06-Nov-09	06-Nov-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00D	Completion of mobilisation of maintenance team management and administrative staff to depot	423,299.97	18.6%	05-Feb-10	05-Feb-10	1	28	28	-	423,300	-	-	-	-	-	-	-	-	-	-	-	423,300
					00E	Delivery to the depot of all Tram maintainer procured spares, special tools,equipment, and all computer	317,474.98	14.0%	08-Apr-10	08-Apr-10	1	30	30	-	-	-	317,475	-	-	-	-	-	-	-	-	-	317,475
					00F	Complete mobilisation of maintenance team technican to Depot	211,649.99	9.3%	06-Nov-10	06-Nov-10	1	37	37	-	-	-	-	-	-	-	-	-	-	211,650	-	-	211,650
					00G	Completion of maintenance team training in accordance with training and recruitment plan and all require	105,824.99	4.7%	13-Jan-11	13-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00H	Demonstration of non conformance to aclient audit to demonstrate readiness for the delivery of the tram	53,481.45	2.4%	08-Jan-11	08-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIFI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
Project Total							2,275,806.32		06-Nov-2008	13-Jan-2011	799	11	40	159,306	-	-	-	-	-	-	-	-	-	-	-	-	159,306
00 Tram Maintenance Mobilisation							2,275,806.32		06-Nov-2008	13-Jan-2011	799	11	40	159,306	-	-	-	-	-	-	-	-	-	-	-	-	159,306
	00A Tram Maintenance Mobilisation						2,275,806.32		06-Nov-2008	13-Jan-2011	799	11	40	159,306	-	-	-	-	-	-	-	-	-	-	-	-	159,306
		00A1 Tram Maintenance Mobilisation					2,275,806.32							159,306	-	-	-	-	-	-	-	-	-	-	-	-	159,306
			Tram Maintenance Mobilisation																								
				Tram Maintenance Mobilisation			2,275,806.32	100%	06-Nov-08	13-Jan-11	799	11	40	159,306	-	-	-	-	-	-	-	-	-	-	-	-	159,306
					00A	Demonstration to tie of completion of review of Tram Supplier Tram design and Infraco Depot design to e	317,474.98	14.0%	06-Nov-08	06-Nov-08	1	11	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00B	Finalisation of any changes agree by tie to the Tram Maintenance Specification and maintenance Specifi	423,299.97	18.6%	08-Mar-09	08-Mar-09	1	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00C	Finalisation of maintenance team training and recruitment plan including competence assessment	423,299.97	18.6%	06-Nov-09	06-Nov-09	1	24	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00D	Completion of mobilisation of maintenance team management and administrative staff to depot	423,299.97	18.6%	05-Feb-10	05-Feb-10	1	28	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00E	Delivery to the depot of all Tram maintainer procured spares, special tools,equipment, and all computer	317,474.98	14.0%	08-Apr-10	08-Apr-10	1	30	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00F	Complete mobilisation of maintenance team technican to Depot	211,649.99	9.3%	06-Nov-10	06-Nov-10	1	37	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00G	Completion of maintenance team training in accordance with training and recruitment plan and all require	105,824.99	4.7%	13-Jan-11	13-Jan-11	1	40	40	105,825	-	-	-	-	-	-	-	-	-	-	-	-	105,825
					00H	Demonstration of non conformance to aclient audit to demonstrate readiness for the delivery of the tram n	53,481.45	2.4%	08-Jan-11	08-Jan-11	1	40	40	53,481	-	-	-	-	-	-	-	-	-	-	-	-	53,481

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year Period Period End	2008 1 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEI

	Year
	Period
	Period End

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08					2009												2009
									Start Date	End Date	Duration	Start Period	End Period	14	15	16	17	18	19	20	21	22	23	24	25	26	Subtotal
														31-Jan-2009	28-Feb-2009	28-Mar-2009	25-Apr-2009	23-May-2009	20-Jun-2009	18-Jul-2009	15-Aug-2009	12-Sep-2009	10-Oct-2009	07-Nov-2009	05-Dec-2009	02-Jan-2010	GBP

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEI

	Year
	Period
	Period End

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08					2010												2010
									Start Date	End Date	Duration	Start Period	End Period	27	28	29	30	31	32	33	34	35	36	37	38	39	Subtotal
														30-Jan-2010	27-Feb-2010	27-Mar-2010	24-Apr-2010	22-May-2010	19-Jun-2010	17-Jul-2010	14-Aug-2010	11-Sep-2010	09-Oct-2010	06-Nov-2010	04-Dec-2010	01-Jan-2011	GBP

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEI

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER

SIEMENS

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	Year 1 Period Period End 02-Feb-2008	2 01-Mar-2008	3 29-Mar-2008	4 26-Apr-2008	5 24-May-2008	2008 6 21-Jun-2008	7 19-Jul-2008	8 16-Aug-2008	9 13-Sep-2008	10 11-Oct-2008	11 08-Nov-2008	12 06-Dec-2008	13 03-Jan-2009	2008 Subtotal GBP
Project Total							1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
00 Spare Parts							1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	00A Spare Parts						1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00A1 Spare Parts					1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Spare Parts																								
				Spare Parts			1,013,090.00	100%	17-Jan-11	17-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00A	Spare Parts	1,013,090.00	100.0%	17-Jan-11	17-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIFI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2009 14 31-Jan-2009	15 28-Feb-2009	16 28-Mar-2009	17 25-Apr-2009	18 23-May-2009	19 20-Jun-2009	20 18-Jul-2009	21 15-Aug-2009	22 12-Sep-2009	23 10-Oct-2009	24 07-Nov-2009	25 05-Dec-2009	26 02-Jan-2010	2009 Subtotal GBP
Project Total							1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
00 Spare Parts							1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	00A Spare Parts						1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00A1 Spare Parts					1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Spare Parts																								
				Spare Parts			1,013,090.00	100%	17-Jan-11	17-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00A	Spare Parts	1,013,090.00	100.0%	17-Jan-11	17-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIFI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2010 27 30-Jan-2010	28 27-Feb-2010	29 27-Mar-2010	30 24-Apr-2010	31 22-May-2010	32 19-Jun-2010	33 17-Jul-2010	34 14-Aug-2010	35 11-Sep-2010	36 09-Oct-2010	37 06-Nov-2010	38 04-Dec-2010	39 01-Jan-2011	2010 Subtotal GBP
Project Total							1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
00 Spare Parts							1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	00A Spare Parts						1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		00A1 Spare Parts					1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Spare Parts																								
				Spare Parts			1,013,090.00	100%	17-Jan-11	17-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					00A	Spare Parts	1,013,090.00	100.0%	17-Jan-11	17-Jan-11	1	40	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIFI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08 Start Date	End Date	Duration	Start Period	End Period	2011 40 29-Jan-2011	41 26-Feb-2011	42 26-Mar-2011	43 23-Apr-2011	44 21-May-2011	45 18-Jun-2011	46 16-Jul-2011	47 13-Aug-2011	48 10-Sep-2011	49 08-Oct-2011	50 05-Nov-2011	51 03-Dec-2011	52 31-Dec-2011	2011 Subtotal GBP
Project Total							1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	1,013,090	-	-	-	-	-	-	-	-	-	-	-	-	1,013,090
00 Spare Parts							1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	1,013,090	-	-	-	-	-	-	-	-	-	-	-	-	1,013,090
	00A Spare Parts						1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	1,013,090	-	-	-	-	-	-	-	-	-	-	-	-	1,013,090
		00A1 Spare Parts					1,013,090.00		17-Jan-2011	17-Jan-2011	1	40	40	1,013,090	-	-	-	-	-	-	-	-	-	-	-	-	1,013,090
			Spare Parts																								
				Spare Parts			1,013,090.00	100%	17-Jan-11	17-Jan-11	1	40	40	1,013,090	-	-	-	-	-	-	-	-	-	-	-	-	1,013,090
					00A	Spare Parts	1,013,090.00	100.0%	17-Jan-11	17-Jan-11	1	40	40	1,013,090	-	-	-	-	-	-	-	-	-	-	-	-	1,013,090

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEMENS

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Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08					2009												2009
									Start Date	End Date	Duration	Start Period	End Period	14	15	16	17	18	19	20	21	22	23	24	25	26	Subtotal
														31-Jan-2009	28-Feb-2009	28-Mar-2009	25-Apr-2009	23-May-2009	20-Jun-2009	18-Jul-2009	15-Aug-2009	12-Sep-2009	10-Oct-2009	07-Nov-2009	05-Dec-2009	02-Jan-2010	GBP

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEI

	Year
	Period
	Period End

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-08					2010												2010
									Start Date	End Date	Duration	Start Period	End Period	27	28	29	30	31	32	33	34	35	36	37	38	39	Subtotal
														30-Jan-2010	27-Feb-2010	27-Mar-2010	24-Apr-2010	22-May-2010	19-Jun-2010	17-Jul-2010	14-Aug-2010	11-Sep-2010	09-Oct-2010	06-Nov-2010	04-Dec-2010	01-Jan-2011	GBP

Project:	Edinburgh Tram Network
Subject:	Milestone Payment Schedule
Currency:	GBP

The Multi Service Group BILFINGER BERGER SIEI

Year	
Period	
Period End	

L1	L2	L3	L4	L5	Activity ID	Activity Name	Contract Value	%age	Programme Dated 15-Apr-06					2011												2011
									Start Date	End Date	Duration	Start Period	End Period	40	41	42	43	44	45	46	47	48	49	50	51	52	Subtotal
														29-Jan-2011	26-Feb-2011	26-Mar-2011	23-Apr-2011	21-May-2011	18-Jun-2011	16-Jul-2011	13-Aug-2011	10-Sep-2011	08-Oct-2011	05-Nov-2011	03-Dec-2011	31-Dec-2011	GBP

THIS IS SCHEDULE PART 6 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 6

MAINTENANCE PAYMENT REGIME

PART A PAYMENT FOR INFRASTRUCTURE MAINTENANCE SERVICES

PART 1 ALLOCATION OF PERFORMANCE POINTS

DEFINITIONS

In this part A of this Schedule Part 6 (*Maintenance Payment Regime*), except to the extent that the context otherwise requires, the following words and expressions shall have the meanings hereby ascribed to them:

"**Actual Performance Level**" means, in relation to each Service Element in each Reporting Period:

(i) (for each Edqual Service Element) the percentage achievement of the Performance Test in respect of that Service Element derived from inspections carried out under paragraph 3 of part A of this Schedule Part 6 (*Maintenance Payment Regime*), during that Reporting Period;

(ii) (for the Punctuality Service Element) the level of performance in relation to that Service Element that is taken into account in calculating the Tram Punctuality Performance for that Service Element in that Reporting Period; and

(iii) (for the Information Provision Service Element and the Fault Correction Service Element) the level of performance in relation to that Service Element that is taken into account in calculating the Performance Points to be allocated for that Service Element in relation to that Reporting Period;

"**Available Infrastructure**" means that the Edinburgh Tram Network:

(i) is fully functional each Operating Day from half an hour before the First Tram is scheduled to leave the Depot until half an hour after the Last Tram is scheduled to return to the Depot, compliant in all material respects with the Employer's Requirements, save for Minor Infrastructure Defects;

"**Correction Time Limit**" means, for a category of Fault set out in the table in part 4 of part A of this Schedule Part 6 (*Maintenance Payment Regime*), the number of hours or days stated in that table in relation to that category;

"**Edqual Performance Benchmark**" means the level above which positive performance points are awarded and below which negative performance points are allocated, as shown in the tables in Part 3;

"**Edqual Service Element**" means a specified aspect of the Infrastructure Maintenance Services inspected under paragraph 3 of part A of this Schedule Part 6 (*Maintenance Payment Regime*), in respect of which a Performance Test is set out in part 2 of part A of this Schedule Part 6 (*Maintenance Payment Regime*), falling within one of the following categories:

A Not used

B Tramstop repairs and maintenance;

C CCTV systems;

D Passenger information visual displays;

E Poster cases, signage and printed Edinburgh Tram Network service information at Tramstops; and

F Public address system and help points at Tramstops;

"**Excusing Cause**" means any one or more of the following events which interrupts the operation of the Trams or which adversely affects the Punctuality Service Element, the Edqual Service Element or the Fault Correction Service Element:

(i) a road traffic accident;

(ii) the actions of any of the Emergency Services, CEC or Utilities Companies,

provided that, in the case of each of (i) and (ii):

(a) the Infraco has used all reasonable endeavours to mitigate the effect of such Excusing Cause; and

(b) the Infraco notifies **tie** as soon as it becomes aware of the potential and/or actual impact on its ability to perform the Infrastructure Maintenance Services;

(iii) a failure on the part of **tie** in complying with its obligations under this Agreement where the Infraco can reasonably demonstrate to **tie**'s satisfaction that:

(a) such failure had a material impact on its ability to perform the Maintenance Services;

(b) the Infraco has used all reasonable endeavours to mitigate the effects of such failure; and

(c) the Infraco notified **tie** as soon as it became aware of the potential and/or actual impact on its ability to perform the Maintenance Services;

(iv) any Permitted Variation which causes the Infraco to be unable to perform the Maintenance Services but only to the extent that **tie**:

(a) shall have given its prior written consent to the Maintenance Services being affected in such a manner;

(b) was informed by the Infraco of the extent of the impact on such Infrastructure Maintenance Services as part of the process of agreeing such Permitted Variation;

(v) a Force Majeure Event;

(vi) environmental conditions, that are outside the environmental parameters in the Employers Requirements contained in Schedule Part 2 of this Agreement which result in damage to the Edinburgh Tram Network;

(vii) where special measures are required to be undertaken in order to comply with protected species in accordance with Clause 18.2 of Part B of Schedule Part 3 (*Code of Maintenance Practice*); and

(viii) where there has been agreement to have a planned suspension of the Transport Services for major maintenance and/or renewal activities in accordance with Clause 17.12 of the Infraco Contract.

"**Exemption Claim**" means a retrospective claim against the allocation of negative Performance Points made by the Infraco in respect of the the Edqual Service Element under paragraph 6.2 and Fault Correction Service Element under paragraph 7.3 of part A of this Schedule Part 6 (*Maintenance Payment Regime*);

"**Fault**" means in respect of any part of the Edinburgh Tram Network maintained by the Infraco as part of the Infrastructure Maintenance Services:

(i) any defect, fault or disrepair that would cause a Performance Test to be failed or the Edinburgh Tram Network not to be Available Infrastructure;

(ii) (in the case of a Monitoring Point) any defect, fault or disrepair that causes it to be Out of Service or to generate inaccurate data whether the cause is equipment installed on the Trams or elsewhere;

(iii) (in the case of any electronic monitoring equipment) any defect, fault or disrepair that causes it to be Out of Service or generate inaccurate data; or

(iv) any other defect, fault or disrepair that has the effect that the relevant part of the Edinburgh Tram Network cannot be used safely, that materially impairs its functionality or that it is both noticeable by members of the public and adversely affects their perception of the quality of the Edinburgh Tram Network as measured by tests contained in Part 2 section B, C, D, E & F;

"**Fault Correction Performance Benchmark**" means the time elapsed after which if a fault has not been corrected then negative performance points are allocated;

"**Fault Correction Service Element**" means the correction of Faults by the Infraco as referred to in paragraph 4 of part A of this Schedule Part 6 (*Maintenance Payment Regime*);

"**First Tram**" means each of the timetabled Trams which are the first to operate in passenger service on each route in each direction on any day;

"**Improvement Programme**" means an improvement programme as referred to in paragraph 15 of part A of this Schedule Part 6 (*Maintenance Payment Regime*);

"**Information Package**" means:

(i) each Annual Service Report required to be submitted annually by the Infraco under Clause 73.4;

(ii) each Self-Monitoring Plan required to be submitted annually by the Infraco under Clause 56.5;

(iii) each Best Value Improvement Plan supporting information required to be submitted by the Infraco under Clause 56.4 and Clause 73.9;

(iv) each annual Maintenance Plan required to be submitted by the Infraco;

(v) each renewal programme required to be submitted annually by the Infraco; and

(vi) each package of information that **tie** is entitled to request and does request by the Infraco to submit to it under any other provision of this Agreement;

"**Information Provision Service Element**" means the provision by the Infraco of Information Packages to **tie** under this Agreement;

"**Infraco Last Late Tram**" means an Infraco Late Tram that is also a Last Tram;

"**Infraco Late Tram**" means a Late Tram that is late because of:

(i) any delay to that Tram, that as a result of a Fault, causes that Tram to be a Late Tram except insofar as the Fault relates to damage or vandalism by a third party which directly or indirectly causes the Tram to be a Late Tram or has already been classified as a Tram Maintainer Late Tram or an Operator Late Tram;

(ii) the Edinburgh Tram Network not being offered as Available Infrastructure by the Infraco;

(iii) any action or omission of the Infraco; or

(iv) any damage or vandalism to the Tram or Edinburgh Tram Network, caused by any action or omission of the Infraco;

"**Infrastructure Performance Rectification Plan**" has the meaning given to it in paragraph 11.5 of part A of this Schedule Part 6 (*Maintenance Payment Regime*);

"**Initial Spares List**" means the list contained in Schedule Part 25 *(Spare Parts)*;

"**Last Tram**" means each of the timetabled Trams which are the last to operate in passenger service on each route in each direction on any day;

"**Low Performance Level**" means, for a Service Element, an Actual Performance Level that is lower than the level required to ensure that positive Performance Points equal to 60% of the Maximum Positive Allocation for the Service Element are allocated;

"**Maximum Negative Allocation**" means, in relation to a Service Element:

(i) (for each Edqual Service Element) the number of negative Performance Points stated as being the Maximum Negative Allocation for that Service Element in part 3 of part A of this Schedule Part 6 (*Maintenance Payment Regime*);

(ii) (for the Information Provision Service Element) 100 negative Performance Points; and

(iii) (for the Fault Correction Service Element) 1,000 negative Performance Points;

"**Maximum Performance Payment**" means the base payment for each Reporting Period in respect of the Infrastructure Maintenance Services in the Maintenance Contract Pricing Price Analysis included in Schedule Part 7 of the Infraco Contract and Indexed for the relevant Service Year;

"**Maximum Positive Allocation**" means, in relation to a Service Element:

(i) (for each Edqual Service Element) the number of positive Performance Points stated as being the Maximum Positive Allocation for that Service Element in part 3 of part A of this Schedule Part 6 (*Maintenance Payment Regime*);

(ii) (for the Information Provision Service Element) 100 positive Performance Points; and

(iii) (for the Fault Correction Service Element) 1000 positive Performance Points;

"**Minimum Overall Payment Performance**" means 95%;

"**Minimum Performance Payment**" means 90% of the Maximum Performance Payment and Indexed for the relevant Service Year;

"**Minimum Spare Parts Pool**" means the minimum level of each Spare Part or Special Tool to be held in the Spare Parts Pool as specified in Schedule Part 25 (*Spare Parts*);

"**Minor Infrastructure Defect**" means a defect to the infrastructure of the Edinburgh Tram Network that will not affect the safety or quality of operation of the Edinburgh Tram Network, or its compliance with the Disability Discrimination Act 1995, that has been advised to the Infraco and which does not constitute a restriction in the manner in which it is to be operated;

"**Monitoring Point**" means the locations where the arrival or departure of Trams is recorded for the purpose of calculating Tram punctuality for the purpose of part A of this Schedule Part 6 (*Maintenance Payment Regime*), being:

(i) **Phase 1A:** for the purposes of monitoring arrival and departure: Edinburgh Airport;

(ii) **Phase 1A:** for the purposes of measuring departure only:

(a) Edinburgh Park Station;

(b) Haymarket;

(c) Foot of the Walk;

(d) Leith (Newhaven or Ocean Terminal - according to the service); and

(e) Picardy Place; and

(iii) **Phase 1B:** for the purposes of measuring departure only:

(a) Crewe Toll (northbound only); and

(b) Granton Square;

"**Negative Allocation Rate**" means, for an Edqual Service Element the rate of allocation of negative Performance Points stated in part 3 of part A of this Schedule Part 6 (*Maintenance Payment Regime*), as being the Negative Allocation Rate for that Service Element;

"**Operating Day**" means a 24 hour period running from 3 a.m. on each day when Trams are timetabled to run;

"**Operator Late Tram**" means a Late Tram that is late because of:

(i) any delay to that Tram, that as a result of any action or omission of the Operator, causes that Tram to be a Late Tram;

(ii) the Tram not being offered as an Available Tram by the Operator as a result of not being cleaned; or

(iii) any damage or vandalism to the Tram or Edinburgh Tram Network, caused by any action or omission of the Operator;

"**Out of Service**" means, in relation to any Monitoring Point or any other relevant electronic monitoring equipment or system, that meaningful data relating to the operation of Transport Services or the availability of the relevant equipment is for the time being not being recorded, irrespective of the reasons for this;

"**Overall Payment Performance**" has the meaning given to it in paragraph 11.2 of part A of this Schedule Part 6 (*Maintenance Payment Regime*);

"**Performance Payment**" means the payment calculated in accordance with paragraph 12.1 of part A of this Schedule Part 6 (*Maintenance Payment Regime*) as Indexed for the relevant Service Year;

"**Performance Point**" means a performance point (which may be positive or negative) allocated in accordance with part A of this Schedule Part 6 (*Maintenance Payment Regime*);

"**Performance Point Value**" means, in relation to a Reporting Period in a Service Year, the amount stated for that Service Year in the following table as Indexed for that Service Year:

Service Year	Performance Point Value
First Service Year	£ 1.00
Second Service Year	£ 1.01
Third Service Year	£ 1.02
Fourth Service Year	£ 1.03
Fifth Service Year	£ 1.04
Sixth Service Year	£ 1.05
Seventh Service Year	£ 1.06
Eighth Service Year	£ 1.07
Ninth Service Year	£ 1.08
Tenth Service Year	£ 1.09

"**Performance Rebate**" equals, in relation to a Reporting Period:

(i) the amount by which the Performance Payment for the Infrastructure Maintenance Services payable by **tie** in relation to that Reporting Period is lower than it would otherwise have been as a result of the occurrence of one or more Excusing Causes; less

(ii) the Relief Threshold;

"**Performance Test**" means, in relation to an Edqual Service Element, the test set out for that Service Element in part 2 of part A of this Schedule Part 6 (*Maintenance Payment Regime*);

"**Positive Allocation Rate**" means, for an Edqual Service Element, the rate of allocation of positive Performance Points stated in part 3 of part A of this Schedule Part 6 (*Maintenance Payment Regime*) as being the Positive Allocation Rate for that Service Element;

"**PPR Commencement Date**" means the date immediately following the first day of the first Reporting Period following the Service Commencement Date;

"**Punctuality Payment**" means the payment calculated in accordance with paragraph 11.1 of part A of this Schedule Part 6 (*Maintenance Payment Regime*);

"**Punctuality Service Element**" means the punctuality performance of the Tram service on the Edinburgh Tram Network measured at a series of Monitoring Points;

"**Relief Threshold**" means £1,000 as Indexed;

"**Service Elements**" means, as the context requires, the Punctuality Service Element, the Edqual Service Element, the Information Provision Service Element and/or the Fault Correction Service Element;

"**Service Year**" means a period between 1 April and 30 March in any year and, for the avoidance of doubt, the second Service Year shall commence on the 1 April immediately following the Service Commencement Date;

"**Timetabled Monitored Trams**" means the number of Trams providing Transport Services timetabled to pass a Monitoring Point in a Reporting Period as adjusted with any pre-agreed changes to the Transport Services;

"**Tram Punctuality Performance**" has the meaning given to it in paragraph 5.1 of part A of this Schedule Part 6 (*Maintenance Payment Regime*);

"**Zero Points Level**" means for an Edqual Service Element, the percentage stated in the table in part 3 of part A of this Schedule Part 6 (*Maintenance Payment Regime*), in the column headed "Zero Points Level (Initial)".

Where defined terms are used in this Schedule Part 6 which are not defined in this Schedule Part 6 or in the Infraco Contract, they shall have the same meaning as is given in the Tram Maintenance Agreement (or Tram Supply Agreement where relevant).

1. GENERAL DESCRIPTION OF THE INFRASTRUCTURE MAINTENANCE PAYMENT REGIME

1.1 The five elements which shall be used to determine the amount of each Infrastructure Maintenance Services Payment in accordance with part A of this Schedule Part 6 (*Maintenance Payment Regime*) are as follows:

(i) Minimum Performance Payment –90% of the Maximum Performance Payment;

(ii) Punctuality Service Element –7.5% of the Maximum Performance Payment;

(iii) Edqual Service Element – 2% of the Maximum Performance Payment; and

(iv) Fault Correction Service Element and Information Provision Service Element – together 0.5% of the Maximum Performance Payment.

2. MONITORING OF PUNCTUALITY SERVICE ELEMENT

2.1 The Punctuality Service Element shall be electronically monitored and the Infraco shall:

(a) (without prejudice to its general obligations to do so under this Agreement) maintain all relevant electronic monitoring equipment;

(b) repair or replace such equipment forthwith where it is Out of Service or where necessary to correct any inaccuracy affecting the calculation of an Infrastructure Maintenance Services Payment; and

(c) ensure that **tie** receives direct reports for the Punctuality Service Element in such form and format as **tie** reasonably requests from time to time.

To support the Infraco achieve this obligation **tie** shall procure that the Operator provides data on the punctuality of the Transport Services in a timely manner.

2.2 Without prejudice to any other obligation of the Infraco under this Agreement, **tie** shall have the right, upon giving reasonable notice to the Infraco, to inspect any electronic monitoring equipment relevant to the monitoring of the Punctuality Service Element installed on the Trams, track or elsewhere or any records kept, including for the purpose of verifying their accuracy.

2.3 If in relation to a Reporting Period, a Monitoring Point:

2.3.1 is Out of Service for 36 hours or less in any Reporting Period (at times when it should have been in service), then the relevant missing data for the period when the Monitoring Point was Out of Service shall be assumed (for the purposes only of allocating Performance Points) to be consistent, so far as possible, with the average of the data actually collected during that Reporting Period at the Monitoring Point; or

2.3.2 if a Monitoring Point is Out of Service for more than 36 hours in any Reporting Period (at times when it should have been in service), then either:

1. the relevant missing data for the period when the Monitoring Point was Out of Service shall be assumed (for the purposes only of allocating Performance Points) to be consistent, so far as possible, with the average of the data

actually collected during the previous three Reporting Periods at the Monitoring Point; or

2. if the Infraco provides alternative data to **tie** in respect of the times of Transport Services operating at that Monitoring Point and **tie** is reasonably satisfied that the data is a reasonably accurate proxy for the relevant missing data and a reasonable basis for determining the Infrastructure Maintenance Services Payment under part A of this Schedule Part 6 (*Maintenance Payment Regime*), then the alternative data shall be accepted by **tie** for the purposes of determining the Actual Performance Level for the Punctuality Service Element;

2.3.3 if a Monitoring Point is not Out of Service but inaccurate to such a degree that the calculation of an Infrastructure Maintenance Services Payment would be affected, then the Parties shall use reasonable endeavours to agree what would be fair and reasonable on the basis of all available alternative information in relation to performance of the relevant Transport Services as the appropriate number of Performance Points (if any) to be allocated for the affected Service Element and service route in that Reporting Period and, failing such agreement within 28 days of the end of that Reporting Period, the matter may at the instance of either Party be referred for determination in accordance with the Dispute Resolution Procedure.

2.4 If in relation to a Reporting Period, any electronic monitoring equipment relevant to the monitoring of the Punctuality Service Element installed on any Trams is Out of Service or inaccurate to such a degree that the calculation of an Infrastructure Maintenance Services Payment would be affected, the Parties shall use their respective reasonable endeavours to agree what would be fair and reasonable on the basis of all available alternative information in relation to performance of the relevant Transport Services as the appropriate number of Performance Points (if any) to be allocated for the affected Service Element and service route in that Reporting Period and, failing such agreement within 28 days of the end of that Reporting Period, the matter may at the instance of either Party be referred for determination in accordance with the Dispute Resolution Procedures.

3. Inspection of Edqual Service Elements

3.1 In relation to each Edqual Service Element, the Actual Performance Level for that Edqual Service Element shall be monitored as follows:

(a) **tie** shall arrange for monitoring inspectors to inspect Tramstops, the Depot, car parks and/or any other part of the Edinburgh Tram Network (including areas adjacent to it), as the case may be, to assess whether the relevant Performance Test is passed in respect of the relevant Edqual Service Elements;

(b) in each Reporting Period, **tie** shall inspect such number of Tramstops, the Depot, car parks and/or any other part of the Edinburgh Tram Network (including areas adjacent to it), as the case may be, as it reasonably considers appropriate provided that:

(i) **tie** shall inspect at least 80% of the Tramstops in each Reporting Period and shall use its reasonable endeavours to inspect all Tramstops in each Reporting Period;

(ii) **tie** shall use all reasonable endeavours to select Tramstops, the Depot, car parks and any other part of the Edinburgh Tram Network (including areas adjacent to it) for inspection at such times and in such a manner as shall ensure, so far as reasonably practicable, that the results of the monitoring provide a reasonable basis for the calculation of Infrastructure Maintenance Services Payments, including by:

(A) carrying out a reasonably greater proportion of inspections at more highly used Tramstops and during periods of higher demand for Transport Services; and

(B) incorporating a random element in their selection; and

(iii) no Tramstop shall be inspected at times other than in the period between 15 minutes prior to the First Tram departing from the Tramstop and 15 minutes after the Last Tram arriving or departing the relevant Tramstop;

and provided further that **tie** shall not be obliged to arrange or carry out any inspections in relation to any part of the Edinburgh Tram Network where Transport Services are not being operated;

(c) the Infraco shall be entitled, on giving reasonable notice to **tie**, to accompany any of **tie**'s monitoring inspectors in carrying out inspections under this paragraph 3; and

(d) **tie** will keep records detailing the number, timing and location of inspections, together with the results of each inspection so far as reasonably practicable in sufficient detail

to enable **tie** to verify consistency with the requirements of part A of this Schedule Part 6 (*Maintenance Payment Regime*).

3.2 **tie** shall:

(a) use reasonable endeavours to notify the Infraco where monitoring inspectors' reports indicate that a Performance Test has not been passed as soon as reasonably practicable after the week in which the relevant inspection has been carried out, and in any event by no later than 3 Business Days after each Reporting Period End Date during which such inspection took place;

(b) submit to the Infraco as soon as reasonably practicable after the end of each Reporting Period and in any event no later than 3 Business Days after each Reporting Period End Date a report containing a reasonable summary of the results of the inspections carried out in that Reporting Period and stating the Actual Performance Level for that Reporting Period for each Edqual Service Element; and

(c) use reasonable endeavours to input inspection results to the Asset Management System on such basis as agreed between **tie** and the Infraco.

3.3 The Infraco shall be entitled, on giving reasonable notice to **tie**, to inspect and to review any or all of **tie**'s records concerning the time, place, methodology and results of inspections made under this paragraph 3 with a view to verifying that inspections have been carried out in accordance with the requirements of part A of this Schedule Part 6 (*Maintenance Payment Regime*), and to identify opportunities for improving the Infraco's performance of the Infrastructure Maintenance Services.

4. Monitoring of Fault Correction Service Element

4.1 The Infraco shall provide and maintain a fault reporting facility, a log of all Faults and a record of the action taken to correct such Faults including by:

(a) (to the extent reasonably practicable) using the Asset Management System for this purpose;

(b) providing a facility for the Infraco Parties, **tie,** the **tie** Parties, **tie's** Representative, the Tram Maintainer, the Infraco and the Operator to report Faults by telephone or by e-mail and encouraging due reporting of all Faults;

(c) recording the date and time at which each Fault is reported to the Infraco or otherwise comes to the Infraco's attention, such date and time to be no later than:

1. the date and time at which **tie** notifies the Infraco under paragraph 3.2 that a Performance Test has not been passed where this has been caused by the relevant Fault; or

2. the date and time at which information relating to the Fault is input into the Asset Management System, if in use for this purpose;

(d) recording the action taken to correct each Fault and, where practicable, the identity of the person(s) taking that action; and

(e) recording the date and time at which each logged Fault is corrected and, where the time between the time at which each Fault is reported pursuant to Paragraph 4.1 (c) above and the time at which each logged Fault is corrected_exceeds the Correction Time Limit, the number of days (including part days) after the expiry of the Correction Time Limit before the Fault was corrected.

5. Calculation of Punctuality Service Element

5.1 Tram Punctuality Performance shall be calculated on the following basis:

$$TPP = 1 - \left(\frac{LT + (5 \times LLT)}{TMT} \right)$$

where:

TPP is the Tram Punctuality Performance;

LT is the total number of Infraco Late Trams in the Reporting Period;

LLT is the total number of Infraco Late Last Trams in the Reporting Period; and

TMT is the total number of Timetabled Monitored Trams in the Reporting Period.

Excusing Causes

5.2 In determining the number of Infraco Late Trams and Infraco Late Last Trams in any Reporting Period for the purposes of paragraph 5.1 above, the Infraco shall not include any Infraco Late Tram or Infraco Late Last Tram arising from an Excusing Cause that existed at

the time the Tram arrived at (or departed) the relevant Monitoring Point. A report shall be submitted in accordance with paragraph 14 of Part A of this Schedule Part 6.

6. Calculation of Performance Points for Edqual Service Elements

6.1 Subject to the remaining provisions of part A of this Schedule Part 6 (*Maintenance Payment Regime*), for each Edqual Service Element, Performance Points shall be allocated in relation to each Reporting Period as follows:

(a) if the Actual Performance Level exceeds the relevant Zero Points Level for that Reporting Period then positive Performance Points shall be allocated as follows:

Positive Performance Points = (APL – ZPL) x PAR x 100

where:

APL is the applicable Actual Performance Level;

ZPL is the applicable Zero Points Level; and

PAR is the applicable Positive Allocation Rate;

(b) if the Actual Performance Level is equal to the relevant Zero Points Level then no positive Performance Points shall be allocated; and

(c) if the Actual Performance Level is less than the relevant Zero Points Level for that Reporting Period, then negative Performance Points shall be allocated as follows:

Negative Performance Points = (ZPL – APL) x NAR x 100

where:

ZPL is the applicable Zero Points Level;

APL is the applicable Actual Performance Level; and

NAR is the applicable Negative Allocation Rate.

6.2 The Infraco may make an Exemption Claim in respect of any Fault for the purposes of avoiding the allocation of negative Performance Points under the Edqual Service Element as follows:

(a) the Infraco shall notify **tie** in writing of the Fault or Faults in respect of which it seeks exemption from the allocation of negative Performance Points under the Edqual Service Element:

(i) setting out the causes of the Fault and the reasons for the Infraco not being able, using reasonable endeavours and in accordance with Good Industry Practice, to correct the Fault within the relevant Correction Time Limit;

(ii) enclosing such supporting information, documents and explanations as shall enable **tie** to consider the Exemption Claim; and

(iii) containing a programme setting out the steps the Infraco reasonably considers will lead to the correction of the Fault as soon as reasonably practicable, the proposed timescales for those steps and their estimated cost;

(b) the Infraco shall submit to **tie** such information and explanations as **tie** may reasonably request in respect of the Exemption Claim and any programme submitted under paragraph 6.2(a)(iii);

(c) without prejudice to any other obligation under this Agreement, the Infraco shall comply with the programme submitted by it under paragraph 6.2(a)(iii); and

(d) if an Exemption Claim demonstrates to **tie**'s reasonable satisfaction that the Infraco's failure to correct the Fault under the Edqual Service Element is due to:

(i) non-availability of parts in circumstances where the Infraco has taken all reasonable and prudent steps to prevent such non-availability in accordance with Good Industry Practice with reference to the Minimum Spare Parts List;

(ii) non-availability of parts in circumstances where the Infraco has taken all reasonable steps to prevent such non-availability and the level of parts as set out in the Minimum Spare Parts List is inadequate as a result of the requirement by **tie** to reduce the level of Spare Parts from the levels set out in the Initial Spare Parts List;

(iii) non-availability of the road-rail maintenance vehicle where there are two maintenance activities to be undertaken in parallel despite the Infraco having taken all prudent steps to prevent such non-availability in accordance with Good Industry Practice to resource planning; and/or

(iv) circumstances beyond the reasonable control of the Infraco which could not reasonably have been foreseen by the Infraco;

but that the Infraco is using all reasonable endeavours to correct the Fault in accordance with the programme submitted by it under paragraph 6.2(a)(iii) and in accordance with Good Industry Practice as soon as reasonably practicable in the circumstances then, if and to the extent that the failure is due to the circumstances in (i) and (ii) above, and for so long as the Infraco is using all such reasonable endeavours and reporting progress to **tie** at intervals of no less than 7 days, no negative Performance Points shall be allocated in respect of the Fault under paragraph 6.1.

7. Calculation of Performance Points for Fault Correction Service Element

7.1 The Fault Correction Service Element consists of the correction of Faults by the Infraco under this Agreement which shall be monitored and Performance Points allocated in respect thereof in accordance with this paragraph 7.

7.2 For the Fault Correction Service Element, Performance Points shall (subject to the remaining provisions of part A of this Schedule Part 6 (*Maintenance Payment Regime*)) be allocated in relation to each Reporting Period as follows:

$$\textbf{Performance Points} = \textbf{MPA}_{(FC)} - \textbf{NPP}_{(FC)}$$

where:

$\textbf{MPA}_{(FC)}$ is the Maximum Positive Allocation for the Fault Correction Service Element; and

$\textbf{NPP}_{(FC)}$ is the aggregate number of negative Performance Points (if any) allocated in relation to the Fault Correction Service Element as follows:

(a) subject to paragraphs (b) and (c) below, by allocating, for each day or part day during that Reporting Period that any individual Fault remained uncorrected after the expiry of the relevant Correction Time Limit, the number of negative Performance Points set out as the daily rate in relation to the category of Faults applying to that Fault in the table in Part 4 of part A of this Schedule Part 6 (*Maintenance Payment Regime*);

(b) for each Reporting Period in the first Service Year the first 1,000 negative Performance Points that would otherwise be allocated under paragraph (a) above shall be disregarded and shall not be so allocated; and

(c) for each Reporting Period in the second and subsequent Service Years the first 500 negative Performance Points that would otherwise be allocated under paragraph (a) above shall be disregarded and shall not be so allocated.

7.3 The Infraco may make an Exemption Claim in respect of any Fault for the purposes of avoiding the allocation of negative Performance Points under the Fault Correction Service Element as follows:

(a) the Infraco shall notify **tie** in writing of the Fault or Faults in respect of which it seeks exemption from the allocation of negative Performance Points under the Fault Correction Service Element:

(i) setting out the causes of the Fault and the reasons for the Infraco not being able, using reasonable endeavours and in accordance with Good Industry Practice, to correct the Fault within the relevant Correction Time Limit;

(ii) enclosing such supporting information, documents and explanations as shall enable **tie** to consider the Exemption Claim; and

(iii) containing a programme setting out the steps the Infraco reasonably considers will lead to the correction of the Fault as soon as reasonably practicable, the proposed timescales for those steps and their estimated cost;

(b) the Infraco shall submit to **tie** such information and explanations as **tie** may reasonably request in respect of the Exemption Claim and any programme submitted under paragraph 7.3(a)(iii);

(c) without prejudice to any other obligation under this Agreement, the Infraco shall comply with the programme submitted by it under paragraph 7.3(a)(iii); and

(d) if an Exemption Claim demonstrates to **tie**'s reasonable satisfaction that the Infraco's failure to correct the Fault within the Correction Time Limit is due to:

(i) non-availability of parts in circumstances where the Infraco has taken all reasonable and prudent steps to prevent such non-availability in accordance with Good Industry Practice with reference to the Minimum Spare Parts List;

(ii) non-availability of parts in circumstances where the Infraco has taken all reasonable steps to prevent such non-availability and the level of parts as set out in the Minimum Spare Parts List is inadequate as a result of the requirement by **tie** to reduce the level of Spare Parts from the levels set out in the Initial Spare Parts List;

(iii) non-availability of the road-rail maintenance vehicle where there are two maintenance activities to be undertaken in parallel despite the Infraco having taken all prudent steps to prevent such non-availability in accordance with Good Industry Practice to resource planning;

(iv) circumstances beyond the reasonable control of the Infraco which could not reasonably have been foreseen by the Infraco; and/or

(v) an Excusing Cause,

but that the Infraco is using all reasonable endeavours to correct the Fault in accordance with the programme submitted by it under paragraph 7.3(a)(iii) and in accordance with Good Industry Practice as soon as reasonably practicable in the circumstances then, if and to the extent that the failure is due to the circumstances in (i) and (ii) above, and for so long as the Infraco is using all such reasonable endeavours and reporting progress to **tie** at intervals of no less than 7 days, no negative Performance Points shall be allocated in respect of the Fault under paragraph 7.2.

8. Allocation of Performance Points for Information Provision Service Element

8.1 For the Information Provision Service Element, Performance Points shall (subject to the remaining provisions of this Schedule Part 6 (*Maintenance Payment Regime*)) be allocated in relation to each Reporting Period as follows:

$$\textbf{Performance Points} = \textbf{MPA}_{(L)} - \textbf{NPP}_{(L)}$$

where:

$MPA_{(L)}$ is the Maximum Positive Allocation for the Information Provision Service Element; and

$NPP_{(L)}$ is the aggregate number of negative Performance Points (if any) allocated as follows in respect of each Information Package which should have been provided to **tie** during that Reporting Period in accordance with this Agreement but was not provided (without any material omissions) before the end of that Reporting Period:

	Negative Performance Points to be allocated
Where the relevant Information Package was duly provided in the most recent previous Reporting Period in which it was due;	50
Where the relevant Information Package was not duly provided in the most recent previous Reporting Period in which it was due but was duly provided in the last but one Reporting Period in which it was due;	250
Where the relevant Information Package was not duly provided in the two or more most recent previous Reporting Periods in which it was due.	500

9. Pro Rata Allocations And Maximum And Minimum Allocations

9.1 In relation to any Reporting Period that is more or less than 28 days in length, Performance Points shall, save to the extent that such Performance Points relate to individual failures in the performance of the Infrastructure Maintenance Services by the Infraco, be allocated under the remaining provisions of part A of this Schedule Part 6 (*Maintenance Payment Regime)* on a pro rata basis.

9.2 The number of positive Performance Points that may be allocated under paragraph 6 of part A of this Schedule Part 6 (*Maintenance Payment Regime*) in relation to an Edqual Service Element for a Reporting Period shall not exceed the Maximum Positive Allocation for that Edqual Service Element for that Reporting Period except where the number of positive Performance Points allocated in relation to that Service Element in the immediately preceding Reporting Period fell short of the relevant Maximum Positive Allocation, in which case any excess positive Performance Points shall be allocated in relation to that Service Element, up to a maximum number equal to such shortfall.

9.3 The number of negative Performance Points that may be allocated under paragraphs 6, 7 and 8 of part A of this Schedule Part 6 (*Maintenance Payment Regime*) in relation to a Service Element for a Reporting Period shall be such that, where there is a resulting net allocation of negative Performance Points in relation to the Service Element, this shall not exceed the number of negative Performance Points equal to the Maximum Negative Allocation for that Service Element for that Reporting Period.

10. Low Performance Ratchets

10.1 Where:

(a) a Low Performance Level occurs in respect of an Edqual Service Element, the Information Provision Service Element or the Fault Correction Service Element; and

(b) there have been three or more previous Low Performance Levels for that Service Element within the five Reporting Periods immediately preceding that Reporting Period;

then additional negative Performance Points equal in number to a specified percentage of the Maximum Negative Allocation for that Service Element shall be allocated in relation to that Reporting Period as follows:

Number of Service Element Low Performance Levels in previous five Reporting Periods	**Percentage of Service Element Maximum Negative Allocation to be allocated as additional negative Performance Points**
3	25
4	50

5	75

11. Conversion of Tram Punctuality Performance into the Punctuality Payment

11.1 Punctuality Payment

The Punctuality Payment due from **tie** to the Infraco for each Reporting Period shall be calculated as follows:

$$PP = (7.5\% \times MaxPP) \times OPP$$

where:

PP is the Punctuality Payment;

MaxPP is the Maximum Performance Payment for the Reporting Period;

OPP is the Overall Payment Performance as calculated in accordance with paragraph 11.2 of part A of this Schedule Part 6 (*Maintenance Payment Regime*).

11.2 The Overall Payment Performance shall be calculated on the following basis:

$$OPP = \frac{TPP - MinOPP}{100\% - MinOPP}$$

save where OPP is a negative figure, in which case OPP shall be 0

and where:

TPP is the Tram Punctuality Performance calculated in accordance with paragraph 5 of part A of this Schedule Part 6 (*Maintenance Payment Regime*); and

MinOPP is the Minimum Overall Payment Performance.

11.3 The Infraco shall evaluate the Tram Punctuality Performance in accordance with part A of this Schedule Part 6 (*Maintenance Payment Regime*).

11.4 The Infraco's Representative shall meet with representatives of the Operator, the Tram Maintainer, **tie** and the Infrastructure Maintainer every Operating Day that is also a Business Day at 09:00 (or such other time as all parties shall reasonably agree) to determine the responsibility for any Late Trams, the Edinburgh Tram Network not being Available

Infrastructure, or poor performance of Trams or the Edinburgh Tram Network. Where the parties cannot, acting reasonably, determine responsibility for any Late Tram, the Edinburgh Tram Network not being Available Infrastructure, or poor performance then **tie** shall, in its absolute discretion, determine responsibility, subject only to referral of such resolution to the Dispute Resolution Procedure.

11.5 If the Tram Punctuality Performance is less than 95% then the Infraco shall, within 3 Business Days, or such other period as is agreed between the Parties, of the end of the Reporting Period prepare a rectification plan ("**Performance Rectification Plan**") (to be agreed with **tie**, acting reasonably) setting out a comprehensive analysis of the reasons why the Tram Punctuality Performance is less than 95% and setting out a detailed plan to improve performance to achieve a Tram Punctuality Performance of at least 98%.

12. Conversion of Performance Points into Infrastructure Maintenance Services Payments

12.1 Subject to paragraph 12.2 of part A of this Schedule Part 6 (*Maintenance Payment Regime*), the Performance Payment for each Reporting Period shall be calculated as follows:

(APP - LPP) x PPV

where:

APP is the aggregate net number of Performance Points (which may be positive or negative) allocated under part A of this Schedule Part 6 (*Maintenance Payment Regime*) other than under paragraph 10 of part A of this Schedule Part 6 (*Maintenance Payment Regime*) for all Service Elements in relation to that Reporting Period;

LPP is the aggregate number of negative Performance Points allocated under paragraph 10 of part A of this Schedule Part 6 (*Maintenance Payment Regime*) in respect of any Low Performance Levels occurring in relation to that Reporting Period; and

PPV is the Performance Point Value for that Reporting Period,

Provided that such Performance Payment in each Reporting Period shall not exceed 2.5% of the Maximum Performance Payment.

12.2 The Performance Payment otherwise payable in accordance with the formula set out in paragraph 12.1 of part A of this Schedule Part 6 (*Maintenance Payment Regime)* shall be subject to the following adjustments during the first Service Year:

(a) for payment calculation purposes only, the Infraco shall be deemed to have been allocated the Maximum Positive Allocation for each Service Element in respect of Reporting Periods prior to the PPR Commencement Date; and

(b) in determining the value of LPP any Low Performance Level occurring in respect of a Reporting Period prior to the PPR Commencement Date shall be disregarded.

12.3 Where the Performance Payment calculated in accordance with paragraph 12 of part A of this Schedule Part 6 (*Maintenance Payment Regime*) is a negative number, no payment shall be required to be made by the Infraco to **tie** but the negative number shall be carried forward and set off against the next Infrastructure Maintenance Services Payment(s) and, in the event that there is such a negative number on the Termination Date that would be carried forward had this Agreement not terminated, the Infraco shall pay to **tie** an amount equal to that number by no later than one month after the Termination Date by way of reimbursement of Infrastructure Maintenance Services Payments previously paid to the Infraco.

13. Determination and Payment of Infrastructure Maintenance Services Payments

13.1 **tie** shall determine the Infrastructure Maintenance Services Payment due for each Reporting Period calculated in accordance with part A of this Schedule Part 6 (*Maintenance Payment Regime*) as follows:

(a) within 3 Business Days after each Reporting Period End Date, the Infraco shall submit an application for payment which shall set out the Minimum Performance Payment, the Punctuality Payment and the Performance Payment claimed for the relevant Reporting Period together with a statement showing how the payments have been calculated including the net number of Performance Points (which may be negative or positive) allocated in relation to each Service Element:

(i) (for Edqual Service Elements) based entirely on the relevant information provided by **tie** to the Infraco under paragraph 3 of part A of this Schedule Part 6 (*Maintenance Payment Regime*);

(ii) (for the Information Provision Service Element) based on the provision or non-provision of Information Packages to **tie** which were due to be provided to **tie** during that Reporting Period; and

(iii) (for the Fault Correction Service Element) based on the relevant records made and kept by the Infraco in accordance with paragraph 4.1 of part A of this Schedule Part 6 (*Maintenance Payment Regime*) but including any

adjustments under paragraph 7.3 of part A of this Schedule Part 6 (*Maintenance Payment Regime*),

together with such supporting information as is reasonably necessary to enable **tie** to understand the basis on which the application for payment and supporting statement has been prepared;

(b) the Infraco shall provide, as soon as reasonably practicable after any request by **tie**, such further information and explanations as **tie** may reasonably request;

(c) if either Party wishes to dispute the Performance Points allocated or the amount of the Infrastructure Maintenance Services Payment for any Reporting Period, it shall refer the matter to the Dispute Resolution Procedure for determination.

13.2 **tie** shall pay to the Infraco each Infrastructure Maintenance Services Payment determined in accordance with paragraph 13.1 of this Schedule Part 6 (*Maintenance Payment Regime*) in accordance with Clause 68 (*Payment in respect of Maintenance Services*).

13.3 NOT USED

13.4 **Review of Performance Benchmarks**

13.4.1 On or prior to the expiry of 13 full Reporting Periods after the date of issue of the Certificate of Service Commencement and thereafter on or prior to each subsequent Performance Review Date, **tie** shall review and determine the Edqual Performance Benchmark and the Fault Correction Performance Benchmark ("Performance Benchmarks") to apply for each Reporting Period from each such date to the next Performance Review Date.

13.4.2 In determining what Performance Benchmarks are to apply up to the next Performance Review Date under paragraph 13.4.1 above, **tie** will have regard to the following:

13.4.2.1 the level of performance achieved by the Infraco in the preceding periods in relation to the then current level of Performance Benchmarks and the extent to which that level of performance is or is likely to be sustainable or to be improved upon by an efficient maintenance contractor using all reasonable endeavours to optimise the availability of the System;

13.4.2.2 the improvement in performance which the Infraco might reasonably be expected to achieve up to the next Performance Review Date; and

13.4.2.3 the effect (or likely effect) of any investments or improvements made, or due to be made which can reasonably be expected to affect the performance of the Infraco under this Agreement.

13.4.3 If the Infraco disagrees that any or all of the Performance Benchmarks determined by **tie** under paragraphs 13.4.1 and 13.4.2 above are reasonable for **tie** to determine then either of the parties may refer that issue for determination in accordance with the Dispute Resolution Procedure but until such revisions are agreed or otherwise determined in accordance with such Dispute Resolution Procedure, the Performance Benchmarks as assessed by **tie** under paragraphs 13.4.1 and 13.4.2 above shall apply.

14. Excusing Causes and Performance Rebates

14.1 If and to the extent that one or more Excusing Causes has an adverse impact on the performance of the Infrastructure Maintenance Services or on the monitoring of such performance under part A of this Schedule Part 6 (*Maintenance Payment Regime*) such that the Infrastructure Maintenance Services Payment payable by **tie** under part A of this Schedule Part 6 (*Maintenance Payment Regime*) in relation to a Reporting Period is lower than it would otherwise have been by an amount equal to or greater than the Relief Threshold then, in order to claim a Performance Rebate from **tie** in consequence thereof, the Infraco shall:

(a) within 14 days after the end of the relevant Reporting Period submit to **tie** written notice:

(i) describing the effect that each such Excusing Cause has had on the performance of the Infrastructure Maintenance Services or on the monitoring of such performance during that Reporting Period including full details of the nature of the Excusing Cause, the date of occurrence and its duration (or likely duration in the case of a Excusing Cause that is affecting Infrastructure Maintenance Services at the date of the notice);

(ii) describing the effect of each such Excusing Cause on the allocation of Infraco Late Trams, Infraco Last Late Trams and Performance Points;

(iii) stating the Infrastructure Maintenance Services Payment that would have been due from **tie** in respect of that Reporting Period had the Excusing Cause(s) not occurred; and

(iv) stating the proposed Performance Rebate due from **tie** assuming that the Actual Performance Level for a Service Element during any period affected by an Excusing Cause would have been no higher than the Actual Performance Level applying to that Service Element during those parts of the Reporting Period not affected by an Excusing Cause (or where the proposed Performance Rebate applies to a full Reporting Period, the previous Reporting Period not affected by an Excusing Cause);

(b) demonstrate to the reasonable satisfaction of **tie** that:

(i) the Infraco could not have avoided the occurrence of the Excusing Cause(s) or the consequences thereof by steps which it might reasonably be expected to have taken, without incurring material additional expenditure;

(ii) the Excusing Cause(s) caused the claimed effect on the allocation of Performance Points; and

(iii) the reduction in the Infrastructure Maintenance Services Payment caused by the Excusing Cause(s) could not reasonably be expected to have been avoided or reduced by the Infraco taking all those steps which a reasonably experienced, efficient and competent maintenance contractor engaged in the same type of undertaking (comparable in size, scope and complexity to its activities in relation to this Agreement) would properly be expected to take if seeking in good faith and in accordance with Good Industry Practice to mitigate or recover the effect of the Excusing Cause(s), in particular by implementing any relevant contingency plans that the Infraco is required to put in place under this Agreement.

14.2 In the event that the Infraco has submitted a notice under paragraph 14.1(a) and complied with its obligations under paragraph 14.1(b) then:

(a) the Infraco and **tie** shall endeavour to agree as soon as practicable the amount of the Performance Rebate (if any);

(b) the Infraco shall provide, as soon as reasonably practicable after any request by **tie**, such further information and explanations as **tie** may reasonably request;

(c) to the extent that **tie** agrees to pay the proposed Performance Rebate, **tie** shall pay to the Infraco the Performance Rebate or such part as it agrees to be payable, within 14 days of the later of the receipt by **tie** of the notice to **tie** under paragraph 14.1(a) and

the receipt of all information and explanations requested under paragraph 14.1(b) that are reasonably required by **tie** to verify its liability to make such payment;

(d) if **tie** wishes to dispute all or part of the proposed Performance Rebate, it shall, within 28 days of receipt of the notice under paragraph 14.1(a) of part A of this Schedule Part 6 (*Maintenance Payment Regime*) (or if later within 28 days after receipt of any further information reasonably requested under paragraph 14.2 (b) of part A of this Schedule Part 6 (*Maintenance Payment Regime*)), submit written notice to the Infraco setting out the reasons why it disagrees with the notice submitted under paragraph 14.1 (a) of part A of this Schedule Part 6 (*Maintenance Payment Regime*) or considers that the Infraco has not complied with its obligations under paragraph 14.1(b) of part A of this Schedule Part 6 (*Maintenance Payment Regime*);

(e) to the extent that the Infraco and **tie** are unable to agree the amount of the Performance Rebate (if any) within 28 days of days of receipt of the notice referred to in paragraph 14.2 (d) of part A of this Schedule Part 6 (*Maintenance Payment Regime*), then the determination of the applicable Performance Rebate may at the instance of either Party be referred for determination in accordance with the Dispute Resolution Procedure; and

(f) **tie** shall pay any unpaid amount of the Performance Rebate subsequently agreed or determined to be payable within 14 days of the quantum of the Performance Rebate being agreed or within 14 days of receipt by **tie** of the determination thereof, together with interest in accordance with the rate set out in Clause 62.4 from the due date for payment of the Infrastructure Maintenance Services Payment for the Reporting Period in relation to which the Performance Rebate is payable up to the date of payment.

14.3 **tie** shall be entitled to deduct from any Performance Rebates payable by it under this paragraph 14 of part A of this Schedule Part 6 (*Maintenance Payment Regime)* any variable cost savings realised by the Infraco as a result of non-performance of the Infrastructure Maintenance Services, particularly in the case of Excusing Causes having an extended duration.

15. Improvement Programmes

15.1 Without prejudice to all other obligations under this Agreement in respect of the Infrastructure Maintenance Services, the Infraco shall use all reasonable endeavours to ensure that as from the PPR Commencement Date, the Actual Performance Level for each Service Element is at

least equal to the level required to achieve the Maximum Positive Allocation for that Service Element.

15.2 Where a Low Performance Level occurs in respect of an Edqual Service Element or the Fault Correction Service Element and there has been a previous Low Performance Level for that Service Element within the five Reporting Periods immediately preceding that Reporting Period then without prejudice to **tie**'s other rights and remedies under this Agreement:

15.2.1 the Infraco shall as soon as reasonably practicable, and in any event within 30 days of the relevant Actual Performance Level that constitutes a Low Performance Level being agreed or determined, submit to **tie** either:

(a) a proposed Improvement Programme setting out:

(i) the steps it reasonably considers are likely to improve the Actual Performance Level for that Service Element for subsequent Reporting Periods such that the Maximum Positive Allocation is allocated for that Service Element;

(ii) why those steps are considered likely so to improve the Actual Performance Level;

(iii) the proposed timescales for the steps to be taken; and

(iv) the estimated costs of the steps to be taken;

or

(b) (if the Infraco reasonably considers that there are no steps that are likely to so improve the Actual Performance Level for that Service Element or where relevant steps previously agreed between the Parties with a view to improving the Actual Performance Level for that Service Element are in the course of being implemented and are yet to come fully into effect) an application for an exemption from the requirement to submit an Improvement Programme, setting out in full the justification for requesting the exemption;

15.2.2 the Infraco shall submit to **tie** such information and explanations as **tie** may reasonably request in respect of a proposed Improvement Programme or application for exemption;

15.2.3 **tie** may make modifications to a proposed Improvement Programme by written notice submitted to the Infraco within 30 days of receipt the proposed Improvement

Programme provided that such modifications are reasonable and practicable and in particular do not require the Infraco to incur additional expenditure that is disproportionate to the improvement in the Actual Performance Level sought to be achieved;

15.2.4 in the event of any dispute between **tie** and the Infraco as to whether or not any exemption applied for under paragraph 15.2.1(a)(ii) of part A of this Schedule Part 6 (*Maintenance Payment Regime)* should be granted, or as to whether or not any modifications proposed by **tie** under paragraph 15.2.3 of part A of this Schedule Part 6 (*Maintenance Payment Regime*) are reasonable and practicable or require the Infraco to incur additional expenditure that is disproportionate, then the dispute may at the instance of either Party be referred for determination in accordance with the Dispute Resolution Procedure; and

(e) without prejudice to any other obligation under this Agreement, the Infraco shall comply with any Improvement Programme, as modified where applicable under paragraphs 15.2.3 and/or 15.2.4.

Part 2 Edinburgh Tram Network Service Element Performance Tests for the Infrastructure Maintenance Services

A: NOT USED

B: EDINBURGH TRAM NETWORK TRAMSTOP REPAIRS AND MAINTENANCE

B1 Service Element: Repair And Maintenance of Tramstop Canopies

This Performance Test will be failed in relation to a Tramstop where, in respect of any canopy at the Tramstop:

(a) the canopy leaks;

(b) the canopy roof or walls are damaged (including peeling paint) over an area larger than A3 size or any section of the canopy roof or wall is missing;

(c) the canopy should be present but is missing (unless an exemption has been agreed with **tie**, acting reasonably);

(d) the canopy has been etched with wording or diagrams that have an obscene or racist meaning; or

(e) the canopy is defective in such a way as to prevent its normal usage and/or that makes it dangerous for passengers to use.

B2 Service Element: Repair And Maintenance of Shelters and Seating

This Performance Test will be failed in relation to a Tramstop where, in respect of any shelter or seat unit (defined as being a set of two or more adjoining seats, or a bench) at the Tramstop:

(a) it should be present but is missing;

(b) it is damaged in such a way as could damage or injure persons or their clothing;

(c) any seat unit is unsecured or unstable;

(d) the asset is defective in such a way as to interfere with usage and/or that makes it dangerous for passengers to use;

(e) the asset has been etched with wording or diagrams that have an obscene or racist meaning;

(f) any glazing panel forming part of or intended to form part of the relevant shelter is missing;

(g) litter bins within the relevant shelter are: missing (when they should be present), damaged, not securely fixed or broken in such a way that they are unfit for use;

(h) any glazing panel forming part of the relevant shelter has a hole in it larger than 10cm in diameter or any crack longer than 10cm; or

(i) any light within the relevant shelter is not working (and for this purpose a light is deemed not to be working if it is broken, missing, flickering or unlit during the hours of darkness).

B 3.1 Service Element: Repair And Maintenance Of Lifts

This Performance Test will be failed in relation to a Tramstop or the Depot where, in respect of any lift at the Tramstop or the Depot:

(a) lighting systems for the relevant lift fail to operate fully within or around the asset (individual units). A lighting system will be deemed to fail if:

(i) any light in, or adjacent to a lift is not fully operational;

(ii) a diffuser is missing or broken; or

(iii) a light is missing when it should be present;

(b) the floor area of the relevant lift is damaged e.g. dangerously uneven or potholed (trip hazard deeper than 3cms) to an extent likely to be a risk to a mobility impaired person;

(c) hand rails are not secure or are missing. There is a requirement that where a place for a hand rail exists within the structure then a rail should be in place;

(d) the floor area of the relevant lift is affected by adverse weather conditions in such a way as to be dangerous when used by passengers;

(e) any glazing panel forming part of the relevant lift is missing;

(f) any glazing panel forming part of the relevant lift has a hole in it;

(g) any glazing panel forming part of the relevant lift has through any means become opaque except where designed to be opaque;

(h) the roof or walls of the lift are damaged e.g. paint peeling, on an individual area larger than A3 size or sections of the relevant roof or wall are missing; or

(i) the relevant lift has been etched with wording or diagrams that have an obscene or racist meaning.

B 3.2 Service Element: Availability of Lifts

This Performance Test will be failed in relation to a Tramstop or the Depot where, in respect of any lift at the Tramstop or the Depot:

(a) the relevant lift is unavailable or fails to operate (unless maintenance is underway or servicing is taking place); or

(b) the relevant lift is defective in such a way as to interfere with usage and/or that makes it dangerous for passengers to use.

B4 Service Element: Repair and Maintenance of Embankments, Ramps and Surrounding Areas

This Performance Test will be failed in relation to a Tramstop where, in respect of any embankments or ramp at the Tramstop:

(a) the relevant embankment or ramp is unavailable or closed during normal operating hours i.e between 15 minutes before the First Tram and 15 minutes after the Last Tram;

(b) the relevant embankment or ramp is defective in such a way as to interfere with usage and/or that makes it dangerous for passengers to use;

(c) lighting systems for the relevant embankment or ramp fail to operate fully within or around it. A lighting system will be deemed to fail for this purpose if:

(i) any two adjacent lights are not fully operational;

(ii) a diffuser is missing or broken; or

(iii) a light is missing when it should be present;

(d) the floor area of the relevant embankment or ramp is damaged e.g. dangerously uneven or potholed (trip hazard deeper than 3cms) to an extent likely to be a risk to a mobility impaired person;

(e) hand or guard rails for the relevant embankment or ramp are not secure or are missing when they should be present;

(f) the relevant embankment or ramp has any railings/fencing that is damaged in such a way that could cause injury to passengers, damage to clothing or allows unauthorised access;

(g) the floor area of the relevant embankment or ramp is affected by adverse weather conditions in such a way as to be dangerous when used by passengers. (Including during icy and/or snowy conditions by not being appropriately treated);

(h) litter bins on the relevant embankment or ramp are: missing, damaged, not securely fixed or broken in such a way as to be unfit for use;

(i) the relevant embankment or ramp has been etched with wording or diagrams that have an obscene or racist meaning; or

(j) the vegetation in surrounding areas is overgrown or non-compliant with the Third Party Agreements or the Environmental Statements.

B5 Service Element: Repair and Maintenance of Stairs, Footbridges and Subways

This Performance Test will be failed in relation to a Tramstop where, in respect of any flight of stairs, footbridge, subway or foyer at the Tramstop:

(a) the area is unavailable or closed during normal operating hours i.e. between 15 minutes before the first Passenger Service and 15 minutes after the last Passenger Service;

(b) the asset is defective in such a way as to interfere with usage and/or that makes it dangerous for passengers to use;

(c) lighting systems fail to operate fully within or around the asset, (Individual Units). For this purpose a lighting system will be deemed to fail if:

(i) any two adjacent lights are not fully operational;

(ii) a diffuser is missing or broken; or

(iii) a light is missing when it should be present;

(d) the floor area is damaged e.g. dangerously uneven or potholed (trip hazard deeper than 3cms) to an extent likely to be a risk to a mobility impaired person, or in the case of stairs, loose stair treads;

(e) hand or guard rails are not secure or are missing when they should be present;

(f) the floor area is affected by adverse weather conditions in such a way as to be dangerous when used by passengers. (Including during icy and/or snowy conditions by not being appropriately treated);

(g) any glazing panel forming part of the stairs, footbridge or subway is missing when it should be present;

(h) any glazing panel forming part of the stairs, footbridge or subway has a hole in it larger than 10cm in diameter or any crack longer than 10cm;

(i) any glazing panel forming part of the stairs, footbridge, subway or foyer has through any means become opaque except where designed to be opaque;

(j) the roof or walls of the relevant stairs, footbridge or subway are damaged over an individual area larger than A3 size (including peeling paint), or any section of the roof or wall is missing;

(k) the roof of the relevant stairs, footbridge, subway or foyer leaks;

(l) the relevant stairs, footbridge or subway have been etched with wording or diagrams that have an obscene or racist meaning; or

(m) the fencing of any flight of stairs or footbridge is missing or is defective in such a way as to interfere with usage and/or that makes it dangerous for passengers.

B6 Service Element: Repair and Maintenance of Platforms

This Performance Test will be failed in relation to a Tramstop where, in respect of any Platform (which for this purpose includes any area at floor level within canopies and shelters together with all and any items of equipment on or within the area of the platform which are not specifically referred to in any other Edinburgh Tram Network Service Element within category B) at the Tramstop:

(a) the area is unavailable or closed during normal operating hours i.e. between 15 minutes before the first Passenger Service and 15 minutes after the last Passenger Service;

(b) the floor area is damaged e.g. dangerously uneven or potholed (trip hazard deeper than 3cms) to an extent likely to be a risk to a mobility impaired person;

(c) the floor area is affected by adverse weather conditions in such a way as to be dangerous when used by passengers. (Including during icy and/or snowy conditions by not being appropriately treated);

(d) lighting systems for the platform fail to operate fully. A lighting system will be deemed to fail if:

(i) any two adjacent lights are not fully operational;

(ii) a diffuser is missing or broken; or

(iii) a light is missing when it should be present;

(e) any litter bin or newspaper dispenser on the platform is: missing (when it should be present), not securely fixed, damaged or broken in such a way that it is unfit for use;

(f) hand or guard rails on the platform are not secure or are missing when they should be present; or

(g) platform railings/fencing is damaged in such a way that could cause injury to passengers, damage to clothing or allow unauthorised access to platform.

B7 Service Element: Repair and Maintenance of Car Parks

This Performance Test will be failed in relation to a Tramstop or the Depot where, in respect of any car park at the Tramstop or the Depot:

(a) less than 95% of parking bays at any Tramstop or the Depot are capable of being available for use by passengers to park cars or motorbikes;

(b) lighting systems for the car park fail to operate fully within or around the car park (individual units). A lighting system will be deemed to fail if:

(i) any two adjacent lights are not fully operational;

(ii) a diffuser is missing or broken; or

(iii) a light is missing when it should be present;

(c) the car park surface is damaged e.g. pot holes larger than an area of A3 size or deeper than 3cms are present;

(d) foliage in the car park is dense and overhangs car parking bays and walkways, in such a way that would prevent or hinder a passenger from using the car park;

(e) foliage in the car park obscures the lighting systems or signs; or

(f) signing in the car park is damaged or missing when it should be present.

B8 Service Element: Repair and Maintenance of Tramstop Cycle Parking

This Performance Test will be failed in relation to a Tramstop where, in respect of any cycle parking facilities at the Tramstop the facilities are damaged in any way so as to prevent:

(a) the cycle parking area is unavailable for use due to obstruction; or

(b) the facilities are missing when they should be present.

C: CLOSED CIRCUIT TELEVISION SYSTEMS

C1 Service Element: Closed Circuit Television Systems

This Performance Test will be failed in relation to a Tramstop or the Depot if, on inspection (whether at the Tramstop, the Depot or at the CCTV control room):

(a) the Infraco does not provide video files for specified cameras, recorded at specified dates and times as requested by **tie** to view the results of the test performed by the monitoring inspector;

(b) a camera at the relevant Tramstop or the Depot which should tilt, pan or zoom fails to do so (including (for the avoidance of doubt) upon activation of a passenger emergency call point) (and, for the avoidance of doubt, a camera will have failed to zoom if (*inter alia*) the real time or recorded picture is sufficiently indistinct to prevent identification of an unknown individual in accordance with police scientific development branch methodology for evidential purposes);

(c) a camera at the relevant Tramstop or Depot fails to operate;

(d) a camera at the relevant Tramstop or Depot is missing when it should be present; or

(e) the real time or recorded picture taken by a camera at the relevant Tramstop or Depot is sufficiently indistinct to prevent recognition of an unknown individual in accordance with police scientific development branch methodology,

provided always that in relation to any Reporting Period when the monitoring inspectors are not (save in circumstances when it would be unreasonable to permit access) permitted access to the CCTV control room to view real time operation, the Performance Test for this Service Element will be deemed to have failed all inspections and the Actual Performance Level shall be zero.

D: PASSENGER INFORMATION VISUAL DISPLAYS AT TRAMSTOPS

D1 Service Element : Passenger Information Visual Displays

This Performance Test will be failed in relation to a Tramstop where, in respect of any Passenger Information Visual Display Unit at the Tramstop:

(a) the unit is not working;

(b) the unit is missing when it should be present; or

(c) the unit is damaged and/or the information is illegible from a distance of 3 metres along the platform of the Tramstop by a person with perfect, or perfectly corrected eyesight.

E: POSTER CASES, SIGNAGE AND PRINTED EDINBURGH TRAM NETWORK SERVICE INFORMATION

E1 Service Element: Poster Cases

This Performance Test will be failed in relation to a Tramstop where, in respect of any poster case at the Tramstop:

(a) the frame of the poster case is damaged in any way that prevents its use for display of posters;

(b) information within the poster case is not clear and legible through the cover of the poster case due to damage;

(c) the poster case frame has visible rust or discoloration covering an area greater than 10cms square; or

(d) the poster case is missing when it should be present.

E2 Service Element: Edinburgh Tram Network Tramstop Signing

This Performance Test will be failed in relation to a Tramstop where, in respect of any signs at the Tramstop:

(a) the sign is missing where it should be present;

(b) the sign is damaged in any way that prevents the information from being clearly legible, (including through failures in internal lighting systems);

(c) the sign is obscured by foliage or other non-authorised materials e.g. including builder's materials, scaffolding or other obscuring object;

(d) the information on the sign is incorrect; or

(e) the sign has been etched with wording or diagrams that have an obscene or racist meaning.

F: PUBLIC ADDRESS SYSTEM AND HELP POINTS AT EDINBURGH TRAM NETWORK TRAMSTOPS

F1 Service Element: Public Address System at Tramstops

This Performance Test will be failed in relation to a Tramstop where, in respect of any public address system at the Tramstop:

(a) announcements are not audible to a person with normal or perfectly corrected hearing under ambient noise conditions that could reasonably be expected to occur at the relevant Tramstop; or

(b) announcements are not clear and understandable and this appears to be as a result of the public address system being faulty.

F2 Service Element: Passenger Emergency and Information Call Points at Tramstops

This Performance Test will be failed in relation to a Tramstop where, in respect of any passenger emergency call point at the Tramstop:

(a) the Operator's response following activation of the passenger emergency call point is not audible to a person with normal or perfectly corrected hearing or is not clear and understandable and this appears to be as a result of the emergency call point being faulty;

(b) the passenger emergency call point is not functioning or is missing when it should be present; or

(c) (if functionality is provided) after the Operator has answered the call, the red light is not illuminated to indicate that it is ready for a member of public to speak.

PART 3 (EDINBURGH TRAM NETWORK SERVICE ELEMENT TABLES)

A: NOT USED

B: TRAMSTOP REPAIRS AND MAINTENANCE

SERVICE ELEMENT		Zero Points Level (Initial)	Positive Allocation Rate	Maximum Positive Allocation	Negative Allocation Rate	Maximum Negative Allocation
B1	Repair and maintenance of Tramstop canopies	86%	10	60	10	60
B2	Repair and maintenance of shelters and seating	89%	10	60	6	60
B3.1	Repair and maintenance of lift(s)	92.5%	25	150	10	150
B3.2	Availability of lift(s)	70%	15	250	15	250
B4	Repair and maintenance of embankments, ramps and surrounding areas	86.5%	10	60	10	60
B5	Repair and maintenance of stairs, footbridges and subways	81%	30	180	30	180
B6	Repair and maintenance of platforms	80%	40	420	40	420
B7	Repair and maintenance of car parks	75%	5	80	5	80
B8	Repair and maintenance of Tramstop cycle parking	85%	5	80	5	80
Totals				1,340		1,340

C: CLOSED CIRCUIT TELEVISION SYSTEMS

SERVICE ELEMENT	Zero Points Level (Initial)	Positive Allocation Rate	Maximum Positive Allocation	Negative Allocation Rate	Maximum Negative Allocation
C Closed Circuit Television Systems	87.5%	100	1700	100	1700
Totals			1700		1700

D: PASSENGER INFORMATION VISUAL DISPLAYS AT TRAMSTOPS

SERVICE ELEMENT	Zero Points Level (Initial)	Positive Allocation Rate	Maximum Positive Allocation	Negative Allocation Rate	Maximum Negative Allocation
D1 Passenger Information Visual Displays	82.5%	20	200	20	200
Totals Service Group D			200		200

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E. POSTER CASES, SIGNAGE AND PRINTED EDINBURGH TRAM NETWORK SERVICE INFORMATION

SERVICE ELEMENT		Zero Points Level (Initial)	Positive Allocation Rate	Maximum Positive Allocation	Negative Allocation Rate	Maximum Negative Allocation
E1	Poster cases, signage and printed ETN Information	80%	4	60	6	60
E2	Tramstop signing	89.5%	10	80	8	80
Totals				140		140

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F. PUBLIC ADDRESS SYSTEM AND HELP POINTS AT EDINBURGH TRAM NETWORK TRAMSTOPS

SERVICE ELEMENT		Zero Points Level (Initial)	Positive Allocation Rate	Maximum Positive Allocation	Negative Allocation Rate	Maximum Negative Allocation
F1	Public address system at Tramstops	90%	10	120	10	120
F2	Passenger emergency call points at Tramstops	90%	25	250	25	250
Totals				370		370

PART 4 (FAULT CORRECTION SERVICE ELEMENT)

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description	Negative Performance Points Per Day or Part Day
1	1 hour to attend and make safe and functional. 2 hours to breakdown intervention	2 hours to attend and make safe and functional. Rectified by 07:30 (if notified before 5:30am)	Critical issue such as health & safety risk, or failure halting the operation of the tram network in whole or part thereof, failure of major system	
2	2 hours	3 hours	Failure impacting the punctuality of the tram network, or having potential to impact	
3	8 hours	9 hours	Failure or incident not having immediate impact on network operation, but impacting the quality of the Transport Services	
4	1 week	1 week	Failure or incident not impacting network operation, nor quality of the Transport Services	
Tramstop lighting Fault	2 days	2 days		500
Tramstop telephone Fault	3 days	3 days		250
Fault causing the lift at Murrayfield Tramstop or depot to be out of operation	6 hours	6 hours		500
Tramstop electronic passenger information display Fault	2 days	2 days		500
Tramstop PA system Fault	24 hours	24 hours		500
Tramstop CCTV Fault	2 days	2 days		250
Defect, fault or other disrepair that restricts access to all or part of a Tramstop or otherwise interferes with its use	1 day	1 day		250
Defect, fault or disrepair causing a	24 hours	24 hours		250

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description	Negative Performance Points Per Day or Part Day
trip hazard at a Tramstop (including unintended changes of floor levels or protrusions from the floor of more than 25mm)				
Defect degrading system access to below DDA requirements	6 days	6 days		250
Broken glass at a Tramstop or the depot	2 hours	2 hours to attend, make safe and functional. Rectified by 07:30, if notified between 22:01 and 05:30		250
Overflowing / damaged gutter at a Tramstop or the depot	24 hours	24 hours		250
Structural defect, fault or other disrepair at a Tramstop or the depot	28 days	28 days		250
Any other defect, fault or other disrepair at a Tramstop or the depot (including in relation to shelters, seats, canopies, signage, cycle parking, litter bins and poster cases) but excluding blocked drains, overgrown vegetation and fencing faults	5 days	5 days		250
Blocked drain other than on a street running section of the Edinburgh Tram Network System	24 hours	24 hours		250
Blocked drain on a street running section of the Edinburgh Tram Network System	2 hours	By 07:30 if notified between 22:01 and 05:30		250
Overgrown vegetation	3 days	3 days		250
Defect, fault or disrepair fencing	6 hours	6 hours		500

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description	Negative Performance Points Per Day or Part Day
such that access to the track or buildings and equipment is not prevented				
Defect, fault or disrepair in respect of a Monitoring Point or any other electronic monitoring equipment	24 hours	24 hours		1000
Structural defect, fault or disrepair other than at a Tramstop or the depot	28 days	28 days		250
Any other defect, fault or disrepair other than at a Tramstop or the depot	2 days	2 days		250

PART B PAYMENT FOR TRAM MAINTENANCE SERVICES

DEFINITIONS

In this part B of this Schedule Part 6 (*Maintenance Payment Regime*), except to the extent that the context otherwise requires, the following words and expressions shall have the meanings hereby ascribed to them:

"**Available Tram**" means that a Tram (or Trams):

(i) fully complies with the Tram Maintenance Specification, save for Minor Defects (as defined in the Tram Maintenance Agreement); and

(ii) is free from Material Defects (as defined in the Tram Maintenance Agreement);

"**Defective Tram**" means a Tram operating in passenger service with a Minor Defect (as defined in the Tram Maintenance Agreement) which arrives at or departs from a Monitoring Point;

"**Excusing Cause**" means any one or more of the following events which interrupts the operation of the Trams:

(i) a road traffic accident;

(ii) the actions of any of the Emergency Services, CEC or Utilities Companies

provided that, in the case of each of (i) and (ii):

(a) the Infraco has used all reasonable endeavours to mitigate the effect of such Excusing Cause; and

(b) the Infraco notifies **tie** as soon as it becomes aware of the potential and/or actual impact on its ability to perform the Tram Maintenance Services;

(iii) a failure on the part of **tie** in complying with its obligations under this Agreement where the Infraco can demonstrate to **tie**'s satisfaction that:

(a) such failure had a material impact on its ability to perform the Tram Maintenance Services;

(b) the Infraco has used all reasonable endeavours to mitigate the effects of such failure; and

(c) the Infraco notified **tie** as soon as it became aware of the potential and/or actual impact on its ability to perform the Tram Maintenance Services;

(iv) any Permitted Variation which causes the Infraco to be unable to perform the Tram Maintenance Services but only to the extent that **tie**:

(a) shall have given its prior written consent to the Tram Maintenance Services being affected in such a manner; and

(b) was informed by the Infraco of the extent of the impact on such Tram Maintenance Services as part of the process of agreeing such Permitted Variation;

(v) a Force Majeure Event; and

(vi) environmental conditions, which result in damage to the Edinburgh Tram Network, that are outside the environmental parameters in the Employer's Requirements.

"**Maximum Performance Payment**" means the base periodic payment for the Tram Maintenance Services set out in part 3 of Schedule 3 (*Payment*) of the Tram Maintenance Agreement;

"**Minimum Overall Payment Performance**" means 95% Tram Punctuality Performance;

"**Minimum Performance Payment**" means 70% of the Maximum Performance Payment;

"**Overall Payment Performance**" has the meaning given to it in paragraph 2 of part B of this Schedule Part 6 (*Maintenance Payment Regime*);

"**Services Payment**" means the payment to be made for carrying out the Tram Maintenance Services (except for the Mobilisation Services) as calculated in accordance with part B of this Schedule Part 6 (*Maintenance Payment Regime*);

"**Timetabled Hot Spares**" means the number of Hot Spares (as defined in the Tram Maintenance Agreement) timetabled to be made Available Tram(s) by the Infraco for use by the Operator in a Reporting Period;

"**Tram Maintainer Late Tram**" means a Late Tram that is late because of:

(i) any defect on the Tram that does not relate to damage or vandalism by a third party directly or indirectly causing the Tram to be a Late Tram;

(ii) any action or omission of the Tram Maintainer; and/or

(iii) a Tram not being offered as an Available Tram to the Operator by the Tram Maintainer.

"**Tram Performance Rectification Plan**" has the meaning given to it in paragraph 6 of part B of this Schedule Part 6 (*Maintenance Payment Regime*);

"**Tram Punctuality Performance**" has the meaning given to it in paragraph 8 of part B of this Schedule Part 6 (*Maintenance Payment Regime*);

1. Tram Maintenance Services Payment

The Services Payment due from **tie** to the Infraco for each Reporting Period shall be established as follows:

SP = ((MaxPP - MinPP) x *OPP) + MinPP*

In any event SP shall not be less that the Minimum Periodic Payment

where:

SP is the Services Payment;

MaxPP is the Maximum Performance Payment for the Reporting Period as calculated in accordance with paragraph 3 of part B of this Schedule Part 6 (*Maintenance Payment Regime*);

MinPP is the Minimum Performance Payment for the Reporting Period;

OPP is the Overall Payment Performance as calculated in accordance with paragraph 2 of part B of this Schedule Part 6 (*Maintenance Payment Regime*).

2. Overall Payment Performance

The Overall Payment Performance shall be calculated on the following basis:

$$OPP = \frac{TPP - MinOPP}{100\% - MinOPP}$$

save where OPP is a negative figure, in which case OPP shall be 0 (zero)

and where:

TPP is the Tram Punctuality Performance calculated in accordance with paragraph 8; and

MinOPP is the Minimum Overall Payment Performance.

3. Maximum Performance Payment

The Maximum Performance Payment shall be adjusted in accordance with this paragraph 3:

3.1 Maximum Performance Payment is based upon the planned total Tram kilometrage per year as set out in Part C of this Schedule Part 6 (*Maintenance Payment Regime*) for the first three years and, thereafter, as advised by the Client ("**Planned Kilometrage**");

3.2 the Infraco will measure the total kilometrage travelled by the Tram fleet in each Reporting Period ("**Actual Kilometrage**").

3.3 not used

3.4 not used

Tram Punctuality

4. The Infraco shall evaluate the Tram Punctuality Performance in accordance with part B of this Schedule Part 6 (*Maintenance Payment Regime*).

5. The Infraco's Representative shall meet with representatives of the Tram Maintainer, the Infrastructure Maintainer, the Operator and **tie** every Operating Day at 09:00 (or such other time as all parties shall reasonably agree) to determine the responsibility for any Late Trams or other non Availability or poor performance of Trams. Where the parties cannot, acting reasonably, determine responsibility for any Late Tram or other non Availability or poor performance then **tie** shall, in its absolute discretion, determine responsibility, subject only to referral of such resolution to the Dispute Resolution Procedure.

6. If the Tram Punctuality Performance is less than 95% then the Infraco shall, within 10 Business Days prepare a rectification plan ("**Tram Performance Rectification Plan**") (to be agreed with **tie**, acting reasonably) setting out a comprehensive analysis of the reasons why the Tram Punctuality Performance is less than 95% and setting out a detailed plan to improve performance to achieve a Tram Punctuality Performance of at least 98%.

7. The Infraco shall report the results of the evaluation for each Reporting Period to **tie** on or before the 10th Business Day of the Reporting Period following the Reporting Period in which the evaluation was performed.

Tram Punctuality Performance

8. Tram Punctuality Performance shall be calculated on the following basis:

$$TPP = 1 - \left(\frac{LT + UHS + \left(\frac{DT}{4} \right) + (5 \times LLT)}{TMT + TMS} \right)$$

where:

TPP is the Tram Punctuality Performance;

LT is the total number of Tram Maintainer Late Trams in the Reporting Period;

UHS is the total number of Timetabled Hot Spares which were not offered as Available Tram(s) in accordance with Clause 9.2.1.1 of the Tram Maintenance Agreement in the Reporting Period;

DT is the total number of Defective Trams in the Reporting Period;

LLT is the total number of Tram Maintainer Late Last Trams in the Reporting Period;

TMT is the total number of Timetabled Monitored Trams in the Reporting Period; and

TMS is the total number of Timetabled Hot Spares in the Reporting Period.

9. Excusing Causes

In determining the number of Tram Maintainer Late Trams and Tram Maintainer Late Last Trams in any Reporting Period for the purposes of paragraph 8 above, the Infraco shall not include any Tram Maintainer Late Tram or Tram Maintainer Late Last Tram arising from an Excusing Cause that existed at the time the Tram arrived at (or departed) the relevant Monitoring Point. A report shall be submitted in accordance with paragraph 12.

10. Services Payment Pending Tram Reliability

10.1 Until the earlier of:

10.1.1 the date when Reliability of every Tram has been certified (within the meaning given in the Tram Supply Agreement); and

10.1.2 the expiry of 13 Full Reporting Periods from the commencement of passenger services,

the Services Payment due from **tie** to the Infraco shall be established as follows:

SP = MaxPP x 0.9

where SP, MaxPP and MinPP have the meaning given to those expressions in paragraph 1 of Part B of this Schedule Part 6 (*Maintenance Payment Regime*).

10.2 That element of the Maximum Performance Payment for each Reporting Period which is not payable pursuant to paragraph 10.1 ("**Service Payment Retention**") shall be applied as follows:

10.2.1 The Service Payment Retention shall be paid to the Infraco in accordance with the provisions of Clause 68 (*Payment in Respect of Maintenance Services*), which shall be construed mutatis mutandis, as if references therein to the date of the Interim Certificate was a reference to the date when the final Tram is declared Reliable provided that all Trams shall have been delivered Reliable not later than the expiry of 13 full Reporting Periods from the commencement of passenger services; or

10.2.2 If all Trams have not been declared reliable by the expiry of 13 full Reporting Periods from the commencement of passenger services, the Service Payment Retention shall be retained by **tie** and the Infraco shall have no further entitlement to it.

10.3 Upon the earlier of:

10.3.1 the payment of the Service Payment Retention to the Infraco pursuant to paragraph 3.2.1; or

10.3.2 the expiry of 13 full Reporting Periods from the commencement of passenger services,

the Services Payment provisions set out in paragraph 1.1 of part B of this Schedule Part 6 (*Maintenance Payment Regime*) shall apply with full force and effect, and the provisions of this paragraph 10 shall cease to have effect (save in respect of the payment obligation or retention right set out in paragraph 10.2 of part B of this Schedule Part 6 (*Maintenance Payment Regime*)).

11. Review of Performance Benchmarks

11.1 On or prior to the expiry of 13 full Reporting Periods after the commencement of passenger services and thereafter on or prior to each subsequent Performance Review Date, the Client shall review and determine the Minimum Overall Payment Performance benchmark and the Tram Punctuality Performance benchmark ("**Performance Benchmarks**") to apply for each Reporting Period from each such date to the next Performance Review Date.

11.2 In determining what Performance Benchmarks are to apply up to the next Performance Review Date under paragraph 11.1 of part B of Schedule Part 6 (*Maintenance Payment Regime*), the Client will have regard to the following:

11.2.1 the level of performance achieved by the Tram Maintainer in the preceding periods in relation to the then current level of Performance Benchmarks and the extent to which that level of performance is or is likely to be sustainable or to be improved upon by an efficient maintenance of the Trams using all reasonable endeavours to optimise the availability of those Trams;

11.2.2 the improvement in performance which the Tram Maintainer might reasonably be expected to achieve up to the next Performance Review Date; and

11.2.3 the effect (or likely effect) of any investments or improvements made, or due to be made which can reasonably be expected to affect the performance of the Tram Maintainer under this Agreement.

11.3 If the Tram Maintainer disagrees that any or all of the Performance Benchmarks determined by the Client under paragraphs 11.1 and 11.2 of part B of Schedule Part 6 (*Maintenance Payment Regime*) are reasonable for the Client to determine then either of the parties may refer that issue for determination in accordance with the Dispute Resolution Procedure but until such revisions are agreed or otherwise determined in accordance with such Dispute Resolution Procedure, the Performance Benchmarks as assessed by the Client under paragraphs 11.1 and 11.2 of part B of Schedule Part 6 (*Maintenance Payment Regime*) shall apply.

12. Excusing Causes and Performance Rebates

12.1 To the extent that:

12.1.1 a single Defect on a Tram in passenger service has lead to Tram Maintainer Late Trams continuing to be allocated in excess of one hour after the removal of the defective Tram back to the Depot where the Tram Maintainer has made a Hot Spare available to the Operator; or

12.1.2 one or more Excusing Causes have resulted in Tram Maintainer Late Trams being allocated which are due to an adverse impact on the performance of the Services by the Tram Maintainer under this Agreement of an Excusing Cause or on the monitoring of such performance under part B of this Schedule Part 6 (*Maintenance Payment Regime*)

results in the Services Payment payable by **tie** under part B of this Schedule Part 6 (*Maintenance Payment Regime*) in relation to a Reporting Period being less than it would otherwise have been by an amount equal to or greater than the Relief Threshold then, in order to claim a Performance Rebate from **tie** in consequence thereof, then the Infraco shall:

(a) within 10 Business Days after the end of the relevant Reporting Period submit to **tie** written notice:

(i) describing the effect that each such single defect or single defect or Excusing Cause has had on the performance of the Tram Maintenance Services or on the monitoring of such performance during that Reporting Period including full details of the nature of the single defect or Excusing Cause, the date of occurrence and its duration (or likely duration in the case of a single defect or Excusing Cause that is affecting Tram Maintenance Services at the date of the notice);

(ii) describing the effect of each such single defect or Excusing Cause or external factor on the allocation of Tram Maintainer Late Trams, Tram Maintainer Last Late Trams and Performance Points;

(iii) stating the Tram Maintenance Services Payment that would have been due from **tie** in respect of that Reporting Period had the Excusing Cause(s) or external factor not occurred; and

(iv) stating the proposed Performance Rebate due from **tie** assuming that the Actual Performance Level for Tram Punctuality Performance during any period affected by an Excusing Cause or external factor

would have been no higher than the Actual Performance Level applying to those parts of the Reporting Period not affected by an Excusing Cause or external factor (or where the proposed Performance Rebate applies to a full Reporting Period, the previous Reporting Period not affected by an Excusing Cause or external factor);

(b) demonstrate to the reasonable satisfaction of **tie** that:

(i) the Tram Maintainer could not have avoided the occurrence of the Excusing Cause(s) or the external factor or the consequences thereof by steps which it might reasonably be expected to have taken, without incurring material additional expenditure;

(ii) the Excusing Cause(s) or external factor caused the claimed effect on the allocation of Performance Points; and

(iii) the reduction in the Services Payment caused by the Excusing Cause(s) or external factor could not reasonably be expected to have been avoided or reduced by the Infraco taking all those steps which a reasonably experienced, efficient and competent maintenance contractor engaged in the same type of undertaking (comparable in size, scope and complexity to its activities in relation to this Agreement) would properly be expected to take if seeking in good faith and in accordance with Good Industry Practice to mitigate or recover the effect of the Excusing Cause(s), in particular by implementing any relevant contingency plans that the Infraco is required to put in place under this Agreement.

12.2 In the event that the Infraco has submitted a notice under paragraph 12.1(a) and complied with its obligations under paragraph 12.1(b) then:

(a) the Infraco and **tie** shall endeavour to agree as soon as practicable the amount of the Performance Rebate (if any);

(b) the Infraco shall provide, as soon as reasonably practicable after any request by **tie**, such further information and explanations as **tie** may reasonably request;

(c) to the extent that **tie** agrees to pay the proposed Performance Rebate, **tie** shall pay to the Infraco the Performance Rebate or such part as it agrees to be payable, within 14 days of the later of the receipt by **tie** of the notice to **tie** under paragraph 12.1(a) and the receipt of all information and explanations requested under paragraph 12.1(b) that are reasonably required by the Client to verify its liability to make such payment;

(d) if **tie** wishes to dispute all or part of the proposed Performance Rebate, it shall, within 28 days of receipt of the notice under paragraph 12.1(a) of part 1 of this Schedule Part 6 (*Maintenance Payment Regime*) (or if later within 28 days after receipt of any further information reasonably requested under paragraph 12.2 (b) of part B of this Schedule Part 6 (*Maintenance Payment Regime*)), submit written notice to the Infraco setting out the reasons why it disagrees with the notice submitted under paragraph 12.1 (a) of part B of this Schedule Part 6 (*Maintenance Payment Regime*) or considers that the Tram Maintainer has not complied with its obligations under paragraph 12.1(b) of part B of this Schedule Part 6 (*Maintenance Payment Regime*);

(e) to the extent that the Infraco and **tie** are unable to agree the amount of the Performance Rebate (if any) within 28 days of days of receipt of the notice referred to in paragraph 12.2 (d) of part B of this Schedule Part 6 (*Maintenance Payment Regime*), then the determination of the applicable Performance Rebate may at the instance of either Party be referred for determination in accordance with the Dispute Resolution Procedure; and

(f) **tie** shall pay any unpaid amount of the Performance Rebate subsequently agreed or determined to be payable within 14 days of the quantum of the Performance Rebate being agreed or within 14 days of receipt by **tie** of the determination thereof, together with interest in accordance with the rate set out in Clause 69.1 of this Agreement from the due date for payment of the Services Payment for the Reporting Period in relation to which the Performance Rebate is payable up to the date of payment.

12.3 **tie** shall be entitled to deduct from any Performance Rebates payable by it under this paragraph 12 of part B of this Schedule Part 6 (*Maintenance Payment Regime*) any variable cost savings realised by the Infraco as a result of non-

performance of the Services, particularly in the case of Excusing Causes having an extended duration.

PART C: MAXIMUM PERFORMANCE PAYMENT FOR TRAM MAINTENANCE SERVICES

PAYMENT MILESTONES SCHEDULE 1 TO 27 TRAMS

PAYMENT MILESTONES MAINTENANCE SCHEDULE- 1 TO 27 Trams			CAF				Payment Period				
No.	**Milestone Description**	**Comments**	**Previous Forecast Date**	**Revised forecast date based on signature on 28th March 2008**	**Previous forecast reporting period**	**revised forecast reporting period**	**Period End Date**	**Application for payment**	**Clause 38.6 Issue of Interim Certificate**	**Clause 38.6 VAT Certificate to client**	**Clause 38 payment of Interim Certificate**
	Maintenance payment will start on commencement of shadow running and will apply to all 27 Trams.							within 15 Business Days	10 Business Days from application date	10 Business Days from issue of interim certificate	20 days from issued of interim certificate
1	Commencement of Shadow Running	Employers Requirements Clause 23.10 Shadow Running. The evaluation of the shadow running is the	30/09/2010	30/12/2010	07/2010-2011	10/2010-2011	08/01/2011	28/01/2011	11/02/2011	25/02/2011	03/03/2011

		pre operations test. Tram Inspector will confirm passing of test so payment can be made									
2	Maintenance payment number 01 year 1	Payment number 1 is due at the start of shadow running	30/09/2010	30/12/2010	07/2010-2011	10/2010-2011	08/01/2011	28/01/2011	11/02/2011	25/02/2011	03/03/2011
3	Maintenance payment number 02 year 1	Payment number 2 is due at end of first period after maintenance payment 1 was applied for		30/01/2011		11/2010-2011	05/02/2011	25/02/2011	11/03/2011	25/03/2011	31/03/2011
4	Maintenance payment number 03 year 1	Payment number 3 is due at end of first period after maintenance payment 2 was applied for		28/02/2011		12/2010-2011	05/03/2011	25/03/2011	08/04/2011	22/04/2011	28/04/2011
5	Maintenance payment number 04 year 1	Payment number 4 is due at end of first period after maintenance payment 3 was applied for		30/03/2011		13/2010-2011	31/03/2011	20/04/2011	04/05/2011	18/05/2011	24/05/2011

6	Maintenance payment number 05 year 1	Payment number 5 is due at end of first period after maintenance payment 4 was applied for		30/04/2011		01/2011-2012	30/04/2011	20/05/2011	03/06/2011	17/06/2011	23/06/2011
7	Maintenance payment number 06 year 1	Payment number 6 is due at end of first period after maintenance payment 5 was applied for		30/05/2011		03/2011-2012	25/06/2011	15/07/2011	29/07/2011	12/08/2011	18/08/2011
8	Maintenance payment number 07 year 1	Payment number 7 is due at end of first period after maintenance payment 6 was applied for		30/06/2011		04/2011-2012	17/10/2009	06/11/2009	20/11/2009	04/12/2009	10/12/2009
9	Maintenance payment number 08 year 1	Payment number 8 is due at end of first period after maintenance payment 7 was applied for		30/07/2011		05/2011-2012	20/08/2011	09/09/2011	23/09/2011	07/10/2011	13/10/2011
10	Maintenance payment number 09 year 1	Payment number 9 is due at end of first period after maintenance payment 8 was applied for		30/08/2011		06/2011-2012	17/09/2011	07/10/2011	21/10/2011	04/11/2011	10/11/2011

11	Maintenance payment number 10 year 1	Payment number 10 is due at end of first period after maintenance payment 9 was applied for		30/09/2011		07/2011-2012	15/10/2011	04/11/2011	18/11/2011	02/12/2011	08/12/2011
12	Maintenance payment number 11 year 1	Payment number 11 is due at end of first period after maintenance payment 10 was applied for		30/10/2011		8/2011-2012	12/11/2011	02/12/2011	16/12/2011	30/12/2011	05/01/2012
13	Maintenance payment number 12 year 1	Payment number 12 is due at end of first period after maintenance payment 11 was applied for		30/11/2011		09/2011-2012	10/12/2011	30/12/2011	13/01/2012	27/01/2012	02/02/2012
14	Maintenance payment number 13 year 1	Payment number 13 is due at end of first period after maintenance payment 12 was applied for		30/12/2011		10/2011-2012	07/01/2012	27/01/2012	10/02/2012	24/02/2012	01/03/2012
15	Maintenance payment number 01 year 2	Payment number 1 year 2 is due at the end of the first period after maintenance payment 13 was applied for		30/01/2012		11/2011-2012	04/02/2012	24/02/2012	09/03/2012	23/03/2012	29/03/2012

16	Maintenance payment number 02 year 2	Payment number 2 year 2 is due at end of first period after maintenance payment 1 was applied for		28/02/2012		12/2011-2012	03/03/2012	23/03/2012	06/04/2012	20/04/2012	26/04/2012
17	Maintenance payment number 03 year 2	Payment number 3 year 2 is due at end of first period after maintenance payment 2 was applied for		30/03/2012		13/2011-2012	31/03/2012	20/04/2012	04/05/2012	18/05/2012	24/05/2012
18	Maintenance payment number 04 year 2	Payment number 4 year 2 is due at end of first period after maintenance payment 3 was applied for		30/04/2012		02/2012-2013	26/05/2012	15/06/2012	29/06/2012	13/07/2012	19/07/2012
19	Maintenance payment number 05 year 2	Payment number 5 year 2 is due at end of first period after maintenance payment 4 was applied for		30/05/2012		03/2012-2013	23/06/2012	13/07/2012	27/07/2012	10/08/2012	16/08/2012
20	Maintenance payment number 06 year 2	Payment number 6 year 2 is due at end of first period after maintenance payment 5 was applied for		30/06/2012		04/2012-2013	21/07/2012	10/08/2012	24/08/2012	07/09/2012	13/09/2012

21	Maintenance payment number 07 year 2	Payment number 7 year 2 is due at end of first period after maintenance payment 6 was applied for		30/07/2012		05/2012-2013	18/08/2012	07/09/2012	21/09/2012	05/10/2012	11/10/2012
22	Maintenance payment number 08 year 2	Payment number 8 year 2 is due at end of first period after maintenance payment 7 was applied for		30/08/2012		06/2012-2013	15/09/2012	05/10/2012	19/10/2012	02/11/2012	08/11/2012
23	Maintenance payment number 09 year 2	Payment number 9 year 2 is due at end of first period after maintenance payment 8 was applied for		30/09/2012		07/2012-2013	13/10/2012	02/11/2012	16/11/2012	30/11/2012	06/12/2012
24	Maintenance payment number 10 year 2	Payment number 10 year 2 is due at end of first period after maintenance payment 9 was applied for		30/10/2012		08/2012-2013	10/11/2012	30/11/2012	14/12/2012	28/12/2012	03/01/2013
25	Maintenance payment number 11 year 2	Payment number 11 year 2 is due at end of first period after maintenance payment 10 was applied for		30/11/2012		09/2012-2013	08/12/2012	28/12/2012	11/01/2013	25/01/2013	31/01/2013
26	Maintenance payment number 12 year 2	Payment number 12 year 2 is due at end of first period after		30/12/2012		10/2012-2013	05/01/2013	25/01/2013	08/02/2013	22/02/2013	28/02/2013

		maintenance payment 11 was applied for									
27	Maintenance payment number 13 year 2	Payment number 13 year 2 is due at end of first period after maintenance payment 12 was applied for		30/01/2013		11/2012-2013	02/02/2013	22/02/2013	08/03/2013	22/03/2013	28/03/2013
28	Maintenance payment number 01 year 3	Payment number 1 year 3 is due at the end of the first period after maintenance payment 13 was applied for		28/02/2013		12/2012-2013	02/03/2013	22/03/2013	05/04/2013	19/04/2013	25/04/2013
29	Maintenance payment number 02 year 3	Payment number 2 year 3 is due at end of first period after maintenance payment 1 was applied for		30/03/2013		13/2012-2013	31/03/2013	20/04/2013	04/05/2013	18/05/2013	24/05/2013
30	Maintenance payment number 03 year 3	Payment number 3 year 3 is due at end of first period after maintenance payment 2 was applied for		30/04/2013		02/2013-2014	25/05/2013	14/06/2013	28/06/2013	12/07/2013	18/07/2013
31	Maintenance payment number 04 year 3	Payment number 4 year 3 is due at end of first period after maintenance payment		30/05/2013		03/2013-2014	22/06/2013	12/07/2013	26/07/2013	09/08/2013	15/08/2013

		3 was applied for									
32	Maintenance payment number 05 year 3	Payment number 5 year 3 is due at end of first period after maintenance payment 4 was applied for		30/06/2013		04/2013-2014	20/07/2013	09/08/2013	23/08/2013	06/09/2013	12/09/2013
33	Maintenance payment number 06 year 3	Payment number 6 year 3 is due at end of first period after maintenance payment 5 was applied for		30/07/2013		05/2013-2014	17/08/2013	06/09/2013	20/09/2013	04/10/2013	10/10/2013
34	Maintenance payment number 07 year 3	Payment number 7 year 3 is due at end of first period after maintenance payment 6 was applied for		30/08/2013		06/2013-2014	14/09/2013	04/10/2013	18/10/2013	01/11/2013	07/11/2013
35	Maintenance payment number 08 year 3	Payment number 8 year 3 is due at end of first period after maintenance payment 7 was applied for		30/09/2013		07/2013-2014	12/10/2013	01/11/2013	15/11/2013	29/11/2013	05/12/2013
36	Maintenance payment number 09 year 3	Payment number 9 year 3 is due at end of first period after maintenance payment 8 was applied for		30/10/2013		08/2013-2014	09/11/2013	29/11/2013	13/12/2013	27/12/2013	02/01/2014

37	Maintenance payment number 10 year 3	Payment number 10 year 3 is due at end of first period after maintenance payment 9 was applied for		30/11/2013		09/2013-2014	07/12/2013	27/12/2013	10/01/2014	24/01/2014	30/01/2014
38	Maintenance payment number 11 year 3	Payment number 11 year 3 is due at end of first period after maintenance payment 10 was applied for		30/12/2013		10/2013-2014	04/01/2014	24/01/2014	07/02/2014	21/02/2014	27/02/2014
39	Maintenance payment number 12 year 3	Payment number 12 year 3 is due at end of first period after maintenance payment 11 was applied for		30/01/2014		11/2013-2014	01/02/2014	21/02/2014	07/03/2014	21/03/2014	27/03/2014
40	Maintenance payment number 13 year 3	Payment number 13 year 3 is due at end of first period after maintenance payment 12 was applied for		28/02/2014		12/2013-2014	01/03/2014	21/03/2014	04/04/2014	18/04/2014	24/04/2014

TRAM KM FORECAST

Year	2008	2009	2010	Year 1 2011	Year 2 2012	Year 3 2013
Mileage (km)	Nil	Nil	Nil	57037	70000	85000
Trams				27	27	27
Total				1540000	1890000	2295000

EDINBURGH TENDER

Tender Data	1,08	€/ km & Trams	100.000	km

KM Proposed		Average	
1st year:	Trams (27 units)	57.037	km/Tram/yr
2nd year:	Trams (27 units)	70.000	km/Tram/yr
3rd year:	Trams (27 units)	85.000	km/Tram/yr

	Year 2007	year 2008	Year 2009	Year 2010	year 2011	Year 2012	Year 2013
		CPI forcast estimate	CPI forcast estimate	CPI forcast estimate	CPI forcast estimate	CPI forcast estimate	CPI forcast estimate
Km/Tram/Yr	**Price € / km**	**3%**	**3%**	**3%**	**3%**	**3%**	**3%**
55001 - 60000	**1,3756**	1,4168	1,4593	1,5031	1,5482	1,5947	1,6425
60001 - 65000	**1,3187**	1,3583	1,3990	1,4410	1,4842	1,5288	1,5746
65001 - 70000	**1,2700**	1,3081	1,3473	1,3878	1,4294	1,4723	1,5164

70001 - 75000	**1,2278**	1,2646	1,3026	1,3416	1,3819	1,4233	1,4660
75001 - 80000	**1,1908**	1,2266	1,2634	1,3013	1,3403	1,3805	1,4219
80001 - 85000	**1,1582**	1,1930	1,2288	1,2656	1,3036	1,3427	1,3830
85001 - 90000	**1,1293**	1,1631	1,1980	1,2340	1,2710	1,3091	1,3484
90001 - 95000	**1,1033**	1,1364	1,1705	1,2056	1,2418	1,2791	1,3174
95001 - 100000	**1,08**	1,1124	1,1458	1,1801	1,2155	1,2520	1,2896

NOTE 1: If each tram or any tram does not exceed 55.000 km per year or is above 100.000 km per year, the parties shall meet and reach an agreement with respect to payment for that tram or trams.

NOTE 2: Unless the parties agree otherwise, the parties shall agree at the beginning of the year the payment forecast and the payments for periods 1 to 12 shall be made based on that forecast with a balancing payment to adjust for the actual at the end of period 13.

NOTE 3: For years 1 to 3 then the proportion of the €/km figure that is based upon costs incurred in £ sterling is 40%. Therefore 40% is not subject to currency fluctuation and shall be converted into £/km using the rate of 0.69 € per £1 sterling. The other 60% shall be converted into £/km based on the prevailing rate on the date of payment application unless the Parties agree to hedge the maintenance payments.

NOTE 4: For years 4 to 30 then the proportion of the €/km figure that is based upon costs incurred in £ sterling is 60%. Therefore 60% is not subject to currency fluctuation and shall be converted into £/km using the rate of 0.69 € per £1 sterling. The other 40% shall be converted into £/km based at the prevailing rate on the date of payment application unless the Parties agree to hedge the maintenance payments.

THIS IS SCHEDULE PART 7 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 7

MAINTENANCE CONTRACT PRICE ANALYSIS

CONTENTS

1.0 Introduction

2.0 Adjusting Prices for Changes

3.0 The Application of Rates

4.0 Maintenance Price Build Ups

5.0 Schedule of Rates for Infraco Repairs

6.0 Schedule of Rates for Tram Maintainer Repairs

7.0 Disallowed Costs

8.0 Tram Maintainer Maintenance Prices

APPENDIX A - Maintenance Price Build up

APPENDIX B - Schedule of Rates for Additional services

APPENDIX C - Schedule of Agreed repairs for Tram Maintainer

APPENDIX D - Schedule of Agreed Repairs for Infraco

APPENDIX E - Manpower ETN

APPENDIX F - Process for Agreement of Permitted Variations

1. INTRODUCTION

1.1 The Tram Maintenance Agreement price is on a 'fixed and firm' price per km basis and indexed.

Payment for the Tram Maintenance Agreement will be made in accordance with the Tram Maintenance Agreement clauses:

- Clause 42 – Payments
- Schedule 3 – Part 1 Performance Payment
- Schedule 3 - Part 2 Mobilisation Milestones
- Schedule 3 - Part 3 Maximum Performance Payment

1.2 The Infraco Contract maintenance pricing (excluding mobilisation fee and payment for initial spare parts) is subject to Indexation, paid each Reporting Period in accordance with this Agreement and not subject to variation unless changed pursuant to one of the following clauses in this Agreement:

- Clause 52 – Maintenance
- Clause 57 – Performance Review
- Clause 65 – Compensation Events
- Clause 66 – Payment of the Contract Price
- Clause 68 – Payment in respect of Maintenance Services
- Clause 71 – Labour Tax and Landfill Tax Fluctuations
- Clause 79 – Management of Variations
- Clause 80 – **tie** Changes
- Clause 81 – Infraco Changes
- Clause 82 – Small Works Changes
- Clause 84 – Qualifying Changes in Law

1.3 The Infraco Contract Schedule contains Employer' Requirements for Maintenance Services and the Infraco Proposal for Infrastructure Maintenance Services

- Schedule Part 2 (Employer's Requirements) – Section 40 Maintenance
- Schedule Part 30 (Infraco Proposals) - Section 3 Maintenance –Part 1 Maintenance Proposal from BBS

1.4 Payment for the Maintenance Services will be made in accordance with the Infraco Contract clauses:

- Clause 52 – Maintenance
- Clause 68 – Payment in respect of Maintenance Services

1.5 The Infraco Contract Schedule contains the Maintenance Payment Regime for determining the performance related payment for both Infrastructure Maintenance Services and Tram Maintenance Services:

- Schedule Part 6 – Maintenance Payment Regime

1.6 The Infraco or Tram Maintainer is not entitled to any other amounts, save as set out in this Schedule Part 7 or as otherwise set out in the Infraco or Tram Maintenance Agreement.

1.7 No provision within the Infraco Contract, the Tram Supply Agreement or Tram Maintenance Agreement shall entitle the Infraco, Tram Supplier or Tram Maintainer to more than one payment for any Part or other entitlement under the Infraco Contract, Tram Supply Agreement or Tram Maintenance Agreement.

1.8 References to clause numbers in the Agreement or paragraph numbers in the Schedule are to Clauses and paragraphs in the Infraco Contract unless expressly stated as referring to the Tram Supply Agreement or the Tram Maintenance Agreement.

1.9 Where defined terms are used in this Schedule Part 7 which are not defined in this Schedule Part 7 or in the Infraco Contract, they shall have the same meaning as is given in the Tram Maintenance Agreement (or Tram Supply Agreement where relevant).

1.10 All rates, lump sums and the like contained in this Schedule Part 7 are exclusive of Value Added Tax and are in Pounds Sterling.

1.11 The Services Payment due to the Tram Maintainer will be subject to Schedule 3 Part 1 of the Tram Maintenance Agreement (Performance Payment) Clause 1.1.

1.12 The Overall Payment Performance due to the Tram Maintainer will be subject to Schedule 3 Part 1 of the Tram Maintenance Agreement (Performance Payment) Clause 1.2.

1.13 The Maximum Performance Payment to the Tram Maintainer will be subject to Schedule 3 Part 1 of the Tram Maintenance Agreement (Performance Payment) Clause 1.3.

1.14 The Maximum Performance Payment set out in Part 3 of Schedule 3 of the Tram Maintenance Agreement is subject to a Minimum Overall Payment Performance of 95% as set out in Part 3 of Schedule 3 of the Tram Maintenance Agreement.

2. ADJUSTING MAINTENANCE PRICES FOR CHANGES

2.1 Adjusting maintenance prices for Permitted Variations shall be undertaken in accordance with this Agreement and where they relate to Tram Maintenance Services, then reference shall be made to the change procedure in the Tram Maintenance Agreement as listed for reference in paragraph 1.1 and 1.2.

3. THE APPLICATION OF RATES

3.1 The rates for Additional Services are as detailed in Appendix B.

3.2 The rates for Agreed Repairs for Tram Maintainer are as detailed in Appendix C.

4. MAINTENANCE PRICE BUILD UPS

4.1 The Infraco Maintenance Costs Evaluation for Phase 1a are as contained in Appendix A.

5. SCHEDULE OF RATES INFRACO REPAIRS

5.1 The schedule of rates for Infraco Repairs is detailed in the Infraco Proposal and in Appendix D.

6. SCHEDULE OF RATES TRAM MAINTAINER REPAIRS

6.1 The schedule of rates for Tram Maintainer Repairs is included in Appendix C.

7. DISALLOWED COSTS

7.1 The following items shall be explicitly excluded from any Payment Application in connection with the provision of the Maintenance Services:

Generally, for items inclusive below, costs shall mean the Infraco's own costs but will not include costs levied by **tie** for any default by the Infraco or are taken as a set off in respect of Maintenance Services.

7.1.1 Costs not payable under the Infraco Contract.

7.1.2 Costs arising from the Infraco's Design errors.

7.1.3 Costs arising related to claims for Deductibles on insurance policies for which the Infraco is responsible in terms of Clause 76.16.

7.1.4 Costs as incurred only because the Infraco did not follow an acceptance or procurement procedure stated in the Agreement to the extent that this has increased actual costs from what they otherwise would have been (i.e. the extra over cost is disallowed).

7.1.5 Costs as incurred only because the Infraco did not proceed regularly and diligently with the Services.

7.1.6 Costs arising where the work was delayed, disrupted, or cancelled due to the default of the Infraco (including where the Infraco's default was the cause of an emergency).

7.1.7 Costs arising where the Infraco did not make a bona fide attempt to use arranged access (which includes having the appropriate physical presence on site required to utilise the access) except where the Infraco was instructed by **tie**'s Representative not to use the access.

7.1.8 Costs arising from the additional cost of a Permitted Variation (calculated in accordance with Appendix F of this Schedule Part 7) resulting where the Infraco failed to give an early warning and/or notification of in accordance with the requirements of the Infraco Contract or failed to submit for the information required by the Infraco Agreement.

7.1.9 Costs arising from correcting defects caused by the Infraco not complying with a requirement for how he is to provide the Services stated in the Infraco Contract.

8. TRAM MAINTAINER MAINTENANCE PRICES

8.1 The Tram Maintainer Maintenance prices are included in Schedule 3, Part 2 (Mobilisation Milestones - Payment Milestones Schedule Capital) and Schedule 3, Part 3 (Maximum Performance Payment) of the Tram Maintenance Agreement.

APPENDIX A

MAINTENANCE PRICE BUILD UP

1. ETN Infraco maintenance costs evaluation

1.1 Basis

The basis of the maintenance costs is section 40 of the Employer's Requirements and the Infraco Proposal.

USB00000047_0007

ETN Infraco maintenance costs evaluation

Bidder name: BBS - Phase 1a

Date submitted: 08.04.2008

(considering bogie, OLE fixed tensioning, extended mobilisation period, carpark maintenance, excluding cleaning it is assumed that Tramco Maintainer will join the consortium; in case of novation Infraco would add a markup to Tramco Maintenance Price)

Sections:

Maintenance	Complete the staff headcount and annual pay details along with annual amounts for planned preventative, reactive and lifecycle materials / contracts
Staff	Complete the staff headcount and annual pay details along for staff members not already included in the maintenance section
Overheads	Complete annual totals for general overheads
Total	Totals the figures entered on the above three tabs

Enter data in the cells shaded green

To be completed in conjunction with the document "ETN Infraco maintenance costs evaluation schedule detail"

Track and formation

Staff headcount (FTE)	0,00	0,00	2,20	5,20	5,20	5,70	5,70	5,70	5,70	5,70	6,20	6,20	6,20						0,73	5,53	3,32	
FTE pay, overtime and other payments			85.608	79.259	79.259	77.657	77.657	77.657	77.657	77.657	76.313	76.313	76.313						85.608	78.159	77.810	
Subtotal staff	0	0	188.337	412.146	412.146	442.644	442.644	442.644	442.644	442.644	473.142	473.142	473.142	0	0	0	0	0	188.337	2.594.868	4.645.275	
Planned preventative materials / contracts																			0	0	0	
Reactive materials / contracts				16.126	16.126	90.461	90.461	90.461	90.461	90.461	133.565	133.565	133.565						0	394.096	885.253	
Lifecycle materials / contracts																			0	0	0	
Tools	41.874	41.874	41.874	7.153	7.153	7.153	7.153	7.153	49.027	7.153	7.153	7.153	7.153						125.621	84.794	239.029	
Spare																			0	0	0	
Spare																			0	0	0	
Total	41.874	41.874	230.211	435.425	435.425	617.921	540.258	540.258	582.132	540.258	613.861	613.861	613.861	0	0	0	0	0	313.958	3.151.421	5.769.557	

Tram stop structures

Staff headcount (FTE)																			0,00	0,00	0,00	
FTE pay, overtime and other payments																			#DIV/0!	#DIV/0!	#DIV/0!	
Subtotal staff	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Planned preventative materials / contracts																			0	0	0	
Reactive materials / contracts																			0	0	0	
Lifecycle materials / contracts																			0	0	0	
Tools																			0	0	0	
Spare																			0	0	0	
Spare																			0	0	0	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Tram stop shelters

Staff headcount (FTE)																			0,00	0,00	0,00	
FTE pay, overtime and other payments																			#DIV/0!	#DIV/0!	#DIV/0!	
Subtotal staff	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Planned preventative materials / contracts																			0	0	0	
Reactive materials / contracts																			0	0	0	
Lifecycle materials / contracts																			0	0	0	
Tools																			0	0	0	
Spare																			0	0	0	
Spare																			0	0	0	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Gogar depot

Staff headcount (FTE)				1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00						0,00	1,00	0,56	
FTE pay, overtime and other payments				61.149	61.149	61.149	61.149	61.149	61.149	61.149	61.149	61.149	61.149						#DIV/0!	61.149	61.149	
Subtotal staff	0	0	0	61.149	61.149	61.149	61.149	61.149	61.149	61.149	61.149	61.149	61.149	0	0	0	0	0	0	366.894	611.490	
Planned preventative materials / contracts				35.596	35.596	46.260	40.928	111.040	83.982	62.342	46.303	174.113	131.059						0	353.402	767.219	
Reactive materials / contracts		6.500	6.500	13.000	13.000	29.815	29.815	67.388	63.531	63.531	63.531	83.531	70.189						13.000	216.550	490.332	
Lifecycle materials / contracts				26.000	26.000	26.000	26.000	26.000	26.000	26.000	26.000	26.000	26.000						0	156.000	260.000	
Tools	73.290	73.290	73.290	53.343	60.438	53.343	60.438	53.343	104.769	53.343	60.438	53.343	60.438						219.869	385.673	833.103	
Carpark maintenance				17.508	17.508	17.508	17.508	17.508	17.508	17.508	17.508	17.508	17.508						0	105.050	175.083	
Spare																			0	0	0	
Total	73.290	79.790	79.790	206.596	213.691	234.075	235.839	336.428	356.939	283.874	274.929	395.644	366.343	0	0	0	0	0	232.869	1.583.569	3.137.228	

Roads

Staff headcount (FTE)																			0,00	0,00	0,00	
FTE pay, overtime and other payments																			#DIV/0!	#DIV/0!	#DIV/0!	
Subtotal staff	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Planned preventative materials / contracts																			0	0	0	
Reactive materials / contracts																			0	0	0	
Lifecycle materials / contracts																			0	0	0	
Tools																			0	0	0	
Spare																			0	0	0	
Spare																			0	0	0	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Buildings

Staff headcount (FTE)																			0,00	0,00	0,00	
FTE pay, overtime and other payments																			#DIV/0!	#DIV/0!	#DIV/0!	
Subtotal staff	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Planned preventative materials / contracts																			0	0	0	
Reactive materials / contracts																			0	0	0	
Lifecycle materials / contracts																			0	0	0	
Tools																			0	0	0	
Spare																			0	0	0	
Spare																			0	0	0	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Structures

Staff headcount (FTE)																			0,00	0,00	0,00	
FTE pay, overtime and other payments																			#DIV/0!	#DIV/0!	#DIV/0!	
Subtotal staff	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Planned preventative materials / contracts																			0	0	0	
Reactive materials / contracts																			0	0	0	

Operating years				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Subtotal / av	Subtotal / av	Grand	Assumptions / comments
Year number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mobilisation	6 years ops	total / av	
Year start	Jan 08	Jan 09	Jan 10	Jan 11	Jan 12	Jan 13	Jan 14	Jan 15	Jan 16	Jan 17	Jan 18	Jan 19	Jan 20	Jan 21	Jan 22	Jan 23	Jan 24	Jan 25				
Year end	Dez 08	Dez 09	Dez 10	Dez 11	Dez 12	Dez 13	Dez 14	Dez 15	Dez 16	Dez 17	Dez 18	Dez 19	Dez 20	Dez 21	Dez 22	Dez 23	Dez 24	Dez 25				
Lifecycle materials / contracts																			0	0	0	
Tools																			0	0	0	
Spare																			0	0	0	
Spare																			0	0	0	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Supervisory control and comms systems (SCC)																						
Staff headcount (FTE)	0,00	0,00	1,35	2,80	2,80	2,80	2,80	2,80	2,80	2,80	2,80	2,80	2,80						0,45	2,80	1,63	
FTE pay, overtime and other payments			81.884	77.619	77.619	77.619	77.619	77.619	77.619	77.619	77.619	77.619	77.619						81.884	77.619	77.619	
Subtotal staff	0	0	110.544	217.334	217.334	217.334	217.334	217.334	217.334	217.334	217.334	217.334	217.334	0	0	0	0	0	110.544	1.304.003	2.283.881	
Planned preventative materials / contracts																			0	0	0	
Reactive materials / contracts				0	0	40.586	40.586	81.172	81.172	81.172	104.557	104.557	104.557						0	243.515	638.357	
Lifecycle materials / contracts									69.783										0	69.783	69.783	
Tools	25.863	25.863	25.863						25.863										77.588	25.863	103.451	
Spare																			0	0	0	
Spare																			0	0	0	
Total	25.863	25.863	136.406	217.334	217.334	257.920	257.920	298.506	394.151	298.506	321.890	321.890	321.890	0	0	0	0	0	188.132	1.643.164	3.095.472	
Overhead line contact system and HV supplies																						
Staff headcount (FTE)	0,00	0,00	0,95	2,50	2,50	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00						0,32	2,63	1,66	
FTE pay, overtime and other payments			80.011	76.649	76.649	76.073	76.073	76.073	76.073	76.073	76.073	76.073	76.073						80.011	76.242	76.294	
Subtotal staff	0	0	76.011	191.622	191.622	228.219	228.219	228.219	228.219	228.219	228.219	228.219	228.219	0	0	0	0	0	76.011	1.296.120	2.285.008	
Planned preventative materials / contracts				45.510	45.510	45.510	45.510	45.510	45.510	45.510	45.510	45.510	45.510						0	273.063	455.104	
Reactive materials / contracts				0	0	38.319	38.319	76.638	76.638	76.638	98.147	98.147	98.147						0	229.914	600.993	
Lifecycle materials / contracts																			0	0	0	
Tools	56.593	56.593	56.593						56.593										169.779	56.593	226.372	
Spare																			0	0	0	
Spare																			0	0	0	
Total	56.593	56.593	132.604	237.132	237.132	312.049	312.049	350.368	406.961	350.368	371.877	371.877	371.877	0	0	0	0	0	245.790	1.855.690	3.567.478	
General																						
Staff headcount (FTE)	0,00	0,00	0,75	0,67	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00						0,25	0,11	0,08	
FTE pay, overtime and other payments			175.698	175.698	0	0	0	0	0	0	0	0	0						175.698	175.698	175.698	
Subtotal staff	0	0	131.774	117.132	0	0	0	0	0	0	0	0	0	0	0	0	0	0	131.774	117.132	248.906	
Planned preventative materials / contracts																			0	0	0	
Reactive materials / contracts																			0	0	0	
Lifecycle materials / contracts																			0	0	0	
Tools																			0	0	0	
Spare																			0	0	0	
Spare																			0	0	0	
Total	0	0	131.774	117.132	0	0	0	0	0	0	0	0	0	0	0	0	0	0	131.774	117.132	248.906	
Defects Liability																						
Staff headcount (FTE)				0,92	0,92	0,92	0,31	0,31	0,31	0,31	0,31	0,31	0,31						0,00	0,62	0,27	
FTE pay, overtime and other payments				48.486	48.486	48.486	48.486	48.486	48.486	48.486	48.486	48.486	48.486						#DIV/0!	48.486	48.486	
Subtotal staff	0	0	0	44.756	44.756	44.756	14.919	14.919	14.919	14.919	14.919	14.919	14.919	0	0	0	0	0	0	179.024	238.699	
Planned preventative materials / contracts				3.048	3.048	3.048	1.016	1.016	1.016	1.016	1.016	1.016	1.016						0	12.190	16.254	
Reactive materials / contracts						3.810	1.778	1.778	1.778	1.778	1.778	1.778	1.778						0	9.143	16.255	
Lifecycle materials / contracts				3.048	3.048	3.048	1.016	1.016	1.016	1.016	1.016	1.016	1.016						0	12.190	16.254	
Tools				26.203	26.203	26.203	8.734	8.734	8.734	8.734	8.734	8.734	8.734						0	104.814	139.752	
Spare																			0	0	0	
Spare																			0	0	0	
Total	0	0	0	77.055	77.055	80.864	27.463	27.463	27.463	27.463	27.463	27.463	27.463	0	0	0	0	0	0	317.362	427.214	
System Civils Infrastructure Maintenance																						
Staff headcount (FTE)				3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4						0,00	3,35	1,86	
FTE pay, overtime and other payments				46.994	46.994	46.994	46.994	46.994	46.994	46.994	46.994	46.994	46.994						#DIV/0!	46.994	46.994	
Subtotal staff	0	0	0	157.430	157.430	157.430	157.430	157.430	157.430	157.430	157.430	157.430	157.430	0	0	0	0	0	0	944.578	1.574.296	
Planned preventative materials / contracts				26.514	26.514	26.514	26.514	26.514	26.514	26.514	26.514	26.514	26.514						0	159.086	265.143	
Reactive materials / contracts				26.514	26.514	26.514	26.514	26.514	26.514	26.514	26.514	26.514	26.514						0	159.086	265.143	
Lifecycle materials / contracts				26.514	26.514	26.514	26.514	26.514	26.514	26.514	26.514	26.514	26.514						0	159.086	265.143	
Tools				67.611	67.611	67.611	67.611	67.611	67.611	67.611	67.611	67.611	67.611						0	405.669	676.114	
Spare																			0	0	0	
Spare																			0	0	0	
Total	0	0	0	304.584	304.584	304.584	304.584	304.584	304.584	304.584	304.584	304.584	304.584	0	0	0	0	0	0	1.827.503	3.045.839	
Landscaping Maintenance																						
Staff headcount (FTE)				0,50	0,50	0,50	0,50	0,50	0,50	0,50	0,50	0,50	0,50						0,00	0,50	0,28	
FTE pay, overtime and other payments				46.708	46.708	46.708	46.708	46.708	46.708	46.708	46.708	46.708	46.708						#DIV/0!	46.708	46.708	
Subtotal staff	0	0	0	23.354	23.354	23.354	23.354	23.354	23.354	23.354	23.354	23.354	23.354	0	0	0	0	0	0	140.123	233.538	
Planned preventative materials / contracts				1.105	1.105	1.105	1.105	1.105	1.105	1.105	1.105	1.105	1.105						0	6.629	11.048	
Reactive materials / contracts				1.105	1.105	1.105	1.105	1.105	1.105	1.105	1.105	1.105	1.105						0	6.629	11.048	
Lifecycle materials / contracts				1.105	1.105	1.105	1.105	1.105	1.105	1.105	1.105	1.105	1.105						0	6.629	11.048	
Tools				5.966	5.966	5.966	5.966	5.966	5.966	5.966	5.966	5.966	5.966						0	35.794	59.657	
Spare																			0	0	0	
Spare																			0	0	0	
Total	0	0	0	32.634	32.634	32.634	32.634	32.634	32.634	32.634	32.634	32.634	32.634	0	0	0	0	0	0	195.803	326.338	
Spare																						
Staff headcount (FTE)																			0,00	0,00	0,00	

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Operating years				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Subtotal / av Mobilisation	Subtotal / av 6 years ops	Grand total / av	Assumptions / comments
Year number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18				
Year start	Jan 08	Jan 09	Jan 10	Jan 11	Jan 12	Jan 13	Jan 14	Jan 15	Jan 16	Jan 17	Jan 18	Jan 19	Jan 20	Jan 21	Jan 22	Jan 23	Jan 24	Jan 25				
Year end	Dez 08	Dez 09	Dez 10	Dez 11	Dez 12	Dez 13	Dez 14	Dez 15	Dez 16	Dez 17	Dez 18	Dez 19	Dez 20	Dez 21	Dez 22	Dez 23	Dez 24	Dez 25				
FTE pay, overtime and other payments																			#DIV/0!	#DIV/0!	#DIV/0!	
Subtotal staff	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Planned preventative materials / contracts																			0	0	0	
Reactive materials / contracts																			0	0	0	
Lifecycle materials / contracts																			0	0	0	
Tools																			0	0	0	
Spare																			0	0	0	
Spare																			0	0	0	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Total / average

Staff headcount (FTE)	0,00	0,00	5,25	16,94	18,27	17,27	16,66	16,66	16,66	16,66	17,16	17,16	17,16	0,00	0,00	0,00	0,00	0,00	1,75	16,74	9,66	
FTE pay, overtime and other payments (av)	#DIV/0!	#DIV/0!	96.508	72.311	68.075	68.018	68.740	68.740	68.740	68.740	68.514	68.514	68.514	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	96.508	69.110	69.729	
Subtotal staff	0	0	506.665	1.224.922	1.107.790	1.174.885	1.145.048	1.145.048	1.145.048	1.145.048	1.175.546	1.175.546	1.175.546	0	0	0	0	0	506.665	6.942.742	12.121.093	
Planned preventative materials / contracts	0	0	0	111.773	111.773	122.437	115.074	185.186	158.127	136.488	120.448	248.256	205.205	0	0	0	0	0	0	804.370	1.514.768	
Reactive materials / contracts	0	6.500	6.500	56.745	56.745	230.610	226.578	345.055	341.199	341.199	429.197	429.197	435.854	0	0	0	0	0	13.000	1.258.933	2.907.361	
Lifecycle materials / contracts	0	0	0	56.667	56.667	56.667	54.635	54.635	124.418	54.635	54.635	54.635	54.635	0	0	0	0	0	0	403.888	622.228	
Tools	197.619	197.619	197.619	160.277	167.372	160.277	149.903	142.808	318.564	142.808	149.903	142.808	149.903	0	0	0	0	0	592.857	1.099.200	2.277.478	
Spare	0	0	0	17.508	17.508	17.508	17.508	17.508	17.508	17.508	17.508	17.508	17.508	0	0	0	0	0	0	105.050	175.083	
Spare	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	197.619	204.119	710.784	1.627.892	1.517.855	1.762.384	1.710.746	1.890.240	2.104.864	1.837.686	1.947.237	2.067.552	2.038.651	0	0	0	0	0	1.112.522	10.813.982	19.618.031	

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Operating years				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Subtotal	Subtotal	Grand	Assumptions / comments
Year number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mobilisation	6 years ops	Total	
Year start	Jan 09	Jan 09	Jan 10	Jan 11	Jan 12	Jan 13	Jan 14	Jan 15	Jan 16	Jan 17	Jan 18	Jan 19	Jan 20	Jan 21	Jan 22	Jan 23	Jan 24	Jan 25				
Year end	Dez 08	Dez 09	Dez 10	Dez 11	Dez 12	Dez 13	Dez 14	Dez 15	Dez 16	Dez 17	Dez 18	Dez 19	Dez 20	Dez 21	Dez 22	Dez 23	Dez 24	Dez 25				
General overheads	########																					
Personnel	50.829	105.554	405.562	642.872	602.211	602.211	602.211	602.211	602.211	602.211	602.211	602.211	602.211						561.965	3.653.926	6.624.734	
Motor vehicles																			0	0	0	
Motor vehicles fuel																						
Motor vehicles car tax																						
Travel and entertaining																			0	0	0	
Print / post / stationery / subscriptions																			0	0	0	
Hire / lease / repair office equipment																			0	0	0	
H, S, E costs																			0	0	0	
Recruitment																			0	0	0	
IT maintenance and support	35.935	35.935	35.935	17.777	17.777	17.777	17.777	17.777	17.777	17.777	17.777	17.777	17.777						107.804	106.663	285.576	
Insurance				8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000						0	48.000	80.000	
Insurance deductibles																						
Telecoms																			0	0	0	
General office expenses																			0	0	0	
Legal and professional																			0	0	0	
Financial charges																			0	0	0	
Project work																			0	0	0	
Waste disposal																			0	0	0	
Uniforms																			0	0	0	
Training																			0	0	0	
Cleaning																			0	0	0	
Security																			0	0	0	
First aid																			0	0	0	
Office computers																			0	0	0	
General office management costs																			0	0	0	
Noise & vibration surveys																			0	0	0	
Stray current monitoring																			0	0	0	
Spare																			0	0	0	
Spare																			0	0	0	
Spare																			0	0	0	
Spare																			0	0	0	
Spare																			0	0	0	
Total	86.763	141.489	441.517	668.649	627.988	627.988	627.988	627.988	627.988	627.988	627.988	627.988	627.988	0	0	0	0	0	669.770	3.808.589	6.990.310	

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Operating years				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Subtotal	Subtotal	Grand
Year number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mobilisation	6 years ops	Total
Year start	Jan 08	Jan 09	Jan 10	Jan 11	Jan 12	Jan 13	Jan 14	Jan 15	Jan 16	Jan 17	Jan 18	Jan 19	Jan 20	Jan 21	Jan 22	Jan 23	Jan 24	Jan 25			
Year end	Dez 08	Dez 09	Dez 10	Dez 11	Dez 12	Dez 13	Dez 14	Dez 15	Dez 16	Dez 17	Dez 18	Dez 19	Dez 20	Dez 21	Dez 22	Dez 23	Dez 24	Dez 25			
Maintenance	197.619	204.119	710.784	1.627.892	1.517.855	1.762.384	1.710.746	1.890.240	2.104.864	1.837.686	1.947.237	2.067.953	2.038.651	0	0	0	0	0	1.112.522	10.613.982	19.618.031
Staff	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Overheads	86.763	141.489	441.517	668.649	627.988	627.988	627.988	627.988	627.988	627.988	627.988	627.988	627.988	0	0	0	0	0	669.770	3.808.589	6.990.310
Total	284.382	345.608	1.152.301	2.296.541	2.145.843	2.390.372	2.338.734	2.518.228	2.732.852	2.465.674	2.575.225	2.695.940	2.666.639	0	0	0	0	0	1.782.292	14.422.570	26.608.341

Maintenance: underlying headcount as per Attachment 2
Overheads: underlying headcount as per Attachment 1

Overhead line contact system 100 % auto-tensioning (Phase 1A)	2.775.997
Price for Phase 1A & Phase 1B considering fix tensioning	27.934.566
Possible reduction through utilization of further potential – TramCo integration	1.209.015

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APPENDIX B

SCHEDULES OF RATES FOR ADDITIONAL SERVICES

Additional Service	Reference No.	Basis of Additional Labour Cost	Basis of Additional Material Cost	Liquidated Damages in the event of failure to provide
Extended operational hours with 15 minute response time from Monday to Saturday inclusive	1	£160 per hour of extended operational hours cover beyond 22:00	No change as existing Agreement	10% of Additional Labour Cost
Additional staff cover over night to prepare for service start-up from Monday to Saturday inclusive	2	£160 per hour of extended operational hours cover prior to 06:00	No change as existing Agreement	10% of Additional Labour Cost
Extended operational hours with 15 minute response time, on Sundays and public holidays only	3	£185 per hour of extended operational hours cover beyond 22:00	No change as existing Agreement	10% of Additional Labour Cost
Additional staff cover over night to prepare for service start-up, on Sundays and public holidays	4	£185 per hour of extended operational hours cover prior to 06:00	No change as existing Agreement	10% of Additional Labour Cost

The hourly rates in the table above are based on the following assumptions:

1) a team of three staff will be provided
2) the additional working time will be limited to the hours given below:
   - maximum 2 hours extra per day
   - maximum 10 hours extra per week
   - maximum 20 hours extra per month
   - maximum 200 hours per year

Additional material costs will be charged if the additional system availability leads to a deviation from the enhanced level timetable as detailed in section 2 of the Employer's Requirements.

APPENDIX C

SCHEDULE OF AGREED REPAIRS FOR TRAM MAINTAINER

Tram Agreed Repairs-V5.xls

	STERLING GBP £ (Fixed exchange rate)			
REF.	REPAIR/DEFECT	MAN-HRS	MATERIALS	TOTAL
			Pounds	
1	Replace bodyside window (glazing) - 1x unit (Opening Window, two glaces)	£104	£378	£482
1A	Replace bodyside window (glazing) - 1x unit (Fixed Window)	£104	£202	£306
2	Replace bodyside window (glazing) - subsequent unit (OW)	£78	£378	£456
2A	Replace bodyside window (glazing) - subsequent unit (FW)	£78	£202	£280
3	Replace bodyside window unit complete (incl. Frame, Opening Window)	£156	£676	£832
4	Replace windscreen (glazing)	£260	£3.797	£4.057
5	Replace cab side window (glazing)	£78	£467	£545
6	Replace door leaf window (glazing)	£52	£435	£487
7	Replace interior glass draught screen	£78	£140	£218
8	Replace front GRP panel	£52	£4.351	£4.403
9	Exchange pantograph complete	£208	£0	£208
10	Replace pantograph carbon	£52	£567	£619
11	Replace wheel - 1x	£416	£1.880	£2.296
12	Replace 2nd or subsequent wheel	£156	£1.880	£2.036
13	Replace tyre 1x	£312	£932	£1.244
14	Replace tyre 2nd or subsequent	£52	£932	£984
15	Exchange traction motor/gearbox unit	£156	£0	£156
16	Replace friction brake disk	£104	£1.868	£1.972
17	Exchange driver seat	£52	£1.479	£1.531
18	Replace cab microphone	£52	£310	£362
19	Exchange power bogie	£234	£0	£234
20	Exchange trailer bogie	£208	£0	£208
21	Exchange cab door	£156	£181	£337
22	Exchange passenger door leaf	£52	£3.049	£3.101
23	Exchange under-guard	£78	£0	£78
24	Tyre turn 1x bogie	£156	£0	£156
25	Tyre turn 2nd or subsequent bogies	£104	£0	£104
26	Exchange Albert (emergency) coupler	£52	£8.171	£8.223
27	Replace saloon seat cushion (base)	£26	£125	£151
28	Replace saloon seat cushion (back)	£26	£125	£151
29	Exchange cab radio module	£52	£0	£52
30	Exchange TPDS transponder	£26	£0	£26
31	Replace door-open pushbutton	£52	£467	£519
32	Replace passenger Call-for-Help unit	£52	£932	£984
33	Carry out OTMR download	£26	£0	£26
34	Carry out static brake test	£26	£0	£26
35	Carry out dynamic brake test	- - -	- - -	- - -
36	Carry out post-third party repairs pre-service inspection	£52	£0	£52
	NOTE: The prices above are based on year 2007and will be Indexed annually. It is also assumed each item is bought on one to one basis. A price revision could be made on the contract effective commencement date to take into account if it is possible to buy in batches and, also, to find local suppliers in order to reduce some of the costs.			

USB00000047_0015

APPENDIX D

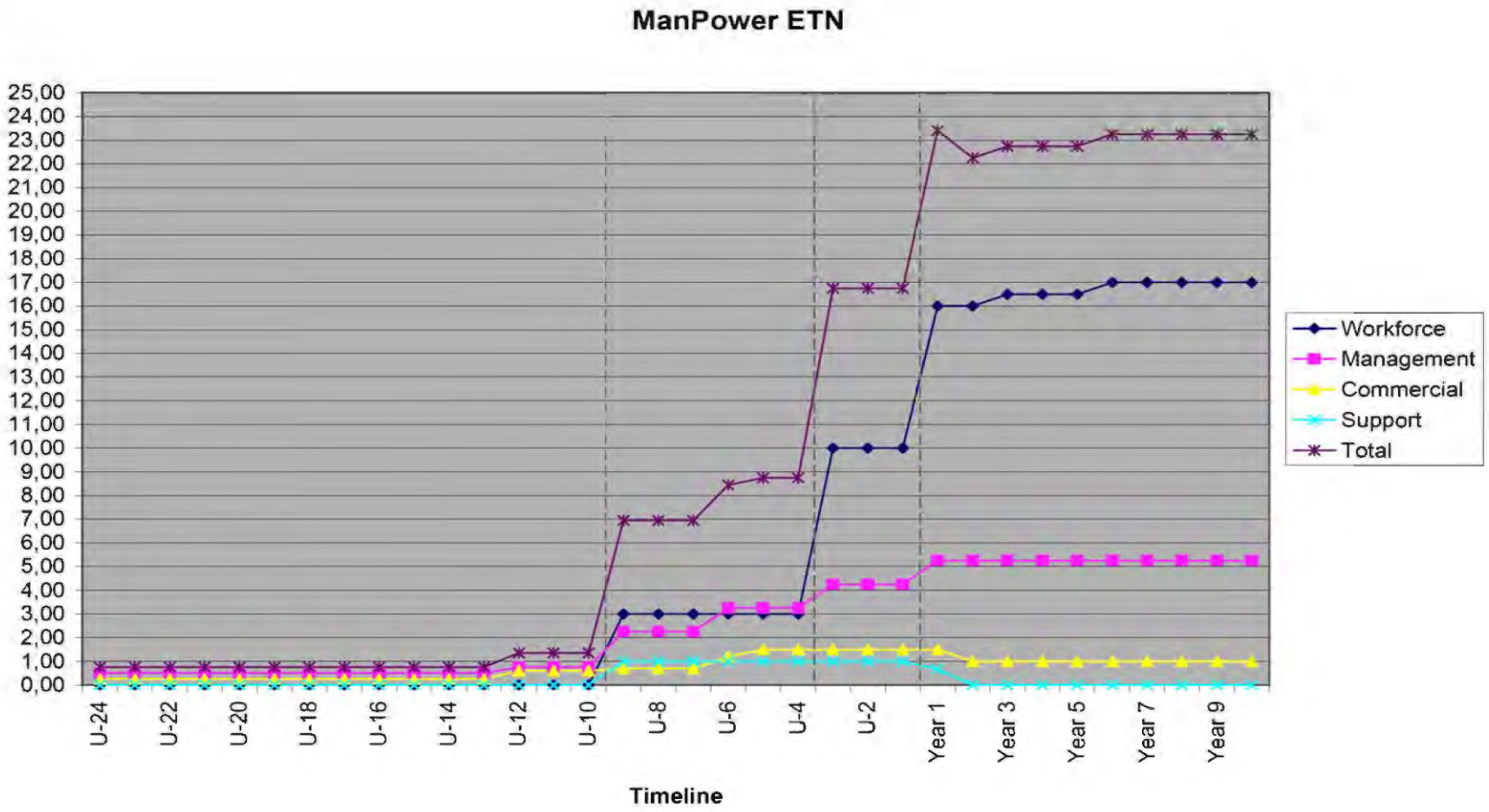
SCHEDULE OF AGREED REPAIRS FOR INFRACO

Extract from Section 11.4 **Appendix 4 : Vandalism Repair Items**

	Unit	Prices
1. Replace pane in tram-stop shelter	no	975,00 £
2. Replace litter bin	no	818,00 £
3. Replace platform lighting column	no	2.250,00 £
4. Replace pedestrian guardrail	no	217,00 £
5. Replace street lighting column	no	2.625,00 £
6. Replace Metal Benching	no	2.163,00 £
7. Replace Security Fencing	no	113,00 £
8. Replace Complete tram-stop Shelter (8 meters)	no	22.635,00 £
9. Replace CCTV Camera	no	2.611,00 £
10. Replace PIS Indicator Panel	no	4.264,00 £
11. Replace Loudspeaker	no	417,00 £
12. Replace Electrical Cabinet	no	22.074,00 £
13. Replace Signal	no	2.609,00 £
14. Replace Point Indicator	no	2.314,00 £
15. Replace Points Heating	no	10.293,00 £
16. Replace Point Machine	no	19.260,00 £
17. Replace Passenger Help Points	no	1.971,00 £
18. Replace Advertising Panel		

The above list is not exhaustive and is provided for indicative reasons where highlighted in yellow.

APPENDIX E



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APPENDIX F

PROCESS FOR AGREEMENT OF PERMITTED VARIATIONS

1.0 Generally

1.1 The Parties shall determine the value of any **tie** Changes in accordance with Clause 80.6 of the Infraco Contract.

1.2 Where Clause 80.6.3 or 80.6.4 applies to the extent that Clause 80.6.3 or 80.6.4 apply then the valuation shall be on the basis of Actual Cost or estimated Actual Cost.

1.3 In respect of a valuation of any work under 1.2 above **tie**'s Representative shall apply head office overheads and profit percentages to the appropriate elements of Actual Cost or Estimated Costs as follows:

(a)	Civil Engineering works	10%
(b)	Systems and Track works	17%

1.4 The amount of the overheads and profit percentage calculated as part of the valuation of Permitted Variations shall be added in the case where the valuation results in an addition and shall be deducted where the valuation results in an omission.

1.5 The following principles shall be applied:

(a) Where the Maintenance Services performed are of similar character and executed under similar conditions to that reflected by the unit rates in this Schedule then such Maintenance Services shall be valued at the unit rates contained therein as applicable.

(b) Where Maintenance Services are not of a similar character, are not executed under similar conditions or involve asset quantities significantly different from those reflected by this Schedule then such Maintenance Services shall be valued using such Rates contained therein as the basis for valuation so far as this may be reasonable.

(c) Where the principles of (a) and (b) are considered inappropriate by the Parties the Maintenance Services shall be valued on the basis of Actual Cost where possible or estimated cost, failing which a fair valuation shall be made.

1.6 Where 1.2 above is the basis of the valuation of **tie** Changes then the following items shall not be included as Actual Costs under the Infraco Contract.

(a) Costs not justified by the Infraco's accounts and records.

(b) Costs not payable under the Infraco Contract.

(c) Costs arising from the Infraco's Design errors.

(d) Costs arising in respect of loss or damage except as provided for under the Agreement.

(e) Costs which should have not been paid to a sub-contractor in accordance with the relevant sub-contract.

(f) Costs arising from people who are part of the Head Office Overhead.

THIS IS SCHEDULE PART 8 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 8

BONDS, PARENT COMPANY GUARANTEES AND COLLATERAL WARRANTIES

PART A

PERFORMANCE BOND

To be issued by ANZ Investment Bank, Australian and New Zealand Banking Group Limited

tie LIMITED
City Point
Haymarket Terrace
Edinburgh
Midlothian
EH12 5HD
Attention: Stewart McGarrity, Finance Director

Performance Guarantee No: *[Insert No]* in relation to the Edinburgh Tram Network

An unincorporated joint venture comprising Bilfinger Berger UK Limited ("**BB Subsidiary**") and Siemens plc ("**Siemens Subsidiary**") (together the "**Infraco**" and individually each an "**Infraco Member**") intend to enter into a contract (with joint and several liability) with **tie** Limited, a company incorporated with registration number SC230949, with registered office at City Chambers, High Street, Edinburgh, Midlothian EHI 1YJ, ("**tie**") for the design, construction, testing, commissioning and maintenance of the Edinburgh Tram Network (the "**Infraco Contract**") . Pursuant to the terms of the Infraco Contract, Infraco agreed to procure for the benefit of **tie** a performance guarantee in the amount £*23,000,000.00* (TWENTY THREE MILLION Pounds Sterling) as security for Infraco's performance under the Infraco Contract.

AUSTRALIA AND NEW ZEALAND BANKING GROUP LIMITED (ABN 11 005 357 522) a company incorporated in the Commonwealth of Australia whose registered office is at Level 14, 100 Queen Street, Melbourne, Victoria 3000, Australia acting through its London branch at 40 Bank Street, Canary Wharf, London E14 5EJ
(the "**Surety**") hereby issues the following performance guarantee (the "**Guarantee**") on behalf of Infraco for the benefit of **tie**.

The Surety hereby guarantees for the benefit of **tie** the payment of an amount up to the maximum total amount of £*23,000,00.00* (TWENTY THREE MILLION Pounds Sterling) (the "**Maximum Liability Amount**"), provided always that the Maximum Liability Amount shall be automatically reduced to the value shown in the following table upon presentation by Infraco of a copy of the below mentioned documents to the Surety and certified by **tie** (which the Surety may accept as conclusive evidence that such reduction is due) as Infraco fulfils its obligations under the Infraco Contract:

Event & Documentation	**Maximum Liability Amount**
Issuance of the Certificate of Service Commencement substantially in the form of Appendix B1	£11,500,000
Issuance of the Network Certificate substantially in the form of Appendix B2	£9,200,000
Issuance of the Reliability Certificate substantially in the form of Appendix B3	Nil

In accordance with the terms of this Guarantee, the Surety shall promptly (and in any event no later than five business days) following receipt of a demand or demands in writing from **tie** (the "**Demand Notice**") substantially in the form set out in Appendix A pay or discharge the amount demanded by **tie**, in available funds by electronic transfer to the account nominated in the Demand Notice, without inquiry and without any deductions whatsoever or any right of set-off, abatement or counterclaim.

A Demand Notice issued by **tie** to the Surety under this Guarantee shall be accompanied by a written statement which identifies the Infraco's failure or default and shall attach a certified copy of **tie's** written notice to the Infraco, pursuant to the Infraco Contract, notifying it of the relevant failure or default (the "**Default Notice**"). Such Demand Notice shall not be presented to the Infraco earlier than the date which is 14 days following the date of the Default Notice.

Any Demand Notice shall be in writing signed by two authorised representatives of **tie** whose signatures shall be proof of authority of **tie**. Where this Guarantee has been assigned according to the terms of this Guarantee, the Demand Notice shall be signed by two authorised signatories of the new beneficiary, and shall be valid providing the assignment has been notified to the Surety in accordance with the below-mentioned procedure and shall be accompanied by written evidence confirming that the Infraco Contract has been assigned to such beneficiary in accordance with the terms of the Infraco Contract.

This Guarantee shall enter into force on the date hereof and shall immediately terminate on the occurrence of the earliest of any of the following events (a "**Termination Event**"):

1. demands totalling in aggregate the Maximum Liability Amount are paid under this Guarantee; or

2. this original Guarantee document is returned to the Surety accompanied by a covering note signed by **tie** confirming that it has been returned for cancellation; or

3. the 31/08/2013; or

4. upon presentation by Infraco to the Surety of a copy of the Reliability Certificate certified by **tie** which the Surety is entitled to accept as conclusive evidence of achievement of a Termination Event.

All obligations and liabilities of the Surety under this Guarantee shall immediately cease after the occurrence of a Termination Event. Any claim by **tie** shall be barred and unenforceable unless the written Demand Notice is received by the Surety prior to the occurrence of a Termination Event. Following the occurrence of a Termination Event **tie** shall immediately return to the Surety the original of this Guarantee, which shall be null and void whether returned to the Surety or not.

tie shall be entitled to assign this Guarantee only to the person to which the Infraco Contract has been assigned with prior notification to, but without the consent of (except of (iv) below), the Surety provided that such assignation shall be as permitted pursuant to the Infraco Contract, that is to say an assignation to any of (i) City of Edinburgh Council or Scottish Ministers (and the legal successors or assignees of each of these parties); (ii) Transport Edinburgh Limited; (iii) any party guaranteed by the City of Edinburgh Council or Scottish Ministers; and (iv) any party prior to such assignation approved in writing by the Infraco. A notice of assignment of this Guarantee (in case of (iv) accompanied by a copy of the approval letter of Infraco) shall be provided by **tie** to the Surety promptly following such assignment which shall be conclusive evidence that such assignment has taken place.

The Surety's liability under this Guarantee shall not be affected or reduced by the insolvency of Infraco (or either Infraco Member) or the liquidation, receivership or other like temporary or permanent status of one or more of them.

A Demand Notice received from **tie** in accordance with the terms of this Guarantee shall be conclusive evidence of the Surety's liability to pay to **tie** and of the amount of the sum or sums which the Surety is liable to pay. Subject to a Demand Notice being made in accordance with the terms of this Guarantee, the Surety's obligation to make payment under this Guarantee shall be a primary, independent and absolute obligation and the Surety shall not be entitled to delay or withhold payment for any reason. The Surety's obligation hereunder shall not be affected by any act, omission, matter or thing which, but for this provision, might operate to release or otherwise exonerate the Surety from the obligations hereunder in whole or in part, including without limitation and whether or not known to the Surety or to **tie**:

(i) any time or waiver granted to **tie** or to Infraco;

(ii) the taking, variation, compromise, renewal or release of or the refusal or neglect to perfect or to enforce any rights, remedies or securities against **tie** or Infraco;

(iii) any legal limitation, disability or incapacity relating to **tie** or Infraco;

(iv) any variation of or amendment to the Infraco Contract (or related documentation) or the works or services to be performed thereunder or any other document or security so that references to the Infraco Contract in this Guarantee shall include each such variation and amendment;

(v) any unenforceability, invalidity or frustration of any rights or obligations of **tie** or Infraco under the Infraco Contract or any other document or security; and

(vi) any other fact, circumstance regarding Infraco (or the Infraco Members), provision of statute or rule of law which might, were the Surety's liability to be secondary rather than primary, entitle the Surety to be released or discharged in whole or in part from the Surety's undertaking.

All notices and Demand Notices related to this Guarantee shall be sent by registered mail and be addressed to Australia and New Zealand Banking Group Limited, 40 Bank Street, Canary Wharf, London, E14 5EJ.

This Guarantee may only be amended, modified or supplemented by an instrument in writing signed for and on behalf of the Surety.

This Guarantee shall be construed and interpreted according to the Laws of Scotland and shall be subject to the exclusive jurisdiction of the Scottish Courts. The Surety confirms that it will not raise any defence of inconvenient forum in proceedings brought in the Scottish Courts.

Dated this [ ] day of [ ] 2008

_____

[Insert Name]

APPENDIX A

DEMAND NOTICE

SURETY
[Address]
Attention: Guarantees Administration
[insert date of Demand Notice]

Dear Sirs,

Performance Guarantee No: [insert number] dated [insert date]

Edinburgh Tram Network

This is our formal demand for payment pursuant to the above instrument issued by you in our favour for the amount of £[◆]. Please pay this sum forthwith by electronic transfer to [◆ *bank account details*].

We hereby certify that Infraco/Infraco Member has failed to [◆ *describe default*] [and has failed to rectify that default as at the date of this Demand Notice].

We attach a certified copy of the relevant Default Notice, dated no later than the date which falls 14 days prior to the date of this Demand Notice.

Signed for and behalf of **tie** Limited

_____
Executive Chairman

_____
Director

APPENDIX B1

CERTIFICATE OF SERVICE COMMENCEMENT

This document certifies pursuant to clause 45.3 of the Infraco Contract that Section D of the Infraco Works was substantially completed, tested and commissioned on [date] in accordance with the provisions of the Infraco Contract.

Signed: …….
tie representative

NAME: ……

USB00000046_0007

APPENDIX B2

NETWORK CERTIFICATE

This document is applicable to the Network Performance Test as envisaged by section 23.16 of the Employer's Requirements and certifies in accordance with Clause 47.3 of this Agreement that the Edinburgh Tram Network has passed the test criteria in section 23.16 of the Employer's Requirements to the satisfaction of **tie's** Representative by meeting or exceeding:

(i) the Punctuality Service Element target in section 2.16 of the Employer's Requirements over twenty-eight days measured in accordance with this Agreement;

(ii) the sub-station and UPS demonstration test in accordance with section 23.16.4 of the Employer's Requirements; and

(iii) the tram changeover test in accordance with section 23.16.5 of the Employer's Requirements.

The necessary test results are listed in Annex 1 to this Certificate including any agreed exclusions that have been applied.

tie's Representative

Signature ……..

Name (in Block Capitals) ……

Original Certificate to be issued to: **tie**

Copies to be issued to: Infraco, the Tram Supplier, the Tram Maintainer and **tie**'s Representative

APPENDIX B3

RELIABILITY CERTIFICATE

This document is applicable to the Network Reliability Test as envisaged by section 23.17 of the Employer's Requirements for ……. and certifies in accordance with Clause 47.4 of this Agreement that this System has passed the test criteria to the satisfaction of **tie's** Representative by meeting or exceeding the Target Value for that System in Table 45 of the Employer's Requirements over the required number of Periods. The necessary test results are listed in Annex 1 to this Certificate including any agreed exclusions that have been applied.

tie's Representative

Signature ……..

Name (in Block Capitals) ……

Original Certificate to be issued to: **tie**

Copies to be issued to: Infraco, the Tram Supplier and the Tram Maintainer and **tie's** Representative

PART B

RETENTION BOND

To be issued by: Deutsche Bank AG (London branch),
Global Trade Finance, Attention Christina Gnad

RETENTION BOND in relation to the Edinburgh Tram Network

THIS RETENTION BOND is issued on 2008

WHEREAS

A. **tie LIMITED**, a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh EH1 1YJ ("**tie**"**)** (which expression shall include it successors, permitted assignees and transferees) intend to enter into an agreement for the appointment of a contractor (hereinafter referred to as the "**Infraco Contract**") with Bilfinger Berger UK Limited and Siemens plc (on a joint and several basis) (the "**Infraco**" and individually "**Infraco Members**") to design, construct, test, commission and maintain a light rapid transit system in Edinburgh known as the Edinburgh Tram Network.

B. The Infraco Contract obliges the Infraco to deliver to **tie** an irrevocable retention bond issued by a surety acceptable to **tie** and callable subject only to written notification by **tie** in terms of this Retention Bond.

C. **DEUTSCHE BANK AG**, a company incorporated in Germany and acting through its London Branch under branch number BR000005 and whose registered office is at Winchester House, 1 Great Winchester Street, London EC2N 2DB ("**Surety**"), is willing to issue this Retention Bond.

THE SURETY HEREBY DECLARES

In consideration of **tie** accepting the Surety's obligations set out in this Retention Bond in discharge of the Infraco's undertaking to provide a retention bond pursuant to the Infraco Contract and subject to the provisions of this Retention Bond, the Surety hereby irrevocably agrees and undertakes to pay to **tie** an initial sum not exceeding a total aggregate value of £2,000,000 (Two Million Pounds Sterling) ("**Bonded Amount**") and the Surety accordingly covenants with **tie** and agrees as follows:

1. The Surety hereby covenants with **tie** that promptly, and in any event no later than five business days, following receipt by the Surety of a notice in writing from **tie** substantially in the form set out in Appendix 1 ("**Demand Notice**") that the Infraco has failed to perform or observe any of its duties and/or obligations arising under or in connection with the Infraco

Contract and/or has committed a breach of any provision and/or has failed to fulfil any warranty or indemnity set out in the Infraco Contract and/or has failed to satisfy any of its liabilities under or in connection with the Infraco Contract, the Surety shall, without inquiry, pay to **tie** in full and without any deductions whatsoever or any right of set-off, abatement or counterclaim, the sum due from the Infraco under the Infraco Contract as stated by **tie** in the Demand Notice in available funds by electronic transfer to the account nominated in the Demand Notice, not exceeding in aggregate the Bonded Amount.

2. Any Demand Notice shall be in writing signed by two authorised representatives of **tie** whose signatures shall be proof of authority of **tie**. A Demand Notice issued by **tie** under this Retention Bond shall provide the Surety with a written statement which identifies the Infraco's failure or default, and shall attach a certified copy of **tie's** communication to the Infraco, pursuant to the Infraco Contract, notifying it of the relevant failure or default (the "**Default Notice**"). Such Demand Notice shall not be presented to the Surety earlier than the date which is 14 days following the date of the Default Notice. Where this Retention Bond has been assigned, in accordance with Clause 1, the Demand Notice shall be signed by two authorised signatories of the new beneficiary, and shall be accompanied by written evidence confirming that the Infraco Contract has been assigned to such beneficiary in accordance with the terms of the Infraco Contract.

3. Subject to Clauses 1 and 2 above, upon receipt by the Surety of a Demand Notice from **tie** the Surety shall not be entitled or obliged to make any enquiry or proof or contestation or impose any further conditions on **tie** (or the Infraco) and **tie** shall not need to take any legal action against or to obtain the consent of the Infraco. **tie** may make as many separate demands hereunder as **tie** thinks fit, provided that the amount demanded, when taken with all previous demands under this Retention Bond and satisfied by the Surety, does not exceed the Bonded Amount. **tie** shall not be obliged to exercise any other right or remedy **tie** may have (against the Infraco, any Infraco Member or any person guaranteeing the obligations of any Infraco Member(s)) before making a demand under this Retention Bond.

4. A Demand Notice received from **tie** in accordance with Clauses 1 and 2 above shall be conclusive evidence of the Surety's liability to pay to **tie** and of the amount of the sum or sums which the Surety is liable to pay. Subject to demand being made in accordance with the terms of this Retention Bond, the Surety's obligation to make payment under this Retention Bond shall be a primary, independent and absolute obligation and the Surety shall not be entitled to delay or withhold payment for any reason. The Surety's obligation hereunder shall not be affected by any act, omission, matter or thing which, but for this provision, might operate to

release or otherwise exonerate the Surety from the obligations hereunder in whole or in part, including without limitation and whether or not known to the Surety or to **tie**:

4.1 any time or waiver granted to **tie** or to the Infraco;

4.2 the taking, variation, compromise, renewal or release of or the refusal or neglect to perfect or to enforce any rights, remedies or securities against **tie** or the Infraco;

4.3 any legal limitation, disability or incapacity relating to **tie** or the Infraco;

4.4 any variation of or amendment to the Infraco Contract (or related documentation) or the works or services to be performed thereunder or any other document or security so that references to the Infraco Contract in this Retention Bond shall include each such variation and amendment;

4.5 any unenforceability, invalidity or frustration of any rights or obligations of **tie** or the Infraco under the Infraco Contract or any other document or security; and

4.6 any other fact, circumstance regarding Infraco (or the Infraco Members), provision of statute or rule of law which might, were the Surety's liability to be secondary rather than primary, entitle the Surety to be released or discharged in whole or in part from the Surety's undertaking.

5. The Surety's liability under this Retention Bond shall not be affected or reduced by the insolvency of the Infraco (or either Infraco Member) or their liquidation, receivership or other like temporary or permanent status.

6. **tie** shall be at liberty to compromise, release, waive or neglect any security as it sees fit, without impairment of its rights under this Retention Bond.

7. This Retention Bond shall cease to have effect on the date ("**Bond Expiry**") being the date which is the earlier of:

7.1 31/08/2013; and

7.2 the date of issue of the Reliability Certificate, as evidenced by presentation by Infraco of a copy of the Reliability Certificate certified by **tie** to the Surety,

save in connection with any Demand Notice received by the Surety in writing prior to Bond Expiry. Immediately following Bond Expiry, **tie** shall return this Retention Bond to the Surety for cancellation which should be null and void whether returned to the Surety or not.

8. **tie** shall be entitled to assign this Retention Bond only to the person to which the Infraco Contract has been assigned with prior notification to, but without the consent of (except of (iv) below in which case consent shall not be unreasonably withheld or delayed), the Surety, provided that the assignation shall be permitted pursuant to the Infraco Contract, that is to say an assignation to any of (i) City of Edinburgh Council or the Scottish Ministers (and the legal successors or assignees of either of these parties); (ii) any party guaranteed by the City of Edinburgh Council or Scottish Ministers; (iii) Transport Edinburgh Limited; and (iv) any party approved prior to such assignation in writing by the Infraco. A notice of assignment of this Retention Bond (in case of (iv) accompanied by a copy of the approval letter of the Infraco) shall be provided by **tie** to the Surety promptly following such assignment which shall be conclusive evidence that such assignment has taken place.

9. Any Demand Notice to be served by **tie** pursuant to this Retention Bond shall be sent by **tie** to the Surety, to the Surety's address at Deutsche Bank AG, Trade and Risk Services group, Winchester House, 1 Great Winchester House, London, EC2N 2DB (and if sent by special or recorded delivery shall be taken as having been received by the Surety on the date of receipt by the Surety as evidenced by the relevant certificate of delivery) or shall be delivered personally to the Surety at the address set out in this Clause 9 (and shall be deemed to have been received at the time of delivery). The Surety appoints its London branch at this address as agent to accept service of process.

10. This Retention Bond shall be governed by and construed in accordance with the Laws of Scotland and the Parties hereby agree to submit to the exclusive jurisdiction of the Court of Session over any claim arising out of this Retention Bond. The Surety confirms it will not raise any defence of inconvenient forum in proceedings brought in the Scottish Courts.

11. Save as permitted under Clause 8, a person who is not a party to this Retention Bond shall have no right to enforce any of the terms of this Retention Bond.

12. In this Retention Bond:

    12.1 "**person**" includes any firm and any entity having legal capacity;

    12.2 the definitions given in the recitals apply to the rest of this Retention Bond; and

12.3 "**Reliability Certificate**" means a certificate substantially in the form shown in Appendix 2, issued by **tie** to confirm that the Edinburgh Tram Network, as designed, constructed, tested, commissioned and maintained by the Infraco, has satisfied reliability testing and performance criteria for a period of one year after opening for public service.

IN WITNESS WHEREOF

EXECUTED for and on behalf of
DEUTSCHE BANK AG at

on 2008 by:

Authorised Signatory _____

Full Name _____

Authorised Signatory _____

Full Name _____

Address _____

_____

APPENDIX 1

DEMAND NOTICE

Deutsche Bank AG
[address]
Attention: [Christina Gnad, Global Trade Finance (Trade Soles)]

Dear Sirs,

Retention Bond [◆ date] [Ref: ◆] in relation to the Edinburgh Tram Network

This is our formal demand for payment pursuant to Clause 1 of the above instrument issued by you in our favour for the amount of £[◆]. Please pay this sum forthwith by electronic transfer to [◆ *bank account details*].

We hereby certify that the Infraco has failed to [◆ *describe default*] *and has failed to rectify that default as at the date of this Demand Notice*. In accordance with Clause 2 of the Retention Bond, we attach a certified copy of the relevant Default Notice, dated no later than the date which falls 14 days prior to the date of this Demand Notice

Yours faithfully

_____
Executive Chairman

_____
Director
For and on behalf of tie Limited

APPENDIX 2

RELIABILITY CERTIFICATE

This document is applicable to the Network Reliability Test as envisaged by section 23.17 of the Employer's Requirements for ……. and certifies in accordance with Clause 47.4 of this Agreement that this System has passed the test criteria to the satisfaction of **tie's** Representative by meeting or exceeding the Target Value for that System in Table 45 of the Employer's Requirements over the required number of Periods. The necessary test results are listed in Annex 1 to this Certificate including any agreed exclusions that have been applied.

tie's Representative

Signature ……..

Name (in Block Capitals) ……

Original Certificate to be issued to: **tie**

Copies to be issued to: Infraco, the Tram Supplier and the Tram Maintainer and **tie's** Representative

PART C

DEFECTS RECTIFICATION BOND

DEFECTS RECTIFICATION BOND in relation to **THE EDINBURGH TRAM NETWORK**

THIS DEFECTS RECTIFICATION BOND is issued on 2008

WHEREAS

A. **tie LIMITED**, a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh EH1 1YJ ("**tie**") (which expression shall include it successors, permitted assignees and transferees) entered into an agreement for the appointment of a contractor (hereinafter referred to as the "**Infraco Contract**") dated [◆] 2008 with Bilfinger Berger UK Limited and Siemens plc (on a joint and several basis) (the "**Infraco**" and individually "**Infraco Members**") to design, construct, test, commission and maintain a light rapid transit system in Edinburgh known as the Edinburgh Tram Network.

B. The Infraco Contract obliges the Infraco to deliver to **tie** an irrevocable defects rectification bond in the circumstances set out in Clause 96.4, issued by a surety acceptable to **tie** and callable subject only to written notification by **tie** in terms of this Defects Rectification Bond.

C. **[◆]**, a company incorporated in England/Wales/Scotland under company number [◆] whose registered office is at [◆] ("**Surety**"), is willing to issue this Defects Rectification Bond.

THE SURETY HEREBY DECLARES

In consideration of **tie** accepting the Surety's obligations set out in this Defects Rectification Bond in discharge of the Infraco's undertaking to provide a defects rectification bond pursuant to the Infraco Contract and subject to the provisions of this Defects Rectification Bond, the Surety hereby irrevocably agrees and undertakes to pay to **tie** an initial sum not exceeding a total aggregate value of [£1,000,000 (One Million Pounds Sterling) or whatever amount is determined should be the amount of this Defects Rectification Bond pursuant to Clause 96.4.3 of the Infraco Contract] ("**Bonded Amount**") and the Surety accordingly covenants with **tie** and agrees as follows:

1. The Surety hereby covenants with **tie** that promptly, and in any event no later than five business days, following receipt by the Surety of a notice in writing from **tie** substantially in the form set out in Appendix 1 ("**Demand Notice**") that the Infraco has failed to perform or observe any of its obligations arising under Clause 96.5 of the Infraco Contract and/or has failed to satisfy any of its liabilities under or in connection with the Required Condition, the

Surety shall, without inquiry, pay to **tie** in full and without any deductions whatsoever or any right of set-off, abatement or counterclaim, the sum due from the Infraco under the Infraco Contract as stated by **tie** in the Demand Notice in available funds by electronic transfer to the account nominated in the Demand Notice, not exceeding in aggregate the Bonded Amount.

2. Any Demand Notice shall be in writing signed by two authorised representatives of **tie** whose signatures shall be proof of authority of **tie**. A Demand Notice issued by **tie** under this Defects Rectification Bond shall provide the Surety with a written statement which identifies the Infraco's failure or default, and shall attach a certified copy of **tie's** communication to the Infraco, pursuant to the Infraco Contract, notifying it of the relevant failure or default (the "**Default Notice**"). Such Demand Notice shall not be presented to the Surety earlier than the date which is 14 days following the date of the Default Notice. Where this Defects Rectification Bond has been assigned, in accordance with Clause 1, the Demand Notice shall be signed by two authorised signatories of the new beneficiary, and shall be accompanied by written evidence confirming that the Infraco Contract has been assigned to such beneficiary in accordance with the terms of the Infraco Contract.

3. Subject to Clauses 1 and 2 above, upon receipt by the Surety of a Demand Notice from **tie** the Surety shall not be entitled or obliged to make any enquiry or proof or contestation or impose any further conditions on **tie** (or the Infraco) and **tie** shall not need to take any legal action against or to obtain the consent of the Infraco. **tie** may make as many separate demands hereunder as **tie** thinks fit, provided that the amount demanded, when taken with all previous demands under this Defects Rectification Bond and satisfied by the Surety, does not exceed the Bonded Amount. **tie** shall not be obliged to exercise any other right or remedy **tie** may have (against the Infraco, any Infraco Member or any person guaranteeing the obligations of any Infraco Member(s)) before making a demand under this Defects Rectification Bond.

4. A Demand Notice received from **tie** in accordance with Clauses 1 and 2 above shall be conclusive evidence of the Surety's liability to pay to **tie** and of the amount of the sum or sums which the Surety is liable to pay. Subject to demand being made in accordance with the terms of this Defects Rectification Bond, the Surety's obligation to make payment under this Defects Rectification Bond shall be a primary, independent and absolute obligation and the Surety shall not be entitled to delay or withhold payment for any reason. The Surety's obligation hereunder shall not be affected by any act, omission, matter or thing which, but for this provision, might operate to release or otherwise exonerate the Surety from the obligations hereunder in whole or in part, including without limitation and whether or not known to the Surety or to **tie**:

4.1 any time or waiver granted to **tie** or to the Infraco;

4.2 the taking, variation, compromise, renewal or release of or the refusal or neglect to perfect or to enforce any rights, remedies or securities against **tie** or the Infraco;

4.3 any legal limitation, disability or incapacity relating to **tie** or the Infraco;

4.4 any variation of or amendment to the Infraco Contract (or related documentation) or the works or services to be performed thereunder or any other document or security so that references to the Infraco Contract in this Defects Rectification Bond shall include each such variation and amendment;

4.5 any unenforceability, invalidity or frustration of any rights or obligations of **tie** or the Infraco under the Infraco Contract or any other document or security; and

4.6 any other fact, circumstance regarding Infraco (or the Infraco Members), provision of statute or rule of law which might, were the Surety's liability to be secondary rather than primary, entitle the Surety to be released or discharged in whole or in part from the Surety's undertaking.

5. The Surety's liability under this Defects Rectification Bond shall not be affected or reduced by the insolvency of the Infraco (or either Infraco Member) or their liquidation, receivership or other like temporary or permanent status.

6. **tie** shall be at liberty to compromise, release, waive or neglect any security as it sees fit, without impairment of its rights under this Defects Rectification Bond.

7. This Defects Rectification Bond shall cease to have effect on the date ("**Bond Expiry**") being the date which is the earlier of:

7.1 **[◆]** [this date will be five years from the date on which the Infraco is obliged pursuant to Clause 96.4.3 of the Infraco Contract to provide the Defects Rectification Bond]; and

7.2 the date of release of the Defects Rectification Bond under Clause 96.6 of the Infraco Contract, as evidenced by a notice from **tie** to the Infraco confirming completion of the rectification works,

save in connection with any Demand Notice received by the Surety in writing prior to Bond Expiry. Immediately following Bond Expiry, **tie** shall return this Defects Rectification Bond

to the Surety for cancellation which should be null and void whether returned to the Surety or not.

8. **tie** shall be entitled to assign this Defects Rectification Bond only to the person to which the Infraco Contract has been assigned with prior notification to, but without the consent of (except in (iv) below in which case consent shall not be unreasonably withheld or delayed), the Surety, provided that the assignation shall be permitted pursuant to the Infraco Contract, that is to say an assignation to any of (i) City of Edinburgh Council or the Scottish Ministers (and the legal successors or assignees of either of these parties); (ii) any party guaranteed by the City of Edinburgh Council or Scottish Ministers; (iii) Transport Edinburgh Limited; and (iv) any party approved prior to such assignation in writing by the Infraco. A notice of assignment of this Defects Rectification Bond (in case of (iv) accompanied by a copy of the approval letter of Infraco) shall be provided by **tie** to the Surety promptly following such assignment which shall be conclusive evidence that such assignment has taken place.

9. Any Demand Notice to be served by **tie** pursuant to this Defects Rectification Bond shall be sent by **tie** to the Surety, to the Surety's address at ***[Insert Address]*** (and if sent by special or recorded delivery shall be taken as having been received by the Surety on the date of receipt by the Surety as evidenced by the relevant certificate of delivery) or shall be delivered personally to the Surety at the address set out in this Clause 9 (and shall be deemed to have been received at the time of delivery). The Surety hereby appoints [its London branch at this address] as agent to accept service of process.

10. This Defects Rectification Bond shall be governed by and construed in accordance with the Laws of Scotland and the Parties hereby agree to submit to the exclusive jurisdiction of the Court of Session over any claim arising out of this Defects Rectification Bond. The Surety confirms it will not raise a defence of inconvenient forum in proceedings brought in the Scottish Courts.

11. Save as permitted under Clause 8, a person who is not a party to this Defects Rectification Bond shall have no right to enforce any of the terms of this Defects Rectification Bond.

12. In this Defects Rectification Bond:

    12.1 "person" includes any firm and any entity having legal capacity;

    12.2 the definitions given in the recitals apply to the rest of this Defects Rectification Bond; and

12.3 "**Required Condition**" shall have the meaning given to it in Clause 96.4.1 of the Infraco Contract.

IN WITNESS WHEREOF

EXECUTED for and on behalf of **[THE SURETY]** at

on 2008 by:

Authorised Signatory _____

Full Name _____

Authorised Signatory _____

Full Name _____

Address _____

APPENDIX 1

DEMAND NOTICE

SURETY
[Address]
Attention: [Responsible Officer]

Dear Sirs

Defects Rectification Bond [◆ date] [Ref: ◆] in relation to the Edinburgh Tram Network

This is our formal demand for payment pursuant to Clause 1 of the above instrument issued by you in our favour for the amount of £[◆]. Please pay this sum forthwith by electronic transfer to [◆ *bank account details*].

We hereby certify that the Infraco has failed to [◆ *describe default*] *and has failed to rectify that default as at the date of this Demand Notice*. In accordance with Clause 2 of the Defects Rectification Bond, we attach a certified copy of the relevant Default Notice, dated no later than the date which falls 7 days prior to the date of this Demand Notice

Yours faithfully

_____
Executive Chairman

_____
Director
For and on behalf of tie Limited

PART D



(1) SIEMENS AKTIENGESELLSCHAFT

- and -

(2) tie LIMITED

PARENT COMPANY GUARANTEE

relating to the obligations under the Infraco Contract dated [◆] 2008 in respect of the Edinburgh Tram Network

THIS GUARANTEE is made this ◆ day of ◆ [*date*]

BETWEEN:

(1) **SIEMENS AKTIENGESELLSCHAFT**, a company established in Berlin and Munich, Germany with registration number HRB 12300 Berlin Charlottenburg and HRB 6684 Munich, (the "**Guarantor**"); and

(2) **tie LIMITED**, a company incorporated with registration number SC230949, with registered office at City Chambers, Edinburgh, Midlothian EHI 1YJ, ("**tie**").

WHEREAS:

(A) An unincorporated joint venture comprising Bilfinger Berger UK Limited ("**Bilfinger Subsidiary**") and Siemens plc ("**Siemens Subsidiary**") (together "**Infraco**" and individually each an "**Infraco Member**") are entering into a contract (with joint and several liability) with **tie** for the design, construction, testing, commissioning and maintenance of the Edinburgh Tram Network (the "**Infraco Contract**").

(B) It is a condition of the Infraco Contract that the Siemens Subsidiary procures the execution and delivery to **tie** of this parent company guarantee (the "**Guarantee**") and the Bilfinger Subsidiary procures the execution and delivery to **tie** of a similar parent company guarantee (the "**Bilfinger Berger AG Guarantee**").

(C) The Guarantor has agreed to guarantee the obligations of the Siemens Subsidiary pursuant to the Infraco Contract.

THE PARTIES AGREE as follows:

1. INTERPRETATION, REPRESENTATIONS, WARRANTIES AND ACKNOWLEDGEMENTS BY THE GUARANTOR

1.1 In this Guarantee and the recitals hereto, unless the context otherwise requires or unless otherwise defined or provided for in this Guarantee, words and expressions when used herein shall have the same meaning as is attributed to them under the Infraco Contract.

1.2 The Guarantor hereby represents and warrants and undertakes to **tie** that:

1.2.1 it is a public limited company duly registered, incorporated and validly existing under the laws of the Federal Republic of Germany;

1.2.2 it has the power to enter into this Guarantee and to exercise its rights and perform its obligations under this Guarantee;

1.2.3 all required corporate (including supervisory board approval) and other action to authorise its execution of this Guarantee and the performance of its obligations under this Guarantee has been duly taken;

1.2.4 the obligations expressed to be assumed by it in this Guarantee are legal and valid obligations binding on it and enforceable in accordance with the terms hereof;

1.2.5 the entry into and performance by it of this Guarantee does not and will not conflict with:

1.2.5.1 any law or regulation applicable to it;

1.2.5.2 its "**Satzung**" and applicable "**Geschaeftsordnungen**" of the "**Vorstand**" and the "**Aufsichtsrat**" (if any); or

1.2.5.3 any agreement or instrument binding upon it or any of its assets;

1.2.6 the Guarantor has legal capacity to enter into this Guarantee governed by Scots law.

1.3 The Guarantor acknowledges that **tie** has accepted this Guarantee in full reliance on the representations and warranties set out in this Clause 1 (Representations, Warranties and Acknowledgements by the Guarantor) and on the basis that this Guarantee is effective to guarantee the performance and payment obligations owed on a joint and several basis by the Siemens Subsidiary as an Infraco Member pursuant to the Infraco Contract.

2. UNDERTAKING

2.1 In consideration of **tie** entering into the Infraco Contract with the Infraco, the Guarantor, subject to Clause 3 of this Guarantee, irrevocably guarantees to **tie** the due and punctual observance and performance of the Siemens Subsidiary, its successors and permitted assignees, either itself or by such other entity nominated by the Guarantor (subject to that entity being acceptable to **tie**), of each and all of the obligations, warranties, duties and undertakings of the Siemens Subsidiary under, or pursuant to, the Infraco Contract (the "**Guaranteed Obligations**") when and as such obligations, warranties, duties and undertakings shall become due and performable by the Siemens Subsidiary according to the terms of the Infraco Contract.

2.2 Subject to Clause 3 of this Guarantee, the Guarantor shall pay any amount demanded by **tie** under a written notice substantially in the form of Schedule 1 hereto, such payment to be made by the Guarantor in pounds sterling (£) with five (5) business days of the date of receipt of the demand to the bank account nominated in the demand notice.

3. LIMITATIONS OF LIABILITY

3.1 The Guarantor may raise hereunder all objections and defences the Siemens Subsidiary and/or the Infraco has under the Infraco Contract and may assume all such defence, counterclaim, limitation and/or exclusion of liability as the Siemens Subsidiary and/or the Infraco may have against **tie** pursuant to the Infraco Contract. In no circumstances shall the Guarantor ever be liable (i) to a greater extent than the liability of the Siemens Subsidiary under the Infraco Contract or (ii) for any loss of business, opportunity, revenue, profit or anticipated profit or for any indirect or consequential loss or damages unless the Infraco is liable therefor.

3.2 Subject to Clause 3.4, the liability of the Guarantor in relation to payment obligations of the Siemens' Subsidiary arising from or in connection with the Infraco Contract pursuant to this Guarantee shall not exceed (when taken together with any other amount recovered by **tie** under the Infraco Contract and/or under this Guarantee) an amount equal to the aggregate of:

3.2.1 the lower of:

a)

(A) £19,800,000 for the period from the Effective Date until the date four years from the issue of the Reliability Certificate; or

(B) £15,750,000 for the period from four to six years from the issue of the Reliability Certificate; or

(C) £13,500,000 for the period from six to eight years from the issue of the Reliability Certificate; or

(D) £9,000,000 for the period from eight to ten years from the issue of the Reliability Certificate; or

(E) £4,500,000 for the period from ten to twelve years from the issue of the Reliability Certificate;

For the avoidance of doubt, any payments made to **tie** by the Guarantor on behalf of the Infraco and/or the Siemens Subsidiary under or pursuant to this Guarantee shall

count- against the relevant amount as per (A) to (E) without regard to the point of time of payment.

and

b) forty five (45%) of the applicable limits of liability set out in clause 77.8 of the Infraco Contract ,

3.2.2 any amounts which the Guarantor is obliged to pay in accordance with the terms of clause 3.4.

For the avoidance of doubt under no circumstances shall the Guarantor's financial liability pursuant to this Guarantee exceed the lower of:

a)

(A) £44,000,000 for the period from the Effective Date until the date four years from the issue of the Reliability Certificate; or

(B) £35,000,000 for the period from four to six years from the issue of the Reliability Certificate; or

(C) £30,000,000 for the period from six to eight years from the issue of the Reliability Certificate; or

(D) £20,000,000 for the period from eight to ten years from the issue of the Reliability Certificate; or

(E) £10,000,000 for the period from ten to twelve years from the issue of the Reliability Certificate;

For the avoidance of doubt, any payments made to **tie** by the Guarantor on behalf of the Infraco, the Siemens Subsidiary and/or the Bilfinger Subsidiary under or pursuant to this Guarantee shall count against the relevant amount as per (A) to (E) without regard to the point of time of payment.

and

b) the applicable limits of liability set out in clause 77.8 of the Infraco Contract.

3.3 The Guarantor's liability in respect of the Guaranteed Obligations shall be conditional on **tie** first having made demand in writing in respect of the same on the Siemens Subsidiary and

shall be conditional, in case of any demand for payment, on **tie** making a demand on Bilfinger Berger AG for fifty five percent (55%) of the total amount claimed from the Infraco (the "**Bilfinger Share**"). Accordingly, the Guarantor's liability in respect to the Guaranteed Obligations shall be initially limited to forty five (45%) of the value of each claim from **tie** but without prejudice to the obligation of the Guarantor, in the circumstances set out at Clause 3.4 to pay the Bilfinger Share.

3.4 In the event that full payment from Bilfinger Berger AG is not received by **tie** with respect to the Bilfinger Share within 30 days of the day of the receipt of the demand, **tie** shall notify the Guarantor in writing and the Guarantor shall pay **tie** the unpaid portion of the Bilfinger Share within 30 days of receipt by the Guarantor of such notice.

4. EXPIRY

4.1 Without prejudice to Clause 4.4 the obligations of the Guarantor set out herein shall constitute and be continuing obligations and accordingly shall remain in full force and effect from the date hereof:

(a) until the date of issue of the Reliability Certificate or the earlier termination of the Infraco Contract, save that the Guarantor's obligations shall continue with regard to any claim brought or liability incurred by **tie** or the Indemnified Parties arising from or in connection with the Infraco Works (excluding Infrastructure Maintenance Services) which has been pursued by **tie** or the Indemnified Parties and which is already the subject of formal dispute resolution proceedings which have been commenced no later than six months after either of these dates, as the case may be; and

(b) until the date which is twelve years from issue of the Reliability Certificate with regard to any claim brought or liability incurred by **tie** or the Indemnified Parties arising from or in connection with (i) latent defects in the Infraco Works (and any third party claim for direct loss or damage made after issue of the Reliability Certificate and arising from or in connection with latent defects) (ii) uncorrected Patent Defects (iii) liquidated damages outstanding from the settlement of the final account pursuant to Clause 66.6 of the Infraco Contract save that the Guarantor's obligations shall continue with regard to any such claims brought or liabilities pursued by **tie** or the Indemnified Parties which are already the subject of formal dispute resolution proceedings prior to such date or commenced within three months thereafter; and

(c) until the Expiry Date (or the Extended Expiry Date) or earlier termination of the Infraco Contract with regard to any claim brought or liability incurred by **tie** or the Indemnified Parties arising from or in connection with Infrastructure Maintenance Services, save that the Guarantor's obligations shall continue with regard to any claim brought or liability pursued by **tie** or the Indemnified Parties which is the subject of formal dispute resolution proceedings commenced no later than six months after either of these dates, as the case may be; or

(d) until 31st May 2027,

whichever in each case is the earlier.

4.2 In any of the events set forth in Clause 4.1 (a) to (d) of this Guarantee the expiry of the Guarantor's obligations under this Guarantee shall be without prejudice to any liability of the Guarantor accrued prior to or arising from expiry of the Infraco Contract, provided that any claim by **tie** in respect of such liability shall be barred and be unenforceable, unless written notice of the same specifying in reasonable detail the nature and amount of the claim has been received by the Guarantor within three (3) months after the date of termination of the Guarantee as set out in Clause 4.1, and any proceedings in respect of such claim are commenced within the time period specified in each of Clauses 4.1(a) to 4.1(c).

4.3 **tie** undertakes to return this Guarantee to the Guarantor immediately after its expiry in accordance with Clause 4.1 and Clause 4.2 respectively, save where written notice has been given under clause 4.2 by **tie**. However, for the avoidance of doubt, this Guarantee expires independently of its return.

4.4 In the event the Siemens Subsidiary ceases to be a subsidiary of the Guarantor, the Guarantor may offer a replacement guarantee for this Guarantee, substantially in the form hereof. If such replacement guarantee is from a guarantor acceptable to **tie**, acting reasonably having due regard to the remaining performance risk of the Siemens Subsidiary and the credit risk of the replacement guarantor, **tie** shall accept such replacement guarantee as security for the Guaranteed Obligations, and this Guarantee shall thereupon automatically terminate. **tie** undertakes to return the Guarantee to the Guarantor immediately following such termination. For avoidance of doubt the Guarantee shall continue in full force and effect notwithstanding the disposal by the Guarantor of any or all of its shares in the Siemens Subsidiary.

5. PRESERVATION OF RIGHTS

Subject to Clause 3, the obligations of the Guarantor under this Guarantee shall not be discharged by any of the following:

5.1 Any non-written arrangement between the Infraco and/or the Siemens Subsidiary and **tie** which does not directly or indirectly increase or extend the liability of the Guarantor under this Guarantee;

5.2 Any amendment to, or any variation, waiver or release of any obligation of the Infraco and/or the Siemens Subsidiary under or pursuant to the Infraco Contract which does not directly or indirectly increase or extend the liability of the Guarantor under this Guarantee, provided that **tie** has promptly notified the Guarantor of any such amendment, variation, waiver or release;

5.3 Any time or indulgence being granted or agreed to be granted to the Infraco and/or the Siemens Subsidiary in respect of its obligations under or pursuant to the Infraco Contract;

5.4 The taking, variation or release of, or enforcement or neglect to perfect or enforce any right, guarantee, remedy or security from or against the Infraco and/or the Siemens Subsidiary;

5.5 Any legal limitation, disability, incapacity or other circumstances solely relating to the Infraco and/or the Siemens Subsidiary;

5.6 The insolvency, winding-up, dissolution, administration or re-organisation of or any change in status, function, control or ownership of the Infraco and/or the Siemens Subsidiary or any other person;

5.7 Any obligation of the Infraco and/or the Siemens Subsidiary under the Infraco Contract being or becoming illegal, void, invalid, unenforceable or ineffective in any respect;

5.8 Any amendment to the Infraco Contract, or any variation, waiver or release of any obligation of the Infraco and/or the Siemens Subsidiary under the Infraco Contract;

5.9 The assignation or novation of the Infraco Contract in accordance with its terms (provided the Siemens Subsidiary is party to the Infraco Contract as assigned or novated);

5.10 The suspension or termination of the Infraco Contract or of the employment of the Infraco and/or the Siemens Subsidiary under the Infraco Contract; and/or

5.11 Any other matter or thing (whether or not known to the Infraco) which would or might operate to exonerate or discharge the Guarantor from its obligations under this Guarantee.

6. ASSIGNATION

6.1 The Guarantor is not entitled to assign this Guarantee.

6.2 **tie** shall be entitled to assign this Guarantee only to the person to which the Infraco Contract has been assigned with prior notification to, but without the consent of, the Guarantor, provided that the assignation shall be permitted pursuant to the Infraco Contract, that is to say an assignation to any of (i) City of Edinburgh Council or the Scottish Ministers (and the legal successors or assignees of either of these parties); (ii) any party guaranteed by the City of Edinburgh Council or Scottish Ministers; (iii) Transport Edinburgh Limited; and (iv) any party approved in writing by the Infraco.

7. SETTLEMENT CONDITIONAL

Any settlement or discharge between the Guarantor and **tie** shall be conditional upon no security given or payment made to **tie** by the Guarantor or any other person on behalf of the Guarantor at any time being avoided or reduced by virtue of any provisions or enactments relating to bankruptcy, insolvency, liquidation or similar laws of general application for the time being in force (whether in Scotland, the Federal Republic of Germany or the European Union) and, if any such security or payment is so avoided or reduced, **tie** shall be entitled to recover the value or amount of such security or payment from the Guarantor subsequently as if such settlement or discharge had not occurred.

8. EXERCISE OF RIGHTS

8.1 Subject to Clause 3.3 **tie** shall not be obliged before exercising any of the rights, powers or remedies conferred upon it in respect of the Guarantor by this Guarantee or by law:

8.1.1 to take any legal proceedings or obtain judgment in any court against the Infraco or either of Bilfinger Subsidiary or Siemens Subsidiary; or

8.1.2 to make or file any claim or proof in a winding-up or dissolution of the Infraco or either of Bilfinger Subsidiary or Siemens Subsidiary.

8.2 Any judgment, award, agreement or determination of any amount due from the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) under the Infraco Contract shall be binding upon the Guarantor.

9. INTEREST

Any amount which is not paid under this Guarantee when due in accordance with a demand served under Clause 3 shall carry interest at the rate of interest applicable to overdue amounts under the Infraco Contract from the due date, which is 2% p.a. above the prevailing published base rate of The Royal Bank of Scotland plc. For avoidance of doubt interest shall not be paid by the Guarantor under this Guarantee for any period during which interest is continuing to accrue under the Infraco Contract.

10. TAXES

All payments in respect of the obligations of the Guarantor under this Guarantee shall be made free and clear of, and without withholding or deduction for, any taxes, duties, assessments or governmental charges of whatsoever nature imposed, levied, collected or assessed by the United Kingdom or the Federal Republic of Germany, or any Land, political or administrative subdivision or any authority thereof having power to tax, save where such withholding or deduction is required by law. In that event, the Guarantor shall pay such additional amounts as will result in the receipt by **tie** of such amount as would have been received by **tie** if no such withholding or deduction had been required.

11. NO SECURITY

The Guarantor shall not hold any security from the Siemens Subsidiary in respect of this Guarantee and any such security which is held in breach of this provision shall be held by the Guarantor in trust for and shall be promptly transferred to **tie**.

12. DEFERRAL OF RIGHTS

12.1 The Guarantor agrees that, so long as any amounts are owed by the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) to **tie** under or pursuant to the Infraco Contract, or any amounts are owed, or have been paid, to **tie** by the Guarantor under this Guarantee, the Guarantor shall not exercise any rights which it may at any time have by reason of performance by it of its obligations under this Guarantee:

12.1.1 to effect or seek to effect any recovery from the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) in respect of any payment made or liability arising pursuant to this Guarantee, whether by receipt of money or set-off or enforcement of security or otherwise;

12.1.2 to claim any contribution from any other guarantor of the obligations of the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) under the Infraco Contract;

12.1.3 to take (in whole or in part and whether by way of subrogation or otherwise) any rights of **tie**;

12.1.4 to claim in the insolvency, administration, winding-up, bankruptcy or liquidation of the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) in competition with **tie**; and/or

12.1.5 subject to Clause 3.3, to require **tie** to make a claim against the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary).

Provided that in the case of Clauses 12.1.1 and 12.1.2 if the Guarantor has made any payment to **tie** pursuant to this Guarantee Agreement, the Guarantor shall be entitled to seek recovery or contribution of such payment (after giving notice to **tie**) on the conditions that such action shall not in any way adversely affect the Infraco's ability (or the Siemens Subsidiary's) to perform and discharge its obligations pursuant to the Infraco Contract for its duration.

12.2 The Guarantor shall hold in trust for **tie** any payment or other benefit received by the Guarantor contrary to the provision of this Clause 12. Such sums shall be used to settle any amounts owing to **tie** and any surplus shall be released to the Guarantor.

13. NOTICES

13.1 Any notice to or demand on the Guarantor to be served under this Guarantee shall be in writing and may be delivered in person or sent by recorded delivery post to the Guarantor at its address appearing in this Guarantee or at such other address as it may have notified to **tie** in accordance with this Clause 13.

13.2 Any such notice or demand shall be deemed to have been served on the Guarantor:

(i) if delivered in person, at the time of delivery; or

(ii) if posted, upon the date recorded for receipt.

(iii) The Guarantor hereby appoints Biggart Baillie LLP, of Dalmore house, 310 St. Vincent Street, Glasgow, G2 5QR, as their agent for service of legal process in Scotland.

14. WAIVER

14.1 No delay or omission of **tie** in exercising any right, power or privilege under this Guarantee shall impair or be construed as a waiver of such right power or privilege nor shall any single or partial exercise of any such right, power or privilege preclude any further exercise of such right, power or privilege or the exercise of any other right, power or privilege.

14.2 A waiver given or consent granted by **tie** under this Guarantee shall be effective only if given in writing and then only in the instance and for the purpose for which it is given.

15. PARTIAL INVALIDITY

The invalidity, illegality or unenforceability in whole or in part of any of the provisions of this Guarantee shall not affect the validity, legality and enforceability of the remaining part or provisions of this Guarantee.

16. DISPUTE RESOLUTION AND GOVERNING LAW

This Guarantee shall be governed by and construed in accordance with the Laws of Scotland and the Parties hereby agree to submit to the exclusive jurisdiction of the Court of Session over any claim arising out of this Guarantee.

17. EXCLUSION OF THIRD PARTY RIGHTS

Subject to any assignation pursuant to clause 6 a person not party to this Guarantee shall have no rights to enforce or rely upon any term of this Guarantee and no *jus quaesitum tertio* is hereby created in favour of any party.

18. PAYMENTS

18.1 All payments to be made by the Guarantor in respect of this Guarantee must be made:

18.1.1 in immediately available electronically transferable funds (with no handling charge, commission or exchange rate conversion fee deducted) to the credit of such bank account as **tie** may designate; and

18.1.2 in pounds sterling or such other currency as **tie** nominates.

IN WITNESS WHEREOF these presents on this and the preceding [◆] pages together with Schedule 1 which is annexed and signed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **SIEMENS AKTIENGESELLSCHAFT**

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Authorised Signatory _____

Full Name _____

This is the Schedule referred to in the foregoing Guarantee Agreement

SCHEDULE 1

DEMAND LETTER

[Date]

[Guarantor's name]
[Guarantor's address]
Attention: Authorised and responsible representative

EDINBURGH TRAM NETWORK

Dear Sirs,

We refer to the Guarantee Agreement dated [◆] 2008 between us and to the contract (the "**Infraco Contract**") dated [◆] 2008 between us and your subsidiary Siemens plc.

1. This letter is our formal demand for the payment of £[◆] pursuant to Clause 2.2. of the Guarantee Agreement, which amount is due and payable by your subsidiary Siemens plc and has not been paid. Please make payment to: **tie** Limited, [bank account number and details] as provided under Clause 18 of the Guarantee Agreement.

AND/OR

2. This letter is our formal demand that you perform and discharge [*describe relevant obligations*] the obligations, warranties, duties and undertakings of your subsidiary Siemens plc as required pursuant to Clause 2.1 of the Guarantee Agreement which your subsidiary, in breach of the Infraco Contract, has failed to perform and discharge. Please confirm by return the mobilisation arrangements you are making and the timetable for their deployment in Edinburgh and generally.

We confirm that we have made formal demand in writing on Bilfinger Berger UK Limited and that we have also made formal demand on Bilfinger Berger AG in relation to this matter.

Yours faithfully,

tie LIMITED

_____
Authorised Signatory

……	…….
Director/Authorised Signatory	Director/Authorised Signatory
tie LIMITED	**SIEMENS AKTIENGESELLSCHAFT**

Addendum to form of Parent Company Guarantee between SIEMENS AKTIENGESELLSCHAFT and TIE LIMITED

The Parties agree that the following clause 1.4 shall be inserted into the final Parent Company Guarantee to be executed:

1.4 The Guarantor hereby acknowledges that Siemens Subsidiary (i) has entered into an agreement with the Bilfinger Subsidiary and Construcciones Y Auxiliar de Ferrocarriles S.A. ("**CAF**") whereby CAF has joined the Infraco and (ii) will enter into an agreement (the "**Minute of Variation**") with Bilfinger Berger UK Limited, **tie** and CAF whereby CAF will become party to the Infraco Contract with joint and several responsibility towards **tie**. The Guarantor and **tie** agree, without reservation, that neither the entry of CAF into the Infraco (and any future variation to the terms of such entry) nor any act or omission by CAF nor the Minute of Variation shall have any effect upon the obligations and liabilities of the Guarantor and the rights and entitlements of **tie** Limited pursuant to this Guarantee.



(1) BILFINGER BERGER AG

- and -

(2) tie LIMITED

PARENT COMPANY GUARANTEE

relating to the obligations under the Infraco Contract dated [◆] 2008 in respect of the Edinburgh Tram Network

THIS GUARANTEE is made this ◆ day of ◆ [*date*]

BETWEEN:

(1) **BILFINGER BERGER AG**, a company established in Mannheim, Germany with registration number Amtsgericht Mannheim HRB 4444, Carl-Reiß-Platz 1-5, 68165 Mannheim (the "**Guarantor**"); and

(2) **tie LIMITED**, a company incorporated with registration number SC230949, with registered office at City Chambers, Edinburgh, Midlothian EHI 1YJ, ("**tie**").

WHEREAS:

(A) An unincorporated joint venture comprising Bilfinger Berger UK Limited ("**Bilfinger Subsidiary**") and Siemens plc ("**Siemens Subsidiary**") (together "**Infraco**" and individually each an "**Infraco Member**") are entering into a contract (with joint and several liability) with **tie** for the design, construction, testing, commissioning and maintenance of the Edinburgh Tram Network (the "**Infraco Contract**").

(B) It is a condition of the Infraco Contract that the Bilfinger Subsidiary procures the execution and delivery to **tie** of this parent company guarantee (the "**Guarantee**") and the Siemens Subsidiary procures the execution and delivery to **tie** of a similar parent company guarantee (the "**Siemens Guarantee**").

(C) The Guarantor has agreed to guarantee the obligations of the Bilfinger Subsidiary pursuant to the Infraco Contract.

THE PARTIES AGREE as follows:

1. INTERPRETATION, REPRESENTATIONS, WARRANTIES AND ACKNOWLEDGEMENTS BY THE GUARANTOR

1.1 In this Guarantee and the recitals hereto, unless the context otherwise requires or unless otherwise defined or provided for in this Guarantee, words and expressions when used herein shall have the same meaning as is attributed to them under the Infraco Contract.

1.2 The Guarantor hereby represents and warrants and undertakes to **tie** that:

1.2.1 it is a public limited company duly registered, incorporated and validly existing under the laws of the Federal Republic of Germany;

1.2.2 it has the power to enter into this Guarantee and to exercise its rights and perform its obligations under this Guarantee;

1.2.3 all required corporate (including supervisory board approval) and other action to authorise its execution of this Guarantee and the performance of its obligations under this Guarantee has been duly taken;

1.2.4 the obligations expressed to be assumed by it in this Guarantee are legal and valid obligations binding on it and enforceable in accordance with the terms hereof;

1.2.5 the entry into and performance by it of this Guarantee does not and will not conflict with:

1.2.5.1 any law or regulation applicable to it;

1.2.5.2 its "**Satzung**" and applicable "**Geschaeftsordnungen**" of the "**Vorstand**" and the "**Aufsichtsrat**" (if any); or

1.2.5.3 any agreement or instrument binding upon it or any of its assets;

1.2.6 the Guarantor has legal capacity to enter into this Guarantee governed by Scots law.

1.3 The Guarantor acknowledges that **tie** has accepted this Guarantee in full reliance on the representations and warranties set out in this Clause 1 (Representations, Warranties and Acknowledgements by the Guarantor) and on the basis that this Guarantee is effective to guarantee the performance and payment obligations owed on a joint and several basis by the Siemens Subsidiary as an Infraco Member pursuant to the Infraco Contract.

2. UNDERTAKING

2.1 In consideration of **tie** entering into the Infraco Contract with the Infraco, the Guarantor, subject to Clause 3 of this Guarantee, irrevocably guarantees to **tie** the due and punctual observance and performance of the Bilfinger Subsidiary, its successors and permitted assignees, either itself or by such other entity nominated by the Guarantor (subject to that entity being acceptable to **tie**), of each and all of the obligations, warranties, duties and undertakings of the Bilfinger Subsidiary under, or pursuant to, the Infraco Contract (the "**Guaranteed Obligations**") when and as such obligations, warranties, duties and undertakings shall become due and performable by the Bilfinger Subsidiary according to the terms of the Infraco Contract.

2.2 Subject to Clause 3 of this Guarantee, the Guarantor shall pay any amount demanded by **tie** under a written notice substantially in the form of Schedule 1 hereto, such payment to be made by the Guarantor in pounds sterling (£) with five (5) business days of the date of receipt of the demand to the bank account nominated in the demand notice.

3. LIMITATIONS OF LIABILITY

3.1 The Guarantor may raise hereunder all objections and defences the Bilfinger Subsidiary and/or the Infraco has under the Infraco Contract and may assume all such defence, counterclaim, limitation and/or exclusion of liability as the Bilfinger Subsidiary and/or the Infraco may have against **tie** pursuant to the Infraco Contract. In no circumstances shall the Guarantor ever be liable (i) to a greater extent than the liability of the Bilfinger Subsidiary under the Infraco Contract or (ii) for any loss of business, opportunity, revenue, profit or anticipated profit or for any indirect or consequential loss or damages unless the Infraco is liable therefor.

3.2 Subject to Clause 3.4, the liability of the Guarantor in relation to payment obligations of the Bilfinger Subsidiary arising from or in connection with the Infraco Contract pursuant to this Guarantee shall not exceed (when taken together with any other amount recovered by **tie** under the Infraco Contract and/or under this Guarantee) an amount equal to the aggregate of:

3.2.1 the lower of:

a)

(A) £24,200,000 for the period from the Effective Date until the date four years from the issue of the Reliability Certificate; or

(B) £19,250,000 for the period from four to six years from the issue of the Reliability Certificate; or

(C) £16,500,000 for the period from six to eight years from the issue of the Reliability Certificate; or

(D) £11,000,000 for the period from eight to ten years from the issue of the Reliability Certificate; or

(E) £5,500,000 for the period from ten to twelve years from the issue of the Reliability Certificate;

For the avoidance of doubt, any payments made to **tie** by the Guarantor on behalf of the Infraco and/or the Siemens Subsidiary under or pursuant to this Guarantee shall

count against the relevant amount as per (A) to (E) without regard to the point of time of payment.

and

(b) fifty five percent (55%) of the applicable limits of liability set out in clause 77.8 of the Infraco Contract,

3.2.2 any amounts which the Guarantor is obliged to pay in accordance with the terms of Clause 3.4.

For the avoidance of doubt under no circumstances shall the Guarantor's financial liability pursuant to this Guarantee exceed the lower of:

a)

(A) £44,000,000 for the period from the Effective Date until the date four years from the issue of the Reliability Certificate; or

(B) £35,000,000 for the period from four to six years from the issue of the Reliability Certificate; or

(C) £30,000,000 for the period from six to eight years from the issue of the Reliability Certificate; or

(D) £20,000,000 for the period from eight to ten years from the issue of the Reliability Certificate; or

(E) £10,000,000 for the period from ten to twelve years from the issue of the Reliability Certificate;

For the avoidance of doubt, any payments made to **tie** by the Guarantor on behalf of the Infraco, the Bilfinger Subsidiary and/or the Siemens Subsidiary under or pursuant to this Guarantee shall count against the relevant amount as per (A) to (E) without regard to the point of time of payment.

and

b) the applicable limits of liability set out in clause 77.8 of the Infraco Contract.

3.3 The Guarantor's liability in respect of the Guaranteed Obligations shall be conditional on **tie** first having made demand in writing in respect of the same on the Bilfinger Subsidiary and

shall be conditional, in case of any demand for payment, on **tie** making a demand on Siemens Aktiengesellschaft for forty five percent (45%) of the total amount claimed from the Infraco (the "**Siemens Share**"). Accordingly, the Guarantor's liability in respect to the Guaranteed Obligations shall be initially limited to fifty five percent (55%) of the value of each claim from **tie** but without prejudice to the obligation of the Guarantor, in the circumstances set out at Clause 3.4 to pay the Siemens Share.

3.4 In the event that full payment from Siemens Aktiengesellschaft is not received by **tie** with respect to the Siemens Share within 30 days of the day of the receipt of the demand, **tie** shall notify the Guarantor in writing and the Guarantor shall pay **tie** the unpaid portion of the Siemens Share within 30 days of receipt by the Guarantor of such notice.

4. EXPIRY

4.1 Without prejudice to Clause 4.4 the obligations of the Guarantor set out herein shall constitute and be continuing obligations and accordingly shall remain in full force and effect from the date hereof:

(a) until the date of issue of the Reliability Certificate or the earlier termination of the Infraco Contract, save that the Guarantor's obligations shall continue with regard to any claim brought or liability incurred by **tie** or the Indemnified Parties arising from or in connection with the Infraco Works (excluding Infrastructure Maintenance Services) which has been pursued by **tie** or the Indemnified Parties and which is already the subject of formal dispute resolution proceedings which have been commenced no later than six months after either of these dates, as the case may be; and

(b) until the date which is twelve years from issue of the Reliability Certificate with regard to any claim brought or liability incurred by **tie** or the Indemnified Parties arising from or in connection with (i) latent defects in the Infraco Works (and any third party claim for direct loss or damage made after issue of the Reliability Certificate and arising from or in connection with latent defects) (ii) uncorrected Patent Defects (iii) liquidated damages outstanding from the settlement of the final account pursuant to Clause 66.6 of the Infraco Contract save that the Guarantor's obligations shall continue with regard to any such claims brought or liabilities pursued by **tie** or the Indemnified Parties which are already the subject of formal dispute resolution proceedings prior to such date or commenced within three months thereafter; and

(c) until the Expiry Date (or the Extended Expiry Date) or earlier termination of the Infraco Contract with regard to any claim brought or liability incurred by **tie** or the Indemnified Parties arising from or in connection with Infrastructure Maintenance Services, save that the Guarantor's obligations shall continue with regard to any claim brought or liability pursued by **tie** or the Indemnified Parties which is the subject of formal dispute resolution proceedings commenced no later than six months after either of these dates, as the case may be; or

(d) until 31st May 2027,

whichever in each case is the earlier.

4.2 In any of the events set forth in Clause 4.1 (a) to (d) of this Guarantee the expiry of the Guarantor's obligations under this Guarantee shall be without prejudice to any liability of the Guarantor accrued prior to or arising from expiry of the Infraco Contract, provided that any claim by **tie** in respect of such liability shall be barred and be unenforceable, unless written notice of the same specifying in reasonable detail the nature and amount of the claim has been received by the Guarantor within three (3) months after the date of termination of the Guarantee as set out in Clause 4.1, and any proceedings in respect of such claim are commenced within the time period specified in each of Clauses 4.1(a) to 4.1(c).

4.3 **tie** undertakes to return this Guarantee to the Guarantor immediately after its expiry in accordance with Clause 4.1 and Clause 4.2 respectively, save where written notice has been given under clause 4.2 by **tie**. However, for the avoidance of doubt, this Guarantee expires independently of its return.

4.4 In the event the Bilfinger Subsidiary ceases to be a subsidiary of the Guarantor, the Guarantor may offer a replacement guarantee for this Guarantee, substantially in the form hereof. If such replacement guarantee is from a guarantor acceptable to **tie**, acting reasonably having due regard to the remaining performance risk of the Bilfinger Subsidiary and the credit risk of the replacement guarantor, **tie** shall accept such replacement guarantee as security for the Guaranteed Obligations, and this Guarantee shall thereupon automatically terminate. **tie** undertakes to return the Guarantee to the Guarantor immediately following such termination. For avoidance of doubt the Guarantee shall continue in full force and effect notwithstanding the disposal by the Contractor of any or all of its shares in the Bilfinger Subsidiary.

5. PRESERVATION OF RIGHTS

Subject to Clause 3, the obligations of the Guarantor under this Guarantee shall not be discharged by any of the following:

5.1 Any non-written arrangement between the Infraco and/or the Bilfinger Subsidiary and **tie** which does not directly or indirectly increase or extend the liability of the Guarantor under this Guarantee;

5.2 Any amendment to, or any variation, waiver or release of any obligation of the Infraco and/or the Bilfinger Subsidiary under or pursuant to the Infraco Contract which does not directly or indirectly increase or extend the liability of the Guarantor under this Guarantee, provided that **tie** has promptly notified the Guarantor of any such amendment, variation, waiver or release;

5.3 Any time or indulgence being granted or agreed to be granted to the Infraco and/or the Bilfinger Subsidiary in respect of its obligations under or pursuant to the Infraco Contract;

5.4 The taking, variation or release of, or enforcement or neglect to perfect or enforce any right, guarantee, remedy or security from or against the Infraco and/or the Bilfinger Subsidiary;

5.5 Any legal limitation, disability, incapacity or other circumstances solely relating to the Infraco and/or the Bilfinger Subsidiary;

5.6 The insolvency, winding-up, dissolution, administration or re-organisation of or any change in status, function, control or ownership of the Infraco and/or the Bilfinger Subsidiary or any other person;

5.7 Any obligation of the Infraco and/or the Bilfinger Subsidiary under the Infraco Contract being or becoming illegal, void, invalid, unenforceable or ineffective in any respect;

5.8 Any amendment to the Infraco Contract, or any variation, waiver or release of any obligation of the Infraco and/or the Bilfinger Subsidiary under the Infraco Contract;

5.9 The assignation or novation of the Infraco Contract in accordance with its terms (provided the Bilfinger Subsidiary is party to the Infraco Contract as assigned or novated);

5.10 The suspension or termination of the Infraco Contract or of the employment of the Infraco and/or the Bilfinger Subsidiary under the Infraco Contract; and/or

5.11 Any other matter or thing (whether or not known to the Infraco) which would or might operate to exonerate or discharge the Guarantor from its obligations under this Guarantee.

6. ASSIGNATION

6.1 The Guarantor is not entitled to assign this Guarantee.

6.2 **tie** shall be entitled to assign this Guarantee only to the person to which the Infraco Contract has been assigned with prior notification to, but without the consent of, the Guarantor, provided that the assignation shall be permitted pursuant to the Infraco Contract, that is to say an assignation to any of (i) City of Edinburgh Council or the Scottish Ministers (and the legal successors or assignees of either of these parties); (ii) any party guaranteed by the City of Edinburgh Council or Scottish Ministers; (iii) Transport Edinburgh Limited; and (iv) any party approved in writing by the Infraco.

7. SETTLEMENT CONDITIONAL

Any settlement or discharge between the Guarantor and **tie** shall be conditional upon no security given or payment made to **tie** by the Guarantor or any other person on behalf of the Guarantor at any time being avoided or reduced by virtue of any provisions or enactments relating to bankruptcy, insolvency, liquidation or similar laws of general application for the time being in force (whether in Scotland, the Federal Republic of Germany or the European Union) and, if any such security or payment is so avoided or reduced, **tie** shall be entitled to recover the value or amount of such security or payment from the Guarantor subsequently as if such settlement or discharge had not occurred.

8. EXERCISE OF RIGHTS

8.1 Subject to Clause 3.3 **tie** shall not be obliged before exercising any of the rights, powers or remedies conferred upon it in respect of the Guarantor by this Guarantee or by law:

8.1.1 to take any legal proceedings or obtain judgment in any court against the Infraco or either of Bilfinger Subsidiary or Siemens Subsidiary; or

8.1.2 to make or file any claim or proof in a winding-up or dissolution of the Infraco or either of Bilfinger Subsidiary or Siemens Subsidiary.

8.2 Any judgment, award, agreement or determination of any amount due from the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) under the Infraco Contract shall be binding upon the Guarantor.

9. INTEREST

Any amount which is not paid under this Guarantee when due in accordance with a demand served under Clause 3 shall carry interest at the rate of interest applicable to overdue amounts under the Infraco Contract from the due date, which is 2% p.a. above the prevailing published base rate of The Royal Bank of Scotland plc. For avoidance of doubt interest shall not be paid

by the Guarantor under this Guarantee for any period during which interest is continuing to accrue under the Infraco Contract.

10. TAXES

All payments in respect of the obligations of the Guarantor under this Guarantee shall be made free and clear of, and without withholding or deduction for, any taxes, duties, assessments or governmental charges of whatsoever nature imposed, levied, collected or assessed by the United Kingdom or the Federal Republic of Germany, or any Land, political or administrative subdivision or any authority thereof having power to tax, save where such withholding or deduction is required by law. In that event, the Guarantor shall pay such additional amounts as will result in the receipt by **tie** of such amount as would have been received by **tie** if no such withholding or deduction had been required.

11. NO SECURITY

The Guarantor shall not hold any security from the Bilfinger Subsidiary in respect of this Guarantee and any such security which is held in breach of this provision shall be held by the Guarantor in trust for and shall be promptly transferred to **tie**.

12. DEFERRAL OF RIGHTS

12.1 The Guarantor agrees that, so long as any amounts are owed by the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) to **tie** under or pursuant to the Infraco Contract, or any amounts are owed, or have been paid, to **tie** by the Guarantor under this Guarantee, the Guarantor shall not exercise any rights which it may at any time have by reason of performance by it of its obligations under this Guarantee:

12.1.1 to effect or seek to effect any recovery from the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) in respect of any payment made or liability arising pursuant to this Guarantee, whether by receipt of money or set-off or enforcement of security or otherwise;

12.1.2 to claim any contribution from any other guarantor of the obligations of the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) under the Infraco Contract;

12.1.3 to take (in whole or in part and whether by way of subrogation or otherwise) any rights of **tie**;

12.1.4 to claim in the insolvency, administration, winding-up, bankruptcy or liquidation of the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) in competition with **tie**; and/or

12.1.5 subject to Clause 3.3, to require **tie** to make a claim against the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary).

Provided that in the case of Clauses 12.1.1 and 12.1.2 if the Guarantor has made any payment to **tie** pursuant to this Guarantee Agreement, the Guarantor shall be entitled to seek recovery or contribution of such payment (after giving notice to **tie**) on the conditions that such action shall not in any way adversely affect the Infraco's ability (or the Bilfinger Subsidiary's) to perform and discharge its obligations pursuant to the Infraco Contract for its duration.

12.2 The Guarantor shall hold in trust for **tie** any payment or other benefit received by the Guarantor contrary to the provision of this Clause 12. Such sums shall be used to settle any amounts owing to **tie** and any surplus shall be released to the Guarantor.

13. NOTICES

13.1 Any notice to or demand on the Guarantor to be served under this Guarantee shall be in writing and may be delivered in person or sent by recorded delivery post to the Guarantor at its address appearing in this Guarantee or at such other address as it may have notified to **tie** in accordance with this Clause 13.

13.2 Any such notice or demand shall be deemed to have been served on the Guarantor:

(i) if delivered in person, at the time of delivery; or

(ii) if posted, upon the date recorded for receipt.

(iii) The Guarantor hereby appoints Pinsent Masons LLP MNP, of 18-22 Melville Street, Edinburgh, EH3 7NS, as their agent for service of legal process in Scotland.

14. WAIVER

14.1 No delay or omission of **tie** in exercising any right, power or privilege under this Guarantee shall impair or be construed as a waiver of such right power or privilege nor shall any single or partial exercise of any such right, power or privilege preclude any further exercise of such right, power or privilege or the exercise of any other right, power or privilege.

14.2 A waiver given or consent granted by **tie** under this Guarantee shall be effective only if given in writing and then only in the instance and for the purpose for which it is given.

15. PARTIAL INVALIDITY

The invalidity, illegality or unenforceability in whole or in part of any of the provisions of this Guarantee shall not affect the validity, legality and enforceability of the remaining part or provisions of this Guarantee.

16. DISPUTE RESOLUTION AND GOVERNING LAW

This Guarantee shall be governed by and construed in accordance with the Laws of Scotland and the Parties hereby agree to submit to the exclusive jurisdiction of the Court of Session over any claim arising out of this Guarantee.

17. EXCLUSION OF THIRD PARTY RIGHTS

Subject to any assignation pursuant to clause 6 a person not party to this Guarantee shall have no rights to enforce or rely upon any term of this Guarantee and no *jus quaesitum tertio* is hereby created in favour of any party.

18. PAYMENTS

18.1 All payments to be made by the Guarantor in respect of this Guarantee must be made:

18.1.1 in immediately available electronically transferable funds (with no handling charge, commission or exchange rate conversion fee deducted) to the credit of such bank account as **tie** may designate; and

18.1.2 in pounds sterling or such other currency as **tie** nominates.

IN WITNESS WHEREOF these presents on this and the preceding **[◆]** pages together with Schedule 1 which is annexed and signed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **BILFINGER BERGER AG**

at

on 2008 by:

Director _____

Full Name _____

Director _____

Full Name _____

This is the Schedule referred to in the foregoing Guarantee Agreement

SCHEDULE 1

DEMAND LETTER

[Date]

[Guarantor's name]
[Guarantor's address]
Attention: Authorised and responsible representative

EDINBURGH TRAM NETWORK

Dear Sirs,

We refer to the Guarantee Agreement dated [◆] 2008 between us and to the contract (the "**Infraco Contract**") dated [◆] 2008 between us and your subsidiary Bilfinger Berger UK Limited.

1. This letter is our formal demand for the payment of £[◆] pursuant to Clause 2.2. of the Guarantee Agreement, which amount is due and payable by your subsidiary Bilfinger Berger UK Limited and has not been paid. Please make payment to: **tie** Limited, [bank account number and details] as provided under Clause 18 of the Guarantee Agreement.

AND/OR

2. This letter is our formal demand that you perform and discharge [*describe relevant obligations*] the obligations, warranties, duties and undertakings of your subsidiary Bilfinger Berger UK Limited as required pursuant to Clause 2.1 of the Guarantee Agreement which your subsidiary, in breach of the Infraco Contract, has failed to perform and discharge. Please confirm by return the mobilisation arrangements you are making and the timetable for their deployment in Edinburgh and generally.

We confirm that we have made formal demand in writing on Siemens plc and that we have also made formal demand on Siemens Aktiengesellschaft in relation to this matter.

Yours faithfully,

tie LIMITED

_____
Authorised Signatory

……	…….
Director/Authorised Signatory	Director/Authorised Signatory
tie LIMITED	**BILFINGER BERGER AG**

Addendum to form of Parent Company Guarantee between BILFINGER BERGER AKTIENGESELLSCHAFT and TIE LIMITED

The Parties agree that the following clause 1.4 shall be inserted into the final Parent Company Guarantee to be executed:

1.4 The Guarantor hereby acknowledges that Bilfinger Subsidiary (i) has entered into an agreement with the Siemens Subsidiary and Construcciones Y Auxiliar de Ferrocarriles S.A. ("**CAF**") whereby CAF has joined the Infraco and (ii) will enter into an agreement (the "**Minute of Variation**") with Siemens plc, **tie** and CAF whereby CAF will become party to the Infraco Contract with joint and several responsibility towards **tie**. The Guarantor and **tie** agree, without reservation, that neither the entry of CAF into the Infraco (and any future variation to the terms of such entry) nor any act or omission by CAF nor the Minute of Variation shall have any effect upon the obligations and liabilities of the Guarantor and the rights and entitlements of **tie** Limited pursuant to this Guarantee.

PART E



(1) BILFINGER BERGER UK LIMITED AND SIEMENS PLC (TOGETHER THE "INFRACO")

- and -

(2) [*THIRD PARTY BENEFICIARY*]

COLLATERAL WARRANTY IN FAVOUR OF [*THIRD PARTY BENEFICIARY*] FROM INFRACO

relating to

THE PROVISION OF THE INFRACO WORKS FOR THE EDINBURGH TRAM NETWORK

AGREEMENT

BETWEEN

(1) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London, EC1A 4EJ, which expression shall include its successors, permitted assignees and transferees and **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens House, Frimley, Camberley, Surrey, GU16 8QD, which expression shall include its successors, permitted assignees and transferees,

together (the "**Infraco**" and separately an "**Infraco Member**"); and

(2) **[*THIRD PARTY BENEFICIARY*]** (company number **[◆]**) whose registered office is at **[◆]** [("**Beneficiary**") which expression shall include its successors and permitted assignees;

BACKGROUND

A By an agreement in writing dated **[◆]** (the "**Infraco Contract**"), **tie** Limited, a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh, EH1 1YJ, ("**tie**") appointed the Infraco to provide the Infraco Works (as hereinafter defined) in connection with the Edinburgh Tram Network.

B It is a term of the Infraco Contract that the Infraco Members shall enter into this Agreement with the Beneficiary.

IT IS AGREED as follows:

1. **DEFINITIONS AND INTERPRETATION**

In this Agreement:

1.1 the following words and expressions have the following meanings, unless the context requires otherwise:

"**Agreement**" means this document (as amended from time to time pursuant to clause 11);

"**Deliverables**" means all documents, information, reports, diagrams, records, method statements, risk assessments, manuals, schedules, databases, photographs, formulae, plans, designs, specifications, drawings (including as-built drawings), details, calculations, analysis, operation and maintenance manuals, software, data, data

configuration designs, tools and details, software protocols, source and object codes, transport and other models and simulations, the outputs and reports based on any models, programmes and all other material created and/or provided by the Infraco (and/or any Infraco Party or any other third party) in relation to the Infraco Works, required to deliver the Infraco Works;

"**Edinburgh Tram Network**" means the tramway which is to be designed, constructed and maintained in Edinburgh pursuant to the Infraco Contract with respect to Phase 1a (forming part of Line One and Line Two as described in the Tram Legislation) and, if the Phase 1b option set out in Clause 85 of the Infraco Contract is exercised, Phase 1b, together with all associated works and facilities required pursuant to the Infraco Contract including all civil engineering and track works, Trams, infrastructure, plant, machinery and equipment installed or used for such tramway;

"**Good Industry Practice**" means using standards, practices, methods and procedures conforming to Law and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably be expected from a large, reputable, professionally qualified, competent and skilled organisation experienced in carrying out activities of a similar nature, scope and complexity to those comprised in the Infraco Works, and seeking in good faith to comply with its contractual obligations and all duties owed by it;

"**Infraco IPR**" means:

(a) all Intellectual Property Rights in the Deliverables (including Intellectual Property Rights in relation to the Infraco Software) which were already existing and owned by, or licensed to, the Infraco and/or the Infraco Parties prior to the Effective Date;

(b) any modifications or developments of any of the Intellectual Property Rights referred to in paragraph (a) above which are generic in nature and not specific to the carry out of the Infraco Works; and

(c) all Intellectual Property Rights in tram signalling systems, communications systems, SCADA systems and system integration programmes, methodologies or software.

"**Infraco Works**" means the works and services to be undertaken by the Infraco under the Infraco Contract to design, construct, test, commission and maintain Phase 1a and, if instructed, Phase 1b and the Phase 1b Works;

"**Intellectual Property Rights**" means any rights in or to any patent, design right, utility model, trade mark, brand name, service mark, trade name, business name, logo, invention (whether registered or unregistered), domain name, semi-conductor right, topography right, software designs and/or other materials, source code, copyright, moral right, know-how, or rights in databases and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or for an extension, revival or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the law of Scotland or of any other jurisdiction;

"**Law**" means:

(a) any Act or instruments of the Scottish Parliament or the United Kingdom Parliament or subordinate legislation within the meaning of section 21(1) of the Interpretation Act 1978, any exercise of the Royal Prerogative, and any enforceable community right within the meaning of section 2 of the European Communities Act 1972, and any bye-laws of any local or other statutory authority;

(b) any applicable guidance, policy, direction or determination issued by any regulatory body with which the Infraco and/or the Infraco Parties are bound to comply; and

(c) any applicable judgment of a relevant court of law which is a binding precedent,

in each case in force in Scotland;

"**Liability Cap**" means the liabilities and respective durations for such liabilities pursuant for such liabilities pursuant to the Infraco Contract and set out in Annex A to this Agreement;

"**Party**" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

"**Phase 1a**" means Edinburgh Airport to Newhaven (inclusive), together with the Depot at Gogar and the spur at Roseburn Junction;

"**Phase 1b**" means Roseburn to Granton Square (inclusive);

"**Project IPR**" means any Intellectual Property Rights arising out of, used in or created to implement the Infraco Works and to produce Deliverables (including the Specially Written Software, any asset management system and/or Works programming system) and for the extension of the Edinburgh Tram Network in accordance with the Infraco Contract but excluding any Infraco IPR contained in the Deliverables;

"**Trams**" means all or any of the tram vehicles for the Edinburgh Tram Network to be provided under the Tram Supply Agreement and maintained under the Tram Maintenance Agreement; and

"**Tram Legislation**" means the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006, and such other legislation relative to the Edinburgh Tram Network as may be enacted from time to time; and

1.2 unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender include all other genders.

1.2.2 a reference to:

1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a clause is a reference to a clause in this Agreement.

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation.

1.4 Where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

1.5 Any capitalised terms not defined above shall have the meaning accorded to them pursuant to the Infraco Contract.

2. STANDARD OF CARE

2.1 The Infraco warrants and undertakes to the Beneficiary that it has carried out and shall carry out the Infraco Works and its other duties and obligations under the Infraco Contract including in relation to Phase 1b, if so instructed, subject to and in accordance with the terms thereof.

2.2 In addition to and without derogation from clause 2.1, the Infraco warrants to the Beneficiary that:

2.2.1 in the performance of the Infraco Works and its other obligations under the Infraco Contract it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent contractor experienced in carrying out works and services similar to the Infraco Works in connection with projects of a similar type, nature and complexity;

2.2.2 any design produced by Infraco will ensure compliance with the Employer's Requirements and Infraco Proposals; and

2.2.3 any design produced by the Infraco will fully comply with Law.

2.3 The Infraco shall owe a duty of care to the Beneficiary in carrying out its duties and obligations under the Infraco Contract.

3. MATERIALS

3.1 The Infraco warrants to the Beneficiary that it has not and shall not specify for use or use in relation to the Infraco Works any materials which at the time of use or specification (as the case may be):

3.1.1 are known to be deleterious in the particular circumstances in which they are specified to be used (either to health and safety or to the durability of the Infraco Works); or

3.1.2 contravene any relevant standard or code of practice issued from time to time by the BSI Group or under a European directive relating to standards; or

3.1.3 do not accord with the guidelines contained in the edition of the publication "Good Practice in Selection of Construction Materials" (Ove Arup & Partners) current at the date of specification of use; or

3.1.4 contravene Good Industry Practice.

4. COPYRIGHT LICENCE

4.1 The Beneficiary and the Infraco acknowledge that under the terms of the Infraco Contract, the Infraco has assigned to **tie**, with full title guarantee the Project IPR which is created by the Infraco and used by it to carry out its obligations under the Infraco Contract.

4.2 The Beneficiary and the Infraco acknowledge that under the terms of the Infraco Contract the Infraco has granted to **tie** a non-exclusive perpetual irrevocable royalty free licence to use such Infraco IPR which is contained in the Deliverables as may be necessary for **tie** to use in relation to the Infraco Works and the Maintenance Services and any extension of the Edinburgh Tram Network and undertakes to procure for **tie** a licence on the same terms as above in respect of any Project IPR created by the Infraco Parties.

4.3 The Beneficiary and the Infraco acknowledge that under the terms of the Infraco Contract the Infraco grants to **tie**, with the prior written consent of the Infraco such consent not to be unreasonably withheld, the right to grant non-exclusive non-assignable sub-licences to third parties for such periods of time as **tie** may reasonably require and otherwise on the same terms as the licence granted to **tie** as described in clause 4.2 above, to use the Infraco IPR referred to in clause 4.2 (other than in relation to Third Party Software and commercially available software which is subject to the provisions of clause 102.9 of the Infraco Contract) in so far as is necessary or desirable for such third party to use such Infraco IPR in relation to the Infraco Works for the Edinburgh Tram Network, the Maintenance Services and any extension of the Edinburgh Tram Network. The Infraco hereby consents to the grant of such non-

exclusive non-assignable sub-licence by **tie** to the Beneficiary if **tie** so requires for the period of time as **tie** may reasonable require.

4.4 The Infraco shall, if so requested at any time, execute such documents and perform such acts as may be required fully and effectively to assure to the Beneficiary the rights referred to in this clause 4.

4.5 The Infraco shall provide to the Beneficiary (at the Beneficiary's cost) a copy of any of the Deliverables as soon as reasonably practicable after receipt by the Infraco of a written request from the Beneficiary to do so.

5. REQUIRED INSURANCES

5.1 The Infraco undertakes that:

5.1.1 cover under the Required Insurances (and the Additional Insurances, if any) is extended to include the Infraco's liabilities under this Agreement, to the extent that the Infraco is obliged to maintain such insurances under the Infraco Contract;

5.1.2 this Agreement has been disclosed to the Infraco's current insurers or brokers (as the case may be) and shall be disclosed to any future insurers or brokers providing the insurance required by this Agreement; and

5.1.3 the Infraco shall abide by the terms and conditions of the Required Insurances and the OCIP Insurances and shall use all reasonable endeavours not to do or omit to do anything that might prejudice the respective cover or rights to make a claim.

5.2 As and when reasonably required by the Beneficiary, the Infraco shall produce for inspection documentary evidence that such insurance is being properly maintained.

5.3 If the insurer makes or attempts to make any material alteration or purports to withdraw the Infraco's cover under the Required Insurances or the Additional Insurances (if any), or if the Infraco is unable to obtain insurance, the Infraco shall promptly give notice of this to the Beneficiary.

6. ASSIGNATION

6.1 Except as provided in clause 6.2 neither Infraco Member shall assign, novate or otherwise transfer the whole or any part of this Agreement without the prior written

agreement of the Beneficiary, such agreement not to be unreasonably withheld or delayed in the case that such assignation is to a subsidiary or associated company.

6.2 Subject to notice being served on **tie** and the Beneficiary, the Infraco shall be entitled to assign, novate or otherwise transfer the whole of this Agreement to any person who the Infraco assigns, novates or otherwise transfers (in whole) its duties and obligations under the Infraco Contract without the prior written agreement of the Beneficiary.

6.3 Subject to notice being served on the Infraco and on **tie**, the Beneficiary shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

6.3.1 without the consent of the Infraco to any person provided that no more than two such assignations will be permitted. Any assignations by the Beneficiary to a subsidiary or associated company of the Beneficiary or a member of the same group of companies will not count as an assignation;

6.3.2 with the prior written consent of the Infraco (such consent not to be unreasonably withheld or delayed).

6.4 The Infraco undertakes to the Beneficiary not to contend in any court proceedings under this Agreement that any person to whom the Beneficiary assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this clause 6 (*Assignation*) is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that the Beneficiary is named under this Agreement or any intermediate assignee of the Beneficiary escaped loss resulting from such breach by reason of the disposal of its interest in the same.

7. LIABILITY OF INFRACO

7.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by the law of contract, delict or otherwise.

7.2 The responsibility of the Infraco under this Agreement is not to be reduced or in any way released or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by the Beneficiary against a third party.

7.3 The rights and benefits conferred upon the Beneficiary by this Agreement are in addition to any other rights and remedies that the Beneficiary may have against the Infraco including (without prejudice to the generality of the foregoing) any remedies in delict.

7.4 Subject to the other provisions of this Agreement, the liability of the Infraco to the Beneficiary is to be determined in all respects in accordance with the terms of the Infraco Contract and, in the event of any claim by the Beneficiary under this Agreement, the Infraco shall be entitled to rely upon any defence, right, limitation or exclusion under the Infraco Contract as though the Beneficiary were named as **tie** under it, except that:

7.4.1 the Beneficiary shall not be affected by any subsequent variation of the Infraco Contract which would adversely affect the obligations owed by the Infraco or the waiver, compromise or withdrawal of any claim made by **tie**; and

7.4.2 the Infraco shall not be entitled to exercise any right of set-off, retention or withholding against the Beneficiary to which the Infraco may be entitled against **tie**.

7.5 The Infraco shall not be liable to the Beneficiary for any delay in completing the Infraco Works.

7.6 Without prejudice to clause 7.4:

7.6.1 the Beneficiary acknowledges and agrees that the Infraco shall have no liability to the Beneficiary under this Agreement to the extent that such liability would result in the total aggregate liability of the Infraco in connection with the Edinburgh Tram Network exceeding the relevant Liability Cap; and

7.6.2 the Infraco shall have no liability to the Beneficiary under this Agreement following expiry of the period of 12 years from the earlier to occur of the date of issue of the Reliability Certificate and the date of termination of the Infraco Contract.

8. **NOTICES**

8.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

8.2 Any notice given pursuant to this clause, if sent by special or recorded delivery, is deemed to have been received on proof of delivery.

9. **RIGHTS OF THIRD PARTIES**

9.1 A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

10. **INVALID TERMS**

10.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

10.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

10.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

11. **VARIATIONS AND WAIVERS TO BE IN WRITING**

11.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

12. **WAIVER**

12.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

12.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

13. JURISDICTION AND LAW

13.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

IN WITNESS WHEREOF these presents on this and the preceding **[◆]** pages, together with the Annex are executed as follows:

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED** at

on 2008 by:

Director _____

Full Name _____

Director _____

Full Name _____

EXECUTED for and on behalf of **SIEMENS PLC** at

on 2008 by:

Authorised Signatory _____

Full Name _____

Authorised Signatory _____

Full Name _____

EXECUTED for and on behalf of **[*third party beneficiary*]** at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

ACKNOWLEDGED for and on behalf of **TIE LIMITED** at

on 2008 by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

ANNEX A

"**Liability Cap**" means:

(i) Subject always to subparagraphs (ii) to (iv) below, in relation to:

(a) any claim brought or liability incurred by **tie** or the Indemnified Parties prior to the issue of the Reliability Certificate or within 6 months of the issue of the Reliability Certificate arising from or in connection with Infraco Works (other than Infrastructure Maintenance Services after the Service Commencement Date) carried out prior to the issue of the Reliability Certificate;

(b) latent defects and uncorrected Patent Defects;

(c) any third party claim made against **tie** or the Indemnified Parties for direct loss or damage made after the issue of the Reliability Certificate and arising from or in connection with latent defects;

(d) liabilities owed by the Infraco connected with liquidated damages outstanding from settlement of final account after Service Commencement;

twenty percent (20%) of the Construction Works Price (including, the value of any **tie** Changes arising from Clause 80 (***tie*** *Changes*), Notified Departures, extensions to the Edinburgh Tram Network instructed through Clause 81 (*Infraco Changes*), Clause 85 (*Phase 1b*) or Clause 86 (*Network Expansions*) (the "**Construction Cap**"), subject to (A) in the case of any liability arising solely from the breach of contract or negligent acts or omissions of the SDS Provider, the SDS Liability Cap; and (B) in the case of any liability arising under (c) above, nine million pounds (£9,000,000);

(ii) subject to sub-paragraphs (iii) and (iv), in respect of claims brought against or liabilities incurred by **tie** or the Indemnified Parties to which paragraph (i) above does not apply, an amount of three million, five hundred thousand pounds (£3,5000,000) (in relation to Phase 1a), or the Maintenance Cap, whichever is lower;

(iii) In relation to liability arising solely from any act or omission of the Tram Supplier, an amount when aggregated with all previous claims equal to twenty percent (20%) of the Aggregate Tram Price and (excluding the proceeds of all insurance, bonds and cash securities) as defined in the Tram Supply Agreement, such liability to be treated as outside the Construction Cap;

(iv) In relation to liability arising from any act or omission of the Tram Maintainer, an aggregate amount of eighteen and one half percent (18.5%) of the aggregate Maximum Performance Payment over the Term of and as defined in the Tram Maintenance Agreement and annually twenty two and one half percent (22.5%) of the aggregate Maximum Performance Payment as defined in the Tram Maintenance Agreement of the Tram Maintenance Services, (in the case of the aggregate cap only excluding the proceeds of any insurance, bonds and cash securities) such liability to be treated as outside the Maintenance Cap;

……
Director/Authorised Signatory
BILFINGER BERGER UK LIMITED

…….
Director/Authorised Signatory
SIEMENS PLC

……
Director/Authorised Signatory
[THIRD PARTY BENEFICIARY]

…….
Director/Authorised Signatory
tie LIMITED

PART F



(1) [SUB-CONTRACTOR]

- and -

(2) [tie LIMITED] or [*OTHER THIRD PARTY BENEFICIARY*]

- and -

(3) BILFINGER BERGER UK LIMITED

- and -

(4) SIEMENS PLC

COLLATERAL WARRANTY IN FAVOUR OF [[tie LIMITED] or [*OTHER THIRD PARTY BENEFICIARY*] FROM [SUB-CONTRACTOR]

relating to
THE INFRACO CONTRACT

AGREEMENT

BETWEEN

(1) **[*SUB-CONTRACTOR*]** [(company number [◆]) whose registered office is at [◆]] *OR* [carrying on business together in partnership under the name of [◆] at [◆]] ("**Sub-Contractor**")];

(2) **[tie LIMITED** (Company Number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ**]** OR **[Other third party beneficiary** (company number ◆)**]** whose registered office is at **[◆]** ***OR*** [carrying on business together in partnership under the name of **[◆]** at **[◆]** [("**Beneficiary**") which expression shall include its successors and permitted assignees;

(3) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London, EC1A 4EJ, which expression shall include its successors, permitted assignees and transferees; and

(4) **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens House, Frimley, Camberley, Surrey, GU16 8QD, which expression shall include its successors, permitted assignees and transferees,

(Bilfinger Berger UK Limited and Siemens plc together the "**Infraco**" and separately an "**Infraco Member**").

BACKGROUND

A By an agreement in writing dated **[◆]** (the "**Infraco Contract**"), [**tie** Limited, a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh, EH1 1YJ, ("**tie**")] [the Beneficiary] appointed the Infraco to provide certain works and services to design, construct, test, commission and maintain the Edinburgh Tram Network.

B It is a term of the Infraco Contract that the Infraco shall procure that the Sub-Contractor enter into this Agreement with the Beneficiary.

C The Sub-Contractor has been appointed by the Infraco as [◆] in terms of the Sub-Contract (as hereinafter defined).

D It is a term of the Sub-Contract or has otherwise been agreed that the Sub-Contractor enters into this Agreement with the Beneficiary in relation to the Sub-Contract Works.

IT IS AGREED as follows:

1. DEFINITIONS AND INTERPRETATION

In this Agreement:

1.1 the following words and expressions have the following meanings, unless the context requires otherwise:

"**Agreement**" means this document (as amended from time to time pursuant to clause 13);

"**Edinburgh Tram Network**" means the tramway which is to be designed, constructed and maintained in Edinburgh pursuant to the Infraco Contract in Phase 1a (forming part of Line One and Line Two as described in the Tram Legislation) [and, if the Phase 1b option set out in Clause 85 of the Infraco Contract is exercised, Phase 1b,] together with all associated works and facilities required pursuant to the Infraco Contract including all civil engineering and track works, Trams, infrastructure, plant, machinery and equipment installed or used for such tramway;

"**Good Industry Practice**" means using standards, practices, methods and procedures conforming to Law and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably be expected from a large, reputable, professionally qualified, competent and skilled organisation experienced in carrying out activities of a similar nature, scope and complexity to those comprised in the Sub-Contract Works, and seeking in good faith to comply with its contractual obligations and all duties owed by it;

"**Insurance Period**" means the period of 12 years from the date of issue of the last certificate of substantial completion in respect of the Sub-Contract Works, as established pursuant to and for the purposes of the Sub-Contract (or, if sooner, 12 years after termination of the employment of the Sub-Contractor under the Sub-Contract);

"**Intellectual Property Rights**" means any rights in or to any patent, design right, utility model, trade mark, brand name, service mark, trade name, business name, logo, invention (whether registered or unregistered), domain name, semi-conductor right, topography right, software designs and/or other materials, source code, copyright, moral right, know-how, or rights in databases and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or for an extension, revival

or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the law of Scotland or of any other jurisdiction;

"**Law**" means:

(a) any Act or instruments of the Scottish Parliament or the United Kingdom Parliament or subordinate legislation within the meaning of section 21(1) of the Interpretation Act 1978, any exercise of the Royal Prerogative, and any enforceable community right within the meaning of section 2 of the European Communities Act 1972 and any bye-laws of any local or other statutory authority;

(b) any applicable guidance, policy, direction or determination issued by any regulatory body with which the Infraco and/or the Sub-Contractor is bound to comply; and

(c) any applicable judgment of a relevant court of law which is a binding precedent,

in each case in force in Scotland;

"**Party**" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

"**Sub-Contract**" means the sub-contract dated [◆] made between the Infraco and the Sub-Contractor;

"**Sub-Contract Works**" means the works and services to be undertaken by the Sub-Contractor under the Sub-Contract;

"**Sub-Contractor Deliverables**" means all documents, information, reports, diagrams, records, method statements, risk assessments, manuals, schedules, databases, photographs, formulae, plans, designs, specifications, drawings (including as-built drawings), details, calculations, analysis, operation and maintenance manuals, software, data, data configuration designs, tools and details, software protocols, source and object codes, transport and other models and simulations, the outputs and reports based on any models, programmes and all other material created and/or provided by the Sub-Contractor (or any other third party) in relation to the Sub-Contract Works, required to deliver the Sub-Contract Works;

"**TEL**" means Transport Edinburgh Limited a company incorporated under the Companies Act with registered number SC269639 and having its registered office at 55 Annandale Street, Edinburgh, Midlothian, EH7 4AZ which shall include its successors in title and permitted assignees;

"**Trams**" means the tram vehicles to be provided for operation on the Edinburgh Tram Network;

"**Tram Legislation**" means the Edinburgh Tram (Line One) Act 2006, the Edinburgh Tram (Line Two) Act 2006 and such other legislation relative to the Edinburgh Tram Network as may be enacted from time to time; and

1.2 unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender include all other genders.

1.2.2 a reference to:

1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a clause is a reference to a clause in this Agreement.

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation.

1.4 Where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

2. STANDARD OF CARE

2.1 The Sub-Contractor warrants and undertakes to the Beneficiary that it has carried out and shall carry out the Sub-Contract Works and its other duties and obligations under the Sub-Contract subject to and in accordance with the terms thereof.

2.2 In addition to and without derogation from clause 2.1, the Sub-Contactor warrants to the Beneficiary that:

2.2.1 in the performance of the Sub-Contract Works and its other obligations under the Sub-Contract it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent contractor experienced in carrying out works and services similar to the Sub-Contract Works in connection with projects of a similar type, nature and complexity;

2.2.2 in respect of the design of the Sub-Contract Works under the Sub-Contract, the Sub-Contractor has exercised and shall continue to exercise all reasonable skill, care and diligence to be expected of a properly qualified and competent architect or other appropriate professional designer experienced in projects of similar scope, type, size, nature and complexity as the Edinburgh Tram Network; and

2.2.3 any design produced by the Sub-Contractor will fully comply with Law.

2.3 The Sub-Contractor shall owe a duty of care to the Beneficiary in carrying out its duties and obligations under the Sub-Contract.

3. MATERIALS

3.1 The Sub-Contractor warrants to the Beneficiary that it has not and shall not specify for use or use in relation to the Sub-Contract Works any materials which at the time of use or specification (as the case may be):

3.1.1 are known to be deleterious in the particular circumstances in which they are specified to be used (either to health and safety or to the durability of the Sub-Contract Works; or

3.1.2 contravene any relevant standard or code of practice issued from time to time by the BSI Group or under a European directive relating to standards; or

3.1.3 do not accord with the guidelines contained in the edition of the publication "Good Practice in Selection of Construction Materials" (Ove Arup & Partners) current at the date of specification or use; or

3.1.4 contravene Good Industry Practice.

4. COPYRIGHT LICENCE

4.1 The Sub-Contractor hereby grants to the Beneficiary an irrevocable, perpetual, royalty-free and non-exclusive licence to use such Intellectual Property Rights in the Sub-Contractor Deliverables as may be necessary for the Beneficiary to use in relation to the **[[**Edinburgh Tram Network**]** ***OR*** **[***Where beneficiary is not* ***tie*** *an appropriate use should be included***]** **[**and any extension of the Edinburgh Tram Network**]]**. This licence shall carry the right to grant non-exclusive, non-assignable sub-licences, for such periods of time as the Beneficiary may reasonably require and otherwise on the same terms as the license granted to the Beneficiary pursuant to this Clause 4.1 to use such Intellectual Property Rights in the Sub-Contractor Deliverables in so far as is necessary or desirable for such third party to use such Intellectual Property Rights in relation to the Sub-Contractor Deliverables for the **[[**Edinburgh Tram Network**]** ***OR*** **[***Where beneficiary is not* ***tie*** *an appropriate use should be included***]** **[**and any extension of the Edinburgh Tram Network**]]**.

4.2 In so far as ownership of the copyright and any other Intellectual Property Rights in any Sub-Contractor Deliverable prepared or provided by the Sub-Contractor in connection with the Edinburgh Tram Network is vested in any person other than the Sub-Contractor, the Sub-Contractor shall procure for the Beneficiary the benefit of such a licence as is referred to in clause 4.1 for the purposes referred to therein.

4.3 The Sub-Contractor shall, if so requested at any time, execute such documents and perform such acts as may be required fully and effectively to assure to the Beneficiary the rights referred to in this clause 4.

4.4 The Sub-Contractor shall provide to the Beneficiary (at the Beneficiary's cost) a copy of any of the Sub-Contractor Deliverables as soon as reasonably practicable after receipt by the Sub-Contractor of a written request from the Beneficiary to do so.

4.5 The Sub-Contractor undertakes to the Beneficiary that the use by the Beneficiary of any of the Sub-Contractor Deliverables for any purpose provided for in this clause 4 shall not infringe the rights of any third party in relation to the Sub-Contractor Deliverables.

4.6 The Sub-Contractor shall not be liable for any claim resulting from (i) any use by the Beneficiary (or its licensees) of any of the Sub-Contractor Deliverables for any

purpose other than the use provided for [under the Sub-Contract][under this Agreement] or (ii) any improper or negligent use by the Beneficiary.

5. REQUIRED INSURANCES

5.1 The Sub-Contractor undertakes that:

5.1.1 it has maintained and shall maintain during the performance of its obligations under the Sub-Contract and the Insurance Period each of the insurances as required in terms of the Sub-Contract;

5.1.2 cover under the professional indemnity insurance is extended to include the Sub-Contractor's liabilities under this Agreement;

5.1.3 this Agreement has been disclosed to the Sub-Contractor's current professional indemnity insurers or brokers (as the case may be) and shall be disclosed to any future professional indemnity insurers or brokers providing the insurance required by this Agreement; and

5.1.4 the Sub-Contractor shall abide by the terms and conditions of insurance and shall use all reasonable endeavours not to do or omit to do anything that might prejudice the cover or its right to make a claim.

5.2 As and when reasonably required by the Beneficiary, the Sub-Contractor shall produce for inspection documentary evidence that such insurance is being properly maintained.

5.3 If the insurer makes or attempts to make any material alteration or purports to withdraw the Sub-Contractor's professional indemnity cover, or if the Sub-Contractor is unable to obtain professional indemnity insurance, the Sub-Contractor shall promptly give notice of this to the Beneficiary.

6. STEP-IN [IN THE CASE OF TIE AND TEL]

6.1 The Sub-Contractor shall not exercise nor seek to exercise any right of determination of its employment under the Sub-Contract or to rescind the Sub-Contract or to discontinue the performance of any of the Sub-Contractor's obligations in relation to the Sub-Contract by reason of breach on the part of the Infraco (or otherwise) without giving to the Beneficiary not less than twenty one days' written notice of its intention to do so and specifying in such notice the grounds for the proposed determination.

The Sub-Contractor will for the period of any such notice diligently and properly continue to perform the Sub-Contractor's obligations under the Sub-Contract.

6.2 Any period stipulated in the Sub-Contract for the exercise by the Sub-Contractor of a right of determination will nevertheless be extended as may be necessary to take account of the period of notice required under clause 6.4.

6.3 Compliance by the Sub-Contractor with the provisions of clause 6.1 will not be treated as a waiver of any breach on the part of the Infraco giving rise to the right of determination nor otherwise prevent the Sub-Contractor from exercising its rights after the expiration of the notice unless the right of determination has ceased under the provisions of clause 6.4.

6.4 The right of the Sub-Contractor to determine its employment under the Sub-Contract or to rescind the Sub-Contract or to discontinue the performance of any of its obligations in relation to the Sub-Contract shall cease if within the period of twenty one days referred to in clause 6.1 the Beneficiary gives written notice to the Sub-Contractor:

6.4.1 requiring the Sub-Contractor to continue with the performance of all its obligations under the Sub-Contract;

6.4.2 acknowledging that the Beneficiary is assuming all the obligations of the Infraco under the Sub-Contract; and

6.4.3 undertaking to the Sub-Contractor to discharge all amounts payable to the Sub-Contractor under the terms of the Sub-Contract.

6.5 Upon compliance by the Beneficiary with the requirements of clause 6.4 the Sub-Contract will continue in full force and effect as if the right of determination on the part of the Sub-Contractor had not arisen and in all respects as if the Sub-Contract had been made between the Beneficiary and the Sub-Contractor to the exclusion of the Infraco.

6.6 Notwithstanding that as between the Infraco and the Sub-Contractor the Sub-Contractor's right of determination of its engagement under the Sub-Contract may not have arisen, or may have arisen and the Sub-Contractor has not exercised nor sought to exercise its right of determination, the provisions of clause 6.5 shall nevertheless apply if the Beneficiary gives written notice to the Sub-Contractor and the Infraco that

it will step-in to the Sub-Contract and comply with the requirements on its part under clauses 6.4.1, 6.4.2 and 6.4.3.

6.7 The Sub-Contractor does not need to be concerned or required to enquire whether, and will be bound to assume that, as between the Infraco and the Beneficiary, the circumstances have occurred permitting the Beneficiary to give notice under clause 6.6.

6.8 By acting in accordance with the provisions of this clause 6, the Sub-Contractor will not incur any liability to the Infraco.

6.9 Unless and until the Beneficiary has given notice under this clause 6:

6.9.1 the Beneficiary has no liability whatsoever to the Sub-Contractor in respect of amounts payable to the Sub-Contractor under the Sub-Contract; and

6.9.2 the Beneficiary has no authority to issue any direction or instruction to the Sub-Contractor in relation to the performance of the Sub-Contractor's duties under the Sub-Contract.

6.10 Without prejudice to the provisions of clauses 6.1 to 6.9 inclusive, if prior to the service of any notice under clause 6.4 the employment of the Sub-Contractor under the Sub-Contract is determined for any reason whatsoever the Sub-Contractor shall, if requested in writing so to do by the Beneficiary no later than 12 weeks after the date of such determination, forthwith enter into a new agreement with the Beneficiary in relation to the carrying out of the Sub-Contract Works on the same terms as the Sub-Contract, but with such revisions as the Beneficiary and the Sub-Contractor may reasonably require to reflect altered circumstances and the fact that it is the Beneficiary and not the Infraco employing the Sub-Contractor.

7. ASSIGNATION

7.1 The Sub-Contractor shall not assign, novate or otherwise transfer the whole or any part of the Agreement without the prior written agreement of the Beneficiary.

7.2 Subject to notice being served on the Sub-Contractor [and on **tie**]**,** the Beneficiary shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

[[*Include where the Beneficiary is* ***tie*****]**

7.2.1 [to the Scottish Ministers, the City of Edinburgh Council or their statutory successors (enjoying full executive authority in their own right under public administrative law) in accordance with the Tram Legislation; or

7.2.2

7.2.2.1 to TEL;

7.2.2.2 or to any other person;

in accordance with the Tram Legislation, and whose obligations under this Agreement are in both cases irrevocably guaranteed (in a form reasonably acceptable to the Sub-Contractor acting reasonably) by CEC or the Scottish Ministers;

7.2.3 with the prior written consent of the Sub-Contractor (such consent not to be unreasonably withheld or delayed) to any person not covered by clauses 7.2.1 or 7.2.2.]

OR

[[*Include where the Beneficiary is an other third party***]**

7.2.1 without the consent of the Sub-Contractor to any person provided that no more than two such assignations will be permitted. Any assignations by the Beneficiary to a subsidiary or associated company of the Beneficiary or a member of the same group of companies will not count as an assignation;

7.2.2 with the prior written consent of the Sub-Contractor (such consent not to be unreasonably withheld or delayed).**]**

7.3 The Sub-Contractor undertakes to the Beneficiary not to contend in any court proceedings under this Agreement that any person to whom the Beneficiary assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this clause is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that the Beneficiary is named under this Agreement or any intermediate assignee of the Beneficiary escaped loss resulting from such breach by reason of the disposal of its interest in the same.

8. LIABILITY OF THE SUB-CONTRACTOR

8.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by the law of contract, delict or otherwise.

8.2 The responsibility of the Sub-Contractor under this Agreement is not to be reduced or in any way released or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by the Beneficiary against a third party.

8.3 The rights and benefits conferred upon the Beneficiary by this Agreement are in addition to any other rights and remedies that the Beneficiary may have against the Sub-Contractor including (without prejudice to the generality of the foregoing) any remedies in delict.

8.4 Subject to the other provisions of this Agreement, the liability of the Sub-Contractor to the Beneficiary is to be determined in all respects in accordance with the terms of the Sub-Contract and, in the event of any claim by the Beneficiary under this Agreement, the Sub-Contractor shall be entitled to rely upon any defence, right, limitation or exclusion under the Sub-Contract as though the Beneficiary were named as the Infraco under it, except that:

8.4.1 the Beneficiary shall not be affected by any subsequent variation of the Sub-Contract which would adversely affect the obligations owed by the Sub-Contractor or the waiver, compromise or withdrawal of any claim made by the Infraco; and

8.4.2 the Sub-Contractor shall not be entitled to exercise any right of set-off, retention or withholding against the Beneficiary to which the Sub-Contractor may be entitled against the Infraco.

8.5 The Sub-Contractor shall not be liable to the Beneficiary for any delay in completing the Sub-Contract Works.

8.6 Without prejudice to clause 8.4:

8.6.1 the Beneficiary acknowledges and agrees that the Sub-Contractor shall have no liability to the Beneficiary under this Agreement to the extent that such liability would result in the total aggregate liability of the Sub-Contractor in connection with the Edinburgh Tram Network exceeding any liability cap provided for pursuant to the Sub-Contract; and

8.6.2 the Sub-Contractor shall have no liability to the Beneficiary under this Agreement following expiry of the period of 12 years from the date of issue of the Reliability Certificate.

8.7 The Sub-Contractor shall owe no greater duties or obligations in time or in nature hereunder to the Beneficiary than it owes to the Infraco under the Sub-Contract.

9. CONSENT OF INFRACO

9.1 The Infraco consents to the terms of this Agreement.

10. NOTICES

10.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

10.2 Any notice given pursuant to this clause, if sent by special or recorded delivery, is deemed to have been received on proof of delivery.

11. RIGHTS OF THIRD PARTIES

11.1 A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

12. INVALID TERMS

12.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

12.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

12.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

13. VARIATIONS AND WAIVERS TO BE IN WRITING

13.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

14. WAIVER

14.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

14.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

15. JURISDICTION AND LAW

15.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

[[*Include where the Beneficiary is* ***tie*****]**

15.2 The Parties agree that any dispute in relation to this Agreement shall be conducted in accordance with clause [◆] (*Dispute Resolution Procedure*) of the Sub-Contract and the provisions of the said clause [◆] (*Dispute Resolution Procedure*) and Schedule [◆] (*Dispute Resolution Procedure*) and Schedule [◆] (*Panels for Dispute Resolution Procedure*) of the Sub-Contract are deemed to be incorporated mutatis mutandis in respect of this Agreement provided that any reference to "Parties" in the Sub-Contract shall be deemed to refer to the Beneficiary and the Sub-Contractor and the reference in the Sub-Contract to ["clause ◆ (*Notices*)"] shall mean clause 10 of this Agreement.

IN WITNESS WHEREOF these presents on this and the preceding [◆] pages are executed as follows:

EXECUTED for and on behalf of **[SUB-CONTRACTOR]** at

on 2008 by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **TIE LIMITED *OR* [*other third party beneficiary*]**

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at

on 2008 by:

Director _____

Full Name _____

Director _____

Full Name _____

EXECUTED for and on behalf of **SIEMENS PLC** at

on 2008 by:

Authorised Signatory _____

Full Name _____

Authorised Signatory _____

Full Name _____

40 Bank Street, Canary Wharf, London E14 5EJ
Telephone [redacted] Facsimile [redacted]
www.anz.com
Australia and New Zealand Banking Group Limited
ABN 11 005 357 522

tie LIMITED
City Point
Haymarket Terrace
Edinburgh
Midlothian
EH12 5HD
Attention: Stewart McGarrity, Finance Director

Performance Guarantee No: GTEE 08/0116 in relation to the Edinburgh Tram Network

An unincorporated joint venture comprising Bilfinger Berger UK Limited ("**BB Subsidiary**"), Siemens plc ("**Siemens Subsidiary**") and Constructiones y Auxiliary de Ferrocarriles S.A. ("**CAF**") (together the "**Infraco**" and individually each an "**Infraco Member**") intend to enter into a contract (with joint and several liability) with **tie** Limited, a company incorporated with registration number SC230949, with registered office at City Chambers, High Street, Edinburgh, Midlothian EH1 1YJ, ("**tie**") for the design, construction, testing, commissioning and maintenance of the Edinburgh Tram Network (the "**Infraco Contract**") . Pursuant to the terms of the Infraco Contract, Infraco agreed to procure for the benefit of **tie** a performance guarantee in the amount *£23,000,000.00* (TWENTY THREE MILLION Pounds Sterling) as security for Infraco's performance under the Infraco Contract.

AUSTRALIA AND NEW ZEALAND BANKING GROUP LIMITED (ABN 11 005 357 522) a company incorporated in the Commonwealth of Australia whose registered office is at Level 14, 100 Queen Street, Melbourne, Victoria 3000, Australia acting through its London branch at 40 Bank Street, Canary Wharf, London E14 5EJ (the "**Surety**") hereby issues the following performance guarantee (the "**Guarantee**") on behalf of Infraco for the benefit of **tie**.

The Surety hereby guarantees for the benefit of **tie** the payment of an amount up to the maximum total amount of *£23,000,00.00* (TWENTY THREE MILLION Pounds Sterling) (the "**Maximum Liability Amount**"), provided always that the Maximum Liability Amount shall be automatically reduced to the value shown in the following table upon presentation by Infraco of a copy of the below mentioned documents to the Surety and certified by **tie** (which the Surety may accept as conclusive evidence that such reduction is due) as Infraco fulfils its obligations under the Infraco Contract:

Event & Documentation	**Maximum Liability Amount**
Issuance of the Certificate of Service Commencement substantially in the form of Appendix B1	*£11,500,000*
Issuance of the Network Certificate substantially in the form of Appendix B2	*£9,200,000*
Issuance of the Reliability Certificate substantially in the form of Appendix B3	Nil

In accordance with the terms of this Guarantee, the Surety shall promptly (and in any event no later than five business days) following receipt of a demand or demands in writing from **tie** (the "**Demand Notice**") substantially in the form set out in Appendix A pay or discharge the amount demanded by **tie**, in available funds by electronic transfer to the account nominated in the Demand Notice, without inquiry and without any deductions whatsoever or any right of set-off, abatement or counterclaim.

Continued on page 2

Registered with limited liability in the State of Victoria, Australia
Incorporated in the Commonwealth of Australia
Registered as an Australian Securities and Investments Commission
Australian Financial Services Licence No. 234527
Head Office 100 Queen Street, Melbourne
Registered in England No. FC023, Branch No. 580
Authorised and regulated by the Financial Services Authority

Continued GTEE 08/0116 page 2 ...

A Demand Notice issued by **tie** to the Surety under this Guarantee shall be accompanied by a written statement which identifies Infraco's failure or default and shall attach a certified copy of **tie's** written notice to Infraco, pursuant to the Infraco Contract, notifying it of the relevant failure or default (the "**Default Notice**"). Such Demand Notice shall not be presented to Infraco earlier than the date which is 14 days following the date of the Default Notice.

Any Demand Notice shall be in writing signed by two authorised representatives of **tie** whose signatures shall be proof of authority of **tie**. Where this Guarantee has been assigned according to the terms of this Guarantee, the Demand Notice shall be signed by two authorised signatories of the new beneficiary, and shall be valid providing the assignment has been notified to the Surety in accordance with the below-mentioned procedure and shall be accompanied by written evidence confirming that the Infraco Contract has been assigned to such beneficiary in accordance with the terms of the Infraco Contract.

This Guarantee shall enter into force on the date hereof and shall immediately terminate on the occurrence of the earliest of any of the following events (a "**Termination Event**"):

1. demands totalling in aggregate the Maximum Liability Amount are paid under this Guarantee; or

2. this original Guarantee document is returned to the Surety accompanied by a covering note signed by **tie** confirming that it has been returned for cancellation; or

3. the 31/08/2013; or

4. upon presentation by Infraco to the Surety of a copy of the Reliability Certificate certified by **tie** which the Surety is entitled to accept as conclusive evidence of achievement of a Termination Event.

All obligations and liabilities of the Surety under this Guarantee shall immediately cease after the occurrence of a Termination Event. Any claim by **tie** shall be barred and unenforceable unless the written Demand Notice is received by the Surety prior to the occurrence of a Termination Event. Following the occurrence of a Termination Event **tie** shall immediately return to the Surety the original of this Guarantee, which shall be null and void whether returned to the Surety or not.

tie shall be entitled to assign this Guarantee only to the person to which the Infraco Contract has been assigned with prior notification to, but without the consent of (except of (iv) below), the Surety provided that such assignation shall be as permitted pursuant to the Infraco Contract, that is to say an assignation to any of (i) City of Edinburgh Council or Scottish Ministers (and the legal successors or assignees of each of these parties); (ii) Transport Edinburgh Limited; (iii) any party guaranteed by the City of Edinburgh Council or Scottish Ministers; and (iv) any party prior to such assignation approved in writing by Infraco. A notice of assignment of this Guarantee (in case of (iv) accompanied by a copy of the approval letter of Infraco) shall be provided by **tie** to the Surety promptly following such assignment which shall be conclusive evidence that such assignment has taken place.

The Surety's liability under this Guarantee shall not be affected or reduced by the insolvency of Infraco (or any Infraco Member) or the liquidation, receivership or other like temporary or permanent status of one or more of them.

A Demand Notice received from **tie** in accordance with the terms of this Guarantee shall be conclusive evidence of the Surety's liability to pay to **tie** and of the amount of the sum or sums which the Surety is liable to pay. Subject to a Demand Notice being made in accordance with the terms of this Guarantee, the Surety's obligation to make payment under this Guarantee shall be a primary, independent and absolute obligation and the Surety shall not be entitled to delay or withhold payment for any reason. The Surety's obligation hereunder shall not be affected by any

Continued on page 3

act, omission, matter or thing which, but for this provision, might operate to release or otherwise exonerate the Surety from the obligations hereunder in whole or in part, including without limitation and whether or not known to the Surety or to **tie**:

i. any time or waiver granted to **tie** or to Infraco;

ii. the taking, variation, compromise, renewal or release of or the refusal or neglect to perfect or to enforce any rights, remedies or securities against **tie** or Infraco,

iii. any legal limitation, disability or incapacity relating to **tie** or Infraco;

iv. any variation of or amendment to the Infraco Contract (or related documentation) or the works or services to be performed thereunder or any other document or security so that references to the Infraco Contract in this Guarantee shall include each such variation and amendment;

v. any unenforceability, invalidity or frustration of any rights or obligations of **tie** or Infraco under the Infraco Contract or any other document or security; and

vi. any other fact, circumstance regarding Infraco (or the Infraco Members), provision of statute or rule of law which might, were the Surety's liability to be secondary rather than primary, entitle the Surety to be released or discharged in whole or in part from the Surety's undertaking.

All notices and Demand Notices related to this Guarantee shall be sent by registered mail and be addressed to Australia and New Zealand Banking Group Limited, 40 Bank Street, Canary Wharf, London, E14 5EJ.

This Guarantee may only be amended, modified or supplemented by an instrument in writing signed for and on behalf of the Surety.

This Guarantee shall be construed and interpreted according to the Laws of Scotland and shall be subject to the exclusive jurisdiction of the Scottish Courts. The Surety confirms that it will not raise any defence of inconvenient forum in proceedings brought in the Scottish Courts.

Dated this 16th day of May 2008

[redacted]

Jennifer Evans
Authorised Signatory

[redacted]

Tim L'Estrange
Authorised Signatory

Continued on page 4

APPENDIX A

DEMAND NOTICE

SURETY
[Address]
Attention: Guarantees Administration
[insert date of Demand Notice]

Dear Sirs,

Performance Guarantee No: [insert number] dated [insert date]

Edinburgh Tram Network

This is our formal demand for payment pursuant to the above instrument issued by you in our favour for the amount of £[◆]. Please pay this sum forthwith by electronic transfer to [◆ *bank account details*].

We hereby certify that Infraco/Infraco Member has failed to [◆ *describe default*] [and has failed to rectify that default as at the date of this Demand Notice].

We attach a certified copy of the relevant Default Notice, dated no later than the date which falls 14 days prior to the date of this Demand Notice.

Signed for and behalf of **tie** Limited

_____
Executive Chairman

_____
Director

Continued on page 5

Continued GTEE 08/0116 page 5 ...

APPENDIX B1

CERTIFICATE OF SERVICE COMMENCEMENT

This document certifies pursuant to clause 45.3 of the Infraco Contract that Section D of the Infraco Works was substantially completed, tested and commissioned on [date] in accordance with the provisions of the Infraco Contract.

Signed: .....
tie representative

NAME: .....

Continued on page 6

Continued GTEE 08/0116 page 6 ...

APPENDIX B2

NETWORK CERTIFICATE

This document is applicable to the Network Performance Test as envisaged by section 23.16 of the Employer's Requirements and certifies in accordance with Clause 47.3 of this Agreement that the Edinburgh Tram Network has passed the test criteria in section 23.16 of the Employer's Requirements to the satisfaction of **tie's** Representative by meeting or exceeding:

(i) the Punctuality Service Element target in section 2.16 of the Employer's Requirements over twenty-eight days measured in accordance with this Agreement;

(ii) the sub-station and UPS demonstration test in accordance with section 23.16.4 of the Employer's Requirements; and

(iii) the tram changeover test in accordance with section 23.16.5 of the Employer's Requirements.

The necessary test results are listed in Annex 1 to this Certificate including any agreed exclusions that have been applied.

tie's Representative

Signature .....

Name (in Block Capitals) .....

Original Certificate to be issued to: **tie**

Copies to be issued to: Infraco, the Tram Supplier, the Tram Maintainer and **tie**'s Representative

Continued on page7

APPENDIX B3

RELIABILITY CERTIFICATE

This document is applicable to the Network Reliability Test as envisaged by section 23.17 of the Employer's Requirements for ..... and certifies in accordance with Clause 47.4 of this Agreement that this System has passed the test criteria to the satisfaction of **tie's** Representative by meeting or exceeding the Target Value for that System in Table 15 of the Employer's Requirements over the required number of Periods. The necessary test results are listed in Annex 1 to this Certificate including any agreed exclusions that have been applied.

tie's Representative

Signature .....

Name (in Block Capitals) .....

Original Certificate to be issued to: **tie**

Copies to be issued to: Infraco, the Tram Supplier and the Tram Maintainer and **tie's** Representative

Deutsche Bank

Deutsche Bank AG London
Winchester House
1 Great Winchester Street
London EC2N 2DB
Tel +44 20 7545 8000

RETENTION BOND in relation to the Edinburgh Tram Network

THIS RETENTION BOND is issued on 19th May 2008

WHEREAS

A. **tie LIMITED**, a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh EH1 1YJ (**"tie"**) (which expression shall include it successors, permitted assignees and transferees) intend to enter into an agreement for the appointment of a contractor (hereinafter referred to as the **"Infraco Contract"**) with Bilfinger Berger UK Limited, Siemens plc and Constructiones y Auxiliary de Ferrocarriles S.A. (CAF) (on a joint and several basis) (the **"Infraco"** and individually **"Infraco Members"**) to design, construct, test, commission and maintain a light rapid transit system in Edinburgh known as the Edinburgh Tram Network.

B. The Infraco Contract obliges the Infraco to deliver to **tie** an irrevocable retention bond issued by a surety acceptable to **tie** and callable subject only to written notification by **tie** in terms of this Retention Bond.

C. **DEUTSCHE BANK AG**, a company incorporated in Germany and acting through its London Branch under branch number BR000005 and whose registered office is at Winchester House, 1 Great Winchester Street, London EC2N 2DB (**"Surety"**), is willing to issue this Retention Bond.

Chairman of the Supervisory Board: Clemens Börsig
Management Board: Josef Ackermann (Chairman), Hugo Bänziger,
Anthony Di Iorio, Hermann Josef Lamberti

Deutsche Bank AG is a Principal [illegible] Authority and
regulated by the Financial Services Authority. Registered in the
Federal Republic of Germany. Deutsche Bank AG is a joint stock
corporation incorporated with limited liability in the Federal
Republic of Germany. In the United Kingdom Deutsche Bank AG is
acting through its London Branch registered as a Multi Business
Company in England and Wales (BR000005) registered address: Winchester
House, 1 Great Winchester Street, London EC2N 2DB.
Deutsche Bank Group code: DBG Www.deutsche-bank.com

[redacted]

THE SURETY HEREBY DECLARES

In consideration of **tie** accepting the Surety's obligations set out in this Retention Bond in discharge of the Infraco's undertaking to provide a retention bond pursuant to the Infraco Contract and subject to the provisions of this Retention Bond, the Surety hereby irrevocably agrees and undertakes to pay to **tie** an sum not exceeding a total aggregate value of £2,000,000 (Two Million Pounds Sterling) ("**Bonded Amount**") and the Surety accordingly covenants with **tie** and agrees as follows:

1. The Surety hereby covenants with **tie** that promptly, and in any event no later than five business days, following receipt by the Surety of a notice in writing from **tie** substantially in the form set out in Appendix 1 ("**Demand Notice**") that the Infraco has failed to perform or observe any of its duties and/or obligations arising under or in connection with the Infraco Contract and/or has committed a breach of any provision and/or has failed to fulfil any warranty or indemnity set out in the Infraco Contract and/or has failed to satisfy any of its liabilities under or in connection with the Infraco Contract, the Surety shall, without inquiry, pay to **tie** in full and without any deductions whatsoever or any right of set-off, abatement or counterclaim, the sum due from the Infraco under the Infraco Contract as stated by **tie** in the Demand Notice in available funds by electronic transfer to the account nominated in the Demand Notice, not exceeding in aggregate the Bonded Amount.

2. Any Demand Notice shall be in writing signed by two authorised representatives of **tie** whose signatures shall be proof of authority of **tie**. A Demand Notice issued by **tie** under this Retention Bond shall provide the Surety with a written statement which identifies the Infraco's failure or default, and shall attach a certified copy of **tie's** communication to the Infraco, pursuant to the Infraco Contract, notifying it of the relevant failure or default (the "**Default Notice**"). Such Demand Notice shall not be presented to the Surety earlier than the date which is 14 days following the date of the Default Notice. Where this Retention Bond has been assigned, in accordance with Clause 1, the Demand Notice shall be signed by two authorised signatories of the new beneficiary, and shall be accompanied by written evidence confirming that the Infraco Contract has been assigned to such beneficiary in accordance with the terms of the Infraco Contract.

[redacted]

3. Subject to Clauses 1 and 2 above, upon receipt by the Surety of a Demand Notice from **tie** the Surety shall not be entitled or obliged to make any enquiry or proof or contestation or impose any further conditions on **tie** (or the Infraco) and **tie** shall not need to take any legal action against or to obtain the consent of the Infraco. **tie** may make as many separate demands hereunder as **tie** thinks fit, provided that the amount demanded, when taken with all previous demands under this Retention Bond and satisfied by the Surety, does not exceed the Bonded Amount. **tie** shall not be obliged to exercise any other right or remedy **tie** may have (against the Infraco, any Infraco Member or any person guaranteeing the obligations of any Infraco Member(s)) before making a demand under this Retention Bond.

4. A Demand Notice received from **tie** in accordance with Clauses 1 and 2 above shall be conclusive evidence of the Surety's liability to pay to **tie** and of the amount of the sum or sums which the Surety is liable to pay. Subject to demand being made in accordance with the terms of this Retention Bond, the Surety's obligation to make payment under this Retention Bond shall be a primary, independent and absolute obligation and the Surety shall not be entitled to delay or withhold payment for any reason. The Surety's obligation hereunder shall not be affected by any act, omission, matter or thing which, but for this provision, might operate to release or otherwise exonerate the Surety from the obligations hereunder in whole or in part, including without limitation and whether or not known to the Surety or to **tie**:

4.1 any time or waiver granted to **tie** or to the Infraco;

4.2 the taking, variation, compromise, renewal or release of or the refusal or neglect to perfect or to enforce any rights, remedies or securities against **tie** or the Infraco;

4.3 any legal limitation, disability or incapacity relating to **tie** or the Infraco;

4.4 any variation of or amendment to the Infraco Contract (or related documentation) or the works or services to be performed thereunder or any other document or security so that references to the Infraco Contract in this Retention Bond shall include each such variation and amendment;

4.5 any unenforceability, invalidity or frustration of any rights or obligations of **tie** or the Infraco under the Infraco Contract or any other document or security; and

[redacted]

4.6 any other fact, circumstance regarding Infraco (or the Infraco Members), provision of statute or rule of law which might, were the Surety's liability to be secondary rather than primary, entitle the Surety to be released or discharged in whole or in part from the Surety's undertaking.

5. The Surety's liability under this Retention Bond shall not be affected or reduced by the insolvency of the Infraco (or either Infraco Member) or their liquidation, receivership or other like temporary or permanent status.

6. **tie** shall be at liberty to compromise, release, waive or neglect any security as it sees fit, without impairment of its rights under this Retention Bond.

7. This Retention Bond shall cease to have effect on the date ("**Bond Expiry**") being the date which is the earlier of:

7.1 31/08/2013; and

7.2 the date of issue of the Reliability Certificate, as evidenced by presentation by Infraco of a copy of the Reliability Certificate certified by **tie** to the Surety,

save in connection with any Demand Notice received by the Surety in writing prior to Bond Expiry. Immediately following Bond Expiry, **tie** shall return this Retention Bond to the Surety for cancellation which should be null and void whether returned to the Surety or not.

8. **tie** shall be entitled to assign this Retention Bond only to the person to which the Infraco Contract has been assigned with prior notification to, but without the consent of (except of (iv) below in which case consent shall not be unreasonably withheld or delayed), the Surety, provided that the assignation shall be permitted pursuant to the Infraco Contract, that is to say an assignation to any of (i) City of Edinburgh Council or the Scottish Ministers (and the legal successors or assignees of either of these parties); (ii) any party guaranteed by the City of Edinburgh Council or Scottish Ministers; (iii) Transport Edinburgh Limited; and (iv) any party approved prior to such assignation in writing by the Infraco. A notice of assignment of this Retention Bond (in case of (iv) accompanied by a copy of the approval letter of the Infraco) shall be provided by **tie** to the Surety promptly following such assignment which shall be conclusive evidence that such assignment has taken place.

[redacted]

9. Any Demand Notice to be served by **tie** pursuant to this Retention Bond shall be sent by **tie** to the Surety, to the Surety's address at ***Deutsche Bank AG, Trade and Risk Services group, Winchester House, 1 Great Winchester House, London EC2N 2DB*** (and if sent by special or recorded delivery shall be taken as having been received by the Surety on the date of receipt by the Surety as evidenced by the relevant certificate of delivery) or shall be delivered personally to the Surety at the address set out in this Clause 9 (and shall be deemed to have been received at the time of delivery). The Surety hereby appoints its London branch at this address as agent to accept service of process.

10. This Retention Bond shall be governed by and construed in accordance with the Laws of Scotland and the Parties hereby agree to submit to the exclusive jurisdiction of the Court of Session over any claim arising out of this Retention Bond. The Surety confirms it will not raise any defence of inconvenient forum in proceedings brought in the Scottish Courts.

11. Save as permitted under Clause 8, a person who is not a party to this Retention Bond shall have no right to enforce any of the terms of this Retention Bond.

12. In this Retention Bond:

    12.1 "**person**" includes any firm and any entity having legal capacity;

    12.2 the definitions given in the recitals apply to the rest of this Retention Bond; and

[redacted]

12.3 **"Reliability Certificate"** means a certificate substantially in the form shown in Appendix 2, issued by **tie** to confirm that the Edinburgh Tram Network, as designed, constructed, tested, commissioned and maintained by the Infraco has satisfied reliability testing and performance criteria for a period of one year after opening for public service.

IN WITNESS WHEREOF **OUR GUARANTEE No.840BGG0800225**

EXECUTED for and on behalf of
DEUTSCHE BANK AG, LONDON BRANCH

On 19th May 2008
by:

Authorised Signatory [redacted]

Full Name JIM McSWEENEY

Authorised Signatory [redacted]

Full Name ANNA WARNER

APPENDIX 1

DEMAND NOTICE

Deutsche Bank AG, LONDON BRANCH
Winchester House, 1 Great Winchester Street, London EC2N 2DB

Attention: Trade Services Department

Dear Sirs,

Retention Bond [◆ date] [Ref: ◆] in relation to the Edinburgh Tram Network

This is our formal demand for payment pursuant to Clause 1 of the above instrument issued by you in our favour for the amount of £[◆]. Please pay this sum forthwith by electronic transfer to [◆ *bank account details*]

We hereby certify that the Infraco has failed to [◆ *describe default*] *and has failed to rectify that default as at the date of this Demand Notice*. In accordance with Clause 2 of the Retention Bond, we attach a certified copy of the relevant Default Notice, dated no later than the date which falls 14 days prior to the date of this Demand Notice

Yours faithfully

_____
Executive Chairman

_____
Director
For and on behalf of tie Limited

[redacted]

APPENDIX 2

RELIABILITY CERTIFICATE

This document is applicable to the Network Reliability Test as envisaged by section 23.17 of the Employer's Requirements for ..... and certifies in accordance with Clause 47.4 of this Agreement that this System has passed the test criteria to the satisfaction of **tie's** Representative by meeting or exceeding the Target Value for that System in Table 45 of the Employer's Requirements over the required number of Periods. The necessary test results are listed in Annex 1 to this Certificate including any agreed exclusions that have been applied.

tie's Representative

Signature .....

Name (in Block Capitals) .....

Original Certificate to be issued to: **tie**

Copies to be issued to: Infraco, the Tram Supplier and the Tram Maintainer and **tie's** Representative

[redacted]



(1) BILFINGER BERGER AG

- and -

(2) tie LIMITED

PARENT COMPANY GUARANTEE
relating to the obligations under the Infraco
Contract dated 14. May 2008 in respect of
the Edinburgh Tram Network

THIS GUARANTEE is made this 14 day of May 2008.

BETWEEN:

(1) **BILFINGER BERGER AG**, a company established in Mannheim, Germany with registration number Amtsgericht Mannheim HRB 4444, Carl-Reiß-Platz 1-5, 68165 Mannheim (the "**Guarantor**"); and

(2) **tie LIMITED**, a company incorporated with registration number SC230949, with registered office at City Chambers, Edinburgh, Midlothian EH1 1YJ, ("**tie**").

WHEREAS:

(A) An unincorporated joint venture comprising Bilfinger Berger UK Limited ("**Bilfinger Subsidiary**") and Siemens plc ("**Siemens Subsidiary**") (together "**Infraco**" and individually each an "**Infraco Member**") are entering into a contract (with joint and several liability) with **tie** for the design, construction, testing, commissioning and maintenance of the Edinburgh Tram Network (the "**Infraco Contract**").

(B) It is a condition of the Infraco Contract that the Bilfinger Subsidiary procures the execution and delivery to **tie** of this parent company guarantee (the "**Guarantee**") and the Siemens Subsidiary procures the execution and delivery to **tie** of a similar parent company guarantee (the "**Siemens Guarantee**").

(C) The Guarantor has agreed to guarantee the obligations of the Bilfinger Subsidiary pursuant to the Infraco Contract.

THE PARTIES AGREE as follows:

1. INTERPRETATION, REPRESENTATIONS, WARRANTIES AND ACKNOWLEDGEMENTS BY THE GUARANTOR

1.1 In this Guarantee and the recitals hereto, unless the context otherwise requires or unless otherwise defined or provided for in this Guarantee, words and expressions when used herein shall have the same meaning as is attributed to them under the Infraco Contract.

1.2 The Guarantor hereby represents and warrants and undertakes to **tie** that:

1.2.1 it is a public limited company duly registered, incorporated and validly existing under the laws of the Federal Republic of Germany;

CEC02083849_0002

1.2.2 it has the power to enter into this Guarantee and to exercise its rights and perform its obligations under this Guarantee;

1.2.3 all required corporate (including supervisory board approval) and other action to authorise its execution of this Guarantee and the performance of its obligations under this Guarantee has been duly taken;

1.2.4 the obligations expressed to be assumed by it in this Guarantee are legal and valid obligations binding on it and enforceable in accordance with the terms hereof;

1.2.5 the entry into and performance by it of this Guarantee does not and will not conflict with:

1.2.5.1 any law or regulation applicable to it;

1.2.5.2 its "**Satzung**" and applicable "**Geschaeftsordnungen**" of the "**Vorstand**" and the "**Aufsichtsrat**" (if any); or

1.2.5.3 any agreement or instrument binding upon it or any of its assets;

1.2.6 the Guarantor has legal capacity to enter into this Guarantee governed by Scots law.

1.3 The Guarantor acknowledges that **tie** has accepted this Guarantee in full reliance on the representations and warranties set out in this Clause 1 (Representations, Warranties and Acknowledgements by the Guarantor) and on the basis that this Guarantee is effective to guarantee the performance and payment obligations owed on a joint and several basis by the Siemens Subsidiary as an Infraco Member pursuant to the Infraco Contract.

1.4 The Guarantor hereby acknowledges that Bilfinger Subsidiary (i) has entered into an agreement with the Siemens Subsidiary and Construcciones Y Auxiliar de Ferrocarriles S.A. ("**CAF**") whereby CAF has joined the Infraco and (ii) will enter into an agreement (the "**Minute of Variation**") with Siemens plc, **tie** and CAF whereby CAF will become party to the Infraco Contract with joint and several responsibility towards **tie**. The Guarantor and **tie** agree, without reservation, that neither the entry of CAF into the Infraco (and any future variation to the terms of such entry) nor any act or omission by CAF nor the Minute of Variation shall have any effect upon the obligations and liabilities of the Guarantor and the rights and entitlements of **tie** Limited pursuant to this Guarantee.

2. UNDERTAKING

2.1 In consideration of **tie** entering into the Infraco Contract with the Infraco, the Guarantor, subject to Clause 3 of this Guarantee, irrevocably guarantees to **tie** the due and punctual observance and performance of the Bilfinger Subsidiary, its successors and permitted assignees, either itself or by such other entity nominated by the Guarantor (subject to that entity being acceptable to **tie**), of each and all of the obligations, warranties, duties and undertakings of the Bilfinger Subsidiary under, or pursuant to, the Infraco Contract (the "**Guaranteed Obligations**") when and as such obligations, warranties, duties and undertakings shall become due and performable by the Bilfinger Subsidiary according to the terms of the Infraco Contract.

2.2 Subject to Clause 3 of this Guarantee, the Guarantor shall pay any amount demanded by **tie** under a written notice substantially in the form of Schedule 1 hereto, such payment to be made by the Guarantor in pounds sterling (£) with five (5) business days of the date of receipt of the demand to the bank account nominated in the demand notice.

3. LIMITATIONS OF LIABILITY

3.1 The Guarantor may raise hereunder all objections and defences the Bilfinger Subsidiary and/or the Infraco has under the Infraco Contract and may assume all such defence, counterclaim, limitation and/or exclusion of liability as the Bilfinger Subsidiary and/or the Infraco may have against **tie** pursuant to the Infraco Contract. In no circumstances shall the Guarantor ever be liable (i) to a greater extent than the liability of the Bilfinger Subsidiary under the Infraco Contract or (ii) for any loss of business, opportunity, revenue, profit or anticipated profit or for any indirect or consequential loss or damages unless the Infraco is liable therefor.

3.2 Subject to Clause 3.4, the liability of the Guarantor in relation to payment obligations of the Bilfinger Subsidiary arising from or in connection with the Infraco Contract pursuant to this Guarantee shall not exceed (when taken together with any other amount recovered by **tie** under the Infraco Contract and/or under this Guarantee) an amount equal to the aggregate of:

3.2.1 the lower of:

a)

(A) £24,200,000 for the period from the Effective Date until the date four years from the issue of the Reliability Certificate: or

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(B) £19,250,000 for the period from four to six years from the issue of the Reliability Certificate; or

(C) £16,500,000 for the period from six to eight years from the issue of the Reliability Certificate; or

(D) £11,000,000 for the period from eight to ten years from the issue of the Reliability Certificate; or

(E) £5,500,000 for the period from ten to twelve years from the issue of the Reliability Certificate;

For the avoidance of doubt, any payments made to tie by the Guarantor on behalf of the Infraco and/or the Siemens Subsidiary under or pursuant to this Guarantee shall count against the relevant amount as per (A) to (E) without regard to the point of time of payment.

and

b) fifty five percent (55%) of the applicable limits of liability set out in clause 77.8 of the Infraco Contract.

3.2.2 any amounts which the Guarantor is obliged to pay in accordance with the terms of Clause 3.4.

For the avoidance of doubt under no circumstances shall the Guarantor's financial liability pursuant to this Guarantee exceed the lower of:

a)

(A) £44,000,000 for the period from the Effective Date until the date four years from the issue of the Reliability Certificate; or

(B) £35,000,000 for the period from four to six years from the issue of the Reliability Certificate; or

(C) £30,000,000 for the period from six to eight years from the issue of the Reliability Certificate; or

(D) £20,000,000 for the period from eight to ten years from the issue of the Reliability Certificate; or

(E) £10,000,000 for the period from ten to twelve years from the issue of the Reliability Certificate:

For the avoidance of doubt, any payments made to **tie** by the Guarantor on behalf of the Infraco, the Bilfinger Subsidiary and/or the Siemens Subsidiary under or pursuant to this Guarantee shall count against the relevant amount as per (A) to (E) without regard to the point of time of payment.

and

b) the applicable limits of liability set out in clause 77.8 of the Infraco Contract.

3.3 The Guarantor's liability in respect of the Guaranteed Obligations shall be conditional on **tie** first having made demand in writing in respect of the same on the Bilfinger Subsidiary and shall be conditional, in case of any demand for payment, on **tie** making a demand on Siemens Aktiengesellschaft for forty five percent (45%) of the total amount claimed from the Infraco (the "**Siemens Share**"). Accordingly, the Guarantor's liability in respect to the Guaranteed Obligations shall be initially limited to fifty five percent (55%) of the value of each claim from **tie** but without prejudice to the obligation of the Guarantor, in the circumstances set out at Clause 3.4 to pay the Siemens Share.

3.4 In the event that full payment from Siemens Aktiengesellschaft is not received by **tie** with respect to the Siemens Share within 30 days of the day of the receipt of the demand, **tie** shall notify the Guarantor in writing and the Guarantor shall pay **tie** the unpaid portion of the Siemens Share within 30 days of receipt by the Guarantor of such notice.

4. EXPIRY

4.1 Without prejudice to Clause 4.4 the obligations of the Guarantor set out herein shall constitute and be continuing obligations and accordingly shall remain in full force and effect from the date hereof:

(a) until the date of issue of the Reliability Certificate or the earlier termination of the Infraco Contract, save that the Guarantor's obligations shall continue with regard to any claim brought or liability incurred by **tie** or the Indemnified Parties arising from or in connection with the Infraco Works (excluding Infrastructure Maintenance Services) which has been pursued by **tie** or the Indemnified Parties and which is already the subject of formal dispute resolution proceedings which have been commenced no later than six months after either of these dates, as the case may be: and

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(b) until the date which is twelve years from issue of the Reliability Certificate with regard to any claim brought or liability incurred by **tie** or the Indemnified Parties arising from or in connection with (i) latent defects in the Infraco Works (and any third party claim for direct loss or damage made after issue of the Reliability Certificate and arising from or in connection with latent defects) (ii) uncorrected Patent Defects (iii) liquidated damages outstanding from the settlement of the final account pursuant to Clause 66.6 of the Infraco Contract save that the Guarantor's obligations shall continue with regard to any such claims brought or liabilities pursued by **tie** or the Indemnified Parties which are already the subject of formal dispute resolution proceedings prior to such date or commenced within three months thereafter; and

(c) until the Expiry Date (or the Extended Expiry Date) or earlier termination of the Infraco Contract with regard to any claim brought or liability incurred by **tie** or the Indemnified Parties arising from or in connection with Infrastructure Maintenance Services, save that the Guarantor's obligations shall continue with regard to any claim brought or liability pursued by **tie** or the Indemnified Parties which is the subject of formal dispute resolution proceedings commenced no later than six months after either of these dates, as the case may be; or

(d) until 31st May 2027,

whichever in each case is the earlier.

4.2 In any of the events set forth in Clause 4.1 (a) to (d) of this Guarantee the expiry of the Guarantor's obligations under this Guarantee shall be without prejudice to any liability of the Guarantor accrued prior to or arising from expiry of the Infraco Contract, provided that any claim by **tie** in respect of such liability shall be barred and be unenforceable, unless written notice of the same specifying in reasonable detail the nature and amount of the claim has been received by the Guarantor within three (3) months after the date of termination of the Guarantee as set out in Clause 4.1, and any proceedings in respect of such claim are commenced within the time period specified in each of Clauses 4.1(a) to 4.1(c).

4.3 **tie** undertakes to return this Guarantee to the Guarantor immediately after its expiry in accordance with Clause 4.1 and Clause 4.2 respectively, save where written notice has been given under clause 4.2 by **tie**. However, for the avoidance of doubt, this Guarantee expires independently of its return.

4.4 In the event the Bilfinger Subsidiary ceases to be a subsidiary of the Guarantor, the Guarantor may offer a replacement guarantee for this Guarantee, substantially in the form hereof. If such replacement guarantee is from a guarantor acceptable to **tie**, acting reasonably having due regard to the remaining performance risk of the Bilfinger Subsidiary and the credit risk of the replacement guarantor, **tie** shall accept such replacement guarantee as security for the Guaranteed Obligations, and this Guarantee shall thereupon automatically terminate. **tie** undertakes to return the Guarantee to the Guarantor immediately following such termination. For avoidance of doubt the Guarantee shall continue in full force and effect notwithstanding the disposal by the Contractor of any or all of its shares in the Bilfinger Subsidiary.

5. PRESERVATION OF RIGHTS

Subject to Clause 3, the obligations of the Guarantor under this Guarantee shall not be discharged by any of the following:

5.1 Any non-written arrangement between the Infraco and/or the Bilfinger Subsidiary and **tie** which does not directly or indirectly increase or extend the liability of the Guarantor under this Guarantee;

5.2 Any amendment to, or any variation, waiver or release of any obligation of the Infraco and/or the Bilfinger Subsidiary under or pursuant to the Infraco Contract which does not directly or indirectly increase or extend the liability of the Guarantor under this Guarantee, provided that **tie** has promptly notified the Guarantor of any such amendment, variation, waiver or release;

5.3 Any time or indulgence being granted or agreed to be granted to the Infraco and/or the Bilfinger Subsidiary in respect of its obligations under or pursuant to the Infraco Contract;

5.4 The taking, variation or release of, or enforcement or neglect to perfect or enforce any right, guarantee, remedy or security from or against the Infraco and/or the Bilfinger Subsidiary;

5.5 Any legal limitation, disability, incapacity or other circumstances solely relating to the Infraco and/or the Bilfinger Subsidiary;

5.6 The insolvency, winding-up, dissolution, administration or re-organisation of or any change in status, function, control or ownership of the Infraco and/or the Bilfinger Subsidiary or any other person;

5.7 Any obligation of the Infraco and/or the Bilfinger Subsidiary under the Infraco Contract being or becoming illegal, void, invalid, unenforceable or ineffective in any respect;

5.8 Any amendment to the Infraco Contract, or any variation, waiver or release of any obligation of the Infraco and/or the Bilfinger Subsidiary under the Infraco Contract;

5.9 The assignation or novation of the Infraco Contract in accordance with its terms (provided the Bilfinger Subsidiary is party to the Infraco Contract as assigned or novated);

5.10 The suspension or termination of the Infraco Contract or of the employment of the Infraco and/or the Bilfinger Subsidiary under the Infraco Contract; and/or

5.11 Any other matter or thing (whether or not known to the Infraco) which would or might operate to exonerate or discharge the Guarantor from its obligations under this Guarantee.

6. ASSIGNATION

6.1 The Guarantor is not entitled to assign this Guarantee.

6.2 **tie** shall be entitled to assign this Guarantee only to the person to which the Infraco Contract has been assigned with prior notification to, but without the consent of, the Guarantor, provided that the assignation shall be permitted pursuant to the Infraco Contract, that is to say an assignation to any of (i) City of Edinburgh Council or the Scottish Ministers (and the legal successors or assignees of either of these parties); (ii) any party guaranteed by the City of Edinburgh Council or Scottish Ministers; (iii) Transport Edinburgh Limited; and (iv) any party approved in writing by the Infraco.

7. SETTLEMENT CONDITIONAL

Any settlement or discharge between the Guarantor and **tie** shall be conditional upon no security given or payment made to **tie** by the Guarantor or any other person on behalf of the Guarantor at any time being avoided or reduced by virtue of any provisions or enactments relating to bankruptcy, insolvency, liquidation or similar laws of general application for the time being in force (whether in Scotland, the Federal Republic of Germany or the European Union) and, if any such security or payment is so avoided or reduced, **tie** shall be entitled to recover the value or amount of such security or payment from the Guarantor subsequently as if such settlement or discharge had not occurred.

8. EXERCISE OF RIGHTS

8.1 Subject to Clause 3.3 **tie** shall not be obliged before exercising any of the rights, powers or remedies conferred upon it in respect of the Guarantor by this Guarantee or by law:

8.1.1 to take any legal proceedings or obtain judgment in any court against the Infraco or either of Bilfinger Subsidiary or Siemens Subsidiary: or

8.1.2 to make or file any claim or proof in a winding-up or dissolution of the Infraco or either of Bilfinger Subsidiary or Siemens Subsidiary.

8.2 Any judgment, award, agreement or determination of any amount due from the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) under the Infraco Contract shall be binding upon the Guarantor.

9. INTEREST

Any amount which is not paid under this Guarantee when due in accordance with a demand served under Clause 3 shall carry interest at the rate of interest applicable to overdue amounts under the Infraco Contract from the due date, which is 2% p.a. above the prevailing published base rate of The Royal Bank of Scotland plc. For avoidance of doubt interest shall not be paid by the Guarantor under this Guarantee for any period during which interest is continuing to accrue under the Infraco Contract.

10. TAXES

All payments in respect of the obligations of the Guarantor under this Guarantee shall be made free and clear of, and without withholding or deduction for, any taxes, duties, assessments or governmental charges of whatsoever nature imposed, levied, collected or assessed by the United Kingdom or the Federal Republic of Germany, or any Land, political or administrative subdivision or any authority thereof having power to tax, save where such withholding or deduction is required by law. In that event, the Guarantor shall pay such additional amounts as will result in the receipt by **tie** of such amount as would have been received by **tie** if no such withholding or deduction had been required.

11. NO SECURITY

The Guarantor shall not hold any security from the Bilfinger Subsidiary in respect of this Guarantee and any such security which is held in breach of this provision shall be held by the Guarantor in trust for and shall be promptly transferred to **tie**.

12. DEFERRAL OF RIGHTS

12.1 The Guarantor agrees that, so long as any amounts are owed by the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) to **tie** under or pursuant to the Infraco Contract,

or any amounts are owed, or have been paid, to **tie** by the Guarantor under this Guarantee, the Guarantor shall not exercise any rights which it may at any time have by reason of performance by it of its obligations under this Guarantee:

12.1.1 to effect or seek to effect any recovery from the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) in respect of any payment made or liability arising pursuant to this Guarantee, whether by receipt of money or set-off or enforcement of security or otherwise;

12.1.2 to claim any contribution from any other guarantor of the obligations of the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) under the Infraco Contract;

12.1.3 to take (in whole or in part and whether by way of subrogation or otherwise) any rights of **tie**;

12.1.4 to claim in the insolvency, administration, winding-up, bankruptcy or liquidation of the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) in competition with **tie**; and/or

12.1.5 subject to Clause 3.3, to require **tie** to make a claim against the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary).

Provided that in the case of Clauses 12.1.1 and 12.1.2 if the Guarantor has made any payment to **tie** pursuant to this Guarantee Agreement, the Guarantor shall be entitled to seek recovery or contribution of such payment (after giving notice to **tie**) on the conditions that such action shall not in any way adversely affect the Infraco's ability (or the Bilfinger Subsidiary's) to perform and discharge its obligations pursuant to the Infraco Contract for its duration.

12.2 The Guarantor shall hold in trust for **tie** any payment or other benefit received by the Guarantor contrary to the provision of this Clause 12. Such sums shall be used to settle any amounts owing to **tie** and any surplus shall be released to the Guarantor.

13. NOTICES

13.1 Any notice to or demand on the Guarantor to be served under this Guarantee shall be in writing and may be delivered in person or sent by recorded delivery post to the Guarantor at its address appearing in this Guarantee or at such other address as it may have notified to **tie** in accordance with this Clause 13.

13.2 Any such notice or demand shall be deemed to have been served on the Guarantor:

(i) if delivered in person, at the time of delivery; or

(ii) if posted, upon the date recorded for receipt.

(iii) The Guarantor hereby appoints Pinsent Masons LLP MNP, of 18-22 Melville Street, Edinburgh, EH3 7NS, as their agent for service of legal process in Scotland.

14. WAIVER

14.1 No delay or omission of **tie** in exercising any right, power or privilege under this Guarantee shall impair or be construed as a waiver of such right power or privilege nor shall any single or partial exercise of any such right, power or privilege preclude any further exercise of such right, power or privilege or the exercise of any other right, power or privilege.

14.2 A waiver given or consent granted by **tie** under this Guarantee shall be effective only if given in writing and then only in the instance and for the purpose for which it is given.

15. PARTIAL INVALIDITY

The invalidity, illegality or unenforceability in whole or in part of any of the provisions of this Guarantee shall not affect the validity, legality and enforceability of the remaining part or provisions of this Guarantee.

16. DISPUTE RESOLUTION AND GOVERNING LAW

This Guarantee shall be governed by and construed in accordance with the Laws of Scotland and the Parties hereby agree to submit to the exclusive jurisdiction of the Court of Session over any claim arising out of this Guarantee.

17. EXCLUSION OF THIRD PARTY RIGHTS

Subject to any assignation pursuant to clause 6 a person not party to this Guarantee shall have no rights to enforce or rely upon any term of this Guarantee and no *jus quaesitum tertio* is hereby created in favour of any party.

18. PAYMENTS

18.1 All payments to be made by the Guarantor in respect of this Guarantee must be made:

18.1.1 in immediately available electronically transferable funds (with no handling charge, commission or exchange rate conversion fee deducted) to the credit of such bank

account as **tie** may designate: and in pounds sterling or such other currency as **tie** nominates.

IN WITNESS WHEREOF these presents on this and the preceding 11 pages together with Schedule 1 which is annexed and signed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**

at Edinburgh

on 21st May 2008 by:

Authorised Signatory [redacted]

Full Name WILLIE GREARSON

Witness Signature [redacted]

Full Name ANDREW SUMMERLAD ATCHIE

Address CULLINS HOUSE RUTLAND SQUARE EDINBURGH EH1 2AA.

EXECUTED for and on behalf of **BILFINGER BERGER AG**

BILFINGER BERGER

Bilfinger Berger AG
Zentrale
Carl-Reiß-Platz 1-5
68165 Mannheim

at Mannheim

on 14 May 2008 by:

Director [redacted]

Full Name

Director [redacted]

Full Name **Wolfgang Hennemann**

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This is the Schedule referred to in the foregoing Guarantee Agreement

SCHEDULE 1
DEMAND LETTER

[Date]

[Guarantor's name]
[Guarantor's address]
Attention: Authorised and responsible representative

EDINBURGH TRAM NETWORK

Dear Sirs,

We refer to the Guarantee Agreement dated [◆] 2008 between us and to the contract (the "**Infraco Contract**") dated [◆] 2008 between us and your subsidiary Bilfinger Berger UK Limited.

1. This letter is our formal demand for the payment of £[◆] pursuant to Clause 2.2. of the Guarantee Agreement, which amount is due and payable by your subsidiary Bilfinger Berger UK Limited and has not been paid. Please make payment to: tie Limited, [bank account number and details] as provided under Clause 18 of the Guarantee Agreement.

AND/OR

2. This letter is our formal demand that you perform and discharge [*describe relevant obligations*] the obligations, warranties, duties and undertakings of your subsidiary Bilfinger Berger UK Limited as required pursuant to Clause 2.1 of the Guarantee Agreement which your subsidiary, in breach of the Infraco Contract, has failed to perform and discharge. Please confirm by return the mobilisation arrangements you are making and the timetable for their deployment in Edinburgh and generally.

We confirm that we have made formal demand in writing on Siemens plc and that we have also made formal demand on Siemens Aktiengesellschaft in relation to this matter.

Yours faithfully,

tie LIMITED

Authorised Signatory

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
BILFINGER BERGER AG

[redacted]

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SIEMENS

(1) SIEMENS AKTIENGESELLSCHAFT

- and -

(2) tie LIMITED

PARENT COMPANY GUARANTEE
No. 213025
relating to the obligations under the
Infraco Contract dated May 14, 2008 in
respect of the Edinburgh Tram Network

Siemens Aktiengesellschaft: Vorsitzender des Aufsichtsrats: Gerhard Cromme. Vorstand: Peter Loscher, Vorsitzender, Wolfgang Dehen, Heinrich Hiesinger, Joe Kaeser, Jim Reid-Anderson, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen. Sitz der Gesellschaft: Berlin und Munchen. Registergericht: Berlin Charlottenburg, HRB 12300, Munchen, HRB 6684. WEEE-Reg.-Nr. DE 23691322

SIEMENS

THIS GUARANTEE is made this 14th day of May 2008

BETWEEN:

(1) **SIEMENS AKTIENGESELLSCHAFT**, a company established in Berlin and Munich, Germany with registration number HRB 12300 Berlin Charlottenburg and HRB 6684 Munich, (the "**Guarantor**"); and

(2) **tie LIMITED**, a company incorporated with registration number SC230949, with registered office at City Chambers, Edinburgh, Midlothian EH1 1YJ, United Kingdom ("**tie**").

WHEREAS:

(A) An unincorporated joint venture comprising Bilfinger Berger UK Limited ("**Bilfinger Subsidiary**") and Siemens plc ("**Siemens Subsidiary**") (together "**Infraco**" and individually each an "**Infraco Member**") are entering into a contract (with joint and several liability) with **tie** for the design, construction, testing, commissioning and maintenance of the Edinburgh Tram Network (the "**Infraco Contract**").

(B) It is a condition of the Infraco Contract that the Siemens Subsidiary procures the execution and delivery to **tie** of this parent company guarantee (the "**Guarantee**") and the Bilfinger Subsidiary procures the execution and delivery to **tie** of a similar parent company guarantee (the "**Bilfinger Berger AG Guarantee**").

(C) The Guarantor has agreed to guarantee the obligations of the Siemens Subsidiary pursuant to the Infraco Contract.

THE PARTIES AGREE as follows:

1. INTERPRETATION, REPRESENTATIONS, WARRANTIES AND ACKNOWLEDGEMENTS BY THE GUARANTOR

1.1 In this Guarantee and the recitals hereto, unless the context otherwise requires or unless otherwise defined or provided for in this Guarantee, words and expressions when used herein shall have the same meaning as is attributed to them under the Infraco Contract.

Siemens Aktiengesellschaft. Vorsitzender des Aufsichtsrats: Gerhard Cromme. Vorstand: Peter Löscher, Vorsitzender; Wolfgang Dehen, Heinrich Hiesinger, Joe Kaeser, Jim Reid-Anderson, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen. Sitz der Gesellschaft: Berlin und München. Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684, WEEE Reg.-Nr. DE 23691322

1.2 The Guarantor hereby represents and warrants and undertakes to **tie** that:

1.2.1 it is a public limited company duly registered, incorporated and validly existing under the laws of the Federal Republic of Germany;

1.2.2 it has the power to enter into this Guarantee and to exercise its rights and perform its obligations under this Guarantee;

1.2.3 all required corporate (including supervisory board approval) and other action to authorise its execution of this Guarantee and the performance of its obligations under this Guarantee has been duly taken;

1.2.4 the obligations expressed to be assumed by it in this Guarantee are legal and valid obligations binding on it and enforceable in accordance with the terms hereof;

1.2.5 the entry into and performance by it of this Guarantee does not and will not conflict with:

1.2.5.1 any law or regulation applicable to it;

1.2.5.2 its "**Satzung**" and applicable "**Geschaeftsordnungen**" of the "**Vorstand**" and the "**Aufsichtsrat**" (if any); or

1.2.5.3 any agreement or instrument binding upon it or any of its assets;

1.2.6 the Guarantor has legal capacity to enter into this Guarantee governed by Scots law.

1.3 The Guarantor acknowledges that **tie** has accepted this Guarantee in full reliance on the representations and warranties set out in this Clause 1 (Representations, Warranties and Acknowledgements by the Guarantor) and on the basis that this Guarantee is effective to guarantee the performance and payment obligations owed on a joint and several basis by the Siemens Subsidiary as an Infraco Member pursuant to the Infraco Contract.

Siemens Aktiengesellschaft: Vorsitzender des Aufsichtsrats: Gerhard Cromme. Vorstand: Peter Löscher, Vorsitzender, Wolfgang Dehen, Heinrich Hiesinger, Joe Kaeser, Jim Reid-Anderson, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen. Sitz der Gesellschaft: Berlin und München. Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684. WEEE-Reg.-Nr. DE 23691322

1.4 The Guarantor hereby acknowledges that Siemens Subsidiary (i) has entered into an agreement with the Bilfinger Subsidiary and Construcciones Y Auxiliar de Ferrocarriles S.A. ("**CAF**") whereby CAF has joined the Infraco and (ii) will enter into an agreement (the "**Minute of Variation**") with Bilfinger Berger UK Limited, **tie** and CAF whereby CAF will become party to the Infraco Contract with joint and several responsibility towards **tie**. The Guarantor and **tie** agree, without reservation, that neither the entry of CAF into the Infraco (and any future variation to the terms of such entry) nor any act or omission by CAF nor the Minute of Variation shall have any effect upon the obligations and liabilities of the Guarantor and the rights and entitlements of **tie** Limited pursuant to this Guarantee.

2. UNDERTAKING

2.1 In consideration of **tie** entering into the Infraco Contract with the Infraco, the Guarantor, subject to Clause 3 of this Guarantee, irrevocably guarantees to **tie** the due and punctual observance and performance of the Siemens Subsidiary, its successors and permitted assignees, either itself or by such other entity nominated by the Guarantor (subject to that entity being acceptable to **tie**), of each and all of the obligations, warranties, duties and undertakings of the Siemens Subsidiary under, or pursuant to, the Infraco Contract (the "**Guaranteed Obligations**") when and as such obligations, warranties, duties and undertakings shall become due and performable by the Siemens Subsidiary according to the terms of the Infraco Contract.

2.2 Subject to Clause 3 of this Guarantee, the Guarantor shall pay any amount demanded by **tie** under a written notice substantially in the form of Schedule 1 hereto, such payment to be made by the Guarantor in pounds sterling (£) with five (5) business days of the date of receipt of the demand to the bank account nominated in the demand notice.

Siemens Aktiengesellschaft. Vorsitzender des Aufsichtsrats: Gerhard Cromme. Vorstand: Peter Loscher, Vorsitzender, Wolfgang Dehen, Heinrich Hiesinger, Joe Kaeser, Jim Reid-Anderson, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen. Sitz der Gesellschaft: Berlin und München. Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684. WEEE-Reg.-Nr. DE 23691322

3. LIMITATIONS OF LIABILITY

3.1 The Guarantor may raise hereunder all objections and defences the Siemens Subsidiary and/or the Infraco has under the Infraco Contract and may assume all such defence, counterclaim, limitation and/or exclusion of liability as the Siemens Subsidiary and/or the Infraco may have against **tie** pursuant to the Infraco Contract. In no circumstances shall the Guarantor ever be liable (i) to a greater extent than the liability of the Siemens Subsidiary under the Infraco Contract or (ii) for any loss of business, opportunity, revenue, profit or anticipated profit or for any indirect or consequential loss or damages unless the Infraco is liable therefor.

3.2 Subject to Clause 3.4, the liability of the Guarantor in relation to payment obligations of the Siemens' Subsidiary arising from or in connection with the Infraco Contract pursuant to this Guarantee shall not exceed (when taken together with any other amount recovered by **tie** under the Infraco Contract and/or under this Guarantee) an amount equal to the aggregate of

3.2.1 the lower of:

a)

(A) £19,800,000 for the period from the Effective Date until the date four years from the issue of the Reliability Certificate; or

(B) £15,750,000 for the period from four to six years from the issue of the Reliability Certificate; or

(C) £13,500,000 for the period from six to eight years from the issue of the Reliability Certificate; or

(D) £9,000,000 for the period from eight to ten years from the issue of the Reliability Certificate; or

(E) £4,500,000 for the period from ten to twelve years from the issue of the Reliability Certificate;

Siemens Aktiengesellschaft Vorsitzender des Aufsichtsrats Gerhard Cromme; Vorstand Peter Löscher Vorsitzender Wolfgang Dehen Heinrich Hiesinger Joe Kaeser Jim Reid-Anderson, Hermann Requardt Siegfried Russwurm, Peter Y Solmssen Sitz der Gesellschaft Berlin und München Registergericht Berlin Charlottenburg, HRB 12300, München, HRB 6684 WEEE Reg-Nr DE [illegible]

For the avoidance of doubt, any payments made to **tie** by the Guarantor on behalf of the Infraco and/or the Siemens Subsidiary under or pursuant to this Guarantee shall count- against the relevant amount as per (A) to (E) without regard to the point of time of payment.

and

b) forty five (45%) of the applicable limits of liability set out in clause 77.8 of the Infraco Contract ,

3.2.2 any amounts which the Guarantor is obliged to pay in accordance with the terms of clause 3.4.

For the avoidance of doubt under no circumstances shall the Guarantor's financial liability pursuant to this Guarantee exceed the lower of:

a)

(A) £44,000,000 for the period from the Effective Date until the date four years from the issue of the Reliability Certificate; or

(B) £35,000,000 for the period from four to six years from the issue of the Reliability Certificate; or

(C) £30,000,000 for the period from six to eight years from the issue of the Reliability Certificate; or

(D) £20,000,000 for the period from eight to ten years from the issue of the Reliability Certificate; or

(E) £10,000,000 for the period from ten to twelve years from the issue of the Reliability Certificate;

Siemens Aktiengesellschaft: Vorsitzender des Aufsichtsrats: Gerhard Cromme; Vorstand: Peter Löscher, Vorsitzender; Wolfgang Dehen, Heinrich Hiesinger, Joe Kaeser, Jim Reid-Anderson, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen; Sitz der Gesellschaft: Berlin und München; Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684; WEEE-Reg.-Nr. DE 23691322

For the avoidance of doubt, any payments made to **tie** by the Guarantor on behalf of the Infraco, the Siemens Subsidiary and/or the Bilfinger Subsidiary under or pursuant to this Guarantee shall count against the relevant amount as per (A) to (E) without regard to the point of time of payment.

and

b) the applicable limits of liability set out in clause 77.8 of the Infraco Contract.

3.3 The Guarantor's liability in respect of the Guaranteed Obligations shall be conditional on **tie** first having made demand in writing in respect of the same on the Siemens Subsidiary and shall be conditional, in case of any demand for payment, on **tie** making a demand on Bilfinger Berger AG for fifty five percent (55%) of the total amount claimed from the Infraco (the "**Bilfinger Share**"). Accordingly, the Guarantor's liability in respect to the Guaranteed Obligations shall be initially limited to forty five (45%) of the value of each claim from **tie** but without prejudice to the obligation of the Guarantor, in the circumstances set out at Clause 3.4 to pay the Bilfinger Share.

3.4 In the event that full payment from Bilfinger Berger AG is not received by **tie** with respect to the Bilfinger Share within 30 days of the day of the receipt of the demand, **tie** shall notify the Guarantor in writing and the Guarantor shall pay **tie** the unpaid portion of the Bilfinger Share within 30 days of receipt by the Guarantor of such notice.

Siemens Aktiengesellschaft: Vorsitzender des Aufsichtsrats: Gerhard Cromme; Vorstand: Peter Löscher, Vorsitzender, Wolfgang Dehen, Heinrich Hiesinger, Joe Kaeser, Jim Reid-Anderson, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen. Sitz der Gesellschaft: Berlin und München. Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684. WEEE-Reg.-Nr. DE 23691322

4. EXPIRY

4.1 Without prejudice to Clause 4.4 the obligations of the Guarantor set out herein shall constitute and be continuing obligations and accordingly shall remain in full force and effect from the date hereof:

(a) until the date of issue of the Reliability Certificate or the earlier termination of the Infraco Contract, save that the Guarantor's obligations shall continue with regard to any claim brought or liability incurred by **tie** or the Indemnified Parties arising from or in connection with the Infraco Works (excluding Infrastructure Maintenance Services) which has been pursued by **tie** or the Indemnified Parties and which is already the subject of formal dispute resolution proceedings which have been commenced no later than six months after either of these dates, as the case may be; and

(b) until the date which is twelve years from issue of the Reliability Certificate with regard to any claim brought or liability incurred by **tie** or the Indemnified Parties arising from or in connection with (i) latent defects in the Infraco Works (and any third party claim for direct loss or damage made after issue of the Reliability Certificate and arising from or in connection with latent defects) (ii) uncorrected Patent Defects (iii) liquidated damages outstanding from the settlement of the final account pursuant to Clause 66.6 of the Infraco Contract save that the Guarantor's obligations shall continue with regard to any such claims brought or liabilities pursued by **tie** or the Indemnified Parties which are already the subject of formal dispute resolution proceedings prior to such date or commenced within three months thereafter; and

Siemens Aktiengesellschaft Vorsitzender des Aufsichtsrats: Gerhard Cromme; Vorstand: Peter Löscher, Vorsitzender; Wolfgang Dehen, Heinrich Hiesinger, Joe Kaeser, Jim Reid-Anderson, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen; Sitz der Gesellschaft: Berlin und München; Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684; WEEE-Reg.-Nr. DE 23691322

(c) until the Expiry Date (or the Extended Expiry Date) or earlier termination of the Infraco Contract with regard to any claim brought or liability incurred by **tie** or the Indemnified Parties arising from or in connection with Infrastructure Maintenance Services, save that the Guarantor's obligations shall continue with regard to any claim brought or liability pursued by **tie** or the Indemnified Parties which is the subject of formal dispute resolution proceedings commenced no later than six months after either of these dates, as the case may be; or

(d) until 31st May 2027,

whichever in each case is the earlier.

4.2 In any of the events set forth in Clause 4.1 (a) to (d) of this Guarantee the expiry of the Guarantor's obligations under this Guarantee shall be without prejudice to any liability of the Guarantor accrued prior to or arising from expiry of the Infraco Contract, provided that any claim by **tie** in respect of such liability shall be barred and be unenforceable, unless written notice of the same specifying in reasonable detail the nature and amount of the claim has been received by the Guarantor within three (3) months after the date of termination of the Guarantee as set out in Clause 4.1, and any proceedings in respect of such claim are commenced within the time period specified in each of Clauses 4.1(a) to 4.1(c).

4.3 **tie** undertakes to return this Guarantee to the Guarantor immediately after its expiry in accordance with Clause 4.1 and Clause 4.2 respectively, save where written notice has been given under clause 4.2 by **tie**. However, for the avoidance of doubt, this Guarantee expires independently of its return.

Siemens Aktiengesellschaft: Vorsitzender des Aufsichtsrats: Gerhard Cromme; Vorstand: Peter Löscher, Vorsitzender, Wolfgang Dehen, Heinrich Hiesinger, Joe Kaeser, Jim Reid-Anderson, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen; Sitz der Gesellschaft: Berlin und München, Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684; WEEE-Reg.-Nr. DE 23691322

4.4 In the event the Siemens Subsidiary ceases to be a subsidiary of the Guarantor, the Guarantor may offer a replacement guarantee for this Guarantee, substantially in the form hereof. If such replacement guarantee is from a guarantor acceptable to **tie**, acting reasonably having due regard to the remaining performance risk of the Siemens Subsidiary and the credit risk of the replacement guarantor, **tie** shall accept such replacement guarantee as security for the Guaranteed Obligations, and this Guarantee shall thereupon automatically terminate. **tie** undertakes to return the Guarantee to the Guarantor immediately following such termination. For avoidance of doubt the Guarantee shall continue in full force and effect notwithstanding the disposal by the Guarantor of any or all of its shares in the Siemens Subsidiary.

5. PRESERVATION OF RIGHTS

Subject to Clause 3, the obligations of the Guarantor under this Guarantee shall not be discharged by any of the following:

5.1 Any non-written arrangement between the Infraco and/or the Siemens Subsidiary and **tie** which does not directly or indirectly increase or extend the liability of the Guarantor under this Guarantee;

5.2 Any amendment to, or any variation, waiver or release of any obligation of the Infraco and/or the Siemens Subsidiary under or pursuant to the Infraco Contract which does not directly or indirectly increase or extend the liability of the Guarantor under this Guarantee, provided that **tie** has promptly notified the Guarantor of any such amendment, variation, waiver or release;

5.3 Any time or indulgence being granted or agreed to be granted to the Infraco and/or the Siemens Subsidiary in respect of its obligations under or pursuant to the Infraco Contract;

5.4 The taking, variation or release of, or enforcement or neglect to perfect or enforce any right, guarantee, remedy or security from or against the Infraco and/or the Siemens Subsidiary;

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5.5 Any legal limitation, disability, incapacity or other circumstances solely relating to the Infraco and/or the Siemens Subsidiary;

5.6 The insolvency, winding-up, dissolution, administration or re-organisation of or any change in status, function, control or ownership of the Infraco and/or the Siemens Subsidiary or any other person;

5.7 Any obligation of the Infraco and/or the Siemens Subsidiary under the Infraco Contract being or becoming illegal, void, invalid, unenforceable or ineffective in any respect;

5.8 Any amendment to the Infraco Contract, or any variation, waiver or release of any obligation of the Infraco and/or the Siemens Subsidiary under the Infraco Contract;

5.9 The assignation or novation of the Infraco Contract in accordance with its terms (provided the Siemens Subsidiary is party to the Infraco Contract as assigned or novated);

5.10 The suspension or termination of the Infraco Contract or of the employment of the Infraco and/or the Siemens Subsidiary under the Infraco Contract; and/or

5.11 Any other matter or thing (whether or not known to the Infraco) which would or might operate to exonerate or discharge the Guarantor from its obligations under this Guarantee.

6. ASSIGNATION

6.1 The Guarantor is not entitled to assign this Guarantee.

Siemens Aktiengesellschaft Vorsitzender des Aufsichtsrats: Gerhard Cromme; Vorstand: Peter Loscher, Vorsitzender, Wolfgang Dehen, Heinrich Hiesinger, Joe Kaeser, Jim Reid-Anderson, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen; Sitz der Gesellschaft: Berlin und München, Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684; WEEE-Reg.-Nr. DE 23691322

6.2 **tie** shall be entitled to assign this Guarantee only to the person to which the Infraco Contract has been assigned with prior notification to, but without the consent of, the Guarantor, provided that the assignation shall be permitted pursuant to the Infraco Contract, that is to say an assignation to any of (i) City of Edinburgh Council or the Scottish Ministers (and the legal successors or assignees of either of these parties); (ii) any party guaranteed by the City of Edinburgh Council or Scottish Ministers; (iii) Transport Edinburgh Limited; and (iv) any party approved in writing by the Infraco.

7. SETTLEMENT CONDITIONAL

Any settlement or discharge between the Guarantor and **tie** shall be conditional upon no security given or payment made to **tie** by the Guarantor or any other person on behalf of the Guarantor at any time being avoided or reduced by virtue of any provisions or enactments relating to bankruptcy, insolvency, liquidation or similar laws of general application for the time being in force (whether in Scotland, the Federal Republic of Germany or the European Union) and, if any such security or payment is so avoided or reduced, **tie** shall be entitled to recover the value or amount of such security or payment from the Guarantor subsequently as if such settlement or discharge had not occurred.

8. EXERCISE OF RIGHTS

8.1 Subject to Clause 3.3 **tie** shall not be obliged before exercising any of the rights, powers or remedies conferred upon it in respect of the Guarantor by this Guarantee or by law:

8.1.1 to take any legal proceedings or obtain judgment in any court against the Infraco or either of Bilfinger Subsidiary or Siemens Subsidiary; or

8.1.2 to make or file any claim or proof in a winding-up or dissolution of the Infraco or either of Bilfinger Subsidiary or Siemens Subsidiary.

8.2 Any judgment, award, agreement or determination of any amount due from the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) under the Infraco Contract shall be binding upon the Guarantor.

Siemens Aktiengesellschaft Vorsitzender des Aufsichtsrats: Gerhard Cromme, Vorstand: Peter Löscher, Vorsitzender, Wolfgang Dehen, Heinrich Hiesinger, Joe Kaeser, Jim Reid-Anderson, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen, Sitz der Gesellschaft: Berlin und München, Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684, WEEE-Reg.-Nr. DE 23691322

9. INTEREST

Any amount which is not paid under this Guarantee when due in accordance with a demand served under Clause 3 shall carry interest at the rate of interest applicable to overdue amounts under the Infraco Contract from the due date, which is 2% p.a. above the prevailing published base rate of The Royal Bank of Scotland plc. For avoidance of doubt interest shall not be paid by the Guarantor under this Guarantee for any period during which interest is continuing to accrue under the Infraco Contract.

10. TAXES

All payments in respect of the obligations of the Guarantor under this Guarantee shall be made free and clear of, and without withholding or deduction for, any taxes, duties, assessments or governmental charges of whatsoever nature imposed, levied, collected or assessed by the United Kingdom or the Federal Republic of Germany, or any Land, political or administrative subdivision or any authority thereof having power to tax, save where such withholding or deduction is required by law. In that event, the Guarantor shall pay such additional amounts as will result in the receipt by **tie** of such amount as would have been received by **tie** if no such withholding or deduction had been required.

11. NO SECURITY

The Guarantor shall not hold any security from the Siemens Subsidiary in respect of this Guarantee and any such security which is held in breach of this provision shall be held by the Guarantor in trust for and shall be promptly transferred to **tie**.

Siemens Aktiengesellschaft: Vorsitzender des Aufsichtsrats: Gerhard Cromme; Vorstand: Peter Loscher, Vorsitzender, Wolfgang Dehen, Heinrich Hiesinger, Joe Kaeser, Jim Reid-Anderson, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen; Sitz der Gesellschaft: Berlin und München, Registergericht: Berlin Charlottenburg, HRB 12300, München, HRB 6684, WEEE-Reg.-Nr. DE 23691322

12. DEFERRAL OF RIGHTS

12.1 The Guarantor agrees that, so long as any amounts are owed by the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) to **tie** under or pursuant to the Infraco Contract, or any amounts are owed, or have been paid, to **tie** by the Guarantor under this Guarantee, the Guarantor shall not exercise any rights which it may at any time have by reason of performance by it of its obligations under this Guarantee:

12.1.1 to effect or seek to effect any recovery from the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) in respect of any payment made or liability arising pursuant to this Guarantee, whether by receipt of money or set-off or enforcement of security or otherwise;

12.1.2 to claim any contribution from any other guarantor of the obligations of the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) under the Infraco Contract;

12.1.3 to take (in whole or in part and whether by way of subrogation or otherwise) any rights of **tie**;

12.1.4 to claim in the insolvency, administration, winding-up, bankruptcy or liquidation of the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary) in competition with **tie**; and/or

12.1.5 subject to Clause 3.3, to require **tie** to make a claim against the Infraco (or either of Bilfinger Subsidiary or Siemens Subsidiary).

Provided that in the case of Clauses 12.1.1 and 12.1.2 if the Guarantor has made any payment to **tie** pursuant to this Guarantee Agreement, the Guarantor shall be entitled to seek recovery or contribution of such payment (after giving notice to **tie**) on the conditions that such action shall not in any way adversely affect the Infraco's ability (or the Siemens Subsidiary's) to perform and discharge its obligations pursuant to the Infraco Contract for its duration.

Siemens Aktiengesellschaft Vorsitzender des Aufsichtsrats Gerhard Cromme Vorstand Peter Löscher Vorsitzender Wolfgang Dehen Heinrich Hiesinger, Joe Kaeser, Jim Reid Anderson Hermann Requardt Siegfried Russwurm Peter Y Solmssen Sitz der Gesellschaft Berlin und München, Registergericht Berlin Charlottenburg HRB 12300, München, HRB 6684 WEEE-Reg Nr DE 23691322

12.2 The Guarantor shall hold in trust for **tie** any payment or other benefit received by the Guarantor contrary to the provision of this Clause 12. Such sums shall be used to settle any amounts owing to **tie** and any surplus shall be released to the Guarantor.

13. NOTICES

13.1 Any notice to or demand on the Guarantor to be served under this Guarantee shall be in writing and may be delivered in person or sent by recorded delivery post to the Guarantor at its address appearing in this Guarantee or at such other address as it may have notified to **tie** in accordance with this Clause 13.

13.2 Any such notice or demand shall be deemed to have been served on the Guarantor:

(i) if delivered in person, at the time of delivery; or

(ii) if posted, upon the date recorded for receipt.

(iii) The Guarantor hereby appoints Biggart Baillie LLP, of Dalmore house, 310 St. Vincent Street, Glasgow, G2 5QR, as their agent for service of legal process in Scotland.

14. WAIVER

14.1 No delay or omission of **tie** in exercising any right, power or privilege under this Guarantee shall impair or be construed as a waiver of such right power or privilege nor shall any single or partial exercise of any such right, power or privilege preclude any further exercise of such right, power or privilege or the exercise of any other right, power or privilege.

14.2 A waiver given or consent granted by **tie** under this Guarantee shall be effective only if given in writing and then only in the instance and for the purpose for which it is given.

Siemens Aktiengesellschaft Vorsitzender des Aufsichtsrats Gerhard Cromme Vorstand Peter Löscher Vorsitzender Wolfgang Dehen Heinrich Hiesinger Joe Kaeser Jim Reid-Anderson Hermann Requardt Siegfried Russwurm Peter v. Solmssen Sitz der Gesellschaft Berlin und München, Registergericht Berlin Charlottenburg HRB 12300 München HRB 6684, WEEE Reg. No. DE 23691322

15. PARTIAL INVALIDITY

The invalidity, illegality or unenforceability in whole or in part of any of the provisions of this Guarantee shall not affect the validity, legality and enforceability of the remaining part or provisions of this Guarantee.

16. DISPUTE RESOLUTION AND GOVERNING LAW

This Guarantee shall be governed by and construed in accordance with the Laws of Scotland and the Parties hereby agree to submit to the exclusive jurisdiction of the Court of Session over any claim arising out of this Guarantee.

17. EXCLUSION OF THIRD PARTY RIGHTS

Subject to any assignation pursuant to clause 6 a person not party to this Guarantee shall have no rights to enforce or rely upon any term of this Guarantee and no *jus quaesitum tertio* is hereby created in favour of any party.

18. PAYMENTS

18.1 All payments to be made by the Guarantor in respect of this Guarantee must be made:

18.1.1 in immediately available electronically transferable funds (with no handling charge, commission or exchange rate conversion fee deducted) to the credit of such bank account as **tie** may designate; and

Siemens Aktiengesellschaft Vorsitzender des Aufsichtsrats Gerhard Cromme Vorstand Peter Loscher Vorsitzender Wolfgang Dehen Heinrich Hiesinger Joe Kaeser Jim Reid-Anderson Hermann Requardt Siegfried Russwurm Peter Y Solmssen Sitz der Gesellschaft Berlin und Munchen Registergericht Berlin Charlottenburg HRB 30000 München HRB 6684 WEEE-Reg-Nr DE 23691322

18.1.2 in pounds sterling or such other currency as **tie** nominates.

IN WITNESS WHEREOF these presents on this and the preceding 16 pages together with Schedule 1 which is annexed and signed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**

at EDINBURGH

on 14 MAY 2008 by:

Authorised Signatory [redacted]

Full Name WILLIAM GALLAGHER

Witness Signature [redacted]

Full Name JOHN SMITH

Address [redacted]

EDIN. EH14 [redacted]

EXECUTED for and on behalf of **SIEMENS AKTIENGESELLSCHAFT**

at Erlangen

on May 14, 2008 by:

Authorised Signatory **Siemens Aktiengesellschaft** [redacted]

Full Name Marlis Laux Michael Wirz [redacted]

Witness Signature

Full Name Walter Reißinger [redacted]

Address Siemens Aktiengesellschaft
Werner-von-Siemens-Str. 50
91052 Erlangen
Germany

Siemens Aktiengesellschaft Vorsitzender des Aufsichtsrats Gerhard Cromme, Vorstand Peter Loscher Vorsitzender Wolfgang Dehen, Heinrich Hiesinger Joe Kaeser Jim Reid-Anderson Hermann Requardt Siegfried Russwurm Peter Y Solmssen Sitz der Gesellschaft Berlin und München Registergericht Berlin Charlottenburg HRB 12300 München HRB 6684 WEEE-Reg Nr DE 23691322

SIEMENS

This is the Schedule referred to in the foregoing Guarantee Agreement

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
SIEMENS AKTIENGESELLSC[redacted]

SCHEDULE 1
DEMAND LETTER

[Date]

[Guarantor's name]
[Guarantor's address]
Attention: Authorised and responsible representative

EDINBURGH TRAM NETWORK

Dear Sirs,

We refer to the Guarantee Agreement dated May 14, 2008 between us and to the contract (the "**Infraco Contract**") dated May 14, 2008 between us and your subsidiary Siemens plc.

1. This letter is our formal demand for the payment of £[□] pursuant to Clause 2.2. of the Guarantee Agreement, which amount is due and payable by your subsidiary Siemens plc and has not been paid. Please make payment to: **tie** Limited, [bank account number and details] as provided under Clause 18 of the Guarantee Agreement.

AND/OR

2. This letter is our formal demand that you perform and discharge [*describe relevant obligations*] the obligations, warranties, duties and undertakings of your subsidiary Siemens plc as required pursuant to Clause 2.1 of the Guarantee Agreement which your subsidiary, in breach of the Infraco Contract, has failed to perform and discharge. Please confirm by return the mobilisation arrangements you are making and the timetable for their deployment in Edinburgh and generally.

We confirm that we have made formal demand in writing on Bilfinger Berger UK Limited and that we have also made formal demand on Bilfinger Berger AG in relation to this matter.

Yours faithfully,

tie LIMITED

_____
Authorised Signatory

Siemens Aktiengesellschaft: Vorsitzender des Aufsichtsrats: Gerhard Cromme; Vorstand: Peter Loscher, Vorsitzender; Wolfgang Dehen, Heinrich Hiesinger, Joe Kaeser, Jim Reid-Anderson, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen; Sitz der Gesellschaft: Berlin und Munchen; Registergericht: Berlin Charlottenburg, HRB 12300, Munchen, HRB 6684; WEEE-Reg.-Nr. DE 23691322



(1) BILFINGER BERGER UK LIMITED AND SIEMENS PLC (TOGETHER THE "INFRACO")

- and -

(2) CITY OF EDINBURGH COUNCIL

COLLATERAL WARRANTY IN FAVOUR OF CITY OF EDINBURGH COUNCIL FROM INFRACO

relating to

THE PROVISION OF THE INFRACO WORKS FOR THE EDINBURGH TRAM NETWORK

AGREEMENT

BETWEEN

(1) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London, EC1A 4EJ, which expression shall include its successors, permitted assignees and transferees and **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens House, Frimley, Camberley, Surrey, GU16 8QD, which expression shall include its successors, permitted assignees and transferees,

together (the "**Infraco**" and separately an "**Infraco Member**"); and

(2) **CITY OF EDINBURGH COUNCIL**, the Local Authority for the said City constituted in terms of the Local Government etc. (Scotland) Act 1994 and having its principal offices at City Chambers, High Street, Edinburgh EH1 1YJ ("**Beneficiary**") which expression shall include its successors and permitted assignees;

BACKGROUND

A By an agreement in writing dated 14 May 2008 (the "**Infraco Contract**"), **tie** Limited, a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh, EH1 1YJ, ("**tie**") appointed the Infraco to provide the Infraco Works (as hereinafter defined) in connection with the Edinburgh Tram Network.

B It is a term of the Infraco Contract that the Infraco Members shall enter into this Agreement with the Beneficiary.

IT IS AGREED as follows:

1. **DEFINITIONS AND INTERPRETATION**

In this Agreement:

1.1 the following words and expressions have the following meanings, unless the context requires otherwise:

"**Agreement**" means this document (as amended from time to time pursuant to clause 11);

"**Deliverables**" means all documents, information, reports, diagrams, records, method statements, risk assessments, manuals, schedules, databases, photographs, formulae,

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plans, designs, specifications, drawings (including as-built drawings), details, calculations, analysis, operation and maintenance manuals, software, data, data configuration designs, tools and details, software protocols, source and object codes, transport and other models and simulations, the outputs and reports based on any models, programmes and all other material created and/or provided by the Infraco (and/or any Infraco Party or any other third party) in relation to the Infraco Works, required to deliver the Infraco Works;

"**Edinburgh Tram Network**" means the tramway which is to be designed, constructed and maintained in Edinburgh pursuant to the Infraco Contract with respect to Phase 1a (forming part of Line One and Line Two as described in the Tram Legislation) and, if the Phase 1b option set out in Clause 85 of the Infraco Contract is exercised, Phase 1b, together with all associated works and facilities required pursuant to the Infraco Contract including all civil engineering and track works, Trams, infrastructure, plant, machinery and equipment installed or used for such tramway;

"**Good Industry Practice**" means using standards, practices, methods and procedures conforming to Law and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably be expected from a large, reputable, professionally qualified, competent and skilled organisation experienced in carrying out activities of a similar nature, scope and complexity to those comprised in the Infraco Works, and seeking in good faith to comply with its contractual obligations and all duties owed by it;

"**Infraco IPR**" means:

(a) all Intellectual Property Rights in the Deliverables (including Intellectual Property Rights in relation to the Infraco Software) which were already existing and owned by, or licensed to, the Infraco and/or the Infraco Parties prior to the Effective Date;

(b) any modifications or developments of any of the Intellectual Property Rights referred to in paragraph (a) above which are generic in nature and not specific to the carry out of the Infraco Works; and

(c) all Intellectual Property Rights in tram signalling systems, communications systems, SCADA systems and system integration programmes, methodologies or software.

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"**Infraco Works**" means the works and services to be undertaken by the Infraco under the Infraco Contract to design, construct, test, commission and maintain Phase 1a and, if instructed, Phase 1b and the Phase 1b Works;

"**Intellectual Property Rights**" means any rights in or to any patent, design right, utility model, trade mark, brand name, service mark, trade name, business name, logo, invention (whether registered or unregistered), domain name, semi-conduetor right, topography right, software designs and/or other materials, source code, copyright, moral right, know-how, or rights in databases and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or for an extension, revival or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the law of Scotland or of any other jurisdiction;

"**Law**" means:

(a) any Act or instruments of the Scottish Parliament or the United Kingdom Parliament or subordinate legislation within the meaning of section 21(1) of the Interpretation Act 1978, any exercise of the Royal Prerogative, and any enforceable community right within the meaning of section 2 of the European Communities Act 1972, and any bye-laws of any local or other statutory authority;

(b) any applicable guidance, policy, direction or determination issued by any regulatory body with which the Infraco and/or the Infraco Parties are bound to comply; and

(c) any applicable judgment of a relevant court of law which is a binding precedent,

in each case in force in Scotland;

"**Liability Cap**" means the liabilities and respective durations for such liabilities pursuant for such liabilities pursuant to the Infraco Contract and set out in Annex A to this Agreement;

"**Party**" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

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"**Phase 1a**" means Edinburgh Airport to Newhaven (inclusive), together with the Depot at Gogar and the spur at Roseburn Junction;

"**Phase 1b**" means Roseburn to Granton Square (inclusive);

"**Project IPR**" means any Intellectual Property Rights arising out of, used in or created to implement the Infraco Works and to produce Deliverables (including the Specially Written Software, any asset management system and/or Works programming system) and for the extension of the Edinburgh Tram Network in accordance with the Infraco Contract but excluding any Infraco IPR contained in the Deliverables;

"**Trams**" means all or any of the tram vehicles for the Edinburgh Tram Network to be provided under the Tram Supply Agreement and maintained under the Tram Maintenance Agreement; and

"**Tram Legislation**" means the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006, and such other legislation relative to the Edinburgh Tram Network as may be enacted from time to time; and

1.2 unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender include all other genders.

1.2.2 a reference to:

1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a clause is a reference to a clause in this Agreement.

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation.

1.4 Where a party comprises two or more persons:

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1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

1.5 Any capitalised terms not defined above shall have the meaning accorded to them pursuant to the Infraco Contract.

2. STANDARD OF CARE

2.1 The Infraco warrants and undertakes to the Beneficiary that it has carried out and shall carry out the Infraco Works and its other duties and obligations under the Infraco Contract including in relation to Phase 1b, if so instructed, subject to and in accordance with the terms thereof.

2.2 In addition to and without derogation from clause 2.1, the Infraco warrants to the Beneficiary that:

2.2.1 in the performance of the Infraco Works and its other obligations under the Infraco Contract it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent contractor experienced in carrying out works and services similar to the Infraco Works in connection with projects of a similar type, nature and complexity;

2.2.2 any design produced by Infraco will ensure compliance with the Employer's Requirements and Infraco Proposals; and

2.2.3 any design produced by the Infraco will fully comply with Law.

2.3 The Infraco shall owe a duty of care to the Beneficiary in carrying out its duties and obligations under the Infraco Contract.

3. MATERIALS

3.1 The Infraco warrants to the Beneficiary that it has not and shall not specify for use or use in relation to the Infraco Works any materials which at the time of use or specification (as the case may be):

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3.1.1 are known to be deleterious in the particular circumstances in which they are specified to be used (either to health and safety or to the durability of the Infraco Works); or

3.1.2 contravene any relevant standard or code of practice issued from time to time by the BSI Group or under a European directive relating to standards; or

3.1.3 do not accord with the guidelines contained in the edition of the publication "Good Practice in Selection of Construction Materials" (Ove Arup & Partners) current at the date of specification of use; or

3.1.4 contravene Good Industry Practice.

4. COPYRIGHT LICENCE

4.1 The Beneficiary and the Infraco acknowledge that under the terms of the Infraco Contract, the Infraco has assigned to **tie**, with full title guarantee the Project IPR which is created by the Infraco and used by it to carry out its obligations under the Infraco Contract.

4.2 The Beneficiary and the Infraco acknowledge that under the terms of the Infraco Contract the Infraco has granted to **tie** a non-exclusive perpetual irrevocable royalty free licence to use such Infraco IPR which is contained in the Deliverables as may be necessary for **tie** to use in relation to the Infraco Works and the Maintenance Services and any extension of the Edinburgh Tram Network and undertakes to procure for **tie** a licence on the same terms as above in respect of any Project IPR created by the Infraco Parties.

4.3 The Beneficiary and the Infraco acknowledge that under the terms of the Infraco Contract the Infraco grants to **tie**, with the prior written consent of the Infraco such consent not to be unreasonably withheld, the right to grant non-exclusive non-assignable sub-licences to third parties for such periods of time as **tie** may reasonably require and otherwise on the same terms as the licence granted to **tie** as described in clause 4.2 above, to use the Infraco IPR referred to in clause 4.2 (other than in relation to Third Party Software and commercially available software which is subject to the provisions of clause 102.9 of the Infraco Contract) in so far as is necessary or desirable for such third party to use such Infraco IPR in relation to the Infraco Works for the Edinburgh Tram Network, the Maintenance Services and any extension of the Edinburgh Tram Network. The Infraco hereby consents to the grant of such non-

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exclusive non-assignable sub-licence by **tie** to the Beneficiary if **tie** so requires for the period of time as **tie** may reasonable require.

4.4 The Infraco shall, if so requested at any time, execute such documents and perform such acts as may be required fully and effectively to assure to the Beneficiary the rights referred to in this clause 4.

4.5 The Infraco shall provide to the Beneficiary (at the Beneficiary's cost) a copy of any of the Deliverables as soon as reasonably practicable after receipt by the Infraco of a written request from the Beneficiary to do so.

5. REQUIRED INSURANCES

5.1 The Infraco undertakes that:

5.1.1 cover under the Required Insurances (and the Additional Insurances, if any) is extended to include the Infraco's liabilities under this Agreement, to the extent that the Infraco is obliged to maintain such insurances under the Infraco Contract;

5.1.2 this Agreement has been disclosed to the Infraco's current insurers or brokers (as the case may be) and shall be disclosed to any future insurers or brokers providing the insurance required by this Agreement; and

5.1.3 the Infraco shall abide by the terms and conditions of the Required Insurances and the OCIP Insurances and shall use all reasonable endeavours not to do or omit to do anything that might prejudice the respective cover or rights to make a claim.

5.2 As and when reasonably required by the Beneficiary, the Infraco shall produce for inspection documentary evidence that such insurance is being properly maintained.

5.3 If the insurer makes or attempts to make any material alteration or purports to withdraw the Infraco's cover under the Required Insurances or the Additional Insurances (if any), or if the Infraco is unable to obtain insurance, the Infraco shall promptly give notice of this to the Beneficiary.

6. ASSIGNATION

6.1 Except as provided in clause 6.2 neither Infraco Member shall assign, novate or otherwise transfer the whole or any part of this Agreement without the prior written

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agreement of the Beneficiary, such agreement not to be unreasonably withheld or delayed in the case that such assignation is to a subsidiary or associated company.

6.2 Subject to notice being served on **tie** and the Beneficiary, the Infraco shall be entitled to assign, novate or otherwise transfer the whole of this Agreement to any person who the Infraco assigns, novates or otherwise transfers (in whole) its duties and obligations under the Infraco Contract without the prior written agreement of the Beneficiary.

6.3 Subject to notice being served on the Infraco and on **tie**, the Beneficiary shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

6.3.1 without the consent of the Infraco to any person provided that no more than two such assignations will be permitted. Any assignations by the Beneficiary to a subsidiary or associated company of the Beneficiary or a member of the same group of companies will not count as an assignation;

6.3.2 with the prior written consent of the Infraco (such consent not to be unreasonably withheld or delayed).

6.4 The Infraco undertakes to the Beneficiary not to contend in any court proceedings under this Agreement that any person to whom the Beneficiary assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this clause 6 (*Assignation*) is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that the Beneficiary is named under this Agreement or any intermediate assignee of the Beneficiary escaped loss resulting from such breach by reason of the disposal of its interest in the same.

7. LIABILITY OF INFRACO

7.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by the law of contract, delict or otherwise.

7.2 The responsibility of the Infraco under this Agreement is not to be reduced or in any way released or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by the Beneficiary against a third party.

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7.3 The rights and benefits conferred upon the Beneficiary by this Agreement are in addition to any other rights and remedies that the Beneficiary may have against the Infraco including (without prejudice to the generality of the foregoing) any remedies in delict.

7.4 Subject to the other provisions of this Agreement, the liability of the Infraco to the Beneficiary is to be determined in all respects in accordance with the terms of the Infraco Contract and, in the event of any claim by the Beneficiary under this Agreement, the Infraco shall be entitled to rely upon any defence, right, limitation or exclusion under the Infraco Contract as though the Beneficiary were named as **tie** under it, except that:

7.4.1 the Beneficiary shall not be affected by any subsequent variation of the Infraco Contract which would adversely affect the obligations owed by the Infraco or the waiver, compromise or withdrawal of any claim made by **tie**; and

7.4.2 the Infraco shall not be entitled to exercise any right of set-off, retention or withholding against the Beneficiary to which the Infraco may be entitled against **tie**.

7.5 The Infraco shall not be liable to the Beneficiary for any delay in completing the Infraco Works.

7.6 Without prejudice to clause 7.4:

7.6.1 the Beneficiary acknowledges and agrees that the Infraco shall have no liability to the Beneficiary under this Agreement to the extent that such liability would result in the total aggregate liability of the Infraco in connection with the Edinburgh Tram Network exceeding the relevant Liability Cap; and

7.6.2 the Infraco shall have no liability to the Beneficiary under this Agreement following expiry of the period of 12 years from the earlier to occur of the date of issue of the Reliability Certificate and the date of termination of the Infraco Contract.

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8. **NOTICES**

8.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

8.2 Any notice given pursuant to this clause, if sent by special or recorded delivery, is deemed to have been received on proof of delivery.

9. **RIGHTS OF THIRD PARTIES**

9.1 A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

10. **INVALID TERMS**

10.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

10.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

10.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

11. **VARIATIONS AND WAIVERS TO BE IN WRITING**

11.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

12. **WAIVER**

12.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

12.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

13. JURISDICTION AND LAW

13.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

IN WITNESS WHEREOF these presents on this and the preceding 10 pages, together with the Annex are executed as follows:

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at: EDINBURGH

on 14 May 2008 by:

Director [redacted]

Full Name SAM, STEVE DACTON

Director [redacted]

Full Name RICHARD JOHN DAUGHS

EXECUTED for and on behalf of **SIEMENS PLC**

at: EDINBURGH

on 14 May 2008 by:

Authorised Signatory [redacted]

Full Name C. KOTH

Authorised Signatory [redacted]

Full Name M. FLYNN

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EXECUTED for and on behalf of **CITY OF EDINBURGH COUNCIL**

at: EDINBURGH

on 30 May 2008 by:

Authorised Signatory [redacted]

Full Name GILL LINDSAY

Witness Signature [redacted]

Full Name MANDY WILSON

Address CITY CHAMBERS

EDINBURGH

ACKNOWLEDGED for and on behalf of **TIE LIMITED**

at: EDINBURGH

on 14 May 2008 by:

Director/Authorised Signatory [redacted]

Full Name WILLIAM CALLAGHER

Witness Signature [redacted]

Full Name ANDREW SUTHERLAND FITCHIE

Address C/O DLA RUTLAND SQUARE

EDINBURGH

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ANNEX A

"**Liability Cap**" means:

(i) Subject always to subparagraphs (ii) to (iv) below, in relation to:

(a) any claim brought or liability incurred by **tie** or the Indemnified Parties prior to the issue of the Reliability Certificate or within 6 months of the issue of the Reliability Certificate arising from or in connection with Infraco Works (other than Infrastructure Maintenance Services after the Service Commencement Date) carried out prior to the issue of the Reliability Certificate;

(b) latent defects and uncorrected Patent Defects;

(c) any third party claim made against **tie** or the Indemnified Parties for direct loss or damage made after the issue of the Reliability Certificate and arising from or in connection with latent defects;

(d) liabilities owed by the Infraco connected with liquidated damages outstanding from settlement of final account after Service Commencement;

twenty percent (20%) of the Construction Works Price (including, the value of any **tie** Changes arising from Clause 80 (*tie Changes*), Notified Departures, extensions to the Edinburgh Tram Network instructed through Clause 81 (*Infraco Changes*), Clause 85 (*Phase 1b*) or Clause 86 (*Network Expansions*) (the "**Construction Cap**"), subject to (A) in the case of any liability arising solely from the breach of contract or negligent acts or omissions of the SDS Provider, the SDS Liability Cap; and (B) in the case of any liability arising under (c) above, nine million pounds (£9,000,000);

(ii) subject to sub-paragraphs (iii) and (iv), in respect of claims brought against or liabilities incurred by **tie** or the Indemnified Parties to which paragraph (i) above does not apply, an amount of three million, five hundred thousand pounds (£3,5000,000) (in relation to Phase 1a), or the Maintenance Cap, whichever is lower;

(iii) In relation to liability arising solely from any act or omission of the Tram Supplier, an amount when aggregated with all previous claims equal to twenty percent (20%) of the Aggregate Tram Price and (excluding the proceeds of all insurance, bonds and cash securities) as defined in the Tram Supply Agreement, such liability to be treated as outside the Construction Cap;

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(iv) In relation to liability arising from any act or omission of the Tram Maintainer , an aggregate amount of eighteen and one half percent (18.5%) of the aggregate Maximum Performance Payment over the Term of and as defined in the Tram Maintenance Agreement and annually twenty two and one half percent (22.5%) of the aggregate Maximum Performance Payment as defined in the Tram Maintenance Agreement of the Tram Maintenance Services, (in both cases excluding the proceeds of any insurance, bonds and cash securities) such liability to be treated as outside the Maintenance Cap;

[redacted]
Director/Authorised Signatory
BILFINGER BERGER UK LIMITED

[redacted]
Director/Authorised Signatory
SIEMENS PLC

[redacted]
Authorised Signatory
CITY OF EDINBURGH COUNCIL

[redacted]
Director/Authorised Signatory
tie LIMITED

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(1) BILFINGER BERGER UK LIMITED AND SIEMENS PLC (TOGETHER THE "INFRACO")

- and -

(2) EDINBURGH AIRPORT LIMITED

COLLATERAL WARRANTY IN FAVOUR OF EDINBURGH AIRPORT AUTHORITY FROM INFRACO

relating to

THE PROVISION OF THE INFRACO WORKS FOR THE EDINBURGH TRAM NETWORK

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AGREEMENT

BETWEEN

(1) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London, EC1A 4EJ, which expression shall include its successors, permitted assignees and transferees and **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens House, Frimley, Camberley, Surrey, GU16 8QD, which expression shall include its successors, permitted assignees and transferees, ("**Tram Contractor**"); and

(2) **EDINBURGH AIRPORT LIMITED**, (company number SC096623) whose registered office is at St Andrew's Drive, Glasgow Airport, Paisley PA3 2SW ("**Beneficiary**" or "**EAL**" as appropriate) which expression shall include its successors and permitted assignees.

BACKGROUND

A By an agreement in writing dated 14 May 2008 ("**Tram Main Works Agreement**"), **tie** Limited (as hereinafter defined) appointed the Tram Contractor to provide the Works (as hereinafter defined) in connection with the Edinburgh Tram Project.

B It is a term of the Tram Main Works Agreement that the Tram Contractor shall enter into this Agreement with the Beneficiary.

IT IS AGREED as follows:

1. DEFINITIONS AND INTERPRETATION

In this Agreement:

1.1 the following words and expressions have the following meanings, unless the context requires otherwise:

"**Act**" means the Edinburgh Tram (Line Two) Act 2006;

"**Agreement**" means this document (as amended from time to time pursuant to clause 11);

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"**Deliverables**" means all documents, information, reports, diagrams, pricing schedules, records, method statements, risk assessments, manuals, schedules, databases, reinforcement details, photographs, formulae, plans, designs, specifications, drawings (including as-built drawings), details, calculations, analysis, operation and maintenance manuals, software, data, data configuration designs, tools and details, software protocols, source and object codes, transport and other models and simulations, the outputs and reports based on any models, programmes and all other material created and/or provided by the Tram Contractor (and/or any Tram Contractor Party or any other third party) in relation to the Tram Main Works Agreement required to deliver the Works;

"**Edinburgh Tram Project**" means the project to construct and operate the Authorised Tramway (as defined in the Act);

"**Good Industry Practice**" means using standards, practices, methods and procedures conforming to law and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably be expected from a large, reputable, professionally qualified, competent and skilled organisation experienced in carrying out activities of a similar nature, scope and complexity to those comprised in the Works, and seeking in good faith to comply with its contractual obligations and all duties owed by it;

"**Intellectual Property Rights**" means any rights in or to any patent, design right, utility model, trade mark, brand name, service mark, trade name, business name, logo, invention (whether registered or unregistered), domain name, semi-conductor right, topography right, software designs and/or other materials, source code, copyright, moral right, know-how, or rights in databases and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or for an extension, revival or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the law of Scotland or of any other jurisdiction;

"**Liability Cap**" means as defined under the Tram Main Works Agreement;

"**Party**" means each and any of the parties to this Agreement and "**Parties**" shall be construed accordingly;

"**Project IPR**" means any Intellectual Property Rights arising out of, used in or created to implement the Works and to produce Deliverables (including the Specially Written Software, any asset management system and/or Works programming system) and for the extension of the Edinburgh Tram Network in accordance with the Tram Main Works Agreement but excluding any Tram Contractor IPR contained in the Deliverables;

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"**Site**" means those areas of ground at Edinburgh Airport used (with the consent of EAL) in connection with the Works;

"**Required Insurances**" means the Required Insurances required under the Tram Main Works Agreement, which shall include professional indemnity insurance of not less than £10,000,000.00 on an each and every claim basis and in the aggregate during each twelve month period of insurance (subject to one reinstatement of the limit of indemnity for each twelve month period of insurance in the case of Bilfinger Berger UK Limited) so long as such professional indemnity insurance may be obtained in the European Union insurance market at commercially reasonable rates and on commercially reasonable terms to contractors of the same status as at the effective date of the Tram Contractor;

"**Statutory Requirements**" means all general or local Acts of Parliament and the regulations and Bye-laws of any local or other statutory authority which may be applicable to the Works, together with any accompanying code of practice or guidance, and the rules and regulations of all public bodies and companies whose property or rights are or may be affected in any way by the Works;

"**tie Limited**" means **tie** Limited, incorporated under the Companies Acts (Company Number SC230949) in Scotland and having its registered office at City Chambers, High Street, Edinburgh, EH1 1YJ;

"**Tram Contractor IPR**" means:

(a) all Intellectual Property Rights in the Deliverables (including Intellectual Property Rights in relation to the Infraco Software) which were already existing and owned by, or licensed to, the Tram Contractor and/or the Tram Contractor Parties prior to the Effective Date;

(b) any modifications or developments of any of the Intellectual Property Rights referred to in paragraph (a) above which are generic in nature and not specific to the carrying out of the Works; and

(c) all Intellectual Property Rights in tram signalling systems, communications systems, SCADA systems and system integration programmes, methodologies or software

in all cases excluding:

(A) all Intellectual Property Rights (including Intellectual Property Rights in relation to programs owned by the Tram Supplier and/or the Tram Maintainer) which the Tram Supplier and/or the Tram Maintainer can demonstrate by documentary evidence were

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already existing and owned by, or licensed to, the Tram Supplier and/or the Tram Maintainer prior to the 13 May 2008 including, without limitation, any asset management system and/or works programming system operated by the Tram Supplier and/or the Tram Maintainer;

(B) all Intellectual Property Rights:

(i) created in the performance of the Tram Supply Obligations relating to the aesthetic and ergonomic detailed design and which are specific in nature to the performance of the Tram Supply Obligations; and/or

(ii) created in the performance of the Tram Maintenance Services which are specific in nature to the performance of the Tram Maintenance Services including any asset management system and/or works planning or programming system created by the Tram Maintainer in connection with the performance of the Tram Maintenance Services; and

(C) any modifications or developments of any of the Intellectual Property Rights referred to in paragraph (A) above which are generic in nature;

"**Tram Contractor Party**" means an Infraco Party as defined under the Tram Main Works Agreement; and

"**Works**" means any works authorised by the Act on or affecting the Site and to be undertaken by the Tram Contractor under the Tram Main Works Agreement; and

1.2 unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender include all other genders.

1.2.2 a reference to:

1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a clause is a reference to a clause in this Agreement.

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation.

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1.4 Where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

1.5 Any capitalised terms not defined above shall have the meaning accorded to them pursuant to the Tram Main Works Agreement.

2. STANDARD OF CARE

2.1 The Tram Contractor warrants and undertakes to the Beneficiary that it has carried out and shall carry out the Works and its other duties and obligations under the Tram Main Works Agreement subject to and in accordance with the terms thereof.

2.2 In addition to and without derogation from clause 2.1, the Tram Contractor warrants to the Beneficiary that:

2.2.1 in the performance of the Works and its other obligations under the Tram Main Works Agreement it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent contractor experienced in carrying out works and services similar to the Works in connection with projects of a similar size, scope and complexity;

2.2.2 any design produced by the Tram Contractor will satisfy in every respect any relevant performance specification or any requirement included or referred to in the Tram Main Works Agreement and will be suitable in every respect for the purposes included in the Tram Main Works Agreement; and

2.2.3 any design produced by the Tram Contractor will fully comply with Statutory Requirements.

2.3 The Tram Contractor shall owe a duty of care to the Beneficiary in carrying out its duties and obligations under the Tram Main Works Agreement.

3. MATERIALS

3.1 The Tram Contractor warrants to the Beneficiary that it has not and shall not use in relation to the Works any materials which at the time of use:

3.1.1 are known to be deleterious in the particular circumstances in which they are used (either to health and safety or to the durability of the Works); or

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3.1.2 contravene any relevant standard or code of practice issued from time to time by the BSI Group or under a European directive relating to standards; or

3.1.3 do not accord with the guidelines contained in the edition of the publication "Good Practice in Selection of Construction Materials" (Ove Arup & Partners) current at the date of specification of use; or

3.1.4 contravene Good Industry Practice.

4. COPYRIGIIT LICENCE

4.1 The Beneficiary and the Tram Contractor acknowledge that under the terms of the Tram Main Works Agreement, the Tram Contractor has assigned to **tie** Limited, with full title guarantee the Project IPR which is created by the Tram Contractor and used by it to carry out its obligations under the Tram Main Works Agreement.

4.2 The Beneficiary and the Tram Contractor acknowledge that under the terms of the Tram Main Works Agreement the Tram Contractor has granted to **tie** Limited a non-exclusive perpetual irrevocable royalty free licence to use such Tram Contractor IPR which is contained in the Deliverables as may be necessary for **tie** Limited to use in relation to the Works and the Maintenance Services and any extension of the Edinburgh Tram Network and undertakes to procure for **tie** Limited a licence on the same terms as above in respect of any Project IPR created by the Tram Contractor Parties.

4.3 The Beneficiary and the Tram Contractor acknowledge that under the terms of the Tram Main Works Agreement the Tram Contractor grants to **tie** Limited, with the prior written consent of the Tram Contractor such consent not to be unreasonably withheld, the right to grant non-exclusive non-assignable sub-licences to third parties for such periods of time as **tie** Limited may reasonably require and otherwise on the same terms as the licence granted to **tie** Limited as described in Clause 4.2 above, to use the Tram Contractor IPR referred to in Clause 4.2 (other than in relation to Third Party Software and commercially available software which is subject to the provisions of Clause 102.9 of the Tram Main Works Agreement) in so far as is necessary or desirable for such third party to use such Tram Contractor IPR in relation to the Works for the Edinburgh Tram Network, the Maintenance Services and any extension of the Edinburgh Tram Network. The Tram Contractor hereby consents to the grant of such non-exclusive non-assignable sub-licence by **tie** Limited to the Beneficiary if **tie** Limited so requires for the period of time as **tie** Limited may reasonably require.

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4.4 The Tram Contractor shall, if so requested at any time, execute such documents and perform such acts as may be required fully and effectively to assure to the Beneficiary the rights referred to in this Clause 4.

4.5 The Tram Contractor shall provide to the Beneficiary (at the Beneficiary's cost) a copy of any of the Deliverables as soon as reasonably practicable after receipt by the Tram Contractor of a written request from the Beneficiary to do so.

5. REQUIRED INSURANCES

5.1 The Tram Contractor undertakes that:

5.1.1 cover under the Required Insurances (and the Additional Insurances, if any) is extended to include the Tram Contractor's liabilities under this Agreement, to the extent that the Tram Contractor is obliged to maintain such insurances under the Tram Main Works Agreement;

5.1.2 this Agreement has been disclosed to the Tram Contractor's current insurers or brokers (as the case may be) and shall be disclosed to any future insurers or brokers providing the insurance required by this Agreement; and

5.1.3 the Tram Contractor shall abide by the terms and conditions of the Required Insurances and the OCIP Insurances and shall use all reasonable endeavours not to do or omit to do anything that might prejudice the respective cover or rights to make a claim.

5.2 As and when reasonably required by the Beneficiary, the Tram Contractor shall produce for inspection documentary evidence that such insurance is being properly maintained.

5.3 If the insurer makes or attempts to make any material alteration or purports to withdraw the Tram Contractor's cover under the Required Insurances or the Additional Insurances (if any), or if the Tram Contractor is unable to obtain insurance for any other reason whatsoever, the Tram Contractor shall promptly give notice of this to the Beneficiary.

6. ASSIGNATION

6.1 The Tram Contractor shall not assign, novate or otherwise transfer the whole or any part of this Agreement without the prior written agreement of the Beneficiary which will not be unreasonably withheld or delayed in respect of:

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6.1.1 an assignation, novation or transfer of the whole of this Agreement to any person to which the whole of the Tram Main Works Agreement has been assigned, novated or otherwise transferred; or

6.1.2 an assignation, novation or transfer of any part of this Agreement to any person to which the relevant and equivalent part of the Tram Main Works Agreement has been assigned, novated or otherwise transferred.

6.2 Subject to notice being served on the Tram Contractor and on **tie** Limited, the Beneficiary shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

6.2.1 without the consent of the Tram Contractor to any person provided that no more than two such assignations will be permitted. Any assignations by the Beneficiary to a subsidiary or associated company of the Beneficiary or a member of the same group of companies will not count as an assignation;

6.2.2 with the prior written consent of the Tram Contractor (such consent not to be unreasonably withheld or delayed).

6.3 The Tram Contractor undertakes to the Beneficiary not to contend in any court proceedings under this Agreement that any person to whom the Beneficiary assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this Clause 6 is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that the Beneficiary is named under this Agreement or any intermediate assignee of the Beneficiary escaped loss resulting from such breach by reason of the disposal of its interest in the same.

7. LIABILITY OF THE TRAM CONTRACTOR

7.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by the law of contract, delict or otherwise.

7.2 The responsibility of the Tram Contractor under this Agreement is not to be reduced or in any way released or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by the Beneficiary against a third party.

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7.3 The rights and benefits conferred upon the Beneficiary by this Agreement are in addition to any other rights and remedies that the Beneficiary may have against the Tram Contractor including (without prejudice to the generality of the foregoing) any remedies in delict.

7.4 Subject to the other provisions of this Agreement, the liability of the Tram Contractor to the Beneficiary is to be determined in all respects in accordance with the terms of the Tram Main Works Agreement and, in the event of any claim by the Beneficiary under this Agreement, the Tram Contractor shall be entitled to rely upon any defence, right, limitation or exclusion under the Tram Main Works Agreement as though the Beneficiary were named as **tie** Limited under it, except that:

7.4.1 the Beneficiary shall not be affected by any subsequent variation of the Tram Main Works Agreement which would adversely affect the obligations owed by the Tram Contractor or the waiver, compromise or withdrawal of any claim made by **tie** Limited; and

7.4.2 the Tram Contractor shall not be entitled to exercise any right of set-off, retention or withholding against the Beneficiary to which the Tram Contractor may be entitled against **tie** Limited.

7.5 The Tram Contractor shall not be liable to the Beneficiary for any delay in achieving the issue of any Certificate of Sectional Completion, Milestone Completion Certificate, the Network Certificate, Certificate of Tram Commissioning, the Certificate of Service Commencement and/or the Reliability Certificate.

7.6 Without prejudice to Clause 7.4:

7.6.1 the Beneficiary acknowledges and agrees that the Tram Contractor shall have no liability to the Beneficiary under this Agreement to the extent that such liability would result in the total aggregate liability of the Tram Contractor in connection with the Edinburgh Tram Network exceeding the relevant Liability Cap; and

7.6.2 the Tram Contractor shall have no liability to the Beneficiary under this Agreement in respect of any latent defects in the Works following expiry of the period of 12 years from the earlier to occur of the date of issue of the Reliability Certificate and the date of termination of the Tram Main Works Agreement.

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8. NOTICES

8.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

8.2 Any notice given pursuant to this Clause, if sent by recorded delivery, shall be deemed to have been received upon proof of delivery.

9. RIGHTS OF THIRD PARTIES

9.1 A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

10. INVALID TERMS

10.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

10.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

10.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

11. VARIATIONS AND WAIVERS TO BE IN WRITING

11.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

12. WAIVER

12.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

12.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

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13. JURISDICTION AND LAW

13.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

IN WITNESS WHEREOF these presents on this and the preceding 10 pages are executed as follows:

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED** at EDINBURGH

on 14th MAY 2008 by:

Director [redacted]

Full Name GARY STEVE DALTON

Director [redacted]

Full Name RICHARD JOHN WARNER.

EXECUTED for and on behalf of **SIEMENS PLC**

at EDINBURGH

on 14 MAY 2008 by:

Authorised Signatory [redacted]

Full Name M. HARTLEY

Authorised Signatory [redacted]

Full Name C. ROTH

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EXECUTED for and on behalf of **EDINBURGH AIRPORT LIMITED**

at Edinburgh

on 2 September 2008 by:

Authorised Signatory [redacted]

Full Name GORDON DEWAR

Witness Signature [redacted]

Full Name Timothy Edward Whittall

Address [redacted]

London

ACKNOWLEDGED for and on behalf of **TIE LIMITED**

at Edinburgh on 14th May 2008 by:

Director/Authorised Signatory [redacted]

Full Name WILLIAM GALLAGHER

Witness Signature [redacted]

Full Name ANDREW SUTHERLAND FITCHIE

Address COLLINS HOUSE, RUTLAND SQUARE, EDINBURGH



(1) BILFINGER BERGER UK LIMITED
AND SIEMENS PLC
(TOGETHER THE "INFRACO")

- and -

(2) NETWORK RAIL INFRASTRUCTURE LIMITED

COLLATERAL WARRANTY IN FAVOUR OF NETWORK RAIL INFRASTRUCTURE LIMITED FROM INFRACO

relating to

THE PROVISION OF THE INFRACO WORKS FOR THE EDINBURGH TRAM NETWORK

THIS AGREEMENT

BETWEEN:

(1) **INFRACO** comprising of **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London, EC1A 4EJ, and **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir Williams Siemens House, Frimley, Camberley, Surrey, GU16 8QD (the "**Infraco**"); and

(2) **NETWORK RAIL INFRASTRUCTURE LIMITED** registered in England and Wales under company number 2904587 and having its registered office at 40 Melton Street, London NW1 2EE ("**Beneficiary**").

WHEREAS:

A By an agreement in writing dated 14 May 2008 (the "**Infraco Contract**"), **tie** Limited ("**tie**") appointed the Infraco to provide the Infraco Works (as hereinafter defined) in connection with the Edinburgh Tram Network.

B By an agreement in writing dated 13 and 14 March 2008 (the "**APA**"), **tie** agreed with Network Rail to ensure that certain additional terms would apply in respect of the Infraco APA Works (as hereinafter defined) in connection with the Edinburgh Tram Network.

C It is a term of the APA and the Infraco Contract that the Infraco shall enter into this Agreement with Network Rail.

NOW IT IS AGREED AS FOLLOWS:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement (including the recitals), except where the context otherwise requires, the following words and expressions shall have the following meanings:

"**Edinburgh Tram Network**" means the tramway which is to be designed, constructed and maintained in Edinburgh pursuant to the Infraco Contract in Phase 1a (forming part of Line One and Line Two as described in the Tram Legislation) and, if the Phase 1b option set out in the Infraco Contract is exercised, Phase 1b, or either of them (as may be amended from time to time together with any modification, line extension, spur, interconnection and any additional line which may be instructed), to

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be constructed in accordance with the Tram Legislation together with all associated works and facilities including all civil engineering and track works, Trams, infrastructure, plant, machinery and equipment installed or used for such tramway;

"**Infraco APA Works**" means that part of the works and services to be undertaken by the Infraco under the Infraco Contract which constitute the 'Works' as defined in the APA;

"**Infraco Works**" means the works and services to be undertaken by the Infraco under the Infraco Contract for the purpose of the Edinburgh Tram Network;

"**Party**" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

"**Phase 1a**" means Edinburgh Airport to Newhaven (inclusive), together with the Depot at Gogar and the spur at Roseburn Junction;

"**Phase 1b**" means Roseburn Junction to Granton Square (inclusive);

"**Trams**" means the tram vehicles to be provided for operation on the Edinburgh Tram Network;and

"**Tram Legislation**" means the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006, and such other legislation relative to the Edinburgh Tram Network as may be enacted from time to time.

1.2 In this Agreement unless the context otherwise requires:

1.2.1 words importing any gender include every gender;

1.2.2 words importing the singular number only include the plural number and *vice versa*;

1.2.3 words importing persons include firms, companies and corporations and *vice versa*;

1.2.4 any reference to any statute (whether or not specifically named) shall include any statutory modification or re-enactment of it for the time being in force and any order, instrument, plan, regulation, permission and direction made or issued under it or under any statute replaced by it or deriving validity from it;

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1.2.5 references to Clauses are references to the relevant Clause in this Agreement;

1.2.6 the words "include" and "including" are to be construed without limitation;

1.2.7 where any obligation is undertaken by two or more persons jointly those persons shall be jointly and severally liable in respect of that obligation (and each of Bilfinger Berger UK Limited and Siemens PLC acknowledge and agree that in enforcing performance of the Infraco's obligations under this Agreement or in taking action for breach of such obligations, the Beneficiary shall be entitled to raise proceedings or raise an action against Bilfinger Berger UK Limited and Siemens PLC or either of them jointly and/or severally); and

1.2.8 the headings to the Clauses are for convenience only and shall not affect the interpretation of this Agreement.

2. THE INFRACO'S OBLIGATIONS

2.1 The Infraco warrants and undertakes to the Beneficiary:

2.1.1 that in performing the Infraco APA Works it has exercised and will continue to exercise all the skill, care and diligence to be reasonably expected of an appropriately qualified and competent contractor which is experienced in carrying out projects of a similar, scope, nature, complexity and size to the Works;

2.1.2 that it has complied with and will comply with each and all of the obligations, duties and undertakings of the Infraco in relation to the Infraco APA Works under and pursuant to the Infraco Contract;

2.1.3 that it has exercised and will exercise the level of skill, care and diligence specified in clause 2.1.1 to see that on completion the Infraco APA Works will satisfy all performance specifications and requirements contained or referred to in the APA and the Infraco Contract; and

2.1.4 that the Beneficiary shall be deemed to have relied upon the Infraco's skill and judgment in respect of those matters relating to the Infraco APA Works as lie within the scope of the Infraco Contract and that the Infraco owes a duty of care in respect thereof to the Beneficiary (but not more onerous than that owed to **tie** under the Infraco Contract).

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3. LIABILITY

3.1 No approvals, comments, instructions, consents, attendance at meetings relating to the Infraco APA Works or advices from the Beneficiary shall in any way relieve the Infraco from its obligations under this Agreement.

3.2 Notwithstanding anything that may be contained elsewhere in this Agreement, the Infraco shall have no greater liability (whether in quantum or in scope) to the Beneficiary than it would have had if the Beneficiary had been named as joint employer under the Infraco Contract (for the purposes of the Infraco APA Works only) provided that, in relying on this clause, the Infraco shall not be entitled to rely on any provision of the Infraco Contract which has not been disclosed to the Beneficiary prior to the Works Commencement Date (as defined in the APA).

3.3 The Infraco shall be entitled in any action or proceedings by the Beneficiary to rely on any limitation in the Infraco Contract and to raise the equivalent rights in defence of liability (except set-off and counterclaim) as it would have against **tie** under the Infraco Contract (but only to the extent that the provisions in the Infraco Contract which are relied on for such purposes have been disclosed to the Beneficiary prior to the Works Commencement Date (as defined in the APA)); Provided that the liability of the Infraco to the Beneficiary for any breach of the terms of this Agreement shall not be affected or diminished where **tie** have suffered no loss, or a loss different from the Beneficiary, by reason of such breach. The Infraco undertakes to the Beneficiary not to contend that its liability to the Beneficiary is so affected or diminished, whether in defence of proceedings under this Agreement or otherwise.

3.4 No action or proceedings for any breach of this Agreement shall be commenced against the Infraco after the expiry of 12 years from the date of practical completion of the Infraco APA Works.

3.5 The Infraco shall not be liable to the Beneficiary (save as may be expressly provided under the Infraco Contract) for any delay in completing the Infraco APA Works.

4. INSURANCE

4.1 Except to the extent that **tie** have effected and maintained owner-controlled insurance in respect of the Infraco APA Works, the Infraco has either:

4.1.1 effected and will maintain professional indemnity insurance of not less than £5million to cover any one claim and in the aggregate during one period of

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insurance (which period shall not be more than one year) against the Infraco for any negligent act, error or omission in the carrying out of the Infraco APA Works for a period of 12 years from the date of the issue of the certificate of practical completion of the Works, provided that such insurance continues to be generally available in the insurance market on commercially reasonable terms; or

4.1.2 has a credit rating of no less than BBB by Standard and Poor's or the equivalent.

4.2 As and when reasonably requested to do so by the Beneficiary, the Infraco shall provide evidence to the reasonable satisfaction of the Beneficiary that the insurances referred to in this Clause are being maintained in accordance with the provisions of this Clause or that the credit rating of the Infraco remains equal to or greater than BBB rating by Standard and Poor's or the equivalent.

5. NOTICES

Any notices to be given under this Agreement shall be either delivered personally or sent by first class recorded delivery post. The address for service of the Beneficiary and of the Infraco shall be as stated in this Agreement or such other address for service as the party to be served may have previously notified in writing to the other party. A notice shall be deemed to have been served as follows:

5.1 if personally delivered, at the time of delivery; or

5.2 if posted, at the expiration of 48 hours after the envelope containing the same was delivered into the custody of the postal authorities.

In proving such service, it shall be sufficient to prove that personal delivery was made or that the envelope containing such notice was properly addressed and delivered into the custody of the postal authorities as a pre-paid first class recorded delivery letter.

6. GENERAL

6.1 The Infraco shall have no claim whatsoever against the Beneficiary in respect of any damage, loss or expense howsoever arising out of or in connection with the Infraco Contract or any amounts due to the Infraco thereunder.

6.2 Subject to written notice being served on the Infraco, the Beneficiary may assign the whole or any part of this Agreement on a maximum of two occasions without the consent of the Infraco and no further assignations shall be permitted. The whole or

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any part of this Agreement may also be assigned by way of security or charged without the consent of the Infraco to any mortgagee of the Beneficiary or its assignees on any number of occasions.

6.3 Nothing in this Agreement confers or purports to confer on a third party who is not a Party to this Agreement any benefits or rights to enforce a term of this Agreement.

6.4 If for any reason any Clause in this Agreement shall be found to be ineffective inoperable or unenforceable, it shall be severed and deemed to be deleted from this Agreement and in such event the remaining provisions of this Agreement shall continue to have full force and effect.

6.5 This Agreement shall be governed by and construed in accordance with the Scots law and any dispute or difference concerned with its terms shall be referred to the non-exclusive jurisdiction of the Scottish Courts.

IN WITNESS whereof these presents on this and the preceding 5 pages are executed as follows:

EXECUTED for and on behalf of
NETWORK RAIL INFRASTRUCTURE LIMITED

at GLASGOW

on the 25TH day of ~~May~~ June 2008 by:

Director/Authorised Signatory [redacted]

Full Name RONALD WILLIAM MCAULAY

Witness Signature [redacted]

Full Name AMANDA MURRAY

Address BUCHANAN HOUSE
58 PORT DUNDAS RD
GLASGOW
G4 0LQ.

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at EDINBURGH

on 14 May 2008 by:

Director [redacted]

Full Name GARY STEVE DALTON

Director [redacted]

Full Name RICHARD JOHN WALKER.

EXECUTED for and on behalf of **SIEMENS PLC**

at EDINBURGH

on 14 May 2008 by:

Authorised Signatory [redacted]

Full Name C. ROTA

Authorised Signatory [redacted]

Full Name M. FLYNN

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THIS IS SCHEDULE PART 9 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 9

DISPUTE RESOLUTION PROCEDURE

1. The Parties agree that this Schedule Part 9 (*Dispute Resolution Procedure*) shall have effect for the resolution of any Dispute.

2. Subject to paragraph 15 hereof, any Dispute shall, in the first instance, be referred to the Internal Resolution Procedure in accordance with paragraph 9.

3. Neither Party shall commence any court proceedings until the procedures in paragraphs 9 to 54 have been completed, under exception that the provisions of this Schedule Part 9 (*Dispute Resolution Procedure*) shall not apply so as to prevent either Party seeking an interim order, or interim relief, in the Scottish courts.

4. In the event that any court proceedings whatsoever are initiated by either Party against the other, the Parties agree that the Court of Session, Scotland, shall have exclusive jurisdiction.

5. Neither Party shall be entitled to suspend the performance of its undisputed obligations under this Agreement merely by reason of the reference of any Dispute to the Dispute Resolution Procedure contained in this Schedule Part 9 (*Dispute Resolution Procedure*).

6. Subject to **tie's** and the Infraco's discretionary rights set out in paragraphs 55 to paragraph 71 to require that a Dispute and a Related Dispute (as defined in paragraph 55) be dealt with together at an appropriate stage of the Dispute Resolution Procedure, the provisions of this Schedule Part 9 (*Dispute Resolution Procedure*) are mandatory and binding upon the Parties. For the avoidance of doubt nothing in this Schedule Part 9 shall be intended to disapply section 80(2) and 79(2) of the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006 (together the "**Tram Acts**") respectively.

7. Except in relation to the matters provided for in paragraphs 14 to 54 and subject to the provisions of paragraph 8, in the event that either Party following the referral of any Dispute pursues such Dispute under the Dispute Resolution Procedure, and in the event that such Party fails to observe any time limit or timescale provided for in this Schedule Part 9 (*Dispute Resolution Procedure*) in relation to the pursuit or progression of such Dispute, such Party shall, upon such failure occurring and upon the expiry of 90 days following written notification from the other Party requiring the first Party to pursue the Dispute Resolution Procedure, be deemed to have irrevocably waived any right to pursue or progress such Dispute any further. In that event, such Party shall be deemed to have elected not to have referred such Dispute or to have withdrawn such Dispute from the Dispute Resolution Procedure and

shall be deemed to have irrevocably waived any right to refer any Dispute arising from the same or substantially the same Dispute or similar circumstances to the Dispute Resolution Procedure and shall be liable for payment of the whole fees incurred by any mediator or adjudicator who has acted in respect of such Dispute. This paragraph 7 is without prejudice to the rights of either Party to raise in defence to any Dispute any defence (including, without prejudice to the foregoing generality, any defence of retention, compensation or set-off) which would otherwise be available to it.

8. Notwithstanding the provisions of paragraph 7, in the event that a Party who pursues any Dispute under the Dispute Resolution Procedure fails to observe any time limit or timescale provided for in this Schedule Part 9 (*Dispute Resolution Procedure*) in relation to the pursuit or progression of the Dispute or fails to take action following a notification from the other Party pursuant to paragraph 7 above, the other Party may elect to waive such failure, in which event the time limit or timescale to which such failure relates shall be extended at the discretion of such other Party and the Dispute shall progress in accordance with the Dispute Resolution Procedure, subject that all other time limits and timescales provided for in this Schedule Part 9 (*Dispute Resolution Procedure*) which are affected by such extension shall be deemed to have been extended to give effect to such extension of the time limit or timescale to which such failure relates.

Internal Resolution Procedure

9. The following procedure is the Internal Resolution Procedure referred to in paragraph 2:

9.1 In the event of any Dispute arising, the Infraco's Representative and **tie's** Representative shall seek to resolve the Dispute at a meeting to be convened within three Business Days of written notification by either Party to the other that it wishes to initiate the Internal Resolution Procedure in respect of that Dispute ("**Notification**"). Such Notification shall be given in accordance with the provisions of Clause 111 (*Notices*) of this Agreement.

9.2 If following the meeting referred to in paragraph 9.1, the Dispute is not resolved or in the event that a meeting has not been convened within 3 Business Days pursuant to paragraph 9.1, each Party shall, before the expiry of the period of seven Business Days from Notification, serve, in accordance with the provisions of Clause 111 (*Notices*) of this Agreement, a written position paper ("**Position Paper**") upon the other Party. Each Party's Position Paper shall state in reasonable detail that Party's position and required objectives in relation to the Dispute; any required redress, and, where possible, any comments on the other Party's position.

9.3 Upon such service of a Position Paper by the Party initiating or pursuing the Dispute, the Chief Executive (or equivalent) of the Infraco and the Chief Executive (or equivalent) of **tie** (or their respective deputies in the event of their unavailability) shall seek to resolve the Dispute by meeting in good faith to discuss and negotiate upon the Dispute without recourse to legal or other proceedings.

9.4 In the event that resolution of the Dispute is achieved by the Chief Executive (or equivalent) of the Infraco and the Chief Executive (or equivalent) of **tie**, the resolution shall be reduced to writing and, once it is signed by the duly authorised representatives of both Parties, shall be binding on the Parties.

9.5 Unless concluded by a written legally binding agreement, all discussions and negotiations connected with the Dispute shall be conducted in confidence and without prejudice to the rights of the Parties in any future legal or other proceedings. Nor may such matters be produced or relied upon in evidence in any such proceedings.

10. In the event that any Dispute is not resolved by the Internal Resolution Procedure within a period of twenty Business Days from Notification (or longer if so agreed by the Parties) then the following provisions of this paragraph 10 shall apply;

10.1 The Chief Executive (or equivalent) of the Infraco and the Chief Executive (or equivalent) of **tie** (or their respective deputies in the event of their unavailability) shall, within a further period of five Business Days, seek to agree that the Dispute shall be resolved by any one of the following procedures:

10.1.1 mediation in accordance with paragraphs 11 to 13; or

10.1.2 adjudication in accordance with paragraphs 14 to 54; or

10.1.3 litigation before the Court of Session, Scotland, in which event the Summons in any such litigation shall be signeted and served within ten Business Days of the date of expiry of the period of 60 Business Days following the conclusion of the internal resolution procedure under paragraphs 9 and 10.

In the event that the Chief Executive (or equivalent) of the Infraco and the Chief Executive (or equivalent) of **tie** (or their respective deputies in the event of their unavailability) are unable to agree that the Dispute be resolved by one of the procedures described in paragraphs 10.1.1, 10.1.2 or 10.1.3, the Party initiating or pursuing the Dispute may refer the Dispute to mediation (and thereafter adjudication, if necessary) in accordance with paragraphs 11 to 13 or in the case of a Related

Dispute conjoined by either Party pursuant to paragraph 55 or where a Related Dispute has already been referred to the decision of an adjudicator to adjudication in accordance with paragraphs 14 to 54 (without the need first to refer the Dispute to mediation).

Mediation

11. The Parties shall attempt in good faith to resolve the Dispute by a procedure of mediation in accordance with the Centre for Effective Dispute Resolution mediation rules or Model Mediation Procedure in force at the commencement of the mediation, (or in the event that the Centre for Effective Dispute Resolution has ceased to exist as at the time of the commencement of the mediation, mediation rules or a model mediation procedure offered by any other body offering commercial mediation services which shall be selected by agreement between the Parties failing such agreement by the Party referring the Dispute to mediation. In the event that any provision of such mediation rules or model mediation procedure conflicts with any provision of this Schedule Part 9 (*Dispute Resolution Procedure*), the provisions of this Schedule Part 9 (*Dispute Resolution Procedure*) shall take precedence. In the event that any timescales contained in such mediation rules or model mediation procedure conflicts with the timescales referred to in this Schedule Part 9 (*Dispute Resolution Procedure*), the timescales contained in such mediation rules or model mediation procedure shall be amended accordingly, such that the timescales referred to in this Schedule Part 9 (*Dispute Resolution Procedure*) shall be adhered to.

12. In the event that resolution of the Dispute is achieved in consequence of such mediation procedure, such agreed resolution shall be recorded in writing and, once it is signed by the duly authorised representatives of both Parties, shall be binding on the Parties. Unless concluded by a written legally binding agreement, all discussions and negotiations (including written submissions made and documents produced in relation thereto) connected with the mediation procedure referred to in paragraph 11 shall be conducted in confidence and without prejudice to the rights of the Parties in any future legal or other proceedings. Nor may such matters be produced or relied upon in evidence in any such proceedings.

13. If any Dispute to which this Schedule Part 9 (*Dispute Resolution Procedure*) relates is not resolved by the mediation procedure referred to in paragraphs 11 and 12 within a period of 30 Business Days from the referral of the Dispute to mediation (or longer if so agreed by the Parties), the mediation procedure shall be terminated and unless the Party initiating or pursuing the Dispute withdraws the Dispute the Dispute shall, within 60 days of the

termination of the mediation procedure be referred to adjudication in accordance with paragraphs 14 to 54.

Adjudication

14. In the event that either Party refers a Dispute to adjudication in terms of paragraph 10.1.2 or 13, or exercises a statutory right available to it under the Housing Grants, Construction and Regeneration Act 1996 to raise adjudication proceedings in relation to "construction operations" (within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996) which are not Authorised Works as defined in the Tram Acts, such adjudication shall be conducted in accordance with paragraphs 14 to 54, wherein any reference to "days" is a reference to calendar days.

15. Where a Related Dispute (as defined in paragraph 55) relates or is claimed by the other party to a Related Contract to relate to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 and where such other party to a Related Contract claims to exercise a statutory right available to it under the Housing Grants, Construction and Regeneration Act 1996, then reference of the Dispute arising under this Agreement to the Internal Resolution Procedure (save as provided regarding the meeting to take place under paragraph 9.1) or to mediation shall not be a precondition to the commencement of adjudication proceedings. In the foregoing circumstances, **tie** or the Infraco shall be entitled to refer a Dispute at any time to adjudication in terms of paragraphs 14 to 54 hereof.

Notice of intention to seek adjudication

16. Either Party may give written notice (the **"Notice of Adjudication"**) of its intention to refer the Dispute to adjudication and the Party giving such notice shall be the "**Referring Party**".

17. The Notice of Adjudication shall be given to the other Party and the Party receiving the Notice of Adjudication shall be the "**Responding Party**".

18. The Notice of Adjudication shall set out briefly:

    18.1 the nature and a brief description of the Dispute and of the parties involved;

    18.2 details of where and when the Dispute has arisen;

    18.3 the nature of the redress which is sought; and

18.4 the names and addresses of the Parties (including the addresses which the Parties have specified for the giving of notices).

19. The adjudicator selected to consider the Dispute shall be selected from one of the panels (**"Panels"**) appointed by the Parties in accordance with the following:

19.1 there shall be three Panels, one in respect of legal matters, ("**Legal Panel**") one in respect of construction and operational matters ("**Construction/Operational Panel**"), and one in respect of financial matters ("**Financial Panel**").

19.2 each Panel shall be comprised of at least four members, who are listed in Schedule Part 10 (*Panels for the Dispute Resolution Procedure*) to the Agreement.

19.3 if any member of a Panel resigns or dies or becomes incapax or ill to the extent of being unable to reasonably discharge his duties as a member of the Panel, a replacement shall be appointed by the Parties as soon as practicable. Any such replacement shall be wholly independent of **tie**, any **tie** Party, TEL, Transport Scotland, the Infraco, any Infraco Party, CEC or any Relevant Authority, any Approval Body, the Tram Supplier, the Tram Maintainer, the MUDFA Contractor or any equipment supplier or any party associated with the Edinburgh Tram Network, and any successor to or subsidiary or parent of any of the aforementioned parties. If the Parties are unable to agree on the identity of such replacement(s), the President or Vice President for the time being of The Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland shall appoint such replacement(s) within thirty days of any application for such appointment by either Party.

20. The Referring Party shall at the same time as giving the Notice of Adjudication to the Responding Party, send to each of the members of the relevant Panel a copy of the Notice of Adjudication and a request that each member of the relevant Panel advises both Parties within three days of the date of the Notice of Adjudication as to whether or not he is able and willing to act. The Referring Party shall (acting reasonably) be entitled to select which of the Panels is the relevant Panel in light of the subject matter of the Dispute. The Parties shall attempt to agree within two further days as to which one of the members of the relevant Panel who responded indicating that they are able and willing to act shall be requested to act as adjudicator. In the event that such agreement is reached, the Referring Party shall, within a further period of one day, request the member of the relevant Panel upon whom agreement has been reached to act as adjudicator. In the event that such agreement is not reached, the Responding Party shall, within a further period of two days, select one of the members of the

relevant Panel who responded indicating that they are able and willing to act and the Referring Party shall request that member to act as adjudicator.

21. If no member of the relevant Panel indicates that he is able and willing to act within three days of receiving a request to act as adjudicator, the Referring Party shall request the President or the Vice President for the time being of the Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland to select a person to act as adjudicator.

22. Any person appointed, requested or selected to act as adjudicator in accordance with paragraphs 19, 20, 21, 24 and 25 shall be a natural person acting in his personal capacity. A person appointed, requested or selected to act as an adjudicator shall be wholly independent of **tie**, any **tie** Party, TEL, Transport Scotland, the Infraco, any Infraco Party, CEC or any Relevant Authority, any Approvals Body, the SDS Provider, the Tram Supplier, the Tram Maintainer, the MUDFA Contractor, or any equipment supplier or any party associated with the Edinburgh Tram Network, and Infraco Parties and any successor to or subsidiary or parent of any of the aforementioned parties.

23. The requests referred to in paragraphs 20 and 21 shall be accompanied by a copy of the Notice of Adjudication.

24. The Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland must communicate the selection of an adjudicator to the Referring Party within three days of receiving a request to do so.

25. If the Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland fails to comply with paragraph 24, the Referring Party may:

    25.1 agree with the other Party to the Dispute to request a specified person to act as adjudicator; or

    25.2 request any other adjudicator nominating body to select a person to act as adjudicator. An "adjudicator nominating body" shall mean a body (not being a natural person and not being a Party to the Dispute) which holds itself out publicly as a body which will select an adjudicator when requested to do so by a Referring Party.

26. The person requested to act as adjudicator in accordance with the provisions of paragraph 20 or 21 shall indicate whether or not he is willing to act within two days of receiving the request.

27. Where an adjudicator has been selected and appointed in accordance with paragraphs 19, 20 or 21 within seven days of the date of the Notice of Adjudication, then the Referring Party shall refer the Dispute in writing (the **"Referral"**) to the adjudicator within that seven day period. Where an adjudicator has not been selected within and appointed within seven days of the Notice of Adjudication, then the Referral shall be made immediately upon such selection and appointment. Any failure on the part of the Referring Party to make the Referral within seven days of the date of the Notice of Adjudication shall not invalidate the decision of the adjudicator.

28. The Referral shall be accompanied by copies of, or relevant extracts from the Agreement and such other documents as the Referring Party intends to rely upon.

29. The Referring Party shall, at the same time as he sends to the adjudicator the documents referred to in paragraphs 27 and 28, send copies of those documents to the Responding Party.

30. The adjudicator may, with the consent of the parties to those Disputes, adjudicate at the same time on more than one Dispute under the Agreement.

31. The Parties may agree to extend the period within which the adjudicator may reach a decision in relation to all or any of these Disputes.

32. An adjudicator may resign at any time on giving notice in writing to the Parties.

33. An adjudicator must resign where the Dispute is the same or substantially the same as one which has previously been referred to adjudication, and a decision has been taken in that adjudication.

34. Where an adjudicator ceases to act under paragraph 32 or 33, or dies or becomes incapax or ill to the extent of being unable to reasonably discharge his duties:

    34.1 the Referring Party may serve a fresh notice in accordance with paragraphs 16 to 18 and shall in accordance with paragraphs 19 to 29 request an adjudicator to act; and

    34.2 if requested by the new adjudicator, the Parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

35. The Parties to a Dispute may at any time agree to revoke the appointment of the adjudicator and in such circumstances the fees and expenses of that adjudicator shall, subject to paragraph 36, be determined and payable in accordance with paragraphs 52 and 53.

36. Where the revocation of the appointment of the adjudicator is due to the default or misconduct of the adjudicator, the Parties shall not be liable to pay the adjudicator's fees and expenses.

Powers of the Adjudicator

37. The adjudicator shall:

37.1 act impartially in carrying out his duties and shall do so in accordance with any relevant terms of the Agreement and shall reach his decision in accordance with Scots law; and

37.2 avoid incurring unnecessary expense.

38. The adjudicator may take the initiative in ascertaining the facts and the law necessary to determine the Dispute, and shall decide on the procedure to be followed in the adjudication. In particular, he may:

38.1 request either Party to supply him with such documents as he may reasonably require including, if he so directs, any written statement from either Party supporting or supplementing the Referral and any other documents given under paragraphs 28 and 29;

38.2 conduct the adjudication in the English language and decide whether a translation of any document is to be provided and, if so, by whom, by when, and at whose cost;

38.3 meet and question either Party and their representatives;

38.4 subject to obtaining any necessary consent from a third party or the Parties, make such site visits and inspections as he considers appropriate, whether accompanied by the Parties or not;

38.5 subject to obtaining any necessary consent from a third party or the Parties, procure the carrying out of any tests or experiments, and make directions as to the conditions for and responsibility for the cost of the same;

38.6 obtain and consider such representations and submissions as he requires, and, provided he has notified the Parties of his intention, appoint experts, assessors or legal advisers;

38.7 give directions as to the timetable for the adjudication, any deadlines, or limits as to the length of written documents or oral representations to be complied with; and

38.8 issue other directions relating to the conduct of the adjudication.

39. The Parties shall comply with any request or direction of the adjudicator in relation to the adjudication.

40. If, without showing sufficient cause, a Party fails to comply with any request, direction or timetable of the adjudicator made in accordance with his powers, fails to produce any document or written statement requested by the adjudicator, or in any other way fails to comply with a requirement under these provisions relating to the adjudication, the adjudicator may:

40.1 continue the adjudication in the absence of that Party or of the document or written statement requested;

40.2 draw such inferences from that failure to comply as may, in the adjudicator's opinion, be justified in the circumstances;

40.3 make a decision on the basis of the information before him, attaching such weight as he thinks fit to any evidence submitted to him outside any period he may have requested or directed;

40.4 disqualify any part or parts of that Party's submissions affected by the failure to comply; and

40.5 grant the other Party proper opportunity to consider and respond to any evidence or representation made late.

41. Subject to any agreement between the Parties to the contrary, either Party may be assisted by, or represented by, such advisers or representatives (whether legally qualified or not) as he considers appropriate.

42. The adjudicator shall consider any relevant information submitted to him by either Party and shall make available to them any information to be taken into account in reaching his decision.

43. The adjudicator and the Parties shall not disclose to any other person any information or document provided in connection with the adjudication which the Party supplying it has indicated is to be treated as confidential, except to the extent that disclosure is required by law or is necessary for the purposes of, or in connection with, the adjudication, or the information is already in the public domain.

Adjudicator's Decision

44. Unless otherwise agreed in accordance with paragraph 56.1 or 65.1 the adjudicator shall reach his decision not later than:

44.1 twenty eight days after the date of the Referral as defined in paragraph 27;

44.2 forty two days after the date of the Referral if the Referring Party so consents; or

44.3 such period exceeding twenty eight days after the Referral as the Parties may, after the giving of that notice, agree.

45. Where the adjudicator fails, for any reason, to reach his decision in accordance with paragraph 44:

45.1 either of the Parties to the Dispute may serve a fresh notice in accordance with paragraphs 16 to 18 and shall request an adjudicator to act in accordance with paragraphs 19 to 29; and

45.2 if requested by the new adjudicator the Parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

46. As soon as possible after he has reached a decision, the adjudicator shall deliver a copy of that decision to each of the Parties.

47. The adjudicator shall decide the matters in Dispute and may make a decision on different aspects of the Dispute at different times.

48. The adjudicator may take into account any other matters which the Parties agree should be within the scope of the adjudication or which are matters under the Agreement which he considers are necessarily connected with the Dispute and, in particular, he may:

48.1 open up, review and revise any decision taken or any notice certifying payment given by any person referred to in the Agreement, unless the Agreement states that the decision or notice certifying payment is final and conclusive;

48.2 decide that any of the Parties to the Dispute is liable to make a payment under the Agreement (whether in sterling or some other currency) and, subject to the terms of the Agreement, when that payment is due and the final date for payment.

49. The adjudicator shall provide written reasons for his decision.

Effect of the Decision

50. In his decision, the adjudicator may, if he thinks fit, order either or both of the Parties to comply forthwith with his decision or any part of it. In the absence of any directions by the adjudicator relating to the time for performance of his decision, the Parties shall be required to comply with any decision of the adjudicator immediately on delivery of the decision to the Parties in accordance with paragraph 46.

51. The decision of the adjudicator shall be binding on the Parties, and they shall comply with it, until the Dispute is finally determined by legal proceedings or by agreement between the Parties.

52. The adjudicator shall be entitled to the payment of such reasonable amount as he may determine by way of fees and expenses incurred by him and the Parties shall be jointly and severally liable to pay that amount to the adjudicator.

53. Without prejudice to the right of the adjudicator to effect recovery from either Party in accordance with paragraph 52, the adjudicator may by direction determine the apportionment between the parties of liability for his fees and expenses.

54. The adjudicator shall not be liable for anything done or omitted in the discharge or purported discharge of his functions as adjudicator unless the act or omission is in bad faith, and any employee or agent of the adjudicator shall be similarly protected from liability.

Related Disputes

55. In the event that a Dispute arising under, out of or in connection with this Agreement which in the opinion of **tie** or the Infraco relates to a dispute or difference arising out of or in connection with any agreement associated with the Edinburgh Tram Network between **tie** and a third party or the Infraco and a third party (a "Related Contract") all such disputes or differences being referred to as a "**Related Dispute**", then providing that the Related Contract contains dispute resolution provisions in terms substantially the same as set out in this Schedule Part 9 (*Dispute Resolution Procedure*) (save for necessary changes), **tie** or the Infraco (as the case may be) may by written notice to the other request that the Dispute and the Related Dispute be dealt with together at an appropriate stage of the Dispute Resolution Procedure.

Referral of a Dispute under this Agreement to a Related Adjudicator

56. In the event that a Related Dispute has already been referred to the decision of an adjudicator (**"Related Adjudicator"**) in accordance with the provisions of the Related Contract, and **tie** or the Infraco (as the case may be) is of the opinion, acting reasonably, that a Dispute is to be (but has not yet been) referred to adjudication under this Schedule Part 9 (*Dispute Resolution Procedure*), **tie** or the Infraco (as the case may be) may refer the Dispute to the Related Adjudicator. **tie** and the Infraco agree that, without fettering or restricting the adjudicator's power and authority in any way, it is their intention that such adjudicator shall, insofar as is relevant, practicable and appropriate, come to the same conclusion as to the facts and apply the same reasoning and analysis in reaching a decision on the Dispute as the adjudicator's conclusions, reasoning and analysis applied by him as the Related Adjudicator in the Related Dispute. The adjudicator shall:

56.1 if practicable, hear the Dispute at the same time as the Related Dispute and shall request such extension of time for producing his decision or award as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The Parties shall agree to such request for an extension of time, except in the event that the Dispute or the Related Dispute relates to "construction operations", which are not Authorised Works, within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the adjudicator);

56.2 except in the event that the Dispute or the Related Dispute relates to "construction operations", which are not Authorised Works, within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the adjudicator), have power (if so requested by **tie** and the Infraco) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the Parties to the Dispute and the Related Dispute, and to the adjudicator; and

56.3 **tie** or the Infraco (as the case may be) shall procure that, as soon as practicable, the other party or parties to the Related Dispute shall give the Infraco or **tie** (as the case may be) copies of the Related Contract, the Referral Notice in the Related Dispute and

any other documentation provided to the adjudicator by any party to the Related Dispute.

tie's or Infraco's request to consolidate a Related Dispute with a Dispute

57. Where a Related Dispute has been referred to adjudication, **tie** or the Infraco (as the case may be) may by written notice request the adjudicator (copied to the Infraco or **tie** as the case may be and to the other party to the Related Dispute) to consolidate the Related Dispute with the Dispute with a view to allowing all questions arising out of the Dispute and the Related Dispute to be disposed of in the adjudication. Where **tie** or the Infraco (as the case may be) request the adjudicator to consolidate the Dispute and Related Dispute then **tie** or the Infraco (as the case may be) shall (or may procure that the other party to the Related Dispute shall) as soon as practicable, and in any case within fourteen (14) days of the referral of the Dispute to the adjudicator, give to the adjudicator conducting the adjudication under this Agreement and also to the other parties to the Dispute and the Related Dispute the following particulars:

57.1 a copy of the relevant Related Contract;

57.2 a preliminary statement from **tie**, the Infraco and/or, as the case may be, the other party to the Related Dispute setting out:

57.2.1 the basis and the grounds for consolidation of the Related Dispute and the Dispute;

57.2.2 the cases of the parties to the Related Dispute;

57.2.3 any relief sought by the parties to the Related Dispute; and

57.2.4 a list of any documents served in relation to the Related Dispute.

Any such particulars sent by **tie**, the Infraco or the other party to the Related Dispute (as the case may be) to the adjudicator shall be sent at the same time to **tie,** the Infraco and the other party to the Related Dispute (as the case may be.)

58. On receiving the particulars set out in paragraph 57 above, provided that such particulars have been received within fourteen (14) days of the referral of the Dispute to the adjudicator, the adjudicator shall if he considers that the Dispute and the Related Dispute are substantially the same or connected one to the other, immediately request that the parties to the Dispute and the other party to the Related Dispute attend a meeting with the adjudicator with a view to determining whether or not the Dispute and the Related Dispute should be consolidated. If the

Adjudicator and all the relevant parties agree, they may hold a telephone conference call instead of a meeting, and in such event references in paragraphs 58 to 62 to a meeting or to attending a meeting, shall mean a telephone conference call and taking part in such a telephone conference call.

59. **tie** or the Infraco (as the case may be) shall use its reasonable endeavours to procure that an authorised representative or nominee of the other party to the Related Dispute shall attend the meeting with the adjudicator referred to in paragraph 58 above. **tie** and the Infraco each agree to send an authorised representative or nominee to any meeting of this kind under this Agreement or under a Related Contract, which they may be requested to attend.

60. At the meeting referred to in paragraph 58 above, the Party which has not requested the adjudicator to consolidate the Dispute with the Related Dispute shall, as a preliminary matter, either:

60.1 confirm to the adjudicator that it accepts the proposed consolidation of the Related Dispute with the Dispute; or

60.2 inform the adjudicator that it does not accept the proposed consolidation of the Related Dispute with the Dispute.

Decision to Consolidate

61. Where paragraph 60.1 applies, or if **tie's** authorised representative or nominee or if the Infraco's authorised representative or nominee (as the case may be) does not attend the meeting referred to in paragraph 58 above (having received due notice thereof) the adjudicator shall if he considers that the Dispute and the Related Dispute are substantially the same or connected one to the other immediately issue a decision consolidating the Dispute and the Related Dispute and shall have the authority and the power referred to in paragraph 63 below.

62. Where paragraph 60.2 above applies, or if **tie's** authorised representative or nominee or if the Infraco's authorised representative or nominee (as the case may be) attends the meeting referred to in paragraph 58 above but does not confirm to the adjudicator whether or not **tie** or the Infraco (as the case may be) accepts or does not accept the proposed consolidation of the Related Dispute with the Dispute, the adjudicator shall issue within one (1) Business Day of the meeting referred to in paragraph 58 above his written decision, as to whether or not the Dispute and the Related Dispute are substantially the same or connected. If the adjudicator considers that the Dispute and the Related Dispute are not substantially the same or not connected one to the other, or has failed or is unable to reach a decision within one (1)

Business Day of the meeting referred to in paragraph 58, the Dispute and the Related Dispute shall not be consolidated. If the adjudicator considers that the Dispute and the Related Dispute are substantially the same or connected one to the other the adjudicator shall immediately issue a decision consolidating the Dispute and the Related Dispute and the adjudicator shall have the authority and the power referred to in paragraph 63 below.

63. The adjudicator shall have the authority and power to consolidate the Dispute and the Related Dispute and to direct that all procedural and/or evidential matters arising in both the Dispute and the Related Dispute are dealt with in whatever manner the adjudicator considers shall lead to the fair and expeditious resolution of both the Dispute and the Related Dispute and the parties (including the other party to the Related Dispute) shall thereafter abide by and implement such consolidation and any such direction and any decision of the adjudicator. For the foregoing purposes:

63.1 unless the context otherwise requires, the provisions of the adjudication rules in this Schedule Part 9 shall apply as between **tie** and the Infraco (as the case may be) and the other party to the Related Dispute, as they apply between the Infraco and **tie** in relation to the Dispute; and

63.2 the adjudicator shall have the same authority and powers as if the Related Dispute constituted a dispute or difference between **tie** and the Infraco.

64. In the event that the Related Dispute is consolidated with the Dispute, the adjudicator shall reach a decision on the Dispute and the Related Dispute at the same time and in any event within twenty eight (28) days of the earlier of the referral of the Dispute or the referral of the Related Dispute, or such longer period as is agreed by the parties to the Dispute and the Related Dispute after the date that the Related Dispute has been consolidated with the Dispute. The adjudicator shall be entitled to extend the said period of twenty eight (28) days by up to fourteen (14) days with the consent of the party by whom the Dispute and (where applicable) the Related Dispute were referred.

Referral of a Related Dispute to the Adjudicator

65. In the event that a Dispute has already been referred to the decision of an adjudicator, and **tie** or the Infraco (as the case may be) is of the opinion (acting reasonably) that a Related Dispute is to be (but has not yet been) referred to adjudication, **tie** or the Infraco (as the case may be) may refer the Related Dispute to the adjudicator appointed in relation to the Dispute under this Schedule Part 9 (*Dispute Resolution Procedure*). **tie** and the Infraco agree that, without fettering or restricting the adjudicator's power and authority in any way, it is their intention

that the adjudicator shall, insofar as is relevant, practicable and appropriate, come to the same conclusion as to the facts and apply the same reasoning and analysis in reaching a decision on the Related Dispute as the adjudicator's conclusions, reasoning and analysis applied by him as adjudicator in relation to the Dispute under this Agreement. The adjudicator shall:

65.1 if practicable, hear the Related Dispute at the same time as the Dispute and shall request such extension of time for producing his decision or award as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The Parties shall agree to such request for an extension of time, except in the event that the Dispute or the Related Dispute relates to "construction operations" which are not Authorised Works within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator);

65.2 except in the event that the Dispute or the Related Dispute relates to "construction operations" which are not Authorised Works within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator), have power (if so requested by **tie** and the Infraco) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the Parties to the Dispute and the Related Dispute, and to the adjudicator; and

65.3 as soon as practicable, **tie** or the Infraco (as the case may be) shall give to the Infraco or **tie** (as the case may be) copies of the Related Contract, the Referral Notice in the Related Dispute and any other documentation provided to the adjudicator by any party to the Related Dispute.

Consolidation of a Dispute under this Agreement with a Related Dispute

66. In the event that, subject to paragraph 67, an adjudicator under a Related Contract (**"Related Adjudicator"**), who is permitted pursuant to the Related Contract to do so, decides that a Dispute under this Agreement be consolidated with a Related Dispute with which the Related Adjudicator is dealing under the Related Contract, then:

66.1 notwithstanding anything in the adjudication rules in this Schedule Part 9, with effect from the time of such decision, the adjudicator shall cease to have authority or

jurisdiction to determine the Dispute which shall instead be determined by the Related Adjudicator and the appointment of the adjudicator under this Agreement shall cease;

66.2 such decision shall be binding on **tie** and the Infraco and both of them shall acknowledge the appointment of the Related Adjudicator as the adjudicator of the Dispute;

66.3 **tie** and the Infraco shall be jointly liable with the other party to the relevant Related Contract for the Related Adjudicator's reasonable fees and expenses including those reasonable fees and expenses of any specialist consultant or adviser (excluding legal) appointed by the Related Adjudicator in accordance with the adjudication procedure in the Related Agreement, in respect of the period after the date on which the Dispute is consolidated with the Related Dispute pursuant to a decision of the Related Adjudicator;

66.4 without prejudice to the right of the Related Adjudicator to effect recovery from either party in accordance with paragraph 66.3, **tie** and the Infraco agree that the Related Adjudicator may by direction determine the apportionment between the parties of liability for his fees and expenses referred to in paragraph 66.3; and

66.5 notwithstanding anything to the contrary a Dispute under this Agreement shall only be consolidated with a Related Dispute, if the Related Adjudicator receives particulars of the Dispute within fourteen (14) days of the referral of the Related Dispute to the Related Adjudicator under the Related Contract.

67. Where the Related Adjudicator receives a request under the Related Contract, that a Dispute under this Agreement be consolidated with a Related Dispute with which he is dealing under the Related Contract, **tie** and the Infraco acknowledge that the Related Adjudicator may immediately request that they, together with the other party to the Related Dispute, attend a meeting with the Related Adjudicator with a view to determining whether or not the Dispute and the Related Dispute should be consolidated. If the Related Adjudicator and all the relevant parties agree, they may hold a telephone conference call instead of a meeting, and in such an event references in paragraphs 67 to 71 to a meeting or to attending a meeting shall mean a telephone conference call and taking part in such a telephone conference call.

68. **tie** and the Infraco each agree to send an authorised representative or nominee to any meeting of this kind under this Agreement or under a Related Agreement, which they may be requested to attend.

69. At the meeting referred to in paragraph 67 above, the Party which has not requested the Related Adjudicator to consolidate the Related Dispute with the Dispute shall, as a preliminary matter, either:

69.1 confirm to the Related Adjudicator that it accepts the proposed consolidation of the Dispute with the Related Dispute; or

69.2 inform the Related Adjudicator that it does not accept the proposed consolidation of the Dispute with the Related Dispute.

70. Where paragraph 69.1 applies, or if **tie's** authorised representative or nominee or if the Infraco's authorised representative or nominee (as the case may be) fails to attend the meeting referred to in paragraph 67 above (having received due notice thereof), the Related Adjudicator shall if he considers that the Dispute and the Related Dispute are substantially the same or connected one to the other, immediately issue a decision consolidating the Dispute and the Related Dispute and shall have the authority and the power to consolidate the Dispute and the Related Dispute and to direct that all procedural and/or evidential matters arising in both the Dispute and the Related Dispute are consolidated in whatever manner the Related Adjudicator considers shall lead to the fair and expeditious resolution of both the Dispute and the Related Dispute and the parties (including the party to the Related Dispute) shall thereafter abide by and implement such consolidation and any such direction.

71. Where paragraph 69.2 applies or if **tie's** authorised representative or nominee or if the Infraco's authorised representative or nominee (as the case may be) attends the meeting referred to in paragraph 67 but does not confirm to the Related Adjudicator whether or not that **tie** or the Infraco (as the case may be) accepts or does not accept the proposed consolidation of the Dispute with the Related Dispute, the Related Adjudicator shall within one (1) Business Day of the meeting referred to in paragraph 67 issue his written decision, as to whether or not the Dispute and the Related Dispute are substantially the same or connected. If the Related Adjudicator considers that the Dispute and the Related Dispute are not substantially the same or not connected one to the other, or has failed or is unable to reach a decision within 1 Business Day of the meeting referred in paragraph 67, the Dispute and the Related Dispute shall not be consolidated. If the Related Adjudicator considers that the Related Dispute and the Dispute are substantially the same or connected one to the other, the Related Adjudicator shall immediately issue a decision consolidating the Dispute and the Related Dispute and shall have the authority and the power to consolidate the Dispute and the Related Dispute and to direct that all procedural and/or evidential matters arising in both the Dispute and the Related Dispute are consolidated in whatever manner the Related Adjudicator considers shall lead to

the fair and expeditious resolution of both the Dispute and the Related Dispute and the parties (including the party to the Related Dispute) shall thereafter abide by and implement such consolidation and any such direction.



THIS IS SCHEDULE PART 10 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE 10

PANELS FOR DISPUTE RESOLUTION PROCEDURE

CONSTRUCTION/OPERATIONAL

Alan Wilson
[redacted]
DERBYSHIRE
[redacted]

Tony Canham
[redacted]
NORWICH
[redacted]

Peter Chapman
[redacted]
OXSHOTT
SURREY
[redacted]

Guy Cottam
[redacted]
BATH
[redacted]

FINANCIAL

Nigel Lowe
Nigel Lowe Consulting Limited
[redacted]
LONDON
[redacted]

Bryan Porter
[redacted]
GLASGOW
[redacted]

John Hunter
Hunter Consulting
[redacted]
STIRLING
[redacted]

Eric Mouzer
[redacted]
BIRMINGHAM
[redacted]

LEGAL

Lord Dervaird (Prof. John Murray QC)
[redacted]
EDINBURGH
[redacted]

Gordon Coutts, QC
[redacted]
EDINBURGH
[redacted]

Robert Howie, QC
[redacted]
EDINBURGH
[redacted]

Nick Ellis
[redacted]
Parliament House
EDINBURGH
[redacted]

THIS IS SCHEDULE PART 11 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 11

REQUIRED INSURANCES

PART 1

Infraco will no later than 7 days of receipt of a written request from **tie** (in respect of certificates) and as soon as reasonably practicable in respect of policies and other documents, to supply **tie** with copies of all placing slips, certificates, cover notes, renewal receipts and confirmations of renewal and payment of premiums and all policy documents (or confirmation of the terms of such policy documents where such policy documents cannot be made available) in respect of the Required Insurances, or upon request, to make available to you the originals of any or all such documents held by us;

1. PROFESSIONAL INDEMNITY INSURANCE

Insured Parties:	**Bilfinger Berger UK Limited** and any sub consultants retained by a written contract and engaged in the delivery of the Infraco Works.
Coverage:	To indemnify the Insured Parties against legal liability for damages or compensation made against them during the Period of Insurance arising out of or in consequence of or as a result of any act, error, or omission by the Infraco or the designer, their subcontractors and consultants in the performance of their professional activities and duties in connection with the activities forming the subject of this Agreement.
Limit of Indemnity:	GBP 10,000,000 on an each and every occurrence basis and in the aggregate during each twelve month Period of Insurance subject to one reinstatement of the limit of indemnity for each twelve month Period of Insurance.
Period of Insurance:	From the Effective Date for twelve months and thereafter each further twelve month period until the earlier of twelve years from the completion of the activities forming the subject of this Agreement or twelve years from the date of termination of this Agreement.
Extensions:	The insurance must include the following minimum extensions: • Libel or slander • Dishonesty of employees • Innocent non-disclosure • Liability for acts of specialist designers, consultants, sub-consultants and sub-contractors of any tier employed by the Insured and retained by a written contract • Breach of intellectual property rights • Loss of documents • Waiver of subrogation between Insured Parties • Indemnity to principals • Inclusion of directors, officers, partners and employees as Insured Parties
Maximum Permitted Deductible:	GBP 25,000

2. EMPLOYERS' LIABILITY INSURANCE

Insured Party: **Bilfinger Berger UK Limited**

Coverage: To indemnify the Insured Party against legal liability for damages or compensation arising out of bodily injury including death, illness, disease and psychiatric damage sustained by any employee arising out of and in the course of the employee's employment caused during the Period of Insurance.

Limit of Liability: Minimum limit of indemnity of GBP10,000,000 any one occurrence or series of occurrences arising from one original cause or event, unlimited during the Period of Insurance.

Period of Insurance: From the Effective Date for twelve months and thereafter each further twelve month period until the expiry or earlier date of termination of this Agreement.

Minimum Extensions: The insurance must include the following minimum extensions:

- Contractual liability
- Claimant's and defence costs and expenses
- Indemnity to principals
- Inclusion of directors, officers, partners and employees as Insured Parties
- Health and Safety legislation prosecution costs including costs of an appeal
- Unsatisfied court judgements
- Compensation for court attendance
- Definition of employee to include as a minimum persons under a contract of service or apprenticeship, labour only subcontractors, self-employed persons, labour masters or persons supplied by them, operators and drivers of hired in plant.

Maximum Permitted Deductible: NIL

3. INFRACO CONTRACTOR'S PLANT

Insured Party: **Bilfinger Berger UK Limited**

Coverage: "All risks" of loss or destruction of or damage to the Property Insured by any cause not excluded.

Property Insured

Constructional plant, tools and equipment of any kind including site huts, temporary buildings and their contents the property of any Insured Party or for which they are responsible to insure.

Limit of Liability: The value of the plant, tools and equipment.

Period of Insurance:	From the Effective Date until expiry or earlier date of termination of this Agreement.
Minimum Extensions:	The insurance must include the following minimum extensions: • Property in transit other than mechanically-propelled plant in transit under its own power • Recovery of immobilised plant • Negligent breakdown of hired-in plant • Continuing hire charges
Exclusions:	BB's legal liability to loss or damage of third party property shall be covered by BB Annual Public Liability Policy.
Maximum Permitted Deductible:	EURO 100,000; 10% co-insurance for flood damage subject to minimum EURO 1,000,000, maximum EURO 5,000,000

4. COMPREHENSIVE MOTOR INSURANCE

Insured Party:	**Bilfinger Berger UK Limited**
Coverage:	Comprehensive in respect of loss or damage to Own Vehicles. Legal liability for death, injury or loss of or damage to Third Party Property.
Limit of Liability:	Own Damage - Self Funded Third Party: Bodily Injury - Unlimited. Property Damage by Cars £20,000,000 any one occurrence Property Damage by Commercial Vehicles £5,000,000 any one occurrence unlimited during the Period of Insurance
Period of Insurance:	From the 1st January each year for twelve months and thereafter each further twelve month period until expiry or earlier date of termination of this Agreement.
Minimum Extensions	The insurance must include the following minimum extensions: • Contingent motor liability • Passenger indemnity and negligence of passengers • Occasional business use by employees • Unauthorised movement • Indemnity to principals • Unauthorised use by employees
Maximum Permitted Deductible:	GBP 250 in respect of own damage GBP NIL in respect of third party liability

1. PROFESSIONAL INDEMNITY INSURANCE

Insured Parties:	**Siemens Transportation Systems**
Coverage:	To indemnify the Insured against legal liability for property damage or bodily injury made against them during the Period of Insurance arising out of or in consequence of or as a result of any act, error, or omission by the Insured in the performance of their professional activities and duties in connection with the activities forming the subject of this Agreement. Subcontractors are not covered under Siemens insurance and Key Subcontractors will be required to obtain their own coverage. Note:- Siemens will ensure that Key Sub Contractors will provide Professional Indemnity Insurance under their sub contracts.
Limit of Indemnity:	Minimum GBP 10,000,000 (or such other sum as may be agreed in writing by **tie**) on an each and every occurrence basis and in the aggregate during each twelve month Period. The aggregate limit would be in respect of Siemens Transportation Systems work on this project.
Period of Insurance:	From the Effective Date for twelve months annually renewable thereafter until completion of the activities forming the subject of this Agreement. The insurance is on a claims occurring basis and would be renewed annually for the duration of Siemens activities on the project including maintenance phase.
Extensions:	The insurance must include the following minimum extensions: ~~Libel or slander~~ ~~Dishonesty of employees~~ ~~Innocent non-disclosure~~ ~~Liability for acts of specialist designers, consultants, sub-consultants and sub-contractors of any tier employed by the Insured~~ ~~Breach of intellectual property rights~~ ~~Loss of documents~~ ~~Waiver of subrogation between Insured Parties~~ • Indemnity to principals • Inclusion of directors, officers, partners and employees as Insured Parties. Siemens' Professional Indemnity coverage (bodily injury/property damage) is an extension of the Global Liability Program which doesn't include the deleted extensions. Siemens will self insure these extensions.
Maximum Permitted Deductible:	deductible €20,000

2. EMPLOYERS' LIABILITY INSURANCE

Insured Party:	**Siemens Transportation Systems**
Coverage:	To indemnify the Insured Party against legal liability for damages or compensation arising out of bodily injury including death, illness, disease and psychiatric damage sustained by any employee arising out of and in the course of the employee's employment caused during the Period of Insurance.
Limit of Liability	Minimum limit of indemnity of GBP10,000,000 any one occurrence or series of occurrences arising from one original cause or event, unlimited during the Period of Insurance.
Period of Insurance:	From the Effective Date for twelve months and thereafter each further twelve month period until the expiry or earlier date of termination of this Agreement.
Minimum Extensions	The insurance must include the following minimum extensions: • Claimant's and defence costs and expenses • Indemnity to principals • Inclusion of directors, officers, partners and employees as Insured Parties • Health and Safety legislation prosecution costs including costs of an appeal • Unsatisfied court judgements • Compensation for court attendance • Definition of employee to include as a minimum persons under a contract of service or apprenticeship, labour only subcontractors, self-employed persons, labour masters or persons supplied by them, operators and drivers of hired in plant •
Maximum Permitted Deductible:	NIL

3. INFRACO CONTRACTOR'S PLANT

Insured Party:	**Siemens Transportation Systems**
Coverage:	"All risks" of loss or destruction of or damage to the Property Insured by any cause not excluded. <u>Property Insured</u> Constructional plant, tools and equipment of any kind including site huts, temporary buildings and their contents the property of any Insured Party or for which they are responsible.
Limit of Liability	The value of the plant, tools and equipment (maximum €30,000,000 any one site).

Period of Insurance:	From the Effective Date until expiry or earlier date of termination of this Agreement.
Minimum Extensions	The insurance must include the following minimum extensions: • Property in transit other than mechanically propelled plant in transit is covered under Siemens Global Marine Program. • Coverage applicable to UK does cover additional expenditure reasonably incurred to avoid/reduce business interruption following a property damage claim but there is a sizeable excess as quoted.
Exclusions	The subject of this insurance is Siemens own plant – damage to other property would not be covered under this insurance. Legal liability for damage to other property insurable under Public Liability policy.
Maximum Permitted Deductible:	EURO 100,000; 10% co-insurance for flood damage subject to minimum EURO 1,000,000, maximum EURO 5,000,000

4. COMPREHENSIVE MOTOR INSURANCE

Insured Party:	**Siemens Transportation Systems**
Coverage:	Legal Liability for death, injury, illness or disease or loss of or damage to Third Party Property.
Limit of Liability	Own Damage - Self funded Third Party: Bodily Injury - Unlimited. Property Damage by Cars £20,000,000 any one occurrence Property Damage by Commercial Vehicles £5,000,000 any one occurrence unlimited during the Period of Insurance
Period of Insurance:	From the Effective Date for twelve months and thereafter each further twelve month period until expiry or earlier date of termination of this Agreement.
Minimum Extensions	The insurance must include the following minimum extensions: Contingent motor liability Passenger indemnity and negligence of passengers Occasional business use by employees Unauthorised movement Indemnity to principals Unauthorised use by employees
Maximum Permitted Deductible:	Self funded in respect of third party liability (Siemens deductible £50,000).

PART 2

FORM OF BROKERS LETTER OF UNDERTAKING

To: **[**THE EMPLOYER**]**

Dear Sirs

We confirm in our capacity as insurance brokers that the Required Insurances specified in Clause 76 (*Required Insurances*) and Schedule 11 *(Required Insurances)* of the Agreement dated ◆ between Bilfinger Berger UK Limited and Siemens Plc (together the "**Infraco**") and **tie** as defined therein are, as at the date hereof, in effect in respect of the risks set out in the attached cover notes.

We have arranged the Required Insurances on the basis of the information and instructions given by [Bilfinger Berger UK Limited] [Siemens Plc]. We have not made any particular or special enquiries regarding the Required Insurances beyond those that we would normally make in the ordinary course of arranging the insurances on behalf of our insurance broking clients.

The confirmations set out in this letter are given by reference to our state of knowledge at the date hereof.

Pursuant to instructions received from [Bilfinger Berger UK Limited] [Siemens Plc], we hereby undertake in respect of the interests of [Bilfinger Berger UK Limited] [Siemens Plc] and **tie** in the Required Insurances referred to in the attached cover notes:

1. to use reasonable endeavours to have endorsed on each and every policy evidencing the Required Insurances when the same is issued, endorsements substantially in the form set out in Schedule 11 (*Required Insurances*) of the Agreement;

2. to advise **tie**:

   2.1 promptly after receiving notice of any insurer's cancellation or suspension of any of the Required Insurances or receiving notice of the intended cancellation or suspension of any of the Required Insurances;

   2.2 promptly upon our receipt from [Bilfinger Berger UK Limited] [Siemens Plc] of any notice of any changes proposed to be made to the Required Insurances which, if effected, would result in a material reduction in limits or coverage (including in respect of extensions of cover) or in an increase in deductibles, exclusions or exceptions;

   2.3 of any default in the payment of any premium for any of the Required Insurances;

   2.4 at least twenty days prior to the expiry of any of the Required Insurances if we have not received written renewal instructions from [Bilfinger Berger UK Limited] [Siemens Plc] or if we receive written instructions to renew, to advise **tie** of the details thereof; and

   2.5 on receipt of notice of any act or omission of [Bilfinger Berger UK Limited] [Siemens Plc] or any Sub-Contractor which will invalidate or render unenforceable in whole or in part, any of the Required Insurances;

3. no later than 7 days (in respect of certificates) and as soon as reasonably practicable in respect of policies and other documents, to supply you and/or your insurance advisors (or your or their

authorised representative) copies of all placing slips, certificates, cover notes, renewal receipts and confirmations of renewal and payment of premiums and all policy documents (or confirmation of the terms of such policy documents where such policy documents cannot be made available) in respect of the Required Insurances, or upon request, to make available to you the originals of any or all such documents held by us;

4. to disclose to the insurers any fact, change of circumstance or occurrence is material to the risks insured against under the Required Insurances;

5. to treat as confidential all information in relation to the Required Insurances supplied to us by [Bilfinger Berger UK Limited] [Siemens Plc] or any Sub-Contractor or **tie** and not to disclose, without the written consent of **tie**, such information to any third party other than the insurers under the Required Insurances, unless required to do so by law or any regulatory authority; and

6. to notify **tie** as soon as reasonably practicable prior to our ceasing to act as brokers to [Bilfinger Berger UK Limited] [Siemens Plc], unless impracticable because of circumstances beyond our control, in which case we shall notify **tie** as soon as reasonably practicable upon becoming aware that we shall cease, or have ceased, so to act.

Where insurers wish any of the Required Insurances to be cancelled for reasons of non-payment of premium, we will request those insurers to give you a reasonable opportunity of paying such amounts outstanding before issuing notice of cancellation on behalf of such insurers.

The above undertakings are given subject to our continuing appointment for the time being as insurance brokers to the [Bilfinger Berger UK Limited] [Siemens Plc] in relation to the Required Insurances concerned and the monitoring and handling of claims in relation to the [Bilfinger Berger UK Limited] [Siemens Plc], and our obligations set out in this letter shall automatically cease upon termination of our appointment.

For the avoidance of doubt all undertakings and other confirmations given in this letter relate solely to the Required Insurances. They do not apply to any other insurances and nothing in this letter should be taken as providing any undertakings or confirmations in relation to any other such insurance that ought to have been placed or may at some future date be placed by other brokers.

This letter is given by us on the instructions of the [Bilfinger Berger UK Limited] [Siemens Plc] and with [Bilfinger Berger UK Limited's] [Siemens Plc's] full knowledge and consent as to its terms as evidenced by [Bilfinger Berger UK Limited's] [Siemens Plc's] signature below.

This letter shall be governed by and shall be construed in accordance with Scots Law and any dispute as to its terms shall be submitted to the exclusive jurisdiction of the courts of Scotland.

Yours faithfully

……..
For and on behalf of (Insurance Broker)

……
For and on behalf of ([Bilfinger Berger UK Limited] [Siemens Plc])

PART 3

INSURANCE QUESTIONNAIRE

ALL CLASSES OF REQUIRED INSURANCES	
Do your current insurance policies comply with the full scope of cover required for each class of Required Insurance as detailed in the Schedules? If NO, please identify the class of Required Insurance and provide full details	YES/NO
Where your current insurance policies do not comply with the full scope of the Required Insurances	
(a) can your policies be amended or extended and if so please provide cost implications, or	
(b) please provide reasons why the full scope of insurance as detailed in the Schedules will not be carried	
1.0 PROFESSIONAL INDEMNITY	
1.1 Name & Address of Insurers	
1.2 Policy Number(s)	
1.3 Renewal Date	
1.4 Limit of Indemnity	i. any one event £ ii. in the aggregate £
1.5 Scope of professional duties insured as stated in the policy. Please confirm that all of the Investigation Works required under the Terms and Conditions of Contract are covered by your professional indemnity insurance.	
1.6 What excess(es) are applicable?	
1.7 Is cover included for sub-consultants?	YES/NO
1.8 Is cover included for the costs of mitigation of loss	YES/NO
1.9 Does the policy include a General Indemnity to Principals/Main Contractors Clause?	YES/NO
1.10 Is cover subject to any material exclusions or limitations? (If YES please supply copies thereof)	YES/NO

1.11	Does the policy respond to judgements made outside UK	YES/NO
2.0	**EMPLOYERS' LIABILITY**	
2.1	Name & Address of Insurers	
2.2	Policy Number(s)	
2.3	Renewal Date	
2.4	Limit of Indemnity	**£**
2.5	Is the policy subject to a heat warranty or condition of any sort and/or any height or depth restrictions? If so attach copies.	YES/NO
2.6	Is Contractual Liability included?	YES/NO
2.7	What is the definition of "employee"?	
2.8	Does the policy include a cross liability provision and a General Indemnity to Principals/Main Contractors Clause?	YES/NO
2.9	Does the policy respond to judgements made outside UK?	YES/NO
3.0	**CONTRACTORS' PLANT ALL RISKS INSURANCE**	
3.1	Name& Address of Insurers:	
3.2	Policy Number:	
3.3	Renewal Date:	
3.4	Sum Insured for Contractors Plant, Tools & Equipment	**£**
3.5	Is cover subject to any material exclusions or limitations? (If YES please supply copies thereof). In particular are there any restrictions on working at heights or depth?	YES/NO
3.6	Is the Principal/Main Contractor named as a Joint Insured?	YES/NO
3.7	Is full Terrorism cover provided?	YES/NO

4.0 COMPREHENSIVE MOTOR INSURANCE	
4.1 Name & Address of Insurers	
4.2 Policy Number(s)	
4.3 Renewal Date	
4.4 Limits of Indemnity in respect of (Please state whether any one occurrence or in the aggregate)	
a. Third Party Property Damage	£
b. Third Party Bodily Injury (if any)	£
4.5 Is the policy subject to a Deductible or excess? If so please provide details.	YES/NO
4.6 Are there any restrictions on usage or types of drivers? If so please provide details.	YES/NO
4.7 Please confirm that your policy will name tie as an additional insured.	YES/NO
5.0 DIRECTORS' & OFFICERS' LIABILITY INSURANCE	
5.1 Name & Address of Insurers	
5.2 Policy Number(s)	
5.3 Renewal Date	
5.4 Limits of Indemnity (Please state whether any one occurrence or in the aggregate)	**£**
5.5 Is the policy subject to a Deductible or excess? If so please provide details.	YES/NO
5.6 Is cover subject to any material exclusions or limitations? If YES so please provide detaIls.	YES/NO
5.7 Please confirm what the provisions of your policy are in respect of – Extended reporting period	

	Bodily injury and property damage exclusion Insured versus insured claims	
6.0	**CRIME INSURANCE**	
6.1	Name & Address of Insurers	
6.2	Policy Number(s)	
6.3	Renewal Date	
6.4	Limits of Indemnity (Please state whether any one occurrence or in the aggregate)	£
6.5	Is the policy subject to a Deductible or excess? If so please provide details.	YES/NO
6.6	Is cover subject to any material exclusions or limitations? If YES so please provide details.	YES/NO
6.7	Please confirm what the provisions of your policy are in respect of – Discovery following expiry Cover in respect of electronic funds transfer	
7.0	**SELF –INSURANCE ARRANGEMENTS**	
7.1	Please advise if any of the above classes of business are completely self-insured and provide details of the arrangements (self-insurance funds, captive insurers etc)	
7.2	Please advise if significant elements or levels of the covers required are self-insured and provide details of the arrangements	

DECLARATION:

We confirm that the foregoing details are accurate and that the above policies are subject to no special terms, conditions and exceptions other than those referred to above. We also confirm that all premiums due to date have been paid.

Signed.....……..

Position.....……

Name .....……..

Date.....……

For and on behalf of

.....

.....

.....

This form should be completed by your Insurers or your Registered Insurance Brokers ONLY.

The above information is agreed on behalf of the Infraco Member by the Infraco Member's Authorised Representative:

Name.....……..

Signed.....……

For and on behalf of.....……

Date.....……

PART 4

Edinburgh Tram Network Project

Construction Owner Controlled Insurance

Summary of Cover

This document is a summary of the cover arranged. For full details of cover reference must be made to the policy.

Phase 1a Only – version 4 prepared 9th April 2008

INSURED: **Sections 1 – Construction All Risks and Section 2 – Third Party Liability**

(i) **tie** Limited as principal

(ii) The main contractors as declared under the MUDFA, Infraco and Tramco contracts (Tram Supply and Tram Maintenance)

(iii) Trade contractors, co-contractors and/or sub-contractors of any tier and any other contractors including Advance Works Contractors and the maintenance contractors

(iv) Architects and/or engineers and/or suppliers and/or consultants not forming part of (ii) or (iii) above as regards their on-site activities only

(v) Local authorities and utility providers including private utility owners as required

(vi) Transdev Edinburgh Tram Limited

(vii) Transport Edinburgh Limited (TEL)

(viii) Any other party having an insurable interest (and not mentioned above) to the extent that the Insured (i) is required by contract or agreement to provide insurance to such parties

(ix) The Scottish Ministers/Scottish Executive, Transport Scotland and City of Edinburgh Council

(x) Network Rail Infrastructure Ltd in respect of the Asset Protection Agreement only

Section 3 – Delay in Start Up

Insured (i) (vi) and (vii) above and CEC

PERIOD: From: 23rd July 2007 To: 25th January 2011

plus the balance of the maintenance/defects liability period thereafter

INTEREST: All work including design, engineering, procurement, demolition, fabrication, construction, erection, installation, testing, commissioning (including trial running of trams) and defects maintenance including all ancillary and associated works and activities.

Section 1 – Construction All Risks

- Contract works whether permanent or temporary

- Property or goods the property of the Insured or for which they may be responsible for in connection with the works

- Plant, equipment, temporary buildings, camps and contents owned, leased or hired by the Insured (insured sub (ii), (iii) and (iv) are excluded) *(note - no items currently insured under this head of cover)*

Section 2 – Third Party Liability

To indemnify the Insured against all sums (including claimants' costs and expenses) arising out of:

- death or bodily injury to or illness or disease or psychiatric damage suffered by any person, invasion of privacy, wrongful arrest, libel and slander;

- loss or damage to physical property;

- obstruction, loss of amenities, nuisance, trespass, stoppage of traffic, infringement of any easement or right of air, light, water or way or any like cause

happening or consequent upon a cause occurring during the Period of Insurance and arising out of or in connection with the Edinburgh Tram Network Construction Phase

Section 3 – Delayed Start Up

To indemnify the Insured (i), (vi) and (vii) against loss of

- anticipated gross revenue
- standing charges
- increased costs or working

following an indemnifiable loss under Section 1.

SUMS INSURED /LIMITS OF INDEMNITY:

Section 1 – Construction All Risks

Estimated contract value £341.9m for 1a.

Cover for MUDFA applies in respect 1a and 1b areas.

Existing structures –limit £6,000,000 any one occurrence.

Section 2 – Third Party Liability

£155m any one occurrence.

£155m any one occurrence and in the aggregate during the Period of Insurance in respect of products liability.

£155m any one occurrence and in the aggregate during the Period of Insurance in respect of pollution or contamination.

Unlimited liability for bodily injury as required under Road Traffic Acts.

Section 3 – Delayed Start Up

£24m - To cover loss of revenue resulting from delay in commencement of passenger operations caused by insured damage to the Property Insured under Section 1.

Maximum indemnity period 24 months.

Additional increase in cost of working – Limit £250,000.

EXCESS:

Section 1 Construction All Risks

£20,000 each and every occurrence and/or series of occurrences increasing to

£40,000 each and every occurrence in respect of storm, tempest, flood, water damage, subsidence, collapse, landslip, frost and claims arising out of maintenance or testing and commissioning activities.

£250,000 each and every occurrence in respect of LEG 3 (design) claims.

Section 2 Third Party Liability

£10,000 each and every occurrence and/or series of occurrences in respect of property damage and bodily injury.

Section 3 Delayed Start Up

60 days aggregate time excess.

TERRITORIAL LIMITS:

Anywhere in the European Union (including inland transits and transits by ro/ro ferries and off-site storage) but worldwide excluding the USA/Canada in respect of Section 2.

CONDITIONS:

Section 1 Construction All Risks

- Full (guarantee) maintenance for first 12 months, followed by 12 months extended maintenance
- Defective design, materials and/or workmanship LEG 3
- Professional fees clause – Limit £1,000,000 any one occurrence
- Debris removal clause – Limit 15% of loss and a maximum of £1,000,000 any one occurrence
- 72 hour clause – storm, tempest, flood, , riot, civil commotion
- Principal supplied materials clause
- Automatic increase clause (25%)
- Expediting expenses – Limit 15% of loss and a maximum of £500,000 any one occurrence
- Public, Local Authorities and European Union reinstatement clause – Limit

£1,000,000 any one occurrence

- Preventive measures clause/minimisation of loss – Limit £250,000 any one occurrence and £500,000 in the aggregate during the Period of Insurance
- Waiver of subrogation
- Munitions clause
- Terrorism to full value within Great Britain – via Pool Re. Terrorism outside Great Britain excluded
- Plans and documents including computer records - £250,000 any one occurrence
- Marine 50/50 clause
- Payments on account
- Temporary repairs
- Automatic reinstatement of sum insured at additional premium to be agreed but not exceeding pro-rata and nil for losses not exceeding £1,000,000
- Non-vitiation and severability of interest clauses
- Off-site storage and specified suppliers - Limit £2,500,000 any one occurrence (limit does not apply to trams if stored in CAF depots or in Edinburgh worksite
- Transit by road, rail, inland waterway or sea (roll on/roll off ferries only) including during loading/unloading, transhipments and storage en route – Limit £2,000,000 any one occurrence
- Undamaged foundations clause
- Testing and Commissioning of the Works
- Testing, commissioning and trial running of trams for passenger service – 4 months limit per tram. Excludes testing, commissioning and trial running outside the United Kingdom
- Recovery of immobilised plant
- Plant and Hired in Plant / Continuing hire charges / Negligent breakdown of hired-in plant – Excludes first 48 hours of hire charges – Limit £1,000,000 any one occurrence
- Existing property and principal's property as required – Limit £6,000,000 any one occurrence
- Buildings due for demolition
- Fire Brigade Charges

- Emergency Braking
- Operator Error

Section 2 Third Party Liability

- Contractual liability
- Claimants' and defence costs and expenses in addition to the Limit of Indemnity
- Personal representatives
- Cross liabilities clause
- Indemnity to Principals
- Unauthorised movement of vehicles
- Inclusion of directors, officers and employees as insured parties
- Waiver of subrogation
- Non-vitiation clauses
- Testing and commissioning of the works
- Testing and trial running for passenger service
- Motor Contingent Liability – limited to Great Britain, Northern Ireland, the Channel Islands, the Isle of Man
- Defective Premises Act Clause.
- Data Protection Act Defence Costs.
- Compensation for court attendance
- Sudden and Accidental Pollution Clause.
- Health and Safety at Work
- Munitions of War Clause.
- Consumer Protection Act
- Food Safety Act
- Project Supervisory Design and Construction Stage
- Wrongful Arrest
- Contracts (Rights of Third Parties) Act 1999

- JCT 21.2.1 – Limit £50m any one occurrence

- Pure financial loss – Limit £2,000,000 in the aggregate during the Period of Insurance, deductible £10,000, claims made basis of cover

Section 3 Delayed Start Up

- off-site storage and premises of specified suppliers where materials/plant/equipment for incorporation into the works is in the process of manufacture or being stored - damage by fire, lightning, explosion or aircraft only covered – Limit £2,500,000 any one occurrence

- prevention of access - Limit £2,500.000 any one occurrence, limited to damage to property within a radius of 1km of the site of the contract or within 1km of either side of the proposed tram route

- damage to the supply of water, gas, electricity or telecommunications systems to any site – Limit £1,000,000 any one occurrence

- delay caused by damage to the Insured Property during transit by road, rail or sea (roll on/roll off ferries only) including during loading/unloading, transhipments and storage en route – Limit £6,000,000 any one occurrence

- terrorism to full value – via Pool Re within Great Britain. Terrorism outside Great Britain is excluded

- non-vitiation and severability of interest clauses

- including consequential losses arising from loss or damage to Constructional Plant and Equipment

- professional fees – Limit 15% of finally-agreed settlement or £500,000 any one occurrence whichever is the lower.

PRINCIPAL EXCLUSIONS:

Section 1 Construction All Risks

- Consequential loss

- Wear and tear and corrosion but not consequent damage

- Inventory losses

- Claims deductibles

- Acts of fraud or theft committed by employees

- Building contractors and sub contractors plants, tools and equipment

- Liquidated damages

- War, invasion, acts of foreign enemies, hostilities, civil war, rebellion, revolution, insurrection or military or usurped power

- Nuclear risks

- Sonic bangs
- Design Exclusion LEG 3
- Aircraft or marine vessels
- Vehicles licensed for road use other than tool of trade risk (exclusion does not apply to trams during testing, commissioning and trial running
- Money
- Tyres by the application of brakes, punctures, cuts or bursts
- Suspension of work in excess of three months
- Normal upkeep or normal making good
- Electronic data exclusion – cover limited to physical damage caused by fire, explosion, collision, derailment
- Piling exclusions and restrictions
- Pre-existing defects in respect of existing structures

Section 2 – Third Party Liability

- Employers' Liability
- Liability arising out of the use of, ownership or possession of any motor vehicle in circumstances where the Road Traffic Acts require compulsory insurance or security. The exclusion does not apply to trams whilst undergoing testing, commissioning and trial running
- Liability arising out of the use of, ownership or possession of any aircraft or waterborne craft
- Asbestos exclusion (cover applies to bodily injury or damage to material property following accidental discovery of asbestos on a claims made basis – limit £1,000,000 in the aggregate during the Period of Insurance, deductible £10,000)
- Liquidated damages
- Fines, penalties, punitive or exemplary damages
- War, invasion, acts of foreign enemies, hostilities (whether declared or not), civil war, rebellion, revolution, insurrection or military or usurped power.
- Nuclear risks
- Seepage, pollution or contamination unless caused by sudden, unintended and unexpected happening.
- Professional indemnity, but not excluding personal or bodily injury or

damage to tangible property.

- Liability arising out of performance warranties
- Property belonging to the Insured or in their care, custody or control
- Repairing or making good faulty, defective or incorrect workmanship, design or specification, materials, goods or other property supplied or installed or erected
- Excluding use of explosives or extent of cover to be agreed
- Product recall, product guarantee
- Terrorism
- Deductibles

Section 3 Delay in Start Up

- Public authority delay
- Rectification of defects
- Non-availability of funds
- Modifications
- Costs incurred to reduce delay during Claims Deductible period
- Suspension, lapse or cancellation of licence after commencement of operations

THIS IS SCHEDULE PART 12 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 12

KEY PERSONNEL

Role	Name	Company	Infraco Contract Clause 26 role
Project Director - BBS	Scott McFadzen/Colin Brady (see note 1)	BB	Infraco's Representative
Project Director - S	Roland Brueckmann	S	Deputy Infraco's Representative
Commercial Director	Alfred Brandenburger	S	
Engineering Manager	David Taylor	BB	
Construction Manager - BB	Jim Rice/TBA (see note 2)	BB	
Construction Manager - S	TBA	S	
Planning Manager	Steve Sharp	BB	
Commercial Manager - B	Tom Murray	BB	
Quality Manager	TBA	BB	
HSE Manager	TBA	BB	
Public Liaison Manager	TBA	BB	
Package Manager 1	TBA	BB	
Package Manager 2	TBA	BB	
Systems Engineer	Robert Kraemer	S	
E&B, EMC	Manfred Menge	S	
Signalling, Comms and Control	Steffen Roehner	S	
SQE Engineer - S	Steven von Bertele	S	
Traction Power and Electrification	Goeran Wendt	S	
RAMS	Uwe Tittelbach	S	
Section 7 Manager	Rober McVittie	Farrans	
Section 6 Manager	Donald Shearer/TBA (see note 3)	Barr	
Section 5 Manager	TBA	BB	
Section 4 Manager	Gabriel Hall	Graham	
Section 3 Manager	TBA	BB/TBA	
Section 2 Manager	TBA	BB	
Section 1 Manager	Spencer Carey	RJ McLeod	

note 1: The Project Director - BBS will be Scott McFadzen initially until Colin Brady is available to assume the role

note 2: The Construction Manager - B will be Jim Rice initially until TBA is available to assume the role

note 3: The Section 6 Manager will be Donald Shearer initially until TBA is available to assume the role



THIS IS SCHEDULE PART 13 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 13

THIRD PARTY AGREEMENTS

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SECTION 1 - FORTH PORTS PLC

1.1 In this Section 1 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Bridges**" means Bridge One and Bridge Two together;

"**Bridge One**" means the most easterly bridge forming part of Ocean Drive as the location of such is shown marked D on Arup Drawing 0661 which forms part of the Site Specific Plans;

"**Bridge Two**" means the most westerly bridge forming part of Ocean Drive as the location of such is shown marked adjacent to Letter F on Arup Drawing 0662 which forms part of the Site Specific Plans;

"**Drawings**" means parliamentary drawings allocated sheet numbers 6 to 12 inclusive as annexed to the Edinburgh Tram (Line One) Act 2006;

"**Forth Ports**" shall mean Forth Ports plc, a company incorporated under the Companies Act (company number SC134741) and having its registered office at 1 Prince of Wales Dock, Leith, Edinburgh EH6 7DX and its successors and assignees as proprietors of property on the Site;

"**Forth Ports Agreement**" means the agreement entered into between Forth Ports and CEC in respect of the withdrawal of Forth Ports objection to the Edinburgh Tram (Line One) Bill and dated 10 and 15 February 2006;

"**Licence**" means a licence to be entered into between CEC and Forth Ports pursuant to the Forth Ports Agreement relating to access onto the Site for the purposes of carrying out the Infraco Works;

"**Licence Site**" means the plot of ground which is the subject of each respective Licence;

"**LLAU**" means, subject to paragraph 1.5, insofar as they relate to the Site, the limits of land to be acquired and used for the purposes of the carrying out of the Infraco Works as more particularly shown on the Drawings;

"**LOD**" means, subject to paragraph 1.4, insofar as they relate to the Site, the limits of deviation within which the Edinburgh Tram Network will be constructed and operated as more particularly shown on the Drawings;

"**Ocean Terminal Building**" means the retail and leisure centre belonging to Ocean Terminal Limited and known as and forming Ocean Terminal, Ocean Drive, Leith, Edinburgh;

"**Site**" means those areas of ground in the City of Edinburgh identified on the Drawings as either LLAU or LOD and which are as at the last date of execution of the Forth Ports Agreement within the ownership of Forth Ports;

"**Site Specific Plans**" means the drawings prepared on behalf of Forth Ports by Ove Arup and Partners Ltd and each identified as being the "Site Specific Plans referred to in paragraph 1.1 of section 1 of Schedule 13" which form Part 1 of Appendix 1 to this Schedule Part 13; each individual drawing is referred to herein by its particular number all of which plans are further interpreted or explained by the Table which shall for all purposes be deemed to form part of the Site Specific Plans;

"**Table**" means the table headed "Leith Docks Tram Integration" which is comprised in Part 2 of Appendix 1 to this Schedule Part 13 and which is to be read along with the Site Specific Plans; and

"**Utilities**" means services of gas, electricity, water, drainage, telecommunications and the cables, conduits, pipes and others provided or in place for the delivery of the same.

1.2 The Infraco shall not design or construct any part of the Edinburgh Tram Network on the Site outside of the LOD as shown on the Drawings. The Infraco shall also ensure that the route for Edinburgh Tram Network will generally adopt the line shown on the Site Specific Plans. In the event that this becomes, or is found not to be, reasonably practicable, then such other most proximate and appropriate route shall be adopted by the Infraco in line with the consultation carried out between CEC and Forth Ports pursuant to clause 2.2 of the Forth Ports Agreement. **tie** will procure that the Infraco's views are sought in respect of any such consultation.

1.3 In respect of the Arup Drawing number 0663 within the Site Specific Plans and the demonstration at letter K, the Infraco shall ensure that during the carrying out of the Infraco Works, it shall not encroach upon on any land beyond the junction of the North East leg of the roundabout unless the Infraco is instructed otherwise by **tie** in accordance with this Agreement.

1.4 Along the frontage and extent of the Ocean Terminal Building, the LOD will be as shown on the Site Specific Plans relative to the face of the Ocean Terminal Building. The LOD on the South East edge in this location will be in accordance with the Drawings. At the location in the vicinity of the letter U marked on Arup drawing 0666 forming part of the Site Specific

Plans, the LOD will be as shown on the Arup drawing referred to. Unless instructed otherwise by **tie** in accordance with this Agreement, the Infraco shall not design or construct any part of the Edinburgh Tram Network on the Site on any land outwith the LOD as referred to in this paragraph 1.4.

1.5 The LLAU will be deemed to be as shown on the Drawings, save that the plots identified as 88a and 89a are excluded therefrom. Unless instructed otherwise by **tie** in accordance with this Agreement, the Infraco shall not encroach on such plots for the purposes of carrying out the Infraco Works, provided that, if such plots have not been utilised for development purposes at the time of carrying out the Infraco Works, the Infraco shall, subject to **tie**'s consent (not to be unreasonably withheld or delayed), be entitled to occupy and use such plots on a temporary basis as the site of a construction compound, provided that **tie's** consent shall not be deemed to be unreasonably withheld or delayed where the consent of Forth Ports is withheld or delayed by Forth Ports in accordance with the Forth Ports Agreement.

1.6 The Infraco shall carry out and/or procure the carrying out of the Infraco Works strictly in accordance with any site specific code of construction practice which may be in place from time to time in respect of the Site as notified to the Infraco by **tie**. The Infraco will provide **tie** with all reasonable assistance requested by **tie** in relation to the negotiation and agreement of any such code.

1.7 The Infraco acknowledges that Forth Ports require specific finishes to be adopted in areas of particular public realm importance to Forth Ports and its redevelopment of the Site. In this regard, the Infraco shall comply with all reasonable requirements of Forth Ports as notified by **tie** to the Infraco so as to ensure that on completion of the Infraco Works there is due and proper cohesion and uniformity between the finish of the Infraco Works and the surrounding areas of public realm works being undertaken by Forth Ports.

1.8 The Infraco acknowledges that Forth Ports have a material preference that no fixing of any component part of the Edinburgh Tram Network should be made to any buildings on the Site. In the event that any such fixing is nonetheless considered by the Infraco to be the most appropriate solution, they will first seek the approval of **tie** on such matter and take due and proper cognisance of the reasonable representations of Forth Ports as notified by **tie** to the Infraco in this respect.

1.9 The Infraco shall have due and proper regard to the representations by Forth Ports, as notified by **tie** to the Infraco, in relation to the period proposed for carrying out the Infraco Works at the Site, any proposals regarding the area proposed to be affected by such Infraco Works, procedures proposed for carrying out the Infraco Works and any amendments to the draft

Programme and will use reasonable endeavours to ensure that its proposed period of the relevant Infraco Works will be made to accord with Forth Ports' reasonable requirements as notified by **tie** to the Infraco.

1.10 Prior to completion of the Infraco Works on each Licence Site, the Infraco shall provide **tie** with notice, in respect of each Licence Site specifying:

1.10.1 the estimated date upon which the Infraco Works at the relevant Licence Site are due to be completed; and

1.10.2 the estimated date upon which possession of the relevant Licence Site will be returned to **tie**;

Provided that such notice shall be provided to **tie** having regard to the need to facilitate an inspection of the relevant Licence Site pursuant to paragraph 1.11.

1.11 The Infraco shall facilitate the carrying out of an inspection of the relevant Licence Site by Forth Ports and a representative of CEC and/or **tie**, such inspection to be carried out on a date to be specified by **tie**, declaring that the relevant date will be at least 5 days before the estimated date of return of possession of the relevant Licence Site to **tie**.

1.12 The Infraco shall take due and proper cognisance of all reasonable and proper representations of Forth Ports, as notified by **tie** to the Infraco, in terms of the sufficiency of the Infraco Works at the relevant Licence Site in order to ensure that on return of possession of such to Forth Ports, the Licence Site should be in a condition fully commensurate with the full and proper compliance by the Infraco with its obligations under this Agreement.

1.13 The Infraco acknowledges that Forth Ports intend to carry out such works as may be necessary to bring Ocean Drive as it passes over the Bridges up to an adoptable standard. The Infraco shall ensure that any programme of Infraco Works to be undertaken to the Bridges or the surrounding road areas will be carried out with reasonable co-ordination so as to give rise to the least practicable requirement for either **tie** or Forth Ports to undo or replace works undertaken by or on behalf of the other.

1.14 In carrying out the Infraco Works the Infraco will act always in accordance with the Programme relevant to any element of the Infraco Works at the Licence Site and will have due and proper regard to the requirement of Forth Ports to be able to access their property and all parts of it at all times in order to carry on their business activities and the like requirement of Forth Ports' tenants and occupiers to go about their respective business activities.

1.15 The Infraco shall ensure that any disturbance of any access route at the Site will be in place for the minimum period reasonably practicable. In intimating any proposed programme for Infraco Works in respect of any Licence Site to **tie** the Infraco shall provide in each instance its best estimate of any period of disruption of such access rights and routes. Without prejudice to the foregoing generality the Infraco shall give **tie** reasonable prior notice of any proposed disconnection of any Utilities at the Site as may be required to carry out the Infraco Works.

1.16 Where there is disruption to normal routes and rights of access, the Infraco shall ensure that such disruption is kept to the minimum. In particular, the Infraco shall ensure that where an existing access route is disturbed at the Site, alternative and suitable access and egress arrangements are made and the original access/egress route is restored to an equivalent standard as existed prior to the commencement of the Infraco Works at the Site by a date not later than that set out in the Programme.

1.17 The Infraco shall facilitate access for Forth Ports to the East breakwater adjacent to and forming part of Granton Harbour (as highlighted by the letter "W" on the Site Specific Plans) for pedestrian and vehicular purposes to facilitate inspection and repair works by Forth Ports at such times as may be specified by **tie**.

1.18 The Infraco shall ensure so far as reasonably practicable that Utilities remain in service and are only disturbed to the minimum.

1.19 The Infraco acknowledges that Forth Ports may in the future wish to run Utilities under the route of the Edinburgh Tram Network. In this regard, the Infraco will take due and proper cognisance of the requirements or requests of Forth Ports as intimated to the Infraco by **tie**. The Infraco further acknowledges that wherever reasonably practicable, such crossing of Utilities shall be to the junctions and crossings demonstrated in the Site Specific Plans and that wherever reasonably practicable Forth Ports shall ensure that Utilities do not run parallel beneath the Edinburgh Tram Network.

SECTION 2 - ALEXANDER LATTO (1986) LIMITED

2.1 In this Section 2 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Secure Parking Area**" means a vehicle parking area in the vicinity of the Property, the exact location and the extent of which will be subject to the approval of **tie** (not to be unreasonably withheld or delayed); and

"**Property**" means the motor recovery and service premises at 111-115 Constitution Street, Edinburgh EH6 7AE.

2.2 Subject to Paragraph 2.3 below, in carrying out the Infraco Works in the vicinity of the Property, the Infraco shall at all times ensure 24 hour access to the Property.

2.3 The Infraco shall use all reasonable endeavours to ensure that vehicle access to the Property will not be disrupted for more than one weekend whilst Infraco Works are being carried out directly outside the Property.

2.4 To the extent that access to the Property is disrupted due to the Infraco Works, the Infraco shall provide a Secure Parking Area, which will have 24 hour access for a reasonable number of vehicles, including recovered vehicles.

2.5 To the extent that the Infraco is required to provide the Secure Parking Area in accordance with paragraph 2.4 above, the Infraco shall, at its own cost, provide and maintain security measures for the Secure Parking Area including all lights, guards, fencing and watching.

2.6 With regard to overhead electrification, the Infraco shall ensure that any poles supporting overhead cabling within the vicinity of the Property will be sited at the side of the road and not in the middle with a view to ensuring that the turning of long vehicles into the Property is not impeded.

2.7 The Infraco shall provide **tie** with reasonable and adequate notice prior to the commencement of any Infraco Works in the vicinity of the Property and shall consult with Alexander Latto (1986) Limited (company no. SC099503) or its representatives in relation to the carrying out of the Infraco Works in the vicinity of the Property if requested to do so by **tie**.

SECTION 3 - TRILLIUM (PRIME) PROPERTY GP LIMITED AND LAND SECURITIES TRILLIUM LIMITED

3.1 In this Section 3 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Drawing**" means parliamentary drawing sheet number 22 as annexed to the Edinburgh Tram (Line One) Act 2006;

"**Noise and Vibration Policy**" means the noise and vibration policy referred to in section 66 of each of the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006 as the same may be amended and/or updated from time to time;

"**Plan**" means the plan forming part 1 of Appendix 2 of Schedule Part 13;

"**Property**" means the area shown hatched on the Plan comprising 0.202 hectares or thereby (0.5 acres or thereby) from Haymarket Terrace towards Rosebery Crescent, known as and forming Haymarket House together with a car park to the rear;

"**Route Plan**" means the plan forming part 2 of Appendix 2 of Schedule Part 13;

"**Site**" means that area of ground extending to 8 square metres or thereby at Haymarket House, Haymarket, as identified as Plot 300 on the Drawing; and

"**Trillium**" means Trillium (Prime) Property GP Limited, a company incorporated under the Companies Act with registered number 03424587 and having its registered office at Bastion House, 140 London Wall, London EC2Y 1BN and its successors and assignees.

3.2 During the carrying out of the Infraco Works, the Infraco shall not encroach upon the Site, unless instructed otherwise by **tie** in accordance with this Agreement.

3.3 The Infraco shall ensure that the route of the Edinburgh Tram Network will generally adopt the line shown on the Route Plan. In the event that this becomes or is found not to be reasonably practicable then, subject always to paragraph 3.2 above, such other most proximate and appropriate route will be adopted by the Infraco, the Infraco having due regard to the reasonable representations of Trillium as notified to the Infraco by **tie** in this regard but not in any event so as to include or impinge on any part of the Property.

3.4 In advance of the Infraco Works commencing in the vicinity of the Property, the Infraco shall provide **tie** with such assistance as it may require in relation to any discussion between **tie** and Trillium regarding the specific measures to be adopted to protect the Property and its users.

3.5 The Infraco shall adopt the targets in the Noise and Vibration Policy in the design of the Edinburgh Tram Network and shall comply with the Noise and Vibration Policy in respect of the carrying out of the Infraco Works at or in the vicinity of the Property.

3.6 If required by **tie**, the Infraco shall carry out or facilitate the carrying out by **tie** of:

3.6.1 an assessment of both the baseline noise and vibration levels at the Property; and

3.6.2 an assessment of the noise and vibration levels at the Property during the operation of the Edinburgh Tram Network;

within such reasonable timescales as may be detailed by **tie**. Where the Infraco is required to carry out such an assessment, the Infraco shall ensure that the person appointed is an appropriately skilled and experienced technical expert.

3.7 The Infraco shall, if required by **tie**, ensure that the results of the assessments referred to in paragraph 3.6 above are delivered to **tie** and copied to Trillium forthwith.

3.8 The Infraco shall, at **tie**'s request, either carry out or facilitate the carrying out by **tie** of appropriate structural condition surveys of the Property;

3.8.1 prior to the commencement of the Infraco Works in the vicinity of the Property; and

3.8.2 following the completion of the Infraco Works in the vicinity of the Property.

3.9 The Infraco shall, if required by **tie**, ensure that the results of the surveys referred to in paragraph 3.8 above are delivered to **tie** forthwith.

3.10 In the event that any assessments or surveys carried out by or on behalf of **tie** or CEC prior to and after completion of the Infraco Works disclose that damage has been caused to the Property by the Infraco Works, the Infraco will take all steps necessary to repair the Property and make good any defects and damage as soon as reasonably practicably possible causing the least possible disruption reasonably practicable to Trillium and any other occupiers of the Property at that time.

SECTION 4 - TRUSTEES OF THE CITY POINT UNIT TRUST

4.1 In this Section 4 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Citypoint**" means ALL and WHOLE the subjects known as and forming Citypoint 65-67 Haymarket Terrace, Edinburgh at the corner of Haymarket Terrace and Haymarket Yards shown outlined in red on Plan 1;

"**CPUT**" means City Point Unit Trust;

"**Drawing**" means parliamentary drawing number 22 as annexed to the Edinburgh Tram (Line One) Act 2006;

"**Licence**" means a licence to be entered into between CEC and the Trustees relating to access onto the Site for the purpose of carrying out the Infraco Works;

"**Licence Period**" means the period of a Licence from the Entry Date (as defined in the Licence) to the date of expiry of the Licence;

"**Limits of Deviation**" means insofar as they relate to the Site, the limits of deviation within which the Edinburgh Tram Network will be constructed and operated as more particularly set out in the Edinburgh Tram (Line One) Act 2006 and the Drawing;

"**Plan 1**" means the plan forming part 1 of Appendix 3 to this Schedule Part 13;

"**Plan 2**" means the plan forming part 2 of Appendix 3 to this Schedule Part 13;

"**Site**" means that area of ground at Citypoint identified as Plot 424 on the Drawing insofar as falling within the Limits of Deviation;

"**Small Vehicles**" means motor cars, motor bikes, mopeds, bicycles, small vans and other similar vehicles but specifically excluding vehicles of a size and nature that would result in that vehicle occupying greater than a single parking space;

"**Tenants**" means all tenants or their authorised occupiers, present and future, of Citypoint and the Site or any part or parts thereof; and

"**Trustees**" means the trustees of CPUT being Walbrook Trustees (Jersey) Limited, a company incorporated under the laws of Jersey (registered number 12781) and Walbrook Properties Limited, a company incorporated under the laws of Jersey (registered number

45279), both companies having their registered office at PO Box 238, Lord Coutanche House, 66/68 Esplanade, St Helier, Jersey JE4 5PS.

4.2 The Infraco acknowledges that in respect of the Site and Plot 423, only Plot 423 as identified on the Drawing will be compulsorily acquired for the purposes of the Edinburgh Tram Network and the Infraco shall not therefore design or construct any part of the Edinburgh Tram Network on the Site. Without prejudice to the foregoing terms of this paragraph 4.2, the Infraco shall be entitled to take temporary possession of such parts of the Site as fall within the Limits of Deviation for the purposes of required regulation of entrance levels and kerb realignment, all in terms of the relevant licence as notified to the Infraco by **tie** in accordance with this Agreement.

4.3 Upon completion of the Infraco Works, the Site shall be reinstated to a condition no worse than that in which the Site was found prior to the commencement of the Infraco Works.

4.4 The Infraco shall, in carrying out the Infraco Works at Citypoint, comply with any directions reasonably given by **tie** so that the impact on the normal operation of the Tenants' business at Citypoint and any building thereon is minimised as far as reasonably practicable having regard to the scope and nature of the Infraco Works.

4.5 Without prejudice to any other terms of this Agreement, the Infraco shall make good all damage caused to Citypoint as a result of the Infraco Works to the reasonable satisfaction of **tie**.

4.6 The Infraco acknowledges that CPUT has a material preference that no fixing of any component part of the Edinburgh Tram Network should be made to Citypoint and any building thereon. In the event that any such fixings are nonetheless considered by the Infraco to be the most appropriate solution, the Infraco shall first consult with CPUT on such matter and take due and proper cognisance of the reasonable representations of CPUT as notified to the Infraco by **tie** in this respect.

4.7 The Infraco shall ensure that throughout the construction of the Infraco Works, continuous vehicular access to, and egress from, the car park and each car parking space at Citypoint will be capable of being taken to and from the nearest public road.

4.8 The Infraco shall ensure that pedestrian access to and egress from Citypoint will be available at all times in the period during which the Infraco Works are being carried out in the vicinity of Citypoint.

4.9 In the event that use of some of the car parking spaces within the car park at Citypoint is interrupted or frustrated by the carrying out of the Infraco Works the Infraco shall use all reasonable endeavours to provide an alternative site or sites for the exclusive unrestricted use by CPUT and the Tenants for the purposes of the exclusive temporary car parking of 35 Small Vehicles during the Licence Period and (if necessary) at all other times until the Infraco Works in the vicinity of Citypoint have been completed (which alternative site is hereinafter referred to as the "**Temporary Site**") and that within that area of Haymarket Yards bounded by Balbirnie Place, Haymarket Station, Haymarket Terrace and the Haymarket railway lines, all as shown outlined in red on Plan 1 (hereinafter referred to as "**Haymarket Yards**"). The location of the car parking spaces will be subject to the prior written consent of **tie**.

4.10 In the event that the Infraco (acting reasonably) cannot reasonably provide a Temporary Site within Haymarket Yards as aforesaid, then the Infraco shall be bound to provide an alternative exclusive temporary site or sites outwith Haymarket Yards but within an area north of the existing railway and within a 250 metre radius of Citypoint as shown outlined in blue on Plan 2 (hereinafter referred to as "**the Extended Area**") declaring for the avoidance of doubt that for the purposes of this paragraph 4.10 only, the Extended Area shall specifically exclude that car park known as 'Morrison Street Car Park' and any other car park located to the south of the Edinburgh to Glasgow railway line as shown on Plan 2.

4.11 The Infraco (acting reasonably) shall be entitled to relocate the Temporary Site to another temporary site or sites within Haymarket Yards or the Extended Area, at any time or times, within the Licence Period as shall be reasonably required for the purposes of the proper carrying out of the Infraco Works, provided that each such proposed relocation shall be subject to **tie** receiving not less than 35 days' prior written notice.

4.12 The Infraco (acting reasonably) shall be entitled to divide the Temporary Site between two or more sites as shall be reasonably required for the purposes of the proper carrying out of the Infraco Works and to accommodate the said 35 Small Vehicles, provided that each such proposed division shall be subject to **tie** receiving not less than 35 days' prior written notice.

4.13 The Infraco shall ensure that the said 35 Small Vehicles parking spaces to be provided within Haymarket Yards or the Extended Area (as the case may be) shall be for the exclusive use of CPUT and the Tenants and shall be available for use at all times.

4.14 Upon imminent completion of the Infraco Works at the Site, the Infraco shall serve written notice on **tie** specifying the date upon which the Infraco Works are due to be completed and the date upon which possession of the Site will be returned to **tie**.

4.15 From the Entry Date (as defined in the relevant Licence) relevant to a Licence and during the relevant Licence Period, subject to the other terms of this Agreement the Infraco's occupation of that part of the Site it occupies will be at the Infraco's risk.

SECTION 5 - OCEAN TERMINAL LIMITED

5.1 In this Section 5 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Drawing**" means parliamentary drawing allocated sheet number 7 as annexed to the Edinburgh Tram (Line One) Act 2006;

"**Licence**" means a licence to be entered into between CEC and Ocean Terminal relating to access onto the Site for the purposes of carrying out the Infraco Works;

"**Licence Site**" means the plot of ground which is the subject of each respective Licence;

"**LLAU**" means, subject to paragraph 5.6, insofar as they relate to the Site, the limits of land to be acquired and used for the purposes of the carrying out of the Infraco Works as more particularly set out in the Edinburgh Tram (Line One) Act 2006;

"**LOD**" means, subject to paragraph 5.4, insofar as they relate to the Site, the limits of deviation within which the Edinburgh Tram Network will be constructed as more particularly shown on the Drawing;

"**Ocean Terminal**" means Ocean Terminal Limited, a company incorporated under the Companies Act with registered number SC178696 and having its registered office at 1 Prince of Wales Dock, Leith, Edinburgh, EH6 7DX and its successors and assignees as proprietors of the Site;

"**Ocean Terminal Agreement**" means the agreement entered into between Ocean Terminal and CEC in respect of the withdrawal of Ocean Terminal's objection to the Edinburgh Tram (Line One) Act 2006;

"**Ocean Terminal Building**" means the retail and leisure centre belonging to Ocean Terminal and known as and forming Ocean Terminal, Ocean Drive, Leith, Edinburgh;

"**Site**" means those areas of ground in the City of Edinburgh registered in the Land Register of Scotland under Title Number MID 11162 and comprising various plots on the Drawing;

"**Site Specific Plans**" means the drawings prepared on behalf of Ocean Terminal by Ove Arup and Partners Ltd and each identified as being the "Site Specific Plans referred to in paragraph 5.1 of section 5 of Schedule 13" which are set out in part 1 of Appendix 4 to Schedule Part 13; each individual drawing is referred to herein by its particular number all of which plans are

further interpreted or explained by the Table which shall for all purposes be deemed to form part of the Site Specific Plans;

"**Table**" means the table headed "The Table" which is set out in part 2 of Appendix 4 to Schedule Part 13 and should be read together with the Site Specific Plans; and

"**Utilities**" means services of gas, electricity, water, drainage, telecommunications and the cables, conduits, pipes and others provided or in place for the delivery of the same.

5.2 The Infraco shall ensure that the route for the Edinburgh Tram Network will generally adopt the line shown on the Site Specific Plans. In the event that this becomes, or is found not to be, reasonably practicable, then such other most proximate and appropriate route shall be adopted by the Infraco, in line with the consultation carried out between CEC and Ocean Terminal pursuant to clause 2.2 of the Ocean Terminal Agreement. **tie** will procure that the Infraco's views are sought in respect of any such consultation.

5.3 In respect of Arup Drawing number 0663 within the Site Specific Plans and the demonstration at letter K, the Infraco shall ensure that during the carrying out of the Infraco Works, it shall not encroach upon on any land beyond the junction of the North East leg of the roundabout unless the Infraco is instructed otherwise by **tie** in accordance with this Agreement.

5.4 Along the frontage and extent of the Ocean Terminal Building, the LOD will be as shown on the Site Specific Plans relative to the face of the Ocean Terminal Building. The LOD on the South East edge in this location will be in accordance with the Drawing. Unless instructed otherwise by **tie** in accordance with this Agreement, the Infraco shall not design any part of the Edinburgh Tram Network upon, and shall not encroach upon any land outwith the LOD as specified in the preceding provisions of this paragraph 5.4.

5.5 Whilst carrying out Infraco Works at the Site, the Infraco shall not impede the availability of coach parking facilities, which shall be of no lesser scale than that currently enjoyed by Ocean Terminal at the Site.

5.6 The LLAU will be deemed to be as shown on the Drawing. Unless instructed otherwise by **tie** in accordance with this Agreement the Infraco shall not encroach upon any land in respect of Infraco Works at the Site outwith the LLAU shown on the Drawing.

5.7 The Infraco shall carry out and/or procure the carrying out of the Infraco Works strictly in accordance with any site specific code which may be in place from time to time in respect of the Site as notified to the Infraco by **tie**. The Infraco will provide **tie** with all reasonable

assistance requested by **tie** in relation to the negotiation and agreement of any such code with Ocean Terminal.

5.8 The Infraco acknowledges that Ocean Terminal require specific finishes to be adopted in areas of particular public realm importance to Ocean Terminal and its redevelopment of the Site. In this regard, the Infraco shall comply with all reasonable requirements of Ocean Terminal as notified by **tie** to the Infraco so as to ensure that on completion of the Infraco Works there is due and proper cohesion and uniformity between the finish of the Infraco Works and the surrounding areas of public realm works being undertaken by Ocean Terminal.

5.9 The Infraco acknowledges that Ocean Terminal have a material preference that no fixing of any component part of the Edinburgh Tram Network should be made to any buildings on the Site. In the event that any such fixing is nonetheless considered by the Infraco to be the most appropriate solution, they will first seek the approval of **tie** on such matter and take due and proper cognisance of the reasonable representations of Ocean Terminal as notified by **tie** to the Infraco in this respect.

5.10 Prior to completion of the Infraco Works at each Licence Site, the Infraco shall provide **tie** with notice in respect of each Licence Site specifying:

5.10.1 the estimated date upon which the Infraco Works at the relevant Licence Site are due to be completed; and

5.10.2 the estimated date upon which possession of the relevant Licence Site will be returned to **tie**;

provided that such notice shall be provided to **tie**, having regard to the need to facilitate an inspection of the relevant Licence Site pursuant to paragraph 5.12.

5.11 The Infraco shall have due and proper regard to the representations made by Ocean Terminal, as notified by **tie** to the Infraco, in relation to the period proposed for carrying out the Infraco Works at the Site, any proposals regarding the area proposed to be affected by such Infraco Works, procedures proposed for carrying out the Infraco Works and any amendments to the draft Programme and will use reasonable endeavours to ensure that its proposed period of the relevant Infraco Works will be made to accord with Ocean Terminal's reasonable requirements as notified by **tie** to the Infraco.

5.12 The Infraco shall facilitate the carrying out of an inspection of the relevant Licence Site by Ocean Terminal and a representative of CEC and/or **tie**, such inspection to be carried out on a

date to be specified by **tie** declaring that the relevant date will be at least 5 days before the estimated date of return of possession of the relevant Licence Site to **tie**.

5.13 The Infraco shall take due and proper cognisance of all reasonable and proper representations of Ocean Terminal, as notified by **tie** to the Infraco, in terms of the sufficiency of the Infraco Works at the relevant Licence Site in order to ensure that on return of possession of such to Ocean Terminal, the Licence Site should be in a condition fully commensurate with the full and proper compliance by the Infraco with its obligations under this Agreement.

5.14 In carrying out the Infraco Works at the Site, the Infraco will act always in accordance with the programme relevant to any element of the Infraco Works at the Licence Site and will have due and proper regard to the requirement of Ocean Terminal to be able to access their property and all parts of it at all times in order to carry on their business activities and the like requirement of Ocean Terminal's tenants and occupiers to go about their respective business activities. The Infraco shall ensure that any disturbance of any access route at the Site will be in place for the minimum period reasonably practicable. In intimating any proposed programme for Infraco Works in respect of any Licence Site to **tie**, the Infraco will provide in each instance its best estimate of any period of disruption of access rights and routes. Without prejudice to the foregoing generality, the Infraco shall give **tie** reasonable prior notice of any proposed disconnection of any Utilities at the Site as may be required to carry out the Infraco Works.

5.15 Whilst carrying out the Infraco Works at the Site, the Infraco shall take all reasonable and proper steps to ensure that any disruption to normal routes and rights of access is kept to the minimum and in particular that at all times where an existing access route is disturbed that an alternative and reasonably suitable access route will be provided and the original access way returned to operation at a date not later than that disclosed in the Programme for the relevant element of the Infraco Works.

5.16 The Infraco shall ensure that at all times during the carrying out of the Infraco Works at the Site, access is available by Ocean Terminal and members of the public to Ocean Terminal's premises by way of the main central access doorway by at least half the total width of the doorway referred to.

5.17 The Infraco shall ensure that the fire safety requirements of Ocean Terminal and its operation of its shopping centre will have priority so that at all times wholly sufficient routes of access and egress will be provided for fire escape purposes along with either no disruption to the existing fire muster safety areas or the substitution of wholly suitable alternate fire muster

safety areas so that Ocean Terminal can at all times operate safely and in accordance with fire regulations and requirements.

5.18 Whilst carrying out the Infraco Works at the Site, the Infraco shall ensure so far as reasonably practicable that Utilities remain in service and only be disturbed to the minimum.

5.19 The Infraco acknowledges that Ocean Terminal may in the future wish to run Utilities under the route of the Edinburgh Tram Network. In this regard, the Infraco will take due and proper cognisance of the requirements or requests of Ocean Terminal as intimated to the Infraco by **tie**. The Infraco further acknowledges that wherever reasonably practicable, such crossing of Utilities shall be to the junctions and crossings demonstrated in the Site Specific Plans and that wherever reasonably practicable Ocean Terminal shall ensure that Utilities do not run parallel beneath the Edinburgh Tram Network.

SECTION 6 - NORMAN, DOWNIE & KERR

6.1 In this Section 6 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Property**" means the offices of Norman, Downie & Kerr at 130 Constitution Street Edinburgh EH6 6AJ.

6.2 Vehicular access to the Property may only be disrupted for up to one weekend approximately whilst Infraco Works are being carried out directly outside the Property.

6.3 Subject to paragraph 6.2 above, the Infraco shall ensure that access is available to the Property throughout the construction of the Infraco Works.

6.4 The Infraco shall provide **tie** with reasonable and adequate notice prior to the commencement of any Infraco Works in the vicinity of the Property.

6.5 The Infraco shall ensure that disruptions to services provided by utility service providers to the Property are limited.

6.6 During the course of the Infraco Works, if any services provided by utility service providers to the Property are disrupted, the Infraco shall ensure that alternative supplies are provided for the Property.

SECTION 7 - THE ROYAL YACHT BRITANNIA TRUST

7.1 In this Section 7 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Drawing**" means parliamentary drawing allocated sheet number 7 as annexed to the Edinburgh Tram (Line One) Act 2006;

"**LLAU**" means, subject to paragraph 7.6, insofar as they relate to the Site, the limits of land to be acquired and used for the purposes of the carrying out of the Infraco Works as more particularly shown on the Drawing;

"**LOD**" means, subject to paragraph 7.3, insofar as they relate to the Site, the limits of deviation within which the Edinburgh Tram Network will be constructed as more particularly shown on the Drawing;

"**Ocean Terminal Limited**" means Ocean Terminal Limited, a company incorporated under the Companies Act with registered number SC 178696 and having its registered office at 1 Prince of Wales Dock, Leith, Edinburgh, EH6 7DX and its successors and assignees as proprietors of the Site;

"**Ocean Terminal Building**" means the retail and leisure centre belonging to Ocean Terminal Limited and known as and forming Ocean Terminal, Ocean Drive, Leith, Edinburgh;

"**RYB**" means The Royal Yacht Britannia Trust, a company incorporated under the Companies Acts with registered number SC 185443 and having its registered office at Princes Exchange, 1 Earl Grey Street, Edinburgh, EH3 9EE;

"**RYB Agreement**" means the agreement entered into between RYB and CEC in respect of the removal of RYB's objections to the Edinburgh Tram (Line One) Bill and dated 14 and 23 February 2006;

"**Site**" means those areas of ground in the City of Edinburgh identified on the Drawing as either LLAU or LOD and which are within the ownership of Ocean Terminal Limited as at the last date of signing of the RYB Agreement;

"**Site Specific Plans**" means the drawings prepared by Ove Arup and Partners Ltd and identified as being "plan number x relative to agreement between the City of Edinburgh Council and Ocean Terminal Limited" which are set out in part 1 of Appendix 5 to Schedule Part 13; each individual drawing is referred to herein by its particular number all of which

plans are further interpreted or explained by the Table which shall for all purposes be deemed to form part of the Site Specific Plans; and

"**Table**" means the table which is set out in part 2 of Appendix 5 to Schedule Part 13 and should be read together with the Site Specific Plans.

7.2 The Infraco shall ensure that the route for the Edinburgh Tram Network will generally adopt the line shown on the Site Specific Plans. In the event that this becomes, or is found not to be, reasonably practicable, then such other most proximate and appropriate route shall be adopted by the Infraco in line with the consultation carried out between CEC and RYB pursuant to clause 2.2 of the RYB Agreement. **tie** will procure that the Infraco's views are sought in respect of any such consultation.

7.3 Unless otherwise instructed by **tie** in accordance with this Agreement, in carrying out the Infraco Works at the Site, the Infraco shall not design or construct any part of the Edinburgh Tram Network at the Site on any land outwith the LOD. For the purposes of the preceding provisions of this paragraph 7.3, along the frontage and extent of the Ocean Terminal Building, the LOD will be deemed to be as shown on the Site Specific Plans relative to the face of the Ocean Terminal Building and the LOD on the south east edge in this location will be in accordance with the Drawing.

7.4 In respect of the Site Specific Plans and the demonstration at letter K, the Infraco shall ensure that during the carrying out of the Infraco Works, it shall not encroach upon on any land beyond the junction of the North East leg of the roundabout unless the Infraco is instructed otherwise by **tie** in accordance with this Agreement.

7.5 Whilst carrying out the Infraco Works at the Site, the Infraco shall not impede the availability of coach parking facilities, which shall be of no lesser scale than that currently enjoyed by RYB at the Site.

7.6 Unless instructed otherwise by **tie** in accordance with this Agreement the Infraco shall not encroach upon any land in respect of Infraco Works at the Site outwith the LLAU shown on the Drawing.

7.7 The Infraco shall carry out and/or procure the carrying out of the Infraco Works strictly in accordance with any site specific code which may be in place from time to time in respect of the Site as notified to the Infraco by **tie**. The Infraco will provide **tie** with all reasonable assistance requested by **tie** in relation to the negotiation and agreement of any such code with RYB.

7.8 The Infraco shall have due and proper regard to the representations made by RYB, as notified by **tie** to the Infraco, in relation to the period proposed for carrying out the Infraco Works at the Site, any proposals regarding the area proposed to be affected by such Infraco Works, procedures proposed for carrying out the Infraco Works and any amendments to the draft Programme and will use reasonable endeavours to ensure that its proposed period of the relevant Infraco Works will be made to accord with RYB's reasonable requirements as notified by **tie** to the Infraco.

7.9 The Infraco shall take due and proper cognisance of all reasonable and proper representations of RYB, as notified by **tie** to the Infraco, in terms of the sufficiency of the Infraco Works at the Site in order to ensure that on return of possession of such to RYB, the Site should be in a condition fully commensurate with the full and proper compliance by the Infraco with its obligations under this Agreement.

7.10 In carrying out the Infraco Works at the Site, the Infraco will act always in accordance with the Programme relevant to any element of the Infraco Works at the Site and will have due and proper regard to the requirement of RYB to be able to access their property and all parts of it at all times in order to carry on their business activities including the requirement for suitable and sufficient coach parking and drop off facilities. The Infraco shall ensure that any disturbance of any access route at the Site will be in place for the minimum period reasonably practicable. The Infraco shall notify **tie** its best estimate of any period of disruption of access rights and routes.

7.11 Whilst carrying out the Infraco Works at the Site, the Infraco shall take all reasonable and proper steps to ensure that any disruption to normal routes and rights of access is kept to the minimum and in particular that at all times where an existing access route is disturbed that an alternative and reasonably suitable access route will be provided and the original access way returned to operation at a date not later than that disclosed in the Programme for the relevant element of the Infraco Works.

7.12 The Infraco shall ensure that at all times during the carrying out of the Infraco Works at the Site, access is available by RYB and members of the public to RYB's premises and that coaches are allowed to park in the immediate vicinity of the entrance doorway to RYB's facility.

SECTION 8 - HAYMARKET YARDS LIMITED

8.1 The Infraco shall ensure that occupation of sites 405, 406 and 407 as identified in the plans attached to the Edinburgh Tram (Line One) Act 2006 and sites 519, 520 and 521 on the plans attached to the Edinburgh Tram (Line Two) Act 2006 will be for the shortest reasonable time possible during the carrying out of the Infraco Works.

8.2 Appropriate access arrangements will be retained at all reasonable times to the sites referred to in paragraph 8.1 above and land in the ownership of Haymarket Yards Limited to the north. Where alternative access arrangements require to be provided, the Infraco shall give **tie** at least 35 days' notice of its proposals. The Infraco shall assist **tie** in respect of any consultation and negotiation relating to access restrictions to the sites referred to in this paragraph 8.2.

8.3 The Infraco shall comply with any instructions provided to it by **tie** in respect of the maintenance of appropriate access arrangements in respect of the sites referred to in paragraphs 8.1 and 8.2 above.

8.4 In relation to the design of the traffic management system in the vicinity of Haymarket Yards, the Infraco shall, at least 35 days before the implementation of any roads traffic regulation order in relation thereto, make available to **tie**, details of the proposed traffic management system and its operation together with all such supporting technical material as **tie** may instruct the Infraco to provide.

8.5 The Infraco shall ensure that the design of the traffic management system to be implemented by the Infraco in the vicinity of Haymarket Yards shall comply with relevant traffic regulation orders and be approved by the relevant roads authority at that time.

SECTION 9 - WEST CRAIGS LIMITED
(FORMERLY MEADOWFIELD DEVELOPMENTS LIMITED)

9.1 In this Section 9 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Depot**" means the buildings and ancillary facilities for the storing, parking and maintenance of the trams permitted by the Tram Legislation within Plots 256, 259 and 260 shown on the Drawings;

"**Drawings**" means sheets numbered 15 and 16 as annexed to the Edinburgh Tram (Line Two) Act 2006;

"**Limits of Deviation**" means, insofar as they relate to the Site, the limits within which the Edinburgh Tram Network will be constructed;

"**MDL Land**" means ALL and WHOLE the subjects at Wester Barnton and Meadowfield Farm, Edinburgh, being the subjects registered in the Land Register for Scotland under Title Number MID34648;

"**New Limits**" means the Limits of Deviation as amended from those shown on the Drawings to the new Limits of Deviation as shown by the broken red line on the Plan;

"**Plan**" means the plan set out in Appendix 6 to this Schedule Part 13; and

"**Site**" means those parts of the MDL Land which for the purposes of the Edinburgh Tram (Line Two) Act 2006 comprise Plot numbers 249, 250, 260, 261, 263, 265, 273 to 275, 286, 291 to 295, part of 296, part of 297, 298 and part of 299 as shown on the Drawings.

9.2 Subject to paragraphs 9.3 and 9.4 of this Section 9 of Section A of Schedule Part 13, the Infraco shall design and construct the Edinburgh Tram Network over the parts of the Site within the Limits of Deviation to the west of Castle Gogar Road with a view to ensuring that the width of the area required for the Edinburgh Tram Network at the Site shall not generally exceed 10 metres together with such additional land immediately adjacent thereto as is reasonably required in order to carry out the Infraco Works.

9.3 Whilst carrying out the Infraco Works at the Site, unless otherwise instructed by **tie** in accordance with this Agreement, the Infraco shall not design or construct any part of the Edinburgh Tram Network upon any land beyond the New Limits.

9.4 The Infraco shall not be entitled to design or construct any part of the Edinburgh Tram Network on or through Plot 274 as shown on the Drawings.

9.5 In the event that **tie** requires the Infraco to landscape Plot 274 as shown on the Drawings, the Infraco shall ensure that such landscaping will not detrimentally impact on the existing visibility splay at the junction of Gogar Farm Road with the A8 road.

9.6 The Infraco shall make good to the reasonable satisfaction of **tie** any damage caused in the carrying out of the Infraco Works so as to ensure that the Site is left in no worse condition that it was prior to the carrying out of the Infraco Works.

9.7 The Infraco shall carry out and/or procure the carrying out of the Infraco Works in such a way as to ensure that the Infraco Works will have no detrimental impact on the field drainage of the MDL Land.

9.8 Upon imminent completion of the Infraco Works at the Site, the Infraco shall serve written notice on **tie** specifying the estimated date upon which the Infraco Works are due to complete and the estimated date upon which possession of the Site will be returned to **tie**.

9.9 The Infraco shall ensure that the Depot is located generally as shown on the Plan so as to accommodate an access from the Gogar Roundabout.

9.10 The Infraco shall construct as part of the Infraco Works, a single carriageway access road and associated footpaths, built to adoptable standard (the "**Depot Access Road**") serving the Depot, which Depot Access Road will be located from points X-Y within the area hatched in green on the Plan and which will then continue westwards from point Y with sufficient room to accommodate in the future a dual carriageway road from the Gogar Roundabout, in the area hatched in green on the Plan, the Depot Access Road to lie outside the boundaries of the Depot save for the spur road leading therefrom to serve exclusively the Depot.

9.11 The Infraco acknowledges that the Site is affected by a high pressure gas pipeline and agrees that occupation of any part of the Site is subject to the rights of Scotland Gas Networks Limited as grantee of a servitude in respect of a pipeline and ancillary rights.

SECTION 10 - FSH NOMINEES LIMITED

10.1 In this Section 10 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Drawing**" means sheet number 20 as annexed to the Edinburgh Tram (Line Two) Act 2006;

"**FSH Nominees**" means FSH Nominees Limited, a company incorporated under the Companies Act with registered number 04046945 and having its registered office at 11-15 Wigmore Street, London, W1A 2JZ and its successors and assignees;

"**Licence Site**" means the area delineated and hatched red on the Plan, declaring for the avoidance of doubt that the boundaries of the said area are taken to be the outermost edges of the said red lines;

"**New Limits**" means the new deemed limits of deviation as shown delineated by the green lines on the Plan, declaring for the avoidance of doubt that the boundaries of the New Limits are taken to be the outermost edges of the said green lines;

"**Plan**" means the Faber Maunsell drawing Number 30894/C319 Rev D and set out in Appendix 7 to Schedule Part 13; and

"**Site**" means ALL and WHOLE that plot or area of ground extending to 4.092 hectares (40,920 square metres) or thereby lying to the east of Eastfield Road, Edinburgh in the County of Midlothian, which subjects are shown delineated in red and hatched red and cross hatched red and blue and cross hatched red and green on Plan 1 (which subjects are also shown as aforesaid for identification purposes on Plan 2) both plans annexed and signed as relative to Disposition by New Ingliston Limited in favour of IBIS (598) Limited dated fifth and recorded in the General Register of Sasines for the County of Midlothian on tenth both days of October two thousand and which for the purposes of the Edinburgh Tram (Line Two) Act 2006 comprises Plot 327 on the Drawing.

10.2 The Infraco acknowledges that land within the New Limits shall not be permanently acquired for the purposes of the construction of the Edinburgh Tram Network and the Infraco shall therefore not design or construct any part of the Edinburgh Tram Network at the Site outwith the New Limits.

10.3 In carrying out or procuring the carrying out of the Infraco Works at the Site, the Infraco shall not encroach upon any land outwith the New Limits or the Licence Site, unless instructed otherwise by **tie** in accordance with this Agreement.

10.4 The Infraco shall ensure that no part of the Site, the New Limits or Plots 317 and 320 of sheet number 19 as annexed to the Edinburgh Tram (Line Two) Act 2006 shall be used to provide compensatory floodwater storage in connection with the Infraco Works or the Edinburgh Tram Network.

10.5 The Infraco shall ensure that no detrimental impact is caused to the Site field drainage as a result of the Edinburgh Tram Network and/or the Infraco Works.

10.6 Upon imminent completion of the Infraco Works at the Site, the Infraco shall serve written notice on **tie** specifying the estimated date upon which the Infraco Works are due to complete and the estimated date upon which possession of the Site will be returned to **tie**.

SECTION 11 - FIRST SCOTRAIL LIMITED

11.1 In this Section 11 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**First**" means First Scotrail Limited, a company incorporated under the Companies Act with registered number SC 185018 and having its registered office at 395 King Street, Aberdeen AB24 5RP;

"First Agreement" means the agreement entered into by **tie**, CEC and First dated 27th October and 1st November 2005 in respect of the removal of First's objection to the Edinburgh Tram (Line Two) Bill;

"**Haymarket Depot**" means the Haymarket Passenger Light Maintenance Depot, Edinburgh currently owned by Network Rail Infrastructure Limited and leased to and operated by First and being currently configured as shown on the plan set out in Appendix 8 to Schedule Part 13; and

"**HMRI**" means Her Majesty Railway Inspectorate.

11.2 **tie** shall provide the Infraco with the profile of First's typical current and anticipated future seven day access and egress requirements as provided to **tie** by First in accordance with clause 2.1 of the First Agreement. At all times during the carrying out of the Infraco Works, the Infraco shall safeguard and ensure access and egress for First to and from Haymarket Depot. Without prejudice to the foregoing generality, the Infraco shall not carry out any Infraco Works at or in the vicinity of any operational entrance or exit of Haymarket Depot at such times and dates as may be notified in advance to the Infraco by **tie**. The Infraco shall comply with any extraordinary access requirements for heavy load vehicles notified to it by **tie**.

11.3 The Infraco shall comply with such amendments to its construction methodology as may be required by First and notified to the Infraco by **tie** in relation to the continuity of access to and egress from Haymarket Depot.

11.4 As required by **tie**, the Infraco shall consult with First and **tie** in relation to access arrangements at Haymarket Depot, and (without prejudice to the foregoing), shall assist **tie** in developing a regime to facilitate access to and egress from Haymarket Depot by First which is not opposed by HMRI.

11.5 Subject to any conclusions reached or determinations made following consultation with HMRI, **tie** shall ensure that traffic light signals or such other similar signals are installed to

facilitate access to Haymarket Depot by First, such traffic light or other system to be capable of manual override by First in the event of signal system failure.

11.6 At all times during the carrying out of the Infraco Works, the Infraco shall ensure that the continuous operation of train fuelling equipment fed by the fuel tanks located within Haymarket Depot is not adversely affected.

11.7 At all times during the carrying out of the Infraco Works, the Infraco shall ensure safe and unrestricted access to the fuel tanks at Haymarket Depot by First for all necessary purposes (including without limitation the supply of fuel to the tanks and maintenance operations).

11.8 In the event that fuel tanks located within Haymarket Depot require to be relocated, the Infraco shall ensure that there is uninterrupted access to alternative fuel tanks whilst the relevant fuel tanks are being relocated.

11.9 During the Infraco Works, the Infraco shall ensure that First is provided with replacement temporary car parking spaces for the exclusive use of First in relation to its business at Haymarket Depot, the number of such replacement temporary car parking spaces to be equivalent to the number of car parking spaces lost during the Infraco Works. Such replacement car parking spaces shall be:

11.9.1 at a single location in or immediately adjacent to the area outlined in red on the plan set out in Appendix 8 to this Schedule Part 13;

11.9.2 within 150 metres of the Russell Road entrance to Haymarket Depot;

11.9.3 capable of allowing ready access and egress by users without undue congestion or delay;

11.9.4 secure;

11.9.5 of well constructed drained and maintained hard standing; and

11.9.6 capable of clear and unambiguous signage to and from Haymarket Depot.

11.10 Upon conclusion of construction of the Infraco Works in the vicinity of Haymarket Depot, the Infraco shall, following consultation with **tie** and CEC, ensure that First is provided with permanent car parking spaces which:

11.10.1 are of a standard no less than that of the car parking system existing at Haymarket Depot prior to the commencement of the Infraco Works;

11.10.2 are located on a site or sites at Haymarket Depot; and

11.10.3 are equivalent in number to the number of car parking spaces lost as a result of the Infraco Works.

11.11 Before the commencement of any Infraco Works at Haymarket Depot, the Infraco shall provide a notice to **tie** specifying the projected commencement date of the Infraco Works at Haymarket Depot and the period of notice it shall endeavour to provide to **tie** of its intention to commence the Infraco Works in the vicinity of Haymarket Depot.

11.12 The Infraco shall, in the design, construction and maintenance of the Infraco Works, take reasonable measures necessary to prevent electromagnetic interference with the railway infrastructure and signalling equipment at Haymarket Depot.

11.13 In carrying out the Infraco Works, the Infraco shall take due cognisance of First's need to ensure the safe and full continued operation of the facilities at Haymarket Depot.

SECTION 12 - STAKIS LIMITED

12.1 In this Section 12 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Car Park Works**" means the construction/reconfiguration of the New Car Park on the Property and all ancillary works required in accordance with the terms of the Planning Permission and any Requisite Consents required;

"**Drawing**" means the parliamentary drawing allocated sheet number 20 as annexed to the Edinburgh Tram (Line Two) Act 2006;

"**Letting Documentation**" means (1) lease between Edinburgh Airport Limited and Stakis plc dated 10 March and 5 April and recorded in the Division of the General Register of Sasines applicable to the County of Midlothian as in the Books of Council and Session on 21 April, both months in the year 1995, and (2) Minute of Variation of Lease between Edinburgh Site No. 1 (CI) Limited and Stakis Limited dated 27 November and 19 December both months in the year 2003, and recorded in the Division of the General Register of Sasines applicable to the County of Midlothian as in the Books of Council and Session on 14 April 2004;

"**New Car Park**" means the car parking spaces coloured green on Plan 2;

"**Plan 1**" means Faber Maunsell Drawing Number 30894/C283 Rev G as set out in part 1 of Appendix 9 to Schedule Part 13;

"**Plan 2**" means Faber Maunsell Drawing Number 30894/C298 Rev C as set out in part 2 of Appendix 9 to Schedule Part 13;

"**Planning Application**" means the application for planning permission to be applied for by the Infraco in respect of the Car Park Works, which application shall only require the consent of Stakis in the event that the configuration of the New Car Park is to differ from that shown on Plan 2;

"**Planning Authority**" means CEC acting as local planning authority;

"**Planning Permission**" means the planning permission to be granted pursuant to the Planning Application in respect of the Car Park Works;

"**Property**" means ALL and WHOLE the subjects let by virtue of the Letting Documentation, and which subjects are shown outlined in green for indicative purposes on Plan 1;

"**Requisite Consents**" means the building regulation consents, local authority approvals, and any other consents, licences and authorisations required from any competent authority, statutory undertaker or person either for the carrying out of the Car Park Works or for the intended use of the Property as contemplated *inter alia* by the terms of the Planning Permission;

"**Site**" means those subjects forming part of the Property and which, for the purposes of the Edinburgh Tram (Line Two) Act 2006 comprise Plot numbers 329, 330, 333 and 334 on the Drawing but only to the extent that the same are let to Stakis by virtue of the Letting Documentation; and

"**Stakis**" means Stakis Limited, a company incorporated under the Companies Act with registered number SC022163 and having its registered office at 4 Cadogan Square, Cadogan Street, Glasgow G2 7PH and its successors and assignees.

12.2 During the carrying out of the Infraco Works at the Site, the Infraco shall not at any time encroach upon that part of the Site forming Plot 334 on the Drawing unless the Infraco is instructed otherwise by **tie** in accordance with this Agreement.

12.3 During the carrying out of the Infraco Works at the Site, the Infraco shall only enter upon those parts of the Site that are shown as hatched blue and/or cross hatched in red on Plan 1, unless the Infraco is instructed otherwise by **tie** in accordance with this Agreement. The Infraco shall not design or construct any part of the Edinburgh Tram Network on the Site outwith the area hatched in blue on Plan 1.

12.4 The Infraco shall carry out the Infraco Works at the Site in accordance with such instructions as may be provided by **tie** with a view to ensuring that the impact on the normal operation of Stakis' business at the Site is minimised so far as reasonably practicable having regard to the scope and nature of the Infraco Works.

12.5 Without prejudice to the preceding provisions of this Section 12, the Infraco shall at all times throughout the carrying out of the Infraco Works at the Site, consult with local hotel management on the issue of fire alarm congregation points.

12.6 The Infraco shall ensure that the carrying out of the Infraco Works at the Site shall not prevent continual access to and from the Property such that the ability of Stakis to operate the hotel at the usual business level will not be adversely affected.

12.7 Without prejudice to the generality of the terms of paragraph 12.6 above, the Infraco shall ensure that:

12.7.1 access for the purposes of carrying out the Infraco Works will not be taken via that stretch of Eastfield Road in so far as the same lies adjacent to the Property, but rather by a haul road which will be located in a position lying generally to the south of the Property; and

12.7.2 no construction compound in relation to the Infraco Works shall be located adjacent to the Property.

12.8 The Infraco shall procure appropriate structural and building fabric condition surveys (in a form and to an extent to be agreed by **tie** and Stakis and notified to the Infraco by **tie**) of the buildings constructed on the Property (1) prior to the commencement of the Infraco Works in the vicinity of the buildings constructed on the Property and (2) following completion of the Infraco Works.

12.9 The Infraco shall make the Planning Application, and shall use all reasonable endeavours (keeping **tie** fully informed as to progress) to obtain the Planning Permission to allow the Infraco to carry out the Car Park Works to provide the New Car Park.

12.10 It is acknowledged by Infraco and **tie** that construction of the New Car Park in the location detailed in Plan 2 is subject to any over-riding consent and requirements of the Planning Authority.

12.11 The Infraco shall procure that the Car Park Works are completed as quickly as reasonably possible and in any event prior to the commencement of the Infraco Works in the vicinity of the Site.

12.12 The Infraco shall return the spaces coloured yellow on Plan 2 to **tie** just as soon as reasonably possible following completion of the Infraco Works at the Site.

12.13 Upon imminent completion of the Infraco Works at the Site, the Infraco shall serve written notice on **tie** specifying the estimated date upon which the Infraco Works are due to complete and the estimated date upon which possession of the Site will be returned to **tie**.

SECTION 13 - UNIVERSITIES SUPERANNUATION SCHEME LIMITED

13.1 In this Section 13 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Accommodation Works**" means (a) any Infraco Works to or in the Gyle Car Park so far as outwith the New Limits; (b) without prejudice to but not limited by (a) aforesaid, works to ensure no reduction in available car parking spaces and circulation path standards consequent upon the Works generally or the works specified at (a) aforesaid; and (c) similarly without prejudice or limitation as aforesaid, all necessary associated restoration works, all of which works referred to at (a), (b) and (c) aforesaid will be described in the Accommodation Works Method Statement;

"**Accommodation Works Method Statement**" means the method statement to be developed by the Infraco pursuant to paragraph 13.7 as the same may be amended pursuant to this Section 13 of Section A of Schedule Part 13;

"**Depot**" means the buildings and ancillary facilities for the storing, parking and maintenance of the trams to be generally located within Plots 259, 494, 496, 497 and 499 on the Drawing;

"**Drawing**" means plans numbered 14 and 15 as attached to the Edinburgh Tram (Line Two) Act 2006;

"**Licence**" means a licence to be entered into by CEC in respect of access to the Site to allow the carrying out of *inter alia* the Infraco Works;

"**Licence Site**" means the subject of a Licence;

"**Method Statements**" means the Accommodation Works Method Statement and the Works Method Statement as the context may require;

"**New Limits**" means the new limits of deviation as shown hatched red on the Plan;

"**Plan**" means the plan set out in Appendix 10 to Schedule Part 13;

"**Site**" means that area of ground known as and forming the Gyle Shopping Centre together with the car park, access roads and all ancillary services being the subjects described in the Feu Contract between The City of Edinburgh Council and Marks & Spencer plc and Safeway Stores plc recorded in the Division of the General Register of Sasines for the County of Midlothian on 10 January 1997 and comprising Plot Numbers 478, 479, 480, 481, 482, 483, 484 and 486 as shown on the Drawing;

"**Tram**" means Edinburgh Tram Line Two, tram vehicles, tram roads, tramways, tram stops and all associated infrastructure, plant and equipment as envisaged by the Tram Legislation;

"**USS**" means Universities Superannuation Scheme Limited, a company incorporated under the Companies Act with registered number 01167127 and having its registered office at Royal Liver Building, Liverpool L3 1PY and its successors and assignees;

"**Works**" means Work No 8 and Work No 9 insofar as in the vicinity of the Site as described in Schedule 1 of the Edinburgh Tram (Line Two) Act 2006, being works required in respect of the construction of the Edinburgh Tram Network but specifically excluding any works required in the future to maintain the Edinburgh Tram Network; and

"**Works Method Statement**" means the method statement to be developed by the Infraco pursuant to paragraph 13.5 as the same may be amended pursuant to this Section 13 of Section A of Schedule Part 13.

13.2 In carrying out or procuring the carrying out of the Infraco Works at the Site, the Infraco shall not design or construct any part of the Edinburgh Tram Network on any land outwith the New Limits.

13.3 In carrying out or procuring the carrying out of the Infraco Works at the Site, the Infraco shall not encroach upon any land outwith the area shown hatched blue on the Plan unless instructed otherwise by **tie** in accordance with this Agreement.

13.4 The Infraco shall design and construct the Edinburgh Tram Network at the Site within the New Limits with a view to ensuring that the width of the area required for the Edinburgh Tram Network shall not generally exceed 10 metres, together with such additional land as is reasonably required in order to carry out the Infraco Works.

13.5 The Infraco shall provide all required assistance to **tie** in respect of the drafting of a Works Method Statement in respect of the Infraco Works to be carried out in the vicinity of the Site. The Works Method Statement will deal specifically with *inter alia* specified working hours, specified time of year and peak retailing periods when working will be avoided, mitigation measures to minimise adverse impact on service and customer access including measures to reconfigure the car park if necessary, mitigation measures to avoid dust/vibration/noise having an adverse effect on trading, restoration of any Licence Site (including landscaping and signage) insofar as applicable to the Infraco Works in the vicinity of the Site and where applicable will mirror the terms of Schedule Part 3 (*Code of Construction Practice*).

13.6 The Infraco Works which constitute Works shall not be commenced until the Works Method Statement has been finalised by **tie**.

13.7 The Infraco shall provide all required assistance to **tie** in relation to the drafting of an Accommodation Works Method Statement in respect of the Accommodation Works. The Accommodation Works Method Statement shall deal specifically with *inter alia* specified working hours, specified times of the year and peak retailing periods when working will either cease or be avoided, mitigation measures to minimise adverse impact on service and customer access including measures to reconfigure the car park if necessary, mitigation to avoid dust/vibration/noise having an adverse effect on trading, restoration of any Licence Site (including layout of the car park, landscaping and signage) insofar as applicable to the Accommodation Works to the extent that they constitute Infraco Works and where applicable will mirror the terms of Schedule Part 3 (*Code of Construction Practice*).

13.8 The Infraco Works at the Site which constitute Accommodation Works shall not be commenced until the Accommodation Works Method Statement has been finalised by **tie** and USS. The Infraco shall provide **tie** with all reasonable assistance requested by **tie** in relation to the negotiation and agreement of the Accommodation Works Method Statement between **tie** and USS.

13.9 The Infraco shall carry out or procure the carrying out of the Infraco Works at the Site strictly in accordance with the terms of the finalised Method Statements.

13.10 Those elements of the Works which constitute the Infraco Works will be carried out in a good and workmanlike manner so that impact on the normal operation of USS business is minimised so far as is reasonably practical in accordance with the finalised Method Statements.

13.11 The Infraco acknowledges that USS has a material preference that no fixing of any component part of the Edinburgh Tram Network should be made to any buildings situated on the Site. In the event that the Infraco considers that such fixings are nonetheless the most appropriate solution, the Infraco shall first consult with **tie** and take due and proper cognisance of the reasonable representations of USS in this respect as notified to the Infraco by **tie**.

13.12 Prior to completion of the Accommodation Works on each Licence Site, the Infraco shall serve notice on **tie** specifying the estimated date upon which the Accommodation Works on that particular Licence Site are due to be completed and the estimated date upon which possession of the Licence Site will be returned to **tie**, provided that such notice shall be

provided to **tie** having regard to the need to facilitate an inspection of the relevant Licence Site pursuant to paragraph 13.13.

13.13 The Infraco shall facilitate the carrying out of an inspection of the relevant Licence Site by USS and a representative of CEC and/or **tie**, such inspection to be carried out on a date to be specified by **tie** declaring that the relevant date will be at least 5 days before the estimated date of return of possession of the relevant Licence Site to **tie**.

13.14 The Infraco shall take due and proper cognisance of all reasonable and proper representations of **tie** in terms of the sufficiency and completeness of the Infraco Works at the Site in order to ensure that on return of possession of such to **tie** the Site should be in a condition fully commensurate with the full and proper compliance by the Infraco with its obligations under this Agreement.

13.15 Any interference with access to any part of the Site proposed by the Infraco in pursuance of the Infraco Works shall only be given effect, whether as to route or other locational factors, or as to timing and duration, after due consultation with and approval thereto from **tie**.

13.16 The Infraco shall ensure that there is two-way traffic flow along Glasgow Road within half a mile in each direction from Gogar Roundabout at all times during the carrying out of the Infraco Works.

13.17 The Infraco shall ensure that the Depot is generally located to the north of Glasgow Road within Plots 259, 494, 496, 497 and 499 as shown on the Drawing and will comply with the requirements of the Town and Country Planning (Safeguard Aerodromes, Technical Sites and Military Explosives Storage Areas) (Scotland) Direction 2003 (SEDD Circular 2/2003).

13.18 The Infraco shall not construct any interlacing track on the Site.

13.19 In carrying out the Infraco Works, the Infraco shall ensure that it does not at any time connect to any of the adopted or unadopted drains located within the Site.

13.20 Further to any obligations under this Agreement to investigate and survey land at the Site, the Infraco shall consult with **tie** in relation to the location and timing of such surveys and use reasonable endeavours to minimise any disruption and shall make good any damage and leave the Site in no worse condition as existed prior to the carrying out of such surveys and investigations.

13.21 With regard to the location of any signage, the Infraco shall consult with **tie** in relation to the location of such signs so as to ensure any such signage does not interfere in any material or misleading way with the normal operation of the Gyle Shopping Centre.

SECTION 14 - SAFEWAY STORES LIMITED AND WM MORRISONS SUPERMARKET PLC

14.1 In this Section 14 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Accommodation Works**" means (a) any Infraco Works to or in the Gyle Car Park so far as outwith the New Limits; (b) without prejudice to but not limited by (a) aforesaid, works to ensure no reduction in available car parking spaces and circulation path standards consequent upon the Works generally or the works specified at (a) aforesaid; and (c) similarly without prejudice or limitation as aforesaid, all necessary associated restoration works, all of which works referred to at (a), (b) and (c) aforesaid will be described in the Accommodation Works Method Statement;

"**Accommodation Works Method Statement**" means the method statement to be developed by the Infraco pursuant to paragraph 14.7 as the same may be amended pursuant to this Section 14 of Section A of Schedule Part 13;

"**Depot**" means the buildings and ancillary facilities for the storing, parking and maintenance of the trams to be generally located within Plots 259, 494, 496, 497 and 499 on the Drawing;

"**Drawing**" means plans numbered 14 and 15 as attached to the Edinburgh Tram (Line Two) Act 2006;

"**Licence**" means a licence to be entered into by CEC in respect of access to the Site to allow the carrying out of *inter alia* the Infraco Works;

"**Licence Site**" means the subject of a Licence;

"**Method Statements**" means Accommodation Works Method Statement and/or the Works Method Statement as the context may require;

"**Morrisons**" means Wm Morrisons Supermarket PLC, a company incorporated under the Companies Act with registered number 00358949 and having its registered office at Hilmore House, Thornton Road, Bradford, West Yorkshire BD8 9AX and its successors and assignees;

"**New Limits**" means the new limits of deviation as shown hatched red on the Plan;

"**Plan**" means the plan set out in Appendix 11 to Schedule Part 13;

"**Proprietors**" means Safeway and Morrisons;

"**Safeway**" means Safeway Stores Limited, a company incorporated under the Companies Act with registered number 00746956 and having its registered office at Hilmore House, Thornton Road, Bradford, Yorkshire, BD8 9AX;

"**Site**" means that area of ground known as and forming the Gyle Shopping Centre together with the car park, access roads and all ancillary services being the subjects described in the Feu Contract between The City of Edinburgh Council and Marks & Spencer plc and Safeway Stores plc recorded in the Division of the General Register of Sasines for the County of Midlothian on 10 January 1997 and for the purposes of the Bill Amendment comprising Plot Numbers 478, 479, 480, 481, 482, 483, 484 and 486 as shown on the Drawing;

"**Works**" means Work No 8 and Work No 9 insofar as in the vicinity of the Site as described in Schedule 1 of the Edinburgh Tram (Line Two) Act 2006, being works required in respect of the construction of the Edinburgh Tram Network but specifically excluding any works required in the future to maintain the Edinburgh Tram Network; and

"**Works Method Statement**" means the method statement to be developed by the Infraco pursuant to paragraph 14.5 as the same may be amended pursuant to this Section 13 of Section A of Schedule Part 13.

14.2 In carrying out or procuring the carrying out of the Infraco Works at the Site, the Infraco shall not design or construct any part of the Edinburgh Tram Network on any land outwith the New Limits.

14.3 In carrying out or procuring the carrying out of the Infraco Works at the Site, the Infraco shall not encroach upon any land outwith the area shown hatched blue on the Plan unless instructed otherwise by **tie** in accordance with this Agreement.

14.4 The Infraco shall design and construct the Edinburgh Tram Network at the Site within the New Limits with a view to ensuring that the width of the area required for the Edinburgh Tram Network shall not generally exceed 10 metres, together with such additional land as is reasonably required in order to carry out the Infraco Works.

14.5 The Infraco shall provide all required assistance to **tie** in respect of the drafting of a Works Method Statement in respect of the Infraco Works to be carried out at the Site. The Works Method Statement will deal specifically with *inter alia* specified working hours, specified time of year and peak retailing periods when working will be avoided, mitigation measures to minimize adverse impact on service and customer access including measures to reconfigure the car park if necessary, mitigation measures to avoid dust/vibration/noise having an adverse

effect on trading, restoration of any Licence Site (including landscaping and signage) insofar as applicable to the Infraco Works at the Site and where applicable will mirror the terms of Schedule Part 3 (*Code of Construction Practice*).

14.6 The Infraco Works at the Site which constitute Works shall not be commenced until the Works Method Statement has been finalised by **tie**.

14.7 The Infraco shall provide all required assistance to **tie** in respect of the drafting of an Accommodation Works Method Statement in respect of the Accommodation Works. The Accommodation Works Method Statement shall deal specifically with *inter alia* specified working hours, specified times of the year and peak retailing periods when working will either cease or be avoided, mitigation measures to minimise adverse impact on service and customer access including measures to reconfigure the car park if necessary, mitigation to avoid dust/vibration/noise having an adverse effect on trading, restoration of any Licence Site (including layout of the car park, landscaping and signage) insofar as applicable to the Accommodation Works to the extent that they constitute Infraco Works and where applicable will mirror the terms of Schedule Part 3 (*Code of Construction Practice and Code of Maintenance Practice*).

14.8 The Infraco Works which constitute Accommodation Works shall not be commenced until the Accommodation Works Method Statement has been finalised by **tie** and Morrisons. The Infraco shall provide **tie** with all reasonable assistance requested by **tie** in relation to the negotiation and agreement of the Accommodation Works Method Statement between **tie** and Morrisons.

14.9 The Infraco shall carry out or procure the carrying out of the Infraco Works at the Site strictly in accordance with the terms of the finalised Method Statement.

14.10 Those elements of the Works which constitute the Infraco Works will be carried out in a good and workmanlike manner so that impact on the normal operation of the Proprietors business is minimised so far as is reasonably practical in accordance with the finalised Method Statements.

14.11 The Infraco acknowledges that Morrisons has a material preference that no fixing of any component part of the Edinburgh Tram Network should be made to any buildings situated on the Site. In the event that the Infraco considers that such fixings are nonetheless the most appropriate solution, the Infraco shall first consult with **tie** and take due and proper cognisance of the reasonable representations of Morrisons in this respect as notified to the Infraco by **tie**.

14.12 Prior to completion of the Accommodation Works on each Licence Site, the Infraco shall serve notice on **tie** specifying the estimated date upon which the Accommodation Works on that particular Licence Site are due to be completed and the estimated date upon which possession of the Licence Site will be returned to **tie**, provided that such notice shall be provided to **tie** having regard to the need to facilitate an inspection of the relevant Licence Site pursuant to paragraph 14.13.

14.13 The Infraco shall facilitate the carrying out of an inspection of the relevant Licence Site by Morrisons and a representative of CEC and/or **tie**, such inspection to be carried out on a date to be specified by **tie** declaring that the relevant date will be at least 5 days before the estimated date of return of possession of the relevant Licence Site to **tie**.

14.14 The Infraco shall take due and proper cognisance of all reasonable and proper representations of **tie** in terms of the sufficiency and completeness of the Infraco Works at the Site in order to ensure that on return of possession of such to **tie** the Site should be in a condition fully commensurate with the full and proper compliance by the Infraco with its obligations under this Agreement.

14.15 Any interference with access to any part of the Site proposed by the Infraco in pursuance of the Infraco Works (including the Accommodation Works) shall only be given effect, whether as to route or other locational factors, or as to timing and duration, after due consultation with and approval thereto from **tie**.

14.16 The Infraco shall ensure that there is two-way traffic flow along Glasgow Road within half a mile in each direction from Gogar Roundabout at all times during the carrying out of the Infraco Works

14.17 The Infraco shall ensure that the Depot is generally located to the north of Glasgow Road within Plots 259, 494, 496, 497 and 499 as shown on the Drawing and will comply with the requirements of the Town and Country Planning (Safeguard Aerodromes, Technical Sites and Military Explosives Storage Areas) (Scotland) Direction 2003 (SEDD Circular 2/2003).

14.18 The Infraco shall not construct any interlacing track on the Site.

14.19 In carrying out the Infraco Works, the Infraco shall ensure that it does not at any time connect to any of the adopted or unadopted drains located within the Site.

14.20 Further to any obligations under this Agreement to investigate and survey land at the Site, the Infraco shall consult with **tie** in relation to the location and timing of such surveys and use reasonable endeavours to minimise any disruption and shall make good any damage and leave

the Site in no worse condition as existed prior to the carrying out of such surveys and investigations.

14.21 With regard to the location of any signage, the Infraco shall consult with **tie** in relation to the location of such signs so as to ensure any such signage does not interfere in any material or misleading way with the normal operation of the Gyle Shopping Centre.

SECTION 15 - NEW INGLISTON LIMITED AND HIGHLAND PROPERTIES (SCOTLAND) LIMITED

15.1 In this Section 15 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Above Ground Level Grade Separated Crossing**" means a road crossing at above ground level finished to an adoptable standard, extending in length over the whole of the CPO Site at the point of crossing sufficient to accommodate a dual carriageway of 16.6 metres in width or such other width as accords with the then current standard for a dual carriageway at the time of construction or such smaller road crossing as determined by NIL together with associated bus lanes and cycle and pedestrian ways and verges on either side;

"**At Grade Crossings**" means the First Crossing and the Second Crossing, being road crossings at rail level finished to an adoptable standard, extending in length over the whole of the CPO Site at the point of crossing sufficient to accommodate a dual carriageway of 16.6 metres in width or of such other width as accords with the then current standard for a dual carriageway at the time of construction together with associated bus lanes and cycle and pedestrian ways and verges on either side;

"**Below Ground Level Grade Separated Crossing**" means a road crossing at below ground level finished to an adoptable standard, extending in length over the whole of the CPO Site at the point of crossing sufficient to accommodate a dual carriageway of 16.6 metres in width or such other width as accords with the then current standard for a dual carriageway at the time of construction or such smaller road crossing as determined by NIL together with associated bus lanes and cycle and pedestrian ways and verges on either side;

"**CPO Site**" means each and every part of the Site which is compulsorily acquired by CEC for the purposes of the Edinburgh Tram Network;

"**Depot**" means the buildings and ancillary facilities for the storing, parking and maintenance of the trams to be located within Plots 256, 259 and 260 on the Drawings;

"**Drawings**" means parliamentary sheets numbered 16, 17, 18 and 19 as annexed to the Edinburgh Tram (Line Two) Act 2006;

"**First Crossing**" means the crossing envisaged within the area hatched orange in Plan 1;

"**Grade Separated Crossings**" means each Above Ground Level Grade Separated Crossing and/or each Below Ground Level Grade Separated Crossing, as the context so permits;

"**Highland**" means Highland Properties (Scotland) Limited, a company incorporated under the Companies Act with registered number SC 165975 and having its registered office at Gogar Mains Estate Office, Gogar Mains Farm Road, Edinburgh EH12 9BP;

"**Limits of Deviation**" means insofar as they relate to the Site, the limits within which the Edinburgh Tram Network will be constructed and which limits are shown on the Drawings;

"**New Limits**" means, subject to the provisions of paragraph 15.2, the restricted Limits of Deviations from those shown on the Drawings to the new Limits of Deviation as shown outlined in blue on Plan 1;

"**New LLAUs**" means, subject to the provisions of paragraph 15.2, the new limits of land to be acquired or used shown outlined in green on Plan 1;

"**NIL**" means New Ingliston Limited, a company incorporated under the Companies Act with registered number SC 157185 and having its registered office at Gogar Mains Estate Office, Gogar Mains Farm Road, Edinburgh EH12 9BP and its successors and assignees;

"**NIL Agreement**" means the agreement entered into by CEC, NIL and Highland dated 8th November 2005 and 9th November 2005 in respect of the removal of the objections to the Edinburgh Tram (Line Two) Bill lodged on behalf of NIL and Highland;

"**Plan 1**" means the plan set out in part 1 of Appendix 12 to Schedule Part 13;

"**Plan 2**" means the plan set out in part 2 of Appendix 12 to Schedule Part 13;

"**Plan 3**" means the plan set out in part 3 of Appendix 12 to Schedule Part 13;

"**Plans**" means Plan 1, Plan 2 and Plan 3;

"**Plot 320**" means plot 320 as attached shown on the Drawings;

"**Second Crossing**" means the crossing envisaged within the area hatched red on Plan 1;

"**Sewer**" means the private sewer which serves the steading belonging to Highland and the office accommodation developed by Highland at the steading and which sewer is shown by way of a red line on Plan 1;

"**Site**" means ALL and WHOLE that area of ground partly edged red and partly shaded purple on Plan 3;

"**SNH**" means Scottish Natural Heritage, or such other body who may be designated or substituted from time to time to carry out their functions;

"**Tram Line**" means that part of the Edinburgh Tram Network consisting of the land within and including the actual rails and the land immediately outwith the actual rails but only to the extent required for the safe passage of tram vehicles along the rails including the full extent of any swept path;

"**Tram Stop**" means an additional tram stop which tram stop will be constructed to the same specification as other tram stops in a similar setting forming part of the Edinburgh Tram Network; and

"**Utilities**" means services of gas, electricity, water, drainage, telecommunications and others and the cables, conduits, pipes and others provided or to be provided or in place for the delivery of the same.

15.2 The Infraco shall ensure that the route of the Tram Line follows the route on the Plans save that in the event that the route of the Tram Line requires to be realigned to accommodate the relocation of badger setts as notified to the Infraco by **tie** or as determined by SNH, then the route of the Tram Line and the New Limits and the New LLAUs shall be adjusted to the most limited degree as is necessary to accommodate the relocation of the badger setts all following consultation with NIL and having due regard to the reasonable representations of NIL as notified to the Infraco by **tie**.

15.3 In relation to the carrying out of any Infraco Works at the Site, the Infraco shall, unless otherwise instructed by **tie** in accordance with this Agreement, only occupy, use or possess such parts of the Site within the New LLAUs and only in so far as may be reasonably required in relation to the Infraco Works.

15.4 The Infraco shall not design or construct any part of the Edinburgh Tram Network at the Site outwith the New Limits. The Infraco shall not encroach upon any land outwith the New Limits whilst carrying out Infraco Works at the Site unless otherwise instructed by **tie** in accordance with this Agreement.

15.5 The Infraco shall ensure that the width of the area required for the Edinburgh Tram Network at the Site shall not exceed 10 metres, together with such additional land immediately adjacent thereto as is reasonably required for the Infraco Works.

15.6 The Infraco shall not encroach upon Plot 320 or any part thereof for the purposes of carrying out the Infraco Works unless instructed otherwise by **tie** in accordance with this Agreement.

15.7 The Infraco shall as soon as reasonably practicable after the completion of the Infraco Works at the Site make good any damage caused so as to ensure that the Site is left in no worse condition than it was prior to the carrying out of the Infraco Works.

15.8 The Infraco shall ensure that the Depot is located so as to allow the future provision of an access sufficient to accommodate a dual carriageway road from the Gogar Roundabout to *inter alia* Edinburgh Airport within the area hatched green on Plan 2 (with a grade separation between the Edinburgh Tram Network and the access by way of a route which does not require to go over, under or across any part of the Depot itself).

15.9 In the event that NIL construct At Grade Crossings prior to the carrying out of the Infraco Works by the Infraco, the Infraco shall comply with any servitude or other right in favour of NIL in respect of such crossing (as the same shall be notified to the Infraco by **tie**) and shall minimise so far as reasonably practicable the extent of any period of interruption or impediment of access over any such At Grade Crossings and shall at all times during the construction of the Infraco Works provide at its own cost alternative vehicular and pedestrian access of a suitable standard and of at least half the pre-existing capacity of the At Grade Crossings across the CPO Site to and from the surrounding road network and the Infraco undertakes to minimise as far as reasonably practicable the extent of and the period of such interruption or impediment.

15.10 If requested to do so by **tie**, the Infraco shall construct the At Grade Crossings as part of the Infraco Works.

15.11 The Infraco shall, if requested to do so by **tie**, facilitate the construction by NIL of:

15.11.1 as many Above Ground Level Grade Separated Crossings as NIL may require; and

15.11.2 as many Below Ground Level Grade Separated Crossings as NIL may require.

15.12 The Infraco shall comply with any servitude or other rights over Grade Separated Crossings as may be notified by **tie** from time to time.

15.13 In the event that NIL construct Grade Separated Crossings prior to the carrying out of the Infraco Works by the Infraco, the Infraco shall minimise so far as reasonably practicable the extent of any period of interruption or impediment of access over any such Grade Separated Crossings and shall at all times during the construction of the Infraco Works provide at its own cost alternative vehicular and pedestrian access of a suitable standard and of at least half the pre-existing capacity of the Grade Separated Crossings across the CPO Site to and from

the surrounding road network and the Infraco undertakes to minimise as far as reasonably practicable the extent of and the period of such interruption or impediment.

15.14 During the carrying out of the Infraco Works at the Site, the Infraco shall ensure that Utilities as far as practicable remain in service and are only disturbed to the minimum.

15.15 In carrying out or procuring the carrying out of the Infraco Works at the Site, the Infraco shall ensure that at all times there is access to Gogar Mains House by Gogar Mains Farm Road.

15.16 The Infraco shall not encroach upon, use or possess temporarily or compulsorily Gogar Mains Farm Road or any part thereof for the purposes of carrying out the Infraco Works unless instructed otherwise by **tie** in accordance with this Agreement.

15.17 The Infraco shall not prevent NIL from upgrading Gogar Mains Farm Road.

15.18 In carrying out or procuring the carrying out of the Infraco Works at the Site, the Infraco shall not damage or make use of the Sewer as part of the Infraco Works.

15.19 In the event that the Infraco is required to construct that section of the Edinburgh Tram Network lying to the west of Eastfield Road as part of the Infraco Works, the Infraco shall include as part of the Infraco Works an at grade road crossing at the point where the Edinburgh Tram Network crosses the roadway which currently connects the various car parks situated immediately to the west of Eastfield Road.

15.20 If Plots 304, 305 and 306 as shown on the Drawings are compulsorily acquired by CEC, the Infraco shall landscape such areas in an environmentally and ecologically sensitive manner in consultation with NIL, subject always to the terms of the Town and Country Planning (Safeguard Aerodromes, Technical Sites and Military Explosives Storage Areas (Scotland) Direction 2003 (SEDD Circular 2/2003).

15.21 The Infraco acknowledges that, pursuant to clause 9.2 of the NIL Agreement, NIL is entitled to carry out the landscaping of that part of the CPO Site outwith the line of the fence erected to secure the Tram Line. In such circumstances, the Infraco shall permit NIL to carry out such landscaping works and shall comply with any servitude or other rights granted by CEC in order for such works to be carried out.

15.22 If requested by **tie**, the Infraco shall construct as part of the Infraco Works (at a location where the nearest edge of the Tram Stop is within 10 metres (or within such other distance as shall be agreed with NIL and notified to the Infraco by **tie**) of either side of the Second Crossing) the foundations of the Tram Stop.

15.23 The Infraco shall provide **tie** with all required assistance with regard to agreeing the system of badger mitigation required in respect of the Edinburgh Tram Network at the Site. In the event that badger mitigation is required for the badger setts currently located within the New Limits or the New LLAUs, then the Infraco shall implement the scheme of mitigation agreed or determined between CEC and NIL pursuant to the NIL Agreement.

SECTION 16 - EDINBURGH AIRPORT LIMITED

16.1 In this Section 16 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Depot Plan**" means the plan entitled Depot Layout Option B General Arrangement (Drawing Number 30894/C305 Rev D) as set out in Part 2 of Appendix 13 to Schedule Part 13;

"**Drawings**" means drawings sheet numbers 15, 20, 21 and 22 as annexed to the Edinburgh Tram (Line Two) Act 2006;

"**EAL**" means Edinburgh Airport Limited, a company incorporated under the Companies Act with registered number SC 096623 and having its registered office at St Andrews Drive, Glasgow Airport, Paisley PA3 2SW;

"**Plan**" means the plan set out in part 1 of Appendix 13 to this Schedule Part 13; and

"**Site**" means those areas of ground at Edinburgh Airport being land identified for the purposes of the Edinburgh Tram (Line Two) Act 2006 as Plots 256, 257, 258, 328, 330 - 353 inclusive, and 360, on the Drawings in so far as owned by EAL.

16.2 The Infraco shall ensure that the Tramstop at the Site will be located where shown as point C on the Plan.

16.3 The Infraco shall ensure that the Depot is located so as to allow the future provision of an access sufficient to accommodate a dual carriageway road from Gogar Roundabout to inter alia Edinburgh Airport generally in the area hatched on the Depot Plan (with grade separation as between the Edinburgh Tram Network and the access).

16.4 For the avoidance of doubt the Infraco shall fully comply with the obligations in Schedule Part 44 (*EAL Works*).

SECTION 17 - VERITY TRUSTEES LIMITED

17.1 In this Section 17 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Drawings**" means drawing number 22 as annexed to the Edinburgh Tram (Line One) Act 2006 and drawing number 4 as annexed to the Edinburgh Tram (Line Two) Act 2006;

"**Plan 1**" means the plan which forms part of Verity's Land Certificate Title Number MID4503 which is marked as Plan 1 and is set out in part 1 of Appendix 14 to Schedule Part 13;

"**Plan 3**" means Mott MacDonald Drawing Number 203011/EDIN/0973 Rev P3, which is marked as Plan 3 and is set out in part 2 of Appendix 14 to Schedule Part 13;

"**Property**" means ALL and WHOLE the subjects at 19 Haymarket Yards, Edinburgh, being the subjects registered in the Land Register for Scotland under Title Number MID4503, which subjects are shown delineated in red on Plan 1, part of which subjects comprise the Site;

"**Site**" means those subjects forming part of the Property and which, for the purposes of the Tram Legislation comprise the following Plot Numbers:

Edinburgh Tram (Line One) Act : Plots 413 to 418, and 292a; and

Edinburgh Tram (Line Two) Act : Plots 508 to 513 and 41a

all as identified on the Drawings; and

"**Verity**" means Verity Trustees Limited, a company incorporated under the Companies Act with registered number 00744017 and having its registered office at Verity House, 6 Canal Wharf, Leeds, West Yorkshire LS11 5BQ.

17.2 The Infraco shall not design or construct any part of the Edinburgh Tram Network on Plot 292a/41a as shown on the Drawings other than any required regulation of entrance levels and kerb realignment. Upon completion of the Infraco Works at the Site, Plot 292a/41a of the Site shall be reinstated and returned to **tie** in no worse condition than that in which Plot 292a/41a was found prior to the commencement of the Infraco Works.

17.3 The Infraco shall not design or construct any part of the Edinburgh Tram Network on Plots 416, 417 and 418/510, 509 and 508 as shown on the Drawings other than any required regulation of entrance levels and kerb realignment. Upon completion of the Infraco Works at the Site, Plots 416, 417 and 418/510, 509 and 508 of the Site shall be reinstated and returned

to **tie** in no worse condition than that in which Plots 416, 417 and 418/510, 509 and 508 were found prior to the commencement of the Infraco Works.

17.4 If requested to do so by **tie**, the Infraco shall consult with **tie** and Verity with regard to the carrying out of the Infraco Works on Verity's business.

17.5 During the carrying out of the Infraco Works at the Site, the Infraco shall comply with any particular conditions on working agreed between CEC and Verity and notified to the Infraco by **tie**, and Infraco shall ensure that any impact on the normal operation of Verity's business is minimised so far as this is reasonably practicable having regard to the scope and nature of the Infraco Works.

17.6 The Infraco shall only design and construct part of the Edinburgh Tram Network over Plots 413 and 414/512 and 513 as shown on the Drawings to the extent that the Infraco has received express advance approval thereto from **tie**.

17.7 Subject to paragraph 17.6 of this Section 17 of Section A of Schedule Part 13, the Infraco shall construct or procure that there is constructed on Plots 413, 414 and 415/511, 512 and 513 a roadway, including the provision of a signalised junction (hereinafter referred to as the "**Access Road**") and that in the position generally indicated on Plan 3, which Access Road will give access to and egress from Haymarket Yards and the existing Network Rail car park. The Access Road and all services relating thereto shall be constructed so as to retain an unobstructed maintenance strip of 2 metres minimum width between all parts of the Access Road (and relative services) and Verity House, the said maintenance strip being the area shown coloured yellow on Plan 3.

17.8 The Infraco shall provide or procure that there is provided on a portion of Plot 413/511, an area of hard landscaping the situation and extent of which will be notified to the Infraco by **tie** and which it is understood will be utilised by Verity for the purposes of servicing, loading and unloading of goods.

17.9 During the carrying out of the Infraco Works in and around the Site, the Infraco shall ensure that connections from the Site

17.9.1 to the electricity sub-station located in the area shown coloured green on Plan 3; and

17.9.2 over a two metre strip for foul sewer in connection with the Property, which strip is located on Plots 409, 410 and 411/517, 516 and 515;

shall be maintained. In the event that the connections referred to above necessarily require to be severed, the Infraco shall secure alternative arrangements.

17.10 With regard to the carrying out of the Infraco Works in and around the Site, the Infraco shall:

17.10.1 use reasonable endeavours to ensure that the Infraco Works are carried out either during the weekend or outwith normal business hours;

17.10.2 ensure that continuous vehicular access to and egress from the Property is capable of being taken to and from the public road, Monday through Friday during normal business hours; and

17.10.3 ensure that pedestrian access to and egress from the Property will be available at all times.

17.11 Whilst the Infraco shall use all reasonable endeavours to ensure or procure that the Infraco Works are carried out either during the weekend or outwith normal business hours, in the event that access and egress is so frustrated, the Infraco shall provide temporary car parking spaces, the location of which shall be subject to the approval of **tie**.

17.12 Upon imminent completion of the Infraco Works at the Site, the Infraco shall serve written notice on **tie** specifying the date on which the Infraco Works are due to be completed and the date upon which possession of the Site will be returned to **tie**.

17.13 The Infraco shall as soon as reasonably practicable after the completion of the Infraco Works at the Site reinstate the Site to the condition in which it was found prior to the commencement of the Infraco Works.

17.14 The Infraco shall ensure that, on completion of the Infraco Works in the vicinity of the Site, vehicular and pedestrian access to and egress from the Property shall available to and from the public road.

SECTION 18 - ADM MILLING LIMITED

18.1 In this Section 18 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**ADM**" means ADM Milling Limited, a company incorporated under the Companies Act with registered number 02445197 and having its registered office at ADM International Limited, Church Manorway, Erith, Kent DA8 1DL;

"**Plan**" means the plan set out in Appendix 15 to Schedule Part 13; and

"**Site**" means the flour milling facility at Chancelot Mill, Western Harbour, Leith Docks, Edinburgh outlined in red on the Plan.

18.2 In carrying out or procuring the carrying out of the Infraco Works at the Site, the Infraco shall ensure that at all times ADM and their customers have continued vehicular and pedestrian access to, and egress from, the Site for all reasonable purposes in connection with ADM's flour milling business at all times.

18.3 The Infraco shall carry out and/or procure the carrying out of the Infraco Works strictly in accordance with any site specific code of construction practice which may be in place from time to time in respect of the Site as notified to the Infraco by **tie**. The Infraco shall provide **tie** with all assistance required in relation to the negotiation and agreement of any such site specific code.

SECTION 19 - SELEX SENSORS AND AIRBORNE SYSTEMS LIMITED

19.1 In this Section 19 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Drawing**" means drawing number 16 as annexed to the Edinburgh Tram (Line One) Act 2006;

"**Plan**" means the plan set out in Appendix 16 to this Schedule Part 13; and

"**Site**" means that area of ground at Crewe Toll, Drylaw, Edinburgh identified as Plots 173 and 174 on the Drawing.

19.2 During the carrying out of the Infraco Works at the Site, the Infraco shall not design or construct any part of the Edinburgh Tram Network upon, and shall ensure that it does not at any time otherwise encroach upon, that part of the Site which is identified as Plot 173 as shown on the Drawing, unless instructed otherwise by **tie** in accordance with this Agreement.

19.3 As part of the Infraco Works, the Infraco shall erect a post and mesh and/or hoop top plastic coated fence or fencing of approximately 1.25 metres in height to be located between the current Selex car park (comprising Plot 173 on the Drawing and the southern aerial site) and the tram corridor (comprising Plots 174 and 175 on the Drawing) the location of which is shown coloured red for indicative purposes on the Plan.

SECTION 20 - NORWICH UNION LIFE AND PENSIONS LIMITED

20.1 In this Section 20 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Access Road**" means the roadway to be constructed by the Infraco including the provision of a signalised junction on Plots 288 and 289 as shown on the drawings annexed to the Edinburgh Tram (Line One) Act 2006 and Plots 49 and 50 as shown on the drawings annexed to the Edinburgh Tram (Line Two) Act 2006, which will give access to and egress from Haymarket Yards and the existing Network Rail car park;

"**Noise and Vibration Policy**" means the noise and vibration policy referred to in section 66 of each of the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006 as the same may be amended and/or updated from time to time;

"**NULAP**" means Norwich Union Life and Pensions Limited, a company incorporated under the Companies Act with registered number 03253947 and having its registered office at 2 Rougier Street, York YO90 1UU and having an interest in Rosebery House;

"**Plan**" means the plan set out in Appendix 17 to this Schedule Part 13; and

"**Rosebery House**" means the subjects known as Rosebery House and situated at Haymarket Terrace, Edinburgh, together with the car parking to the rear of the subjects within the Network Rail car park, all shown delineated in red on the Plan.

20.2 The Infraco shall construct the Access Road.

20.3 The Infraco shall use all reasonable endeavours to reinstate the car parking spaces within the Network Rail car park in the ownership of NULAP, which car parking spaces are shown hatched on the Plan. In the event that the Infraco cannot reasonably reinstate the car parking spaces as aforesaid, the Infraco shall provide, at **tie's** cost, permanent parking spaces in a location to be approved by **tie**.

20.4 If requested to do so by **tie**, the Infraco shall participate in consultation with **tie** and NULAP in relation to the impact of the Infraco Works on the operation of NULAP's business. The Infraco acknowledges that the intention behind such consultation is to minimise the impact of the Infraco Works on NULAP's business so far as reasonably practicable, having regard to the nature and scope of the Infraco Works.

20.5 At least 2 months prior to the start of the Infraco Works in the vicinity of Rosebery House, the Infraco shall, if requested to do so by **tie**, consult with **tie** and NULAP with regard to the proposed approach to the Infraco Works and the proposed Programme. The Infraco shall have due and proper regard to any representations made by NULAP during such consultation. If requested to do so by **tie**, the Infraco shall participate in similar consultations with **tie** and NULAP during the carrying out of the Infraco Works in the vicinity of Rosebery House.

20.6 If requested to do so by **tie**, the Infraco shall consult with **tie** and NULAP prior to the finalisation of the design, in relation to the design and in particular in relation to the impacts on the immediate surroundings and the alternatives considered. The Infraco shall have due and proper regard to any reasonable and appropriate design alternatives suggested by NULAP where the adoption of such alterations to the design will not result in overly onerous obligations on either party or be viewed as unreasonable in the context of the desired quality of environment to be achieved at and around Rosebery House.

20.7 The Infraco shall comply with the Noise and Vibration Policy. The Infraco shall, if requested by **tie**, carry out an appropriate detailed noise and vibration assessment, the terms of which will be subject to **tie**'s approval. In carrying out such an assessment, the Infraco shall be entitled to use such technical experts as it considers appropriate, but shall ensure that such assessment shall be carried out in accordance with relevant guidelines and good industry practice. The Infraco shall provide the results of the detailed noise and vibration assessment to **tie** within 10 days of receipt by the Infraco of such results. The results of this assessment will form the basis of the identification of any necessary mitigation measures to be put in place by the Infraco.

20.8 Wherever reasonably practicable the Infraco Works at or around Rosebery House shall be carried out in a single pass without any significant periods of inactivity.

SECTION 21 - NATIONAL GRID PROPERTY HOLDINGS LIMITED, PORT GREENWICH LIMITED AND WM MORRISON SUPERMARKETS PLC

21.1 In this Section 21 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Greenwich**" means Port Greenwich Limited, incorporated under the Companies Act (company number 02392867) and having its registered office at 1-3 Strand, London, WC2N 5EH and its successors and assignees;

"**Land to be Acquired**" means the subjects shown shaded purple on the Plan;

"**Larger Subjects**" means subjects at West Granton Road, Edinburgh being the whole subjects registered in the Land Register of Scotland under Title Number MID15716;

"**Limits of Deviation**" means, in so far as they relate to the Site, the limits within which the Edinburgh Tram Network will be constructed;

"**Morrisons**" means Wm Morrison Supermarkets Plc, a company incorporated under the Companies Acts (company number 00358949) and having its Registered Office at Hilmore House, Thornton Road, Bradford, West Yorkshire, BD8 9AX and its successors and assignees;

"**National Grid**" means National Grid Property Holdings Limited (formerly known as Secondsite Property Holdings Limited having changed its name conform to certificate of incorporation on change of name dated 10 October 2005), incorporated under the Companies Act (Company Number 03797578) and having its registered office at 1-3 Strand, London, WC2N 5EH and its successors and assignees;

"**New Limits**" means the Limits of Deviation as amended and restricted to the new limits of deviation as shown shaded green on the Plan;

"**Plan**" means the White Young Green Drawing No. 173 Revision E set out in part 1 of Appendix 18 to Schedule Part 13;

"**Site**" means that area of ground shown coloured green on the Plan which area forms part and portion of the Larger Subjects;

"**Supermarket Plan**" means the White Young Green Drawing Number A007183/115/Revision I set out in part 2 of Appendix 18 to Schedule Part 13;

"**Supermarket Site**" means that area of ground lying generally to the north of West Granton Road, Edinburgh extending to 7.01 acres or 2.84 hectares or thereby shown delineated in red and marked "Retail Site" on the Supermarket Plan; and

"**Utilities**" means services of gas, electricity, water, drainage, telecommunications and the cables, conduits, pipes and others provided or in place for the delivery of the same.

21.2 Unless otherwise instructed by **tie** in accordance with this Agreement, the Infraco shall not design or construct any part of the Edinburgh Tram Network upon any land at the Site beyond the New Limits.

21.3 The Infraco shall carry out and/or procure the carrying out of the Infraco Works strictly in accordance with any site specific code of construction practice which may be in place from time to time in respect of the Site as notified to the Infraco by **tie**. The Infraco shall provide **tie** with all assistance required in relation to the negotiation and agreement of any such site specific code.

21.4 The Infraco acknowledges that Greenwich, Morrisons and National Grid have a material preference that no fixing of any component part of the Edinburgh Tram Network should be made to any buildings situated on the Site or the Supermarket Site. In the event that such fixing is nonetheless considered by the Infraco to be the most appropriate solution, the Infraco shall first seek the approval of **tie** on such matter and take due cognisance of the reasonable representations of Greenwich, Morrisons and National Grid as notified to the Infraco by **tie**, in this respect.

21.5 Prior to the completion of the Infraco Works on the Site, the Infraco shall serve a notice on **tie** specifying the estimated date upon which the Infraco Works at the Site are due to complete and the estimated date upon which possession of the Site will be returned to **tie**, provided that such notice shall be provided to **tie** having regard to the need to facilitate an inspection of the Site pursuant to paragraph 21.6.

21.6 The Infraco shall facilitate access to the Site to allow Greenwich and **tie** to inspect the Infraco Works. Such inspection shall take place at least 5 days prior to the completion of the Infraco Works at the Site.

21.7 The Infraco shall take due and proper cognisance of all reasonable and proper representations of **tie** in terms of the sufficiency and completeness of the Infraco Works at the Site in order to ensure that on return of possession of such to **tie** the Site should be in a condition fully

commensurate with the full and proper compliance by the Infraco with its obligations under this Agreement.

21.8 At all times during the carrying out of the Infraco Works the Infraco shall have due and proper regard to the requirements of National Grid, Greenwich and Morrisons to be able to access their property and all parts of it (including the Supermarket Site) at all times in order to carry out business activities and the like requirements of Greenwich and National Grid's successors, assignees tenants and occupiers to go about their respective business activities.

21.9 At all times during the carrying out of the Infraco Works the Infraco shall ensure that any disturbance of any access route will be in place for the minimum period reasonably practicable. The Infraco shall provide to **tie** its best estimate for any period of disruption of access rights and routes.

21.10 At all times during the carrying out of the Infraco Works, the Infraco shall take all reasonable and proper steps to ensure that that disruption to normal routes and rights of access will be kept to the minimum and in particular that at all times where an existing access route is disturbed that an alternative and reasonably suitable access route will be provided and the original access way returned to operation at a date not later than that disclosed in the Programme for the relevant element of the Infraco Works.

21.11 Notwithstanding the preceding provisions of this Section 21, at all times during the carrying out of the Infraco Works the Infraco shall ensure that access is maintained for customers and their vehicles to and from the local centre development to be erected on the Supermarket Site and for the drop off and collection of deliveries to and from the proposed local centre development.

21.12 At all times during the carrying out of the Infraco Works at the Site and the Supermarket Site, Utilities should as far as reasonably practicable remain in service and only be disturbed to the minimum.

21.13 The Infraco acknowledges that Greenwich and/or Morrisons may in future wish to run Utilities under the route of the Edinburgh Tram Network and the Infraco shall accordingly ensure that the design and implementation of the Infraco Works will take due and proper cognisance of the requirements or requests of Greenwich and/or Morrisons as notified to the Infraco by **tie** in this respect. The Infraco further acknowledges that wherever reasonably practicable, such crossing of Utilities shall be directed to existing junctions and crossings and that Greenwich and/or Morrisons shall ensure that the Utilities do not run parallel beneath the Edinburgh Tram Network.

SECTION 22 - INSTITUTE OF CHARTERED ACCOUNTANTS

22.1 In this Section 22 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**ICAS**" means the Institute of Chartered Accountants in Scotland, having a place of business at CA House, 21 Haymarket Yards, Edinburgh, Midlothian EH12 5BH;

"**Plan**" means the plan set out in Appendix 19 to this Schedule Part 13; and

"**Site**" means the land shown numbered 46, 48, 52, 53, 54, 55 and 56 on the Plan and includes CA House.

22.2 The Infraco shall not design or construct any part of the Edinburgh Tram Network on the Site outside the black dotted line on the Plan marked "northern extent of land at ICAS required permanently for tramway operations and maintenance". For the avoidance of doubt, this does not restrict the rights of the Infraco to occupy land temporarily in accordance with the Tram Legislation.

22.3 The Infraco shall, if requested to do so by **tie**, consult with **tie** and/or ICAS in relation to the design of the Edinburgh Tram Network in the vicinity of the Site.

22.4 If requested to do so by **tie**, the Infraco shall provide **tie** and/or ICAS with all relevant design data relating to the vibration impact of the Edinburgh Tram Network on CA House and take required remedial measures to minimise the vibration impact on CA House.

22.5 The Infraco shall not attach overhead line equipment to CA House unless it is not reasonably practicable to install such equipment in the area in any other way and the Infraco is required to do so in accordance with the conditions of a planning permission. If required to do so by **tie**, the Infraco shall consult with **tie** and/or ICAS and take into account ICAS' comments prior to the submission of the relevant application for approval from the planning authority.

22.6 The Infraco shall, if requested to do so by **tie**, consult with **tie** and/or ICAS generally in relation to the Programme for the Infraco Works in the vicinity of the Site. **tie** may require that such consultation takes place on a regular basis. In particular, the Infraco may be required to discuss the specific timing of major civil engineering works to be undertaken in the vicinity of the Site.

22.7 The Infraco shall use all reasonable endeavours to ensure that the Infraco Works in the vicinity of the Site are carried out over the shortest time period practicable.

SECTION 23 - HOLYROOD SERVICES LIMITED

23.1 In this Section 23 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Plan**" means the Mott MacDonald Drawing Number 203011/EDIN/0584 Rev. P3 as set out in Appendix 20 of Schedule Part 13; and

"**Site**" means ALL and WHOLE that area of ground at Granton Harbour, Edinburgh as shown outlined in black and shaded in red and partly crossed by a broken black line on the Plan being part and portion on that area of ground at Granton Harbour, Edinburgh, registered in the Land Register of Scotland under Title Number MID54065 and for the purposes of the Edinburgh Tram (Line One) Act 2006, comprising the eastern part of Plot Number 116.

23.2 Unless instructed otherwise by **tie** in accordance with this Agreement, the Infraco should not design or construct any part of the Edinburgh Tram Network upon the Site and shall not encroach upon the Site for the purposes of carrying out the Infraco Works.

SECTION 24 - SERVISAIR (UK) LIMITED

24.1 In this Section 24 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Site**" means SUK's operating base and associated land in the vicinity of Edinburgh Airport; and

"**SUK**" means Servisair (UK) Ltd, a subsidiary of Penauille Servisair UK Limited, such holding company being incorporated under the Companies Acts with registered number 00509585 and having its registered office at Atlantic House, Atlas Business Park, Simonsway, Manchester M22 5PR.

24.2 Whilst carrying out Infraco Works at the Site on Eastfield Road, Edinburgh over Plots 337 and 338 as shown on drawing 20 attached to the Edinburgh Tram (Line Two) Act 2006, the Infraco shall ensure that it does not preclude other road users taking access across these Plots.

24.3 Whilst carrying out Infraco Works at the Site, the Infraco shall ensure that the Infraco Works shall have no direct impact upon Turnhouse Road.

24.4 Whilst carrying out Infraco Works at the Site, the Infraco shall ensure that the Infraco Works will not require the closure of the A8 trunk road.

24.5 Whilst carrying out Infraco Works at the Site insofar as traffic restrictions may be imposed affecting the A8 trunk road, the Infraco shall ensure that these will be confined to the vicinity of the Gogar roundabout, and all reasonable endeavours will be taken to maintain two lanes of traffic to pass in both easterly and westerly directions, either via the main carriageways of the A8 or via the sliproads to and from the junction with the City of Edinburgh Bypass.

24.6 The Infraco shall assist and participate if and when requested by **tie** in any consultation carried out by **tie** with SUK in relation to the proposed traffic management arrangements in the vicinity of the Gogar roundabout and shall give **tie** not less than 35 days' prior notice of each new or altered restriction affecting traffic on the A8 trunk road.

24.7 The Infraco shall ensure that the remaining Plots on Eastfield Avenue and Gogar Bridge Road (as shown on drawing 20 attached to the Edinburgh Tram (Line Two) Act 2006) shall only be used on a temporary basis in order to ensure that access to carry out the Infraco Works is achieved.

SECTION 25 - HISTORIC SCOTLAND

25.1 In this Section 25 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Design Working Group**" means a group to be set up by **tie** and/or CEC, the remit of which will be to:

(a) discuss and review the emerging design of the tram system against the requirements of the Design Manual;

(b) review the environmental impact of the emerging design to confirm that the impact of the design is not materially worse than that identified in the Environmental Statement and to mitigate this so far as is reasonably practicable; and

(c) advise on the supporting, environmental and other information that will be appropriate to submit with the prior applications;

"**Edinburgh World Heritage Site**" means the various conservation areas shown in the plan as set out in Appendix 21 of this Schedule Part 13, as the same shall be updated from time to time and notified to the Infraco by **tie**; and

"**Historic Scotland**" means Historic Scotland based at Longmore House, Salisbury Place, Edinburgh EH9 1SH.

25.2 The Infraco shall assist **tie** in any consultation with Historic Scotland regarding the design of the Edinburgh Tram Network in relation to that part of the route which runs through the Edinburgh World Heritage Site.

25.3 The Infraco shall, if required by **tie**, facilitate and/or participate in the Design Working Group which shall meet fortnightly or at such other intervals as **tie** may advise the Infraco.

25.4 The Infraco shall comply with the provisions of this Section 25 in order to:

25.4.1 ensure that Historic Scotland is fully involved in the relevant parts of the design process; and

25.4.2 resolve any issues prior to the submission of an application for prior approval and thus avoiding objection to the application at a late stage in the process.

25.5 The Infraco will co-operate with **tie**, if required, in respect of any review of the operation of the Design Working Group.

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SECTION 26 - MURRAYFIELD INDOOR SPORTS CLUB

26.1 In this Section 26 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Access Route**" means the access to the entrance of the premises on the Site via the route marked in blue on the Plan;

"**Club**" means Murrayfield Indoor Sports Club, having a place of business at 25 Roseburn Street, Edinburgh, EH12 5PE and its successors and assignees the present trustees of which are George Russell, residing at 6 Drylaw Place, Edinburgh, George Manson residing at 13 Sighthill Grove, Edinburgh and John Small residing at 47 Hillview Terrace;

"**Drawing**" means drawing number 5 as annexed to the Edinburgh Tram (Line Two) Act 2006;

"**Plan**" means the plan set out in Appendix 22 to this Schedule Part 13; and

"**Site**" means those second floor premises at Roseburn Street outlined in green on the Plan and including the areas identified as Plot 90 on the Drawing.

26.2 The Infraco shall construct, for the benefit of the Club, a fire escape at the location marked "A" on the Plan from the Club's premises, such construction to take place at a time to be agreed between **tie** and the Club and notified to the Infraco by **tie**. The Infraco shall ensure that the construction referred to in the preceding provisions of this paragraph 26.2 shall cause the minimum disturbance reasonably practicable to the normal operation of the premises on the Site.

26.3 During the carrying out of the Infraco Works at the Site, the Infraco shall ensure that the Access Route shall be maintained.

26.4 During the carrying out of the Infraco Works at the Site, the Infraco shall have due regard to the requirement of the Club to be able to access their property via the Access Route at all reasonable times in order to carry out the Club's activities.

26.5 Unless otherwise instructed by **tie** in accordance with this Agreement, regarding the Infraco's access onto the Site, the Infraco shall ensure:

26.5.1 that its exercise of access on the Site causes the minimum disturbance reasonably practicable to the normal operation of the Club; and

26.5.2 that access on the Site shall, wherever possible be taken outwith the period between 1700hrs and 0100hrs.

SECTION 27 - ROYAL MAIL GROUP PLC AND POST OFFICE LIMITED

27.1 In this Section 27 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Post Office Limited**" means a company registered under the companies acts with registered number 02154540 and having its registered office at 80-86 Old Street, London EC1V 9NN;

"**Postal Services**" means in relation to Royal Mail Group PLC the delivery and collection by Royal Mail Group PLC of letter and parcel post including handling letters, postal packets and high value (registered) packets and in respect of Post Office Limited the operation of the national network of Post Office Counter offices and the delivery and collection of cash, stock, and other valuable items from the national network of Post Office Counter offices;

"**Post Box**" includes a pouch box, and for this purpose pouch box means a receptacle belonging to RMPO used for the storage of postal packets and materials required for the collection of postal packets from post boxes;

"**Protected Premises**" means those delivery offices, post offices and sub post offices located within 100 metres of any works to be undertaken by or on behalf of CEC under the Tram Legislation and specified as follows:

(a) Royal Mail PLC Sorting and Delivery Office, Russell Road, Edinburgh;

(b) St James' Centre DMB, St James' Centre, Edinburgh;

(c) Frederick Street DMB, Frederick Street, Edinburgh;

(d) Tallents House, 21 South Gyle Crescent, Edinburgh;

(e) The Edinburgh Mail Centre, Cultins Road, Edinburgh; and

(f) Parcel Force Depot, 100 Bankhead Crossway North, Edinburgh;

"**RMPO**" means in any case whichever of Royal Mail Group PLC or Post Office Limited is affected in that case, or if both are affected, each of them;

"**Royal Mail Group PLC**" means a company registered under the companies acts with registered number 04138203 and having its registered office at 148 Old Street, London EC1V 9HQ; and

"**Specified Work**" means any part of the Infraco Works that is within 10 metres (measured in any direction) of a Post Box or of premises occupied or operated by RMPO.

27.2 The Infraco shall, not less than 100 days before commencing any Specified Work, notify **tie** thereof and assist **tie** in relation to any required consultation with RMPO with a view to carrying out the Specified Work in such a way as to:

27.2.1 avoid where reasonably practicable the removal or relocation of Post Boxes; and

27.2.2 minimise disruption to Postal Services and interference with access to Post Boxes.

27.3 In compliance with paragraph 27.2 above, the Infraco shall, at **tie**'s request, assist **tie** in specifying the Post Boxes that will require to be moved to enable construction of the Infraco Works to be carried out and shall assist **tie** in supplying to RMPO such plans, drawings and other details relating to the Infraco Works as RMPO may reasonably require in order to assess how its Postal Services, including Post Boxes, may be affected by the Infraco Works.

27.4 The Infraco shall not commence construction of any Specified Work that involves the removal of any Post Box or prevents reasonable and necessary access to any Post Box until such plans, drawings and other details referred to in paragraph 27.3 have been approved by RMPO and such approval has been notified accordingly by **tie** to the Infraco.

27.5 In carrying out the Specified Work and due to an emergency, or for some other unforeseen and immediate reason, if the Infraco requires to relocate or close a Post Box, it shall give **tie** at least 72 hours' notice of its intention to do so.

27.6 The Infraco shall not prevent or substantially inhibit vehicular or pedestrian access to or egress from any of the Protected Premises, either temporarily or permanently.

27.7 In the event that a Post Box is specified for removal (other than in the event of an emergency or other unforeseen and immediate reason), and the approval for such removal has been intimated to the Infraco by **tie**, the Infraco acknowledges that such removal shall be carried out by Royal Mail Group PLC. If the removal has not been carried out within 28 days of RMPO's approval being intimated to the Infraco by **tie**, the Infraco may, subject to **tie**'s approval, itself remove the Post Box.

27.8 The Infraco shall not alter or remove any Post Box belonging to the Royal Mail Group PLC except in accordance with the provisions of this Section 27 of Section A of Schedule Part 13.

27.9 Without prejudice to any other requirement set out in this Agreement, the Infraco shall give **tie** at least 48 days' notice in writing of the commencement of any Specified Work.

27.10 Not later than 100 days before the commencement of Infraco Works which may interfere with the use by Royal Mail Group plc of roads in connection with the provision of Postal Services, the Infraco shall require that **tie** requests from RMPO a breakdown of van movements and related matters pertinent to any permanent or temporary stopping up of a road.

27.11 The Infraco shall give **tie** not less than 35 days' notice of the commencement of any Infraco Works (other than Specified Works) situated in a road, where the Infraco reasonably considers that such Infraco Works or stopping up may interfere with the use by RMPO of the road in connection with the provision of Postal Services.

27.12 During the construction of the Infraco Works, the Infraco shall use all reasonable endeavours to minimise disruption to Postal Services.

27.13 The Infraco shall only obtain access to RMPO's Russell Road site in order to construct a retaining wall on the south side of the building, and to maintain fire escape routes from the building. Such access will be governed by the terms of this Section 27 of Section A of Schedule Part 13.

SECTION 28 - UGC PROPERTIES LIMITED AND UNIPART AUTOMOTIVE LIMITED

28.1 In this Section 28 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Drawing**" means drawing number 5 as annexed to the Edinburgh Tram (Line Two) Act 2006;

"**Plan**" means plan 30894/C280 Rev A and as set out in Appendix 23 to this Schedule Part 13;

"**Premises**" means the property at 13 Roseburn Street, Edinburgh, registered in the Land Register of Scotland under title number MID51438;

"**Site**" means that area of ground mainly to the south-west of the Premises, which is identified as Plot 80 on the Drawing;

"**UGC**" means UGC Properties Limited, a company incorporated under the companies acts with registered number 4842174 and having its registered office at Unipart House, Garsington Road, Cowley, Oxford OX4 2PG and its successors and assignees;

"**Unipart**" means Unipart Automotive Limited (formerly known as Partco Limited), a company incorporated under the companies acts with registered number 658368 and having its registered office at Unipart House, Garsington Road, Cowley, Oxford OX4 2PG and its successors and assignees;

"**UGC/UNI**" means UGC and Unipart. For the avoidance of doubt reference to "UGC/UNI" shall mean whichever of UGC or Unipart as are affected, or if both are affected, each of them; and

"**UGC/UNI Agreement**" means the agreement entered into between UGC, Unipart and CEC on 25 October 2005 and 21 November 2005 in respect of the removal of UGC/UNI's objection to the Edinburgh Tram (Line Two) Bill.

28.2 The Infraco acknowledges that, pursuant to clause Three (2) of the UGC/UNI Agreement, CEC has been granted unrestricted and unencumbered pedestrian and vehicular access, with or without construction traffic, over, across and through the Site for the purposes of the Infraco Works.

28.3 The Infraco shall notify **tie** at least 35 days prior to the date upon which the Infraco wishes to exercise its rights of access over the Site specified in paragraph 28.2 above, specifying the

proposed date on which the proposed rights of access will require to commence. In the event that the Infraco removes all plant and equipment from the Site and desist all Infraco Works thereon for a period exceeding 28 days then the Infraco shall be obliged to re-notify **tie** at least 7 working days prior to the date upon which the Infraco intends to re-enter the Site to re-commence exercise of its rights, otherwise all in accordance with this paragraph 28.3.

28.4 Whilst carrying out the Infraco Works in the vicinity of the Site, the Infraco shall ensure that access and egress through the Site is maintained for UGC/UNI to:

28.4.1 a car parking area to be situated on the South East of the Premises at the location more particularly shown outlined and cross-hatched in red on the Plan;

28.4.2 the loading bay situated on the South West face of the Premises at the point marked 'A' on the Plan for the purposes only of loading and off-loading goods to and from the said building, declaring that such rights are required pursuant to the UGC/UNI Agreement to be exercised as quickly as reasonably possible with vehicles being removed from the loading bay immediately upon completion of loading or off-loading, always having regard to nature of the Infraco Works and to any requirements of the Infraco's Representative; and

28.4.3 the fire exit door situated on the South-West face of the Premises at the point marked 'B' on the Plan.

28.5 The Infraco shall only access the Site between the hours of 7am and 7pm unless otherwise instructed by **tie** under this Agreement.

28.6 Upon imminent completion of the Infraco Works at the Site, the Infraco shall serve written notice on **tie** specifying the estimated date upon which the Infraco Works are due to be completed at the Site and the date upon which possession of the Site will be returned to **tie**.

SECTION 29 - JPSE LIMITED

29.1 In this Section 29 of the Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Drawings**" means drawing numbers 6 and 7 as annexed to the Edinburgh Tram (Line Two) Act 2006;

"**Jenners**" means JPSE Limited (formerly Jenners Princes Street Edinburgh Limited), a company incorporated under the Companies Acts with registered number SC013150 and having its registered office at 16 Charlotte Square, Edinburgh EH2 4DF and its successors and assignees;

"**Jenners Agreement**" means the agreement entered into between Jenners and CEC on 18th January and 27th January 2006 in respect of the removal of Jenners' objection to the Edinburgh Tram (Line Two) Bill;

"**Plan**" means drawing number 30894/C286 Rev B dated 4 July 2005 produced by Faber Maunsell and set out in Appendix 24 to this Schedule Part 13; and

"**Site**" means that area of ground at 140 Balgreen Road, Edinburgh identified as Plots 139,140 and 141 on the Drawings and also shown for indicative purposes on the Plan.

29.2 The Infraco shall design and construct the relevant section of the Edinburgh Tram Network in accordance with the "**high option**" as defined in Clause 2.2.1(a) of the Jenners Agreement.

29.3 The Infraco acknowledges that the Site will not be permanently acquired for the purposes of the Edinburgh Tram Network and the Infraco shall not therefore design or construct any part of the Edinburgh Tram Network on the Site. Subject to the terms of the relevant licence, the foregoing terms of this paragraph 29.3 of Section A of Schedule Part 13 are without prejudice to the rights of the Infraco to take temporary possession of part of the Site in accordance with the Tram Legislation.

29.4 Upon imminent completion of the Infraco Works at the Site, the Infraco shall serve written notice on **tie** specifying the estimated date upon which the Infraco Works are due to complete and the estimated date upon which possession of the Site will be returned to **tie**.

SECTION 30 - NEW EDINBURGH LIMITED AND EDINBURGH PARK (MANAGEMENT) LIMITED

30.1 In this Section 30 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Access Road**" means that length of road from Hermiston Gait roundabout to the New Limits as shown hatched black on Plan 2;

"**Drawings**" means drawing numbers 12, 13 and 14 as annexed to the Edinburgh Tram (Line Two) Act 2006;

"**Edinburgh Park**" means that area of ground indicatively outlined in red on Plan 1;

"**EPML**" means Edinburgh Park (Management) Limited, a company incorporated under the Companies Acts with registered number 137394 and having its registered office at Miller House, 2 Lochside View, Edinburgh Park, Edinburgh EH12 9DH and its successors and assignees;

"**Ground Works**" means the Infraco Works which are the main heavy works of excavation, utilities, backfilling and making safe accordingly;

"**Hermiston Gait**" means that area of ground indicatively outlined in blue and green on Plan 1;

"**Hotel Site**" means that part of Hermiston Gait indicatively outlined in green on Plan 1;

"**LLAU**" means insofar as they relate to Edinburgh Park or Hermiston Gait, the limits of land that may be acquired and used for the purposes of the Infraco Works;

"**LOD**" means insofar as they relate to Edinburgh Park or Hermiston Gait, the limits of deviation within which the Edinburgh Tram Network will be constructed and operated;

"**Maintenance Schedule**" means the schedule set out in part 6 of Appendix 25 of this Schedule Part 13;

"**NEL**" means New Edinburgh Limited, a company incorporated under the Companies Acts with registered number 126384 and having its registered office at Miller House, 2 Lochside View, Edinburgh Park, Edinburgh EH12 9DH and its successors and assignees;

"**New Limits**" shall have the meaning assigned to that term by paragraph 30.2 of this Section 30;

"**Plan 1**" means Halcrow Drawing Number 04-4582-PODEPL-102-9011 and forming part 1 of Appendix 25 to this Schedule Part 13;

"**Plan 2**" means Faber Maunsell Drawing Number 30894/C210, Rev.L and forming part 2 of Appendix 25 of this Schedule Part 13;

"**Plan 3**" means Faber Maunsell Drawing Number 30894/C209, Rev.E and forming part 3 of Appendix 25 of this Schedule Part 13;

"**Plan 4**" means Faber Maunsell Drawing Number 04-4582-PODEPL-102-9010, Rev.C and forming part 4 of Appendix 25 of this Schedule Part 13; and

"**Plan PT**" means drawing number PT/1/01/001/2/293F and forming part 5 of Appendix 25 to this Schedule Part 13;

30.2 The LLAU shall be deemed to be amended from those shown on the Drawings and shall be restricted, insofar as they relate to Edinburgh Park and/or Hermiston Gait, to the extent shown by the broken purple line on Plan 2 and, shall for the purposes of this Section 30 of Section A of Schedule Part 13, be called the "**New Limits**" and for the avoidance of any doubt, save as aforementioned, the New Limits shall otherwise be as shown by the broken red lines on Plans 2 and 3.

30.3 The Infraco acknowledges that:

30.3.1 only those parts of Edinburgh Park and/or Hermiston Gait as are required for the Edinburgh Tram Network which are within either the LOD or the New Limits will be permanently acquired; and

30.3.2 the Hotel Site will not be permanently acquired.

30.4 The Infraco shall assist **tie**, as required, in supplying to the directors or relevant employees of NEL or EPML such information regarding the Edinburgh Tram Network as NEL or EPML may from time to time reasonably request.

30.5 Upon request from **tie**, the Infraco shall make available for examination to NEL or EPML copies of all insurance policies taken out by the Infraco in accordance with this Agreement and evidence that the premiums payable thereunder have been paid to date and that the insurances are in full force and effect.

30.6 The Infraco shall use all reasonable endeavours to ensure that such of the Ground Works which are to be constructed:

30.6.1 to the north of the point marked "B" on Plan 2 are completed within 12 months of their commencement; and

30.6.2 to the south of the point "B" on Plan 2 are completed within 24 months of their commencement.

30.7 The Infraco shall ensure that the centre line of the Edinburgh Tram Network between the points S and T shown on Plan 2 and Plan 3 shall not extend further to the east from the centre line of the tramways shown on Plan 2 and Plan 3, subject always to the ground conditions, comparative cost of alternative proposals and other engineering factors and any requirement made by the planning authority under clause 29 of Part 11 of Schedule 1 of the Town and Country Planning (General Permitted Development) (Scotland) Order 1992 (whether as a consequence of the refusal of an approval by it under that Part, or by reason of any conditions attaching to an approval under that Part).

30.8 The Infraco shall not encroach upon any land in Edinburgh Park or Hermiston Gait which lies outwith the LOD and/or the New Limits unless otherwise instructed by **tie** in accordance with this Agreement.

30.9 With regard to the formation by the Infraco of an at-grade crossing of the way designated as Lochside Avenue in Edinburgh Park which also permits access to and egress from the Edinburgh Tram Network at that point, the Infraco shall ensure:

30.9.1 the tram junctions are surfaced using appropriate natural stone materials; and

30.9.2 traffic sensors are installed linking to traffic signals to enable signal staging and phasing to be modified, so as to reduce as far as possible traffic queuing distances.

30.10 Before commencing the execution of the Infraco Works at Hermiston Gait or Edinburgh Park, the Infraco shall give notice in writing to **tie** of the works intended, accompanied by plans of those works showing the manner in which and the materials with which they are to be constructed, together with details of the proposed timescale and any further information NEL and EPML reasonably require as notified to the Infraco by **tie**.

30.11 In preparing the plans referred to in paragraph 30.10 above, where fencing is required around the tram lines the Infraco shall have regard to Plan PT (but under declaration that any references therein to a guided busway shall be deemed to be references to the Edinburgh Tram

Network and the said drawing shall be interpreted accordingly) and to the design criteria set out in paragraph 30.12 below, and in the event that the works depicted on the plans referred to in paragraph 30.10 above differ in any material respect from those anticipated by Plan PT or from the design criteria set out in paragraph 30.12 below the Infraco shall, when submitting the plans referred to in paragraph 30.10 above to **tie**, give full written reasons for any such differences.

30.12 The design criteria referred to in paragraph 30.11 above are as follows:

30.12.1 where safety railings are required, their design will be in accordance with accepted British Standards and will incorporate such architectural or artistic enhancements as NEL or EPML may reasonably require provided these do not contravene accepted British Standards;

30.12.2 all retaining wall features will be faced in split-faced natural stone with dressed stone copes to established Edinburgh Park standards;

30.12.3 all materials used in connection with the Infraco Works will be of a high standard and shall be so far as is reasonably practicable similar to or consistent with the existing materials used within the common parts of Edinburgh Park; and

30.12.4 all Tramstops in Edinburgh Park or Hermiston Gait shall be lit and monitored by CCTV and will be fully accessible and provide bicycle racks for cyclists.

30.13 The Infraco acknowledges that, if NEL or EPML reasonably considers that by reason of their design or appearance, the Infraco Works as proposed to be constructed would injure the amenity of the urban landscape of Edinburgh Park and the said design or appearance of the Infraco Works is reasonably capable of modification to avoid such injury, they may, within 14 days of the receipt of the notice referred to in paragraph 30.10 above by notice to CEC in writing specify the alterations that they seek. **tie** shall forward any such notice on to the Infraco as soon as reasonably practicable. The Infraco shall alter the said design or appearance of those works in such a proper and reasonable way as may be required by NEL or EPML and notified to the Infraco by **tie**, having regard always to the standard of design commensurate with that of Edinburgh Park existing as at the date of this Agreement, so as to avoid such injury.

30.14 The Infraco acknowledges that NEL and EPML are not entitled to request any alteration to the design of the Edinburgh Tram Network or the Infraco Works pursuant to paragraph 30.13 above:

30.14.1 on the basis that the Infraco should be required to construct any structure as part of or adjacent to the Infraco Works to facilitate the construction by NEL or EPML of any lochan, lake, pond, marsh, wetland or other body of water adjacent to those works; or

30.14.2 where to do so would conflict with:

(a) any requirement made by the planning authority pursuant to Clause 29 of Part 11 of Schedule 1 of the Town and Country Planning (General Permitted Development) (Scotland) Order 1992 (whether as a consequence of the refusal of an approval by it under that Part, or by reason of any conditions attaching to an approval under that Part); or

(b) a requirement of the planning authority where the Infraco has sought to include a requirement of NEL or EPML pursuant to paragraph 30.13 above in any planning application for the Infraco Works, but can demonstrate that the said alteration is unacceptable to the planning authority and will materially delay the procurement of a planning permission for the Infraco Works.

30.15 In this paragraph 30.15 "**construction site**" means any parcel of land in Edinburgh Park or Hermiston Gait which CEC may acquire or has acquired or in which it may acquire or has acquired any interest (whether temporarily or permanently) under the powers of the Tram Legislation or by agreement with NEL or EPML, for the purpose of constructing the relevant Infraco Works:

30.15.1 Subject to the provisions of this Section 30 of Section A of Schedule Part 13, the Infraco shall not use any road or way within Edinburgh Park in connection with the construction of the Edinburgh Tram Network without the prior written consent of **tie**.

30.15.2 The Infraco may use the ways within Edinburgh Park designated as Roads 1 and 8 in connection with the construction of the junction between the Edinburgh Tram Network and the road or way designated as Road 8, including in connection with the construction and placing of all facilities ancillary to that junction.

30.15.3 Nothing in this paragraph affects the Infraco's ability to:

(a) use any land in respect of which CEC/**tie** has secured access by virtue of the Tram Legislation or any other right or agreement; or

(b) to gain access to and egress from any such land from and to any public highway; or

(c) to use the roads and other ways within Edinburgh Park in connection with the operation of the Edinburgh Tram Network.

30.15.4 In the construction of the relevant Infraco Works, no motor vehicles shall be parked outwith any construction site.

30.15.5 Any motor vehicle of the Infraco that breaks down whilst in Edinburgh Park and going to or from a construction site shall be dealt with by or on behalf of the Infraco in an efficient and timely manner.

30.15.6 No offloading or loading of construction materials shall be made by the Infraco outwith the construction sites. All noxious refuse on a construction site shall be stored so as to avoid so far as is reasonably practicable unsightly visual impact, airborne debris and noxious smells, and shall be removed from Edinburgh Park at regular intervals.

On completion of the construction of the relevant Infraco Works, all debris, rubble, waste and refuse not required for landscaping of the relevant Infraco Works shall be removed by the Infraco from Edinburgh Park.

30.15.7 During the construction of the relevant Infraco Works, a 20 mph speed limit shall apply to all construction vehicles within Edinburgh Park.

30.15.8 The Infraco shall report any damage caused by it to property in Edinburgh Park outwith the construction sites in writing to **tie** as soon as reasonably practicable after it has become aware of that damage. Any such damage caused by the Infraco shall be repaired by the Infraco to the reasonable satisfaction of EPML and NEL (as confirmed to the Infraco by **tie**) at the Infraco's expense. In the event of failure by the Infraco to comply with this requirement within a period of 30 working days, or such longer period as NEL shall reasonably allow (as notified to the Infraco by **tie**), the Infraco acknowledges that NEL or EPML may effect such repairs to its reasonable satisfaction and the Infraco shall pay the proper and reasonable costs of doing so to **tie** or (if requested by **tie**) directly to NEL or EPML.

30.15.9 All litter and accidental spillages outwith the construction sites shall be removed by the Infraco as soon as possible from the areas affected. In the event of failure to comply with this requirement, the Infraco acknowledges that EPML may undertake that removal to its reasonable satisfaction and the Infraco shall pay the reasonable costs of doing so to **tie** or (if requested by **tie**) directly to NEL or EPML.

30.15.10 During dry weather conditions, the Infraco shall dampen roads in the construction sites in order to minimise airborne dust.

30.15.11 The Infraco shall use reasonable endeavours to minimise noise created by the construction of the relevant Infraco Works.

30.15.12 The Infraco shall not discharge any surface water into any of the lochans in Edinburgh Park.

30.15.13 The Infraco shall ensure that the wheels of all motor vehicles leaving the construction sites are properly cleaned at or near their point of egress.

30.15.14 The Infraco shall ensure that all roads in Edinburgh Park to and from the construction sites are kept free of mud and dust as far as reasonably practicable. In the event of failure by the Infraco to keep all such roads clean to the reasonable satisfaction of NEL or EPML, the Infraco acknowledges that NEL or EPML may effect such cleaning to its reasonable satisfaction and the Infraco shall pay the reasonable costs of doing so to **tie** or (if requested by **tie**) directly to NEL or EPML.

30.15.15 The Infraco shall provide to **tie** the following contacts in respect of the Infraco Works being carried out at Edinburgh Park and Hermiston Gait, including their respective telephone numbers:

(a) project manager;

(b) site foreman;

(c) site security officer;

(d) site health and safety officer; and

(e) three out-of-hours emergency contact numbers and contact details.

The Infraco shall notify **tie** as soon as reasonably practicable, of any changes in the information previously provided.

30.15.16 Prior to commencing the relevant Infraco Works at any construction site, the Infraco shall erect a hoarding to the specifications, and at locations, shown on Plan 4 around that site and the Infraco shall maintain the hoarding to a reasonable standard throughout the period of construction. On completion of the Infraco Works, the

Infraco shall remove the hoarding to the reasonable satisfaction of NEL and EPML as confirmed to the Infraco by **tie**.

In the event of failure by the Infraco to hoard the site in accordance with this provision to the reasonable satisfaction of NEL or EPML after having been called upon to do so, and having failed to do so within a reasonable period, NEL or EPML may effect such hoarding to its reasonable satisfaction and recover the proper and reasonable costs of doing so from the Infraco.

30.16 The Infraco shall ensure that all workmanship is at least to the standard of workmanship which has been applied in Edinburgh Park.

30.17 The Infraco shall ensure that the effects of construction of the Edinburgh Tram Network on noise and vibration and other environmental impacts on buildings within Edinburgh Park constructed and occupied as at the date of this Agreement shall not at any time be significantly worse than the levels envisaged by the Environmental Statement.

30.18 The Infraco will advise **tie** fully in relation to the construction programme for the Infraco Works at Edinburgh Park and Hermiston Gait and shall provide **tie** with a monthly update of such programme with a written explanation of all material alterations to the programme.

30.19 All Maintenance Services carried out on the Edinburgh Tram Network at the Site shall be carried out in accordance with the Maintenance Schedule.

30.20 It is acknowledged by the Infraco that the Edinburgh Tram Network will cross the Edinburgh to Glasgow railway line by means of a viaduct bridge to be located between the points marked "**A**" and "**B**" on Plan 2 (the "**Bridge**"). The Infraco shall ensure that the Bridge will be an open structure (as opposed to solid embankment) on concrete pillars and will be of a design complementary with the landscaping already in existence in Edinburgh Park and the Infraco shall assist **tie** in relation to any consultation with NEL and EPML on the proposed design of the Bridge.

30.21 The Infraco acknowledges that NEL or EPML shall be entitled to impose such barriers/control systems or other regulation on the Access Road as they may deem necessary (acting reasonably) from time to time in order to regulate and control the flow, access and egress of vehicular traffic to and from Edinburgh Park provided always that the said barriers/control systems or other regulations shall not at any time prevent pedestrian and vehicular access with or without construction traffic of the Infraco to and from Edinburgh Park and Hermiston Gait

for the purposes of the construction of the Edinburgh Tram Network in accordance with the Tram Legislation and this Agreement.

30.22 Upon imminent completion of the relevant part of the Infraco Works the Infraco shall serve written notice on **tie** specifying the estimated date upon which the relevant part of the Infraco Works are due to complete and the estimated date upon which possession of the relevant site will be returned to **tie**.

30.23 Notwithstanding the provisions of the Edinburgh Tram (Line Two) Act 2006, unless otherwise instructed by **tie** in accordance with this Agreement, the Infraco shall not design or construct any part of the Edinburgh Tram Network on or otherwise encroach upon:

30.23.1 Plot 196;

30.23.2 Plot 208A;

30.23.3 Plot 218;

30.23.4 Plot 220; or

30.23.5 Plot 221;

all as shown on the Drawings, unless otherwise instructed by **tie** in accordance with this Agreement.

30.24 The Infraco shall install drainage in accordance with Plan 2 and Plan 3 and shall ensure that it will take the following form:

35.24.1 **Preliminary Catchment No. 9**

(a) Subject to the approval of **tie**, connect to and discharge from the Edinburgh Tram Network to the 450mm diameter storm water drain to be constructed by NEL for the further development of Edinburgh Park and for the purposes of the Tram Legislation as appropriate, at the point marked "**C**" on Plan 2, and for the purposes of which drain NEL has set aside land to attenuate flows prior to discharge thereto.

(b) In the event that the construction of the Edinburgh Tram Network at Edinburgh Park or Hermiston Gait precedes the said drains' construction, temporarily connect and discharge instead to the Gogar Burn, as culverted, between the points marked "**C**" and "**D**" on Plan 2 until such time as NEL

construct the said drain, but that subject to the Infraco procuring all necessary statutory consents for such connection and discharge.

30.24.2 **Preliminary Catchment No.10**

(a) Subject to the approval of **tie**, connect to and discharge from the Edinburgh Tram Network to the 750mm diameter sewer constructed by NEL in Lochside Avenue, at the point marked "**E**" on Plan 3;

(b) In the event that soakaway tests, undertaken at the detailed design of the Edinburgh Tram Network, prove that the ground conditions are satisfactory, then the Infraco shall install a SUDS system to allow a reduction in the peak discharge from the Edinburgh Tram Network.

30.25 The Infraco shall not design or construct any part of the Edinburgh Tram Network on, and shall not encroach upon Plots 192 and 194 as shown on the Drawings unless otherwise instructed by **tie** in accordance with this Agreement. For the avoidance of doubt, no use shall be made of these plots which shall at any time prevent the use of the roundabout in question by NEL, EPML and any relevant third parties.

30.26 The Infraco shall not encroach upon Plot 197 as shown on the Drawings unless otherwise instructed by **tie** in accordance with this Agreement.

30.27 With regard to Plots 212, 213, 214 and 216 as shown on the Drawings, the Infraco Works shall be carried out so as to cause as little practicable interference as possible with the existing services, conducting media, traffic management equipment, CCTV, traffic light controls and counters, EPML switchgear or the like.

30.28 With regard to Plot 219 as shown on the Drawings, the Infraco Works shall be carried out in a manner so as to ensure no damage to the lochan liners and shall in the event of any damage arising, make good all direct and indirect damage as soon as reasonably practicable.

SECTION 31 - CHRIS HOLMES CABINETMAKERS

31.1 In this Section 31 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**CHC**" means Chris Holmes Cabinetmakers, a cabinet making workshop having a place of business at Gogar Church, 194 Glasgow Road, Edinburgh EH12 9BR; and

"**Planting Plan**" means Faber Maunsell Drawing Number 30894iee/MO1 as set out in Appendix 26 to this Schedule Part 13.

31.2 The Infraco shall ensure that it complies with the Planting Plan which sets out the requirements necessary to shield, to the extent possible, the proposed tram stop in the vicinity of CHC's workplace at 194 Glasgow Road, Edinburgh. The planting shall take the form of broadleaf woodland at the location indicated on the Planting Plan to provide visual screening with, in addition, hedge planting in a continuous line along the back of the said stop to restrict, to the extent possible, lateral pedestrian movement. All planting will be carried out in accordance with CAA bird hazard guidelines and the Environmental Statement.

31.3 The Infraco shall provide to **tie**, quarterly progress reports of the design process until such time as the proposed vertical alignment of the Edinburgh Tram Network as it will travel north along Gogar Burn is completed, at which time the Infraco will prepare a design report which sets out the constraints and the manner in which the vertical alignment design fits within these in light of the concerns expressed by CHC (as the same are notified to the Infraco by **tie**). Such report shall be sent by the Infraco to **tie**.

31.4 The Infraco shall advise **tie** of the results of the archaeological survey and provide a copy to **tie**.

SECTION 32 - NETWORK RAIL INFRASTRUCTURE LIMITED

32.1 In this Section 32 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Access Agreement**" has the meaning given by section 83 of the Railways Act 1993;

"**Legal Requirement**" means:

(i) any enactment to the extent that it applies to that party;

(ii) any regulation made by the Council or the Commission of the European Union to the extent that it applies to that party or a decision taken by the Commission which is binding on that party to the extent that it is so binding; and

(iii) any interpretation of law, or finding, contained in any judgement given by a court or tribunal of competent jurisdiction in respect of which the period for making an appeal has expired which requires any legal requirement falling within paragraphs (i) or (ii) above to have effect in a way which is different to that in which it previously had effect;

"**Network**" means that part of the railway network of which Network Rail is the facility owner (as defined in section 17(6) of the Railways Act 1993 (as amended by the Transport Act 2000) which is situated in England, Wales and Scotland;

"**Network Licence**" means the licence relating to the rail network granted to Network Rail pursuant to section 8 of the Railways Act 1993;

"**Network Operation Issue**" means;

(i) any relevant Safety Critical Event;

(ii) any relevant Operational Emergency;

(iii) any relevant Legal Requirement;

(iv) any relevant requirement of the Network Licence;

(v) a contractual commitment of Network Rail existing on or prior to agreement to undertake any Protective Work;

"**Network Rail**" means:

(i) Network Rail Infrastructure Limited, a company incorporated under the Companies Acts with registered number 2904587 and having its registered office at 40 Melton Street, London NW1 2EE;

(ii) any associated company of Network Rail Infrastructure Limited which holds property for railway purposes;

(iii) the servants, agents and contractors of any of those companies; and

(iv) the successors and assignees of any legal person within paragraph (i), (ii) or (iii) above;

"**Network Rail Agreement**" means the protective provisions agreement entered into by **tie**, CEC and Network Rail on 17 June and 21 June, both dates in 2005 in relation to the Edinburgh Tram Network;

"**Network Rail Company Standards**" means a standards document issued by Network Rail for its own use in relation to the Network as a whole which applies to the performance of the Infraco Works (or the equivalent of such document together with such amendments as may from time to time be made by Network Rail to reflect changes in Legal Requirements and/or for safety related reasons);

"**Operational Emergency**" means disruption to scheduled railway services on any relevant part of the Network in Scotland, arising (whether directly or indirectly) as a result of any unforeseen circumstance or event affecting the Network in Scotland or any part thereof;

"**Operator Costs**" means costs, direct losses and expenses (including loss of revenue) payable by Network Rail to a Train Operator pursuant to an Access Agreement;

"**Protective Work**" means any work, which Network Rail specifies should be carried out before the commencement of construction of any Infraco Works to ensure the safety or stability of Railway Property or the continuation of safe and efficient operation of the Network or the services of Train Operators;

"**Railway Group Standards**" means (i) technical standards to which railway assets or equipment used on or as part of the Network must conform and (ii) operating procedures with which the operators of railway assets must comply, in each case as issued by the Rail Safety and Standards Body Limited and authorised pursuant to the Railway Group Standards Code;

"**Railway Operational Procedures**" means procedures, requirements, and obligations on Network Rail, specified under (i) any Access Agreement or (ii) any station/depot lease, or (iii) Network Rail's asset stewardship criteria, or (iv) Network Rail's Network Licence;

"**Railway Property**" means any property belonging to Network Rail and forming part of the Network including any railway infrastructure, station, depot, buildings, lands, works, apparatus and equipment belonging to Network Rail or a relevant associated company connected therewith and includes any land held or used by Network Rail, including any servitude or other property interest held or used by Network Rail for the purposes of such railway, Network, or station, depot, buildings, lands, works, apparatus or equipment;

"**Relevant Work**" means:

(a) so much of any of the Infraco Works as is situated upon, across, under, over (i) Railway Property, or (ii) within 15 metres of Railway Property, or (iii) which may in any way adversely affect, Railway Property; and

(b) any Protective Work constructed or to be constructed by the Infraco;

"**Safety Critical Event**" means a relevant risk to the health and safety of any person(s) or risk of material damage or destruction to any Railway Property, or any incident, which may reduce the safety integrity levels of any item of infrastructure on the Network; and

"**Train Operator**" means any person who operates trains in accordance with a licence under section 8 of the Railways Act 1993 or an exemption under section 7 of the Railways Act 1993.

32.2 Unless otherwise instructed by **tie** in accordance with this Agreement, the Infraco shall not encroach upon any Railway Property whilst carrying out the Infraco Works. The Infraco shall not carry out any Relevant Work unless it has received confirmation from **tie** that the plans in respect of the Relevant Work have been agreed by Network Rail.

32.3 When the Infraco is instructed to carry out Infraco Works on Railway Property, it shall carry out the Infraco Works subject to such reasonable conditions as may be specified by Network Rail and notified to the Infraco by **tie**. The Infraco acknowledges that the reasonable conditions will be for the protection of Railway Property and rail operations and the reasonable conditions will be:-

32.3.1 required to ensure the safety, integrity, and stability of Railway Property, and

32.3.2 required to ensure the continuing, safe and efficient operation of the Network and the services of the Train Operators operating on the Network; and

32.3.3 required as a consequence of any Network Operation Issue, Network Rail Company Standards, Railway Group Standards, any relevant Railway Operational Procedures or regulatory requirement.

32.4 The Infraco shall ensure that any Infraco Works to all new or existing overbridges and underbridges, including footbridges, will comply with Railway Group Standards, and Network Rail Company Standards, together with the requirements of HMRI.

32.5 The Infraco shall not construct any public and/or private level crossings which straddle the Network.

32.6 The Infraco shall ensure that an appropriate traffic light system, or other control system is installed with a view to ensuring that, so far as the operation of the Edinburgh Tram Network over the access road to Network Rail's Haymarket Depot is concerned, the existing access to such depot is not materially adversely affected. The Infraco shall assist **tie** in developing and agreeing the details of such traffic light or other control system with Network Rail prior to the implementation of such system.

32.7 The Infraco acknowledges that:

32.7.1 Network Rail signalling and telecommunications equipment may require to be immunised, and/or require other related works, prior to the installation and energisation of any overhead line equipment relevant to the Edinburgh Tram Network to protect Network Rail's signalling equipment; and

32.7.2 the provision of cross-bonding and stray-voltage collection mats may, amongst other related works, be required to protect Network Rail's overhead line electrification equipment.

32.8 In recognition of and acknowledging the provisions of paragraph 32.7 above, the Infraco shall in the design and construction of the Infraco Works, take all necessary measures to prevent electromagnetic interference with Network Rail infrastructure and shall establish with **tie** appropriate arrangements to verify such measures.

32.9 If any:

32.9.1 damage to Railway Property; or

32.9.2 interference with the conduct of rail traffic on the Network or obstruction of the Network;

is caused by or is a consequence of the carrying out by the Infraco of any obligations related to powers conferred by the Tram Legislation, including construction activities associated with any Relevant Work to be carried out by the Infraco hereunder, the Infraco shall:

32.9.3 make good such damage; and

32.9.4 pay to **tie** an amount equal to **tie's** liability to pay Operator Costs to Network Rail pursuant to Clause 9(3)(ii) of the Network Rail Agreement.

32.10 The Infraco's liability under this Section 32 shall be limited in that:

32.10.1 to the extent that paragraph 32.9.4 includes Operator Costs which arise prior to the Service Commencement Date and for which recovery under Clause 16 is available (or would be available but for the application of the caps or the exceptions expressly specified in Clause 16), the provisions of Clause 16 shall supersede paragraph 32.9.4 and paragraph 32.9.4 shall not apply to those Operator Costs;

32.10.2 the Infraco shall have no liability under paragraph 32.9.4 in respect of any Additional Expense as defined in the Asset Protection Agreement; and

32.10.3 the limitations of liability set out in Clause 16.72 and 16.73 shall apply where relevant.

SECTION 33 - RODERICK JAMES MCLEAN

33.1 In this Section 33 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**McLeans**" means Roderick James McLean and Julie Bremner McLean, residing at 97 Ravelston Dykes Road, Edinburgh;

"**Plan**" means the plan set out in Appendix 27 to this Schedule Part 13;

"**Retained Subjects**" means Plots 82, 83, 86, 88, 89, 90, 91, 92 and 95 as shown on the drawings attached to the Edinburgh Tram (Line Two) Act 2006; and

"**Subjects**" means the rear lean-to at 27 Roseburn Street, Edinburgh shown hatched on the Plan.

33.2 The Infraco shall not design or construct any part of the Edinburgh Tram Network upon, or otherwise encroach upon the Retained Subjects unless otherwise instructed by **tie** in accordance with this Agreement.

33.3 The Infraco shall ensure that any temporary road closure of Roseburn Street as required for the purposes of the Infraco Works shall be effected so as to cause the least practical disturbance to the McLeans' business, as located at the Subjects, the Retained Subjects and any other location used by such business as a result of the implementation of the Infraco Works, and such road closure shall be for as short a period as practicable and all reasonable endeavours shall be taken by the Infraco to keep such period of road closure to a minimum.

33.4 As part of the Infraco Works, the Infraco shall sub-divide the Subjects and the Retained Subjects within such timescale as may be specified by **tie** and to the reasonable satisfaction of the McLeans (as notified to the Infraco by **tie**).

33.5 Regarding the Infraco Works specified in paragraph 33.4 above, the Infraco shall deliver to **tie** copies of all requisite building warrants, docqueted plans, completion certificates, planning permission and all other requisite documentation in accordance with all relevant regulations and legal requirements.

SECTION 34 - CLERICAL MEDICAL INVESTMENT GROUP LIMITED

34.1 In this Section 34 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Clerical Medical**" means Clerical Medical Investment Group Limited, a company incorporated under the Companies Acts with registered number 03196171 and having its registered office at 33 Old Broad Street, London, EC2N 1HZ and its successors and assignees;

"**Drawing**" means drawing sheet number 12 as attached to the Edinburgh Tram (Line Two) Act 2006;

"**Limits of Deviation**" means, insofar as they relate to the Site, the limits within which the Edinburgh Tram Network will be constructed;

"**Plots**" means Plots 188, 189, 190 and 191, all as shown on the Drawing;

"**Property**" means **ALL** and **WHOLE** that area of ground extending to Seventeen Acres and Two Hundred and Five One Thousandth parts of an Acre or thereby (17.205 Acres or thereby) being the subjects registered in the Land Register of Scotland under title number MID65614;

"**Site**" means that area of ground at the Property identified as the Plots in so far as falling within the Limits of Deviation; and

"**Tenants**" means all tenants or other authorised occupiers, present and future, of the Property and the Site or any part or parts thereof;

34.2 During the carrying out of the Infraco Works, the Infraco shall not design or construct any part of the Edinburgh Tram Network on and shall not encroach upon Plot 190 unless otherwise instructed by **tie** in accordance with this Agreement.

34.3 The Infraco acknowledges that the Site will not be permanently acquired for the purposes of the Edinburgh Tram Network and accordingly the Infraco shall not design or construct any part of the Edinburgh Tram Network upon any part of the Site. For the avoidance of doubt, the Infraco may take temporary possession of part of the Site for the purposes of carrying out the Infraco Works (which may include works to regulate entrance levels, kerb realignment and insertion of local retaining structure).

34.4 Upon completion of the Infraco Works at the Site, the Site shall be reinstated and returned to **tie** in no worse condition than that in which the Site was found prior to the commencement of the Infraco Works.

34.5 The Infraco shall, if required, assist **tie** in any consultation with Clerical Medical as regards the impact of the carrying out of the Infraco Works on the operation of the tenant's business at the Property and any building thereon. Prior to commencing the Infraco Works the Infraco shall, if required, assist **tie** in reaching a mutually acceptable solution with Clerical Medical in relation to the timing of the carrying out of the Infraco Works so that the impact on the normal operation of the tenant's business at the Property and any building thereon is minimised so far as reasonably practicable having regard to the scope and nature of the Infraco Works.

34.6 The Infraco acknowledges that Clerical Medical has a material preference that no fixing of any component part of the Edinburgh Tram Network should be made to any buildings on the Property and any building thereon. In the event that any such fixings are nonetheless considered by the Infraco to be the most appropriate solution the Infraco shall first consult with **tie** and (if requested by **tie**), Clerical Medical on such matter and shall take due and proper cognisance of the reasonable representations of Clerical Medical, as notified to the Infraco by **tie**, in this respect.

34.7 Upon imminent completion of the Infraco Works at the Site the Infraco shall serve written notice on **tie** specifying the date upon which the Infraco Works at the Site are due to be completed and the date upon which possession of the Site will be returned to **tie**.

34.8 The Infraco shall ensure that vehicular and pedestrian access to and egress from the Property is capable of being taken at all times by way of the Hermiston Gait Roundabout forming Plots 192 and 194 as shown on the Drawing ("**the Roundabout**"). The Infraco shall not materially impede such access to the Roundabout.

SECTION 35 - SCOTTISH RUGBY UNION PLC

35.1 In this Section 35 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Adopted Highway LLAU**" means the area hatched light blue on the Plan;

"**Drawings**" means sheets numbered 5 and 6 as annexed to the Edinburgh Tram (Line Two) Act 2006;

"**Event**" means a Major Event and/or a Minor Event as the case may be;

"**Licence**" means the licence to be entered into between CEC and the SRU in respect of the Oversailing LLAU, the Normal LLAU, the Temporary LLAU, the Optional LLAU, and the Reconfiguration LLAU;

"**Licence Site**" means the relevant part of the Site to be come the subject of each respective Licence;

"**Local Construction Plan**" means the local construction plan (revision 6) set out in part 2 of Appendix 28 to this Schedule Part 13; and which will be developed in accordance with paragraph 35.14 of this Section 35;

"**Major Event**" means a full stadium event at which the anticipated number of spectators exceeds twenty thousand or such other event as may be agreed between SRU, CEC and the Safety Officer (and notified to the Infraco by **tie**) as being a Major Event;

"**Minor Event**" means any event, exhibition, conference or function which is not a Major Event;

"**Normal LLAU**" means the area hatched purple on the Plan;

"**Optional LLAU**" means the area hatched pink on the Plan;

"**Oversailing LLAU**" means the area hatched brown on the Plan;

"**Pitches**" means the pitches located in the area delineated in blue on the Plan;

"**Pitches Specification**" means the specification set out in part 3 of Appendix 28 to this Schedule Part 13;

"Plan" means Drawing 30894/SK05 Rev G as set out in part 1 of Appendix 28 to this Schedule Part 13;

"Reconfiguration LLAU" means the area hatched dark green on the Plan;

"Reconfiguration Works" means the reconfiguration works required as set out in the Local Construction Plan including works required to cover the open space, relocate the turnstiles, reconfigure paving and parking at the Site and the works required to the Wanderers Club;

"**Safety Certificate**" means the certificate issued by the Safety Officer which permits the Event to take place;

"**Safety Officer**" means the relevant safety officer appointed by CEC;

"Shared Access LLAU" means the area hatched yellow on the Plan;

"Shared Access LOD" means the area hatched dark blue on the Plan;

"Site" means ALL and WHOLE that area of ground known as and forming the Murrayfield Stadium and ancillary ground and facilities being the land shown outlined in red on the Plan;

"**SRU**" means Scottish Rugby Union Plc, a company incorporated under the Companies Acts with registered number 132061 and having its registered office at Murrayfield, Edinburgh, EH12 5JP and its successors and assignees;

"**SRU Agreement**" means the agreement to be entered into between SRU and CEC in respect of the withdrawal of SRU's objection to the Edinburgh Tram (Line One) Bill;

"Temporary Use LLAU" means, subject to the provisions of paragraph 35.4, the area hatched red on the Plan; and

"Wanderers Club" means the clubhouse to the south of the stadium.

35.2 The Infraco shall not design or construct any part of the Edinburgh Tram Network at the Site on Plot 108 as shown on the Drawings, declaring that the SRU shall be entitled to access the Shared Access LOD.

35.3 The Infraco shall not design or construct any part of the Edinburgh Tram Network upon, or otherwise encroach upon the area hatched green on the Plan for the purposes of the Infraco Works unless otherwise instructed by **tie** in accordance with this Agreement.

35.4 The Infraco shall not encroach upon the Optional LLAU for the purposes of the Infraco Works, provided that if the Infraco requires the Optional LLAU as a lay down area then provided always that at the relevant time the Optional LLAU has not be utilised for development purposes, **tie** will use its reasonable endeavours to arrange for the Infraco to temporarily occupy and use the Optional LLAU subject to such terms and conditions as the SRU may specify (as notified to the Infraco by **tie**). If the Optional LLAU is occupied by the Infraco in accordance with this Agreement, then the Optional LLAU shall be deemed to be part of the Temporary Use LLAU for the purposes of this Section 35.

35.5 The Infraco acknowledges that the Adopted Highway LLAU is outwith the Site but provides necessary day to day access to the Site. Accordingly if the Infraco's use of the Adopted Highway LLAU results in any changes to the traffic circulation or to the access to the Site, the Infraco will forthwith provide notice to **tie** of such changes.

35.6 The Infraco acknowledges that the SRU will be entitled to use the Shared Access LLAU for access to the offices and shops with the Site, the Wanderers Club, the Temporary Use LLAU and the Normal LLAU. The Infraco acknowledges that its access through the Shared Access LLAU may be restricted by the SRU and the Safety Officer (as will be notified to the Infraco by **tie**). The Infraco agrees to consult if required by **tie** with the SRU and the Safety Officer in respect of the restrictions to such access. For the avoidance of doubt that the Shared Access LLAU shall only be used by the Infraco as the main construction access to the Temporary Use LLAU and the Normal LLAU when the east-west spectator link is blocked due to the Infraco Works.

35.7 The Infraco's use of the Oversailing LLAU to operate a crane will be subject to the following conditions:-

35.7.1 the Infraco shall give **tie** at least 9 days written notice of its intention to install and operate the crane and at least 9 days written notice of its intention to remove the crane;

35.7.2 the Infraco shall ensure that the crane is operated in a proper, good and workmanlike manner; and

35.7.3 the crane and all other equipment must oversail the highest part of the Oversailing LLAU by at least 5 metres.

35.8 Prior to the completion of the Infraco Works on each Licence Site, the Infraco shall serve notice on **tie** specifying the estimated date upon which the Infraco Works on that particular

Licence Site are due to be completed and estimated date upon which possession of the Licence Site will be returned to **tie**.

35.9 Not less that five days prior to the estimated date of return of possession of the Licence Site to **tie**, the Infraco shall facilitate the inspection of the relevant site by the SRU, **tie** and CEC. The SRU will be entitled to make representations to CEC or **tie** in relation to any matters of concern to it in relation to the condition of the Licence Site and of any extent to which it appears to the SRU that there may not have been full or satisfactory compliance with the terms of the SRU Agreement and the Local Construction Plan. **tie** shall inform the Infraco of any such representations as soon as possible and the Infraco shall remedy any fault or inadequacy in the Infraco Works in accordance with this Agreement.

35.10 Without prejudice to paragraph 35.9 above, the Infraco shall take due and proper cognisance of all reasonable and proper representations of the SRU, as notified to the Infraco by **tie**, in terms of the sufficiency of the Infraco Works at the relevant Licence Site in order to ensure that on return of possession of such to the SRU, the Licence Site should be in a condition fully commensurate with the full and proper compliance by the Infraco of its obligations under this Agreement and the Local Construction Plan.

35.11 The Infraco acknowledges that the Normal LLAU can be temporarily occupied and used by the Infraco continually and without interruption for the duration of the Infraco Works as a construction compound and that on the terms and conditions set out in paragraphs 35.8, 35.9 and 35.10 above.

35.12 The Infraco's possession and use of the Temporary Use LLAU will be subject to the following conditions:-

35.12.1 for the period commencing at least 5 days before an Event until at least 5 days after said Event, the Infraco shall vacate the Temporary Use LLAU and shall procure that all workers and equipment are removed from the Temporary Use LLAU;

35.12.2 where two Events take place in close succession, the Infraco shall not be obliged to re-enter the Site during the period in between Events;

35.12.3 the terms of paragraphs 35.8, 35.9 and 35.10 shall apply.

35.13 The Infraco acknowledges that it shall temporarily occupy the Reconfiguration LLAU in order to facilitate the Reconfiguration Works. The Infraco's possession and use of the Reconfiguration LLAU will be subject to:

35.13.1 the terms of paragraphs 35.8, 35.9 and 35.10; and

35.13.2 the condition that on completion of the Reconfiguration Works the Reconfiguration LLAU will then be excluded from the LLAU and the Infraco shall not thereafter encroach upon the Reconfiguration LLAU.

35.14 The Infraco shall, if required, assist **tie** in evolving the Local Construction Plan in conjunction with the SRU so as to ensure that:

35.14.1 the Infraco Works at the Site are carried out in a manner which is to the mutual satisfaction of **tie** and the SRU; and

35.14.2 the normal operation of the SRU's business is minimised so far as reasonably practicable having regard to the scope and nature of the Infraco Works declaring that in the event of any inconsistency between Schedule Part 3 (*Code of Construction Practice*) and the Local Construction Plan, the terms of the Local Construction Plan shall prevail.

35.15 During the carrying out of the Infraco works, the Infraco acknowledges that the SRU shall be obliged to liaise with the safety office to ensure that the Safety Certificate remains valid in respect of any Event at the Site for which a Safety Certificate is required in sufficient time to allow the Event to take place bearing in mind the nature and stage of the Infraco Works and the likely impact those works may have on the issuing of a Safety Certificate. In the event that the Safety Officer confirms that the Safety Certificate is valid but subject to conditions or restrictions which have been imposed as a result of the construction works (the "**Conditions**"), **tie** shall advise the Infraco of the Conditions and the Infraco shall use all reasonable endeavours to ensure that the Conditions are met.

35.16 Where the Infraco requires assistance from the SRU in order to meet the Conditions, **tie** shall procure that the SRU uses all reasonable endeavours to assist the Infraco.

35.17 Following the first Event after the completion of the Infraco Works at the Site, CEC, the SRU and the Safety Officer shall carry out a post event briefing and in the event that any further works are required to ensure that the Safety Certificate is granted, the Infraco shall, if required by **tie**, ensure that such works are carried out as soon as reasonably practicable.

35.18 The Infraco shall make good any damage caused in the course of the Infraco Works or the Maintenance Services so as to ensure that the Site is left in no worse condition than it was prior to the exercise of said right.

35.19 The Infraco shall, if required, assist **tie** in consulting with the SRU regarding the design of the bridge to be erected over Roseburn Street and the retaining wall as follows:-

35.19.1 not less than 3 months prior to the anticipated submission of any application to the Planning Authority for prior approval in respect of the bridge, the Infraco will provide **tie** with a copy of the draft application including all drawings;

35.19.2 the Infraco will have due and proper regard to any representations made by the SRU (either directly or as notified to the Infraco by **tie**); and

35.19.3 in the event that the SRU fail to make representations, the Infraco may, subject to the other terms of this Agreement, submit the application for prior approval.

35.20 The Infraco shall ensure that any design of the bridge referred to in paragraph 35.19 provides for a minimum clearance of 5.3m.

35.21 Any security features and/or fencing requiring to be carried out to the Site as part of the Infraco Works shall be implemented by the Infraco on the terms and conditions and to the standards more particularly set out in Schedule Part 3 (*Code of Construction Practice*) and the Local Construction Plan. Following completion of the Infraco Works any fencing and/or security features of the Site removed and/or damaged as part of the Infraco Works shall be reinstated to the standard and condition in which they existed prior to the commencement of the Infraco Works.

35.22 Any advertising boards which are removed due to the construction of the Edinburgh Tram Network will be relocated on the Site. The Infraco acknowledges that the exact location of the relocated boards is subject to the consent of the SRU (as notified to the Infraco by **tie**).

35.23 The Infraco shall be responsible for obtaining the necessary planning consent in the relocation of the advertising boards and **tie** shall procure that the SRU shall use all reasonable endeavours to assist the Infraco in obtaining such consent.

35.24 The Infraco shall, as requested, assist **tie** in consulting with the SRU and the police to ensure that the "Tram Stop", as more particularly shown on the Drawings, safely meets with the pedestrian access requirements of the SRU, and in particular but without prejudice to the foregoing generality, on those days that matches take place at Murrayfield Stadium.

35.25 The Infraco acknowledges that the Wanderers Club will be required to be reconfigured to relocate the stairs and storage area which require to be moved to accommodate the Infraco Works all as detailed in the Local Construction Plan. Accordingly the Infraco shall assist **tie** as required to consult and agree with the tenants of the Wanderers Club and the SRU the nature of the reconfiguration and the programme of such Reconfiguration Works bearing in mind the progress of the detailed design.

35.26 For the avoidance of doubt, all Reconfiguration Works will be carried out so that they comply with all buildings regulations and other statutory requirements and in particular with the Disability Discrimination Act 1995.

35.27 For the avoidance of doubt, the Infraco will be responsible for obtaining the necessary planning consents and permissions in respect of any Reconfiguration Works. The SRU will use all reasonable endeavours to assist the Infraco in obtaining such consents.

35.28 In the event that any planning consent obtained in respect of the Reconfiguration Works has conditions attached to it which, in the opinion of the SRU acting reasonably, are detrimental to the SRU and/or the tenants of the Wanderers Club, the Infraco shall use all reasonable endeavours to:

35.28.1 comply with or to procure compliance with the conditions; and

35.28.2 minimise the impact of such conditions on the SRU or the tenants.

35.29 The Infraco shall ensure that the Edinburgh Tram Network will have no detrimental impact on the future flood prevention schemes being considered by either CEC or proposed by SRU (the "**Scheme**"). Further, the Infraco will use reasonable endeavours to minimise inconvenience to the Scheme insofar as it is able having regard to the nature of the Infraco Works, in the event that funding for both the Edinburgh Tram Network and the Scheme is released at the same time and to minimise the impact on the SRU should both schemes proceed at the same time.

35.30 The Infraco shall relocate and reinstate the Pitches in accordance with the Pitches Specification.

35.31 The Infraco shall carry out any such enhancements to the Pitches Specification as may be notified to it by **tie**, provided that **tie** may not require any such enhancement where this would cause delay to the Infraco Works.

35.32 **tie** shall advise the Infraco if and when the relocation by the Infraco of the Pitch marked '6' on the Plan is to take place.

35.33 The relocation of all Pitches is strictly conditional upon the receipt, if required, of planning permission for the said relocation in terms acceptable to both **tie** and the SRU. The Infraco shall be responsible for submission of the relocation planning application and the pursuance of the same until a decision is granted on the application.

35.34 In the event that the Infraco is unable to obtain on terms satisfactory to **tie**, any planning permissions or consents in respect of the relocation of the Pitches or the reconfiguration works at the Wanderers Club, the Infraco shall assist **tie** in any consultation with the SRU regarding the reconfiguration of the Pitches.

SECTION 36 - ROSEBURN GARAGE

36.1 In this Section 36 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Mr Khalil**" means the proprietor of the business known as Roseburn Garage, and having a place of business at 35 Roseburn Street, Edinburgh EH12 5PE; and

"**Property**" means Roseburn Garage at 35 Roseburn Street, Edinburgh EH12 5PE.

36.2 Whilst carrying out the Infraco Works within the vicinity of the Property, the Infraco shall make every reasonable effort to ensure that the construction impacts of the Infraco Works on the Property are minimised.

36.3 At least 6 months prior to the commencement of the Infraco Works within the vicinity of the Property, the Infraco shall assist **tie** in consulting with Mr Khalil in relation to the design of the Infraco Works at and around the Property.

SECTION 37 - SCOTTISH NATURAL HERITAGE

37.1 In this Section 37 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**SNH**" means Scottish Natural Heritage; and

"**SSSI**" means the Firth of Forth Site of Special Scientific Interest at Wardie Shore, Edinburgh, as more particularly shown hatched on the plan at Appendix 29 of Schedule Part 13.

37.2 In the event that the Infraco requires to gain access to the SSSI pursuant to the Infraco Works, the Infraco shall:

37.2.1 comply fully with the Nature Conservation (Scotland) Act 2004; and

37.2.2 fully consult with **tie** and (if required by **tie**) SNH and/or the appropriate regulatory authority (as defined in the Nature Conservation (Scotland) Act 2004);

in order to avoid damage being caused to the interests of the SSSI, including the geological interest at Wardie Shore, Edinburgh.

SECTION 38 - STANLEY CASINOS LIMITED

38.1 In this Section 38 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Ancillary Requirements**" means the following:

(a) the provision of a direction sign indicating the entrance to the new/reconfigured car park to be provided in accordance with this Section 38 of Section A of Schedule Part 13, the type and location of such sign is subject to the approval of **tie**, not to be unreasonably withheld or delayed;

(b) the current external lighting to the southern façade of the building which is to be removed by virtue of the Infraco Works will be replaced with equivalent standard lighting, and lighting (the form and standard of which is subject to **tie**'s approval, not to be unreasonably withheld or delayed) to the new/reconfigured car park entrance will be provided, all in compliance with modern safety standards; and

(c) the provision of CCTV coverage at the entrance to the new/reconfigured car park as aforesaid, and also the taxi drop off area, the specifics of which are subject to **tie**'s approval, not to be unreasonably withheld or delayed;

"**Car Park**" means the 77 standard car parking spaces and 4 disabled car parking spaces at the Site as detailed in the Existing Planning Consent;

"**Car Park Works**" means the construction/reconfiguration of the Reconfigured Car Parking Spaces and the New Loading Area, and the provision of the Ancillary Requirements, all as the same are more particularly described in paragraph 38.4 below;

"**Drawing**" means drawing number 6 as annexed to the Edinburgh Tram (Line One) Act 2006;

"**Existing Planning Consent**" means application reference 99/02128/FUL in respect of which a Decision Notice was granted on 21 October 1999;

"**Footway Works**" means the works described in paragraph 38.11 of this Section A of Schedule Part 13;

"**Limits of Deviation**" means, insofar as they relate to the Site, the limits within which the Edinburgh Tram Network will be constructed and operated as more particularly set out in the Edinburgh Tram (Line One) Act 2006;

"**New Loading Area**" means the loading bay/taxi drop off area to be constructed, the proposed location of which is shown coloured yellow and annotated "See detail A" on Plan 1 and the detail of which (including, for the avoidance of doubt, the provision of (i) the replacement section of the boundary wall and (ii) removable bollards, the design of which is to be agreed between the parties, both acting reasonably) is shown coloured orange and brown and designated "Detail A - Drop Off/Loading Bay Plan" on Plan 2;

"**Plan 1**" means Scott Wilson Scotland Limited drawing number B137101/STAN/1/01 as set out in part 1 of Appendix 30 to this Schedule Part 13;

"**Plan 2**" means Scott Wilson Scotland Limited drawing number B137101/STAN/1/02 as set out in part 2 of Appendix 30 to this Schedule Part 13;

"**Property**" means the property described in the Minute of Lease between Forth Ports plc and Stanley dated 26 January and 11 February and registered in the Books of Council and Session for preservation and execution on 14 March, all in the year 2000;

"**Reconfigured Car Parking Spaces**" means the car parking spaces shown coloured yellow on Plan 1 to the extent that these fall outwith the Limits of Deviation;

"**Site**" means that area of ground on Ocean Drive, Leith, identified as Plots 40, 45 and 46 on the Drawing; and

"**Stanley**" means Stanley Casinos Limited, a company incorporated under the Companies Acts with registered number 1519689 and having its registered office at Stanley House, 151 Dale Street, Liverpool, L2 2JW and its successors and assignees;

38.2 During the carrying out of the Infraco Works, the Infraco shall not design or construct any part of the Edinburgh Tram Network on and shall not encroach upon Plot 46 as shown on the Drawing unless otherwise instructed by **tie** in accordance with this Agreement.

38.3 If requested to do so by **tie**, the Infraco shall consult with **tie** and Stanley as regards the impact of carrying out the Infraco Works on the operation of Stanley's business. The Infraco acknowledges that the intention behind such consultation is to reach a mutually acceptable solution with Stanley in relation to the timing of carrying out the Infraco Works so that the impact on the normal operation of Stanley's business is minimised so far as reasonably practicable having regard to the scope and nature of the Infraco Works.

38.4 The Infraco shall carry out the Car Park Works, which, for the avoidance of doubt shall include the following:

38.4.1 the reconfiguration of the Car Park to provide the Reconfigured Car Parking Spaces;

38.4.2 the construction of the New Loading Area; and

38.4.3 the provision of the Ancillary Requirements.

38.5 The Infraco shall submit any planning application required in respect of the Car Park Works to CEC (as planning authority) in a form acceptable to **tie** and Stanley (as the same is notified to the Infraco by **tie**) and shall use all reasonable endeavours to obtain planning permission in relation thereto.

38.6 Without prejudice to paragraph 38.5 of this Section A of Schedule Part 13, the Infraco shall consult with **tie** and (if requested to do so by **tie**) Stanley with regard to the terms of such planning application.

38.7 The Infraco shall not commence the Car Park Works until the planning permission referred to in paragraph 38.5 of this Section A of Schedule Part 13 is issued.

38.8 Subject to paragraph 38.7 of this Section A of Schedule Part 13, the Infraco shall complete the Car Park Works in accordance with this Agreement as quickly as is reasonably possible, using all reasonable endeavours to complete the Car Park Works prior to the commencement of the construction of the Edinburgh Tram Network in the vicinity of the Site.

38.9 The Infraco will use all reasonable endeavours to minimise disruption to Stanley's property and business, and shall ensure that access to and from the building located on the Property is maintained during normal business hours.

38.10 Throughout the duration of the Car Park Works and the Infraco Works, the Infraco shall ensure that there is available for use at all times at least 50% of the number of car parking spaces currently available in terms of the Existing Planning Consent.

38.11 The Infraco shall relocate the existing footway lying generally to the south of the Property to a position approximately 2 metres south of its current position, all as the same is coloured grey on Plan 1 and Plan 2. The relocation of the footway shall, for the avoidance of doubt, include the insertion of a pedestrian crossing point, the approximate location of which is shown and designated "pedestrian crossing point" on Plan 1.

38.12 Without prejudice to the other requirements of this Agreement, the Footway Works shall be carried out in a good and workmanlike manner, using good quality suitable materials, and in compliance with a standard road specification, and brought to adoptable standard.

SECTION 39 - MARKS & SPENCER PLC

39.1 In this Section 39 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Accommodation Works**" means (a) any Infraco Works to or in the Gyle Car Park so far as outwith the New Limits (b) without prejudice to but not limited by (a) aforesaid, works to ensure no reduction in available car parking spaces and circulation path standards consequent upon the Works generally or the works specified at (a) aforesaid and (c) similarly without prejudice or limitation as aforesaid, all necessary associated restoration works, all of which works referred to at (a), (b) and (c) aforesaid will be described in the Accommodation Works Method Statement;

"**Accommodation Works Method Statement**" means the method statement to be developed by the Infraco pursuant to paragraph 39.7 as the same may be amended pursuant to this Section 39 of Section A of Schedule Part 13;

"**Depot**" means the buildings and ancillary facilities for the storing, parking and maintenance of the trams to be generally located within Plots 259, 494, 496, 497 and 499 on the Drawing;

"**Drawing**" means plans numbered 14 and 15 as attached to the Edinburgh Tram (Line Two) Act 2006;

"**Licence**" means a licence to be entered into by CEC in respect of access to the Site to allow the carrying out of *inter alia* the Infraco Works;

"**Licence Site**" means the subject of a Licence;

"**M & S**" means Marks and Spencer Plc, a company incorporated under the Companies Act with registered number 00214436 and having its registered office at Waterside House, 35 North Wharf Road, London, W2 1NW and its successors and assignees

"**Method Statements**" means the Accommodation Works Method Statement and the Works Method Statement as the context may require;

"**New Limits**" means the new limits of deviation as shown hatched red on the Plan;

"**Plan**" means the plan set out in Appendix 31 to Schedule Part 13;

"**Site**" means that area of ground known as and forming the Gyle Shopping Centre together with the car park, access roads and all ancillary services being the subjects described in the

Feu Contract between The City of Edinburgh Council and Marks & Spencer plc and Safeway Stores plc recorded in the Division of the General Register of Sasines for the County of Midlothian on 10 January 1997 and comprising Plot Numbers 478, 479, 480, 481, 482, 483, 484 and 486 as shown on the Drawing;

"**Tram**" means Edinburgh Tram Line Two, tram vehicles, tram roads, tramways, tram stops and all associated infrastructure, plant and equipment as envisaged by the Tram Legislation;

"**Works**" means Work No 8 and Work No 9 insofar as in the vicinity of the Site as described in Schedule 1 of the Edinburgh Tram (Line Two) Act 2006, being works required in respect of the construction of the Edinburgh Tram Network but specifically excluding any works required in the future to maintain the Edinburgh Tram Network; and

"**Works Method Statement**" means the method statement to be developed by the Infraco pursuant to paragraph 39.5 as the same may be amended pursuant to this Section 39 of Section A of Schedule Part 13.

39.2 In carrying out or procuring the carrying out of the Infraco Works at the Site, the Infraco shall not design or construct any part of the Edinburgh Tram Network on any land outwith the New Limits.

39.3 In carrying out or procuring the carrying out of the Infraco Works at the Site, the Infraco shall not encroach upon any land outwith the area shown hatched blue on the Plan unless instructed otherwise by **tie** in accordance with this Agreement.

39.4 The Infraco shall design and construct the Edinburgh Tram Network at the Site within the New Limits with a view to ensuring that the width of the area required for the Edinburgh Tram Network shall not generally exceed 10 metres, together with such additional land as is reasonably required in order to carry out the Infraco Works.

39.5 The Infraco shall provide all required assistance to **tie** in respect of the drafting of a Works Method Statement in respect of the Infraco Works to be carried out in the vicinity of the Site. The Works Method Statement will deal specifically with *inter alia* specified working hours, specified time of year and peak retailing periods when working will be avoided, mitigation measures to minimise adverse impact on service and customer access including measures to reconfigure the car park if necessary, mitigation measures to avoid dust/vibration/noise having an adverse effect on trading, restoration of any Licence Site (including landscaping and signage) insofar as applicable to the Infraco Works in the vicinity of the Site and where applicable will mirror the terms of Schedule Part 3 (*Code of Construction Practice*).

39.6 The Infraco Works which constitute Works shall not be commenced until the Works Method Statement has been finalised by **tie**.

39.7 The Infraco shall provide all required assistance to **tie** in relation to the drafting of an Accommodation Works Method Statement in respect of the Accommodation Works. The Accommodation Works Method Statement shall deal specifically with *inter alia* specified working hours, specified times of the year and peak retailing periods when working will either cease or be avoided, mitigation measures to minimise adverse impact on service and customer access including measures to reconfigure the car park if necessary, mitigation to avoid dust/vibration/noise having an adverse effect on trading, restoration of any Licence Site (including layout of the car park, landscaping and signage) insofar as applicable to the Accommodation Works to the extent that they constitute Infraco Works and where applicable will mirror the terms of Schedule Part 3 (*Code of Construction Practice*).

39.8 The Infraco Works at the Site which constitute Accommodation Works shall not be commenced until the Accommodation Works Method Statement has been finalised by **tie** and M & S. The Infraco shall provide **tie** with all reasonable assistance requested by **tie** in relation to the negotiation and agreement of the Accommodation Works Method Statement between **tie** and M & S.

39.9 The Infraco shall carry out or procure the carrying out of the Infraco Works at the Site strictly in accordance with the terms of the finalised Method Statements.

39.10 Those elements of the Works which constitute the Infraco Works will be carried out in a good and workmanlike manner so that impact on the normal operation of M & S business is minimised so far as is reasonably practical in accordance with the finalised Method Statements.

39.11 The Infraco acknowledges that M & S has a material preference that no fixing of any component part of the Edinburgh Tram Network should be made to any buildings situated on the Site. In the event that the Infraco considers that such fixings are nonetheless the most appropriate solution, the Infraco shall first consult with **tie** and take due and proper cognisance of the reasonable representations of M & S in this respect as notified to the Infraco by **tie**.

39.12 Prior to completion of the Accommodation Works on each Licence Site, the Infraco shall serve notice on **tie** specifying the estimated date upon which the Accommodation Works on that particular Licence Site are due to be completed and the estimated date upon which possession of the Licence Site will be returned to **tie**, provided that such notice shall be

provided to **tie** having regard to the need to facilitate an inspection of the relevant Licence Site pursuant to paragraph 39.13.

39.13 The Infraco shall facilitate the carrying out of an inspection of the relevant Licence Site by M & S and a representative of CEC and/or **tie**, such inspection to be carried out on a date to be specified by **tie** declaring that the relevant date will be at least 5 days before the estimated date of return of possession of the relevant Licence Site to **tie**.

39.14 The Infraco shall take due and proper cognisance of all reasonable and proper representations of **tie** in terms of the sufficiency and completeness of the Infraco Works at the Site in order to ensure that on return of possession of such to **tie** the Site should be in a condition fully commensurate with the full and proper compliance by the Infraco with its obligations under this Agreement.

39.15 Any interference with access to any part of the Site proposed by the Infraco in pursuance of the Infraco Works shall only be given effect, whether as to route or other locational factors, or as to timing and duration, after due consultation with and approval thereto from **tie**.

39.16 The Infraco shall ensure that there is two-way traffic flow along Glasgow Road within half a mile in each direction from Gogar Roundabout at all times during the carrying out of the Infraco Works.

39.17 The Infraco shall ensure that the Depot is generally located to the north of Glasgow Road within Plots 259, 494, 496, 497 and 499 as shown on the Drawing and will comply with the requirements of the Town and Country Planning (Safeguard Aerodromes, Technical Sites and Military Explosives Storage Areas) (Scotland) Direction 2003 (SEDD Circular 2/2003).

39.18 The Infraco shall not construct any interlacing track on the Site.

39.19 In carrying out the Infraco Works, the Infraco shall ensure that it does not at any time connect to any of the adopted or unadopted drains located within the Site.

39.20 Further to any obligations under this Agreement to investigate and survey land at the Site, the Infraco shall consult with **tie** in relation to the location and timing of such surveys and use reasonable endeavours to minimise any disruption and shall make good any damage and leave the Site in no worse condition as existed prior to the carrying out of such surveys and investigations.

39.21 With regard to the location of any signage, the Infraco shall consult with **tie** in relation to the location of such signs so as to ensure any such signage does not interfere in any material or misleading way with the normal operation of the Gyle Shopping Centre.

SECTION 40 - ADSHEL LIMITED

40.1 In this Section 40 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Adshel**" means Adshel Limited (company number 03153077) having its registered office at 33 Golden Square, London, W1R 3PA;

"**Advertisement**" shall mean any word, letter, model, sign, placard, board notice, device or representation whether illuminated or not in the nature of and employed wholly or partly for the purposes of advertisement, announcement or direction; and

"**the Shelter(s)**" shall mean any bus passenger shelter(s) provided by Adshel under the Minute of Agreement between the City of Edinburgh Council and Adshel Limited dated 27 September and 15 October 1996.

40.2 **Alterations to Shelters and Advertisements**

The Infraco while carrying out the Infraco Works shall ensure that neither it nor any of its servants, agents, or sub-contractors shall at any time affix any notices or signs to a Shelter nor, without the prior written consent of **tie**, make any alterations to or otherwise interfere with any Shelter or Advertisement posted or affixed to any such Shelter.

40.3 **Removal of Adshel Property**

If the Infraco requires to dismantle any Shelter or remove any bus stop poles or any other property owned by Adshel because of the Infraco Works, then the Infraco shall inform **tie** giving not less than 40 days' notice that such Shelters, bus stop poles, or any other property requires to be removed.

SECTION 41 MISCELLANEOUS

41.1 In this Section 41 of Section A of Schedule Part 13, the following expressions shall, unless the context otherwise requires, have the following meanings:

"**Authorised Car Park**" means the car park shown outlined in red on the plan set out in Appendix 32 to this Schedule Part 13;

"**Drawing**" means parliamentary sheet number 5 as annexed to Edinburgh Tram (Line Two) Act 2006;

"**Plot 73**" means Plot 73 as shown on the Drawing;

"**Police Box Coffee Bar**" means the police box coffee bar situated on the pedestrian area to the east of St Mary's RC Cathedral, close to the junction with Little King Street at Picardy Place, Edinburgh;

"**Premises**" means the properties known as Inchkeith House, 139 Leith Walk, Edinburgh, and Allander House, 141 Leith Walk, Edinburgh;

"**Property**" means the flats at Rennies Isle, Leith and the car park forming part thereof;

"**Royal Mail**" means Royal Mail Group Limited a company registered under the companies acts with registered number 04138203 and having its registered office at 148 Old Street, London EC1V 9HQ, the tenant of the property at the Royal Mail Russell Road Sorting and Delivery Office, Russell Road, Edinburgh; and

"**Trust**" means Lothian Primary Care NHS Trust, together with its successors and assignees.

41.2 During the carrying out of the Infraco Works, the Infraco shall ensure that the utility services which feed into the Police Box Coffee Bar are not unduly disrupted.

41.3 The Infraco shall not encroach upon Police Box Coffee Bar land and shall ensure that pedestrian access and egress to and from the Police Box Coffee Bar is maintained at all times during the carrying out of the Infraco Works.

41.4 Throughout the period of the Infraco Works, the Infraco shall use all reasonable endeavours to ensure that access to and egress from the Property and, in particular, access to and egress from the car park forming part of the Property, via Ocean Drive, to and from the road network, shall be maintained at all times throughout the period of the Infraco Works.

41.5 Notwithstanding the provisions of paragraph 41.4 above, where usual access to and egress from the car park referred to in paragraph 41.4 cannot be maintained, the Infraco shall ensure that alternative temporary access is provided to allow access to and egress from the car park.

41.6 Prior to the commencement of any Infraco Works in the vicinity of the Property, the Infraco shall assist **tie,** as required, in any consultation with third parties regarding the likely duration of the Infraco Works in the vicinity of the Property and the impact of such Infraco Works.

41.7 The Infraco shall carry out surveys of the properties along Wester Coates Terrace which back on to the Roseburn Railway Corridor being numbers 1 to 19 and that prior to the commencement of the Infraco Works which are described as "Works No. 12" in the Edinburgh Tram (Line One) Act 2006.

41.8 The Infraco shall not use Wester Coates Terrace as a construction access route for the purposes of carrying out the Infraco Works.

41.9 The Infraco shall carry out a survey of the property situated at 11A Craigleith Drive prior to the commencement of the Infraco Works which are described as "Works No. 12" in the Edinburgh Tram (Line One) Act 2006 and provide a copy of the report at the Infraco's cost to each of **tie** and Mr Mark M Clarke at 11A Craigleith Drive, Edinburgh EH4 3HR.

41.10 The Infraco shall not encroach on the Authorised Car Park for the purposes of carrying out the Infraco Works.

41.11 Access to and egress from the Authorised Car Park shall be maintained at all times during construction of the Infraco Works in the vicinity of the Premises. In the event that the construction of the Infraco Works prevents access being taken to the Authorised Car Park by the means current as at the date that the Infraco Works commence in the vicinity of the Premises, the Infraco shall provide an alternative access route of a nature and in a location acceptable to the Trust (as notified to the Infraco by **tie**).

41.12 The Infraco shall, if requested to do so by **tie**, co-operate and consult with **tie** and the Edinburgh and Lothians Badger Group in respect of any issues caused by the existence, presence or change in activities of badgers in the vicinity of the area to be affected by the Infraco Works. The Infraco shall comply with **tie**'s requirements in relation to badger mitigation as the same is notified to the Infraco by **tie** from time to time.

41.13 The Infraco shall not, in designing or carrying out the Infraco Works, amend the height or span of the bridge structure crossing Groathill Road South, Edinburgh.

41.14 The Infraco shall procure that an area with a width of 2 metres along the boundary of the properties known as 32 and 34 Groathill Road South and the land adjacent to such properties to be used for the construction of the Infraco Works shall be fenced off to protect the hedges and other foliage growing along said boundary.

41.15 Upon completion of any Infraco Works at Plot 73, the Infraco shall ensure that the final condition of Plot 73 is no worse than it is was prior to the commencement of the Infraco Works at Plot 73.

41.16 If requested to do so by **tie**, the Infraco shall participate in consultation with **tie** and the Royal Mail in relation to agreeing detailed arrangements to ensure that the Royal Mail is able to meet its fire safety obligations during the Infraco Works at Plot 73 and upon completion of the Infraco Works at Plot 73.

SECTION B

THIRD PARTY DOCUMENTATION

1 Forth Ports Plc

1.1 Minute of Agreement between The City of Edinburgh Council and Forth Ports PLC dated 10 and 15 February 2006.

2 Alexander Latto (1986) Limited

2.1 Letter from **tie** to Alexander Latto dated 2 September 2005.

3 Trillium (Prime) Property GP Limited and Land Securities Trillium Limited

3.1 Minute of Agreement between The City of Edinburgh Council and Trillium (Prime) Property GP Limited and Land Securities Trillium Limited dated 2 September 2005 and 14 September 2005 and registered in the Books of Council and Session on 19 September 2005.

4 Trustees of the City Point Unit Trust

4.1 Minute of Agreement between The City of Edinburgh Council and the Trustees of the City Point Unit Trust dated 10 May 2006.

5 Ocean Terminal Limited

5.1 Minute of Agreement between The City of Edinburgh Council and Ocean Terminal Limited dated 10 and 15 February 2006.

6 Norman, Downie & Kerr

6.1 Letter from **tie** to Jack Kerr dated 14 September 2005.

7 The Royal Yacht Britannia Trust

7.1 Minute of Agreement between The City of Edinburgh Council and The Royal Yacht Britannia Trust dated 14 and 23 February 2006.

8 Haymarket Yards Limited

8.1 Letter of comfort dated 27 October 2005.

9 West Craigs Limited (formerly Meadowfield Developments Limited)

9.1 Minute of Agreement between The City of Edinburgh Council and Meadowfield Developments Limited dated 25 and 28 November 2005.

10 FSH Nominees Limited

10.1 Minute of Agreement between The City of Edinburgh Council and FSH Nominees Limited and FSH (Edinburgh) Services Limited and Frogmore Developments Limited and Salmon Harvester Properties Limited dated 25 November 2005 and 2 December 2005 and 6 December 2005.

11 First Scotrail Limited

11.1 Minute of Agreement between The City of Edinburgh Council and **tie** Limited and The City of Edinburgh Council and First Scotrail Limited dated 1 November 2005 and 27 October 2005.

12 Stakis Limited

12.1 Minute of Agreement between The City of Edinburgh Council and Stakis Limited dated 13 September 2005 and 20 September 2005.

13 Universities Superannuation Scheme Limited

13.1 Minute of Agreement between The City of Edinburgh Council and Universities Superannuation Scheme Limited with the consent of Safeway Stores Ltd and WM Morrison Supermarkets plc dated 15 November 2005 and 9 December 2005 and 23 December 2005.

14 Safeway Stores Limited and WM Morrisons Supermarkets Plc

14.1 Agreement between The City of Edinburgh Council and Safeway Stores Limited and WM Morrison Supermarkets plc with the consent of Universities Superannuation Scheme Limited dated 13 November 2005, 24 November 2005 and 15 March 2005.

15 New Ingliston Limited and Highland Properties (Scotland) Limited

15.1 Minute of Agreement between The City of Edinburgh Council and New Ingliston Limited and Highland Properties (Scotland) Limited dated 8 November 2005 and 9 November 2005.

16 Edinburgh Airport Limited

16.1 Minute of Agreement between The City of Edinburgh Council and Edinburgh Airport Limited dated 14 September 2005.

16.2 Licence between The City of Edinburgh Council and Edinburgh Airport Limited dated 28 January and 25 February 2008.

16.3 Agreement to Lease between The City of Edinburgh Council and Edinburgh Airport Limited dated 20 and 25 February 2008.

17 Verity Trustees Limited

17.1 Minute of Agreement between The City of Edinburgh Council and Verity Trustees Limited dated 28 October 2005 and 4 November 2005.

18 ADM Milling Limited

18.1 Minute of Agreement between The City of Edinburgh Council and ADM Milling Limited dated 23 January 2006.

19 Selex Sensors and Airborne Systems Limited

19.1 Minute of Agreement between The City of Edinburgh Council and Selex Sensors and Airborne Systems Limited dated 20 and 25 January 2006.

20 Norwich Union Life and Pensions Limited

20.1 Minute of Agreement between The City of Edinburgh Council and Norwich Union Life and Pensions Limited, National Car Parks Limited and George Watt Limited dated 3 May 2007 and 23 May 2007.

21 National Grid Property Holdings Limited, Port Greenwich Limited and WM Morrison Supermarkets Plc

21.1 Minute of Agreement between The City of Edinburgh Council Limited, National Grid Property Holdings Limited, Port Greenwich Limited and WM Morrison Supermarkets Plc, dated 28 February 2006 (not fully executed).

22 Institute of Chartered Accountants

22.1 Minute of Agreement between The City of Edinburgh Council and The Institute of Chartered Accountants for Scotland dated 27 September 2006 and 23 October 2006. (ETL1).

22.2 Minute of Agreement between The City of Edinburgh Council and The Institute of Charted Accountants for Scotland dated 27 September 2006 and 23 October 2006. (ETL2).

23 Holyrood Services Limited

23.1 Minute of Agreement between The City of Edinburgh Council and Holyrood Services Limited dated 17 December 2004.

24 Servisair (UK) Limited

24.1 Letter from **tie** to Ian Robertson dated 21 October 2005.

24.2 Letter of comfort from **tie** to Jim Shapton dated 16 November 2005.

25 Historic Scotland

25.1 Letter from D & W to Historic Scotland dated 17 May 2005.

26 Murrayfield Indoor Sports Club

26.1 Minute of Agreement between The City of Edinburgh Council and George Russell, George Manson, John Small, the trustees of Murrayfield Indoor Sports Club dated 25 October 2005 and 2 November 2005.

27 Royal Mail Group Plc and Post Office Limited

27.1 Minute of Agreement between The City of Edinburgh Council and Royal Mail Group Plc and Post Office Limited dated 2 March 2006 and 8 February 2006.

28 UGC Properties Limited and Unipart Automotive Limited

28.1 Minute of Agreement between The City of Edinburgh Council and UGC Properties Limited and Unipart Automotive Limited dated 25 October 2005 and 21 November 2005.

29 JPSE Limited

29.1 Minute of Agreement between The City of Edinburgh Council and JPSE Limited dated 18 January 2006 and 27 January 2006.

30 New Edinburgh Limited and Edinburgh Park (Management) Limited

30.1 Minute of Agreement between The City of Edinburgh Council and Edinburgh Park (Management) Limited dated 7 October 2005 and 4 October 2005.

30.2 Letter from The City of Edinburgh Council to New Edinburgh Limited dated 7 October 2005.

31 Chris Holmes Cabinetmakers

31.1 Letter of comfort from **tie** to Chris Holmes dated 3 November 2005, attaching Schedule of Undertakings.

32 Network Rail Infrastructure Limited

32.1 Minute of Agreement between **tie** Limited and The City of Edinburgh Council and Network Rail Infrastructure Limited dated 17 June 2005 and 21 June 2005.

33 Roderick James McLean

33.1 Missives between The City of Edinburgh Council and Roderick James McLean and Julie Bremner McLean dated October 2005.

34 Clerical Medical Investment Group Limited

34.1 Minute of Agreement between The City of Edinburgh Council and the Clerical Medical Investment Group with the consent of Clerical Medical and General Life Assurance Society dated 2 June 2006 and 14 June 2006.

35 Scottish Rugby Union Plc

35.1 Draft Minute of Agreement between The City of Edinburgh Council and Scottish Rugby Union plc.

35.2 Letter to Faber Maunsell from Carl Bro dated 19 December 2005.

36 Roseburn Garage

36.1 Letter from **tie** to M Khali dated 21 October 2005.

36.2 Letter of comfort to M Khali dated 30 September 2005.

37 Scottish Natural Heritage

37.1 Letter from **tie** to Scottish Natural Heritage dated 26 August 2005.

37.2 Letter from **tie** to Private Bills Unit dated 26 August 2005.

38 Stanley Casinos Limited

38.1 Draft Minute of Agreement between The City of Edinburgh Council and Stanley Casinos Limited.

39 Marks & Spencer Plc

39.1 Minute of Agreement is in draft form and is not available - terms match the Safeway Stores and WM Morrisons Agreement. Relevant obligations have been flowed down to Schedule 13.

40 Adshel Limited

40.1 Minute of Agreement between The City of Edinburgh Council and Adshel Limited dated 27 September 1996 and 15 October 1996.

40.2 Street Furniture Operating Lease between the City of Edinburgh Council and More Group UK Limited dated 3 August 1999 and 2 August 1999.

41 Miscellaneous

41.1 Mrs Alison Bourne

41.1.1 Letter to Mrs A Bourne dated 30 May 2005.

41.1.2 Letter to "Resident" dated 16 December 2004.

41.1.3 Letter to Mrs Bourne dated 13 January 2005.

41.2 Mr & Mrs M Clarke

41.2.1 Letter to Mark Clarke dated 21 February 2006.

41.3 Mrs Patricia Craik

41.3.1 Letter to Patricia Craik dated 29 June 2005.

41.3.2 Letter to P Craik dated 12 January 2005.

41.4 Police Box Coffee Bars

41.4.1 Letter to Gordon Coutts Thomson dated 20 January 2005.

41.5 Lothian Healthcare

41.5.1 Letter to Murray Duncanson, Chief Executive, Lothian Primary Care NHS Trust dated 20 March 2006, together with Schedule.

41.6 O Milne

41.6.1 Letters to Odell Milne dated 21 February 2006.

41.6.2 Letter to Odell Milne regarding Wester Coates Terrace dated 5 December 2006.

41.7 Edinburgh and Lothian Badgers Group

41.7.1 Letter to Patricia Alderson, Edinburgh and Lothian Badgers Group dated 18 November 2005 (ETL 1).

41.7.2 Letter to Patricia Alderson, Edinburgh and Lothian Badgers Group dated 7 November 2005 (ETL 2).

41.8 Groathill Residents

41.8.1 Letter from **tie** to Resident dated 12 January 2005.

41.9 Beauchamp Investments

41.9.1 Letter from **tie** to Tim Mallett dated 11 August 2005.

A. CLOSURES

	ETL 1
	CALA MANAGEMENT - CONSTITUTION ST.
1.	Letter to Kevin Whitaker, Cala Management from **tie**, dated 7 September 2005.
2.	Letter to Jane Sutherland, PBU from Ledingham Chalmers regarding CALA Management Limited dated 8 September 2005.
	DEWAR, R - NEW ORCHARDFIELD
3.	Letter to Robert Dewar from **tie** dated 3 November 2006.
	S. FRAME - TELFORD DR.
4.	Letter to Simon Frame from **tie** dated 19 March 2007.
	J. PEARSON, OCEAN DRIVE
5.	Letter to Ewan Kennedy, from **tie**, dated 25 August 2005 enclosing letter to J. Pearson, from **tie**, dated 19 August 2005.
6.	Letter to Ms. J.H. Pearson from **tie**, dated 17 March 2005
7.	Letter to Judith Pearson from **tie**, dated 21 February 2006.
8.	Draft Minute of Agreement, dated 17 May 2005
	M. SCOTT, OCEAN DRIVE
9.	Letter to Mr. Scott from **tie** dated 2 February 2007.
	ETL 1 + 2
	SCOTTISH ENTERPRISE - HAYMARKET
10.	Letter to Kirsty Ramsay from **tie** dated 15 February 2007
	VERISCOLOUR - CLIFFORD TERRACE
11.	Letter to Bonar Mackenzie dated 14 September 2005
	ETL 2
	COLLINSON CERAMICS
12.	Letter of Closure from **tie** Limited to Collinson Ceramics dated 19 October 2005.
	CUSTOM PROJECTS LIMITED - ROSEBURN STREET
13.	Draft Minute of Agreement between The City of Edinburgh Council and Customs Projects Limited.

	FRANK EARLEY (PROLAMINATES)
14.	Correspondence with Frank Earley dated 5 April 2007.
	GRAY'S MILL COACHWORKS
15.	Draft Minute of Agreement between The City of Edinburgh Council and Gray's Mill Coachworks.
	D. KAUR
16.	Letters to Davidson Chalmers LLP regarding Dalwinder Kaur dated 21 October and 18 November 2005.
	MRM COACHWORKS
17.	Letter of Closure to Mr. James Gibb from **tie** dated September 2005
	NATIONAL CAR PARKS
18.	Letter of Closure to Mr. Sutherland from **tie** dated 14 November 2005
19.	Draft Minute of Agreement between The City of Edinburgh Council, Norwich Union Life and Pensions Limited, National Car Parks Limited and George Watt Limited.
	NATS LIMITED
20.	Email from Kate Shudall to Elaine Cropley dated 22 January 2007.
	NCR VANGUARD
21.	Letter of Closure from **tie** Limited to Vanguard Rental (UK) Limited dated 11 October 2005.
	PD LABELS
22.	Letter to PD Labels from **tie** dated 16 September 2005
23.	Draft Minute of Agreement between The City of Edinburgh Council and PD Labels.
	TNT EXPRESS
24.	Letter to AD Pratt regarding TNT Express Services UK and Ireland dated 10 January 2007.
	VIKING INTERNATIONAL (T/A STEPGRADE MOTOR ACCESSORIES LIMITED)
25.	Letter of Closure from **tie** Limited to Fairhurst Estates Limited in relation to Viking International dated 11 October 2005.

B. COMFORTS AND ASSURANCES

	CLG ASSURANCES
	Please see separate **tie** summary of CLG Commitments (version 2) dated 24 August 2007.
1.	**BAIRD DRIVE CLG**
2.	**CRAIGLEITH CLG**
3.	**DRYLAW TELFORD RESIDENTS**
4.	**ELBG - BADGER GROUP**
5.	**FRUWCA - ROSEBURN CORRIDOR**
6.	**GARSCUBE TERRACE RESIDENTS**
7.	**GROATHILL AVENUE RESIDENTS**
8.	**LEITH BLG**
9.	**LEITH CLG**
10.	**LOWER GRANTON ROAD CLG**
11.	**RATHO STATION CLG**
12.	**ROSEBURN BLG**
13.	**ROSEBURN CORRIDOR PUBLIC NOTICE** (in relation to environmental mitigation)
14.	**TRINITY STARBANK CLG**
15.	**WEST END CLG**
	ETL 1
16.	**G BARKER** Letter to G Barker dated 11 October 2005.
17.	**BHS** Letter to Biggart Baillie Solicitors regarding BHS Ltd. dated 21 May 2007.
18.	**J CAMPBELTON** Letter to John Campbelton regarding Plot 30 - Tower Street dated 20 December 2006.

19.	**CAVERSHAM TRADING** Letter to Gillespie MacAndrew WS LLP regarding Caversham Trading Limited dated 10 January 2007.
20.	**CEC (THOMSON G)** Email to Clare Norman and George Duke regarding CEC buildings on Smith Place dated 21 December 2006.
21.	**MR AND MRS CLARKE (Starbank Road)** Letter to MR M and Ms D Clarke dated 22 April 2005.
22.	**CONELL - GUARINO** Letter to Ms Irene Connel-Guarino regarding Plot 30-Tower Street dated 4 January 2007.
23.	**MR AND MRS CRASKE** Letter to John and Alison Craske dated 24 March 2005.
24.	**A DEAN** Letter to Anthony White and Ann Dean dated 24 March 2005.
25.	**DEBENHAMS** Letter to Biggart Baillie Solicitors regarding Debenhams Plc dated 21 May 2007.
26.	**MR DEGG** Email to Mr Degg regarding Ocean Drive dated 21 December 2006.
27.	**MR DONAGHUE** Letter to Mr D Donaghue dated 24 March 2005 and letter to Mr D Donaghue dated 22 April 2005.
28.	**F DOUGLAS** Letter to Fiona Douglas regarding Plot 30 - Tower Street dated 11 December 2006.
29.	**R DRYSDALE** Letter to Mr R Drysdale dated 24 March 2005.
30.	**G DUFF** Email to Graham Duff dated 20 April 2005.

31.	**G&A DUNCAN** Letter to George & Audrey Aileen Duncan dated 21 December 2006.
32.	**EDINBURGH MASONIC CLUB** Letter to Walter Sneddon dated 27 January 2005.
33.	**MRS MEM FORREST** Letter to Mrs Forrest dated 22 April 2005.
34.	**C FOSTER** Letter to Christopher Foster dated 3 November 2006.
35.	**GARLANDS** Letter to Gillian Nicoll of Garlands Florists dated 10 July 2007.
36.	**S GAYNOR - TOWER STREET** Email to Sheila Gaynor dated 21 December 2006.
37.	**F GERMI - ELM ROW** Letter to Francesco Germi dated 17 March 2005.
38.	**MR GHULAM** Note of meeting between Andy Dixon, Bob Clarke and Mr Ghulam dated 14 November 2006.
39.	**G GILBERT - OCEAN DR** Letter to Gary Gilbert dated 19 February 2004.
40.	**AM GILLON** Letter to Anne Marie Gillon dated 11 December 2006.
41.	**L HAGGERTY & L HILL** Draft Letter to Ms L Haggerty and Ms L Hill dated 17 March 2005.
42.	**MR HANNAN AND SPENCE** Draft Letter to Ms Spence and Mr Hannan dated 22 April 2005.
43.	**M HETHERINGTON - TOWER STREET** Letter to Leslie Wolfson & Co regarding Murray Hetherington dated 10 January 2007.

44.	**MR AND MRS HUDSON** Draft Letter to Lorna and Nick Hudson dated 11 April 2005.
45.	**E. INNES - CONSTITUTION STREET** Draft Letter to Eric Innes dated 17 March 2005, issued by email on 11 April 2005.
46.	**IRISH LIFE ASSURANCE** Email to Caroline Hood regarding Ocean Point dated 21 December 2006.
47.	**MR AND MRS JOY** Letter to Mr and Mrs Joy dated 3 March 2006.
48.	**MR AND MRS KANE - LEITH WALK** Letter to Mrs Kane dated 10 July 2007
49.	**R KEEN** Letters to Ms Rachel Keen dated 17 March 2005, 15 January 2007 and 29 January 2007.
50.	**MR AND MRS LAIRD - OCEAN WAY** Notes of Meeting between Andy Dixon, Bob Clarke and Mr & Mrs Laird dated 14 February 2007.
51.	**PROF LANG - OCEAN DRIVE** Letter to Professor Margaret Lang dated 21 December 2006.
52.	**F&G LOW - OCEAN DRIVE** Letter to Georgia Low dated 19 February 2004 and acknowledgement from Fergus Low dated 11 March 2004.
53.	**MAD JACKS BACK - ELM ROW** Letter to Kate Mackenzie dated 9 July 2007.
54.	**L MARSH - CONSTITUTION STREET** Letter to Lynne Marsh regarding Plot 30 - Tower Street dated 11 December 2006, and email dated 11 December 2006.
55.	**MR MCKEOWN - COLTBRIDGE AVENUE** Email to Brian McKeown dated 2 November 2006.

56.	**C MCLEOD - CRAIGLEITH ROAD** Email to Steve Mitchell regarding Carolyn McLeod dated 12 August 2005.
57.	**L MCNAUGHT - CONSTITUTION STREET** Letter to Mrs Lee-Anne McNaught dated 18 October 2005.
58.	**MR MINTO** Minute of Meeting regarding Mr Minto dated 26 March 2004.
59.	**MR & MRS MURPHY** Letter to Ms Jill Murphy dated 27 July 2005. Letter to Adams Lawyers and Estate Agents dated 1 November 2005. Letter from **tie** Limited to Mr and Mrs Murphy dated 22 December 2005.
60.	**D O'CARROLL** Letter to Derek O'Carroll dated 17 March 2005.
61.	**MR & MRS PARNELL** Draft letter to Karen Hamilton regarding Andrew & Birgitta Parnell.
62.	**MS PEIFFER - TOWER STREET** Letter to Doreen Peiffer regarding Plot 30 - Tower Street dated 8 January 2007.
63.	**MR PENDER** Email to Martin Pender dated 15 March 2005.
64.	**A PRITCHARD** Email to Mr Pritchard, undated.
65.	**F RENNIE** Letter to Mrs F Rennie regarding Plot 30 - Tower Street dated 11 December 2006.
66.	**C ROONEY** Letter to Ms C Rooney dated 24 March 2005.
67.	**S SCOTLAND** Letter to Miss Samantha Scotland regarding Plot 30 - Tower Street dated 22 January 2007.

68.	**M SCOTT - OCEAN DRIVE** Letter to Marshall Scott regarding Ocean Drive dated 4 January 2007.
69.	**N SHEEHAN - TOWER STREET** Letter to Natalie Sheehan regarding Plot 30 - 4/6 Constitution Street dated 4 February 2004.
70.	**I SHIRLEY - TIMBER BUSH** Letter to Ian Shirley dated 19 June 2006.
71.	**C SPROTT - TOWER PLACE** Letter to Ms Sprott dated 20 February 2007.
72.	**N STANSFIELD** Letter to Nick Stansfield dated 10 July 2007.
73.	**P TOSH** Letter to Pamela Tosh and Neil Willett dated 22 April 2005.
74.	**TRADITIONAL BARBERS - LEITH WALK** Letter to Janet Dunbar regarding Traditional Barbers dated 9 July 2007.
75.	**WEL - WEST HARBOUR ROAD** Letter to Colin MacKenzie from Waterfront Edinburgh Limited dated 3 January 2007.
76.	**JB WILKEN** Letter to JB Wilken dated 22 April 2005.
77.	**B WILLIAMS - TOWER STREET** Letter to Gordon D Hamilton regarding Mrs B Williams, Plot 30 - Tower Street dated 22 January 2007.
	ETL 1 + 2
78.	**CLOWES DEVELOPMENTS - COATES CRESCENT** Letter to Ms Alison Welsh regarding Clowes Development (Scotland) Ltd. dated 18 December 2006.
79.	**MR CULLEN - BALBIRNIE PLACE** Email to Elaine Cropley regarding telephone call between Geoff Duke and Mr Cullen dated 12 December 2006.

80.	**M DUTHIE - ROSEBURN MALTINGS** Letter to Margaret Duthie dated 21 June 2005.
81.	**EURO - HOSTELS - PRINCES STREET** Email to Ian Curry regarding Euro-Hostels dated 9 December 2005.
82.	**A HARKNESS - ATHOLL PLACE** Letter to Alistair Harkness dated 17 March 2005.
83.	**HODKINSON & MITCHELL - ROSEBURN MALTINGS** Letter to Darren Hodkinson and Jacqueline Mitchell dated 16 September 2005 and email to Darren Hodkinson dated 26 July 2006.
84.	**I MUNRO - BALBIRNIE PLACE** Email to Mr Munro dated 12 July 2005.
85.	**NEW LOOK RETAILERS** Letter to Biggart Baillie Solicitors regarding New Look Retailers Ltd dated 21 May 2007 and email to Anna Veal, New Look dated 22 January 2007.
86.	**H REYNOLDS - BALBIRNIE PLACE** Letter to Miss H. T. Reynolds dated 30 May 2005.
87.	**J ROBERTSON - BALBIRNIE PLACE** Letter to Jane Robertson dated 25 July 2005.
88.	**L SMITH - ROSEBURN MALTINGS** Letter to Lynsey Smith dated 18 October 2005.
89.	**STARBUCKS** Letter to Biggart Baillie Solicitors regarding Starbucks Coofee Company Ltd dated 21 May 2007.
90.	**C SYME - BALBIRNIE PLACE** Letter to Christian Syme dated 7 April 2005.

	ETL 2
91.	**E BALL** Letter to Mrs E. J. Ball dated 30 May 2005.
92.	**D BREWSTER** Letter to Mr D Brewster dated 15 October 2003.
93.	**DAVID FLATMAN LTD** Note of telephone call from Lizzie Flatman dated 3 November 2006.
94.	**A HAMILTON** Letter to Mr Hamilton and Ms Sansom dated 17 August 2004 and various.
95.	**L. McTIGHE** Notes of meeting between Geoff Duke, Cliff Hutt, Alasdair Sim and Libby McTighe dated 26 May 2004.
96.	**STAPLES UK RETAIL LTD PLOT** Letter to Richard Smalley dated 21 December 2006.
97.	**J STEVENSON** Letter to Jeffrey Stevenson dated 23 June 2005.
98.	**THAMES RICO - NEWBRIDGE SERVICE STATION** Letter to Sarah MacLeod re Thames Rico, dated 21 April 2006 enclosing letter of comfort and draft Side Agreement.
99.	**P TORRENT** Email to Peter Torrent dated 21 December 2006.
100.	**K WILSON** Letters to K Wilson dated 3 August 2005, 30 March 2005 and 11 October 2005.

C. LICENCES

1.	**FORTH PORTS** Licence to Occupy by Forth Ports plc in favour of CEC, dated 29 March 2007. Letter from D & W to **tie** dated 3 April 2007 enclosing Forth Ports Licence.
2.	**NIL** Licence to Occupy by New Ingliston Limited in favour of CEC, dated 21 June 2007 and 22 June 2007.
3.	**WEST CRAIGS** Licence to Occupy by West Craigs Limited in favour of CEC, dated 25 June 2007 and 3 July 2007.

D. UNDERTAKINGS

	ETL 1
1.	**D HARTE - CONSTITUTION STREET** Email to Deirdre Harte dated 18 July 2006.
2.	**J MURPHY** Letter to Mr and Mrs Murphy dated 22 December 2005.
3.	**WESTERN GENERAL HOSPITAL** Letter to Professor James Barbour OBE, NHS Lothian, dated 6 February 2006.
	ETL 2
4.	**BEAUCHAMP INVESTMENTS - RUSSELL ROAD** **4.1** Letter to John Lee, ASO Property Services (UK) Ltd, dated 2 May 2007. **4.2** Letter to Joanne Plant, Farningham McCreadie Partnership re Royal Mail Sorting Office, dated 2 May 2007. **4.3** Emails between D & W and **tie** and **tie** and David Marwick.
5.	**EDINBURGH LEISURE - CARRICK KNOWE GOLF COURSE** Email to Alasdair Dunlop dated 15 January 2007.
6.	**REDPATH MCLEAN - RUSSELL ROAD** Email in relation to call with Keith McLean dated 23 March 2007.

E. DOCUMENTATION NOT IN RELATION TO PHASE 1A

ETL 1

1. CROWN ESTATE COMMISSIONERS - LOWER GRANTON ROAD

1.1 Letter to Alan Menzies, Crown Estate Solicitor, dated 26 March 2004.

1.2 Internal emails dated 19 April, 21 and 22 May 2007.

ETL 1+2

2. CALEDONIAN ALE HOUSE - HAYMARKET

2.1 Grant offer to the City of Edinburgh Council for Purchase of The Caledonian Ale House and 27 Roseburn Street dated 26 October 2005.

2.2 Schedule of Condition referred to in the lease between The City of Edinburgh Council and David Elliot.

3. CGM EDINBURGH LIMITED - HAYMARKET

Minute of Agreement between The City of Edinburgh Council and CGM (Edinburgh) Limited with the Consent of the Governor and Company of the Bank of Scotland dated 13 May 2005, 16 May 2005 and 19 May 2005.

4. KENMORE CAPITAL - HAYMARKET

Minute of Agreement between The City of Edinburgh Council and Kenmore Capital Edinburgh Limited with the consent of The Governor and Company of the Bank of Scotland unsigned.

ETL 2

5. BRB RESIDUARY - RATHO

Minute of Agreement between The City of Edinburgh Council and BRB (Residuary) Limited dated 31 January 2006 and 9 February 2006.

6. GRAMPIAN COUNTRY FOODS - NEWBRIDGE

Minute of Agreement between the City of Edinburgh Council and Marshall Food Group Limited dated 14 September 2005 and 23 September 2005.

7. MCDONALDS - NEWBRIDGE

Minute of Agreement between The City of Edinburgh Council and McDonalds Restaurant Limited dated 8 November 2005 and 18 January 2005.

8. M RBSI - HANOVER PROPERTIES PLOT - NEWBRIDGE

Minute of Agreement between The City of Edinburgh Council and Trustees of Hanover Property Unit Trust and RBSI Custody Bank Limited and RBSI Trust Company Limited dated 12 October 2005 and 12 December 2005.

9. RHASS - INGLISTON

Minute of Agreement between The City of Edinburgh Council and The Royal Highland Agricultural Society of Scotland dated 8 November 2005 and 9 November 2005.

F. ROUTE WIDE AGREEMENTS

1. BRITISH TRANSPORT POLICE

1.1 Agreement letter between The City of Edinburgh Council and British Transport Police dated 11 November 2005.

1.2 Agreement letter between The City of Edinburgh Council and British Transport Police dated 11 November 2005.

2. BT

Minute of Agreement between The City of Edinburgh Council and British Telecommunications Plc dated 7 February 2006 and 25 January 2006.

3. CABLE AND WIRELESS

Minute of Agreement between The City of Edinburgh Council and Cable and Wireless UK dated 5 October 2006.

4. EASYNET TELECOMMUNICATIONS LIMITED

Minute of Agreement between The City of Edinburgh Council and Easynet Telecommunications Limited dated 1 December 2006 and 28 November 2005.

5. NTL

Minute of Agreement between **tie** Limited and The City of Edinburgh Council and NTL Group Limited and NTL National Networks Limited dated 17 October 2005 and 18 October 2005 and 10 October 2005.

6. SCOTTISH WATER

Minute of Agreement between **tie** Limited and The City of Edinburgh Council and Scottish Water dated 20 June, 23 June and 3 August 2005.

7. THUS

Minute of Agreement between **tie** Limited and The City of Edinburgh Council and Thus Plc dated 7 December 2005 and 1 December 2005.

8. TRANSCO

8.1 Minute of Agreement between **tie** Limited and The City of Edinburgh Council and Transco Plc and Scottish Gas Networks Limited.

8.2 Side letter dated 7 December 2005.

G. SECTION 75 AGREEMENTS

1. CAPITAL CITY HOMES -

1.1 Covering letter and Minute of Agreement between The City of Edinburgh Council and Capital City Homes dated 5 January 2006 and 9 January 2006.

1.2 Covering letter and Minute of Agreement between The City of Edinburgh Council and Capital City Homes dated 20 January 2006 and 26 January 2006.

1.3 Covering letter and Minute of Agreement between The City of Edinburgh Council and Capital City Homes dated 7 November 2006 and 11 November 2006.

2. CLYDESIDE INVESTMENT PROPERTIES

Covering letter and Minute of Agreement between The City of Edinburgh Council and Clydeside Investment Properties dated 14 November 2005 and 23 November 2005.

3. FORTH PORTS - Granton Harbour

3.1 Minute of Agreement between The City of Edinburgh Council and Forth Ports Plc dated 19 June 2003 and 20 June 2003.

3.2 Minute of Agreement between The City of Edinburgh Council and Forth Ports Plc dated 28 June 2002

4. NEL

4.1 Covering letter and Minute of Agreement between The City of Edinburgh Council and New Edinburgh Limited and **tie** Ltd and The Edinburgh Branded Hotel and Leisure LLP with the consent of The Governor and Company of The Bank of Scotland dated 13, 17, 19 and 23 August 2005 and 1 and 8 September 2005.

4.2 Covering letter and Minute of Agreement between The City of Edinburgh Council and New Edinburgh Limited with the consent of The Governor and company of the Bank of Scotland dated 25 November 2005, 5 December 2006 and 9 January 2006.

5. RBS - GOGAR

Minute of Agreement between The City of Edinburgh Council and The Royal Bank of Scotland Plc dated 6 November 2002 and 8 November 2002.

6. SECONDSITE - PORT GREENWICH

Minute of Agreement between The City of Edinburgh Council Limited and Port Greenwich Limited dated 28 February 2006.

7. SKILLEXPRESS

Letter enclosing Minute of Agreement between The City of Edinburgh Council and SkillExpress Limited dated 27 April 2005 and 3 May 2005.

8. TUSCAN DAWN

Letter enclosing Minute of Agreement between The City of Edinburgh Council and Tuscan Dawn Limited dated 29 September 2005 and 3 October 2005.

SCHEDULE PART 13

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   - 1.2 Part 2 (Table headed Leith Docks Tram Integration)
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   - 2.1 Part 1 (Plan)
   - 2.2 Part 2 (Route Plan)
3. Appendix 3 - City Point Unit Trust
   - 3.1 Part 1 (Plan 1)
   - 3.2 Part 2 (Plan 2)
4. Appendix 4 - Ocean Terminal Limited
   - 4.1 Part 1 (Site Specific Plans)
   - 4.2 Part 2 (Table headed Ocean Terminal Tram Integration)
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13. Appendix 13 - Edinburgh Airport Limited

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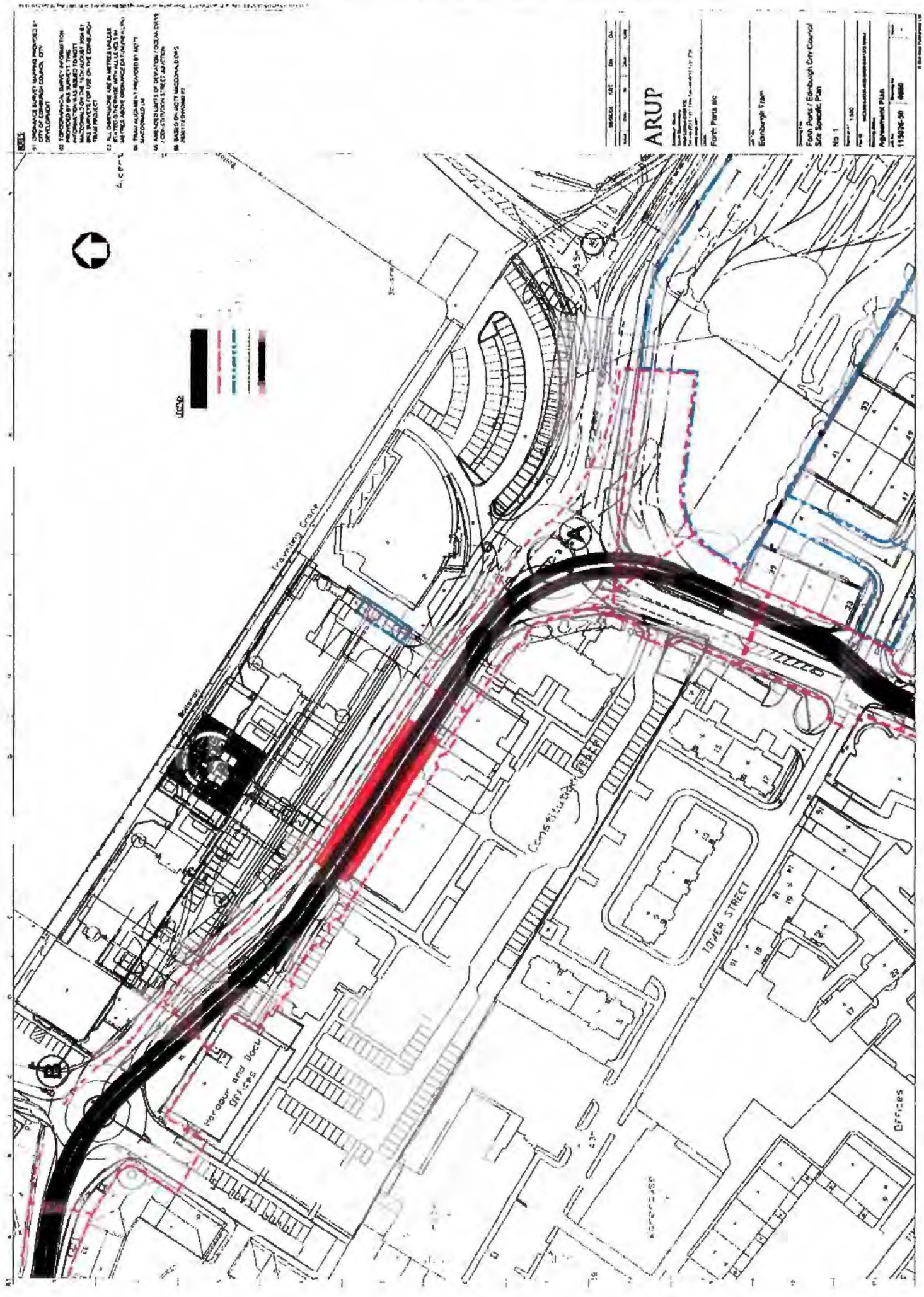
Appendix 1

Forth Ports plc

Part 1 (Site Specific Plans)

Part 2 (Table headed Leith Docks Tram Integration)

These are the Site Specific Plans referred to in paragraph 1.1 of Section 1 of Schedule 13.



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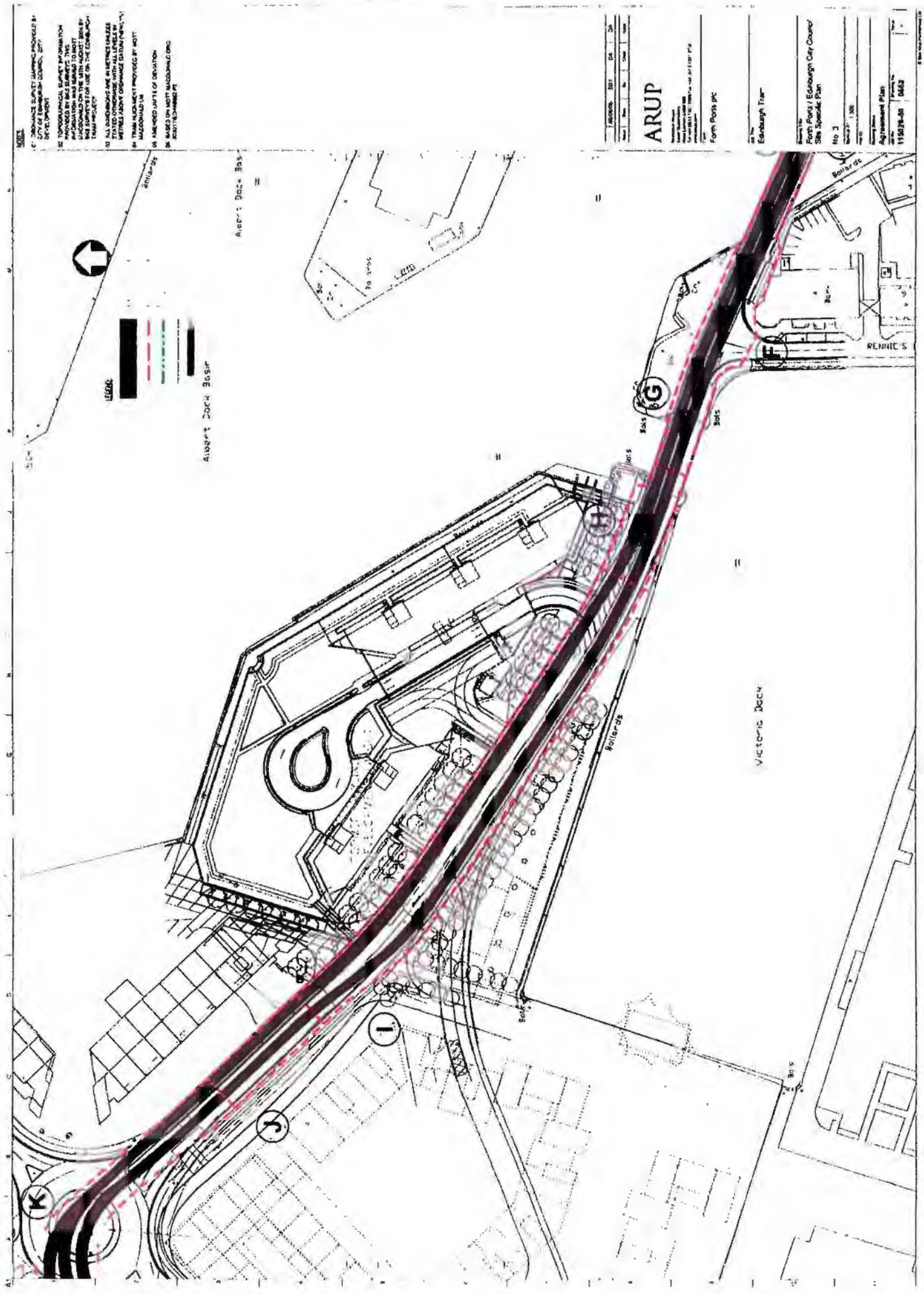

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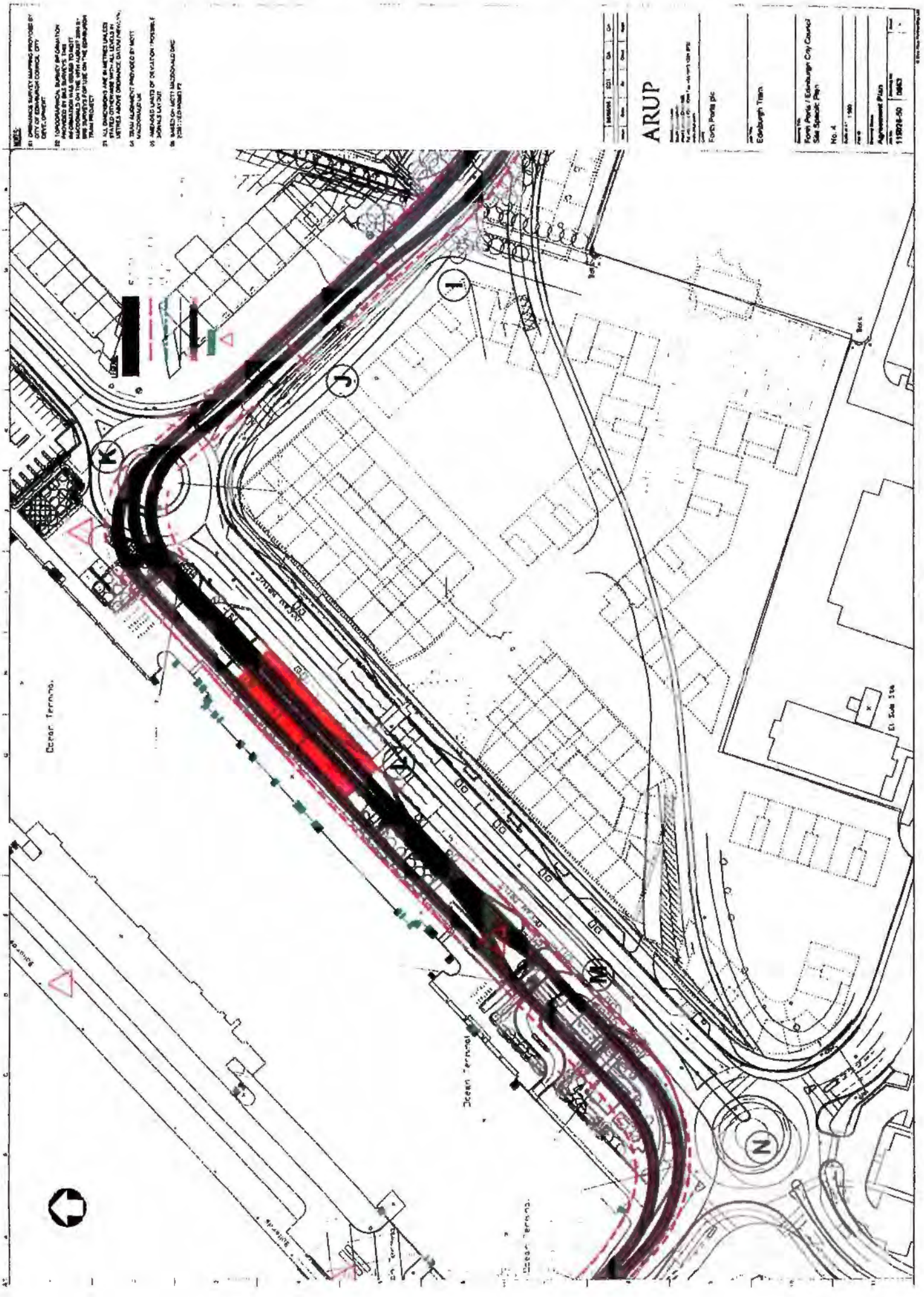

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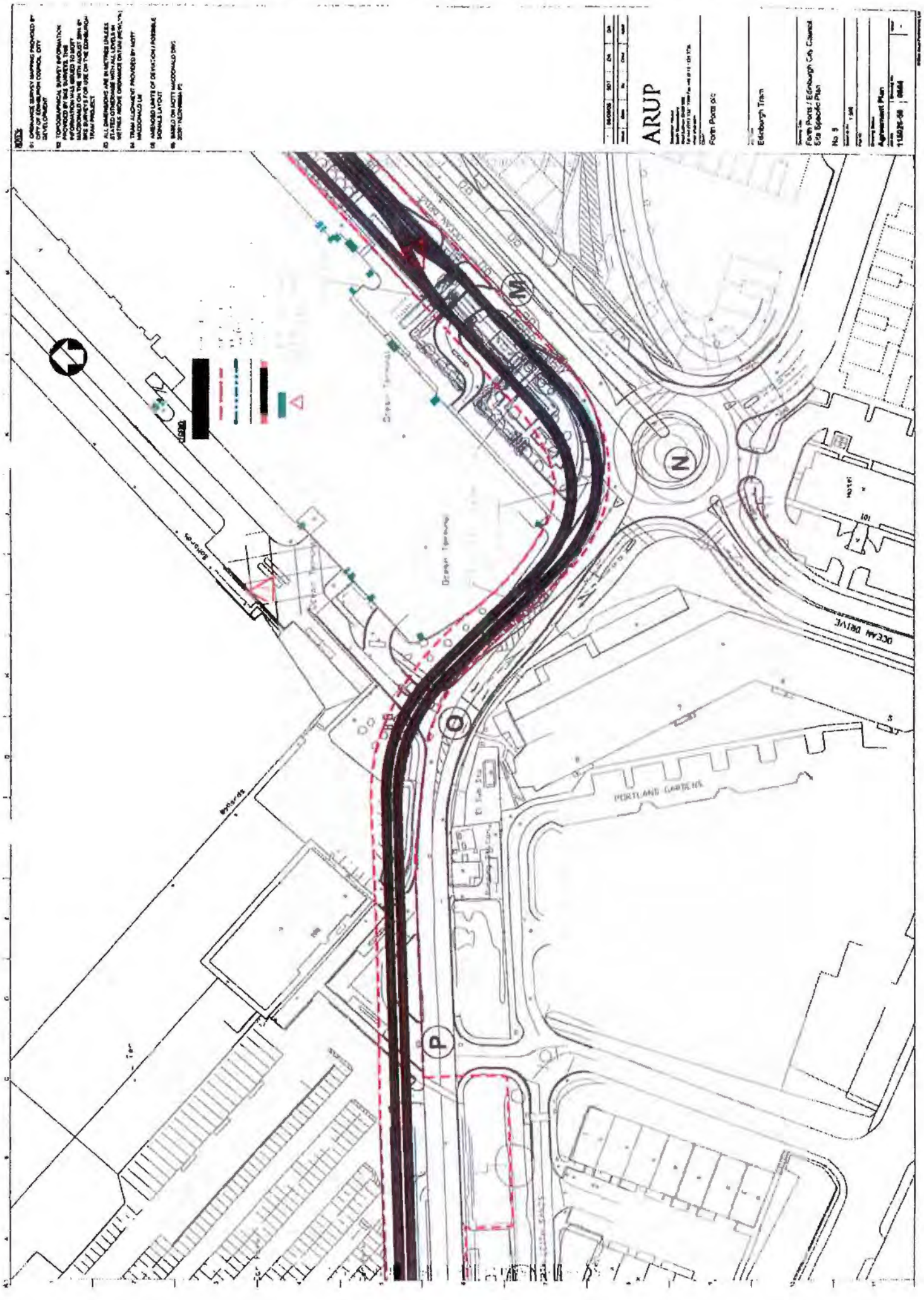

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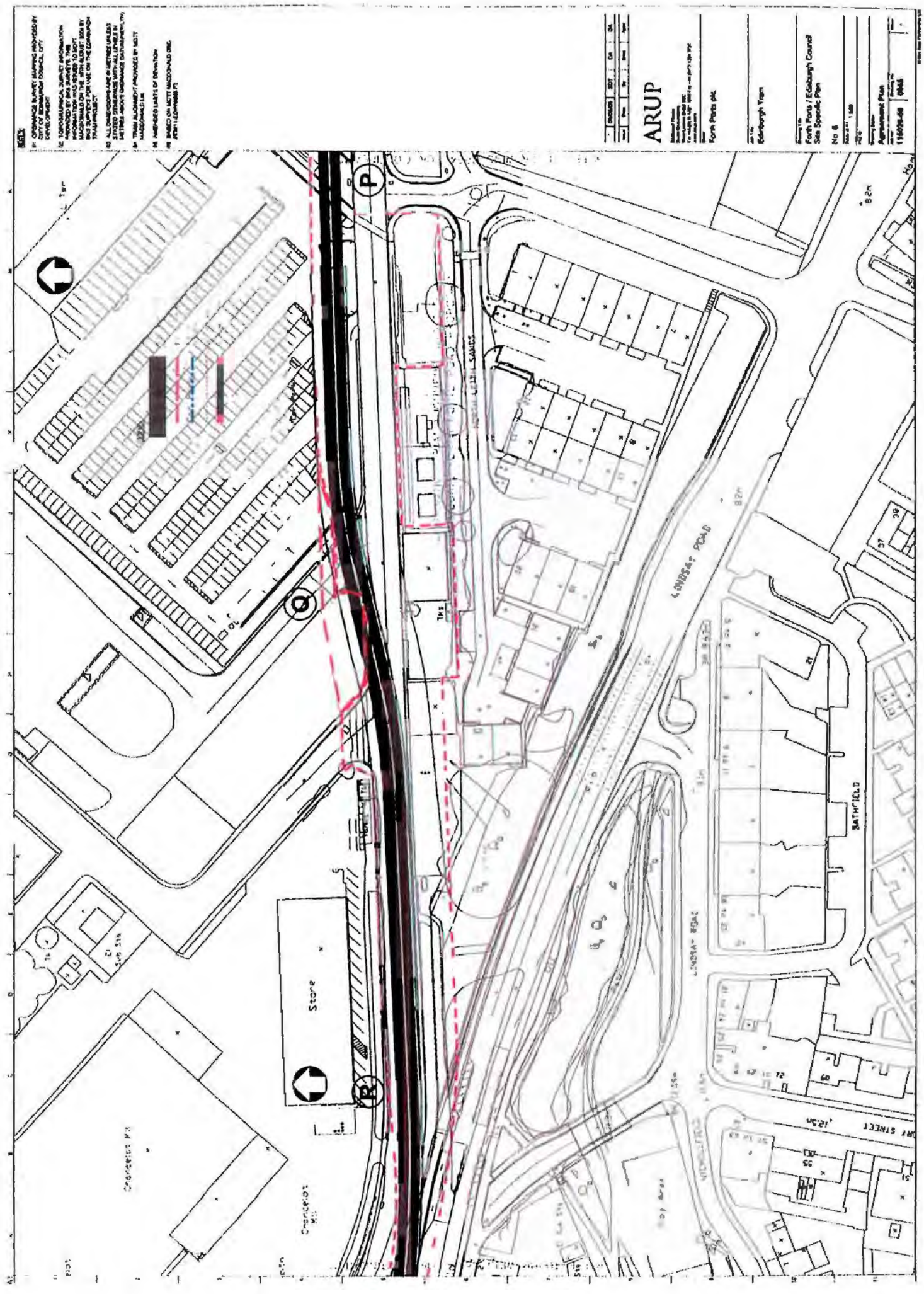

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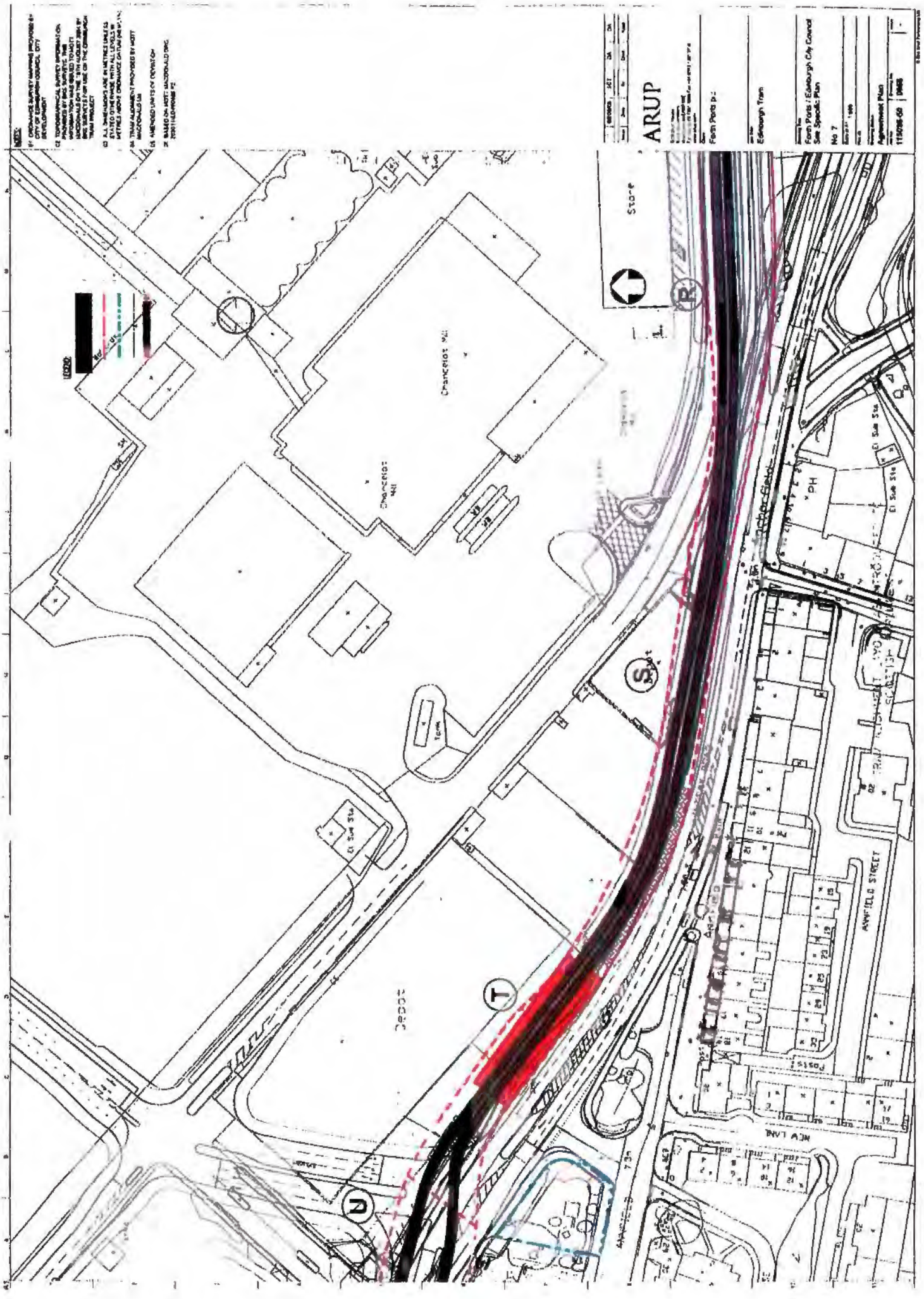

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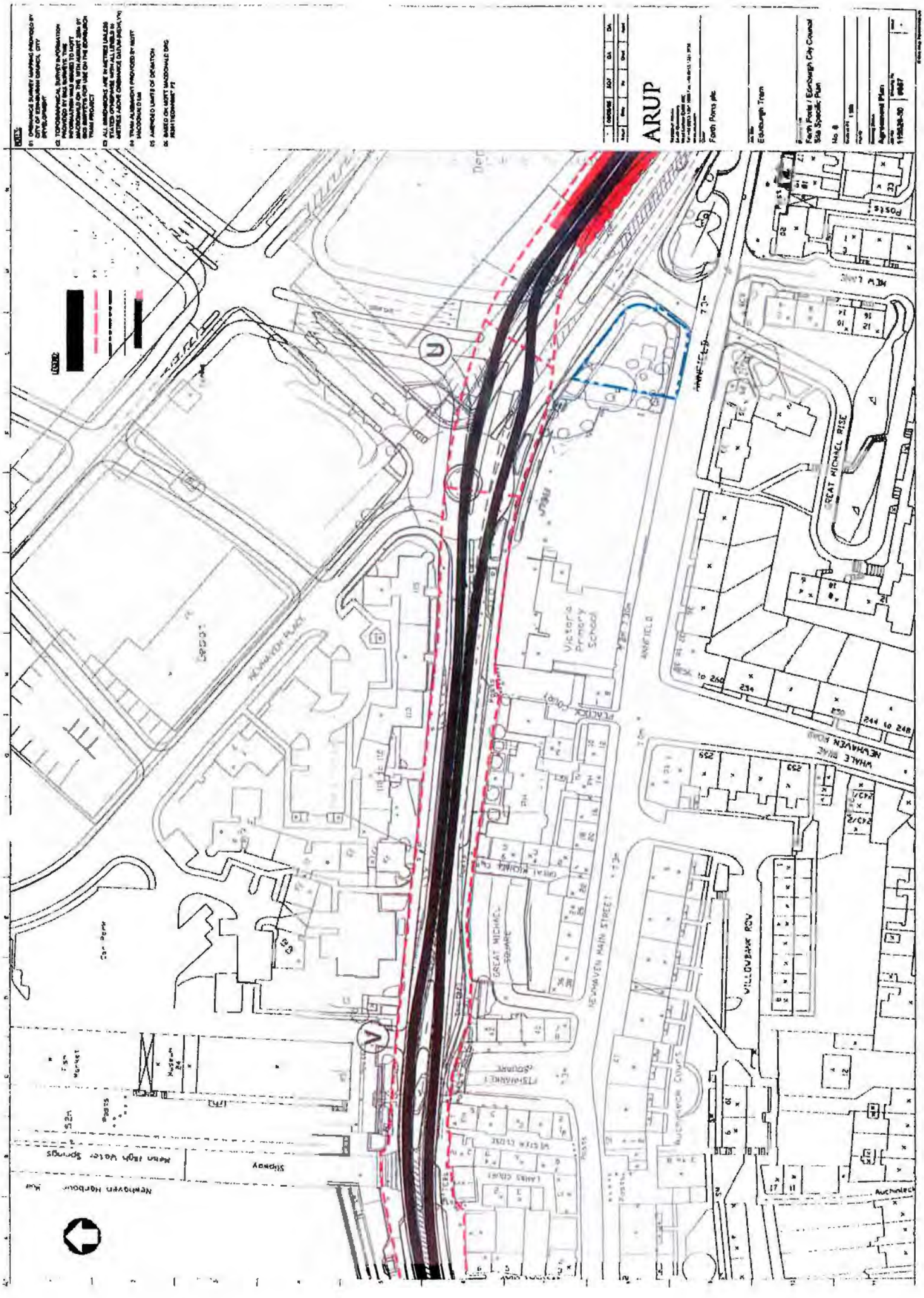

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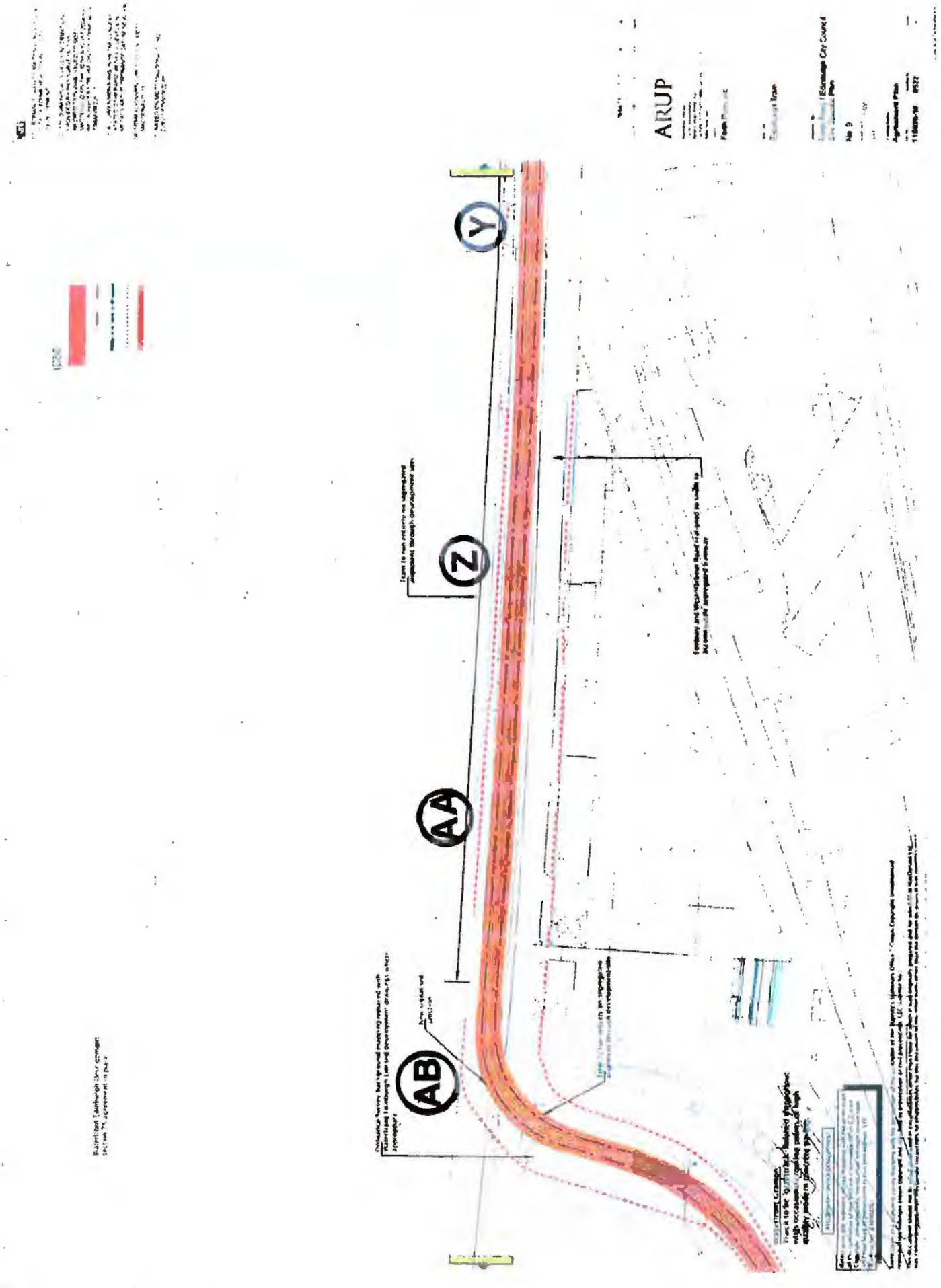

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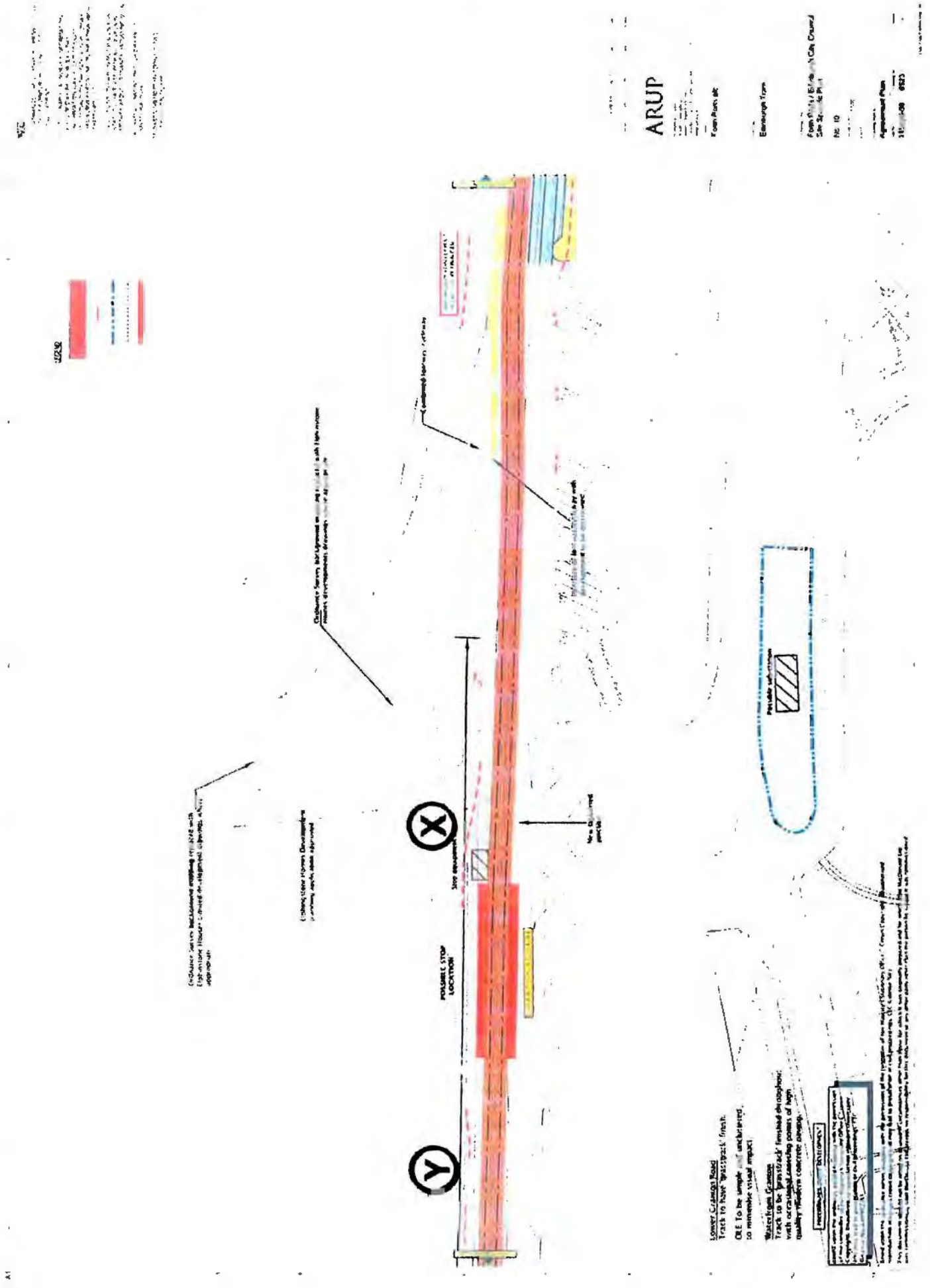


These are the Site Specific Plans referred to in paragraph 1.1 of Section 1 of Schedule 13.

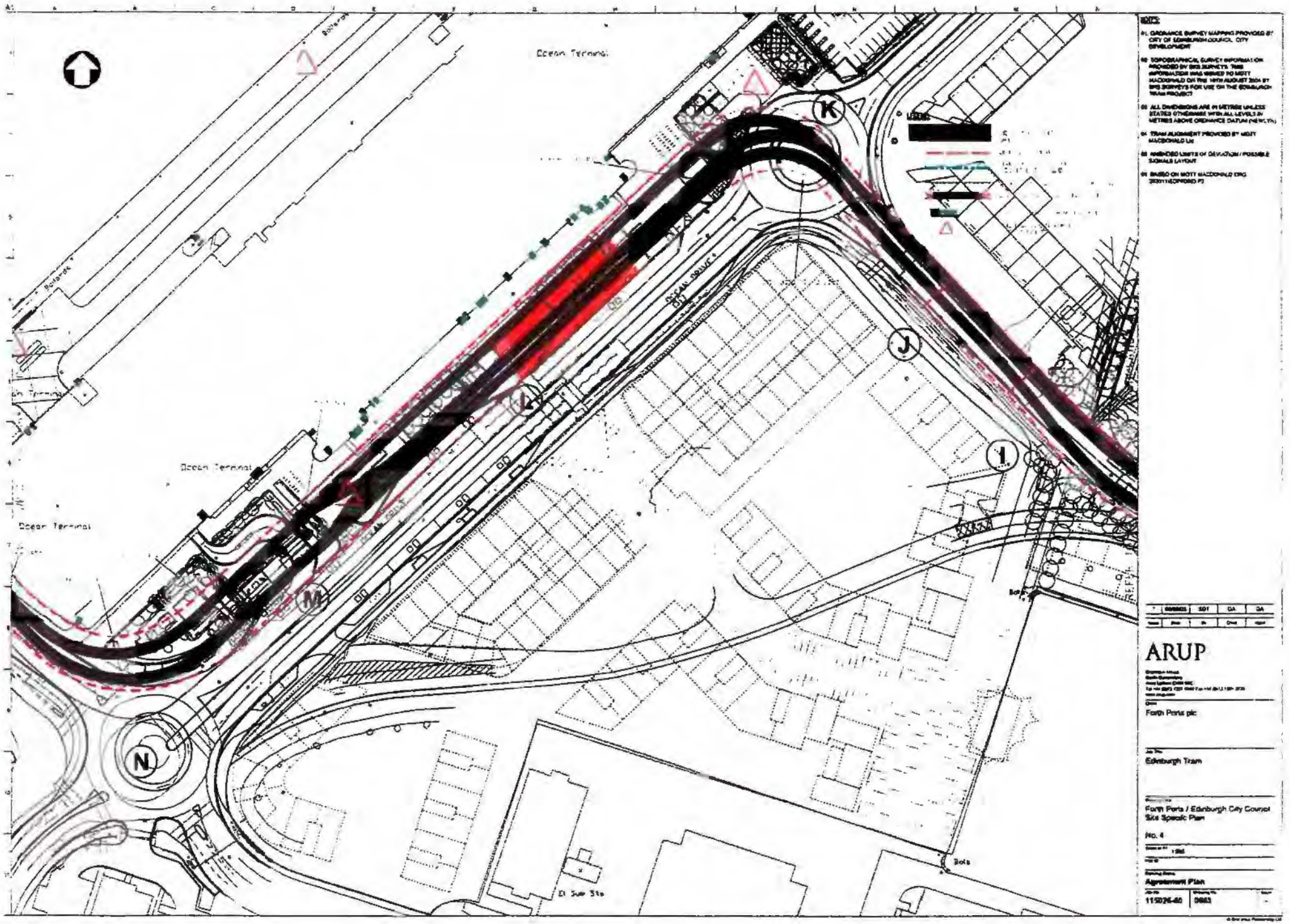


This schedule sets out the access and junction requirements associated with the development of Forth Ports PLC's land. The Council as promoter of Edinburgh Tram Line One shall ensure that the design of Tram Line One will accommodate such access and junction requirements. This clause does not negate the need for appropriate consents. This schedule should be read in conjunction with the amended consultation drawings prepared by Arup for Forth in respect of the Tram, reference ******** which drawings are referred to in the Agreement between Forth and the City of Edinburgh Council. This schedule and the drawings referred to are annexed to and form part of such Agreement.

Reference	Drawing Ref	Requirement
A	0660	Space for construction of traffic signal controlled junction to the east of Stanley Casino. Modification of the LOD for Works Nos. 4 and 4B. Non-acquisition of land marked 39, 41 on Sheet no 6. Forth will transfer land to allow solution with Stanley Casino as shown in this drawing 0660 on request and free from consideration. The solution demonstrated is proposed to cover the intent of both the Council and Forth that there should be created in the future in this location a road suitable for accommodating four lanes and associated footpath and other works to an adoptable standard to provide full vehicular access to the area generally to the East to be developed pursuant to the Leith Docks Development Framework SPG.
B	0661	Provision of a signal controlled cross roads at the junction of Tower Place and Ocean Drive,. All turning movements are to be allowed within the junction, and provision made for pedestrian crossings on all arms of the junction.
C D not used.	0661	Provision of a pedestrian crossing of Ocean Drive to the east of Victoria Bridge.
E	0661	Removal of LLAU adjacent to Victoria Bridge, an non-acquisition of land marked 59a, 60a and 64a on Sheet no 6. Provision required in this area to enable continuing vehicular and pedestrian access to land at North East of bridge for party carrying out clearance of debris from Water of Leith. Extent of bridge to transfer to be limited to ensure that Forth continue to be able to exercise rights of passage under bridge spans which areas should remain in Forth ownership.
F	0661	Maintain existing road junction to Rennie's Isle allowing all turning movements.
G	0661	Provision of a junction to land to the north of Ocean Drive allowing all turning movements such land being allocated for future potential development.
H	0662	Provision of a junction to land on the northern side of Ocean Drive, allowing left in/left out turning movements. Modification of LOD for Works Nos 5 and 6
I	0662	Provision of a traffic signal controlled junction allowing access to land to the north and south of Ocean Drive north including pedestrian crossing facilities of Ocean Drive
J	0662	Provision of a junction to land on the southern side of Ocean Drive, allowing

USB00000078_0017

		left in/ left out turning movements
K	0663	Deletion of Works Nos 8A and 8B and modification of LOD for Work No 8. Non acquisition of land marked 69 on Sheet no 7.
L	0663	Pedestrian crossing facility outside Ocean Terminal Main Entrance.
M	0663	Installation of traffic signals on the car park entrance to advise of the approach of trams.
N	0663	Provision of traffic signal controlled junction on Ocean Drive in place of existing roundabout to the south east of Ocean Terminal.
O	0664	Maintain existing junction allowing all traffic movements and modification of LOD for Work No 8
P	0664	Maintain existing access link at North Leith Sands allowing all traffic movements. Non-acquisition of land marked 71, 73 and 74a on Sheet no 7
Q	0665	Provide signal controlled traffic junction allowing all traffic movements and provision of pedestrian/ cycle facilities. Proposal noted of alternative Tram alignment.
R	0666	Provide a junction between Lindsay Road and Ocean Drive ..
S T	0666	Non-acquisition of LLAU and land marked 88a and 89a on Sheet no 8
U	0666	Provision of traffic signal controlled junction for Western Harbour including modifications to Works Nos 8 and 9 and non-acquisition of land marked 92 on Sheet no 8. For these purposes it is acknowledged and assumed that the road junction will be reconfigured and designed generally as shown on this drawing.
V	0667	Maintain existing junction at Newhaven Fish Market
W	0524	Maintain existing access to Granton Harbour breakwater per Agreement allowing all traffic movements and classes of vehicles without particular weight restriction.
X	0523	Maintain existing access to Granton Harbour, through provision of traffic signals allowing all turning movements consistent with the revised layout and operation of Granton Square. Location of Equipment Room to be considered further.
Y	0522	Provision of access to Granton Harbour
Z	0522	Provision of priority junction allowing all turning movements to land to the north of West Harbour Road
aa	0522	Provision of access to Granton Harbour
bb	0522	Provision of traffic signal controlled junction at the junction of West Harbour Road and Chestnut Street allowing all turning movements and incorporating pedestrian/cycle facilities.



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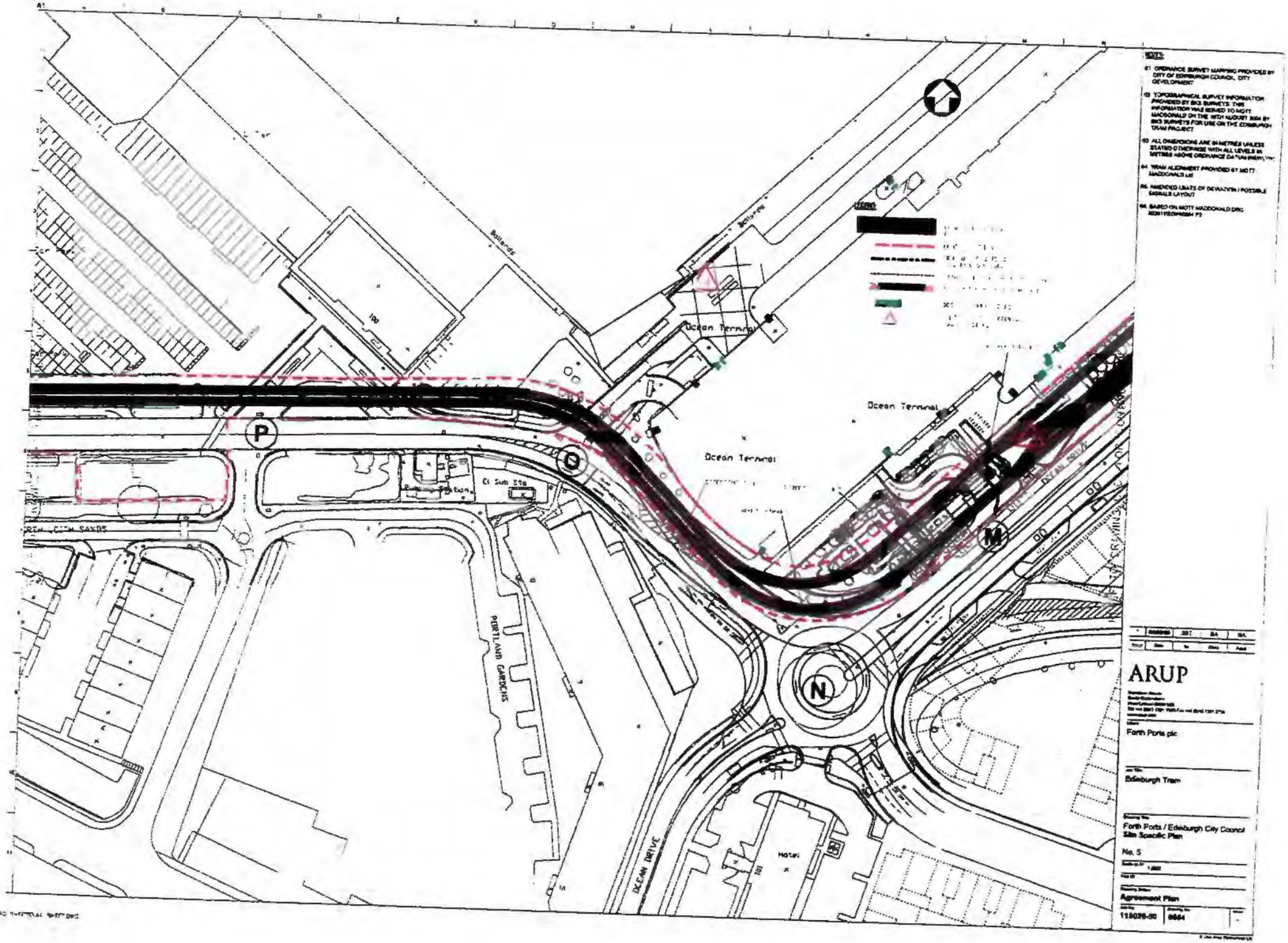

Ocean Terminal
Ocean Terminal
Ocean Terminal
Bollards
Bollards
El Sub Sta
PORTLAND GARDENS
OCEAN DRIVE
Hotel
P
O
M
N
ARUP
Forth Ports plc
Edinburgh Tram
Forth Ports / Edinburgh City Council
Site Specific Plan
No. 5
Agreement Plan

Appendix 2

Trillium (Prime) Property GP Limited and Land Securities Trillium Limited

Part 1 (Plan)

Part 2 (Route Plan)

This is the Plan forming part 1 of Appendix 2 referred to in paragraph 3.1 of Section 3 of Schedule 13

LAND REGISTER OF SCOTLAND	Officer's ID / Date	TITLE NUMBER
	3569 18/8/2004	**MID60865**
ORDNANCE SURVEY NATIONAL GRID REFERENCE		Scale 1/1250
NT2373SE NT2473SW		Survey Scale 1/1250

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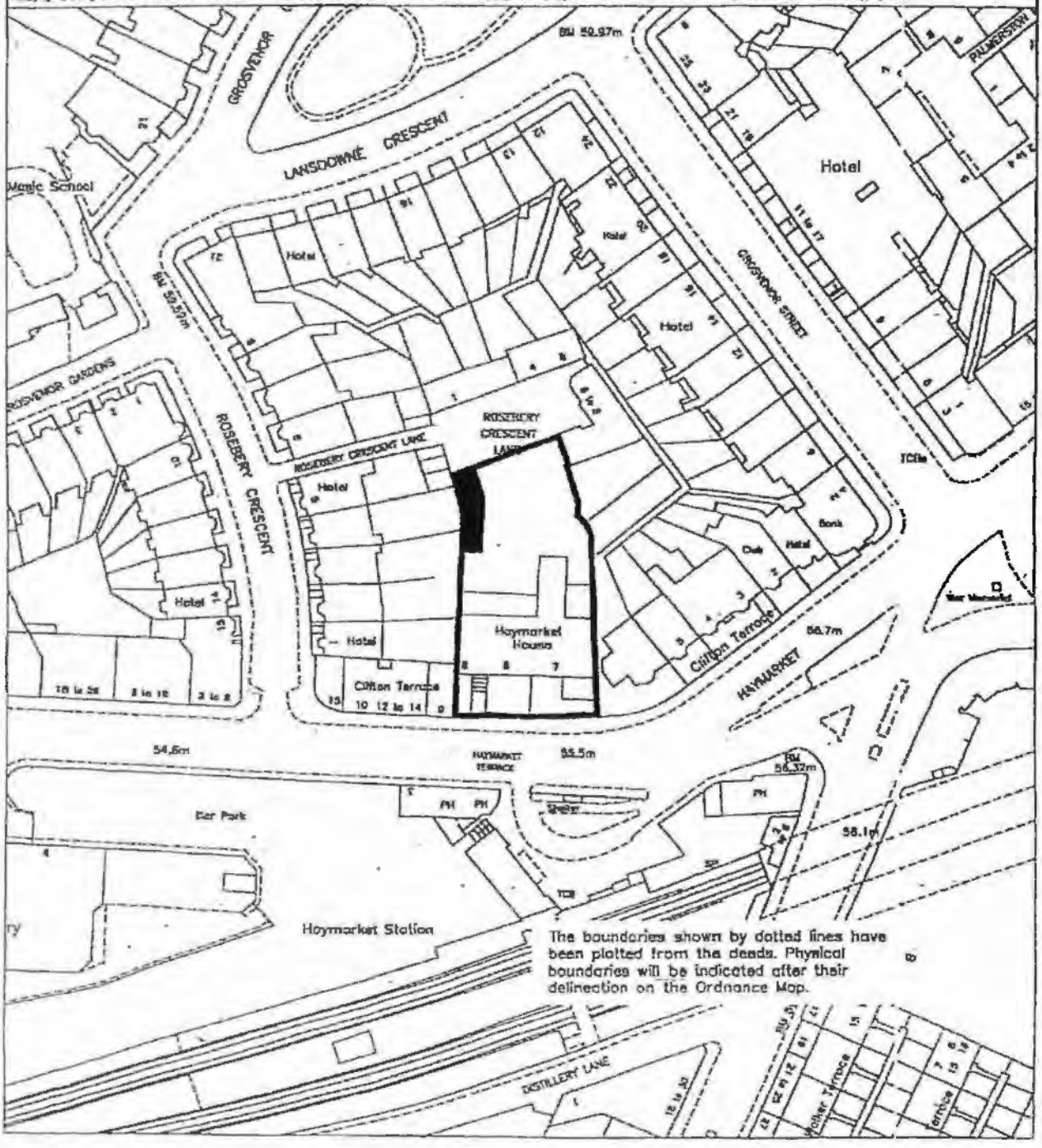
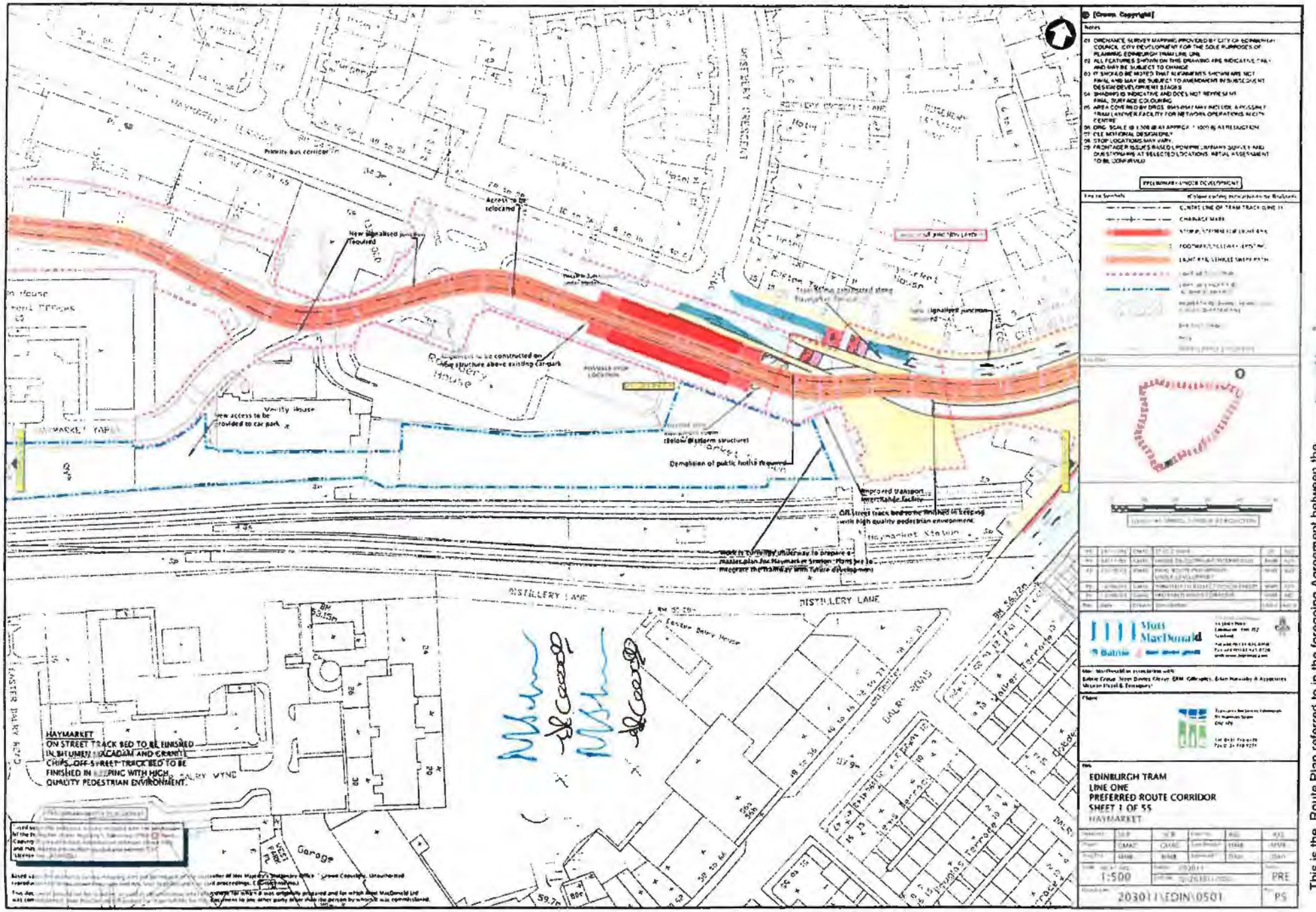


This is the Plan referred to in the foregoing Agreement between the City of Edinburgh Council, Trillium (Prime) Property GP Limited and Land Securities Trillium Limited

This is the Route Plan forming Part 2 of Appendix 2 referred to in paragraph 3.1 of Section 3 of Schedule 13



This is the Route Plan referred to in the foregoing Agreement between the City of Edinburgh Council, Trillium (Prime) Property GP Limited and Land Securities Trillium Limited

USB00000078_0023

Appendix 3

City Point Unit Trust

Part 1 (Plan 1)

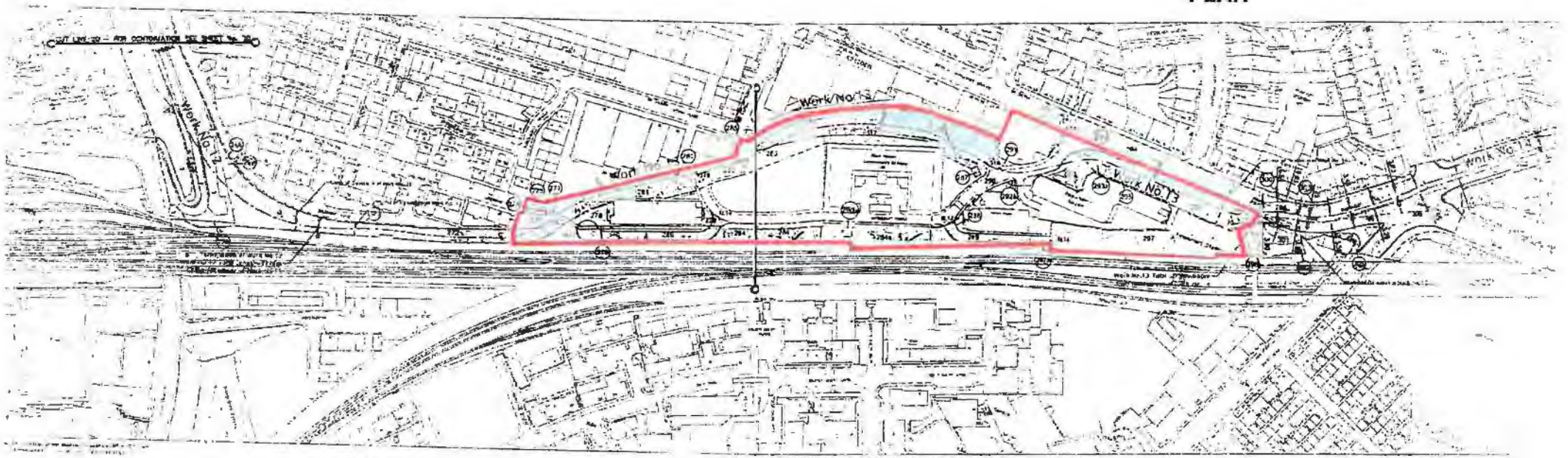
Part 2 (Plan 2)

This is Plan 1 forming part 1 of Appendix 3 as referred to in paragraph 4.1 of Section 4 of Schedule 13

PLAN 3/

CITY OF EDINBURGH
EDINBURGH TRAM (LINE ONE)

PLAN

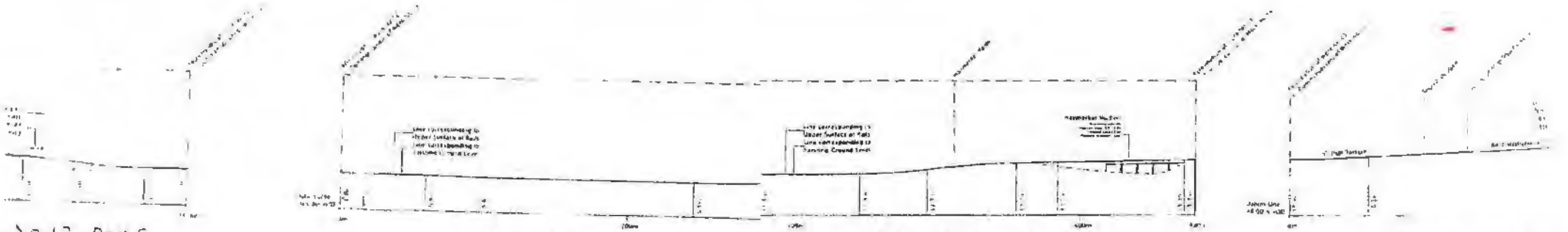


SECTIONS

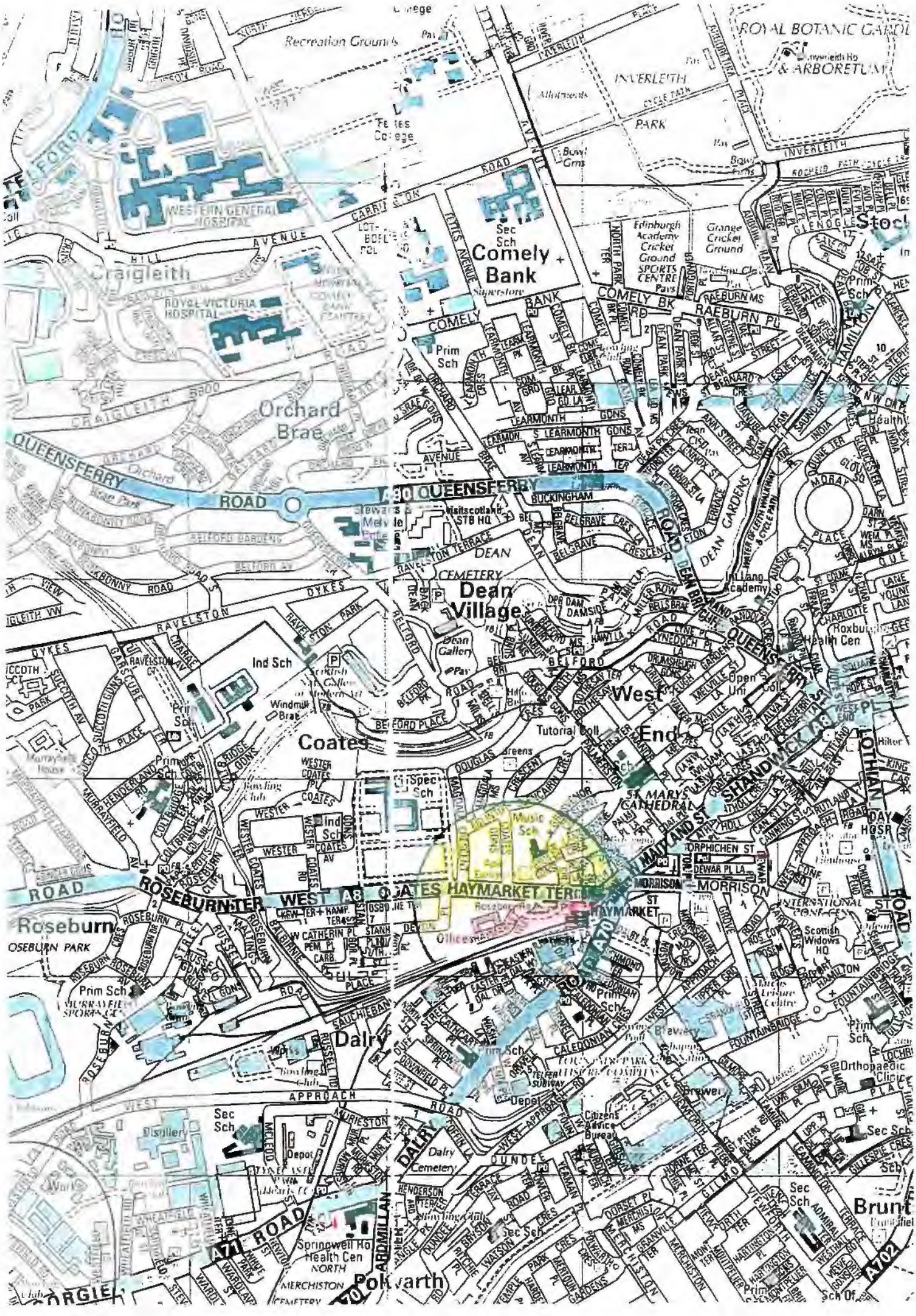
CITY OF EDINBURGH
EDINBURGH TRAM (LINE ONE)

PLAN

SECTIONS



USB00000078_0025



This is Plan 2 forming part 2 of Appendix 3 as referred to in paragraph 4.1 of Section 4 of Schedule 13

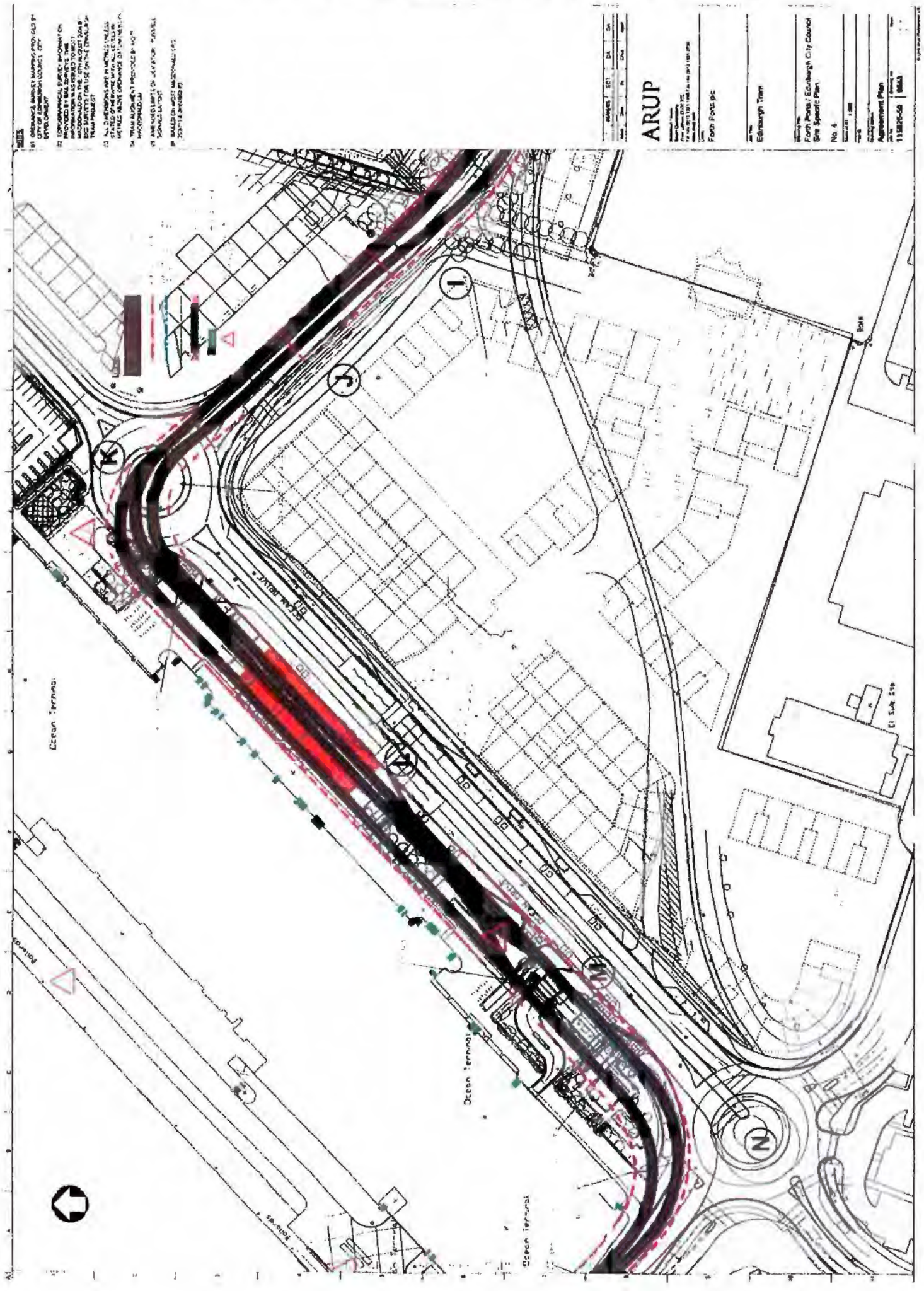
Appendix 4

Ocean Terminal Limited

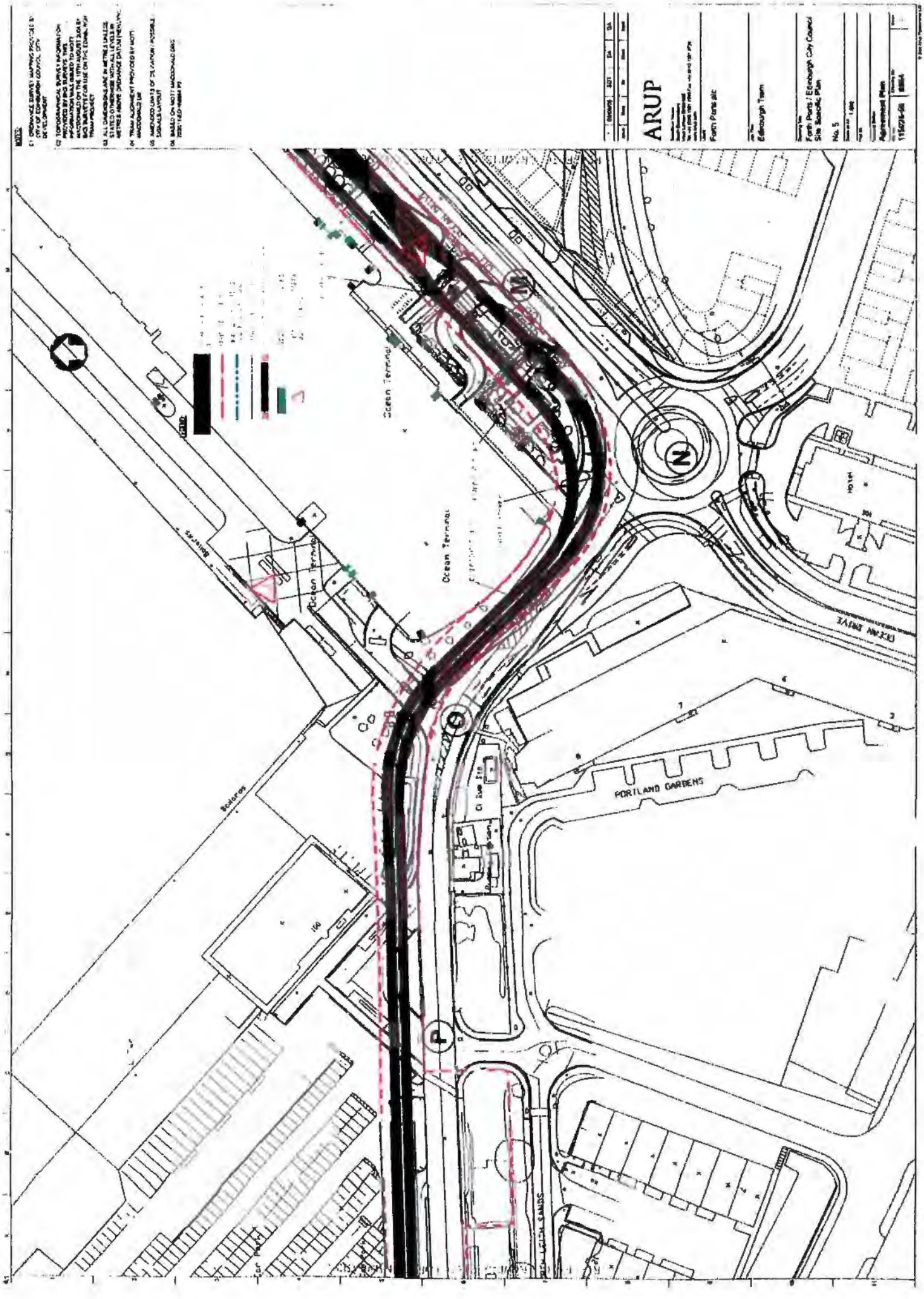
Part 1 (Site Specific Plans)

Part 2 (Table headed Ocean Terminal Tram Integration)

These are the Site Specific Plans referred to in paragraph 5.1 of Section 5 of Schedule 13.



These are the Site Specific Plans referred to in paragraph 5.1 of Section 5 of Schedule 13.



This is the Table referred to in paragraph 5.1 of Section 5 of Schedule 13.

PART 4

THE TABLE

This schedule sets out the access and junction requirements associated with the development of land belonging to Ocean Terminal Limited. The Council as promoter of Edinburgh Tram Line One shall ensure that the design of Tram Line One will accommodate such access and junction requirements. This clause does not negate the need for appropriate consents. This schedule should be read in conjunction with the amended consultation drawings prepared by Arup for Ocean Terminal Limited in respect of the Tram, reference ******** which drawings are referred to in the Agreement between Ocean Terminal Limited and the City of Edinburgh Council. This schedule and the drawings referred to are annexed to and form part of such Agreement.

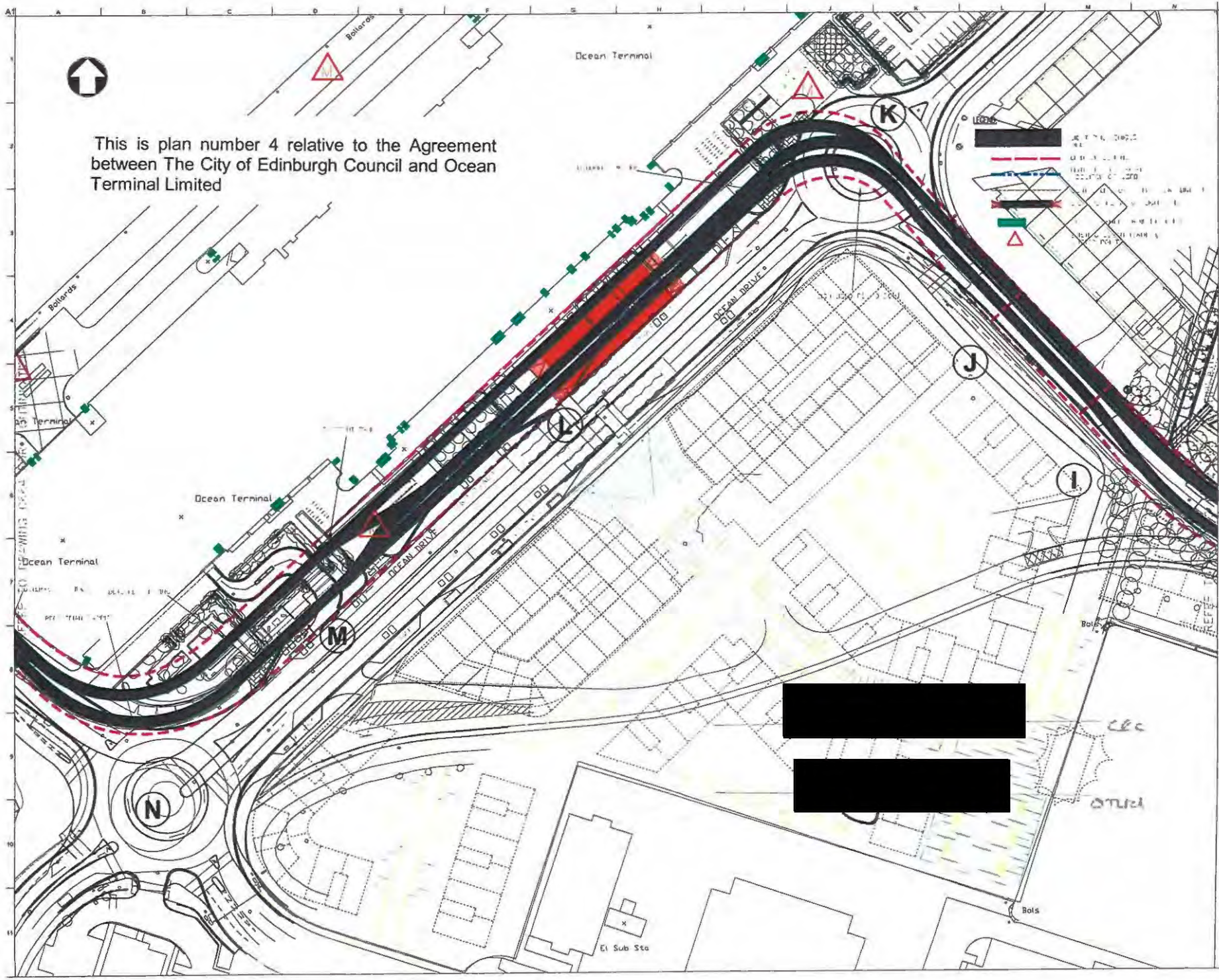
K	0663	Deletion of Works Nos 8A and 8B and modification of LOD for Work No 8. Non acquisition of land marked 69 on Sheet no 7.
L	0663	Pedestrian crossing facility outside Ocean Terminal Main Entrance.
M	0663	Installation of traffic signals on the car park entrance to advise of the approach of trams.
N	0663	Provision of traffic signal controlled junction on Ocean Drive in place of existing roundabout to the south east of Ocean Terminal.
O	0664	Maintain existing junction allowing all traffic movements and modification of LOD for Work No 8

Appendix 5

The Royal Yacht Britannia Trust

Part 1 (Site Specific Plans)

Part 2 (Table)


This is plan number 4 relative to the Agreement between The City of Edinburgh Council and Ocean Terminal Limited

NOTES:

01. ORDNANCE SURVEY MAPPING PROVIDED BY CITY OF EDINBURGH COUNCIL, CITY DEVELOPMENT
02. TOPOGRAPHICAL SURVEY INFORMATION PROVIDED BY BKS SURVEYS. THIS INFORMATION WAS ISSUED TO MOTT MACDONALD ON THE 10TH AUGUST 2004 BY BKS SURVEYS FOR USE ON THE EDINBURGH TRAM PROJECT.
03. ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE WITH ALL LEVELS IN METRES ABOVE ORDNANCE DATUM (NEWLYN).
04. TRAM ALIGNMENT PROVIDED BY MOTT MACDONALD Ltd.
05. AMENDED LIMITS OF DEVIATION / POSSIBLE SIGNALS LAYOUT
06. BASED ON MOTT MACDONALD DRG 203011\EDIN\0663 P2

Issue	Date	By	Chkd	Appd
-	06/06/05	SDT	DA	DA

ARUP

Forth Ports plc

Edinburgh Tram

Forth Ports / Edinburgh City Council Site Specifc Plan

No. 4

Scale at A1 1:500

Agreement Plan

Job No	Drawing No	Sheet
115026-50	0663	-

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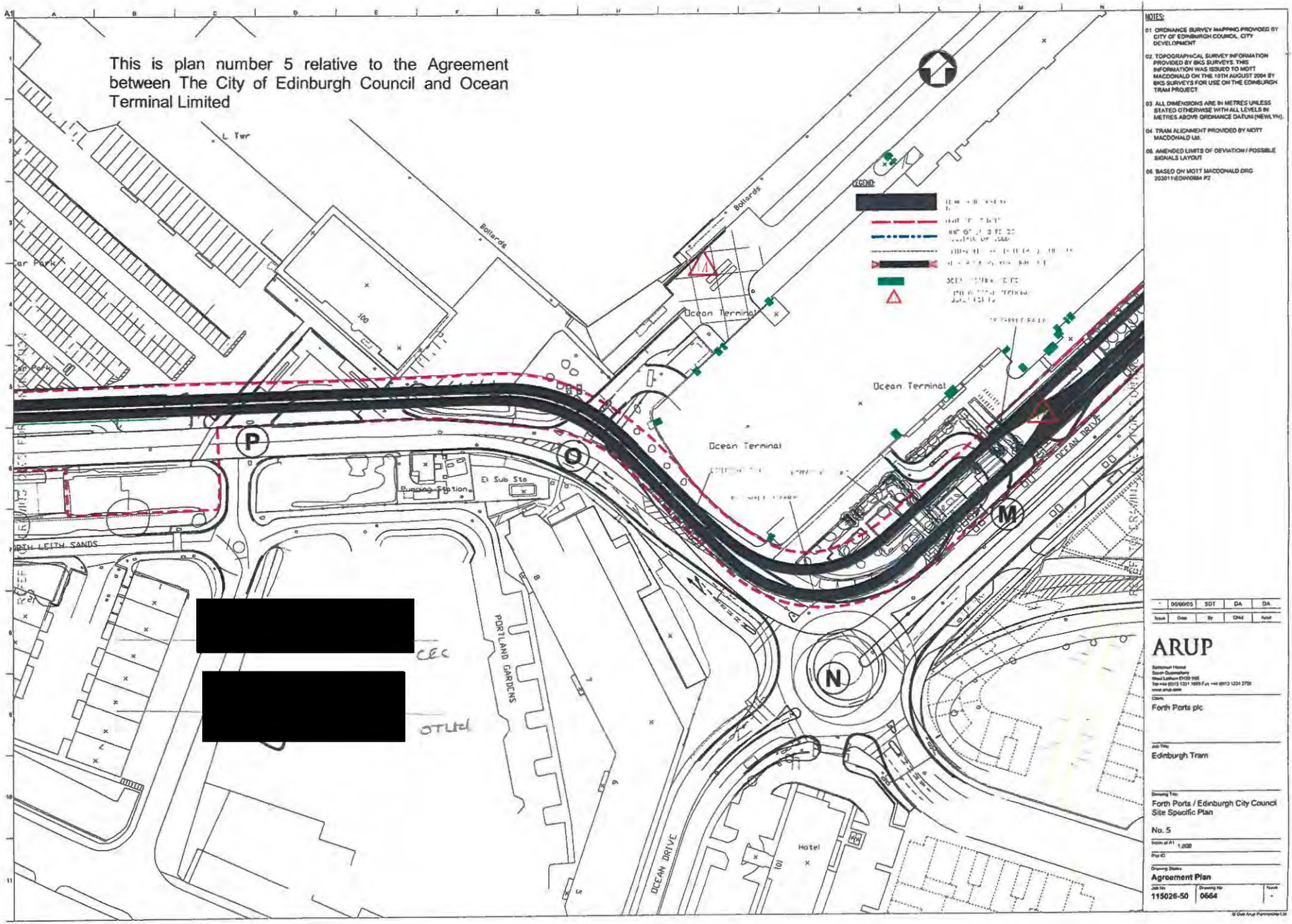
Krel...\DRG SHEETS\A1 SHEET.DWG

USB00000078_0032



USB00000078_0033

Xref...\DRG SHEETS\A1 SHEET.DWG

THE TABLE

K	0663	Deletion of Works Nos 8A and 8B and modification of LOD for Work No 8. Non acquisition of land marked 69 on Sheet no 7.
L	0663	Pedestrian crossing facility outside Ocean Terminal Main Entrance.
M	0663	Installation of traffic signals on the car park entrance to advise of the approach of trams.
N	0663	Provision of traffic signal controlled junction on Ocean Drive in place of existing roundabout to the south east of Ocean Terminal.
O	0664	Maintain existing junction allowing all traffic movements and modification of LOD for Work No 8

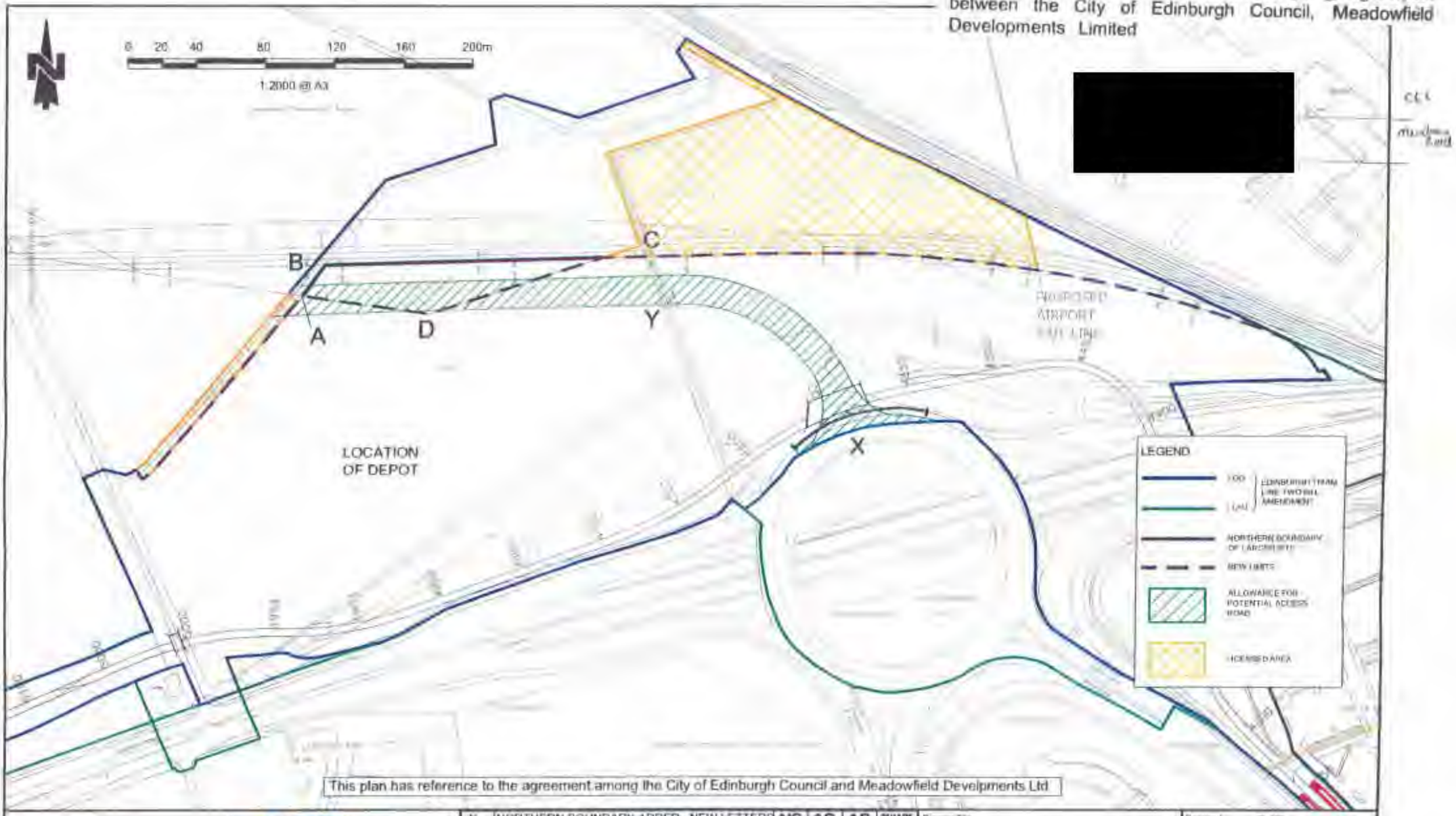
Appendix 6

Meadowfield Developments Limited

Plan

This is the Plan referred to in the foregoing Agreement between the City of Edinburgh Council, Meadowfield Developments Limited

[redacted]



This plan has reference to the agreement among the City of Edinburgh Council and Meadowfield Develpments Ltd

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19 Haymarket Yards
Edinburgh
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Fax 0131 633 6301

Rev	Description of revision	Drawn	Chkd	App	Date
K	NORTHERN BOUNDARY ADDED, NEW LETTERS	AIC	AS	AS	25/11/05
J	COLORS ADJUSTED, DEPOT NOTE ADDED	AIC	AS	AS	24/11/05
H	LICENSED AREA ADDED ADDED	PM	AIC	AS	18/11/05
G	ACCESS RD AND NEW LIMITS ADDED	PM	AIC	AS	17/11/05
F	LAYOUT FOR SIDE AGREEMENT	NSM	AIC	AS	14/09/05
E	REQUIRED LAND AREAS AMENDED	NSM	AIC	AS	13/09/05
D	LAND REQUIRED AREAS MODIFIED	AIC	AS	GRM	31/08/05

Drawing Title: EDINBURGH TRAM LINE TWO PLAN A

Drawing No: 30894 / C306

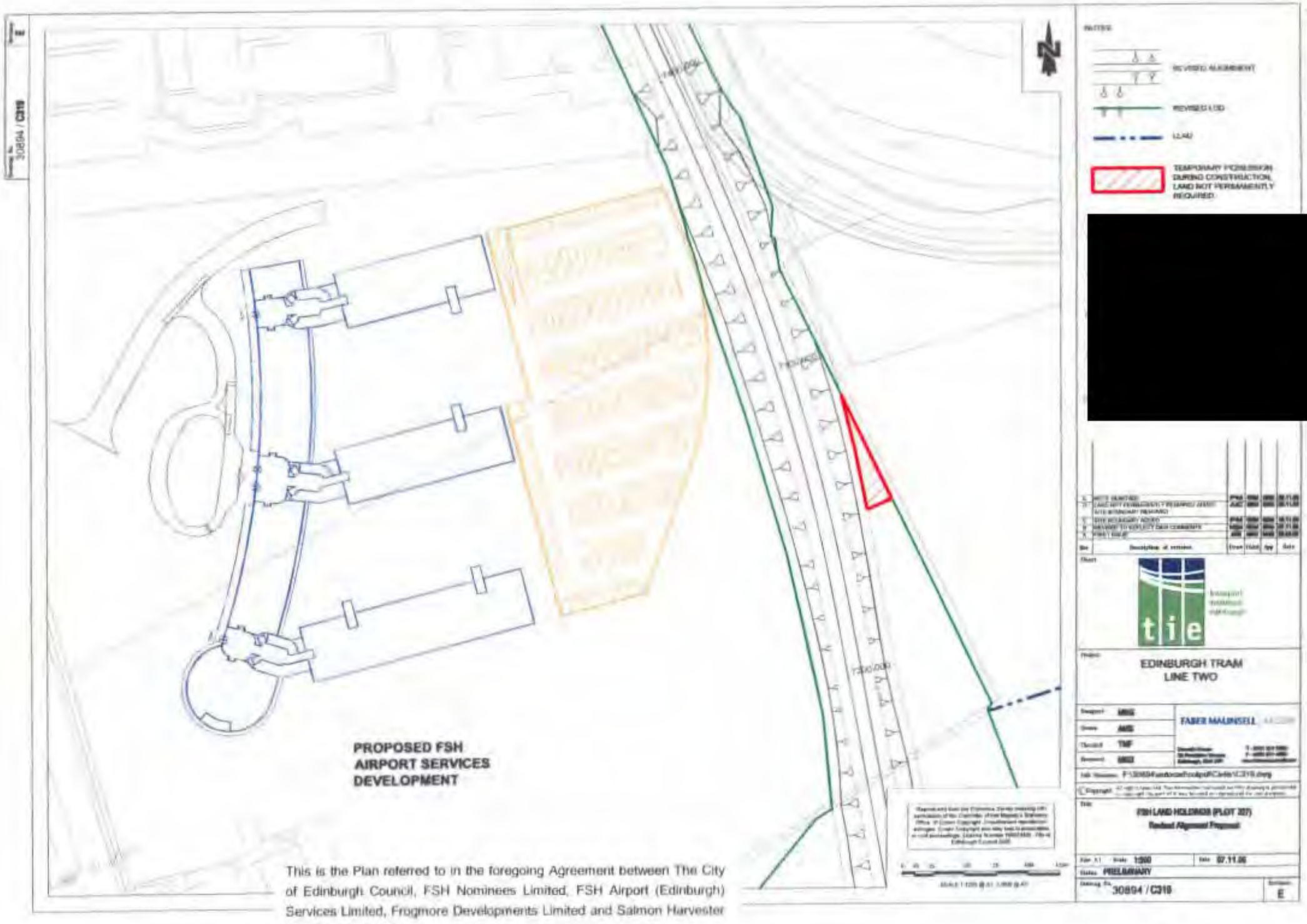
Designed: SJP
Drawn: AIC
Approved: GRM
Scale: 1 : 2000 @ A3
Revision: K
Status: DRAFT

USB00000078_0036

Appendix 7

FSH Nominees Limited

Plan

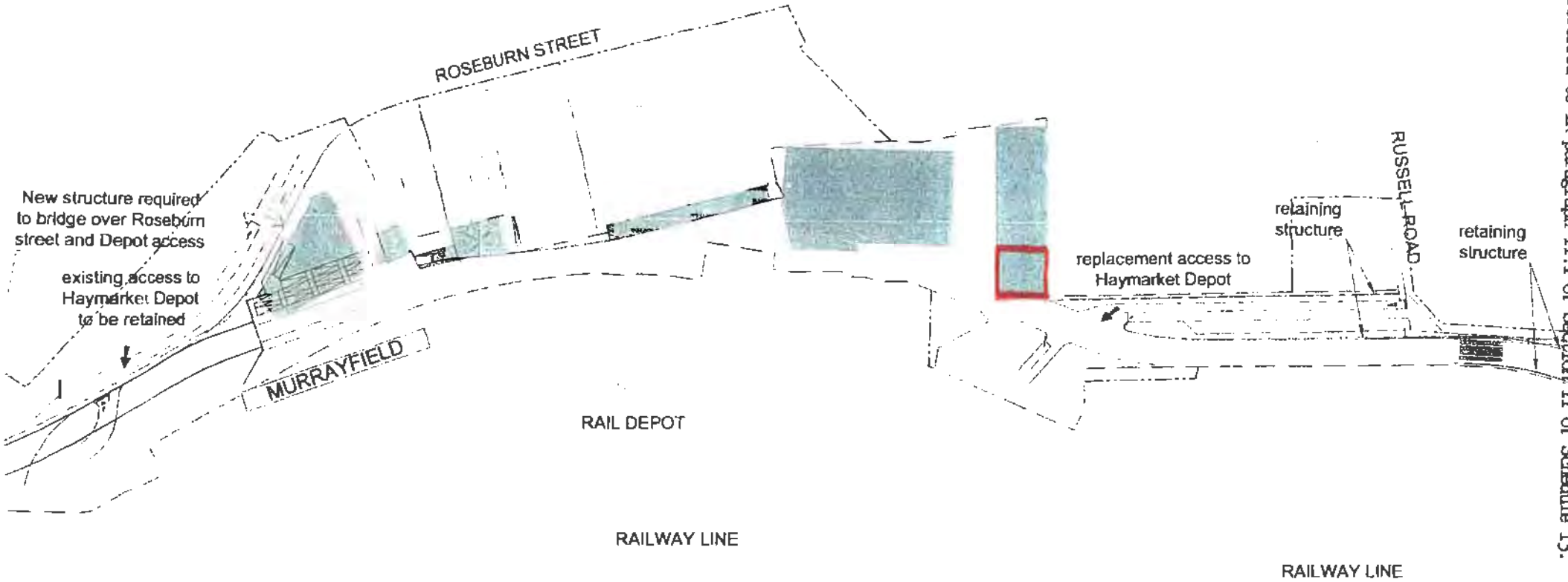


This is the Plan referred to in the foregoing Agreement between The City of Edinburgh Council, FSH Nominees Limited, FSH Airport (Edinburgh) Services Limited, Frogmore Developments Limited and Salmon Harvester Properties Limited

Appendix 8

First Scotrail Limited

Plan



EDINBURGH TRAM LINES 1 & 2 HAYMARKET DEPOT	Scale: 1:1250	DEPOT PLAN

This is the Plan referred to in paragraph 11.1 of Section 11 of Schedule 13.

Appendix 9

Stakis Limited

Part 1 (Plan 1)

Part 2 (Plan 2)

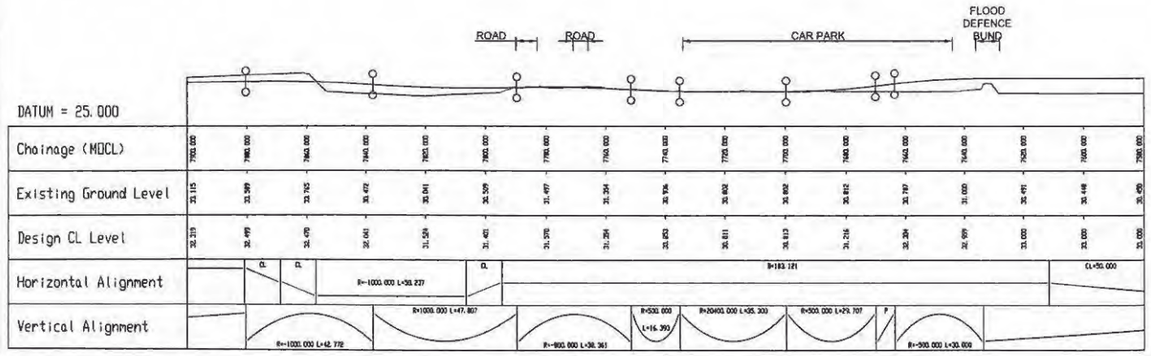
THIS IS PLAN 1 REFERRED TO IN THE FOREGOING MINUTE OF AGREEMENT AMONG THE CITY OF EDINBURGH COUNCIL AND STAKIS LIMITED.

Revision G

Drawing No. 30894 / C283



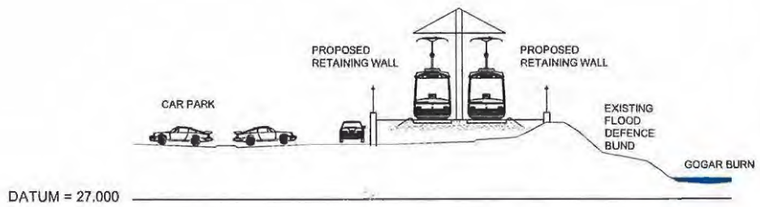
PLAN SCALE N.T.S.



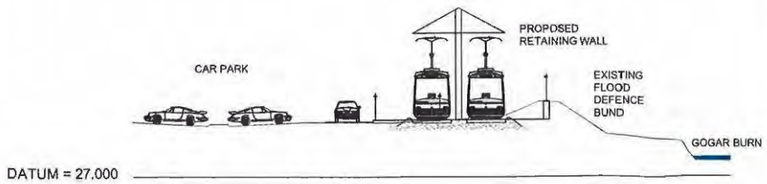
LONG SECTION - SCALE H = 1:1000, V = 1:500 @ A1

[redacted] CEC Solicitor

[redacted] CEC Witness



CROSS SECTION A-A SCALE 1:200 @ A1



CROSS SECTION B-B SCALE 1:200 @ A1

0 2 4 8 12 16 20m
SCALE 1:200 @ A1; 1:400 @ A3

0 5 10 20 30 40 50m
SCALE 1:500 @ A1; 1:1000 @ A3

KEY:

	EXISTING SPACES LOST	35No.
	SPACES WHICH WILL BE TEMPORARILY LOST DURING CONSTRUCTION.	33No.
	NEW SPACES CREATED	35No.
	LAND REQUIRED FOR PERMANENT ACQUISITION (1930m² WITHIN THE STAKIS BOUNDARY	
	LAND REQUIRED FOR TEMPORARY ACQUISITION (1293m² WITHIN THE STAKIS BOUNDARY	
	LOD	
	LLAU	
	STAKIS HOTEL BOUNDARY	

1. THIS ALIGNMENT IS A REFINEMENT OF THE PARLIAMENTARY ROUTE IN ORDER TO MINIMISE IMPACT ON THE CAR PARK. VERTICALLY IT IS BASED ON THE FSH OBJECTOR'S ALIGNMENT.

Rev	Description of revision	Draw	Chkd	App	Date
G	TEMP & EXISTING PARKING BAYS MERGED	NSM	AIC	AS	Sept '05
F	LAND REQUIRED & PARKING BAYS WITHIN STAKIS BOUNDARY AMENDED	NSM	MKG	AS	Sept '05
E	STAKIS BOUNDARY ADDED ACQUISITION ADDED. LOD AMENDED.	NSM	MKG	AS	Sept '05
D	AREAS OF STAKIS HOTEL CAR PARK TO BE TAKEN UP BY TEMPORARY & PERMANENT ACQUISITION NOTED ON DRAWING	AA	MKG	AS	Aug '05
C	AREAS OF TEMPORARY & PERMANENT ACQUISITION ADDED. LOD AMENDED.	AA	MKG	AS	Aug '05
B	AREAS OF TEMPORARY & PERMANENT ACQUISITION ADDED. LOD ADDED.	AA	MKG	AS	Aug '05
A	FIRST ISSUE	JB	AC	AS	June '05

Client: transport initiatives edinburgh

Project: EDINBURGH TRAM LINE TWO

Designed	TMF
Drawn	SJP
Checked	MKG
Reviewed	AS

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CAD filename: F:\30894\autocad\output\civils\C282.dwg

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Title: STAKIS HOTEL CAR PARK ALIGNMENT ALTERNATIVE RETAINING WALL OPTION

Size A1 | Scale AS SHOWN | Date 28.06.05

Status PRELIMINARY

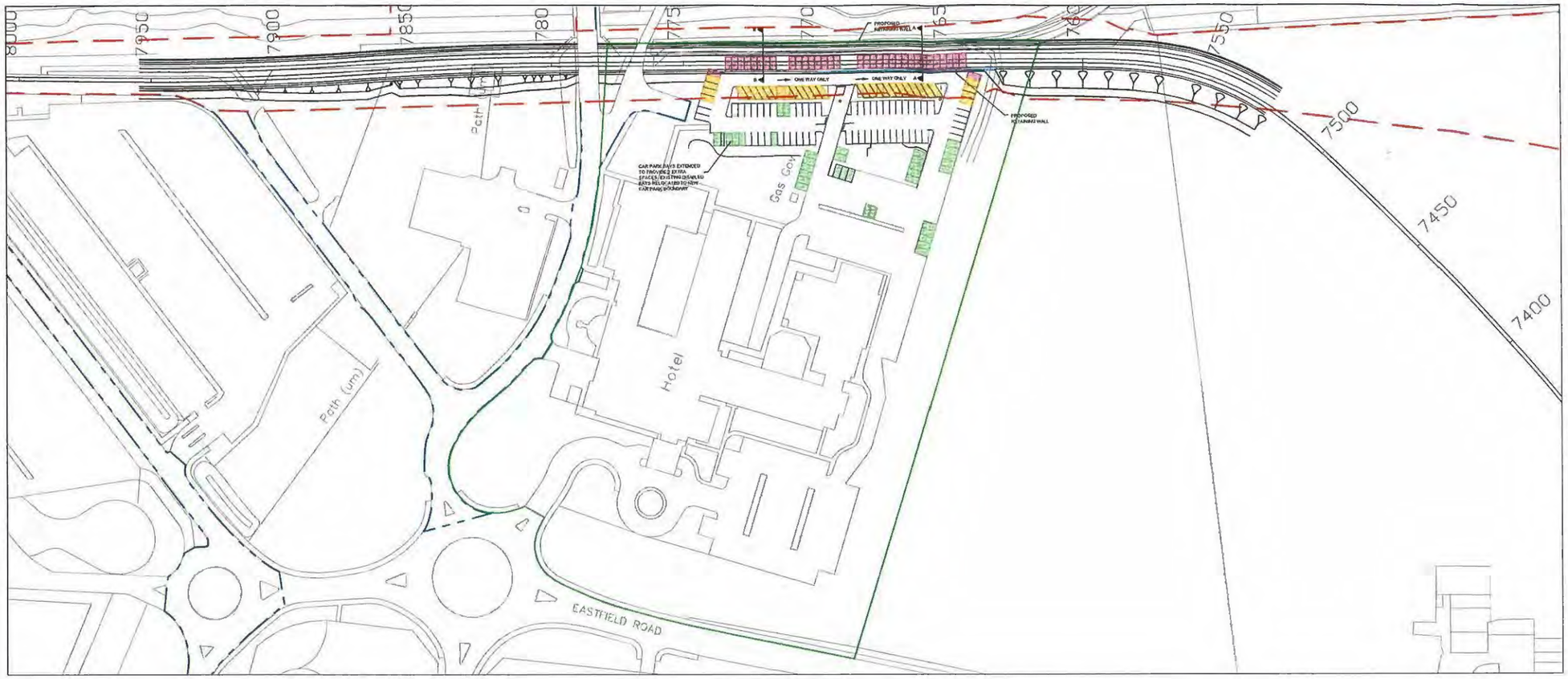
Drawing No. 30894 / C283 | Revision G

USB00000078_0042

THIS IS PLAN 2 REFERRED TO IN THE FOREGOING MINUTE OF AGREEMEN
AMONG THE CITY OF EDINBURGH COUNCIL AND STAKIS LIMITED

Revision C

Drawing No. 30894 / C298

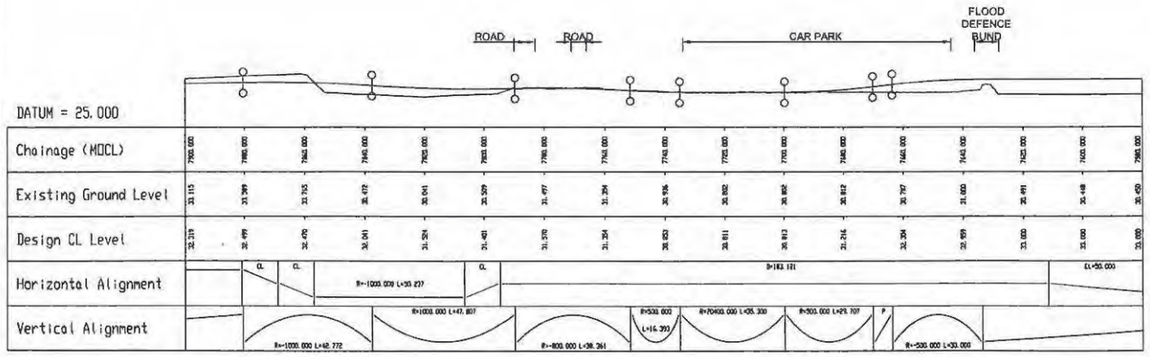


PLAN N.T.S.

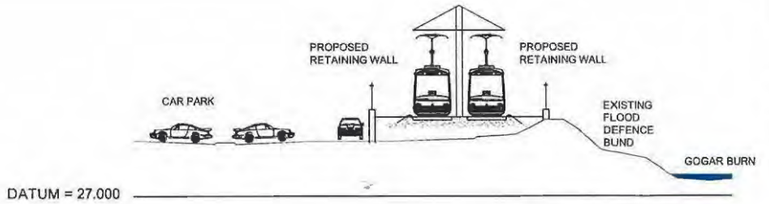
KEY:

	EXISTING SPACES LOST PERMENANTLY	35No.
	SPACES WHICH WILL BE TEMPORARILY LOST DURING CONSTRUCTION.	33No.
	NEW SPACES CREATED	35No.
	LOD	
	LLAU	
	STAKIS HOTEL BOUNDARY	

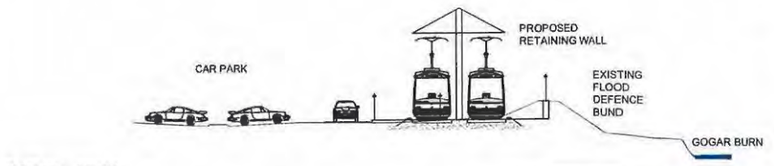
1. THIS ALIGNMENT IS A REFINEMENT OF THE PARLIAMENTARY ROUTE IN ORDER TO MINIMISE IMPACT ON THE CAR PARK. VERTICALLY IT IS BASED ON THE FSH OBJECTOR'S ALIGNMENT.



LONG SECTION - SCALE H = 1:1000, V = 1:500 @ A1



CROSS SECTION A-A SCALE 1:200 @ A1



CROSS SECTION B-B SCALE 1:200 @ A1

0 2 4 8 12 16 20m
SCALE 1:200 @ A1; 1:400 @ A3

0 5 10 20 30 40 50m
SCALE 1:500 @ A1; 1:1000 @ A3

[redacted]

CEC Solicitor

[redacted]

CEC Witness

Rev	Description of revision	Draw	Chkd	App	Date
C	TEMPORARY & EXISTING SPACES MERGED	NSM	AS	AS	13/09/05
B	PARKING BAYS IN SKAKIS BOUNDARY AMENDED	NSM	AS	AS	13/09/05
A	FIRST ISSUE	AIC	AS	AS	12/09/05

Client: transport initiatives edinburgh

Project: EDINBURGH TRAM LINE TWO

Designed	TMF
Drawn	AIC
Checked	AS
Reviewed	AS

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CAD filename: F:\30894\autocad\output\civils\C282.dwg

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Title: STAKIS HOTEL CAR PARK
ALIGNMENT ALTERNATIVE
RETAINING WALL OPTION - PARKING

Size A1 | Scale AS SHOWN | Date 12.09.05

Status PRELIMINARY

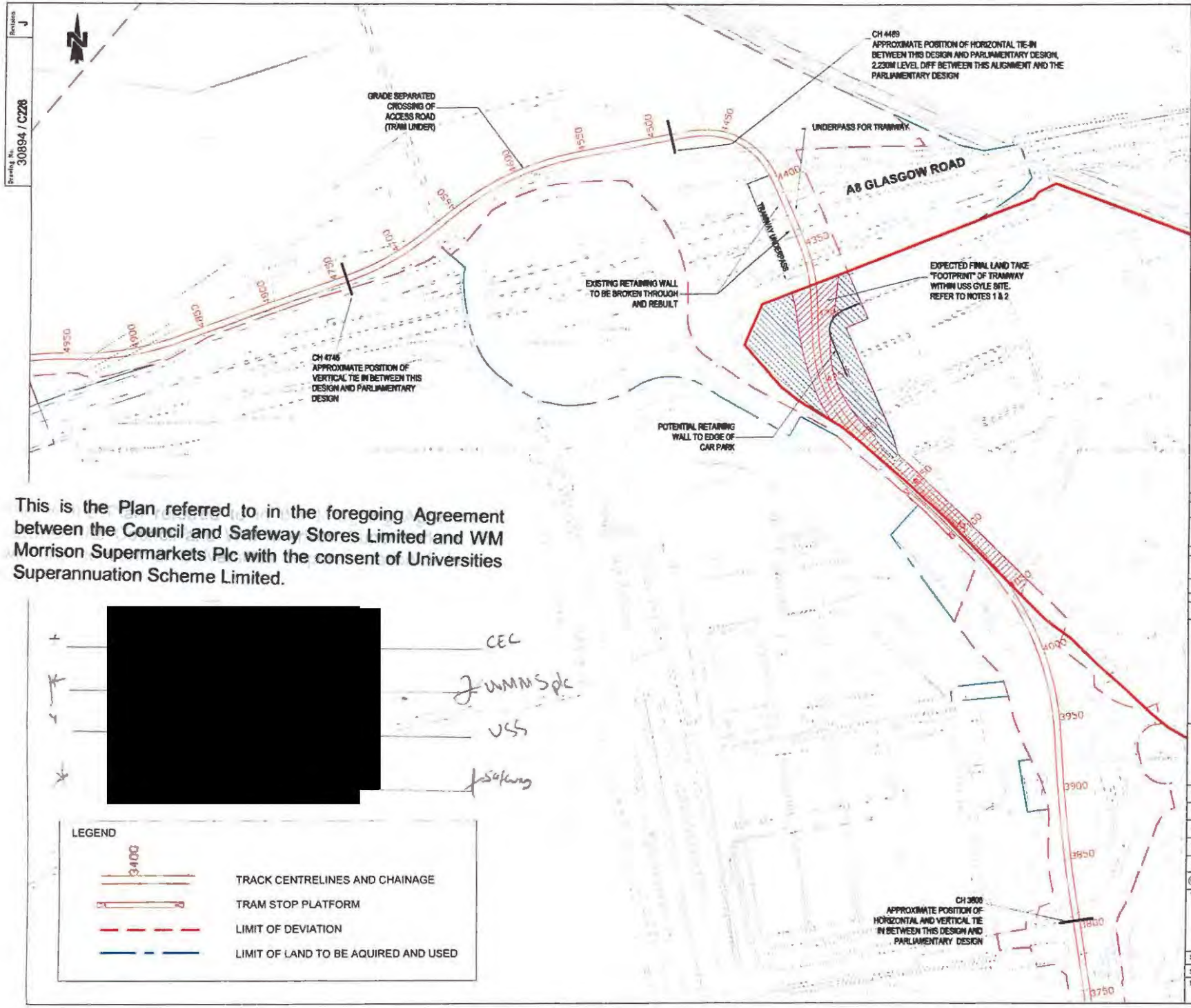
Drawing No. 30894 / C298 | Revision C

USB00000078_0043

Appendix 10

Universities Superannuation Scheme Limited

Plan



NOTES :

1. THE EXPECTED FINAL LAND TAKE "FOOTPRINT" WILL PROVIDE FOR A BASIC CORRIDOR OF 10m WIDTH WITH ADDITIONAL WIDTH FOR CUT AND EMBANKMENT SLOPES WHERE THESE ARE REQUIRED.
2. NOTWITHSTANDING NOTE 1 ABOVE, THE ACTUAL ALIGNMENT OF THE TRAMWAY IS SUBJECT TO ALTERATION WITHIN THE LOD. HOWEVER SUCH ALTERATION WOULD BE MINIMISED AND UNDERTAKEN IN KEEPING WITH THE UNDERSTANDING THAT THE FINAL SCHEME WILL BE SYMPATHETIC TO THE NEEDS OF USS AND THEIR TENANTS.

LEGEND :

- POSSIBLE EXTENT OF LAND REQUIRED PERMANANTLY
- POSSIBLE EXTENT OF LAND REQUIRED DURING CONSTRUCTION
- THE GYLE BOUNDARY

Rev	Description of revision	Drwn	Chkd	App	Date
J	THE GYLE BOUNDARY ADDED.	PM	AS	AS	[illegible]
H	LAND TAKE FOOTPRINT ADDED. DEPOT REMOVED	AC	[illegible]	AS	[illegible]
G	DETAIL CORRECTIONS TO LOD LLAU	SJP	MG	AS	[illegible]
F	LOD & LLAU MODIFIED	KB	MG	AS	[illegible]
E	LOD MODIFIED	PM	MG	AS	[illegible]
D	ANNOTATION CHANGED	JB	MG	AS	[illegible]
C	DEPOT LAYOUT ADDED & LOD REVISED FIGURE REF CHANGED TO 3.4 OPTION REF CHANGED TO 3	PM	MG	AS	[illegible]
B	VERTICAL TIE IN POSITION MOVED TO CHAINAGE 4745	SJP	TMF	MG	[illegible]
A	FIRST ISSUE	SJP	TMF	MG	[illegible]

Client: tie transport initiatives edinburgh

Project: EDINBURGH TRAM LINE TWO

Designed	TMF
Drawn	MT
Checked	SJP
Reviewed	GM

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CAD filename:

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Title: FIGURE 3.4 OPTION 3

Size A1 | Scale 1:1250 @ A1 | Date Mar '05

Status DRAFT

Drawing No. 30894 / C226 | Revision J

This is the Plan referred to in the foregoing Agreement between the Council and Safeway Stores Limited and WM Morrison Supermarkets Plc with the consent of Universities Superannuation Scheme Limited.

[redacted]

CEC

WMMSplc

USS

Safeway

LEGEND

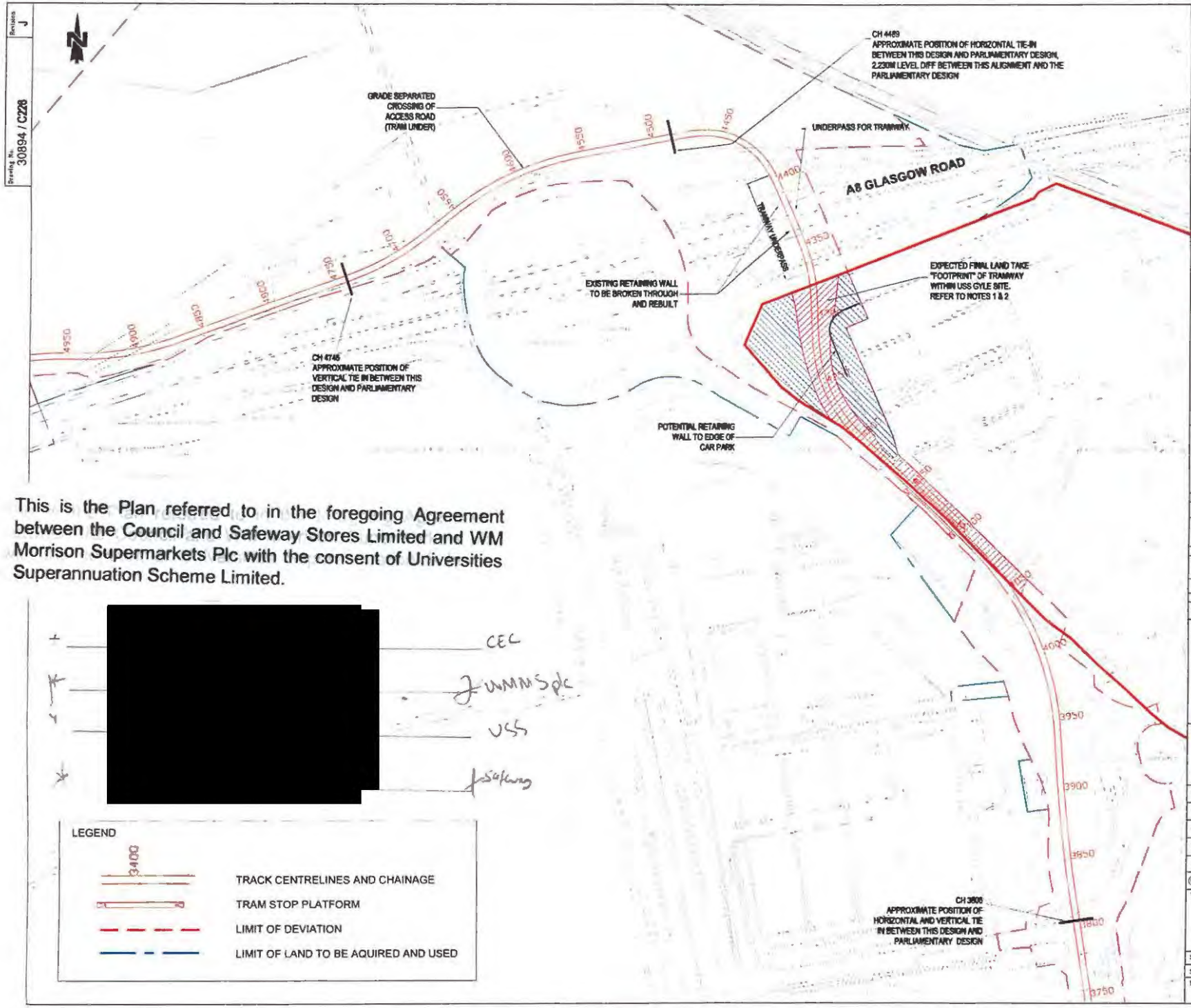
- TRACK CENTRELINES AND CHAINAGE
- TRAM STOP PLATFORM
- LIMIT OF DEVIATION
- LIMIT OF LAND TO BE AQUIRED AND USED

USB00000078_0045

Appendix 11

Safeway Stores Limited and WM Morrisons Supermarket plc

Plan



NOTES :

1. THE EXPECTED FINAL LAND TAKE "FOOTPRINT" WILL PROVIDE FOR A BASIC CORRIDOR OF 10m WIDTH WITH ADDITIONAL WIDTH FOR CUT AND EMBANKMENT SLOPES WHERE THESE ARE REQUIRED.
2. NOTWITHSTANDING NOTE 1 ABOVE, THE ACTUAL ALIGNMENT OF THE TRAMWAY IS SUBJECT TO ALTERATION WITHIN THE LOD. HOWEVER SUCH ALTERATION WOULD BE MINIMISED AND UNDERTAKEN IN KEEPING WITH THE UNDERSTANDING THAT THE FINAL SCHEME WILL BE SYMPATHETIC TO THE NEEDS OF USS AND THEIR TENANTS.

LEGEND :

- POSSIBLE EXTENT OF LAND REQUIRED PERMANANTLY
- POSSIBLE EXTENT OF LAND REQUIRED DURING CONSTRUCTION
- THE GYLE BOUNDARY

Rev	Description of revision	Drwn	Chkd	App	Date
J	THE GYLE BOUNDARY ADDED.	PM	AS	AS	[illegible]
H	LAND TAKE FOOTPRINT ADDED. DEPOT REMOVED	AIC	[illegible]	AS	[illegible]
G	DETAIL CORRECTIONS TO LOD LLAU	SJP	BKG	AS	[illegible]
F	LOD & LLAU MODIFIED	KB	BKG	AS	[illegible]
E	LOD MODIFIED	PM	BKG	AS	[illegible]
D	ANNOTATION CHANGED	JB	BKG	AS	[illegible]
C	DEPOT LAYOUT ADDED & LOD REVISED FIGURE REF CHANGED TO 3.4 OPTION REF CHANGED TO 3	PM	BKG	AS	[illegible]
B	VERTICAL TIE IN POSITION MOVED TO CHAINAGE 4745	SJP	TMF	BKG	[illegible]
A	FIRST ISSUE	SJP	TMF	BKG	[illegible]

Client: tie transport initiatives edinburgh

Project: EDINBURGH TRAM LINE TWO

Designed	TMF
Drawn	MT
Checked	SJP
Reviewed	GM

FABER MAUNSELL

CAD filename:

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Title: FIGURE 3.4 OPTION 3

Size A1 | Scale 1:1250 @ A1 | Date Mar '05

Status DRAFT

Drawing No. 30894 / C226 | Revision J

This is the Plan referred to in the foregoing Agreement between the Council and Safeway Stores Limited and WM Morrison Supermarkets Plc with the consent of Universities Superannuation Scheme Limited.

[redacted]

CEC

WMMSplc

USS

Safeway

LEGEND

- TRACK CENTRELINES AND CHAINAGE
- TRAM STOP PLATFORM
- LIMIT OF DEVIATION
- LIMIT OF LAND TO BE AQUIRED AND USED

USB00000078_0047

Appendix 12

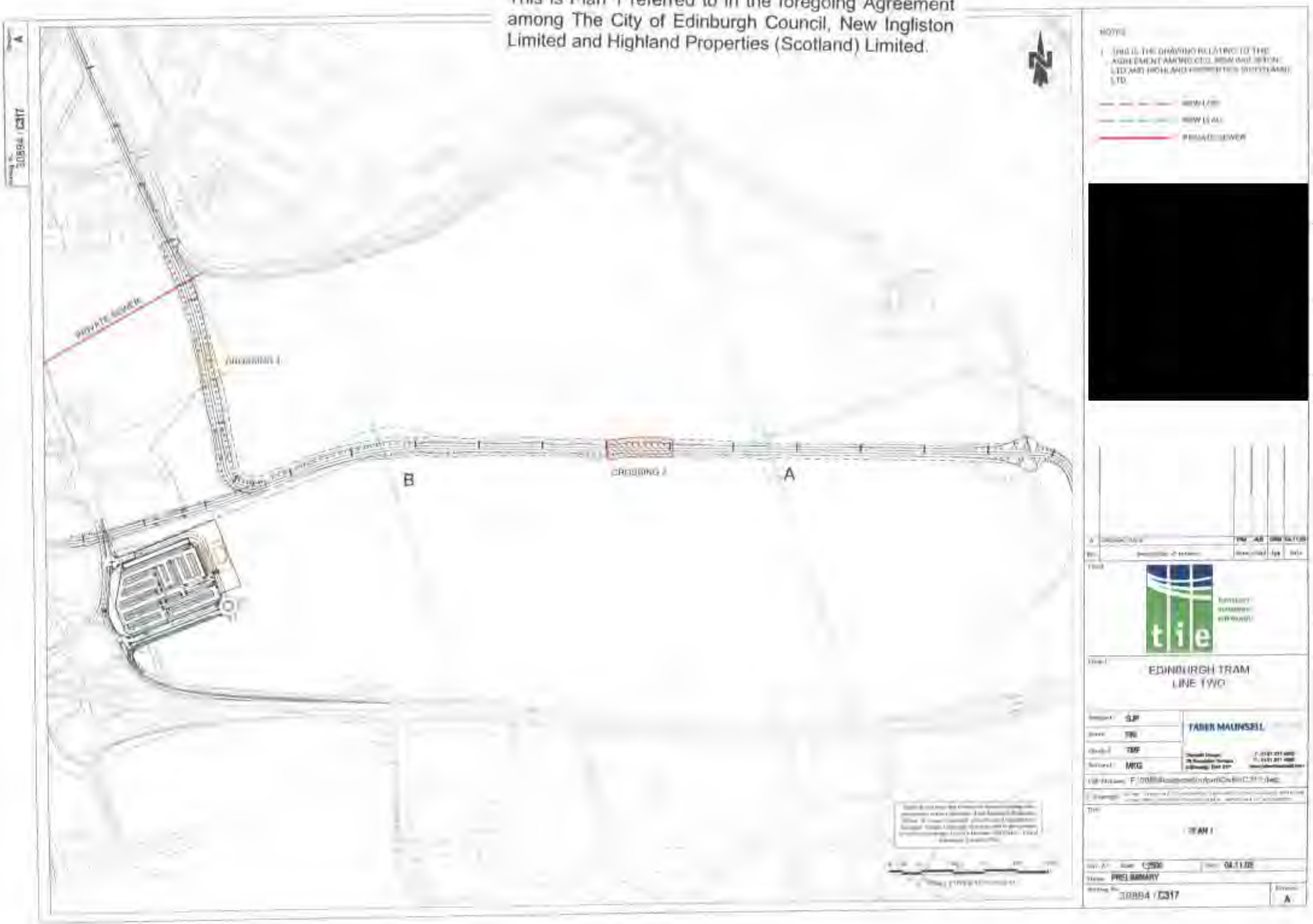
New Ingliston Limited and Highland Properties (Scotland) Limited

Part 1 (Plan 1)

Part 2 (Plan 2)

Part 3 (Plan 3)

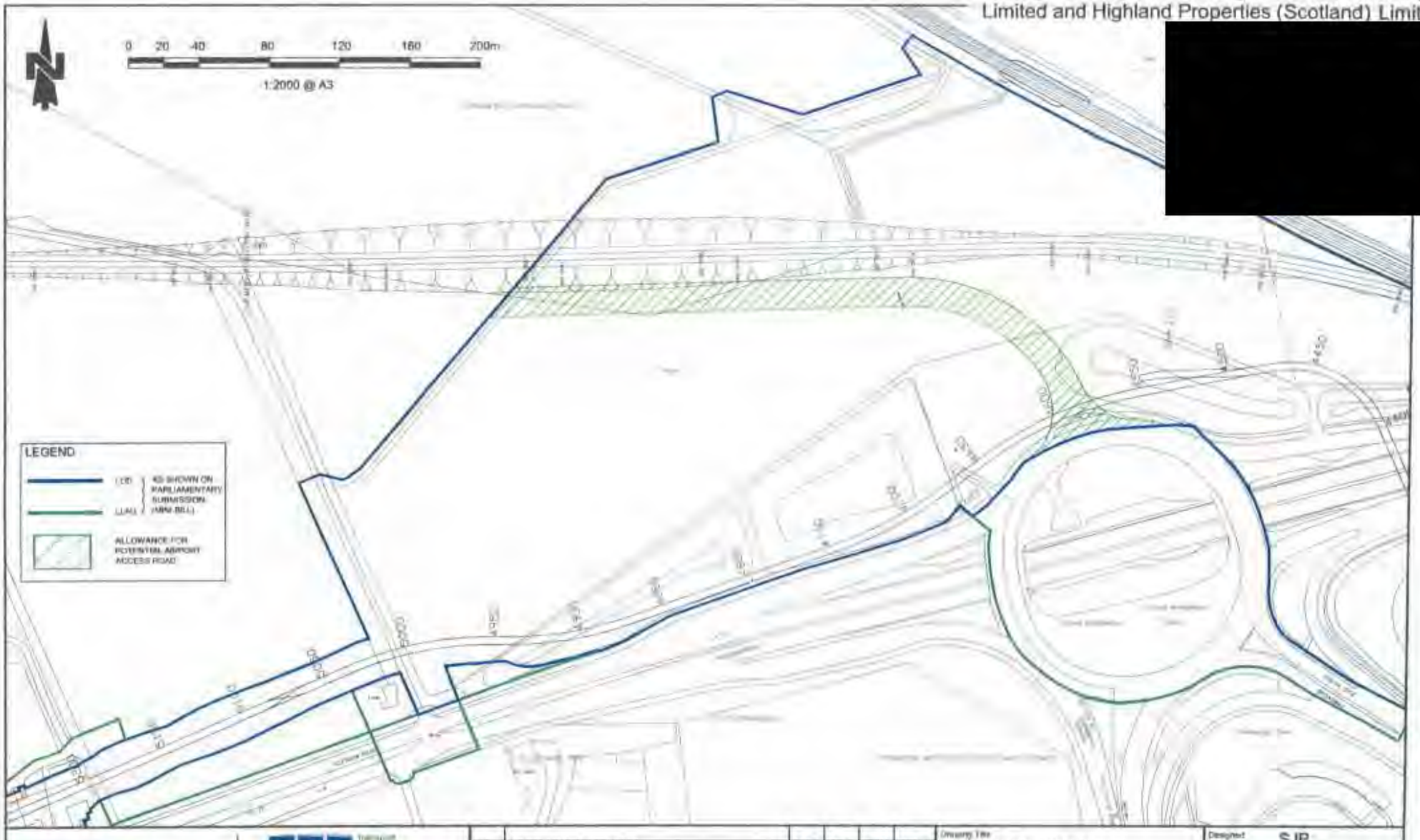
This is Plan 1 referred to in the foregoing Agreement among The City of Edinburgh Council, New Ingliston Limited and Highland Properties (Scotland) Limited.



USB00000078_0049

This is Plan 2 referred to in the foregoing Agreement among The City of Edinburgh Council, New Ingliston Limited and Highland Properties (Scotland) Limited.

[redacted]



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tie

Rev	Description of Revision	Drawn	Chkd	App	Date
E	DRAWING RENAMED	AIC	AS	GM	04/11/05
D	LAYOUT FOR SITE AGREEMENT	NSM	AIC	AS	13/10/05
C	OPTION RENAMED & SERVICES MODIFIED	NSM	REM	GRM	18/09/05
B	REVISED LAYOUT	NSM	REM	GRM	17/08/05
A	FIRST ISSUE	AIC	REM	GRM	03/08/05

Drawing Title: EDINBURGH TRAM LINE TWO

PLAN 2

Drawing No: 30894 / C305

Designed	SJP
Drawn	AIC
Approved	GRM
Scale	1 : 2000 @ A3
Revision	E
Status	DRAFT

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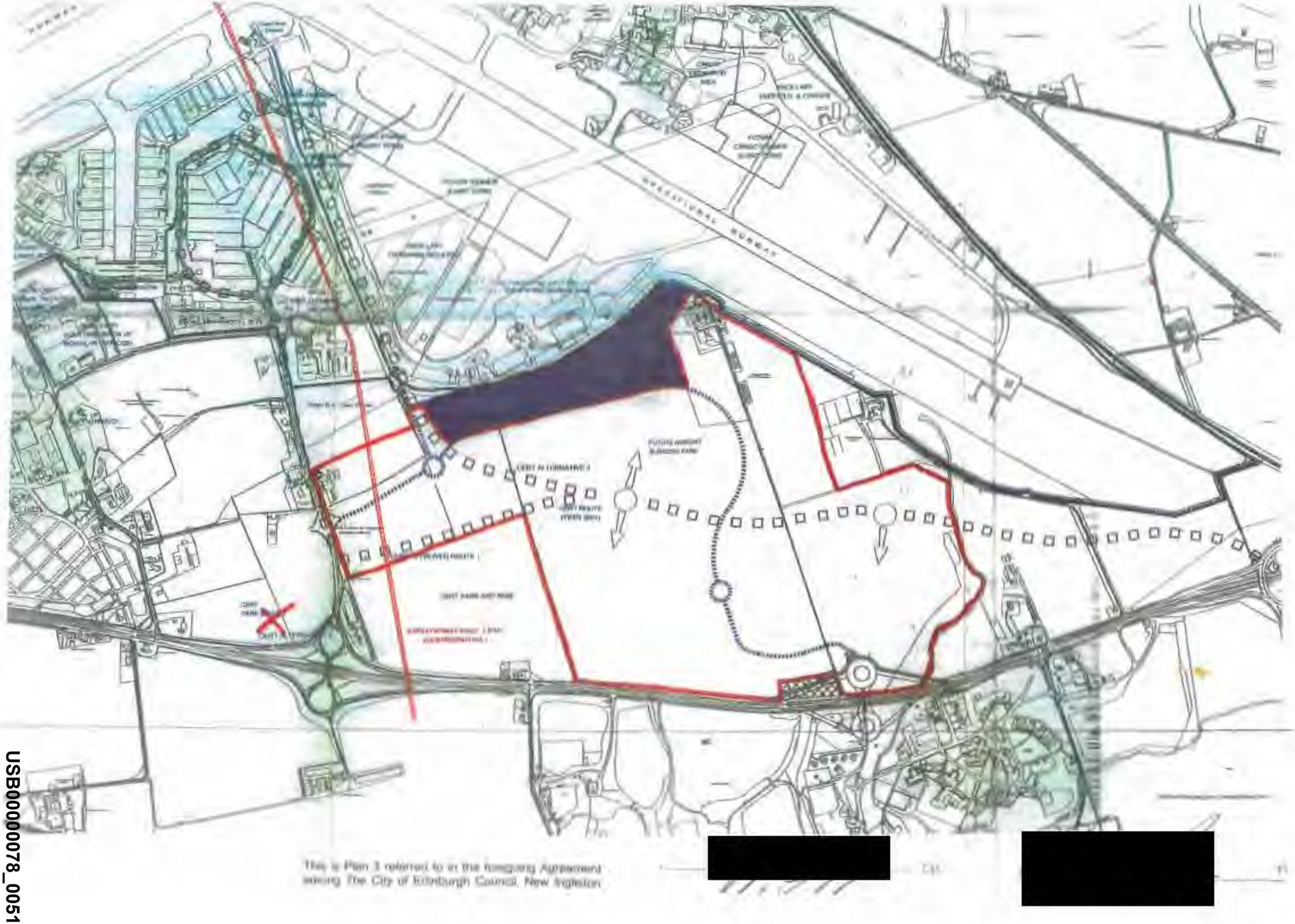
USB00000078_0050



This is Plan 3 referred to in the foregoing Agreement between The City of Edinburgh Council, New Ingliston

[redacted]

[redacted]

USB00000078_0051

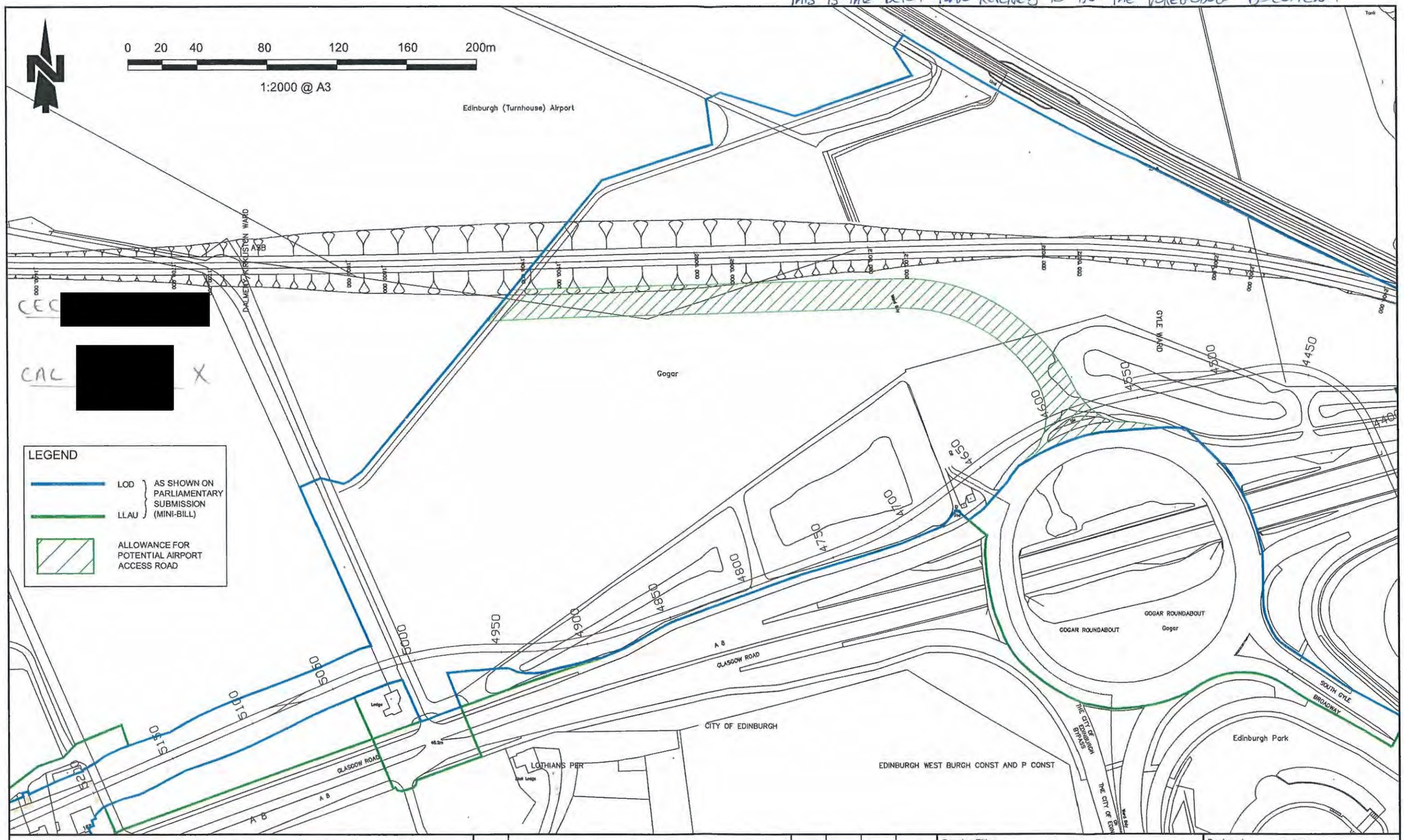
Appendix 13

Edinburgh Airport Limited

Part 1 (Plan)

Part 2 (Depot Plan)

THIS IS THE DEPOT PLAN REFERRED TO IN THE FOREGOING DOCUMENT



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Rev	Description of revision	Drawn	Chkd	App	Date
D	LAYOUT FOR SITE AGREEMENT	NSM	AIC	AS	13/09/05
C	OPTION RENAMED & SERVICES MODIFIED	NSM	REM	GRM	18/08/05
B	REVISED LAYOUT	NSM	REM	GRM	17/08/05
A	FIRST ISSUE	AIC	REM	GRM	03/08/05

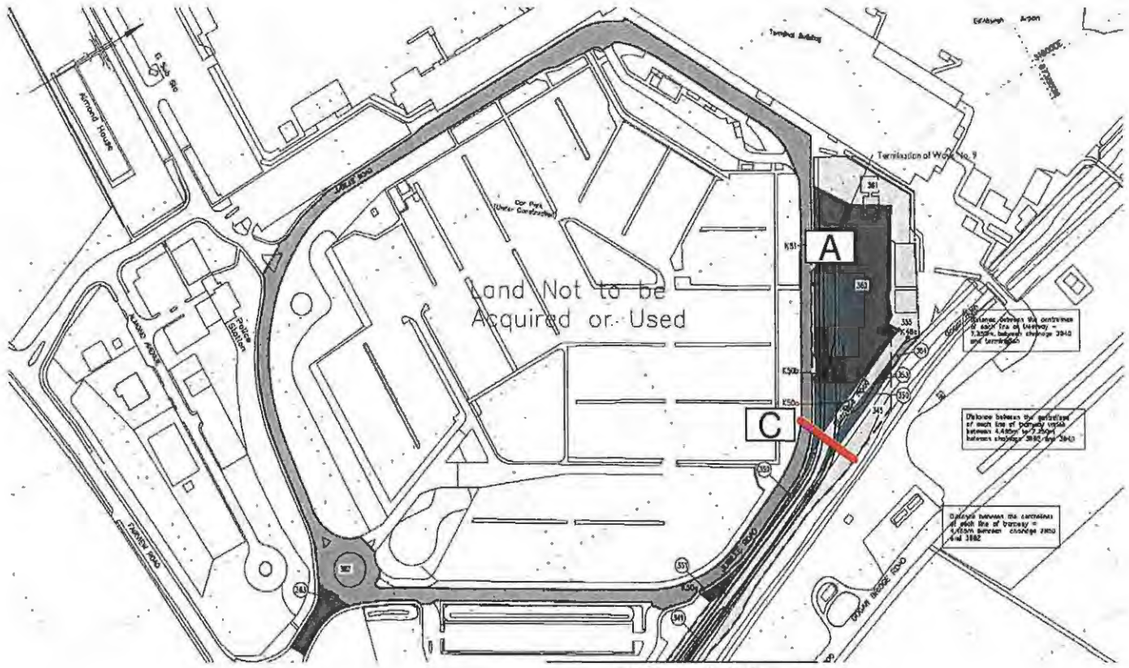
Drawing Title
EDINBURGH TRAM
LINE TWO
DEPOT LAYOUT OPTION B
GENERAL ARRANGEMENT

Drawing No. 30894 / C305

Designed	SJP
Drawn	AIC
Approved	GRM
Scale	1 : 2000 @ A3
Revision	D
Status	DRAFT

THIS IS THE PLAN REFERRED TO IN THE FOREGOING AGREEMENT

CITY OF EDINBURGH



For Continuation see Sheet No. 20

SHEET No.21

SCOTTISH PARLIAMENT-SESSION 2

EDINBURGH TRAM (LINE TWO) BILL

Work No. 9 (Tramroad) Length = 4032m

TRAMWAY LENGTHS			
Work	Name of Road	No. of track	Length of track affected
9	Barnton Road	Double	252m

PERMANENT ACQUISITION OF LAND INCLUDE LIMITS OF DEVIATION (See Section 12(a))	
Plot No. as given	Purpose for which land may be taken
345, 349, 350, 351, 352, 352, 363	For the authorised work

TEMPORARY POSSESSION OF LAND OUTSIDE LIMITS OF DEVIATION (See Schedule 7)	
Plot No. as given	Purpose for which temporary possession may be taken
354, 361, 361, 362, 363	Working site and access

KEY:

- Alignment of Work
- Limit of Deviation
- Limit of Land to be Acquired or Used
- New Kerbline

Note:

The area enclosed by any limit of deviation or by any limit of land to be acquired or used is the area extending to the outer edge of the line marking those limits.

Total length of double tramroad = 13k 271m
Total length of double tramway = 9k 369m



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transport initiatives edinburgh

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19 Haymarket Yards
Edinburgh
EH12 5BH
Tel 0131 622 8300
Fax 0131 633 8301

Rev	Description of revision	Drawn	Chkd	App	Date
A	FIRST ISSUE	NSM	AIC	AS	13/09/05

Drawing Title
EDINBURGH TRAM
LINE TWO
EDINBURGH AIRPORT
POTENTIAL TRAM
STOP LOCATIONS

Drawing No. 30894 / C316

Designed	REM
Drawn	NSM
Approved	AS
Scale	NOT TO SCALE
Revision	A
Status	DRAFT

USB00000078_0054

Appendix 14

Verity Trustees Limited

Part 1 (Plan 1)

Part 2 (Plan 3)

This is Plan 1 referred to in paragraph 17.1 of Section 17 of Schedule 13.

LAND REGISTER OF SCOTLAND	Officer's ID / Date	TITLE NUMBER
	3649 30/8/2001	MID4503
ORDNANCE SURVEY NATIONAL GRID REFERENCE		Scale 1/1250
NT2372NW NT2372NE NT2373SW NT2373SE		Survey Scale 1/1250

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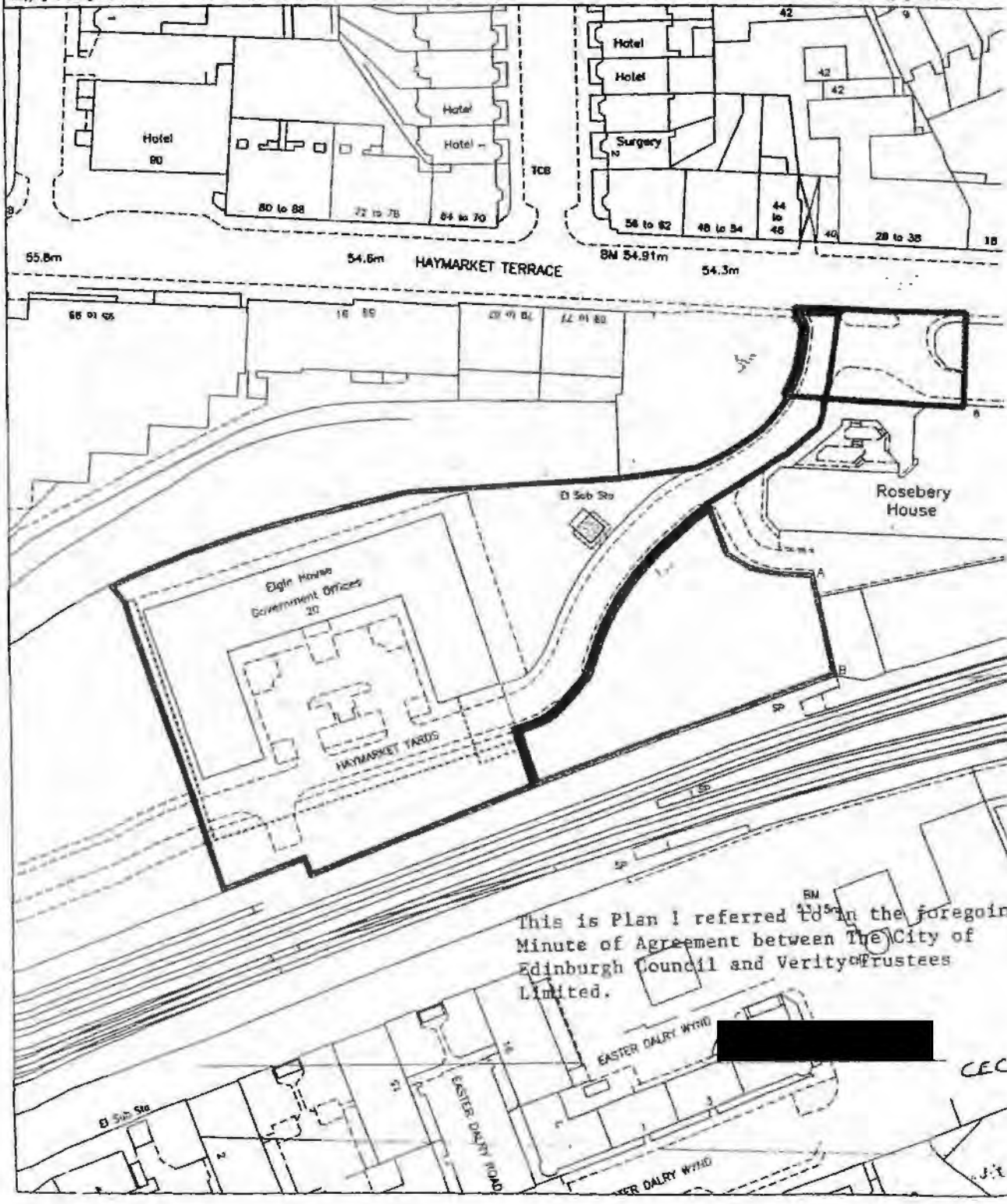
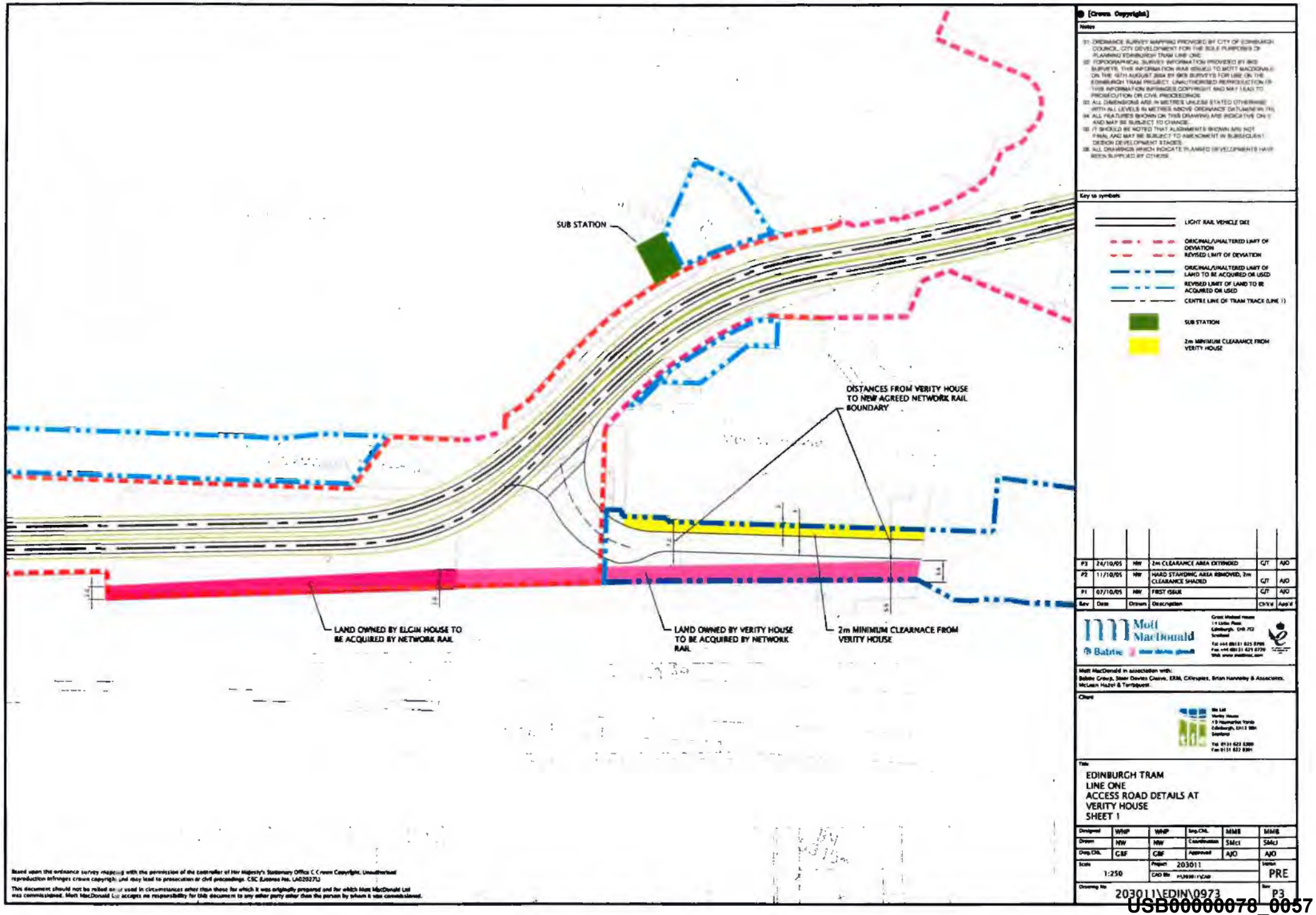


This is Plan 1 referred to in the foregoing Minute of Agreement between The City of Edinburgh Council and Verity Trustees Limited.

[redacted]

CEC

This is Plan 3 referred to in paragraph 17.1 of Section 17 of Schedule 13.



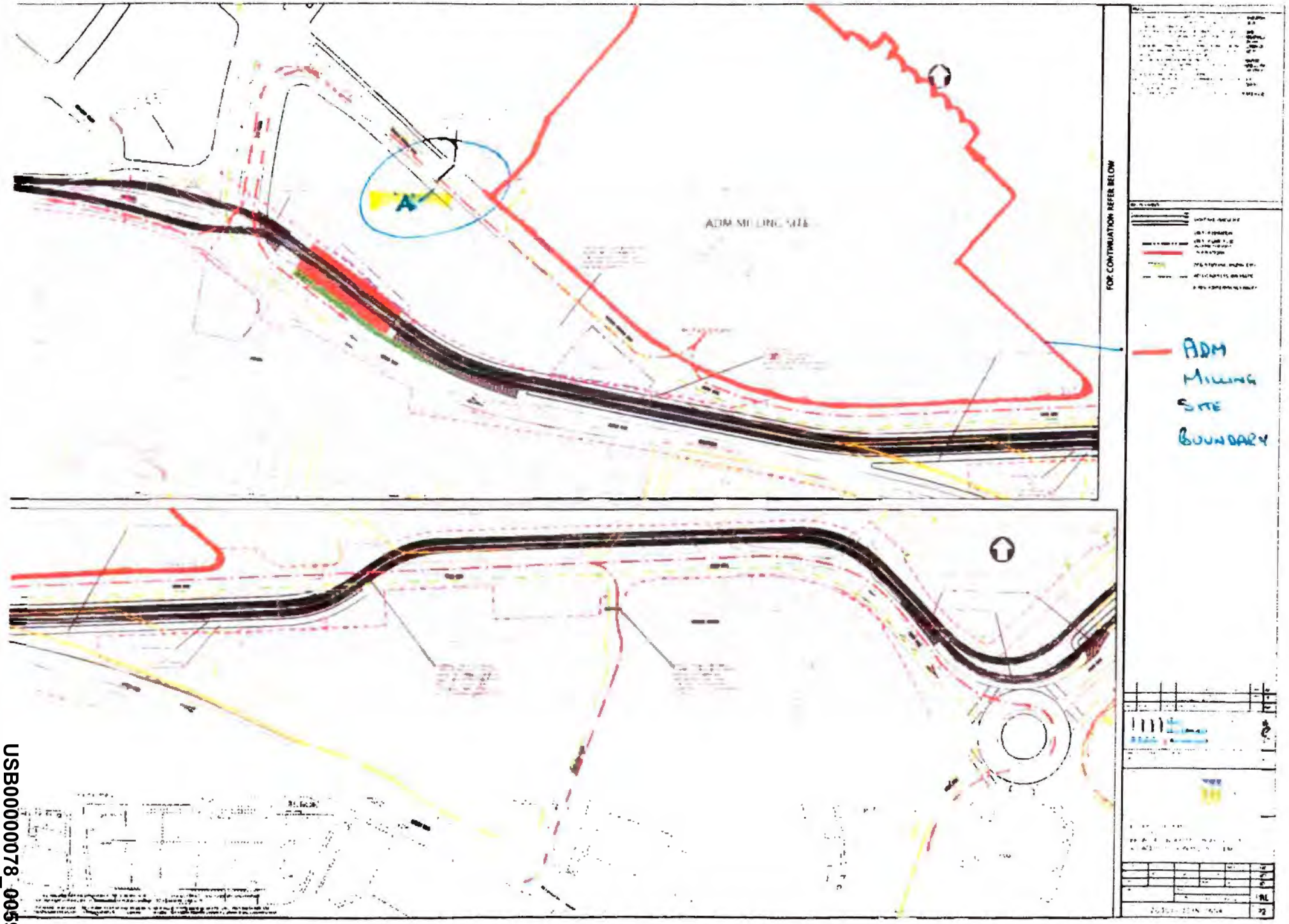
USB00000078_0057

Appendix 15

ADM Milling Limited

Plan

This is the plan referred to in paragraph 18.1 of Section 18 of Schedule 13.



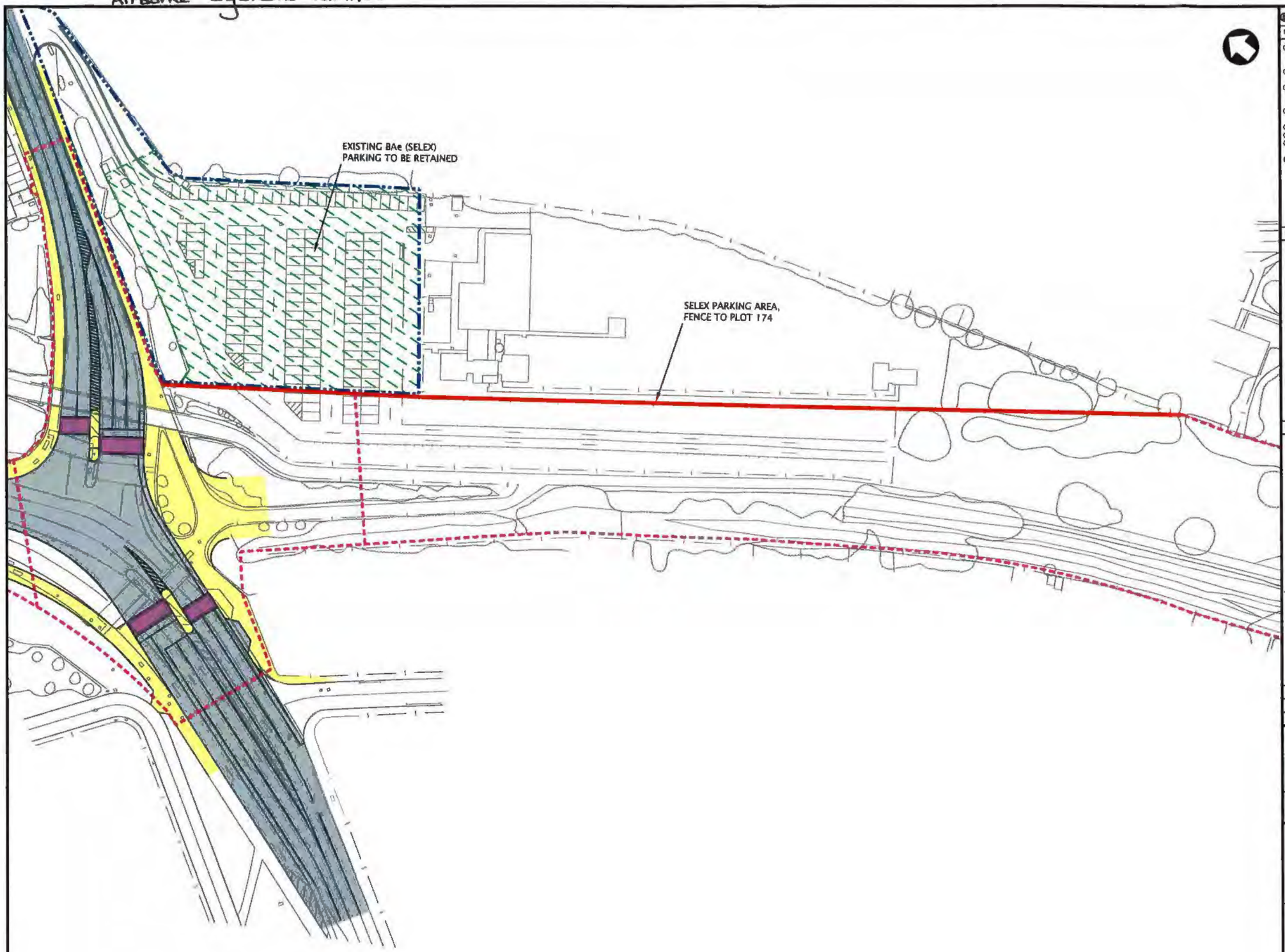
USB00000078_0059

Appendix 16

Selex Sensors and Airborne Systems Limited

Plan

This is the Plan referred to in the foregoing Minute of Agreement between The City of Edinburgh Council and Selex Sensors and Airborne Systems Limited



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02. ALL FEATURES SHOWN ON THIS DRAWING ARE INDICATIVE ONLY AND MAY BE SUBJECT TO CHANGE.
03. IT SHOULD BE NOTED THAT ALIGNMENTS SHOWN ARE NOT FINAL AND MAY BE SUBJECT TO AMENDMENT IN SUBSEQUENT DESIGN DEVELOPMENT STAGES.
04. SHADING IS INDICATIVE AND DOES NOT REPRESENT FINAL SURFACE COLOURING.
05. DRG. SCALE IS 1:500 AT A1 APPROX. 1:1000 AT A3 REDUCTION.
06. STOP LOCATIONS MAY VARY.
07. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH 203011/EDIN.0963, 0964, 0966 AND 0967.
08. ADJACENT TO THE TRAMWAY THE BOUNDARY IS SHOWN TO ACCOUNT FOR THE ELECTRICAL HAZARD ZONE OF 2m FROM THE NEAREST RAIL. AN ADDITIONAL DISTANCE SHOULD BE ALLOWED FOR DURING CONSTRUCTION AND BUILDING MAINTENANCE. AN ADDITIONAL ALLOWANCE OF 3m IS SUGGESTED. TOTAL DEVELOPABLE AREA = APPROX. 1 Ha

Key to symbols

LIMIT OF DEVIATION

LIMIT OF LAND TO BE ACQUIRED OR USED

BAe CARPARK FENCELINE

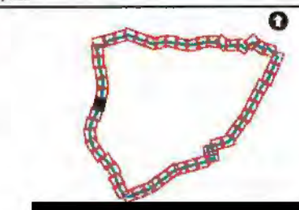
[redacted]

Div / Sec

[redacted]

Div / Sec

Key Plan



[redacted]

CEC

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	23/11/05	MW	FENCELINE EXTENDED	GJT	GJT
P1	10/11/05	NW	FIRST ISSUE	GJT	AJO

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Web www.mottmac.com

Mott MacDonald in association with:
Babtie Group, Steer Davies Gleave, ERM, Gillespies, Brian Hannaby & Associates, McLean Hazel & Terraquest.

Client

tie Ltd
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Scotland
Tel 0131 622 8300
Fax 0131 622 8301

Title

EDINBURGH TRAM
LINE ONE
SELEX BOUNDARY FENCE TO PLOT 174

Designed	WNP	WNP	Eng.Chk.	GJT	GJT
Drawn	NW	NW	Coordination	SCmI	SMcI
Dwg.Chk.	GJT	GJT	Approved	AJO	AJO
Scale 1:500		Project 203011		Status PRE	
Drawing No 203011\EDIN\1004		CAD file P:\203011\CAD		Rev P2	

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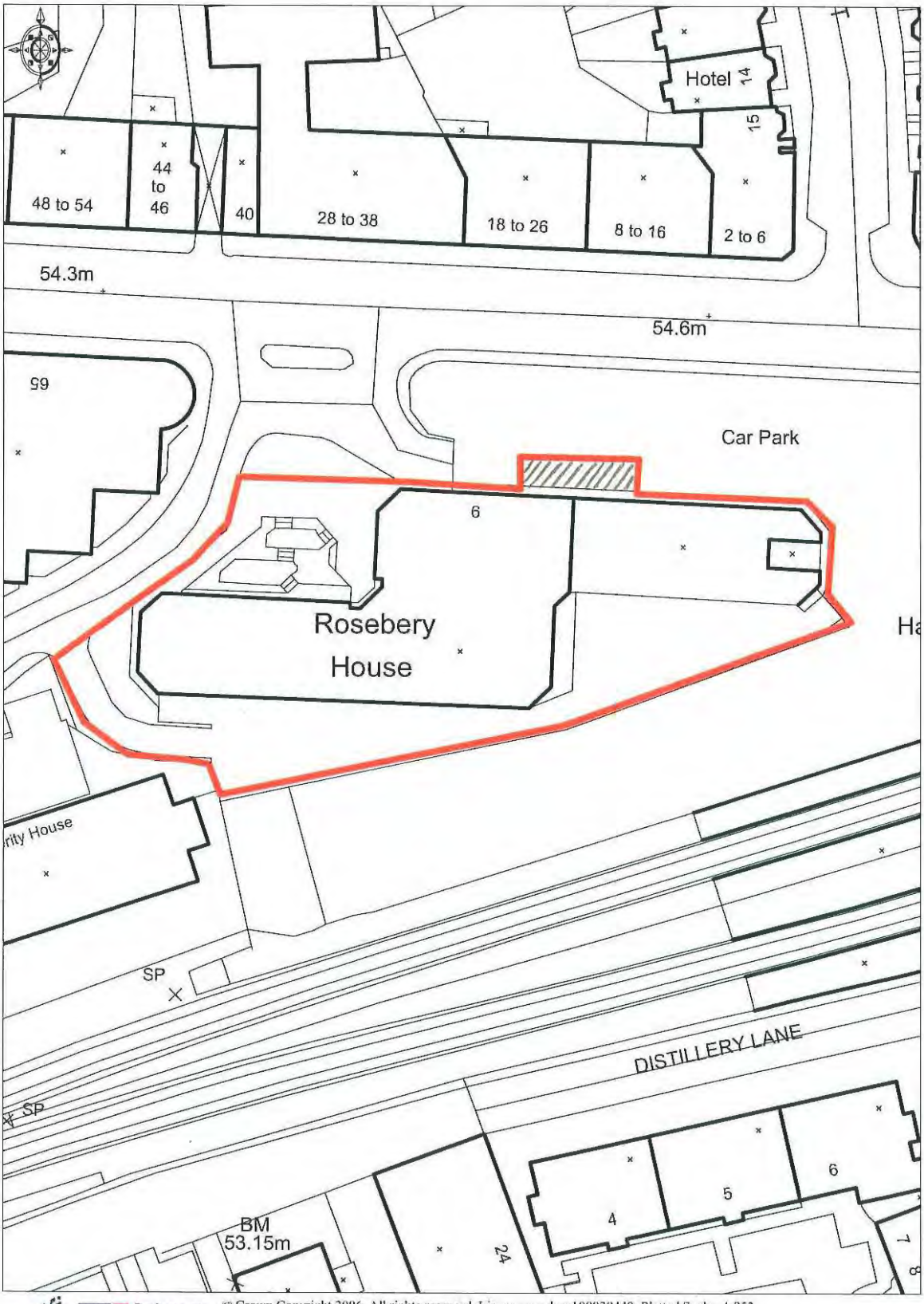
Appendix 17

Norwich Union Life and Pensions Limited

Plan

Norwich Union Life and Pensions Ltd.
Rosebery House
Haymarket Terrace Edinburgh EH12 5YA



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For guidance only. Full extent of curtilage to be verified by reference to deeds.

Appendix 18

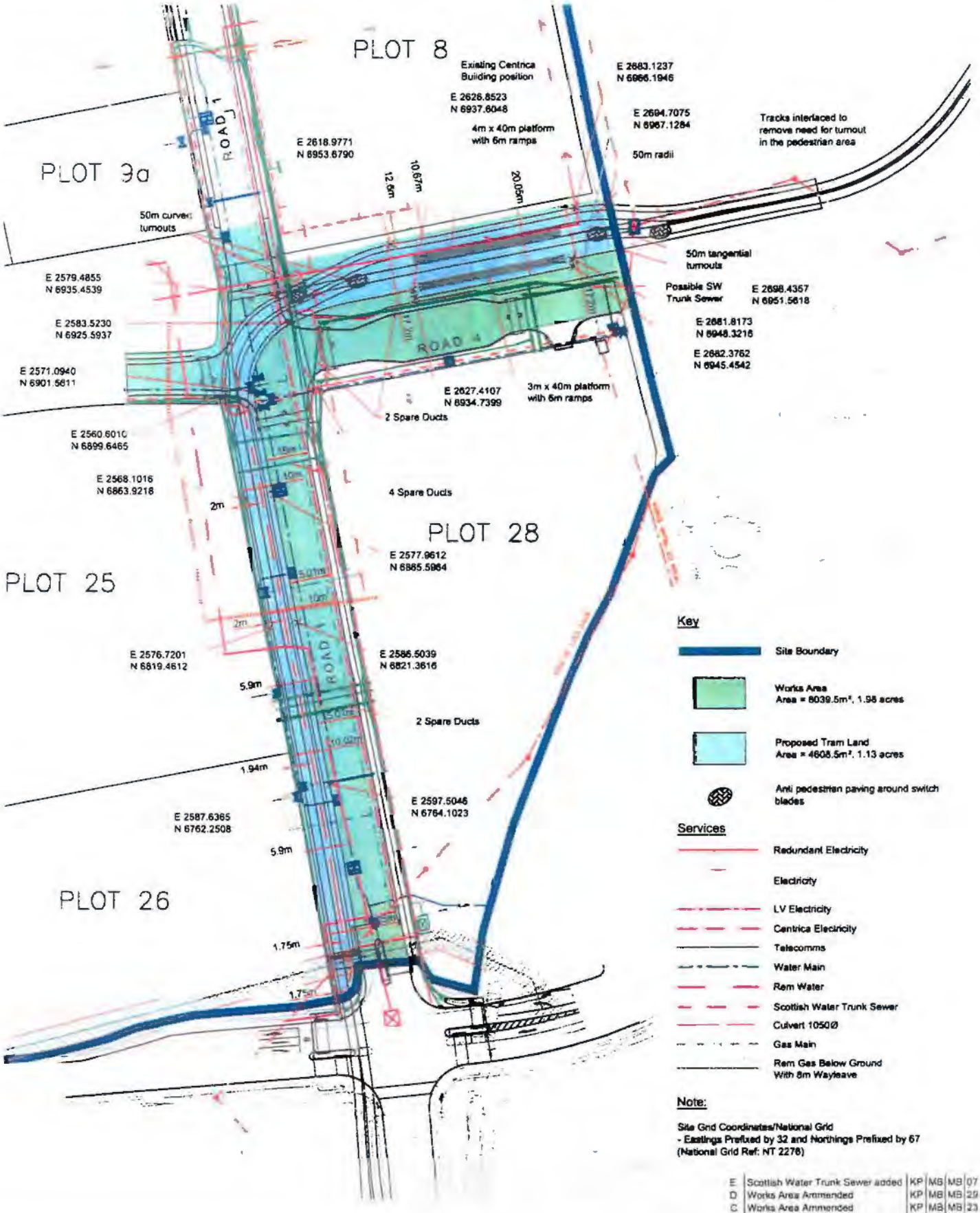
National Grid Property Holdings Limited, Port Greenwich Limited and WM Morrison Supermarkets plc

Part 1 (Plan)

Part 2 (Supermarket Plan)

This is the plan forming Part 1 of Appendix 13 to Schedule 13 referred to in paragraph 21.1 of Section 21 of Schedule 13.

DO NOT SCALE Contractor to check all dimensions and report any omissions or errors



Key

- Site Boundary
- Works Area Area = 8039.5m², 1.98 acres
- Proposed Tram Land Area = 4608.5m², 1.13 acres
- Anti pedestrian paving around switch blades

Services

- Redundant Electricity
- Electricity
- LV Electricity
- Centrica Electricity
- Telecomms
- Water Main
- Rem Water
- Scottish Water Trunk Sewer
- Culvert 1050Ø
- Gas Main
- Rem Gas Below Ground With 8m Wayleave

Note:

Site Grid Coordinates/National Grid
- Eastings Prefixed by 32 and Northings Prefixed by 67
(National Grid Ref: NT 2276)

Rev	Description	By	Chk	App	Date
E	Scottish Water Trunk Sewer added	KP	MB	MB	07.12.05
D	Works Area Ammended	KP	MB	MB	29.11.05
C	Works Area Ammended	KP	MB	MB	23.11.05
B	Services added	KP	MB	MB	04.11.05
A	Shading and Areas Added	KP	MB	MB	18.08.05

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Edinburgh
EH12 8XF
Tel: 0131 339 5494
Fax: 0131 317 7248
e-mail: edinburgh@wyg.com

White Young Green
Consulting Engineers
Civil Structural Mechanical Electrical Process Rail Traffic Environmental Project Management

Project: GRANTON WORKS EDINBURGH

Client: SecondSite Property

Drawing Title: PROPOSED TRAM ROUTE

Scale at A3	Drawn By	Date	Checked By	Date	Approved By	Date
1:1250	KP	1.07.05	MB	1.07.05	MB	1.07.05

Project No.	Office	Type	Drawing No.	Revision
A007183	31	CS	173	E

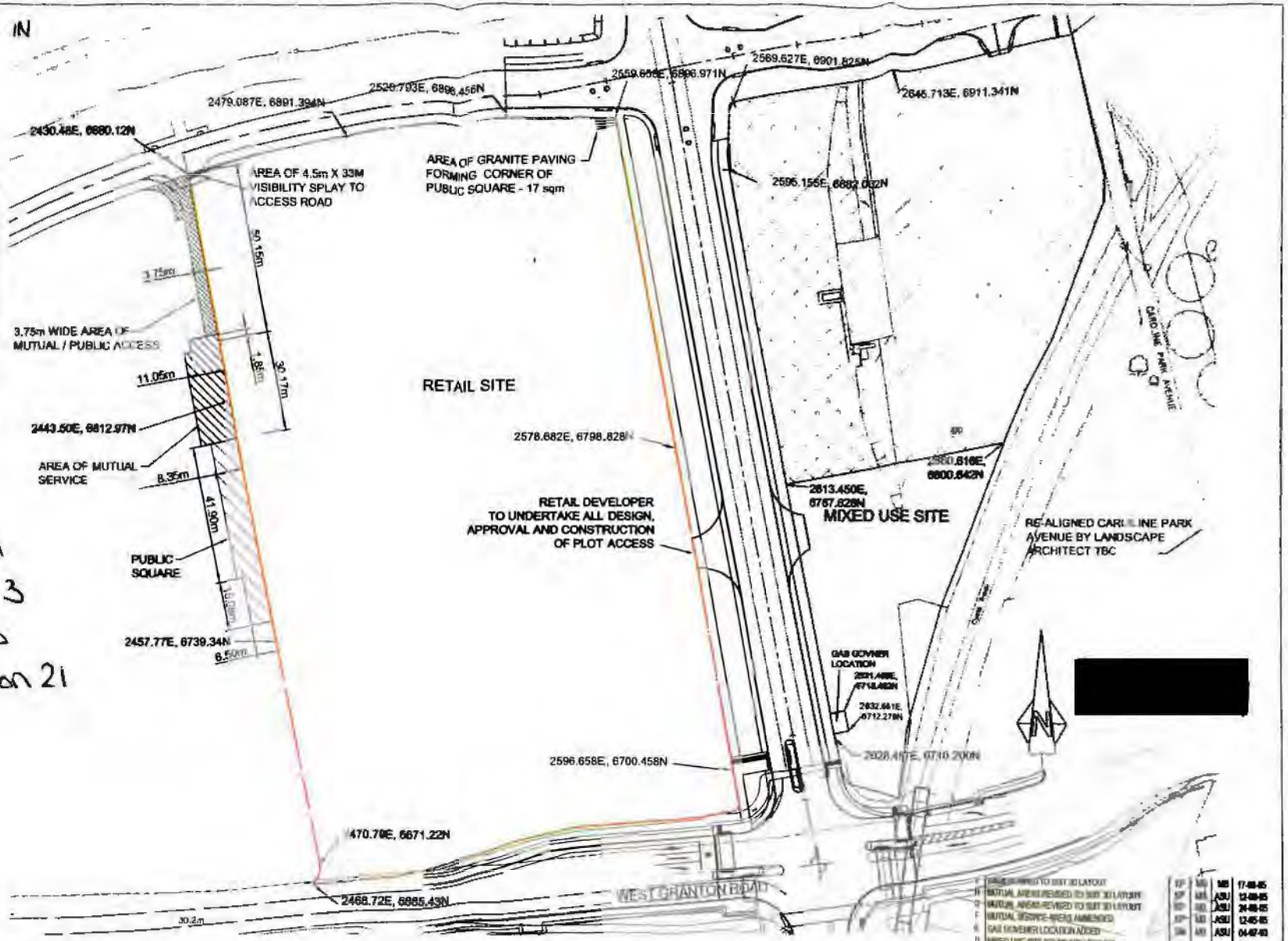
APPROVAL ☐ INFORMATION ☒ TENDER ☐ CONTRACT ☐ CONSTRUCTION ☐

THIS IS "PLAN C 1" REFERRED TO IN THE FOREGOING MINUTE OF VARIATION OF REAL BURDENS

AREA SUMMARY	(acres / hectares)
1. RETAIL SITE	7.01 acres / 2.84 ha or thereby
2. MIXED USE SITE	3.80 acres / 1.54 ha or thereby
TOTAL :	10.81 acres / 4.38 ha or thereby

Note: Site Grid Coordinates/National Grid
- Eastings Prefixed by 32 and Northings Prefixed by 67 (National Grid Ref: NT 2276)
The drawing has been prepared utilising information obtained from OS Drawing of the site and other topographical information of the existing site

This is the supermarket plan forming Part 2 of Appendix 13 to Schedule 13 referred to at paragraph 21.1 of Section 21 of Schedule 13.



[redacted]

Rev	Description	By	Chk	App	Date
F	[illegible] TO SUIT 3D LAYOUT	KP	MB	MB	17-08-05
H	MUTUAL AREAS REVISED TO SUIT 3D LAYOUT	KP	MB	ASU	12-08-05
G	MUTUAL AREAS REVISED TO SUIT 3D LAYOUT	KP	MB	ASU	24-08-05
F	MUTUAL SERVICE AREAS AMMENDED	KP	MB	ASU	12-05-05
E	GAS GOVERNER LOCATION ADDED	SM	MB	ASU	04-07-03
D	MIXED USE SITE BOUNDARY UPDATED TO LATEST 3D ARCHITECTS LAYOUT	SM	MB	ASU	16-06-03
C	MIXED USE SITE SHOWN PATCHED VISIBILITY SPLAY ADDED	SM	MB	ASU	01-05-03
B	SIZE OF PUBLIC SQUARE AMMENDED	MB	ASU	ASU	16-04-03
A	MUTUAL SERVICE ACCESS INCLUDES 2nd FOOTWAY	MB	ASU	ASU	10-04-03

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Fax: 0131 317 7248
e-mail: edinburgh@wyg.com

White Young Green

Consulting Engineers
Civil Structural Mechanical Electrical Process Rail Traffic Environmental Project Management

Project
GRANTON DEVELOPMENT

Client
SECONDSITE PROPERTY

Drawing Title
RETAIL PLOT 25/25 AND MIXED USE PLOT 28
TITLE PLAN

Scale	Drawn By	Date	Checked By	Date	Approved By	Date
1:1250	MB	10-03-03	ASU	11-03-03	ASU	11-03-03

Project No	Office	Type	Drawing No.	Revision
A007183	3103	CS	145	1

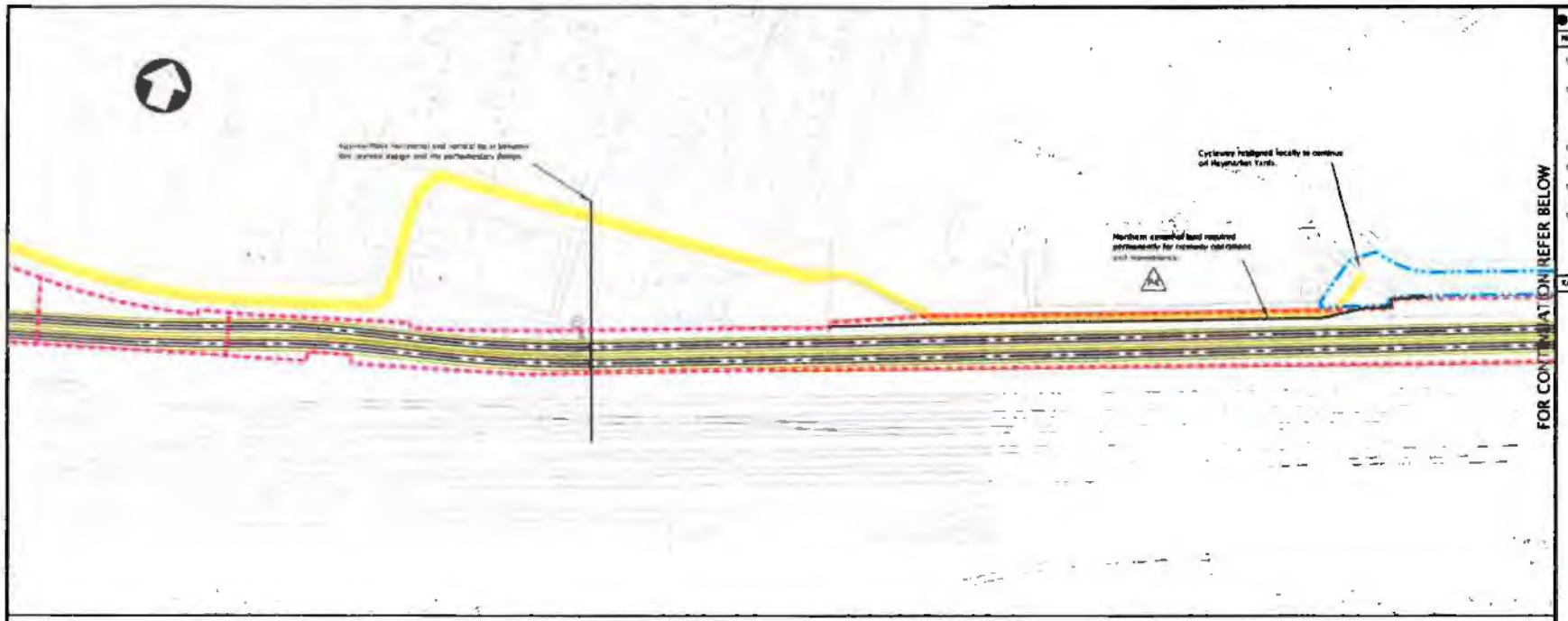
APPROVAL ☐ INFORMATION ☐ TENDER ☐ CONTRACT ☐ CONSTRUCTION ☐

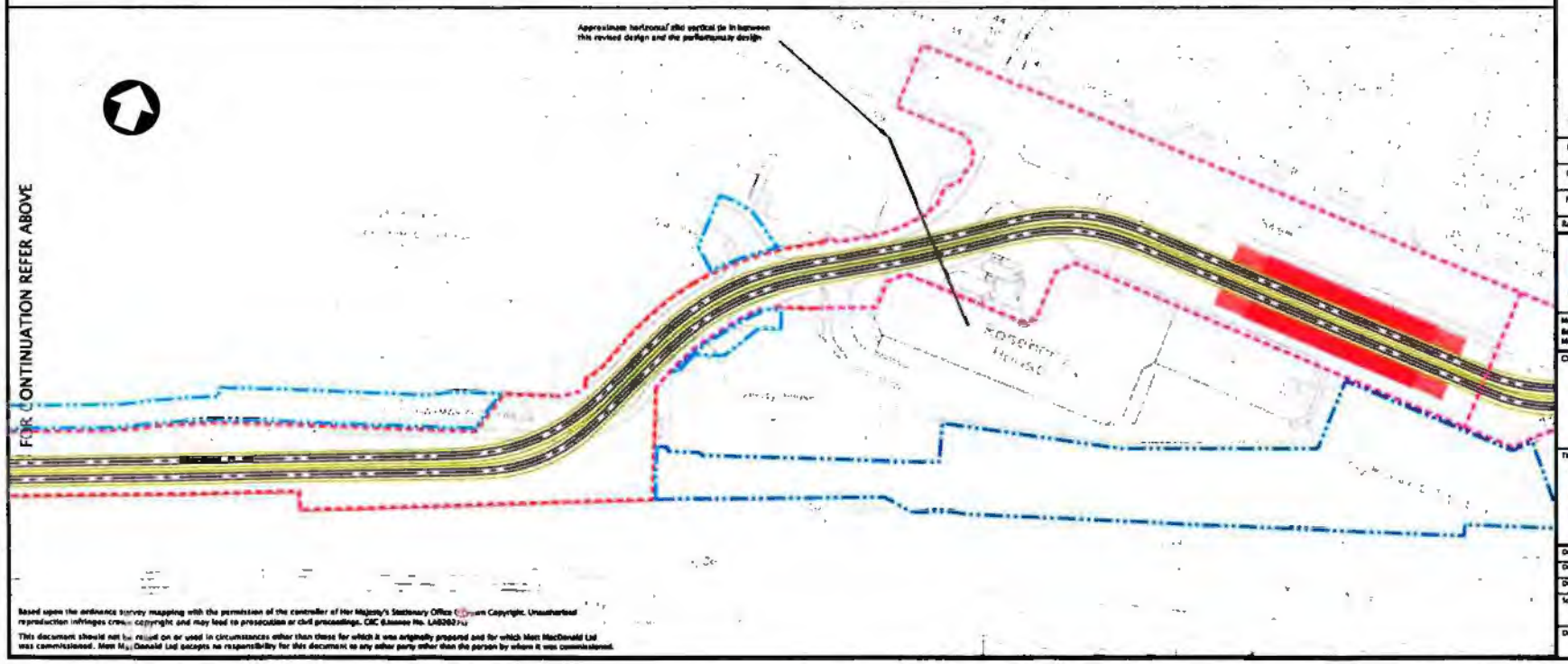
Appendix 19

Institute of Chartered Accountants

Plan

This is the Plan referred to in paragraph 22.1 of Section 22 of Schedule 13





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06. ALL DRAWINGS WHICH INDICATE PLANNED DEVELOPMENTS HAVE BEEN SUPPLIED BY OTHERS.

Key to symbols

FOR DISCUSSION PURPOSES ONLY

- LIGHT RAIL VEHICLE DKE
- ORIGINAL/UNALTERED LIMIT OF DEVIATION
- REVISED LIMIT OF DEVIATION
- ORIGINAL/UNALTERED LIMIT OF LAND TO BE ACQUIRED OR USED
- REVISED LIMIT OF LAND TO BE ACQUIRED OR USED
- NORTHERN EXTENT OF LAND AT ICAS REQUIRED PERMANENTLY FOR TRAMWAY OPERATIONS AND MAINTENANCE
- CENTRE LINE OF TRAM TRACK (LINE 1)
- STOP PLATFORM FOR LIGHT RAIL

Rev	Date	Drawn	Description	Ch'k'd	App'd
P4	30/08/05	GBF	EXTENT OF LAND PERMANENTLY REQUIRED ADDED	MMB	AJO
P3	25/08/05	NW	MINOR REVISIONS AND AMENDMENT TO REFLECT FINAL LOD AS SHOWN	MMB	AJO
P2	16/06/05	GBF	AMENDMENTS MADE TO LODS TO REFLECT FINAL MINI BILL SUBMISSION	MMB	GJT
P1	17/05/05	JPS	ISSUED IN SUPPORT OF PARLIAMENTARY MINI BILL SUBMISSION	MMB	GJT

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Babtie
Mott MacDonald in association with:
Babtie Group, Steer Davies Gleave, ERM, Gillespies, Brian Hannaby & Associates, McLean Hazel & Torrequest.

Client

Title

EDINBURGH TRAM
LINE ONE
PROPOSED INFRASTRUCTURE LAYOUT AND CHANGES TO LIMITS OF DEVIATION AT HAYMARKET FOR PARLIAMENTARY MINI BILL

Designed	GBF	GBF	Eng.Chk.	MMB	MMB
Drawn	JPS	JPS	Coordinator	SMCI	SMCI
Dwg.Chk.	GBF	GBF	Approved	GJT	GJT
Scale	1:500 AT A1 SIZE	Project	203011	Status	PRE
		CAD No	[illegible]		
Drawing No	203[illegible]			Rev	[illegible]

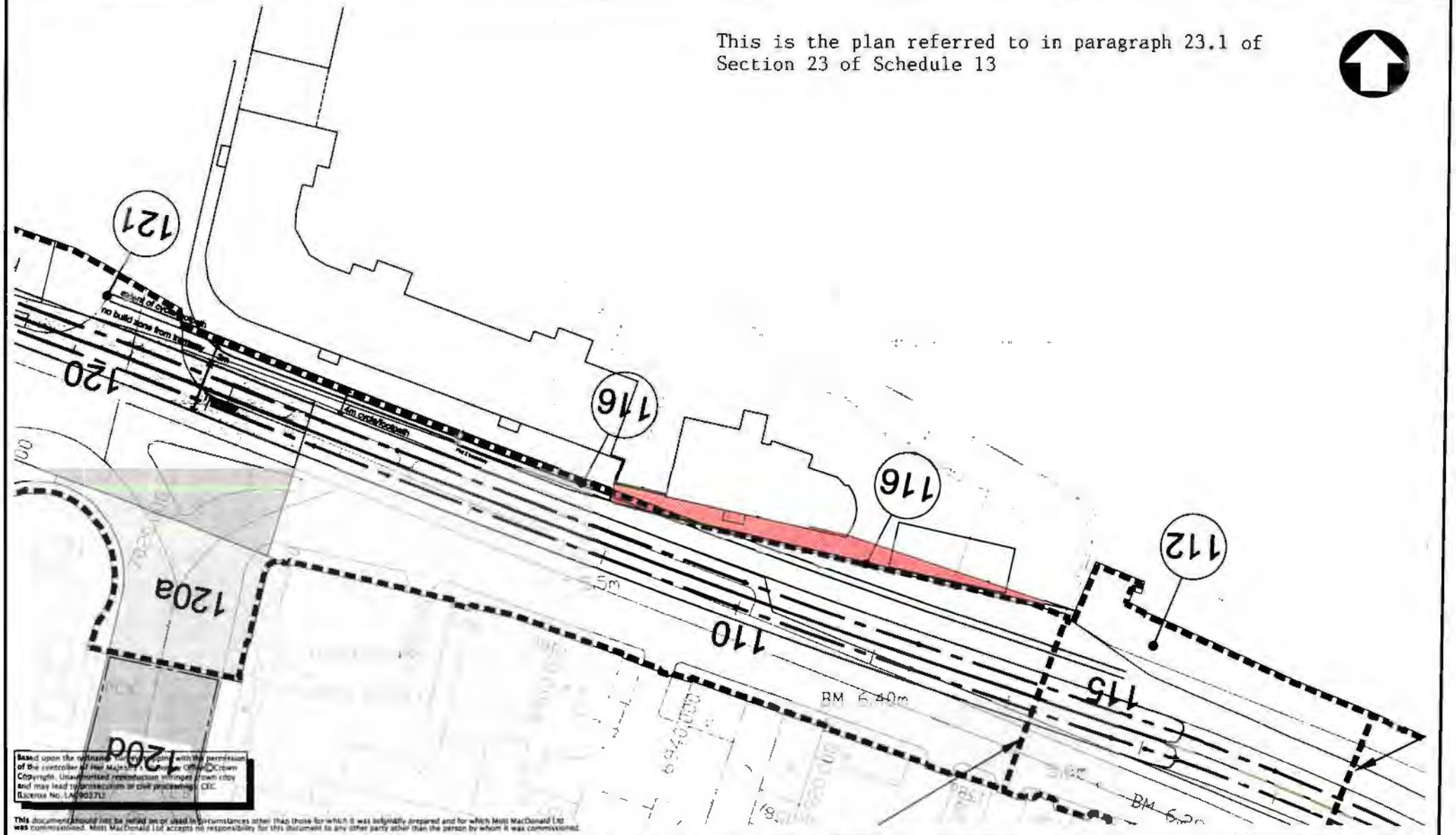
USB0000078 0068

Appendix 20

Holyrood Services Limited

Plan

This is the plan referred to in paragraph 23.1 of Section 23 of Schedule 13



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Tel 0131 718 4270
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Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	09/02/04	SR	FIRST ISSUE	MMB	AJO
P2	29/03/04	MMB	COMPARATIVE CHECK OS CO-ORDS ADDED	SR	AJO
P3	16/04/04	MMB	VARIOUS REVS. AS AGREED WITH COOPER CROMAR IN E-MAIL MESSAGE FROM CC DATED 02/04/04. ISSUED FOR INCORPORATION IN SIDE AGREEMENT	GT	GT

Title
EDINBURGH TRAM
LINE ONE
ELPHINSTONE HOMES
LoD AND PLOT DEFINITION

Drawn	SR
Checked	MMB
Approved	AJO
Scale	1:500

Drawing No.
203011/EDIN/0584

Rev	Status
P3	PRE

Appendix 21

Historic Scotland

Plan

Inverleith Conservation Area

New Town Conservation Area

Dean Village Conservation Area

Old Town Conservation Area

Coltbridge and Wester Coates Conservation Area

West End Conservation Area

South Side Conservation Area

Marchmont and Meadows Conservation Area

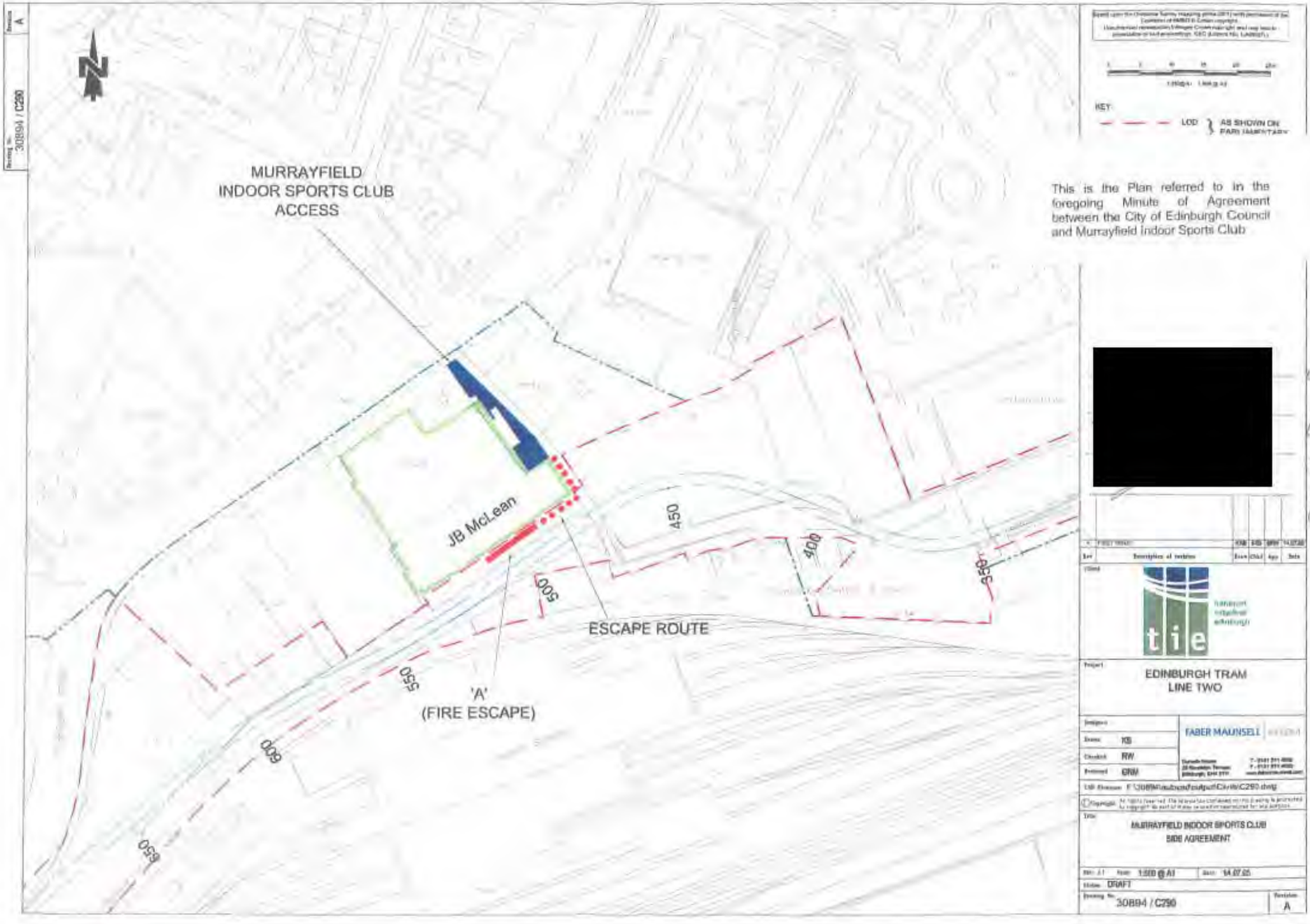
INVERLEITH TERRACE
EAST FETTES AVENUE
CREWE ROAD SOUTH
COMELY BANK
COMELY BANK AV
ARBORETUM AV
GLENOGLE ROAD
RAEBURN PLACE
ORCHARD BRAE
DEAN PARK CR
QUEENSFERRY ROAD
A90 QUEENSFERRY ROAD
QUEENSFERRY ROAD
Water of Leith
MORAY PLACE
DEAN BRIDGE
BELFORD ROAD
PALMERSTON PLACE
WEST MAITLAND ST
SHANDWICK PLACE
HENDERSON ROW
DUNDAS STREET
FETTES ROW
GREAT KING STREET
ROYAL CIRCUS
INDIA STREET
HERIOT ROW
QUEEN STREET
GEORGE STREET
PRINCES STREET
ST ANDREW SQUARE
HANOVER STREET
THE MOUND
NORTH BRIDGE
MARKET ST
HIGH STREET (Royal Mile)
CANONGATE (Royal Mile)
EAST MARKET ST
NEW STREET
CALTON ROAD
REGENT ROAD
WATERLOO PLACE
LEITH ST
LEITH WALK
YORK PLACE
ALBANY STREET
LONDON ROAD
ROYAL TERRACE
CALTON HILL
ALBERT STREET
IONA STREET
EASTER ROAD
ALBION
A1
The Palace of Holyroodhouse
WORLD HERITAGE SITE BOUNDARY
Edinburgh Castle
KINGS STABLES RD
CASTLE TERR
JOHNSTON TERRACE
GRASSMARKET
WEST PORT
COWGATE
CHAMBERS ST
GEORGE IV BRIDGE
FLEMING
QUEENS DRIVE
HAYMARKET TERR
HAYMARKET STATION
DALRY RD
WEST APPROACH ROAD
FOUNTAINBRIDGE
MORRISON STREET
GROVE STREET
LAURISTON PLACE
LAURISTON GARDENS
PONTON THORNY
HOME ST
LEVEN ST
GILMORE PLACE
DUNDEE STREET
VIEWFORTH
DALRY ROAD
CLERK ST
MELVILLE DRIVE
ROYAL COMMONWEALTH POOL
EWH CONSERVATION FUNDING BOUNDARY
WORLD HERITAGE SITE BOUNDARY

USB00000078_0072

Appendix 22

Murrayfield Indoor Sports Club

Plan

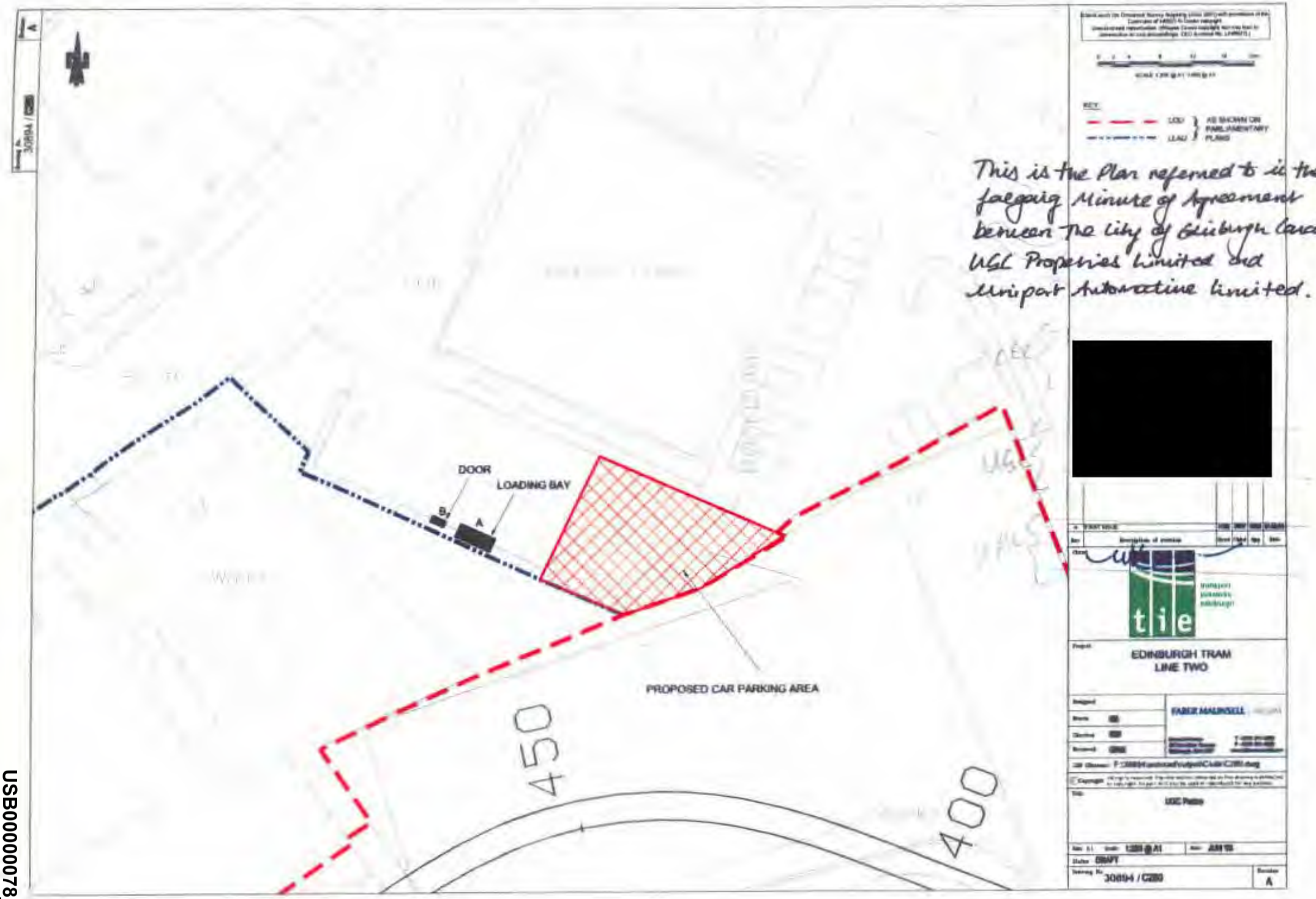


USB00000078_0074

Appendix 23

UGC Properties Limited and Uniport Automotive Limited

Plan

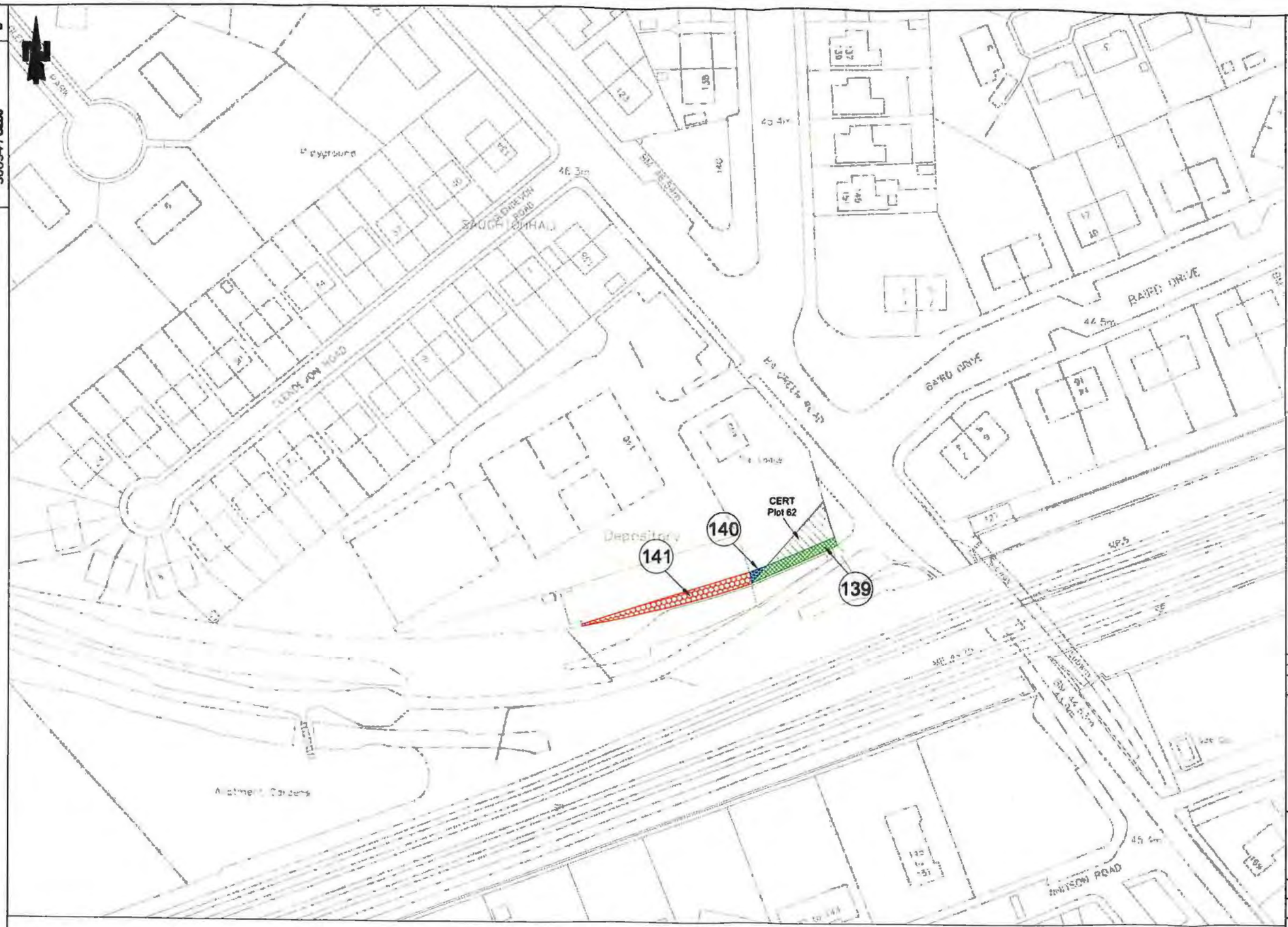


USB00000078_0076

Appendix 24

JPSE Limited

Plan



0 5 10 20 30 40 50m

SCALE 1:500 @ A1; 1:1000 @ A3

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Drawing No. 30894 / C286 Revision B

[redacted]

CEC

[redacted] director

AM COMPANY SERVICES LIMITED

JPSE Dir/Sec

[redacted] JPSE Dir

Rev	Description of revision	Draw	Chkd	App	Date
B	AREAS 139, 140 AND 141 ADDED	AA	RW	GM	[illegible]
A	ORIGINAL ISSUE	AIC	RW	GM	[illegible]

Client

tie transport initiatives edinburgh

Project

EDINBURGH TRAM
LINE TWO

Designed RW
Drawn AIC
Checked RW
Reviewed GM

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CAD filename: F:\30894\autocad\output\Civils\C286.dwg

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Title

CEC LAND TAKE
AT JENNERS DEPOSITORY

Size A1 Scale 1:500 Date 4 July 2005

Status INFO

Drawing No. 30894 / C286 Revision B

Appendix 25

New Edinburgh Limited and New Edinburgh Park (Management) Limited

Part 1 (Plan 1)

Part 2 (Plan 2)

Part 3 (Plan 3)

Part 4 (Plan 4)

Part 5 (Plan PT)

Part 6 (Maintenance Schedule)



Edinburgh Park
Hotel Site
Hermiston Gait

This is Plan 1 referred to in the foregoing Agreement between The City of Edinburgh Council, New Edinburgh Limited and Edinburgh Park (Management) Limited.

[redacted]

FOR CONSULTATION

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www.halcrow.com
Halcrow

Client: NEW EDINBURGH LTD

Notes:

EDINBURGH PARK/HERMISTON GAIT - TRAM 2

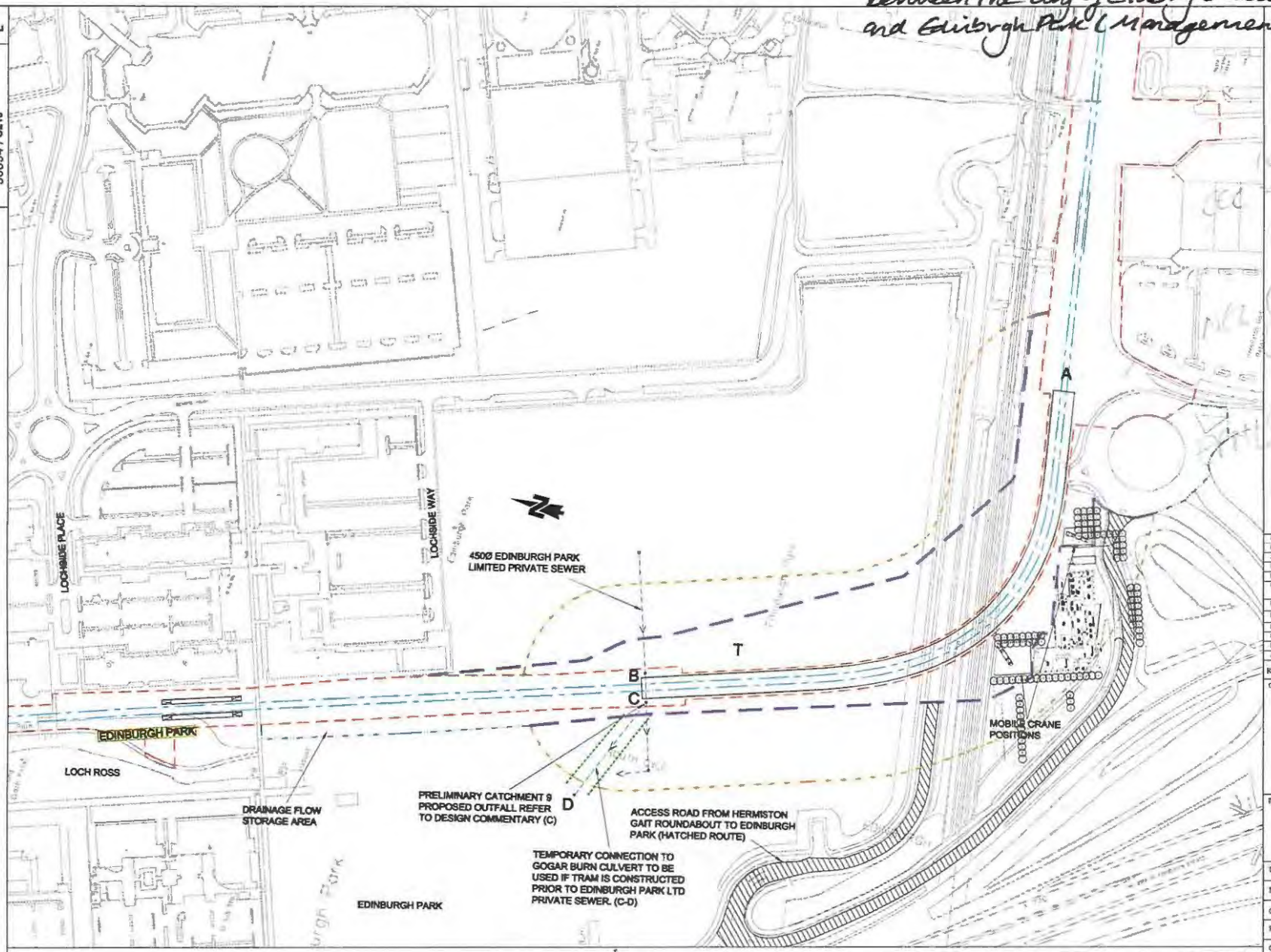
Rev	By	Chkd	Apprvd	Date	Description
-					

Drawing: IDENTIFICATION OF SITE BOUNDARIES

Drawn by: SWKT Date: 31/5/05
Checked by: SWKT Date: 01/06/05
Approved by: - Date: -
Drawing No: 04-4582-PODEPL-102-9011 Revision: -
Drawing Scale: -

USB00000078_0080

This is Plan 2 referred to in the foregoing Agreement between The City of Edinburgh Council, New Edinburgh Limited and Edinburgh Park (Management) Limited



Revision L

Drawing No. 30894 / C210

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0 12.5 25 50 75 100 125m

SCALE 1:1250 @ A1 1:2500 @ A3

[redacted]

Rev	Description of revision	Drawn	Chkd	App	Date
L	DRAFT STAMP REMOVED	AIC	AS	GM	[illegible]
K	LLAU AMENDED	AA	RW	RW	[illegible]
J	POINT 'T' ADDED	PM	GM	GM	[illegible]
I	LLAU AMENDED	PM	GM	GM	[illegible]
H	LLAU (NEW LIMITS) AMENDED	AIC	GM	GM	[illegible]
G	HATCHING AMENDED, LOD/LLAU AMENDED FOR ROAD	AIC	GM	GM	[illegible]
F	REVISED HOTEL LAYOUT	JB	AS	GM	[illegible]
E	LLAU AMENDED, LETTERS ADDED	AIC	AS	GM	[illegible]
D	LLAU CHANGED	JB	AIC	MG	[illegible]
C	MINOR CHANGES	JB	AIC	MG	[illegible]
B	CHANGES TO LLAU	KAB	AIC	MG	[illegible]
A	ORIGINAL ISSUE	AIC	AS	GM	[illegible]

Client: tie transport initiatives edinburgh

Project: EDINBURGH TRAM LINE TWO

Designed	AS
Drawn	AIC
Checked	AS
Reviewed	GM

FABER MAUNSELL

CAD filename: F:\30894\autocad\output\Civils\C210.dwg

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Title: EDINBURGH PARK PROPOSED CHANGES TO LLAU SHEET 2 OF 2

Size A1 | Scale 1:1250 | Date 20/01/05

Status

Drawing No. 30894 / C210 | Revision L

Legend

Track Centre Line

Tramstops

New Structure

LOD

LLAU (ORIGINAL)

LLAU (NEW LIMITS)

LLAU (NO LONGER REQUIRED)

Additional Land Take / easement to accomodate changes to drainage

Drainage

THE GYLE

CDM Regulations :

A CDM health and safety assessment has been completed and the following unusual, significant or difficult to manage CDM hazards were identified :-

- Southern area of Edinburgh Park Industrial Estate. Works adjacent to or crossing line of high pressure gas pipeline.
- Crossing Glasgow Road. Proximity to railway. Possible risk of flooding. Road traffic impact
- Retail park. Public interface during construction and access during maintenance.
- Proximity of depot to airport and flight path. Proximity to railway.

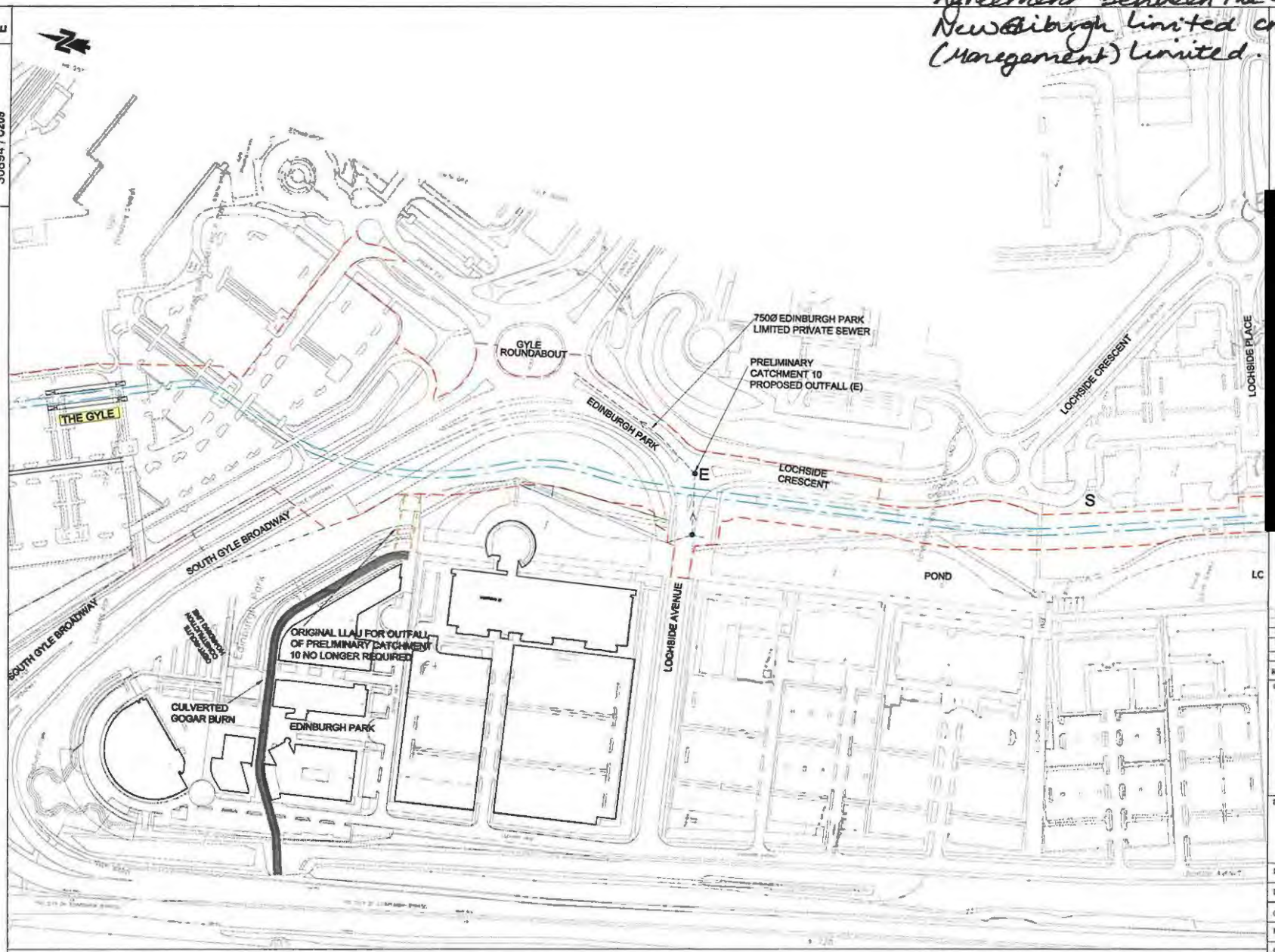
USB00000078_0081

This is to be read in conjunction with the Agreement between The City of Edinburgh Council, New Edinburgh Limited and Edinburgh Park (Management) Limited.

USB00000078_0082

Revision E

Drawing No. 30894 / C209



[redacted]

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SCALE 1:1250 @ A1, 1:2500 @ A3

Rev	Description of revision	Draw	Chkd	App	Date
E	DRAFT STAUP REMOVED	AIC	AS	GM	[illegible]
D	POINT 'S' ADDED	PM	GM	GM	[illegible]
C	LLAU AMENDED	AIC	GM	GM	[illegible]
B	OUTFALL NOTE AMENDED	AIC	AS	GM	7/3/05
A	ORIGINAL ISSUE	KAB	MG	MG	9/2/05

Client: tie transport initiatives edinburgh

Project: EDINBURGH TRAM LINE TWO

Designed	AS	FABER MAUNSELL
Drawn	AIC	
Checked	AS	
Reviewed	GM	

CAD filename: F:\30894\autocad\output\Civils\C209.dwg

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Title: EDINBURGH PARK PROPOSED CHANGES TO LLAU SHEET 1 OF 2

Size A1 | Scale 1:1250 | Date 10.02.05

Status

Drawing No. 30894 / C209 | Revision E

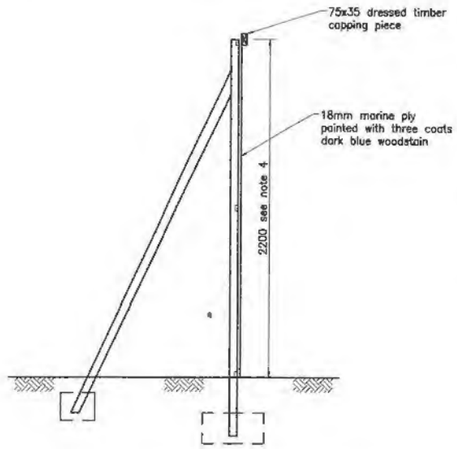
Legend

- Track Centre Line
- Tramstops
- New Structure
- LOD
- LLAU (ORIGINAL)
- LLAU (NEW LIMITS)
- LLAU (NO LONGER REQUIRED)
- Additional Land Take / easement to accomodate changes to drainage
- Drainage

THE GYLE

CDM Regulations :
A CDM health and safety assessment has been completed and the following unusual, significant or difficult to manage CDM hazards were identified :-
- Southern area of Edinburgh Park Industrial Estate. Works adjacent to or crossing line of high pressure gas pipeline.
- Crossing Glasgow Road. Proximity to railway. Possible risk of flooding. Road traffic impact
- Retail park. Public interface during construction and access during maintenance.
- Proximity of depot to airport and flight path. Proximity to railway.





HOARDING DETAIL (1:20)

Hoarding notes
1. Posts, raking supports and framing to be developer designed.
2. Vertical support to be provided at joints as required to prevent bowing and distortion.
3. All posts to be concreted and depth etc to be developer designed.
4. Hoarding height may be varied if required to meet safety standards.
5. Gates in the hoarding to be the same height as the rest of the hoarding (subject to point 4 above) and painted in conformity with the rest of the hoarding as far as is reasonably practicable.
6. All dimensions are in millimetres unless otherwise stated.

This is Plan 4 referred to in the foregoing Agreement among the City of Edinburgh Council, New Edinburgh Limited and Edinburgh Park (Management) Limited.

[redacted]

FOR CONSULTATION

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www.halcrow.com
Halcrow

Client: NEW EDINBURGH LTD

EDINBURGH PARK/HERMISTON GAIT - TRAM 2

Notes:
1. Hoardings will not be erected outwith the line of the dashed red lines.
2. Access and egress from area 1 to be taken via South Gyle Broadway.

Rev	By	Chkd	Approvd	Date	Description
C	[illegible]	[illegible]	DCL	19.05.05	Hoarding line amended at Hermiston Gait Roundabout/new road
B	[illegible]	[illegible]	DCL	01.04.05	Hoarding detail added
A	[illegible]	[illegible]	DCL	25.03.05	Line of hoarding revised

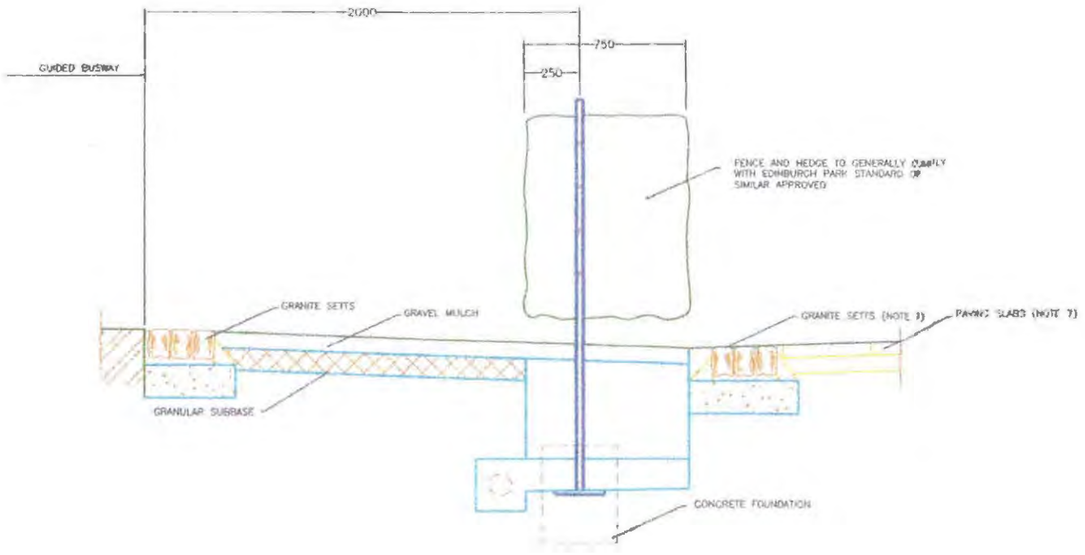
Drawing: LINE OF HOARDING TRAM LINE 2

Drawn by: JMJ Date: 19.05.05
Checked by: DCL Date: 19.05.05
Approved by: DCL Date: 19.05.05
Drawing No.: 04-4582-PODEPL-102-9010 Revision: C
Drawing Scale:

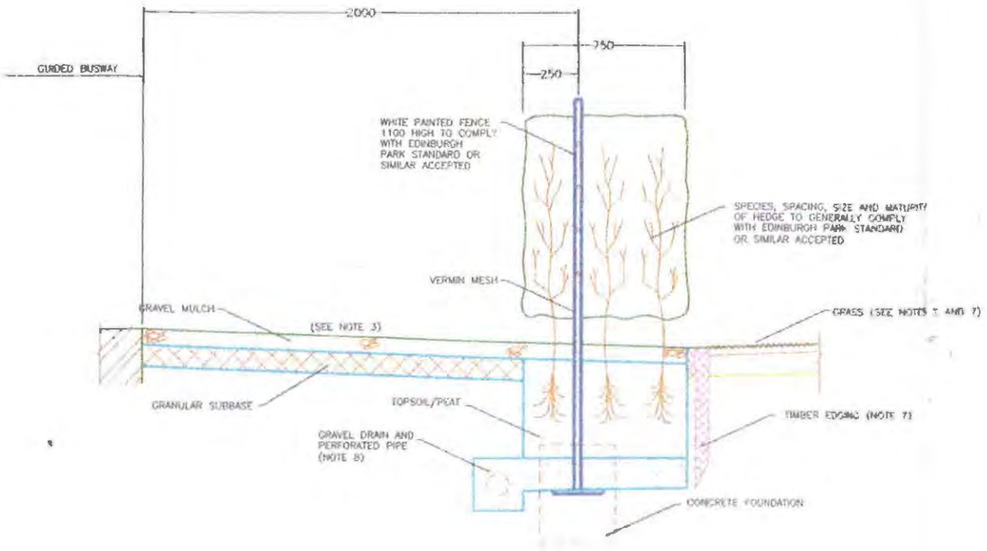
USB00000078_0083

THE CITY OF EDINBURGH COUNCIL : CITY DEVELOMENT DEPARTMENT

DRG. NO.PT/1/01/001/2/293F



EDGE TREATMENT ADJACENT TO FOOTWAY



EDGE TREATMENT ADJACENT TO GRASSED AREA

This is Plan PT/1/01/001/2/293F referred to in the foregoing Agreement between the City of Edinburgh Council, New Edinburgh Limited and Edinburgh Park (Management) Limited.

[redacted]

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES
2. EXTENT AND SLOPE OF GRASS REINSTATEMENT VARIES ALONG THE ROUTE
3. GRAVEL MULCH TO FALL AWAY FROM GUIDED BUSWAY AT GRADE OF 1:30
4. EDGE OF GUIDED BUSWAY IS TAKEN AS EDGE OF RUNNING TRACK OR BACK OF FOOTWAY WITHIN HALTS
5. CONCRETE USED IN THE CONSTRUCTION OF GUIDED BUSWAY TRACK WHERE VISIBLE SHALL BE COLOURED TO COMPLEMENT PAVING SLABS IN EDINBURGH PARK, OR SIMILAR. INFILL MATERIAL BETWEEN THE RAILS WILL BE WATER WORN GRAVEL. THE GAP BETWEEN THE TRACKS WILL BE GRANITE SETTS
6. ALL GRAVEL TO BE WATER WORN AGGREGATES, CONSISTENT WITH GRAVEL IN EDINBURGH PARK, OR SIMILAR
7. LANDSCAPE DETAILS AND MATERIALS OUTWITH FENCELINE SHALL BE TO ACCEPTED EDINBURGH PARK STANDARDS
8. DRAINAGE TO HEDGE TRENCH SHALL BE LOCATED OUTSIDE FENCELINE WHERE GUIDED BUSWAY IS LOWER THAN SURROUNDING GROUND LEVEL
9. SUITABLE PROPOSALS FOR EDGE TREATMENT AND SOIL PREPARATION TO BS 3882 SHALL BE INCORPORATED
10. DRAWING NOT TO BE SCALED. STATED DIMENSIONS ONLY TO BE USED

[redacted]

REVISION	DETAILS	BY	DATE
F	AMEND NOTES 5, 6 & 7	DM	27/08/97
E	ADD FENCE DESCRIPTION. AMEND NOTE 9	LL	07/04/97
D	AMEND NOTE 5, ADD VERMIN MESH AND HEDGE NOTE	DM	14/03/97
C	REDRAFT DRAWING AMEND EXTENT OF CROSS SECTION, ADD NOTES	DM	11/02/97
B	BUSWAY PROFILE REMOVED BUSWAY DIMENSIONS AND MINOR NOTES ADDED	DM	10/01/97
A	BUSWAY PROFILE REMOVED BUSWAY DIMENSIONS AND MINOR NOTES ADDED	CH	18/12/96

EDINBVRGH
THE CITY OF EDINBURGH COUNCIL

TRANSPORT & COMMUNICATIONS
c/o 18/19 MARKET STREET
EDINBURGH EH1 1ER
TEL No. 031 200 2000

PUBLIC TRANSPORT
SUSTAINABLE TRANSPORT AND PROJECTS
STRATEGY PROJECTS

CITY OF EDINBURGH RAPID TRANSIT
INDICATIVE EDGE TREATMENT
IN EDINBURGH PARK

Date 05/12/96
Scale 1:20

Drawn By D MILLAR
Checked By C HUTT

1/8

DRG. NO. PT/1/01/001/2/293F

DRG. NO.PT/1/01/001/2/293F

USB00000078_0084

Maintenance Schedule

TRAM – Edinburgh Park

New Edinburgh Limited

Maintenance Schedule for Tram Route and Associated Landscape Edge Strip (No. of visits per 12 month period).

Hedging

6 hand weedings, 2 firm ups, 1 fertiliser (70g/m²), beef up for plant deaths/losses (if necessary replacement of previously replaced material will be required to ensure a fully established hedgeline after a 36 month period); 1 prune as directed, 1 residual herbicide, insecticide as required to maintain pest-free. Water as directed.

Fencing

4 check and re-strain (including replacement of burst tie-wires/mesh/clips and radiseurs).

Grass

16 cuts, 2 fertiliser (35g/m²), 1 selective weedkill, 2 aerations, 1 manual edge with edging iron.

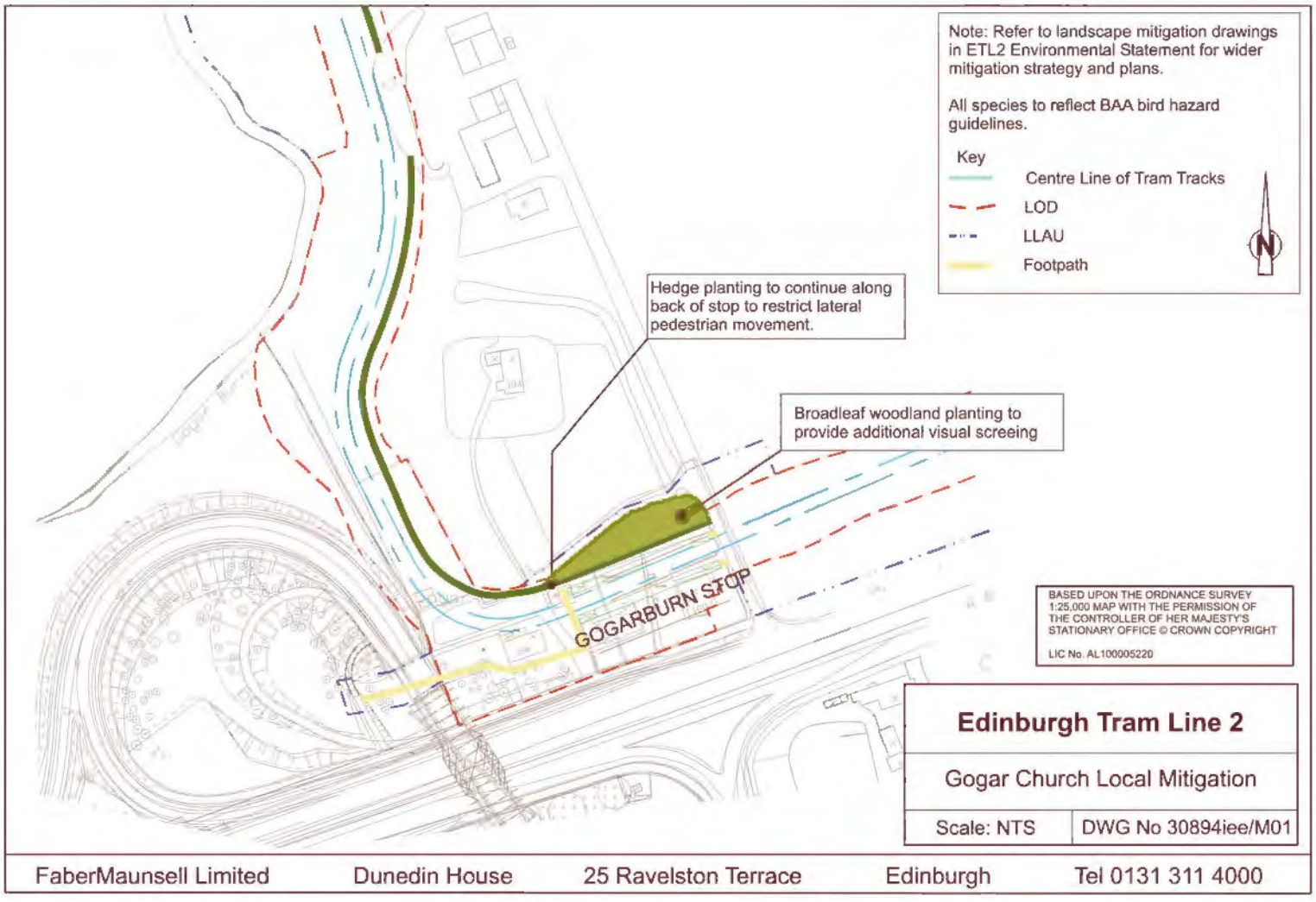
General

24 litter pick, 1 top up gravel mulch, 1 chemical weedkill to hard surfaces, 12 brush hard surfaces.

Appendix 26

Chris Holmes Cabinet Makers

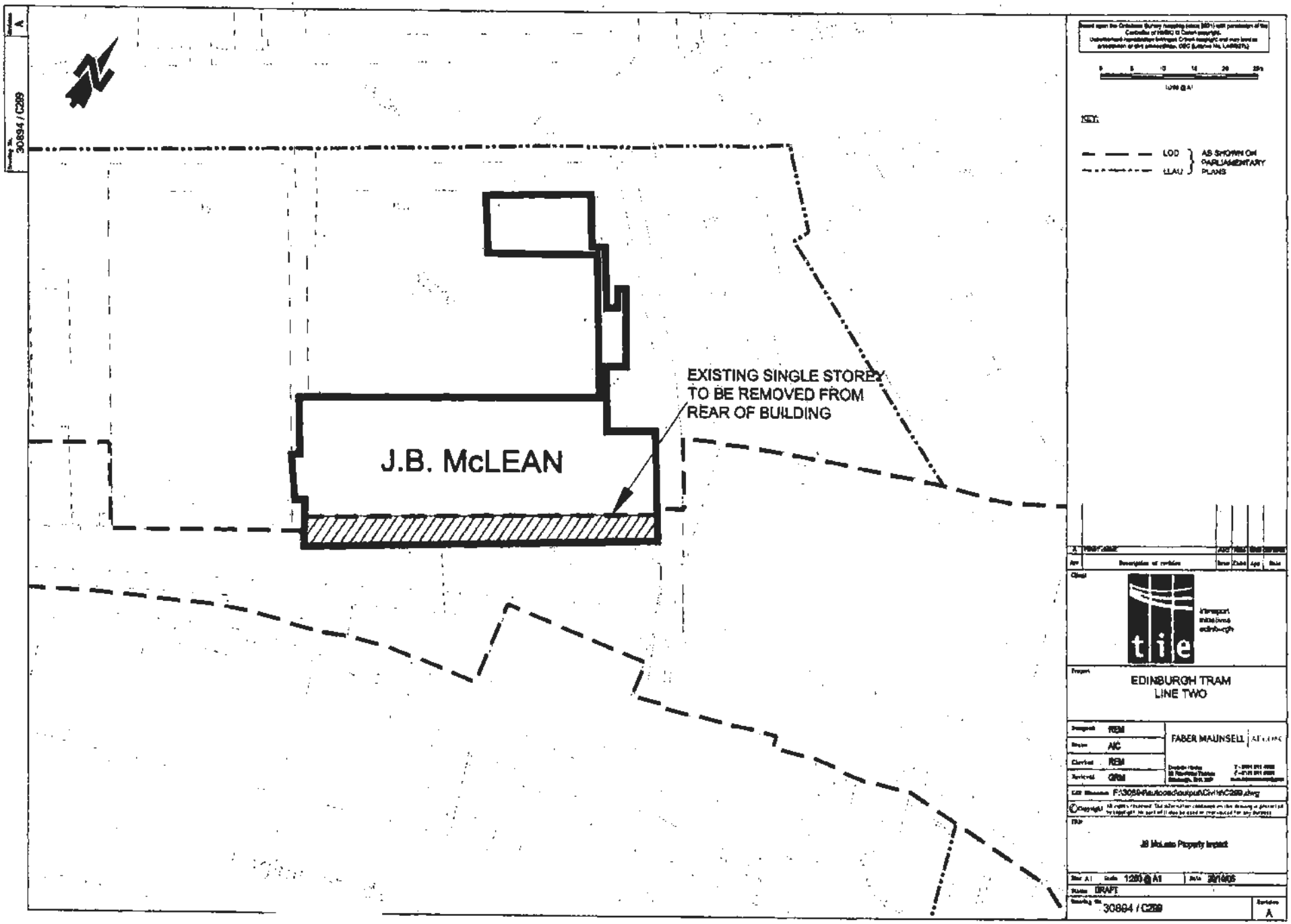
Planting Plan


Note: Refer to landscape mitigation drawings in ETL2 Environmental Statement for wider mitigation strategy and plans.
All species to reflect BAA bird hazard guidelines.
Key
Centre Line of Tram Tracks
LOD
LLAU
Footpath
N
Hedge planting to continue along back of stop to restrict lateral pedestrian movement.
Broadleaf woodland planting to provide additional visual screeing
GOGARBURN STOP
BASED UPON THE ORDNANCE SURVEY 1:25,000 MAP WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE © CROWN COPYRIGHT
LIC No. AL100005220
Edinburgh Tram Line 2
Gogar Church Local Mitigation
Scale: NTS
DWG No 30894iee/M01
FaberMaunsell Limited
Dunedin House
25 Ravelston Terrace
Edinburgh
Tel 0131 311 4000

Appendix 27

Roderick James McLean

Plan



Edinburgh [date]. This is the plan referred to in the foregoing offer by Dundas & Wilson for to Lendrops

Appendix 28

Scottish Rugby Union

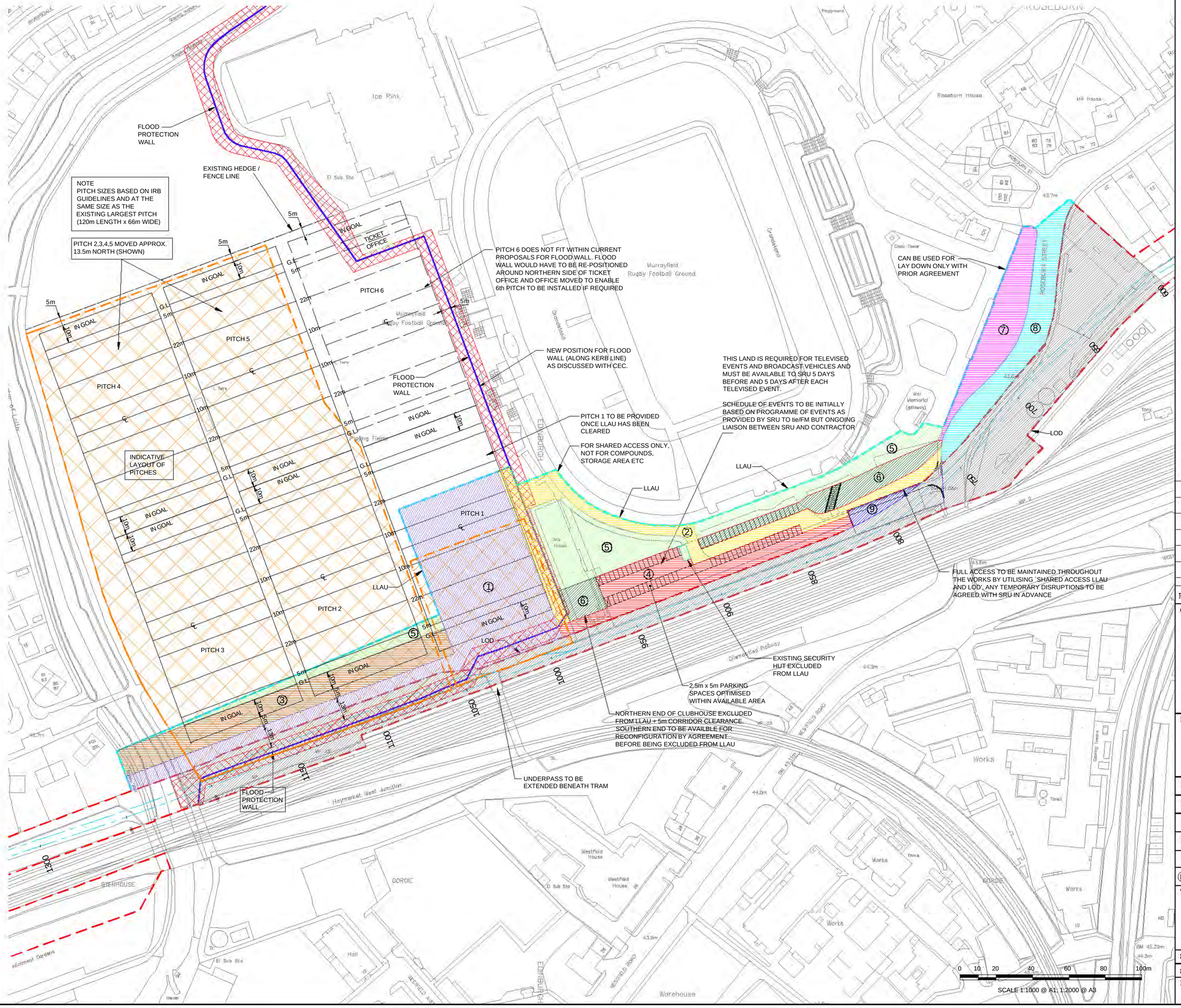
Part 1 (Plan)

Part 2 (Local Construction Plan)

Part 3 (Pitches Specification)

Drawing No. 30894 / SK05

Revision G



NOTES

1 REFER TO EDINBURGH TRAMLINE 2 LOCAL CONSTRUCTION PLAN MURRAYFIELD FOR DEFINITION OF LLAU AND CONSTRUCTION STRATEGY.

KEY

- LLAU
- LOD
- ① 'NORMAL' LLAU
- ② 'SHARED ACCESS' LLAU
- ③ 'OVER-SAILING' LLAU
- ④ 'TEMPORARY USE' LLAU
- ⑤ 'EXCLUDED' LLAU
- ⑥ 'RECONFIGURATION' LLAU
- ⑦ 'EXCLUDED' FROM LLAU BUT CAN BE USED WITH PRIOR AGREEMENT
- ⑧ 'APOPTED HIGHWAY' LLAU
- ⑨ 'SHARED ACCESS' LOD
- LOD
- FLOOD WALL AND LOD
- AREA OF SRU PITCH STRENGTHENING FOR CAR PARKING

Rev	Description of revision	Draw	Chkd	App	Date
G	AREA OF SRU PITCH STRENGTHENING FOR CAR PARK AMENDED	ED			09.01.06
F	AREA OF SRU PITCH STRENGTHENING FOR CAR PARK SHOWN	ED	KP	GRM	22.12.05
E	LOD AND 'SHARED ACCESS' LOD AREAS AMENDED	AJS	KP	GRM	25.11.05
D	TEMPORARY USE LLAU AMENDED TO SHARED ACCESS LLAU	AJS	KP	GRM	22.11.05
C	ADOPTED AREAS AMENDED	AA/RB	KP	GRM	16.11.05
B	AREAS ADOPTED HIGHWAY AND SHARED ACCESS SHOWN	AA	JMc	KP	10.06.05
A	DRAFT ISSUE	AA	JMc	KP	01.06.05

Client

tie transport initiatives edinburgh

Project

EDINBURGH TRAM LINE TWO

Designed	KP
Drawn	AA/RB
Checked	KP
Reviewed	GRM

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CAD filename: F:\30894\Drawings\Consultation\SRU\SK-05-rev g

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Title

MURRAYFIELD / TRAMLINE 2 INTERFACE ACCESS AND LLAU DEFINITION

DRAFT

Size A1 | Scale 1:1000 | Date 18/11/05

Status

Drawing No. 30894 / SK05 | Revision G

EDINBURGH TRAM LINE 2
LOCAL CONSTRUCTION PLAN
MURRAYFIELD

Transport Initiatives Edinburgh

November 2005

DRAFT

TRANSPORT INITIATIVES EDINBURGH

EDINBURGH TRAM LINE 2

LOCAL CONSTRUCTION PLAN

MURRAYFIELD

Prepared by: ..... Approved by: ...

Keith Prentice
Senior Engineer

Gavin Murray
Project Manager

Rev No	Comments	Date
1	Draft Issue 1	08/06/05
2	Draft Issue 2	16/06/05
3	Draft Issue 3	24/06/05
4	Draft Issue 4	18/11/05
5	Draft Issue 5	25/11/05
6	Draft Issue 6	13/12/05

Executive Summary

This is a local Construction Plan for the area of Murrayfield Stadium. This plan describes some key features of the Edinburgh Tram Line 2 (ETL2) construction in the vicinity of Murrayfield Stadium and the need to complete the construction with the minimum of impact on the operation of Scottish Rugby Union (SRU) and others using the stadium or surrounding pitches. The plan details the land use requirements needed to complete the construction at Murrayfield, outlining revised requirements for Land to be Acquired or Used (LLAU) within the construction phase of ETL2.

The tram alignment is discussed in relation to its impact on access to the stadium showing how this has been considered in the outline design. An appreciation of the safe operational requirements of SRU on event days is outlined showing the need to comply with the terms and conditions set out in the General Safety Certificate issued by CEC. Also included in the plan is a statement, which shows the potential impact on the Wanderers Clubhouse detailing how a staircase and storage area will require to be relocated to facilitate the East-West Link. This report further details of the relocation required for the back pitches.

In a number of areas the report does not draw final conclusions on the optimum solution rather identifying a number of potential options leaving the final decision to the detailed design but clearly stating the commitment of the promoter to ensure that an appropriate level of consultation is carried out with the land owner. All of this shows how the promoter has undertaken to ensure the operation of this key venue can be maintained despite these major construction works in the immediate vicinity.

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3. Construction Technique 7

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- ~~3.3 Construction Sequence~~
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  - ~~3.3.2 Site Establishment~~
  - ~~3.3.3 Construction of the Retained Fill / Structural Embankment~~
- ~~3.4 Construction Technique~~
- ~~3.5 Construction Timetable~~

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- ~~4.9. Noise, Dust and Air Pollution ..... 11~~

~~5.0 Safe Operation on Event Days ..... 12~~
- ~~5.1. Major Events ..... 13~~
- ~~5.2. Minor Events ..... 13~~

~~6.0 Alignment Impact on Access to Stadium ..... 14~~
~~7.0 Impact on Wanderers Clubhouse ..... 15~~
~~8.0 Relocation of back pitches ..... 17~~

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LOCAL CONSTRUCTION PLAN
MURRAYFIELD





1. Introduction

ETL2 is a proposed tramline development , which connects Edinburgh city centre with Edinburgh Airport and Newbridge and includes a stop adjacent to Murrayfield Stadium.

SRU have agreed that the proposed ETL2 will bring associated benefits to the Murrayfield area in terms of accessibility. SRU have however, voiced their concern with regards to the safety and operational impacts on the stadium of the tramway predominantly during construction, so discussions have been on going to alleviate this concern. It is the intention that construction of ETL2 go ahead with the minimum of disruption to the continued operation of Murrayfield Stadium. This document outlines the critical interfaces identified between ETL2 and SRU, which need to be developed to ensure that this is achieved.

The aim of this document is to identify key areas of concern to SRU, to outline what measures may be required to be investigated in detail such that they can be considered more thoroughly through the detailed design and be developed into a *local code of construction* to govern the Contractor's activities on this site.

At this stage of the project, the scheme is at Parliamentary Approval Stage. Designs have not been developed beyond typical concept and therefore the construction techniques and procedures cannot be confirmed. Following parliamentary approval detail design will progress and specific documentation and information will be confirmed and issued. The contractor will be required to take all measures necessary to ensure that the normal Land to be Acquired or Used (LLAU) is safe and secure and will have to demonstrate that the stadium can be released back to SRU for an agreed period covering each event to allow safe operation in accordance with approvals of the City of Edinburgh Council.

The proposed tramway will run between the railway corridor and the South Stand of the Stadium. The initial extents of the Limits Of Deviation (LOD) and LLAU developed for the Parliamentary Bill were not acceptable to SRU as they potentially took all control of this area away from SRU passing it to the Contractor. Following discussions with SRU the LLAU has been revised and the limits now shown on drawing 30894 / SK05 Rev G~~F~~ (included in Appendix A) are in accordance with the currently agreed requirements.

2. Definition of LLAU at Murrayfield

Drawing 30894 / SK05 identifies different areas of land within the LLAU at Murrayfield. The following commentary describes the definition of these areas.

2.1 'Normal' LLAU (Area No. 1)

This area provides construction access across the back pitches. In addition there is a compound area situated to the west of the Wanderers Clubhouse.(on practice pitch 1) This area will be fenced off and made secure for the duration of the construction. This area is available for the contractor at all times, though access may be restricted as noted below.

2.2 'Shared Access' LLAU (Area No. 2)

The shared access corridor enables access for all to SRU offices, hospitality suites and shop, Wanderers Clubhouse, the temporary use area and the construction compound on Pitch 1. The key site access should be considered to be along the existing SRU / Network Rail boundary however it is anticipated that that during the works this will not always be possible hence this shared access route has been agreed with the SRU. On event days contractor movement within the shared access corridor will be restricted for a time depending on prior agreement with SRU and CEC Safety Officer. It is anticipated that on the event day the contractor would be prevented from use of this area.

2.3 'Over-sailing' LLAU (Area No. 3)

The over-sailing area extends 15m from the fenced off construction area of the normal LLAU. This extends from the west side of pitch 1 to the boundary west of pitch 3. This area is not fenced off and is required as clearance for lifting activities. Contractor use of this area on event days will be restricted to that agreed with SRU. Whilst this provision may not be required in the final solution through the practice pitches it is maintained to ensure that works can be adequately constructed – for example should temporary or permanent piling be required over-sailing would still be necessary.

2.4 'Temporary Use' LLAU (Area No. 4)

The temporary use area is required by the SRU for televised events for broadcast vehicles and for all major events to provide an east west spectator link (extending the full width of the stadium and along the length of practice pitch 1 to ensure full access between Roseburn Street and parking provision on the back pitches). This area must be available to SRU 5 days before and 5 days after each televised event. A schedule for access to this area will be based on a programme of events provided by SRU to **tie** and ongoing liaison between SRU and the contractor.

2.5 'Excluded' from LLAU (Area No. 5)

The areas around the Wanderers Clubhouse (other than that outlined above), the area south of the stadium and adjacent to the over-sailing area are excluded from the LLAU and passed back to the SRU on the understanding that they agree to facilitate any essential work which may require to be undertaken within this area – for example should the SRU require their 'V' board advertising to be mounted on the stadium they will make working area available.

2.6 'Reconfiguration' LLAU (area No 6**)**

Covering the open space and turnstyles to the south of the stadium as well as the southern end of the Wanderers Clubhouse, this area is required at the start of the contract to facilitate reconfigurationworks. Once these works are completed this area would revert to SRU and treated as Excluded from LLAU.

2.7 'Excluded' from LLAU but can be used with prior agreement (Area No. 7)

The area adjacent to Roseburn Street is excluded from LLAU but can be used as a lay down area with prior agreement from SRU.

2.8 'Adopted Highway' LLAU (Area No. 8)

This area is outside the boundary of Murrayfield and will be dealt with in consultation with CEC, however SRU will be informed of any changes, which may affect them. Appropriate measures will be required to ensure appropriate access is provided to the SRU for normal day to day activities throughout the works except by prior consent of the SRU, noting particularly the Shared Access LLAU as outlined in 2.2 above.

2.9 ‘Shared Access’ LOD (Area No. 9)

The use of this area is to be discussed and agreed between SRU and the contractor. It is important that a continuous safe access be provided for the ongoing activities of the SRU (as outlined in 2.2 above) both for day to day and event operation.

3. Construction Technique

A range of construction options has been considered for this section of the Tram alignment. Whereas the indication within the Parliamentary Bill documentation would indicate that the track be placed on a viaduct structure, considerable additional evaluation and consultation has subsequently been undertaken. This has given rise to alternative proposals which utilise the whole of the LOD between the Stadium and the railway. Further details of construction proposals, outline methodologies and indicative construction durations are being worked up in further detail as the project is taken forward. This work will investigate and compare the options to ensure the best final solution. To facilitate SRU agreement, however, the following note on construction technique has been prepared to assist the SRU's understanding of likely impacts of the construction on their property and operations (both day to day and events).

Prior to construction commencing there will be a full dilapidation survey carried out jointly by the Contractor and the SRU Facility Manager.

In the initial stages of design it was considered likely that ETL2 would be supported on a continuous viaduct of either steel beam and composite concrete deck, or pre-cast concrete beam superstructure. Intermediate supports were assumed to be either column or pier type and of reinforced concrete construction.

Subsequently, alternatives involving an embankment or retained fill have been brought forward as alternative options, to reduce both the construction period and potential construction impacts on Network Rail operations, particularly reducing disruptive possessions. This option utilizes slightly more SRU land in the permanent situation than would the viaduct option as it extends to the edge of the LOD and no land beneath the structure can be handed back to the SRU. To achieve this requires a revision of the circulation area to the south of the stadium and this has been developed as a number of options resulting in that shown in 30894 / SK008 Rev F (as shown in Appendix B). The structure (viaduct or embankment) will extend some 400m in length rising to a maximum height of 7m across the southern boundary of the SRU ground.

In relation to the retained fill / embankment options, several alternatives have been considered and it must be stressed that these are generic and that the final detailed design will rest with SDS and INFRACO. The findings are summarized below.

a) Retained fill
b) Structural embankment

Considering each of the elements of the proposed embankment in turn the following sections identify some of the salient points to note.

3.1 Retained Fill.

This is a combination of a retaining structure, which could be a vertical wall, stepped reinforced earth wall, or a crib mass wall (the latter two being amenable to soft landscape planting) with structural fill benched into the existing railway embankment. This element would extend from the west end of the viaduct over Roseburn Street to 40m west of Wanderers pavilion. The structure would extend between 2 and 3 metres north of the tramway swept path whilst still remaining within the LOD.

It is noted that the existing Railway access underpass at ch1045 will be extended under the new tramway embankment.

3.2 Full Structural Embankment.

This is a structural embankment with 1-1.5 side slopes constructed with imported fill benched into the existing railway embankment. A further refinement could incorporate a masonry toe of batter wall with stone salvaged from the existing boundary wall. This would provide a similar environment to the existing. This construction form extends from the west end of the retained fill (described in 3.1 above) to the western boundary of the SRU ground adjacent to the Water of Leith. The embankment would extend between 9 to 10 metres north of the tramway swept path remaining within the LOD provided in the Parliamentary Plans to facilitate the stabling track.

The inclusion of the stabling track at this location has been reviewed and a decision taken to relocate it further west, however it is anticipated that the need to relocate the practice pitches will remain and it is proposed that this extra width in the LOD through the rear pitches may be utilised for the provision of a more environmentally friendly embankment solution as defined in drawing 30894/SK011 Rev B (shown in Appendix C). Within the detailed design it will be possible to refine this solution and review the exact

extent of pitch relocation to ensure it is optimised between the Tram embankment to the South and the boundary fence to the north.

Note: The above could be alternatively be constructed as the retained fill section to include for the flood protection wall. Similarly the flood protection wall could be used in lieu of the masonry wall if the CEC proposed flood protection scheme goes ahead.

A retained fill solution could be applied throughout the SRU property (a length of approximately 400m). A structural embankment would not be practicable at the eastern end of the site, however, where the site is most constrained. As a result, a combination of the two construction techniques is felt to be the most appropriate to take forward to facilitate a cheaper more easily constructed solution which provides scope for a softer end result (i.e. reducing the extent of retaining wall). This would involve retained fill between the stadium and railway line, changing to a structural embankment west of the Wanderers clubhouse, in the area previously proposed for stabling track, which has subsequently been relocated further west outwith the SRU property. It is anticipated that this relocation facilitates the introduction of a structural embankment within the LOD of the City Council's Flood Protection scheme. Thus if the Council proposals are taken forward the embankment could be designed to include flood protection capacity. These proposals would encroach on the SRU ground by either 4m or 15m (depending on the structure adopted) however would all be within the Parliamentary LOD.

3.3 Construction Sequence

It should be noted that the following are initial notes regarding the form of construction and do not represent detailed or final information on this subject. A key element in working up more detailed construction sequence information in this area will be a requirement for further consultation with the SRU. Detailed design will take note firstly of major sporting events already scheduled, followed by more minor events already scheduled, as well as mechanisms for ensuring capability to manage other events which may from time to time arise.

3.3.1 Reconfiguration

A number of elements within the area between the south stand of the Stadium and the railway embankment require to be reconfigured to facilitate ongoing safe operation of the Stadium both during and after construction of the Tram. Notably the new proposals extend to the northern LOD of the Parliamentary Bill and thereby impact on the east-west spectator link which is vital to safe operation during events. Additionally there is a requirement to reconfigure the turnstiles to enable sufficient east-west movement space. Proposals to achieve this have been investigated and put to the SRU as outlined in drawing 30894/SK008.

To achieve the SRU requirements there will be a need to undertake some early work in remodelling the turnstiles, parking and paving in this area. In undertaking this, it is vital to ensure that the operational needs of the Stadium are understood both for events and on a day by day basis, and that these are facilitated in the working solutions implemented by the Contractor. For this reason final proposals will need to facilitate the requirements of SRU.

At this stage two possible scenarios have been developed:

A. Rebuilding in a new location the turnstiles and all the necessary buildings to ensure the integral security of the SRU premises including day to day access for SRU employees. The Contractor would be required to liaise with the SRU to ensure this is achieved to meet the needs and requirements of SRU.
   Note: Temporary hardstandings may be provided for parking for the exclusive use of SRU employees at a suitable location to be agreed.

   The anticipated duration for this element of the work is between four and five (4-5) months. It should be noted that during this time, there would be impacts on public access from time to time and that the turnstiles would be out of operation for a period, potentially two to three (2 - 3) weeks, while the new turnstiles are built. The timing of this exercise is to be mutually agreed between SRU and the Contractor, to avoid planned events at the Stadium whilst meeting the requirements of the construction programme, and will be dependent upon delivery of the turnstiles.

B. An alternative method could be used by constructing temporary turnstiles on Roseburn Street until such time as the permanent turnstiles can be located in their final position. This would give the advantage of total ground security and uninterrupted access to the stadium during the construction period. When the new turnstiles are constructed in the programmed sequence, the temporary turnstiles would then be removed and the boundary fence finalised (reinstated or left in place by mutual agreement between SRU and the Contractor).

This alternative would also make the construction of the west end of the Roseburn Street viaduct considerably easier. This option may impact on the overall duration of the work at Murrayfield, as it enables some elements of the reconfiguration to be carried out in parallel with the main tram works. Thus it may be possible to achieve some time savings overall. That said however it would be the requirement of the Contractor to ensure that all requirements for Event Safety are ~~realised~~facilitated.

3.3.2 Site Establishment

Having facilitated the ongoing access to the SRU grounds in a manner acceptable to SRU, there would be a need to establish the extent of the Construction Site. This would include the erection of security fencing along the boundaries of Network Rail and the limits of construction within SRU's land. The exact nature of the fencing would be agreed with SRU, to ensure suitable hand back of appropriate elements of the LLAU in advance of major events as outlined elsewhere in this document.

Once the site had been secured there would be a requirement for site clearance of the area including all the existing structures. Where this includes advertising boards, these would be relocated to appropriate locations as agreed with SRU.

3.3.3 Construction of the Retained Fill/Structural

Embankment will follow and is expected to take between nine and twelve (9-12) months, depending on the type of construction adopted, and would be a linear form of construction working from east to west During this period, the Contractor will ensure that SRU land and premises are secure at all times.

Once the Major works of Roseburn Street viaduct and the retained fill / structural embankment are completed, the finishing work will be applied to elements within the '*temporary use*' (and in the case of Option B above '*reconfiguration*') LLAU area, including the car park and the turnstiles and fencing will be carried out. As noted elsewhere it will be the Contractor's responsibility to ensure that the works are made safe and the area handed back to the SRU sufficiently ahead of any Major event.

3.4 Construction Technique Summary

Whilst the earlier work indicated a continuous viaduct through the stadium area, subsequent work has indicated significant savings to all parties by the use of earth embankments. The mechanism for achieving this is yet to be finalised however it is believed that a variety of methods may be applicable at different locations along the route through SRU land, with a retained solution to the eastern end giving way to a more open embankment along the south of the back pitches. These methods will also reduce the size and number of construction plant required and the number of disruptive possessions required.

The work to construct the embankment or viaduct to the south of the stadium is to be undertaken as a single continuous activity. Once the main Civil construction (retaining wall, earthworks etc.) is completed it is envisaged that the majority of the contractors activities would be completed within the LOD.

In undertaking the work it is anticipated that early preparation work may take four to five (4-5) months with the heavier embankment work taking a further nine to twelve (9-12). As this indicates it is anticipated that all the works in the SRU grounds will be completed within a period of eighteen (18) months, and that construction work will be continuous throughout the 18 month period. As outlined above a viaduct option would require a considerably longer construction period.

3.5 Construction Programme

DAVID Ramsay Input required

4. Code of Construction Practice

A Code of Construction Practice has been introduced by **tie** its purpose is to define standards of construction practice in so far as they affect the environment, amenity and safety of local residents, businesses, the public and the physical surroundings and the natural and cultural heritage in the vicinity of proposed works.

A local Code of Construction Practice will be generated out of the findings of work detailed in this document to control specific activities of the contractor within SRU vicinity.

tie will establish an appropriate person ['the Supervisor'] to ensure compliance with the Code by all contracting parties. Compliance with Applicable Legislation, Codes and Standards, etc.

Compliance with this Code will not absolve the Contractor from compliance with all legislation, Codes and Standards relating to construction. The Contractor shall be responsible for ensuring compliance with the current versions of all legislation, Codes and Standards. Wherever this Code refers to any Legislation, Standards or Codes it shall be the Contractor's responsibility to ensure that the current versions are used at all times.

4.1 Environmental Management System

The Contractor will implement an Environmental Management System in accordance with ISO 14001.

4.2 Liaison and Public Information

The Contractor shall appoint a liaison officer to manage all public relations, information and press related matters, who shall liase with **tie**, The City of Edinburgh Council, SRU, other statutory bodies, members of the public, press and the media on all matters relating to the works. **tie** will establish a single point of contact to deal with all issues relating to SRU.

4.3 Hours of Working

Normal hours of working for construction of Edinburgh Tram shall be Monday to Saturday 07.00 – 19.00 hours. However it is anticipated that large amounts of the works will have to take place at night during Network Rail possessions. The contractor would require both normal and disruptive possessions to progress the construction and of particular importance are the disruptive possessions which last from approximately 12.00 midnight on Friday until 06.00 on Monday morning and have to be booked 80 weeks in advance.

4.4 Site Housekeeping

A 'good housekeeping' policy shall be applied at all times. This shall include, but not necessarily be limited to, the following requirements:

(i) all working areas shall be kept in a clean and tidy condition;

(ii) all working areas shall be a no-smoking area. Specific areas within the site shall be designated as smoking areas and shall be equipped with containers for smoking waste. These shall not be located at the boundary of the site adjacent to neighbouring land;

(iii) open fires shall be prohibited at all times;

(iv) all necessary measures shall be taken to minimise the risk of fire and the Contractor shall comply with the requirements of the local fire authority;

(v) radios (other than two-way radios used for the purposes of communication related to the works) and other forms of audio equipment shall not be operated on any work site;

(vi) any waste susceptible to spreading by wind or liable to cause litter shall be stored in enclosed containers;

(vii) rubbish shall be removed at frequent intervals and the site kept clean and tidy;

(viii) hoardings shall be frequently inspected, repaired and re-painted as necessary;

(ix) adequate toilet facilities shall be provided for all site staff;

(x) food waste shall be removed frequently;

(xi) Wheel-washing areas shall be brushed clean frequently.

The Contractor shall inspect all working areas at least fortnightly and shall provide a written report on compliance with this section of the Code to **tie**. A nominated representative of **tie** may carry out inspections of the site at any time without prior notice of time and place of the inspections. Access to all areas of the works shall be available to visiting inspectors and the Contractor shall give inspectors all reasonable assistance during their site inspection.

4.5 Fencing and Hoardings

The Contractor shall ensure that all working areas are sufficiently and adequately fenced to prevent the public and animals from straying on to working area. In line with SRU's Operational Safety Policy fences and gates should be of appropriate height and strength and should not provide the opportunity for hand or footholds which might assist climbing. Hoardings shall be provided to suit the location but may be:

(i) A wire mesh fence, where appropriate for minimum security needs, or

(ii) A 2.4 m minimum height, plywood faced, timber framed boundary hoarding, of a surface density of not less than 7kg/m² or other hoarding providing equivalent security and noise attenuation, in the vicinity of noise sensitive neighbours, or

(iii) Other designs where a particular appearance or acoustic rating is considered to be required and is agreed with The City of Edinburgh Council.

(iv) Where appropriate hoarding and fencing will be required to withstand crowd loading.

At present the preferred fencing option is a Darfen Steelhoard Sitescreen that has several safety, installation and appearance benefits over other fencing options.

Hoardings that create poorly lit pedestrian routes shall have bulkhead lights fitted and these shall be illuminated at all times when the adjacent street lighting is lit.

The Contractor shall ensure that where hoardings are provided, they are painted on the side facing away from the working area in a colour and style to be approved by **tie,** The City of Edinburgh Council and SRU and that the public side of the hoarding carries signs that identify the project and give appropriate Contractor contact information.

All hoardings shall be maintained in a neat and tidy condition.

The Contractor is expressly prohibited from displaying or allowing to be displayed any advertisement, notice, etc including illicit bill or fly posting on the hoardings. The Contractor shall ensure that all graffiti, fly posting or defacement to the hoardings is removed and made good or obscured within 48 hours.

An information board shall be provided at each working area detailing information on the work programme and estimated duration of the works, together with the web address and a 24-hour telephone number for use by members of the public who wish to lodge complaints or comments.

All works fencing and hoarding shall be removed as soon as reasonably practicable after the completion of work. In relation to the permanent gates and fences it should be noted that these are to be agreed with the SRU ensuring the provision of adequate time for adequate consultation and review by the SRU in advance of the contractors programme to erect the fences or gates.

4.6 Access and Loading

Lorries shall enter and exit the site in a forward direction, except where space restriction does not permit this. If the reversing of vehicles into public spaces is required, then a responsible person observing the rear of the vehicle shall properly control the movement. The sounding of audible reversing alarms shall not be permitted outside normal working hours, except where this has been approved by The City of Edinburgh Council in connection with works permitted under Clause 3(c). Entry/exit conditions shall be subject to prior approval by The City of Edinburgh Council before implementation.

4.7 Security

Adequate security shall be exercised by the contractor to protect the public and prevent unauthorised entry to or exit from the site. Site gates shall be closed and locked when there is no site activity and site security measures shall be implemented. Event day security is discussed in the Safe Operation on Event Days section (1.5) later.

4.8 Access for Emergency Vehicles

Routes for emergency service vehicles and personnel to gain access to work sites, the construction corridor and neighbouring sites along the route shall be agreed with the emergency services, The City of Edinburgh Council and SRU prior to the start of construction.

4.9 Noise, Dust and Air Pollution

The Contractor shall have a general duty to take all practicable measures to minimise nuisance from noise. The noise limits specified in this section or which may be otherwise agreed with The City of Edinburgh Council shall not be regarded as a licence to make noise up to the stated limit.

The Contractor shall take all necessary measures to avoid creating a dust nuisance during construction and demolition works.

5. Safe Operation on Event Days

SRU is required to ensure compliance of the terms and conditions set out in the General Safety Certificate regarding operational safety, issued by the Local Authority under the definitions contained in the Safety of Sports Grounds Act 1975 as amended by the Fire Safety and Safety of Sports Act 1987.

In order to comply with the Act during construction, discussions have been held with SRU and their agents to identify general and specific requirements regarding provision of safe and workable access for the public, emergency services and stadium staff during events. It is SRU policy to take reasonable care to see that people entering their premises are not injured or suffer damage by dangers due to the state of the premises. The safe entry, movement and egress of spectators are of paramount importance to SRU, a view shared by the Promoter. Included in discussions with SRU are the requirements for a period to set up before and then take down after an event. It is hoped that through consultation a degree of flexibility will be achieved between SRU, CEC, **tie** and the Contractor to ensure that all parties operations are maximised whilst disruption is minimised.

The main concerns raised by SRU are the requirements to ensure safe access and egress to and from the stadium and to provide an adequate safety area should there be an incident during an event.

Within the LLAU there are areas identified that will be required to be fully released back to SRU for major events and also for agreed periods before and after major events to allow setting up and taking down. These areas will be required for emergency services, TV access and crowd access between the east and west of the stadium -and to turnstiles. There will need to be adequate fencing/hoarding between the remaining LLAU and the released access areas to ensure adequate safety. An adequate designated and agreed zone will also be required as a safety area in the event of an emergency incident.

For the purposes of this agreement a Major Event is to be defined in agreement between the SRU and the CEC safety officer. Unless agreed otherwise (on an event specific basis) it will be assumed that an event which invokes the requirement of the Section 50 agreement is a 'major' event which will require the clearance of the site and handback of appropriate LLAU areas to the SRU and their authorised agents. However at the sole discression of the CEC safety officer and with the SRU agreement a lesser handback may be negotiated between the parties.

During events all LLAU areas inside the perimeter of the Stadium (Stadium boundaries as defined in SRU Operational Safety Policy 2) will be closed to the contractor, including the East-West Link, car park and access to rear pitches. The Contractor will ensure that all requirements of the Stadium Manager, Safety and Security officer and CEC are met to enable events at the Stadium to take place safely and with the minimum of disruption.

A set of protocols and procedures will be developed by **tie** and the Contractor in conjunction with SRU to deal with matters moving forward such as programme of works, safety management, interface with CEC and procedures during the period of any events. In coordination with SRU, **tie** and the contractor will programme all Stadium events into the construction programme. SRU produce a detailed programme for each event, and it is the key elements of this programme that will be incorporated into the construction programme. It is proposed that the construction programme be broken down into different periods, 'White' periods where there are no events at the Stadium and the Contractor has full access to the site, 'Blue' periods where there are minor events taking place and there will be some limitations but the Contractor will still have access to the site, and 'Red' periods where major events are scheduled and the contractor will not have access to the Stadium or the east-west link

There are approximately 8 major events in the Stadium each year plus other events such as Edinburgh Rugby matches which have much smaller crowds. At the major events, the back pitches are used for car parking, and there are approximately 5 other large events on the back pitches each year not including use by Murrayfield Wanderers and other teams training and playing. Although the turnstiles at the west stand are capable of dealing with the public accessing all areas of the stadium, if there is overcrowding at these turnstiles the public are diverted towards the east-west link to use other entrances. At present the east-west link is open for public passage both before and after all events.

For all events the Contractor and **tie** will coordinate with the Stadium Manager at the pre event planning meetings to establish the requirements to ensure that the Stadium is prepared for events. **tie** and the Contractor will also attend the post event de-brief meeting to get feedback on the event. **tie** and the Contractor will comply with the Safety and Security Officers inspection plan leading up to an event, and the CEC, Police and other agencies inspection which is normally undertaken the day before an event. Contact details will be provided to the Stadium Manager, Safety and Security Officer and to the Control Point of the **tie** and contractor Nominated Persons who will be available 'on call' for the duration of events. The Contractor will also provide a works team on stand-by leading up to an event, to deal with any issues arising from the preparations. The Contractor will, in all cases, adhere to the Transport Initiatives

Edinburgh (**tie**) Edinburgh Tram Code of Construction Practice(Code of Construction Practice). The Code of Construction Practice gives guidance on, amongst other things, Security, Access for Emergency Vehicles and Site Housekeeping. (See section 4 above) The Contractor security requirements for event days will be discussed with SRU, Police, CEC and the Contractor to ensure that the security arrangements implemented are in line with the stadium security policy.

6. Alignment Impact on Access to Stadium

As stated earlier, during all events the Contractor will not have any access inside the Stadium perimeter.

During construction it is proposed that the fence between the east-west link and the access road within the Shared Access LOD (No. 9) would be removed to ease vehicular access to the site. This section of fence would be reinstated for events to segregate the east west link from the vehicular access to the Shared Access LLAU, Temporary Use LLAU and the areas excluded from the LLAU within the Stadium boundary.

In a similar manner the existing fence within the Temporary Use LLAU (separating the Television compound and the East West Spectator link) could be removed by the Contractor whist he has control over the site, but would require to be reinstated as part of the site handback process in advance of a major event as outlined above. This would require to be completed in a manner which secures the east-west link in a safe manner for its intended purpose.

The area of 'Normal' LLAU to the west of the Wanderers clubhouse (located on pitch 1) will be surrounded by hoardings as described in 4.6 and secured back to the southern boundary. In the vicinity of exit gate E5 the hoarding will be aligned to maintain good egress characteristics from the stadium. There will be a solid gate for access to the compound at the corner of the east west link where it turns north round the clubhouse. This gate will form a controlled site access and be governed by a security hut. The compound gates will be locked and the agreed security regime implemented during events. Any signage requirements to be attached to the hoardings to direct the public towards turnstiles will be agreed and installed prior to any event. It is noted that the disabled parking facilities are at present located on pitch 1 and a contingency plan for disabled parking and access would have to be implemented.

6.1 Major Events

It is proposed that for major events ('Red' areas on the construction programme) the east west link is cleared and opened for pedestrian access. The Temporary Use LLAU (no. 4 on drawing SK05) would be cleared and the fenceline along the east west link reinstated to maintain segregation between vehicular access to the 'Stickyard' car park, the television compound and the pedestrian link.

6.2 Minor Events

At minor events with small crowds ('Blue' on the construction programme) it is proposed that the east west link remain closed to the public and access to the Stadium be from the north, west and east. Due to the smaller crowd numbers and the ticket allocation strategy for minor events it would be likely that the public would be located in the west and east stands and that they could access these areas from inside the stadium perimeter without the need to use the east west link. However as for major events the temporary fence at the east end of the east west link would be reinstated to maintain the vehicular access control over the 'Stickyard' car park.

As noted above, notwithstanding the indication within the parliamentary documentation the proposals for the tram alignment through land owned by SRU has been reconsidered and rather than a continuous viaduct as previously proposed it is now anticipated that a retained earth solution will be implemented.

The alignment layout of the tram is for the line to run along the southern boundary of the stadium site. By placing this on embankment it will be benched into the railway embankment however will also encroach into SRU land impacting on the east west spectator link for the stadium. As a result there is a need to reconfigure the area between the stadium and the rail embankment to ensure adequate provision for efficient and safe movement in this area both in day to day and event usage. This reconfiguration requires to be facilitated in accordance with the requirements of the 'Guide to Safety at Sports Grounds' and in agreement with both the SRU and the City or Edinburgh Council Safety representatives.

Headroom clearance to the overhanging deck of the Roseburn Street bridge is to be a minimum of 5.3m so there should be no restriction to normal road vehicles along this corridor. It must be noted that the viaduct layout and sections prepared to date are conceptual only and do not form part of the client's specification for the final design of the scheme. However, it will be a requirement on the designer to ensure the eventual layout does not restrict vehicle access or pedestrian access by restricting the east west spectator link.

At Roseburn Street the viaduct crosses the main vehicle and pedestrian access entrance. The principal issues at this site are the positioning of the support columns, which may restrict the clear width of the gate, and the headroom as the viaduct passes over.

To address these a possible structural layout has been prepared. This provides for one column to be positioned to the immediate south of the access and one within the existing dividing fence line. As the width between is greater than the normal overall deck width, the superstructure would be supported by a crossbeam extending full width between the piers to give clear vehicle and pedestrian access beneath.

Outline vertical alignment of the tramway has been developed so that a minimum 5.3m clearance can be achieved beneath the crossbeam. All structural elements within the HA defined vehicle impact zones will be required to meet impact requirements or adequate protective barriers provided.

The SRU have expressed concern about existing issues regarding the access from Roseburn Street to their premises and are anxious to ensure that none of these lead to deficiencies in the amended design imposed by the introduction of the tram. Notably it will be important to ensure that adequate sight lines for vehicles entering or leaving the access are achieved. Parking provision is to be made so as to optimise the available space taking into consideration the occasional use by larger vehicles (for example the need for television lorries to have safe and efficient access and egress from their delegated area for match coverage). Additionally issues such as signage and lighting require careful attention in the detailed design. To ensure that the SRU concern is fully and properly understood it is proposed that the detailed design include consultation with the SRU seeking their input to the proposals.

7. Impact on Wanderers Clubhouse

In the final scheme there will be some impact on the Wanderers Clubhouse and its immediate surroundings. The existing two storey access stairway and the single storey storeroom structures currently sited on the south elevation protrude into the expected line of the reconfigured east west spectator link and it is anticipated that they will require to be relocated to provide necessary space and permit a replacement access ~~roadway~~ past the building. That said however other alternatives to adjust the tram embankment locally at the clubhouse could offer an alternative solution which should be considered in detailed design. The following text however is based on the assumption of achieving a straight uninterrupted walkway.

7.1 Access Stairway Structure.

Should the existing clubhouse access be revised it would be necessary for the promoter to provide upgraded access provision appropriate to modern disapled access standards. This would be facilitated within the scheme proposals.

The existing two storey access stairway structure is of fairly simple steel frame construction, clad with a combination of timber, glass, masonry and profiled steel sheeting. The structure protrudes approx 4m from the main building line and is some 3.2 m in width, with a simple purlin supported steel sheet and monopitch roof. A steel container box exists sited against the west elevation of the stair and would require ~~removal~~ / relocation.

Internally, most elements of the steel frame are exposed to view, RHS posts at outer corners and framing I- beams at first floor and to underside of roof. Access from ground to first floor level is provided by two flights of 1.3m wide precast concrete stairs with an integral half landing and steel ballustrading.
After careful removal of existing satellite dishes and external floodlighting items, demolition of the cladding envelope and lifting away of the precast stairway elements would allow access to the structural steelwork, which could be unbolted and removed from the steel frame of the main section of the clubhouse. The ensuing opening created by stairway removal at both levels on the south elevation can then be closed-in with cavity blockwork / brickwork walling and blue coloured profiled cladding, to match existing external walls, albeit that some localised simple foundation works to provide necessary support for new walling may be required. The new wall leafs can be readily tied and toothed-in to the existing structure.

The existing roof of the clubhouse building features substantial eaves overhangs on all elevations carrying the rainwater gutter system. The section of roof at the existing stairway location would require remedial work locally, to replicate the existing eaves details and ensure continuity of gutter lines. Given the existence of structural steel framing members at roof level at this location, support for such new eaves construction would be readily available.

Replacement of the access stairway would of course be necessary. This could be achieved by construction of a similar replacement `enclosed stair`, sited externally on the east elevation of the building at the southeast corner, as there is believed to be sufficient space to permit this without undue effect on the current car parking area, though some minor groundworks alteration may be required with the potential loss of one or two spaces. The new stair would however require a breakthrough opening at first floor level into the existing offices, with some re-arrangement of internal block partition walling locally, to create a suitable top-landing area.

Alternatively, consideration could be given to creating a new `internal` access stairway within the existing entrance foyer at the south-east corner of the clubhouse. This would involve relocation of existing, or new, glazed entrance doors and screens outwards onto the external building line, with the corner column stripped of its brick cladding and incorporated into the new entrance screen arrangement. Minor alterations to extend the foyer ground slab would be required.

Locating the new access stairway within the existing 2.6m wide ground floor foyer would require formation of a local opening in the existing insitu concrete composite Ribdeck of the first floor construction. Such opening could be easily formed and framed out with supplementary steelwork, to facilitate installation of a new straight access stairway as appropriate. Again, this approach would require some re-arrangement of internal block partition walling locally at first floor, to create suitable landing/circulation areas.

This clearly shows that various options are possible however it would be necessary to work with the SRU and the occupier of the property to identify the most appropriate solution. For this reason it is proposed that further consultation is required to ensure an appropriate solution, acceptable to the building owner and tenants. Such solution must also achieve the relevant planning approvals and building warrants, as well as developing an appropriate construction method and programme which will not have an undue effect on those utilising the building.

7.2 Single Storey Storeroom

This building is approx 4m wide by 3.9m long and some 3.5m high to roof parapet. There are no windows, but a double leaf access door exists on the west elevation. Two floodlights exist externally.
The structure has clearly been constructed after the original gable wall of the clubhouse, the 2.5m high cavity blockwork walls being risband jointed and probably only simply tied to the original gable. The Roof parapet is formed in 1m high blue profiled sheet cladding and a flat roof construction is thought to exist. The roof is however wholly independent of the main clubhouse roof, with drainage likely connected into the original rainwater downpipe from the clubhouse, which remains essentially intact.
It is considered that the demolition of the simple storeroom structure could be easily achieved without undue disturbance to the main building.

It is anticipated that through consultation with the SRU it would be viable to relocate this facility along the east or west wall of the clubhouse as agreed with the owner and tenant of the facility, where it would continue to operate in its current capacity.

8. Relocation of back pitches

SRU has raised the issue of maintained use of the open pitches to the immediate west of the stadium. There are currently 5 pitches marked out and provision is available for a 6th. These pitches are used extensively for club matches at weekends and for training purposes during the week. All are floodlit and there is a positive drainage and irrigation system for each pitch. Furthermore some of the pitches have been strengthened to accommodate parking on event days (as shown on the attached drawing 30894 / SK05).

To the south pitches 2 and 3 lie, in part, within the scheme LOD and LLAU and must therefore be relocated. In doing so pitches 4 and 5 will be affected and so must also be relocated. To the north the available area for pitches is bounded by a fence and an established hedge line. To the east the area is currently bounded by the stadium access and various buildings. The land between the existing pitch 1 and these buildings will change should the proposed floodwall, as identified to be necessary within the zonal flood protection scheme by CEC, be constructed.

Whilst the overall Flood scheme solution in this area is still unresolved, it is believed that should the CEC solution be taken forward, the position of this wall could be reviewed by CEC as the proposed line will impact on the eastern boundary of the existing pitch 1 and will also affect any future pitch 6. (Note that the wall also extends along the southern boundary of the pitch area but this is within the ETL2 LOD and so is not the critical issue on location of pitches.

Lengthy discussions have been held with SRU to try to arrive at a suitable arrangement for a revised pitch layout and it is believed agreement has been reached whereby pitches 2, 3, 4 and 5 are moved northwards from their current position to a location that meets the temporary access, LLAU, and permanent boundary LOD limits. Thereby there should be no requirement to relocate these pitches on completion of ETL2 works. It is also confirmed that these pitches will only be moved during the off season to minimise disruption.

It should be noted that in addition to the 'Normal' LLAU boundary, agreement has been reached whereby an additional strip of land immediately north of this is available to the contractor on non-match days as 'Over-sailing' LLAU for cranage of materials. (LLAU area No. 3)

Relocation of pitch 1 and the possible location of pitch 6 cannot be determined until agreement has been reached between CEC and SRU over the line of the proposed floodwall. This currently awaits the final outcome of the local public enquiry into these proposals carried out earlier this year (whilst the enquiry report has been issued the eventual solution remains uncertain).

Associated facilities for the pitches, including drainage, floodlighting, sprinkler system and pitch reinforcement will need to be adjusted to cover the new locations. Once final agreement has been reached on the new pitch locations a revised drainage, lighting, sprinkler and pitch reinforcement arrangement will be designed. These facilities will be replaced to at least their current standard and condition at the time of construction.

If the relocated drainage or sprinkler elements of the system are found to be within the LLAU, any pipes and/or trenches within this zone will need to be protected, either permanently or temporarily, by appropriate load distribution mats or similar to reduce the risk of damage under construction vehicle loading. As a secondary precaution should damage occur, it will be a requirement for these areas to be isolated if necessary without affecting the remaining system (note particularly that the proposed location of Pitch 1 is covered by normal LLAU and is anticipated to be used as a construction compound).

As noted above it is not possible to ascertain the exact final requirements at this time, thus it is necessary to retain an element of flexibility in relation to the details of back pitch relocation. That said however it is important to note that this element of the work will require to be completed in detailed consultation with the SRU thus minimising the disruption to the pitch usage (the bulk of the reconfiguration being undertaken outwith the regular season of back pitch usage).

APPENDICES







Appendix A – Drawing 30894 / SK05

USB00000078_0116

Appendix B – Drawing 30894 / SK008

USB00000078_0117

Appendix C – Drawing 30894 / SK011

TEMPORARY BRIDGE TO BE REMOVED END OF MARCH "94"

NORTH

ACCESS BY RIVERSDALE BRIDGE ONLY

SITE ACCOMMODATION (12M x 40M) TO BE FENCED

EXISTING WATER TANK (BELOWGROUND)

225 ø EPVC EXISTING OUT FALL SEWER (1:240)

EXISTING PUMP CHAMBER

EXISTING SILT TRAP PROVIDE NEW CONN. AT IL 39.690

MURRAYFIELD ICE RINK

ABOVE GROUND BREAK TANK

EXISTING 110 ø WATER MAIN

PROVIDE NEW CONN. IL.39.690 AT TAIL

80 ø PERFORATED PIPES

FALL TO TURN OUT (MIN. 1:200)>>>

EXISTING 160ø DRAIN >>>

EXISTING 160ø DRAIN APPROX. EXTENT OF NEW 80ø PERF. PIPES

AREA TO BE FULLY REINSTATED

PROVIDE TEMPORARY TIMBER FENCING TO EAST AND WEST BOUNDARIES OF SITE AS INDICATED.(NORTH TO SOUTH)

EXTENT OF PITCH RECONSTRUCTION DURING 1993 REFER TO DRAWING NO 6957/3005 FOR AS BUILT INFO

EDINBURGH WANDERERS STAND TO BE DEMOLISHED

EXISTING 90 ø WATER MAIN

PROPOSED NEW STAND

EXISTING SITE FENCE

TYPICAL LAMPOSTS TO BE REMOVED REFER CARL BRO KIRKPATRICKS SPECIFICATION

EXISTING LEVELS

AREA TO BE FULLY REINSTATED

1000mm from touch line

INSPECTION CHAMBER CL. 41.750 IL. 40.200

150 ø UPVC PIPE LAID TO FALL AT 1:200

CONTRACTORS FENCE TO TIE IN TO EXISTING FENCE BOUNDARY TO TILBURY DOUGLAS SITE COMPOUND

EXISTING SITE FENCE

INSPECTION CHAMBER CL. 41.760 IL. 40.420

INSPECTION CHAMBER CL. 41.470 IL. 40.800

REFER TO ARCHITECTS DETAILS FOR LEVEL INFORMATION

RECONSTRUCTION OF PITCHES TO COMMENCE IMMEDIATELY ADJACENT TO PREVIOUS RECONSTRUCTED PITCHES THIS TO BE ESTABLISHED ON SITE

PROVIDE TEMPORARY TIMBER FENCING TO EAST AND WEST BOUNDARIES OF SITE AS INDICATED.(NORTH TO SOUTH)

HATCHED AREA DENOTES REQUIREMENT BY CONTRACTOR TO ALLOW ACCESS ACROSS SITE TO PITCHES 3 & 4 FOR SRU PERSONEL AND CLUB MEMBERS THE LOCATION BEING VARIED TO SUIT CONSTRUCTION SEQUENCES-WIDTH TO BE AGREED WITH SRU

80 ø PERFORATED PIPES @ 10m. CENTRES.

TEMPORARY FENCE

EXISTING TOUCH LINE PITCH 1

3000mm clearance

80 ø PERFORATED PIPE

PLAYING FIELDS FOR LEVEL INFORMATION

WIDTH OF PITCH = 68M

DRAINSUIT (TYP)

SLIT DRAINAGE TO BE PROVIDED ACROSS SITE AT 1000mm C/C approx. width of reconstruction = 75M

SLIT DRAINAGE TO BE PROVIDED ACROSS SITE AT 1000mm C/C approx. width of reconstruction = 69M

3rd 1:5 UP ø 600

Groundsmans' Offices and Machinery Store — Dressing Rooms

Tarmacadam CAR PARK

Retaining Wall

Top of Railway Embankment

R.E CL. 41.850 IL. 41.400

90.00°

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND M&E ENGINEERS DRAWING INFORMATION AND SPECIFICATIONS.

2. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATION.

3. ALL CONTRACTORS PROPOSALS ARISING FROM THE SPECIFICATION REQUIREMENTS ARE TO BE SUBMITTED TO THE ENGINEER FOR ACCEPTANCE PRIOR TO COMMENCEMENT OF WORKS.

4. REFER TO THE MILLER PARTNERSHIP'S INFORMATION FOR SET OUT & LEVEL REQUIREMENTS TO NEW PITCHES

5. REFER TO CARL BRO KIRKPATRICK'S INFORMATION FOR IRRIGATION SCHEME AND FLOODLIGHT ARRANGEMENT.

6. THE CONTRACTOR SHALL TAKE CARE WHEN EXCAVATING ADJACENT TO EXISTING SERVICES NOTING THE EXISTING WATER MAIN TO WEST BOUNDARY OF SITE.

7. THIS DRAWING SHOULD BE READ IN CONJUNTION WITH THE FOLLOWING DRAWINGS.
6957 / 3002 TABULATED RAINFALL INFORMATION
6957 / 3003 TABULATED WINDSPEED INFORMATION
6957 / 3004 TABULATED TEMPERATURE INFORMATION
6957 / 3006 TYP. MANHOLE DETAILS
6957 / 3009 TYP. DRAINAGE DETAILS

8. LEVELS INDICATED ON THIS DRAWING ARE EXISTING SURVEYED LEVELS

9. THE CONTRACTOR SHALL LOCATE AND RECORD ALL EXISTING SERVICES WITHIN THE SITE AREA. THIS INFORMATION WILL BE SHOWN ON THE CONTRACTORS AS BUILT DRAWING..

REV	DESCRIPTION	BY	DATE	CHECK	DATE
C	PITCH 1 LAND DRAINAGE ADDED	ANN	10.05	JT	10.05
B	SITE FENCING REVISED CONTRACTORS ACCOMMODATION INDICATED SITE ACCESS ADVISED.	DMM	FEB 94	JT	FEB 94
A	UPDATED FOR TENDER.EXTENT OF SLIT DRAINAGE, REVISED MANHOLES REPLACED WITH I.C. THRUSITE ACCESS WIDENED.SET OUT OF PITCH ADDED,HERAS FENCE REVISED TO TIMBER	DMM	FEB 94	JT	FEB 94

FOR CONSTRUCTION

CONSULTING ENGINEERS

THORBURN COLQUHOUN

17 ALBANY STREET EDINBURGH EH1 3PY
TEL 0131-556-8216 FAX 0131-557-5421

CLIENT: SCOTTISH RUGBY UNION

PROJECT: MURRAYFIELD STADIUM - EDINBURGH
PHASE TWO.

DRAWING TITLE: LAYOUT PITCHES 2 & 5 RECONSTRUCTION.

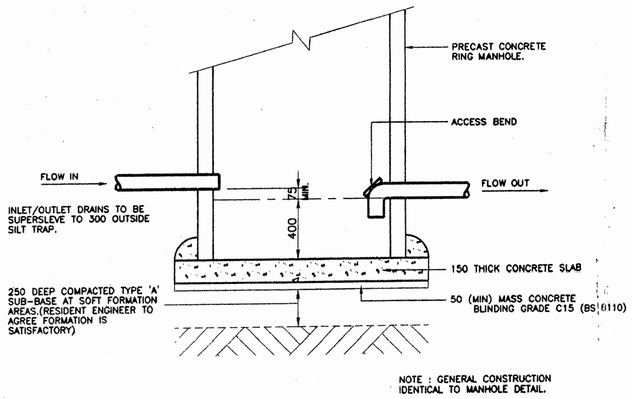
DRAWN	TRACED	CHECKED	APPROVED	DATE
DMM		JT	JT	31.1.94

SCALE	DRG No.	REV
1:500	6957/3011	C

ORIGINAL DRAWING A0

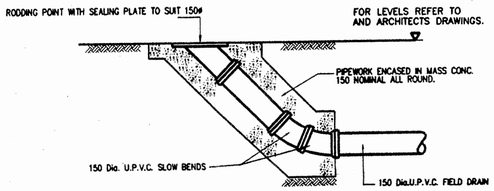
USB0000078_0019

DO NOT SCALE

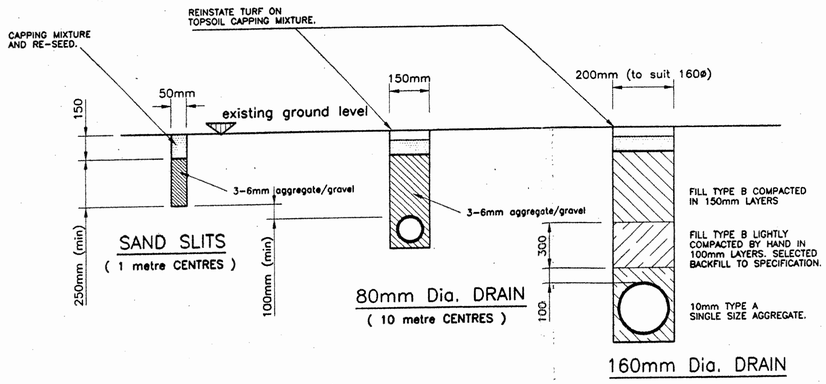


NOTE : GENERAL CONSTRUCTION IDENTICAL TO MANHOLE DETAIL.

TYPICAL SILT TRAP DETAIL



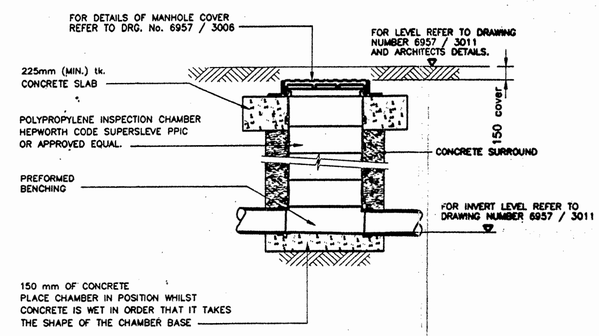
TYPICAL RODDING-EYE DETAIL



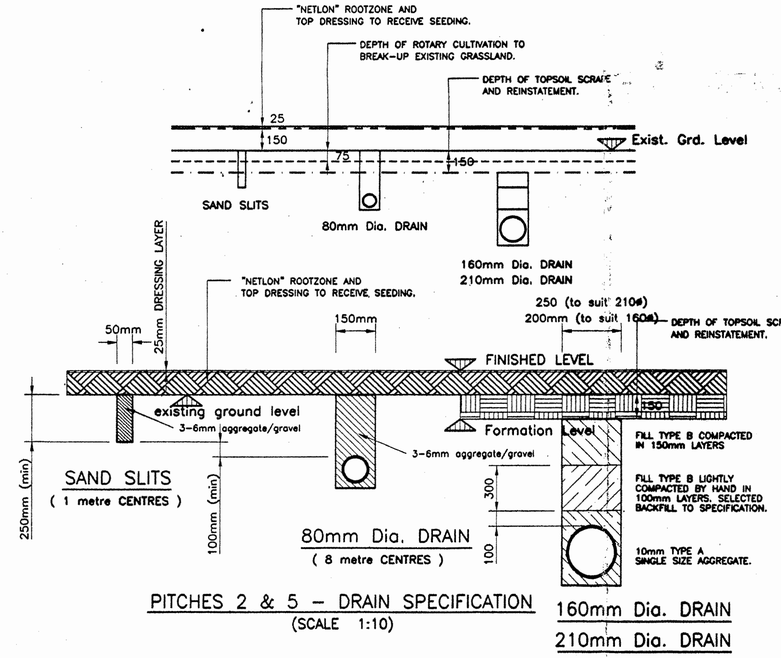
PITCH 1 - DRAIN SPECIFICATION

(SCALE 1:10)

D REV

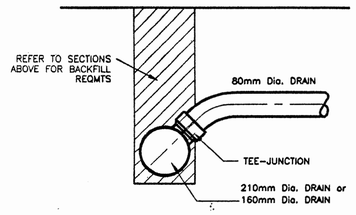


TYPICAL INSPECTION CHAMBER DETAIL



PITCHES 2 & 5 - DRAIN SPECIFICATION

(SCALE 1:10)



TYPICAL DRAIN DETAIL.

(SCALE 1:10)

NOTES

1. CONCRETE GRADE C30 IN ACCORDANCE WITH THE BS 8110
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE FOLLOWING DRAWINGS 6957/3011 & 3005 ,THE SPECIFICATIONS FOR THE WORKS AND ALL RELEVANT ARCH'T & M&E DRAWINGS

FOR CONSTRUCTION

REV	DESCRIPTION	BY	DATE	CHECK	DATE
D	PITCH 1 - DRAIN SPECIFICATION ADDED	ANM	10:05:94	JT	10:05:94
C	AIR VENT DETAIL DELETED;210 ø TRENCH DETAIL :BACK DROP DETAIL DELETED;VC PIPE REF. AMENDED TO UPVC	DMM	FEB 94	JT	FEB 94
B	DETAILS DELETED,DRESSING DEPTH REVISED,IC SPEC REVISED,NOTES ADDED	DMM	FEB 94	JT	FEB 94
A	DRAIN SPEC. DETAILS REVISED;TYP. PIPE BEDDING DETAILS REVISED	DMM	JUNE 93	JT	FEB 94

CONSULTING ENGINEERS

THORBURN

243 WEST GEORGE STREET GLASGOW G2 4QE TEL 041-226-3611 FAX 041-248-3773
11 SOHO SQUARE LONDON W1V 5DB TEL 071-734-8661 FAX 071-734-8664
17 ALBANY STREET EDINBURGH EH1 3PY TEL 031-556-8216 FAX 031-557-5421
SEALOCK WAREHOUSE BURT STREET CARDIFF CF1 6HZ TEL 0222-462426 FAX 0222-483320
BROOK HOUSE NARBERTH BRIDGE BUSINESS PARK NARBERTH DYFED SA67 8RA TEL 0834-861761 FAX 0834-861717

CLIENT: SCOTTISH RUGBY UNION

JOB: MURRAYFIELD STADIUM - EDINBURGH.
RECONSTRUCTION OF TWO PITCHES.

DRG TITLE: TYPICAL DRAINAGE DETAILS.

DRAWN	TRACED	CHECKED	APPROVED	DATE
DMM		JT	J.T.	April '93

SCALE	DRG No.	REV
1:20	6957 / 3009	D

ORIGINAL DRAWING A1

USB00000078_0120

Appendix 29

Scottish Natural Heritage

Plan



INTEREST ZONATION

CRUCIAL AREA

CONTEXT AREA

This sketch is annexed to **tie** letter to Scottish National Heritage, dated 26th August 2005.

Signed [redacted]

FIGURE 22 Interest zonation map for the Wardie Shore Site of Special Scientific Interest.

The Forth Bridge to Granton Shore and Wardie Shore Sites of Special Scientific Interest: Geological Conservation Review. Scottish Natural Heritage 1995.

Appendix 30

Stanley Casinos Limited

Part 1 (Plan 1)

Part 2 (Plan 2)

DISABLED CAR PARKING BAY TO BE REALIGNED TO REFLECT REQUIRED DIMENSIONS

EX LAMP/CCTV POSTS ARE NOT AFFECTED BY PROPOSALS

CENTRAL BAYS TO BE RECONFIGURED AS SHOWN AND BAY END WALLED STRUCTURE TO BE REPOSITIONED AS SHOWN

EX MANHOLE

REPOSITIONED CAR PARKING BAYS

NEW CARPARK ACCESS

Crane

Bollards

Swing-bridge

Bollards

Bollards

WB

N

THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

NOTES

LIMIT OF DEVIATION (LOD)

LIMIT OF LAND TO BE ACQUIRED OR USED (LLAU)

USB00000078_0124

Drawing Status

DRAFT A 02Jun 2006

Job Title

EDINBURGH TRAM

Drawing Title

STANLEY CASINOS NEW CAR PARK AND BAY PLAN 1

Scale @ A1

AS SHOWN AT A3

Drawn: EP

Approved:

Stage 1 check: KM

Stage 2 check:

Designed:

Date:

Scott Wilson Scotland Ltd

Drawing Number

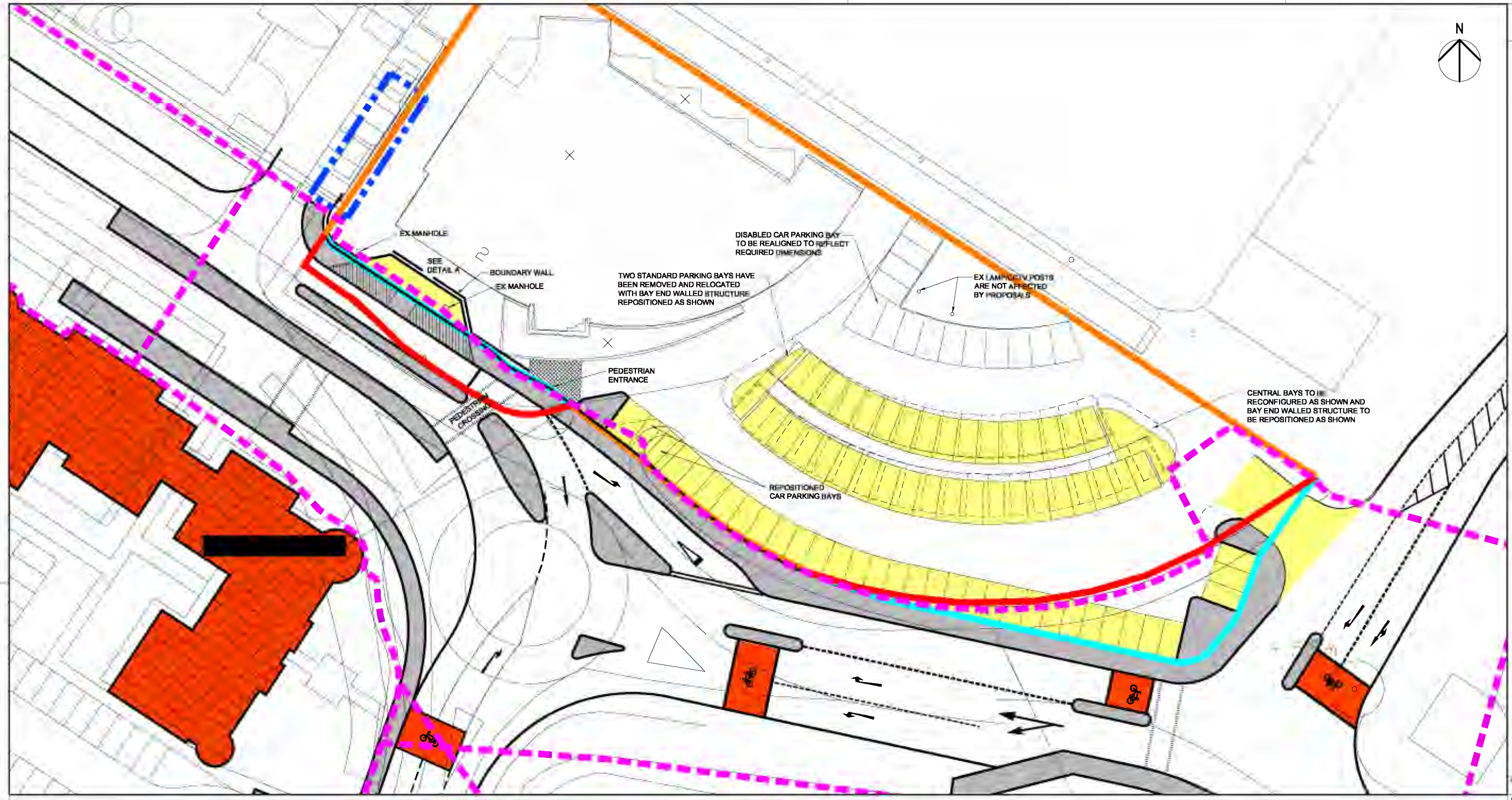
B137101/STAN/1/01

Rev:

Plot Date :

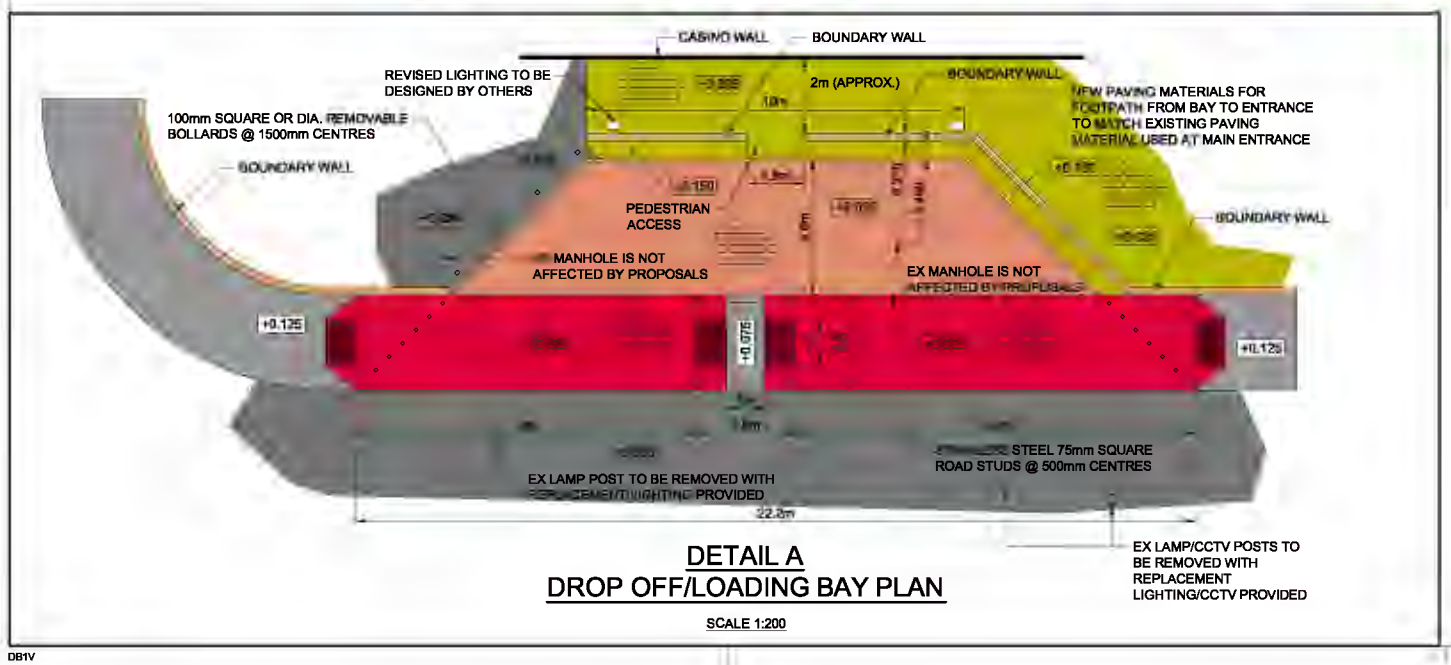
AutoCAD File Name :

DB1V



LOCATION PLAN

SCALE 1:500



DETAIL A
DROP OFF/LOADING BAY PLAN

SCALE 1:200

THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

NOTES

- LIMIT OF DEVIATION (LOD)
- LIMIT OF LAND TO BE ACQUIRED OR USED (LLAU)
- EXISTING BOUNDARY
- MUTUAL EXISTING AND PROPOSED BOUNDARY
- PROPOSED BOUNDARY

USB00000078_0125

Drawing Status
DRAFT A 02Jun 2006

Job Title
EDINBURGH TRAM

Drawing Title
STANLEY CASINOS NEW CAR PARK AND BAY PLAN 2

Scale at A1
AS SHOWN AT A3

Drawn: EP
Stage 1 check: KM
Stage 2 check:
Designed:
Date:

Scott Wilson Scotland Ltd
332 2258
225
6000

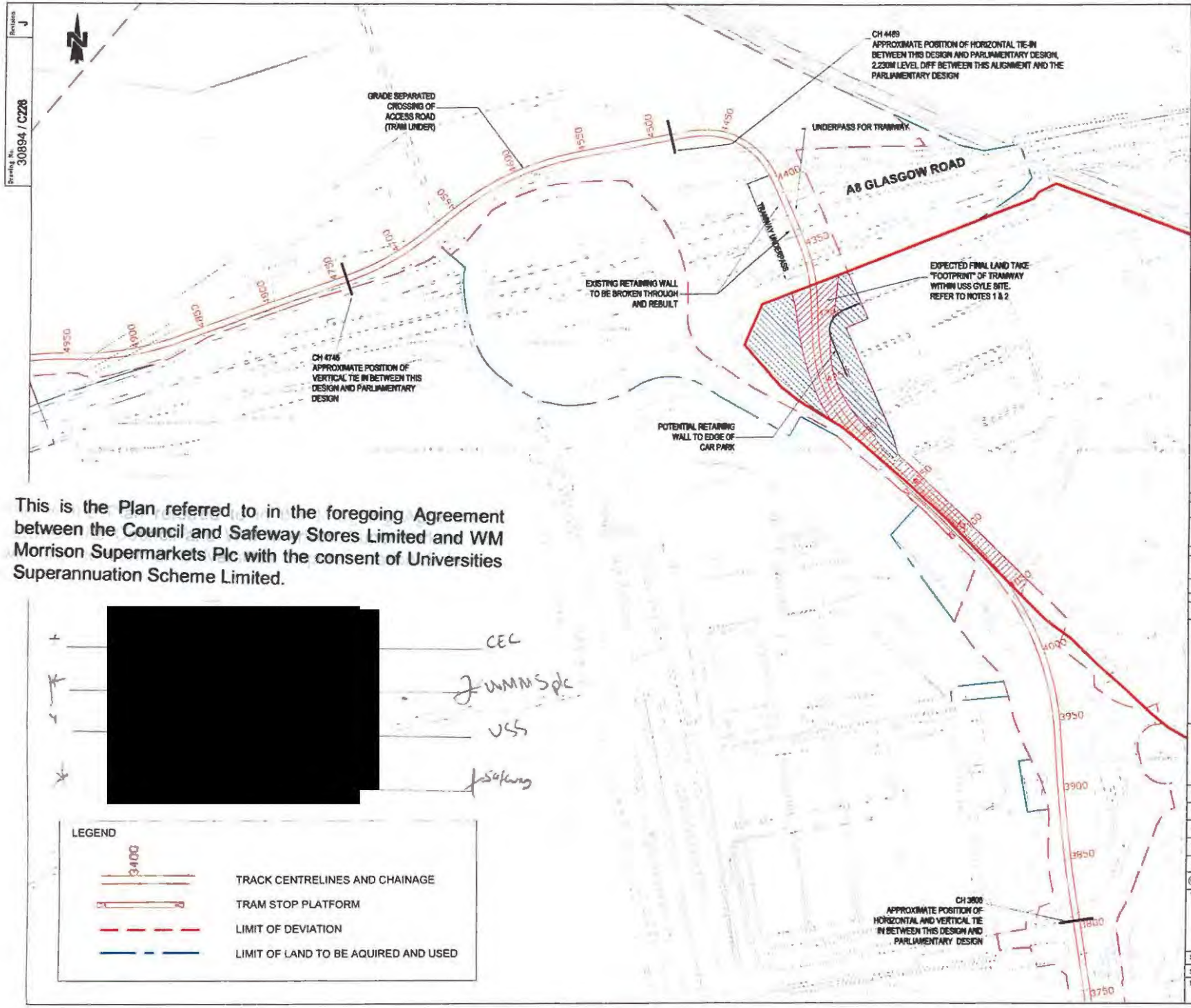
Drawing Number
B137101/STAN/1/02

Plot Date :
AutoCAD File Name :
DB1V

Appendix 31

Marks & Spencer plc

Plan



This is the Plan referred to in the foregoing Agreement between the Council and Safeway Stores Limited and WM Morrison Supermarkets Plc with the consent of Universities Superannuation Scheme Limited.

[redacted]

CEC

WMMSplc

USS

Safeway

LEGEND

3400 TRACK CENTRELINES AND CHAINAGE

TRAM STOP PLATFORM

LIMIT OF DEVIATION

LIMIT OF LAND TO BE AQUIRED AND USED

NOTES :

1. THE EXPECTED FINAL LAND TAKE "FOOTPRINT" WILL PROVIDE FOR A BASIC CORRIDOR OF 10m WIDTH WITH ADDITIONAL WIDTH FOR CUT AND EMBANKMENT SLOPES WHERE THESE ARE REQUIRED.
2. NOTWITHSTANDING NOTE 1 ABOVE, THE ACTUAL ALIGNMENT OF THE TRAMWAY IS SUBJECT TO ALTERATION WITHIN THE LOD. HOWEVER SUCH ALTERATION WOULD BE MINIMISED AND UNDERTAKEN IN KEEPING WITH THE UNDERSTANDING THAT THE FINAL SCHEME WILL BE SYMPATHETIC TO THE NEEDS OF USS AND THEIR TENANTS.

LEGEND :

POSSIBLE EXTENT OF LAND REQUIRED PERMANANTLY

POSSIBLE EXTENT OF LAND REQUIRED DURING CONSTRUCTION

THE GYLE BOUNDARY

Rev	Description of revision	Drwn	Chkd	App	Date
J	THE GYLE BOUNDARY ADDED.	PM	AS	AS	[illegible]
H	LAND TAKE FOOTPRINT ADDED. DEPOT REMOVED	AIC	[illegible]	AS	[illegible]
G	DETAIL CORRECTIONS TO LOD LLAU	SJP	BRG	AS	[illegible]
F	LOD & LLAU MODIFIED	KB	BRG	AS	[illegible]
E	LOD MODIFIED	PM	BRG	AS	[illegible]
D	ANNOTATION CHANGED	JB	BRG	AS	[illegible]
C	DEPOT LAYOUT ADDED & LOD REVISED FIGURE REF CHANGED TO 3.4 OPTION REF CHANGED TO 3	PM	BRG	AS	[illegible]
B	VERTICAL TIE IN POSITION MOVED TO CHAINAGE 4745	SJP	TMF	BRG	[illegible]
A	FIRST ISSUE	SJP	TMF	BRG	[illegible]

Client: tie transport initiatives edinburgh

Project: EDINBURGH TRAM LINE TWO

Designed	TMF
Drawn	MT
Checked	SJP
Reviewed	GM

FABER MAUNSELL

CAD filename:

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Title: FIGURE 3.4 OPTION 3

Size A1 | Scale 1:1250 @ A1 | Date Mar '05

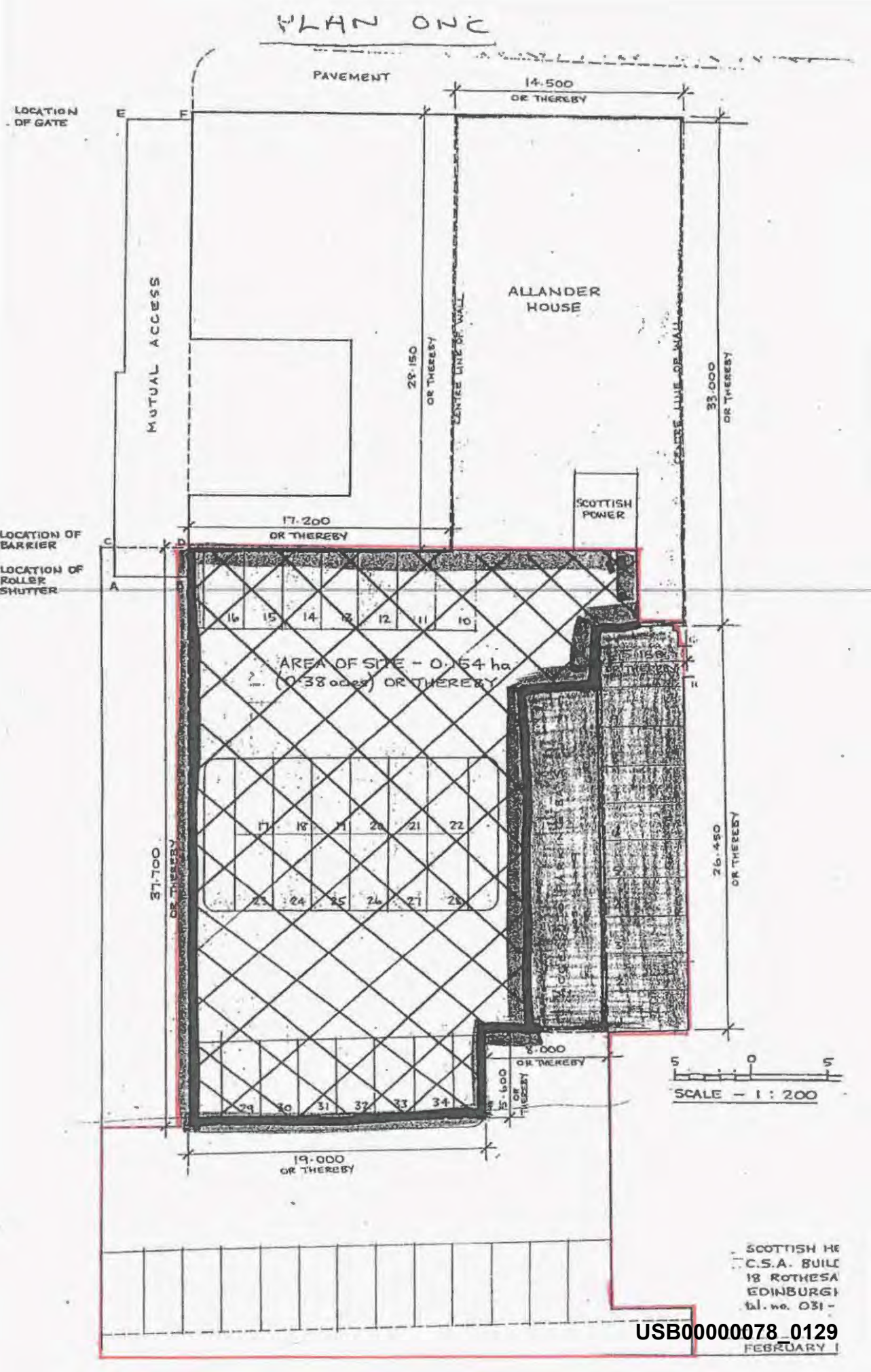
Status DRAFT

Drawing No. 30894 / C226 | Revision J

Appendix 32

Miscellaneous

Authorised Car Park



USB00000078_0129

THIS IS SCHEDULE PART 14 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 14

DESIGN REVIEW AND DESIGN MANAGEMENT PLAN

PART A - DESIGN REVIEW PROCEDURE

1. Introduction

1.1 Except where otherwise agreed in writing, the provisions of this Schedule Part 14 (*Review Procedure and Design Management Plan*) shall apply whenever any Deliverable or course of action is required to be reviewed, approved, agreed, consented to or otherwise processed in accordance with the Agreement.

1.2 Each submission by the Infraco to **tie's** Representative under the Review Procedure shall be accompanied by five hard copies and a soft copy (in agreed appropriate format) of the proposed Deliverable (in appropriate agreed format) to be reviewed or a statement of the proposed course of action (the entire contents of a submission being referred to as a "Submitted Item"). In relation to each Submitted Item, the provisions of this Schedule Part 14 A (*Review Procedure*) shall apply.

2. Method Statements

2.1 Method statements shall be reviewed using the procedure set out in the **tie** "Method Statement Review Policy" (as updated from time to time by **tie**, with the consent of the Infraco (not to be unreasonably withheld or delayed)). The current version of the “Method Statement Review Policy” is rev 0.0 and is included as Part B of this Schedule Part 14.

2.2 The Infraco shall submit a method statement and risk assessment for a package of work not less than 10 Business Days (or such other period as the Parties may agree in writing) before the work in question is due to be commenced.

2.3 No works shall commence until a method statement has been written, accepted in accordance with the **tie** “Method Statement Review Policy” and briefed to all related staff, for the works concerned.

2.4 Where a method statement is submitted to **tie** for acceptance, within 8 Business Days of the date of receipt of a submission (or re-submission, as the case may be) of the method statement to **tie**'s Representative (or such other period as the Parties may agree), **tie**'s Representative shall return one copy of the method statement to the

Infraco endorsed (subject to and in accordance with paragraph 6 (Grounds of Objection)) "Level A - no objection", "Level B - proceed subject to comments" or "Level C - resubmit".

2.5 If **tie**'s Representative fails to return a copy of any method statement within 8 Business Days (or within such other period as the Parties may agree in writing) of the date of its submission to **tie**'s Representative, then the Infraco shall re-submit the method statement stating that it is a re-submitted item. If **tie**'s Representative fails to return a copy of any method statement within 5 Business Days of any re-submission, then the Infraco may, at its discretion refer the matter for determination in accordance with the Dispute Resolution Procedure.

2.6 If **tie**'s Representative makes an objection to any method statement in accordance with paragraph 6 (Grounds of Objection), **tie**'s Representative shall state the ground upon which such objection is based and the evidence or other information necessary to substantiate that ground.

2.7 For the avoidance of doubt, **tie**'s Representative shall be entitled to make such comments on any method statement on any grounds as he sees fit but, to the extent that **tie**'s Representative comments on a method statement other than on the grounds specified in paragraph 6 (Grounds of Objection), the Infraco shall not be obliged to take such comments into account.

2.8 Where any information that has been provided is updated, the new issues shall be provided promptly to **tie** as soon as reasonably possible.

2.9 The Infraco shall ensure that each method statement shall contain sufficient detail and shall be accompanied by sufficient information to enable **tie**'s Representative to assess the method statement in accordance with this Schedule Part 14 (*Review Procedure and Design Management Plan*).

2.10 Where a revised method statement is submitted, the Infraco shall also ensure that such revision clearly identifies what revision to the method statement was made.

3. Design Deliverables

3.1 Design Deliverables shall be reviewed using the procedure set out in the Design Management Plan (as updated from time to time by **tie**). The current version of the Design Management Plan is version 5.3 and is included as Part C of this Schedule Part 14.

3.2 Within 10 Business Days of the date of receipt of a submission (or re-submission, as the case may be) of the Submitted Item to **tie**'s Representative (or such other period as the Parties may agree), **tie**'s Representative shall return one copy of the relevant Submitted Item to the Infraco and one copy to the SDS Provider endorsed (subject to and in accordance with paragraph 6 (Grounds of Objection)) "Level A - no objection", "Level B - proceed subject to comments" or "Level C - resubmit".

3.3 If **tie**'s Representative fails to return a copy of any Submitted Item within 20 Business Days (or within such other period as the Parties may agree in writing) of the date of its submission to **tie**'s Representative, then the Infraco shall re-submit the submitted items stating that it is a re-submitted item. If **tie**'s Representative fails to return a copy of any Submitted Item within 5 Business Days of any re-submission, then **tie**'s Representative shall be deemed to have returned the Submitted Item to the Infraco endorsed "Level A - no objection".

3.4 If **tie**'s Representative makes an objection to any Submitted Item in accordance with paragraph 6 (Grounds of Objection), **tie**'s Representative shall state the ground upon which such objection is based and the evidence or other information necessary to substantiate that ground.

3.5 For the avoidance of doubt, **tie**'s Representative shall be entitled to make such comments on any Submitted Item on any grounds as he sees fit but, to the extent that **tie**'s Representative comments on a Submitted Item other than on the grounds specified in paragraph 6 (Grounds of Objection), the Infraco shall not be obliged to take such comments into account.

3.6 Where any information that has been provided is updated, the new issues shall be provided promptly to **tie** as soon as reasonably possible.

3.7 **tie**'s Representative shall be entitled to instruct the Infraco that a defined class of Deliverable or course of action may be submitted "for information" and not for review in accordance with this Schedule Part 14 (*Review Procedure and Design Management Plan*).

3.8 The Infraco shall ensure that each Submitted Item shall contain sufficient detail and shall be accompanied by sufficient information to enable **tie**'s Representative to assess the Submitted Item in accordance with this Schedule Part 14 (*Review Procedure and Design Management Plan*).

3.9 Where a revised Submitted Item is submitted, the Infraco shall also ensure that such revision clearly identifies what revision to the Deliverable was made.

4. Not used

5. Further Information

5.1 The Infraco shall submit any further or other information, drawings, data and documents (including details of calculations) that **tie's** Representative reasonably requires to act in accordance with this Schedule Part 14 (*Review Procedure and Design Management Plan*). If the Infraco does not submit any such information, data and documents, **tie's** Representative shall be entitled to object to the Submitted Item:

5.1.1 on the basis of the information, data and documents which have been provided; or

5.1.2 on the grounds that insufficient information, data and documents have been provided to enable **tie's** Representative to act in accordance with this Schedule Part 14 (*Review Procedure and Design Management Plan*).

6. Grounds of Objection

6.1 **tie's** Representative may object to any Submitted Item on the grounds set out in paragraph 5 (*Further Information*) above but otherwise may make objections in relation to a Submitted Item if, on the balance of probabilities, implementation of that Submitted Item:

6.1.1 would not be in accordance with this Agreement; and/or

6.1.2 would result in an increase to **tie's** liabilities or potential or contingent liabilities under this Agreement; and/or

6.1.3 would be inefficient as to expenditure of resource/costs; and/or

6.1.4 would lead to a health and safety risk to any person or property; and/or

6.1.5 would lead to a breach of any Law or the terms of any Consent or Land Consent; and/or

6.1.6 would necessitate the obtaining of a new Law or the obtaining of a variation to an existing Law; and/or

6.1.7 would not be in accordance with any relevant environmental requirements; and/or

6.1.8 would not be in accordance with the Employer's Requirements; and/or

6.1.9 would adversely impact on the flexibility or ease of operation, run time, reliability, operating maintenance costs of revenues of the Edinburgh Tram Network; and/or

6.1.10 would materially adversely affect the Infraco's ability to perform its obligations under this Agreement; and/or

6.1.11 would materially adversely affect **tie's** ability to perform its obligations or enforce its rights under this Agreement; and/or

6.1.12 is not in accordance with the Infraco's quality plans; and/or

6.1.13 would not be in accordance with Good Industry Practice; and/or

6.1.14 would prevent efficient construction, completion and/or commissioning of or under the Infraco Contract; and/or

6.1.15 would prevent a Certificate of Service Commencement being achieved by any of the Planned Service Commencement Dates.

7. Effect of Review

7.1 Any Submitted Item which is returned or deemed pursuant to paragraph 3.3 to have been returned by **tie's** Representative endorsed "Level A - no objection" shall be complied with and implemented by the Infraco.

7.2 If **tie's** Representative returns the Submitted Item endorsed other than "Level A - no objection", the Infraco shall:

7.2.1 where **tie's** Representative has endorsed the Submitted Item "Level B - proceed subject to comments", proceed with the performance of the Infraco Works in accordance with the Programme but acknowledge and take into account **tie's** Representative's comments;

7.2.2 where **tie's** Representative has endorsed the Submitted Item "Level C - resubmit", not act upon the Submitted Item, amend the Submitted Item to respond to **tie's** Representative's objections and requirements in so far as they

are in accordance with paragraph 6 (Grounds of Objection), and re-submit the same to **tie's** Representative in accordance with paragraph 7.3 unless the Infraco disputes that any such objection or proposed requirement is on grounds permitted by this Agreement, in which case the Infraco or **tie's** Representative may refer the matter for determination in accordance with the Dispute Resolution Procedure, and the Infraco shall be entitled (at the Infraco's risk) to proceed to implement such Submitted Item subject to the outcome of the referral to the Dispute Resolution Procedure.

7.3 Where the Submitted Item has been endorsed "Level C", the Infraco shall within 10 Business Days (or as otherwise agreed between the Parties) of receiving the returned Submitted Item, resubmit the Submitted Item as amended to **tie's** Representative and the provisions of paragraphs 1.2 to 7 of this Schedule Part 14 *(Review Procedure and Design Management Plan)* shall apply (mutatis mutandis) to such re-submission.

7.4 The return or deemed return of any Submitted Item endorsed "Level A - no objection" or otherwise endorsed in accordance with paragraph 7.2.1 ("Level B" - proceed subject to comments) shall mean that the relevant Submitted Item may be used or implemented (subject to any comments made in accordance with paragraph 7.2.1) for the purposes for which it is intended. However, the return or deemed return of any Submitted Item howsoever endorsed shall not:

7.4.1 relieve the Infraco of its obligations under this Agreement; nor

7.4.2 constitute an acknowledgement, admission or acceptance by **tie** that the Infraco has complied with such obligations.

8. Disclaimer

8.1 No review, objection, comment or silence by **tie** shall operate to (i) exclude or limit the Infraco's obligations or liabilities under this Agreement (or **tie's** rights under this Agreement) or (ii) fix **tie** with any express or implied obligations, duties or liabilities with respect to the Submitted Item.

8.2 For the avoidance of doubt, this information is supplementary to information required to be produced by the Infraco in order to satisfy the approval requirements of and Consents from other third parties and Approval Bodies. These include those required for:

8.2.1 CEC in its capacity as planning authority;

8.2.2 CEC in its capacity as roads authority;

8.2.3 HMRI;

8.2.4 Network Rail;

8.2.5 the Utilities;

8.2.6 Transport Scotland;

8.2.7 Historic Scotland;

8.2.8 SEPA;

8.2.9 SNH; and

8.2.10 EAL.

8.3 The Infraco shall promptly provide copies of all such submissions to **tie** together with the responses to them as a matter of routine.

9. Documentation Format and Management

9.1 The Infraco shall issue five hard copies and a soft copy (in appropriate agreed format) of all Submitted Items to **tie** and compile and maintain a register of the date and contents of the submission for each Submitted Item.

9.2 The Infraco shall compile and maintain a register of the date of receipt and content of all Submitted Items that are returned or deemed to be returned by **tie's** Representative.

9.3 All drawings shall be presented as A3 sized paper copies and drawings shall be prepared at their original size in a manner that allows them to be readily legible when reduced to A3 size. Original drawings shall not be greater than A0 in size.

10. Variations

10.1 No review, objection or comment or any failure to make objection or comment under this Schedule Part 14 (*Review Procedure and Design Management Plan*) by **tie** shall constitute a **tie** Change.

10.2 If, having received comments from **tie's** Representative, the Infraco considers that compliance with those comments would amount to a **tie** Change, the Infraco shall within 10 Business Days (or such other period as **tie** may agree, acting reasonably) of

any comments being received, before complying with the comments, notify **tie** of the same and, if it is agreed by the Parties or determined pursuant to the Dispute Resolution Procedure that a **tie** Change would arise if the comments were complied with, **tie** may proceed with the matter in accordance with Clause 80 (**tie** *Changes*).

10.3 Any failure by the Infraco to notify **tie** within 10 Business Days (or such other period as **tie** has agreed) of comments being received that it considers compliance with such comments of **tie's** Representative would amount to a **tie** Change shall constitute an irrevocable acceptance by the Infraco that any compliance with **tie's** comments shall be without cost to **tie** and without any entitlement to any extension of time or other relief.

10.4 No alteration or modification to the scope, quality, quantity or nature of the Infraco Works arising from the development of the detailed Design or from the co-ordination or integration of the Design shall be construed or regarded as a **tie** Change or give rise to a Relief Event or a Compensation Event but for the avoidance of doubt this provision shall not effect Infraco's rights under Schedule Part 4 or pursuant to the terms of the SDS Novation Agreement.

PART B - tie METHOD STATEMENT REVIEW POLICY

1. PURPOSE

The purpose of this procedure is to ensure that we have a standard process for the preparation, contents, review and acceptance/ approval of all method statements whether created in-house or submitted by a contractor. This procedure is created to meet the requirements of the company Integrated Management System (IMS) which reflect the criteria specified in International Standards Organisation (ISO) BS EN ISO 9001, 14001 and Occupational Health and Safety Assessment Services (OHSAS) 18001.

2. SCOPE

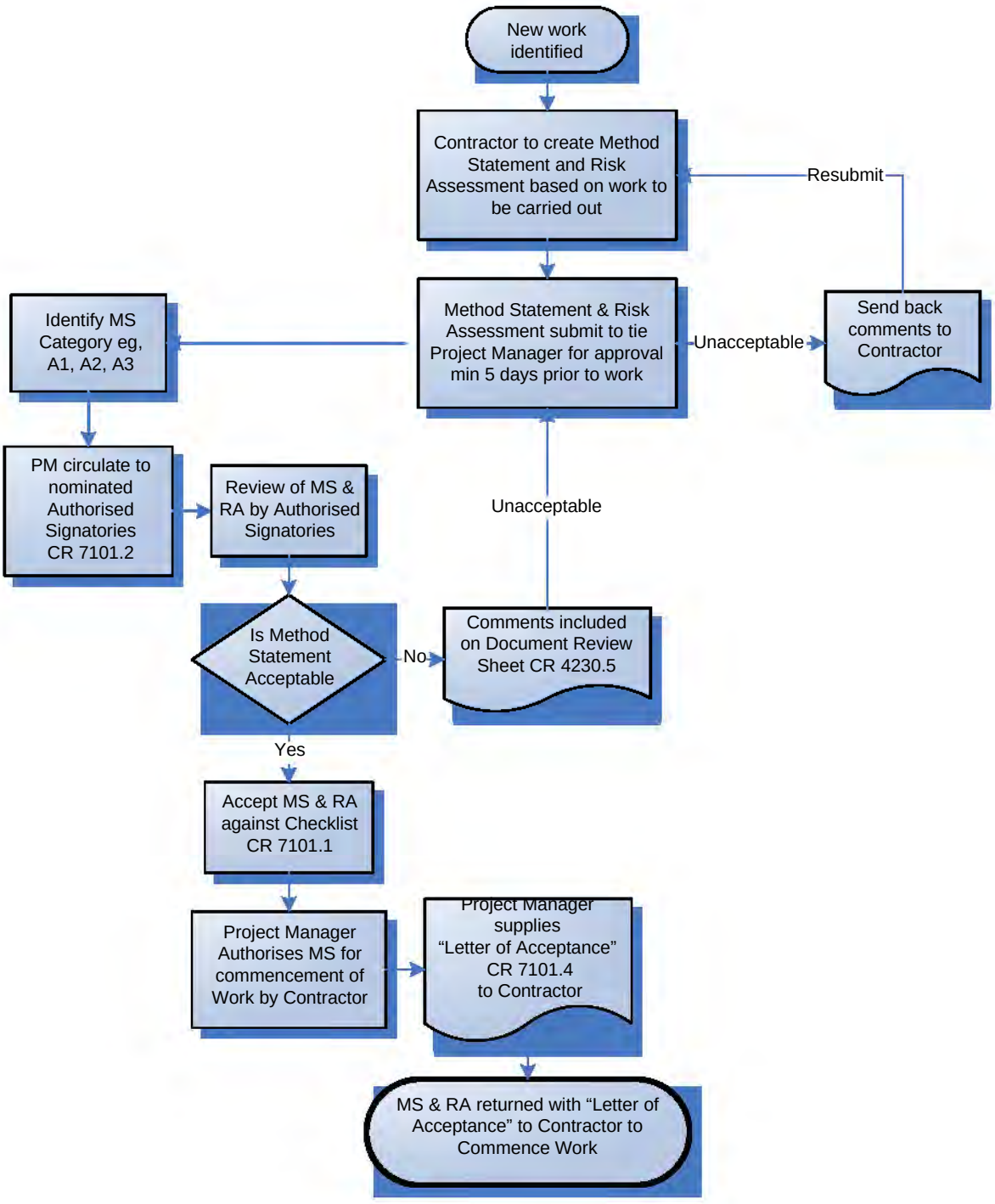
The scope of this procedure shall address all method statements which are produced for all elements of work and that any risks and impacts associated with the work element are assessed and appropriate control measures are put in place to allow the work to be undertaken safely and in an environmentally compliant manner and in accordance with contract requirements.

When writing the method statement the author/ contractor shall ensure that all necessary items are covered and the format and consistency of information is achieved in accordance with the work being carried out.

All contractors and sub contractors shall provide method statements with consistent content and the appropriate approvals, prior to commencing work. Method statements shall be specific to the work content and shall NOT BE OF A GENERIC NATURE ensuring that adequate coverage of all safety, quality and environmental aspects are addressed.

A formal system for acceptance of all Method Statements detailing the contractors proposed work activities within each work site shall be assured in accordance with this procedure, prior to site works commencing.

3. FLOWCHART


New work identified
Contractor to create Method Statement and Risk Assessment based on work to be carried out
Resubmit
Method Statement & Risk Assessment submit to tie Project Manager for approval min 5 days prior to work
Unacceptable
Send back comments to Contractor
Identify MS Category eg, A1, A2, A3
PM circulate to nominated Authorised Signatories CR 7101.2
Review of MS & RA by Authorised Signatories
Unacceptable
Is Method Statement Acceptable
No
Comments included on Document Review Sheet CR 4230.5
Yes
Accept MS & RA against Checklist CR 7101.1
Project Manager Authorises MS for commencement of Work by Contractor
Project Manager supplies "Letter of Acceptance" CR 7101.4 to Contractor
MS & RA returned with "Letter of Acceptance" to Contractor to Commence Work

4. RESPONSIBILITIES

4.1 Company Responsibility

The company is responsible for ensuring that everyone works in a safe and environmentally friendly fashion, which includes not only employees but all associated 3rd party contractors whilst undertaking work at any **tie** worksite.

4.2 Management Responsibilities

4.2.1 Project Director

The Project Director is responsible for nominating the authorised signatories for the signing of method statements.

4.2.2 Project Managers

Project Managers are responsible for reviewing the procedure for suitability and implementation in operation including liaison with designated responsible persons and contractor personnel, as well as acting as the key contact person in liaison with the contractors over the accuracy and content of the method statement to meet the requirements of the contract. Project Managers shall record all related method statements, maintaining and updating the method statement tracker database, final acceptance/ sign-off of the method statement lies with the Project Manager.

4.2.3 Construction Manager

The Construction Manager is responsible for implementing the procedure and liaising with designated responsible persons and contractors in ensuring the supply of adequate method statements and risk assessments to address all related construction work on the project.

4.2.4 Project HSQE Manager

The Project Health, Safety, Quality and Environmental (HSQE) Manager is responsible for the monitoring of this procedure. Further responsibilities include liaising with the Project Manager and designated responsible persons and contractors over the accuracy and content of the method statement to meet the requirements of the contract.

4.2.5 Project Administrator

The Project Administrator is responsible for the registering, filing and retrieval of all records associated with this procedure.

4.2.6 Contractor

The contractor is responsible for the submission of all relevant method statements and relevant documentation associated with their aspects of the contract, in sufficient time for **tie** to review, accept and where discrepancies/ comments are identified, to resubmit prior to commencement of any associated work.

5. PROCEDURE

All work elements shall require a method statement to cover the methodology, safety, quality and environmental aspects of the work. Method statements must be contract, and site specific and relevant to the work being carried out.

All method statements shall be submitted through the document control process, to allow correct transmittal and tracking of these documents.

No works shall commence until a method statement has been written, accepted and briefed to all related staff, for the works concerned.

The Project Manager shall ensure that method statements are written and provided by contractors, and that they are correctly reviewed and accepted by the authorised signatories. Final acceptance/ sign-off of the method statement lies with the Project Manager. The Letter of Acceptance sign-off sheet must be completed and received by the contractor, before any work commences.

The following categories identified below can be used as guidance to assess the risk associated with the work addressed in any method statements and ensure that all relevant authorities address the review of the document prior to implementation on a project.

5.1 Categorisation of Method Statements

CATEGORY	RISK	AUTHORISATION
A1	**Low risk**. Minimum implications on human life or the Project E.g., Fixed parts protruding into passageways, excessive storage, sharp edges on equipment, low level fumes/ dust, non intrusive surveys. Subject to contractors review & approval process	**Prepared** by Contractor/ Sub Contractor **Approved** by Contractor/ Sub Contractor
A2	**Medium risk**. Possibly implications on human life or the Project E.g., Electrical equipment which is electrically untested or worn un-inspected slings for lifting duties, intrusive surveys. Provided to **tie** for information	**Prepared** by Contractor/ Sub Contractor **Approved** by Contractor/ Sub Contractor **For Information tie** Ltd Project Manager
A3	**High risk**. Major implications on human life or the Project. E.g., Equipment with inadequate guarding, or electrical equipment with damaged cabling, piling, earthworks. Due to high risk **tie** acceptance required.	**Prepared & Approved** by Contractor/ Sub Contractor **Accepted** by **tie** Ltd Project Manager

A useful mnemonic to remember when addressing the Risk associated with equipment is "**GASP**" – **G**ood condition, **A**dequate strength, **S**ound condition & free from **P**atent defect.

Contractors shall be supplied with a copy of the **tie** Method Statement Requirements CR 7101.2 as guidance for the creation of method statements to suit the company requirements. This allows the checking and acceptance process to be simplified while giving the contractor the opportunity to provide the necessary information under the requisite headings.

Method statements must be submitted at least 5 working days prior to being required for operations, to avoid possible delays in revisions to content and the seeking of project acceptance signatories.

The method statement must be accepted at least 2 working days prior to the works commencing.

Any comments concerning the method statement and its content shall be recorded by the accepters using the Method Statement Review Checklist CR 7101.1 and issued to

the Project Manager for subsequent review. This shall ensure that there is no duplication of comments prior to submission to the contractor.

The flowchart which forms part of this procedure, explains the process of submission, review and re-submission.

All method statements and associated relevant information shall be briefed to the work force prior to starting work. This briefing is recorded by the contractor on their relevant briefing record attached to the method statement.

5.2 Method Statement Content

Method statements are to be compiled by the contractor or internally using the Method Statement Requirements CR 7101.2 as guidance. This procedure and the associated requirements indicate what items should be covered within the method statement, as a minimum requirement.

Method statements shall have a validity period from date of being prepared until completion of identified work. Method statements are required to be reviewed and amended, if necessary, when a work process changes ensuring that all details are still valid.

There are 17 Sections detailed within the "Method Statement Requirements" that must be addressed within a method statement, if applicable. Each heading has a guidance list as Bullet Points, detailed in the Method Statement Requirements and in the Method Statement Checklist CR 7101.1; this allows each heading to be completed using the italic notes as pointers. Other specific and pertinent information may be added if required.

Section 17 indicates what supporting information must be attached to the method statement. The list of supporting information is itemised in the table of contents and shall be ticked against each itemised aspect identifying the relevant information addressed accordingly.

The method statement must be signed by all **tie** authorised persons designated by the Project Director on the Authorised Signatories List CR 7101.3 in accordance with the "Categorisation of Method Statements" in Section 5.1 above. Prior to being copied to site; the "Letter of Acceptance" CR 7101.4 supplied by the Project Manager must accompany the method statement, this is confirmation that the method statement on site is the current issue.

The contractor shall ensure that the method statements are briefed to the operators who will be undertaking the identified work. Records of evidence of compliance showing that operators having been briefed, by a competent person must be available as proof that briefing have been carried out. Signed briefings are objective evidence, of staff understanding, of the application of the method statement relevant to the work that they have to carry out.

5.3 Further Supporting Information

Additional information such as risk assessments, Control of Substances Hazardous to Health (COSHH) assessments, environmental impacts, permits to work, drawings, design details, hazard directory/ log and sectional appendices including extracts may also be required to fully support the information in completing a method statement. If this information is required, it shall be annotated and attached to the method statement.

6. HEALTH, SAFETY AND ENVIRONMENTAL REQUIREMENTS

This procedure directly impacts on the health, safety and environmental requirements of the individuals and related project work.

7. REFERENCES

7.1 External Documents

The following external documents are referenced herein.

Doc Type/ Number	Document Title
BS EN ISO 9001	Quality Management Systems – Requirements
BS EN ISO 14001	Environmental Management Systems – Specification with guidance for use
OHSAS 18001	Occupational Health & Safety Management Systems – Specification

7.2 Internal Company Documents

The following **tie** documents are referenced herein.

All identified records are deemed part of the company management system and shall be maintained in the live files for a period of one year and then in archive for a period of 5 years.

Doc Reference Number	Document Title
CP 6220	Learning and Development Procedure
CR 7101.1	Method Statement Review Checklist
CR 7101.2	Method Statement Requirements
CR 7101.3	Authorised Signatories List
CR 7101.4	Letter of Acceptance

8.0 DEFINITIONS & ACRONYMS

The following definitions and acronyms apply to this document.

Word or Acronym	Definition
Acceptance	The process of reviewing and acknowledging the content of the method statement, as suitable to ensure that the identified risks have been mitigated and controlled.
COSHH	Control of Substances Hazardous to Health
GASP	Good condition, Adequate strength, Sound condition & free from Patent defect
Hazard	Anything that has the potential to cause harm.
HSQE	Health, Safety, Quality and Environment
High Risk	A condition or practice likely to cause:- loss of life/ plant/ equipment or property; or a dangerous occurrence reportable under RIDDOR.
IMS	Integrated Management System
ISO	International Standards Organisation
Low Risk	A condition or practice which may result in:- minor, non disabling injury or illness which results in little of no lost time; or minor non-disruptive damage to plant, equipment or property.

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Word or Acronym	Definition
Medium Risk	A condition of practice which is likely to:- cause serious injury or illness resulting in temporary disability to one or more persons; or damage to plant, equipment or property, which results in disruption to normal activities.
OHSAS	Occupational Health & Safety Assessment Services
Risk	The level of harm that will arise from a hazard with or without control measures in place.

9.0 TRAINING

Education and Training associated with this procedure shall be carried out in accordance with Company Procedure for Learning and Development CP 6220.

All **tie** employees, consultants and contractors are required to be made aware of the requirements of this procedure and the relevant legislation associated with its implementation. All operators shall be briefed on method statements relevant to their area of work.

10. DOCUMENTATION CHANGE CONTROL HISTORY

Revision	Date	DCR No	Reason for Change
0.0	25/09/07	0017	1st Issue
1.0	18/12/2007		Re-define of use on comments from Project Managers

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PART C - DESIGN MANAGEMENT PLAN

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1. Purpose

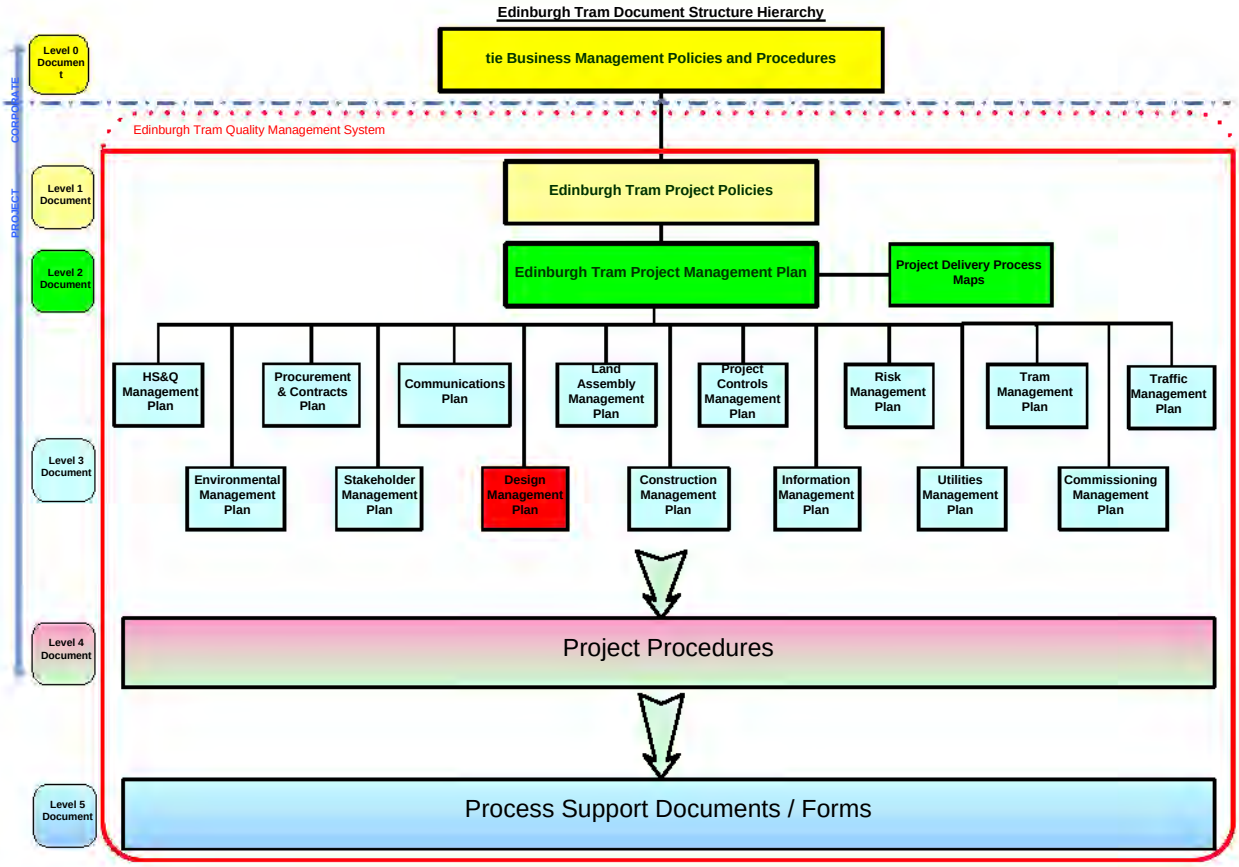
1.1. Plan Objectives

1.1.1. To provide the overall strategy for the detailed design of ETN and its subsequent review.

1.1.2. This plan will be reviewed regularly to ensure effectiveness.

1.2. Documentation Structure

1.2.1. The following chart highlights where the Design Management Plan sits in relation to the overarching Edinburgh Tram Project Management Plan and the various other work stream plans developed specifically for the Edinburgh Tram Project. The Design Management Plan is viewed as a Level 3 Document within the Hierarchy, whereby any associated procedures and support documents will be referenced within it.



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2. Overview

2.1. Detailed Design

2.1.1. Post-novation of the SDS Agreement, and the Tramco Agreement respectively, the complete Tram system detailed design, which is relevant for the Infraco scope of works, will be delivered by Infraco.

2.1.2. Infraco is the principal party in respect of design, with the SDS and Tramco contracts for design and build novated to them. In the notes below, where the term 'SDS/Infraco/Tramco' is used, it is intended to refer to a process managed by Infraco in respect of these novated arrangements.

2.1.3. The effectiveness of detailed design is critical to the success of ETN. It:

- allows the Infraco to construct and maintain the works within the constraints of the Infraco Agreement;
- delivers a wide range of statutory and non-statutory approvals;
- achieves system safety to the requirements of safety legislation via the ICP; and
- provides a design which complies with the requirements of the Parliamentary Acts and within the constraints set out by Promoter.

2.1.4. Detailed design takes the preliminary design forward to achieve a series of deliverables, which are tailored to obtain consents and approvals and to provide all information required to allow the Infraco works to be constructed.

2.1.5. In addition to the design covered by SDS, certain design elements will be produced directly by Infraco. This also includes all necessary system integration activity, including integration of the tram vehicle into the system.

2.1.6. Through Infraco, Tramco will design the tram vehicle and any necessary activity to ensure that the vehicle can be integrated into the tram system, as defined by Infraco.

2.2. Design Review Process

2.2.1. As required, designs will each be reviewed, for, or under:

2.2.1.1. '**Prior Approvals**' - a CEC planning approvals process, which is in lieu of a full council Planning Committee application for matters of public interest which require such approvals (as defined in the relevant Acts). Documents submitted for Prior Approval generally present outline design information that will require further development to detailed design standard after Planning Permission has been granted. Note: the tram vehicle as well as any temporary works and temporary traffic management measures are not subject to Prior Approval (see para 2.6.1). **Prior Approvals** comprise:

- An Informal Consultation: a period of consultation of 8 weeks duration with CEC Case Officers to allow a good understanding of design content and basis.

- The Prior Approval itself: an administrative process of 8 weeks duration carried out with the delegated authority of the CEC Planning Committee which provides formal planning consent to designs which require it. This **element of the process causes designs to be made public following Informal**

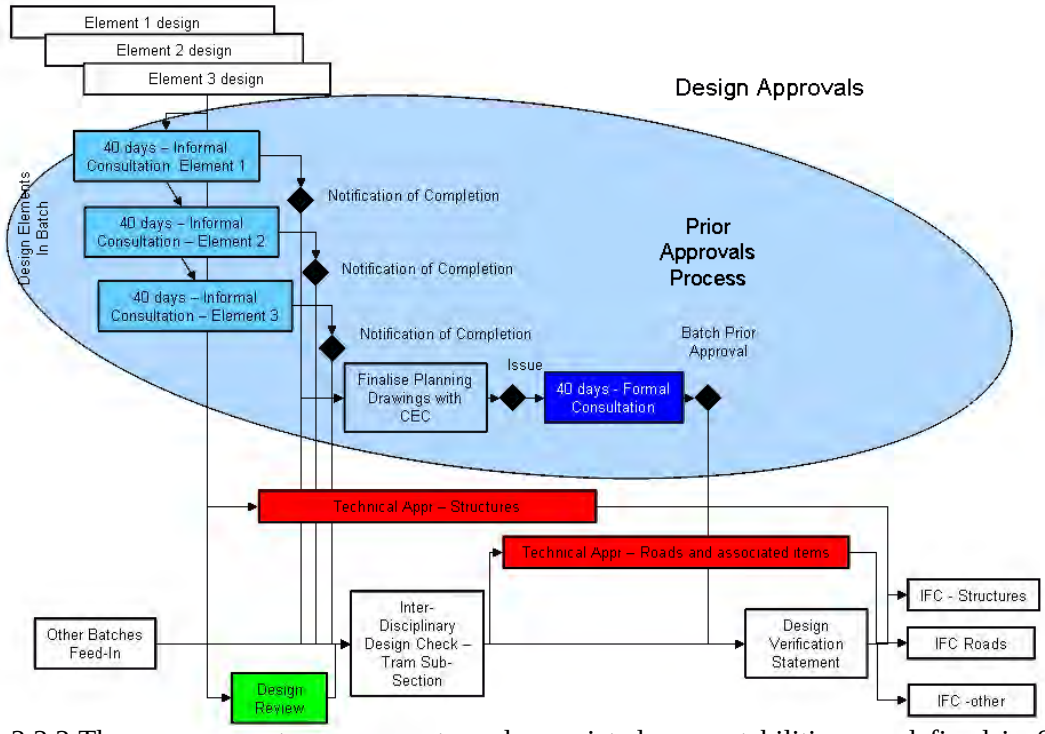
Consultation. A protocol exists to deal with exceptions to this process which requires a full application to the Planning Committee

2.2.1.2. **Technical Approvals** of the designs provide formal technical approvals for the various design elements by the relevant competent authority. Usually, these will be sought from CEC, in respect of their statutory authority role. However, others will also be needed from bodies such as the Scottish Environment Protection Agency, Scottish Natural Heritage and the Department for Transport. Unless otherwise agreed with CEC a review period of 8 weeks shall apply for all Technical Approvals associated with CEC. Technical Approvals may include, as appropriate:

- **Approvals in Principle (AIP)** for structures in accordance with the requirements of CEC or Network Rail in their role as Technical Approval Authority. Documents submitted for AIP generally present outline design information that will require further development to detailed design standard after AIP has been granted.

2.2.1.3. A **tie**-led 4-week **Design Review** process, which includes stakeholders and BBS, SDS, CAF and Transdev whose purpose is to review selected design packages for the effective integration of design elements to create an operationally acceptable tram system. The tram vehicle design will itself be subject to this design review process.

[Omit flow chart]



2.2.2. The management arrangements and associated accountabilities are defined in Section 2.9, below.

2.3. Revision of design

2.3.1. It is possible that revision of some completed design elements may be required from time to time. This may occur, for example, because a Value Engineering opportunity is identified, **tie** issues a Change Order, or SDS/Infraco/Tramco issue a Change Request.

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For major changes, whatever the source of initiation of the change of design, the new design must undergo all necessary design processes to ensure IDC and overall compliance with requirements.

2.3.2. Minor design changes can be agreed between SDS/Infraco/Tramco and **tie** outside the formal design review process. Minor design changes are defined as those changes that do not affect the nature, scale and principal detailing of a design proposal.

2.3.3. Typical examples for minor design changes are:

- Alternative rebar arrangements required to suit construction methods
- Adjustments to pipe / duct runs to avoid potential underground features
- Local adjustments to the positions of highway features such as re-positioning of signs to avoid clashes with underground services
- Correction of errors by the designer
- Clarifications on drawings, such as adding dimensions

2.3.4. It should be noted that the list of minor design changes above is not exhaustive. Through an appropriate process, as part of their management system, it is for SDS/Infraco/Tramco to make the case for each such change to be designated as minor.

2.4. Submission of Designs

2.4.1. SDS/Infraco/Tramco will submit packages of design to **tie** electronically, to an agreed programme. Before this happens SDS/Infraco/Tramco will have been an integral part of a number of interfacing activities, whose purpose it is to inform detailed design such that it is most likely to be as expected at first submission and to ensure that all technical interfaces are co-ordinated.

2.5. Technical Approvals

2.5.1. Technical Approvals requirements will be defined by any or all of **tie,** CEC, Network Rail, Department for Transport. Matters which require Technical Approval by CEC are defined by the Council's duties under the Roads (Scotland) Act 1984. These are primarily concerned with the structural integrity of the completed design and with roads design. It is CEC's practice to handle as much as possible within the roads Technical Approval so that, for example, roads construction consent and overall roads design approval are dealt with in a single submission. The systems design and tram vehicle are not subject to CEC Technical Approval; they are subject to design review by **tie.**

2.6. Prior Approvals

2.6.1. 'Prior Approvals' requirements will be defined by CEC. Matters which require Prior Approvals are defined by Section 73 of the Edinburgh Tram Acts and Class 29 in Part 11 of Schedule 1 to the Town and Country Planning (General Permitted Development) (Scotland) Order 1992. These are mainly the structures, the overhead line equipment, lighting, tramstops and any buildings. The tram vehicle as well as any temporary works and temporary traffic management measures are not subject to Prior Approval.

2.7. Design Review

2.7.1. The purpose of the **tie-**led Design Review process is to take selected packages of submitted design and review them for the fit of the design with stated requirements. It is primarily concerned with providing assurance that **tie** can demonstrate to the Independent Competent Person that the requirements of ROGS are being met. It does so by addressing the design as an effective integration of design elements to create an operational tram system which meets the requirements. **The design review is not an approval process and does not does not dilute the accountability of SDS/Infraco/Tramco for good-quality, fit-for-purpose design and securing approval for that design.** In the event of a clash between offered design and stated requirements the review will include the taking of a decision as to the required outcome.

2.7.2. Issues which emerge comprise a Record of Review (RoR), co-ordinated by **tie** which then will be addressed by SDS/Infraco/Tramco and transferred into other similarly applicable designs.

2.7.3. The overall permanent works design comprises several hundred design elements. Generally, SDS/Infraco/Tramco shall prepare Design Assurance Statements (DAS) for the combination of all design elements relevant for each geographic sub-section and submit these together with the design data for **tie** review.

2.8. Design Assurance Statement

2.8.1. Packages of design will be submitted to **tie** by SDS/Infraco/Tramco with an associated Design Assurance Statement, which will detail how the design complies with statutory, stated and best-practice requirements.

2.8.2. When packages of design have been submitted for review, the review will comprise examination of how each package demonstrates:

- How it meets the Employers Requirements
- How it meets stakeholder requirements
- How it meets the Approvals and Consents requirements (including CEC and other 3rd Parties)
- How it closes issues raised in previous Records of Review
- How it complies with engineering standards – or how it handles non-compliances (SDS to specify following initial review period)
- How it meets the Verification and Validation requirements
- How it mitigates hazards from the Hazard Log
- How it meets the Detailed Design Case for Safety
- How it meets the CDM requirements

- How it is “Fit for Purpose”
- How it meets the CEC Street’s Design manual
- How it meets the CEC Tram Design Manual
- How it meets requirements, comments or ROR issues raised at PD, TDWG or RDWG and by CEC at PD1
- How it meets with run-time requirements
- How it meets with RAMS definitions

2.8.3. Where sub-packages of design are submitted for review, whilst a full DAS may not be available, a written statement of conformance with the maximum possible inclusion of the main points above is required.

2.9. Key Responsibilities

2.9.1. **tie’s** Engineering Services Director is responsible for the overall management of this Plan, chairing the **tie**-led design reviews; arbitrating where during design review a conflict arises over offered design and stakeholder requirements; and ensuring that this Plan is effective and is complied with. He shall also assist Infraco during the design approval and consultation process, noting that final accountability for gaining approvals rests with Infraco.

2.9.2. SDS/Infraco/Tramco is responsible for detailed design and for management of the external approvals process to ensure successful approval of the design, first time. Infraco is the principal party in respect of design with the SDS and Tramco contracts for design and build novated to them. Where the term ‘SDS/Infraco/Tramco’ is used it is intended to refer to a process managed by Infraco in respect of these novated arrangements.

2.9.3. **CEC** is responsible for ensuring their compliance with timescales within this plan and for attendance at necessary meetings required during the process.

2.9.4. Stakeholders are responsible for appropriately resourcing the requirements of this Plan such that their needs are covered.

2.10. Definitions

- **CEC**: City of Edinburgh Council. Promoter of the Edinburgh Tram Network (ETN).
- **Stakeholder:** a party who has a stated requirement to be complied with.
- **SDS**: The Systems Design Services contractor – i.e. Parsons Brinckerhoff and its sub-contractors.
- **Infraco:** The appointed Infraco - i.e. BBS
- **Tramco:** The appointed Tramco - i.e. CAF
- **TSS**: The Technical Services and Support contractor – i.e. Scott Wilson and its sub-contractors.
- **ICP**: The Independent Competent Person, as defined in the ROGS regulations; a person independent of the project appointed by **tie** to signify his non-objection to the overall tram system’s construction, operation and maintenance.

3. Key Activities

3.1. Overview

3.1.1. The “RACI” Chart below details key tasks and their associated functional roles:

	Key Tasks	Functional Roles				
		Engineering Services Director	SDS/Infraco/Tramco	TSS	CEC. TEL, Transdev	tie HSQE Manager
Processes to inform detailed design	Set up meetings	A	R	CI	CI	CI
	Attend meetings and ensure appropriate people in attendance	A	R	C	C	C
	Prepare minutes of meetings	A	R	CI	CI	CI
	Raise RFIs and incorporate changes	A	R	CI	CI	C
	Respond to RFIs and raise changes	A R	C I	C I	C I	C
Detailed design	Raise issues for resolution	A	R	CI	CI	CI
	Incorporate all requirements	A	R	CI	CI	CI
	Verify design adequacy and quality	CI	AR	CI	CI	CI
	Prepare package delivery schedule	CI	AR	CI	CI	CI
	Prepare package verification detail	C	AR	C	C	C
Procedure Audit	Set up audit plan to cover this Design Management procedure	A	C	C	C	R
	Conduct audit and report results	A	CI	CI	CI	R
Design Review	Manage process	AR	CI	C	CI	CI
	Monitor programme	AR	CI	CI	CI	
	Compile management reports	A R	CI	CI	CI	CI

RACI is an acronym for:

R = **Responsible** – owns the delivery of the Activity

A = to whom "R" is **Accountable** – must sign-off (approve) the output of the Activities

C = to be **Consulted** – has information or capability to contribute to the activity

I = to be **Informed** – must be notified of results

3.2. Reporting

3.2.1. The Engineering Services Director will report 4 weekly to the Project Director.

3.3. Monitoring, Reviewing and Auditing

3.3.1. The Engineering Services Director shall regularly monitor the effectiveness of this Plan and shall formally review it at least once every three months.
The HQSE Manager shall audit compliance with this procedure to a schedule commensurate with the perceived risk.

THIS IS SCHEDULE PART 15 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

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SCHEDULE PART 15

PROGRAMME

The Programme consists of the following documents:

- Infraco Construction Programme
- The Programming Assumptions
- Relaxations to the CoCP constraints assumed by BBS in their construction programme as annotated and agreed with **tie**
- On Street Construction Works Methodology
- SDS Design Delivery Programme V26
- SDS Consents Programme (derived from the SDS Design Delivery Programme V26)

The On Street Construction Works Methodology provides details of how Infraco will deliver its works in the city centre sections of the route, including proposed traffic diversions, and has been agreed between the Parties and CEC. The Infraco Construction Programme is based on the On Street Construction Works Methodology and it is one of the programming assumptions.

The Infraco Construction Programme dated 29/04/08 is based on V26 of the SDS design programme. Since this programme was produced, SDS has provided an update to the design programme.

It was agreed that any variation between the SDS Design Delivery Programme and the Infraco Construction Programme would be dealt with as a Notified Departure to the extent that such variation adversely affects the achievement of the Infraco Construction Programme.

Explanatory Note:-.

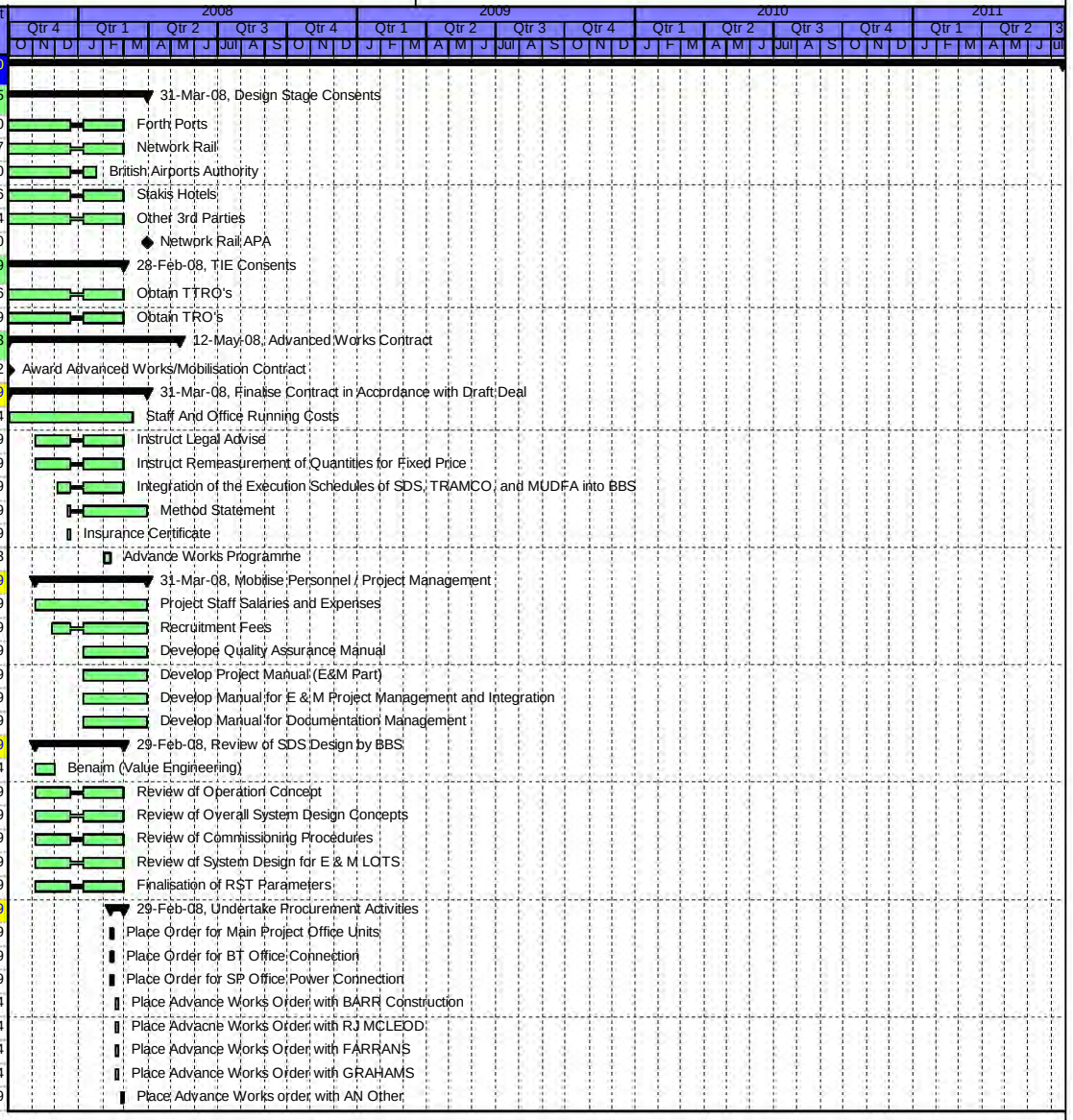
Rather than to fully align the BBS Construction Programme with the SDS Design Delivery Programme prior to Contract award, both parties agreed that the contract would be based on V26 of the SDS design programme, along with a mitigation plan to deal with movement to the SDS design programme which had potential to impact on the BBS construction programme.

INFRACO CONTRACT PROGRAMME

EDINBURGH TRAM NETWORK

BILFINGER BERGER Civil SIEMENS

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
Edinburgh Tram Contract Programme 29 April 2008		933	28-Sep-07	16-Jul-11	0
Design Stage Consents		121	28-Sep-07	31-Mar-08	235
A17260	Forth Ports	100	28-Sep-07	28-Feb-08	20
A17270	Network Rail	100	28-Sep-07	28-Feb-08	7
A17300	British Airports Authority	75	28-Sep-07	24-Jan-08	70
A17310	Stakis Hotels	100	28-Sep-07	28-Feb-08	256
A17320	Other 3rd Parties	100	28-Sep-07	28-Feb-08	174
A17330	Network Rail APA	0		31-Mar-08*	0
TIE Consents		100	28-Sep-07	28-Feb-08	669
A17280	Obtain TTRO's	100	28-Sep-07	28-Feb-08	126
A17290	Obtain TRO's	100	28-Sep-07	28-Feb-08	669
Advanced Works Contract		149	01-Oct-07	12-May-08	783
161	Award Advanced Works/Mobilisation Contract	0	01-Oct-0		32
Finalise Contract in Accordance with Draft Deal		120	01-Oct-07	31-Mar-08	9
A1000	Staff And Office Running Costs	116	01-Oct-07	11-Mar-08	24
A1010	Instruct Legal Advise	75	05-Nov-(	29-Feb-08	29
A1020	Instruct Remeasurement of Quantities for Fixed Pric	75	05-Nov-(	29-Feb-08	29
A1030	Integration of the Execution Schedules of SDS, TRA	55	03-Dec-(	29-Feb-08	29
A1040	Method Statement	65	17-Dec-(	31-Mar-08	9
A1050	Insurance Certificate	5	17-Dec-(	21-Dec-07	69
A1060	Advance Works Programme	6	04-Feb-(	11-Feb-08	43
Mobilise Personnel / Project Management		95	05-Nov-07	31-Mar-08	9
A1070	Project Staff Salaries and Expenses	106	05-Nov-(	31-Mar-08	9
A1080	Recruitment Fees	80	26-Nov-(	31-Mar-08	9
A1120	Develope Quality Assurance Manual	60	07-Jan-0	31-Mar-08	9
A17220	Develop Project Manual (E&M Part)	60	07-Jan-0	31-Mar-08	9
A17230	Develop Manual for E & M Project Management and	60	07-Jan-0	31-Mar-08	9
A17240	Develop Manual for Documentation Management	60	07-Jan-0	31-Mar-08	9
Review of SDS Design by BBS		75	05-Nov-07	29-Feb-08	29
A1240	Benaim (Value Engineering)	20	05-Nov-(	30-Nov-07	84
A1250	Review of Operation Concept	75	05-Nov-(	29-Feb-08	29
A1260	Review of Overall System Design Concepts	75	05-Nov-(	29-Feb-08	29
A1265	Review of Commissioning Procedures	75	05-Nov-(	29-Feb-08	29
A1270	Review of System Design for E & M LOTS	75	05-Nov-(	29-Feb-08	29
A1290	Finalisation of RST Parameters	75	05-Nov-(	29-Feb-08	29
Undertake Procurement Activities		15	11-Feb-08	29-Feb-08	29
A1130	Place Order for Main Project Office Units	5	11-Feb-(	15-Feb-08	39
A1140	Place Order for BT Office Connection	5	11-Feb-(	15-Feb-08	39
A1150	Place Order for SP Office Power Connection	5	11-Feb-(	15-Feb-08	39
A1160	Place Advance Works Order with BARR Constructi	5	18-Feb-(	22-Feb-08	34
A1170	Place Advacne Works Order with RJ MCLEOD	5	18-Feb-(	22-Feb-08	34
A1180	Place Advance Works Order with FARRANS	5	18-Feb-(	22-Feb-08	34
A1190	Place Advance Works Order with GRAHAMS	5	18-Feb-(	22-Feb-08	34
A1200	Place Advance Works order with AN Other	5	25-Feb-(	29-Feb-08	29



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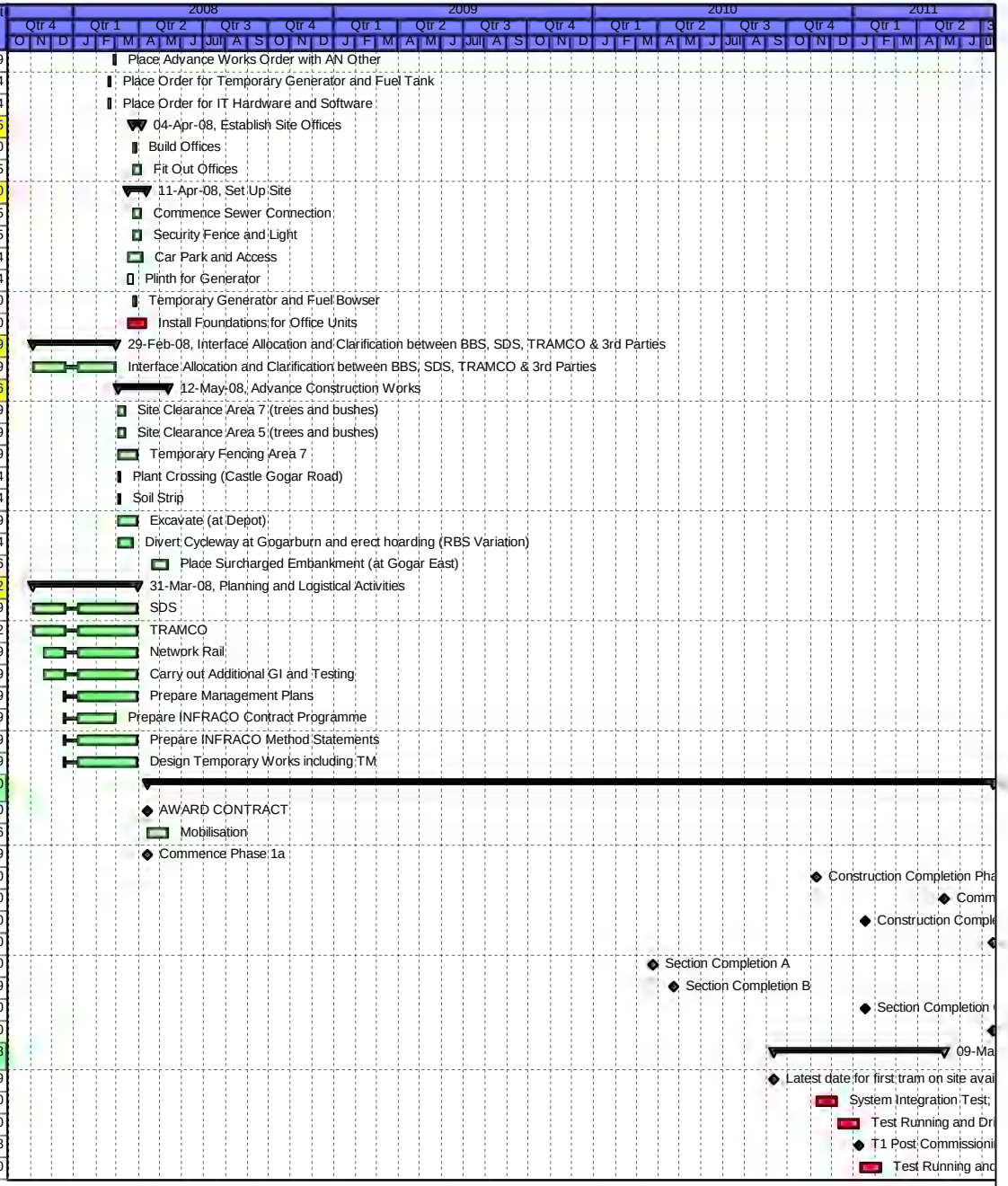
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A1210	Place Advance Works Order with AN Other	5	25-Feb-(	29-Feb-08	29
A1220	Place Order for Temporary Generator and Fuel Ta	5	18-Feb-(	22-Feb-08	34
A1230	Place Order for IT Hardware and Software	5	18-Feb-(	22-Feb-08	34
Establish Site Offices		10	24-Mar-08	04-Apr-08	5
A1370	Build Offices	5	24-Mar-(	28-Mar-08	10
A1380	Fit Out Offices	10	24-Mar-(	04-Apr-08	5
Set Up Site		19	17-Mar-08	11-Apr-08	0
A1300	Commence Sewer Connection	10	24-Mar-(	04-Apr-08	5
A1310	Security Fence and Light	10	24-Mar-(	04-Apr-08	5
A1320	Car Park and Access	15	17-Mar-(	07-Apr-08	4
A1340	Plinth for Generator	5	17-Mar-(	24-Mar-08	14
A1350	Temporary Generator and Fuel Bowser	5	24-Mar-(	28-Mar-08	10
A1360	Install Foundations for Office Units	20	17-Mar-(	11-Apr-08	0
Interface Allocation and Clarification between BBS, SDS, TRAMCO		75	05-Nov-07	29-Feb-08	29
A1580	Interface Allocation and Clarification between BBS,	75	05-Nov-(	29-Feb-08	29
Advance Construction Works		49	03-Mar-08	12-May-08	66
A1520	Site Clearance Area 7 (trees and bushes)	10	03-Mar-(	14-Mar-08	19
A1525	Site Clearance Area 5 (trees and bushes)	10	03-Mar-(	14-Mar-08	19
A1530	Temporary Fencing Area 7	20	03-Mar-(	31-Mar-08	9
A1540	Plant Crossing (Castle Gogar Road)	5	03-Mar-(	07-Mar-08	24
A1550	Soil Strip	5	03-Mar-(	07-Mar-08	24
A1560	Excavate (at Depot)	20	03-Mar-(	31-Mar-08	9
A1570	Divert Cycleway at Gogarburn and erect hoarding (	15	03-Mar-(	24-Mar-08	14
A17250	Place Surcharged Embankment (at Gogar East)	15	21-Apr-0	12-May-08	66
Planning and Logistical Activities		95	05-Nov-07	31-Mar-08	812
A1440	SDS	95	05-Nov-(	31-Mar-08	9
A1450	TRAMCO	95	05-Nov-(	31-Mar-08	812
A1460	Network Rail	85	19-Nov-(	31-Mar-08	9
A1470	Carry out Additional GI and Testing	85	19-Nov-(	31-Mar-08	9
A1480	Prepare Management Plans	65	17-Dec-(	31-Mar-08	9
A1490	Prepare INFRACO Contract Programme	45	17-Dec-(	29-Feb-08	29
A1500	Prepare INFRACO Method Statements	65	17-Dec-(	31-Mar-08	9
A1510	Design Temporary Works including TM	65	17-Dec-(	31-Mar-08	9
Key Dates		803	14-Apr-08	16-Jul-11	0
170	AWARD CONTRACT	0	14-Apr-0		0
270	Mobilisation	20	14-Apr-08	12-May-08	16
280	Commence Phase 1a	0	14-Apr-08		1189
281	Construction Completion Phase 1a Edinburgh Airpo	0		09-Nov-10	0
310	Commencement of Revenue Service Phase 1a Edi	0		09-May-11	0
311	Construction Completion Phase 1a Haymarket to N	0		17-Jan-11	0
312.8	Commencement of Revenue Service Phase 1a Hay	0		16-Jul-11	0
313	Section Completion A	0		25-Mar-10	0
314	Section Completion B	0		23-Apr-10	449
315	Section Completion C	0		17-Jan-11	180
325	Section Completion D	0		16-Jul-11	0
Commissioning Phase 1a Edinburgh Airport to Haymark		158	11-Sep-10	09-May-11	48
295	Latest date for first tram on site available for commi	0		11-Sep-10	309
300	System Integration Test; Phase 1a Edinburgh Airpo	30	10-Nov-10	09-Dec-10	0
301	Test Running and Driver Familiarisation; Phase 1a I	30	10-Dec-10	09-Jan-11	0
302	T1 Post Commissioning Test completed; Phase 1a E	0		09-Jan-11	188
302.1	Test Running and Driver familiarisation performanc	30	10-Jan-11	08-Feb-11	0



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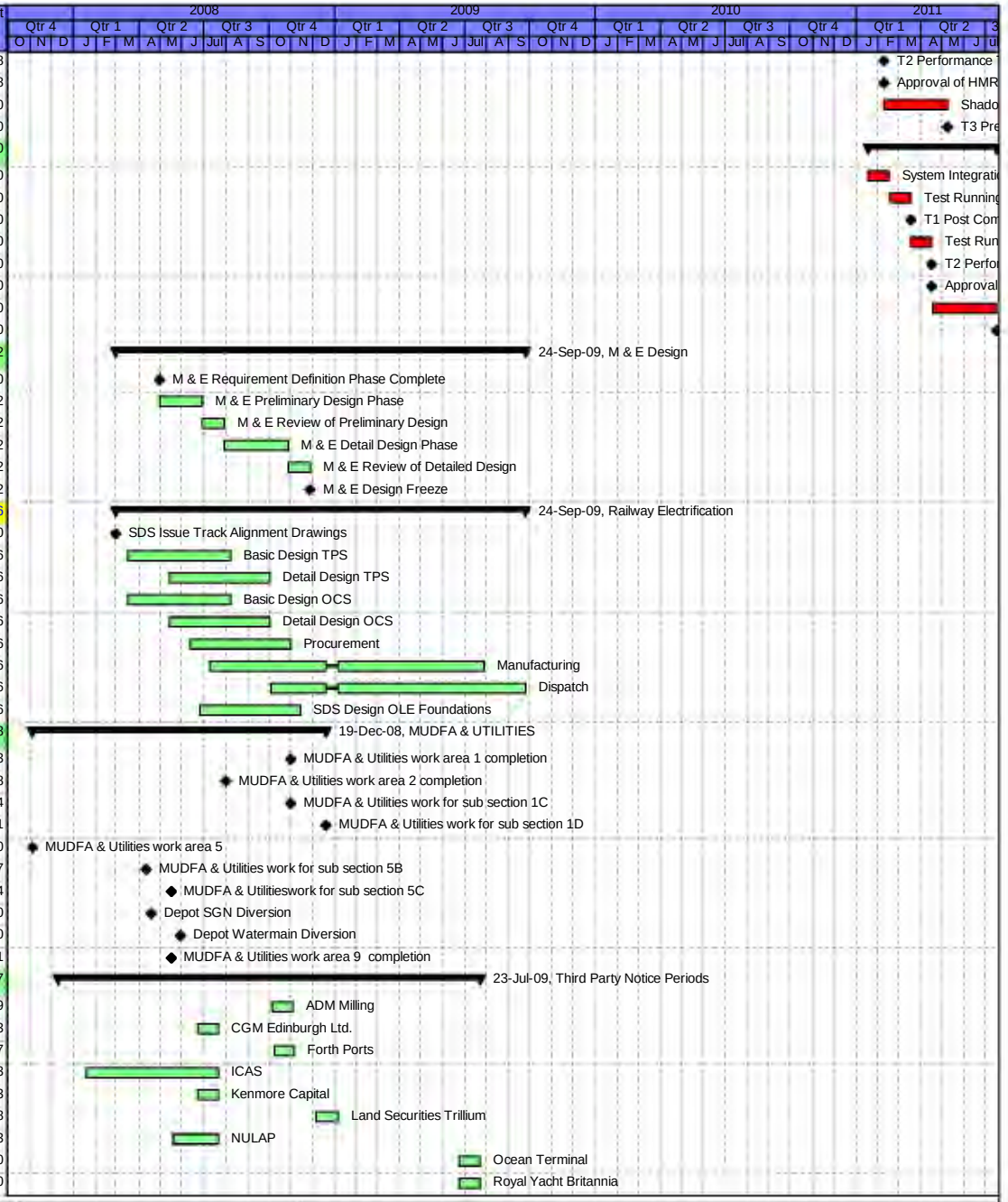
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
302.2	T2 Performance Test completed; Phase 1a Edinbur	0		08-Feb-11	158
302.3	Approval of HMRI; Phase 1a Edinburgh Airport to H	0		08-Feb-11	158
302.4	Shadow running: Phase 1a Edinburgh Airport to Ha	90	09-Feb-11	09-May-11	0
302.5	T3 Pre-Operations Test Completed; Phase 1a Edin	0		09-May-11	0
Commissioning Phase 1a Haymarket to Newhaven		126	18-Jan-11	16-Jul-11	0
312	System Integration Test; Phase 1a Haymarket to Ne	30	18-Jan-11	16-Feb-11	0
312.1	Test Running and Driver Familiarisation; Phase 1a I	30	17-Feb-11	18-Mar-11	0
312.2	T1 Post Commissioning Test completed; Phase 1a I	0		18-Mar-11	0
312.3	Test Running and Driver familiarisation performanc	30	19-Mar-11	17-Apr-11	0
312.4	T2 Performance Test completed; Phase 1a Haymar	0		17-Apr-11	0
312.5	Approval of HMRI; Phase 1a Haymarket to Newhav	0		17-Apr-11	0
312.6	Shadow running: Phase 1a Haymarket to Newhave	90	18-Apr-11	16-Jul-11	0
312.7	T3 Pre-Operations Test Completed; Phase 1a Hayr	0		16-Jul-11	0
M & E Design		390	29-Feb-08	24-Sep-09	442
740	M & E Requirement Definition Phase Complete	0		01-May-08*	0
750	M & E Preliminary Design Phase	60	01-May-(	30-Jun-08	962
760	M & E Review of Preliminary Design	30	30-Jun-08	30-Jul-08	962
770	M & E Detail Design Phase	90	30-Jul-08	28-Oct-08	962
780	M & E Review of Detailed Design	30	28-Oct-08	27-Nov-08	962
790	M & E Design Freeze	0		27-Nov-08	962
Railway Electrification		390	29-Feb-08	24-Sep-09	56
A17080	SDS Issue Track Alignment Drawings	0		29-Feb-08*	0
A17090	Basic Design TPS	100	17-Mar-08	07-Aug-08	56
A17100	Detail Design TPS	100	14-May-(	02-Oct-08	56
A17110	Basic Design OCS	100	17-Mar-08	07-Aug-08	56
A17120	Detail Design OCS	100	14-May-(	02-Oct-08	56
A17130	Procurement	100	12-Jun-08	30-Oct-08	56
A17140	Manufacturing	260	10-Jul-08	29-Jul-09	56
A17150	Dispatch	240	03-Oct-08	24-Sep-09	56
A17160	SDS Design OLE Foundations	100	26-Jun-08	13-Nov-08	56
MUDFA & UTILITIES		279	05-Nov-07	19-Dec-08	628
180	MUDFA & Utilities work area 1 completion	0	31-Oct-0		3
190	MUDFA & Utilities work area 2 completion	0	01-Aug-(		18
200	MUDFA & Utilities work for sub section 1C	0	31-Oct-0		84
210	MUDFA & Utilities work for sub section 1D	0	19-Dec-(		21
220	MUDFA & Utilities work area 5	0	05-Nov-(		1350
230	MUDFA & Utilities work for sub section 5B	0	11-Apr-0		67
240	MUDFA & Utilitieswork for sub section 5C	0	16-May-(		94
245	Depot SGN Diversion	0		18-Apr-08*	0
255	Depot Watermain Diversion	0		30-May-08*	0
260	MUDFA & Utilities work area 9 completion	0	16-May-(		91
Third Party Notice Periods		395	10-Dec-07	23-Jul-09	487
A14170	ADM Milling	28	06-Oct-08	03-Nov-08	979
A14180	CGM Edinburgh Ltd.	28	23-Jun-08	22-Jul-08	1083
A14190	Forth Ports	28	08-Oct-08	05-Nov-08	977
A14200	ICAS	184	19-Jan-08	22-Jul-08	1083
A14210	Kenmore Capital	28	23-Jun-08	22-Jul-08	1083
A14220	Land Securities Trillium	28	06-Dec-08	05-Jan-09	918
A14230	NULAP	62	20-May-(	22-Jul-08	1083
A14240	Ocean Terminal	28	24-Jun-09	23-Jul-09	720
A14250	Royal Yacht Britannia	28	24-Jun-09	23-Jul-09	720



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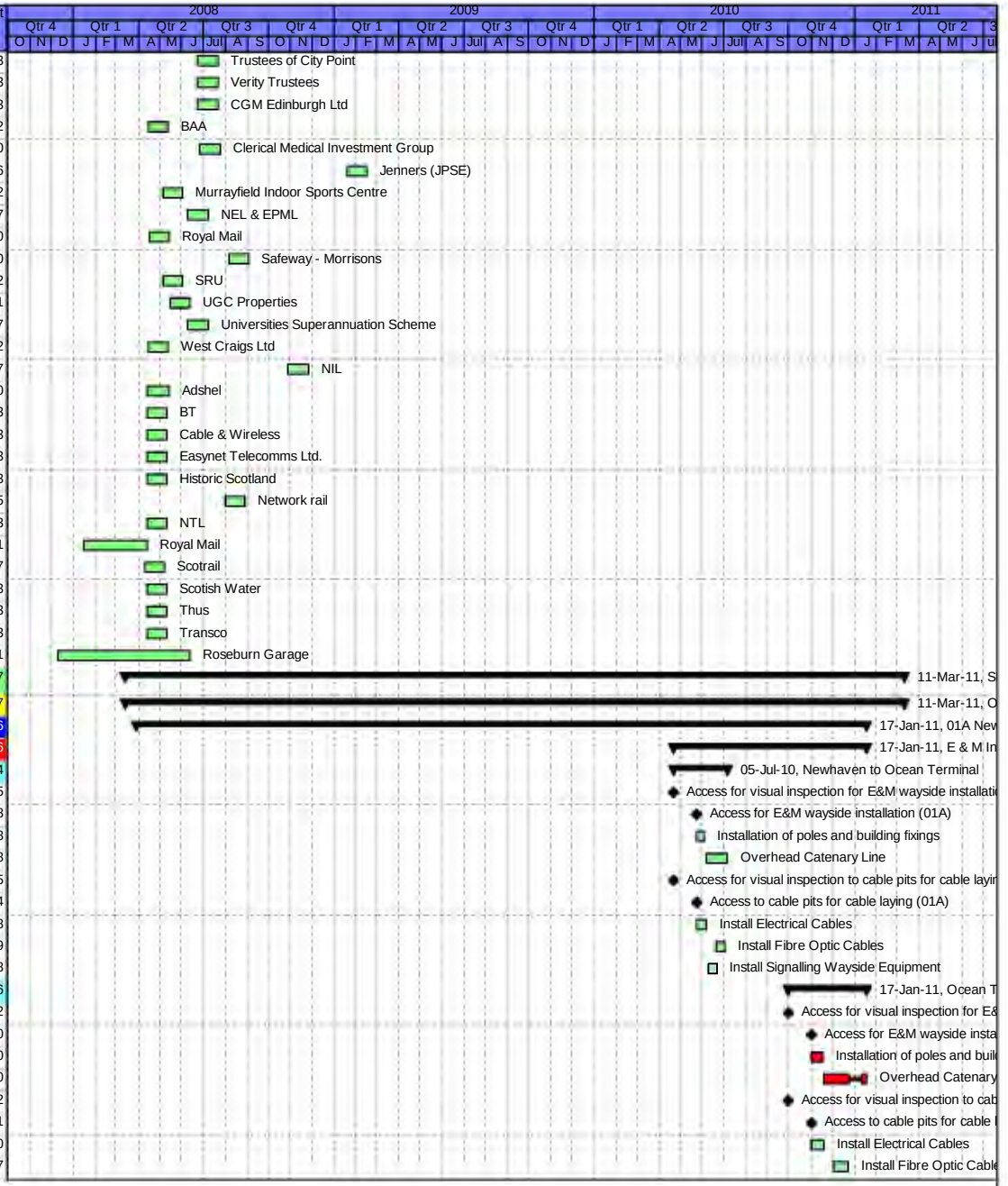
29-Apr-08	Contract Programme 29 April 2008	SCS	

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A14260	Trustees of City Point	28	23-Jun-08	22-Jul-08	1083
A14270	Verity Trustees	28	23-Jun-08	22-Jul-08	1083
A14280	CGM Edinburgh Ltd	28	23-Jun-08	22-Jul-08	1083
A14350	BAA	28	15-Apr-08	13-May-08	1152
A14360	Clerical Medical Investment Group	28	26-Jun-08	25-Jul-08	1080
A14370	Jenners (JPSE)	28	19-Jan-09	16-Feb-09	876
A14380	Murrayfield Indoor Sports Centre	28	05-May-(	02-Jun-08	1132
A14390	NEL & EPML	28	09-Jun-08	08-Jul-08	1097
A14400	Royal Mail	28	17-Apr-08	15-May-08	1150
A14410	Safeway - Morrisons	28	06-Aug-08	02-Sep-08	1040
A14420	SRU	28	05-May-(	02-Jun-08	1132
A14430	UGC Properties	28	16-May-(	13-Jun-08	1121
A14440	Universities Superannuation Scheme	28	09-Jun-08	08-Jul-08	1097
A14450	West Craigs Ltd	28	15-Apr-08	13-May-08	1152
A14470	NIL	28	28-Oct-08	25-Nov-08	957
A14500	Adshel	31	14-Apr-08	14-May-08	1150
A14510	BT	28	14-Apr-08	11-May-08	1153
A14520	Cable & Wireless	28	14-Apr-08	11-May-08	1153
A14530	Easynet Telecomms Ltd.	28	14-Apr-08	11-May-08	1153
A14540	Historic Scotland	28	14-Apr-08	11-May-08	1153
A14550	Network rail	28	01-Aug-08	28-Aug-08	1045
A14560	NTL	28	14-Apr-08	11-May-08	1153
A14570	Royal Mail	90	15-Jan-08	14-Apr-08	1181
A14580	Scotrail	28	10-Apr-08	08-May-08	1157
A14590	Scotish Water	28	14-Apr-08	11-May-08	1153
A14600	Thus	28	14-Apr-08	11-May-08	1153
A14610	Transco	28	14-Apr-08	11-May-08	1153
A14620	Roseburn Garage	184	10-Dec-07	13-Jun-08	1121
SECTION 01 NEWHAVEN ROAD TO HAYMARKET		735	14-Mar-08	11-Mar-11	87
Opening Sequence B (Haymarket to Newhaven Road)		735	14-Mar-08	11-Mar-11	87
01A Newhaven Road (inc.) to Foot of the Walk (exc.)		687	28-Mar-08	17-Jan-11	126
E & M Installations		179	21-Apr-10	17-Jan-11	126
Newhaven to Ocean Terminal		51	21-Apr-10	05-Jul-10	254
A16990	Access for visual inspection for E&M wayside installa	0	21-Apr-10		305
A17000	Access for E&M wayside installation (01A)	0	24-May-:		138
A17010	Installation of poles and building fixings	9	24-May-:	04-Jun-10	8
A17020	Overhead Catenary Line	21	07-Jun-10	05-Jul-10	8
A17030	Access for visual inspection to cable pits for cable la	0	21-Apr-10		305
A17040	Access to cable pits for cable laying (01A)	0	24-May-:		284
A17050	Install Electrical Cables	10	24-May-:	07-Jun-10	138
A17060	Install Fibre Optic Cables	10	21-Jun-10	02-Jul-10	129
A17070	Install Signalling Wayside Equipment	10	08-Jun-10	21-Jun-10	138
Ocean Terminal to Foot of the Walk		66	30-Sep-10	17-Jan-11	126
A3883	Access for visual inspection for E&M wayside installa	0	30-Sep-10		192
A3884	Access for E&M wayside installation (01A)	0	01-Nov-10		10
A3885	Installation of poles and building fixings	13	01-Nov-10	17-Nov-10	0
A3890	Overhead Catenary Line	32	18-Nov-10	17-Jan-11	0
A3898	Access for visual inspection to cable pits for cable la	0	30-Sep-10		192
A3899	Access to cable pits for cable laying (01A)	0	01-Nov-10		171
A3900	Install Electrical Cables	15	01-Nov-10	19-Nov-10	10
A3910	Install Fibre Optic Cables	15	03-Dec-10	23-Dec-10	7



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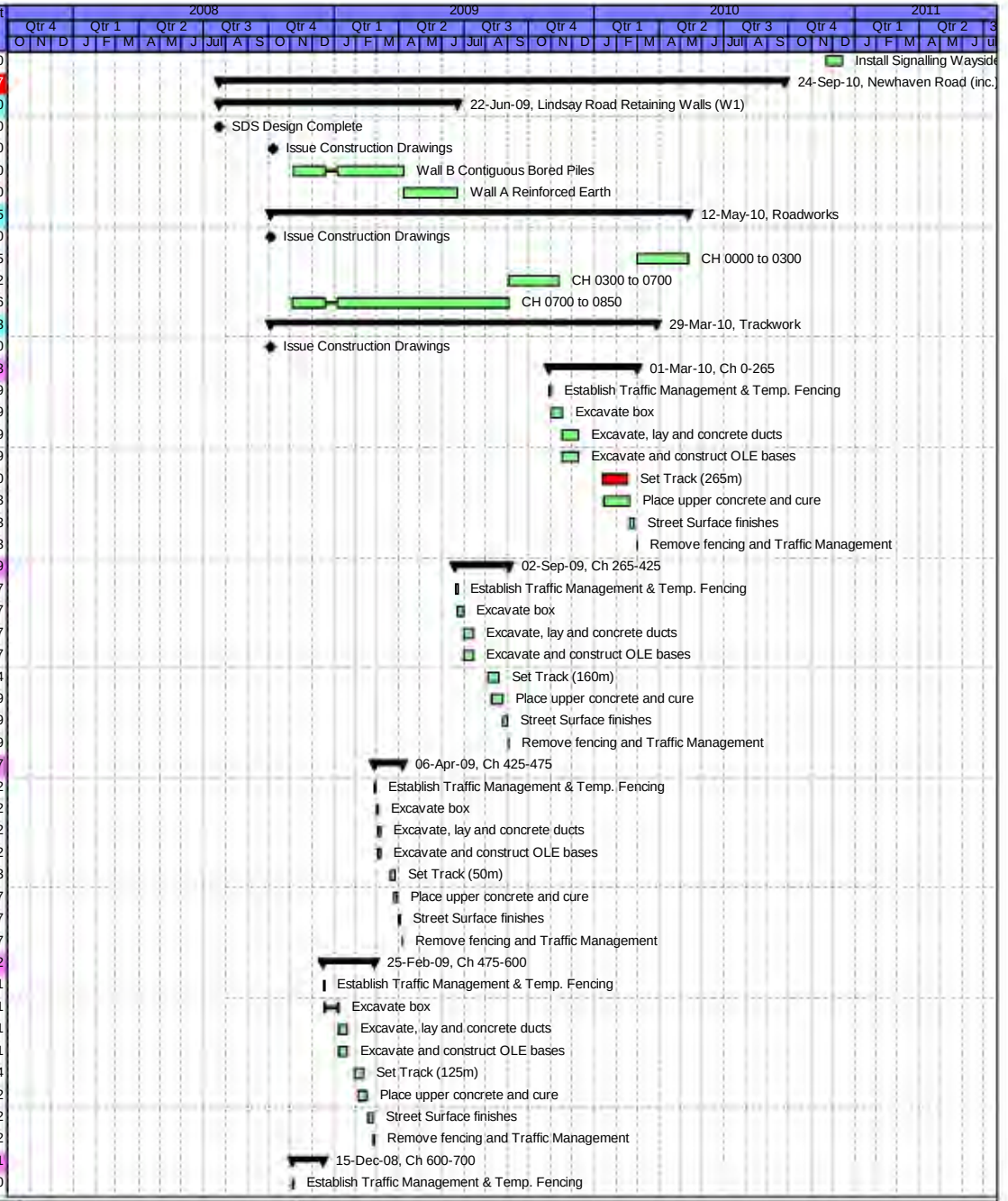
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A3920	Install Signalling Wayside Equipment	15	22-Nov-10	13-Dec-10	10
Newhaven Road (inc.) to Ocean Terminal (exc.)		535	23-Jul-08	24-Sep-10	197
Lindsay Road Retaining Walls (W1)		223	23-Jul-08	22-Jun-09	180
11999	SDS Design Complete	0		23-Jul-08*	0
12000	Issue Construction Drawings	0		07-Oct-08*	0
5	Wall B Contiguous Bored Piles	100	05-Nov-08	08-Apr-09	180
A1710	Wall A Reinforced Earth	50	09-Apr-09	22-Jun-09	180
Roadworks		390	03-Oct-08	12-May-10	165
11970	Issue Construction Drawings	0		03-Oct-08*	0
A1090	CH 0000 to 0300	50	02-Mar-10	12-May-10	165
A1100	CH 0300 to 0700	50	03-Sep-09	11-Nov-09	282
A1110	CH 0700 to 0850	203	03-Nov-08	02-Sep-09	156
Trackwork		360	03-Oct-08	29-Mar-10	53
11980	Issue Construction Drawings	0		03-Oct-08*	0
Ch 0-265		77	29-Oct-09	01-Mar-10	73
A15970	Establish Traffic Management & Temp. Fencing	2	29-Oct-09	02-Nov-09	89
A15980	Excavate box	11	02-Nov-09	17-Nov-09	89
A15990	Excavate, lay and concrete ducts	16	17-Nov-09	10-Dec-09	89
A16000	Excavate and construct OLE bases	16	17-Nov-09	10-Dec-09	89
A16010	Set Track (265m)	25	12-Jan-10	15-Feb-10	0
A16020	Place upper concrete and cure	25	15-Jan-10	18-Feb-10	73
A16030	Street Surface finishes	6	19-Feb-10	26-Feb-10	73
A16040	Remove fencing and Traffic Management	1	01-Mar-10	01-Mar-10	73
Ch 265-425		53	19-Jun-09	02-Sep-09	129
A15890	Establish Traffic Management & Temp. Fencing	2	19-Jun-09	23-Jun-09	147
A15900	Excavate box	6	23-Jun-09	01-Jul-09	147
A15910	Excavate, lay and concrete ducts	9	01-Jul-09	14-Jul-09	147
A15920	Excavate and construct OLE bases	9	01-Jul-09	14-Jul-09	147
A15930	Set Track (160m)	11	05-Aug-09	19-Aug-09	4
A15940	Place upper concrete and cure	11	10-Aug-09	24-Aug-09	129
A15950	Street Surface finishes	6	25-Aug-09	01-Sep-09	129
A15960	Remove fencing and Traffic Management	1	02-Sep-09	02-Sep-09	129
Ch 425-475		28	26-Feb-09	06-Apr-09	197
A15810	Establish Traffic Management & Temp. Fencing	2	26-Feb-09	27-Feb-09	12
A15820	Excavate box	2	02-Mar-09	03-Mar-09	12
A15830	Excavate, lay and concrete ducts	3	04-Mar-09	06-Mar-09	12
A15840	Excavate and construct OLE bases	3	04-Mar-09	06-Mar-09	12
A15850	Set Track (50m)	5	20-Mar-09	26-Mar-09	3
A15860	Place upper concrete and cure	5	25-Mar-09	31-Mar-09	197
A15870	Street Surface finishes	3	01-Apr-09	03-Apr-09	197
A15880	Remove fencing and Traffic Management	1	06-Apr-09	06-Apr-09	197
Ch 475-600		42	16-Dec-08	25-Feb-09	12
A15730	Establish Traffic Management & Temp. Fencing	2	16-Dec-08	17-Dec-08	11
A15740	Excavate box	5	18-Dec-08	07-Jan-09	11
A15750	Excavate, lay and concrete ducts	8	08-Jan-09	19-Jan-09	11
A15760	Excavate and construct OLE bases	8	08-Jan-09	19-Jan-09	11
A15770	Set Track (125m)	10	29-Jan-09	11-Feb-09	4
A15780	Place upper concrete and cure	10	03-Feb-09	16-Feb-09	12
A15790	Street Surface finishes	6	17-Feb-09	24-Feb-09	12
A15800	Remove fencing and Traffic Management	1	25-Feb-09	25-Feb-09	12
Ch 600-700		30	03-Nov-08	15-Dec-08	11
A15650	Establish Traffic Management & Temp. Fencing	2	03-Nov-08	04-Nov-08	0



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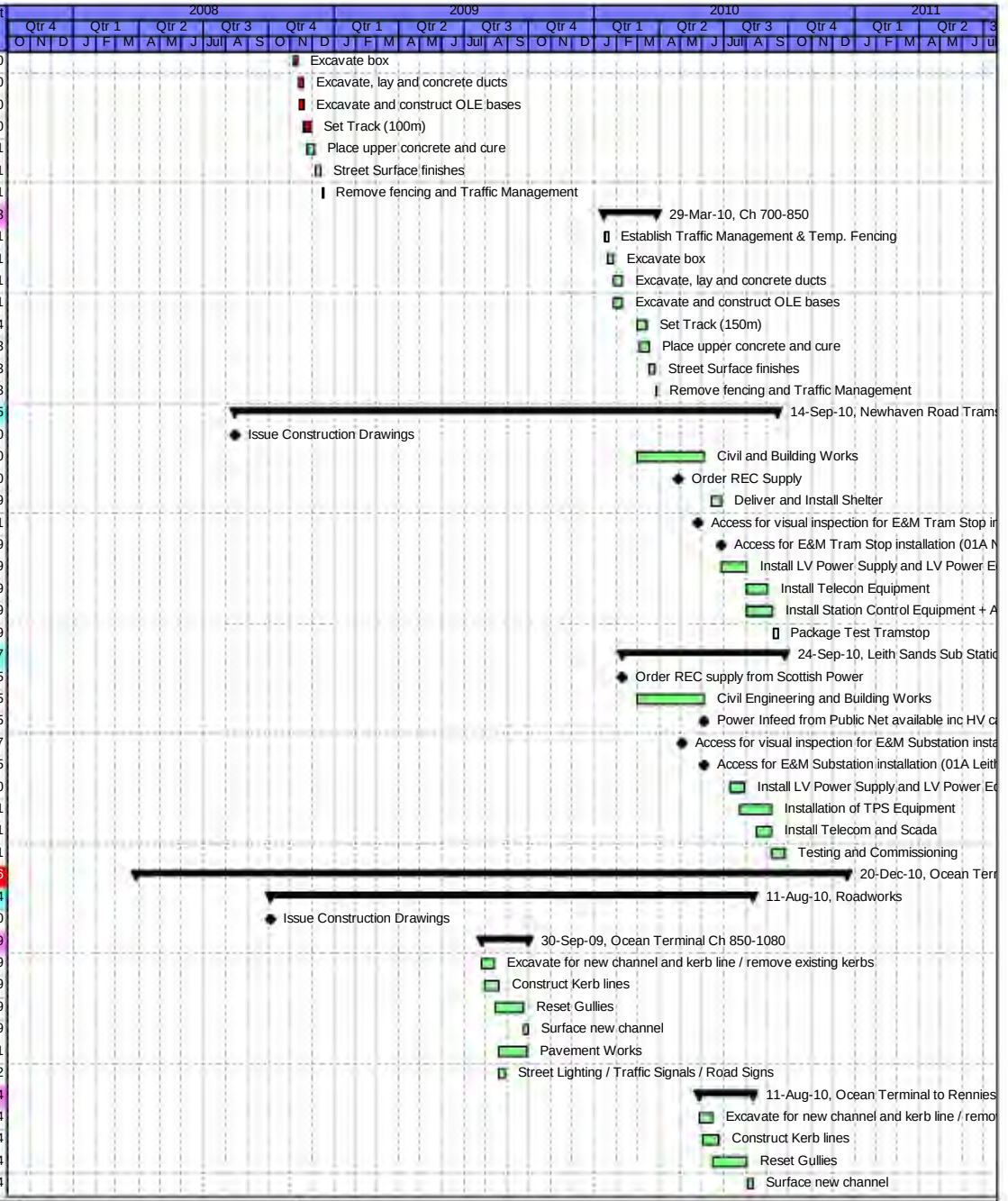
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A15660	Excavate box	4	05-Nov-08	10-Nov-08	0
A15670	Excavate, lay and concrete ducts	6	11-Nov-08	18-Nov-08	0
A15680	Excavate and construct OLE bases	6	11-Nov-08	18-Nov-08	0
A15690	Set Track (100m)	8	19-Nov-08	28-Nov-08	0
A15700	Place upper concrete and cure	8	24-Nov-08	04-Dec-08	11
A15710	Street Surface finishes	6	05-Dec-08	12-Dec-08	11
A15720	Remove fencing and Traffic Management	1	15-Dec-08	15-Dec-08	11
Ch 700-850		52	15-Jan-10	29-Mar-10	53
A15570	Establish Traffic Management & Temp. Fencing	2	15-Jan-10	19-Jan-10	71
A15580	Excavate box	6	19-Jan-10	27-Jan-10	71
A15590	Excavate, lay and concrete ducts	9	27-Jan-10	09-Feb-10	71
A15600	Excavate and construct OLE bases	9	27-Jan-10	09-Feb-10	71
A15610	Set Track (150m)	10	02-Mar-10	15-Mar-10	4
A15620	Place upper concrete and cure	10	05-Mar-10	18-Mar-10	53
A15630	Street Surface finishes	6	19-Mar-10	26-Mar-10	53
A15640	Remove fencing and Traffic Management	1	29-Mar-10	29-Mar-10	53
Newhaven Road Tramstop		512	14-Aug-08	14-Sep-10	205
11990	Issue Construction Drawings	0		14-Aug-08*	0
8	Civil and Building Works	65	02-Mar-10	03-Jun-10	110
98	Order REC Supply	0	29-Apr-10		300
A1680	Deliver and Install Shelter	10	14-Jun-10	28-Jun-10	79
A4288	Access for visual inspection for E&M Tram Stop inst	0	26-May-:		281
A4289	Access for E&M Tram Stop installation (01A Newha	0	28-Jun-10		79
A4290	Install LV Power Supply and LV Power Equipment	25	28-Jun-10	03-Aug-10	79
A4300	Install Telecon Equipment	20	03-Aug-10	31-Aug-10	89
A4310	Install Station Control Equipment + AFC Equipment	25	03-Aug-10	07-Sep-10	79
A4315	Package Test Tramstop	5	07-Sep-10	14-Sep-10	79
Leith Sands Sub Station		159	09-Feb-10	24-Sep-10	197
36	Order REC supply from Scottish Power	0	09-Feb-10		135
6	Civil Engineering and Building Works	65	02-Mar-10	03-Jun-10	135
A5480	Power Infeed from Public Net available inc HV cable	0	04-Jun-10		135
A5483	Access for visual inspection for E&M Substation insta	0	04-May-:		297
A5484	Access for E&M Substation installation (01A Leith Sa	0	04-Jun-10		135
A5490	Install LV Power Supply and LV Power Equipment	15	09-Jul-10	30-Jul-10	110
A5500	Installation of TPS Equipment	30	23-Jul-10	06-Sep-10	71
A5510	Install Telecom and Scada	15	16-Aug-10	06-Sep-10	71
A5520	Testing and Commissioning	14	06-Sep-10	24-Sep-10	71
Ocean Terminal (inc.) to Port of Leith (exc.)		677	28-Mar-08	20-Dec-10	136
Roadworks		453	03-Oct-08	11-Aug-10	64
12010	Issue Construction Drawings	0		03-Oct-08*	0
Ocean Terminal Ch 850-1080		47	27-Jul-09	30-Sep-09	169
A15510	Excavate for new channel and kerb line / remove ex	12	27-Jul-09	12-Aug-09	169
A15520	Construct Kerb lines	14	30-Jul-09	19-Aug-09	169
A15530	Reset Gullies	28	14-Aug-09	22-Sep-09	169
A15540	Surface new channel	6	23-Sep-09	30-Sep-09	169
A15550	Pavement Works	28	20-Aug-09	28-Sep-09	171
A15560	Street Lighting / Traffic Signals / Road Signs	7	20-Aug-09	28-Aug-09	192
Ocean Terminal to Rennies Isle Ch 1080-1410		53	27-May-:	11-Aug-10	64
A15450	Excavate for new channel and kerb line / remove ex	14	27-May-:	16-Jun-10	64
A15460	Construct Kerb lines	17	02-Jun-10	24-Jun-10	64
A15470	Reset Gullies	34	16-Jun-10	03-Aug-10	64
A15480	Surface new channel	6	04-Aug-10	11-Aug-10	64



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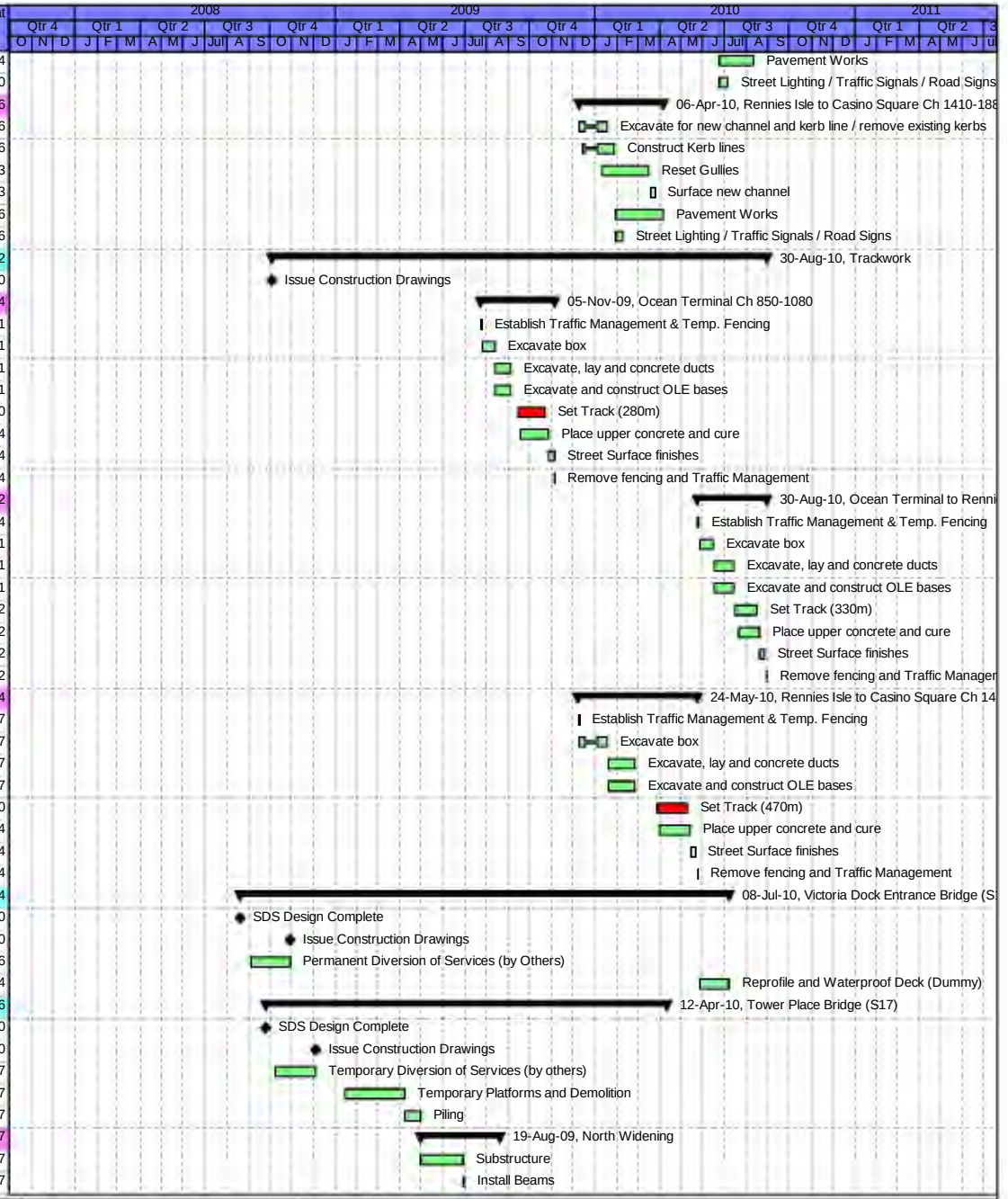
A15490	Pavement Works	33	25-Jun-10	11-Aug-10	64
A15500	Street Lighting / Traffic Signals / Road Signs	7	25-Jun-10	05-Jul-10	90
Rennies Isle to Casino Square Ch 1410-1880		74	09-Dec-09	06-Apr-10	96
A15390	Excavate for new channel and kerb line / remove e	19	09-Dec-09	18-Jan-10	96
A15400	Construct Kerb lines	24	14-Dec-09	28-Jan-10	96
A15410	Reset Gullies	48	11-Jan-10	17-Mar-10	103
A15420	Surface new channel	6	18-Mar-10	25-Mar-10	103
A15430	Pavement Works	47	29-Jan-10	06-Apr-10	96
A15440	Street Lighting / Traffic Signals / Road Signs	7	29-Jan-10	08-Feb-10	136
Trackwork		466	03-Oct-08	30-Aug-10	52
12020	Issue Construction Drawings	0		03-Oct-08*	0
Ocean Terminal Ch 850-1080		75	23-Jul-09	05-Nov-09	144
A15310	Establish Traffic Management & Temp. Fencing	2	23-Jul-09	24-Jul-09	21
A15320	Excavate box	12	27-Jul-09	12-Aug-09	21
A15330	Excavate, lay and concrete ducts	17	13-Aug-09	04-Sep-09	21
A15340	Excavate and construct OLE bases	17	13-Aug-09	04-Sep-09	21
A15350	Set Track (280m)	28	15-Sep-09	22-Oct-09	0
A15360	Place upper concrete and cure	28	18-Sep-09	27-Oct-09	144
A15370	Street Surface finishes	6	28-Oct-09	04-Nov-09	144
A15380	Remove fencing and Traffic Management	1	05-Nov-09	05-Nov-09	144
Ocean Terminal to Rennies Isle Ch 1080-1410		68	25-May-:	30-Aug-10	52
A15230	Establish Traffic Management & Temp. Fencing	2	25-May-:	26-May-10	64
A15240	Excavate box	14	27-May-:	16-Jun-10	71
A15250	Excavate, lay and concrete ducts	20	17-Jun-10	14-Jul-10	71
A15260	Excavate and construct OLE bases	20	17-Jun-10	14-Jul-10	71
A15270	Set Track (330m)	21	16-Jul-10	16-Aug-10	52
A15280	Place upper concrete and cure	21	21-Jul-10	19-Aug-10	52
A15290	Street Surface finishes	6	20-Aug-10	27-Aug-10	52
A15300	Remove fencing and Traffic Management	1	30-Aug-10	30-Aug-10	52
Rennies Isle to Casino Square Ch 1410-1880		109	07-Dec-09	24-May-10	64
A15150	Establish Traffic Management & Temp. Fencing	2	07-Dec-09	08-Dec-09	47
A15160	Excavate box	19	09-Dec-09	18-Jan-10	47
A15170	Excavate, lay and concrete ducts	28	19-Jan-10	25-Feb-10	47
A15180	Excavate and construct OLE bases	28	19-Jan-10	25-Feb-10	47
A15190	Set Track (470m)	29	29-Mar-10	10-May-10	0
A15200	Place upper concrete and cure	29	01-Apr-10	13-May-10	64
A15210	Street Surface finishes	6	14-May-:	21-May-10	64
A15220	Remove fencing and Traffic Management	1	24-May-:	24-May-10	64
Victoria Dock Entrance Bridge (S16)		463	19-Aug-08	08-Jul-10	74
12029	SDS Design Complete	0		19-Aug-08*	0
12030	Issue Construction Drawings	0		29-Oct-08*	0
12330	Permanent Diversion of Services (by Others)	40	04-Sep-08	29-Oct-08	456
131	Reprofile and Waterproof Deck (Dummy)	30	27-May-:	08-Jul-10	74
Tower Place Bridge (S17)		376	24-Sep-08	12-Apr-10	186
12039	SDS Design Complete	0		24-Sep-08*	0
12040	Issue Construction Drawings	0		03-Dec-08*	0
A16050	Temporary Diversion of Services (by others)	40	08-Oct-08	03-Dec-08	67
A16060	Temporary Platforms and Demolition	60	15-Jan-09	08-Apr-09	47
A1770	Piling	15	09-Apr-09	30-Apr-09	47
North Widening		76	01-May-(	19-Aug-09	47
A101	Substructure	40	01-May-(	29-Jun-09	47
A11	Install Beams	1	30-Jun-09	30-Jun-09	47



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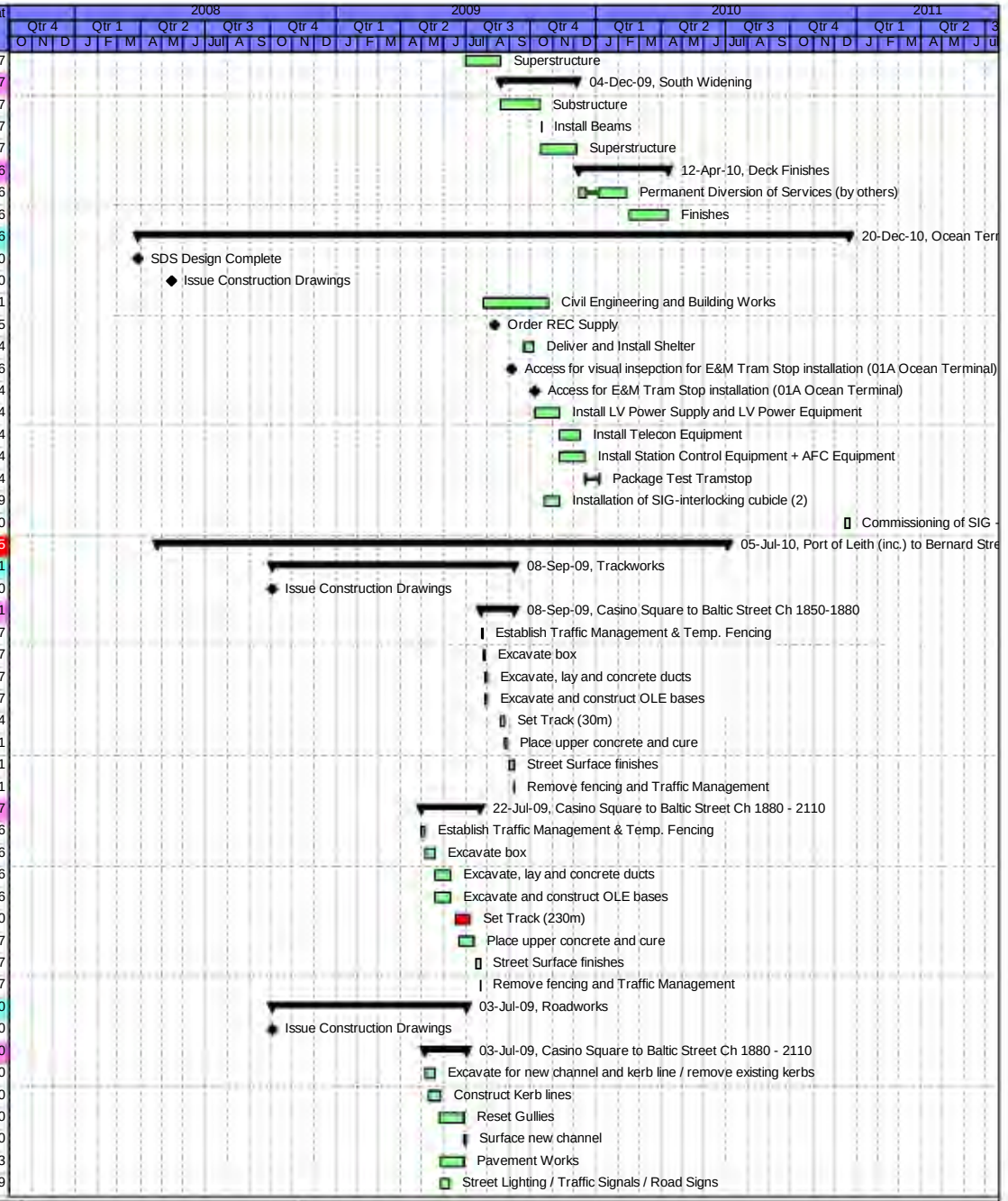
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A16070	Superstructure	35	01-Jul-09	19-Aug-09	47
South Widening		76	20-Aug-09	04-Dec-09	47
A16080	Substructure	40	20-Aug-09	14-Oct-09	47
A1760	Install Beams	1	15-Oct-09	15-Oct-09	47
A31	Superstructure	35	16-Oct-09	04-Dec-09	47
Deck Finishes		80	07-Dec-09	12-Apr-10	186
A16090	Permanent Diversion of Services (by others)	40	07-Dec-09	12-Feb-10	186
A16100	Finishes	40	15-Feb-10	12-Apr-10	186
Ocean Terminal Tram Stop		677	28-Mar-08	20-Dec-10	136
12049	SDS Design Complete	0		28-Mar-08*	0
12050	Issue Construction Drawings	0		14-May-08*	0
14	Civil Engineering and Building Works	65	27-Jul-09	26-Oct-09	151
178	Order REC Supply	0	11-Aug-09		475
A1720	Deliver and Install Shelter	10	22-Sep-09	05-Oct-09	254
A4318	Access for visual insepction for E&M Tram Stop inst	0	04-Sep-09		456
A4319	Access for E&M Tram Stop installation (01A Ocean	0	06-Oct-09		254
A4320	Install LV Power Supply and LV Power Equipment	25	06-Oct-09	09-Nov-09	254
A4330	Install Telecon Equipment	20	10-Nov-09	08-Dec-09	264
A4340	Install Station Control Equipment + AFC Equipment	25	10-Nov-09	15-Dec-09	254
A4350	Package Test Tramstop	5	16-Dec-09	05-Jan-10	254
A6090	Installation of SIG-interlocking cubicle (2)	15	20-Oct-09	09-Nov-09	279
A6100	Commissioning of SIG -interlocking cubicle	5	14-Dec-10	20-Dec-10	10
Port of Leith (inc.) to Bernard Street (exc.)		538	25-Apr-08	05-Jul-10	255
Trackworks		227	03-Oct-08	08-Sep-09	291
12060	Issue Construction Drawings	0		03-Oct-08*	0
Casino Square to Baltic Street Ch 1850-1880		33	23-Jul-09	08-Sep-09	291
A16110	Establish Traffic Management & Temp. Fencing	2	23-Jul-09	24-Jul-09	17
A16120	Excavate box	2	27-Jul-09	28-Jul-09	17
A16130	Excavate, lay and concrete ducts	3	29-Jul-09	31-Jul-09	17
A16140	Excavate and construct OLE bases	3	29-Jul-09	31-Jul-09	17
A16150	Set Track (30m)	4	20-Aug-09	25-Aug-09	4
A16160	Place upper concrete and cure	4	25-Aug-09	28-Aug-09	291
A16170	Street Surface finishes	6	31-Aug-09	07-Sep-09	291
A16180	Remove fencing and Traffic Management	1	08-Sep-09	08-Sep-09	291
Casino Square to Baltic Street Ch 1880 - 2110		57	01-May-(	22-Jul-09	17
A15010	Establish Traffic Management & Temp. Fencing	2	01-May-(	06-May-09	26
A15020	Excavate box	10	06-May-(	20-May-09	26
A15030	Excavate, lay and concrete ducts	14	20-May-(	10-Jun-09	26
A15040	Excavate and construct OLE bases	14	20-May-(	10-Jun-09	26
A15050	Set Track (230m)	15	18-Jun-09	08-Jul-09	0
A15060	Place upper concrete and cure	15	23-Jun-09	13-Jul-09	17
A15070	Street Surface finishes	6	14-Jul-09	21-Jul-09	17
A15080	Remove fencing and Traffic Management	1	22-Jul-09	22-Jul-09	17
Roadworks		180	03-Oct-08	03-Jul-09	30
12070	Issue Construction Drawings	0		03-Oct-08*	0
Casino Square to Baltic Street Ch 1880 - 2110		41	06-May-(	03-Jul-09	30
A15090	Excavate for new channel and kerb line / remove e>	10	06-May-(	20-May-09	30
A15100	Construct Kerb lines	12	11-May-(	28-May-09	30
A15110	Reset Gullies	24	26-May-(	29-Jun-09	30
A15120	Surface new channel	4	29-Jun-09	03-Jul-09	30
A15130	Pavement Works	23	28-May-(	30-Jun-09	33
A15140	Street Lighting / Traffic Signals / Road Signs	7	28-May-(	08-Jun-09	49



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Port of Leith Tram Stop		538	25-Apr-08	05-Jul-10	255
12080	Issue Construction Drawings	0		25-Apr-08*	0
17	Civil Engineering and Building Works	65	09-Dec-09	23-Mar-10	105
188	Order REC Supply	0	17-Feb-10		350
A1800	Deliver and Install Shelter	10	31-Mar-10	15-Apr-10	129
A4358	Access for visual inspection for E&M Tram Stop inst	0	16-Mar-10		348
A4359	Access for E&M Tram Stop installation (01A Ocean	0	15-Apr-10		132
A4360	Install LV Power Supply and LV Power Equipment	25	15-Apr-10	21-May-10	129
A4370	Install Telecon Equipment	20	21-May-:	21-Jun-10	139
A4380	Install Station Control Equipment + AFC Equipment	25	21-May-:	28-Jun-10	129
A4390	Package Test Tramstop	5	28-Jun-10	05-Jul-10	129
Bernard Street (inc.) to Foot of the Walk (exc.)		661	25-Apr-08	24-Dec-10	132
Bernard Street Tram Stop		661	25-Apr-08	24-Dec-10	132
12090	Issue Construction Drawings	0		25-Apr-08*	0
198	Order REC Supply	0	13-Aug-10		227
20	Civil Engineering And Building Works	65	15-Jun-10	14-Sep-10	6
A1850	Deliver and Install Shelter	10	24-Sep-10	07-Oct-10	6
A4398	Access for visual insepction for E&M Tram Stop inst	0	08-Sep-10		223
A4399	Access for E&M Tram Stop installation (01A Constit	0	08-Oct-10		201
A4400	Install LV Power Supply and LV Power Equipment	25	08-Oct-10	11-Nov-10	6
A4410	Install Telecon Equipment	20	12-Nov-10	10-Dec-10	16
A4420	Install Station Control Equipment + AFC Equipment	25	12-Nov-10	17-Dec-10	6
A4430	Package Test Tramstop	5	20-Dec-10	24-Dec-10	6
Trackworks		478	03-Oct-08	15-Sep-10	40
12100	Issue Construction Drawings	0		03-Oct-08*	0
Baltic to Queen Charlotte Ch 2110-2340		68	11-Jun-10	15-Sep-10	40
A14870	Establish Traffic Management & Temp. Fencing	2	11-Jun-10	14-Jun-10	6
A14880	Excavate box	10	15-Jun-10	28-Jun-10	33
A14890	Excavate, lay and concrete ducts	14	29-Jun-10	16-Jul-10	33
A14900	Excavate and construct OLE bases	14	29-Jun-10	16-Jul-10	33
A14910	Set Track (230m)	15	01-Jul-10	21-Jul-10	33
A14920	Place upper concrete and cure	15	06-Jul-10	26-Jul-10	69
A14930	Street Surface finishes	6	27-Jul-10	04-Aug-10	69
A14940	Remove fencing and Traffic Management	1	15-Sep-10	15-Sep-10	40
Queen Charlotte to Foot/Walk Ch 2340-2730		87	05-Feb-10	10-Jun-10	6
A14630	Establish Traffic Management & Temp. Fencing	2	05-Feb-10	09-Feb-10	19
A14640	Excavate box	16	09-Feb-10	03-Mar-10	19
A14650	Excavate, lay and concrete ducts	24	03-Mar-10	07-Apr-10	19
A14660	Excavate and construct OLE bases	24	03-Mar-10	07-Apr-10	19
A14680	Set Track (390m)	25	21-Apr-10	26-May-10	6
A14690	Place upper concrete and cure	25	26-Apr-10	01-Jun-10	6
A14700	Street Surface finishes	6	02-Jun-10	09-Jun-10	6
A14710	Remove fencing and Traffic Management	1	10-Jun-10	10-Jun-10	6
Roadworks		453	03-Oct-08	11-Aug-10	64
12110	Issue Construction Drawings	0		03-Oct-08*	0
Baltic to Queen Charlotte Ch 2110-2340		41	15-Jun-10	11-Aug-10	64
A14950	Excavate for new channel and kerb line / remove ex	10	15-Jun-10	28-Jun-10	64
A14960	Construct Kerb lines	12	18-Jun-10	05-Jul-10	64
A14970	Reset Gullies	24	02-Jul-10	05-Aug-10	64
A14980	Surface new channel	4	06-Aug-10	11-Aug-10	64
A14990	Pavement Works	23	06-Jul-10	06-Aug-10	67
A15000	Street Lighting / Traffic Signals / Road Signs	7	06-Jul-10	14-Jul-10	83



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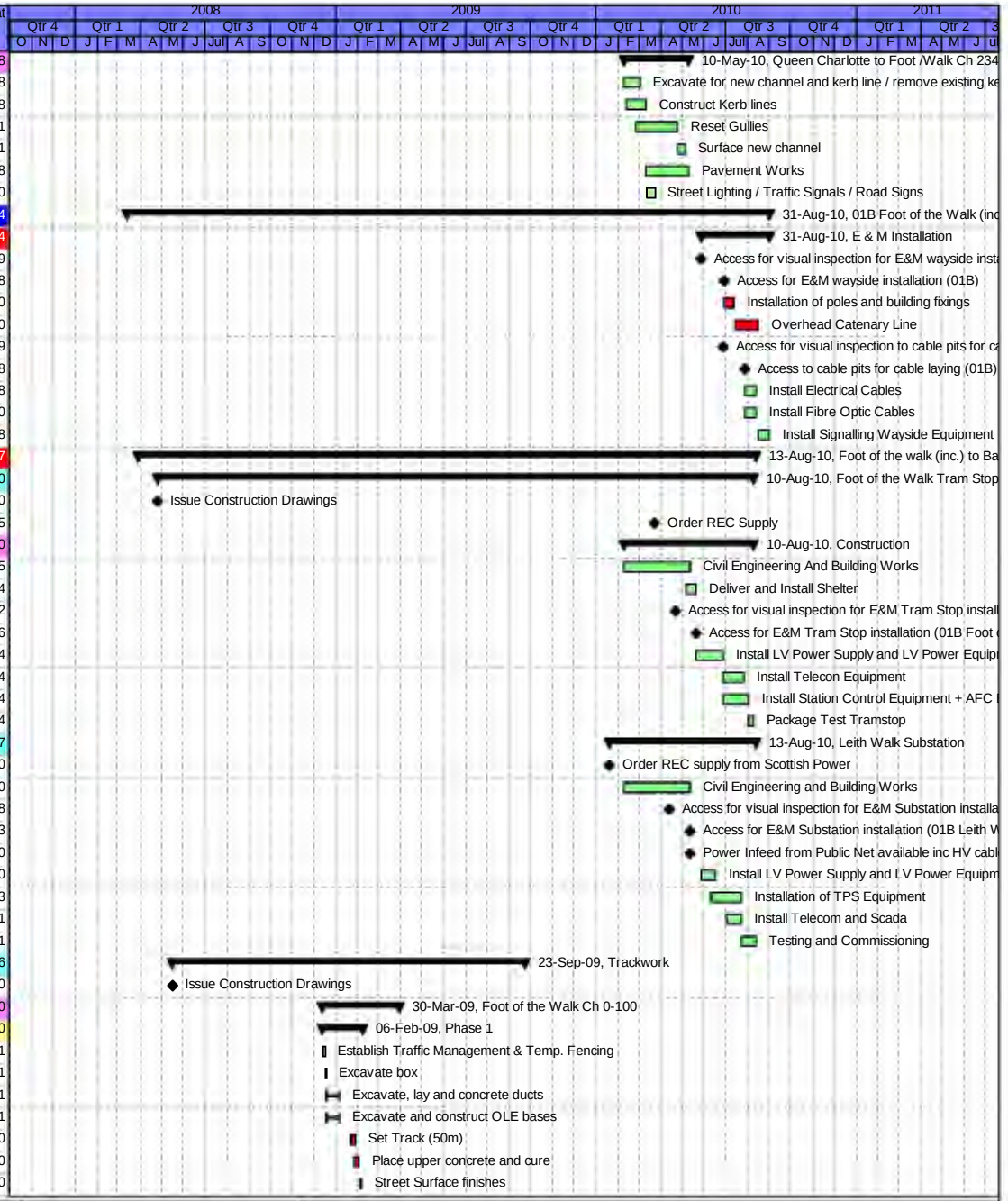
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
Queen Charlotte to Foot /Walk Ch 2340-2730		62	09-Feb-10	10-May-10	28
A14810	Excavate for new channel and kerb line / remove ex	16	09-Feb-10	03-Mar-10	28
A14820	Construct Kerb lines	20	12-Feb-10	12-Mar-10	28
A14830	Reset Gullies	40	26-Feb-10	26-Apr-10	31
A14840	Surface new channel	6	26-Apr-10	05-May-10	31
A14850	Pavement Works	39	12-Mar-10	10-May-10	28
A14860	Street Lighting / Traffic Signals / Road Signs	7	12-Mar-10	23-Mar-10	60
01B Foot of the Walk (inc.) to McDonald Road (exc.)		608	14-Mar-08	31-Aug-10	214
E & M Installation		65	28-May-:	31-Aug-10	214
A3763	Access for visual inspection for E&M wayside installa	0	28-May-:		279
A3764	Access for E&M wayside installation (01B)	0	30-Jun-10		258
A3765	Installation of poles and building fixings	10	30-Jun-10	13-Jul-10	0
A3770	Overhead Catenary Line	23	14-Jul-10	16-Aug-10	0
A3778	Access for visual inspection to cable pits for cable la	0	28-Jun-10		259
A3779	Access to cable pits for cable laying (01B)	0	28-Jul-10		238
A3780	Install Electrical Cables	12	28-Jul-10	13-Aug-10	88
A3790	Install Fibre Optic Cables	12	28-Jul-10	13-Aug-10	100
A3800	Install Signalling Wayside Equipment	12	16-Aug-10	31-Aug-10	88
Foot of the walk (inc.) to Balfour Street (exc.)		586	28-Mar-08	13-Aug-10	227
Foot of the Walk Tram Stop		563	25-Apr-08	10-Aug-10	230
12120	Issue Construction Drawings	0		25-Apr-08*	0
528	Order REC Supply	0	24-Mar-10		325
Construction		126	09-Feb-10	10-Aug-10	230
50	Civil Engineering And Building Works	65	09-Feb-10	13-May-10	125
A2560	Deliver and Install Shelter	10	07-May-:	21-May-10	104
A4438	Access for visual inspection for E&M Tram Stop inst	0	21-Apr-10		322
A4439	Access for E&M Tram Stop installation (01B Foot of	0	21-May-:		106
A4440	Install LV Power Supply and LV Power Equipment	25	21-May-:	28-Jun-10	104
A4450	Install Telecon Equipment	20	28-Jun-10	26-Jul-10	114
A4460	Install Station Control Equipment + AFC Equipment	25	28-Jun-10	03-Aug-10	104
A4470	Package Test Tramstop	5	03-Aug-10	10-Aug-10	104
Leith Walk Substation		144	19-Jan-10	13-Aug-10	227
146	Order REC supply from Scottish Power	0	19-Jan-10		150
176	Civil Engineering and Building Works	65	09-Feb-10	13-May-10	150
A2638	Access for visual inspection for E&M Substation insta	0	13-Apr-10		328
A2639	Access for E&M Substation installation (01B Leith W	0	13-May-:		153
A5530	Power Infeed from Public Net available inc HV cable	0	13-May-:		150
A5540	Install LV Power Supply and LV Power Equipment	15	27-May-:	18-Jun-10	140
A5550	Installation of TPS Equipment	30	11-Jun-10	23-Jul-10	93
A5560	Install Telecom and Scada	15	02-Jul-10	23-Jul-10	101
A5570	Testing and Commissioning	14	23-Jul-10	13-Aug-10	101
Trackwork		337	15-May-(	23-Sep-09	6
12130	Issue Construction Drawings	0		15-May-08*	0
Foot of the Walk Ch 0-100		67	12-Dec-08	30-Mar-09	0
Phase 1		31	12-Dec-08	06-Feb-09	0
A12450	Establish Traffic Management & Temp. Fencing	2	12-Dec-08	15-Dec-08	11
A12460	Excavate box	2	16-Dec-08	17-Dec-08	11
A12470	Excavate, lay and concrete ducts	3	18-Dec-08	05-Jan-09	11
A12480	Excavate and construct OLE bases	3	18-Dec-08	05-Jan-09	11
A12500	Set Track (50m)	6	21-Jan-09	28-Jan-09	0
A12510	Place upper concrete and cure	6	26-Jan-09	02-Feb-09	0
A12520	Street Surface finishes	3	03-Feb-09	05-Feb-09	0



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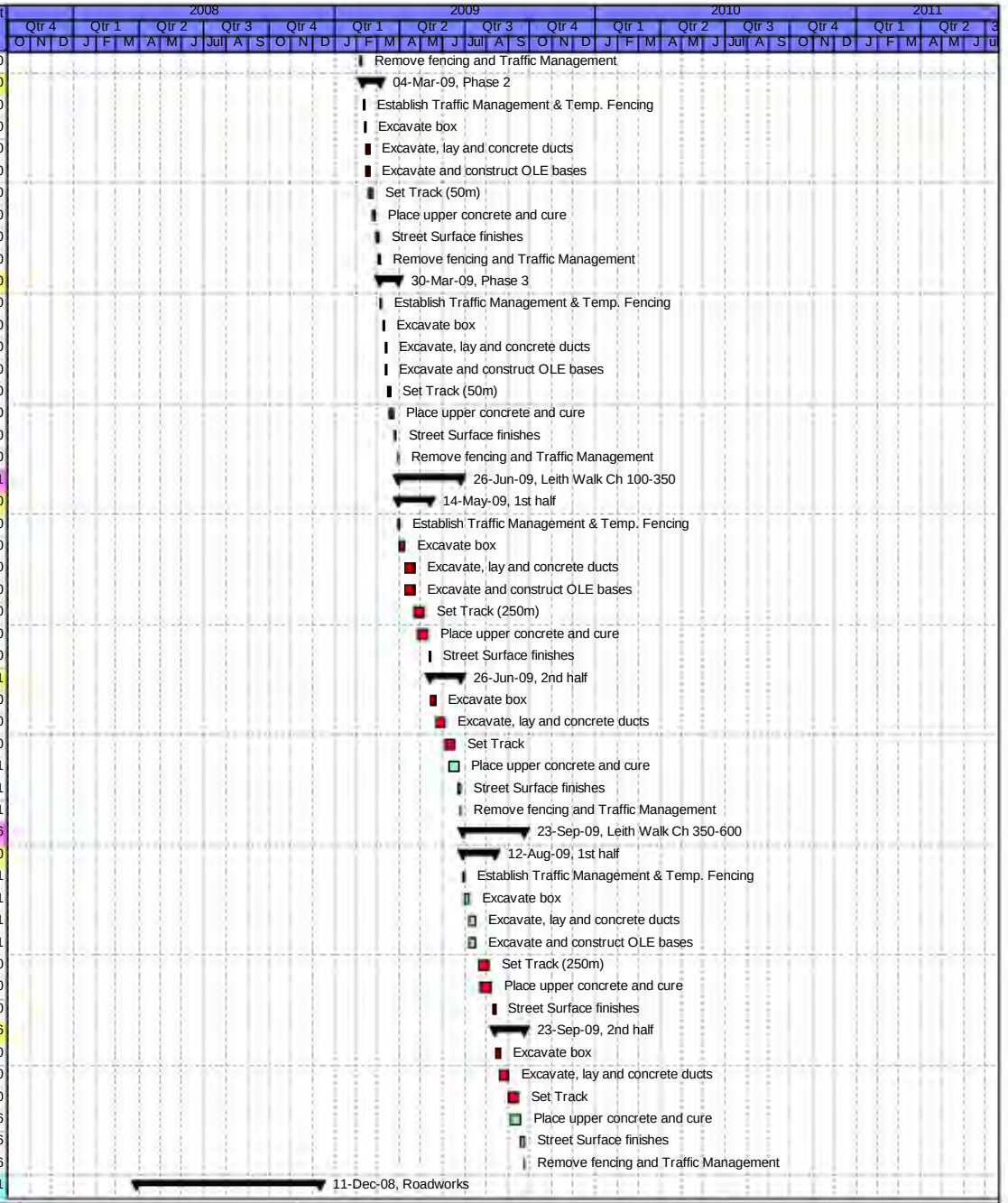
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A13510	Remove fencing and Traffic Management	1	06-Feb-09	06-Feb-09	0
Phase 2		18	09-Feb-09	04-Mar-09	0
A12530	Establish Traffic Management & Temp. Fencing	2	09-Feb-09	10-Feb-09	0
A12540	Excavate box	2	11-Feb-09	12-Feb-09	0
A12550	Excavate, lay and concrete ducts	3	13-Feb-09	17-Feb-09	0
A12560	Excavate and construct OLE bases	3	13-Feb-09	17-Feb-09	0
A12580	Set Track (50m)	4	18-Feb-09	23-Feb-09	0
A12590	Place upper concrete and cure	4	23-Feb-09	26-Feb-09	0
A12600	Street Surface finishes	3	27-Feb-09	03-Mar-09	0
A13500	Remove fencing and Traffic Management	1	04-Mar-09	04-Mar-09	0
Phase 3		18	05-Mar-09	30-Mar-09	0
A12610	Establish Traffic Management & Temp. Fencing	2	05-Mar-09	06-Mar-09	0
A12620	Excavate box	2	09-Mar-09	10-Mar-09	0
A12630	Excavate, lay and concrete ducts	3	11-Mar-09	13-Mar-09	0
A12640	Excavate and construct OLE bases	3	11-Mar-09	13-Mar-09	0
A12660	Set Track (50m)	4	16-Mar-09	19-Mar-09	0
A12670	Place upper concrete and cure	4	19-Mar-09	24-Mar-09	0
A12680	Street Surface finishes	3	25-Mar-09	27-Mar-09	0
A13490	Remove fencing and Traffic Management	1	30-Mar-09	30-Mar-09	0
Leith Walk Ch 100-350		61	31-Mar-09	26-Jun-09	1
1st half		31	31-Mar-09	14-May-09	0
A12690	Establish Traffic Management & Temp. Fencing	2	31-Mar-09	01-Apr-09	0
A12700	Excavate box	5	02-Apr-09	08-Apr-09	0
A12710	Excavate, lay and concrete ducts	8	09-Apr-09	21-Apr-09	0
A12720	Excavate and construct OLE bases	8	09-Apr-09	21-Apr-09	0
A12740	Set Track (250m)	10	22-Apr-09	06-May-09	0
A12750	Place upper concrete and cure	10	27-Apr-09	11-May-09	0
A12760	Street Surface finishes	3	12-May-(	14-May-09	0
2nd half		30	15-May-(	26-Jun-09	1
A13090	Excavate box	5	15-May-(	21-May-09	0
A13100	Excavate, lay and concrete ducts	8	22-May-(	03-Jun-09	0
A13130	Set Track	10	04-Jun-09	17-Jun-09	0
A13140	Place upper concrete and cure	10	09-Jun-09	22-Jun-09	1
A13150	Street Surface finishes	3	23-Jun-09	25-Jun-09	1
A13160	Remove fencing and Traffic Management	1	26-Jun-09	26-Jun-09	1
Leith Walk Ch 350-600		62	29-Jun-09	23-Sep-09	6
1st half		32	29-Jun-09	12-Aug-09	0
A12770	Establish Traffic Management & Temp. Fencing	2	29-Jun-09	30-Jun-09	1
A12780	Excavate box	5	01-Jul-09	07-Jul-09	1
A12790	Excavate, lay and concrete ducts	8	08-Jul-09	17-Jul-09	1
A12800	Excavate and construct OLE bases	8	08-Jul-09	17-Jul-09	1
A12820	Set Track (250m)	10	21-Jul-09	04-Aug-09	0
A12830	Place upper concrete and cure	10	24-Jul-09	07-Aug-09	0
A12840	Street Surface finishes	3	10-Aug-09	12-Aug-09	0
2nd half		30	13-Aug-09	23-Sep-09	6
A13170	Excavate box	5	13-Aug-09	19-Aug-09	0
A13180	Excavate, lay and concrete ducts	8	20-Aug-09	31-Aug-09	0
A13210	Set Track	10	01-Sep-09	14-Sep-09	0
A13220	Place upper concrete and cure	10	04-Sep-09	17-Sep-09	6
A13230	Street Surface finishes	3	18-Sep-09	22-Sep-09	6
A13240	Remove fencing and Traffic Management	1	23-Sep-09	23-Sep-09	6
Roadworks		180	28-Mar-08	11-Dec-08	11



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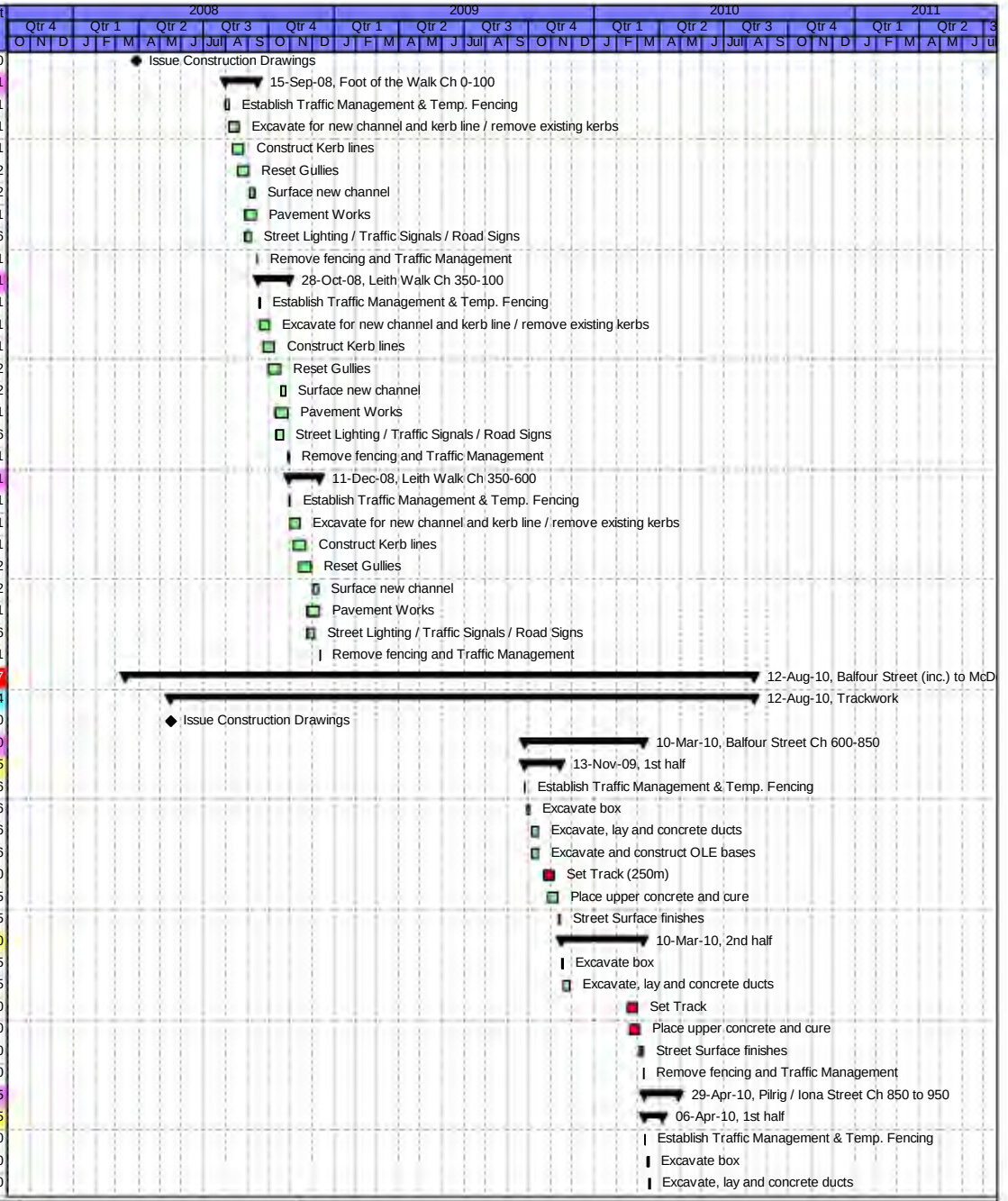
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
12140	Issue Construction Drawings	0		28-Mar-08*	0
Foot of the Walk Ch 0-100		31	01-Aug-08	15-Sep-08	11
A12370	Establish Traffic Management & Temp. Fencing	2	01-Aug-08	05-Aug-08	11
A12380	Excavate for new channel and kerb line / remove e>	10	06-Aug-08	19-Aug-08	11
A12390	Construct Kerb lines	13	11-Aug-08	27-Aug-08	11
A12400	Reset Gullies	13	18-Aug-08	03-Sep-08	12
A12410	Surface new channel	6	04-Sep-08	11-Sep-08	12
A12420	Pavement Works	12	28-Aug-08	12-Sep-08	11
A12430	Street Lighting / Traffic Signals / Road Signs	7	28-Aug-08	05-Sep-08	16
A12440	Remove fencing and Traffic Management	1	15-Sep-08	15-Sep-08	11
Leith Walk Ch 350-100		31	16-Sep-08	28-Oct-08	11
A11970	Establish Traffic Management & Temp. Fencing	2	16-Sep-08	17-Sep-08	11
A11980	Excavate for new channel and kerb line / remove e>	10	18-Sep-08	01-Oct-08	11
A11990	Construct Kerb lines	13	23-Sep-08	09-Oct-08	11
A12000	Reset Gullies	13	30-Sep-08	16-Oct-08	12
A12010	Surface new channel	6	17-Oct-08	24-Oct-08	12
A12020	Pavement Works	12	10-Oct-08	27-Oct-08	11
A12030	Street Lighting / Traffic Signals / Road Signs	7	10-Oct-08	20-Oct-08	16
A12040	Remove fencing and Traffic Management	1	28-Oct-08	28-Oct-08	11
Leith Walk Ch 350-600		31	29-Oct-08	11-Dec-08	11
A12050	Establish Traffic Management & Temp. Fencing	2	29-Oct-08	30-Oct-08	11
A12060	Excavate for new channel and kerb line / remove e>	10	31-Oct-08	13-Nov-08	11
A12070	Construct Kerb lines	13	05-Nov-08	21-Nov-08	11
A12080	Reset Gullies	13	12-Nov-08	28-Nov-08	12
A12090	Surface new channel	6	02-Dec-08	09-Dec-08	12
A12100	Pavement Works	12	24-Nov-08	10-Dec-08	11
A12110	Street Lighting / Traffic Signals / Road Signs	7	24-Nov-08	03-Dec-08	16
A12120	Remove fencing and Traffic Management	1	11-Dec-08	11-Dec-08	11
Balfour Street (inc.) to McDonald Road (exc.)		595	14-Mar-08	12-Aug-10	227
Trackwork		553	15-May-(	12-Aug-10	4
12150	Issue Construction Drawings	0		15-May-08*	0
Balfour Street Ch 600-850		109	24-Sep-09	10-Mar-10	0
1st half		37	24-Sep-09	13-Nov-09	45
A12850	Establish Traffic Management & Temp. Fencing	2	24-Sep-09	25-Sep-09	6
A12860	Excavate box	5	28-Sep-09	02-Oct-09	6
A12870	Excavate, lay and concrete ducts	8	05-Oct-09	14-Oct-09	6
A12880	Excavate and construct OLE bases	8	05-Oct-09	14-Oct-09	6
A12900	Set Track (250m)	10	23-Oct-09	05-Nov-09	0
A12910	Place upper concrete and cure	10	28-Oct-09	10-Nov-09	45
A12920	Street Surface finishes	3	11-Nov-09	13-Nov-09	45
2nd half		72	16-Nov-09	10-Mar-10	0
A13250	Excavate box	2	16-Nov-09	17-Nov-09	45
A13260	Excavate, lay and concrete ducts	8	18-Nov-09	27-Nov-09	45
A13290	Set Track	10	16-Feb-10	01-Mar-10	0
A13300	Place upper concrete and cure	10	19-Feb-10	04-Mar-10	0
A13310	Street Surface finishes	3	05-Mar-10	09-Mar-10	0
A13320	Remove fencing and Traffic Management	1	10-Mar-10	10-Mar-10	0
Pilrig / Iona Street Ch 850 to 950		35	11-Mar-10	29-Apr-10	5
1st half		18	11-Mar-10	06-Apr-10	5
A12930	Establish Traffic Management & Temp. Fencing	2	11-Mar-10	12-Mar-10	0
A12940	Excavate box	2	15-Mar-10	16-Mar-10	0
A12950	Excavate, lay and concrete ducts	3	17-Mar-10	19-Mar-10	0



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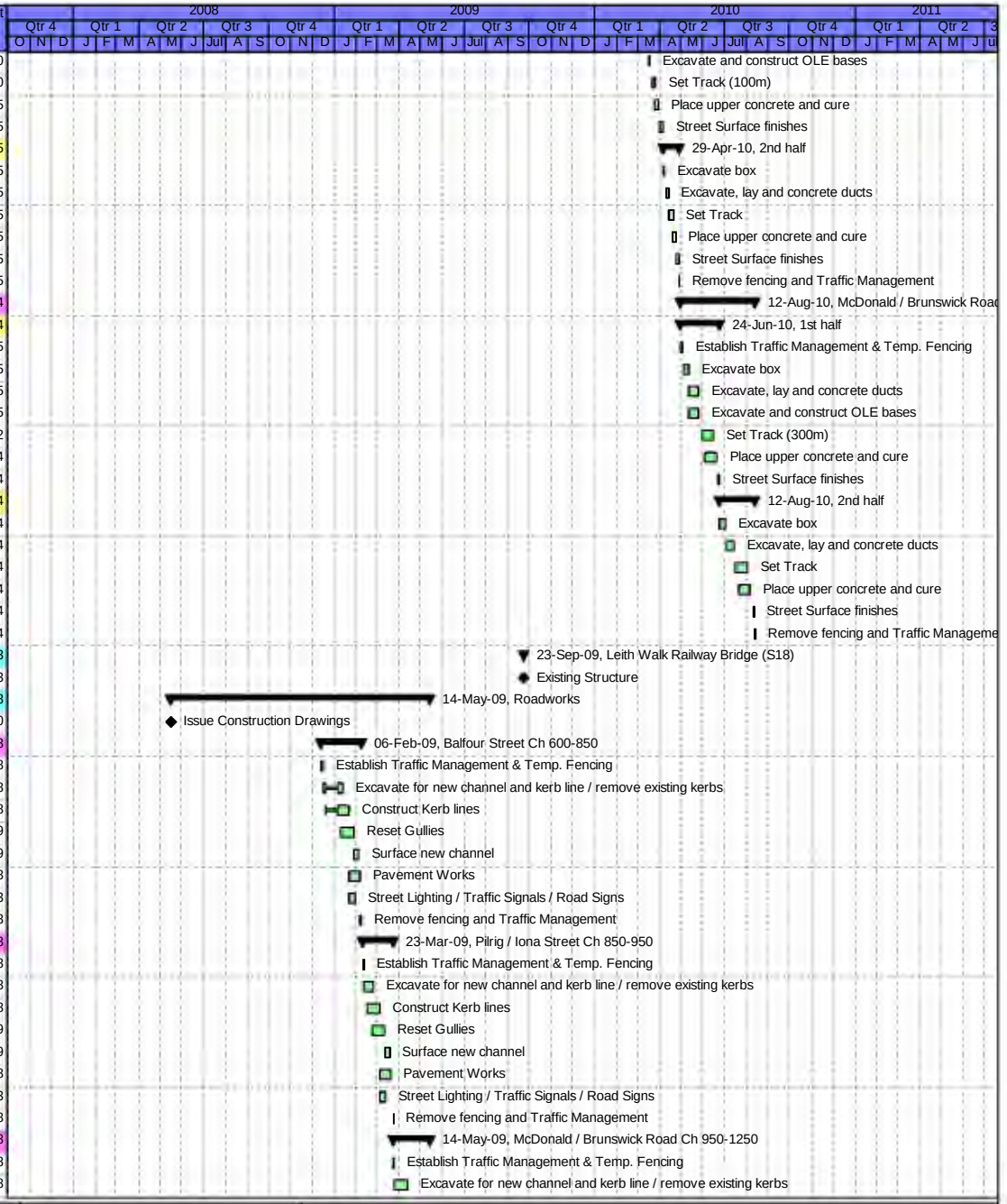
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A12960	Excavate and construct OLE bases	3	17-Mar-10	19-Mar-10	0
A12980	Set Track (100m)	5	22-Mar-10	26-Mar-10	0
A12990	Place upper concrete and cure	5	25-Mar-10	31-Mar-10	5
A13000	Street Surface finishes	3	01-Apr-10	06-Apr-10	5
2nd half		17	07-Apr-10	29-Apr-10	5
A13330	Excavate box	2	07-Apr-10	08-Apr-10	5
A13340	Excavate, lay and concrete ducts	3	09-Apr-10	13-Apr-10	5
A13370	Set Track	5	14-Apr-10	20-Apr-10	5
A13380	Place upper concrete and cure	5	19-Apr-10	23-Apr-10	5
A13390	Street Surface finishes	3	26-Apr-10	28-Apr-10	5
A13400	Remove fencing and Traffic Management	1	29-Apr-10	29-Apr-10	5
McDonald / Brunswick Road Ch 950-1250		72	30-Apr-10	12-Aug-10	4
1st half		38	30-Apr-10	24-Jun-10	4
A13010	Establish Traffic Management & Temp. Fencing	2	30-Apr-10	04-May-10	5
A13020	Excavate box	6	05-May-:	12-May-10	5
A13030	Excavate, lay and concrete ducts	9	13-May-:	25-May-10	5
A13040	Excavate and construct OLE bases	9	13-May-:	25-May-10	5
A13060	Set Track (300m)	12	01-Jun-10	16-Jun-10	2
A13070	Place upper concrete and cure	12	04-Jun-10	21-Jun-10	4
A13080	Street Surface finishes	3	22-Jun-10	24-Jun-10	4
2nd half		34	25-Jun-10	12-Aug-10	4
A13410	Excavate box	6	25-Jun-10	02-Jul-10	4
A13420	Excavate, lay and concrete ducts	9	05-Jul-10	15-Jul-10	4
A13450	Set Track	12	16-Jul-10	03-Aug-10	4
A13460	Place upper concrete and cure	12	21-Jul-10	06-Aug-10	4
A13470	Street Surface finishes	3	09-Aug-10	11-Aug-10	4
A13480	Remove fencing and Traffic Management	1	12-Aug-10	12-Aug-10	4
Leith Walk Railway Bridge (S18)		0	23-Sep-09	23-Sep-09	443
26	Existing Structure	0		23-Sep-09	443
Roadworks		245	15-May-(	14-May-09	98
12160	Issue Construction Drawings	0		15-May-08*	0
Balfour Street Ch 600-850		31	12-Dec-08	06-Feb-09	98
A12130	Establish Traffic Management & Temp. Fencing	2	12-Dec-08	15-Dec-08	98
A12140	Excavate for new channel and kerb line / remove ex	10	16-Dec-08	12-Jan-09	98
A12150	Construct Kerb lines	13	19-Dec-08	20-Jan-09	98
A12160	Reset Gullies	13	09-Jan-09	27-Jan-09	99
A12170	Surface new channel	6	28-Jan-09	04-Feb-09	99
A12180	Pavement Works	12	21-Jan-09	05-Feb-09	98
A12190	Street Lighting / Traffic Signals / Road Signs	7	21-Jan-09	29-Jan-09	103
A12200	Remove fencing and Traffic Management	1	06-Feb-09	06-Feb-09	98
Pilrig / Iona Street Ch 850-950		31	09-Feb-09	23-Mar-09	98
A12210	Establish Traffic Management & Temp. Fencing	2	09-Feb-09	10-Feb-09	98
A12220	Excavate for new channel and kerb line / remove ex	10	11-Feb-09	24-Feb-09	98
A12230	Construct Kerb lines	13	16-Feb-09	04-Mar-09	98
A12240	Reset Gullies	13	23-Feb-09	11-Mar-09	99
A12250	Surface new channel	6	12-Mar-09	19-Mar-09	99
A12260	Pavement Works	12	05-Mar-09	20-Mar-09	98
A12270	Street Lighting / Traffic Signals / Road Signs	7	05-Mar-09	13-Mar-09	103
A12280	Remove fencing and Traffic Management	1	23-Mar-09	23-Mar-09	98
McDonald / Brunswick Road Ch 950-1250		36	24-Mar-09	14-May-09	98
A12290	Establish Traffic Management & Temp. Fencing	2	24-Mar-09	25-Mar-09	98
A12300	Excavate for new channel and kerb line / remove ex	12	26-Mar-09	13-Apr-09	98



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Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A12310	Construct Kerb lines	15	31-Mar-09	21-Apr-09	98
A12320	Reset Gullies	15	07-Apr-09	28-Apr-09	99
A12330	Surface new channel	9	29-Apr-09	12-May-09	99
A12340	Pavement Works	15	22-Apr-09	13-May-09	98
A12350	Street Lighting / Traffic Signals / Road Signs	7	22-Apr-09	30-Apr-09	106
A12360	Remove fencing and Traffic Management	1	14-May-(	14-May-09	98
Balfour Street Tram Stop		542	14-Mar-08	28-May-10	280
12170	Issue Construction Drawings	0		14-Mar-08*	0
538	Order REC Supply	0	13-Jan-10		375
Construction		161	28-Sep-09	28-May-10	280
590	Civil Engineering And Building Works	65	28-Sep-09	11-Jan-10	210
A2600	Deliver and Install Shelter	10	24-Feb-10	10-Mar-10	154
A4478	Access for visual inspection for E&M Tram Stop inst	0	08-Feb-10		374
A4479	Access for E&M Tram Stop installation (01B Balfour	0	10-Mar-10		158
A4480	Install LV Power Supply and LV Power Equipment	25	10-Mar-10	15-Apr-10	154
A4490	Install Telecon Equipment	20	15-Apr-10	14-May-10	164
A4500	Install Station Control Equipment + AFC Equipment	25	15-Apr-10	21-May-10	154
A4510	Package Test Tramstop	5	21-May-:	28-May-10	154
01C McDonald Road (inc.) to Princess Street West (exc.)		735	14-Mar-08	11-Mar-11	87
E & M Installations		112	16-Jun-10	22-Nov-10	155
A3843	Access for visual inspection for E&M wayside installa	0	16-Jun-10		224
A3844	Access for E&M wayside installation (01C)	0	16-Jul-10		203
A3845	Installation of poles and building fixings	15	16-Jul-10	09-Sep-10	0
A3850	Overhead Catenary Line	36	10-Sep-10	29-Oct-10	0
A3858	Access for visual inspection to cable pits for cable la	0	21-Jul-10		199
A3859	Access to cable pits for cable laying (01C)	0	24-Sep-10		178
A3860	Install Electrical Cables	20	24-Sep-10	21-Oct-10	7
A3870	Install Fibre Optic Cables	20	24-Sep-10	21-Oct-10	32
A3880	Install Signalling Wayside Equipment	20	22-Oct-10	22-Nov-10	7
McDonald Road (inc.) to Picardy Place (exc.)		583	14-Mar-08	26-Jul-10	239
McDonald Road Tram Stop		477	14-Mar-08	23-Feb-10	345
12180	Issue Construction Drawings	0		14-Mar-08*	0
548	Order REC Supply	0	09-Sep-09		454
600	Civil Engineering And Building Works	65	22-Jul-09	24-Nov-09	176
A2660	Deliver and Install Shelter	10	21-Oct-09	03-Nov-09	176
A2668	Access for visual inspection for E&M Tram Stop inst	0	05-Oct-09		464
A2669	Access for E&M Tram Stop installation (01C McDon	0	04-Nov-09		229
A2670	Install LV Power Supply and LV Power Equipment	25	04-Nov-09	12-Jan-10	176
A2673	Install Telecon Equipment	20	13-Jan-10	09-Feb-10	186
A2675	Install Station Control Equipment + AFC Equipment	25	13-Jan-10	16-Feb-10	176
A2680	Package Test Tramstop	5	17-Feb-10	23-Feb-10	176
Trackworks		532	29-May-(	26-Jul-10	1
12190	Issue Construction Drawings	0		29-May-08*	0
Leith Walk Ch 0-375		216	22-Jul-09	09-Jun-10	0
1st Half (Dummy)		114	22-Jul-09	13-Jan-10	62
A16190	Establish Traffic Management & Temp. Fencing	2	22-Jul-09	23-Jul-09	35
A16200	Excavate box	8	24-Jul-09	08-Sep-09	35
A16210	Excavate, lay and concrete ducts	11	09-Sep-09	23-Sep-09	35
A16220	Excavate and construct OLE bases	11	09-Sep-09	23-Sep-09	35
A16230	Set Track (300m)	14	12-Nov-09	05-Jan-10	0
A16240	Place upper concrete and cure	14	17-Nov-09	08-Jan-10	62
A16250	Street Surface finishes	3	11-Jan-10	13-Jan-10	62



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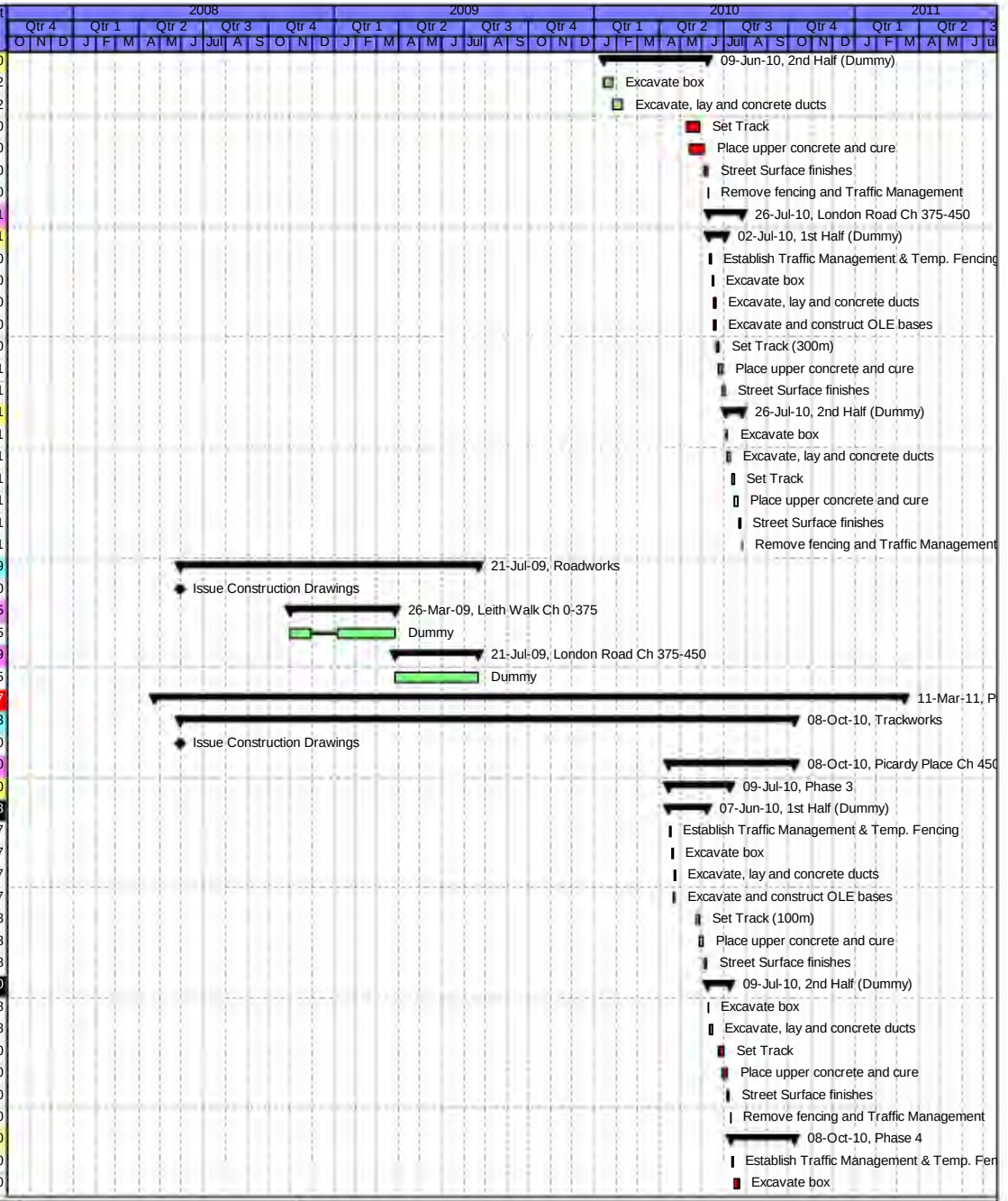
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
2nd Half (Dummy)		102	14-Jan-10	09-Jun-10	0
A16330	Excavate box	8	14-Jan-10	25-Jan-10	62
A16340	Excavate, lay and concrete ducts	11	26-Jan-10	09-Feb-10	62
A16350	Set Track	14	11-May-:	28-May-10	0
A16360	Place upper concrete and cure	14	14-May-:	03-Jun-10	0
A16370	Street Surface finishes	3	04-Jun-10	08-Jun-10	0
A16380	Remove fencing and Traffic Management	1	09-Jun-10	09-Jun-10	0
London Road Ch 375-450		33	10-Jun-10	26-Jul-10	1
1st Half (Dummy)		17	10-Jun-10	02-Jul-10	1
A16260	Establish Traffic Management & Temp. Fencing	2	10-Jun-10	11-Jun-10	0
A16270	Excavate box	2	14-Jun-10	15-Jun-10	0
A16280	Excavate, lay and concrete ducts	3	16-Jun-10	18-Jun-10	0
A16290	Excavate and construct OLE bases	3	16-Jun-10	18-Jun-10	0
A16300	Set Track (300m)	4	21-Jun-10	24-Jun-10	0
A16310	Place upper concrete and cure	4	24-Jun-10	29-Jun-10	1
A16320	Street Surface finishes	3	30-Jun-10	02-Jul-10	1
2nd Half (Dummy)		16	05-Jul-10	26-Jul-10	1
A16390	Excavate box	2	05-Jul-10	06-Jul-10	1
A16400	Excavate, lay and concrete ducts	3	07-Jul-10	09-Jul-10	1
A16410	Set Track	4	12-Jul-10	15-Jul-10	1
A16420	Place upper concrete and cure	4	15-Jul-10	20-Jul-10	1
A16430	Street Surface finishes	3	21-Jul-10	23-Jul-10	1
A16440	Remove fencing and Traffic Management	1	26-Jul-10	26-Jul-10	1
Roadworks		283	29-May-(	21-Jul-09	59
12200	Issue Construction Drawings	0		29-May-08*	0
Leith Walk Ch 0-375		94	31-Oct-08	26-Mar-09	35
A13540	Dummy	80	31-Oct-08	26-Mar-09	35
London Road Ch 375-450		80	27-Mar-09	21-Jul-09	59
A13570	Dummy	80	27-Mar-09	21-Jul-09	35
Picardy Place (inc.) to St. Andrews Square (exc.)		708	23-Apr-08	11-Mar-11	87
Trackworks		585	29-May-(	08-Oct-10	23
12210	Issue Construction Drawings	0		29-May-08*	0
Picardy Place Ch 450-700		124	15-Apr-10	08-Oct-10	0
Phase 3		60	15-Apr-10	09-Jul-10	0
1st Half (Dummy)		36	15-Apr-10	07-Jun-10	8
A164	Establish Traffic Management & Temp. Fencing	2	15-Apr-10	16-Apr-10	27
A164	Excavate box	2	19-Apr-10	20-Apr-10	27
A164	Excavate, lay and concrete ducts	3	21-Apr-10	23-Apr-10	27
A164	Excavate and construct OLE bases	3	21-Apr-10	23-Apr-10	27
A164	Set Track (100m)	4	24-May-:	27-May-10	8
A165	Place upper concrete and cure	4	27-May-:	02-Jun-10	8
A165	Street Surface finishes	3	03-Jun-10	07-Jun-10	8
2nd Half (Dummy)		24	08-Jun-10	09-Jul-10	0
A165	Excavate box	2	08-Jun-10	09-Jun-10	8
A165	Excavate, lay and concrete ducts	3	10-Jun-10	14-Jun-10	8
A165	Set Track	4	25-Jun-10	30-Jun-10	0
A165	Place upper concrete and cure	4	30-Jun-10	05-Jul-10	0
A165	Street Surface finishes	3	06-Jul-10	08-Jul-10	0
A165	Remove fencing and Traffic Management	1	09-Jul-10	09-Jul-10	0
Phase 4		64	12-Jul-10	08-Oct-10	0
A16580	Establish Traffic Management & Temp. Fencing	2	12-Jul-10	13-Jul-10	0
A16590	Excavate box	6	14-Jul-10	21-Jul-10	0



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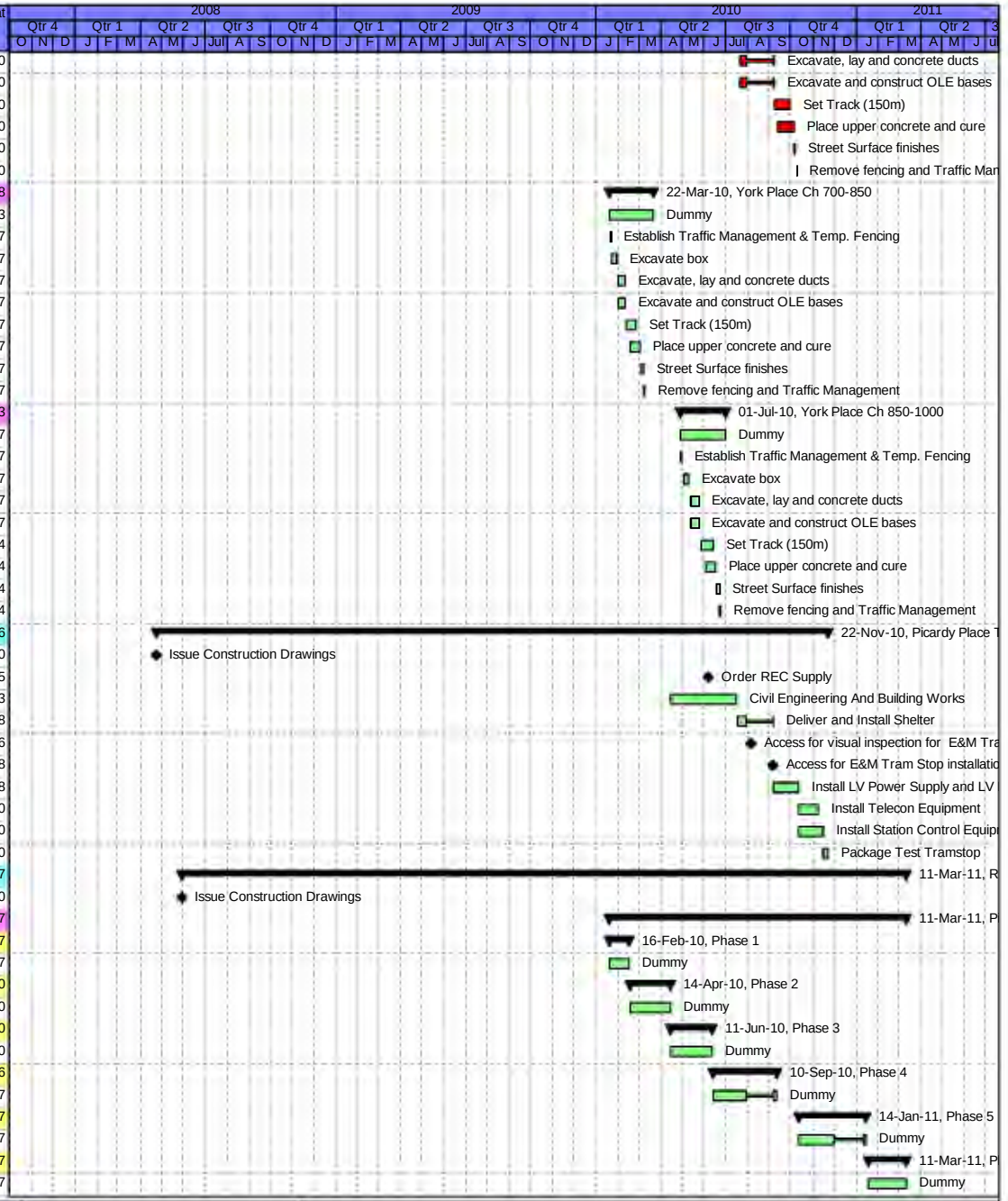
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A16600	Excavate, lay and concrete ducts	9	22-Jul-10	07-Sep-10	0
A16610	Excavate and construct OLE bases	9	22-Jul-10	07-Sep-10	0
A16620	Set Track (150m)	16	08-Sep-10	29-Sep-10	0
A16630	Place upper concrete and cure	16	13-Sep-10	04-Oct-10	0
A16640	Street Surface finishes	3	05-Oct-10	07-Oct-10	0
A16650	Remove fencing and Traffic Management	1	08-Oct-10	08-Oct-10	0
York Place Ch 700-850		44	20-Jan-10	22-Mar-10	88
A13660	Dummy	44	20-Jan-10	22-Mar-10	33
A16660	Establish Traffic Management & Temp. Fencing	2	20-Jan-10	21-Jan-10	7
A16670	Excavate box	6	22-Jan-10	29-Jan-10	7
A16680	Excavate, lay and concrete ducts	9	01-Feb-10	11-Feb-10	7
A16690	Excavate and construct OLE bases	9	01-Feb-10	11-Feb-10	7
A16700	Set Track (150m)	11	12-Feb-10	26-Feb-10	7
A16710	Place upper concrete and cure	11	17-Feb-10	03-Mar-10	97
A16720	Street Surface finishes	3	04-Mar-10	08-Mar-10	97
A16730	Remove fencing and Traffic Management	1	09-Mar-10	09-Mar-10	97
York Place Ch 850-1000		44	29-Apr-10	01-Jul-10	93
A13670	Dummy	44	29-Apr-10	01-Jul-10	67
A16740	Establish Traffic Management & Temp. Fencing	2	29-Apr-10	30-Apr-10	27
A16750	Excavate box	6	04-May-:	11-May-10	27
A16760	Excavate, lay and concrete ducts	9	12-May-:	24-May-10	27
A16770	Excavate and construct OLE bases	9	12-May-:	24-May-10	27
A16780	Set Track (150m)	11	28-May-:	14-Jun-10	24
A16790	Place upper concrete and cure	11	03-Jun-10	17-Jun-10	24
A16800	Street Surface finishes	3	18-Jun-10	22-Jun-10	24
A16810	Remove fencing and Traffic Management	1	23-Jun-10	23-Jun-10	24
Picardy Place Tram Stop		639	23-Apr-08	22-Nov-10	156
12220	Issue Construction Drawings	0		23-Apr-08*	0
558	Order REC Supply	0	07-Jun-10		275
610	Civil Engineering And Building Works	65	15-Apr-10	16-Jul-10	53
A2720	Deliver and Install Shelter	10	19-Jul-10	06-Sep-10	28
A4518	Access for visual inspection for E&M Tram Stop ins	0	05-Aug-10		246
A4519	Access for E&M Tram Stop installation (01C Picardy	0	06-Sep-10		28
A4520	Install LV Power Supply and LV Power Equipment	25	06-Sep-10	11-Oct-10	28
A4530	Install Telecon Equipment	20	11-Oct-10	08-Nov-10	40
A4540	Install Station Control Equipment + AFC Equipment	25	11-Oct-10	15-Nov-10	30
A4550	Package Test Tramstop	5	15-Nov-10	22-Nov-10	30
Roadworks		684	29-May-(	11-Mar-11	87
12230	Issue Construction Drawings	0		29-May-08*	0
Picardy Place Ch 450-700		283	20-Jan-10	11-Mar-11	87
Phase 1		20	20-Jan-10	16-Feb-10	7
A13580	Dummy	20	20-Jan-10	16-Feb-10	7
Phase 2		40	17-Feb-10	14-Apr-10	20
A13590	Dummy	40	17-Feb-10	14-Apr-10	20
Phase 3		40	15-Apr-10	11-Jun-10	20
A13600	Dummy	40	15-Apr-10	11-Jun-10	20
Phase 4		64	14-Jun-10	10-Sep-10	126
A13610	Dummy	40	14-Jun-10	10-Sep-10	107
Phase 5		59	11-Oct-10	14-Jan-11	87
A13620	Dummy	40	11-Oct-10	14-Jan-11	87
Phase 6		40	17-Jan-11	11-Mar-11	87
A13630	Dummy	40	17-Jan-11	11-Mar-11	87



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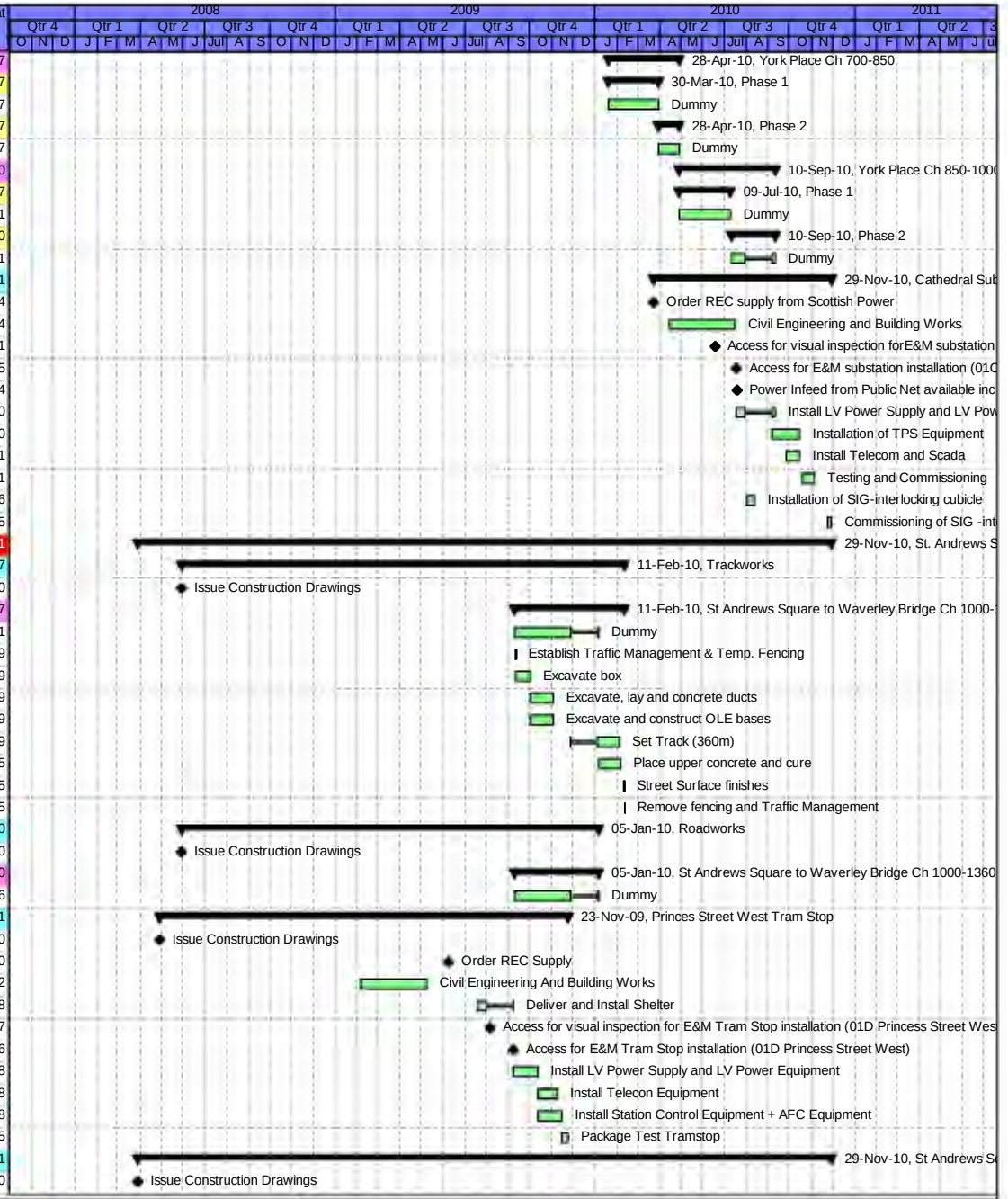
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
York Place Ch 700-850		70	20-Jan-10	28-Apr-10	27
Phase 1		50	20-Jan-10	30-Mar-10	7
A13680	Dummy	50	20-Jan-10	30-Mar-10	7
Phase 2		20	31-Mar-10	28-Apr-10	27
A13690	Dummy	20	31-Mar-10	28-Apr-10	27
York Place Ch 850-1000		94	29-Apr-10	10-Sep-10	80
Phase 1		50	29-Apr-10	09-Jul-10	87
A13700	Dummy	50	29-Apr-10	09-Jul-10	61
Phase 2		44	12-Jul-10	10-Sep-10	80
A13710	Dummy	20	12-Jul-10	10-Sep-10	61
Cathedral SubStation		174	24-Mar-10	29-Nov-10	151
346	Order REC supply from Scottish Power	0	24-Mar-10		54
356	Civil Engineering and Building Works	65	15-Apr-10	16-Jul-10	54
A2838	Access for visual inspection forE&M substation insta	0	17-Jun-10		281
A2839	Access for E&M substation installation (01C Cathrec	0	19-Jul-10		55
A5580	Power Infeed from Public Net available inc HV cable	0	19-Jul-10		54
A5590	Install LV Power Supply and LV Power Equipment	15	19-Jul-10	10-Sep-10	30
A5600	Installation of TPS Equipment	30	06-Sep-10	15-Oct-10	30
A5610	Install Telecom and Scada	15	27-Sep-10	15-Oct-10	41
A5620	Testing and Commissioning	14	18-Oct-10	04-Nov-10	41
A6120	Installation of SIG-interlocking cubicle	10	02-Aug-10	13-Aug-10	106
A6130	Commissioning of SIG -interlocking cubicle	5	23-Nov-10	29-Nov-10	35
St. Andrews Square (inc.) to Princes Street West (exc.)		662	28-Mar-08	29-Nov-10	151
Trackworks		418	29-May-(	11-Feb-10	227
12240	Issue Construction Drawings	0		29-May-08*	0
St Andrews Square to Waverley Bridge Ch 1000-1360		101	09-Sep-09	11-Feb-10	227
A13530	Dummy	60	09-Sep-09	05-Jan-10	211
A16820	Establish Traffic Management & Temp. Fencing	2	09-Sep-09	10-Sep-09	39
A16830	Excavate box	15	11-Sep-09	01-Oct-09	39
A16840	Excavate, lay and concrete ducts	22	02-Oct-09	02-Nov-09	39
A16850	Excavate and construct OLE bases	22	02-Oct-09	02-Nov-09	39
A16860	Set Track (360m)	24	27-Nov-09	03-Feb-10	9
A16870	Place upper concrete and cure	23	06-Jan-10	05-Feb-10	115
A16880	Street Surface finishes	3	08-Feb-10	10-Feb-10	115
A16890	Remove fencing and Traffic Management	1	11-Feb-10	11-Feb-10	115
Roadworks		391	29-May-(	05-Jan-10	190
12250	Issue Construction Drawings	0		29-May-08*	0
St Andrews Square to Waverley Bridge Ch 1000-1360		74	09-Sep-09	05-Jan-10	190
A13520	Dummy	60	09-Sep-09	05-Jan-10	166
Princes Street West Tram Stop		390	29-Apr-08	23-Nov-09	401
12290	Issue Construction Drawings	0		29-Apr-08*	0
578	Order REC Supply	0	08-Jun-09		520
630	Civil Engineering And Building Works	65	05-Feb-09	08-May-09	292
A2780	Deliver and Install Shelter	10	20-Jul-09	07-Sep-09	218
A4598	Access for visual inspection for E&M Tram Stop inst	0	06-Aug-09		477
A4599	Access for E&M Tram Stop installation (01D Princes	0	07-Sep-09		256
A4600	Install LV Power Supply and LV Power Equipment	25	07-Sep-09	12-Oct-09	218
A4610	Install Telecon Equipment	20	12-Oct-09	09-Nov-09	228
A4620	Install Station Control Equipment + AFC Equipment	25	12-Oct-09	16-Nov-09	218
A4630	Package Test Tramstop	5	16-Nov-09	23-Nov-09	275
St Andrews Square Tram Stop		662	28-Mar-08	29-Nov-10	151
12260	Issue Construction Drawings	0		28-Mar-08*	0



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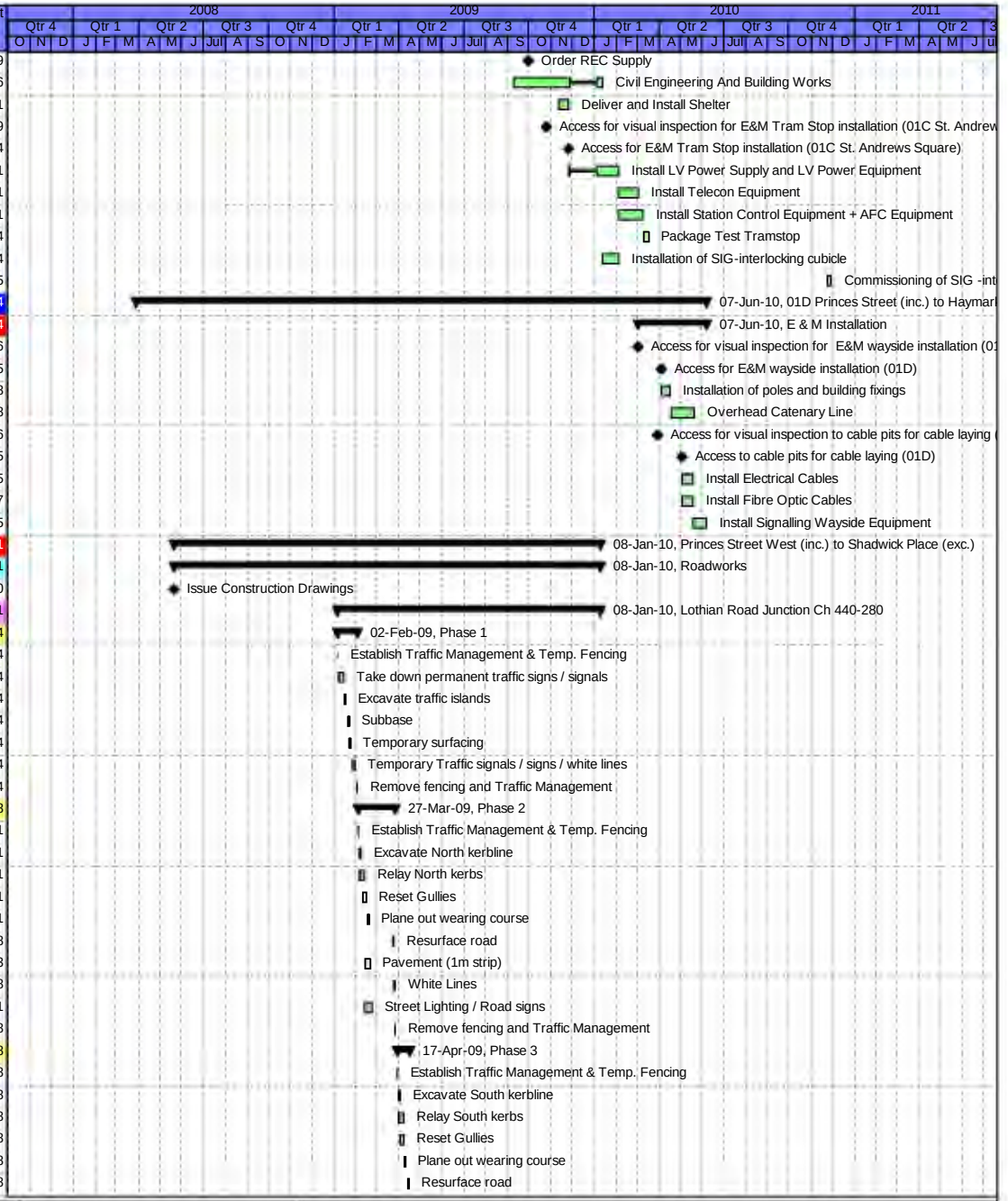
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
568	Order REC Supply	0	30-Sep-09		439
620	Civil Engineering And Building Works	65	09-Sep-09	12-Jan-10	166
A2750	Deliver and Install Shelter	10	11-Nov-09	25-Nov-09	161
A4558	Access for visual inspection for E&M Tram Stop inst	0	26-Oct-09		449
A4559	Access for E&M Tram Stop installation (01C St. And	0	25-Nov-09		214
A4560	Install LV Power Supply and LV Power Equipment	25	25-Nov-09	03-Feb-10	161
A4570	Install Telecon Equipment	20	03-Feb-10	03-Mar-10	171
A4580	Install Station Control Equipment + AFC Equipment	25	03-Feb-10	10-Mar-10	161
A4590	Package Test Tramstop	5	10-Mar-10	17-Mar-10	204
A6150	Installation of SIG-interlocking cubicle	15	13-Jan-10	03-Feb-10	244
A6160	Commissioning of SIG -interlocking cubicle	5	23-Nov-10	29-Nov-10	35
01D Princes Street (inc.) to Haymarket (exc.)		539	28-Mar-08	07-Jun-10	274
E & M Installation		65	03-Mar-10	07-Jun-10	274
A3803	Access for visual inspection for E&M wayside install	0	03-Mar-10		296
A3804	Access for E&M wayside installation (01D)	0	05-Apr-10		275
A3805	Installation of poles and building fixings	10	05-Apr-10	16-Apr-10	8
A3810	Overhead Catenary Line	24	19-Apr-10	21-May-10	8
A3818	Access for visual inspection to cable pits for cable la	0	31-Mar-10		276
A3819	Access to cable pits for cable laying (01D)	0	04-May-:		255
A3820	Install Electrical Cables	12	04-May-:	19-May-10	105
A3830	Install Fibre Optic Cables	12	04-May-:	19-May-10	117
A3840	Install Signalling Wayside Equipment	12	20-May-:	07-Jun-10	105
Princes Street West (inc.) to Shadwick Place (exc.)		399	21-May-(	08-Jan-10	251
Roadworks		399	21-May-(	08-Jan-10	251
12270	Issue Construction Drawings	0		21-May-08*	0
Lothian Road Junction Ch 440-280		250	05-Jan-09	08-Jan-10	251
Phase 1		21	05-Jan-09	02-Feb-09	4
A8250	Establish Traffic Management & Temp. Fencing	2	05-Jan-09	06-Jan-09	4
A8260	Take down permanent traffic signs / signals	5	07-Jan-09	13-Jan-09	4
A8270	Excavate traffic islands	3	14-Jan-09	16-Jan-09	4
A8280	Subbase	2	19-Jan-09	20-Jan-09	4
A8290	Temporary surfacing	3	21-Jan-09	23-Jan-09	4
A8300	Temporary Traffic signals / signs / white lines	5	26-Jan-09	30-Jan-09	4
A8310	Remove fencing and Traffic Management	1	02-Feb-09	02-Feb-09	4
Phase 2		39	03-Feb-09	27-Mar-09	38
A8490	Establish Traffic Management & Temp. Fencing	2	03-Feb-09	04-Feb-09	61
A8500	Excavate North kerbline	2	05-Feb-09	06-Feb-09	61
A8510	Relay North kerbs	5	06-Feb-09	12-Feb-09	61
A8520	Reset Gullies	5	09-Feb-09	13-Feb-09	61
A8530	Plane out wearing course	2	16-Feb-09	17-Feb-09	61
A8540	Resurface road	3	23-Mar-09	25-Mar-09	38
A8550	Pavement (1m strip)	5	13-Feb-09	19-Feb-09	63
A8560	White Lines	1	26-Mar-09	26-Mar-09	38
A8570	Street Lighting / Road signs	7	13-Feb-09	23-Feb-09	61
A8670	Remove fencing and Traffic Management	1	27-Mar-09	27-Mar-09	38
Phase 3		14	30-Mar-09	17-Apr-09	38
A8580	Establish Traffic Management & Temp. Fencing	2	30-Mar-09	31-Mar-09	38
A8590	Excavate South kerbline	2	01-Apr-09	02-Apr-09	38
A8600	Relay South kerbs	4	02-Apr-09	07-Apr-09	38
A8610	Reset Gullies	4	03-Apr-09	08-Apr-09	38
A8620	Plane out wearing course	1	09-Apr-09	09-Apr-09	38
A8630	Resurface road	3	13-Apr-09	15-Apr-09	38



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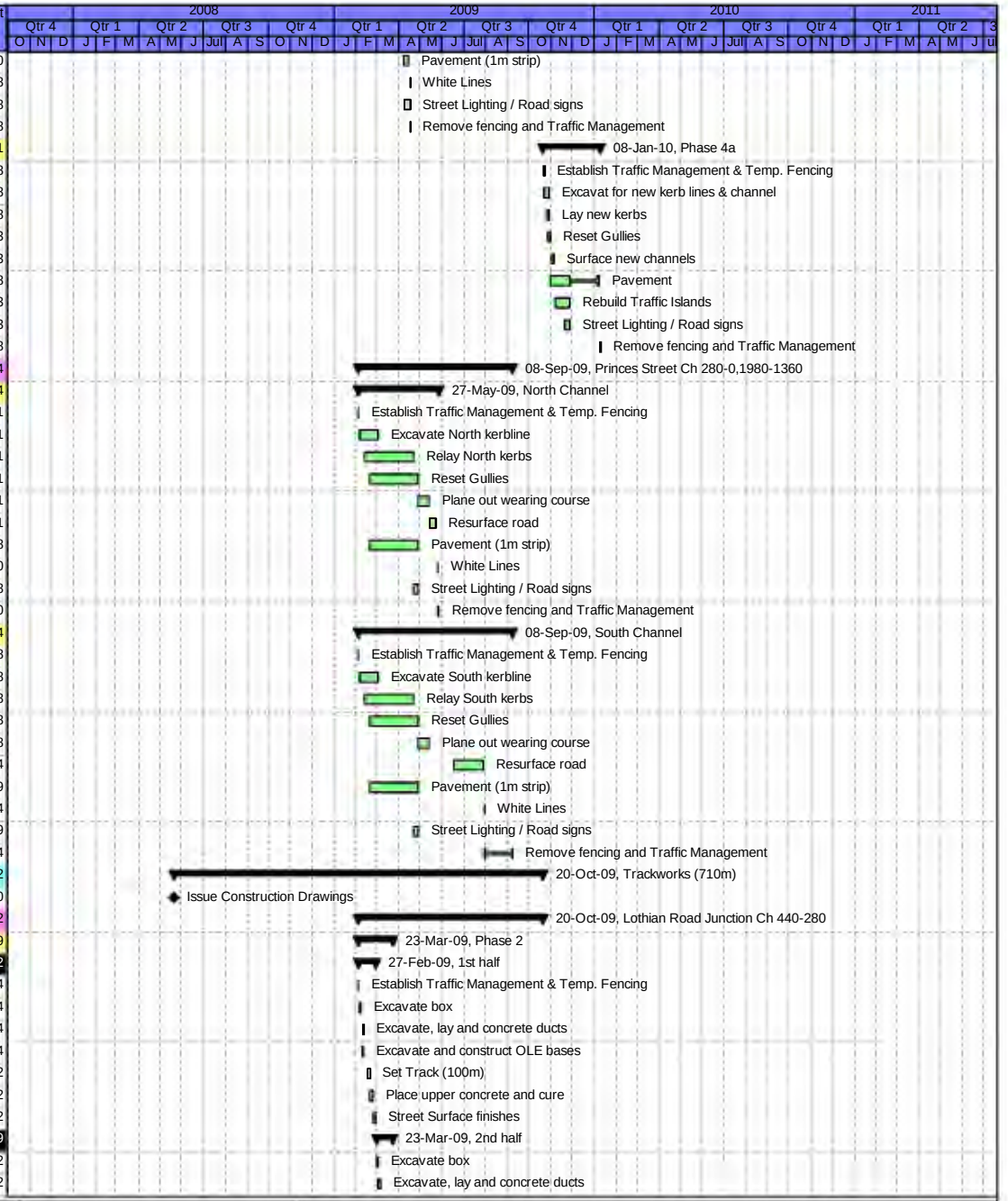
A8640	Pavement (1m strip)	4	08-Apr-09	14-Apr-09	40
A8650	White Lines	1	16-Apr-09	16-Apr-09	38
A8660	Street Lighting / Road signs	6	08-Apr-09	16-Apr-09	38
A8665	Remove fencing and Traffic Management	1	17-Apr-09	17-Apr-09	38
Phase 4a		47	21-Oct-09	08-Jan-10	251
A9000	Establish Traffic Management & Temp. Fencing	2	21-Oct-09	22-Oct-09	208
A9010	Excavat for new kerb lines & channel	4	23-Oct-09	28-Oct-09	208
A9020	Lay new kerbs	4	26-Oct-09	29-Oct-09	208
A9030	Reset Gullies	4	27-Oct-09	30-Oct-09	213
A9040	Surface new channels	4	02-Nov-09	05-Nov-09	213
A9050	Pavement	25	30-Oct-09	07-Jan-10	208
A9060	Rebuild Traffic Islands	15	06-Nov-09	26-Nov-09	213
A9080	Street Lighting / Road signs	5	20-Nov-09	26-Nov-09	213
A9130	Remove fencing and Traffic Management	1	08-Jan-10	08-Jan-10	208
Princes Street Ch 280-0,1980-1360		152	03-Feb-09	08-Sep-09	4
North Channel		79	03-Feb-09	27-May-09	74
A13840	Establish Traffic Management & Temp. Fencing	2	03-Feb-09	04-Feb-09	21
A13850	Excavate North kerbline	19	05-Feb-09	03-Mar-09	21
A13860	Relay North kerbs	48	12-Feb-09	21-Apr-09	21
A13870	Reset Gullies	48	19-Feb-09	28-Apr-09	21
A13880	Plane out wearing course	10	29-Apr-09	13-May-09	21
A13890	Resurface road	7	14-May-(	22-May-09	21
A13900	Pavement (1m strip)	48	19-Feb-09	28-Apr-09	68
A13910	White Lines	1	26-May-(	26-May-09	50
A13920	Street Lighting / Road signs	5	22-Apr-09	28-Apr-09	68
A13930	Remove fencing and Traffic Management	1	27-May-(	27-May-09	50
South Channel		152	03-Feb-09	08-Sep-09	4
A13940	Establish Traffic Management & Temp. Fencing	2	03-Feb-09	04-Feb-09	28
A13950	Excavate South kerbline	19	05-Feb-09	03-Mar-09	28
A13960	Relay South kerbs	48	12-Feb-09	21-Apr-09	28
A13970	Reset Gullies	48	19-Feb-09	28-Apr-09	28
A13980	Plane out wearing course	10	29-Apr-09	13-May-09	28
A13990	Resurface road	30	18-Jun-09	29-Jul-09	4
A14000	Pavement (1m strip)	48	19-Feb-09	28-Apr-09	69
A14010	White Lines	1	30-Jul-09	30-Jul-09	4
A14020	Street Lighting / Road signs	5	22-Apr-09	28-Apr-09	69
A14030	Remove fencing and Traffic Management	3	31-Jul-09	08-Sep-09	4
Trackworks (710m)		352	21-May-(	20-Oct-09	122
12280	Issue Construction Drawings	0		21-May-08*	0
Lothian Road Junction Ch 440-280		182	03-Feb-09	20-Oct-09	122
Phase 2		35	03-Feb-09	23-Mar-09	269
1st half		19	03-Feb-09	27-Feb-09	2
A8320	Establish Traffic Management & Temp. Fencing	2	03-Feb-09	04-Feb-09	4
A8330	Excavate box	2	05-Feb-09	06-Feb-09	4
A8340	Excavate, lay and concrete ducts	3	09-Feb-09	11-Feb-09	4
A8350	Excavate and construct OLE bases	3	09-Feb-09	11-Feb-09	4
A8370	Set Track (100m)	4	16-Feb-09	19-Feb-09	2
A8380	Place upper concrete and cure	4	19-Feb-09	24-Feb-09	2
A8390	Street Surface finishes	3	25-Feb-09	27-Feb-09	2
2nd half		16	02-Mar-09	23-Mar-09	269
A8410	Excavate box	2	02-Mar-09	03-Mar-09	2
A8420	Excavate, lay and concrete ducts	3	04-Mar-09	06-Mar-09	2



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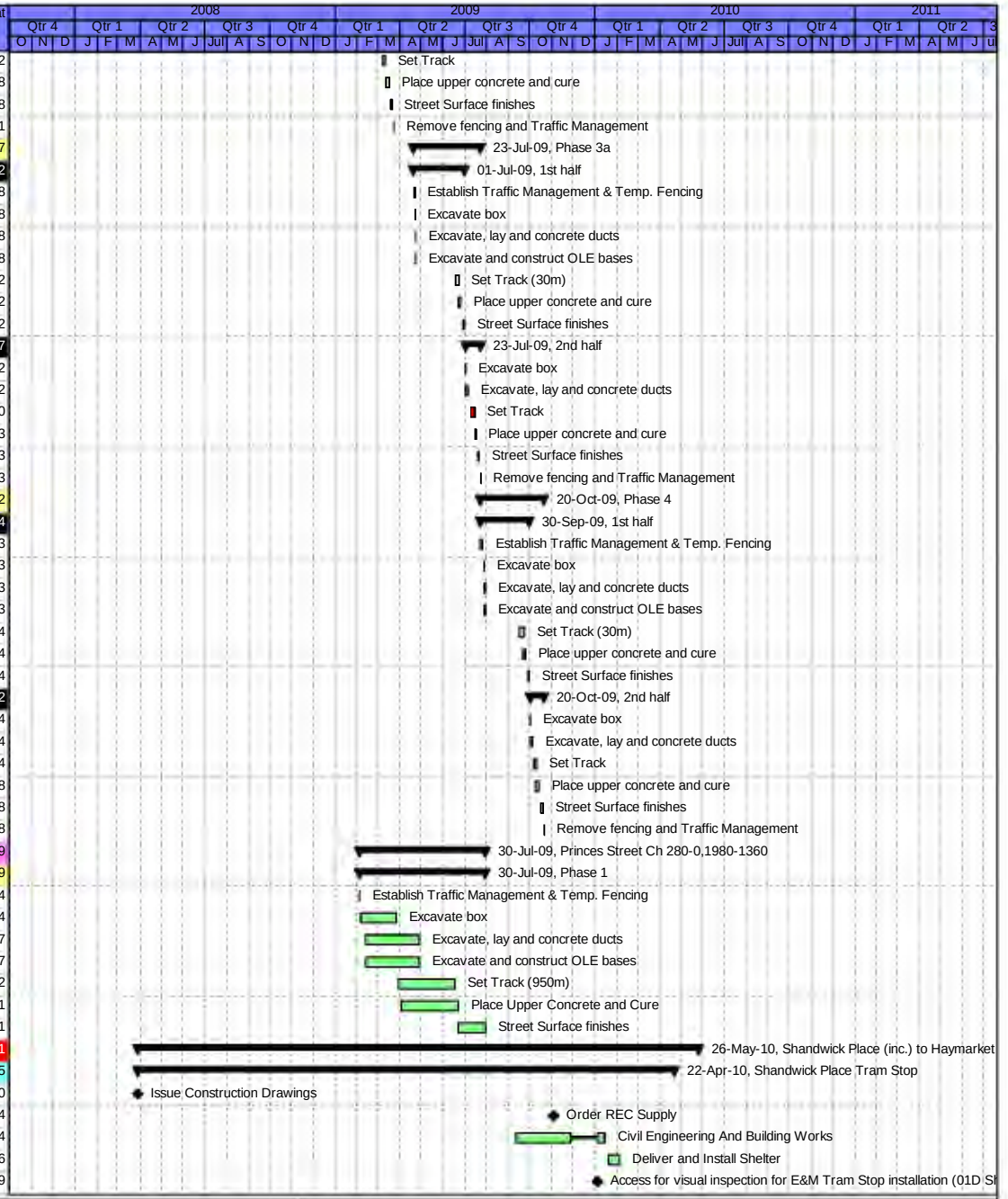
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A8450	Set Track	4	09-Mar-09	12-Mar-09	2
A8460	Place upper concrete and cure	4	12-Mar-09	17-Mar-09	38
A8470	Street Surface finishes	3	18-Mar-09	20-Mar-09	38
A8480	Remove fencing and Traffic Management	1	23-Mar-09	23-Mar-09	231
Phase 3a		67	20-Apr-09	23-Jul-09	37
1st half		51	20-Apr-09	01-Jul-09	2
A8680	Establish Traffic Management & Temp. Fencing	2	20-Apr-09	21-Apr-09	38
A8690	Excavate box	1	22-Apr-09	22-Apr-09	38
A8700	Excavate, lay and concrete ducts	2	23-Apr-09	24-Apr-09	38
A8710	Excavate and construct OLE bases	2	23-Apr-09	24-Apr-09	38
A8730	Set Track (30m)	4	18-Jun-09	23-Jun-09	2
A8740	Place upper concrete and cure	4	23-Jun-09	26-Jun-09	2
A8750	Street Surface finishes	3	29-Jun-09	01-Jul-09	2
2nd half		16	02-Jul-09	23-Jul-09	37
A8760	Excavate box	1	02-Jul-09	02-Jul-09	2
A8770	Excavate, lay and concrete ducts	2	03-Jul-09	06-Jul-09	2
A8800	Set Track	4	09-Jul-09	14-Jul-09	0
A8810	Place upper concrete and cure	4	14-Jul-09	17-Jul-09	13
A8820	Street Surface finishes	3	20-Jul-09	22-Jul-09	13
A8830	Remove fencing and Traffic Management	1	23-Jul-09	23-Jul-09	13
Phase 4		62	24-Jul-09	20-Oct-09	122
1st half		48	24-Jul-09	30-Sep-09	4
A8840	Establish Traffic Management & Temp. Fencing	2	24-Jul-09	27-Jul-09	13
A8850	Excavate box	1	28-Jul-09	28-Jul-09	13
A8860	Excavate, lay and concrete ducts	2	29-Jul-09	30-Jul-09	13
A8870	Excavate and construct OLE bases	2	29-Jul-09	30-Jul-09	13
A8890	Set Track (30m)	4	17-Sep-09	22-Sep-09	4
A8900	Place upper concrete and cure	4	22-Sep-09	25-Sep-09	4
A8910	Street Surface finishes	3	28-Sep-09	30-Sep-09	4
2nd half		14	01-Oct-09	20-Oct-09	122
A8920	Excavate box	1	01-Oct-09	01-Oct-09	4
A8930	Excavate, lay and concrete ducts	2	02-Oct-09	05-Oct-09	4
A8960	Set Track	4	06-Oct-09	09-Oct-09	4
A8970	Place upper concrete and cure	4	09-Oct-09	14-Oct-09	108
A8980	Street Surface finishes	3	15-Oct-09	19-Oct-09	108
A8990	Remove fencing and Traffic Management	1	20-Oct-09	20-Oct-09	108
Princes Street Ch 280-0,1980-1360		125	03-Feb-09	30-Jul-09	179
Phase 1		125	03-Feb-09	30-Jul-09	179
A13760	Establish Traffic Management & Temp. Fencing	2	03-Feb-09	04-Feb-09	4
A13770	Excavate box	36	05-Feb-09	26-Mar-09	4
A13780	Excavate, lay and concrete ducts	54	12-Feb-09	29-Apr-09	177
A13790	Excavate and construct OLE bases	54	12-Feb-09	29-Apr-09	177
A13810	Set Track (950m)	54	31-Mar-09	17-Jun-09	2
A13820	Place Upper Concrete and Cure	54	03-Apr-09	22-Jun-09	141
A13830	Street Surface finishes	28	23-Jun-09	30-Jul-09	141
Shandwick Place (inc.) to Haymarket (exc.)		532	28-Mar-08	26-May-10	281
Shandwick Place Tram Stop		508	28-Mar-08	22-Apr-10	305
12300	Issue Construction Drawings	0		28-Mar-08*	0
588	Order REC Supply	0	04-Nov-09		414
640	Civil Engineering And Building Works	65	11-Sep-09	14-Jan-10	164
A2810	Deliver and Install Shelter	10	20-Jan-10	03-Feb-10	136
A4638	Access for visual inspection for E&M Tram Stop inst	0	04-Jan-10		399



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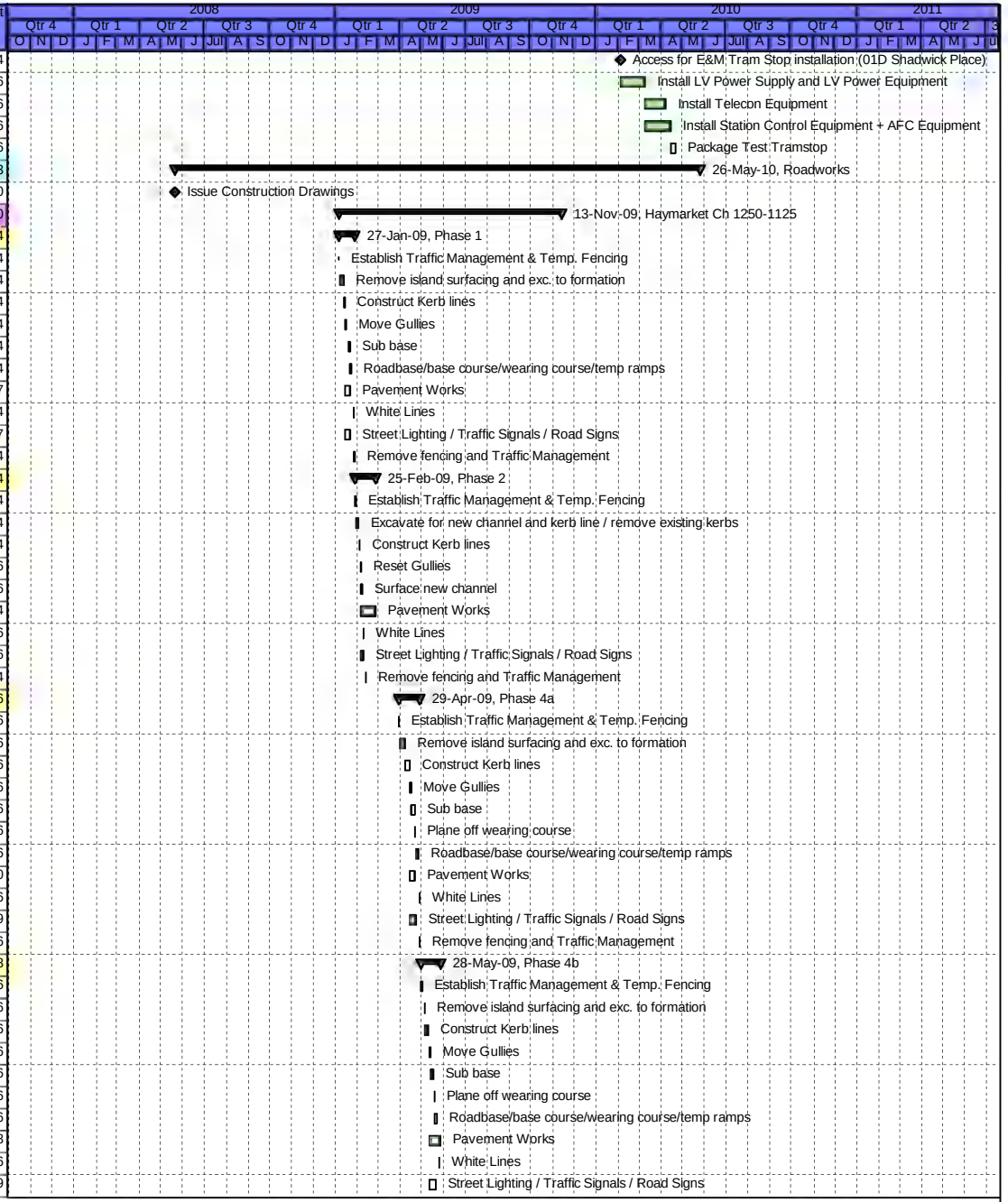
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A4639	Access for E&M Tram Stop installation (01D Shadw	0	03-Feb-10		164
A4640	Install LV Power Supply and LV Power Equipment	25	03-Feb-10	10-Mar-10	136
A4650	Install Telecon Equipment	20	10-Mar-10	08-Apr-10	146
A4660	Install Station Control Equipment + AFC Equipment	25	10-Mar-10	15-Apr-10	136
A4670	Package Test Tramstop	5	15-Apr-10	22-Apr-10	136
Roadworks		495	21-May-(	26-May-10	163
12310	Issue Construction Drawings	0		21-May-08*	0
Haymarket Ch 1250-1125		221	05-Jan-09	13-Nov-09	280
Phase 1		17	05-Jan-09	27-Jan-09	4
A6390	Establish Traffic Management & Temp. Fencing	2	05-Jan-09	06-Jan-09	4
A6400	Remove island surfacing and exc. to formation	4	07-Jan-09	12-Jan-09	4
A6410	Construct Kerb lines	2	13-Jan-09	14-Jan-09	4
A6420	Move Gullies	2	15-Jan-09	16-Jan-09	4
A6430	Sub base	2	19-Jan-09	20-Jan-09	4
A6440	Roadbase/base course/wearing course/temp ramps	3	21-Jan-09	23-Jan-09	4
A6450	Pavement Works	5	15-Jan-09	21-Jan-09	7
A6460	White Lines	1	26-Jan-09	26-Jan-09	4
A6470	Street Lighting / Traffic Signals / Road Signs	5	15-Jan-09	21-Jan-09	7
A6475	Remove fencing and Traffic Management	1	27-Jan-09	27-Jan-09	4
Phase 2		21	28-Jan-09	25-Feb-09	4
A6480	Establish Traffic Management & Temp. Fencing	2	28-Jan-09	29-Jan-09	4
A6490	Excavate for new channel and kerb line / remove e>	2	30-Jan-09	02-Feb-09	4
A6500	Construct Kerb lines	2	03-Feb-09	04-Feb-09	4
A6510	Reset Gullies	1	05-Feb-09	05-Feb-09	6
A6520	Surface new channel	1	06-Feb-09	06-Feb-09	6
A6540	Pavement Works	15	05-Feb-09	25-Feb-09	4
A6550	White Lines	1	09-Feb-09	09-Feb-09	6
A6560	Street Lighting / Traffic Signals / Road Signs	3	05-Feb-09	09-Feb-09	6
A6565	Remove fencing and Traffic Management	1	12-Feb-09	12-Feb-09	4
Phase 4a		22	30-Mar-09	29-Apr-09	16
A6730	Establish Traffic Management & Temp. Fencing	2	30-Mar-09	31-Mar-09	16
A6740	Remove island surfacing and exc. to formation	5	01-Apr-09	07-Apr-09	16
A6750	Construct Kerb lines	4	08-Apr-09	14-Apr-09	16
A6760	Move Gullies	2	15-Apr-09	16-Apr-09	16
A6770	Sub base	3	17-Apr-09	21-Apr-09	16
A6775	Plane off wearing course	1	22-Apr-09	22-Apr-09	16
A6780	Roadbase/base course/wearing course/temp ramps	3	23-Apr-09	27-Apr-09	16
A6790	Pavement Works	6	15-Apr-09	22-Apr-09	20
A6800	White Lines	1	28-Apr-09	28-Apr-09	16
A6810	Street Lighting / Traffic Signals / Road Signs	7	15-Apr-09	23-Apr-09	19
A6815	Remove fencing and Traffic Management	1	29-Apr-09	29-Apr-09	16
Phase 4b		19	30-Apr-09	28-May-09	18
A6820	Establish Traffic Management & Temp. Fencing	2	30-Apr-09	01-May-09	16
A6830	Remove island surfacing and exc. to formation	1	05-May-(	05-May-09	16
A6840	Construct Kerb lines	4	06-May-(	11-May-09	16
A6850	Move Gullies	2	12-May-(	13-May-09	16
A6860	Sub base	3	14-May-(	18-May-09	16
A6870	Plane off wearing course	1	19-May-(	19-May-09	16
A6880	Roadbase/base course/wearing course/temp ramps	3	20-May-(	22-May-09	16
A6890	Pavement Works	12	12-May-(	28-May-09	18
A6900	White Lines	1	26-May-(	26-May-09	16
A6910	Street Lighting / Traffic Signals / Road Signs	7	12-May-(	20-May-09	19



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Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A6915	Remove fencing and Traffic Management	1	27-May-(	27-May-09	16
Phase 6b		49	30-Jul-09	07-Oct-09	275
A7240	Establish Traffic Management & Temp. Fencing	2	30-Jul-09	31-Jul-09	235
A7250	Excavate for new channel and kerb line / remove e>	2	07-Sep-09	08-Sep-09	235
A7260	Construct Kerb lines	5	09-Sep-09	15-Sep-09	235
A7270	Reset Gullies	5	10-Sep-09	16-Sep-09	247
A7280	Surface new channel	2	17-Sep-09	18-Sep-09	247
A7290	Pavement Works	15	16-Sep-09	06-Oct-09	235
A7310	Street Lighting / Traffic Signals / Road Signs	7	16-Sep-09	24-Sep-09	243
A7315	Remove fencing and Traffic Management	1	07-Oct-09	07-Oct-09	235
Phase 7		15	26-Oct-09	13-Nov-09	280
A7320	Establish Traffic Management & Temp. Fencing	2	26-Oct-09	27-Oct-09	223
A7330	Replace north junction kerb line	6	28-Oct-09	04-Nov-09	223
A7340	Rebuild splitter island	6	05-Nov-09	12-Nov-09	223
A7350	White Lines / Traffic Signals / Road Signs	4	28-Oct-09	02-Nov-09	231
A7355	Remove fencing and Traffic Management	1	13-Nov-09	13-Nov-09	223
Torphicen Ch 1125-940		47	19-Mar-10	26-May-10	163
Phase 3		47	19-Mar-10	26-May-10	163
North Pavement		13	19-Mar-10	07-Apr-10	144
A7680	Establish Traffic Management & Temp. Fencing	2	19-Mar-10	22-Mar-10	120
A7690	Replace north kerb line	10	23-Mar-10	06-Apr-10	120
A7695	Remove fencing and Traffic Management	1	07-Apr-10	07-Apr-10	120
South Pavement		14	08-Apr-10	27-Apr-10	146
A7700	Establish Traffic Management & Temp. Fencing	2	08-Apr-10	09-Apr-10	120
A7710	Excavate for new channel and kerb line / remove e>	2	12-Apr-10	13-Apr-10	120
A7720	Construct Kerb lines	3	14-Apr-10	16-Apr-10	120
A7730	Reset Gullies	2	19-Apr-10	20-Apr-10	120
A7740	Surface new channel	1	21-Apr-10	21-Apr-10	120
A7750	Pavement Works	7	19-Apr-10	27-Apr-10	120
A7760	Street Lighting / Traffic Signals / Road Signs	3	19-Apr-10	21-Apr-10	120
A7765	Remove fencing and Traffic Management	1	22-Apr-10	22-Apr-10	120
Splitter Island		23	23-Apr-10	26-May-10	163
A7770	Establish Traffic Management & Temp. Fencing	2	23-Apr-10	26-Apr-10	120
A7780	Excavate for new channel and kerb line / remove e>	2	27-Apr-10	28-Apr-10	120
A7790	Construct Kerb lines	4	28-Apr-10	04-May-10	120
A7800	Reset Gullies	4	29-Apr-10	05-May-10	125
A7810	Surface new channel	1	06-May-:	06-May-10	125
A7820	Pavement Works	16	05-May-:	26-May-10	120
A7830	Street Lighting / Traffic Signals / Road Signs	3	05-May-:	07-May-10	124
A7835	Remove fencing and Traffic Management	1	14-May-:	14-May-10	120
West Maitland Ch 940-850		19	06-Jan-10	01-Feb-10	4
Phase 1		19	06-Jan-10	01-Feb-10	4
South Pavement		11	06-Jan-10	20-Jan-10	4
A7840	Establish Traffic Management & Temp. Fencing	2	06-Jan-10	07-Jan-10	4
A7850	Excavate for new channel and kerb line / remove e>	2	08-Jan-10	11-Jan-10	4
A7860	Construct Kerb lines	4	11-Jan-10	14-Jan-10	4
A7870	Reset Gullies	4	12-Jan-10	15-Jan-10	4
A7880	Surface new channel	2	18-Jan-10	19-Jan-10	4
A7885	Remove fencing and Traffic Management	1	20-Jan-10	20-Jan-10	4
North Pavement		8	21-Jan-10	01-Feb-10	4
A7890	Establish Traffic Management & Temp. Fencing	2	21-Jan-10	22-Jan-10	4
A7900	Excavate for new channel and kerb line / remove e>	1	25-Jan-10	25-Jan-10	4



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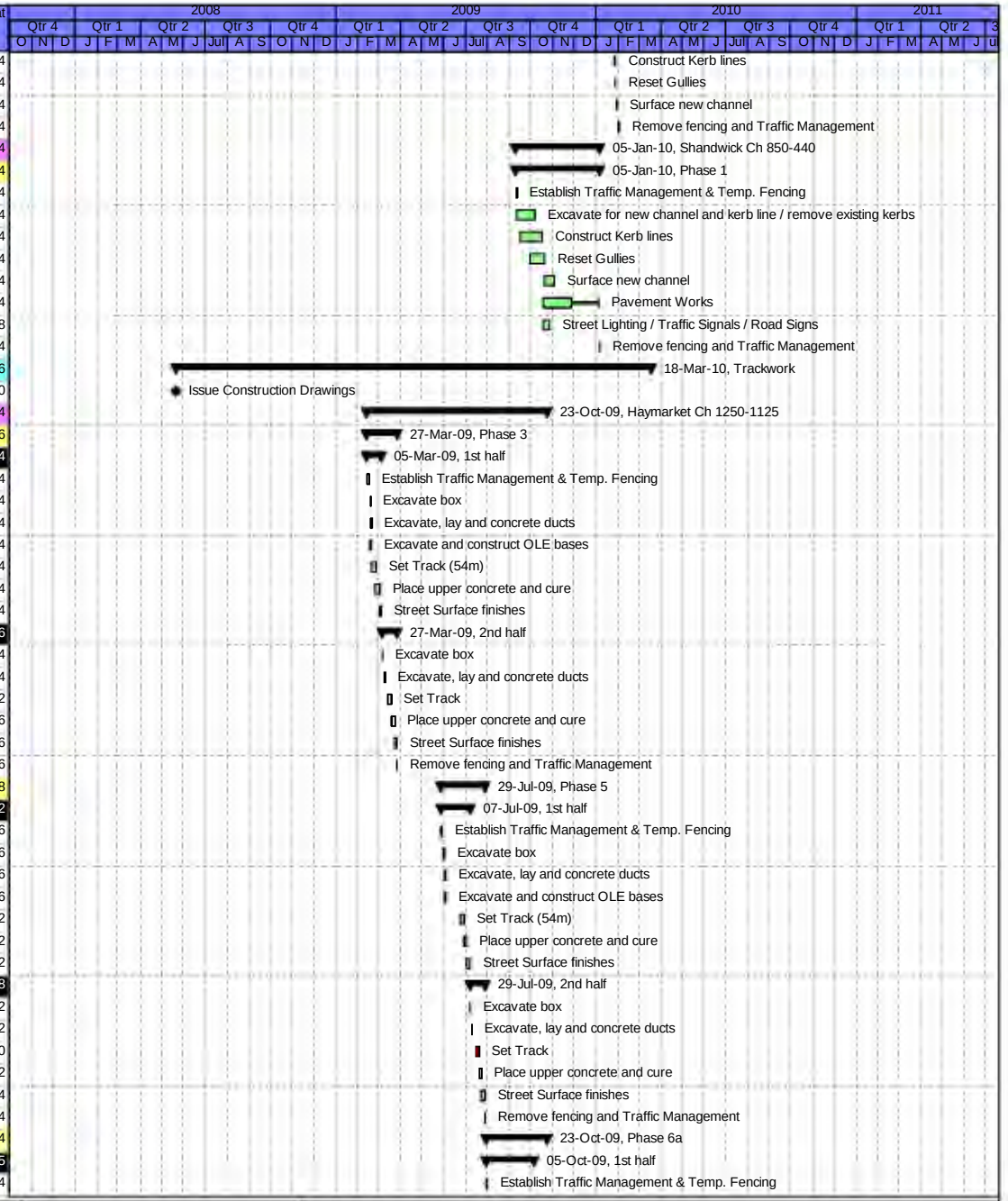
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A7910	Construct Kerb lines	2	26-Jan-10	27-Jan-10	4
A7920	Reset Gullies	1	28-Jan-10	28-Jan-10	4
A7930	Surface new channel	1	29-Jan-10	29-Jan-10	4
A7935	Remove fencing and Traffic Management	1	01-Feb-10	01-Feb-10	4
Shandwick Ch 850-440		74	09-Sep-09	05-Jan-10	4
Phase 1		74	09-Sep-09	05-Jan-10	4
A8180	Establish Traffic Management & Temp. Fencing	2	09-Sep-09	10-Sep-09	4
A8190	Excavate for new channel and kerb line / remove e>	18	11-Sep-09	06-Oct-09	4
A8200	Construct Kerb lines	23	16-Sep-09	16-Oct-09	4
A8210	Reset Gullies	15	30-Sep-09	20-Oct-09	24
A8220	Surface new channel	9	21-Oct-09	02-Nov-09	24
A8230	Pavement Works	31	19-Oct-09	04-Jan-10	4
A8240	Street Lighting / Traffic Signals / Road Signs	7	19-Oct-09	27-Oct-09	28
A8245	Remove fencing and Traffic Management	1	05-Jan-10	05-Jan-10	4
Trackwork		448	21-May-(	18-Mar-10	26
12320	Issue Construction Drawings	0		21-May-08*	0
Haymarket Ch 1250-1125		177	13-Feb-09	23-Oct-09	4
Phase 3		31	13-Feb-09	27-Mar-09	16
1st half		15	13-Feb-09	05-Mar-09	4
A6570	Establish Traffic Management & Temp. Fencing	2	13-Feb-09	16-Feb-09	4
A6580	Excavate box	1	17-Feb-09	17-Feb-09	4
A6590	Excavate, lay and concrete ducts	2	18-Feb-09	19-Feb-09	4
A6600	Excavate and construct OLE bases	2	18-Feb-09	19-Feb-09	4
A6620	Set Track (54m)	4	20-Feb-09	25-Feb-09	4
A6630	Place upper concrete and cure	4	25-Feb-09	02-Mar-09	4
A6640	Street Surface finishes	3	03-Mar-09	05-Mar-09	4
2nd half		16	06-Mar-09	27-Mar-09	16
A6650	Excavate box	1	06-Mar-09	06-Mar-09	4
A6660	Excavate, lay and concrete ducts	2	09-Mar-09	10-Mar-09	4
A6690	Set Track	4	13-Mar-09	18-Mar-09	2
A6700	Place upper concrete and cure	4	18-Mar-09	23-Mar-09	16
A6710	Street Surface finishes	3	24-Mar-09	26-Mar-09	16
A6720	Remove fencing and Traffic Management	1	27-Mar-09	27-Mar-09	16
Phase 5		45	28-May-(	29-Jul-09	38
1st half		29	28-May-(	07-Jul-09	2
A6920	Establish Traffic Management & Temp. Fencing	2	28-May-(	29-May-09	16
A6940	Excavate box	1	01-Jun-09	01-Jun-09	16
A6950	Excavate, lay and concrete ducts	2	02-Jun-09	03-Jun-09	16
A6960	Excavate and construct OLE bases	2	02-Jun-09	03-Jun-09	16
A6980	Set Track (54m)	4	24-Jun-09	29-Jun-09	2
A6990	Place upper concrete and cure	4	29-Jun-09	02-Jul-09	2
A7000	Street Surface finishes	3	03-Jul-09	07-Jul-09	2
2nd half		16	08-Jul-09	29-Jul-09	38
A7010	Excavate box	1	08-Jul-09	08-Jul-09	2
A7020	Excavate, lay and concrete ducts	2	09-Jul-09	10-Jul-09	2
A7050	Set Track	4	15-Jul-09	20-Jul-09	0
A7060	Place upper concrete and cure	4	20-Jul-09	23-Jul-09	12
A7070	Street Surface finishes	3	24-Jul-09	28-Jul-09	14
A7075	Remove fencing and Traffic Management	1	29-Jul-09	29-Jul-09	14
Phase 6a		61	30-Jul-09	23-Oct-09	4
1st half		47	30-Jul-09	05-Oct-09	5
A7080	Establish Traffic Management & Temp. Fencing	2	30-Jul-09	31-Jul-09	14



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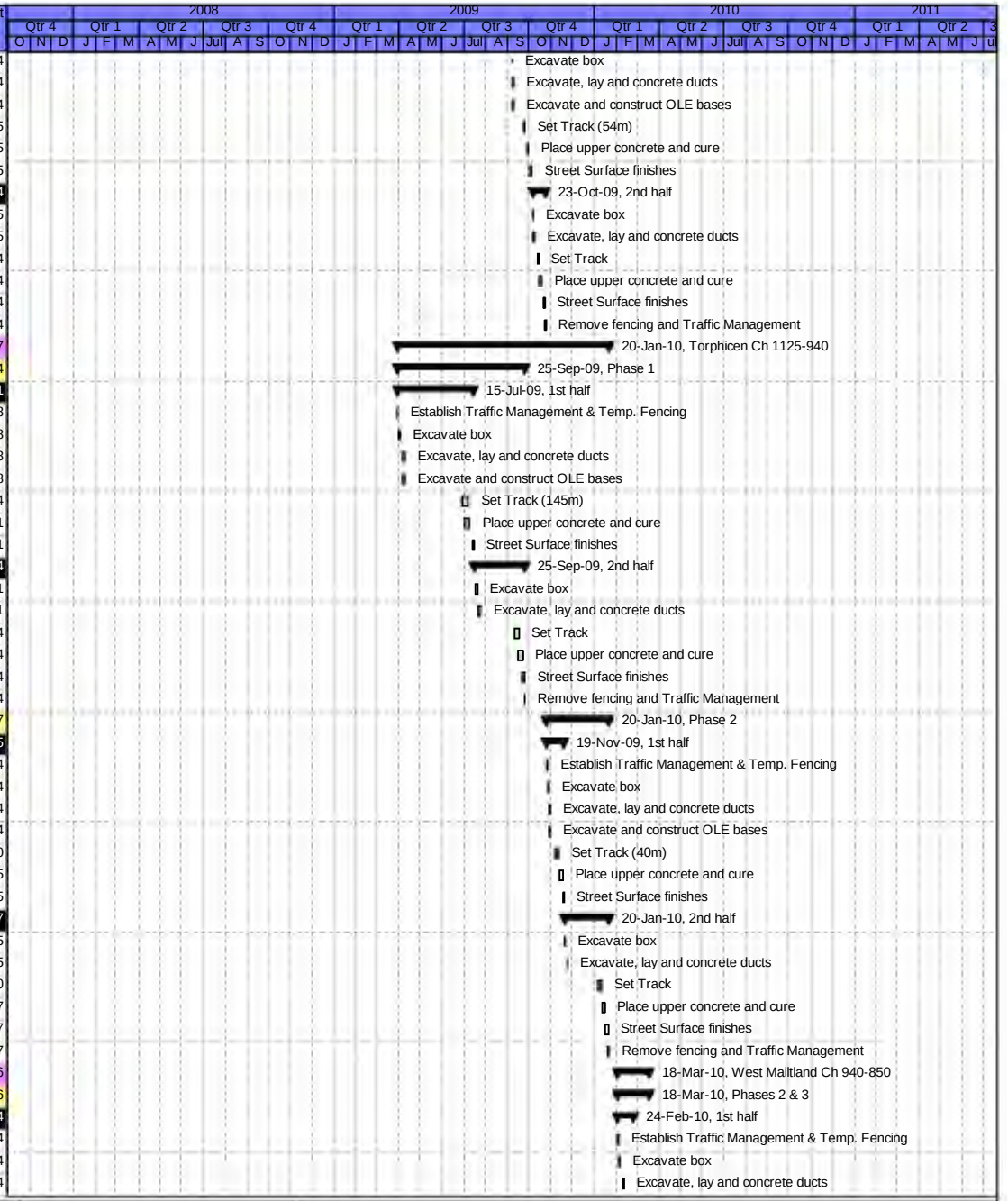
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A7100	Excavate box	1	07-Sep-09	07-Sep-09	14
A7110	Excavate, lay and concrete ducts	2	08-Sep-09	09-Sep-09	14
A7120	Excavate and construct OLE bases	2	08-Sep-09	09-Sep-09	14
A7140	Set Track (54m)	3	23-Sep-09	25-Sep-09	5
A7150	Place upper concrete and cure	3	28-Sep-09	30-Sep-09	5
A7160	Street Surface finishes	3	01-Oct-09	05-Oct-09	5
2nd half		14	06-Oct-09	23-Oct-09	4
A7170	Excavate box	1	06-Oct-09	06-Oct-09	5
A7180	Excavate, lay and concrete ducts	2	07-Oct-09	08-Oct-09	5
A7210	Set Track	3	12-Oct-09	14-Oct-09	4
A7220	Place upper concrete and cure	3	15-Oct-09	19-Oct-09	4
A7230	Street Surface finishes	3	20-Oct-09	22-Oct-09	4
A7235	Remove fencing and Traffic Management	1	23-Oct-09	23-Oct-09	4
Torphicen Ch 1125-940		198	30-Mar-09	20-Jan-10	67
Phase 1		126	30-Mar-09	25-Sep-09	24
1st half		75	30-Mar-09	15-Jul-09	11
A7360	Establish Traffic Management & Temp. Fencing	2	30-Mar-09	31-Mar-09	58
A7380	Excavate box	3	01-Apr-09	03-Apr-09	58
A7390	Excavate, lay and concrete ducts	4	06-Apr-09	09-Apr-09	58
A7400	Excavate and construct OLE bases	4	06-Apr-09	09-Apr-09	58
A7420	Set Track (145m)	6	30-Jun-09	07-Jul-09	4
A7430	Place upper concrete and cure	6	03-Jul-09	10-Jul-09	11
A7440	Street Surface finishes	3	13-Jul-09	15-Jul-09	11
2nd half		51	16-Jul-09	25-Sep-09	24
A7450	Excavate box	3	16-Jul-09	20-Jul-09	11
A7460	Excavate, lay and concrete ducts	4	21-Jul-09	24-Jul-09	11
A7490	Set Track	6	09-Sep-09	16-Sep-09	4
A7500	Place upper concrete and cure	6	14-Sep-09	21-Sep-09	24
A7510	Street Surface finishes	3	22-Sep-09	24-Sep-09	24
A7515	Remove fencing and Traffic Management	1	25-Sep-09	25-Sep-09	24
Phase 2		52	26-Oct-09	20-Jan-10	67
1st half		19	26-Oct-09	19-Nov-09	5
A7520	Establish Traffic Management & Temp. Fencing	2	26-Oct-09	27-Oct-09	4
A7540	Excavate box	1	28-Oct-09	28-Oct-09	4
A7550	Excavate, lay and concrete ducts	2	29-Oct-09	30-Oct-09	4
A7560	Excavate and construct OLE bases	2	29-Oct-09	30-Oct-09	4
A7580	Set Track (40m)	4	06-Nov-09	11-Nov-09	0
A7590	Place upper concrete and cure	4	11-Nov-09	16-Nov-09	5
A7600	Street Surface finishes	3	17-Nov-09	19-Nov-09	5
2nd half		33	20-Nov-09	20-Jan-10	67
A7610	Excavate box	1	20-Nov-09	20-Nov-09	5
A7620	Excavate, lay and concrete ducts	2	23-Nov-09	24-Nov-09	5
A7650	Set Track	4	06-Jan-10	11-Jan-10	0
A7660	Place upper concrete and cure	4	11-Jan-10	14-Jan-10	67
A7670	Street Surface finishes	3	15-Jan-10	19-Jan-10	67
A7675	Remove fencing and Traffic Management	1	20-Jan-10	20-Jan-10	67
West Mailtland Ch 940-850		33	02-Feb-10	18-Mar-10	26
Phases 2 & 3		33	02-Feb-10	18-Mar-10	26
1st half		17	02-Feb-10	24-Feb-10	4
A7940	Establish Traffic Management & Temp. Fencing	2	02-Feb-10	03-Feb-10	4
A7960	Excavate box	2	04-Feb-10	05-Feb-10	4
A7970	Excavate, lay and concrete ducts	3	08-Feb-10	10-Feb-10	4



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Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A7980	Excavate and construct OLE bases	3	08-Feb-10	10-Feb-10	4
A8000	Set Track (90m)	4	11-Feb-10	16-Feb-10	4
A8010	Place upper concrete and cure	4	16-Feb-10	19-Feb-10	4
A8020	Street Surface finishes	3	22-Feb-10	24-Feb-10	4
2nd half		16	25-Feb-10	18-Mar-10	26
A8030	Excavate box	2	25-Feb-10	26-Feb-10	4
A8040	Excavate, lay and concrete ducts	3	01-Mar-10	03-Mar-10	4
A8070	Set Track	4	04-Mar-10	09-Mar-10	4
A8080	Place upper concrete and cure	4	09-Mar-10	12-Mar-10	26
A8090	Street Surface finishes	3	15-Mar-10	17-Mar-10	26
A8095	Remove fencing and Traffic Management	1	18-Mar-10	18-Mar-10	26
Shandwick Place Ch 850-440		84	09-Sep-09	19-Jan-10	7
Phase 1		84	09-Sep-09	19-Jan-10	7
A8100	Establish Traffic Management & Temp. Fencing	2	09-Sep-09	10-Sep-09	16
A8110	Excavate box	17	11-Sep-09	05-Oct-09	16
A8120	Excavate, lay and concrete ducts	24	16-Sep-09	19-Oct-09	16
A8130	Excavate and construct OLE bases	24	16-Sep-09	19-Oct-09	16
A8150	Set Track (410m)	31	15-Oct-09	26-Nov-09	7
A8160	Place Upper Concrete and Cure	31	20-Oct-09	05-Jan-10	16
A8170	Street Surface finishes	16	23-Nov-09	18-Jan-10	7
A8175	Remove fencing and Traffic Management	1	19-Jan-10	19-Jan-10	7
SECTION 2 HAYMARKET CORRIDOR		435	31-Mar-08	11-Jan-10	377
Opening Sequence A (Airport to Haymarket)		435	31-Mar-08	11-Jan-10	377
02A Haymarket Corridor		435	31-Mar-08	11-Jan-10	377
E & M Installations		62	24-Jul-09	21-Oct-09	423
A4043	Access for visual inspection for E&M wayside installa	0	24-Jul-09		485
A4044	Access for E&M wayside installation (02A)	0	26-Aug-09		464
A4045	Installation of poles and building fixings	7	26-Aug-09	03-Sep-09	8
A4050	Overhead Catenary Line	16	04-Sep-09	25-Sep-09	8
A4058	Access visual inspection to cable pits for cable laying	0	19-Aug-09		468
A4059	Access to cable pits for cable laying (02A)	0	18-Sep-09		447
A4060	Install Electrical Cables	12	18-Sep-09	05-Oct-09	254
A4070	Install Fibre Optic Cables	12	18-Sep-09	05-Oct-09	271
A4080	Install Signalling Wayside Equipment	12	06-Oct-09	21-Oct-09	254
Haymarket (inc.) to Roseburn Junction (inc.)		435	31-Mar-08	11-Jan-10	377
Haymarket Station Viaduct (S19)		176	31-Mar-08	08-Dec-08	556
10330	Issue Construction Drawings	0		08-Apr-08*	0
10331	Notice to Vacate Caledonian Ale House	0		31-Mar-08*	0
1138	Demolish Caledonian Ale House	20	01-Apr-08	28-Apr-08	105
1139	Bankseat at Grid line 1	40	08-May-(	03-Jul-08	99
192	Pier 2	30	15-May-(	26-Jun-08	99
227	Pier 3	30	30-May-(	10-Jul-08	99
498	Pier 4	30	13-Jun-08	24-Jul-08	99
508	Pier 5	30	27-Jun-08	08-Aug-08	99
560	Bankseat at Gridline 6	40	11-Jul-08	05-Sep-08	99
570	Superstructure	95	04-Jul-08	14-Nov-08	99
580	Finishes	15	17-Nov-08	08-Dec-08	556
Trackwork (1135m)		278	29-May-(	14-Jul-09	329
10340	Issue Construction Drawings	0		29-May-08*	0
10350	Delay start for latest SDS design programme	0		21-Jul-08*	0
1099	Bulk Excavation - Sub Base	18	22-Jul-08	15-Aug-08	2



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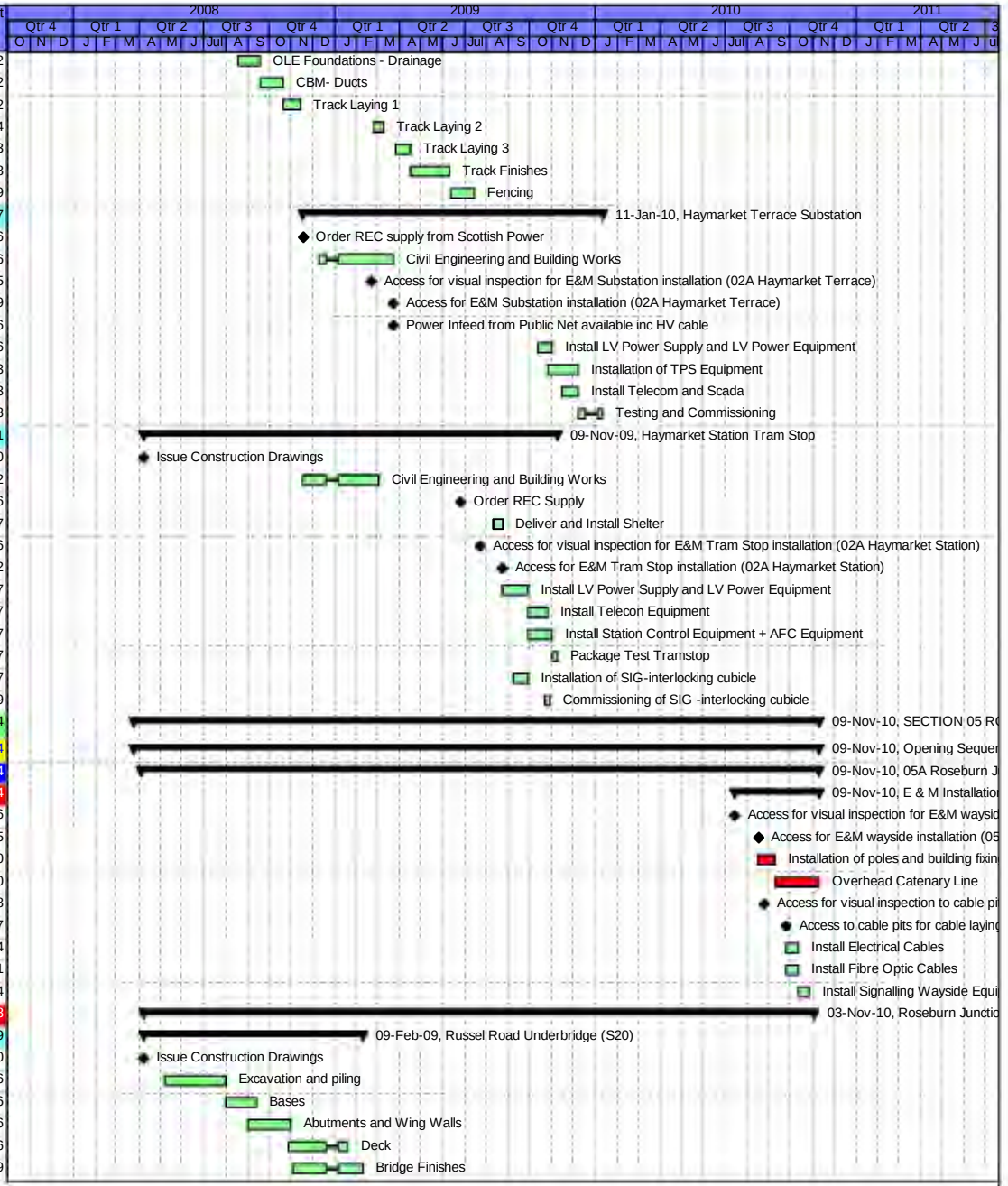
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
1109	OLE Foundations - Drainage	23	18-Aug-08	17-Sep-08	2
1119	CBM- Ducts	23	18-Sep-08	20-Oct-08	2
1129	Track Laying 1	19	21-Oct-08	14-Nov-08	2
1169	Track Laying 2	10	24-Feb-09	09-Mar-09	4
1279	Track Laying 3	14	27-Mar-09	16-Apr-09	3
263	Track Finishes	38	17-Apr-09	11-Jun-09	8
550	Fencing	23	12-Jun-09	14-Jul-09	329
Haymarket Terrace Substation		274	17-Nov-08	11-Jan-10	377
326	Order REC supply from Scottish Power	0	17-Nov-08		556
336	Civil Engineering and Building Works	65	09-Dec-08	23-Mar-09	556
A2698	Access for visual inspection for E&M Substation insta	0	20-Feb-09		625
A2699	Access for E&M Substation installation (02A Haymar	0	24-Mar-09		589
A5630	Power Infeed from Public Net available inc HV cable	0	24-Mar-09		556
A5640	Install LV Power Supply and LV Power Equipment	15	12-Oct-09	02-Nov-09	416
A5650	Installation of TPS Equipment	30	26-Oct-09	08-Dec-09	213
A5660	Install Telecom and Scada	15	16-Nov-09	08-Dec-09	213
A5670	Testing and Commissioning	14	08-Dec-09	11-Jan-10	213
Haymarket Station Tram Stop		395	08-Apr-08	09-Nov-09	411
12350	Issue Construction Drawings	0		08-Apr-08*	0
135	Civil Engineering and Building Works	65	17-Nov-08	02-Mar-09	382
488	Order REC Supply	0	26-Jun-09		506
A2480	Deliver and Install Shelter	10	10-Aug-09	24-Aug-09	247
A4678	Access for visual inspection for E&M Tram Stop inst	0	23-Jul-09		516
A4679	Access for E&M Tram Stop installation (02A Hayma	0	24-Aug-09		262
A4680	Install LV Power Supply and LV Power Equipment	25	24-Aug-09	28-Sep-09	247
A4690	Install Telecon Equipment	20	28-Sep-09	26-Oct-09	257
A4700	Install Station Control Equipment + AFC Equipment	25	28-Sep-09	02-Nov-09	247
A4710	Package Test Tramstop	5	02-Nov-09	09-Nov-09	247
A6170	Installation of SIG-interlocking cubicle	15	07-Sep-09	28-Sep-09	287
A6180	Commissioning of SIG -interlocking cubicle	5	22-Oct-09	28-Oct-09	269
SECTION 05 ROSEBURN JUNCTION TO GOGAR		651	26-Mar-08	09-Nov-10	164
Opening Sequence A (Airport to Haymarket)		651	26-Mar-08	09-Nov-10	164
05A Roseburn Junction (exc.) to Balgreen Road (inc.)		644	04-Apr-08	09-Nov-10	164
E & M Installations		82	15-Jul-10	09-Nov-10	164
A4083	Access for visual inspection for E&M wayside installa	0	15-Jul-10		246
A4084	Access for E&M wayside installation (05A)	0	17-Aug-10		225
A4085	Installation of poles and building fixings	18	17-Aug-10	09-Sep-10	0
A4090	Overhead Catenary Line	43	10-Sep-10	09-Nov-10	0
A4098	Access for visual inspection to cable pits for cable la	0	25-Aug-10		218
A4099	Access to cable pits for cable laying (05A)	0	24-Sep-10		197
A4100	Install Electrical Cables	12	24-Sep-10	11-Oct-10	4
A4110	Install Fibre Optic Cables	12	24-Sep-10	11-Oct-10	21
A4120	Install Signalling Wayside Equipment	12	12-Oct-10	27-Oct-10	4
Roseburn Junction (exc.) to Murrayfield Stadium (inc.)		638	08-Apr-08	03-Nov-10	168
Russel Road Underbridge (S20)		205	08-Apr-08	09-Feb-09	199
10270	Issue Construction Drawings	0		08-Apr-08*	0
103	Excavation and piling	60	08-May-(	31-Jul-08	76
238	Bases	30	01-Aug-08	12-Sep-08	76
429	Abutments and Wing Walls	45	01-Sep-08	31-Oct-08	76
439	Deck	50	27-Oct-08	19-Jan-09	76
449	Bridge Finishes	60	03-Nov-08	09-Feb-09	199



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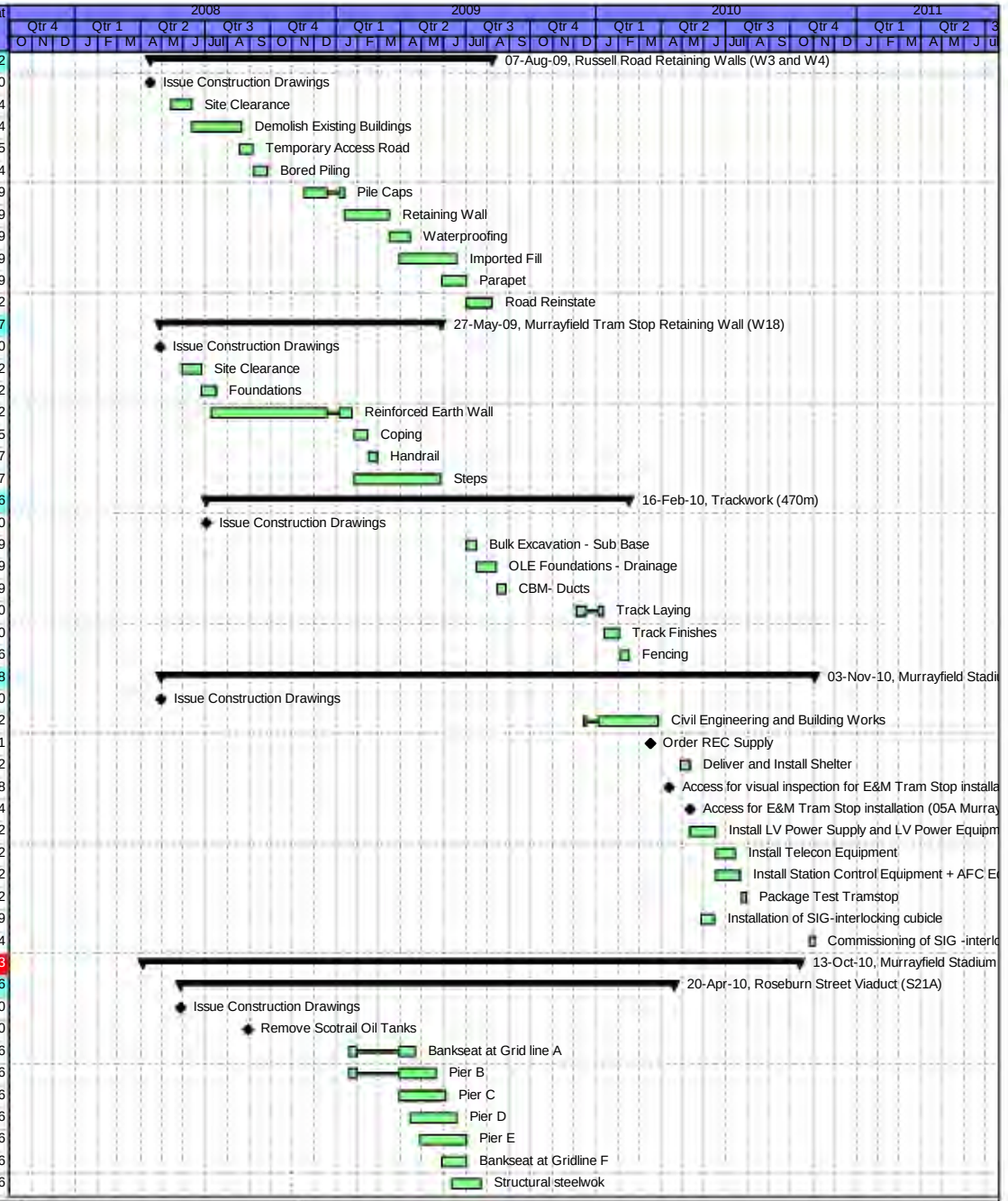
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
Russell Road Retaining Walls (W3 and W4)		325	15-Apr-08	07-Aug-09	312
10660	Issue Construction Drawings	0		15-Apr-08*	0
107	Site Clearance	20	15-May-(	12-Jun-08	134
250	Demolish Existing Buildings	50	13-Jun-08	22-Aug-08	134
338	Temporary Access Road	15	18-Aug-08	05-Sep-08	145
348	Bored Piling	15	08-Sep-08	26-Sep-08	134
370	Pile Caps	30	17-Nov-08	12-Jan-09	99
659	Retaining Wall	45	13-Jan-09	16-Mar-09	99
669	Waterproofing	20	17-Mar-09	14-Apr-09	99
679	Imported Fill	55	31-Mar-09	18-Jun-09	99
689	Parapet	25	29-May-(	02-Jul-09	99
699	Road Reinstate	25	03-Jul-09	07-Aug-09	312
Murrayfield Tram Stop Retaining Wall (W18)		265	28-Apr-08	27-May-09	247
10740	Issue Construction Drawings	0		28-Apr-08*	0
108	Site Clearance	20	29-May-(	25-Jun-08	92
182	Foundations	15	26-Jun-08	16-Jul-08	92
217	Reinforced Earth Wall	130	10-Jul-08	23-Jan-09	92
418	Coping	15	26-Jan-09	13-Feb-09	195
428	Handrail	10	16-Feb-09	27-Feb-09	247
440	Steps	85	26-Jan-09	27-May-09	247
Trackwork (470m)		396	03-Jul-08	16-Feb-10	186
10180	Issue Construction Drawings	0		03-Jul-08*	0
1029	Bulk Excavation - Sub Base	10	03-Jul-09	16-Jul-09	99
1039	OLE Foundations - Drainage	19	17-Jul-09	13-Aug-09	99
1049	CBM- Ducts	10	14-Aug-09	27-Aug-09	99
1059	Track Laying	17	04-Dec-09	11-Jan-10	30
253	Track Finishes	16	12-Jan-10	02-Feb-10	170
540	Fencing	10	03-Feb-10	16-Feb-10	186
Murrayfield Stadium Tram Stop		622	30-Apr-08	03-Nov-10	168
10460	Issue Construction Drawings	0		30-Apr-08*	0
105	Civil Engineering and Building Works	65	15-Dec-09	29-Mar-10	72
228	Order REC Supply	0	16-Mar-10		331
A2030	Deliver and Install Shelter	10	28-Apr-10	12-May-10	72
A5078	Access for visual inspection for E&M Tram Stop inst	0	13-Apr-10		328
A5079	Access for E&M Tram Stop installation (05A Murray	0	13-May-:		74
A5080	Install LV Power Supply and LV Power Equipment	25	13-May-:	17-Jun-10	72
A5090	Install Telecon Equipment	20	18-Jun-10	15-Jul-10	82
A5100	Install Station Control Equipment + AFC Equipment	25	18-Jun-10	22-Jul-10	72
A5110	Package Test Tramstop	5	23-Jul-10	29-Jul-10	72
A6270	Installation of SIG-interlocking cubicle	15	27-May-:	16-Jun-10	99
A6280	Commissioning of SIG -interlocking cubicle	5	28-Oct-10	03-Nov-10	4
Murrayfield Stadium (exc.) to Balgreen Road (inc.)		625	04-Apr-08	13-Oct-10	183
Roseburn Street Viaduct (S21A)		467	27-May-(	20-Apr-10	36
10750	Issue Construction Drawings	0		27-May-08*	0
10751	Remove Scotrail Oil Tanks	0		29-Aug-08*	0
109	Bankseat at Grid line A	25	20-Jan-09	21-Apr-09	36
172	Pier B	45	20-Jan-09	20-May-09	36
207	Pier C	45	31-Mar-09	04-Jun-09	36
398	Pier D	45	15-Apr-09	18-Jun-09	36
408	Pier E	45	29-Apr-09	02-Jul-09	36
420	Bankseat at Gridline F	25	29-May-(	02-Jul-09	36
430	Structural steelwok	30	12-Jun-09	23-Jul-09	36



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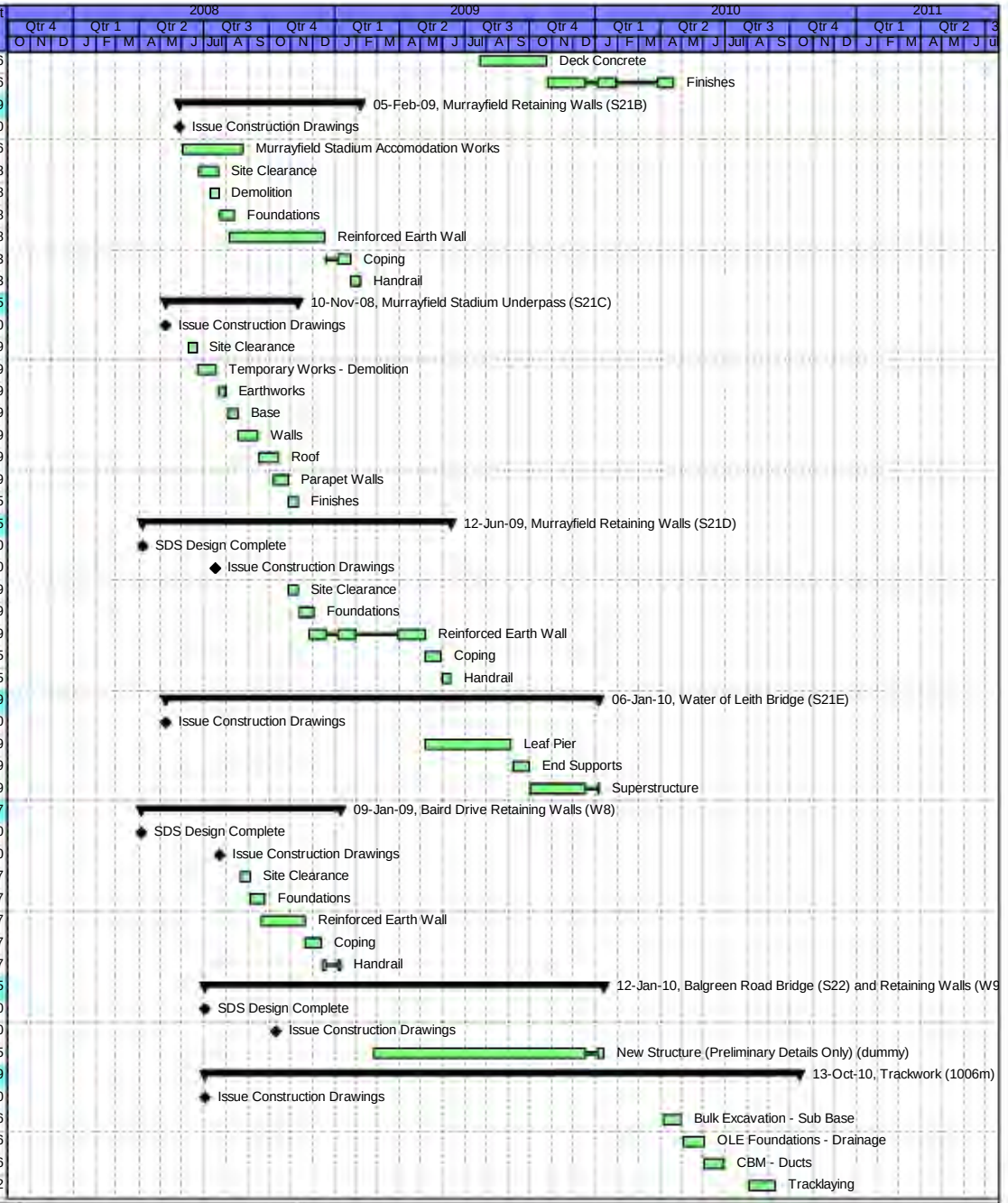
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
729	Deck Concrete	65	24-Jul-09	23-Oct-09	36
739	Finishes	75	26-Oct-09	20-Apr-10	36
Murrayfield Retaining Walls (S21B)		170	27-May-(	05-Feb-09	439
10700	Issue Construction Drawings	0		27-May-08*	0
10760	Murrayfield Stadium Accomodation Works	60	02-Jun-0	25-Aug-08	546
110	Site Clearance	20	25-Jun-0	22-Jul-08	88
197	Demolition	10	09-Jul-08	22-Jul-08	88
378	Foundations	15	23-Jul-08	13-Aug-08	88
388	Reinforced Earth Wall	95	07-Aug-08	18-Dec-08	88
400	Coping	15	19-Dec-08	22-Jan-09	323
410	Handrail	10	23-Jan-09	05-Feb-09	323
Murrayfield Stadium Underpass (S21C)		130	08-May-(	10-Nov-08	375
10720	Issue Construction Drawings	0		08-May-08*	0
112	Site Clearance	10	09-Jun-08	20-Jun-08	139
187	Temporary Works - Demolition	20	23-Jun-08	18-Jul-08	139
358	Earthworks	10	21-Jul-08	01-Aug-08	139
368	Base	10	05-Aug-08	18-Aug-08	139
380	Walls	20	19-Aug-08	15-Sep-08	139
390	Roof	20	16-Sep-08	13-Oct-08	139
709	Parapet Walls	15	07-Oct-08	27-Oct-08	139
719	Finishes	10	28-Oct-08	10-Nov-08	375
Murrayfield Retaining Walls (S21D)		292	07-Apr-08	12-Jun-09	235
10729	SDS Design Complete	0		07-Apr-08*	0
10730	Issue Construction Drawings	0		16-Jul-08*	0
111	Site Clearance	10	28-Oct-08	10-Nov-08	139
438	Foundations	15	11-Nov-08	02-Dec-08	139
448	Reinforced Earth Wall	65	25-Nov-08	07-May-09	99
450	Coping	15	08-May-(	29-May-09	235
460	Handrail	10	01-Jun-09	12-Jun-09	235
Water of Leith Bridge (S21E)		406	08-May-(	06-Jan-10	99
10770	Issue Construction Drawings	0		08-May-08*	0
113	Leaf Pier	84	08-May-(	04-Sep-09	99
639	End Supports	18	07-Sep-09	30-Sep-09	99
649	Superstructure	59	01-Oct-09	06-Jan-10	99
Baird Drive Retaining Walls (W8)		186	04-Apr-08	09-Jan-09	127
10689	SDS Design Complete	0		04-Apr-08*	0
10690	Issue Construction Drawings	0		23-Jul-08*	0
114	Site Clearance	10	22-Aug-08	04-Sep-08	127
458	Foundations	15	05-Sep-08	25-Sep-08	127
468	Reinforced Earth Wall	45	19-Sep-08	20-Nov-08	127
470	Coping	15	21-Nov-08	12-Dec-08	127
480	Handrail	10	15-Dec-08	09-Jan-09	127
Balgreen Road Bridge (S22) and Retaining Walls (W9)		371	03-Jul-08	12-Jan-10	95
10709	SDS Design Complete	0		03-Jul-08*	0
10710	Issue Construction Drawings	0		10-Oct-08*	0
115	New Structure (Preliminary Details Only) (dummy)	215	25-Feb-09	12-Jan-10	95
Trackwork (1006m)		563	03-Jul-08	13-Oct-10	19
10080	Issue Construction Drawings	0		03-Jul-08*	0
1009	Bulk Excavation - Sub Base	18	07-Apr-10	30-Apr-10	36
1019	OLE Foundations - Drainage	20	04-May-:	01-Jun-10	36
243	CBM - Ducts	20	02-Jun-10	29-Jun-10	36
530	Tracklaying	27	04-Aug-10	09-Sep-10	12



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Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
989	Track Finishes	5	10-Sep-10	16-Sep-10	12
999	Fencing	19	17-Sep-10	13-Oct-10	19
Balgreen Road Tram Stop		315	26-Jun-08	05-Oct-09	436
10790	Issue Construction Drawings	0		26-Jun-08*	0
117	Civil Engineering and Builders Work	65	16-Feb-09	19-May-09	328
328	Order REC Supply	0	21-May-(		531
A2300	Deliver and Install Shelter	10	03-Jul-09	17-Jul-09	272
A5118	Access for visual inspection for E&M Tram Stop inst	0	17-Jun-09		543
A5119	Access for E&M Tram Stop installation (05A Balgree	0	17-Jul-09		309
A5120	Install LV Power Supply and LV Power Equipment	25	17-Jul-09	24-Aug-09	272
A5130	Install Telecon Equipment	20	24-Aug-09	21-Sep-09	282
A5140	Install Station Control Equipment + AFC Equipment	25	24-Aug-09	28-Sep-09	272
A5150	Package Test Tramstop	5	28-Sep-09	05-Oct-09	272
Jenners Depository Sub Station		355	26-Jan-09	01-Jul-10	257
286	Order REC supply from Scottish Power	0	26-Jan-09		353
296	Civil Engineering and Building Works	65	16-Feb-09	19-May-09	353
A2278	Access for visual inspection for E&M Substation insta	0	20-Apr-09		584
A2279	Access for E&M Substation installation (05A Jenners	0	20-May-(		370
A5830	Power Infeed from Public Net available inc HV cable	0	20-May-(		353
A5840	Install LV Power Supply and LV Power Equipment	15	14-Apr-10	06-May-10	132
A5850	Installation of TPS Equipment	30	28-Apr-10	11-Jun-10	93
A5860	Install Telecom and Scada	15	20-May-:	11-Jun-10	93
A5870	Testing and Commissioning	14	11-Jun-10	01-Jul-10	93
05B Balgreen Road (exc.) to Edinburgh Park Central (inc.)		529	26-Mar-08	20-May-10	286
E & M Installations		147	27-Aug-09	07-Apr-10	315
A4123	Access for visual inspection for E&M wayside installa	0	27-Aug-09		462
A4124	Access for E&M wayside installation (05B)	0	28-Sep-09		441
A4125	Installation of poles and building fixings	36	28-Sep-09	16-Nov-09	8
A4130	Overhead Catenary Line	87	17-Nov-09	01-Apr-10	8
A4138	Access for visual inspection to cable pits for cable la	0	30-Oct-09		416
A4139	Access to cable pits for cable laying (05B)	0	02-Dec-09		395
A4140	Install Electrical Cables	40	02-Dec-09	09-Feb-10	146
A4150	Install Fibre Optic Cables	40	02-Dec-09	09-Feb-10	191
A4160	Install Signalling Wayside Equipment	40	10-Feb-10	07-Apr-10	146
Balgreen Road (exc.) to Saughton Road North (inc.)		529	26-Mar-08	20-May-10	286
Carricknowe Bridge (S23)		276	27-Mar-08	11-May-09	538
10809	SDS Design Complete	0		27-Mar-08*	0
10810	Issue Construction Drawings	0		22-Jul-08*	0
Carrick Knowe disruptive possessions		175	21-Aug-08	11-May-09	538
Establishment		174	21-Aug-08	09-May-09	539
12	Temporary Fencing	5	21-Aug-08	27-Aug-08	17
13	Haul Roads	5	21-Aug-08	27-Aug-08	17
24	Possessions 1 (12hrs)	0	28-Aug-08		17
A15	Possessions 2 (12hrs)	0	29-Aug-08		733
B14	Erect Network Rail Safety Barrier	2	28-Aug-08	29-Aug-08	557
C13	Possessions 4 (12hrs)	0		09-May-09	793
C14	Remove Crash Deck and Barriers	1	23-Apr-09	23-Apr-09	561
North Abutment		103	28-Aug-08	03-Feb-09	14
Excavate and Blind		10	28-Aug-08	10-Sep-08	18
106	Excavate	4	04-Sep-08	09-Sep-08	18
16	Blinding	1	10-Sep-08	10-Sep-08	18
96	Temporary Support to Railway Lines	5	28-Aug-08	03-Sep-08	18



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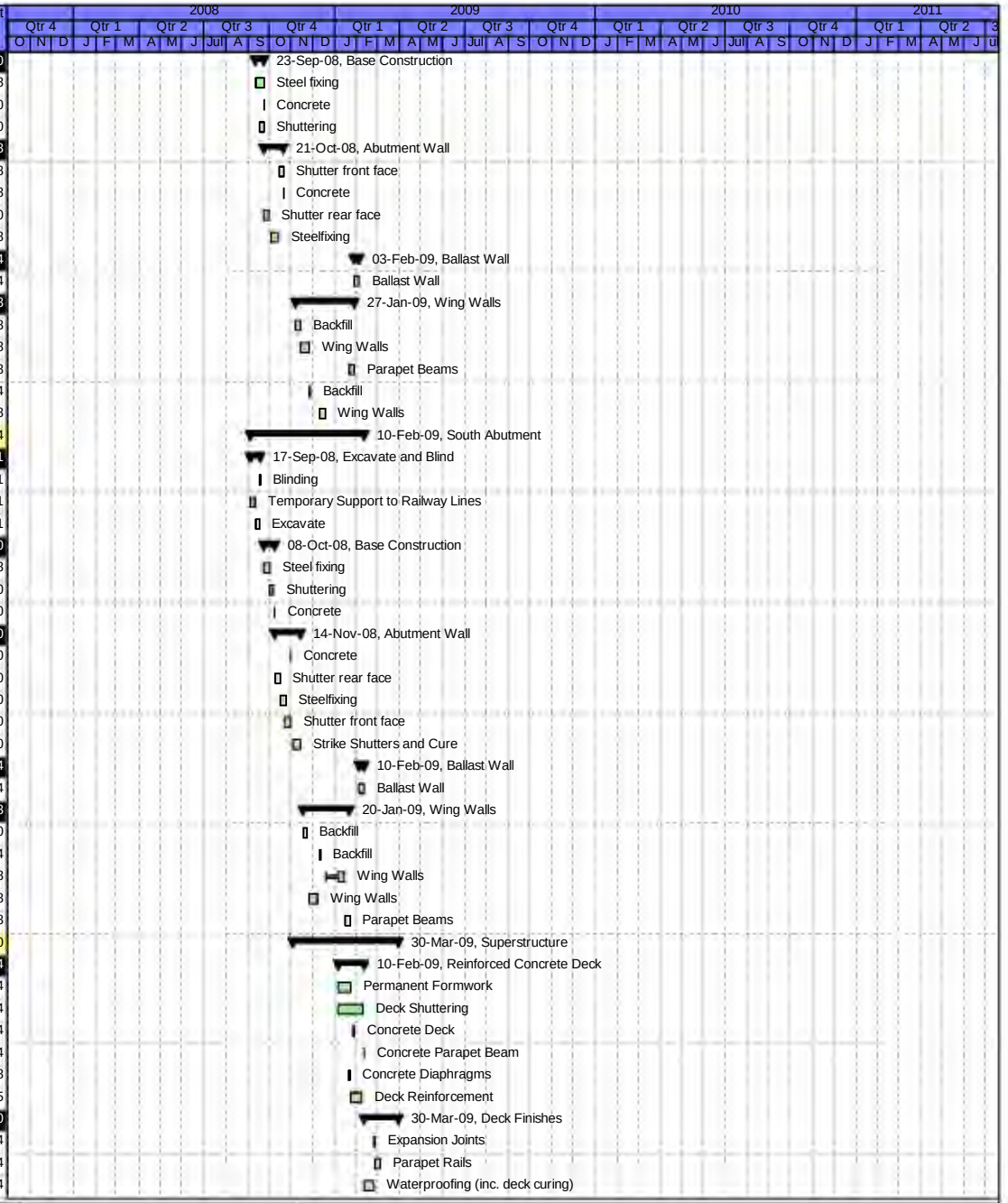
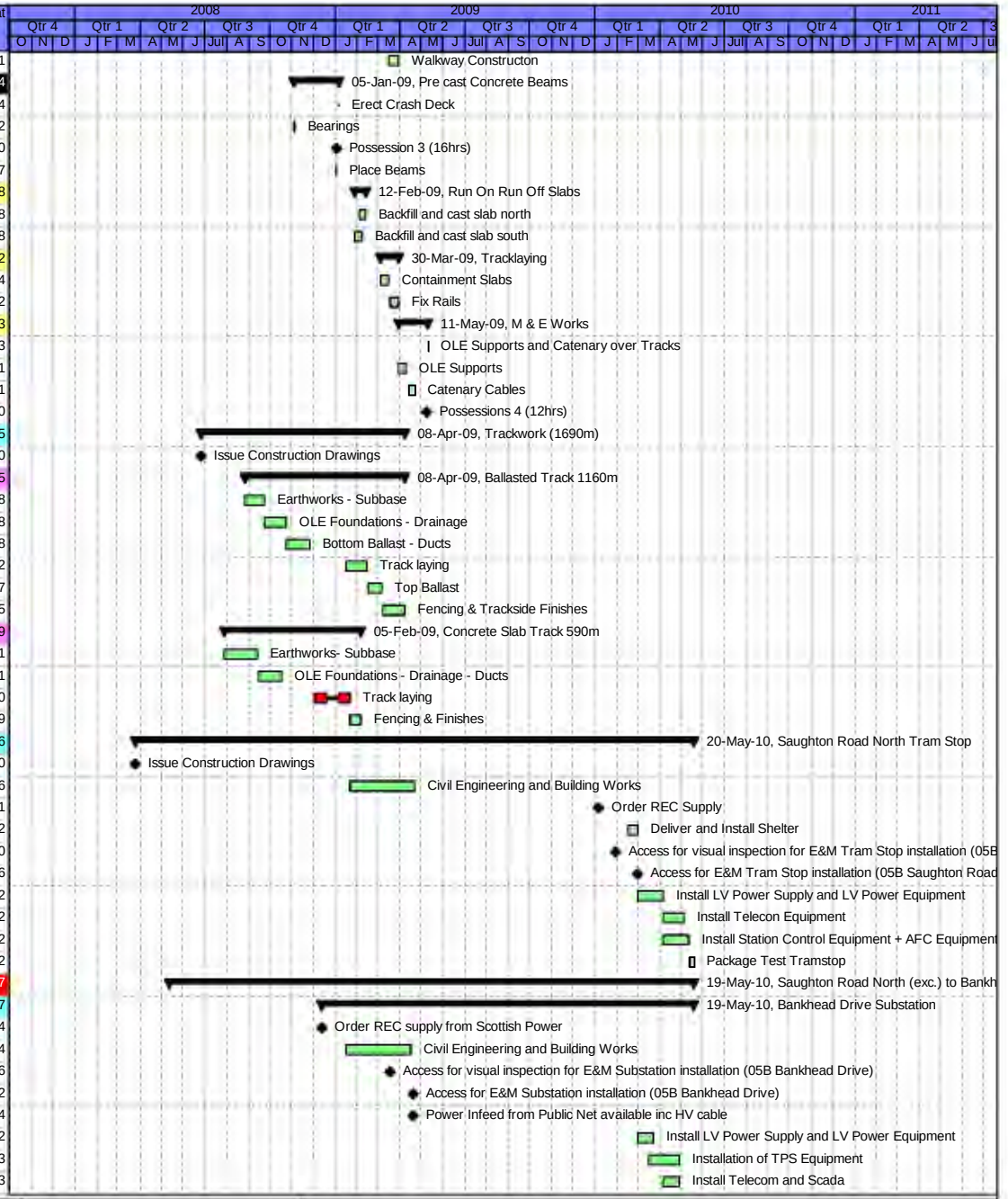
Base Construction		9	11-Sep-08	23-Sep-08	20
37	Steel fixing	8	11-Sep-08	22-Sep-08	18
7	Concrete	1	23-Sep-08	23-Sep-08	20
87	Shuttering	5	16-Sep-08	22-Sep-08	20
Abutment Wall		20	24-Sep-08	21-Oct-08	18
128	Shutter front face	6	13-Oct-08	20-Oct-08	18
28	Concrete	1	21-Oct-08	21-Oct-08	18
38	Shutter rear face	5	24-Sep-08	30-Sep-08	20
58	Steelfixing	8	03-Oct-08	14-Oct-08	18
Ballast Wall		5	28-Jan-09	03-Feb-09	14
A10	Ballast Wall	5	28-Jan-09	03-Feb-09	14
Wing Walls		47	07-Nov-08	27-Jan-09	18
69	Backfill	5	07-Nov-08	13-Nov-08	18
A140	Wing Walls	8	14-Nov-08	25-Nov-08	18
A140	Parapet Beams	5	21-Jan-09	27-Jan-09	18
A140	Backfill	2	26-Nov-08	27-Nov-08	24
A140	Wing Walls	8	09-Dec-08	18-Dec-08	18
South Abutment		103	04-Sep-08	10-Feb-09	14
Excavate and Blind		10	04-Sep-08	17-Sep-08	21
116	Blinding	1	17-Sep-08	17-Sep-08	21
206	Temporary Support to Railway Lines	5	04-Sep-08	10-Sep-08	21
236	Excavate	4	11-Sep-08	16-Sep-08	21
Base Construction		12	23-Sep-08	08-Oct-08	20
177	Steel fixing	8	23-Sep-08	02-Oct-08	18
237	Shuttering	5	01-Oct-08	07-Oct-08	20
97	Concrete	1	08-Oct-08	08-Oct-08	20
Abutment Wall		27	09-Oct-08	14-Nov-08	20
688	Concrete	1	31-Oct-08	31-Oct-08	20
698	Shutter rear face	5	09-Oct-08	15-Oct-08	20
708	Steelfixing	8	15-Oct-08	24-Oct-08	20
718	Shutter front face	6	23-Oct-08	30-Oct-08	20
A140	Strike Shutters and Cure	10	03-Nov-08	14-Nov-08	20
Ballast Wall		5	04-Feb-09	10-Feb-09	14
A140	Ballast Wall	5	04-Feb-09	10-Feb-09	14
Wing Walls		36	17-Nov-08	20-Jan-09	18
89	Backfill	5	17-Nov-08	21-Nov-08	20
A1012	Backfill	2	09-Dec-08	10-Dec-08	24
A1015	Wing Walls	8	19-Dec-08	13-Jan-09	18
A141	Wing Walls	8	26-Nov-08	08-Dec-08	18
A141	Parapet Beams	5	14-Jan-09	20-Jan-09	18
Superstructure		95	03-Nov-08	30-Mar-09	140
Reinforced Concrete Deck		26	06-Jan-09	10-Feb-09	4
104	Permanent Formwork	13	06-Jan-09	22-Jan-09	4
246	Deck Shuttering	25	06-Jan-09	09-Feb-09	4
247	Concrete Deck	1	27-Jan-09	27-Jan-09	14
257	Concrete Parapet Beam	1	10-Feb-09	10-Feb-09	4
27	Concrete Diaphragms	1	20-Jan-09	20-Jan-09	18
285	Deck Reinforcement	11	23-Jan-09	06-Feb-09	5
Deck Finishes		34	11-Feb-09	30-Mar-09	140
59	Expansion Joints	1	25-Feb-09	25-Feb-09	4
70	Parapet Rails	5	26-Feb-09	04-Mar-09	4
728	Waterproofing (inc. deck curing)	10	11-Feb-09	24-Feb-09	4



Date	Revision	Checked	Approved
29-Apr-08	Contract Programme 29 April 2008	SCS	

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
80	Walkway Constructon	10	17-Mar-09	30-Mar-09	141
Pre cast Concrete Beams		35	03-Nov-08	05-Jan-09	4
193	Erect Crash Deck	1	05-Jan-09	05-Jan-09	4
32	Bearings	2	03-Nov-08	04-Nov-08	32
63	Possession 3 (16hrs)	0		02-Jan-09*	0
93	Place Beams	1	02-Jan-09	03-Jan-09	7
Run On Run Off Slabs		12	28-Jan-09	12-Feb-09	18
275	Backfill and cast slab north	8	03-Feb-09	12-Feb-09	18
34	Backfill and cast slab south	8	28-Jan-09	06-Feb-09	18
Tracklaying		18	05-Mar-09	30-Mar-09	2
44	Containment Slabs	8	05-Mar-09	16-Mar-09	4
45	Fix Rails	8	19-Mar-09	30-Mar-09	2
M & E Works		28	31-Mar-09	11-May-09	113
265	OLE Supports and Catenary over Tracks	1	11-May-(	11-May-09	113
64	OLE Supports	8	31-Mar-09	09-Apr-09	11
75	Catenary Cables	8	13-Apr-09	22-Apr-09	11
94	Possessions 4 (12hrs)	0		09-May-09*	0
Trackwork (1690m)		192	26-Jun-08	08-Apr-09	395
12830	Issue Construction Drawings	0		26-Jun-08*	0
Ballasted Track 1160m		151	26-Aug-08	08-Apr-09	395
1533	Earthworks - Subbase	20	26-Aug-08	22-Sep-08	28
1534	OLE Foundations - Drainage	23	23-Sep-08	23-Oct-08	28
1609	Bottom Ballast - Ducts	23	24-Oct-08	25-Nov-08	28
1619	Track laying	21	16-Jan-09	13-Feb-09	2
1629	Top Ballast	15	16-Feb-09	06-Mar-09	157
1639	Fencing & Trackside Finishes	23	09-Mar-09	08-Apr-09	395
Concrete Slab Track 590m		127	28-Jul-08	05-Feb-09	439
1543	Earthworks- Subbase	34	28-Jul-08	12-Sep-08	31
1544	OLE Foundations - Drainage - Ducts	24	15-Sep-08	16-Oct-08	31
1659	Track laying	26	02-Dec-08	20-Jan-09	0
1679	Fencing & Finishes	12	21-Jan-09	05-Feb-09	439
Saughton Road North Tram Stop		529	26-Mar-08	20-May-10	286
10840	Issue Construction Drawings	0		26-Mar-08*	0
123	Civil Engineering and Building Works	65	21-Jan-09	22-Apr-09	346
248	Order REC Supply	0	05-Jan-10		381
A2080	Deliver and Install Shelter	10	16-Feb-10	02-Mar-10	122
A5158	Access for visual inspection for E&M Tram Stop inst	0	29-Jan-10		380
A5159	Access for E&M Tram Stop installation (05B Saught	0	02-Mar-10		126
A5160	Install LV Power Supply and LV Power Equipment	25	02-Mar-10	07-Apr-10	122
A5170	Install Telecon Equipment	20	07-Apr-10	06-May-10	132
A5180	Install Station Control Equipment + AFC Equipment	25	07-Apr-10	13-May-10	122
A5190	Package Test Tramstop	5	13-May-:	20-May-10	122
Saughton Road North (exc.) to Bankhead (inc.)		496	12-May-(	19-May-10	287
Bankhead Drive Substation		346	12-Dec-08	19-May-10	287
256	Order REC supply from Scottish Power	0	12-Dec-08		374
266	Civil Engineering and Building Works	65	16-Jan-09	17-Apr-09	374
A2258	Access for visual inspection for E&M Substation insta	0	19-Mar-09		606
A2259	Access for E&M Substation installation (05B Bankhe	0	20-Apr-09		392
A5880	Power Infeed from Public Net available inc HV cable	0	20-Apr-09		374
A5890	Install LV Power Supply and LV Power Equipment	15	02-Mar-10	23-Mar-10	162
A5900	Installation of TPS Equipment	30	16-Mar-10	28-Apr-10	123
A5910	Install Telecom and Scada	15	07-Apr-10	28-Apr-10	123



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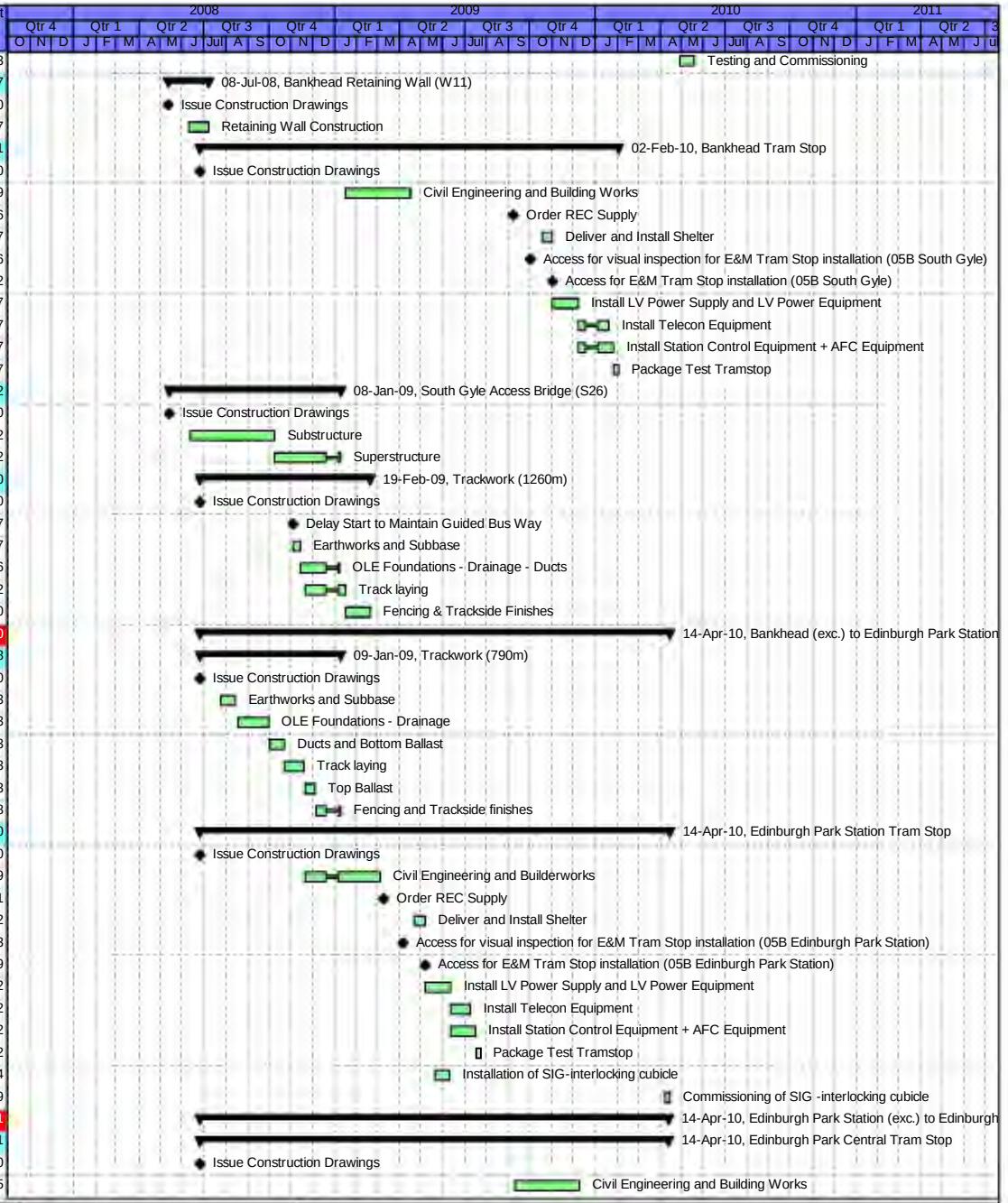
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A5920	Testing and Commissioning	14	28-Apr-10	19-May-10	123
Bankhead Retaining Wall (W11)		40	12-May-(	08-Jul-08	67
10860	Issue Construction Drawings	0		12-May-08*	0
127	Retaining Wall Construction	20	11-Jun-08	08-Jul-08	67
Bankhead Tram Stop		390	26-Jun-08	02-Feb-10	361
12870	Issue Construction Drawings	0		26-Jun-08*	0
129	Civil Engineering and Building Works	65	16-Jan-09	17-Apr-09	349
318	Order REC Supply	0	07-Sep-09		456
A2230	Deliver and Install Shelter	10	19-Oct-09	02-Nov-09	197
A5198	Access for visual inspection for E&M Tram Stop inst	0	01-Oct-09		466
A5199	Access for E&M Tram Stop installation (05B South (	0	02-Nov-09		212
A5200	Install LV Power Supply and LV Power Equipment	25	02-Nov-09	08-Dec-09	197
A5210	Install Telecon Equipment	20	08-Dec-09	19-Jan-10	207
A5220	Install Station Control Equipment + AFC Equipment	25	08-Dec-09	26-Jan-10	197
A5230	Package Test Tramstop	5	26-Jan-10	02-Feb-10	197
South Gyle Access Bridge (S26)		158	14-May-(	08-Jan-09	2
12880	Issue Construction Drawings	0		14-May-08*	0
156	Substructure	83	13-Jun-08	08-Oct-08	2
276	Superstructure	55	09-Oct-08	08-Jan-09	2
Trackwork (1260m)		158	26-Jun-08	19-Feb-09	160
12890	Issue Construction Drawings	0		26-Jun-08*	0
13000	Delay Start to Maintain Guided Bus Way	0		03-Nov-08*	7
223	Earthworks and Subbase	8	04-Nov-08	13-Nov-08	7
510	OLE Foundations - Drainage - Ducts	28	14-Nov-08	07-Jan-09	166
919	Track laying	29	21-Nov-08	15-Jan-09	2
939	Fencing & Trackside Finishes	25	16-Jan-09	19-Feb-09	160
Bankhead (exc.) to Edinburgh Park Station (inc.)		441	26-Jun-08	14-Apr-10	310
Trackwork (790m)		129	26-Jun-08	09-Jan-09	458
12900	Issue Construction Drawings	0		26-Jun-08*	0
213	Earthworks and Subbase	15	25-Jul-08	15-Aug-08	3
500	OLE Foundations - Drainage	32	18-Aug-08	30-Sep-08	3
859	Ducts and Bottom Ballast	16	01-Oct-08	22-Oct-08	3
879	Track laying	20	23-Oct-08	19-Nov-08	3
889	Top Ballast	10	20-Nov-08	04-Dec-08	213
899	Fencing and Trackside finishes	16	05-Dec-08	09-Jan-09	458
Edinburgh Park Station Tram Stop		441	26-Jun-08	14-Apr-10	310
12910	Issue Construction Drawings	0		26-Jun-08*	0
132	Civil Engineering and Builderworks	65	20-Nov-08	05-Mar-09	379
278	Order REC Supply	0	10-Mar-09		581
A2140	Deliver and Install Shelter	10	22-Apr-09	07-May-09	322
A5238	Access for visual inspection for E&M Tram Stop inst	0	07-Apr-09		593
A5239	Access for E&M Tram Stop installation (05B Edinbu	0	07-May-(		339
A5240	Install LV Power Supply and LV Power Equipment	25	07-May-(	12-Jun-09	322
A5250	Install Telecon Equipment	20	12-Jun-09	10-Jul-09	332
A5260	Install Station Control Equipment + AFC Equipment	25	12-Jun-09	17-Jul-09	322
A5270	Package Test Tramstop	5	17-Jul-09	24-Jul-09	322
A6290	Installation of SIG-interlocking cubicle	15	21-May-(	11-Jun-09	364
A6300	Commissioning of SIG -interlocking cubicle	5	08-Apr-10	14-Apr-10	149
Edinburgh Park Station (exc.) to Edinburgh Park Central (inc.)		440	26-Jun-08	14-Apr-10	311
Edinburgh Park Central Tram Stop		440	26-Jun-08	14-Apr-10	311
12920	Issue Construction Drawings	0		26-Jun-08*	0
166	Civil Engineering and Building Works	65	09-Sep-09	09-Dec-09	185



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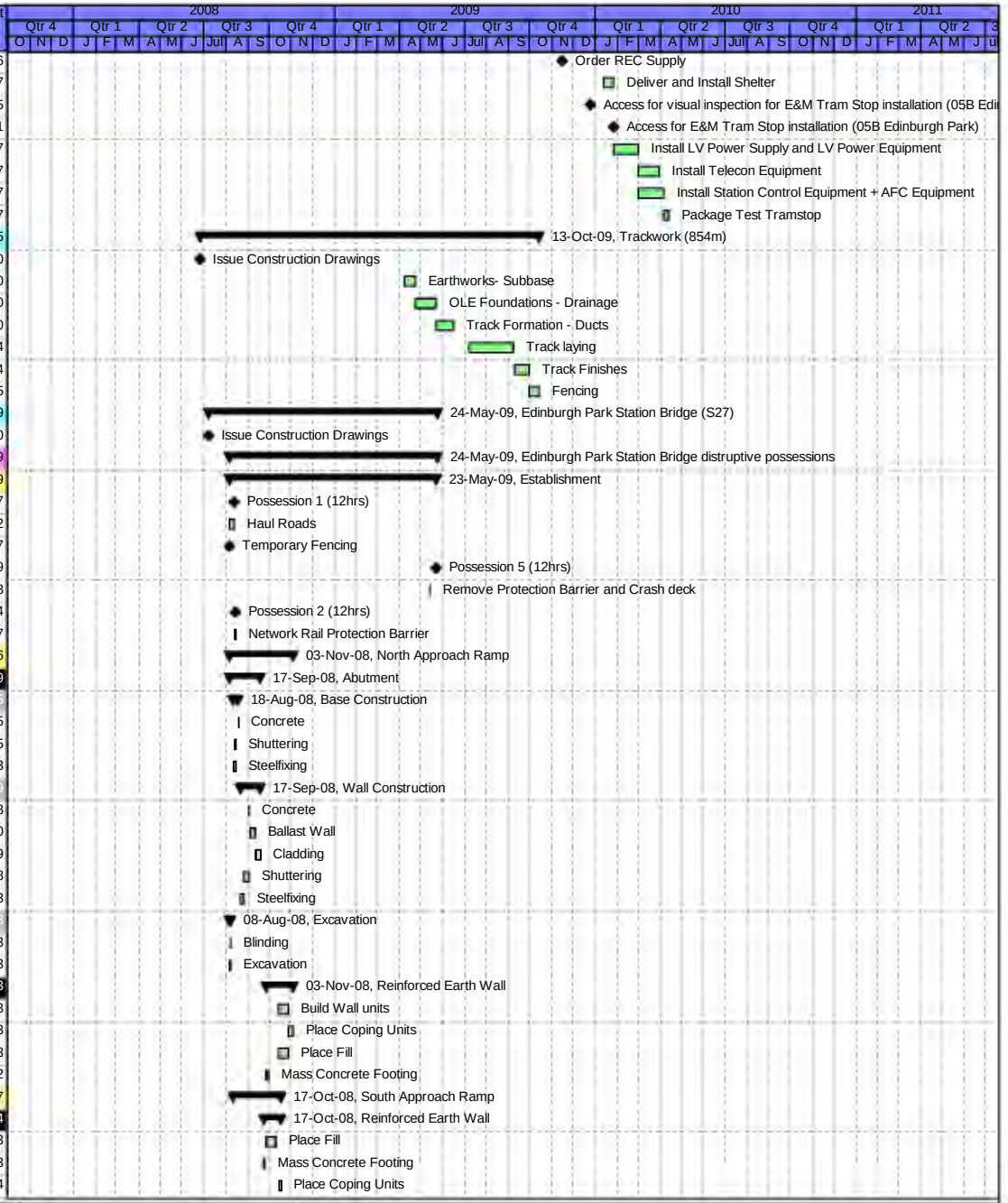
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
268	Order REC Supply	0	16-Nov-09		406
A2110	Deliver and Install Shelter	10	12-Jan-10	26-Jan-10	147
A5278	Access for visual inspection for E&M Tram Stop inst	0	25-Dec-09		405
A5279	Access for E&M Tram Stop installation (05B Edinbui	0	26-Jan-10		151
A5280	Install LV Power Supply and LV Power Equipment	25	26-Jan-10	02-Mar-10	147
A5290	Install Telecon Equipment	20	02-Mar-10	30-Mar-10	157
A5300	Install Station Control Equipment + AFC Equipment	25	02-Mar-10	07-Apr-10	147
A5310	Package Test Tramstop	5	07-Apr-10	14-Apr-10	147
Trackwork (854m)		322	26-Jun-08	13-Oct-09	265
12930	Issue Construction Drawings	0		26-Jun-08*	0
203	Earthworks- Subbase	11	08-Apr-09	24-Apr-09	20
490	OLE Foundations - Drainage	19	24-Apr-09	22-May-09	20
829	Track Formation - Ducts	16	22-May-(	16-Jun-09	20
839	Track laying	44	08-Jul-09	08-Sep-09	4
849	Track Finishes	15	09-Sep-09	29-Sep-09	14
869	Fencing	10	30-Sep-09	13-Oct-09	265
Edinburgh Park Station Bridge (S27)		215	07-Jul-08	24-May-09	529
12940	Issue Construction Drawings	0		07-Jul-08*	0
Edinburgh Park Station Bridge distruptive possessions		195	05-Aug-08	24-May-09	529
Establishment		195	05-Aug-08	23-May-09	529
184	Possession 1 (12hrs)	0	13-Aug-08		567
363	Haul Roads	5	06-Aug-08	12-Aug-08	552
42	Temporary Fencing	0		05-Aug-08	47
A12	Possession 5 (12hrs)	0		23-May-09	779
A14	Remove Protection Barrier and Crash deck	1	14-May-(	14-May-09	378
A14120	Possession 2 (12hrs)	0	14-Aug-08		744
A14130	Network Rail Protection Barrier	2	13-Aug-08	14-Aug-08	567
North Approach Ramp		64	06-Aug-08	03-Nov-08	496
Abutment		31	06-Aug-08	17-Sep-08	529
Base Construction		6	11-Aug-08	18-Aug-08	125
11	Concrete	1	18-Aug-08	18-Aug-08	125
479	Shuttering	3	13-Aug-08	15-Aug-08	125
758	Steelfixing	4	11-Aug-08	14-Aug-08	123
Wall Construction		20	21-Aug-08	17-Sep-08	529
11	Concrete	1	03-Sep-08	03-Sep-08	138
292	Ballast Wall	5	04-Sep-08	10-Sep-08	160
513	Cladding	5	11-Sep-08	17-Sep-08	529
579	Shuttering	5	27-Aug-08	02-Sep-08	138
768	Steelfixing	4	21-Aug-08	26-Aug-08	123
Excavation		3	06-Aug-08	08-Aug-08	123
267	Blinding	1	08-Aug-08	08-Aug-08	123
426	Excavation	2	06-Aug-08	07-Aug-08	123
Reinforced Earth Wall		27	26-Sep-08	03-Nov-08	123
101	Build Wall units	11	13-Oct-08	27-Oct-08	123
212	Place Coping Units	5	28-Oct-08	03-Nov-08	123
469	Place Fill	11	13-Oct-08	27-Oct-08	123
748	Mass Concrete Footing	2	26-Sep-08	29-Sep-08	132
South Approach Ramp		50	11-Aug-08	17-Oct-08	507
Reinforced Earth Wall		18	24-Sep-08	17-Oct-08	134
459	Place Fill	11	26-Sep-08	10-Oct-08	123
738	Mass Concrete Footing	2	24-Sep-08	25-Sep-08	123
A102	Place Coping Units	5	13-Oct-08	17-Oct-08	134



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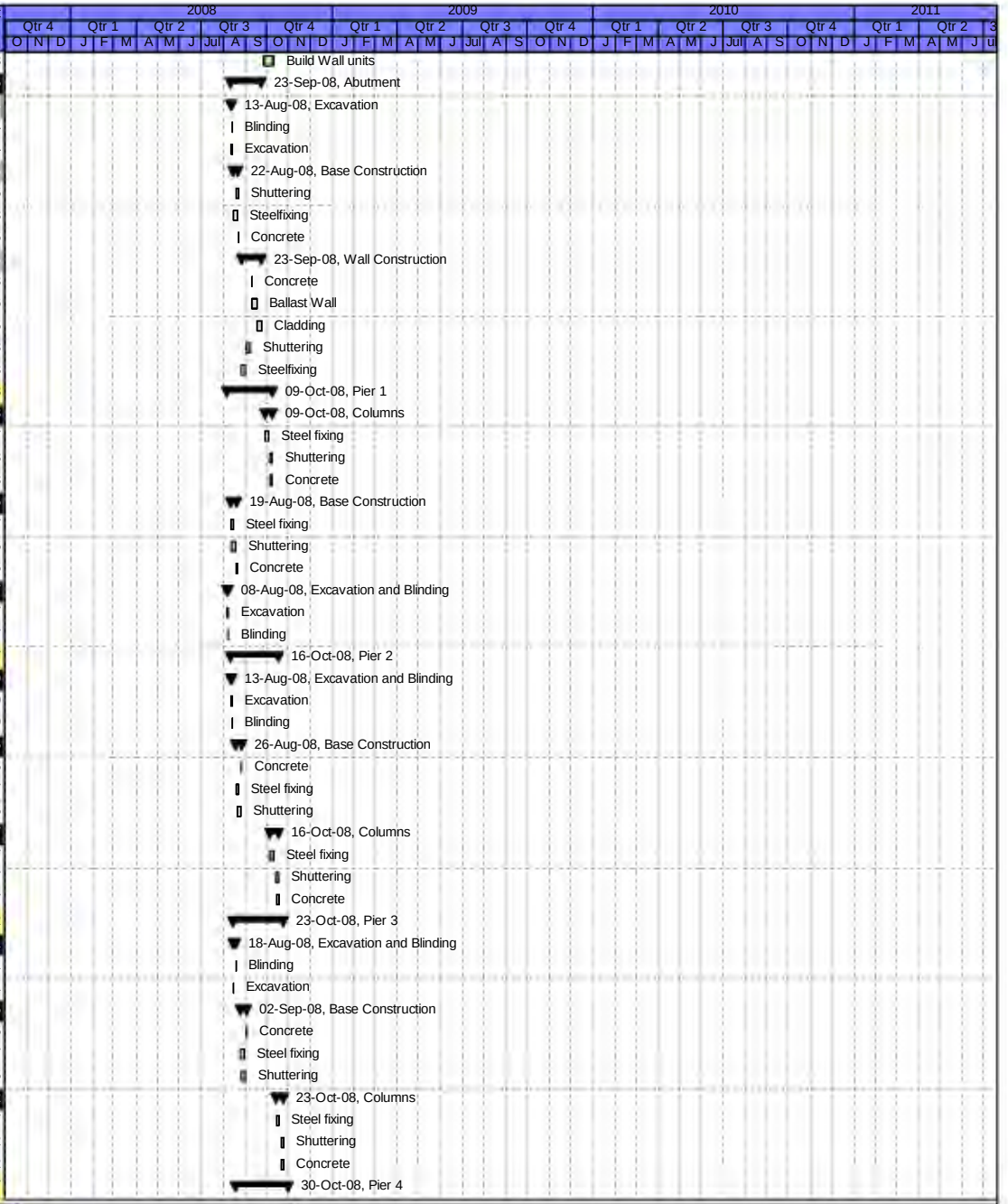
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A141	Build Wall units	11	26-Sep-08	10-Oct-08	123
Abutment		32	11-Aug-08	23-Sep-08	525
Excavation		3	11-Aug-08	13-Aug-08	124
277	Blinding	1	13-Aug-08	13-Aug-08	124
436	Excavation	2	11-Aug-08	12-Aug-08	124
Base Construction		6	15-Aug-08	22-Aug-08	125
589	Shuttering	3	19-Aug-08	21-Aug-08	125
778	Steelfixing	4	15-Aug-08	20-Aug-08	123
A1	Concrete	1	22-Aug-08	22-Aug-08	125
Wall Construction		20	27-Aug-08	23-Sep-08	525
11	Concrete	1	09-Sep-08	09-Sep-08	123
322	Ballast Wall	5	10-Sep-08	16-Sep-08	156
523	Cladding	5	17-Sep-08	23-Sep-08	525
599	Shuttering	5	02-Sep-08	08-Sep-08	123
788	Steelfixing	4	27-Aug-08	01-Sep-08	123
Pier 1		47	06-Aug-08	09-Oct-08	48
Columns		9	29-Sep-08	09-Oct-08	48
202	Steel fixing	5	29-Sep-08	03-Oct-08	47
383	Shuttering	4	06-Oct-08	09-Oct-08	48
393	Concrete	4	06-Oct-08	09-Oct-08	48
Base Construction		7	11-Aug-08	19-Aug-08	75
191	Steel fixing	5	11-Aug-08	15-Aug-08	47
201	Shuttering	4	13-Aug-08	18-Aug-08	75
81	Concrete	1	19-Aug-08	19-Aug-08	75
Excavation and Blinding		3	06-Aug-08	08-Aug-08	47
360	Excavation	2	06-Aug-08	07-Aug-08	47
800	Blinding	1	08-Aug-08	08-Aug-08	47
Pier 2		49	11-Aug-08	16-Oct-08	57
Excavation and Blinding		3	11-Aug-08	13-Aug-08	49
120	Excavation	2	11-Aug-08	12-Aug-08	49
290	Blinding	1	13-Aug-08	13-Aug-08	49
Base Construction		7	18-Aug-08	26-Aug-08	75
241	Concrete	1	26-Aug-08	26-Aug-08	75
251	Steel fixing	5	18-Aug-08	22-Aug-08	47
261	Shuttering	4	20-Aug-08	25-Aug-08	75
Columns		9	06-Oct-08	16-Oct-08	57
232	Steel fixing	5	06-Oct-08	10-Oct-08	47
403	Shuttering	4	13-Oct-08	16-Oct-08	57
413	Concrete	4	13-Oct-08	16-Oct-08	57
Pier 3		51	14-Aug-08	23-Oct-08	52
Excavation and Blinding		3	14-Aug-08	18-Aug-08	51
810	Blinding	1	18-Aug-08	18-Aug-08	51
820	Excavation	2	14-Aug-08	15-Aug-08	51
Base Construction		7	25-Aug-08	02-Sep-08	75
211	Concrete	1	02-Sep-08	02-Sep-08	75
221	Steel fixing	5	25-Aug-08	29-Aug-08	47
231	Shuttering	4	27-Aug-08	01-Sep-08	75
Columns		9	13-Oct-08	23-Oct-08	52
222	Steel fixing	5	13-Oct-08	17-Oct-08	47
A103	Shuttering	4	20-Oct-08	23-Oct-08	52
A113	Concrete	4	20-Oct-08	23-Oct-08	52
Pier 4		53	19-Aug-08	30-Oct-08	47



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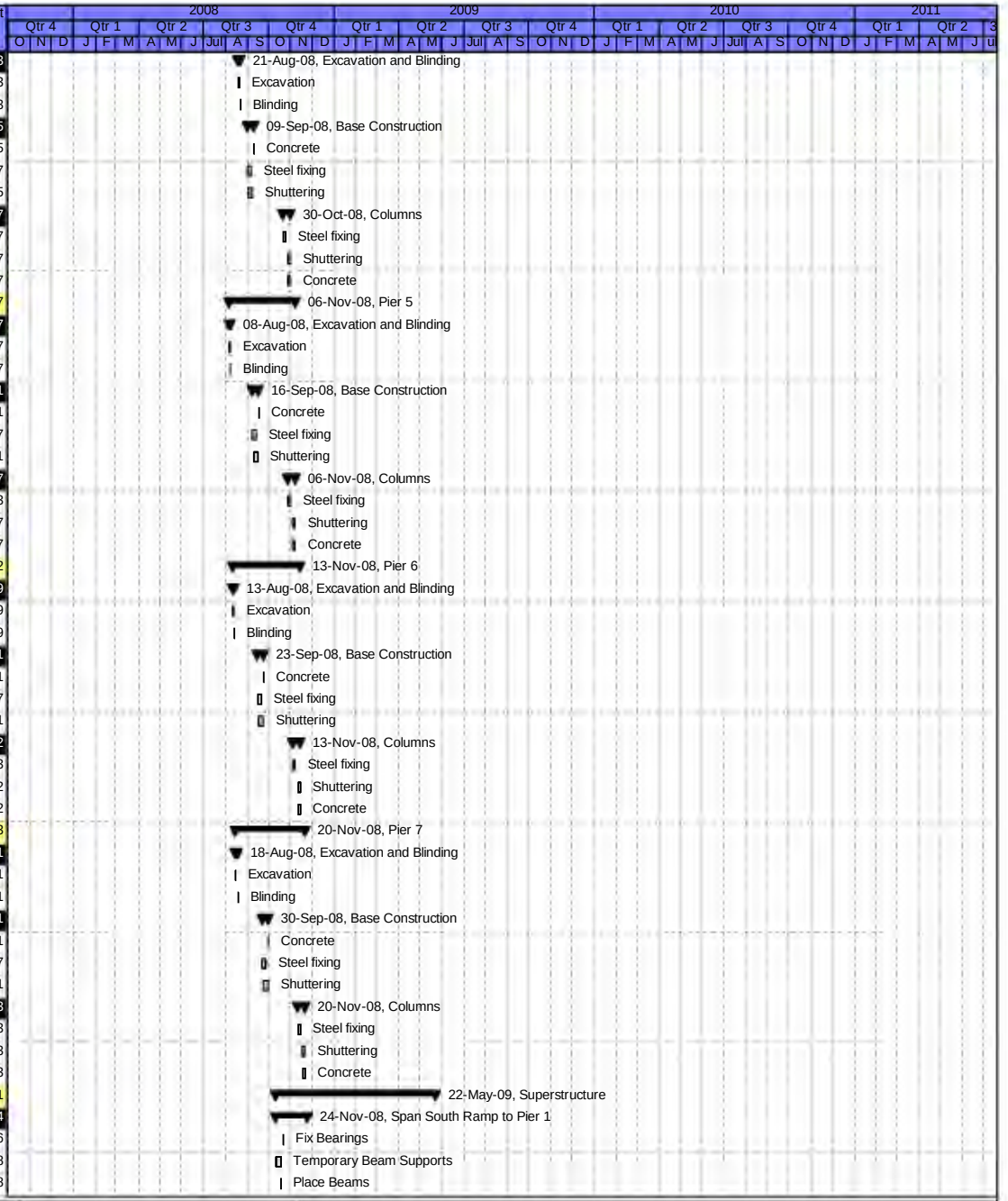
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
Excavation and Blinding		3	19-Aug-08	21-Aug-08	53
850	Excavation	2	19-Aug-08	20-Aug-08	53
860	Blinding	1	21-Aug-08	21-Aug-08	53
Base Construction		7	01-Sep-08	09-Sep-08	75
331	Concrete	1	09-Sep-08	09-Sep-08	75
341	Steel fixing	5	01-Sep-08	05-Sep-08	47
351	Shuttering	4	03-Sep-08	08-Sep-08	75
Columns		9	20-Oct-08	30-Oct-08	47
242	Steel fixing	5	20-Oct-08	24-Oct-08	47
A123	Shuttering	4	27-Oct-08	30-Oct-08	47
A133	Concrete	4	27-Oct-08	30-Oct-08	47
Pier 5		67	06-Aug-08	06-Nov-08	77
Excavation and Blinding		3	06-Aug-08	08-Aug-08	67
830	Excavation	2	06-Aug-08	07-Aug-08	67
840	Blinding	1	08-Aug-08	08-Aug-08	67
Base Construction		7	08-Sep-08	16-Sep-08	81
271	Concrete	1	16-Sep-08	16-Sep-08	81
291	Steel fixing	5	08-Sep-08	12-Sep-08	47
321	Shuttering	4	10-Sep-08	15-Sep-08	81
Columns		9	27-Oct-08	06-Nov-08	77
262	Steel fixing	5	27-Oct-08	31-Oct-08	53
443	Shuttering	4	03-Nov-08	06-Nov-08	77
453	Concrete	4	03-Nov-08	06-Nov-08	77
Pier 6		69	11-Aug-08	13-Nov-08	72
Excavation and Blinding		3	11-Aug-08	13-Aug-08	69
890	Excavation	2	11-Aug-08	12-Aug-08	69
900	Blinding	1	13-Aug-08	13-Aug-08	69
Base Construction		7	15-Sep-08	23-Sep-08	81
361	Concrete	1	23-Sep-08	23-Sep-08	81
371	Steel fixing	5	15-Sep-08	19-Sep-08	47
381	Shuttering	4	17-Sep-08	22-Sep-08	81
Columns		9	03-Nov-08	13-Nov-08	72
252	Steel fixing	5	03-Nov-08	07-Nov-08	53
423	Shuttering	4	10-Nov-08	13-Nov-08	72
433	Concrete	4	10-Nov-08	13-Nov-08	72
Pier 7		71	14-Aug-08	20-Nov-08	53
Excavation and Blinding		3	14-Aug-08	18-Aug-08	71
870	Excavation	2	14-Aug-08	15-Aug-08	71
880	Blinding	1	18-Aug-08	18-Aug-08	71
Base Construction		7	22-Sep-08	30-Sep-08	81
391	Concrete	1	30-Sep-08	30-Sep-08	81
401	Steel fixing	5	22-Sep-08	26-Sep-08	47
591	Shuttering	4	24-Sep-08	29-Sep-08	81
Columns		9	10-Nov-08	20-Nov-08	53
272	Steel fixing	5	10-Nov-08	14-Nov-08	53
463	Shuttering	4	17-Nov-08	20-Nov-08	53
473	Concrete	4	17-Nov-08	20-Nov-08	53
Superstructure		148	10-Oct-08	22-May-09	101
Span South Ramp to Pier 1		32	10-Oct-08	24-Nov-08	94
601	Fix Bearings	1	20-Oct-08	20-Oct-08	96
611	Temporary Beam Supports	5	10-Oct-08	16-Oct-08	48
621	Place Beams	1	17-Oct-08	17-Oct-08	48



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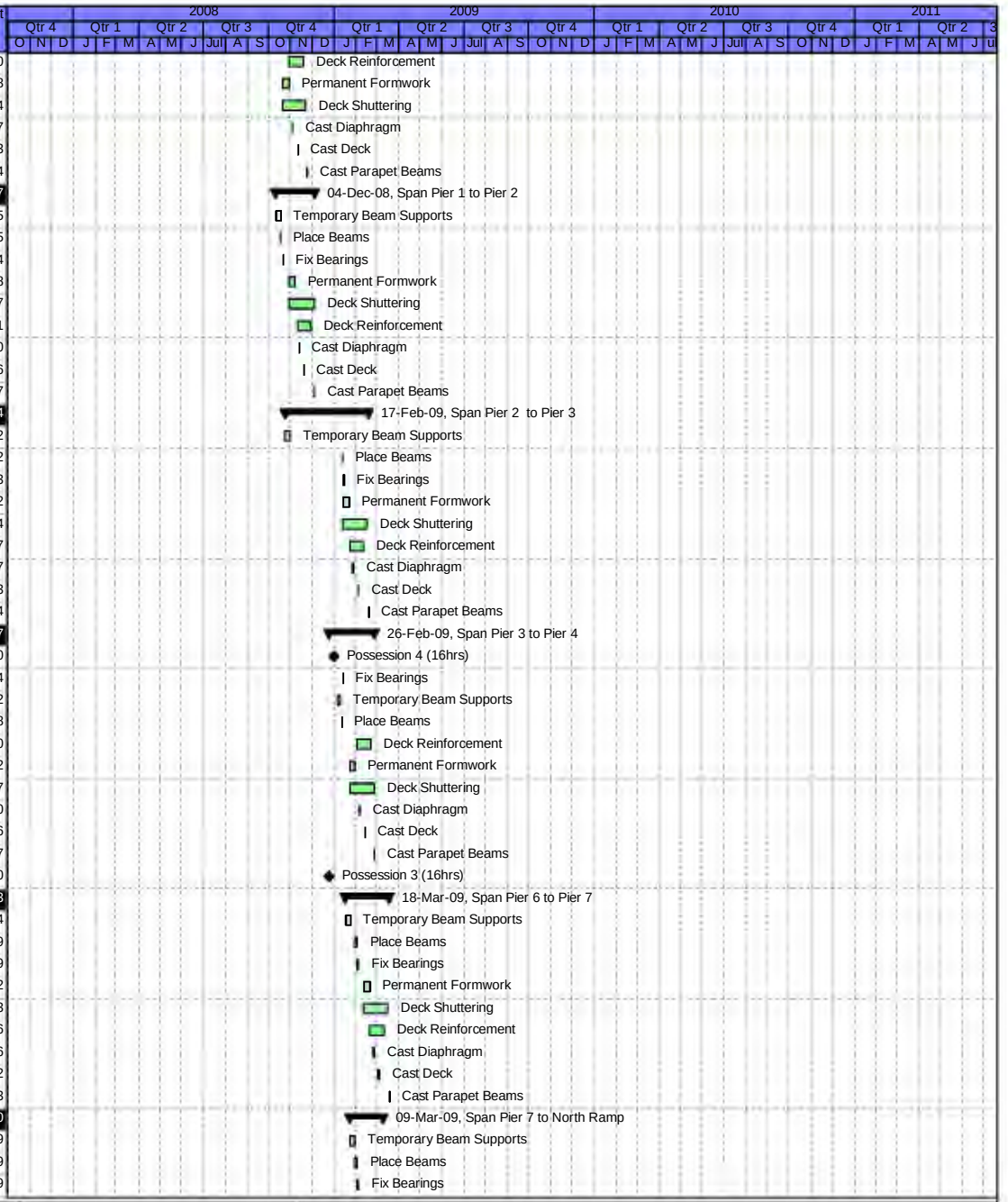
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
631	Deck Reinforcement	15	29-Oct-08	18-Nov-08	90
641	Permanent Formwork	7	20-Oct-08	28-Oct-08	48
651	Deck Shuttering	25	20-Oct-08	21-Nov-08	94
661	Cast Diaphragm	1	03-Nov-08	03-Nov-08	107
671	Cast Deck	1	10-Nov-08	10-Nov-08	103
681	Cast Parapet Beams	1	24-Nov-08	24-Nov-08	94
Span Pier 1 to Pier 2		39	10-Oct-08	04-Dec-08	87
411	Temporary Beam Supports	5	10-Oct-08	16-Oct-08	55
421	Place Beams	1	17-Oct-08	17-Oct-08	55
431	Fix Bearings	1	20-Oct-08	20-Oct-08	104
441	Permanent Formwork	7	29-Oct-08	06-Nov-08	48
451	Deck Shuttering	25	29-Oct-08	03-Dec-08	87
461	Deck Reinforcement	15	10-Nov-08	28-Nov-08	101
471	Cast Diaphragm	1	12-Nov-08	12-Nov-08	100
481	Cast Deck	1	19-Nov-08	19-Nov-08	96
491	Cast Parapet Beams	1	04-Dec-08	04-Dec-08	87
Span Pier 2 to Pier 3		72	24-Oct-08	17-Feb-09	44
501	Temporary Beam Supports	5	24-Oct-08	30-Oct-08	52
511	Place Beams	1	12-Jan-09	12-Jan-09	12
521	Fix Bearings	1	13-Jan-09	13-Jan-09	53
531	Permanent Formwork	7	13-Jan-09	21-Jan-09	12
541	Deck Shuttering	25	13-Jan-09	16-Feb-09	44
551	Deck Reinforcement	15	22-Jan-09	11-Feb-09	47
561	Cast Diaphragm	1	27-Jan-09	27-Jan-09	57
571	Cast Deck	1	03-Feb-09	03-Feb-09	53
581	Cast Parapet Beams	1	17-Feb-09	17-Feb-09	44
Span Pier 3 to Pier 4		39	24-Dec-08	26-Feb-09	37
592	Possession 4 (16hrs)	0		31-Dec-08*	0
691	Fix Bearings	1	12-Jan-09	12-Jan-09	54
701	Temporary Beam Supports	5	05-Jan-09	09-Jan-09	12
711	Place Beams	1	10-Jan-09	10-Jan-09	18
721	Deck Reinforcement	15	02-Feb-09	20-Feb-09	40
731	Permanent Formwork	7	22-Jan-09	30-Jan-09	12
741	Deck Shuttering	25	22-Jan-09	25-Feb-09	37
751	Cast Diaphragm	1	05-Feb-09	05-Feb-09	50
761	Cast Deck	1	12-Feb-09	12-Feb-09	46
771	Cast Parapet Beams	1	26-Feb-09	26-Feb-09	37
910	Possession 3 (16hrs)	0		24-Dec-08*	0
Span Pier 6 to Pier 7		44	16-Jan-09	18-Mar-09	23
861	Temporary Beam Supports	5	16-Jan-09	23-Jan-09	24
871	Place Beams	1	30-Jan-09	02-Feb-09	19
881	Fix Bearings	1	02-Feb-09	03-Feb-09	39
891	Permanent Formwork	7	11-Feb-09	19-Feb-09	12
901	Deck Shuttering	25	11-Feb-09	17-Mar-09	23
911	Deck Reinforcement	15	20-Feb-09	12-Mar-09	26
921	Cast Diaphragm	1	25-Feb-09	25-Feb-09	36
931	Cast Deck	1	04-Mar-09	04-Mar-09	32
941	Cast Parapet Beams	1	18-Mar-09	18-Mar-09	23
Span Pier 7 to North Ramp		32	23-Jan-09	09-Mar-09	30
951	Temporary Beam Supports	5	23-Jan-09	30-Jan-09	19
961	Place Beams	1	30-Jan-09	02-Feb-09	19
971	Fix Bearings	1	02-Feb-09	03-Feb-09	39



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Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
981	Permanent Formwork	7	02-Feb-09	10-Feb-09	12
991	Deck Shuttering	25	02-Feb-09	06-Mar-09	30
A1001	Deck Reinforcement	15	11-Feb-09	03-Mar-09	33
A1011	Cast Diaphragm	1	16-Feb-09	16-Feb-09	43
A1021	Cast Deck	1	23-Feb-09	23-Feb-09	39
A1031	Cast Parapet Beams	1	09-Mar-09	09-Mar-09	30
Span Pier 4 to Pier 5		44	05-Feb-09	07-Apr-09	12
1011	Fix Bearings	1	20-Feb-09	23-Feb-09	28
1021	Temporary Beam Supports	5	05-Feb-09	12-Feb-09	24
1031	Place Beams	1	19-Feb-09	20-Feb-09	19
1041	Deck Reinforcement	15	12-Mar-09	01-Apr-09	15
1051	Permanent Formwork	7	03-Mar-09	11-Mar-09	12
1061	Deck Shuttering	25	03-Mar-09	06-Apr-09	12
1071	Cast Diaphragm	1	17-Mar-09	17-Mar-09	25
1081	Cast Deck	1	24-Mar-09	24-Mar-09	21
1091	Cast Parapet Beams	1	07-Apr-09	07-Apr-09	12
Span Pier 5 to Pier 6		32	12-Feb-09	27-Mar-09	16
1001	Cast Parapet Beams	1	27-Mar-09	27-Mar-09	16
781	Temporary Beam Supports	5	12-Feb-09	19-Feb-09	19
791	Fix Bearings	1	20-Feb-09	23-Feb-09	25
801	Place Beams	1	19-Feb-09	20-Feb-09	19
811	Permanent Formwork	7	20-Feb-09	02-Mar-09	12
821	Deck Reinforcement	15	03-Mar-09	23-Mar-09	19
831	Deck Shuttering	25	20-Feb-09	26-Mar-09	16
841	Cast Diaphragm	1	06-Mar-09	06-Mar-09	29
851	Cast Deck	1	13-Mar-09	13-Mar-09	25
Deck Finishes		57	03-Mar-09	22-May-09	101
282	Waterproofing	8	03-Apr-09	15-Apr-09	12
483	Expansion Joints	9	16-Apr-09	28-Apr-09	17
493	Parapet Rails	40	03-Mar-09	28-Apr-09	17
503	Walkway Construction	20	24-Apr-09	22-May-09	101
Trackwork		11	16-Apr-09	30-Apr-09	12
339	Containment Slabs	10	16-Apr-09	29-Apr-09	12
90	Fix Rails	5	24-Apr-09	30-Apr-09	12
M & E Works		15	01-May-(	24-May-09	102
373	Catenary Cables	5	07-May-(	13-May-09	12
52	OLE Supports	3	01-May-(	06-May-09	12
A14140	Possession 5 (12hrs)	0		23-May-09*	0
A14150	OLE Supports and Catenary over Tracks	1	24-May-(	24-May-09	143
05C Edinburgh Park Central (exc.) to Gogarburn (inc.)		563	28-Mar-08	09-Jul-10	250
E & M Installations		158	11-Nov-09	09-Jul-10	250
Edinburgh Park to Depot		72	26-Mar-10	09-Jul-10	250
A4163	Access for visual inspection for E&M wayside installa	0	26-Mar-10		322
A4164	Access for E&M wayside installation (05C)	0	28-Apr-10		301
A4165	Installation of poles and building fixings	10	28-Apr-10	12-May-10	7
A4170	Overhead Catenary Line	26	24-May-:	29-Jun-10	0
A4178	Access for visual inspection to cable pits for cable la	0	21-Apr-10		305
A4179	Access to cable pits for cable laying (05C)	0	24-May-:		284
A4180	Install Electrical Cables	17	24-May-:	16-Jun-10	86
A4190	Install Fibre Optic Cables	17	24-May-:	16-Jun-10	103
A4200	Install Signalling Wayside Equipment	17	17-Jun-10	09-Jul-10	86
Depot to Gogarburn		42	11-Nov-09	25-Jan-10	366



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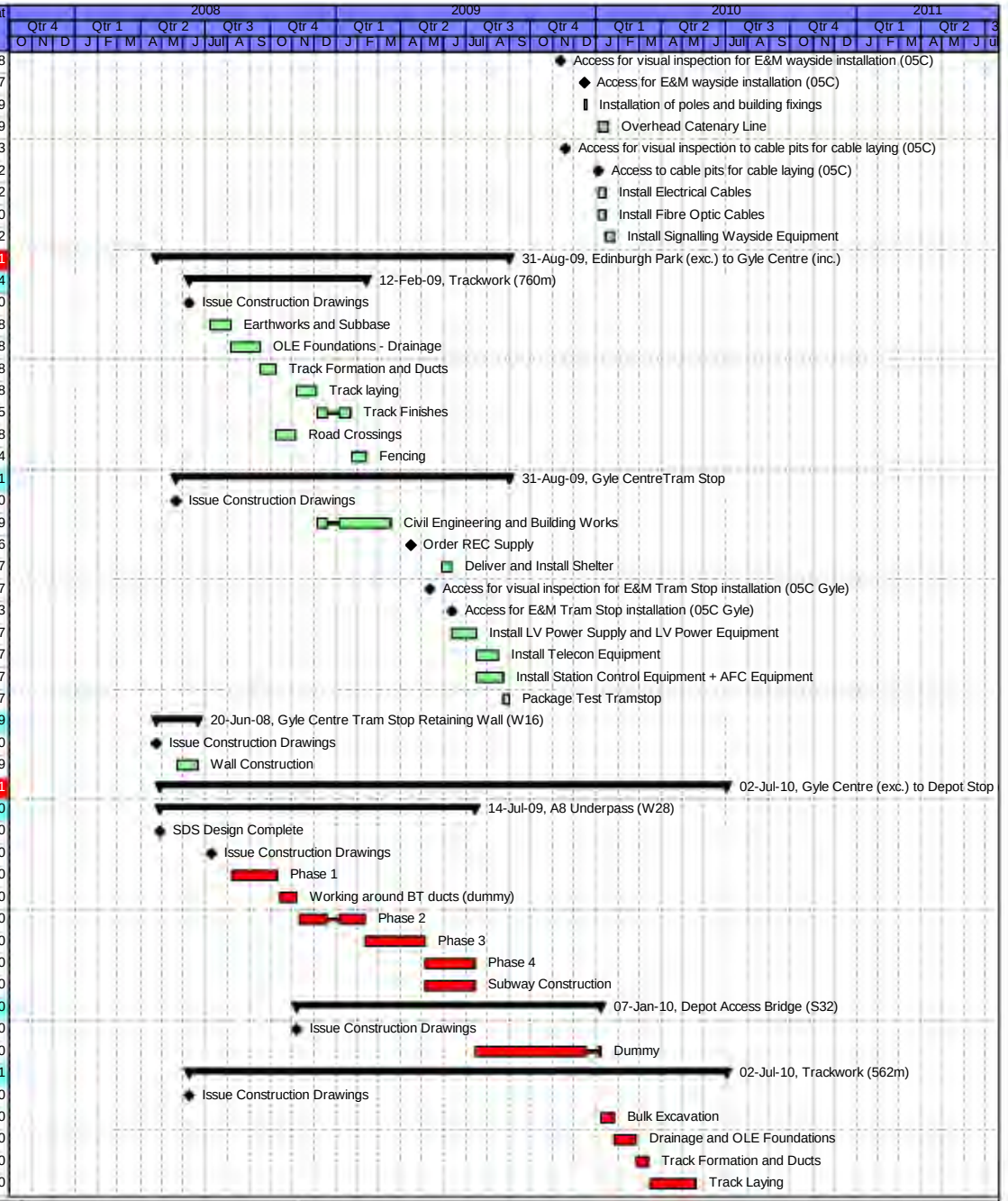
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A16900	Access for visual inspection for E&M wayside installa	0	11-Nov-09		408
A16910	Access for E&M wayside installation (05C)	0	14-Dec-09		387
A16920	Installation of poles and building fixings	5	14-Dec-09	18-Dec-09	9
A16930	Overhead Catenary Line	11	04-Jan-10	18-Jan-10	9
A16940	Access for visual inspection to cable pits for cable la	0	18-Nov-09		403
A16950	Access to cable pits for cable laying (05C)	0	04-Jan-10		382
A16960	Install Electrical Cables	8	04-Jan-10	13-Jan-10	202
A16970	Install Fibre Optic Cables	8	04-Jan-10	13-Jan-10	210
A16980	Install Signalling Wayside Equipment	8	14-Jan-10	25-Jan-10	202
Edinburgh Park (exc.) to Gyle Centre (inc.)		334	23-Apr-08	31-Aug-09	461
Trackwork (760m)		166	09-Jun-08	12-Feb-09	434
12950	Issue Construction Drawings	0		09-Jun-08*	0
140	Earthworks and Subbase	20	08-Jul-08	05-Aug-08	48
183	OLE Foundations - Drainage	30	06-Aug-08	16-Sep-08	48
779	Track Formation and Ducts	16	17-Sep-08	08-Oct-08	48
789	Track laying	20	06-Nov-08	04-Dec-08	48
799	Track Finishes	24	05-Dec-08	21-Jan-09	355
809	Road Crossings	20	09-Oct-08	05-Nov-08	48
819	Fencing	16	22-Jan-09	12-Feb-09	434
Gyle CentreTram Stop		315	21-May-(	31-Aug-09	461
12960	Issue Construction Drawings	0		21-May-08*	0
141	Civil Engineering and Building Works	65	05-Dec-08	19-Mar-09	369
298	Order REC Supply	0	15-Apr-09		556
A2170	Deliver and Install Shelter	10	29-May-(	12-Jun-09	297
A5318	Access for visual inspection for E&M Tram Stop inst	0	13-May-(		567
A5319	Access for E&M Tram Stop installation (05C Gyle)	0	12-Jun-09		313
A5320	Install LV Power Supply and LV Power Equipment	25	12-Jun-09	17-Jul-09	297
A5330	Install Telecon Equipment	20	17-Jul-09	17-Aug-09	307
A5340	Install Station Control Equipment + AFC Equipment	25	17-Jul-09	24-Aug-09	297
A5350	Package Test Tramstop	5	24-Aug-09	31-Aug-09	297
Gyle Centre Tram Stop Retaining Wall (W16)		40	23-Apr-08	20-Jun-08	59
12970	Issue Construction Drawings	0		23-Apr-08*	0
139	Wall Construction	20	23-May-(	20-Jun-08	59
Gyle Centre (exc.) to Depot Stop (inc.)		537	28-Apr-08	02-Jul-10	91
A8 Underpass (W28)		299	28-Apr-08	14-Jul-09	0
12059	SDS Design Complete	0		28-Apr-08*	0
12980	Issue Construction Drawings	0		09-Jul-08*	0
143	Phase 1	46	08-Aug-08	10-Oct-08	0
153	Working around BT ducts (dummy)	20	13-Oct-08	07-Nov-08	0
519	Phase 2	56	10-Nov-08	10-Feb-09	0
529	Phase 3	58	11-Feb-09	05-May-09	0
539	Phase 4	49	06-May-(	14-Jul-09	0
549	Subway Construction	49	06-May-(	14-Jul-09	0
Depot Access Bridge (S32)		279	06-Nov-08	07-Jan-10	0
12990	Issue Construction Drawings	0		06-Nov-08*	0
144	Dummy	115	15-Jul-09	07-Jan-10	0
Trackwork (562m)		509	09-Jun-08	02-Jul-10	91
10590	Issue Construction Drawings	0		09-Jun-08*	0
1069	Bulk Excavation	12	08-Jan-10	25-Jan-10	0
1079	Drainage and OLE Foundations	23	26-Jan-10	25-Feb-10	0
1089	Track Formation and Ducts	12	26-Feb-10	15-Mar-10	0
478	Track Laying	47	16-Mar-10	21-May-10	0



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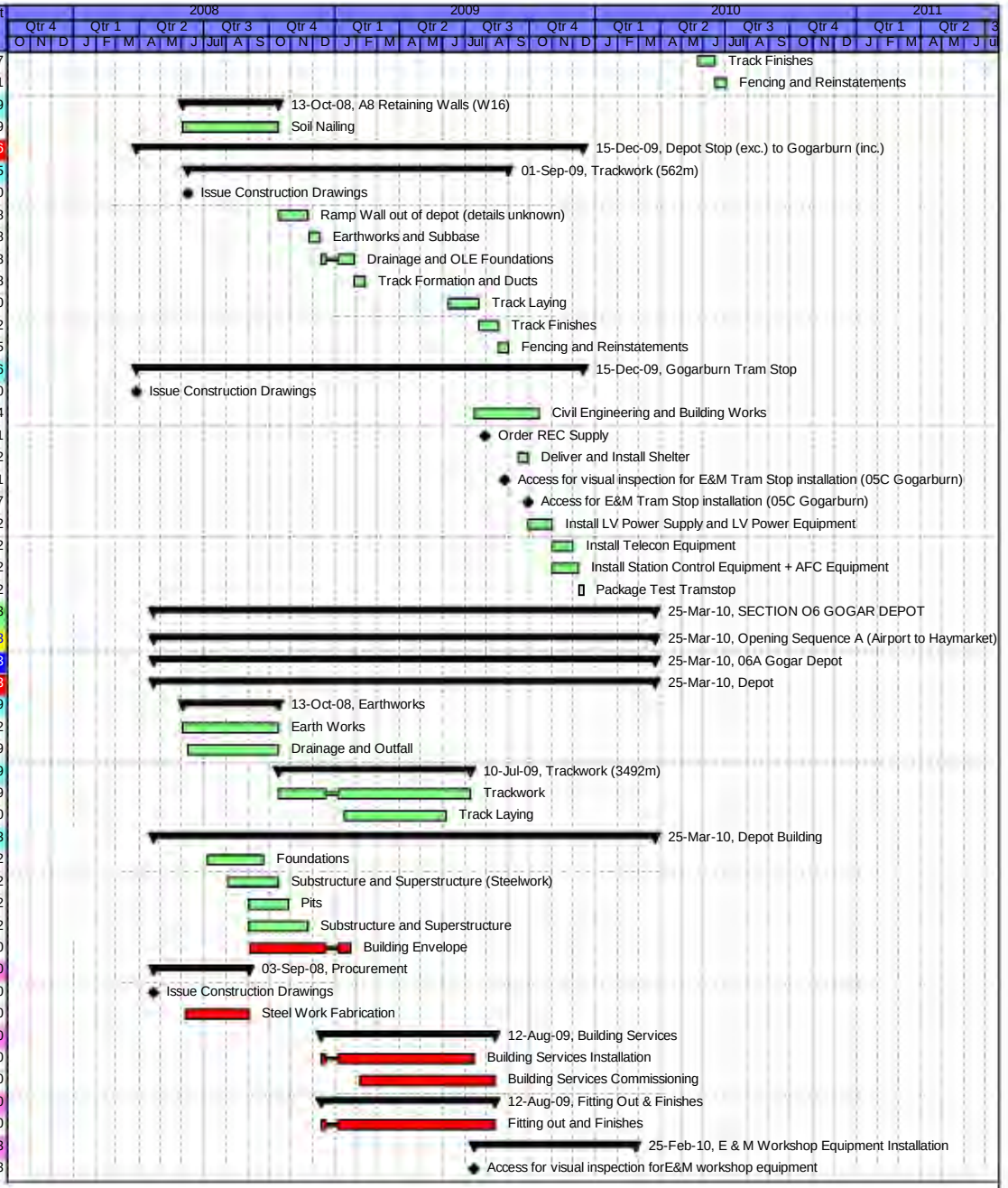
A2380	Track Finishes	18	24-May-:	17-Jun-10	7
A2390	Fencing and Reinstatements	11	18-Jun-10	02-Jul-10	91
A8 Retaining Walls (W16)		95	02-Jun-08	13-Oct-08	9
145	Soil Nailing	95	02-Jun-08	13-Oct-08	9
Depot Stop (exc.) to Gogarburn (inc.)		427	28-Mar-08	15-Dec-09	386
Trackwork (562m)		305	09-Jun-08	01-Sep-09	295
13020	Issue Construction Drawings	0		09-Jun-08*	0
148	Ramp Wall out of depot (details unknown)	30	14-Oct-08	24-Nov-08	108
288	Earthworks and Subbase	12	25-Nov-08	11-Dec-08	108
749	Drainage and OLE Foundations	23	12-Dec-08	27-Jan-09	108
759	Track Formation and Ducts	12	28-Jan-09	12-Feb-09	108
769	Track Laying	32	08-Jun-09	21-Jul-09	30
A2330	Track Finishes	18	22-Jul-09	17-Aug-09	92
A2340	Fencing and Reinstatements	11	18-Aug-09	01-Sep-09	295
Gogarburn Tram Stop		427	28-Mar-08	15-Dec-09	386
13030	Issue Construction Drawings	0		28-Mar-08*	0
149	Civil Engineering and Building Works	65	15-Jul-09	14-Oct-09	224
308	Order REC Supply	0	31-Jul-09		481
A2200	Deliver and Install Shelter	10	14-Sep-09	28-Sep-09	222
A5358	Access for visual inspection for E&M Tram Stop inst	0	27-Aug-09		491
A5359	Access for E&M Tram Stop installation (05C Gogart	0	28-Sep-09		237
A5360	Install LV Power Supply and LV Power Equipment	25	28-Sep-09	02-Nov-09	222
A5370	Install Telecon Equipment	20	02-Nov-09	01-Dec-09	232
A5380	Install Station Control Equipment + AFC Equipment	25	02-Nov-09	08-Dec-09	222
A5390	Package Test Tramstop	5	08-Dec-09	15-Dec-09	222
SECTION O6 GOGAR DEPOT		474	21-Apr-08	25-Mar-10	323
Opening Sequence A (Airport to Haymarket)		474	21-Apr-08	25-Mar-10	323
06A Gogar Depot		474	21-Apr-08	25-Mar-10	323
Depot		474	21-Apr-08	25-Mar-10	323
Earthworks		95	02-Jun-08	13-Oct-08	9
1149	Earth Works	95	02-Jun-08	13-Oct-08	2
1289	Drainage and Outfall	90	09-Jun-08	13-Oct-08	9
Trackwork (3492m)		180	14-Oct-08	10-Jul-09	9
154	Trackwork	180	14-Oct-08	10-Jul-09	9
204	Track Laying	100	14-Jan-09	05-Jun-09	30
Depot Building		474	21-Apr-08	25-Mar-10	323
A17170	Foundations	55	07-Jul-08	22-Sep-08	2
A17180	Substructure and Superstructure (Steelwork)	50	05-Aug-08	13-Oct-08	62
A17190	Pits	40	02-Sep-08	27-Oct-08	52
A17200	Substructure and Superstructure	60	02-Sep-08	24-Nov-08	32
A17210	Building Envelope	90	04-Sep-08	22-Jan-09	0
Procurement		94	21-Apr-08	03-Sep-08	0
1158	Issue Construction Drawings	0		21-Apr-08*	0
1159	Steel Work Fabrication	64	05-Jun-08	03-Sep-08	0
Building Services		160	12-Dec-08	12-Aug-09	0
1249	Building Services Installation	140	12-Dec-08	14-Jul-09	0
1259	Building Services Commissioning	130	06-Feb-09	12-Aug-09	0
Fitting Out & Finishes		160	12-Dec-08	12-Aug-09	0
1269	Fitting out and Finishes	160	12-Dec-08	12-Aug-09	0
E & M Workshop Equipment Installation		150	15-Jul-09	25-Feb-10	343
A2542	Access for visual inspection forE&M workshop equip	0	15-Jul-09		523



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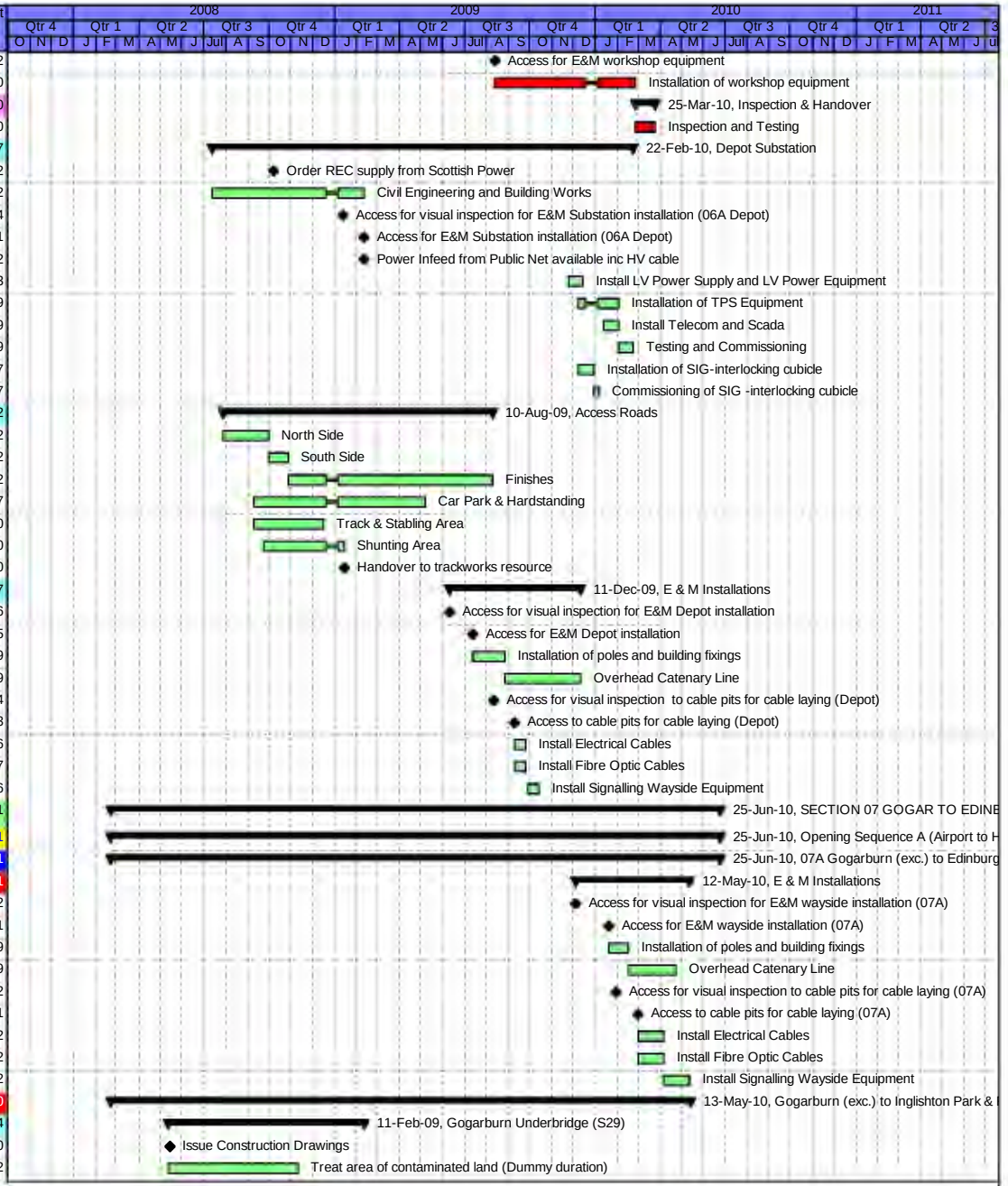
A2544	Access for E&M workshop equipment	0	13-Aug-09		502
A2545	Installation of workshop equipment	130	13-Aug-09	25-Feb-10	0
Inspection & Handover		20	26-Feb-10	25-Mar-10	0
A2550	Inspection and Testing	20	26-Feb-10	25-Mar-10	0
Depot Substation		393	14-Jul-08	22-Feb-10	347
306	Order REC supply from Scottish Power	0	07-Oct-08		392
316	Civil Engineering and Building Works	140	14-Jul-08	10-Feb-09	392
A2518	Access for visual inspection for E&M Substation insta	0	12-Jan-09		654
A2519	Access for E&M Substation installation (06A Depot)	0	11-Feb-09		411
A5930	Power Infeed from Public Net available inc HV cable	0	11-Feb-09		392
A5940	Install LV Power Supply and LV Power Equipment	15	23-Nov-09	15-Dec-09	193
A5950	Installation of TPS Equipment	30	08-Dec-09	02-Feb-10	169
A5960	Install Telecom and Scada	15	12-Jan-10	02-Feb-10	169
A5970	Testing and Commissioning	14	02-Feb-10	22-Feb-10	169
A6330	Installation of SIG-interlocking cubicle	15	08-Dec-09	29-Dec-09	207
A6340	Commissioning of SIG -interlocking cubicle	5	29-Dec-09	05-Jan-10	207
Access Roads		255	28-Jul-08	10-Aug-09	152
1179	North Side	45	28-Jul-08	29-Sep-08	152
1189	South Side	20	30-Sep-08	27-Oct-08	152
1199	Finishes	190	28-Oct-08	10-Aug-09	152
1209	Car Park & Hardstanding	160	09-Sep-08	07-May-09	217
1219	Track & Stabling Area	70	09-Sep-08	16-Dec-08	40
1229	Shunting Area	70	23-Sep-08	13-Jan-09	30
1239	Handover to trackworks resource	0		13-Jan-09	30
E & M Installations		129	11-Jun-09	11-Dec-09	387
A4203	Access for visual inspection for E&M Depot installatio	0	11-Jun-09		516
A4204	Access for E&M Depot installation	0	13-Jul-09		495
A4205	Installation of poles and building fixings	32	13-Jul-09	26-Aug-09	9
A4210	Overhead Catenary Line	76	27-Aug-09	11-Dec-09	9
A4218	Access for visual inspection to cable pits for cable la	0	11-Aug-09		474
A4219	Access to cable pits for cable laying (Depot)	0	10-Sep-09		453
A4220	Install Electrical Cables	12	10-Sep-09	25-Sep-09	246
A4230	Install Fibre Optic Cables	12	10-Sep-09	25-Sep-09	277
A4240	Install Signalling Wayside Equipment	12	28-Sep-09	13-Oct-09	246
SECTION 07 GOGAR TO EDINBURGH AIRPORT		576	22-Feb-08	25-Jun-10	261
Opening Sequence A (Airport to Haymarket)		576	22-Feb-08	25-Jun-10	261
07A Gogarburn (exc.) to Edinburgh Airport (inc.)		576	22-Feb-08	25-Jun-10	261
E & M Installations		101	04-Dec-09	12-May-10	291
A4243	Access for visual inspection for E&M wayside installa	0	04-Dec-09		392
A4244	Access for E&M wayside installation (07A)	0	19-Jan-10		371
A4245	Installation of poles and building fixings	20	19-Jan-10	15-Feb-10	9
A4250	Overhead Catenary Line	48	16-Feb-10	23-Apr-10	9
A4258	Access for visual inspection to cable pits for cable la	0	29-Jan-10		362
A4259	Access to cable pits for cable laying (07A)	0	02-Mar-10		341
A4260	Install Electrical Cables	25	02-Mar-10	06-Apr-10	122
A4270	Install Fibre Optic Cables	25	02-Mar-10	06-Apr-10	152
A4280	Install Signalling Wayside Equipment	25	07-Apr-10	12-May-10	122
Gogarburn (exc.) to Inglishton Park & Ride (inc.)		547	22-Feb-08	13-May-10	290
Gogarburn Underbridge (S29)		184	13-May-(	11-Feb-09	44
13040	Issue Construction Drawings	0		14-May-08*	0
13041	Treat area of contaminated land (Dummy duration)	130	13-May-(	10-Nov-08	112



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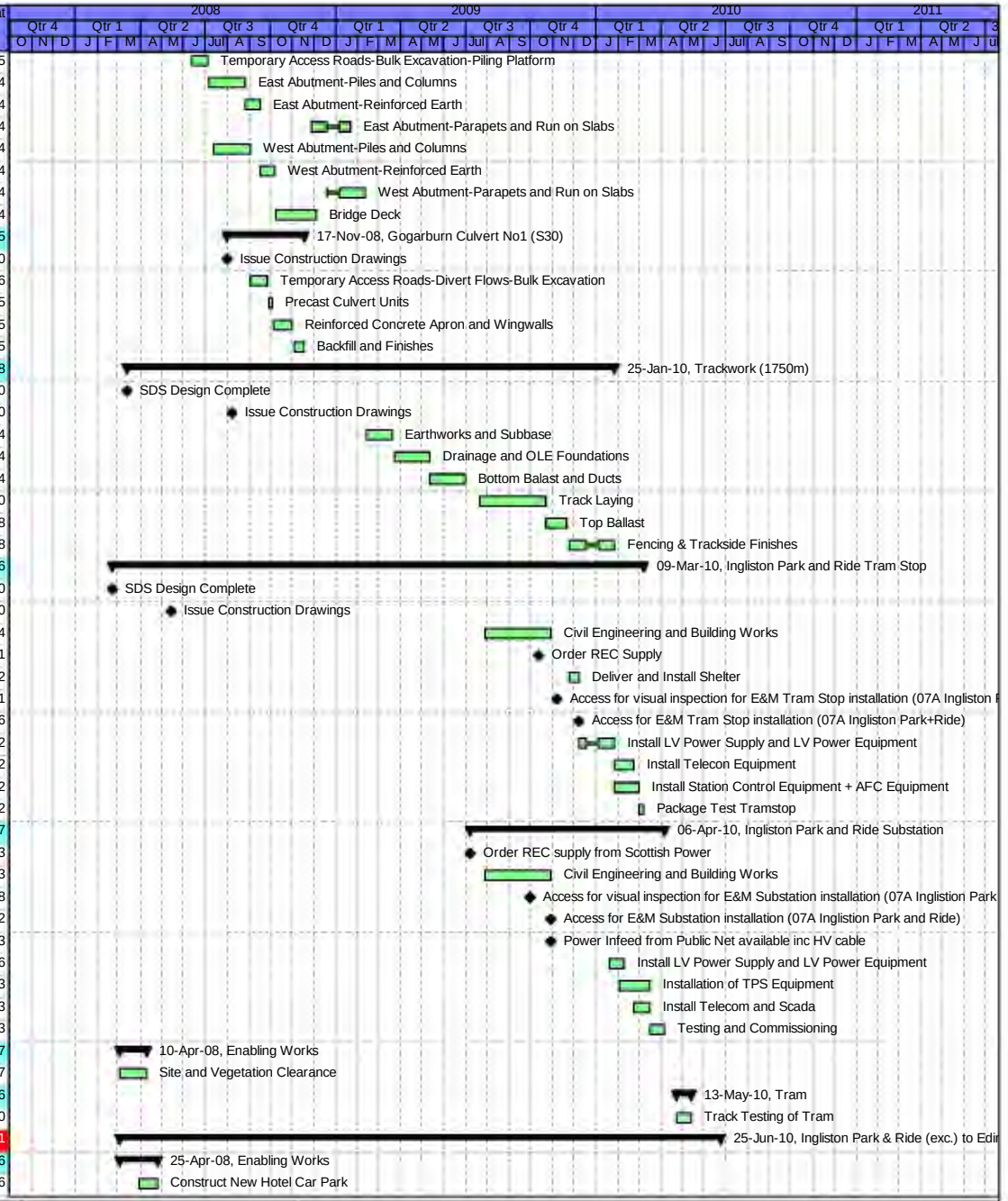
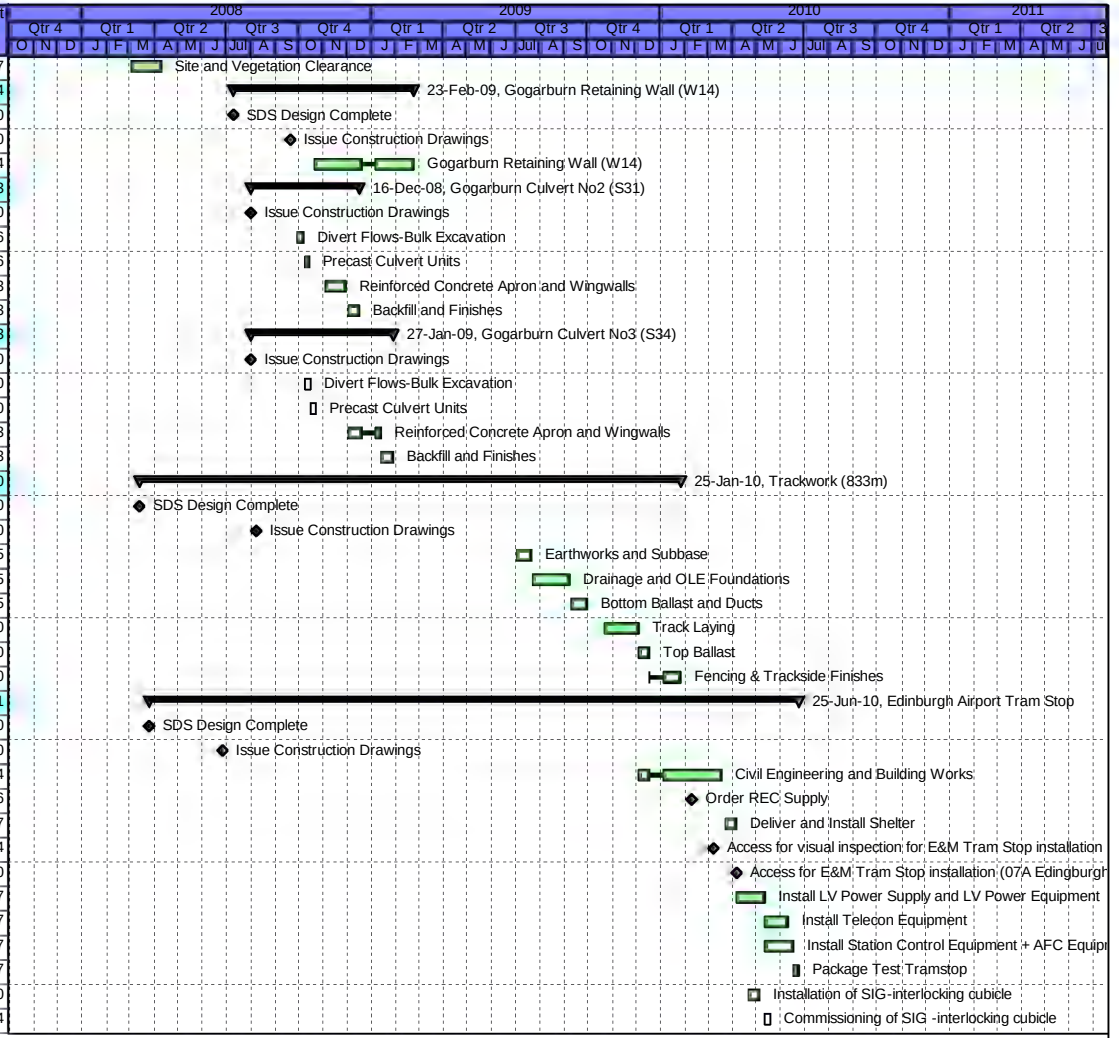
159	Temporary Access Roads-Bulk Excavation-Piling Pl	16	13-Jun-08	04-Jul-08	45
179	East Abutment-Piles and Columns	36	07-Jul-08	26-Aug-08	44
189	East Abutment-Reinforced Earth	15	27-Aug-08	16-Sep-08	44
199	East Abutment-Parapets and Run on Slabs	29	27-Nov-08	21-Jan-09	44
209	West Abutment-Piles and Columns	36	14-Jul-08	02-Sep-08	54
219	West Abutment-Reinforced Earth	15	17-Sep-08	07-Oct-08	44
229	West Abutment-Parapets and Run on Slabs	29	19-Dec-08	11-Feb-09	44
239	Bridge Deck	41	08-Oct-08	04-Dec-08	44
Gogarburn Culvert No1 (S30)		75	01-Aug-08	17-Nov-08	95
13050	Issue Construction Drawings	0		01-Aug-08*	0
160	Temporary Access Roads-Divert Flows-Bulk Excav	19	02-Sep-08	26-Sep-08	106
249	Precast Culvert Units	5	29-Sep-08	03-Oct-08	95
259	Reinforced Concrete Apron and Wingwalls	20	06-Oct-08	31-Oct-08	95
269	Backfill and Finishes	11	03-Nov-08	17-Nov-08	95
Trackwork (1750m)		456	14-Mar-08	25-Jan-10	188
12099	SDS Design Complete	0		14-Mar-08*	0
13060	Issue Construction Drawings	0		07-Aug-08*	0
162	Earthworks and Subbase	27	12-Feb-09	20-Mar-09	44
399	Drainage and OLE Foundations	35	23-Mar-09	12-May-09	44
409	Bottom Balast and Ducts	35	13-May-(	01-Jul-09	44
419	Track Laying	65	22-Jul-09	21-Oct-09	30
A1990	Top Ballast	22	22-Oct-09	20-Nov-09	188
A2020	Fencing & Trackside Finishes	35	23-Nov-09	25-Jan-10	188
Ingliston Park and Ride Tram Stop		501	22-Feb-08	09-Mar-10	336
12089	SDS Design Complete	0		22-Feb-08*	0
13070	Issue Construction Drawings	0		14-May-08*	0
163	Civil Engineering and Building Works	65	29-Jul-09	28-Oct-09	214
218	Order REC Supply	0	12-Oct-09		431
A1940	Deliver and Install Shelter	10	23-Nov-09	08-Dec-09	172
A5398	Access for visual inspection for E&M Tram Stop inst	0	06-Nov-09		441
A5399	Access for E&M Tram Stop installation (07A Inglisto	0	08-Dec-09		186
A5400	Install LV Power Supply and LV Power Equipment	25	08-Dec-09	26-Jan-10	172
A5410	Install Telecon Equipment	20	26-Jan-10	23-Feb-10	182
A5420	Install Station Control Equipment + AFC Equipment	25	26-Jan-10	02-Mar-10	172
A5430	Package Test Tramstop	5	02-Mar-10	09-Mar-10	172
Ingliston Park and Ride Substation		181	08-Jul-09	06-Apr-10	317
216	Order REC supply from Scottish Power	0		08-Jul-09	403
226	Civil Engineering and Building Works	65	29-Jul-09	28-Oct-09	403
A1968	Access for visual inspection for E&M Substation insta	0	29-Sep-09		468
A1969	Access for E&M Substation installation (07A Inglistio	0	29-Oct-09		432
A5980	Power Infeed from Public Net available inc HV cable	0	29-Oct-09		403
A5990	Install LV Power Supply and LV Power Equipment	15	19-Jan-10	09-Feb-10	356
A6000	Installation of TPS Equipment	30	02-Feb-10	16-Mar-10	153
A6010	Install Telecom and Scada	15	23-Feb-10	16-Mar-10	153
A6020	Testing and Commissioning	14	16-Mar-10	06-Apr-10	153
Enabling Works		28	03-Mar-08	10-Apr-08	87
A2000	Site and Vegetation Clearance	28	03-Mar-08	10-Apr-08	87
Tram		13	24-Apr-10	13-May-10	126
A6380	Track Testing of Tram	20	24-Apr-10	13-May-10	180
Ingliston Park & Ride (exc.) to Edinburgh Airport (inc.)		571	03-Mar-08	25-Jun-10	261
Enabling Works		39	03-Mar-08	25-Apr-08	256
A1920	Construct New Hotel Car Park	20	31-Mar-08	25-Apr-08	256



Date	Revision	Checked	Approved
29-Apr-08	Contract Programme 29 April 2008	SCS	

USB00000080_0041

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
A1930	Site and Vegetation Clearance	28	03-Mar-08	10-Apr-08	267
Gogarburn Retaining Wall (W14)		150	10-Jul-08	23-Feb-09	134
12079	SDS Design Complete	0		10-Jul-08*	0
13080	Issue Construction Drawings	0		19-Sep-08*	0
167	Gogarburn Retaining Wall (W14)	80	20-Oct-08	23-Feb-09	134
Gogarburn Culvert No2 (S31)		95	01-Aug-08	16-Dec-08	173
13090	Issue Construction Drawings	0		01-Aug-08*	0
165	Divert Flows-Bulk Excavation	7	29-Sep-08	07-Oct-08	166
309	Precast Culvert Units	5	08-Oct-08	14-Oct-08	166
319	Reinforced Concrete Apron and Wingwalls	20	03-Nov-08	28-Nov-08	153
329	Backfill and Finishes	11	02-Dec-08	16-Dec-08	173
Gogarburn Culvert No3 (S34)		115	01-Aug-08	27-Jan-09	153
13100	Issue Construction Drawings	0		01-Aug-08*	0
196	Divert Flows-Bulk Excavation	6	08-Oct-08	15-Oct-08	180
279	Precast Culvert Units	5	16-Oct-08	22-Oct-08	180
289	Reinforced Concrete Apron and Wingwalls	20	02-Dec-08	12-Jan-09	153
299	Backfill and Finishes	11	13-Jan-09	27-Jan-09	153
Trackwork (833m)		456	14-Mar-08	25-Jan-10	240
12109	SDS Design Complete	0		14-Mar-08*	0
13110	Issue Construction Drawings	0		07-Aug-08*	0
168	Earthworks and Subbase	15	02-Jul-09	22-Jul-09	45
369	Drainage and OLE Foundations	33	23-Jul-09	08-Sep-09	45
379	Bottom Ballast and Ducts	16	09-Sep-09	30-Sep-09	45
389	Track Laying	30	22-Oct-09	03-Dec-09	30
A1910	Top Ballast	10	04-Dec-09	17-Dec-09	240
A2350	Fencing & Trackside Finishes	17	18-Dec-09	25-Jan-10	240
Edinburgh Airport Tram Stop		555	25-Mar-08	25-Jun-10	261
12069	SDS Design Complete	0		25-Mar-08*	0
13120	Issue Construction Drawings	0		26-Jun-08*	0
169	Civil Engineering and Building Works	65	04-Dec-09	18-Mar-10	124
208	Order REC Supply	0	09-Feb-10		356
A1880	Deliver and Install Shelter	10	23-Mar-10	07-Apr-10	97
A5438	Access for visual inspection for E&M Tram Stop inst	0	08-Mar-10		354
A5439	Access for E&M Tram Stop installation (07A Edingbı	0	07-Apr-10		100
A5440	Install LV Power Supply and LV Power Equipment	25	07-Apr-10	13-May-10	97
A5450	Install Telecon Equipment	20	13-May-:	11-Jun-10	107
A5460	Install Station Control Equipment + AFC Equipment	25	13-May-:	18-Jun-10	97
A5470	Package Test Tramstop	5	18-Jun-10	25-Jun-10	97
A6360	Installation of SIG-interlocking cubicle	10	21-Apr-10	05-May-10	130
A6370	Commissioning of SIG -interlocking cubicle	5	13-May-:	19-May-10	124



BILFINGER BERGER U. K. Limited

SIEMENS

Programming Assumptions (12 May 2008)

1 GENERAL

1.1Our programme for the works recognises the allowed working hours stated in the Code of Construction Practice of 0700 to 1900 Monday to Friday and 0800 to 1300 on a Saturday. Schedule 15 separately identifies areas where Infraco may make applications for relaxations to the CoCP. General assumptions are as follows

1.1.1 Removal of hedgerows, trees, vegetation and other habitats used by breeding birds will be executed before March 2008, as part of an advanced works contract.

1.1.2 The scope and complexity of the works is as shown on the drawings at 25 November 2007 and detailed in the bill of quantities.

2 DESIGN PROGRAMME

2.1 Version 26 of the SDS design programme has been used to establish milestone dates for the Issue for Construction drawings. We have assumed that there will be no amendments to the SDS design programme. The dates from the following activities have been extracted,

2.2 Substations – There are no dates for the Issue for Construction drawings and it is assumed that the civil engineering and building designs will be Issued for Construction sufficiently in advance of programme so as to ensure that the programme is maintained.

2.3 There are no dates given for the design of the structure that has replaced the A8 retaining wall. We have assumed that the design of this structure will be Issued for Construction as part of the depot earthworks redesign and that this redesign will be completed by the end of April 2008.

2.4 The programme assumes that Issue for Construction information for the Gogar Depot building will be released as required to construct the Depot in accordance with the programme. This will require Issue for Construction in advance of the date shown on version 26 of the SDS design programme.

2.5 Version 26 of the SDS design programme has been used to identify Issue for Construction programme milestone dates that are 4 weeks in advance of the start of construction works on site. It has been assumed that where a longer lead in time is required for items on extended delivery (i.e. bridge beams) that this can be accommodated by advanced information release by SDS.

2.6 It is assumed that where Issue for Construction programme milestones shown against version 26 of the SDS design programme as “letters of completion”, the design is complete. Where no milestone is identified it is assumed that the design is complete.

2.7 The trackwork activities in Section 2A commence on 21 July 2008 as requested by tie to accommodate the revised forecast receipt of Issued for Construction drawings from SDS.

3 MUDFA & UTILITIES

3.1 The programme is based on MUDFA having completed all works and all utilities being diverted that would conflict with INFRACO operations by the following dates;

1A 31 October 2008
1B 01 August 2008
1C 31 October 2008
1D 19 December 2008
2A 16 May 2008
5A No constraint
5B 11 April 2008
5C 16 May 2008
6 SGN Diversion, 18 April 2008
Watermain Diversion 30 May 2008
7A 16 May 2008

3.2 No enabling works shall be required to be undertaken by INFRACO before MUDFA (or other Utilities) can complete their works. The programme is based on the Utilities in the Victoria Dock Access Bridge and Tower Place Bridge area being temporarily diverted away from INFRACO works by MUDFA in advance of the INFRACO works.

4 NETWORK RAIL

4.1 The programme assumes that the Bridge beams will be placed at Carrick Knowe Bridge and Edinburgh Park Bridge over the Christmas and New Year period 2008.

4.2 In the other possessions already booked for 2008 we will undertake the following works:

- Site Clearance
- Temporary earthworks support at Carrick Knowe.
- Temporary earthworks support to corner of base at Piers 3 & 4 Edinburgh Park.
- Bunding to protect beam support at Scaffold at Edinburgh Park.
- Temporary Rail protection.

4.3 Further possessions will be required in 2009 to remove crash decks, take down safety fences, erect OLE poles and string catenary wires and the programme assumes that this will be available as required.

4.4 In addition works to be undertaken at the following bridges South Gyle Access, Balgreen Road, Water of Leith, Russell Road and Roseburn Street Viaduct may require to be undertaken

in existing or new possessions depending on the requirements of Network Rail. The programme assumes that these works can be undertaken at such times as enable the programme to be maintained.

5 TRACKWORK

5.1 There is no allowance in the programme for excavation below earthworks outline level for soft spots or more extensive areas of ground improvement.

6 DESIGN/INFORMATION

6.1 There are a number of sections of Phase 1a of the Project where we do not have information that enables us to firm up our programme. The most significant are as follows;

6.1.1 Sub-section 1A, Newhaven to Foot of the Walk

The road and tramway layout is in the process of being changed, we understand to Forth Ports requirements. This also affects the 3 structures in the section, Lindsay Road RW, Tower Place Bridge and Victoria Dock Bridge. We have assumed that Victoria Dock Access Bridge will only require resurfacing. The programme, for the other activities, is based on the information made available by tie for pricing prior to 25 November 2007.

6.1.2 Subsection 1C, McDonald Road to Princes Street West

The junction layouts are being radically changed at London Road and Picardy Place, due to CEC requirements, and a significant vertical alignment change is being made to the North St Andrews St/York Pl junction for tramway alignment reasons. Picardy and York may also involve us in Utility Works. Only provisional activities (called dummy) are included in the programme for these locations. The programme assumes that these activities are no longer in duration than the "dummy" activities shown on the programme.

6.1.3 Sub-section 5A, Roseburn Junction to Balgreen

6.1.3.1 Balgreen Road Bridge and the adjacent Baird Drive and Balgreen Road Walls are being changed to Network Rail requirements. The requirements for one element of the bridge have not been agreed between CEC and Network Rail.

6.1.3.2 Dummy item included in the programme for Balgreen Road. - the programme assumes that these activities are no longer in duration than the "dummy" activities shown on the programme.

6.1.4 Sub-section 5B, Balgreen to Edinburgh Park

Carrick Knowe Railway Bridge is being re-designed (widened) to incorporate a cycleway, CEC requirement. (No time allowance made for widening)

6.1.5 Sub-section 5C, Edinburgh Park to Gogarburn

6.1.5.1 A dummy programme item of 20 days has been allowed for supporting and working around the large bank of BT ducts which conflict with the A8 underpass construction. The Base Date Design Information for the A8 underpass does not cater for the large BT duct (above) and the large diameter sewer (below) which prevent the secant (or contiguous) piled wall design from working where these two services intersect the line of the structure. Whilst it is recognised that the resolution of this problem will have an impact on the programme, the programme allows only

a duration of 20 days, as noted above, for the impact of the works required to resolve the BT duct problem.

6.1.5.2 The Depot Access Bridge is being re-designed (dummy item added). The programme assumes that this activity is no longer in duration than the "dummy" activity shown on the programme.

6.1.6 Sub-section 7A, Gogarburn to Edinburgh Airport

Due to the cancellation of EARL, the vertical alignment of the Tramway, 3No Culverts and 2No Walls at the Airport Tramstop are being changed. (No allowance for these changes has been made and the programme assumes that there will be no impact).

7 OLE DESIGN

7.1 The programme milestone for OLE design to commence (i.e. SDS issue Issue for Construction track alignment drawings) includes the receipt by the Infraco of the following information sufficient to allow construction in accordance with the programme:

7.1.1 Complete and approved track alignment in data format.

7.1.2 Other structures and Utilities data.

7.1.3 tie decision re OCS system in City Centre.

7.1.4 Complete and approved vehicle data.

7.2 That approval of the OLE design is not required prior to Issue for Construction of the OLE foundation design (i.e. no approval periods have been allowed in the logic SDS issue track alignment drawings – Siemens design OLE – SDS design OLE foundations – OLE foundation construction).

7.3 That approval of the OLE design is not required prior to Issue for Construction of the OLE building fixing design (i.e. no approval periods have been allowed in the logic SDS issue track alignment drawings – Siemens design OLE – SDS design building fixings –Siemens OLE installation).

8 DESIGN STAGE AND TIE CONSENTS

8.1 The programme assumes that tie will timeously obtain the relevant TTRO's and TRO's to allow the necessary traffic management for the construction and operation of the tram respectively.

8.2 The programme also assumes that all third party consents will be granted to allow works to proceed in accordance with the logic and timescales shown.

9 MAIN PROGRAMMING ASSUMPTIONS

9.1 Further assumptions upon which the programme is based are as follows:

9.1.1 Relaxations on City Centre Constraints are required which could be subject to full CEC approval. The programme assumes that such relaxations shall be permitted so as to ensure that the programme is maintained as identified in Schedule 15.

9.1.2 tie shall accept that commissioning shall commence (on the date shown on the programme) prior to the completion of the Picardy Place Roadworks.

9.1.3 That there shall be no slippage in the MUDFA programme.

9.1.3 That there shall be no slippage on the SDS programme.

9.1.4 That the SDS design will allow road construction by planing the existing surfacing to underside of new surface course and laying the new surface course.

9.1.5 The only programming constraint imposed by the Scotrail Depot at Haymarket is that Roseburn Street Viaduct cannot commence until the oil tanks have been relocated. For the avoidance of doubt, the relocation of the oil tanks only, will be deemed to be delayed if such relocation is not completed by the date on the Programme regardless of the date noted in Schedule Part 26, tie Obligations, for the same activity.

9.1.6 Construction of the trackwork to the Guided Bus Way will commence in November 2008.

10 COMPLETION

10.1 The current version of the programme completes Airport to Haymarket in May 2011, Haymarket to Newhaven in July 2011.

EDINBURGH TRAM PROJECT
Proposed Schedule of Works to Seek Dispensation from CoCP

Category	Item	Status	Comments
On – Street Track Works	Establish Traffic Management - only as justified - exception rather than the rule	Agreed with comments	Only where justified and agreed. Should be the exception rather than the rule
On – Street Track Works	Delivery of Rails	Agreed	
On – Street Track Works	Cross carriageway ducts.	Agreed with comments	This is to tie in central track ducts to existing drainage/ducts agreed for difficult access & exceptions
On – Street Track Works	Cross carriageway drains	Agreed with comments	This is to tie in central track ducts to existing drainage/ducts agreed for difficult access & exceptions
On – Street Track Works	Tie ins for road surfacing (Planing and Surfacing)	Agreed	
On – Street Track Works	Erection of street lights	Agreed with comments	Agreed for modifications to existing layouts. New build to be done under CoCP
On – Street Track Works	Erection of traffic signals.	Agreed with comments	Agreed for modifications to existing layouts. New build to be done under CoCP
On – Street Track Works	Permanent road markings	Agreed with comments	At major road junctions or area's of difficult access
On – Street Track Works	Rail tie ins at road junctions	Agreed	
On – Street Track Works	Building fixings for OLE	Agreed with comments	For erection of equipment and/or OHL only and not for the actual drilling/fitting of fixings
On – Street Track Works	OLE Columns	Agreed with comments	Only for area's of difficult access
On – Street Track Works	Stringing Catenary Cables.	Agreed with comments	Only for area's of difficult access
On – Street Track Works	Pulling comms and power cables.	Agreed with comments	Only for area's of difficult access
On – Street Track Works	Applying mastic seal to rail edges.	Agreed with comments	Should be the exception rather than the rule
On – Street Track Works	Removing Traffic Management.	Agreed with comments	Should be the exception rather than the rule
On – Street Track Works	Delivery of Tram Stop Shelters and other large equipment.	Agreed	
On – Street Track Works	Work activities in Constitution Street where access is very restricted	Agreed with comments	Only to provide / facilitate for special 3rd party access or similar
Depot	Works necessitated due to possible restrictions on craneage etc enforced by British Airports Authority.- agreed	Agreed	
Works Associated with Network Rail	All works that by the nature of their proximity to the Network Rail Tracks require Possessions to undertake.	Agreed	
A8 Subway	Establish traffic management- agreed	Agreed with comments	In agreement with BAA as there may be restrictions on lighting at night as emergency runway will be in use when main runway is resurfaced.
A8 Subway	Mobilise and demobilise piling rigs- agreed	Agreed with comments	In agreement with BAA as there may be restrictions on lighting at night as emergency runway will be in use when main runway is resurfaced.
A8 Subway	Installation and removal of temporary sheet piles which provide temporary support to the carriageway.- agreed	Agreed with comments	In agreement with BAA as there may be restrictions on lighting at night as emergency runway will be in use when main runway is resurfaced.
A8 Subway	Tie ins for road surfacing (Planning and Surfacing)- agreed	Agreed with comments	In agreement with BAA as there may be restrictions on lighting at night as emergency runway will be in use when main runway is resurfaced.
A8 Subway	Permanent road markings- agreed	Agreed with comments	In agreement with BAA as there may be restrictions on lighting at night as emergency runway will be in use when main runway is resurfaced.
A8 Subway	Removing Traffic Management.- agreed	Agreed with comments	In agreement with BAA as there may be restrictions on lighting at night as emergency runway will be in use when main runway is resurfaced.
General	Dewatering Excavations.	Agreed with comments	By exception
General	Maintenance of Traffic Management.	Agreed with comments	As and when required in response to defects
General	Site Safety. Please provide more details	Agreed with comments	In response to an incident or a planned monitoring activity
General	Completion of concrete pours (power floating etc of bridge decks).	Agreed	
General	Erection of bridge beams, crash decks etc over roads (South Gyle Access, Roseburn Street, Balgreen Road etc.)	Agreed	
General	Works that need to be completed outside normal working hours as a result of Third Party Agreements	Agreed	
General	Movement of Plant and Machinery. - by exception	Agreed with comments	By exception
General	Delivery of abnormal loads.- agreed	Agreed	

EDINBURGH TRAM PROJECT
Proposed Schedule of Works to Seek Dispensation from CoCP

Category	Item	Status	Comments
General	Connection of power and telecomm outside peak times or due to the availability of outages.	Agreed	
General	Testing and commissioning of sub-stations. - by exception	Agreed with comments	By exception
General	Testing and commissioning of Trams to avoid traffic problems in case of a breakdown or systems failure.	Agreed with comments	By exception or for specific testing requirements / situations. Not for general training
General	Signal and system integration testing operations. - by exception depending on test	Agreed with comments	By exception depending on test requiremetns
General	Works adjacent to the guided bus route which would cause disruption during peak times.	Agreed	
General	Works which are programmed but cannot be carried out without causing disruption to City festivals and events. Examples?	Agreed with comments	Specific or unknown events only. Not known embargos or identified events at 28Feb08
General	Road works and footway works that would affect access points to business premises, distribution centres etc.	Agreed with comments	Not as the norm. by exception only

EDINBURGH TRAM PROJECT

On-Street Construction Methodology

Construction Methodology and proposals Based on Design Available to December 2007 and to be confirmed by Detailed Design

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Introduction

This document has been prepared to provide a summary view of the documentation that has been used and decisions that have been made to agree the construction methodology primarily for Edinburgh Tram Infraco Construction Works that are to take place in the City Centre (Haymarket to Newhaven) but also for two recognised areas outwith the city centre being the interface between the A8 Underpass construction at the Gogar Roundabout and the construction activities to the existing guided busway.

This document refers to may separate sketches and drawings that have been reviewed and discussed in some detail by not only **tie** and the Infraco Constructor (**BBS**) but also with major stakeholders such as CEC, TEL and Lothian and Borders Police.
All referenced drawings and sketches are available under separate cover.

General

1. Queen Street – George Street – Princes Street have to be recognised as the "cornerstone" of any traffic management proposals and should be used as the foundation to build traffic management solutions from.

2. CEC advised that as there are only 3 recognised North – South routes through the city being :
    a. Princes St. – Lothian Rd.
    b. Through Mound junction
    c. Picardy place – Leith St. North Bridge

    and that only one of these thoroughfares can be closed at any given time and this constraint must be recognised during INFRACO programme development.

3. **tie** advised that any temporary traffic management deemed necessary will be input to the traffic modelling software by JRC.

4. Identification required by INFRACO of other works off the tram route that may be required to facilitate Traffic management i.e. removal of existing traffic calming measures, tree lopping, parking restrictions, signage etc.

5. Colour coded route map for on-street section referred to during discussions has been scanned and made available to all. (Attachment 1)

6. The constraints matrix (issued previously) is also colour coded to match map. The route map if reproduced for 3rd parties are not to be issued greater then A3 size. (Attached)- This has been superseded by the 'relaxation' of city centre constraints as detailed in the following pages. (Attachment 2)

7. BBS to consider in all proposals the requirement to service both business and private premises and required access to bus stops. BBS initial response is that servicing or business premises may have to be done outwith construction hours.

8. All proposals discussed are utilising CoCP hours only.

9. There are three areas have been recognised as full closure, due to considerable reduction on programme duration. (Shandwick place, Princess street and Constitution street)

Code of Construction Practice

The agreed Code of Construction Practice (CoCP) limits the working hours available as follows

Monday to Friday 7am-7pm
Saturday 8am-1pm

Any requirement to work outside of the COCP will have to be identified and an application made to CEC well in advance of the requirement.

Site Specific CoCP

Site Specific Code of Construction Practices exist for the area's listed below which have to be recognised and adhered to during Infraco Construction works.

1. Porth Ports
2. Ocean Terminal
3. Royal Yocht Brittania
4. BAA
5. SRU
6. Edinburgh Park
7. Network Rail
8. Others

{ XE "Code of Construction Practice" **}**

Embargo's

August Festival

August festival restriction period will run annually from the 1st Sunday in August to the 1st Sunday in September inclusive.

Christmas

From the Thursday preceding the first Sunday in December until the first working day of the New Year annually

Limits

Haymarket to Picardy Place

ON –STREET CONSTRUCTION METHODOLOGIES

Haymarket Junction

Limits

Frontage of Caley Ale House with Haymarket Station to West side of Palmerston Place (includes left turn into Plamerston Place)

Agreement

Phase 1 Drawing SK-TM-001

1. BBS confirmed that subject to being able to maintain acceptable pedestrian crossings that the 2 lane flow of traffic exiting Dalry Road into West Maitland Street would be maintained by"skewing" across the junction into West Maitland Street by building-up the east end of the existing pedestrian Island to the north of Ryries public house. BBS to confirm what works will be required to accommodate this and to update their proposals / drawings.

2. BBS confirmed that the Storage area 1b proposed for the north side of Morrison Street could be relocated to the south side of West Maitland Street to assist with traffic flows in Morrison street.

3. BBS confirmed that the fence line designating the working area around the existing East Island outside the Haymarket Bar would reduce traffic flow from Morrison Street into West Maitland Street to one lane.

Phase 2 Drawing SK-TM-002

1. BBS confirmed that with the East Island removed in Phase 1a that a 2 lane flow will be re-instated from Morrison Street into West Maitland Street.

Phase 3 Drawing SK-TM-003

1. BBS proposal to relocate bus stop from outside Ryries Bar to West End of Haymarket Terrace and build-up in the West end of the Scotrail Carpark adjacent to existing Air Quality Monitoring station to provide a standing area for bus passengers is agreed.

2. BBS proposal to relocate bus stop from outside Haymarket Station forecourt to West End of Haymarket Terrace and build-up in the West end of the Scotrail Carpark adjacent to existing Air Quality Monitoring station to provide a standing area for bus passengers agreed.

3. CEC to advise on situation with relocation of taxi rank from Haymarket Station carpark.

4. BBS to submit proposals for enabling works in Station forecourt

5. Caley Ale House - Demolition re-programmed from August 2008 to April 2008 following re-sequencing of programme to work from Haymarket into city centre. (Licence to vacate expires 31/3/8).

6. Junction Construction - Westbound traffic from Morrison Street to Haymarket Terrace will be reduced to one lane along the front of Ryries Bar / Haymarket Station.

7. Junction Construction - BBS to submit Traffic Management proposals for diverting general eastbound traffic from Haymarket Terrace into the surrounding streets (Coates Gardens or Rosebery Cresent) and exiting further up West Maitland Street, whilst maintaining a single bus lane eastbound through Haymarket junction and having a single westbound lane on Haymarket Station (South) side.(Applies to Phases 5 & 6 also)

Phase 4A Drawing SK-TM-004

1. Bus stop outside Haymarket station will be relocated during Phase 3 above

2. Taxi rank in station forecourt will be moved during Phase 3 above

Phase 4B Drawing SK-TM-005

1. Bus stop outside Haymarket station will be relocated during Phase 3 above

2. Taxi rank in station forecourt will be moved during Phase 3 above

Phase 5 Drawing SK-TM-006

1. BBS to submit Traffic Management proposals for diverting general eastbound traffic from Haymarket Terrace into the surrounding streets (Coates Gardens or Rosebery Cresent) and exiting further up West Maitland Street, whilst maintaining a single bus lane eastbound through Haymarket junction and having a single westbound lane on Haymarket Station (South) side (As per Phase 3)

2. Proposed diversion route for Westbound traffic through existing Haymarket station forecourt will require enabling works. (As per phase 3)

3. This phase requires Caley Ale House to have been demolished and would assist the construction to have continued junction section off-road and build the first part of Haymarket Viaduct through the Caley footprint. BBS to programme accordingly.

4. Programme logic to be checked to interface with Haymarket Terrace sub-station.

Phase 6A/6B Drawing SK-TM-007

1. BBS to submit Traffic Management proposals for diverting general eastbound traffic from Haymarket Terrace into the surrounding streets (Coates Gardens or Rosebery Cresent) and exiting further up West Maitland Street, whilst maintaining a single bus lane eastbound through Haymarket junction and having a single westbound lane on Haymarket Station (South) side (As per Phase 3)

2. TEL raised concerns on the temporary reduction of Dalry Road northbound to one lane and the impact of stationary buses. BBS requested to review potential to have 2 lanes running northbound on Dalry Rd towards West Maitland Street with the existing 2 lanes from Morrison Street southbound to Dalry Road reduced to one. BBS to update proposal.

3. BBS to advise on proposals for maintaining safe pedestrian access to the frontage of Haymarket Station.

General

1. BBS to advise proposals for ensuring pedestrian access and safety across Haymarket junction during construction period as central islands will be removed.

2. BBS to consider options during Programme Development and submit proposals for diverting traffic away from the A8/Haymarket and on to other approach routes into the city to ease congestion prior to Haymarket area construction.

3. Temporary Traffic Management design is responsibility of BBS and must consider such items as servicing of premises and through-routes for emergency vehicles etc

Palmerston Place / Torphicen Junction to Manor Place

Limits

West Maitland Street (West Side of Palmerston Place (excluding left turn into Palmerston Place) to West side of Manor Place (includes left turn in Manor Place)
West Maitland Street to Torphicen Place/Manor Place

Agreements

Jnc 81 Layout Drawing Phase's 1-2-3

1. BBS proposal is to reduce existing 4 lanes to 2 only eastbound to allow for a sufficient working area. Diversion strategy is a continuation of that adopted for Haymarket junction i.e. divert general eastbound traffic from Haymarket Terrace into the surrounding streets (Coates Gardens or Rosebery Cresent) and exiting further up West Maitland Street.

2. BBS confirmed that the right turn is retained from West Maitland into Torphicen Place.
   Proposal agreed in principal with BBS-CEC-TEL-L&BP subject to confirmed design dimensions and agreement of further detailed traffic management. See attached layout drawings.

3. CEC advised that Torphicen Street becomes 2 way in the final scheme with 2 lanes heading south and 1 lane heading north across the junction and into Palmerston place. BBS unaware of this design and the associated kerb re-alignments.
4. A north/south flow from Palmerston place to Torphichen street to be maintained during the construction of section 1d. This junction will be re-visited at the completion of the rest of section 1d to complete the construction of this section.

West Maitland Street Junction with Palmerston Place/Torphicen Street

Limits

West Side of Palmerston Place Junction on West Maintland Street to East side of Junction with Torphicen Street

Agreements

Shandwick Place (East side of Manor Place to West Side of Queensferry Street)
East Side of Manor Place to entrance to Coates / Atholl Crescents
Jnc 79 & 80 Layout Drawing Phase's 1-2-3

1. Following lengthy discussion it was agreed to merge Phase's 2 and 3 as shown to close the junction between Manor Place and West Maitland Street with traffic diverted down Palmerston Place.

2. Proposal agreed in principal with BBS-CEC-TEL-L&BP subject to confirmed design dimensions and agreement of further detailed traffic management. See attached layout drawings.

3. Existing road width is proving challenging to fit in a construction zone, a safety zone and maintain a traffic flow. BBS requested a x-section of the road.

4. Noted that if the revised Haymarket junction is constructed first then that would reduce Traffic Management challenges on Shandwick Place.BBS to consider in programme development.

5. Identified that the permanent measure could prove problematic as in the example of Shandwick Place there would be a centre island tram stop constructed whilst still maintaining two-way traffic flow prior to the permanent TRO approval, and that a further TTRO may be required to divert traffic away from this area. Needs to be considered for all areas.

Shandwick Place (Full Closure)

Limits

East side of Manor Place to West Side of Queensferry Street ,Entrance to Coates / Atholl Crescents to Lothian Road Junction

Agreements

No Construction methodology drawings yet developed for this section

1. Noted that if the revised Haymarket junction is constructed first then that would reduce Traffic Management challenges on Shandwick Place. BBS to consider in programme development.

2. Proposal is to close Shandwick Place and divert all traffic in both directions through Coates and Atholl crescents. Proposal agreed in principal with BBS-CEC-TEL-L&BP subject to submitted drawings, confirmed design dimensions and agreement of further detailed traffic management.

3. Identified that the permanent measure could prove problematic as in the example of Shandwick Place there would be a centre island tram stop constructed whilst still maintaining two-way traffic flow prior to the permanent TRO approval, and that a further TTRO may be required to divert traffic away from this area. Needs to be considered for all areas.

Lothian Road Junction

Limits

Junction between Lothian Road / South Queensferry Street/ Hope Street / Princess Street to east side of South Charlotte Street junction

Agreements

Lothian Road Junction

Jnc 72 & 70 Layout Drawing Phase's 1-2-3-3a-4

1. Proposal agreed in principal with BBS-CEC-TEL-L&BP subject to confirmed design dimensions and agreement of further detailed traffic management. See attached layout drawings. Enabling works required
    a. Opening the junction between Shandwick place / Queensferry Street/Hope Street (Fraser's Corner) and creating a gyratory in a clockwise direction. Will be done to some extent by MUDFA.
    b. The pedestrian flow across the Fraser's corner junction must be accommodated.

2. L&BP raised a concern with the potential for traffic performing a U-turn on the east side of Charlotte Square to access George Street.

3. Initial discussions took place around traffic management at Princes St, South Charlotte St, Charlotte Sq, Hope St. with the intention of introducing a virtual roundabout situation with traffic on Princes St running on the north side of Princes Street only between South Charlotte Street and Lothian Road junction. This would need enabling works to open the junction between Shandwick place / Queensferry Street/Hope street (Fraser's Corner)

Lothian Road junction to Princes St/South Charlotte St.

1. CEC advised that road alignment has changed from that shown on the drawings with BBS.

2. CEC advised that the pedestrian flow across the Fraser's corner junction in both east/west and north/south directions must be accommodated.

3. Issue whether or not re-profiling is required to Princes Street road surface and to what extent. Current design required.

4. Noted that once left turn is incorporated from South Charlotte St. to Princes St. eastbound that this will be for buses and taxis only.

5. 3 lanes running south in South Charlotte Street to be configured so that 2 lanes turn right into Princes Street for Lothian Road/Shandwick Place / Queensferry Street and 1 lane turns left into Princes Street for bus/taxi traffic only-Post construction

6. Phase 3 as shown on attached drawings can only be completed if existing road dimensions are sufficient. Await design details.

Princess Street (East – Central – West combined)

Limits

East Side of South Charlotte Street to the mid point of the Waverley bridge / Princes Street junction

Princes St. West Agreements

East side of South Charlotte Street to West Side of The Mound
East Side of South Charlotte Street to mid Fredrick Street Junction

Options Discussed:

Layout Drawing Phase's 1-2-3-4

1. Fredrick Street scheduled to be re-opened by MUDFA under St.Andrew Square programme by mid February 2008.

2. Princes Street Central Reservation may be removed by MUDFA prior to BBS requiring site.

3. A single phase between South Charlotte Street and Fredrick Street would remove up to 4 bus stops. TEL requested that this section be reviewed to terminate at the mid point of the Fredrick Street junction thus enabling a 2-way flow to be retained during both this and the following phase.

4. BBS were requested to submit proposals to split Princes St. into 3 phase's being
    a. East Side of South Charlotte Street to the mid point of Fredrick Street junction.
    b. Mid point of Fredrick Street junction to Mid point of the Mound Junction.
    c. Mid point of the Mound Junction to Waverley Bridge / South St.Andrew Street junction

5. BBS to be able to demonstrate the benefits to programme of this logic.

6. BBS proposal to split Princess Street into only 2 phase's
    a. East Side of South Charlotte Street to the mid point of Mound junction.
    b. Mid point of Mound junction to Waverley Bridge / South St.Andrew Street junction.

7. BBS to submit proposals with examples of how this would benefit programme and costs.

8. TEL have requested that if possible 2 lanes are retained in a westerly direction. BBS advised that the required width incorporating 2 lanes of traffic, working zone and safety zone may not be available. To be confirmed.

9. BBS indicated that complete closure had not been considered in their programme submission and that significant programme duration reduction would be expected in this area. Programme to be updated.

10. BBS requested that design x-sections of the road construction be made available.

Princes Street Agreement

Due to significant programme duration reduction made after the complete closure option exercise, it has been reprogrammed with complete closure of Princes street (from the east side of South Charlotte Street to the mid point of the Waverley bridge / Princes Street junction) whilst maintaining a single lane north-south flow across the Mount Junction under traffic light control.

Princess Street (Mount Junction)

Limits
Mound Junction

Mound Junction Agreements

Jnc 67 Layout Drawing Phase's 1-2-3-4-5-6-7-8

1. Current Proposal is to re-open Fredrick Street and move north/south traffic from Hanover Street to Fredrick Street. Construction will reduce traffic lanes to 1 lane westbound and 2 lanes eastbound. (This proposal assumes bus traffic remains on Princes St.)

2. Fredrick Street requires to be re-opened to traffic sooner rather than later to facilitate both MUDFA and INFRACO works. (Post mtg note – this requires to be done by end January 2008 to facilitate MUDFA works in St.Andrew Square

Waverley Bridge Junction

Limits

East end Princes Street at Junction with South St Andrew Street and Waverley Bridge

Jnc 49-50-53-63-66 Layout Drawing Phase's 1-2-3-4-5-6-7-8

1. Concern on amount of time in construction programme to construct this junction curve (37 days) due to complexity of traffic management issues. This has been resolved with the proposal of 3 phase construction discussed at meeting 6th Nov. and included in Construction methodology drawing pack received 12th Nov. under which the junction is now closed to all traffic thus providing a secure construction environment.

St. Andrew Square

Limits

North St Andrew Street to South St Andrew Street excluding junction York Place / North St Andrew Street and junction Princes Street / South St Andrew Street

Agreement:

1. East side of the Square will be closed to traffic by the time BBS require to construct in this area. BBS need to consider servicing of premises during construction.

2. If the re-profiling of road surface on South St.David Street currently being done as part of MUDFA works was continued through the left turn junction onto Princes St. (eastbound) then this would greatly assist traffic management proposals for Infraco. To be considered in MUDFA programme.

North St.Andrew Street to York Place Junction

Limits

Junction York Place / North St Andrew Street

Agreements

1. BBS unaware of any design associated with build-up of road levels at junction and require understanding of current design for this area. No information can be found in the data room indicating that this junction has to be built-up by around 500-600mm.

2. BBS were advised that this is an area where utilities may be left for Infraco.

3. BBS advised that to construct this junction the westbound left turn from York Place into North St.Andrew St would have to be banned. This will already have been done under MUDFA works.

4. BBS suggested diverting traffic through Herriot Row / Abercromby Place but after some discussion this was deemed unworkable.

5. Princes Street could be used as a diversion route to take traffic of York Place if Princes St construction programme could be completed first. BBS to consider in programme development.

6. Previous proposal to divert southbound traffic from Leith Walk to Leith Street and Princes Street was deemed unworkable by both TEL and L&BP as Leith Street already operating at capacity.

7. Issue is that major engineering works are required at this junction and traffic will have to be thinned-out by other diversions prior to reaching this location. Wider area diversion strategy required as mentioned above.

York Place

~~Limits~~

York Place from junction with North St Andrew Street to junction with Picardy Place/Broughton Street but excluding both of these junctions

~~Agreements~~

1. Access to Bus station at Elder street junction will require access to be maintained at all times. To be included in proposals.
2. Preferred option is two retain 2 lanes of traffic in one direction with the opposite flow diverted to a location yet to be decided.

Picardy Place

~~Limits~~

Between Picardy Place roundabout at its junctions with Broughton Street and Leith Street and London Road roundabout

1. CEC advised that the T-Junction proposal is being taken forward. SDS are currently working-up TSS initial design so that a “fixed” conceptual design will be available in December to allow BBS to programme and cost.

2. tie (D.Sharp) provided a draft of the final design and talked through with BBS. A copy of the draft layout plus a copy of the original layout incorporating Utilities was provided to BBS for information only. See attached. Formal issue expected later this week. Dwgs. B13703/SK/27 and B13703/SK/28

London Road Junction

~~Limits~~

London Road with its junctions to Leith Walk south and Leith Street

~~Agreement~~

1. CEC advised that this is now a T-junction design and has been for some time. Current design to be confirmed to BBS.

2. Understood that under MUDFA that the existing roundabout and clock would be removed this year. To be confirmed. (Post meeting note – removal of roundabout underway and clock to be removed to CEC storage w/c 19th Nov.2007)

Leith Walk (South)

~~Limits~~

Leith Walk (South) – Junction at London Road to Balfour Street

~~Agreement~~

1. Dalmeny Street and Iona Street cannot be closed together as each is a diversionary route for the other.

2. Pilrig Street and MacDonald Road cannot be closed together as each is a diversionary route for the other.

3. Bus movements between Elm Row and Annandale Street are critical. Provided MacDonald Road and Hopetoun Street are accessible then diversions northbound only could be accommodated between the hours of 08:00 and 18:00.

4. Southbound from Annandale Street to Elm Row is needed at all times.

5. Potential for TRO impact on permanent measures to be considered during programme development.

6. Proposal agreed in principal with BBS-CEC-TEL-L&BP subject to confirmed design dimensions, submitted drawings and agreement of further detailed traffic management. BBS to submit drawings to support proposal.

Leith Walk (North)

~~Limits~~

Leith Walk (North) – Junction Balfour Street to just South of Foot of the Walk junction with Great Junction Street

~~Agreements~~

Potential for TRO impact on permanent measures to be considered during programme development.

Proposal agreed in principal with BBS-CEC-TEL-L&BP subject to confirmed design dimensions, submitted drawings and agreement of further detailed traffic management. BBS to submit drawings to support proposal

Foot of the Walk

~~Limits~~

Foot of the Walk / Great Junction Street / Constitution Street / Duke Street Junctions

~~Agreement~~

1. Existing pedestrian crossings and associated signalling moved back into Duke Street, Great Junction Street, Leith Walk, Constitution St away from the junction.

2. Construction at south end of constitution street is extended as far south into Great Junction St junction as practically possible.

3. Traffic management in a East/West direction is reduced to one lane over the already built section in 2 above south of constitution st and a L-shape construction is done incorporating remaining 2/3rds of Great Junction Street and ½ of Leith Walk.

4. Traffic management in a East/West direction is reduced to one lane over the already built section in 2 above south of constitution st and a L-shape construction is done incorporating remaining 2/3rds of Duke Street and ½ of Leith Walk.

5. Proposal agreed in principal with BBS-CEC-TEL-L&BP subject to confirmed design dimensions, submitted drawings and agreement of further detailed traffic management. BBS to submit drawings to support proposal.

Constitution Street (South)- Closure

~~Limits~~

Constitution Street north of junction with Great Junction St/Duke Street to North side of Queen Charlotte Street (includes junction)

~~Agreement~~

Due to permanent TRO constraints the works in constitution street should be programmed so that they are not completed until after the TRO is in place. BBS to consider during development of programme

Constitution Street- Closure

Limits
Constitution Street north of junction with Queen Charlotte Street to south side of junction with Baltic Street / Bernard Street

Agreement

Due to permanent TRO constraints the works in constitution street should be programmed so that they are not completed until after the TRO is in place. BBS to consider during development of programme.

Constitution Street (North)-Closure

Limits

Constitution Street north of junction with Baltic Street / Bernard Street to roundabout at Casino Square

Agreement

Due to permanent TRO constraints the works in constitution street should be programmed so that they are not completed until after the TRO is in place. BBS to consider during development of programme.

Ocean Drive

Limits
Ocean Drive from roundabout at Casino Square to Junction with Lindsay Road including Victoria Quay Roundabout

Agreement

Casino Square
Roundabout is removed and essentially becomes a T-junction.

Ocean Drive

1. Tower Place Bridge – Clarity required on whether or not an additional footway is required. Bridge is to be widened.

2. CEC advised that their understanding is that the CoCP will be agreed with Forth Ports w/e 16th November and that CEC will be adopting the road therefore becoming the owners.

3. Casino Square to Ocean Terminal – BBS understood that the alignment in this section was in the verge only moving into the roadway to cross Tower Place and Victoria Dock bridges. CEC advised that the alignment in this section is in the centre of the road.

4. CEC also adopting the section in front of Ocean Terminal upto Ocean Drive West

5. Temporary road to be built through existing blaes carpark incorporating part of existing road. BBS to incorporate in programme logic.

6. Access must be maintained to carpark at North end of Ocean Terminal at all times. BBS to incorporate in programme logic.

7. Constraints expected outside of Ocean Terminal to be advised

Victoria Quay Roundabout

Becomes a T-junction in the permanent measure with controlled pedestrian crossing. This conflicts with the design BBS currently have. Data room to be checked for correct design.

Lindsay Road to Newhaven

~~Limits~~
Lindsay Road at junction with Ocean Drive to Newhaven Road

~~Agreement~~

This section is currently under re-design as there is an expected change to the alignment. This is also a section where MUDFA and INFRACO may work in parallel as the road levels may be changed by up to 2m.

A8 Underpass

Agreement

- BBS used AIP report as a basis as was a very detailed report on design, construction methodology and associated traffic management.

  The change to design criteria around the A8 retained wall (soil nailing rather than contiguous piles) now means that the wing walls are now stand-alone structures rather than as previously when they were part of the A8 contiguous piled wall.

- Phase 1 (North Side)
  The traffic management associated with this will see the closure of the near-side lane (eastbound) on the Gogar roundabout and one lane of the current eastbound (city bound) slip road from the Gogar roundabout closed-off using a physical TVCB (temporary vehicle control barrier).

  Once the traffic management is in place construction will commence on the North side with a top down dig to allow enough spoil to be removed to allow the construction of the first part of the tunnel roof soffit. A base layer will be put in place and timbered over which will allow the first section of the tunnel roof to be cast.

  2 rows of piles have to be driven in a north-south direction leading into the north access to the tunnel. This will be supported by east-west sheet piling to ensure integrity between the worksite and the traffic lane.

  Following completion, the road surface will be re-instated.

- TEL commented that the need for cross-over flows from the slip road to city bound lanes and from the A8 under the roundabout to Leith bound lanes needs to be maintained as well as considering the impact of stacking in the slip lane onto the roundabout itself.

- tie proposed the use of temporary traffic lights to control the merge across lanes with temporary stop lines painted on the road both at the east end of the slip road and the east end of the A8 exiting from under the roundabout. The location of these lights would enable integration with the existing controllers for the lights on the roundabout thus keeping them in sequence.

- It was agreed by all present that physical separation of traffic, however difficult, i.e prohibit city bound access from Gogar roundabout slip road, should be considered during traffic modelling

- Phase 2

  Following the completion of phase 1 a temporary running lane will be built in the verge to the north of the existing slip-road. The traffic management will then switch to the inside lane of the slip road although by the use of the temporary road 2 lanes of traffic will then be retained on the slip road city bound.

  Traffic management to the lanes under the roundabout will see the eastbound (city bound) lanes closed to public traffic with a contra-flow in place to allow east and west bound traffic to run on the westbound (towards airport) lanes only.

- Phase 3

  The eastbound slip road is fully re-opened in original configuration.

  The contra-flow on the lanes under the roundabout will be switched from the westbound lanes to the eastbound lanes i.e. 2 directional traffic flows on eastbound (city bound) lanes only with the westbound lanes closed to public traffic.

  The west-bound slip-road from the A8 to the Gogar roundabout will be reduced to one lane at the point of the sub-way but will open out again to three lanes prior to meeting the roundabout. This ensures that traffic can set itself for exits to the Gyle or City bypass.

- Phase 4 (South Side)

  This will see the westbound slip road from the A8 into the Gyle centre closed completely with Gyle bound traffic directed up to the Gogar roundabout then back into the Gyle.

  Note that sheet piling required for phases 1 and 4 is very close to the running lanes and will therefore have to be installed either overnight or in periods where the road can be closed to traffic.

  Hammer noise and vibration radius will also have to be considered with residential properties situated just to the north-east of the worksite.

- Phases 1 & 2 will provide the most challenging in terms of traffic management with the part closure of slip roads.

- Tie requested BBS to consider the implications of re-programming the A8 underpass from its current north–south to south–north i.e phases 1-4 changed to 4-1.
  Both TEL and L&BP requested that the construction sequencing be maintained as programmed i.e North-South as this completes the most difficult phase 1 in terms of traffic management at the most suitable period.

- Tie confirmed that the sewer diversion would be carried out under the MUDFA contract and should have no impact on the underpass construction as the subway construction is currently programmed to complete in June 2009 with the next activities for drainage and

trackwork not programmed to commence until November 2009 as the logic is dependant on the completion of structure S32 Depot Access bridge.

- If the depot access bridge has been re-located in the current design, further north then this can be started earlier as there will be no impact on underpass construction and associated traffic management.

A8 Underpass / Guided Busway Interface

- As design changes have evolved and the location of the Gogar Depot has moved north, the requirement for a contiguous piled wall along the north side of the A8 has been reduced to a requirement for a soil nailed wall only.

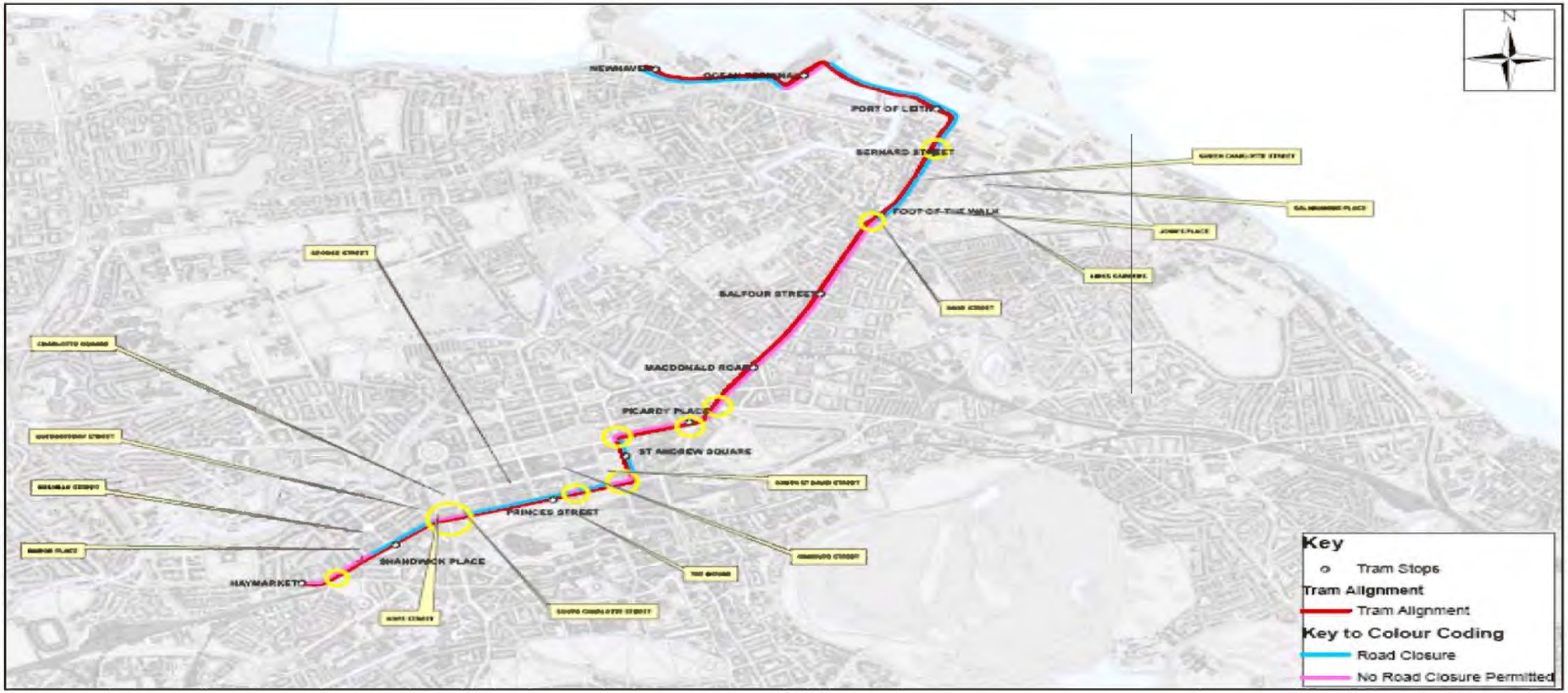
  This should reduce the construction duration required for the A8 wall and thus make it possible to commence the A8 Underpass earlier.

- This has to be managed to avoid the Royal Highland Show at Ingliston Showground in June 2008 as this will put immense pressure on any traffic management in place prior to the show.

  CEC events team to confirm dates for Royal Highland Show (TC)

- BBS to re-programme A8 Underpass to commence in late June 2008, (following completion of Highland Show) which will see completion approx end of 3rd week of April 2009 resulting in a 7-8 week overlap with the guided busway construction commencing in February 2009.

Attachment 1



Trams For Edinburgh: Haymarket to Newhaven

0 600 1,200 2,400 Meters

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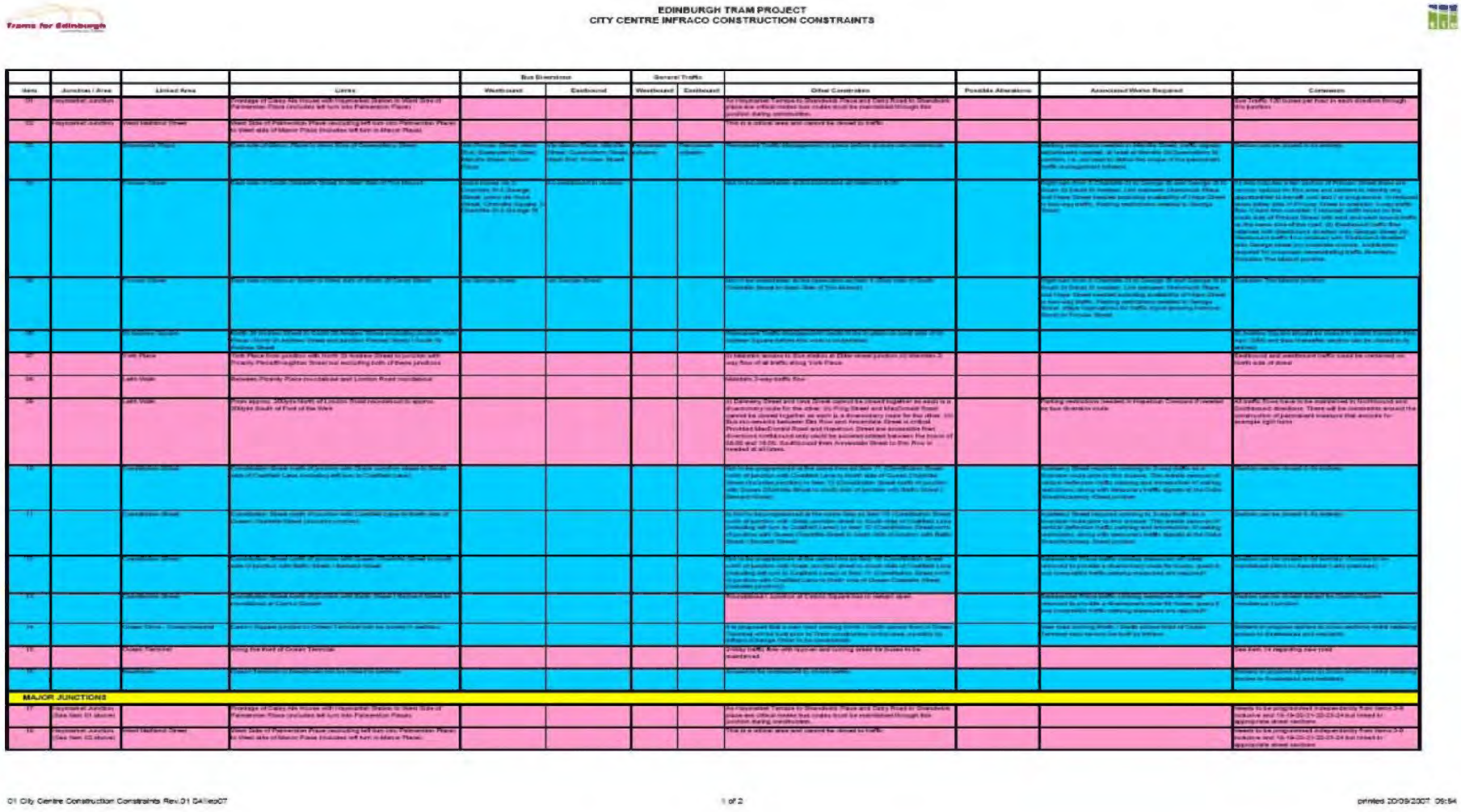
Trams for Edinburgh

Attachment 2



EDINBURGH TRAM PROJECT
CITY CENTRE INFRACO CONSTRAINTS

Item	Junction / Area	Linked Area	Lanes	Bus Diversions		General Traffic		Other Constraints	Possible Alterations	Associated Works Required	Comments
				Westbound	Eastbound	Westbound	Eastbound				
01	Haymarket Junction		Frontage of Dairy Ale House with Haymarket Station to West Side of Palmerston Place (includes left turn into Palmerston Place)					As Haymarket Terrace to Shandwick Place and Dairy Road to Shandwick place are critical routes bus routes must be maintained through the junction during construction.			
02	Haymarket Junction	West Maitland Street	West Side of Palmerston Place (excluding left turn into Palmerston Place) to West side of Manor Place (includes left turn in Manor Place)					This is a critical area and cannot be closed to traffic			
03		Shandwick Place	East side of Manor Place to West Side of Queensferry Street								
04		Princes Street	East side of Castle Terrace to West side of South St David Street								
05		Princes Street	East side of South St David Street to West side of South Charlotte Street								
06		Princes Street	East side of Frederick Street to West side of South Charlotte Street								
07		Castle Terrace	East side of Lothian Road to West side of Castle Terrace (includes left turn into Castle Terrace)								
08		Castle Terrace	Between Lothian Road and Cambridge Street (Eastbound)								
09		Castle Terrace	Between Cambridge Street and Lothian Road (Eastbound)								
10		Castle Terrace	Between Lothian Road and Cambridge Street (Eastbound)								
11		Castle Terrace	Between Lothian Road and Cambridge Street (Eastbound)								
12		Castle Terrace	Between Lothian Road and Cambridge Street (Eastbound)								
13		Castle Terrace	Between Lothian Road and Cambridge Street (Eastbound)								
14		Castle Terrace	Between Lothian Road and Cambridge Street (Eastbound)								
15		Castle Terrace	Between Lothian Road and Cambridge Street (Eastbound)								
16		Castle Terrace	Between Lothian Road and Cambridge Street (Eastbound)								
MAJOR JUNCTIONS											
17	Haymarket Junction (See Item 01 above)		Frontage of Dairy Ale House with Haymarket Station to West Side of Palmerston Place (includes left turn into Palmerston Place)					As Haymarket Terrace to Shandwick Place and Dairy Road to Shandwick place are critical routes bus routes must be maintained through the junction during construction.			
18	Haymarket Junction (See Item 02 above)	West Maitland Street	East Side of Palmerston Place (excluding left turn into Palmerston Place) to West side of Manor Place (includes left turn in Manor Place)					This is a critical area and cannot be closed to traffic			

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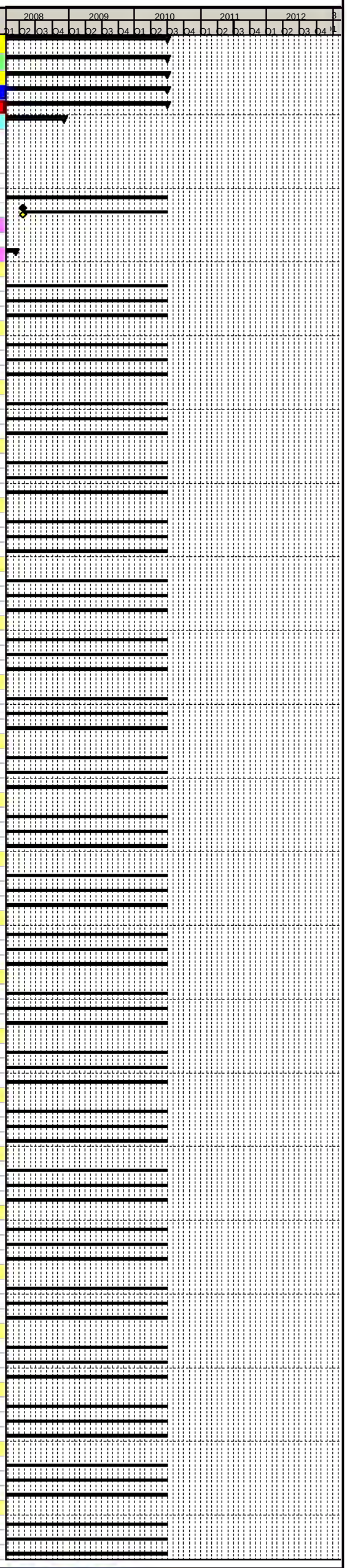
EDINBURGH TRAM PROJECT
CITY CENTRE INFRACO CONSTRUCTION CONSTRAINTS

				Box Diversions		General Traffic					
Item	Junction / Area	Linked Area	Limits	Westbound	Eastbound	Westbound	Eastbound	Other Constraints	Possible Alterations	Associated Works Required	Comments
16a	West End		Junction between Lothian Road and Princes Street to east side of Castle Cheyenne Street junction (Jenners pavement)						Potential to programme over short full closure e.g. [illegible]		Needs to be programmed independently from items 1-3 [illegible]
16b	West End		Junction between west side of Queensferry Street junction and west side of Lothian Road junction						Potential to programme over short full closure e.g. [illegible]		Needs to be programmed independently from items 1-3 and 17-18-19-20-21-22-23-24 but based to appropriate street sections
20	Princes Street		Round to Rutland Street junction						Potential to programme over short full closure e.g. [illegible]		Needs to be programmed independently from items 1-3 & 7 & 17-18-19-21-22-23-24 but based to appropriate street sections
21	Princes Street		Rutland Street junction					Permanent Traffic Management needs to be in place on west side of St Andrew Square before this work is undertaken	Potential to programme over short full closure e.g. [illegible]		Needs to be programmed independently from items 1-3 & 7 & 17-18-19-21-22-23-24 but based to appropriate street sections
22	York Place		Junction between York Place and North St Andrew Street					Permanent Traffic Management needs to be in place on west side of St Andrew Square before this work is undertaken		Change in road levels / Removal of stays?	Not to be undertaken at same time as 19-23
23	Lane Walk		Picardy Place Junction							Change in road levels	Not to be undertaken at same time as 19-23
24	Lane Walk		Lanton Road Junction								Not to be undertaken at same time as 19-23
25	Lane Walk		Foot of Lane Walk / Lower Junction Street junction						Potential to programme over short full closure e.g. [illegible]		Not to be undertaken at same time as 20
26	Constitution Street		Bonhard Street / Baltic Street junction						Potential to programme over short full closure e.g. [illegible]		Not to be undertaken at same time as 20
GENERAL											
27	ALL		Full Route					Access to be maintained for servicing for Businesses and residents at all times			
27	ALL		Haymarket to Picardy Place					August festival restriction period will run from 1st Sunday in August to 1st Sunday in September inclusive			
28	ALL		Haymarket to Picardy Place					December Christmas market restriction period will run from 1st of December to the first working day of the New Year inclusive			
30	ALL		Major junctions					Major junctions to be operational when Major events at Murrayfield (20,000 plus spectators)			
31	ALL		Major junctions					Major junctions to be operational when Rugby International at Murrayfield			
32	ALL		Major junctions					Major junctions to be operational when Hearts or Hibs football matches scheduled			
33	ALL		Major junctions					Major junctions to be operational when either Hearts or Hibs field either Rangers or Celtic			
		[illegible]									
		Must maintain 3-way Traffic Flow									

Activity ID	Activity Name	Original Duration	Start	Finish
Total		1221d	19-Sep-05 A	01-Jul-10
ULE90130 SDS Edinburgh Tram V26 update on V25 - Actual progress to Data Date 14th Jan 08 Rec 04Feb08		1221d	19-Sep-05 A	01-Jul-10
MS - Programme Key Milestones		1221d	19-Sep-05 A	01-Jul-10
MS - Programme Key Milestones		1221d	19-Sep-05 A	01-Jul-10
MS - Programme Key Milestones		1221d	19-Sep-05 A	01-Jul-10
SDS Key Milestones		824d	19-Sep-05 A	04-Dec-08
CON-0000	PB SDS Contractual Start Date	0d	19-Sep-05 A	
SDS001	Preliminary Design Phase Start	0d	19-Dec-05 A	
SDS007	Preliminary Design Complete for tie Submission	0d		30-Jun-06 A
SDS008	Preliminary Design Release Final	0d		28-Jul-06 A
SDS009	Preliminary Design Phase Finished	0d		30-Jun-06 A
SDS020	All Outstanding Preliminary Design Issues Resolved	0d		24-Apr-08
General		0d	03-Jul-06 A	03-Jul-06 A
SDS010	Detailed Design Phase Start	0d	03-Jul-06 A	
ROR Presentations		123d	12-Sep-07 A	12-Mar-08
Craigleith Tram Stop		9d	12-Sep-07 A	25-Sep-07 A
SDS80920	Review Session	0d		12-Sep-07 A
SDS80930	ROR Presentation	0d		19-Sep-07 A
SDS80940	Formal Issue of ROR	0d		25-Sep-07 A
Craigleith Bank Retaining Wall		9d	19-Sep-07 A	02-Oct-07 A
SDS79760	Review Session	0d		19-Sep-07 A
SDS79770	ROR Presentation	0d		26-Sep-07 A
SDS79780	Formal Issue of ROR	0d		02-Oct-07 A
St George's Access Bridge		9d	19-Sep-07 A	02-Oct-07 A
SDS79790	Review Session	0d		19-Sep-07 A
SDS79800	ROR Presentation	0d		26-Sep-07 A
SDS79810	Formal Issue of ROR	0d		02-Oct-07 A
3A Roads		9d	26-Sep-07 A	09-Oct-07 A
SDS79310	Review Session	0d		26-Sep-07 A
SDS79320	ROR Presentation	0d		03-Oct-07 A
SDS79330	Formal Issue of ROR	0d		09-Oct-07 A
Roseburn Junction to Granton Square Street Lighting		9d	03-Oct-07 A	16-Oct-07 A
SDS79340	Review Session	0d		03-Oct-07 A
SDS79350	ROR Presentation	0d		10-Oct-07 A
SDS79360	Formal Issue of ROR	0d		16-Oct-07 A
Roseburn Junction to Granton Square Boundary & Accomodation Works		9d	03-Oct-07 A	16-Oct-07 A
SDS79370	Review Session	0d		03-Oct-07 A
SDS79380	ROR Presentation	0d		10-Oct-07 A
SDS79390	Formal Issue of ROR	0d		16-Oct-07 A
South Groathill Avenue Substation		9d	10-Oct-07 A	23-Oct-07 A
SDS79400	Review Session	0d		10-Oct-07 A
SDS79410	ROR Presentation	0d		17-Oct-07 A
SDS79420	Formal Issue of ROR	0d		23-Oct-07 A
Roseburn Junction to Granton Square OLE		9d	10-Oct-07 A	23-Oct-07 A
SDS79430	Review Session	0d		10-Oct-07 A
SDS79440	ROR Presentation	0d		17-Oct-07 A
SDS79450	Formal Issue of ROR	0d		23-Oct-07 A
Section 5C Drainage (Roads & Track)		9d	17-Oct-07 A	30-Oct-07 A
SDS79460	Review Session	0d		17-Oct-07 A
SDS79470	ROR Presentation	0d		24-Oct-07 A
SDS79480	Formal Issue of ROR	0d		30-Oct-07 A
Alignment - Subsection 1B		9d	17-Oct-07 A	30-Oct-07 A
SDS79550	Review Session	0d		17-Oct-07 A
SDS79560	ROR Presentation	0d		24-Oct-07 A
SDS79570	Formal Issue of ROR	0d		30-Oct-07 A
Coltbridge Viaduct Design Review		9d	24-Oct-07 A	06-Nov-07 A
SDS79880	Review Session	0d		24-Oct-07 A
SDS79890	ROR Presentation	0d		31-Oct-07 A
SDS79900	Formal Issue of ROR	0d		06-Nov-07 A
Russell Road Bridge (Substructure and Superstructure)		9d	24-Oct-07 A	06-Nov-07 A
SDS79580	Review Session	0d		24-Oct-07 A
SDS79590	ROR Presentation	0d		31-Oct-07 A
SDS79600	Formal Issue of ROR	0d		06-Nov-07 A
Hard & Soft Landscaping - Section 3A		10d	07-Nov-07 A	21-Nov-07 A
SDS79640	Review Session	0d		07-Nov-07 A
SDS79650	ROR Presentation	0d		14-Nov-07 A
SDS79660	Formal Issue of ROR	0d		21-Nov-07 A
Hard & Soft Landscaping - Section 1D		10d	07-Nov-07 A	21-Nov-07 A
SDS79520	Review Session	0d		07-Nov-07 A
SDS79530	ROR Presentation	0d		14-Nov-07 A
SDS79540	Formal Issue of ROR	0d		21-Nov-07 A
Section 5A Boundary and Accomodation Works		9d	15-Nov-07 A	28-Nov-07 A
SDS79610	Review Session	0d		15-Nov-07 A
SDS79620	ROR Presentation	0d		21-Nov-07 A
SDS79630	Formal Issue of ROR	0d		28-Nov-07 A
Section 1D Street Lighting		9d	15-Nov-07 A	28-Nov-07 A
SDS81570	Review Session	0d		15-Nov-07 A
SDS81580	ROR Presentation	0d		22-Nov-07 A
SDS81590	Formal Issue of ROR	0d		28-Nov-07 A
Section 2A Alignment		9d	22-Nov-07 A	05-Dec-07 A
SDS79700	Review Session	0d		22-Nov-07 A
SDS79710	ROR Presentation	0d		29-Nov-07 A
SDS79720	Formal Issue of ROR	0d		05-Dec-07 A
Section 2A Roads		9d	22-Nov-07 A	05-Dec-07 A
SDS79730	Review Session	0d		22-Nov-07 A
SDS79740	ROR Presentation	0d		29-Nov-07 A
SDS79750	Formal Issue of ROR	0d		05-Dec-07 A
Depot Office Building		9d	29-Nov-07 A	12-Dec-07 A
SDS81480	Review Session	0d		29-Nov-07 A
SDS81490	ROR Presentation	0d		06-Dec-07 A
SDS81500	Formal Issue of ROR	0d		12-Dec-07 A
Section 2A Drainage (Roads and Track)		9d	06-Dec-07 A	19-Dec-07 A
SDS81420	Review Session	0d		06-Dec-07 A
SDS81430	ROR Presentation	0d		13-Dec-07 A
SDS81440	Formal Issue of ROR	0d		19-Dec-07 A
Haymarket Station Viaduct		9d	06-Dec-07 A	19-Dec-07 A
SDS81600	Review Session	0d		06-Dec-07 A
SDS81610	ROR Presentation	0d		13-Dec-07 A
SDS81620	Formal Issue of ROR	0d		19-Dec-07 A
OLE Building Fixings		6d	13-Dec-07 A	21-Dec-07 A
SDS79850	Review Session	0d		13-Dec-07 A
SDS79860	ROR Presentation	0d		20-Dec-07 A
SDS79870	Formal Issue of ROR	0d		21-Dec-07 A



Primary Baseline
Actual Work
Remaining Work
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Milestone

Trams for Edinburgh ..connecting our Capital

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SDS FULL DESIGN PROGRAMME @ V26

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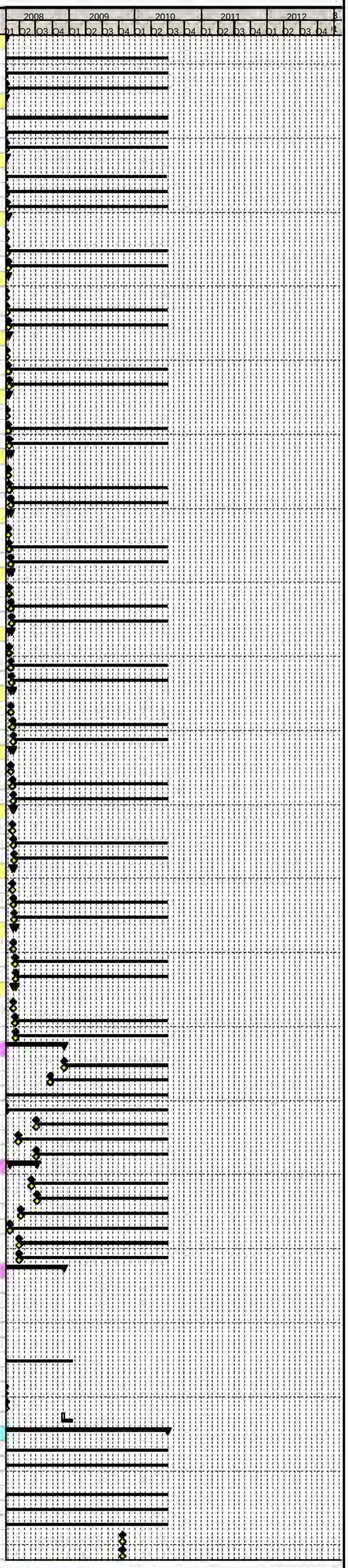
Activity ID	Activity Name	Original Duration	Start	Finish
Princes Street Tram Stop		12d	20-Dec-07 A	16-Jan-08
SDS79490	Review Session	0d		20-Dec-07 A
SDS79500	ROR Presentation	0d		10-Jan-08 A
SDS79510	Formal Issue of ROR	0d		16-Jan-08
Bernard Street Stop		12d	20-Dec-07 A	16-Jan-08
SDS79820	Review Session	0d		20-Dec-07 A
SDS79830	ROR Presentation	0d		10-Jan-08 A
SDS79840	Formal Issue of ROR	0d		16-Jan-08
Catherdrale Lane Substation		9d	10-Jan-08 A	23-Jan-08
SDS82440	Review Session	0d		10-Jan-08 A
SDS82450	ROR Presentation	0d		17-Jan-08
SDS82460	Formal Issue of ROR	0d		23-Jan-08
Systems & Communications		9d	17-Jan-08	30-Jan-08
SDS79670	Review Session	0d		17-Jan-08*
SDS79680	ROR Presentation	0d		24-Jan-08
SDS79690	Formal Issue of ROR	0d		30-Jan-08
Edinburgh Park Station Viaduct		9d	17-Jan-08	30-Jan-08
SDS81630	Review Session	0d		17-Jan-08*
SDS81640	ROR Presentation	0d		24-Jan-08
SDS81650	Formal Issue of ROR	0d		30-Jan-08
Section 1B Roads		9d	24-Jan-08	06-Feb-08
SDS82500	Review Session	0d		24-Jan-08*
SDS82510	ROR Presentation	0d		31-Jan-08
SDS82520	Formal Issue of ROR	0d		06-Feb-08
Section 1D Roads		9d	24-Jan-08	06-Feb-08
SDS82530	Review Session	0d		24-Jan-08*
SDS82540	ROR Presentation	0d		31-Jan-08
SDS82550	Formal Issue of ROR	0d		06-Feb-08
Section 5C Hard and Soft Landscaping		9d	31-Jan-08	13-Feb-08
SDS82470	Review Session	0d		31-Jan-08*
SDS82480	ROR Presentation	0d		07-Feb-08
SDS82490	Formal Issue of ROR	0d		13-Feb-08
Depot Hard and Soft Landscaping		9d	31-Jan-08	13-Feb-08
SDS82560	Review Session	0d		31-Jan-08*
SDS82570	ROR Presentation	0d		07-Feb-08
SDS82580	Formal Issue of ROR	0d		13-Feb-08
Depot Earthworks and Ducting		9d	07-Feb-08	20-Feb-08
SDS82590	Review Session	0d		07-Feb-08*
SDS82600	ROR Presentation	0d		14-Feb-08
SDS82610	Formal Issue of ROR	0d		20-Feb-08
Depot Drainage		9d	07-Feb-08	20-Feb-08
SDS82620	Review Session	0d		07-Feb-08*
SDS82630	ROR Presentation	0d		14-Feb-08
SDS82640	Formal Issue of ROR	0d		20-Feb-08
Section 1A Roads		9d	14-Feb-08	27-Feb-08
SDS82650	Review Session	0d		14-Feb-08*
SDS82660	ROR Presentation	0d		21-Feb-08
SDS82670	Formal Issue of ROR	0d		27-Feb-08
Section 1C Roads		9d	14-Feb-08	27-Feb-08
SDS82680	Review Session	0d		14-Feb-08*
SDS82690	ROR Presentation	0d		21-Feb-08
SDS82700	Formal Issue of ROR	0d		27-Feb-08
Section 5C Drainage Revisit		9d	21-Feb-08	05-Mar-08
SDS82710	Review Session	0d		21-Feb-08*
SDS82720	ROR Presentation	0d		28-Feb-08
SDS82730	Formal Issue of ROR	0d		05-Mar-08
TBC 1		9d	21-Feb-08	05-Mar-08
SDS82770	Review Session	0d		21-Feb-08*
SDS82780	ROR Presentation	0d		28-Feb-08
SDS82790	Formal Issue of ROR	0d		05-Mar-08
TBC 2		9d	28-Feb-08	12-Mar-08
SDS82800	Review Session	0d		28-Feb-08*
SDS82810	ROR Presentation	0d		06-Mar-08
SDS82820	Formal Issue of ROR	0d		12-Mar-08
TBC 3		9d	28-Feb-08	12-Mar-08
SDS82740	Review Session	0d		28-Feb-08*
SDS82750	ROR Presentation	0d		06-Mar-08
SDS82760	Formal Issue of ROR	0d		12-Mar-08
Detail Design Submittals to tie		344d	31-Jul-07 A	03-Dec-08
SDS030	Complete All Detail Design Submittals to tie	0d		03-Dec-08
SDS73360	Detail Design Submittals to tie Complete For Section 1	0d		17-Sep-08
SDS73370	Detail Design Submittals to tie Complete For Section 2	0d		31-Jul-07 A
SDS73380	Detail Design Submittals to tie Complete For Section 3	0d		14-Jan-08
SDS73390	Detail Design Submittals to tie Complete For Section 5	0d		03-Jul-08
SDS73400	Detail Design Submittals to tie Complete For Section 6	0d		26-Mar-08
SDS73410	Detail Design Submittals to tie Complete For Section 7	0d		03-Jul-08
Detail Design Submittals to CEC		109d	08-Feb-08	10-Jul-08
SDS73420	Detail Design Submittals to CEC Complete For Section 6	0d		09-Jun-08
SDS73430	Detail Design Submittals to CEC Complete For Section 1	0d		10-Jul-08
SDS73440	Detail Design Submittals to CEC Complete For Section 3	0d		11-Apr-08
SDS73450	Detail Design Submittals to CEC Complete For Section 2	0d		08-Feb-08
SDS73460	Detail Design Submittals to CEC Complete For Section 5	0d		01-Apr-08
SDS73470	Detail Design Submittals to CEC Complete For Section 7	0d		01-Apr-08
IDRs		515d	24-Nov-06 A	04-Dec-08
SDS050	Intermediate Design Review (IDR) 1	0d		24-Nov-06 A
SDS67810	Intermediate Design Review (IDR) 2	0d		29-Mar-07 A
SDS67820	Intermediate Design Review (IDR) 3	0d		18-Apr-07 A
SDS67830	Intermediate Design Review (IDR) 4	0d		13-Jun-07 A
SDS67840	Intermediate Design Review (IDR) 5	0d		08-Aug-07 A
SDS67860	System Detail Design Review Resources	203d	05-Feb-07 A	10-Dec-07 A
SDS74080	Intermediate Design Review (IDR) 6	0d		26-Sep-07 A
SDS74090	Intermediate Design Review (IDR) 7	0d		14-Jan-08*
SDS74100	Intermediate Design Review (IDR) 8	0d		16-Jan-08*
SDS82910	System Detail Design Review	9d	20-Nov-08	04-Dec-08
TIE Milestones		1221d	19-Sep-05 A	01-Jul-10
SDS67370	DFBC Stage 1 Submission	0d		15-Nov-06 A
SDS67390	CEC (Full Council) Approval of DFBC - Stage 1	0d		21-Dec-06 A
TIE0100	TIE Award SDS Contract Start Date	0d	19-Sep-05 A	
TIE0101	6 Week Plan Submissions	0d		31-Oct-05 A
TIE0102	13 Week Deliverables	0d		19-Dec-05 A
TIE0103	Royal Assent	0d	08-May-06 A	
TIE0104	Tram Delivery	0d	23-Oct-09*	
TIE0105	Commissioning, Trial Running & Driver Training Complete	0d	23-Oct-09*	



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SDS FULL DESIGN PROGRAMME @ V26

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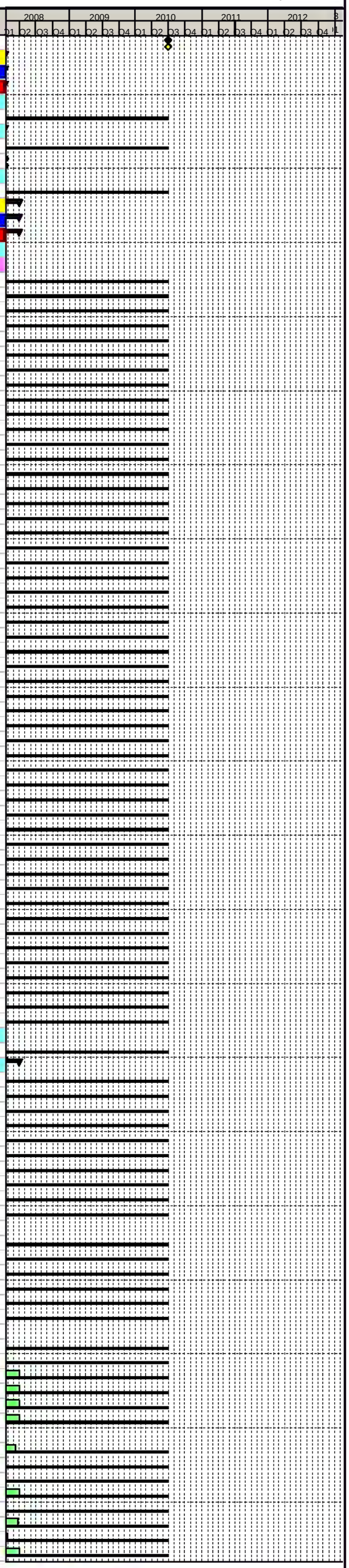
Activity ID	Activity Name	Original Duration	Start	Finish
TIE0106	Scheduled Opening Date	0d		01-Jul-10*
PPWA - PROCUREMENT		326d	22-Sep-06 A	14-Jan-08
PPWA - PROCUREMENT		326d	22-Sep-06 A	14-Jan-08
PPWA - PROCUREMENT		326d	22-Sep-06 A	14-Jan-08
TRAMCO		0d	05-Oct-06 A	05-Oct-06 A
SDS67360	TRAMCO Bids Submitted	0d		05-Oct-06 A
INFRACO		319d	03-Oct-06 A	14-Jan-08
SDS67340	INFRACO ITN Issued	0d		03-Oct-06 A
SDS67520	INFRACO Commence On Street	0d		14-Jan-08*
MUDFA		0d	22-Sep-06 A	22-Sep-06 A
SDS67330	MUDFA Contractor Appointed	0d		22-Sep-06 A
MPWA - MANAGEMENT Project Wide Activities		647d	19-Sep-05 A	31-Mar-08
MPWA - MANAGEMENT Project Wide Activities		647d	19-Sep-05 A	31-Mar-08
MPWA - Management Project Wide Activities		647d	19-Sep-05 A	31-Mar-08
SDS Contractual Requirements Deliverable Lists. (CDRLs)		60d	30-Sep-05 A	23-Dec-05 A
RD - Contractual Requirements Deliverables List		60d	30-Sep-05 A	23-Dec-05 A
SDS-000	Deliverables Matrix	0d	19-Dec-05 A	
SDS-001	Project Management Plan	0d	30-Nov-05 A	
SDS-002	Quality Management Plan	0d	30-Nov-05 A	
SDS-004	Configuration Management Plan	0d	30-Nov-05 A	
SDS-005	Verification and Validation Plan	0d	30-Nov-05 A	
SDS-006	Programme Schedule 05 12 05	0d	05-Dec-05 A	
SDS-007-001	Requirements Specification :- Architectural	0d	19-Dec-05 A	
SDS-007-002	Requirements Specification :- Depot CCTV	0d	19-Dec-05 A	
SDS-007-003	Requirements Specification :- Depot Control & Equipment Room.	0d	19-Dec-05 A	
SDS-007-004	Requirements Specification :- Electrical Works	0d	19-Dec-05 A	
SDS-007-005	Requirements Specification :- Integrated Fare Collection	0d	19-Dec-05 A	
SDS-007-006	Requirements Specification :- Mechanical & Public Health Works	0d	19-Dec-05 A	
SDS-007-007	Requirements Specification :- Operational and Performance	0d	19-Dec-05 A	
SDS-007-008	Requirements Specification :- Operational Radio System	0d	19-Dec-05 A	
SDS-007-009	Requirements Specification :- Operations Data Network	0d	19-Dec-05 A	
SDS-007-010	Requirements Specification :- Overhead Line Equipment	0d	23-Dec-05 A	
SDS-007-011	Requirements Specification :- Roads	0d	19-Dec-05 A	
SDS-007-012	Requirements Specification :- SCADA System (Aux & Traction Power)	0d	19-Dec-05 A	
SDS-007-013	Requirements Specification :- Structures	0d	19-Dec-05 A	
SDS-007-014	Requirements Specification :- System Wide Non-Functional	0d	19-Dec-05 A	
SDS-007-015	Requirements Specification :- Telephone Network	0d	19-Dec-05 A	
SDS-007-016	Requirements Specification :- Track & Formation	0d	19-Dec-05 A	
SDS-007-017	Requirements Specification :- Traction Power Outline	0d	19-Dec-05 A	
SDS-007-018	Requirements Specification :- Tram Position & Detection System	0d	19-Dec-05 A	
SDS-007-019	Requirements Specification :- Trams	0d	19-Dec-05 A	
SDS-007-020	Requirements Specification :- Selection of Traction Voltage	0d	19-Dec-05 A	
SDS-008	Preliminary HIRA Tram Report	0d	19-Dec-05 A	
SDS-009	Hazard Log	0d	19-Dec-05 A	
SDS-010	Preliminary Safety Case Arguments (GSN)	0d	19-Dec-05 A	
SDS-011	List of Applicable Standards	0d	19-Dec-05 A	
SDS-013	Requirements Database Baseline Report N0 1	0d	19-Dec-05 A	
SDS-015	Environmental Management Plan	0d	19-Dec-05 A	
SDS-016	Approvals & Concents Management plan	0d	19-Dec-05 A	
SDS-018	Risk Management Plan	0d	19-Dec-05 A	
SDS-019	Communication plan	0d	19-Dec-05 A	
SDS-020	Outline EMC Management Plan	0d	19-Dec-05 A	
SDS-021	Chainage System Definition	0d	19-Dec-05 A	
SDS-022	Technology Review - Wire - Free Traction System	0d	19-Dec-05 A	
SDS-023	Technology Review - In Street Trackform	0d	19-Dec-05 A	
SDS-024	St Andrews Square Alignment Design Study	0d	19-Dec-05 A	
SDS-025	Requirements Database Populated	0d		20-Dec-05 A
SDS-026	Integrated Fare Collection Technology Review	0d	19-Dec-05 A	
SDS-027	Preliminary HIRA Electrification & Power Report	0d	19-Dec-05 A	
SDS-028	Preliminary HIRA Operations & Maintenance Report	0d	19-Dec-05 A	
SDS-029	Preliminary HIRA SCC Report	0d	19-Dec-05 A	
SDS-030	Technology Review - Wirless Communications	0d	19-Dec-05 A	
SDS-031	Assumptions Register	0d	19-Dec-05 A	
SDS-032	Safety Management Plan	0d	30-Nov-05 A	
SDS-033	Requirements Test Specification	0d	19-Dec-05 A	
SDS-034	Risk Register	0d	19-Dec-05 A	
SDS-036	Prepare, Review & Deliver List A	26d	30-Sep-05 A	04-Nov-05 A
Bid to Cost Delta		95d	20-Feb-06 A	30-Jun-06 A
A569540	PD - Cost Delta	95d	20-Feb-06 A	30-Jun-06 A
Management (Task100)		638d	30-Sep-05 A	31-Mar-08
A00040	Information Management	76d	30-Sep-05 A	23-Jan-06 A
A00050	Project Management - Site Based	64d	30-Sep-05 A	04-Jan-06 A
A00060	Project Management - Office Based	64d	30-Sep-05 A	04-Jan-06 A
A00080	Change Control Management	66d	14-Oct-05 A	20-Jan-06 A
A00090	Project Management - System Integration	66d	14-Oct-05 A	20-Jan-06 A
A00100	Document Controller	60d	28-Oct-05 A	27-Jan-06 A
A00110	RFI Management	19d	30-Nov-05 A	02-Jan-06 A
A00120	Sr Management Costs	32d	30-Nov-05 A	20-Jan-06 A
A0040	RC Project Programme Plan	76d	30-Sep-05 A	20-Jan-06 A
A0050	CORDOROY Contract award	64d	30-Sep-05 A	04-Jan-06 A
A0094010	Risk Register & Management	76d	30-Sep-05 A	20-Jan-06 A
A486768	PD - SDS Project and Technical Management	120d	16-Jan-06 A	30-Jun-06 A
A486778	PD - Design Management	120d	16-Jan-06 A	30-Jun-06 A
A486788	PD - OLE Management	120d	16-Jan-06 A	30-Jun-06 A
A486798	PD - Technical Procurement	120d	16-Jan-06 A	30-Jun-06 A
A486808	PD- Halcrow Design Management	120d	16-Jan-06 A	30-Jun-06 A
A486818	PD - Safety Management	120d	16-Jan-06 A	30-Jun-06 A
A486828	PD - Architecture Management	117d	03-Jan-06 A	30-Jun-06 A
A486838	PD - Quality Management	120d	16-Jan-06 A	30-Jun-06 A
A486848	PD - Construction Management	105d	06-Feb-06 A	30-Jun-06 A
A486868	DD - Project Controls (Task 100.3)	409d	03-Jul-06 A	31-Mar-08
A486878	DD - Project Management (Task100.1)	409d	03-Jul-06 A	31-Mar-08
A486888	DD - Commercial Management (Task 100.6)	409d	03-Jul-06 A	31-Mar-08
A486898	DD - Safety, Quality & Risk Management (Task 100.4)	409d	03-Jul-06 A	31-Mar-08
A486908	PD - Track Management	109d	16-Jan-06 A	30-Jun-06 A
A486918	DD - Administration (Task 900.1)	400d	03-Jul-06 A	14-Mar-08
A486919	DD - Internal Transfer From PD (Task 999)	5d	03-Jul-06 A	07-Jul-06 A
A486958	DD - Internal Change Control Database Development (Task 955.1))	17d	01-Nov-06 A	24-Nov-06 A
A486968	DD - Design Management (Task 100.2)	409d	03-Jul-06 A	31-Mar-08
A486978	DD - Engineering Management (Task 100.7)	358d	03-Jul-06 A	14-Jan-08
A486998	DD - Procurement Management (Task 100.8)	408d	03-Jul-06 A	28-Mar-08
A487018	DD - CAD Management & On Site Support (Task 100.9)	349d	31-Jul-06 A	25-Jan-08
A487038	DD - Structures Management (Task200.11)	409d	03-Jul-06 A	31-Mar-08



Primary Baseline
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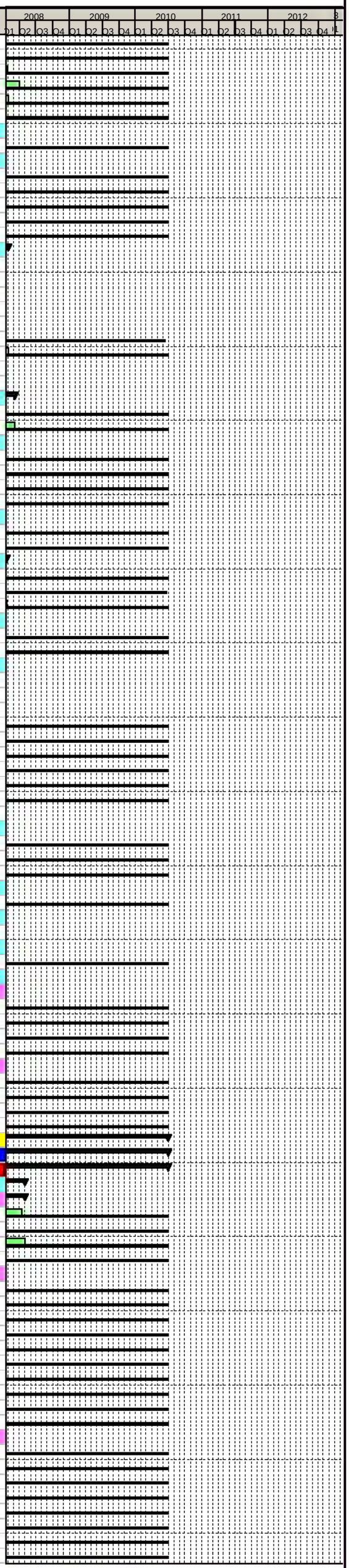
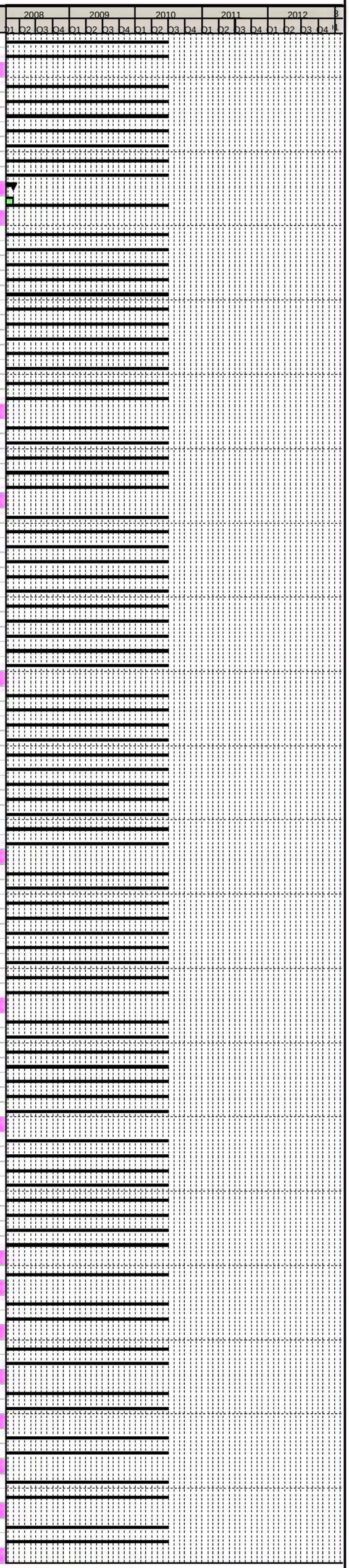
Milestone

Activity ID	Activity Name	Original Duration	Start	Finish
A487048	DD - Configuration Management (Task 865)	270d	31-Jul-06 A	21-Sep-07 A
A487058	Halcrow Resources	120d	16-Jan-06 A	30-Jun-06 A
A487068	DD - Planning Drawings Management (Task 100.10)	205d	12-Mar-07 A	25-Jan-08
A487078	DD - Halcrow Management	409d	03-Jul-06 A	31-Mar-08
A487088	DD - Construction Management (Task 894.1)	370d	03-Jul-06 A	30-Jan-08
VO1410	VO38 CNS016 Procurement Support/ITN Submissions	85d	03-Jul-06 A	07-Nov-06 A
Mobilisation		9d	19-Sep-05 A	30-Sep-05 A
A00020	Mobilisation Fee	9d	19-Sep-05 A	30-Sep-05 A
Requirements Database		99d	19-Sep-05 A	02-Feb-06 A
A0070010	Requirements Capture	77d	12-Oct-05 A	02-Feb-06 A
A0070020	Operational and Performance Specification	49d	30-Sep-05 A	07-Dec-05 A
A0070030	List of Applicable Standards	4d	08-Dec-05 A	13-Dec-05 A
A0070040	Requirements Test Specification	1d	14-Dec-05 A	15-Dec-05 A
A0091020	Requirements Database	63d	19-Sep-05 A	14-Dec-05 A
Capital Cost		596d	30-Sep-05 A	31-Jan-08
A486810	Establish Rough Order of Magnitude (ROM)	42d	30-Sep-05 A	28-Nov-05 A
A486820	ROM Line 1 BOQ	19d	27-Apr-06 A	23-May-06 A
A486830	ROM Line 2 BOQ	19d	27-Apr-06 A	23-May-06 A
A486840	ROM Baseline Estimate - Current Pricing Q4-2005	17d	24-May-06 A	15-Jun-06 A
A486850	ROM Escalated Estimate to Reflect inflation to 2Q-2010	11d	15-Jun-06 A	30-Jun-06 A
A486860	PD - Capital Cost	120d	16-Jan-06 A	30-Jun-06 A
A486870	DD - Capital Cost	379d	01-Aug-06 A	31-Jan-08
A486880	ROM Line 1 BOQ & Update Cost Estimate	19d	06-Jun-06 A	30-Jun-06 A
A486890	ROM Line 2 BOQ & Update Cost Estimate	19d	06-Jun-06 A	30-Jun-06 A
Planning & Approvals		521d	20-Feb-06 A	07-Mar-08
A0200160	Planning Approvals	95d	20-Feb-06 A	30-Jun-06 A
A0200170	DD- Prior Approvals	396d	03-Jul-06 A	07-Mar-08
Gateway Review and Finalisation		107d	03-Oct-05 A	28-Feb-06 A
A0010790	Client Review	74d	03-Oct-05 A	19-Jan-06 A
A0010800	Finalise Deliverables	44d	06-Dec-05 A	13-Feb-06 A
A0010810	Preliminary Design Stage Set-up Activities	36d	06-Dec-05 A	01-Feb-06 A
A0010900	Requirements Phase Finished	0d		28-Feb-06 A
Noise & Vibration		272d	06-Mar-06 A	30-Mar-07 A
A569500	Rupert Taylor - Noise & Vibration	84d	06-Mar-06 A	30-Jun-06 A
A569510	DD - Rupert Taylor - Noise & Vibration	178d	17-Jul-06 A	30-Mar-07 A
Stakeholder Management		590d	30-Sep-05 A	23-Jan-08
A0052	Quill Stake Holder Management	91d	30-Sep-05 A	10-Feb-06 A
A569520	PD - Quill Power Stakeholder Management	100d	13-Feb-06 A	30-Jun-06 A
A569530	DD - Quill Power Stakeholder Management	374d	31-Jul-06 A	23-Jan-08
Environmental Planning		140d	16-Jan-06 A	28-Jul-06 A
A569460	PD - Environmental Planning	140d	16-Jan-06 A	28-Jul-06 A
A569570	PD - Urban Design	114d	20-Feb-06 A	28-Jul-06 A
Risk Management		148d	07-Dec-05 A	30-Jun-06 A
A546930	Risk Workshop 01	0d	07-Dec-05 A	
A546940	Risk Workshop 02	0d	18-Jan-06 A	
A546980	Risk Workshop 03 - Trackform	0d	22-Mar-06 A	
A547190	Risk Workshop - Roads, Track & Utilities	0d	14-Jun-06 A	
A547200	Risk Workshop - Programme	0d	27-Apr-06 A	
A547210	Risk Workshop - Third Party Interfaces - BAA, NR, Stakeholders	0d	12-Apr-06 A	
A547220	Risk Workshop - Structures	0d	17-May-06 A	
A547280	Risk Workshop - Radio Base Stations	0d	25-Apr-06 A	
A547300	Risk Workshop - JRC	0d	10-May-06 A	
A569440	SDS Risk Management	120d	16-Jan-06 A	30-Jun-06 A
Value Management		11d	13-Jun-06 A	28-Jun-06 A
A547240	Value Management Workshop (Depot)	0d	28-Jun-06 A	
A547250	Value Management Workshop (Trackform/Pway/Roads)	0d	28-Jun-06 A	
A547260	Value Management Workshop (Initial Meeting)	0d	13-Jun-06 A	
Provisional Additional Work		95d	20-Feb-06 A	30-Jun-06 A
A200210	Provisional Additional Work	95d	20-Feb-06 A	30-Jun-06 A
SDS Support to Tie Tram Selection		95d	20-Feb-06 A	30-Jun-06 A
A567090	SDS Tram Specification	95d	20-Feb-06 A	30-Jun-06 A
SDS Management Support to Eng. System Wide		125d	09-Jan-06 A	30-Jun-06 A
A569930	System Wide Integration/Validation/Configuration	125d	09-Jan-06 A	30-Jun-06 A
Safety Management Activities		105d	19-Sep-05 A	10-Feb-06 A
Safety		101d	19-Sep-05 A	06-Feb-06 A
A0060000	Safety	96d	19-Sep-05 A	06-Feb-06 A
A0060010	Preliminary HIRA	51d	04-Oct-05 A	13-Dec-05 A
A0060020	Preliminary Safety Case Arguments	53d	30-Sep-05 A	13-Dec-05 A
A0060030	Hazard Log & Risk Register	10d	02-Dec-05 A	15-Dec-05 A
Quality		105d	19-Sep-05 A	10-Feb-06 A
A0061000	Quality	100d	19-Sep-05 A	10-Feb-06 A
A0061010	Quality Management Plan	10d	30-Sep-05 A	13-Oct-05 A
A0061020	Configuration Management Plan	6d	14-Oct-05 A	21-Oct-05 A
A0061030	Validation and Verification Plan	5d	24-Oct-05 A	28-Oct-05 A
EPWA - ENGINEERING Project Wide Activities		1221d	19-Sep-05 A	01-Jul-10
EPWA - ENGINEERING Project Wide Activities		1221d	19-Sep-05 A	01-Jul-10
EPWA - ENGINEERING Project Wide Activities		1221d	19-Sep-05 A	01-Jul-10
Track (Task200.1.1)		561d	20-Feb-06 A	02-May-08
Track Management (Task200.1.2)		466d	03-Jul-06 A	02-May-08
A486928	DD - Track Management	417d	03-Jul-06 A	11-Apr-08
A486938	DD - Alignment Management Line 1	152d	14-Aug-06 A	06-Apr-07 A
A486948	DD - Alignment Management	403d	14-Aug-06 A	02-May-08
SDS63600	Optioneering	18d	01-Aug-06 A	25-Aug-06 A
Track Category Plans		293d	20-Feb-06 A	13-Apr-07 A
SDS22600	Produce Track Category Plan	63d	20-Feb-06 A	26-May-06 A
SDS24280	Issue Track Category Plan to tie - All Lines	0d		31-May-06 A
SDS24290	tie Approval Period	18d	31-May-06 A	26-Jun-06 A
SDS24300	Produce Final Track Catagory Plans	61d	06-Dec-06 A	14-Mar-07 A
SDS24310	Issue Final Track Catagory Plans to tie	0d		14-Mar-07 A
SDS24640	Issue Track Category Plan to tie - Line 1	0d		24-Mar-06 A
SDS35000	Receive tie Comments	0d		26-Jun-06 A
SDS35010	Update to tie Comments	5d	27-Jun-06 A	03-Jul-06 A
SDS35020	Re Issue Track Category Plan to tie	0d		03-Jul-06 A
SDS59870	tie Approval Period	19d	15-Mar-07 A	13-Apr-07 A
Typical Tramway Cross Sections		286d	06-Mar-06 A	19-Apr-07 A
SDS22540	Produce Typical Tramway Cross Sections	53d	06-Mar-06 A	26-May-06 A
SDS22550	tie Approval Period	18d	31-May-06 A	26-Jun-06 A
SDS22560	Update to tie Comments	4d	27-Jun-06 A	30-Jun-06 A
SDS22570	Issue Typical Tramway Cross Sections to tie - All Lines	0d		31-May-06 A
SDS22580	Re-Issue Typical Tramway Cross Sections to tie	0d		30-Jun-06 A
SDS23820	Issue Typical Tramway Cross Sections to tie - Line 1	0d		24-Mar-06 A
SDS35030	Produce Final Typical Tramway Cross Sections	57d	12-Dec-06 A	14-Mar-07 A
SDS35040	Issue Final Typical Tramway Cross Sections to tie	0d		14-Mar-07 A



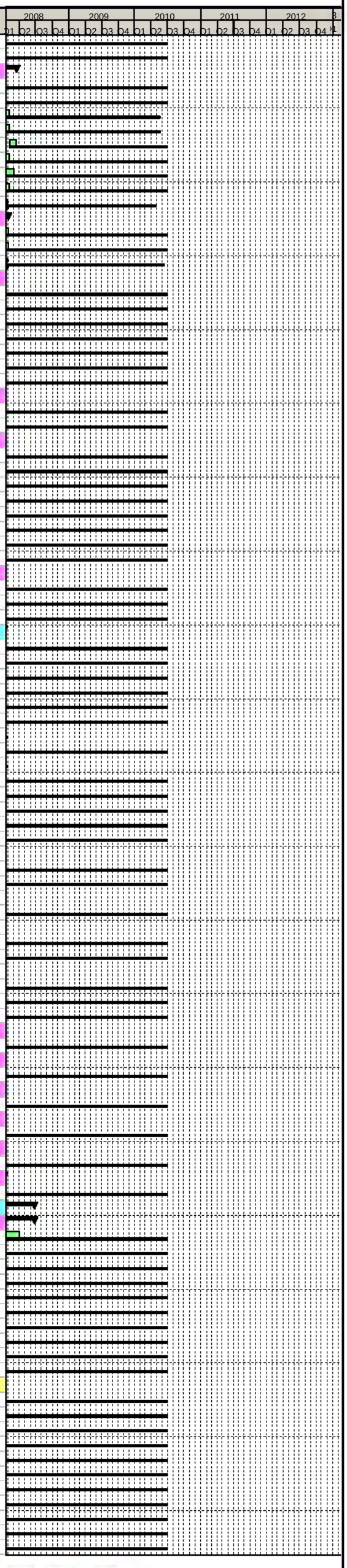
Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Activity ID	Activity Name	Original Duration	Start	Finish
SDS59900	tie Approval Period	19d	15-Mar-07 A	13-Apr-07 A
SDS70930	Receive tie Comments	0d	19-Apr-07 A	
Trackform & Surface Finish Plans & Schedules		378d	20-Feb-06 A	10-Aug-07 A
SDS22300	Issue Schedule of Trackforms to tie	0d		26-May-06 A
SDS22310	tie Approval Period	19d	30-May-06 A	26-Jun-06 A
SDS22320	Update to tie Comments	5d	27-Jun-06 A	03-Jul-06 A
SDS22330	Re-Issue Schedule of Trackforms to tie	0d		03-Jul-06 A
SDS22690	Produce Schedule of Trackforms	63d	20-Feb-06 A	26-May-06 A
SDS35060	Produce Final Trackform/Surface Finish Plans & Schedules	125d	29-Jan-07 A	07-Aug-07 A
SDS35070	Issue Final Trackform/Surface Finish Plans & Schedules to tie	0d		10-Aug-07 A
Civils Support to Trackform Design		396d	07-Aug-06 A	29-Feb-08
SDS63610	Civils Support to Trackform Design	368d	07-Aug-06 A	29-Feb-08
Wheel / Rail Interface Report		398d	13-Mar-06 A	28-Sep-07 A
SDS22610	Produce Wheel / Rail Interface Report	67d	13-Mar-06 A	23-Jun-06 A
SDS24320	Issue Wheel / Rail Interface Report to tie	0d		23-Jun-06 A
SDS24330	tie Approval Period	19d	26-Jun-06 A	21-Jul-06 A
SDS24340	Update to tie Comments	5d	24-Jul-06 A	28-Jul-06 A
SDS24350	Re-Issue Wheel / Rail Interface Report to tie	0d		28-Jul-06 A
SDS35080	Produce Final Wheel/Rail Interface Report	17d	03-Sep-07 A	26-Sep-07 A
SDS35090	Issue Final Wheel / Rail Interface Report to tie	0d		28-Sep-07 A
SDS35100	Wheel / Rail Interface Study	128d	31-Jan-07 A	14-Aug-07 A
SDS35170	Receive INFRACO Track Information - (NOT RECEIVED)	0d		07-Sep-07 A
SDS35420	Re-Continue Wheel / Rail Study - (NOT NECESSARY)	16d	15-Aug-07 A	07-Sep-07 A
SDS61500	IDC	2d	27-Sep-07 A	28-Sep-07 A
SDS63590	IDC	2d	24-Jul-06 A	25-Jul-06 A
Assumed Design Tram Vehicle Report		95d	20-Feb-06 A	30-Jun-06 A
SDS22630	Produce Assumed Design Tram Vehicle Report	18d	20-Feb-06 A	16-Mar-06 A
SDS24360	Issue Assumed Design Tram Vehicle Report to tie	0d		16-Mar-06 A
SDS24370	tie Approval Period ** No Comments Received - Activity Closed **	19d	20-Mar-06 A	18-Apr-06 A
SDS24380	Update to tie Comments ** - No Comments Received - Activity Closed **	5d	19-Apr-06 A	25-Apr-06 A
SDS24390	Re-Issue Assumed Design Tram Vehicle Report to tie	0d		30-Jun-06 A
Alignment Criteria		307d	20-Feb-06 A	05-May-07 A
SDS22640	Produce Alignment Criteria	19d	20-Feb-06 A	17-Mar-06 A
SDS22650	tie Approval Period ** No Comments Received - Activity Closed **	19d	20-Mar-06 A	18-Apr-06 A
SDS22660	Update to tie Comments ** No Comments Received - Activity Closed **	4d	19-Apr-06 A	24-Apr-06 A
SDS22670	Issue Alignment Criteria to tie	0d		17-Mar-06 A
SDS22680	Re-Issue Alignment Criteria to tie	0d		30-Jun-06 A
SDS35160	Produce Final Track Alignment Criteria	47d	06-Dec-06 A	21-Feb-07 A
SDS35180	Issue Final Track Alignment Criteria to tie	0d		21-Feb-07 A
SDS59960	tie Approval Period	19d	22-Feb-07 A	21-Mar-07 A
SDS59970	Update to tie Comments	1d	04-May-07 A	05-May-07 A
SDS61770	IDC	2d	19-Feb-07 A	20-Feb-07 A
SDS70940	Receive tie Comments	0d	30-Mar-07 A	
Structure Gauge & Clearances Drawings		338d	24-Apr-06 A	20-Aug-07 A
SDS22490	Produce Structure Gauge & Clearances Drawings	8d	24-Apr-06 A	05-May-06 A
SDS22500	tie Approval Period	19d	05-May-06 A	05-Jun-06 A
SDS22510	Update to tie Comments	18d	06-Jun-06 A	30-Jun-06 A
SDS22520	Issue Structure Gauge & Clearances Drawings to tie	0d		05-May-06 A
SDS22530	Re-Issue Structure Gauge & Clearances Drawings to tie	0d		30-Jun-06 A
SDS35140	Produce Final Structure Gauge & Clearance Drawings	16d	18-Dec-06 A	17-Jan-07 A
SDS35150	Issue Final Structure Gauge & Clearance Drawings to tie	0d		02-Apr-07 A
SDS59990	tie Approval Period	19d	23-Jan-07 A	19-Feb-07 A
SDS70950	Receive tie Comments	0d	18-Apr-07 A	
SDS71000	Update to tie Comments	5d	09-Aug-07 A	16-Aug-07 A
SDS71010	Re-Issue Structure Gauge Drawings	0d		20-Aug-07 A
Trackform Typical Cross Sections & Details		398d	13-Mar-06 A	28-Sep-07 A
SDS22590	Prepare Preliminary Cross Sections	74d	13-Mar-06 A	22-Jun-06 A
SDS24200	Issue Preliminary Cross Sections to tie	0d		23-Jun-06 A
SDS24210	tie Approval Period	19d	23-Jun-06 A	21-Jul-06 A
SDS24220	Update to tie Comments	5d	24-Jul-06 A	28-Jul-06 A
SDS24230	Re-Issue Preliminary Cross Sections to tie	0d		28-Jul-06 A
SDS35190	Develop Trackfroms with On Going tie Review	110d	07-Aug-06 A	25-Jan-07 A
SDS35200	Receipt of ties Agreement to Trackforms	0d		25-Jan-07 A
SDS35210	Produce Final Trackform Cross Sections & Details	158d	29-Jan-07 A	26-Sep-07 A
SDS35220	Issue Final Trackform Cross Sections & Details	0d		28-Sep-07 A
Trackwork Specification		368d	24-Apr-06 A	28-Sep-07 A
SDS22620	Produce Draft Trackwork Specification	44d	24-Apr-06 A	22-Jun-06 A
SDS24240	Issue Draft Trackwork Specification to tie	0d		23-Jun-06 A
SDS24250	tie Approval Period	19d	23-Jun-06 A	21-Jul-06 A
SDS24260	Update to tie Comments	5d	24-Jul-06 A	28-Jul-06 A
SDS24270	Re-Issue Draft Trackwork Specification to tie	0d		28-Jul-06 A
SDS24470	Produce Final Trackwork Specification	163d	11-Jan-07 A	18-Sep-07 A
SDS35230	Issue Final Trackwork Specification to tie	0d		28-Sep-07 A
Switches & Crossing Design		342d	15-May-06 A	13-Sep-07 A
SDS22340	Produce Draft Switches & Crossing Preliminary Design	23d	15-May-06 A	16-Jun-06 A
SDS22350	tie Approval Period	19d	03-Jul-06 A	28-Jul-06 A
SDS22360	Update to tie Comments	5d	31-Jul-06 A	04-Aug-06 A
SDS22370	Issue Draft Switches & Crossing Preliminary Design to tie	0d		30-Jun-06 A
SDS22380	Re-Issue Draft Switches & Crossing Preliminary Design to tie	0d		04-Aug-06 A
SDS35380	Produce Final S&C Layout Plans	159d	11-Jan-07 A	12-Sep-07 A
SDS35390	Issue Final S&C Layout Plans to tie	0d		13-Sep-07 A
SDS61590	IDC (NOT REQUIRED)	1d	12-Sep-07 A	12-Sep-07 A
Schedule of Geometry Speed Restrictions		22d	02-Jan-07 A	01-Feb-07 A
SDS22390	Produce Schedule of Geometry Speed Restrictions (Now Inc On Track Alignment Drawings)	22d	02-Jan-07 A	01-Feb-07 A
Rail Section Schedule		97d	10-Apr-07 A	22-Aug-07 A
SDS35240	Produce Rail Section Schedule	89d	10-Apr-07 A	22-Aug-07 A
SDS35250	Issue Rail Section Schedule to tie	0d		22-Aug-07 A
Rail Grade Schedule		97d	10-Apr-07 A	22-Aug-07 A
SDS35260	Produce Rail Grade Schedule	89d	10-Apr-07 A	22-Aug-07 A
SDS35270	Issue Rail Grade Schedule to tie	0d		22-Aug-07 A
Rail Movement Joint Schedule		246d	04-Sep-06 A	22-Aug-07 A
SDS35280	Produce Rail Movement Joint Schedule	228d	04-Sep-06 A	22-Aug-07 A
SDS35290	Issue Rail Movement Joint Schedule to tie	0d		22-Aug-07 A
Check Rail Schedule		97d	10-Apr-07 A	22-Aug-07 A
SDS35300	Produce Check Rail Schedule	89d	10-Apr-07 A	22-Aug-07 A
SDS35310	Issue Check Rail Schedule to tie	0d		22-Aug-07 A
Guard Rail Schedule		97d	10-Apr-07 A	22-Aug-07 A
SDS35320	Produce Guard Section Schedule	89d	10-Apr-07 A	22-Aug-07 A
SDS35330	Issue Guard Section Schedule to tie	0d		22-Aug-07 A
Vehicle Arrestment Schedule		124d	02-Mar-07 A	22-Aug-07 A
SDS35340	Produce Vehicle Arrestment Schedule	113d	02-Mar-07 A	22-Aug-07 A
SDS35350	Issue Vehicle Arrestment Schedule to tie	0d		22-Aug-07 A
Isolatable Rail Joint Schedule		97d	10-Apr-07 A	22-Aug-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Activity ID	Activity Name	Original Duration	Start	Finish
SDS35360	Produce Isolatable Rail Joint Schedule	89d	10-Apr-07 A	22-Aug-07 A
SDS35370	Issue Isolatable Rail Joint Schedule to tie	0d		22-Aug-07 A
Vehicle Tenderers		419d	24-Jul-06 A	19-Mar-08
SDS36790	Review Information Received from Vehicle Tenderers	23d	24-Jul-06 A	25-Aug-06 A
SDS36900	Provide Input to Vehicle Procurement Process	265d	31-Jul-06 A	14-Sep-07 A
SDS37050	Revise Alignment Criteria	18d	14-Jan-08*	07-Feb-08
SDS37080	Revise Design DKE	18d	14-Jan-08*	07-Feb-08
SDS37090	Revise Alignment	27d	08-Feb-08	19-Mar-08
SDS37100	Revise Wheel Rail Interface Study	18d	14-Jan-08*	07-Feb-08
SDS37110	Revise Tramway Category Plans	36d	14-Jan-08*	05-Mar-08
SDS37120	Revise Tramway Cross Sections	18d	14-Jan-08*	07-Feb-08
SDS37130	Receive Instruction to Revise Design	0d	14-Jan-08*	
Assess Selected Vehicle		15d	14-Jan-08	01-Feb-08
SDS61790	Assess Impact of Selected Vehicle	14d	14-Jan-08	01-Feb-08
SDS61800	Verify Alignment (Run AutoTram)	14d	14-Jan-08	01-Feb-08
SDS79280	Receive Instruction to Assess Selected Vehicle	0d	14-Jan-08*	
Rail Sections		97d	06-Nov-06 A	30-Mar-07 A
SDS36800	Determine Rail Sections	28d	06-Nov-06 A	15-Dec-06 A
SDS37140	Issue Rail Section Report to tie	0d		22-Dec-06 A
SDS37150	Produce Rail Section Report	19d	27-Nov-06 A	22-Dec-06 A
SDS60290	tie Approval Period	19d	05-Jan-07 A	01-Feb-07 A
SDS61680	IDC	8d	12-Dec-06 A	22-Dec-06 A
SDS61810	Input to Wheel Interface Report	0d		22-Dec-06 A
SDS70960	Receive tie Comments	0d	30-Mar-07 A	
Rail Grades		188d	06-Nov-06 A	03-Aug-07 A
SDS36810	Determine Rail Grades	173d	06-Nov-06 A	03-Aug-07 A
SDS37160	Input to Wheel Interface Report	0d		03-Aug-07 A
Guard Rails		189d	20-Nov-06 A	20-Aug-07 A
SDS36860	Produce Guard Rail Drawings	15d	20-Nov-06 A	11-Dec-06 A
SDS37170	Issue Guard Rail Drawings to tie	0d		15-Dec-06 A
SDS60320	tie Approval Period	24d	18-Dec-06 A	30-Jan-07 A
SDS60330	Update to tie Comments	13d	31-Jan-07 A	19-Feb-07 A
SDS60340	Re-Issue Guard Rail Schedule to tie	0d		19-Feb-07 A
SDS61690	IDC	2d	11-Dec-06 A	12-Dec-06 A
SDS75100	Update to tie Comments	5d	09-Aug-07 A	16-Aug-07 A
SDS75110	Re-Issue Structure Gauge Drawings	0d		20-Aug-07 A
Switching & Crossing Schedule		97d	10-Apr-07 A	22-Aug-07 A
SDS61710	Produce Switching & Crossing Schedule Drawings	89d	10-Apr-07 A	22-Aug-07 A
SDS61720	Issue Switching & Crossing Schedule to tie	0d		22-Aug-07 A
SDS61760	IDC	7d	13-Aug-07 A	21-Aug-07 A
Surveys		583d	29-Sep-05 A	11-Jan-08 A
A10390	Structures Condition Survey	92d	29-Sep-06 A	21-Feb-07 A
A10400	VO65 Additional Topographical Survey	183d	25-Sep-06 A	06-Jul-07 A
A10410	Void Locations, Cellars and Basement Survey	150d	09-Oct-06 A	01-Jun-07 A
A10420	Archaeological Survey Work Package 1	83d	03-Jul-06 A	03-Nov-06 A
A10430	Archaeological Survey Work Package 2	81d	03-Jul-06 A	31-Oct-06 A
A10440	Archaeological Survey Work Package 3	160d	03-Jul-06 A	07-Mar-07 A
A10450	Geotechnical Survey	331d	03-Jul-06 A	23-Nov-07 A
A10460	Ecological Survey - Bat Survey For Structures	76d	01-Nov-06 A	01-Mar-07 A
A10470	Norwest Holst Issue Final Factual Report	0d		23-Nov-07 A
A10480	Ecological Survey - Bat Survey For Trees	60d	16-Oct-06 A	19-Jan-07 A
S001	Road Condition Surveys	96d	09-Oct-06 A	28-Feb-07 A
S002	Utilities Apparatus (GPR Surveys)	175d	25-Oct-05 A	03-Jul-06 A
S003	Geotechnical Surveys	169d	01-Nov-05 A	30-Jun-06 A
S006	Topographical Surveys	192d	29-Sep-05 A	30-Jun-06 A
S007	Hydrological Surveys	65d	13-Feb-06 A	12-May-06 A
S008	Archaeological Surveys	128d	04-Jan-06 A	30-Jun-06 A
S010	Structures Conditional Surveys	192d	29-Sep-05 A	30-Jun-06 A
S011	Network Rail Asset Survey	140d	12-Dec-05 A	30-Jun-06 A
S013	Noise and Vibration Surveys	170d	31-Oct-05 A	30-Jun-06 A
S016	Frontager Surveys	74d	20-Dec-05 A	07-Apr-06 A
S017	Radio Surveys	207d	08-Aug-06 A	01-Jun-07 A
S021	EMC Third Party Surveys	55d	17-Apr-06 A	30-Jun-06 A
S022	Stray Currents Survey (To Be Done For Construction Only)	1d	01-May-06 A	02-May-06 A
S046	Environmental & Ecological Surveys	88d	15-Feb-06 A	30-Jun-06 A
S077	Void Locations, Cellars & Basements	173d	03-Oct-05 A	30-Jun-06 A
S087	Utilities Trial Pits	145d	15-Oct-06 A	01-Jun-07 A
VO30 Earl Ground Investigation CNS013		5d	30-Oct-06 A	03-Nov-06 A
VO1420	Earl Ground Investigation - Management Support	5d	30-Oct-06 A	03-Nov-06 A
VO35 Additional Noise and Vibration Survey		56d	06-Dec-06 A	02-Mar-07 A
A13030	Additional Noise and Vibration Monitoring	53d	06-Dec-06 A	02-Mar-07 A
VO36 Additional Invasive Species Surveys		52d	04-Sep-06 A	14-Nov-06 A
A13240	Additional Invasive Species Surveys	49d	04-Sep-06 A	14-Nov-06 A
VO49 Additional Survey Granton to Newhaven Road		202d	06-Dec-06 A	24-Sep-07 A
A10640	Additional Ground Investigation Survey from Granton to Newhaven Road	186d	06-Dec-06 A	24-Sep-07 A
VO64 Site Notification Letters		202d	06-Dec-06 A	24-Sep-07 A
A12200	Site Notification Letters	186d	06-Dec-06 A	24-Sep-07 A
VO232 Ground Investigation Gogar Additional Costs due to UXO		13d	17-Dec-07 A	11-Jan-08 A
VO2740	Additional Ground Investigation at Gogar due to UXO	13d	17-Dec-07 A	11-Jan-08 A
Modelling (Task200.2)		709d	19-Sep-05 A	25-Jun-08
Traffic Modelling (Task 200.2.1)		709d	19-Sep-05 A	25-Jun-08
A487008	DD - Traffic Management	409d	03-Jul-06 A	31-Mar-08
SDS18860	Prepare and Issue Planning & Design Specifications	20d	19-Sep-05 A	17-Oct-05 A
SDS18870	Determine Additional Survey Requirements	14d	18-Oct-05 A	07-Nov-05 A
SDS18880	Undertake additional Surveys	20d	08-Nov-05 A	06-Dec-05 A
SDS18890	Additional survey analysis	50d	07-Dec-05 A	27-Feb-06 A
SDS18900	Additional surveys complete	0d		04-Jan-06 A
SDS18910	Network Coding Including PT	92d	18-Oct-05 A	10-Mar-06 A
SDS18920	Traffic Assignment Flows	49d	05-Jan-06 A	17-Mar-06 A
SDS18930	Final Calibration of Model / Initial Performance Testing	68d	17-Jan-06 A	28-Apr-06 A
SDS42950	PD - Management	116d	04-Jan-06 A	30-Jun-06 A
Model Based On Preliminary Design		78d	27-Jul-06 A	13-Nov-06 A
SDS55940	JRC Revise Traffic Flows Using Full VISSIM/VISUM Modelling Suite	24d	10-Aug-06 A	15-Sep-06 A
SDS55980	SDS Prepare LINSIG/TRANSYT Final Signal Timing & Junction Layouts (Iteration 3)	21d	31-Aug-06 A	29-Sep-06 A
SDS56000	Issue Patronage/Revenue Forecasts to tie (For Issue Of Business Case to Scottish Executive)	0d		13-Oct-06 A
SDS56010	Possible Amendments to SDS LINSIG/TRANSYT Signal Timing & Junction Layouts (Iteration 4)	9d	18-Sep-06 A	29-Sep-06 A
SDS56110	JRC Prepare Entire Route Final VISSIM/VISSUM Analysis	10d	18-Sep-06 A	02-Oct-06 A
SDS56120	JRC Prepare Patronage/Revenue Forecast for Business Case	5d	02-Oct-06 A	06-Oct-06 A
SDS56920	JRC Update VISSIM Model	5d	27-Jul-06 A	02-Aug-06 A
SDS56930	SDS Prepare LINSIG/TRANSYT Analysis (Iteration 2)	5d	03-Aug-06 A	09-Aug-06 A
SDS56940	SDS Reporting	8d	23-Oct-06 A	02-Nov-06 A
SDS56950	SDS Issue Modelling Report to tie	0d		17-Oct-06 A
SDS56960	tie Approval Period	19d	17-Oct-06 A	13-Nov-06 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

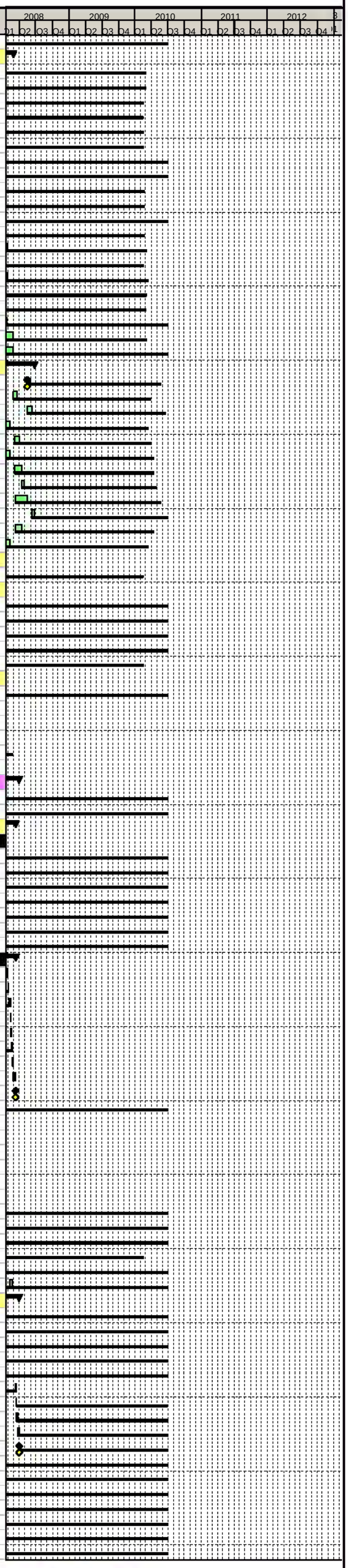
Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

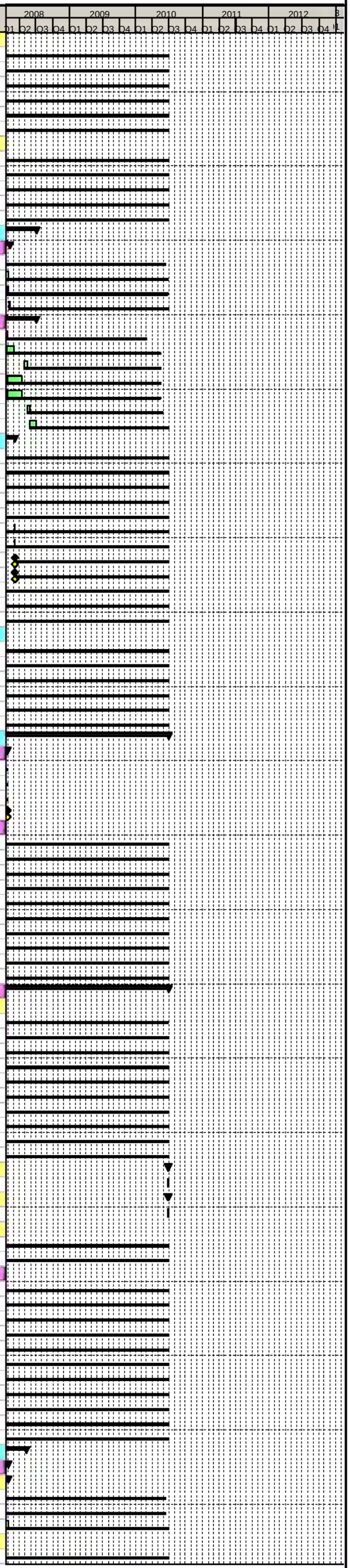
tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS57010	SDS Provide Parameters to TPi to enable Calc of Runtime	0d		23-Oct-06 A
Traffic Modelling First Pass		167d	02-Jul-07 A	28-Feb-08
SDS68140	H1: VISSM: Complete Airport section models and review way Granton Waterfron is modelled	83d	10-Sep-07 A	18-Jan-08
SDS68530	F: VISSIM model areas 1 and 2 review, espeically way Foot of the Walk is modelled	99d	15-Aug-07 A	18-Jan-08
SDS74120A	A: Code most of VISUM and models 7&8 VISSIM, run VISUM, cordon flows to VISSIM and run test 1	9d	02-Jul-07 A	13-Jul-07 A
SDS74130B	B: Discuss test 1 results with CEC, tie and TEL. Get direction on tests 2 and 3	5d	16-Jul-07 A	20-Jul-07 A
SDS74140C	C: Recode VISSIM models 7 & 8 to reflect changes for test 2 and 3 and run	5d	23-Jul-07 A	27-Jul-07 A
SDS74150D	D: Discuss test 2 and 3 results with CEC, tie and TEL. Get direction on final changes	12d	27-Jul-07 A	14-Aug-07 A
SDS74150D1	Issue Notification of Phase Completion Letter to tie (Activity D)	0d		24-Sep-07 A
SDS74150D11	Issue Notification of Phase Completion Letter to tie (Activity F)	0d		24-Sep-07 A
SDS74160E	E:Code VISSIM areas 1 and 2, cordon flows from first VISUM run, and run models 1 and 2	9d	09-Jul-07 A	20-Jul-07 A
SDS74170F	F: Discuss results of model areas 1 and 2 with CEC/TELand get direction on final changes	16d	23-Jul-07 A	14-Aug-07 A
SDS74180G	G: Run LINSIG for Leith Walk - junctions not previously modelled, pass timings to Main iteration VISUM and VISSIM models	115d	23-Jul-07 A	18-Jan-08
SDS74190H	H: Code remaining VISSIM model areas, cordon flows from first VISUM run, and run remaining VISSIM models	37d	16-Jul-07 A	07-Sep-07 A
SDS74200I	I: VISSIM: Discuss model changes with tie/CEC and get sign off	5d	21-Jan-08	25-Jan-08
SDS74210J	J: Code remaining tram route in VISUM not coded in task A (ie Granton, Forth Ports) and incorporate results of D, F & I	37d	16-Jul-07 A	07-Sep-07 A
SDS74300	R1: Confirmation of junction designs to model (except Forth Ports area) inc Picardy Pl, Torphichen Pl, Frederick St	5d	21-Jan-08	25-Jan-08
SDS81770	H2: VISSIM: Any Further modelling required e.g. Picardy Place	83d	10-Sep-07 A	18-Jan-08
SDS81780	H3: VISSIM: Complete any other changes	83d	10-Sep-07 A	18-Jan-08
SDS81790	H4: Linsig: Pass 1 of Airport section junctions	11d	07-Jan-08 A	22-Jan-08
SDS81800	R2: Input design Changes to VISUM, VISSIM	32d	14-Jan-08	28-Feb-08
SDS81810	R3: Input Linsig Pass 1 timings into VISUM/VISSIM	32d	14-Jan-08	28-Feb-08
Main Traffic Model Iteration		366d	22-Jan-07 A	25-Jun-08
SDS67680	Issue Traffic Modelling Update Report to tie (& Approval From CEC)	0d		13-May-08
SDS69490	S: Run AM, Interpeak & PM VISUM/VISSIM Models. Feed Traffic Data Into LINSIGs & TRANSIT	14d	29-Feb-08	20-Mar-08
SDS69500	CEC Approval Of Traffic Modelling Report	19d	14-May-08	11-Jun-08
SDS69530	AF: Create Individual Junction LINSIG Models Using Detailed Geometry	248d	22-Jan-07 A	08-Feb-08
SDS69540	AG: Run AM, Interpeak & PM Peak LINSIGs Using Output From VISSIM Models	14d	07-Mar-08	31-Mar-08
SDS69550	AI: TRANSYT: review detailed geometry and make any design changes	248d	22-Jan-07 A	08-Feb-08
SDS69560	AJ: Strategic TRANSYT: Input Traffic Flows From VISSIM	23d	07-Mar-08	14-Apr-08
SDS69570	AK: Run AM, Interpeak & PM Peak TRANSYT Using Output From LINSIG Models	9d	15-Apr-08	28-Apr-08
SDS69580	AM Produce Junction Assessment Report for CEC	38d	14-Mar-08	13-May-08
SDS69590	Update Modelling Report To Any CEC Comments	9d	12-Jun-08	25-Jun-08
SDS70890	AH: Tram ' Green Wave': identify junctions where tram signal stages need adjusting	19d	14-Mar-08	14-Apr-08
SDS81820	AE: Linsig Pass 2: Review intergreens and braking times for tram minimum green times	37d	10-Dec-07 A	08-Feb-08
VO245 Revised Modelling Scope including Wider Area Modelling		56d	03-Sep-07 A	19-Nov-07 A
SDS74230K	K: Identify wider area junction issues and possible solutions to model	53d	03-Sep-07 A	19-Nov-07 A
Model Based On Preliminary Design Inc. Charettes		166d	02-Jan-07 A	22-Aug-07 A
SDS68490	tie/CEC Provide Comments On VISUM/VISSIM Cal/Val Reports	117d	02-Jan-07 A	29-Jun-07 A
SDS68500	Refinements to Models	117d	02-Jan-07 A	29-Jun-07 A
SDS68510	Future Development Area Trips eg Waterfront	50d	12-Feb-07 A	27-Apr-07 A
SDS68520	Traffic Counts At Junctions Previously Not Counted	68d	15-Jan-07 A	27-Apr-07 A
SDS69520	AE: Calc Braking Times In Order To Calc Tram Stage Min Green Times, and Tram Post-intergreen Times	95d	29-Mar-07 A	22-Aug-07 A
Design & Junction Modelling Iterations		72d	19-Oct-06 A	06-Feb-07 A
SDS60600	LINSIG Modelling for Section 2A & Discuss Changes With Junction Designer	5d	19-Oct-06 A	25-Oct-06 A
SDS60610	LINSIG Modelling for Section 3A & Discuss Changes With Junction Designer	1d	08-Jan-07 A	08-Jan-07 A
SDS60620	LINSIG Modelling for Section 3B & Discuss Changes With Junction Designer	5d	08-Jan-07 A	12-Jan-07 A
SDS60630	LINSIG Modelling for Section 3C & Discuss Changes With Junction Designer	5d	31-Jan-07 A	06-Feb-07 A
SDS60650	LINSIG Modelling for Section 5B & Discuss Changes With Junction Designer	2d	05-Jan-07 A	08-Jan-07 A
SDS60670	LINSIG Modelling for Section 7A & Discuss Changes With Junction Designer	1d	20-Dec-06 A	20-Dec-06 A
Tram Simulation (Task 200.2.2)		595d	29-Nov-05 A	31-Mar-08
M01020	Run Time Modelling - Issue 1	0d		29-Nov-05 A
M01030	VO60 General Runtime Modelling Assistance	157d	29-Aug-06 A	30-Apr-07 A
Stage 3 - Operational Simulations for Preliminary Design		441d	14-Jun-06 A	12-Mar-08
Modelling Including Section 4		116d	03-Jul-06 A	11-Dec-06 A
SDS24090	Review of Operational Principles	4d	03-Jul-06 A	06-Jul-06 A
SDS24100	Review of Technical Data	3d	07-Jul-06 A	11-Jul-06 A
SDS24110	Line 1 - Pway Modeling	5d	19-Jul-06 A	25-Jul-06 A
SDS24120	Line 1 - Road Modelling	2d	26-Jul-06 A	27-Jul-06 A
SDS24150	Time Table Definition	34d	12-Oct-06 A	30-Nov-06 A
SDS24160	Produce Discussion Simulation Report	15d	20-Nov-06 A	11-Dec-06 A
SDS24170	Issue Discussion Simulation Report	0d		11-Dec-06 A
Modelling Excluding Section 4		441d	14-Jun-06 A	12-Mar-08
SDS22860	Review of Operational Principles	57d	29-Oct-07 A	29-Jan-08
SDS22870	Review of Technical Data	63d	22-Oct-07 A	31-Jan-08
SDS22880	Line 1 - Pway Modeling	72d	22-Oct-07 A	13-Feb-08
SDS22890	Line 1 - Road Modelling	2d	13-Feb-08	15-Feb-08
SDS22900	Line 2 - Pway Modeling	3d	15-Feb-08	20-Feb-08
SDS22910	Line 2 - Road Junction Modelling	65d	12-Nov-07 A	25-Feb-08
SDS22920	Time Table Definition	2d	25-Feb-08	27-Feb-08
SDS23000	Produce Report of Simulation Results	9d	27-Feb-08	12-Mar-08
SDS23670	Issue Report of Simulation Results to tie	0d		12-Mar-08
SDS52850	Review of Operational Principles	7d	14-Jun-06 A	22-Jun-06 A
SDS52860	Review of Technical Data	8d	14-Jun-06 A	23-Jun-06 A
SDS52870	Line 1 - Pway Modeling	9d	19-Jun-06 A	30-Jun-06 A
SDS52890	Line 2 - Pway Modeling	3d	03-Jul-06 A	05-Jul-06 A
SDS52910	Time Table Definition	2d	06-Jul-06 A	07-Jul-06 A
SDS52920	Produce Report of Simulation Results	4d	10-Jul-06 A	13-Jul-06 A
SDS52930	Issue Report of Simulation Results	0d		13-Jul-06 A
SDS67690	Update Simulation Report To Incorporate tie Comments	6d	20-Nov-06 A	27-Nov-06 A
SDS67700	Receive tie Comments For Simulation Results Report	0d		20-Nov-06 A
SDS67710	Re-Issue Report of Simulation Results	0d		27-Nov-06 A
SDS67720	Update Of Runtime Model To Reflect Charette Changes	62d	22-Jan-07 A	25-Apr-07 A
SDS67730	Issue Runtime Model To Reflect Charette Changes	0d		25-Apr-07 A
SDS81000	Sim Support Hours	79d	22-Oct-07 A	25-Feb-08
Stage 4 - Traction Power		479d	10-May-06 A	31-Mar-08
SDS23010	Line 1 & 2 Traction Power Modeling	71d	10-May-06 A	24-Aug-06 A
SDS23020	Produce Report of Traction Power Results	2d	23-Aug-06 A	24-Aug-06 A
SDS23030	Outages Work and Development	2d	23-Aug-06 A	24-Aug-06 A
SDS23040	Updates to Network & Reporting	1d	24-Aug-06 A	24-Aug-06 A
SDS24030	Issue Traction Power Simulation Report Internally Only	0d		24-Aug-06 A
SDS52940	Line 1 & 2 Traction Power Modeling	84d	05-Nov-07 A	17-Mar-08
SDS52950	Produce Report of Traction Power Results	2d	17-Mar-08	19-Mar-08
SDS52960	Outages Work and Development	4d	19-Mar-08	27-Mar-08
SDS52970	Updates to Network & Reporting	2d	27-Mar-08	31-Mar-08
SDS52980	Issue Traction Power Simulation Report	0d		31-Mar-08
SDS66680	Power Team Review Traction Power Simulation Report (PD)	17d	02-Aug-06 A	25-Aug-06 A
SDS66690	Modelling Team Incorporate Power Comments Onto Traction Power Simulation Report (PD)	9d	05-Oct-06 A	18-Oct-06 A
SDS66700	Issue Traction Power Simulation Report (PD) to tie	0d		18-Oct-06 A
SDS67550	Power Team Review Traction Power Simulation Report (DD)	25d	29-Aug-06 A	04-Oct-06 A
SDS67740	tie Approval Period	19d	19-Oct-06 A	15-Nov-06 A
SDS67750	Re-Issue Traction Power Simulation Report (PD) to tie	0d		26-Apr-07 A
SDS67760	Update to tie Comments	69d	11-Jan-07 A	26-Apr-07 A



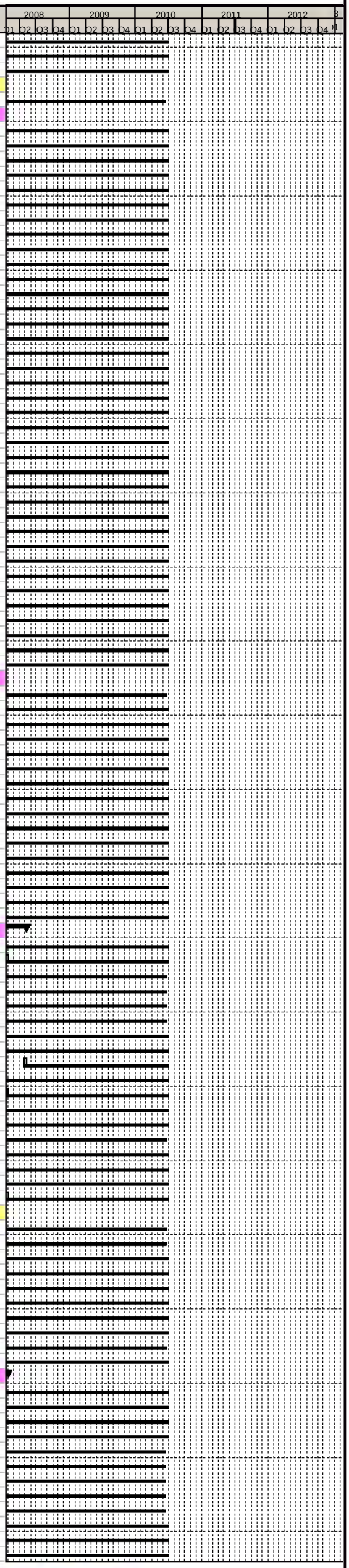
Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Activity ID	Activity Name	Original Duration	Start	Finish
VO80 Simulation of Proposed Trams (Not tie Approved)		49d	07-Feb-07 A	16-Apr-07 A
SDS69980	Agree Inputs	5d	07-Feb-07 A	13-Feb-07 A
SDS70000	Input, testing and check Inputs	4d	14-Feb-07 A	19-Feb-07 A
SDS70010	Runtime Results preparation and issue	1d	20-Feb-07 A	20-Feb-07 A
SDS70020	Timetable definition to allow traction power review of substation loadings	8d	21-Feb-07 A	03-Mar-07 A
SDS70030	Run and check outputs	3d	07-Mar-07 A	09-Mar-07 A
SDS70040	Reporting	23d	11-Mar-07 A	16-Apr-07 A
VO82 Additional Runtime Modelling (Sector 3 in and out) (Not tie Approved)		97d	12-Dec-06 A	04-May-07 A
SDS69600	Traction Power Review for Looped Model	6d	12-Dec-06 A	19-Dec-06 A
SDS69610	Results And Report Production (Stage 4.1)	84d	20-Dec-06 A	04-May-07 A
SDS69620	Model Build & Timetable Development For Phase 1A Scheme Model	76d	12-Dec-06 A	13-Apr-07 A
SDS70280	Reporting of Phase 1A Scheme Model (TIE4D)	12d	02-Apr-07 A	20-Apr-07 A
SDS70290	Issue Discussion Simulation Report	0d		20-Apr-07 A
Wider Area Traffic Signal Design		256d	02-Jul-07 A	02-Jul-08
Preliminary Design of Wider Area Traffic Signals		153d	02-Jul-07 A	08-Feb-08
SDS74320T	T: For junctions likely to be affected prepare existing signal data ready for review	193d	02-Jul-07 A	14-Jan-08
SDS74330U	U: For simple changes - check if infrastructure will cope	14d	14-Jan-08	01-Feb-08
SDS74340V	V: For simple changes - summarise changes required	5d	28-Jan-08	01-Feb-08
SDS74350W	W: For more complex changes: Run Linsig (and possibly Transyt) to confirm detailed signalling arrangements	5d	04-Feb-08	08-Feb-08
Detailed Design of Traffic Signals		141d	10-Dec-07 A	02-Jul-08
SDS70900AN	AN: Establish First Calculated Tram Loop Positions	27d	10-Dec-07 A	25-Jan-08
SDS81840	AO1: VISUM/VISSIM Incorporate Forth Ports design into VISUM and VISSIM	28d	24-Jan-08	05-Mar-08
SDS81850	AO2: VISUM/VISSIM Incorporate off set signals timings from Transyt	9d	29-Apr-08	13-May-08
SDS81860	AO3: VISUM/VISSIM Incorporate Wider Area Transyt modelling results	52d	28-Jan-08	15-Apr-08
SDS81870	AO4: VISSIM Incorporate calculated loop positions in VISVAP programme	52d	28-Jan-08	15-Apr-08
SDS81880	AO5: VISUM Re-run and cordon down traffic flows	9d	14-May-08	28-May-08
SDS81890	AO6: Establish simulated tram loop positions utilising VISSIM	23d	29-May-08	02-Jul-08
Geotechnical		540d	25-Jan-06 A	10-Mar-08
A4160	Prepare Tender Documents for Ground Investigation	46d	25-Jan-06 A	04-Apr-06 A
A52010	Agree Extent of Ground Investigation	5d	29-Mar-06 A	04-Apr-06 A
A52020	Procure Ground Investigation	28d	05-Apr-06 A	19-May-06 A
A52120	Proposal for Ground Investigation	2d	27-Mar-06 A	28-Mar-06 A
A52510	Photographic & Visual Survey & Produce Report	5d	20-Mar-06 A	24-Mar-06 A
SDS79030	Prepare Detailed Design Submission of Cuttings and Embankment Register	75d	12-Nov-07 A	10-Mar-08
SDS79040	Prepare Series 600 Appendix	75d	12-Nov-07 A	10-Mar-08
SDS79050	Issue Cuttings and Embankment Register to tie V2	0d		10-Mar-08
SDS79060	Issue Series 600 Appendix to tie	0d		10-Mar-08
SDS79070	Prepare Summarising Geotechnical Report	195d	31-Jan-07 A	23-Nov-07 A
SDS79080	Issue Summarising Geotechnical Report to tie	0d		23-Nov-07 A
SDS81350	Issue of Cuttings and Embankment Register to tie V1	0d		21-Dec-07 A
System Management		117d	19-Sep-05 A	28-Feb-06 A
A0020008	System Wide Costs	93d	19-Sep-05 A	01-Feb-06 A
A0020010	Tram & Vehicles	67d	21-Oct-05 A	30-Jan-06 A
A0020018	Update to tie Comments	46d	20-Dec-05 A	28-Feb-06 A
A0092002	Technology Reviews	91d	30-Sep-05 A	10-Feb-06 A
A0093010	Network Rail Asset - Investigation Study	48d	10-Oct-05 A	14-Dec-05 A
A0093020	Requirements Definition Enginerring Activities	48d	10-Oct-05 A	14-Dec-05 A
Environmental (Task 200.3)		1132d	20-Jan-06 A	01-Jul-10
Contaminated Land		269d	08-Jan-07 A	28-Jan-08
A4200	Prepare Contaminated Land Remediation Action Plan	225d	08-Jan-07 A	14-Dec-07 A
A4210	Liaison with Statutory Bodies & General Contamination Issues	197d	19-Feb-07 A	14-Dec-07 A
A4220	Prepare Contaminated Land Remediation Action Plan for Contractor	187d	06-Mar-07 A	14-Dec-07 A
A4230	Issue Contaminated Land Remediation Action Plan to Contractor	0d		28-Jan-08*
General Environmental		290d	20-Feb-06 A	10-Apr-07 A
A4240	Break down Environmental Requirements in relation to STAG drawings	22d	06-Mar-06 A	05-Apr-06 A
A4250	Feed into Design Issues Tracker and Drawings	22d	06-Mar-06 A	05-Apr-06 A
A4260	Consultation with Statutory Consultees (SHN, HS, SEPA, CEC)	85d	20-Feb-06 A	30-Jun-06 A
A4270	Update Environmental Management Plan for Preliminary Design	67d	20-Mar-06 A	30-Jun-06 A
A4690	Update Environmental Management Plan for Detailed Design	128d	03-Jul-06 A	17-Jan-07 A
A4700	Issue Updated Environmental Management Plan for Preliminary Design	0d		30-Jun-06 A
A5060	tie Approval Period	54d	17-Jan-07 A	10-Apr-07 A
A5600	Issue Updated Environmental Management Plan for Detailed Design to tie	0d		17-Jan-07 A
A5820	Update to tie Comments As Required	0d	10-Apr-07 A	10-Apr-07 A
A5830	Re-Issue Updated Environmental Management Plan for Detailed Design to tie	0d		10-Apr-07 A
Ecology		1096d	13-Mar-06 A	01-Jul-10
Design Surveys		254d	13-Mar-06 A	12-Mar-07 A
A4400	General Ecological Update/ Walkover report	57d	03-Apr-06 A	30-Jun-06 A
A4410	Protected Species Surveys (otter, Water Vole, Badgers and Bats)	49d	17-Apr-06 A	30-Jun-06 A
A4420	Produce Protected Species Mitigation Strategy (With SNH Consultation)	75d	04-Sep-06 A	22-Dec-06 A
A4430	Further Tree Surveys (Results to Be Passed To Site Clearance Schedule Teams)	98d	09-Oct-06 A	12-Mar-07 A
A4440	Establish Policy for Removal of trees	1d	13-Mar-06 A	13-Mar-06 A
A4480	Mitigation Strategy for treatment of Jap Knotweed & Giant Hogweed	5d	15-Aug-06 A	21-Aug-06 A
A4490	Issue Final Protected Species Mitigation Strategy to tie & SNH	0d		22-Dec-06 A
A5670	Badger or Protected Species License for GI	48d	03-Apr-06 A	16-Jun-06 A
A5680	Issue to tie Mitigation Strategy for Treatment of Jap Knotweed & Giant Hogweed	0d		03-Nov-06 A
A5690	tie Issue Instruction on how to Proceed with Jap Knotweed & Giant Hogweed	43d	29-Aug-06 A	31-Oct-06 A
MUDFA Surveys		5d	25-Jun-10	01-Jul-10
A5630	General Ecological Update/ Walkover report	5d	25-Jun-10	01-Jul-10
INFRACO Surveys		5d	25-Jun-10	01-Jul-10
A5650	General Ecological Update/ Walkover report	5d	25-Jun-10	01-Jul-10
Pre Construction Surveys		31d	23-Mar-07 A	07-May-07 A
A4510	Protected Species Surveys (otter, Water Vole, Badgers and Bats)	9d	23-Mar-07 A	09-Apr-07 A
A4540	Badger or Protected Species License	8d	25-Apr-07 A	07-May-07 A
Archaeological and Cultural Heritage		317d	20-Jan-06 A	18-Apr-07 A
A4550	Review and summary of Environmental Statement	24d	20-Jan-06 A	24-Feb-06 A
A4560	Identify Archaeological & Culture Heritage Works Required by Environmental Statement	24d	27-Jan-06 A	03-Mar-06 A
A4570	Identify Edinburgh Council Archaeologists initial requirements for Arch & Cult Heritage	1d	20-Feb-06 A	20-Feb-06 A
A4590	Produce Table of works required and Location Mapping	2d	21-Feb-06 A	22-Feb-06 A
A4600	Develop Specification for early archaeological monitoring of GI works and infrastructure (IS) works	21d	23-Feb-06 A	24-Mar-06 A
A4610	Develop methodology for full Arch & Cult Heritage investigation works to City Archaeologists Brief	19d	09-Mar-06 A	05-Apr-06 A
A4620	Input into preparation of Tender Documents for early Arch monitoring of GI and IS works	5d	02-Mar-06 A	08-Mar-06 A
A4630	Review and award sub-contractors on Price & WSI's for full Arch & Cult Heritage investigation works	5d	22-May-06 A	26-May-06 A
A4650	Input into preparation of Tender Documents for full Arch & Cult Heritage Investigation works	5d	06-Apr-06 A	12-Apr-06 A
A4660	Review and award sub-contractors on Price & WSI's for early monitoring of GI and SI works	5d	16-May-06 A	22-May-06 A
A4680	Archaeological Management of the monitoring of GI works and Infrastructure (IS) works	149d	29-Aug-06 A	18-Apr-07 A
System & Communications (Task200.5)		677d	19-Sep-05 A	12-May-08
SCC Management (Task200.5.1)		400d	03-Jul-06 A	31-Jan-08
SCC Management		400d	03-Jul-06 A	31-Jan-08
A10530	Management Activity Resources	214d	03-Jul-06 A	31-May-07 A
A14530	Remobilised S&C Resources	48d	01-Oct-07 A	10-Dec-07 A
A14590	S&C Management Resources	32d	10-Dec-07 A	31-Jan-08
SCC Preparation and Information Gathering		35d	03-Jul-06 A	18-Aug-06 A
A10490	Production Of SCC Scope / OPS	33d	03-Jul-06 A	18-Aug-06 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Activity ID	Activity Name	Original Duration	Start	Finish
A10500	Develop SCC Detailed Design Process	33d	03-Jul-06 A	18-Aug-06 A
A10510	Develop SCC Engineering Plan	33d	03-Jul-06 A	18-Aug-06 A
A10520	Review Programme, Resources and Authority Levels Issued	19d	24-Jul-06 A	18-Aug-06 A
VO234 Additional SCC Support During Design Hold Period (Internal)		104d	08-May-07 A	28-Sep-07 A
A14520	VO234 Support During S&C Demobilisation Period	96d	08-May-07 A	28-Sep-07 A
VO59 Preliminary Design Plus		44d	01-Aug-06 A	29-Sep-06 A
A10540	tie / PB Review Meetings For PD (Original Submission)	2d	05-Sep-06 A	06-Sep-06 A
A10550	Outline PD PLUS Programme, Resources and Hours	1d	07-Sep-06 A	07-Sep-06 A
A10560	Categorise Types of Changes Hours and Allocate Resources	1d	07-Sep-06 A	07-Sep-06 A
A10570	ID Relevant PD x-Discipline Specs and Drawings - Appendix	1d	08-Sep-06 A	08-Sep-06 A
A10580	Direct Signalling Resource Workload - A Williams	2d	08-Sep-06 A	11-Sep-06 A
A10590	Initial Liaison / Initial Works With Depot Safety Assurance and TRA	1d	08-Sep-06 A	11-Sep-06 A
A10600	Add X References With Other Documents	2d	08-Sep-06 A	11-Sep-06 A
A10610	Fibre Layout Drawings (Diverse Route) and Associate Text	6d	08-Sep-06 A	15-Sep-06 A
A10620	Propose Sample Update To Sections x.5 x.6, x.7 x.8 (Incl Meeting)	2d	08-Sep-06 A	11-Sep-06 A
A10630	Highlight Input / Output Text For Interfaces Per Discipline	2d	11-Sep-06 A	12-Sep-06 A
A10650	Do SCC Tram Drawing Update	1d	11-Sep-06 A	11-Sep-06 A
A10660	Minor Edits of Existing Text	1d	12-Sep-06 A	12-Sep-06 A
A10670	Meet With Signalling Resource	1d	12-Sep-06 A	13-Sep-06 A
A10680	Additional Text / Minor Edits (Ex M Reeves Input)	2d	12-Sep-06 A	13-Sep-06 A
A10690	Changes To Comms Sections x.5 x.6, x.7 x.8 (Incl Above)	2d	12-Sep-06 A	13-Sep-06 A
A10700	Identify ODN Text To Remain Un-Touched Revise Or New	1d	13-Sep-06 A	13-Sep-06 A
A10710	Review Of CP Text / Handover Spec From CP To JC	1d	13-Sep-06 A	13-Sep-06 A
A10720	Cross Checks With AP / IB / MR	7d	13-Sep-06 A	21-Sep-06 A
A10730	Pass For Review Changes To Be Made To Date Plus Outline Drawings	2d	13-Sep-06 A	14-Sep-06 A
A10740	Additional Text / Minor Edits (M Reeves Input)	7d	14-Sep-06 A	22-Sep-06 A
A10750	Changes To Signalling Sections x.5 x.6, x.7 x.8	7d	14-Sep-06 A	22-Sep-06 A
A10760	Review TPDS / SCADA Sections	7d	14-Sep-06 A	22-Sep-06 A
A10840	Re-Forecast DD Works / Programme	7d	14-Sep-06 A	22-Sep-06 A
A10850	Feedback From Paul Alliott On Initial Text Changes Pass Any Others	2d	15-Sep-06 A	18-Sep-06 A
A10860	SCC Drawings Update - Comms and Location Based (+)	2d	18-Sep-06 A	19-Sep-06 A
A10880	SCC Drawings Update - Signalling Track Layout (+)	7d	12-Sep-06 A	20-Sep-06 A
A10930	Depot Control Room Layout (Depot Led)	9d	07-Sep-06 A	20-Sep-06 A
A10940	Depot Equipment Room Layout (Depot Led)	1d	20-Sep-06 A	20-Sep-06 A
A11010	Paul Alliott Input Into Depot Drawings	1d	20-Sep-06 A	20-Sep-06 A
A11020	Paul Alliott To Confirm SDS On Target For PD PLUS	1d	20-Sep-06 A	21-Sep-06 A
A11030	M Rose To Import Signalling And Comms Drawings	1d	22-Sep-06 A	22-Sep-06 A
A11040	Comms Check And Update	2d	25-Sep-06 A	26-Sep-06 A
A11050	Signalling Check And Update	2d	25-Sep-06 A	26-Sep-06 A
A11060	Final Paul Alliott Review Update and Sign Off	3d	27-Sep-06 A	29-Sep-06 A
A11070	Client Sign Off	0d		29-Sep-06 A
A11090	SCC Internal PD PLUS Meeting	1d	07-Sep-06 A	08-Sep-06 A
A11100	PD Plus Management	40d	01-Aug-06 A	29-Sep-06 A
SCC General Activities and High Level		373d	03-Jul-06 A	14-Dec-07 A
A11130	Outline Drawings To Be Produced and Quantities	9d	14-Aug-06 A	25-Aug-06 A
A11150	Meetings Schedule; Interfaces and Stakeholders	18d	21-Aug-06 A	15-Sep-06 A
A11160	Review and Allocate HIRA PD Outputs, Risks Including CDM	32d	02-Nov-06 A	19-Dec-06 A
A11170	Collate and Closed Down All Comments Including IDC, Client and Checks of Internal Reviews	100d	03-Jul-06 A	29-Nov-06 A
A11180	Develop SCC Technical Spec & SCC Test Spec Format	8d	20-Nov-06 A	30-Nov-06 A
A11190	Support / Liaise / Exchange of Data Between Disciplines	294d	04-Sep-06 A	30-Nov-07 A
A11200	Produce Draft SCC Technical Specification -First Pass	142d	19-Feb-07 A	24-Sep-07 A
A11210	IDC of SCC Technical Specification and Manage Reviews / Comments	19d	12-Nov-07 A	07-Dec-07 A
A11220	Produce Draft SCC Technical Specification	85d	19-Feb-07 A	30-Jun-07 A
A11230	Identify and Agree New / Changed Requirements and Agree With Engineering Manager	120d	04-May-07 A	02-Nov-07 A
A14210	Produce SCC Test Specification	121d	11-Jun-07 A	07-Dec-07 A
A14220	SCC Peer Review SCC Technical Specification and Drawings	8d	27-Nov-07 A	06-Dec-07 A
A14230	Update SCC Technical Specification, Drawings and BoQ With Comments Received	9d	26-Nov-07 A	07-Dec-07 A
A14240	Update SCC Requirements Specification If Required	107d	11-Jun-07 A	16-Nov-07 A
A14250	Detailed Design OPS Meeting With Client and Review	0d		12-Oct-06 A
A14260	Issue SCC Technical Specification and Drawings to tie	0d		14-Dec-07 A
Signalling - Technical Activities		472d	03-Jul-06 A	12-May-08
A14380	PB Client and Stakeholder Meetings To Develop Required Scope, Level of Detail and Way Forward	33d	16-Oct-06 A	01-Dec-06 A
A14390	TMS & TPDS Developt of Design & Test Documentation	290d	02-Nov-06 A	31-Jan-08
A14400	PIDS Development of Design and Test Documentation	19d	27-Nov-06 A	22-Dec-06 A
A14410	SCADA Development of Design and Test Documentation	12d	01-Mar-07 A	19-Mar-07 A
A14420	Control Room Development of Design and Test Documentation	70d	18-Dec-06 A	11-Apr-07 A
A14430	Integrated Equipment Cubicle Development of Design and Test Documentation	63d	08-Nov-06 A	16-Feb-07 A
A14440	SCC Review of SCC Comms Led Drawings (Including Location Based)	5d	12-Nov-07 A	16-Nov-07 A
A14450	Provide Design Level of Detail To Other Disciplines To Enable Their Designs To Be Completed	230d	23-Oct-06 A	15-Oct-07 A
A14460	Finalise TPDS Loop Drawings	9d	29-Apr-08	12-May-08
A14470	Provide Test Specification Sections of Signalling Led Test	30d	20-Mar-07 A	04-May-07 A
A14480	SCC Risks and Assumptions Associated With For Signalling Led Subsystems	55d	02-Nov-07 A	31-Jan-08
A14490	Identify New / Revised Requirements For Consideration	53d	20-Mar-07 A	11-Jun-07 A
A14500	Produce Initial Sample Drawings	19d	02-Oct-06 A	27-Oct-06 A
A14510	Correlate Drawings Against Other Discipline Output and Finalise All At 100%	243d	23-Oct-06 A	02-Nov-07 A
A14550	Systems Assurance Review Meeting 2	0d		12-Feb-07 A
A14560	Systems Assurance Review Meeting 3	0d		09-Mar-07 A
A14600	Support As Required To Safety Assurance	256d	04-Sep-06 A	04-Oct-07 A
A14610	Signalling Resources	371d	03-Jul-06 A	31-Jan-08
Produce / Revise Sig Led Drawings In Line With A1 and A3 of SCC OPS		298d	02-Oct-06 A	30-Nov-07 A
A14270	PIDS Drawings	23d	23-Oct-06 A	24-Nov-06 A
A14280	Tram Position Detection System Track Layout	276d	02-Oct-06 A	30-Nov-07 A
A14290	SCC Floor Plans Input To Ian Brown	39d	02-Jan-07 A	28-Feb-07 A
A14300	SCC Cable Routes Input to Tony Bishop	173d	02-Jan-07 A	24-Sep-07 A
A14310	Cubicles Input To Ian Brown	58d	27-Nov-06 A	28-Feb-07 A
A14320	Workstation Layout Typicals	198d	12-Jan-07 A	09-Nov-07 A
A14330	TPDS Mimic For Lothian Bus	203d	05-Jan-07 A	09-Nov-07 A
A14340	Mass Trip / Intertrip Drawings	62d	08-Nov-06 A	15-Feb-07 A
A14350	SCADA Drawings	82d	08-Nov-06 A	16-Mar-07 A
A14370	T Power end of task to feed into programme A13940	0d		15-Jan-07 A
Comms - Technical Activities		400d	03-Jul-06 A	31-Jan-08
A14690	PB Client and Stakeholder Meetings To Develop Required Scope Level of Detail and Way Forward	33d	16-Oct-06 A	01-Dec-06 A
A14700	Support as Required To Safety Assurance	256d	04-Sep-06 A	04-Oct-07 A
A14710	Telephone Network Development of Design and Test Documentation	14d	04-Dec-06 A	22-Dec-06 A
A14720	Public Address Development of Design and Test Documentation	45d	15-Jan-07 A	21-Mar-07 A
A14730	Operational Radio System Propagation Modelling	38d	23-Oct-06 A	15-Dec-06 A
A14740	Operational Radio System Development of Design and Test Documentation	39d	23-Jan-07 A	21-Mar-07 A
A14750	Passenger Help / Passenger Emergency Help Point Development of Design and Test Documentation	35d	02-Jan-07 A	21-Feb-07 A
A14760	CCTV Development of Design and Test Documentation	42d	30-Jan-07 A	02-Apr-07 A
A14770	ODN Development of Design and Test Documentation	20d	15-Mar-07 A	16-Apr-07 A
A14780	Depot Equipment Room Development of Design and Test Documentation	77d	18-Dec-06 A	20-Apr-07 A
A14790	SCC Review of TPDS Track Layout Drawings	14d	19-Nov-07 A	07-Dec-07 A
A14800	Provide Design Level of Detail To Other Disciplines To Enable Their Designs To Be Completed	218d	08-Nov-06 A	15-Oct-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

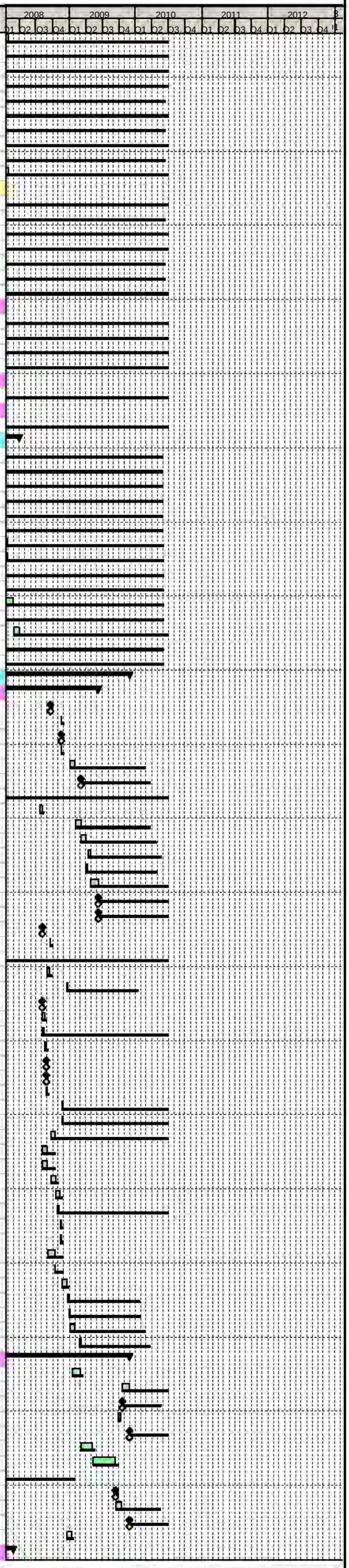
Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
A14820	Provide Test Specification Sections of Comms Led Text	191d	06-Apr-07 A	31-Jan-08
A14830	SCC Risks and Assumptions Associated Comms Led Activities	119d	17-Apr-07 A	15-Oct-07 A
A14840	Identify New / Revised Requirements For Consideration	31d	17-Apr-07 A	04-Jun-07 A
A14850	Produce Initial Sample Drawings	28d	09-Oct-06 A	17-Nov-06 A
A14860	SCC Operational Radio System Basestation Site	39d	23-Jan-07 A	21-Mar-07 A
A14870	Correlate Drawings Against Other Discipline Outputs and Finalise	205d	17-Nov-06 A	04-Oct-07 A
A14910	Operational Radio System Propagation Modelling Report For Issue To tie	0d		15-Dec-06 A
A14920	tie Approval Period Propagation Report	20d	18-Dec-06 A	23-Jan-07 A
A14940	Initial Consultation With Radio Site Owners	0d	02-Jan-07 A	02-Jan-07 A
A14950	Comms Resources	371d	03-Jul-06 A	31-Jan-08
Produce / Revise Comms Led Drawings In Line With A1 and A2 of SCC OPS		99d	20-Nov-06 A	16-Apr-07 A
A14620	SCC Location Based Drawings	70d	08-Dec-06 A	30-Mar-07 A
A14630	SCC Tram CCTV To External Parties	60d	02-Jan-07 A	30-Mar-07 A
A14640	SCC Operational Radio System (Exc Basestation Site Detail)	52d	15-Jan-07 A	30-Mar-07 A
A14650	SCC Telephone Network	9d	20-Nov-06 A	01-Dec-06 A
A14660	SCC Operational Data Network	92d	20-Nov-06 A	16-Apr-07 A
A14670	Input From tie	0d		29-Nov-06 A
A14680	Instigate Radio Site Discussion	32d	04-Dec-06 A	29-Jan-07 A
Supervisory Control & Comms (SCC) (Task200.5.2)		205d	19-Sep-05 A	30-Jun-06 A
A0041000	Telecommunications	95d	19-Sep-05 A	03-Feb-06 A
A0092010	Wireless Communications	20d	30-Nov-05 A	03-Jan-06 A
SDS22250	Develop Systems & Communications Specifications	85d	20-Feb-06 A	30-Jun-06 A
SDS22280	Issue Systems & Communications Specifications	0d		30-Jun-06 A
VO155 IT Performance Review (Internal - Rejected)		115d	03-Nov-06 A	23-Apr-07 A
A11320	IT Performance Review	107d	03-Nov-06 A	23-Apr-07 A
VO156 CAD Issues and Underestimation (Internal - Rejected)		122d	03-Nov-06 A	02-May-07 A
A11340	CAD Issues and Underestimation	113d	03-Nov-06 A	02-May-07 A
Stakeholder Reviews		538d	20-Feb-06 A	01-Apr-08
A569560	Prepare Plans as Defined in Bill	37d	20-Feb-06 A	13-Apr-06 A
A569590	Special Interest Groups Consultation	57d	21-Feb-06 A	19-May-06 A
A569600	SLGs Consultation Surveys	23d	06-Mar-06 A	07-Apr-06 A
A569610	Feed in Stakeholder Comments	27d	06-Mar-06 A	13-Apr-06 A
A569620	Review Potential Issues with tie	4d	22-May-06 A	25-May-06 A
A569630	SLGs Consultation Meetings	25d	28-Apr-06 A	07-Jun-06 A
A569870	Design Correspondence	368d	03-Jul-06 A	25-Jan-08
A569880	Coordination of Technical support to tie Communication Team	368d	03-Jul-06 A	25-Jan-08
A569890	Analysis of Stakeholder Information	345d	03-Jul-06 A	14-Dec-07 A
A569900	Project Reporting	351d	03-Jul-06 A	24-Dec-07 A
A569910	Communications Support to Design Process	391d	03-Jul-06 A	29-Feb-08
A569920	Communications Support for Surveys	176d	03-Jul-06 A	30-Mar-07 A
A569940	Close Out Review	19d	03-Mar-08	01-Apr-08
A569950	Individual Landowners Consultation	233d	03-Jul-06 A	29-Jun-07 A
A569960	Opinion Formers Approvals Consultation	205d	14-Aug-06 A	29-Jun-07 A
TRO's (Task200.4)		915d	01-May-06 A	30-Nov-09
Order Preparation & Process		456d	24-Aug-07 A	11-Jun-09
SDS34220	Issue Consultation Package to Consultees	0d		21-Sep-08
SDS34230	Preparation of Consultation Report	2d	18-Nov-08	19-Nov-08
SDS34260	Submit Package to CEC for report to comittee	0d		19-Nov-08
SDS55810	Preparation of Consultation Report to Comittee to obtain authorisation for Public Deposit	2d	18-Nov-08	19-Nov-08
SDS55820	Public Deposit of Documents and Open Public Exhibition	19d	08-Jan-09	04-Feb-09
SDS55830	Submit Package to CEC for Report to Committee	0d		04-Mar-09
SDS55860	Dundas and Wilson Compile Draft TRO Articles (REVISION OF PROCESS)	72d	24-Aug-07 A	10-Dec-07 A
SDS67050	Preperation of draft relevant Maps showing proposed traffic regulation measures	9d	23-Jul-08	05-Aug-08
SDS70650	Analyse Objection & Prepare Objections Report	19d	05-Feb-09	04-Mar-09
SDS70670	Council decision to Make Orders or proceed to Public Hearing	19d	06-Mar-09	02-Apr-09
SDS70680	Orders made by CEC and Public Notice of Making Orders	9d	16-Apr-09	29-Apr-09
SDS70690	Preparation of Notices for Making of Orders	5d	03-Apr-09	09-Apr-09
SDS70700	TRO Legal Challenge Period	28d	30-Apr-09	10-Jun-09
SDS70710	TRO Legal & Able to be Enacted	0d		11-Jun-09
SDS70720	Commence Implementation	0d		11-Jun-09*
SDS70800	Issue Draft Relevant Maps to CEC For Comments	0d		05-Aug-08
SDS70820	Preparation of letters with copy Relevant Map to issue to Statutory Consultees	1d	19-Sep-08	20-Sep-08
SDS74260	Dundas and Wilson Complete Appropriate Deposit Documents (REVISION OF PROCESS)	72d	24-Aug-07 A	10-Dec-07 A
SDS74270	Briefing session with Member based on Relevant Map and receive approval to conduct Statutory Consultation	9d	03-Sep-08	16-Sep-08
SDS74280	Collate Documents for Public Deposit	5d	18-Dec-08	24-Dec-08
SDS82170	Issue Draft Relevant Maps to tie For Comments	0d		05-Aug-08
SDS82180	Receive tie and CEC comments on proposed traffic regulation meansures	9d	06-Aug-08	19-Aug-08
SDS82200	Informal briefing session with Consultees based on relevant maps	5d	06-Aug-08	12-Aug-08
SDS82210	Preparation of final draft of Relevant Map showing proposed traffic regulation measures	5d	20-Aug-08	26-Aug-08
SDS82220	Issue Final Draft Relevant Maps to CEC For Approval	0d		26-Aug-08
SDS82230	Issue Final Draft Relevant Maps to tie For Approval	0d		26-Aug-08
SDS82240	Receive tie and CEC Approval of final draft of Relevant Map	5d	27-Aug-08	02-Sep-08
SDS82250	Briefing Session for listed Consultees on Final Draft Orders	5d	20-Nov-08	26-Nov-08
SDS82270	Briefing Session for Members on Final Draft Orders	5d	20-Nov-08	26-Nov-08
SDS82280	Meeting with Police, emergency services, bus operators and road haulage to discuss proposed measures	19d	22-Sep-08	17-Oct-08
SDS82290	Preparation of Draft Schedules	19d	06-Aug-08	02-Sep-08
SDS82300	Preparation of Draft Articles	19d	06-Aug-08	02-Sep-08
SDS82310	Receive Consultation Responses	20d	22-Sep-08	20-Oct-08
SDS82320	Analyse Responses and Review and Finalise TRO in view of Statutory Consulation Process	14d	21-Oct-08	10-Nov-08
SDS82330	Meeting with Roads Authority to appraise issues raised by Consultees	5d	30-Oct-08	05-Nov-08
SDS82350	Finalise Schedules	5d	11-Nov-08	17-Nov-08
SDS82360	Finalise Articles	5d	11-Nov-08	17-Nov-08
SDS82370	Finalise Statement of Case and Statement of Reasons	28d	04-Sep-08	15-Oct-08
SDS82380	Draft Statutory Notice for Public Advertisment	1d	16-Oct-08	16-Oct-08
SDS82390	Council decision to proceed to Public Deposit	19d	20-Nov-08	17-Dec-08
SDS82400	Arragement for Public Exhibition and Deposit of Draft Orders	5d	25-Dec-08	31-Dec-08
SDS82410	Advertisments to Newspapers	5d	01-Jan-09	07-Jan-09
SDS82420	Period for objections to be logged	19d	08-Jan-09	04-Feb-09
SDS82430	Briefing Session for Members on Objections	5d	26-Feb-09	04-Mar-09
Public Hearing		557d	24-Sep-07 A	30-Nov-09
SDS34650	TRO Public Hearing For Order 5 (Statutory Processs)	28d	21-Jan-09	03-Mar-09
SDS34670	TRO Legal Challenge Period (Statutory Processs)	28d	20-Oct-09	30-Nov-09
SDS34730	TRO Orders Made By CEC (Statutory Processs)	0d		19-Oct-09
SDS34820	Prepare & Publish Making Notice	10d	25-Sep-09*	09-Oct-09
SDS34870	First Permanent Measures Able To Take Place	0d		30-Nov-09
SDS55790	Reporters Report (Statutory Processs)	45d	04-Mar-09	08-May-09
SDS55800	Review, Recommend & Conclude from Reporters Report (Statutory Processs)	85d	11-May-09	14-Sep-09
SDS55850	Preparation For Public Hearing	53d	24-Sep-07 A	10-Dec-07 A
SDS55900	Issue Report to CEC On Reporters Findings for Order 5 Hearing	0d		14-Sep-09
SDS56140	Report to CEC for Approval to Make TRO for Order 5	21d	15-Sep-09	14-Oct-09
SDS70840	TRO Orders Made By CEC (Statutory Processs)	0d		30-Nov-09
SDS82840	Preparation For Public Hearing	19d	18-Dec-08	14-Jan-09
Application to Scottish Executive		212d	01-May-07 A	29-Feb-08



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

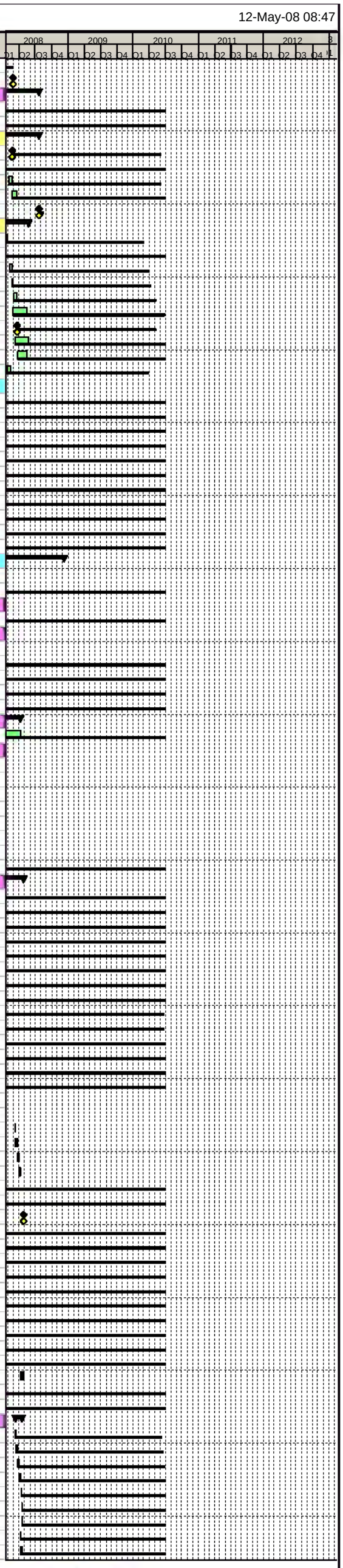
Trams for Edinburgh ...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS70730	Formal Application to Scottish Executive For Change to the Regulations	41d	01-May-07 A	29-Jun-07 A
SDS70740	Confirmation of Regulations Being Changed From SE	0d		29-Feb-08*
Design Process		570d	01-May-06 A	24-Jul-08
SDS70850	Collate Exisiting TRO	62d	01-May-06 A	31-Jul-06 A
SDS70860	Receive PD2 Roads Design	0d	10-Aug-07 A	
LOD		242d	13-Aug-07 A	24-Jul-08
SDS70760	Full Draft TRO proposal available	0d		22-Feb-08
SDS70870	Complete Draft TRO Proposals Based On PD2 (REVISION OF PROCESS)	81d	13-Aug-07 A	10-Dec-07 A
SDS82130	TRO Drafted to reflect Roads Design as Submitted to tie and CEC subsection by subsection	14d	04-Feb-08	22-Feb-08
SDS82140	Interim Informal meetings with Emergency services and other Statutory Consultees	19d	25-Feb-08	21-Mar-08
SDS82160	TRO team receive Final Road Design approved by RTA	0d		24-Jul-08
Wider Area TRO Design		228d	02-Jul-07 A	23-May-08
SDS74240L	L: Test wider area junction solutions in TRANSYT to optimise traffic flows	69d	08-Oct-07 A	25-Jan-08
SDS74380Z	Z: Prepare any existing data ready for review for junctions and links likley to be affected	95d	02-Jul-07 A	19-Nov-07 A
SDS74390AA	AA: On site surveys	9d	11-Feb-08	22-Feb-08
SDS74400AB	AB: Draw up draft TRO	5d	25-Feb-08	29-Feb-08
SDS74450AP	AP: Detailed Design of Wider Area TRO	14d	03-Mar-08	21-Mar-08
SDS74460	Issue Preliminary TRO to CEC for Initial Approval	53d	29-Feb-08	16-May-08
SDS74470	Issue Detailed TRO to CEC for Approval	0d		21-Mar-08
SDS74480	Initial Approval of TRO granted by CEC	51d	11-Mar-08	23-May-08
SDS74490	Final Approval of TRO granted by CEC	38d	24-Mar-08	16-May-08
SDS81830	Z: Junctions and links requiring changes prepare exisitng data redy for review	14d	28-Jan-08	15-Feb-08
TTROs		178d	04-Dec-06 A	17-Aug-07 A
SDS23680	Handover Traffic Management Requirements to MUDFA (In Accordance With Contract)	0d		08-May-07 A
SDS56990	Handover Traffic Management Requirements to INFRACO (In Accordance With Contract)	0d		17-Aug-07 A
TTRO230	Receive & Update to tie Comments	9d	12-Feb-07 A	23-Feb-07 A
TTRO380	MUDFA TTRO Legal Process	8d	26-Mar-07 A	06-Apr-07 A
TTRO410	INFRACO TTRO Legal Process	38d	25-Jun-07 A	17-Aug-07 A
TTRO520	tie Approval Period	19d	12-Dec-06 A	16-Jan-07 A
TTRO530	SDS & Dundas & Wilson Draft MUDFA TTRO Order & Schedules	5d	04-Dec-06 A	08-Dec-06 A
TTRO540	Re-Issue MUDFA TTRO Order & Schedules To tie	0d		12-Mar-07 A
TTRO570	Issue MUDFA TTRO Order & Schedules To tie	0d		11-Dec-06 A
TTRO580	SDS & Dundas & Wilson Draft INFRACO TTRO Order & Schedules	14d	04-Jun-07 A	22-Jun-07 A
TTRO610	Issue INFRACO TTRO Order & Schedules To tie	0d		22-Jun-07 A
Traction Power (Task 200.6.1)		829d	19-Sep-05 A	10-Dec-08
A0050000	Traction Power	90d	19-Sep-05 A	27-Jan-06 A
A0050010	11KV Feeders	90d	19-Sep-05 A	27-Jan-06 A
VO61 Additional Traction Power Hours (Internal)		96d	14-Nov-06 A	06-Apr-07 A
SDS73160	VO61 Additional Traction Power Hours	91d	14-Nov-06 A	06-Apr-07 A
VO172 Traction Power Management (Internal)		170d	12-Mar-07 A	02-Nov-07 A
SDS70620	VO172 Additional Traction Power Design Management	155d	12-Mar-07 A	02-Nov-07 A
SDS73690	Revise Engineering Plan and OPS (subject to VO135 and VO230)	8d	29-Jun-07 A	11-Jul-07 A
SDS73700	Internal Issue - Revised EP and OPS	0d		17-Jul-07 A
SDS73710	Generate System Interface Specifications (Traction Power)	5d	18-Jul-07 A	24-Jul-07 A
SDS73720	Internal Issue - System Interface Specifications	0d		25-Jul-07 A
VO273 Extention to Traction Power Management (Internal)		107d	02-Nov-07 A	09-Apr-08
SDS80980	VO273 Extention to Traction Power Design Management	99d	02-Nov-07 A	09-Apr-08
Substation (Task 200.2)		124d	06-Feb-06 A	27-Jul-06 A
A1210	Interface Design With DNO Scottish Power	93d	06-Feb-06 A	29-Jun-06 A
A1220	Prelim substation layouts and sites	51d	13-Mar-06 A	31-May-06 A
A1240	Planning input - Substation buildings	9d	19-Jun-06 A	30-Jun-06 A
A1470	Issue Draft Substation Layout Report	0d		30-Jun-06 A
A4720	Identify Substation Sites	91d	06-Feb-06 A	27-Jun-06 A
SDS32810	tie Approval Period	19d	19-Jun-06 A	14-Jul-06 A
SDS32820	Receive tie Comments	0d		14-Jul-06 A
SDS32830	Update to tie Comments	9d	14-Jul-06 A	27-Jul-06 A
Traction Power Systems - General TPS - System Wide		444d	25-Jul-06 A	25-Apr-08
A1175	Evaluate Traction Power Equipment and Finalise, Substation Equipment Specification - Update 2 (TPS 18)	14d	04-Dec-06 A	22-Dec-06 A
A13820	Undertake Calculation Of DC Protection Settings For Complete TPS System (TPS 21)	42d	08-Dec-06 A	16-Feb-07 A
A13840	Issue Generic TSS Protection Schematic (TPS 20)	0d		18-Dec-06 A
A13850	Issue DC Protection Settings For Complete TPS System (TPS 21)	0d		16-Feb-07 A
A13860	Develop Traction Power Cable and Routing Schedule (Owner T Bishop) (TPS 12DD)	77d	11-Sep-06 A	10-Jan-07 A
A13870	Issue Traction Power Cable and Routing Schedule (TPS 12DD) (Owner T Bishop)	0d		10-Jan-07 A
A13880	Detail Design Electrical Safety - Prepare Update to Electrical Nonenclature Report - Update 1 (TPS 25)	29d	18-Aug-06 A	02-Oct-06 A
A13920	Detail Design Input Into Electrical Specifications For Track	5d	12-Jan-07 A	18-Jan-07 A
A13930	Prepare Generic SCADA I / O Schedules (TP 28)	1d	12-Jan-07 A	15-Jan-07 A
A13940	Issue Generic SCADA I / O Schedules (TPS 28)	0d		16-Jan-07 A
A14160	Detail Design Electrical Safety - Prepare Update to Electrical Nonenclature Report - Update 2 (TPS 25)	7d	08-Jan-07 A	16-Jan-07 A
A14170	Issue Electrical Nonenclature Report - Iteration 2 (TPS 25)	0d		16-Jan-07 A
A1720	Evaluate Results of Traction Power Simulation Modelling and Modify Interim TPS System Proposals	10d	07-Aug-06 A	21-Aug-06 A
A1790	Prepare Interim TPS Scheme Development Report (TPS3DDB)	53d	29-Aug-06 A	15-Nov-06 A
A1800	Establish / Confirm System Design Criteria To Be Applied	2d	20-Nov-06 A	21-Nov-06 A
A1810	Obtain and Review Data Relating To TPS System Detailed Design	2d	17-Nov-06 A	20-Nov-06 A
A1820	Undertake TPS System Load Flow / Voltage Regulation Analysis	0d	12-Mar-08	12-Mar-08
A1830	Evaluate Results Of Simulation Modelling and Adjust TPS System Design	11d	12-Mar-08	28-Mar-08
A1840	Refine TPS System Load Flow / Voltage Regulation Analysis	1d	28-Mar-08	31-Mar-08
A1850	Validate Equipment Ratings and Cable and Overhead Conductor Sizes	8d	31-Mar-08	10-Apr-08
A1860	Intitial Preparation TPS System Design Report (TPS3DDI)	3d	07-Feb-07 A	09-Feb-07 A
A1870	Issue Interim TPS Scheme Development Report (TPS 3DDB)	0d		20-Nov-06 A
A1880	Issue Internally TPS System Design Report (TPS 3DDI)	0d		25-Apr-08
A1890	Determine DNO Derived Power Supply Availability and Sizing.	128d	25-Jul-06 A	08-Feb-07 A
A3310	Evaluate and Finalise Substation Locations - DNO Power Supplies Output (TPS 16)	6d	12-Feb-07 A	19-Feb-07 A
A3320	Issue Substation Sites and DNO Requirements Summary Report (TPS 16)	0d		19-Feb-07 A
A3330	Develop Detail Of & Finalise TPS AC/DC Feeding & Sectioning Diagram - Update 1 (TPS 17)	23d	21-Sep-06 A	25-Oct-06 A
A3340	Develop Detail Of and Finalise TPS AC / DC Feeding and Sectioning Diagram - Update 2 (TPS 17)	6d	06-Nov-06 A	13-Nov-06 A
A3350	Issue TPS AC / DC Feeding and Sectioning Diagram (TPS 17)	0d		13-Nov-06 A
A3360	Evaluate Traction Power Equipment and Finalise, Substation Equipt Spec - Update 1 (TPS 18)	20d	19-Oct-06 A	16-Nov-06 A
A3370	Issue Traction Power Equipment and Substation Equipment Specification - Update 2 (TPS18) to tie	0d		21-Dec-06 A
A3440	Develop Detail Of and Finalise Earthing and Bonding Policy (TPS 8DD)	6d	04-Dec-06 A	11-Dec-06 A
A3450	Issue Updated Earthing and Bonding Policy (TPS 8DD)	0d		18-Dec-06 A
A4280	Prepare Final TPS System Design Report (TPS3DDI)	10d	10-Apr-08	25-Apr-08
SDS67310	Issue DC Feeding and Sectioning Diagrams (Iteration 1)	0d		25-Oct-06 A
SDS67320	Issue of Substation Equipment Specification Update 1 (TPS 18)	0d		16-Nov-06 A
VO192 Traction Power Systems Extension to Design Programme (Internal)		26d	12-Mar-08	17-Apr-08
VO21500	Power Quality - Review Traction Loads for Power Quality Changes	3d	12-Mar-08	17-Mar-08
VO22300	Power Quality - Prepare Power Quality Report Update	7d	17-Mar-08	26-Mar-08
VO42900	Protection Settings - Review AC/DC Traction Loads for Protection Settings	4d	26-Mar-08	01-Apr-08
VO43000	Protection Settings - Prepare Protection Settings Report Update	5d	01-Apr-08	08-Apr-08
VO43100	DC Feeding & Sectioning Diagrams - Prepare Update	1d	14-Apr-08	15-Apr-08
VO43700	Cable Schedules - Review Pan Volts, Rail Potentials and Loads for Cable Quantities	1d	16-Apr-08	16-Apr-08
VO45000	Cable Schedules - Prepare Update	1d	17-Apr-08	17-Apr-08
VO45800	Traction Power Equipment - Review Traction Power Equipment Ratings in line with revised load flow	0d	10-Apr-08	10-Apr-08
VO46400	Traction Power Equipment - Prepare Update to Traction Power Equipment Specification	3d	11-Apr-08	16-Apr-08



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

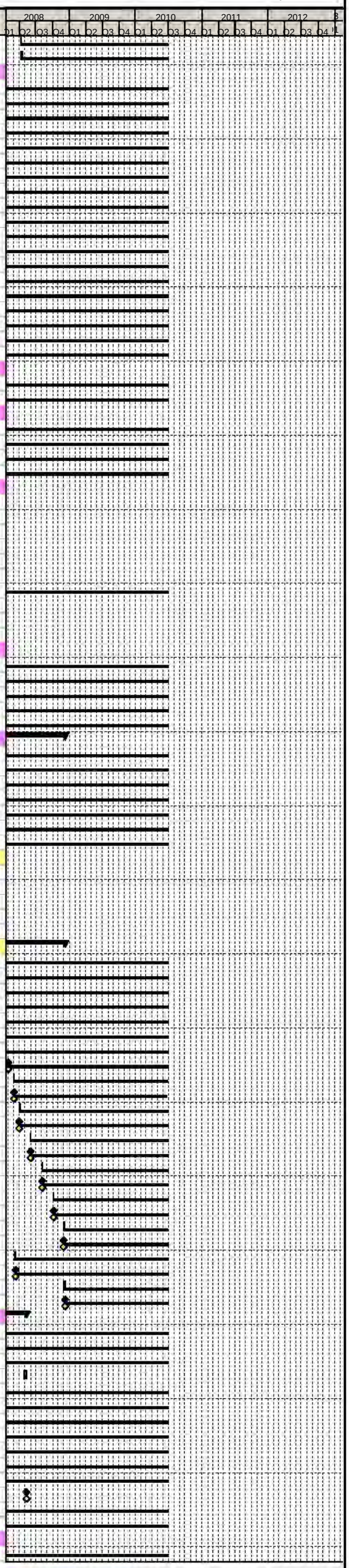
Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

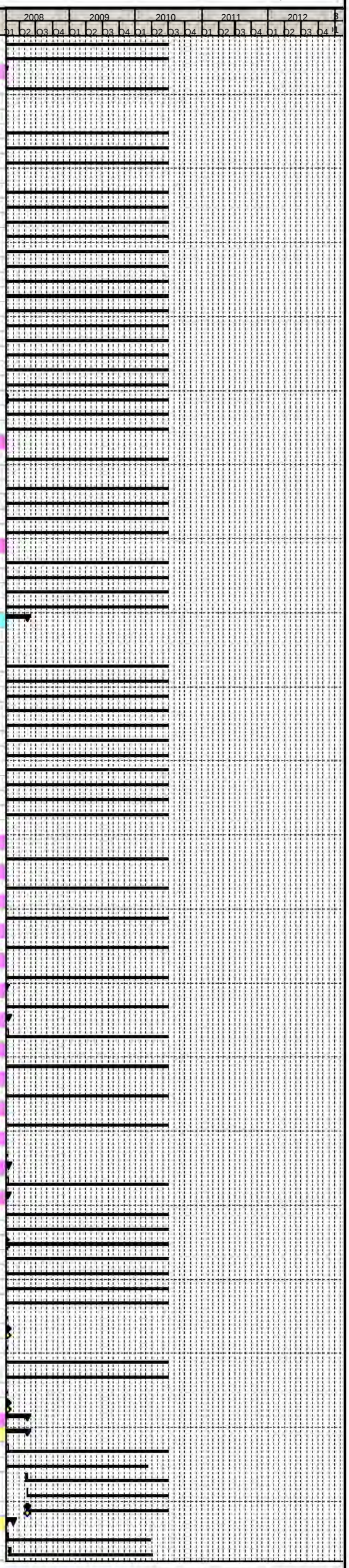
tie

Activity ID	Activity Name	Original Duration	Start	Finish
VO46700	Single Line Diagrams - Review for Revisions Subject to Traction Power Equipment Ratings	0d	10-Apr-08	10-Apr-08
VO47100	Single Line Diagrams - Prepare Update to SLDs	4d	11-Apr-08	17-Apr-08
Traction Substation Electrical Design		123d	14-Aug-06 A	09-Feb-07 A
A13790	Specific Single Line Diagrams - Granton Road Substation	5d	05-Feb-07 A	09-Feb-07 A
A13800	Issue Site Specific Substation Single Line Diagrams	0d		09-Feb-07 A
A13810	Develop TSS Short Circuit, Overload Protect Methods & Generic Protection Schematic (TPS20)	7d	08-Dec-06 A	18-Dec-06 A
A13900	Prepare Detailed Substation & Trackside Interface Demarcation Diagram (TPS 26)	63d	14-Aug-06 A	15-Nov-06 A
A13910	Issue Substation and Trackside Interface Demarcation Diagram (TPS 26)	0d		15-Nov-06 A
A13970	Specific Single Line Diagrams - Gogar Depot	5d	05-Feb-07 A	09-Feb-07 A
A3290	Prepare Schematic Diagram for DNO Derived LVAC Power Supplies (TPS 31)	15d	08-Jan-07 A	30-Jan-07 A
A3300	Issue Schematic Diagram for DNO Derived LVAC Power Supplies (TPS 31)	0d		30-Jan-07 A
A3460	Specific Single Line Diagrams - Generic Substation	13d	06-Nov-06 A	23-Nov-06 A
A3470	Specific Single Line Diagrams - Ingliston P&R Substation	4d	23-Nov-06 A	28-Nov-06 A
A3480	Specific Single Line Diagrams - Bankhead Drive Substation	11d	20-Nov-06 A	05-Dec-06 A
A3490	Specific Single Line Diagrams - Jenners Substation	4d	06-Dec-06 A	11-Dec-06 A
A3500	Specific Single Line Diagrams - Russell Road Paralleling Hut	5d	18-Dec-06 A	22-Dec-06 A
A4450	Specific Single Line Diagrams - Haymarket Substation	5d	02-Jan-07 A	08-Jan-07 A
A4460	Specific Single Line Diagrams - Cathedral Substation	4d	08-Jan-07 A	11-Jan-07 A
A4470	Specific Single Line Diagrams - Leith Walk Substation	4d	11-Jan-07 A	16-Jan-07 A
A5530	Specific Single Line Diagrams - North Leith Sands Substation	6d	12-Jan-07 A	19-Jan-07 A
A5540	Specific Single Line Diagrams - Craigleith Substation	5d	22-Jan-07 A	26-Jan-07 A
A5710	Specific Single Line Diagrams - Granton Mains Substation	5d	29-Jan-07 A	02-Feb-07 A
Depot OLE / Plant Interlocking		33d	12-Jan-07 A	27-Feb-07 A
A13950	Energisation Warning and Interlocking Scheme (TPS 29)	31d	12-Jan-07 A	27-Feb-07 A
A13960	Issue Energisation Warning and Interlocking Scheme (TPS 29)	0d		27-Feb-07 A
Stray Current Management		34d	04-Oct-06 A	20-Nov-06 A
A1185	Finalise Stray Current Management Strategy (TPS 34)	10d	04-Oct-06 A	18-Oct-06 A
A1555	Issue Updated Stray Current Management Strategy (TPS 34)	0d		17-Nov-06 A
A3420	Finalise Stray Current Code of Practice (TPS 7DD)	14d	31-Oct-06 A	20-Nov-06 A
A3430	Issue Stray Current Code of Practice (TPS 7DD)	0d		20-Nov-06 A
Design		113d	03-Feb-06 A	11-Jul-06 A
A1040	Traction Power Model / Calculations	98d	03-Feb-06 A	04-Jul-06 A
A1050	Cabling / OLE sizing	77d	10-Mar-06 A	07-Jul-06 A
A1060	OLE Feeder isolator principles	66d	10-Mar-06 A	21-Jun-06 A
A1070	Feeding and Sectioning Diagram	89d	03-Feb-06 A	21-Jun-06 A
A1080	Main cabling, Routing and Schedules	51d	21-Apr-06 A	07-Jul-06 A
A1090	Depot switching and Interlocking with E&M Plant (Input)	5d	05-Jul-06 A	11-Jul-06 A
A1100	SCADA Facilities and Schedules (input into Comms)	73d	03-Feb-06 A	26-May-06 A
A1110	Trackside LV Power Supplies	9d	26-Jun-06 A	07-Jul-06 A
A1380	Issue Traction Power Specification	0d		07-Jul-06 A
A1460	Prepare Traction Power Specification	18d	13-Jun-06 A	07-Jul-06 A
Specification		79d	10-Feb-06 A	31-May-06 A
A1120	Substation Equipment Specification	42d	10-Feb-06 A	13-Apr-06 A
A1130	Issue Draft Substation Equipment Specification	0d		13-Apr-06 A
A1140	Draft System Earthing & Bonding Policy	32d	27-Feb-06 A	13-Apr-06 A
A1150	Issue Draft System Earthing & Bonding Policy	0d		13-Apr-06 A
A1160	Input into SCADA Specification	70d	10-Feb-06 A	31-May-06 A
Stray Current		704d	13-Mar-06 A	10-Dec-08
A1260	Draft Stray Current Management Position Report	22d	13-Mar-06 A	13-Apr-06 A
A1270	Issue Stray Current Management Position Report	0d		30-Jun-06 A
A1280	Stray Current Working Party - Set up with Utilities	27d	22-May-06 A	30-Jun-06 A
A1290	Draft Stray Current Code of Practice	39d	16-May-06 A	13-Jul-06 A
A1300	Issue Draft Stray Current Code of Practice Position Report	0d		13-Jul-06 A
SDS56890	tie Approval Period	19d	13-Jul-06 A	09-Aug-06 A
SDS56900	Receive tie Comments	0d		10-Aug-06 A
VO135 Detailed Design of Stray Current (Internal)		14d	06-Aug-07 A	23-Aug-07 A
SDS73730	Stray Current Code of Practice Report	1d	06-Aug-07 A	06-Aug-07 A
SDS73740	Stray Current Corrosion Control Agreement	1d	07-Aug-07 A	07-Aug-07 A
SDS73750	Stray Current Risk Management Strategy	3d	08-Aug-07 A	10-Aug-07 A
SDS73760	Stray Current Testing & Commissioning Plan	4d	13-Aug-07 A	16-Aug-07 A
SDS73770	Issue SC COP, SC, CCA, SC RMS and SC TCP	0d		23-Aug-07 A
VO230 SDS Support to Stray Current Working Party		391d	04-Jun-07 A	10-Dec-08
SDS73820	Support to Stray Current Working Party No 1	3d	04-Jun-07 A	06-Jun-07 A
SDS73830	Stray Current Working Party No 1	0d	05-Jun-07 A	
SDS73840	Support to Stray Current Working Party No 2	16d	20-Aug-07 A	12-Sep-07 A
SDS73850	Stray Current Working Party No 2	0d	11-Sep-07 A	
SDS73860	Support to Stray Current Working Party No 3	4d	15-Oct-07 A	18-Oct-07 A
SDS73870	Stray Current Working Party No 3	0d	17-Oct-07 A	
SDS73880	Support to Stray Current Working Party No 4	32d	10-Nov-07 A	04-Jan-08 A
SDS73890	Stray Current Working Party No 4	0d	01-Feb-08*	
SDS73900	Support to Stray Current Working Party No 5	3d	03-Mar-08	05-Mar-08
SDS73910	Stray Current Working Party No 5	0d	04-Mar-08*	
SDS73920	Support to Stray Current Working Party No 6	3d	31-Mar-08	02-Apr-08
SDS73930	Stray Current Working Party No 6	0d	01-Apr-08*	
SDS73940	Support to Stray Current Working Party No 7	3d	02-Jun-08	04-Jun-08
SDS73950	Stray Current Working Party No 7	0d	03-Jun-08*	
SDS73960	Support to Stray Current Working Party No 8	3d	04-Aug-08	06-Aug-08
SDS73970	Stray Current Working Party No 8	0d	05-Aug-08*	
SDS73980	Support to Stray Current Working Party No 9	3d	06-Oct-08	08-Oct-08
SDS73990	Stray Current Working Party No 9	0d	07-Oct-08*	
SDS74000	Support to Stray Current Working Party No 10	3d	01-Dec-08*	03-Dec-08
SDS74010	Stray Current Working Party No 10	0d	02-Dec-08*	
SDS74020	Prepare, Check and Approve Stray Current Test Site Drawings	5d	06-Mar-08	12-Mar-08
SDS74030	Issue Stray Current Test Site Drawings for External Approval	0d		12-Mar-08
SDS74040	Prepare, Check and Approve Stray Current Working Party Position Report	6d	03-Dec-08	10-Dec-08
SDS74050	Issue Stray Current Working Party Position Report for External Approval	0d		10-Dec-08
Traction Power Systems		439d	15-Aug-06 A	09-May-08
A1005	Review and Update Outline Project Specification (OPS) 'Traction Power Distribution' (TPS 14)	19d	07-Sep-06 A	04-Oct-06 A
A1180	Review and Update Detailed Design Phase Programme	34d	15-Aug-06 A	04-Oct-06 A
A1190	Prepare Risk Register Update Associated with TPS (TPS 15)	24d	11-Oct-06 A	15-Nov-06 A
A14050	Final IDC - Systemwide Traction Power Design	9d	25-Apr-08	09-May-08
A14060	Prepare CDM Designers Risk Assessment Sheets	16d	12-Feb-07 A	06-Mar-07 A
A14070	Internal Issue of CDM Designers Risk Assessment Sheets (TPS 33)	0d		06-Mar-07 A
A1520	Issue Outline Project Specification (OPS) 'Traction Power Distribution' (TPS14)	0d		04-Oct-06 A
A15240	Interim IDC - System Wide Traction Power Design (Design Drawings)	9d	26-Feb-07 A	11-Mar-07 A
A15250	Interim IDC - System Wide Traction Power Design (Design Reports)	12d	09-Mar-07 A	27-Mar-07 A
A15260	Interim Issue Of Systemwide Traction Power Detailed Design	0d		29-Mar-07 A
A1530	Issue Risk Register Update Associated With TPS (TPS 15)	0d		15-Nov-06 A
SDS67220	Final Issue of Systemwide Traction Power Design To tie	0d		09-May-08*
SDS67530	DTL Project Engineering Activities	106d	29-Aug-06 A	09-Feb-07 A
SDS67540	Design Review	111d	29-Aug-06 A	16-Feb-07 A
Electrical Operation		15d	12-Jun-06 A	30-Jun-06 A
A1310	Draft Electrical Operating Procedures	14d	12-Jun-06 A	30-Jun-06 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Activity ID	Activity Name	Original Duration	Start	Finish
A1330	Draft Electrical Safety Rules	14d	12-Jun-06 A	30-Jun-06 A
A1390	Issue Electrical Operation Docs for Inclusion into First Draft of Operator's Suite of Electrical Operations Documents	0d		30-Jun-06 A
Electro Magnetic Compatibility		471d	06-Mar-06 A	14-Jan-08
A1350	EMC Management Plan - Preliminary Design	57d	03-Apr-06 A	30-Jun-06 A
A1500	Review Contract Requirements	67d	06-Mar-06 A	16-Jun-06 A
A1510	Earthing Plan	9d	19-Jun-06 A	30-Jun-06 A
A1540	Suppliers EMC Requirements Document	71d	06-Mar-06 A	23-Jun-06 A
A1550	Cable Separation Specification	44d	24-May-06 A	28-Jul-06 A
A1580	Radiated Emissions Requirements	53d	03-Apr-06 A	23-Jun-06 A
A1600	Network Rail Asset ID	56d	03-Apr-06 A	29-Jun-06 A
A1630	DC Stray Current - Zone of Influence Report	56d	03-Apr-06 A	29-Jun-06 A
A1640	Initial Meeting with BAA	5d	16-May-06 A	22-May-06 A
A1670	Issue Cable Separation Specification For Internal Review	0d		27-Oct-06 A
A1700	Produce Network Rail Strategy & Management Plan	29d	18-Jul-07 A	30-Aug-07 A
A1710	Issue Network Rail Strategy & Management Plan to tie	0d		31-Aug-07 A
A1750	Produce BAA Strategy & Management Plan	32d	03-Aug-07 A	20-Sep-07 A
A1760	Issue BAA Strategy & Management Plan to tie	0d		21-Sep-07 A
A2150	Produce Forth Ports Strategy & Management Plan	19d	24-Aug-07 A	21-Sep-07 A
A2230	Issue Forth Ports Strategy & Management Plan to tie	0d		21-Sep-07 A
A4290	Produce BAA Interface Report	38d	10-Sep-07 A	02-Nov-07 A
A4300	Issue BAA Interface Report to tie	0d		02-Nov-07 A
A4310	Produce Forth Ports Interface Report	42d	31-Aug-07 A	01-Nov-07 A
A4370	Issue Forth Ports Interface Report to tie	0d		02-Nov-07 A
A4500	Produce Utilities Interface Report	87d	28-Aug-07 A	14-Jan-08
A4580	Issue Utilities Interface Report to tie	0d		14-Jan-08
A6400	Issue Cable Separation Specification To tie	0d		19-Jul-07 A
SDS69390	Internal Review of Issue Cable Separation Specification	12d	02-Jul-07 A	18-Jul-07 A
General		78d	28-Oct-05 A	14-Feb-06 A
A003101	Highways	64d	28-Oct-05 A	01-Feb-06 A
A1000	Traction Voltage Selection - Technology Review (update to Client's Comments	9d	20-Dec-05 A	10-Jan-06 A
A1010	Electrical Nomenclature Report	7d	06-Feb-06 A	14-Feb-06 A
A1020	Electrical Operation Principles	7d	06-Feb-06 A	14-Feb-06 A
A1360	Issue Electrical Nomenclature Report	0d		14-Feb-06 A
A1370	Traction Voltage Selection - Technology Review	0d		10-Jan-06 A
Exemplar Substation Design		74d	22-May-06 A	31-Aug-06 A
A1730	Issue Detailed Design for Exemplar Substation Layout	0d		30-Jun-06 A
A4320	Produce Detailed Design for Exemplar Substation Layout	27d	22-May-06 A	30-Jun-06 A
A4350	tie Approval Period	19d	03-Jul-06 A	28-Jul-06 A
A4360	Receive & Update to tie Comments for Substation Detailed Design	22d	31-Jul-06 A	31-Aug-06 A
OLE (Task200.7)		615d	20-Dec-05 A	16-May-08
SDS22740	Equipment Options Report	121d	20-Dec-05 A	30-Jun-06 A
SDS22750	Building Fixings Report	109d	16-Jan-06 A	30-Jun-06 A
SDS22760	Technical Specification Report	109d	16-Jan-06 A	30-Jun-06 A
SDS22770	Prelim Plans for Cross Sections in Special Areas	109d	16-Jan-06 A	30-Jun-06 A
SDS22780	Produce Prelim Plans & Typical Cross Sections	88d	16-Jan-06 A	31-May-06 A
SDS22790	Produce Pantograph Technical Specification	34d	06-Mar-06 A	26-Apr-06 A
SDS22830	IDC OLE	69d	03-Jul-06 A	13-Oct-06 A
SDS22980	Issue Pantograph Technical Specification	0d		14-Jun-06 A
SDS24040	Issue Technical Specification Report	0d		30-Jun-06 A
SDS24050	Issue Typical Cross Sections Report (Inc. Special Areas)	0d		31-May-06 A
SDS24060	Issue Equipment Options Report	0d		30-Jun-06 A
SDS24070	Produce Material Take Off Report	9d	19-Jun-06 A	30-Jun-06 A
SDS24080	Issue Material Take Off Report	0d		30-Jun-06 A
SDS32150	Issue Building Fixing Report	0d		30-Jun-06 A
VO162 Extention of OLE Management due to Programme Change (Internal)		105d	05-Feb-07 A	29-Jun-07 A
A487108	VO162 Extension of OLE Management	95d	05-Feb-07 A	29-Jun-07 A
VO200 Prolongation of OLE Management Period (Internal)		61d	29-Jun-07 A	21-Sep-07 A
A487098	VO200 Extension of OLE Management	56d	29-Jun-07 A	21-Sep-07 A
VO237 Prolongation of OLE Management Period (Internal)		18d	24-Sep-07 A	17-Oct-07 A
A487118	VO237 Extension of OLE Management	17d	24-Sep-07 A	17-Oct-07 A
VO269 Prolongation of OLE Management Period (Internal)		15d	22-Oct-07 A	09-Nov-07 A
A487248	VO269 Extension of OLE Management	14d	22-Oct-07 A	09-Nov-07 A
VO275 Prolongation of OLE Management Period (Internal)		20d	12-Nov-07 A	07-Dec-07 A
A487278	VO275 Extension of OLE Management	19d	12-Nov-07 A	07-Dec-07 A
VO282 Prolongation of OLE Management Period (Internal)		27d	03-Dec-07 A	17-Jan-08 A
SDS81660	VO282 Extension of OLE Management	26d	03-Dec-07 A	17-Jan-08 A
VO297 Prolongation of OLE Management Period (Internal Not Approved)		28d	17-Dec-07 A	01-Feb-08
SDS82860	VO297 Extension to OLE Management	27d	17-Dec-07 A	01-Feb-08
VO235 Risk Review with OLE Sub-Section Design (Internal)		39d	11-Jun-07 A	02-Aug-07 A
A487178	VO235 Risk Assessment to Design in Sub-section by Sub-section	37d	11-Jun-07 A	02-Aug-07 A
VO239 Request for Attending a Meeting in Edinburgh (Internal)		15d	11-Jun-07 A	29-Jun-07 A
A487188	VO239 Meeting Preparation and Attendance	14d	11-Jun-07 A	29-Jun-07 A
VO240 OLE Programme Review (Internal - not PM approved)		15d	11-Jun-07 A	29-Jun-07 A
A487168	VO240 Review of V16 and impact on OLE deliverables	14d	11-Jun-07 A	29-Jun-07 A
VO249 OLE Pole Loading Calculation (Internal)		15d	10-Sep-07 A	28-Sep-07 A
A487208	VO249 Produce Pole Loading for SDS (Civils) Advanced Info	14d	10-Sep-07 A	28-Sep-07 A
VO298 OLE Pole Loading Calculation (Specials) (Internal Not Approved)		28d	17-Dec-07 A	01-Feb-08
A487288	VO298 Produce Pole Loading for Specials	27d	17-Dec-07 A	01-Feb-08
OLE General (Task200.7.1)		376d	31-Jul-06 A	25-Jan-08
A487028	DD - OLE Management	121d	31-Jul-06 A	05-Feb-07 A
SDS24130	Produce Dynamic Simulation Report	255d	11-Dec-06 A	17-Jan-08
SDS50760	Issue Dynamic Simulation Report	0d		17-Jan-08
SDS50770	Produce Final Technical & Pantograph Specifications	211d	25-Sep-06 A	17-Aug-07 A
SDS50780	Issue Final Technical & Pantograph Specifications	0d		17-Aug-07 A
SDS50790	Produce Final Building Fixings Report	266d	20-Oct-06 A	06-Dec-07 A
SDS50800	Issue Final Building Fixings Report	0d		07-Dec-07 A
SDS50830	Produce Pole Schedule - Loading Chart (Interim for PB Civils)	136d	31-Jul-06 A	27-Feb-07 A
SDS50840	Issue Pole Schedule - Loading Chart	0d		25-Jan-08*
SDS50880	Produce Pole Schedule - Loading Schedule (Final)	57d	13-Sep-07 A	06-Dec-07 A
SDS66840	IDCs, Review Panels, OLE Optioneering, Fix OLE Design To Latest PD Info	9d	14-Aug-06 A	25-Aug-06 A
SDS68270	OLE Alternative Design Building Fixings (690.1)	177d	31-Aug-06 A	05-Jun-07 A
SDS74060	Produce Design Commentary Report	14d	16-Nov-07 A	06-Dec-07 A
SDS74070	Issue Design Commentary Report	0d		25-Jan-08*
OLE Bases (Task200.7.2)		451d	07-Aug-06 A	16-May-08
OLE Bases General		451d	07-Aug-06 A	16-May-08
SDS52550	OLE Bases Civils Management	347d	07-Aug-06 A	30-Jan-08
SDS52560	Update Available Base Data/Info Re Alignment/Topo etc	5d	14-Jan-08	18-Jan-08
SDS52710	Prepare Specification Clauses	5d	08-May-08	14-May-08
SDS52720	Check Drawings	2d	15-May-08	16-May-08
SDS52730	Issue OLE Base Design to tie	0d		16-May-08
OLE Pile Designs		30d	21-Jan-08	29-Feb-08
SDS52580	Steel or Concrete Designs (3m, 4m, 6m, 8m Lengths)	9d	21-Jan-08	01-Feb-08
SDS52590	Concrete Reinforcement Design (3m, 4m, 6m, 8m Lengths)	9d	04-Feb-08	15-Feb-08



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Trams for Edinburgh
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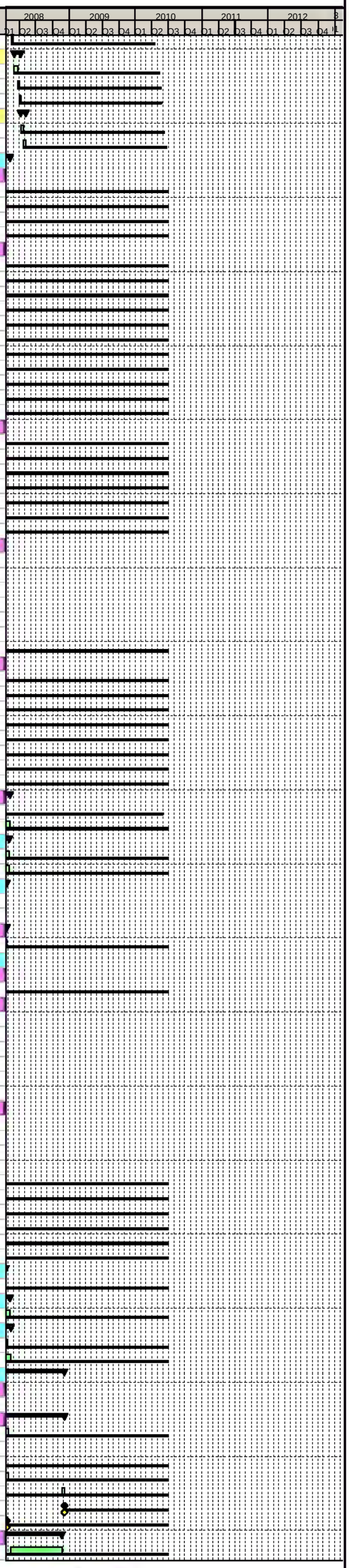
Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS52600	Detailed Design Draughting	9d	18-Feb-08	29-Feb-08
2 Spread Designs		27d	03-Mar-08	08-Apr-08
SDS52660	Base Design	14d	03-Mar-08	25-Mar-08
SDS52670	Concrete Reinforcement	5d	26-Mar-08	01-Apr-08
SDS52680	Detailed Design Drafting	5d	02-Apr-08	08-Apr-08
2 Special Designs		21d	09-Apr-08	07-May-08
SDS52690	Special Design	9d	09-Apr-08	22-Apr-08
SDS52700	Detailed Design Draughting	9d	23-Apr-08	07-May-08
Tram Stops		502d	20-Feb-06 A	11-Feb-08
Locations		147d	17-May-06 A	07-Dec-06 A
A1930	Issue Stop Location Feasibility Report	0d		30-Jun-06 A
A1940	tie Approval of Tram Stop Locations	19d	17-May-06 A	14-Jun-06 A
A1950	Receive & Update to tie Comments for Stop Locations	73d	21-Aug-06 A	07-Dec-06 A
A1960	Re-Issue Stop Location Feasibility Report	0d		07-Dec-06 A
Tram Stop Equipment & Finishes		199d	20-Feb-06 A	23-Nov-06 A
A1970	Produce Schedule of Typical Stop Equipment	23d	20-Feb-06 A	24-Mar-06 A
A1980	Produce Typical Stop Layouts & Finishes	55d	20-Feb-06 A	16-May-06 A
A1990	Produce Schedule of Site Specific Stop Equipment	21d	12-Apr-06 A	16-May-06 A
A2000	Issue Typical Stop Equipment Schedule	0d		19-Jun-06 A
A2010	Issue Typical Stop Layouts & Finishes	0d		30-Jun-06 A
A2020	tie Approval of Typical Stop Equipment Schedule	19d	17-May-06 A	14-Jun-06 A
A2030	Receive & Update to tie Comments for Typical Stop Equipment Schedule	5d	19-Jun-06 A	26-Jun-06 A
A2040	Re-Issue Typical Stop Equipment Schedule	0d		30-Jun-06 A
A2050	tie Approval of Typical Stop Layouts & Finishes	19d	17-May-06 A	14-Jun-06 A
A2060	Receive & Update to tie Comments for Typical Stop Layouts & Finishes	4d	20-Nov-06 A	23-Nov-06 A
A2070	Re-Issue Typical Stop Layouts & Finishes	0d		23-Nov-06 A
Exempler Island Platform Stop		218d	06-Mar-06 A	12-Jan-07 A
A2080	Outline Design for Exemplar Island Platform Stop	19d	06-Mar-06 A	31-Mar-06 A
A2090	Issue Preliminary Design to tie for Approval	0d		12-May-06 A
A2100	tie Approval Period	19d	17-May-06 A	14-Jun-06 A
A2110	Receive & Update to tie Comments for Tramstop Preliminary Design	5d	19-Jun-06 A	23-Jun-06 A
A2120	Produce Detailed Design for Exemplar Island Platform Stop	12d	03-Apr-06 A	21-Apr-06 A
A2130	tie Approval Period	111d	26-Jun-06 A	07-Dec-06 A
A2140	Receive & Update to tie Comments for Tramstop Detailed Design	19d	08-Dec-06 A	12-Jan-07 A
Exempler Side Platform Stop		224d	24-Feb-06 A	12-Jan-07 A
A2160	Outline Design for Exemplar Side Platform Stop	29d	24-Feb-06 A	07-Apr-06 A
A2170	Issue Preliminary Design to tie for Approval	0d		03-May-06 A
A2180	tie Approval Period	19d	17-May-06 A	14-Jun-06 A
A2190	Receive & Update to tie Comments for Tramstop Preliminary Design	5d	26-Jun-06 A	30-Jun-06 A
A2200	Produce Detailed Design for Exemplar Side Platform Stop	4d	14-Apr-06 A	21-Apr-06 A
A2210	tie Approval Period	106d	03-Jul-06 A	07-Dec-06 A
A2220	Receive & Update to tie Comments for Tramstop Detailed Design	19d	08-Dec-06 A	12-Jan-07 A
VO18 Tramstop Locations CNB007 (Task950.1)		80d	14-Aug-06 A	01-Dec-06 A
VO1430	Environmental Study	74d	14-Aug-06 A	01-Dec-06 A
VO1440	Roads Study	74d	14-Aug-06 A	01-Dec-06 A
VO1450	Stops Study	5d	14-Aug-06 A	18-Aug-06 A
VO1460	Simulation Study	74d	14-Aug-06 A	01-Dec-06 A
VO1470	Track Study	74d	14-Aug-06 A	01-Dec-06 A
VO1500	Utiltities Study	74d	14-Aug-06 A	01-Dec-06 A
VO1530	Systems Study	74d	14-Aug-06 A	01-Dec-06 A
VO1540	Urban Design	74d	14-Aug-06 A	01-Dec-06 A
VO215 Changing Tramstop Names Not tie Approved		100d	14-Sep-07 A	11-Feb-08
VO1480	Recieve Change Order from tie for VO215	0d	14-Sep-07 A	
VO1490	Review and sign off of Documents and Drawings for Revised Tramstop Names	95d	14-Sep-07 A	11-Feb-08
Landscaping		195d	30-Apr-07 A	05-Feb-08
SDS53010	Specification Development	181d	30-Apr-07 A	05-Feb-08
SDS53020	Approvals Support	181d	30-Apr-07 A	05-Feb-08
Utilities		487d	20-Feb-06 A	21-Jan-08
UTIL010	Internal Briefing (Utilities)	5d	20-Feb-06 A	24-Feb-06 A
UTIL020	Intergrate GPR (Utilities)	81d	27-Feb-06 A	30-Jun-06 A
VO291 Utilities Meetings		24d	10-Dec-07 A	21-Jan-08
SDS82920	Utilities Meetings	23d	10-Dec-07 A	21-Jan-08
Network Rail Activities		398d	09-Jan-06 A	29-Jul-07 A
General		52d	30-Oct-06 A	18-Jan-07 A
A6390	Produce Network Rail Infrastructure Works Scope	50d	30-Oct-06 A	18-Jan-07 A
Framework Development Agreement Process		75d	09-Jan-06 A	21-Apr-06 A
A1170	tie Issue Request for Proposal	5d	09-Jan-06 A	13-Jan-06 A
A1200	Network Rail respond with Works Proposal	9d	16-Jan-06 A	27-Jan-06 A
A1230	Network Rail accept Draft Works Proposal	14d	06-Feb-06 A	24-Feb-06 A
A1250	tie issue draft Works Instruction	5d	30-Jan-06 A	03-Feb-06 A
A1420	Network Rail Investment Authority	0d	10-Mar-06 A	
A1430	Agree Works Contract & amend Framework Development Agreement	27d	10-Mar-06 A	21-Apr-06 A
Possessions		368d	20-Feb-06 A	29-Jul-07 A
A1320	Initial Possession Requirement to Network Rail	6d	20-Feb-06 A	28-Feb-06 A
A1340	Finalise Possession requirements for 3no. Structures	34d	28-Feb-06 A	21-Apr-06 A
A1400	Network Rail Confirm Draft Possession Request	9d	19-Jun-06 A	30-Jun-06 A
A1410	Submit Draft Possession Requirements to Network Rail	0d	05-Jun-06 A	
A1440	Submit Formal Possession Request to Network Rail	1d	05-Jun-06 A	05-Jun-06 A
A1450	Survey Leith Walk Under Network Rail Possession	0d	31-Jan-07 A	31-Jan-07 A
A1560	Survey For 4 Nights Under T3 Network Rail Possession	4d	08-Aug-06 A	11-Aug-06 A
A1740	Abutment Coring Survey Commences	5d	23-Jul-07 A	27-Jul-07 A
A6380	Geotechnical Investigation On Network Rail Land	123d	20-Jan-07 A	29-Jul-07 A
SDS24190	SDS Meeting with Network Rail to Agree Way Forward with Possessions	0d		05-Apr-06 A
SDS Support to Tram Selection (Task200.8)		391d	03-Jul-06 A	18-Jan-08
A567092	DD- SDS Support to Tram Selection	391d	03-Jul-06 A	18-Jan-08
Architecture Management (Task200.9)		386d	31-Jul-06 A	08-Feb-08
A486858	DD - Architecture Management	358d	31-Jul-06 A	08-Feb-08
EMC (Task200.10)		391d	31-Jul-06 A	15-Feb-08
A486988	DD - EMC Management	350d	31-Jul-06 A	28-Jan-08
A487198	VO198 EMC Interface Doc additional hours	144d	06-Jul-07 A	15-Feb-08
System Engineering		619d	03-Jul-06 A	04-Dec-08
Detailed Design Phase Planning		101d	03-Jul-06 A	20-Nov-06 A
SDS67850	Detailed Design Phase Planning	94d	03-Jul-06 A	20-Nov-06 A
Requirements Test Specification		619d	03-Jul-06 A	03-Dec-08
A10770	Development and Approval of Test Statement by DTLs SDMs	370d	03-Jul-06 A	30-Jan-08
A10780	Update Requirements Test Specification After tie Comments	74d	03-Jul-06 A	20-Oct-06 A
A10820	Align SDS Test and Procurement System Test Specification for Comprehensive and Complete Test Regime	361d	03-Jul-06 A	16-Jan-08
A10830	RAMS Requirements Tests	370d	03-Jul-06 A	30-Jan-08
A10870	Requirements Test Specification Update	572d	03-Jul-06 A	03-Dec-08
SDS68180	Issue Requirements Test Specification Ready To tie (second issue)	0d		03-Dec-08
SDS82900	Issue Requirements Test Specification Ready To tie (first issue)	0d		24-Jan-08
System Engineering Management Reporting and Meetings		609d	03-Jul-06 A	20-Nov-08
SDS68130	Systems Engineering Reporting and Meetings	563d	03-Jul-06 A	20-Nov-08



Primary Baseline
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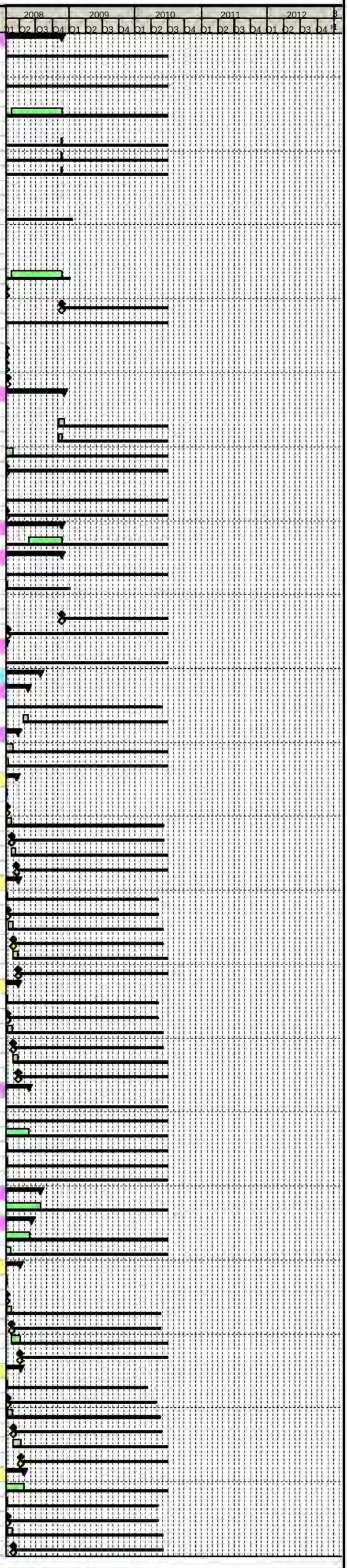
Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
System Integration		609d	03-Jul-06 A	20-Nov-08
A10890	System Architecture - DTL Review and Approve System Architecture	361d	03-Jul-06 A	16-Jan-08
A10910	System Architecture - Response To tie Review of System Architecture Rev 1 Submission	94d	03-Jul-06 A	20-Nov-06 A
A10920	System Architecture - Update and Review Against Design	361d	03-Jul-06 A	16-Jan-08
A10950	Interface Report - Agree Format of Detailed Design Phase Integration Report	271d	03-Jul-06 A	24-Aug-07 A
A10960	Interface Report - Detailed Design Phase End Interface Report	563d	03-Jul-06 A	20-Nov-08
A10970	Interface Specifications - Template and Guidance	150d	03-Jul-06 A	20-Feb-07 A
A10980	Interface Specification - Agree Lower Level Interface Issues Which Require Escalation To Write Interface Specification	563d	03-Jul-06 A	20-Nov-08
A10990	Interface Specifications - Facilitation of Interface Specifications	563d	03-Jul-06 A	20-Nov-08
A11000	Interface Specifications - Review and Approval of Interface Specification Document	563d	03-Jul-06 A	20-Nov-08
SDS68000	System Integration Plan - Update	362d	03-Jul-06 A	17-Jan-08
SDS68010	System Integration Plans - ETNIP First Draft Agreed With tie	213d	03-Jul-06 A	30-May-07 A
SDS68020	System Integration Plans - ETNIP - Detailed Design Phase 1st Submission	250d	03-Jul-06 A	25-Jul-07 A
SDS68070	Syst Arch - System Design Description For Inclusion in System Architecture Specification and Submitted As An Update	362d	03-Jul-06 A	17-Jan-08
SDS68080	Interface Report - Response To tie Review Of Baseline 1 Interface Report	94d	03-Jul-06 A	20-Nov-06 A
SDS68090	Interface Report - Agree L1 L2 Specifications To Be Written	94d	03-Jul-06 A	20-Nov-06 A
SDS68100	Interface Register	563d	03-Jul-06 A	20-Nov-08
SDS68150	Issue System Integration Plan To tie	0d		18-Jan-08*
SDS68160	System Interface Register Baseline Ready to Issue To tie	0d		20-Nov-08
SDS68190	Issue Edinburgh Tram Network Integration Plan (1st Submission) to tie	0d		17-Jul-07 A
SDS74230	System Integration Plans - ETNIP - Detailed Design Phase 2nd Submission	362d	03-Jul-06 A	17-Jan-08
SDS74240	Issue Edinburgh Tram Network Integration Plan (2nd Submission) to tie	0d		18-Jan-08*
SDS82880	Issue System Architecture Specification Plan to tie	0d		18-Jan-08*
SDS82930	Issue System Interface Register Baseline To tie (1st Submmission)	0d		25-Jan-08*
Verification and Validation		619d	03-Jul-06 A	04-Dec-08
A11080	Update Verification and Validation Plan - Detailed Design Phase	361d	03-Jul-06 A	16-Jan-08
A11110	SDDR Support	20d	05-Nov-08	04-Dec-08
A11120	Detailed Design Verification and Validation Report	10d	05-Nov-08	20-Nov-08
A11140	IDR Support	294d	23-Nov-06 A	28-Feb-08
A11300	Issue Verification and Validation Plan to tie	0d		18-Jan-08
SDS68110	Preliminary Design Phase End Review Close Out	213d	03-Jul-06 A	30-May-07 A
SDS68250	Detailed Design Phase End Review Plan	362d	03-Jul-06 A	17-Jan-08
SDS82870	Issue System Detailed Design Review Plan to tie	0d		18-Jan-08
Requirements Change Control		609d	03-Jul-06 A	20-Nov-08
SDS68120	Requirements Change Control	563d	03-Jul-06 A	20-Nov-08
Requirements Database		609d	03-Jul-06 A	20-Nov-08
SDS67880	PBRMS Tool Upgrade	138d	03-Jul-06 A	01-Feb-07 A
SDS67890	RDB Baseline 3 Report	368d	03-Jul-06 A	28-Jan-08
SDS67900	Update BL2 Report From tie Comments	94d	03-Jul-06 A	20-Nov-06 A
SDS68170	Issue Requirements Database Baseline 3 To tie (second issue)	0d		20-Nov-08
SDS82890	Issue Requirements Database Baseline 3 To tie (first issue)	0d		28-Jan-08
SDS Requirements Traceability Analysis		389d	03-Jul-06 A	16-Jan-08
SDS67870	SDS Requirements Traceability Analysis	361d	03-Jul-06 A	16-Jan-08
Systems Assurance (100.5)		526d	03-Jul-06 A	25-Jul-08
Non RAMS		479d	03-Jul-06 A	21-May-08
SDS67030	Verification and Validation Plan Updates	362d	03-Jul-06 A	17-Jan-08
SDS67040	SDDR (System Detailed Design Phase End Review)	19d	23-Apr-08*	21-May-08
RAM		441d	03-Jul-06 A	28-Mar-08
SDS66970	Reliability Apportionment	391d	03-Jul-06 A	29-Feb-08
SDS67000	Systems Assurance and Design Team Leader Meetings	372d	03-Jul-06 A	01-Feb-08
RAMP		432d	03-Jul-06 A	17-Mar-08
SDS66960	Prepare RAMP	365d	03-Jul-06 A	22-Jan-08
SDS74630	Issue Reliability Availability Maintainability Plan to tie	0d		23-Jan-08*
SDS74920	tie Approval Period for Reliability Availability Maintainability Plan	19d	24-Jan-08	20-Feb-08
SDS74930	Receive Comments for Reliability Availability Maintainability Plan	0d	21-Feb-08	
SDS74940	Update Reliability Availability Maintainability Plan to tie comments	16d	21-Feb-08	14-Mar-08
SDS74950	Final Detailed Design Stage Issue of Reliability Availability Maintainability Plan to tie	0d		17-Mar-08
RAM Analysis		440d	03-Jul-06 A	27-Mar-08
SDS66980	RAM Analysis / Reporting of SDS Designed Equipment	368d	03-Jul-06 A	28-Jan-08
SDS74960	Issue RAM Analysis to tie	0d		29-Jan-08
SDS74970	tie Approval Period for RAM Analysis	19d	30-Jan-08	26-Feb-08
SDS74980	Receive Comments for RAM Analysis	0d	27-Feb-08	
SDS74990	Update RAM Anlysis to tie comments	18d	27-Feb-08	26-Mar-08
SDS75000	Final Detailed Design Stage Issue of RAM Analysis to tie	0d		27-Mar-08
RDP		168d	30-Jul-07 A	28-Mar-08
SDS66990	RDP and RDTP Preparation - System Wide	116d	30-Jul-07 A	28-Jan-08
SDS75010	Issue RDP to tie	0d		28-Jan-08
SDS75020	tie Approval Period for RDP	19d	29-Jan-08	25-Feb-08
SDS75030	Receive Comments for RDP	0d	26-Feb-08	
SDS75040	Update RDP to tie comments	20d	26-Feb-08	27-Mar-08
SDS75050	Final Detailed Design Stage Issue of RDP to tie	0d		28-Mar-08
General RAMS		481d	03-Jul-06 A	23-May-08
SDS67010	Prepare Procurement Specifications	262d	03-Jul-06 A	10-Aug-07 A
SDS67020	Management and Review of Suppliers Contractor (particularly Tram) RAMS issues/analyses	193d	27-Oct-06 A	24-Aug-07 A
SDS68200	IDR Meetings	352d	20-Nov-06 A	23-May-08
SDS68210	Requirements Test Specification Review 1	9d	14-Jan-08*	25-Jan-08
SDS68220	Requirements Test Specification Review 2	9d	14-Jan-08*	25-Jan-08
SDS68230	Information / Data Collection and Analysis	363d	03-Jul-06 A	18-Jan-08
Systems Assurance Management		526d	03-Jul-06 A	25-Jul-08
SDS66850	Systems Assurance Management	486d	03-Jul-06 A	25-Jul-08
System Safety		491d	03-Jul-06 A	06-Jun-08
SDS66880	HMRI Meetings	448d	03-Jul-06 A	30-May-08
SDS66930	Safety Audits / Walk Throughs	344d	29-Aug-06 A	15-Feb-08
SSMP		446d	03-Jul-06 A	04-Apr-08
SDS66860	SSMP	365d	03-Jul-06 A	22-Jan-08
SDS74620	Issue System Safety Management Plan to tie	0d		23-Jan-08*
SDS74780	tie approval period for SSMP	19d	24-Jan-08	20-Feb-08
SDS74790	Receive Comments for SSMP	0d	21-Feb-08	
SDS74800	Update System Safety Management Plan to tie comments	27d	21-Feb-08	03-Apr-08
SDS74810	Final DD Stage Issue of System Safety Management Plan to tie	0d		04-Apr-08
Safety Analysis		448d	03-Jul-06 A	08-Apr-08
SDS66890	Safety Analysis / Reporting of SDS Designed Equipment	368d	03-Jul-06 A	28-Jan-08
SDS67060	Issue Safety Analysis to tie	0d		28-Jan-08
SDS74820	tie approval period for Safety Analysis	19d	29-Jan-08	25-Feb-08
SDS74830	Receive Comments for Safety Analysis	0d	26-Feb-08	
SDS74840	Update Safety Analysis to tie comments	26d	26-Feb-08	07-Apr-08
SDS74850	Final DD Stage Issue of Safety Analysis to tie	0d		08-Apr-08
Hazard log		461d	03-Jul-06 A	25-Apr-08
SDS66900	Hazard Log Management	427d	03-Jul-06 A	25-Apr-08
SDS67100	Prepare Hazard Log Report	9d	15-Jan-08*	28-Jan-08
SDS74860	Issue Hazard Log Report to tie	0d		28-Jan-08
SDS74870	tie Approval Period for Hazard Log Report	19d	29-Jan-08	25-Feb-08
SDS74880	Receive Comments for Hazard Log Report	0d	26-Feb-08	



Primary Baseline
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Milestone

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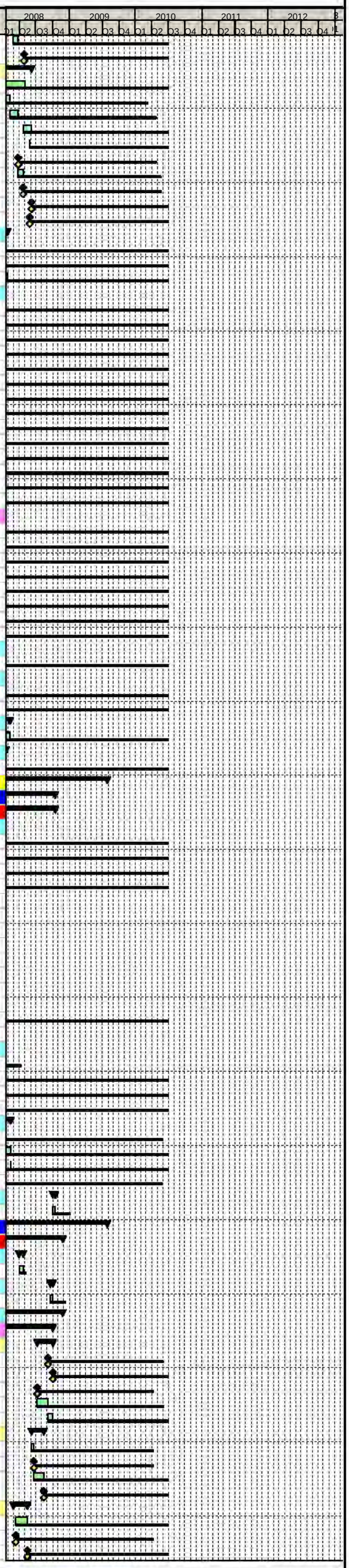
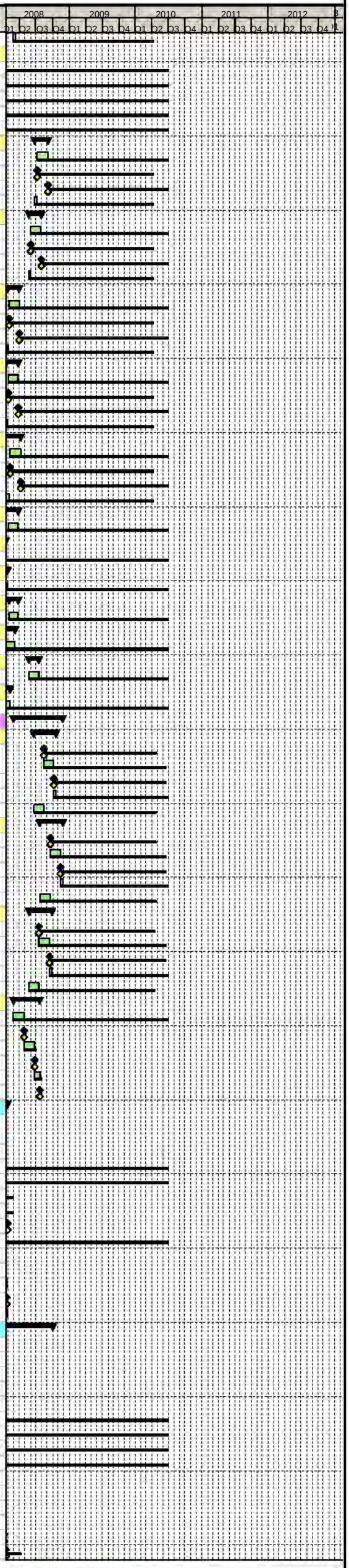
Activity ID	Activity Name	Original Duration	Start	Finish
SDS74890	Updates Hazard Log Report to tie Comments	19d	26-Feb-08	26-Mar-08
SDS74900	Final DD stage issue of HL report to tie	0d		25-Apr-08
DDCS		491d	03-Jul-06 A	06-Jun-08
SDS66910	PSCC Meetings	431d	03-Jul-06 A	02-May-08
SDS66920	Preliminary Case For Safety	377d	03-Jul-06 A	08-Feb-08
SDS66940	Detailed Design Case For Safety Preparation	28d	11-Feb-08	25-Mar-08
SDS66950	Update Detailed Design Case for Safety to Comments	27d	24-Apr-08	05-Jun-08
SDS68240	Final DD PSCC Meeting	1d	29-May-08	29-May-08
SDS74540	Issue Detailed Design Case For Safety to tie	0d		26-Mar-08
SDS74550	Detailed Design Case for Safety Approval Period	19d	27-Mar-08	23-Apr-08
SDS74560	Receive Comments for Detailed Design Case for Safety	0d		23-Apr-08
SDS74570	Final Detailed Design stage issue of DDCS to tie	0d		06-Jun-08
SDS74910	Issue Detailed Design Case For Safety to PSCC	0d		28-May-08
Track Auxiliary (Task200.12)		397d	03-Jul-06 A	28-Jan-08
SDS63640	Track Auxiliary (Inc Spec, Heating, Motors & Detection)	284d	03-Jul-06 A	14-Sep-07 A
SDS63650	Issue Track Auxiliary Report to tie	0d		14-Sep-07 A
SDS63660	Track Auxiliary support to other disciplines	53d	01-Nov-07 A	28-Jan-08
VO241 Phase 1a/1b Separation		59d	18-Sep-07 A	07-Dec-07 A
SDS79090	Review of Budget and Commercial Impact	6d	29-Nov-07 A	07-Dec-07 A
SDS79100	Review of Cable Ducting	14d	19-Nov-07 A	07-Dec-07 A
SDS79110	Review of Documentation	14d	19-Nov-07 A	07-Dec-07 A
SDS79120	Review of Drainage	23d	05-Nov-07 A	07-Dec-07 A
SDS79130	Review of Landscaping	19d	12-Nov-07 A	07-Dec-07 A
SDS79140	Review of Low Voltage Supplies	19d	12-Nov-07 A	07-Dec-07 A
SDS79150	Review of OLE	38d	15-Oct-07 A	07-Dec-07 A
SDS79160	Review of SCC	19d	12-Nov-07 A	07-Dec-07 A
SDS79170	Review of Structures	19d	12-Nov-07 A	07-Dec-07 A
SDS79180	Review of Track Alignment	38d	15-Oct-07 A	07-Dec-07 A
SDS79190	Review of Track Auxillaries	5d	15-Oct-07 A	19-Oct-07 A
SDS79200	Review of Trackside Cabling	19d	12-Nov-07 A	07-Dec-07 A
SDS79210	Produce Separation Phase 1a and 1b Impact Report	19d	12-Nov-07 A	07-Dec-07 A
SDS79220	Issue Separation Phase 1a and 1b Impact Report to tie	0d		07-Dec-07 A
VO241 Traction Power		24d	18-Sep-07 A	19-Oct-07 A
SDS78950	Task Management	23d	18-Sep-07 A	19-Oct-07 A
SDS78960	Prepare Report	15d	28-Sep-07 A	19-Oct-07 A
SDS78970	Leith Study	7d	01-Oct-07 A	09-Oct-07 A
SDS78980	Russell Road Study	6d	10-Oct-07 A	17-Oct-07 A
SDS78990	Electrical Operations Review	8d	03-Oct-07 A	15-Oct-07 A
SDS79000	Protection Review	3d	10-Oct-07 A	13-Oct-07 A
SDS79010	Related Document Review	4d	10-Oct-07 A	15-Oct-07 A
SDS79020	Brainstorming Meeting	1d	27-Sep-07 A	27-Sep-07 A
VO136 Structures Design Charette		1d	14-Feb-07 A	14-Feb-07 A
VO1640	Structures Design Charette	1d	14-Feb-07 A	14-Feb-07 A
VO102 Review of Employers Requirements With SDS Technical Specifications CNS030		10d	06-Feb-07 A	19-Feb-07 A
VO1550	Review of Employers Requirements Documentation	9d	06-Feb-07 A	19-Feb-07 A
VO1560	Issue Employers Requirements Review Document to tie	0d		19-Feb-07 A
VO83 Cable Coordination		159d	22-Jun-07 A	08-Feb-08
VO2620	Cable Coordination	149d	22-Jun-07 A	08-Feb-08
VO299 tie Employers Requirements V3 Review		10d	04-Jan-08 A	17-Jan-08
VO2770	tie Employers Requirements V3 review	9d	04-Jan-08 A	17-Jan-08
Haymarket to Newhaven Road - Section 1 (Task300)		986d	19-Sep-05 A	28-Jul-09
Section Wide - Section 1		631d	27-Apr-06 A	15-Oct-08
Section Wide		631d	27-Apr-06 A	15-Oct-08
Preliminary Design Approvals		102d	27-Apr-06 A	15-Sep-06 A
SDS23100	Track IDC	33d	03-Jul-06 A	18-Aug-06 A
SDS23110	Roads IDC	28d	03-Jul-06 A	11-Aug-06 A
SDS23130	Structures IDC	51d	03-Jul-06 A	15-Sep-06 A
SDS23140	Tramstops IDC	38d	03-Jul-06 A	25-Aug-06 A
SDS23150	Substation IDC	4d	02-Jun-06 A	08-Jun-06 A
SDS23190	PD - Submit Section 1 Substation Deliverables	0d		30-Jun-06 A
SDS23520	tie Approval (Including Structures)	19d	03-Jul-06 A	28-Jul-06 A
SDS23540	Informal Consultation with tie	38d	27-Apr-06 A	23-Jun-06 A
SDS24180	tie Approval (Excluding Structures)	19d	03-Jul-06 A	28-Jul-06 A
SDS34140	PD - Submit Section 1 Track Deliverables	0d		30-Jun-06 A
SDS34150	PD - Submit Section 1 Tramstops Deliverables	0d		30-Jun-06 A
SDS34160	PD - Submit Section 1 Roads Deliverables	0d		30-Jun-06 A
SDS34170	PD - Submit Section 1 Structures Deliverables	0d		30-Jun-06 A
SDS34180	PD - Section 1 Complete - Issue to tie	0d		30-Jun-06 A
OLE (Task300.1)		322d	29-Aug-06 A	30-Nov-07 A
SDS31280	Produce Final Detailed Layout Plans	289d	29-Aug-06 A	16-Nov-07 A
SDS51380	Issue Notification Of Completion Letter-Final Detailed Layout Plans & Standard & Special Cross Sections to tie Sec1	0d		30-Nov-07 A
SDS59420	Finalise Combined Pole Design (With Street Lighting Traffic Signals)	5d	22-Nov-07 A	29-Nov-07 A
SDS69420	SDM Design Interface Review Meetings	1d	01-Dec-06 A	02-Dec-06 A
Stakeholder Reviews		399d	17-Jul-06 A	15-Feb-08
A569660	Review Potential Issues with tie & Determine Consultation Strategy	9d	17-Jul-06 A	28-Jul-06 A
A569730	Review Potential Issues with tie & Determine Consultation Strategy	147d	02-Jul-07 A	14-Feb-08
A569740	Feedback to Design Teams for Study	138d	16-Jul-07 A	15-Feb-08
SDS23170	Stakeholder Review	215d	31-Jul-06 A	29-Jun-07 A
Design Assurance Review		10d	02-Oct-08	15-Oct-08
SDS72270	Produce Section Wide Design Assurance Statement	9d	02-Oct-08	15-Oct-08
FOW - NER - Section 1A (Task300.2)		986d	19-Sep-05 A	28-Jul-09
Sub Section Wide		698d	07-Mar-06 A	26-Nov-08
Sub Section Wide IDC		18d	31-Mar-08	23-Apr-08
A40161	Subsection Wide IDC	17d	31-Mar-08	23-Apr-08
Design Assurance Review		10d	18-Sep-08	01-Oct-08
SDS67910	Produce Design Assurance Statement	9d	18-Sep-08	01-Oct-08
Consents & Approvals		382d	31-May-07 A	26-Nov-08
Prior Approvals		342d	31-May-07 A	02-Oct-08
Combined Section Prior Approval		60d	10-Jul-08	02-Oct-08
A25100	Receive Combined Package 1A Comments From CEC	0d		04-Sep-08
A25130	Prior Approval Granted for Section 1A Combined Package	0d		02-Oct-08
A25210	Issue Combined Package 1A for Prior Approval to CEC	0d		10-Jul-08
A40100	CEC Approval Period - 1A Combined Package	38d	10-Jul-08	04-Sep-08
A40130	Update 1A Combined Package to CEC Comments	19d	04-Sep-08	02-Oct-08
Batch 1/01		50d	05-Jun-08	14-Aug-08
SDS75208	Batch 1/01 Newhaven - Collation of Planning Drawings	9d	05-Jun-08*	18-Jun-08
SDS75209	Issue Batch 1/01 For Approval to CEC	0d	19-Jun-08	
SDS75210	Batch 1/01 Formal Approval Period	38d	19-Jun-08	13-Aug-08
SDS75220	Receive CEC Prior Approval For Batch 1/01	0d	14-Aug-08	
Batch 1/02		53d	29-Feb-08	14-May-08
SDS77660	Batch 1/02 Formal Approval Period	38d	14-Mar-08	13-May-08
SDS77670	Issue Batch 1/02 For Approval to CEC	0d	14-Mar-08	
SDS77680	Receive CEC Prior Approval For Batch 1/02	0d	14-May-08	



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Activity ID	Activity Name	Original Duration	Start	Finish
SDS77710	Batch 1/02 Ocean Terminal - Collation of Planning Drawings	9d	29-Feb-08	13-Mar-08
Batch 1/03 Tram North Leith Sands Substation		29d	31-May-07 A	11-Jul-07 A
A27830	Issue Tram North Leith Sands Substation Design for Prior Approval	0d		31-May-07 A
A27840	Prior Approval For Tram North Leith Sands Substation	0d		11-Jul-07 A
A27850	Receive Tram North Leith Sands Substation CEC Comments (No Comments)	0d		11-Jul-07 A
A41090	Batch 1/03 Formal Approval Period	27d	01-Jun-07 A	11-Jul-07 A
A44650	Incorporate Tram North Leith Sands Substation CEC Comments for Prior Approval (No Comments)	1d	11-Jul-07 A	11-Jul-07 A
Batch 1/04		51d	26-Jun-08	05-Sep-08
SDS77780	Batch 1/04 Formal Approval Period	38d	10-Jul-08	04-Sep-08
SDS77790	Issue Batch 1/04 For Approval to CEC	0d	10-Jul-08	
SDS77800	Receive CEC Prior Approval For Batch 1/04	0d	05-Sep-08	
SDS77830	Batch 1/04 Victoria Dock Bridge - Collation of Planning Drawings	9d	26-Jun-08*	09-Jul-08
Batch 1/05		47d	23-May-08	29-Jul-08
SDS77840	Batch 1/05 Formal Approval Period	38d	03-Jun-08	28-Jul-08
SDS77850	Issue Batch 1/05 For Approval to CEC	0d	03-Jun-08	
SDS77860	Receive CEC Prior Approval For Batch 1/05	0d	29-Jul-08	
SDS77890	Batch 1/05 Tower Place Bridge - Collation of Planning Drawings	6d	23-May-08	02-Jun-08
Batch 1/06		47d	28-Jan-08	02-Apr-08
SDS77900	Batch 1/06 Formal Approval Period	38d	04-Feb-08	01-Apr-08
SDS77910	Issue Batch 1/06 For Approval to CEC	0d	04-Feb-08	
SDS77920	Receive CEC Prior Approval For Batch 1/06	0d	02-Apr-08	
SDS77950	Batch 1/06 Port of Leith Tramstop - Collation of Planning Drawings	5d	28-Jan-08	01-Feb-08
Batch 1/07		52d	16-Jan-08	28-Mar-08
SDS77960	Batch 1/07 Formal Approval Period	38d	30-Jan-08	27-Mar-08
SDS77970	Issue Batch 1/07 For Approval to CEC	0d	30-Jan-08	
SDS77980	Receive CEC Prior Approval For Batch 1/07	0d	28-Mar-08	
SDS78010	Batch 1/07 Bernard Street Tramstop - Collation of Planning Drawings	9d	16-Jan-08*	29-Jan-08
Batch 1/08		115d	19-Oct-07 A	08-Apr-08
SDS78020	Batch 1/08 Formal Approval Period	38d	08-Feb-08	07-Apr-08
SDS78030	Issue Batch 1/08 For Approval to CEC	0d	08-Feb-08	
SDS78040	Receive CEC Prior Approval For Batch 1/08	0d	08-Apr-08	
SDS78070	Batch 1/08 Foot of the Walk Tramstop - Collation of Planning Drawings	69d	19-Oct-07 A	07-Feb-08
Roads, Track, OLE, Landscaping, Street Lighting		153d	20-Aug-07 A	28-Mar-08
SDS24700	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	142d	20-Aug-07 A	28-Mar-08
Tram Stop Bernard Street		103d	20-Aug-07 A	18-Jan-08
A40080	Informal Consultation With CEC & tie over Prior Approval for Tram Stop Bernard Street	97d	20-Aug-07 A	18-Jan-08
Tram Stop Port Of Leith		102d	27-Aug-07 A	25-Jan-08
A40110	Informal Consultation With CEC & tie over Prior Approval Tram Stop Port Of Leith	97d	27-Aug-07 A	25-Jan-08
Tram Stop Ocean Terminal		40d	04-Feb-08	28-Mar-08
A40140	Informal Consultation With CEC & tie over Prior Approval Tram Stop Ocean Terminal	38d	04-Feb-08	28-Mar-08
Tram Stop Newhaven		40d	14-Jan-08	07-Mar-08
A40170	Informal Consultation With CEC & tie over Prior Approval Tram Stop Newhaven	38d	14-Jan-08	07-Mar-08
Lindsay Road Retaining Wall Structure		40d	23-May-08	17-Jul-08
A13190	Commence Lindsay Road RW Informal Consultation With CEC & tie Over Prior Approval	37d	23-May-08	17-Jul-08
Tram Stop Foot of the Walk		113d	27-Aug-07 A	11-Feb-08
A40230	Informal Consultation With CEC & tie over Prior Approval Tram Stop Foot of the Walk	107d	27-Aug-07 A	11-Feb-08
Technical Approvals		195d	28-Feb-08	26-Nov-08
Victoria Dock (TAA)		90d	19-Jun-08	22-Oct-08
A7070	Issue Victoria Dock Design Package to TAA	0d		13-Aug-08
A7080	TAA Victoria Dock Design Package Review Period	38d	14-Aug-08	08-Oct-08
A7090	Receive Victoria Dock Design Package Comments from TAA	0d		08-Oct-08
A7100	Incorporate TAA Comments into Victoria Dock Design Package	9d	09-Oct-08	22-Oct-08
A7110	Commence Victoria Dock Informal Consultation With CEC Over Technical Approval	38d	19-Jun-08	13-Aug-08
Tower Place Bridge Review Period (TAA)		90d	24-Jul-08	26-Nov-08
A7400	Issue Tower Place Bridge Superstructure Design Package to TAA	0d		17-Sep-08
A7410	TAA Tower Place Bridge Superstructure Design Package Review Period	38d	18-Sep-08	12-Nov-08
A7420	Receive Tower Place Bridge Superstructure Design Package Comments from TAA	0d		12-Nov-08
A7430	Incorporate TAA Comments into Tower Place Bridge Superstructure Design Package	9d	13-Nov-08	26-Nov-08
A7440	Commence Tower Place Bridge Superstructure Informal Consultation With CEC Over Technical Approval	38d	24-Jul-08	17-Sep-08
Lindsay Road Retaining Wall Structure Review Period (TAA)		94d	22-May-08	30-Sep-08
A7730	Issue Lindsay Road RW Design Package to TAA	0d		17-Jul-08
A7740	TAA Lindsay Road RW Design Package Review Period	39d	18-Jul-08	15-Sep-08
A7750	Receive Lindsay Road RW Design Package Comments from TAA	0d		15-Sep-08
A7760	Incorporate TAA Comments into Lindsay Road RW Design Package	10d	16-Sep-08	30-Sep-08
A8210	Commence Lindsay Road RW Informal Consultation With CEC Over Technical Approval	38d	22-May-08	17-Jul-08
Roads inc Drainage Technical Approval		104d	28-Feb-08	22-Jul-08
SDS24710	Roads Authority Informal Consultation	38d	28-Feb-08	25-Apr-08
SDS24720	Issue Roads Design to Roads Authority for Approval	0d		25-Apr-08
SDS24730	Roads Authority Approval Period	38d	28-Apr-08	24-Jun-08
SDS24740	Receive Roads Authority Comments	0d		24-Jun-08
SDS24750	Update to Roads Authority Comments	19d	25-Jun-08	22-Jul-08
SDS24820	Roads Technical Approval Granted	0d		22-Jul-08
Track (Task300.2.1)		476d	13-Mar-06 A	25-Jan-08
A2240	First Pass Mx Horizontal and Vertical Alignment	45d	13-Mar-06 A	22-May-06 A
A2250	Handover Alignment Design P Way to Roads & Issue to tie	0d		23-May-06 A
A2260	Coordination Meeting/Workshop Between PWay/Roads & Resolution of Major Conflicts	1d	23-May-06 A	23-May-06 A
SDS24400	Revise Alignment to Match Roads First Pass Vertical	3d	20-Dec-06 A	22-Dec-06 A
SDS24450	Handover Alignment Design Track to Roads	0d		22-Dec-06 A
SDS24840	Revise Alignment to Inc. Preliminary Design Comments	55d	07-Aug-06 A	27-Oct-06 A
SDS24860	Handover Alignment Design Track to Roads	0d		27-Oct-06 A
SDS56910	Issue Notification Of Completion Letter - Track Alignment Design to tie Section 1A	0d		25-Jan-08
SDS60550	Revise Track Alignment to Inc. Modelling Changes	0d	20-Dec-06 A	20-Dec-06 A
SDS69770	Revise Alignment to Inc. Preliminary Design Comments	10d	09-Feb-07 A	23-Feb-07 A
SDS69780	Handover Alignment Design Track to Roads	0d		23-Feb-07 A
SDS69790	Revise Alignment to Match Roads First Pass Vertical	18d	18-Dec-07 A	21-Jan-08
SDS69800	Handover Alignment Design Track to Roads	0d		21-Jan-08
SDS69870	Final Alignment to Match Roads & Check	171d	04-May-07 A	25-Jan-08
Roads, Street Lighting & Landscaping SubSections 1A1 & 1A2 (Task300.2.2)		658d	07-Mar-06 A	02-Oct-08
A2270	Route Appreciation/Junct Layout & Determine with tie & CEC Works Extent	44d	13-Mar-06 A	19-May-06 A
A2280	Frontage Surveys	30d	07-Mar-06 A	21-Apr-06 A
A2290	Set Up Mx Models	5d	22-May-06 A	26-May-06 A
A2300	Produce Preliminary Horizontal Road Alignment Design (Inc Lanes & Parking Zones)	8d	30-May-06 A	08-Jun-06 A
A2310	Preliminary Rd Junction Configuration Design	10d	09-Jun-06 A	23-Jun-06 A
A2320	Preliminary Road Safety Audit	2d	30-Jun-06 A	03-Jul-06 A
A2330	Review & Amend TRO Drawings & Schedules for Modifications Required Post Prelim Design	3d	12-Jun-06 A	14-Jun-06 A
A2340	Handover Alignment Design Roads to Pway	0d		04-Jul-06 A
A2350	Coordination Meeting/Workshop Between Roads & Pway Teams	1d	03-Jul-06 A	03-Jul-06 A
A5450	Undertake Road Marking, Pedestrian Req & Traffic Signalling Design	10d	15-Jun-06 A	15-Jun-06 A
SDS24410	Produce First Pass Vertical Alignment	172d	01-Mar-07 A	19-Nov-07 A
SDS24430	Handover Alignment Design Roads to Pway	0d		19-Nov-07 A
SDS24460	Revise Vertical Alignment to Match Final Track Alignment	5d	03-Jan-08 A	09-Jan-08 A
SDS24480	Horizontal & Vertical Alignment Design Complete	0d		09-Jan-08 A
SDS24490	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 1A1 & 1A2	0d		18-Jan-08



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

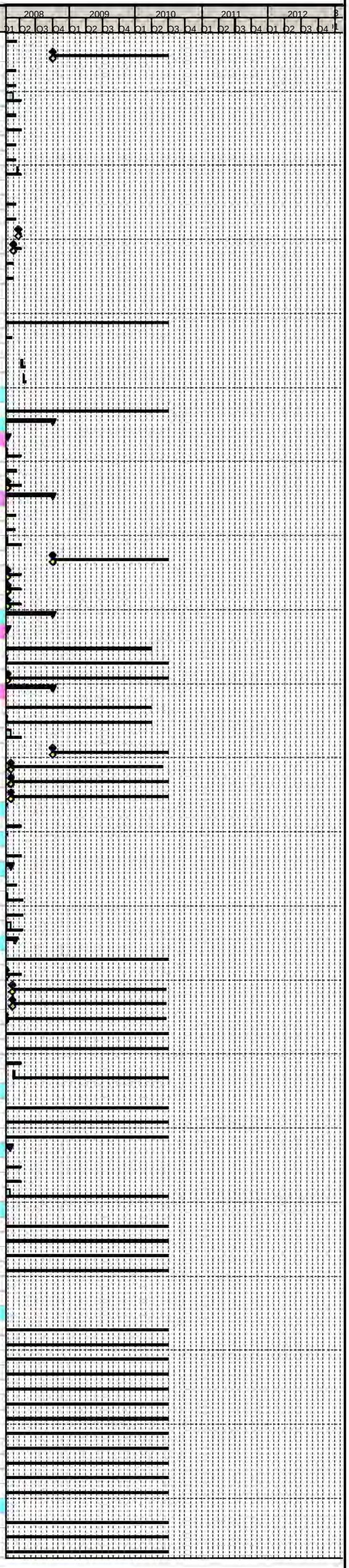
Trams for Edinburgh
connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS24500	Cross Check all Horizontal Design Aspects With Vertical Alignment	2d	17-Jan-08	18-Jan-08
SDS24540	Issue Construction Drawings	0d		02-Oct-08
SDS24570	Produce Site Clearance Drawings & Schedule	190d	01-Mar-07 A	17-Dec-07 A
SDS24580	Produce Fencing, Barriers & Guardrails Design	205d	01-Mar-07 A	16-Jan-08
SDS24590	Produce Street Lighting Design (& Liaise With OLE)	252d	01-Feb-07 A	27-Feb-08
SDS24600	Produce Traffic Signal Only Ducting	6d	09-Jan-08 A	16-Jan-08
SDS24610	Produce Soft Landscaping Design	99d	15-Aug-07 A	18-Jan-08
SDS24620	Produce Traffic Signals Layout	163d	08-May-07 A	16-Jan-08
SDS24630	Produce Traffic Signs Design (Signs, Markings, Signals)	205d	01-Mar-07 A	16-Jan-08
SDS24760	Produce Hard Landscaping Design	188d	11-Jun-07 A	28-Mar-08
SDS24870	Revise Alignment to Inc. Final Track Horizontal Alignment (Horizontal Design Freeze) & Issue to Substn Designers & Issue	3d	26-Feb-07 A	28-Feb-07 A
SDS24880	Produce Kerbs, Footway & Paved Area Design	205d	01-Mar-07 A	16-Jan-08
SDS24890	Produce Pavement Design	6d	09-Jan-08 A	16-Jan-08
SDS56160	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 1A1 & 1A2	0d		28-Mar-08
SDS56740	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole) to tie Section 1A1 & 1A2	0d		28-Feb-08
SDS59690	Advise Track, Stops, Modellers Changes To Accom RSA1 & PD Comments	16d	02-Oct-06 A	24-Oct-06 A
SDS59700	Pass Guidance/Envelope To Track & Others As Necessary	0d		24-Oct-06 A
SDS60350	Advise Track, Stops, Modellers Changes To Accom RSA1 & PD Comments	14d	25-Jan-07 A	14-Feb-07 A
SDS60360	Pass Guidance/Envelope To Track & Others As Necessary	0d		14-Feb-07 A
SDS60530	Revise Horizontal to Inc. Track Horizontal Alignment, RSA1 & PD Comments	48d	26-Oct-06 A	15-Jan-07 A
SDS67230	Street Lighting Survey Work	43d	29-Aug-06 A	31-Oct-06 A
SDS69810	Resolution of Red Issues (Tie Approval)	0d	25-Jan-07 A	
SDS79920	Final RSA	9d	07-Apr-08	18-Apr-08
SDS79930	Incorporate Final RSA Comments	5d	21-Apr-08	25-Apr-08
VO195 Lindsay Road Function Design Forth Ports Concept SUPERSEDED BY VO253		33d	06-Sep-07 A	22-Oct-07 A
SDS73610	Alternative Track Layouts and Iteration with Roads Team superseded by VO253	31d	06-Sep-07 A	22-Oct-07 A
VO253 - Subsection 1A4 - Lindsay Road Detailed Design (Not Approved)		216d	26-Nov-07 A	02-Oct-08
VO253 Subsection 1A4 - Track		10d	14-Jan-08	25-Jan-08
SDS78800	Amend Vertical Alignemnt & Fix Design (Track)	2d	18-Jan-08	21-Jan-08
SDS78810	Amend Horizontal Alignment & Handover to Roads	5d	14-Jan-08	18-Jan-08
SDS78820	Issue Notification of Completion Letter Track Sub Section 1A4	0d		25-Jan-08
VO253 Subsection 1A4 - Roads		216d	26-Nov-07 A	02-Oct-08
SDS78830	Fix Horizontal Alignment & Handover toTrack	22d	26-Nov-07 A	03-Jan-08 A
SDS78840	Design Vertical Alignment & Fix Design	8d	08-Jan-08 A	17-Jan-08
SDS78850	Complete Roads, Street Lighting & Landscaping Design	9d	15-Jan-08	28-Jan-08
SDS78930	Issue Construction Drawings	0d		02-Oct-08
SDS80750	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 1A4	0d		28-Jan-08
SDS80790	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 1A4	0d		28-Jan-08
SDS80800	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 1A4	0d		28-Jan-08
VO252 - Subsection 1A3 - Ocean Terminal Detailed Design (Not Approved)		216d	26-Nov-07 A	02-Oct-08
VO252 Subsection 1A3 - Track		10d	14-Jan-08	25-Jan-08
SDS78860	Amend Horizontal Alignment & Handover to Roads	5d	14-Jan-08	18-Jan-08
SDS78870	Amend Vertical Alignemnt & Fix Design (Track)	2d	18-Jan-08	21-Jan-08
SDS78880	Issue Notification of Completion Letter Track Sub Section 1A3	0d		25-Jan-08
VO252 Subsection 1A3 - Roads		216d	26-Nov-07 A	02-Oct-08
SDS78890	Fix Horizontal Alignment & Handover toTrack	30d	26-Nov-07 A	16-Jan-08
SDS78900	Design Vertical Alignment & Fix Design	8d	11-Jan-08 A	23-Jan-08
SDS78910	Complete Roads, Street Lighting & Landscaping Design	20d	18-Jan-08	15-Feb-08
SDS78940	Issue Construction Drawings	0d		02-Oct-08
SDS80760	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 1A3	0d		15-Feb-08
SDS80770	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 1A3	0d		15-Feb-08
SDS80780	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 1A3	0d		15-Feb-08
VO254 Casino Car Park Design (Not Approved)		18d	10-Dec-07 A	11-Jan-08 A
SDS78920	Complete Car Park Design	18d	10-Dec-07 A	11-Jan-08 A
VO259 Bernard Street Works (Not Approved)		18d	10-Dec-07 A	11-Jan-08 A
SDS80850	Additional Roads Design	18d	10-Dec-07 A	11-Jan-08 A
VO257 - Casino Square Alignment Revisions (Not Approved)		38d	17-Dec-07 A	15-Feb-08
SDS80810	Additional Roads Design	13d	17-Dec-07 A	11-Jan-08 A
SDS80820	Additional OLE Design	5d	21-Jan-08	25-Jan-08
SDS80830	Additional Track Design	7d	03-Jan-08 A	11-Jan-08 A
SDS80840	Additional Street Lighting Design	19d	21-Jan-08	15-Feb-08
Drainage		254d	12-Mar-07 A	10-Mar-08
SDS70970	Hydraulic Modelling & First Pass Drainage Design	127d	12-Mar-07 A	21-Sep-07 A
SDS70990	Issue Drainage Design Completion Letter to tie for Approval Section 1A	0d		18-Jan-08
SDS71030	Receipt of Drainage Survey Information	0d		25-Feb-08*
SDS71040	Outfall Consent/Approval from SW	0d		25-Feb-08*
SDS71050	Outfall Consent/Approval from CEC	0d		14-Jan-08*
SDS71060	Outfall Consent/Approval from SEPA	0d		10-May-07 A
SDS73170	Detailed Drainage Design and Review of Hydraulic Modelling	23d	20-Aug-07 A	24-Sep-07 A
SDS80650	Final Detailed Drainage Design	37d	16-Nov-07 A	17-Jan-08
SDS80660	Confirm Drainage and amend if required	9d	26-Feb-08	10-Mar-08
Traffic Modelling		23d	23-Jun-06 A	26-Jul-06 A
SDS55950	JRC Receive Junction Layouts	0d		23-Jun-06 A
SDS55960	JRC Prepare VISSIM Initial Traffic Flows (Low Level Model)	12d	26-Jun-06 A	12-Jul-06 A
SDS55970	SDS Produce LINSIG/TRANSYT Assessments (Iteration 1)	9d	13-Jul-06 A	26-Jul-06 A
Boundary & Accomodation Works (Task300.2.4)		223d	26-Mar-07 A	08-Feb-08
SDS41770	Detailed Design of Boundary & Accomodation Works	112d	26-Mar-07 A	13-Sep-07 A
SDS41780	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 1A	0d		14-Sep-07 A
SDS41790	Additional Boundary and Accommodation Works and review	56d	09-Nov-07 A	08-Feb-08
Utilities Section 1A (Includes Constitution Street) Plates 1 to 12		373d	13-Mar-06 A	27-Aug-07 A
A11240	Close Out PD Issues & Propose Diversions	41d	29-Aug-06 A	27-Oct-06 A
A11250	Issue PD to SUCs	0d		16-Oct-06 A
A11260	Consult SUCs and MUDFA (at later stage - when appointed)	192d	30-Oct-06 A	27-Aug-07 A
A11270	Access to MUDFA	0d		10-Oct-06 A
UTIL030	Section 1A - Pre-Preliminary Design (Utilities)	42d	13-Mar-06 A	17-May-06 A
UTIL200	Issue to Statutory Utility Companies (SUCs)	0d		17-May-06 A
Utilities Section 1A1 (Excludes Constitution Street) Plates 13 to 15		334d	13-Mar-06 A	02-Jul-07 A
A11280	Close Out PD Issues & Propose Diversions	41d	29-Aug-06 A	27-Oct-06 A
A11290	Issue PD to SUCs	0d		16-Oct-06 A
A11930	Consult SUCs and MUDFA (at later stage - when appointed)	46d	30-Oct-06 A	12-Jan-07 A
A11940	Access to MUDFA	0d		10-Oct-06 A
A12210	Issue to SUCs	0d		12-Jan-07 A
A12230	SUCs Approval	99d	12-Jan-07 A	14-Jun-07 A
A14570	Incorporate Comments and Compile IFC Drawings Section 1A1	8d	14-Jun-07 A	25-Jun-07 A
A14580	Issue First Draft IFC to tie Section 1A1	0d		25-Jun-07 A
A14970	Compile Final Drawings	6d	25-Jun-07 A	02-Jul-07 A
A14980	Issue Construction Drawings	0d		02-Jul-07 A
UTIL120	Section 1A - Pre-Preliminary Design (Utilities)	42d	13-Mar-06 A	17-May-06 A
UTIL210	Issue to Statutory Utility Companies (SUCs)	0d		17-May-06 A
Utilities Section 1A2 (Tower Place to Newhaven) Plates 16 to 21		373d	13-Mar-06 A	27-Aug-07 A
A11990	Consult SUCs and MUDFA (at later stage - when appointed)	8d	15-Aug-07 A	27-Aug-07 A
UTIL220	Section 1A - Pre-Preliminary Design (Utilities)	42d	13-Mar-06 A	17-May-06 A
UTIL230	Issue to Statutory Utility Companies (SUCs)	0d		17-May-06 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

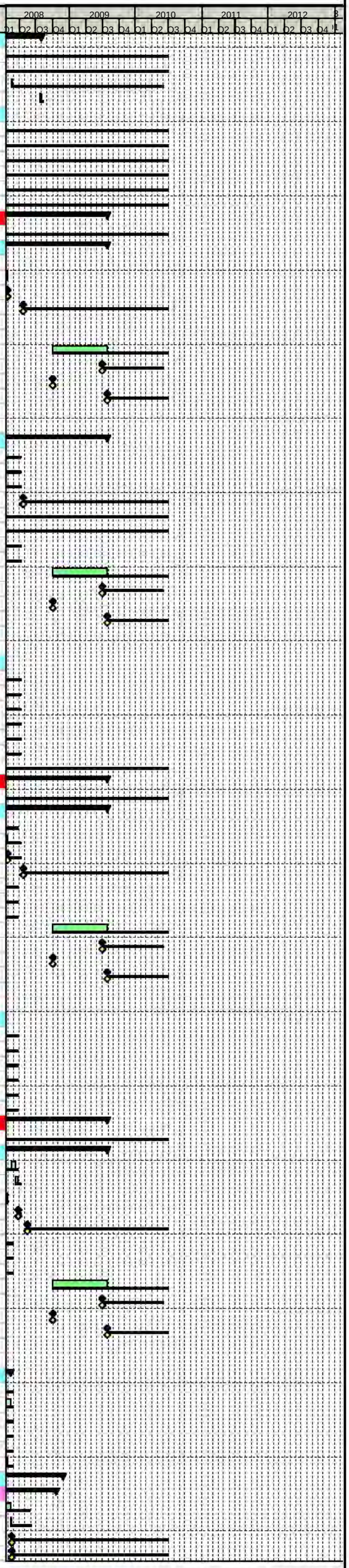
Trams for Edinburgh
connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

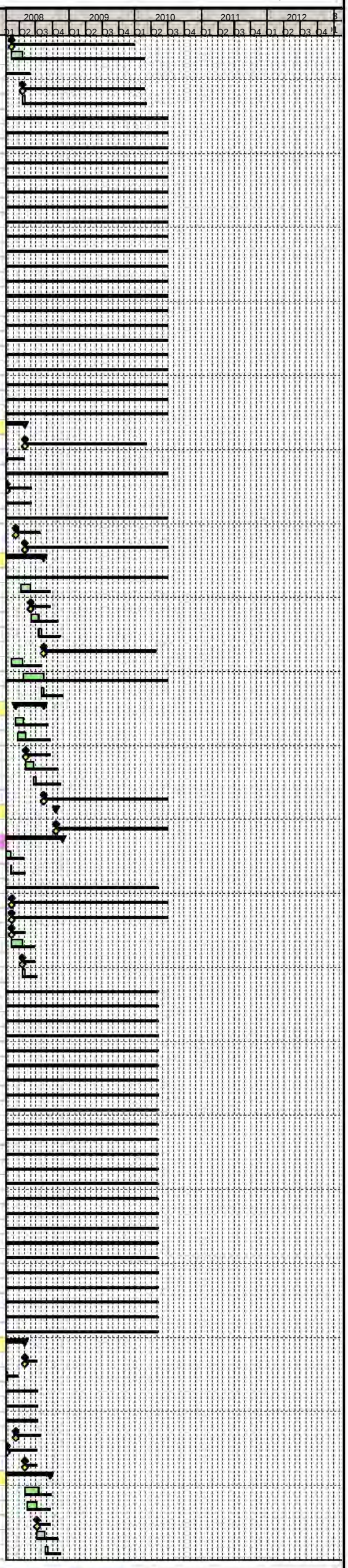
Activity ID	Activity Name	Original Duration	Start	Finish
TRO's		528d	03-Jul-06 A	29-Jul-08
SDS33050	Collate Exisiting TROs	8d	03-Jul-06 A	12-Jul-06 A
SDS33060	Receive Preliminary Roads Design	0d		12-Jul-06 A
SDS81910	Interim TRO Design Section 1A	5d	18-Feb-08	22-Feb-08
SDS81920	Final TRO Design Section 1A	5d	23-Jul-08	29-Jul-08
TTRO's		177d	29-Aug-06 A	11-May-07 A
TTRO200	SDS Produce Affected Roads Listing For MUDFA Works	64d	29-Aug-06 A	30-Nov-06 A
TTRO210	SDS Produce Affected Roads Listing For INFRACO Works	36d	12-Mar-07 A	04-May-07 A
TTRO390	Dundas & Wilson Draft TTRO Schedule For MUDFA Works	6d	01-Dec-06 A	08-Dec-06 A
TTRO420	Dundas & Wilson Draft TTRO Schedule For INFRACO Works	5d	04-May-07 A	11-May-07 A
TTRO470	Issue Affected Roads Listing To Dundas & Wilson For MUDFA Works Section 1A	0d		30-Nov-06 A
TTRO490	Issue Affected Roads Listing To Dundas & Wilson For INFRACO Works Section 1A	0d		04-May-07 A
FOW - COS		986d	19-Sep-05 A	28-Jul-09
CON-0250	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Foot of the Walk (Task300.3.10)		799d	07-Jun-06 A	28-Jul-09
A25010	Prepare Tram Stop Planning Submission Drawings for Issue to Planning Drawing Team	88d	31-Aug-07 A	17-Jan-08
A25020	Produce Engineering Detailed Design Drawings	33d	03-Dec-07 A	28-Jan-08
A25200	Issue Notification Of Completion Letter- Foot Of The Walk Tram Stop Design to tie	0d		28-Jan-08*
A25950	Tram Stop Design Complete - Drawings Issued for Construction	0d		23-Apr-08
A27440	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Mar-07 A	02-Mar-07 A
A43980	Prepare Detailed Design Stop Drawings	66d	17-Nov-06 A	02-Mar-07 A
A47280	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47290	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47300	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47310	Issue Final As Built Drawings	0d		28-Jul-09
A4780	General Arrangement Drawings	12d	07-Jun-06 A	23-Jun-06 A
A5160	Issue Tram Stop GA Drawings for Foot of the Walk	0d		30-Jun-06 A
Tram Stop Bernard Street (Task300.2.8)		811d	22-May-06 A	28-Jul-09
A24860	Prepare Tram Stop Planning Submission Drawings for issue to Planning Drawing Team	63d	16-Apr-07 A	19-Jul-07 A
A24890	Produce Engineering Detailed Design Drawings	62d	23-Aug-07 A	23-Nov-07 A
A25110	Issue Notification Of Completion Letter- Bernard Street Tram Stop Design to tie	0d		23-Nov-07 A
A25810	Tram Stop Design Complete - Drawings Issued for Construction	0d		23-Apr-08
A25940	Alterations to Tram Stop due to Road alterations (VO259)	14d	14-Dec-07 A	11-Jan-08 A
A27390	Site Visit To Review Preliminary Design	1d	07-Sep-06 A	07-Sep-06 A
A43240	IDC Tram Stop Design for Planning Submission (Inc. Systems Assurance)	22d	02-Apr-07 A	07-May-07 A
A43930	Prepare Detailed Design Stop Drawings	5d	26-Feb-07 A	02-Mar-07 A
A47080	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47090	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47100	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47110	Issue Final As Built Drawings	0d		28-Jul-09
A4730	General Arrangement Drawings	23d	22-May-06 A	23-Jun-06 A
A5110	Issue Tram Stop GA Drawings for Constitution Street	0d		30-Jun-06 A
VO42 Bernard Street Tram Stop (Not tie approved)		89d	16-Oct-06 A	26-Feb-07 A
A26600	OLE Re-design	84d	16-Oct-06 A	26-Feb-07 A
A26610	Tramstop Re-design	84d	16-Oct-06 A	26-Feb-07 A
A27650	Systems and Communications Re-design	84d	16-Oct-06 A	26-Feb-07 A
A28270	Track Re-design	84d	16-Oct-06 A	26-Feb-07 A
A28280	Additional Runtime	84d	16-Oct-06 A	26-Feb-07 A
A28290	Roads Re-design	84d	16-Oct-06 A	26-Feb-07 A
A28300	Additional Traffic Modelling	84d	16-Oct-06 A	26-Feb-07 A
COS - OCD		986d	19-Sep-05 A	28-Jul-09
CON-0280	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Port of Leith (Task300.2.9)		811d	22-May-06 A	28-Jul-09
A24870	Prepare Tram Stop Planning Submission Drawings for issue to Planning Drawing Team	38d	01-Jun-07 A	27-Jul-07 A
A24900	Produce Engineering Detailed Design Drawings	98d	24-Aug-07 A	25-Jan-08
A25120	Issue Notification Of Completion Letter- Port Of Leith Tram Stop Design to tie	0d		25-Jan-08
A25830	Tram Stop Design Complete - Drawings Issued for Construction	0d		23-Apr-08
A27400	Site Visit with tie & CEC To Review Preliminary Design	1d	26-Feb-07 A	26-Feb-07 A
A43250	IDC Tram Stop Design for Planning Submission (Inc. Systems Assurance)	14d	16-Apr-07 A	04-May-07 A
A43940	Prepare Detailed Design Stop Drawings	66d	17-Nov-06 A	02-Mar-07 A
A47120	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47130	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47140	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47150	Issue Final As Built Drawings	0d		28-Jul-09
A4740	General Arrangement Drawings	23d	22-May-06 A	23-Jun-06 A
A5120	Issue Tram Stop GA Drawings for Ocean Drive	0d		30-Jun-06 A
VO40 Port Of Leith Tram Stop (Not tie approved)		25d	16-Oct-06 A	17-Nov-06 A
A26540	OLE Re-design	23d	16-Oct-06 A	17-Nov-06 A
A26550	Tramstop Re-design	23d	16-Oct-06 A	17-Nov-06 A
A26560	Systems and Communications Re-design	23d	16-Oct-06 A	17-Nov-06 A
A26570	Track Re-design	23d	16-Oct-06 A	17-Nov-06 A
A26580	Additional Runtime	23d	16-Oct-06 A	17-Nov-06 A
A26590	Roads Re-design	23d	16-Oct-06 A	17-Nov-06 A
OCD - OCT		986d	19-Sep-05 A	28-Jul-09
CON-0310	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Ocean Terminal (Task300.2.10)		805d	30-May-06 A	28-Jul-09
A24880	Prepare Tram Stop Planning Submission Drawings for issue to Planning Drawing Team ON HOLD	132d	20-Aug-07 A	12-Mar-08
A24910	Produce Engineering Detailed Design Drawings	11d	13-Mar-08	28-Mar-08
A24970	Resolution of Forth Ports Issues	0d	15-Jan-08*	
A25140	Issue Notification Of Completion Letter- Ocean Terminal Tram Stop Design to tie	0d		28-Mar-08
A25860	Tram Stop Design Complete - Drawings Issued for Construction	0d		14-May-08
A27410	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Mar-07 A	02-Mar-07 A
A43260	IDC Tram Stop Design for Planning Submission (Inc. Systems Assurance) ON HOLD	14d	16-Apr-07 A	04-May-07 A
A43950	Prepare Detailed Design Stop Drawings	5d	26-Feb-07 A	02-Mar-07 A
A47160	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47170	Receive Final As Built Data the Contractor	0d		30-Jun-09
A47180	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47190	Issue Final As Built Drawings	0d		28-Jul-09
A4750	General Arrangement Drawings	18d	30-May-06 A	23-Jun-06 A
A5130	Issue Tram Stop GA Drawings for Ocean Terminal	0d		30-Jun-06 A
VO53 Ocean Terminal Stop Revision (Not tie approved)		336d	16-Oct-06 A	15-Feb-08
A28310	OLE Re-design	145d	16-Oct-06 A	04-Jun-07 A
A28320	Tramstop Re-design	23d	15-Jan-08	15-Feb-08
A28330	Systems and Communications Re-design	146d	16-Oct-06 A	04-Jun-07 A
A28340	Revise Track Layout and Alignment	11d	16-Oct-06 A	31-Oct-06 A
A28350	Additional Runtime	129d	16-Oct-06 A	08-May-07 A
A28360	Roads Re-design	299d	16-Oct-06 A	28-Jan-08
Structures		694d	13-Mar-06 A	26-Nov-08
S16 Victoria Dock Entrance Bridge		669d	13-Mar-06 A	22-Oct-08
A7180	Assessment and Superstructure Preliminary Design	24d	09-Jan-08 A	13-Feb-08
A7190	Produce AIP	5d	14-Feb-08	20-Feb-08
A7200	Issue Victoria Dock Entrance Bridge AIP to tie	0d		20-Feb-08
A7210	Issue Victoria Dock Entrance Bridge AIP to CEC	0d		20-Feb-08



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Trams for Edinburgh ...connecting our Capital

Activity ID	Activity Name	Original Duration	Start	Finish
A7220	Issue Victoria Dock Entrance Bridge AIP to TAA	0d		20-Feb-08
A7230	TAA Approval Period	38d	21-Feb-08	16-Apr-08
A7380	Receive Approval of Change Request VO252	0d		13-Dec-07 A
A7390	Receive TAA Comments	0d	17-Apr-08	
A7510	Update to Comments	9d	17-Apr-08	30-Apr-08
SDS44880	Review of Previous Work	9d	13-Mar-06 A	24-Mar-06 A
SDS44890	Optioneering	5d	27-Mar-06 A	31-Mar-06 A
SDS44900	Initial Design	8d	03-Apr-06 A	13-Apr-06 A
SDS44910	Production of AIP Drawing	21d	10-Apr-06 A	12-May-06 A
SDS44920	Issue AIP Drawing to tie	0d		12-May-06 A
SDS44930	Checking	4d	15-May-06 A	18-May-06 A
SDS44940	tie AIP Drawing Review Period	4d	15-May-06 A	18-May-06 A
SDS44950	Undertake Consultations	17d	15-May-06 A	08-Jun-06 A
SDS44960	Receive AIP Drawing Comments from tie	0d		18-May-06 A
SDS44970	Incorporate tie Comments into AIP Drawing	5d	22-May-06 A	26-May-06 A
SDS44980	Production of AIP Document	5d	22-May-06 A	26-May-06 A
SDS44990	Issue Victoria Dock AIP Document to tie	0d		30-Jun-06 A
SDS45000	tie AIP Document Review Period	32d	03-Jul-06 A	17-Aug-06 A
SDS45010	Receive AIP Document Comments from tie	0d		23-Oct-06 A
SDS45020	Incorporate tie Comments into AIP Document	7d	23-Oct-06 A	31-Oct-06 A
SDS45030	Issue AIP Document & Drawing to TAA	0d		22-Aug-06 A
SDS45040	TAA AIP Document & Drawing Review Period	2d	23-Aug-06 A	24-Aug-06 A
SDS45050	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS45060	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS45070	Recieve AIP Document & Drawing Comments from TAA	0d		24-Aug-06 A
SDS45080	Incorporate TAA Comments into AIP Document & Drawing	1d	25-Aug-06 A	28-Aug-06 A
Victoria Dock Preliminary Design Milestones		433d	14-Aug-06 A	30-Apr-08
A5610	Receipt of tie PD Acceptance	0d		30-Apr-08
A5620	Receipt of Roads Alignment	0d		09-Jan-08 A
A5700	Receipt of OLE Prelim Design Package	0d		14-Aug-06 A
A5940	Receipt of Revised OLE Design Package	0d		22-Jan-08
A6960	Receipt of Ground Investigation Data and Interpretative Geotechnical Data	0d		14-Aug-06 A
A6970	Receipt of Approved and Signed AIP Document	0d		22-Dec-06 A
A7040	Receipt of Ground Investigation Data and Interpretative Geotechnical Data	0d		12-Mar-08
A8150	Receipt of Revised Approved and Signed AIP Document	0d		30-Apr-08
Victoria Dock Superstructure Detailed Design		538d	01-Aug-06 A	13-Aug-08
A6980	Assessment and Superstructure Detailed Design ABANDONED DUE TO VARIATION	289d	01-Aug-06 A	22-Oct-07 A
A6990	Superstructure Detailed Design Draughting	38d	10-Apr-08	04-Jun-08
A7000	Issue Superstructure Detailed Design Package to CAT II Checker	0d		04-Jun-08
A7010	Superstructure CAT II Check	28d	05-Jun-08	16-Jul-08
A7020	Receive and Incoporate CAT II Comments	9d	17-Jul-08	30-Jul-08
A7030	Issue Notification Of Completion Letter- Victoria Dock Superstructure Design Package to tie	0d		13-Aug-08
A7060	Assessment and Superstructure Detailed Design	38d	21-Feb-08	16-Apr-08
SDS19160	Detailed Design Resources	496d	01-Aug-06 A	13-Aug-08
SDS61860	IDC	9d	31-Jul-08	13-Aug-08
Victoria Dock Substructure Detailed Design		110d	13-Mar-08	13-Aug-08
A7120	Substructure Detailed Design	28d	13-Mar-08	23-Apr-08
A7130	Substructure Detailed Design Draughting	28d	27-Mar-08	07-May-08
A7140	Issue Substructure Detailed Design Package to CAT II Checker	0d		07-May-08
A7150	Substructure CAT II Check	28d	08-May-08	18-Jun-08
A7160	Receive and Incorporate CAT II Comments	9d	19-Jun-08	02-Jul-08
A7170	Issue Notification Of Completion Letter- Victoria Dock Substructure Detailed Design Package to tie	0d		13-Aug-08
Issue Victoria Dock Design Package for Construction / Fabrication		0d	22-Oct-08	22-Oct-08
SDS62420	Issue Victoria Dock Design Package for Construction / Fabrication	0d		22-Oct-08
S17 Tower Place Bridge		694d	13-Mar-06 A	26-Nov-08
A7240	Assessment and Superstructure Preliminary Design	24d	09-Jan-08 A	13-Feb-08
A7250	Produce AIP	5d	14-Feb-08	20-Feb-08
A7370	Receive Approval of Change Request VO252	0d		13-Dec-07 A
A7520	Issue Victoria Dock Entrance Bridge AIP to tie	0d		20-Feb-08
A7530	Issue Victoria Dock Entrance Bridge AIP to CEC	0d		20-Feb-08
A7540	Issue Victoria Dock Entrance Bridge AIP to TAA	0d		20-Feb-08
A7550	TAA Approval Period	38d	21-Feb-08	16-Apr-08
A7560	Receive TAA Comments	0d	17-Apr-08	
A7570	Update to Comments	9d	17-Apr-08	30-Apr-08
SDS45120	Review of Previous Work	9d	13-Mar-06 A	24-Mar-06 A
SDS45130	Optioneering	5d	27-Mar-06 A	31-Mar-06 A
SDS45140	Initial Design	8d	03-Apr-06 A	13-Apr-06 A
SDS45150	Production of AIP Drawing	18d	10-Apr-06 A	09-May-06 A
SDS45160	Issue AIP Drawing to tie	0d		19-May-06 A
SDS45170	Checking	4d	10-May-06 A	15-May-06 A
SDS45180	tie AIP Drawing Review Period	4d	10-May-06 A	15-May-06 A
SDS45190	Undertake Consultations	17d	10-May-06 A	05-Jun-06 A
SDS45200	Receive AIP Drawing Comments from tie	0d		15-May-06 A
SDS45210	Incorporate tie Comments into AIP Drawing	5d	22-May-06 A	26-May-06 A
SDS45220	Production of AIP Document	5d	06-Jun-06 A	12-Jun-06 A
SDS45230	Issue Tower Place Bridge AIP Document to tie	0d		30-Jun-06 A
SDS45240	tie AIP Document Review Period	23d	14-Aug-06 A	18-Sep-06 A
SDS45250	Receive AIP Document Comments from tie	0d		23-Oct-06 A
SDS45260	Incorporate tie Comments into AIP Document	4d	23-Oct-06 A	26-Oct-06 A
SDS45270	Issue AIP Document & Drawing to TAA	0d		18-Sep-06 A
SDS45280	TAA AIP Document & Drawing Review Period	5d	21-Aug-06 A	28-Aug-06 A
SDS45290	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS45300	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS45310	Recieve AIP Document & Drawing Comments from TAA	0d		26-Oct-06 A
SDS45320	Incorporate TAA Comments into AIP Document & Drawing	5d	27-Oct-06 A	02-Nov-06 A
SDS45330	Recieve AIP Document & Drawing Comments from Planning Department	0d		11-Dec-06 A
SDS45340	Incorporate Planning Department TAA Comments into AIP Document & Drawing	6d	11-Dec-06 A	18-Dec-06 A
SDS45350	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		18-Dec-06 A
Tower Place Bridge Preliminary Design Milestones		433d	14-Aug-06 A	30-Apr-08
A7260	Receipt of tie PD Acceptance	0d		30-Apr-08
A7270	Receipt of Roads Alignment	0d		09-Jan-08 A
A7280	Receipt of OLE Prelim Design Package	0d		12-Feb-07 A
A7290	Receipt of Ground Investigation Data and Interpretative Geotechnical Data	0d		14-Aug-06 A
A7300	Receipt of Approved and Signed AIP Document	0d		22-Dec-06 A
A8160	Receipt of Ground Investigation Data and Interpretative Geotechnical Data	0d		12-Mar-08
A8280	Receipt of Revised OLE Design Package	0d		22-Jan-08
A8290	Receipt of Approved and Signed AIP Document	0d		30-Apr-08
Tower Place Bridge Superstructure Detailed Design		548d	01-Aug-06 A	17-Sep-08
A7310	Assessment and Superstructure Detailed Design	52d	01-May-08	16-Jul-08
A7320	Superstructure Detailed Design Draughting	38d	15-May-08	09-Jul-08
A7330	Issue Superstructure Detailed Design Package to CAT II Checker	0d		09-Jul-08
A7340	Superstructure CAT II Check	28d	10-Jul-08	20-Aug-08
A7350	Receive and Incoporate CAT II Comments	9d	21-Aug-08	03-Sep-08



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

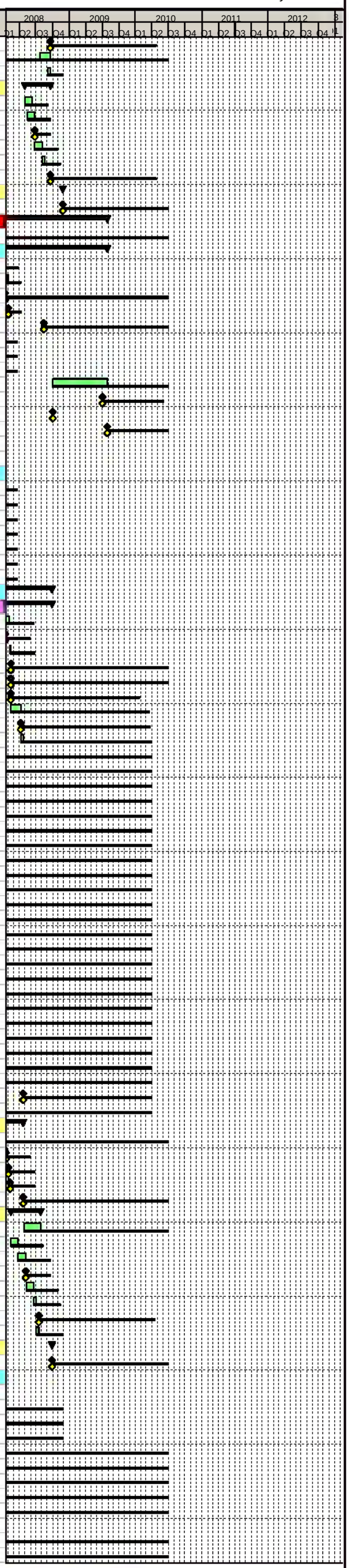
Trams for Edinburgh
...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
A7360	Issue Notification Of Completion Letter- Tower Place Bridge Superstructure Design Package to tie	0d		17-Sep-08
SDS39550	Detailed Design Resources	505d	01-Aug-06 A	17-Sep-08
SDS61880	IDC	9d	04-Sep-08	17-Sep-08
Tower Place Bridge Substructure Detailed Design		100d	01-May-08	17-Sep-08
A7450	Substructure Detailed Design	28d	01-May-08	11-Jun-08
A7460	Substructure Detailed Design Draughting	28d	15-May-08	25-Jun-08
A7470	Issue Substructure Detailed Design Package to CAT II Checker	0d		25-Jun-08
A7480	Substructure CAT II Check	28d	26-Jun-08	06-Aug-08
A7490	Receive and Incorporate CAT II Comments	9d	07-Aug-08	20-Aug-08
A7500	Issue Notification Of Completion Letter- Tower Place Bridge Substructure Detailed Design Package to tie	0d		17-Sep-08
Issue Tower Place Bridge Design Package For Construction / Fabrication		0d	26-Nov-08	26-Nov-08
SDS62430	Issue Tower Place Bridge Design Package For Construction / Fabrication	0d		26-Nov-08
OCT - NER		986d	19-Sep-05 A	28-Jul-09
CON-0340	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Newhaven (Task300.2.11)		811d	22-May-06 A	28-Jul-09
A24920	Prepare Tram Stop Planning Submission Drawings For Issue to the Planning Drawing Team	97d	20-Aug-07 A	18-Jan-08
A24930	Produce Engineering Detailed Design Drawings	9d	21-Jan-08	01-Feb-08
A24960	Resolution of Forth Ports Issues	0d	15-Jan-08*	
A25160	Issue Notification Of Completion Letter- Newhaven Tram Stop Design to tie	0d		01-Feb-08
A25890	Tram Stop Design Complete - Drawings Issued for Construction	0d		14-Aug-08
A27420	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Mar-07 A	02-Mar-07 A
A43270	IDC Tram Stop Design for Planning Submission (Inc. Systems Assurance) ON HOLD	14d	16-Apr-07 A	04-May-07 A
A43960	Prepare Detailed Design Stop Drawings	106d	19-Sep-06 A	02-Mar-07 A
A47200	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47210	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47220	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47230	Issue Final As Built Drawings	0d		28-Jul-09
A4760	General Arrangement Drawings	23d	22-May-06 A	23-Jun-06 A
A5140	Issue Tram Stop GA Drawings for Newhaven Road	0d		30-Jun-06 A
VO55 Newhaven Tram Stop Layout (Not tie approved)		78d	16-Oct-06 A	09-Feb-07 A
A28370	OLE Re-design	74d	16-Oct-06 A	09-Feb-07 A
A28380	Tramstop Re-design	74d	16-Oct-06 A	09-Feb-07 A
A28390	Systems and Communications Re-design	74d	16-Oct-06 A	09-Feb-07 A
A28400	Revise Track Layout and Alignment	74d	16-Oct-06 A	09-Feb-07 A
A28410	Additional Runtime	74d	16-Oct-06 A	09-Feb-07 A
A28420	Roads Re-design	74d	16-Oct-06 A	09-Feb-07 A
A28430	Utilities	74d	16-Oct-06 A	09-Feb-07 A
Structures		663d	27-Feb-06 A	30-Sep-08
W01 Lindsay Road Retaining Wall		663d	27-Feb-06 A	30-Sep-08
A7580	Assessment and Superstructure Preliminary Design	14d	18-Jan-08	07-Feb-08
A7700	Receive Information from Forth Ports (VO253)	0d	15-Jan-08*	
A7710	Produce AIP	5d	08-Feb-08	14-Feb-08
A7720	Issue Lindsay Road Retaininng Wall AIP to tie	0d		14-Feb-08
A7910	Issue Lindsay Road Retaininng Wall AIP to CEC	0d		14-Feb-08
A7920	Issue Lindsay Road Retaininng Wall AIP to TAA	0d		14-Feb-08
A7930	TAA Approval Period	38d	15-Feb-08	10-Apr-08
A8010	Receive TAA Comments	0d	11-Apr-08	
A8140	Update to Comments	9d	11-Apr-08	24-Apr-08
SDS50400	Review of Previous Work	9d	27-Feb-06 A	10-Mar-06 A
SDS50410	Optioneering	4d	10-Apr-06 A	13-Apr-06 A
SDS50420	Initial Design	8d	24-Apr-06 A	05-May-06 A
SDS50430	Production of AIP Drawing	41d	28-Apr-06 A	28-Apr-06 A
SDS50440	Issue Lindsay Rd RW AIP Drawing to tie	0d		30-Jun-06 A
SDS50450	Checking	4d	14-Aug-06 A	17-Aug-06 A
SDS50460	tie AIP Drawing Review Period	4d	14-Aug-06 A	17-Aug-06 A
SDS50470	Undertake Consultations	36d	08-May-06 A	29-Jun-06 A
SDS50480	Receive AIP Drawing Comments from tie	0d		17-Aug-06 A
SDS50490	Incorporate tie Comments into AIP Drawing	5d	14-Aug-06 A	18-Aug-06 A
SDS50500	Production of AIP Document	4d	14-Aug-06 A	17-Aug-06 A
SDS50510	Issue Lindsay Rd RW AIP Document to tie	0d		17-Aug-06 A
SDS50520	tie AIP Document Review Period	4d	14-Aug-06 A	17-Aug-06 A
SDS50530	Receive AIP Document Comments from tie	0d		17-Aug-06 A
SDS50540	Incorporate tie Comments into AIP Document	4d	14-Aug-06 A	17-Aug-06 A
SDS50550	Issue AIP Document & Drawing to TAA	0d		18-Aug-06 A
SDS50560	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS50570	TAA AIP Document & Drawing Review Period	5d	21-Aug-06 A	28-Aug-06 A
SDS50580	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS50590	Recieve AIP Document & Drawing Comments from TAA	0d		23-Oct-06 A
SDS50600	Recieve AIP Document & Drawing Comments from Planning Department	0d		23-Oct-06 A
SDS50610	Incorporate TAA Comments into AIP Document & Drawing	42d	23-Oct-06 A	22-Dec-06 A
SDS50620	Incorporate Planning Department TAA Comments into AIP Document & Drawing	6d	23-Oct-06 A	30-Oct-06 A
SDS50630	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		24-Apr-08
SDS50750	Condition Survey	19d	13-Mar-06 A	07-Apr-06 A
Lindsay Road Retaining Wall Preliminary Design Milestones		432d	09-Aug-06 A	24-Apr-08
A7590	Receipt of tie PD Acceptance	0d		09-Aug-06 A
A7600	Receipt of Roads Alignment	0d		17-Jan-08
A7610	Receipt of OLE Prelim Design Package	0d		31-Jan-08
A7620	Receipt of Ground Investigation Data and Interpretative Geotechnical Data	0d		11-Feb-08
A7630	Receipt of Approved and Signed AIP Document	0d		24-Apr-08
Lindsay Road Retaining Wall Structure Detailed Design		116d	15-Feb-08	25-Jul-08
A47970	Detailed Design Resourcing	59d	28-Apr-08	25-Jul-08
A7640	Structure Detailed Design	28d	15-Feb-08	27-Mar-08
A7650	Structure Detailed Design Draughting	28d	28-Mar-08	08-May-08
A7660	Issue Structure Detailed Design Package to CAT I Checker	0d		08-May-08
A7670	Structure CAT I Check	28d	09-May-08	19-Jun-08
A7680	Receive and Incoporate CAT I Comments	9d	20-Jun-08	03-Jul-08
A7690	Issue Notification Of Completion Letter- Lindsay Road Structure Design Package to tie	0d		17-Jul-08
SDS61900	IDC	9d	04-Jul-08	17-Jul-08
Lindsay Road Retaining Wall Issue Structure Design Package for Construction / Fabrication		0d	30-Sep-08	30-Sep-08
A7810	Issue Lindsay Road Retaining Wall Structure Design Package For Construction / Fabrication	0d		30-Sep-08
Tram North Leith Sands Substation (Task300.2.12)		406d	09-May-06 A	07-Dec-07 A
A548940	Preliminary Design of Substation	15d	09-May-06 A	30-May-06 A
A549060	Detailed Design Civils	23d	12-Jan-07 A	16-Feb-07 A
A549070	Detailed Architecture Design	107d	08-Sep-06 A	22-Feb-07 A
A549080	IDC on Detailed Design (Inc. Systems Assurance)	9d	05-Feb-07 A	16-Feb-07 A
A549090	Issue Tram North Leith Sands Substation Planning Submission To tie For Approval	0d		22-Feb-07 A
A549100	tie Approval Period For Planning Submission	19d	23-Feb-07 A	22-Mar-07 A
A549110	Receive tie Comments	0d		16-Mar-07 A
A549120	Update Substation Planning Submission To Incorporate tie Comments	9d	16-Mar-07 A	29-Mar-07 A
A549620	Compile Substation Planning Submission	9d	09-Feb-07 A	22-Feb-07 A
A550020	Substation Consultation Period	9d	19-Jun-06 A	30-Jun-06 A
A550140	Issue of Leith Sands Substation Design	0d		30-Jun-06 A
SDS68600	Compile Detailed Engineering Drawings Submission	23d	27-Apr-07 A	01-Jun-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

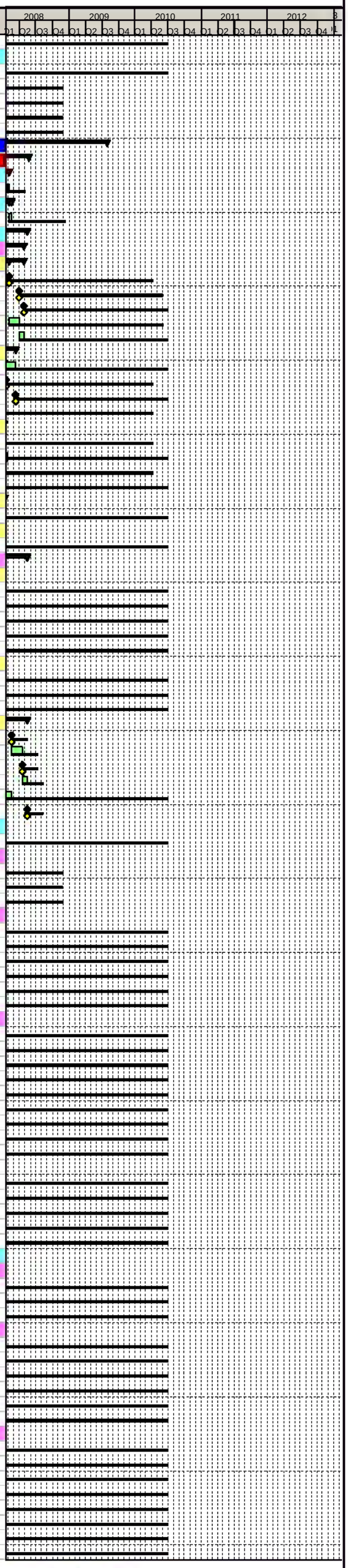
Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS81030	Address tie Comments, Other Revisions, IDC & Section Submission Package	24d	02-Nov-07 A	07-Dec-07 A
VO54 North Leith Sands Substation Relocation (Not tie approved)		137d	17-Oct-06 A	04-May-07 A
SDS73110	Substation Revision	128d	17-Oct-06 A	04-May-07 A
SDS73120	Review Feeding/Sectioning Arrangement & Interface with OLE Feed Location	68d	17-Oct-06 A	02-Feb-07 A
SDS73130	Roads Check	68d	17-Oct-06 A	02-Feb-07 A
SDS73140	Traction Power Check	68d	17-Oct-06 A	02-Feb-07 A
SDS73150	Utilities	68d	17-Oct-06 A	02-Feb-07 A
MDR - FOW - Section 1B (Task300.3)		986d	19-Sep-05 A	28-Jul-09
Sub Section Wide		565d	06-Mar-06 A	22-May-08
Sub Section Wide IDC		39d	03-Dec-07 A	04-Feb-08
A40181	Subsection Wide IDC - Roads, Track, Stops, B&A, Street Lighting, Utilities	38d	03-Dec-07 A	04-Feb-08
Design Assurance Review		10d	05-Feb-08	18-Feb-08
SDS67920	Produce Design Assurance Statement	9d	05-Feb-08	18-Feb-08
Consents & Approvals		320d	14-Feb-07 A	15-May-08
Prior Approvals		176d	16-Aug-07 A	28-Apr-08
Combined Section Prior Approval		60d	04-Feb-08	28-Apr-08
A25150	Issue Combined Package 1B for Prior Approval to CEC	0d		04-Feb-08
A25170	Receive Combined Package 1B Comments From CEC	0d		31-Mar-08
A25190	Prior Approval Granted for Section 1B Combined Package	0d		28-Apr-08
A40120	CEC Approval Period - 1B Combined Package	38d	05-Feb-08	31-Mar-08
A40150	Update 1B Combined Package to CEC Comments	19d	01-Apr-08	28-Apr-08
Batch 1/09		97d	19-Oct-07 A	14-Mar-08
SDS78080	Batch 1/09 Formal Approval Period	38d	18-Jan-08	13-Mar-08
SDS78090	Issue Batch 1/09 For Approval to CEC	0d	18-Jan-08	
SDS78100	Receive CEC Prior Approval For Batch 1/09	0d	14-Mar-08	
SDS78130	Batch 1/09 Balfour Street Tramstop - Collation of Planning Drawings	54d	19-Oct-07 A	17-Jan-08
Batch 1/10 Tram Leith Walk 163 Substation		99d	16-Aug-07 A	10-Jan-08 A
A27860	Issue Tram Leith Walk 163 Substation Design for Prior Approval	0d		14-Nov-07 A
A27870	Prior Approval For Tram Leith Walk 163 Substation	0d		10-Jan-08 A
A41100	Informal Consultation With CEC & tie over Prior Approval For Tram Leith Walk 163 Substation	60d	16-Aug-07 A	14-Nov-07 A
A41110	Tram Leith Walk 163 Substation CEC Approval Period	33d	14-Nov-07 A	09-Jan-08 A
Roads, Track, OLE, Landscaping, Street Lighting		93d	27-Aug-07 A	14-Jan-08
SDS25190	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	88d	27-Aug-07 A	14-Jan-08
Tram Stop Balfour Street		55d	27-Aug-07 A	12-Nov-07 A
A40200	Informal Consultation With CEC & tie over Prior Approval Tram Stop Balfour Street	52d	27-Aug-07 A	12-Nov-07 A
Technical Approvals		320d	14-Feb-07 A	15-May-08
Leith Walk Rail Bridge Assessment Review Period (TAA)		78d	14-Feb-07 A	01-Jun-07 A
A7940	Issue Leith Walk Rail Bridge Assessment Report to TAA	0d		04-Apr-07 A
A7950	TAA Leith Walk Rail Bridge Assessment Report Review Period	24d	05-Apr-07 A	15-May-07 A
A7960	Receive Leith Walk Rail Bridge Assessment Report Comments from TAA	0d		15-May-07 A
A7970	Incorporate TAA Comments into Leith Walk Rail Bridge Assessment Report	11d	16-May-07 A	01-Jun-07 A
A8350	Commence Leith Walk Rail Bridge Informal Consultation With CEC Over Technical Approval	34d	14-Feb-07 A	04-Apr-07 A
Leith Walk Rail Bridge Assessment Review Period (Network Rail)		80d	01-Jun-07 A	20-Sep-07 A
A7980	Issue Design and Check Certificate to Network Rail For Comment	0d		01-Jun-07 A
A7990	Network Rail Comment Period	19d	01-Jun-07 A	28-Jun-07 A
A8000	NR COMMENTS NOT RECEIVED	0d		20-Sep-07 A
Roads inc Drainage Technical Approval		122d	19-Nov-07 A	15-May-08
SDS25200	Issue Roads Design to Roads Authority for Approval	0d		18-Feb-08
SDS25210	Roads Authority Approval Period	38d	19-Feb-08	16-Apr-08
SDS25220	Receive Roads Authority Comments	0d		16-Apr-08
SDS25230	Update to Roads Authority Comments	19d	17-Apr-08	15-May-08
SDS25240	Roads Authority Informal Consultation	56d	19-Nov-07 A	18-Feb-08
SDS25310	Roads Technical Approval Granted	0d		15-May-08
VO26 Charette Changes Leith Walk CNB014		284d	14-Aug-06 A	24-Sep-07 A
A7050	Interim OLE Design Update Prior to Final Submission	38d	30-Jul-07 A	24-Sep-07 A
Optioneering		21d	14-Aug-06 A	12-Sep-06 A
A1900	Receive Notice to Proceed from Client	0d	12-Sep-06 A	
A1910	Exploratory Assessment	4d	14-Aug-06 A	17-Aug-06 A
A1920	2-Hour Meeting With CEC	0d	12-Sep-06 A	
Feasibility (2 Designs)		36d	14-Aug-06 A	03-Oct-06 A
A4340	Roads Feasibility Assessment	19d	29-Aug-06 A	25-Sep-06 A
A4380	2-Hour Meeting With CEC - Update	0d	26-Sep-06 A	
A4390	Feasibility Statement Assessment (Not Full Report)	5d	26-Sep-06 A	02-Oct-06 A
A5840	Feasibility Drawings (With Statement Assessment)	5d	26-Sep-06 A	02-Oct-06 A
A5850	With CEC For Approval	0d	03-Oct-06 A	
A6780	Track Feasibility Assessment	12d	14-Aug-06 A	31-Aug-06 A
Preliminary Design (1 Design)		193d	04-Sep-06 A	08-Jun-07 A
A15120	Management Support	60d	04-Sep-06 A	30-Nov-06 A
A5860	Preliminary Road Design	32d	03-Oct-06 A	17-Nov-06 A
A5870	Preliminary Junction Design	24d	13-Oct-06 A	20-Nov-06 A
A5880	Integration With Traffic Modelling	5d	20-Nov-06 A	24-Nov-06 A
A5890	2-Hour Meeting With CEC - Update (Not Required)	0d	17-Nov-06 A	
A5900	Roads Technical Design Statement (Not Required)	21d	19-Oct-06 A	17-Nov-06 A
A5910	TRO Schedules & Plans (Not Required)	2d	16-Nov-06 A	17-Nov-06 A
A5920	Utilities Design Update	2d	16-Nov-06 A	17-Nov-06 A
A5930	TTROs report and Plans (Not Required)	2d	16-Nov-06 A	17-Nov-06 A
A5970	4-hour Meeting With CEC for Approval	0d	06-Dec-06 A	
A6790	Preliminary Track Design	5d	16-Oct-06 A	20-Oct-06 A
A6900	Integration With OLE Design	5d	04-Jun-07 A	08-Jun-07 A
A7800	Stops Design	9d	23-Oct-06 A	03-Nov-06 A
A7840	Environmental	5d	02-Oct-06 A	06-Oct-06 A
A9130	Urban Design	5d	16-Oct-06 A	20-Oct-06 A
VO27 Charette Changes Foot of Walk CNB015		213d	07-Aug-06 A	08-Jun-07 A
Optioneering		30d	14-Aug-06 A	25-Sep-06 A
A6580	Receive Notice to Proceed from Client	0d	25-Sep-06 A	
A6590	Exploratory Assessment	4d	14-Aug-06 A	17-Aug-06 A
A6600	2-Hour Meeting With CEC	0d	25-Sep-06 A	
Feasibility (2 Designs)		41d	07-Aug-06 A	03-Oct-06 A
A6610	Roads Feasibility Assessment	9d	12-Sep-06 A	25-Sep-06 A
A6620	2-Hour Meeting With CEC - Update	0d	26-Sep-06 A	
A6630	Feasibility Statement Assessment (Not Full Report)	5d	26-Sep-06 A	02-Oct-06 A
A6640	Feasibility Drawings (With Statement Assessment)	5d	26-Sep-06 A	02-Oct-06 A
A6650	With CEC For Approval	0d	03-Oct-06 A	
A6800	Track Feasibility Assessment	20d	07-Aug-06 A	05-Sep-06 A
Preliminary Design (1 Design)		193d	04-Sep-06 A	08-Jun-07 A
A6660	Preliminary Road Design	8d	23-Oct-06 A	01-Nov-06 A
A6670	Preliminary Junction Design	7d	02-Nov-06 A	10-Nov-06 A
A6680	Integration With Traffic Modelling	4d	13-Nov-06 A	17-Nov-06 A
A6690	2-Hour Meeting With CEC - Update (Not Required)	0d	17-Nov-06 A	
A6700	Roads Technical Design Statement (Not Required)	5d	13-Nov-06 A	17-Nov-06 A
A6710	TRO Schedules & Plans (Not Required)	2d	16-Nov-06 A	17-Nov-06 A
A6720	Utilities Design Update	2d	16-Nov-06 A	17-Nov-06 A
A6730	TTROs report and plans (Not Required)	2d	16-Nov-06 A	17-Nov-06 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

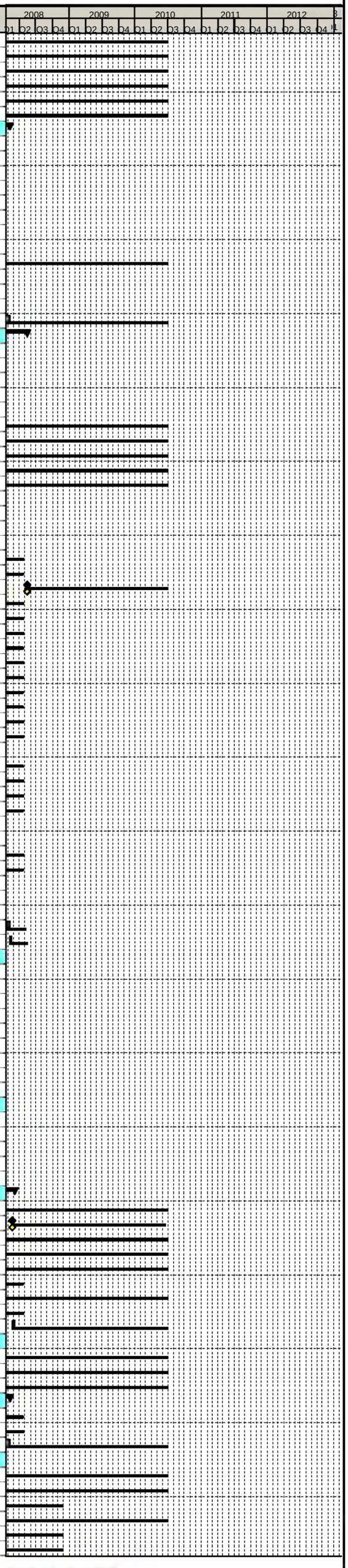
Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

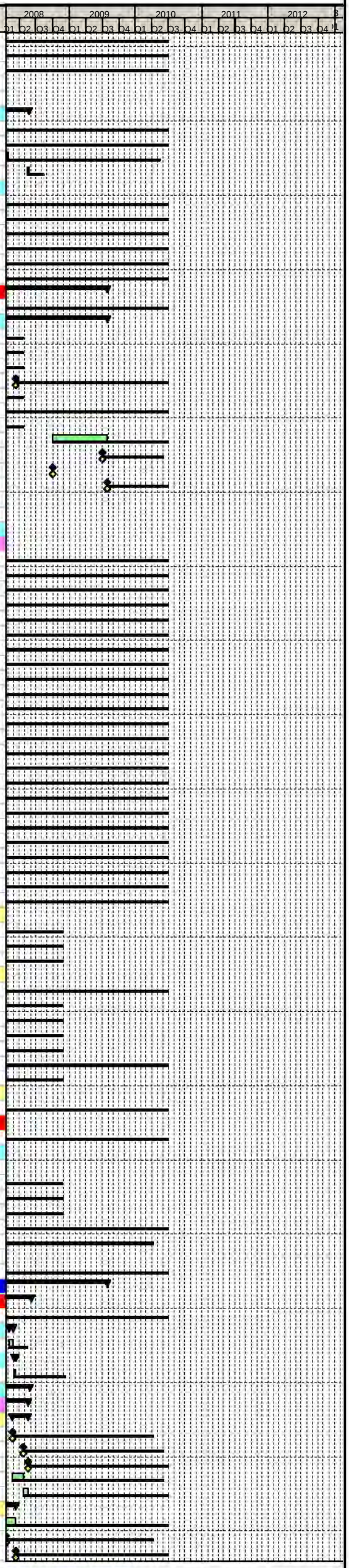
SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
A6810	Preliminary Track Design	5d	16-Oct-06 A	20-Oct-06 A
A6880	Stops Design	9d	16-Oct-06 A	27-Oct-06 A
A6910	Integration With OLE Design	5d	04-Jun-07 A	08-Jun-07 A
A7770	Environmental	5d	16-Oct-06 A	20-Oct-06 A
A7780	Urban Design	5d	16-Oct-06 A	20-Oct-06 A
A7790	Management Support	60d	04-Sep-06 A	30-Nov-06 A
Track (Task300.3.1)		486d	13-Mar-06 A	08-Feb-08
A2360	First Pass Mx Horizontal and Vertical Alignment	47d	13-Mar-06 A	24-May-06 A
A2370	Handover Alignment Design P Way to Roads	0d		25-May-06 A
A2380	Coordination Meeting/Workshop Between PWay/Roads & Resolution of Major Conflicts	1d	25-May-06 A	25-May-06 A
SDS24910	Revise Alignment to Match Roads First Pass Vertical	5d	06-Aug-07 A	10-Aug-07 A
SDS24960	Handover Alignment Design Track to Roads	0d		10-Aug-07 A
SDS25330	Revise Alignment to Inc. Preliminary Design Comments	5d	04-Dec-06 A	11-Dec-06 A
SDS25350	Handover Alignment Design Track to Roads	0d		11-Dec-06 A
SDS57020	Issue Notification Of Completion Letter- Track Alignment Design to tie Section 1B	0d		31-Aug-07 A
SDS67780	Advanced Work on Detailed Design Alignment	5d	04-Sep-06 A	08-Sep-06 A
SDS69820	Revise Alignment to Inc. Preliminary Design Comments	105d	09-Feb-07 A	20-Jul-07 A
SDS69830	Handover Alignment Design Track to Roads	0d		20-Jul-07 A
SDS69880	Final Alignment to Match Roads & Check	3d	23-Aug-07 A	28-Aug-07 A
SDS79300	Address tie Comments, Other Revisions, IDC & Section Submission Package	103d	31-Aug-07 A	08-Feb-08
Roads, Street Lighting & Landscaping (Task300.3.2)		559d	07-Mar-06 A	15-May-08
A2390	Route Appreciation/Junct Layout & Determine with tie & CEC Works Extent	4d	10-May-06 A	15-May-06 A
A2400	Frontage Surveys	30d	07-Mar-06 A	21-Apr-06 A
A2410	Set Up Mx Models	4d	09-May-06 A	12-May-06 A
A2420	Produce Preliminary Horizontal Road Alignment Design (Inc Lanes & Parking Zones)	8d	16-May-06 A	25-May-06 A
A2430	Preliminary Rd Junction Configuration Design	4d	26-May-06 A	01-Jun-06 A
A2440	Preliminary Road Safety Audit	2d	29-Jun-06 A	30-Jun-06 A
A2450	Review & Amend TRO Drawings & Schedules for Modifications Required Post Prelim Design	3d	12-Jun-06 A	14-Jun-06 A
A2460	Handover Alignment Design Roads to Pway	0d		30-Jun-06 A
A2470	Coordination Meeting/Workshop Between Roads & Pway Teams	1d	30-Jun-06 A	30-Jun-06 A
A5460	Undertake Road Marking, Pedestrian Req & Traffic Signalling Design	4d	26-May-06 A	01-Jun-06 A
SDS24920	Produce First Pass Vertical Alignment	8d	14-Aug-07 A	23-Aug-07 A
SDS24940	Handover Alignment Design Roads to Pway	0d		24-Aug-07 A
SDS24970	Revise Vertical Alignment to Match Final Track Alignment	12d	28-Aug-07 A	13-Sep-07 A
SDS24980	Horizontal & Vertical Alignment Design Complete	0d		13-Sep-07 A
SDS24990	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 1B	0d		05-Nov-07 A
SDS25000	Cross Check all Horizontal Design Aspects With Vertical Alignment	2d	01-Oct-07 A	02-Oct-07 A
SDS25040	Issue Construction Drawings	0d		15-May-08
SDS25050	Road Safety Audit Stage 2 (Intermediate)	9d	03-Oct-07 A	16-Oct-07 A
SDS25060	Insert Intermediate RSA Comments	4d	17-Oct-07 A	22-Oct-07 A
SDS25070	Produce Site Clearance Drawings & Schedule	53d	02-Aug-07 A	22-Oct-07 A
SDS25080	Produce Fencing, Barriers & Guardrails Design	34d	03-Sep-07 A	22-Oct-07 A
SDS25090	Produce Street Lighting Design (& Liaise With OLE)	182d	01-Feb-07 A	06-Nov-07 A
SDS25100	Produce Traffic Signal Only Ducting	33d	04-Sep-07 A	22-Oct-07 A
SDS25110	Produce Soft Landscaping Design	39d	12-Sep-07 A	08-Nov-07 A
SDS25120	Produce Traffic Signals Layout	16d	02-Aug-07 A	24-Aug-07 A
SDS25130	Produce Traffic Signs Design (Signs, Markings, Signals)	53d	02-Aug-07 A	22-Oct-07 A
SDS25140	Produce Earthworks Design (NOT REQUIRED)	1d	03-Sep-07 A	03-Sep-07 A
SDS25360	Revise Alignment to Inc. Final Track Horizontal Alignment (Horizontal Design Freeze) & Issue to Substn Designers	61d	01-May-07 A	01-Aug-07 A
SDS25370	Produce Kerbs, Footway & Paved Area Design	53d	02-Aug-07 A	22-Oct-07 A
SDS25380	Produce Pavement Design	33d	04-Sep-07 A	22-Oct-07 A
SDS56210	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 1B	0d		09-Nov-07 A
SDS56750	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 1B	0d		09-Nov-07 A
SDS59670	Advise Track, Stops, Modellers Changes To Accom RSA1 & PD Comments	5d	29-Nov-06 A	06-Dec-06 A
SDS59680	Pass Guidance/Envelope To Track & Others As Necessary	0d		07-Dec-06 A
SDS67240	Street Lighting Survey Work	17d	07-Nov-06 A	30-Nov-06 A
SDS69630	Produce Hard Landscaping Design NOT REQUIRED	75d	04-Jun-07 A	24-Sep-07 A
SDS69840	Resolution of Red Issues (tie Approval)	0d	13-Jul-07 A	
SDS69850	Advise Track, Stops, Modellers Changes To Accom RSA1 & PD Comments	34d	10-Apr-07 A	01-Jun-07 A
SDS69860	Pass Guidance/Envelope To Track & Others As Necessary	0d		01-Jun-07 A
SDS79940	Final RSA	9d	29-Jan-08	11-Feb-08
SDS79950	Incorporate Final RSA Comments	5d	12-Feb-08	18-Feb-08
VO147 Bottom of Leith Walk		156d	06-Dec-06 A	20-Jul-07 A
VO1670	Track	70d	06-Dec-06 A	28-Mar-07 A
VO1680	OLE	112d	06-Dec-06 A	04-Jun-07 A
VO1690	Traffic/Junction Modelling	94d	06-Dec-06 A	04-May-07 A
VO1700	Runtime Simulation	112d	06-Dec-06 A	04-Jun-07 A
VO1710	TRO	112d	06-Dec-06 A	04-Jun-07 A
VO1720	Roads	139d	06-Dec-06 A	13-Jul-07 A
VO1730	Systems and Communications	115d	06-Dec-06 A	08-Jun-07 A
VO1740	Utilities	5d	06-Dec-06 A	12-Dec-06 A
VO1750	Reporting and review	5d	16-Jul-07 A	20-Jul-07 A
VO148 Bus Provision for Foot of the walk and Constiution Street		46d	06-Dec-06 A	16-Feb-07 A
VO2290	Track	25d	06-Dec-06 A	19-Jan-07 A
VO2300	Tram stops	25d	06-Dec-06 A	19-Jan-07 A
VO2310	Roads	39d	06-Dec-06 A	09-Feb-07 A
VO2320	Urban Design	25d	06-Dec-06 A	19-Jan-07 A
VO2330	Reporting and Review	5d	12-Feb-07 A	16-Feb-07 A
Drainage		253d	12-Mar-07 A	10-Mar-08
SDS71070	Hydraulic Modelling & First Pass Drainage Design	127d	12-Mar-07 A	21-Sep-07 A
SDS71080	Receipt of Drainage Survey Information	0d		25-Feb-08*
SDS71090	Outfall Consent/Approval from SW (NOT REQUIRED)	0d		28-Aug-07 A
SDS71100	Outfall Consent/Approval from CEC (NOT REQUIRED)	0d		28-Aug-07 A
SDS71110	Outfall Consent/Approval from SEPA	0d		07-May-07 A
SDS71130	Issue Drainage Design Completion Letter to tie for Approval Section 1B INCLUDED IN ROADS SUBMISSION	0d		07-Nov-07 A
SDS73180	Detailed Drainage Design and Review of Hydraulic Modelling	16d	31-Aug-07 A	24-Sep-07 A
SDS80670	Final Detailed Drainage Design	8d	17-Oct-07 A	29-Oct-07 A
SDS80680	Confirm Drainage and amend if necessary	9d	25-Feb-08	10-Mar-08
Traffic Modelling		45d	22-May-06 A	21-Jul-06 A
SDS56020	JRC Receive Junction Layouts	0d		22-May-06 A
SDS56030	JRC Prepare VISSIM Initial Traffic Flows (Low Level Model)	9d	05-Jun-06 A	16-Jun-06 A
SDS56040	SDS Produce LINSIG/TRANSYT Assessments (Iteration 1)	14d	03-Jul-06 A	21-Jul-06 A
Boundary & Accomodation Works (Task300.3.4)		208d	16-Apr-07 A	08-Feb-08
SDS41830	Detailed Design of Boundary & Accomodation Works	99d	16-Apr-07 A	13-Sep-07 A
SDS41840	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 1B	0d		14-Sep-07 A
SDS41850	Additional Boundary and Accommodation Works and Review	53d	14-Nov-07 A	08-Feb-08
Utilities Plates 22 to 31		378d	06-Mar-06 A	27-Aug-07 A
A11370	Close Out PD Issues & Propose Diversions	52d	29-Aug-06 A	13-Nov-06 A
A11380	Issue PD to SUCs	0d		16-Oct-06 A
A11390	Consult SUCs and MUDFA (at later stage - when appointed)	53d	30-Oct-06 A	23-Jan-07 A
A11400	Access to MUDFA	0d		23-Oct-06 A
A11410	Issue For IDC	0d		23-Jan-07 A
A11420	IDC For Utilities	9d	24-Jan-07 A	06-Feb-07 A



Activity ID	Activity Name	Original Duration	Start	Finish
A11430	Issue to SUCs	0d		06-Feb-07 A
A11440	SUCs Approval	112d	06-Feb-07 A	26-Jul-07 A
A11450	Compile First Draft IFC Drawings Section 1B	21d	26-Jul-07 A	27-Aug-07 A
UTIL040	Section 1B - Pre-Preliminary Design (Utilities)	46d	06-Mar-06 A	16-May-06 A
UTIL300	Issue to Statutory Utility Companies (SUCs)	0d		16-May-06 A
TRO's (Task300.3.6)		518d	10-May-06 A	22-May-08
SDS33110	Collate Exisiting TROs	42d	10-May-06 A	12-Jul-06 A
SDS33120	Receive Preliminary Roads Design	0d		12-Jul-06 A
SDS81930	Interim TRO Design Section 1B	5d	28-Jan-08*	01-Feb-08
SDS81940	Final TRO Design Section 1B	5d	16-May-08	22-May-08
TTRO's (Task300.3.7)		186d	29-Aug-06 A	24-May-07 A
TTRO220	SDS Produce Affected Roads Listing For MUDFA Works	64d	29-Aug-06 A	30-Nov-06 A
TTRO270	SDS Produce Affected Roads Listing For INFRACO Works	36d	12-Mar-07 A	04-May-07 A
TTRO400	Dundas & Wilson Draft TTRO Schedule For MUDFA Works	6d	01-Dec-06 A	08-Dec-06 A
TTRO430	Dundas & Wilson Draft TTRO Schedule For INFRACO Works	23d	29-Mar-07 A	04-May-07 A
TTRO480	Issue Affected Roads Listing For MUDFA Works To Dundas & Wilson Section 1B	0d		30-Nov-06 A
TTRO500	Issue Affected Roads Listing For INFRACO Works To Dundas & Wilson Section 1B	0d		24-May-07 A
MDR - BAS		986d	19-Sep-05 A	28-Jul-09
CON-0190	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Balfour Street (Task300.3.8)		824d	03-May-06 A	28-Jul-09
A24940	Prepare Tram Stop Planning Submission Drawings for issue Planning Drawing Team	71d	01-Jun-07 A	17-Sep-07 A
A24950	Produce Engineering Detailed Design Drawings	38d	18-Sep-07 A	13-Nov-07 A
A25180	Issue Notification Of Completion Letter- Balfour Street Tram Stop Design to tie	0d		13-Nov-07 A
A25920	Tram Stop Design Complete - Drawings Issued for Construction	0d		14-Mar-08
A27430	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Mar-07 A	02-Mar-07 A
A28240	Redraw - Due to Moving Moving Stop 25m	8d	10-Oct-06 A	19-Oct-06 A
A43970	Prepare Detailed Design Stop Drawings	66d	17-Nov-06 A	02-Mar-07 A
A47240	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47250	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47260	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47270	Issue Final As Built Drawings	0d		28-Jul-09
A4770	General Arrangement Drawings	35d	03-May-06 A	23-Jun-06 A
A5150	Issue Tram Stop GA Drawings for Balfour Street	0d		30-Jun-06 A
Structures		392d	13-Mar-06 A	20-Sep-07 A
S18 - Leith Walk Railway Bridge (Task300.3.9)		392d	13-Mar-06 A	20-Sep-07 A
SDS44640	Review of Previous Work	9d	13-Mar-06 A	24-Mar-06 A
SDS44650	Optioneering	5d	27-Mar-06 A	31-Mar-06 A
SDS44660	Initial Design	12d	24-Apr-06 A	11-May-06 A
SDS44670	Production of AIP Drawing	8d	02-May-06 A	11-May-06 A
SDS44680	Issue AIP Drawing to tie	0d		12-May-06 A
SDS44690	Checking	4d	12-May-06 A	17-May-06 A
SDS44700	tie AIP Drawing Review Period	4d	12-May-06 A	17-May-06 A
SDS44710	Undertake Consultations	6d	12-May-06 A	19-May-06 A
SDS44720	Receive AIP Drawing Comments from tie	0d		17-May-06 A
SDS44730	Incorporate tie Comments into AIP Drawing	23d	18-May-06 A	21-Jun-06 A
SDS44740	Production of AIP Document	7d	22-Jun-06 A	30-Jun-06 A
SDS44750	Issue Leith Walk AIP Document to tie	0d		30-Jun-06 A
SDS44760	tie AIP Document Review Period	5d	22-Jun-06 A	28-Jun-06 A
SDS44770	Receive AIP Document Comments from tie	0d		28-Jun-06 A
SDS44780	Incorporate tie Comments into AIP Document	4d	23-Jun-06 A	28-Jun-06 A
SDS44790	Issue AIP Document & Drawing to TAA	0d		14-Aug-06 A
SDS44800	TAA AIP Document & Drawing Review Period	9d	14-Aug-06 A	28-Aug-06 A
SDS44810	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS44820	Planning Department AIP Document & Drawing Review Period	74d	11-Jul-06 A	30-Oct-06 A
SDS44830	Recieve AIP Document & Drawing Comments from TAA	0d		23-Oct-06 A
SDS44840	Incorporate TAA Comments into AIP Document & Drawing	5d	23-Oct-06 A	27-Oct-06 A
SDS44850	Recieve AIP Document & Drawing Comments from Planning Department	0d		30-Oct-06 A
SDS44860	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	31-Oct-06 A	06-Nov-06 A
SDS44870	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		12-Dec-06 A
Leith Walk Rail Bridge Preliminary Design Milestones		89d	09-Aug-06 A	12-Dec-06 A
A7820	Receipt of tie PD Acceptance	0d		09-Aug-06 A
A7830	Receipt of Alignment Prelim Design Package	0d		23-Oct-06 A
A7850	Receipt of Approved and Signed AIP Document	0d		12-Dec-06 A
Leith Walk Rail Bridge Structure Assessment		83d	13-Nov-06 A	16-Mar-07 A
A47960	Detailed Design Resourcing	79d	13-Nov-06 A	16-Mar-07 A
A7860	Structure Assessment	34d	13-Nov-06 A	09-Jan-07 A
A7870	Issue Structure Assessment Package to CAT I Checker	0d		09-Jan-07 A
A7880	Structure Assessment Package CAT I Check	31d	10-Jan-07 A	23-Feb-07 A
A7890	Receive and Incoporate CAT I Comments	5d	26-Feb-07 A	02-Mar-07 A
A7900	Issue Leith Walk Rail Bridge Assessment Report to tie (NOT REQ. DIRECT TO CEC)	0d		16-Mar-07 A
SDS61910	IDC	9d	05-Mar-07 A	16-Mar-07 A
Leith Walk Rail Bridge Issue Structure Assessment Package for Construction / Fabrication		0d	20-Sep-07 A	20-Sep-07 A
A8020	IFC NOT REQUIRED-SEE CORRESPONDENCE TO TIE 20/9/07	0d		20-Sep-07 A
BAS - FOW		556d	19-Sep-05 A	14-Nov-07 A
CON-0220	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Leith Walk 163 Substation (Task300.3.11)		391d	08-May-06 A	14-Nov-07 A
A548950	Preliminary Design of Substation	19d	08-May-06 A	02-Jun-06 A
A549140	Detailed Design Civils	173d	20-Feb-07 A	09-Nov-07 A
A549150	Detailed Architecture Design	230d	17-Nov-06 A	09-Nov-07 A
A549160	IDC on Detailed Design (Inc. Systems Assurance)	9d	01-Nov-07 A	14-Nov-07 A
A549170	Issue Notification Of Completion Letter- Tram Leith Walk 163 Substation Planning Submission to tie for Approval	0d		01-Oct-07 A
A549630	Batch 1/09 Tram Leith Walk 163 Substation - Collation of Planning Drawings	3d	08-Nov-07 A	13-Nov-07 A
A550030	Substation Consultation Period	28d	19-Jun-06 A	27-Jul-06 A
A550150	Issue of Leith Walk Substation Design	0d		30-Jun-06 A
PSW - MDR - Section 1C (Task300.4)		986d	19-Sep-05 A	28-Jul-09
Sub Section Wide		575d	06-Mar-06 A	05-Jun-08
SDS69430	SDM Design Interface Review Meetings	1d	01-Dec-06 A	02-Dec-06 A
Sub Section Wide IDC		20d	04-Feb-08	29-Feb-08
A40191	Subsection Wide IDC	19d	04-Feb-08	29-Feb-08
Design Assurance Review		10d	03-Mar-08	14-Mar-08
SDS67930	Produce Design Assurance Statement	9d	03-Mar-08	14-Mar-08
Consents & Approvals		237d	25-Jun-07 A	29-May-08
Prior Approvals		228d	25-Jun-07 A	19-May-08
Combined Section Prior Approval		60d	25-Feb-08	19-May-08
A25230	Issue Combined Package 1C for Prior Approval to CEC	0d		25-Feb-08
A25240	Receive Combined Package 1C Comments From CEC	0d		21-Apr-08
A25280	Prior Approval Granted for Section 1C Combined Package	0d		19-May-08
A40210	CEC Approval Period - 1C Combined Package	38d	25-Feb-08	21-Apr-08
A40220	Update 1C Combined Package to CEC Comments	19d	21-Apr-08	19-May-08
Batch 1/11		97d	22-Oct-07 A	14-Mar-08
SDS78200	Batch 1/11 Formal Approval Period	38d	18-Jan-08	13-Mar-08
SDS78210	Issue Batch 1/11 For Approval to CEC	0d	18-Jan-08	
SDS78220	Receive CEC Prior Approval For Batch 1/11	0d	14-Mar-08	



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

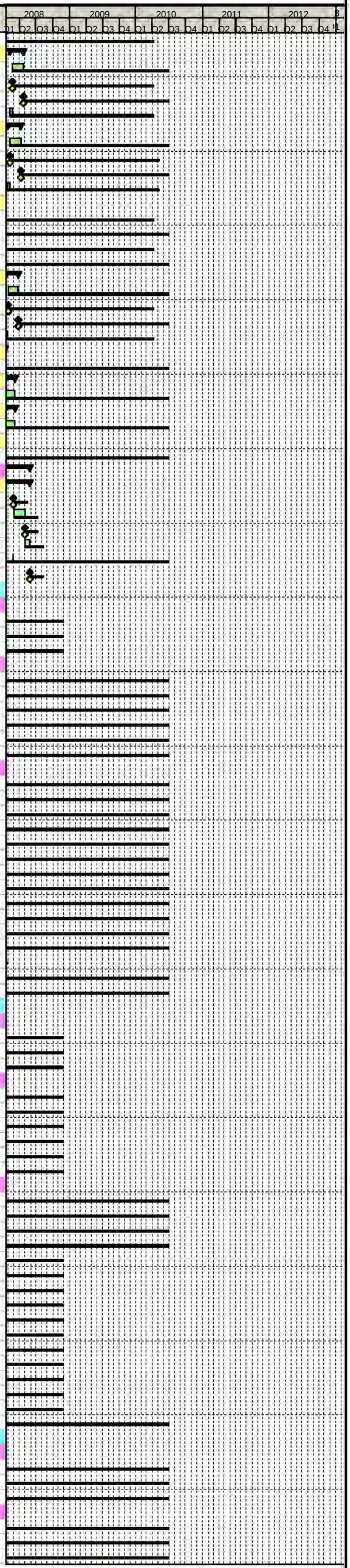
Trams for Edinburgh
...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS78250	Batch 1/11 McDonald Road Tramstop - Collation of Planning Drawings	54d	22-Oct-07 A	17-Jan-08
Batch 1/12		52d	11-Feb-08	23-Apr-08
SDS78260	Batch 1/12 Formal Approval Period	38d	25-Feb-08	22-Apr-08
SDS78270	Issue Batch 1/12 For Approval to CEC	0d	25-Feb-08	
SDS78280	Receive CEC Prior Approval For Batch 1/12	0d	23-Apr-08	
SDS78310	Batch 1/12 Picardy Place Tramstop - Collation of Planning Drawings	9d	11-Feb-08*	22-Feb-08
Batch 1/13		52d	28-Jan-08	09-Apr-08
SDS78320	Batch 1/13 Formal Approval Period	38d	11-Feb-08	08-Apr-08
SDS78330	Issue Batch 1/13 For Approval to CEC	0d	11-Feb-08	
SDS78340	Receive CEC Prior Approval For Batch 1/13	0d	09-Apr-08	
SDS78370	Batch 1/13 York Place - Collation of Planning Drawings	9d	28-Jan-08*	08-Feb-08
Batch 1/14 Tram Cathedral Lane Substation		91d	25-Jun-07 A	29-Oct-07 A
A27890	Issue Tram Catherdral Lane Substation Design To CEC For Planning Permission	0d		17-Aug-07 A
A27900	Planning Permission Granted For Tram Cathedral Lane Substation	0d		29-Oct-07 A
A41120	Informal Consultation With CEC & tie Over Planning Permission Tram Catherdral Lane Substation	38d	25-Jun-07 A	17-Aug-07 A
A41130	Batch 1/14 Formal Approval Period	48d	17-Aug-07 A	29-Oct-07 A
Batch 1/15		52d	16-Jan-08	28-Mar-08
SDS78440	Batch 1/15 Formal Approval Period	38d	30-Jan-08	27-Mar-08
SDS78450	Issue Batch 1/15 For Approval to CEC	0d	30-Jan-08	
SDS78460	Receive CEC Prior Approval For Batch 1/15	0d	28-Mar-08	
SDS78490	Batch 1/15 St Andrew Square Tramstop - Collation of Planning Drawings	9d	16-Jan-08*	29-Jan-08
Roads, Track, OLE, Landscaping, Street Lighting		93d	27-Aug-07 A	14-Jan-08
SDS25680	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	88d	27-Aug-07 A	14-Jan-08
Tram Stop Picardy Place		40d	14-Jan-08	07-Mar-08
A40290	Informal Consultation With CEC & tie over Prior Approval Tram stop Piccardy Place	38d	14-Jan-08	07-Mar-08
Tram Stop St. Andrew Square		40d	14-Jan-08	07-Mar-08
A40260	Informal Consultation With CEC & tie over Prior Approval Tram Stop St Andrew Square	38d	14-Jan-08	07-Mar-08
Tram Stop McDonald Road		55d	27-Aug-07 A	12-Nov-07 A
A40320	Informal Consultation With CEC & tie over Prior Approval Tram Stop MacDonald Road	52d	27-Aug-07 A	12-Nov-07 A
Technical Approvals		127d	26-Nov-07 A	29-May-08
Roads inc Drainage Technical Approval		127d	26-Nov-07 A	29-May-08
SDS25690	Issue Roads Design to Roads Authority for Approval	0d		29-Feb-08
SDS25700	Roads Authority Approval Period	38d	03-Mar-08	29-Apr-08
SDS25710	Receive Roads Authority Comments	0d		29-Apr-08
SDS25720	Update to Roads Authority Comments	19d	30-Apr-08	29-May-08
SDS25730	Roads Authority Informal Consultation	60d	26-Nov-07 A	29-Feb-08
SDS25800	Roads Technical Approval Granted	0d		29-May-08
VO22 Charette Changes St Andrew Square CNB010		123d	17-Jul-06 A	15-Jan-07 A
Optioneering		21d	14-Aug-06 A	12-Sep-06 A
A1030	Receive Notice to Proceed from Client	0d	12-Sep-06 A	
A2830	Exploratory Assessment	4d	14-Aug-06 A	17-Aug-06 A
A2840	2-Hour Meeting With CEC	0d	18-Aug-06 A	
Feasibility (2 Designs)		56d	17-Jul-06 A	02-Oct-06 A
A2850	Roads Feasibility Assessment	33d	07-Aug-06 A	25-Sep-06 A
A2860	2-Hour Meeting With CEC - Update	0d	26-Sep-06 A	
A2870	Feasibility Statement Assessment (Not Full Report)	5d	26-Sep-06 A	02-Oct-06 A
A2990	Feasibility Drawings (With Statement Assessment)	5d	26-Sep-06 A	02-Oct-06 A
A3120	With CEC For Approval	0d	02-Oct-06 A	
A6820	Track Feasibility Assessment	47d	17-Jul-06 A	25-Sep-06 A
Preliminary Design (1 Design)		88d	04-Sep-06 A	15-Jan-07 A
A15200	Environmental	5d	02-Oct-06 A	06-Oct-06 A
A15210	Urban Design	5d	16-Oct-06 A	20-Oct-06 A
A15220	Stops Design	9d	23-Oct-06 A	03-Nov-06 A
A15230	Management Support	60d	04-Sep-06 A	30-Nov-06 A
A3250	Preliminary Road Design	5d	23-Oct-06 A	27-Oct-06 A
A3380	Preliminary Junction Design	5d	30-Oct-06 A	03-Nov-06 A
A3510	Integration With Traffic Modelling	5d	06-Nov-06 A	10-Nov-06 A
A3630	2-Hour Meeting With CEC - Update (Not Required)	0d	13-Nov-06 A	
A3750	Roads Technical Design Statement (Not Required)	5d	06-Nov-06 A	10-Nov-06 A
A3880	TRO Schedules & Plans (Not Required)	5d	13-Nov-06 A	17-Nov-06 A
A4140	Utilities Design Update	5d	13-Nov-06 A	17-Nov-06 A
A4150	TTROs report and plans (Not Required)	5d	13-Nov-06 A	17-Nov-06 A
A4330	4-hour Meeting With CEC for Approval	0d	06-Dec-06 A	
A6830	Preliminary Track Design	5d	16-Oct-06 A	20-Oct-06 A
A6920	Integration With OLE Design	33d	17-Nov-06 A	15-Jan-07 A
VO24 Charette Changes Princes Street CNB012		88d	01-Aug-06 A	30-Nov-06 A
Optioneering		30d	14-Aug-06 A	25-Sep-06 A
A5980	Receive Notice to Proceed from Client	0d	25-Sep-06 A	
A5990	Exploratory Assessment	4d	14-Aug-06 A	17-Aug-06 A
A6000	2-Hour Meeting With CEC	0d	25-Sep-06 A	
Feasibility (2 Designs)		40d	01-Aug-06 A	26-Sep-06 A
A6010	Roads Feasibility Assessment	9d	12-Sep-06 A	25-Sep-06 A
A6020	2-Hour Meeting With CEC - Update	0d	26-Sep-06 A	
A6030	Feasibility Statement Assessment (Not Full Report)	5d	19-Sep-06 A	25-Sep-06 A
A6040	Feasibility Drawings (With Statement Assessment)	5d	19-Sep-06 A	25-Sep-06 A
A6050	With CEC For Approval	0d	25-Sep-06 A	
A6840	Track Feasibility Assessment	9d	01-Aug-06 A	14-Aug-06 A
Preliminary Design (1 Design)		64d	04-Sep-06 A	30-Nov-06 A
A15160	Environmental	5d	02-Oct-06 A	06-Oct-06 A
A15170	Urban Design	5d	16-Oct-06 A	20-Oct-06 A
A15180	Stops Design	9d	23-Oct-06 A	03-Nov-06 A
A15190	Management Support	60d	04-Sep-06 A	30-Nov-06 A
A6060	Preliminary Road Design	8d	03-Oct-06 A	12-Oct-06 A
A6070	Preliminary Junction Design	7d	13-Oct-06 A	23-Oct-06 A
A6080	Integration With Traffic Modelling	5d	24-Oct-06 A	30-Oct-06 A
A6090	2-Hour Meeting With CEC - Update (Not Required)	0d	31-Oct-06 A	
A6100	Roads Technical Design Statement (Not Required)	5d	23-Oct-06 A	27-Oct-06 A
A6110	TRO Schedules & Plans (Not Required)	5d	31-Oct-06 A	06-Nov-06 A
A6120	Utilities Design Update	9d	31-Oct-06 A	13-Nov-06 A
A6130	TTROs report and plans (Not Required)	9d	31-Oct-06 A	13-Nov-06 A
A6150	Preliminary Design Submission (Not Required)	5d	14-Nov-06 A	20-Nov-06 A
A6160	IDCs (Not Required)	5d	13-Nov-06 A	17-Nov-06 A
A6850	Preliminary Track Design	5d	16-Oct-06 A	20-Oct-06 A
A6930	Integration With OLE Design	5d	23-Oct-06 A	27-Oct-06 A
VO25 Charette Changes Picardy Place CNB013		91d	01-Aug-06 A	06-Dec-06 A
Optioneering		21d	14-Aug-06 A	12-Sep-06 A
A6180	Receive Notice to Proceed from Client	0d	12-Sep-06 A	
A6190	Exploratory Assessment	4d	14-Aug-06 A	17-Aug-06 A
A6200	2-Hour Meeting With CEC	0d	12-Sep-06 A	
Feasibility (2 Designs)		36d	01-Aug-06 A	20-Sep-06 A
A6210	Roads Feasibility Assessment	24d	07-Aug-06 A	12-Sep-06 A
A6220	2-Hour Meeting With CEC - Update	0d	13-Sep-06 A	
A6230	Feasibility Statement Assessment (Not Full Report)	5d	13-Sep-06 A	19-Sep-06 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

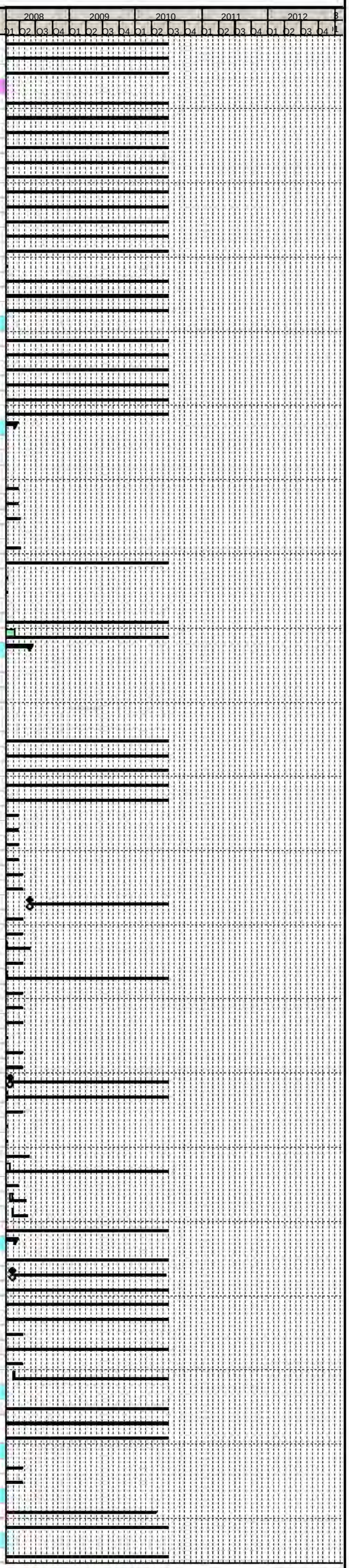
Trams for Edinburgh
...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
A6240	Feasibility Drawings (With Statement Assessment)	5d	13-Sep-06 A	19-Sep-06 A
A6250	With CEC For Approval	0d	20-Sep-06 A	
A6860	Track Feasibility Assessment	9d	01-Aug-06 A	14-Aug-06 A
Preliminary Design (1 Design)		67d	04-Sep-06 A	06-Dec-06 A
A15130	Urban Design	5d	16-Oct-06 A	20-Oct-06 A
A15140	Stops Design	9d	23-Oct-06 A	03-Nov-06 A
A15150	Management Support	60d	04-Sep-06 A	30-Nov-06 A
A6260	Preliminary Road Design	33d	25-Sep-06 A	10-Nov-06 A
A6270	Preliminary Junction Design	30d	05-Oct-06 A	17-Nov-06 A
A6280	Integration With Traffic Modelling	5d	13-Nov-06 A	17-Nov-06 A
A6290	2-Hour Meeting With CEC - Update (Not Required)	0d	17-Nov-06 A	
A6300	Roads Technical Design Statement (Not Required)	23d	16-Oct-06 A	17-Nov-06 A
A6310	TRO Schedules & Plans (Not Required)	2d	16-Nov-06 A	17-Nov-06 A
A6320	Utilities Design Update	2d	16-Nov-06 A	17-Nov-06 A
A6330	TTROs report and plans (Not Required)	2d	16-Nov-06 A	17-Nov-06 A
A6370	4-hour Meeting With CEC for Approval	0d	06-Dec-06 A	
A6870	Preliminary Track Design	5d	16-Oct-06 A	20-Oct-06 A
A6940	Integration With OLE Design	5d	20-Nov-06 A	24-Nov-06 A
A9510	Environmental	5d	02-Oct-06 A	06-Oct-06 A
VO212 St Andrew Square Design Acceleration		18d	22-Oct-07 A	14-Nov-07 A
SDS81360	St Andrew Square Design Acceleration Roads	17d	22-Oct-07 A	14-Nov-07 A
SDS81370	St Andrew Square Design Acceleration OLE	17d	22-Oct-07 A	14-Nov-07 A
SDS81380	St Andrew Square Design Acceleration Traffic Modelling	17d	22-Oct-07 A	14-Nov-07 A
SDS81390	St Andrew Square Design Acceleration Track layouts and iterations with Roads team	17d	22-Oct-07 A	14-Nov-07 A
SDS81400	St Andrew Square Design Acceleration Tram Stop cooridination and development	17d	22-Oct-07 A	14-Nov-07 A
SDS81410	St Andrew Square Design Acceleration Utilities	17d	22-Oct-07 A	14-Nov-07 A
Track (Task300.4.1)		508d	09-Mar-06 A	07-Mar-08
A2480	First Pass Mx Horizontal and Vertical Alignment	53d	09-Mar-06 A	31-May-06 A
A2490	Handover Alignment Design P Way to Roads	0d		01-Jun-06 A
A2500	Coordination Meeting/Workshop Between PWay/Roads & Resolution of Major Conflicts	1d	01-Jun-06 A	01-Jun-06 A
SDS25400	Revise Alignment to Match Roads First Pass Vertical	9d	04-Sep-07 A	17-Sep-07 A
SDS25450	Handover Alignment Design Track to Roads	0d		17-Sep-07 A
SDS25840	Handover Alignment Design Track to Roads	0d		20-Dec-06 A
SDS57030	Issue Notification Of Completion Letter- Track Alignment Design to tie Section 1C	0d		09-Nov-07 A
SDS61080	Revise Alignment to Inc. Preliminary Design Comments	9d	07-Dec-06 A	20-Dec-06 A
SDS67790	Advanced Work on Detailed Design Alignment	8d	29-Aug-06 A	08-Sep-06 A
SDS69890	Revise Alignment to Inc. Preliminary Design Comments	99d	05-Mar-07 A	03-Aug-07 A
SDS69900	Handover Alignment Design Track to Roads	0d		03-Aug-07 A
SDS69920	Final Alignment to Match Roads & Check	32d	18-Sep-07 A	02-Nov-07 A
SDS69970	Advanced Works Of Revise Alignment to Inc. Preliminary Design Comments	1d	09-Feb-07 A	09-Feb-07 A
SDS81010	Address tie comments, Other Revisions, IDC and Section Submission Packages	65d	26-Nov-07 A	07-Mar-08
Roads, Street Lighting & Landscaping (Task300.4.2)		569d	07-Mar-06 A	29-May-08
A2510	Route Appreciation/Junct Layout & Determine with tie & CEC Works Extent	38d	09-Mar-06 A	09-May-06 A
A2520	Frontage Surveys	30d	07-Mar-06 A	21-Apr-06 A
A2530	Set Up Mx Models	26d	13-Mar-06 A	21-Apr-06 A
A2540	Produce Preliminary Horizontal Road Alignment Design (Inc Lanes & Parking Zones)	18d	10-May-06 A	06-Jun-06 A
A2550	Preliminary Rd Junction Configuration Design	5d	07-Jun-06 A	13-Jun-06 A
A2560	Preliminary Road Safety Audit	4d	27-Jun-06 A	30-Jun-06 A
A2570	Review & Amend TRO Drawings & Schedules for Modifications Required Post Prelim Design	3d	12-Jun-06 A	14-Jun-06 A
A2580	Handover Alignment Design Roads to Pway	0d		30-Jun-06 A
A2590	Coordination Meeting/Workshop Between Roads & Pway Teams	1d	19-Jun-06 A	19-Jun-06 A
A5470	Undertake Road Marking, Pedestrian Req & Traffic Signalling Design	5d	07-Jun-06 A	13-Jun-06 A
SDS25410	Produce First Pass Vertical Alignment	9d	20-Aug-07 A	03-Sep-07 A
SDS25430	Handover Alignment Design Roads to Pway	0d		03-Sep-07 A
SDS25460	Revise Vertical Alignment to Match Final Track Alignment	42d	18-Sep-07 A	19-Nov-07 A
SDS25470	Horizontal & Vertical Alignment Design Complete	0d		19-Nov-07 A
SDS25480	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 1C	0d		19-Dec-07 A
SDS25490	Cross Check all Horizontal Design Aspects With Vertical Alignment	3d	27-Nov-07 A	29-Nov-07 A
SDS25530	Issue Construction Drawings	0d		29-May-08
SDS25560	Produce Site Clearance Drawings & Schedule	60d	29-Aug-07 A	26-Nov-07 A
SDS25570	Produce Fencing, Barriers & Guardrails Design	24d	22-Oct-07 A	26-Nov-07 A
SDS25580	Produce Street Lighting Design (& Liaise With OLE)	227d	01-Feb-07 A	21-Jan-08
SDS25590	Produce Traffic Signal Only Ducting	10d	12-Nov-07 A	26-Nov-07 A
SDS25600	Produce Soft Landscaping Design	42d	12-Nov-07 A	21-Jan-08
SDS25610	Produce Traffic Signals Layout	60d	29-Aug-07 A	26-Nov-07 A
SDS25620	Produce Traffic Signs Design (Signs, Markings, Signals)	60d	29-Aug-07 A	26-Nov-07 A
SDS25630	Produce Earthworks Design (NOT REQUIRED)	1d	03-Sep-07 A	03-Sep-07 A
SDS25850	Revise Alignment to Inc. Final Track Horizontal Alignment (Horizontal Design Freeze)	78d	01-May-07 A	28-Aug-07 A
SDS25860	Produce Kerbs, Footway & Paved Area Design	66d	20-Aug-07 A	26-Nov-07 A
SDS25870	Produce Pavement Design	10d	12-Nov-07 A	26-Nov-07 A
SDS56250	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 1C	0d		11-Feb-08
SDS56760	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 1C	0d		08-Jan-08 A
SDS59310	Compile Planning Drawings	15d	27-Nov-07 A	18-Dec-07 A
SDS59650	Advise Track, Stops, Modellers Changes To Accom RSA1 & PD Comments	26d	24-Apr-07 A	04-Jun-07 A
SDS59660	Pass Guidance/Envelope To Track & Others As Necessary (& Issue to Substn Designers)	0d		02-Jul-07 A
SDS67250	Street Lighting Survey Work	69d	29-Aug-06 A	08-Dec-06 A
SDS69640	Produce Hard Landscaping Design	163d	04-Jun-07 A	11-Feb-08
SDS69910	Resolution of Red Issues (tie Approval)	0d	12-Jul-07 A	
SDS79260	Final RSA	9d	11-Feb-08	22-Feb-08
SDS79270	Incorporate Final RSA Comments	5d	25-Feb-08	29-Feb-08
SDS80990	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 1C (Part Submission Only)	0d		14-Nov-07 A
Drainage		254d	12-Mar-07 A	10-Mar-08
SDS71170	Hydraulic Modelling & First Pass Drainage Design	127d	12-Mar-07 A	21-Sep-07 A
SDS71180	Receipt of Drainage Survey Information	0d		25-Feb-08*
SDS71190	Outfall Consent/Approval from SW (NOT REQUIRED)	0d		28-Aug-07 A
SDS71200	Outfall Consent/Approval from CEC (NOT REQUIRED)	0d		28-Aug-07 A
SDS71210	Outfall Consent/Approval from SEPA	0d		07-May-07 A
SDS71230	Issue Drainage Design Completion Letter to tie for Approval Section 1C ISSUED WITH ROADS	0d		19-Dec-07 A
SDS73190	Detailed Drainage Design and Review of Haydraulic Modelling	2d	21-Sep-07 A	24-Sep-07 A
SDS80690	Final Detailed Drainage Design	34d	22-Oct-07 A	10-Dec-07 A
SDS80700	Confirm Drainage and amend if necessary	9d	26-Feb-08	10-Mar-08
Traffic Modelling		23d	13-Jun-06 A	14-Jul-06 A
SDS56050	JRC Receive Junction Layouts	0d		13-Jun-06 A
SDS56060	JRC Prepare VISSIM Initial Traffic Flows (Low Level Model)	9d	19-Jun-06 A	30-Jun-06 A
SDS56070	SDS Produce LINSIG/TRANSYT Assessments (Iteration 1)	9d	03-Jul-06 A	14-Jul-06 A
Boundary & Accomodation Works (Task300.4.4)		110d	16-Apr-07 A	14-Sep-07 A
SDS41890	Detailed Design of Boundary & Accomodation Works	99d	16-Apr-07 A	13-Sep-07 A
SDS41900	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 1C	0d		14-Sep-07 A
VO140 St Andrew Square Pole Locations		179d	17-Jan-07 A	24-Sep-07 A
VO2600	Ole Re-design	163d	17-Jan-07 A	24-Sep-07 A
VO2610	Site visit	1d	24-Sep-07 A	24-Sep-07 A
VO143 St Andrew Square Island Platform (Not tie approved)		186d	06-Dec-06 A	31-Aug-07 A
VO2450	Track	72d	06-Dec-06 A	30-Mar-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

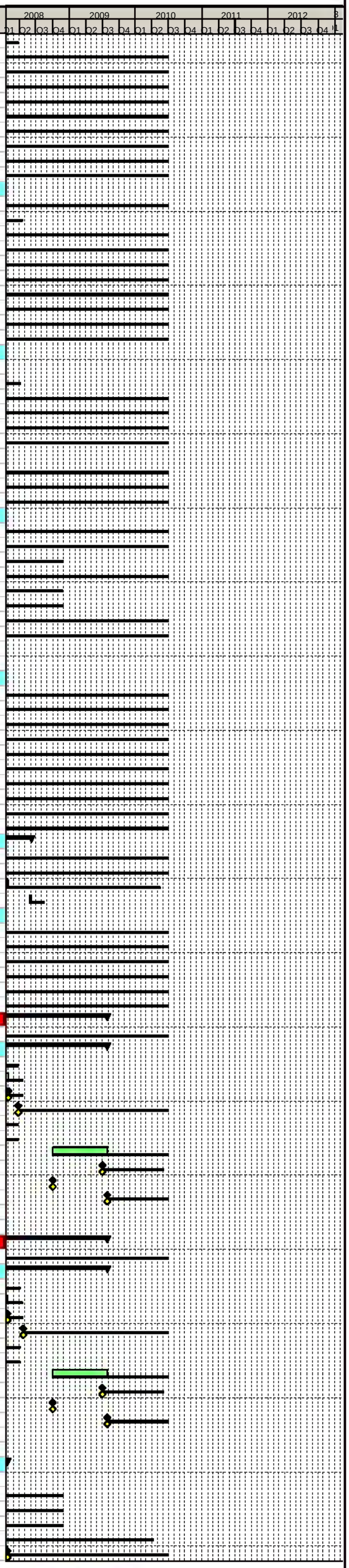
Trams for Edinburgh ...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
VO2460	Tram stops	171d	06-Dec-06 A	31-Aug-07 A
VO2470	OLE	112d	06-Dec-06 A	04-Jun-07 A
VO2480	Trafffic/Junction Modelling	94d	06-Dec-06 A	04-May-07 A
VO2490	Runtime Simulation	112d	06-Dec-06 A	04-Jun-07 A
VO2500	TRO	112d	06-Dec-06 A	04-Jun-07 A
VO2510	Roads	149d	06-Dec-06 A	30-Jul-07 A
VO2520	Utilities	112d	06-Dec-06 A	04-Jun-07 A
VO2530	Urban Design	171d	06-Dec-06 A	31-Aug-07 A
VO2540	Environmental	20d	02-Jul-07 A	30-Jul-07 A
VO2550	Reporting and Review	20d	02-Jul-07 A	30-Jul-07 A
VO145 Princes Street Realignment		191d	06-Dec-06 A	07-Sep-07 A
VO2020	Track	49d	06-Dec-06 A	23-Feb-07 A
VO2030	Tram stops	112d	06-Dec-06 A	04-Jun-07 A
VO2040	Roads	149d	06-Dec-06 A	30-Jul-07 A
VO2050	Urban Design	171d	06-Dec-06 A	31-Aug-07 A
VO2060	OLE	112d	06-Dec-06 A	04-Jun-07 A
VO2070	Trafffic/Junction Modelling	94d	06-Dec-06 A	04-May-07 A
VO2080	Runtime Simulation	112d	06-Dec-06 A	04-Jun-07 A
VO2090	TRO	112d	06-Dec-06 A	04-Jun-07 A
VO2100	Utilities	5d	06-Dec-06 A	12-Dec-06 A
VO2110	Reporting and Review	5d	03-Sep-07 A	07-Sep-07 A
VO146 Picardy Place Concept Revision (Not tie approved)		236d	06-Dec-06 A	09-Nov-07 A
VO1870	Track	218d	06-Dec-06 A	09-Nov-07 A
VO1880	Tram stops	171d	06-Dec-06 A	31-Aug-07 A
VO1890	OLE	112d	06-Dec-06 A	04-Jun-07 A
VO1900	Trafffic/Junction Modelling	94d	06-Dec-06 A	04-May-07 A
VO1910	Runtime Simulation	112d	06-Dec-06 A	04-Jun-07 A
VO1920	TRO	112d	06-Dec-06 A	04-Jun-07 A
VO1930	Roads	149d	06-Dec-06 A	30-Jul-07 A
VO1940	Utilities	5d	06-Dec-06 A	12-Dec-06 A
VO1950	Reporting and Review	5d	03-Sep-07 A	07-Sep-07 A
VO1970	Urban Design	171d	06-Dec-06 A	31-Aug-07 A
Utilities Section 1C1 (Excludes St.A Sq & Yk Place) Plates 32 to 38		378d	06-Mar-06 A	27-Aug-07 A
A11500	Close Out PD Issues & Propose Diversions	41d	29-Aug-06 A	27-Oct-06 A
A11510	Issue PD to SUCs	0d		27-Oct-06 A
A11520	Consult SUCs and MUDFA (at later stage - when appointed)	58d	23-Oct-06 A	24-Jan-07 A
A11530	Access to MUDFA	0d		23-Oct-06 A
A11540	Issue For IDC	0d		24-Jan-07 A
A11550	IDC	10d	25-Jan-07 A	08-Feb-07 A
A11560	Issue to SUCs	0d		08-Feb-07 A
A11570	SUCs Approval	129d	08-Feb-07 A	27-Aug-07 A
UTIL050	Section 1C - Pre-Preliminary Design (Utilities)	69d	06-Mar-06 A	21-Jun-06 A
UTIL400	Issue to Statutory Utility Companies (SUCs)	0d		21-Jun-06 A
Utilities Section 1C2 (St.A Sq & Yk Place) Plates 39 to 46		378d	06-Mar-06 A	27-Aug-07 A
A12460	Close Out PD Issues & Propose Diversions	41d	29-Aug-06 A	27-Oct-06 A
A15000	Issue PD to SUCs	0d		27-Oct-06 A
A15010	Consult SUCs and MUDFA (at later stage - when appointed)	45d	10-Apr-07 A	18-Jun-07 A
A15020	Access to MUDFA	0d		23-Oct-06 A
A15030	Issue For IDC	0d		12-Jun-07 A
A15040	IDC	5d	13-Jun-07 A	20-Jun-07 A
A15050	Issue to SUCs	0d		29-Jun-07 A
A15060	SUCs Approval	38d	29-Jun-07 A	27-Aug-07 A
UTIL180	Section 1C - Pre-Preliminary Design (Utilities)	69d	06-Mar-06 A	21-Jun-06 A
UTIL410	Issue to Statutory Utility Companies (SUCs)	0d		21-Jun-06 A
TRO's (Task300.4.6)		490d	03-Jul-06 A	05-Jun-08
SDS33170	Collate Exisiting TROs	8d	03-Jul-06 A	12-Jul-06 A
SDS33180	Receive Preliminary Roads Design	0d		12-Jul-06 A
SDS81950	Interim TRO Design Section 1C	5d	28-Jan-08*	01-Feb-08
SDS81960	Final TRO Design Section 1C	5d	30-May-08	05-Jun-08
TTRO's (Task300.4.7)		177d	29-Aug-06 A	11-May-07 A
TTRO240	SDS Produce Affected Roads Listing For MUDFA Works	64d	29-Aug-06 A	30-Nov-06 A
TTRO290	SDS Produce Affected Roads Listing For INFRACO Works	36d	12-Mar-07 A	04-May-07 A
TTRO550	Issue Affected Roads Listing For MUDFA Works To Dundas & Wilson Section 1C	0d		30-Nov-06 A
TTRO560	Dundas & Wilson Draft TTRO Schedule For MUDFA Works	0d	01-Dec-06 A	01-Dec-06 A
TTRO660	Issue Affected Roads Listing For INFRACO Works To Dundas & Wilson Section 1C	0d		04-May-07 A
TTRO690	Dundas & Wilson Draft TTRO Schedule For INFRACO Works	5d	04-May-07 A	11-May-07 A
PSW - SAS		986d	19-Sep-05 A	28-Jul-09
CON-0100	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop St. Andrew Square (Task300.4.8)		799d	07-Jun-06 A	28-Jul-09
A25040	Prepare Tram Stop Planning Submission Drawings for Issue to Planning Drawing Team	23d	03-Dec-07 A	11-Jan-08 A
A25050	Produce Engineering Detailed Design Drawings	34d	06-Dec-07 A	01-Feb-08
A25220	Issue Notification Of Completion Letter- St Andrews Square Tram Stop Design to tie	0d		01-Feb-08
A25980	Tram Stop Design Complete - Drawings Issued for Construction	0d		28-Mar-08
A27450	Site Visit with tie & CEC To Review Preliminary Design	1d	06-Aug-07 A	06-Aug-07 A
A44720	Prepare Detailed Design Stop Drawings	253d	17-Nov-06 A	14-Dec-07 A
A47320	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47330	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47340	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47350	Issue Final As Built Drawings	0d		28-Jul-09
A4790	General Arrangement Drawings	12d	07-Jun-06 A	23-Jun-06 A
A5170	Issue Tram Stop GA Drawings for St Andrews Square	0d		30-Jun-06 A
SAS - PIP		986d	19-Sep-05 A	28-Jul-09
CON-0130	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Picardy Place (Task300.4.9)		831d	24-Apr-06 A	28-Jul-09
A25070	Prepare Tram Stop Planning Submission Drawings For Issue to Planning Drawing Team	27d	28-Nov-07 A	15-Jan-08
A25080	Produce Engineering Detailed Design Drawings	33d	03-Dec-07 A	28-Jan-08
A25250	Issue Notification Of Completion Letter- Picardy Place Tram Stop Design to tie	0d		28-Jan-08
A26010	Tram Stop Design Complete - Drawings Issued for Construction	0d		23-Apr-08
A27460	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
A44770	Prepare Detailed Design Stop Drawings	85d	31-Aug-07 A	14-Jan-08
A47360	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47370	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47380	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47390	Issue Final As Built Drawings	0d		28-Jul-09
A4800	General Arrangement Drawings	40d	24-Apr-06 A	23-Jun-06 A
A5180	Issue Tram Stop GA Drawings for Picardy Place	0d		30-Jun-06 A
Tram Cathedral Lane Substation(Task300.4.10)		426d	22-May-06 A	25-Jan-08
A548960	Preliminary Design of Substation	5d	22-May-06 A	26-May-06 A
A549220	Detailed Design Civils	240d	07-Dec-06 A	14-Dec-07 A
A549230	Detailed Architecture Design	166d	15-Sep-06 A	04-Jun-07 A
A549240	IDC on Detailed Design (Inc. Systems Assurance)	66d	26-Jan-07 A	08-May-07 A
A549250	Issue Notification Of Completion Letter- Tram Cathedral Lane Substation Planning Submission to tie for Approval	0d		12-Jul-07 A
A549290	Issue Tram Cathedral Lane Substation For Construction Drawings	0d		25-Jan-08*



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

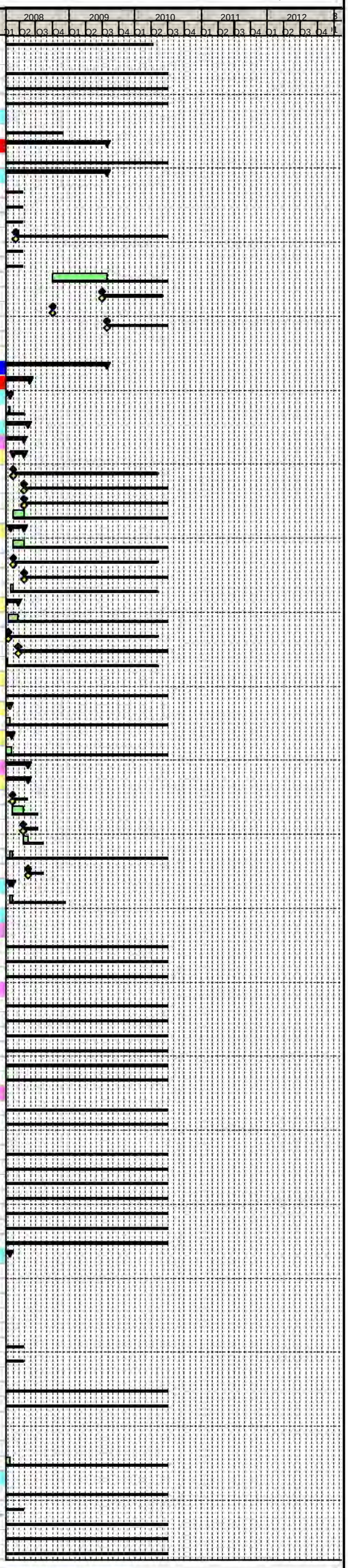
Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
A549640	Compile Substation Planning Submission	60d	28-May-07 A	27-Aug-07 A
A550040	Substation Consultation Period	28d	19-Jun-06 A	27-Jul-06 A
A550160	Issue of Cathedral Substation Design	0d		30-Jun-06 A
SDS68710	Compile Detailed Engineering Drawings Submission	32d	30-Oct-07 A	14-Dec-07 A
SDS68720	Issue Notification Of Completion Letter- Tram Cathedral Lane Substation Detailed Engineering Drawings To tie	0d		17-Dec-07 A
VO176 Cathedral Substation Revision		128d	06-Feb-07 A	02-Aug-07 A
SDS73500	Revision of Cathedral Substation Design	116d	06-Feb-07 A	02-Aug-07 A
PIP - MDR		986d	19-Sep-05 A	28-Jul-09
CON-0160	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop McDonald Road (Task300.4.11)		804d	31-May-06 A	28-Jul-09
A25260	Prepare Tram Stop Planning Submission Drawings For Issue to Planning Drawing Team	38d	11-Jun-07 A	03-Aug-07 A
A25270	Produce Engineering Detailed Design Drawings	89d	02-Jul-07 A	12-Nov-07 A
A25300	Issue Notification Of Completion Letter- McDonald Road Tram Stop Design to tie	0d		12-Nov-07 A
A26040	Tram Stop Design Complete - Drawings Issued for Construction	0d		14-Mar-08
A27470	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
A44780	Prepare Detailed Design Stop Drawings	101d	26-Sep-06 A	02-Mar-07 A
A47400	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47410	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47420	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47430	Issue Final As Built Drawings	0d		28-Jul-09
A4810	General Arrangement Drawings	17d	31-May-06 A	23-Jun-06 A
A5190	Issue Tram Stop GA Drawings for McDonald Road	0d		30-Jun-06 A
HAY - PSW - Section 1D (Task300.5)		986d	19-Sep-05 A	28-Jul-09
Sub Section Wide		595d	30-Jan-06 A	29-May-08
Sub Section Wide IDC		43d	03-Dec-07 A	08-Feb-08
A40241	Subsection Wide IDC	41d	03-Dec-07 A	08-Feb-08
Consents & Approvals		185d	27-Aug-07 A	21-May-08
Prior Approvals		168d	27-Aug-07 A	29-Apr-08
Combined Section Prior Approval		40d	29-Feb-08	25-Apr-08
A25290	Issue Combined Package 1D for Prior Approval to CEC	0d		29-Feb-08
A25330	Receive Combined Package 1D Comments From CEC	0d		25-Apr-08
A25340	Prior Approval Granted for Section 1D Combined Package	0d		25-Apr-08
A40250	CEC Approval Period - 1D Combined Package	38d	29-Feb-08	25-Apr-08
Batch 1/16		52d	15-Feb-08	29-Apr-08
SDS78500	Batch 1/16 Formal Approval Period	38d	29-Feb-08	28-Apr-08
SDS78510	Issue Batch 1/16 For Approval to CEC	0d	29-Feb-08	
SDS78520	Receive CEC Prior Approval For Batch 1/16	0d	29-Apr-08	
SDS78550	Batch 1/16 Princes Street Tramstop - Collation of Planning Drawings	9d	15-Feb-08*	28-Feb-08
Batch 1/17		52d	16-Jan-08	28-Mar-08
SDS78560	Batch 1/17 Formal Approval Period	38d	30-Jan-08	27-Mar-08
SDS78570	Issue Batch 1/17 For Approval to CEC	0d	30-Jan-08	
SDS78580	Receive CEC Prior Approval For Batch 1/17	0d	28-Mar-08	
SDS78610	Batch 1/17 Shandwick Place Tramstop - Collation of Planning Drawings	9d	16-Jan-08*	29-Jan-08
Roads, Track, OLE, Landscaping, Street Lighting		39d	27-Aug-07 A	19-Oct-07 A
SDS26170	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	37d	27-Aug-07 A	19-Oct-07 A
Tram Stop Shandwick Place		113d	27-Aug-07 A	11-Feb-08
A40350	Informal Consultation With CEC & tie over Prior Approval Tram Stop Shandwick Place	107d	27-Aug-07 A	11-Feb-08
Tram Stop Princes Street		113d	04-Sep-07 A	18-Feb-08
A40380	Informal Consultation With CEC & tie over Prior Approval Tram Stop Princes Street West	107d	04-Sep-07 A	18-Feb-08
Technical Approvals		136d	05-Nov-07 A	21-May-08
Roads inc Drainage Technical Approval		136d	05-Nov-07 A	21-May-08
SDS26180	Issue Roads Design to Roads Authority for Approval	0d		22-Feb-08
SDS26190	Roads Authority Approval Period	38d	25-Feb-08	22-Apr-08
SDS26200	Receive Roads Authority Comments	0d		22-Apr-08
SDS26210	Update to Roads Authority Comments	19d	23-Apr-08	21-May-08
SDS26220	Roads Authority Informal Consultation	69d	05-Nov-07 A	22-Feb-08
SDS26290	Roads Technical Approval Granted	0d		21-May-08
Design Assurance Review		10d	11-Feb-08	22-Feb-08
SDS67940	Produce Design Assurance Statement	9d	11-Feb-08	22-Feb-08
VO37 Haymarket Charette Changes		91d	01-Aug-06 A	06-Dec-06 A
Optioneering		30d	14-Aug-06 A	25-Sep-06 A
A6460	Receive Notice to Proceed from Client	0d	25-Sep-06 A	
A6470	Exploratory Assessment	4d	14-Aug-06 A	17-Aug-06 A
A6480	2-Hour Meeting With CEC	0d	25-Sep-06 A	
Feasibility (2 Designs)		47d	01-Aug-06 A	05-Oct-06 A
A13890	Track Feasibility Assessment	9d	01-Aug-06 A	14-Aug-06 A
A6490	Roads Feasibility Assessment	15d	04-Sep-06 A	25-Sep-06 A
A6500	2-Hour Meeting With CEC - Update	0d	28-Sep-06 A	
A6510	Feasibility Statement Assessment (Not Full Report)	5d	28-Sep-06 A	04-Oct-06 A
A6520	Feasibility Drawings (With Statement Assessment)	5d	28-Sep-06 A	04-Oct-06 A
A6530	With CEC For Approval	0d	05-Oct-06 A	
Preliminary Design (1 Design)		44d	05-Oct-06 A	06-Dec-06 A
A12160	Utilities Design Update	2d	16-Nov-06 A	17-Nov-06 A
A12190	TTROs report and plans (Not Required)	2d	16-Nov-06 A	17-Nov-06 A
A12240	4-hour Meeting With CEC for Approval	0d	06-Dec-06 A	
A13980	Preliminary Track Design	5d	16-Oct-06 A	20-Oct-06 A
A13990	Integration With OLE Design	21d	26-Oct-06 A	24-Nov-06 A
A6540	Preliminary Road Design	25d	05-Oct-06 A	10-Nov-06 A
A6550	Preliminary Junction Design	23d	17-Oct-06 A	17-Nov-06 A
A6560	Integration With Traffic Modelling	4d	13-Nov-06 A	17-Nov-06 A
A6890	Roads Technical Design Statement (Not Required)	22d	18-Oct-06 A	17-Nov-06 A
A6950	TRO Schedules & Plans (Not Required)	2d	16-Nov-06 A	17-Nov-06 A
Track (Task300.5.1)		516d	30-Jan-06 A	08-Feb-08
A2600	First Pass Mx Horizontal and Vertical Alignment	75d	30-Jan-06 A	24-May-06 A
A2610	Handover Alignment Design P Way to Roads	0d		19-Jun-06 A
A2620	Coordination Meeting/Workshop Between PWay/Roads & Resolution of Major Conflicts	1d	25-May-06 A	25-May-06 A
SDS25890	Revise Alignment to Match Roads First Pass Vertical	6d	23-Aug-07 A	31-Aug-07 A
SDS25940	Handover Alignment Design Track to Roads	0d		31-Aug-07 A
SDS26310	Revise Alignment to Inc. Preliminary Design Comments	5d	08-Jan-07 A	12-Jan-07 A
SDS26330	Handover Alignment Design Track to Roads	0d		12-Jan-07 A
SDS57040	Issue Notification Of Completion Letter - Track Alignment Design to tie Section 1D	0d		14-Sep-07 A
SDS63580	Trial Planning Submission For Haymarket Stop & Adv Wks	5d	01-Aug-06 A	07-Aug-06 A
SDS67800	Advanced Work on Detailed Design Alignment	9d	04-Sep-06 A	15-Sep-06 A
SDS69930	Revise Alignment to Inc. Preliminary Design Comments	110d	09-Feb-07 A	27-Jul-07 A
SDS69940	Handover Alignment Design Track to Roads	0d		27-Jul-07 A
SDS69950	Final Alignment to Match Roads & Check	3d	10-Sep-07 A	12-Sep-07 A
SDS79290	Address tie Comments, Other Revisions, IDC & Section Submission Package	94d	14-Sep-07 A	08-Feb-08
VO144 Shandwick Place Changes		201d	06-Dec-06 A	21-Sep-07 A
VO2150	Track	89d	06-Dec-06 A	27-Apr-07 A
VO2160	Tram stops	171d	06-Dec-06 A	31-Aug-07 A
VO2170	OLE	112d	06-Dec-06 A	04-Jun-07 A
VO2180	Trafffic/Junction Modelling	94d	06-Dec-06 A	04-May-07 A
VO2190	Runtime Simulation	112d	06-Dec-06 A	04-Jun-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Trams for Edinburgh
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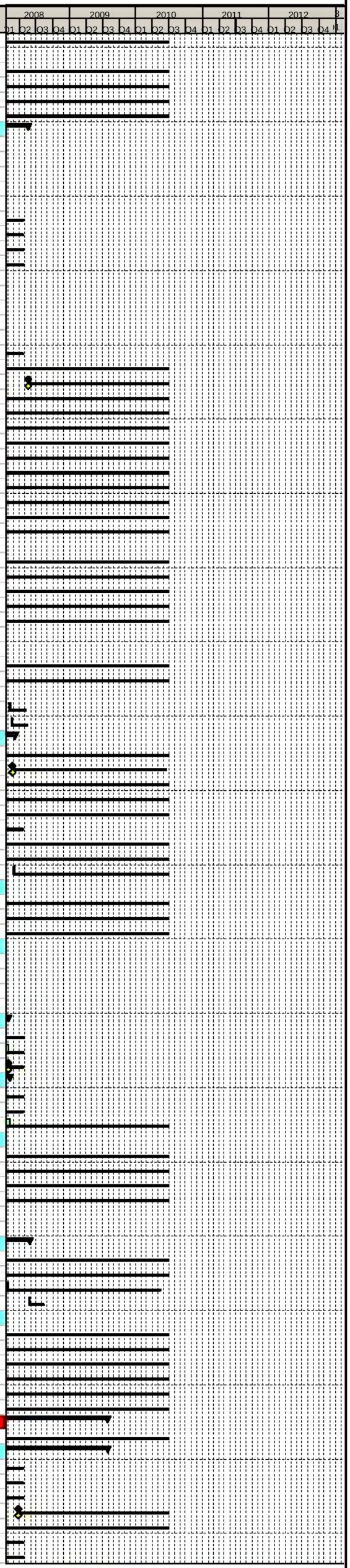
Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
VO2200	TRO	112d	06-Dec-06 A	04-Jun-07 A
VO2210	Roads	149d	06-Dec-06 A	30-Jul-07 A
VO2220	Utilities	5d	06-Dec-06 A	12-Dec-06 A
VO2230	Urban Design	171d	06-Dec-06 A	31-Aug-07 A
VO2240	Reporting and Review	5d	17-Sep-07 A	21-Sep-07 A
VO2280	Environmental	20d	02-Jul-07 A	30-Jul-07 A
Roads, Street Lighting & Landscaping (Task300.5.2)		574d	20-Feb-06 A	21-May-08
A2630	Route Appreciation/Junct Layout & Determine with tie & CEC Works Extent	51d	20-Feb-06 A	09-May-06 A
A2640	Frontage Surveys	30d	07-Mar-06 A	21-Apr-06 A
A2650	Set Up Mx Models	35d	28-Feb-06 A	21-Apr-06 A
A2660	Produce Preliminary Horizontal Road Alignment Design (Inc Lanes & Parking Zones)	16d	10-May-06 A	02-Jun-06 A
A2670	Preliminary Rd Junction Configuration Design	10d	05-Jun-06 A	19-Jun-06 A
A2680	Preliminary Road Safety Audit	2d	29-Jun-06 A	30-Jun-06 A
A2690	Review & Amend TRO Drawings & Schedules for Modifications Required Post Prelim Design	3d	12-Jun-06 A	14-Jun-06 A
A2700	Handover Alignment Design Roads to Pway	0d		29-Jun-06 A
A2710	Coordination Meeting/Workshop Between Roads & Pway Teams	1d	29-Jun-06 A	29-Jun-06 A
A5480	Undertake Road Marking, Pedestrian Req & Traffic Signalling Design	8d	08-Jun-06 A	19-Jun-06 A
SDS25900	Produce First Pass Vertical Alignment	9d	09-Aug-07 A	22-Aug-07 A
SDS25920	Handover Alignment Design Roads to Pway	0d		22-Aug-07 A
SDS25950	Revise Vertical Alignment to Match Final Track Alignment	12d	24-Aug-07 A	12-Sep-07 A
SDS25960	Horizontal & Vertical Alignment Design Complete	0d		12-Sep-07 A
SDS25970	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 1D	0d		16-Nov-07 A
SDS25980	Cross Check all Horizontal Design Aspects With Vertical Alignment	2d	24-Sep-07 A	25-Sep-07 A
SDS26020	Issue Construction Drawings	0d		21-May-08
SDS26030	Road Safety Audit Stage 2 (Intermediate)	6d	26-Sep-07 A	03-Oct-07 A
SDS26040	Insert Intermediate RSA Comments	5d	04-Oct-07 A	10-Oct-07 A
SDS26050	Produce Site Clearance Drawings & Schedule	33d	09-Aug-07 A	27-Sep-07 A
SDS26060	Produce Fencing, Barriers & Guardrails Design	33d	09-Aug-07 A	27-Sep-07 A
SDS26070	Produce Street Lighting Design (& Liaise With OLE)	180d	01-Feb-07 A	02-Nov-07 A
SDS26080	Produce Traffic Signal Only Ducting	24d	22-Aug-07 A	27-Sep-07 A
SDS26090	Produce Soft Landscaping Design	30d	12-Sep-07 A	25-Oct-07 A
SDS26100	Produce Traffic Signals Layout	33d	09-Aug-07 A	27-Sep-07 A
SDS26110	Produce Traffic Signs Design (Signs, Markings, Signals)	33d	09-Aug-07 A	27-Sep-07 A
SDS26120	Produce Earthworks Design	4d	30-Jul-07 A	02-Aug-07 A
SDS26340	Revise Alignment to Inc. Final Track Horizontal Alignment (Horizontal Design Freeze)	66d	30-Apr-07 A	08-Aug-07 A
SDS26350	Produce Kerbs, Footway & Paved Area Design	33d	09-Aug-07 A	27-Sep-07 A
SDS26360	Produce Pavement Design	13d	10-Sep-07 A	27-Sep-07 A
SDS56290	Issue Notification Of Completion Letter- Hard Landscaping Design to tie Section 1D	0d		07-Dec-07 A
SDS56770	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 1D	0d		31-Oct-07 A
SDS59320	Compile Planning Drawings	4d	16-Oct-07 A	19-Oct-07 A
SDS59630	Advise Track, Stops, Modellers Changes To Accom RSA1 & PD Comments	26d	23-Apr-07 A	01-Jun-07 A
SDS59640	Pass Guidance/Envelope To Track & Others As Necessary	0d		01-Jun-07 A
SDS67260	Street Lighting Survey Work	5d	05-Dec-06 A	11-Dec-06 A
SDS69650	Produce Hard Landscaping Design	117d	15-Jun-07 A	07-Dec-07 A
SDS69960	Resolution of Red Issues (tie Approval)	0d	12-Jul-07 A	
SDS79960	Final RSA	9d	04-Feb-08	15-Feb-08
SDS79970	Incorporate Final RSA Comments	5d	18-Feb-08	22-Feb-08
Drainage		254d	12-Mar-07 A	10-Mar-08
SDS71270	Hydraulic Modelling & First Pass Drainage Design	127d	12-Mar-07 A	21-Sep-07 A
SDS71280	Receipt of Drainage Survey Information	0d		25-Feb-08*
SDS71290	Outfall Consent/Approval from SW (NOT REQUIRED)	0d		30-Jul-07 A
SDS71300	Outfall Consent/Approval from CEC (NOT REQUIRED)	0d		30-Jul-07 A
SDS71310	Outfall Consent/Approval from SEPA	0d		07-May-07 A
SDS71330	Issue Drainage Design Completion Letter to tie for Approval Section 1D ISSUED WITH 1D ROADS	0d		16-Nov-07 A
SDS73200	Detailed Drainage Design and Review of Hydraulic Modelling	20d	24-Aug-07 A	24-Sep-07 A
SDS80710	Final Detailed Drainage Design	11d	22-Oct-07 A	06-Nov-07 A
SDS80720	Confirm Drainage and amend if necessary	9d	26-Feb-08	10-Mar-08
Traffic Modelling		27d	19-Jun-06 A	26-Jul-06 A
SDS56080	JRC Receive Junction Layouts	0d		19-Jun-06 A
SDS56090	JRC Prepare VISSIM Initial Traffic Flows (Low Level Model)	16d	20-Jun-06 A	12-Jul-06 A
SDS56100	SDS Produce LINSIG/TRANSYT Assessments (Iteration 1)	9d	13-Jul-06 A	26-Jul-06 A
VO180 Lothian Road Junction (not tie approved)		10d	06-Jul-07 A	19-Jul-07 A
SDS73510	Receive Change Order from tie	0d	06-Jul-07 A	
SDS73520	Assess and Revise Roads design for Lothian Road Junction	9d	06-Jul-07 A	19-Jul-07 A
SDS73530	Co-ordinate with Track Design	5d	13-Jul-07 A	19-Jul-07 A
SDS73540	Approval for Lothian Road Junction from Roads Design Working Group	0d		12-Jul-07 A
VO258 Torphican Street Conversion (Not Approved)		71d	16-Oct-07 A	01-Feb-08
SDS80860	Additional Roads Design	15d	16-Oct-07 A	06-Nov-07 A
SDS80870	Additional Lighting Design	14d	14-Jan-08*	01-Feb-08
SDS80880	Issue Notification Of Completion Letter- Street Lighting Torphican Street Design to tie	0d		01-Feb-08
Boundary & Accomodation Works (Task300.5.4)		208d	16-Apr-07 A	08-Feb-08
SDS41950	Detailed Design of Boundary & Accomodation Works	99d	16-Apr-07 A	13-Sep-07 A
SDS41960	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 1D	0d		14-Sep-07 A
SDS81190	Additional Boundary and Accommodation Works and review	53d	14-Nov-07 A	08-Feb-08
Utilities Plates 47 to 56		378d	06-Mar-06 A	27-Aug-07 A
A11630	Close Out PD Issues & Propose Diversions	52d	29-Aug-06 A	13-Nov-06 A
A11640	Issue PD to SUCs	0d		16-Oct-06 A
A11650	Consult SUCs and MUDFA	136d	30-Jan-07 A	27-Aug-07 A
A11660	Access to MUDFA	0d		23-Oct-06 A
UTIL060	Section 1D - Pre-Preliminary Design (Utilities)	46d	06-Mar-06 A	16-May-06 A
UTIL500	Issue to Statutory Utility Companies (SUCs)	0d		16-May-06 A
TRO's		527d	04-May-06 A	29-May-08
SDS33230	Collate Exisiting TROs	46d	04-May-06 A	12-Jul-06 A
SDS33240	Receive Preliminary Roads Design	0d		12-Jul-06 A
SDS81970	Interim TRO Design Section 1D	5d	28-Jan-08*	01-Feb-08
SDS81980	Final TRO Design Section 1D	5d	22-May-08	29-May-08
TTRO's		177d	29-Aug-06 A	11-May-07 A
TTRO260	SDS Produce Affected Roads Listing For MUDFA Works	64d	29-Aug-06 A	30-Nov-06 A
TTRO310	SDS Produce Affected Roads Listing For INFRACO Works	36d	12-Mar-07 A	04-May-07 A
TTRO590	Issue Affected Roads Listing For MUDFA Works To Dundas & Wilson Section 1D	0d		30-Nov-06 A
TTRO600	Dundas & Wilson Draft TTRO Schedule For MUDFA Works	0d	01-Dec-06 A	01-Dec-06 A
TTRO700	Issue Affected Roads Listing For INFRACO Works To Dundas & Wilson Section 1D	0d		04-May-07 A
TTRO730	Dundas & Wilson Draft TTRO Schedule For INFRACO Works	5d	04-May-07 A	11-May-07 A
HAY - SHP		986d	19-Sep-05 A	28-Jul-09
CON-0040	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Shandwick Place (Task300.5.8)		831d	24-Apr-06 A	28-Jul-09
A25310	Prepare Tram Stop Planning Submission Drawings For Issue to Planning Drawings Team	10d	03-Aug-07 A	17-Aug-07 A
A25320	Produce Engineering Detailed Design Drawings	53d	21-Sep-07 A	07-Dec-07 A
A25350	Issue Notification Of Completion Letter- Shandwick Place Tram Stop Design to tie	0d		13-Dec-07 A
A26070	Tram Stop Design Complete - Drawings Issued for Construction	0d		28-Mar-08
A26080	Alterations to Tram Stop due to Roads alterations	9d	14-Dec-07 A	04-Jan-08 A
A27480	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
A44790	Prepare Detailed Design Stop Drawings	88d	17-Nov-06 A	06-Apr-07 A



Primary Baseline
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Milestone

Trams for Edinburgh ..connecting our Capital

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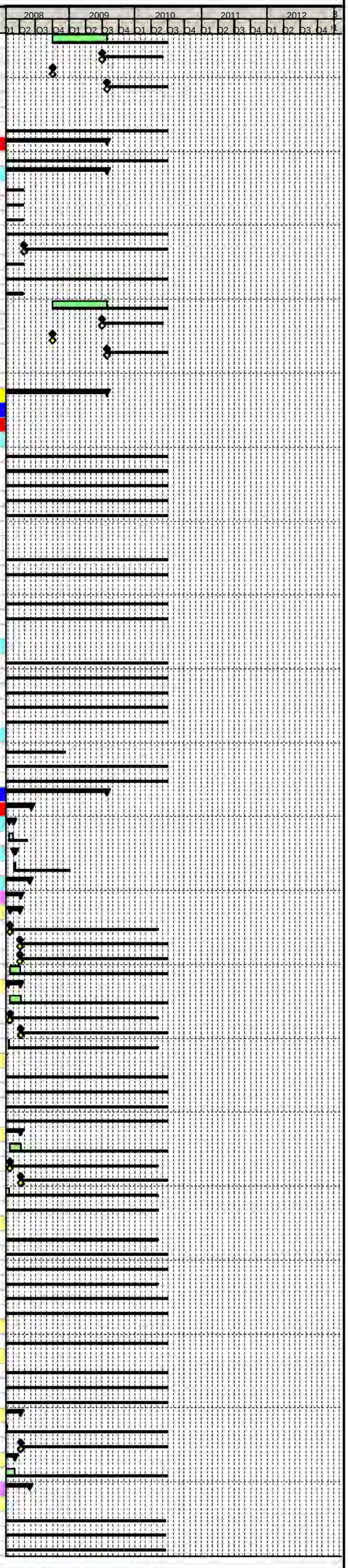
SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
A47440	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47450	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47460	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47470	Issue Final As Built Drawings	0d		28-Jul-09
A4820	General Arrangement Drawings	45d	24-Apr-06 A	30-Jun-06 A
A5200	Issue Tram Stop GA Drawings for Shandwick Place	0d		30-Jun-06 A
SDS68280	Advanced Tram Stop Works For Planning	15d	26-Sep-06 A	17-Oct-06 A
SHP - PSW		986d	19-Sep-05 A	28-Jul-09
CON-0070	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Princes Street (Task300.5.9)		827d	28-Apr-06 A	28-Jul-09
A25360	Prepare Tram Stop Planning Submission Drawings For Issue to Planning Drawings Team	59d	11-Sep-07 A	06-Dec-07 A
A25370	Produce Engineering Detailed Design Drawings	9d	22-Nov-07 A	05-Dec-07 A
A25400	Issue Notification Of Completion Letter- Princes Street Tram Stop Design to tie	0d		06-Dec-07 A
A26090	Alterations to Tram Stop due to Roads alterations	9d	14-Dec-07 A	04-Jan-08 A
A26100	Tram Stop Design Complete - Drawings Issued for Construction	0d		29-Apr-08
A27490	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
A27600	Moving Stop Position (Due to Charette Changes)	34d	30-Aug-06 A	18-Oct-06 A
A44800	Prepare Detailed Design Stop Drawings	5d	26-Feb-07 A	02-Mar-07 A
A47480	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47490	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47500	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47510	Issue Final As Built Drawings	0d		28-Jul-09
A4830	General Arrangement Drawings	41d	28-Apr-06 A	30-Jun-06 A
A5340	Issue Tram Stop GA Drawings for Princes Street West	0d		30-Jun-06 A
Haymarket to Roseburn Junction - Section 2 (Task400)		986d	19-Sep-05 A	28-Jul-09
Section Wide - Section 2		328d	24-Apr-06 A	03-Aug-07 A
Section Wide		328d	24-Apr-06 A	03-Aug-07 A
Preliminary Design Approvals		105d	24-Apr-06 A	15-Sep-06 A
SDS23180	Track IDC	38d	03-Jul-06 A	25-Aug-06 A
SDS23200	Tramstops IDC	38d	03-Jul-06 A	25-Aug-06 A
SDS23210	Roads IDC	40d	03-Jul-06 A	31-Aug-06 A
SDS23220	Structures IDC	51d	03-Jul-06 A	15-Sep-06 A
SDS23230	Substation IDC	5d	01-Jun-06 A	07-Jun-06 A
SDS23850	Informal Consultation with tie	45d	24-Apr-06 A	30-Jun-06 A
SDS23860	tie approval	19d	30-Jun-06 A	27-Jul-06 A
SDS34520	PD - Submit Section 2 Substation Deliverables	0d		30-Jun-06 A
SDS34530	PD - Submit Section 2 Track Deliverables	0d		30-Jun-06 A
SDS34540	PD - Submit Section 2 Tramstops Deliverables	0d		30-Jun-06 A
SDS34550	PD - Submit Section 2 Roads Deliverables	0d		30-Jun-06 A
SDS34560	PD - Submit Section 2 Structures Deliverables	0d		30-Jun-06 A
SDS34570	PD - Section 2 Complete - Issue to tie	0d		30-Jun-06 A
Stakeholder Reviews		192d	24-Jul-06 A	26-Apr-07 A
A569670	Review Potential Issues with tie & Determine Consultation Strategy	5d	24-Jul-06 A	28-Jul-06 A
A569750	Review Potential Issues with tie & Determine Consultation Strategy	5d	07-Aug-06 A	11-Aug-06 A
A569760	Feedback to Design Teams for Study	43d	20-Feb-07 A	26-Apr-07 A
A569790	Wider Community Meeting	5d	20-Apr-07 A	26-Apr-07 A
SDS23250	Stakeholder Review	5d	31-Jul-06 A	04-Aug-06 A
OLE (Task400.1)		237d	29-Aug-06 A	03-Aug-07 A
SDS31290	Produce Final Detailed Layout Plans	201d	29-Aug-06 A	06-Jul-07 A
SDS55880	Issue Notification Of Completion Letter- Final Detailed Layout Plans & Standard & Special Cross Sections to tie Sec2	0d		03-Aug-07 A
SDS69440	SDM Design Interface Review Meetings	1d	01-Dec-06 A	02-Dec-06 A
HAY - ROJ - Section 2A (Task400.2)		986d	19-Sep-05 A	28-Jul-09
Sub Section Wide		585d	20-Feb-06 A	05-Jun-08
Sub Section Wide IDC		20d	04-Feb-08	29-Feb-08
A40311	Subsection Wide IDC	19d	04-Feb-08	29-Feb-08
Design Assurance Review		10d	03-Mar-08	14-Mar-08
SDS67950	Produce Section Wide Design Assurance Statement	9d	03-Mar-08	14-Mar-08
Consents & Approvals		387d	16-Nov-06 A	29-May-08
Prior Approvals		349d	16-Nov-06 A	08-Apr-08
Combined Section Prior Approval		40d	08-Feb-08	04-Apr-08
A25380	Issue Combined Package 2A for Prior Approval to CEC	0d		08-Feb-08
A25390	Receive Combined Package 2A Comments From CEC	0d		04-Apr-08
A25430	Prior Approval Granted for Section 2A Combined Package	0d		04-Apr-08
A40280	CEC Approval Period - 2A Combined Package	38d	08-Feb-08	04-Apr-08
Batch 2/01		47d	01-Feb-08	08-Apr-08
SDS78620	Batch 2/01 Formal Approval Period	38d	08-Feb-08	07-Apr-08
SDS78630	Issue Batch 2/01 For Approval to CEC	0d	08-Feb-08	
SDS78640	Receive CEC Prior Approval For Batch 2/01	0d	08-Apr-08	
SDS78670	Batch 2/01 Haymarket Tramstop - Collation of Planning Drawings	5d	01-Feb-08*	07-Feb-08
Batch 2/02		61d	03-Oct-07 A	04-Jan-08 A
SDS78680	Batch 2/02 Formal Approval Period	38d	02-Nov-07 A	04-Jan-08 A
SDS78690	Issue Batch 2/02 For Approval to CEC	0d	02-Nov-07 A	
SDS78700	Receive CEC Prior Approval For Batch 2/02	0d	24-Dec-07 A	
SDS78730	Batch 2/02 Haymarket Yards to Russell Road - Collation of Planning Drawings	22d	03-Oct-07 A	02-Nov-07 A
Batch 2/03		163d	13-Aug-07 A	08-Apr-08
SDS78740	Batch 2/03 Formal Approval Period	38d	08-Feb-08	07-Apr-08
SDS78750	Issue Batch 2/03 For Approval to CEC	0d	08-Feb-08	
SDS78760	Receive CEC Prior Approval For Batch 2/03	0d	08-Apr-08	
SDS78790	Batch 2/03 Russell Road Bridge - Collation of Planning Drawings	14d	18-Jan-08*	07-Feb-08
SDS79910	Russell Road Bridge Informal Consultation	38d	13-Aug-07 A	09-Oct-07 A
Batch 2/04 Russell Road TPH Substation		129d	12-Jan-07 A	11-Jul-07 A
A28070	Issue Russell Road TPH Substation Design for Prior Approval	0d		18-May-07 A
A28080	Prior Approval For Russell Road TPH Substation	0d		11-Jul-07 A
A28090	Receive Russell Road TPH Substation CEC Comments (No Comments)	0d		11-Jul-07 A
A41240	Informal Consultation With CEC & tie over Prior Approval Russell Road TPH Substation	82d	12-Jan-07 A	17-May-07 A
A41250	Batch 2/04 Formal Approval Period	36d	18-May-07 A	11-Jul-07 A
A44730	Incorporate Russell Road TPH Substation CEC Comments for Prior Approval (No Comments)	1d	11-Jul-07 A	11-Jul-07 A
Roads, Track, OLE, Landscaping, Street Lighting		40d	16-Jan-07 A	12-Mar-07 A
SDS26660	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	16-Jan-07 A	12-Mar-07 A
Tram Stop Haymarket		115d	16-Nov-06 A	04-May-07 A
A25440	Issue Tram Stop Haymarket Design for Prior Approval	0d		05-Feb-07 A
A40410	Informal Consultation With CEC & tie over Prior Approval Tram Stop Haymarket	48d	16-Nov-06 A	02-Feb-07 A
A40420	CEC Approval Period (Protocol Changed to Combined Section)	58d	06-Feb-07 A	04-May-07 A
Tram Haymarket Terrace 1 Sub Station		303d	30-Jan-07 A	08-Apr-08
A41160	Informal Consultation With CEC & tie over Prior Approval Tram Haymarket Terrace 1 Substation	228d	30-Jan-07 A	21-Jan-08
A41170	Prior Approval Tram Haymarket Terrace 1 Substation	0d		08-Apr-08
Haymarket Station Viaduct Superstructure		40d	14-Jan-08	07-Mar-08
141	Commence Haymarket Station Viaduct Superstructure Informal Consultation With CEC & tie Over Prior Approval	38d	14-Jan-08	07-Mar-08
Technical Approvals		351d	16-Jan-07 A	29-May-08
Russell Road Bridge Review Period (TAA)		159d	08-May-07 A	14-Dec-07 A
124	Issue Russell Road Bridge Design Package to TAA	0d	28-Sep-07 A	
125	TAA Russell Road Bridge Design Package Review Period	19d	28-Sep-07 A	25-Oct-07 A
126	Receive Russell Road Bridge Design Package comments from TAA	0d	13-Nov-07 A	



Primary Baseline
Actual Work
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Trams for Edinburgh
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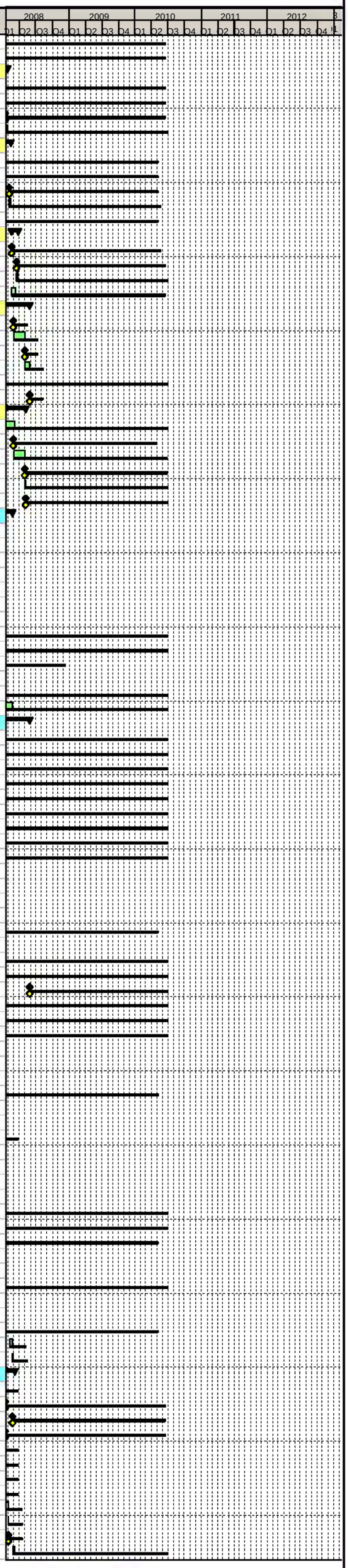
SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
127	Incorporate TAA comments into Russell Road Bridge Design Package	22d	14-Nov-07 A	14-Dec-07 A
145	Commence Russell Road Bridge Informal Consultation With CEC Over Technical Approval	55d	08-May-07 A	30-Jul-07 A
Russell Road Bridge Review Period (Network Rail)		52d	06-Nov-07 A	25-Jan-08
129	Issue Design and Check Certificate to Network Rail For Comment	0d	06-Nov-07 A	
130	Network Rail Comment Period	19d	06-Nov-07 A	03-Dec-07 A
131	Receive Network Rail Comments	0d	14-Jan-08	
132	Incorporate Network Rail comments into Superstructure Design Package	9d	14-Jan-08	25-Jan-08
Haymarket Station Viaduct Review Period (TAA)		265d	01-Feb-07 A	15-Feb-08
20	Issue Haymarket Station Viaduct Superstructure Design Package to TAA	0d	30-Oct-07 A	
21	TAA Haymarket Station Viaduct Superstructure Design Package Review Period	38d	30-Oct-07 A	24-Dec-07 A
22	Receive Haymarket Station Viaduct Superstructure Design Package comments from TAA	0d	04-Feb-08*	
33	Incorporate TAA comments into Haymarket Station Viaduct Superstructure Design Package	9d	04-Feb-08	15-Feb-08
41	Commence Haymarket Station Viaduct Superstructure Informal Consultation With CEC Over Technical Approval	38d	01-Feb-07 A	28-Mar-07 A
Haymarket Station Viaduct Review Period (Network Rail & ScotRail)		30d	18-Feb-08	28-Mar-08
25	Issue Design and Check Certificate to Network Rail For Comment	0d	18-Feb-08	
27	Receive Network Rail Comments	0d	17-Mar-08	
28	Incorporate Network Rail & First Scot Rail comments into Superstructure Design Package	9d	17-Mar-08	28-Mar-08
36	Network Rail Comment Period	19d	18-Feb-08	14-Mar-08
Roads Technical Approval		351d	16-Jan-07 A	29-May-08
SDS26670	Issue Roads Design to Roads Authority for Approval	0d		29-Feb-08
SDS26680	Roads Authority Approval Period	38d	03-Mar-08	29-Apr-08
SDS26690	Receive Roads Authority Comments	0d		29-Apr-08
SDS26700	Update to Roads Authority Comments	19d	30-Apr-08	29-May-08
SDS26710	Roads Authority Informal Consultation	38d	16-Jan-07 A	12-Mar-07 A
SDS26780	Roads Technical Approval Granted	0d		29-May-08
Drainage Technical Approval		83d	14-Jan-08	07-May-08
SDS72300	Roads Authority Informal Consultation For Drainage	38d	14-Jan-08	07-Mar-08
SDS72310	Issue Drainage Design to Roads Authority for Approval	0d		29-Feb-08
SDS72320	Roads Authority Approval Period For Drainage	38d	03-Mar-08	29-Apr-08
SDS72330	Receive Roads Authority Comments For Drainage	0d		29-Apr-08
SDS72340	Update to Raods Authority Comments For Drainage	5d	30-Apr-08	07-May-08
SDS72350	Drainage Approval Granted	0d		07-May-08
Track (Task400.2.1)		511d	20-Feb-06 A	22-Feb-08
A2720	First Pass Mx Horizontal and Vertical Alignment	47d	20-Feb-06 A	04-May-06 A
A2730	Handover Alignment Design P Way to Roads	0d		04-May-06 A
A2740	Coordination Meeting/Workshop Between PWay/Roads & Resolution of Major Conflicts	1d	03-May-06 A	03-May-06 A
SDS26380	Revise Alignment to Match Roads First Pass Vertical	2d	05-Dec-06 A	06-Dec-06 A
SDS26430	Handover Alignment Design Track to Roads	0d		06-Dec-06 A
SDS26800	Revise Alignment to Inc. Preliminary Design Comments	82d	04-Jul-06 A	02-Nov-06 A
SDS26820	Handover Alignment Design Track to Roads	0d		02-Nov-06 A
SDS57050	Issue Track Alignment Design to tie Section 2A	0d		14-Dec-06 A
SDS57150	tie Approval Period	19d	15-Dec-06 A	19-Jan-07 A
SDS59550	IDC Track Design	5d	04-Dec-06 A	08-Dec-06 A
SDS60860	Revise Track Alignment to Inc. Modelling Changes	0d	20-Nov-06 A	20-Nov-06 A
SDS70580	Receive tie Comments	0d	05-Apr-07 A	
SDS70590	Address tie Comments, Other Revisions, IDC & Section Submission Package	129d	06-Aug-07 A	22-Feb-08
Roads, Street Lighting & Landscaping (Task400.2.2)		580d	20-Feb-06 A	29-May-08
A2750	Route Appreciation/Junct Layout & Determine with tie & CEC Works Extent	54d	20-Feb-06 A	15-May-06 A
A2760	Frontage Surveys	30d	07-Mar-06 A	21-Apr-06 A
A2770	Set Up Mx Models	32d	03-Mar-06 A	21-Apr-06 A
A2780	Produce Preliminary Horizontal Road Alignment Design (Inc Lanes & Parking Zones)	43d	09-Mar-06 A	16-May-06 A
A2790	Preliminary Road Safety Audit	1d	19-Jun-06 A	19-Jun-06 A
A2800	Review & Amend TRO Drawings & Schedules for Modifications Required Post Prelim Design	3d	12-Jun-06 A	14-Jun-06 A
A2810	Handover Alignment Design Roads to Pway	0d		20-Jun-06 A
A2820	Coordination Meeting/Workshop Between Roads & Pway Teams	1d	20-Jun-06 A	20-Jun-06 A
A5490	Undertake Road Marking, Pedestrian Req & Traffic Signalling Design	3d	22-May-06 A	24-May-06 A
SDS26390	Produce First Pass Vertical Alignment	7d	24-Nov-06 A	04-Dec-06 A
SDS26410	Handover Alignment Design Roads to Pway	0d		04-Dec-06 A
SDS26440	Revise Vertical Alignment to Match Final Track Alignment	8d	28-Nov-06 A	07-Dec-06 A
SDS26450	Horizontal & Vertical Alignment Design Complete	0d		11-Dec-06 A
SDS26460	Issue Roads Design to tie for Approval Section 2A	0d		30-Jan-07 A
SDS26470	Cross Check all Horizontal Design Aspects With Vertical Alignment	2d	03-Jan-07 A	04-Jan-07 A
SDS26480	tie Approval Period	19d	30-Jan-07 A	26-Feb-07 A
SDS26490	No tie Comments Received To Date - Change in Protocol Going Forward	0d		04-May-07 A
SDS26510	Issue Construction Drawings	0d		29-May-08
SDS26520	Road Safety Audit Stage 2 (Intermediate)	12d	04-Jan-07 A	22-Jan-07 A
SDS26530	Insert Intermediate RSA Comments	16d	23-Jan-07 A	14-Feb-07 A
SDS26540	Produce Site Clearance Drawings & Schedule	19d	15-Jan-07 A	09-Feb-07 A
SDS26550	Produce Fencing, Barriers & Guardrails Design	7d	11-Dec-06 A	19-Dec-06 A
SDS26560	Produce Street Lighting Design (& Liaise With OLE)	5d	04-Dec-06 A	08-Dec-06 A
SDS26570	Produce Traffic Signal Only Ducting	58d	15-Jan-07 A	12-Apr-07 A
SDS26580	Produce Soft Landscaping Design	33d	15-Jan-07 A	02-Mar-07 A
SDS26590	Produce Traffic Signals Layout	5d	11-Dec-06 A	15-Dec-06 A
SDS26600	Produce Traffic Signs Design (Signs, Markings, Signals)	9d	11-Dec-06 A	22-Dec-06 A
SDS26610	Produce Earthworks Design	233d	15-Jan-07 A	11-Jan-08 A
SDS26830	Revise Alignment to Inc. Final Track Horizontal Alignment (Horizontal Design Freeze) & Issue to Substn Designers	4d	03-Nov-06 A	08-Nov-06 A
SDS26840	Produce Kerbs, Footway & Paved Area Design	5d	11-Dec-06 A	15-Dec-06 A
SDS26850	Produce Pavement Design	129d	15-Jan-07 A	31-Jul-07 A
SDS26860	IDC (Inc. Systems Assurance)	21d	04-Jan-07 A	02-Feb-07 A
SDS56330	Issue Hard & Soft Landscaping Design to tie Section 2A	0d		27-Feb-07 A
SDS56780	Issue Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 2A	0d		30-Jan-07 A
SDS59330	Compile Planning Drawings	10d	16-Jan-07 A	30-Jan-07 A
SDS59710	Advise Track, Stops, Modellers Changes To Accom RSA1 & PD Comments	23d	02-Oct-06 A	03-Nov-06 A
SDS59720	Pass Guidance/Envelope To Track & Others As Necessary	0d		03-Nov-06 A
SDS60840	Revise Horizontal to Inc. Track Horizontal Alignment, RSA1 & PD Comments	16d	17-Oct-06 A	08-Nov-06 A
SDS60850	Revise Alignment to Inc. Minor Changes From Traffic Modelling	3d	16-Nov-06 A	20-Nov-06 A
SDS67270	Street Lighting Survey Work	43d	29-Aug-06 A	31-Oct-06 A
SDS69660	Produce Hard Landscaping Design	14d	09-Jan-07 A	30-Jan-07 A
SDS79980	Final RSA	9d	11-Feb-08	22-Feb-08
SDS79990	Incorporate Final RSA Comments	5d	25-Feb-08	29-Feb-08
Drainage		254d	12-Mar-07 A	10-Mar-08
SDS71370	Hydraulic Modelling & First Pass Drainage Design	90d	12-Mar-07 A	27-Jul-07 A
SDS71380	Receipt of Drainage Survey Information	0d	14-Jan-08*	
SDS71390	Outfall Consent/Approval from SW	0d		25-Feb-08*
SDS71400	Outfall Consent/Approval from CEC	0d		14-Jan-08*
SDS71410	Outfall Consent/Approval from SEPA	0d		10-May-07 A
SDS71420	Compile Drainage Package	5d	17-Sep-07 A	21-Sep-07 A
SDS71430	Issue Drainage Design Completion Letter to tie for Approval Section 2A	0d		27-Sep-07 A
SDS73210	Final Detailed Drainage Design	38d	20-Jul-07 A	14-Sep-07 A
SDS80360	Final Detailed Drainage Design	49d	13-Nov-07 A	31-Jan-08
SDS80370	Compile Drainage Package	2d	31-Jan-08	01-Feb-08
SDS80380	Issue Drainage Design Completion Letter to tie for Approval Section 2A	0d		01-Feb-08
SDS80390	Confirm Drainage and Amend if Required	9d	26-Feb-08	10-Mar-08



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

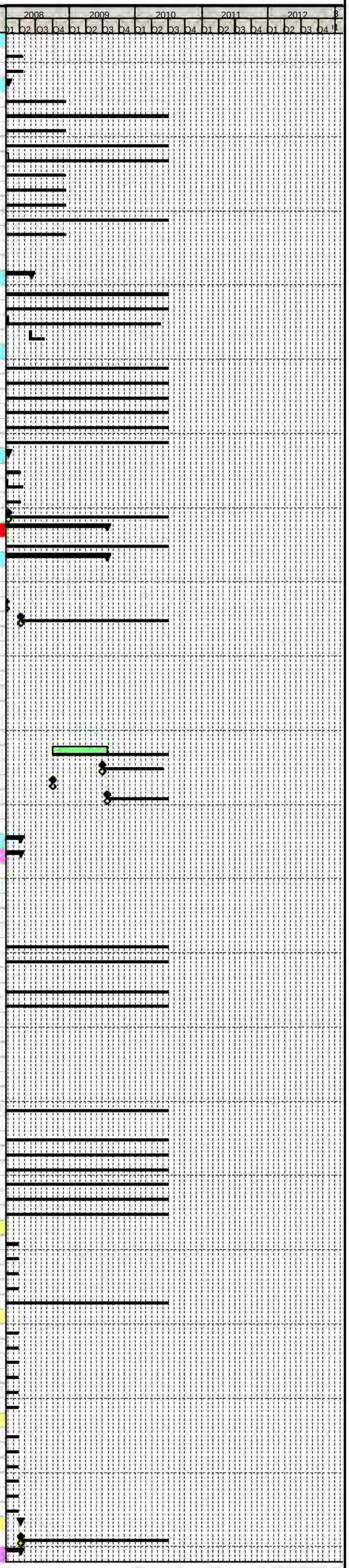
Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
Boundary & Accomodation Works (Task400.2.3)		105d	26-Mar-07 A	17-Aug-07 A
SDS42010	Detailed Design of Boundary & Accomodation Works	95d	26-Mar-07 A	17-Aug-07 A
SDS42020	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 2A	0d		17-Aug-07 A
Utilities (Task400.2.4)		483d	09-Mar-06 A	01-Feb-08
A12150	Close Out PD Issues and Re-issue PD Drawings to SUCs	32d	31-Jul-06 A	15-Sep-06 A
A12170	Design Development	326d	21-Aug-06 A	14-Jan-08
A12180	Access to MUDFA and Others	116d	03-Oct-06 A	02-Apr-07 A
A12220	SUC Approval Period	89d	12-Apr-07 A	27-Aug-07 A
A12280	Utilities Management	353d	31-Jul-06 A	01-Feb-08
SDS67070	Inital Consultations With SUCs and IDTs	38d	29-Aug-06 A	23-Oct-06 A
SDS67080	MUDFA Appointment	0d		03-Oct-06 A
SDS67090	Consult With SUCs on DD	116d	03-Oct-06 A	02-Apr-07 A
SDS67110	Issue DD to SUC For Approval	0d		12-Apr-07 A
SDS67140	IDC	7d	02-Apr-07 A	12-Apr-07 A
UTIL070	Section 2A - Pre-Preliminary Design (Utilities)	78d	09-Mar-06 A	07-Jul-06 A
UTIL600	Issue to Statutory Utility Companies (SUCs)	0d		07-Jul-06 A
TRO's (Task400.2.5)		555d	01-Apr-06 A	05-Jun-08
SDS33290	Collate Exisiting TROs	65d	01-Apr-06 A	12-Jul-06 A
SDS33300	Receive Preliminary Roads Design	0d		12-Jul-06 A
SDS81990	Interim TRO Design Section 2A	5d	28-Jan-08*	01-Feb-08
SDS82000	Final TRO Design Section 2A	5d	30-May-08	05-Jun-08
TTRO's (Task400.2.6)		177d	29-Aug-06 A	11-May-07 A
TTRO280	SDS Produce Affected Roads Listing For MUDFA Works	64d	29-Aug-06 A	30-Nov-06 A
TTRO330	SDS Produce Affected Roads Listing For INFRACO Works	36d	12-Mar-07 A	04-May-07 A
TTRO630	Issue Affected Roads Listing For MUDFA Works To Dundas & Wilson Section 2A	0d		30-Nov-06 A
TTRO640	Dundas & Wilson Draft TTRO Schedule For MUDFA Works	0d	01-Dec-06 A	01-Dec-06 A
TTRO740	Issue Affected Roads Listing For INFRACO Works To Dundas & Wilson Section 2A	0d		04-May-07 A
TTRO770	Dundas & Wilson Draft TTRO Schedule For INFRACO Works	5d	04-May-07 A	11-May-07 A
VO190 Crew Relief Facility		168d	01-Jun-07 A	31-Jan-08
A25970	Receive Change Order from tie for Crew Relief Facility	0d	01-Jun-07 A	
A25990	Design Crew Relief Facility and Step Reconfiguration	60d	22-Oct-07 A	25-Jan-08
A26000	Receive MH Survey Information	0d	22-Oct-07 A	
A26110	Issue Crew Relief Facility to tie	0d		31-Jan-08
HAY - ROJ		986d	19-Sep-05 A	28-Jul-09
CON-0370	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Haymarket (Task400.2.7)		831d	24-Apr-06 A	28-Jul-09
A25410	Prepare Tram Stop Planning Submission Drawings	54d	30-Aug-06 A	17-Nov-06 A
A25420	Produce Engineering Detailed Design Drawings	222d	06-Feb-07 A	17-Jan-08
A25450	Issue Notification Of Completion Letter- Haymarket Tram Stop Design to tie	0d		18-Jan-08*
A26130	Tram Stop Design Complete - Drawings Issued for Construction	0d		08-Apr-08
A27500	Site Visit with tie & CEC To Review Preliminary Design	1d	12-Jul-06 A	12-Jul-06 A
A43230	Issue Haymarket Tram Stop Package for Prior Approval to tie	0d		17-Nov-06 A
A43350	Update Planning Submission	9d	23-Jan-07 A	05-Feb-07 A
A43360	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	9d	25-Aug-06 A	08-Sep-06 A
A43370	tie Approval Period	19d	17-Nov-06 A	14-Dec-06 A
A43380	Receive tie Comments	0d		23-Jan-07 A
A44810	Prepare Detailed Design Stop Drawings	78d	08-Aug-06 A	01-Dec-06 A
A45050	Revision of Detailed Design Tram Stop Planning Drawings due to VO190 for issue to Planning Drawing Team	19d	28-Aug-07 A	24-Sep-07 A
A47520	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47530	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47540	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47550	Issue Final As Built Drawings	0d		28-Jul-09
A4840	General Arrangement Drawings 2a	40d	24-Apr-06 A	23-Jun-06 A
A5350	Issue Tram Stop GA Drawings for Haymarket	0d		30-Jun-06 A
Structures		542d	20-Feb-06 A	08-Apr-08
S01 Russell Road Bridge		532d	06-Mar-06 A	08-Apr-08
SDS43200	Review of Previous Work	9d	06-Mar-06 A	17-Mar-06 A
SDS43210	Optioneering	14d	24-Apr-06 A	15-May-06 A
SDS43220	Initial Design	25d	16-May-06 A	22-Jun-06 A
SDS43230	Production of AIP Drawing	26d	16-May-06 A	23-Jun-06 A
SDS43240	Issue Russell Road Bridge AIP Drawing to tie	0d		30-Jun-06 A
SDS43250	Checking	19d	26-May-06 A	23-Jun-06 A
SDS43260	tie AIP Drawing Review Period	22d	14-Jul-06 A	15-Aug-06 A
SDS43270	Undertake Consultations	13d	26-May-06 A	15-Jun-06 A
SDS43280	Receive AIP Drawing Comments from tie	0d		15-Aug-06 A
SDS43290	Incorporate tie Comments into AIP Drawing	2d	14-Aug-06 A	15-Aug-06 A
SDS43300	Production of AIP Document	10d	16-Jun-06 A	30-Jun-06 A
SDS43310	Issue Russell Road Bridge AIP Document to tie	0d		14-Aug-06 A
SDS43320	tie AIP Document Review Period	2d	14-Aug-06 A	15-Aug-06 A
SDS43330	Receive AIP Document Comments from tie	0d		15-Aug-06 A
SDS43340	Incorporate tie Comments into AIP Document	2d	14-Aug-06 A	15-Aug-06 A
SDS43350	Issue AIP Document & Drawing to TAA	0d		15-Aug-06 A
SDS43360	TAA AIP Document & Drawing Review Period	8d	16-Aug-06 A	28-Aug-06 A
SDS43370	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS43380	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS43390	Recieve AIP Document & Drawing Comments from TAA	0d		23-Oct-06 A
SDS43400	Incorporate TAA Comments into AIP Document & Drawing	5d	23-Oct-06 A	27-Oct-06 A
SDS43410	Recieve AIP Document & Drawing Comments from Planning Department	0d		23-Oct-06 A
SDS43420	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	23-Oct-06 A	27-Oct-06 A
SDS43430	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		30-Oct-06 A
Preliminary Design Milestones		226d	09-Aug-06 A	02-Jul-07 A
107	Receipt of tie PD Acceptance	0d	09-Aug-06 A	
108	Receipt of Alignment Prelim Design Package	0d	23-Oct-06 A	
109	Receipt of OLE Prelim Design Package	0d	12-Feb-07 A	
110	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	02-Jul-07 A	
111	Receipt of an Approved and Signed AIP document	0d	23-Oct-06 A	
Superstructure Detailed Design		197d	18-Dec-06 A	28-Sep-07 A
113	Superstructure Detailed Design	28d	18-Dec-06 A	05-Feb-07 A
114	Superstructure Detailed Design Draughting	37d	03-Jan-07 A	26-Feb-07 A
115	Issue Superstructure Detailed Design Package to CAT II Checker	0d	27-Feb-07 A	
116	Superstructure CAT II Check	39d	27-Feb-07 A	27-Apr-07 A
117	Receive & Incorporate CAT II comments	50d	30-Apr-07 A	13-Jul-07 A
118	Issue Notification Of Completion Letter- Russell Road Bridge Superstructure Design Package to tie	0d	28-Sep-07 A	
Substructure Detailed Design		173d	30-Jan-07 A	28-Sep-07 A
135	Substructure Detailed Design	108d	30-Jan-07 A	13-Jul-07 A
136	Substructure Detailed Design Draughting	98d	13-Feb-07 A	13-Jul-07 A
137	Issue Substructure Detailed Design Package to CAT II Checker	0d	16-Jul-07 A	
138	Substructure CAT II Check	9d	16-Jul-07 A	27-Jul-07 A
139	Receive & Incorporate CAT II comments	31d	30-Jul-07 A	13-Sep-07 A
140	Issue Notification Of Completion Letter- Russell Road Bridge Substructure Design Package to tie	0d	28-Sep-07 A	
Russell Road Design Package For Construction / Fabrication		0d	08-Apr-08	08-Apr-08
SDS62440	Issue Russell Road Bridge Design Package For Construction/Fabrication	0d		08-Apr-08
S19 Haymarket Station Viaduct		542d	20-Feb-06 A	08-Apr-08



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

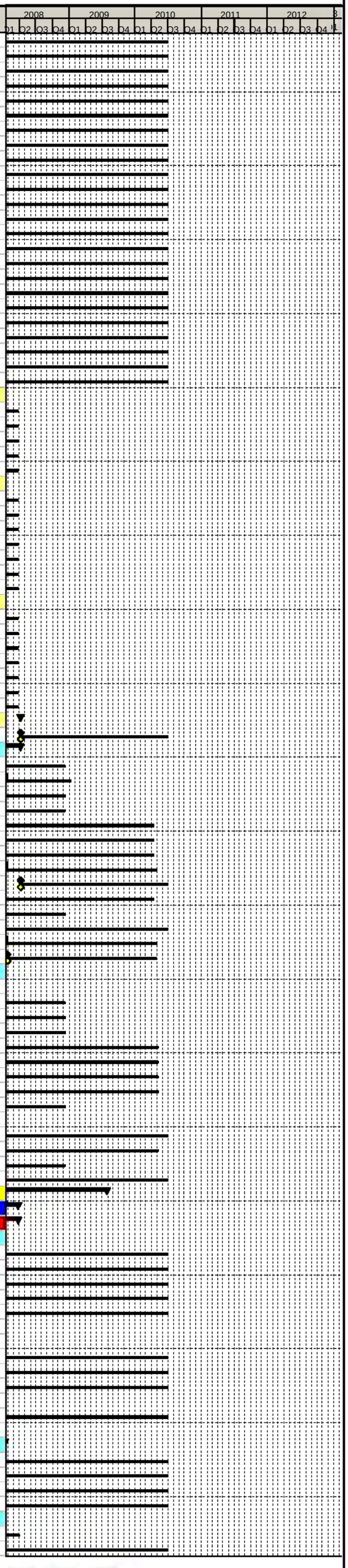
Trams for Edinburgh
...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS22150	Review of Previous Work	9d	20-Feb-06 A	03-Mar-06 A
SDS22190	Optioneering	14d	06-Mar-06 A	24-Mar-06 A
SDS22200	Initial Design	9d	27-Mar-06 A	07-Apr-06 A
SDS22210	Production of AIP Drawing	21d	03-Apr-06 A	05-May-06 A
SDS22220	Issue AIP Drawing to tie	0d		15-May-06 A
SDS22230	Checking	20d	10-Apr-06 A	11-May-06 A
SDS22240	tie AIP Drawing Review Period	30d	10-Apr-06 A	26-May-06 A
SDS22260	Undertake Consultations	21d	10-Apr-06 A	12-May-06 A
SDS22270	Receive AIP Drawing Comments from tie	0d		26-May-06 A
SDS22290	Incorporate tie Comments into AIP Drawing	14d	12-May-06 A	02-Jun-06 A
SDS22700	Production of AIP Document	5d	15-May-06 A	19-May-06 A
SDS22710	Issue AIP Document to tie	0d		15-May-06 A
SDS22720	tie AIP Document Review Period	14d	19-May-06 A	09-Jun-06 A
SDS22730	Receive AIP Document Comments from tie	0d		09-Jun-06 A
SDS22800	Incorporate tie Comments into AIP Document	47d	12-Jun-06 A	18-Aug-06 A
SDS22940	Issue AIP Document & Drawing to TAA	0d		16-Aug-06 A
SDS23120	TAA AIP Document & Drawing Review Period	5d	21-Aug-06 A	28-Aug-06 A
SDS23270	Recieve AIP Document & Drawing Comments from TAA	0d		23-Oct-06 A
SDS23350	Incorporate TAA Comments into AIP Document & Drawing	5d	23-Oct-06 A	27-Oct-06 A
SDS23430	Issue AIP Document & Drawing to Planning Department	0d		16-Aug-06 A
SDS23510	Planning Department AIP Document & Drawing Review Period	5d	21-Aug-06 A	28-Aug-06 A
SDS23590	Recieve AIP Document & Drawing Comments from Planning Department	0d		23-Oct-06 A
SDS23690	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	23-Oct-06 A	27-Oct-06 A
SDS23700	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		30-Oct-06 A
Preliminary Design Milestones		126d	09-Aug-06 A	12-Feb-07 A
13	Receipt of tie PD Acceptance	0d	09-Aug-06 A	
14	Receipt of Alignment Prelim Design Package	0d	23-Oct-06 A	
15	Receipt of OLE Prelim Design Package	0d	12-Feb-07 A	
16	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	18-Jan-07 A	
7	Receipt of an Approved and Signed AIP document	0d	14-Aug-06 A	
Superstructure Detailed Design		284d	18-Sep-06 A	29-Oct-07 A
10	Superstructure Detailed Design Draughting	8d	18-Jan-07 A	29-Jan-07 A
11	Issue Superstructure Detailed Design Package to CAT II Checker	0d	30-Jan-07 A	
12	Superstructure CAT II Check	59d	30-Jan-07 A	30-Apr-07 A
23	Receive & Incorporate CAT II comments	39d	01-May-07 A	29-Jun-07 A
24	Issue Notification Of Completion Letter- Haymarket Station Viaduct Superstructure Design Package to tie	0d		29-Oct-07 A
9	Superstructure Detailed Design	84d	18-Sep-06 A	29-Jan-07 A
SDS63690	Finalise Design (access/steps etc) & Prepare Planning Drawings	28d	03-Sep-07 A	12-Oct-07 A
Substructure Detailed Design		202d	18-Jan-07 A	29-Oct-07 A
31	Substructure Detailed Design	8d	18-Jan-07 A	29-Jan-07 A
32	Substructure Detailed Design Draughting	8d	18-Jan-07 A	29-Jan-07 A
34	Substructure CAT II Check	59d	30-Jan-07 A	30-Apr-07 A
35	Receive & Incorporate CAT II comments	39d	01-May-07 A	29-Jun-07 A
43	Issue Substructure Detailed Design Package to CAT II Checker	0d	30-Jan-07 A	
46	Issue Notification Of Completion Letter- Haymarket Station Viaduct Substructure Design Package to tie	0d	29-Oct-07 A	
SDS62050	IDC	8d	22-May-07 A	01-Jun-07 A
Issue Haymarket Station Viaduct Design Package For Construction/Fabrication		0d	08-Apr-08	08-Apr-08
51	Issue Haymarket Station Viaduct Design Package For Construction/Fabrication	0d	08-Apr-08	
Tram Haymarket Terrace 1 Sub Station (Task400.2.8)		489d	03-May-06 A	08-Apr-08
A548980	Preliminary Design of Substation	20d	03-May-06 A	31-May-06 A
A549380	Detailed Design Civils	339d	14-Aug-06 A	25-Jan-08
A549390	Detailed Architecture Design	47d	14-Aug-06 A	23-Oct-06 A
A549400	IDC on Detailed Design (Inc. Systems Assurance)	10d	03-Nov-06 A	17-Nov-06 A
A549410	Issue Tram Haymarket Terrace 1 Substation Planning Submission to tie For Approval	0d		17-Nov-06 A
A549420	tie Approval Period For Planning Submission	19d	20-Nov-06 A	15-Dec-06 A
A549430	Receive tie Comments	0d		08-Jan-07 A
A549440	Update Substation Planning Submission to Incorporate tie Comments	245d	11-Jan-07 A	25-Jan-08
A549450	Issue Tram Haymarket Terrace 1 Substation For Construction Drawings	0d		08-Apr-08
A549650	Compile Substation Planning Submission	9d	06-Nov-06 A	17-Nov-06 A
A550050	Substation Consultation Period	28d	19-Jun-06 A	27-Jul-06 A
A550170	Issue of Haymarket Terrace Substation Design	0d		30-Jun-06 A
SDS68540	Compile Detailed Engineering Drawings Submission	188d	10-Apr-07 A	25-Jan-08
SDS68550	Issue Notification Of Completion Letter- Tram Haymarket Terrace 1 Substation Detailed Engineering Drawings To tie	0d		25-Jan-08
Russell Road TPH Substation (Task400.2.9)		386d	30-May-06 A	30-Nov-07 A
A549020	Preliminary Design of Substation	5d	30-May-06 A	06-Jun-06 A
A549700	Detailed Design Civils	15d	24-Nov-06 A	15-Dec-06 A
A549710	Detailed Architecture Design	38d	20-Oct-06 A	15-Dec-06 A
A549720	IDC on Detailed Design (Inc. Systems Assurance)	38d	15-Jan-07 A	09-Mar-07 A
A549730	Issue Russell Road TPH Substation Planning Submission to tie for Approval	0d		09-Jan-07 A
A549740	tie Approval Period For Planning Submission	19d	09-Jan-07 A	05-Feb-07 A
A549750	Receive tie Comments	0d		10-Apr-07 A
A549760	Update Substation Planning Submission to Incorporate tie Comments	30d	02-Apr-07 A	18-May-07 A
A550080	Re-Work Preliminary Design (Relocate SubStation)	14d	11-Sep-06 A	29-Sep-06 A
A550090	Substation Consultation Period	28d	19-Jun-06 A	27-Jul-06 A
A550210	Issue of Russell Road Parralling Hut Design	0d		30-Jun-06 A
A550260	Compile Substation Planning Submission	3d	03-Jan-07 A	05-Jan-07 A
A550390	Design Review Panel	2d	16-Nov-06 A	17-Nov-06 A
SDS81040	Address tie Comments, Other Revisions, IDC & Section Submission Package	20d	02-Nov-07 A	30-Nov-07 A
Haymarket to Granton Square - Section 3 (Task500)		986d	19-Sep-05 A	28-Jul-09
Section Wide - Section 3		480d	05-May-06 A	26-Mar-08
Section Wide		480d	05-May-06 A	26-Mar-08
Preliminary Design Approvals		96d	05-May-06 A	15-Sep-06 A
SDS23260	Track IDC	38d	03-Jul-06 A	25-Aug-06 A
SDS23280	Tramstops IDC	38d	03-Jul-06 A	25-Aug-06 A
SDS23290	Roads IDC	40d	03-Jul-06 A	31-Aug-06 A
SDS23300	Structures IDC	51d	03-Jul-06 A	15-Sep-06 A
SDS23310	Substation IDC	5d	13-Jun-06 A	20-Jun-06 A
SDS23880	Informal Consultation with tie	38d	05-May-06 A	30-Jun-06 A
SDS23890	tie approval	19d	30-Jun-06 A	27-Jul-06 A
SDS34590	PD - Submit Section 3 Substation Deliverables	0d		20-Jun-06 A
SDS34600	PD - Submit Section 3 Track Deliverables	0d		30-Jun-06 A
SDS34610	PD - Submit Section 3 Tramstops Deliverables	0d		30-Jun-06 A
SDS34620	PD - Submit Section 3 Roads Deliverables	0d		30-Jun-06 A
SDS34630	PD - Submit Section 3 Structures Deliverables	0d		30-Jun-06 A
SDS34640	PD - Section 3 Complete - Issue to tie	0d		30-Jun-06 A
Stakeholder Reviews		377d	17-Jul-06 A	14-Jan-08
A569680	Review Potential Issues with tie & Determine Consultation Strategy	9d	17-Jul-06 A	28-Jul-06 A
A569770	Review Potential Issues with tie & Determine Consultation Strategy	61d	01-Oct-07 A	07-Jan-08 A
A569780	Feedback to Design Teams for Study	38d	12-Nov-07 A	14-Jan-08
SDS23330	Stakeholder Review (Inc. Noise Mitigation Meeting)	323d	31-Jul-06 A	10-Dec-07 A
OLE (Task 500.1)		248d	29-Aug-06 A	20-Aug-07 A
SDS31300	Produce Final Detailed Layout Plans	205d	29-Aug-06 A	13-Jul-07 A
SDS55890	Issue Notification Of Completion Letter- Final Detailed Layout Plans & Standard & Special Cross Sections to tie Sec3	0d		20-Aug-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

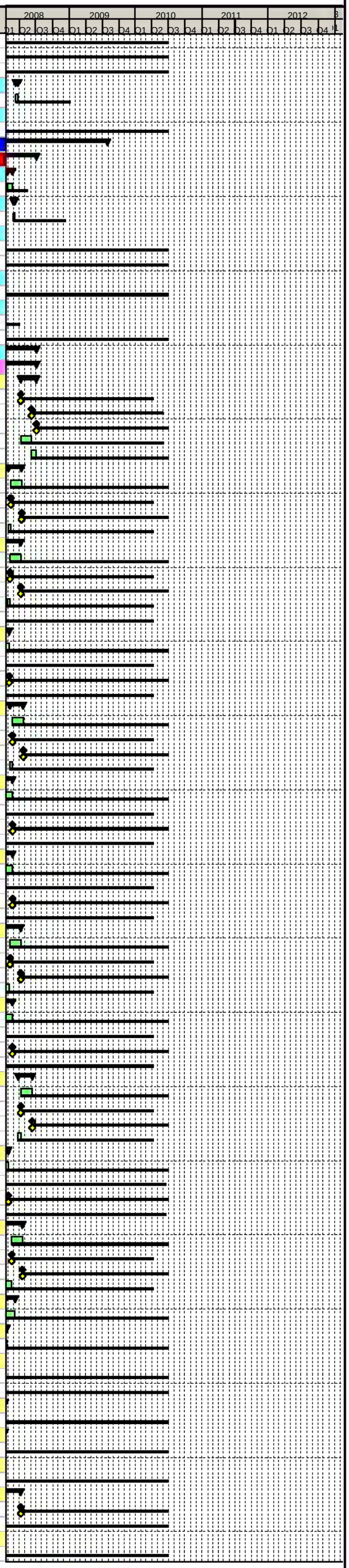
Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

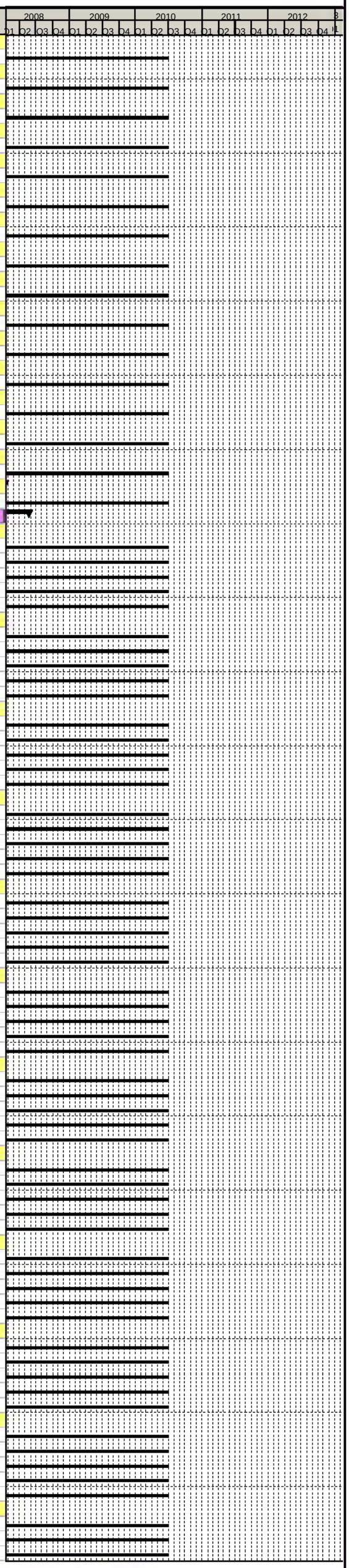
tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS59430	Finalise Combined Pole Design (With Street Lighting Traffic Signals)	5d	30-Jul-07 A	03-Aug-07 A
SDS67770	Pole siting on Roseburn Corridor (500.1)	14d	30-Aug-06 A	19-Sep-06 A
SDS69450	SDM Design Interface Review Meetings	1d	01-Dec-06 A	02-Dec-06 A
Design Assurance Review		12d	11-Mar-08	26-Mar-08
SDS72280	Produce Section Wide Design Assurance Statement	9d	11-Mar-08	26-Mar-08
VO86 Land Acquisition and Costing for Artificial Badger Setts (Section 3)		200d	07-Dec-06 A	24-Sep-07 A
VO2430	Meetings with TSS, Corderoy and NIL	184d	07-Dec-06 A	24-Sep-07 A
ROJ - CRT - Section 3A (Task500.2)		986d	19-Sep-05 A	28-Jul-09
Sub Section Wide		595d	06-Mar-06 A	04-Jul-08
Sub Section Wide IDC		20d	29-Jan-08	25-Feb-08
A40361	Subsection Wide IDC	19d	29-Jan-08	25-Feb-08
Design Assurance Review		10d	26-Feb-08	10-Mar-08
SDS67960	Produce Design Assurance Statement	9d	26-Feb-08	10-Mar-08
VO197 Tram Sighting Exercise Roseburn Junction to Granton Square (Not tie approved)		35d	14-May-07 A	29-Jun-07 A
SDS73480	Tram Driver Sighting Exercise	32d	14-May-07 A	29-Jun-07 A
SDS73490	Complete Tram Driver Sighting Exercise	0d		29-Jun-07 A
VO236 OLE Amendment for Pway Changes at Crewe Toll (Internal)		56d	18-Jun-07 A	03-Sep-07 A
A487128	OLE Amendments for Pway Changes at Crewe Toll	52d	18-Jun-07 A	03-Sep-07 A
VO242 OLE Rework for Section 3A (Internal)		45d	10-Sep-07 A	09-Nov-07 A
A487137	OLE rework for section 3A	42d	10-Sep-07 A	09-Nov-07 A
A487138	Issue OLE rework for section 3A	0d		09-Oct-07 A
Consents & Approvals		362d	05-Feb-07 A	04-Jul-08
Prior Approvals		362d	05-Feb-07 A	04-Jul-08
Combined Section Prior Approval		60d	11-Apr-08	04-Jul-08
A25480	Issue Combined Package 3A for Prior Approval to CEC	0d		11-Apr-08
A25490	Receive Combined Package 3A Comments From CEC	0d		06-Jun-08
A25530	Prior Approval Granted for Section 3A Combined Package	0d		04-Jul-08
A40330	CEC Approval Period - 3A Combined Package	38d	11-Apr-08	06-Jun-08
A40340	Update 3A Combined Package to CEC Comments	19d	06-Jun-08	04-Jul-08
Batch 3/02		52d	01-Feb-08	15-Apr-08
SDS75240	Batch 3/02 Formal Approval Period	38d	15-Feb-08	14-Apr-08
SDS75250	Issue Batch 3/02 For Approval to CEC	0d	15-Feb-08	
SDS75260	Receive CEC Prior Approval For Batch 3/02	0d	15-Apr-08	
SDS75290	Batch 3/02 Roseburn Tramstop & Bridge - Collation of Planning Drawings	9d	01-Feb-08*	14-Feb-08
Batch 3/03		121d	12-Oct-07 A	09-Apr-08
SDS76750	Batch 3/03 Formal Approval Period	38d	11-Feb-08	08-Apr-08
SDS76760	Issue Batch 3/03 For Approval to CEC	0d	11-Feb-08	
SDS76770	Receive CEC Prior Approval For Batch 3/03	0d	09-Apr-08	
SDS76790	Batch 3/03 Coltbridge Viaduct - Collation of Planning Drawings	9d	28-Jan-08*	08-Feb-08
SDS76800	Batch 3/03 Coltbridge Viaduct - Informal Consultation	38d	12-Oct-07 A	06-Dec-07 A
Batch 3/04		56d	12-Nov-07 A	07-Feb-08
SDS76810	Batch 3/04 Formal Approval Period	38d	05-Dec-07 A	06-Feb-08
SDS76820	Issue Batch 3/04 For Approval to CEC	0d	05-Dec-07 A	
SDS76830	Receive CEC Prior Approval For Batch 3/04	0d	07-Feb-08	
SDS76850	Batch 3/04 St Georges Access Bridges-Collation of Planning Drawings	15d	12-Nov-07 A	04-Dec-07 A
Batch 3/05		52d	08-Feb-08	22-Apr-08
SDS76870	Batch 3/05 Formal Approval Period	38d	22-Feb-08	21-Apr-08
SDS76880	Issue Batch 3/05 For Approval to CEC	0d	22-Feb-08	
SDS76890	Receive CEC Prior Approval For Batch 3/05	0d	22-Apr-08	
SDS76910	Batch 3/05 Ravelston Tramstop-Collation of Planning Drawings	9d	08-Feb-08*	21-Feb-08
Batch 3/07		48d	10-Dec-07 A	25-Feb-08
SDS76930	Batch 3/07 Formal Approval Period	38d	21-Dec-07 A	22-Feb-08
SDS76940	Issue Batch 3/07 For Approval to CEC	0d	21-Dec-07 A	
SDS76950	Receive CEC Prior Approval For Batch 3/07	0d	25-Feb-08	
SDS76970	Batch 3/07 Craigleith Drive Bridge - Collation of Planning Drawings	8d	10-Dec-07 A	20-Dec-07 A
Batch 3/09		48d	10-Dec-07 A	25-Feb-08
SDS76990	Batch 3/09 Formal Approval Period	38d	21-Dec-07 A	22-Feb-08
SDS77000	Issue Batch 3/09 For Approval to CEC	0d	21-Dec-07 A	
SDS77010	Receive CEC Prior Approval For Batch 3/09	0d	25-Feb-08	
SDS77030	Batch 3/09 Queensferry Road Bridge - Collation of Planning Drawings	8d	10-Dec-07 A	20-Dec-07 A
Batch 3/10		119d	15-Oct-07 A	08-Apr-08
SDS77050	Batch 3/10 Formal Approval Period	38d	08-Feb-08	07-Apr-08
SDS77060	Issue Batch 3/10 For Approval to CEC	0d	08-Feb-08	
SDS77070	Receive CEC Prior Approval For Batch 3/10	0d	08-Apr-08	
SDS77090	Batch 3/10 Craigleith Tramstop - Collation of Planning Drawings	73d	15-Oct-07 A	07-Feb-08
Batch 3/11		68d	12-Nov-07 A	25-Feb-08
SDS77110	Batch 3/11 Formal Approval Period	38d	21-Dec-07 A	22-Feb-08
SDS77120	Issue Batch 3/11 For Approval to CEC	0d	21-Dec-07 A	
SDS77130	Receive CEC Prior Approval For Batch 3/11	0d	25-Feb-08	
SDS77150	Batch 3/11 Groathill Road South Bridge - Collation of Planning Drawings	27d	12-Nov-07 A	20-Dec-07 A
Batch 3/12		52d	28-Mar-08	10-Jun-08
SDS77170	Batch 3/12 Formal Approval Period	38d	11-Apr-08	09-Jun-08
SDS77180	Issue Batch 3/12 For Approval to CEC	0d	11-Apr-08	
SDS77190	Receive CEC Prior Approval For Batch 3/12	0d	10-Jun-08	
SDS77210	Batch 3/12 Telford Road Bridge - Collation of Planning Drawings	9d	28-Mar-08*	10-Apr-08
Batch 3/13		126d	30-Jul-07 A	31-Jan-08
SDS77230	Batch 3/13 Formal Approval Period	45d	16-Nov-07 A	30-Jan-08
SDS77240	Issue Batch 3/13 For Approval to CEC	0d	16-Nov-07 A	
SDS77250	Receive CEC Prior Approval For Batch 3/13	0d	31-Jan-08	
SDS77270	Batch 3/13 Telford Road Tramstop - Collation of Planning Drawings	74d	30-Jul-07 A	16-Nov-07 A
Batch 3/14		182d	30-Jul-07 A	18-Apr-08
SDS77290	Batch 3/14 Formal Approval Period	38d	20-Feb-08	17-Apr-08
SDS77300	Issue Batch 3/14 For Approval to CEC	0d	20-Feb-08	
SDS77310	Receive CEC Prior Approval For Batch 3/14	0d	18-Apr-08	
SDS77330	Batch 3/14 Crewe Toll Tramstop - Collation of Planning Drawings	131d	30-Jul-07 A	19-Feb-08
Roads, Track, OLE, Landscaping, Street Lighting		40d	14-Jan-08	07-Mar-08
SDS27150	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	14-Jan-08	07-Mar-08
Tram Stop Roseburn		221d	09-Mar-07 A	22-Jan-08
A40440	Informal Consultation With CEC & tie over Prior Approval Tram Stop Roseburn	203d	09-Mar-07 A	22-Jan-08
Tram Stop Ravelston		14d	20-Feb-07 A	09-Mar-07 A
A25540	Issue Tram Stop Ravelston Design for Prior Approval	0d		09-Mar-07 A
A40470	Informal Consultation With CEC & tie over Prior Approval for Tram Stop Ravelston	13d	20-Feb-07 A	09-Mar-07 A
Tram Stop Craigleith		214d	09-Mar-07 A	14-Jan-08
A40500	Informal Consultation With CEC & tie over Prior Approval Tram Stop Craigleith	197d	09-Mar-07 A	14-Jan-08
Tram Stop Telford Road		214d	09-Mar-07 A	14-Jan-08
A40530	Informal Consultation With CEC & tie over Prior Approval Tram Stop Telford Road	197d	09-Mar-07 A	14-Jan-08
Tram Stop Crewe Toll for Western General Hospital		102d	09-Mar-07 A	30-Jul-07 A
A40560	Informal Consultation With CEC & tie over Prior Approval Tram Stop Crewe Toll for Western General Hospital	92d	09-Mar-07 A	30-Jul-07 A
Tram South Groathill Avenue Substation		288d	20-Feb-07 A	08-Apr-08
A27990	Prior Approval For Tram South Groathill Avenue Substation	0d		08-Apr-08
A41180	Informal Consultation With CEC & tie Over Prior Approval Tram South Groathill Avenue Substation	38d	20-Feb-07 A	18-Apr-07 A
Roseburn Corridor Retaining Structure Section A		41d	21-Jun-07 A	17-Aug-07 A
1163	Commence Roseburn Corridor RW Section A Informal Consultation With CEC & tie Over Prior Approval	38d	21-Jun-07 A	17-Aug-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Activity ID	Activity Name	Original Duration	Start	Finish
	Roseburn Corridor Retaining Structure Section B	41d	21-Jun-07 A	17-Aug-07 A
1198	Commence Roseburn Corridor RW Section B Informal Consultation With CEC & tie Over Prior Approval	38d	21-Jun-07 A	17-Aug-07 A
	Roseburn Corridor Retaining Structure Section C	41d	20-Jun-07 A	16-Aug-07 A
1203	Commence Roseburn Corridor RW Section C Informal Consultation With CEC & tie Over Prior Approval	38d	20-Jun-07 A	16-Aug-07 A
	Roseburn Corridor Retaining Structure Section D	40d	25-Jun-07 A	17-Aug-07 A
1208	Commence Roseburn Corridor RW Section D Informal Consultation With CEC & tie Over Prior Approval	38d	25-Jun-07 A	17-Aug-07 A
	Roseburn Corridor Retaining Structure Section E	41d	21-Jun-07 A	17-Aug-07 A
1213	Commence Roseburn Corridor RW Section E Informal Consultation With CEC & tie Over Prior Approval	38d	21-Jun-07 A	17-Aug-07 A
	Roseburn Corridor Retaining Structure Section F	40d	25-Jun-07 A	17-Aug-07 A
1218	Commence Roseburn Corridor RW Section F Informal Consultation With CEC & tie Over Prior Approval	38d	25-Jun-07 A	17-Aug-07 A
	Roseburn Corridor Retaining Structure Section G	20d	30-Jul-07 A	24-Aug-07 A
1223	Commence Roseburn Corridor RW Section G Informal Consultation With CEC & tie Over Prior Approval	19d	30-Jul-07 A	24-Aug-07 A
	Roseburn Corridor Retaining Structure Section H	40d	25-Jun-07 A	17-Aug-07 A
1228	Commence Roseburn Corridor RW Section H Informal Consultation With CEC & tie Over Prior Approval	38d	25-Jun-07 A	17-Aug-07 A
	Roseburn Terrace Bridge Superstructure	44d	02-Apr-07 A	01-Jun-07 A
A13290	Commence Roseburn Terrace Superstructure Informal Consultation With CEC & tie Over Prior Approval	38d	02-Apr-07 A	01-Jun-07 A
	St Georges School Access Bridge Structure	40d	05-Feb-07 A	02-Apr-07 A
A13430	Commence St Georges Access Bridge Informal Consultation With CEC & tie Over Prior Approval	38d	05-Feb-07 A	02-Apr-07 A
	St Georges School Footbridge Structure	50d	13-Apr-07 A	22-Jun-07 A
A13440	Commence St Georges Footbridge Informal Consultation With CEC & tie Over Prior Approval	45d	13-Apr-07 A	22-Jun-07 A
	Ravelston Dykes Bridge Structure	42d	10-Apr-07 A	06-Jun-07 A
A13570	Commence Ravelston Dykes Informal Consultation With CEC & tie Over Prior Approval	38d	10-Apr-07 A	06-Jun-07 A
	Craigleith Drive Bridge Structure	44d	30-Mar-07 A	30-May-07 A
A13580	Commence Craigleith Drive Bridge Informal Consultation With CEC & tie Over Prior Approval	38d	30-Mar-07 A	30-May-07 A
	Holiday Inn Access Bridge Structure	42d	10-Apr-07 A	06-Jun-07 A
A13740	Commence Holiday Inn Access Bridge Informal Consultation With CEC & tie Over Prior Approval	38d	10-Apr-07 A	06-Jun-07 A
	Queensferry Road Bridge Structure	42d	10-Apr-07 A	06-Jun-07 A
A13590	Commence Queensferry Road Bridge Informal Consultation With CEC & tie Over Prior Approval	38d	10-Apr-07 A	06-Jun-07 A
	Groathill Road South Bridge Structure	61d	30-Mar-07 A	22-Jun-07 A
A13680	Commence Groathill Road South Bridge Informal Consultation With CEC & tie Over Prior Approval	53d	30-Mar-07 A	22-Jun-07 A
	Telford Road Bridge Structure	192d	10-Apr-07 A	14-Jan-08
A13690	Commence Telford Road Bridge Informal Consultation With CEC & tie Over Prior Approval	178d	10-Apr-07 A	14-Jan-08
	Technical Approvals	332d	05-Feb-07 A	22-May-08
	Roseburn Corridor Retaining Structure Section A Review Period (TAA)	155d	21-May-07 A	21-Dec-07 A
962	Issue Roseburn Corridor RW Section A Design Package to TAA	0d	16-Aug-07 A	
963	TAA Roseburn Corridor RW Section A Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A
964	Receive Roseburn Corridor RW Section A Design Package comments from TAA	0d	09-Nov-07 A	
965	Incorporate TAA comments into Roseburn Corridor RW Section A Design Package	28d	12-Nov-07 A	21-Dec-07 A
993	Commence Roseburn Corridor RW Section A Informal Consultation With CEC Over Technical Approval	27d	21-May-07 A	29-Jun-07 A
	Roseburn Corridor Retaining Structure Section B Review Period (TAA)	156d	18-May-07 A	21-Dec-07 A
1018	Commence Roseburn Corridor RW Section B Informal Consultation With CEC Over Technical Approval	38d	18-May-07 A	13-Jul-07 A
987	Issue Roseburn Corridor RW Section B Design Package to TAA	0d	16-Aug-07 A	
988	TAA Roseburn Corridor RW Section B Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A
989	Receive Roseburn Corridor RW Section B Design Package comments from TAA	0d	09-Nov-07 A	
990	Incorporate TAA comments into Roseburn Corridor RW Section B Design Package	28d	12-Nov-07 A	21-Dec-07 A
	Roseburn Corridor Retaining Structure Section C Review Period (TAA)	156d	18-May-07 A	21-Dec-07 A
1012	Issue Roseburn Corridor RW Section C Design Package to TAA	0d	16-Aug-07 A	
1013	TAA Roseburn Corridor RW Section C Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A
1014	Receive Roseburn Corridor RW Section C Design Package comments from TAA	0d	09-Nov-07 A	
1015	Incorporate TAA comments into Roseburn Corridor RW Section C Design Package	28d	12-Nov-07 A	21-Dec-07 A
1043	Commence Roseburn Corridor RW Section C Informal Consultation With CEC Over Technical Approval	38d	18-May-07 A	13-Jul-07 A
	Roseburn Corridor Retaining Structure Section D Review Period (TAA)	156d	18-May-07 A	21-Dec-07 A
1037	Issue Roseburn Corridor RW Section D Design Package to TAA	0d	16-Aug-07 A	
1038	TAA Roseburn Corridor RW Section D Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A
1039	Receive Roseburn Corridor RW Section D Design Package comments from TAA	0d	09-Nov-07 A	
1040	Incorporate TAA comments into Roseburn Corridor RW Section D Design Package	28d	12-Nov-07 A	21-Dec-07 A
1068	Commence Roseburn Corridor RW Section D Informal Consultation With CEC Over Technical Approval	29d	18-May-07 A	02-Jul-07 A
	Roseburn Corridor Retaining Structure Section E Review Period (TAA)	155d	21-May-07 A	21-Dec-07 A
1062	Issue Roseburn Corridor RW Section E Design Package to TAA	0d	16-Aug-07 A	
1063	TAA Roseburn Corridor RW Section E Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A
1064	Receive Roseburn Corridor RW Section E Design Package comments from TAA	0d	09-Nov-07 A	
1065	Incorporate TAA comments into Roseburn Corridor RW Section E Design Package	28d	12-Nov-07 A	21-Dec-07 A
1093	Commence Roseburn Corridor RW Section E Informal Consultation With CEC Over Technical Approval	38d	21-May-07 A	16-Jul-07 A
	Roseburn Corridor Retaining Structure Section F Review Period (TAA)	156d	18-May-07 A	21-Dec-07 A
1087	Issue Roseburn Corridor RW Section F Design Package to TAA	0d	16-Aug-07 A	
1088	TAA Roseburn Corridor RW Section F Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A
1089	Receive Roseburn Corridor RW Section F Design Package comments from TAA	0d	09-Nov-07 A	
1090	Incorporate TAA comments into Roseburn Corridor RW Section Fe Design Package	28d	12-Nov-07 A	21-Dec-07 A
1118	Commence Roseburn Corridor RW Section F Informal Consultation With CEC Over Technical Approval	38d	18-May-07 A	13-Jul-07 A
	Roseburn Corridor Retaining Structure Section G Review Period (TAA)	154d	22-May-07 A	21-Dec-07 A
1112	Issue Roseburn Corridor RW Section G Design Package to TAA	0d	16-Aug-07 A	
1113	TAA Roseburn Corridor RW Section G Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A
1114	Receive Roseburn Corridor RW Section G Design Package comments from TAA	0d	09-Nov-07 A	
1115	Incorporate TAA comments into Roseburn Corridor RW Section G Design Package	28d	12-Nov-07 A	21-Dec-07 A
1143	Commence Roseburn Corridor RW Section G Informal Consultation With CEC Over Technical Approval	38d	22-May-07 A	17-Jul-07 A
	Roseburn Corridor Retaining Structure Section H Review Period (TAA)	111d	20-Jul-07 A	21-Dec-07 A
1137	Issue Roseburn Corridor RW Section H Design Package to TAA	0d	16-Aug-07 A	
1138	TAA Roseburn Corridor RW Section H Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A
1139	Receive Roseburn Corridor RW Section H Design Package comments from TAA	0d	09-Nov-07 A	
1140	Incorporate TAA comments into Roseburn Corridor RW Section H Design Package	28d	12-Nov-07 A	21-Dec-07 A
1148	Commence Roseburn Corridor RW Section H Informal Consultation With CEC Over Technical Approval	14d	20-Jul-07 A	09-Aug-07 A
	Roseburn Terrace Bridge Review Period (TAA)	152d	24-Apr-07 A	21-Nov-07 A
A10380	Commence Roseburn Terrace Informal Consultation With CEC Over Technical Approval	17d	24-Apr-07 A	18-May-07 A
A8170	Issue Roseburn Terrace Design Package to TAA	0d		02-Jul-07 A
A8180	TAA Roseburn Terrace Design Package Review Period	38d	02-Jul-07 A	24-Aug-07 A
A8190	Receive Roseburn TerraceDesign Package Comments from TAA	0d		06-Nov-07 A
A8200	Incorporate TAA Comments into Roseburn Terrace Design Package	10d	07-Nov-07 A	21-Nov-07 A
	Coltbridge Viaduct Structure Review Period (TAA)	91d	30-Jul-07 A	03-Dec-07 A
A12950	Commence Coltbridge Viaduct Informal Consultation With CEC Over Technical Approval	31d	30-Jul-07 A	13-Sep-07 A
A8500	Issue Coltbridge Viaduct Design Package to TAA	0d		13-Sep-07 A
A8510	TAA Coltbridge Viaduct Design Package Review Period	38d	13-Sep-07 A	07-Nov-07 A
A8520	Receive Coltbridge Viaduct Design Package Comments from TAA	0d		19-Nov-07 A
A8530	Incorporate TAA Comments into Coltbridge Viaduct Design Package	9d	20-Nov-07 A	03-Dec-07 A
	St Georges School Access Bridge Structure Review Period (TAA)	161d	05-Feb-07 A	17-Sep-07 A
A12960	Commence St Georges Access Bridge Informal Consultation With CEC Over Technical Approval	60d	05-Feb-07 A	08-May-07 A
A8690	Issue St Georges Access Bridge Design Package to TAA	0d		25-May-07 A
A8700	TAA St Georges Access Bridge Design Package Review Period	38d	25-May-07 A	20-Jul-07 A
A8710	Receive St Georges Access Bridge Design Package Comments from TAA	0d		03-Sep-07 A
A8720	Incorporate TAA Comments into St Georges Access Bridge Design Package	9d	04-Sep-07 A	17-Sep-07 A
	St Georges School Footbridge Structure Review Period (TAA)	97d	04-May-07 A	17-Sep-07 A
A12970	Commence St Georges Footbridge Informal Consultation With CEC Over Technical Approval	14d	04-May-07 A	25-May-07 A
A8870	Issue St Georges Footbridge Design Package to TAA	0d		25-May-07 A
A8880	TAA St Georges Footbridge Design Package Review Period	38d	29-May-07 A	23-Jul-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
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Milestone

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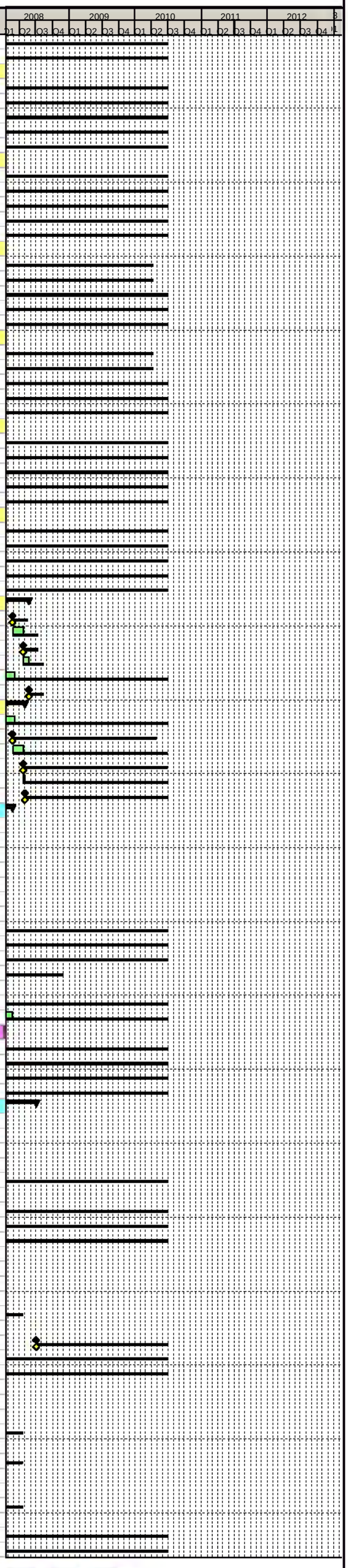
Activity ID	Activity Name	Original Duration	Start	Finish
A8890	Receive St Georges Footbridge Design Package Comments from TAA	0d		03-Sep-07 A
A8900	Incorporate TAA Comments into St Georges Footbridge Design Package	9d	04-Sep-07 A	17-Sep-07 A
Ravelston Dykes Bridge Structure Review Period (TAA)		148d	22-Feb-07 A	17-Sep-07 A
A12980	Commence Ravelston Dykes Informal Consultation With CEC Over Technical Approval	38d	22-Feb-07 A	20-Apr-07 A
A9060	Issue Ravelston Dykes Design Package to TAA	0d		25-May-07 A
A9070	TAA Ravelston Dykes Design Package Review Period	38d	29-May-07 A	23-Jul-07 A
A9080	Receive Ravelston Dykes Design Package Comments from TAA	0d		03-Sep-07 A
A9090	Incorporate TAA Comments into Ravelston Dykes Design Package	9d	04-Sep-07 A	17-Sep-07 A
Craigleith Drive Bridge Structure Review Period (TAA)		105d	24-Apr-07 A	17-Sep-07 A
A12990	Commence Craigleith Drive Bridge Informal Consultation With CEC Over Technical Approval	31d	24-Apr-07 A	11-Jun-07 A
A9250	Issue Craigleith Drive Bridge Design Package to TAA	0d		12-Jun-07 A
A9260	TAA Craigleith Drive Bridge Design Package Review Period	38d	12-Jun-07 A	06-Aug-07 A
A9270	Receive Craigleith Drive Bridge Design Package Comments from TAA	0d		03-Sep-07 A
A9280	Incorporate TAA Comments into Craigleith Drive Bridge Design Package	9d	04-Sep-07 A	17-Sep-07 A
Holiday Inn Access Bridge Structure Review Period (TAA)		115d	10-Apr-07 A	17-Sep-07 A
A13050	Commence Holiday Inn Access Bridge Informal Consultation With CEC Over Technical Approval	25d	10-Apr-07 A	17-May-07 A
A9900	Issue Holiday Inn Access Bridge Design Package to TAA	0d		18-May-07 A
A9910	TAA Holiday Inn Access Bridge Design Package Review Period	38d	21-May-07 A	16-Jul-07 A
A9920	Receive Holiday Inn Access Bridge Design Package Comments from TAA	0d		03-Sep-07 A
A9930	Incorporate TAA Comments into Holiday Inn Access Bridge Design Package	9d	04-Sep-07 A	17-Sep-07 A
Queensferry Road Bridge Structure Review Period (TAA)		150d	10-Apr-07 A	05-Nov-07 A
A13000	Commence Queensferry Road Bridge Informal Consultation With CEC Over Technical Approval	25d	10-Apr-07 A	17-May-07 A
A9440	Issue Queensferry Road Bridge Design Package to TAA	0d		18-May-07 A
A9450	TAA Queensferry Road Bridge Design Package Review Period	38d	21-May-07 A	16-Jul-07 A
A9460	Receive Queensferry Road Bridge Design Package Comments from TAA	0d		22-Oct-07 A
A9470	Incorporate TAA Comments into Queensferry Road Bridge Design Package	9d	23-Oct-07 A	05-Nov-07 A
Groathill Road South Bridge Structure Review Period (TAA)		105d	24-Apr-07 A	17-Sep-07 A
A13010	Commence Groathill Road South Bridge Informal Consultation With CEC Over Technical Approval	18d	24-Apr-07 A	21-May-07 A
A9630	Issue Groathill Road South Bridge Design Package to TAA	0d		26-Jun-07 A
A9640	TAA Groathill Road South Bridge Design Package Review Period	38d	26-Jun-07 A	20-Aug-07 A
A9650	Receive Groathill Road South Bridge Design Package Comments from TAA	0d		03-Sep-07 A
A9660	Incorporate TAA Comments into Groathill Road South Bridge Design Package	9d	04-Sep-07 A	17-Sep-07 A
Telford Road Bridge Structure Review Period (TAA)		150d	10-Apr-07 A	05-Nov-07 A
A13020	Commence Telford Road Bridge Informal Consultation With CEC Over Technical Approval	26d	10-Apr-07 A	18-May-07 A
A9820	Issue Telford Road Bridge Design Package to TAA	0d		25-May-07 A
A9830	TAA Telford Road Bridge Design Package Review Period	38d	25-May-07 A	23-Jul-07 A
A9840	Receive Telford Road Bridge Design Package Comments from TAA	0d		22-Oct-07 A
A9850	Incorporate TAA Comments into Telford Road Bridge Design Package	9d	23-Oct-07 A	05-Nov-07 A
Roads Technical Approval		94d	14-Jan-08	22-May-08
SDS27160	Issue Roads Design to Roads Authority for Approval	0d		25-Feb-08
SDS27170	Roads Authority Approval Period	38d	26-Feb-08	23-Apr-08
SDS27180	Receive Roads Authority Comments	0d		23-Apr-08
SDS27190	Update to Roads Authority Comments	19d	24-Apr-08	22-May-08
SDS27200	Roads Authority Informal Consultation	38d	14-Jan-08	07-Mar-08
SDS27270	Roads Technical Approval Granted	0d		22-May-08
Drainage Technical Approval		78d	14-Jan-08	30-Apr-08
SDS72600	Roads Authority Informal Consultation For Drainage	38d	14-Jan-08	07-Mar-08
SDS72610	Issue Drainage Design to Roads Authority for Approval	0d		25-Feb-08
SDS72620	Roads Authority Approval Period For Drainage	38d	26-Feb-08	23-Apr-08
SDS72630	Receive Roads Authority Comments For Drainage	0d		23-Apr-08
SDS72640	Update to Roads Authority Comments For Drainage	5d	24-Apr-08	30-Apr-08
SDS72650	Drainage Technical Approval Granted	0d		30-Apr-08
Track (Task 500.2.1)		496d	13-Mar-06 A	22-Feb-08
A2880	First Pass Mx Horizontal and Vertical Alignment	47d	13-Mar-06 A	24-May-06 A
A2890	Handover Alignment Design P Way to Roads	0d		25-May-06 A
A2900	Coordination Meeting/Workshop Between PWay/Roads & Resolution of Major Conflicts	1d	25-May-06 A	25-May-06 A
SDS26870	Revise Alignment to Match Roads First Pass Vertical	3d	15-Jan-07 A	17-Jan-07 A
SDS26920	Handover Alignment Design Track to Roads	0d		17-Jan-07 A
SDS27290	Revise Alignment to Inc. Preliminary Design Comments	64d	07-Aug-06 A	10-Nov-06 A
SDS27310	Handover Alignment Design Track to Roads	0d		10-Nov-06 A
SDS57060	Issue Track Alignment Design to tie Section 3A	0d		02-Feb-07 A
SDS57340	tie Approval Period	19d	05-Feb-07 A	02-Mar-07 A
SDS57350	Incorporate tie Comments	1d	04-May-07 A	05-May-07 A
SDS59560	IDC Track Design	10d	19-Jan-07 A	02-Feb-07 A
SDS60890	Revise Track Alignment to Inc. Modelling Changes	9d	30-Oct-06 A	10-Nov-06 A
SDS70190	Receive tie Comments	0d	03-Apr-07 A	
SDS75120	Address tie Comments, Other Revisions, IDC & Section Submission Package	129d	06-Aug-07 A	22-Feb-08
VO111 Crewe Toll Land Availability		5d	29-Jan-07 A	02-Feb-07 A
SDS74500	Provisional Alignment Design and Produce Drawings	2d	29-Jan-07 A	30-Jan-07 A
SDS74510	Issue to Interfacing SDS Design Teams for Comments	0d		30-Jan-07 A
SDS74520	Recieve Comments	0d	31-Jan-07 A	
SDS74530	Incorporate Comments, develop design and incorporate into overall section 3a design	3d	31-Jan-07 A	02-Feb-07 A
Roads, Street Lighting & Landscaping (Task 500.2.2)		594d	07-Mar-06 A	04-Jul-08
A2910	Route Appreciation/Junct Layout & Determine with tie & CEC Works Extent	1d	19-May-06 A	19-May-06 A
A2920	Frontage Surveys	30d	07-Mar-06 A	21-Apr-06 A
A2930	Set Up Mx Models	7d	18-May-06 A	26-May-06 A
A2940	Produce Preliminary Horizontal Road Alignment Design (Inc Lanes & Parking Zones)	5d	30-May-06 A	05-Jun-06 A
A2950	Preliminary Road Safety Audit	1d	30-Jun-06 A	30-Jun-06 A
A2960	Review & Amend TRO Drawings & Schedules for Modifications Required Post Prelim Design	3d	12-Jun-06 A	14-Jun-06 A
A2970	Handover Alignment Design Roads to Pway	0d		29-Jun-06 A
A2980	Coordination Meeting/Workshop Between Roads & Pway Teams	1d	29-Jun-06 A	29-Jun-06 A
A5500	Undertake Road Marking, Pedestrian Req & Traffic Signalling Design	3d	06-Jun-06 A	08-Jun-06 A
SDS26880	Produce First Pass Vertical Alignment	2d	10-Jan-07 A	11-Jan-07 A
SDS26900	Handover Alignment Design Roads to Pway	0d		11-Jan-07 A
SDS26930	Revise Vertical Alignment to Match Final Track Alignment	3d	17-Jan-07 A	19-Jan-07 A
SDS26940	Horizontal & Vertical Alignment Design Complete	0d		09-Feb-07 A
SDS26950	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 3A	0d		14-Aug-07 A
SDS26960	Cross Check all Horizontal Design Aspects With Vertical Alignment	5d	12-Feb-07 A	16-Feb-07 A
SDS27000	Issue Construction Drawings	0d		04-Jul-08
SDS27010	Road Safety Audit Stage 2 (Intermediate)	2d	01-Mar-07 A	02-Mar-07 A
SDS27020	Insert Intermediate RSA Comments	5d	30-Jul-07 A	03-Aug-07 A
SDS27030	Produce Site Clearance Drawings & Schedule	127d	16-Jan-07 A	27-Jul-07 A
SDS27040	Produce Fencing, Barriers & Guardrails Design	5d	12-Feb-07 A	16-Feb-07 A
SDS27050	Produce Street Lighting Design (& Liaise With OLE)	83d	16-Feb-07 A	25-Jun-07 A
SDS27070	Produce Soft Landscaping Design	134d	19-Jan-07 A	13-Aug-07 A
SDS27090	Produce Traffic Signs Design (Signs, Markings, Signals)	5d	12-Feb-07 A	16-Feb-07 A
SDS27100	Produce Earthworks Design	86d	10-Apr-07 A	17-Aug-07 A
SDS27320	Revise Alignment to Inc. Final Track Horizontal Alignment (Horizontal Design Freeze) & Issue to Substn Designers	2d	08-Jan-07 A	09-Jan-07 A
SDS27330	Produce Kerbs, Footway & Paved Area Design	5d	12-Feb-07 A	16-Feb-07 A
SDS27340	Produce Pavement Design	56d	08-May-07 A	31-Jul-07 A
SDS27350	IDC (Inc. Systems Assurance)	5d	12-Feb-07 A	16-Feb-07 A
SDS56370	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 3A	0d		26-Sep-07 A
SDS56790	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 3A	0d		17-Aug-07 A



Primary Baseline
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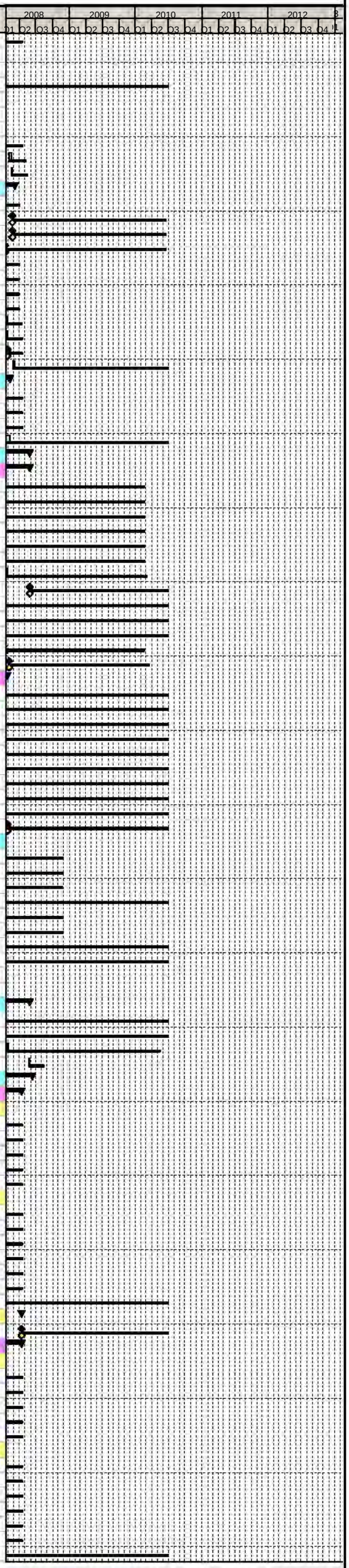
Activity ID	Activity Name	Original Duration	Start	Finish
SDS59340	Compile Planning Drawings	9d	31-Jul-07 A	13-Aug-07 A
SDS59730	Advise Track, Stops, Modellers Changes To Accom RSA1 & PD Comments	6d	16-Oct-06 A	23-Oct-06 A
SDS59740	Pass Guidance/Envelope To Track & Others As Necessary	0d		07-Nov-06 A
SDS60480	Confirm - Track / Roads Alignment, Stop Locations, Track Drainage Connection Locations and Volumes	29d	08-Nov-06 A	20-Dec-06 A
SDS60870	Revise Horizontal to Inc. Track Horizontal Alignment, RSA1 & PD Comments	26d	13-Nov-06 A	20-Dec-06 A
SDS60880	Revise Alignment to Inc. Minor Changes From Traffic Modelling	2d	16-Nov-06 A	17-Nov-06 A
SDS67280	Street Lighting Survey Work	2d	20-Nov-06 A	21-Nov-06 A
SDS69670	Produce Hard Landscaping Design	111d	10-Apr-07 A	25-Sep-07 A
SDS80000	Final RSA	9d	05-Feb-08	18-Feb-08
SDS80010	Incorporate Final RSA Comments	5d	19-Feb-08	25-Feb-08
Drainage		254d	12-Mar-07 A	10-Mar-08
SDS71470	Hydraulic Modelling & First Pass Drainage Design	111d	12-Mar-07 A	29-Aug-07 A
SDS71480	Receipt of Drainage Survey Information	0d		25-Feb-08*
SDS71490	Outfall Consent/Approval from SW	0d		25-Feb-08*
SDS71500	Outfall Consent/Approval from CEC	0d		14-Jan-08*
SDS71510	Outfall Consent/Approval from SEPA	0d		10-May-07 A
SDS71520	Compile Drainage Package	5d	03-Oct-07 A	10-Oct-07 A
SDS71530	Issue Drainage Design Completion Letter to tie for Approval Section 3A	0d		11-Oct-07 A
SDS73220	Final Detailed Drainage Design	68d	29-Jun-07 A	10-Oct-07 A
SDS80400	Final Detailed Drainage Design	37d	26-Nov-07 A	25-Jan-08
SDS80410	Compile Drainage Package	2d	25-Jan-08	28-Jan-08
SDS80420	Issue Drainage Design Completion Letter to tie for Approval Section 3A	0d		28-Jan-08
SDS80430	Confirm Drainage and Amend if Required	9d	26-Feb-08	10-Mar-08
Boundary & Accomodation Works (Task 500.2.3)		306d	20-Nov-06 A	08-Feb-08
SDS42070	Detailed Design of Boundary & Accomodation Works	99d	26-Mar-07 A	24-Aug-07 A
SDS42080	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 3A	0d		24-Aug-07 A
SDS61090	Detailed Design of Noise Fencing	178d	20-Nov-06 A	24-Aug-07 A
SDS81200	Additional Boundary and Accommodation Works and review	64d	30-Oct-07 A	08-Feb-08
Environmental		455d	14-Aug-06 A	29-May-08
Badger Mitigation Plan		455d	14-Aug-06 A	29-May-08
SDS60430	Produce Badger Mitigation Plan	88d	14-Aug-06 A	22-Dec-06 A
SDS60440	Issue Badger Mitigation Plan to tie	0d		22-Dec-06 A
SDS60450	tie Approval Period	28d	22-Dec-06 A	12-Feb-07 A
SDS60460	Update Badger Mitigation Plan to tie Comments	187d	29-Jan-07 A	08-Nov-07 A
SDS60470	Re-Issue Draft Badger Mitigation Plan to tie	0d		08-Nov-07 A
SDS60490	tie Approval Period	19d	09-Nov-07 A	06-Dec-07 A
SDS60500	Update Badger Mitigation Plan to Comments	14d	07-Jan-08 A	25-Jan-08
SDS60510	Badger Mitigation Plan and Landscape and Mitigation Plan Approval	0d		29-May-08
SDS67580	Selection of New Sett/ Holt Locations	2d	20-Nov-06 A	21-Nov-06 A
SDS67590	Design New Setts/ Holt	20d	09-Oct-06 A	06-Nov-06 A
SDS67600	Issue New Setts/ Holt Design Section 3A	0d		15-Nov-06 A
SDS81900	Receive Badger Mitigation Plan Comments	0d		04-Jan-08 A
SDS82830	Issue Badger Mitigation to Planning Committee	0d		06-Feb-08
Landscaping and Habitat Plan		355d	29-Aug-06 A	25-Jan-08
SDS60380	Produce Landscape & Habitat Management Plan	79d	29-Aug-06 A	22-Dec-06 A
SDS60390	Issue Landscape & Habitat Management Plan to tie	0d		22-Dec-06 A
SDS60400	tie Approval Period	48d	22-Dec-06 A	12-Mar-07 A
SDS60410	Issue Landscape & Habitat Plan to CEC	0d		27-Feb-07 A
SDS60420	Update Landscape & Habitat Plan to tie Comments	10d	12-Mar-07 A	26-Mar-07 A
SDS61100	CEC Approval Period	38d	28-Feb-07 A	26-Apr-07 A
SDS61110	Update Landscape & Habitat Plan to CEC Comments	86d	27-Apr-07 A	06-Sep-07 A
SDS61180	Re-Issue Landscape & Habitat Plan to tie	0d		06-Sep-07 A
SDS61190	Consultation with tie and CEC over Landscape & Habitat Plan	47d	07-Sep-07 A	15-Nov-07 A
SDS61230	Final Issue of Landscape & Habitat Plan	0d		25-Jan-08*
Utilities Plates 1 to 23		378d	06-Mar-06 A	27-Aug-07 A
A11760	Close Out PD Issues & Propose Diversions	23d	25-Sep-06 A	27-Oct-06 A
A11770	Issue PD to SUCs	0d		07-Nov-06 A
A11780	Consult SUCs and MUDFA (at later stage - when appointed)	46d	29-Jan-07 A	05-Apr-07 A
A11790	Access to MUDFA	0d		23-Oct-06 A
A11800	Issue For IDC	0d		05-Apr-07 A
A11810	IDC	8d	10-Apr-07 A	19-Apr-07 A
A11820	Issue to SUCs	0d		19-Apr-07 A
A11830	SUCs Approval	84d	19-Apr-07 A	27-Aug-07 A
UTIL080	Section 3A - Pre-Preliminary Design (Utilities)	76d	06-Mar-06 A	30-Jun-06 A
UTIL700	Issue to Statutory Utility Companies (SUCs)	0d		30-Jun-06 A
TRO's		551d	01-Apr-06 A	30-May-08
SDS33350	Collate Exisiting TROs	65d	01-Apr-06 A	12-Jul-06 A
SDS33360	Receive Preliminary Roads Design	0d		12-Jul-06 A
SDS82010	Interim TRO Design Section 3A	5d	28-Jan-08*	01-Feb-08
SDS82020	Final TRO Design Section 3A	5d	23-May-08	30-May-08
Roseburn Corridor Retaining Structures		465d	09-Aug-06 A	10-Jun-08
Roseburn Corridor Retaining Structures: Section A - Russell Road to Roseburn Terrace		425d	09-Aug-06 A	15-Apr-08
Preliminary Design Milestones		146d	09-Aug-06 A	12-Mar-07 A
945	Receipt of tie PD Acceptance	0d	09-Aug-06 A	
946	Receipt of Alignment Prelim Design Package	0d	12-Oct-06 A	
947	Receipt of OLE Prelim Design Package	0d	12-Mar-07 A	
948	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	15-Jan-07 A	
949	Receipt of an Approved and Signed AIP document	0d	23-Oct-06 A	
Structure Detailed Design		217d	09-Oct-06 A	17-Aug-07 A
951	Structure Detailed Design	188d	09-Oct-06 A	27-Jul-07 A
952	Structure Detailed Design Draughting	109d	12-Feb-07 A	27-Jul-07 A
953	Issue Structure Detailed Design Package to CAT I Checker	0d	13-Apr-07 A	
954	Structure CAT I Check	67d	13-Apr-07 A	24-Jul-07 A
955	Receive & Incorporate CAT I comments	73d	27-Apr-07 A	16-Aug-07 A
956	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section A to tie	0d	17-Aug-07 A	
SDS63700	Prepare Planning Drawings	9d	27-Jun-07 A	10-Jul-07 A
Issue Roseburn Corridor Retaining Structure A Design Package For Construction/Fabrication		0d	15-Apr-08	15-Apr-08
966	Issue Roseburn Corridor Retaining Structure A Design Package For Construction/Fabrication	0d		15-Apr-08
Roseburn Corridor Retaining Structures: Section B -Roseburn Terrace to Coltbridge Viaduct		379d	12-Oct-06 A	15-Apr-08
Preliminary Design Milestones		80d	12-Oct-06 A	12-Feb-07 A
970	Receipt of tie PD Acceptance	0d	11-Dec-06 A	
971	Receipt of Alignment Prelim Design Package	0d	12-Oct-06 A	
972	Receipt of OLE Prelim Design Package	0d	11-Dec-06 A	
973	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	12-Feb-07 A	
974	Receipt of an Approved and Signed AIP document	0d	11-Dec-06 A	
Structure Detailed Design		134d	12-Feb-07 A	17-Aug-07 A
976	Structure Detailed Design	109d	12-Feb-07 A	27-Jul-07 A
977	Structure Detailed Design Draughting	109d	12-Feb-07 A	27-Jul-07 A
978	Issue Structure Detailed Design Package to CAT I Checker	0d	18-Jul-07 A	
979	Structure CAT I Check	9d	18-Jul-07 A	31-Jul-07 A
980	Receive & Incorporate CAT I comments	5d	01-Aug-07 A	07-Aug-07 A
981	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section B to tie	0d	17-Aug-07 A	
SDS63720	Prepare Planning Drawings	9d	27-Jun-07 A	10-Jul-07 A



Primary Baseline
Actual Work
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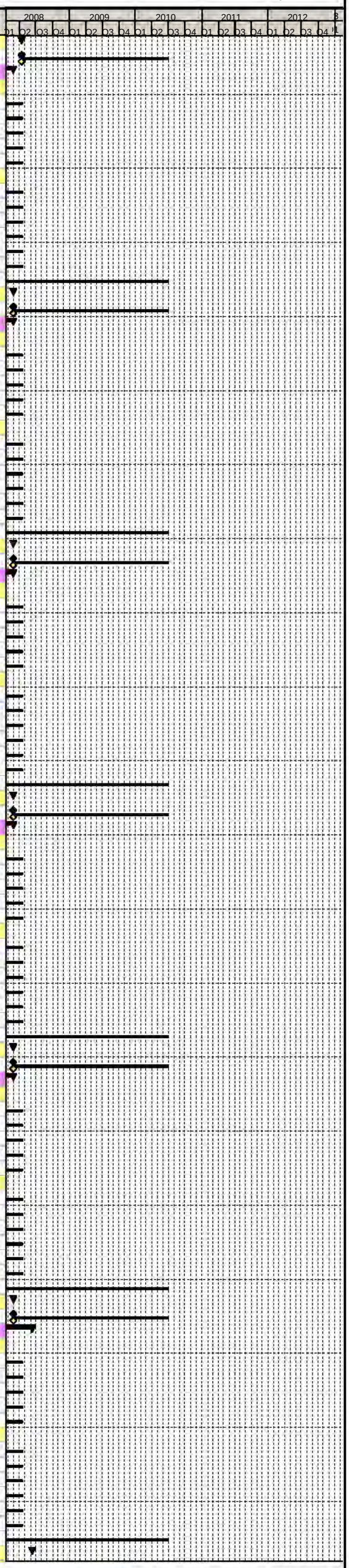
Activity ID	Activity Name	Original Duration	Start	Finish
Issue Roseburn Corridor Retaining Structure B Design Package For Construction/Fabrication		0d	15-Apr-08	15-Apr-08
991	Issue Roseburn Corridor Retaining Structure B Design Package For Construction/Fabrication	0d	15-Apr-08	
Roseburn Corridor Retaining Structures: Section C - Coltbridge Viaduct to Ravelston		344d	12-Oct-06 A	26-Feb-08
Preliminary Design Milestones		60d	12-Oct-06 A	15-Jan-07 A
995	Receipt of tie PD Acceptance	0d	11-Dec-06 A	
996	Receipt of Alignment Prelim Design Package	0d	12-Oct-06 A	
997	Receipt of OLE Prelim Design Package	0d	11-Dec-06 A	
998	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	15-Jan-07 A	
999	Receipt of an Approved and Signed AIP document	0d	23-Oct-06 A	
Structure Detailed Design		134d	12-Feb-07 A	17-Aug-07 A
1001	Structure Detailed Design	109d	12-Feb-07 A	27-Jul-07 A
1002	Structure Detailed Design Draughting	109d	12-Feb-07 A	27-Jul-07 A
1003	Issue Structure Detailed Design Package to CAT I Checker	0d	18-Jul-07 A	
1004	Structure CAT I Check	9d	18-Jul-07 A	31-Jul-07 A
1005	Receive & Incorporate CAT I comments	5d	01-Aug-07 A	07-Aug-07 A
1006	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section C to tie	0d	17-Aug-07 A	
SDS63730	Prepare Planning Drawings	9d	27-Jun-07 A	10-Jul-07 A
Issue Roseburn Corridor Retaining Structure C Design Package For Construction/Fabrication		0d	26-Feb-08	26-Feb-08
1016	Issue Roseburn Corridor Retaining Structure C Design Package For Construction/Fabrication	0d	26-Feb-08	
Roseburn Corridor Retaining Structures: Section D - Ravelston to Craigleith Drive		344d	12-Oct-06 A	26-Feb-08
Preliminary Design Milestones		100d	12-Oct-06 A	12-Mar-07 A
1020	Receipt of tie PD Acceptance	0d	15-Jan-07 A	
1021	Receipt of Alignment Prelim Design Package	0d	12-Oct-06 A	
1022	Receipt of OLE Prelim Design Package	0d	12-Mar-07 A	
1023	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	15-Jan-07 A	
1024	Receipt of an Approved and Signed AIP document	0d	23-Oct-06 A	
Structure Detailed Design		134d	12-Feb-07 A	17-Aug-07 A
1026	Structure Detailed Design	109d	12-Feb-07 A	27-Jul-07 A
1027	Structure Detailed Design Draughting	109d	12-Feb-07 A	27-Jul-07 A
1028	Issue Structure Detailed Design Package to CAT I Checker	0d	14-May-07 A	
1029	Structure CAT I Check	51d	14-May-07 A	27-Jul-07 A
1030	Receive & Incorporate CAT I comments	41d	29-May-07 A	27-Jul-07 A
1031	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section D to tie	0d	17-Aug-07 A	
SDS63740	Prepare Planning Drawings	9d	27-Jun-07 A	10-Jul-07 A
Issue Roseburn Corridor Retaining Structure D Design Package For Construction/Fabrication		0d	26-Feb-08	26-Feb-08
1041	Issue Roseburn Corridor Retaining Structure D Design Package For Construction/Fabrication	0d	26-Feb-08	
Roseburn Corridor Retaining Structures: Section E -Craigleith Drive to Queensferry Road		344d	12-Oct-06 A	26-Feb-08
Preliminary Design Milestones		100d	12-Oct-06 A	12-Mar-07 A
1045	Receipt of tie PD Acceptance	0d	15-Jan-07 A	
1046	Receipt of Alignment Prelim Design Package	0d	12-Oct-06 A	
1047	Receipt of OLE Prelim Design Package	0d	12-Mar-07 A	
1048	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	15-Jan-07 A	
1049	Receipt of an Approved and Signed AIP document	0d	23-Oct-06 A	
Structure Detailed Design		114d	12-Mar-07 A	17-Aug-07 A
1051	Structure Detailed Design	90d	12-Mar-07 A	27-Jul-07 A
1052	Structure Detailed Design Draughting	90d	12-Mar-07 A	27-Jul-07 A
1053	Issue Structure Detailed Design Package to CAT I Checker	0d	23-Jul-07 A	
1054	Structure CAT I Check	9d	23-Jul-07 A	03-Aug-07 A
1055	Receive & Incorporate CAT I comments	8d	06-Aug-07 A	16-Aug-07 A
1056	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section E to tie	0d	17-Aug-07 A	
SDS63750	Prepare Planning Drawings	9d	27-Jun-07 A	10-Jul-07 A
Issue Roseburn Corridor Retaining Structure E Design Package For Construction/Fabrication		0d	26-Feb-08	26-Feb-08
1066	Issue Roseburn Corridor Retaining Structure E Design Package For Construction/Fabrication	0d	26-Feb-08	
Roseburn Corridor Retaining Structures: Section F - Queensferry Road to Groathill		344d	12-Oct-06 A	26-Feb-08
Preliminary Design Milestones		100d	12-Oct-06 A	12-Mar-07 A
1070	Receipt of tie PD Acceptance	0d	15-Jan-07 A	
1071	Receipt of Alignment Prelim Design Package	0d	12-Oct-06 A	
1072	Receipt of OLE Prelim Design Package	0d	12-Mar-07 A	
1073	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	15-Jan-07 A	
1074	Receipt of an Approved and Signed AIP document	0d	23-Oct-06 A	
Structure Detailed Design		114d	12-Mar-07 A	16-Aug-07 A
1076	Structure Detailed Design	90d	12-Mar-07 A	27-Jul-07 A
1077	Structure Detailed Design Draughting	90d	12-Mar-07 A	27-Jul-07 A
1078	Issue Structure Detailed Design Package to CAT I Checker	0d	23-Jul-07 A	
1079	Structure CAT I Check	5d	23-Jul-07 A	27-Jul-07 A
1080	Receive & Incorporate CAT I comments	13d	30-Jul-07 A	16-Aug-07 A
1081	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section F to tie	0d	16-Aug-07 A	
SDS63760	Prepare Planning Drawings	9d	27-Jun-07 A	10-Jul-07 A
Issue Roseburn Corridor Retaining Structure F Design Package For Construction/Fabrication		0d	26-Feb-08	26-Feb-08
1091	Issue Roseburn Corridor Retaining Structure F Design Package For Construction/Fabrication	0d	26-Feb-08	
Roseburn Corridor Retaining Structures: Section G - Groathill to Telford Road		344d	12-Oct-06 A	26-Feb-08
Preliminary Design Milestones		100d	12-Oct-06 A	12-Mar-07 A
1095	Receipt of tie PD Acceptance	0d	15-Jan-07 A	
1096	Receipt of Alignment Prelim Design Package	0d	12-Oct-06 A	
1097	Receipt of OLE Prelim Design Package	0d	12-Mar-07 A	
1098	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	15-Jan-07 A	
1099	Receipt of an Approved and Signed AIP document	0d	23-Oct-06 A	
Structure Detailed Design		114d	12-Mar-07 A	17-Aug-07 A
1101	Structure Detailed Design	90d	12-Mar-07 A	27-Jul-07 A
1102	Structure Detailed Design Draughting	90d	12-Mar-07 A	27-Jul-07 A
1103	Issue Structure Detailed Design Package to CAT I Checker	0d	23-Jul-07 A	
1104	Structure CAT I Check	9d	23-Jul-07 A	03-Aug-07 A
1105	Receive & Incorporate CAT I comments	8d	06-Aug-07 A	16-Aug-07 A
1106	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section G to tie	0d	17-Aug-07 A	
SDS63770	Prepare Planning Drawings	9d	27-Jun-07 A	10-Jul-07 A
Issue Roseburn Corridor Retaining Structure G Design Package For Construction/Fabrication		0d	26-Feb-08	26-Feb-08
1116	Issue Roseburn Corridor Retaining Structure G Design Package For Construction/Fabrication	0d	26-Feb-08	
Roseburn Corridor Retaining Structures: Section H - Telford Road to Ferry Road		419d	12-Oct-06 A	10-Jun-08
Preliminary Design Milestones		100d	12-Oct-06 A	12-Mar-07 A
1120	Receipt of tie PD Acceptance	0d	15-Jan-07 A	
1121	Receipt of Alignment Prelim Design Package	0d	12-Oct-06 A	
1122	Receipt of OLE Prelim Design Package	0d	12-Mar-07 A	
1123	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	15-Jan-07 A	
1124	Receipt of an Approved and Signed AIP document	0d	23-Oct-06 A	
Structure Detailed Design		114d	12-Mar-07 A	17-Aug-07 A
1126	Structure Detailed Design	90d	12-Mar-07 A	27-Jul-07 A
1127	Structure Detailed Design Draughting	90d	12-Mar-07 A	27-Jul-07 A
1128	Issue Structure Detailed Design Package to CAT I Checker	0d	23-Jul-07 A	
1129	Structure CAT I Check	9d	23-Jul-07 A	03-Aug-07 A
1130	Receive & Incorporate CAT I comments	8d	06-Aug-07 A	16-Aug-07 A
1131	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section H to tie	0d	17-Aug-07 A	
SDS63780	Prepare Planning Drawings	9d	27-Jun-07 A	10-Jul-07 A
Issue Roseburn Corridor Retaining Structure H Design Package For Construction/Fabrication		0d	10-Jun-08	10-Jun-08



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

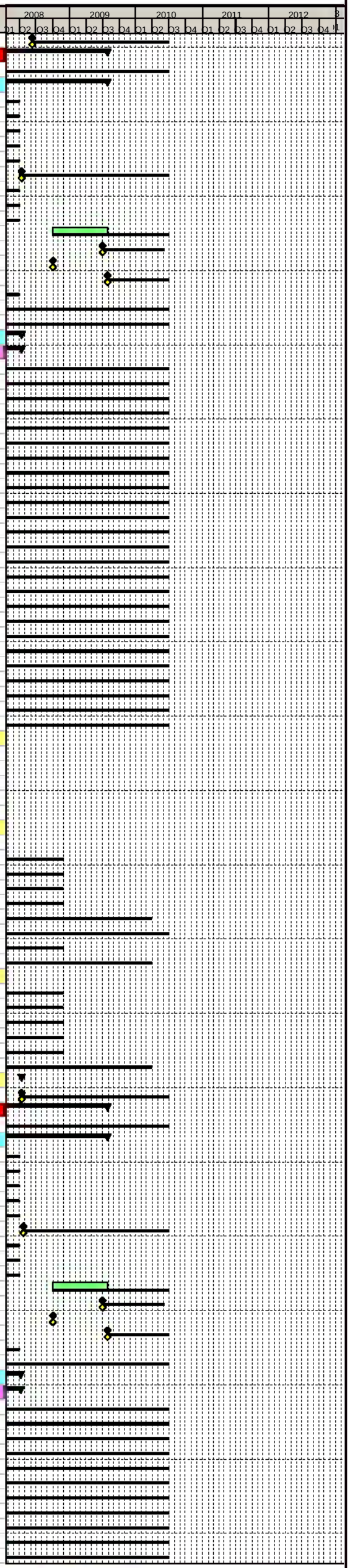
Trams for Edinburgh ...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
1141	Issue Roseburn Corridor Retaining Structure H Design Package For Construction/Fabrication	0d	10-Jun-08	
ROJ - ROS		986d	19-Sep-05 A	28-Jul-09
CON-0400	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Roseburn (Task500.2.6)		805d	30-May-06 A	28-Jul-09
A25460	Prepare Tram Stop Planning Submission Drawings	94d	05-Feb-07 A	29-Jun-07 A
A25470	Produce Engineering Detailed Design Drawings	15d	03-Sep-07 A	24-Sep-07 A
A25500	Issue Notification Of Completion Letter- Roseburn Tram Stop Design to tie	0d		11-Dec-07 A
A26020	Resolution of Abutment Issues	0d	24-Aug-07 A	
A26030	Delay Due to Abutment Assesment Work and Retaining Wall Design	70d	24-Aug-07 A	07-Dec-07 A
A26160	Tram Stop Design Complete - Drawings Issued for Construction	0d		15-Apr-08
A27510	Site Visit with tie & CEC To Review Preliminary Design	2d	19-Jan-07 A	22-Jan-07 A
A43420	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	10d	29-Jan-07 A	12-Feb-07 A
A44820	Prepare Detailed Design Stop Drawings	6d	22-Jan-07 A	29-Jan-07 A
A47560	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47570	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47580	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47590	Issue Final As Built Drawings	0d		28-Jul-09
A4850	General Arrangement Drawings	18d	30-May-06 A	23-Jun-06 A
A5360	Issue Tram Stop GA Drawings for Roseburn	0d		30-Jun-06 A
SDS81090	Address tie Comments, Other Revisions, IDC & Section Submission Package	24d	02-Nov-07 A	07-Dec-07 A
Structures		547d	20-Feb-06 A	15-Apr-08
S01 Roseburn Terrace Bridge		547d	20-Feb-06 A	15-Apr-08
SDS47040	Review of Previous Work	9d	20-Feb-06 A	03-Mar-06 A
SDS47050	Optioneering	5d	03-Apr-06 A	07-Apr-06 A
SDS47060	Initial Design	6d	03-Apr-06 A	10-Apr-06 A
SDS47070	Production of AIP Drawing	6d	03-Apr-06 A	10-Apr-06 A
SDS47080	Issue AIP Drawing to tie	0d		10-Apr-06 A
SDS47090	Checking	5d	03-Apr-06 A	07-Apr-06 A
SDS47100	tie AIP Drawing Review Period	6d	03-Apr-06 A	10-Apr-06 A
SDS47110	Undertake Consultations	6d	03-Apr-06 A	10-Apr-06 A
SDS47120	Receive AIP Drawing Comments from tie	0d		24-Apr-06 A
SDS47130	Incorporate tie Comments into AIP Drawing	4d	24-Apr-06 A	28-Apr-06 A
SDS47140	Production of AIP Document	5d	28-Apr-06 A	08-May-06 A
SDS47150	Issue AIP Document to tie	0d		12-May-06 A
SDS47160	tie AIP Document Review Period	5d	08-May-06 A	15-May-06 A
SDS47170	Receive AIP Document Comments from tie	0d		15-May-06 A
SDS47180	Incorporate tie Comments into AIP Document	5d	15-May-06 A	22-May-06 A
SDS47190	Issue AIP Document & Drawing to TAA	0d		19-May-06 A
SDS47200	TAA AIP Document & Drawing Review Period	62d	19-May-06 A	21-Aug-06 A
SDS47210	Issue AIP Document & Drawing to Planning Department	0d		19-May-06 A
SDS47220	Planning Department AIP Document & Drawing Review Period	62d	19-May-06 A	21-Aug-06 A
SDS47230	Recieve AIP Document & Drawing Comments from TAA	0d		21-Aug-06 A
SDS47240	Incorporate TAA Comments into AIP Document & Drawing	4d	22-Aug-06 A	28-Aug-06 A
SDS47250	Recieve AIP Document & Drawing Comments from Planning Department	0d		21-Aug-06 A
SDS47260	Incorporate Planning Department TAA Comments into AIP Document & Drawing	4d	22-Aug-06 A	28-Aug-06 A
SDS47270	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		15-Jan-07 A
SDS50160	Condition Survey	19d	06-Mar-06 A	31-Mar-06 A
Roseburn Terrace Bridge Preliminary Design Milestones		73d	09-Aug-06 A	20-Nov-06 A
A8030	Receipt of tie PD Acceptance	0d		09-Aug-06 A
A8040	Receipt of Alignment Prelim Design Package	0d		12-Oct-06 A
A8050	Receipt of OLE Prelim Design Package	0d		12-Oct-06 A
A8060	Receipt of Ground Investigation Data and Interpretative Geotechnical Data	0d		20-Nov-06 A
A8070	Receipt of Approved and Signed AIP Document	0d		14-Aug-06 A
Roseburn Terrace Bridge Superstructure Detailed Design		196d	18-Sep-06 A	27-Jun-07 A
A8080	Superstructure Detailed Design	103d	18-Sep-06 A	26-Feb-07 A
A8090	Superstructure Detailed Design Draughting	80d	23-Oct-06 A	26-Feb-07 A
A8100	Issue Superstructure Detailed Design Package to CAT II Checker	0d		26-Feb-07 A
A8110	Superstructure CAT II Check	44d	27-Feb-07 A	04-May-07 A
A8120	Receive and Incoporate CAT II Comments	9d	04-May-07 A	18-May-07 A
A8130	Issue Notification Of Completion Letter- Roseburn Terrace Bridge Superstructure Design Package to tie	0d		27-Jun-07 A
SDS39600	Detailed Design Resourcing	156d	18-Sep-06 A	18-May-07 A
SDS61920	IDC	9d	18-May-07 A	01-Jun-07 A
SDS63790	Prepare Planning Drawings	6d	08-May-07 A	15-May-07 A
Roseburn Terrace Bridge Substructure Detailed Design		100d	12-Feb-07 A	29-Jun-07 A
A8220	Substructure Detailed Design	10d	12-Feb-07 A	26-Feb-07 A
A8230	Substructure Detailed Design Draughting	0d	26-Feb-07 A	26-Feb-07 A
A8240	Issue Substructure Detailed Design Package to CAT II Checker	0d		26-Feb-07 A
A8250	Substructure CAT II Check	27d	27-Feb-07 A	10-Apr-07 A
A8260	Receive and Incorporate CAT II Comments	13d	02-Apr-07 A	23-Apr-07 A
A8270	Issue Notification Of Completion Letter- Roseburn Terrace Bridge Substructure Detailed Design Package to tie	0d		29-Jun-07 A
Issue Design Package For Construction / Fabrication		0d	15-Apr-08	15-Apr-08
SDS62410	Issue Design Package For Construction / Fabrication	0d		15-Apr-08
ROS - RAD		986d	19-Sep-05 A	28-Jul-09
CON-0430	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Ravelston (Task500.2.7)		805d	30-May-06 A	28-Jul-09
A25510	Prepare Tram Stop Planning Submission Drawings For Issue to Planning Drawings Team	96d	09-Feb-07 A	06-Jul-07 A
A25520	Produce Engineering Detailed Design Drawings	9d	22-Nov-07 A	06-Dec-07 A
A25550	Issue Notification Of Completion Letter- Ravelston Tram Stop Design to tie	0d		11-Dec-07 A
A26050	Resolution of Ownership of Structure Element	0d	03-Aug-07 A	
A26060	Delay Due to Access Ramp to Tramstop Design	84d	03-Aug-07 A	07-Dec-07 A
A26190	Tram Stop Design Complete - Drawings Issued for Construction	0d		22-Apr-08
A27520	Site Visit with tie & CEC To Review Preliminary Design	1d	19-Jan-07 A	19-Jan-07 A
A43480	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	10d	29-Jan-07 A	12-Feb-07 A
A44830	Prepare Detailed Design Stop Drawings	5d	22-Jan-07 A	26-Jan-07 A
A47600	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47610	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47620	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47630	Issue Final As Built Drawings	0d		28-Jul-09
A4860	General Arrangement Drawings	23d	30-May-06 A	30-Jun-06 A
A5370	Issue Tram Stop GA Drawings for Ravelston Dykes	0d		30-Jun-06 A
Structures		587d	20-Dec-05 A	09-Apr-08
S02 Coltbridge Viaduct		587d	20-Dec-05 A	09-Apr-08
SDS47280	Review of Previous Work	9d	30-Jan-06 A	10-Feb-06 A
SDS47290	Optioneering	5d	13-Mar-06 A	17-Mar-06 A
SDS47300	Initial Design	9d	20-Mar-06 A	31-Mar-06 A
SDS47310	Production of AIP Drawing	5d	27-Mar-06 A	31-Mar-06 A
SDS47320	Issue AIP Drawing to tie	0d		10-Apr-06 A
SDS47330	Checking	5d	03-Apr-06 A	07-Apr-06 A
SDS47340	tie AIP Drawing Review Period	5d	03-Apr-06 A	07-Apr-06 A
SDS47350	Undertake Consultations	12d	03-Apr-06 A	21-Apr-06 A
SDS47360	Receive AIP Drawing Comments from tie	0d		17-Apr-06 A
SDS47370	Incorporate tie Comments into AIP Drawing	4d	17-Apr-06 A	21-Apr-06 A
SDS47380	Production of AIP Document	4d	24-Apr-06 A	27-Apr-06 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

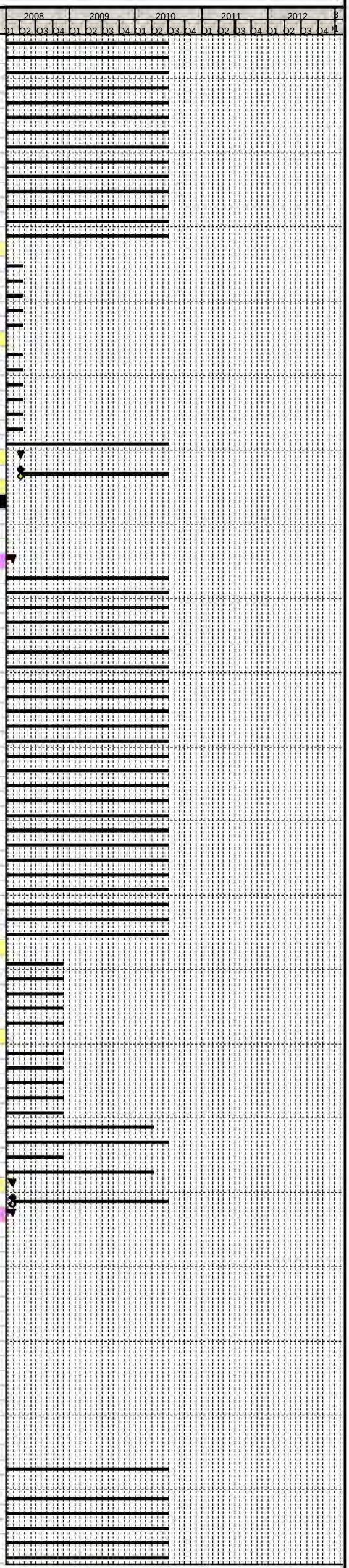
Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS47390	Issue AIP Document to tie	0d		12-May-06 A
SDS47400	tie AIP Document Review Period	5d	28-Apr-06 A	05-May-06 A
SDS47410	Receive AIP Document Comments from tie	0d		05-May-06 A
SDS47420	Incorporate tie Comments into AIP Document	14d	08-May-06 A	26-May-06 A
SDS47430	Issue AIP Document & Drawing to TAA	0d		14-Aug-06 A
SDS47440	TAA AIP Document & Drawing Review Period	9d	14-Aug-06 A	28-Aug-06 A
SDS47450	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS47460	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS47470	Recieve AIP Document & Drawing Comments from TAA	0d		20-Nov-06 A
SDS47480	Incorporate TAA Comments into AIP Document & Drawing	5d	20-Nov-06 A	24-Nov-06 A
SDS47490	Recieve AIP Document & Drawing Comments from Planning Department	0d		08-May-07 A
SDS47500	Incorporate Planning Department TAA Comments into AIP Document & Drawing	6d	11-Dec-06 A	18-Dec-06 A
SDS47510	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		18-Dec-06 A
SDS50170	Condition Survey	19d	13-Feb-06 A	10-Mar-06 A
Coltbridge Viaduct Preliminary Design Milestones		100d	12-Oct-06 A	12-Mar-07 A
A8360	Receipt of tie PD Acceptance	0d		12-Mar-07 A
A8370	Receipt of Alignment Prelim Design Package	0d		12-Oct-06 A
A8380	Receipt of OLE Prelim Design Package	0d		12-Feb-07 A
A8390	Receipt of Approved and Signed AIP Document	0d		11-Dec-06 A
A8400	Receipt of Ground Investigation Data and Intepretative Geotechnical Data	0d		15-Dec-06 A
Coltbridge Viaduct Structure Detailed Design		182d	03-Jan-07 A	13-Sep-07 A
A8410	Structure Assessment and Detailed Design	42d	03-Jan-07 A	06-Mar-07 A
A8420	Structure Detailed Design Draughting	99d	26-Feb-07 A	27-Jul-07 A
A8430	Issue Structure Detailed Design Package to CAT II Checker	0d		27-Jul-07 A
A8440	Structure CAT II Check	19d	27-Jul-07 A	23-Aug-07 A
A8450	Receive and Incoporate CAT II Comments	9d	28-Aug-07 A	10-Sep-07 A
A8460	Issue Notification Of Completion Letter- Coltbridge Viaduct Structure Design Package to tie	0d		13-Sep-07 A
SDS31570	Detailed Design Resourcing	82d	03-Jan-07 A	08-May-07 A
Issue Coltbridge Viaduct Structure Design Package For Construction / Fabrication		0d	09-Apr-08	09-Apr-08
A8540	Issue Coltbridge Viaduct Structure Design Package For Construction / Fabrication	0d		09-Apr-08
Surveys		89d	20-Dec-05 A	21-Apr-06 A
Topographical		89d	20-Dec-05 A	21-Apr-06 A
A483070	Desk Top Studies	68d	20-Dec-05 A	07-Apr-06 A
A483080	Draft & approve Method Statements	0d	19-Apr-06 A	
A483090	Undertake Detailed Surveys	8d	10-Apr-06 A	21-Apr-06 A
S03 St Georges School Access Bridge		517d	13-Feb-06 A	25-Feb-08
SDS48000	Review of Previous Work	9d	13-Feb-06 A	24-Feb-06 A
SDS48010	Optioneering	5d	27-Mar-06 A	31-Mar-06 A
SDS48020	Initial Design	8d	03-Apr-06 A	13-Apr-06 A
SDS48030	Production of AIP Drawing	4d	10-Apr-06 A	13-Apr-06 A
SDS48040	Issue AIP Drawing to tie	0d		13-Apr-06 A
SDS48050	Checking	4d	24-Apr-06 A	27-Apr-06 A
SDS48060	tie AIP Drawing Review Period	4d	24-Apr-06 A	27-Apr-06 A
SDS48070	Undertake Consultations	17d	24-Apr-06 A	18-May-06 A
SDS48080	Receive AIP Drawing Comments from tie	0d		27-Apr-06 A
SDS48090	Incorporate tie Comments into AIP Drawing	5d	28-Apr-06 A	05-May-06 A
SDS48100	Production of AIP Document	5d	15-May-06 A	19-May-06 A
SDS48110	Issue AIP Document to tie	0d		30-Jun-06 A
SDS48120	tie AIP Document Review Period	5d	14-Aug-06 A	18-Aug-06 A
SDS48130	Receive AIP Document Comments from tie	0d		18-Aug-06 A
SDS48140	Incorporate tie Comments into AIP Document	4d	15-Aug-06 A	18-Aug-06 A
SDS48150	Issue AIP Document & Drawing to TAA	0d		18-Aug-06 A
SDS48160	TAA AIP Document & Drawing Review Period	5d	21-Aug-06 A	28-Aug-06 A
SDS48170	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS48180	Planning Department AIP Document & Drawing Review Period	88d	11-Jul-06 A	20-Nov-06 A
SDS48190	Recieve AIP Document & Drawing Comments from TAA	0d		23-Oct-06 A
SDS48200	Incorporate TAA Comments into AIP Document & Drawing	5d	23-Oct-06 A	27-Oct-06 A
SDS48210	Recieve AIP Document & Drawing Comments from Planning Department	0d		13-Nov-06 A
SDS48220	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	20-Nov-06 A	27-Nov-06 A
SDS48230	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		11-Dec-06 A
SDS50670	Condition Survey	19d	27-Feb-06 A	24-Mar-06 A
St Georges School Access Bridge Preliminary Design Milestones		74d	29-Aug-06 A	11-Dec-06 A
A8550	Receipt of tie PD Acceptance	0d		20-Nov-06 A
A8560	Receipt of Alignment Prelim Design Package	0d		12-Oct-06 A
A8570	Receipt of OLE Prelim Design Package	0d		12-Oct-06 A
A8580	Receipt of Approved and Signed AIP Document	0d		29-Aug-06 A
A8590	Receipt of Ground Investigation Data and Intepretative Data	0d		11-Dec-06 A
St Georges School Access Bridge Structure Detailed Design		196d	18-Sep-06 A	27-Jun-07 A
A8600	Structure Detailed Design	62d	18-Sep-06 A	18-Dec-06 A
A8610	Structure Detailed Design Draughting	69d	23-Oct-06 A	12-Feb-07 A
A8620	Issue Structure Detailed Design Package to CAT I Checker	0d		29-Jan-07 A
A8630	Structure CAT I Check	9d	30-Jan-07 A	12-Feb-07 A
A8640	Receive and Incoporate CAT I Comments	9d	13-Feb-07 A	26-Feb-07 A
A8650	Issue Notification Of Completion Letter- St Georges School Access Bridge Structure Design Package to tie	0d		27-Jun-07 A
SDS39680	Detailed Design Resourcing	150d	18-Sep-06 A	10-May-07 A
SDS61950	IDC	9d	27-Feb-07 A	12-Mar-07 A
SDS63810	Prepare Planning Drawings	9d	11-Jun-07 A	22-Jun-07 A
Issue St Georges School Access Bridge Structure Design Package For Construction / Fabrication		0d	25-Feb-08	25-Feb-08
A8730	Issue St Georges School Access Bridge Structure Design Package For Construction / Fabrication	0d		25-Feb-08
S04 St Georges School Footbridge		517d	13-Feb-06 A	25-Feb-08
SDS49440	Review of Previous Work	9d	13-Feb-06 A	24-Feb-06 A
SDS49450	Optioneering	5d	27-Mar-06 A	31-Mar-06 A
SDS49460	Initial Design	8d	03-Apr-06 A	13-Apr-06 A
SDS49470	Production of AIP Drawing	23d	24-Apr-06 A	26-May-06 A
SDS49480	Issue AIP Drawing to tie	0d		26-May-06 A
SDS49490	Checking	10d	15-May-06 A	30-May-06 A
SDS49500	tie AIP Drawing Review Period	4d	30-May-06 A	02-Jun-06 A
SDS49510	Undertake Consultations	32d	15-May-06 A	30-Jun-06 A
SDS49520	Receive AIP Drawing Comments from tie	0d		02-Jun-06 A
SDS49530	Incorporate tie Comments into AIP Drawing	5d	05-Jun-06 A	09-Jun-06 A
SDS49540	Production of AIP Document	5d	12-Jun-06 A	16-Jun-06 A
SDS49550	Issue St Georges School Footibridge AIP Document to tie	0d		30-Jun-06 A
SDS49560	tie AIP Document Review Period	1d	16-Jun-06 A	16-Jun-06 A
SDS49570	Receive AIP Document Comments from tie	0d		16-Jun-06 A
SDS49580	Incorporate tie Comments into AIP Document	8d	14-Aug-06 A	24-Aug-06 A
SDS49590	Issue AIP Document & Drawing to TAA	0d		24-Aug-06 A
SDS49600	TAA AIP Document & Drawing Review Period	2d	24-Aug-06 A	28-Aug-06 A
SDS49610	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS49620	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS49630	Recieve AIP Document & Drawing Comments from TAA	0d		20-Nov-06 A
SDS49640	Incorporate TAA Comments into AIP Document & Drawing	5d	20-Nov-06 A	24-Nov-06 A
SDS49650	Recieve AIP Document & Drawing Comments from Planning Department	0d		20-Nov-06 A
SDS49660	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	20-Nov-06 A	24-Nov-06 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

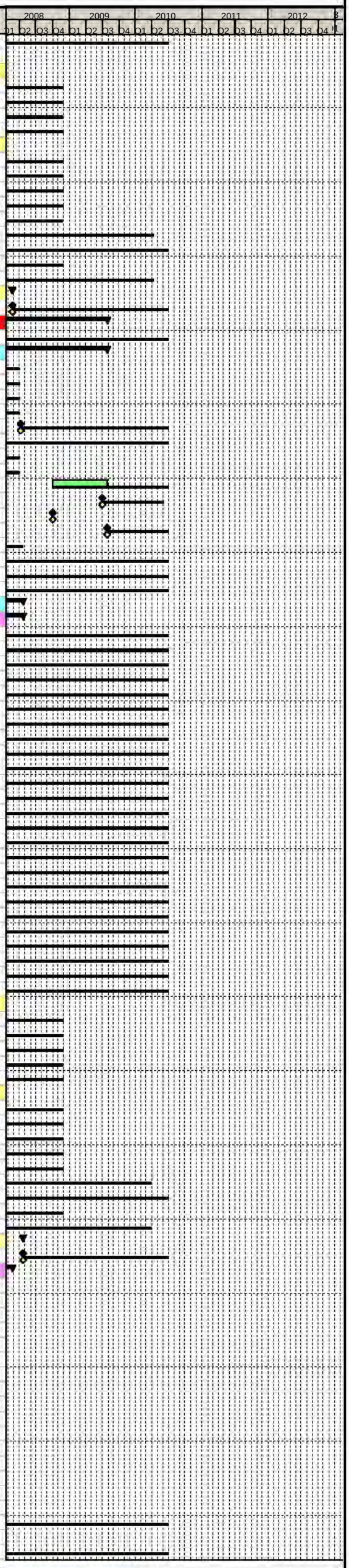
Trams for Edinburgh ...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS49670	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		27-Nov-06 A
SDS50720	Condition Survey	19d	27-Feb-06 A	24-Mar-06 A
St Georges School Footbridge Preliminary Design Milestones		59d	29-Aug-06 A	20-Nov-06 A
A8740	Receipt of tie PD Acceptance	0d		20-Nov-06 A
A8750	Receipt of Alignment Prelim Design Package	0d		12-Oct-06 A
A8760	Receipt of OLE Prelim Design Package	0d		20-Nov-06 A
A8770	Receipt of Approved and Signed AIP Document	0d		29-Aug-06 A
St Georges School Footbridge Structure Detailed Design		113d	22-Jan-07 A	27-Jun-07 A
A8780	Structure Detailed Design and Assessment	14d	22-Jan-07 A	09-Feb-07 A
A8790	Structure Detailed Design Draughting	19d	31-Jan-07 A	27-Feb-07 A
A8800	Issue Structure Detailed Design Package to CAT I Checker	0d		27-Feb-07 A
A8810	Structure CAT I Check	37d	12-Mar-07 A	08-May-07 A
A8820	Receive and Incoporate CAT I Comments	27d	26-Mar-07 A	08-May-07 A
A8830	Issue Notification Of Completion Letter- St Georges School Footbridge Structure Design Package to tie	0d		27-Jun-07 A
SDS39730	Detailed Design	55d	12-Feb-07 A	08-May-07 A
SDS61960	IDC	9d	14-May-07 A	25-May-07 A
SDS63820	Prepare Planning Drawings	9d	11-Jun-07 A	22-Jun-07 A
Issue St Georges School Footbridge Structure Design Package For Construction / Fabrication		0d	25-Feb-08	25-Feb-08
A8910	Issue St Georges School Footbridge Structure Design Package For Construction / Fabrication	0d		25-Feb-08
RAD - CRA		986d	19-Sep-05 A	28-Jul-09
CON-0460	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Craigleith (Task500.2.8)		815d	16-May-06 A	28-Jul-09
A25560	Prepare Tram Stop Planning Submission Drawings for Issue to Planning Drawings Team	96d	09-Feb-07 A	06-Jul-07 A
A25570	Produce Engineering Detailed Design Drawings	14d	10-Jul-07 A	30-Jul-07 A
A25600	Issue Notification Of Completion Letter- Craigleith Tram Stop Design to tie	0d		30-Jul-07 A
A26180	Compile Planning Drawings Tram Stop Craigleith	19d	03-Jul-07 A	30-Jul-07 A
A26220	Tram Stop Design Complete - Drawings Issued for Construction	0d		08-Apr-08
A27530	Site Visit with tie & CEC To Review Preliminary Design	1d	22-Jan-07 A	22-Jan-07 A
A43540	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	9d	30-Jan-07 A	12-Feb-07 A
A44840	Prepare Detailed Design Stop Drawings	43d	17-Nov-06 A	29-Jan-07 A
A47640	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47650	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47660	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47670	Issue Final As Built Drawings	0d		28-Jul-09
A4870	General Arrangement Drawings	31d	16-May-06 A	30-Jun-06 A
A5380	Issue Tram Stop GA Drawings for Craigleith	0d		30-Jun-06 A
SDS68290	Advanced Tram Stop Works	2d	10-Oct-06 A	11-Oct-06 A
SDS81100	Address tie and CEC Comments, Other Revisions and IDC	24d	02-Nov-07 A	07-Dec-07 A
Structures		567d	30-Jan-06 A	22-Apr-08
S05 Ravelston Dykes Bridge		562d	06-Feb-06 A	22-Apr-08
SDS49680	Review of Previous Work	9d	06-Feb-06 A	17-Feb-06 A
SDS49690	Optioneering	5d	20-Mar-06 A	24-Mar-06 A
SDS49700	Initial Design	9d	27-Mar-06 A	07-Apr-06 A
SDS49710	Production of AIP Drawing	5d	03-Apr-06 A	07-Apr-06 A
SDS49720	Issue AIP Drawing to tie	0d		13-Apr-06 A
SDS49730	Checking	4d	10-Apr-06 A	13-Apr-06 A
SDS49740	tie AIP Drawing Review Period	5d	14-Apr-06 A	24-Apr-06 A
SDS49750	Undertake Consultations	8d	10-Apr-06 A	21-Apr-06 A
SDS49760	Receive AIP Drawing Comments from tie	0d		24-Apr-06 A
SDS49770	Incorporate tie Comments into AIP Drawing	5d	25-Apr-06 A	02-May-06 A
SDS49780	Production of AIP Document	17d	03-May-06 A	26-May-06 A
SDS49790	Issue Ravelston Dykes Bridge AIP Document to tie	0d		30-Jun-06 A
SDS49800	tie AIP Document Review Period	5d	14-Aug-06 A	18-Aug-06 A
SDS49810	Receive AIP Document Comments from tie	0d		18-Aug-06 A
SDS49820	Incorporate tie Comments into AIP Document	5d	21-Aug-06 A	25-Aug-06 A
SDS49830	Issue AIP Document & Drawing to TAA	0d		25-Aug-06 A
SDS49840	TAA AIP Document & Drawing Review Period	5d	20-Nov-06 A	24-Nov-06 A
SDS49850	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS49860	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS49870	Recieve AIP Document & Drawing Comments from TAA	0d		15-Jan-07 A
SDS49880	Incorporate TAA Comments into AIP Document & Drawing	5d	24-Nov-06 A	30-Nov-06 A
SDS49890	Recieve AIP Document & Drawing Comments from Planning Department	0d		24-Nov-06 A
SDS49900	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	20-Nov-06 A	24-Nov-06 A
SDS49910	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		01-Dec-06 A
SDS50730	Condition Survey	19d	20-Feb-06 A	17-Mar-06 A
Ravelston Dykes Bridge Preliminary Design Milestones		74d	29-Aug-06 A	11-Dec-06 A
A8920	Receipt of tie PD Acceptance	0d		20-Nov-06 A
A8930	Receipt of Alignment Prelim Design Package	0d		12-Oct-06 A
A8940	Receipt of OLE Prelim Design Package	0d		20-Nov-06 A
A8950	Receipt of Approved and Signed AIP Document	0d		29-Aug-06 A
A8960	Receipt of Ground Investigation Data and Intepretative Data	0d		11-Dec-06 A
Ravelston Dykes Bridge Structure Detailed Design		196d	18-Sep-06 A	27-Jun-07 A
A8970	Structure Detailed Design	70d	18-Sep-06 A	08-Jan-07 A
A8980	Structure Detailed Design Draughting	36d	08-Nov-06 A	08-Jan-07 A
A8990	Issue Structure Detailed Design Package to CAT I Checker	0d		08-Jan-07 A
A9000	Structure CAT I Check	9d	09-Jan-07 A	22-Jan-07 A
A9010	Receive and Incoporate CAT I Comments	9d	23-Jan-07 A	05-Feb-07 A
A9020	Issue Notification Of Completion Letter- Ravelston Dykes Bridge Structure Design Package to tie	0d		27-Jun-07 A
SDS39780	Detailed Design Resourcing	159d	18-Sep-06 A	24-May-07 A
SDS61970	IDC	21d	22-Feb-07 A	23-Mar-07 A
SDS63830	Prepare Planning Drawings	9d	11-Jun-07 A	22-Jun-07 A
Issue Ravelston Dykes Structure Design Package For Construction / Fabrication		0d	22-Apr-08	22-Apr-08
A9100	Issue Ravelston Dykes Structure Design Package For Construction / Fabrication	0d		22-Apr-08
S06 Craigleith Drive Bridge		527d	30-Jan-06 A	25-Feb-08
SDS47520	Review of Previous Work	9d	30-Jan-06 A	10-Feb-06 A
SDS47530	Optioneering	5d	13-Mar-06 A	17-Mar-06 A
SDS47540	Initial Design	9d	20-Mar-06 A	31-Mar-06 A
SDS47550	Production of AIP Drawing	35d	27-Mar-06 A	19-May-06 A
SDS47560	Issue AIP Drawing to tie	0d		19-May-06 A
SDS47570	Checking	30d	03-Apr-06 A	19-May-06 A
SDS47580	tie AIP Drawing Review Period	6d	19-May-06 A	26-May-06 A
SDS47590	Undertake Consultations	18d	15-May-06 A	09-Jun-06 A
SDS47600	Receive AIP Drawing Comments from tie	0d		26-May-06 A
SDS47610	Incorporate tie Comments into AIP Drawing	4d	30-May-06 A	02-Jun-06 A
SDS47620	Production of AIP Document	4d	12-Jun-06 A	15-Jun-06 A
SDS47630	Issue Craigleith Drive Bridge AIP Document to tie	0d		30-Jun-06 A
SDS47640	tie AIP Document Review Period	5d	14-Aug-06 A	18-Aug-06 A
SDS47650	Receive AIP Document Comments from tie	0d		18-Aug-06 A
SDS47660	Incorporate tie Comments into AIP Document	4d	21-Aug-06 A	24-Aug-06 A
SDS47670	Issue AIP Document & Drawing to TAA	0d		24-Aug-06 A
SDS47680	TAA AIP Document & Drawing Review Period	2d	24-Aug-06 A	28-Aug-06 A
SDS47690	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS47700	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Trams for Edinburgh
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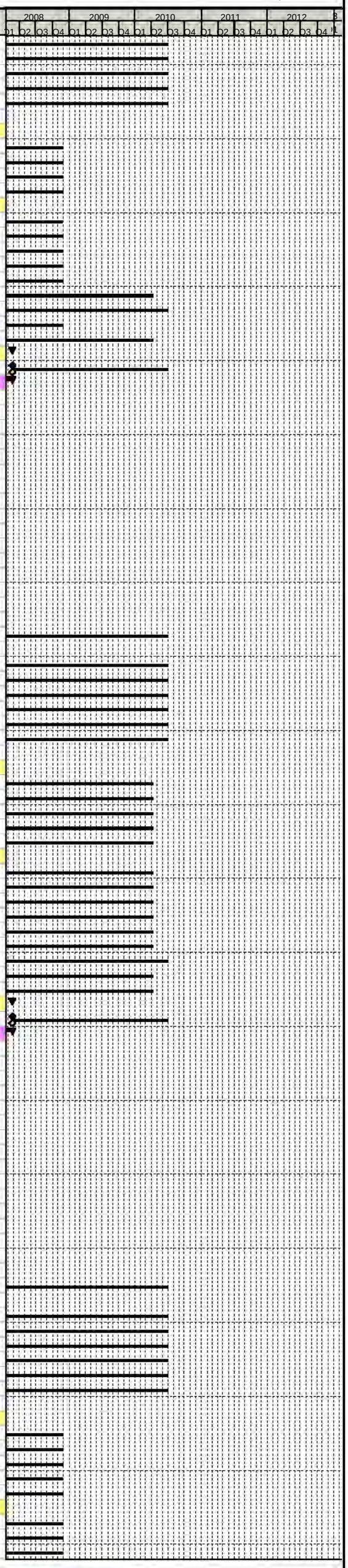
Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS47710	Recieve AIP Document & Drawing Comments from TAA	0d		08-Jan-07 A
SDS47720	Incorporate TAA Comments into AIP Document & Drawing	5d	09-Jan-07 A	15-Jan-07 A
SDS47730	Recieve AIP Document & Drawing Comments from Planning Department	0d		15-Jan-07 A
SDS47740	Incorporate Planning Department TAA Comments into AIP Document & Drawing	10d	09-Jan-07 A	23-Jan-07 A
SDS47750	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		15-Jan-07 A
SDS50640	Condition Survey	19d	13-Feb-06 A	10-Mar-06 A
Craigleith Drive Bridge Preliminary Design Milestones		60d	12-Oct-06 A	15-Jan-07 A
A9110	Receipt of tie PD Acceptance	0d		15-Jan-07 A
A9120	Receipt of Alignment Prelim Design Package	0d		12-Oct-06 A
A9140	Receipt of Approved and Signed AIP Document	0d		15-Jan-07 A
A9150	Receipt of Ground Investigation Data and Intepretative Geotechnical Data	0d		08-Dec-06 A
Craigleith Drive Bridge Structure Detailed Design		221d	14-Aug-06 A	27-Jun-07 A
A9160	Structure Assessment and Detailed Design	108d	14-Aug-06 A	30-Jan-07 A
A9170	Structure Detailed Design Draughting	76d	30-Oct-06 A	27-Feb-07 A
A9180	Issue Structure Detailed Design Package to CAT II Checker	0d		27-Feb-07 A
A9190	Structure CAT II Check	54d	28-Feb-07 A	23-May-07 A
A9200	Receive and Incoporate CAT II Comments	38d	26-Mar-07 A	23-May-07 A
A9210	Issue Notification Of Completion Letter- Craigleith Drive Bridge Structure Design Package to tie	0d		27-Jun-07 A
SDS31690	Detailed Design Resourcing	149d	02-Oct-06 A	23-May-07 A
SDS61980	IDC	9d	04-Jun-07 A	15-Jun-07 A
SDS63840	Prepare Planning Drawings	9d	11-Jun-07 A	22-Jun-07 A
Issue Craigleith Drive Bridge Structure Design Package For Construction / Fabrication		0d	25-Feb-08	25-Feb-08
A9290	Issue Craigleith Drive Bridge Structure Design Package For Construction / Fabrication	0d		25-Feb-08
S07 Holiday Inn Access Bridge		517d	13-Feb-06 A	25-Feb-08
SDS49200	Review of Previous Work	9d	13-Feb-06 A	24-Feb-06 A
SDS49210	Optioneering	5d	20-Mar-06 A	24-Mar-06 A
SDS49220	Initial Design	8d	27-Mar-06 A	06-Apr-06 A
SDS49230	Production of AIP Drawing	35d	03-Apr-06 A	26-May-06 A
SDS49240	Issue AIP Drawing to tie	0d		26-May-06 A
SDS49250	Checking	31d	07-Apr-06 A	26-May-06 A
SDS49260	tie AIP Drawing Review Period	4d	30-May-06 A	02-Jun-06 A
SDS49270	Undertake Consultations	48d	07-Apr-06 A	22-Jun-06 A
SDS49280	Receive AIP Drawing Comments from tie	0d		02-Jun-06 A
SDS49290	Incorporate tie Comments into AIP Drawing	5d	05-Jun-06 A	09-Jun-06 A
SDS49300	Production of AIP Document	2d	12-Jun-06 A	13-Jun-06 A
SDS49310	Issue Holiday Inn Access Bridge AIP Document to tie	0d		06-Jun-06 A
SDS49320	tie AIP Document Review Period	2d	14-Jun-06 A	15-Jun-06 A
SDS49330	Receive AIP Document Comments from tie	0d		19-Jun-06 A
SDS49340	Incorporate tie Comments into AIP Document	9d	16-Jun-06 A	29-Jun-06 A
SDS49350	Issue AIP Document & Drawing to TAA	0d		14-Aug-06 A
SDS49360	TAA AIP Document & Drawing Review Period	9d	14-Aug-06 A	28-Aug-06 A
SDS49370	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS49380	Planning Department AIP Document & Drawing Review Period	93d	11-Jul-06 A	27-Nov-06 A
SDS49390	Recieve AIP Document & Drawing Comments from TAA	0d		20-Nov-06 A
SDS49400	Incorporate TAA Comments into AIP Document & Drawing	5d	20-Nov-06 A	24-Nov-06 A
SDS49410	Recieve AIP Document & Drawing Comments from Planning Department	0d		11-Dec-06 A
SDS49420	Incorporate Planning Department TAA Comments into AIP Document & Drawing	6d	11-Dec-06 A	18-Dec-06 A
SDS49430	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		18-Dec-06 A
SDS50710	Condition Survey	14d	27-Feb-06 A	17-Mar-06 A
Holiday Inn Access Bridge Preliminary Design Milestones		173d	29-Aug-06 A	08-May-07 A
A9410	Receipt of tie PD Acceptance	0d		20-Nov-06 A
A9420	Receipt of Alignment Prelim Design Package	0d		12-Oct-06 A
A9430	Receipt of OLE Prelim Design Package	0d		08-May-07 A
A9600	Receipt of Approved and Signed AIP Document	0d		29-Aug-06 A
A9890	Receipt of Ground Investigation Data and Intepretative Geotechnical Data	0d		11-Dec-06 A
Holiday Inn Access Bridge Structure Detailed Design		122d	09-Jan-07 A	27-Jun-07 A
A9610	Structure Detailed Design	8d	09-Jan-07 A	19-Jan-07 A
A9620	Structure Detailed Design Draughting	15d	18-Jan-07 A	08-Feb-07 A
A9790	Issue Structure Detailed Design Package to CAT I Checker	0d		08-Feb-07 A
A9800	Structure CAT I Check	6d	08-Feb-07 A	15-Feb-07 A
A9810	Receive and Incoporate CAT I Comments	6d	16-Feb-07 A	23-Feb-07 A
A9870	Issue Notification Of Completion Letter- Holiday Inn Access Bridge Structure Design Package to tie	0d		27-Jun-07 A
SDS75060	Detailed Design Resourcing	78d	09-Jan-07 A	08-May-07 A
SDS75070	IDC	20d	26-Feb-07 A	26-Mar-07 A
SDS75080	Prepare Planning Drawings	9d	11-May-07 A	25-May-07 A
Issue Holiday Inn Access Bridge Structure Design Package For Construction / Fabrication		0d	25-Feb-08	25-Feb-08
A9880	Issue Holiday Inn Access Bridge Design Package For Construction / Fabrication	0d		25-Feb-08
S08 Queensferry Road Bridge		517d	13-Feb-06 A	25-Feb-08
SDS48240	Review of Previous Work	9d	13-Feb-06 A	25-Feb-06 A
SDS48250	Optioneering	5d	27-Mar-06 A	31-Mar-06 A
SDS48260	Initial Design	8d	03-Apr-06 A	13-Apr-06 A
SDS48270	Production of AIP Drawing	25d	10-Apr-06 A	19-May-06 A
SDS48280	Issue AIP Drawing to tie	0d		22-May-06 A
SDS48290	Checking	26d	18-Apr-06 A	26-May-06 A
SDS48300	tie AIP Drawing Review Period	5d	19-May-06 A	25-May-06 A
SDS48310	Undertake Consultations	26d	18-Apr-06 A	26-May-06 A
SDS48320	Receive AIP Drawing Comments from tie	0d		26-May-06 A
SDS48330	Incorporate tie Comments into AIP Drawing	5d	30-May-06 A	05-Jun-06 A
SDS48340	Production of AIP Document	5d	06-Jun-06 A	12-Jun-06 A
SDS48350	Issue Queensferry Road AIP Document to tie	0d		12-Jun-06 A
SDS48360	tie AIP Document Review Period	3d	13-Jun-06 A	15-Jun-06 A
SDS48370	Receive AIP Document Comments from tie	0d		15-Jun-06 A
SDS48380	Incorporate tie Comments into AIP Document	7d	16-Jun-06 A	26-Jun-06 A
SDS48390	Issue AIP Document & Drawing to TAA	0d		14-Aug-06 A
SDS48400	TAA AIP Document & Drawing Review Period	9d	14-Aug-06 A	28-Aug-06 A
SDS48410	Issue AIP Document & Drawing to Planning Department	0d		26-Jun-06 A
SDS48420	Planning Department AIP Document & Drawing Review Period	42d	26-Jun-06 A	28-Aug-06 A
SDS48430	Recieve AIP Document & Drawing Comments from TAA	0d		20-Nov-06 A
SDS48440	Incorporate TAA Comments into AIP Document & Drawing	5d	20-Nov-06 A	24-Nov-06 A
SDS48450	Recieve AIP Document & Drawing Comments from Planning Department	0d		20-Nov-06 A
SDS48460	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	21-Nov-06 A	28-Nov-06 A
SDS48470	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		27-Nov-06 A
SDS50680	Condition Survey	19d	27-Feb-06 A	24-Mar-06 A
Queensferry Road Bridge Preliminary Design Milestones		173d	29-Aug-06 A	08-May-07 A
A9300	Receipt of tie PD Acceptance	0d		20-Nov-06 A
A9310	Receipt of Alignment Prelim Design Package	0d		12-Oct-06 A
A9320	Receipt of OLE Prelim Design Package	0d		08-May-07 A
A9330	Receipt of Approved and Signed AIP Document	0d		29-Aug-06 A
A9340	Receipt of Ground Investigation Data and Intepretative Geotechnical Data	0d		11-Dec-06 A
Queensferry Road Bridge Structure Detailed Design		122d	09-Jan-07 A	27-Jun-07 A
A9350	Structure Detailed Design	8d	09-Jan-07 A	19-Jan-07 A
A9360	Structure Detailed Design Draughting	15d	18-Jan-07 A	08-Feb-07 A
A9370	Issue Structure Detailed Design Package to CAT I Checker	0d		08-Feb-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

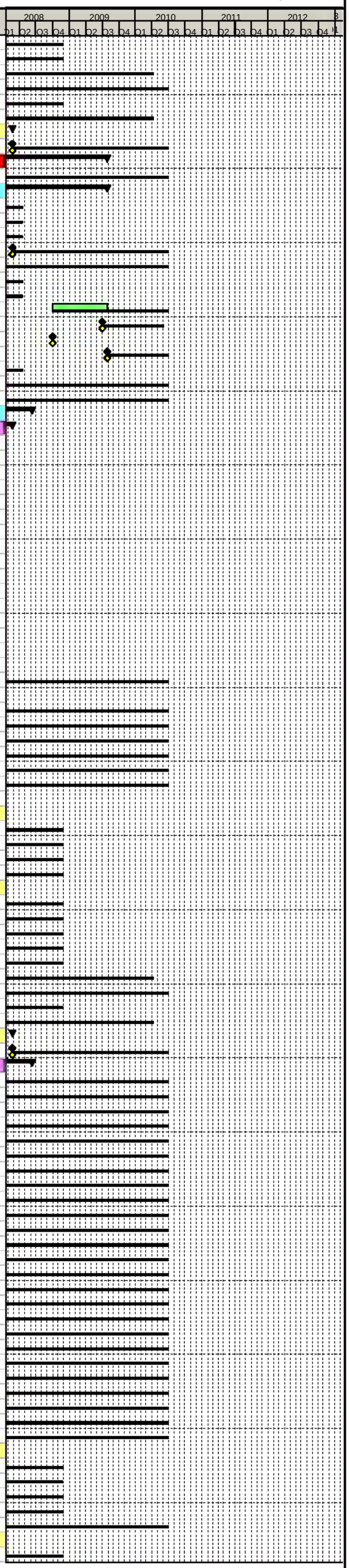
Trams for Edinburgh
connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

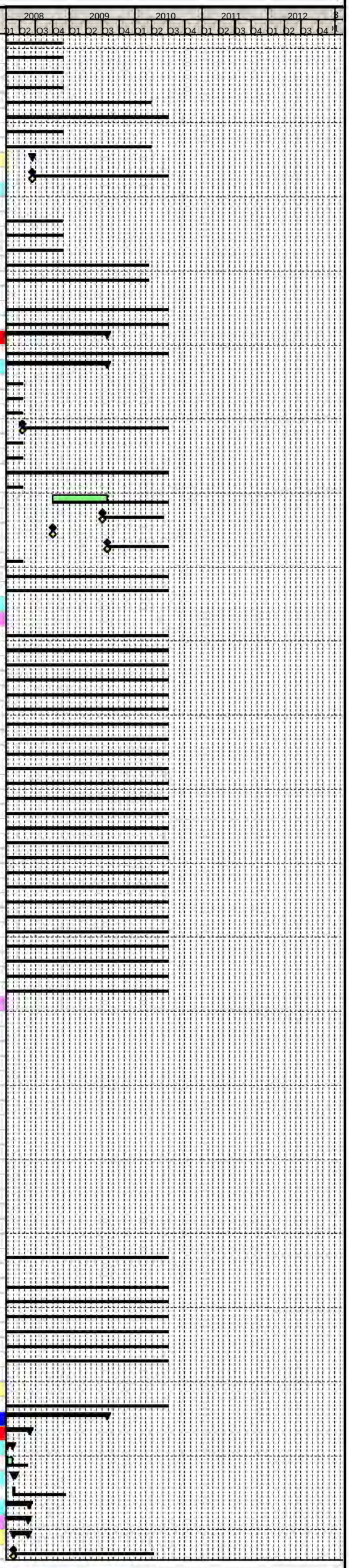
tie

Activity ID	Activity Name	Original Duration	Start	Finish
A9380	Structure CAT I Check	6d	08-Feb-07 A	15-Feb-07 A
A9390	Receive and Incoporate CAT I Comments	6d	16-Feb-07 A	23-Feb-07 A
A9400	Issue Notification Of Completion Letter- Queensferry Road Bridge Structure Design Package to tie	0d		27-Jun-07 A
SDS39890	Detailed Design Resourcing	78d	09-Jan-07 A	08-May-07 A
SDS61990	IDC	20d	26-Feb-07 A	26-Mar-07 A
SDS63850	Prepare Planning Drawings	9d	11-May-07 A	25-May-07 A
Issue Queensferry Road Structure Design Package For Construction / Fabrication		0d	25-Feb-08	25-Feb-08
A9480	Issue Queensferry Road Structure Design Package For Construction / Fabrication	0d		25-Feb-08
CRA - WGH		986d	19-Sep-05 A	28-Jul-09
CON-0490	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Telford Road (Task500.2.9)		800d	06-Jun-06 A	28-Jul-09
A25610	Prepare Tram Stop Planning Submission Drawings for Issue to Planning Drawing Team	96d	05-Feb-07 A	02-Jul-07 A
A25620	Produce Engineering Detailed Design Drawings	9d	17-Jul-07 A	30-Jul-07 A
A25650	Issue Notification Of Completion Letter- Telford Road Tram Stop Design to tie	0d		30-Jul-07 A
A26250	Tram Stop Design Complete - Drawings Issued for Construction	0d		25-Feb-08
A27540	Site Visit with tie & CEC To Review Preliminary Design	1d	19-Jan-07 A	19-Jan-07 A
A43600	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	9d	22-Jan-07 A	02-Feb-07 A
A44850	Prepare Detailed Design Stop Drawings	38d	17-Nov-06 A	19-Jan-07 A
A47680	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47690	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47700	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47710	Issue Final As Built Drawings	0d		28-Jul-09
A4880	General Arrangement Drawings	18d	06-Jun-06 A	30-Jun-06 A
A5390	Issue Tram Stop GA Drawings for Western General Hospital	0d		30-Jun-06 A
SDS81110	Address tie and CEC Comments, Other Revisions and IDC	24d	02-Nov-07 A	07-Dec-07 A
Structures		602d	30-Jan-06 A	10-Jun-08
S09 Groathill Road South Bridge		527d	30-Jan-06 A	25-Feb-08
SDS47760	Review of Previous Work	9d	30-Jan-06 A	10-Feb-06 A
SDS47770	Optioneering	5d	13-Mar-06 A	17-Mar-06 A
SDS47780	Initial Design	14d	20-Mar-06 A	07-Apr-06 A
SDS47790	Production of AIP Drawing	35d	27-Mar-06 A	19-May-06 A
SDS47800	Issue AIP Drawing to tie	0d		19-May-06 A
SDS47810	Checking	25d	10-Apr-06 A	19-May-06 A
SDS47820	tie AIP Drawing Review Period	6d	19-May-06 A	26-May-06 A
SDS47830	Undertake Consultations	18d	15-May-06 A	09-Jun-06 A
SDS47840	Receive AIP Drawing Comments from tie	0d		26-May-06 A
SDS47850	Incorporate tie Comments into AIP Drawing	4d	30-May-06 A	02-Jun-06 A
SDS47860	Production of AIP Document	4d	12-Jun-06 A	15-Jun-06 A
SDS47870	Issue Groathill Road South Bridge AIP Document to tie	0d		30-Jun-06 A
SDS47880	tie AIP Document Review Period	5d	14-Aug-06 A	18-Aug-06 A
SDS47890	Receive AIP Document Comments from tie	0d		18-Aug-06 A
SDS47900	Incorporate tie Comments into AIP Document	4d	21-Aug-06 A	24-Aug-06 A
SDS47910	Issue AIP Document & Drawing to TAA	0d		24-Aug-06 A
SDS47920	TAA AIP Document & Drawing Review Period	2d	24-Aug-06 A	28-Aug-06 A
SDS47930	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS47940	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS47950	Recieve AIP Document & Drawing Comments from TAA	0d		20-Nov-06 A
SDS47960	Incorporate TAA Comments into AIP Document & Drawing	5d	17-Nov-06 A	24-Nov-06 A
SDS47970	Recieve AIP Document & Drawing Comments from Planning Department	0d		20-Nov-06 A
SDS47980	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	20-Nov-06 A	27-Nov-06 A
SDS47990	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		27-Nov-06 A
SDS50650	Condition Survey	50d	13-Feb-06 A	28-Apr-06 A
Groathill Road South Bridge Preliminary Design Milestones		42d	12-Oct-06 A	11-Dec-06 A
A9490	Receipt of tie PD Acceptance	0d		20-Nov-06 A
A9500	Receipt of Alignment Prelim Design Package	0d		12-Oct-06 A
A9520	Receipt of Approved and Signed AIP Document	0d		23-Oct-06 A
A9530	Receipt of Ground Investigation Data and Intepretative Geotechnical Data	0d		11-Dec-06 A
Groathill Road South Bridge Structure Detailed Design		166d	30-Oct-06 A	27-Jun-07 A
A9540	Structure Assessment and Detailed Design	58d	30-Oct-06 A	31-Jan-07 A
A9550	Structure Detailed Design Draughting	66d	14-Nov-06 A	27-Feb-07 A
A9560	Issue Structure Detailed Design Package to CAT II Checker	0d		27-Feb-07 A
A9570	Structure CAT II Check	59d	28-Feb-07 A	31-May-07 A
A9580	Receive and Incoporate CAT II Comments	42d	26-Mar-07 A	31-May-07 A
A9590	Issue Notification Of Completion Letter- Groathill Road South Bridge Structure Design Package to tie	0d		27-Jun-07 A
SDS31720	Detailed Design	135d	30-Oct-06 A	31-May-07 A
SDS62000	IDC	9d	04-Jun-07 A	15-Jun-07 A
SDS63860	Prepare Planning Drawings	9d	11-Jun-07 A	22-Jun-07 A
Issue Groathill Road South Bridge Structure Design Package For Construction / Fabrication		0d	25-Feb-08	25-Feb-08
A9670	Issue Groathill Road South Bridge Structure Design Package For Construction / Fabrication	0d		25-Feb-08
S10 Telford Road Bridge		597d	06-Feb-06 A	10-Jun-08
SDS48720	Review of Previous Work	9d	06-Feb-06 A	17-Feb-06 A
SDS48730	Optioneering	5d	20-Mar-06 A	24-Mar-06 A
SDS48740	Initial Design	9d	27-Mar-06 A	07-Apr-06 A
SDS48750	Production of AIP Drawing	5d	03-Apr-06 A	07-Apr-06 A
SDS48760	Issue AIP Drawing to tie	0d		13-Apr-06 A
SDS48770	Checking	4d	10-Apr-06 A	13-Apr-06 A
SDS48780	tie AIP Drawing Review Period	4d	14-Apr-06 A	21-Apr-06 A
SDS48790	Undertake Consultations	8d	10-Apr-06 A	21-Apr-06 A
SDS48800	Receive AIP Drawing Comments from tie	0d		24-Apr-06 A
SDS48810	Incorporate tie Comments into AIP Drawing	4d	24-Apr-06 A	28-Apr-06 A
SDS48820	Production of AIP Document	19d	28-Apr-06 A	26-May-06 A
SDS48830	Issue AIP Document to tie	0d		30-Jun-06 A
SDS48840	tie AIP Document Review Period	4d	14-Aug-06 A	17-Aug-06 A
SDS48850	Receive AIP Document Comments from tie	0d		17-Aug-06 A
SDS48860	Incorporate tie Comments into AIP Document	1d	18-Aug-06 A	18-Aug-06 A
SDS48870	Issue AIP Document & Drawing to TAA	0d		18-Aug-06 A
SDS48880	TAA AIP Document & Drawing Review Period	6d	18-Aug-06 A	28-Aug-06 A
SDS48890	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS48900	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS48910	Recieve AIP Document & Drawing Comments from TAA	0d		20-Nov-06 A
SDS48920	Incorporate TAA Comments into AIP Document & Drawing	5d	20-Nov-06 A	27-Nov-06 A
SDS48930	Recieve AIP Document & Drawing Comments from Planning Department	0d		20-Nov-06 A
SDS48940	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	20-Nov-06 A	27-Nov-06 A
SDS48950	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		29-Nov-06 A
SDS50690	Condition Survey	19d	20-Feb-06 A	17-Mar-06 A
Telford Road Bridge Preliminary Design Milestones		141d	12-Oct-06 A	08-May-07 A
A9680	Receipt of tie PD Acceptance	0d		20-Nov-06 A
A9690	Receipt of Alignment Prelim Design Package	0d		12-Oct-06 A
A9700	Receipt of OLE Prelim Design Package	0d		08-May-07 A
A9710	Receipt of Approved and Signed AIP Document	0d		30-Nov-06 A
A9720	Receipt of Ground Investigation Data and Intepretative Geotechnical Data	0d		11-Dec-06 A
Telford Road Bridge Structure Detailed Design		141d	04-Dec-06 A	27-Jun-07 A
A9730	Structure Detailed Design Resourcing	96d	04-Dec-06 A	04-May-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Activity ID	Activity Name	Original Duration	Start	Finish
A9740	Structure Detailed Design Draughting	19d	20-Dec-06 A	24-Jan-07 A
A9750	Issue Structure Detailed Design Package to CAT I Checker	0d		24-Jan-07 A
A9760	Structure CAT I Check	9d	25-Jan-07 A	07-Feb-07 A
A9770	Receive and Incoporate CAT I Comments	9d	08-Feb-07 A	21-Feb-07 A
A9780	Issue Notification Of Completion Letter- Telford Road Bridge Structure Design Package to tie	0d		27-Jun-07 A
SDS39950	Detailed Design	91d	04-Dec-06 A	27-Apr-07 A
SDS62010	IDC	10d	12-Mar-07 A	26-Mar-07 A
SDS63870	Prepare Planning Drawings	9d	11-Jun-07 A	22-Jun-07 A
Issue Telford Road Bridge Structure Design Package For Construction / Fabrication		0d	10-Jun-08	10-Jun-08
A9860	Issue Telford Road Bridge Structure Design Package For Construction / Fabrication	0d		10-Jun-08
Tram South Groathill Avenue Substation (Task500.2.10)		403d	15-May-06 A	07-Dec-07 A
A548990	Preliminary Design of Substation	26d	15-May-06 A	19-Jun-06 A
A549460	Detailed Design Civils	82d	10-Apr-07 A	10-Aug-07 A
A549470	Detailed Architecture Design	185d	03-Jul-06 A	16-Apr-07 A
A549480	IDC on Detailed Design (Inc. Systems Assurance)	65d	29-Jan-07 A	08-May-07 A
A549490	Issue Notification Of Completion Letter- Tram South Groathill Avenue Substation Design to tie for Approval	0d		30-Jul-07 A
A549660	Compile Substation Planning Submission	73d	08-May-07 A	24-Aug-07 A
A550060	Substation Consultation Period	23d	19-Jun-06 A	20-Jul-06 A
A550180	Issue of Craigleith Substation Design	0d		20-Jun-06 A
SDS81050	Address tie Comments, Other Revisions, IDC & Section Submission Package	24d	02-Nov-07 A	07-Dec-07 A
WGH - CRT		986d	19-Sep-05 A	28-Jul-09
CON-0520	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Crewe Toll for Western General Hospital (Task500.2.11)		816d	15-May-06 A	28-Jul-09
A25660	Prepare Tram Stop Planning Submission Drawings for Issue to Planning Drawings Team	85d	26-Feb-07 A	06-Jul-07 A
A25670	Produce Engineering Detailed Design Drawings	9d	17-Jul-07 A	30-Jul-07 A
A25700	Issue Notification Of Completion Letter- Crewe Toll for Western General Hospital Tram Stop Design to tie	0d		30-Jul-07 A
A26280	Tram Stop Design Complete - Drawings Issued for Construction	0d		18-Apr-08
A27550	Site Visit with tie & CEC To Review Preliminary Design	1d	12-Sep-06 A	12-Sep-06 A
A43660	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	9d	30-Jan-07 A	12-Feb-07 A
A43670	tie Approval Period	19d	12-Mar-07 A	10-Apr-07 A
A44860	Prepare Detailed Design Stop Drawings	5d	23-Jan-07 A	29-Jan-07 A
A47720	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47730	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47740	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47750	Issue Final As Built Drawings	0d		28-Jul-09
A4890	General Arrangement Drawings	32d	15-May-06 A	30-Jun-06 A
A5400	Issue Tram Stop GA Drawings for Crewe Toll	0d		30-Jun-06 A
SDS81080	Address tie and CEC Comments, Other Revisions and IDC	24d	02-Nov-07 A	07-Dec-07 A
Structures		297d	06-Feb-06 A	06-Apr-07 A
S11 Drylaw Drive Bridge		218d	06-Feb-06 A	07-Dec-06 A
SDS48960	Review of Previous Work	9d	06-Feb-06 A	17-Feb-06 A
SDS48970	Optioneering	5d	20-Mar-06 A	24-Mar-06 A
SDS48980	Initial Design	9d	27-Mar-06 A	07-Apr-06 A
SDS48990	Production of AIP Drawing	5d	03-Apr-06 A	07-Apr-06 A
SDS49000	Issue AIP Drawing to tie	0d		13-Apr-06 A
SDS49010	Checking	4d	10-Apr-06 A	13-Apr-06 A
SDS49020	tie AIP Drawing Review Period	20d	14-Apr-06 A	17-May-06 A
SDS49030	Undertake Consultations	23d	10-Apr-06 A	17-May-06 A
SDS49040	Receive AIP Drawing Comments from tie	0d		17-May-06 A
SDS49050	Incorporate tie Comments into AIP Drawing	2d	18-May-06 A	19-May-06 A
SDS49060	Production of AIP Document	8d	19-May-06 A	31-May-06 A
SDS49070	Issue AIP Document to tie	0d		30-Jun-06 A
SDS49080	tie AIP Document Review Period	5d	14-Aug-06 A	18-Aug-06 A
SDS49090	Receive AIP Document Comments from tie	0d		18-Aug-06 A
SDS49100	Incorporate tie Comments into AIP Document	5d	21-Aug-06 A	25-Aug-06 A
SDS49110	Issue AIP Document & Drawing to TAA	0d		25-Aug-06 A
SDS49120	TAA AIP Document & Drawing Review Period	7d	20-Nov-06 A	29-Nov-06 A
SDS49130	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS49140	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS49150	Recieve AIP Document & Drawing Comments from TAA	0d		29-Nov-06 A
SDS49160	Incorporate TAA Comments into AIP Document & Drawing	5d	29-Nov-06 A	06-Dec-06 A
SDS49170	Recieve AIP Document & Drawing Comments from Planning Department	0d		20-Nov-06 A
SDS49180	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	20-Nov-06 A	27-Nov-06 A
SDS49190	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		07-Dec-06 A
SDS50700	Condition Survey	19d	20-Feb-06 A	17-Mar-06 A
W02 Ferry Road Retaining Wall		282d	27-Feb-06 A	06-Apr-07 A
SDS49920	Review of Previous Work	9d	27-Feb-06 A	10-Mar-06 A
SDS49930	Optioneering	4d	10-Apr-06 A	13-Apr-06 A
SDS49940	Initial Design	21d	24-Apr-06 A	24-May-06 A
SDS49950	Production of AIP Drawing	21d	24-May-06 A	23-Jun-06 A
SDS49960	Issue Ferry Rd RW AIP Drawing to tie	0d		30-Jun-06 A
SDS49970	Checking	4d	01-Jun-06 A	06-Jun-06 A
SDS49980	tie AIP Drawing Review Period	4d	14-Aug-06 A	17-Aug-06 A
SDS49990	Undertake Consultations	4d	14-Aug-06 A	17-Aug-06 A
SDS50000	Receive AIP Drawing Comments from tie	0d		17-Aug-06 A
SDS50010	Incorporate tie Comments into AIP Drawing	4d	14-Aug-06 A	17-Aug-06 A
SDS50020	Production of AIP Document	4d	14-Aug-06 A	17-Aug-06 A
SDS50030	Issue Ferry Road Retaining Wall AIP Document to tie	0d		17-Aug-06 A
SDS50040	tie AIP Document Review Period	5d	14-Aug-06 A	18-Aug-06 A
SDS50050	Receive AIP Document Comments from tie	0d		18-Aug-06 A
SDS50060	Incorporate tie Comments into AIP Document	4d	15-Aug-06 A	18-Aug-06 A
SDS50070	Issue AIP Document & Drawing to TAA	0d		18-Aug-06 A
SDS50080	TAA AIP Document & Drawing Review Period	5d	21-Aug-06 A	28-Aug-06 A
SDS50090	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS50100	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS50110	Recieve AIP Document & Drawing Comments from TAA	0d		22-Nov-06 A
SDS50120	Incorporate TAA Comments into AIP Document & Drawing	5d	21-Nov-06 A	28-Nov-06 A
SDS50130	Recieve AIP Document & Drawing Comments from Planning Department	0d		20-Nov-06 A
SDS50140	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	17-Nov-06 A	24-Nov-06 A
SDS50150	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		27-Nov-06 A
SDS50740	Condition Survey	19d	13-Mar-06 A	07-Apr-06 A
Ferry Road Retaining Wall Structure Detailed Design		63d	09-Jan-07 A	06-Apr-07 A
SDS40050	Detailed Design Resourcing	59d	09-Jan-07 A	06-Apr-07 A
CRT - CAP - Section 3B (Task500.3)		986d	19-Sep-05 A	28-Jul-09
Sub Section Wide		571d	06-Mar-06 A	30-May-08
Sub Section Wide IDC		20d	29-Jan-08	25-Feb-08
A40401	Subsection Wide IDC	19d	29-Jan-08	25-Feb-08
Design Assurance Review		10d	26-Feb-08	10-Mar-08
SDS67970	Produce Design Assurance Statement	9d	26-Feb-08	10-Mar-08
Consents & Approvals		317d	26-Feb-07 A	22-May-08
Prior Approvals		315d	26-Feb-07 A	21-May-08
Combined Section Prior Approval		60d	27-Feb-08	21-May-08
A25580	Issue Combined Package 3B for Prior Approval to CEC	0d		27-Feb-08



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

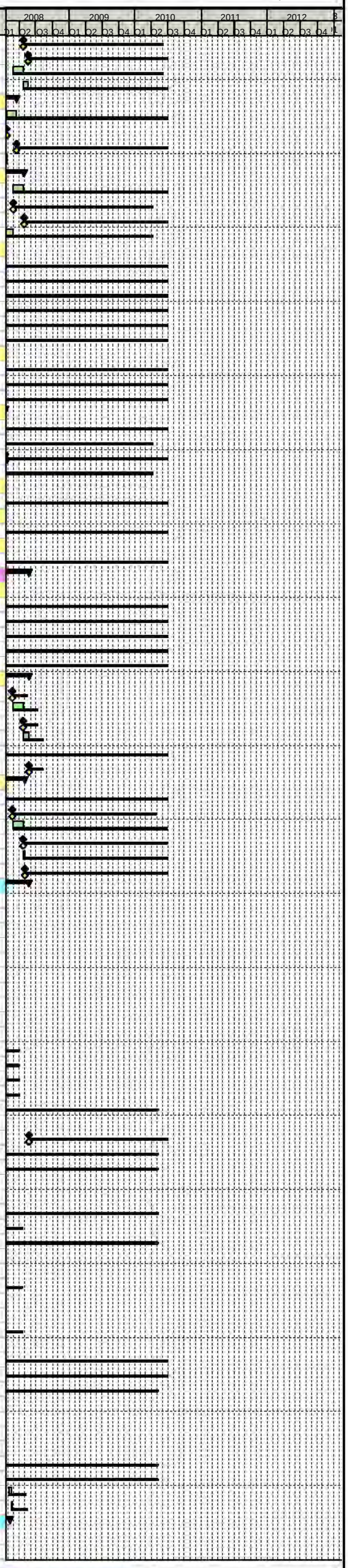
Trams for Edinburgh
...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
A25590	Receive Combined Package 3B Comments From CEC	0d		23-Apr-08
A25630	Prior Approval Granted for Section 3B Combined Package	0d		21-May-08
A40370	CEC Approval Period - 3B Combined Package	38d	27-Feb-08	23-Apr-08
A40390	Update 3B Combined Package to CEC Comments	19d	23-Apr-08	21-May-08
Batch 3/15		183d	27-Jun-07 A	19-Mar-08
SDS77350	Batch 3/15 Formal Approval Period	38d	23-Jan-08	18-Mar-08
SDS77360	Issue Batch 3/15 For Approval to CEC	0d	23-Jan-08*	
SDS77370	Receive CEC Prior Approval For Batch 3/15	0d	19-Mar-08	
SDS77390	Batch 3/15 Crewe Road Gardens Bridge - Collation of Planning Drawings	134d	27-Jun-07 A	22-Jan-08
Batch 3/16		112d	12-Nov-07 A	25-Apr-08
SDS77410	Batch 3/16 Formal Approval Period	38d	27-Feb-08	24-Apr-08
SDS77420	Issue Batch 3/16 For Approval to CEC	0d	27-Feb-08	
SDS77430	Receive CEC Prior Approval For Batch 3/16	0d	25-Apr-08	
SDS77450	Batch 3/16 West Pilton Tramstop - Collation of Planning Drawings	67d	12-Nov-07 A	26-Feb-08
Batch 3/17		75d	19-Jun-07 A	01-Oct-07 A
A28040	Issue Tram Granton Mains East 15 Substation Design for Prior Approval	0d		10-Aug-07 A
A28050	Prior Approval For Tram Granton Mains East 15 Substation	0d		01-Oct-07 A
A28060	Receive Tram Granton Mains East 15 Substation CEC Comments	0d		01-Oct-07 A
A41220	Batch 3/17 Granton Mains East Substation - Informal Consultation	35d	19-Jun-07 A	08-Aug-07 A
A41230	Tram Granton Mains East 15 Substation CEC Approval Period	34d	10-Aug-07 A	01-Oct-07 A
A45020	NO COMMENTS TO INCORPORATE	1d	01-Oct-07 A	01-Oct-07 A
Batch 3/18		33d	10-Aug-07 A	25-Sep-07 A
SDS81160	Batch 3/18 Formal Approval Period	30d	10-Aug-07 A	25-Sep-07 A
SDS81170	Issue Batch 3/18 For Approval to CEC	0d	10-Aug-07 A	
SDS81180	Receive CEC Prior Approval For Batch 3/18	0d	25-Sep-07 A	
Batch 3/19		77d	18-Sep-07 A	14-Jan-08
SDS77480	Batch 3/19 Formal Approval Period	38d	10-Oct-07 A	04-Dec-07 A
SDS77490	Issue Batch 3/19 For Approval to CEC	0d	11-Oct-07 A	
SDS77500	Receive CEC Prior Approval For Batch 3/19	0d	14-Jan-08*	
SDS77520	Batch 3/19 Caroline Park Tramstop - Collation of Planning Drawings	16d	18-Sep-07 A	10-Oct-07 A
Roads, Track, OLE, Landscaping, Street Lighting		42d	26-Feb-07 A	24-Apr-07 A
SDS27640	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	26-Feb-07 A	24-Apr-07 A
Tram Stop West Pilton		41d	11-May-07 A	06-Jul-07 A
A40590	Informal Consultation With CEC & tie over Prior Approval Tram Stop West Pilton	38d	11-May-07 A	06-Jul-07 A
Tram Stop Caroline Park		44d	03-Apr-07 A	01-Jun-07 A
A40620	Informal Consultation With CEC & tie over Prior Approval Tram Stop Caroline Park	38d	03-Apr-07 A	01-Jun-07 A
Technical Approvals		292d	02-Apr-07 A	22-May-08
Crewe Road Gardens Bridge Review Period (TAA)		119d	08-May-07 A	19-Oct-07 A
A10200	Issue Crewe Road Gardens Design Package to TAA	0d		14-Jun-07 A
A10210	TAA Crewe Road Gardens Design Package Review Period	38d	15-Jun-07 A	09-Aug-07 A
A10220	Receive Crewe Road Gardens Design Package Comments from TAA	0d		05-Oct-07 A
A10230	Incorporate TAA Comments into Crewe Road Gardens Design Package	9d	08-Oct-07 A	19-Oct-07 A
A13040	Commence Crewe Road Gardens Informal Consultation With CEC Over Technical Approval	25d	08-May-07 A	14-Jun-07 A
Roads Technical Approval		292d	02-Apr-07 A	22-May-08
SDS27650	Issue Roads Design to Roads Authority for Approval	0d		25-Feb-08
SDS27660	Roads Authority Approval Period	38d	26-Feb-08	23-Apr-08
SDS27670	Receive Roads Authority Comments	0d		23-Apr-08
SDS27680	Update to Roads Authority Comments	19d	24-Apr-08	22-May-08
SDS27690	Roads Authority Informal Consultation	38d	02-Apr-07 A	31-May-07 A
SDS27760	Roads Technical Approval Granted	0d		22-May-08
Drainage Technical Approval		276d	02-Apr-07 A	30-Apr-08
SDS72660	Roads Authority Informal Consultation For Drainage	38d	02-Apr-07 A	31-May-07 A
SDS72670	Issue Drainage Design to Roads Authority for Approval	0d		25-Feb-08
SDS72680	Roads Authority Approval Period For Drainage	38d	26-Feb-08	23-Apr-08
SDS72690	Receive Roads Authority Comments For Drainage	0d		23-Apr-08
SDS72700	Update to Roads Authority Comments For Drainage	5d	24-Apr-08	30-Apr-08
SDS72710	Drainage Technical Approval Granted	0d		30-Apr-08
Roads, Street Lighting & Landscaping (Task500.3.2)		564d	07-Mar-06 A	22-May-08
A3030	Route Appreciation/Junct Layout & Determine with tie & CEC Works Extent	3d	15-May-06 A	17-May-06 A
A3040	Frontage Surveys	30d	07-Mar-06 A	21-Apr-06 A
A3050	Set Up Mx Models	3d	05-May-06 A	09-May-06 A
A3060	Produce Preliminary Horizontal Road Alignment Design (Inc Lanes & Parking Zones)	7d	18-May-06 A	26-May-06 A
A3070	Preliminary Rd Junction Configuration Design	2d	30-May-06 A	31-May-06 A
A3080	Preliminary Road Safety Audit	1d	19-Jun-06 A	19-Jun-06 A
A3090	Review & Amend TRO Drawings & Schedules for Modifications Required Post Prelim Design	2d	12-Jun-06 A	13-Jun-06 A
A3100	Handover Alignment Design Roads to Pway	0d		20-Jun-06 A
A3110	Coordination Meeting/Workshop Between Roads & Pway Teams	1d	20-Jun-06 A	20-Jun-06 A
A5510	Undertake Road Marking, Pedestrian Req & Traffic Signalling Design	2d	01-Jun-06 A	02-Jun-06 A
SDS27370	Produce First Pass Vertical Alignment	3d	01-Feb-07 A	05-Feb-07 A
SDS27390	Handover Alignment Design Roads to Pway	0d		05-Feb-07 A
SDS27420	Revise Vertical Alignment to Match Final Track Alignment	5d	19-Feb-07 A	23-Feb-07 A
SDS27430	Horizontal & Vertical Alignment Design Complete	0d		23-Feb-07 A
SDS27440	Issue Roads Design to tie for Approval Section 3B	0d		26-Apr-07 A
SDS27450	Cross Check all Horizontal Design Aspects With Vertical Alignment	2d	09-Mar-07 A	12-Mar-07 A
SDS27490	Issue Construction Drawings	0d		22-May-08
SDS27500	Road Safety Audit Stage 2 (Intermediate)	5d	30-Mar-07 A	09-Apr-07 A
SDS27510	Insert Intermediate RSA Comments	5d	13-Apr-07 A	19-Apr-07 A
SDS27520	Produce Site Clearance Drawings & Schedule	3d	16-Feb-07 A	20-Feb-07 A
SDS27530	Produce Fencing, Barriers & Guardrails Design	5d	01-Feb-07 A	07-Feb-07 A
SDS27540	Produce Street Lighting Design (& Liaise With OLE)	23d	19-Mar-07 A	24-Apr-07 A
SDS27550	Produce Traffic Signal Only Ducting	7d	12-Apr-07 A	23-Apr-07 A
SDS27560	Produce Soft Landscaping Design	14d	26-Mar-07 A	17-Apr-07 A
SDS27570	Produce Traffic Signals Layout	23d	01-Feb-07 A	06-Mar-07 A
SDS27580	Produce Traffic Signs Design (Signs, Markings, Signals)	21d	01-Feb-07 A	02-Mar-07 A
SDS27590	Produce Earthworks Design (NOT REQUIRED)	111d	08-May-07 A	22-Oct-07 A
SDS27810	Revise Alignment to Inc. Final Track Horizontal Alignment (Horizontal Design Freeze) & Issue to Substn Designers	9d	18-Jan-07 A	31-Jan-07 A
SDS27820	Produce Kerbs, Footway & Paved Area Design	9d	01-Feb-07 A	14-Feb-07 A
SDS27830	Produce Pavement Design	56d	08-May-07 A	31-Jul-07 A
SDS27840	IDC (Inc. Systems Assurance)	5d	13-Apr-07 A	19-Apr-07 A
SDS56410	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 3B	0d		30-Aug-07 A
SDS56800	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 3B	0d		26-Apr-07 A
SDS59350	Compile Planning Drawings	6d	17-Apr-07 A	24-Apr-07 A
SDS59750	Advise Track, Stops, Modellers Changes To Accom RSA1 & PD Comments	7d	27-Nov-06 A	05-Dec-06 A
SDS59760	Pass Guidance/Envelope To Track & Others As Necessary	0d		05-Dec-06 A
SDS60900	Revise Horizontal to Inc. Track Horizontal Alignment, RSA1 & PD Comments	5d	03-Jan-07 A	09-Jan-07 A
SDS60910	Revise Alignment to Inc. Minor Changes From Traffic Modelling	4d	10-Jan-07 A	15-Jan-07 A
SDS67290	Street Lighting Survey Work	8d	21-Nov-06 A	30-Nov-06 A
SDS69680	Produce Hard Landscaping Design	98d	02-Apr-07 A	30-Aug-07 A
SDS80020	Final RSA	9d	05-Feb-08	18-Feb-08
SDS80030	Incorporate Final RSA Comments	5d	19-Feb-08	25-Feb-08
Track (Task 500.3.1)		486d	13-Mar-06 A	08-Feb-08
A3000	First Pass Mx Horizontal and Vertical Alignment	48d	13-Mar-06 A	25-May-06 A
A3010	Handover Alignment Design P Way to Roads	0d		26-May-06 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

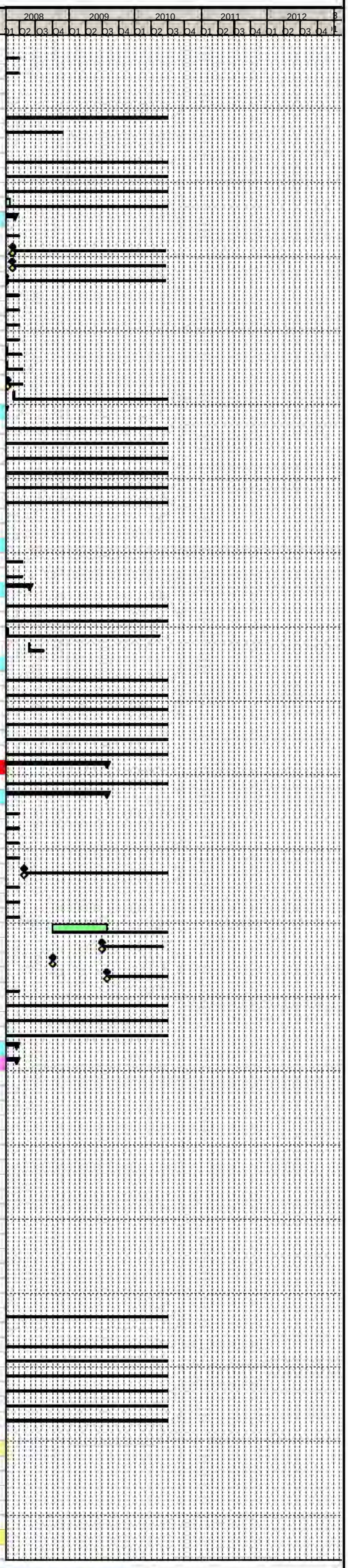
Trams for Edinburgh ...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
A3020	Coordination Meeting/Workshop Between PWay/Roads & Resolution of Major Conflicts	1d	26-May-06 A	26-May-06 A
SDS27360	Revise Alignment to Match Roads First Pass Vertical	6d	09-Feb-07 A	16-Feb-07 A
SDS27410	Handover Alignment Design Track to Roads	0d		16-Feb-07 A
SDS27780	Revise Alignment to Inc. Preliminary Design Comments	98d	17-Jul-06 A	11-Dec-06 A
SDS27800	Handover Alignment Design Track to Roads	0d		11-Dec-06 A
SDS57070	Issue Track Alignment Design to tie Section 3B	0d		09-Mar-07 A
SDS59570	IDC Track Design	8d	26-Feb-07 A	07-Mar-07 A
SDS60920	Revise Track Alignment to Inc. Modelling Changes	2d	16-Jan-07 A	17-Jan-07 A
SDS70420	tie Approval Period	19d	12-Mar-07 A	10-Apr-07 A
SDS70430	Receive tie Comments	0d		20-Apr-07 A
SDS70440	Incorporate tie Comments	1d	04-May-07 A	05-May-07 A
SDS75130	Address tie Comments, Other Revisions, IDC & Section Submission Package	120d	06-Aug-07 A	08-Feb-08
Drainage		254d	12-Mar-07 A	10-Mar-08
SDS71570	Hydraulic Modelling & First Pass Drainage Design	57d	12-Mar-07 A	08-Jun-07 A
SDS71580	Receipt of Drainage Survey Information	0d	25-Feb-08*	
SDS71590	Outfall Consent/Approval from SW	0d		25-Feb-08*
SDS71600	Outfall Consent/Approval from CEC	0d		14-Jan-08*
SDS71610	Outfall Consent/Approval from SEPA	0d		16-Aug-07 A
SDS71620	Compile Drainage Package	5d	02-Oct-07 A	09-Oct-07 A
SDS71630	Issue Drainage Design Completion Letter to tie for Approval Section 3B	0d		11-Oct-07 A
SDS73230	Final Detailed Drainage Design	36d	17-Aug-07 A	10-Oct-07 A
SDS80440	Final Detailed Drainage Design	45d	13-Nov-07 A	25-Jan-08
SDS80450	Compile Drainage Package	2d	25-Jan-08	28-Jan-08
SDS80460	Issue Drainage Design Completion Letter to tie for Approval Section 3B	0d		28-Jan-08
SDS80470	Confirm Drainage and Amend if Required	9d	26-Feb-08	10-Mar-08
Utilities Plates 24 to 33		470d	06-Mar-06 A	14-Jan-08
A11890	Close Out PD Issues & Propose Diversions	41d	29-Aug-06 A	27-Oct-06 A
A11900	Issue PD to SUCs	0d		07-Nov-06 A
A11910	Consult SUCs and MUDFA (at later stage - when appointed)	22d	08-Nov-06 A	08-Dec-06 A
A11920	Access to MUDFA	0d		23-Oct-06 A
A11950	Issue to SUCs	0d		22-Dec-06 A
A11960	SUCs Approval	243d	22-Dec-06 A	14-Jan-08
UTIL090	Section 3B - Pre-Preliminary Design (Utilities)	76d	06-Mar-06 A	30-Jun-06 A
UTIL800	Issue to Statutory Utility Companies (SUCs)	0d		30-Jun-06 A
Boundary & Accomodation Works (Task500.3.3)		95d	26-Mar-07 A	03-Aug-07 A
SDS42130	Detailed Design of Boundary & Accomodation Works	85d	26-Mar-07 A	03-Aug-07 A
SDS42140	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 3B	0d		03-Aug-07 A
TRO's		530d	02-May-06 A	30-May-08
SDS33410	Collate Exisiting TROs	48d	02-May-06 A	12-Jul-06 A
SDS33420	Receive Preliminary Roads Design	0d		12-Jul-06 A
SDS82030	Interim TRO Design Section 3B	5d	28-Jan-08*	01-Feb-08
SDS82040	Final TRO Design Section 3B	5d	23-May-08	30-May-08
TTRO's		177d	29-Aug-06 A	11-May-07 A
TTRO300	SDS Produce Affected Roads Listing For MUDFA Works	64d	29-Aug-06 A	30-Nov-06 A
TTRO350	SDS Produce Affected Roads Listing For INFRACO Works	36d	12-Mar-07 A	04-May-07 A
TTRO670	Issue Affected Roads Listing For MUDFA Works To Dundas & Wilson	0d		30-Nov-06 A
TTRO680	Dundas & Wilson Draft TTRO Schedule For MUDFA Works	0d	01-Dec-06 A	01-Dec-06 A
TTRO780	Issue Affected Roads Listing For INFRACO Works To Dundas & Wilson	0d		04-May-07 A
TTRO810	Dundas & Wilson Draft TTRO Schedule For INFRACO Works	5d	04-May-07 A	11-May-07 A
CRT - WGA		986d	19-Sep-05 A	28-Jul-09
CON-0550	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop West Pilton (Task500.3.7)		800d	06-Jun-06 A	28-Jul-09
A25710	Prepare Tram Stop Planning Submission Drawings for Issue to Planning Drawings Team	62d	25-Apr-07 A	27-Jul-07 A
A25720	Produce Engineering Detailed Design Drawings	9d	17-Jul-07 A	30-Jul-07 A
A25750	Issue Notification Of Completion Letter- West Pilton Tram Stop Design to tie	0d		30-Aug-07 A
A26230	Compile Planning Drawings Tram Stop West Pilton	19d	03-Jul-07 A	30-Jul-07 A
A26310	Tram Stop Design Complete - Drawings Issued for Construction	0d		25-Apr-08
A27560	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
A43720	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance) ON HOLD	28d	22-Mar-07 A	04-May-07 A
A44870	Prepare Detailed Design Stop Drawings	5d	12-Mar-07 A	19-Mar-07 A
A47760	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47770	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47780	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47790	Issue Final As Built Drawings	0d		28-Jul-09
A4900	General Arrangement Drawings	0d	06-Jun-06 A	06-Jun-06 A
A5410	Issue Tram Stop GA Drawings for West Granton Access	0d		30-Jun-06 A
SDS68300	Re Draw Due to Track Changes	1d	20-Oct-06 A	20-Oct-06 A
SDS81120	Address tie and CEC Comments, Other Revisions and IDC	24d	02-Nov-07 A	07-Dec-07 A
Structures		538d	06-Feb-06 A	19-Mar-08
S12 Crewe Road Gardens Bridge		538d	06-Feb-06 A	19-Mar-08
SDS48480	Review of Previous Work	9d	06-Feb-06 A	17-Feb-06 A
SDS48490	Optioneering	5d	20-Mar-06 A	24-Mar-06 A
SDS48500	Initial Design	9d	27-Mar-06 A	07-Apr-06 A
SDS48510	Production of AIP Drawing	35d	03-Apr-06 A	26-May-06 A
SDS48520	Issue Crewe Rd Gardens Bridge AIP Drawing to tie	0d		02-Jun-06 A
SDS48530	Checking	9d	15-May-06 A	26-May-06 A
SDS48540	tie AIP Drawing Review Period	4d	30-May-06 A	02-Jun-06 A
SDS48550	Undertake Consultations	18d	15-May-06 A	09-Jun-06 A
SDS48560	Receive AIP Drawing Comments from tie	0d		02-Jun-06 A
SDS48570	Incorporate tie Comments into AIP Drawing	4d	05-Jun-06 A	08-Jun-06 A
SDS48580	Production of AIP Document	5d	09-Jun-06 A	15-Jun-06 A
SDS48590	Issue Crewe Road Gardens Bridge AIP Document to tie	0d		06-Jun-06 A
SDS48600	tie AIP Document Review Period	3d	14-Jun-06 A	16-Jun-06 A
SDS48610	Receive AIP Document Comments from tie	0d		16-Jun-06 A
SDS48620	Incorporate tie Comments into AIP Document	8d	16-Jun-06 A	28-Jun-06 A
SDS48630	Issue AIP Document & Drawing to TAA	0d		14-Aug-06 A
SDS48640	TAA AIP Document & Drawing Review Period	9d	14-Aug-06 A	28-Aug-06 A
SDS48650	Issue AIP Document & Drawing to Planning Department	0d		06-Jun-06 A
SDS48660	Planning Department AIP Document & Drawing Review Period	38d	29-Jun-06 A	23-Aug-06 A
SDS48670	Recieve AIP Document & Drawing Comments from TAA	0d		11-Dec-06 A
SDS48680	Incorporate TAA Comments into AIP Document & Drawing	20d	11-Dec-06 A	16-Jan-07 A
SDS48690	Recieve AIP Document & Drawing Comments from Planning Department	0d		23-Aug-06 A
SDS48700	Incorporate Planning Department TAA Comments into AIP Document & Drawing	2d	24-Aug-06 A	28-Aug-06 A
SDS48710	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		16-Jan-07 A
SDS50660	Condition Survey	19d	20-Feb-06 A	17-Mar-06 A
Crewe Road Gardens Bridge Preliminary Design Milestones		42d	12-Oct-06 A	11-Dec-06 A
A10060	Receipt of tie PD Acceptance	0d		20-Nov-06 A
A10070	Receipt of Alignment Prelim Design Package	0d		12-Oct-06 A
A10080	Receipt of OLE Prelim Design Package	0d		11-Dec-06 A
A10090	Receipt of Ground Investigation Data and Interpretative Geotechnical Data	0d		23-Oct-06 A
A10100	Receipt of Approved and Signed AIP Document	0d		23-Oct-06 A
Crewe Road Gardens Bridge Superstructure Detailed Design		142d	01-Dec-06 A	27-Jun-07 A
A10110	Superstructure Detailed Design	28d	01-Dec-06 A	19-Jan-07 A



Primary Baseline
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Trams for Edinburgh
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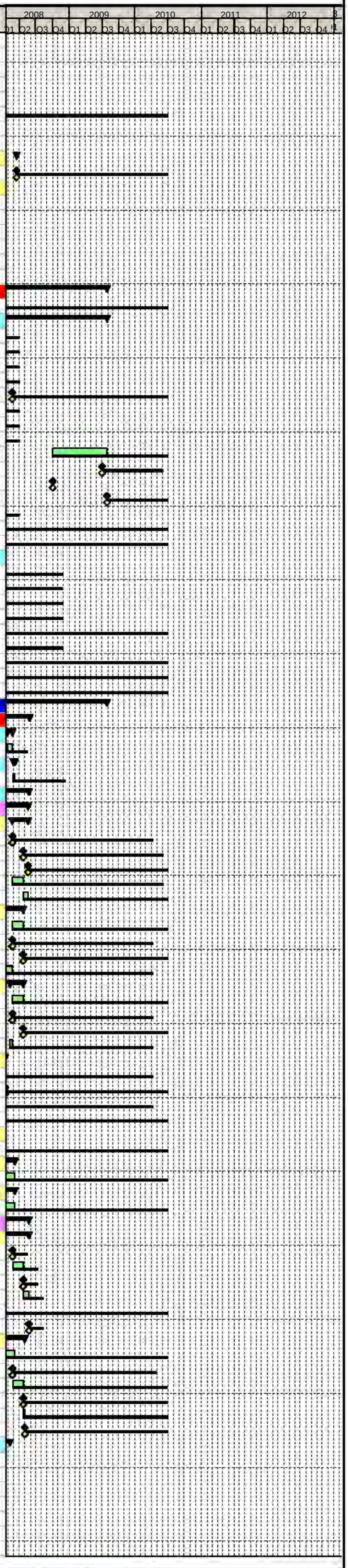
SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
A10120	Superstructure Detailed Design Draughting	38d	15-Jan-07 A	12-Mar-07 A
A10130	Issue Superstructure Detailed Design Package to CAT II Checker	0d		12-Mar-07 A
A10140	Superstructure CAT II Check	23d	19-Mar-07 A	23-Apr-07 A
A10150	Receive and Incoporate CAT II Comments	5d	24-Apr-07 A	30-Apr-07 A
A10160	Issue Notification Of Completion Letter- Crewe Road Gardens Bridge Superstructure Design Package to tie	0d		27-Jun-07 A
SDS31530	Detailed Design Resourcing	80d	01-Dec-06 A	10-Apr-07 A
SDS62020	IDC	9d	08-May-07 A	21-May-07 A
SDS63890	Prepare Planning Drawings	8d	22-May-07 A	01-Jun-07 A
Issue Crewe Road Gardens Design Package For Construction / Fabrication		0d	19-Mar-08	19-Mar-08
A10240	Issue Crewe Road Design Package For Construction / Fabrication	0d		19-Mar-08
Crewe Road Gardens Bridge Substructure Detailed Design		123d	08-Jan-07 A	27-Jun-07 A
A10250	Substructure Detailed Design	19d	08-Jan-07 A	02-Feb-07 A
A10260	Substructure Detailed Design Draughting	47d	22-Jan-07 A	30-Mar-07 A
A10270	Issue Substructure Detailed Design Package to CAT II Checker	0d		30-Mar-07 A
A10280	Substructure CAT II Check	16d	02-Apr-07 A	26-Apr-07 A
A10290	Receive and Incorporate CAT II Comments	6d	27-Apr-07 A	04-May-07 A
A10300	Issue Notification Of Completion Letter- Crewe Road Gardens Bridge Substructure Detailed Design Package to tie	0d		27-Jun-07 A
WGA - CAP		986d	19-Sep-05 A	28-Jul-09
CON-0580	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Caroline Park (Task500.3.8)		795d	13-Jun-06 A	28-Jul-09
A25760	Prepare Tram Stop Planning Submission Drawings for Issue to Planning Drawings Team	62d	25-Apr-07 A	27-Jul-07 A
A25770	Produce Engineering Detailed Design Drawings	9d	17-Jul-07 A	30-Jul-07 A
A26240	Compile Planning Drawings Tram Stop Caroline Park	19d	03-Jul-07 A	30-Jul-07 A
A26340	Issue Notification Of Completion Letter- Caroline Park Tram Stop Design to tie	0d		30-Jul-07 A
A26360	Tram Stop Design Complete - Drawings Issued for Construction	0d		25-Feb-08
A27570	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
A43780	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	23d	30-Mar-07 A	04-May-07 A
A44880	Prepare Detailed Design Stop Drawings	5d	19-Mar-07 A	26-Mar-07 A
A47800	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47810	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47820	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47830	Issue Final As Built Drawings	0d		28-Jul-09
A4910	General Arrangement Drawings	0d	13-Jun-06 A	13-Jun-06 A
A5420	Issue Tram Stop GA Drawings for Caroline Park	0d		30-Jun-06 A
SDS81130	Address tie and CEC Comments, Other Revisions and IDC	24d	02-Nov-07 A	07-Dec-07 A
Tram Granton Mains East 15 Substation (Task500.3.9)		423d	17-Apr-06 A	07-Dec-07 A
A549300	Preliminary Design of Substation	44d	17-Apr-06 A	16-Jun-06 A
A549680	Detailed Design Civils	94d	30-Mar-07 A	22-Aug-07 A
A549690	Detailed Architecture Design	112d	16-Oct-06 A	10-Apr-07 A
A550300	IDC on Detailed Design (Inc. Systems Assurance)	10d	08-May-07 A	22-May-07 A
A550310	Issue Notification Of Completion Letter- Tram Granton Mains East 15 Substation Planning Submission to tie for Appro	0d		23-Aug-07 A
A550360	Substation Consultation Period	23d	19-Jun-06 A	20-Jul-06 A
A550370	Issue of Grant Mains East Substation Design	0d		30-Jun-06 A
A550380	Compile Substation Planning Submission	19d	26-Jul-07 A	22-Aug-07 A
SDS81060	Address tie Comments, Other Revisions, IDC & Section Submission Package	24d	02-Nov-07 A	07-Dec-07 A
CAP - GRS - Section 3C (Task500.4)		986d	19-Sep-05 A	28-Jul-09
Sub Section Wide		571d	06-Mar-06 A	30-May-08
Sub Section Wide IDC		20d	29-Jan-08	25-Feb-08
A40461	Subsection Wide IDC	19d	29-Jan-08	25-Feb-08
Design Assurance Review		10d	26-Feb-08	10-Mar-08
SDS67980	Produce Design Assurance Statement	9d	26-Feb-08	10-Mar-08
Consents & Approvals		270d	02-May-07 A	22-May-08
Prior Approvals		265d	03-May-07 A	19-May-08
Combined Section Prior Approval		60d	25-Feb-08	19-May-08
A25640	Issue Combined Package 3C for Prior Approval to CEC	0d		25-Feb-08
A25680	Receive Combined Package 3C Comments From CEC	0d		21-Apr-08
A25690	Prior Approval Granted for Section 3C Combined Package	0d		19-May-08
A40430	CEC Approval Period - 3C Combined Package	38d	25-Feb-08	21-Apr-08
A40450	Update 3C Combined Package to CEC Comments	19d	21-Apr-08	19-May-08
Batch 3/20		185d	30-Jul-07 A	23-Apr-08
SDS77540	Batch 3/20 Formal Approval Period	38d	25-Feb-08	22-Apr-08
SDS77550	Issue Batch 3/20 For Approval to CEC	0d	25-Feb-08	
SDS77560	Receive CEC Prior Approval For Batch 3/20	0d	23-Apr-08	
SDS77580	Batch 3/20 Saltire Square Tramstop - Collation of Planning Drawings	134d	30-Jul-07 A	22-Feb-08
Batch 3/21		52d	11-Feb-08	23-Apr-08
SDS77600	Batch 3/21 Formal Approval Period	38d	25-Feb-08	22-Apr-08
SDS77610	Issue Batch 3/21 For Approval to CEC	0d	25-Feb-08	
SDS77620	Receive CEC Prior Approval For Batch 3/21	0d	23-Apr-08	
SDS77640	Batch 3/21 Granton Tramstop - Collation of Planning Drawings	9d	11-Feb-08*	22-Feb-08
Batch 3/22 Tram Granton View Substation		108d	06-Aug-07 A	14-Jan-08
A28010	Issue Tram Granton View Substation Design for Prior Approval	0d		31-Oct-07 A
A28020	Prior Approval For Tram Granton Road Substation	0d		14-Jan-08
A41200	Informal Consultation With CEC & tie over Prior Approval Tram Granton View Substation	38d	06-Aug-07 A	01-Oct-07 A
A41210	Batch 3/22 Formal Approval Period	38d	31-Oct-07 A	02-Jan-08 A
Roads, Track, OLE, Landscaping, Street Lighting		42d	03-May-07 A	29-Jun-07 A
SDS28130	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	03-May-07 A	29-Jun-07 A
Tram Stop Saltire Square		40d	14-Jan-08	07-Mar-08
A40650	Informal Consultation With CEC & tie over Prior Approval Tram Stop Saltire Square	38d	14-Jan-08	07-Mar-08
Tram Stop Granton		40d	14-Jan-08	07-Mar-08
A40680	Informal Consultation With CEC & tie over Prior Approval Tram Stop Granton	38d	14-Jan-08	07-Mar-08
Technical Approvals		270d	02-May-07 A	22-May-08
Roads Technical Approval		270d	02-May-07 A	22-May-08
SDS28140	Issue Roads Design to Roads Authority for Approval	0d		25-Feb-08
SDS28150	Roads Authority Approval Period	38d	26-Feb-08	23-Apr-08
SDS28160	Receive Roads Authority Comments	0d		23-Apr-08
SDS28170	Update to Roads Authority Comments	19d	24-Apr-08	22-May-08
SDS28180	Roads Authority Informal Consultation	38d	02-May-07 A	28-Jun-07 A
SDS28250	Roads Technical Approval Granted	0d		22-May-08
Drainage Technical Approval		78d	14-Jan-08	30-Apr-08
SDS72720	Roads Authority Informal Consultation For Drainage	38d	14-Jan-08	07-Mar-08
SDS72730	Issue Drainage Design to Roads Authority for Approval	0d		25-Feb-08
SDS72740	Roads Authority Approval Period For Drainage	38d	26-Feb-08	23-Apr-08
SDS72750	Receive Roads Authority Comments For Drainage	0d		23-Apr-08
SDS72760	Update to Roads Authority Comments For Drainage	5d	24-Apr-08	30-Apr-08
SDS72770	Drainage Technical Approval Granted	0d		30-Apr-08
Track (Task500.4.1)		466d	10-Apr-06 A	08-Feb-08
A3130	First Pass Mx Horizontal and Vertical Alignment	32d	10-Apr-06 A	31-May-06 A
A3140	Handover Alignment Design P Way to Roads	0d		01-Jun-06 A
A3150	Coordination Meeting/Workshop Between PWay/Roads & Resolution of Major Conflicts	1d	01-Jun-06 A	01-Jun-06 A
SDS27850	Revise Alignment to Match Roads First Pass Vertical	12d	05-Mar-07 A	21-Mar-07 A
SDS27900	Handover Alignment Design Track to Roads	0d		21-Mar-07 A
SDS28270	Revise Alignment to Inc. Preliminary Design Comments	129d	10-Jul-06 A	26-Jan-07 A
SDS28290	Handover Alignment Design Track to Roads	0d		26-Jan-07 A



Primary Baseline
Actual Work
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Critical Remaining Work
Baseline Milestone
Milestone

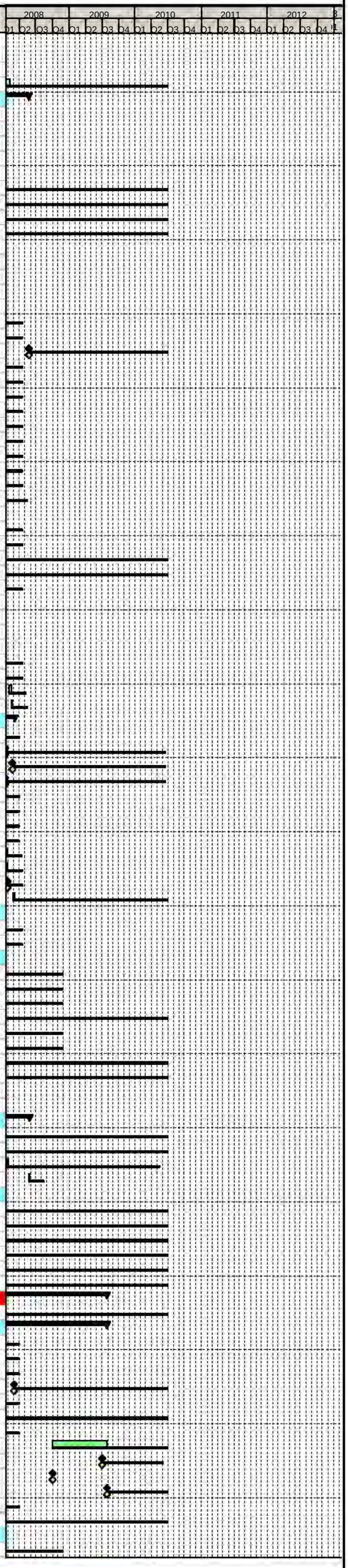
Trams for Edinburgh — connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS57080	Issue Notification Of Completion Letter- Track Alignment Design to tie Section 3C	0d		15-Jun-07 A
SDS59580	IDC Track Design	5d	29-Mar-07 A	04-Apr-07 A
SDS60930	Revise Track Alignment to Inc. Modelling Changes	9d	05-Feb-07 A	16-Feb-07 A
SDS75140	Address tie Comments, Other Revisions, IDC & Section Submission Package	120d	06-Aug-07 A	08-Feb-08
Roads, Street Lighting & Landscaping (Task500.4.2)		564d	07-Mar-06 A	22-May-08
A3160	Route Appreciation/Junct Layout & Determine with tie & CEC Works Extent	48d	07-Mar-06 A	19-May-06 A
A3170	Frontage Surveys	1d	19-May-06 A	19-May-06 A
A3180	Set Up Mx Models	4d	17-Apr-06 A	21-Apr-06 A
A3190	Produce Preliminary Horizontal Road Alignment Design (Inc Lanes & Parking Zones)	4d	22-May-06 A	25-May-06 A
A3200	Preliminary Rd Junction Configuration Design	2d	26-May-06 A	30-May-06 A
A3210	Preliminary Road Safety Audit	1d	30-Jun-06 A	30-Jun-06 A
A3220	Review & Amend TRO Drawings & Schedules for Modifications Required Post Prelim Design	3d	12-Jun-06 A	14-Jun-06 A
A3230	Handover Alignment Design Roads to Pway	0d		03-Jul-06 A
A3240	Coordination Meeting/Workshop Between Roads & Pway Teams	1d	03-Jul-06 A	03-Jul-06 A
A5520	Undertake Road Marking, Pedestrian Req & Traffic Signalling Design	2d	31-May-06 A	01-Jun-06 A
SDS27860	Produce First Pass Vertical Alignment	9d	01-Mar-07 A	14-Mar-07 A
SDS27880	Handover Alignment Design Roads to Pway	0d		14-Mar-07 A
SDS27910	Revise Vertical Alignment to Match Final Track Alignment	5d	22-Mar-07 A	28-Mar-07 A
SDS27920	Horizontal & Vertical Alignment Design Complete	0d		28-Mar-07 A
SDS27930	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 3C	0d		02-Jul-07 A
SDS27940	Cross Check all Horizontal Design Aspects With Vertical Alignment	2d	31-May-07 A	01-Jun-07 A
SDS27980	Issue Construction Drawings	0d		22-May-08
SDS27990	Road Safety Audit Stage 2 (Intermediate)	5d	22-Jun-07 A	29-Jun-07 A
SDS28000	Insert Intermediate RSA Comments	5d	22-Jun-07 A	29-Jun-07 A
SDS28010	Produce Site Clearance Drawings & Schedule	9d	01-Mar-07 A	14-Mar-07 A
SDS28020	Produce Fencing, Barriers & Guardrails Design	9d	01-Mar-07 A	14-Mar-07 A
SDS28030	Produce Street Lighting Design (& Liaise With OLE)	78d	09-Mar-07 A	09-Jul-07 A
SDS28040	Produce Traffic Signal Only Ducting	7d	08-May-07 A	16-May-07 A
SDS28050	Produce Soft Landscaping Design	57d	02-Apr-07 A	29-Jun-07 A
SDS28060	Produce Traffic Signals Layout	19d	01-Mar-07 A	28-Mar-07 A
SDS28070	Produce Traffic Signs Design (Signs, Markings, Signals)	12d	01-Mar-07 A	19-Mar-07 A
SDS28080	Produce Earthworks Design	160d	08-May-07 A	11-Jan-08 A
SDS28300	Revise Alignment to Inc. Final Track Horizontal Alignment (Horizontal Design Freeze) & Issue to Substn Designers	9d	15-Feb-07 A	28-Feb-07 A
SDS28310	Produce Kerbs, Footway & Paved Area Design	9d	01-Mar-07 A	14-Mar-07 A
SDS28320	Produce Pavement Design	56d	08-May-07 A	31-Jul-07 A
SDS56450	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 3C	0d		21-Sep-07 A
SDS56810	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 3C	0d		16-Aug-07 A
SDS59360	Compile Planning Drawings	4d	21-Aug-07 A	24-Aug-07 A
SDS59770	Advise Track, Stops, Modellers Changes To Accom RSA1 & PD Comments	7d	03-Jan-07 A	11-Jan-07 A
SDS59780	Pass Guidance/Envelope To Track & Others As Necessary	0d		11-Jan-07 A
SDS60940	Revise Horizontal to Inc. Track Horizontal Alignment, RSA1 & PD Comments	5d	30-Jan-07 A	05-Feb-07 A
SDS60950	Revise Alignment to Inc. Minor Changes From Traffic Modelling	3d	15-Jan-07 A	17-Jan-07 A
SDS67300	Street Lighting Survey Work	8d	21-Nov-06 A	30-Nov-06 A
SDS69690	Produce Hard Landscaping Design	111d	02-Apr-07 A	19-Sep-07 A
SDS80040	Final RSA	9d	05-Feb-08	18-Feb-08
SDS80050	Incorporate Final RSA Comments	5d	19-Feb-08	25-Feb-08
Drainage		254d	12-Mar-07 A	10-Mar-08
SDS71670	Hydraulic Modelling & First Pass Drainage Design	116d	12-Mar-07 A	07-Sep-07 A
SDS71680	Receipt of Drainage Survey Information	0d		14-Jan-08*
SDS71690	Outfall Consent/Approval from SW	0d		25-Feb-08*
SDS71700	Outfall Consent/Approval from CEC	0d		14-Jan-08*
SDS71710	Outfall Consent/Approval from SEPA	0d		06-Aug-07 A
SDS71720	Compile Drainage Package	5d	03-Oct-07 A	10-Oct-07 A
SDS71730	Issue Drainage Design Completion Letter to tie for Approval Section 3C	0d		11-Oct-07 A
SDS73240	Final Detailed Drainage Design	23d	07-Sep-07 A	10-Oct-07 A
SDS80480	Final Detailed Drainage Design	42d	16-Nov-07 A	25-Jan-08
SDS80490	Compile Drainage Package	2d	25-Jan-08	28-Jan-08
SDS80500	Issue Drainage Design Completion Letter to tie for Approval Section 3C	0d		28-Jan-08
SDS80510	Confirm Drainage and Amend if Required	9d	26-Feb-08	10-Mar-08
Boundary & Accomodation Works (Task500.4.3)		115d	26-Mar-07 A	31-Aug-07 A
SDS42190	Detailed Design of Boundary & Accomodation Works	103d	26-Mar-07 A	31-Aug-07 A
SDS42200	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 3C	0d		31-Aug-07 A
Utilities Plates 34 to 42		378d	06-Mar-06 A	27-Aug-07 A
A12020	Close Out PD Issues & Propose Diversions	41d	29-Aug-06 A	27-Oct-06 A
A12030	Issue PD to SUCs	0d		07-Nov-06 A
A12040	Consult SUCs and MUDFA (at later stage - when appointed)	64d	08-Nov-06 A	19-Feb-07 A
A12050	Access to MUDFA	0d		23-Oct-06 A
A12060	Issue For IDC	0d		19-Feb-07 A
A12070	IDC	3d	19-Feb-07 A	21-Feb-07 A
A12080	Issue to SUCs	0d		22-Feb-07 A
A12090	SUCs Approval	120d	22-Feb-07 A	27-Aug-07 A
UTIL100	Section 3C - Pre-Preliminary Design (Utilities)	76d	06-Mar-06 A	30-Jun-06 A
UTIL900	Issue to Statutory Utility Companies (SUCs)	0d		30-Jun-06 A
TRO's		551d	01-Apr-06 A	30-May-08
SDS33470	Collate Exisiting TROs	65d	01-Apr-06 A	12-Jul-06 A
SDS33480	Receive Preliminary Roads Design	0d		12-Jul-06 A
SDS82050	Interim TRO Design Section 3C	5d	28-Jan-08*	01-Feb-08
SDS82060	Final TRO Design Section 3C	5d	23-May-08	30-May-08
TTRO's		177d	29-Aug-06 A	11-May-07 A
TTRO320	SDS Produce Affected Roads Listing For MUDFA Works	64d	29-Aug-06 A	30-Nov-06 A
TTRO370	SDS Produce Affected Roads Listing For INFRACO Works	36d	12-Mar-07 A	04-May-07 A
TTRO710	Issue Affected Roads Listing For MUDFA Works To Dundas & Wilson	0d		30-Nov-06 A
TTRO720	Dundas & Wilson Draft TTRO Schedule For MUDFA Works	0d	01-Dec-06 A	01-Dec-06 A
TTRO820	Issue Affected Roads Listing For INFRACO Works To Dundas & Wilson	0d		04-May-07 A
TTRO830	Dundas & Wilson Draft TTRO Schedule For INFRACO Works	5d	04-May-07 A	11-May-07 A
CAP - GRW		986d	19-Sep-05 A	28-Jul-09
CON-0610	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Saltire Square (Task500.4.7)		801d	05-Jun-06 A	28-Jul-09
A26380	Prepare Tram Stop Planning Submission Drawings for Issue to Planning Drawings Team	33d	11-Jun-07 A	27-Jul-07 A
A26390	Produce Engineering Detailed Design Drawings	76d	16-Aug-07 A	07-Dec-07 A
A26420	Issue Notification Of Completion Letter- Saltire Square Tram Stop Design to tie	0d		10-Dec-07 A
A26440	Tram Stop Design Complete - Drawings Issued for Construction	0d		04-Mar-08 A
A27580	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
A28250	ReDraw Due To Track Changes	1d	13-Oct-06 A	13-Oct-06 A
A44890	Prepare Detailed Design Stop Drawings	25d	02-May-07 A	11-Jun-07 A
A47840	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47850	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47860	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47870	Issue Final As Built Drawings	0d		28-Jul-09
A4920	General Arrangement Drawings	0d	05-Jun-06 A	05-Jun-06 A
A5430	Issue Tram Stop GA Drawings for Waterfront	0d		23-Jun-06 A
Tram Granton View Substation (Task500.4.10)		379d	19-Jun-06 A	10-Dec-07 A
A549540	Detailed Design Civils	160d	10-Apr-07 A	07-Dec-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

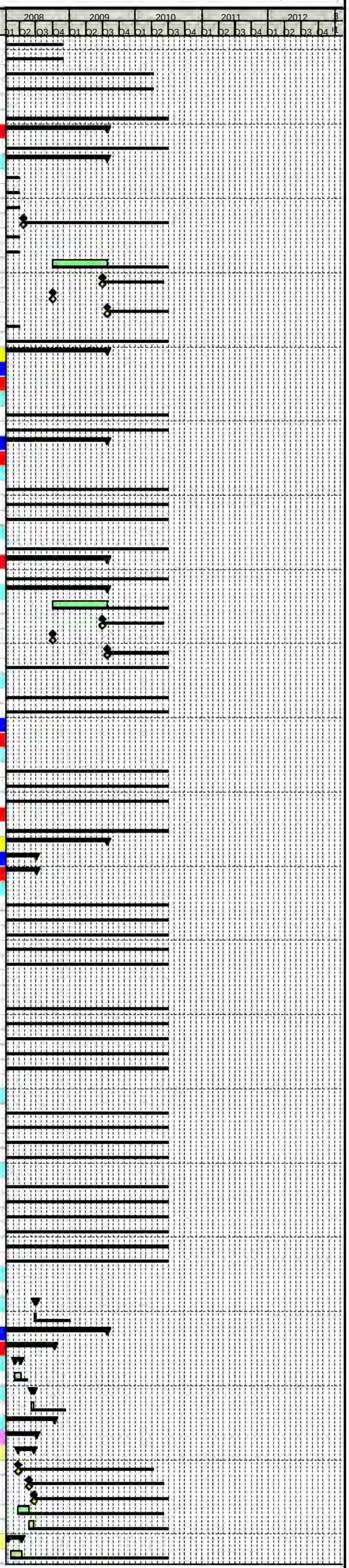
Trams for Edinburgh ...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
A549550	Detailed Architecture Design	169d	20-Nov-06 A	10-Aug-07 A
A549560	IDC on Detailed Design (Inc. Systems Assurance)	9d	13-Aug-07 A	24-Aug-07 A
A549570	Issue Notification Of Completion Letter- Tram Granton View Substation Planning Submission to tie for Approval	0d		10-Dec-07 A
A549670	Compile Substation Planning Submission	70d	24-Aug-07 A	07-Dec-07 A
A550070	Substation Consultation Period	28d	19-Jun-06 A	27-Jul-06 A
A550190	Issue of Grant Mains East Substation Design	0d		30-Jun-06 A
GRW - GRS		986d	19-Sep-05 A	28-Jul-09
CON-0640	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Granton (Task500.4.9)		796d	12-Jun-06 A	28-Jul-09
A26460	Prepare Tram Stop Planning Submission Drawings for Issue to Planning Drawings Team	9d	07-Aug-07 A	20-Aug-07 A
A26470	Produce Engineering Detailed Design Drawings	73d	21-Aug-07 A	07-Dec-07 A
A26500	Issue Notification Of Completion Letter- Granton Tram Stop Design to tie	0d		10-Dec-07 A
A26520	Tram Stop Design Complete - Drawings Issued for Construction	0d		23-Apr-08
A27590	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
A44900	Prepare Detailed Design Stop Drawings	5d	01-Aug-07 A	07-Aug-07 A
A47880	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47890	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47900	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47910	Issue Final As Built Drawings	0d		28-Jul-09
A4930	General Arrangement Drawings	0d	12-Jun-06 A	12-Jun-06 A
A5440	Issue Tram Stop GA Drawings for Granton Square	0d		30-Jun-06 A
Granton Square to Newhaven Road - Section 4		986d	19-Sep-05 A	28-Jul-09
Section Wide - Section 4		5d	12-Jun-06 A	16-Jun-06 A
Section Wide		5d	12-Jun-06 A	16-Jun-06 A
Preliminary Design Approvals		5d	12-Jun-06 A	16-Jun-06 A
SDS23390	Substation IDC	5d	12-Jun-06 A	16-Jun-06 A
SDS34740	PD - Submit Section 4 Substation Deliverables	0d		16-Jun-06 A
GRS - LGR - Section 4A		986d	19-Sep-05 A	28-Jul-09
Sub Section Wide		85d	06-Mar-06 A	30-Jun-06 A
Track		10d	02-Jun-06 A	15-Jun-06 A
A3260	First Pass Mx Horizontal and Vertical Alignment	8d	02-Jun-06 A	14-Jun-06 A
A3270	Handover Alignment Design P Way to Roads	0d		15-Jun-06 A
A3280	Coordination Meeting/Workshop Between PWay/Roads & Resolution of Major Conflicts	1d	15-Jun-06 A	15-Jun-06 A
Utilities		85d	06-Mar-06 A	30-Jun-06 A
UTIL110	Section 4A - Pre-Preliminary Design (Utilities)	76d	06-Mar-06 A	30-Jun-06 A
GRS - LGR		986d	19-Sep-05 A	28-Jul-09
CON-0670	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Lower Granton Road		795d	13-Jun-06 A	28-Jul-09
A47920	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47930	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A47940	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A47950	Issue Final As Built Drawings	0d		28-Jul-09
A4940	General Arrangement Drawings	8d	13-Jun-06 A	23-Jun-06 A
Sub Station Granton Road		45d	17-Apr-06 A	16-Jun-06 A
A549010	Preliminary Design of Substation	45d	17-Apr-06 A	16-Jun-06 A
A550200	Issue of Granton Road Substation Design	0d		16-Jun-06 A
LGR - NER - Section 4B		195d	19-Sep-05 A	16-Jun-06 A
Sub Section Wide		11d	02-Jun-06 A	16-Jun-06 A
Track		11d	02-Jun-06 A	16-Jun-06 A
A3390	First Pass Mx Horizontal and Vertical Alignment	9d	02-Jun-06 A	15-Jun-06 A
A3400	Handover Alignment Design P Way to Roads	0d		16-Jun-06 A
A3410	Coordination Meeting/Workshop Between PWay/Roads & Resolution of Major Conflicts	1d	16-Jun-06 A	16-Jun-06 A
LGR - NER		66d	19-Sep-05 A	19-Dec-05 A
CON-0700	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Roseburn Junction to Gogarburn - Section 5 (Task700)		986d	19-Sep-05 A	28-Jul-09
Section Wide - Section 5		552d	05-May-06 A	04-Jul-08
Section Wide		552d	05-May-06 A	04-Jul-08
Preliminary Design Approvals		101d	05-May-06 A	22-Sep-06 A
SDS23420	Track IDC	38d	03-Jul-06 A	25-Aug-06 A
SDS23440	Tramstops IDC	38d	03-Jul-06 A	25-Aug-06 A
SDS23450	Roads IDC	38d	03-Jul-06 A	25-Aug-06 A
SDS23460	Structures IDC	51d	03-Jul-06 A	15-Sep-06 A
SDS23470	Substation IDC	4d	13-Jun-06 A	16-Jun-06 A
SDS23940	Informal Consultation with tie	38d	05-May-06 A	30-Jun-06 A
SDS23950	tie approval	55d	03-Jul-06 A	22-Sep-06 A
SDS34760	PD - Submit Section 5 Substation Deliverables	0d		16-Jun-06 A
SDS34770	PD - Submit Section 5 Track Deliverables	0d		30-Jun-06 A
SDS34780	PD - Submit Section 5 Tramstops Deliverables	0d		30-Jun-06 A
SDS34790	PD - Submit Section 5 Roads Deliverables	0d		30-Jun-06 A
SDS34800	PD - Submit Section 5 Structures Deliverables	0d		30-Jun-06 A
SDS34810	PD - Section 5 Complete - Issue to tie	0d		30-Jun-06 A
Stakeholder Reviews		363d	17-Jul-06 A	14-Dec-07 A
A569700	Review Potential Issues with tie & Determine Consultation Strategy	9d	17-Jul-06 A	28-Jul-06 A
A569810	Review Potential Issues with tie & Determine Consultation Strategy	38d	15-Oct-07 A	10-Dec-07 A
A569820	Feedback to Design Teams for Study	23d	12-Nov-07 A	14-Dec-07 A
SDS23490	Stakeholder Review (Inc. Wider Community Meeting)	323d	31-Jul-06 A	10-Dec-07 A
OLE (Task700.1)		293d	29-Aug-06 A	22-Oct-07 A
A487228	(NOT REQUIRED) Re-issue Notification Of Completion Letter- Final Detailed Layout Plans & Standard & Special Cross	0d		22-Oct-07 A
SDS31320	Produce Final Detailed Layout Plans	139d	29-Aug-06 A	30-Mar-07 A
SDS55910	Issue Notification Of Completion Letter- Final Detailed Layout Plans & Standard & Special Cross Section to tie Sec 5B	0d		13-Apr-07 A
SDS59440	Finalise Combined Pole Design (With Street Lighting Traffic Signals)	5d	28-Mar-07 A	04-Apr-07 A
SDS59480	IDC OLE Design	8d	30-Mar-07 A	13-Apr-07 A
SDS69460	SDM Design Interface Review Meetings	1d	01-Dec-06 A	02-Dec-06 A
VO246 Edinburgh Park Viaduct OLE Pole Loading Calculations (Internal)		15d	10-Sep-07 A	28-Sep-07 A
SDS75200	VO246 Produce Pole Loading for SDS (Civils)	14d	10-Sep-07 A	28-Sep-07 A
Section Wide Design Assurance Review		10d	23-Jun-08	04-Jul-08
SDS72290	Produce Section Wide Design Assurance Statement	9d	23-Jun-08	04-Jul-08
ROJ - BAR - Section 5A (Task700.2)		986d	19-Sep-05 A	28-Jul-09
Sub Section Wide		676d	20-Feb-06 A	10-Oct-08
Sub Section Wide IDC		22d	10-Mar-08	08-Apr-08
A40511	Subsection Wide IDC	21d	10-Mar-08	08-Apr-08
Design Assurance Review		10d	09-Jun-08	20-Jun-08
SDS67990	Produce Design Assurance Statement	9d	09-Jun-08	20-Jun-08
Consents & Approvals		479d	22-Nov-06 A	10-Oct-08
Prior Approvals		408d	22-Nov-06 A	03-Jul-08
Combined Section Prior Approval		60d	28-Mar-08	20-Jun-08
A25730	Issue Combined Package 5A for Prior Approval to CEC	0d		28-Mar-08
A25740	Receive Combined Package 5A Comments From CEC	0d		23-May-08
A25780	Prior Approval Granted for Section 5A Combined Package	0d		20-Jun-08
A40480	CEC Approval Period - 5A Combined Package	38d	28-Mar-08	23-May-08
A40490	Update 5A Combined Package to CEC Comments	19d	23-May-08	20-Jun-08
Batch 5/05		52d	01-Feb-08	15-Apr-08
SDS75300	Batch 5/05 Formal Approval Period	38d	15-Feb-08	14-Apr-08



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

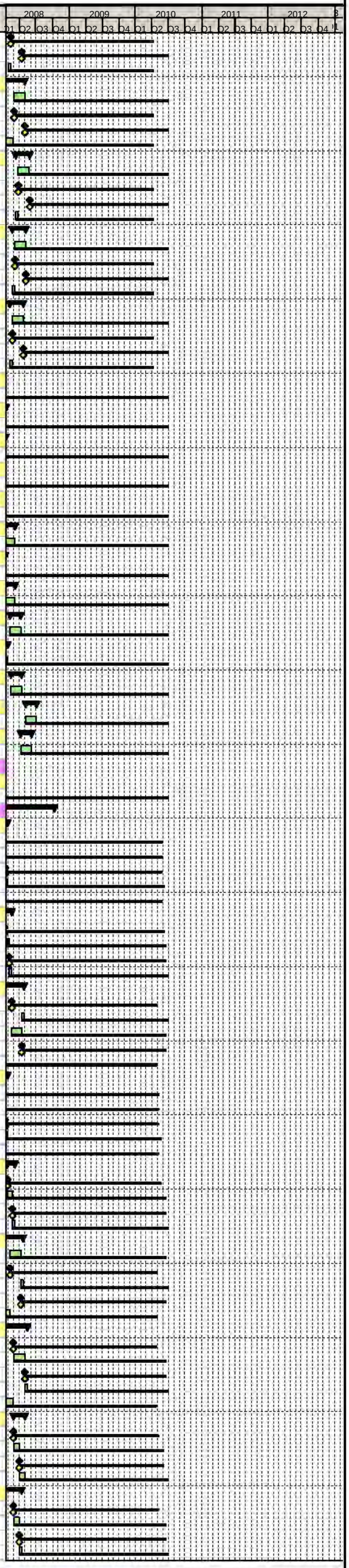
Trams for Edinburgh
...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS75310	Issue Batch 5/05 For Approval to CEC	0d	15-Feb-08	
SDS75320	Receive CEC Prior Approval For Batch 5/05	0d	15-Apr-08	
SDS75350	Batch 5/05 Russell Road Retaining Walls - Collation of Planning Drawings	9d	01-Feb-08*	14-Feb-08
Batch 5/06		200d	16-Jul-07 A	30-Apr-08
SDS75360	Batch 5/06 Formal Approval Period	38d	03-Mar-08	29-Apr-08
SDS75370	Issue Batch 5/06 For Approval to CEC	0d	03-Mar-08	
SDS75380	Receive CEC Prior Approval For Batch 5/06	0d	30-Apr-08	
SDS75410	Batch 5/06 Murrayfield Stadium Tramstop - Collation of Planning Drawings	148d	16-Jul-07 A	29-Feb-08
Batch 5/07		54d	12-Mar-08	27-May-08
SDS75420	Batch 5/07 Formal Approval Period	38d	28-Mar-08	23-May-08
SDS75430	Issue Batch 5/07 For Approval to CEC ON HOLD AWAITING TIE DECISION	0d	28-Mar-08	
SDS75440	Receive CEC Prior Approval For Batch 5/07	0d	27-May-08	
SDS75470	Batch 5/07 Roseburn Street and Murrayfield Stadium - Collation of Planning Drawings	9d	12-Mar-08*	27-Mar-08
Batch 5/08		53d	25-Feb-08	08-May-08
SDS75480	Batch 5/08 Formal Approval Period	38d	10-Mar-08	07-May-08
SDS75490	Issue Batch 5/08 For Approval to CEC	0d	10-Mar-08	
SDS75500	Receive CEC Prior Approval For Batch 5/08	0d	08-May-08	
SDS75530	Batch 5/08 Murrayfield pitches and Water of Leith + Underpass- Collation of Planning Drawings	9d	25-Feb-08	07-Mar-08
Batch 5/10		52d	11-Feb-08	23-Apr-08
SDS75600	Batch 5/10 Formal Approval Period	38d	25-Feb-08	22-Apr-08
SDS75610	Issue Batch 5/10 For Approval to CEC	0d	25-Feb-08	
SDS75620	Receive CEC Prior Approval For Batch 5/10	0d	23-Apr-08	
SDS75650	Batch 5/10 Baird Drive and Balgreen Road - Collation of Planning Drawings	9d	11-Feb-08*	22-Feb-08
Roads, Track, OLE, Landscaping, Street Lighting		42d	21-Feb-07 A	19-Apr-07 A
SDS29600	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	21-Feb-07 A	19-Apr-07 A
Russell Road Retaining Wall One		73d	27-Sep-07 A	16-Jan-08
357	Commence Russell Road RW One Informal Consultation With CEC & tie Over Prior Approval	69d	27-Sep-07 A	16-Jan-08
Russell Road Retaining Wall Two		73d	27-Sep-07 A	16-Jan-08
417	Commence Russell Road RW Two Informal Consultation With CEC & tie Over Prior Approval	69d	27-Sep-07 A	16-Jan-08
Murrayfield Stop Retaining Walls		41d	30-Jul-07 A	24-Sep-07 A
SDS64000	Commence Murrayfield Stop RW Informal Consultation With CEC & tie Over Prior Approval	38d	30-Jul-07 A	24-Sep-07 A
Tram Stop Murrayfield Stadium		40d	22-Nov-06 A	25-Jan-07 A
A40740	Informal Consultation With CEC & tie over Prior Approval Tram Stop Murrayfield Stadium	38d	22-Nov-06 A	25-Jan-07 A
Roseburn Street Viaduct Superstructure		40d	14-Jan-08	07-Mar-08
SDS64210	Commence Roseburn Street Viaduct Informal Consultation With CEC & tie Over Prior Approval	38d	14-Jan-08	07-Mar-08
Murrayfield Stadium Retaining Wall		92d	28-Aug-07 A	14-Jan-08
SDS64320	Commence Murrayfield Stadium RW Informal Consultation With CEC & tie Over Prior Approval	87d	28-Aug-07 A	14-Jan-08
Murrayfield Underpass Superstructure		40d	14-Jan-08	07-Mar-08
SDS64870	Commence Murrayfield Underpass Informal Consultation With CEC & tie Over Prior Approval	38d	14-Jan-08	07-Mar-08
Murrayfield Training Pitches Retaining Wall		42d	08-Feb-08	07-Apr-08
SDS64380	Commence Murrayfield Training Pitches Informal Consultation With CEC & tie Over Prior Approval	38d	08-Feb-08	07-Apr-08
Water of Leith Bridge Superstructure		70d	15-Oct-07 A	29-Jan-08
SDS65080	Commence Water of Leith Structure Informal Consultation With CEC & tie Over Prior Approval	67d	15-Oct-07 A	29-Jan-08
Baird Drive Retaining Wall		42d	15-Feb-08	14-Apr-08
SDS64440	Commence Baird Drive RW Informal Consultation With CEC & tie Over Prior Approval	38d	15-Feb-08	14-Apr-08
Balgreen Road Bridge Superstructure		41d	08-May-08	03-Jul-08
SDS65330	Commence Balgreen Road Bridge Informal Consultation With CEC & tie Over Prior Approval	38d	08-May-08	03-Jul-08
Balgreen Road Retaining Wall		42d	10-Apr-08	06-Jun-08
SDS64500	Commence Balgreen Road RW Informal Consultation With CEC & tie Over Prior Approval	38d	10-Apr-08	06-Jun-08
VO71 Accomodation Works at Murrayfield (Not tie Approved)		40d	02-Jul-07 A	24-Aug-07 A
Planning Permission Boundary & Accomodation Works Murrayfield Stadium		40d	02-Jul-07 A	24-Aug-07 A
SDS61290	Informal Consultation With CEC & tie Over Planning Permission Murrayfield Stadium Boundary & Accomodation Works	38d	02-Jul-07 A	24-Aug-07 A
Technnical Approvals		421d	21-Feb-07 A	10-Oct-08
Russell Road Retaining Wall One Review Period (TAA)		92d	11-Sep-07 A	25-Jan-08
176	Issue Russell Road RW One Design Package to TAA	0d	06-Nov-07 A	
177	TAA Russell Road RW One Design Package Review Period	28d	06-Nov-07 A	17-Dec-07 A
178	Receive Russell Road RW One Design Package comments from TAA	0d	14-Jan-08	
179	Incorporate TAA comments into Russell Road RW One Design Package	9d	14-Jan-08	25-Jan-08
187	Commence Russell Road RW One Informal Consultation With CEC Over Technical Approval	38d	11-Sep-07 A	05-Nov-07 A
Russell Road Retaining Wall One Review Period (ScotRail)		30d	09-Jan-08 A	19-Feb-08
181	Issue Design and Check Certificate to Network Rail For Comment	0d	09-Jan-08 A	
182	Network Rail Comment Period	19d	09-Jan-08 A	05-Feb-08
183	Receive Network Rail Comments	0d	06-Feb-08	
184	Incorporate First Scot Rail comments into Structure Design Package	9d	06-Feb-08	19-Feb-08
Murrayfield Stop Retaining Walls Structure Review (TAA)		178d	13-Aug-07 A	28-Apr-08
SDS51460	Issue Murrayfield Stop RW Detailed Design Package to TAA	0d		18-Feb-08
SDS51530	Incorporate Murrayfield Stop RW TAA Comments	9d	15-Apr-08	28-Apr-08
SDS51570	Murrayfield Stop RW TAA Review Period	38d	18-Feb-08	15-Apr-08
SDS51600	Receive Murrayfield Stop RW TAA Comments	0d		15-Apr-08
SDS62920	Commence Murrayfield Stop RW Informal Consultation With CEC Over Technical Approval	38d	13-Aug-07 A	09-Oct-07 A
Russell Road Retaining Wall Two Review Period (TAA)		92d	11-Sep-07 A	25-Jan-08
206	Issue Russell Road RW Two Design Package to TAA	0d	22-Nov-07 A	
207	TAA Russell Road RW Two Design Package Review Period	28d	22-Nov-07 A	10-Jan-08 A
208	Receive Russell Road RW Two Design Package comments from TAA	0d	14-Jan-08	
209	Incorporate TAA comments into Russell Road RW Two Design Package	9d	14-Jan-08	25-Jan-08
217	Commence Russell Road RW Two Informal Consultation With CEC Over Technical Approval	49d	11-Sep-07 A	21-Nov-07 A
Russell Road Retaining Wall Two Review Period (ScotRail)		30d	28-Jan-08	07-Mar-08
211	Issue Design and Check Certificate to Network Rail For Comment	0d	28-Jan-08	
212	Network Rail Comment Period	19d	28-Jan-08	22-Feb-08
213	Receive Network Rail Comments	0d	25-Feb-08	
214	Incorporate First Scot Rail comments into Structure Design Package	9d	25-Feb-08	07-Mar-08
Roseburn Street Viaduct Review (TAA)		99d	26-Nov-07 A	21-Apr-08
SDS63080	Roseburn Street Viaduct TAA Review Period	38d	11-Feb-08	08-Apr-08
SDS63090	Issue Roseburn Street Viaduct Detailed Design Package to TAA	0d		11-Feb-08*
SDS63100	Incorporate Roseburn Street Viaduct TAA Comments	9d	08-Apr-08	21-Apr-08
SDS63110	Receive Roseburn Street Viaduct TAA Comments	0d		08-Apr-08
SDS63120	Commence Roseburn Street Viaduct Informal Consultation With CEC Over Technical Approval	47d	26-Nov-07 A	11-Feb-08
Murrayfield Stadium Retaining Wall Structure Review (TAA)		217d	06-Jul-07 A	14-May-08
SDS58030	Issue Murrayfield Stadium Retaining Wall Detailed Design Package to TAA	0d		29-Feb-08
SDS58060	TAA Murrayfield Stadium Retaining Wall Review Period	38d	03-Mar-08	29-Apr-08
SDS58100	Receive Murrayfield Stadium Retaining Wall TAA Comments	0d		29-Apr-08
SDS58130	Incorporate Murrayfield Stadium Retaining Wall TAA Comments	9d	30-Apr-08	14-May-08
SDS62930	Commence Murrayfield Stadium RW Informal Consultation With CEC Over Technical Approval	154d	06-Jul-07 A	29-Feb-08
Murrayfield Stadium Retaining Wall Structure Review (Network Rail)		42d	29-Feb-08	29-Apr-08
SDS63220	Issue Murrayfield Stadium RW Design and Check Certificate to Network Rail For Comment	0d		29-Feb-08
SDS63230	Murrayfield Stadium RW Network Rail Comment Period	19d	03-Mar-08	01-Apr-08
SDS63240	Receive Murrayfield Stadium RW Network Rail Comments	0d		01-Apr-08
SDS63250	Incorporate Murrayfield Stadium RW Network Rail Comments	19d	02-Apr-08	29-Apr-08
Murrayfield Underpass Superstructure Review (TAA)		181d	27-Jul-07 A	15-Apr-08
SDS58560	Issue Murrayfield Underpass Detailed Design Package to TAA	0d		29-Feb-08*
SDS58590	TAA Murrayfield Underpass Review Period	19d	03-Mar-08	01-Apr-08
SDS58630	Receive Murrayfield Underpass TAA Comments	0d		01-Apr-08
SDS58660	Incorporate Murrayfield Underpass TAA Comments	9d	02-Apr-08	15-Apr-08



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

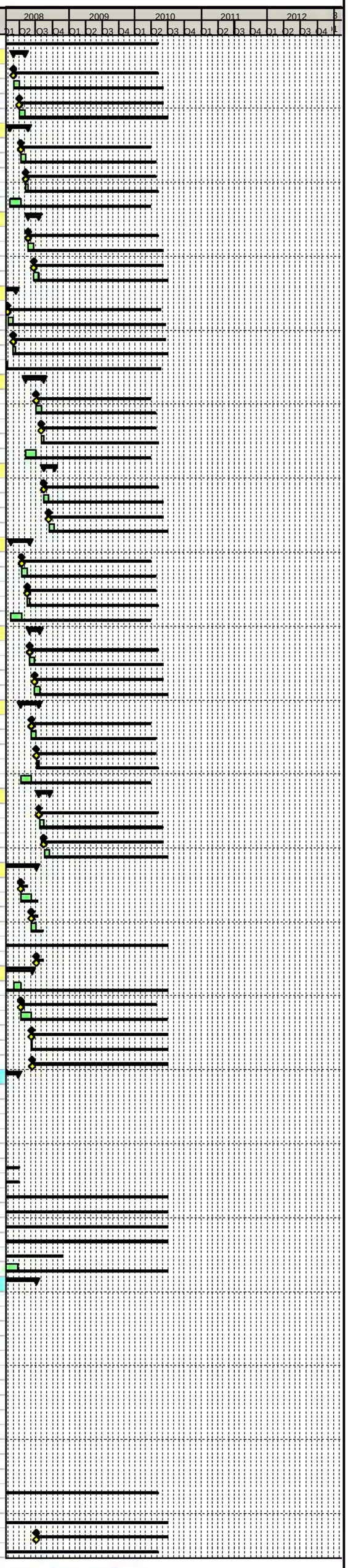
Trams for Edinburgh
connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS62940	Commence Murrayfield Underpass Informal Consultation With CEC Over Technical Approval	38d	27-Jul-07 A	24-Sep-07 A
Murrayfield Underpass Superstructure Review (Network Rail)		42d	29-Feb-08	29-Apr-08
SDS63280	Issue Murrayfield Underpass Design and Check Certificate to Network Rail For Comment	0d		29-Feb-08
SDS63290	Murrayfield Underpass Network Rail Comment Period	19d	03-Mar-08	01-Apr-08
SDS63300	Receive Murrayfield Underpass Network Rail Comments	0d		01-Apr-08
SDS63310	Incorporate Murrayfield Underpass Network Rail Comments	19d	02-Apr-08	29-Apr-08
Murrayfield Training Pitches Retaining Wall Structure Review (TAA)		73d	08-Feb-08	20-May-08
SDS58280	Issue Murrayfield Training Pitches Detailed Design Package to TAA	0d		07-Apr-08
SDS58310	Murrayfield Training Pitches TAA Review Period	19d	08-Apr-08	06-May-08
SDS58350	Receive Murrayfield Training Pitches TAA Comments	0d		06-May-08
SDS58380	Incorporate Murrayfield Training Pitches TAA Comments	9d	07-May-08	20-May-08
SDS62950	Commence Murrayfield Training Pitches Informal Consultation With CEC Over Technical Approval	38d	08-Feb-08	07-Apr-08
Murrayfield Training Pitches Retaining Wall Structure Review (Network Rail)		41d	20-May-08	16-Jul-08
SDS63340	Issue Murrayfield Training Pitches Design and Check Certificate to Network Rail For Comment	0d		20-May-08
SDS63350	Murrayfield Training Pitches Network Rail Comment Period	19d	21-May-08	18-Jun-08
SDS63360	Receive Murrayfield Training Pitches Network Rail Comments	0d		18-Jun-08
SDS63370	Incorporate Murrayfield Training Pitches Network Rail Comments	19d	19-Jun-08	16-Jul-08
Water of Leith Bridge Review (TAA)		95d	22-Oct-07 A	11-Mar-08
SDS63150	Issue Water of Leith Bridge Detailed Design Package to TAA	0d		29-Jan-08
SDS63160	Water of Leith Bridge TAA Review Period	19d	30-Jan-08	26-Feb-08
SDS63170	Receive Water of Leith Bridge TAA Comments	0d		26-Feb-08
SDS63180	Incorporate Water of Leith Bridge TAA Comments	9d	27-Feb-08	11-Mar-08
SDS63190	Commence Water of Leith Informal Consultation With CEC Over Technical Approval	62d	22-Oct-07 A	29-Jan-08
Balgreen Road Bridge Review (TAA)		71d	08-May-08	14-Aug-08
SDS35810	Issue Balgreen Road Bridge Detailed Design Package to TAA	0d		03-Jul-08
SDS35840	Balgreen Road Bridge TAA Review Period	19d	04-Jul-08	31-Jul-08
SDS35880	Receive Balgreen Road Bridge TAA Comments	0d		31-Jul-08
SDS35910	Incorporate Balgreen Road Bridge TAA Comments	9d	01-Aug-08	14-Aug-08
SDS62910	Commence Balgreen Road Bridge Informal Consultation With CEC Over Technical Approval	38d	08-May-08	03-Jul-08
Balgreen Road Bridge Review (Network Rail)		41d	14-Aug-08	10-Oct-08
SDS63400	Issue Balgreen Road Bridge Design and Check Certificate to Network Rail For Comment	0d		14-Aug-08
SDS63410	Balgreen Road Bridge Network Rail Comment Period	19d	15-Aug-08	12-Sep-08
SDS63420	Receive Balgreen Road Bridge Network Rail Comments	0d		12-Sep-08
SDS63430	Incorporate Balgreen Road Bridge Network Rail Comments	19d	15-Sep-08	10-Oct-08
Baird Drive Retaining Wall Structure Review (TAA)		74d	15-Feb-08	28-May-08
SDS35500	Issue Baird Drive RW Detailed Design Package to TAA	0d		14-Apr-08
SDS35530	Baird Drive RW TAA Review Period	19d	15-Apr-08	13-May-08
SDS35570	Receive Baird Drive RW TAA Comments	0d		13-May-08
SDS35600	Incorporate Baird Drive RW TAA Comments	9d	14-May-08	28-May-08
SDS62960	Commence Baird Drive RW Informal Consultation With CEC Over Technical Approval	38d	15-Feb-08	14-Apr-08
Baird Drive Retaining Wall Structure Review (Network Rail)		40d	28-May-08	23-Jul-08
SDS63460	Issue Baird Drive RW Design and Check Certificate to Network Rail For Comment	0d		28-May-08
SDS63470	Baird Drive RW Network Rail Comment Period	19d	29-May-08	25-Jun-08
SDS63480	Receive Baird Drive RW Network Rail Comments	0d		25-Jun-08
SDS63490	Incorporate Baird Drive RW Network Rail Comments	19d	26-Jun-08	23-Jul-08
Balgreen Road Retaining Wall Structure Review (TAA)		72d	10-Apr-08	18-Jul-08
SDS51210	Issue Balgreen Road RW Detailed Design Package to TAA	0d		06-Jun-08
SDS51240	Balgreen Road RW TAA Review Period	19d	09-Jun-08	04-Jul-08
SDS51280	Receive Balgreen Road RW TAA Comments	0d		04-Jul-08
SDS51310	Incorporate Balgreen Road RW TAA Comments	9d	07-Jul-08	18-Jul-08
SDS62970	Commence Balgreen Road RW Informal Consultation With CEC Over Technical Approval	38d	10-Apr-08	06-Jun-08
Balgreen Road Retaining Wall Structure Review (Network Rail)		41d	18-Jul-08	15-Sep-08
SDS63520	Issue Balgreen Road RW Design and Check Certificate to Network Rail For Comment	0d		18-Jul-08
SDS63530	Balgreen Road RW Network Rail Comment Period	19d	21-Jul-08	15-Aug-08
SDS63540	Receive Balgreen Road RW Network Rail Comments	0d		15-Aug-08
SDS63550	Incorporate Balgreen Road RW Network Rail Comments	19d	18-Aug-08	15-Sep-08
Roads Technical Approval		350d	21-Feb-07 A	03-Jul-08
SDS29610	Issue Roads Design to Roads Authority for Approval	0d		08-Apr-08
SDS29620	Roads Authority Approval Period	38d	09-Apr-08	05-Jun-08
SDS29630	Receive Roads Authority Comments	0d		05-Jun-08
SDS29640	Update to Roads Authority Comments	19d	06-Jun-08	03-Jul-08
SDS29650	Roads Authority Informal Consultation	38d	21-Feb-07 A	19-Apr-07 A
SDS29720	Roads Technical Approval Granted	0d		03-Jul-08
Drainage Technical Approval		110d	11-Jan-08 A	12-Jun-08
SDS72780	Roads Authority Informal Consultation For Drainage	57d	11-Jan-08 A	08-Apr-08
SDS72790	Issue Drainage Design to Roads Authority for Approval	0d		08-Apr-08
SDS72800	Roads Authority Approval Period For Drainage	38d	09-Apr-08	05-Jun-08
SDS72810	Receive Roads Authority Comments For Drainage	0d		05-Jun-08
SDS72820	Update to Roads Authority Comments For Drainage	5d	06-Jun-08	12-Jun-08
SDS72830	Drainage Technical Approval Granted	0d		12-Jun-08
Track (Task700.2.1)		515d	21-Mar-06 A	28-Mar-08
A3520	First Pass Mx Horizontal and Vertical Alignment	15d	21-Mar-06 A	11-Apr-06 A
A3530	Handover Alignment Design P Way to Roads	0d		12-Apr-06 A
A3540	Coordination Meeting/Workshop Between PWay/Roads & Resolution of Major Conflicts	1d	12-Apr-06 A	12-Apr-06 A
SDS29320	Revise Alignment to Match Roads First Pass Vertical	6d	03-Jan-07 A	10-Jan-07 A
SDS29370	Handover Alignment Design Track to Roads	0d		10-Jan-07 A
SDS29740	Revise Alignment to Inc. Preliminary Design Comments	85d	03-Jul-06 A	08-Nov-06 A
SDS29760	Handover Alignment Design Track to Roads	0d		08-Nov-06 A
SDS57090	Issue Track Alignment Design to tie Section 5A	0d		01-Feb-07 A
SDS57370	tie Approval Period	19d	01-Feb-07 A	28-Feb-07 A
SDS57400	Receive tie Comments	0d	03-Apr-07 A	
SDS57460	Incorporate tie Comments	37d	04-May-07 A	29-Jun-07 A
SDS59590	IDC Track Design	9d	19-Jan-07 A	01-Feb-07 A
SDS75150	Address tie Comments, NR Accom, Other Revisions, IDC & Section Submission Package	151d	06-Aug-07 A	28-Mar-08
Roads, Street Lighting & Landscaping (Task700.2.2)		605d	20-Feb-06 A	03-Jul-08
A3550	Route Appreciation/Junct Layout & Determine with tie & CEC Works Extent	52d	20-Feb-06 A	10-May-06 A
A3560	Frontage Surveys	30d	07-Mar-06 A	21-Apr-06 A
A3570	Set Up Mx Models	27d	10-Mar-06 A	21-Apr-06 A
A3580	Produce Preliminary Horizontal Road Alignment Design (Inc Lanes & Parking Zones)	6d	11-May-06 A	18-May-06 A
A3590	Preliminary Road Safety Audit	1d	19-Jun-06 A	19-Jun-06 A
A3600	Review & Amend TRO Drawings & Schedules for Modifications Required Post Prelim Design	1d	12-Jun-06 A	12-Jun-06 A
A3610	Handover Alignment Design Roads to Pway	0d		19-Jun-06 A
A3620	Coordination Meeting/Workshop Between Roads & Pway Teams	1d	19-May-06 A	19-May-06 A
A5550	Undertake Road Marking, Pedestrian Req & Traffic Signalling Design	3d	17-May-06 A	19-May-06 A
SDS29330	Produce First Pass Vertical Alignment	8d	15-Dec-06 A	03-Jan-07 A
SDS29350	Handover Alignment Design Roads to Pway	0d		03-Jan-07 A
SDS29380	Revise Vertical Alignment to Match Final Track Alignment	4d	10-Jan-07 A	15-Jan-07 A
SDS29390	Horizontal & Vertical Alignment Design Complete	0d		24-Feb-07 A
SDS29400	Issue Roads Design to tie for Approval Section 5A	0d		27-Mar-07 A
SDS29410	Cross Check all Horizontal Design Aspects With Vertical Alignment	9d	12-Feb-07 A	23-Feb-07 A
SDS29420	tie Approval Period	19d	27-Mar-07 A	25-Apr-07 A
SDS29450	Issue Construction Drawings	0d		03-Jul-08
SDS29460	Road Safety Audit Stage 2 (Intermediate)	5d	16-Mar-07 A	22-Mar-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

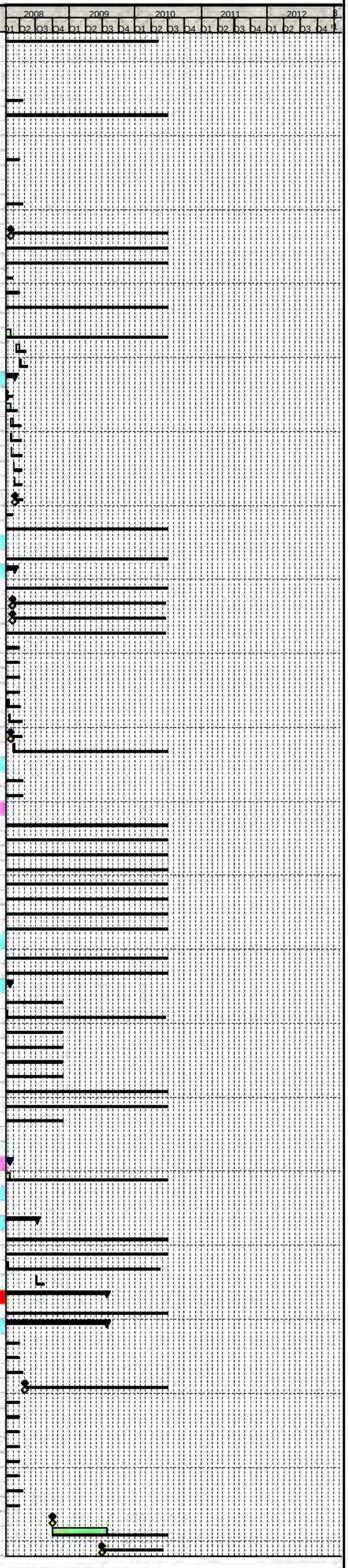
Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS29470	Insert Intermediate RSA Comments	3d	23-Mar-07 A	27-Mar-07 A
SDS29480	Produce Site Clearance Drawings & Schedule	4d	12-Mar-07 A	15-Mar-07 A
SDS29490	Produce Fencing, Barriers & Guardrails Design	9d	12-Feb-07 A	23-Feb-07 A
SDS29500	Produce Street Lighting Design (& Liaise With OLE)	1d	03-Jan-07 A	04-Jan-07 A
SDS29510	Produce Traffic Signal Only Ducting	7d	08-Dec-06 A	18-Dec-06 A
SDS29520	Produce Soft Landscaping Design	50d	17-Jan-07 A	30-Mar-07 A
SDS29530	Produce Traffic Signals Layout	9d	12-Feb-07 A	23-Feb-07 A
SDS29540	Produce Traffic Signs Design (Signs, Markings, Signals)	9d	12-Feb-07 A	23-Feb-07 A
SDS29550	Produce Earthworks Design	41d	13-Aug-07 A	12-Oct-07 A
SDS29770	Revise Alignment to Inc. Final Track Horizontal Alignment (Horizontal Design Freeze)	9d	01-Dec-06 A	14-Dec-06 A
SDS29780	Produce Kerbs, Footway & Paved Area Design	9d	12-Feb-07 A	23-Feb-07 A
SDS29790	Produce Pavement Design	56d	08-May-07 A	31-Jul-07 A
SDS29800	IDC (Inc. Systems Assurance)	9d	12-Feb-07 A	23-Feb-07 A
SDS56570	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 5A	0d		15-Feb-08
SDS56840	Issue Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 5A	0d		06-Mar-07 A
SDS59370	Compile Planning Drawings	9d	13-Mar-07 A	26-Mar-07 A
SDS59790	Advise Track, Stops, Modellers Changes To Accom RSA1 & PD Comments	11d	19-Oct-06 A	03-Nov-06 A
SDS59800	Pass Guidance/Envelope To Track & Others As Necessary	0d		03-Nov-06 A
SDS60970	Revise Horizontal to Inc. Track Horizontal Alignment, RSA1 & PD Comments	8d	08-Nov-06 A	17-Nov-06 A
SDS67160	Street Lighting Survey Work	60d	03-Jul-06 A	29-Sep-06 A
SDS69700	Produce Hard Landscaping Design	202d	10-Apr-07 A	15-Feb-08
SDS80060	Final RSA	9d	17-Mar-08	01-Apr-08
SDS80070	Incorporate Final RSA Comments	5d	02-Apr-08	08-Apr-08
VO231 Balgreen Road Option 3		83d	05-Nov-07 A	10-Mar-08
SDS81210	Inputs received (track, tramstop, substation)	0d	14-Jan-08	
SDS81220	Additional Roads Design	20d	17-Jan-08 A	14-Feb-08
SDS81230	RSA2 (by auditors)	10d	15-Feb-08	29-Feb-08
SDS81240	Detailed Design Check	2d	15-Feb-08	18-Feb-08
SDS81250	Update from DD check comments, inc CAD	2d	19-Feb-08	20-Feb-08
SDS81260	Update from RSA comments, inc CAD	3d	03-Mar-08	05-Mar-08
SDS81270	Finalise Design and prepare for issue	2d	06-Mar-08	07-Mar-08
SDS81280	Issue Notification of Completion letter - revised Roads Detailed Design Section 5A (VO231)	0d	10-Mar-08	
SDS81330	Track Redesign	10d	05-Nov-07 A	19-Nov-07 A
SDS81340	OLE Design Rework due to Track changes	14d	03-Dec-07 A	21-Dec-07 A
VO286 Balgreen Road Option 3 additional OLE work		10d	10-Dec-07 A	21-Dec-07 A
SDS81760	OLE Design Rework due to Track changes	9d	10-Dec-07 A	21-Dec-07 A
Drainage		254d	12-Mar-07 A	10-Mar-08
SDS71770	Hydraulic Modelling & First Pass Drainage Design	111d	12-Mar-07 A	29-Aug-07 A
SDS71780	Receipt of Drainage Survey Information	0d		25-Feb-08*
SDS71790	Outfall Consent/Approval from SW	0d		25-Feb-08*
SDS71800	Outfall Consent/Approval from CEC	0d		31-Aug-07 A
SDS71810	Outfall Consent/Approval from SEPA	0d		10-May-07 A
SDS71820	Compile Drainage Package	14d	19-Sep-07 A	09-Oct-07 A
SDS71830	Issue Drainage Design Completion Letter to tie for Approval Section 5A	0d		10-Oct-07 A
SDS73250	Final Detailed Drainage Design	53d	29-Jun-07 A	18-Sep-07 A
SDS80520	Final Detailed Drainage Design	5d	29-Jan-08	04-Feb-08
SDS80530	Compile Drainage Package	5d	05-Feb-08	11-Feb-08
SDS80540	Issue Drainage Design Completion Letter to tie for Approval Section 5A	0d		13-Feb-08
SDS80550	Confirm Drainage and Amend if Required	9d	26-Feb-08	10-Mar-08
Boundary & Accomodation Works (Task700.2.3)		228d	02-Oct-06 A	24-Aug-07 A
SDS42370	Detailed Design of Boundary & Accomodation Works	95d	26-Mar-07 A	17-Aug-07 A
SDS42380	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 5A	0d		24-Aug-07 A
VO71 Accomodation Works at Murrayfield (Not tie approved)		148d	02-Oct-06 A	04-May-07 A
SDS61130	Relocation of Turnstiles, Reconfigure Pavement/Parking, Clubhouse, Stairs & Storage	47d	02-Oct-06 A	08-Dec-06 A
SDS61140	Relocate & Reinstate Training Pitches Inc. Drainage, Floodlights, Sprinklers & Reinforcement	47d	02-Oct-06 A	08-Dec-06 A
SDS61150	Issue Murrayfield Stadium Boundary & Accomodation Works	0d		04-Dec-06 A
SDS61160	tie Approval Period	19d	11-Dec-06 A	15-Jan-07 A
SDS61170	No Comments Received & Now Changed Protocol	0d		04-May-07 A
SDS61200	Issue Murrayfield Training Pitches Boundary & Accomodation Works	0d		04-Dec-06 A
SDS61210	tie Approval Period	19d	11-Dec-06 A	15-Jan-07 A
SDS61220	No Comments Received & Now Changed Protocol	0d		04-May-07 A
VO163 SRU Cross Sections		22d	20-Dec-06 A	29-Jan-07 A
SDS73090	Additional Report Produced for tie & SRU	22d	20-Dec-06 A	29-Jan-07 A
SDS73100	Issue Additional Report to tie & SRU	0d		29-Jan-07 A
Utilities (Task700.2.4)		486d	13-Mar-06 A	08-Feb-08
A12290	Close Out PD Issues and Re-issue PD Drawings to SUCs	51d	14-Aug-06 A	27-Oct-06 A
A12300	Design Development	331d	29-Aug-06 A	28-Jan-08
A12310	Initial Consultations With SUCs and IDTs	38d	29-Aug-06 A	23-Oct-06 A
A12320	Access to MUDFA and Others	119d	03-Oct-06 A	05-Apr-07 A
A12330	MUDFA Appointment	0d		03-Oct-06 A
A12340	IDC	10d	22-Mar-07 A	05-Apr-07 A
A12350	Issue DD to SUC For Approval	0d		05-Apr-07 A
A12360	SUC Approval Period	91d	06-Apr-07 A	27-Aug-07 A
A14080	Consult With SUCs on DD	119d	03-Oct-06 A	05-Apr-07 A
UTIL1200	Issue to Statutory Utility Companies (SUCs)	0d		30-Jun-06 A
UTIL130	Section 5A - Pre-Preliminary Design (Utilities)	71d	13-Mar-06 A	30-Jun-06 A
VO45 TGP Design Co-odination		397d	14-Jul-06 A	08-Feb-08
A14540	Additional Coordination with TGP and ScotRail over HG Cable	368d	14-Jul-06 A	08-Feb-08
OLE		2d	19-Jun-06 A	20-Jun-06 A
A4170	Preliminary Review of OLE Pole Positioning for Utility Survey Scope Definition	2d	19-Jun-06 A	20-Jun-06 A
TRO's		580d	01-Apr-06 A	10-Jul-08
SDS33650	Collate Exisiting TROs	65d	01-Apr-06 A	12-Jul-06 A
SDS33660	Receive Preliminary Roads Design	0d		12-Jul-06 A
SDS82070	Interim TRO Design Section 5A	5d	28-Jan-08*	01-Feb-08
SDS82080	Final TRO Design Section 5A	5d	04-Jul-08	10-Jul-08
ROJ - MUR		986d	19-Sep-05 A	28-Jul-09
CON-0730	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Murrayfield Stadium (Task700.2.6)		827d	28-Apr-06 A	28-Jul-09
A26620	Prepare Murrayfield Tram Stop Planning Submission Drawings	6d	13-Nov-06 A	20-Nov-06 A
A26630	Produce Engineering Detailed Design Drawings	172d	02-Mar-07 A	20-Nov-07 A
A26660	Issue Notification Of Completion Letter- Murrayfield Stadium Tram Stop Design to tie	0d		20-Nov-07 A
A26680	Tram Stop Design Complete - Drawings Issued for Construction	0d		30-Apr-08
A27610	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Aug-06 A	02-Aug-06 A
A44000	Issue Murrayfield Stadium Tram Stop Package for Prior Approval to tie	0d		21-Nov-06 A
A44010	Update Planning Submission for Issue to Planning Drawings Team	109d	29-Jan-07 A	13-Jul-07 A
A44020	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	10d	06-Nov-06 A	20-Nov-06 A
A44030	tie Approval Period	19d	22-Nov-06 A	19-Dec-06 A
A44040	Receive tie Comments	0d		15-Jan-07 A
A44050	Compile Planning Drawings Tram Stop Murrayfield Stadium	10d	16-Jul-07 A	30-Jul-07 A
A44910	Prepare Detailed Design Stop Drawings	132d	02-Aug-06 A	23-Feb-07 A
A48380	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A48390	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A48400	Receive Final As Built Data from the Contractor	0d		30-Jun-09



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

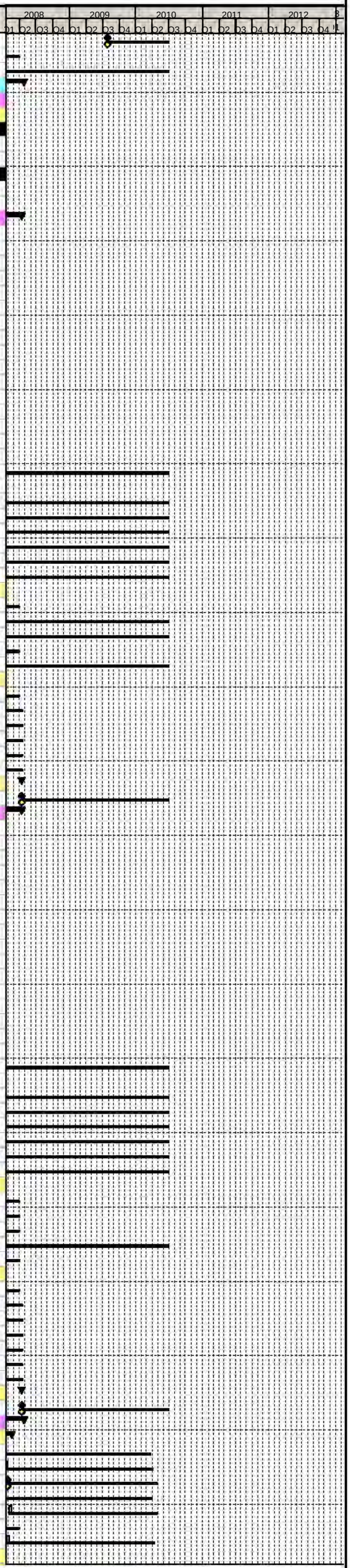
Trams for Edinburgh ...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
A48410	Issue Final As Built Drawings	0d		28-Jul-09
A4950	General Arrangement Drawings	41d	28-Apr-06 A	30-Jun-06 A
A5720	Issue Tram Stop GA Drawings for Murrayfield	0d		30-Jun-06 A
Structures		601d	20-Dec-05 A	28-Apr-08
S14 Existing Russell Road Railway Bridge		96d	20-Dec-05 A	03-May-06 A
Surveys		96d	20-Dec-05 A	03-May-06 A
Topographical		96d	20-Dec-05 A	03-May-06 A
A484230	Desk Top Studies	82d	20-Dec-05 A	02-May-06 A
A484240	Draft & approve Method Statements	0d	03-May-06 A	
Geotechnical		96d	20-Dec-05 A	03-May-06 A
A484260	Desk Top Studies	82d	20-Dec-05 A	02-May-06 A
A484270	Draft & approve Method Statements	0d	03-May-06 A	
W01 Russell Road Retaining Wall One		552d	13-Feb-06 A	15-Apr-08
SDS43440	Review of Previous Work	9d	13-Feb-06 A	24-Feb-06 A
SDS43450	Optioneering	14d	27-Feb-06 A	17-Mar-06 A
SDS43460	Initial Design	9d	20-Mar-06 A	31-Mar-06 A
SDS43470	Production of AIP Drawing	16d	04-May-06 A	26-May-06 A
SDS43480	Issue AIP Drawing to tie	0d		26-May-06 A
SDS43490	Checking	12d	11-May-06 A	30-May-06 A
SDS43500	tie AIP Drawing Review Period	5d	30-May-06 A	05-Jun-06 A
SDS43510	Undertake Consultations	34d	11-May-06 A	30-Jun-06 A
SDS43520	Receive AIP Drawing Comments from tie	0d		05-Jun-06 A
SDS43530	Incorporate tie Comments into AIP Drawing	4d	06-Jun-06 A	09-Jun-06 A
SDS43540	Production of AIP Document	4d	12-Jun-06 A	15-Jun-06 A
SDS43550	Issue Russell Road Retaining Wall One AIP Document to tie	0d		30-Jun-06 A
SDS43560	tie AIP Document Review Period	1d	14-Aug-06 A	14-Aug-06 A
SDS43570	Receive AIP Document Comments from tie	0d		14-Aug-06 A
SDS43580	Incorporate tie Comments into AIP Document	5d	15-Aug-06 A	21-Aug-06 A
SDS43590	Issue AIP Document & Drawing to TAA	0d		21-Aug-06 A
SDS43600	TAA AIP Document & Drawing Review Period	4d	22-Aug-06 A	28-Aug-06 A
SDS43610	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS43620	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS43630	Recieve AIP Document & Drawing Comments from TAA	0d		20-Nov-06 A
SDS43640	Incorporate TAA Comments into AIP Document & Drawing	5d	20-Nov-06 A	27-Nov-06 A
SDS43650	Recieve AIP Document & Drawing Comments from Planning Department	0d		20-Nov-06 A
SDS43660	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	20-Nov-06 A	27-Nov-06 A
SDS43670	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		30-Nov-06 A
Preliminary Design Milestones		228d	14-Aug-06 A	09-Jul-07 A
159	Receipt of tie PD Acceptance	0d	20-Nov-06 A	
160	Receipt of Alignment Prelim Design Package	0d	22-Dec-06 A	
161	Receipt of OLE Prelim Design Package	0d	10-Apr-07 A	
162	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	09-Jul-07 A	
163	Receipt of an Approved and Signed AIP document	0d	14-Aug-06 A	
Structure Detailed Design		78d	23-Jul-07 A	07-Nov-07 A
165	Structure Detailed Design	18d	23-Jul-07 A	16-Aug-07 A
166	Structure Detailed Design Draughting	23d	06-Aug-07 A	10-Sep-07 A
167	Issue Structure Detailed Design Package to CAT I Checker	0d	11-Sep-07 A	
168	Structure CAT I Check	19d	11-Sep-07 A	08-Oct-07 A
169	Receive & Incorporate CAT I comments	9d	09-Oct-07 A	22-Oct-07 A
170	Issue Notification Of Completion Letter- Russell Road Retaining Wall One Structure Design Package to tie	0d		07-Nov-07 A
Issue Russell Road RW One Structure Design Package For Construction/Fabrication		0d	15-Apr-08	15-Apr-08
185	Issue Russell Road RW One Structure Design Package For Construction/Fabrication	0d	15-Apr-08	
W02 Russell Road Retaining Wall Two		552d	13-Feb-06 A	15-Apr-08
SDS43680	Review of Previous Work	9d	13-Feb-06 A	24-Feb-06 A
SDS43690	Optioneering	14d	27-Feb-06 A	17-Mar-06 A
SDS43700	Initial Design	9d	20-Mar-06 A	31-Mar-06 A
SDS43710	Production of AIP Drawing	16d	04-May-06 A	26-May-06 A
SDS43720	Issue Russell Rd RW2 AIP Drawing to tie	0d		26-May-06 A
SDS43730	Checking	12d	11-May-06 A	30-May-06 A
SDS43740	tie AIP Drawing Review Period	5d	30-May-06 A	05-Jun-06 A
SDS43750	Undertake Consultations	34d	11-May-06 A	30-Jun-06 A
SDS43760	Receive AIP Drawing Comments from tie	0d		05-Jun-06 A
SDS43770	Incorporate tie Comments into AIP Drawing	4d	06-Jun-06 A	09-Jun-06 A
SDS43780	Production of AIP Document	4d	12-Jun-06 A	15-Jun-06 A
SDS43790	Issue Russell Road Retaining Wall Two AIP Document to tie	0d		30-Jun-06 A
SDS43800	tie AIP Document Review Period	40d	15-Jun-06 A	14-Aug-06 A
SDS43810	Receive AIP Document Comments from tie	0d		14-Aug-06 A
SDS43820	Incorporate tie Comments into AIP Document	6d	14-Aug-06 A	21-Aug-06 A
SDS43830	Issue AIP Document & Drawing to TAA	0d		21-Aug-06 A
SDS43840	TAA AIP Document & Drawing Review Period	5d	21-Aug-06 A	28-Aug-06 A
SDS43850	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS43860	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS43870	Recieve AIP Document & Drawing Comments from TAA	0d		25-Oct-06 A
SDS43880	Incorporate TAA Comments into AIP Document & Drawing	9d	23-Oct-06 A	03-Nov-06 A
SDS43890	Recieve AIP Document & Drawing Comments from Planning Department	0d		24-Oct-06 A
SDS43900	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	24-Oct-06 A	31-Oct-06 A
SDS43910	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		31-Oct-06 A
Preliminary Design Milestones		228d	14-Aug-06 A	09-Jul-07 A
189	Receipt of tie PD Acceptance	0d	20-Nov-06 A	
190	Receipt of Alignment Prelim Design Package	0d	15-Jan-07 A	
191	Receipt of OLE Prelim Design Package	0d	20-Nov-06 A	
192	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	09-Jul-07 A	
193	Receipt of an Approved and Signed AIP document	0d	14-Aug-06 A	
Structure Detailed Design		69d	17-Aug-07 A	21-Nov-07 A
195	Structure Detailed Design	14d	17-Aug-07 A	07-Sep-07 A
196	Structure Detailed Design Draughting	24d	17-Aug-07 A	24-Sep-07 A
197	Issue Structure Detailed Design Package to CAT I Checker	0d	25-Sep-07 A	
198	Structure CAT I Check	9d	25-Sep-07 A	08-Oct-07 A
199	Receive & Incorporate CAT I comments	9d	09-Oct-07 A	22-Oct-07 A
200	Issue Notification Of Completion Letter- Russell Road Retaining Wall Two Structure Design Package to tie	0d		21-Nov-07 A
SDS63910	Completion of Planning Drawings	11d	06-Nov-07 A	21-Nov-07 A
Issue Russell Road RW Two Structure Design Package For Construction/Fabrication		0d	15-Apr-08	15-Apr-08
SDS62400	Issue Russell Road RW Two Structure Design Package For Construction/Fabrication	0d		15-Apr-08
W18 Murrayfield Stop Retaining Walls (Task700.2.17)		433d	11-Aug-06 A	28-Apr-08
Murrayfield Stop Retaining Walls Structure Detailed Design		313d	17-Nov-06 A	18-Feb-08
SDS51410	Retaining Wall Detailed Design	188d	17-Nov-06 A	10-Sep-07 A
SDS51420	Retaining Wall Detailed Design Draughting	263d	08-Dec-06 A	28-Jan-08
SDS51450	Issue Notification Of Completion Letter- Murrayfield Stop Retaining Walls Package to tie for Comments	0d		29-Jan-08
SDS51470	Issue Detailed Design Package to CAT II or CAT III Checker (as appropriate)	0d	05-Jan-07 A	
SDS51510	Receive and Incorporate CATII or CATIII Check Comments	9d	05-Feb-08	18-Feb-08
SDS63950	Prepare Planning Drawings	9d	11-Sep-07 A	24-Sep-07 A
SDS64150	CAT II Review Period	9d	22-Jan-08	04-Feb-08
Murrayfield Stop Retaining Walls Preliminary Design Milestones		145d	11-Aug-06 A	12-Mar-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Trams for Edinburgh
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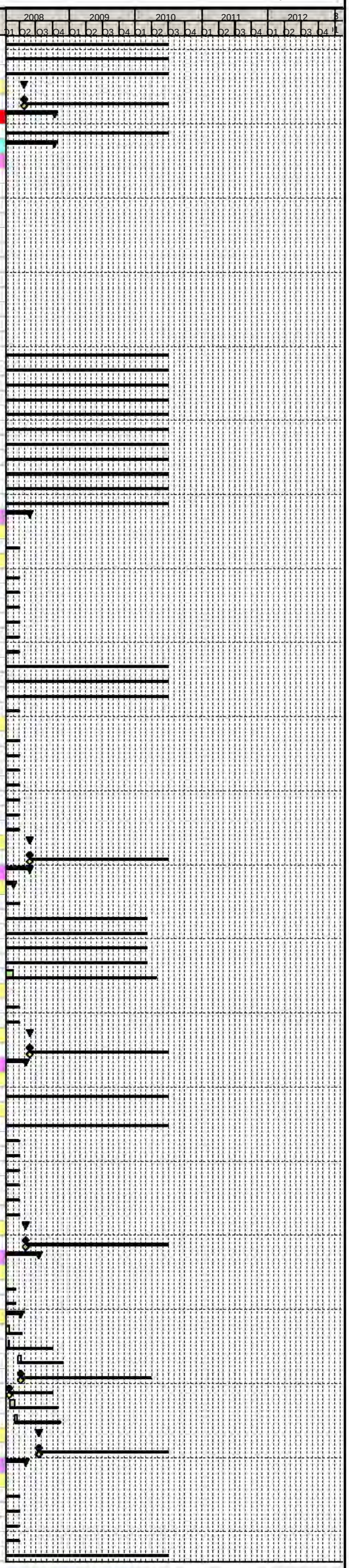
Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

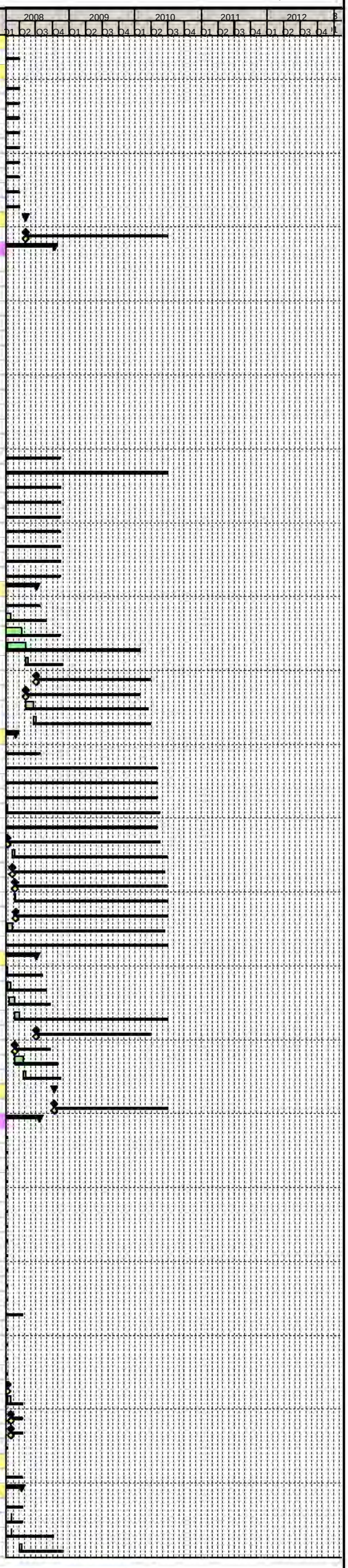
tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS51400	Retaining Wall Analysis	74d	30-Oct-06 A	23-Feb-07 A
SDS62380	PD of Murrayfield Stop Retaining Walls Structure	89d	11-Aug-06 A	22-Dec-06 A
SDS66660	tie and TAA Sign Off PD	0d		12-Mar-07 A
Issue Murrayfield Stop Retaining Walls Design Package For Construction / Fabrication		0d	28-Apr-08	28-Apr-08
SDS51560	Issue Murrayfield Stop Retaining Walls Specification clauses For Construction	0d		28-Apr-08
MUR - BAR Including Elevated Route		786d	19-Sep-05 A	10-Oct-08
CON-0760	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Structures		648d	30-Mar-06 A	10-Oct-08
S21 Murrayfield Structure		202d	30-Mar-06 A	16-Jan-07 A
SDS20610	Collate Base Data on Alignment & Topo survey	16d	30-Mar-06 A	25-Apr-06 A
SDS20620	Define Clearances	10d	13-Apr-06 A	02-May-06 A
SDS20630	Develop Preliminary Structures Options	23d	21-Apr-06 A	26-May-06 A
SDS20650	Options Review	5d	30-May-06 A	05-Jun-06 A
SDS20660	Produce Draft GA (AIP) Drg Showing Preferred Option	16d	30-May-06 A	21-Jun-06 A
SDS20670	Issue Murrayfield Structure Draft GA (AIP) Drg to tie	0d		23-Jun-06 A
SDS20680	Select Preferred Design Option in Liaison with tie	5d	09-Jun-06 A	15-Jun-06 A
SDS20690	Update Base Data on Alignment & Topo Survey	2d	09-Jun-06 A	12-Jun-06 A
SDS20700	Draft AIP Document Text	8d	13-Jun-06 A	22-Jun-06 A
SDS20710	Update AIP GA Drgs	8d	15-Jun-06 A	26-Jun-06 A
SDS20720	Check of AIP Document	2d	23-Jun-06 A	26-Jun-06 A
SDS20730	Issue AIP Document to Technical Approval Authority (TAA) Form A	0d		23-Jun-06 A
SDS20740	TAA Review AIP & Comment	78d	27-Jun-06 A	20-Oct-06 A
SDS20750	Receive AIP Comments from TAA	0d		20-Oct-06 A
SDS20760	Incorporate AIP Comments from TAA	28d	20-Oct-06 A	30-Nov-06 A
SDS20770	Re-issue AIP to TAA	0d		09-Jan-07 A
SDS20780	TAA Review AIP	5d	10-Jan-07 A	16-Jan-07 A
SDS20790	TAA Sign Off AIP Document	0d		16-Jan-07 A
SDS20800	Issue AIP Document to Planning Department	0d		20-Nov-06 A
SDS20810	Planning Department Review AIP & Comment	6d	20-Nov-06 A	27-Nov-06 A
SDS20830	Receive AIP Comments from Planning Department	0d		18-Dec-06 A
SDS20840	Incorporate AIP Comments from Planning Department	9d	19-Dec-06 A	09-Jan-07 A
SDS20850	Issue AIP to Structures Detailed Design Team	0d		16-Jan-07 A
S21A Roseburn Street Viaduct (Task700.2.9)		462d	31-Jul-06 A	27-May-08
Roseburn Street Viaduct Preliminary Design Milestones		10d	31-Jul-06 A	11-Aug-06 A
SDS58730	Update Available Base Data/Info Re Alignment/Topo Survey etc	9d	31-Jul-06 A	11-Aug-06 A
Roseburn Street Viaduct Superstructure Detailed Design		308d	07-Aug-06 A	19-Oct-07 A
SDS58750	Superstructure Analysis	148d	07-Aug-06 A	23-Mar-07 A
SDS58770	Superstructure Detailed Design	205d	19-Sep-06 A	03-Aug-07 A
SDS58790	Superstructure Detailed Design Draughting	201d	03-Oct-06 A	10-Aug-07 A
SDS58830	Issue Notification Of Completion Letter- Roseburn Street Viaduct Superstructure Detailed Design Package to tie	0d		19-Oct-07 A
SDS58850	Issue Detailed Design Package to CAT III Checker	0d		20-Jul-07 A
SDS58860	Bridge CAT III Review Period	52d	20-Jul-07 A	05-Oct-07 A
SDS58870	CAT II Check	4d	02-Apr-07 A	05-Apr-07 A
SDS58910	Update to CAT II Comments	8d	05-Apr-07 A	20-Apr-07 A
SDS58920	Issue CAT II Checked Roseburn Street Viaduct Superstructure to tie For Procurement Purposes	0d		13-Apr-07 A
SDS58940	Receive and Incorporate CATIII Check Comments	20d	17-Sep-07 A	15-Oct-07 A
Roseburn Street Viaduct Substructure Detailed Design		298d	21-Aug-06 A	19-Oct-07 A
SDS58760	Substructure Analysis	143d	21-Aug-06 A	30-Mar-07 A
SDS58780	Substructure Detailed Design	205d	19-Sep-06 A	03-Aug-07 A
SDS58800	Substructure Detailed Design Draughting	104d	02-Apr-07 A	10-Sep-07 A
SDS64100	Issue Notification Of Completion Letter- Roseburn Street Substructure Viaduct Detailed Design Package to tie for co	0d		19-Oct-07 A
SDS64110	Issue Detailed Design Package to CAT III Checker	0d		02-Apr-07 A
SDS64120	Bridge CAT III Review Period	4d	02-Apr-07 A	05-Apr-07 A
SDS64130	Receive and Incorporate CATIII Check Comments	26d	11-Sep-07 A	18-Oct-07 A
Roseburn Street Viaduct Design Package For Construction / Fabrication		0d	27-May-08	27-May-08
SDS59000	Issue Roseburn Street Viaduct Specification clauses For Construction	0d		27-May-08
S21B Murrayfield Stadium Retaining Wall (Task700.2.13)		403d	20-Oct-06 A	27-May-08
Murrayfield Stadium Retaining Wall Structure Detailed Design		286d	17-Jan-07 A	29-Feb-08
SDS57980	Retaining Wall Detailed Design	135d	17-Jan-07 A	10-Aug-07 A
SDS57990	Retaining Wall Detailed Design Draughting	205d	31-Jan-07 A	10-Dec-07 A
SDS58020	Issue Notification Of Completion Letter- Murrayfield Stadium RW Package to tie for Comments	0d		11-Dec-07 A
SDS58040	Issue Detailed Design Package to CAT II Checker	0d		07-Dec-07 A
SDS58050	Bridge CATII or CAT III Review Period	10d	07-Dec-07 A	21-Dec-07 A
SDS58110	Receive and Incorporate CATII Check Comments	42d	21-Dec-07 A	29-Feb-08
Murrayfield Stadium Retaining Wall Preliminary Design Milestones		99d	20-Oct-06 A	16-Mar-07 A
SDS57950	Update Available Base Data/Info Re Alignment/Topo Survey etc	60d	20-Oct-06 A	25-Jan-07 A
SDS57970	Retaining Wall Analysis	56d	15-Dec-06 A	16-Mar-07 A
Issue Murrayfield Stadium Retaining Wall Design Package For Construction / Fabrication		0d	27-May-08	27-May-08
SDS58190	Issue Murrayfield Stadium Retaining Wall Specification clauses For Construction	0d		27-May-08
S21C Murrayfield Underpass (Task700.2.14)		449d	31-Jul-06 A	08-May-08
Murrayfield Underpass Preliminary Design Milestones		10d	31-Jul-06 A	11-Aug-06 A
SDS58450	Update Available Base Data/Info Re Alignment/Topo Survey etc	9d	31-Jul-06 A	11-Aug-06 A
Murrayfield Underpass Superstructure Detailed Design		291d	07-Aug-06 A	26-Sep-07 A
SDS58470	Superstructure Analysis	148d	07-Aug-06 A	23-Mar-07 A
SDS58490	Superstructure Detailed Design	156d	05-Sep-06 A	07-May-07 A
SDS58520	Superstructure Detailed Design Draughting	173d	11-Dec-06 A	10-Sep-07 A
SDS58550	Issue Notification Of Completion Letter- Murrayfield Underpass Superstructure Package to tie	0d		26-Sep-07 A
SDS58570	Issue Detailed Design Package to CAT II	0d	08-Jan-07 A	
SDS58580	Bridge CATII Review Period	165d	08-Jan-07 A	17-Sep-07 A
SDS58640	Receive and Incorporate CATII Check Comments	13d	04-Sep-07 A	21-Sep-07 A
Murrayfield Underpass Design Package For Construction / Fabrication		0d	08-May-08	08-May-08
SDS58720	Issue Murrayfield Underpass Specification Clauses For Construction	0d		08-May-08
S21D Murrayfield Training Pitches Retaining Wall (Task700.2.15)		440d	20-Oct-06 A	16-Jul-08
Murrayfield Training Pitches Retaining Wall Preliminary Design Milestones		148d	20-Oct-06 A	24-May-07 A
SDS58200	Update Available Base Data/Info Re Alignment/Topo Survey etc	125d	20-Oct-06 A	07-May-07 A
SDS58220	Retaining Wall Analysis	94d	02-Jan-07 A	24-May-07 A
Murrayfield Training Pitches Retaining Wall Structure Detailed Design		299d	05-Feb-07 A	07-Apr-08
SDS58230	Retaining Wall Detailed Design	237d	05-Feb-07 A	07-Feb-08
SDS58240	Retaining Wall Detailed Design Draughting	208d	20-Mar-07 A	07-Feb-08
SDS58260	Check of Drawings (IDC)	9d	25-Mar-08	07-Apr-08
SDS58270	Issue Notification Of Completion Letter- Murrayfield Training Pitches RW Package to tie	0d		07-Apr-08
SDS58290	Issue Detailed Design Package to CAT II or CAT III Checker (as appropriate)	0d		07-Feb-08*
SDS58300	Bridge CATII or CAT III Review Period	19d	08-Feb-08	06-Mar-08
SDS58360	Receive and Incorporate CATII or CATIII Check Comments	9d	07-Mar-08	20-Mar-08
Murrayfield Training Pitches Retaining Wall Design Package For Construction / Fabrication		0d	16-Jul-08	16-Jul-08
SDS58440	Issue Murrayfield Training Pitches Retaining Wall Specification clauses For Construction	0d		16-Jul-08
S21E Water of Leith Bridge (Task700.2.16)		449d	31-Jul-06 A	08-May-08
Water of Leith Bridge Substructure Detailed Design		264d	20-Nov-06 A	03-Dec-07 A
SDS59040	Substructure Analysis	164d	20-Nov-06 A	03-Aug-07 A
SDS59060	Substructure Detailed Design	13d	08-Dec-06 A	04-Jan-07 A
SDS59080	Substructure Detailed Design Draughting	224d	18-Dec-06 A	30-Nov-07 A
SDS64970	Issue Notification Of Completion Letter- Water of Leith Bridge Detailed Design Package to tie	0d		03-Dec-07 A
SDS64980	Issue Detailed Design Package to CAT II Checker	0d		09-Jan-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Activity ID	Activity Name	Original Duration	Start	Finish
	Water of Leith Bridge Preliminary Design Milestones	120d	31-Jul-06 A	23-Jan-07 A
SDS59010	Update Available Base Data/Info Re Alignment/Topo Survey etc	113d	31-Jul-06 A	23-Jan-07 A
	Water of Leith Bridge Superstructure Detailed Design	230d	13-Nov-06 A	09-Oct-07 A
SDS59030	Superstructure Analysis	45d	13-Nov-06 A	25-Jan-07 A
SDS59050	Superstructure Detailed Design	191d	20-Nov-06 A	14-Sep-07 A
SDS59070	Superstructure Detailed Design Draughting	187d	04-Dec-06 A	21-Sep-07 A
SDS59090	Check of Drawings (IDC)	9d	24-Sep-07 A	08-Oct-07 A
SDS59100	Prepare Relevant Bridgeworks Specification Clauses	14d	18-Dec-06 A	15-Jan-07 A
SDS59110	Issue Notification Of Completion Letter- Water of Leith Bridge Detailed Design Package to tie	0d		09-Oct-07 A
SDS59130	Issue Detailed Design Package to CAT II Checker	0d		18-Dec-06 A
SDS59140	Bridge CATII Review Period	186d	19-Dec-06 A	05-Oct-07 A
SDS59220	Receive and Incorporate CATII Check Comments	13d	13-Sep-07 A	03-Oct-07 A
	Water of Leith Bridge Design Package For Construction / Fabrication	0d	08-May-08	08-May-08
SDS59280	Issue Water of Leith Bridge Specification clauses For Construction	0d		08-May-08
	S22 Balgreen Road Bridge (Task700.2.10)	648d	30-Mar-06 A	10-Oct-08
SDS53030	Collate Base Data on Alignment & Topo survey	16d	30-Mar-06 A	25-Apr-06 A
SDS53040	Define Clearances	8d	13-Apr-06 A	27-Apr-06 A
SDS53050	Develop Preliminary Structures Options	41d	13-Apr-06 A	19-Jun-06 A
SDS53060	Options Review	2d	19-Jun-06 A	20-Jun-06 A
SDS53070	Produce Draft GA (AIP) Drg Showing Preferred Option	36d	02-May-06 A	23-Jun-06 A
SDS53080	Issue Balgreen Road Bridge Draft GA (AIP) Drg to tie	0d		30-Jun-06 A
SDS53090	Select Preferred Design Option in Liaison with tie	5d	19-May-06 A	25-May-06 A
SDS53100	Update Base Data on Alignment & Topo Survey	5d	19-May-06 A	25-May-06 A
SDS53110	Draft AIP Document Text	5d	19-May-06 A	25-May-06 A
SDS53120	Update AIP GA Drgs	5d	19-May-06 A	26-May-06 A
SDS53130	Check of AIP Document	5d	19-May-06 A	25-May-06 A
SDS53140	Issue AIP Document to Technical Approval Authority (TAA) Form A	0d		30-Jun-06 A
SDS53150	Issue AIP Document to Planning Department	0d		11-Jul-06 A
SDS53160	TAA Review AIP & Comment	16d	30-Jun-06 A	24-Jul-06 A
SDS53170	Planning Department Review AIP & Comment	8d	11-Jul-06 A	21-Jul-06 A
SDS53180	Receive AIP Comments from TAA	0d		24-Jul-06 A
SDS53190	Balgreen Bridge On Hold, Possible Revisit to Design	38d	29-Sep-06 A	24-Nov-06 A
SDS53200	Incorporate AIP Comments from TAA	46d	24-Jul-06 A	29-Sep-06 A
SDS53220	Re-issue AIP to TAA	0d		24-Nov-06 A
SDS53230	TAA Review AIP	5d	27-Nov-06 A	01-Dec-06 A
SDS53240	TAA Sign Off AIP Document	0d		01-Dec-06 A
SDS53250	Issue AIP to Structures Detailed Design Team	0d		01-Dec-06 A
	Balgreen Road Bridge Superstructure Detailed Design	431d	20-Oct-06 A	03-Jul-08
SDS35710	Update Available Base Data/Info Re Alignment/Topo Survey etc	125d	20-Oct-06 A	07-May-07 A
SDS35720	Superstructure Analysis	282d	29-Nov-06 A	15-Feb-08
SDS35740	Superstructure Detailed Design	60d	14-Jan-08	14-Apr-08
SDS35760	Superstructure Detailed Design Draughting	66d	28-Jan-08	07-May-08
SDS35780	Check of Drawings (IDC)	9d	08-May-08	21-May-08
SDS35800	Issue Notification Of Completion Letter- Balgreen Road Bridge Superstructure Package to tie	0d		03-Jul-08
SDS35820	Issue Detailed Design Package to CAT II or CAT III Checker (as appropriate)	0d		07-May-08
SDS35830	Bridge CATII or CAT III Review Period	28d	08-May-08	19-Jun-08
SDS35890	Receive and Incorporate CATII or CATIII Check Comments	9d	20-Jun-08	03-Jul-08
	VO231 Balgreen Road Bridge Preliminary Design Re-Visit	329d	20-Nov-06 A	13-Mar-08
SDS61380	Receive Network Rail Acceptance	0d		20-Nov-06 A
SDS70050	Develop Preliminary Structures Options	69d	29-May-07 A	10-Sep-07 A
SDS70060	Produce Draft GA (AIP) Drg Showing Preferred Option	32d	26-Jun-07 A	10-Aug-07 A
SDS70070	Draft AIP Document Text	54d	16-Jul-07 A	04-Oct-07 A
SDS70080	Check of AIP Document	87d	11-Sep-07 A	25-Jan-08
SDS70090	Options Review	0d	20-Jul-07 A	20-Jul-07 A
SDS70110	Issue AIP Document to Technical Approval Authority (TAA) Form A	0d		25-Jan-08
SDS70120	Incorporate AIP Comments from TAA	9d	22-Feb-08	06-Mar-08
SDS70130	Receive AIP Comments from TAA	0d		21-Feb-08
SDS70140	Re-issue AIP to TAA	0d		06-Mar-08
SDS70150	TAA Review AIP	5d	07-Mar-08	13-Mar-08
SDS70160	TAA Sign Off AIP Document	0d		13-Mar-08
SDS70170	TAA Review Period	18d	28-Jan-08	21-Feb-08
SDS70180	Receive Preferred Option from tie	0d		28-Aug-07 A
	Balgreen Road Bridge Substructure Detailed Design	124d	14-Jan-08	03-Jul-08
SDS35730	Substructure Analysis	9d	14-Jan-08	25-Jan-08
SDS35750	Substructure Detailed Design	14d	28-Jan-08*	15-Feb-08
SDS35770	Substructure Detailed Design Draughting	23d	04-Feb-08*	07-Mar-08
SDS65180	Prepare Relevant Bridgeworks Specification Clauses	14d	10-Mar-08	01-Apr-08
SDS65190	Issue Notification Of Completion Letter- Balgreen Road Bridge Substructure Package to tie	0d		03-Jul-08
SDS65200	Issue Detailed Design Package to CAT II or CAT III Checker (as appropriate)	0d		07-Mar-08
SDS65210	Bridge CATII or CAT III Review Period	28d	10-Mar-08	22-Apr-08
SDS65230	Receive and Incorporate CATII or CATIII Check Comments	9d	23-Apr-08	07-May-08
	Balgreen Road Bridge Design Package For Construction / Fabrication	0d	10-Oct-08	10-Oct-08
SDS35970	Issue Balgreen Road Bridge Specification Clauses For Construction	0d		10-Oct-08
	W08 Baird Drive Retaining Wall (Task700.2.11)	591d	30-Mar-06 A	23-Jul-08
SDS53260	Collate Base Data on Alignment & Topo survey	15d	30-Mar-06 A	24-Apr-06 A
SDS53270	Define Clearances	8d	13-Apr-06 A	26-Apr-06 A
SDS53280	Develop Preliminary Structures Options	9d	13-Apr-06 A	28-Apr-06 A
SDS53290	Options Review	5d	02-May-06 A	08-May-06 A
SDS53300	Produce Draft GA (AIP) Drg Showing Preferred Option	9d	02-May-06 A	15-May-06 A
SDS53310	Issue Baird Drive RW Draft GA (AIP) Drg to tie	0d		22-May-06 A
SDS53320	Select Preferred Design Option in Liaison with tie	7d	16-May-06 A	24-May-06 A
SDS53330	Update Base Data on Alignment & Topo Survey	4d	16-May-06 A	19-May-06 A
SDS53340	Draft AIP Document Text	10d	16-May-06 A	31-May-06 A
SDS53350	Update AIP GA Drgs	9d	01-Jun-06 A	14-Jun-06 A
SDS53360	Check of AIP Document	3d	19-May-06 A	24-May-06 A
SDS53370	Issue AIP Document to Technical Approval Authority (TAA) Form A	0d		14-Jun-06 A
SDS53380	Issue AIP Document to Planning Department	0d		14-Jun-06 A
SDS53390	TAA Review AIP & Comment	48d	19-Jun-06 A	29-Aug-06 A
SDS53410	Receive AIP Comments from TAA	0d		01-Sep-06 A
SDS53430	Incorporate AIP Comments from TAA	9d	01-Sep-06 A	14-Sep-06 A
SDS53440	Incorporate AIP Comments from Planning Department	20d	16-Aug-06 A	14-Sep-06 A
SDS53450	Re-issue AIP to TAA	0d		28-Jan-08*
SDS53460	TAA Review AIP	14d	28-Jan-08	15-Feb-08
SDS53470	TAA Sign Off AIP Document	0d		15-Feb-08
SDS53480	Issue AIP to Structures Detailed Design Team	0d		15-Feb-08
SDS68310	Baird Drive On Hold, Possible Revisit to Design	153d	29-Sep-06 A	29-May-07 A
	Baird Drive Retaining Wall Preliminary Design Milestones	31d	22-Nov-06 A	12-Jan-07 A
SDS35410	Retaining Wall Analysis	30d	22-Nov-06 A	12-Jan-07 A
	Baird Drive Retaining Wall Structure Detailed Design	373d	20-Oct-06 A	14-Apr-08
SDS35400	Update Available Base Data/Info Re Alignment/Topo Survey etc	125d	20-Oct-06 A	07-May-07 A
SDS35430	Retaining Wall Detailed Design	47d	03-Dec-07 A	18-Feb-08
SDS35460	Retaining Wall Detailed Design Draughting	47d	03-Dec-07 A	18-Feb-08
SDS35480	Check of Drawings (IDC)	8d	02-Apr-08	14-Apr-08



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

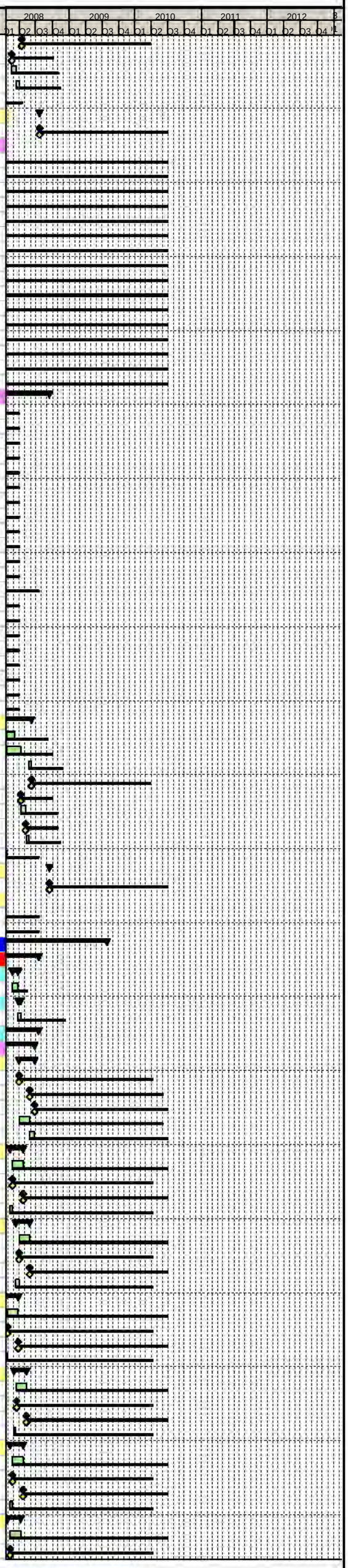
Trams for Edinburgh ...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS35490	Issue Notification Of Completion Letter- Baird Drive Retaining Wall Package to tie	0d		14-Apr-08
SDS35510	Issue Detailed Design Package to CAT II or CAT III Checker (as appropriate)	0d		18-Feb-08
SDS35520	Bridge CATII or CAT III Review Period	19d	19-Feb-08	17-Mar-08
SDS35580	Receive and Incorporate CATII or CATIII Check Comments	9d	17-Mar-08	01-Apr-08
SDS81290	Delay due to VO231 Balgreen Road Redesign	139d	08-May-07 A	03-Dec-07 A
Baird Drive Retaining Wall Design Package For Construction / Fabrication		0d	23-Jul-08	23-Jul-08
SDS35660	Issue Baird Drive Retaining Wall Specification clauses For Construction	0d		23-Jul-08
W07 Balgreen Road Retaining Wall One (Task700.2.12)		122d	30-Mar-06 A	15-Sep-06 A
SDS53490	Collate Base Data on Alignment & Topo survey	19d	30-Mar-06 A	28-Apr-06 A
SDS53500	Define Clearances	5d	02-May-06 A	08-May-06 A
SDS53510	Develop Preliminary Structures Options	18d	02-May-06 A	26-May-06 A
SDS53520	Options Review	5d	30-May-06 A	05-Jun-06 A
SDS53530	Produce Draft GA (AIP) Drg Showing Preferred Option	12d	12-May-06 A	31-May-06 A
SDS53540	Issue Balgreen Rd RW1 Draft GA (AIP) Drg to tie	0d		31-May-06 A
SDS53550	Select Preferred Design Option in Liaison with tie	5d	01-Jun-06 A	07-Jun-06 A
SDS53560	Update Base Data on Alignment & Topo Survey	2d	01-Jun-06 A	02-Jun-06 A
SDS53570	Draft AIP Document Text	5d	01-Jun-06 A	07-Jun-06 A
SDS53580	Update AIP GA Drgs	8d	06-Jun-06 A	15-Jun-06 A
SDS53590	Check of AIP Document	2d	08-Jun-06 A	09-Jun-06 A
SDS53600	Issue AIP Document to Technical Approval Authority (TAA) Form A	0d		15-Jun-06 A
SDS53610	Issue AIP Document to Planning Department	0d		15-Jun-06 A
SDS53620	TAA Review AIP & Comment	51d	19-Jun-06 A	01-Sep-06 A
SDS53640	Receive AIP Comments from TAA	0d		02-Sep-06 A
SDS53660	Incorporate AIP Comments from TAA	21d	16-Aug-06 A	15-Sep-06 A
W09 Balgreen Road Retaining Wall (Task700.2.12)		629d	30-Mar-06 A	15-Sep-08
SDS53720	Collate Base Data on Alignment & Topo survey	19d	30-Mar-06 A	28-Apr-06 A
SDS53730	Define Clearances	5d	02-May-06 A	08-May-06 A
SDS53740	Develop Preliminary Structures Options	18d	02-May-06 A	26-May-06 A
SDS53750	Options Review	5d	30-May-06 A	05-Jun-06 A
SDS53760	Produce Draft GA (AIP) Drg Showing Preferred Option	8d	30-May-06 A	09-Jun-06 A
SDS53770	Issue Balgreen Rd RW2 Draft GA (AIP) Drg to tie	0d		09-Jun-06 A
SDS53780	Select Preferred Design Option in Liaison with tie	5d	12-Jun-06 A	16-Jun-06 A
SDS53790	Update Base Data on Alignment & Topo Survey	2d	12-Jun-06 A	13-Jun-06 A
SDS53800	Draft AIP Document Text	5d	12-Jun-06 A	16-Jun-06 A
SDS53810	Update AIP GA Drgs	2d	15-Jun-06 A	16-Jun-06 A
SDS53820	Check of AIP Document	1d	16-Jun-06 A	16-Jun-06 A
SDS53830	Issue AIP Document to Technical Approval Authority (TAA) Form A	0d		16-Jun-06 A
SDS53840	Issue AIP Document to Planning Department	0d		16-Jun-06 A
SDS53850	TAA Review AIP & Comment	51d	19-Jun-06 A	01-Sep-06 A
SDS53870	Receive AIP Comments from TAA	0d		01-Sep-06 A
SDS53890	Incorporate AIP Comments from TAA	9d	01-Sep-06 A	14-Sep-06 A
SDS53910	Re-issue AIP to TAA	0d		24-Nov-06 A
SDS53920	TAA Review AIP	5d	27-Nov-06 A	01-Dec-06 A
SDS53930	TAA Sign Off AIP Document	0d		01-Dec-06 A
SDS53940	Issue AIP to Structures Detailed Design Team	0d		01-Dec-06 A
SDS68320	Baird Drive On Hold, Possible Revisit to Design	38d	29-Sep-06 A	24-Nov-06 A
Balgreen Road Retaining Wall Structure Detailed Design		361d	10-Jan-07 A	06-Jun-08
SDS51160	Retaining Wall Detailed Design	275d	10-Jan-07 A	10-Mar-08
SDS51170	Retaining Wall Detailed Design Draughting	52d	22-Jan-08	09-Apr-08
SDS51190	Check of Drawings (IDC)	9d	23-May-08	06-Jun-08
SDS51200	Issue Notification Of Completion Letter- Balgreen Road Retaining Wall Package to tie	0d		06-Jun-08
SDS51220	Issue Detailed Design Package to CAT II or CAT III Checker (as appropriate)	0d		09-Apr-08
SDS51230	Bridge CATII or CAT III Review Period	19d	10-Apr-08	08-May-08
SDS51260	Receive CATII or CATIII Check Comments	0d		08-May-08
SDS51290	Receive and Incorporate CATII or CATIII Check Comments	9d	09-May-08	22-May-08
SDS81300	Delay due to VO231 Balgreen Road Redesign	166d	08-May-07 A	21-Jan-08
Balgreen Road Retaining Wall Design Package For Construction / Fabrication		0d	15-Sep-08	15-Sep-08
SDS51370	Issue Balgreen Road Retaining Wall Specification clauses For Construction	0d		15-Sep-08
Balgreen Road Retaining Wall Preliminary Design Milestones		134d	20-Oct-06 A	07-May-07 A
SDS40440	Update Available Base Data/Info Re Alignment/Topo Survey etc	125d	20-Oct-06 A	07-May-07 A
SDS51150	Retaining Wall Analysis	19d	05-Dec-06 A	09-Jan-07 A
BAR - EDP - Section 5B (Task700.3)		986d	19-Sep-05 A	28-Jul-09
Sub Section Wide		604d	07-Mar-06 A	17-Jul-08
Sub Section Wide IDC		22d	25-Feb-08	25-Mar-08
A40521	Subsection Wide IDC	21d	25-Feb-08	25-Mar-08
Design Assurance Review		10d	28-Mar-08	10-Apr-08
SDS68030	Produce Design Assurance Statement	9d	28-Mar-08	10-Apr-08
Consents & Approvals		359d	22-Feb-07 A	17-Jul-08
Prior Approvals		308d	09-Apr-07 A	24-Jun-08
Combined Section Prior Approval		60d	01-Apr-08	24-Jun-08
A25790	Issue Combined Package 5B for Prior Approval to CEC	0d		01-Apr-08
A25800	Receive Combined Package 5B Comments From CEC	0d		27-May-08
A25820	Prior Approval Granted for Section 5B Combined Package	0d		24-Jun-08
A40600	CEC Approval Period - 5B Combined Package	38d	01-Apr-08	27-May-08
A40610	Update5B Combined Package to CEC Comments	19d	27-May-08	24-Jun-08
Batch 5/11		52d	08-Feb-08	22-Apr-08
SDS76080	Batch 5/11 Formal Approval Period	38d	22-Feb-08	21-Apr-08
SDS76090	Issue Batch 5/11 For Approval to CEC	0d	22-Feb-08	
SDS76100	Receive CEC Prior Approval For Batch 5/11	0d	22-Apr-08	
SDS76130	Batch 5/11 Balgreen Road to Carrick Knowe - Collation of Planning Drawings	9d	08-Feb-08*	21-Feb-08
Batch 5/12		54d	14-Mar-08	29-May-08
SDS75660	Batch 5/12 Formal Approval Period	38d	01-Apr-08	28-May-08
SDS75670	Issue Batch 5/12 For Approval to CEC	0d	01-Apr-08	
SDS75680	Receive CEC Prior Approval For Batch 5/12	0d	29-May-08	
SDS75710	Batch 5/12 Carrick Knowe Bridge - Collation of Planning Drawings	9d	14-Mar-08	31-Mar-08
Batch 5/14		52d	14-Jan-08	26-Mar-08
SDS75720	Batch 5/14 Formal Approval Period	38d	28-Jan-08	25-Mar-08
SDS75730	Issue Batch 5/14 For Approval to CEC	0d	28-Jan-08	
SDS75740	Receive CEC Prior Approval For Batch 5/14	0d	26-Mar-08	
SDS75770	Batch 5/14 Saughton Tramstop and Broomhouse Drive - Collation of Planning Drawings	9d	14-Jan-08	25-Jan-08
Batch 5/15		50d	03-Mar-08	12-May-08
SDS75780	Batch 5/15 Formal Approval Period	35d	17-Mar-08	09-May-08
SDS75790	Issue Batch 5/15 For Approval to CEC	0d	17-Mar-08	
SDS75800	Receive CEC Prior Approval For Batch 5/15	0d	12-May-08	
SDS75830	Batch 5/15 Bankhead Tramstop - Collation of Planning Drawings	9d	03-Mar-08*	14-Mar-08
Batch 5/16		52d	08-Feb-08	22-Apr-08
SDS75840	Batch 5/16 Formal Approval Period	38d	22-Feb-08	21-Apr-08
SDS75850	Issue Batch 5/16 For Approval to CEC	0d	22-Feb-08	
SDS75860	Receive CEC Prior Approval For Batch 5/16	0d	22-Apr-08	
SDS75890	Batch 5/16 Edinburgh Park Station Tramstop - Collation of Planning Drawings	9d	08-Feb-08*	21-Feb-08
Batch 5/17		52d	29-Jan-08	10-Apr-08
SDS75900	Batch 5/17 Formal Approval Period	38d	12-Feb-08	09-Apr-08
SDS75910	Issue Batch 5/17 For Approval to CEC	0d	12-Feb-08	



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

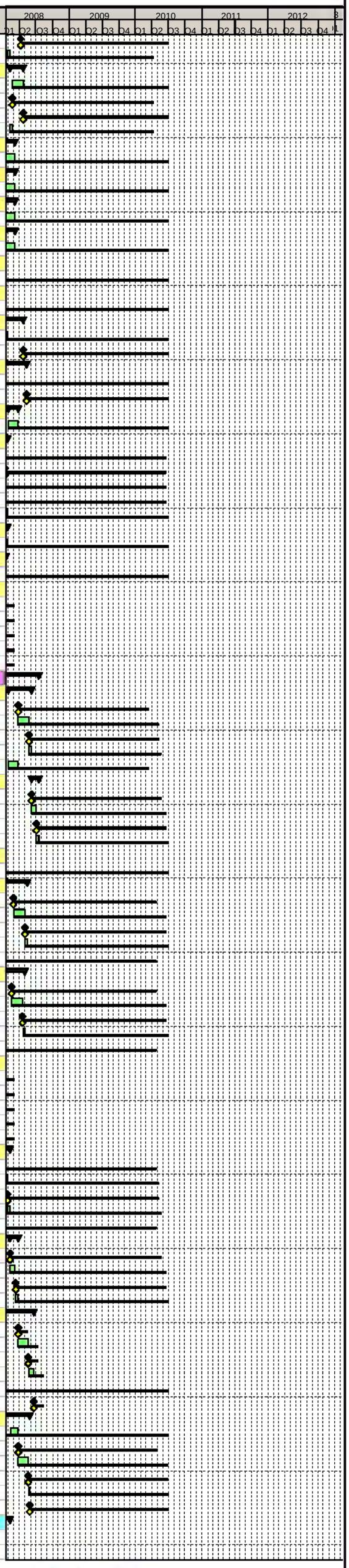
Trams for Edinburgh
connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS75920	Receive CEC Prior Approval For Batch 5/17	0d	10-Apr-08	
SDS75950	Batch 5/17 Edinburgh Park Station Bridge - Collation of Planning Drawings	9d	29-Jan-08*	11-Feb-08
Batch 5/18		52d	08-Feb-08	22-Apr-08
SDS75960	Batch 5/18 Formal Approval Period	38d	22-Feb-08	21-Apr-08
SDS75970	Issue Batch 5/18 For Approval to CEC	0d	22-Feb-08	
SDS75980	Receive CEC Prior Approval For Batch 5/18	0d	22-Apr-08	
SDS76010	Batch 5/18 Edinburgh Park Central tramstop - Collation of Planning Drawings	9d	08-Feb-08*	21-Feb-08
Roads, Track, OLE, Landscaping, Street Lighting		40d	14-Jan-08	07-Mar-08
SDS30090	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	14-Jan-08	07-Mar-08
Tram Stop Balgreen		40d	14-Jan-08	07-Mar-08
A40770	Informal Consultation With CEC & tie over Prior Approval Tram Stop Balgreen	38d	14-Jan-08	07-Mar-08
Tram Stop Saughton		40d	14-Jan-08	07-Mar-08
A40800	Informal Consultation With CEC & tie over Prior Approval Tram Stop Saugton	38d	14-Jan-08	07-Mar-08
Tram Stop Bankhead		40d	14-Jan-08	07-Mar-08
A40830	Informal Consultation With CEC & tie over Prior Approval Tram Stop Bankhead	38d	14-Jan-08	07-Mar-08
Tram Stop Edinburgh Park Station		72d	17-May-07 A	24-Aug-07 A
A40860	Informal Consultation With CEC & tie over Prior Approval Tram Stopn Edinburgh Park Station	67d	17-May-07 A	24-Aug-07 A
Tram Stop Edinburgh Park Central		41d	17-May-07 A	12-Jul-07 A
A40890	Informal Consultation With CEC & tie over Prior Approval Tram Stop Edinburgh Park Central	38d	17-May-07 A	12-Jul-07 A
Tram Jenners Depository Substation		120d	29-Oct-07 A	23-Apr-08
A41260	Informal Consultation With CEC & tie over Prior Approval Tram Jenners Depository Substation	55d	29-Oct-07 A	25-Jan-08
A41270	Prior Approval Tram Jenners Depository Substation	0d		23-Apr-08
Tram Bankhead Drive Substation		277d	10-Apr-07 A	12-May-08
A41280	Informal Consultation With CEC & tie over Prior Approval Tram Bankhead Drive Substation	178d	10-Apr-07 A	14-Jan-08
A41290	Prior Approval Tram Bankhead Drive Substation	0d		12-May-08
Carrick Knowe Superstructure		40d	01-Feb-08	27-Mar-08
447	Commence Carrick Knowe Superstructure Informal Consultation With CEC & tie Over Prior Approval	38d	01-Feb-08	27-Mar-08
Saughton Road Assessment		182d	08-May-07 A	25-Jan-08
336	Issue Saughton Road Assessment Report to CEC	0d	02-Jul-07 A	
428	Receive Saughton Road Assessment Report comments from CEC	0d	14-Jan-08	
457	CEC Saughton Road Assessment Report Review Period	125d	02-Jul-07 A	14-Jan-08
467	Commence Saughton Road Informal Consultation With CEC & tie Over Prior Approval	17d	08-May-07 A	01-Jun-07 A
489	Incorporate CEC comments into Saughton Road Assessment Report	9d	14-Jan-08	25-Jan-08
South Gyle Access Road Bridge Superstructure		58d	29-Oct-07 A	25-Jan-08
SDS65540	Commence South Gyle Access Road Bridge Informal Consultation With CEC & tie Over Prior Approval	55d	29-Oct-07 A	25-Jan-08
Bankhead Drive Retaining Wall		40d	14-Nov-07 A	18-Jan-08
SDS64560	Commence Bankhead Drive RW Informal Consultation With CEC & tie Over Prior Approval	39d	14-Nov-07 A	18-Jan-08
Broomhouse Road Assessment		39d	09-Apr-07 A	01-Jun-07 A
320	Receive Broomhouse Road Assessment Report comments from CEC	0d	18-May-07 A	
331	Incorporate CEC comments into Broomhouse Road Assessment Report	9d	18-May-07 A	01-Jun-07 A
458	Issue Broomhouse Road Assessment Report to CEC	0d	27-Apr-07 A	
519	CEC Broomhouse Road Assessment Report Review Period	13d	27-Apr-07 A	17-May-07 A
529	Commence Broomhouse Road Informal Consultation With CEC & tie Over Prior Approval	13d	09-Apr-07 A	27-Apr-07 A
Technical Approvals		359d	22-Feb-07 A	17-Jul-08
Carrick Knowe Review Period (TAA)		90d	01-Feb-08	05-Jun-08
236	Issue Carrick Knowe Superstructure Design Package to TAA	0d	28-Mar-08	
237	TAA Carrick Knowe Superstructure Design Package Review Period	38d	28-Mar-08	22-May-08
238	Receive Carrick Knowe Superstructure Design Package comments from TAA	0d	23-May-08	
239	Incorporate TAA comments into Carrick Knowe Superstructure Design Package	9d	23-May-08	05-Jun-08
257	Commence Carrick Knowe Superstructure Informal Consultation With CEC Over Technical Approval	38d	01-Feb-08	27-Mar-08
Carrick Knowe Review Period (Network Rail)		30d	06-Jun-08	17-Jul-08
241	Issue Design and Check Certificate to Network Rail For Comment	0d	06-Jun-08	
242	Network Rail Comment Period	19d	06-Jun-08	03-Jul-08
243	Receive Superstructure Design Package comments from Network Rail	0d	04-Jul-08	
244	Incorporate Network Rail comments into Superstructure Design Package	9d	04-Jul-08	17-Jul-08
Saughton Road Assessment Review Period (TAA)		43d	09-Mar-07 A	08-May-07 A
297	Commence Saughton Road Informal Consultation With CEC Over Technical Approval	38d	09-Mar-07 A	08-May-07 A
South Gyle Access Road Bridge Review (TAA)		313d	22-Feb-07 A	14-May-08
SDS36080	Issue South Gyle Access Road Bridge Detailed Design Package to TAA	0d		29-Feb-08
SDS36110	TAA Approval Period	38d	03-Mar-08	29-Apr-08
SDS36150	Receive TAA Comments	0d		29-Apr-08
SDS36180	Incorporate TAA Comments	9d	30-Apr-08	14-May-08
SDS62980	Commence South Gyle Access Road Bridge Informal Consultation With CEC Over Technical Approval	38d	22-Feb-07 A	20-Apr-07 A
Bankhead Drive Retaining Wall Structure Review (TAA)		190d	02-Aug-07 A	02-May-08
SDS57220	Issue Bankhead Drive RW Detailed Design Package to TAA	0d		20-Feb-08
SDS57250	TAA Approval Period	38d	21-Feb-08	18-Apr-08
SDS57290	Receive TAA Comments	0d		18-Apr-08
SDS57320	Incorporate TAA Comments	9d	21-Apr-08	02-May-08
SDS62990	Commence Bankhead Drive RW Informal Consultation With CEC Over Technical Approval	103d	02-Aug-07 A	14-Jan-08
Broomhouse Road Assessment Review Period (TAA)		39d	09-Apr-07 A	01-Jun-07 A
308	Issue Broomhouse Road Assessment Report to TAA	0d	27-Apr-07 A	
309	TAA Broomhouse Road Assessment Report Review Period	13d	27-Apr-07 A	17-May-07 A
310	Receive Broomhouse Road Assessment Report comments from TAA	0d	18-May-07 A	
311	Incorporate TAA comments into Broomhouse Road Assessment Report	9d	18-May-07 A	01-Jun-07 A
469	Commence Broomhouse Road Informal Consultation With CEC Over Technical Approval	13d	09-Apr-07 A	27-Apr-07 A
Edinburgh Park Station Viaduct Review Period (TAA)		87d	03-Oct-07 A	11-Feb-08
72	Issue Edinburgh Park Station Superstructure Design Package to TAA	0d	23-Nov-07 A	
73	TAA Edinburgh Park Station Superstructure Design Package Review Period	38d	26-Nov-07 A	28-Jan-08
74	Receive Edinburgh Park Station Superstructure Design Package comments from TAA	0d	29-Jan-08	
75	Incorporate TAA comments into Edinburgh Park Station Superstructure Design Package	9d	29-Jan-08	11-Feb-08
93	Commence Edinburgh Park Station Superstructure Informal Consultation With CEC Over Technical Approval	36d	03-Oct-07 A	23-Nov-07 A
Edinburgh Park Station Viaduct Review Period (Network Rail)		30d	12-Feb-08	24-Mar-08
77	Issue Design and Check Certificate to Network Rail For Comment	0d	12-Feb-08	
78	Network Rail Comment Period	19d	12-Feb-08	10-Mar-08
79	Receive Superstructure Design Package comments from Network Rail	0d	11-Mar-08	
80	Incorporate Network Rail comments into Superstructure Design Package	9d	11-Mar-08	24-Mar-08
Roads Technical Approval		311d	03-Apr-07 A	19-Jun-08
SDS30100	Issue Roads Design to Roads Authority for Approval	0d		25-Mar-08
SDS30110	Roads Authority Approval Period	38d	26-Mar-08	21-May-08
SDS30120	Receive Roads Authority Comments	0d		21-May-08
SDS30130	Update to Roads Authority Comments	19d	22-May-08	19-Jun-08
SDS30140	Roads Authority Informal Consultation	38d	03-Apr-07 A	01-Jun-07 A
SDS30210	Roads Technical Approval Granted	0d		19-Jun-08
Drainage Technical Approval		110d	19-Dec-07 A	29-May-08
SDS72840	Roads Authority Informal Consultation For Drainage	58d	19-Dec-07 A	25-Mar-08
SDS72850	Issue Drainage Design to Roads Authority for Approval	0d		25-Mar-08
SDS72860	Roads Authority Approval Period For Drainage	38d	26-Mar-08	21-May-08
SDS72870	Receive Roads Authority Comments For Drainage	0d		21-May-08
SDS72880	Update to Roads Authority Comments For Drainage	5d	22-May-08	29-May-08
SDS72890	Drainage Technical Approval Granted	0d		29-May-08
Track (Task700.3.1)		480d	21-Mar-06 A	08-Feb-08
A3640	First Pass Mx Horizontal and Vertical Alignment	15d	21-Mar-06 A	11-Apr-06 A
A3650	Handover Alignment Design P Way to Roads	0d		12-Apr-06 A



Primary Baseline
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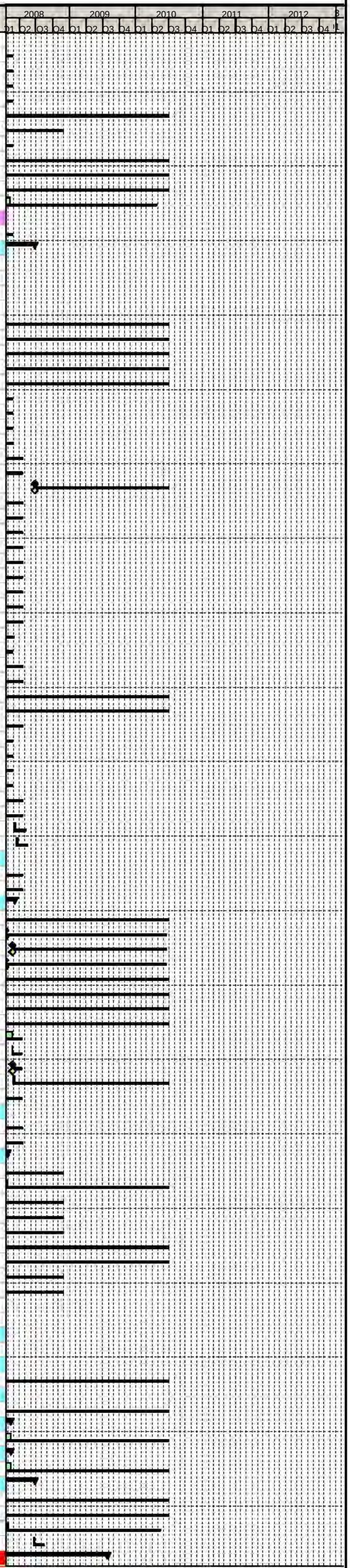
SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
A3660	Coordination Meeting/Workshop Between PWay/Roads & Resolution of Major Conflicts	1d	12-Apr-06 A	12-Apr-06 A
SDS29810	Revise Alignment to Match Roads First Pass Vertical	1d	09-Feb-07 A	09-Feb-07 A
SDS29860	Handover Alignment Design Track to Roads	0d		13-Feb-07 A
SDS30230	Revise Alignment to Inc. Preliminary Design Comments	113d	06-Jul-06 A	22-Dec-06 A
SDS30250	Handover Alignment Design Track to Roads	0d		22-Dec-06 A
SDS57100	Issue Track Alignment Design to tie Section 5B	0d		23-Mar-07 A
SDS59600	IDC Track Design	7d	13-Mar-07 A	21-Mar-07 A
SDS60990	Revise Track Alignment to Inc. Modelling Changes	4d	15-Jan-07 A	18-Jan-07 A
SDS70500	tie Approval Period	19d	26-Mar-07 A	24-Apr-07 A
SDS70510	Receive tie Comments	0d	20-Apr-07 A	
SDS70520	Incorporate tie Comments	1d	04-May-07 A	05-May-07 A
SDS75160	Address tie Comments, NR Accom, Other Revisions, IDC & Section Submission Package	120d	06-Aug-07 A	08-Feb-08
VO44 NEL Proposed Development Levels		6d	01-Sep-06 A	08-Sep-06 A
SDS73080	Amend 5B Alignment in NEL area	6d	01-Sep-06 A	08-Sep-06 A
Roads, Street Lighting & Landscaping (Task700.3.2)		586d	07-Mar-06 A	24-Jun-08
A3670	Route Appreciation/Junct Layout & Determine with tie & CEC Works Extent	35d	16-Mar-06 A	10-May-06 A
A3680	Frontage Surveys	30d	07-Mar-06 A	21-Apr-06 A
A3690	Set Up Mx Models	1d	10-May-06 A	10-May-06 A
A3700	Produce Preliminary Horizontal Road Alignment Design (Inc Lanes & Parking Zones)	11d	11-May-06 A	26-May-06 A
A3710	Preliminary Road Safety Audit	1d	30-Jun-06 A	30-Jun-06 A
A3720	Review & Amend TRO Drawings & Schedules for Modifications Required Post Prelim Design	3d	12-Jun-06 A	14-Jun-06 A
A3730	Handover Alignment Design Roads to Pway	0d		30-Jun-06 A
A3740	Coordination Meeting/Workshop Between Roads & Pway Teams	1d	30-Jun-06 A	30-Jun-06 A
A5560	Undertake Road Marking, Pedestrian Req & Traffic Signalling Design	5d	30-May-06 A	05-Jun-06 A
SDS29820	Produce First Pass Vertical Alignment	3d	31-Jan-07 A	02-Feb-07 A
SDS29840	Handover Alignment Design Roads to Pway	0d		08-Feb-07 A
SDS29870	Revise Vertical Alignment to Match Final Track Alignment	2d	01-Feb-07 A	02-Feb-07 A
SDS29880	Horizontal & Vertical Alignment Design Complete	0d		02-Feb-07 A
SDS29890	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 5B	0d		01-Jun-07 A
SDS29900	Cross Check all Horizontal Design Aspects With Vertical Alignment	2d	01-Feb-07 A	02-Feb-07 A
SDS29940	Issue Construction Drawings	0d		24-Jun-08
SDS29950	Road Safety Audit Stage 2 (Intermediate)	9d	19-Apr-07 A	02-May-07 A
SDS29960	Insert Intermediate RSA Comments	10d	17-May-07 A	01-Jun-07 A
SDS29970	Produce Site Clearance Drawings & Schedule	4d	31-Jan-07 A	05-Feb-07 A
SDS29980	Produce Fencing, Barriers & Guardrails Design	3d	31-Jan-07 A	02-Feb-07 A
SDS29990	Produce Street Lighting Design (& Liaise With OLE)	82d	09-Feb-07 A	15-Jun-07 A
SDS30000	Produce Traffic Signal Only Ducting	6d	01-Mar-07 A	08-Mar-07 A
SDS30010	Produce Soft Landscaping Design	9d	18-May-07 A	01-Jun-07 A
SDS30020	Produce Traffic Signals Layout	2d	31-Jan-07 A	01-Feb-07 A
SDS30030	Produce Traffic Signs Design (Signs, Markings, Signals)	2d	01-Feb-07 A	02-Feb-07 A
SDS30040	Produce Earthworks Design	88d	13-Aug-07 A	21-Dec-07 A
SDS30260	Revise Alignment to Inc. Final Track Horizontal Alignment (Horizontal Design Freeze) & Issue to Substn Designers	9d	17-Jan-07 A	30-Jan-07 A
SDS30270	Produce Kerbs, Footway & Paved Area Design	2d	01-Feb-07 A	02-Feb-07 A
SDS30280	Produce Pavement Design	56d	08-May-07 A	31-Jul-07 A
SDS56610	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 5B	0d		25-Jun-07 A
SDS56850	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 5B	0d		19-Jun-07 A
SDS59380	Compile Planning Drawings	6d	24-May-07 A	01-Jun-07 A
SDS59810	Advise Track, Stops, Modellers Changes To Accom RSA1 & PD Comments	7d	05-Dec-06 A	13-Dec-06 A
SDS59820	Pass Guidance/Envelope To Track & Others As Necessary	0d		13-Dec-06 A
SDS61000	Revise Horizontal to Inc. Track Horizontal Alignment, RSA1 & PD Comments	6d	22-Dec-06 A	08-Jan-07 A
SDS61010	Revise Alignment to Inc. Minor Changes From Traffic Modelling	6d	08-Jan-07 A	15-Jan-07 A
SDS67190	Street Lighting Survey Work	60d	03-Jul-06 A	29-Sep-06 A
SDS69710	Produce Hard Landscaping Design	50d	10-Apr-07 A	25-Jun-07 A
SDS80080	Final RSA	9d	03-Mar-08	14-Mar-08
SDS80090	Incorporate Final RSA Comments	5d	17-Mar-08	25-Mar-08
VO222 Subsection 5B Edinburgh Park Bus Stop		35d	16-Apr-07 A	01-Jun-07 A
SDS73670	Amendment of Tram Stop Design to Accomodate Late Requirement from CEC/TEL	31d	16-Apr-07 A	01-Jun-07 A
SDS73680	Amendment of Roads Design to Accomodate Late Requirement from CEC/TEL	31d	16-Apr-07 A	01-Jun-07 A
Drainage		254d	12-Mar-07 A	10-Mar-08
SDS71870	Hydraulic Modelling & First Pass Drainage Design	57d	12-Mar-07 A	08-Jun-07 A
SDS71880	Receipt of Drainage Survey Information	0d	14-Jan-08*	
SDS71890	Outfall Consent/Approval from SW	0d		25-Feb-08*
SDS71900	Outfall Consent/Approval from CEC	0d		14-Jan-08*
SDS71910	Outfall Consent/Approval from SEPA	0d		10-May-07 A
SDS71920	Compile Drainage Package	6d	12-Sep-07 A	19-Sep-07 A
SDS71930	Issue Drainage Design Completion Letter to tie for Approval Section 5B	0d		27-Sep-07 A
SDS73260	Final Detailed Drainage Design	49d	29-Jun-07 A	11-Sep-07 A
SDS80560	Final Detailed Drainage Design	64d	12-Nov-07 A	21-Feb-08
SDS80570	Compile Drainage Package	1d	22-Feb-08	22-Feb-08
SDS80580	Issue Drainage Design Completion Letter to tie for Approval Section 5B	0d		22-Feb-08
SDS80590	Confirm Drainage and Amend if Required	9d	26-Feb-08	10-Mar-08
SDS80970	Receipt of WEBS System Inputs	0d		10-Dec-07 A
Boundary & Accomodation Works (Task700.3.3)		91d	26-Mar-07 A	30-Jul-07 A
SDS42430	Detailed Design of Boundary & Accomodation Works	82d	26-Mar-07 A	30-Jul-07 A
SDS42440	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 5B	0d		30-Jul-07 A
Utilities (Task700.3.4)		476d	13-Mar-06 A	25-Jan-08
A12420	Close Out PD Issues and Re-issue PD Drawings to SUCs	23d	14-Aug-06 A	18-Sep-06 A
A12430	Design Development	330d	29-Aug-06 A	25-Jan-08
A12440	Initial Consultations With SUCs and IDTs	38d	29-Aug-06 A	23-Oct-06 A
A12450	Access to MUDFA and Others	113d	04-Oct-06 A	29-Mar-07 A
A12470	IDC	10d	15-Mar-07 A	29-Mar-07 A
A12480	Issue DD to SUC For Approval	0d		29-Mar-07 A
A12490	SUC Approval Period	96d	30-Mar-07 A	27-Aug-07 A
SDS67170	Consult With SUCs on DD	113d	04-Oct-06 A	29-Mar-07 A
SDS67180	MDFA Appointment	0d		03-Oct-06 A
UTIL1300	Issue to Statutory Utility Companies (SUCs)	0d		30-Jun-06 A
UTIL140	Section 5B - Pre-Preliminary Design (Utilities)	71d	13-Mar-06 A	30-Jun-06 A
OLE		2d	19-Jun-06 A	20-Jun-06 A
A4180	Preliminary Review of OLE Pole Positioning for Utility Survey Scope Definition	2d	19-Jun-06 A	20-Jun-06 A
VO255 OLE Rework for Section 5B (Internal)		15d	10-Sep-07 A	28-Sep-07 A
A487218	OLE Rework for Section 5B	14d	10-Sep-07 A	28-Sep-07 A
VO263 OLE Rework at Balgreen Turnback Siding (Internal)		5d	24-Sep-07 A	28-Sep-07 A
A487238	OLE Rework Due to Track Changes	5d	24-Sep-07 A	28-Sep-07 A
VO266 OLE Rework at Carrick Knowe (Internal - Not PM Approved)		25d	14-Jan-08	15-Feb-08
A487258	OLE Rework Due to Track Changes	23d	14-Jan-08	15-Feb-08
VO267 OLE Pole Loading at Carrick Knowe (Internal - Not PM Approved)		25d	14-Jan-08	15-Feb-08
A487268	OLE Rework Due to Tack Changes	23d	14-Jan-08	15-Feb-08
TRO's		570d	01-Apr-06 A	26-Jun-08
SDS33710	Collate Exisiting TROs	65d	01-Apr-06 A	12-Jul-06 A
SDS33720	Receive Preliminary Roads Design	0d		12-Jul-06 A
SDS82090	Interim TRO Design Section 5B	5d	28-Jan-08*	01-Feb-08
SDS82100	Final TRO Design Section 5B	5d	20-Jun-08	26-Jun-08
BAR - SRN		986d	19-Sep-05 A	28-Jul-09



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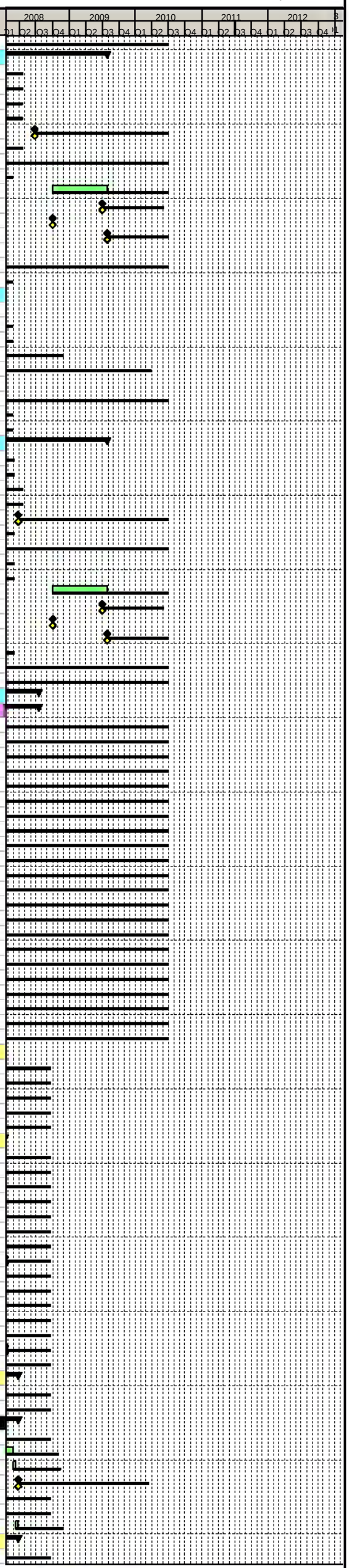
SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
CON-0790	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Balgreen (Task700.3.5)		815d	16-May-06 A	28-Jul-09
A26700	Prepare Tram Stop Planning Submission Drawings for Issue to Planning Drawings Team	87d	07-Aug-07 A	14-Dec-07 A
A26710	Produce Engineering Detailed Design Drawings	10d	03-Dec-07 A	17-Dec-07 A
A26720	Compile Planning Drawings Tram Stop Balgreen	8d	10-Dec-07 A	19-Dec-07 A
A26740	Issue Notification Of Completion Letter- Balgreen Tram Stop Design to tie	0d		19-Dec-07 A
A26760	Tram Stop Design Complete - Drawings Issued for Construction	0d		24-Jun-08
A27620	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
A28220	Addressing PD Comments	3d	20-Sep-06 A	22-Sep-06 A
A44920	Prepare Detailed Design Stop Drawings	104d	06-Jul-07 A	10-Dec-07 A
A47980	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A47990	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A48040	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A48050	Issue Final As Built Drawings	0d		28-Jul-09
A4960	General Arrangement Drawings	19d	16-May-06 A	13-Jun-06 A
A5730	Issue Tram Stop GA Drawings for Balgreen Road	0d		30-Jun-06 A
SDS81310	Delay due to VO231 Balgreen Road Redesign	137d	08-May-07 A	29-Nov-07 A
Tram Jenners Depository Substation (Task700.3.9)		417d	08-May-06 A	20-Dec-07 A
A549030	Preliminary Design of Substation	21d	08-May-06 A	05-Jun-06 A
A549780	Detailed Design Civils	215d	23-Jan-07 A	14-Dec-07 A
A549790	Detailed Architecture Design	215d	23-Jan-07 A	14-Dec-07 A
A549800	IDC on Detailed Design (Inc. Systems Assurance)	4d	17-Dec-07 A	20-Dec-07 A
A549810	Issue Notification Of Completion Letter- Tram Jenner's Depository Substation Planning Submission to tie for Approva	0d		20-Dec-07 A
A550100	Substation Consultation Period	28d	19-Jun-06 A	27-Jul-06 A
A550220	Issue of Jenners Depository Substation Design	0d		30-Jun-06 A
A550320	Receive Confirmation of Substation Location	0d	22-Oct-07 A	
SDS81320	Delay due to VO231 Balgreen Road Redesign	143d	08-May-07 A	10-Dec-07 A
Tram Stop Saughton (Task700.3.6)		831d	24-Apr-06 A	28-Jul-09
A26780	Prepare Tram Stop Planning Submission Drawings For Issue to Planning Drawings Team	57d	02-May-07 A	27-Jul-07 A
A26790	Produce Engineering Detailed Design Drawings	9d	31-Jul-07 A	13-Aug-07 A
A26800	Compile Planning Drawings Tram Stop Saughton	28d	03-Jul-07 A	13-Aug-07 A
A26820	Issue Notification Of Completion Letter- Saughton Tram Stop Design to tie	0d		17-Aug-07 A
A26840	Tram Stop Design Complete - Drawings Issued for Construction	0d		26-Mar-08
A27630	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
A28230	Addressing PD Comments	1d	22-Sep-06 A	22-Sep-06 A
A44140	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	9d	18-Apr-07 A	01-May-07 A
A44930	Prepare Detailed Design Stop Drawings	5d	16-Mar-07 A	23-Mar-07 A
A48060	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A48070	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A48080	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A48130	Issue Final As Built Drawings	0d		28-Jul-09
A4970	General Arrangement Drawings	27d	24-Apr-06 A	05-Jun-06 A
A5740	Issue Tram Stop GA Drawings for Saughton Road North	0d		30-Jun-06 A
SDS81150	Address tie and CEC Comments, Other Revisions and IDC	24d	02-Nov-07 A	07-Dec-07 A
Structures		635d	23-Jan-06 A	18-Jul-08
S23 Carrick Knowe Underbridge (NR Ref 090/009-1)		635d	23-Jan-06 A	18-Jul-08
SDS45360	Review of Previous Work	9d	23-Jan-06 A	03-Feb-06 A
SDS45370	Optioneering	14d	06-Feb-06 A	24-Feb-06 A
SDS45380	Initial Design	9d	27-Feb-06 A	10-Mar-06 A
SDS45390	Production of Form A Drawing	5d	06-Mar-06 A	10-Mar-06 A
SDS45400	Issue Form A Drawing to tie	0d		10-Mar-06 A
SDS45410	Checking	5d	13-Mar-06 A	17-Mar-06 A
SDS45420	tie Form A Drawing Review Period	5d	13-Mar-06 A	17-Mar-06 A
SDS45430	Undertake Consultations	19d	13-Mar-06 A	07-Apr-06 A
SDS45440	Receive Form A Drawing Comments from tie	0d		17-Mar-06 A
SDS45450	Incorporate tie Comments into Form A Drawing	5d	20-Mar-06 A	24-Mar-06 A
SDS45460	Production of Form A Document	4d	10-Apr-06 A	13-Apr-06 A
SDS45470	Issue Form A Document to tie	0d		13-Apr-06 A
SDS45480	tie Form A Document Review Period	4d	24-Apr-06 A	27-Apr-06 A
SDS45490	Receive Form A Document Comments from tie	0d		27-Apr-06 A
SDS45500	Incorporate tie Comments into Form A Document	5d	28-Apr-06 A	05-May-06 A
SDS45510	Issue Form A Document & Drawing to TAA	0d		09-May-06 A
SDS45520	TAA Form A Document & Drawing Review Period	26d	08-May-06 A	15-Jun-06 A
SDS45530	Issue Form A Document & Drawing to Planning Department	0d		09-May-06 A
SDS45540	Planning Department Form A Document & Drawing Review Period	36d	08-May-06 A	29-Jun-06 A
SDS45550	Receive Form A Document & Drawing Comments from TAA	0d		15-Jun-06 A
SDS45560	Incorporate TAA Comments into Form A Document & Drawing	10d	16-Jun-06 A	30-Jun-06 A
SDS45590	Issue Drawing & Form A Document to Structures Detailed Design Team	0d		22-Jan-07 A
Preliminary Design Milestones		223d	14-Aug-06 A	02-Jul-07 A
219	Receipt of tie PD Acceptance	0d	02-Jul-07 A	
220	Receipt of Alignment Prelim Design Package	0d	23-Oct-06 A	
221	Receipt of OLE Prelim Design Package	0d	11-Dec-06 A	
222	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	15-Jan-07 A	
223	Receipt of an Approved and Signed AIP document	0d	14-Aug-06 A	
VO193 Carricknowe Bridge Widening for Footpaths PD revisit		143d	18-Jun-07 A	14-Jan-08
231	Revised PD for Carricknowe Bridge due to widening for footpaths	19d	18-Jun-07 A	13-Jul-07 A
232	Issue AIP for Carricknowe Bridge to CEC for Planning	0d		23-Jul-07 A
233	TAA Approval Period	19d	24-Jul-07 A	20-Aug-07 A
240	Issue AIP For Acceptance to TAA	0d		23-Jul-07 A
259	Recieve TAA Comments	0d	17-Sep-07 A	
260	Issue AIP For Acceptance to tie	0d		20-Jul-07 A
263	CEC Planning Approval Period	19d	24-Jul-07 A	20-Aug-07 A
269	Recieve CEC Planning Comments	0d	14-Jan-08*	
270	Issue AIP For Acceptance to NR	0d		23-Jul-07 A
283	NR Approval Period	19d	24-Jul-07 A	20-Aug-07 A
303	Update to comments	52d	17-Sep-07 A	30-Nov-07 A
313	tie Approval Period	20d	23-Jul-07 A	20-Aug-07 A
359	Recieve NR Comments	0d	17-Sep-07 A	
389	Recieve tie Comments	0d	14-Jan-08*	
419	PD Approval completed issue for Detailed Design (TAA approval only)	0d		17-Dec-07 A
Superstructure Detailed Design		399d	29-Aug-06 A	27-Mar-08
225	Superstructure Detailed Design ABORTED DUE TO VO193	178d	29-Aug-06 A	04-Jun-07 A
226	Superstructure Detailed Design Draughting ABORTED DUE TO VO193	142d	23-Oct-06 A	04-Jun-07 A
VO193 Superstructure Detailed Design Restart		132d	17-Sep-07 A	27-Mar-08
227	Issue Superstructure Detailed Design Package to CAT III Checker	0d	18-Dec-07 A	
228	Superstructure CAT III Check	42d	18-Dec-07 A	26-Feb-08
229	Receive & Incorporate CAT III comments	9d	27-Feb-08	11-Mar-08
230	Issue Notification Of Completion Letter- Carrick Knowe Superstructure Design Package to tie	0d		27-Mar-08
235	Superstructure Detailed Design Restart	62d	17-Sep-07 A	17-Dec-07 A
256	Superstructure Detailed Design Draughting Restart	62d	17-Sep-07 A	17-Dec-07 A
SDS62130	IDC	9d	12-Mar-08	27-Mar-08
Substructure Detailed Design		336d	24-Nov-06 A	27-Mar-08
247	Substructure Detailed Design ABORTED DUE TO VO193	138d	24-Nov-06 A	02-Jul-07 A



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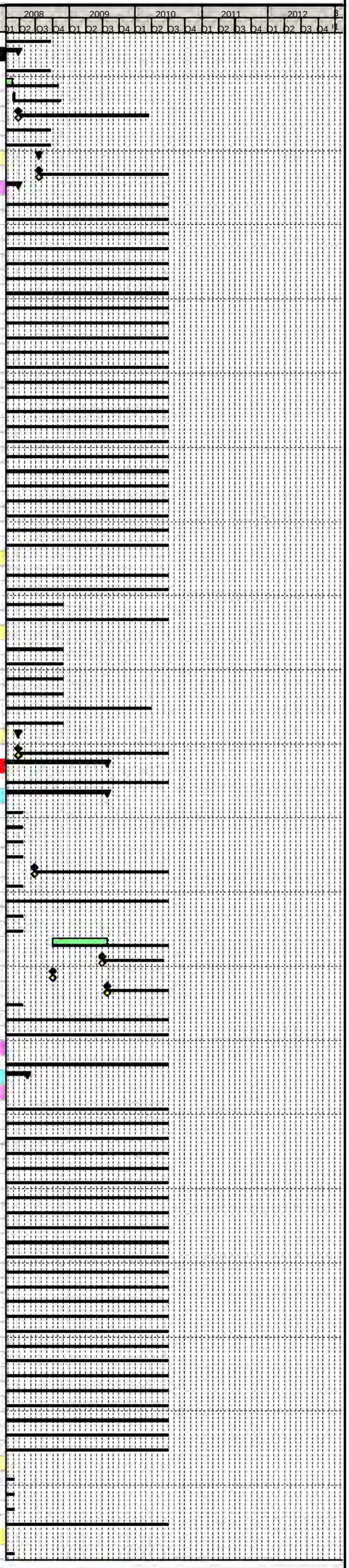
SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
248	Substructure Detailed Design Draughting ABORTED DUE TO VO193	91d	12-Feb-07 A	02-Jul-07 A
VO193 Substructure Detailed Design Restart		132d	17-Sep-07 A	27-Mar-08
249	Issue Substructure Detailed Design Package to CAT III Checker	0d	21-Dec-07 A	
250	Substructure CAT III Check	38d	21-Dec-07 A	25-Feb-08
251	Receive & Incorporate CAT III comments	9d	26-Feb-08	10-Mar-08
252	Issue Notification Of Completion Letter- Carrick Knowe Substructure Design Package to tie	0d		27-Mar-08
258	Substructure Detailed Design Draughting Restart	65d	17-Sep-07 A	20-Dec-07 A
287	Substructure Detailed Design Restart	65d	17-Sep-07 A	20-Dec-07 A
Issue Carrick Knowe Design Package For Construction/Fabrication		0d	18-Jul-08	18-Jul-08
267	Issue Carrick Knowe Design Package For Construction/Fabrication	0d	18-Jul-08	
S24 Existing Saughton Road Bridge		528d	27-Feb-06 A	26-Mar-08
SDS45600	Review of Previous Work	9d	27-Feb-06 A	10-Mar-06 A
SDS45610	Optioneering	3d	01-Mar-06 A	04-Mar-06 A
SDS45620	Initial Design	4d	01-Mar-06 A	06-Mar-06 A
SDS45630	Production of AIP Drawing	2d	03-Mar-06 A	06-Mar-06 A
SDS45640	Issue AIP Drawing to tie	0d		07-Mar-06 A
SDS45650	Checking	5d	03-Apr-06 A	07-Apr-06 A
SDS45660	tie AIP Drawing Review Period	15d	08-Mar-06 A	29-Mar-06 A
SDS45670	Undertake Consultations	12d	03-Apr-06 A	21-Apr-06 A
SDS45680	Receive AIP Drawing Comments from tie	0d		07-Apr-06 A
SDS45690	Incorporate tie Comments into AIP Drawing	4d	10-Apr-06 A	13-Apr-06 A
SDS45700	Production of AIP Document	4d	24-Apr-06 A	27-Apr-06 A
SDS45710	Issue AIP Document to tie	0d		27-Apr-06 A
SDS45720	tie AIP Document Review Period	5d	28-Apr-06 A	05-May-06 A
SDS45730	Receive AIP Document Comments from tie	0d		05-May-06 A
SDS45740	Incorporate tie Comments into AIP Document	5d	08-May-06 A	12-May-06 A
SDS45750	Issue AIP Document & Drawing to TAA	0d		12-May-06 A
SDS45760	TAA AIP Document & Drawing Review Period	13d	15-May-06 A	02-Jun-06 A
SDS45770	Issue AIP Document & Drawing to Planning Department	0d		12-May-06 A
SDS45780	Planning Department AIP Document & Drawing Review Period	18d	15-May-06 A	09-Jun-06 A
SDS45790	Recieve AIP Document & Drawing Comments from TAA	0d		02-Jun-06 A
SDS45800	Incorporate TAA Comments into AIP Document & Drawing	5d	05-Jun-06 A	09-Jun-06 A
SDS45810	Recieve AIP Document & Drawing Comments from Planning Department	0d		09-Jun-06 A
SDS45820	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	12-Jun-06 A	16-Jun-06 A
SDS45830	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		03-Jul-06 A
Preliminary Design Milestones		94d	14-Aug-06 A	22-Dec-06 A
271	Receipt of tie PD Acceptance	0d	22-Dec-06 A	
272	Receipt of Alignment Prelim Design Package	0d	22-Dec-06 A	
273	Receipt of OLE Prelim Design Package	0d	11-Dec-06 A	
274	Receipt of an Approved and Signed AIP document	0d	14-Aug-06 A	
Structure Assessment		114d	15-Dec-06 A	04-Jun-07 A
276	Structure Assessment	47d	15-Dec-06 A	02-Mar-07 A
277	Issue Structure Assessment Package to CAT I Checker	0d	05-Mar-07 A	
278	Structure Assessment Package CAT I Check	19d	05-Mar-07 A	30-Mar-07 A
279	Receive & Incorporate CAT I comments	9d	10-Apr-07 A	23-Apr-07 A
280	Issue Notification Of Completion Letter- Existing Saughton Road Bridge Assessment Report to tie	0d	04-Jun-07 A	
SDS62150	IDC	8d	24-Apr-07 A	04-May-07 A
Issue Existing Saughton Road Bridge Structure Design Package For Construction / Fabrication		0d	26-Mar-08	26-Mar-08
SDS63060	Issue Existing Saughton Road Bridge Structure Design Package For Construction	0d		26-Mar-08
SRN - SGA		986d	19-Sep-05 A	28-Jul-09
CON-0820	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Bankhead (Task700.3.10)		831d	24-Apr-06 A	28-Jul-09
A26860	Prepare Tram Stop Planning Submission Drawings For Issue to Planning Drawings Team	56d	03-May-07 A	27-Jul-07 A
A26870	Produce Engineering Detailed Design Drawings	9d	31-Jul-07 A	13-Aug-07 A
A26880	Compile Planning Drawings Tram Stop Bankhead	32d	03-Jul-07 A	17-Aug-07 A
A26900	Issue Notification Of Completion Letter- Bankhead Tram Stop Design to tie	0d		17-Aug-07 A
A26920	Tram Stop Design Complete - Drawings Issued for Construction	0d		24-Jun-08
A27640	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
A27930	Addressing Comments from Preliminary Design	7d	21-Sep-06 A	29-Sep-06 A
A44200	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	9d	19-Apr-07 A	02-May-07 A
A44940	Prepare Detailed Design Stop Drawings	5d	21-Mar-07 A	28-Mar-07 A
A48140	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A48150	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A48280	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A48290	Issue Final As Built Drawings	0d		28-Jul-09
A4980	General Arrangement Drawings	27d	24-Apr-06 A	05-Jun-06 A
A5750	Issue Tram Stop GA Drawings for South Gyle Access	0d		30-Jun-06 A
SDS81140	Address tie and CEC Comments, Other Revisions and IDC	24d	02-Nov-07 A	07-Dec-07 A
VO208 South Gyle Tramstop		152d	15-Aug-06 A	23-Mar-07 A
A45040	Options Report and Revision of Design to Accommodate RED issue at DAP	143d	15-Aug-06 A	23-Mar-07 A
Structures		564d	27-Feb-06 A	14-May-08
S05 Existing Broomhouse Road Bridge		322d	27-Feb-06 A	01-Jun-07 A
SDS45840	Review of Previous Work	9d	27-Feb-06 A	10-Mar-06 A
SDS45850	Optioneering	3d	01-Mar-06 A	03-Mar-06 A
SDS45860	Initial Design	4d	01-Mar-06 A	06-Mar-06 A
SDS45870	Production of AIP Drawing	2d	06-Mar-06 A	07-Mar-06 A
SDS45880	Issue AIP Drawing to tie	0d		07-Mar-06 A
SDS45890	Checking	5d	13-Mar-06 A	17-Mar-06 A
SDS45900	tie AIP Drawing Review Period	12d	08-Mar-06 A	24-Mar-06 A
SDS45910	Undertake Consultations	12d	03-Apr-06 A	21-Apr-06 A
SDS45920	Receive AIP Drawing Comments from tie	0d		24-Mar-06 A
SDS45930	Incorporate tie Comments into AIP Drawing	4d	10-Apr-06 A	13-Apr-06 A
SDS45940	Production of AIP Document	4d	24-Apr-06 A	27-Apr-06 A
SDS45950	Issue AIP Document to tie	0d		27-Apr-06 A
SDS45960	tie AIP Document Review Period	5d	28-Apr-06 A	05-May-06 A
SDS45970	Receive AIP Document Comments from tie	0d		05-May-06 A
SDS45980	Incorporate tie Comments into AIP Document	5d	08-May-06 A	12-May-06 A
SDS45990	Issue AIP Document & Drawing to TAA	0d		12-May-06 A
SDS46000	TAA AIP Document & Drawing Review Period	5d	15-May-06 A	22-May-06 A
SDS46010	Issue AIP Document & Drawing to Planning Department	0d		12-May-06 A
SDS46020	Planning Department AIP Document & Drawing Review Period	18d	15-May-06 A	09-Jun-06 A
SDS46030	Recieve AIP Document & Drawing Comments from TAA	0d		22-May-06 A
SDS46040	Incorporate TAA Comments into AIP Document & Drawing	5d	22-May-06 A	30-May-06 A
SDS46050	Recieve AIP Document & Drawing Comments from Planning Department	0d		09-Jun-06 A
SDS46060	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	12-Jun-06 A	16-Jun-06 A
SDS46070	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		03-Jul-06 A
Preliminary Design Milestones		85d	14-Aug-06 A	11-Dec-06 A
293	Receipt of tie PD Acceptance	0d	11-Dec-06 A	
294	Receipt of Alignment Prelim Design Package	0d	11-Dec-06 A	
295	Receipt of OLE Prelim Design Package	0d	11-Dec-06 A	
296	Receipt of an Approved and Signed AIP document	0d	14-Aug-06 A	
Structure Assessment		117d	11-Dec-06 A	01-Jun-07 A
298	Structure Assessment	47d	11-Dec-06 A	26-Feb-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

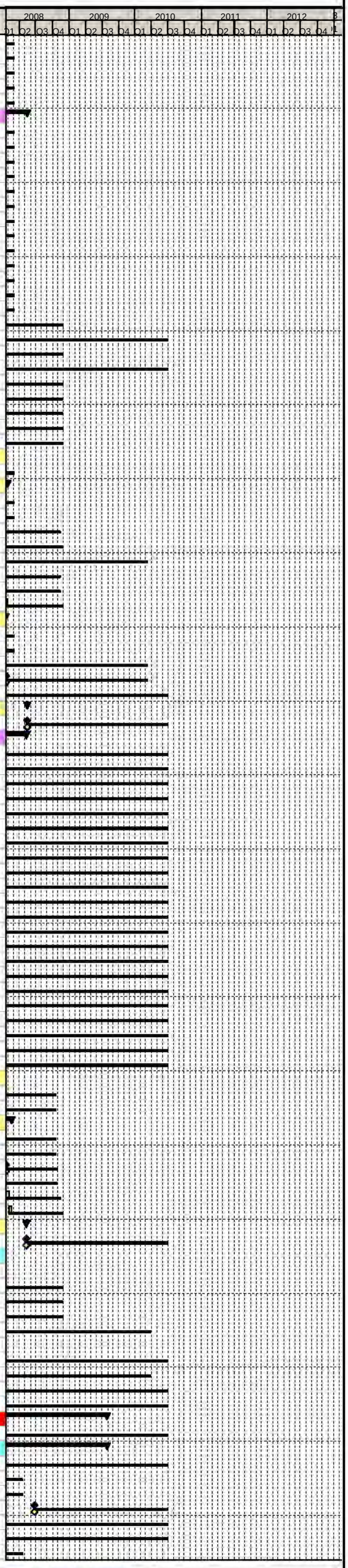
Trams for Edinburgh
...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

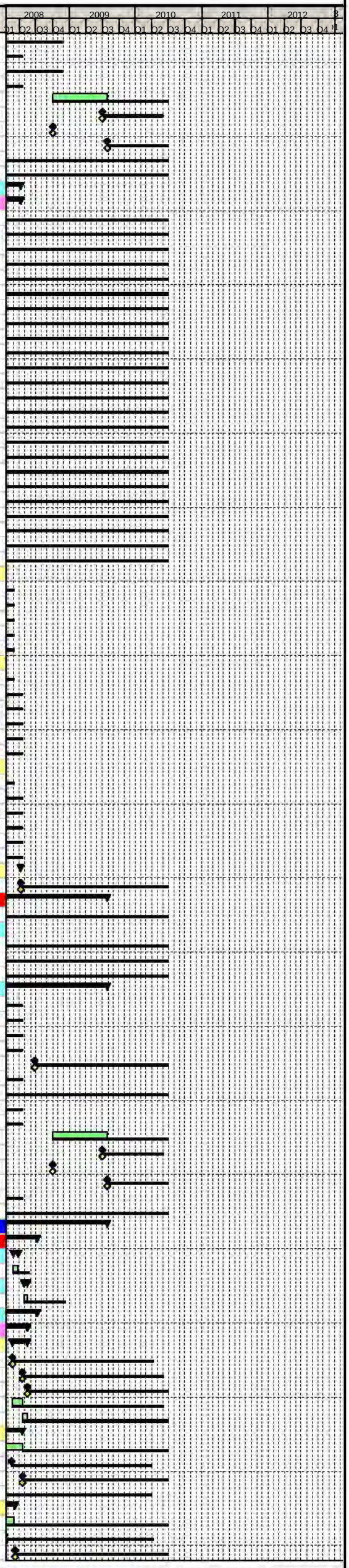
tie

Activity ID	Activity Name	Original Duration	Start	Finish
299	Issue Structure Assessment Package to CAT I Checker	0d	27-Feb-07 A	
300	Structure Assessment Package CAT I Check	14d	27-Feb-07 A	19-Mar-07 A
301	Receive & Incorporate CAT I comments	9d	20-Mar-07 A	02-Apr-07 A
329	Broomhouse Road Bridge Design Complete	0d	01-Jun-07 A	
SDS62160	IDC	21d	03-Apr-07 A	04-May-07 A
S26 South Gyle Access Road Bridge (Task700.3.12)		534d	10-Apr-06 A	14-May-08
SDS53950	Collate Base Data on Alignment & Topo survey	9d	10-Apr-06 A	25-Apr-06 A
SDS53960	Define Clearances	14d	10-Apr-06 A	03-May-06 A
SDS53970	Develop Preliminary Structures Options	26d	17-Apr-06 A	26-May-06 A
SDS53980	Options Review	13d	11-May-06 A	31-May-06 A
SDS53990	Produce Draft GA (AIP) Drg Showing Preferred Option	14d	11-May-06 A	01-Jun-06 A
SDS54000	Issue S Gyle Access Bridge Draft GA (AIP) Drg to tie	0d		30-Jun-06 A
SDS54010	Select Preferred Design Option in Liaison with tie	16d	16-May-06 A	08-Jun-06 A
SDS54020	Update Base Data on Alignment & Topo Survey	4d	16-May-06 A	19-May-06 A
SDS54030	Draft AIP Document Text	16d	19-May-06 A	13-Jun-06 A
SDS54040	Update AIP GA Drgs	6d	03-Jul-06 A	10-Jul-06 A
SDS54050	Check of AIP Document	1d	16-Jun-06 A	16-Jun-06 A
SDS54060	Issue AIP Document to Technical Approval Authority (TAA) Form A	0d		11-Jul-06 A
SDS54070	Issue AIP Document to Planning Department	0d		11-Jul-06 A
SDS54080	TAA Review AIP & Comment	14d	11-Jul-06 A	31-Jul-06 A
SDS54090	Planning Department Review AIP & Comment	14d	11-Jul-06 A	31-Jul-06 A
SDS54100	Receive AIP Comments from TAA	0d		01-Aug-06 A
SDS54110	Receive AIP Comments from Planning Department	0d		01-Aug-06 A
SDS54120	Incorporate AIP Comments from TAA	24d	02-Aug-06 A	07-Sep-06 A
SDS54140	Re-issue AIP to TAA	0d		07-Sep-06 A
SDS54150	TAA Review AIP	46d	08-Sep-06 A	15-Nov-06 A
SDS54160	TAA Sign Off AIP Document	0d		16-Nov-06 A
SDS54170	Issue AIP to Structures Detailed Design Team	0d		16-Nov-06 A
South Gyle Access Road Bridge Preliminary Design Milestones		10d	24-Jul-06 A	04-Aug-06 A
SDS35980	Update Available Base Data/Info Re Alignment/Topo Survey etc	9d	24-Jul-06 A	04-Aug-06 A
South Gyle Access Road Bridge Superstructure Detailed Design		373d	07-Aug-06 A	29-Jan-08
SDS35990	Superstructure Analysis	52d	07-Aug-06 A	23-Oct-06 A
SDS36010	Superstructure Detailed Design	51d	26-Sep-06 A	08-Dec-06 A
SDS36030	Superstructure Detailed Design Draughting	205d	23-Oct-06 A	07-Sep-07 A
SDS36060	Prepare Relevant Bridgeworks Specification Clauses	89d	02-Jan-07 A	17-May-07 A
SDS36070	Issue Notification Of Completion Letter- South Gyle Access Bridge Superstructure Package to tie for Comments	0d		20-Dec-07 A
SDS36090	Issue Detailed Design Package to CAT II Checker	0d		22-Dec-06 A
SDS36100	Bridge CATII Review Period	244d	02-Jan-07 A	15-Jan-08
SDS36160	Receive and Incorporate CATII Check Comments	9d	16-Jan-08	29-Jan-08
South Gyle Access Road Bridge Substructure Detailed Design		341d	08-Sep-06 A	17-Jan-08
SDS36000	Substructure Analysis	98d	08-Sep-06 A	09-Feb-07 A
SDS36020	Substructure Detailed Design	117d	29-Sep-06 A	30-Mar-07 A
SDS36040	Substructure Detailed Design Draughting	288d	23-Oct-06 A	17-Jan-08
SDS65360	Issue Notification Of Completion Letter- South Gyle Access Bridge Substructure Package to tie for Comments	0d		17-Jan-08
SDS65370	Issue Detailed Design Package to CAT II or CAT III Checker (as appropriate)	0d		08-Jan-07 A
South Gyle Access Road Bridge Design Package For Construction / Fabrication		0d	14-May-08	14-May-08
SDS36240	Issue South Gyle Access Road Bridge Specification Clauses For Construction	0d		14-May-08
W11 Bankhead Drive Retaining Wall (Task700.3.11)		530d	11-Apr-06 A	12-May-08
SDS54180	Collate Base Data on Alignment & Topo survey	9d	11-Apr-06 A	26-Apr-06 A
SDS54190	Define Clearances	11d	17-Apr-06 A	04-May-06 A
SDS54200	Develop Preliminary Structures Options	26d	17-Apr-06 A	26-May-06 A
SDS54210	Options Review	24d	12-May-06 A	19-Jun-06 A
SDS54220	Produce Draft GA (AIP) Drg Showing Preferred Option	29d	12-May-06 A	26-Jun-06 A
SDS54230	Issue S Gyle Access RW Draft GA (AIP) Drg to tie	0d		30-Jun-06 A
SDS54240	Select Preferred Design Option in Liaison with tie	24d	19-May-06 A	26-Jun-06 A
SDS54250	Update Base Data on Alignment & Topo Survey	27d	16-May-06 A	26-Jun-06 A
SDS54260	Draft AIP Document Text	11d	09-Jun-06 A	26-Jun-06 A
SDS54270	Update AIP GA Drgs	11d	14-Jun-06 A	29-Jun-06 A
SDS54280	Check of AIP Document	2d	29-Aug-06 A	30-Aug-06 A
SDS54290	Issue AIP Document to Technical Approval Authority (TAA) Form A	0d		30-Aug-06 A
SDS54300	Issue AIP Document to Planning Department	0d		30-Jun-06 A
SDS54310	TAA Review AIP & Comment	5d	11-Jul-06 A	17-Jul-06 A
SDS54320	Planning Department Review AIP & Comment	5d	11-Jul-06 A	17-Jul-06 A
SDS54330	Receive AIP Comments from TAA	0d		30-Jun-06 A
SDS54340	Receive AIP Comments from Planning Department	0d		30-Jun-06 A
SDS54350	Incorporate AIP Comments from TAA	45d	03-Jul-06 A	07-Sep-06 A
SDS54370	Re-issue AIP to TAA	0d		07-Sep-06 A
SDS54380	TAA Review AIP	47d	07-Sep-06 A	15-Nov-06 A
SDS54390	TAA Sign Off AIP Document	0d		16-Nov-06 A
SDS54400	Issue Bankhead Drive AIP to Structures Detailed Design Team	0d		16-Nov-06 A
Bankhead Drive Retaining Wall Preliminary Design Milestones		148d	10-Jul-06 A	09-Feb-07 A
SDS57140	Update Available Base Data/Info Re Alignment/Topo Survey etc	9d	10-Jul-06 A	21-Jul-06 A
SDS57160	Retaining Wall Anaysis	134d	17-Jul-06 A	09-Feb-07 A
Bankhead Drive Retaining Wall Structure Detailed Design		384d	14-Aug-06 A	20-Feb-08
SDS57170	Retaining Wall Detailed Design	330d	14-Aug-06 A	11-Jan-08 A
SDS57180	Retaining Wall Detailed Design Draughting	303d	25-Sep-06 A	11-Jan-08 A
SDS57210	Issue Notification Of Completion Letter- Bankhead Drive Retaining Wall Package to tie for Comments	0d		18-Jan-08
SDS57230	Issue Detailed Design Package to CAT II Checker	0d		18-Dec-06 A
SDS57240	Bridge CATII Review Period	13d	18-Jan-08	06-Feb-08
SDS57300	Receive and Incorporate CATII Check Comments	9d	07-Feb-08	20-Feb-08
Bankhead Drive Retaining Wall Design Package For Construction / Fabrication		0d	12-May-08	12-May-08
SDS57380	Issue Bankhead Drive retaining Wall Specification clauses For Construction	0d		12-May-08
Tram Bankhead Drive Substation (Task700.3.13)		403d	15-May-06 A	07-Dec-07 A
A549040	Preliminary Design of Substation	21d	15-May-06 A	13-Jun-06 A
A549860	Detailed Design Civils	197d	17-Nov-06 A	21-Sep-07 A
A549870	Detailed Architecture Design	63d	15-Jan-07 A	19-Apr-07 A
A549880	IDC on Detailed Design (Inc. Systems Assurance)	10d	03-Apr-07 A	19-Apr-07 A
A549890	Issue Notification Of Completion Letter- Tram Bankhead Drive Substation Planning Submission to tie for Approval	0d		19-Apr-07 A
A550110	Substation Consultation Period	28d	19-Jun-06 A	27-Jul-06 A
A550230	Issue of Bankhead Drive Substation Design	0d		30-Jun-06 A
A550280	Compile Substation Planning Submission	8d	10-Apr-07 A	19-Apr-07 A
A550400	Investigate Options For Planners	1d	20-Oct-06 A	20-Oct-06 A
SDS81070	Address tie Comments, Other Revisions, IDC & Section Submission Package	24d	02-Nov-07 A	07-Dec-07 A
SGA - EPS		986d	19-Sep-05 A	28-Jul-09
CON-0850	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Edinburgh Park Station (Task700.3.14)		827d	28-Apr-06 A	28-Jul-09
A26940	Prepare Tram Stop Planning Submission Drawings	9d	13-Mar-07 A	26-Mar-07 A
A26950	Produce Engineering Detailed Design Drawings	23d	24-Aug-07 A	28-Sep-07 A
A26980	Issue Notification Of Completion Letter- Edinburgh Park Station Tram Stop Design to tie	0d		28-Sep-07 A
A27000	Tram Stop Design Complete - Drawings Issued for Construction	0d		24-Jun-08
A28200	Addressing PD Comments	2d	21-Sep-06 A	22-Sep-06 A
A44240	Issue Edinburgh Park Station Tram Stop Package for Prior Approval to tie	0d		26-Mar-07 A
A44250	Update Planning Submission for Issue to Planning Drawings Team	6d	01-Aug-07 A	08-Aug-07 A



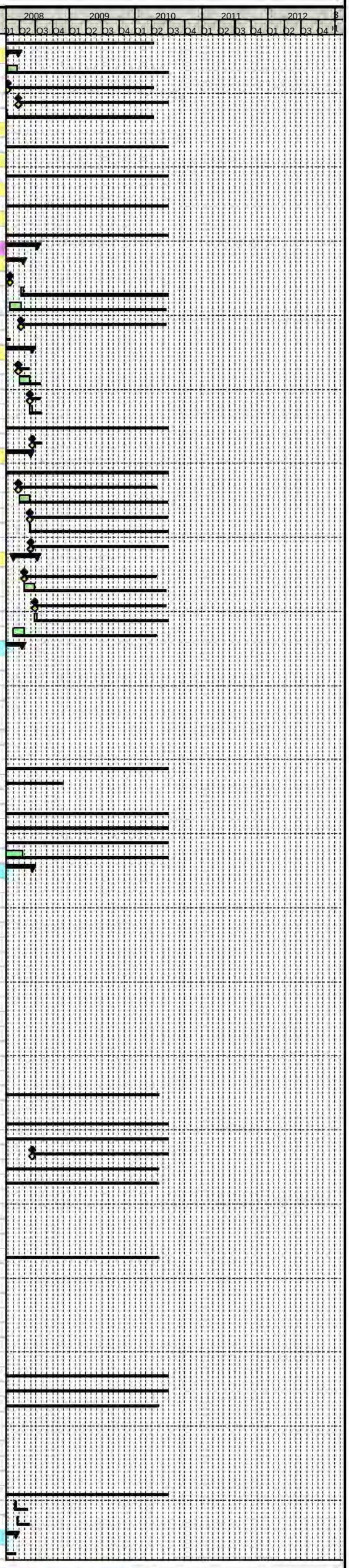
Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Activity ID	Activity Name	Original Duration	Start	Finish
A44260	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	9d	27-Feb-07 A	12-Mar-07 A
A44270	Compile Planning Drawings Tram Stop Edinburgh Park Station	11d	08-Aug-07 A	23-Aug-07 A
A44950	Prepare Detailed Design Stop Drawings	126d	14-Aug-06 A	26-Feb-07 A
A45030	Re-Design Edinburgh Park Station Stop Due To Change To RW After Submission	42d	18-Jun-07 A	17-Aug-07 A
A48300	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A48310	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A48320	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A48330	Issue Final As Built Drawings	0d		28-Jul-09
A4990	General Arrangement Drawings	41d	28-Apr-06 A	30-Jun-06 A
A5760	Issue Tram Stop GA Drawings for Edinburgh Park Station	0d		30-Jun-06 A
Structures		564d	23-Jan-06 A	10-Apr-08
S27 Edinburgh Park Station Viaduct (NR Ref 070/003-2)		564d	23-Jan-06 A	10-Apr-08
SDS42960	Review of Previous Work	9d	23-Jan-06 A	03-Feb-06 A
SDS42970	Optioneering	14d	06-Feb-06 A	24-Feb-06 A
SDS42980	Initial Design	9d	27-Feb-06 A	10-Mar-06 A
SDS42990	Production of Form A Drawing	5d	06-Mar-06 A	10-Mar-06 A
SDS43000	Issue Form A Drawing to tie	0d		10-Mar-06 A
SDS43010	Checking	5d	13-Mar-06 A	17-Mar-06 A
SDS43020	tie Form A Drawing Review Period	5d	13-Mar-06 A	17-Mar-06 A
SDS43030	Undertake Consultations	19d	13-Mar-06 A	07-Apr-06 A
SDS43040	Receive Form A Drawing Comments from tie	0d		17-Mar-06 A
SDS43050	Incorporate tie Comments into Form A Drawing	26d	20-Mar-06 A	28-Apr-06 A
SDS43060	Production of Form A Document	14d	10-Apr-06 A	03-May-06 A
SDS43070	Issue Formal Form A Document to tie	0d		04-May-06 A
SDS43080	tie Form A Document Review Period	4d	04-May-06 A	09-May-06 A
SDS43090	Receive Form A Document Comments from tie	0d		09-May-06 A
SDS43100	Incorporate tie Comments into Form A Document	5d	10-May-06 A	16-May-06 A
SDS43110	Issue Form A Document & Drawing to TAA	0d		09-May-06 A
SDS43120	TAA Form A Document & Drawing Review Period	59d	17-May-06 A	14-Aug-06 A
SDS43130	Issue Form A Document & Drawing to Planning Department	0d		09-May-06 A
SDS43140	Planning Department Form A Document & Drawing Review Period	61d	15-May-06 A	14-Aug-06 A
SDS43150	Receive Form A Document & Drawing Comments from TAA	0d		14-Aug-06 A
SDS43160	Incorporate TAA Comments into Form A Document & Drawing	5d	15-Aug-06 A	21-Aug-06 A
SDS43170	Receive Form A Document & Drawing Comments from Planning Department	0d		14-Aug-06 A
SDS43180	Incorporate Planning Department TAA Comments into Form A Document & Drawing	5d	15-Aug-06 A	21-Aug-06 A
SDS43190	Issue Drawing & Form A Document to Structures Detailed Design Team	0d		21-Aug-06 A
Preliminary Design Milestones		259d	14-Aug-06 A	21-Aug-07 A
55	Receipt of tie PD Acceptance	0d	12-Feb-07 A	
56	Receipt of Alignment Prelim Design Package	0d	12-Feb-07 A	
57	Receipt of OLE Prelim Design Package	0d	21-Aug-07 A	
58	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	12-Feb-07 A	
59	Receipt of an Approved and Signed AIP document	0d	14-Aug-06 A	
Superstructure Detailed Design		134d	21-May-07 A	23-Nov-07 A
61	Superstructure Detailed Design	60d	21-May-07 A	17-Aug-07 A
62	Superstructure Detailed Design Draughting	66d	12-Jun-07 A	18-Sep-07 A
63	Issue Superstructure Detailed Design Package to CAT III Checker	0d	19-Sep-07 A	
64	Superstructure CAT III Check	28d	19-Sep-07 A	30-Oct-07 A
65	Receive & Incorporate CAT III comments	9d	31-Oct-07 A	13-Nov-07 A
66	Issue Notification Of Completion Letter- Edinburgh Park Station Viaduct Superstructure Design Package to tie	0d	23-Nov-07 A	
Substructure Detailed Design		123d	05-Jun-07 A	23-Nov-07 A
83	Substructure Detailed Design	51d	05-Jun-07 A	17-Aug-07 A
84	Substructure Detailed Design Draughting	66d	12-Jun-07 A	18-Sep-07 A
85	Issue Substructure Detailed Design Package to CAT III Checker	0d	19-Sep-07 A	
86	Substructure CAT III Check	19d	19-Sep-07 A	16-Oct-07 A
87	Receive & Incorporate CAT III comments	9d	17-Oct-07 A	30-Oct-07 A
88	Issue Notification Of Completion Letter- Edinburgh Park Station Viaduct Substructure Design Package to tie	0d	23-Nov-07 A	
Issue Design Package For Construction/Fabrication		0d	10-Apr-08	10-Apr-08
81	Issue Edinburgh Park Station Viaduct Design Package For Construction/Fabrication	0d	10-Apr-08	
EPS - EDP		986d	19-Sep-05 A	28-Jul-09
CON-0880	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Sub Station Edinburgh Park (Task700.3.16)		40d	01-Jun-06 A	27-Jul-06 A
A548970	Preliminary Design of Substation	5d	01-Jun-06 A	07-Jun-06 A
A550120	Substation Consultation Period	28d	19-Jun-06 A	27-Jul-06 A
A550240	Issue of Edinburgh Park Substation Design	0d		30-Jun-06 A
Tram Stop Edinburgh Park Central (Task700.3.17)		831d	24-Apr-06 A	28-Jul-09
A27020	Prepare Tram Stop Planning Submission Drawings For Issue to Planning Drawing Team	71d	11-Apr-07 A	27-Jul-07 A
A27030	Produce Engineering Detailed Design Drawings	9d	06-Aug-07 A	17-Aug-07 A
A27040	Compile Planning Drawings Tram Stop Edinbrugh Park Central	32d	03-Jul-07 A	17-Aug-07 A
A27060	Issue Notification Of Completion Letter- Edinburgh Park Central Tram Stop Design to tie	0d		17-Aug-07 A
A27080	Tram Stop Design Complete - Drawings Issued for Construction	0d		24-Jun-08
A27660	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
A28210	Addressing PD Comments	1d	22-Sep-06 A	22-Sep-06 A
A44320	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	9d	19-Mar-07 A	02-Apr-07 A
A44960	Prepare Detailed Design Stop Drawings	5d	14-Mar-07 A	21-Mar-07 A
A48340	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A48350	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A48360	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A48370	Issue Final As Built Drawings	0d		28-Jul-09
A5000	General Arrangement Drawings	27d	24-Apr-06 A	05-Jun-06 A
A5770	Issue Tram Stop GA Drawings for Edinburgh Park	0d		30-Jun-06 A
EDP - GOG - Section 5C (Task700.4)		986d	19-Sep-05 A	28-Jul-09
Sub Section Wide		599d	06-Mar-06 A	09-Jul-08
Sub Section Wide IDC		22d	28-Feb-08	28-Mar-08
A40541	Subsection Wide IDC	21d	28-Feb-08	28-Mar-08
Design Assurance Review		11d	29-Apr-08	13-May-08
SDS68040	Produce Design Assurance Statement	9d	29-Apr-08	13-May-08
Consents & Approvals		368d	01-Feb-07 A	09-Jul-08
Prior Approvals		329d	01-Feb-07 A	16-May-08
Combined Section Prior Approval		60d	22-Feb-08	16-May-08
A25840	Issue Combined Package 5C for Prior Approval to CEC	0d		22-Feb-08
A25850	Receive Combined Package 5C Comments From CEC	0d		18-Apr-08
A25870	Prior Approval Granted for Section 5C Combined Package	0d		16-May-08
A40630	CEC Approval Period - 5C Combined Package	38d	22-Feb-08	18-Apr-08
A40640	Update 5C Combined Package to CEC Comments	19d	18-Apr-08	16-May-08
Batch 5/19		146d	17-Sep-07 A	17-Apr-08
SDS76020	Batch 5/19 Formal Approval Period	38d	20-Feb-08 A	16-Apr-08
SDS76030	Issue Batch 5/19 For Approval to CEC	0d	20-Feb-08 A	
SDS76040	Receive CEC Prior Approval For Batch 5/19	0d	17-Apr-08	
SDS76070	Batch 5/19 Gyle Centre Tramstop - Collation of Planning Drawings	32d	17-Sep-07 A	01-Nov-07 A
Batch 5/20		68d	22-Nov-07 A	06-Mar-08
SDS76140	Batch 5/20 Formal Approval Period	38d	10-Jan-08 A	05-Mar-08
SDS76150	Issue Batch 5/20 For Approval to CEC	0d	10-Jan-08 A	
SDS76160	Receive CEC Prior Approval For Batch 5/20	0d	06-Mar-08	



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Activity ID	Activity Name	Original Duration	Start	Finish
SDS76190	Batch 5/20 A8 Underpass - Collation of Planning Drawings	9d	22-Nov-07 A	05-Dec-07 A
Batch 5/22		46d	21-Jan-08	25-Mar-08
SDS76200	Batch 5/22 Formal Approval Period	38d	25-Jan-08	20-Mar-08
SDS76210	Issue Batch 5/22 For Approval to CEC	0d	25-Jan-08	
SDS76220	Receive CEC Prior Approval For Batch 5/22	0d	25-Mar-08	
SDS76250	Batch 5/22 Gogarburn tramstop - Collation of Planning Drawings	4d	21-Jan-08	24-Jan-08
Roads, Track, OLE, Landscaping, Street Lighting		40d	01-Feb-07 A	28-Mar-07 A
SDS30580	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	01-Feb-07 A	28-Mar-07 A
Tram Stop Gyle Centre		40d	01-Feb-07 A	28-Mar-07 A
A40920	Informal Consultation With CEC & tie over Prior Approval Tram Stop Gyle Centre	38d	01-Feb-07 A	28-Mar-07 A
Depot Halt		40d	06-Feb-07 A	02-Apr-07 A
A40950	Informal Consultation With CEC & tie over Prior Approval Tram Stop Depot Stop	38d	06-Feb-07 A	02-Apr-07 A
Gyle Stop Retaining Walls		40d	01-Feb-07 A	28-Mar-07 A
SDS66600	Commence Gyle Stop RW Informal Consultation With CEC & tie Over Prior Approval	38d	01-Feb-07 A	28-Mar-07 A
Technical Approvals		368d	01-Feb-07 A	09-Jul-08
Gyle Stop Retaining Walls Structure Review (TAA)		298d	22-Feb-07 A	23-Apr-08
SDS66610	Issue Detailed Design Package to TAA	0d		11-Feb-08*
SDS66620	Incorporate TAA Comments	9d	10-Apr-08	23-Apr-08
SDS66630	TAA Review Period	38d	12-Feb-08	09-Apr-08
SDS66640	Receive TAA Comments	0d		09-Apr-08
SDS66650	Commence Gyle Stop RW Informal Consultation With CEC Over Technical Approval	38d	22-Feb-07 A	20-Apr-07 A
Roads Technical Approval		346d	01-Feb-07 A	09-Jun-08
SDS30590	Issue Roads Design to Roads Authority for Approval	0d		28-Mar-08
SDS30600	Roads Authority Approval Period	38d	31-Mar-08	27-May-08
SDS30610	Receive Roads Authority Comments	0d		27-May-08
SDS30620	Update to Roads Authority Comments	8d	28-May-08	09-Jun-08
SDS30630	Roads Authority Informal Consultation	38d	01-Feb-07 A	28-Mar-07 A
SDS30700	Roads Technical Approval Granted	0d		09-Jun-08
Drainage Technical Approval		342d	01-Feb-07 A	03-Jun-08
SDS72900	Roads Authority Informal Consultation For Drainage	38d	01-Feb-07 A	28-Mar-07 A
SDS72910	Issue Drainage Design to Roads Authority for Approval	0d		28-Mar-08
SDS72920	Roads Authority Approval Period For Drainage	38d	31-Mar-08	27-May-08
SDS72930	Receive Roads Authority Comments For Drainage	0d		27-May-08
SDS72940	Update to Roads Authority Comments For Drainage	5d	28-May-08	03-Jun-08
SDS72950	Drainage Technical Approval Granted	0d		03-Jun-08
A8 Underpass Superstructure Review (TAA)		94d	29-Feb-08	09-Jul-08
SDS36620	Issue Detailed Design Package to TAA	0d		28-Apr-08
SDS36650	TAA Approval Period	38d	29-Apr-08	25-Jun-08
SDS36690	Receive TAA Comments	0d		25-Jun-08
SDS36720	Incorporate TAA Comments	9d	26-Jun-08	09-Jul-08
SDS63010	Commence A8 Underpass Informal Consultation With CEC Over Technical Approval	38d	29-Feb-08	28-Apr-08
Track (Task700.4.1)		515d	11-Apr-06 A	18-Apr-08
A3760	First Pass Mx Horizontal and Vertical Alignment	19d	11-Apr-06 A	11-May-06 A
A3770	Handover Alignment Design P Way to Roads	0d		12-May-06 A
A3780	Coordination Meeting/Workshop Between PWay/Roads & Resolution of Major Conflicts	1d	12-May-06 A	12-May-06 A
SDS30300	Revise Alignment to Match Roads First Pass Vertical	6d	06-Dec-06 A	13-Dec-06 A
SDS30350	Handover Alignment Design Track to Roads	0d		13-Dec-06 A
SDS30720	Revise Alignment to Inc. Preliminary Design Comments	68d	10-Jul-06 A	18-Oct-06 A
SDS30740	Handover Alignment Design Track to Roads	0d		18-Oct-06 A
SDS57110	Issue Track Alignment Design to tie Section 5C	0d		10-Jan-07 A
SDS59610	IDC Track Design	8d	20-Dec-06 A	08-Jan-07 A
SDS61020	Revise Track Alignment to Inc. Modelling Changes	1d	09-Nov-06 A	09-Nov-06 A
SDS70200	tie Approval Period	19d	11-Jan-07 A	07-Feb-07 A
SDS70210	Receive tie Comments	0d	03-Apr-07 A	
SDS70220	Incorporate tie Comments	1d	04-May-07 A	05-May-07 A
SDS75170	Address tie Comments, Connections to Rev Depot Layout, Other Revisions, IDC & Section Submission Package	165d	06-Aug-07 A	18-Apr-08
Roads, Street Lighting & Landscaping (Task700.4.2)		530d	10-May-06 A	09-Jun-08
A3790	Route Appreciation/Junct Layout & Determine with tie & CEC Works Extent	2d	10-May-06 A	11-May-06 A
A3800	Frontage Surveys	2d	12-May-06 A	15-May-06 A
A3810	Set Up Mx Models	2d	17-May-06 A	18-May-06 A
A3820	Produce Preliminary Horizontal Road Alignment Design (Inc Lanes & Parking Zones)	7d	22-May-06 A	31-May-06 A
A3830	Preliminary Rd Junction Configuration Design	2d	01-Jun-06 A	02-Jun-06 A
A3840	Preliminary Road Safety Audit	1d	19-Jun-06 A	19-Jun-06 A
A3850	Review & Amend TRO Drawings & Schedules for Modifications Required Post Prelim Design	1d	12-Jun-06 A	12-Jun-06 A
A3860	Handover Alignment Design Roads to Pway	0d		20-Jun-06 A
A3870	Coordination Meeting/Workshop Between Roads & Pway Teams	1d	20-Jun-06 A	20-Jun-06 A
A5570	Undertake Road Marking, Pedestrian Req & Traffic Signalling Design	1d	05-Jun-06 A	05-Jun-06 A
SDS30310	Produce First Pass Vertical Alignment	7d	11-Dec-06 A	19-Dec-06 A
SDS30330	Handover Alignment Design Roads to Pway	0d		19-Dec-06 A
SDS30360	Revise Vertical Alignment to Match Final Track Alignment	5d	05-Jan-07 A	11-Jan-07 A
SDS30370	Horizontal & Vertical Alignment Design Complete	0d		11-Jan-07 A
SDS30380	Issue Roads Design to tie for Approval Section 5C	0d		23-Feb-07 A
SDS30390	Cross Check all Horizontal Design Aspects With Vertical Alignment	24d	12-Jan-07 A	16-Feb-07 A
SDS30400	tie Approval Period	19d	26-Feb-07 A	23-Mar-07 A
SDS30410	No tie Comments Received - Change in Protocol Going Forward	0d		04-May-07 A
SDS30430	Issue Construction Drawings	0d		09-Jun-08
SDS30440	Road Safety Audit Stage 2 (Intermediate)	31d	15-Jan-07 A	28-Feb-07 A
SDS30450	Insert Intermediate RSA Comments	5d	01-Mar-07 A	07-Mar-07 A
SDS30460	Produce Site Clearance Drawings & Schedule	23d	15-Jan-07 A	15-Feb-07 A
SDS30470	Produce Fencing, Barriers & Guardrails Design	3d	11-Jan-07 A	15-Jan-07 A
SDS30480	Produce Street Lighting Design (& Liaise With OLE)	4d	15-Jan-07 A	18-Jan-07 A
SDS30490	Produce Traffic Signal Only Ducting	6d	08-Jan-07 A	15-Jan-07 A
SDS30500	Produce Soft Landscaping Design	6d	07-Feb-07 A	14-Feb-07 A
SDS30510	Produce Traffic Signals Layout	18d	11-Dec-06 A	12-Jan-07 A
SDS30520	Produce Traffic Signs Design (Signs, Markings, Signals)	18d	11-Dec-06 A	12-Jan-07 A
SDS30530	Produce Earthworks Design	5d	09-Jan-07 A	15-Jan-07 A
SDS30750	Revise Alignment to Inc. Final Track Horizontal Alignment (Horizontal Design Freeze)	20d	13-Nov-06 A	11-Dec-06 A
SDS30760	Produce Kerbs, Footway & Paved Area Design	19d	11-Dec-06 A	15-Jan-07 A
SDS30770	Produce Pavement Design	4d	08-Jan-07 A	11-Jan-07 A
SDS30780	IDC (Inc. Systems Assurance)	23d	17-Jan-07 A	19-Feb-07 A
SDS56650	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 5C	0d		30-Aug-07 A
SDS56860	Issue Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 5C	0d		19-Feb-07 A
SDS59390	Compile Planning Drawings	3d	21-Feb-07 A	23-Feb-07 A
SDS59830	Advise Track, Stops, Modellers Changes To Accom RSA1 & PD Comments	7d	02-Oct-06 A	10-Oct-06 A
SDS59840	Pass Guidance/Envelope To Track & Others As Necessary (Track Not advised, No Changes)	0d		23-Oct-06 A
SDS61030	Revise Horizontal to Inc. Track Horizontal Alignment, RSA1 & PD Comments	9d	19-Oct-06 A	01-Nov-06 A
SDS61040	Revise Alignment to Inc. Minor Changes From Traffic Modelling	13d	02-Nov-06 A	21-Nov-06 A
SDS67200	Street Lighting Survey Work	60d	03-Jul-06 A	29-Sep-06 A
SDS69720	Produce Hard Landscaping Design	82d	24-Apr-07 A	24-Aug-07 A
SDS80100	Final RSA	9d	06-Mar-08	19-Mar-08
SDS80110	Incorporate Final RSA Comments	5d	20-Mar-08	28-Mar-08
Drainage		256d	12-Mar-07 A	12-Mar-08
SDS71970	Hydraulic Modelling & First Pass Drainage Design	110d	12-Mar-07 A	28-Aug-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

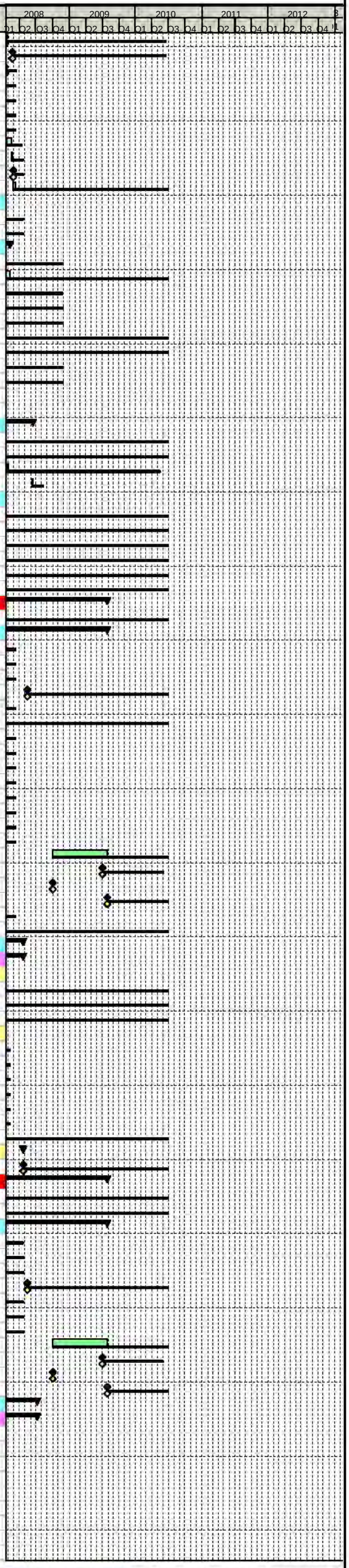
Trams for Edinburgh ...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS71980	Receipt of Drainage Survey Information	0d		14-Jan-08*
SDS71990	Outfall Consent/Approval from SW	0d		25-Feb-08*
SDS72000	Outfall Consent/Approval from CEC	0d		14-Jan-08*
SDS72010	Outfall Consent/Approval from SEPA	0d		10-May-07 A
SDS72020	Compile Drainage Package	4d	19-Sep-07 A	24-Sep-07 A
SDS72030	Issue Drainage Design Completion Letter to tie for Approval Section 5C	0d		27-Sep-07 A
SDS73270	Final Detailed Drainage Design	53d	29-Jun-07 A	18-Sep-07 A
SDS80600	Final Detailed Drainage Design	38d	17-Dec-07 A	18-Feb-08
SDS80610	Compile Drainage Package	5d	19-Feb-08	25-Feb-08
SDS80620	Issue Drainage Design Completion Letter to tie for Approval Section 5C	0d		27-Feb-08
SDS80630	Confirm Drainage and Amend if Required	9d	28-Feb-08	12-Mar-08
Boundary & Accomodation Works (Task700.4.3)		81d	26-Mar-07 A	16-Jul-07 A
SDS42490	Detailed Design of Boundary & Accomodation Works	72d	26-Mar-07 A	16-Jul-07 A
SDS42500	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 5C	0d		16-Jul-07 A
Utilities (Task700.4.4)		492d	06-Mar-06 A	11-Feb-08
A12550	Close Out PD Issues and Re-issue PD Drawings to SUCs	23d	14-Aug-06 A	15-Sep-06 A
A12560	Design Development	327d	18-Sep-06 A	11-Feb-08
A12570	Initial Consultations With SUCs and IDTs	23d	29-Aug-06 A	02-Oct-06 A
A12580	MUDFA Appointment	0d		03-Oct-06 A
A12600	IDC	9d	17-Apr-07 A	01-May-07 A
A12610	Issue DD to SUC For Approval	0d		01-May-07 A
A12620	SUC Approval Period	77d	01-May-07 A	27-Aug-07 A
A14100	Access to MUDFA and Others	124d	03-Oct-06 A	16-Apr-07 A
A14110	Consult With SUCs on DD	124d	03-Oct-06 A	16-Apr-07 A
UTIL1400	Issue to Statutory Utility Companies (SUCs)	0d		30-Jun-06 A
UTIL150	Section 5C - Pre-Preliminary Design (Utilities)	76d	06-Mar-06 A	30-Jun-06 A
TRO's		538d	05-May-06 A	16-Jun-08
SDS33770	Collate Exisiting TROs	45d	05-May-06 A	12-Jul-06 A
SDS33780	Receive Preliminary Roads Design	0d		12-Jul-06 A
SDS82110	Interim TRO Design Section 5C	5d	28-Jan-08*	01-Feb-08
SDS82120	Final TRO Design Section 5C	5d	10-Jun-08	16-Jun-08
TTRO's		138d	23-Oct-06 A	11-May-07 A
TTRO340	SDS Produce Affected Roads Listing For MUDFA Works	27d	23-Oct-06 A	30-Nov-06 A
TTRO440	SDS Produce Affected Roads Listing For INFRACO Works	36d	12-Mar-07 A	04-May-07 A
TTRO750	Issue Affected Roads Listing For MUDFA Works To Dundas & Wilson	0d		30-Nov-06 A
TTRO760	Dundas & Wilson Draft TTRO Schedule For MUDFA Works	0d	01-Dec-06 A	01-Dec-06 A
TTRO840	Issue Affected Roads Listing For INFRACO Works To Dundas & Wilson	0d		04-May-07 A
TTRO850	Dundas & Wilson Draft TTRO Schedule For INFRACO Works	5d	04-May-07 A	11-May-07 A
EDP - GYL		986d	19-Sep-05 A	28-Jul-09
CON-0910	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Gyle Centre (Task700.4.7)		816d	15-May-06 A	28-Jul-09
A27100	Prepare Tram Stop Planning Submission Drawings	8d	22-Jan-07 A	01-Feb-07 A
A27110	Produce Engineering Detailed Design Drawings	78d	20-Apr-07 A	16-Aug-07 A
A27140	Issue Notification Of Completion Letter- Gyle Centre Tram Stop Design to tie	0d		17-Aug-07 A
A27160	Tram Stop Design Complete - Drawings Issued for Construction	0d		16-May-08
A27670	Site Visit with tie & CEC To Review Preliminary Design	1d	15-Jan-07 A	15-Jan-07 A
A27940	Liaision With Structures Team Regarding RW In Advance Of DD	3d	20-Sep-06 A	22-Sep-06 A
A30270	IDC Tram Stop Engineering Detailed Design (Inc. Systems Assurance)	10d	20-Apr-07 A	04-May-07 A
A44360	Issue Gyle Tram Stop Package for Prior Approval to tie	0d		01-Feb-07 A
A44370	Update Planning Submission For Issue to Planning Drawings Team	67d	20-Mar-07 A	02-Jul-07 A
A44380	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	9d	22-Jan-07 A	02-Feb-07 A
A44390	tie Approval Period	19d	01-Feb-07 A	28-Feb-07 A
A44400	Receive tie Comments	0d		16-Mar-07 A
A44410	Compile Planning Drawings Tram Stop Gyle Centre	31d	03-Jul-07 A	16-Aug-07 A
A44970	Prepare Detailed Design Stop Drawings	18d	08-Jan-07 A	01-Feb-07 A
A48420	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A48430	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A48440	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A48450	Issue Final As Built Drawings	0d		28-Jul-09
A5010	General Arrangement Drawings	14d	15-May-06 A	05-Jun-06 A
A5780	Issue Tram Stop GA Drawings for Gyle	0d		30-Jun-06 A
Structures		430d	11-Aug-06 A	23-Apr-08
W19? Gyle Stop Retaining Walls (Task700.4.6)		430d	11-Aug-06 A	23-Apr-08
Gyle Stop Retaining Walls Preliminary Design Milestones		124d	11-Aug-06 A	09-Feb-07 A
SDS66400	Retaining Wall Analysis	58d	08-Nov-06 A	09-Feb-07 A
SDS66520	PD of Gyle Stop Retaining Walls Structure	106d	11-Aug-06 A	25-Jan-07 A
SDS66670	tie and TAA Sign Off PD	0d		25-Jan-07 A
Gyle Stop Retaining Walls Structure Detailed Design		229d	26-Sep-06 A	21-Aug-07 A
SDS66410	Retaining Wall Detailed Design	160d	17-Nov-06 A	27-Jul-07 A
SDS66420	Retaining Wall Detailed Design Draughting	155d	11-Dec-06 A	10-Aug-07 A
SDS66450	Issue Notification Of Completion Letter- Gyle Stop Retaining Walls Package to tie for Comments	0d		21-Aug-07 A
SDS66460	Issue Detailed Design Package to CAT II Checker	0d		10-Jan-07 A
SDS66480	Receive and Incorporate CATII Check Comments	5d	09-Aug-07 A	16-Aug-07 A
SDS66550	CAT II Review Period	9d	30-Jul-07 A	10-Aug-07 A
SDS68260	Advanced Work on Detailed Design	51d	26-Sep-06 A	08-Dec-06 A
Issue Gyle Stop Retaining Walls Design Package For Construction / Fabrication		0d	23-Apr-08	23-Apr-08
SDS66500	Issue Gyle Stop Retaining Walls Specification clauses For Construction	0d		23-Apr-08
GYL - DEH (Including A8 Underpass)		986d	19-Sep-05 A	28-Jul-09
CON-0010	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
CON-0940	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Depot Halt(Task700.4.8)		648d	15-Jan-07 A	28-Jul-09
A27180	Prepare Tram Stop Planning Submission Drawings for Issue to Planning Drawings Team	19d	06-Aug-07 A	03-Sep-07 A
A27190	Produce Engineering Detailed Design Drawings	18d	24-Aug-07 A	20-Sep-07 A
A27220	Issue Notification Of Completion Letter- Depot Halt Design to tie	0d		20-Sep-07 A
A27240	Tram Stop Design Complete - Drawings Issued for Construction	0d		16-May-08
A27680	Site Visit with tie & CEC To Review Preliminary Design	1d	15-Jan-07 A	15-Jan-07 A
A44440	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	9d	23-Jan-07 A	05-Feb-07 A
A44980	Prepare Detailed Design Stop Drawings	117d	06-Feb-07 A	03-Aug-07 A
A48460	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A48470	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A48480	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A48490	Issue Final As Built Drawings	0d		28-Jul-09
Structures		581d	30-Mar-06 A	09-Jul-08
VO28 S28 A8 Underpass (Task700.4.9) CNS010		581d	30-Mar-06 A	09-Jul-08
SDS54410	Collate Base Data on Alignment & Topo survey	18d	30-Mar-06 A	27-Apr-06 A
SDS54420	Define Clearances	9d	13-Apr-06 A	28-Apr-06 A
SDS54430	Develop Preliminary Structures Options	36d	13-Apr-06 A	09-Jun-06 A
SDS54440	Options Review	6d	12-Jun-06 A	19-Jun-06 A
SDS54450	Produce Draft GA (AIP) Drg Showing Preferred Option	28d	09-May-06 A	20-Jun-06 A
SDS54460	Issue Draft GA A8 Underpass (AIP) Drg to tie	0d		30-Jun-06 A
SDS54470	Select Preferred Design Option in Liaison with tie	8d	13-Jun-06 A	23-Jun-06 A
SDS54480	Update Base Data on Alignment & Topo Survey	4d	16-May-06 A	19-May-06 A
SDS54490	Draft AIP Document Text	9d	13-Jun-06 A	26-Jun-06 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

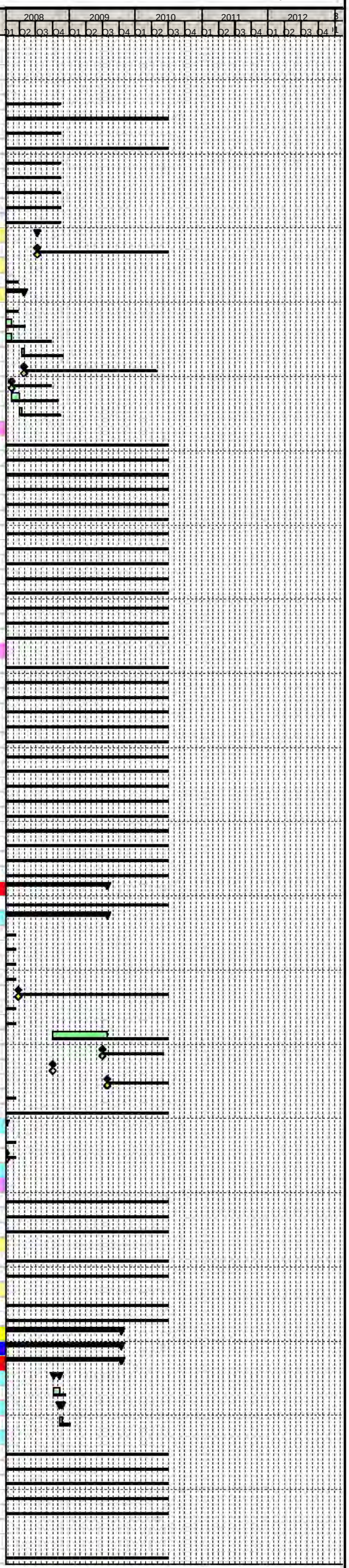
Trams for Edinburgh
Connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS54500	Update AIP GA Drgs	9d	15-Jun-06 A	28-Jun-06 A
SDS54510	Check of AIP Document	2d	29-Aug-06 A	30-Aug-06 A
SDS54520	Issue AIP Document to Technical Approval Authority (TAA) Form A	0d		11-Jul-06 A
SDS54530	Issue AIP Document to Planning Department	0d		11-Jul-06 A
SDS54540	TAA Review AIP & Comment	8d	11-Jul-06 A	21-Jul-06 A
SDS54550	Planning Department Review AIP & Comment	8d	11-Jul-06 A	21-Jul-06 A
SDS54560	Receive AIP Comments from TAA	0d		24-Jul-06 A
SDS54570	Receive AIP Comments from Planning Department	0d		24-Jul-06 A
SDS54580	Incorporate AIP Comments from TAA	33d	25-Jul-06 A	12-Sep-06 A
SDS54600	Re-issue AIP to TAA	0d		14-Sep-06 A
SDS54610	TAA Review AIP	5d	15-Sep-06 A	21-Sep-06 A
SDS54620	TAA Sign Off AIP Document	0d		15-Sep-06 A
SDS54630	Issue AIP to Structures Detailed Design Team	0d		18-Sep-06 A
A8 Underpass Design Package For Construction / Fabrication		0d	09-Jul-08	09-Jul-08
SDS36780	Issue A8 Underpass Specification Clauses For Construction	0d		09-Jul-08
A8 Underpass Preliminary Design Milestones		28d	20-Oct-06 A	28-Nov-06 A
SDS36520	Update Available Base Data/Info Re Alignment/Topo Survey etc	26d	20-Oct-06 A	28-Nov-06 A
A8 Underpass Superstructure Detailed Design		362d	20-Nov-06 A	28-Apr-08
SDS36530	Superstructure Analysis	159d	20-Nov-06 A	27-Jul-07 A
SDS36550	Superstructure Detailed Design ON HOLD	276d	11-Dec-06 A	18-Feb-08
SDS36570	Superstructure Detailed Design Draughting ON HOLD	266d	02-Jan-07 A	18-Feb-08
SDS36590	Check of Drawings (IDC)	9d	15-Apr-08	28-Apr-08
SDS36610	Issue Notification Of Completion Letter- A8 Underpass Superstructure Detailed Design Package to tie for Comments	0d		28-Apr-08
SDS36630	Issue Detailed Design Package to CAT II Checker	0d	19-Feb-08*	
SDS36640	Bridge CATII Review Period	27d	19-Feb-08	01-Apr-08
SDS36700	Receive and Incorporate CATII Check Comments	9d	02-Apr-08	15-Apr-08
W10 Gyle Retaining Wall (Task700.4.11)		111d	30-Mar-06 A	31-Aug-06 A
SDS54870	Collate Base Data on Alignment & Topo survey	19d	30-Mar-06 A	28-Apr-06 A
SDS54880	Define Clearances	5d	02-May-06 A	08-May-06 A
SDS54890	Develop Preliminary Structures Options	18d	02-May-06 A	26-May-06 A
SDS54900	Options Review	8d	22-May-06 A	01-Jun-06 A
SDS54910	Produce Draft GA (AIP) Drg Showing Preferred Option	10d	22-May-06 A	06-Jun-06 A
SDS54920	Issue Gyle RW Draft GA (AIP) Drg to tie	0d		06-Jun-06 A
SDS54930	Select Preferred Design Option in Liaison with tie	3d	07-Jun-06 A	09-Jun-06 A
SDS54940	Update Base Data on Alignment & Topo Survey	2d	07-Jun-06 A	08-Jun-06 A
SDS54950	Draft AIP Document Text	5d	09-Jun-06 A	15-Jun-06 A
SDS54960	Update AIP GA Drgs	3d	14-Jun-06 A	16-Jun-06 A
SDS54970	Check of AIP Document	2d	15-Jun-06 A	16-Jun-06 A
SDS54980	Issue AIP Document to Technical Approval Authority (TAA) Form A	0d		16-Jun-06 A
SDS54990	Issue AIP Document to Planning Department	0d		16-Jun-06 A
SDS55000	TAA Review AIP & Comment	50d	19-Jun-06 A	31-Aug-06 A
W11 Glasgow Road Retaining Wall (Task700.4.12)		111d	30-Mar-06 A	31-Aug-06 A
SDS55100	Collate Base Data on Alignment & Topo survey	19d	30-Mar-06 A	28-Apr-06 A
SDS55110	Define Clearances	5d	02-May-06 A	08-May-06 A
SDS55120	Develop Preliminary Structures Options	18d	02-May-06 A	26-May-06 A
SDS55130	Options Review	5d	30-May-06 A	05-Jun-06 A
SDS55140	Produce Draft GA (AIP) Drg Showing Preferred Option	16d	12-May-06 A	06-Jun-06 A
SDS55150	Issue Glasgow RW Draft GA (AIP) Drg to tie	0d		06-Jun-06 A
SDS55160	Select Preferred Design Option in Liaison with tie	3d	07-Jun-06 A	09-Jun-06 A
SDS55170	Update Base Data on Alignment & Topo Survey	2d	07-Jun-06 A	08-Jun-06 A
SDS55180	Draft AIP Document Text	5d	09-Jun-06 A	15-Jun-06 A
SDS55190	Update AIP GA Drgs	2d	14-Jun-06 A	15-Jun-06 A
SDS55200	Check of AIP Document	2d	15-Jun-06 A	16-Jun-06 A
SDS55210	Issue AIP Document to Technical Approval Authority (TAA) Form A	0d		16-Jun-06 A
SDS55220	Issue AIP Document to Planning Department	0d		16-Jun-06 A
SDS55230	TAA Review AIP & Comment	48d	19-Jun-06 A	30-Aug-06 A
SDS55240	Planning Department Review AIP & Comment	50d	19-Jun-06 A	31-Aug-06 A
DEH - GOG		986d	19-Sep-05 A	28-Jul-09
CON-0970	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Gogarburn (Task700.4.13)		816d	15-May-06 A	28-Jul-09
A27260	Prepare Tram Stop Planning Submission Drawings for Issue to Planning Drawings Team	11d	10-Jul-07 A	25-Jul-07 A
A27270	Produce Engineering Detailed Design Drawings	10d	03-Aug-07 A	17-Aug-07 A
A27280	Compile Planning Drawings Tram Stop Gogarburn	15d	26-Jul-07 A	16-Aug-07 A
A27300	Issue Notification Of Completion Letter- Gogarburn Tram Stop Design to tie	0d		17-Aug-07 A
A27320	Tram Stop Design Complete - Drawings Issued for Construction	0d		28-Mar-08
A27690	Site Visit with tie & CEC To Review Preliminary Design (Delay Due to RBS)	1d	02-Jul-07 A	02-Jul-07 A
A44990	Prepare Detailed Design Stop Drawings	11d	22-Jun-07 A	09-Jul-07 A
A48500	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A48510	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A48520	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A48530	Issue Final As Built Drawings	0d		28-Jul-09
A5020	General Arrangement Drawings	32d	15-May-06 A	30-Jun-06 A
A5790	Issue Tram Stop GA Drawings for Gogar Burn	0d		30-Jun-06 A
VO84 RBS Gogarburn Stop Design Approval		298d	09-Nov-06 A	18-Jan-08
A45110	RBS Gogarburn Stop Design Coordination	277d	09-Nov-06 A	18-Jan-08
A45120	Decision of Design with CEC, tie and RBS	0d		18-Jan-08
Structures		292d	29-Aug-06 A	19-Oct-07 A
A8 Retaining Walls (Task870.11)		292d	29-Aug-06 A	19-Oct-07 A
SDS62680	Collate Base Data on Alignment & Topo survey	8d	29-Aug-06 A	08-Sep-06 A
SDS62700	Develop Preliminary Structures Options	8d	11-Sep-06 A	21-Sep-06 A
SDS62710	Options Review	6d	22-Sep-06 A	29-Sep-06 A
A8 Retaining Wall Preliminary Design Milestones		154d	20-Oct-06 A	01-Jun-07 A
SDS51390	Update Available Base Data/Info Re Alignment/Topo Survey etc	66d	20-Oct-06 A	02-Feb-07 A
SDS62450	Retaining Wall Analysis	123d	17-Nov-06 A	01-Jun-07 A
A8 Retaining Wall Structure Detailed Design		207d	04-Jan-07 A	19-Oct-07 A
SDS62460	Retaining Wall Detailed Design NOW NOT REQUIRED	189d	04-Jan-07 A	19-Oct-07 A
SDS62470	Retaining Wall Detailed Design Draughting NOW NOT REQUIRED	145d	12-Mar-07 A	19-Oct-07 A
GDE DEPOT - Section 6 (Task870)		946d	01-Feb-06 A	15-Oct-09
GDE DEPOT - Section Wide		946d	01-Feb-06 A	15-Oct-09
DEPOT		946d	01-Feb-06 A	15-Oct-09
Sub Section Wide IDC		20d	09-Oct-08	06-Nov-08
A40551	Subsection Wide IDC - Roads, Track, Stops, B&A, Street Lighting (Excl. Dept Access Bridge)	19d	09-Oct-08	06-Nov-08
Design Assurance Review		10d	06-Nov-08	20-Nov-08
SDS68050	Produce Section Wide Design Assurance Statement	9d	06-Nov-08	20-Nov-08
Preliminary Design Approvals		265d	05-May-06 A	21-May-07 A
SDS23500	Track IDC	38d	03-Jul-06 A	25-Aug-06 A
SDS23530	Roads IDC	38d	03-Jul-06 A	25-Aug-06 A
SDS23550	Substation IDC	5d	31-May-06 A	06-Jun-06 A
SDS23800	Structures IDC	207d	03-Jul-06 A	21-May-07 A
SDS23810	PD - Submit Section 6 Structures Deliverables	0d		29-Jun-06 A
SDS23970	Informal Consultation with tie	38d	05-May-06 A	30-Jun-06 A
SDS23980	tie approval	19d	03-Jul-06 A	28-Jul-06 A
SDS34830	PD - Submit Section 6 Substation Deliverables	0d		19-Jun-06 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

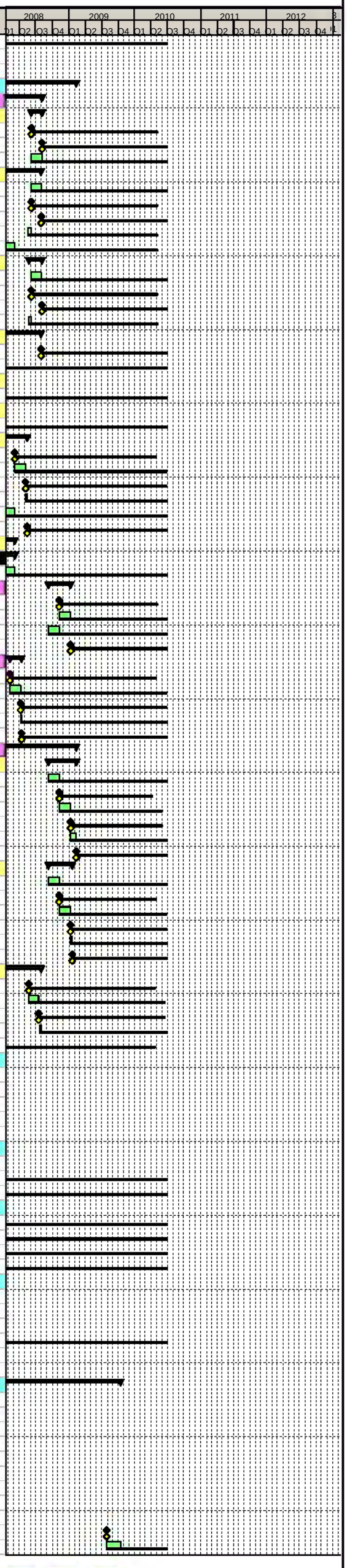
Trams for Edinburgh
...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS34840	PD - Submit Section 6 Track Deliverables	0d		23-Jun-06 A
SDS34860	PD - Submit Section 6 Roads Deliverables	0d		30-Jun-06 A
SDS34880	PD - Section 6 Complete - Issue to tie	0d		30-Jun-06 A
Section Approvals		505d	13-Feb-07 A	09-Feb-09
Planning Conditions		377d	13-Feb-07 A	04-Aug-08
Combined Section Prior Approval		40d	09-Jun-08	04-Aug-08
A25930	Issue Combined Package 6 for Prior Approval to CEC	0d		09-Jun-08
A25960	Prior Approval Granted for Section 6 Combined Package	0d		04-Aug-08
A40690	CEC Approval Period - 6 Combined Package	38d	09-Jun-08	04-Aug-08
Batch 6/21		144d	14-Jan-08	01-Aug-08
SDS76260	Batch 6/21 Formal Approval Period	38d	06-Jun-08	31-Jul-08
SDS76270	Issue Batch 6/21 For Approval to CEC	0d	06-Jun-08	
SDS76280	Receive CEC Prior Approval For Batch 6/21	0d	01-Aug-08	
SDS76310	Batch 6/21 Depot - Collation of Planning Drawings (Excl Depot Access Bridge)	11d	20-May-08	05-Jun-08
SDS76350	Informal Consultation With CEC & tie Over Prior Approval of Depot	38d	14-Jan-08*	07-Mar-08
Batch 6/22		51d	23-May-08	04-Aug-08
SDS80160	Batch 6/22 Formal Approval Period	38d	09-Jun-08	01-Aug-08
SDS80170	Issue Batch 6/22 For Approval to CEC	0d	09-Jun-08	
SDS80180	Receive CEC Prior Approval For Batch 6/22	0d	04-Aug-08	
SDS80190	Batch 6/22 Depot - Collation of Planning Drawings (Depot Access Bridge Only)	9d	23-May-08	06-Jun-08
Tram Gogar Depot Substation		258d	27-Jul-07 A	01-Aug-08
SDS32660	Prior Approval For Tram Gogar Depot Substation	0d		01-Aug-08
SDS32670	Informal Consultation With CEC & tie Over Prior Approval Tram Gogar Depot Substation	38d	27-Jul-07 A	21-Sep-07 A
Roads, Track, OLE, Landscaping, Street Lighting		42d	13-Feb-07 A	11-Apr-07 A
SDS32450	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	13-Feb-07 A	11-Apr-07 A
Depot Buildings		41d	16-Jul-07 A	10-Sep-07 A
SDS32730	Informal Consultation With CEC & tie Over Prior Approval Depot Buildings	38d	16-Jul-07 A	10-Sep-07 A
Depot Drainage		88d	14-Jan-08	14-May-08
SDS32920	Issue Drainage Design To CEC For Prior Approval	0d		07-Mar-08
SDS32930	Depot Drainage Design CEC Approval Period	38d	10-Mar-08	07-May-08
SDS32940	Receive Depot Drainage Design CEC Comments	0d		07-May-08
SDS32950	Incorporate CEC Comments into Depot Drainage Design	5d	08-May-08	14-May-08
SDS32960	Informal Consultation With CEC & tie Over Prior Approval For Drainage	38d	14-Jan-08	07-Mar-08
SDS32970	Drainage Prior Approval	0d		14-May-08
Structure Prior Approvals		40d	14-Jan-08	07-Mar-08
Depot Access Road Bridge Superstructure		40d	14-Jan-08	07-Mar-08
SDS65970	Commence Depot Access Road Bridge Informal Consultation With CEC & tie Over Prior Approval	38d	14-Jan-08	07-Mar-08
British Airport Authority (BAA) Approval		80d	11-Sep-08	12-Jan-09
SDS32740	Issue to BAA for Approval	0d		06-Nov-08
SDS32750	BAA Approval Period	38d	06-Nov-08	12-Jan-09
SDS32780	BAA Informal Consultation	38d	11-Sep-08	06-Nov-08
SDS32790	BAA Approval	0d		12-Jan-09
Building Regulations Approval		47d	08-Feb-08	15-Apr-08
SDS32570	Submit Package for Building Regulations Approval	0d		08-Feb-08
SDS32580	Building Regulations Approval Period	38d	11-Feb-08	08-Apr-08
SDS32590	Incorporate Comments for Building Regulations Approval	0d		08-Apr-08
SDS32600	Update to Building Regulations Approval Comments	5d	09-Apr-08	15-Apr-08
SDS32610	Receive Stage 1 Building Reg Approval	0d		15-Apr-08
Technical Approvals		351d	17-Sep-07 A	09-Feb-09
Roads Technical Approval		100d	11-Sep-08	09-Feb-09
SDS32510	Roads Authority Informal Consultation	38d	11-Sep-08	06-Nov-08
SDS32520	Issue Roads Design to Roads Authority for Approval	0d		06-Nov-08
SDS32530	Roads Authority Approval Period	38d	06-Nov-08	12-Jan-09
SDS32540	Receive Roads Authority Comments	0d		12-Jan-09
SDS32550	Update to Roads Authority Comments	19d	12-Jan-09	09-Feb-09
SDS32560	Discharge of Roads Technical Approval	0d		09-Feb-09
Drainage Technical Approval		85d	11-Sep-08	19-Jan-09
SDS72960	Roads Authority Informal Consultation For Drainage	38d	11-Sep-08	06-Nov-08
SDS72970	Issue Drainage Design to Roads Authoriy for Approval	0d		06-Nov-08
SDS72980	Roads Authority Approval Period For Drainage	38d	06-Nov-08	12-Jan-09
SDS72990	Receive Roads Authority Comments For Drainage	0d		12-Jan-09
SDS73000	Update to Roads Authority Comments For Drainage	5d	12-Jan-09	19-Jan-09
SDS73010	Drainage Technical Approval Granted	0d		19-Jan-09
Depot Access Road Bridge Review (TAA)		223d	17-Sep-07 A	01-Aug-08
SDS57500	Issue Detailed Design Package to TAA	0d		22-May-08
SDS57530	TAA Approval Period	38d	23-May-08	18-Jul-08
SDS57570	Receive TAA Comments	0d		18-Jul-08
SDS57600	Incorporate TAA Comments	9d	21-Jul-08	01-Aug-08
SDS63020	Commence Depot Access Road Bridge Informal Consultation With CEC Over Technical Approval	74d	17-Sep-07 A	14-Jan-08
Depot Layout		75d	01-Feb-06 A	16-May-06 A
A52070	Develop Preliminary Design for Depot Arrangement	13d	01-Feb-06 A	20-Feb-06 A
A52410	Agree Design Concept with tie	44d	08-Feb-06 A	13-Apr-06 A
A52420	Issue Depot General Arrangement to tie	0d		13-Apr-06 A
A52430	tie Approval Period	19d	18-Apr-06 A	16-May-06 A
A53010	Receive Depot General Arrangement Approval	0d		16-May-06 A
Depot General (Task870.10)		321d	01-Feb-06 A	04-May-07 A
SDS19070	Depot Start Date	0d	01-Feb-06 A	
SDS20590	Depot Workshop	0d		20-Mar-06 A
SDS20600	Finalisation of Depot Layout General Arrangement Plans	18d	10-Apr-07 A	04-May-07 A
Stakeholder Reviews		232d	24-Jul-06 A	21-Jun-07 A
A569710	Review Potential Issues with tie & Determine Consultation Strategy	5d	24-Jul-06 A	28-Jul-06 A
A569830	Review Potential Issues with tie & Determine Consultation Strategy	22d	11-Apr-07 A	14-May-07 A
A569840	Feedback to Design Teams for Study	25d	15-May-07 A	21-Jun-07 A
SDS23570	Stakeholder Review	22d	11-Apr-07 A	14-May-07 A
Track (Task870.2)		286d	19-Jun-06 A	01-Aug-07 A
A3890	First Pass Mx Horizontal and Vertical Alignment	5d	19-Jun-06 A	23-Jun-06 A
A3900	Handover Alignment Design P Way to Roads	0d		26-Jun-06 A
A3910	Coordination Meeting/Workshop Between PWay/Roads & Resolution of Major Conflicts	1d	26-Jun-06 A	26-Jun-06 A
A4010	Produce Final Depot Layout Plans	22d	02-Jul-07 A	01-Aug-07 A
A4190	Design Alignment	228d	11-Aug-06 A	01-Aug-07 A
SDS57120	Issue Notification Of Completion Letter- Track Alignment Design to tie Section 6	0d		01-Aug-07 A
Roads, Street Lighting & Landscaping (Task870.3)		922d	07-Mar-06 A	15-Oct-09
A3920	Route Appreciation/Junct Layout & Determine with tie & CEC Works Extent	46d	09-Mar-06 A	19-May-06 A
A3930	Frontage Surveys	30d	07-Mar-06 A	21-Apr-06 A
A3940	Set Up Mx Models	3d	31-May-06 A	02-Jun-06 A
A3950	Produce Preliminary Horizontal Road Alignment Design (Inc Lanes & Parking Zones)	7d	05-Jun-06 A	13-Jun-06 A
A3960	Preliminary Rd Junction Configuration Design	2d	14-Jun-06 A	15-Jun-06 A
A3970	Preliminary Road Safety Audit	1d	26-Jun-06 A	26-Jun-06 A
A3980	Review & Amend TRO Drawings & Schedules for Modifications Required Post Prelim Design	1d	16-Jun-06 A	16-Jun-06 A
A3990	Handover Alignment Design Roads to Pway	0d		30-Jun-06 A
A4000	Coordination Meeting/Workshop Between Roads & Pway Teams	1d	30-Jun-06 A	30-Jun-06 A
A48090	Receive First As Built Data from Contractor	0d		27-Jul-09*
A48100	Produce As Built Drawings	54d	28-Jul-09	15-Oct-09



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

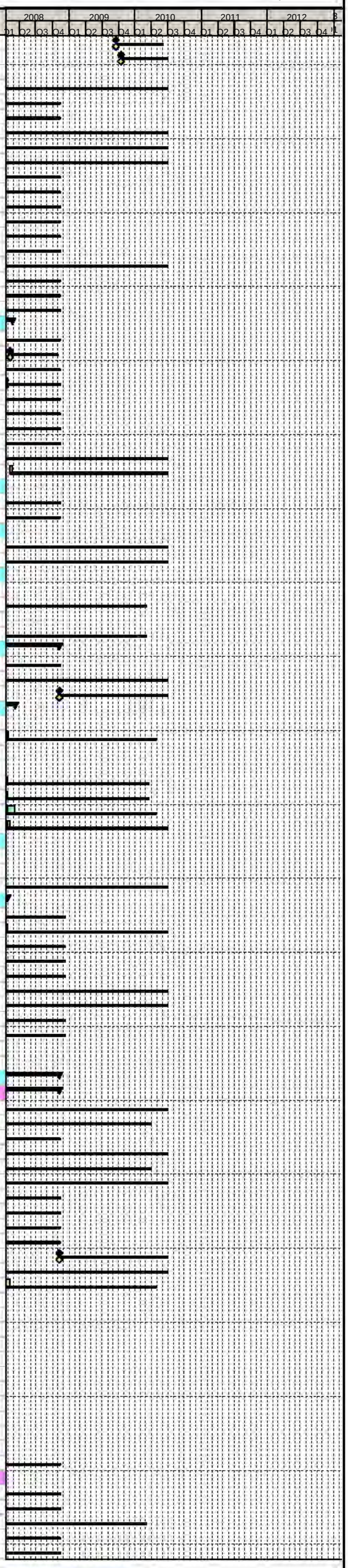
Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
A48110	Receive Final As Built Data from Contractor	0d		17-Sep-09
A48120	Issue Final As Built Drawings	0d		15-Oct-09
A5580	Undertake Road Marking, Pedestrian Req & Traffic Signalling Design	10d	16-Jun-06 A	30-Jun-06 A
SDS32230	Produce Fencing, Barriers & Guardrails Design	6d	08-Mar-07 A	15-Mar-07 A
SDS32240	Produce Street Lighting Design (& Liaise With OLE)	33d	29-Aug-06 A	16-Oct-06 A
SDS32250	Produce Soft Landscaping Design	14d	16-Mar-07 A	10-Apr-07 A
SDS32260	Produce Traffic Signals Layout	12d	27-Feb-07 A	15-Mar-07 A
SDS32270	Produce Traffic Signs Design (Signs, Markings, Signals)	10d	01-Mar-07 A	15-Mar-07 A
SDS32280	Produce Kerbs, Footway & Paved Area Design	5d	09-Mar-07 A	15-Mar-07 A
SDS32330	Produce Traffic Signal Only Ducting	7d	19-Feb-07 A	28-Feb-07 A
SDS32340	Produce Earthworks Design	92d	04-May-07 A	21-Sep-07 A
SDS32350	Produce Pavement Design	56d	08-May-07 A	31-Jul-07 A
SDS32380	Road Safety Audit Stage 2 (Intermediate)	9d	07-Mar-07 A	20-Mar-07 A
SDS32390	Insert Intermediate RSA Comments	5d	21-Mar-07 A	28-Mar-07 A
SDS32400	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 6	0d		11-Apr-07 A
SDS56690	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 6	109d	10-Apr-07 A	21-Sep-07 A
SDS56870	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 6	0d		24-Aug-07 A
SDS59400	Compile Planning Drawings	9d	27-Mar-07 A	11-Apr-07 A
SDS69730	Produce Hard Landscaping Design	109d	10-Apr-07 A	21-Sep-07 A
Drainage		243d	12-Mar-07 A	25-Feb-08
SDS72070	Hydraulic Modelling & First Pass Drainage Design	130d	12-Mar-07 A	27-Sep-07 A
SDS72080	Receipt of Drainage Survey Information	0d		11-Feb-08*
SDS72090	Outfall Consent/Approval from SW NOT REQUIRED	0d		22-Oct-07 A
SDS72100	Outfall Consent/Approval from CEC	0d		14-Jan-08*
SDS72110	Outfall Consent/Approval from SEPA	0d		10-May-07 A
SDS72120	Compile Drainage Package	5d	20-Sep-07 A	27-Sep-07 A
SDS72130	Issue Drainage Design Completion Letter to tie for Approval Section 6	0d		27-Sep-07 A
SDS73280	Final Detailed Drainage Design	23d	24-Aug-07 A	27-Sep-07 A
SDS80730	Re-Issue Drainage Design Completion Letter to tie for Approval Section 6 NOT REQUIRED - PART OF GENERAL DEPOT R...	0d		22-Oct-07 A
SDS80740	Confirm Drainage and amend if necessary	9d	11-Feb-08	25-Feb-08
Boundary & Accomodation Works (Task870.4)		91d	16-Apr-07 A	20-Aug-07 A
SDS42550	Detailed Design of Boundary & Accomodation Works	73d	16-Apr-07 A	03-Aug-07 A
SDS42560	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 6	0d		20-Aug-07 A
TRO's		8d	03-Jul-06 A	12-Jul-06 A
SDS34030	Collate Exisiting TROs	8d	03-Jul-06 A	12-Jul-06 A
SDS34040	Receive Preliminary Roads Design	0d		12-Jul-06 A
Earthworks		313d	30-Jun-06 A	21-Sep-07 A
A51840	Produce Preliminary Earthworks Design	1d	30-Jun-06 A	30-Jun-06 A
A52140	Produce Detailed Earthworks Design	38d	19-Jul-07 A	13-Sep-07 A
A52730	Issue Depot Preliminary Earthworks Design	0d	30-Jun-06 A	
A52740	Issue Notification Of Completion Letter- Detailed Depot Earthworks Design	0d	21-Sep-07 A	
Depot Ductwork -External Services		401d	16-Apr-07 A	06-Nov-08
A45760	Ductwork Design	69d	16-Apr-07 A	30-Jul-07 A
A45790	Issue Notification Of Completion Letter- Depot Ductwork Design to tie	0d		21-Sep-07 A
A45810	Issue Ductwork Design to Contractor for Construction	0d		06-Nov-08
Depot Drainage Design (Task870.8)		476d	24-Apr-06 A	07-Mar-08
A51850	Produce Preliminary Design for DeWatering of Depot Site	38d	02-May-06 A	27-Jun-06 A
A52050	Produce Detailed Design for DeWatering of Depot Site	46d	19-Nov-07 A	01-Feb-08
A52970	Produce Overall Drainage Design for Depot Site	5d	24-Apr-06 A	28-Apr-06 A
A52980	Produce Drainage Interceptor Design	5d	02-May-06 A	08-May-06 A
A52990	Produce Overall Drainage Design for Depot Site	86d	12-Sep-07 A	25-Jan-08
A53000	Produce Drainage Interceptor Design	37d	26-Nov-07 A	28-Jan-08
A53020	Pumping Station Civil Engineering Design	28d	28-Jan-08	07-Mar-08
A53060	Electrical Supplies to Depot Drainage	9d	28-Jan-08	08-Feb-08
Systems & Comms		393d	13-Mar-06 A	21-Sep-07 A
A52040	Produce Preliminary Telecomms Performance Specification	71d	13-Mar-06 A	30-Jun-06 A
A52060	Issue Preliminary Telecomms Performance Specification	0d		30-Jun-06 A
SDS32980	CCTV Detailed Design	196d	20-Nov-06 A	21-Sep-07 A
Utilities (Task870.1)		467d	27-Mar-06 A	28-Jan-08
A12680	Close Out PD Issues and Re-issue PD Drawings to SUCs	26d	04-Aug-06 A	14-Sep-06 A
A12690	Design Development	331d	29-Aug-06 A	28-Jan-08
A12700	Initial Consultations With SUCs and IDTs	38d	29-Aug-06 A	23-Oct-06 A
A12710	MUDFA Appointment	0d		03-Oct-06 A
A12730	IDC	9d	18-Dec-06 A	08-Jan-07 A
A12740	Issue DD to SUC For Approval	0d		08-Jan-07 A
A12750	SUC Approval Period	150d	09-Jan-07 A	24-Aug-07 A
A14120	Access to MUDFA and Others	59d	04-Oct-06 A	08-Jan-07 A
A14130	Consult With SUCs on DD	59d	04-Oct-06 A	08-Jan-07 A
UTIL1500	Issue to Statutory Utility Companies (SUCs)	0d		21-Jun-06 A
UTIL160	Section 6 - Pre-Preliminary Design (Utilities)	55d	27-Mar-06 A	21-Jun-06 A
Depot Main Building (Task870.1)		653d	18-Apr-06 A	06-Nov-08
General (Task870.1.1)		653d	18-Apr-06 A	06-Nov-08
A28980	Review Utilities Supply (Gas, Electricity, Water)	79d	30-Jan-07 A	31-May-07 A
A28990	Develop External Services Connection Routes for Gas, Electricity & Water	99d	10-Apr-07 A	07-Sep-07 A
A29010	Review Operational Issues	137d	09-Feb-07 A	07-Sep-07 A
A29020	Develop Utilities-Supply, Routes	5d	20-Nov-06 A	24-Nov-06 A
A29030	Confirm External Service Connections	19d	20-Nov-06 A	15-Dec-06 A
A29050	Produce Plant Installation Layouts (Inc all Builders Wk Details-Foundations, Services, Loadings etc) from Contractor	28d	23-Oct-06 A	01-Dec-06 A
A29070	Architectural Layouts (1st Iteration)	96d	03-Jul-06 A	22-Nov-06 A
A29080	Architectural Detailed Design	211d	26-Oct-06 A	20-Sep-07 A
A29090	Architectural Layouts (2nd Iteration)	8d	10-Sep-07 A	20-Sep-07 A
A29120	Issue Notification Of Completion Letter- Depot Building Architectural Layout Package to tie	0d		21-Sep-07 A
A29140	Issue IFC Drawings For Depot Building	0d		06-Nov-08
A29240	Re Working Design For Infraco Tender	19d	25-Sep-06 A	20-Oct-06 A
A31710	Prepare Package for Building Reg Approval	80d	08-Oct-07 A	08-Feb-08
A51910	Produce Preliminary Floor Plans	27d	18-Apr-06 A	30-May-06 A
A51920	Produce General Arrangement Location Plans	27d	18-Apr-06 A	30-May-06 A
A52090	Establish Existing Utilities Supply & External Services Connections	23d	24-Apr-06 A	30-May-06 A
A52100	Develop Superstructure Configuration, Bay Sizes etc	27d	18-Apr-06 A	30-May-06 A
A52110	Review Operational Issues	14d	18-Apr-06 A	09-May-06 A
A52130	Establish Detailed Site Plan	13d	10-May-06 A	30-May-06 A
A52540	Issue Depot Main Building Preliminary Floor Plans	0d		30-Jun-06 A
A52550	Produce Depot & Office Building Elevations	10d	15-May-06 A	30-May-06 A
A52560	Produce Architectural Specification for Depot & Office Building	13d	10-May-06 A	30-May-06 A
A52750	Issue Architectural Specification for Depot & Office Building	0d	30-Jun-06 A	
A52760	Issue Depot & Office Building Elevations to tie	0d	30-Jun-06 A	
A53050	Second Iteration of Architetural Specification	147d	25-Jan-07 A	07-Sep-07 A
Building Foundations (Task870.1.2)		351d	10-May-06 A	21-Sep-07 A
A28771	Foundations Concrete Spec	147d	01-Feb-07 A	14-Sep-07 A
A28780	Foundations RC Design	147d	01-Feb-07 A	14-Sep-07 A
A28790	Foundations Drawings	149d	24-Nov-06 A	18-Jul-07 A
A29110	Issue Notification Of Completion Letter- Depot Detailed Substructure Drawings & Specifications to tie	0d		21-Sep-07 A
A5210	Foundations Layout & Calculations	66d	10-Apr-07 A	18-Jul-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

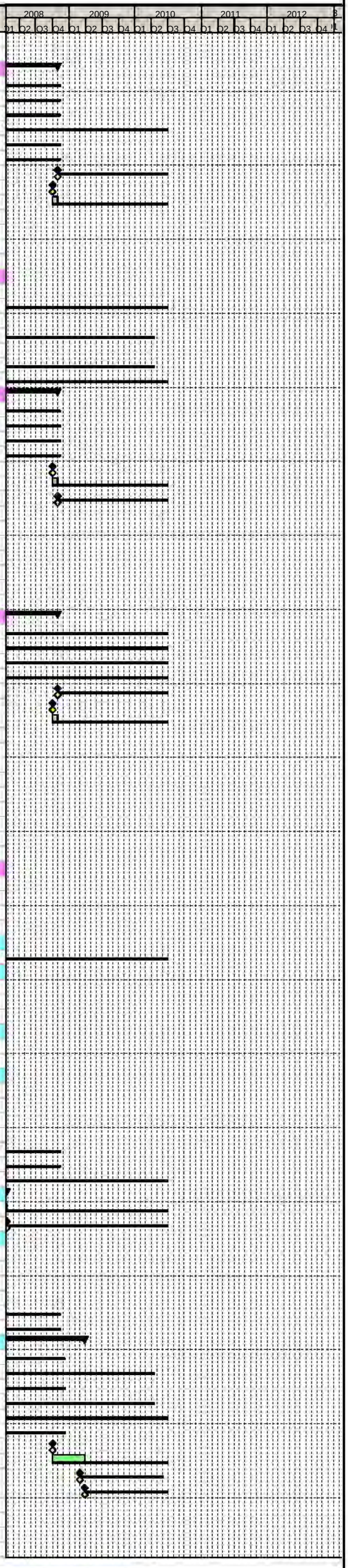
Trams for Edinburgh ...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
A52400	Prepare Preliminary Building Foundations Design	13d	10-May-06 A	30-May-06 A
A52670	Issue Preliminary Building Foundations Design	0d		30-Jun-06 A
Ground Floor Slab & Pits (Task870.1.3)		629d	15-May-06 A	29-Oct-08
A28830	Ground Floor Slab & Pits Layout & Calculations	184d	20-Nov-06 A	04-Sep-07 A
A28831	Ground Floor Slab & Pits Concrete Spec	8d	05-Sep-07 A	14-Sep-07 A
A28840	Ground Floor Slab & Pits RC Design	8d	10-Sep-07 A	19-Sep-07 A
A28850	Ground Floor Slab & Pits Drawings	153d	29-Jan-07 A	19-Sep-07 A
A29150	Issue Notification Of Completion Letter- Depot Ground Flr Slab to tie	0d		21-Sep-07 A
A30360	Drawings & Reinforcement Schedule (Ground Flr Slab & Pits)	0d		24-Sep-07 A
A48220	Issue Final As Built Drawings	0d		29-Oct-08
A48230	Receive As Built Information from Contractor	0d		01-Oct-08*
A48240	Produce Civil/Structural As Built Drawings & Manuals	19d	02-Oct-08	29-Oct-08
A52170	Prepare Preliminary Ground Floor Slab & Pit Design	10d	15-May-06 A	30-May-06 A
A52180	Prepare Preliminary Ground Floor & Pits Concrete Specification	9d	31-May-06 A	13-Jun-06 A
A52680	Issue Preliminary Ground Floor Slab & Pit Design	0d		30-Jun-06 A
A52690	Issue Preliminary Ground Floor & Pits Concrete Specification to tie	0d		30-Jun-06 A
Steel Superstructure (Task870.1.4)		352d	10-May-06 A	24-Sep-07 A
A52190	Prepare Preliminary Steel Superstructure Layout	23d	10-May-06 A	13-Jun-06 A
A5220	Steel Superstructure Layout & Calculations	193d	20-Nov-06 A	18-Sep-07 A
A52200	Prepare General Arrangement Drawings Superstructure Main Steelwork	21d	15-May-06 A	14-Jun-06 A
A5230	General Arrangement Drawings Superstructure Main Steelwork	191d	20-Nov-06 A	14-Sep-07 A
A52770	Issue General Arrangement Drawings Superstructure Main Steelwork	0d	30-Jun-06 A	
A5280	Issue Notification Of Completion Letter- Depot Detailed Superstructure Drawings and Specifications	0d		21-Sep-07 A
A5330	Sign Off Drawings for Construction Superstructure	1d	24-Sep-07 A	24-Sep-07 A
Mechanical (Task870.1.5)		648d	18-Apr-06 A	29-Oct-08
A28860	Calcs/Layouts/Schematics-Heating/Comp Air/Vent/Cooling	280d	21-Jul-06 A	28-Sep-07 A
A28870	Plant Schedules	219d	23-Oct-06 A	28-Sep-07 A
A28890	Calcs/Layouts/Schematics (Plant)	23d	23-Oct-06 A	24-Nov-06 A
A32180	Produce Mechanical Detailed Design Inc Comprehensive Drawings	164d	22-Jan-07 A	28-Sep-07 A
A45680	Receive Mechanical As Built Information from Contractor	0d		01-Oct-08*
A45690	Produce Mechanical As Built Drawings & Manuals	19d	02-Oct-08	29-Oct-08
A48180	Issue Final As Built Drawings	0d		29-Oct-08
A52230	Produce Plant Schedules	27d	18-Apr-06 A	30-May-06 A
A52240	Produce Plant Specifications	23d	17-May-06 A	20-Jun-06 A
A52520	Issue Plant Specifications	0d	30-Jun-06 A	
A52530	Issue Plant Schedules	0d	30-Jun-06 A	
A52570	Produce Ventilation Preliminary Design	8d	17-May-06 A	30-May-06 A
A52580	Produce Workshop Services Preliminary Design	8d	17-May-06 A	30-May-06 A
A52590	Produce Plant Room Layout Preliminary Design	8d	17-May-06 A	30-May-06 A
Electrical (Task870.1.6)		648d	18-Apr-06 A	29-Oct-08
A28920	Calcs/Layouts/Schematics-Fire/Data/Comms/Power/Mains Dist/Lighting	95d	11-Jul-06 A	29-Nov-06 A
A28930	Schedules	27d	23-Oct-06 A	30-Nov-06 A
A28940	Specifications	28d	23-Oct-06 A	01-Dec-06 A
A28950	Calcs/Layouts/Schematics (Plant)	219d	23-Oct-06 A	28-Sep-07 A
A48190	Issue Final As Built Drawings	0d		29-Oct-08
A48200	Receive As Built Information from Contractor	0d		01-Oct-08*
A48210	Produce Electrical As Built Drawings & Manuals	19d	02-Oct-08	29-Oct-08
A52250	Prepare Electrical Specifications	27d	18-Apr-06 A	30-May-06 A
A52260	Prepare Electrical Schedules	27d	18-Apr-06 A	30-May-06 A
A52270	Prepare Calcs/Layouts/Schematics (Plant) Drawings & Report	5d	12-Jun-06 A	16-Jun-06 A
A52600	Produce Preliminary Design for LV Power & Data Layouts	16d	17-May-06 A	09-Jun-06 A
A52610	Produce Preliminary Design for Lighting Layouts	16d	17-May-06 A	09-Jun-06 A
A52620	Produce Outline Design for Fire alarm Systems	16d	17-May-06 A	09-Jun-06 A
A52700	Issue Electrical Specifications	0d		30-Jun-06 A
A52710	Issue Depot Electrical Schedules	0d	30-Jun-06 A	
A52720	Issue Drawings & Report for Electrical Design Depot	0d		30-Jun-06 A
Ad Depot Public Health		38d	10-May-06 A	30-Jun-06 A
A52630	Produce Site Drainage Preliminary Design	25d	10-May-06 A	16-Jun-06 A
A52640	Produce Internal Plumbing Preliminary Design	35d	10-May-06 A	30-Jun-06 A
A52780	Issue Site Drainage Preliminary Design	0d	30-Jun-06 A	
A52790	Issue Internal Plumbing Preliminary Design	0d	30-Jun-06 A	
Environmental		95d	20-Mar-06 A	28-Jul-06 A
A52470	Produce Environmental Surveys & Recommendations	85d	20-Mar-06 A	28-Jul-06 A
Tram Wash (Outline Design Builders Work)		33d	17-May-06 A	30-Jun-06 A
A51930	Produce Tram Wash Preliminary Design	6d	09-Jun-06 A	16-Jun-06 A
A51940	Issue Tram Wash Preliminary Design	0d		30-Jun-06 A
A52500	Select Tram Wash Location	8d	17-May-06 A	30-May-06 A
Outline Power Design		29d	22-May-06 A	30-Jun-06 A
A52160	Produce Power Supplies Requirements Specification for Depot Site	18d	22-May-06 A	16-Jun-06 A
A52800	Issue Power Supplies Requirements Specification for Depot Site	0d	30-Jun-06 A	
Depot OLE (Task870.5)		263d	24-Apr-06 A	04-May-07 A
A51950	Produce Preliminary OLE Design	36d	24-Apr-06 A	16-Jun-06 A
A51960	Produce OLE Performance Specification	9d	19-Jun-06 A	30-Jun-06 A
A51970	Issue Depot Preliminary OLE Design	0d		30-Jun-06 A
A51980	Issue Depot Preliminary OLE Performance Specification	0d		30-Jun-06 A
SDS31330	Produce Final Detailed Layout Plans	135d	05-Sep-06 A	02-Apr-07 A
SDS55920	Issue Notification Of Completion Letter- Final Detailed Layout Plans & Standard & Special Cross Sections to tie Sec6	0d		04-May-07 A
SDS69470	SDM Design Interface Review Meetings	1d	01-Dec-06 A	02-Dec-06 A
VO238 OLE rework for depot (Internal - not PM approved)		8d	14-Jan-08	23-Jan-08
A487148	OLE Rework Due to Track/Roads Changes	8d	14-Jan-08	23-Jan-08
A487158	Re-Issue Notification Of Completion Letter- Final Detailed Layout Plans & Standard & Special Cross Sections to tie	0d		23-Jan-08
Depot Lighting Design (Task870.6)		367d	18-Apr-06 A	21-Sep-07 A
A52460	Produce Yard Preliminary Lighting Design	8d	17-May-06 A	30-May-06 A
A52650	Produce Yard Provisional Lighting Layout Specification	27d	18-Apr-06 A	30-May-06 A
A52820	Issue Depot Yard Preliminary Lighting Design	0d	30-Jun-06 A	
A52830	Issue Depot Yard Provisional Lighting Layout Specification	0d	30-Jun-06 A	
A53030	Produce Yard Detailed Design Lighting Design	191d	17-Nov-06 A	13-Sep-07 A
A53040	Issue Notification Of Completion Letter- Yard Detailed Design Lighting Design	0d		21-Sep-07 A
Tram Gogar Depot Substation (Task870.7)		748d	18-Apr-06 A	27-Mar-09
A1680	Detailed Substation Layout	178d	20-Nov-06 A	27-Aug-07 A
A29130	Issue Notification Of Completion Letter- Tram Gogar Depot Substation Design to tie (Part of General Depot Submission)	0d		21-Sep-07 A
A33340	IDC Substation Detailed Design (Inc. Systems Assurance)	9d	03-Sep-07 A	14-Sep-07 A
A33360	Compile Substation Planning Submission	5d	14-Sep-07 A	20-Sep-07 A
A45720	Determine Transformer Dimensions,Cable Routes Foundation Req,Maintenace Access from Power	0d		20-Nov-06 A
A45730	Prepare Detailed Construction Drawings	141d	30-Jan-07 A	03-Sep-07 A
A48000	Receive First As Built Data from Contractor	0d		01-Oct-08*
A48010	Produce As Built Drawings	119d	02-Oct-08	27-Mar-09
A48020	Receive Final As Built Data from Contractor	0d		27-Feb-09
A48030	Issue Final As Built Drawings	0d		27-Mar-09
A52280	Substation Initial Design	27d	18-Apr-06 A	30-May-06 A
A52660	Produce Architectural Preliminary Specification for Substation	27d	18-Apr-06 A	30-May-06 A
A52850	Issue Substation Initial Design	0d		30-Jun-06 A
A52860	Issue Architectural Preliminary Specification for Substation	0d		30-Jun-06 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

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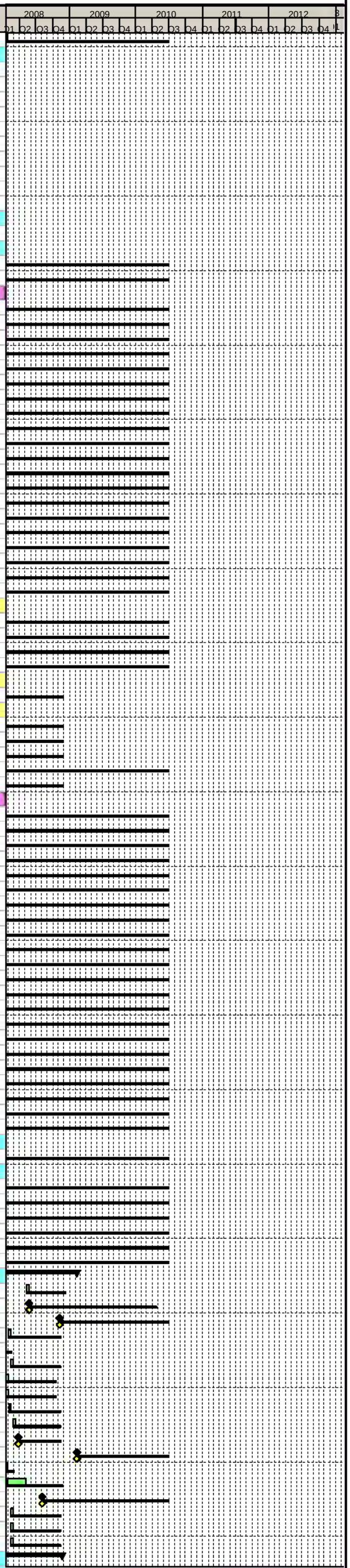
Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS81020	Address tie Comments, Other Revisions, IDC & Section Submission Package	52d	02-Nov-07 A	25-Jan-08
External Yard E&M Design		39d	09-May-06 A	30-Jun-06 A
A52870	Performance Specification for Yard E&M Services	9d	19-Jun-06 A	30-Jun-06 A
A52880	Produce Preliminary Design for LV Power Distribution	9d	19-Jun-06 A	30-Jun-06 A
A52890	Produce Preliminary Design for Water Supply	9d	19-Jun-06 A	30-Jun-06 A
A52900	Produce Preliminary Design for Compressed Air	32d	09-May-06 A	26-Jun-06 A
A52910	Produce Preliminary Design for Fire Protection	32d	09-May-06 A	26-Jun-06 A
A52920	Produce Preliminary Design for Earthing	9d	19-Jun-06 A	30-Jun-06 A
A52930	Produce Preliminary Design for CCTV	9d	19-Jun-06 A	30-Jun-06 A
A52940	Produce Preliminary Design for Security & Alarm Systems	9d	19-Jun-06 A	30-Jun-06 A
A52950	Issue Preliminary Design for External Yard E&M Design	0d		30-Jun-06 A
A52960	Issue Performance Specification for Yard E&M Services	0d		30-Jun-06 A
Operational Review		0d	13-Apr-06 A	13-Apr-06 A
A51900	PB Receive Preliminary Operation Report	0d		13-Apr-06 A
Structures		411d	15-Feb-06 A	21-Sep-07 A
A52440	Produce Structures Preliminary Design Concepts	87d	15-Feb-06 A	29-Jun-06 A
A52810	Issue Depot Structures Preliminary Design Concepts	0d	30-Jun-06 A	
VO7 - S32 - Depot Access Road Bridge (Task CR7)		380d	30-Mar-06 A	21-Sep-07 A
SDS55330	Collate Base Data on Alignment & Topo survey	22d	30-Mar-06 A	04-May-06 A
SDS55340	Define Clearances	5d	05-May-06 A	11-May-06 A
SDS55350	Develop Preliminary Structures Options	15d	05-May-06 A	26-May-06 A
SDS55360	Options Review	5d	30-May-06 A	05-Jun-06 A
SDS55370	Produce Draft GA (AIP) Drg Showing Preferred Option	7d	30-May-06 A	07-Jun-06 A
SDS55380	Issue Depot Draft GA (AIP) Drg to tie	0d		30-Jun-06 A
SDS55390	Select Preferred Design Option in Liaison with tie	4d	22-Aug-06 A	29-Aug-06 A
SDS55400	Update Base Data on Alignment & Topo Survey	2d	22-Aug-06 A	23-Aug-06 A
SDS55410	Draft AIP Document Text	4d	24-Aug-06 A	30-Aug-06 A
SDS55420	Update AIP GA Drgs	4d	25-Aug-06 A	31-Aug-06 A
SDS55430	Check of AIP Document	2d	29-Aug-06 A	30-Aug-06 A
SDS55440	Issue AIP Document to Technical Approval Authority (TAA) Form A	0d		07-Sep-06 A
SDS55450	Issue AIP Document to Planning Department	0d		11-Jul-06 A
SDS55460	TAA Review AIP & Comment	39d	06-Sep-06 A	02-Nov-06 A
SDS55480	Receive AIP Comments from TAA	0d		02-Nov-06 A
SDS55500	Incorporate AIP Comments from TAA	94d	03-Nov-06 A	30-Mar-07 A
SDS55520	Re-issue AIP to TAA	0d		30-Mar-07 A
SDS55530	TAA Review AIP	5d	02-Apr-07 A	10-Apr-07 A
SDS55540	TAA Sign Off AIP Document	0d		05-Apr-07 A
SDS55550	Issue AIP to Structures Detailed Design Team	0d		09-Apr-07 A
Depot Access Road Bridge Substructure Detailed Design		233d	23-Oct-06 A	21-Sep-07 A
SDS57420	Substructure Analysis	169d	23-Oct-06 A	13-Jul-07 A
SDS57440	Substructure Detailed Design	197d	17-Nov-06 A	21-Sep-07 A
SDS57450	Substructure Detailed Design Draughting	184d	07-Dec-06 A	21-Sep-07 A
SDS65790	Issue Detailed Design Package to CAT II Checker	0d	21-Dec-06 A	
Depot Access Road Bridge Preliminary Design Milestones		139d	21-Aug-06 A	12-Mar-07 A
SDS57390	Update Available Base Data/Info Re Alignment/Topo Survey etc	130d	21-Aug-06 A	12-Mar-07 A
Depot Access Road Bridge Superstructure Detailed Design		272d	29-Aug-06 A	21-Sep-07 A
SDS57410	Superstructure Analysis	191d	29-Aug-06 A	22-Jun-07 A
SDS57430	Superstructure Detailed Design	197d	17-Nov-06 A	21-Sep-07 A
SDS57480	Prepare Relevant Bridgeworks Specification Clauses	137d	22-Dec-06 A	27-Jul-07 A
SDS57510	Issue Detailed Design Package to CAT II Checker	0d	08-Jan-07 A	
SDS65920	Superstructure Detailed Design Draughting	127d	12-Mar-07 A	21-Sep-07 A
W16 - A8 Retaining Walls (Task870.11)		214d	30-Mar-06 A	01-Feb-07 A
SDS54640	Collate Base Data on Alignment & Topo survey	17d	30-Mar-06 A	26-Apr-06 A
SDS54650	Define Clearances	12d	12-Apr-06 A	03-May-06 A
SDS54660	Develop Preliminary Structures Options	20d	27-Apr-06 A	26-May-06 A
SDS54670	Options Review	8d	22-May-06 A	01-Jun-06 A
SDS54680	Produce Draft GA (AIP) Drg Showing Preferred Option	19d	22-May-06 A	19-Jun-06 A
SDS54690	Issue A8 RW Draft GA (AIP) Drg to tie	0d		27-Jun-06 A
SDS54700	Select Preferred Design Option in Liaison with tie	18d	23-May-06 A	19-Jun-06 A
SDS54710	Update Base Data on Alignment & Topo Survey	2d	23-May-06 A	24-May-06 A
SDS54720	Draft AIP Document Text	21d	25-May-06 A	26-Jun-06 A
SDS54730	Update AIP GA Drgs	21d	31-May-06 A	29-Jun-06 A
SDS54740	Check of AIP Document	2d	27-Jun-06 A	28-Jun-06 A
SDS54750	Issue AIP Document to Technical Approval Authority (TAA) Form A	0d		11-Jul-06 A
SDS54760	Issue AIP Document to Planning Department	0d		11-Jul-06 A
SDS54770	TAA Review AIP & Comment	14d	11-Jul-06 A	31-Jul-06 A
SDS54780	Planning Department Review AIP & Comment	14d	11-Jul-06 A	31-Jul-06 A
SDS54790	Receive AIP Comments from TAA	0d		01-Aug-06 A
SDS54800	Receive AIP Comments from Planning Department	0d		01-Aug-06 A
SDS54810	Incorporate AIP Comments from TAA	113d	02-Aug-06 A	25-Jan-07 A
SDS54830	Re-issue AIP to TAA	0d		25-Jan-07 A
SDS54840	TAA Review AIP	5d	26-Jan-07 A	01-Feb-07 A
SDS54850	TAA Sign Off AIP Document	0d		01-Feb-07 A
SDS54860	Issue AIP to Structures Detailed Design Team	0d		01-Feb-07 A
VO76 Gogar Depot Runway Extension CNS020		10d	11-Dec-06 A	22-Dec-06 A
VO1380	Feasibitlity Study for Gogar Depot Runway Extn	9d	11-Dec-06 A	22-Dec-06 A
VO244 Possible Gogar Depot Adjustment Due to EARL CNS065		254d	16-Aug-06 A	16-Aug-07 A
VO1510	Review of Depot Building to Determine Impact of Demise of EARL	12d	31-Jul-07 A	16-Aug-07 A
VO1570	Review of Depot Structures to Determine Impact of Demise of EARL	12d	31-Jul-07 A	16-Aug-07 A
VO1580	Review of OLE to Determine Impact of Demise of EARL	12d	31-Jul-07 A	16-Aug-07 A
VO1590	Review of Track to Determine Impact of Demise of EARL	12d	31-Jul-07 A	16-Aug-07 A
VO1600	Additional Management	8d	06-Aug-07 A	16-Aug-07 A
VO1790	Issue Gogar Depot Report 'Possible Adjustments' to tie	0d		16-Aug-06 A
VO250 Gogar Depot Adjustment due to EARL CNS067		351d	17-Sep-07 A	09-Feb-09
SDS57470	Depot Access Bridge Redesign IDC	9d	09-May-08	22-May-08
SDS57490	Issue Notification Of Completion Letter- Depot Access Road Bridge Structure Package to tie	0d		22-May-08
SDS57660	Issue Depot Access Road Bridge Specification Clauses For Construction	0d		06-Nov-08
VO1650	Lighting Revision	12d	30-Jan-08	15-Feb-08
VO1660	Receive Change Order Approval	0d	14-Dec-07 A	
VO1760	Systems & Comms Re Design	9d	13-Feb-08	26-Feb-08
VO1770	Track Redesign	69d	15-Oct-07 A	01-Feb-08
VO1780	Depot Layout Redesign	88d	17-Sep-07 A	01-Feb-08
VO1800	OLE Redesign	9d	04-Feb-08	15-Feb-08
VO1810	Landscaping	9d	27-Feb-08	11-Mar-08
VO1820	Issue Notification Of Completion Letter- Depot Redesign (Excl. Depot Access Bridges)	0d		26-Mar-08
VO1840	Issue For Construction Drawings Depot Inc Redesigned Scope (Excl. Depot Access Bridges)	0d		09-Feb-09
VO1850	Depot Access Bridge Redesign - AIP	52d	05-Nov-07 A	28-Jan-08
VO1860	Depot Access Bridge Redesign - Detailed Design	66d	29-Jan-08	08-May-08
VO1960	Issue For Construction - Depot Access Bridge Redesign	0d		04-Aug-08
VO1980	Ductwork Redesign	9d	13-Feb-08	26-Feb-08
VO1990	Additional Utilities Resources	9d	13-Feb-08	26-Feb-08
VO2000	Additional Interface Management Resources	9d	13-Feb-08	26-Feb-08
VO265 Gogar Depot Redesign (Internal - not PM approved)		265d	06-Nov-07 A	20-Nov-08



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

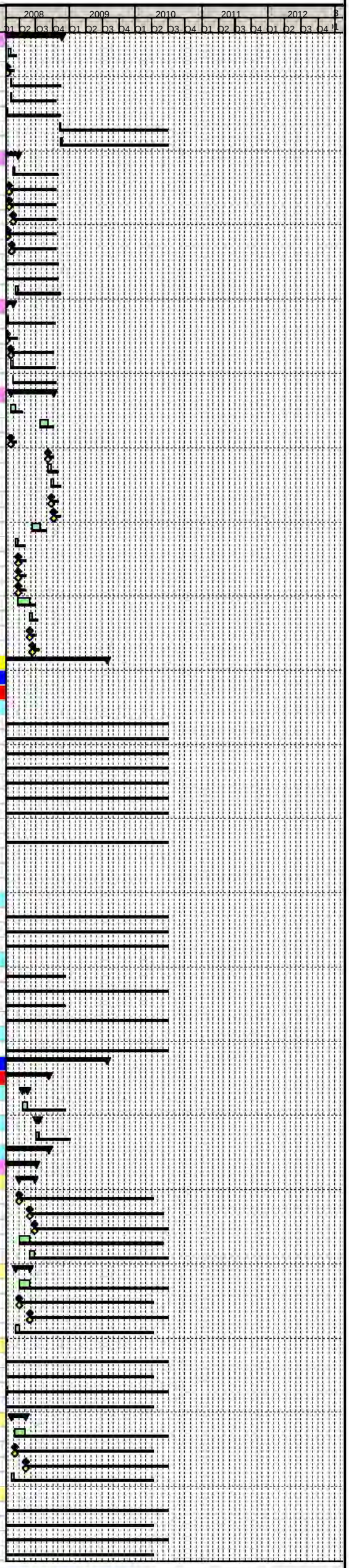
Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
VO265 Depot Roads Redesign		223d	14-Jan-08	20-Nov-08
VO1610	Horizontal and Vertical Alignment - Depot Access Road	9d	30-Jan-08	12-Feb-08
VO2010	Receive Bridge Decks Plan and Levels from Structures	0d	29-Jan-08	
VO2120	Ancillary Design	5d	13-Feb-08	19-Feb-08
VO2130	Roads Drainage Design	5d	13-Feb-08	19-Feb-08
VO2140	Design Pumping Station Access Road	9d	14-Jan-08	25-Jan-08
VO2250	Final RSA	5d	06-Nov-08	13-Nov-08
VO2260	Incorporate RSA Comments	5d	13-Nov-08	20-Nov-08
VO265 Depot Drainage Redesgin		95d	06-Nov-07 A	26-Mar-08
VO1630	Drainage Redesign	8d	28-Feb-08	10-Mar-08
VO2270	Receive Depot Track Outfall Location	0d	04-Feb-08	
VO2340	Receive Buildings and Paved Area Outfalls (Locations and Volumes)	0d	04-Feb-08	
VO2350	Receive Earthworks Ground Water Calculations	0d	27-Feb-08	
VO2360	Receive Structure Catchment Area and Drainage Connections	0d	29-Jan-08	
VO2370	Receive Roads Drainage Design	0d	20-Feb-08	
VO2380	Agree Drainage Principles with Architect	13d	06-Nov-07 A	23-Nov-07 A
VO2390	Determine Location of Pumping Station	3d	22-Nov-07 A	26-Nov-07 A
VO2400	Attenuation Tank Design	9d	11-Mar-08	26-Mar-08
VO265 Depot Earthworks Redesign		27d	21-Jan-08	27-Feb-08
VO1620	Earthworks Design for A8 (including MX)	9d	21-Jan-08	01-Feb-08
VO2410	Receive Topo of Completed Depot MUDFA works	0d	21-Jan-08*	
VO2420	Receive Access Road Horizontal and Vertical Alignment	0d	13-Feb-08	
VO2560	Earthworks Design for Depot Access Road	9d	13-Feb-08	26-Feb-08
VO2570	Calculate Ground Water	0d	27-Feb-08	27-Feb-08
VO265 Additional Retaining Walls		171d	13-Feb-08	09-Oct-08
VO1520	Depot Internal Retaining Walls Preliminary Design	19d	13-Feb-08	12-Mar-08
VO1830	Depot Internal Retaining Walls Detailed Design Draughting	28d	23-Jul-08	03-Sep-08
VO2580	Receive Access Road Horzontal and Vertical Alignment	0d	13-Feb-08	
VO2590	Issue Detailed Design to CAT II check	0d	04-Sep-08	
VO2630	CAT II check	14d	04-Sep-08	24-Sep-08
VO2640	Incorporate CAT II comments	9d	25-Sep-08	09-Oct-08
VO2650	Receive CAT II check comments	0d	25-Sep-08	
VO2660	Issue Notification of Completion Letter to tie - Depot Internal Retaining Walls	0d		09-Oct-08
VO2670	Depot Internal Retaining Walls Detailed Design	28d	11-Jun-08	22-Jul-08
VO2680	Depot Internal Retaining Walls Produce AIP	9d	12-Mar-08	28-Mar-08
VO2690	Issue Depot Internal Retaining Walls AIP to tie	0d	28-Mar-08	
VO2700	Issue Depot Internal Retaining Walls AIP to CEC	0d	28-Mar-08	
VO2710	Issue Depot Internal Retaining Walls AIP to TAA	0d	28-Mar-08	
VO2720	tie, CEC and TAA approval period	38d	28-Mar-08	27-May-08
VO2730	Update to TAA comments	9d	27-May-08	10-Jun-08
VO2750	Receive TAA comments	0d	27-May-08	
VO2760	Receive approved and signed AIP	0d	10-Jun-08	
Gogarburn to Edinburgh Airport - Section 7 (Task800)		986d	19-Sep-05 A	28-Jul-09
Section Wide - Section 7		354d	05-May-06 A	21-Sep-07 A
Section Wide		354d	05-May-06 A	21-Sep-07 A
Preliminary Design Approvals		131d	05-May-06 A	03-Nov-06 A
SDS23580	Track IDC	38d	03-Jul-06 A	25-Aug-06 A
SDS23600	Tramstops IDC	38d	03-Jul-06 A	25-Aug-06 A
SDS23610	Roads IDC	38d	03-Jul-06 A	25-Aug-06 A
SDS23620	Structures IDC	83d	03-Jul-06 A	03-Nov-06 A
SDS23630	Substation IDC	4d	12-Jun-06 A	16-Jun-06 A
SDS24000	Informal Consultation with tie	38d	05-May-06 A	30-Jun-06 A
SDS34890	PD - Submit Section 7 Substation Deliverables	0d		30-Jun-06 A
SDS34900	PD - Submit Section 7 Track Deliverables	0d		30-Jun-06 A
SDS34910	PD - Submit Section 7 Tramstops Deliverables	0d		30-Jun-06 A
SDS34920	PD - Submit Section 7 Roads Deliverables	0d		30-Jun-06 A
SDS34930	PD - Submit Section 7 Structures Deliverables	0d		30-Jun-06 A
SDS34940	PD - Section 7 Complete - Issue to tie	0d		30-Jun-06 A
Stakeholder Reviews		33d	12-Feb-07 A	28-Mar-07 A
A569720	Review Potential Issues with tie & Determine Consultation Strategy	5d	12-Feb-07 A	16-Feb-07 A
A569860	Feedback to Design Teams for Study	26d	19-Feb-07 A	28-Mar-07 A
SDS23650	Stakeholder Review	5d	12-Feb-07 A	16-Feb-07 A
OLE (Task800.1)		157d	29-Aug-06 A	13-Apr-07 A
SDS31340	Produce Final Detailed Layout Plans	138d	29-Aug-06 A	29-Mar-07 A
SDS55930	Issue Notification Of Completion Letter- Final Detailed Layout Plans & Standard & Special Cross Section to tie Section 7	0d		13-Apr-07 A
SDS59500	IDC OLE Design	9d	29-Mar-07 A	13-Apr-07 A
SDS69480	SDM Design Interface Review Meetings	1d	01-Dec-06 A	02-Dec-06 A
VO86 Land Acquisition and Costing for Artificial Badger Setts (Section 7)		200d	07-Dec-06 A	21-Sep-07 A
VO2440	Meetings with TSS, Corderoy and NIL	184d	07-Dec-06 A	21-Sep-07 A
GOG - AIR - Section 7A (Task800.2)		986d	19-Sep-05 A	28-Jul-09
Sub Section Wide		644d	06-Mar-06 A	10-Sep-08
Sub Section Wide IDC		20d	16-Apr-08	13-May-08
A40581	Subsection Wide IDC	19d	16-Apr-08	13-May-08
Design Assurance Review		10d	03-Jul-08	16-Jul-08
SDS68060	Produce Section Wide Design Assurance Statement	9d	03-Jul-08	16-Jul-08
Consents & Approvals		396d	26-Feb-07 A	10-Sep-08
Prior Approvals		346d	26-Feb-07 A	02-Jul-08
Combined Section Prior Approval		60d	01-Apr-08	24-Jun-08
A25880	Issue Combined Package 7A for Prior Approval to CEC	0d		01-Apr-08
A25900	Receive Combined Package 7A Comments From CEC	0d		27-May-08
A25910	Prior Approval Granted for Section 7A Combined Package	0d		24-Jun-08
A40660	CEC Approval Period - 7A Combined Package	38d	01-Apr-08	27-May-08
A40670	Update 7A Combined Package to CEC Comments	19d	27-May-08	24-Jun-08
Batch 7/23		54d	14-Mar-08	29-May-08
SDS76320	Batch 7/23 Formal Approval Period	38d	01-Apr-08	28-May-08
SDS76330	Issue Batch 7/23 For Approval to CEC	0d	01-Apr-08	
SDS76340	Receive CEC Prior Approval For Batch 7/23	0d	29-May-08	
SDS76370	Batch 7/23 Gogar Church to Gogar Burn - Collation of Planning Drawings	9d	14-Mar-08*	31-Mar-08
Batch 7/24		74d	17-Sep-07 A	08-Jan-08 A
SDS76380	Batch 7/24 Formal Approval Period	38d	02-Nov-07 A	04-Jan-08 A
SDS76390	Issue Batch 7/24 For Approval to CEC	0d	02-Nov-07 A	
SDS76400	Receive CEC Prior Approval For Batch 7/24	0d	08-Jan-08 A	
SDS76430	Batch 7/24 Gogarburn Bridge - Collation of Planning Drawings	32d	17-Sep-07 A	01-Nov-07 A
Batch 7/25		53d	21-Feb-08	06-May-08
SDS76440	Batch 7/25 Formal Approval Period	38d	06-Mar-08	02-May-08
SDS76450	Issue Batch 7/25 For Approval to CEC	0d	06-Mar-08	
SDS76460	Receive CEC Prior Approval For Batch 7/25	0d	06-May-08	
SDS76490	Batch 7/25 Gogar Burn to Ingliston - Collation of Planning Drawings	9d	21-Feb-08*	05-Mar-08
Batch 7/26 NO LONGER REQUIRED		57d	05-Jul-07 A	21-Sep-07 A
SDS76500	Batch 7/26 Formal Approval Period	37d	30-Jul-07 A	21-Sep-07 A
SDS76510	Issue Batch 7/26 For Approval to CEC	0d	01-Aug-07 A	
SDS76520	NO LONGER REQUIRED DUE TO DEMISE OF EARL	0d	21-Sep-07 A	
SDS76540	Batch 7/26 EARL Bridge - Informal Consultation	17d	05-Jul-07 A	30-Jul-07 A



Primary Baseline
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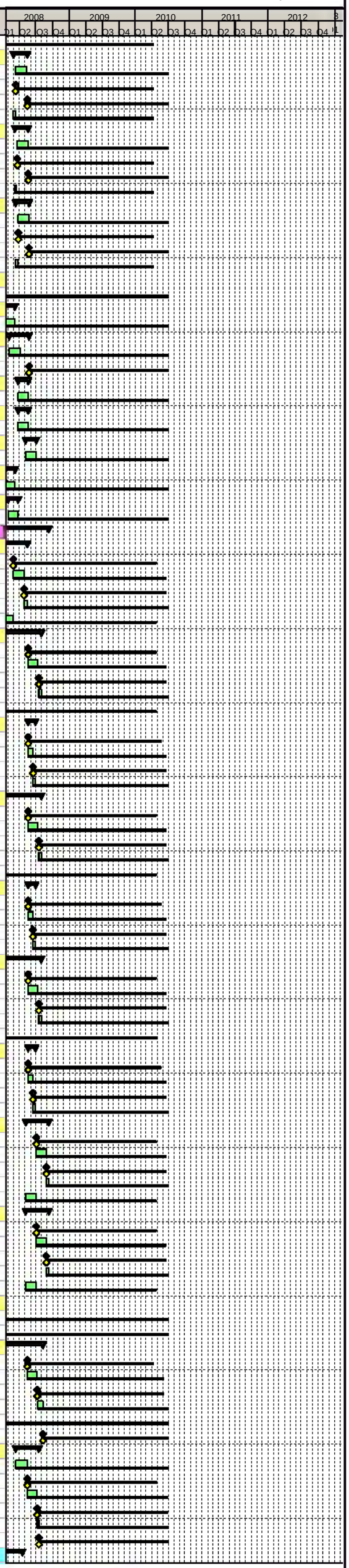
Trams for Edinburgh
...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS76550	Batch 7/26 EARL Bridge - Collation of Planning Drawings	9d	16-Jul-07 A	27-Jul-07 A
Batch 7/27		53d	28-Feb-08	13-May-08
SDS76560	Batch 7/27 Formal Approval Period	38d	13-Mar-08	12-May-08
SDS76570	Issue Batch 7/27 For Approval to CEC	0d	13-Mar-08	
SDS76580	Receive CEC Prior Approval For Batch 7/27	0d	13-May-08	
SDS76610	Batch 7/27 Ingliston Park & Ride Tramstop - Collation of Planning Drawings	9d	28-Feb-08*	12-Mar-08
Batch 7/28		53d	06-Mar-08	20-May-08
SDS76620	Batch 7/28 Formal Approval Period	38d	20-Mar-08	19-May-08
SDS76630	Issue Batch 7/28 For Approval to CEC	0d	20-Mar-08	
SDS76640	Receive CEC Prior Approval For Batch 7/28	0d	20-May-08	
SDS76670	Batch 7/28 Ingliston to Airport - Collation of Planning Drawings	9d	06-Mar-08*	19-Mar-08
Batch 7/29		53d	11-Mar-08	23-May-08
SDS76680	Batch 7/29 Formal Approval Period	38d	27-Mar-08	22-May-08
SDS76690	Issue Batch 7/29 For Approval to CEC	0d	27-Mar-08	
SDS76700	Receive CEC Prior Approval For Batch 7/29	0d	23-May-08	
SDS76730	Batch 7/29 Edinburgh Airport - Collation of Planning Drawings	9d	11-Mar-08	26-Mar-08
Roads, Track, OLE, Landscaping, Street Lighting		42d	26-Feb-07 A	24-Apr-07 A
SDS31070	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	26-Feb-07 A	24-Apr-07 A
Tram Stop Ingliston Park and Ride		40d	14-Jan-08	07-Mar-08
A41020	Informal Consultation With CEC & tie over Prior Approval Tram Stop Ingliston Park and Ride	38d	14-Jan-08	07-Mar-08
Tram Eastfield Road Substation		76d	07-Feb-08	23-May-08
A41300	Informal Consultation With CEC & tie over Prior Approval Tram Eastfield Road Substation	38d	07-Feb-08	02-Apr-08
A41310	Prior Approval Tram Eastfield Road Substation	0d		23-May-08
Gogar Culvert Two		40d	26-Mar-08	20-May-08
563	Commence Gogar Burn Culvert Two Informal Consultation With CEC & tie Over Prior Approval	38d	26-Mar-08	20-May-08
Gogar Culvert Three		40d	26-Mar-08	20-May-08
593	Commence Gogar Burn Culvert Three Informal Consultation With CEC & tie Over Prior Approval	38d	26-Mar-08	20-May-08
Gogar Burn Retaining Wall One		40d	08-May-08	02-Jul-08
573	Commence Gogar Burn RW One Informal Consultation With CEC & tie Over Prior Approval	38d	08-May-08	02-Jul-08
Gogar Burn Retaining Wall Two		40d	14-Jan-08	07-Mar-08
583	Commence Gogar Burn RW Two Informal Consultation With CEC & tie Over Prior Approval	38d	14-Jan-08	07-Mar-08
Tram Stop Edinburgh Airport		40d	30-Jan-08	25-Mar-08
A41050	Informal Consultation With CEC & tie over Prior Approval Tram Stop Edinburgh Airport	38d	30-Jan-08	25-Mar-08
Technical Approvals		396d	26-Feb-07 A	10-Sep-08
Gogarburn Bridge Review (TAA)		140d	22-Oct-07 A	13-May-08
SDS36350	Issue Detailed Design Package to TAA	0d		28-Feb-08
SDS36380	TAA Approval Period	38d	29-Feb-08	28-Apr-08
SDS36420	Receive TAA Comments	0d		28-Apr-08
SDS36450	Incorporate TAA Comments	9d	29-Apr-08	13-May-08
SDS63030	Commence Gogar Burn Bridge Informal Consultation With CEC Over Technical Approval	88d	22-Oct-07 A	28-Feb-08
Gogar Culvert One Structure Review Period (TAA)		298d	30-May-07 A	29-Jul-08
332	Issue Gogar Burn Culvert One Design Package to TAA	0d	21-May-08	
333	TAA Gogar Burn Culvert One Design Package Review Period	38d	21-May-08	15-Jul-08
334	Receive Gogar Burn Culvert One Design Package comments from TAA	0d	16-Jul-08	
335	Incorporate TAA comments into Gogar Burn Culvert One Design Package	9d	16-Jul-08	29-Jul-08
343	Commence Gogar Burn Culvert One Informal Consultation With CEC Over Technical Approval	41d	30-May-07 A	30-Jul-07 A
Gogar Culvert One Structure Review Period (SEPA)		30d	21-May-08	01-Jul-08
337	Issue Gogar Burn Culvert One Design Package to SEPA	0d	21-May-08	
338	SEPA Gogar Burn Culvert One Design Package Review Period	19d	21-May-08	17-Jun-08
339	Receive Gogar Burn Culvert One Design Package comments from SEPA	0d	18-Jun-08	
340	Incorporate SEPA comments into Gogar Burn Culvert One Design Package	9d	18-Jun-08	01-Jul-08
Gogar Culvert Two Structure Review Period (TAA)		298d	30-May-07 A	29-Jul-08
362	Issue Gogar Burn Culvert Two Design Package to TAA	0d	21-May-08	
363	TAA Gogar Burn Culvert Two Design Package Review Period	38d	21-May-08	15-Jul-08
364	Receive Gogar Burn Culvert Two Design Package comments from TAA	0d	16-Jul-08	
365	Incorporate TAA comments into Gogar Burn Culvert Two Design Package	9d	16-Jul-08	29-Jul-08
373	Commence Gogar Burn Culvert Two Informal Consultation With CEC Over Technical Approval	41d	30-May-07 A	30-Jul-07 A
Gogar Culvert Two Structure Review Period (SEPA)		30d	21-May-08	01-Jul-08
367	Issue Gogar Burn Culvert Two Design Package to SEPA	0d	21-May-08	
368	SEPA Gogar Burn Culvert Two Design Package Review Period	19d	21-May-08	17-Jun-08
369	Receive Gogar Burn Culvert Two Design Package comments from SEPA	0d	18-Jun-08	
370	Incorporate SEPA comments into Gogar Burn Culvert Two Design Package	9d	18-Jun-08	01-Jul-08
Gogar Culvert Three Structure Review Period (TAA)		298d	30-May-07 A	29-Jul-08
392	Issue Gogar Burn Culvert Three Design Package to TAA	0d	21-May-08	
393	TAA Gogar Burn Culvert Three Design Package Review Period	38d	21-May-08	15-Jul-08
394	Receive Gogar Burn Culvert Three Design Package comments from TAA	0d	16-Jul-08	
395	Incorporate TAA comments into Gogar Burn Culvert Three Design Package	9d	16-Jul-08	29-Jul-08
403	Commence Gogar Burn Culvert Three Informal Consultation With CEC Over Technical Approval	41d	30-May-07 A	30-Jul-07 A
Gogar Culvert Three Structure Review Period (SEPA)		30d	21-May-08	01-Jul-08
397	Issue Gogar Burn Culvert Three Design Package to SEPA	0d	21-May-08	
398	SEPA Gogar Burn Culvert Three Design Package Review Period	19d	21-May-08	17-Jun-08
399	Receive Gogar Burn Culvert Three Design Package comments from SEPA	0d	18-Jun-08	
400	Incorporate SEPA comments into Gogar Burn Culvert Three Design Package	9d	18-Jun-08	01-Jul-08
Gogar Burn Retaining Wall One Review Period (TAA)		90d	08-May-08	10-Sep-08
422	Issue Gogar Burn RW One Design Package to TAA	0d	03-Jul-08	
423	TAA Gogar Burn RW One Design Package Review Period	38d	03-Jul-08	27-Aug-08
424	Receive Gogar Burn RW One Design Package comments from TAA	0d	28-Aug-08	
425	Incorporate TAA comments into Gogar Burn RW One Design Package	9d	28-Aug-08	10-Sep-08
433	Commence Gogar Burn RW One Informal Consultation With CEC Over Technical Approval	38d	08-May-08	02-Jul-08
Gogar Burn Retaining Wall Two Structure Review Period (TAA)		90d	08-May-08	10-Sep-08
452	Issue Gogar Burn RW Two Design Package to TAA	0d	03-Jul-08	
453	TAA Gogar Burn RW Two Design Package Review Period	38d	03-Jul-08	27-Aug-08
454	Receive Gogar Burn RW Two Design Package comments from TAA	0d	28-Aug-08	
455	Incorporate TAA comments into Gogar Burn RW Two Design Package	9d	28-Aug-08	10-Sep-08
463	Commence Gogar Burn RW Two Informal Consultation With CEC Over Technical Approval	38d	08-May-08	02-Jul-08
EARL Overbridge Review (TAA)		178d	15-Mar-07 A	19-Nov-07 A
SDS57780	Issue Detailed Design Package to TAA - NO LONGER REQUIRED	0d		19-Nov-07 A
SDS63040	Commence EARL Overbridge Informal Consultation With CEC Over Technical Approval	38d	15-Mar-07 A	14-May-07 A
Roads Technical Approval		372d	26-Feb-07 A	07-Aug-08
SDS31080	Issue Roads Design to Roads Authority for Approval	0d		14-May-08
SDS31090	Roads Authority Approval Period	38d	15-May-08	10-Jul-08
SDS31100	Receive Roads Authority Comments	0d		10-Jul-08
SDS31110	Update to Roads Authority Comments	19d	11-Jul-08	07-Aug-08
SDS31120	Roads Authority Informal Consultation	38d	26-Feb-07 A	24-Apr-07 A
SDS31190	Roads Technical Approval Granted	0d		07-Aug-08
Drainage Technical Approval		89d	14-Mar-08	16-Jul-08
SDS73020	Roads Authority Informal Consultation For Drainage	38d	14-Mar-08	13-May-08
SDS73030	Issue Drainage Design to Roads Authority for Approval	0d		13-May-08
SDS73040	Roads Authority Approval Period For Drainage	38d	14-May-08	09-Jul-08
SDS73050	Receive Roads Authority Comments For Drainage	0d		09-Jul-08
SDS73060	Update to Roads Authority Comments For Drainage	5d	10-Jul-08	16-Jul-08
SDS73070	Drainage Technical Approval Granted	0d		16-Jul-08
VO243 EARL - Tram Changes		115d	29-Oct-07 A	16-Apr-08



Primary Baseline
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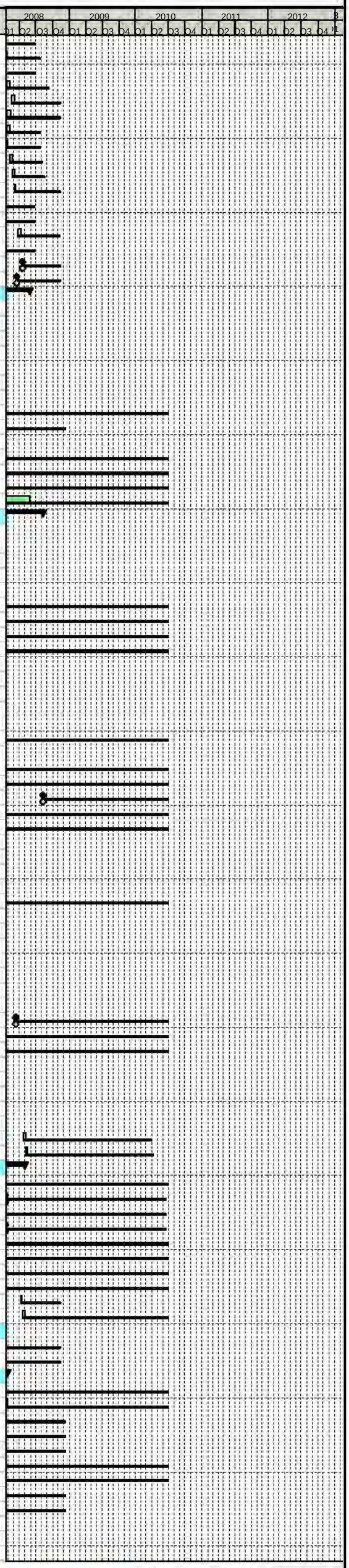
Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
SDS80200	Collate Drainage Limiting Levels	5d	16-Nov-07 A	22-Nov-07 A
SDS80210	Drainage Indicative Design	41d	16-Nov-07 A	24-Jan-08
SDS80220	Track Vertical Alignment Detailed Design Inc NIL + New Bridge Future Proof	46d	05-Nov-07 A	18-Jan-08
SDS80230	Tram Stops Detailed Design	14d	21-Jan-08	08-Feb-08
SDS80240	Substation Detailed Design	14d	18-Feb-08	07-Mar-08
SDS80250	Roads Detailed Design	19d	21-Jan-08	15-Feb-08
SDS80260	OLE Detailed Design	14d	21-Jan-08	08-Feb-08
SDS80270	Ducting Detailed Design	1d	28-Jan-08	28-Jan-08
SDS80280	Prepare Composite Cross Sections	9d	11-Feb-08	22-Feb-08
SDS80290	Earthworks Detailed Design	9d	25-Feb-08*	07-Mar-08
SDS80310	Landscaping	5d	10-Mar-08	14-Mar-08
SDS80320	Authority to Proceed	0d	29-Oct-07 A	
SDS80330	Badger Mitigation Constraints Passed to Drainage Team	6d	29-Oct-07 A	05-Nov-07 A
SDS80340	Final Drainage Detailed Design	9d	26-Mar-08	08-Apr-08
SDS80350	Receive Park & Ride Level Information From tie	0d	02-Nov-07 A	
SDS80950	Issue Notification of Completion Letter to tie for Drainage Design VO243	0d	16-Apr-08	
SDS80960	Issue Notification of Completion Letter to tie for VO243 Earl Tram Changes EXCL Drainage	0d	17-Mar-08	
Track (Task800.2.1)		522d	12-May-06 A	30-May-08
A4020	First Pass Mx Horizontal and Vertical Alignment	17d	12-May-06 A	07-Jun-06 A
A4030	Handover Alignment Design P Way to Roads	0d		08-Jun-06 A
A4040	Coordination Meeting/Workshop Between PWay/Roads & Resolution of Major Conflicts	1d	08-Jun-06 A	08-Jun-06 A
SDS30790	Revise Alignment to Match Roads First Pass Vertical	5d	11-Jan-07 A	17-Jan-07 A
SDS30840	Handover Alignment Design Track to Roads	0d		17-Jan-07 A
SDS31210	Revise Alignment to Inc. Preliminary Design Comments	94d	11-Jul-06 A	28-Nov-06 A
SDS31230	Handover Alignment Design Track to Roads	0d		01-Dec-06 A
SDS57130	Issue Track Alignment Design to tie	0d		08-Feb-07 A
SDS59620	IDC Track Design	11d	22-Jan-07 A	06-Feb-07 A
SDS61050	Revise Track Alignment to Inc. Modelling Changes	1d	15-Dec-06 A	15-Dec-06 A
SDS70240	tie Approval Period	19d	08-Feb-07 A	07-Mar-07 A
SDS70250	Receive tie Comments	0d	03-Apr-07 A	
SDS70260	Incorporate tie Comments	1d	04-May-07 A	05-May-07 A
SDS75190	Address tie Comments, EARL,Ingliston PnR, Other Revs, IDC & Section Submission Package	191d	06-Aug-07 A	30-May-08
Roads, Street Lighting & Landscaping (Task800.2.2)		619d	07-Mar-06 A	07-Aug-08
A4050	Route Appreciation/Junct Layout & Determine with tie & CEC Works Extent	3d	22-May-06 A	24-May-06 A
A4060	Frontage Surveys	30d	07-Mar-06 A	21-Apr-06 A
A4070	Set Up Mx Models	2d	22-May-06 A	23-May-06 A
A4080	Produce Preliminary Horizontal Road Alignment Design (Inc Lanes & Parking Zones)	3d	25-May-06 A	30-May-06 A
A4090	Preliminary Rd Junction Configuration Design	2d	31-May-06 A	01-Jun-06 A
A4100	Preliminary Road Safety Audit	2d	21-Jun-06 A	22-Jun-06 A
A4110	Review & Amend TRO Drawings & Schedules for Modifications Required Post Prelim Design	1d	12-Jun-06 A	12-Jun-06 A
A4120	Handover Alignment Design Roads to Pway	0d		23-Jun-06 A
A4130	Coordination Meeting/Workshop Between Roads & Pway Teams	1d	23-Jun-06 A	23-Jun-06 A
A5590	Undertake Road Marking, Pedestrian Req & Traffic Signalling Design	2d	19-Jun-06 A	20-Jun-06 A
SDS30800	Produce First Pass Vertical Alignment	4d	15-Jan-07 A	18-Jan-07 A
SDS30820	Handover Alignment Design Roads to Pway	0d		18-Jan-07 A
SDS30850	Revise Vertical Alignment to Match Final Track Alignment	2d	08-Feb-07 A	09-Feb-07 A
SDS30860	Horizontal & Vertical Alignment Design Complete	0d		09-Feb-07 A
SDS30870	Issue Roads Design to tie for Approval Section 7	0d		09-Mar-07 A
SDS30880	Cross Check all Horizontal Design Aspects With Vertical Alignment	2d	16-Feb-07 A	19-Feb-07 A
SDS30890	tie Approval Period	19d	12-Mar-07 A	10-Apr-07 A
SDS30900	tie Comments Not Received - Change In Protocol Going Forward	0d		04-May-07 A
SDS30920	Issue Construction Drawings	0d		07-Aug-08
SDS30930	Road Safety Audit Stage 2 (Intermediate)	5d	02-Mar-07 A	08-Mar-07 A
SDS30940	Insert Intermediate RSA Comments	2d	08-Mar-07 A	09-Mar-07 A
SDS30950	Produce Site Clearance Drawings & Schedule	2d	23-Feb-07 A	27-Feb-07 A
SDS30960	Produce Fencing, Barriers & Guardrails Design	7d	12-Feb-07 A	20-Feb-07 A
SDS30970	Produce Street Lighting Design (& Liaise With OLE)	7d	31-Jan-07 A	08-Feb-07 A
SDS30980	Produce Traffic Signal Only Ducting	4d	01-Mar-07 A	07-Mar-07 A
SDS30990	Produce Soft Landscaping Design	26d	31-Jan-07 A	09-Mar-07 A
SDS31000	Produce Traffic Signals Layout	11d	12-Feb-07 A	27-Feb-07 A
SDS31010	Produce Traffic Signs Design (Signs, Markings, Signals)	7d	12-Feb-07 A	20-Feb-07 A
SDS31020	Produce Earthworks Design	9d	10-Sep-07 A	21-Sep-07 A
SDS31240	Revise Alignment to Inc. Final Track Horizontal Alignment (Horizontal Design Freeze) & Issue to Substn Designers	6d	08-Jan-07 A	15-Jan-07 A
SDS31250	Produce Kerbs, Footway & Paved Area Design	5d	12-Feb-07 A	16-Feb-07 A
SDS31260	Produce Pavement Design	2d	22-Feb-07 A	23-Feb-07 A
SDS31270	IDC (Inc. Systems Assurance)	2d	22-Feb-07 A	23-Feb-07 A
SDS56730	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 7A	0d		14-Mar-08
SDS56880	Issue Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 7	0d		14-Mar-07 A
SDS59410	Compile Planning Drawings	2d	08-Mar-07 A	09-Mar-07 A
SDS59850	Advise Track, Stops, Modellers Changes To Accom RSA1 & PD Comments	7d	13-Nov-06 A	21-Nov-06 A
SDS59860	Pass Guidance/Envelope To Track & Others As Necessary	0d		21-Nov-06 A
SDS61060	Revise Horizontal to Inc. Track Horizontal Alignment, RSA1 & PD Comments	7d	11-Dec-06 A	19-Dec-06 A
SDS61070	Revise Alignment to Inc. Minor Changes From Traffic Modelling	5d	20-Dec-06 A	03-Jan-07 A
SDS67210	Street Lighting Survey Work	44d	03-Jul-06 A	06-Sep-06 A
SDS80140	Final RSA	9d	23-Apr-08	07-May-08
SDS80150	Incorporate Final RSA Comments	5d	08-May-08	14-May-08
Drainage		290d	12-Mar-07 A	29-Apr-08
SDS72170	Hydraulic Modelling & First Pass Dainage Design	116d	12-Mar-07 A	07-Sep-07 A
SDS72180	Receipt of Drainage Survey Information	0d		14-Jan-08*
SDS72190	Outfall Consent/Approval from SW NOT REQUIRED	0d		24-Aug-07 A
SDS72200	Outfall Consent/Approval from CEC	0d		14-Jan-08*
SDS72210	Outfall Consent/Approval from SEPA	0d		10-May-07 A
SDS72220	Compile Drainage Package	2d	20-Sep-07 A	21-Sep-07 A
SDS72230	Issue Drainage Design Completion Letter to tie for Approval Section 7A	0d		27-Sep-07 A
SDS73290	Final Detailed Drainage Design	54d	29-Jun-07 A	19-Sep-07 A
SDS80900	Compile Drainage Package	5d	09-Apr-08	15-Apr-08
SDS80910	Confirm Drainage and amend if necessary	9d	16-Apr-08	29-Apr-08
Boundary & Accomodation Works (Task800.2.3)		106d	26-Mar-07 A	20-Aug-07 A
SDS42610	Detailed Design of Boundary & Accomodation Works	96d	26-Mar-07 A	20-Aug-07 A
SDS42620	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 7A	0d		20-Aug-07 A
Utilities (Task800.2.4)		482d	06-Mar-06 A	28-Jan-08
A12810	Close Out PD Issues and Re-issue PD Drawings to SUCs	26d	04-Aug-06 A	14-Sep-06 A
A12820	Design Development	331d	29-Aug-06 A	28-Jan-08
A12830	Initial Consultations With SUCs and IDTs	38d	29-Aug-06 A	23-Oct-06 A
A12840	MUDFA Appointment	0d		23-Oct-06 A
A12860	IDC	9d	30-Apr-07 A	14-May-07 A
A12870	Issue DD to SUC For Approval	0d		14-May-07 A
A12880	SUC Approval Period	68d	15-May-07 A	27-Aug-07 A
A14140	Access to MUDFA and Others	132d	04-Oct-06 A	30-Apr-07 A
A14150	Consult With SUCs on DD	132d	04-Oct-06 A	30-Apr-07 A
UTIL1600	Issue to Statutory Utility Companies (SUCs)	0d		30-Jun-06 A
UTIL170	Section 7A - Pre-Preliminary Design (Utilities)	76d	06-Mar-06 A	30-Jun-06 A
UTIL190	GPR Survey in BAA land	9d	19-Jun-06 A	30-Jun-06 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

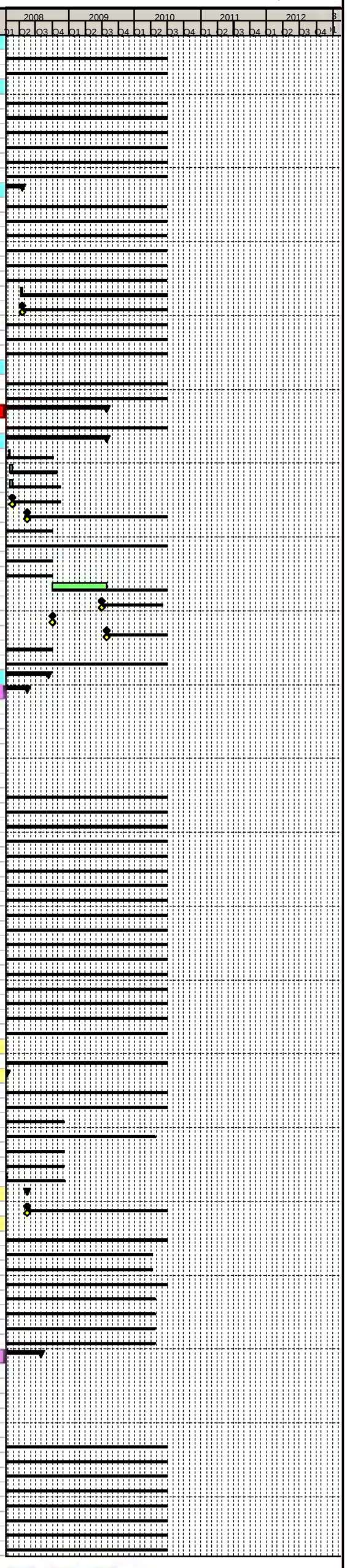
Trams for Edinburgh ...connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
TRO's (Task800.2.5)		8d	03-Jul-06 A	12-Jul-06 A
SDS33830	Collate Exisiting TROs	8d	03-Jul-06 A	12-Jul-06 A
SDS33840	Receive Preliminary Roads Design	0d		12-Jul-06 A
TTRO's (Task800.2.6)		138d	23-Oct-06 A	11-May-07 A
TTRO360	SDS Produce Affected Roads Listing For MUDFA Works	27d	23-Oct-06 A	30-Nov-06 A
TTRO450	SDS Produce Affected Roads Listing For INFRACO Works	36d	12-Mar-07 A	04-May-07 A
TTRO790	Issue Affected Roads Listing For MUDFA Works To Dundas & Wilson	0d		30-Nov-06 A
TTRO800	Dundas & Wilson Draft TTRO Schedule For MUDFA Works	0d	01-Dec-06 A	01-Dec-06 A
TTRO860	Issue Affected Roads Listing For INFRACO Works To Dundas & Wilson	0d		04-May-07 A
TTRO870	Dundas & Wilson Draft TTRO Schedule For INFRACO Works	5d	04-May-07 A	11-May-07 A
Environmental		424d	14-Aug-06 A	16-Apr-08
SDS61390	Produce Protected Species Mitigation Plan	65d	14-Aug-06 A	17-Nov-06 A
SDS61400	Issue Protected Species Plan to tie	0d		22-Dec-06 A
SDS61410	tie Approval Period	17d	03-Jan-07 A	26-Jan-07 A
SDS61420	Update Protected Species Mitigation Plan to tie Comments	9d	31-Jan-07 A	13-Feb-07 A
SDS61430	Issue Protected Species Mitigation Plan to Scottish National Heritage	0d		16-Feb-07 A
SDS61440	Final Scottish National Heritage Approval Period	19d	19-Feb-07 A	16-Mar-07 A
SDS61450	Update Protected Species Mitigation Plan to Scottish National Heritage Comments	6d	09-Apr-08	16-Apr-08
SDS61460	Final Protected Species Mitigation Plan Approval	0d		16-Apr-08
SDS67610	Selection of New Sett/ Holt Locations	41d	20-Nov-06 A	26-Jan-07 A
SDS67620	Design New Setts/ Holt	20d	09-Oct-06 A	06-Nov-06 A
SDS67630	Issue New Setts/ Holt Design Section 7A	0d		08-Jan-07 A
VO50 Gogarburn Partnership Report CNS021		24d	22-Aug-07 A	24-Sep-07 A
VO1390	Review Gogarburn Partnership Report as issued by tie	20d	22-Aug-07 A	20-Sep-07 A
VO1400	Issue SDS response to the review of the Gogarburn Partnership report	0d		24-Sep-07 A
GOG - IPR		986d	19-Sep-05 A	28-Jul-09
CON-1000	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Ingliston Park and Ride (Task800.2.7)		796d	12-Jun-06 A	28-Jul-09
A27340	Prepare Tram Stop Planning Submission Drawings for Issue to Planning Drawings Team	144d	29-Jun-07 A	08-Feb-08
A27350	Produce Engineering Detailed Design Drawings	9d	11-Feb-08	22-Feb-08
A27360	Compile Planning Drawings Tram Stop Ingliston Park and Ride	9d	11-Feb-08	22-Feb-08
A27380	Issue Notification Of Completion Letter- Ingliston Tram Stop Design to tie	0d		22-Feb-08
A27710	Tram Stop Design Complete - Drawings Issued for Construction	0d		13-May-08
A27720	Site Visit with tie & CEC To Review Preliminary Design	1d	31-Jan-07 A	31-Jan-07 A
A28190	Advance Levels Work (Liaision With Halcrows)	6d	22-Sep-06 A	29-Sep-06 A
A44560	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	56d	08-Feb-07 A	04-May-07 A
A45000	Prepare Detailed Design Stop Drawings	5d	01-Feb-07 A	07-Feb-07 A
A48540	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A48550	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A48560	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A48570	Issue Final As Built Drawings	0d		28-Jul-09
A5030	General Arrangement Drawings	14d	12-Jun-06 A	30-Jun-06 A
A5800	Issue Tram Stop GA Drawings for Ingliston Park & Ride	0d		30-Jun-06 A
Structures		644d	06-Mar-06 A	10-Sep-08
S29 Gogarburn Bridge (Task800.2.8)		530d	13-Apr-06 A	13-May-08
SDS55560	Collate Base Data on Alignment & Topo survey	7d	13-Apr-06 A	25-Apr-06 A
SDS55570	Define Clearances	9d	17-Apr-06 A	02-May-06 A
SDS55580	Develop Preliminary Structures Options	14d	20-Apr-06 A	11-May-06 A
SDS55590	Options Review	5d	12-May-06 A	18-May-06 A
SDS55600	Produce Draft GA (AIP) Drg Showing Preferred Option	17d	05-May-06 A	31-May-06 A
SDS55610	Issue Gogar Burn Bridge Draft GA (AIP) Drg to tie	0d		31-May-06 A
SDS55620	Select Preferred Design Option in Liaison with tie	16d	15-May-06 A	07-Jun-06 A
SDS55630	Update Base Data on Alignment & Topo Survey	2d	01-Jun-06 A	02-Jun-06 A
SDS55640	Draft AIP Document Text	5d	05-Jun-06 A	09-Jun-06 A
SDS55650	Update AIP GA Drgs	7d	08-Jun-06 A	16-Jun-06 A
SDS55660	Check of AIP Document	2d	12-Jun-06 A	13-Jun-06 A
SDS55670	Issue AIP Document to Technical Approval Authority (TAA) Form A	0d		26-Jun-06 A
SDS55680	Issue AIP Document to Planning Department	0d		14-Aug-06 A
SDS55690	TAA Review AIP & Comment	33d	27-Jun-06 A	14-Aug-06 A
SDS55700	Planning Department Review AIP & Comment	24d	11-Jul-06 A	15-Aug-06 A
SDS55710	Receive AIP Comments from TAA	0d		15-Aug-06 A
SDS55720	Receive AIP Comments from Planning Department	0d		15-Aug-06 A
SDS55730	Incorporate AIP Comments from TAA	9d	16-Aug-06 A	30-Aug-06 A
SDS55740	Incorporate AIP Comments from Planning Department	8d	16-Aug-06 A	30-Aug-06 A
SDS55750	Re-issue AIP to TAA	0d		31-Aug-06 A
SDS55760	TAA Review AIP	28d	07-Sep-06 A	18-Oct-06 A
SDS55770	TAA Sign Off AIP Document	0d		18-Oct-06 A
SDS55780	Issue AIP to Structures Detailed Design Team	0d		18-Oct-06 A
Gogarburn Bridge Preliminary Design Milestones		10d	24-Jul-06 A	04-Aug-06 A
SDS36250	Update Available Base Data/Info Re Alignment/Topo Survey etc	9d	24-Jul-06 A	04-Aug-06 A
Gogarburn Bridge Substructure Detailed Design		341d	12-Sep-06 A	21-Jan-08
SDS36270	Substructure Analysis	120d	12-Sep-06 A	16-Mar-07 A
SDS36290	Substructure Detailed Design	112d	02-Oct-06 A	23-Mar-07 A
SDS36310	Substructure Detailed Design Draughting	283d	02-Oct-06 A	12-Dec-07 A
SDS66000	Issue Notification Of Completion Letter- Gogar Burn Bridge Substructure Package to tie	0d		14-Dec-07 A
SDS66010	Issue Detailed Design Package to CAT II Checker (as appropriate)	0d		27-Nov-06 A
SDS66020	Bridge CATII Review Period	246d	27-Nov-06 A	12-Dec-07 A
SDS66040	Receive and Incorporate Substructure CATII Check Comments	246d	04-Jan-07 A	21-Jan-08
Gogarburn Bridge Design Package For Construction / Fabrication		0d	13-May-08	13-May-08
SDS36510	Issue Gogarburn Bridge Specification clauses For Construction	0d		13-May-08
Gogarburn Bridge Superstructure Detailed Design		348d	07-Aug-06 A	14-Dec-07 A
SDS36260	Superstructure Analysis	101d	07-Aug-06 A	12-Jan-07 A
SDS36280	Superstructure Detailed Design	87d	26-Sep-06 A	09-Feb-07 A
SDS36300	Superstructure Detailed Design Draughting	173d	02-Oct-06 A	29-Jun-07 A
SDS36330	Prepare Relevant Bridgeworks Specification Clauses	14d	27-Nov-06 A	15-Dec-06 A
SDS36340	Issue Notification Of Completion Letter- Gogar Burn Bridge Superstructure Package to tie for Comments	0d		14-Dec-07 A
SDS36360	Issue Detailed Design Package to CAT II Checker	0d		24-Nov-06 A
SDS36370	Bridge CATII Review Period	21d	27-Nov-06 A	03-Jan-07 A
SDS36430	Receive and Incorporate Superstructure CATII Check Comments	172d	04-Jan-07 A	24-Sep-07 A
S10 Gogar Culvert One		613d	06-Mar-06 A	30-Jul-08
SDS46560	Review of Previous Work	9d	06-Mar-06 A	17-Mar-06 A
SDS46570	Optioneering	14d	20-Mar-06 A	07-Apr-06 A
SDS46580	Initial Design	8d	10-Apr-06 A	21-Apr-06 A
SDS46590	Production of AIP Drawing	4d	24-Apr-06 A	27-Apr-06 A
SDS46600	Issue AIP Drawing to tie	0d		27-Apr-06 A
SDS46610	Checking	19d	28-Apr-06 A	26-May-06 A
SDS46620	tie AIP Drawing Review Period	23d	28-Apr-06 A	02-Jun-06 A
SDS46630	Undertake Consultations	27d	22-May-06 A	30-Jun-06 A
SDS46640	Receive AIP Drawing Comments from tie	0d		02-Jun-06 A
SDS46650	Incorporate tie Comments into AIP Drawing	4d	05-Jun-06 A	08-Jun-06 A
SDS46660	Production of AIP Document	14d	19-May-06 A	09-Jun-06 A
SDS46670	Issue Gogar Culvert 1 AIP Document to tie	0d		30-Jun-06 A
SDS46680	tie AIP Document Review Period	5d	14-Aug-06 A	18-Aug-06 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

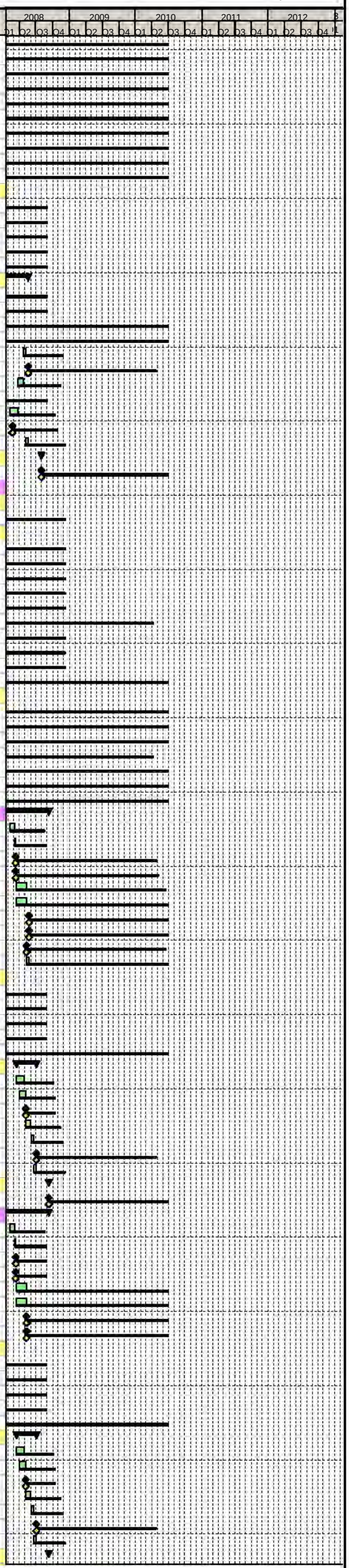
Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

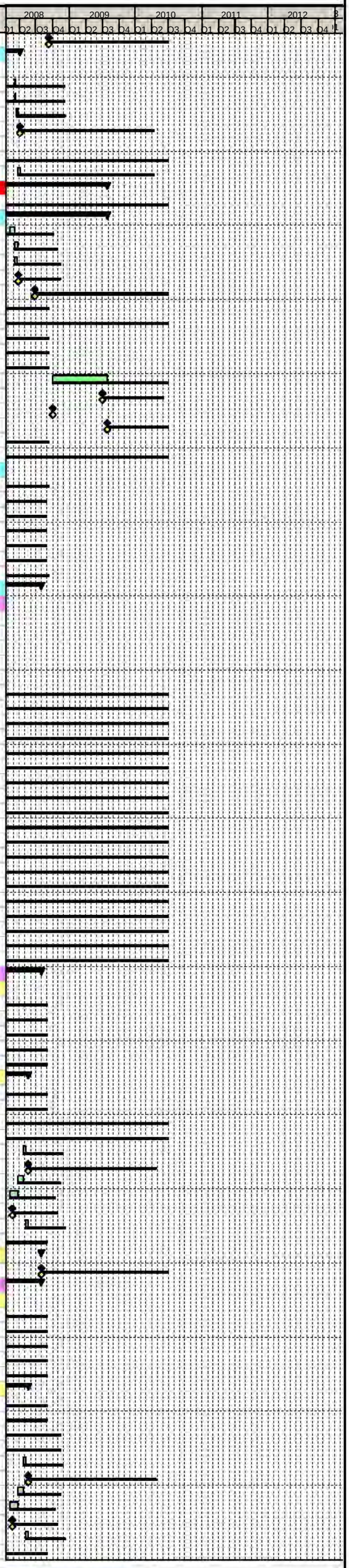
Activity ID	Activity Name	Original Duration	Start	Finish
SDS46690	Receive AIP Document Comments from tie	0d		16-Jun-06 A
SDS46700	Incorporate tie Comments into AIP Document	4d	21-Aug-06 A	24-Aug-06 A
SDS46710	Issue AIP Document & Drawing to TAA	0d		24-Aug-06 A
SDS46720	TAA AIP Document & Drawing Review Period	1d	25-Aug-06 A	28-Aug-06 A
SDS46730	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS46740	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS46750	Recieve AIP Document & Drawing Comments from TAA	0d		18-Jun-07 A
SDS46760	Incorporate TAA Comments into AIP Document & Drawing	136d	11-Dec-06 A	13-Jul-07 A
SDS46770	Recieve AIP Document & Drawing Comments from Planning Department	0d		20-Nov-06 A
SDS46780	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	20-Nov-06 A	24-Nov-06 A
Preliminary Design Milestones		168d	30-Oct-06 A	02-Jul-07 A
315	Receipt of tie PD Acceptance	0d	20-Nov-06 A	
316	Receipt of Alignment Prelim Design Package	0d	30-Oct-06 A	
317	Receipt of OLE Prelim Design Package	0d	20-Nov-06 A	
318	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	12-Feb-07 A	
319	Receipt of an Approved and Signed AIP document	0d	02-Jul-07 A	
Structure Detailed Design		423d	18-Sep-06 A	20-May-08
321	Structure Detailed Design	178d	18-Sep-06 A	22-Jun-07 A
322	Structure Detailed Design Draughting NOW INCLUDED IN 465	187d	05-Dec-06 A	24-Sep-07 A
323	Issue Structure Detailed Design Package to CAT I Checker	0d	02-Jul-07 A	
324	Structure CAT I Check ABANDONED	13d	03-Jul-07 A	20-Jul-07 A
325	Receive & Incorporate CAT I comments	9d	23-Apr-08	06-May-08
326	Re Issue Gogar Burn Culvert One Structure Revised Design Package to tie	0d		20-May-08
344	Structure CAT I Check	19d	26-Mar-08	22-Apr-08
366	Issue Notification Of Completion Letter- Gogar Burn Culvert One Structure Design Package to tie	0d		20-Nov-07 A
465	Review Design & Amend if Necessary	30d	11-Feb-08	25-Mar-08
515	Agree Drainage Interface	0d	25-Feb-08	
SDS62170	IDC	9d	07-May-08	20-May-08
Issue Gogar Culvert One Structure Design Package For Construction/Fabrication		0d	30-Jul-08	30-Jul-08
341	Issue Gogar Culvert One Structure Design Package For Construction/Fabrication	0d	30-Jul-08	
VO29 S33 EARL Overbridge (Task800.2.13) CNS011		268d	31-Jul-06 A	17-Aug-07 A
EARL Overbridge Preliminary Design Milestones		10d	31-Jul-06 A	11-Aug-06 A
SDS57670	Update Available Base Data/Info Re Alignment/Topo Survey etc	9d	31-Jul-06 A	11-Aug-06 A
EARL Overbridge Superstructure Detailed Design		263d	07-Aug-06 A	17-Aug-07 A
SDS57690	Superstructure Analysis	52d	07-Aug-06 A	23-Oct-06 A
SDS57710	Superstructure Detailed Design	129d	05-Sep-06 A	23-Mar-07 A
SDS57740	Superstructure Detailed Design Draughting	159d	19-Sep-06 A	25-May-07 A
SDS57750	Check of Drawings (IDC)	4d	13-Aug-07 A	16-Aug-07 A
SDS57760	Prepare Relevant Bridgeworks Specification Clauses	14d	21-Nov-06 A	11-Dec-06 A
SDS57770	Issue Notification Of Completion Letter- EARL Overbridge Superstructure Package to tie	0d		17-Aug-07 A
SDS57790	Issue Detailed Design Package to CAT II Checker	0d		20-Nov-06 A
SDS57800	Bridge CATII Review Period	130d	10-Jan-07 A	27-Jul-07 A
SDS57850	Receive and Incorporate CATII Check Comments	140d	10-Jan-07 A	10-Aug-07 A
SDS66340	Prepare Planning Drawings	9d	02-Aug-07 A	16-Aug-07 A
EARL Overbridge Substructure Detailed Design		253d	21-Aug-06 A	17-Aug-07 A
SDS57700	Substructure Analysis	48d	21-Aug-06 A	31-Oct-06 A
SDS57720	Substructure Detailed Design	129d	05-Sep-06 A	23-Mar-07 A
SDS57730	Substructure Detailed Design Draughting	191d	12-Sep-06 A	06-Jul-07 A
SDS66210	Issue Notification Of Completion Letter- EARL Overbridge Substructure Package to tie	0d		17-Aug-07 A
SDS66220	Issue Detailed Design Package to CAT II Checker	0d		22-Nov-06 A
SDS66230	Bridge CATII Review Period	28d	22-Nov-06 A	10-Jan-07 A
SDS66250	Receive and Incorporate CATII Check Comments	39d	11-Jan-07 A	09-Mar-07 A
W14 Gogar Burn Retaining Wall One		474d	30-Oct-06 A	10-Sep-08
503	Revise Preliminary Design	19d	11-Feb-08	07-Mar-08
513	Produced Revised AIP Document	5d	10-Mar-08	14-Mar-08
523	Issue Revised PD to TAA	0d		14-Mar-08
533	Issue Revised PD to tie	0d		14-Mar-08
543	TAA approval period	38d	17-Mar-08	09-May-08
553	tie approval period	38d	17-Mar-08	09-May-08
603	Receive Approved and Sign AIP document	0d	26-May-08	
613	Recieve tie PD acceptance	0d	26-May-08	
703	Receive TAA comments	0d	12-May-08	
713	Update to TAA comments	9d	12-May-08	23-May-08
Preliminary Design Milestones		68d	30-Oct-06 A	12-Feb-07 A
405	Receipt of tie PD Acceptance	0d	11-Dec-06 A	
406	Receipt of Alignment Prelim Design Package	0d	30-Oct-06 A	
407	Receipt of OLE Prelim Design Package	0d	11-Dec-06 A	
408	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	12-Feb-07 A	
409	Receipt of an Approved and Signed AIP document	0d	15-Jan-07 A	
Structure Detailed Design		78d	17-Mar-08	02-Jul-08
411	Structure Detailed Design	28d	17-Mar-08	25-Apr-08
412	Structure Detailed Design Draughting	26d	31-Mar-08	07-May-08
413	Issue Structure Detailed Design Package to CAT I Checker	0d	08-May-08	
414	Structure CAT I Check	19d	08-May-08	04-Jun-08
415	Receive & Incorporate CAT I comments	9d	05-Jun-08	18-Jun-08
416	Issue Notification Of Completion Letter- Gogar Burn Retaining Wall One Structure Design Package to tie	0d		02-Jul-08
SDS62200	IDC	9d	19-Jun-08	02-Jul-08
Issue Gogar Burn Retaining Wall One Structure Design Package For Construction/Fabrication		0d	10-Sep-08	10-Sep-08
431	Issue Gogar Burn Retaining Wall One Structure Design Package For Construction/Fabrication	0d		10-Sep-08
W15 Gogar Burn Retaining Wall Two		474d	30-Oct-06 A	10-Sep-08
623	Revise Preliminary Design	19d	11-Feb-08	07-Mar-08
633	Produced Revised AIP Document	5d	10-Mar-08	14-Mar-08
643	Issue Revised PD to TAA	0d		14-Mar-08
653	Issue Revised PD to tie	0d		14-Mar-08
663	TAA approval period	38d	17-Mar-08	09-May-08
673	tie approval period	38d	17-Mar-08	09-May-08
683	Receive TAA acceptance	0d	12-May-08	
693	Recieve tie acceptance	0d	12-May-08	
Preliminary Design Milestones		68d	30-Oct-06 A	12-Feb-07 A
435	Receipt of tie PD Acceptance	0d	11-Dec-06 A	
436	Receipt of Alignment Prelim Design Package	0d	30-Oct-06 A	
437	Receipt of OLE Prelim Design Package	0d	11-Dec-06 A	
438	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	12-Feb-07 A	
439	Receipt of an Approved and Signed AIP document	0d	15-Jan-07 A	
Structure Detailed Design		78d	17-Mar-08	03-Jul-08
441	Structure Detailed Design	28d	17-Mar-08	25-Apr-08
442	Structure Detailed Design Draughting	26d	31-Mar-08	07-May-08
443	Issue Structure Detailed Design Package to CAT I Checker	0d	08-May-08	
444	Structure CAT I Check	19d	08-May-08	04-Jun-08
445	Receive & Incorporate CAT I comments	9d	05-Jun-08	18-Jun-08
446	Issue Notification Of Completion Letter- Gogar Burn Retaining Wall Two Structure Design Package to tie	0d	03-Jul-08	
SDS62210	IDC	9d	19-Jun-08	02-Jul-08
Issue Gogar Burn Retaining Wall Two Structure Design Package For Construction/Fabrication		0d	10-Sep-08	10-Sep-08



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Trams for Edinburgh
connecting our Capital

Activity ID	Activity Name	Original Duration	Start	Finish
461	Issue Gogar Burn Retaining Wall Two Structure Design Package For Construction/Fabrication	0d		10-Sep-08
Tram Eastfield Road Substation (Task800.2.9)		463d	06-Jun-06 A	02-Apr-08
A549050	Preliminary Design of Substation	5d	06-Jun-06 A	12-Jun-06 A
A549940	Detailed Design Civils	276d	15-Jan-07 A	14-Mar-08
A549950	Detailed Architecture Design	327d	20-Oct-06 A	14-Mar-08
A549960	IDC on Detailed Design (Inc. Systems Assurance)	6d	17-Mar-08	26-Mar-08
A549970	Issue Notification Of Completion Letter- Tram Eastfield Road Substation Planning Submission to tie	0d		02-Apr-08
A550130	Substation Consultation Period	28d	19-Jun-06 A	27-Jul-06 A
A550250	Issue of Ingliston Park & Ride Substation Design	0d		30-Jun-06 A
A550290	Compile Substation Planning Submission	5d	27-Mar-08	02-Apr-08
IPR - AIR		986d	19-Sep-05 A	28-Jul-09
CON-1030	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A
Tram Stop Edinburgh Airport (Task800.2.10)		805d	30-May-06 A	28-Jul-09
A27740	Prepare Tram Stop Planning Submission Drawings for Issue to Planning Drawings Team	169d	22-Jun-07 A	07-Mar-08
A27750	Produce Engineering Detailed Design Drawings	11d	10-Mar-08	25-Mar-08
A27760	Compile Planning Drawings Tram Stop Edinburgh Airport	9d	10-Mar-08	21-Mar-08
A27780	Issue Notification Of Completion Letter- Edinburgh Airport Tram Stop Design to tie	0d		25-Mar-08
A27800	Tram Stop Design Complete - Drawings Issued for Construction	0d		24-Jun-08
A27810	Site Visit with tie & CEC To Review Preliminary Design	1d	31-Jan-07 A	31-Jan-07 A
A27920	Advance Works Edinburgh Airport Tramstop (As On Hold)	24d	14-Aug-06 A	19-Sep-06 A
A28260	Awaiting Letter From tie To Confirm Design & Construction Phasing Req For Earl	0d	24-Sep-07 A	
A44620	IDC Tram Stop Design for Planning Submission (Inc. Systems Asssurance)	56d	08-Feb-07 A	04-May-07 A
A45010	Prepare Detailed Design Stop Drawings	5d	01-Feb-07 A	07-Feb-07 A
A48580	Produce As Built Drawings	200d	03-Oct-08	28-Jul-09
A48590	Receive Final As Built Data from the Contractor	0d		30-Jun-09
A48600	Receive First As Built Data from the Contractor	0d		01-Oct-08*
A48610	Issue Final As Built Drawings	0d		28-Jul-09
A5040	General Arrangement Drawings	23d	30-May-06 A	30-Jun-06 A
A5810	Issue Tram Stop GA Drawings for Edinburgh Airport	0d		30-Jun-06 A
VO72 Eastfield Ave & Airport Tramstop CNS018		249d	30-Oct-06 A	22-Oct-07 A
A45060	Airport Stop BAA/EARL Phasing Design Coordination NOW SUPERSEEDED BY VO243	184d	07-Dec-06 A	21-Sep-07 A
A45070	EARL Impact on Track and Roads Design CNS018	64d	30-Oct-06 A	08-Feb-07 A
A45080	Receive Change Order for CNS018 NOW SUPERCEDED BY VO243	0d	22-Oct-07 A	
A45090	Additional Preliminary Design for Gogarburn Retaining Walls due to CNS018 NOW SUPERCEDED BY VO243	1d	22-Oct-07 A	22-Oct-07 A
A45100	Receive CNS018	0d	30-Oct-06 A	
A45130	Update to Track due to CNS018	16d	17-Jan-07 A	08-Feb-07 A
A45140	Additional Edinburgh Airport Tramstop Design due to CNS018 NOW SUPERSEEDED BY VO243	37d	30-Jul-07 A	21-Sep-07 A
Structures		623d	20-Feb-06 A	30-Jul-08
W11 Gogar Culvert Two		305d	06-Mar-06 A	15-May-07 A
SDS46800	Review of Previous Work	9d	06-Mar-06 A	17-Mar-06 A
SDS46810	Optioneering	14d	20-Mar-06 A	07-Apr-06 A
SDS46820	Initial Design	8d	10-Apr-06 A	21-Apr-06 A
SDS46830	Production of AIP Drawing	4d	24-Apr-06 A	27-Apr-06 A
SDS46840	Issue AIP Drawing to tie	0d		27-Apr-06 A
SDS46850	Checking	19d	28-Apr-06 A	26-May-06 A
SDS46860	tie AIP Drawing Review Period	5d	22-May-06 A	26-May-06 A
SDS46870	Undertake Consultations	18d	22-May-06 A	19-Jun-06 A
SDS46880	Receive AIP Drawing Comments from tie	0d		26-May-06 A
SDS46890	Incorporate tie Comments into AIP Drawing	4d	30-May-06 A	02-Jun-06 A
SDS46900	Production of AIP Document	15d	19-May-06 A	12-Jun-06 A
SDS46910	Issue Gogar Culvert Two AIP Document to tie	0d		30-Jun-06 A
SDS46920	tie AIP Document Review Period	5d	22-May-06 A	26-May-06 A
SDS46930	Receive AIP Document Comments from tie	0d		19-Jun-06 A
SDS46940	Incorporate tie Comments into AIP Document	4d	14-Aug-06 A	17-Aug-06 A
SDS46950	Issue AIP Document & Drawing to TAA	0d		17-Aug-06 A
SDS46960	TAA AIP Document & Drawing Review Period	6d	18-Aug-06 A	28-Aug-06 A
SDS46970	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS46980	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS46990	Recieve AIP Document & Drawing Comments from TAA	0d		08-May-07 A
SDS47000	Incorporate TAA Comments into AIP Document & Drawing	97d	11-Dec-06 A	15-May-07 A
SDS47010	Recieve AIP Document & Drawing Comments from Planning Department	0d		20-Nov-06 A
SDS47020	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	20-Nov-06 A	24-Nov-06 A
SDS47030	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		15-May-07 A
S31 Gogar Burn Culvert Two		443d	30-Oct-06 A	30-Jul-08
Preliminary Design Milestones		168d	30-Oct-06 A	02-Jul-07 A
345	Receipt of tie PD Acceptance	0d	11-Dec-06 A	
346	Receipt of Alignment Prelim Design Package	0d	30-Oct-06 A	
347	Receipt of OLE Prelim Design Package	0d	20-Nov-06 A	
348	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	15-Jan-07 A	
349	Receipt of an Approved and Signed AIP document	0d	02-Jul-07 A	
Structure Detailed Design		367d	05-Dec-06 A	20-May-08
351	Structure Detailed Design	126d	05-Dec-06 A	22-Jun-07 A
352	Structure Detailed Design Draughting NOW INCLUDED IN 475	187d	05-Dec-06 A	24-Sep-07 A
353	Issue Structure Detailed Design Package to CAT I Checker	0d	02-Jul-07 A	
354	Structure CAT I Check ABANDONED	13d	03-Jul-07 A	20-Jul-07 A
355	Receive & Incorporate CAT I comments	9d	23-Apr-08	06-May-08
356	Re Issue Gogar Burn Culvert Two Structure Revised Design Package to tie	0d		20-May-08
374	Structure CAT I Check	19d	26-Mar-08	22-Apr-08
475	Review Design & Amend if Necessary	30d	11-Feb-08	25-Mar-08
505	Agree Drainage Interface	0d	25-Feb-08	
SDS62180	IDC	9d	07-May-08	20-May-08
SDS62181	Issue Notification Of Completion Letter- Gogar Burn Culvert Two Structure Design Package to tie	0d		20-Nov-07 A
Issue Gogar Burn Culvert Two Structure Design Package For Construction/Fabrication		0d	30-Jul-08	30-Jul-08
371	Issue Gogar Burn Culvert Two Structure Design Package For Construction/Fabrication	0d	30-Jul-08	
S34 Gogar Burn Culvert Three		443d	30-Oct-06 A	30-Jul-08
Preliminary Design Milestones		168d	30-Oct-06 A	02-Jul-07 A
375	Receipt of tie PD Acceptance	0d	11-Dec-06 A	
376	Receipt of Alignment Prelim Design Package	0d	30-Oct-06 A	
377	Receipt of OLE Prelim Design Package	0d	11-Dec-06 A	
378	Receipt of Ground Investigation Data & Interpretative Geotechnical Report	0d	08-May-07 A	
379	Receipt of an Approved and Signed AIP document	0d	02-Jul-07 A	
Structure Detailed Design		251d	25-May-07 A	20-May-08
381	Structure Detailed Design	19d	25-May-07 A	22-Jun-07 A
382	Structure Detailed Design Draughting NOW INCLUDED IN 485	54d	04-Jul-07 A	24-Sep-07 A
383	Issue Structure Detailed Design Package to CAT I Checker	0d	02-Jul-07 A	
384	Structure CAT I Check ABANDONED	13d	03-Jul-07 A	20-Jul-07 A
385	Receive & Incorporate CAT I comments	9d	23-Apr-08	06-May-08
386	Re Issue Gogar Burn Culvert Three Structure Revised Design Package to tie	0d		20-May-08
404	Structure CAT I Check	19d	26-Mar-08	22-Apr-08
485	Review Design & Amend if Necessary	30d	11-Feb-08	25-Mar-08
495	Agree Drainage Interface	0d	25-Feb-08	
SDS62190	IDC	9d	07-May-08	20-May-08
SDS62191	Issue Notification Of Completion Letter- Gogar Burn Culvert Three Structure Design Package to tie	0d		20-Nov-07 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

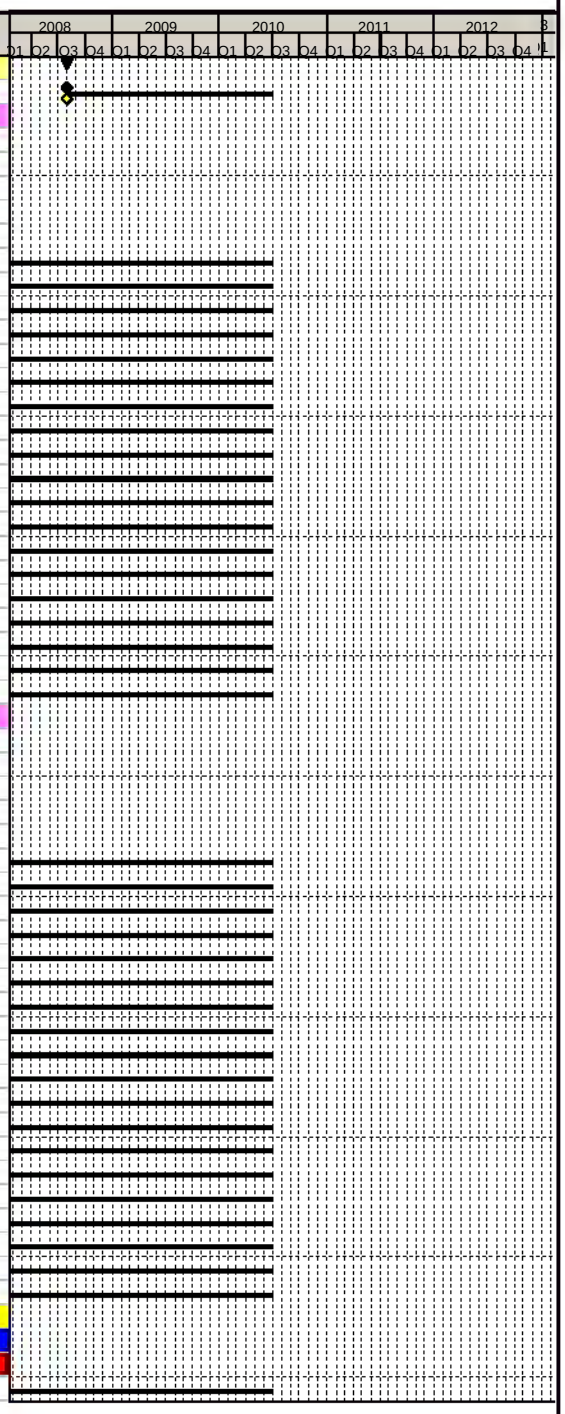
Trams for Edinburgh
connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
Issue Gogar Burn Culvert Three Structure Design Package For Construction/Fabrication		0d	30-Jul-08	30-Jul-08
401	Issue Gogar Burn Culvert Three Structure Design Package For Construction/Fabrication	0d	30-Jul-08	
W14 Gogarburn Retaining Wall One (Task800.2.11)		200d	20-Feb-06 A	27-Nov-06 A
SDS46320	Review of Previous Work	9d	20-Feb-06 A	03-Mar-06 A
SDS46330	Optioneering	36d	06-Mar-06 A	28-Apr-06 A
SDS46340	Initial Design	9d	02-May-06 A	15-May-06 A
SDS46350	Production of AIP Drawing	31d	09-May-06 A	23-Jun-06 A
SDS46360	Issue AIP Drawing to tie	0d		30-Jun-06 A
SDS46370	Checking	21d	24-May-06 A	23-Jun-06 A
SDS46380	tie AIP Drawing Review Period	4d	14-Aug-06 A	17-Aug-06 A
SDS46390	Undertake Consultations	4d	14-Aug-06 A	17-Aug-06 A
SDS46400	Receive AIP Drawing Comments from tie	0d		17-Aug-06 A
SDS46410	Incorporate tie Comments into AIP Drawing	4d	14-Aug-06 A	17-Aug-06 A
SDS46420	Production of AIP Document	4d	14-Aug-06 A	17-Aug-06 A
SDS46430	Issue Gogar Burn Retaining Wall One AIP Document to tie	0d		17-Aug-06 A
SDS46440	tie AIP Document Review Period	5d	14-Aug-06 A	18-Aug-06 A
SDS46450	Receive AIP Document Comments from tie	0d		18-Aug-06 A
SDS46460	Incorporate tie Comments into AIP Document	5d	14-Aug-06 A	18-Aug-06 A
SDS46470	Issue AIP Document & Drawing to TAA	0d		21-Nov-06 A
SDS46480	TAA AIP Document & Drawing Review Period	5d	21-Aug-06 A	28-Aug-06 A
SDS46490	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS46500	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS46510	Recieve AIP Document & Drawing Comments from TAA	0d		21-Nov-06 A
SDS46520	Incorporate TAA Comments into AIP Document & Drawing	5d	17-Nov-06 A	24-Nov-06 A
SDS46530	Recieve AIP Document & Drawing Comments from Planning Department	0d		20-Nov-06 A
SDS46540	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	17-Nov-06 A	24-Nov-06 A
SDS46550	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		27-Nov-06 A
W15 Gogarburn Retaining Wall Two (Task800.2.12)		203d	20-Feb-06 A	30-Nov-06 A
SDS46080	Review of Previous Work	9d	20-Feb-06 A	03-Mar-06 A
SDS46090	Optioneering	36d	06-Mar-06 A	28-Apr-06 A
SDS46100	Initial Design	9d	02-May-06 A	15-May-06 A
SDS46110	Production of AIP Drawing	31d	09-May-06 A	23-Jun-06 A
SDS46120	Issue Gogar Burn RW2 AIP Drawing to tie	0d		30-Jun-06 A
SDS46130	Checking	4d	14-Aug-06 A	17-Aug-06 A
SDS46140	tie AIP Drawing Review Period	4d	14-Aug-06 A	17-Aug-06 A
SDS46150	Undertake Consultations	4d	14-Aug-06 A	17-Aug-06 A
SDS46160	Receive AIP Drawing Comments from tie	0d		17-Aug-06 A
SDS46170	Incorporate tie Comments into AIP Drawing	4d	14-Aug-06 A	17-Aug-06 A
SDS46180	Production of AIP Document	4d	14-Aug-06 A	17-Aug-06 A
SDS46190	Issue Gogar Burn Retaining Wall Two AIP Document to tie	0d		30-Jun-06 A
SDS46200	tie AIP Document Review Period	5d	14-Aug-06 A	18-Aug-06 A
SDS46210	Receive AIP Document Comments from tie	0d		18-Aug-06 A
SDS46220	Incorporate tie Comments into AIP Document	5d	14-Aug-06 A	18-Aug-06 A
SDS46230	Issue AIP Document & Drawing to TAA	0d		18-Aug-06 A
SDS46240	TAA AIP Document & Drawing Review Period	5d	21-Aug-06 A	28-Aug-06 A
SDS46250	Issue AIP Document & Drawing to Planning Department	0d		11-Jul-06 A
SDS46260	Planning Department AIP Document & Drawing Review Period	32d	11-Jul-06 A	28-Aug-06 A
SDS46270	Recieve AIP Document & Drawing Comments from TAA	0d		17-Nov-06 A
SDS46280	Incorporate TAA Comments into AIP Document & Drawing	5d	22-Nov-06 A	29-Nov-06 A
SDS46290	Recieve AIP Document & Drawing Comments from Planning Department	0d		21-Nov-06 A
SDS46300	Incorporate Planning Department TAA Comments into AIP Document & Drawing	5d	22-Nov-06 A	29-Nov-06 A
SDS46310	Issue AIP Drawing & Document to Structures Detailed Design Team	0d		30-Nov-06 A
Ingliston Park & Ride to Newbridge - Section 8		66d	19-Sep-05 A	19-Dec-05 A
IPR - NEB (Section 8A)		66d	19-Sep-05 A	19-Dec-05 A
IPR - INW - RAS - NBS		66d	19-Sep-05 A	19-Dec-05 A
CON-1060	Requirements Definition (Contract Dates)	62d	19-Sep-05 A	19-Dec-05 A



Primary Baseline
Actual Work
Remaining Work
Critical Remaining Work
Baseline Milestone
Milestone

Trams for Edinburgh ..connecting our Capital

Edinburgh Tram Project

SDS FULL DESIGN PROGRAMME @ V26

tie

Activity ID	Activity Name	Original Duration	Start	Finish
Total		652d	12-Jul-06 A	09-Feb-09
ULE90130 SDS Edinburgh Tram V26 update on V25 - Actual progress to Data Date 14th Jan 08 Rec 04F...		652d	12-Jul-06 A	09-Feb-09
MS - Programme Key Milestones		344d	31-Jul-07 A	03-Dec-08
MS - Programme Key Milestones		344d	31-Jul-07 A	03-Dec-08
MS - Programme Key Milestones		344d	31-Jul-07 A	03-Dec-08
SDS Key Milestones		344d	31-Jul-07 A	03-Dec-08
Detail Design Submittals to tie		344d	31-Jul-07 A	03-Dec-08
	Complete All Detail Design Submittals to tie	0d		03-Dec-08
	Detail Design Submittals to tie Complete For Section 1	0d		17-Sep-08
	Detail Design Submittals to tie Complete For Section 2	0d		31-Jul-07 A
	Detail Design Submittals to tie Complete For Section 3	0d		14-Jan-08
	Detail Design Submittals to tie Complete For Section 5	0d		03-Jul-08
	Detail Design Submittals to tie Complete For Section 6	0d		26-Mar-08
	Detail Design Submittals to tie Complete For Section 7	0d		03-Jul-08
Detail Design Submittals to CEC		109d	08-Feb-08	10-Jul-08
	Detail Design Submittals to CEC Complete For Section 6	0d		09-Jun-08
	Detail Design Submittals to CEC Complete For Section 1	0d		10-Jul-08
	Detail Design Submittals to CEC Complete For Section 3	0d		11-Apr-08
	Detail Design Submittals to CEC Complete For Section 2	0d		08-Feb-08
	Detail Design Submittals to CEC Complete For Section 5	0d		01-Apr-08
	Detail Design Submittals to CEC Complete For Section 7	0d		01-Apr-08
EPWA - ENGINEERING Project Wide Activities		556d	04-Oct-06 A	10-Dec-08
EPWA - ENGINEERING Project Wide Activities		556d	04-Oct-06 A	10-Dec-08
EPWA - ENGINEERING Project Wide Activities		556d	04-Oct-06 A	10-Dec-08
Track (Task200.1.1)		198d	15-Dec-06 A	28-Sep-07 A
Track Category Plans		22d	14-Mar-07 A	13-Apr-07 A
	Issue Final Track Catagory Plans to tie	0d		14-Mar-07 A
	tie Approval Period	19d	15-Mar-07 A	13-Apr-07 A
Typical Tramway Cross Sections		22d	14-Mar-07 A	13-Apr-07 A
	Issue Final Typical Tramway Cross Sections to tie	0d		14-Mar-07 A
	tie Approval Period	19d	15-Mar-07 A	13-Apr-07 A
Trackform & Surface Finish Plans & Schedules		0d	10-Aug-07 A	10-Aug-07 A
	Issue Final Trackform/Surface Finish Plans & Schedules to tie	0d		10-Aug-07 A
Wheel / Rail Interface Report		0d	28-Sep-07 A	28-Sep-07 A
	Issue Final Wheel / Rail Interface Report to tie	0d		28-Sep-07 A
Alignment Criteria		20d	21-Feb-07 A	21-Mar-07 A
	Issue Final Track Alignment Criteria to tie	0d		21-Feb-07 A
	tie Approval Period	19d	22-Feb-07 A	21-Mar-07 A
Structure Gauge & Clearances Drawings		50d	23-Jan-07 A	02-Apr-07 A
	Issue Final Structure Gauge & Clearance Drawings to tie	0d		02-Apr-07 A
	tie Approval Period	19d	23-Jan-07 A	19-Feb-07 A
Trackform Typical Cross Sections & Details		0d	28-Sep-07 A	28-Sep-07 A
	Issue Final Trackform Cross Sections & Details	0d		28-Sep-07 A
Trackwork Specification		0d	28-Sep-07 A	28-Sep-07 A
	Issue Final Trackwork Specification to tie	0d		28-Sep-07 A
Switches & Crossing Design		0d	13-Sep-07 A	13-Sep-07 A
	Issue Final S&C Layout Plans to tie	0d		13-Sep-07 A
Rail Section Schedule		0d	22-Aug-07 A	22-Aug-07 A
	Issue Rail Section Schedule to tie	0d		22-Aug-07 A
Rail Grade Schedule		0d	22-Aug-07 A	22-Aug-07 A
	Issue Rail Grade Schedule to tie	0d		22-Aug-07 A
Rail Movement Joint Schedule		0d	22-Aug-07 A	22-Aug-07 A
	Issue Rail Movement Joint Schedule to tie	0d		22-Aug-07 A
Check Rail Schedule		0d	22-Aug-07 A	22-Aug-07 A
	Issue Check Rail Schedule to tie	0d		22-Aug-07 A
Guard Rail Schedule		0d	22-Aug-07 A	22-Aug-07 A
	Issue Guard Section Schedule to tie	0d		22-Aug-07 A
Vehicle Arrestment Schedule		0d	22-Aug-07 A	22-Aug-07 A
	Issue Vehicle Arrestment Schedule to tie	0d		22-Aug-07 A
Isolatable Rail Joint Schedule		0d	22-Aug-07 A	22-Aug-07 A
	Issue Isolatable Rail Joint Schedule to tie	0d		22-Aug-07 A
Rail Sections		22d	22-Dec-06 A	01-Feb-07 A
	Issue Rail Section Report to tie	0d		22-Dec-06 A
	tie Approval Period	19d	05-Jan-07 A	01-Feb-07 A
Guard Rails		39d	15-Dec-06 A	19-Feb-07 A
	Issue Guard Rail Drawings to tie	0d		15-Dec-06 A
	tie Approval Period	24d	18-Dec-06 A	30-Jan-07 A
	Update to tie Comments	13d	31-Jan-07 A	19-Feb-07 A
	Re-Issue Guard Rail Schedule to tie	0d		19-Feb-07 A
Switching & Crossing Schedule		0d	22-Aug-07 A	22-Aug-07 A
	Issue Switching & Crossing Schedule to tie	0d		22-Aug-07 A
Modelling (Task200.2)		398d	13-Oct-06 A	13-May-08
Traffic Modelling (Task 200.2.1)		398d	13-Oct-06 A	13-May-08
Model Based On Preliminary Design		21d	13-Oct-06 A	13-Nov-06 A
	Issue Patronage/Revenue Forecasts to tie (For Issue Of Business Case to Scottish Executive)	0d		13-Oct-06 A
	SDS Issue Modelling Report to tie	0d		17-Oct-06 A

Activity ID	Activity Name	Original Duration	Start	Finish
	tie Approval Period	19d	17-Oct-06 A	13-Nov-06 A
	Traffic Modelling First Pass	0d	24-Sep-07 A	24-Sep-07 A
	Issue Notification of Phase Completion Letter to tie (Activity D)	0d		24-Sep-07 A
	Issue Notification of Phase Completion Letter to tie (Activity F)	0d		24-Sep-07 A
	Main Traffic Model Iteration	0d	13-May-08	13-May-08
	Issue Traffic Modelling Update Report to tie (& Approval From CEC)	0d		13-May-08
	Tram Simulation (Task 200.2.2)	239d	20-Apr-07 A	31-Mar-08
	Stage 3 - Operational Simulations for Preliminary Design	223d	25-Apr-07 A	12-Mar-08
	Modelling Excluding Section 4	223d	25-Apr-07 A	12-Mar-08
	Issue Report of Simulation Results to tie	0d		12-Mar-08
	Issue Runtime Model To Reflect Charette Changes	0d		25-Apr-07 A
	Stage 4 - Traction Power	0d	31-Mar-08	31-Mar-08
	Issue Traction Power Simulation Report	0d		31-Mar-08
	VO82 Additional Runtime Modelling (Sector 3 in and out) (Not tie Approved)	0d	20-Apr-07 A	20-Apr-07 A
	Issue Discussion Simulation Report	0d		20-Apr-07 A
	Environmental (Task 200.3)	105d	03-Nov-06 A	10-Apr-07 A
	General Environmental	59d	17-Jan-07 A	10-Apr-07 A
	Issue Updated Environmental Management Plan for Detailed Design to tie	0d		17-Jan-07 A
	Re-Issue Updated Environmental Management Plan for Detailed Design to tie	0d		10-Apr-07 A
	Ecology	35d	03-Nov-06 A	22-Dec-06 A
	Design Surveys	35d	03-Nov-06 A	22-Dec-06 A
	Issue Final Protected Species Mitigation Strategy to tie & SNH	0d		22-Dec-06 A
	Issue to tie Mitigation Strategy for Treatment of Jap Knotweed & Giant Hogweed	0d		03-Nov-06 A
	System & Communications (Task200.5)	253d	15-Dec-06 A	14-Dec-07 A
	SCC General Activities and High Level	0d	14-Dec-07 A	14-Dec-07 A
	Issue SCC Technical Specification and Drawings to tie	0d		14-Dec-07 A
	Comms - Technical Activities	0d	15-Dec-06 A	15-Dec-06 A
	Operational Radio System Propagation Modelling Report For Issue To tie	0d		15-Dec-06 A
	TRO's (Task200.4)	198d	22-Feb-08	26-Nov-08
	Order Preparation & Process	81d	05-Aug-08	26-Nov-08
	Issue Draft Relevant Maps to CEC For Comments	0d		05-Aug-08
	Issue Draft Relevant Maps to tie For Comments	0d		05-Aug-08
	Receive tie and CEC comments on proposed traffic regulation meansures	9d	06-Aug-08	19-Aug-08
	Informal briefing session with Consultees based on relevant maps	5d	06-Aug-08	12-Aug-08
	Preparation of final draft of Relevant Map showing proposed traffic regulation measures	5d	20-Aug-08	26-Aug-08
	Issue Final Draft Relevant Maps to CEC For Approval	0d		26-Aug-08
	Issue Final Draft Relevant Maps to tie For Approval	0d		26-Aug-08
	Briefing Session for listed Consultees on Final Draft Orders	5d	20-Nov-08	26-Nov-08
	Briefing Session for Members on Final Draft Orders	5d	20-Nov-08	26-Nov-08
	Design Process	20d	22-Feb-08	21-Mar-08
	LOD	0d	22-Feb-08	22-Feb-08
	Full Draft TRO proposal available	0d		22-Feb-08
	Wider Area TRO Design	0d	21-Mar-08	21-Mar-08
	Issue Detailed TRO to CEC for Approval	0d		21-Mar-08
	TTROs	132d	11-Dec-06 A	22-Jun-07 A
	Re-Issue MUDFA TTRO Order & Schedules To tie	0d		12-Mar-07 A
	Issue MUDFA TTRO Order & Schedules To tie	0d		11-Dec-06 A
	Issue INFRACO TTRO Order & Schedules To tie	0d		22-Jun-07 A
	Traction Power (Task 200.6.1)	556d	04-Oct-06 A	10-Dec-08
	Traction Power Systems - General TPS - System Wide	76d	25-Oct-06 A	19-Feb-07 A
	Issue Generic TSS Protection Schematic (TPS 20)	0d		18-Dec-06 A
	Issue DC Protection Settings For Complete TPS System (TPS 21)	0d		16-Feb-07 A
	Issue Traction Power Cable and Routing Schedule (TPS 12DD) (Owner T Bishop)	0d		10-Jan-07 A
	Issue Generic SCADA I / O Schedules (TPS 28)	0d		16-Jan-07 A
	Issue Electrical Nonenclature Report - Iteration 2 (TPS 25)	0d		16-Jan-07 A
	Issue Interim TPS Scheme Development Report (TPS 3DDB)	0d		20-Nov-06 A
	Issue Substation Sites and DNO Requirements Summary Report (TPS 16)	0d		19-Feb-07 A
	Issue TPS AC / DC Feeding and Sectioning Diagram (TPS 17)	0d		13-Nov-06 A
	Issue Traction Power Equipment and Substation Equipment Specification - Update 2 (TPS18) to tie	0d		21-Dec-06 A
	Issue Updated Earthing and Bonding Policy (TPS 8DD)	0d		18-Dec-06 A
	Issue DC Feeding and Sectioning Diagrams (Iteration 1)	0d		25-Oct-06 A
	Issue of Substation Equipment Specification Update 1 (TPS 18)	0d		16-Nov-06 A
	Traction Substation Electrical Design	55d	15-Nov-06 A	09-Feb-07 A
	Issue Site Specific Substation Single Line Diagrams	0d		09-Feb-07 A
	Issue Substation and Trackside Interface Demarcation Diagram (TPS 26)	0d		15-Nov-06 A
	Issue Schematic Diagram for DNO Derived LVAC Power Supplies (TPS 31)	0d		30-Jan-07 A
	Depot OLE / Plant Interlocking	0d	27-Feb-07 A	27-Feb-07 A
	Issue Energisation Warning and Interlocking Scheme (TPS 29)	0d		27-Feb-07 A
	Stray Current Management	1d	17-Nov-06 A	20-Nov-06 A
	Issue Updated Stray Current Management Strategy (TPS 34)	0d		17-Nov-06 A
	Issue Stray Current Code of Practice (TPS 7DD)	0d		20-Nov-06 A
	Stray Current	332d	23-Aug-07 A	10-Dec-08
	VO135 Detailed Design of Stray Current (Internal)	0d	23-Aug-07 A	23-Aug-07 A
	Issue SC COP, SC, CCA, SC RMS and SC TCP	0d		23-Aug-07 A
	VO230 SDS Support to Stray Current Working Party	195d	12-Mar-08	10-Dec-08
	Issue Stray Current Test Site Drawings for External Approval	0d		12-Mar-08

Activity ID	Activity Name	Original Duration	Start	Finish
	Issue Stray Current Working Party Position Report for External Approval	0d		10-Dec-08
	Traction Power Systems	403d	04-Oct-06 A	09-May-08
	Issue Outline Project Specification (OPS) 'Traction Power Distribution' (TPS14)	0d		04-Oct-06 A
	Issue Risk Register Update Associated With TPS (TPS 15)	0d		15-Nov-06 A
	Final Issue of Systemwide Traction Power Design To tie	0d		09-May-08*
	Electro Magnetic Compatibility	119d	19-Jul-07 A	14-Jan-08
	Issue Network Rail Strategy & Management Plan to tie	0d		31-Aug-07 A
	Issue BAA Strategy & Management Plan to tie	0d		21-Sep-07 A
	Issue Forth Ports Strategy & Management Plan to tie	0d		21-Sep-07 A
	Issue BAA Interface Report to tie	0d		02-Nov-07 A
	Issue Forth Ports Interface Report to tie	0d		02-Nov-07 A
	Issue Utilities Interface Report to tie	0d		14-Jan-08
	Issue Cable Separation Specification To tie	0d		19-Jul-07 A
	OLE (Task200.7)	188d	17-Aug-07 A	16-May-08
	OLE General (Task200.7.1)	108d	17-Aug-07 A	25-Jan-08
	Issue Dynamic Simulation Report	0d		17-Jan-08
	Issue Final Technical & Pantograph Specifications	0d		17-Aug-07 A
	Issue Final Building Fixings Report	0d		07-Dec-07 A
	Issue Pole Schedule - Loading Chart	0d		25-Jan-08*
	Issue Design Commentary Report	0d		25-Jan-08*
	OLE Bases (Task200.7.2)	0d	16-May-08	16-May-08
	OLE Bases General	0d	16-May-08	16-May-08
	Issue OLE Base Design to tie	0d		16-May-08
	System Engineering	354d	17-Jul-07 A	03-Dec-08
	Requirements Test Specification	225d	24-Jan-08	03-Dec-08
	Issue Requirements Test Specification Ready To tie (second issue)	0d		03-Dec-08
	Issue Requirements Test Specification Ready To tie (first issue)	0d		24-Jan-08
	System Integration	345d	17-Jul-07 A	20-Nov-08
	Issue System Integration Plan To tie	0d		18-Jan-08*
	System Interface Register Baseline Ready to Issue To tie	0d		20-Nov-08
	Issue Edinburgh Tram Network Integration Plan (1st Submission) to tie	0d		17-Jul-07 A
	Issue Edinburgh Tram Network Integration Plan (2nd Submission) to tie	0d		18-Jan-08*
	Issue System Architecture Specification Plan to tie	0d		18-Jan-08*
	Issue System Interface Register Baseline To tie (1st Submmission)	0d		25-Jan-08*
	Verification and Validation	219d	18-Jan-08	20-Nov-08
	Detailed Design Verification and Validation Report	10d	05-Nov-08	20-Nov-08
	Issue Verification and Validation Plan to tie	0d		18-Jan-08
	Issue System Detailed Design Review Plan to tie	0d		18-Jan-08
	Requirements Database	213d	28-Jan-08	20-Nov-08
	Issue Requirements Database Baseline 3 To tie (second issue)	0d		20-Nov-08
	Issue Requirements Database Baseline 3 To tie (first issue)	0d		28-Jan-08
	Systems Assurance (100.5)	97d	23-Jan-08	06-Jun-08
	RAM	47d	23-Jan-08	28-Mar-08
	RAMP	38d	23-Jan-08	17-Mar-08
	Issue Reliability Availability Maintainability Plan to tie	0d		23-Jan-08*
	Final Detailed Design Stage Issue of Reliability Availability Maintainability Plan to tie	0d		17-Mar-08
	RAM Analysis	42d	29-Jan-08	27-Mar-08
	Issue RAM Analysis to tie	0d		29-Jan-08
	Final Detailed Design Stage Issue of RAM Analysis to tie	0d		27-Mar-08
	RDP	44d	28-Jan-08	28-Mar-08
	Issue RDP to tie	0d		28-Jan-08
	Final Detailed Design Stage Issue of RDP to tie	0d		28-Mar-08
	System Safety	97d	23-Jan-08	06-Jun-08
	SSMP	52d	23-Jan-08	04-Apr-08
	Issue System Safety Management Plan to tie	0d		23-Jan-08*
	Final DD Stage Issue of System Safety Management Plan to tie	0d		04-Apr-08
	Safety Analysis	51d	28-Jan-08	08-Apr-08
	Issue Safety Analysis to tie	0d		28-Jan-08
	Final DD Stage Issue of Safety Analysis to tie	0d		08-Apr-08
	Hazard log	64d	28-Jan-08	25-Apr-08
	Issue Hazard Log Report to tie	0d		28-Jan-08
	Final DD stage issue of HL report to tie	0d		25-Apr-08
	DDCS	52d	26-Mar-08	06-Jun-08
	Issue Detailed Design Case For Safety to tie	0d		26-Mar-08
	Final Detailed Design stage issue of DDCS to tie	0d		06-Jun-08
	Issue Detailed Design Case For Safety to PSCC	0d		28-May-08
	VO102 Review of Employers Requirements With SDS Technical Specifications CNS030	0d	19-Feb-07 A	19-Feb-07 A
	Issue Employers Requirements Review Document to tie	0d		19-Feb-07 A
	Haymarket to Newhaven Road - Section 1 (Task300)	580d	18-Aug-06 A	26-Nov-08
	Section Wide - Section 1	0d	30-Nov-07 A	30-Nov-07 A
	Section Wide	0d	30-Nov-07 A	30-Nov-07 A
	OLE (Task300.1)	0d	30-Nov-07 A	30-Nov-07 A
	Issue Notification Of Completion Letter-Final Detailed Layout Plans & Standard & Special Cross Sections to tie Sec1	0d		30-Nov-07 A
	FOW - NER - Section 1A (Task300.2)	566d	07-Sep-06 A	26-Nov-08
	Sub Section Wide	482d	12-Jan-07 A	26-Nov-08
	Sub Section Wide IDC	18d	31-Mar-08	23-Apr-08

Activity ID	Activity Name	Original Duration	Start	Finish
	Subsection Wide IDC	17d	31-Mar-08	23-Apr-08
	Consents & Approvals	382d	31-May-07 A	26-Nov-08
	Prior Approvals	342d	31-May-07 A	02-Oct-08
	Combined Section Prior Approval	60d	10-Jul-08	02-Oct-08
	Receive Combined Package 1A Comments From CEC	0d		04-Sep-08
	Prior Approval Granted for Section 1A Combined Package	0d		02-Oct-08
	Issue Combined Package 1A for Prior Approval to CEC	0d		10-Jul-08
	CEC Approval Period - 1A Combined Package	38d	10-Jul-08	04-Sep-08
	Update 1A Combined Package to CEC Comments	19d	04-Sep-08	02-Oct-08
	Batch 1/01	40d	19-Jun-08	14-Aug-08
	Issue Batch 1/01 For Approval to CEC	0d	19-Jun-08	
	Batch 1/01 Formal Approval Period	38d	19-Jun-08	13-Aug-08
	Receive CEC Prior Approval For Batch 1/01	0d	14-Aug-08	
	Batch 1/02	43d	14-Mar-08	14-May-08
	Batch 1/02 Formal Approval Period	38d	14-Mar-08	13-May-08
	Issue Batch 1/02 For Approval to CEC	0d	14-Mar-08	
	Receive CEC Prior Approval For Batch 1/02	0d	14-May-08	
	Batch 1/03 Tram North Leith Sands Substation	29d	31-May-07 A	11-Jul-07 A
	Issue Tram North Leith Sands Substation Design for Prior Approval	0d		31-May-07 A
	Prior Approval For Tram North Leith Sands Substation	0d		11-Jul-07 A
	Receive Tram North Leith Sands Substation CEC Comments (No Comments)	0d		11-Jul-07 A
	Batch 1/03 Formal Approval Period	27d	01-Jun-07 A	11-Jul-07 A
	Incorporate Tram North Leith Sands Substation CEC Comments for Prior Approval (No Comments)	1d	11-Jul-07 A	11-Jul-07 A
	Batch 1/04	41d	10-Jul-08	05-Sep-08
	Batch 1/04 Formal Approval Period	38d	10-Jul-08	04-Sep-08
	Issue Batch 1/04 For Approval to CEC	0d	10-Jul-08	
	Receive CEC Prior Approval For Batch 1/04	0d	05-Sep-08	
	Batch 1/05	40d	03-Jun-08	29-Jul-08
	Batch 1/05 Formal Approval Period	38d	03-Jun-08	28-Jul-08
	Issue Batch 1/05 For Approval to CEC	0d	03-Jun-08	
	Receive CEC Prior Approval For Batch 1/05	0d	29-Jul-08	
	Batch 1/06	42d	04-Feb-08	02-Apr-08
	Batch 1/06 Formal Approval Period	38d	04-Feb-08	01-Apr-08
	Issue Batch 1/06 For Approval to CEC	0d	04-Feb-08	
	Receive CEC Prior Approval For Batch 1/06	0d	02-Apr-08	
	Batch 1/07	42d	30-Jan-08	28-Mar-08
	Batch 1/07 Formal Approval Period	38d	30-Jan-08	27-Mar-08
	Issue Batch 1/07 For Approval to CEC	0d	30-Jan-08	
	Receive CEC Prior Approval For Batch 1/07	0d	28-Mar-08	
	Batch 1/08	42d	08-Feb-08	08-Apr-08
	Batch 1/08 Formal Approval Period	38d	08-Feb-08	07-Apr-08
	Issue Batch 1/08 For Approval to CEC	0d	08-Feb-08	
	Receive CEC Prior Approval For Batch 1/08	0d	08-Apr-08	
	Roads, Track, OLE, Landscaping, Street Lighting	153d	20-Aug-07 A	28-Mar-08
	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	142d	20-Aug-07 A	28-Mar-08
	Tram Stop Bernard Street	103d	20-Aug-07 A	18-Jan-08
	Informal Consultation With CEC & tie over Prior Approval for Tram Stop Bernard Street	97d	20-Aug-07 A	18-Jan-08
	Tram Stop Port Of Leith	102d	27-Aug-07 A	25-Jan-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Port Of Leith	97d	27-Aug-07 A	25-Jan-08
	Tram Stop Ocean Terminal	40d	04-Feb-08	28-Mar-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Ocean Terminal	38d	04-Feb-08	28-Mar-08
	Tram Stop Newhaven	40d	14-Jan-08	07-Mar-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Newhaven	38d	14-Jan-08	07-Mar-08
	Lindsay Road Retaining Wall Structure	40d	23-May-08	17-Jul-08
	Commence Lindsay Road RW Informal Consultation With CEC & tie Over Prior Approval	37d	23-May-08	17-Jul-08
	Tram Stop Foot of the Walk	113d	27-Aug-07 A	11-Feb-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Foot of the Walk	107d	27-Aug-07 A	11-Feb-08
	Technical Approvals	195d	28-Feb-08	26-Nov-08
	Victoria Dock (TAA)	90d	19-Jun-08	22-Oct-08
	Issue Victoria Dock Design Package to TAA	0d		13-Aug-08
	TAA Victoria Dock Design Package Review Period	38d	14-Aug-08	08-Oct-08
	Receive Victoria Dock Design Package Comments from TAA	0d		08-Oct-08
	Incorporate TAA Comments into Victoria Dock Design Package	9d	09-Oct-08	22-Oct-08
	Commence Victoria Dock Informal Consultation With CEC Over Technical Approval	38d	19-Jun-08	13-Aug-08
	Tower Place Bridge Review Period (TAA)	90d	24-Jul-08	26-Nov-08
	Issue Tower Place Bridge Superstructure Design Package to TAA	0d		17-Sep-08
	TAA Tower Place Bridge Superstructure Design Package Review Period	38d	18-Sep-08	12-Nov-08
	Receive Tower Place Bridge Superstructure Design Package Comments from TAA	0d		12-Nov-08
	Incorporate TAA Comments into Tower Place Bridge Superstructure Design Package	9d	13-Nov-08	26-Nov-08
	Commence Tower Place Bridge Superstructure Informal Consultation With CEC Over Technical Approval	38d	24-Jul-08	17-Sep-08
	Lindsay Road Retaining Wall Structure Review Period (TAA)	94d	22-May-08	30-Sep-08
	Issue Lindsay Road RW Design Package to TAA	0d		17-Jul-08
	TAA Lindsay Road RW Design Package Review Period	39d	18-Jul-08	15-Sep-08
	Receive Lindsay Road RW Design Package Comments from TAA	0d		15-Sep-08
	Incorporate TAA Comments into Lindsay Road RW Design Package	10d	16-Sep-08	30-Sep-08
	Commence Lindsay Road RW Informal Consultation With CEC Over Technical Approval	38d	22-May-08	17-Jul-08

Activity ID	Activity Name	Original Duration	Start	Finish
	Roads inc Drainage Technical Approval	104d	28-Feb-08	22-Jul-08
	Roads Authority Informal Consultation	38d	28-Feb-08	25-Apr-08
	Issue Roads Design to Roads Authority for Approval	0d		25-Apr-08
	Roads Authority Approval Period	38d	28-Apr-08	24-Jun-08
	Receive Roads Authority Comments	0d		24-Jun-08
	Update to Roads Authority Comments	19d	25-Jun-08	22-Jul-08
	Roads Technical Approval Granted	0d		22-Jul-08
	Track (Task300.2.1)	0d	25-Jan-08	25-Jan-08
	Issue Notification Of Completion Letter - Track Alignment Design to tie Section 1A	0d		25-Jan-08
	Roads, Street Lighting & Landscaping SubSections 1A1 & 1A2 (Task300.2.2)	50d	18-Jan-08	28-Mar-08
	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 1A1 & 1A2	0d		18-Jan-08
	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 1A1 & 1A2	0d		28-Mar-08
	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole) to tie Section 1A1 & 1A2	0d		28-Feb-08
	VO253 - Subsection 1A4 - Lindsay Road Detailed Design (Not Approved)	0d	28-Jan-08	28-Jan-08
	VO253 Subsection 1A4 - Roads	0d	28-Jan-08	28-Jan-08
	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 1A4	0d		28-Jan-08
	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 1A4	0d		28-Jan-08
	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 1A4	0d		28-Jan-08
	VO252 - Subsection 1A3 - Ocean Terminal Detailed Design (Not Approved)	0d	15-Feb-08	15-Feb-08
	VO252 Subsection 1A3 - Roads	0d	15-Feb-08	15-Feb-08
	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 1A3	0d		15-Feb-08
	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 1A3	0d		15-Feb-08
	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 1A3	0d		15-Feb-08
	Drainage	0d	18-Jan-08	18-Jan-08
	Issue Drainage Design Completion Letter to tie for Approval Section 1A	0d		18-Jan-08
	Boundary & Accomodation Works (Task300.2.4)	0d	14-Sep-07 A	14-Sep-07 A
	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 1A	0d		14-Sep-07 A
	Utilities Section 1A1 (Excludes Constitution Street) Plates 13 to 15	117d	12-Jan-07 A	25-Jun-07 A
	SUCs Approval	99d	12-Jan-07 A	14-Jun-07 A
	Incorporate Comments and Compile IFC Drawings Section 1A1	8d	14-Jun-07 A	25-Jun-07 A
	Issue First Draft IFC to tie Section 1A1	0d		25-Jun-07 A
	FoW - CoS	349d	07-Sep-06 A	26-Jan-08
	Tram Stop Foot of the Walk (Task300.3.10)	230d	02-Mar-07 A	28-Jan-08
	Issue Notification Of Completion Letter- Foot Of The Walk Tram Stop Design to tie	0d		28-Jan-08*
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Mar-07 A	02-Mar-07 A
	Tram Stop Bernard Street (Task300.2.8)	310d	07-Sep-06 A	23-Nov-07 A
	Issue Notification Of Completion Letter- Bernard Street Tram Stop Design to tie	0d		23-Nov-07 A
	Site Visit To Review Preliminary Design	1d	07-Sep-06 A	07-Sep-06 A
	CoS - OCD	233d	26-Feb-07 A	25-Jan-08
	Tram Stop Port of Leith (Task300.2.9)	233d	26-Feb-07 A	25-Jan-08
	Issue Notification Of Completion Letter- Port Of Leith Tram Stop Design to tie	0d		25-Jan-08
	Site Visit with tie & CEC To Review Preliminary Design	1d	26-Feb-07 A	26-Feb-07 A
	OCD - OCT	397d	02-Mar-07 A	17-Sep-08
	Tram Stop Ocean Terminal (Task300.2.10)	274d	02-Mar-07 A	28-Mar-08
	Issue Notification Of Completion Letter- Ocean Terminal Tram Stop Design to tie	0d		28-Mar-08
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Mar-07 A	02-Mar-07 A
	Structures	150d	20-Feb-08	17-Sep-08
	S16 Victoria Dock Entrance Bridge	125d	20-Feb-08	13-Aug-08
	Issue Victoria Dock Entrance Bridge AIP to tie	0d		20-Feb-08
	Issue Victoria Dock Entrance Bridge AIP to CEC	0d		20-Feb-08
	Issue Victoria Dock Entrance Bridge AIP to TAA	0d		20-Feb-08
	TAA Approval Period	38d	21-Feb-08	16-Apr-08
	Victoria Dock Superstructure Detailed Design	50d	04-Jun-08	13-Aug-08
	Issue Superstructure Detailed Design Package to CAT II Checker	0d		04-Jun-08
	Superstructure CAT II Check	28d	05-Jun-08	16-Jul-08
	Receive and Incoporate CAT II Comments	9d	17-Jul-08	30-Jul-08
	Issue Notification Of Completion Letter- Victoria Dock Superstructure Design Package to tie	0d		13-Aug-08
	Victoria Dock Substructure Detailed Design	70d	07-May-08	13-Aug-08
	Issue Substructure Detailed Design Package to CAT II Checker	0d		07-May-08
	Substructure CAT II Check	28d	08-May-08	18-Jun-08
	Receive and Incorporate CAT II Comments	9d	19-Jun-08	02-Jul-08
	Issue Notification Of Completion Letter- Victoria Dock Substructure Detailed Design Package to tie	0d		13-Aug-08
	S17 Tower Place Bridge	150d	20-Feb-08	17-Sep-08
	Issue Victoria Dock Entrance Bridge AIP to tie	0d		20-Feb-08
	Issue Victoria Dock Entrance Bridge AIP to CEC	0d		20-Feb-08
	Issue Victoria Dock Entrance Bridge AIP to TAA	0d		20-Feb-08
	TAA Approval Period	38d	21-Feb-08	16-Apr-08
	Tower Place Bridge Superstructure Detailed Design	50d	09-Jul-08	17-Sep-08
	Issue Superstructure Detailed Design Package to CAT II Checker	0d		09-Jul-08
	Superstructure CAT II Check	28d	10-Jul-08	20-Aug-08
	Receive and Incoporate CAT II Comments	9d	21-Aug-08	03-Sep-08
	Issue Notification Of Completion Letter- Tower Place Bridge Superstructure Design Package to tie	0d		17-Sep-08
	Tower Place Bridge Substructure Detailed Design	60d	25-Jun-08	17-Sep-08
	Issue Substructure Detailed Design Package to CAT II Checker	0d		25-Jun-08
	Substructure CAT II Check	28d	26-Jun-08	06-Aug-08
	Receive and Incorporate CAT II Comments	9d	07-Aug-08	20-Aug-08

Activity ID	Activity Name	Original Duration	Start	Finish
	Issue Notification Of Completion Letter- Tower Place Bridge Substructure Detailed Design Package to tie	0d		17-Sep-08
	OCT - NER	358d	22-Feb-07 A	17-Jul-08
	Tram Stop Newhaven (Task300.2.11)	234d	02-Mar-07 A	01-Feb-08
	Issue Notification Of Completion Letter- Newhaven Tram Stop Design to tie	0d		01-Feb-08
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Mar-07 A	02-Mar-07 A
	Structures	110d	14-Feb-08	17-Jul-08
	W01 Lindsay Road Retaining Wall	110d	14-Feb-08	17-Jul-08
	Issue Lindsay Road Retaininng Wall AIP to tie	0d		14-Feb-08
	Issue Lindsay Road Retaininng Wall AIP to CEC	0d		14-Feb-08
	Issue Lindsay Road Retaininng Wall AIP to TAA	0d		14-Feb-08
	TAA Approval Period	38d	15-Feb-08	10-Apr-08
	Lindsay Road Retaining Wall Structure Detailed Design	50d	08-May-08	17-Jul-08
	Issue Structure Detailed Design Package to CAT I Checker	0d		08-May-08
	Structure CAT I Check	28d	09-May-08	19-Jun-08
	Receive and Incoporate CAT I Comments	9d	20-Jun-08	03-Jul-08
	Issue Notification Of Completion Letter- Lindsay Road Structure Design Package to tie	0d		17-Jul-08
	Tram North Leith Sands Substation (Task300.2.12)	25d	22-Feb-07 A	29-Mar-07 A
	Issue Tram North Leith Sands Substation Planning Submission To tie For Approval	0d		22-Feb-07 A
	tie Approval Period For Planning Submission	19d	23-Feb-07 A	22-Mar-07 A
	Receive tie Comments	0d		16-Mar-07 A
	Update Substation Planning Submission To Incorporate tie Comments	9d	16-Mar-07 A	29-Mar-07 A
	MDR - FOW - Section 1B (Task300.3)	424d	12-Sep-06 A	15-May-08
	Sub Section Wide	424d	12-Sep-06 A	15-May-08
	Sub Section Wide IDC	39d	03-Dec-07 A	04-Feb-08
	Subsection Wide IDC - Roads, Track, Stops, B&A, Street Lighting, Utilities	38d	03-Dec-07 A	04-Feb-08
	Consents & Approvals	320d	14-Feb-07 A	15-May-08
	Prior Approvals	176d	16-Aug-07 A	28-Apr-08
	Combined Section Prior Approval	60d	04-Feb-08	28-Apr-08
	Issue Combined Package 1B for Prior Approval to CEC	0d		04-Feb-08
	Receive Combined Package 1B Comments From CEC	0d		31-Mar-08
	Prior Approval Granted for Section 1B Combined Package	0d		28-Apr-08
	CEC Approval Period - 1B Combined Package	38d	05-Feb-08	31-Mar-08
	Update 1B Combined Package to CEC Comments	19d	01-Apr-08	28-Apr-08
	Batch 1/09	40d	18-Jan-08	14-Mar-08
	Batch 1/09 Formal Approval Period	38d	18-Jan-08	13-Mar-08
	Issue Batch 1/09 For Approval to CEC	0d	18-Jan-08	
	Receive CEC Prior Approval For Batch 1/09	0d	14-Mar-08	
	Batch 1/10 Tram Leith Walk 163 Substation	99d	16-Aug-07 A	10-Jan-08 A
	Issue Tram Leith Walk 163 Substation Design for Prior Approval	0d		14-Nov-07 A
	Prior Approval For Tram Leith Walk 163 Substation	0d		10-Jan-08 A
	Informal Consultation With CEC & tie over Prior Approval For Tram Leith Walk 163 Substation	60d	16-Aug-07 A	14-Nov-07 A
	Tram Leith Walk 163 Substation CEC Approval Period	33d	14-Nov-07 A	09-Jan-08 A
	Roads, Track, OLE, Landscaping, Street Lighting	93d	27-Aug-07 A	14-Jan-08
	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	88d	27-Aug-07 A	14-Jan-08
	Tram Stop Balfour Street	55d	27-Aug-07 A	12-Nov-07 A
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Balfour Street	52d	27-Aug-07 A	12-Nov-07 A
	Technical Approvals	320d	14-Feb-07 A	15-May-08
	Leith Walk Rail Bridge Assessment Review Period (TAA)	78d	14-Feb-07 A	01-Jun-07 A
	Issue Leith Walk Rail Bridge Assessment Report to TAA	0d		04-Apr-07 A
	TAA Leith Walk Rail Bridge Assessment Report Review Period	24d	05-Apr-07 A	15-May-07 A
	Receive Leith Walk Rail Bridge Assessment Report Comments from TAA	0d		15-May-07 A
	Incorporate TAA Comments into Leith Walk Rail Bridge Assessment Report	11d	16-May-07 A	01-Jun-07 A
	Commence Leith Walk Rail Bridge Informal Consultation With CEC Over Technical Approval	34d	14-Feb-07 A	04-Apr-07 A
	Leith Walk Rail Bridge Assessment Review Period (Network Rail)	80d	01-Jun-07 A	20-Sep-07 A
	Issue Design and Check Certificate to Network Rail For Comment	0d		01-Jun-07 A
	Network Rail Comment Period	19d	01-Jun-07 A	28-Jun-07 A
	NR COMMENTS NOT RECEIVED	0d		20-Sep-07 A
	Roads inc Drainage Technical Approval	122d	19-Nov-07 A	15-May-08
	Issue Roads Design to Roads Authority for Approval	0d		18-Feb-08
	Roads Authority Approval Period	38d	19-Feb-08	16-Apr-08
	Receive Roads Authority Comments	0d		16-Apr-08
	Update to Roads Authority Comments	19d	17-Apr-08	15-May-08
	Roads Authority Informal Consultation	56d	19-Nov-07 A	18-Feb-08
	Roads Technical Approval Granted	0d		15-May-08
	VO26 Charette Changes Leith Walk CNB014	61d	12-Sep-06 A	06-Dec-06 A
	Optioneering	0d	12-Sep-06 A	12-Sep-06 A
	2-Hour Meeting With CEC	0d	12-Sep-06 A	
	Feasibility (2 Designs)	5d	26-Sep-06 A	03-Oct-06 A
	2-Hour Meeting With CEC - Update	0d	26-Sep-06 A	
	With CEC For Approval	0d	03-Oct-06 A	
	Preliminary Design (1 Design)	13d	17-Nov-06 A	06-Dec-06 A
	2-Hour Meeting With CEC - Update (Not Required)	0d	17-Nov-06 A	
	4-hour Meeting With CEC for Approval	0d	06-Dec-06 A	
	VO27 Charette Changes Foot of Walk CNB015	39d	25-Sep-06 A	17-Nov-06 A
	Optioneering	0d	25-Sep-06 A	25-Sep-06 A
	2-Hour Meeting With CEC	0d	25-Sep-06 A	

Activity ID	Activity Name	Original Duration	Start	Finish
	Feasibility (2 Designs)	5d	26-Sep-06 A	03-Oct-06 A
	2-Hour Meeting With CEC - Update	0d	26-Sep-06 A	
	With CEC For Approval	0d	03-Oct-06 A	
	Preliminary Design (1 Design)	0d	17-Nov-06 A	17-Nov-06 A
	2-Hour Meeting With CEC - Update (Not Required)	0d	17-Nov-06 A	
	Track (Task300.3.1)	0d	31-Aug-07 A	31-Aug-07 A
	Issue Notification Of Completion Letter- Track Alignment Design to tie Section 1B	0d		31-Aug-07 A
	Roads, Street Lighting & Landscaping (Task300.3.2)	4d	05-Nov-07 A	09-Nov-07 A
	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 1B	0d		05-Nov-07 A
	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 1B	0d		09-Nov-07 A
	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 1B	0d		09-Nov-07 A
	Drainage	0d	07-Nov-07 A	07-Nov-07 A
	Issue Drainage Design Completion Letter to tie for Approval Section 1B INCLUDED IN ROADS SUBMISSION	0d		07-Nov-07 A
	Boundary & Accomodation Works (Task300.3.4)	0d	14-Sep-07 A	14-Sep-07 A
	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 1B	0d		14-Sep-07 A
	Utilities Plates 22 to 31	123d	06-Feb-07 A	26-Jul-07 A
	Issue to SUCs	0d		06-Feb-07 A
	SUCs Approval	112d	06-Feb-07 A	26-Jul-07 A
	MDR - BAS	220d	09-Jan-07 A	13-Nov-07 A
	Tram Stop Balfour Street (Task300.3.8)	183d	02-Mar-07 A	13-Nov-07 A
	Issue Notification Of Completion Letter- Balfour Street Tram Stop Design to tie	0d		13-Nov-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Mar-07 A	02-Mar-07 A
	Structures	48d	09-Jan-07 A	16-Mar-07 A
	S18 - Leith Walk Railway Bridge (Task300.3.9)	48d	09-Jan-07 A	16-Mar-07 A
	Leith Walk Rail Bridge Structure Assessment	48d	09-Jan-07 A	16-Mar-07 A
	Issue Structure Assessment Package to CAT I Checker	0d		09-Jan-07 A
	Structure Assessment Package CAT I Check	31d	10-Jan-07 A	23-Feb-07 A
	Receive and Incoporate CAT I Comments	5d	26-Feb-07 A	02-Mar-07 A
	Issue Leith Walk Rail Bridge Assessment Report to tie (NOT REQ. DIRECT TO CEC)	0d		16-Mar-07 A
	BAS - FOW	0d	01-Oct-07 A	01-Oct-07 A
	Tram Leith Walk 163 Substation (Task300.3.11)	0d	01-Oct-07 A	01-Oct-07 A
	Issue Notification Of Completion Letter- Tram Leith Walk 163 Substation Planning Submission to tie for Approval	0d		01-Oct-07 A
	PSW - MDR - Section 1C (Task300.4)	451d	18-Aug-06 A	29-May-08
	Sub Section Wide	451d	18-Aug-06 A	29-May-08
	Sub Section Wide IDC	20d	04-Feb-08	29-Feb-08
	Subsection Wide IDC	19d	04-Feb-08	29-Feb-08
	Consents & Approvals	237d	25-Jun-07 A	29-May-08
	Prior Approvals	228d	25-Jun-07 A	19-May-08
	Combined Section Prior Approval	60d	25-Feb-08	19-May-08
	Issue Combined Package 1C for Prior Approval to CEC	0d		25-Feb-08
	Receive Combined Package 1C Comments From CEC	0d		21-Apr-08
	Prior Approval Granted for Section 1C Combined Package	0d		19-May-08
	CEC Approval Period - 1C Combined Package	38d	25-Feb-08	21-Apr-08
	Update 1C Combined Package to CEC Comments	19d	21-Apr-08	19-May-08
	Batch 1/11	40d	18-Jan-08	14-Mar-08
	Batch 1/11 Formal Approval Period	38d	18-Jan-08	13-Mar-08
	Issue Batch 1/11 For Approval to CEC	0d	18-Jan-08	
	Receive CEC Prior Approval For Batch 1/11	0d	14-Mar-08	
	Batch 1/12	42d	25-Feb-08	23-Apr-08
	Batch 1/12 Formal Approval Period	38d	25-Feb-08	22-Apr-08
	Issue Batch 1/12 For Approval to CEC	0d	25-Feb-08	
	Receive CEC Prior Approval For Batch 1/12	0d	23-Apr-08	
	Batch 1/13	42d	11-Feb-08	09-Apr-08
	Batch 1/13 Formal Approval Period	38d	11-Feb-08	08-Apr-08
	Issue Batch 1/13 For Approval to CEC	0d	11-Feb-08	
	Receive CEC Prior Approval For Batch 1/13	0d	09-Apr-08	
	Batch 1/14 Tram Cathedral Lane Substation	91d	25-Jun-07 A	29-Oct-07 A
	Issue Tram Catherdral Lane Substation Design To CEC For Planning Permission	0d		17-Aug-07 A
	Planning Permission Granted For Tram Cathedral Lane Substation	0d		29-Oct-07 A
	Informal Consultation With CEC & tie Over Planning Permission Tram Catherdral Lane Substation	38d	25-Jun-07 A	17-Aug-07 A
	Batch 1/14 Formal Approval Period	48d	17-Aug-07 A	29-Oct-07 A
	Batch 1/15	42d	30-Jan-08	28-Mar-08
	Batch 1/15 Formal Approval Period	38d	30-Jan-08	27-Mar-08
	Issue Batch 1/15 For Approval to CEC	0d	30-Jan-08	
	Receive CEC Prior Approval For Batch 1/15	0d	28-Mar-08	
	Roads, Track, OLE, Landscaping, Street Lighting	93d	27-Aug-07 A	14-Jan-08
	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	88d	27-Aug-07 A	14-Jan-08
	Tram Stop Picardy Place	40d	14-Jan-08	07-Mar-08
	Informal Consultation With CEC & tie over Prior Approval Tram stop Piccardy Place	38d	14-Jan-08	07-Mar-08
	Tram Stop St. Andrew Square	40d	14-Jan-08	07-Mar-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop St Andrew Square	38d	14-Jan-08	07-Mar-08
	Tram Stop McDonald Road	55d	27-Aug-07 A	12-Nov-07 A
	Informal Consultation With CEC & tie over Prior Approval Tram Stop MacDonald Road	52d	27-Aug-07 A	12-Nov-07 A
	Technical Approvals	127d	26-Nov-07 A	29-May-08
	Roads inc Drainage Technical Approval	127d	26-Nov-07 A	29-May-08
	Issue Roads Design to Roads Authority for Approval	0d		29-Feb-08

Activity ID	Activity Name	Original Duration	Start	Finish
	Roads Authority Approval Period	38d	03-Mar-08	29-Apr-08
	Receive Roads Authority Comments	0d		29-Apr-08
	Update to Roads Authority Comments	19d	30-Apr-08	29-May-08
	Roads Authority Informal Consultation	60d	26-Nov-07 A	29-Feb-08
	Roads Technical Approval Granted	0d		29-May-08
	VO22 Charette Changes St Andrew Square CNB010	78d	18-Aug-06 A	06-Dec-06 A
	Optioneering	0d	18-Aug-06 A	18-Aug-06 A
	2-Hour Meeting With CEC	0d	18-Aug-06 A	
	Feasibility (2 Designs)	4d	26-Sep-06 A	02-Oct-06 A
	2-Hour Meeting With CEC - Update	0d	26-Sep-06 A	
	With CEC For Approval	0d	02-Oct-06 A	
	Preliminary Design (1 Design)	17d	13-Nov-06 A	06-Dec-06 A
	2-Hour Meeting With CEC - Update (Not Required)	0d	13-Nov-06 A	
	4-hour Meeting With CEC for Approval	0d	06-Dec-06 A	
	VO24 Charette Changes Princes Street CNB012	26d	25-Sep-06 A	31-Oct-06 A
	Optioneering	0d	25-Sep-06 A	25-Sep-06 A
	2-Hour Meeting With CEC	0d	25-Sep-06 A	
	Feasibility (2 Designs)	1d	25-Sep-06 A	26-Sep-06 A
	2-Hour Meeting With CEC - Update	0d	26-Sep-06 A	
	With CEC For Approval	0d	25-Sep-06 A	
	Preliminary Design (1 Design)	0d	31-Oct-06 A	31-Oct-06 A
	2-Hour Meeting With CEC - Update (Not Required)	0d	31-Oct-06 A	
	VO25 Charette Changes Picardy Place CNB013	61d	12-Sep-06 A	06-Dec-06 A
	Optioneering	0d	12-Sep-06 A	12-Sep-06 A
	2-Hour Meeting With CEC	0d	12-Sep-06 A	
	Feasibility (2 Designs)	5d	13-Sep-06 A	20-Sep-06 A
	2-Hour Meeting With CEC - Update	0d	13-Sep-06 A	
	With CEC For Approval	0d	20-Sep-06 A	
	Preliminary Design (1 Design)	13d	17-Nov-06 A	06-Dec-06 A
	2-Hour Meeting With CEC - Update (Not Required)	0d	17-Nov-06 A	
	4-hour Meeting With CEC for Approval	0d	06-Dec-06 A	
	Track (Task300.4.1)	0d	09-Nov-07 A	09-Nov-07 A
	Issue Notification Of Completion Letter- Track Alignment Design to tie Section 1C	0d		09-Nov-07 A
	Roads, Street Lighting & Landscaping (Task300.4.2)	56d	14-Nov-07 A	11-Feb-08
	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 1C	0d		19-Dec-07 A
	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 1C	0d		11-Feb-08
	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 1C	0d		08-Jan-08 A
	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 1C (Part Submission Only)	0d		14-Nov-07 A
	Drainage	0d	19-Dec-07 A	19-Dec-07 A
	Issue Drainage Design Completion Letter to tie for Approval Section 1C ISSUED WITH ROADS	0d		19-Dec-07 A
	Boundary & Accomodation Works (Task300.4.4)	0d	14-Sep-07 A	14-Sep-07 A
	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 1C	0d		14-Sep-07 A
	Utilities Section 1C1 (Excludes St.A Sq & Yk Place) Plates 32 to 38	142d	08-Feb-07 A	27-Aug-07 A
	Issue to SUCs	0d		08-Feb-07 A
	SUCs Approval	129d	08-Feb-07 A	27-Aug-07 A
	Utilities Section 1C2 (St.A Sq & Yk Place) Plates 39 to 46	41d	29-Jun-07 A	27-Aug-07 A
	Issue to SUCs	0d		29-Jun-07 A
	SUCs Approval	38d	29-Jun-07 A	27-Aug-07 A
	PSW - SAS	123d	06-Aug-07 A	01-Feb-08
	Tram Stop St. Andrew Square (Task300.4.8)	123d	06-Aug-07 A	01-Feb-08
	Issue Notification Of Completion Letter- St Andrews Square Tram Stop Design to tie	0d		01-Feb-08
	Site Visit with tie & CEC To Review Preliminary Design	1d	06-Aug-07 A	06-Aug-07 A
	SAS - PIP	144d	02-Jul-07 A	28-Jan-08
	Tram Stop Picardy Place (Task300.4.9)	144d	02-Jul-07 A	28-Jan-08
	Issue Notification Of Completion Letter- Picardy Place Tram Stop Design to tie	0d		28-Jan-08
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
	Tram Cathedral Lane Substation(Task300.4.10)	112d	12-Jul-07 A	17-Dec-07 A
	Issue Notification Of Completion Letter- Tram Cathedral Lane Substation Planning Submission to tie for Approval	0d		12-Jul-07 A
	Issue Notification Of Completion Letter- Tram Cathedral Lane Substation Detailed Engineering Drawings To tie	0d		17-Dec-07 A
	PIP - MDR	96d	02-Jul-07 A	12-Nov-07 A
	Tram Stop McDonald Road (Task300.4.11)	96d	02-Jul-07 A	12-Nov-07 A
	Issue Notification Of Completion Letter- McDonald Road Tram Stop Design to tie	0d		12-Nov-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
	HAY - PSW - Section 1D (Task300.5)	437d	30-Aug-06 A	21-May-08
	Sub Section Wide	419d	25-Sep-06 A	21-May-08
	Sub Section Wide IDC	43d	03-Dec-07 A	08-Feb-08
	Subsection Wide IDC	41d	03-Dec-07 A	08-Feb-08
	Consents & Approvals	185d	27-Aug-07 A	21-May-08
	Prior Approvals	168d	27-Aug-07 A	29-Apr-08
	Combined Section Prior Approval	40d	29-Feb-08	25-Apr-08
	Issue Combined Package 1D for Prior Approval to CEC	0d		29-Feb-08
	Receive Combined Package 1D Comments From CEC	0d		25-Apr-08
	Prior Approval Granted for Section 1D Combined Package	0d		25-Apr-08
	CEC Approval Period - 1D Combined Package	38d	29-Feb-08	25-Apr-08
	Batch 1/16	42d	29-Feb-08	29-Apr-08
	Batch 1/16 Formal Approval Period	38d	29-Feb-08	28-Apr-08

Activity ID	Activity Name	Original Duration	Start	Finish
	Issue Batch 1/16 For Approval to CEC	0d	29-Feb-08	
	Receive CEC Prior Approval For Batch 1/16	0d	29-Apr-08	
	Batch 1/17	42d	30-Jan-08	28-Mar-08
	Batch 1/17 Formal Approval Period	38d	30-Jan-08	27-Mar-08
	Issue Batch 1/17 For Approval to CEC	0d	30-Jan-08	
	Receive CEC Prior Approval For Batch 1/17	0d	28-Mar-08	
	Roads, Track, OLE, Landscaping, Street Lighting	39d	27-Aug-07 A	19-Oct-07 A
	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	37d	27-Aug-07 A	19-Oct-07 A
	Tram Stop Shandwick Place	113d	27-Aug-07 A	11-Feb-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Shandwick Place	107d	27-Aug-07 A	11-Feb-08
	Tram Stop Princes Street	113d	04-Sep-07 A	18-Feb-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Princes Street West	107d	04-Sep-07 A	18-Feb-08
	Technical Approvals	136d	05-Nov-07 A	21-May-08
	Roads inc Drainage Technical Approval	136d	05-Nov-07 A	21-May-08
	Issue Roads Design to Roads Authority for Approval	0d		22-Feb-08
	Roads Authority Approval Period	38d	25-Feb-08	22-Apr-08
	Receive Roads Authority Comments	0d		22-Apr-08
	Update to Roads Authority Comments	19d	23-Apr-08	21-May-08
	Roads Authority Informal Consultation	69d	05-Nov-07 A	22-Feb-08
	Roads Technical Approval Granted	0d		21-May-08
	VO37 Haymarket Charette Changes	52d	25-Sep-06 A	06-Dec-06 A
	Optioneering	0d	25-Sep-06 A	25-Sep-06 A
	2-Hour Meeting With CEC	0d	25-Sep-06 A	
	Feasibility (2 Designs)	5d	28-Sep-06 A	05-Oct-06 A
	2-Hour Meeting With CEC - Update	0d	28-Sep-06 A	
	With CEC For Approval	0d	05-Oct-06 A	
	Preliminary Design (1 Design)	0d	06-Dec-06 A	06-Dec-06 A
	4-hour Meeting With CEC for Approval	0d	06-Dec-06 A	
	Track (Task300.5.1)	0d	14-Sep-07 A	14-Sep-07 A
	Issue Notification Of Completion Letter - Track Alignment Design to tie Section 1D	0d		14-Sep-07 A
	Roads, Street Lighting & Landscaping (Task300.5.2)	27d	31-Oct-07 A	07-Dec-07 A
	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 1D	0d		16-Nov-07 A
	Issue Notification Of Completion Letter- Hard Landscaping Design to tie Section 1D	0d		07-Dec-07 A
	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 1D	0d		31-Oct-07 A
	Drainage	0d	16-Nov-07 A	16-Nov-07 A
	Issue Drainage Design Completion Letter to tie for Approval Section 1D ISSUED WITH 1D ROADS	0d		16-Nov-07 A
	Boundary & Accomodation Works (Task300.5.4)	0d	14-Sep-07 A	14-Sep-07 A
	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 1D	0d		14-Sep-07 A
	HAY - SHP	119d	02-Jul-07 A	13-Dec-07 A
	Tram Stop Shandwick Place (Task300.5.8)	119d	02-Jul-07 A	13-Dec-07 A
	Issue Notification Of Completion Letter- Shandwick Place Tram Stop Design to tie	0d		13-Dec-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
	SHP - PSW	325d	30-Aug-06 A	06-Dec-07 A
	Tram Stop Princes Street (Task300.5.9)	325d	30-Aug-06 A	06-Dec-07 A
	Issue Notification Of Completion Letter- Princes Street Tram Stop Design to tie	0d		06-Dec-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
	Moving Stop Position (Due to Charette Changes)	34d	30-Aug-06 A	18-Oct-06 A
	Haymarket to Roseburn Junction - Section 2 (Task400)	478d	12-Jul-06 A	29-May-08
	Section Wide - Section 2	0d	03-Aug-07 A	03-Aug-07 A
	Section Wide	0d	03-Aug-07 A	03-Aug-07 A
	OLE (Task400.1)	0d	03-Aug-07 A	03-Aug-07 A
	Issue Notification Of Completion Letter- Final Detailed Layout Plans & Standard & Special Cross Sections to tie Sec2	0d		03-Aug-07 A
	HAY - ROJ - Section 2A (Task400.2)	478d	12-Jul-06 A	29-May-08
	Sub Section Wide	387d	16-Nov-06 A	29-May-08
	Sub Section Wide IDC	20d	04-Feb-08	29-Feb-08
	Subsection Wide IDC	19d	04-Feb-08	29-Feb-08
	Consents & Approvals	387d	16-Nov-06 A	29-May-08
	Prior Approvals	349d	16-Nov-06 A	08-Apr-08
	Combined Section Prior Approval	40d	08-Feb-08	04-Apr-08
	Issue Combined Package 2A for Prior Approval to CEC	0d		08-Feb-08
	Receive Combined Package 2A Comments From CEC	0d		04-Apr-08
	Prior Approval Granted for Section 2A Combined Package	0d		04-Apr-08
	CEC Approval Period - 2A Combined Package	38d	08-Feb-08	04-Apr-08
	Batch 2/01	42d	08-Feb-08	08-Apr-08
	Batch 2/01 Formal Approval Period	38d	08-Feb-08	07-Apr-08
	Issue Batch 2/01 For Approval to CEC	0d	08-Feb-08	
	Receive CEC Prior Approval For Batch 2/01	0d	08-Apr-08	
	Batch 2/02	39d	02-Nov-07 A	04-Jan-08 A
	Batch 2/02 Formal Approval Period	38d	02-Nov-07 A	04-Jan-08 A
	Issue Batch 2/02 For Approval to CEC	0d	02-Nov-07 A	
	Receive CEC Prior Approval For Batch 2/02	0d	24-Dec-07 A	
	Batch 2/03	163d	13-Aug-07 A	08-Apr-08
	Batch 2/03 Formal Approval Period	38d	08-Feb-08	07-Apr-08
	Issue Batch 2/03 For Approval to CEC	0d	08-Feb-08	
	Receive CEC Prior Approval For Batch 2/03	0d	08-Apr-08	
	Russell Road Bridge Informal Consultation	38d	13-Aug-07 A	09-Oct-07 A

Activity ID	Activity Name	Original Duration	Start	Finish
	Batch 2/04 Russell Road TPH Substation	129d	12-Jan-07 A	11-Jul-07 A
	Issue Russell Road TPH Substation Design for Prior Approval	0d		18-May-07 A
	Prior Approval For Russell Road TPH Substation	0d		11-Jul-07 A
	Receive Russell Road TPH Substation CEC Comments (No Comments)	0d		11-Jul-07 A
	Informal Consultation With CEC & tie over Prior Approval Russell Road TPH Substation	82d	12-Jan-07 A	17-May-07 A
	Batch 2/04 Formal Approval Period	36d	18-May-07 A	11-Jul-07 A
	Incorporate Russell Road TPH Substation CEC Comments for Prior Approval (No Comments)	1d	11-Jul-07 A	11-Jul-07 A
	Roads, Track, OLE, Landscaping, Street Lighting	40d	16-Jan-07 A	12-Mar-07 A
	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	16-Jan-07 A	12-Mar-07 A
	Tram Stop Haymarket	115d	16-Nov-06 A	04-May-07 A
	Issue Tram Stop Haymarket Design for Prior Approval	0d		05-Feb-07 A
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Haymarket	48d	16-Nov-06 A	02-Feb-07 A
	CEC Approval Period (Protocol Changed to Combined Section)	58d	06-Feb-07 A	04-May-07 A
	Tram Haymarket Terrace 1 Sub Station	303d	30-Jan-07 A	08-Apr-08
	Informal Consultation With CEC & tie over Prior Approval Tram Haymarket Terrace 1 Substation	228d	30-Jan-07 A	21-Jan-08
	Prior Approval Tram Haymarket Terrace 1 Substation	0d		08-Apr-08
	Haymarket Station Viaduct Superstructure	40d	14-Jan-08	07-Mar-08
	Commence Haymarket Station Viaduct Superstructure Informal Consultation With CEC & tie Over Prior Approval	38d	14-Jan-08	07-Mar-08
	Technical Approvals	351d	16-Jan-07 A	29-May-08
	Russell Road Bridge Review Period (TAA)	159d	08-May-07 A	14-Dec-07 A
	Issue Russell Road Bridge Design Package to TAA	0d	28-Sep-07 A	
	TAA Russell Road Bridge Design Package Review Period	19d	28-Sep-07 A	25-Oct-07 A
	Receive Russell Road Bridge Design Package comments from TAA	0d	13-Nov-07 A	
	Incorporate TAA comments into Russell Road Bridge Design Package	22d	14-Nov-07 A	14-Dec-07 A
	Commence Russell Road Bridge Informal Consultation With CEC Over Technical Approval	55d	08-May-07 A	30-Jul-07 A
	Russell Road Bridge Review Period (Network Rail)	52d	06-Nov-07 A	25-Jan-08
	Issue Design and Check Certificate to Network Rail For Comment	0d	06-Nov-07 A	
	Network Rail Comment Period	19d	06-Nov-07 A	03-Dec-07 A
	Receive Network Rail Comments	0d	14-Jan-08	
	Incorporate Network Rail comments into Superstructure Design Package	9d	14-Jan-08	25-Jan-08
	Haymarket Station Viaduct Review Period (TAA)	265d	01-Feb-07 A	15-Feb-08
	Issue Haymarket Station Viaduct Superstructure Design Package to TAA	0d	30-Oct-07 A	
	TAA Haymarket Station Viaduct Superstructure Design Package Review Period	38d	30-Oct-07 A	24-Dec-07 A
	Receive Haymarket Station Viaduct Superstructure Design Package comments from TAA	0d	04-Feb-08*	
	Incorporate TAA comments into Haymarket Station Viaduct Superstructure Design Package	9d	04-Feb-08	15-Feb-08
	Commence Haymarket Station Viaduct Superstructure Informal Consultation With CEC Over Technical Approval	38d	01-Feb-07 A	28-Mar-07 A
	Haymarket Station Viaduct Review Period (Network Rail & ScotRail)	30d	18-Feb-08	28-Mar-08
	Issue Design and Check Certificate to Network Rail For Comment	0d	18-Feb-08	
	Receive Network Rail Comments	0d	17-Mar-08	
	Incorporate Network Rail & First Scot Rail comments into Superstructure Design Package	9d	17-Mar-08	28-Mar-08
	Network Rail Comment Period	19d	18-Feb-08	14-Mar-08
	Roads Technical Approval	351d	16-Jan-07 A	29-May-08
	Issue Roads Design to Roads Authority for Approval	0d		29-Feb-08
	Roads Authority Approval Period	38d	03-Mar-08	29-Apr-08
	Receive Roads Authority Comments	0d		29-Apr-08
	Update to Roads Authority Comments	19d	30-Apr-08	29-May-08
	Roads Authority Informal Consultation	38d	16-Jan-07 A	12-Mar-07 A
	Roads Technical Approval Granted	0d		29-May-08
	Drainage Technical Approval	83d	14-Jan-08	07-May-08
	Roads Authority Informal Consultation For Drainage	38d	14-Jan-08	07-Mar-08
	Issue Drainage Design to Roads Authority for Approval	0d		29-Feb-08
	Roads Authority Approval Period For Drainage	38d	03-Mar-08	29-Apr-08
	Receive Roads Authority Comments For Drainage	0d		29-Apr-08
	Update to Raods Authority Comments For Drainage	5d	30-Apr-08	07-May-08
	Drainage Approval Granted	0d		07-May-08
	Track (Task400.2.1)	72d	14-Dec-06 A	05-Apr-07 A
	Issue Track Alignment Design to tie Section 2A	0d		14-Dec-06 A
	Receive tie Comments	0d	05-Apr-07 A	
	Roads, Street Lighting & Landscaping (Task400.2.2)	68d	30-Jan-07 A	04-May-07 A
	Issue Roads Design to tie for Approval Section 2A	0d		30-Jan-07 A
	tie Approval Period	19d	30-Jan-07 A	26-Feb-07 A
	No tie Comments Received To Date - Change in Protocol Going Forward	0d		04-May-07 A
	Issue Hard & Soft Landscaping Design to tie Section 2A	0d		27-Feb-07 A
	Issue Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 2A	0d		30-Jan-07 A
	Drainage	84d	27-Sep-07 A	01-Feb-08
	Issue Drainage Design Completion Letter to tie for Approval Section 2A	0d		27-Sep-07 A
	Issue Drainage Design Completion Letter to tie for Approval Section 2A	0d		01-Feb-08
	Boundary & Accomodation Works (Task400.2.3)	0d	17-Aug-07 A	17-Aug-07 A
	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 2A	0d		17-Aug-07 A
	Utilities (Task400.2.4)	97d	12-Apr-07 A	27-Aug-07 A
	SUC Approval Period	89d	12-Apr-07 A	27-Aug-07 A
	HAY - RO.I	389d	12-Jul-06 A	25-Jan-08
	Tram Stop Haymarket (Task400.2.7)	384d	12-Jul-06 A	18-Jan-08
	Issue Notification Of Completion Letter- Haymarket Tram Stop Design to tie	0d		18-Jan-08*
	Site Visit with tie & CEC To Review Preliminary Design	1d	12-Jul-06 A	12-Jul-06 A
	Issue Haymarket Tram Stop Package for Prior Approval to tie	0d		17-Nov-06 A

Activity ID	Activity Name	Original Duration	Start	Finish
	tie Approval Period	19d	17-Nov-06 A	14-Dec-06 A
	Receive tie Comments	0d		23-Jan-07 A
	Structures	195d	30-Jan-07 A	29-Oct-07 A
	S01 Russell Road Bridge	153d	27-Feb-07 A	28-Sep-07 A
	Superstructure Detailed Design	153d	27-Feb-07 A	28-Sep-07 A
	Issue Superstructure Detailed Design Package to CAT II Checker	0d	27-Feb-07 A	
	Superstructure CAT II Check	39d	27-Feb-07 A	27-Apr-07 A
	Receive & Incorporate CAT II comments	50d	30-Apr-07 A	13-Jul-07 A
	Issue Notification Of Completion Letter- Russell Road Bridge Superstructure Design Package to tie	0d	28-Sep-07 A	
	Substructure Detailed Design	54d	16-Jul-07 A	28-Sep-07 A
	Issue Substructure Detailed Design Package to CAT II Checker	0d	16-Jul-07 A	
	Substructure CAT II Check	9d	16-Jul-07 A	27-Jul-07 A
	Receive & Incorporate CAT II comments	31d	30-Jul-07 A	13-Sep-07 A
	Issue Notification Of Completion Letter- Russell Road Bridge Substructure Design Package to tie	0d	28-Sep-07 A	
	S19 Haymarket Station Viaduct	195d	30-Jan-07 A	29-Oct-07 A
	Superstructure Detailed Design	195d	30-Jan-07 A	29-Oct-07 A
	Issue Superstructure Detailed Design Package to CAT II Checker	0d	30-Jan-07 A	
	Superstructure CAT II Check	59d	30-Jan-07 A	30-Apr-07 A
	Receive & Incorporate CAT II comments	39d	01-May-07 A	29-Jun-07 A
	Issue Notification Of Completion Letter- Haymarket Station Viaduct Superstructure Design Package to tie	0d		29-Oct-07 A
	Substructure Detailed Design	194d	30-Jan-07 A	29-Oct-07 A
	Substructure CAT II Check	59d	30-Jan-07 A	30-Apr-07 A
	Receive & Incorporate CAT II comments	39d	01-May-07 A	29-Jun-07 A
	Issue Substructure Detailed Design Package to CAT II Checker	0d	30-Jan-07 A	
	Issue Notification Of Completion Letter- Haymarket Station Viaduct Substructure Design Package to tie	0d	29-Oct-07 A	
	Tram Haymarket Terrace 1 Sub Station (Task400.2.8)	296d	17-Nov-06 A	25-Jan-08
	Issue Tram Haymarket Terrace 1 Substation Planning Submission to tie For Approval	0d		17-Nov-06 A
	tie Approval Period For Planning Submission	19d	20-Nov-06 A	15-Dec-06 A
	Receive tie Comments	0d		08-Jan-07 A
	Issue Notification Of Completion Letter- Tram Haymarket Terrace 1 Substation Detailed Engineering Drawings To tie	0d		25-Jan-08
	Russell Road TPH Substation (Task400.2.9)	94d	09-Jan-07 A	18-May-07 A
	Issue Russell Road TPH Substation Planning Submission to tie for Approval	0d		09-Jan-07 A
	tie Approval Period For Planning Submission	19d	09-Jan-07 A	05-Feb-07 A
	Receive tie Comments	0d		10-Apr-07 A
	Update Substation Planning Submission to Incorporate tie Comments	30d	02-Apr-07 A	18-May-07 A
	Haymarket to Granton Square - Section 3 (Task500)	459d	12-Sep-06 A	04-Jul-08
	Section Wide - Section 3	0d	20-Aug-07 A	20-Aug-07 A
	Section Wide	0d	20-Aug-07 A	20-Aug-07 A
	OLE (Task 500.1)	0d	20-Aug-07 A	20-Aug-07 A
	Issue Notification Of Completion Letter- Final Detailed Layout Plans & Standard & Special Cross Sections to tie Sec3	0d		20-Aug-07 A
	ROJ - CRT - Section 3A (Task500.2)	459d	12-Sep-06 A	04-Jul-08
	Sub Section Wide	412d	15-Nov-06 A	04-Jul-08
	Sub Section Wide IDC	20d	29-Jan-08	25-Feb-08
	Subsection Wide IDC	19d	29-Jan-08	25-Feb-08
	VO242 OLE Rework for Section 3A (Internal)	0d	09-Oct-07 A	09-Oct-07 A
	Issue OLE rework for section 3A	0d		09-Oct-07 A
	Consents & Approvals	362d	05-Feb-07 A	04-Jul-08
	Prior Approvals	362d	05-Feb-07 A	04-Jul-08
	Combined Section Prior Approval	60d	11-Apr-08	04-Jul-08
	Issue Combined Package 3A for Prior Approval to CEC	0d		11-Apr-08
	Receive Combined Package 3A Comments From CEC	0d		06-Jun-08
	Prior Approval Granted for Section 3A Combined Package	0d		04-Jul-08
	CEC Approval Period - 3A Combined Package	38d	11-Apr-08	06-Jun-08
	Update 3A Combined Package to CEC Comments	19d	06-Jun-08	04-Jul-08
	Batch 3/02	42d	15-Feb-08	15-Apr-08
	Batch 3/02 Formal Approval Period	38d	15-Feb-08	14-Apr-08
	Issue Batch 3/02 For Approval to CEC	0d	15-Feb-08	
	Receive CEC Prior Approval For Batch 3/02	0d	15-Apr-08	
	Batch 3/03	42d	11-Feb-08	09-Apr-08
	Batch 3/03 Formal Approval Period	38d	11-Feb-08	08-Apr-08
	Issue Batch 3/03 For Approval to CEC	0d	11-Feb-08	
	Receive CEC Prior Approval For Batch 3/03	0d	09-Apr-08	
	Batch 3/04	39d	05-Dec-07 A	07-Feb-08
	Batch 3/04 Formal Approval Period	38d	05-Dec-07 A	06-Feb-08
	Issue Batch 3/04 For Approval to CEC	0d	05-Dec-07 A	
	Receive CEC Prior Approval For Batch 3/04	0d	07-Feb-08	
	Batch 3/05	42d	22-Feb-08	22-Apr-08
	Batch 3/05 Formal Approval Period	38d	22-Feb-08	21-Apr-08
	Issue Batch 3/05 For Approval to CEC	0d	22-Feb-08	
	Receive CEC Prior Approval For Batch 3/05	0d	22-Apr-08	
	Batch 3/07	39d	21-Dec-07 A	25-Feb-08
	Batch 3/07 Formal Approval Period	38d	21-Dec-07 A	22-Feb-08
	Issue Batch 3/07 For Approval to CEC	0d	21-Dec-07 A	
	Receive CEC Prior Approval For Batch 3/07	0d	25-Feb-08	
	Batch 3/09	39d	21-Dec-07 A	25-Feb-08
	Batch 3/09 Formal Approval Period	38d	21-Dec-07 A	22-Feb-08

Activity ID	Activity Name	Original Duration	Start	Finish
	Issue Batch 3/09 For Approval to CEC	0d	21-Dec-07 A	
	Receive CEC Prior Approval For Batch 3/09	0d	25-Feb-08	
	Batch 3/10	42d	08-Feb-08	08-Apr-08
	Batch 3/10 Formal Approval Period	38d	08-Feb-08	07-Apr-08
	Issue Batch 3/10 For Approval to CEC	0d	08-Feb-08	
	Receive CEC Prior Approval For Batch 3/10	0d	08-Apr-08	
	Batch 3/11	39d	21-Dec-07 A	25-Feb-08
	Batch 3/11 Formal Approval Period	38d	21-Dec-07 A	22-Feb-08
	Issue Batch 3/11 For Approval to CEC	0d	21-Dec-07 A	
	Receive CEC Prior Approval For Batch 3/11	0d	25-Feb-08	
	Batch 3/12	42d	11-Apr-08	10-Jun-08
	Batch 3/12 Formal Approval Period	38d	11-Apr-08	09-Jun-08
	Issue Batch 3/12 For Approval to CEC	0d	11-Apr-08	
	Receive CEC Prior Approval For Batch 3/12	0d	10-Jun-08	
	Batch 3/13	47d	16-Nov-07 A	31-Jan-08
	Batch 3/13 Formal Approval Period	45d	16-Nov-07 A	30-Jan-08
	Issue Batch 3/13 For Approval to CEC	0d	16-Nov-07 A	
	Receive CEC Prior Approval For Batch 3/13	0d	31-Jan-08	
	Batch 3/14	42d	20-Feb-08	18-Apr-08
	Batch 3/14 Formal Approval Period	38d	20-Feb-08	17-Apr-08
	Issue Batch 3/14 For Approval to CEC	0d	20-Feb-08	
	Receive CEC Prior Approval For Batch 3/14	0d	18-Apr-08	
	Roads, Track, OLE, Landscaping, Street Lighting	40d	14-Jan-08	07-Mar-08
	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	14-Jan-08	07-Mar-08
	Tram Stop Roseburn	221d	09-Mar-07 A	22-Jan-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Roseburn	203d	09-Mar-07 A	22-Jan-08
	Tram Stop Ravelston	14d	20-Feb-07 A	09-Mar-07 A
	Issue Tram Stop Ravelston Design for Prior Approval	0d		09-Mar-07 A
	Informal Consultation With CEC & tie over Prior Approval for Tram Stop Ravelston	13d	20-Feb-07 A	09-Mar-07 A
	Tram Stop Craigleith	214d	09-Mar-07 A	14-Jan-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Craigleith	197d	09-Mar-07 A	14-Jan-08
	Tram Stop Telford Road	214d	09-Mar-07 A	14-Jan-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Telford Road	197d	09-Mar-07 A	14-Jan-08
	Tram Stop Crewe Toll for Western General Hospital	102d	09-Mar-07 A	30-Jul-07 A
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Crewe Toll for Western General Hospital	92d	09-Mar-07 A	30-Jul-07 A
	Tram South Groathill Avenue Substation	288d	20-Feb-07 A	08-Apr-08
	Prior Approval For Tram South Groathill Avenue Substation	0d		08-Apr-08
	Informal Consultation With CEC & tie Over Prior Approval Tram South Groathill Avenue Substation	38d	20-Feb-07 A	18-Apr-07 A
	Roseburn Corridor Retaining Structure Section A	41d	21-Jun-07 A	17-Aug-07 A
	Commence Roseburn Corridor RW Section A Informal Consultation With CEC & tie Over Prior Approval	38d	21-Jun-07 A	17-Aug-07 A
	Roseburn Corridor Retaining Structure Section B	41d	21-Jun-07 A	17-Aug-07 A
	Commence Roseburn Corridor RW Section B Informal Consultation With CEC & tie Over Prior Approval	38d	21-Jun-07 A	17-Aug-07 A
	Roseburn Corridor Retaining Structure Section C	41d	20-Jun-07 A	16-Aug-07 A
	Commence Roseburn Corridor RW Section C Informal Consultation With CEC & tie Over Prior Approval	38d	20-Jun-07 A	16-Aug-07 A
	Roseburn Corridor Retaining Structure Section D	40d	25-Jun-07 A	17-Aug-07 A
	Commence Roseburn Corridor RW Section D Informal Consultation With CEC & tie Over Prior Approval	38d	25-Jun-07 A	17-Aug-07 A
	Roseburn Corridor Retaining Structure Section E	41d	21-Jun-07 A	17-Aug-07 A
	Commence Roseburn Corridor RW Section E Informal Consultation With CEC & tie Over Prior Approval	38d	21-Jun-07 A	17-Aug-07 A
	Roseburn Corridor Retaining Structure Section F	40d	25-Jun-07 A	17-Aug-07 A
	Commence Roseburn Corridor RW Section F Informal Consultation With CEC & tie Over Prior Approval	38d	25-Jun-07 A	17-Aug-07 A
	Roseburn Corridor Retaining Structure Section G	20d	30-Jul-07 A	24-Aug-07 A
	Commence Roseburn Corridor RW Section G Informal Consultation With CEC & tie Over Prior Approval	19d	30-Jul-07 A	24-Aug-07 A
	Roseburn Corridor Retaining Structure Section H	40d	25-Jun-07 A	17-Aug-07 A
	Commence Roseburn Corridor RW Section H Informal Consultation With CEC & tie Over Prior Approval	38d	25-Jun-07 A	17-Aug-07 A
	Roseburn Terrace Bridge Superstructure	44d	02-Apr-07 A	01-Jun-07 A
	Commence Roseburn Terrace Superstructure Informal Consultation With CEC & tie Over Prior Approval	38d	02-Apr-07 A	01-Jun-07 A
	St Georges School Access Bridge Structure	40d	05-Feb-07 A	02-Apr-07 A
	Commence St Georges Access Bridge Informal Consultation With CEC & tie Over Prior Approval	38d	05-Feb-07 A	02-Apr-07 A
	St Georges School Footbridge Structure	50d	13-Apr-07 A	22-Jun-07 A
	Commence St Georges Footbridge Informal Consultation With CEC & tie Over Prior Approval	45d	13-Apr-07 A	22-Jun-07 A
	Ravelston Dykes Bridge Structure	42d	10-Apr-07 A	06-Jun-07 A
	Commence Ravelston Dykes Informal Consultation With CEC & tie Over Prior Approval	38d	10-Apr-07 A	06-Jun-07 A
	Craigleith Drive Bridge Structure	44d	30-Mar-07 A	30-May-07 A
	Commence Craigleith Drive Bridge Informal Consultation With CEC & tie Over Prior Approval	38d	30-Mar-07 A	30-May-07 A
	Holiday Inn Access Bridge Structure	42d	10-Apr-07 A	06-Jun-07 A
	Commence Holiday Inn Access Bridge Informal Consultation With CEC & tie Over Prior Approval	38d	10-Apr-07 A	06-Jun-07 A
	Queensferry Road Bridge Structure	42d	10-Apr-07 A	06-Jun-07 A
	Commence Queensferry Road Bridge Informal Consultation With CEC & tie Over Prior Approval	38d	10-Apr-07 A	06-Jun-07 A
	Groathill Road South Bridge Structure	61d	30-Mar-07 A	22-Jun-07 A
	Commence Groathill Road South Bridge Informal Consultation With CEC & tie Over Prior Approval	53d	30-Mar-07 A	22-Jun-07 A
	Telford Road Bridge Structure	192d	10-Apr-07 A	14-Jan-08
	Commence Telford Road Bridge Informal Consultation With CEC & tie Over Prior Approval	178d	10-Apr-07 A	14-Jan-08
Technical Approvals		332d	05-Feb-07 A	22-May-08
	Roseburn Corridor Retaining Structure Section A Review Period (TAA)	155d	21-May-07 A	21-Dec-07 A
	Issue Roseburn Corridor RW Section A Design Package to TAA	0d	16-Aug-07 A	
	TAA Roseburn Corridor RW Section A Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A

Activity ID	Activity Name	Original Duration	Start	Finish
	Receive Roseburn Corridor RW Section A Design Package comments from TAA	0d	09-Nov-07 A	
	Incorporate TAA comments into Roseburn Corridor RW Section A Design Package	28d	12-Nov-07 A	21-Dec-07 A
	Commence Roseburn Corridor RW Section A Informal Consultation With CEC Over Technical Approval	27d	21-May-07 A	29-Jun-07 A
	Roseburn Corridor Retaining Structure Section B Review Period (TAA)	156d	18-May-07 A	21-Dec-07 A
	Commence Roseburn Corridor RW Section B Informal Consultation With CEC Over Technical Approval	38d	18-May-07 A	13-Jul-07 A
	Issue Roseburn Corridor RW Section B Design Package to TAA	0d	16-Aug-07 A	
	TAA Roseburn Corridor RW Section B Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A
	Receive Roseburn Corridor RW Section B Design Package comments from TAA	0d	09-Nov-07 A	
	Incorporate TAA comments into Roseburn Corridor RW Section B Design Package	28d	12-Nov-07 A	21-Dec-07 A
	Roseburn Corridor Retaining Structure Section C Review Period (TAA)	156d	18-May-07 A	21-Dec-07 A
	Issue Roseburn Corridor RW Section C Design Package to TAA	0d	16-Aug-07 A	
	TAA Roseburn Corridor RW Section C Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A
	Receive Roseburn Corridor RW Section C Design Package comments from TAA	0d	09-Nov-07 A	
	Incorporate TAA comments into Roseburn Corridor RW Section C Design Package	28d	12-Nov-07 A	21-Dec-07 A
	Commence Roseburn Corridor RW Section C Informal Consultation With CEC Over Technical Approval	38d	18-May-07 A	13-Jul-07 A
	Roseburn Corridor Retaining Structure Section D Review Period (TAA)	156d	18-May-07 A	21-Dec-07 A
	Issue Roseburn Corridor RW Section D Design Package to TAA	0d	16-Aug-07 A	
	TAA Roseburn Corridor RW Section D Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A
	Receive Roseburn Corridor RW Section D Design Package comments from TAA	0d	09-Nov-07 A	
	Incorporate TAA comments into Roseburn Corridor RW Section D Design Package	28d	12-Nov-07 A	21-Dec-07 A
	Commence Roseburn Corridor RW Section D Informal Consultation With CEC Over Technical Approval	29d	18-May-07 A	02-Jul-07 A
	Roseburn Corridor Retaining Structure Section E Review Period (TAA)	155d	21-May-07 A	21-Dec-07 A
	Issue Roseburn Corridor RW Section E Design Package to TAA	0d	16-Aug-07 A	
	TAA Roseburn Corridor RW Section E Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A
	Receive Roseburn Corridor RW Section E Design Package comments from TAA	0d	09-Nov-07 A	
	Incorporate TAA comments into Roseburn Corridor RW Section E Design Package	28d	12-Nov-07 A	21-Dec-07 A
	Commence Roseburn Corridor RW Section E Informal Consultation With CEC Over Technical Approval	38d	21-May-07 A	16-Jul-07 A
	Roseburn Corridor Retaining Structure Section F Review Period (TAA)	156d	18-May-07 A	21-Dec-07 A
	Issue Roseburn Corridor RW Section F Design Package to TAA	0d	16-Aug-07 A	
	TAA Roseburn Corridor RW Section F Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A
	Receive Roseburn Corridor RW Section F Design Package comments from TAA	0d	09-Nov-07 A	
	Incorporate TAA comments into Roseburn Corridor RW Section Fe Design Package	28d	12-Nov-07 A	21-Dec-07 A
	Commence Roseburn Corridor RW Section F Informal Consultation With CEC Over Technical Approval	38d	18-May-07 A	13-Jul-07 A
	Roseburn Corridor Retaining Structure Section G Review Period (TAA)	154d	22-May-07 A	21-Dec-07 A
	Issue Roseburn Corridor RW Section G Design Package to TAA	0d	16-Aug-07 A	
	TAA Roseburn Corridor RW Section G Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A
	Receive Roseburn Corridor RW Section G Design Package comments from TAA	0d	09-Nov-07 A	
	Incorporate TAA comments into Roseburn Corridor RW Section G Design Package	28d	12-Nov-07 A	21-Dec-07 A
	Commence Roseburn Corridor RW Section G Informal Consultation With CEC Over Technical Approval	38d	22-May-07 A	17-Jul-07 A
	Roseburn Corridor Retaining Structure Section H Review Period (TAA)	111d	20-Jul-07 A	21-Dec-07 A
	Issue Roseburn Corridor RW Section H Design Package to TAA	0d	16-Aug-07 A	
	TAA Roseburn Corridor RW Section H Design Package Review Period	38d	17-Aug-07 A	12-Oct-07 A
	Receive Roseburn Corridor RW Section H Design Package comments from TAA	0d	09-Nov-07 A	
	Incorporate TAA comments into Roseburn Corridor RW Section H Design Package	28d	12-Nov-07 A	21-Dec-07 A
	Commence Roseburn Corridor RW Section H Informal Consultation With CEC Over Technical Approval	14d	20-Jul-07 A	09-Aug-07 A
	Roseburn Terrace Bridge Review Period (TAA)	152d	24-Apr-07 A	21-Nov-07 A
	Commence Roseburn Terrace Informal Consultation With CEC Over Technical Approval	17d	24-Apr-07 A	18-May-07 A
	Issue Roseburn Terrace Design Package to TAA	0d		02-Jul-07 A
	TAA Roseburn Terrace Design Package Review Period	38d	02-Jul-07 A	24-Aug-07 A
	Receive Roseburn TerraceDesign Package Comments from TAA	0d		06-Nov-07 A
	Incorporate TAA Comments into Roseburn Terrace Design Package	10d	07-Nov-07 A	21-Nov-07 A
	Coltbridge Viaduct Structure Review Period (TAA)	91d	30-Jul-07 A	03-Dec-07 A
	Commence Coltbridge Viaduct Informal Consultation With CEC Over Technical Approval	31d	30-Jul-07 A	13-Sep-07 A
	Issue Coltbridge Viaduct Design Package to TAA	0d		13-Sep-07 A
	TAA Coltbridge Viaduct Design Package Review Period	38d	13-Sep-07 A	07-Nov-07 A
	Receive Coltbridge Viaduct Design Package Comments from TAA	0d		19-Nov-07 A
	Incorporate TAA Comments into Coltbridge Viaduct Design Package	9d	20-Nov-07 A	03-Dec-07 A
	St Georges School Access Bridge Structure Review Period (TAA)	161d	05-Feb-07 A	17-Sep-07 A
	Commence St Georges Access Bridge Informal Consultation With CEC Over Technical Approval	60d	05-Feb-07 A	08-May-07 A
	Issue St Georges Access Bridge Design Package to TAA	0d		25-May-07 A
	TAA St Georges Access Bridge Design Package Review Period	38d	25-May-07 A	20-Jul-07 A
	Receive St Georges Access Bridge Design Package Comments from TAA	0d		03-Sep-07 A
	Incorporate TAA Comments into St Georges Access Bridge Design Package	9d	04-Sep-07 A	17-Sep-07 A
	St Georges School Footbridge Structure Review Period (TAA)	97d	04-May-07 A	17-Sep-07 A
	Commence St Georges Footbridge Informal Consultation With CEC Over Technical Approval	14d	04-May-07 A	25-May-07 A
	Issue St Georges Footbridge Design Package to TAA	0d		25-May-07 A
	TAA St Georges Footbridge Design Package Review Period	38d	29-May-07 A	23-Jul-07 A
	Receive St Georges Footbridge Design Package Comments from TAA	0d		03-Sep-07 A
	Incorporate TAA Comments into St Georges Footbridge Design Package	9d	04-Sep-07 A	17-Sep-07 A
	Ravelston Dykes Bridge Structure Review Period (TAA)	148d	22-Feb-07 A	17-Sep-07 A
	Commence Ravelston Dykes Informal Consultation With CEC Over Technical Approval	38d	22-Feb-07 A	20-Apr-07 A
	Issue Ravelston Dykes Design Package to TAA	0d		25-May-07 A
	TAA Ravelston Dykes Design Package Review Period	38d	29-May-07 A	23-Jul-07 A
	Receive Ravelston Dykes Design Package Comments from TAA	0d		03-Sep-07 A
	Incorporate TAA Comments into Ravelston Dykes Design Package	9d	04-Sep-07 A	17-Sep-07 A
	Craigleith Drive Bridge Structure Review Period (TAA)	105d	24-Apr-07 A	17-Sep-07 A

Activity ID	Activity Name	Original Duration	Start	Finish
	Commence Craigleith Drive Bridge Informal Consultation With CEC Over Technical Approval	31d	24-Apr-07 A	11-Jun-07 A
	Issue Craigleith Drive Bridge Design Package to TAA	0d		12-Jun-07 A
	TAA Craigleith Drive Bridge Design Package Review Period	38d	12-Jun-07 A	06-Aug-07 A
	Receive Craigleith Drive Bridge Design Package Comments from TAA	0d		03-Sep-07 A
	Incorporate TAA Comments into Craigleith Drive Bridge Design Package	9d	04-Sep-07 A	17-Sep-07 A
	Holiday Inn Access Bridge Structure Review Period (TAA)	115d	10-Apr-07 A	17-Sep-07 A
	Commence Holiday Inn Access Bridge Informal Consultation With CEC Over Technical Approval	25d	10-Apr-07 A	17-May-07 A
	Issue Holiday Inn Access Bridge Design Package to TAA	0d		18-May-07 A
	TAA Holiday Inn Access Bridge Design Package Review Period	38d	21-May-07 A	16-Jul-07 A
	Receive Holiday Inn Access Bridge Design Package Comments from TAA	0d		03-Sep-07 A
	Incorporate TAA Comments into Holiday Inn Access Bridge Design Package	9d	04-Sep-07 A	17-Sep-07 A
	Queensferry Road Bridge Structure Review Period (TAA)	150d	10-Apr-07 A	05-Nov-07 A
	Commence Queensferry Road Bridge Informal Consultation With CEC Over Technical Approval	25d	10-Apr-07 A	17-May-07 A
	Issue Queensferry Road Bridge Design Package to TAA	0d		18-May-07 A
	TAA Queensferry Road Bridge Design Package Review Period	38d	21-May-07 A	16-Jul-07 A
	Receive Queensferry Road Bridge Design Package Comments from TAA	0d		22-Oct-07 A
	Incorporate TAA Comments into Queensferry Road Bridge Design Package	9d	23-Oct-07 A	05-Nov-07 A
	Groathill Road South Bridge Structure Review Period (TAA)	105d	24-Apr-07 A	17-Sep-07 A
	Commence Groathill Road South Bridge Informal Consultation With CEC Over Technical Approval	18d	24-Apr-07 A	21-May-07 A
	Issue Groathill Road South Bridge Design Package to TAA	0d		26-Jun-07 A
	TAA Groathill Road South Bridge Design Package Review Period	38d	26-Jun-07 A	20-Aug-07 A
	Receive Groathill Road South Bridge Design Package Comments from TAA	0d		03-Sep-07 A
	Incorporate TAA Comments into Groathill Road South Bridge Design Package	9d	04-Sep-07 A	17-Sep-07 A
	Telford Road Bridge Structure Review Period (TAA)	150d	10-Apr-07 A	05-Nov-07 A
	Commence Telford Road Bridge Informal Consultation With CEC Over Technical Approval	26d	10-Apr-07 A	18-May-07 A
	Issue Telford Road Bridge Design Package to TAA	0d		25-May-07 A
	TAA Telford Road Bridge Design Package Review Period	38d	25-May-07 A	23-Jul-07 A
	Receive Telford Road Bridge Design Package Comments from TAA	0d		22-Oct-07 A
	Incorporate TAA Comments into Telford Road Bridge Design Package	9d	23-Oct-07 A	05-Nov-07 A
	Roads Technical Approval	94d	14-Jan-08	22-May-08
	Issue Roads Design to Roads Authority for Approval	0d		25-Feb-08
	Roads Authority Approval Period	38d	26-Feb-08	23-Apr-08
	Receive Roads Authority Comments	0d		23-Apr-08
	Update to Roads Authority Comments	19d	24-Apr-08	22-May-08
	Roads Authority Informal Consultation	38d	14-Jan-08	07-Mar-08
	Roads Technical Approval Granted	0d		22-May-08
	Drainage Technical Approval	78d	14-Jan-08	30-Apr-08
	Roads Authority Informal Consultation For Drainage	38d	14-Jan-08	07-Mar-08
	Issue Drainage Design to Roads Authority for Approval	0d		25-Feb-08
	Roads Authority Approval Period For Drainage	38d	26-Feb-08	23-Apr-08
	Receive Roads Authority Comments For Drainage	0d		23-Apr-08
	Update to Roads Authority Comments For Drainage	5d	24-Apr-08	30-Apr-08
	Drainage Technical Approval Granted	0d		30-Apr-08
Track (Task 500.2.1)		41d	02-Feb-07 A	03-Apr-07 A
	Issue Track Alignment Design to tie Section 3A	0d		02-Feb-07 A
	Receive tie Comments	0d	03-Apr-07 A	
Roads, Street Lighting & Landscaping (Task 500.2.2)		31d	14-Aug-07 A	26-Sep-07 A
	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 3A	0d		14-Aug-07 A
	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 3A	0d		26-Sep-07 A
	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 3A	0d		17-Aug-07 A
Drainage		70d	11-Oct-07 A	28-Jan-08
	Issue Drainage Design Completion Letter to tie for Approval Section 3A	0d		11-Oct-07 A
	Issue Drainage Design Completion Letter to tie for Approval Section 3A	0d		28-Jan-08
Boundary & Accomodation Works (Task 500.2.3)		0d	24-Aug-07 A	24-Aug-07 A
	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 3A	0d		24-Aug-07 A
Environmental		269d	15-Nov-06 A	06-Dec-07 A
Badger Mitigation Plan		269d	15-Nov-06 A	06-Dec-07 A
	Issue Badger Mitigation Plan to tie	0d		22-Dec-06 A
	tie Approval Period	28d	22-Dec-06 A	12-Feb-07 A
	Re-Issue Draft Badger Mitigation Plan to tie	0d		08-Nov-07 A
	tie Approval Period	19d	09-Nov-07 A	06-Dec-07 A
	Issue New Setts/ Holt Design Section 3A	0d		15-Nov-06 A
Landscaping and Habitat Plan		83d	22-Dec-06 A	26-Apr-07 A
	Issue Landscape & Habitat Management Plan to tie	0d		22-Dec-06 A
	tie Approval Period	48d	22-Dec-06 A	12-Mar-07 A
	CEC Approval Period	38d	28-Feb-07 A	26-Apr-07 A
Utilities Plates 1 to 23		92d	19-Apr-07 A	27-Aug-07 A
	Issue to SUCs	0d		19-Apr-07 A
	SUCs Approval	84d	19-Apr-07 A	27-Aug-07 A
Roseburn Corridor Retaining Structures		90d	13-Apr-07 A	17-Aug-07 A
Roseburn Corridor Retaining Structures: Section A - Russell Road to Roseburn Terrace		90d	13-Apr-07 A	17-Aug-07 A
Structure Detailed Design		90d	13-Apr-07 A	17-Aug-07 A
	Issue Structure Detailed Design Package to CAT I Checker	0d	13-Apr-07 A	
	Structure CAT I Check	67d	13-Apr-07 A	24-Jul-07 A
	Receive & Incorporate CAT I comments	73d	27-Apr-07 A	16-Aug-07 A
	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section A to tie	0d	17-Aug-07 A	

Activity ID	Activity Name	Original Duration	Start	Finish
	Roseburn Corridor Retaining Structures: Section B -Roseburn Terrace to Coltbridge Viaduct	22d	18-Jul-07 A	17-Aug-07 A
	Structure Detailed Design	22d	18-Jul-07 A	17-Aug-07 A
	Issue Structure Detailed Design Package to CAT I Checker	0d	18-Jul-07 A	
	Structure CAT I Check	9d	18-Jul-07 A	31-Jul-07 A
	Receive & Incorporate CAT I comments	5d	01-Aug-07 A	07-Aug-07 A
	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section B to tie	0d	17-Aug-07 A	
	Roseburn Corridor Retaining Structures: Section C - Coltbridge Viaduct to Ravelston	22d	18-Jul-07 A	17-Aug-07 A
	Structure Detailed Design	22d	18-Jul-07 A	17-Aug-07 A
	Issue Structure Detailed Design Package to CAT I Checker	0d	18-Jul-07 A	
	Structure CAT I Check	9d	18-Jul-07 A	31-Jul-07 A
	Receive & Incorporate CAT I comments	5d	01-Aug-07 A	07-Aug-07 A
	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section C to tie	0d	17-Aug-07 A	
	Roseburn Corridor Retaining Structures: Section D - Ravelston to Craigleith Drive	69d	14-May-07 A	17-Aug-07 A
	Structure Detailed Design	69d	14-May-07 A	17-Aug-07 A
	Issue Structure Detailed Design Package to CAT I Checker	0d	14-May-07 A	
	Structure CAT I Check	51d	14-May-07 A	27-Jul-07 A
	Receive & Incorporate CAT I comments	41d	29-May-07 A	27-Jul-07 A
	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section D to tie	0d	17-Aug-07 A	
	Roseburn Corridor Retaining Structures: Section E -Craigleith Drive to Queensferry Road	19d	23-Jul-07 A	17-Aug-07 A
	Structure Detailed Design	19d	23-Jul-07 A	17-Aug-07 A
	Issue Structure Detailed Design Package to CAT I Checker	0d	23-Jul-07 A	
	Structure CAT I Check	9d	23-Jul-07 A	03-Aug-07 A
	Receive & Incorporate CAT I comments	8d	06-Aug-07 A	16-Aug-07 A
	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section E to tie	0d	17-Aug-07 A	
	Roseburn Corridor Retaining Structures: Section F - Queensferry Road to Groathill	19d	23-Jul-07 A	16-Aug-07 A
	Structure Detailed Design	19d	23-Jul-07 A	16-Aug-07 A
	Issue Structure Detailed Design Package to CAT I Checker	0d	23-Jul-07 A	
	Structure CAT I Check	5d	23-Jul-07 A	27-Jul-07 A
	Receive & Incorporate CAT I comments	13d	30-Jul-07 A	16-Aug-07 A
	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section F to tie	0d	16-Aug-07 A	
	Roseburn Corridor Retaining Structures: Section G - Groathill to Telford Road	19d	23-Jul-07 A	17-Aug-07 A
	Structure Detailed Design	19d	23-Jul-07 A	17-Aug-07 A
	Issue Structure Detailed Design Package to CAT I Checker	0d	23-Jul-07 A	
	Structure CAT I Check	9d	23-Jul-07 A	03-Aug-07 A
	Receive & Incorporate CAT I comments	8d	06-Aug-07 A	16-Aug-07 A
	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section G to tie	0d	17-Aug-07 A	
	Roseburn Corridor Retaining Structures: Section H - Telford Road to Ferry Road	19d	23-Jul-07 A	17-Aug-07 A
	Structure Detailed Design	19d	23-Jul-07 A	17-Aug-07 A
	Issue Structure Detailed Design Package to CAT I Checker	0d	23-Jul-07 A	
	Structure CAT I Check	9d	23-Jul-07 A	03-Aug-07 A
	Receive & Incorporate CAT I comments	8d	06-Aug-07 A	16-Aug-07 A
	Issue Notification Of Completion Letter- Roseburn Corridor Retaining Structure Design Package For Section H to tie	0d	17-Aug-07 A	
ROS - ROS		233d	19-Jan-07 A	11-Dec-07 A
	Tram Stop Roseburn (Task500.2.6)	233d	19-Jan-07 A	11-Dec-07 A
	Issue Notification Of Completion Letter- Roseburn Tram Stop Design to tie	0d		11-Dec-07 A
	Site Visit with tie & CEC To Review Preliminary Design	2d	19-Jan-07 A	22-Jan-07 A
	Structures	89d	26-Feb-07 A	29-Jun-07 A
	S01 Roseburn Terrace Bridge	89d	26-Feb-07 A	29-Jun-07 A
	Roseburn Terrace Bridge Superstructure Detailed Design	87d	26-Feb-07 A	27-Jun-07 A
	Issue Superstructure Detailed Design Package to CAT II Checker	0d		26-Feb-07 A
	Superstructure CAT II Check	44d	27-Feb-07 A	04-May-07 A
	Receive and Incoporate CAT II Comments	9d	04-May-07 A	18-May-07 A
	Issue Notification Of Completion Letter- Roseburn Terrace Bridge Superstructure Design Package to tie	0d		27-Jun-07 A
	Roseburn Terrace Bridge Substructure Detailed Design	89d	26-Feb-07 A	29-Jun-07 A
	Issue Substructure Detailed Design Package to CAT II Checker	0d		26-Feb-07 A
	Substructure CAT II Check	27d	27-Feb-07 A	10-Apr-07 A
	Receive and Incorporate CAT II Comments	13d	02-Apr-07 A	23-Apr-07 A
	Issue Notification Of Completion Letter- Roseburn Terrace Bridge Substructure Detailed Design Package to tie	0d		29-Jun-07 A
ROS - RAD		233d	19-Jan-07 A	11-Dec-07 A
	Tram Stop Ravelston (Task500.2.7)	233d	19-Jan-07 A	11-Dec-07 A
	Issue Notification Of Completion Letter- Ravelston Tram Stop Design to tie	0d		11-Dec-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	19-Jan-07 A	19-Jan-07 A
	Structures	163d	29-Jan-07 A	13-Sep-07 A
	S02 Coltbridge Viaduct	35d	27-Jul-07 A	13-Sep-07 A
	Coltbridge Viaduct Structure Detailed Design	35d	27-Jul-07 A	13-Sep-07 A
	Issue Structure Detailed Design Package to CAT II Checker	0d		27-Jul-07 A
	Structure CAT II Check	19d	27-Jul-07 A	23-Aug-07 A
	Receive and Incoporate CAT II Comments	9d	28-Aug-07 A	10-Sep-07 A
	Issue Notification Of Completion Letter- Coltbridge Viaduct Structure Design Package to tie	0d		13-Sep-07 A
	S03 St Georges School Access Bridge	107d	29-Jan-07 A	27-Jun-07 A
	St Georges School Access Bridge Structure Detailed Design	107d	29-Jan-07 A	27-Jun-07 A
	Issue Structure Detailed Design Package to CAT I Checker	0d		29-Jan-07 A
	Structure CAT I Check	9d	30-Jan-07 A	12-Feb-07 A
	Receive and Incoporate CAT I Comments	9d	13-Feb-07 A	26-Feb-07 A
	Issue Notification Of Completion Letter- St Georges School Access Bridge Structure Design Package to tie	0d		27-Jun-07 A
	S04 St Georges School Footbridge	86d	27-Feb-07 A	27-Jun-07 A

Activity ID	Activity Name	Original Duration	Start	Finish
	St Georges School Footbridge Structure Detailed Design	86d	27-Feb-07 A	27-Jun-07 A
	Issue Structure Detailed Design Package to CAT I Checker	0d		27-Feb-07 A
	Structure CAT I Check	37d	12-Mar-07 A	08-May-07 A
	Receive and Incoporate CAT I Comments	27d	26-Mar-07 A	08-May-07 A
	Issue Notification Of Completion Letter- St Georges School Footbridge Structure Design Package to tie	0d		27-Jun-07 A
RAD - CRA		269d	02-Oct-06 A	30-Jul-07 A
Tram Stop Craigleith (Task500.2.8)		136d	22-Jan-07 A	30-Jul-07 A
	Issue Notification Of Completion Letter- Craigleith Tram Stop Design to tie	0d		30-Jul-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	22-Jan-07 A	22-Jan-07 A
Structures		186d	02-Oct-06 A	27-Jun-07 A
S05 Ravelston Dykes Bridge		122d	08-Jan-07 A	27-Jun-07 A
	Ravelston Dykes Bridge Structure Detailed Design	122d	08-Jan-07 A	27-Jun-07 A
	Issue Structure Detailed Design Package to CAT I Checker	0d		08-Jan-07 A
	Structure CAT I Check	9d	09-Jan-07 A	22-Jan-07 A
	Receive and Incoporate CAT I Comments	9d	23-Jan-07 A	05-Feb-07 A
	Issue Notification Of Completion Letter- Ravelston Dykes Bridge Structure Design Package to tie	0d		27-Jun-07 A
S06 Craigleith Drive Bridge		186d	02-Oct-06 A	27-Jun-07 A
	Craigleith Drive Bridge Structure Detailed Design	186d	02-Oct-06 A	27-Jun-07 A
	Issue Structure Detailed Design Package to CAT II Checker	0d		27-Feb-07 A
	Issue Notification Of Completion Letter- Craigleith Drive Bridge Structure Design Package to tie	0d		27-Jun-07 A
	Detailed Design Resourcing	149d	02-Oct-06 A	23-May-07 A
S07 Holiday Inn Access Bridge		100d	08-Feb-07 A	27-Jun-07 A
	Holiday Inn Access Bridge Structure Detailed Design	100d	08-Feb-07 A	27-Jun-07 A
	Issue Structure Detailed Design Package to CAT I Checker	0d		08-Feb-07 A
	Structure CAT I Check	6d	08-Feb-07 A	15-Feb-07 A
	Receive and Incoporate CAT I Comments	6d	16-Feb-07 A	23-Feb-07 A
	Issue Notification Of Completion Letter- Holiday Inn Access Bridge Structure Design Package to tie	0d		27-Jun-07 A
S08 Queensferry Road Bridge		100d	08-Feb-07 A	27-Jun-07 A
	Queensferry Road Bridge Structure Detailed Design	100d	08-Feb-07 A	27-Jun-07 A
	Issue Structure Detailed Design Package to CAT I Checker	0d		08-Feb-07 A
	Structure CAT I Check	6d	08-Feb-07 A	15-Feb-07 A
	Receive and Incoporate CAT I Comments	6d	16-Feb-07 A	23-Feb-07 A
	Issue Notification Of Completion Letter- Queensferry Road Bridge Structure Design Package to tie	0d		27-Jun-07 A
CRA - WGH		137d	19-Jan-07 A	30-Jul-07 A
Tram Stop Telford Road (Task500.2.9)		137d	19-Jan-07 A	30-Jul-07 A
	Issue Notification Of Completion Letter- Telford Road Tram Stop Design to tie	0d		30-Jul-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	19-Jan-07 A	19-Jan-07 A
Structures		110d	24-Jan-07 A	27-Jun-07 A
S09 Groathill Road South Bridge		86d	27-Feb-07 A	27-Jun-07 A
	Groathill Road South Bridge Structure Detailed Design	86d	27-Feb-07 A	27-Jun-07 A
	Issue Structure Detailed Design Package to CAT II Checker	0d		27-Feb-07 A
	Structure CAT II Check	59d	28-Feb-07 A	31-May-07 A
	Receive and Incoporate CAT II Comments	42d	26-Mar-07 A	31-May-07 A
	Issue Notification Of Completion Letter- Groathill Road South Bridge Structure Design Package to tie	0d		27-Jun-07 A
S10 Telford Road Bridge		110d	24-Jan-07 A	27-Jun-07 A
	Telford Road Bridge Structure Detailed Design	110d	24-Jan-07 A	27-Jun-07 A
	Issue Structure Detailed Design Package to CAT I Checker	0d		24-Jan-07 A
	Structure CAT I Check	9d	25-Jan-07 A	07-Feb-07 A
	Receive and Incoporate CAT I Comments	9d	08-Feb-07 A	21-Feb-07 A
	Issue Notification Of Completion Letter- Telford Road Bridge Structure Design Package to tie	0d		27-Jun-07 A
Tram South Groathill Avenue Substation (Task500.2.10)		0d	30-Jul-07 A	30-Jul-07 A
	Issue Notification Of Completion Letter- Tram South Groathill Avenue Substation Design to tie for Approval	0d		30-Jul-07 A
WGH - CRT		223d	12-Sep-06 A	30-Jul-07 A
Tram Stop Crewe Toll for Western General Hospital (Task500.2.11)		223d	12-Sep-06 A	30-Jul-07 A
	Issue Notification Of Completion Letter- Crewe Toll for Western General Hospital Tram Stop Design to tie	0d		30-Jul-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	12-Sep-06 A	12-Sep-06 A
	tie Approval Period	19d	12-Mar-07 A	10-Apr-07 A
CRT - CAP - Section 3B (Task500.3)		356d	22-Dec-06 A	22-May-08
Sub Section Wide		356d	22-Dec-06 A	22-May-08
Sub Section Wide IDC		20d	29-Jan-08	25-Feb-08
	Subsection Wide IDC	19d	29-Jan-08	25-Feb-08
Consents & Approvals		317d	26-Feb-07 A	22-May-08
Prior Approvals		315d	26-Feb-07 A	21-May-08
	Combined Section Prior Approval	60d	27-Feb-08	21-May-08
	Issue Combined Package 3B for Prior Approval to CEC	0d		27-Feb-08
	Receive Combined Package 3B Comments From CEC	0d		23-Apr-08
	Prior Approval Granted for Section 3B Combined Package	0d		21-May-08
	CEC Approval Period - 3B Combined Package	38d	27-Feb-08	23-Apr-08
	Update 3B Combined Package to CEC Comments	19d	23-Apr-08	21-May-08
	Batch 3/15	40d	23-Jan-08	19-Mar-08
	Batch 3/15 Formal Approval Period	38d	23-Jan-08	18-Mar-08
	Issue Batch 3/15 For Approval to CEC	0d	23-Jan-08*	
	Receive CEC Prior Approval For Batch 3/15	0d	19-Mar-08	
	Batch 3/16	42d	27-Feb-08	25-Apr-08
	Batch 3/16 Formal Approval Period	38d	27-Feb-08	24-Apr-08
	Issue Batch 3/16 For Approval to CEC	0d	27-Feb-08	

Activity ID	Activity Name	Original Duration	Start	Finish
	Receive CEC Prior Approval For Batch 3/16	0d	25-Apr-08	
	Batch 3/17	75d	19-Jun-07 A	01-Oct-07 A
	Issue Tram Granton Mains East 15 Substation Design for Prior Approval	0d		10-Aug-07 A
	Prior Approval For Tram Granton Mains East 15 Substation	0d		01-Oct-07 A
	Receive Tram Granton Mains East 15 Substation CEC Comments	0d		01-Oct-07 A
	Batch 3/17 Granton Mains East Substation - Informal Consultation	35d	19-Jun-07 A	08-Aug-07 A
	Tram Granton Mains East 15 Substation CEC Approval Period	34d	10-Aug-07 A	01-Oct-07 A
	NO COMMENTS TO INCORPORATE	1d	01-Oct-07 A	01-Oct-07 A
	Batch 3/18	33d	10-Aug-07 A	25-Sep-07 A
	Batch 3/18 Formal Approval Period	30d	10-Aug-07 A	25-Sep-07 A
	Issue Batch 3/18 For Approval to CEC	0d	10-Aug-07 A	
	Receive CEC Prior Approval For Batch 3/18	0d	25-Sep-07 A	
	Batch 3/19	61d	10-Oct-07 A	14-Jan-08
	Batch 3/19 Formal Approval Period	38d	10-Oct-07 A	04-Dec-07 A
	Issue Batch 3/19 For Approval to CEC	0d	11-Oct-07 A	
	Receive CEC Prior Approval For Batch 3/19	0d	14-Jan-08*	
	Roads, Track, OLE, Landscaping, Street Lighting	42d	26-Feb-07 A	24-Apr-07 A
	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	26-Feb-07 A	24-Apr-07 A
	Tram Stop West Pilton	41d	11-May-07 A	06-Jul-07 A
	Informal Consultation With CEC & tie over Prior Approval Tram Stop West Pilton	38d	11-May-07 A	06-Jul-07 A
	Tram Stop Caroline Park	44d	03-Apr-07 A	01-Jun-07 A
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Caroline Park	38d	03-Apr-07 A	01-Jun-07 A
Technical Approvals		292d	02-Apr-07 A	22-May-08
	Crewe Road Gardens Bridge Review Period (TAA)	119d	08-May-07 A	19-Oct-07 A
	Issue Crewe Road Gardens Design Package to TAA	0d		14-Jun-07 A
	TAA Crewe Road Gardens Design Package Review Period	38d	15-Jun-07 A	09-Aug-07 A
	Receive Crewe Road Gardens Design Package Comments from TAA	0d		05-Oct-07 A
	Incorporate TAA Comments into Crewe Road Gardens Design Package	9d	08-Oct-07 A	19-Oct-07 A
	Commence Crewe Road Gardens Informal Consultation With CEC Over Technical Approval	25d	08-May-07 A	14-Jun-07 A
	Roads Technical Approval	292d	02-Apr-07 A	22-May-08
	Issue Roads Design to Roads Authority for Approval	0d		25-Feb-08
	Roads Authority Approval Period	38d	26-Feb-08	23-Apr-08
	Receive Roads Authority Comments	0d		23-Apr-08
	Update to Roads Authority Comments	19d	24-Apr-08	22-May-08
	Roads Authority Informal Consultation	38d	02-Apr-07 A	31-May-07 A
	Roads Technical Approval Granted	0d		22-May-08
	Drainage Technical Approval	276d	02-Apr-07 A	30-Apr-08
	Roads Authority Informal Consultation For Drainage	38d	02-Apr-07 A	31-May-07 A
	Issue Drainage Design to Roads Authority for Approval	0d		25-Feb-08
	Roads Authority Approval Period For Drainage	38d	26-Feb-08	23-Apr-08
	Receive Roads Authority Comments For Drainage	0d		23-Apr-08
	Update to Roads Authority Comments For Drainage	5d	24-Apr-08	30-Apr-08
	Drainage Technical Approval Granted	0d		30-Apr-08
Roads, Street Lighting & Landscaping (Task500.3.2)		90d	26-Apr-07 A	30-Aug-07 A
	Issue Roads Design to tie for Approval Section 3B	0d		26-Apr-07 A
	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 3B	0d		30-Aug-07 A
	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 3B	0d		26-Apr-07 A
Track (Task 500.3.1)		30d	09-Mar-07 A	20-Apr-07 A
	Issue Track Alignment Design to tie Section 3B	0d		09-Mar-07 A
	Receive tie Comments	0d		20-Apr-07 A
Drainage		70d	11-Oct-07 A	28-Jan-08
	Issue Drainage Design Completion Letter to tie for Approval Section 3B	0d		11-Oct-07 A
	Issue Drainage Design Completion Letter to tie for Approval Section 3B	0d		28-Jan-08
Utilities Plates 24 to 33		261d	22-Dec-06 A	14-Jan-08
	Issue to SUCs	0d		22-Dec-06 A
	SUCs Approval	243d	22-Dec-06 A	14-Jan-08
Boundary & Accomodation Works (Task500.3.3)		0d	03-Aug-07 A	03-Aug-07 A
	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 3B	0d		03-Aug-07 A
CRT - WGA		123d	12-Mar-07 A	30-Aug-07 A
	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 3B	0d		03-Aug-07 A
Tram Stop West Pilton (Task500.3.7)		44d	02-Jul-07 A	30-Aug-07 A
	Issue Notification Of Completion Letter- West Pilton Tram Stop Design to tie	0d		30-Aug-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
Structures		77d	12-Mar-07 A	27-Jun-07 A
S12 Crewe Road Gardens Bridge		77d	12-Mar-07 A	27-Jun-07 A
	Crewe Road Gardens Bridge Superstructure Detailed Design	77d	12-Mar-07 A	27-Jun-07 A
	Issue Superstructure Detailed Design Package to CAT II Checker	0d		12-Mar-07 A
	Superstructure CAT II Check	23d	19-Mar-07 A	23-Apr-07 A
	Receive and Incoporate CAT II Comments	5d	24-Apr-07 A	30-Apr-07 A
	Issue Notification Of Completion Letter- Crewe Road Gardens Bridge Superstructure Design Package to tie	0d		27-Jun-07 A
	Crewe Road Gardens Bridge Substructure Detailed Design	63d	30-Mar-07 A	27-Jun-07 A
	Issue Substructure Detailed Design Package to CAT II Checker	0d		30-Mar-07 A
	Substructure CAT II Check	16d	02-Apr-07 A	26-Apr-07 A
	Receive and Incorporate CAT II Comments	6d	27-Apr-07 A	04-May-07 A
	Issue Notification Of Completion Letter- Crewe Road Gardens Bridge Substructure Detailed Design Package to tie	0d		27-Jun-07 A
WGA - CAP		39d	02-Jul-07 A	23-Aug-07 A
Tram Stop Caroline Park (Task500.3.8)		21d	02-Jul-07 A	30-Jul-07 A

Activity ID	Activity Name	Original Duration	Start	Finish
	Issue Notification Of Completion Letter- Caroline Park Tram Stop Design to tie	0d		30-Jul-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
	Tram Granton Mains East 15 Substation (Task500.3.9)	0d	23-Aug-07 A	23-Aug-07 A
	Issue Notification Of Completion Letter- Tram Granton Mains East 15 Substation Planning Submission to tie for Appro	0d		23-Aug-07 A
	CAP - GRS - Section 3C (Task500.4)	319d	22-Feb-07 A	22-May-08
	Sub Section Wide	319d	22-Feb-07 A	22-May-08
	Sub Section Wide IDC	20d	29-Jan-08	25-Feb-08
	Subsection Wide IDC	19d	29-Jan-08	25-Feb-08
	Consents & Approvals	270d	02-May-07 A	22-May-08
	Prior Approvals	265d	03-May-07 A	19-May-08
	Combined Section Prior Approval	60d	25-Feb-08	19-May-08
	Issue Combined Package 3C for Prior Approval to CEC	0d		25-Feb-08
	Receive Combined Package 3C Comments From CEC	0d		21-Apr-08
	Prior Approval Granted for Section 3C Combined Package	0d		19-May-08
	CEC Approval Period - 3C Combined Package	38d	25-Feb-08	21-Apr-08
	Update 3C Combined Package to CEC Comments	19d	21-Apr-08	19-May-08
	Batch 3/20	42d	25-Feb-08	23-Apr-08
	Batch 3/20 Formal Approval Period	38d	25-Feb-08	22-Apr-08
	Issue Batch 3/20 For Approval to CEC	0d	25-Feb-08	
	Receive CEC Prior Approval For Batch 3/20	0d	23-Apr-08	
	Batch 3/21	42d	25-Feb-08	23-Apr-08
	Batch 3/21 Formal Approval Period	38d	25-Feb-08	22-Apr-08
	Issue Batch 3/21 For Approval to CEC	0d	25-Feb-08	
	Receive CEC Prior Approval For Batch 3/21	0d	23-Apr-08	
	Batch 3/22 Tram Granton View Substation	108d	06-Aug-07 A	14-Jan-08
	Issue Tram Granton View Substation Design for Prior Approval	0d		31-Oct-07 A
	Prior Approval For Tram Granton Road Substation	0d		14-Jan-08
	Informal Consultation With CEC & tie over Prior Approval Tram Granton View Substation	38d	06-Aug-07 A	01-Oct-07 A
	Batch 3/22 Formal Approval Period	38d	31-Oct-07 A	02-Jan-08 A
	Roads, Track, OLE, Landscaping, Street Lighting	42d	03-May-07 A	29-Jun-07 A
	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	03-May-07 A	29-Jun-07 A
	Tram Stop Saltire Square	40d	14-Jan-08	07-Mar-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Saltire Square	38d	14-Jan-08	07-Mar-08
	Tram Stop Granton	40d	14-Jan-08	07-Mar-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Granton	38d	14-Jan-08	07-Mar-08
	Technical Approvals	270d	02-May-07 A	22-May-08
	Roads Technical Approval	270d	02-May-07 A	22-May-08
	Issue Roads Design to Roads Authority for Approval	0d		25-Feb-08
	Roads Authority Approval Period	38d	26-Feb-08	23-Apr-08
	Receive Roads Authority Comments	0d		23-Apr-08
	Update to Roads Authority Comments	19d	24-Apr-08	22-May-08
	Roads Authority Informal Consultation	38d	02-May-07 A	28-Jun-07 A
	Roads Technical Approval Granted	0d		22-May-08
	Drainage Technical Approval	78d	14-Jan-08	30-Apr-08
	Roads Authority Informal Consultation For Drainage	38d	14-Jan-08	07-Mar-08
	Issue Drainage Design to Roads Authority for Approval	0d		25-Feb-08
	Roads Authority Approval Period For Drainage	38d	26-Feb-08	23-Apr-08
	Receive Roads Authority Comments For Drainage	0d		23-Apr-08
	Update to Roads Authority Comments For Drainage	5d	24-Apr-08	30-Apr-08
	Drainage Technical Approval Granted	0d		30-Apr-08
	Track (Task500.4.1)	0d	15-Jun-07 A	15-Jun-07 A
	Issue Notification Of Completion Letter- Track Alignment Design to tie Section 3C	0d		15-Jun-07 A
	Roads, Street Lighting & Landscaping (Task500.4.2)	59d	02-Jul-07 A	21-Sep-07 A
	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 3C	0d		02-Jul-07 A
	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 3C	0d		21-Sep-07 A
	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 3C	0d		16-Aug-07 A
	Drainage	70d	11-Oct-07 A	28-Jan-08
	Issue Drainage Design Completion Letter to tie for Approval Section 3C	0d		11-Oct-07 A
	Issue Drainage Design Completion Letter to tie for Approval Section 3C	0d		28-Jan-08
	Boundary & Accomodation Works (Task500.4.3)	0d	31-Aug-07 A	31-Aug-07 A
	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 3C	0d		31-Aug-07 A
	Utilities Plates 34 to 42	132d	22-Feb-07 A	27-Aug-07 A
	Issue to SUCs	0d		22-Feb-07 A
	SUCs Approval	120d	22-Feb-07 A	27-Aug-07 A
	CAP - GRW	116d	02-Jul-07 A	10-Dec-07 A
	Tram Stop Saltire Square (Task500.4.7)	116d	02-Jul-07 A	10-Dec-07 A
	Issue Notification Of Completion Letter- Saltire Square Tram Stop Design to tie	0d		10-Dec-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
	Tram Granton View Substation (Task500.4.10)	0d	10-Dec-07 A	10-Dec-07 A
	Issue Notification Of Completion Letter- Tram Granton View Substation Planning Submission to tie for Approval	0d		10-Dec-07 A
	GRW - GRS	116d	02-Jul-07 A	10-Dec-07 A
	Tram Stop Granton (Task500.4.9)	116d	02-Jul-07 A	10-Dec-07 A
	Issue Notification Of Completion Letter- Granton Tram Stop Design to tie	0d		10-Dec-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
	Roseburn Junction to Gogarburn - Section 5 (Task700)	559d	02-Aug-06 A	10-Oct-08
	Section Wide - Section 5	136d	13-Apr-07 A	22-Oct-07 A

Activity ID	Activity Name	Original Duration	Start	Finish
	Section Wide	136d	13-Apr-07 A	22-Oct-07 A
	OLE (Task700.1)	136d	13-Apr-07 A	22-Oct-07 A
	(NOT REQUIRED) Re-issue Notification Of Completion Letter- Final Detailed Layout Plans & Standard & Special Cross	0d		22-Oct-07 A
	Issue Notification Of Completion Letter- Final Detailed Layout Plans & Standard & Special Cross Section to tie Sec 5B	0d		13-Apr-07 A
	ROJ - BAR - Section 5A (Task700.2)	559d	02-Aug-06 A	10-Oct-08
	Sub Section Wide	479d	22-Nov-06 A	10-Oct-08
	Sub Section Wide IDC	22d	10-Mar-08	08-Apr-08
	Subsection Wide IDC	21d	10-Mar-08	08-Apr-08
	Consents & Approvals	479d	22-Nov-06 A	10-Oct-08
	Prior Approvals	408d	22-Nov-06 A	03-Jul-08
	Combined Section Prior Approval	60d	28-Mar-08	20-Jun-08
	Issue Combined Package 5A for Prior Approval to CEC	0d		28-Mar-08
	Receive Combined Package 5A Comments From CEC	0d		23-May-08
	Prior Approval Granted for Section 5A Combined Package	0d		20-Jun-08
	CEC Approval Period - 5A Combined Package	38d	28-Mar-08	23-May-08
	Update 5A Combined Package to CEC Comments	19d	23-May-08	20-Jun-08
	Batch 5/05	42d	15-Feb-08	15-Apr-08
	Batch 5/05 Formal Approval Period	38d	15-Feb-08	14-Apr-08
	Issue Batch 5/05 For Approval to CEC	0d	15-Feb-08	
	Receive CEC Prior Approval For Batch 5/05	0d	15-Apr-08	
	Batch 5/06	42d	03-Mar-08	30-Apr-08
	Batch 5/06 Formal Approval Period	38d	03-Mar-08	29-Apr-08
	Issue Batch 5/06 For Approval to CEC	0d	03-Mar-08	
	Receive CEC Prior Approval For Batch 5/06	0d	30-Apr-08	
	Batch 5/07	42d	28-Mar-08	27-May-08
	Batch 5/07 Formal Approval Period	38d	28-Mar-08	23-May-08
	Issue Batch 5/07 For Approval to CEC ON HOLD AWAITING TIE DECISION	0d	28-Mar-08	
	Receive CEC Prior Approval For Batch 5/07	0d	27-May-08	
	Batch 5/08	43d	10-Mar-08	08-May-08
	Batch 5/08 Formal Approval Period	38d	10-Mar-08	07-May-08
	Issue Batch 5/08 For Approval to CEC	0d	10-Mar-08	
	Receive CEC Prior Approval For Batch 5/08	0d	08-May-08	
	Batch 5/10	42d	25-Feb-08	23-Apr-08
	Batch 5/10 Formal Approval Period	38d	25-Feb-08	22-Apr-08
	Issue Batch 5/10 For Approval to CEC	0d	25-Feb-08	
	Receive CEC Prior Approval For Batch 5/10	0d	23-Apr-08	
	Roads, Track, OLE, Landscaping, Street Lighting	42d	21-Feb-07 A	19-Apr-07 A
	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	21-Feb-07 A	19-Apr-07 A
	Russell Road Retaining Wall One	73d	27-Sep-07 A	16-Jan-08
	Commence Russell Road RW One Informal Consultation With CEC & tie Over Prior Approval	69d	27-Sep-07 A	16-Jan-08
	Russell Road Retaining Wall Two	73d	27-Sep-07 A	16-Jan-08
	Commence Russell Road RW Two Informal Consultation With CEC & tie Over Prior Approval	69d	27-Sep-07 A	16-Jan-08
	Murrayfield Stop Retaining Walls	41d	30-Jul-07 A	24-Sep-07 A
	Commence Murrayfield Stop RW Informal Consultation With CEC & tie Over Prior Approval	38d	30-Jul-07 A	24-Sep-07 A
	Tram Stop Murrayfield Stadium	40d	22-Nov-06 A	25-Jan-07 A
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Murrayfield Stadium	38d	22-Nov-06 A	25-Jan-07 A
	Roseburn Street Viaduct Superstructure	40d	14-Jan-08	07-Mar-08
	Commence Roseburn Street Viaduct Informal Consultation With CEC & tie Over Prior Approval	38d	14-Jan-08	07-Mar-08
	Murrayfield Stadium Retaining Wall	92d	28-Aug-07 A	14-Jan-08
	Commence Murrayfield Stadium RW Informal Consultation With CEC & tie Over Prior Approval	87d	28-Aug-07 A	14-Jan-08
	Murrayfield Underpass Superstructure	40d	14-Jan-08	07-Mar-08
	Commence Murrayfield Underpass Informal Consultation With CEC & tie Over Prior Approval	38d	14-Jan-08	07-Mar-08
	Murrayfield Training Pitches Retaining Wall	42d	08-Feb-08	07-Apr-08
	Commence Murrayfield Training Pitches Informal Consultation With CEC & tie Over Prior Approval	38d	08-Feb-08	07-Apr-08
	Water of Leith Bridge Superstructure	70d	15-Oct-07 A	29-Jan-08
	Commence Water of Leith Structure Informal Consultation With CEC & tie Over Prior Approval	67d	15-Oct-07 A	29-Jan-08
	Baird Drive Retaining Wall	42d	15-Feb-08	14-Apr-08
	Commence Baird Drive RW Informal Consultation With CEC & tie Over Prior Approval	38d	15-Feb-08	14-Apr-08
	Balgreen Road Bridge Superstructure	41d	08-May-08	03-Jul-08
	Commence Balgreen Road Bridge Informal Consultation With CEC & tie Over Prior Approval	38d	08-May-08	03-Jul-08
	Balgreen Road Retaining Wall	42d	10-Apr-08	06-Jun-08
	Commence Balgreen Road RW Informal Consultation With CEC & tie Over Prior Approval	38d	10-Apr-08	06-Jun-08
	VO71 Accomodation Works at Murrayfield (Not tie Approved)	40d	02-Jul-07 A	24-Aug-07 A
	Planning Permission Boundary & Accomodation Works Murrayfield Stadium	40d	02-Jul-07 A	24-Aug-07 A
	Informal Consultation With CEC & tie Over Planning Permission Murrayfield Stadium Boundary & Accomodation Works	38d	02-Jul-07 A	24-Aug-07 A
	Technnical Approvals	421d	21-Feb-07 A	10-Oct-08
	Russell Road Retaining Wall One Review Period (TAA)	92d	11-Sep-07 A	25-Jan-08
	Issue Russell Road RW One Design Package to TAA	0d	06-Nov-07 A	
	TAA Russell Road RW One Design Package Review Period	28d	06-Nov-07 A	17-Dec-07 A
	Receive Russell Road RW One Design Package comments from TAA	0d	14-Jan-08	
	Incorporate TAA comments into Russell Road RW One Design Package	9d	14-Jan-08	25-Jan-08
	Commence Russell Road RW One Informal Consultation With CEC Over Technical Approval	38d	11-Sep-07 A	05-Nov-07 A
	Russell Road Retaining Wall One Review Period (ScotRail)	30d	09-Jan-08 A	19-Feb-08
	Issue Design and Check Certificate to Network Rail For Comment	0d	09-Jan-08 A	
	Network Rail Comment Period	19d	09-Jan-08 A	05-Feb-08
	Receive Network Rail Comments	0d	06-Feb-08	

Activity ID	Activity Name	Original Duration	Start	Finish
	Incorporate First Scot Rail comments into Structure Design Package	9d	06-Feb-08	19-Feb-08
	Murrayfield Stop Retaining Walls Structure Review (TAA)	178d	13-Aug-07 A	28-Apr-08
	Issue Murrayfield Stop RW Detailed Design Package to TAA	0d		18-Feb-08
	Incorporate Murrayfield Stop RW TAA Comments	9d	15-Apr-08	28-Apr-08
	Murrayfield Stop RW TAA Review Period	38d	18-Feb-08	15-Apr-08
	Receive Murrayfield Stop RW TAA Comments	0d		15-Apr-08
	Commence Murrayfield Stop RW Informal Consultation With CEC Over Technical Approval	38d	13-Aug-07 A	09-Oct-07 A
	Russell Road Retaining Wall Two Review Period (TAA)	92d	11-Sep-07 A	25-Jan-08
	Issue Russell Road RW Two Design Package to TAA	0d	22-Nov-07 A	
	TAA Russell Road RW Two Design Package Review Period	28d	22-Nov-07 A	10-Jan-08 A
	Receive Russell Road RW Two Design Package comments from TAA	0d	14-Jan-08	
	Incorporate TAA comments into Russell Road RW Two Design Package	9d	14-Jan-08	25-Jan-08
	Commence Russell Road RW Two Informal Consultation With CEC Over Technical Approval	49d	11-Sep-07 A	21-Nov-07 A
	Russell Road Retaining Wall Two Review Period (ScotRail)	30d	28-Jan-08	07-Mar-08
	Issue Design and Check Certificate to Network Rail For Comment	0d	28-Jan-08	
	Network Rail Comment Period	19d	28-Jan-08	22-Feb-08
	Receive Network Rail Comments	0d	25-Feb-08	
	Incorporate First Scot Rail comments into Structure Design Package	9d	25-Feb-08	07-Mar-08
	Roseburn Street Viaduct Review (TAA)	99d	26-Nov-07 A	21-Apr-08
	Roseburn Street Viaduct TAA Review Period	38d	11-Feb-08	08-Apr-08
	Issue Roseburn Street Viaduct Detailed Design Package to TAA	0d		11-Feb-08*
	Incorporate Roseburn Street Viaduct TAA Comments	9d	08-Apr-08	21-Apr-08
	Receive Roseburn Street Viaduct TAA Comments	0d		08-Apr-08
	Commence Roseburn Street Viaduct Informal Consultation With CEC Over Technical Approval	47d	26-Nov-07 A	11-Feb-08
	Murrayfield Stadium Retaining Wall Structure Review (TAA)	217d	06-Jul-07 A	14-May-08
	Issue Murrayfield Stadium Retaining Wall Detailed Design Package to TAA	0d		29-Feb-08
	TAA Murrayfield Stadium Retaining Wall Review Period	38d	03-Mar-08	29-Apr-08
	Receive Murrayfield Stadium Retaining Wall TAA Comments	0d		29-Apr-08
	Incorporate Murrayfield Stadium Retaining Wall TAA Comments	9d	30-Apr-08	14-May-08
	Commence Murrayfield Stadium RW Informal Consultation With CEC Over Technical Approval	154d	06-Jul-07 A	29-Feb-08
	Murrayfield Stadium Retaining Wall Structure Review (Network Rail)	42d	29-Feb-08	29-Apr-08
	Issue Murrayfield Stadium RW Design and Check Certificate to Network Rail For Comment	0d		29-Feb-08
	Murrayfield Stadium RW Network Rail Comment Period	19d	03-Mar-08	01-Apr-08
	Receive Murrayfield Stadium RW Network Rail Comments	0d		01-Apr-08
	Incorporate Murrayfield Stadium RW Network Rail Comments	19d	02-Apr-08	29-Apr-08
	Murrayfield Underpass Superstructure Review (TAA)	181d	27-Jul-07 A	15-Apr-08
	Issue Murrayfield Underpass Detailed Design Package to TAA	0d		29-Feb-08*
	TAA Murrayfield Underpass Review Period	19d	03-Mar-08	01-Apr-08
	Receive Murrayfield Underpass TAA Comments	0d		01-Apr-08
	Incorporate Murrayfield Underpass TAA Comments	9d	02-Apr-08	15-Apr-08
	Commence Murrayfield Underpass Informal Consultation With CEC Over Technical Approval	38d	27-Jul-07 A	24-Sep-07 A
	Murrayfield Underpass Superstructure Review (Network Rail)	42d	29-Feb-08	29-Apr-08
	Issue Murrayfield Underpass Design and Check Certificate to Network Rail For Comment	0d		29-Feb-08
	Murrayfield Underpass Network Rail Comment Period	19d	03-Mar-08	01-Apr-08
	Receive Murrayfield Underpass Network Rail Comments	0d		01-Apr-08
	Incorporate Murrayfield Underpass Network Rail Comments	19d	02-Apr-08	29-Apr-08
	Murrayfield Training Pitches Retaining Wall Structure Review (TAA)	73d	08-Feb-08	20-May-08
	Issue Murrayfield Training Pitches Detailed Design Package to TAA	0d		07-Apr-08
	Murrayfield Training Pitches TAA Review Period	19d	08-Apr-08	06-May-08
	Receive Murrayfield Training Pitches TAA Comments	0d		06-May-08
	Incorporate Murrayfield Training Pitches TAA Comments	9d	07-May-08	20-May-08
	Commence Murrayfield Training Pitches Informal Consultation With CEC Over Technical Approval	38d	08-Feb-08	07-Apr-08
	Murrayfield Training Pitches Retaining Wall Structure Review (Network Rail)	41d	20-May-08	16-Jul-08
	Issue Murrayfield Training Pitches Design and Check Certificate to Network Rail For Comment	0d		20-May-08
	Murrayfield Training Pitches Network Rail Comment Period	19d	21-May-08	18-Jun-08
	Receive Murrayfield Training Pitches Network Rail Comments	0d		18-Jun-08
	Incorporate Murrayfield Training Pitches Network Rail Comments	19d	19-Jun-08	16-Jul-08
	Water of Leith Bridge Review (TAA)	95d	22-Oct-07 A	11-Mar-08
	Issue Water of Leith Bridge Detailed Design Package to TAA	0d		29-Jan-08
	Water of Leith Bridge TAA Review Period	19d	30-Jan-08	26-Feb-08
	Receive Water of Leith Bridge TAA Comments	0d		26-Feb-08
	Incorporate Water of Leith Bridge TAA Comments	9d	27-Feb-08	11-Mar-08
	Commence Water of Leith Informal Consultation With CEC Over Technical Approval	62d	22-Oct-07 A	29-Jan-08
	Balgreen Road Bridge Review (TAA)	71d	08-May-08	14-Aug-08
	Issue Balgreen Road Bridge Detailed Design Package to TAA	0d		03-Jul-08
	Balgreen Road Bridge TAA Review Period	19d	04-Jul-08	31-Jul-08
	Receive Balgreen Road Bridge TAA Comments	0d		31-Jul-08
	Incorporate Balgreen Road Bridge TAA Comments	9d	01-Aug-08	14-Aug-08
	Commence Balgreen Road Bridge Informal Consultation With CEC Over Technical Approval	38d	08-May-08	03-Jul-08
	Balgreen Road Bridge Review (Network Rail)	41d	14-Aug-08	10-Oct-08
	Issue Balgreen Road Bridge Design and Check Certificate to Network Rail For Comment	0d		14-Aug-08
	Balgreen Road Bridge Network Rail Comment Period	19d	15-Aug-08	12-Sep-08
	Receive Balgreen Road Bridge Network Rail Comments	0d		12-Sep-08
	Incorporate Balgreen Road Bridge Network Rail Comments	19d	15-Sep-08	10-Oct-08
	Baird Drive Retaining Wall Structure Review (TAA)	74d	15-Feb-08	28-May-08
	Issue Baird Drive RW Detailed Design Package to TAA	0d		14-Apr-08

Activity ID	Activity Name	Original Duration	Start	Finish
	Baird Drive RW TAA Review Period	19d	15-Apr-08	13-May-08
	Receive Baird Drive RW TAA Comments	0d		13-May-08
	Incorporate Baird Drive RW TAA Comments	9d	14-May-08	28-May-08
	Commence Baird Drive RW Informal Consultation With CEC Over Technical Approval	38d	15-Feb-08	14-Apr-08
	Baird Drive Retaining Wall Structure Review (Network Rail)	40d	28-May-08	23-Jul-08
	Issue Baird Drive RW Design and Check Certificate to Network Rail For Comment	0d		28-May-08
	Baird Drive RW Network Rail Comment Period	19d	29-May-08	25-Jun-08
	Receive Baird Drive RW Network Rail Comments	0d		25-Jun-08
	Incorporate Baird Drive RW Network Rail Comments	19d	26-Jun-08	23-Jul-08
	Balgreen Road Retaining Wall Structure Review (TAA)	72d	10-Apr-08	18-Jul-08
	Issue Balgreen Road RW Detailed Design Package to TAA	0d		06-Jun-08
	Balgreen Road RW TAA Review Period	19d	09-Jun-08	04-Jul-08
	Receive Balgreen Road RW TAA Comments	0d		04-Jul-08
	Incorporate Balgreen Road RW TAA Comments	9d	07-Jul-08	18-Jul-08
	Commence Balgreen Road RW Informal Consultation With CEC Over Technical Approval	38d	10-Apr-08	06-Jun-08
	Balgreen Road Retaining Wall Structure Review (Network Rail)	41d	18-Jul-08	15-Sep-08
	Issue Balgreen Road RW Design and Check Certificate to Network Rail For Comment	0d		18-Jul-08
	Balgreen Road RW Network Rail Comment Period	19d	21-Jul-08	15-Aug-08
	Receive Balgreen Road RW Network Rail Comments	0d		15-Aug-08
	Incorporate Balgreen Road RW Network Rail Comments	19d	18-Aug-08	15-Sep-08
	Roads Technical Approval	350d	21-Feb-07 A	03-Jul-08
	Issue Roads Design to Roads Authority for Approval	0d		08-Apr-08
	Roads Authority Approval Period	38d	09-Apr-08	05-Jun-08
	Receive Roads Authority Comments	0d		05-Jun-08
	Update to Roads Authority Comments	19d	06-Jun-08	03-Jul-08
	Roads Authority Informal Consultation	38d	21-Feb-07 A	19-Apr-07 A
	Roads Technical Approval Granted	0d		03-Jul-08
	Drainage Technical Approval	110d	11-Jan-08 A	12-Jun-08
	Roads Authority Informal Consultation For Drainage	57d	11-Jan-08 A	08-Apr-08
	Issue Drainage Design to Roads Authority for Approval	0d		08-Apr-08
	Roads Authority Approval Period For Drainage	38d	09-Apr-08	05-Jun-08
	Receive Roads Authority Comments For Drainage	0d		05-Jun-08
	Update to Roads Authority Comments For Drainage	5d	06-Jun-08	12-Jun-08
	Drainage Technical Approval Granted	0d		12-Jun-08
	Track (Task700.2.1)	43d	01-Feb-07 A	03-Apr-07 A
	Issue Track Alignment Design to tie Section 5A	0d		01-Feb-07 A
	tie Approval Period	19d	01-Feb-07 A	28-Feb-07 A
	Receive tie Comments	0d	03-Apr-07 A	
	Roads, Street Lighting & Landscaping (Task700.2.2)	241d	06-Mar-07 A	15-Feb-08
	Issue Roads Design to tie for Approval Section 5A	0d		27-Mar-07 A
	tie Approval Period	19d	27-Mar-07 A	25-Apr-07 A
	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 5A	0d		15-Feb-08
	Issue Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 5A	0d		06-Mar-07 A
	Drainage	83d	10-Oct-07 A	13-Feb-08
	Issue Drainage Design Completion Letter to tie for Approval Section 5A	0d		10-Oct-07 A
	Issue Drainage Design Completion Letter to tie for Approval Section 5A	0d		13-Feb-08
	Boundary & Accomodation Works (Task700.2.3)	182d	04-Dec-06 A	24-Aug-07 A
	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 5A	0d		24-Aug-07 A
	VO71 Accomodation Works at Murrayfield (Not tie approved)	102d	04-Dec-06 A	04-May-07 A
	Issue Murrayfield Stadium Boundary & Accomodation Works	0d		04-Dec-06 A
	tie Approval Period	19d	11-Dec-06 A	15-Jan-07 A
	No Comments Received & Now Changed Protocol	0d		04-May-07 A
	Issue Murrayfield Training Pitches Boundary & Accomodation Works	0d		04-Dec-06 A
	tie Approval Period	19d	11-Dec-06 A	15-Jan-07 A
	No Comments Received & Now Changed Protocol	0d		04-May-07 A
	VO163 SRU Cross Sections	0d	29-Jan-07 A	29-Jan-07 A
	Issue Additional Report to tie & SRU	0d		29-Jan-07 A
	Utilities (Task700.2.4)	101d	05-Apr-07 A	27-Aug-07 A
	Issue DD to SUC For Approval	0d		05-Apr-07 A
	SUC Approval Period	91d	06-Apr-07 A	27-Aug-07 A
	RO4 - MUR	333d	02-Aug-06 A	18-Feb-08
	Tram Stop Murrayfield Stadium (Task700.2.6)	333d	02-Aug-06 A	20-Nov-07 A
	Issue Notification Of Completion Letter- Murrayfield Stadium Tram Stop Design to tie	0d		20-Nov-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Aug-06 A	02-Aug-06 A
	Issue Murrayfield Stadium Tram Stop Package for Prior Approval to tie	0d		21-Nov-06 A
	tie Approval Period	19d	22-Nov-06 A	19-Dec-06 A
	Receive tie Comments	0d		15-Jan-07 A
	Structures	285d	05-Jan-07 A	18-Feb-08
	W01 Russell Road Retaining Wall One	42d	11-Sep-07 A	07-Nov-07 A
	Structure Detailed Design	42d	11-Sep-07 A	07-Nov-07 A
	Issue Structure Detailed Design Package to CAT I Checker	0d	11-Sep-07 A	
	Structure CAT I Check	19d	11-Sep-07 A	08-Oct-07 A
	Receive & Incorporate CAT I comments	9d	09-Oct-07 A	22-Oct-07 A
	Issue Notification Of Completion Letter- Russell Road Retaining Wall One Structure Design Package to tie	0d		07-Nov-07 A
	W02 Russell Road Retaining Wall Two	42d	25-Sep-07 A	21-Nov-07 A
	Structure Detailed Design	42d	25-Sep-07 A	21-Nov-07 A

Activity ID	Activity Name	Original Duration	Start	Finish
	Issue Structure Detailed Design Package to CAT I Checker	0d	25-Sep-07 A	
	Structure CAT I Check	9d	25-Sep-07 A	08-Oct-07 A
	Receive & Incorporate CAT I comments	9d	09-Oct-07 A	22-Oct-07 A
	Issue Notification Of Completion Letter- Russell Road Retaining Wall Two Structure Design Package to tie	0d		21-Nov-07 A
	W18 Murrayfield Stop Retaining Walls (Task700.2.17)	285d	05-Jan-07 A	18-Feb-08
	Murrayfield Stop Retaining Walls Structure Detailed Design	285d	05-Jan-07 A	18-Feb-08
	Issue Notification Of Completion Letter- Murrayfield Stop Retaining Walls Package to tie for Comments	0d		29-Jan-08
	Issue Detailed Design Package to CAT II or CAT III Checker (as appropriate)	0d	05-Jan-07 A	
	Receive and Incorporate CATII or CATIII Check Comments	9d	05-Feb-08	18-Feb-08
	CAT II Review Period	9d	22-Jan-08	04-Feb-08
	Murrayfield Stop Retaining Walls Preliminary Design Milestones	0d	12-Mar-07 A	12-Mar-07 A
	tie and TAA Sign Off PD	0d		12-Mar-07 A
	MUR - BAR including Elevated Route	409d	20-Nov-06 A	03-Jul-08
	Structures	409d	20-Nov-06 A	03-Jul-08
	S21A Roseburn Street Viaduct (Task700.2.9)	145d	02-Apr-07 A	19-Oct-07 A
	Roseburn Street Viaduct Superstructure Detailed Design	66d	20-Jul-07 A	19-Oct-07 A
	Issue Notification Of Completion Letter- Roseburn Street Viaduct Superstructure Detailed Design Package to tie	0d		19-Oct-07 A
	Issue Detailed Design Package to CAT III Checker	0d		20-Jul-07 A
	Bridge CAT III Review Period	52d	20-Jul-07 A	05-Oct-07 A
	Receive and Incorporate CATIII Check Comments	20d	17-Sep-07 A	15-Oct-07 A
	Roseburn Street Viaduct Substructure Detailed Design	145d	02-Apr-07 A	19-Oct-07 A
	Issue Notification Of Completion Letter- Roseburn Street Substructure Viaduct Detailed Design Package to tie for co	0d		19-Oct-07 A
	Issue Detailed Design Package to CAT III Checker	0d		02-Apr-07 A
	Bridge CAT III Review Period	4d	02-Apr-07 A	05-Apr-07 A
	Receive and Incorporate CATIII Check Comments	26d	11-Sep-07 A	18-Oct-07 A
	S21B Murrayfield Stadium Retaining Wall (Task700.2.13)	54d	07-Dec-07 A	29-Feb-08
	Murrayfield Stadium Retaining Wall Structure Detailed Design	54d	07-Dec-07 A	29-Feb-08
	Issue Notification Of Completion Letter- Murrayfield Stadium RW Package to tie for Comments	0d		11-Dec-07 A
	Issue Detailed Design Package to CAT II Checker	0d		07-Dec-07 A
	Bridge CATII or CAT III Review Period	10d	07-Dec-07 A	21-Dec-07 A
	Receive and Incorporate CATII Check Comments	42d	21-Dec-07 A	29-Feb-08
	S21C Murrayfield Underpass (Task700.2.14)	188d	08-Jan-07 A	26-Sep-07 A
	Murrayfield Underpass Superstructure Detailed Design	188d	08-Jan-07 A	26-Sep-07 A
	Issue Notification Of Completion Letter- Murrayfield Underpass Superstructure Package to tie	0d		26-Sep-07 A
	Issue Detailed Design Package to CAT II	0d	08-Jan-07 A	
	Bridge CATII Review Period	165d	08-Jan-07 A	17-Sep-07 A
	Receive and Incorporate CATII Check Comments	13d	04-Sep-07 A	21-Sep-07 A
	S21D Murrayfield Training Pitches Retaining Wall (Task700.2.15)	42d	07-Feb-08	07-Apr-08
	Murrayfield Training Pitches Retaining Wall Structure Detailed Design	42d	07-Feb-08	07-Apr-08
	Issue Notification Of Completion Letter- Murrayfield Training Pitches RW Package to tie	0d		07-Apr-08
	Issue Detailed Design Package to CAT II or CAT III Checker (as appropriate)	0d		07-Feb-08*
	Bridge CATII or CAT III Review Period	19d	08-Feb-08	06-Mar-08
	Receive and Incorporate CATII or CATIII Check Comments	9d	07-Mar-08	20-Mar-08
	S21E Water of Leith Bridge (Task700.2.16)	243d	18-Dec-06 A	03-Dec-07 A
	Water of Leith Bridge Substructure Detailed Design	234d	09-Jan-07 A	03-Dec-07 A
	Issue Notification Of Completion Letter- Water of Leith Bridge Detailed Design Package to tie	0d		03-Dec-07 A
	Issue Detailed Design Package to CAT II Checker	0d		09-Jan-07 A
	Water of Leith Bridge Superstructure Detailed Design	204d	18-Dec-06 A	09-Oct-07 A
	Issue Notification Of Completion Letter- Water of Leith Bridge Detailed Design Package to tie	0d		09-Oct-07 A
	Issue Detailed Design Package to CAT II Checker	0d		18-Dec-06 A
	Bridge CATII Review Period	186d	19-Dec-06 A	05-Oct-07 A
	Receive and Incorporate CATII Check Comments	13d	13-Sep-07 A	03-Oct-07 A
	S22 Balgreen Road Bridge (Task700.2.10)	409d	20-Nov-06 A	03-Jul-08
	Balgreen Road Bridge Superstructure Detailed Design	41d	07-May-08	03-Jul-08
	Issue Notification Of Completion Letter- Balgreen Road Bridge Superstructure Package to tie	0d		03-Jul-08
	Issue Detailed Design Package to CAT II or CAT III Checker (as appropriate)	0d		07-May-08
	Bridge CATII or CAT III Review Period	28d	08-May-08	19-Jun-08
	Receive and Incorporate CATII or CATIII Check Comments	9d	20-Jun-08	03-Jul-08
	VO231 Balgreen Road Bridge Preliminary Design Re-Visit	324d	20-Nov-06 A	06-Mar-08
	Receive Network Rail Acceptance	0d		20-Nov-06 A
	Re-issue AIP to TAA	0d		06-Mar-08
	Balgreen Road Bridge Substructure Detailed Design	84d	07-Mar-08	03-Jul-08
	Issue Notification Of Completion Letter- Balgreen Road Bridge Substructure Package to tie	0d		03-Jul-08
	Issue Detailed Design Package to CAT II or CAT III Checker (as appropriate)	0d		07-Mar-08
	Bridge CATII or CAT III Review Period	28d	10-Mar-08	22-Apr-08
	Receive and Incorporate CATII or CATIII Check Comments	9d	23-Apr-08	07-May-08
	W08 Baird Drive Retaining Wall (Task700.2.11)	40d	18-Feb-08	14-Apr-08
	Baird Drive Retaining Wall Structure Detailed Design	40d	18-Feb-08	14-Apr-08
	Issue Notification Of Completion Letter- Baird Drive Retaining Wall Package to tie	0d		14-Apr-08
	Issue Detailed Design Package to CAT II or CAT III Checker (as appropriate)	0d		18-Feb-08
	Bridge CATII or CAT III Review Period	19d	19-Feb-08	17-Mar-08
	Receive and Incorporate CATII or CATIII Check Comments	9d	17-Mar-08	01-Apr-08
	W09 Balgreen Road Retaining Wall (Task700.2.12)	42d	09-Apr-08	06-Jun-08
	Balgreen Road Retaining Wall Structure Detailed Design	42d	09-Apr-08	06-Jun-08
	Issue Notification Of Completion Letter- Balgreen Road Retaining Wall Package to tie	0d		06-Jun-08
	Issue Detailed Design Package to CAT II or CAT III Checker (as appropriate)	0d		09-Apr-08

Activity ID	Activity Name	Original Duration	Start	Finish
	Bridge CATII or CAT III Review Period	19d	10-Apr-08	08-May-08
	Receive CATII or CATIII Check Comments	0d		08-May-08
	Receive and Incorporate CATII or CATIII Check Comments	9d	09-May-08	22-May-08
	BAR - EDP - Section 5B (Task700.3)	463d	20-Sep-06 A	17-Jul-08
	Sub Section Wide	359d	22-Feb-07 A	17-Jul-08
	Sub Section Wide IDC	22d	25-Feb-08	25-Mar-08
	Subsection Wide IDC	21d	25-Feb-08	25-Mar-08
	Consents & Approvals	359d	22-Feb-07 A	17-Jul-08
	Prior Approvals	308d	09-Apr-07 A	24-Jun-08
	Combined Section Prior Approval	60d	01-Apr-08	24-Jun-08
	Issue Combined Package 5B for Prior Approval to CEC	0d		01-Apr-08
	Receive Combined Package 5B Comments From CEC	0d		27-May-08
	Prior Approval Granted for Section 5B Combined Package	0d		24-Jun-08
	CEC Approval Period - 5B Combined Package	38d	01-Apr-08	27-May-08
	Update5B Combined Package to CEC Comments	19d	27-May-08	24-Jun-08
	Batch 5/11	42d	22-Feb-08	22-Apr-08
	Batch 5/11 Formal Approval Period	38d	22-Feb-08	21-Apr-08
	Issue Batch 5/11 For Approval to CEC	0d	22-Feb-08	
	Receive CEC Prior Approval For Batch 5/11	0d	22-Apr-08	
	Batch 5/12	42d	01-Apr-08	29-May-08
	Batch 5/12 Formal Approval Period	38d	01-Apr-08	28-May-08
	Issue Batch 5/12 For Approval to CEC	0d	01-Apr-08	
	Receive CEC Prior Approval For Batch 5/12	0d	29-May-08	
	Batch 5/14	42d	28-Jan-08	26-Mar-08
	Batch 5/14 Formal Approval Period	38d	28-Jan-08	25-Mar-08
	Issue Batch 5/14 For Approval to CEC	0d	28-Jan-08	
	Receive CEC Prior Approval For Batch 5/14	0d	26-Mar-08	
	Batch 5/15	40d	17-Mar-08	12-May-08
	Batch 5/15 Formal Approval Period	35d	17-Mar-08	09-May-08
	Issue Batch 5/15 For Approval to CEC	0d	17-Mar-08	
	Receive CEC Prior Approval For Batch 5/15	0d	12-May-08	
	Batch 5/16	42d	22-Feb-08	22-Apr-08
	Batch 5/16 Formal Approval Period	38d	22-Feb-08	21-Apr-08
	Issue Batch 5/16 For Approval to CEC	0d	22-Feb-08	
	Receive CEC Prior Approval For Batch 5/16	0d	22-Apr-08	
	Batch 5/17	42d	12-Feb-08	10-Apr-08
	Batch 5/17 Formal Approval Period	38d	12-Feb-08	09-Apr-08
	Issue Batch 5/17 For Approval to CEC	0d	12-Feb-08	
	Receive CEC Prior Approval For Batch 5/17	0d	10-Apr-08	
	Batch 5/18	42d	22-Feb-08	22-Apr-08
	Batch 5/18 Formal Approval Period	38d	22-Feb-08	21-Apr-08
	Issue Batch 5/18 For Approval to CEC	0d	22-Feb-08	
	Receive CEC Prior Approval For Batch 5/18	0d	22-Apr-08	
	Roads, Track, OLE, Landscaping, Street Lighting	40d	14-Jan-08	07-Mar-08
	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	14-Jan-08	07-Mar-08
	Tram Stop Balgreen	40d	14-Jan-08	07-Mar-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Balgreen	38d	14-Jan-08	07-Mar-08
	Tram Stop Saughton	40d	14-Jan-08	07-Mar-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Saugton	38d	14-Jan-08	07-Mar-08
	Tram Stop Bankhead	40d	14-Jan-08	07-Mar-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Bankhead	38d	14-Jan-08	07-Mar-08
	Tram Stop Edinburgh Park Station	72d	17-May-07 A	24-Aug-07 A
	Informal Consultation With CEC & tie over Prior Approval Tram Stopn Edinburgh Park Station	67d	17-May-07 A	24-Aug-07 A
	Tram Stop Edinburgh Park Central	41d	17-May-07 A	12-Jul-07 A
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Edinburgh Park Central	38d	17-May-07 A	12-Jul-07 A
	Tram Jenners Depository Substation	120d	29-Oct-07 A	23-Apr-08
	Informal Consultation With CEC & tie over Prior Approval Tram Jenners Depository Substation	55d	29-Oct-07 A	25-Jan-08
	Prior Approval Tram Jenners Depository Substation	0d		23-Apr-08
	Tram Bankhead Drive Substation	277d	10-Apr-07 A	12-May-08
	Informal Consultation With CEC & tie over Prior Approval Tram Bankhead Drive Substation	178d	10-Apr-07 A	14-Jan-08
	Prior Approval Tram Bankhead Drive Substation	0d		12-May-08
	Carrick Knowe Superstructure	40d	01-Feb-08	27-Mar-08
	Commence Carrick Knowe Superstructure Informal Consultation With CEC & tie Over Prior Approval	38d	01-Feb-08	27-Mar-08
	Saughton Road Assessment	182d	08-May-07 A	25-Jan-08
	Issue Saughton Road Assessment Report to CEC	0d	02-Jul-07 A	
	Receive Saughton Road Assessment Report comments from CEC	0d	14-Jan-08	
	CEC Saughton Road Assessment Report Review Period	125d	02-Jul-07 A	14-Jan-08
	Commence Saughton Road Informal Consultation With CEC & tie Over Prior Approval	17d	08-May-07 A	01-Jun-07 A
	Incorporate CEC comments into Saughton Road Assessment Report	9d	14-Jan-08	25-Jan-08
	South Gyle Access Road Bridge Superstructure	58d	29-Oct-07 A	25-Jan-08
	Commence South Gyle Access Road Bridge Informal Consultation With CEC & tie Over Prior Approval	55d	29-Oct-07 A	25-Jan-08
	Bankhead Drive Retaining Wall	40d	14-Nov-07 A	18-Jan-08
	Commence Bankhead Drive RW Informal Consultation With CEC & tie Over Prior Approval	39d	14-Nov-07 A	18-Jan-08
	Broomhouse Road Assessment	39d	09-Apr-07 A	01-Jun-07 A
	Receive Broomhouse Road Assessment Report comments from CEC	0d	18-May-07 A	
	Incorporate CEC comments into Broomhouse Road Assessment Report	9d	18-May-07 A	01-Jun-07 A

Activity ID	Activity Name	Original Duration	Start	Finish
	Issue Broomhouse Road Assessment Report to CEC	0d	27-Apr-07 A	
	CEC Broomhouse Road Assessment Report Review Period	13d	27-Apr-07 A	17-May-07 A
	Commence Broomhouse Road Informal Consultation With CEC & tie Over Prior Approval	13d	09-Apr-07 A	27-Apr-07 A
	Technical Approvals	359d	22-Feb-07 A	17-Jul-08
	Carrick Knowe Review Period (TAA)	90d	01-Feb-08	05-Jun-08
	Issue Carrick Knowe Superstructure Design Package to TAA	0d	28-Mar-08	
	TAA Carrick Knowe Superstructure Design Package Review Period	38d	28-Mar-08	22-May-08
	Receive Carrick Knowe Superstructure Design Package comments from TAA	0d	23-May-08	
	Incorporate TAA comments into Carrick Knowe Superstructure Design Package	9d	23-May-08	05-Jun-08
	Commence Carrick Knowe Superstructure Informal Consultation With CEC Over Technical Approval	38d	01-Feb-08	27-Mar-08
	Carrick Knowe Review Period (Network Rail)	30d	06-Jun-08	17-Jul-08
	Issue Design and Check Certificate to Network Rail For Comment	0d	06-Jun-08	
	Network Rail Comment Period	19d	06-Jun-08	03-Jul-08
	Receive Superstructure Design Package comments from Network Rail	0d	04-Jul-08	
	Incorporate Network Rail comments into Superstructure Design Package	9d	04-Jul-08	17-Jul-08
	Saughton Road Assessment Review Period (TAA)	43d	09-Mar-07 A	08-May-07 A
	Commence Saughton Road Informal Consultation With CEC Over Technical Approval	38d	09-Mar-07 A	08-May-07 A
	South Gyle Access Road Bridge Review (TAA)	313d	22-Feb-07 A	14-May-08
	Issue South Gyle Access Road Bridge Detailed Design Package to TAA	0d		29-Feb-08
	TAA Approval Period	38d	03-Mar-08	29-Apr-08
	Receive TAA Comments	0d		29-Apr-08
	Incorporate TAA Comments	9d	30-Apr-08	14-May-08
	Commence South Gyle Access Road Bridge Informal Consultation With CEC Over Technical Approval	38d	22-Feb-07 A	20-Apr-07 A
	Bankhead Drive Retaining Wall Structure Review (TAA)	190d	02-Aug-07 A	02-May-08
	Issue Bankhead Drive RW Detailed Design Package to TAA	0d		20-Feb-08
	TAA Approval Period	38d	21-Feb-08	18-Apr-08
	Receive TAA Comments	0d		18-Apr-08
	Incorporate TAA Comments	9d	21-Apr-08	02-May-08
	Commence Bankhead Drive RW Informal Consultation With CEC Over Technical Approval	103d	02-Aug-07 A	14-Jan-08
	Broomhouse Road Assessment Review Period (TAA)	39d	09-Apr-07 A	01-Jun-07 A
	Issue Broomhouse Road Assessment Report to TAA	0d	27-Apr-07 A	
	TAA Broomhouse Road Assessment Report Review Period	13d	27-Apr-07 A	17-May-07 A
	Receive Broomhouse Road Assessment Report comments from TAA	0d	18-May-07 A	
	Incorporate TAA comments into Broomhouse Road Assessment Report	9d	18-May-07 A	01-Jun-07 A
	Commence Broomhouse Road Informal Consultation With CEC Over Technical Approval	13d	09-Apr-07 A	27-Apr-07 A
	Edinburgh Park Station Viaduct Review Period (TAA)	87d	03-Oct-07 A	11-Feb-08
	Issue Edinburgh Park Station Superstructure Design Package to TAA	0d	23-Nov-07 A	
	TAA Edinburgh Park Station Superstructure Design Package Review Period	38d	26-Nov-07 A	28-Jan-08
	Receive Edinburgh Park Station Superstructure Design Package comments from TAA	0d	29-Jan-08	
	Incorporate TAA comments into Edinburgh Park Station Superstructure Design Package	9d	29-Jan-08	11-Feb-08
	Commence Edinburgh Park Station Superstructure Informal Consultation With CEC Over Technical Approval	36d	03-Oct-07 A	23-Nov-07 A
	Edinburgh Park Station Viaduct Review Period (Network Rail)	30d	12-Feb-08	24-Mar-08
	Issue Design and Check Certificate to Network Rail For Comment	0d	12-Feb-08	
	Network Rail Comment Period	19d	12-Feb-08	10-Mar-08
	Receive Superstructure Design Package comments from Network Rail	0d	11-Mar-08	
	Incorporate Network Rail comments into Superstructure Design Package	9d	11-Mar-08	24-Mar-08
	Roads Technical Approval	311d	03-Apr-07 A	19-Jun-08
	Issue Roads Design to Roads Authority for Approval	0d		25-Mar-08
	Roads Authority Approval Period	38d	26-Mar-08	21-May-08
	Receive Roads Authority Comments	0d		21-May-08
	Update to Roads Authority Comments	19d	22-May-08	19-Jun-08
	Roads Authority Informal Consultation	38d	03-Apr-07 A	01-Jun-07 A
	Roads Technical Approval Granted	0d		19-Jun-08
	Drainage Technical Approval	110d	19-Dec-07 A	29-May-08
	Roads Authority Informal Consultation For Drainage	58d	19-Dec-07 A	25-Mar-08
	Issue Drainage Design to Roads Authority for Approval	0d		25-Mar-08
	Roads Authority Approval Period For Drainage	38d	26-Mar-08	21-May-08
	Receive Roads Authority Comments For Drainage	0d		21-May-08
	Update to Roads Authority Comments For Drainage	5d	22-May-08	29-May-08
	Drainage Technical Approval Granted	0d		29-May-08
	Track (Task700.3.1)	22d	23-Mar-07 A	24-Apr-07 A
	Issue Track Alignment Design to tie Section 5B	0d		23-Mar-07 A
	tie Approval Period	19d	26-Mar-07 A	24-Apr-07 A
	Receive tie Comments	0d	20-Apr-07 A	
	Roads, Street Lighting & Landscaping (Task700.3.2)	16d	01-Jun-07 A	25-Jun-07 A
	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 5B	0d		01-Jun-07 A
	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 5B	0d		25-Jun-07 A
	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 5B	0d		19-Jun-07 A
	Drainage	99d	27-Sep-07 A	22-Feb-08
	Issue Drainage Design Completion Letter to tie for Approval Section 5B	0d		27-Sep-07 A
	Issue Drainage Design Completion Letter to tie for Approval Section 5B	0d		22-Feb-08
	Boundary & Accomodation Works (Task700.3.3)	0d	30-Jul-07 A	30-Jul-07 A
	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 5B	0d		30-Jul-07 A
	Utilities (Task700.3.4)	106d	29-Mar-07 A	27-Aug-07 A
	Issue DD to SUC For Approval	0d		29-Mar-07 A
	SUC Approval Period	96d	30-Mar-07 A	27-Aug-07 A

Activity ID	Activity Name	Original Duration	Start	Finish
	BAR - SRN	333d	20-Sep-06 A	27-Mar-08
	Tram Stop Balgreen (Task700.3.5)	319d	20-Sep-06 A	19-Dec-07 A
	Issue Notification Of Completion Letter- Balgreen Tram Stop Design to tie	0d		19-Dec-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
	Addressing PD Comments	3d	20-Sep-06 A	22-Sep-06 A
	Tram Jenners Depository Substation (Task700.3.9)	0d	20-Dec-07 A	20-Dec-07 A
	Issue Notification Of Completion Letter- Tram Jenner's Depository Substation Planning Submission to tie for Approva	0d		20-Dec-07 A
	Tram Stop Saughton (Task700.3.6)	229d	22-Sep-06 A	17-Aug-07 A
	Issue Notification Of Completion Letter- Saughton Tram Stop Design to tie	0d		17-Aug-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
	Addressing PD Comments	1d	22-Sep-06 A	22-Sep-06 A
	Structures	272d	05-Mar-07 A	27-Mar-08
	S23 Carrick Knowe Underbridge (NR Ref 090/009-1)	66d	18-Dec-07 A	27-Mar-08
	Superstructure Detailed Design	66d	18-Dec-07 A	27-Mar-08
	VO193 Superstructure Detailed Design Restart	66d	18-Dec-07 A	27-Mar-08
	Issue Superstructure Detailed Design Package to CAT III Checker	0d	18-Dec-07 A	
	Superstructure CAT III Check	42d	18-Dec-07 A	26-Feb-08
	Receive & Incorporate CAT III comments	9d	27-Feb-08	11-Mar-08
	Issue Notification Of Completion Letter- Carrick Knowe Superstructure Design Package to tie	0d		27-Mar-08
	Substructure Detailed Design	63d	21-Dec-07 A	27-Mar-08
	VO193 Substructure Detailed Design Restart	63d	21-Dec-07 A	27-Mar-08
	Issue Substructure Detailed Design Package to CAT III Checker	0d	21-Dec-07 A	
	Substructure CAT III Check	38d	21-Dec-07 A	25-Feb-08
	Receive & Incorporate CAT III comments	9d	26-Feb-08	10-Mar-08
	Issue Notification Of Completion Letter- Carrick Knowe Substructure Design Package to tie	0d		27-Mar-08
	S24 Existing Saughton Road Bridge	65d	05-Mar-07 A	04-Jun-07 A
	Structure Assessment	65d	05-Mar-07 A	04-Jun-07 A
	Issue Structure Assessment Package to CAT I Checker	0d	05-Mar-07 A	
	Structure Assessment Package CAT I Check	19d	05-Mar-07 A	30-Mar-07 A
	Receive & Incorporate CAT I comments	9d	10-Apr-07 A	23-Apr-07 A
	Issue Notification Of Completion Letter- Existing Saughton Road Bridge Assessment Report to tie	0d	04-Jun-07 A	
	SRN - SGA	356d	21-Sep-06 A	20-Feb-08
	Tram Stop Bankhead (Task700.3.10)	230d	21-Sep-06 A	17-Aug-07 A
	Issue Notification Of Completion Letter- Bankhead Tram Stop Design to tie	0d		17-Aug-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
	Addressing Comments from Preliminary Design	7d	21-Sep-06 A	29-Sep-06 A
	Structures	293d	18-Dec-06 A	20-Feb-08
	S05 Existing Broomhouse Road Bridge	68d	27-Feb-07 A	01-Jun-07 A
	Structure Assessment	68d	27-Feb-07 A	01-Jun-07 A
	Issue Structure Assessment Package to CAT I Checker	0d	27-Feb-07 A	
	Structure Assessment Package CAT I Check	14d	27-Feb-07 A	19-Mar-07 A
	Receive & Incorporate CAT I comments	9d	20-Mar-07 A	02-Apr-07 A
	Broomhouse Road Bridge Design Complete	0d	01-Jun-07 A	
	S26 South Gyle Access Road Bridge (Task700.3.12)	273d	22-Dec-06 A	29-Jan-08
	South Gyle Access Road Bridge Superstructure Detailed Design	273d	22-Dec-06 A	29-Jan-08
	Issue Notification Of Completion Letter- South Gyle Access Bridge Superstructure Package to tie for Comments	0d		20-Dec-07 A
	Issue Detailed Design Package to CAT II Checker	0d		22-Dec-06 A
	Bridge CATII Review Period	244d	02-Jan-07 A	15-Jan-08
	Receive and Incorporate CATII Check Comments	9d	16-Jan-08	29-Jan-08
	South Gyle Access Road Bridge Substructure Detailed Design	261d	08-Jan-07 A	17-Jan-08
	Issue Notification Of Completion Letter- South Gyle Access Bridge Substructure Package to tie for Comments	0d		17-Jan-08
	Issue Detailed Design Package to CAT II or CAT III Checker (as appropriate)	0d		08-Jan-07 A
	W11 Bankhead Drive Retaining Wall (Task700.3.11)	293d	18-Dec-06 A	20-Feb-08
	Bankhead Drive Retaining Wall Structure Detailed Design	293d	18-Dec-06 A	20-Feb-08
	Issue Notification Of Completion Letter- Bankhead Drive Retaining Wall Package to tie for Comments	0d		18-Jan-08
	Issue Detailed Design Package to CAT II Checker	0d		18-Dec-06 A
	Bridge CATII Review Period	13d	18-Jan-08	06-Feb-08
	Receive and Incorporate CATII Check Comments	9d	07-Feb-08	20-Feb-08
	Tram Bankhead Drive Substation (Task700.3.13)	0d	19-Apr-07 A	19-Apr-07 A
	Issue Notification Of Completion Letter- Tram Bankhead Drive Substation Planning Submission to tie for Approval	0d		19-Apr-07 A
	SGA - EPS	173d	26-Mar-07 A	23-Nov-07 A
	Tram Stop Edinburgh Park Station (Task700.3.14)	134d	26-Mar-07 A	28-Sep-07 A
	Issue Notification Of Completion Letter- Edinburgh Park Station Tram Stop Design to tie	0d		28-Sep-07 A
	Issue Edinburgh Park Station Tram Stop Package for Prior Approval to tie	0d		26-Mar-07 A
	Structures	47d	19-Sep-07 A	23-Nov-07 A
	S27 Edinburgh Park Station Viaduct (NR Ref 070/003-2)	47d	19-Sep-07 A	23-Nov-07 A
	Superstructure Detailed Design	47d	19-Sep-07 A	23-Nov-07 A
	Issue Superstructure Detailed Design Package to CAT III Checker	0d	19-Sep-07 A	
	Superstructure CAT III Check	28d	19-Sep-07 A	30-Oct-07 A
	Receive & Incorporate CAT III comments	9d	31-Oct-07 A	13-Nov-07 A
	Issue Notification Of Completion Letter- Edinburgh Park Station Viaduct Superstructure Design Package to tie	0d	23-Nov-07 A	
	Substructure Detailed Design	47d	19-Sep-07 A	23-Nov-07 A
	Issue Substructure Detailed Design Package to CAT III Checker	0d	19-Sep-07 A	
	Substructure CAT III Check	19d	19-Sep-07 A	16-Oct-07 A
	Receive & Incorporate CAT III comments	9d	17-Oct-07 A	30-Oct-07 A
	Issue Notification Of Completion Letter- Edinburgh Park Station Viaduct Substructure Design Package to tie	0d	23-Nov-07 A	

Activity ID	Activity Name	Original Duration	Start	Finish
	EPS - EDP	229d	22-Sep-06 A	17-Aug-07 A
	Tram Stop Edinburgh Park Central (Task700.3.17)	229d	22-Sep-06 A	17-Aug-07 A
	Issue Notification Of Completion Letter- Edinburgh Park Central Tram Stop Design to tie	0d		17-Aug-07 A
	Site Visit with tie & CEC To Review Preliminary Design	1d	02-Jul-07 A	02-Jul-07 A
	Addressing PD Comments	1d	22-Sep-06 A	22-Sep-06 A
	EDP - GOG - Section 5C (Task700.4)	383d	10-Jan-07 A	09-Jul-08
	Sub Section Wide	383d	10-Jan-07 A	09-Jul-08
	Sub Section Wide IDC	22d	28-Feb-08	28-Mar-08
	Subsection Wide IDC	21d	28-Feb-08	28-Mar-08
	Consents & Approvals	368d	01-Feb-07 A	09-Jul-08
	Prior Approvals	329d	01-Feb-07 A	16-May-08
	Combined Section Prior Approval	60d	22-Feb-08	16-May-08
	Issue Combined Package 5C for Prior Approval to CEC	0d		22-Feb-08
	Receive Combined Package 5C Comments From CEC	0d		18-Apr-08
	Prior Approval Granted for Section 5C Combined Package	0d		16-May-08
	CEC Approval Period - 5C Combined Package	38d	22-Feb-08	18-Apr-08
	Update 5C Combined Package to CEC Comments	19d	18-Apr-08	16-May-08
	Batch 5/19	112d	20-Feb-08 A	17-Apr-08
	Batch 5/19 Formal Approval Period	38d	20-Feb-08 A	16-Apr-08
	Issue Batch 5/19 For Approval to CEC	0d	20-Feb-08 A	
	Receive CEC Prior Approval For Batch 5/19	0d	17-Apr-08	
	Batch 5/20	40d	10-Jan-08 A	06-Mar-08
	Batch 5/20 Formal Approval Period	38d	10-Jan-08 A	05-Mar-08
	Issue Batch 5/20 For Approval to CEC	0d	10-Jan-08 A	
	Receive CEC Prior Approval For Batch 5/20	0d	06-Mar-08	
	Batch 5/22	42d	25-Jan-08	25-Mar-08
	Batch 5/22 Formal Approval Period	38d	25-Jan-08	20-Mar-08
	Issue Batch 5/22 For Approval to CEC	0d	25-Jan-08	
	Receive CEC Prior Approval For Batch 5/22	0d	25-Mar-08	
	Roads, Track, OLE, Landscaping, Street Lighting	40d	01-Feb-07 A	28-Mar-07 A
	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	01-Feb-07 A	28-Mar-07 A
	Tram Stop Gyle Centre	40d	01-Feb-07 A	28-Mar-07 A
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Gyle Centre	38d	01-Feb-07 A	28-Mar-07 A
	Depot Halt	40d	06-Feb-07 A	02-Apr-07 A
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Depot Stop	38d	06-Feb-07 A	02-Apr-07 A
	Gyle Stop Retaining Walls	40d	01-Feb-07 A	28-Mar-07 A
	Commence Gyle Stop RW Informal Consultation With CEC & tie Over Prior Approval	38d	01-Feb-07 A	28-Mar-07 A
	Technical Approvals	368d	01-Feb-07 A	09-Jul-08
	Gyle Stop Retaining Walls Structure Review (TAA)	298d	22-Feb-07 A	23-Apr-08
	Issue Detailed Design Package to TAA	0d		11-Feb-08*
	Incorporate TAA Comments	9d	10-Apr-08	23-Apr-08
	TAA Review Period	38d	12-Feb-08	09-Apr-08
	Receive TAA Comments	0d		09-Apr-08
	Commence Gyle Stop RW Informal Consultation With CEC Over Technical Approval	38d	22-Feb-07 A	20-Apr-07 A
	Roads Technical Approval	346d	01-Feb-07 A	09-Jun-08
	Issue Roads Design to Roads Authority for Approval	0d		28-Mar-08
	Roads Authority Approval Period	38d	31-Mar-08	27-May-08
	Receive Roads Authority Comments	0d		27-May-08
	Update to Roads Authority Comments	8d	28-May-08	09-Jun-08
	Roads Authority Informal Consultation	38d	01-Feb-07 A	28-Mar-07 A
	Roads Technical Approval Granted	0d		09-Jun-08
	Drainage Technical Approval	342d	01-Feb-07 A	03-Jun-08
	Roads Authority Informal Consultation For Drainage	38d	01-Feb-07 A	28-Mar-07 A
	Issue Drainage Design to Roads Authority for Approval	0d		28-Mar-08
	Roads Authority Approval Period For Drainage	38d	31-Mar-08	27-May-08
	Receive Roads Authority Comments For Drainage	0d		27-May-08
	Update to Roads Authority Comments For Drainage	5d	28-May-08	03-Jun-08
	Drainage Technical Approval Granted	0d		03-Jun-08
	A8 Underpass Superstructure Review (TAA)	94d	29-Feb-08	09-Jul-08
	Issue Detailed Design Package to TAA	0d		28-Apr-08
	TAA Approval Period	38d	29-Apr-08	25-Jun-08
	Receive TAA Comments	0d		25-Jun-08
	Incorporate TAA Comments	9d	26-Jun-08	09-Jul-08
	Commence A8 Underpass Informal Consultation With CEC Over Technical Approval	38d	29-Feb-08	28-Apr-08
	Track (Task700.4.1)	58d	10-Jan-07 A	03-Apr-07 A
	Issue Track Alignment Design to tie Section 5C	0d		10-Jan-07 A
	tie Approval Period	19d	11-Jan-07 A	07-Feb-07 A
	Receive tie Comments	0d	03-Apr-07 A	
	Roads, Street Lighting & Landscaping (Task700.4.2)	138d	19-Feb-07 A	30-Aug-07 A
	Issue Roads Design to tie for Approval Section 5C	0d		23-Feb-07 A
	tie Approval Period	19d	26-Feb-07 A	23-Mar-07 A
	No tie Comments Received - Change in Protocol Going Forward	0d		04-May-07 A
	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 5C	0d		30-Aug-07 A
	Issue Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 5C	0d		19-Feb-07 A
	Drainage	102d	27-Sep-07 A	27-Feb-08
	Issue Drainage Design Completion Letter to tie for Approval Section 5C	0d		27-Sep-07 A

Activity ID	Activity Name	Original Duration	Start	Finish
	Issue Drainage Design Completion Letter to tie for Approval Section 5C	0d		27-Feb-08
	Boundary & Accomodation Works (Task700.4.3)	0d	16-Jul-07 A	16-Jul-07 A
	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 5C	0d		16-Jul-07 A
	Utilities (Task700.4.4)	84d	01-May-07 A	27-Aug-07 A
	Issue DD to SUC For Approval	0d		01-May-07 A
	SUC Approval Period	77d	01-May-07 A	27-Aug-07 A
	EDP - GYL	159d	10-Jan-07 A	21-Aug-07 A
	Tram Stop Gyle Centre (Task700.4.7)	142d	01-Feb-07 A	17-Aug-07 A
	Issue Notification Of Completion Letter- Gyle Centre Tram Stop Design to tie	0d		17-Aug-07 A
	Issue Gyle Tram Stop Package for Prior Approval to tie	0d		01-Feb-07 A
	tie Approval Period	19d	01-Feb-07 A	28-Feb-07 A
	Receive tie Comments	0d		16-Mar-07 A
	Structures	159d	10-Jan-07 A	21-Aug-07 A
	W19? Gyle Stop Retaining Walls (Task700.4.6)	159d	10-Jan-07 A	21-Aug-07 A
	Gyle Stop Retaining Walls Preliminary Design Milestones	0d	25-Jan-07 A	25-Jan-07 A
	tie and TAA Sign Off PD	0d		25-Jan-07 A
	Gyle Stop Retaining Walls Structure Detailed Design	159d	10-Jan-07 A	21-Aug-07 A
	Issue Notification Of Completion Letter- Gyle Stop Retaining Walls Package to tie for Comments	0d		21-Aug-07 A
	Issue Detailed Design Package to CAT II Checker	0d		10-Jan-07 A
	Receive and Incorporate CATII Check Comments	5d	09-Aug-07 A	16-Aug-07 A
	CAT II Review Period	9d	30-Jul-07 A	10-Aug-07 A
	GYL - DEH (including A8 Underpass)	150d	20-Sep-07 A	28-Apr-08
	Depot Halt(Task700.4.8)	0d	20-Sep-07 A	20-Sep-07 A
	Issue Notification Of Completion Letter- Depot Halt Design to tie	0d		20-Sep-07 A
	Structures	50d	19-Feb-08	28-Apr-08
	VO28 S28 A8 Underpass (Task700.4.9) CNS010	50d	19-Feb-08	28-Apr-08
	A8 Underpass Superstructure Detailed Design	50d	19-Feb-08	28-Apr-08
	Issue Notification Of Completion Letter- A8 Underpass Superstructure Detailed Design Package to tie for Comments	0d		28-Apr-08
	Issue Detailed Design Package to CAT II Checker	0d	19-Feb-08*	
	Bridge CATII Review Period	27d	19-Feb-08	01-Apr-08
	Receive and Incorporate CATII Check Comments	9d	02-Apr-08	15-Apr-08
	DEH - GOG	0d	17-Aug-07 A	17-Aug-07 A
	Tram Stop Gogarburn (Task700.4.13)	0d	17-Aug-07 A	17-Aug-07 A
	Issue Notification Of Completion Letter- Gogarburn Tram Stop Design to tie	0d		17-Aug-07 A
	GDE DEPOT - Section 6 (Task870)	536d	21-Dec-06 A	09-Feb-09
	GDE DEPOT - Section Wide	536d	21-Dec-06 A	09-Feb-09
	DEPOT	536d	21-Dec-06 A	09-Feb-09
	Sub Section Wide IDC	20d	09-Oct-08	06-Nov-08
	Subsection Wide IDC - Roads, Track, Stops, B&A, Street Lighting (Excl. Dept Access Bridge)	19d	09-Oct-08	06-Nov-08
	Section Approvals	505d	13-Feb-07 A	09-Feb-09
	Planning Conditions	377d	13-Feb-07 A	04-Aug-08
	Combined Section Prior Approval	40d	09-Jun-08	04-Aug-08
	Issue Combined Package 6 for Prior Approval to CEC	0d		09-Jun-08
	Prior Approval Granted for Section 6 Combined Package	0d		04-Aug-08
	CEC Approval Period - 6 Combined Package	38d	09-Jun-08	04-Aug-08
	Batch 6/21	40d	06-Jun-08	01-Aug-08
	Batch 6/21 Formal Approval Period	38d	06-Jun-08	31-Jul-08
	Issue Batch 6/21 For Approval to CEC	0d	06-Jun-08	
	Receive CEC Prior Approval For Batch 6/21	0d	01-Aug-08	
	Batch 6/22	40d	09-Jun-08	04-Aug-08
	Batch 6/22 Formal Approval Period	38d	09-Jun-08	01-Aug-08
	Issue Batch 6/22 For Approval to CEC	0d	09-Jun-08	
	Receive CEC Prior Approval For Batch 6/22	0d	04-Aug-08	
	Tram Gogar Depot Substation	258d	27-Jul-07 A	01-Aug-08
	Prior Approval For Tram Gogar Depot Substation	0d		01-Aug-08
	Informal Consultation With CEC & tie Over Prior Approval Tram Gogar Depot Substation	38d	27-Jul-07 A	21-Sep-07 A
	Roads, Track, OLE, Landscaping, Street Lighting	42d	13-Feb-07 A	11-Apr-07 A
	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	13-Feb-07 A	11-Apr-07 A
	Depot Buildings	41d	16-Jul-07 A	10-Sep-07 A
	Informal Consultation With CEC & tie Over Prior Approval Depot Buildings	38d	16-Jul-07 A	10-Sep-07 A
	Depot Drainage	88d	14-Jan-08	14-May-08
	Issue Drainage Design To CEC For Prior Approval	0d		07-Mar-08
	Depot Drainage Design CEC Approval Period	38d	10-Mar-08	07-May-08
	Receive Depot Drainage Design CEC Comments	0d		07-May-08
	Incorporate CEC Comments into Depot Drainage Design	5d	08-May-08	14-May-08
	Informal Consultation With CEC & tie Over Prior Approval For Drainage	38d	14-Jan-08	07-Mar-08
	Drainage Prior Approval	0d		14-May-08
	Structure Prior Approvals	40d	14-Jan-08	07-Mar-08
	Depot Access Road Bridge Superstructure	40d	14-Jan-08	07-Mar-08
	Commence Depot Access Road Bridge Informal Consultation With CEC & tie Over Prior Approval	38d	14-Jan-08	07-Mar-08
	British Airport Authority (BAA) Approval	80d	11-Sep-08	12-Jan-09
	Issue to BAA for Approval	0d		06-Nov-08
	BAA Approval Period	38d	06-Nov-08	12-Jan-09
	BAA Informal Consultation	38d	11-Sep-08	06-Nov-08
	BAA Approval	0d		12-Jan-09
	Building Regulations Approval	47d	08-Feb-08	15-Apr-08

Activity ID	Activity Name	Original Duration	Start	Finish
	Submit Package for Building Regulations Approval	0d		08-Feb-08
	Building Regulations Approval Period	38d	11-Feb-08	08-Apr-08
	Incorporate Comments for Building Regulations Approval	0d		08-Apr-08
	Update to Building Regulations Approval Comments	5d	09-Apr-08	15-Apr-08
	Receive Stage 1 Building Reg Approval	0d		15-Apr-08
Technical Approvals		351d	17-Sep-07 A	09-Feb-09
Roads Technical Approval		100d	11-Sep-08	09-Feb-09
	Roads Authority Informal Consultation	38d	11-Sep-08	06-Nov-08
	Issue Roads Design to Roads Authority for Approval	0d		06-Nov-08
	Roads Authority Approval Period	38d	06-Nov-08	12-Jan-09
	Receive Roads Authority Comments	0d		12-Jan-09
	Update to Roads Authority Comments	19d	12-Jan-09	09-Feb-09
	Discharge of Roads Technical Approval	0d		09-Feb-09
Drainage Technical Approval		85d	11-Sep-08	19-Jan-09
	Roads Authority Informal Consultation For Drainage	38d	11-Sep-08	06-Nov-08
	Issue Drainage Design to Roads Authoriy for Approval	0d		06-Nov-08
	Roads Authority Approval Period For Drainage	38d	06-Nov-08	12-Jan-09
	Receive Roads Authority Comments For Drainage	0d		12-Jan-09
	Update to Roads Authority Comments For Drainage	5d	12-Jan-09	19-Jan-09
	Drainage Technical Approval Granted	0d		19-Jan-09
Depot Access Road Bridge Review (TAA)		223d	17-Sep-07 A	01-Aug-08
	Issue Detailed Design Package to TAA	0d		22-May-08
	TAA Approval Period	38d	23-May-08	18-Jul-08
	Receive TAA Comments	0d		18-Jul-08
	Incorporate TAA Comments	9d	21-Jul-08	01-Aug-08
	Commence Depot Access Road Bridge Informal Consultation With CEC Over Technical Approval	74d	17-Sep-07 A	14-Jan-08
Track (Task870.2)		0d	01-Aug-07 A	01-Aug-07 A
	Issue Notification Of Completion Letter- Track Alignment Design to tie Section 6	0d		01-Aug-07 A
Roads, Street Lighting & Landscaping (Task870.3)		97d	11-Apr-07 A	24-Aug-07 A
	Issue Notification Of Completion Letter- Roads Design to tie for Approval Section 6	0d		11-Apr-07 A
	Issue Notification Of Completion Letter- Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 6	0d		24-Aug-07 A
Drainage		17d	27-Sep-07 A	22-Oct-07 A
	Issue Drainage Design Completion Letter to tie for Approval Section 6	0d		27-Sep-07 A
	Re-Issue Drainage Design Completion Letter to tie for Approval Section 6 NOT REQUIRED - PART OF GENERAL DEPOT RE ISSUE	0d		22-Oct-07 A
Boundary & Accomodation Works (Task870.4)		0d	20-Aug-07 A	20-Aug-07 A
	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 6	0d		20-Aug-07 A
Earthworks		0d	21-Sep-07 A	21-Sep-07 A
	Issue Notification Of Completion Letter- Detailed Depot Earthworks Design	0d	21-Sep-07 A	
Depot Ductwork -External Services		0d	21-Sep-07 A	21-Sep-07 A
	Issue Notification Of Completion Letter- Depot Ductwork Design to tie	0d		21-Sep-07 A
Utilities (Task870.1)		0d	08-Jan-07 A	08-Jan-07 A
	Issue DD to SUC For Approval	0d		08-Jan-07 A
Depot Main Building (Task870.1)		0d	21-Sep-07 A	21-Sep-07 A
General (Task870.1.1)		0d	21-Sep-07 A	21-Sep-07 A
	Issue Notification Of Completion Letter- Depot Building Architectural Layout Package to tie	0d		21-Sep-07 A
Building Foundations (Task870.1.2)		0d	21-Sep-07 A	21-Sep-07 A
	Issue Notification Of Completion Letter- Depot Detailed Substructure Drawings & Specifications to tie	0d		21-Sep-07 A
Ground Floor Slab & Pits (Task870.1.3)		0d	21-Sep-07 A	21-Sep-07 A
	Issue Notification Of Completion Letter- Depot Ground Flr Slab to tie	0d		21-Sep-07 A
Steel Superstructure (Task870.1.4)		0d	21-Sep-07 A	21-Sep-07 A
	Issue Notification Of Completion Letter- Depot Detailed Superstructure Drawings and Specifications	0d		21-Sep-07 A
Depot OLE (Task870.5)		0d	04-May-07 A	04-May-07 A
	Issue Notification Of Completion Letter- Final Detailed Layout Plans & Standard & Special Cross Sections to tie Sec6	0d		04-May-07 A
VO238 OLE rework for depot (Internal - not PM approved)		0d	23-Jan-08	23-Jan-08
	Re-Issue Notification Of Completion Letter- Final Detailed Layout Plans & Standard & Special Cross Sections to tie	0d		23-Jan-08
Depot Lighting Design (Task870.6)		0d	21-Sep-07 A	21-Sep-07 A
	Issue Notification Of Completion Letter- Yard Detailed Design Lighting Design	0d		21-Sep-07 A
Tram Gogar Depot Substation (Task870.7)		0d	21-Sep-07 A	21-Sep-07 A
	Issue Notification Of Completion Letter- Tram Gogar Depot Substation Design to tie (Part of General Depot Submission)	0d		21-Sep-07 A
Structures		5d	21-Dec-06 A	08-Jan-07 A
VO7 - S32 - Depot Access Road Bridge (Task CR7)		5d	21-Dec-06 A	08-Jan-07 A
Depot Access Road Bridge Substructure Detailed Design		0d	21-Dec-06 A	21-Dec-06 A
	Issue Detailed Design Package to CAT II Checker	0d	21-Dec-06 A	
Depot Access Road Bridge Superstructure Detailed Design		0d	08-Jan-07 A	08-Jan-07 A
	Issue Detailed Design Package to CAT II Checker	0d	08-Jan-07 A	
VO250 Gogar Depot Adjustment due to EARL CNS067		0d	22-May-08	22-May-08
	Issue Notification Of Completion Letter- Depot Access Road Bridge Structure Package to tie	0d		22-May-08
VO265 Gogar Depot Redesign (Internal - not PM approved)		52d	28-Mar-08	10-Jun-08
VO265 Additional Retaining Walls		52d	28-Mar-08	10-Jun-08
	Issue Depot Internal Retaining Walls AIP to tie	0d	28-Mar-08	
	Issue Depot Internal Retaining Walls AIP to CEC	0d	28-Mar-08	
	Issue Depot Internal Retaining Walls AIP to TAA	0d	28-Mar-08	
	Receive TAA comments	0d	27-May-08	
	Receive approved and signed AIP	0d	10-Jun-08	
Gogarburn to Edinburgh Airport - Section 7 (Task800)		500d	22-Sep-06 A	10-Sep-08
Section Wide - Section 7		0d	13-Apr-07 A	13-Apr-07 A

Activity ID	Activity Name	Original Duration	Start	Finish
	Section Wide	0d	13-Apr-07 A	13-Apr-07 A
	OLE (Task800.1)	0d	13-Apr-07 A	13-Apr-07 A
	Issue Notification Of Completion Letter- Final Detailed Layout Plans & Standard & Special Cross Section to tie Section 7	0d		13-Apr-07 A
	GOG - AIR - Section 7A (Task800.2)	500d	22-Sep-06 A	10-Sep-08
	Sub Section Wide	434d	22-Dec-06 A	10-Sep-08
	Sub Section Wide IDC	20d	16-Apr-08	13-May-08
	Subsection Wide IDC	19d	16-Apr-08	13-May-08
	Consents & Approvals	396d	26-Feb-07 A	10-Sep-08
	Prior Approvals	346d	26-Feb-07 A	02-Jul-08
	Combined Section Prior Approval	60d	01-Apr-08	24-Jun-08
	Issue Combined Package 7A for Prior Approval to CEC	0d		01-Apr-08
	Receive Combined Package 7A Comments From CEC	0d		27-May-08
	Prior Approval Granted for Section 7A Combined Package	0d		24-Jun-08
	CEC Approval Period - 7A Combined Package	38d	01-Apr-08	27-May-08
	Update 7A Combined Package to CEC Comments	19d	27-May-08	24-Jun-08
	Batch 7/23	42d	01-Apr-08	29-May-08
	Batch 7/23 Formal Approval Period	38d	01-Apr-08	28-May-08
	Issue Batch 7/23 For Approval to CEC	0d	01-Apr-08	
	Receive CEC Prior Approval For Batch 7/23	0d	29-May-08	
	Batch 7/24	40d	02-Nov-07 A	08-Jan-08 A
	Batch 7/24 Formal Approval Period	38d	02-Nov-07 A	04-Jan-08 A
	Issue Batch 7/24 For Approval to CEC	0d	02-Nov-07 A	
	Receive CEC Prior Approval For Batch 7/24	0d	08-Jan-08 A	
	Batch 7/25	43d	06-Mar-08	06-May-08
	Batch 7/25 Formal Approval Period	38d	06-Mar-08	02-May-08
	Issue Batch 7/25 For Approval to CEC	0d	06-Mar-08	
	Receive CEC Prior Approval For Batch 7/25	0d	06-May-08	
	Batch 7/26 NO LONGER REQUIRED	40d	30-Jul-07 A	21-Sep-07 A
	Batch 7/26 Formal Approval Period	37d	30-Jul-07 A	21-Sep-07 A
	Issue Batch 7/26 For Approval to CEC	0d	01-Aug-07 A	
	NO LONGER REQUIRED DUE TO DEMISE OF EARL	0d	21-Sep-07 A	
	Batch 7/27	43d	13-Mar-08	13-May-08
	Batch 7/27 Formal Approval Period	38d	13-Mar-08	12-May-08
	Issue Batch 7/27 For Approval to CEC	0d	13-Mar-08	
	Receive CEC Prior Approval For Batch 7/27	0d	13-May-08	
	Batch 7/28	43d	20-Mar-08	20-May-08
	Batch 7/28 Formal Approval Period	38d	20-Mar-08	19-May-08
	Issue Batch 7/28 For Approval to CEC	0d	20-Mar-08	
	Receive CEC Prior Approval For Batch 7/28	0d	20-May-08	
	Batch 7/29	41d	27-Mar-08	23-May-08
	Batch 7/29 Formal Approval Period	38d	27-Mar-08	22-May-08
	Issue Batch 7/29 For Approval to CEC	0d	27-Mar-08	
	Receive CEC Prior Approval For Batch 7/29	0d	23-May-08	
	Roads, Track, OLE, Landscaping, Street Lighting	42d	26-Feb-07 A	24-Apr-07 A
	Informal Consultation With CEC & tie Over Prior Approval for Roads, Track, OLE, Landscaping and Street Lighting	38d	26-Feb-07 A	24-Apr-07 A
	Tram Stop Ingliston Park and Ride	40d	14-Jan-08	07-Mar-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Ingliston Park and Ride	38d	14-Jan-08	07-Mar-08
	Tram Eastfield Road Substation	76d	07-Feb-08	23-May-08
	Informal Consultation With CEC & tie over Prior Approval Tram Eastfield Road Substation	38d	07-Feb-08	02-Apr-08
	Prior Approval Tram Eastfield Road Substation	0d		23-May-08
	Gogar Culvert Two	40d	26-Mar-08	20-May-08
	Commence Gogar Burn Culvert Two Informal Consultation With CEC & tie Over Prior Approval	38d	26-Mar-08	20-May-08
	Gogar Culvert Three	40d	26-Mar-08	20-May-08
	Commence Gogar Burn Culvert Three Informal Consultation With CEC & tie Over Prior Approval	38d	26-Mar-08	20-May-08
	Gogar Burn Retaining Wall One	40d	08-May-08	02-Jul-08
	Commence Gogar Burn RW One Informal Consultation With CEC & tie Over Prior Approval	38d	08-May-08	02-Jul-08
	Gogar Burn Retaining Wall Two	40d	14-Jan-08	07-Mar-08
	Commence Gogar Burn RW Two Informal Consultation With CEC & tie Over Prior Approval	38d	14-Jan-08	07-Mar-08
	Tram Stop Edinburgh Airport	40d	30-Jan-08	25-Mar-08
	Informal Consultation With CEC & tie over Prior Approval Tram Stop Edinburgh Airport	38d	30-Jan-08	25-Mar-08
	Technical Approvals	396d	26-Feb-07 A	10-Sep-08
	Gogarburn Bridge Review (TAA)	140d	22-Oct-07 A	13-May-08
	Issue Detailed Design Package to TAA	0d		28-Feb-08
	TAA Approval Period	38d	29-Feb-08	28-Apr-08
	Receive TAA Comments	0d		28-Apr-08
	Incorporate TAA Comments	9d	29-Apr-08	13-May-08
	Commence Gogar Burn Bridge Informal Consultation With CEC Over Technical Approval	88d	22-Oct-07 A	28-Feb-08
	Gogar Culvert One Structure Review Period (TAA)	298d	30-May-07 A	29-Jul-08
	Issue Gogar Burn Culvert One Design Package to TAA	0d	21-May-08	
	TAA Gogar Burn Culvert One Design Package Review Period	38d	21-May-08	15-Jul-08
	Receive Gogar Burn Culvert One Design Package comments from TAA	0d	16-Jul-08	
	Incorporate TAA comments into Gogar Burn Culvert One Design Package	9d	16-Jul-08	29-Jul-08
	Commence Gogar Burn Culvert One Informal Consultation With CEC Over Technical Approval	41d	30-May-07 A	30-Jul-07 A
	Gogar Culvert One Structure Review Period (SEPA)	30d	21-May-08	01-Jul-08
	Issue Gogar Burn Culvert One Design Package to SEPA	0d	21-May-08	
	SEPA Gogar Burn Culvert One Design Package Review Period	19d	21-May-08	17-Jun-08

Activity ID	Activity Name	Original Duration	Start	Finish
	Receive Gogar Burn Culvert One Design Package comments from SEPA	0d	18-Jun-08	
	Incorporate SEPA comments into Gogar Burn Culvert One Design Package	9d	18-Jun-08	01-Jul-08
	Gogar Culvert Two Structure Review Period (TAA)	298d	30-May-07 A	29-Jul-08
	Issue Gogar Burn Culvert Two Design Package to TAA	0d	21-May-08	
	TAA Gogar Burn Culvert Two Design Package Review Period	38d	21-May-08	15-Jul-08
	Receive Gogar Burn Culvert Two Design Package comments from TAA	0d	16-Jul-08	
	Incorporate TAA comments into Gogar Burn Culvert Two Design Package	9d	16-Jul-08	29-Jul-08
	Commence Gogar Burn Culvert Two Informal Consultation With CEC Over Technical Approval	41d	30-May-07 A	30-Jul-07 A
	Gogar Culvert Two Structure Review Period (SEPA)	30d	21-May-08	01-Jul-08
	Issue Gogar Burn Culvert Two Design Package to SEPA	0d	21-May-08	
	SEPA Gogar Burn Culvert Two Design Package Review Period	19d	21-May-08	17-Jun-08
	Receive Gogar Burn Culvert Two Design Package comments from SEPA	0d	18-Jun-08	
	Incorporate SEPA comments into Gogar Burn Culvert Two Design Package	9d	18-Jun-08	01-Jul-08
	Gogar Culvert Three Structure Review Period (TAA)	298d	30-May-07 A	29-Jul-08
	Issue Gogar Burn Culvert Three Design Package to TAA	0d	21-May-08	
	TAA Gogar Burn Culvert Three Design Package Review Period	38d	21-May-08	15-Jul-08
	Receive Gogar Burn Culvert Three Design Package comments from TAA	0d	16-Jul-08	
	Incorporate TAA comments into Gogar Burn Culvert Three Design Package	9d	16-Jul-08	29-Jul-08
	Commence Gogar Burn Culvert Three Informal Consultation With CEC Over Technical Approval	41d	30-May-07 A	30-Jul-07 A
	Gogar Culvert Three Structure Review Period (SEPA)	30d	21-May-08	01-Jul-08
	Issue Gogar Burn Culvert Three Design Package to SEPA	0d	21-May-08	
	SEPA Gogar Burn Culvert Three Design Package Review Period	19d	21-May-08	17-Jun-08
	Receive Gogar Burn Culvert Three Design Package comments from SEPA	0d	18-Jun-08	
	Incorporate SEPA comments into Gogar Burn Culvert Three Design Package	9d	18-Jun-08	01-Jul-08
	Gogar Burn Retaining Wall One Review Period (TAA)	90d	08-May-08	10-Sep-08
	Issue Gogar Burn RW One Design Package to TAA	0d	03-Jul-08	
	TAA Gogar Burn RW One Design Package Review Period	38d	03-Jul-08	27-Aug-08
	Receive Gogar Burn RW One Design Package comments from TAA	0d	28-Aug-08	
	Incorporate TAA comments into Gogar Burn RW One Design Package	9d	28-Aug-08	10-Sep-08
	Commence Gogar Burn RW One Informal Consultation With CEC Over Technical Approval	38d	08-May-08	02-Jul-08
	Gogar Burn Retaining Wall Two Structure Review Period (TAA)	90d	08-May-08	10-Sep-08
	Issue Gogar Burn RW Two Design Package to TAA	0d	03-Jul-08	
	TAA Gogar Burn RW Two Design Package Review Period	38d	03-Jul-08	27-Aug-08
	Receive Gogar Burn RW Two Design Package comments from TAA	0d	28-Aug-08	
	Incorporate TAA comments into Gogar Burn RW Two Design Package	9d	28-Aug-08	10-Sep-08
	Commence Gogar Burn RW Two Informal Consultation With CEC Over Technical Approval	38d	08-May-08	02-Jul-08
	EARL Overbridge Review (TAA)	178d	15-Mar-07 A	19-Nov-07 A
	Issue Detailed Design Package to TAA - NO LONGER REQUIRED	0d		19-Nov-07 A
	Commence EARL Overbridge Informal Consultation With CEC Over Technical Approval	38d	15-Mar-07 A	14-May-07 A
	Roads Technical Approval	372d	26-Feb-07 A	07-Aug-08
	Issue Roads Design to Roads Authority for Approval	0d		14-May-08
	Roads Authority Approval Period	38d	15-May-08	10-Jul-08
	Receive Roads Authority Comments	0d		10-Jul-08
	Update to Roads Authority Comments	19d	11-Jul-08	07-Aug-08
	Roads Authority Informal Consultation	38d	26-Feb-07 A	24-Apr-07 A
	Roads Technical Approval Granted	0d		07-Aug-08
	Drainage Technical Approval	89d	14-Mar-08	16-Jul-08
	Roads Authority Informal Consultation For Drainage	38d	14-Mar-08	13-May-08
	Issue Drainage Design to Roads Authority for Approval	0d		13-May-08
	Roads Authority Approval Period For Drainage	38d	14-May-08	09-Jul-08
	Receive Roads Authority Comments For Drainage	0d		09-Jul-08
	Update to Roads Authority Comments For Drainage	5d	10-Jul-08	16-Jul-08
	Drainage Technical Approval Granted	0d		16-Jul-08
Track (Task800.2.1)		38d	08-Feb-07 A	03-Apr-07 A
	Issue Track Alignment Design to tie	0d		08-Feb-07 A
	tie Approval Period	19d	08-Feb-07 A	07-Mar-07 A
	Receive tie Comments	0d	03-Apr-07 A	
Roads, Street Lighting & Landscaping (Task800.2.2)		258d	09-Mar-07 A	14-Mar-08
	Issue Roads Design to tie for Approval Section 7	0d		09-Mar-07 A
	tie Approval Period	19d	12-Mar-07 A	10-Apr-07 A
	tie Comments Not Received - Change In Protocol Going Forward	0d		04-May-07 A
	Issue Notification Of Completion Letter- Hard & Soft Landscaping Design to tie Section 7A	0d		14-Mar-08
	Issue Street Lighting Design (Inc. Any OLE Combined Pole Design) to tie Section 7	0d		14-Mar-07 A
Drainage		0d	27-Sep-07 A	27-Sep-07 A
	Issue Drainage Design Completion Letter to tie for Approval Section 7A	0d		27-Sep-07 A
Boundary & Accomodation Works (Task800.2.3)		0d	20-Aug-07 A	20-Aug-07 A
	Issue Notification Of Completion Letter- Detailed Design of Boundary & Accomodation Works Section 7A	0d		20-Aug-07 A
Utilities (Task800.2.4)		74d	14-May-07 A	27-Aug-07 A
	Issue DD to SUC For Approval	0d		14-May-07 A
	SUC Approval Period	68d	15-May-07 A	27-Aug-07 A
Environmental		53d	22-Dec-06 A	16-Mar-07 A
	Issue Protected Species Plan to tie	0d		22-Dec-06 A
	tie Approval Period	17d	03-Jan-07 A	26-Jan-07 A
	Final Scottish National Heritage Approval Period	19d	19-Feb-07 A	16-Mar-07 A
	Issue New Setts/ Holt Design Section 7A	0d		08-Jan-07 A
VO50 Gogarburn Partnership Report CNS021		0d	24-Sep-07 A	24-Sep-07 A

Activity ID	Activity Name	Original Duration	Start	Finish
	Issue SDS response to the review of the Gogarburn Partnership report	0d		24-Sep-07 A
GOG - IPR		450d	22-Sep-06 A	03-Jul-08
Tram Stop Ingliston Park and Ride (Task800.2.7)		357d	22-Sep-06 A	22-Feb-08
	Issue Notification Of Completion Letter- Ingliston Tram Stop Design to tie	0d		22-Feb-08
	Site Visit with tie & CEC To Review Preliminary Design	1d	31-Jan-07 A	31-Jan-07 A
	Advance Levels Work (Liaision With Halcrows)	6d	22-Sep-06 A	29-Sep-06 A
Structures		408d	20-Nov-06 A	03-Jul-08
S29 Gogarburn Bridge (Task800.2.8)		287d	24-Nov-06 A	21-Jan-08
Gogarburn Bridge Substructure Detailed Design		287d	27-Nov-06 A	21-Jan-08
	Issue Notification Of Completion Letter- Gogar Burn Bridge Substructure Package to tie	0d		14-Dec-07 A
	Issue Detailed Design Package to CAT II Checker (as appropriate)	0d		27-Nov-06 A
	Bridge CATII Review Period	246d	27-Nov-06 A	12-Dec-07 A
	Receive and Incorporate Substructure CATII Check Comments	246d	04-Jan-07 A	21-Jan-08
Gogarburn Bridge Superstructure Detailed Design		268d	24-Nov-06 A	14-Dec-07 A
	Issue Notification Of Completion Letter- Gogar Burn Bridge Superstructure Package to tie for Comments	0d		14-Dec-07 A
	Issue Detailed Design Package to CAT II Checker	0d		24-Nov-06 A
	Bridge CATII Review Period	21d	27-Nov-06 A	03-Jan-07 A
	Receive and Incorporate Superstructure CATII Check Comments	172d	04-Jan-07 A	24-Sep-07 A
S10 Gogar Culvert One		225d	02-Jul-07 A	20-May-08
Structure Detailed Design		225d	02-Jul-07 A	20-May-08
	Issue Structure Detailed Design Package to CAT I Checker	0d	02-Jul-07 A	
	Structure CAT I Check ABANDONED	13d	03-Jul-07 A	20-Jul-07 A
	Receive & Incorporate CAT I comments	9d	23-Apr-08	06-May-08
	Re Issue Gogar Burn Culvert One Structure Revised Design Package to tie	0d		20-May-08
	Structure CAT I Check	19d	26-Mar-08	22-Apr-08
	Issue Notification Of Completion Letter- Gogar Burn Culvert One Structure Design Package to tie	0d		20-Nov-07 A
	Review Design & Amend if Necessary	30d	11-Feb-08	25-Mar-08
	Agree Drainage Interface	0d	25-Feb-08	
VO29 S33 EARL Overbridge (Task800.2.13) CNS011		187d	20-Nov-06 A	17-Aug-07 A
EARL Overbridge Superstructure Detailed Design		187d	20-Nov-06 A	17-Aug-07 A
	Issue Notification Of Completion Letter- EARL Overbridge Superstructure Package to tie	0d		17-Aug-07 A
	Issue Detailed Design Package to CAT II Checker	0d		20-Nov-06 A
	Bridge CATII Review Period	130d	10-Jan-07 A	27-Jul-07 A
	Receive and Incorporate CATII Check Comments	140d	10-Jan-07 A	10-Aug-07 A
EARL Overbridge Substructure Detailed Design		186d	22-Nov-06 A	17-Aug-07 A
	Issue Notification Of Completion Letter- EARL Overbridge Substructure Package to tie	0d		17-Aug-07 A
	Issue Detailed Design Package to CAT II Checker	0d		22-Nov-06 A
	Bridge CATII Review Period	28d	22-Nov-06 A	10-Jan-07 A
	Receive and Incorporate CATII Check Comments	39d	11-Jan-07 A	09-Mar-07 A
W14 Gogar Burn Retaining Wall One		78d	14-Mar-08	02-Jul-08
	Issue Revised PD to TAA	0d		14-Mar-08
	Issue Revised PD to tie	0d		14-Mar-08
	Receive Approved and Sign AIP document	0d	26-May-08	
	Recieve tie PD acceptance	0d	26-May-08	
	Receive TAA comments	0d	12-May-08	
	Update to TAA comments	9d	12-May-08	23-May-08
Structure Detailed Design		40d	08-May-08	02-Jul-08
	Issue Structure Detailed Design Package to CAT I Checker	0d	08-May-08	
	Structure CAT I Check	19d	08-May-08	04-Jun-08
	Receive & Incorporate CAT I comments	9d	05-Jun-08	18-Jun-08
	Issue Notification Of Completion Letter- Gogar Burn Retaining Wall One Structure Design Package to tie	0d		02-Jul-08
W15 Gogar Burn Retaining Wall Two		78d	14-Mar-08	03-Jul-08
	Issue Revised PD to TAA	0d		14-Mar-08
	Issue Revised PD to tie	0d		14-Mar-08
	Receive TAA acceptance	0d	12-May-08	
	Recieve tie acceptance	0d	12-May-08	
Structure Detailed Design		40d	08-May-08	03-Jul-08
	Issue Structure Detailed Design Package to CAT I Checker	0d	08-May-08	
	Structure CAT I Check	19d	08-May-08	04-Jun-08
	Receive & Incorporate CAT I comments	9d	05-Jun-08	18-Jun-08
	Issue Notification Of Completion Letter- Gogar Burn Retaining Wall Two Structure Design Package to tie	0d	03-Jul-08	
Tram Eastfield Road Substation (Task800.2.9)		0d	02-Apr-08	02-Apr-08
	Issue Notification Of Completion Letter- Tram Eastfield Road Substation Planning Submission to tie	0d		02-Apr-08
IPR - AIR		225d	02-Jul-07 A	20-May-08
Tram Stop Edinburgh Airport (Task800.2.10)		0d	25-Mar-08	25-Mar-08
	Issue Notification Of Completion Letter- Edinburgh Airport Tram Stop Design to tie	0d		25-Mar-08
Structures		225d	02-Jul-07 A	20-May-08
S31 Gogar Burn Culvert Two		225d	02-Jul-07 A	20-May-08
Structure Detailed Design		225d	02-Jul-07 A	20-May-08
	Issue Structure Detailed Design Package to CAT I Checker	0d	02-Jul-07 A	
	Structure CAT I Check ABANDONED	13d	03-Jul-07 A	20-Jul-07 A
	Receive & Incorporate CAT I comments	9d	23-Apr-08	06-May-08
	Re Issue Gogar Burn Culvert Two Structure Revised Design Package to tie	0d		20-May-08
	Structure CAT I Check	19d	26-Mar-08	22-Apr-08
	Review Design & Amend if Necessary	30d	11-Feb-08	25-Mar-08
	Agree Drainage Interface	0d	25-Feb-08	

Activity ID	Activity Name	Original Duration	Start	Finish
	Issue Notification Of Completion Letter- Gogar Burn Culvert Two Structure Design Package to tie	0d		20-Nov-07 A
	S34 Gogar Burn Culvert Three	225d	02-Jul-07 A	20-May-08
	Structure Detailed Design	225d	02-Jul-07 A	20-May-08
	Issue Structure Detailed Design Package to CAT I Checker	0d	02-Jul-07 A	
	Structure CAT I Check ABANDONED	13d	03-Jul-07 A	20-Jul-07 A
	Receive & Incorporate CAT I comments	9d	23-Apr-08	06-May-08
	Re Issue Gogar Burn Culvert Three Structure Revised Design Package to tie	0d		20-May-08
	Structure CAT I Check	19d	26-Mar-08	22-Apr-08
	Review Design & Amend if Necessary	30d	11-Feb-08	25-Mar-08
	Agree Drainage Interface	0d	25-Feb-08	
	Issue Notification Of Completion Letter- Gogar Burn Culvert Three Structure Design Package to tie	0d		20-Nov-07 A

THIS IS SCHEDULE PART 16 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 16

TRAM SUPPLY AGREEMENT

PLEASE REFER TO EXECUTED COPY OF TRAM SUPPLY AGREEMENT



(1) tie LIMITED

- and -

(2) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

TRAM SUPPLY AGREEMENT

in respect of

EDINBURGH TRAM NETWORK

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SCHEDULE 17 - CODE OF CONSTRUCTION PRACTICE AND CODE OF MAINTENANCE PRACTICE .....

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SCHEDULE 18 - SUB-CONTRACTOR DIRECT AGREEMENT .....

SCHEDULE 19 - ADDITIONAL TRAMS.....

SCHEDULE 20 - TIE AND CEC POLICIES .....

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SCHEDULE 23 - TRAM SUPPLIER'S PROPOSALS.....

TRAM SUPPLY AGREEMENT

BETWEEN

(1) **tie LIMITED** a company registered in Scotland under company number SC230949 whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ ("**Client**") and which expression shall includes its successors, permitted assignees and transferees; and

(2) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa) – Spain ("**Tram Supplier**") which expression shall include its personal representatives, successors, permitted assignees and transferees;

each a "**Party**" and together the "**Parties**".

WHEREAS

A On 28 November 2005, **tie** published in the Official Journal of the European Union notice of its intention to seek offers for the provision of Trams in respect of the Edinburgh Tram Network and following a procurement contest conducted in accordance with the Public Supply Contracts Regulations 1995 (SI 1995/201), has appointed the Tram Supplier for the provision of such Trams on the terms of this Agreement.

B By virtue of the Tram Legislation, CEC has been granted the requisite authorities and statutory powers to construct, operate and maintain Line One and Line Two.

C On 31 January 2006 **tie** published in the Official Journal of the European Union notice of its intention to seek offers for the provision of infrastructure works (including systems integration services) for Line One and Line Two. Pursuant to a procurement contest to be completed after the Effective Date, **tie** intends to appoint Infraco to provide such services.

D If required by **tie**, **tie** and the Tram Supplier have agreed that this Agreement will be novated by **tie** to Infraco or another party, with the intention that such party shall take over the rights and liabilities of the "Client" under this Agreement and will, thereafter, be responsible to **tie** for the supply of Trams as part of its responsibilities to **tie**. The Tram Supplier agrees to such novation on the terms set out in this Agreement.

E The Trams will be operated by the Operator.

F This Agreement sets out the terms on which the Client shall procure from the Tram Supplier the design, manufacture, delivery, testing and commissioning of 27 Trams for use on the System with an option to purchase Additional Trams.

G It is acknowledged that this Agreement forms part of a suite of documents which together aim to achieve a project vision (the "**Project Vision**") for the Edinburgh Tram Network. This Project Vision involves the development of a tramway which will stand favourable comparison with the best in Europe. The quality of the tramway provided will be appropriate to Edinburgh's status and role as a European capital city and its city centre's designation as a World Heritage Site. The tramway will integrate as far as possible with other transport modes to serve the existing fabric of the City of Edinburgh, and promote appropriate development and social inclusion. It is intended that this goal be achieved in a spirit of partnership, utilising modern design and construction methods and standards.

NOW IT IS AGREED AS FOLLOWS:

1. DEFINITIONS AND INTERPRETATIONS

1.1 In this Agreement unless the context otherwise requires the following words and expressions shall have the following meanings:

"**Accounts**" means in respect of the Tram Supplier such accounting records as are required to be kept under section 386 of the Companies Act 2006, to be prepared on a consistent basis for each consecutive period not exceeding one month;

"**Additional Insurances**" has the meaning given to it in Clause 40.17;

"**Additional Trams**" means Tram unit(s) which may be ordered by the Client in accordance with Clause 22.1;

"**Additional Trams Order**" has the meaning given to that term in Clause 22.1;

"**Advance Payment Bond**" means the advance payment bond in the form set out in part C of Schedule 10 (*Bonds and Collateral Warranty*);

"**Affected Party**" means a Party that is unable to comply with all or a material part of its obligations under this Agreement as a direct result of a Force Majeure Event;

"**Affiliate**" means in relation to any person, any holding company or subsidiary of that person or any subsidiary of such holding company and "holding company" and "subsidiary" shall have the meanings given to them in sections 1159 and 1160 of the Companies Act 2006;

"**Aggregate Tram Price**" means the sum of fifty five million seven hundred and eighty one thousand and six hundred and thirty three pounds sterling (£55,781,633), this aggregate contract sum includes 27 trams plus spare parts plus depot equipment;

"**Agreed Commissioning Date**" means in respect of each Tram the date set out in part 1 of Schedule 4 (*Programme*) on which a Certificate of Tram Commissioning is due to be issued in respect of such Tram;

"**Agreed Delivery Date**" means in respect of each Tram the date set out in part 1 of Schedule 4 (*Programme*) on which each Tram is to be delivered to the Depot;

"**Agreement**" means Clauses 1 to 80 (inclusive) together with Schedules 1 to 23 (inclusive) which are annexed and signed as relative hereto, all as may be amended from time to time in accordance with this Agreement;

"**Annual Service Report**" has the meaning given to it in Clause 50.4;

"**Approval Bodies**" means any Relevant Authorities, Utilities, CEC, planning authorities, roads authorities, HMRI, BAA, Network Rail and any other parties who are to issue Consents which may be required for the construction, installation, commissioning, completion, opening maintenance, use or modification of the Edinburgh Tram Network;

"**Assets**" means all assets and rights to enable CEC, TEL, **tie** Limited or another party to own, operate and maintain and extend the Edinburgh Tram Network in accordance with this Agreement, including:

(a) any equipment;

(b) any books and records (including the operating and maintenance manual, health and safety manuals and other know-how) relating specifically to the Tram Supplier's works;

(c) any Trams, Spare Parts, Special Tools and other assets (together with any warranties in respect of assets being transferred); and

(d) any Project IPR or any licence relating to Tram Supplier IPR;

(e) any contractual rights;

(f) any Intellectual Property Rights;

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but excluding any assets and rights in respect of which **tie** is full, legal and beneficial owner;

"**Background Information**" means all and any materials, documents, drawings, plans or other information in paper, electronic or any other form, relating in any way to this Agreement or the Tram Legislation (and the parliamentary process) and made available to the Tram Supplier by **tie**, CEC, any **tie** Party, the Client, any Client Party and/or any of their respective members, officers, agents and/or advisers in connection with this Agreement or during the procurement competition relating to this Agreement or thereafter;

"**Base Case RPIX**" means RPIX as at September 2007;

"**Best Value Improvement Plan**" means the plan referred to in Clause 50.8;

"**Bill**" means a document which constitutes draft primary Legislation;

"**Business Day**" means any day other than a Saturday or Sunday or a day which is a public holiday recognised by CEC;

"**Calibrated Tram Weight**" has the meaning given to it in paragraph 1 of part 2 of Schedule 5 (*Payments*);

"**Case for Safety**" means all necessary documentation, information and other requirements for the issue of a safety certificate or a safety authorisation (as appropriate) by the Office of the Rail Regulator pursuant to the Railways and Other Guided Transport Systems (Safety) Regulations 2006;

"**CDM**" means Construction (Design and Management) Regulations 2007 (SI 2007/320);

"**CEC**" means the City of Edinburgh Council or its statutory successors;

"**Certificate of Tram Commissioning**" means the certificate to be issued by the Tram Inspector in accordance with Clause 31 (*Training, Commissioning, Testing and Certification*) in the form set out in Schedule 12 (*Certificates*);

"**Certificate of Tram Delivery**" means the certificate to be issued by the Tram Inspector in accordance with Clause 30 (*Tram Delivery Tests and Certification*) in the form set out in Schedule 12 (*Certificates*);

"**Change in Control**" means any sale or disposal of any legal, beneficial or equitable interest in share capital comprising 30% of a corporation, or the transfer or acquisition of the ability to direct the management and control of the corporation;

"**Change in Law**" means the coming into effect after 14 September 2007, of:

(a) Legislation, other than any Legislation which on or before 14 September 2007 has been published:

(i) in a draft Bill as a part of a Scottish Executive/Scottish Parliament or United Kingdom Government consultation paper;

(ii) in a Bill;

(iii) in draft subordinate Legislation within the meaning of section 21(1) of the Interpretation Act 1978; or

(iv) as a proposal in the Official Journal of the European Union or as a common position adopted by the European Parliament; or

(b) any Guidance (other than Guidance which on 14 September 2007, has been published (in draft or otherwise) or changes in Guidance; or

(c) any applicable judgement of a relevant court of law which changes binding precedent;

"**Change Procedure**" means the variation procedure set out in Clause 20 (*Changes*);

"**Client Change**" means any addition, modification, reduction or omission in respect of the Tram Works or any other term of this Agreement instructed by the Client in accordance with Clause 20 (*Changes*);

"**Client Change Order**" means the written confirmation issued by the Client to proceed with a Client Change on the basis of an Estimate (as modified, if required);

"**Client Claim**" means a relief or entitlement pursuant to the Infraco Contract (other than in respect of compensation on termination payment) to which the Client is or becomes or may become entitled under the Infraco Contract which is equivalent to and/or consistent with relief or entitlement pursuant to and under the same circumstances as an EPR Claim;

"**Client Default**" shall have the meaning given to it in Clause 57.1;

"**Client Notice of Change**" means a notice served by the Client pursuant to Clause 20.1 setting out the matters specified in Clause 20.2;

"**Client Party**" means any advisers appointed by the Client or any of the Client's employees, agents, contractors and Sub-contractors of any tier and its or their directors, officers and employees (excluding the Tram Supplier or any Tram Supplier Party);

"**Client's Programme**" means the programme for the Infraco Works which shall be notified to the Tram Supplier and updated from time to time;

"**Client's Representative**" means the person or persons appointed by the Client from time to time and notified to the Tram Supplier;

"**Code**" means the Scottish Ministers' Code of Practice on the Discharge of Functions by Public Authorities under the Freedom of Information (Scotland) Act 2002 as the same may be amended, varied or replaced from time to time;

"**Code of Construction Practice**" means the code set out in part 1 of Schedule 17 (*Code of Construction Practice and Code of Maintenance Practice*);

"**Code of Maintenance Practice**" means the code set out in part 2 of Schedule 17 (*Code of Construction Practice and Code of Maintenance Practice*);

"**Commencement Conditions Precedent**" shall mean the conditions set out in part 1 of Schedule 1 (*Conditions Precedent*);

"**Commencement Date**" means the date on which the Tram Supplier has been notified by the Client that all of the Commencement Conditions Precedent have been either satisfied, waived or in respect of which the Client has notified the Tram Supplier that they may be treated as Works Conditions Precedent;

"**Commercially Sensitive Information**" means the subset of Confidential Information listed in Schedule 16 (*Commercially Sensitive Information*) comprised of information:

(a) which is provided by the Tram Supplier to the Client in confidence for the period set out in that schedule; and/or

(b) that constitutes a trade secret;

"**Compensation Event**" means the occurrence of any of the following:

(a) on any date on or after the Agreed Delivery Date in respect of the first Tram, of the issue of a Factory Acceptance Type Test Certificate and a Factory Acceptance Routine Test Certificate in respect of a Tram in accordance with Clause 28 (*Pre-*

Delivery Inspections and Factory Acceptance Tests) where the Depot is not ready to accept delivery following the issue of such certificates such that the Tram Supplier cannot despatch the Trams to the Depot; or

(b) of a breach by the Client and/or the Tram Inspector of their respective obligations under this Agreement and/or the Tram Inspector Agreement which has a material adverse effect on the ability of the Tram Supplier to perform its obligations under this Agreement in relation to the achievement of the Tram Delivery Tests, the Tram Commissioning Type Tests, the Tram Commissioning Routine Tests and/or the Training Programme in accordance with the timescales set out in the Tram Manufacturing and Delivery Programme and/or Training Schedule (as appropriate); or

(c) of a breach by the Client of its obligation to give (or procure) access to the Depot in accordance with the provisions of the Depot Sub-Licence which has a material adverse effect on the ability of the Tram Supplier to perform its obligations under this Agreement; or

(d) Protestor Action which exceeds 1 day in duration;

"**Conditions Precedent**" shall mean the Commencement Conditions Precedent and the Works Conditions Precedent;

"**Confidential Information**" means any information which has been designated as confidential by either Party in writing or that ought to be considered as confidential (however it is conveyed or on whatever media it is stored) including information which relates to the business, affairs, properties, assets, trading practices, goods, services, developments, trade secrets, Intellectual Property Rights, know-how, personnel of either Party, all personal data and sensitive personal data within the meaning of the Data Protection Act 1998;

"**Consents**" means without limitation all permissions, consents, approvals, certificates, permits, licences, agreements and authorisations (including those required by Law) needed to carry out the Tram Works and any reference t o "consent" shall mean written consent;

"**Construction Panel**" has the meaning given to it in paragraph 19.1 of Schedule 13 (*Dispute Resolution Procedure*);

"**Control Centre**" means the control centre for the Edinburgh Tram Network to be provided by the Infraco pursuant to the Infraco Contract and operated by the Operator pursuant to the DPOFA;

"**Defect Notice**" shall have the meaning given to it in Clause 36.2.1.1;

"**Delay**" shall have the meaning given to it in Clause 45.1;

"**Deliverables**" means the designs, Design Data and other deliverables as set out in part 5 of Schedule 4 (*Programme*) to be provided by the Tram Supplier in accordance with the Deliverables Programme;

"**Deliverables Programme**" means the programme set out in part 5 of Schedule 4 (*Programme*);

"**Delivery Acceptance Tests**" means the acceptance tests to be carried out on each Tram as set out in section 23 of the Employer's Requirements;

"**Delivery Retention**" shall have the meaning given to it in Clause 41.21;

"**Delivery Retention Repayment**" shall have the meaning given to it in Clause 41.23;

"**Depot**" means the depot at Gogar comprising maintenance facilities, stabling facilities, sidings, operations, cleaning facilities, the Control Centre, storage facilities and accommodation for operational and maintenance staff;

"**Depot Equipment**" means the equipment which is identified as being supplied by the Tram Supplier in table 83 of section 29 of the Employer's Requirements;

"**Depot Sub-Licence**" means the sub-licence to the Depot in the form annexed to Schedule 3 (*Depot Sub-Licence*);

"**Depot Plan**" means the plan of the Depot annexed to the Depot Sub-Licence;

"**Design Data**" means all drawings, specifications, systems, statements, procedures, proposals, reports, documents, plans, software, formulae, calculations and data relating to the design, construction, testing, commissioning, completion and/or operation of the Trams and/or Tram Works;

"**Design Development Services**" means the production of designs pursuant to Clause 15 (*Design Development*);

"**Developed Kinematic Envelope**" has the meaning given to that term in Railway Safety Publication 2;

"**Discriminatory Change in Law**" means a Change in Law, the terms of which apply expressly to:

(a) the Edinburgh Tram Network; and/or

(b) the Tram Supplier and not to other persons;

"**Dispute**" means any dispute, difference or unresolved claim between the Parties in connection with or arising from this Agreement;

"**Dispute Resolution Procedure**" means the procedure provided for in Clause 64 (*Dispute Resolution*) and set out in Schedule 13 (*Dispute Resolution Procedure*);

"**DPOFA**" means the development partnering and operating franchise agreement between **tie** and the Operator dated 14 May 2004 as amended at 20 December 2007;

"**Edinburgh Tram Network**" means the tramway which is to be designed, constructed and maintained in Edinburgh pursuant to the Infraco Contract in Phase 1a (forming part of Line One and Line Two as described in the Tram Legislation (and Phase 1b if built) together with all associated works and facilities including all civil engineering and track works, Trams, infrastructure, plant, machinery and equipment installed or used for such tramway;

"**Effective Date**" means the last date of execution of this Agreement;

"**Emergency Services**" means Lothian and Borders Police, Lothian and Borders Fire Brigade, British Transport Police, Scottish Ambulance Services and HM Coastguard;

"**EMC Directive**" means the Electromagnetic Compatibility Directive (2004/108/ECJL390);

"**EPR Claim**" means a relief or entitlement or payment pursuant to this Agreement to which the Tram Supplier is or becomes or may become entitled pursuant to either a:

(a) Compensation Event,

(b) Relief Event;

(c) Force Majeure Event;

(d) Client Change;

(e) Change in Law; or,

(f) any other rights to claim additional payment or relief;

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"**Employer's Requirements**" means the requirements set out in part 1 of Schedule 2 (*Employer's Requirements*);

"**Environmental Information Regulations**" means the Environmental Information (Scotland) Regulations 2004, Scottish SI 2004/520;

"**Escrow Agreement**" means the agreement relating to the Software and/or any Tram Documentation set out in Schedule 8 (*Escrow Agreement*);

"**Escrow Release Event**" has the meaning given to it in the Escrow Agreement;

"**Estimate**" shall have the meaning given to it in Clause 20.2.2;

"**Excess Tram Weight**" has the meaning given to it in paragraph 2 of part 2 of Schedule 5 (*Payments*);

"**Expiry Date**" shall have the meaning given to it in Clause 4.1;

"**Extended Tram Warranty Defects**" means a design defect in relation to an Extended Tram Warranty Part which causes a mechanical or structural failing to that Tram and which:

(a) prevents that Tram operating in accordance with the performance standards set out in the Tram Requirements Specification; and/or

(b) has the effect of shortening the design life of that Tram to a period shorter than 30 years;

"**Extended Tram Warranty Part**" means the bogie frames, axle boxes, gear boxes, slewing rings (or equivalent), traction motors and/or major components of the carshell structure of a Tram;

"**Extended Tram Warranty Period**" means a period of 10 years from the Tram Maintenance Commencement Date;

"**Factory**" has the meaning given to it in Clause 7.4;

"**Factory Acceptance Routine Test Certificate**" means the certificate to be issued by the Tram Inspector in accordance with Clause 28 (*Pre-Delivery Inspections and Factory Acceptance Tests*) in the form set out in Schedule 12 (*Certificates*);

"**Factory Acceptance Routine Tests**" means the factory acceptance tests and other relevant static inspections and dynamic tests to be carried out on all Trams as set out in section 23.4 of the Employer's Requirements;

"**Factory Acceptance Tests**" means together the Factory Acceptance Routine Tests and the Factory Acceptance Type Tests;

"**Factory Acceptance Type Test Certificate**" means the certificate to be issued by the Tram Inspector in accordance with Clause 28 (*Pre-Delivery Inspections and Factory Acceptance Tests*) in the form set out in Schedule 12 (*Certificates*);

"**Factory Acceptance Type Tests**" means the factory acceptance tests and other relevant static inspections and dynamic tests to be carried out on specified Trams as set out in section 23 of Schedule 2 (*Employer's Requirements)*;);

"**Final Persistent Breach Notice**" shall have the meaning given to it in Clause 56.2 ;

"**Financial Panel**" has the meaning given to it in paragraph 19.1 of Schedule 13 (*Dispute Resolution Procedure*);

"**Fleet Tram Defect**" means a Tram Defect which:

(a) has occurred during a consecutive period of:

(i) 12 months in respect of any 4 Trams; or

(ii) 18 months in respect of any 6 Trams; and

(b) affects 15% of the component assemblies (interchangeable units) or subassemblies of the same type in respect of those Trams referred to in paragraph (a) above;

"**Fleet Tram Defect Period**" means:

(a) a period from the date on which the first Tram is issued with a Certificate of Tram Commissioning until the date on which the last Tram to be issued with a Certificate of Tram Commissioning is issued with a Certificate of Tram Commissioning; and

(b) once the last Tram to be issued with a Certificate of Tram Commissioning is issued with a Certificate of Tram Commissioning a period until 2 years after the date on which Passenger Services commence;

"**FOISA**" means the Freedom of Information (Scotland) Act 2002 and any subordinate legislation made under that Act from time to time together with any guidance and/or codes of practice issued by the Scottish Information Commissioner in relation to such legislation;

"**Force Majeure Event**" means the occurrence after the Effective Date of:

(a) war, civil war or armed conflict in the United Kingdom and Spain; or

(b) nuclear, chemical or biological contamination unless the source or cause of the contamination is the result of actions of the Tram Supplier or any Tram Supplier Party; or

(c) pressure waves caused by devices travelling at supersonic speeds; or

(d) exceptionally adverse weather conditions affecting shipment or transportation of Tram;

"**General Change in Law**" means a Change in Law which is not a Qualifying Change in Law;

"**Good Industry Practice**" means using standards, practices, methods and procedures conforming to the Law and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably be expected from a large, reputable, professionally qualified, competent and skilled organisation experienced in carrying out a similar type of undertaking to those comprised in the design, manufacture, supply and maintenance of Trams and seeking in good faith to comply with its contractual obligations and all duties owed by it;

"**Guidance**" means any applicable guidance, policy, direction or determination issued by any regulatory body with which the Client, **tie**, CEC, the Operator, the Tram Supplier and/or the Tram Supplier Parties and/or its Sub-contractors are bound to comply and, to the extent not published or otherwise publicly available is made available to the Tram Supplier and shall include the **tie** and CEC Policies;

"**Hardware Intellectual Property Rights**" means any Intellectual Property Rights which are not Software Intellectual Property Rights and which are the property of the Tram Supplier and/or which the Tram Supplier obtains under the terms of this Agreement;

"**HMRI**" means Her Majesty's Railway Inspectorate;

"**Identified Defect**" shall have the meaning given to it in Clause 36.2.1.1.(a);

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"**Indemnified Liabilities**" means actions, claims (including third party claims) demands, proceedings, losses, damages, liabilities, costs and expenses (including legal and other professional charges and expenses);

"**Indemnified Parties**" shall have the meaning given to it in Clause 41.1;

"**Independent Competent Person**" means Interfleet or such other person appointed by **tie** to agree and oversee the implementation of all procedures and processes to comply with the provisions of the Railway and Other Guide Transport System (Safety) Regulations 2006 and to enable permitting for the testing, commissioning and operation of the Edinburgh Tram Network;

"**Indexed**" means in relation to an amount, that amount to be multiplied by the value of RPIX at the Point of Indexation, divided by the Base Case RPIX to generate a percentage movement;

"**Indirect Loss**" means any damage, cost, third party claim, expense or loss incurred by a Party to this Agreement or Client Party (or an Indemnified Party) as a consequence of a breach of this Agreement or a negligent act or omission which relates to consequential or indirect loss of profits, or loss of revenue, loss of use, loss of production or output, interruption or loss of business or business opportunity or other consequential or indirect loss, loss of contract, loss of goodwill and whether or not the Party committing the breach knew, or ought to have known, that such indirect or consequential loss would be likely to be suffered as a consequence of such breach;

"**Infraco**" means the contractor to be selected and appointed by **tie** which will be responsible for carrying out and/or managing a comprehensive turnkey contract including the design, construction, installation, commissioning, tram procurement, system integration, infrastructure maintenance, tram maintenance, and supply of related equipment and materials, trams and related infrastructure in relation to the Edinburgh Tram Network or any successor appointed by **tie** and notified to the Tram Supplier by notice in writing from time to time;

"**Infraco Contract**" means the contract to be entered into by **tie** with the Infraco;

"**Infraco Party**" means each and any of the Infraco's employees, directors, officers, agents, professional advisors, consultants and contractors and its or their Sub-contractors (of any tier) and shall include its or their directors, officers and employees as they are involved in relation to the Infraco Works and "Infraco Parties" shall be construed accordingly;

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"**Infraco Works**" means as the context requires, all or any of the works to be constructed and completed and/or services to be provided and/or the plant, machinery and equipment to be supplied and installed by the Infraco in accordance with the Infraco Contract and which are necessary to deliver a fully functional tram system in Edinburgh, and to subsequently maintain such system all in accordance with the Employer's Requirements;

"**Insolvency Event**" means any of the following events:

(a) the Tram Supplier is unable to pay its debts as they fall due or is insolvent or admits (in writing) its inability to pay its debts as they fall due;

(b) the Tram Supplier suspends for a period of two months making payments on all or any class of its debts or a moratorium is declared by the Tram Supplier in respect of its indebtedness;

(c) the Tram Supplier ceases business or announces an intention to do so;

(d) the following are entered into:

(i) a voluntary arrangement (other than a solvent one) for a composition of debts of the Tram Supplier;

(ii) a scheme of arrangement in respect of the Tram Supplier pursuant to the Insolvency Act 1986 or arrangement in the context of insolvency pursuant to the Companies Act 2006; or

(iii) a material composition or arrangement other than a solvent one with the Tram Supplier's creditors;

(e) either of the following:

(i) the winding-up of the Tram Supplier (including passing a shareholders' resolution or the presentation of a petition by the Tram Supplier for the purpose of winding up the Tram Supplier); or

(ii) its administration (including where an application is made by the Tram Supplier for, or petition is presented by the Tram Supplier for, or any meeting of its directors or members resolves to make an application for, an administration order);

(f) an order for the winding-up or administration of the Tram Supplier is made;

(g) any liquidator, judicial custodian, receiver, administrative receiver, administrator or the like is appointed in respect of the Tram Supplier or any material part of the Tram Supplier's assets;

(h) possession is taken of, or any distress, execution or other process (other than on the dependence or inhibition) is levied or enforced upon, any material part of the property (whether real or personal) of the Tram Supplier by or on behalf of any creditor or encumbrancer of the Tram Supplier; or

(i) anything analogous to any of the events mentioned in paragraphs (a) to (h) above occurs in relation to the Tram Supplier under the law of any relevant jurisdiction including but not limited to Spanish Law 22/2003 of July 9 and Spanish Law 1564/1989 of December 22;

"**Intellectual Property Rights**" or "**IPR**" means any rights in or to any patent, design right, utility model, trade mark, brand name, service mark, trade name, business name, logo, invention (whether registered or unregistered), domain name, semi-conductor right, topography right, software designs and/or other materials, source code, copyright, moral right, know-how or rights in databases and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or for an extension, revival or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the law of Scotland or of any other jurisdiction;

"**Interim Certificate**" shall have the meaning ascribed to it in Clause 38.5;

"**Internal Resolution Procedure**" means the procedure described in paragraphs 10 and 11 of Schedule 13 (*Dispute Resolution Procedure*);

"**IPR Claim**" means any claim of infringement or alleged infringement (including to the defence of such infringement or alleged infringement) of any IPR used to design, manufacture, engineer, supply, test, commission, sell, deliver, maintain or operate the Trams or as otherwise provided by the Tram Supplier to the Client in the fulfilment of its obligations under this Agreement;

"**Key Personnel**" means those persons listed in Schedule 6 (*Key Personnel*);

"**Late Tram**" has the meaning ascribed to it in the Tram Maintenance Agreement;

"**Law**" means:

(a) any Legislation;

(b) any Guidance; and

(c) any judgment of a relevant court of law which is a binding precedent,

in each case in force or applicable in Scotland;

"**Legislation**" means any Act or instruments of the Scottish Parliament or the United Kingdom Parliament or subordinate legislation within the meaning of section 21(1) of the Interpretation Act 1978, any exercise of the Royal Prerogative, and any enforceable community right within the meaning of section 2 of the European Communities Act 1972 and any bye-laws of any Local (or other statutory) Authority;

"**Legal Opinion**" means a legal opinion from a law firm satisfactory to the Client acting reasonably in a form acceptable to the Client acting reasonably;

"**Legal Panel**" has the meaning given to it in paragraph 19.1 of Schedule 13 (*Dispute Resolution Procedure*);

"**Line One**" means the tramway works as authorised by the Edinburgh Tram (Line One) Act 2006;

"**Line Two**" means the tramway works as authorised by the Edinburgh Train (Line Two) Act 2006;

"**Liquidated Damages**" means the liquidated damages payable pursuant to Clause 41 (*Liability, Indemnities, Retention and Liquidated Damages*) (as the context requires);

"**Local Authority**" means CEC or any local authority established pursuant to the Local Government (Scotland) Acts 1973 and 1994 (as these statues may be amended) or their statutory successors or any regional transport partnership or body established pursuant to the Transport (Scotland) Act 2005;

"**Losses**" means all damages, losses, liabilities, costs, expenses (including legal and other professional charges and expenses) and charges whether arising under statute, contract or at common law or in connection with judgments, proceedings, internal costs or demands;

"**Material Change**" means a change that makes a significant difference to the way in which the Tram is operated and/or a significant difference to the environment in which it operates;

"**Maximum Tram Weight**" means the maximum weight of a tare Tram of 55.85 tonnes;

"**Milestone**" means the output to be achieved before payment of a Milestone Payment set out in the Milestone Payment Schedule;

"**Milestone Payment**" means the payment to be made against the achievement of a Milestone for an amount set out in the Milestone Payment Schedule;

"**Milestone Payment Schedule**" means the schedule of Milestones and Milestone Payments set out at part 1 of Schedule 5 (*Payments*);

"**Mobilisation Cost**" means the agreed fixed cost of mobilising to produce Additional Trams if an Additional Trams Order is placed more than 17 months after the Effective Date, in the sum of 2,886,000 Euros to restart production;

"**Mock Up Production**" means the production of a Tram mock-up in accordance with Clause 23 (*Mock Up*);

"**NCC**" has the meaning given to it in Clause 51.19.3;

"**Net Loss**" or "**Net Gain**" means the net financial loss or the net financial gain, as the case may be, which it is reasonably considered would be suffered or made by the Tram Maintainer (as agreed reasonably by the Parties) as a result of a Client Change required pursuant to Clause 5.2;

"**Notice of Adjudication**" has the meaning given in paragraph 16 of Schedule 13 (*Dispute Resolution Procedure*);

"**Notification**" has the meaning given in paragraph 10.1 of Schedule 13 (*Dispute Resolution Procedure*);

"**Novation Agreement Escrow Letter**" means the escrow letter in substantially the form set out in part 3 of Schedule 1 (*Conditions Precedent*);

"**Object Code**" means any form of computer program which is suitable for direct execution by a machine only and unsuitable to be read and understood by a person;

"**OCIP Insurances**" means the insurances referred to in Clause 40.14, which shall be notified to the Tram Supplier from time to time;

"**Open Book Basis**" means the availability and disclosure (consistent with operation of Clause 24 (*Audit and Inspection*)) of a reasonable level of data and calculations used by the Tram Supplier to create and justify costings and financial analysis presented to the Client;

"**Operational Panel**" has the meaning given to it in paragraph 19.1 of Schedule 13 (*Dispute Resolution Procedure*);

"**Operations Performance Specification**" means the specification included within Schedule 2 (*Employer's Requirements*);

"**Operator**" means Transdev Edinburgh Tram Limited, a company incorporated in Scotland under registered number SC267598 and having its registered office at Level 1st Floor, City Point, Haymarket Terrace, Edinburgh EH1 2ET, appointed by **tie** as operator under the DPOFA or such successor operator of the Edinburgh Tram Network as may be appointed from time to time;

"**Operator Maintenance**" means the maintenance of the Edinburgh Tram Network to be carried out by the Operator (and its required frequency) shall be as follows:

(a) cleaning of all tramstops, access ways and car parks operated under the auspices of **tie** so as to ensure they are clean and free from all litter, dirt, debris, detritus, industrial and bodily fluids; such cleaning to be carried out not less than daily;

(b) emptying of all litter bins at tramstops or on the Trams daily or as regularly as necessary to prevent them from becoming full;

(c) promptly remove any observed or reported rubbish and debris at the tramstops or on Trams likely to create a risk of fire or other dangers;

(d) regularly remove any observed or reported litter on Trams throughout each day so as to maintain a reasonably clean travelling environment for passengers. This obligation shall also relate to the cleaning up of observed or reported fluids of any type on the Trams; and

(e) cleaning of the parts of the Depot for which the Operator is either the main user or which are shared and this shall include offices, Control Room, messing facilities, Operator locker rooms, car parking at the Depot and Depot entrances, so as to ensure such parts are clean and free from all litter, dirt, debris, detritus, industrial and bodily fluids; such cleaning to be carried out not less than daily or as may be otherwise agreed between **tie** and the Operator;

and shall also include the carrying out of the initial response to a failure of, damage to or other incident occurring on the System which is not specifically identified as the Operator's responsibility to resolve but actually or, in the Operator's reasonable opinion, potentially interrupts or delays the Transport Services;

"**Operator Maintenance Plan**" means the plan to be prepared by the Operator in relation to the performance of the Operator Maintenance and notified to the Parties from time to time;

"**Paint and Finishes**" means the paintwork, internal and external finishes of each Tram as set out in the Tram Requirements Specification;

"**Paint and Finish Defect**" means any defect in the Paint and Finishes;

"**Paint and Finish Warranty Period**" means a period of six (6) years from the Tram Maintenance Commencement Date;

"**Panels**" has the meaning given to it in paragraph 19 of Schedule 13 (*Dispute Resolution Procedure*);

"**Passenger Services**" means the public passenger Tram services to be provided by the Operator on the Edinburgh Tram Network;

"**Performance Bond**" means the performance bond in the form set out in part D of Schedule 10 (*Bonds and Collateral Warranty*);

"**Permitted Variations**" means a Client Change and/or a change proposed by the Tram Supplier which has been authorised to proceed in accordance with the provisions of this Agreement;

"**Persistent Breach Notice**" shall have the meaning given to it in Clause 56.1;

"**Persistent Failure**" means in respect of the same part or component of a Tram, where a failure or defect (other than a Fleet Tram Defect or normal wear of a wearable part or component) occurs on three or more occasions within any 12 month period and as such is required to be repaired, rebuilt or replaced under Warranty;

"**Phase 1a**" means Edinburgh Airport to Newhaven (inclusive), together with the Depot at Gogar and the spur at Roseburn Junction;

"**Phase 1b**" means Roseburn Junction to Granton Square (inclusive);

"**Point of Indexation**" shall be January each year to be applied annually as of 1st April each year;

"**Potential Relief Event**" shall have the meaning given to it in Clause 47.1;

"**Potential Relief Event Notice**" shall have the meaning given to it in Clause 47.1;

"**Pre-Operational Consents**" means any necessary approvals consents or authorisations relating to the design construction or performance of the Trams that are required either from HMRI, the Scottish Executive or another Approval Body prior to their operation in public service, such approvals to include but not be limited to those required under The Railways and Other Transport Systems (Approval of Works, Plant and Equipment) Regulations 1994, the Rail Vehicle Accessibility Regulations 1998 (as amended) and the relevant parts of the EMC Directive;

"**Pre-Works Development Services**" means the Design Development Services, the Mock-Up Production and obtaining of all Consents necessary prior to the Works Commencement Date;

"**Primary Tram Warranty Period**" means in respect of each Tram a period of 2 years commencing on the Tram Maintenance Commencement Date;

"**Prohibited Act**" means:

(a) offering, giving or agreeing to give to **tie,** the Scottish Executive, Transport Scotland, the Scottish Ministers, CEC or any **tie** Party or any other public body or any person owned or employed by, any of them any gift or consideration of any kind as an inducement or reward:

(i) for doing or not doing (or for having done or not having done) any act in relation to the obtaining or performance of this Agreement; or

(ii) for showing or not showing favour or disfavour to any person in relation to this Agreement;

(b) paying commission or agreeing to pay commission to any person in connection with the award of this Agreement;

(c) committing any offence:

(i) under the Prevention of Corruption Acts 1889-1916 or in section 68(2) of the Local Government (Scotland) Act 1973;

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(ii) under any Law creating offences in respect of fraudulent acts; or

(iii) at common law in respect of fraudulent acts in relation to this Agreement or any other relevant agreement with **tie**, any **tie** Party, the Scottish Executive, Transport Scotland, the Scottish Ministers, CEC or any other public body; and/or

(d) defrauding or attempting to defraud or conspiring to defraud the Scottish Executive, **tie**, any **tie** Party, CEC, Transport Scotland, the Scottish Ministers or any other public body;

Any references within this Agreement to any "Prohibited Act" shall include acts outwith the United Kingdom and the references within the definition "Prohibited Act" to UK legislation shall be deemed to be amended to refer to legislation in other jurisdictions outside of the United Kingdom;

"**Project**" means the project to procure the construction, operation and maintenance of a two line light rail network in Edinburgh;

"**Project IPR**" means all Intellectual Property Rights created in the performance of the Tram Works relating to aesthetic and ergonomic detailed design and which are specific in nature to the performance of the Tram Works;

"**Project Quality Assurance Programme**" means the quality assurance programme in respect of the manufacture, testing and delivery of the Trams set out in part 4 to Schedule 4 (*Programme*) to this Agreement as the same may be amended from time to time in accordance with this Agreement;

"**Project Safety and Certification Committee**" **or** "**PSCC**" shall include representatives from **tie**, Transport Edinburgh Limited, CEC in its capacity as roads authority, the Infraco, the Operator, the Tram Supplier and the Tram Maintainer;

"**Project Vision**" means the project vision referred to in recital G of this Agreement;

"**Protestor Action**" means any action occurring in Edinburgh or whilst undertaking the delivery of trams within Scotland, directed against **tie** or a **tie** Party or the Edinburgh Tram Network which materially affects the performance of the Tram Supplier's obligations under this Agreement and has not arisen as a result of or been caused by the Tram Supplier's breach of its obligations under this Agreement or otherwise by any action or omission of the Tram Supplier unrelated to the Edinburgh Tram Network;

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"**Qualifying Change in Law**" means

(a) a Discriminatory Change in Law; and/or

(b) a Specific Change in Law;

"**Railway Safety Publication 2**" means the railway safety publication paper providing guidance on trams and published by the Office of Rail Regulation in 2006 as may be amended from time to time;

"**Rectification Period**" shall have the meaning given to it in Clause 36.2.2.3;

"**Rectification Plan**" shall have the meaning given to it in Clause 36.2.2.3;

"**Referral**" has the meaning given in paragraph 27 of Schedule 13 (*Dispute Resolution Procedure*);

"**Referring Party**" has the meaning given in paragraph 16 of Schedule 13 (*Dispute Resolution Procedure*);

"**Related Contracts**" has the meaning given to it in paragraph 55 of Schedule 13 (*Dispute Resolution Procedure*);

"**Related Dispute**" has the meaning given in paragraph 55 of Schedule 13 (*Dispute Resolution Procedure*);

"**Relevant Authority**" means any court with the relevant jurisdiction and any local, national or supra-national agency, inspectorate, minister, ministry, official or public or statutory person of the government of the United Kingdom or of the European Union;

"**Reliability**" means in respect of a Tram that it has operated for two consecutive Reporting Periods in passenger carrying service without being a Tram Maintainer Late Tram and that during the same two Reporting Periods it has travelled a distance in excess of 10,000 kilometres;

"**Reliability Bond**" means the bond to be provided on behalf of the Tram Supplier by a bond provider of standing acceptable to the Client (acting reasonably) in a form substantially similar to that set out in Schedule 10 (*Bonds and Collateral Warranty*);

"**Relief Event**" means one or more of the following events:

(a) fire, explosion, lightning, storm, tempest, flood, ionising radiation (to the extent it

does not constitute a Force Majeure Event), earthquakes, riot and civil commotion; or

(b) any:

(i) official or unofficial strike; or

(ii) lockout; or

(iii) go-slow; or

(iv) other industrial dispute generally affecting the tram and/or tram manufacturing industry or a significant sector of it; or

(v) failure of the Operator to make available drivers or other relevant staff as necessary;

save where such events relate to the Tram Supplier's workforce or the workforce of any Sub-contractor to the Tram Supplier, in which case they shall not qualify as a Relief Event; or

(c) any breach by the Client of its obligations under this Agreement which has an adverse effect (provided that it is not de-minimis) on the ability of the Tram Supplier to perform its obligations under this Agreement, or

(d) an act of terrorism; or,

(e) the occurrence of a Force Majeure Event

"**Repeated Failure Notice**" shall have the meaning given to it in Clause 32.1;

"**Repeated Failure Remedy Plan**" shall have the meaning given to it in Clause 32.2;

"**Reporting Period**" has the meaning ascribed to it in the Tram Maintenance Agreement;

"**Reporting Period End Date**" means the dates set out in Schedule 21 (*Reporting Period End Dates*);

"**Representatives**" means the Client's Representative and the Tram Supplier's Representative;

"**Request for Information**" shall have the meaning set out in FOISA and shall include any apparent request for information under FOISA, the Environmental Information Regulations or the Code;

"**Required Insurances**" means the insurances complying with the insurance requirements set out in part 1 of Schedule 11 (*Required Insurances*);

"**Required Standards**" means:

(a) it has received all such Pre-Operational Consents as are required for use in Passenger Services; and

(b) it has been so designed, built, manufactured, installed, calibrated, adapted and commissioned and otherwise engineered as to be compatible with all relevant operational interfaces (as those interfaces may from time to time be notified to the Tram Supplier);

(c) and so as to ensure that the Tram Requirements Specification is complied with;

"**Responding Party**" has the meaning given in paragraph 17 of Schedule 13 (Dispute Resolution Procedure);

"**Routine Tests**" means any of the: Site Commissioning Routine Tests, System Integration Routine Tests, Tram Commissioning Routine Tests, or the Factory Acceptance Routine Tests;

"**RPIX**" means the general index of retail prices for all items excluding mortgage interest payments (Office of National Statistics: Series Identifier: CHMK) as published or any replacement thereof or, in the event such index ceases to exist, such other similar index as the Parties shall agree from time to time (or, if the Parties cannot so agree, as determined under the Dispute Resolution Procedure on the referral of either Party) provided that, if the basis of computation of such index shall have changed between the two relevant months, any official reconciliation between the two bases of computation published by a United Kingdom government department shall be binding on the Parties and, in the absence of such official reconciliation, such adjustment shall be made to the figure of such index for the second of those months to make it correspond as nearly as possible to the method of computation for the first of those months and such adjusted figure shall be considered for the purpose of this Agreement to the exclusion of the actual published figure;

"**SDS Provider**" means Parsons Brinckerhoff Limited, a company registered in England and Wales with registered number 02554514 whose registered office is at Amber Court, William Armstrong Drive, Newcastle Business Park, Newcastle upon Tyne, NE4 7YQ which expression shall include its permitted assignees or such other system design services provider appointed by **tie** or the Client and notified to the Tram Supplier by notice in writing from time to time in relation to the Edinburgh Tram Network;

"**Security Interests**" means any mortgage, pledge, lien, hypothecation, security interest or other charge or encumbrance or any other agreement or arrangement having substantially the same economic effect and includes any security as defined in section 248(b) of the Insolvency Act 1986;

"**Service Commencement Date**" means the first date of commencement of Passenger Services;

"**Site Commissioning Routine Tests**" means the commissioning acceptance tests to be carried out on the System on each Tram as set out in section 23 of Schedule 2 (*Employer's Requirements*);

"**Site Commissioning Tests**" means together the Site Commissioning Routine Tests and the Site Commissioning Type Tests;

"**Site Commissioning Type Tests**" means the commissioning acceptance tests to be carried out on the System on a specified number of Trams as set out in section 23 of the Employer's Requirements;

"**Software**" means the executable object code version of software relating to equipment installed on the Trams, which is supplied in machine readable form and already loaded upon the relevant piece of equipment or computer system to which it relates, including for the avoidance of doubt all Software embedded in a hardware device which is installed on the Trams;

"**Software Intellectual Property Rights**" means any Intellectual Property Right which exists in the Software (including the Source Code);

"**Source Code**" means the source code version of Software, which is supplied in a form capable of being read and interpreted by humans, together with related interpretive information;

"**Spare Parts**" means such components, parts, consumables, equipment and furnishings as may reasonably be required from time to time to maintain, repair or replace any part of any Tram or to keep it compliant with Required Standards and Law for the duration of its operational life;

"**Spare Parts Period**" means a period of 30 years from the Tram Maintenance Commencement Date;

"**Special Tools**" means the special tools required to carry out maintenance of the Trams, listed in part 5 of Schedule 2 (*Employer's Requirements*) as the same may be varied from time to time by written agreement of the parties (such agreement not to be unreasonably withheld or delayed);

"**Specific Change in Law**" means any Change in Law which specifically applies to the provision of works the same as or similar to the Tram Works (but not to the provision of other works);

"**Sub-Contractor**" means any sub-contractor, sub-consultant, supplier, specialist and/or other party appointed in accordance with Clause 69 (*Assignation, Changes in Legal Status, Changes in Control and Sub-Contracting*) or otherwise approved by the Client, and Sub-Contract is to be interpreted accordingly;

"**Sub-Contractor Direct Agreement**" means an agreement in a form substantially similar to that set out in Schedule 18 (*Sub-Contractor Direct Agreement*);

"**System**" the tram system to be constructed in accordance with the Tram Legislation made in respect of the Edinburgh Tram Network together with associated works and facilities and including all civil engineering and track works, tram infrastructure, plant, machinery and equipment installed or used for such tram system;

"**Systems Acceptance Tests**" means the acceptance tests to be carried out on the System as set out in section 23 of the Employer's Requirements;

"**System Availability Targets**" means the targets set out in section 15 of the Employer's Requirements;

"**System Design Services Agreement**" (or "**SDS Agreement**") means the agreement dated 19 September 2005 made between **tie** and the SDS Provider relating to the provision of system design services in relation to the Project;

"**System Integration Routine Tests**" means the commissioning acceptance tests to be carried out on the System on each Tram as set out in section 23 of the Employer's Requirements;

"**System Integration Tests**" means together the System Integration Routine Tests and the System Integration Type Tests;

"**System Integration Type Tests**" means the commissioning acceptance tests to be carried out on the System on a specified number of Trams as set out in section 23 of the Employer's Requirements;

"**Tax**" means any kind of tax (including for the avoidance of doubt insurance premium tax), duty, levy, imposition, assessment or other charge (other than VAT) whether or not similar to any in force at the date of this Agreement and whether imposed by a local, governmental or other Relevant Authority in the United Kingdom or elsewhere;

"**Term**" means the period from (and including) the Effective Date until (and including) the earlier of the Expiry Date or the date of termination of this Agreement;

"**Termination Date**" means any date of early termination of this Agreement in accordance with its terms;

"**Technical Library**" has the meaning given to it in Clause 51.20.1;

"**Test Certificates**" means the certificates set out in parts 1 to 7 of Schedule 12 (*Certificates*);

"**Testing Failure**" means a failure to meet the requirements of any of the Tram Tests;

"**Test Plan**" means the plan for testing and commissioning of the Trams to be agreed with the Client in accordance with in section 23 of the Employer's Requirements;

"**Test Specifications**" means the specifications for testing and commissioning of the Trams as set out in section 23 of the Employer's Requirements and as varied from time to time in accordance with this Agreement;

"**Test Track**" means the track to be built by Infraco for the initial purposes of the testing and commissioning of the Trams;

"**Third Party Software**" means programmes, the Intellectual Property Rights in which are owned by a third party and used by the Tram Supplier to perform its obligations under this Agreement;

"**Third Party Software Licence**" means a licence to use the Third Party Software;

"**tie**" means **tie** limited, a company registered in Scotland under company number SC230949 and having its registered office at City Chambers, High Street, Edinburgh, EH1 1YJ, Midlothian, which shall include its successors in title, permitted assignees and transferees;

"**tie and CEC Policies**" means the policies included in Schedule 20 (**tie** *and CEC Policies*);

"**tie Customer Satisfaction Survey**" has the meaning given to it in Clause 50.3;

"**tie's Drug and Alcohol Policy**" means the policy set out in Schedule 20 (**tie** *and CEC Policies)*;

"**tie Party**" means any advisers appointed by **tie** and/or any of **tie's**, agents, employees, contractors and Sub-contractors of any tier and its or their directors, officers, employees (but excluding the Infraco, any Infraco Party, the Tram Supplier and any Tram Supplier Party) and "**tie Parties**" shall be construed accordingly;

"**tie's** Representative" means the person or persons appointed by **tie** from time to time and notified to the Tram Supplier;

"**Timetable**" means the timetable which is developed by the Operator under the terms of the DPOFA Agreement and section 2 of the Tram Employer's Requirements, as may be notified to the Tram Supplier by the Client from time to time;

"**Training Programme**" means the training programme for the training of Operator's driver instructors and the Tram maintenance staff set out at part 3 to Schedule 2 (*Programme*);

"**Training Schedule**" means part 3 of Schedule 2 (*Employer's Requirements*);

"**Tram**" means any electric tram unit to be designed, manufactured, engineered, fitted out, equipped, installed and delivered by the Tram Supplier in accordance with the terms of this Agreement including for the avoidance of doubt, Additional Trams;

"**Tram Commissioning Certificate**" means a certificate issued in accordance with Clause 7.2.1.10;

"**Tram Commissioning Requirements**" shall have the meaning given to it in Clause 31.8;

"**Tram Commissioning Routine Tests**" means together the Site Commissioning Routine Tests and the System Integration Routine Tests;

"**Tram Commissioning Tests**" means together the Tram Commissioning Routine Tests and the Tram Commissioning Type Tests;

"**Tram Commissioning Type Tests**" shall have the meaning given to it in Clause 31.9;

"**Tram Commissioning Type Test Certificate**" means the certificate issued in accordance with Clause 31.9;

"**Tram Defect**" means in respect of any Tram supplied by the Tram Supplier under this Agreement that it:

(a) does not comply with the Tram Employer's Requirements;

(b) does not satisfy the Required Standards as at the date of the issue of the Tram Commissioning Type Test Certificate; or

(c) is not otherwise in accordance with any other provision of this Agreement;

"**Tram Delivery Requirements**" shall have the meaning given to it in Clause 30.2;

"**Tram Delivery Tests**" means the tests to be conducted on the Trams on arrival at the Depot, in accordance with Clause 30 (*Tram Delivery Tests and Certification*) and in section 23 of the Employer's Requirements;

"**Tram Documentation**" means the documentation, specifications, instructions, catalogues, spare parts list, training and maintenance manuals and log books and Software listed in part 2 of Schedule 4 (*Programme*);

"**Tram Documentation Delivery Programme**" means the delivery and approval programme in respect of the Tram Documentation set out in part 2 of Schedule 4 (*Programme*);

"**Tram Employer's Requirements**" means the subset of the Employer's Requirements listed in part 1 of Schedule 2 (*Employer's Requirements*) as relating to the Tram Maintainer and Tram Supplier;

"**Tram Inspector**" means the person specified as such in the Tram Inspector Agreement or such other person as the Client may notify the Tram Supplier in writing from time to time;

"**Tram Inspector Agreement**" means an agreement between the Tram Inspector, **tie**, and the Infraco for the inspection and certification of Trams dated on or about the date of this Agreement;

"**Tram Interface Specification**" means paragraph 1.2.5 of Schedule 23 (*Tram Supplier's Proposal*);

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"**Tram Legislation**" means the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006 which received Royal Assent on 8 May 2006 and 27 April 2006 respectively and which confer on CEC all requisite authorities and statutory powers to procure construction, operation and maintenance of the Edinburgh Tram Network;

"**Tram Maintainer**" means the party appointed to carry out the Tram Maintenance Services in accordance with the Tram Maintenance Agreement or such other person as may enter into a contract with the Client on similar terms from time to time;

"**Tram Maintainer Late Tram**" shall have the meaning set out in the Tram Maintenance Agreement;

"**Tram Maintenance Agreement**" means the maintenance agreement to be entered into on or about the date of this Agreement between the Tram Maintainer and **tie** for the ongoing maintenance of the Trams which is to be novated to the Infraco;

"**Tram Maintenance Commencement Date**" means the date on which the maintenance obligations commence under the Tram Maintenance Agreement;

"**Tram Maintenance Plan**" means the plan prepared by the Tram Supplier in respect of the maintenance of the Trams as updated from time to time;

"**Tram Maintenance Services**" means the ongoing maintenance of the Trams, supply of consumable spares for the Trams, the provision of any associated services and other obligations incumbent on the Tram Maintainer as described in the Tram Maintenance Agreement;

"**Tram Maintenance Specification**" means the specification for the maintenance services to be provided by the Tram Maintainer as set out in part 40 of the Tram Employer's Requirements;

"**Tram Manufacturing and Delivery Programme**" means the programme for the design, manufacture, delivery, testing and commissioning of the Trams set out in part 1 of Schedule 4 (*Programme*) as the same may be amended from time to time in accordance with the terms of this Agreement;

"**Tram Price**" means the price of a Tram being an amount of one million nine hundred and fifty seven thousand and forty one pounds sterling (£1,957,041);

"**Tram Rejection Notice**" means a tram rejection notice in the form set out in part 5 of Schedule 12 (*Certificates*);

"**Tram Related Equipment**" means the Tram Documentation, Spare Parts and Special Tools;

"**Tram Requirements Specification**" means the specification for the Trams set out in the Tram Employer's Requirements;

"**Tram Supplier Certificates of Insurance**" means the certificates of insurance of the Tram Supplier in relation to the Required Insurances set out in part 2 of Schedule 11 (*Required Insurances*);

"**Tram Supplier Default**" shall have the meaning given to it in Clause 55.1;

"**Tram Supplier IPR**" means:

(a) all Intellectual Property Rights (including Intellectual Property Rights in relation to the Tram Supplier Software) which the Tram Supplier can demonstrate by documentary evidence were already existing and owned by, or licensed to, the Tram Supplier prior to the Effective Date including, without limitation, any asset management system and/or works programming system operated by the Tram Supplier which is not comprised within the Project IPR; and

(b) any modifications or developments of any of the Intellectual Property Rights referred to in paragraph (a) above which are generic in nature;

"**Tram Supplier Party**" means any contractors, agents, sub-contractors, professional advisors or consultants engaged by the Tram Supplier to perform, facilitate or assist with the performance of any of the Tram Works and any of its or their sub-contractors of any tier and its or their directors, officers, employees and workmen in relation to the Project and "**Tram Supplier Parties**" shall be construed accordingly;

"**Tram Supplier's Proposals**" means the proposals set out in Schedule 23 (Tram Supplier's Proposals) and which in addition shall include all features on the Tram mock-up produced and approved pursuant to Clause 23 (*Mock-Up*);

"**Tram Supplier's Representative**" means the Tram Supplier's Project Manager or such other person as may from time to time be notified in writing by the Tram Supplier to the Client;

"**Tram Supplier Safety Management System**" has the meaning given to it in Clause 10.8.1.2;

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"**Tram Supplier Software**" means programs, the Intellectual Property Rights in which are:

(a) owned by the Tram Supplier; and

(b) used by the Tram Supplier to carry out its obligations under this Agreement;

"**Tram Supply Advance Works Agreement**" means the agreement entered into between **tie** and the Tram Supplier on 18th December 2007;

"**Tram Supply Collateral Warranty**" means a collateral warranty between **tie** and the Tram Supplier substantially in the form set out in part 3 of Schedule 1 (*Conditions Precedent*);

"**Tram Supply Novation Agreement**" means a novation agreement between a New Party, **tie** and the Tram Supplier substantially in the form set out in part 2 of Schedule 1 (*Conditions Precedent*);

"**Tram Supply Period**" means the period from the Effective Date until the expiry of the last Extended Tram Warranty Period;

"**Tram Tests**" means any of the Factory Acceptance Tests, Delivery Acceptance Tests, Site Commissioning Tests and System Integration Tests;

"**Tram Works**" means the Tram Supplier's obligations pursuant to this Agreement including the Pre Works Development Services and the supply of the Depot Equipment;

"**Transport Edinburgh Limited**" or "**TEL**" means Transport Edinburgh Limited a company incorporated under the Companies Act with registered number SC269639 and having its registered office at 55 Annandale Street, Edinburgh, EH7 4AZ;

"**Transport Scotland**" means an agency within the Scottish Executive Enterprise, Transport and Lifelong Learning Department which was established in January 2006 and having its principal office at Buchanan House, 58 Port Dundas Road, Glasgow, H4 0HF;

"**Transport Services**" means the public passenger transport services to be provided by the Operator on the Edinburgh Tram Network (or any part thereof) set out in the Operations and Performance Specification;

"**Type Test**" means any of the Factory Acceptance Type Test, Site Commissioning Type Test, System Integration Type Test, and Tram Commissioning Type Test;

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"**Utilities**" means BT, Easynet, NTL, Scottish Water, Scottish Gas Networks, Thus and their successors, permitted assignees and transferees and "Utility" shall be construed accordingly;

"**VAT**" means Value Added Tax;

"**Warranty**" shall have the meaning given to it in Clause 36.1;

"**Warranty Period**" means the Primary Tram Warranty Period, Paint and Finish Warranty Period, Fleet Defect Warranty Period and/or Extended Tram Warranty Period;

"**Works Commencement Date**" means the date on which the Tram Supplier has been notified by the Client that all of the Commencement Conditions Precedent and Works Conditions Precedent (if any) have been satisfied or waived; and

"**Works Conditions Precedent**" shall mean any Commencement Conditions Precedent that the Client has notified the Tram Supplier may be treated as Works Conditions Precedent.

1.2 In this Agreement, except where the context otherwise requires:

1.2.1 words importing gender include masculine, feminine and neuter;

1.2.2 the singular includes the plural and vice versa;

1.2.3 a reference to any part, Clause, sub-Clause, Schedule or appendix is, except where it is expressly stated to the contrary, a reference to such part, Clause or sub-Clause of or Schedule or appendix to this Agreement;

1.2.4 a reference in any Schedule or appendix to any part, paragraph or sub- paragraph is, except where it is expressly stated to the contrary, a reference to such part, paragraph or sub-paragraph of that Schedule or appendix (as the case may be);

1.2.5 any reference to this Agreement or to any other document shall include any variation, amendment, or supplement to this Agreement or such other document expressly permitted under the terms of this Agreement;

1.2.6 any reference to any enactment, draft enactment, order, regulation or other similar instrument (including any EU instrument) (whether specifically named or not) shall be construed as a reference to the enactment, order, regulation or instrument as amended, replaced, consolidated or re-enacted and shall include any orders, regulations, legally binding codes of practice or subordinate legislation (within the meaning of section 21(1) of the Interpretation Act 1978) made thereunder;

1.2.7 references to any items being "in the agreed form" means such items have been initialled by or on behalf of each of the Parties for the purpose of identification;

1.2.8 a reference to a person includes individuals, firms, partnerships, bodies corporate, joint ventures, government departments and any organisation capable of suing or being sued and references to any of the same include the others and their successors and assignees and transferees;

1.2.9 headings and the contents list are for convenience of reference only and do not affect the interpretation of this Agreement;

1.2.10 the ejusdem generis rule does not apply and the meaning of general words is not to be restricted by any particular examples preceding or following those general words;

1.2.11 a reference to a time of day is a reference to the time in Edinburgh;

1.2.12 subject to the restrictions imposed by this Agreement on sub-contracting, an obligation to do something includes an obligation to procure it to be done;

1.2.13 an obligation not to do something includes an obligation not to wilfully allow it to be done; and

1.2.14 the word "including" means "including without limitation".

1.3 This Agreement shall be interpreted and construed as a whole provided that in the event of any inconsistency or conflict between the main body of this Agreement and/or the Schedules and/or the appendices, then:

1.3.1 the main body shall prevail to the extent of any such conflict or inconsistency over the Schedules and appendices; and

1.3.2 the Schedules shall prevail to the extent of any such conflict or inconsistency between the Schedules and appendices.

2. CONDITIONS PRECEDENT

2.1 The Client may by notice in writing to the Tram Supplier waive satisfaction of any or all of the Conditions Precedent.

2.2 The Client may by notice in writing to the Tram Supplier confirm that any of the Commencement Conditions Precedent can be treated as Works Conditions Precedent.

2.3 On the date that each of the Commencement Conditions Precedent (with the exception of any Commencement Conditions Precedent that have been expressly waived by the Client in writing) have in the Client's opinion (acting reasonably) been satisfied, the Client shall notify the Tram Supplier of the same.

2.4 On the date that each of the Works Conditions Precedent (if any) (with the exception of any Works Conditions Precedent that have been expressly waived by the Client in writing) have in the Client's opinion (acting reasonably) been satisfied, the Client shall notify the Tram Supplier of the same.

2.5 The Tram Supplier shall use its reasonable endeavours to satisfy or procure the satisfaction of the Conditions Precedent as soon as reasonably possible after the Effective Date.

3. EFFECTIVE DATE, COMMENCEMENT DATE AND WORKS COMMENCEMENT DATE

3.1 With the exception of:

3.1.1 the provisions of Clauses 1 (*Definitions and Interpretation*), 2 (*Conditions Precedent*), 3 (*Effective Date, Commencement Date and Works Commencement Date*), 4 (*Term of this Agreement*), 40 (*Required Insurances*), 41 (*Liability, Indemnities, Retention and Liquidated Damages*), 51 (*Copyright and Intellectual Property*), 52 (*Confidential Information*), 64 (*Dispute Resolution*), 65 (*Derogations*), 66 (*Variations to be in Writing*), 67 (*Waiver and Cumulative Remedies*), 68 (*Notices*), 69 (*Assignation, Changes in Legal Status, Changes in Control and Sub-Contracting*), 70 (*Conflict of Interest*), 71 (*Security Interests*), 72 (*Data Protection*), 73 (*Entire Agreement*), 74 (*Consent and Approval*), 75 (*Discrimination*), 76 (*Further Assurance*), 77 (*Applicable Law*), 78 (*No Partnership or Agency*), 79 (*Invalid Terms*) and 80 (*Third Party Rights*) of this Agreement, which shall take effect on the Effective Date; and

3.1.2 the provisions of Clauses 7 (*General Obligations*) (but in respect of the Pre- Works Development Services only), Clause 11 (*General Warranties*), 12 (*Consents*) (with the exception of Clause 12.7 which shall already have taken effect), 13 (*Client's Representative*), 14 (*Tram Supplier's Representative*), 15 (*Design Development*), 18 (*Personnel*), 19 (*Approvals and Consents*), 20 (*Changes*), 23 (*Mock Up*), 24 (*Audit and Inspection*), 25 (*Quality Assurance*), 38 (*Price and Payment*), 39 (*VAT*), 43 (*Mitigation*), 45 (*Tram Supplier Delays*), 55 (*Tram Supplier Default Termination*) to 63 (*Effect of Termination or Expiry*) of this Agreement, which shall take effect on the Commencement Date,

the obligations of the parties under this Agreement shall be conditional upon the occurrence of the Works Commencement Date.

3.2 This Agreement shall terminate automatically on a date 12 months after the Effective Date or, if later, 6 months after the execution of the Infraco Contract (or on such later date as may be agreed in writing between the Parties) if the Commencement Date has not arisen on or before such date, in which event:

3.2.1 all provisions of this Agreement (other than the provisions of Clauses 1 (*Definitions and Interpretation*), 2 (*Conditions Precedent*), 3 (*Effective Date, Commencement Date and Works Commencement Date*), 4 (*Term of the Agreement*), 41 (*Liability, Indemnities, Retention and Liquidated Damages*), 51 (*Copyright and Intellectual Property*), 52 (*Confidential Information*), 64 (*Dispute Resolution*), 66 (*Variations to be in Writing*), 68 (*Notices*), 73 (*Entire Agreement*), 77 (*Applicable Law*), 78 (*No Partnership or Agency*), 79 (*Invalid Terms*), 80 (*Third Party Rights*)) shall cease to have effect; and

3.2.2 such termination shall be without prejudice to any accrued rights or obligations as at that date.

4. TERM OF THE AGREEMENT

4.1 Subject to Clause 3 (*Effective Date, Commencement Date and Works Commencement Date*) and 4.2, this Agreement shall commence on the Effective Date and shall continue unless terminated earlier in accordance with its terms, until the expiry of the Tram Supply Period ("**Expiry Date**").

4.2 Unless terminated earlier in accordance with its terms, this Agreement shall continue in full force and effect until the expiry of a period of 30 years from the Tram Maintenance Commencement Date only in respect of the rights and obligations of the Tram Supplier and the Client pursuant to Clauses 34.3, 34.4 and 34.6 and all other provisions of this Agreement necessary to give effect to such Clauses.

4.3 Clause 62.1 shall not apply on the expiry of the Tram Supply Period or the Spare Parts Period.

5. NOVATION

5.1 Unless waived by the Client in accordance with Clause 2.1, it is one of the conditions precedent to the occurrence of the Works Commencement Date that the Tram Supplier shall, if required by **tie**, enter into and execute:

5.1.1 a Tram Supply Novation Agreement in the form set out in part 3 of Schedule 1 (*Conditions Precedent*);

5.1.2 a Tram Supply Collateral Warranty in the form set out in part 3 of Schedule 1 (*Conditions Precedent)*; and

5.1.3 a Novation Agreement Escrow Letter in the form set out in part 3 of Schedule 1 (*Conditions Precedent)*;

5.2 Subject to Clause 5.3, prior to the Tram Supply Novation Agreement coming into effect pursuant to the terms of the Novation Agreement Escrow Letter, the provisions of this Agreement and any associated documentation are subject to any amendment reasonably required by **tie** upon obtaining the Tram Supplier's written agreement, such agreement not to be unreasonably withheld, to reflect the terms of any agreement reached by **tie** with any new party to this Agreement

5.3 Any amendment to this Agreement required pursuant to Clause 5.2 shall be made on a No Net Gain No Net Loss Basis.

6. COMMENCEMENT OF TRAM WORKS

6.1 The Tram Supplier shall on the Works Commencement Date immediately commence manufacturing and supplying the Trams in accordance with the terms of this Agreement.

7. GENERAL OBLIGATIONS

7.1 Notwithstanding the specific responsibilities set out in Clause 7.2, the Tram Supplier warrants to the Client that in carrying out and completing the Tram Works it has exercised and shall continue to exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent professional contractor experienced in carrying out works and services of a similar nature to the Tram Works in connection with projects of a similar scope and complexity. The Tram Supplier acknowledges that the Client will rely upon the skill, care and diligence of the Tram Supplier in connection with all matters for which the Tram Supplier is responsible under this Agreement.

7.2 The Tram Supplier shall:

7.2.1 carry out the Tram Works and design, manufacture, engineer, supply, test, commission, deliver and provide 27 Trams, Depot Equipment and, if required, any Additional Trams, and otherwise perform its obligations under this Agreement:

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7.2.1.1 so as to ensure compliance with the Tram Employer's Requirements;

7.2.1.2 so as to ensure compliance with the Tram Supplier's Proposals;

7.2.1.3 in accordance with part 1 of Schedule 4 (*Programme*);

7.2.1.4 in accordance with the Project Quality Assurance Programme;

7.2.1.5 so as to ensure that all parts, components, systems, devices, equipment, software and mechanisms incorporated in the Trams are fit for purpose to comply with the Tram Employer's Requirements, compatible and interoperable with each other;

7.2.1.6 using Good Industry Practice;

7.2.1.7 in compliance with all applicable Laws and Consents;

7.2.1.8 in a manner which does not infringe the Intellectual Property Rights of any third party;

7.2.1.9 in a manner which does not infringe the instructions issued to it by the Client or its authorised representatives or assignees (provided that the identity of such persons is notified to the Tram Supplier in advance in writing) and/or the Tram Inspector in accordance with the terms of this Agreement;

7.2.1.10 so as to ensure that in relation to each Tram, that it meets the Required Standards and each Tram shall (without prejudice to the Client's other rights and remedies under this Agreement) be deemed to have achieved the Required Standards upon receipt of a certificate ("**Tram Commissioning Certificate**"); and

7.2.1.11 so as to ensure that it obtains all Pre-Operational Consents;

7.2.1.12 in accordance with the Code of Construction Practice, so far as it is applicable;

7.2.1.13 in accordance with the Code of Maintenance Practice, so far as it is applicable;

7.2.1.14 in accordance with relevant environmental regulations and requirements in Scotland; and

7.2.1.15 in accordance with **tie** and CEC Policies;

7.2.1.16 so as to ensure compliance with the Tram Legislation;

7.2.1.17 so as to assist **tie** in relation to providing information that best value (pursuant to the Local Government (Scotland) Act 1973 as amended by the Local Government in Scotland Act 2003) has been secured in respect of the carrying out of the Tram Works;

7.2.1.18 in such manner as not wilfully to detract from the image and reputation of **tie**, Transport Edinburgh Limited, CEC, the Scottish Ministers, Transport Scotland, the Edinburgh Tram Network and the Client;

7.2.1.19 so as to ensure that sustainability is considered and discussed with the Client in relation to energy consumption and the supply of materials from sustainable sources in respect of the manufacture and operation of the Trams;

7.2.1.20 in a manner that is not likely to be injurious to persons or property; and

7.2.1.21 using the Key Personnel.

7.2.2 provide such support, assistance and co-operation to the Client Parties in relation to the Project as the Client may reasonably request from time to time;

7.2.3 keep the Client's Representative and the Tram Inspector fully informed updated and apprised of all relevant developments in relation to the development, manufacturing, supply and testing of the Trams in a timely manner;

7.2.4 maintain the Trams until the Tram Maintenance Commencement Date so that they at all times comply with the Tram Employer's Requirements;

7.2.5 handover maintenance of the Trams to the Tram Maintainer in accordance with Clause 42 (*Maintenance Handover*); and

7.2.6 comply with the Construction (Design and Management) Regulations 2007 in so far as they are applicable to the discharge of the Tram Supplier's obligations under this Agreement, comply with the health and safety plan, the instructions of the Client's CDM coordinator in its activities on site and provide relevant information required by the Client's CDM coordinator within 20 Business Days of such request.

7.3 The Tram Supplier undertakes that the Tram Supplier's Proposals and Trams, Tram Related Equipment and any materials supplied shall meet the Tram Employer's Requirements.

7.4 The Tram Supplier shall, unless agreed otherwise by the Client in writing, assemble the Trams in Zaragoza, Beasain and Irun ("**Factory**"). The Client shall not unreasonably withhold its consent to a request from the Tram Supplier that it assembles the Trams in a location other than the Factory if the reason for such request is the occurrence of a serious event at the premises in the Factory which prevents the Trams from being assembled in the Factory.

7.5 The Tram Supplier shall promptly provide such information, assistance and expertise as any of the Client Parties may reasonably request to meet their respective obligations in respect of the Project.

7.6 The commencement or continuance of any proceedings pursuant to the Dispute Resolution Procedure shall not:

7.6.1 relieve the Tram Supplier from performing its obligations; or

7.6.2 suspend in whole or in part the Tram Supplier's obligations, under or in relation to this Agreement.

7.7 The Tram Supplier shall at all times keep itself fully informed about current professional and technical standards and about all matters relating to, or which might have a bearing on, the carrying out of the Tram Works.

7.8 The Tram Supplier's duties and obligations under or pursuant to this Agreement will not be released, diminished or in any other way affected by any independent inquiry into any matter which may be made or carried out by the Client or **tie** or by any firm, company or party on the Client or **tie's** behalf nor by any action or omission of any such firm, company or party whether or not such action or omission might give rise to any independent liability of such firm, company or party to the Client or **tie**.

7.9 The Tram Supplier is deemed to have satisfied itself that it fully understands the scope and extent of the requirements in respect of its obligations pursuant to this Agreement, and that it has sufficient information (including the Background Information) or will at the relevant time have sufficient information, to enable it to carry out its obligations pursuant to this Agreement. In connection with such information the Tram Supplier is deemed to have satisfied itself that it has or will have satisfied itself that it is accurate and complete before placing reliance upon it.

Liaison

7.10 The Tram Supplier shall (and shall procure that the Tram Supplier Parties) liaise with the Client, any Client Party, **tie**, any **tie** Party, the Operator and any other parties as may reasonably be required by the Client or **tie** to facilitate the production, by such persons, of any information required from them, in order that the carrying out of the Tram Works and its other obligations under this Agreement can be progressed according to the Tram Manufacturing and Delivery Programme. The Tram Supplier shall (and shall procure that the Tram Supplier Parties) liaise with the Client, any Client Party **tie**, any **tie** Party, the Operator, and any other parties as may be reasonably required by the Client or **tie** as often as is necessary in order to ensure that the Tram Works are carried out properly and in accordance with the terms of this Agreement.

7.11 The Tram Supplier shall (and shall procure that the Tram Supplier Parties shall) liaise with the Client, any Client Party, **tie**, any **tie** Party, the Operator and any other parties as may reasonably be required by the Client or **tie** and shall provide such information as may be reasonably requested by such persons in relation to the design, construction, testing, commissioning, integration, operation and maintenance of the Edinburgh Tram Network to the extent that such information is available to the Tram Supplier, and does not constitute Tram Supplier IPR.

Prohibited Materials

7.12 The Tram Supplier undertakes and warrants to the Client that at the date of contract award it has not specified for use and shall not specify for use and shall ensure that there shall not be used in relation to the Trams, any materials which at the time of specification or use (as the case may be):

7.12.1 are known to be deleterious in the particular circumstances in which they are specified to be used (either to health and safety or to the durability of the Trams); or

7.12.2 contravene any relevant standard or code of practice issued from time to time by the BSI Group or under a European directive relating to standards; or

7.12.3 do not accord with the guidelines contained in the edition of the publication "Good Practice in Selection of Construction Materials" (Ove Arup & Partners) current at the date of specification or use; or

7.12.4 contravene Good Industry Practice.

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7.13 The Tram Supplier confirms that it has studied in detail the Employer's Requirements and each document comprised therein and has satisfied itself that no discrepancies or errors exist within the Employer's Requirements or between the Employer's Requirements and the Tram Supplier's Proposals, Trams and/or Tram Documentation and in relation to the Background Information in relation to this Agreement it has satisfied itself as to the veracity, accuracy, reasonableness, scope, materiality, currency (where applicable) and completeness of such Background Information, this comparison is limited to the scope of supply of the Tram Supplier and not to the Edinburgh Tram Network in its entirety. The Tram Supplier acknowledges that it accepts all risks arising from any discrepancies, errors or omissions that subsequently appear within or between such documents and that it shall not be entitled to make any claim against the Client for an extension of time, additional payment, any relief or otherwise in respect of any such errors, discrepancies or omissions. Where there is such discrepancy or error, the Tram Supplier shall as soon as reasonably practicable, and in any event within 5 Business Days, provide the Client with proposals for resolving such discrepancy or error which comply with this Agreement. Unless, within 10 Business Days of receipt by the Client of the Tram Supplier's proposals for resolving such discrepancy or error, the Client notifies the Tram Supplier requiring it to resolve the error, discrepancy or omission in a different manner (which manner shall be binding but shall be reasonable in time and cost having regard to the Employer's Requirements), the Tram Supplier shall resolve the discrepancy in the manner proposed by it.

7.14 The Tram Supplier shall not deliver to the Client, if **tie** novates this Agreement to Infraco, information relating to manufacturing, calculations and detailed design of its trams. Tram Supplier shall however put such information into escrow in accordance with the Escrow Agreement and where required by **tie** release information to the Tram Inspector on a confidential basis.

7.15 The Tram Supplier acknowledges that the Client has supplied to it a copy of the Infraco Contract as at the Effective Date.

7A. EQUIVALENT PROJECT RELIEF

7A.1 Raising EPR Claims

7A.1.1 In the event that the Tram Supplier reasonably considers it has an entitlement to an EPR Claim, then (except to the extent that the Tram Supplier's entitlement arises out of a breach of this Agreement by the Client which has not been caused or contributed to a corresponding breach by **tie**) the Tram Supplier shall notify the Client's Representative of the details as are reasonably required by the Client to evidence such

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EPR Claim so as to enable the Client to meet its requirements in relation to the Client Claim.

7A.1.2 Provided that details of the EPR Claim are supplied in accordance with the relevant provisions of this Agreement and so as to enable the Client to meet its requirements in relation to the Client Claim the Client shall, following the appropriate procedure under the Infraco Contract, pursue or defend such EPR Claim with **tie** diligently, expeditiously and treating such claim as if the EPR Claim was its own. The Client shall identify the EPR Claim as separate from any claim the Client has under the Infraco Contract unless it can demonstrate to the reasonable satisfaction of the Tram Supplier that it is not reasonably practicable to do so.

7A.2 Processing EPR Claims

7A.2.1 In relation to any EPR Claims the Client shall

7A.2.1.1 keep the Tram Supplier fully informed as to the progress of such EPR Claims and, if requested by the Tram Supplier and, at the cost of the Tram Supplier, provide copies of all documentation relating to the same;

7A.2.1.2 act in good faith and shall not bring the good name of the Tram Supplier into disrepute;

7A.2.1.3 not act (or omit to act) in such a manner as would result in a breach of this Agreement;

7A.2.1.4 not act (or omit to act) in a manner which threatens the continuance of the Infraco Contract; and

7A.2.1.5 procure that **tie** shall consult with the Tram Supplier and that the Tram Supplier has the right to consult with **tie**, in relation to the EPR Claim.

7A.2.2 The Client shall notify and consult with the Tram Supplier in relation to: (i) **tie**'s and the Client's proposals to resolve the Client Claim to which the EPR Claim relates; and (ii) in the event that it is not reasonably practicable to identify the EPR Claim as separate pursuant to Clause 7A.1.2, the proportion of the Client Claim which is properly and reasonably attributable to the EPR Claim. The Tram Supplier agrees that the EPR Claim shall not the exceed any relief, entitlement and/or additional payment agreed or determine in relation to the Client Claim.

7A.2.3 The Client shall not resolve any Client Claim under the Infraco Contract to which an EPR Claim relates without the prior written consent of the Tram Supplier, which consent shall not be unreasonably withheld or delayed. If such consent is unreasonably withheld or if the Tram Supplier has not responded to any request for consent within ten (10) Business Days, the Tram Supplier shall be deemed to have consented to such resolution, agreement, withdrawal, compromise or settlement as proposed to the Tram Supplier by the Client.

7A.2.4 Should the Tram Supplier consent to the resolution of the Client Claim as notified to it by the Client pursuant to Clause 7A.2.2, then the provisions of Clause 7A.4 (*Agreement, Certification and Payment*) shall apply.

7A.3 Dispute Resolution Procedure

7A.3.1 Should the Client or **tie** raise a dispute under the Infraco Contract in relation to an EPR Claim or the Tram Supplier does not consent to the resolution of the Client Claim or, in the event that it is not reasonably practicable to identify the EPR Claim as separate pursuant to Clause 7A.1.2, the proportion of the Client Claim which is properly and reasonably attributable to the EPR Claim in the manner notified to it by the Client pursuant to 7A.2.2, then:

7A.3.1.1 the Tram Supplier shall be entitled to invoke the Dispute Resolution Procedure under this Agreement if not already invoked;

7A.3.1.2 the Client shall, at the request of the Tram Supplier, invoke the Dispute Resolution Procedure under the Infraco Contract; and

7A.3.1.3 the Client shall, at the request of Tram Supplier, invoke the Related Disputes mechanism contained at paragraphs 55 to 57 of Schedule 13 (Dispute Resolution Procedure) under this Agreement and procure that **tie** invokes the Related Disputes mechanism contained in Schedule Part 9 (*Dispute Resolution Procedure*) of the Infraco Contract.

7A.3.2 The Parties agree that should there be a resolution of the Client Claim or, in the event that it is not reasonably practicable to identify the EPR Claim as separate pursuant to Clause 7A.1.2, the proportion of the Client Claim which is properly and reasonably attributable to the EPR Claim following Clause 7A.3.1:

7A.3.2.1 where such resolution was achieved following the Internal Resolution Procedure or Mediation (as described in the Dispute Resolution Procedure),

then the Tram Supplier and the Client shall, and the Client shall procure that **tie** shall, be responsible for its own costs in relation to this Clause 7A (*Equivalent Project Relief*);

7A.3.2.2 where such resolution was achieved following the Adjudication procedure (as described in the Dispute Resolution Procedure), then the Tram Supplier and the Client shall, and the Client shall procure that **tie,** shall submit to the decision of the adjudicator in respect of allocation of costs; and

7A.3.2.3 where it is agreed, as part of the Internal Resolution Procedure immediately prior to the matter proceeding to "Adjudication" (as described in paragraphs 10 and 11 of the Dispute Resolution Procedure), by **tie**, the Tram Supplier and the Client that the Client's sole involvement in the Client Claim is in performing administrative functions in relation to the Client Claim, and not as an interested or affected party, then the Client shall be entitled to recover all its costs incurred, such Client costs shall be minimised as far as reasonably practicable in relation to this Clause 7A (*Tramco Equivalent Project Relief*) and payment of the Client costs shall be the responsibility of **tie** or payment shared as allocated between **tie** and the Tram Supplier by the adjudicator following the "Adjudication" procedure (as described in paragraph 48.2 in the Dispute Resolution Procedure).

7A.4 Agreement, Certification and Payment

7A.4.1 The Client shall resolve the Client Claim under the Infraco Contract:

7A.4.1.1 where consent has been given or is deemed to have been given pursuant to Clause 7A.2.3, in the manner notified to the Tram Supplier under Clause 7A.2.2; or

7A.4.1.2 where there has been a resolution following Clause 7A.3.1, as directed by such outcome following Clause 7A.3.1.

7A.4.2 The Client's Representative shall certify such amount or extension of time as is resolved following Clause 7A.4.1 in respect of the EPR Claim to the Tram Supplier within ten (10) Business Days of such sum or extension of time being resolved.

7A.4.3 Upon certification by the Client's Representative pursuant to Clause 7A.4.2, the Client shall make payment to the Tram Supplier in accordance with Clause 38 (*Price and Payment*) following the date upon which entitlement to payment in respect of the

relevant Client Claim arises under there Infraco Contract, or grant the extension of time to the Tram Supplier.

7A.4.4 Upon certification in accordance with Clause 7A.4.2 the Tram Supplier expressly, unconditionally and irrevocably waives and abandons all its rights to recover from the Client relief, entitlement and/or additional payment greater than such certified amount or extension of time in respect of the specific circumstances giving rise thereto.

7A.5 No Tramco Equivalent Project Relief on Termination

7A.5.1 For the avoidance of doubt the provisions of this Clause 7A (*Equivalent Project Relief*) shall not apply to the calculation of compensation on termination payments pursuant to this Agreement.

7B. NOTICES, CONSENTS, APPROVALS, CERTIFICATES AND DETERMINATIONS

7B.1 In so far as the Client is obliged to act reasonably under this Agreement it will be deemed to have acted reasonably where it is acting on the request, instruction, opinion or other act of **tie** under the Infraco Contract and **tie** has acted reasonably in giving such request, instruction, opinion or other act.

7B.2 In the event the Tram Supplier, acting reasonably, does not consider that the Client has acted reasonably, the Tram Supplier shall be entitled to invoke the dispute resolution procedure under Clause 7A.3.

7C. TRAM SUPPLY ADVANCE WORKS AGREEMENT

7C.1 On the Commencement Date, all work performed by the Tram Supplier under the Tram Supply Advance Works Agreement shall be deemed to have been performed under the Tram Supply Agreement and the Tram Supply Advance Works Agreement shall terminate.

8. PROJECT PARTNERING

8.1 The Parties agree to work in mutual co-operation to fulfil their agreed roles and responsibilities and apply their expertise to carry out and complete the Tram Works in accordance with this Agreement.

8.2 The Client and the Tram Supplier shall procure that each Client Party and each Tram Supplier Party (as appropriate) shall work in accordance with the principles set out in Clause 8.1.

8.3 Subject to Clause 8.4, each Party ("**First Party**") undertakes to co-operate with the other ("**Second Party**") in order to facilitate the performance of this Agreement and in particular the First Party shall:

8.3.1 approach all Permitted Variations on a collaborative and Open Book Basis;

8.3.2 use reasonable endeavours to avoid unnecessary complaints, disputes and claims against or with the Second Party;

8.3.3 comply with the provisions of the Dispute Resolution Procedure in relation to any such complaints, disputes and claims with or against the Second Party;

8.3.4 not interfere with the rights of the Second Party in performing its obligations under this Agreement, nor in any other way hinder or prevent the Second Party from performing those obligations or from enjoying the benefits of its rights;

8.3.5 take reasonable steps to mitigate any foreseeable losses and liabilities of the Second Party which are likely to arise out of any failure by the First Party to take any of the steps referred to in Clauses 8.3.2 to 8.3.4 (inclusive); and

8.3.6 take all reasonable steps to manage, minimise and mitigate all costs.

8.4 Nothing in Clause 8.3 shall:

8.4.1 interfere with the right of each of the Parties to arrange its affairs in whatever manner it considers fit (in compliance with Law) in order to exercise its rights and perform its obligations under this Agreement (in compliance with Law); or

8.4.2 relieve either Party from any obligation contained in this Agreement or from any obligation to pay any debt due and payable under this Agreement.

8.5 Senior representatives from the Parties shall meet on a quarterly basis (or as may be otherwise agreed by the Parties) to review:

8.5.1 any matter which has adversely affected or may adversely affect:

8.5.1.1 the completion of the Tram Works;

8.5.1.2 the performance and presentation of the Edinburgh Tram Network;

8.5.1.3 the functioning of the City of Edinburgh (including other modes of transport) and the people of Edinburgh, because of the carrying out of the Tram Works;

and/or

8.5.1.4 the Tram Supplier's ability to perform its obligations in terms of this Agreement; and

8.5.2 any proposal from either Party to:

8.5.2.1 minimise costs; and/or

8.5.2.2 optimise the performance and quality of the Edinburgh Tram Network.

8.6 Either Party may propose measures to address the matters set out in Clause 8.5.1 and a determination of what measures (if any) should be undertaken by the Tram Supplier and/or the Client to address such matters shall be considered in accordance with and subject to each Party's existing rights, obligations and the existing contractual mechanisms under this Agreement including but not restricted to the rights, obligations and contractual mechanisms set out in Clause 47 *(Relief Events)*, Clause 49 *(Compensation Events)*, Clause 20 *(Changes)* and Clause 48 *(Qualifying Changes in Law)*.

8.7 Any proposal from either Party in terms of Clause 8.5.2 shall be reviewed in accordance with Clause 20 *(Changes)*.

8.8 As required by the Client, the Tram Supplier shall procure the attendance of any of the Tram Supplier Parties at the meetings described in Clause 8.5.

9. SUPPORT FOR SYSTEM INTEGRATION

9.1 The Tram Supplier shall cooperate with the Client (in any way the Client acting reasonably may request, but for the avoidance of doubt additional Works not included in the scope of this Agreement shall be at the cost of the Client) in ensuring that the following key elements of the system integration of the Tram Works with the Edinburgh Tram Network are implemented, including:

9.1.1 determination of the sub-system performance requirements and to demonstrate by calculation that when such sub-systems are integrated they shall achieve the Edinburgh Tram Network System Availability Targets set out in Schedule 2 *(Employer's Requirements)* (including the Operations Performance Specification)

9.1.2 management of technical interfaces as set out in the Tram Employer's Requirements and as developed by the Client from time to time including issues such as electro-

magnetic compatibility, noise, vibration and wheel/rail interface ensuring that each and every material issue arising is satisfactorily closed out;

9.1.3 test management cooperation including input to the preparation of method statements, test scripts, the setting of pass/fail criteria and analysis in so far as the tests relate to the Trams;

9.1.4 alignment of operations and maintenance procedures to ensure they form a whole and safe system of work in so far as they relate to the maintenance of the Trams;

9.1.5 cooperation over system activation;

9.1.6 safety assurances and the Case for Safety; and

9.1.7 preparation and updating of a requirements traceability matrix which shall have the ability to trace the requirements of the Tram Works and/or the Tram Requirements Specification and Tram Employer's Requirements through the design process, the testing procedures and the operation of the Edinburgh Tram Network in so far as it relates to the Trams.

9.2 The Tram Supplier shall cooperate with the Client in ensuring that the delivery and commissioning of the Trams is fully integrated with the rest of the Edinburgh Tram Network but for the avoidance of doubt additional works not included in the scope of this Agreement shall be at the cost of the Client.

9.3 The Tram Supplier shall carry out all of the system integration activities described in the Tram Interface Specification.

9.4 The Tram Supplier shall liaise with the Operator and the Client as instructed by the Client in relation to:

9.4.1 system operation and related design issues;

9.4.2 the Systems Acceptance Tests; and

9.4.3 operational defects.

9.5 The Tram Supplier shall cooperate with the Client in ensuring that all elements of the design (which are relevant to the carrying out of the Tram Works) relative to the Edinburgh Tram Network are compatible with system integration and the Tram Supplier shall make qualified

personnel available to support effective system integration, acting reasonably and within its scope of supply.

9.6 The Tram Supplier shall be responsible for managing the configuration control of the modification status of the Trams. Specifically, but not exclusively controlling the introduction of software changes and hardware modifications through version control and providing documentation detailing the operational implications (if any) of the modifications, a minimum of 5 Business Days before their planned introduction.

9.7 The Tram Supplier shall co-operate and provide all information reasonably requested by the Client relating to the Tram Works so as to enable the Client to discharge its obligations under the Employer's Requirements including the provision of all information referred to in the Tram Interface Specification.

9.8 The Client shall, in relation to the tram interface and Depot, give adequate consideration to any issues relating to interface with the tram or tram maintenance raised in writing by the Tram Supplier and shall ensure that **tie** is informed in writing of any such issues raised.

10. INTERFACE WITH THE OPERATOR

Design Input and Technical Requirements

10.1 In accordance with Schedule 9 (*Review Procedure*), the Tram Supplier shall take account of any comments made by the Client or **tie** in relation to operational issues when refining the Tram Maintenance Plan, standards, procedures and safety documentation in accordance with Schedule 2 (*Employer's Requirements*) and when supporting system integration in accordance with Clause 9 (*Support for System Integration*). The Tram Supplier shall comment on functional and maintainability issues to the Client during the design and construction process, seeking to optimise the whole life asset cost of the Tram. These comments shall be delivered to **tie**, the Operator and the Client.

Operation and Maintenance Procedures

10.2 The Tram Supplier acknowledges that the Operator shall be responsible for Operator Maintenance of the Edinburgh Tram Network and in relation to such maintenance, the Tram Supplier shall at all times liaise with the Operator in its performance of the responsibilities set out in the Operator Maintenance Plan and co-ordinate such performance with the carrying out of the Tram Works. The Tram Supplier and the Client agree to work in mutual cooperation to allow the Operator to perform such maintenance in accordance with the terms of the Operator

Maintenance Plan with a view to ensuring that the Edinburgh Tram Network as a whole and each part of it are continuously available for the provision of Transport Services.

10.3 As directed by the Client, the Tram Supplier shall accept and act upon reasonable instructions from the Operator in respect of specific contractual rights including safety management, possession co-ordination and maintenance interaction. Should these instructions be likely to impede or delay the execution of works by the Tram Supplier then the Operator shall be required to confirm them in writing to the Tram Supplier. In so far as the written instructions do not arise from an act or omission under this Agreement or procedures by the Tram Supplier the Tram Supplier shall not be liable for such non-execution or delay and penalties shall not be applied. If the instructions or actions require the addition of works or duties or deliveries not included in the scope of this Agreement, the Tram Supplier shall be entitled to claim reasonable, substantiated economic compensation for such works from the Client in accordance with Clause 49 (*Compensation Events*). The Client shall remain bound by such written instructions and/or actions issued by the Operator pursuant to this sub-clause until such time as they are rescinded.

10.4 The Tram Supplier shall work together with the Operator with the continual objective that the Tram Works be delivered in accordance with the Tram Employer's Requirements. The Tram Supplier:

10.4.1 shall respond promptly and in compliance with the timing commitments set out in this Agreement to any notification by the Operator that there is a requirement for Tram Works of which the Operator becomes aware, and shall give the Client a copy of any said notification which is received;

10.4.2 shall promptly notify the Operator, **tie** and the Client of any requirement for Operator Maintenance of which the Tram Supplier becomes aware;

10.4.3 shall co-operate with the Operator in relation to the planning and execution of the Tram Works; and

10.4.4 shall co-operate with the Operator in relation to any aspect of the Tram Employer's Requirements where relevant to the Tram Supplier's scope of supply.

10.5 If, at any time after the Commencement Date, it appears likely to the Tram Supplier that any planned works or activities to be carried out by the Tram Supplier or Tram Maintainer will necessitate interruption to or restriction of the Transport Services on the Edinburgh Tram Network, the Tram Supplier (as appropriate) shall:

10.5.1 notify the Client, **tie** and the Operator not less than 30 days prior to such planned works or activities, and take all reasonable steps to support the Operator in notifying passengers as soon as reasonably practicable in advance of the carrying out of such planned works or activities, of the nature of such work and the likely disruption or restriction of the Transport Services; and

10.5.2 take all steps, where required by the Client, which are reasonably practicable to minimise the adverse consequences of such works or activities to passengers.

10.6 In the event of any unplanned works or activities to be carried out by the Tram Supplier as a result of a system failure, breakdown or an emergency, the Tram Supplier shall:

10.6.1 notify the Client and the Operator as soon as possible of the nature of such works or activities and the likely disruption to the Trams; and

10.6.2 take all steps which are reasonably practicable to minimise the adverse consequences of such works and activities to passengers. The Tram Supplier shall take such steps that shall include support to the Operator or the Client as the case may be.

10.7 Where the Tram Supplier has been notified by the Client of any proposed variation under the DPOFA which in the Client's opinion (acting reasonably) may materially affect the Tram Supplier's performance of its obligations or the exercise of its rights under this Agreement, the Tram Supplier shall respond with comments within 10 Business Days of being notified by the Client of any such proposed variation under DPOFA. Failure by the Tram Supplier to respond as stipulated in this Clause shall be a bar to any claim for relief or compensation under this Agreement.

10.8 The Tram Supplier shall provide a permanent representative for the Project Safety and Certification Committee ("**PSCC**") who shall be responsible for the Tram Supplier's mandatory participation in and technical contribution to the PSCC's output and the discharge of its responsibilities.

10.8.1 The Tram Supplier's obligations shall encompass as a minimum:

10.8.1.1 participation on a compulsory basis in all liaison meetings with HMRI, the Independent Competent Person and the Emergency Services;

10.8.1.2 the development and implementation of a safety management system (the "**Tram Supplier Safety Management System**") which shall address without limitation:

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(a) Tram Supplier staff competency and its continual assessment;

(b) training on all safety related issues;

(c) safety procedures;

(d) record keeping and audit;

(e) certification of materials and equipment;

(f) frequency and mode of audit by the Tram Supplier of the Tram Supplier Safety Management System;

(g) incident response and management; and

(h) continual improvement and best practice.

10.9 The Client, **tie** and the Operator shall be entitled to review the Tram Supplier's Safety Management System (and its implementation) at any time upon notice which is appropriate in the circumstances and in any case within no more than 3 days notice. For the avoidance of doubt, **tie**, the Client and the Operator shall be entitled to immediate access upon the occurrence of an incident which potentially involves the safe functioning of the Tram on the Edinburgh Tram Network.

10.10 It shall be the responsibility of the Tram Supplier to undertake and complete verification, through agreed procedure, of the safety and service readiness of the Tram or Trams prior to use for testing and commissioning and to certify this status to the Client, **tie** and to the Operator in an agreed form.

10.11 In the event that the Operator can demonstrate to the Tram Supplier that the Tram or Trams are not ready for testing and commissioning, the Tram Supplier shall notify the Client and **tie,** and the Tram Supplier shall rectify any deficiency in accordance with this Agreement which is preventing the commencement of testing and commissioning in accordance with this Agreement.

10.12 The Tram Supplier shall liaise effectively with the Client, **tie** and the Operator in co-ordination of health and safety issues at the Depot in accordance with the Depot Sub-Licence.

10.13 Following the Service Commencement Date, the day-to-day operation of the Edinburgh Tram Network shall be the responsibility of the Operator. For the purpose of operating and maintaining the Edinburgh Tram Network and to enable the efficient operation of the

Edinburgh Tram Network, the Tram Supplier shall provide technical advice free of charge to the Client, the Operator and **tie** regarding the operational deployment and integration of the various components of the Tram and any other information regarding their design, construction, standards, integration, operation and maintenance which the Infraco, the Operator and/or **tie** may reasonably request.

Facilities and Access

10.14 The Tram Supplier shall at all times provide to the Operator, **tie** and the Client such access to the site, and the places where the Tram Works are being performed, during the performance of the Tram Works as the Operator may reasonably require and in accordance with Clause 10.15, provided that such access shall not disrupt or interfere with the performance by the Tram Supplier or any Tram Supplier Party of the Tram Works and the Client shall, and shall procure that the Operator shall, during any period when it or they have access to the site or the Tram Works, comply with all rules and regulations applicable to working at those premises for the safety of persons and convenience of the public.

10.15 The Tram Supplier acknowledges that the Operator, **tie** and the Client will require access to the site, and the places where the Tram Works are being performed in order to prepare for the operation of the Edinburgh Tram Network from the Service Commencement Date. The Tram Supplier agrees that it will co-operate with the Operator, **tie** and the Client and plan to avoid any interference with mobilisation by the Operator.

10.16 The Client agrees that where any damage is caused to the Tram Works by the Operator or by **tie**, the repair of such damage shall not be part of the Tram Supplier's obligations under this Agreement but where the Client requires the Tram Supplier to repair such damage, it will issue a Client Notice of Change in respect of such repair works.

10.17 The Client shall at all times provide to the Tram Supplier access to the site and the places where the Tram Works or Tram Maintenance Services require to be performed. The Tram Supplier acknowledges that such access may not be exclusive and the Tram Supplier and the Client shall co-ordinate with each other in relation to the provision of access. For clarity, such access includes timeous access to the Depot.

System Acceptance

10.18 The Tram Supplier shall ensure that at all times it works closely and effectively with the Operator in the performance of both the Operator and the Tram Supplier's obligations pursuant

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to the Systems Acceptance Tests and the associated obligations on testing and commissioning set out in Schedule 2 (*Employer's Requirements*).

Partnering

10.19 The Tram Supplier shall use reasonable endeavours to work collaboratively with the Operator at all times in order to:

10.19.1 maximise productivity during the Tram Works and minimise disruption for the public and third parties;

10.19.2 ensure the effective discharge of the Tram Supplier's obligation to support system integration in accordance with Clause 9 (*Support for System Integration*);

10.19.3 maintain the highest standards achievable with regard to the provision of the Tram Works;

10.19.4 minimise and give best advance notice to one another and to the Client and **tie** of any interruption to Tram Works caused by any Tram Supplier Default, maintenance (planned or unplanned) or third party incident;

10.19.5 safeguard proper performance of the Tram Works and all obligations under this Agreement; and

10.19.6 mutually support adherence to the Client's Programme and all related timelines and programmes and to share with the Client, **tie** and the Operator on a systematic basis, Deliverables and key information connected with such adherence.

Nuisance

10.20 The Tram Supplier shall at all times seek to minimise any nuisance or inconvenience to or interference with the business or operations of the owners, tenants or occupiers of premises in the locality of the Depot, to TEL's bus operations and to the public generally, including measures to reduce the nuisance from noise, dust, smell, fumes and vibration during the carrying out of the Tram Works. The Tram Supplier shall comply with the requirements of the Code of Maintenance Practice in this regard.

11. GENERAL WARRANTIES

11.1 The Tram Supplier represents and warrants to the Client that:

11.1.1 none of the Tram Supplier, or any officer, agent or employee of the Tram Supplier or any Affiliate of the Tram Supplier has committed a Prohibited Act;

11.1.2 all factual information in relation to the Trams which has been given by the Tram Supplier or any of its respective officers, employees, agents or Affiliates in the Tram Supplier's Proposals or in any written response to subsequent written requests or enquiries by the Client was when given and remains as at the Effective Date, true and accurate in all material respects and all projections, estimates and statements of belief in the Tram Supplier's Proposals or such responses have been prepared with due care and attention and there is no fact or matter known to the Tram Supplier and not already disclosed in writing to the Client's Representative which renders any such information untrue, inaccurate or misleading or might, if disclosed, adversely affect the decision of anyone considering whether or not to contract with the Tram Supplier;

11.1.3 it:

11.1.3.1 is duly incorporated under the law of Spain and has the power to own its own assets and carry on its own business; and

11.1.3.2 has full power and authority to enter into and perform this Agreement which constitutes a binding obligation on the Tram Supplier in accordance with its terms;

11.1.3.3 the Tram Supplier will not, by performing its obligations under this Agreement, be in breach of any undertaking, agreement or legal obligation of any nature in respect of any third party or of any applicable Law so as to have a material adverse effect on its ability to discharge its obligations under this Agreement;

11.1.4 the Tram Supplier is not involved in any dispute with HM Revenue and Customs or any other fiscal or regulatory authority in any jurisdiction concerning any matter which could affect the business of the Tram Supplier or its ability to perform the Tram Works in any way;

11.1.5 the Tram Supplier's Proposals or responses to subsequent enquiries by the Client or any Client Party relating to the manner in which the Tram Supplier proposes to perform the Tram Works does not involve the use of any designs, materials, know how, trademark, business name, or processes which represent or would represent a breach of any Intellectual Property Rights belonging to any third party, or a breach of

any duties of confidentiality owed to, any third party, or otherwise infringe the legal rights of any third party;

11.1.6 no act has been committed or event or circumstance occurred in respect of the Tram Supplier which constitutes a Tram Supplier Default as at the Effective Date and no circumstances are known which make it likely that such a Tram Supplier Default will occur during the Term;

11.1.7 no litigation, arbitration or proceedings are in progress or, to the best of the knowledge and belief of the Tram Supplier, are pending or threatened, against it or any of its assets which might have an adverse effect on the ability of the Tram Supplier to observe and perform the Tram Works;

11.1.8 the performance of the Tram Works does not create any situation in which a conflict of interest arises for the Tram Supplier;

11.1.9 the Tram Supplier does not use any processes and is not engaged in any activities which involve the misuse of any confidential or proprietary information belonging to any third party;

11.1.10 the Tram Supplier's provision of any Deliverables and the use by the Client of any of the Deliverables provided to it as part of the Tram Works has not infringed and shall not infringe any third party's Intellectual Property Rights; and

11.1.11 there has been no material adverse change to the financial condition of the Tram Supplier since the audited accounts for the financial year 2007 including any matter resulting in a downgrade of the Tram Supplier's credit rating with any commercially acknowledged independent rating agency reporting the transportation sector.

11.2 Each of the warranties and representations set out in Clause 11.1 shall be construed as a separate and independent warranty and (save where expressly provided to the contrary) shall not be limited or restricted by reference to or inference from any other terms of this Agreement.

11.3 The Tram Supplier hereby undertakes with the Client that it will as soon as reasonably practicable (and in any event within 3 Business Days) disclose in writing to the Client any event or circumstance which may arise or become known to it after the date of this Agreement which is materially inconsistent with any of the warranties or representations set out in this Clause 11 (*General Warranties*) or which has or is likely to have an adverse effect on the Project.

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11.4 The warranties and representations set out in Clause 11.1 shall be deemed to be repeated by the Tram Supplier as at the Commencement Date and thereafter on the Works Commencement Date and each date on which a Milestone Payment is made.

11.5 Neither **tie** nor the Client gives any warranty or undertaking or makes any representation as to the completeness, currency, accuracy or fitness for any purpose of any of the Background Information and, subject to Clause 41.5, neither the Client, **tie** nor any Client Party or any of their respective members or advisers nor any of their employees shall be liable to any party to this Agreement in contract, delict (including negligence or breach of statutory duty), or otherwise as a result of:

11.5.1 any inaccuracy, error, defect, omission, unfitness for any purpose or inadequacy of any kind whatsoever in the Background Information; and/or

11.5.2 any failure to make available to the Tram Supplier or any of the Tram Supplier Parties any materials, documents, drawings, plans or other information relating to the Project,

provided that nothing in this Clause 11.5 shall exclude any liability in respect of any statements made or information provided fraudulently.

12. CONSENTS

12.1 The Tram Supplier shall (at its own cost and expense):

12.1.1 obtain and maintain in effect all Consents which may be required for the performance of the Tram Works and/or pursuant to this Agreement from time to time; and

12.1.2 implement each Consent within the period of its validity and in accordance with its terms.

12.2 The Tram Supplier shall provide copies of such Consents to the Client's Representative.

12.3 Acknowledgement by the Client of the photocopies of Consents provided to them pursuant to Clause 12.2 shall not in any way affect the Tram Supplier's obligations or relieve the Tram Supplier from its obligations pursuant to this Clause 12 (*Consents*) or otherwise.

12.4 Where **tie**'s or the Client's or the Operator's authorisation or completion of documentation in respect of compliance with any Law or the obtaining of any Consent may be required, the Tram Supplier shall furnish the relevant documentation to **tie** or the Client or the Operator (as the case may be) and, where possible, permit **tie** or the Client or the Operator a period of 10 Business Days to authorise or complete it.

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12.5 The Client shall endeavour to assist the Tram Supplier with applications for Consents which it is required to obtain under this Agreement for the performance of the Tram Works where the Client considers, in its sole discretion, that such assistance would facilitate the Tram Supplier in obtaining any Consents. Such assistance shall in no way affect the principle set down in Clause 12.1 that it is the Tram Supplier's obligation to obtain, maintain and implement the Consents required by this Agreement. Subject to Clause 41.3, the Client shall not incur any liability whatsoever to the Tram Supplier in connection with its actions pursuant to this Clause 12.5.

12.6 The Tram Supplier shall keep the Client's Representative and the Tram Inspector informed about its programme for seeking Consents and its progress in obtaining Consents and, within 5 Business Days of a Consent being granted or refused, supply to the Client's Representative and the Tram Inspector a copy of such Consent or refusal.

12.7 For the avoidance of doubt, where it is necessary, in order to achieve the Tram Manufacturing and Delivery Programme for applications for Consents to be made before the Works Commencement Date, such applications shall be prepared and submitted in accordance with the applicable rules and procedures before the Works Commencement Date, within the timescales and to the extent necessary to meet the Tram Manufacturing and Delivery Programme.

12.8 The Tram Supplier shall provide such information and assistance as the Client may reasonably request to assist the Client in obtaining, maintaining in effect and implementing all other consents which may be required for the purposes of the Project.

13. CLIENT'S REPRESENTATIVE

13.1 The Client's Representative shall:

13.1.1 exercise the functions and powers of the Client in relation to the Project which are identified in this Agreement as functions and powers to be carried out by the Client's Representative;

13.1.2 exercise such other functions and powers of the Client under this Agreement as the Client may notify in writing to the Tram Supplier from time to time; and

13.1.3 be the primary point of contact for the Tram Supplier with the Client,

and the Tram Supplier shall observe, and shall procure that any Tram Supplier Parties observe, all reasonable instructions of the Client and the Client's Representative given in accordance

with this Agreement. The Tram Supplier shall not, and shall procure that any Tram Supplier Parties shall not, act upon any instruction from any other party unless confirmed by the Client or the Client's Representative in writing. If the Tram Supplier or any Tram Supplier Parties shall receive any instructions from any other parties, the Tram Supplier shall notify the Client or the Client's Representative immediately.

13.2 The Client's Representative shall be entitled at any time, by notice in writing to the Tram Supplier, to authorise any other persons to exercise the functions and powers of the Client delegated to him, either generally or specifically. Until further notice from the Client, any act of any such person shall, for the purposes of this Agreement, constitute an act of the Client's Representative and all references to "the Client's Representative" in this Agreement (apart from Clause 13 (*Client's Representative*)) shall be taken as references to such person so far as they concern matters within the scope of such person's authority.

13.3 The Client may by notice in writing to the Tram Supplier change the identity of the Client's Representative. Such change shall have effect on the date specified in written notice.

13.4 During any period when a Client's Representative has not been appointed (or when the Client's Representative is unable through illness, incapacity or any other reason whatsoever to carry out or exercise his functions under this Agreement), the Client shall carry out the functions which would otherwise be performed by the Client's Representative.

13.5 No decision, act or omission of the Client, or the Client's Representative shall, except as otherwise expressly provided in this Agreement:

13.5.1 in any way relieve or absolve the Tram Supplier from, modify, or act as a waiver or personal bar of, any liability, responsibility, obligation or duty under this Agreement;

13.5.2 in the absence of an express written instruction or authorisation issued by the Client under Clause 20 (*Changes*), constitute or authorise a variation; or

13.5.3 be construed as restricting or binding the Client in any way save with regard to the specific project matters to which it relates.

13.6 The Tram Supplier shall be entitled to treat all instructions and directions of the Client's Representative in respect of any functions and powers of the Client which have been delegated to the Client's Representative in accordance with Clause 13.1 as those of the Client provided always that such instructions or directions of the Client's Representative are in writing, are not in conflict with and is consistent with this Clause 13 (*Client's Representative*) and the other provisions of this Agreement or any other express instructions or directions of the Client, and

the Tram Supplier shall not be required to determine whether an express authority has in fact been given. The Tram Supplier shall, as soon as reasonably practicable, bring to the attention of the Client any instructions or directions that are given to the Tram Supplier that are ambiguous or in conflict or inconsistent, and the Client will verify such instructions in writing.

13.7 If for any reason the Client's Representative considers it necessary to give any instructions or directions orally, then, provided that the Client confirms such instruction or direction in writing within five Business Days, such oral instruction or direction shall be deemed to be an express instruction or direction of the Client.

13.8 Notwithstanding any other provision of this Agreement, the Tram Supplier shall not accept instruction from any party other that the Client and shall on receipt of any such instruction inform the Client of the same.

14. TRAM SUPPLIER'S REPRESENTATIVE

14.1 The Tram Supplier shall appoint a Tram Supplier's Representative who shall:

14.1.1 act as the principal point of contact for the Client, and the Client's Representative in relation to all matters related to this Agreement;

14.1.2 have full authority to act on behalf of the Tram Supplier for all purposes of this Agreement, and the Client and the Client's Representative shall be entitled to treat all instructions and directions of the Tram Supplier Representative as those of the Tram Supplier;

14.1.3 manage and co-ordinate the provision of the Tram Works by the Tram Supplier (and any Tram Supplier Party) and the integration of provision of the Tram Works with the tasks being performed by the Client's internal team and the other advisers appointed by the Client and/or **tie** (where such tasks have been notified to the Tram Supplier); and

14.1.4 liaise with the Client's Representative in relation to various matters including the scope of the Tram Works to be carried out from time to time.

14.2 The Tram Supplier may by written notice to the Client change the identity of the Tram Supplier's Representative. Where the Tram Supplier wishes to do so, it shall by written notice to the Client propose a substitute for approval, taking account of the need for liaison and continuity in respect of the provision of the Tram Works and the Tram Manufacturing and

Delivery Programme when the change is proposed. Such substitute shall be subject to the prior written approval of the Client (not to be unreasonably withheld or delayed).

14.3 The Tram Supplier shall also nominate a deputy to the Tram Supplier's Representative. During any period when the Tram Supplier's Representative is unable through illness, incapacity, annual leave or any other reason whatsoever to carry out or exercise his functions under this Agreement, such deputy shall carry out the functions which would otherwise be performed by the Tram Supplier's Representative.

15. DESIGN DEVELOPMENT

15.1 The Tram Supplier shall develop and finalise the Deliverables in accordance with this Agreement, and the Client shall be entitled to review the Deliverables (which shall include any amendment to any submitted item) in accordance with Schedule 9 (*Review Procedure*).

15.2 The Tram Supplier shall submit the design of any changes and any other Deliverables associated with any Permitted Variations to the Client's Representative for review pursuant to Schedule 9 (*Review Procedure*).

15.3 The Tram Supplier shall allow the Client's Representative, at any reasonable time, a reasonable opportunity to view any Deliverable at any stage of development, and this opportunity shall be made available to the Client's Representative as soon as reasonably practicable following receipt of any written request from the Client's Representative. Where electronic versions of the Deliverables are available, the Tram Supplier shall upload such Deliverables (including any drawings comprised within the Deliverables) on the extranet established and maintained by the Client as soon as practicable.

15.4 The Tram Supplier shall provide the Deliverables in accordance with the Deliverables Programme set out in part 5 of Schedule 4 (*Programme*).

15.5 During the preparation of the Deliverables, the Client and/or the Client's Representative shall at its discretion but acting reasonably be entitled to call for a meeting to discuss the development of any Deliverable, and the Tram Supplier shall give due consideration to any comments made by the Client or the Client's Representative at any such meetings. As soon as reasonably practicable following any such meeting, the Tram Supplier will prepare and circulate to those attending the meeting, a report listing the Deliverables discussed and any comments made at such meeting.

15.6 If it should be found that the Deliverables do not fulfil the requirements of this Agreement or the needs of any Approval Bodies, the Tram Supplier shall at its own expense amend the

Deliverable. Such amendment shall be made in accordance with Schedule 9 (*Review Procedure*) and such amendment and rectification shall ensure that the Deliverable shall satisfy the requirements of this Agreement and any Approval Bodies.

15.7 The Tram Supplier shall provide the Client with all Deliverables in accordance with the terms of this Agreement and where no timescale for provision of such Deliverables is specified in the Deliverables Programme, such Deliverables shall be provided to the Client as soon as reasonably practicable. The Tram Supplier shall provide to the Client three copies of the agreed Deliverables in hard copy form and one copy in an agreed soft copy form (as appropriate to the format of the Deliverables).

15.8 The Tram Supplier accepts all risks arising from any conflicts, ambiguities, discrepancies, errors or omissions that subsequently appear within or between any of the Tram Requirements Specification and any of the other Deliverables, and the Tram Supplier shall not be entitled to make any claim against the Client for an extension of time, payment or otherwise in respect of any such conflicts, ambiguities, discrepancies, errors or omissions.

15.9 The Tram Supplier shall within 10 Business Days notify the Client upon becoming aware of any conflicts, ambiguities, discrepancies, errors or omissions within or between any of the Tram Requirements Specification, and any of the other Deliverables. Where there are any conflicts, ambiguities, discrepancies, errors or omissions, the Tram Supplier shall provide with any such notification its proposals for resolving such conflicts, ambiguities, discrepancies, errors or omissions in compliance with this Agreement. Such proposals could include the suggestion that no action is required. The Tram Supplier shall proceed with its proposals to resolve any such conflicts, ambiguities, discrepancies, errors or omissions as soon as reasonably practicable. If the proposal from the Tram Supplier is that no action is required or the Client does not agree with the action proposed by the Tram Supplier, the Client may notify the Tram Supplier, within 10 Business Days of the Tram Supplier's notice, to resolve any conflicts, ambiguities, discrepancies, errors or omissions in a different manner (which notification shall be binding on the Tram Supplier).

16. MEETINGS

16.1 The Tram Supplier and the Client shall procure that the Tram Supplier's Representative and the Client's Representative (respectively) attend monthly progress meetings at the Client's premises in Edinburgh or at the Tram Supplier's premises (unless agreed otherwise in writing), with **tie**, any **tie** Party, the Tram Inspector and/or any person authorised by the Tram Supplier's Representative or the Client's Representative in writing to review progress in relation to the design, manufacture, delivery, testing and/or commissioning of the Trams.

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16.2 Notwithstanding the provisions of Clause 16.1, the Client's Representative or the Tram Supplier's Representative may call a meeting at any time to review progress with the design, manufacture, delivery, testing and/or commissioning of the Trams or any other matter provided that the Representative calling such meeting gives all other Representatives at least 5 Business Days written notice of such meeting, at a location agreed between the parties.

16.3 If reasonably requested by the Client, the Tram Supplier shall attend and shall procure that the Tram Supplier's Representative, any Key Personnel and/or Tram Supplier Parties attend any meetings called by **tie**, **tie's** Representative, any **tie** Party, the Client, the Client's Representative or any other party .

16.4 Any relevant Party (including representatives of such Parties) may with the Client's Representative's prior written consent (such consent not to be unreasonably withheld or delayed) participate in a meeting called under this Agreement through the medium of one or more conference telephones or similar form of communication equipment, provided that all persons participating in the meeting are able to hear and speak to each other throughout such meeting.

16A. WORK TO BE TO SATISFACTION OF THE CLIENT

16A.1 The Tram Supplier shall complete the Tram Works in strict accordance with this Agreement to the satisfaction of Client (acting reasonably).

16A.2 The whole of the materials, Tram Related Equipment and labour to be provided by the Tram Supplier under Clause 7 (*General Obligations*) and the mode, manner and speed of construction of the Tram Works are to be in accordance with this Agreement.

16B. ERRORS AND OMISSIONS IN THE TRAM WORKS

16B.1 If during the carrying out of the Tram Works and/or where the Tram Supplier has completed the Tram Works, the Client becomes aware of any error or omission in the carrying out of the Tram Works or of any other breach of this Agreement, the Client shall notify the Tram Supplier, who shall, at its own expense and in liaison with the Client, rectify any error or omission or breach or, where this is agreed by the Client to be impracticable or undesirable, take such other agreed steps to address the error or omission.

16B.2 Any reasonable and demonstrable direct costs to the Client associated with the Client remedying any such errors or omissions or breaches shall be paid by the Tram Supplier to the Client.

16B.3 These arrangements shall in no respect diminish the Client's ability to recover damages from the Tram Supplier for direct losses incurred by the Client consequent upon the error or omission or breach in question.

16B.4 If and to the extent that the Tram Supplier fails to carry out the necessary rectification and/or other agreed steps in accordance with Clause 16B.1 to the Client's reasonable satisfaction and/or within a reasonable period of time, the Client shall be entitled to carry out such rectification and/or other agreed steps itself, or procure the carrying out by a third party of such rectification and/or other agreed steps in accordance with Good Industry Practice at the Tram Supplier's expense and shall recover any costs from the Tram Supplier as a debt.

17. TESTING AND COMMISSIONING INSPECTIONS

17.1 The Representatives or anyone authorised by them to act on their behalf, **tie**, **tie's** Representative and the Tram Inspector shall be entitled to attend and witness any and all inspections and/or tests carried out pursuant to Clauses 28 (*Pre-Delivery Inspections and Factory Acceptance Tests*), 30 (*Tram Delivery Tests and Certification*) and 31 (*Training, Commissioning, Testing and Certification*).

17.2 The Tram Supplier's Representative shall give the other Representatives, **tie** and **tie's** Representative at least 10 Business Days notice before each and every inspection or test is due to take place pursuant to Clauses 28 (*Pre-Delivery Inspections and Factory Acceptance Tests*), 30 (*Tram Delivery Tests and Certification*) and 31 (*Training, Commissioning, Testing and Certification*).

17.3 The Tram Supplier shall procure that:

17.3.1 without prejudice to Clause 24 (*Audit and Inspection*), the Representatives or anyone authorised by them to act on their behalf, **tie**, **tie's** Representative and the Tram Inspector shall have such access as is necessary at all reasonable times during normal working hours to the sites where the Trams or their components are to be designed, manufactured, tested or assembled provided that the Tram Supplier is given sufficient prior notice; and

17.3.2 at the manufacturing sites, the Tram Inspector, the Operator's representative, the Client's Representative and **tie's** Representative shall be given and shall be entitled to use such office accommodation and facilities as may reasonably be available provided that in using such office accommodation and facilities the Tram Inspector, the

Operator's representative, the Client's Representative and **tie's** Representative shall comply with the reasonable instructions of the Tram Supplier.

17.4 The Tram Supplier shall (where it has access to any site and/or premises in relation to this Agreement which are not controlled or owned by it) comply with all rules and regulations notified to it by the owner or occupier of such site or premises or otherwise applicable to it in relation to it accessing and using such site and/or premises.

17.5 All operations carried out by the Tram Supplier in performing its obligations under this Agreement in Edinburgh shall be conducted with due regard to third parties and so as to minimise noise, disturbance and/or interference with third parties.

18. PERSONNEL

18.1 The Tram Supplier shall ensure that the Key Personnel in respect of the Pre-Works Development Services are appointed on or prior to the Commencement Date and that the Key Personnel in respect of the rest of the Tram Works are appointed on or prior to the Works Commencement Date. The Tram Supplier shall obtain the prior written consent of the Client's Representative (such consent not to be unreasonably withheld or delayed) before removing or replacing any Key Personnel at any time from the Commencement Date up to the date of the issue of the Certificate of Tram Commissioning in respect of the last Tram.

18.2 The Tram Supplier acknowledges that the Key Personnel are essential to the proper performance of the Tram Supplier's obligations under this Agreement. The Tram Supplier shall ensure that the role of any Key Personnel is not vacant for any longer than 10 consecutive Business Days and shall replace any Key Personnel who leave its employment with employees with similar levels of training expertise and experience.

18.3 The Tram Supplier shall, and shall procure that its Sub-contractors shall, maintain a true and correct set of records of all transactions relating to the manufacture of the Tram or part of the Tram and make such records available at all reasonable times for inspection by the Client.

18.4 If reasonably requested by the Client, the Tram Supplier shall make available to the Client, personnel of appropriate competence, expertise and qualifications (employed either by the Tram Supplier or any relevant Sub-contractor) for the purposes of dealing with matters referred to in this Agreement. In particular the duties of such personnel shall include but not be limited to:

18.4.1 attending meetings called in accordance with Clause 16.2; and

18.4.2 providing (as reasonably requested by the Client) reports, information, advice and/or assistance in relation to matters referred to in this Agreement, including prior to and/or following any such meeting.

18.5 The Tram Supplier shall until the expiry of the Extended Tram Warranty Period render to the Client, the Tram Inspector and (at the Client's direction) any other Client Party such technical assistance and advice in relation to any Tram as such parties may at any time reasonably require at no additional charge.

18.6 The Tram Supplier shall from the expiry of the Extended Tram Warranty Period until the expiry of this Agreement render to the Client and (at the Client's direction) any other Client Party such technical assistance and advice in relation to any Tram as such parties may reasonably require charged at six hundred and twenty pounds (£620) sterling per day.

18.7 Neither party shall, during the period of this Agreement, contract or retain as an adviser or consultant, any person currently or previously employed or engaged in the previous 6 months by the other Party unless the prior written approval of the other party has been obtained.

18.8 The Tram Supplier shall (and shall procure that the Key Personnel, its staff employed in the performance of the Tram Works and the Tram Supplier Parties shall) comply with all regulatory requirements appropriate to and required for the performance of the Tram Works, **tie's** Drug and Alcohol Policy and any rules, regulations and instructions from the Client's Representative.

18.9 The Tram Supplier shall not at the Depot or at any premises from where any Tram Supplier Parties carry out the Tram Works and/or any obligations under this Agreement at any time allow the consumption of, or work under, the influence of alcoholic liquors or drugs or give, sell or barter any alcoholic liquors or drugs or permit or suffer any such gift, sale or barter to be made by any Tram Supplier Party.

18.10 The Tram Supplier shall employ or cause to be employed in and about the construction and completion of the Tram Works and in the superintendence thereof only persons who are careful, skilled and experienced in their several trades and callings. The Tram Supplier shall ensure that its supervisors and operatives who are involved in carrying out the Tram Works shall have appropriate certification, if relevant to the works they are performing.

18.11 The Client's Representative shall, acting reasonably, have the right to object to and require the Tram Supplier to remove or cause to be removed from the site of the Tram Works at the Edinburgh Tram Network any person employed thereon who mis-conducts himself in the

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performance of his duties or fails to conform with any particular provisions with regard to safety which may be set out in this Agreement or persists in any conduct which is prejudicial to safety or health, and such persons shall not be again employed upon the site of the Tram Works at Edinburgh Tram Network without the permission of Client's Representative.

18.12 Any costs incurred by the Tram Supplier in removing, or causing to be removed, a person in accordance with Clauses 18.10 and 18.11 shall be borne by the Tram Supplier.

19. APPROVALS AND CONSENTS

19.1 Wherever in this Agreement the Tram Inspector is required to make any determination or to exercise his discretion by the giving of decisions, opinions or consents or to express satisfaction or approval or otherwise take any action, the Tram Inspector shall exercise such discretion fairly and reasonably within the terms of this Agreement (save where this Agreement expressly states that he is to have absolute discretion), and having regard to all the circumstances.

19.2 No act or omission of the Tram Inspector, the Client, the Client's Representative or any of the Client Parties shall, except as otherwise expressly provided in this Agreement:

19.2.1 in any way relieve or absolve the Tram Supplier from, modify, or act as a waiver of, any liability, responsibility, obligation or duty under this Agreement; or

19.2.2 in the absence of an express order or authorisation under Clause 20 (*Changes*) constitute or authorise a Client Change.

19.3 Any approval, consent or certificate given or issued by the Client or the Tram Inspector in accordance with this Agreement shall take effect in accordance with its terms, including under Clause 23 (*Mock Up*), but shall not relieve the Tram Supplier from any liability to the Client arising out of, or connected with the performance or non-performance of the Tram Supplier's obligations under this Agreement, except that the issue of an approval, consent or certificate shall constitute discharge by the Tram Supplier of its obligation to obtain such approval, consent or certificate.

19.4 Notwithstanding any other provision of this Agreement, the Tram Supplier undertakes that it shall not accept any instructions from any third party which, if implemented would cause a variation to any term of this Agreement unless:

19.4.1 the Client has in its absolute discretion given its prior written consent to such instructions; or

19.4.2 the acceptance of instructions is required by the provisions of any applicable Law, in which case the Tram Supplier undertakes to immediately give notice to the Client of the acceptance of such instructions.

19.5 All certificates to be issued under this Agreement shall be issued in multiple with a copy being sent by the Tram Inspector to each of the Client's Representative, **tie** and the Tram Supplier's Representative.

20. CHANGES

Client Changes

20.1 Unless expressly stated in this Agreement or as may otherwise be agreed by the Parties, Client Changes shall be dealt with in accordance with this Clause 20 (*Changes*). If the Client requires a Client Change, it must serve a Client Notice of Change on the Tram Supplier.

20.2 A Client Notice of Change shall:

20.2.1 set out the proposed Client Change in sufficient detail to enable the Tram Supplier to calculate and provide an Estimate in accordance with Clause 20.4;

20.2.2 require the Tram Supplier to provide the Client within 18 days of receipt of the Client Notice of Change with an estimate in accordance with Clauses 20.4 and 20.6 ("**Estimate**") and specify whether any competitive quotes are required; and

20.2.3 set out how the Client wishes to pay or be reimbursed (as the case may be) for the proposed Client Change.

20.3 If, on receipt of the Client Notice of Change, the Tram Supplier considers (acting reasonably) that the Estimate required is too complex to be completed and returned to the Client within 18 Business Days, then the Tram Supplier shall, within 5 Business Days of receipt of such Client Notice of Change, deliver to the Client a request for a reasonable extended period of time for return of the Estimate, such extended period to be agreed by the Parties, both acting reasonably.

20.4 As soon as reasonably practicable, and in any event within 18 Business Days after having received a Client Notice of Change (or such longer period as may have been agreed by the Parties pursuant to Clause 20.3 where extensive engineering / design work is required), the Tram Supplier shall deliver to the Client the Estimate. The Estimate shall include the opinion of the Tram Supplier (acting reasonably) on:

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20.4.1 whether relief from compliance with any of its obligations under this Agreement is required during or as a result of the implementation of the proposed Client Change;

20.4.2 any impact on the performance of the Tram Works and changes required to be made to the Tram Requirements Specification;

20.4.3 any impact on the Tram Manufacturing and Delivery Programme, and any requirement for an extension of time;

20.4.4 any amendment required to this Agreement as a result of the implementation of the proposed Client Change,

20.4.5 the proposed method of delivery of the proposed Client Change;

20.4.6 proposals to mitigate the impact of the proposed Client Change;

20.4.7 any Consents, or changes to existing Consents, which are required as a result of the implementation of the Client Change;

20.4.8 any increase or decrease in any sums due to be paid to the Tram Supplier (including the value of any Milestone Payments and the scheduling of such Milestone Payments) as a result of the implementation of the proposed Client Change; and

20.4.9 any impact or likely impact on the performance of the Mobilisation Services or the Services under the Tram Maintenance Agreement (as those expressions are defined in the Tram Maintenance Agreement), any changes required to be made to the Tram Maintenance Programme and/or the Tram Maintenance Specification (as those expressions are defined in the Tram Maintenance Agreement) and any changes required to be made to any of the Tram Documentation.

20.5 The valuation of any Client Changes made in compliance with this Clause 20 (*Changes*) shall be added to or deducted from the sums due to be paid to the Tram Supplier as the case may be, and shall be ascertained by the Client by measurement and/or valuation based upon the value of the resources and labour employed thereon taking into account the type of work to be carried out, the location that such work is to be carried out and typical prices in the market for such labour and/or components to be used, so as to ensure that the measurement or valuation is at fair rates and/or prices.

20.6 The Tram Supplier shall use all reasonable endeavours to include in the Estimate evidence demonstrating that:

20.6.1 the Tram Supplier has used all reasonable endeavours to minimise (including by the use of competitive quotes where appropriate) any increase in costs and to maximise any reduction of costs;

20.6.2 the Tram Supplier has, where required by the Client and practicable, sought competitive quotes from persons other than the Tram Supplier Parties in pursuance of its obligation under Clause 20.6.1 above;

20.6.3 the Tram Supplier has investigated how to mitigate the impact of the Client Change; and

20.6.4 the proposed Client Change will, where relevant, be implemented in the most cost-effective manner, including showing, where reasonably practicable, that when any expenditure is incurred relevant Changes in Law that are foreseeable at the time of consideration of the specific Client Change and which relate to that Client Change have been taken into account by the Tram Supplier.

20.7 If the Tram Supplier does not intend to use its own resources to implement any proposed Client Change, it shall:

20.7.1 demonstrate that it is appropriate to subcontract the implementation of such Client Change; and

20.7.2 comply with Good Industry Practice with the objective of ensuring that it obtains best value for money when procuring any supplier or deliverable required in relation to the proposed Client Change.

20.8 As soon as reasonably practicable after the Client receives the Estimate, the Parties shall discuss and agree the issues set out in the Estimate. From such discussions the Client may modify the Client Notice of Change, and the Client may require the Tram Supplier to seek and evaluate competitive tenders (to the extent not already sought). In each case the Tram Supplier shall, as soon as practicable, and in any event not more than 15 Business Days after receipt of such modification, notify the Client of any consequential changes to the Estimate.

20.9 If the Parties cannot agree on the contents of the Estimate, then either Party may refer the Estimate for determination in accordance with the Dispute Resolution Procedure (unless the Client Notice of Change has already been withdrawn) provided that the Tram Supplier shall not be obliged to implement any proposed Client Change where:

20.9.1 the Client does not have the legal power or capacity to require the implementation of such proposed Client Change; or

20.9.2 implementation of such proposed Client Change would

20.9.2.1 be contrary to Law;

20.9.2.2 not be technically feasible;

20.9.2.3 substantially and materially increase the probability of a substantial non-compliance with this Agreement by the Tram Supplier; and/or

20.9.2.4 be outwith the specific competence of the Tram Supplier either in performing the activity required by the Client Change or in supervising a Tram Supplier Party to carry out the activity required by the Client Change.

20.10 As soon as reasonably practicable after the contents of the Estimate have been agreed or determined pursuant to the Dispute Resolution Procedure or where a Client Change has led to irrevocable withdrawal of a Consent, the Client shall:

20.10.1 issue a Client Change Order ; or

20.10.2 withdraw the Client Notice of Change in which case the Client shall pay to the Tram Supplier the reasonable costs incurred by the Tram Supplier in complying with this Clause 20 (*Changes*) in relation to that Client Notice of Change.

For the avoidance of doubt, the Tram Supplier shall not commence work until instructed through receipt of a Client Change Order.

20.11 If the Client does not issue a Client Change Order within 28 Business Days of the contents of the Estimate having been agreed or determined pursuant to Clause 20.10, then the Client Notice of Change shall be deemed to have been withdrawn.

20.12 Where the Parties cannot agree on the content of an Estimate, and it is deemed by the Client (acting reasonably) that the proposed Client Change is urgent and/or has a potential significant impact on the Tram Manufacturing and Delivery Programme, the Client shall, acting reasonably, determine a provisional Estimate and the Tram Supplier shall, subject to Clause 20.9, carry out the proposed Client Change in accordance with such provisional Estimate and a Client Change Order shall be deemed to have been served on the Tram Supplier by the Client. Either Party may refer the provisional Estimate for determination in accordance with the

Dispute Resolution Procedure provided that such referral shall not allow the Tram Supplier to refuse to carry out such proposed Client Change.

Restrictions on Entitlements to Relief for a Client Change

20.13 The Tram Supplier shall not be entitled to any extension of time, payment or relief in respect of any Client Change if and to the extent that the Tram Supplier is in breach of this Agreement.

20.14 If, having received instructions from the Client or the Client's Representative, the Tram Supplier considers that compliance with those instructions would amount to a Client Change, then the Tram Supplier shall comply with the instruction when it is confirmed in writing and shall within 10 Business Days of any instructions being received, notify the Client of the same, such notification to include an estimate pursuant to Clause 20.12. From the date of receipt by the Client of such Estimate, Clause 20.12 shall be deemed to apply mutatis mutandis to the work carried out by the Tram Supplier in complying with such instruction. If it is agreed by the Parties or determined pursuant to the Dispute Resolution Procedure that a Client Change would arise if the instructions were complied with (either Party being entitled to refer the matter to the Dispute Resolution Procedure if the matter has not been agreed within 10 Business Days of the estimate being received by the Client), then the Client may proceed with the instruction in accordance with this Clause 20 (*Changes*).

20.15 Any failure by the Tram Supplier to notify the Client within 10 Business Days of instructions being received that it considers that compliance with such instructions from the Client or the Client's Representative would amount to a Client Change shall constitute an acceptance by the Tram Supplier that any compliance with the Client's or the Client's Representative's instructions shall be without cost to the Client and without any entitlement to any extension of time or other relief.

20.16 Any failure by the Tram Supplier to notify the Client within 120 Business Days of becoming aware of any other matter or occurrence which could amount to a Client Change shall constitute an acceptance by the Tram Supplier that in being instructed to deal with such matter or occurrence as a Client Change, the Tram Supplier shall not be entitled to any costs, extension of time or other relief in respect of such Client Change.

Change Control Register

20.17 The Tram Supplier shall maintain a change control register which shall detail the status and give summary information on all withdrawn, potential and confirmed variations under this Agreement.

21. TRAM SUPPLIER CHANGES

21.1 Within 10 Business Days of the Tram Supplier becoming aware of the need or desirability for a variation to the Tram Works, the Tram Supplier shall notify the Client of the reasons for such variation and make proposals for the proposed variation in writing. The Client shall be free to accept or reject any proposed variation as the Client thinks fit, and the Client shall determine whether such proposal is dealt with in accordance with Clause 21.2 or Clause 21.3.

21.2 If the Client wishes to proceed with a variation proposed by the Tram Supplier, the Client shall serve a Client Notice of Change on the Tram Supplier and Clauses 20.2 to 20.17 shall be adhered to by the Client and the Tram Supplier provided that:

21.2.1 the Client may require that there be a reduction to the Tram Price if such change will result in lower costs for the Tram Supplier; or

21.2.2 in the event that the proposed Tram Supplier change is of benefit only to the Tram Supplier any anticipated increase to the costs of the Tram Supplier resulting from any change requested by the Tram Supplier pursuant to Clause 21.1, shall not result in a variation to the Tram Price.

21.3 If the Tram Supplier considers that a change could effect a saving of £20,000 (as Indexed) or more, the Tram Supplier shall propose such change in accordance with Clause 21.1 and the Tram Supplier's proposal shall be accompanied by a value engineering report which shall include:

21.3.1 a whole life cost analysis in respect of each element of (i) the Tram affected by the proposed change and/or (ii) any additional works proposed to be carried out in order to effect the proposed change;

21.3.2 option appraisals and reasoned arguments to demonstrate why any particular systems, equipment, materials and the like should be selected in preference to others for incorporation into the Tram Works, taking into account the operational life of the Tram; or

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21.3.3 the Tram Supplier's proposals for the lump sum reduction to the contract price in respect of such proposal.

The Client may accept such proposal at its entire discretion and its decision in this respect shall be final and binding. If the proposed change is accepted, the reduction to the Tram Price that is anticipated as arising as a result of such change shall be shared between the Client and the Tram Supplier on a 50:50 basis and the Tram Supplier's share (50% of the cost savings) will be applied to the corresponding payment Milestone or in a financially neutral way.

22. ADDITIONAL TRAMS

22.1 The Client may, by providing the Tram Supplier with a written notice or notices, order Additional Trams with related Spare Parts and Special Tools ("**Additional Trams Order**") from the Tram Supplier on the following terms:

22.1.1 if the Client places an Additional Trams Order or Orders for a maximum total of 4 Additional Trams before 17 months have expired from the date of execution of this Agreement, then the price for such Additional Trams Order or Orders shall be as set out in Schedule 19 (*Additional Trams*);

22.1.2 if the Client places an Additional Trams Order or Orders for a maximum total of 8 Additional Trams (including any Additional Trams ordered under Clause 22.1) after 17 months have expired from the date of execution of this Agreement, then the price and indexation mechanism for such Additional Trams Order or Orders which is set out in Schedule 19 (*Additional Trams)* shall be applied.

22.2 Any necessary changes to this Agreement arising out of any Additional Trams Orders shall be agreed by the Parties (both acting reasonably and in good faith).

23. MOCK-UP

23.1 Mock-Up

23.1.1 The Tram Supplier shall prepare a mock-up of the Tram in accordance with this Clause 23 (*Mock-Up*). The Tram Supplier has a target date for completion of the mock-up as shown in part 1 of Schedule 4 (*Tram Manufacturing and Delivery Programme*), and recognises and acknowledges the need for its participation in the process of reviewing and commenting upon the mock-up to be carried out expeditiously and regularly as the design and fabrication of the mock-up proceeds. The Client and **tie** will be invited (and will be expected) to make periodic inspections

at the premises where the mock-up is being fabricated during construction of the mock-up and, subject to the following terms of this Clause 23 (*Mock-Up*), to make comments. Upon completion of the mock-up, the Client and **tie** shall be invited to make further inspections and meetings will be held to discuss and resolve the Client's and **tie**'s comments upon the final presentation of the mock-up, provided that no new comments shall be made after the expiry of 20 Business Days from the date upon which the Tram Supplier notifies the Client and **tie** that the mock-up is complete.

23.1.2 The mock-up shall be prepared in accordance with the requirements of section 2 of the Tram Requirements Specification. The mock-up will be used to demonstrate, subject to the provisions of this Clause 23 (*Mock Up*):

23.1.2.1 compliance with the Tram Employer's Requirements;

23.1.2.2 compliance with the Rail Vehicle Accessibility Regulations 1998 (as amended from time to time) and Railway Safety Publication 2;

23.1.2.3 cab and saloon interior and external styling, livery design and provision of advertising space;

23.1.2.4 interior layout, including:

(a) seat spacing, dimensions and design;

(b) wheelchair positions;

(c) aisle widths;

(d) window arrangement;

(e) luggage racks;

(f) hand rails;

23.1.2.5 cab interior and controls layout;

23.1.2.6 passenger information displays; and

23.1.2.7 passenger emergency communication units.

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23.2 Client's rights to comment and approve

23.2.1 The Client's and/or **tie**'s rights to make comments upon and approve the mock-up shall be subject to the time limits set out in Clause 23.1 above, and to the following further provisions.

23.2.2 The Client and/or **tie** shall act reasonably in approving the mock-up, and shall not unreasonably disapprove any aspect of the design which is materially similar to that contained in the relevant drawings and colour renderings listed or described in Schedule 23 *(Tram Supplier's Proposals)*. Without prejudice to this, the Client may not require any changes in respect of the following:

23.2.2.1 overall vehicle dimensions (length, width, height);

23.2.2.2 heating, ventilation and air conditioning air distribution system;

23.2.2.3 door sizes; and

23.2.2.4 any dimension which would change the Developed Kinematic Envelope and in particular the length of the Tram nose.

The Client and/or **tie** shall not require any changes to the Trams which will prevent or make materially more difficult compliance with the Disability Discrimination Act 1995, the Rail Vehicle Accessibility Regulations 1998 (as amended), or any other Legislation.

23.2.3 The Client and/or **tie** may require reasonable changes in respect of exterior cab styling (provided due consideration has been given to the Developed Kinematic Envelope, passenger compartment, viewing angles and the like and that such changes shall not impact upon the structural design of the Tram seating arrangement, handrail location, seat selection, interior and exterior colour schemes).

23.2.4 Notwithstanding anything else in this Clause 23.2, the Client and/or **tie** may not require changes which would materially change the intent of the Employer's Requirements unless such change is instructed as a Client Change under Clause 20 (*Changes*).

23.2.5 The approval by the Client, **tie** or the Tram Inspector of the mock-up shall not in any way relieve the Tram Supplier of any of its obligations under this Agreement.

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23.3 Design finalisation and use of mock-up for display purposes

23.3.1 Upon such completion, the Tram Supplier shall incorporate the agreed design changes into the final design of the Tram, and shall make such changes to the mock-up as are required to reflect the agreed changes.

23.3.2 The Tram Supplier shall, provided it no longer reasonably requires the mock-up for the purposes of finalisation of the design of the Tram, make the mock-up available to **tie**, upon reasonable notice by **tie** to the Tram Supplier, for the purposes of display to the public at a venue in Edinburgh selected by **tie** and thereafter at a site to be jointly agreed and secured by the Parties.

24. AUDIT AND INSPECTION

24.1 The Tram Supplier shall supply such financial information relating to the Tram Supplier and its Affiliates as may from time to time be reasonably requested by the Client within 10 Business Days of such request.

24.2 In relation to the accounts of the Tram Supplier, and its Affiliates it declares that it is a Corporation traded on the Madrid Stock Market with which it is obliged to register and publish the accounting records (balance sheet, profit and loss account, etc) and refer financial and commercial information to the stock market from time to time abiding by the rules of the CNMV (Spanish National Commission of Stocks and Commercial Values) and the LSA (Spanish companies law). Thus, this financial information will be public and available for the Client.

24.3 The Tram Supplier shall promptly provide the Client and the Client Parties with all reasonable co-operation and assistance in relation to any inspection including without limitation:

24.3.1 providing all information reasonably required by the Client and/or the Client Parties for the purposes of its inspection;

24.3.2 providing a reasonable number of copies of any documents or records reasonably requested by, the Client and/or the Client Parties; and

24.3.3 complying with the Client's reasonable requests for access to personnel engaged in the Tram Supplier's performance of this Agreement. If the Client has justified suspicions that the Tram Supplier could enter into an Insolvency Event, a representative of the Financial Department of the Tram Supplier shall meet, when required by the Client at

an agreed location with the financial information that is in the Public Registered Offices in Spain and give a detailed analysis of such financial Information.

24.4 The Tram Supplier shall bear the costs of any inspection where such inspection is the consequence of or uncovers a Tram Supplier Default.

24.5 The Tram Supplier acknowledges and agrees that **tie**, CEC and certain Relevant Authorities from time to time require whether by virtue of Law, regulation or otherwise, to provide reports, returns and to carryout audits and accordingly the Tram Supplier agrees to provide assistance to the extent required by **tie**, CEC and such Relevant Authorities from time to time. Each of the parties shall bear their own costs of such information provision and/or audits.

24.6 The Client shall have the right to exercise its rights of audit and inspection set out in this Clause 24 (*Audit and Inspection*) for a period of 6 years from expiry or termination of this Agreement.

24.7 The Tram Supplier shall for at least 6 years following expiry or termination of this Agreement keep safely and in good order such technical and financial information as is necessary for the Client to carry out its rights to audit and inspect in accordance with this Clause 24 (*Audit and Inspection*).

25. QUALITY ASSURANCE

25.1 The Tram Supplier shall at all times:

25.1.1 utilise a Project Quality Assurance Programme that is compliant with EN ISO 9001:2000; and

25.1.2 comply with the Project's health and safety and environmental management requirements and policies applicable to the Edinburgh Tram Network and by Law and Legislation (as such requirements and policies are described in Schedule 2, (*Employer's Requirements)* and as may be notified by the Client to the Tram Supplier from time to time) in the performance of its obligations under this Agreement.

25.2 The Tram Supplier shall promptly rectify any non-conformities, including in the Deliverables, with the Project Quality Assurance Programme identified during the course of an assessment by the Tram Inspector or the Client or any of their appointed representatives in a timely manner.

25.3 Compliance with the Project Quality Assurance Programme shall not relieve the Tram Supplier from any of its other duties, obligations or liabilities under this Agreement.

25.4 The Tram Supplier shall appoint (or shall procure the appointment of) a quality manager as soon as reasonably practicable following the Effective Date. The identity of the quality manager (and any replacement) shall be subject to the approval of the Client's Representative (such approval not to be unreasonably withheld or delayed).

25.5 The quality manager shall:

25.5.1 ensure the effective operation of the quality systems under the Project Quality Assurance Programme;

25.5.2 audit the quality systems at regular intervals and report the findings to the Client's Representative;

25.5.3 review all quality systems at intervals agreed with the Client's Representative to ensure their continued suitability and effectiveness; and

25.5.4 liaise with the Client's Representative on all matters relating to quality management.

26. PROGRAMMING OF TRAM DESIGN, MANUFACTURE, DELIVERY, TESTING AND COMMISSIONING

The Tram Supplier shall:

26.1 undertake and programme all activities, so as to ensure the timeous delivery of Trams in accordance with the Tram Manufacturing and Delivery Programme;

26.2 at the end of each Reporting Period (or as otherwise agreed by the Parties), re-issue electronically (and if requested in paper format) the Tram Manufacturing and Delivery Programme to the Client's Representative showing the key activities completed to date against the original Tram Manufacturing and Delivery Programme incorporating:

26.2.1 an explanation of any failure to achieve any activities referred to in the Tram Manufacturing and Delivery Programme by the date or dates originally set and proposals setting out the steps taken or to be taken to meet, in so far as reasonably practicable, or otherwise to mitigate the adverse effects on the requirements of the Tram Manufacturing and Delivery Programme;

26.2.2 details of other circumstances which have or may delay manufacture or delivery of the Trams in accordance with the Tram Manufacturing and Delivery Programme and proposals setting out the steps taken or to be taken to meet, in so far as reasonably practicable, or otherwise to mitigate the adverse effects on the requirements of the Tram Manufacturing and Delivery Programme; and

26.2.3 details of any proposed changes to the Tram Manufacturing and Delivery Programme that the Tram Supplier reasonably considers necessary, such changes to be agreed, subject to Clause 27.2, in accordance with Clause 20 (*Changes*);

26.3 provide all necessary support to the Client required for the testing and commissioning of the Trams, including:

26.3.1 provision of testing managers and technicians based in Edinburgh throughout the delivery and testing of the Trams;

26.3.2 full logistic support for the despatch of urgent and routine Spare Parts required throughout the delivery and testing of the Trams;

26.3.3 provision of all documentation authors and administrative support necessary for the production and delivery to the Client of Tram Documentation.

26.3.4 promptly following request by the Client provide such further information to clarify and substantiate any information provided pursuant to Clause 26.2 and Clause 26.3; and

26.3.5 take all reasonable steps to mitigate the effects of any delay to its progress in accordance with the Tram Manufacturing and Delivery programme.

27. ACCELERATION

27.1 If for any reason which does not entitle the Tram Supplier to an extension of time, the rate of progress of the Tram Works is at any time, in the opinion of the Client's Representative, whose opinion shall be neither unreasonable nor expressed vexatiously and with the agreement of the Tram Supplier (agreement not to be unreasonably delayed or withheld), too slow to ensure substantial completion in accordance with the Tram Manufacturing and Delivery Programme, or any previously agreed revised time for completion of the Tram Works agreed under Clause 27.2, the Client's Representative shall notify the Tram Supplier in writing and the Tram Supplier shall thereupon take such steps as are necessary and to which the Client's Representative may consent to expedite the progress so as substantially to complete the Tram

Works in accordance with the Tram Manufacturing and Delivery Programme, such consent not to be unreasonably delayed or withheld. The Tram Supplier shall not be entitled to any additional payment for taking such steps. For the avoidance of doubt, any dispute arising out of this sub-clause is capable of referral through the Dispute Resolution Procedure.

27.2 Where the Client desires either:

27.2.1 a date for completion of certain of the Tram Supplier's obligations under this Agreement earlier than the date set out in the Tram Manufacturing and Delivery Programme current at the date of issue of the preliminary instruction under Clause 27.3; or

27.2.2 to have certain of the Tram Works completed by the relevant date set out in the Tram Manufacturing and Delivery Programme where, following delays or stoppage to programme for whatever reason, the Tram Works would not be so completed in the absence of any acceleration or re-sequencing arrangements; or

27.2.3 to obviate the necessity for, or to order the cancellation of, or a reduction in the length of, any extension of time being fixed under Clause 47 (*Relief Events);*

the Client's Representative may issue a preliminary instruction under Clause 27.3.

27.3 If the Client's Representative issues a preliminary instruction to the Tram Supplier to accelerate the carrying out or alter the sequence and timing of any work to be executed under the provisions of this Agreement, the Client's Representative shall, in such instruction set out the exact nature of the requirements of the Client with regard to the Tram Manufacturing and Delivery Programme as referred to in Clause 27.2 for which the preliminary instruction has been issued.

27.4 If the Tram Supplier makes a reasonable objection to such an instruction, the preliminary instruction shall either be withdrawn or so varied as to meet such objection and may then be re-issued by the Client's Representative.

27.5 As soon as reasonably practicable after receipt of the preliminary instruction (or after receipt of a preliminary instruction re-issued under Clause 27.4) the Tram Supplier shall inform the Client's Representative in writing in respect of the proposed instruction:

27.5.1 of the amount of any additional cost to which the Tram Supplier should be entitled as a result of compliance with the instruction when issued by the Client's Representative subject to Clause 27.3; or

27.5.2 that it is not reasonably practicable to state such a sum and that the cost to the Client of compliance by the Tram Supplier will therefore have to be ascertained in accordance with Clause 20 (*Changes*); and

27.5.3 of the earlier date for completion of the relevant aspect of the Tram Works and the unsequential amendment to the Tram Manufacturing and Delivery Programme; or

27.5.4 of the extent to which an extension of time that would otherwise be fixed under Clause 47 (*Relief Events*) can be cancelled or reduced and the date for completion of the relevant aspect of the Tram Works which as a result will be or become the date for completion of the activity in the Tram Manufacturing and Delivery Programme for all the purposes of this Agreement.

27.6 If on receipt of the information given to the Client's Representative under Clause 27.5 the Client wishes to pay the amount referred to in Clause 27.5.1 and to accept the new date for completion of the Tram Works stated by the Tram Supplier pursuant to Clause 27.5.3, the Client shall cause the Client's Representative to issue an instruction:

27.6.1 confirming the details of the acceleration or alteration of sequence or timing required; and

27.6.2 fixing the new date for completion of the relevant aspect of the Tram Works and the amount to which Clause 27.5.1 refers shall be included as if it were a variation.

27.7 Following any instruction under Clause 27.6 the Tram Supplier shall revise the Tram Manufacturing and Delivery Programme in accordance with the terms of Clause 26 (*Programming of Tram Design, Manufacture, Delivery, Testing and Commissioning*).

28. PRE-DELIVERY INSPECTIONS AND FACTORY ACCEPTANCE TESTS

28.1 The Tram Supplier acknowledges and agrees that **tie**, the Client and the Tram Inspector shall be involved in inspecting the Trams at various stages of the manufacturing process.

28.2 The Tram Supplier shall:

28.2.1 supply to the Client and **tie** photographs in a suitable digital format setting out each key stage of the Tram build process;

28.2.2 deliver the Trams to the delivery point designated by the Client in the Depot in accordance with the Tram Manufacturing and Delivery Programme;

28.2.3 notify the Tram Inspector and the Client's Representative of the expected delivery date not less than 30 days prior to such delivery date and provide the Tram Inspector and the Client's Representative with a quality control report before transporting any Tram to the Depot;

28.2.4 allow the Tram Inspector to inspect each Tram before it leaves the Tram Supplier's premises to be transported to the Depot; and

28.2.5 not transport a Tram to the Depot until the Tram Inspector has issued the Factory Acceptance Type Test Certificate and a Factory Acceptance Routine Test Certificate in respect of the Tram to be despatched and the Tram Supplier has confirmed with the Client that the Depot is ready to accept delivery of the Tram

28.3 The Tram Inspector shall inspect and the Tram Supplier shall provide all assistance requested by the Tram Inspector to enable it to so inspect:

28.3.1 each Tram before it is despatched to the Depot in accordance with the Factory Acceptance Routine Tests; and

28.3.2 specified Tram or Trams (identified in the Factory Acceptance Type Tests) before they are despatched to the Depot in accordance with the Factory Acceptance Type Tests.

28.4 The Factory Acceptance Type Test Certificate shall not be issued in respect of any Tram until all of the Factory Acceptance Type Tests have in the reasonable opinion of the Tram Inspector been satisfactorily completed.

28.5 A Factory Acceptance Routine Test Certificate shall not be issued in respect of any Tram until:

28.5.1 the Factory Acceptance Type Test Certificate has been issued; and

28.5.2 the Factory Acceptance Routine Tests in respect of that Tram have in the reasonable opinion of the Tram Inspector been satisfactorily completed.

28.6 If, in the reasonable opinion of the Tram Inspector, either the Factory Acceptance Routine Test and/or the Factory Acceptance Type Tests have not been satisfactorily completed, the Tram Inspector may issue a Tram Rejection Notice, identifying the Testing Failures and the Tram Supplier shall propose a rectification plan and period for rectification for agreement by the Tram Inspector (such agreement not to be unreasonably withheld or delayed).

28.7 Once the Tram Supplier has (at its own cost) rectified the failures identified in the Tram Rejection Notice in accordance with the rectification plan and within the rectification period, the Tram Supplier shall resubmit the Tram for inspection in accordance with the relevant Factory Acceptance Tests and the process set out in Clauses 28.3 to 28.7 shall continue until the Tram Inspector issues a Factory Acceptance Type Test Certificate and/or a Factory Acceptance Routine Test Certificate.

28.8 Notwithstanding any other provision of this Clause 28 (*Pre-Delivery Inspections and Factory Acceptance Tests*), once the Tram Inspector has issued a Factory Acceptance Type Test Certificate:

28.8.1 no further Factory Acceptance Type Tests shall be conducted (unless any one or more of such tests are also Factory Acceptance Routine Tests); and

28.8.2 there shall be no further requirement for the Tram Supplier to obtain a Factory Acceptance Type Test Certificate in respect of any further Tram.

29. DELIVERY

29.1 The Tram Supplier shall:

29.1.1 deliver the Trams to the point of delivery designated by the Client at the Depot;

29.1.2 use every reasonable means available to it in delivering the Trams pursuant to Clause 29.1.1, to prevent any of the roads or bridges communicating with or en route to the Depot being subjected to extraordinary traffic within the meaning of applicable legislation and specifically the Roads (Scotland) Act 1984 (as amended) by any traffic of the Tram Supplier or any Tram Supplier Party;

29.1.3 be responsible for the costs associated with the strengthening of any bridges or altering or improving any road communicating with or on route to the Depot to facilitate the movement and delivery of the Trams to the Depot;

29.1.4 be solely responsible for unloading the Trams at the point of delivery;

29.1.5 indemnify the Client and keep the Client indemnified against any and all Losses suffered or incurred by the Client arising out of or in connection with the movement and delivery of the Trams to the Depot, the unloading, loading or other removal or storage of that Tram at the point of delivery; and

29.1.6 be responsible for obtaining such export and import licences and other consents in relation to the Trams as are from time to time required and, if required by the Client will make those licences and consents available to the Client prior to the relevant shipment.

29.1.7 if, notwithstanding Clause 29.1.2, any damage occurs to any bridge or road communicating with or on the route to the Depot arising from the transport of the Trams, notify the Client's Representative as soon as the Tram Supplier becomes aware of such damage or as soon as the Tram Supplier receives any claim from the authority entitled to make such claim. For the avoidance of doubt, the Client shall not be liable for any costs charges or expenses in respect thereof in relation thereto.

29.2 In relation to all Tram delivery dates set out in the Tram Manufacturing and Delivery Programme, time shall be of the essence (save in circumstances where an extension of time is granted pursuant to the express terms of this Agreement).

30. TRAM DELIVERY TESTS AND CERTIFICATION

30.1 Tram Delivery Tests shall be conducted by the Tram Supplier on all Trams on delivery (or as soon as reasonably practicable thereafter) to the Depot and witnessed by the Tram Inspector.

30.2 The Certificate of Tram Delivery in respect of any Tram shall not be issued before:

30.2.1 all Tram Documentation has been received in accordance with the Tram Documentation Delivery Programme;

30.2.2 all of the Tram Delivery Tests in respect of that Tram have been satisfactorily completed;

30.2.3 the Tram Inspector is satisfied that the Tram conforms with the Tram Requirements Specification and all other requirements of this Agreement; and

30.2.4 in respect of the twenty seventh Certificate of Tram Delivery only, the Reliability Bond has been put in place in accordance with Clause 44 (*Bonds and Collateral Warranty*);

(together, the "**Tram Delivery Requirements**").

30.3 If the Tram fails to meet the Tram Delivery Requirements then the Tram Inspector shall issue a Tram Rejection Notice, identifying the Testing Failures and the Tram Supplier shall propose a rectification plan and period for rectification for agreement by the Tram Inspector (such

agreement not to be unreasonably withheld or delayed). Once the Tram Supplier has rectified the failures identified in the Tram Rejection Notice in accordance with the rectification plan and within the rectification period, the Tram Supplier shall resubmit the Tram to be tested in accordance with the Tram Delivery Tests and the process set out in this Clause 30 (*Tram Delivery Tests and Certification*) shall be repeated until the Tram Inspector issues a Certificate of Tram Delivery in respect of the rejected Tram.

30.4 The Tram Inspector shall have the right to require the Tram Supplier to repeat any Tram Delivery Test if:

30.4.1 the Tram Supplier has been unable to provide to the Tram Inspector such written evidence, details or other information as the Tram Inspector may reasonably require to evidence that the Tram Delivery Tests have been properly conducted and that the conditions for the issue of a Certificate of Tram Delivery set out in this Clause 30 (*Tram Delivery Tests and Certification*) are satisfied; or

30.4.2 the Tram Inspector is not reasonably satisfied that:

30.4.2.1 any part of the Tram Delivery Test has been or is being conducted properly; or

30.4.2.2 following any part of the Tram Delivery Test having been conducted, a Tram, in any respect, satisfies the conditions for the issue of such a Certificate of Tram Delivery.

31. TRAINING, COMMISSIONING, TESTING AND CERTIFICATION

31.1 The Tram Supplier, the Client, **tie** and the Operator shall within 12 months of the Commencement Date (each party acting reasonably and in good faith) agree the Training Programme and the detailed implementation of the Training Programme. The Tram Supplier shall implement the Training Programme in accordance with this Clause 31 (*Training, Commissioning, Testing and Certification*) and the terms of the Training Programme.

31.2 The Tram Supplier acknowledges that **tie** shall procure that on the date falling no later than two weeks prior to the date on which the first Tram is scheduled for delivery the Operator shall provide 4 drivers (in each case appropriately qualified) ready to commence the Training Programme and once trained participate in the Tram Delivery Tests and Tram Commissioning Tests. The Tram Supplier further acknowledges that **tie** shall procure that on the date on which the first Tram has been issued with a Certificate of Tram Delivery there are a further 2 drivers and 10 maintenance staff (in each case appropriately qualified) ready to commence the

Training Programme and, if required, once trained participate in the Tram Delivery Tests and Tram Commissioning Tests.

31.3 The Client shall procure that, for the purposes of the Tram Commissioning Tests the following are made available to the Tram Supplier:

31.3.1 the Depot (to the extent necessary for the Tram Commissioning Tests); and

31.3.2 the Test Track, power supplies and other facilities, as required to meet the Tram Manufacturing and Delivery Programme;

31.4 The Tram Supplier acknowledges that **tie** shall procure reasonable assistance from the Operator in relation to the provision of operational staff, including drivers, (subject to appropriate training by the Tram Supplier pursuant to Clause 31.2);

31.5 The Tram Supplier and the Client shall, and the Client shall procure that all other relevant Client Parties shall, observe all reasonable requirements of the Operator (as may be notified in writing by **tie** to the Client) during the carrying out of the Tram Commissioning Tests, to use reasonable endeavours to:

31.5.1 preserve health and safety;

31.5.2 protect the Trams against damage; and

31.5.3 avoid unnecessary disruption to the Operator's operations;

31.6 The Tram Supplier shall make available throughout the Tram Commissioning Tests qualified staff to:

31.6.1 conduct, supervise and record the results of all the Tram Commissioning Tests; and

31.6.2 respond to all reasonable enquiries about the condition or performance of the Trams and the major systems, sections, apparatus, equipment, components, internal seating, fixtures and fittings and devices, system configuration, modification status and software version control including all structural, electrical, hydraulic and other major components and assemblies and to rectify any failures of the same;

31.7 Subject to the provision by the Client and **tie** of the requisite operational facilities and staff:

31.7.1 the Tram Supplier shall conduct the Site Commissioning Type Tests and the Client shall conduct the System Integration Type Tests on the first Tram; and

31.7.2 the Tram Supplier shall conduct the Site Commissioning Routine Tests and the Client shall conduct the System Integration Routine Tests on every Tram.

31.8 Subject to Clause 31.12, the Certificate of Tram Commissioning in respect of a Tram shall not be issued before:

31.8.1 all Tram Documentation has been received in accordance with the Tram Documentation Delivery Programme;

31.8.2 all of the Tram Commissioning Routine Tests in respect of that Tram have been satisfactorily completed; and

31.8.3 the Tram Inspector is satisfied that the Tram is in accordance with the terms of the Tram Requirements Specification and all other requirements of this Agreement,

(together the "**Tram Commissioning Requirements**").

31.9 The Tram Inspector shall issue a certificate ("**Tram Commissioning Type Test Certificate**") when the specified number of Trams (identified in the Tram Commissioning Type Tests) in the reasonable opinion of the Tram Inspector have completed and passed the Tram commissioning type tests ("**Tram Commissioning Type Tests**") as detailed in section 23 of the Tram Employer's Requirements. Notwithstanding any other provisions of this Clause 31 (*Training, Commissioning, Testing and Certification*) no Certificate of Tram Commissioning shall be issued in respect of any Tram until the Tram Supplier has been issued with a Tram Commissioning Type Test Certificate.

31.10 If a Tram does not meet the Tram Commissioning Requirements to the reasonable satisfaction of the Tram Inspector then the Tram Inspector may issue a Tram Rejection Notice, identifying the Testing Failures and the Tram Supplier shall propose a rectification plan and period for rectification for agreement by the Tram Inspector (such agreement not to be unreasonably withheld or delayed). Once the Tram Supplier has (at its own cost) rectified the failures identified in the Tram Rejection Notice in accordance with the rectification plan and within the rectification period, the Tram Supplier shall resubmit the Tram to be commissioned in accordance with the relevant Tram Commissioning Routine Tests and/or Tram Commissioning Type Tests and the process set out in this Clause 31 (*Training, Commissioning, Testing and Certification*) shall be repeated until the Tram Inspector issues a Certificate of Tram Commissioning.

31.11 The Tram Inspector shall have the right to require the Tram Supplier to repeat any Routine Test and/or Type Test if:

31.11.1 the Tram Supplier has been unable to provide to the Tram Inspector such written evidence, details or other information as the Tram Inspector may reasonably require to evidence that the Tram Commissioning Routine Tests and/or Tram Commissioning Type Tests have been properly conducted and that the conditions for the issue of a Certificate of Tram Commissioning set out in this Clause 31 (*Training, Commissioning, Testing and Certification*) are satisfied; or

31.11.2 the Tram Inspector is not reasonably satisfied that:

31.11.2.1 any part of the Tram Commissioning Routine Test and/or Tram Commissioning Type Test has been or is being conducted properly; or

31.11.2.2 following any part of the Tram Commissioning Routine Test and/or Tram Commissioning Type Test having been conducted, a Tram, in any respect, satisfies the conditions for the issue of such a Certificate of Tram Commissioning.

31.12 Notwithstanding any other provision of this Clause 31 (*Training, Commissioning, Testing and Certification*) once the Tram Supplier has been issued with a Tram Commissioning Type Test Certificate no further Tram Commissioning Type Tests shall be conducted (unless any one or more of such Tram Commissioning Type Tests are also Tram Commissioning Routine Tests);

31.13 Following the issue of the first Certificate of Tram Commissioning, the Tram issued with such a certificate shall be weighed in accordance with part 2 of Schedule 5 (*Payments*).

31A. TRAM PAYMENT MILESTONE CERTIFICATION AND APPROVAL

31A.1 Milestones Payments are detailed in the Milestone Payment Schedule in part 1 of Schedule 5 (*Payments*) of this Agreement and:

(a) the scheduling of those associated with the physical works is shown in the Tram Manufacturing and Delivery Programme in part 1 of Schedule 4 (*Programme*).

(b) the scheduling of those associated with documentation delivery is shown in the Tram Documentation Delivery Programme in part 5 of Schedule 4 (*Programme*).

(c) the scheduling of those associated with training delivery is shown in the Tram Manufacturing and Delivery Programme in part 1 of Schedule 4 (*Programme*).

(d) the scheduling of those associated with system acceptance testing is shown in the Client's Programme; and

(e) the scheduling of those associated with depot equipment is shown in part 1 of Schedule 5 (*Payment*).

31A.2 The initial Milestone is associated with contract award and is deemed to have been achieved, and therefore application for payment due, upon the Effective Date.

31A.3 Milestones 1, 3, 4, 10 and 66 as set out in part 5 of Schedule 4 (*Programme*) of the Tram Supply Agreement will be approved by the Tram Inspector when the activities referred to are complete in accordance with the Tram Documentation Delivery Programme in part 5 of Schedule 4 and with the requirements of this Agreement. Such approval in writing shall evidence the achievement of each relevant Milestone.

31A.4 Milestones 2, 5, 6, 7, 8, 65 and 67 as set out in part 1 of Schedule 4 (*Programme*)of the Tram Supply Agreement will be approved by the Tram Inspector when the activities referred to are complete in accordance with the Tram Manufacturing and Delivery Programme in part 1 of Schedule 4 (*Programme*) and requirements of this Agreement. Such approval in writing shall evidence the achievement of each Milestone.

31A.5 The process for certification of Tram delivery and Tram commissioning and testing is as set out in Clause 30 (*Tram Delivery Tests and Certification)* which relates to Milestones Payments 9 and 11 to 64 inclusive. The issue of a Certificate of Tram Delivery and issue of a Certificate of Tram Commissioning by the Tram Inspector shall evidence the achievement of each relevant Milestone.

31A.6 Milestones 68 and 69 as set out in part 1 of Schedule 5 (*Payment*) of the Tram Supply Agreement will be approved by the Tram Inspector when the activities referred to are complete in accordance with the Tram Manufacturing and Delivery Programme in part 1 of Schedule 4 (*Programme*)and requirements of this Agreement. Such approval in writing shall evidence the achievement of each relevant Milestone.

31A.7 Milestone 70 relates to T1, for Section D (as defined in the Infraco Contract) of the Infraco Works in accordance with section 23 of the Employer's Requirements and in this regard; the Client shall provide the Tram Supplier with a copy of the written approval of successful completion of T1 issued by **tie** to the Client within 2 Business Days of its issue date. This document shall be deemed to be certification of the achievement of this Milestone.

31A.8 Milestone 71 relates to T2 (as defined in the Infraco Contract), for Phase 1a of the Edinburgh Tram Network, in accordance with section 23 of the Employer's Requirements and in this regard; the Client shall provide the Tram Supplier with a copy of the written approval of

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successful completion of Test T2 issued by **tie** to the Client within 2 Business Days of its issue date. This document shall be deemed to be certification of the achievement of this milestone.

31A.9 Milestone 72 relates to T3 (as defined in the Infraco Contract), for Phase 1a of the Edinburgh Tram Network, in accordance with section 23 of the Employer's Requirements and in this regard; the Client shall provide the Tram Supplier with a copy of the written approval of successful completion of T3 issued by **tie** to the Client within 2 Business Days of its issue date. This document shall be deemed to be certification of the achievement of this Milestone.

31A.10 In the event that the Client fails to transmit **tie's** approval within 2 Business Days, as required by Clause 31A.7 through Clause 31A.9, the certification of the achievement of the Milestone shall be deemed to be the date of **tie's** approval of the System Acceptance Tests T1, T2 and/or T3 as appropriate (T1, T2 and T3 shall have the meaning as defined in the Infraco Contract).

32. REPEATED TESTING AND COMMISSIONING FAILURES

32.1 If at any time four or more Trams have been issued with a Tram Rejection Notice then, unless the Tram Supplier can demonstrate to the reasonable satisfaction of the Client that the causes of such notices have been rectified, the Client may issue a written notice to the Tram Supplier setting out the fact that four or more Trams have been issued with a Tram Rejection Notice and requesting that the Tram Supplier submits a remedy plan in relation to such failure ("**Repeated Failure Notice**") and until such remedy plan is implemented in accordance with this Clause 32 (*Repeated Testing and Commissioning Failures*):

32.1.1 the Tram Inspector shall not issue any further Certificates of Tram Commissioning;

32.1.2 notwithstanding any other provision of this Agreement, the Client shall not be under any obligation to pay any sums due to the Tram Supplier in relation to which:

32.1.2.1 an invoice has been raised but not yet paid; or

32.1.2.2 the Tram Supplier subsequently raises an invoice;

32.1.3 the Client shall not be under any obligation to accept delivery of further Trams and the Tram Supplier shall pay Liquidated Damages where applicable in accordance with Clause 41 (*Liability, Indemnities, Retention and Liquidated Damages*).

32.2 Upon receipt of a Repeated Failure Notice, the Tram Supplier shall promptly propose a remedy plan for agreement by the Tram Inspector, the Client's Representative and **tie's**

Representative (such agreement not to be unreasonably withheld or delayed) ("**Repeated Failure Remedy Plan**").

32.3 If the Tram Inspector, the Client's Representative and **tie's** Representative agree the Repeated Failure Remedy Plan, the Tram Supplier shall promptly implement, at its own cost and expense, the Repeated Failure Remedy Plan. Provided that the Repeated Failure Remedy Plan has been implemented to the reasonable satisfaction of the Tram Inspector, the Client's Representative and **tie's** Representative:

32.3.1 the Client shall accept delivery of those Trams awaiting to be dispatched to the Depot subject to Clause 28 (*Pre-Delivery Inspections and Factory Acceptance Tests*) and in accordance with Clause 29 (*Delivery*),

32.3.2 the Client shall within 30 days pay all sums due to the Tram Supplier in respect of those invoices raised before the date of the Repeated Failure Notice (save for invoices which are the subject of genuine dispute other than pursuant to Clause 32.1.2); and

32.3.3 the Tram Inspector shall issue a Certificate of Tram Commissioning in respect of those Trams which have passed the relevant tests as a result of the Tram Supplier implementing the Repeated Failure Remedy Plan.

32.4 If the Tram Inspector, the Client's Representative and **tie's** Representative do not agree the Repeated Failure Remedy Plan, the provisions of Clauses 32.1.1 to 32.1.3 shall continue to apply until the date on which an alternative remedy plan is agreed by the Tram Inspector, the Client's Representative and **tie's** Representative (such agreement not to be unreasonably withheld or delayed) and successfully implemented by the Tram Supplier to the reasonable satisfaction of the Tram Inspector, the Client's Representative and **tie's** Representative whereupon the provisions of Clause 32.3 shall apply.

32.5 If the Tram Supplier fails to implement any agreed Repeated Failure Remedy Plan in accordance with its terms then the provisions of Clauses 32.1.1 to 32.1.3 shall continue to apply until the date on which the Tram Supplier implements such Repeated Failure Remedy Plan to the reasonable satisfaction of the Tram Inspector, the Client's Representative and **tie's** Representative whereupon the provisions of Clause 32.3 shall apply

32.6 The Tram Supplier shall not be entitled to any extensions of time to comply with any Milestone or Agreed Delivery Date, as a result of the occurrence of a failure in accordance with this Clause 32 (*Repeated Testing and Commissioning Failures*).

32.7 Any disputes which arise between the Tram Supplier and the Client's Representative shall be resolved in accordance with the Dispute Resolution Procedure.

32.8 The Client Representative, if requested by the Client, **tie** and any **tie** Party shall be entitled to attend and witness the carrying out of inspections and tests to be performed by the Tram Inspector pursuant to Clauses 28 (*Pre-Delivery Inspections and Factory Acceptance Tests*) to 32 (*Repeated Testing and Commissioning Failures*) (inclusive).

33. TRAM DOCUMENTATION

33.1 The Tram Supplier shall provide to the Client the Tram Documentation in accordance with the Tram Documentation Delivery Programme. The Tram Documentation shall be subject to approval by the Client.

33.2 The Tram Supplier shall until the expiry of the last of:

33.2.1 the Primary Tram Warranty Period in respect of all aspects of the Trams which are not Paint or Finishes or Extended Tram Warranty Parts;

33.2.2 the Paint and Finish Warranty Period in respect of the Paint and Finishes; and

33.2.3 the Extended Tram Warranty Period in respect of the Extended Tram Warranty Parts,

keep the Tram Documentation (held on all media on which such Tram Documentation has been supplied to the Client) current and up to date with (and shall promptly inform the Client of) any changes due to alterations to the Trams made, or authorised, by the Tram Supplier, availability of parts and components, identified faults in existing procedures or other relevant circumstances covered under the relevant warranty provided that the Tram Supplier shall in respect of a defect first identified during any Warranty Period, update the Tram Documentation upon a solution being found notwithstanding that the relevant Warranty Period may have elapsed. If an Identified Defect is notified to the Tram Supplier under a Warranty and is repaired by the Tram Supplier under Warranty, the Tram Supplier shall, as part of the repair process, update the Tram Documentation in relation to the Identified Defect repaired. The Tram Supplier shall update the Tram Documentation upon any changes introduced by the Tram Supplier, which arise as a result of an Client Change or which result from a Change in Law.

33.3 Without prejudice to Clause 33.2, the Tram Supplier shall as soon as reasonably practicable and in any event within 28 days of the occurrence of any relevant event referred to in this

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Clause 33.3, update the Tram Documentation (held on all media on which such Tram Documentation has been supplied to the Client):

33.3.1 if the Tram Requirements Specification is amended after a Certificate of Tram Commissioning is issued in respect of a Tram;

33.3.2 in the event that at any time during the term of this Agreement there are product wide changes to the Trams and for the purposes of this Clause 33.3.2, "product wide changes" shall mean changes made to a Tram or a component or part of a Tram as a result of a modification to a tram, component or part of a tram by the Tram Supplier that has been applied to the Trams; or

33.3.3 where reasonably requested by the Client:

33.3.3.1 during the period from the date on which the first Tram delivered is issued with a Certificate of Tram Commissioning until the date on which the last Tram to be issued with a Certificate of Tram Commissioning is issued with a Certificate of Tram Commissioning; and

33.3.3.2 once the last Tram to be issued with a Certificate of Tram Commissioning is issued with a Certificate of Tram Commissioning, during a period of no more than 9 months from the date on which such Certificate of Tram Commissioning is issued.

33.4 The Tram Supplier shall ensure that the Tram Documentation shall:

33.4.1 be complete and of good legible quality, in the English language;

33.4.2 contain all necessary drawings and all drawings shall set out:

33.4.2.1 equipment title;

33.4.2.2 unique document number;

33.4.2.3 number of pages;

33.4.2.4 revision number, date of revision and content of any revision (where applicable);

33.4.2.5 originator, checker and authorised signature; and

33.4.2.6 (where larger than A3 size) be capable of being photo reduced to A3 size

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without loss of clarity; and

33.4.3 wherever practicable, be provided both in hard copy and electronic media and all electronic media shall:

33.4.3.1 be provided in suitable Microsoft Office or Adobe Acrobat format (which shall, for the avoidance of doubt, be easily printable and electronically copiable); and

33.4.3.2 shall be delivered virus checked in accordance with Good Industry Practice.

33.5 Such of the Tram Documentation, including that Tram Documentation referred to in Clause 33.3, that relates exclusively to Software shall, as soon as reasonably practicable and in any event within 25 Business Days of the Software having been updated, be deposited by the Tram Supplier as escrow material in accordance with the Escrow Agreement. The Client shall have equivalent access rights to the material as to the Tram Documentation save only that the Client shall only have access to said escrow material in the circumstances set out in the Escrow Agreement.

34. SPARES AND SPECIAL TOOLS

34.1 The Tram Supplier shall deliver to the Client on or before the Tram Maintenance Commencement Date at the Depot:

34.1.1 the Spare Parts set out in part 4 of Schedule 2 (*Employer's Requirements*); and

34.1.2 the Special Tools set out in part 5 of Schedule 2 (*Employer's Requirements*).

34.2 The Tram Supplier shall provide to the Client as soon as reasonably practicable and in any event within 12 months of the Commencement Date a list of all first tier Sub-contractors used by or intended to be used by it to obtain, manufacture and supply Spare Parts and Special Tools. The extent of first tier Sub-contractors shall be agreed by the Client and the Tram Supplier and in reaching such agreement, the Client shall be entitled to ask the Tram Supplier for details of those Sub-contractors who are not listed.

34.3 For a period of 30 years following the Tram Maintenance Commencement Date the Tram Supplier shall (at the price and within the delivery timescales set out for each Special Tool or Spare Part in Parts 4 and 5 (respectively) of Schedule 2 (*Employer's Requirements*)) continue to make available to the Client, **tie** and/or the Tram Maintainer, Spare Parts and Special Tools as may reasonably be required to operate the Trams and maintain them.

34.4 If the Tram Supplier cannot provide a Spare Part and/or a Special Tool at the price or within the delivery timescale specified then the Client, and/or **tie** (or the Tram Maintainer acting on **tie**'s behalf) shall be entitled to use the rights granted to it pursuant to Clause 51 (*Copyright and Intellectual Property*) in relation to the relevant Spare Parts and/or Special Tools to either manufacture such Spare Part and/or Special Tool itself or appoint a third party to do so. Any dispute arising out of this Clause 34.4 shall be resolved in accordance with the Dispute Resolution Procedure.

34.5 The purchase price for the Spare Parts and Special Tools provided pursuant to Clause 34.1 shall be payable by the Client as part of the Aggregate Tram Price in accordance with the Milestone Payment Schedule. The detailed list of Spare Parts is contained in part 4 of Schedule 2 (*Employer's Requirements*), and the detailed list of Special Tools is contained in part 5 of Schedule 2 (*Employer's Requirements*).

34.6 If any Spare Part or Special Tool is reasonably considered by the Client or **tie** to be defective or otherwise fails to meet the Required Standards within two years of delivery then provided that the Client (upon becoming aware of such situation) promptly notifies the Tram Supplier in writing of that fact and either (at the cost of the Tram Supplier):

34.6.1 makes such Spare Part reasonably available for collection by the Tram Supplier; or

34.6.2 returns such Spare Part to the Tram Supplier,

the Tram Supplier shall replace or modify (as appropriate) such Spare Part or Special Tool within 30 days of the notification (or such other period as the parties may agree acting reasonably and taking into account the nature of the relevant Spare Part or Special Tool), failing which the Aggregate Tram Price shall be reduced or (if the Aggregate Tram Price has already been paid) a rebate payment made within 10 days thereafter of an amount equal to the value of such Spare Part or Special Tool.

35. RISK AND TITLE

35.1 The Tram Supplier shall supply each Tram and the Tram Related Equipment free from all Security Interests and third party rights of any nature.

35.2 The Trams supplied pursuant to this Agreement shall become the property of CEC and legal ownership shall automatically vest in CEC when:

35.2.1 a Certificate of Tram Commissioning has been issued pursuant to this Agreement and in any event within twenty four hours of the successful completion of the Tram Commissioning Test; or

35.2.2 by exception on an individual Tram basis, at the sole discretion of the Client and formalised in writing when a Tram is complete and a Factory Acceptance Test Certificate has been issued pursuant to Clause 28 (*Pre-Delivery Inspections and Factory Acceptance Tests*);

35.2.3 in relation to each item of the Tram Related Equipment delivered to CEC, on the later of delivery of each item of the Tram Related Equipment to CEC and the Certificate of Tram Commissioning being issued in respect of the first Tram;

35.2.4 where pursuant to Clause 35.2.2 prior to delivery, the property in any Tram passes to CEC, the Tram Supplier shall set the Tram aside and mark it as CEC property in a manner which is effective under Spanish law to identify CEC legal ownership.

35.3 The Tram Supplier shall permit the Client and **tie** at any time upon reasonable notice to inspect any Tram which has become the property of CEC and shall grant the Client and **tie** access for such purpose to the Tram Supplier's premises or procure the grant to the Client and **tie** of access for such purpose to any other premises where the Tram may be located.

35.4 In relation to all Trams in which legal title has vested in CEC under this Clause legal title shall be in the possession of the Tram Supplier solely for the purposes of performing its obligations following delivery (or completed manufacture) pursuant to this Agreement and shall not be within the ownership or the disposition of the Tram Supplier for any other purpose. Notwithstanding the foregoing, the Tram Supplier shall remain liable, as prescribed by this Agreement, except for theft, vandalism, collision or other damage arising outwith the Tram Supplier's control (while in use on the Edinburgh Tram Network), for the safekeeping of and the risk of loss, damage or theft of each Tram until the relevant final Certificate of Tram Commissioning has been issued pursuant to Clause 31 (*Training, Commissioning, Testing And Certification*) and likewise in the case of each item of the Tram Related Equipment.

35.5 No Interim Certificate issued by the Client shall prejudice its right to reject any Tram which is not in accordance with this Agreement. Upon any such rejection, the legal title in the rejected Tram (and the risk of loss, damage or theft) shall immediately revert to the Tram Supplier.

35.6 The Tram Supplier shall be responsible for each Tram completely manufactured or in the course of manufacture and for all Tram Related Equipment until such time as risk in the Trams and the Tram Related Equipment passes to CEC in accordance with Clause 35.4.

35.7 The Tram Supplier shall promptly replace any Tram or any part, component or material incorporated in or to be used in connection with such Tram or any Tram Related Equipment, which are lost, damaged or destroyed by whatever cause, prior to the time when risk passes to CEC in accordance with Clause 35.2.

35.8 Any materials, goods, and equipment intended to form part of the completed Trams and all Tram Related Equipment which are at any time removed, such removal to be with the written consent of the Client (such consent not to be unreasonably withheld), from the Trams or the Depot will remain the property of CEC and the Tram Supplier undertakes (and shall procure that the Tram Supplier Parties so undertake) to the extent reasonably practicable, to clearly identify such materials, goods, equipment and all Tram Related Equipment as belonging to CEC and to keep all such Parts or Tram Related Equipment stored separately from any third party's property. The location of all such Parts shall be tracked in an asset management system at all times.

35.9 To the extent reasonably practicable, the Tram Supplier shall at its own expense label or otherwise clearly identify with a unique traceable coding system at all times as being the property of CEC (effective under Spanish law) any materials, goods, and equipment forming or intended to form part of the completed Trams and all Tram Related Equipment in the Tram Supplier's or any Tram Supplier Party's possession or control in relation to which advance payment has been made and/or title has vested in CEC pursuant to this Agreement or otherwise and the Tram Supplier shall ensure that such items shall at all times in the Tram Supplier's (or any Tram Supplier Party's) possession or control be kept separate from the Tram Supplier's or any third party's goods.

36. WARRANTY REGIME

36.1 Subject to the provisions of this Clause 36 (*Warranty Regime*), the Tram Supplier warrants that:

36.1.1 each Tram shall be free from Tram Defects during the Primary Tram Warranty Period;

36.1.2 all Paint and Finishes shall be free from Paint and Finish Defects during the Paint and Finish Warranty Period;

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36.1.3 all Extended Tram Warranty Parts shall be free from Extended Tram Warranty Defects during the Extended Tram Warranty Period; and

36.1.4 the fleet of Trams shall be free from Fleet Tram Defects during the Fleet Tram Defect Period,

each a "**Warranty**" and together the "**Warranties**".

36.2 If the Client claims that there is a Tram Defect, an Extended Tram Warranty Defect, a Paint and Finish Defect and/or a Fleet Tram Defect:

36.2.1 the Client:

36.2.1.1 shall, subject to Clause 36.2.1.3 promptly send to the Tram Supplier a notice ("**Defect Notice**") detailing and identifying:

(a) the type of defect as a Tram Defect, a Fleet Tram Defect, a Paint and Finish Defect and/or an Extended Tram Warranty Defect (each an "**Identified Defect**" and together the "**Identified Defects**"); and

(b) when it expects to make the Tram available to the Tram Supplier for rectification;

36.2.1.2 shall, if it submits a Defect Notice, provide the Tram Supplier with all records reasonably requested by the Tram Supplier in writing and which are reasonably necessary to enable the Tram Supplier to carry out its obligations under Clause 36.2.2; and

36.2.1.3 may, if the Tram Supplier does not diligently investigate and rectify the Identified Defect in accordance with Clause 36.2.2, carry out the rectification work or appoint a suitably qualified and insured third party to carry out the rectification work (including giving such warranty as is appropriate without prejudice to the continuation of any Warranty) and without prejudice to its other rights and remedies recover its reasonable costs of so doing from the Tram Supplier; and

36.2.2 upon the delivery of the Defect Notice, the Tram Supplier shall:

36.2.2.1 promptly, diligently and carefully investigate and search for the cause of the Identified Defect;

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36.2.2.2 immediately notify the Client and the Tram Supplier where it appears to the Tram Supplier that the Tram is unlikely to be available for a period of more than four hours;

36.2.2.3 subject to Clause 36.4, promptly propose a rectification plan ("**Rectification Plan**") and a rectification period ("**Rectification Period**") (which may be extended by agreement of the parties) to be approved by the Client (such approval not to be unreasonably withheld or delayed); and

36.2.2.4 in accordance with the approved Rectification Plan:

(a) remedy the Identified Defect; and

(b) in respect of Fleet Tram Defects, execute all works of repair or rectification to ensure that the relevant Fleet Tram Defect is corrected and that such Fleet Tram Defect is not present in the Trams already delivered or to be delivered.

36.3 If the Tram Supplier fails to rectify an Identified Defect in accordance with Clause 36.2.2.3, the Client may itself carry out the rectification work or appoint a third party to carry out the rectification work and without prejudice to its other rights and remedies under this Agreement (including the full benefit of any Warranty under this Clause 36 (*Warranty Regime*)), recover the costs of so doing as a debt due from the Tram Supplier.

36.4 If the Client does not approve the Rectification Plan proposed by the Tram Supplier in accordance with Clause 36.2.2.3, then a Dispute shall be deemed to have occurred and the Client and the Tram Supplier shall resolve the Dispute in accordance with the Dispute Resolution Procedure, provided that before submitting to the Dispute Resolution Procedure, the Client reserves the right to appoint a qualified third party to perform or itself perform the relevant rectification work, with the party who is responsible for paying the costs of the rectification works being decided as part of the resolution of the Dispute pursuant to the Dispute Resolution Procedure.

36.5 If having rectified an Identified Defect, the Tram Supplier considers that the Client did not have the right to require it to rectify an Identified Defect under Warranty and/or it was not entitled to recover all or some of its costs incurred in rectifying an Identified Defect because:

36.5.1 the Identified Defect was in fact outside the scope of the Warranty or the Warranty Period applicable to the Identified Defect;

36.5.2 the Client did not comply in all material respects with the relevant obligations pursuant to Clause 36.2.1.2;

36.5.3 the Identified Defect was caused by the Tram Supplier or Operator respectively not maintaining or operating the Trams in accordance with the relevant parts of the Tram Documentation;

36.5.4 the infrastructure of the Edinburgh Tram Network not being maintained in accordance with Good Industry Practice;

36.5.5 there was a material change in the operating conditions (as specified in the Tram Requirements Specification and/or the Tram Employer's Requirements) of the Tram the subject of the Identified Defect;

36.5.6 an accident had occurred involving the Tram the subject of the Identified Defect (excluding those accidents which arise out of or in connection with the inadequacy of the training provided by the Tram Supplier and/or the inadequacy of the Tram Documentation or the occurrence of the Identified Defect);

36.5.7 the Identified Defect is caused by a clear act of vandalism; and/or

36.5.8 in relation to an Extended Tram Warranty Defect, such defect had been caused by modifications to the Extended Tram Warranty Part identified as defective which had not been approved by the Tram Supplier (excluding such modifications that were required by Law or by this Agreement and/or had been performed by the Tram Supplier or by a third party pursuant to Clauses 36.2.1.3 or 36.4),

then the Tram Supplier shall notify the Client of such reason and a Dispute shall be deemed to have occurred and the Tram Supplier and the Client shall resolve the Dispute in accordance with the Dispute Resolution Procedure.

36.6 If any part, component or system of a Tram is repaired, rebuilt or replaced under Warranty then it shall have applied to it the appropriate full Primary Warranty Tram Period, Extended Tram Warranty Period, Paint and Finish Warranty Period and/or Fleet Tram Defect Period (as appropriate to the repaired, rebuilt or replaced part, component or system).

36.7 Following the submission of a Defect Notice, if a Tram is taken out of service for rectification under Warranty pursuant to this Clause 36 (*Warranty Regime*), the Warranties given in respect of that Tram and all Warranties applicable to all relevant systems, section, parts, components, or equipment incorporated in or supplied with such Tram shall continue until:

36.7.1 the rectification has been completed in accordance with the approved rectification plan or has otherwise been rectified by the Client and/or its Sub-contractors;

36.7.2 any necessary consents have been obtained to enable such Tram to resume Passenger Services; and

36.7.3 the Tram has been returned to the Client for use in Passenger Services,

and thereafter for a period (in respect of each Warranty) equal to the unexpired portion of each Warranty at the date of the Defect Notice.

37. USE OF THE DEPOT

37.1 On completion of the construction of the Depot, the Tram Supplier shall enter into and execute the Depot Sub-Licence in the form set out in Schedule 3 (*Depot Sub-Licence*).

37.2 Subject to the Tram Supplier executing the Depot Sub-Licence and complying with and procuring the Tram Supplier Parties' compliance with the obligations in this Clause 37 (*Use of the Depot*) and the Depot Sub-Licence, the Tram Supplier and the Tram Supplier Parties shall have the right to access and use those parts of the Depot which the Tram Supplier and the Tram Supplier Parties properly require to so use for the purpose of carrying out the Tram Works in accordance with this Agreement.

37.3 The Tram Supplier agrees that:

37.3.1 the right to access and use the Depot granted pursuant to this Clause 37 (*Use of the Depot*) and the Depot Sub-Licence shall terminate on the earlier of the Termination Date or the Expiry Date; and

37.3.2 the Tram Supplier's and the Tram Supplier Parties' right to use such parts of the Depot shall not create any relationship of landlord and tenant.

37.4 The Client gives no warranty as to the condition or fitness for purpose of the Depot.

37.5 Subject to the exception set out in Clause 41.5, **tie** and the Client shall not be liable for the death of or injury to persons or damage to any property or for any losses, claims, demands, actions, proceedings, damages, costs or expenses or other liability incurred by the Tram Supplier and/or the Tram Supplier Parties or any person in the use of the Depot.

37.6 Nothing in this Clause 37 (*Use of the Depot*) or the Depot Sub-Licence shall restrict **tie's** and the Client's absolute right of access to any part of the Depot at any time.

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38. PRICE AND PAYMENT

Milestone Achievement

38.1 Subject to and in accordance with the remaining provisions of this Clause 38 (*Price and Payment*), the Client shall pay the Tram Supplier each Milestone Payment following the completion of the Milestone to which it relates.

38.2 Any application for payments of sums due under this Agreement and any payment to be made shall be made in accordance with the procedure set out in this Clause 38 (*Price and Payment*).

Milestone Payments

38.3 The Tram Supplier shall submit each application for payment in respect of Milestone Payments, any other fees, costs and/or expenses in respect of Permitted Variations or as otherwise agreed in accordance with this Agreement which are being claimed by the Tram Supplier for the previous Reporting Period, to the Client's Representative within 3 Business Days following each Reporting Period End Date.

38.4 Each application for payment shall:

38.4.1 set out the Milestones completed in that Reporting Period and the Milestone Payment due in respect of the same, with evidence of satisfaction of such Milestones;

38.4.2 set out any Delivery Retentions to be made, pursuant to Clause 41.21;

38.4.3 set out any Delivery Retention Repayments to be made by the Client to the Tram Supplier, pursuant to Clause 41.23 and 41.24.3;

38.4.4 set out any other agreed adjustments pursuant to a Permitted Variation; and

38.4.5 set out any other sums due to or from the Tram Supplier under and/or arising out of this Agreement in accordance with its terms,

(together with reasonable supporting documentation establishing the basis of such sums being claimed).

38.5 The Client shall procure that the Client's Representative shall, subject to any clarifications as are in the Client's opinion (acting properly and reasonably) necessary, certify by notice in writing (an "**Interim Certificate**") to the Tram Supplier that part of the sum claimed in the application for payment which is approved by the Client and give reasons why any part of the

sum claimed has not been certified and the value of the sums involved no later than 10 Business Days after the date on which application for payment was received by the Client.

38.6 The Tram Supplier shall submit a VAT invoice in respect of the amount set out in the Interim Certificate to the Client within seven days of the date of the Interim Certificate. Payment will become due to the Tram Supplier on the date of receipt of the said VAT invoice by the Client and subject to Clause 38.7 the final date for payment by the Client of such valid VAT invoice shall be twenty (20) Business Days from the date of receipt of the VAT invoice by the Client.

38.7 NOT USED.

38.8 If the Tram Supplier is late in supplying a valid VAT invoice to the Client by more than three Business Days after the required timescales set out in Clause 38.6, payment in respect of any amount certified in an Interim Certificate shall become due to the Tram Supplier on the date of receipt of the relevant valid VAT invoice by the Client in respect of the late application for payment, and the final date for payment of such valid VAT invoice to be made by the Client to the Tram Supplier shall be within twenty (20) Business Days of the first date of the Reporting Period following receipt of the late valid VAT invoice.

38.9 Set-off

38.9.1 The Tram Supplier shall not be entitled to retain or set-off any amount owed to it by the Client against any amount due to the Client by it.

38.9.2 Subject to Clause 38.9.3, the Client may deduct any amount payable by the Tram Supplier to the Client whether by way of damages or in respect of any loss or expense sustained by the Client by reason of the Tram Supplier's breach of this Agreement from any other payment or payments due to be made to the Client by the Tram Supplier under this Agreement.

38.9.3 Any notice of intention to withhold payment shall be served by the Client at least five (5) Business Days prior to the final date for payment calculated in accordance with Clause 38.6 and such notice shall state the sums being withheld and the detailed reason or detailed reasons for such withholding. Where an effective notice of intention to withhold payment is given, but on the matter being referred to the Dispute Resolution Procedure, it is decided that the whole or part of the amount should be paid, the decision shall be construed as requiring payment not later than:

38.9.3.1 five (5) Business Days from the date of the decision; or

38.9.3.2 the date which, apart from the notice, would have been the final date for payment,

whichever is the later.

38.9.4 The Tram Supplier shall be entitled to payment of interest as provided in Clause 38.14 in respect of the relevant part of any payments which have been withheld in accordance with Clause 38.9.2 but are subsequently determined as being payable by the Client to the Tram Supplier either by agreement between the Parties or a decision following a referral to the Dispute Resolution Procedure. The interest shall be calculated for the period between the date when the relevant part of the payment should have been paid but for the notice of intention to withhold payment and the date on which payment is made by the Client in accordance with Clause 38.9.3.

38.10 The Tram Supplier and the Client acknowledge that:

38.10.1 a maximum of only one application for payment may be made under this Clause 38 (*Price and Payment*) in any Reporting Period;

38.10.2 the amount to be specified for payment in any Interim Certificate in respect of a Milestone shall not exceed the amount specified in the Milestone Payment Schedule in relation to the achievement of the Milestone to which such Interim Certificate relates; and

38.10.3 notwithstanding anything to the contrary contained in this Agreement, the Client shall not be obliged to pay any Milestone Payment earlier than the date set out in the Milestone Payment Schedule.

General

38.11 Save as otherwise expressly stated in this Agreement:

38.11.1 all payments under this Agreement to the Tram Supplier shall be made in pounds sterling by electronic transfer of funds to:

Name and Address of Bank:	CITIBANK C/ Jose Ortega y Gasset, no. 29 28006 Madrid (Spain)
Swift:	CITIESMX
IBAN:	ES19 1474 0000 1200 0693 0115

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Account Number: 1474-0000-12-0006930115

Account Name: Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

38.11.2 all payments under this Agreement to the Client shall be made in pounds sterling by electronic transfer of funds to:

Name and Address of Bank:

Swift:

IBAN:

Account Number:

Account Name:

38.11.3 all payments payable by (or on behalf of) the Client under this Agreement are inclusive of:

38.11.3.1 all costs and charges whatsoever in relation to the design, manufacture, delivery, testing and commissioning of the relevant Tram or Tram Related Equipment including those costs and charges relating to repeat testing or repeat commissioning resulting from a Tram Supplier failure;

38.11.3.2 all costs and charges regarding technical advice and assistance to be given relating to the design, manufacture, delivery, testing and/or commissioning of the Trams;

38.11.3.3 all training costs and charges in accordance with the Training Schedule; and

38.11.3.4 all fees and expenses payable by the Tram Supplier arising out of or in connection with the performance by the Tram Supplier of this Agreement, including all fees and expenses:

(a) of transporting and delivering Trams and Tram Related Equipment to the Depot whether from inside or outside the UK including any relevant import duties, export duties or other similar or related charges;

(b) incurred for or in connection with applications for or the grant of any Consent;

(c) payable to professional advisers and otherwise in connection with the review, negotiation and entering into and enforcement of this Agreement and any related agreement;

(d) incurred in relation to licence applications and renewals of any kind; and

(e) incurred in procuring and maintaining relevant insurance.

38.12 If the due date for any payment would otherwise be a day that is not a Business Day, payment shall be made on the next Business Day.

38.13 No payment made by a Party to another Party under this Agreement shall prevent the paying Party from recovering any amount overpaid or wrongfully paid by the paying Party under this Agreement (however that payment may have arisen) including those paid by mistake of law or of fact.

38.14 In the event of a failure by either party to make payment on the due date in accordance with this Clause 38 (*Price and Payment*), such party shall pay to the other party interest on such payment at a rate per annum equivalent to 2 per cent above the base rate of The Royal Bank of Scotland plc current on the date upon which such payment first becomes overdue adjusted to reflect any changes to the rate during the period over which the payment remains overdue.

38.15 Pursuant to Clause 38.14 in the event that the party to whom payment is due, suffers a demonstrable cost of the currency exchange hedge as a result of an exchange rate fluctuation between the pound sterling and the Euro, then the party due to make payment shall be liable for this amount to the party to whom the payment is due.

38.16 The Tram Supplier shall not suspend the performance of its obligations under this Agreement if any payment is overdue (but without prejudice to the Tram Supplier's rights to terminate this Agreement under Clause 57 (*Client Default Termination*)).

39. VAT

39.1 The Tram Supplier shall be deemed to have allowed in its tender for the tax payable by it as a taxable person to the Commissioners of Customs and Excise (or similar authorities in any

relevant jurisdiction) being tax chargeable on any taxable supplies to the Client which are to be made under this Agreement.

39.2 All certificates issued by the Client or the Client's Representative under Clause 38.5 shall be net of Value Added Tax. In addition to the payments due under such certificates the Client shall separately identify and pay to the Tram Supplier any Value Added Tax properly chargeable by the Tram Supplier on the supply to the Client of any goods and/or services by the Tram Supplier under this Agreement.

39.3 If any dispute, difference or question arises between either the Client or the Tram Supplier and the Commissioners of Customs and Excise (or similar authorities in any relevant jurisdiction) in relation to any tax chargeable or alleged to be chargeable in connection with this Agreement or the Tram Works, each shall render to the other such support and assistance as may be necessary to resolve the dispute, difference or question.

39.4 Where, under this Agreement, any amount is calculated by reference to any sum which has been or may be incurred by any person, the amount shall include any VAT in respect of that sum only to the extent that such VAT is not recoverable as input tax by that person (or a member of the same VAT group) whether by set-off or repayment.

39.5 Clause 64 (*Dispute Resolution*) shall not apply to any dispute, difference or question arising under this Clause 39 (*VAT*).

40. REQUIRED INSURANCES

40.1 The Tram Supplier shall, at its own cost, procure that each of the Required Insurances is taken out and comes into effect on the relevant date specified in each "Period of Insurance" set out in part 1 of Schedule 11 (*Required Insurances*) and shall maintain the Required Insurances in full force and effect until the relevant date specified in each "Period of Insurance" set out in part 1 of Schedule 11 (*Required Insurances*), provided that each such Required Insurance is available in the EU insurance market at commercially reasonable rates and on commercially reasonable terms to contractors of the same status as at the Effective Date and of the same discipline as the Tram Supplier.

40.2 The Tram Supplier shall procure that all Required Insurances shall:

40.2.1 be maintained in accordance with part 1 of Schedule 11 (*Required Insurances*); and

40.2.2 be placed at all times with insurers authorised to carry out insurance business in the United Kingdom and confirmed in writing as acceptable by the Client (such written acceptance not to be unreasonably withheld or delayed).

40.3 The Tram Supplier shall not make any material alteration to the terms of the Required Insurances (including material changes to the level of deductibles) without the Client's prior approval (which approval shall not be unreasonably withheld). If any such material alteration to the Required Insurances is made, the Tram Supplier shall complete the questionnaire set out in part 3 of Schedule 11 (*Required Insurances*), duly endorsed by its insurance broker. If the insurer makes or attempts to make any material alteration or purports to withdraw cover, the Tram Supplier shall promptly give notice of this to the Client.

40.4 The Tram Supplier shall ensure that each of its insurance brokers gives the Client as soon as reasonably practicable after any policy of Required Insurance is taken out, replaced or renewed, a letter of undertaking in the form set out in part 2 of Schedule 11 (*Required Insurances*).

40.5 The Tram Supplier shall provide satisfactory evidence to the Client that the Required Insurances have been effected. Thereafter, the Tram Supplier shall upon request produce to the Client receipts for the payment of current insurance premiums or equivalent documentary evidence to confirm that such Required Insurances are being properly maintained, and on the anniversary of the Effective Date and on each subsequent anniversary thereof until the Expiry Date or Termination Date (whichever is earlier), the Tram Supplier shall complete an insurance questionnaire set out in part 3 of Schedule 11 (*Required Insurances*) in relation to the Required Insurances to be taken out by the Tram Supplier and submit such completed questionnaire to the Client as soon as reasonably practicable. If the Tram Supplier defaults in insuring or continuing to maintain the Required Insurances, the Client may insure against any risk in respect of which such default has occurred and recover any premiums from the Tram Supplier as a debt immediately due and payable.

40.6 The Tram Supplier shall:

40.6.1 procure that the Required Insurances which are to be maintained by the Tram Supplier in accordance with part 1 of Schedule 11 (*Required Insurances*) contain a waiver of subrogation against **tie**, any **tie** Party, the Client, any Client Parties, and the insured parties as set out in part 1 of Schedule 11 (*Required Insurances*) save in respect of fraud or deliberate non-disclosure; and

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40.6.2 where the Tram Supplier is obliged to effect any Required Insurances, not bring any claim or action against **tie** (or any **tie** Party) or the Client (or any Client Party) in respect of any Losses suffered by it in circumstances where and to the extent that the Tram Supplier could recover such Losses under such insurance (whether or not such insurance has in fact been effected or, if effected, has been vitiated as a result of any act or omission of the Tram Supplier (or any Tram Supplier Party), including non-disclosure or under-insurance), provided that, to avoid doubt, this Clause 40.6.2 shall not by itself prevent the Tram Supplier from claiming against the Client (or any Client Party) in respect of a breach of this Agreement by the Client or any Client Party for any loss or damage arising from such breach not covered because of the level of deductibles under such insurance permitted by this Agreement or to the extent such loss or damage exceeds the greater of the insurance placed or the minimum limit of indemnity required in respect of such insurance under part 1 of Schedule 11 (*Required Insurances*).

40.7 The Tram Supplier shall not take any action or fail to take any action or (insofar as it is reasonably within its power) permit or allow others to take or fail to take any action (in either case including failure to disclose any fact) as a result of which any of the Required Insurances may be rendered void, voidable, unenforceable, suspended or impaired in whole or in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

40.8 The supply to the Client of any insurance policy or insurance certificate or renewal certificate or other evidence of compliance with this Clause 40 (*Required Insurances)* shall not imply, or be taken as, acceptance by the Client that:

40.8.1 the extent of insurance cover is sufficient and its terms are satisfactory; or

40.8.2 in respect of any interests or parties not insured or any risks not insured against, an acceptance by the Client that the same were uninsurable.

40.9 Neither failure to comply nor full compliance with the provisions of this Clause 40 (*Required Insurances*) shall relieve the Tram Supplier of its liabilities and obligations under this Agreement.

40.10 The Tram Supplier shall apply any proceeds of any policies of insurance maintained in accordance with part 1 of Schedule 11 (*Required Insurances*) in satisfaction of the claim, demand, proceeding or liability in respect of which such proceeds are payable (unless already paid direct to the third party or employee by the insurer).

40.11 The Tram Supplier undertakes with the Client in relation to the Required Insurances:

40.11.1 to comply with all requirements of the insurers; and

40.11.2 to give notice to the Client immediately upon the happening of any event which will adversely affect any policy of insurance effected in accordance with this Clause 40 (*Required Insurances*), including the downgrading of the credit rating below A- by Standard & Poors of any party providing any of the Required Insurances.

40.12 The Tram Supplier shall immediately inform the Client in writing if any of the Required Insurances cease to be maintained and/or cease to be available in the EU insurance market at commercially reasonable rates provided that if the Tram Supplier is maintaining such insurance at such rates, the Client shall undertake in writing to reimburse the Tram Supplier in respect of half of the net cost of such insurance to the Tram Supplier above commercially reasonable rates. If the Client undertakes in writing to reimburse the Tram Supplier in respect of half of the net cost of such insurance to the Tram Supplier above commercially reasonable rates or, if the Client effects such insurance at or above commercially reasonable rates, the Tram Supplier shall reimburse the Client in respect of what the net cost of such insurance to the Tram Supplier would have been at commercially reasonable rates and terms, and the cost of maintaining any such insurance at rates above commercially reasonable rates by the Tram Supplier or by the Client shall be borne in equal proportions by the Tram Supplier and the Client

40.13 The Tram Supplier shall fully co-operate with any measures reasonably required by the Client, including completing any proposals for insurance and associated documents or maintaining such insurance at rates above commercially reasonable rates if the Client undertakes in writing to reimburse the Tram Supplier in respect of the net cost of such insurance to the Tram Supplier above commercially reasonable rates or, if the Client effects such insurance at or above commercially reasonable rates, reimbursing the Client in respect of what the net cost of such insurance to the Client would have been at commercially reasonable rates and terms.

40.14 The Tram Supplier acknowledges that **tie** has taken out insurances (the "**OCIP Insurances**") and agrees to comply with the requirements of the insurers with whom the OCIP Insurances are placed. The Tram Supplier agrees that it will intimate to the Client any act, occurrence or failure which may:

40.14.1 lead to any claim being made under the OCIP Insurances; or

40.14.2 render any of the OCIP Insurances void, voidable, unenforceable, suspended or impaired in whole or in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

40.15 The Tram Supplier shall not take any action or fail to take any reasonable action or (insofar as it is reasonably within its power) permit or allow others to take or fail to take any action (including in either case failure to disclose any fact) as a result of which any of the OCIP Insurances may be rendered void, voidable, unenforceable, suspended or impaired in whole or in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

40.16 The Tram Supplier shall bear all excesses and deductibles payable in respect of claims made under the OCIP Insurances or the Additional Insurances, until the Certificate of Tram Commissioning is issued in respect of each Tram, except for acts of vandalism of Trams whilst stabled in the Depot or when being used for testing other than whilst under the responsibility of the Tram Supplier. Notwithstanding the foregoing the Tram Supplier shall not be liable for payment of any applicable deductible under the OCIP Insurances and the Additional Insurances where any claim arising is due solely to the act or omission or negligence of the Client or the Tram Supplier or where the Tram Supplier or any Tram Supplier Party is otherwise responsible for such claim in terms of this Agreement.

40.17 The Client may ask the Tram Supplier to take out and maintain any insurance from time to time in the names of the parties reasonably requested by the Client (the "**Additional Insurance**"). If Additional Insurance is required, the terms of this Clause 40 (*Required Insurances*) including the provisions which are stated to apply to the "Required Insurances" shall apply with any appropriate adjustment to be agreed between the Parties as a Client Change. The Tram Supplier shall procure that any Additional Insurance shall:

40.17.1 (if the Client so requires) contain a provision that the Client or any other party reasonably requested by the Client is named as a co-insured party;

40.17.2 provide that any Additional Insurance shall continue in effect and unaltered for the benefit of the insured parties for at least ninety days after written notice by registered mail of any cancellation (including non-renewal), change, modification or lapse for any reason;

40.17.3 contain a provision that requires the insurer to send copies of all notices of cancellation or alteration or suspension or any other notices given under or in relation

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to the policy to the Client promptly upon receiving any notices of cancellation or alteration or suspension or any other notices;

40.17.4 contain a provision that a notice of a claim given to the insurer by one of the insured parties under the policy shall, in the absence of manifest error, be accepted by the insurer as valid notification of a claim in respect of the interests of all insured parties;

40.17.5 contain a provision to the effect (on the basis of non-vitiation/severability) that all the provisions of any Additional Insurance shall operate as if there were a separate policy in effect (save in respect of the sums insured, limits of liability and excesses/deductibles which shall be at the levels stated) for each named insured and that non-compliance with any policy term, condition or warranty and/or misrepresentation or non disclosure of material information by the Tram Supplier or any other co-insured will not affect the rights and/or interests of the Client or any other co-insured party under any policies effected as Additional Insurance; and

40.17.6 ensure that the Additional Insurances are primary, and shall not be brought into contribution with any other policy or policies effected by or on behalf of any of the insured parties;

40.18 The Tram Supplier shall supply the Client with copies of every policy document, insurance certificate and renewal certificate relating to any Additional Insurance (or such other evidence of insurances as may be reasonably required by the Client) and documentary evidence to the effect that the Required Insurances (other than any Additional Insurance) have been taken out and are being maintained as soon as it is available but in any event no later than 7 days (in respect of certificates) and sixty days (in respect of policies) after the inception of the relevant policies, together with evidence of payment of the premiums and any periodic renewal certificates.

40.19 The Tram Supplier shall inform the Client in writing as soon as reasonably practicable after it receives a claim or becomes aware of the occurrence of any event that may give rise to a claim under any Required Insurance (if related to the Edinburgh Tram Network), or Additional Insurance and will ensure that the Client is kept fully informed of subsequent action and developments concerning the claim; such written information shall not be required in relation to any claim of less than £50,000 (as Indexed). The Tram Supplier shall take such steps as are necessary or appropriate to ensure that each Tram Supplier Party, in respect of any event or claim of a like nature arising out of or relating to the operation or responsibility of that Tram Supplier Party, or any event of claim of which they become aware, takes in relation to the Tram Supplier like action to that which the Tram Supplier is required to take under this Clause

40.19 in relation to the Client, and shall inform the Client promptly of information thus received from any Tram Supplier Party.

40.20 At each anniversary of the Effective Date, the Tram Supplier shall provide the Client with a summary of all claims made under the Required Insurances, where such claims arise out of this Agreement. Such summary shall include date, circumstances, status and amounts paid and outstanding on each claim.

40.21 Without prejudice to any other provision of this Agreement, the Tram Supplier undertakes to the extent it has the right to do so under the relevant policy that it will not (and that each of the Tram Supplier Parties to the extent each respectively has the right to do so under the relevant policy will not) settle any OCIP Insurance or Additional Insurance claim above £50,000 (as Indexed) without the prior written agreement of the Client (such agreement not to be unreasonably withheld or delayed).

40.22 The Tram Supplier shall promptly inform the Client in writing if any of the Additional Insurances cease to be maintained and/or cease to be available in the EU insurance market at commercially reasonable rates and on commercially reasonable terms to contractors of the same status, as at the date of Client's request to the Tram Supplier that it takes out the Additional Insurance, and discipline as the Tram Supplier. In this event, the Parties shall meet to discuss the means by which any risks previously covered by the Additional Insurances should be managed, mitigated or controlled. Any agreement shall be a Client Change. Any increased or additional premium required by insurers by reason of the Tram Supplier's own claims record or other acts, omissions, matters or things particular to the Tram Supplier shall be deemed to be within commercially reasonable rates and terms.

41. LIABILITY, INDEMNITIES, RETENTION AND LIQUIDATED DAMAGES

41.1 Subject to the exception set out in Clauses 41.3, 41.4 and 41.5 the Tram Supplier shall indemnify the Client and its officers, agents and employees ("**Indemnified Parties**") from and against any and all actions, claims, (including third party claims), demands, proceedings, liabilities damages, penalties, fines, forfeitures, and the costs and expenses incident thereto (including any legal costs of defence) which any of the Indemnified Parties may hereafter incur, become responsible for, or pay out as a result of or in connection with:

41.1.1 any of the Tram Supplier's, or its employees' or any Tram Supplier Party's negligent or wilful acts or wilful omissions in the performance of the Tram Works;

41.1.2 breach of any term or provision of this Agreement;

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41.1.3 breach of any Law; and/or

41.1.4 any non-performance or delay in performance of the Tram Supplier's obligations under this Agreement.

Such actions, claims, demands, proceedings, suits, losses, penalties, fines, forfeitures, and the costs and expenses shall include such actions, claims, demands, proceedings, suits, losses, penalties, fines, forfeitures, and the costs and expenses, in respect of:

(a) death or injury to any person;

(b) loss of or damage to any property;

(c) loss of or damage to any part of the Tram Works (including any Trams);

(d) causing the Client be in breach of any Law;

(e) causing the Client to be in breach of the Tram Inspector Agreement; or

(f) infringement or alleged infringement of a third party's Intellectual Property Rights.

41.2 Save where expressly provided for, nothing in this Agreement shall expose either Party to the application of Indirect Loss.

41.3 The exception referred to in Clause 41.1, which is the responsibility of the Client, is death of, or injury to, persons or loss of or damage to property resulting from any act, neglect, or breach of statutory duty by the Client, its agents, servants or other contractors (not being employed by the Tram Supplier or any Tram Supplier Party) or for or in respect of any claims, demands, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto.

41.4 The Tram Supplier's liability to indemnify the Client under Clause 41.1 shall be reduced in proportion to the extent that the act or neglect of the Client, its agents, servants or other contractors (not being employed by the Tram Supplier or any Sub-Contractor) may have contributed to the said death, injury, loss or damage.

41.5 Nothing in this Agreement shall exclude or limit the liability of either Party for:

41.5.1 death or personal injury caused by that Party's negligence or the negligence of anyone for whom that Party is vicariously liable;

41.5.2 fraud or fraudulent misrepresentation;

41.5.3 any breach of warranty given as to valid and marketable title, freedom from unduly onerous burdens and conditions of entitlement to possession by action of prescription;

41.5.4 subject to Clause 41.6, any breach of this Agreement or any delict (including negligence) or other liability arising prior to termination of this Agreement; or

41.5.5 any breach of the Warranties;

provided that nothing in this Clause 41.5 shall confer on either Party rights or remedies that they would not otherwise have.

41.6 Notwithstanding anything to the contrary contained in this Agreement and/or the Reliability Bond, the liability of the Tram Supplier under or in connection with this Agreement whether in contract or delict in negligence for breach of statutory duty or otherwise other than in respect of Clause 41.5.1, 41.5.2, and 41.5.5 shall not exceed the sum of 20% of the Aggregate Tram Price, which sum shall exclude:

41.6.1 liabilities which are or should have been covered by the proceeds of the Required Insurances, the OCIP Insurances, and/or any Additional Insurances.

41.6.2 liabilities which would have been covered by the proceeds of the Required Insurances, the OCIP Insurances and/or any Additional Insurances but for the application of any deductible under such Required Insurances, the OCIP Insurances and/or any Additional Insurances.

41.7 Notwithstanding anything to the contrary contained in this Agreement and/or the Reliability Bond and, except as detailed in Clause 41.5.1, the Client's total liability hereunder whether in contract, delict or howsoever arising shall not exceed the Aggregate Tram Price.

41.8 Subject to Clause 41.3, neither party shall be entitled to claim damages for breach of this Agreement, in delict (including negligence), breach of statutory duty or on any other basis whatsoever to the extent that such damages claimed by that Party are for Indirect Losses suffered by that Party or any of the Indemnified Parties provided that for the avoidance of doubt, nothing in this Clause 41.8 or Clause 41.2 shall affect either Party's liability to the other Party or Indemnified Party, in respect of any claim, action, proceedings or demand against such other Party or an Indemnified Party by a third party in connection with Indirect Losses suffered.

41.9 The Tram Supplier shall not be relieved or excused of any responsibility, liability or obligation under this Agreement by the appointment of any Tram Supplier Party. The Tram Supplier

shall, as between itself and the Client, be responsible for the selection, pricing, performance, acts, defaults, omissions, breaches, delicts and offences of any Tram Supplier Party. All references in this agreement to any act, default, omission, breach, delict or offence of the Tram Supplier shall be construed to include any such act, default, omission, breach or delict of any Tram Supplier Party.

41.10 The Tram Supplier acknowledges and agrees that the express rights provided in this Agreement in relation to termination and the calculation and payment of amounts due following such termination are exclusive and are in place of (and not cumulative with) any other rights or remedies which might arise as a consequence of such termination. The Tram Supplier hereby waives all other rights and remedies arising from such termination, whether express or implied, arising by common law (including in delict), by statute or otherwise howsoever provided that nothing in this Clause 41.10 excludes the right of the Tram Supplier to claim remedies expressly conferred on them by this Agreement.

41.11 Where the act or default of the Tram Supplier or any of the Tram Supplier Parties, causes the Client to commit an offence, the Tram Supplier shall immediately take any measure necessary to ensure that that act or default, no longer causes the Client to commit that offence.

41.12 Where the Client reasonably suspects that such an act or default is about to take place and it reasonably believes that this will result in the Client committing an offence, the Client may issue an instruction to the Tram Supplier to remedy the act or default forthwith and the Tram Supplier shall comply with the said instruction.

41.13 The Parties acknowledge and agree that the only rights available to them to terminate this Agreement are those expressly set out in this Agreement and that neither Party shall be entitled to exercise a right to terminate or rescind or accept the repudiation of this Agreement under any right whether arising in common law or statute or otherwise howsoever (other than for fraud or a fraudulent misrepresentation).

IPR Claims

41.14 Subject always to the limitations of liability in Clause 41.4, the Tram Supplier shall at all times, during and after the Tram Supply Period, on written demand indemnify the Client and keep the same indemnified against all Losses incurred by, awarded against or agreed to be paid by the Client arising from an IPR Claim provided that the Tram Supplier shall not be liable under this Clause 41.14 if such Losses and other liabilities (including legal fees) are caused by the Client Parties failing to use the IPR in accordance with Clause 51 (*Copyright and Intellectual Property*).

41.15 The Client agrees that:

41.15.1 it will notify the Tram Supplier in writing of any IPR Claim;

41.15.2 subject to the Tram Supplier securing the Client to its reasonable satisfaction in relation to any further claims or losses incurred thereby, it will allow the Tram Supplier to conduct all negotiations and proceedings and will provide the Tram Supplier with such reasonable assistance required by the Tram Supplier, each at the Tram Supplier's cost, regarding the IPR Claim; and

41.15.3 it will not, without prior consultation with the Tram Supplier, make an admission relating to the IPR Claim.

41.16 The Tram Supplier shall diligently consider and defend or shall procure that the IPR Claim is diligently considered and defended using competent and experienced counsel and in such a way as not to bring the reputation of the Client into disrepute. The Tram Supplier shall consult the Client's Representative regularly regarding the defence and other dealings that it has regarding the IPR Claim.

41.17 The Tram Supplier shall not settle or compromise any IPR Claim without the Client's prior written consent (not to be unreasonably withheld).

41.18 If an IPR Claim is made the Tram Supplier may, at its own expense and sole option, either:

41.18.1 procure for the Client and, where relevant, the Client Parties (without further payment or further restriction on the part of the Client or such Client Parties) the right to continue using the relevant part or parts of the Tram or Tram Related Equipment which is subject to the IPR Claim; or

41.18.2 replace or modify or procure the replacement or modification of the relevant part or parts of the Tram or Tram Related Equipment with non-infringing substitutes provided that those substitutes do not adversely affect the performance or material functionality of the same.

41.19 If the Tram Supplier has availed itself of its rights to replace or modify or procure the replacement or modification of the relevant part or parts of the Tram or Tram Related Equipment with non-infringing substitutes pursuant to Clause 41.18.2 or to procure the right to continue using the relevant part or parts of the Tram or Tram Related Equipment under Clause 41.18.1 and if such exercise of the said rights has avoided any claim, demand or action for infringement or alleged infringement, then the Tram Supplier shall have no further liability

thereafter in respect of the said claim, demand or action save in respect of any and all Losses, damages, costs or expenses and other liabilities (including legal fees) incurred by the Client during the period of any IPR Claim, (which costs shall be recoverable on an indemnity basis as provided in Clause 41.14).

41.20 If the Tram Supplier elects to modify the item(s) or to supply substitute item(s) pursuant to Clause 41.18.2 or to procure a licence in accordance with Clause 41.18.1, but this has not avoided or resolved the IPR Claim, the Client may (without prejudice to its other rights and remedies) terminate this Agreement by written notice with immediate effect.

Retention and Liquidated Damages for Delay

41.21 Subject to Clause 41.23, if any Tram is not delivered to the Depot by the Agreed Delivery Date for such Tram the Tram Supplier shall pay to the Client (or the Client shall be entitled to retain from payments to the Tram Supplier) a sum equal to 1% of the Tram Price payable in respect of such Tram ("**Delivery Retention**").

41.22 Subject to Clause 41.23, if:

41.22.1 the first Tram to be issued with a Certificate of Tram Commissioning is not issued with such certificate by the Agreed Commissioning Date the Tram Supplier shall pay Liquidated Damages to the Client at the rate of 1% of the Tram Price for each period of seven days (with an apportionment on a time basis for each part period) by which the issue of such Certificate of Tram Commissioning is delayed after the Agreed Commissioning Date and until such a Certificate of Tram Commissioning is issued in respect of such Tram; and

41.22.2 any other Tram to be issued with a Certificate of Tram Commissioning is not issued with such certificate by the Agreed Commissioning Date the Tram Supplier shall, in respect of each such Tram, pay Liquidated Damages to the Client at the rate of 0.5% of the Tram Price for each period of seven days (with an apportionment on a time basis for each part period) by which the issue of such Certificate of Tram Commissioning is delayed after the Agreed Commissioning Date and until such a Certificate of Tram Commissioning is issued in respect of such Tram.

41.23 If any Tram in respect of which a Delivery Retention has been made pursuant to Clause 41.21 is issued with a Certificate of Tram Commissioning on or before the Agreed Commissioning Date for such Tram then the Client shall release the Delivery Retention in respect of such

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Tram to the Tram Supplier ("**Delivery Retention Repayment**") in accordance with Clause 38 (*Price and Payment*).

41.24 If Liquidated Damages are payable pursuant to Clause 41.21 in respect of a Tram which has had a Delivery Retention made in respect of it, then:

41.24.1 the Liquidated Damages payable in respect of such Tram shall be initially payable from the Delivery Retention until such Delivery Retention is exhausted or the full quantum of Liquidated Damages has been paid to the Client;

41.24.2 any outstanding Liquidated Damages shall remain payable by the Tram Supplier to the Client;

41.24.3 if, following the payment of Liquidated Damages in accordance with Clause 41.22.1 any of the sums retained as a Delivery Retention in respect of such Tram remains then such sum shall be repaid to the Tram Supplier as a Delivery Retention Repayment.

41.25 The aggregate amount of Liquidated Damages that the Tram Supplier shall be obliged to pay pursuant to Clause 41.21 shall be capped at 10% of the Aggregate Tram Price.

Liquidated Damages for Weight

41.26 If a Tram exceeds the Maximum Tram Weight, as calculated in accordance with part 2 of Schedule 5 (*Payments*), then the Tram Supplier shall pay liquidated damages in respect of each such Tram of an amount calculated in accordance with part 2 of Schedule 5 (*Payments*) provided that if the amount that a Tram is overweight is equal to or more than an amount equal to five per cent of the Maximum Tram Weight, the Client shall without prejudice to its other rights or remedies be entitled to reject the Tram.

General

41.27 The parties hereby acknowledge and confirm that the Liquidated Damages payable pursuant to this Agreement at the rate pre-agreed in this Clause 41 (*Liability, Indemnities, Retention and Liquidated Damages*) represent a genuine pre-estimate of the loss that is anticipated to be suffered by the Client consequent to a failure by the Tram Supplier to comply with those obligations under this Agreement to which they relate.

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42. MAINTENANCE HANDOVER

42.1 Prior to termination or completion of the Tram Works, the Tram Supplier shall establish appropriate handover procedures with the Client and the Tram Supplier in respect of the maintenance pursuant to Clause 7.2.7.

42.2 For a minimum period of at least two years after termination or completion of the Tram Works but as long as practicable thereafter, the Tram Supplier shall provide the Client and **tie** with such access as each party may reasonably require to persons having the appropriate knowledge and experience of the Trams and associated technical matters for the following purposes:

42.2.1 general technical advice on subjects for which the Tram Supplier was responsible pursuant to this Agreement; and

42.2.2 interpretation of any maintenance history data, drawing modifications, and regulations.

42.3 Upon termination or completion of the Tram Works, the Tram Supplier shall procure that the Client is provided with (with copies to the Tram Supplier) all manuals and documentation used by the Tram Supplier in connection with the provision of maintenance pursuant to Clause 7.2.6.

43. MITIGATION

43.1 The Client and the Tram Supplier shall take all reasonable steps to minimise the adverse effects of any Relief Event, Force Majeure Event or Compensation Event (including by seeking damages from third parties or other remedies where proceedings would have a reasonable chance of success and would not be economically imprudent having regard to the likely level of damages or the nature of the remedies and the estimated cost of the proceedings) and any claim made by the Tram Supplier as a result of such event shall:

43.1.1 exclude any amounts incurred or to be incurred as a result of any failure of the party being compensated to comply with this Clause 43 (*Mitigation*); and

43.1.2 be reduced by any amount which the party being compensated will recover or has recovered under any insurance policy (or would have recovered, if it had complied with the terms of this Agreement or if it and the insurer had complied with the terms of any policy required under this Agreement).

44. BONDS AND COLLATERAL WARRANTY

44.1 On the Effective Date, the Tram Supplier shall provide to **tie** an Advance Payment Bond in an amount of 20% of the Aggregate Tram Price substantially in the form of part C, of Schedule 10 (*Bonds and Collateral Warranty*) and issued by a surety approved in advance by **tie**, such approval not to be unreasonably withheld or delayed.

44.2 The Tram Supplier shall procure on or before the planned delivery date for the first Tram pursuant to the Tram Manufacturing and Delivery Programme (or if earlier, before the actual delivery date of such Tram) a Performance Bond to the Client to a value of 5% of the Aggregate Tram Price which has been issued by a surety approved in advance by the Client (acting reasonably).

44.3 On the date on which the Tram Inspector certifies the twenty seventh Certificate of Tram Commissioning, the Performance Bond shall be released by the Client, and the Tram Supplier shall provide a Reliability Bond to the Client to a value of 5% of the Aggregate Tram Price substantially in the form of part A, of Schedule 10 (*Bonds and Collateral Warranty*) and issued by a surety approved in advance by the Client, such approval not to be unreasonably withheld or delayed.

44.4 The Tram Supplier shall commence testing the Reliability of each Tram upon the commencement of Passenger Services. If, on the expiry of 13 full Reporting Periods from the commencement of Passenger Services the Tram Supplier has failed to establish Reliability in respect of any Tram then the Client shall be entitled to call upon and retain the Reliability Bond. For the avoidance of doubt, retention of the Reliability Bond shall not be the Client's sole remedy in respect of any failure by the Tram Supplier to establish Reliability in respect of any Tram.

44.5 Within 20 days of any written request from the Client (or such longer period as the Parties, acting reasonably, may agree), the Tram Supplier shall execute a collateral warranty (in the form set out in part B of Schedule 10 (*Bonds and Collateral Warranty*) or where such form is not acceptable, in a different form which is acceptable to both Parties (acting reasonably) in favour of **tie**, CEC, Transport Scotland, TEL and any other party at the Client's reasonable request, in respect of carrying out the Tram Works.

45. TRAM SUPPLIER DELAYS

45.1 If, at any time, the Tram Supplier becomes aware that it will not (or is unlikely to) achieve any Milestone or meet an Agreed Delivery Date for any reason which is not a Relief Event

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("**Delay**") it shall notify the Client's Representative in writing. The Tram Supplier shall detail in the notice:

45.1.1 the reasons for the Delay;

45.1.2 the consequences of the Delay; and

45.1.3 how the Tram Supplier proposes to mitigate the Delay.

45.2 If the Tram Supplier fails to achieve a Milestone and/or meet an Agreed Delivery Date it shall:

45.2.1 take and/or procure the taking of all remedial action necessary to correct the failure and achieve the Milestone and/or meet the Agreed Delivery Date as soon as practicable;

45.2.2 if relevant, pay liquidated damages in accordance with Clause 41 (*Liability, Retention and Liquidated Damages*); and

45.2.3 use all reasonable endeavours to mitigate the Delay and the effects of the Delay.

45.3 If a Milestone is not achieved and/or Agreed Delivery Date not met, the Client may (without prejudice to the Client's other rights and remedies) choose to:

45.3.1 if relevant accept the Tram "as is" subject to a reduction in the applicable Tram Price which reflects the reduced value of the Tram to CEC (such reduction to be agreed between the Parties, both acting reasonably or in the absence of agreement to be determined by the Tram Inspector (acting as an expert and not as an arbitrator) and whose decision shall be binding on the Parties in the absence of manifest error); or

45.3.2 extend, via the change control process in accordance with Clause 20 (*Changes*), the applicable Milestone date and/or Agreed Delivery Date within the Tram Manufacturing and Delivery Programme, and the Deliverables Programme.

45.4 Save as expressly stated to the contrary, any disputes about or arising out of this Clause 45 (*Tram Supplier Delays*) shall be resolved through the Dispute Resolution Procedure. Pending the resolution of the dispute the Tram Supplier shall continue to resolve the causes of and mitigate the effects of the Delay.

46. NOT USED

47. RELIEF EVENTS

47.1 The Tram Supplier shall within 10 Business Days of it becoming aware of the occurrence of an event which is likely to result in a Relief Event which may cause a delay in relation to the Tram Supplier achieving a Milestone and/or meeting an Agreed Delivery Date ("**Potential Relief Event**") serve a notice in writing ("**Potential Relief Event Notice**") on the Client:

47.1.1 stating the Tram Supplier's current view of the likelihood and probable extent of the delay relating to the Potential Relief Event; and

47.1.2 specifying whether the Tram Supplier is of the view that it is, or may become, entitled to an extension of time if the Potential Relief Event becomes a Relief Event.

47.2 If and to the extent that a Relief Event is the direct cause of a delay in achievement of a Milestone and/or an Agreed Delivery Date, then the Tram Supplier shall be entitled to apply for an extension of time. The Tram Supplier's sole right to such extension of time in connection with a Relief Event shall be as set out in this Clause 47 (*Relief Events*).

47.3 To obtain such extension of time, the Tram Supplier must, as soon as practicable, and in any event within 10 Business Days after it first became aware that the Relief Event had caused or is likely to cause delay:

47.3.1 give to the Client a notice of its claim for an extension of time and full details of the nature of the Relief Event, the date of occurrence and its likely duration;

47.3.2 include in any notice given under Clause 47.3.1 full details of the extension of time claimed including:

47.3.2.1 the Tram Supplier's estimate of the likely effect of such delay upon the Tram Manufacturing and Delivery Programme;

47.3.2.2 mitigation measures adopted and why unsuccessful; and

47.3.2.3 any acceleration measures which the Tram Supplier could take to mitigate the effects of such delay and, where applicable, an estimate of the costs thereof

provided that where a Relief Event has a continuing effect or the Tram Supplier is unable to determine whether the effect of the Relief Event will actually cause it not to be able to comply with its obligations under this Agreement, such that it is not practicable for the Tram Supplier to submit full details in accordance with this Clause 47.3, then the Tram Supplier shall instead submit to the Client:

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(a) a statement to that effect with reasons, together with interim written particulars (including an estimate of the likelihood and the likely extent of the delay); and

(b) thereafter, further interim written particulars until the actual delay caused is ascertainable, whereupon the Tram Supplier shall as soon as reasonably practicable, submit to the Client the items referred to in Clause 47.3.2.

47.3.3 demonstrate to the reasonable satisfaction of the Client that:

47.3.3.1 the Tram Supplier and the Tram Supplier Parties could not have foreseen the occurrence or consequences of the relevant Relief Event and could not have avoided such occurrence or consequences by steps which they might reasonably be expected to have taken;

47.3.3.2 the Relief Event is the direct cause of the delay; and

47.3.3.3 the Tram Supplier is using best endeavours to perform its obligations under this Agreement.

47.4 In the event that the Tram Supplier has complied with its obligations under Clause 47.3 and the Client is satisfied as to the matters specified in Clause 47.3.3, then (as applicable in the circumstances) the Milestone and/or Agreed Delivery Date shall be postponed by such time as shall be reasonable for such a Relief Event, taking into account the likely effect of delay and the Tram Manufacturing and Delivery Programme shall be revised accordingly by the Tram Supplier. For the avoidance of doubt, the Tram Supplier shall be deemed to have waived any entitlement to an extension of time unless the Tram Supplier has submitted a notice under Clause 47.3 within 10 Business Days.

47.5 If the Client decides that the Tram Supplier is not entitled to an extension of time, the Client shall notify the Tram Supplier accordingly as soon as reasonably practicable in writing.

47.6 The Tram Supplier shall notify the Client if at any time it receives or becomes aware of any further information relating to the Relief Event, giving details of that information to the extent that such information is new or renders information previously submitted materially inaccurate or misleading. If the Client's Representative considers that the Tram Supplier is no longer entitled to the extension granted to it pursuant to this Clause 47 (*Relief Events*) because of such new, inaccurate or misleading information then the Client shall be entitled to notify the Tram Supplier in writing that it has terminated the extension. Provided always that the Tram

Supplier shall be deemed to have complied with its obligations under this Agreement during the time when the extension was granted.

47.7 If the Parties cannot agree the extent of the extension of time required or the Client disagrees that a Relief Event has occurred (or as to its consequences) or that the Tram Supplier is entitled to any extension of time, either Party may refer the matter for determination in accordance with the Dispute Resolution Procedure.

47.8 The Client shall, in assessing any delay or extension of time for the purpose of this Clause 47 (*Relief Events*):

47.8.1 not take into account:

47.8.1.1 any event or cause of delay which is in any way consequent upon or necessitated by any negligence, omission, default, breach of contract or breach of statutory duty of the Tram Supplier or any Tram Supplier Parties; or

47.8.1.2 any delay which is concurrent with another delay for which the Tram Supplier is responsible; or

47.8.2 take into account an event or cause of delay only if and to the extent that the Tram Supplier establishes to the satisfaction of the Client that the Tram Supplier has used its best endeavours to adjust the order and sequence in which the Tram Supplier proposes to execute the Tram Works in such a manner as to minimise the effects of the delay in, or if possible to avoid altogether any delay in, the progress of the Tram Works.

47.9 The Tram Supplier shall not be entitled to and shall be deemed to have irrevocably waived any entitlement to any extension of time in respect of any failure by the Tram Supplier to:

47.9.1 identify any long lead time works and/or order any long lead time materials; or

47.9.2 manage the required interface with any Approval Body and/or third party where consent or approval for the Tram Works is required at any stage of such works; or

47.9.3 identify any instructions which are required from the Client in order to progress the Tram Works in accordance with the Tram Manufacturing and Delivery Programme.

47.10 If the Tram Works are delayed in circumstances other than those entitling the Tram Supplier to an extension of time as set out in this Clause 47 (*Relief Events*), the Tram Supplier shall inform the Client at the earliest opportunity and shall give an estimate of the likely effect upon the Tram Manufacturing and Delivery Programme. In such circumstances, the Tram Supplier

at its own expense shall take such acceleration measures as are necessary to achieve the requirements of the Tram Manufacturing and Delivery Programme.

47.11 Notwithstanding the occurrence of a Relief Event, the Tram Supplier shall continue to carry out the Tram Works unless otherwise agreed in connection with this Clause 47 (*Relief Events*), except in cases of a Force Majeure Event affecting the Tram Supplier's manufacturing capability.

47.12 The Tram Supplier acknowledges and agrees that:

47.12.1 subject to Clause 47.12.2, any extension of time given by the Client's Representative under this Clause 47 (*Relief Events*) to a Milestone and/or to an Agreed Delivery Date shall not of itself entitle the Tram Supplier to any extension to any other Milestone and/or Agreed Delivery Date or any other period and the Tram Supplier must make a claim under this Clause 47 (*Relief Events*) for an extension of time to each date or period to which it considers it is, or may become, entitled under this Clause 47 (*Relief Events*);

47.12.2 the Client shall be entitled (in its absolute discretion) to include within an extension, an extension to any other Milestone and/or Agreed Delivery Date;

47.12.3 any extension of time granted by the Client to the Tram Supplier shall, except as expressly provided elsewhere in this Agreement, be in full compensation and satisfaction for any loss sustained or sustainable by the Tram Supplier in respect of any matter or thing in connection with which that extension is granted;

47.12.4 the Client may grant an extension of time at any time, whether prospective or retrospective, whether interim or in full and the Client's Representative shall not be bound by or limited to the grounds (if any) set out in the Tram Supplier's relief event notice; and

47.12.5 the procedures to be followed where the occurrence of a delay has been caused by a Client Change shall be those set out in Clause 20 (*Changes*) and not this Clause 47 (*Relief Events*).

48. QUALIFYING CHANGES IN LAW

48.1 If a Qualifying Change in Law occurs or is to occur, then either Party may write to the other to express an opinion on its likely effects, giving details of its opinion of:

48.1.1 any necessary change in the Tram Works;

48.1.2 whether any changes are required to the terms of this Agreement to deal with the Qualifying Change in Law; or

48.1.3 whether relief from compliance with any obligations under this Agreement is required as a result of the Qualifying Change in Law,

48.1.4 in each case giving in full detail the procedure for implementing the Qualifying Change in Law. Responsibility for any costs of such implementation (and any resulting variation to payments due under this Agreement or other payment method at the Client's discretion) shall be dealt with in accordance with Clauses 48.2 and 48.3 below.

48.2 As soon as reasonably practicable after receipt of any notice from either Party under Clause 48.1 above, the Parties shall discuss and agree the issues referred to in Clause 48.1 above and any ways in which the Tram Supplier can mitigate the effect of the Qualifying Change in Law and the Tram Supplier shall:

48.2.1 provide evidence to the Client that the Tram Supplier has used and will continue to use all reasonable endeavours (including where appropriate and practicable the use of competitive quotes) to minimise any increase in costs and maximise any reduction in costs;

48.2.2 demonstrate how the effects of the Qualifying Change in Law will be mitigated;

48.2.3 demonstrate that the relevant changes will be implemented in the most cost-effective manner, including showing where reasonably practicable, that when any expenditure is incurred relevant Changes in Law that are foreseeable at the time of consideration of the specific Qualifying Change in Law and which relate to that Qualifying Change in Law have been taken into account by the Tram Supplier; and

48.2.4 give evidence, where reasonably practicable, as to how the Qualifying Change in Law has affected the fees and/or costs of similar contractors.

48.3 As soon as reasonably practicable after the issues referred to in Clause 48.2 have been agreed between the Parties or determined pursuant to the Dispute Resolution Procedure, the Client shall give a Client Notice of Change and the provisions of Clause 20 (*Changes*) shall apply except that the Tram Supplier shall be obliged to implement the change in all circumstances (except to the extent that such change is not necessary to implement the Qualifying Change in

Law). The Client shall issue a Client Change Order once it has been agreed or determined pursuant to the Dispute Resolution Procedure. In assessing the value of the change, the Client shall pay the agreed amount less the agreed threshold of £30,000 for each and every event. The Client will, at its sole discretion, determine the scope of each and every event.

48.4 Except as otherwise expressly provided in this Agreement, the Tram Supplier shall be responsible for any increase in its costs and shall not be entitled to any relief from its obligations under this Agreement to the extent that the same is caused as a result of a General Change in Law.

49. COMPENSATION EVENTS

49.1 If and to the extent that a Compensation Event:

49.1.1 is the direct cause of delay in achievement of a Milestone and/or an Agreed Delivery Date (as appropriate); and/or

49.1.2 causes the Tram Supplier to incur costs beyond such costs which were reasonably anticipated to be incurred by the Tram Supplier,

then the Tram Supplier shall be entitled to apply for an extension of time and/or claim costs under this Agreement. The Tram Supplier's sole right to an extension of time and/or to claim costs in connection with a Compensation Event shall be as set out in this Clause 49 (*Compensation Events*).

49.2 To obtain such extension of time and/or claim costs, the Tram Supplier must, as soon as practicable, and in any event within 10 Business Days after it first became aware that the Compensation Event had caused or is likely to cause delay or the Tram Supplier to incur additional costs:

49.2.1 give to the Client a notice of its claim for an extension of time and/or costs and full details of the nature of the Compensation Event, the date of occurrence and its likely duration;

49.2.2 include in any notice given under Clause 49.2.1 full details of the extension of time and/or any costs claimed including:

49.2.2.1 the Tram Supplier's estimate of the likely effect of such delay upon the Tram Manufacturing and Delivery Programme;

49.2.2.2 details of the costs;

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49.2.2.3 mitigation measures adopted and why unsuccessful; and

49.2.2.4 any acceleration measures which the Tram Supplier could take to mitigate the effects of such delay and, where applicable, an estimate of the costs thereof; and

49.2.3 demonstrate to the reasonable satisfaction of the Client that:

49.2.3.1 the Tram Supplier and the Tram Supplier Parties could not have foreseen the occurrence or consequences of the relevant Compensation Event and could not have avoided such occurrence or consequences by steps which they might reasonably be expected to have taken;

49.2.3.2 the Compensation Event is the direct cause of the delay and/or the additional costs; and

49.2.3.3 the Tram Supplier is using best endeavours to perform its obligations under this Agreement.

49.3 In the event that the Tram Supplier has complied with its obligations under Clause 49.2 and the Client is satisfied as to the matters specified in Clause 49.2.3, then (as applicable in the circumstances):

49.3.1 the Milestone and/or Agreed Delivery Date shall be postponed by such time as shall be reasonable for such a Compensation Event, taking into account the likely effect of delay and the Tram Manufacturing and Delivery Programme shall be revised accordingly by the Tram Supplier; and/or

49.3.2 the Tram Supplier shall be paid the amount of any direct and demonstrable cost as may be reasonable in the circumstances of the Compensation Event.

For the avoidance of doubt, the Tram Supplier shall be deemed to have waived any entitlement to an extension of time unless the Tram Supplier has submitted a notice under Clause 49.2 within 10 Business Days.

49.4 The Tram Supplier shall notify the Client if at any time it receives or becomes aware of any further information relating to the Compensation Event, giving details of that information to the extent that such information is new or renders information previously submitted materially inaccurate or misleading. If the Client's Representative considers that the Tram Supplier is no longer entitled to the extension granted to it pursuant to this Clause 49 (*Compensation Events*)

because of such new, inaccurate or misleading information then the Client shall be entitled to notify the Tram Supplier in writing that it has terminated the extension. Provided always that the Tram Supplier shall be deemed to have complied with its obligations under this Agreement during the time when the extension was granted.

49.5 If the Parties cannot agree the extent of the extension of time required or the additional costs claimed or the Client disagrees that a Compensation Event has occurred (or as to its consequences) or that the Tram Supplier is entitled to any extension of time and/or additional costs, either Party may refer the matter for determination in accordance with the Dispute Resolution Procedure.

49.6 The Client shall, in assessing any delay or extension of time or costs for the purpose of this Clause 49 (*Compensation Events*):

49.6.1 not take into account:

49.6.1.1 any event or cause of delay or costs which is in any way consequent upon or necessitated by any negligence, omission, default, breach of contract or breach of statutory duty of the Tram Supplier or any Tram Supplier Parties; or

49.6.1.2 any delay which is concurrent with another delay for which the Tram Supplier is responsible; or

49.6.2 take into account an event or cause of delay or costs only if and to the extent that the Tram Supplier establishes to the satisfaction of the Client that the Tram Supplier has used its best endeavours to adjust the order and sequence in which the Tram Supplier proposes to execute the Tram Works in such a manner as to minimise the effects of the delay in, or if possible to avoid altogether any delay in, the progress of the Tram Works and mitigate the costs.

49.7 The Tram Supplier shall not be entitled to and shall be deemed to have irrevocably waived any entitlement to any extension of time and/or additional costs in respect of any failure by the Tram Supplier, to:

49.7.1 identify any long lead time works and/or order any long lead time materials; or

49.7.2 manage any required interface with any Approval Body and/or third party where consent or approval for the Tram Works is required at any stage of such works; or

49.7.3 identify any instructions which are required from the Client in order to progress the Tram Works in accordance with the Tram Manufacturing and Delivery Programme.

49.8 If the Tram Works are delayed in circumstances other than those entitling the Tram Supplier to an extension of time as set out in this Clause 49 (*Compensation Events*), the Tram Supplier shall inform the Client at the earliest opportunity and shall give an estimate of the likely effect upon the Tram Manufacturing and Delivery Programme. In such circumstances, the Tram Supplier at its own expense shall take such acceleration measures as are necessary to achieve the requirements of the Tram Manufacturing and Delivery Programme.

49.9 Notwithstanding the occurrence of a Compensation Event, the Tram Supplier shall continue to carry out the Tram Works unless otherwise agreed in connection with this Clause 49 (*Compensation Events*).

49.10 Notwithstanding any other provision of this Clause 49 (*Compensation Events*), if a Compensation Event occurs because the Depot is not ready to accept delivery of the Trams following the issue of the Factory Acceptance Type Test Certificate and Factory Acceptance Routine Certificate in respect of a Tram in accordance with Clause 28 (*Pre-Delivery Inspections and Factory Acceptance Tests*) then:

49.10.1 unless directed otherwise by the Client in writing, the Trams which cannot be delivered shall be stored by the Tram Supplier in the most practicable and cost effective location and manner; and

49.10.2 the Tram Supplier shall promptly remove the Trams from storage and deliver the Trams to the Depot in accordance with the terms of this Agreement when the Client notifies the Tram Supplier in writing that the Depot is ready to accept delivery of the Trams.

50. BEST VALUE

50.1 The Tram Supplier shall provide reasonable assistance, throughout the Term and to the extent consistent with its obligations under this Agreement, make arrangements to secure continuous improvement in the way in which the Tram Works are conducted having regard to the Project Vision and, a combination of economy, efficiency and effectiveness.

50.2 The Tram Supplier agrees to undertake (or refrain from undertaking) such actions as the Client shall reasonably request, and shall:

50.2.1 prepare and, support and assist the Client (in compliance with Clause 24 (*Audit and Inspection*)) in preparing best value performance plans and conducting best value reviews in relation to the Tram Works;

50.2.2 comply with requests for information, data or other assistance made by the Client in pursuance of its best value assessment; and

50.2.3 comply with all requests by the Client, acting reasonably, to procure the attendance of specific officers or employees of the Tram Supplier or Tram Supplier Parties at any Client meetings and **tie** meetings at which the Tram Works are to be discussed.

50.3 The Tram Supplier acknowledges that **tie** may undertake an annual customer satisfaction survey ("**tie Customer Satisfaction Survey**") in order to:

50.3.1 assess satisfaction among the public and passengers with the quality, efficiency and effectiveness of the Tram Works;

50.3.2 complement preparation of the Annual Service Report; and

50.3.3 monitor compliance by the Tram Supplier with its obligations including its management of the Tram Works,

and the Tram Supplier shall provide reasonable assistance to enable the Client and **tie** to undertake the **tie** Customer Satisfaction Survey.

50.4 Without prejudice to any other provision in this Agreement (and no later than 2 Reporting Periods prior to the end of any year), the Tram Supplier shall, at its own cost, provide a written report (the "**Annual Service Report**") which shall review the quality and performance of all Tram Works measured during the relevant period and show the key issues to be addressed going forward, including customer feedback, operational and maintenance issues and improvement proposals. The customer feedback shall include the results of any **tie** Customer Satisfaction Survey carried out pursuant to Clause 50.3. The Tram Supplier shall upon written request promptly provide supporting information to verify and audit the information and other material contained in the Annual Service Report.

50.5 The Client may make comments on and/or objections to and/or specify omissions in the supporting information or the Annual Service Report and in such case shall provide the Tram Supplier with written comments and/or objections within 40 Business Days of receipt. In the absence of such Client comments or objections, the supporting information (or the Annual Service Report) shall be deemed to have been accepted by the Client.

50.6 The Tram Supplier shall, within 25 Business Days of receipt of the Client comments and/or objections under Clause 50.5 make revisions having regard to such comments and/or objections and resubmit the information and report to the Client. If the information and reports cannot be agreed by the Parties then the matter will be determined in accordance with the Dispute Resolution Procedure.

50.7 If, in the Client's reasonable opinion, the provision and performance of the Tram Works could be more effective, efficient and economic having regard to the Annual Service Report and the **tie** Customer Satisfaction Survey, then the Client may serve an Client Notice of Change pursuant to Clause 20 *(Changes)* stating the desired nature and timing of the changes to the provision or performance of the Tram Works (or the relevant part thereof).

50.8 The Tram Supplier shall, in conjunction with the Client, develop Best Value Improvement Plans setting out mutually agreed tasks between the Tram Supplier and the Client to improve the delivery of the Tram Works, and demonstrate continuous improvement in the Tram Works, and the achievement of the Project Vision.

50.9 The preparation of Best Value Improvement Plans will take into account the conclusions from the Annual Service Report and the **tie** Customer Satisfaction Surveys.

51. COPYRIGHT AND INTELLECTUAL PROPERTY

51.1 All Tram Supplier IPR shall continue to be owned by the Tram Supplier.

51.2 The Tram Supplier hereby:

51.2.1 assigns by way of future assignation to the Client with full title guarantee the Project IPR which is created by it and shall procure that Project IPR created by any Tram Supplier Party is also so assigned, for all of the residue of the term of such rights and all renewals or extensions thereof and together with all accrued causes of action in respect thereof;

51.2.2 grants to the Client a non-exclusive perpetual irrevocable royalty free licence to use such Tram Supplier IPR as may be necessary for the Client to use in relation to the Tram Supplier's scope of supply and having regard to the operating, maintaining and repairing of the Edinburgh Tram Network, and including any and all Intellectual Property Rights which subsist at any time in:

51.2.2.1 the Tram Documentation;

51.2.2.2 the Trams; and

51.2.2.3 Spare Parts and/or Special Tools.

For clarity, nothing within this sub-clause shall permit the Client to use Tram Supplier IPR for any commercial or tendering purposes (except by CEC, TEL or **tie** Limited in connection with the extension or expansion of the infrastructure of the Edinburgh Tram Network). Such Tram Supplier IPR shall not, without the express written consent of the Tram Supplier, be used, copied or disclosed in whole or in part by the Client other than for the purposes outlined in this Clause 51.2.2;

51.2.3 grants to the Client, with the prior written consent of the Tram Supplier (such consent not to be unreasonably withheld or delayed) the right to grant non-exclusive non-assignable sub-licences to third parties for such lengths of time as the Client may reasonably require and otherwise on the same terms as the licence granted to the Client pursuant to Clause 51.2.2 above, to use the Tram Supplier IPR referred to in that Clause (other than in relation to Third Party Software in respect of which the Tram Supplier shall use its reasonable endeavours to obtain the grant of a license to use such Software in so far as is necessary or desirable for such third party to use such Tram Supplier IPR in relation to any projects associated with the Tram Works including in relation to any extension or expansion of the Edinburgh Tram Network;

51.3 The Tram Supplier shall promptly deliver to the Client copies of all Tram Supplier IPR licensed to the Client pursuant to this Clause 51 (*Copyright and Intellectual Property*).

51.4 For the avoidance of doubt, the persons to whom the Client may grant sub-licences pursuant to Clause 51.2.3 shall include:

51.4.1 **tie** and any **tie** Party;

51.4.2 any Client Party;

51.4.3 the Operator and any party other than the Operator providing support to **tie** in relation to the System;

51.4.4 the SDS Provider;

51.4.5 the Tram Maintainer;

51.4.6 CEC and Transport Edinburgh Limited with the prior written consent of the Tram Supplier such consent not to be unreasonably withheld

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51.4.7 any assignee or transferee under this Agreement;

51.4.8 any party providing maintenance in respect of the Edinburgh Tram Network.

51.5 The Client hereby grants to the Tram Supplier a non-exclusive revocable royalty free licence for the duration of this Agreement to use such Project IPR as is owned by it as may be necessary for the Tram Supplier to use solely and exclusively for the purpose of performing the Tram Works.

51.6 The copyright of this Agreement and any data or software supplied to the Tram Supplier by the Client, shall remain solely with the Client.

51.7 The Tram Supplier shall at any time and from time to time hereafter at the request of the Client execute all such documents and do all such further acts as may be required in order to vest the rights referred to in Clause 51.2.1 in the Client.

51.8 The Tram Supplier waives any and all moral rights held or to be held by the Tram Supplier in the Deliverables and Project IPR and shall use best endeavours that all of the Tram Supplier Parties who are authors of the whole or any part of the Project IPR waive and abandon in writing all moral rights.

51.9 The Tram Supplier agrees that all rights in the Project IPR shall remain the property of the Client and the Tram Supplier shall retain no rights in the Project IPR beyond the licence granted in Clause 51.5. The Tram Supplier shall be entitled to use such Project IPR only on the terms set out herein and solely for the purpose of the performance of the Tram Works. In particular, otherwise as permitted in this Agreement herein, the Tram Supplier shall not disclose, assign, sub-license, lease, rent or otherwise dispose of the Project IPR.

51.10 The Client shall be entitled to use the rights granted to it pursuant to Clause 51.2 (and to sub-license to third parties such rights) to perform its obligations and exercise its rights and allow all Client Parties to perform their obligations and exercise their rights in respect of the Project, such performance of rights and exercise of obligations to include:

51.10.1 carrying out any necessary completion of the design, manufacture, construction and commissioning of any Trams and each part thereof;

51.10.2 carrying out any and all work in relation to the design and construction, testing and operation of the System;

51.10.3 carrying out all and any necessary maintenance, repairs and work including work to rectify any faults with the Spare Parts and Special Tools or breach of the Warranties and to modify them to comply with any Law or other mandatory requirements or otherwise;

51.10.4 making copies of using and reproducing in any format the Tram Documentation and all other documents which the Tram Supplier is required to deliver in accordance with this Agreement for the purposes of maintenance and repair of the Trams and/or the maintenance of the Spare Parts and Special Tools but only such copies as may be reasonably necessary to achieve such purpose; and

51.10.5 enabling and allowing relevant third parties to perform their obligations in respect of the Project.

51.11 For the purposes of this Clause 51 (*Copyright and Intellectual Property*), "use" shall include the acts of copying, modifying, adapting and translating the material in question and/or incorporating them with other materials and the term "the right to use" shall be construed accordingly.

51.12 The Tram Supplier:

51.12.1 hereby grants to the Client, free of charge, an irrevocable, perpetual, non-exclusive and transferable (but only to any assignee or transferee of any rights or benefits under this Agreement or upon or at any time following termination or expiry of this Agreement) a licence (carrying the right to grant sub-licences) to use the Intellectual Property Rights which are or become at any time during the Term vested in the Tram Supplier to the same extent as the Tram Supplier has acquired such rights; and

51.12.2 shall in respect of any of the Intellectual Property Rights which the Tram Supplier is not entitled to license to the Client pursuant to Clause 51.2, use its best endeavours to procure the grant of a licence from the owners of such Intellectual Property Rights in favour of the Client in substantially the same terms as the licence set forth in Clause 51.2.

51.13 The Client shall not exercise any of the rights licensed to it pursuant to this Clause 51 (*Copyright and Intellectual Property*) to design, construct, manufacture or commission or have designed, constructed, manufactured or commissioned any of the Trams or any part thereof unless and until:

51.13.1 the Client and the Tram Supplier cannot agree a price and/or delivery time in relation to a Spare Part or Special Tool pursuant to Clause 34.3; and/or

51.13.2 there occurs a Tram Supplier Default;

51.14 The Client shall not be entitled to adapt, reverse engineer, decompile, disassemble and/or modify the Tram Supplier Software in whole or in part except:

51.14.1 as permitted by Law; and

51.14.2 to the extent that such action is legitimately required for the purposes of integrating the operation of the Tram Supplier Software with the operation of other software or systems used by the Client or any of the Client Parties on the Edinburgh Tram Network.

51.15 All payments and royalties payable in one sum or by instalments or otherwise in connection with Intellectual Property Rights used by the Tram Supplier in connection with or to enable the Tram Supplier to carry out the Project or licensed to the Client shall be deemed to be included in the Aggregate Tram Price and shall be paid by the Tram Supplier to those to whom they may be due or payable.

51.16 Where a claim or proceeding is made or brought against the Client or its permitted licensees which arises out of the infringement of any Intellectual Property Rights in any materials provided by the Tram Supplier or any Tram Supplier Party to the Client then the Tram Supplier shall indemnify and keep the Client indemnified on demand at all times from and against all Indemnified Liabilities arising in connection with such claim or proceedings.

51.17 The provisions of this Clause 51 (*Copyright and Intellectual Property*) shall apply during the continuance of this Agreement and after its termination howsoever arising, and immediately following termination howsoever arising, the Tram Supplier shall provide the Client with:

51.17.1 a copy of the Object Code on media that is reasonably acceptable to the Client; and

51.17.2 a copy of all documentation, manuals and other technical information relating to the Software that is reasonably required by the Client;

51.18 The Tram Supplier shall not reproduce or publish any document or matter relating to the Tram Works or this Agreement, either alone or in association with any other body or person, without the prior written consent of the Client.

51.19 Software

51.19.1 In designing and creating Tram Supplier Software forming part of the Deliverables, the Tram Supplier shall ensure (and the Tram Inspector shall audit):

51.19.1.1 that orderly auditable records of the progress of the development of the Tram Supplier Software from the functional requirements to the final code are maintained, and that regular verification and testing occurs at each stage of the design process;

51.19.1.2 that it shall produce, during the development of the Tram Supplier Software comprehensive and accurate documentation including specifications, cause and effect charts and flowcharts are produced;

51.19.1.3 that the documentation, access rights, details of configuration software and the like produced in accordance with Clause 51.19.1.1, is such as to enable an appropriately qualified independent auditor (who is not involved in the original design) to:

(i) relate the Tram Supplier Software to the performance of the relevant equipment under normal and fault conditions;

(ii) to verify its compliance with the functional requirements of that equipment; and

(iii) to operate and reconfigure the Tram Supplier Software without the assistance of the Infraco; and

51.19.1.4 that the Tram Supplier Software is designed, developed and documented following an industry-recognised standard (and where no particular standard is required by the Upgrade Works Specifications or Central SCADA Works Specifications (as such terms are used in the Employer's Requirements)), using recognised quality control methods.

51.19.2 Subject to the terms of any Third Party Software Licence, the Tram Supplier shall to a reasonable extent, create or provide:

51.19.2.1 coding and documentation, in machine readable form, of the final structure of the Tram Supplier Software, and of the intermediate stages leading to it (i.e. source and object codes); and

51.19.2.2 where the Client so instructs, usable copies of any ancillary computer programs used to generate the code (such as compilers) provided that the Client meet the costs of any additional Third Party Software Licence.

51.19.3 Where the Tram Supplier is required to provide Tram Supplier Software as part of a Deliverable under this Agreement it shall, within thirty (30) days of acceptance of the Tram Supplier Software by the Client place, or shall procure the placement of, a copy of the source code of the Tram Supplier Software in escrow with the NCC Group of Manchester Technology Centre, Oxford Road, Manchester ("**NCC**") or such other escrow agent as the Parties may agree. The Parties shall enter into NCC's standard escrow agreement (provided that, in the case of Third Party Software, the Tram Supplier shall procure that the owner of such software enters into such escrow agreement) for a single licensee (or if no such agreement exists, the appropriate standard agreement as stipulated by NCC). The cost of such source code deposit (including all renewal costs) shall be payable by the Client.

Technical Library

51.20 The Tram Supplier shall;

51.20.1 as soon as reasonably practicable shall cooperate with the Client in the establishment by the Client of a secure, virtual electronic site for the storage of Deliverables other than the source code (the "**Technical Library**"). Such electronic site shall be capable of being accessed through a standard web browser. At the Client's request, the Tram Supplier will in addition also cooperate with the Client in delivering and managing documents to establish a physical site with paper copies of the Technical Library;

51.20.2 as and when Deliverables (other than the source code) are produced or updated from time to time:

51.20.2.1 where such Deliverables are produced or updated by the Tram Supplier, promptly ensure that a copy of those Deliverables or its updated version is placed in the Technical Library;

51.20.2.2 where such Deliverables are produced or updated by any sub-contractor of the Tram Supplier, as soon as reasonably practical ensure that a copy of those Deliverables or their updated version(s) are placed in the Technical Library;

51.20.2.3 establish an index, in a format approved by the Client, of all

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Deliverables deposited in the Technical Library from time to time and update that index whenever any such Deliverables are deposited in the Technical Library;

51.20.2.4 deliver one copy of the index and each update established under Clause 51.20.2.3 to the Client; and

51.20.2.5 permit the Client (or its nominee) to have access to the Technical Library from time to time during normal business hours, and following reasonable notice from the Client (or its nominee) to the Tram Supplier, for the purpose only of auditing its contents against the current catalogue.

51.21 Within three Business Days of the earlier of the release of the Reliability Bond or the termination of this Agreement, the Tram Supplier shall hand over the Technical Library, and the secure access to it, to the Client and the Tram Supplier's obligations in relation to the further maintenance of the Technical Library shall cease. Should an audit of the contents of the Technical Library against the current catalogue reveal that the index does not contain details of categories or types of Deliverables which should be contained within the Technical Library, the Client may request and the Tram Supplier grants access to the Client to the Technical Library from time to time during business hours in order to audit the contents of the Technical Library to determine whether such categories and types of Deliverables are in fact contained within the Technical Library. Any such request shall be made with reasonable notice and shall indicate with reasonable clarity the technical information or the type of Deliverable which is required for review.

52. CONFIDENTIAL INFORMATION

52.1 Each Party:

52.1.1 shall treat all Confidential Information belonging to the other Party as confidential and safeguard it accordingly; and

52.1.2 shall not disclose any Confidential Information belonging to the other Party to any other person without the prior written consent of the other Party, or except to such persons and to such extent as may be necessary for the performance of this Agreement or except where disclosure is otherwise expressly permitted by the provisions of this Agreement.

52.2 Each Party shall take all necessary precautions to ensure that all Confidential Information obtained from the other Party, or **tie,** under or in connection with this Agreement:

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52.2.1 is given only to such of the staff professional advisors and/or the Client Parties, Tram Supplier Parties or **tie** in connection with this Agreement as is strictly necessary for the performance by the Tram Supplier of the Tram Works and its other obligations under this Agreement; and

52.2.2 is treated as confidential and not disclosed (without prior approval from the owner of the Confidential Information) or used by such staff or professional advisors and/or the Tram Supplier Parties otherwise than for the purposes of this Agreement.

52.3 Where it is considered necessary in the opinion of the owner of the Confidential Information, the other Party shall ensure that its staff, contractors, agents, Sub-contractors, consultants and professional advisors sign a confidentiality undertaking before commencing work in connection with this Agreement.

52.4 Neither Party shall use any Confidential Information it receives from the other Party or **tie** other than for the purposes of this Agreement.

52.5 The provisions of Clauses 52.1 to 52.4 shall not apply to:

52.5.1 any information which is or becomes public knowledge (otherwise than by breach of this Clause 52 (*Confidential Information*));

52.5.2 any information which was in the possession of the receiving Party, without restriction as to its disclosure, before receiving it from the disclosing Party;

52.5.3 any information which is received from a third party who lawfully acquired it and who is under no obligation restricting its disclosure;

52.5.4 any information which is independently developed without access to the Confidential Information;

52.5.5 any disclosure pursuant to a statutory, legal or parliamentary obligation placed upon the Party making the disclosure, including any requirements for disclosure under FOISA, the Code, or the Environmental Information Regulations pursuant to Clauses 52.8 to 52.12(inclusive);

52.5.6 any disclosure by the Client of this Agreement including the Tram Supplier's fees and commercial terms, any information relating to the design of any aspect of the Edinburgh Tram Network and such other information as may be reasonably required

for the purpose of conducting a due diligence exercise with any candidates for other agreements relating to the System and their advisers;

52.5.7 any disclosure by the Client of this Agreement and any related information to **tie**, any **tie** Party, the Operator or any Client Party;

52.5.8 any information which is required to be disclosed to that Party's insurers and/or financial or legal advisers subject to Clauses 52.2 and 52.3;

52.5.9 any registration of information in respect of the Consents and any property registration required;

52.5.10 any disclosure of information by the Client and/or **tie** to Transport Edinburgh Limited, CEC, Partnerships UK Limited, the Scottish Ministers, Transport Scotland or any department, office or agency of the Scottish Executive or the UK government;

52.5.11 any disclosure for the purpose of any examination, pursuant to applicable Law, of the economy, efficiency and effectiveness with which **tie** has used its resources or funding made available to it including any examination pursuant to the Local Government (Scotland) Act 1973 as amended by the Local Government in Scotland Act 2003 of whether **tie** has secured best value in the performance of its functions; and

52.5.12 any disclosure of Confidential Information obtained from the Tram Supplier to:

52.5.12.1 any government department or any other local government authority or public authority equivalent in status to **tie.** All government departments or any other local government authority or public authority equivalent in status to **tie** receiving such Confidential Information shall be entitled to further disclose the Confidential Information to other government departments or any other local government authority or public authority equivalent in status to **tie** on the basis that the information is confidential and is not to be disclosed to a third party which is not part of any government department or any other local government authority or public authority equivalent in status to **tie**;

52.5.12.2 to any person engaged in providing any services to **tie** or the Client for any purpose relating to or ancillary to this Agreement, provided that in disclosing information under this Clause 52 (*Confidential Information*) the Client discloses only the information which is necessary for the purpose concerned and requires that the information is treated in confidence and that a confidentiality undertaking is given where appropriate.

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52.6 Nothing in this Clause 52 (*Confidential Information*) shall prevent either Party from using any techniques, ideas or know-how gained during the performance of this Agreement in the course of its normal business, to the extent that this does not result in a disclosure of Confidential Information or an infringement of Intellectual Property Rights.

52.7 In the event that the Tram Supplier fails to comply with this Clause 52 (*Confidential Information*), the Client reserves the right to terminate the Agreement by notice in writing in accordance with Clause 55 (*Tram Supplier Default Termination*).

52.8 The Tram Supplier acknowledges that **tie** is subject to the requirements of FOISA and the Environmental Information Regulations and shall assist and cooperate with **tie** or the Client (at the Tram Supplier's expense) to enable **tie** or the Client to comply with these Information disclosure requirements. **tie** or the Client agrees that it shall comply with the terms of the Code in respect of the discharge of its obligations under FOISA.

52.9 The Tram Supplier shall and shall procure that the Tram Supplier Parties shall:

52.9.1 transfer any Request for Information to **tie** or the Client as soon as practicable after receipt and in any event within five Business Days of receiving a Request for Information;

52.9.2 provide **tie** or the Client with a copy of all information in its possession or power in the form that **tie** or the Client requires within five Business Days (or such other period as **tie** or the Client may specify) of **tie** requesting that information; and

52.9.3 provide all necessary assistance as reasonably requested by **tie** or the Client to enable **tie** to respond to a Request for Information within the time for compliance set out in section 10 of FOISA or regulation 5 of the Environmental Information Regulations.

52.10 **tie** shall be responsible for determining at its absolute discretion whether the Confidential Information and/or any other information:

52.10.1 is exempt from disclosure in accordance with the provisions of the Code, FOISA or the Environmental Information Regulations; and

52.10.2 is to be disclosed in response to a Request for Information,

52.11 In no event shall the Tram Supplier respond directly to a Request for information unless expressly authorised to do so by **tie**.

52.12 The Tram Supplier acknowledges that **tie** may be obliged, pursuant to the Code, FOISA, or the Environmental Information Regulations to disclose information:

52.12.1 without consulting with the Tram Supplier, or

52.12.2 following consultation with the Tram Supplier and having taken its views into account.

52.13 The Tram Supplier shall ensure that all information and Deliverables produced in the course of this Agreement or relating to this Agreement are retained for disclosure and shall permit the Client and **tie** to inspect such records as requested from time to time.

52.14 The Tram Supplier acknowledges that any lists or schedules provided by it outlining Commercially Sensitive Information are of indicative value only and that **tie** and/or the Client may nevertheless be obliged to disclose Confidential Information in accordance with Clause 52.8.

52.15 Any public relations material, press releases, public presentations or conference engagements in relation to this Agreement planned by the Tram Supplier require the Client's prior written approval.

53. PROTESTOR ACTION

53.1 If any Protestor Action occurs in respect of the Edinburgh Tram Network the Tram Supplier shall take whatever action and measures as are necessary to ensure the continued operation of its obligations under this Agreement during any relevant period of Protestor Action and to provide such support and assistance to the Client in relation to the Project as the Client may reasonably require.

53.2 In respect of any Protestor Action, if compliance with Clause 53.1 involves the Tram Supplier in any delay, the Client's Representative shall take such delay into account in determining any extension of time to which the Tram Supplier is entitled pursuant to Clause 49 *(Compensation Events*) provided that the Client shall not take into account any delay to the extent that the impact of such Protestor Action on the progress of the Tram Works has been caused by a breach of this Agreement by the Tram Supplier and/or such impact could have been mitigated by the Tram Supplier.

54. SUSPENSION OF WORK

54.1 The Client's Representative may, having received the written permission of **tie**, suspend the progress of the Tram Works or any part thereof, excluding the manufacture of Trams, for such time or times and in such manner as the Client's Representative may consider necessary. The Tram Supplier shall, during such suspension, properly protect and secure the work so far as is necessary in the opinion of the Client's Representative. Except to the extent that such suspension is:

54.1.1 otherwise provided for in this Agreement;

54.1.2 necessary by reason of some default on the part of the Tram Supplier; or

54.1.3 necessary for the proper completion or for the safety of the Tram Works or any part thereof in as much as such necessity does not arise from any act or default of the Client's Representative or Client,

then if compliance with the Client's Representative's instructions under this Clause 54 (*Suspension of Work*) involves the Tram Supplier in delay or extra cost, including the cost of storage at the Tram Supplier's own or an alternative facility, the Client's Representative shall take such delay into account in determining any extension of time or costs to which the Tram Supplier is entitled under Clause 49 (*Compensation Events*).

54.2 If the progress of the Tram Works or any part thereof is suspended on the written order of the Client's Representative and if permission to resume work is not given by the Client's Representative within a period of six months from the date of suspension then the Tram Supplier may unless such suspension is otherwise provided for in this Agreement or continues to be necessary by reason of some default on the part of the Tram Supplier serve a written notice on the Client's Representative requiring permission within 20 Business Days from the receipt of such notice to proceed with the Tram Works or that part thereof in regard to which progress is suspended. If within the said 20 Business Days the Client's Representative does not grant such permission, the Tram Supplier by a further written notice so served may (but it is not bound to) elect to treat the suspension where it affects part only of the works as an omission of such part under Clause 20 (*Changes*) or where it affects the whole Tram Works as an abandonment of this Agreement by the Client.

54.3 Within 45 Business Days of service of notice by the Tram Supplier in accordance with Clause 54.2 to treat any suspension as an abandonment of this Agreement, this Agreement shall be

terminated in whole and the provisions of Clause 62 (*Payment on Termination*) and Clause 63 (*Effect of Termination or Expiry*) shall apply.

55. TRAM SUPPLIER DEFAULT TERMINATION

55.1 Without prejudice to any of the Client's other rights or remedies, the Client may, subject to the approval of **tie** Limited, after giving 7 days notice in writing to the Tram Supplier terminate this Agreement in whole or in part on any of the following grounds set out in Clauses 55.1.1 to 55.1.11(each a "**Tram Supplier Default**"), and if this Agreement is terminated in part the Client may terminate this Agreement in respect of any one or more Trams on or following:

55.1.1 breach of any material provision or requirement of this Agreement, where the Client has by written notice requested rectification of such breach and the Tram Supplier has failed to rectify such breach within 10 Business Days.

55.1.2 any failure to pay any Liquidated Damages within a period of forty five days of the due date as specified in Clause 41 (*Liability, Retention and Liquidated Damages*);

55.1.3 any failure to meet a Milestone within 180 days of the date for completion;

55.1.4 the occurrence of any Insolvency Event in relation to the Tram Supplier or any Affiliate of the Tram Supplier;

55.1.5 any Change in Control of the Tram Supplier or any other change in the legal status of the Tram Supplier occurs which is materially prejudicial to carrying out and completing the Tram Works;

55.1.6 any abandonment of the Tram Works by the Tram Supplier without due cause; and/or

55.1.7 the total liability of the Tram Supplier under this Agreement would be in excess of 20% of the Aggregate Tram Price, save for the application of Clause 41.6;

55.1.8 the aggregate amount of Liquidated Damages payable by the Tram Supplier would be in excess of 10% of the Aggregate Tram Price save for the application of the cap pursuant to Clause 41.25;

55.1.9 conduct by the Tram Supplier in a manner which **tie,** reasonably considers to be incompatible with the performance of the Tram Works and/or in such a manner so as to wilfully detract from the image and reputation of **tie,** CEC, Transport Edinburgh Limited, the Scottish Executive, the Scottish Ministers or any project related to the performance of the Tram Works;

55.1.10 any breach of Clause 52 (*Confidential Information*);

55.1.11 any failure to resolve a conflict of interest in accordance with Clause 70 (*Conflict of Interest*) to the reasonable satisfaction of **tie**;

55.2 Without prejudice to Clause 55.1, the Client may (with the prior written consent of **tie**) terminate this Agreement in respect of one or more Trams if a Certificate of Tram Delivery and Certificate of Tram Commissioning are not issued in respect of a Tram within 12 months following delivery of that Tram to the Depot. The Parties agree that in the event that there is a delay in issuing the Certificate of Tram Delivery and Certificate of Tram Commissioning which has a material adverse effect on the ability of the Tram Supplier to perform its obligations under this Agreement and:

55.2.1 which is beyond the reasonable control of the Tram Supplier; or

55.2.2 to the extent that it is directly caused by a breach by the Client or any Client Party of their respective obligations under this Agreement, the Infraco Contract or the DPOFA (as the case may be),

the 12 month period shall be extended by a reasonable period to reflect such delay.

55.3 If the Client terminates this Agreement pursuant to this Clause 55 (*Tram Supplier Default Termination*), the provisions of Clause 62 (*Payment on Termination*) and Clause 63 (*Effect of Termination or Expiry*) shall apply.

55.4 The Tram Supplier shall, in so far as is permitted by the laws of Spain and only following public disclosure of such information notify the Client of:

55.4.1 any resolution or decision by the Tram Supplier or the board of directors of the Tram Supplier or a decision by any director of the Tram Supplier to seek legal or financial advice pertaining to the solvency of the Tram Supplier; and/or

55.4.2 any presentation of any petition for the purpose of winding up the Tram Supplier or any petition for an administration order.

55.5 In the event that the Client has grounds to service notice pursuant to Clause 55.1, the Client may elect to require the Tram Supplier to provide a rectification plan within 5 Business Days of the Client serving written notice requiring the Tram Supplier to provide such plan. The Tram Supplier shall set out in the rectification plan:

55.5.1 the actions required to be taken by the Tram Supplier in order to achieve the sustainable rectification (measured against an agreed revised programme and production criteria over a set period) of the Tram Supplier's poor performance; and

55.5.2 any specific alternative terms or modifications to the terms of this Agreement,

such that the Tram Supplier shall not be in breach of this Agreement if it performs to this level.

55.6 The Tram Supplier shall propose the rectification plan at its cost and shall participate in good faith in discussions or negotiations held by the Client regarding the implementation of the rectification plan.

56. PERSISTENT BREACH

56.1 If a breach by the Tram Supplier of any of its obligations under this Agreement has occurred more than twice then the Client may serve a notice ("**Persistent Breach Notice**") on the Tram Supplier:

56.1.1 specifying that it is a Persistent Breach Notice;

56.1.2 giving reasonable details of the breach; and

56.1.3 stating that such breach is a breach which, if it recurs frequently or continues, may result in a termination of this Agreement.

56.2 If following service of such a Persistent Breach Notice, the breach specified has continued or occurred once again after the date falling 30 days after the date of service of such Persistent Breach Notice and before the date falling 365 days after the date of service of the Persistent Breach Notice, then the Client may serve another notice ("**Final Persistent Breach Notice**") on the Tram Supplier:

56.2.1 specifying that it is a Final Persistent Breach Notice;

56.2.2 stating that the breach specified has been the subject of a prior Persistent Breach Notice within the period of 365 days prior to the date of service of the Final Persistent Breach Notice; and

56.2.3 stating that if such failure is not remedied within 7 days or is remedied and occurs once or more within the 180 day period after the date of service of the Final Persistent Breach Notice, this Agreement may be terminated with immediate effect (but only if

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the said Final Persistent Breach Notice given under this Clause 56.2 has been countersigned by **tie**).

56.3 If the Client terminates this Agreement pursuant to this Clause 56 (*Persistent Breach*) the provisions of Clause 62 (*Payment on Termination*) and Clause 63 (*Effect of Termination or Expiry*) shall apply.

57. CLIENT DEFAULT TERMINATION

57.1 The Tram Supplier may by notice in writing to the Client terminate this Agreement if:

57.1.1 the Client fails to pay an undisputed sum or sums due to the Tram Supplier under this Agreement which, either singly or in aggregate, exceeds 5% of the Aggregate Tram Price and such failure continues for sixty (60) days from receipt by the Client of a notice of non-payment from the Tram Supplier; or

57.1.2 the Client is in material breach of this Agreement which substantially frustrates or renders it impossible for the Tram Supplier to perform its obligations under this Agreement and if such breach is capable of remedy is not remedied by the Client within 60 days of written notice from the Tram Supplier to the Client specifying the relevant material breach,

each a ("**Client Default**"), and this Agreement shall terminate on the day falling sixty days after the day on which the Client receives the termination notice from the Tram Supplier unless the Client rectifies the Client Default within the said sixty day period.

57.2 The Tram Supplier shall not exercise, or purport to exercise, any right to terminate this Agreement (or accept any repudiation of this Agreement) except as expressly set out in this Agreement.

57.3 If the Tram Supplier terminates this Agreement pursuant to this Clause 57 (*Client Default Termination*), the provisions of Clause 62 (*Payment on Termination*) and Clause 63 (*Effect of Termination or Expiry*) shall apply.

57.4 If a termination notice is issued by the Tram Supplier in accordance with Clause 57.1, the Client and the Tram Supplier acknowledge that **tie** may elect to exercise its rights to step into this Agreement under the terms of the Tram Supply Collateral Warranty.

58. NO FAULT TERMINATION

58.1 The Client may at any time in its sole and absolute discretion give 30 days' written notice to the Tram Supplier to terminate this Agreement in whole or in part at any time for whatever reason (but, save where Clause 58.1.1 applies only if the said notice given under this Clause 58.1 has been countersigned by **tie**):

58.1.1 in the event that the Infraco Contract has been terminated, then the Client shall offer to novate the Tram Supply Agreement to **tie;** and

58.1.2 if **tie** have refused such novation in writing then the Client shall be entitled to terminate this Agreement.

58.2 If the Client terminates this Agreement pursuant to this Clause 58 (*No Fault Termination*) then the provisions of Clause 62 (*Payment on Termination*) and Clause 63 (*Effect of Termination or Expiry*) shall apply.

58.3 Within 60 Business Days prior to the date of expiry of the Infraco Contact or in the event that notice has been served to terminate the Infraco Contract, the Client shall offer to novate, assign or otherwise transfer this Agreement to any party identified in Clauses 58.5.1 and 58.5.2.

58.4 If **tie** have refused such novation, assignation or other transfer in writing the Client shall be entitled to terminate this Agreement in accordance with this Clause 58 (*No Fault Termination).*

58.5 If required by the Client, the Client shall offer to novate, assign or otherwise transfer the whole or any part of this Agreement as directed by **tie**, to:

58.5.1 **tie**, the Operator, the Scottish Ministers, TEL, CEC, Transport Scotland or their successors with no worse financial standing than that of **tie**; or

58.5.2 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed by a person falling within Clause 58.7.1.

58.6 In the case of such a novation or assignation, the Tram Supplier shall enter into a collateral warranty in favour of the Client in substantially the form set out in Schedule 10 (*Reliability Bond and Collateral Warranty).*

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59. TERMINATION ON FORCE MAJEURE

59.1 Neither Party shall be entitled to bring a claim for a breach of obligations under this Agreement by the other Party or incur any liability to the other Party for any losses or damages incurred by that other party to the extent that a Force Majeure Event occurs and such party is directly prevented from carrying out such obligations by that Force Majeure Event, provided that such prohibition on bringing a claim and exclusion of liability shall not operate if and to the extent that:

59.1.1 the Affected Party could, by the exercise of reasonable foresight and diligence, have prevented or reduced the effect of the Force Majeure Event; and

59.1.2 the Affected Party could, whether before or after the occurrence of the Force Majeure Event, have reduced or eliminated the resulting breach of its obligations under this Agreement by taking reasonable steps.

59.2 On the occurrence of a Force Majeure Event, the Affected Party shall notify the other Party as soon as reasonably practicable, specifying details of the Force Majeure Event and providing evidence of its effect on the obligations of the Affected Party and any action proposed to remove or mitigate its effect.

59.3 The Parties shall enter into bona fide discussions with a view to alleviating and removing the effects of such Force Majeure Event as soon as reasonably practicable, and if the terms or measures to remove the effect of the Force Majeure Event cannot be agreed on or before the date falling 12 months after the date of the commencement of the Force Majeure Event or by the end of such longer period as the Parties may have agreed, or such Force Majeure Event is continuing or its consequence remains such that the Affected Party is unable to comply with all or a material part of its obligations under this Agreement for a period of more than 12 months after the date of the commencement of the Force Majeure Event or by the end of such longer period as the Parties may have agreed, either Party shall have the option to terminate this Agreement by written notice to the other.

59.4 The Parties shall at all times following the occurrence of a Force Majeure Event use all reasonable endeavours to prevent and mitigate the effects of any delay to the performance of the Tram Works and the Tram Supplier shall at all times during which a Force Majeure Event is subsisting take all steps in accordance with Good Industry Practice to overcome or minimise the consequences of the Force Majeure Event.

59.5 The Affected Party shall notify the other party as soon as reasonably practicable after the Force Majeure Event ceases or no longer causes the Affected Party to be unable to comply with its obligations under this Agreement. Following such notification, this Agreement shall continue to be performed on the terms existing immediately prior to the occurrence of the Force Majeure Event.

59.6 If this Agreement is terminated pursuant to this Clause 59 (*Termination on Force Majeure*) then the provisions of Clause 62 (*Payment on Termination*) and Clause 63 (*Effect of Termination or Expiry*) shall apply.

60. TERMINATION FOR CORRUPT GIFTS AND FRAUD

60.1 The Tram Supplier or anyone employed by it or acting on its behalf (including any Tram Supplier Party) shall not commit any Prohibited Act.

60.2 If the Tram Supplier, or anyone employed by it or acting on its behalf (including any Tram Supplier Party) commits any Prohibited Act, then the Client shall be entitled to act in accordance with Clauses 60.3 to 60.7.

60.3 If a Prohibited Act is committed by the Tram Supplier or by an employee of the Tram Supplier not acting independently of the Tram Supplier, then the Client may terminate this Agreement by giving notice to the Tram Supplier.

60.4 If a Prohibited Act is committed by an employee of the Tram Supplier acting independently of the Tram Supplier, then the Client may give notice to the Tram Supplier of termination and this Agreement will terminate, unless within 30 days of receipt of such notice the Tram Supplier terminates that employee's employment and (if necessary) procures the performance of the relevant obligations by another person.

60.5 If a Prohibited Act is committed by anyone acting on behalf of the Tram Supplier (excluding employees of the Tram Supplier, but including any Tram Supplier Party and their employees) and not acting independently of the Tram Supplier, then the Client may give notice to the Tram Supplier of termination and this Agreement shall terminate.

60.6 If a Prohibited Act is committed by anyone acting on behalf of the Tram Supplier (excluding employees of the Tram Supplier but including any Tram Supplier Party, and their employees) and acting independently of the Tram Supplier, then the Client may give notice to the Tram Supplier of termination and this Agreement will terminate unless within 30 days of receipt of such notice given under this Clause 60.6, the Tram Supplier terminates that party's employment and procures the performance of the relevant obligations by another person.

60.7 Any notice of termination under this Clause 60 (*Termination for Corrupt Gifts and Fraud*) shall specify:

60.7.1 the nature of the Prohibited Act;

60.7.2 the identity of the person whom the Client believes has committed the Prohibited Act; and

60.7.3 the date on which this Agreement will terminate, in accordance with the applicable provision of this Clause 60 (*Termination for Corrupt Gifts and Fraud*).

60.8 If this Agreement is terminated pursuant to this Clause 60 (*Termination for Corrupt Gifts and Fraud*) the provisions of Clause 62 (*Payment on Termination*) and Clause 63 (*Effect of Termination or Expiry*) shall apply.

61. RISK MANAGEMENT

61.1 The Tram Supplier shall comply with the requirements of Schedule 15 (*Risk Management*).

62. PAYMENT ON TERMINATION

62.1 Where the Client terminates this Agreement pursuant to Clauses 55 (*Tram Supplier Default Termination*), 56 (*Persistent Breach*) or 60 (*Termination for Corrupt Gifts and Fraud*) the Tram Supplier shall, subject to Clause 41 (*Liability, Indemnities, Retention and Liquidated Damages*), be liable to the Client and shall indemnify the Client for all Losses suffered by the Client and claims brought against the Client as a result of such termination and the circumstances or events giving rise to the same.

62.2 No compensation shall be payable by the Client to the Tram Supplier for termination of this Agreement whether under contract, delict (including negligence), breach of (or compliance with) statutory duty, restitution or otherwise but without prejudice to payments due under Clause 62.3.4.

62.3 Within 35 Business Days of termination of this Agreement and following receipt of a valid VAT invoice, the Client shall pay to the Tram Supplier:

62.3.1 any undisputed sums due from the Client to the Tram Supplier pursuant to Clause 38 (*Price and Payment*);

62.3.2 any entitlement to demobilisation costs pursuant to Clause 62.3.4; and

62.3.3 where this Agreement is terminated pursuant to Clause 54 (*Suspension of Work*), Clause 57 (*Client Default Termination*) or Clause 58 (*No Fault Termination*) any amount in respect of any of the Tram Supplier's work in progress under this Agreement, provided that the calculation of such sums have been certified as follows:

62.3.3.1 the Tram Supplier shall have provided the Client with a valuation of all work in progress, including any demonstrable committed costs, in relation to the Tram Works, such valuation shall discount any payments already made in respect of such work; In addition to the forgoing the Tram Supplier shall be entitled to recover loss of profit fixed at 19% with reference to demobilisation costs; and

62.3.3.2 the Client shall, subject to any clarifications as are in the Client's opinion (acting properly and reasonably) necessary certify by notice in writing to the Tram Supplier that part of the work in progress which is approved by the Client and give reasons why any part of the work in progress has not been certified and the value of the sums involved no later than 10 Business Days after the date on which such valuation was received.

62.3.4 The Client shall make payment to the Tram Supplier of any demobilisation costs which have been demonstrably and reasonably incurred by the Tram Supplier in respect of:

62.3.4.1 termination for Client Default pursuant to Clause 57 (*Client Default Termination*); or

62.3.4.2 termination for No Fault Termination pursuant to Clause 58 (*No Fault Termination*);or

62.3.4.3 termination pursuant to Clause 54 (*Suspension of Work*).

62.4 The Tram Supplier shall use all reasonable endeavours to minimise and mitigate any demobilisation costs payable pursuant to Clause 62.3.4 and the Client shall not be liable to pay the Tram Supplier for such demobilisation costs to the extent that:

62.4.1 the Tram Supplier has failed to minimise or mitigate such demobilisation costs;

62.4.2 such demobilisation costs have arisen out of the Tram Supplier's breach of this Agreement or any negligent or wilful act or omission by the Tram Supplier; or

62.4.3 such demobilisation costs relate to any costs incurred by the Tram Supplier prior to the Works Commencement Date, other than those incurred solely in respect of the Pre Works Development Services, unless such costs were incurred with the prior written agreement of the Client;

62.5 If the Tram Supplier is obliged by this Agreement to pay to the Client any payment in respect of termination of this Agreement under this Clause 62 (*Payment on Termination*), the Tram Supplier shall pay the amount due thereunder to the Client within 35 Business Days of the Termination Date.

62.6 When the Client and the Tram Supplier agree or it is determined that the Client shall pay to the Tram Supplier any payment in respect of termination of this Agreement, under this Clause 62 (*Payment on Termination*), it shall pay such amount within 35 days of the Termination Date.

63. EFFECT OF TERMINATION OR EXPIRY

63.1 On termination or expiry of this Agreement, the Client shall be entitled in its sole and absolute discretion to:

63.1.1 take possession of all work-in-progress (including all Trams allocated to this Agreement and parts therefor) and use of all jigs and tools used solely in respect of the Trams and for that purpose to enter on to any premises of the Tram Supplier (and of any Sub-contractor or agent of the Tram Supplier) to take possession of such work-in-progress, jigs and tools with a view to **tie** and/or the Client being able to re-contract with a third party for the completion of the Trams;

63.1.2 be assigned all agreements relating to the Tram Works entered into between the Tram Supplier and its Sub-contractors;

63.1.3 be assigned any assignable warranties which have been given to the Tram Supplier by any Sub-contractor to the Tram Supplier by any manufacturer of any part of the Trams and to give notice to any such other party of any such assignation (in respect of which the Tram Supplier undertakes to assist in enforcing any rights thus arising);

63.1.4 continue to use all relevant Intellectual Property Rights in accordance with Clause 51 (*Copyright and Intellectual Property*) provided that the Client may in those circumstances purchase a Spare Part or Special Tool from a party other than the Tram Supplier without any requirement to seek to purchase the same from the Tram Supplier (whether further to Clause 34 (*Spares and Special Tools*) or otherwise) and

without any restriction (whether the restriction is set out in Clause 34 (*Spares and Special Tools*) or otherwise); and

63.1.5 reject one or more of the Trams, whether or not:

63.1.5.1 such Tram or Trams have been or are in the process of being delivered to the Depot;

63.1.5.2 a Certificate of Tram Delivery has been issued in respect of such Tram or Trams; or

63.1.5.3 a Certificate of Tram Commissioning has been issued in respect of such Tram or Trams,

and notwithstanding any other provision of this Agreement (including, for the avoidance of doubt, Clause 41.6) recover from the Tram Supplier the Tram Price in respect of such rejected Trams;

63.2 On termination or expiry of this Agreement, the Client shall be relieved from any obligation to accept delivery of any further Trams at the date of such notice; and

63.3 On termination or expiry of this Agreement, the Tram Supplier shall make available to the Client and/or **tie** all Tram Documentation relating to the Trams.

63.4 On termination or expiry of this Agreement in whole, the obligations of the Parties shall cease except for:

63.4.1 any obligations arising as a result of any antecedent breach of this Agreement;

63.4.2 Clauses 1 (*Definitions and Interpretations*), 33 (*Tram Documentation*), 34 (*Spares and Special Tools*), 35.1 and 36 (*Warranty Regime*), 38 (*Price And Payment*), 39 (*VAT*), 41 (*Liability, Indemnities, Retention and Liquidated Damages*), 43 (*Mitigation*), 51 (*Copyright and Intellectual Property*), 52 (*Confidential Information*), 63 (*Effect of Termination or Expiry*), 64 (*Dispute Resolution*) and 80 (*Third Party Rights*) and under any other provision of this Agreement which is expressed to survive termination or which is required to give effect to such termination or the consequences of termination;

63.4.3 the Warranties and Liquidated Damages in relation to any Trams which have been delivered; and

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63.4.4 any other obligations which give effect to such termination or to the consequences of such termination or which otherwise apply (expressly or by implication) on or after such termination or expiry.

63.5 Upon termination of this Agreement in part, only those obligations directly relating to such part of this Agreement that has been terminated shall cease.

64. DISPUTE RESOLUTION

64.1 The Parties agree that any Dispute shall be dealt with in accordance with the provisions set out in Schedule 13 (*Dispute Resolution Procedure*).

65. DEROGATIONS

65.1 The Tram Supplier shall not, without the prior written consent of the Client's Representative, apply for any exemption or derogation from or dispensation under any applicable Law which would otherwise apply to the Tram Works and including, without limitation, any exemption order under Section 47(3) of the Disability Discrimination Act 1995 or dispensations under the provisions of Section 10 of the Railways and Other Passenger Transport Systems (Approval of Works, Plant and Equipment) Regulations 1994 or any provisions which may replace, modify or supersede such provisions.

66. VARIATIONS TO BE IN WRITING

66.1 No variation or alteration of any of the provisions of this Agreement shall be effective unless it is in writing and signed by both Parties.

67. WAIVER AND CUMULATIVE REMEDIES

67.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement will operate as a waiver of it or of any other right or remedy nor will any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

67.2 The Parties agree that no waiver shall occur or be deemed to have occurred unless or until a clear and unequivocal express waiver of a clearly identified default is contained in a written notice by the waiving Party to the other Party expressly for the purpose of effecting such waiver.

67.3 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by Law.

67.4 Neither Party shall be entitled to recover compensation or make a claim under this Agreement in respect of any loss that it has incurred to the extent that it has already been compensated in respect of that loss pursuant to this Agreement or otherwise.

68. NOTICES

68.1 Any notice or notification required or authorised to be given under this Agreement by one Party to the other shall be:

68.1.1 in writing;

68.1.2 sent by one of the following methods:

68.1.2.1 pre-paid special or recorded delivery post or facsimile transmission addressed to the Party to which it is given at:

(a) in the case of notices given to the Client: **tie** limited, Citypoint, 65 Haymarket Terrace, Edinburgh, EH12 5HD, fax number 0131 622 8301, attention: Tram Project Director, or such other address or fax number in the United Kingdom as the Client may notify the Tram Supplier from time to time for that purpose; or

(b) Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF) address, J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa) – Spain fax number, 00 34 943 189211 attention the Edinburgh Tram Project Manager or such other address or fax number in the United Kingdom as the Tram Maintainer may notify the Client from time to time for that purpose; or

68.1.2.2 facsimile transmission addressed to the Client's Representative or the Tram Supplier's Representative (as appropriate) at a facsimile number notified to the giving Party by the receiving Party for the service of notices under this Agreement from time to time; or

68.1.2.3 personal delivery into the hands of:

(a) in the case of notices given to the Client, the Client's Representative;

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or

(b) in the case of notices given to the Tram Supplier, the Tram Supplier's Representative.

68.1.3 be deemed duly served:

68.1.3.1 if sent by pre-paid special or recorded delivery post, on proof of delivery; or

68.1.3.2 if sent via facsimile transmission or personal delivery, on the day of issue of the relevant fax confirmation receipt or such personal delivery (as appropriate), unless that day is not a Business Day or such delivery or transmission is made after 5.00 pm on a Business Day in which case it shall be deemed duly served on the next Business Day thereafter.

69. ASSIGNATION, CHANGES IN LEGAL STATUS, CHANGES IN CONTROL AND SUB-CONTRACTING

69.1 The Tram Supplier shall not assign, novate or otherwise transfer the whole or any part of this Agreement without the prior written agreement of the Client.

69.2 In addition to and without prejudice to the provisions of Clause 5 (*Novation*) and the Tram Supply Novation Agreement to be entered into in accordance with Clause 5 (*Novation*), the Client shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

69.2.1 to the Scottish Ministers, TEL, CEC, Transport Scotland or any local authority; or

69.2.2 to any body with no worse financial standing than that of **tie** who takes over all or substantially all of the functions of **tie**; or

69.2.3 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to the Tram Supplier acting reasonably) by **tie** or a person falling within Clause 69.2.1; or

69.2.4 to the Operator; or

69.2.5 with the prior written consent of the Tram Supplier (such consent not to be unreasonably withheld or delayed) to any person not covered by Clauses 69.2.1, 69.2.2, 69.2.3 or 69.2.4 whose on-going financial standing is no worse than **tie**.

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69.3 If the legal status of the Tram Supplier shall change in any material way, the Client shall be informed by the Tram Supplier in writing, immediately.

69.4 If there is a Change in Control in the Tram Supplier, the Client shall be informed immediately by the Tram Supplier in writing.

69.5 The Tram Supplier shall not sub-contract the whole of the Tram Works and shall not without the prior written consent of the Client (such consent not to be unreasonably withheld or delayed) sub-contract any part of the Tram Works.

69.6 The Tram Supplier shall procure that any Sub-contractor employed by the Tram Supplier shall, provide and employ in connection with the execution of the Tram Works only such technical assistants as are skilled, experienced and assessed as competent for undertaking a specified range of activities in their respective occupations and, as appropriate, such sub-agents, foremen and leading hands as are competent to give proper supervision to the work they are required to supervise and such skilled, semi-skilled and un-skilled labour as is necessary for the proper and timely execution of the Tram Works.

69.7 The Client's Representative shall have the right after due warning in writing to require the Tram Supplier to remove from the Edinburgh Tram Network any Sub-contractor or employee of such Sub-contractor who misconducts itself or is incompetent or negligent in the performance of its duties of fails to conform with any particular provisions with regard to safety which may be set out in this Agreement or persists in any conduct which is prejudicial to health and safety and such Sub-contractor and/or employee of such Sub-contractor shall not be again employed upon the Tram Works without permission of the Client's Representative.

69.8 The Tram Supplier shall in respect of any part of the Tram Works in respect of which the Tram Requirements Specification expressly states that a Sub-Contractor Direct Agreement will be required from a supplier in respect of which the Client shall as a condition of giving its consent to the sub-contracting of an element of the Tram Works, require the relevant Sub-contractor to enter into a Sub-Contractor Direct Agreement with the Client and **tie** within 2 months of the Effective Date, and in respect of any other Sub-contractor if so requested by the Client at any time, the Tram Supplier shall use all reasonable endeavours to ensure that such Sub-contractor enters into a Sub-Contractor Direct Agreement with the Client and **tie**.

69.9 The Client may withhold its consent relating to issues including but not limited to:

69.9.1 any sub-contract or assignation where the proposed Sub-contractor or assignee:

69.9.1.1 is not in the Client's opinion appropriately qualified and experienced in and/or

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accredited for the purposes of carrying out work of the scope, type and complexity to that required in carrying out that part of the Tram Works to be sub-contracted to it; or

69.9.1.2 has not entered into a Sub-contractor Direct Agreement with the Client and **tie** pursuant to Clause 69.8; or

69.9.1.3 is not approved by the Independent Competent Person;

69.9.2 any sub-contract or assignation where the proposed assignee or Sub-contractor is not in the Client's absolute opinion of suitable financial standing.

69.10 The appointment or authorisation by the Tram Supplier of any Sub-contractor, agent, officer or employee and/or any consent given by the Client to any Sub-contractor, agent, officer or employee, shall not relieve the Tram Supplier of any obligation under this Agreement, and the acts of and omissions of any such Sub-contractor, agent, officer or employee shall, for the purposes of this Agreement, be deemed to be the acts or omissions of the Tram Supplier.

69.11 The Tram Supplier shall provide sufficient superintendence to ensure that the work to be carried out by Sub-Contractors will comply with the requirements of this Agreement and applicable Laws.

69.12 Any application to the Client for consent pursuant to Clauses 69.5 shall be in writing and shall be sent to the address set out in Clause 68 *(Notices)*.

70. CONFLICT OF INTEREST

70.1 The Tram Supplier shall (and shall procure that the Tram Supplier Parties shall):

70.1.1 be responsible for ensuring that no conflict of interest arises in respect of its duties under this Agreement;

70.1.2 make all possible enquiries to ensure that there is no conflict of interest prior to its assuming the duties required of it under the terms of this Agreement; and

70.1.3 consult and advise the Client if the Tram Supplier considers that a conflict of interest arises or if he considers that a conflict of interest may exist or may arise or may be foreseeable and shall furnish the Client with such information as shall enable the Client to determine whether or not a conflict of interest has arisen.

71. SECURITY INTERESTS

71.1 The Tram Supplier shall not create or agree to create any Security Interest over any Assets or over this Agreement.

71.2 The Tram Supplier shall not dispose of any right in respect of or interest in any Asset used in the Tram Works or relating to the Edinburgh Tram Network if to do so would have a material adverse effect upon either the Edinburgh Tram Network, the rights in the Assets held by CEC, the position of **tie**, or the position of the Client under this Agreement, whether or not this Agreement has terminated or expired provided always that restrictions in this Clause 71 (*Security Interests*) shall not apply in the case of:

71.2.1 disposals of redundant or obsolete assets not required for the Edinburgh Tram Network provided that the Client has procured **tie's** and CEC's consent to such disposal, and CEC receives any proceeds associated with such disposal; or

71.2.2 disposals of property or assets where such property or assets are replaced by other property or assets comparable or superior as to type and function.

72. DATA PROTECTION

72.1 For the purpose of this Clause 72 (*Data Protection*), the term "personal data" shall have the meaning given to it in the Data Protection Act 1998.

72.2 In so far as is applicable to its obligations pursuant to this Agreement, the Tram Supplier shall, in relation to any personal data relating to the performance of the Tram Works in respect of which it is either the "data controller" or the "data processor" for the purposes of the Data Protection Act 1998, comply with the obligations of a "data controller" under the provisions of the seventh data protection principle as set out in schedule 1 of that Act. In addition, the Tram Supplier:

72.2.1 shall have at all material times (and shall use its reasonable endeavours to procure that all the Tram Supplier Parties have or will have at all material times) the appropriate technical and organisational measures in place against unauthorised or unlawful processing of personal data and against accidental loss or destruction of, or damage to, personal data held or processed by it;

72.2.2 shall (and shall use its reasonable endeavours to procure that the Tram Supplier Parties shall) take at all material times, all reasonable steps to ensure the integrity of any of its staff with access to personal data processed in connection with the Tram Works;

72.2.3 shall act only on the instructions of the Client or **tie** in relation to the processing of any personal data in respect of which the Client or **tie** is the "data controller" for the purposes of that Act;

72.2.4 shall only obtain, hold, process, use, store and disclose such personal data as is necessary to perform its obligations under this Agreement; and

72.2.5 shall allow the Client, or **tie** access to any relevant premises on reasonable notice to inspect its procedures referred to in Clause 72.2.1, This access shall be duly justified by the Client.

73. ENTIRE AGREEMENT

73.1 Except where expressly provided otherwise in this Agreement, this Agreement constitutes the entire agreement between the Parties in connection with its subject matter and supersedes all prior representations, communications, negotiations and understandings concerning the subject matter of this Agreement.

73.2 Each of the Parties confirms to the other that it has neither been induced to enter into this Agreement in reliance on, nor has it made, any representation or warranty except those contained or referred to in this Agreement.

73.3 Any representations or warranties other than those contained or referred to in this Agreement are superseded and extinguished by this Agreement.

73.4 Each Party irrevocably and unconditionally waives all rights and remedies which it might otherwise have had in relation to any representations or warranties other than those contained or referred to in this Agreement save in respect of any fraudulent misrepresentation.

74. CONSENT AND APPROVAL

74.1 The giving of any consent or approval by or on behalf of **tie** or the Client shall not in any way relieve the Tram Supplier of any of its obligations under this Agreement or of its duty to ensure the correctness, accuracy or suitability of the matter or thing which is the subject of the consent or approval.

74.2 Failure by **tie** or the Client to disapprove or object to any matter or thing shall not prejudice its power subsequently to take action under this Agreement in connection therewith.

75. DISCRIMINATION

75.1 The Tram Supplier shall not (and the Tram Supplier shall insert a clause to this effect in each contract with any Tram Supplier Party) unlawfully discriminate within the meaning and scope of the provisions of the Equal Pay Act 1970, the Sex Discrimination Act 1975, the Employment Rights Act 1996, the Working Time Regulations 1998, the Part-Time Workers (Prevention of Less Favourable Treatment) Regulations 2000, the Fixed Term Employees (Prevention of Less Favourable Treatment) Regulations 2002, the Race Relations Act 1976, the Disability Discrimination Act 1995, the Employment Equality (Sexual Orientation) Regulations 2003 and the Employment Equality (Religion or Belief) Regulations 2003 and the Employment Equality (Age) Regulations 2006.

76. FURTHER ASSURANCE

76.1 Each Party shall at the reasonable request and cost of the other (save where it is expressly provided that the cost of such act or execution shall be for that Party's account) do any act or execute any document that may be necessary to give full effect to this Agreement.

77. APPLICABLE LAW

77.1 This Agreement, any document completed or to be completed in accordance with its provisions and any matter arising from this Agreement or any such document shall be governed by and construed in accordance with Scots law.

77.2 Subject to Clause 64 (*Dispute Resolution*), the Parties hereby irrevocably submit to the exclusive jurisdiction of the Court of Session in relation to this Agreement, any such document and any such matter.

78. NO PARTNERSHIP OR AGENCY

78.1 Nothing in this Agreement shall be construed as creating a partnership between the Client and the Tram Supplier.

78.2 The Tram Supplier shall not (and shall procure that the Tram Supplier Parties shall not) act or purport to act as agent for **tie** and/or the Client in relation to any matter unless specifically authorised in writing under this Agreement by the Client. The Tram Supplier shall not be entitled to bind **tie** and/or the Client in any way or to create any liability or cause of action against **tie** and/or the Client and shall not hold itself out (and shall procure that no Tram Supplier Party shall hold itself out) as having any such authority or power

79. INVALID TERMS

79.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

79.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

79.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

79.2 Without prejudice to any other terms of this Agreement, the Parties shall promptly consult in good faith with a view to agreeing as soon as reasonably practicable one or more provisions in lieu of the invalid provision such as will, so far as is possible under any applicable Law, have the same commercial effect as the invalid provision would have had if it had not been invalid, unlawful or unenforceable.

80. THIRD PARTY RIGHTS

80.1 Subject to Clause 35 (*Risk and Title*) and Clause 51.2.2 creating rights in favour of CEC and **tie** and any other express provision of this Agreement, a person who is not party to this Agreement shall have no right to enforce any term of this Agreement and there shall not be created any ius quaesitum tertio in favour of any party whatsoever.

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IN WITNESS WHEREOF these presents consisting of this and the 167 preceding pages together with Schedules 1 to 23 (inclusive) which are annexed and signed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**

at EDINBURGH

on 13 MAY 2008 by:

[redacted]

Authorised Signatory

Full Name WILLIE GALLAGHER

[redacted]

Witness Signature

Full Name ALASTAIR RICHARDS

Address [redacted]

EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at EDINBURGH

on 13 MAY 2008 by:

[redacted]

Authorised Signatory

[redacted] JESUS ESNAOLA

Full Name

[redacted]

Witness Signature

Full Name ANTONIO CAMPOS

Address [redacted] Spain

TIE00899939_0176

This is Schedule 1 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 1

CONDITIONS PRECEDENT

PART 1: COMMENCEMENT CONDITIONS PRECEDENT

Delivery to the Client, in form and substance satisfactory to the Client (acting reasonably) of the documents listed below. Where listed as a duly certified copy, the document is to be certified by the company secretary of the Tram Supplier as being a true copy, in full force and effect:

1.1 a copy, duly certified, of its certificate of incorporation (or equivalent) and of any certificate of incorporation on change of name (or equivalent) or certificate of re-registration as a public company (or equivalent) related to it;

1.2 a copy, duly certified, of its memorandum and articles of association (or equivalent constitutional documents);

1.3 a copy, duly certified, of minutes of a meeting of its board of directors, or any other owners, representatives, committee or board entitled to bind the Tram Supplier to the terms of the Tram Supply Agreement:

1.3.1 evidencing all necessary approvals on behalf of the Tram Supplier to the execution, delivery and performance by the Tram Supplier of the Tram Supply Agreement and all documents to be executed by the Tram Supplier pursuant to the Tram Supply Agreement;

1.3.2 authorising a specified person to execute the Tram Supply Agreement, all documents to be executed by the Tram Supplier pursuant to the Tram Supply Agreement and to approve any amendments to the draft of the Tram Supply Agreement and to all documents to be executed by the Tram Supply pursuant to the Tram Supply Agreement;

1.3.3 authorising the Tram Supplier's Representative to sign and despatch all notices and other communications required or permitted to be given by the Tram Supplier under the Tram Supply Agreement and all documents to be executed by the Tram Supplier pursuant to the Tram Supply Agreement; and

1.3.4 authorising the Tram Supplier's Representative to sign and despatch all notices and other communications required or permitted to be given by the Tram Supplier under the Tram Supply Agreement and all documents to be executed by the Tram Supplier pursuant to the Tram Supply Agreement;

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1.4 evidence that all insurances to be taken out under the Tram Supply Agreement and be in force from the Effective Date have been effected on the Effective Date and that the relevant policies comply with the requirements of the Tram Supply Agreement and provision of copies of the certificates of insurance and policy documents for the insurances specified in the Tram Supply Agreement;

1.5 duly executed Subcontractor Direct Agreements in respect of the Tram Works from key Sub-Contractors, or undertakings that such Subcontractor Direct Agreements will be provided within 2 months of the Effective Date;

1.6 Legal Opinions in respect of the powers and capacity of the Tram Supplier to enter into this Tram Supply Agreement.

PART 2: CONDITIONS PRECEDENT DOCUMENTS

(1) TIE LIMITED

- and -

(2) BILFINGER BERGER (UK) LIMITED

- and -

(3) SIEMENS plc

-and-

(4) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

NOVATION OF A TRAM SUPPLY AGREEMENT

in respect of

EDINBURGH TRAM NETWORK

TIE00899939_0179

AGREEMENT

AMONG

(1) **tie LIMITED** (company number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ ("**tie**");

(2) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London EC1A 4EJ which expression shall include its successors, permitted assignees and transferees; and

(3) **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens Square, Frimley, Camberley, Surrey GU16 8QD which expression shall include its successors, permitted assignees and transferees,

(Bilfinger Berger UK Limited and Siemens plc together the "**Infraco**" and each separately an "**Infraco Member**"); and

(4) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF),** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa), Spain ("**Tramco**");

BACKGROUND

A By an agreement in writing dated ◆ . 2008 ("**Tram Supply Agreement**") **tie** appointed Tramco to design, manufacture and supply Trams and to supply documentation and associated equipment in connection with the Edinburgh Tram Network. A copy of the Tram Supply Agreement is attached to this Agreement and initialled by the parties for the purpose of identification. This Agreement is supplemental to the Tram Supply Agreement.

B **tie** and Infraco have entered into a contract ("**Infraco Contract**") under which Infraco has been appointed to carry out and/or manage the design, construction, installation, commissioning, tram procurement, system integration, infrastructure maintenance, tram maintenance and supply of related equipment and materials, trams and related infrastructure in respect of the Edinburgh Tram Network.

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C **tie** and Infraco have agreed, with the consent of Tramco, that Infraco shall take over the rights and liabilities of the "Client" (as defined in the Tram Supply Agreement) under the Tram Supply Agreement and that Tramco shall owe all of the duties and obligations arising thereunder to Infraco by novating the Tram Supply Agreement from **tie** to Infraco upon and subject to the terms of this Agreement.

D **tie** wishes to be released from the Tram Supply Agreement and Tramco has agreed to release **tie**.

1. DEFINITIONS AND INTERPRETATION

1.1 The definitions given in the recitals to this Agreement apply to this Agreement.

1.2 In this Agreement the following additional words and expressions shall have the meanings set out opposite to them:

"**Effective Date**" means the last date of execution of this Agreement."

1.3 Clause headings in this Agreement are for the convenience of the parties only and do not affect its interpretation.

1.4 Unless otherwise defined hereunder, where the Tram Supply Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement.

2. RELEASE BY TRAMCO OF tie

2.1 Tramco releases and discharges **tie** from any and all duties, obligations and liabilities owed to Tramco under the Tram Supply Agreement and accepts the liability of Infraco under the Tram Supply Agreement in lieu of **tie**.

3. RELEASE BY tie OF TRAMCO

3.1 **tie** releases and discharges Tramco from the further performance of Tramco's duties and obligations under the Tram Supply Agreement.

4. ACCEPTANCE OF LIABILITY BY TRAMCO TO THE INFRACO

4.1 Tramco undertakes to Infraco to continue to perform all the duties and to discharge all the obligations of Tramco under the Tram Supply Agreement and to be bound by its terms and conditions in every way as if Infraco was and always had been a party to the Tram Supply Agreement in place of **tie**.

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4.2 Tramco warrants to Infraco that, in respect of the duties and obligations which it has already performed under the Tram Supply Agreement, it has performed those duties and obligations in accordance with the standards of skill and care set out in the Tram Supply Agreement and otherwise in compliance with all of the terms and conditions thereof. Tramco warrants to Infraco that it shall be liable for any loss or damage suffered or incurred by Infraco arising out of any negligent act, default or breach by Tramco in the performance of its obligations under the Tram Supply Agreement prior to the Effective Date. Tramco shall be liable for such loss or damage notwithstanding that such loss or damage would not have been suffered or incurred by **tie** (or suffered or incurred to the same extent by **tie**).

4.3 Without prejudice to Clauses 4.2 or 4.4, Tramco shall not contend under this Agreement that its liability to Infraco is affected or diminished by reason of **tie** having suffered no loss and/or any loss claimed to have been suffered by Infraco being different in character from that suffered by **tie**.

4.4 Tramco confirms it was aware at the time of entering into the Tram Supply Agreement that Infraco could suffer losses, damages, costs, expenses, claims, demands and proceedings as a result of Tramco's breach of the Tram Supply Agreement.

4.5 Without prejudice to the generality of this Agreement, Tramco warrants and undertakes to Infraco that its duties and obligations under, the Tram Supply Agreement, whether required to be performed prior to the date hereof, have been and will be performed in accordance with the Tram Supply Agreement.

4.6 Tramco acknowledges that any breach of the warranties in this Agreement may cause Infraco to be in breach of the Infraco Contract and/or cause Infraco to suffer loss and/or damage.

4.7 The liability of Tramco to Infraco pursuant to the Tram Supply Agreement as novated by this Agreement (both in respect of the period prior to the Effective Date and after the Effective Date) shall not be affected by Infraco's assumption of liability to **tie** in respect of the Edinburgh Tram Network pursuant to the Infraco Contract.

4.8 Tramco acknowledges that Infraco has and shall continue to rely upon all Tram Works provided by Tramco under the Tram Supply Agreement as novated by this Agreement.

4.9 For the avoidance of doubt, in accordance with Clause 41.2 of the Tram Supply Agreement save where expressly provided for in the Tram Supply Agreement, nothing in this Agreement shall expose either Party to the application of Indirect Loss.

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5. VESTING OF REMEDIES AGAINST TRAMCO

All rights of action and remedies against Tramco under and pursuant to the Tram Supply Agreement vested in **tie** (including their accrued rights of action and remedies) shall automatically and without the need for any further action on the part of Infraco, vest in Infraco with effect from the Effective Date.

6. ACCEPTANCE OF LIABILITY BY INFRACO

With effect from the Effective Date Infraco undertakes to perform all the duties and to discharge all the obligations of **tie** under the Tram Supply Agreement as novated by this Agreement and to be bound by its terms and conditions in every way as if Infraco was and always had been a party to the Tram Supply Agreement in place of **tie** and as if all acts and omissions of **tie** under or pursuant to the Tram Supply Agreement prior to the Effective Date were the acts and omissions of Infraco.

7. VESTING OF REMEDIES AGAINST tie

As from the Effective Date, all rights of action and remedies under or pursuant to the Tram Supply Agreement vested in Tramco shall lie against Infraco and not **tie** whether or not such rights of action or remedies may have arisen prior to, on or after the Effective Date.

8. ACKNOWLEDGEMENT OF PAYMENT

Tramco acknowledges that all payments properly due to Tramco under the Tram Supply Agreement up to the Effective Date have been paid by **tie** (subject to confirmation of pending payments and the assurance that the Tramco will not suffer payment delays due to the novation process).

9. AMENDMENT OF TRAM SUPPLY AGREEMENT

tie, Tramco and Infraco agree that the terms of the Tram Supply Agreement shall be and are varied in the manner set out in Appendix 1 to this Agreement.

10. AFFIRMATION OF TRAM SUPPLY AGREEMENT

The terms and conditions of this Agreement represent the entire agreement between the parties relating to the novation of the Tram Supply Agreement and, except as specifically amended by Appendix 1 of this Agreement, all the terms and conditions of the Tram Supply Agreement remain in full force and effect. **tie** hereby confirms that it has not exercised any rights and discretions in regard to the Tram Supply Agreement prior to the point of novation.

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11. EQUIVALENT PROJECT RELIEF

tie acknowledges that in relation to any Dispute under the Infraco Contract where the Client's sole involvement in any Client Claim is in performing administrative functions in relation to the Client Claim, and not as an interested or affected party, then Infraco shall be entitled to recover its costs incurred in relation to such dispute pursuant to Clause 7A (*Tramco Equivalent Project Relief*) of the Tram Supply Agreement from **tie**. **tie** agrees to pay to the Infraco such reasonable costs unless the dispute proceeds to adjudication where such costs shall be paid as allocated between **tie** and the Tram Supplier by the adjudicator following the Dispute Resolution Procedure.

The Infraco agrees that it shall minimise as far as reasonably practicable its administrative costs in relation to Equivalent Project Relief.

The Tram Supplier agrees not to vexatiously claim under the Tram Supply Agreement or vexatiously use the Disputes Resolution Procedure.

12. RIGHTS OF THIRD PARTIES

A person who is not party to this Agreement shall have no right to enforce any term of this Agreement. This clause does not affect any right or remedy of any person which exists or is otherwise available.

13. LAW AND JURISDICTION

This Agreement shall be governed by and construed in accordance with Scots law and the Scottish Courts shall have jurisdiction with regard to all matters arising under it.

IN WITNESS WHEREOF these presents on this and the preceding [ ] pages together with Appendix 1 which is annexed and subscribed as relative hereto and the copy of the Tram Supply Agreement which is attached and subscribed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at

on 2008 by:

Director _____

Full Name _____

Director _____

Full Name _____

EXECUTED for and on behalf of **SIEMENS PLC**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Authorised Signatory _____

Full Name _____

EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

TIE00899939_0186

APPENDIX 1 TO THE TRAM SUPPLY NOVATION AGREEMENT

SCHEDULE OF AMENDMENTS TO THE TRAM SUPPLY AGREEMENT

Clause 7.15

Insert at end of Clause 7.15 the following:

The Tram Supplier acknowledges that it has a copy of the Infraco Contract and is deemed to be aware of the obligations, risks and liabilities assumed by the Infraco thereunder. Without prejudice to the foregoing, the Tram Supplier shall be deemed to be fully aware of the adverse financial and other consequences for the Client which could arise under the Infraco Contract in consequence, in whole or in part, of a breach on the part of the Tram Supplier of its obligations under this Agreement.

Clause 38.11.2

Delete Clause 38.11.2 and replace with:

38.11.2 all payments under this Agreement to the Client shall be made in pounds sterling by electronic transfer of funds to:

Name and Address of Bank:

Sort Code:

Account Number:

Account Name:

Clause 58.2 - No Fault Termination

Insert the following new Clause 58.2:

58.2 In the event that the Infraco Contract is terminated, this Agreement shall terminate unless the Tram Supplier is notified that **tie** (or another nominated party) requires to step into this Agreement.

Clause 60 - Termination for Corrupt Gifts and Fraud

Delete Clause 60 (Termination for Corrupt Gifts and Fraud), in its entirety substitute therefore:

60.1 The Tram Supplier or anyone employed by it or acting on its behalf (including any Tram Supplier Party) shall not commit any Prohibited Act.

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60.2 If the Tram Supplier or anyone employed by it or acting on its behalf (including any Tram Supplier Party) commits any Prohibited Act, then the Client may terminate this Agreement with immediate effect by giving notice to the Tram Supplier.

Clause 68.1.2.1.1

Delete Clause 68.1.2.1.1 and replace with:

68.1.2.1.1 in the case of notices given to the Client: Bilfinger Berger-Siemens Consortium, Lochside House, Lochside Way, Edinburgh Park EH12 9DT, fax number 0131 452 2518, attention: Project Director, or such other address or fax number in the United Kingdom as the Client may notify the Tram Supplier from time to time for that purpose; or

.....
Director/Authorised Signatory
tie LIMITED

.....
Director/Authorised Signatory
BILFINGER BERGER UK LIMITED

.....
Director/Authorised Signatory
SIEMENS PLC

.....
Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)



(1) TIE LIMITED

- and -

(2) BILFINGER BERGER (UK) LIMITED

- and -

(3) SIEMENS plc

-and-

(4) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

COLLATERAL WARRANTY IN RESPECT OF A TRAM SUPPLY AGREEMENT IN FAVOUR OF tie FROM TRAMCO

relating to

THE EDINBURGH TRAM NETWORK

TIE00899939_0189

AGREEMENT

BETWEEN

(1) **tie LIMITED** (company number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ ("**tie**");

(2) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London EC1A 4EJ which expression shall include its successors, permitted assignees and transferees; and

(3) **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens Square, Frimley, Camberley, Surrey GU16 8QD which expression shall include its successors, permitted assignees and transferees,

(Bilfinger Berger UK Limited and Siemens plc together referred to as the "**Infraco**", which term shall include its successors and permitted assignees); and

(4) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF),** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa), Spain ("**Tramco**");

BACKGROUND

A By an agreement in writing dated ◆ 2008 (the "**Tram Supply Agreement**"), **tie** appointed Tramco to design, manufacture and supply Trams and supply documentation and associated equipment in connection with the Edinburgh Tram Network.

B **tie** and Infraco have entered into a contract under which Infraco has been appointed to carry out and/or manage the design, construction, installation, commissioning tram procurement, system integration, infrastructure maintenance, tram maintenance and supply of related equipment and materials, trams and related infrastructure in respect of the Edinburgh Tram Network.

C **tie** and Infraco have agreed, with the consent of Tramco, that Infraco shall take over the rights and liabilities of the "**Client**" (as defined in the Tram Supply Agreement) under the Tram

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Supply Agreement by novating the Tram Supply Agreement from **tie** to Infraco upon and subject to the terms of the Novation Agreement (as hereinafter defined).

D It is a term of the Tram Supply Agreement that Tramco shall enter into this Agreement with **tie** following the execution of the Novation Agreement.

IT IS AGREED as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement the following words and expressions shall have the following meanings, unless the context requires otherwise:

"**Agreement**" means this document (as amended from time to time pursuant to Clause 13);

"**Deliverables**" means all written or documentary outputs to be prepared and delivered by Tramco in the performance of the Tram Works and Tramco's other obligations under the Tram Supply Agreement;

"**Infraco Contract**" means the contract to be entered into or entered into by **tie** with Infraco as described in Recital B above;

"**Novation Agreement**" means the novation agreement entered into among **tie**, Tramco and Infraco relating to the novation of the Tram Supply Agreement;

"**Party**" means each and any of the parties to this Agreement and **Parties** shall be construed accordingly; and

"**Tram Supply Agreement**" means the agreement dated [◆] and originally entered into by **tie** and Tramco, which has been novated to Infraco and Tramco pursuant to the Novation Agreement.

1.2 Unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender includes all other genders.

1.2.2 a reference to:

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1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a recital, clause or schedule is a reference to a recital, clause or schedule of or to this Agreement.

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation.

1.4 Where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

1.5 Unless otherwise defined hereunder, where the Tram Supply Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement.

1.6 In the case of any unintended conflict between the definition or interpretation of words or expressions in this Agreement and in the Tram Supply Agreement, the Tram Supply Agreement shall prevail save where by express words or where it is apparent from the context that the contrary is intended in this Agreement.

2. STANDARD OF CARE

Tramco warrants and undertakes to **tie** that:

2.1 it has carried out and shall carry out and discharge the Tram Works and all its other duties and obligation under the Tram Supply Agreement subject to and in accordance with the terms thereof; and

2.2 in addition to and without derogation from clause 2.1;

2.2.1 Tramco warrants to **tie** that, in the performance of the Tram Works and all its other duties and obligations under the Tram Supply Agreement it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent Tram designer and manufacturer experienced in carrying out works similar to the Tram Works to be carried out under the Tram Supply Agreement;

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2.2.2 it owes a duty of care to **tie** in carrying out its duties and obligations under the Tram Supply Agreement;

2.2.3 all obligations and duties on the part of Tramco set out in the Tram Supply Agreement which are expressed to be made in favour of or given to **tie** shall be directly enforceable by **tie** pursuant to this Agreement following the novation of the Tram Supply Agreement pursuant to the Novation Agreement.

3. COPYRIGHT LICENCE

3.1 Tramco hereby grants to **tie** a royalty-free and exclusive licence to use such Project IPR and Tram Supplier IPR as may be necessary, for operation and maintenance of the trams but, not in any case, for manufacturing purposes, for **tie** to use in relation to any projects associated with the Tram Works and or the operation and/or maintenance of the Edinburgh Tram Network, including the Trams. This licence shall carry the right to grant sub-licences, and be transferable to third parties, prior written approval of the Tram Supplier. Tramco shall be liable for the Project IPR and the Tram Supplier IPR only to the extent that it is used for the purposes for which it was intended.

3.2 In so far as ownership of the copyright and any other Intellectual Property Rights in any Deliverable prepared or provided by Tramco in connection with the provision of the Tram Works under the Tram Supply Agreement is vested in any person other than Tramco including, without limitation, any Tram Supplier Party, Tramco shall procure for **tie** the benefit of such a licence as is referred to in clause 3.1 for the purposes referred to therein.

3.3 Tramco shall, if so requested at any time, execute such documents and perform such acts (including the grant to **tie** of a licence to use any Software related with operation and maintenance) as may be required fully and effectively to assure to **tie** or any third party the rights referred to in this clause 3.

3.4 Tramco shall provide to **tie** a copy of any of the Deliverables which are to be provided to Infraco under the Tram Supply Agreement as soon as reasonably practicable after receipt by Tramco of a written request from **tie** to do so, unless already delivered to **tie**.

3.5 Tramco undertakes to **tie** that the use by **tie** of any of the Deliverables for any purpose provided for in this clause 3 shall not infringe the rights of any third party in relation to the Deliverables.

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4. REQUIRED INSURANCES AND OCIP INSURANCES

4.1 Tramco undertakes to **tie** that:

4.1.1 it has maintained and shall maintain during the performance of its obligations under the Tram Supply Agreement each of the Required Insurances in accordance with the requirements of Clause 40 (*Required Insurances*) and Schedule 11 (*Required Insurances*) of the Tram Supply Agreement;

4.1.2 cover under the professional indemnity insurance is extended to include Tramco's liabilities under this Agreement;

4.1.3 this Agreement has been disclosed to Tramco's current professional indemnity insurers or brokers (as the case may be) and shall be disclosed to any future professional indemnity insurers or brokers providing the insurance required by this Agreement;

4.1.4 Tramco shall abide by the terms and conditions of insurance and not do or omit to do anything that might prejudice the cover or its rights to make a claim; and

4.1.5 it has been disclosed to it details of the OCIP Insurances and that it shall abide by the terms and conditions of the insurances contained therein and shall not do or omit to do anything that might prejudice the cover of **tie**'s right to make a claim under the OCIP Insurances.

4.2 As and when required by **tie**, Tramco shall produce for inspection documentary evidence that the Required Insurances are being properly maintained.

4.3 Tramco shall not make any material alteration to the terms of the Required Insurances without **tie**'s prior approval which approval shall not be unreasonably withheld. If the insurer makes or attempts to make any material alteration or purports to withdraw cover, or if Tramco is unable to obtain professional indemnity insurance, Tramco shall promptly give written notice of this to **tie**.

5. tie STEP-IN

5.1 Tramco shall not exercise nor seek to exercise any right of determination of the Tram Supply Agreement or to rescind the Tram Supply Agreement by reason of a Client Default or to otherwise discontinue the performance of any of Tramco's obligations in relation to the Tram Supply Agreement by reason of breach on the part of Infraco (or otherwise) without giving **tie** not less than 21 days' written notice of its intention to do so and specifying in such notice the

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grounds for the proposed determination. Tramco for the period of any such notice diligently and properly continue to perform Tramco's obligations under the Tram Supply Agreement.

5.2 Any period stipulated in the Tram Supply Agreement for the exercise by Tramco of a right of determination shall nevertheless be extended as may be necessary to take account of the period of notice required under clause 5.1.

5.3 Compliance by Tramco with the provisions of clause 5.1 shall not be treated as a waiver of any breach on the part of Infraco giving rise to the right of determination nor otherwise prevent Tramco from exercising its rights after the expiration of the notice unless the right of determination shall have ceased under the provisions of clause 5.4

5.4 The right of Tramco to determine the Tram Supply Agreement or to rescind the Tram Supply Agreement or to discontinue the performance of any of its obligations in relation to the Tram Supply Agreement shall cease if within the period of 21 days referred to in clause 5.1, **tie** gives written notice to Tramco:

5.4.1 requiring Tramco to continue with the performance of all its obligations under the Tram Supply Agreement;

5.4.2 acknowledging that **tie** is assuming all the obligations of Infraco (as "Client") under the Tram Supply Agreement; and

5.4.3 undertaking to Tramco to discharge all amounts payable to Tramco under the terms of the Tram Supply Agreement from the date on which such notice under this clause 5.4 is given to Tramco.

5.5 Upon compliance by **tie** with the requirements of clause 5.4, the Tram Supply Agreement shall continue in full force and effect as if the right of determination on the part of Tramco had not arisen and in all respects as if the Tram Supply Agreement had been made between **tie** and Tramco to the exclusion of Infraco.

5.6 Notwithstanding that as between Infraco and Tramco, Tramco's right of determination of its engagement under the Tram Supply Agreement may not have arisen, the provisions of clause 5.5 shall nevertheless apply if **tie** gives written notice to Tramco and Infraco to that effect and **tie** complies with the requirements on its part under clause 5.4.

5.7 Tramco does not need to be concerned or required to enquire whether, and shall be entitled to assume that, as between Infraco and **tie**, the circumstances have occurred permitting **tie** to give notice under clause 5.6.

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5.8 Tramco acting in accordance with the provisions of this clause 5 shall not incur any liability to Infraco arising out of the exercise by **tie** of its rights under this clause 5.

5.9 Save as otherwise set out in this Agreement, unless and until **tie** has given notice under this clause 5:

5.9.1 **tie** has no liability whatsoever to Tramco in respect of amounts payable to Tramco under the Tram Supply Agreement; and

5.9.2 **tie** has no authority to issue any direction or instruction to Tramco in relation to the performance of Tramco's obligations under the Tram Supply Agreement.

5.10 Without prejudice to the provisions of clauses 5.1 to 5.9 inclusive, if prior to the service of any notice under clause 5.4 Tramco is determined under the Tram Supply Agreement for any reason whatsoever, Tramco shall, if required in writing so to do by **tie**, no later than 12 weeks after the date of such determination forthwith enter into a new agreement with **tie** on the same terms as the Tram Supply Agreement, but with such revisions as **tie** and Tramco may reasonable require to reflect altered circumstances and the fact that it is **tie** and not Infraco employing Tramco.

6. ASSIGNATION

6.1 Tramco shall not assign, novate or otherwise transfer the whole or any part of this Agreement without the prior written agreement of **tie**.

6.2 **tie** shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

6.2.1 to the Scottish Ministers or any local authority or other body with no worse financial standing than that of **tie**; or

6.2.2 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to Tramco) by **tie** or a person falling within clause 6.2.1; or

6.2.3 to City of Edinburgh Council or Transport Edinburgh Limited; or

6.2.4 to any other person with the prior written consent of Tramco (such consent not to be unreasonably withheld or delayed).

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6.3 Tramco undertakes to **tie** not to contend in any court proceedings under this Agreement that any person to whom **tie** assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this clause is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that **tie** is named under this Agreement or any intermediate assignee of **tie** escaped loss resulting from such breach by reason of the disposal of its interest in the same.

7. LIABILITY OF TRAMCO

7.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by law of contract, delict or otherwise.

7.2 The responsibility of Tramco under this Agreement is not to be reduced or in any way reduced or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by **tie** against a third party.

7.3 The rights and remedies conferred upon **tie** by this Agreement are in addition to any other rights and remedies that **tie** may have against Tramco including (without prejudice to the generality of the foregoing) any remedies in delict.

7.4 Subject to the other provisions of this Agreement, the liability of Tramco to **tie** is to be determined in all respects in accordance with the terms of the Tram Supply Agreement and this Agreement and, in the event of any claim by **tie** under or through this Agreement, Tramco shall be entitled to rely upon any defence, right, limitation or exclusion under the Tram Supply Agreement as though **tie** were named as Client under it, except that:

7.4.1 **tie** shall not be affected by any subsequent variation of the Tram Supply Agreement which would adversely affect the obligations owed by Tramco or the waiver, compromise or withdrawal of any claim made Infraco; and

7.4.2 Tramco shall not be entitled to exercise any right of set-off, retention or withholding against **tie** to which Tramco may be entitled as against Infraco.

7.5 The liability of Tramco under this Agreement shall be no greater in extent than the liability of Tramco under the Tram Supply Agreement.

7.6 In no event shall the Tram Supplier be responsible for indirect or consequential damages.

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8. DELIVERY, TITLE TO PARTS AND OTHER PROPERTY

Notwithstanding any provision of the Tram Supply Agreement to the contrary, in respect of Tramco's performance of its obligations under the Tram Supply Agreement:

8.1 Tramco shall sell to **tie** or such other party as shall be notified by **tie** to Tramco in writing, each Tram free from all claims, charges, rights in security, liens, encumbrances, hypothecs and other third party rights of any nature.

8.2 Tramco shall transfer title:

8.2.1 to each Tram, to **tie** or such other party as shall be notified by **tie** to Tramco in writing, on the date of issue of the Certificate of Tram Delivery being issued in respect of that Tram;

8.2.2 to each item of the Tram Related Equipment to **tie** or such other party as notified by **tie** to Tramco in writing, on the later of delivery of each item of the Tram Related Equipment to Infraco and the Certificate of Tram Commissioning being issued in respect of the first Tram.

8.3 The risk of loss, theft, damage or destruction of:

8.3.1 each Tram shall pass from Tramco to **tie** or such other party as notified by **tie** to Tramco in writing on the date of issue of the Certificate of Tram Delivery being issued in respect of that Tram;

8.3.2 each item of the Tram Related Equipment shall pass from Tramco to **tie** or such other party as notified by **tie** to Tramco in writing, on the later of delivery of each item of the Tram Related Equipment and the Certificate of Tram Commissioning being issued in respect of the first Tram.

8.4 Tramco shall be responsible for each Tram completely manufactured or in the course of manufacture and for all Tram Related Equipment until such time as risk in the Trams and the Tram Related Equipment passes to **tie** (or as **tie** otherwise shall direct) in accordance with this clause 8.

8.5 Tramco undertakes to **tie** that it shall promptly replace any Tram or any part, component or material incorporated in or to be used in connection with such Tram or any Tram Related Equipment, which is lost, damaged or destroyed by whatever cause, prior to such passing of risk.

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9. CONSENT OF INFRACO

Infraco consents to the terms of this Agreement.

10. NOTICES

10.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

10.2 Any notice given pursuant to this clause, if sent by registered or recorded delivery post, is deemed to have been received 48 hours after being posted.

11. RIGHTS OF THIRD PARTIES

A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

12. INVALID TERMS

12.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

12.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

12.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

13. VARIATIONS AND WAIVERS TO BE IN WRITING

13.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

14. WAIVER

14.1 Save where expressly stated, no failure or delay by any Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

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14.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do no operate to exclude one another or any rights or remedies provided by law.

15. JURISDICTION AND LAW

15.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

15.2 The Parties agree that any dispute in relation to this Agreement shall be conducted in accordance with Clause 64 (*Dispute Resolution Procedure*) of the Tram Supply Agreement and the provisions of the said Clause 64 and Schedules 13 (*Dispute Resolution Procedure*) and 14 (*Panels to the Dispute Resolution Procedure*) are deemed to be incorporated mutatis mutandis in respect of this Agreement provided that any reference to "Parties" shall be deemed to refer to **tie** and Tramco, any reference to "Client" shall be deemed to refer to **tie**, and notices to be given in connection therewith shall be given in accordance with clause 10 of this Agreement.

IN WITNESS WHEREOF these presents on this and the preceding [◆] pages are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

TIE00899939_0200

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **SIEMENS PLC**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

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EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

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NOVATION AGREEMENT ESCROW LETTER

DLA Piper Scotland LLP
Collins House
Rutland Square
EDINBURGH
EH1 2AA

[**Date**] 2008

Dear Sirs,

EDINBURGH TRAM NETWORK - TRAM SUPPLY AND TRAM MAINTENANCE AGREEMENTS

We refer to:

1. a Tram Supply Agreement dated ◆ between (1) **tie** Limited and (2) Construcciones Y Auxiliar De Ferrocarriles S.A. (CAF) for the design, manufacture and supply of Trams and the supply of documentation and associated equipment ("**Tram Supply Agreement**"); and

2. a Tram Maintenance Agreement dated ◆ between (1) **tie** Limited and (2) Construcciones Y Auxiliar De Ferrocarriles S.A. (CAF) for the provision of services for the ongoing maintenance of Trams and for the supply of consumables and spares for Trams ("**Tram Maintenance Agreement**").

We also refer to the documents detailed in Schedule 1 to this letter (items numbered 1 and 2 being referred to as the "**Novation Agreements**" and items 3 and 4 being referred to at the "**Collateral Warranties**") which have been signed by **tie** Limited and Construcciones Y Auxiliar De Ferrocarriles S.A. (CAF) (but which are as at today's date unsigned by Infraco) (as referred to below) (which shall be referred to as the "**Agreement Documents**").

Originals of the Agreement Documents are enclosed with this letter, and are to be held by you as escrow agent upon the following terms and conditions:

3. Whilst the Agreement Documents are held by you in escrow, they shall have no effect as between the parties thereto.

4. Upon **tie** Limited confirming to you in writing in the form set out in Schedule 2 that an agreement to be made between (1) **tie** Limited and (2) a contractor to be appointed by **tie** Limited ("**Infraco**") to carry out and/or manage the design, construction, installation, commissioning, tram procurement, system integration, infrastructure maintenance, tram maintenance and supply of related equipment and materials, trams and related infrastructure in respect of the Edinburgh Tram Network ("**Infraco Contract**") has been executed by **tie** and Infraco in accordance with the Requirements of Writing (Scotland) Act 1995 and that the

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Infraco Contract has become unconditional in all respects save only for the execution by Infraco of the Agreement Documents ("**Infraco Completion**"), you are thereupon authorised and directed forthwith:

to deliver the Agreement Documents to Infraco for execution by Infraco in accordance with the Requirements of Writing (Scotland) Act 1995. Delivery of documents hereunder is to be by hand, by courier or by recorded first-class post.

If you do not receive notice from **tie** Limited as aforesaid that Infraco Completion has occurred before the first anniversary of the date of this escrow letter, or such later date as may be agreed in writing by the parties to this escrow letter, you shall be under no further obligation to the signatories of this letter and none of the Agreement Documents shall have any legal effect.

All of the parties to this escrow letter agree that you shall be fully entitled to act in accordance with the terms set out in this escrow letter upon receipt by you of the notice from **tie** Limited referred to in paragraph 2 above, and that in so doing you shall have no liability to us (or any of us) in any respect whatsoever connected to the performance of your duties under this escrow letter. Furthermore, upon the performance of such duties in accordance with the terms of this escrow letter, you shall be irrevocably released from the obligations arising under this escrow letter.

Please sign the acknowledgement below confirming your agreement to the above terms.

Yours faithfully

They are subscribed for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at

on 2008 by:

Authorised Signatory _____

Full Name _____

.....
Accepted and agreed:
DLA Piper Scotland LLP

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SCHEDULE 1 OF THE NOVATION AGREEMENT ESCROW LETTER

AGREEMENT DOCUMENTS

Document No.	Document Description	Parties
	Tram Supply Agreement Novation Agreement	(1) **tie** Limited (2) Construcciones y Auxliliar de Ferrocarriles (CAF) (3) Bilfinger Berger UK Ltd and Siemens plc
	Tram Maintenance Agreement Novation Agreement	(1) **tie** Limited (2) Construcciones y Auxliliar de Ferrocarriles (CAF) (3) Bilfinger Berger UK Ltd and Siemens plc
	Tram Supply Agreement Collateral Warranty	(1) Construcciones y Auxliliar de Ferrocarriles (CAF) (2) **tie** Limited (3) Bilfinger Berger UK Ltd and Siemens plc
	Tram Maintenance Agreement Collateral Warranty	(1) Construcciones y Auxliliar de Ferrocarriles (CAF) (2) **tie** Limited (3) Bilfinger Berger UK Ltd and Siemens plc

They are subscribed for and on behalf of **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)**

at

on 2008 by:

Authorised Signatory _____

Full Name _____

They are subscribed for and on behalf of **TIE LIMITED** at

on 2008 by:

Authorised Signatory _____

Full Name _____

SCHEDULE 2 OF THE NOVATION AGREEMENT ESCROW LETTER

RELEASE LETTER

To: DLA Piper Scotland LLP
Collins House
Rutland Square
Edinburgh EH1 2AA

[Date] 200◆

We, **tie** Limited, refer to the escrow letter dated ◆ from us and Construcciones y Auxliliar de Ferrocarriles (CAF) to you and countersigned by you. Words and phrases defined in the escrow letter shall have the same meanings when used herein.

We hereby confirm to you, by reference to paragraph 2 of the escrow letter that Infraco Completion has taken place, and you are therefore hereby authorised and directed forthwith to deliver the Agreement Documents to Infraco for execution in accordance with the Requirements of Writing (Scotland) Act 1995 (by hand or courier or recorded first-class post) in accordance with paragraph 2 (a) of the escrow letter.

Director/Authorised Signatory,

For and on behalf of **tie** Limited

They are subscribed for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at

on 2008 by:

Authorised Signatory _____

Full Name _____

They are subscribed for and on behalf of **TIE LIMITED** at

on 2008 by:

Authorised Signatory _____

Full Name _____

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

TIE00899939_0206

This is Schedule 2 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 2

EMPLOYER'S REQUIREMENTS

SCHEDULE PART 2

EMPLOYER'S REQUIREMENTS

Erratum to Version 4

Erratum	Date	Comments
001	24/04/08	Page 48: Section 2.15: The footnote "Damian has already instructed this change." – is to be ignored.
002	24/04/08	Page 90: Section 7: The footnote "The word maximum would allow no channels to be provided and still be compliant! Two channels ok as a minimum." – is to be ignored.
003	24/04/08	Page 147: Section 10.1.5: The reference in the last sentence to Schedule 32 is incorrect. It should read "The Noise and Vibration Policy is included in Schedule Part 29 (***tie*** *and CEC Policies*)".
004	24/04/08	Page 174: Section 12.9 - The reference to Schedule 45 should refer to Schedule Part 40.
005	24/04/08	Page 209: Section 17.1: Last paragraph The reference to Section 32 should read Schedule Part 29. After Project Safety and Quality Interface Document add (40-91-PLA-002).
006	24/04/08	Page 273: Section 23.16.6 - Schedule 7 - Performance Regime is incorrect. This should now refer to Schedule Part 6.
007	24/04/08	Page 609: Section 40.1.2 – Final paragraph Performance payment regime – The reference to Schedule 7. This should now refer to Schedule Part 6.
008	24/04/08	Page 634: Section 40.2.4 Last line Reference to Clause 52 of Infraco should read as Clause 52.20.1.
009	24/04/08	Page 635: Section 40.2.4 Table 93 Fault Category 3 “Edqual Service elements in Schedule 7” should read “Equal Service elements in Schedule Part 6”.
010	24/04/08	Page 645: Section 40.2.8 Last set of bullet points at bottom of page Reference to Schedule 7 Performance Measurement System should read as Schedule Part 6.
011	05/05/08	Page 40 Section 2.8 Table 2 reformatted to show entire contents (see attached)
012	05/05/08	Page 41 Section 2.8 Table 3 reformatted to show entire contents (see attached)
013	05/05/08	Page 42 Section 2.8 Table 4 reformatted to show entire contents (see attached)
014	05/05/08	Page 431 Section 29.14 Table 83 see updated version (see attached)
015	05/05/08	Page 610 Section 4.2.2 Table 89 see updated version (see attached)
016	05/05/08	Page 50 Section 2.16(b) 4th bullet - delete “Leith” and replace with “Ocean Terminal or Newhaven according to service”
017	05/05/08	Page 147 Section 10.1.7 - delete “Section 68 of the Edinburgh Tram Line Act 2006” and replace with “Section 63C of the Edinburgh Tram Line Act 2006”
018	05/05/08	Page 169 Section 12.8 Update reference to ISO 10005-1995 to ISO 10005-2005
019	05/05/08	Page 260 Section 23.13.3 - delete “Network” from section heading
020	05/05/08	Page 264 Section 23.14.3 - delete “Network” from section heading
021	05/05/08	Page 266 Section 23.15.3 - delete “Network” from section heading
022	05/05/08	Page 318 Section 24.5 Change reference to Schedule 22 of the Tram Supply Agreement to Schedule 23 of the Tram Supply Agreement
023	05/05/08	Page 318 Section 24.6 3rd paragraph should read “The Trams shall have a key suiting system that provides a logical hierarchy of access to cleaners, inspectors, drivers and maintenance staff. It shall not be part of the general suite but tram specific as detailed in Section 22.2.1 of these Employer’s Requirements.”

Erratum	Date	Comments
024	05/05/08	Page 622 Section 40.2.2 Table 92 Structures SO3 and SO4 - delete "(if CEC own it)" from the comments column
025	05/05/08	Page 625 Section 40.2.2 Table 92 Structures S20 to S31 - insert "the Operator is responsible for cleaning and graffiti removal" to the comments column
026	05/05/08	Page 627 Section 40.2.2 Table 92 Retaining Walls W03 to W19 - insert "the Operator is responsible for cleaning and graffiti removal" to the comments column
027	05/05/08	Page 632 Section 40.2.4 Final paragraph headed "**Further Maintenance Activities" -** delete bullet "removal of graffiti" and bullet "cleaning"
028	05/05/08	Page 644 Section 40.2.8 Under heading "Reporting Period Review", 4th bullet relating to maintenance report, sub-bullets 1 and 2 - delete "including cleaning"
029	05/05/08	Page 646 Section 40.2.10 3rd paragraph - delete "operational phase" and replace with "Term"
030	05/05/08	Page 652 Section 40.2.19 - delete section and insert "Not used"
031	05/05/08	Page 652 Section 40.2.20 - delete bullets 1 to 4, and 6
032	05/05/08	Page 662 Section 40.3.9 1st paragraph - delete "will be established in detail during the tender process" and replace with "in the Tram Maintenance Agreement"
033	05/05/08	Page 665 Section 40.4.1 9th paragraph 3rd sentence - replace with "The Edinburgh Tram Network design shall be selected such that all equipment/systems used in the design shall continue to be available for the design life specified and that the Infraco shall give tie a minimum of 12 months notice where any supplier intends to cease supply of any component. The Infraco shall recommend a strategy for managing such obsolescence and effect replacement of such components where these fail."
034	05/05/08	Page 672 Section 40.5.2 6th bullet - amend to read "evidence of product whole life cycle experience to date in other service use"
035	05/05/08	Appendix 1 – ET Brand Guidelines as referred to in Section 5 (see attached)

Employer's Requirements

Erratum 011

Table 2 (Page 40 Section 2.8)

Network / Phasing	Service frequency commencing at:	Monday - Friday (trams per hour)					
		first tram 06:00	06:45	07:00	07:20	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Network / Phasing	Service frequency commencing at:	Saturday (trams per hour)					
		first tram 06:00	06:45	07:30	07:50	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Network / Phasing	Service frequency commencing at:	Sunday (trams per hour)					
		first tram 07:00	07:45	08:00	08:20	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Notes:

[a] from approx 23:15 Trams run from the Airport - City Centre only

[b] from approx 23:15 Trams run from Granton - City Centre only

[c] from approx 23:15 Trams run from Newhaven - Haymarket continuing in service on TL2 to Gyle

Employer's Requirements

Erratum 012

Table 3 (Page 41 Section 2.8)

8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario

Networking (Phasing) and Service Frequency commencing at:		06:00	06:45	07:00	07:20	07:45	09:45	15:45	19:00	19:45	23:15
1a	Airport to Ocean Terminal	0	6	8	8	8	6	6	8	6	6a
1a	Ocean Terminal to Airport	6	6	8	8	8	6	6	8	6	6
1a	Haymarket to Newhaven	0	[redacted]	6	8	8	6	6	8	6	6
1a	Newhaven to Haymarket	0	[redacted]	0	6	8	6	6	8d	6	6
1b	Airport to Ocean Terminal	0	6	8	[redacted]	8	6	6	8	6	6a
1b	Ocean Terminal to Airport	6	6	8	[redacted]	8	6	6	8	6	6
1b	Granton to Haymarket	0	6	8	[redacted]	8	6	6	8	6	6 b
1b	Haymarket to Granton	6	6	8	[redacted]	8	6	6	8	6	6c

Networking (Phasing) andService Frequency commencing at:		Saturday (trams per hour) first tram 06:00	06:45	07:30	07:50	08:15	18:30	18:50	19:15	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	8	[redacted]	8	8	6	6a	0
1a	Ocean Terminal to Airport	6	6	6	8	[redacted]	8	8	6	6	0
1a	Haymarket to Newhaven	0	[redacted]	6	8	[redacted]	8	8	6	6	0
1a	Newhaven to Haymarket	0	[redacted]	0	6	[redacted]	8	8d	6	6	0
1b	Airport to Ocean Terminal	0	6	6	8	8	8	[redacted]	6	6a	0
1b	Ocean Terminal to Airport	6	6	6	8	8	8	[redacted]	6	6	0
1b	Granton to Haymarket	0	6	6	8	8	8	[redacted]	6	6b	0
1b	Haymarket to Granton	6	6	6	6	8	8	[redacted]	6	6c	0

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Networking (Phasing) andService Frequency commencing at:		Sunday (trams per hour)									
		first tram 07:00	07:45	07:50	08:00	08:45	18:00	18:20	18:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6		6	6		6a	0
1a	Ocean Terminal to Airport	6	6	6	6		6	6		6	0
1a	Haymarket to Newhaven	0		6	6		6	6			0
1a	Newhaven to Haymarket	0		0	6		6	6d			0
1b	Airport to Ocean Terminal	0	6		6	6	6		6	6a	0
1b	Ocean Terminal to Airport	6	6		6	6	6		6	6	0
1b	Granton to Haymarket	0	6		6	6	6		6	6b	0
1b	Haymarket to Granton	6	6		6	6	6		6	6c	0

Notes:
a) from approx 23:15 trams run from Airport - St Andrew Sq only
b) from approx 23:15 trams run from Granton - St Andrew Sq only
c) from approx 23:15 Granton trams run from Newhaven - Haymarket continuing in service on to Gyle
d) from approx 19:20 (18:50 Saturdays and 18:20 Sundays) Haymarket trams running from Newhaven - Haymarket continue in service to Gyle

Note: The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Employer's Requirements

Erratum 013

Table 4 (Page 42 Section 2.8)

TIE00899939_0215

Phase	Service Frequency	Saturday (trams per hour)					
		First tram					Last tram
	commencing at:	06:00	06:45	07:30	07:50	23:15	23:59
1a	Airport to Ocean Terminal	0	6	6	6	6a	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6	6	6	6a	0
1b	Ocean Terminal to Airport	6	6	6	6	6	0
1b	Granton to Newhaven	0	6	6	6	6b	0
1b	Newhaven to Granton	6	6	6	6	6c	0

Employer's Requirements

Erratum 014

Table 83 (Page 431 Section 29.14)

TIE00899939_0217

Table 83 - Depot Plant and Equipment to be Provided (updated 020508)

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
1		Cleaning Equipment										
	1.1	Tram Cleaning Equipment	Equipment for cleaning of tram interiors	110V Industrial vacuum cleaning equipment, ≥ 2kW power Equipment to allow removal Floor polishing equipment	P	Generally used in stabling areas However can be used throughout the Depot	T	O	O	O	O	6
	1.2	Tram pressure washer	Industrial washer for general tram cleaning within the Depot including bogie washing	Self powered Hot water/steam - self heating Pressure variable up to ≥200 bar Flow rate ≥12 l/min Lance and hose ≥10m Detergents compatible with Tram external finishes	M	Throughout Depot	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.3	Infraco pressure washer	Removal Removal of fly posters General cleaning	Features as per Tram pressure washer Mobile towable bowser with capacity for up to one shift of cleaning Infraco to ensure interchangability with tram pressure washer Readily transportable on back of road-rail and other road vehicles	M	Across the ETN	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.4	Tram Washing Plant	Fixed plant for cleaning of Tram exterior	Unidirectional >15 tph continuously Minimised water consumption, maximised water recirculation controllable and monitored from Control Centre via SCADA system Self contained Pre-wet One pair application brushes Automatic end wash Two pair water wash brushes Dryer Operates from -5°C ambient external temperature within shelter Final details TBD with tram supplier ≥70% water recycling	F	Alongside main workshop	I	O	O	O	O	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Backflow prevention devices shall be installed. Treatment of wastewater to meet appropriate standards prior to connecting to site drainage system shall be provided.								
	1.5	Rail Groove Cleaning Equipment	P-way cleaning	Vacuum equipment to remove detritus/debris from grooved track including drain boxes and points Able to clean drains and gullies employing water jets Transportable on road/rail vehicle, lifted with crane or fork lift truck	M	Across the ETN	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Self powered for full shift Easy collection/disposal of detritus/debris								
	1.6	Parts washer	Infrastructure/Tram component cleaning & degreasing in dirty workshop	Able to wash components ≤100kg, ≤750mm diameter	F	Within dirty workshop	I	I/T	I	I	User	1
	1.7	Floor scrubber	Depot floor cleaning	Industrial vacuum/brush scrubber equipment Compatible with floor finishes	M	Within Depot building	T	T	T	T	T	1
2		Mechanical Handling										
	2.1	Shunter	Manouveuring Trams within workshop	Battery powered Road/rail capability Capable of towing/propelling single Trams Speed up to 3 km/h Local and remote control	M	Throughout Depot tracks Road capability to move between tracks on	T	O/T	~~I/~~T	O	User	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Charging facilities Coupler at each end		hardstanding						
	2.2	Tram lifting system and stands	Lifting Trams to allow routine maintenance and removal of bogie(s)	Fixed underfloor system providing flush floor when not in use. Ability to lift fully functional, unladen tram. Synchronised lift from single control panel. Ability to stop and lock lift at any vertical positionInterlocking to protect Tram in event of system/component failure. Manually positioned stands to be provided Interlocking with OLE if required.	F	Main workshop	I	T	T	T	T	1 set

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.3	Fixed high level access platforms	To allow access to all equipment mounted on Tram roof	Capable of providing access to all roof mounted equipment on tram Decking to prevent tools or small to components falling through Handrails and toeboards to prevent personnel/material falling Access/egress gates interlocked with OLE End protection	F	Main workshop	I	T	I	T	T	2 sets
	2.4	Overhead crane	Bridge type crane spanning 2 roads within the workshop to allow all material within main workshop to be transported up to and including size/weight of motor bogie	≥6.3 tonne capacity Vertical clearance <960 mm from hook (fully raised) to top of crane Traverses below OLE Interlocked with OLE Remote control using hand held device	F	Main workshop	I	T/I	T	T	User	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Multi-speed faciltiy - lift, traverse and travel Long and cross travel to cover all areas over the two roads								
	2.5	Mobile crane	Facilitate removal of miscellaneous equipment including bogie components within the dirty workshop	≥2t capacity Powered operation	M	Throughout workshops	T	T/I	T	T	User	1
	2.6	Bogie workstands	To allow dismounted bogies to be maintained	Allows bogie to be manoeuvred along the stub track in the dirty workshop Wheel locks Capable of supporting both trailer and motor bogie	M	Dirty workshop	T	T	T	T	T	1
	2.7	Other tram equipment stands	Various stands to allow items of equipment to be stored and readily maintained when dismounted from the Tram	Infraco to propose depending on tram design Expected to include stands for doors,	M	Throughout Depot	T	T	T	T	T	

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				windows, body panels etc…								
	2.8	Accommodation bogies	To allow Trams to be moved within workshop once bogies have been removed or the Tram has been split at any articulation	Allows Tram to be manoeuvred throughout the depot once any combination of bogies has been replaced Allows entire tram to be manoeuvred throughout the depot once any articulation has been split	M	Throughout Depot	T	T	T	T	T	
	2.9	Fork lift truck	Lifting and transporting miscellaneous equipment	Battery powered Charging facilities Road wheels >3 t lifting capacity Drum handling equipment Crane arm Capable of accessing	M	Throughout the Depot but limited to hard standing areas when outside	T & I	T/I	T & ~~/~~I	T & I	User	1 plus 1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				all shelving and racking in stores- Infraco to demonstrate								
	2.10	Pallet truck	Lifting & Transporting equipment particularly in stores	Manually manoeuvred, hydraulic lifting the Infraco to propose requirements. Infraco to provide integrated solution	M	Throughout the Depot but limited to hard standing areas when outside	I	T/I	T/I	T	User	The Infraco to propose
	2.11	Hand trolleys	Transporting tools and spares	Unpowered the Infraco to propose requirements. Infraco to provide integrated solution	M	Throughout the Depot but limited to hard standing areas when outside	I	T/I	T/I	T	User	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.12	Infraco lifting slings	General slings for lifting infrastructure heavy components on system and in Depot building	Infraco to propose. Stand for storage	P	Use on system infrastructure	I	I	I	I	I	The Infraco to propose
	2.13	Tram lifting slings	Specific lifting gear to allow all equipment to be removed and replaced.	Raised hook on overhead crane can be no more than 5390 mm ARL the Infraco to propose Stand for storage	M	Use in Depot building only	T	T	T	T	T	Tramco to propose
	2.14	Windscreen/window removal equipment	For use in replacing tram windscreens and side windows	Mobile stand capable to being used to access both windscreen and side windows Electrically powered vacuum beam with suckers adapted to windscreen design Audio/visual alarm in the event of suction loss	M	Use in Depot building only	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.15	Re-railing equipment	For use in re-railing trams out on the System	Variety of jacks/beams/slides to be proposed by the Infraco Airbags Slew locking devices Capable of being readily transported on the road/rail vehicle	M	Used any where on system including Tramstops	T	T	T	T	T	1 set
	2.15	Stop boards	To indicate the presence of equipment/personnel/trams on the tracks	The Infraco to propose requirements. Infraco to develop integrated solution	P	Throughout System	I	T/I	I	T/I	User	≥20
3		Workshop & Stores Furniture										
	3.1	Shelving and racking	Storage of spares and other material	Heavy duty The Infraco to propose requirements. The Infraco to develop integrated solution	F	Stores	I	T/I	I	T/I	User	The Infraco to propose
	3.2	Tram staging	for Tram inspections/repairs	The Infraco to propose any	M	Used within Depot	T	T	T	T	T	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				additional staging required		building						
	3.3	General staging	For infrastructure inspections/repairs	The Infraco to propose any additional staging required	M	Across Edinburgh Tram Network	I	I	I	I	I	The Infraco to propose
	3.4	Shelving	Storage of minor items/documents	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose
	3.5	Workbenches	Equipment maintenance	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose
	3.6	Cupboards	Storage of minor items/documents	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose
	3.7	COSHH cupboard	Storage of COSHH items	The Infraco to propose requirements. The	F	Dirty workshop	I	T/I	I	T/I	user	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Infraco to develop integrated solution								
	3.8	Workshop stools	Personnel comfort when working	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	T/I	T/I	Us er	The Infraco to propose
4		Fixed Plant										
	4.1	Air conditioning maintenance equipment	Specialist tools for filling/emptying refrigerant	The Infraco to propose	F	Anywhere in Depot building	T/I	T/I	T/I	T/I	T/I	The Infraco to propose
	4.2	Tyre replacement equipment	Specialist tools for tyre splitting/removal/balancing /bearing replacement	The Infraco to propose	F	Dirty workshop	T	T	T	T	T	1
	4.3	Underfloor wheel lathe	In-situ reprofiling of Tram tyres	Capable of producing a range of wheel profiles. Tolerances to be agreed between the Infraco Swarf conveyed to skip for removal by means of forklift truck capable of turning all wheels on one Tram within	F	Within Depot building.	I	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				eight hour shift								
	4.4	Sand Plant	Refilling of Tram sanding equipment	Minimum silo capacity 30 tonnes Capable of receiving sand delivery directly from road vehicle Allows Tram driver to fill an empty tram within 5 minutes Rate of fill to be sustainable for 30 minutes. In no circumstances shall the interval between the filling of two Trams exceed 10 minutes The physical condition of the sand shall not deteriorate when stored Sand deliveries to a	F	Dedicated facility	T	O	O	O	~~I~~T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Tram shall stop automatically when the tram sand box is full Sand filling nozzles to be compatible with the sand filling inlets on the trams Signal interlocking to inhibit the movement of a tram if the sand filling nozzles are not returned to their correct storage position.								
	4.5	Machine tools	General machine tools required for maintenance	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Dirty workshop	I	T/I	T/I	T/I	User	The Infraco to propose
	4.6	Paint booth	Respraying of removable Tram panels	For use with water based paints integrated compressor	F	Outside workshop	T	T/I	T/I	T	User	1
	4.7	Pantograph	to calibrates and align	The Infraco to	F	Throughout	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
		maintenance & load test jig	tram pantograph off Tram roof	propose		workshops						
	4.8	Suspension setting equipment	To allow suspension to be set/shimmed without using tram lift	The Infraco to propose	M	Throughout workshops	T	T	T	T	T	1
	4.9	Diesel generator	Back up power source	Capable of connection to the depot LV switchboard and other plant requiring an external energy source. Capable of providing at least three day continuous operation.	M	Across network	*	I, T & O	~~I~~*	I		*To be rented by the Operator if and when required.
5		Hand & Mobile Tools										
	5.1	Infrastructure tools	Hand tools	The Infraco to propose	P	Across ETN	I	I	I	I	I	The Infraco to propose
	5.2	Tram tools	Hand tools	The Infraco to propose	P	Across ETN	T	T	T	T	T	Tramco to propose
6		Welding Shop Equipment										
	6.1	Ferrous welding equipment	General infrastructure repairs	The Infraco to propose requirements. Infraco	F	Dirty workshop	I	T/I	I	T/I	User	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				to develop integrated solution								
	6.2	Aluminium welding equipment	Specialist Tram and Tram shelter repairs	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Dirty workshop	I	T/I	I	T/I	Us er	The Infraco to propose
7		Battery Shop Equipment										
	7.1	Tram battery charger	To recharge Tram Batteries	The Infraco to propose	P	Battery room	T	T	T	T	T	The Infraco to propose
	7.2	Infrastructure battery chargers	To recharge various batteries used in power supply, control and comms equipment	The Infraco to propose and develop solution compatible with tram battery charger	P	Battery room	I	T	T	T	T	The Infraco to propose
8		Instrumentation and Test Equipment										
	8.1	Tram test equipment	To allow testing of measurement and testing of tram equipment	The Infraco to propose. Note any overlap with "Special Tools" to be highlighted. As a minimum, proposal to	M/P	The Infraco to propose	T	T	T	T	T	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				include; headlight tester, tools to allow event recorder to be downloaded and interrogated, tools to allow CCTV systems to be downloaded and interrogated, tools to allow PA and PID announcements to be re-configured.								
	8.2	Infrastructure and Fixed systems test equipment	To allow measurement and testing of infrastructure and fixed systems	The Infraco to propose. Note any overlap with "Special Tools" to be highlighted as a minimum, proposal to include; OLE height and stagger gauge, stray current data loggers, noise measurement equipment, ride measurement equipment, point	M/P	The Infraco to propose	I	I	I	I	I	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				setting detection equipment, ≥3 sets of live line testing equipment								
9		Infrastructure Maintenance Equipment										
	9.1	Portable P&C grinders	To dress points and crossings	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.2	Track welding equipment	to build up profiles/replace sections of track	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.3	Portable tamping equipment	To build up track ballast to realign track	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.3	Portable lighting equipment	To illuminate work/collision sites	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.4	Portable generators	To power site tools/lights	The Infraco to propose	P	On Site	I	I	I	I	I	2
	9.5	Track measuring Equipment	To allow track line and levels to be measured	The Infraco to propose	P	On site	I	I	I	I	I	1 set
10		Road Vehicles										

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	10.1	Road - rail vehicle	To move about the system carrying mobile equipment and personnel	Able to operate on UK roads Able to operate on all parts of the ETN To be equipped with demountable ≥2 man-basket to enable OLE inspection throughout the ETN Capable of towing a tram including ability to apply tram brakes from cab of road-rail vehicle Capable of having snow plough attached in both road and rail mode Crane with capacity ≥6t and a reach (reduced capacity) of at least 4m. Able to transport other equipment items as set out elsewhere in	M	Mobile throughout ETN and road network	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				this list Able to transport ≥3 personnel in cab Payload capability ≥10t This will make it a requirement that the driver has a LGV driving license. Powered winch with ≥8t pulling capacity								
	10.2	Other road vehicles	Miscellaneous vehicles to be proposed by Infraco	The Infraco to propose	M	Throughout road network	I	I	I	I	I	The Infraco to propose
	10.3	Road/rail trailer	Trailer with large man lift for OLE inspection/repairs	Capable of being towed to site by road/rail vehicle or truck	M	Throughout road network	I	I	I	I	I	1

Employer's Requirements

Erratum 015

Table 89 (Page 610 Section 4.2.2)

TIE00899939_0240

Table 89 – Infrastructure and Equipment Responsibilities Allocation Matrix

(updated 020508)

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Tram Stop Structure																
Platform surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Platform Inclined Approach		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Canopy		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Inside surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Internal Roof surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External Roof surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Integral Lighting		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Internal seating		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Stop Furnishings																
Stop Name Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Static Information Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Guard Rails/Barriers (as applicable)		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Lighting Columns		N/A	N/A	N/A	✗	✗	✗	✓	✗	✗	✓	✗	✗	✗	✗	✓
Lighting Lanterns		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Litter Bins		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External seating		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Platform Edge White Line		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Advertising Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Stop Equipment																
CCTV Cameras		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Public Address		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓

Loudspeakers																
Hearing Loops		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Passenger Information Displays		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Passenger Alarm/Help points		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Ticket Vending Machines (maintained & serviced by TEL)		N/A	N/A	N/A	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓
Drainage (Interface defined in Table 93)		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Trackside Equipments																
Stop Equipment Cabinets		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Stop Equipment Cabinet Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Traction Isolator Cabinets		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Traction Isolator Cabinet Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Point Control Cabinets		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Point Control Cabinet Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Point Heater Cabinets, Point Heaters & Controls		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Road Junction Cabinets		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗
Road Junction Cabinet Equipment		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗
Point Machines (including Manual Control)		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Contact Wire & Supports		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Poles		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Pole mounted Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Wall Fixings		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Wall fixed Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Tram Signal Heads (Roadside)		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✓

Tram Signal Posts (Trackside)		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Signals Posts		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Detector Loops		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Lighting on OLE Masts		N/A	N/A	N/A	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trackside cable ducts		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trackside cables		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Cable drawpits		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Structures (Bridges, Retaining Walls etc)																
Over Bridges See Table 95 for split		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Under bridges See Table 95 for split		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Retaining walls		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Misc Structures		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Swept Path		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Swept Path Markings		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Track																
Trackwork		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Points & Crossings		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Track Drainage		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Field' Stray Current Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Sub Stations																
Sub Station Buildings		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Sub Station Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Sub Station Compounds		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Sub Station Parking Facilities		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Stray Current Monitoring Points		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Stray Current Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Earthing Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trams																
Free issue' tram mounted equipments		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Trams		N/A	N/A	N/A	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✓

Tram saloon & Drivers cabs		N/A	N/A	N/A	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✓
Radio																
Portable radios		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Radio Base stations		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Landscaping																
Soft landscaping		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Hard Landscaping		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓

Floor	Room No.	Description	User Competence Assessor	Used by			Cleaned by			Maintained by			Access Controlled by		
				Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**
Stores, Workshops and Maintenance Area															
Ground Floor Level		Stores Office Centrally located	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✔	✘
		Heavy Store (Infraco)		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Heavy store (Tramco)		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Visitors Entrance Hall	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
		Workshop Cleaners Room	n.a	✔	✔	✘	✘	✔	✘	✔	✘	✘	✔	✔	✘
		Light Store (Infraco)		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Light Store (Tramco)		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Infrastructure Workshop		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Dirty Workshop / Machine Shop		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Clean Workshop (Infraco)		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Clean workshop (Tramco)		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Lobby	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Male Toilets	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Male Showers	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Female Toilets	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Female Showers	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Staff Corridor	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✘
		Infrastructure Admin	n.a	✔	✘	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Maintenance (Tramco) Admin	n.a	✘	✔	✘	✘	✘	✔	✔	✘	✘	✘	✔	✘
		First Aid	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
		Switchroom		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Infrastructure Manager	n.a	✔	✘	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Maintenance (Tramco) Manager	n.a	✘	✔	✘	✘	✘	✔	✔	✘	✘	✘	✔	✘
		Store Room (Cleaners?)	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✘	✘	✘
		Staff Entrance Hall	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
		Drying Room	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✔	✘
		Tram Batteries		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Equipment Room		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		UPS Room		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘

Floor	Room No.	Description	User Competence Assessor	Used by			Cleaned by			Maintained by			Access Controlled by		
				Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**
		Compressor Room - Air tools		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Tram Maintenance Area		✘	✔	✔	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Maintenance Area Transit Zone		✔	✔	✔	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Inspection Pits		✘	✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘
First Floor office accommodation			n.a	✘	✘	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
Furnishings - Used, Cleaned, Maintained and Controlled as appropriate															
Chairs, Desks, Tables, Filing cabinets etc			**As Appropriate**	✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
Kitchen and Catering Equipment				✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
Reception Desk & Furnishings				✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
Control Room Furnishings				✘	✘	✔	✘	✘	✔	✔	✘	✔	✘	✘	✔
Lockers, Coat Rails etc				✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
Training Room furnishings (Projector, Screen etc)				✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
External															
Depot Yard				✘	✘	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
Depot Stabling Area				✘	✘	✔	✔	✔	✔	✔	✘	✘	✘	✘	✔
Electrical Sub Station				✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
Power Energy Building (Electric, Gas etc)				✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
Depot Car Park				✘	✘	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Miscellaneous																
Communication & Control links		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓

	LEGEND
	Provided by Tram Maintainer
	Provided by the Infraco
✓	Responsible
✗	Not Responsible

Employer's Requirements

Erratum 035

Appendix 1 – ET Brand Guidelines



BRAND GUIDELINES JANUARY 2008

Edinburgh Trams

TIE00899939_0249

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Welcome to the Edinburgh Trams brand.

The Edinburgh Trams brand plays a crucial part in our communications with our customers and in creating a strong, memorable and recognisable image for the system. The brand has been specifically developed to sit alongside Lothian Buses as part of a co-ordinated presentation of public transport in Edinburgh.
For the strategy to succeed it is vital that all those involved in the delivery and service of the system adhere to the guidelines contained in this manual.
This will ensure that the Edinburgh Trams brand remains coherent and consistent. It is a well known fact that a well managed and consistently implemented brand helps inspire public confidence and trust.
By working within these guidelines you will help contribute to that process.

Phil Wheeler



Convener, Transport, Infrastructure and Environment
City of Edinburgh Council



Willie Gallaher
Chairman tie



David Mackay
Chairman TEL

TIE00899939_0251

Introduction

The elements and architecture of the Edinburgh Trams brand draw heavily from the Lothian Buses identity. This is to reinforce the strategy that has been adopted to create a genuinely integrated public transport system for Edinburgh.

Colours, typography and graphics are consistent between the two modes and are immediately recognisable as 'family members'.

The contents of this manual define how the branding must be implemented if the integrity of the visual relationship between the two modes is to be maintained.

In essence the branding is clean, simple and easy to understand - precisely the values the tram service provides.



TIE00899939_0252

Glossary

The key terms used in this document are as follows:

The Mark

A combination of the harlequins, the logotype and the red block.



The Logotype

The text of Edinburgh Trams set in Swiss 721BT. The logotype is used with the harlequins and the block in fixed relationships to form marks.



The Exclusion Zone

The minimum area around marks or logotypes that must be kept free of other graphic elements. This is to ensure that they are reproduced clearly and legibly without interference from other visual devices.



TIE00899939_0253

Guide to using the Mark

This page describes how the mark and the red block should be used.

Some simple rules are:

1. Never extend the red block unless the extended width of the red block to the left is more than 2 times the width of the mark and the extensions bleed off the page or media as illustrated by the header above. The extension to the right edge of the media should be half the width of the mark.

2. The red block should never be reduced in height when part of the mark alone but can be extended in height when the width is extended subject to rule 1.

3. The height should only be extended if the block is to bleed off the page or media.



TIE00899939_0254

Colour Glossary

To assist those who are involved in reproducing the Edinburgh Trams identity we have described here the primary specifications for print, screen and paint.

Print

PMS
This is short for the Pantone Matching System. This system is used to specify proprietary 'spot' colours. Spot colours are individually mixed for printing.

The letter 'C' after the colour number shows a colour's appearance on coated paper stock. The letter 'U' after the number shows a colour's appearance on uncoated paper stock.

CMYK
These initials represent the colours used in the four colour printing process: Cyan, Magenta, Yellow and Black (Kohl). Different combinations and percentages of these four colours are used to make matches to the 'spot' colours.

Screen

RGB
This is short for Red, Green, Blue the primary colours of light. RGB is used for reproduction on screens and electronic display systems.

Web
To make colours that can be reproduced on internet and intranet sites, Web safe colours should be specified. Web safe colours provide a greater degree of consistency than RGB colours when there is no control over the equipment used to view the site.

Paint

NCS
This is short for Natural Color System. NCS provides a wide range of colour specifications applicable to paints and other materials.

Other systems such as RAL and British Standard BS4800 have a limited number of Edinburgh Trams colour matches. Approval needs to be sought before using these systems.

TIE00899939_0255

Typography

We have two fonts: Humanist 521BT for general use and Swiss 721 BT which is only used to create the Logotype.

Only Roman, Bold and Light versions of Humanist 521 should be used with italic versions as appropriate.

Humanist 521 BT

Roman Aa

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

Bold Aa

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

Light Aa

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

TIE00899939_0256

Mark usage

The mark shown here is the only acceptable version to be used.

No other colours should be used and the mark should never be stretched or the proportions altered in any way.



TIE00899939_0257

Mark usage

When using a single colour mark the version on the right shows how to reverse out of white while the version on the left demonstrates reversing from black or another colour.





TIE00899939_0258

Mark usage

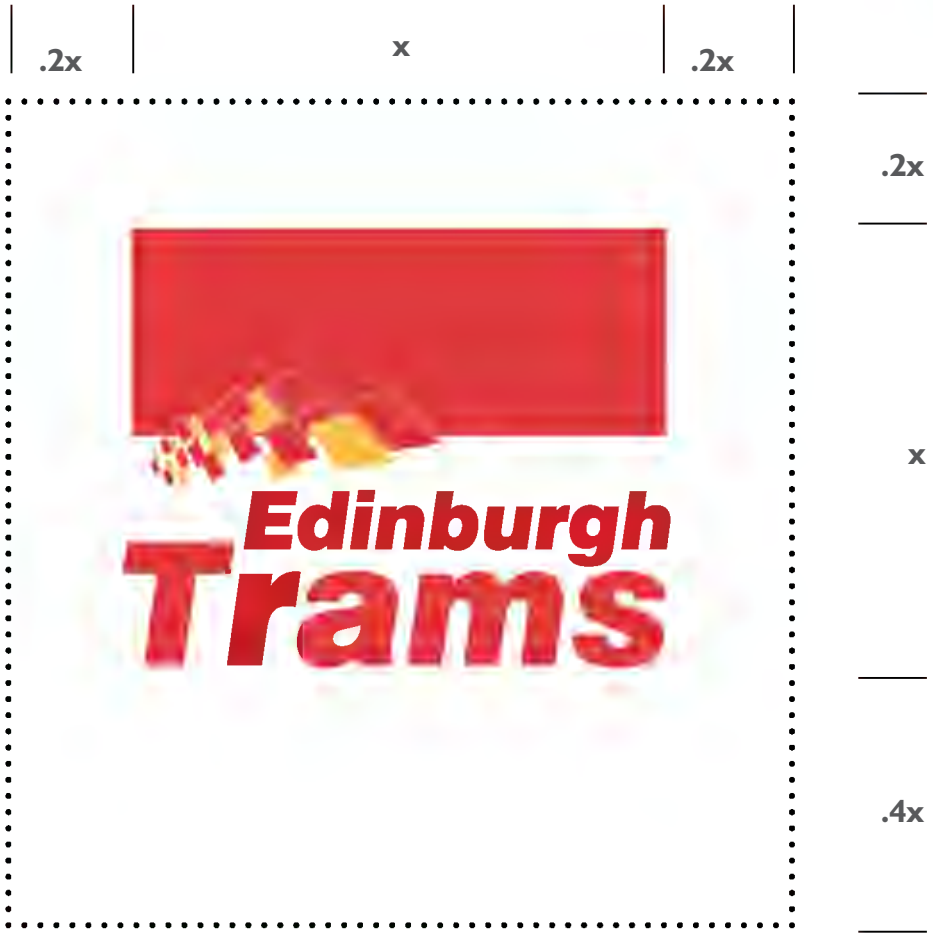
Another option when using a single colour mark, for example when positioned over an image as illustrated here, is to use a transparent mark.



TIE00899939_0259

Exclusion Zone

The dotted line indicates the zone into which no other graphic devices should be placed.



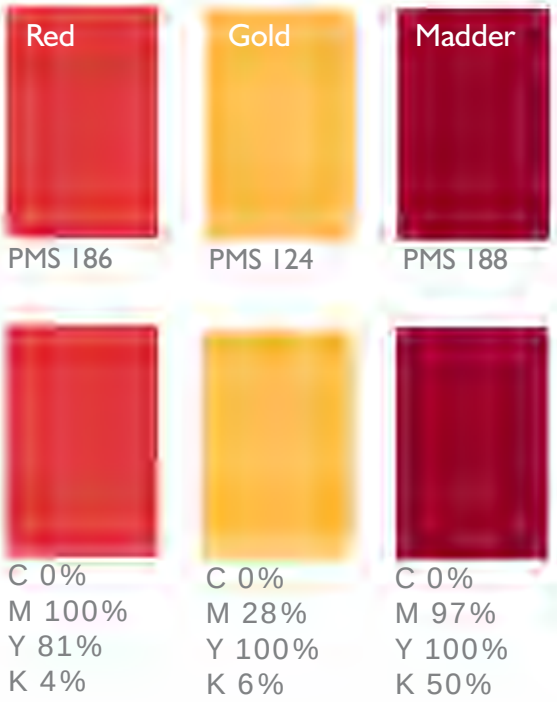
TIE00899939_0260

Colours

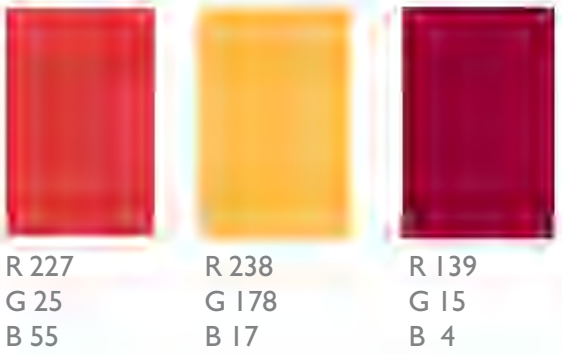
Three core colours make up the brand palette:
Red
Gold
Madder

In certain circumstances gold metallic ink in the form of PMS 873 can be used.

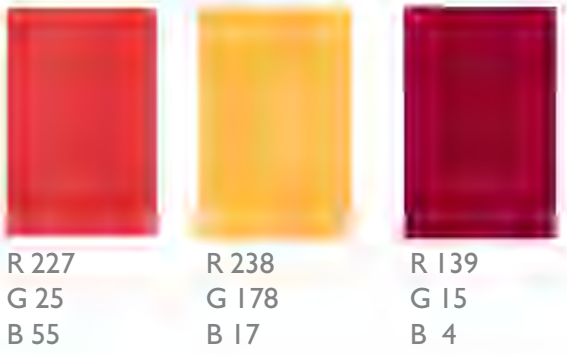
Print



Screen



Web



TIE00899939_0261

Stationery

Letterheads should follow the layout and formatting shown here. Guidance on fonts is provided in the typography section.



Edinburgh Trams

Mr G. McCluskey
19 Williams Street
Edinburgh
EH12 9QT

24th November 2007

Our ref: ETL/1234

Dear Mr McCluskey

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exercitation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat. Duis autem vel eum iriure dolor in hendrerit in vulputatevelit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi.

Yours sincerely

Andrew McKinnon

Operations Director

Edinburgh Trams Limited
City Point
Haymarket Terrace
Edinburgh
EH1 7YU

T : 0131 226 7896
F : 0131 226 7897
e mail info@tramsforedinburgh.com

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod

TIE00899939_0262

Stationery

Business cards follow the same format as the letterhead.



TIE00899939_0263

Marketing

The examples we show here illustrate the basic image and values the Edinburgh Tram brand should convey:

Clean

Simple

Easily understood



TIE00899939_0264

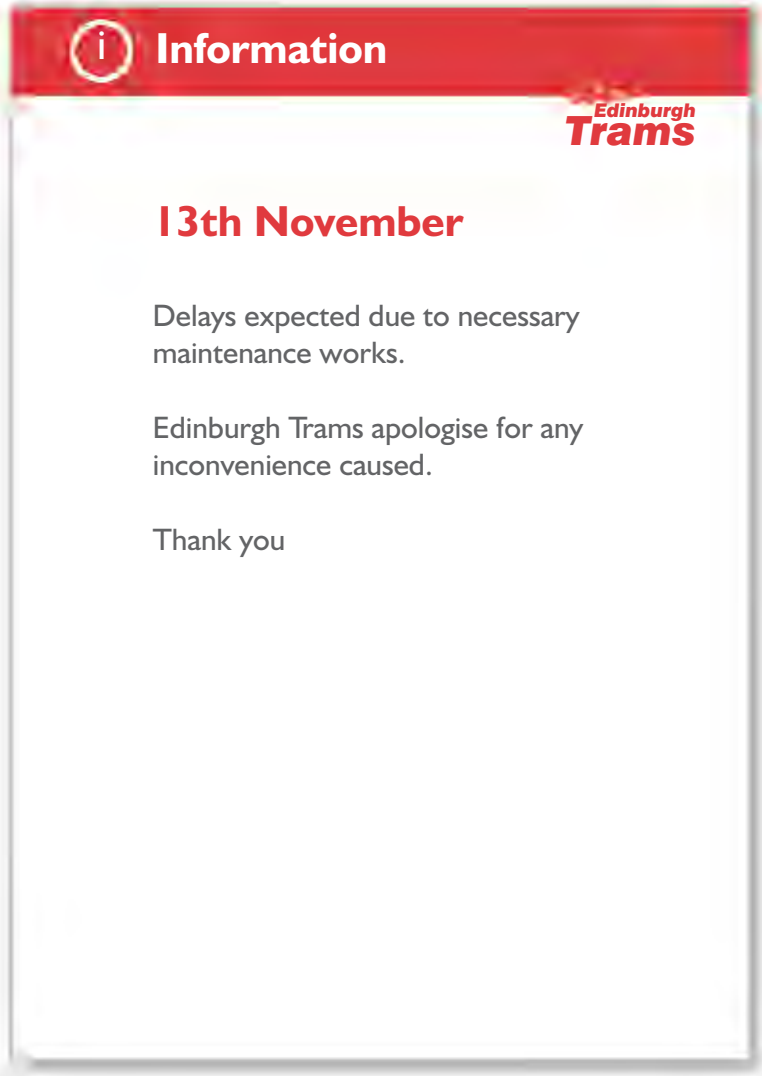
Passenger information

Again information should follow the 3 basic rules:

Clean

Simple

Easily understood



TIE00899939_0265

Passenger information

Route map



TIE00899939_0266

Web site

The web site should share the same layout and ‘feel’ as its sister site for Lothian Buses.

Consistency in navigation and layout help to reinforce the integrated transport concept.



TIE00899939_0267

Pictograms



Informational pictograms



Statutory pictograms



Directional pictograms



Space Bar Sample of Space Bar position

TIE00899939_0268

External design

Reinforcing the strategy of creating a visually integrated public transport system for Edinburgh, the tram livery draws from the Lothian Bus livery. Some modifications have been made in order to satisfy the Rail Vehicle Accessibility Regulations (RVAR) such as the red door colour that provides the required contrast of the doors from the tram body.

Colours follow the Brand palette with the exception of the 'gold' where, on the livery only, a gold vinyl is to be used as on Lothian Buses and not by using the specifications in this document.

Four designated advertising zones have been identified to control the revenue generating advertising presence that the business plan requires. Two trams have been allocated for 'all over' advertising and they will be subject to a strict, separate, design protocol.





TIE00899939_0269

Interior

As with the exterior the tram interior will use some of the same colours and finishes to be found on the buses. These will have to be adapted to ensure compliance with RVAR as there are strict technical guidelines on issues such as colour contrast based on Light Reflection Factors which affects all the visible surfaces within the vehicle. Compliance with RVAR is a legal requirement and the end result will be determined in consultation with the DfT Mobility Unit.

The image opposite is an early iteration of the proposed tram interior and will be developed through the process described above.



TIE00899939_0270

Tram stops

The finishes of the tram stop elements are generally of a neutral colouration.
The introduction of the Edinburgh Trams' key red as a highlight colour should therefore be used sparingly and appropriately as indicated here. The red has been introduced as an integral, functioning part of the shelter structure and serves to carry the high level stop sign. Elsewhere the red is introduced as signage or through information points.

Subtle use of the harlequins can be made on such areas as glazing manifestation as illustrated here. A further example of using the branding in a functional, rather than superficial, way.

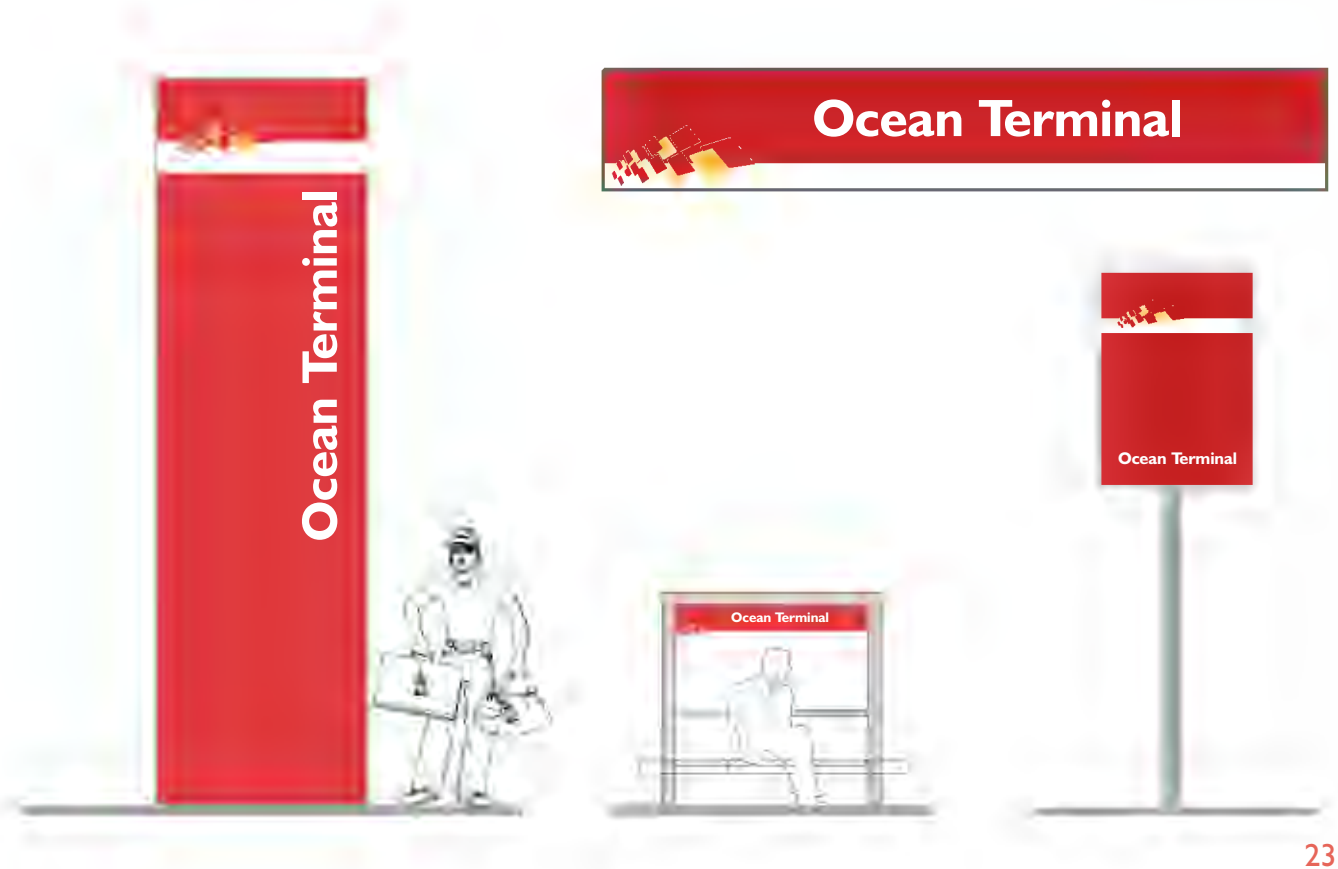


TIE00899939_0271

Signage

The signage concept has been conceived to create strong, highly visible and legible points of reference and information.

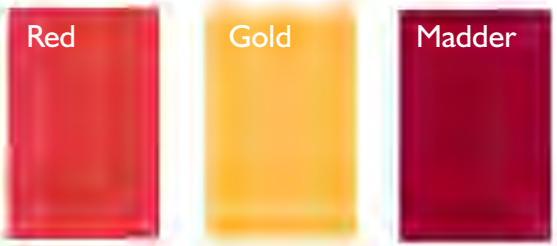
As part of the tramstop elements they follow the principle of introducing the Edinburgh Trams key red in a controlled, functional manner whilst reinforcing the identity and aiding recognition.



TIE00899939_0272

Colours

The red, madder and gold are freely available in a variety of finishes such as paint and powder coating by using the RAL specification here.



TIE00899939_0273

Uniforms

To assist those who are involved in procuring the staff uniforms the following images are intended as a simple guide to make sure the image conveyed through the uniforms is consistent with other areas of the brand's application.

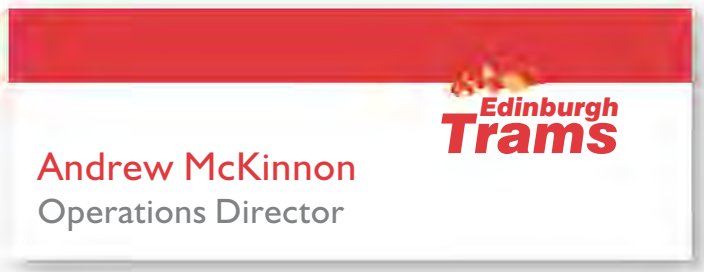
By keeping the uniforms neutral the key red can then be introduced as a detail. As with other elements of the system the red should be used sparingly as shown here.



TIE00899939_0274

Name badges

Name badges follow the guidelines established for communications.



TIE00899939_0275

Contacts

For assistance with any aspect of the contents of these guidelines please contact either:

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or

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Edinburgh
EH7 4AZ

Tel: 0131 554 4494
Fax: 0131 554 3942
e mail: icoupar@transportedinburgh.com

TIE00899939_0276

This is Schedule 2 referred to in the foregoing Agreement between tie and the Tram Supplier

SCHEDULE 2

Employer's Requirements

Part 1: Employer's Requirements

See separate volume V4.0

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Document Management Sheet – Employer's Requirements

3.6	Version updated to include: 1) Legal alignment changes agreed on meeting at Tuesday 11.03.08 2) Technical adjustments by RK and AS 3) CEC changes that resulted from their review 4) Revised s26	14/03/08	14/03/08		
3.6a	Version updated to include: 5) Revised s28.13 6) Revised s23 7) Ref check – not complete. 8) Incorporation of DLA (SF) checks. 9) Depot Scope changes.	19/03/08	19/03/08	SH	
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Edinburgh Tram Network

Employer's Requirements

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1 Introduction

1.1 Summary of Overall Scope

The Infraco shall be fully responsible for the works and services described in these Employer's Requirements and in the Agreement:

1.2 Infraco Works

Summary Scope of Infraco Works

Detailed requirements associated with the infrastructure and equipment for the Infraco Works are described within other Sections of these Employer's Requirements and the Agreement.

The scope defined within this section is limited to a summary of the principal elements of the Infraco Works:

- the supply of Trams in accordance with the Tram Supply Agreement;
- the provision of maintenance as defined in the Tram Maintenance Agreement and Section 40 (Maintenance) of these Employers Requirements;
- the provision of Trackwork - A total of approximately 18.8km and 5.5km (for phases 1a and 1b, respectively) of track kilometres, on street and off street trackform;
- the provision of Tramstops - A total of 22 Tramstops and 1 staff only Tramstop for Phase 1a, and 9 Tramstops for Phase 1b, together with associated infrastructure;
- the provision of Tramstop furniture, systems and equipment;
- the provision of interchange facilities as provided in the design information;
- the provision of points and crossings including point machines, their power supplies, point heating and the control thereof, detection and indication;
- the provision of traffic / tram signals;
- the provision of Tram detection system;
- the provision of all 11kv, 400volt and 230 volt power supplies;
- the provision of traction substations and d.c. traction distribution;
- the provision of OLE (Including all trackside isolators);

- the provision of supervisory control, and communication systems and sub-systems including all field, Tram (free issue for installation by Tram Supplier) network and central control and interface equipment;

- Develop and manage an EMC strategy that includes appropriate immunisation of all Third Party neighbouring systems including Network Rail.

- Accept delivery of fixed and portable Ticket Vending Machines from **tie** and then undertake the installation of such machines and the provision of the necessary supporting infrastructure (including power supplies, communication links and foundations). The maintenance of these machines is not within the scope of the Infraco;

- Provision of the Depot containing:

  - A depot building containing a maintenance workshop and associated workshops, offices, stores and equipment;

  - The Control Centre (First Floor) and associated equipment room (Ground Floor);

  - The Edinburgh Tram Network administration offices;

  - A depot yard and stabling area;

  - A traction power substation;

  - A building services transformer and associated works;

  - All necessary services and utility connections;

  - A boiler house;

  - Hard-standing for a diesel alternator; and

  - The Depot access road.

- Provision of Tram associated road works;

- Provision of traffic management;

- Provision of road furnishings;
- Provision of bridges, structures and retaining walls, including the necessary services and facilities e.g. lighting, drainage, fencing and guardrails, earthing and bonding etc.;
- Civil works including earthworks (inclusive of contamination removal, demolition, Site clearance, excavation, bridges and structures, all necessary temporary works and drainage;
- Demolition/modification of certain buildings as identified in the design phase.
- Relocating the War Memorial at Haymarket Junction (the Infraco shall be required to obtain confirmation from **tie** prior to such re-location that **tie** is satisfied that all relevant Consents have been obtained by the Infraco;
- Landscaping including, hard landscaping, soft landscaping, boundary treatments;
- Provision of lighting;
- Provision of signage;
- Provision of fencing;
- The provision of all temporary works and installations (to allow construction of the Edinburgh Tram Network and achievement of delivery of the Edinburgh Tram Network into service) including the provision of connections to appropriate power supplies.
- to carry out and/or manage to completion the design of the Edinburgh Tram Network, including the management coordination, and specification and implementation of the necessary works for the modification of the Urban Traffic Control System;
- to procure and install all materials and equipment, required for the complete operating Edinburgh Tram Network, as summarised and as further detailed within these Employer's Requirements;
- to supply documentation as defined within these Employer's Requirements, including design documentation, as-built documentation, statutory information, as-built information, maintenance documentation and training documentation;
- to energise the Edinburgh Tram Network including liaison with and management of all interested and affected parties;

- to provide access and support for driver training;
- to provide comprehensive management and technical and maintenance services and Deliverables to ensure that all of the above is delivered in full compliance with these Employer's Requirements.

1.3 Phase 1a Scope Statement Regarding Inclusion for the Phase 1b Option

Phase 1a shall meet these Employer's Requirements and provide full functionality as a standalone tram network. The scope for Phase 1a shall include the following elements in order to facilitate the addition of Phase 1b as an option instructed later under this Agreement.

1. The structure, earthworks and necessary works at Roseburn Junction shall include all sub-structure, structures, earthworks, ductwork, drainage and fitting out to bottom of rail fixing, including the provision for the OLE spur connection for Phase 1b from Phase 1a and OLE supports, for the delta connection of Phase 1b with Phase 1a. The structure, earthworks and works shall extend as a minimum such that the subsequent construction of Phase 2b does not interfere with the operation of Phase 2a except to the extent allowed by the possessions detailed below.

2. Plain line shall be installed along the Phase 1a route through the Roseburn Junction, however the Infraco shall ensure that the design and construction shall provide for the turnouts to be installed in a maximum of one 54 hour possession of the Phase 1a inbound and outbound tracks between Murrayfield and the Western end of Haymarket Yards turnback. Traction power supply sectioning shall allow the turnback of service trams throughout the possession. In addition, up to 28 normal night-time possessions shall be available for preparatory works and commissioning works.

3. The central supervisory, control and communications systems provided by the Infraco for Phase 1a shall have sufficient capacity and functionality to accommodate the incorporation of Phase 1b. This shall include all software, firmware, databases with the same control and indication functionality as for Phase 1a. All central control system hardware shall be provided to allow the connection of the Phase 1b infrastructure by means of cable connection alone.

4. The central supervisory, control and communications systems shall be designed and configured such that the commissioning of Phase 1b infrastructure shall be possible without material impact on the passenger services operating on Phase 1a or the operational Control Centre prior to assimilation of Phase 1b with Phase 1a.

5. Documentation, drawings, manuals, spare parts and training shall be provided for Phase 1a on a standalone basis, but shall be in the form that is expandable to accommodate Phase 1b as and when constructed..

2 Operations and Performance

2.1 Scope

The scope of this Section of the Employer's Requirements defines the Operations & Performance requirements applicable to the Edinburgh Tram Network (ETN) which the Infraco must comply with.

2.2 Network Description and Principles

The Edinburgh Tram Network will operate as a 'line-of-sight' tramway, with tramway signalling provided at road junctions and at tramway junctions where appropriate. A fleet of Trams will serve the ETN providing level boarding with low level platforms located along the routes.

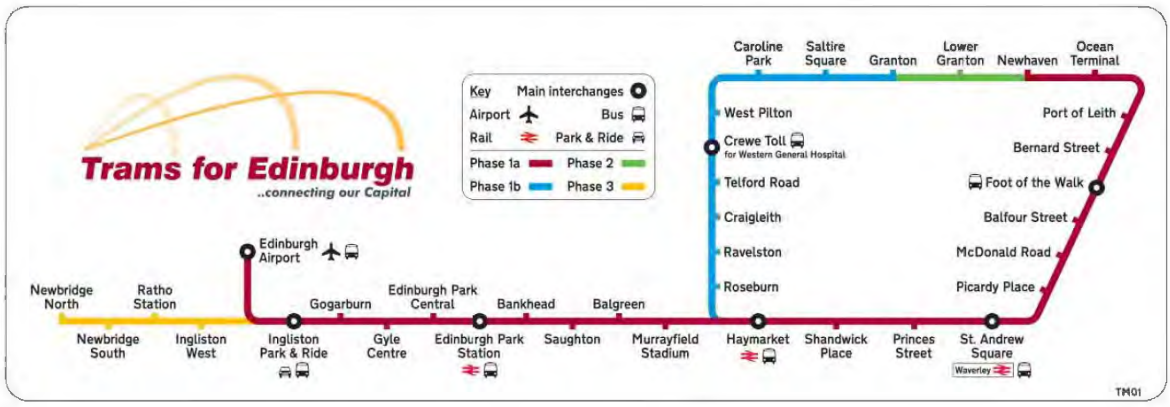


Figure 1

For ease of reference, a diagram of the Edinburgh Tramway Network is shown in Figure 1 above.

The route in the city from Newhaven to Haymarket (approximately half of Phase 1a) and from West Granton Access to Granton Square (approximately a third of Phase 1b) runs mainly on-street with varying degrees of segregation. The Roseburn corridor (approximately two thirds of Phase 1b) is a segregated off-street alignment, shared with a combined footpath and cycleway. Most of the route between Haymarket and the Airport (the remaining half of Phase 1a) is segregated from road traffic.

The whole ETN will consist of double track.

The Depot, located at Gogar, will provide maintenance and stabling facilities for the entire fleet of Trams operating on the ETN. It will also contain the administration and management offices, including an operations and Control Centre, from where the ETN will be managed and maintained.

Transport Services shall be operated in accordance to a timetable, as agreed between the Operator and **tie**, to achieve reliable and consistent operation at the required tram frequencies.

Throughout these Employer's Requirements reference is made to three timetables that shall be progressively introduced in response to patronage demand growth. These are intended to allow for reliability growth and Operator familiarisation with the Edinburgh Tram Network. The following definitions shall apply:

- **Operational Timetable**

  A timetable developed by **tie**, which provides Trams at a frequency of twelve Trams per hour in each direction on the common section between Haymarket and Ocean Terminal. Six Trams per hour in each direction are operated on the sections between Haymarket and the Airport and between Ocean Terminal and Newhaven. For Phase 1b, Trams at a frequency of six trams per hour in each direction on the section between Haymarket and Granton square shall be operated. The Operational Timetable shall be in effect from the Service Commencement Date for a minimum of one year.

- **AM and PM Peak Enhanced Timetable**:

  A timetable developed by **tie**, which provides Trams during the AM and PM peaks at a frequency of sixteen Trams per hour in each direction on the common section between Haymarket and Ocean Terminal. For Phase 1b providing Trams at a frequency of eight trams per hour in each direction on the section between Haymarket and Granton square for the AM and PM peak times only, reverting to the Operational Timetable during the inter peak period. The AM and PM Peak Enhanced Timetable shall be introduced no earlier than one year after the Service Commencement Date and shall be operated for a minimum of six months.

- **Enhanced Timetable:**

  A timetable developed by **tie**, which provides Trams at a frequency of sixteen Trams per hour in each direction on the common section between Haymarket and Ocean Terminal. For Phase 1b providing Trams at a frequency of eight Trams per hour in each direction on the section between Haymarket and Granton square. The Enhanced Timetable shall be introduced no earlier than two years after the Service Commencement Date.

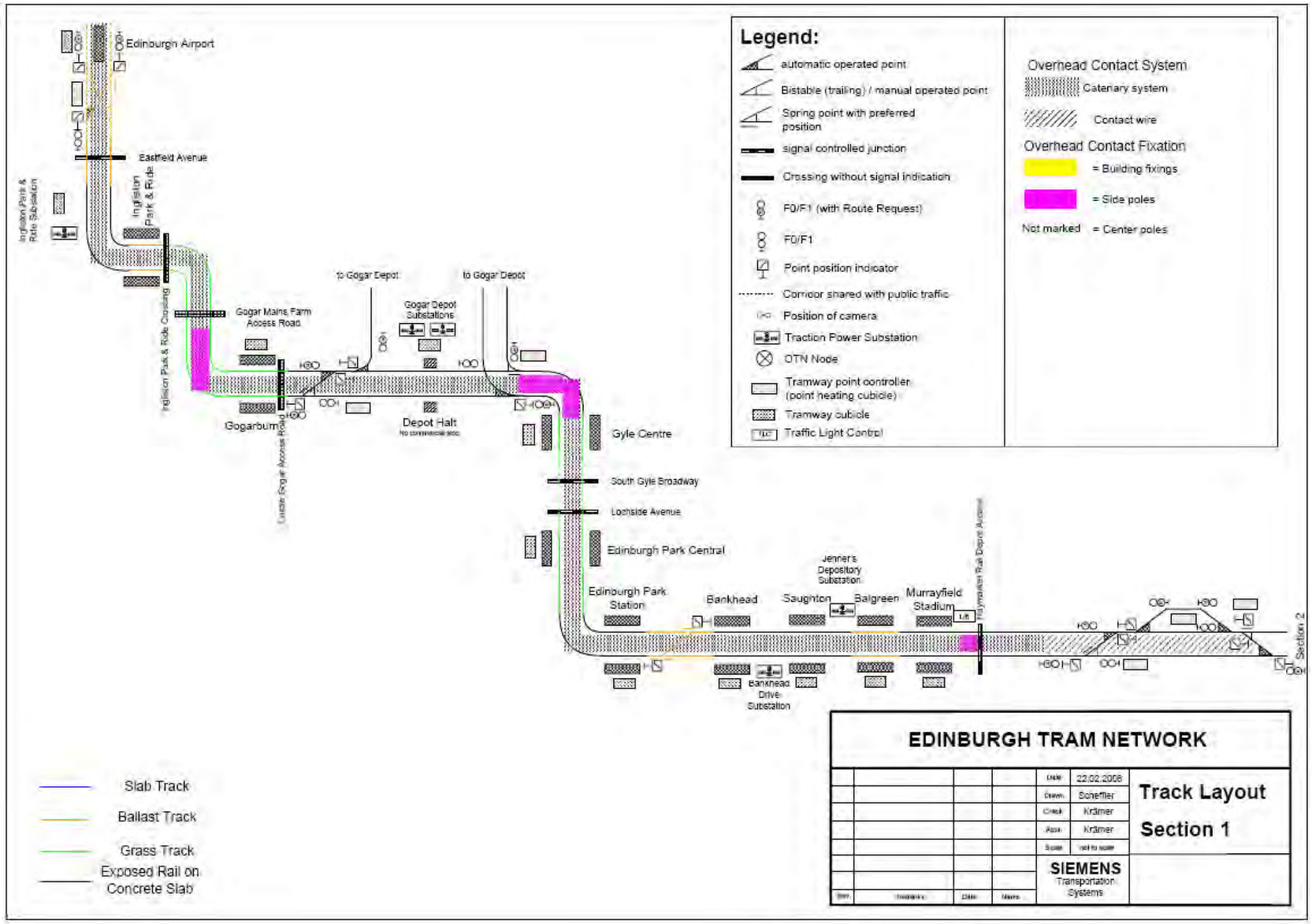


Figure 2 – Edinburgh Tram Phases 1a and 1b Network Diagram

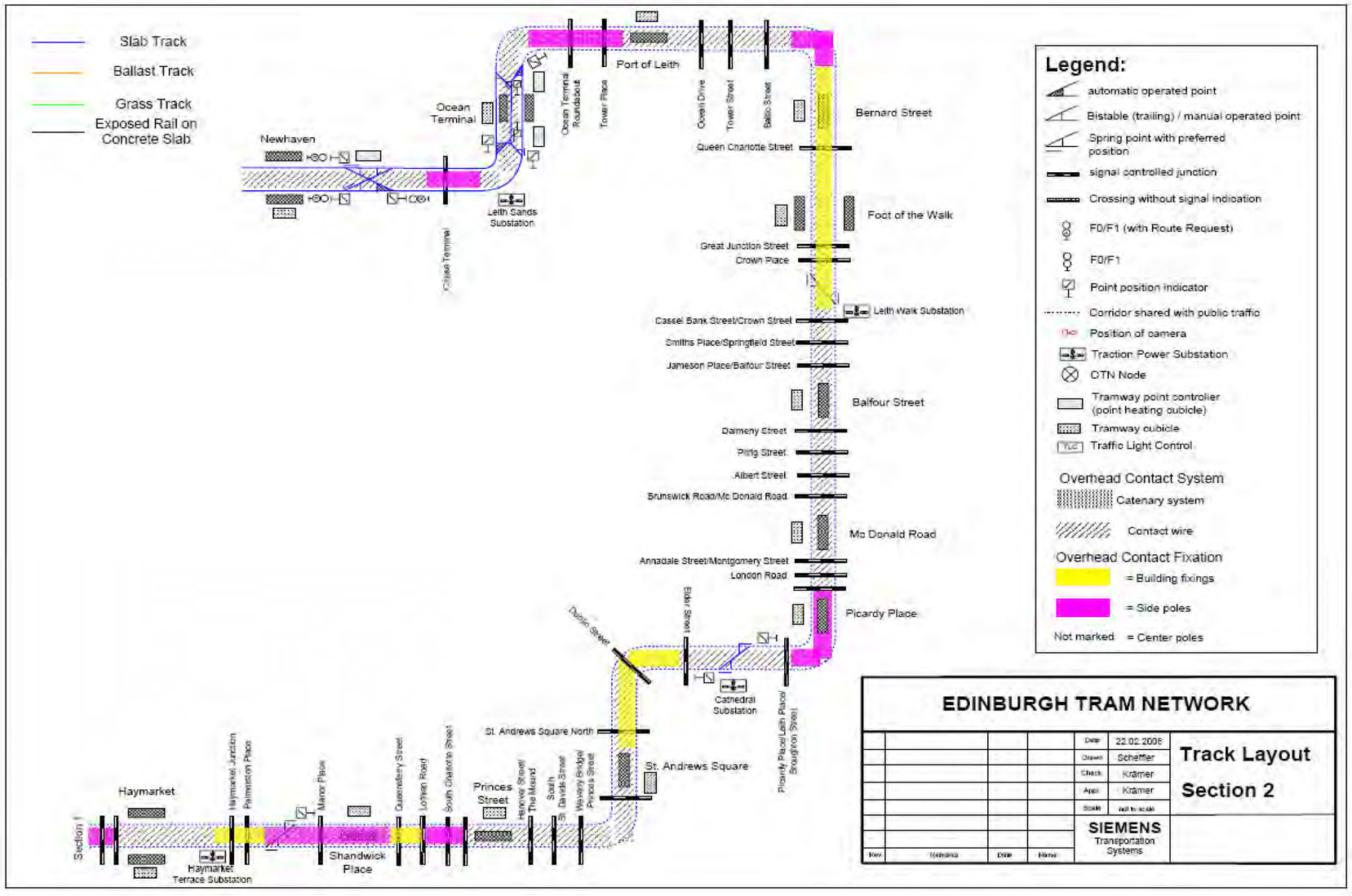


Figure 3 – Edinburgh Tram Phases 1a and 1b Network Diagram

2.3 Specific Operations and Performance Requirements

2.4 Tramstop Location and Types

The Tramstop location and types are detailed in the following table. The acronyms given are provisional.

ID	Tramstop	Platform Style
	PHASE 1a	
AIR	Edinburgh Airport	1 Centre
IPR	Ingliston Park and Ride	2 Side
GBN	Gogarburn	2 Side
DEH	Depot Halt (Staff Only)	2 Side
GYL	Gyle Centre	2 Side
EDP	Edinburgh Park Central	2 Side
EPS	Edinburgh Park Station	2 Side
BNK	Bankhead	2 Side
SGT	Saughton	2 Side
BAL	Balgreen	2 Side
MUS	Murrayfield Stadium	2 Side
HAY	Haymarket	2 Side
SHP	Shandwick Place	1 Centre
PST	Princes Street	1 Centre
SAS	St Andrew Square	1 Centre
PPL	Picardy Place	1 centre
MDR	McDonald Road	1 Centre
BFS	Balfour Street	1 Centre
FOW	Foot of the Walk	2 Side
BER	Bernard Street	1 Centre
POL	Port of Leith	1 Centre
OCT	Ocean Terminal	1 Centre, 1 Side
NEW	Newhaven	2 Side

	PHASE 1b	
GRT	Granton	1 Centre
SSQ	Saltire Square	2 Side
CPK	Caroline Park	2 Side
WPN	West Pilton	2 Side
CTL	Crewe Toll (for Western General)	2 Side
TEL	Telford Road	2 Side
CRA	Craigleith	2 Side
RAV	Ravelston	2 Side
ROS	Roseburn	2 Side

Table 1 – Edinburgh Tram Phases 1a and 1b Network Tramstop Location and Details

2.5 Expansion (including Line 3)

The Infraco shall ensure that the ETN shall be designed to permit expansion to include the following elements:

- Phased implementation of the ETN and associated fleet increases (including the implementation of the Phase 1b Option);
- Addition of Phase 2 of the ETN (as shown in Figure 1), including provision of Lower Granton Road stop, to close the loop along the sea front between Newhaven and Granton Square using the powers in the Edinburgh Tram (Line One) Act 2006;
- Addition of Phase 3 of the ETN (as shown in Figure 1), including associated stops at Ingliston West, Ratho Bridge and Newbridge South, from Ingliston Park and Ride to Newbridge using the powers in the Edinburgh Tram (Line Two) Act 2006;
- Addition of Line Three (From the junction of Princes Street/South St. Andrew Street to Royal Infirmary);

Extensions to the ETN set out above are not currently covered by these Employer's Requirements. However, the ETN must be designed in such a way as not to impede this future expansion.

For the avoidance of doubt, the following are covered by these Employer's Requirements.

- Future frequency increases beyond the enhanced service frequency of 8 & 8 tph;
- Increased operating hours beyond the scheduled last Tram of 23:59 and before the scheduled first Tram at 06:00;
- Associated impacts of increased staff numbers from 361 initially anticipated up to a maximum of 403 e.g. accommodation at the Depot.

2.6 Depot Locations

The Edinburgh Tram Network Depot is located at Gogar and shall be capable of providing capacity for the stabling of 27 trams of 44m in length, clear of fouling points in the stabling area.

The Depot shall be capable of future expansion to provide the capacity required for the identified future service frequencies and/or the requirements for Line Three, such that the Depot can be extended to stable 36 Trams of 44m in length, clear of fouling points in the stabling area.

2.7 Service Patterns, Operating Hours and Frequencies

The ETN shall support a daily service, all year round. The proposed initial service patterns, operating hours and frequencies are as follows:

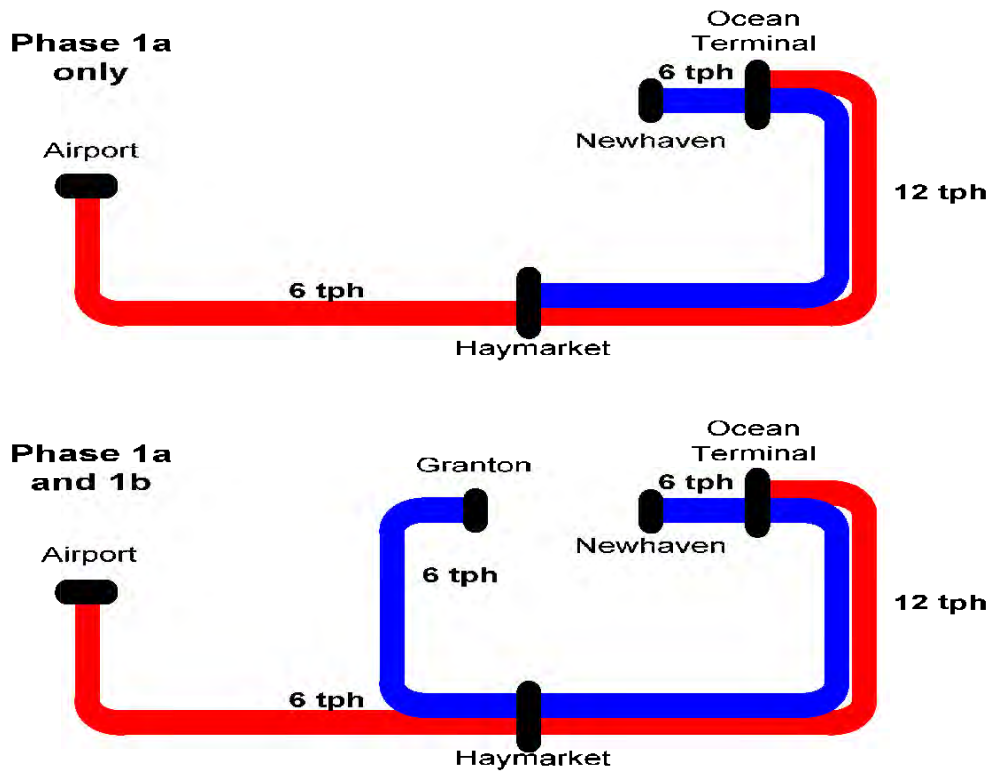


Figure 4 - Service Patterns for the Operational Timetable 6 & 6 Tram per hour scenario

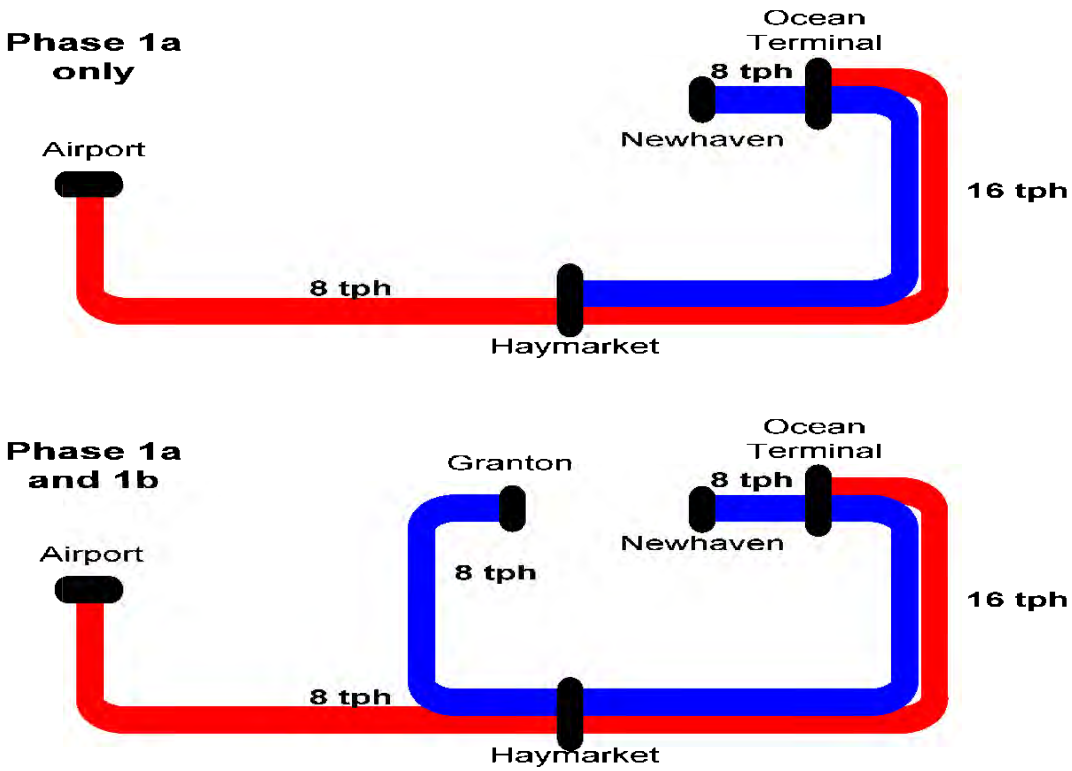


Figure 5 - Peak Service Patterns for the Enhanced AM & PM Peaks Timetable and the Enhanced Timetable 8 & 8 Tram per hour scenario

2.8 Operating Hours and Frequencies

The first and last Tram services and frequencies for 6 & 6 Tram per hour scenario are shown in Figure 4 - service patterns for the Operational Timetable 6 & 6 Tram per hour scenario and for 8 & 8 Tram per hour scenario in Figure 5.

These scenarios are based upon the following assumptions and conditions:

- The two balanced services combine to give a total of 12 or 16 Trams per hour per direction on the common section between Ocean Terminal and Haymarket are required during the daytime to replace withdrawn bus services (and therefore demand and capacity) on Leith Walk;
- For the purposes of ramping up/down service Short workings between Edinburgh Airport (Phase 1a) / Granton Square (Phase 1a & Phase 1b) or Haymarket (Phase 1a only) and St. Andrew Square are based on terminating Trams at St. Andrew Square. The location of the turnback is at York Place;
- Edinburgh Airport service Tram frequency is ramped up/down from Ocean Terminal. Granton Square (Phase 1a & Phase 1b) or Haymarket (Phase 1a only) service Tram frequency is ramped up/down from Newhaven;
- Trams going into service between Gogar Depot and Ocean Terminal/Newhaven will run "in service" from the Gyle (first tram Gyle to Ocean Terminal approx. 05:15 Monday to Saturday inclusive);
- Haymarket (Phase 1a only) or Granton Square (Phase 1a & Phase 1b) service Trams going out of service running between Newhaven and Gogar Depot will run "in service" as far as the Gyle;
- St. Andrew Square curtailed Trams going out of service running between St. Andrew Square and Gogar Depot will run "in service" as far as the Gyle;
- Edinburgh Airport service Trams going out of service will run "in service" from Ocean Terminal to Edinburgh Airport with a short "dead run" from Edinburgh Airport to Gogar Depot;

- The period of time between the last Tram returning to the depot at night and the first Tram leaving the Depot in the morning Monday to Saturday inclusive is anticipated to be 4hrs 30 min, although this may be subject to amendment. Work requiring possessions will have to be agreed with the Operator. Subject to agreed possessions, work may be allowed on the Edinburgh Tram Network infrastructure for 3 hours and 45 minutes, depending on location, each night and allowing time for the implementation and withdrawal of isolations and/or possessions; and

- The provision of Transport Services is based on the requirement to always have a Tram present at the Airport Tramstop.

Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable

1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

		Sunday (trams per hour)					
Network / Phasing	**Service frequency commencing at:**	first tram **07:00**	**07:45**	**08:00**	**08:20**	**23:15**	last tram **23:59**
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Note: The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Notes:

[a] from approx 2 23:15 Trams run from the Airport - City Centre only

[b] from approx 2 23:15 Trams run from Granton - City Centre only

[c] from approx 2 23:15 Trams run from Newhaven - Haymarket continuing in service on TL2 to Gyle

First and last Tram services and frequencies for 6 & 6 tram per hour Operational Timetable

Table 3 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario

Networking (Phasing) andService Frequency commencing at:		06:00	06:45	07:00	07:20	07:45	09:45	15:45	19:00	19:45
1a	Airport to Ocean Terminal	0	6	8	8	8	6	6	8	6
1a	Ocean Terminal to Airport	6	6	8	8	8	6	6	8	6
1a	Haymarket to Newhaven	0		6	8	8	6	6	8	6
1a	Newhaven to Haymarket	0		0	6	8	6	6	8d	6
1b	Airport to Ocean Terminal	0	6	8		8	6	6	8	6
1b	Ocean Terminal to Airport	6	6	8		8	6	6	8	6
1b	Granton to Haymarket	0	6	8		8	6	6	8	6
1b	Haymarket to Granton	6	6	8		8	6	6	8	6

Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario

Phase	Service Frequency commencing at:	Saturday (trams per hour) First tram 06:00	06:45	07:30	07:50	23:15
1a	Airport to Ocean Terminal	0	6	6	6	6a
1a	Ocean Terminal to Airport	6	6	6	6	6
1a	Haymarket to Newhaven	0	0	6	6	0
1a	Newhaven to Haymarket	0	0	0	6	0
1b	Airport to Ocean Terminal	0	6	6	6	6a
1b	Ocean Terminal to Airport	6	6	6	6	6
1b	Granton to Newhaven	0	6	6	6	6b
1b	Newhaven to Granton	6	6	6	6	6c

Table 5 - First and Last Tram Times for the Enhanced AM & PM Peak Timetable

	Networking (Phasing) and Service Frequency commencing at:	Sunday (trams per hour) first tram 07:00	07:45	07:50	08:00	08:45	18:00	18:20	18:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6		6	6		6a	0
1a	Ocean Terminal to Airport	6	6	6	6		6	6		6	0
1a	Haymarket to Newhaven	0		6	6		6	6			0
1a	Newhaven to Haymarket	0		0	6		6	6d			0
1b	Airport to Ocean Terminal	0	6		6	6	6		6	6a	0
1b	Ocean Terminal to Airport	6	6		6	6	6		6	6	0
1b	Granton to Haymarket	0	6		6	6	6		6	6b	0
1b	Haymarket to Granton	6	6		6	6	6		6	6c	0

Notes:

a) from approx. 23:15 Trams run from Airport – St Andrew Sq. only.
b) from approx. 23:15 Trams run from Granton – St Andrew Sq. only.
c) from approx. 23:15 Granton Trams run from Newhaven – Haymarket continuing in service on to Gyle.
d) from approx. 19:20 (18:%0 Saturday and 18:20 Sundays) Haymarket Trams running from Newhaven – Haymarket continue in service to Gyle.

The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Table 6 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced Timetable

Network (phasing) and service frequency commencing at:		Monday - Friday (trams per hour)									
		06:00	06:45	07:00	07:20	07:45	19:00	19:20	19:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	8	8	8		8	8		8[a]	0
1a	Ocean Terminal to Airport	8	8	8	8		8	8		8	0
1a	Haymarket to Newhaven	0		8	8		8	8			0
1a	Newhaven to Haymarket	0		0	8		8	8[d]			0
1b	Airport to Ocean Terminal	0	8	8		8	8		8	8[a]	0
1b	Ocean Terminal to Airport	8	8	8		8	8		8	8	0
1b	Granton to Newhaven	0	4	4		8	8		4	4[b]	0
1b	Newhaven to Granton	4	4	8		8	4		4	4[c]	0

Network (phasing) and service frequency commencing at:		Saturday (trams per hour)									
		first tram 06:00	06:45	07:30	07:50	08:15	18:30	18:50	19:15	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	8	8	8		8	8		8[a]	0
1a	Ocean Terminal to Airport	8	8	8	8		8	8		8	0
1a	Haymarket to Newhaven	0		8	8		8	8			0
1a	Newhaven to Haymarket	0		0	8		8	8[d]			0
1b	Airport to Ocean Terminal	0	8	8		8	8		8	8[a]	0
1b	Ocean Terminal to Airport	8	8	8		8	8		8	8	0
1b	Granton to Newhaven	0	4	4		8	8		4	4[b]	0
1b	Newhaven to Granton	4	4	8		8	4		4	4[c]	0

Network (phasing) and service frequency commencing at:		Sunday (trams per hour)									
		first tram 07:00	07:45	07:50	08:00	08:45	18:00	18:20	18:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6		6	6		6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6		6	6		6	0
1a	Haymarket to Newhaven	0		6	6		6	6			0
1a	Newhaven to Haymarket	0		0	6		6	6[d]			0
1b	Airport to Ocean Terminal	0	6		6	6	6		6	6[a]	0
1b	Ocean Terminal to Airport	6	6		6	6	6		6	6	0
1b	Granton to Newhaven	0	6		6	6	6		6	6[b]	0
1b	Newhaven to Granton	6	6		6	6	6		6	6[c]	0

Note: The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Notes:

[a] from approx 23:15 trams run from Airport - St Andrew Sq only

[b] from approx 23:15 trams run from Granton - St Andrew Sq only

[c] from approx 23:15 Granton trams run from Newhaven - Haymarket continuing in service on to Gyle

[d] from approx 19:20 (18:50 Saturdays and 18:20 Sundays) Haymarket trams running from Newhaven - Haymarket continue in service to Gyle

2.9 Service Frequencies and Expansion

The design of the ETN shall support the Operational Timetable and Enhanced Timetable service frequencies set out in Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable, Table 3 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario and Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario. In addition to this, the ETN shall operate the same service pattern as set out in Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario above, but with the Trams per hour increased by 50% throughout without upgrade or loss of performance for up to a maximum of 2 hours between Ocean Terminal and Picardy Place, and indefinitely between Picardy Place and the Airport.

The service patterns for the ETN are defined as the Operational Timetable (as shown in Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable), the AM and PM Peak Enhanced Timetable (as shown in Table 3 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario) and the Enhanced Timetable (as shown in Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario).

A simulation indicating the power consumption of the ETN service patterns as defined above and considering the braking energy regeneratated by the Tram shall be performed during design phase.

2.10 Special Working and Degraded Operation

Special working is required at certain times of the year, as detailed in Table 8 - Reconfiguration of Service due to the Closure of Princes Street to allow for the short workings on the network routes, when sections of the ETN shall be closed to allow for example Hogmanay, the Edinburgh Festival and other special events and festivals.

The design of the ETN shall allow services to be turned back at the locations detailed in Table 7 - Turnback Locations. The precise chainages where turnbacks are to be installed is shown on the alignment drawings.

ID	Location
	PHASE 1a
EPS	Edinburgh Park Station
HAY	Haymarket Yards
SHP	Shandwick Place
PPL	Picardy Place
FOW	Foot of the Walk (Leith Walk)

OCT	Ocean Terminal
	PHASE 1b
CTL	Crewe Toll

Table 7 - Turnback Locations

Note that Trams may also be turned back at Gogar Depot, and the facility to allow this shall be provided by the Infraco.

The individual services will be reconfigured to operate using the turn-back facility nearest to the affected area. An example is the requirement to close Princes Street for Hogmanay. In this situation the services shall be reconfigured as detailed in Table 8 - Reconfiguration of Service due to the Closure of Princes Street.

Service alteration for Closure of Princes Street			
Original Route of Service	**Affected Area**	**Trams / Hour**	**Revision**
Between Airport and Ocean Terminal	Princes St. section closed	6 or 8	Services run between Airport and Shandwick Place. No service runs between Shandwick Place and Picardy Place. Services run between Picardy Place and Newhaven
Between Haymarket and Newhaven (Phase 1a only)	Princes St. section closed	6 or 8	No service runs between Haymarket and Picardy Place[a]. Services run between Picardy Place and Newhaven
Between Granton Square and Newhaven (Phase 1b)	Princes St. section closed	6 or 8	Services run between Granton Square and Shandwick Place. No service runs between Shandwick Place and Picardy Place. Services run between Picardy Place and Newhaven

a – Assumption that no services will run the short leg Haymarket to Shandwick Place when Princes Street is closed.

Table 8 - Reconfiguration of Service due to the Closure of Princes Street

2.11 Journey Time and Runtime

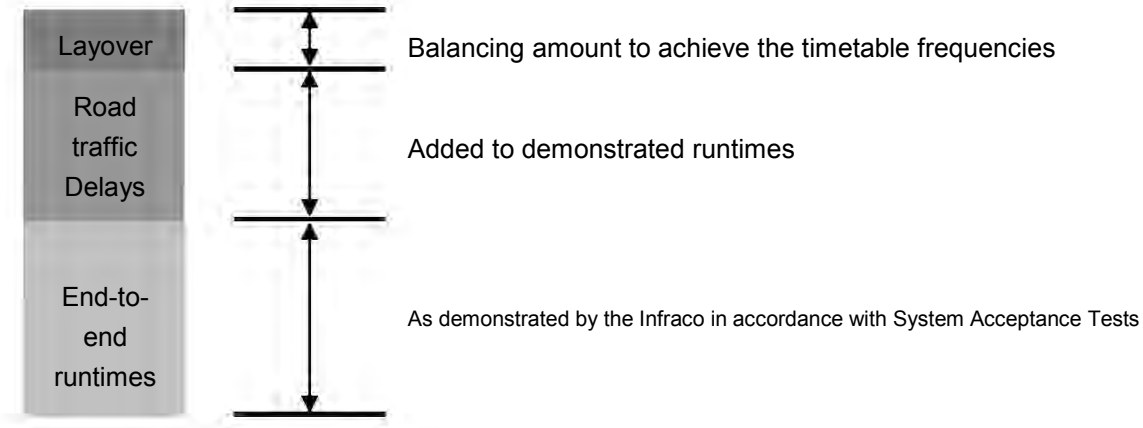


Figure 6 - Maximum Journey Times

The required maximum journey times for the Edinburgh Tram Network, quoted as operational journey time including dwell times of 25 seconds at each Tramstop, as defined during Preliminary design shall be as follows:

Phase 1a		
Airport to Ocean Terminal	in either direction including 25 secs dwells at Tramstops	42mins 18 secs
Phase 1b		
Granton Sq to Newhaven	in either direction including 25 secs dwells at Tramstops	39mins 26 secs

For the avoidance of doubt these are end to end journey times and the Infraco shall demonstrate during System Acceptance Tests defined in Section 23.18 (Testing and Commissioning) of these Employer's Requirements the trip times which can be achieved by the Trams running on the ETN infrastructure as developed and adjusted from the above base line in accordance with Section 2.12. These do not include layover time at the turnback stops as shall be agreed between the Operator and **tie** in order to develop the Operational Timetable.

2.12 Journey Time and Runtime

The Infraco shall continue to develop and refine the runtime model as the design progresses and, at a frequency of no less than every three months or upon **tie**'s request, provide updated reports demonstrating that the maximum run times can be achieved. The Infraco shall also prepare a model of the electricity consumption linked to the run time model and shall use reasonable endeavours to optimise the system design and construction to minimise electricity usage.

Reference should be made to the Runtime Simulation Stage 3 Report (ref: ULE90130-SW-REP-00238-V3) for vehicle performance characteristics and actual driver operations.

The operational and modelling assumptions that shall be used in all modelling of runtime and operational timetables are set out in Table 9 - Operational and Modelling Assumptions.

Item	Value	Notes
Door Performance	12 seconds	Defined as the time for the doors to open and close including DDA requirements and passenger and driver reaction times.
Boarding and Alighting Time	13 seconds	Defined as the time between the doors being fully open and the sounding of the door closing tone.
Dwell Times	25 seconds a constant in modelling and during end to end journey time tests, to be refined for the purposes of the timetables to be Tramstop specific	Average dwell, made up of the door performance time and the boarding and alighting time
Loading	AW2 all seated 4 pass/m2 standing	
Gradient	+/- 8% Max. Note: This value is the maximum allowable gradient for track design.	Gradient data for the complete ETN has been developed in the design phase This identified major gradients at St. Andrew Square and the line alongside Gogar Depot

2.13 Operational Allowances and Rules for Timetabling

An operational allowance will be added to the end to end runtimes demonstrated through testing to meet those quoted in this section to ensure a robust Operational Timetable is constructed.

Requirement	Allowance
Operational Journey time allowance	Newhaven to Haymarket = 1.5 minutes Ocean Terminal to Airport = 1.5 minutes Newhaven to Granton Square = 45 secs (Phase 1b only)
Layover	4 minute minimum or 10% of timetabled runtime, whichever is the greater taken at the terminus for each end to end trip with the exception of the Airport Tramstop where a Tram is required to always be present. Crew change-over locations to be determined as the Operational Timetable is refined.

Table 10 - Operational Runtime Allowances

2.14 Miscellaneous Operational Requirements

2.15 Comfort Break Facilities

Facilities shall be available for driver comfort breaks at the nominated layover locations detailed in Table 11 - Layover Facilities

Location	Comments
Edinburgh Airport	Crew Change Facility[1]
Ocean Terminal	Normal Terminus
Granton Square	Normal Terminus
Haymarket	Crew Change Facility

Table 11 - Layover Facilities

[1] *Damian has already instructed this change.*

At these locations access shall be provided to a suitable toilet with hand washing facilities.

Crew Change Facility

A crew changing facility shall be provided adjacent to the Haymarket Tramstop. This facility shall provide tram crew with access to a toilet with hand washing facilities, a drinking water supply, suitable heating, power, lighting, drainage and connection to the telephone network.

2.16 Performance and Reliability

The design and construction of the ETN shall be demonstrated by RAMS analysis to enable the individual systems availability targets stated in these Employer's Requirements to be met. It shall enable an overall tram punctuality for System technical causes of at least 99% in accordance with the calculation of the Punctuality Service Element contained in Schedule 6 of the Agreement.
As measured on a 28 day basis at the following monitoring points along the route at least 99% of the Trams shall be no earlier than one minute and no greater than two minutes late, caused by technical failure, compared to the scheduled headway.

Monitoring points

a) Phase 1a: for the purposes of monitoring arrival and departure headways between Trams:

- Edinburgh Airport.

b) Phase 1a: for the purposes of measuring departure headways between Trams only:

- Edinburgh Park Station;
- Haymarket;
- Foot of the Walk;
- Leith; and
- Picardy Place.

c) Phase 1b: for the purposes of measuring departure headways between Trams only:

- Crewe Toll (northbound only); and
- Granton Square.

The performance mechanism for Infraco is contained within this Agreement. The design of the ETN shall be such that it allows the ETN to operate safely and effectively in all modes.

Normal Mode being that used to establish the operational timetable. Degraded Mode being restricted operation due to failures or disruption on the tramway or the adjacent highway network.

2.17 Network and Service Pattern

See table 2 – Service Patterns for the Operational Timetable 6 & 6 Tram per hour scenario and table 5 – Peak Service Patterns for the Enhanced AM & PM Peaks Timetable and table 6 – the Enhanced Timetable 8 & 8 Tram per hour scenario] for further information; for daily service patterns; and note that trams are to be co-ordinated between OCT and HAY to give an even headway pattern in both directions.

2.18 Layover s

The Operational Timetable and the Enhanced Timetable developed by the Operator and the Infraco's Proposals shall allow for the following:

- An operational Tram can always be present at the Airport Tramstop;
- Additional layovers to be added to the minimum values to deliver the required headways where appropriate. This additional layover maybe apportioned along the route; and
- The minimum layover requirements are as set out in these Employer's Requirements and these shall be apportioned at the terminus Tramstops only.

Allowance for perturbations that are not road traffic delays:

- These shall be apportioned along the route, as can be seen in Figure 6 - Maximum Journey Times.

2.19 Calculation of Minimum Round Trip Times

In this section, the minimum round trip times for each of the service options are calculated. The calculations add up the elements that are required to establish the round trip times, and the source of each element is stated.

Table 12 - Ocean Terminal – Edinburgh Airport Service (Phase 1a and Phase 1b)

OCT – AIR

00:42:18	OCT - AIR (includes dwell time)[a]
00:04:52	AM junction delay (OCT - HAY)[b]
00:01:30	additional delay between HAY - AIR[c]
00:00:10	10 seconds on each leg for crossover at terminal Tramstop[d]
00:48:50	Total

AIR – OCT

00:41:59	AIR - OCT (includes dwell time)[a]
00:06:01	AM junction delay (HAY - OCT)[b]
00:01:30	additional minutes of junction delay between AIR - HAY[c]
00:00:10	10 seconds on each leg for crossover at terminal Tramstop[d]
00:49:40	Total

Layovers

00:04:55	Minimum layover at OCT end for Airport service[e]
00:10:00	Minimum layover at AIR end for Airport service[f]
00:07:30	Minimum layover at AIR end for Airport service[f]
00:14:55	Total min layover for 6 & 6 tram per hour scenario
00:12:25	Total min layover for 8 & 8 tram per hour scenario
01:53:25	Minimum round trip time for 6 & 6 tram per hour scenario
01:50:55	Minimum round trip time for 8 & 8 tram per hour scenario

Notes:

a Data from 'Edinburgh Tram Network Stage 3 Runtime Simulation Report' (Doc Ref: ULE90130-SW-REP-00238 v2).

b Data from 'Mott Macdonald Report - Traffic Interface Report' (Doc Ref: 0003048//REVC/241103). AM Junction delays between Haymarket and Leith Walk have been used as greater than PM delays.

c of additional junction delay between Haymarket and Edinburgh Airport.

d Estimate of additional time to move through the crossover at the terminus / turnback

e Layover calculated from Table 17 – Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario)

f Based on Headway of 10 or 7.5 minutes, from the requirement for Airport layover in Section 32.

Table 13 - Newhaven – Granton Square Service, (Phase 1b only)

NEW – GRT

00:02:49	NEW – OCT (includes 25s dwell time)[a]
00:36:28	OCT – GRT (includes dwell time)[a]
00:04:52	AM junction delay (NEW - HAY)[b]
00:00:45	additional delay between HAY - GRT[c]
00:00:10	10s on each leg for crossover at terminal Tramstop[d]
00:45:04	Total

GRT – NEW

00:37:00	GRT - OCT (includes dwell time)[a]
00:02:26	OCT - NEW (includes 25s dwell time)[a]
00:06:01	AM junction delay (NEW - HAY)[b]
00:00:45	additional delay between NEW - HAY[c]
00:00:10	10s on each leg for crossover at terminal Tramstop[d]
00:43:56	Total
00:04:15	Minimum layover at NEW end for Granton service[e]
00:04:07	Minimum layover at GRT end for Granton service[e]
00:08:22	Total min layover
01:37:22	Minimum round trip time

Notes:

[a] Data from 'Edinburgh Tram Network Stage 3 Runtime Simulation Report' (Doc Ref: ULE90130-SW-REP-00238v2).

[b] Data from 'Mott Macdonald Report - Traffic Interface Report' (Doc Ref: 0003048//REVC/241103)(AM Junction delays between Haymarket and Leith Walk have been used as greater than PM delays)

[c] Transdev estimate of additional junction delay between Haymarket and Granton Square.

[d] Transdev estimate of additional time to move through the crossover at the terminus / turnback

[e] Layover calculated from Table 17 – Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario).

Table 14 - Newhaven – Haymarket Service (Phase 1a only)

NEW - HAY	
00:02:49	NEW - OCT (includes 25 seconds dwell time)[a]
00:18:58	OCT - HAY (includes dwell time)[a]
00:04:52	AM junction delay (NEW - HAY)[b]
00:01:30	Additional delay between NEW - HAY
00:00:10	10 seconds on each leg for crossover at turnback[c]
00:00:54	Additional movement from HAY to turnback[e]
00:29:13	Total

HAY - NEW	
00:19:11	HAY - OCT (includes dwell time)[a]
00:02:51	OCT - NEW (includes 25 seconds dwell time)[a]
00:06:01	AM junction delay (HAY - NEW)[b]
00:01:30	Additional delay between HAY- NEW
	10 seconds on each leg for crossover at terminal
00:00:10	Tramstop[c]
00:00:54	Additional movement from turnback to HAY[e]
00:29:07	Total
00:04:00	Minimum layover at NEW end for Haymarket service[d]
00:04:00	Minimum layover at HAY end for Haymarket service[d]
00:08:00	Total min layover
01:06:20	Minimum round trip time

Notes:

a Data from 'Edinburgh Tram Network Stage 3 Runtime Simulation Report' (Doc Ref: ULE90130-SW-REP-00238v2).

b Data from 'Mott Macdonald Report - Traffic Interface Report' (Doc Ref: 0003048//REVC/241103). AM Junction delays between Haymarket and Leith Walk have been used as greater than PM delays.

c Transdev estimate of additional time to move through the crossover at the terminus / turnback

d Layover calculated from Table 17 – Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario)

e Transdev estimate of runtime between HAY and Haymarket Turnback (20kph over 300m = 5.6m/s over 300m = 54 seconds)

2.20 Summary to Establish Fleet Size

The minimum round trip times determined in Section 2.19 above are used in Tables 15 to 18 to determine the tram Peak Vehicle Requirement (PVR) and fleet size for Phase 1a & Phase 1b:

	OCT - AIR service	NER - HAY service	NER - GRS service
Service used on Phase	1a and 1b	1a only	1b only
Headway (min:sec)	10:00	10:00	10:00
Trams per hour	6	6	6
Minimum round trip time (hr:min:sec)	01:53:25	01:06:20	01:38:52
Actual round trip time needed to provide required headways and minimum layover (hr:min:sec)	02:00:00	01:10:00	01:40:00
Total additional layover to achieve headways (min:sec)	06:35	03:40	01:08
Peak number of trams	12	7	10

Table 15 - Number of Trams needed for each service (based on 6 & 6 Trams per hour scenario)

Network Option	1a	1a and 1b
PVR	19	22
Standby/maintenance/repair/training	3	3
Total tram fleet required	22	25

Table 16 - Number of Trams needed for each Phase (based on 6 & 6 Trams per hour scenario)

	OCT - AIR service	NEW - HAY service	NEW - GRT service
Service used on Phase	1a and 1b	1a only	1b only
Headway (min:sec)	07:30	07:30	07:30
Trams per hour	8	8	8
Minimum round trip time (hr:min:sec)	01:50:55	01:06:20	01:37:22
Actual round trip time needed to provide required headways & minimum layover (hr:min:sec)	01:52:30	01:07:30	01:37:30
Total additional layover to achieve headways (min:sec)	01:35	01:10	0:08
Peak number of trams	15	9	13

Table 17 - Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario)

Network Option	1a	1a and 1b
PVR	24	28
Standby/maintenance/repair/training	3	3
Total tram fleet required	27	31

Table 18 - Number of Trams needed for each Phase (based on 8 & 8 Trams per hour scenario)

2.21 Tram Fleet Kilometre Usage

The journey times and fleet sizes calculated above can be used to derive an approximate annual fleet and per Tram kilometre run of:

INITIAL OPERATING TIMETABLE

6tph	Daily	Days	Km	6tph	Daily	Days	Km
Weekdays	5531	261	1443591	Weekdays	7103	261	1853883
Saturdays	5363	52	278876	Saturdays	6950	52	361400
Sundays	5318	52	276536	Sundays	6815	52	354380
Total			**1999003**	**Total**			**2569663**
Per Tram 27 trams			**74037**	**Per Tram 27 trams**			**95173**
ENHANCED AM & PM PEAK SERVICE							
8tph	**Daily**	**Days**	**Km**	**8tph**	**Daily**	**Days**	**Km**
Weekdays	6217	261	1622596	Weekdays	7840	261	2046240
Saturdays	5363	52	320150	Saturdays	6950	52	361400
Sundays	5318	52	276536	Sundays	6815	52	354380
Total			**2219282**	**Total**			**2762020**
Per Tram 27 trams			**82196**	**Per Tram 31 trams**			**89097**
FLAT DAYTIME PEAK SERVICE							
8tph	**Daily**	**Days**	**Km**	**8tph**	**Daily**	**Days**	**Km**
Weekdays	7436	261	1940796	Weekdays	9347	261	2439567
Saturdays	7292	52	379184	Saturdays	9224	52	479648
Sundays	5318	52	276536	Sundays	6815	52	354380
Total			**2596516**	**Total**			**3273595**
Per Tram 27 trams			**96167**	**Per Tram 31 trams**			**105600**

Figure 7 – Operational Timetable

The principal assumptions are:

- 'Empty' running to and from the Depot is included;

3 General

3.1 Definitions

In these Employer's Requirements, Schedule 1 (Definitions and Interpretation) and the following definitions shall apply:

Table 19 - Definitions

Term	Definition
Act	An Act of Parliament or the Scottish Parliament following consideration and approval of a Bill
AFC	Automatic Fare Collection (see also TVM)
AIP	Approval in Principle for structures
ALARP	As low as reasonably practicable
Approval	(see Consent); also an approval of detail by an authority where consent is deemed to be granted by with prior conditions.
AutoCAD	Proprietary software used for engineering design
AW0 – AW5	Standard loading conditions for Tram Vehicles defined at Section 22.2.3
BRB	British Railways Board
BS	British Standard
CAA	Civil Aviation Authority
Case for Safety	All necessary documentation, information and other requirements pursuant to the Railways and Other Guided Transport Systems (Safety) Regulations 2006;
CAR	Corrective Action Report
CCTV	Closed Circuit Television
CIBSE	Chartered Institute of Building Services Engineers
CMS	Central Management System
COCP	Code of Construction Practice
COMP	Code of Maintenance Practice
Communications Plan	The Plan to be developed in accordance with the Employer's Requirements
COSHH	Control of Substances Hazardous to Health Regulations 1998
DAT	Delivery Acceptance Test
DCCB	Direct Current Circuit Breaker
DDA	Disability Discrimination Act
Developed	The enlarged Kinematic Envelope that takes into account all of the possible effects of

Term	Definition
Kinematic Envelope (DKE)	curvature, including superelevation of the track together with end and centre throw of the Tram. It is speed dependent and unique to a particular location at a given speed (See also Static Envelope, Dynamic Envelope and Kinematic Envelope) (See also RSPG Part 2 Section G – Guidance on Tramways).
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DSD	Drivers Safety Device
Dynamic Envelope	The Static Envelope enlarged to the maximum possible displacement of the Tram in motion on straight track. It takes into account suspension characteristics and allowances for maintenance and wear of Trams. (End and Centre throw is not included.) (See also Static Envelope, Kinematic Envelope and Developed Kinematic Envelope.) (See also RSPG Part 2 Section G – Guidance on Tramways)
EDMS	Electronic Document Management System
EIA	Environmental Impact Assessment
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMP	Environmental Management Plan
Enhanced Timetable	The Timetable described at Part 1a with 16 trams per hour Hay to Oct
ES	Environmental Statement
FAT	Factory Acceptance Test
GDPO	Town and Country Planning (General Development Procedure)(Scotland) Order 1992
GPR	Ground penetrating radar
Grandfather Rights	A longstanding right where the original reason and date of the granting of the right is unknown
GSN	Goal Structured Notation
HCI	Human Computer Interface
HF	Human Factors
HLM	High Level Model
HMRI	Her Majesty's Railway Inspectorate (or the appropriate approval regime in force)
HS	Historic Scotland
HSCB	High Speed Circuit Breaker
HVAC	Heating, Ventilating and Air Conditioning
ICP	Independent Competent Person
ISO	International Organisation for Standardisation
ITSO	Integrated Transport Smartcard Organisation - a non profit sharing, member owned organisation supported by the Department for Transport

Term	Definition
ItN	Invitation to Negotiate
JRC	Joint Revenue Committee
Kinematic Envelope (DKE)	The Dynamic Envelope enlarged to allow for the permitted tolerances in track gauge, alignment, level and cross-level and the dynamic and static effects of track wear. It is speed dependant. See also Static Envelope, Dynamic Envelope and Developed Kinematic Envelope. (See also RSPG Part 2 Section G – Guidance on Tramways)
LBC	Listed Building Consent
LHMP	Landscape and Habitat Management Plan
Lifecycle Replacement Plan	The Plan to be developed in accordance with the Employer's Requirements
Line 3	A planned extension of the Edinburgh Tram Network to the south east. Line 3 is not currently being progressed although some safeguarding provisions are required.
LRU	Line Replaceable Unit
LRV	Light Rail Vehicle
Maintainer	Infrastructure and Tram Vehicle maintenance
Markov Analysis	Reliability modelling method
MUDFA	Multi-Utilities Diversion Framework Agreement
MX	Proprietary software used for engineering design
NCR	Non Conformance Report
NR	Network Rail
OEM	Original Equipment Manufacturer
OLE	Overhead Line Equipment
Operational Timetable	The Timetable described at Table 2 – First and Last Trams for the 6 & 6 Tram per Hour Operational Timetable Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable - Hay to Oct
ORR	Office of Rail Regulation
ORS	Operational Radio System
OTMR	On Tram Monitoring and Recording
PA	Public Address System
Pan	Pantograph
PCC	Point Control Cabinet
PCS	Point Control System
PHC	Point Heating Cabinet
PHP	Passenger Help Point
PEHP	Passenger Emergency Help Point

Term	Definition
PID	Passenger Information Display
Prior Approval	Written approval by any approving body evidencing prior consent.
QA	Quality Assurance
Quality Management Plan	The Plan to be developed in accordance with the Employer's Requirements
RAMS	Reliability, Availability, Maintainability and Safety
RSPG	Railway Safety Principles and Guidance
RSP2	Ralilway Safety Publication 2 – Guidance on Tramways
RTPI	Real Time Passenger Information
RVAR	Rail Vehicle Accessibility Regulations
Safety Management Plan	The Plan to be developed in accordance with the Employer's Requirements
SAT	System Acceptance Test
SCADA	Supervisory, Control and Data Acquisition
SCC	Supervisory Control and Communications
SCT	Site Commissioning Test
SEPA	Scottish Environment Protection Agency
Shadow Running	Validation of the Operational Timetable without carrying passengers
SIT	System Integration Test
SP	Swept Path
SSSI	Site of Special Scientific Interest
STAG	Scottish Transport Assessment Guidance
Static Envelope	The maximum cross-section of Trams loaded or unloaded at rest on straight and level track, taking account of tolerances in the manufacture of the trams and the effects on the suspension of tram loading and tram loads arising from the wind and other weather. See also Dynamic Envelope, Kinematic Envelope, and Developed Kinematic Envelope. (See also RSPG Part 2 Section G – Guidance on Tramways)
Sub-System	An individual technical element e.g. communications, Tram etc.
SUC	Statutory Utility Company
SUDS	Sustainable Urban Drainage System ('soakaways')
The System	Collectively the technical sub-systems that together form the Edinburgh Tram Network.
System Interface	The interaction point between the sub-systems
Test Plan	The proposals developed by the Infraco for the structured and programmed testing of the components and the System

Term	Definition
Test T1 – T5	Formal Test requirements defined at Tests and Commissioning
TPDS	Tram Position and Detection System
Tramway Path	The area reserved for a moving tram in its environment. (See also RSP2 – Guidance on Tramways)
Transdev	"Transdev Edinburgh Tram Limited" (TETL) the Edinburgh Tram Network Operator
TRO	Traffic Regulation Order
TRY	Test Reference Year
TTRO	Temporary Traffic Regulation Order
TSS	Traction Sub-Station
TSS	Technical Support Services – advisors to **tie**.
TVM	Ticket Vending Machine (see also AFC)
UTC	Urban Traffic Control
UPS	Uninterruptible Power Supply
WBS	Work Breakdown Structure
WEBS	West of Edinburgh Busway Scheme

3.2 Infraco Services

3.3 General

This section provides a summary of the services that shall be required to be undertaken by the Infraco throughout the duration of the Infraco Works, or during particular stages of the Infraco Works, as appropriate.

3.4 Management and Technical Services

3.5 Summary of Deliverables

This section summarises the Deliverables that shall be provided by the Infraco. The Deliverables shall be provided in accordance with the requirements of the Agreement and shall be reviewed in accordance with the Review Procedure.

The Infraco shall complete the Deliverables set out hereunder, in the timescales agreed, and as identified in the Submittal Programme referred to.

In addition to the required Deliverables, this section also develops, where appropriate, the management and technical systems and services that shall be required to be provided by the Infraco to meet these Employer's Requirements. The Infraco shall develop and submit the following Deliverables for approval by **tie** in accordance with the Review Procedure.

Table 20 - Table showing Summary of Deliverables

Communications, Meetings and Reporting
Communications Plan
Meetings Schedule
Progress Photos
Progress Reports
Site Reports
Topics Register
Programme
Programme to include Design, Construction, Snagging, Commissioning, training, shadow running and opening to passenger service
Time Chainage Diagram
Management Plans
Construction Health and Safety Plan

Construction Plan
Construction Stage Environmental & Sustainability Management Plan(s)
Documentation associated with the completion of all research, surveys and inspections
Environmental Action Plan (EAP)
Infraco KPI Reporting
Infraco Performance Measurement
Network Rail Interface Plan
Overall Approvals Management Plan and Approvals Management Plan
Project Health & Safety File
Project Management Plan
Quality Forms (associated with the Project Safety and Quality Interface document)
Quality Management Plan
Research, Surveys and Inspections
Safety Forms associated with the Project Safety and Quality Interface document.
Safety Management Plan
Schedule of Internal Audits
System Safety Management Plan
Testing and Commissioning Plans
Training Plans

Design Deliverables

Earthing and Bonding Plan
Case for Safety for the Network or Geographical Sections as applicable
Design Stage Configuration Management Plan
Design Stage Verification & Validation Plan
Detailed Cause Consequence Analysis
Functional Hazard Analysis
Hazard Log & Risk Register
Interface Control Documents
Interface Schedules
List of Applicable Standards
Procurement Plan
Requirements Specification / Database
Scheme Plan
Road Network Plan of affected areas
System Architecture Specification
System Design Specification
System Design Test Specification
System Interface Management Plan
System Interface Register

Detailed drawings and other detailed design documentation

Archaeological & Heritage Mitigation Plan
Boundaries Treatment Management Plan
Construction Advice
Construction Site Drainage Plan
Initial and Final Buildability Reports
Landscape and Habitat Management Plan
Method of Working around Protected Species
Other construction advice as noted
Procedures for dealing with Unidentified Apparatus or Recorded Artificial Obstructions
Schedule 3 (Code of Construction Practice) Deliverables
Schedule and Conditional Surveys of Structures / Buildings Documentation (Dilapidation)
Strategy for controlling Invasive and Alien Species
Survey Photographs of Reinstatement Work
Temporary Works, Security and Fencing Arrangements Plan
Waste Management Plan

Cost Management

Actual / Planned / Forecast Spend Tables / Curves
Change Control Schedule and background information
Cost Loaded Programme / Earned Value Analysis based on WBS structure
Cost Report
Schedule of Compensation Events and background information
Value Management Estimates / Analysis

Risk

Commissioning Risk Control Report
Construction Risk Control Report
Infraco Assumptions Register
Infraco Risk Management Plan
Infraco Risk Register
Operational and Maintenance Report
Residual Risk Control Report
Risk Progress Reports

Traffic Management and TTROs

Access Control Permit Procedures
Access Control Permits and Permits to Work
Permits to Work and Utility Permits to Work Procedures
Traffic Management and Work Site Staging Plan
TTRO Obligations and Traffic Management Procedures

Method Statements

Method Statements

Schedule and Conditional Surveys of Structures / Buildings and Documentation (to avoid delay to the Service Commencement Date)

Survey Photographs of Reinstatement Work

Surveys of Structures which may affect Progress

Stakeholder Management Deliverables

Communications Log

Information for the **tie** monthly newsletter

Procurement Schedule

Traffic Routing Map

Weekly Newsletter

Weekly updates of Progress

Other Deliverables as defined below:

Asset Register

Documentation - As-built Design Drawings

Infrastructure Maintenance Plan

Maintenance Plan

O&M manuals

Overall Approvals Management Plan and Approvals Management Plan

Overall Test and Commissioning Plan

Simulation

Spare Parts manuals

Spare Parts, Tools & Test Equipment

Staffing Plan and Recruitment, Retention and Training Plan

System Acceptance

System Integration – including System Integration Plan

3.6 Design

3.6.1 General Obligations

The Infraco shall be responsible for the complete design of the Edinburgh Tram Network including the achievement of full compliance with the Employer's Requirements. The Infraco shall be responsible for achieving the following:

- The Deliverables necessary to enable the Edinburgh Tram Network to be procured, constructed, tested, commissioned and brought into commercial service and consistent with the requirements for training and Case for Safety (taking account of the need to fully co-ordinate these activities, including with other physically-related projects, so as to minimise overall disruption) to meet these Employer's Requirements and the Programme.
- The Infraco shall produce a tram service simulation that will demonstrate that its implementation of the design will achieve the required run times, power consumption and service performance where defined in these Employer's Requirements;
- The Infraco shall ensure that the design covers all aspects of the Edinburgh Tram Network and the associated works as defined in these Employer's Requirements;

- The Infraco shall approach the design and technical services in a structured manner using a recognised 'V' life cycle model with regard to the integration of design engineering, systems engineering and safety engineering activities;

- The Infraco shall be responsible for ensuring that there are no gaps and omissions in the specification and design of the Edinburgh Tram Network;

- The Infraco shall demonstrate that the design has properly considered and adopted the most advantageous whole life cost solutions;

3.6.2 Design Approach

The design approach shall be as set out in the SDS Agreement. The Infraco shall:

- Adopt, develop and adapt the SDS Management Plans covering Configuration Management and Verification and Validation.

- Undertake such supplementary safety analysis that will allow further development of the Case for Safety concurrent with any design undertaken to prove that the Edinburgh Tram Network is acceptably safe;

- Where any new technologies are proposed by the Infraco, submit reports and presentations analysing and assessing the options and justifying the final selections of technologies in terms of time, cost, quality, safety, risk and maintainability, for review by **tie**;
- Prepare and maintain the Risk and Hazard Log;
- Prepare and maintain the System Architecture Specification;
- Prepare and maintain the System Design Specification;
- Prepare and maintain the System Design Test Specification;
- Prepare and maintain the Functional Hazard Analysis;
- Prepare and maintain the Detailed Cause Consequence Analysis;
- Prepare and maintain the Requirements Specification / Database;
- Prepare and maintain the Scheme Plan;
- Prepare and maintain the Procurement Plan;
- Prepare and maintain the Interface Schedules;
- Prepare and maintain the Earthing and Bonding Plan;
- Prepare and maintain the detailed drawings and other detailed design documentation;

3.6.3 Transport Modelling

The Infraco shall procure that the SDS provider performs its obligations in respect of

- transport modelling as such obligations are set out in the SDS Agreement.
- detailed traffic junction design recognition and evaluation and wider area effect assessment;
- temporary traffic diversions and support to **tie** where reasonably required in respect of obtaining the Traffic Regulation Order including impact analysis as defined in section 12.12.

For detailed traffic signal modelling; Infraco shall provide adequate modelling upon which to baseits design.

3.6.4 Environmental

All equipment shall meet its required operational functionality in accordance with these Employer's Requirements. The Edinburgh Tram Network and its components shall take cognisance of, inter alia, the following factors: electrical interference, dust, vibration, supply voltage variations, radio signal variations, solar radiation, temperature, humidity, salt, mist, wind, precipitation, snow etc.

Table 21 shows average temperature and humidity conditions for the region. Based on the given information all equipment shall be suitable for a working life as defined in Design Life of these Employer's Requirements under maximum ambient temperature range from – 9° to + 28 ° C, unless otherwise agreed by **tie**.

Edinburgh (eastern Scotland)

	Sunshine (average hours per day)	Temperatures: Average daily minimum °C	°F	Average daily maximum °C	°F	Highest recorded °C	°F	Lowest recorded °C	°F	Precipitation and humidity: Relative humidity 900 x %	Average monthly precipitation mm	in	Wet days (more than 0.1 mm/0.004 in)	
Jan	2	1	34	6	42	14	57	-8	17	84	57	2	17	Jan
Feb	3	1	34	6	43	14	58	-9	15	83	39	2	15	Feb
March	4	2	36	8	46	20	68	-6	21	81	39	2	15	March
April	5	4	39	11	51	22	72	-4	25	75	39	2	14	April
May	6	6	43	14	56	24	76	-1	31	76	54	2	14	May
June	6	9	49	17	62	28	83	3	37	75	47	2	15	June
July	5	11	52	18	65	28	83	6	42	78	83	3	17	July
Aug	4	11	52	18	64	28	82	4	40	80	77	3	16	Aug
Sept	4	9	49	16	60	25	77	1	33	80	57	2	16	Sept
Oct	3	7	44	12	54	20	68	-2	28	82	65	3	17	Oct
Nov	2	4	39	9	48	19	67	-4	24	83	62	2	17	Nov
Dec	1	2	36	7	44	14	58	-7	20	84	57	2	18	Dec

Based on readings for 30 years at 55°55' N, 3°11' W, altitude 134 m/440 ft.

Where equipment is enclosed in equipment housings / enclosures the equipment contained therein shall be capable of operating at an external ambient temperature 15°C higher than the upper limit and at a temperature of 5°C lower than the figures in Table 21 taking into account any heat generated by the equipment.

All equipment housings / enclosures that contain electronic equipment shall be so equipped to minimise the occurrence of condensation within the enclosure.

The following data in Figures 8 & 9 are based on the Edinburgh Test Reference Year (TRY) as given by CIBSE. It is a synthesised weather year based on 20 years of record data. CIBSE recommend that this type of weather data be used for analysing energy use and overall environmental performance.

Temperature

Dry Bulb Temperature	MAX 26.7°C	MIN –10.1°C	MEAN 8.43°C
Wet Bulb Temperature	MAX 18.9°C	MIN –10.7°C	MEAN 6.82°C

Figure 8 - Dry Bulb Temperature Analysis 1: Number of Hours per Year That the Dry Bulb Temperature is Greater Than the Given Value

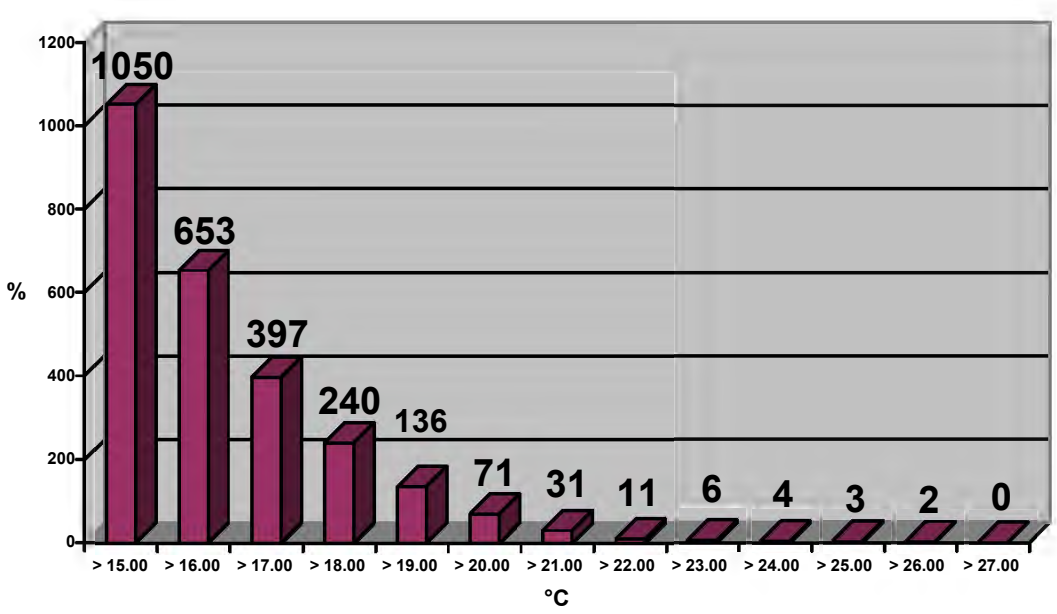
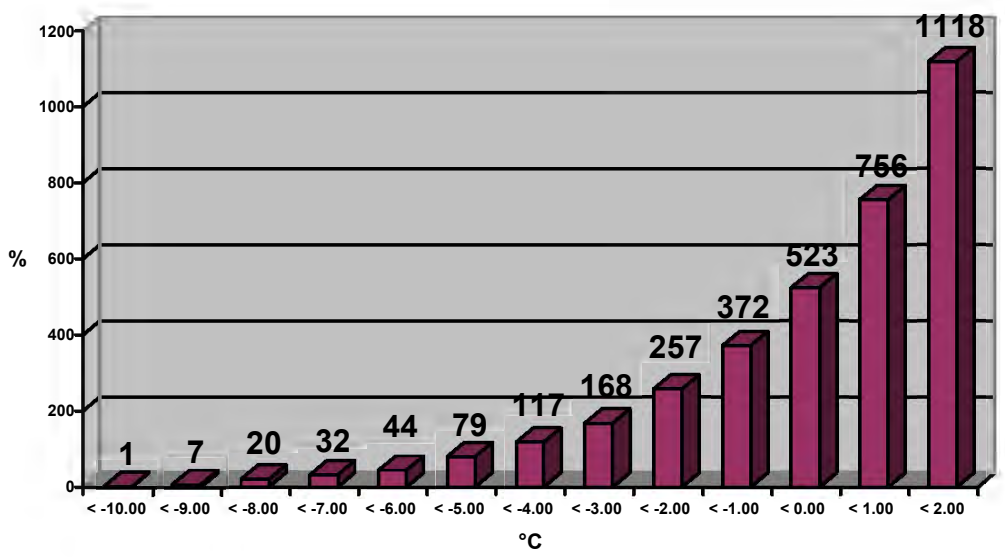


Figure 9 - Dry Bulb Temperature Analysis 2: Number of Hours per Year That the Dry Bulb Temperature is Less Than the Given Value



Wind Speed MAX 19.5m/s MIN 0m/s MEAN 4.6m/s

3.7 Construction-related Deliverables (Schedule 3 Requirements)

The following deliverables, from and with regard to *Schedule 3 (Code of Construction Practice and Code of Maintenance Practice)* are highlighted for submission in accordance with the Review Procedure:

- In accordance with Schedule 3 (Code of Construction Practice and Code of Maintenance Practice), the Infraco shall compile a schedule of all buildings, or other structures, which may be at risk of physical damage as a result of the Infraco Works. Furthermore records of the condition and surveys of any defects shall be prepared by the Infraco;

- Under Schedule 3 (Code of Construction Practice and Code of Maintenance Practice) there is a requirement for the Infraco to undertake works to address defects in existing structures, caused by the Infraco Works. Where such work is completed the Infraco shall be required to take appropriate photographs to fully demonstrate the quality of the reinstatement works;

3.8 Construction Advice and Buildability

The Infraco shall be required to develop a =Buildability Report in accordance with the Review Procedure.

The Infraco shall provide a Buildability Report in accordance with the Review Procedure, which shall address the following.

- The Infraco shall propose construction methods which shall be utilised in respect of the Infraco Works. The Infraco shall also advise **tie** on the time and cost implications of any alternative solutions proposed by the Infraco and which have been accepted by **tie**. The Infraco shall initiate the requirements for Temporary Works, and the programme for approvals for such Temporary Works and their execution.

- Notwithstanding the Infraco's obligations with respect to compliance with the third party agreements, the Infraco shall advise **tie** on the potential impact of the Infraco Works upon neighbouring occupiers and users of nearby roads, railways, buildings and airport facilities and the Infraco shall plan the execution of the Infraco Works in such a way as to minimise disruption and prevent nuisance.

- The Infraco shall advise **tie** on the provision and layout of the main site office and local Work Sector / Work Section facilities and services to be provided or secured by the Infraco. **tie**'s requirements for office accommodation at the main site office are expressed in this section.

The Infraco shall prepare, maintain and comply with plans, schedules and drawings that shall show the Infraco's proposals for temporary works, security and fencing arrangements throughout the duration of the Infraco Works ("Temporary Works, Security and Fencing Arrangements Plan").

3.9 Site Support Facilities for tie

The Infraco shall be responsible for the provision, servicing, maintenance and removal of the specified **tie** office accommodation and transport for the use of **tie** officers and staff

The Infraco shall provide and maintain fully serviced office accommodation and furnishings throughout the duration of the Infraco Works, in accordance with the following requirements:

- Office accommodation to accommodate 10 desks (Infraco supply) each with at least one secure lockable drawer, a swivel cloth upholstered chair. ;
- Three separate offices with a minimum working space of $16m^2$;
- 2 meeting rooms suitable for sitting up to 20 and 8 people respectively;
- Male and female toilets. Minimum area $3m^2$ each;
- Changing/Locker facilities;
- Kitchen facilities;
- Drying facilities;
- Male & Female shower room;
- Parking for up to 15 cars.

The Infraco shall prepare and submit an office layout based on the accommodation description set out below for approval by **tie**.

The Infraco shall integrate this accommodation with the Infraco's own accommodation and, subject to proposals which are acceptable to **tie**, the meeting rooms and welfare facilities may be shared by the Infraco.

3.9.1 Fittings and Furnishings

The Infraco shall also provide the following as minimum requirements:

General Office

- 7 x 4 drawer lockable metal filing cabinets
- 6 wall mounted notice board 1m high 1.5m wide
- 10 waste paper baskets
- 10 telephones connected to 2 lines
- 1 fax machine connected to a separate dedicated line
- 1 high output combined printer and photocopier capable of producing A4 and A3 black and white copies
- 10 connections to internet via broadband, all able to connect at same time
- 1 plan layout table 1 x 2 m
- 1 A0 drawing board and drafting equipment
- 10 desk lamps
- 10 letter tray/ filing baskets
- 2 m of book shelves at 6 of the desks
- 6 large white boards

Meeting Rooms

- Suitably sized tables and the requisite number of chairs for each of the two meeting rooms referred to above.

- 3 flip charts and flip chart paper as required and 1 large wall mounted white board in each meeting room

Changing / drying room

- Lockers c/w locks and keys for 30 people
- 4 chairs
- 30 coat pegs mounted on wall
- 1 boot pull.

General

- A security alarm system
- Access doors, fitted with five lever mortice locks and 6 sets of keys

3.9.2 Services

The Infraco shall provide, install and maintain all the services i.e. Gas, electric, water, drainage, telephone (two lines), broadband etc necessary to ensure effective occupation by **tie** of the accommodation for the duration of the Infraco Works

The Infraco shall provide install and maintain a printer/photocopier capable of producing A4 and A3 size black and white photocopies. The Infraco shall ensure that sufficient stocks of consumables (including paper and toner) are available at all times. Subject to acceptable proposals, the photocopier / fax may be shared by the Infraco and **tie**.

The Infraco shall provide tea, coffee, sugar fresh milk and a supply of drinking water for use by **tie** for the duration of the Infraco Works.

The Infraco shall arrange for the servicing and daily cleaning of the accommodation.

Toilet paper, paper towels, soap, and detergents shall be provided by the Infraco as required.

3.9.3 Equipment

The Infraco shall provide the following equipment for the exclusive use of **tie** throughout the duration of the Infraco Works:

- 10 x 10m long steel tape measures
- 10 x 50m long tape measures
- 10 x high output hand-held torches
- 2 approved electronic utility tracers for tracing/locating cables and pipes
- other consumables as may be required by **tie** (i.e. marker paint etc.).

The Infraco shall provide surveying/setting out equipment to **tie** as reasonably required, in connection with the Infraco Works.

3.9.4 Site Vehicles

The Infraco shall provide, licence, insure (comprehensive for any qualified driver together with any authorised passengers and the carriage of goods or samples), service and maintain four 4 wheeled road vehicles (suitable for the Edinburgh Tram Network) and visitor transport for the exclusive use of **tie**'s representative and staff to enable them to carry out their duties for the duration of the Agreement. The number and type shall be to the specific approval of **tie**.

The vehicles shall be delivered and maintained by the Infraco in good, roadworthy condition.

The Infraco shall provide fuel, oil and maintenance in conformity with the vehicle manufacturers' recommendations and shall clean the vehicles inside and outside as required by **tie**.

A suitable replacement vehicle shall be provided by the Infraco in the event any vehicle being out of service for more than 24 hours.

The Infraco shall ensure that each vehicle shall be fitted with approved warning beacons and any other safety equipment as required for work on roads or within the boundaries of the Edinburgh International Airport.

3.10 Spare Parts, Tools and Test Equipment

The Infraco shall be responsible for the provision, delivery, offloading and placing into stores of the necessary Spares Parts, Tools & Test Equipment.

Detailed requirements and deliverables in respect of the Spares Parts, tools and Test Equipment responsibilities are included in the Agreement.

3.11 Documentation

The Infraco shall be responsible for the provision of all as built / constructed / manufactured drawings, manufacturers information, test certification and other documentation to be provided inaccordance with the Agreement.

Detailed requirements and Deliverables in respect of the documentation responsibilities are included within the Agreement and the Maintenance section of these Employer's Requirements.

3.12 Training

The Infraco shall be responsible for all necessary initial training associated with the operation and maintenance of the Edinburgh Tram Network. Detailed requirements and deliverables in respect of the Training responsibilities are included within Section 40 (*Maintenance*) of these Employer's Requirements.

4 Use of Industry Standard Equipment

The Infraco shall base its system supply on Commercial Off the Shelf (COTS) equipment and software. The use of proprietary equipment and software which is not available on a COTS basis is prohibited unless prior written agreement has been obtained from **tie,** other than that which is specified in the Infraco Proposal.

This is to allow the maintenance, extension and modification of the ETN by third party suppliers and maintainers if necessary.

All electronic interfaces between subsystems shall use open standards and shall utilise non-proprietary protocol.

5 System Identity and Branding

A single system identity shall be applied to the ETN. This shall be developed by **tie** through a specialist contractor appointed by **tie**. The output of this contract with the specialist contractor shall be a documented set of design guidelines which shall be incorporated into these Employer's Requirements as Appendix 1 and which shall be complied with by the Infraco in respect of the Infraco Works. The design guidelines shall include the following elements:

- Logo and other elements of the ETN's graphic identity;
- Signage;
- Application of the systems identity to the following:
  - Ticket machines;
  - Stop furniture;
  - Passenger information;
  - Depot.
- Tram livery;
- Tram interior;
- Uniforms;
- Pictograms;
- Other aspects of the ETN which are visible to the public.

6 Design Life

The equipment and systems to be supplied for the Edinburgh Tram Network shall be designed and built by the Infraco to a standard that shall ensure the System as a whole is capable of continuous operation for a minimum period of 15 years from the Service Commencement Date for each Phase.

Individual items of Infrastructure and equipment shall have a design life as indicated in the table below. Where the design life for an item of equipment is not specified, a minimum of 15 years shall be assumed. All design lives are from the Service Commencement Date for each Phase.

Item of Equipment or System	Design Life
Trams	30 years
Structures	120 years
Track Bed	50 years
Track	25 years
Rails in Straight Lines	20 years
OLE	30 years
Power Cables	30 years
Substations and Substation Equipment	30 years
Tramstop Platforms	50 years
Tramstop Superstructure (including shelters and poles)	25 years
Tram Position and Detection equipment	15 years
Passenger Information Displays	10 years
Telephone Handsets	10 years
Telephone PABX	15 years
Voice recorder	15 years
PA Controller	10 years
Loudspeakers	15 years
Hand Portable Radio Handsets	5 years
Vehicle Mobile Radio Equipment	7 years

Item of Equipment or System	Design Life
Radio Base Station Equipment	15 years
Radio Masts and Antennae	15 years
Passenger Help Points	15 years
CCTV cameras	7 years
CCTV Digital Video Recorders	7 years
SCADA outstations	20 years
Fibre Optic Cabling and Patch Panels	25 years
Fibre Optic Switches, Routers, Hubs	15 years
Other communications equipment	15 years
Cabinets	25 years
UPS systems (excluding batteries)	15 years
Copper Communications Cables	25 years
Batteries (if employed)	4 years
Workstations including Monitors	5 years
Servers	5 years
Standard hand tools	5 years
Portable electrical tools	7 years

Table 22 - Equipment Design Life

7 Extensibility

Table 23 below sets out the assumptions being made in the design of Phase 1a and Phase 1b to allow Phases 2 and 3 to be added with minimum change, and also for future increase in service levels on Phase 1a/1b (over the "8+8" pattern) and for the addition on the proposed Line 3 (assumed routing Bridges-Princes St-Haymarket).

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
Track Layout	Roseburn Junction/Delta	Design for full delta	n/a		n/a	n/a
	Balgreen loop and crossover	Design for loop and crossover	n/a		n/a	n/a
	Granton Square	Design for interim terminus	Design for track continuation; build initial as over-run for terminus	n/a	n/a	n/a
	Newhaven	Design for interim terminus	Design for track continuation	n/a	n/a	n/a

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Ingliston Junction and P&R Tramstop	Make provision for Phase 3 and long-term aspirations	Alignment design not to preclude an allowance terminating Phase 3 service at Ingliston P&R and for East-West continuation from Phase 1	n/a	n/a	n/a
	Track alignment at Princes St/South St Andrew St Junction	Make Provision for Line 3	n/a	n/a	Alignment to allow pointwork and appropriate future traffic management(See CR078)	n/a
Modelling	Network modelling inc. for TSJs	To support 8+8 service	None	None	None	n/a
Traction Power	Traction Power Supply system (Substations/OLE/cabling)	To support 8+8 service +50% addition	Part of basic design	In basic design	Effectively in basic design, as an alternative use of the increased service design provision	n/a

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Definition of Power characteristics (and other parameters for modelling)	Full traction characteristic of the selected tram	n/a	n/a	n/a	n/a
Depot	Stabling sidings	Design for 35, build for 27	Inc. in 8 extra	Inc. in 8 extra	Not specifically included	n/a
	Workshop	8 Berths theoretical maximum; (practically:4 berths plus 2 service roads)	Initial design would accommodate	Initial design would accommodate	Not specifically included	n/a
	Depot staff accommodation	Numbers to be accommodated nominally match fleet that could be accommodated	Initial design would accommodate	Initial design would accommodate	Not included	n/a
	Depot car parking	See drawings	n/a	n/a	Not included	n/a
	Depot Control Centre	Design for 5 desks; provide 3	Design layout would accommodate	Initial provision would accommodate	Design layout would accommodate	n/a

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Depot stores	Design basis	Would accommodate	Would accommodate	Not included	n/a
						n/a
SCC	ODN capacity					
	General capacity	There is an initial +50% requirement above the calculated maximum usage	TBA	TBA	TBA	n/a
	Route coding capacity	3-digit route-coding included	Included in base	n/a	Included in base	n/a
	Radio system capacity	A minimum[2] of two channels at each base station	TBA	TBA	TBA	n/a
Roads	Traffic Signalled Junction design and modelling (inc. at temporary termini)	Phase 1a/1b only	Possibly ductwork at temporary termini	n/a	None	n/a

[2] *The word maximum would allow no channels to be provided and still be compliant! Two channels ok as a minimum.*

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Traffic Management layout at Princes St/South St Andrew St	Phase 1a only	n/a	n/a	None	n/a
	Traffic signalling ductwork	Design basis	n/a	n/a	n/a	Allowance in design at locations where additional signals might be provided
Tramway Ducting	Ductwork and access chambers	A minimum of 20% addition of the number of ducts	Initial design would accommodate	Initial design would accommodate	Initial design would accommodate	n/a
Utilities	Cross-track ducts	Where agreed with the SUCs, provision of secondary spare duct	n/a	n/a	n/a	Provision in design basis

Table 23 - Extensibility Assumptions

8 Standards

8.1 Principles

Where there is no relevant standard specified in the Agreement, the Infraco Works shall comply as a minimum with relevant current British or European Standards, DfT and/or Scottish Government Publications, Standards and Technical Memoranda or IEC/ISO Standards in accordance with the order of precedence set out in section 8.2.

The Infraco Works shall comply with the ORR Safety Publication 2 and with the requirements of HMRI. Where standards do not exist, the Infraco Works shall comply with Good Industry Practice and all relevant codes of practice and guidance notes. Materials or equipment provided shall be in accordance with regulations and standards appropriate to the United Kingdom or the country of manufacture, but only where in the opinion of **tie**, compliance with the regulations and standards appropriate to the country of manufacture ensures an equivalent or higher quality than the regulations and standards appropriate to the United Kingdom. In such situations, the onus will be on the Infraco to prove that they are of an equivalent or higher quality.

Where standards are specified in these Employer's Requirements, these shall include any successor or replacement standards, announced or in force before7 August 2007 and in relation to Tram Supply Obligations and Tram Maintenance Obligations only, 14 September 2007, which provide an equivalent or improved quality and standard.

The Infraco shall comply with standards reasonably required by the relevant Roads Authority, including any local standards and amendments to the Design Manual for Roads and Bridges.

The Infraco shall be responsible for identifying all proposed departures from standards: in these instances, the Infraco shall seek the formal approval of **tie**, and provide all details justifying the departure from standards.

The Infraco shall be responsible for making any necessary applications to the relevant Roads Authority for departure from standards and for complying with the resulting consequences, including those arising from the failure of an application for such departure.

The Infraco shall ensure that all materials, construction and workmanship comprised in the Infraco Works meet the requirements of the British or European standards relevant to the materials used. Materials used should have a British Board of Agrément Certificate wherever reasonably possible which identifies a lifespan for that material.

8.2 Hierarchy of Precedence.

The order of precedence shall be as follows:

1) Legislation;

2) Guidance;

3) Where not included in Guidance;

(i.) British Standards;

(ii.) Scottish Government standards and guidance;

(iii.) Local Authority standards (CEC);

(iv.) Statutory Utility standards;

(v.) International Industry standards.

8.3 The Infraco's Responsibilities

The Infraco in its system integrator role and as the system designer shall be responsible for:

- As appropriate, the development of, and compliance to, robust management processes in respect of compliance with Law and any other relevant standards or regulations included in the Agreement and section 8.2.
- The identification and selection of appropriate standards for all aspects of the Infraco Works
- The identification and definition of any application limits of such standards for all aspects and at all stages of the Infraco Works (such as design, construction, testing and commissioning, operation, and maintenance) in particular at the network, System and subsystem level.
- The identification and successful resolution of any conflicts within and between the obligations contained within this section 8 and Law.

8.3.1 Applicable Standards

Applicable standards are listed in the following table.

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 8500 – 1: 2002	Concrete – Complementary British Standard to BS EN 206-1. Method for specifying and guidance for specifier	x	x	x			x		x	x	
BS 8500 – 2: 2002	Concrete – Complementary British Standard to BS EN 206-1. Specification for constituents material and concrete	x	x	x			x		x	x	
BRE Special Digest Nr 1	Concrete in aggressive ground.	x	x	x			x		x	x	
BS 4449: 1997	Specification for carbon steel bars for reinforcement of concrete	x	x	x			x		x	x	
BS 6744: 2001	Stainless steel bars for the reinforcement and use in concrete – Requirements and test methods	x	x	x			x		x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 10210 S355 J2H	Steelwork: Hollow sections	x					x				
BS EN 10025 S355J2G3	Steelwork: All other sections	x					x			x	
BS 5400 -	Steel, Concrete and Composite Bridges	x									
BS 5400 - Part 1: 1988	General Statement (see BD 15/92)	x									
BS 5400 Part 2: 1978	Specification for Loads (See BD 37/01)	x									
BS 5400 Part 3: 2000	Code of Practice for Design of Steel Bridges	x									
BS 5400 Part 4: 1990	Code of Practice for Design of Concrete Bridges (see IA.5 and BD 24/92)	x									
BS 5400 Part 5: 1979	Code of Practice for Design of Composite Bridges (see BD 16/82)	x									
BS 5400 Part 9: 1983	Bridge Bearings (see BD 20/92)	x									
BS 5400 Part 10: 1980	Code of Practice for Fatigue (see BD 9/81)	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 5930: 1999	Code of Practice for Site Investigations	x	x	x					x	x	
BS 8666: 2000	Scheduling, Dimensioning, Bending and Cutting of Steel Reinforcement for Concrete	x	x	x			x		x	x	
BS EN 206-1: 2000	Concrete - Specification, performance, production and conformity (AMD 13189)	x	x	x			x		x	x	
BS 8500-1: 2002	Concrete – Complimentary British Standard to BS EN 206-1. Method of specifying and guidance for the specifier.	x	x	x			x		x	x	
BA 47/99 (Aug '99)	Waterproofing and Surfacing of Concrete Bridge Decks	x									
BA 41/98 (Feb '98)	The Design and Appearance of Bridges	x									
BA 42/96 (Nov '96)	The Design of Integral Bridges	x									
BA 55/00 (May '00)	The Assessment of Bridge Substructures & Foundations, Retaining Walls & Buried Structures	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BA 57/95 (Aug '95)	Design For Durability	x									
BD 2/79 (Jun '88)	Technical Approval of Highway Structures on Motorways and other Trunk Roads, Part IV: Procedures for Lighting Columns	x		x							
BD 2/89 (Oct '89)	Technical approval of DTp highway structures on motorways and other trunk roads Part 1, General Procedures	x									
BD 7/81 (Aug '81)	Weathering steel for highway structures	x									
BD 9/81 (Dec '81)	Implementation of BS 5400 Pt 10, CP for fatigue	x									
BD 12/95 (Feb '96)	Design of Corrugated Steel Buried Structures with spans not exceeding 8m (including circular Arches)	x									
BD 13/90 (Feb '91)	Design of Steel Bridges Use of BS 5400: Part 3: 1982	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BD 15/92 (Dec '92)	General Principles for the Design and Construction of Bridges Use of BS 5400: Part 1: 1988	x									
BD 16/82 (Dec '82)	Design of composite bridges - Use of BS 5400 Pt 5: 1979 including Amendment No. 1 (Dec '87)	x									
BD 20/92 (Oct '92)	Bridge Bearings Use of BS 5400: Part 9: 1983	x									
BD 21/97 (Aug '97)	The Assessment of Highway Bridges and Structures Amendment No. 1 (Aug '97)	x									
BD 24/92 (Nov '92)	Design of Concrete Highway Bridges and Structures Use of BS 5400: Part 4: 1990 Including Interim Advice Note IA.5 July 1996	x									
BD 28/87 (Jul '87)	Early thermal cracking of concrete including Amendment No. 1 (Aug '89)	x									
BD 30/87 (Jul '87)	Backfilled retaining walls and bridge abutments	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BD 31/87 (Jan '88)	Buried concrete box type structures	x									
BD 33/94 (Nov '94)	Expansion Joints for Use in Highway Bridge Decks	x									
BD 37/01 (Aug '01)	Loads for Highway Bridges	x									
BD 42/00 (May '00)	Design of Embedded Retaining Walls and Bridge Abutments	x									
BD 43/90 (Apr '90)	Criteria and Material for the Impregnation of Concrete Highway Structures	x									
BD 44/95 (Jan '95)	The Assessment of Concrete Highway Bridges and Structures Including Interim Advice Note IA.4 July 1996.	x									
BD 47/99 (Aug '99)	Waterproofing and Surfacing of Concrete Bridge Decks	x									
BD 48/93 (Jun '93)	The Assessment and Strengthening of Highway Bridge Supports	x									
BD 49/93 (Jan '93)	Design Rules for Aerodynamic Effects on Bridges	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BD 52/93 (Apr '93)	The Design of Highway Bridge Parapets	x									
BD 56/96 (Nov '96)	The Assessment of Steel Highway Bridges and Structures	x									
BD 57/95 (Aug '95)	Design for Durability	x									
BD 58/94 (Nov '94)	The Design of Concrete Highway Bridges and Structures with External and Unbonded Prestressing	x									
BD 60/94 (Apr '94)	The Design of Highway Bridges for Vehicle Collision Loads (this does not apply to existing structures).	x									
BD 70/97 (Feb '97)	Strengthened/Reinforced Soils and Other Fills for Retaining Walls and Bridge Abutments (use of BS 8006:1995)	x									
BD 74/00 (May '00)	Foundations	x					x			x	
TD 9/93 (Jun '93)	Highway Link Design	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
TD 27/96 (Aug '96)	Cross sections and headrooms	x									
ASO10	Railway sleepers – Jarrah, Karri and Wandoo.		x								
ASO11	Railway crossing timbers – Jarrah.		x								
BS EN 13674-1:2003	Specification for railway rails (partially replaces BS11)		x								
BS47	Fishplates for railway rails.		x								
BS EN 13043:2002	Aggregates for bituminous mixtures and surface treatments for roads.		x	x						x	
BS64	Specification for normal and high strength steel bolts and nuts for railways rail fishplates.		x								
BS729	Specification for hot dip galvanised coatings on iron and steel articles.		x								
BS EN 1097-3:1998	Testing aggregates. (partially replaces BS812)		x								

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS970	Specification for wrought steels for mechanical and allied engineering purposes.		x								
BS1377	Methods of tests for soils for civil engineering purposes.	x	x	x			x			x	
BS3100 (withdrawn)	Specification for steel coatings for general engineering purposes.		x				x			x	
BS4921	Specification for sheradised coatings on iron and steel.		x				x			x	
BS EN 10270-1:2001	Specification for patented cold drawn steel wire for mechanical springs.		x								
BS6906	Methods of tests for geotextiles.		x								
BS EN 1562	Founding. Malleable cast irons.		x								
BS EN 1563	Founding. Spheroidal graphite cast iron.		x								
BS EN 13481-2	Performance requirements for fastening systems for concrete sleepers.		x								
BS EN 13481-3	Performance requirements for fastening systems for wooden sleepers.		x								

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 10002 – 1	Tensile testing of metallic materials (method of test at ambient temperature).		x								
BS EN 10025	Hot rolled products of structural steels. General technical delivery conditions		x							x	
ENAAA-2	Railway applications – Track – Fastening Systems Part 2: Performance requirements for fastening system for concrete sleepers.		x								
ISO/R887	Plain washers for metric bolts, screws and nuts.		x								
RT/E/S/40045	Network Rail Standard Electric Points Heating.		x								
UIC605OR	Protection from corrosion – measures to be taken on direct current catenaries to reduce the risks on adjacent piping and cable systems.		x								
UIC860	Technical specification for the supply of rails.		x								

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
UIC861-2	Standard sections for points rails adapted to the UIC54 and 60kg/m rail sections.		x								
UIC861-3	Standard 60kg/m rail profiles – types UIC60 and 60E.		x								
UIC863	Technical specification for the supply of non-treated track support (wooden sleepers for standard and broad-gauge track and crossing timbers).		x								
UIC863-1	Use of non-European timbers for the manufacture of sleepers.		x								
UIC864-1	Technical specification for the supply of sleeper screws.		x								
UIC864-2	Technical specification for the supply of steel track bolts.		x								
UIC864-3	Technical specification for the supply of spring steel washers for use in permanent way.		x								

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
UIC864-4	Technical specification for the supply of fishplates or sections for fish-plates made of rolled steel.		x								
UIC864-5	Technical specification for the supply of rail seat pads.		x								
UIC864-6	Technical specification for the supply of baseplates and for sections for baseplates made of rolled steel.		x								
UIC864-7	Rolled profiles for baseplates for UIC rails.		x								
UIC864-8	Rolled profiles for fishplates for 54kg/m and 60kg/m rails.		x								
UIC866	Technical specification for the supply of cast manganese steel crossings for switch and crossing work.		x								
BS 1363-2:1995	13A plugs, sockets-outlets and adaptors. Part 2, Spec. for 13A switched and unswitched socket-outlets				x			x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 1363-4:1995	13A plugs, socket-outlets and adaptors. Part 4, Spec. for 13A fused connection units switched and unswitched				x			x	x	x	
BS 3573:1990	Polyolefin copper-conducted telecommunications cables							x	x	x	
BS 4533-102.1:1990	Luminaires. Particular requirements. Part 102.1 Fixed general purpose luminaires				x				x	x	
BS 4579-1:1970 (withdrawn, replaced by BS EN 61238-1)	Performance of mechanical and compression joints in electric cable and wire connectors. Part 1 Compression joints in copper conductors				x	x	x	x	x	x	
BS 4579-2:1973	Performance of mechanical and compression joints in electric cable and wire connectors. Part 2 Compression joints in nickel, iron and plated copper conductors				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 4662:1970 (withdrawn. replaced by BS 4662:2006)	Specification for boxes for the enclosure of electrical accessories				x	x	x	x	x	x	
BS 4737-4.1:1987	Intruder alarm systems in buildings. Part 4.1 Codes of practice. Code of practice for planning and installation				x				x	x	
BS 5225-1:1975	Photometric data for luminaires. Part 1 Photometric measurements				x				x	x	
BS 5225-3:1982	Photometric data for luminaires. Part 3 Method of photometric measurement of battery-operated emergency lighting luminaires				x				x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 5266-1:1999	Emergency lighting. Part 1 Code of practice for the emergency lighting of premises other than cinemas and certain other specified premises used for entertainment				x				x	x	
BS 5266-3:1981	Emergency lighting. Part 3 Specification for small power relays (electromagnetic) for emergency lighting applications up to and including 32A				x				x	x	
BS 5467:1997 (equivalen european harmonisation document to be provided)	Specification for 600/1000V and 1900/3300V armoured electric cables having thermosetting insulation				x		x		x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 546:1950	2-pole and earthing-pin plugs, socket-outlets and socket-outlet adaptors. See also Supplement No 1:1960 Specification for plugs made of resilient material				x				x	x	
BS 5486-11:1989 (withdrawn, replaced by BS EN 60439)	Low-voltage switchgear and control gear assemblies. Part 11 Specification for particular requirements of fuseboards				(withdrawn, replaced by BS EN 60439)x			x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 5486-12:1989 (withdrawn, replaced by BS EN 60439)	Low-voltage switchgear and control gear assemblies. Part 12 Specification for particular requirements of type-tested miniature circuit-breaker boards				x			x	x	x	
BS 5499-1:2002	Graphical symbols and signs. Part 1 Safety signs, including fire safety signs. Specification for geometric shapes, colours and layout				x				x	x	
BS 5499-3:1990	Fire safety signs, notices and graphic symbols. Part 3 Specification for internally-illuminated fire safety signs				x			x	x	x	
BS 5499-5:2002	Graphical symbols and signs. Safety signs, including fire safety signs. Part 5 Signs with specific safety meanings				x			x	x	x	
BS 5649-2:1978	Lighting columns. Part 2 Dimensions and tolerances			x					x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 5649-5:1982	Lighting columns. Part 5 Specification for base compartments and cableways			x					x	x	
BS 5649-7:1985	Lighting columns. Part 7 Method for verification of structural design by calculation			x					x	x	
BS 5733:1995	Specification for general requirements for electrical accessories				x	x	x	x	x	x	
BS 5839-1:2002	Fire detection and alarm systems for buildings. Part 1 Code of practice for system design, installation, commissioning and maintenance				x				x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6004:2000 (equivalen european harmonisation document to be provided)	Electric cables. PVC insulated, non-armoured cables for voltages up to and including 450/750V, for electric power, lighting and internal wiring				x	(please provide equivalen european harmonisation document to be provided)x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6121-2:1989 (withdrawn, replaced by BS EN 50262)	Mechanical cable glands. Part 2 Specification for polymeric glands				(withdrawn, replaced by BS EN 50262)x	x	x(withdrawn; refer to "Power")	x	x	x	
BS 6133:1995	Code of practice for safe operation of lead-acid stationary batteries								x	x	
BS 6290-2:1999	Lead-acid stationary cells and batteries. Part 2 Specification for the high-performance Plant positive type								x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6290-4:1997	Lead-acid stationary cells and batteries. Part 4 Specification for classifying valve regulated types								x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6346:1997 (equivalent european harmonisation document to be provided)	600/1000V and 1900/3300V armoured electric cables having PVC insulation				x(please provide equivalen european harmonisation doc	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6651:1999 (withdrawn, replaced by BS EN 62305)	Code of Practice for protection of structures against lightning	x			(withdrawn, replaced by BS EN 62305)x	x	x(withdrawn; refer to "Power")	x	x	x	
BS 6701:1994	Code of Practice for installation of apparatus intended for connection to certain telecommunication systems				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6724:1997 (equivalent european harmonisation document to be provided)	600/1000V and 1900/3300V armoured electric cables having thermosetting insulation and low emission of smoke and corrosive gases when affected by fire				x	x	x	x	x	x	
BS 7001:1988	Interchangeability and safety of a standardized luminaire supporting coupler								x	x	
BS 7211:1998 (equivalent european harmonisation document to be provided)	Thermosetting insulated cables (non-armoured) for electric power and lighting with low emission of smoke and corrosive gases when affected by fire				x	x	x	(refer to "Power")x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 7430:1998	Code of practice for earthing	x			x	x	x		x	x	
BS 7654:1997	Single phase street lighting fuses (cut-outs) for low-voltage public electricity distribution systems. 25A rating for highway power supplies and street furniture			x					x	x	
BS 7671:2001	Requirements for electrical installations. IEE Wiring Regulations. Sixteenth edition			x	x	x	x	x	x	x	
BS 7919:2001 (equivalent european harmonisation document to be provided)	Electric cables. Flexible cables rated up to 450/750V, for use with appliances and equipment intended for industrial and similar environments			x	x	x	x	x(refer to "Power")	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 12613:2001	Plastic warning devices for underground cables and pipelines with visual characteristics			x	x	x	x	x	x	x	
BS EN 40-1:1991	Lighting columns. Part 1 Definitions and terms			x					x	x	
BS EN 40-3-1:2000	Lighting columns. Part 3-1 Design and verification. Specification for characteristic loads			x					x	x	
BS EN 40-3-2:2000	Lighting columns. Part 3-2 Design and verification. Verification by testing			x					x	x	
BS EN 40-5:2002	Lighting columns. Part 5 Requirements for steel lighting columns			x					x	x	
BS EN 40-6:2002	Lighting columns. Part 6 Requirements for aluminium lighting columns			x					x	x	
BS EN 50085-1:1999	Cable trunking and cable ducting systems for electrical installations. Part 1 General requirements			x	x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 50085-2-3:2001	Part 2-3 Particular requirements for slotted cable trunking systems intended for installation in cabinets				x	x	x	x	x	x	
BS EN 50086-2-1:1996	Conduit systems for cable management. Part 2-1, Particular requirements. Rigid conduit systems				x	x	x	x	x	x	
BS EN 50171:2001	Central power supply systems				x	x	x	x	x	x	
BS EN 50173-1:2002	Information technology. Generic cabling systems. General requirements and office areas				x	x	x	x	x	x	
BS EN 50174-1:2001	Information technology. Cabling installation. Part 1 Specification and quality assurance				x	x	x	x	x	x	
BS EN 50174-2:2001	Information technology. Cabling installation. Part 2 Installation planning and practices inside buildings				x	x	x	x	x	x	
BS EN 50262:1999	Metric cable glands for electrical installations				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 50310:2000	Application of equipotential bonding and earthing in buildings with information technology equipment				x	x	x	x	x	x	
BS EN 54-10:2002	Fire detection and fire alarm systems. Part 10 Flame detectors. Point detectors				X				x	x	
BS EN 54-11:2001	Fire detection and fire alarm systems. Part 11 Manual call points				X				x	x	
BS EN 54-1:1996	Fire detection and fire alarm systems. Part 1 Introduction				X				x	x	
BS EN 54-2:1998	Fire detection and fire alarm systems. Part 2 Control and indicating equipment				X				x	x	
BS EN 54-3:2001	Fire detection and fire alarm systems. Part 3 Fire alarm devices. Sounders				X				x	x	
BS EN 54-4:1998	Fire detection and fire alarm systems. Part 4 Power supply equipment				X				x	x	
BS EN 54-5:2001	Fire detection and fire alarm systems. Part 5 Heat detectors. Point detectors				X	x		x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 54-7:2001	Fire detection and fire alarm systems. Part 7 Smoke detectors. Point detectors using scattered light, transmitted light or ionization				X				x	x	
BS EN 55015:2001	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment							x	x	x	
BS EN 60051-1:1999	Direct acting indicating analogue electrical measuring instruments and their accessories. Part 1 Definitions and general requirements common to all parts				x				x	x	
BS EN 60081:1998	Double-capped fluorescent lamps. Performance specifications				x				x	x	
BS EN 60188:2001	High-pressure mercury vapour lamps. Performance specifications								x	x	
BS EN 60269-1:1999	Low-voltage fuses. Part 1 General requirements				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 60400:2000	Lamp holders for tubular fluorescent lamps and starter holders				x				x	x	
BS EN 60432-2:2000	Safety specification for incandescent lamps. Part 2 Tungsten halogen lamps for domestic and similar general lighting purposes				x				x	x	
BS EN 60439-1:1999	Specification for low-voltage switchgear and control gear assemblies. Part 1 Type-tested and partially type-tested assemblies				x	x		x	x	x	
BS EN 60439-2:2000	Specification for low-voltage switchgear and control gear assemblies. Part 2 Particular requirements for busbar trunking systems (busways)				x	x		x	x	x	
BS EN 60439-3:1991	Part 3 Particular requirements for low-voltage switchgear and control gear assemblies for installation in places where unskilled persons have access to their use.				x	x		x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 60439-4:1991	Part 4 Particular requirements for assemblies for construction sites (ACS)				x	x	x	x	x	x	
BS EN 60439-5:1996	Part 5 Particular requirements for assemblies intended to be installed outdoors in public places. Cable distribution cabinets (CDCs) for power distribution in networks				x	x	x	x	x	x	
BS EN 60454-1:1995	Pressure-sensitive adhesive tapes for electrical purposes. Part 1 General requirements				x	x	x	x	x	x	
BS EN 60529:1992	Degrees of protection provided by enclosures (IP code)				x	x	x	x	x	x	
BS EN 60598-1:2000	Luminaires. Part 1 General requirements and tests								x	x	
BS EN 60598-2-18:1994	Luminaires. Part 2-18. Particular requirements. Luminaires for swimming pools and similar applications								x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 60598-2-22:1999	Luminaires. Part 2-22. Particular requirements. Luminaires for emergency lighting								x	x	
BS EN 60598-2-23:1997	Luminaires. Part 2-23. Particular requirements. Extra low voltage lighting systems for filament lamps								x	x	
BS EN 60598-2-2:1997	Luminaires. Part 2-2. Particular requirements. Recessed luminaires								x	x	
BS EN 60598-2-3:2003	Luminaires. Part 2-3. Particular requirements. Luminaires for road and street lighting			x					x	x	
BS EN 60598-2-5:1998	Luminaires. Part 2-5. Particular requirements. Floodlights								x	x	
BS EN 60896-2:1996	Stationary lead-acid batteries. General requirements and methods of test. Part 2 Valve regulated types								x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 60898-1:2003	Circuit-breakers for overcurrent protection for household and similar installations. Part 1 Circuit-breakers for a.c. operation				x	x		x	x	x	
BS EN 60898-2:2001	Part 2 Circuit-breakers for a.c. and d.c. operation				x	x	x	x	x	x	x
BS EN 60921:1991	Ballasts for tubular fluorescent lamps. Performance requirements				x	x	x	x	x	x	
BS EN 60923:1996	Auxiliaries for lamps. Ballasts for discharge lamps (excluding tubular fluorescent lamps). Performance requirements				x	x	x	x	x	x	
BS EN 60925:1991	Performance requirements for d.c. supplied electronic ballasts for tubular fluorescent lamps				x	x	x	x	x	x	
BS EN 60927:1997	Auxiliaries for lamps. Starting devices (other than glow starters). Performance requirements				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 60929:1992	a.c. supplied electronic ballasts for tubular fluorescent lamps. Performance requirements				x	x	x	x	x	x	
BS EN 60947-2:2003	Low-voltage switchgear and control gear. Part 2, Circuit-breakers				x	x	x	x	x	x	
BS EN 60947-3:1999	Part 3, Switches, disconnectors, switch-disconnect TBA ors and fuse-combination units				x	x	x	x	x	x	
BS EN 60947-4-1:2001	Part 4-1, Contactors and motor-starters. Electromechanical contactors and motor-starters				x	x	x	x	x	x	
BS EN 61008-1:1995	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs). Part 1 General rules				x	x	x	x	x	x	
BS EN 61008-2-1:1995	Part 2-1 Applicability of the general rules to RCCBs functionally independent of line voltage				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 61009-1:1995	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs). Part 1 General rules				x	x	x	x	x	x	
BS EN 61009-2-1:1995	Part 2-1 Applicability of the general rules to RCBOs functionally independent of line voltage				x	x	x	x	x	x	
BS EN 61048:1993	Capacitors for use in tubular fluorescent and other discharge lamp circuits. General and safety requirements				x	x	x	x	x	x	
BS EN 61049:1993	Capacitors for use in tubular fluorescent and other discharge lamp circuits. Performance requirements				x	x	x	x	x	x	
BS EN 61347-2-1:2001	Lamp control gear. Part 2-1 Particular requirements for starting devices (other than glow starters)				x	x	x	x	x	x	
BS EN 61347-2-3:2001	Lamp control gear. Part 2-3 Particular requirements for a.c. supplied electronic ballasts for fluorescent lamps				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 61347-2-7:2001	Lamp control gear. Part 2-7 Particular requirements for d.c. supplied electronic ballasts for emergency lighting				x	x	x	x	x	x	
BS EN 61347-2-8:2001	Lamp control gear. Part 2-8 Particular requirements for ballasts for fluorescent lamps				x	x	x	x	x	x	
BS EN 61347-2-9:2001	Lamp control gear. Part 2-9 Particular requirements for ballasts for discharge lamps (excluding fluorescent lamps)				x	x	x	x	x	x	
BS EN 61537:2002	Cable tray systems and cable ladder systems for cable management				x	x	x	x	x	x	
BS EN 61558-1:1998	Safety of power transformers, power supply units and similar devices. Part 1 General requirements and tests				x	x	x	x	x	x	
BS EN 61558-2-9:2003	Part 2-9 Particular requirements for transformers for Class III handlamps for tungsten filament lamps				x	x	x	x	x	x	
BS EN 62035:2000	Discharge lamps (excluding fluorescent lamps). Safety specifications				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 62040-1-1:2003	Uninterruptible power systems (UPS). Part 1-1 General and safety requirements for UPS used in operator access areas				x	x	x	x	x	x	
BS EN 62040-1-2:2003	Uninterruptible power systems (UPS). Part 1-2 General and safety requirements for UPS used in restricted access locations				x	x	x	x	x	x	
BS IEC 1008-2-2:1990	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCCBs). Part 2-2 Applicability of the general rules to RCCBs functionally dependent on line voltage				x	x	x	x	x	x	
BS 5489-1:2003	Code of Practice for the Design of Road Lighting				x	x	x	x	x	x	
GM/TT0146	Lighting of Railway Premises (Railway Group Standards)								x	x	
GI/RT7010	Lighting of Railway Premises (Railway Group Standards)								x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
GI/GN7607	Guidance for Low Voltage Electrical Installations (Railway group guidance notes)				x	x	x	x	x	x	
GI/RT7007	Low Voltage Electrical Installations (Railway Group Standards)				x	x	x	x	x	x	
GPGLRP3	Good Practice – Lighting for Railway Premises				x			x	x	x	
										x	
EN50121 Pts 1-5	Railway applications electromagnetic compatibility				x	x	x	x	x	x	
2004/40/EC	European directive				x			x		x	
EN50128: 2001	Railway Applications – Communications, signalling and processing systems – software for railway control and protection systems.				(not applicable)x			x		x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
ENV50129: 1998	Safety related electronic systems for signalling.				(not applicaqble)x			x		x	
IEC61508: 1998	Functional safety of electrical/electronic/programmable electronic safety related systems.							x		x	
	Methods for assessing the safety integrity of safety related software of uncertain pedigree (SOUP), Health and Safety Executive				(not applicable)x			x		x	
	Edinburgh Tram Earthing Systems Policy	x	x		x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
EN50128: 2001	Railway Applications – Communications, signalling and processing systems – software for railway control and protection systems.				(not applicable)x	x	x	x	x	x	
IEC61508: 1998	Functional safety of electrical/electronic/programmable electronic safety related systems.				(not applicable)x			x			
MPT 1331	Code of Practice for Radio Site Engineering							x			
MPT 1362	Code of Practice for installation of mobile radio equipment in land based vehicles							x			
MPT 1327	A Signalling Standard For Trunked Private Land Mobile Radio Systems (June 1997)							x			

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
G1/RT7015	Railway Group Standard (Feb 2003)					x					
BS EN50126	Railway applications- The specification and demonstration of Dependency, Reliability, Availability, Maintainability and Safety,		x		x	x	x	x	x	x	x
BS EN50149	Railway applications – Fixed installation-Copper and Copper alloy grooved contact wire,						x				
BS EN50119	Railway applications - Fixed installation-electric traction-Overhead Lines.						x				
BS EN50206-2 –	Pantographs for Light Rail vehicles						x				
BS EN50125-1	Railway applications - Fixed installations, Environmental conditions						x				
BS EN50317,	Railway applications - Fixed installations, Requirements for and validation of measurements of dynamic interaction between pantograph and contact line						x				

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN50151	Railway applications - Fixed installations, Special requirements for composite insulators						x				
BS EN50345	Railway applications - Fixed installations, Insulating synthetic rope assemblies for support of overhead contact lines						x				
BS EN50318	Railway applications - Fixed installations, validation of the simulation of dynamic interaction between pantograph and contact line						x				
BS EN 50122-1	Railway Applications – Fixed Installations Part 1: Protective provisions relating to electrical safety and earthing				x		x				
BS EN 50122-2	Railway Applications – Fixed Installations Part 2: Protective provisions against the effects of stray currents caused by d.c. traction systems				x						

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 60146	Semiconductor convertors – General requirements and line commutated convertors				x						
BS EN 50123	Railway Installations – Fixed installations – d.c. switchgear				x						
IEC 850 (IEC 60850)	Supply voltages for traction systems										
BS 2618	British Standard Specification for Electrical Traction Equipment				(not applicable)x						
BS 6290	Batteries				x						
BS 7354	Battery Duty Calculations.				x						
CP 1013	Earthing.				x						
BRB Spec. DC 112	DC Power Cables.				x		x				

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6360 (IEC 60228)	Cable Conductors.				x		x				
BS 6899 Type GP2	DC Power Cable Insulation.				x		x				
IEC 228 (BS 6360)	Conductors for Multicores.				x		x				
DMRB	The United Kingdom Design Manual for Roads and Bridges (as amended by any City of Edinburgh Council -specific requirements)	x		x							
TSM	Traffic Signs Manual			x							
MCDHW	The Manual of Contract Documents for Highway Works;			x							
SHW	Specification for Highway Works;			x							
HCD	Highway Construction Details.			x							
CEC	'Edinburgh Standards for Streets'.			x							
NRSWA	New Roads and Street Works Act 1991			x							

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
CEC	Measures Necessary Where Apparatus is Affected by Major Works (Diversionary Works)			x							
CEC	Specification for the Reinstatement of Openings in Roads			x							
	Code of Practice for the Co-ordination of Street Work and Works for Road Purposes and Related Matters			x							
	Utility specific specifications (to be advised by each utility)			x							
RSPG Part 1, 1966	Railway Safety Principles and Guidance, Safety Principles	x	x	x	x	x	x	x	x	x	x
RSPG Part 2, Section G	2005, Railway Safety Principles and Guidance, Tramways	x	x	x	x	x	x	x	x	x	x
RVAR	Railway Vehicle Accessibility Regulations								x		x
GM/RC1500	1994-12, 2001-10 Code of Practice for EMC between the railway and its neighbourhood				x	x	x	x	x	x	x

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
EN55013	Sound and television broadcast receivers and associated equipment. Radio disturbance characteristics. Limits and methods of measurements.							x		x	x
GE/RT8015, 2002	Electromagnetic compatibility between railway infrastructure and trains.										x
ECE 43	1990-08, Uniform Provisions Concerning the Approval of Safety Glazing and Glazing Materials (Rev1 08.1990).								x	X	x
prEN13129-3	2003-10, Railway Applications – Air conditioning for urban and suburban rolling stock – Part 1: Comfort parameters										x
BS EN 779	2002-12-05, Particulate air filters for general ventilation - Determination of the filtration performance									x	x
BS 857	1967-06-30, Specification for safety glass for land transport										x

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6853 1999-01-15	Code of Practice for fire precautions in the design and construction of passenger carrying trains or European equivalent Standard										x
BS EN 50121-3-1 2000-12-15	Railway Applications - Electromagnetic compatibility - Rolling stock - Train and complete vehicle										x
BS EN 50125-1	Railway Applications – Environmental conditions for equipment										x
BS EN 50155-3-1 2000-12-15	Railway Applications – Electronic Equipment used on Rolling Stock										x
BS EN 50215 1999-09-15	Railway Applications - Testing of rolling stock after completion of construction and before entry into service										x
BS EN 60077-1 2002	Railway Applications – Electric Equipment for Rolling Stock										x

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
prEN ISO 3095 1975-09	Acoustics; Measurement of noise emitted by rail bound vehicles										x
prEN ISO 3381 1976-02	Acoustics; Measurement of noise inside rail bound vehicles										x
EN 12663-2000	Railway applications, Structural requirements of railway vehicle bodies										x
EN 13749-2005	Methods of specifying structural requirements of bogie frames										x
VDV 164 1995-04	System for fault detection, fault registration and fault message (FERM) on guided public transport vehicles										x
IEC 60494-2, 2002-08	Railway applications - Rolling stock; Pantographs; Characteristics and tests - Part 2: Pantographs for metros and light rail vehicles						x				x

Table 24 - Applicable Standards

9 Geotechnical

Where the Infraco Works may affect geotechnical and geo-environmental features, including but not limited to, aquifers, ground water and surface watercourses, the Infraco shall comply with the requirements of relevant third parties, the Scottish Environment Protection Agency (SEPA) or other statutory consultees and environmental legislation.

The Infraco shall agree the criteria and methods for the identification, classification, treatment and disposal of material with SEPA, the relevant local environmental health authority or other relevant authority as appropriate. The Infraco shall obtain all necessary consents for the removal, disposal or re-use of materials. Materials not suitable for re-use shall be transported off Site to a licensed facility in accordance with the requirements of the applicable relevant authority and environmental legislation.

The Infraco shall not carry out works or activities which would result in any Site or any land licensed to the Infraco under the Agreement or any adjacent or adjoining property being classified as contaminated land under the Environmental Protection Act 1990, the Contaminated Land (Scotland) Regulations 2000, the Contaminated Land (Scotland) Regulations 2005 and the guidance contained in the Scottish Executive Statutory Guidance for the the Contaminated Land Regime, Edition 2 dated May 2006 and/or any similar environmental legislation, or that would preclude such a classification being removed.

The Infraco shall assess the risk of the ingress of landfill gases, coalfield gases and other hazardous ground gases and implement appropriate measures to mitigate such risks.

The Infraco Works shall be designed and constructed to accommodate reasonably foreseeable changes in the existing and potential future nature and level of ground water, where reasonably practicable.

10 Environment

10.1 Environmental Considerations

10.1.1 General

Environmental Statements have been prepared for Line One and Line Two in accordance with the standing orders of the Scottish Parliament, which require that projects approved by private Act of Parliament must be subject to Environmental Impact Assessment (EIA). EIA in Scotland is governed by the Environmental Impact Assessment (Scotland) Regulations 1999 (S.I. 1999 No. 1). The Environmental Impact Assessments (EIAs) have been undertaken to identify the construction and operational effects of building and operating a tram network in Edinburgh. Each assessment has been documented in a comprehensive Environmental Statement which describes:

- The design of the project and the way it will be constructed and operated;
- Its impacts on the physical, natural and human environment; and
- The measures that will be undertaken to minimise these impacts.

The Environmental Statements report the assessment of the following environmental topics which should be considered by the Infraco:

- The proposed scheme – including an explanation of the need for the scheme, alternatives considered, route alignment and infrastructure description, construction and operational activities;
- Approach to the EIA – summarising the legal requirements, scope and methods used in undertaking this EIA;
- Policy context – provides a review of compliance of Line One and Line Two to relevant national, regional and local policies;
- Traffic and transport;
- Land use - including potential impacts to the agricultural use of land along the route;
- Geology, soils and contamination – including references to hydrogeology and waste management;

- Landscape and visual amenity;
- Ecology and nature conservation;
- Surface water – including water quality and hydrology;
- Heritage - including archaeology;
- Socio-economic effects;
- Noise and vibration;
- Air quality - including local air quality (PM10, NO2), global air quality (CO2) and dust; and
- Cumulative impacts.

The Infraco shall ensure that the environmental impact caused by the Infraco Works shall be no worse than that contained in the Environmental Statements.

10.1.2 Freedom of Access to Environmental Information

The attention of the Infraco is drawn to the requirements of the Environmental Information (Scotland) Regulations 2004 (SSI 2004/520). This Statute permits public access to environmental information held by a Scottish public authority.

10.1.3 Relevant Legislation, Regulations and Guidance

The following are a series of project specific documentation governing various aspects of the environmental considerations of the Edinburgh Tram Network design, construction and operation.

10.1.4 Code of Construction Practice

A code of construction practice was prepared in consultation with the City of Edinburgh Council (CEC), Scottish Natural Heritage (SNH), the Scottish Environmental Protection Agency (SEPA) and Historic Scotland, in order to define **tie's** minimum standards of construction practice. Compliance with this code is a legal requirement of the Edinburgh Tram (Line One) and (Line Two) Acts (2006) under Section 66 and this code has been developed by **tie** and this developed version is included in Schedule 3 (Code of Construction Practice and Code of Maintenance Practice).

The Code of Construction Practice sets out policies, legislation and guidance relating to the impact of the proposed construction works on the environment and the amenity and safety of residents, businesses, the general public and the physical surroundings adjacent to the ETN. The Code of Construction Practice also provides a list of environmental protection measures to be implemented during the construction of the ETN.

10.1.5 tie's Noise and Vibration Policy

tie's Noise and Vibration Policy (NVP/001 V1.01) sets out the mitigation approach for noise and vibration impacts during the operation of the Tram in Edinburgh. Mitigation requirements relating to noise and vibration impacts during the construction of the ETN route are outlined in the Code of Construction Practice. Compliance with the Noise and Vibration Policy is a legal requirement under Section 66 of the Edinburgh Tram (Line One) and (Line Two) Acts (2006). Other legal requirements relating to noise insulation are set out in Sections 63, 64 and 65 of the respective Acts. The Noise and Vibration Policy is included in Schedule 32 (**tie** and CEC Policies).

10.1.6 The Tram Design Manual and Urban Design Briefs

A Design Manual and urban design briefs have been prepared for the ETN. Both sets are regarded as supplemental guides to deemed consent for Line One and Line Two under the section 11 (Class 29) of the General Permitted Development (Scotland) Order 1992.

Although permitted development status exists for the ETN it is nonetheless necessary to gain prior approval from the City of Edinburgh Council before the Infraco Works can commence. The Design Manual and urban design briefs are both designed as guides in informing both the design process and the prior approval process. It is therefore important that the Infraco gives appropriate consideration to the contents of the Design Manual and the briefs as major component in the integration of a tram design into the urban fabric of the City.

10.1.7 Landscape and Habitat Management Plan

The Landscape and Habitat Management Plan (LHMP) details the proposals for retention, protection and enhancement of existing planting and habitats, within the Roseburn Corridor. It also sets out details of replacement planting and habitat which are lost as a consequence of the development. The plan will be updated by the Infraco as new information on habitat, landscape proposals and Tram design becomes available. The plan will also include proposals for noise mitigation for properties adjacent to the ETN. Revisions to the LHMP will require to be approved by the City of Edinburgh Council Planning Authority. The procedure for updating the LHMP is set out within Section 68 of the Edinburgh Tram (Line One) Act (2006).

10.1.8 Badger Mitigation Plan

The Badger Mitigation Plan sets out the scope and form of the proposed mitigation measures for avoiding/ reducing adverse impacts on badgers within the Roseburn Corridor. The Plan will be updated by the Infraco as new information on badger social groups and the ETN design becomes available. Revisions to this Plan will be agreed with SNH, CEC and the Edinburgh and Lothians Badger Group (ELBG) and approved by the CEC Planning Authority.

In preparing the detailed environmental design and implementation (including maintenance and monitoring periods) proposals for landscape and ecology the Infraco will ensure that all commitments given in the Environmental Statement and arising from the Scottish parliamentary process relating to the Tram Legislation (including the detailed agreements following discussions with stakeholders) are met.

10.1.9 Protected Species Plan

The Protected Species Plan identifies the constraints governing how all protected species (predominantly located in the Gogarburn area) are to be dealt with.

10.1.10 Archaeological Requirements

All Infraco Works are to be carried out in compliance with the approved AHMP relevant to that location.

10.1.11 Landscape Design

The landscape design shall include, for construction, aftercare and maintenance / monitoring, ongoing for the whole Term. The detailed landscape design shall be in accordance with the environmental objectives, principles and requirements given in the Environmental Statements, to ensure that the Edinburgh Tram Network as constructed and operated is in compliance with the Environmental Statements, and any subsequent side agreements entered into between the CEC, **tie** and various third parties.

10.2 Ecological Design

The ecological design shall include, for construction, aftercare maintenance and monitoring:, the ecological mitigation proposals will cover the wholeTerm.

The ecological design shall be in accordance with the environmental objectives, principles and requirements given in the Environmental Statements, to ensure that the Edinburgh Tram Network as constructed and operated is in compliance with the Environmental Statements prepared for Parliament, and any subsequent side agreements entered into between the CEC, **tie** and various third parties (e.g. Scottish Natural Heritage, New Ingliston Limited, Edinburgh and Lothian Badger Group).

The updated and ongoing ecological surveys and mitigation works to be carried out by Infraco shall take into account seasonal constraints and variations and will accommodate ongoing relevant surveys begun by other parties (e.g. biological water quality monitoring). The Infraco shall ensure that the construction, maintenance and monitoring of the Infraco Works complies with all existing UK and EU Environmental legislation concerned with the protection of species and habitats including but not limited to:

- Wildlife and Countryside Act 1981 (as amended in particular by Variation of Schedules 1988, 1992 & 1998);
- The Conservation (Natural Habitats, & c.) Regulations 1994 (as amended);
- Protection of Badgers Act 1992; and
- Countryside and Rights of Way Act 2000 in so far as it extends to Scotland.

The Infraco shall not commence works within any part of the Site until the necessary update surveys of ecological interest in respect of that part of the Site have been undertaken and a survey report has been submitted to **tie**. Any relevant findings of such surveys shall be included into the Infraco's Landscape and Habitat Management Plan and the Construction Environmental Management Plan (CEMP).

The Infraco shall ensure that:

- Details of all species protected by Law and any structure or place used for shelter or protection by any such species protected by Law within the Site are kept confidential and not disclosed to any person except insofar as is essential for carrying out the Infraco Works; and

- All necessary current licenses, and named license holders, are available before the commencement of any Infraco Works, which may affect species protected by Law and or any structure or place used for shelter or protection by any such species protected by Law.

In the event that the Infraco identifies or becomes aware of any species protected by Law, or any structure or place used for shelter or protection by any species also protected by Law, which could be directly or indirectly affected by the Infraco Works and for which appropriate protection measures have not previously been agreed, the Infraco shall notify **tie** immediately and shall:

- Cease all Infraco Works that may adversely affect such species, structure or place;

- Provide Scottish Natural Heritage and **tie** with any further information of which the Infraco is aware relating to such species, structure or place as may be requested;

- Consult upon and agree mitigation and/or monitoring measures with Scottish Natural Heritage and **tie** in relation to such species, structure or place; and

- Obtain any necessary licenses to carry out the agreed measures.

The Infraco shall ensure that all construction work is carried out with due regard to the seasonal interests of any flora, fauna or habitat and in particular, all species listed for any degree of protection under Law. The Infraco shall make due allowance for the seasonal constraints in preparing the Programme.

10.3 Construction of Ecological Measures

10.3.1 General

Special ecological measures shall include but not be limited to the requirements for carrying out the Infraco Works:

- fencing;
- safe passage for wildlife;
- the location of nesting or roosting boxes;
- the location of habitat creation measures to be inspected;
- the known location of protected species, and
- the list of licenses obtained or required for working with or within the vicinity of Protected Species; and
- maintaining access to foraging and water.

10.3.2 Site Supervision of Landscape and Ecological Works

The Infraco shall ensure that the environmental Site works shall be inspected and monitored by Infraco's environmental clerk of works who will be supported by Infraco's landscape architect and ecologist, as necessary.

10.3.3 Landscape Works

Planting, seeding and aftercare works shall be carried out by the Infraco.

The Infraco will be responsible for locating all services routes prior to any landscape work being carried out.

10.3.4 Completion of the Planting Works and Completion of the Landscape and Ecological Aftercare Works

On practical completion of the landscape and ecological implementation works and on completion of the three years landscape and ecological aftercare works. The Infraco shall submit the required certificates and arrange a formal inspection of the Infraco Works with **tie**.

A separate inspection shall be arranged with relevant landowners for any areas of off-site planting.

10.3.5 Construction Environmental Management Plan (CEMP)

The Infraco shall prepare a Construction Environmental Management Plan (CEMP) including specific management / action plans or Method Statements, as necessary, to convey the required level of information for the following:

- Drainage features, including oil interceptors and pollution control valves, treatment of run-off, (including run-off volumes) and the location and appearance of any balancing ponds and/or swales, access or proposed access to the same;
- Carriageway surfacing;
- Working times;
- Noise reduction and abatement;
- Pollution control and contingency plan (see below);
- Discharge, land drainage and abstraction licenses to comply with EA requirements;
- Protection of retained vegetation;
- Maintenance e.g. de-icing;
- Sourcing of construction materials;

- Waste disposal, including disposal of construction waste, arisings, spoil, miscellaneous solids and liquids;
- Topsoil and subsoil handling (strip, storage, amelioration and re-use);
- Management and disposal of any excess soil or spoil arising from the works; and
- Site compounds.

The specific requirements of the pollution control and contingency plan are as follows:

- Compliance with the SEPA pollution prevention guidance;
- Identification and categorisation of surface waters vulnerable to Site works and an assessment of the earthworks that are likely to give rise to silty run off, the routes this is likely to take and the methods to prevent damage from silt;
- Precautions for handling of fuel, oil and other liquids during the works, in particular, near rivers, streams and watercourses;
- Requirements for pollution control equipment;
- How mud and dust will be controlled;
- How water supply boreholes and wells will be protected;
- The measures to be taken to protect watercourses and associated wildlife from, for example, chemical spillages or the introduction of sediment-laden run off; and
- Discharge criteria for suspended solids in run off from the Site during construction and proposals for monitoring and control.

11 Surveys

Surveys and investigations shall be undertaken by the Infraco as required to facilitate the design, construction and maintenance of the Edinburgh Tram Network.

Before commencing any Infraco Works (including investigations) where either the Infraco or **tie** considers there to be potential for a future claim from adjacent property owners or occupiers, the Infraco shall carry out a detailed condition inspection of the relevant properties and infrastructure which may be affected by the Infraco Works. If any such inspection is carried out, this shall be done in conjunction with the owners or occupiers concerned. A condition survey report shall then be prepared and agreed with the owner or occupier.

Condition survey reports prepared under the preceding paragraph shall include photographic evidence of the existing condition of the relevant property or infrastructure including evidence of critical dimensions such as existing crack widths.

The Infraco shall undertake sufficient surveys to prepare a topographical survey model. Relevant sections of the topographical survey model shall be updated by the Infraco at least every six months throughout the period of the Infraco Works, where work has been undertaken in relation to the sections concerned.

The topographical survey model shall include all Works as constructed and the Infraco shall include in each updated topographical survey model all then existing fixtures including:

- principal cabling;
- street furniture;
- structures and buildings;
- trackwork;
- drainage;
- power supply systems including OLE structures;
- ducting and draw pits.

These surveys shall include aspects concerned with:

- dimensions
- condition; and
- inspection for assessment.

The Infraco shall update the photographic records (excluding aerial photographs) and other such data contained in the topographical survey model at intervals of not less than six months.

The Infraco shall provide access to and copies of, when requested, all reports of investigations carried out as part of the Infraco Works.

12 Project Management Processes

12.1 Communication – General

The Infraco shall develop and maintain a "Communications Plan" and this shall be submitted to **tie** in accordance with the Review Procedure.

The Communications Plan shall illustrate how all the communication processes, activities and issues are to be managed, progressed and satisfactorily resolved. The Communications Plan shall detail how the Infraco will communicate with Sub-Contractors, the Operator, **tie**, the MUDFA Contractor, key stakeholders and third parties. The Communications Plan shall also include the intended processes for dealing with enquiries, particularly complaints, from all sources. The Infraco shall refer to the Stakeholder Services in this Section of the Employer's Requirements, in order to ensure that the Communications Plan includes all necessary requirements.

The Infraco shall implement all the requirements of the Communications Plan.

The Infraco shall liaise with the relevant parties to ensure that the Infraco is copied into all relevant communications that are generated by others, in order to ensure that any relevant construction related issues, such as Temporary Works and practical constraints, are identified and addressed.

12.1.1 Meetings

The Infraco shall work with **tie** to develop the meetings schedules and requirements for progress reporting throughout the duration of the Infraco Works. The following table provides an outline of the minimum requirements:

Meetings	Frequency	Chaired by / Minutes taken
Safety Meeting	Weekly	Infraco
Management Review Meetings	Two monthly	**tie**/Infraco alternately
Project Progress Meetings	Four weekly (Fortnightly prior to Site start)	**tie**

Meetings	Frequency	Chaired by / Minutes taken
Design and Planning Meetings	Fortnightly	Infraco
Stakeholder & Third Party Meetings	As required	**tie**
Site Meetings	Weekly	Infraco
Cost Review Meetings	Four weekly	**tie**
Risk Review Meetings	Four weekly	**tie**

Table 25 - Table showing meeting schedules

The primary purpose of these meetings shall be to enable the Infraco to advise on:

- Any safety issues;
- The current state of the programmed Infraco Works;
- Progress made in the various activities;
- Communication issues;
- Third party issues; and
- Commercial issues (Including change control).

The Infraco shall develop and maintain a comprehensive meetings schedule indicating those meetings which the Infraco shall chair and those meetings which the Infraco shall attend.

Prior to commencement on Site, progress meetings shall be held every two weeks. The purpose of these meetings shall be to review progress made by both Parties, and identify and agree actions required.

The Infraco shall provide an agenda, for all meetings to which they are designated as chair. The Infraco shall also provide appropriate documentation in advance of each of the meetings, as defined in the following sections, or otherwise as agreed with **tie**.

12.1.2 Progress Reporting

Progress reports shall be submitted by the Infraco to **tie** no later than three Business Days before each progress meeting.

The Infraco's progress reports shall contain comprehensive information and shall be structured in a manner which is commensurate with **tie**'s own reporting structure. The various sections of the progress reports shall require to be agreed with **tie**, but should include the following:

1. Executive Summary;
2. Health & Safety Report;
3. Quality & Environment;
4. Financial Summary Report; and
5. Project Performance / Programme.

Information provided within the progress reports shall include, but not be limited to, the following:

- Health & safety report including a summary of H&S records
- Summary financial information summarised from the separate cost report including summary and headline data on planned spend/actual spend, forecast spend and summary of costs for Compensation Events and future forecast.
- Planned versus actual resource summary;
- Physical progress against Milestones anticipated/required completion dates;

- Four weekly forecast of all activities;
- Eight weekly critical impact notice (including all information on any internal or external factor which may affect programme delivery);
- Labour histograms detailing planned, actual and forecast across all disciplines;
- The activities commenced or completed since the previous report and upon what dates;
- The expected remaining duration of all activities commenced but not completed;
- Any other additional activities with expected durations, methods, and resource requirements and sequence assumptions;
- Schedule and programme for the delivery of method statements, permits and isolations for the next four weeks;
- Any changes to expected durations, method, resource requirements and sequence assumptions;
- Forecast completion dates for all Infraco Works in each geographical section and intermediate geographical section including any slippage or advance upon the Planned Service Commencement Date and/or the Planned Sectional Completion Dates (as appropriate);
- Programme comparison between actual vs. planned;
- Schedule of information received;
- Schedule of outstanding information;
- Progress photographs;
- Top 10 opportunities; and
- Top 10 risks.

12.1.3 Progress Photos

The Infraco shall on a monthly basis throughout the period until the Service Commencement Date procure that photographs covering all of the Infraco Works are taken by a professional photographer whose appointment the Project shall be approved by **tie**, such approval not to be unreasonably withheld or delayed.

tie shall determine the scope of the photographs referred above.

The Infraco shall ensure that:

- A minimum of 50 digital colour photographs shall be taken on a monthly basis;
- All photos shall be provided in electronic format in a form to be agreed with **tie**;
- One set of 10 inch x 8 inch size prints shall be prepared from the colour photographs referred to above;
- All prints referred to above shall be presented in albums with individual clear plastic wallets and marked on the reverse side with the date that the photograph was taken, the name and address of the photographer, identification reference number and a brief description of Work being undertaken and the direction from which the photograph was taken;
- All prints and negatives shall be delivered to **tie** within two weeks of being taken; and
- Except where **tie** have provided their prior written consent, the photographs shall not be used for any purpose other than as set out in the Agreement.

The Infraco shall procure that all Intellectual Property in respect of the photographs vests in **tie**.

12.1.4 Site Meeting Report

A report shall be submitted by the Infraco to **tie** no later than one Business Day before each site meeting. The report shall include reference to any significant issues (associated with safety, programme, design, cost, planning and consultee aspects), which have arisen since the previous monthly progress report.

The site meeting report shall also identify actual manpower resources (labour returns), plant and equipment that have occurred on site, for the previous week.

12.1.5 Topic Register

It is **tie**'s intention to continue to develop and maintain a "Topics Register" for the Infraco Works. The Topics Register is used to record all issues as they arise that require to be specifically addressed. The record is then amended as appropriate to track the manner in which issues have been progressed or resolved to the satisfaction of **tie**. The Infraco is required to add to, or respond to issues as appropriate and attend regular review meetings at which the Topics Register shall be updated and actions assigned by **tie**.

The Infraco shall participate in the management of the Topics Register.

12.1.6 Work Breakdown Structure

An agreed Work Breakdown Structure is included in the Introduction of these Employer's Requirements. The Infraco shall adopt this WBS to ensure a recognised, structured analysis, by all parties, when interrogating the programme and cost analysis. The WBS may be further developed by the Infraco with the written consent of **tie**.

Accordingly there shall be a requirement for the Infraco to adopt all aspects of the WBS in the development of programme and cost documentation.

12.2 Programme Management

The Infraco shall undertake programme management including the implementation, regular updating and management of a fully detailed comprehensive Programme illustrating how the Infraco proposes to execute the whole of the Infraco Works in compliance with the Project Programme.

This Infraco Programme shall be prepared using Primavera software in a version compatible with that of **tie**.

This Programme shall be in Primavera P3e (Version 6 or otherwise as agreed with **tie**) format and accompanied by a time chainage programme illustrating the same information. The Programme shall be cost and resource loaded and coded to reflect the Infraco's WBS activities as detailed in section 39 of these Employer's Requirements.

The Infraco shall be responsible for liaising directly with **tie**, CEC (and other appropriate third parties) to maximise delivery of the ETN but minimise disruption to public transport and other services, and ensuring that any necessary diversion routes are agreed in recognised time periods prior to the commencement of Infraco works. The Infraco shall also take note of the constraints as identified in 39 of these Employer's Requirements.

The Programme shall be submitted to **tie** in accordance with the Review Procedure within a period which shall ensure that the Infraco Works can be progressed and monitored by the Infraco and **tie** against the details contained therein. The Programme shall clearly identify the following:

- the commencement, construction and completion constraints for all elements of the Infraco Works, separated into sectors by WBS code;
- all Milestones;
- the constraints, procedures, documentation and approvals specified in the Agreement;
- the Infraco manufacture and construction execution strategy, Infraco Works and site testing and commissioning, all constraints, procedures, documentation and approvals periods;
- seasonal constraints and constraints applied by CEC and other third party and statutory bodies as defined in the Agreement;
- the required design approvals and notices;
- all works to be undertaken by any Sub-Contractor;
- sufficient detail to illustrate the integration of the Deliverables with the proposed dates of possessions and the commencement and completion of construction for all elements of the Infraco Works, by WBS code;
- all other projects affecting the Infraco Works and how they are integrated into the Infraco Works. For example, any street works to be carried out by CEC, and works by or on behalf of all third parties (including landowners and developers);

- any witnessing, inspections, testing etc of the Infraco Works which requires to be carried out by third parties;
- long lead time materials and works;
- the identification and duration of all advance works, other than those already underway;
- the requirements and approval periods for traffic management, TROs, TTROs, and including any third party's requirements for notices and road closures;
- the commencement, completion dates and relationships of intermediate geographical section of the Infraco Works within each geographical section of the Infraco Works;
- the links and relationships between all activities and the justification of the underpinning logic;
- all design, manufacture and construction periods;
- the identification and timing of inputs and approvals required from **tie**, third parties, and any Approval Bodies are clearly identified; and
- the interface and relationship with the MUDFA Works;

The Programme shall meet the following minimum requirements:

- shall be in Primavera P3e (Version 6) for detailed implementation;
- shall follow and fully reflect the **tie**'s Work Breakdown Structure ("WBS") included within these Employer's Requirements.
- shall be cost and resource loaded down to coded activities;
- all resource reporting and progress reporting shall be coded to suit the activities contained within the WBS;
- records of time spent against activities shall be completed weekly against planned works as generated by Primavera;

- Any deviations shall be reported in the progress report and include notification of remedial actions for authorisation by **tie**;

- weekly records shall be collated and delivered to **tie** by 09:00hrs on the Tuesday following the week to which the records relate;

- the Programme shall also take into account programming input and attendance at meetings, both as required by **tie**; and

- the Programme shall also contain cost/spend tables and cumulative curves to match the achievement of major milestones and activities within the WBS.

The Infraco shall take into account the availability of alternative materials or components when developing the Programme. The Infraco shall identify those materials and components which require advance ordering and processing. Any advanced orders which are approved shall be identified and defined in the Programme.

The Infraco shall update the Programme every four weeks in line with **tie** reporting periods to take full account of the Infraco progress in completing the Infraco Works.

A hard and soft copy updated Programme and an Infraco Progress Report shall be submitted by the Infraco to **tie** no later than three Business Days before each four weekly progress meeting.

12.3 Time Chainage

The Infraco shall also produce, manage, develop and work in accordance with its Time Chainage Diagram.

The Time Chainage Diagram shall be submitted to **tie** in accordance with the Review Procedure to ensure that the Infraco Works can be progressed and monitored by the Infraco against the details contained therein but in any case, the Time Chainage Diagram shall be submitted not later than six weeks after the Commencement Date. The Time Chainage Diagram shall be updated regularly and be available for inspection or distribution on a monthly basis, during the course of the Infraco Works.

The Time Chainage Diagram shall fully reflect, accommodate and comply with the information detailed on the Programme.

12.4 Planning and Other Consents

The responsibility for the Consents is as set out in Clause 19 of the Agreement.

12.5 Project Management Plan

12.5.1 General

The Infraco shall submit and maintain a plan describing the approach to project management for the delivery of the complete scope of the Infraco Works. This project management plan shall include sections to clearly and separately describe the approach to the specific topics set out below.

12.5.2 Resource and Competence

A description of the procedures employed to ensure that the required resource and competence level throughout the duration of the Infraco Works shall be achieved.

12.5.3 Documentation

Identify key policies and procedures to deliver such works, infrastructure and equipment to programme, specification, budget and otherwise safely and efficiently and in a manner which is fully integrated with the activities of other relevant contractors.

The approach to the development of a suite of project specific documentation, indicating how they shall effectively be integrated with, and reflect, the Infraco's corporate procedures and policies (including any Joint venture or consortia procedures).

Templates that shall be used for the procurement and delivery of the service deliverables, which shall be required to be prepared by the Infraco.

Outline proposals covering the suite of required documentation including training, maintenance and operations manuals, as-built drawings, design Information, testing procedures and proposals, and certification and records (e.g. testing).

12.5.4 Regulations

Management arrangements and procedures for ensuring/monitoring compliance with all applicable Regulations (e.g. HMRI), Law, and the requirements of the Agreement and its Schedules.

12.5.5 Procedures

Details of internal procedures for decision making and review in your management team with particular emphasis on safety, programme, budget, quality, the management and control of non-compliance and the implementation of continuous improvement.

12.5.6 Proposals on reporting and controlling design information requirements

Procedures which shall be followed in obtaining outstanding consents and approvals for the works.

Definition of the process for managing the approvals interface with **tie**, HMRI, Planning Authority, Roads Authority, Network Rail, the Operator and third parties with whom agreements have been entered into.

12.5.7 Interface Plans

Given that successful co-operation between the Operator, Infraco, and **tie** is essential to the delivery of a successful project, a description of the key areas of this interface and details which demonstrate how this is successfully achieved.

Details of supply chain process/procedures, in particular provide details of the criteria for selection of sub-contractors/suppliers for this project.

Details of how the Tram Provider shall be managed.

Details regarding the commissioning and handover of the Edinburgh Tram Network or Geographical Sections thereof to the Operator shall be provided.

12.5.8 Design

Clear definition of the areas where the Infraco shall undertake design work and an explanation of where the Infraco believes this deviates from the previous design work done.

12.6 Construction Management Plan

The Infraco shall submit and maintain a Construction Plan relating to the Programme. This Construction Plan shall include sections to clearly and separately describe the approach to the specific topics set out below.

12.6.1 Mobilisation

Detailed mobilisation plan, to incorporate comprehensive details of all aspects of mobilisation including, but not limited to, number of work sites, the facilities on each, a general arrangement drawing of main sites, lay down areas, materials storage, welfare and car parking. This should detail timescales and immediate resource availability and should also provide details of the permissions required and assumptions made.

12.6.2 Plant

A description of the plant that will be used for the construction of the project and of how long the plant will be used. This should include description in relation to plant used for specialist purposes such as rail laying or wire stringing (these should be separately identified).

12.6.3 Sub-Contractors

Details of the sub-contractor management and control process during the construction phase, including how the performance of sub-contractors will be measured and reviewed and how sub-contractor compliance with standards will be assured.

12.6.4 Method Statements

A description of the process by which method statements shall be developed and approved, and a schedule summarising those method statements that are anticipated. An initial schedule shall be submitted in accordance with the Review Procedure and this shall be updated from time to time with agreement from **tie**.

12.6.5 Avoidance of Disruption

Description of the management process for ensuring that traffic disruption is kept to a minimum, particularly in relation to Traffic Management and TTRO requirements. Details of procedures of how unforeseen works (that are out with the area covered by the Temporary Traffic Restriction Order, but are necessary to complete the Infraco Works within the TTRO area) shall be dealt with.

Proposals for maintaining reasonable access to premises at all times and what measures The Infraco might employ when access is denied taking into account the requirements of the Disability Discrimination Act 1995.

Details of how it is proposed to liaise with all potentially affected third parties, and an assessment of the likely identities of such parties.

12.7 Network Rail Interface Plan

The Infraco shall submit and maintain a plan describing the approach to managing the ongoing interface requirements with Network Rail. The plan should identify the critical activities and the key risks associated with this interface and proposals to mitigate these risks. Notwithstanding the Infraco's responsibility of complying with the Agreement (including compliance with the Third Party Agreement and the Asset Protection Agreement) the Plan should address the following issues.

- A description of procedures for gaining access to Network Rail's infrastructure both in terms of the approval process and the physical access proposals;
- Confirmation, in terms of safety and in terms of undertaking the Infraco Works, the personnel utilised shall be appropriately qualified, skilled, experienced and adequate in quantity;
- The proposed Possession Strategy for works on or adjacent to Network Rail infrastructure, to include identification of Possessions & Isolations on Programme taking cognisance of lead time;
- Summary of the required method statements for principal construction activities associated with Works adjacent to Network Rail infrastructure;
- The proposals which allow access for Network Rail to maintain their infrastructure;
- Details as to how the Railway Group & Network Rail Line standards shall be complied with;
- Specific details of how Network Rail's infrastructure and rail vehicles shall be protected from injury/damage arising from the works activities;
- Details of how staff and any third parties shall be protected from injury from Network Rail's infrastructure or vehicles using it;
- The strategy for Red & Green Zone working;

- Proposals for competencies, making specific reference to management of the certification of personnel and operatives in accordance with the National Competency Control Agency "Sentinel" systems and procedures;

- A specific accident/incident procedure with regard to Network Rail infrastructure which details action to be taken, including the communications regime;

- Proposals for security and prevention of trespass onto site, especially onto adjacent Network Rail property;

- Proposals with regard to work in and around First Scotrail's Haymarket Depot and its associated stabling & sidings. There shall be a requirement to highlight proposals for ensuring access to Haymarket Depot is maintained for staff; road and rail vehicles, especially if rail vehicles require access/egress to the depot by road. There shall be a requirement to identify how First ScotRail operations shall not be restricted.

12.8 Quality Management

The Infraco shall undertake the Works fully in compliance with quality management processes and procedures referenced in ISO 9001 and ISO 9004.

The Infraco shall develop and maintain a Quality Plan to meet the requirements of ISO 10005 - 1995, and which fully defines all quality aspects of the Works. The Quality Plan shall be submitted in accordance with the Review Procedure. The Quality Plan shall demonstrate an integrated quality management system relating to the design, construction, testing and commissioning of the system and shall show how Infraco and its Sub-Contractors shall comply with the requirements of the Quality Plan.

The Infraco shall have all associated documentation readily available for internal review and review by **tie**. Regular internal audits shall be undertaken by the Infraco to ensure full compliance with ISO 9001 and ISO 9004 in accordance with Clause 5.1 of the Code of Construction Practice. The Infraco shall prepare and submit in accordance with the Review Procedure a "Schedule of Internal Audits" for agreement with **tie**. This shall define the planned nature and timing of the internal audits. Furthermore **tie** reserve the right to undertake external audits in accordance with paragraph 5.2 of the Code of Construction Practice and Code of Maintenance Practice.

The Infraco shall ensure that their management system for the Infraco Works is developed to ensure that it aligns with the requirements of the Tram Project Quality policy Statement (DEL.HSQE.103).

Quality control including materials and works on Site shall also be undertaken in accordance with the requirements of paragraph 3.2 of the Code of Construction Practice. The Infraco shall be required to comply with these Employer's Requirements including the completion of forms and other systems in order to assist **tie** in complying with **tie**'s own safety and quality management systems.

12.8.1 Document Standards and Control

All Deliverables that are shared with, or issued to, **tie** shall be posted and reside within **tie**'s document management system. The official version of any project document shall be the version that exists within **tie**'s document management system. Access shall be granted to **tie**'s document management system on a named basis, and access levels shall be determined by **tie**. The Infraco also agrees to abide by **tie**'s document management procedure as notified to Infraco from time-to-time.

Documents from external parties should be uploaded to the project extranet for processing by document control. The extranet will also be the official conduit for issuing project information. In exceptional circumstances where documents must be exchanged by email, only the Document Control team will receive and issue this information. They will then handle all appropriate processing and distribution.

Deliverables shall conform to the following standards:

Acceptable File Types

- MS Office Suite 2003;
- MS Project 2003;
- MS Visio 2003;
- Portable Document Format (PDF) – Fully-searchable (OCR) Acrobat Reader v7 compatible;
- Compressed Files/Folders – WinZip v10 compatible;
- Graphics – GIF, TIFF, JPG, JPEG, or BMP;
- Audio – Audio files should be saved in MP3 format;
- Video – WMV or MPEG format with WMV preferred;

- Drawings – DWG (inclusive of used templates) and DCF.

Acceptable File Sizes

In general, all files should be optimised to keep their size to a minimum. For email correspondence the maximum allowable attachment size is 10MB. Individual files in excess of 50MB are only acceptable with prior agreement from **tie**.

Project Applications

- Collaboration – SharePoint 2007 (hosted by **tie**);
- Project Planning – Primavera v6;
- Risk Management – Active Risk Manager (hosted by **tie**);
- Deliverables. In addition to Deliverables conforming to the above, they should specifically be supplied in complete, self-contained and fully editable formats.

Typical examples include;

- Drawing Deliverables should be supplied as complete DWG files (inclusive of used templates) as well as the DCF print snapshot;
- Documents should be in Word 2003 (or previous) format;
- Spreadsheets should be in Excel 2003 (or previous) format and include the associated macros, equations, and functions.

Illegal Characters

As a matter of best practice the following characters should not be used in filenames to minimise the risk of error in software applications:

&	**¦**	**$**
~	**¬**	**£**
*****	**^**	**?**
%	**; (semi-colon)**	**!**
#	**, (comma)**	**@**
****	**‘ (apostrophe)**	**=**
/	**` (single quote)**	
<	**“**	
>	**. (dot)**	
{	**: (colon)**	
}		

12.9 Infraco Performance Measurement

As part of the overall project reporting regime, a four weekly report incorporating performance against Key Performance Indicators (KPI) shall be required from the Infraco. These shall be project, as opposed to company, specific.

A fundamental consideration is that the KPIs agreed must be measurable and without dispute, thus they shall be fact based. The outputs shall be compared on a four weekly basis against both four weekly and rolling targets. A colour coded "traffic light" visual warning shall be used.

The KPIs agreed are split into a number of different areas. The following provides the breakdown of components within each of the areas. Deductions against the failure to achieve the agreed KPIs are set out in Schedule 45.

Table 26 – Table showing indication of Safety KPIs

Safety
Accident Frequency Rate (AFR)
Equivalent Fatality Rate (EFR)
Lost Time Accidents (LTA)
RIDDOR
Road Traffic Injuries
Road Traffic Damage (caused by Infraco actions)
Accident Investigations (late receipt)
HSE inspections, observations, improvement notices and prohibitions
Working at height
PPE – not using/not using correctly
Review of Accident Book entries
Possible 3rd Party specific (e.g. Network Rail)
NCRs
CARs (non-completion/late response or action)
Procedure compliance
Test failures (to include concrete and welding)
Safety Tours
Safety Inspections
Security
Achievement of programme
Snagging correction

Method Statements/Risk Assessments – failure to operate in compliance therewith
Late Possessions / Overruns
Reporting
Spills
Working hours contraventions
Complaints
Pollution – water courses; noise; light; dust; others
Trespass
COSHH contraventions
Signage and warning signage
Specific parameters may need to be devised relating to programme, performance, reporting and other specific issues that are important to **tie**.

The Infraco shall submit samples, manufacturers' literature, documentation and other such materials to demonstrate compliance with the Employer's Requirements, from time to time, for review by **tie**, in advance of the associated materials or equipment being procured. The Infraco shall prepare a Schedule of Procurement Proposals to identify all such proposed submissions and their timing for approval by **tie**.

12.10 Cost Management and Reporting

The Infraco shall carry out a pro-active role in cost management and reporting. A cost report shall be submitted by the Infraco to **tie** no later than 3 Business Days before each cost review meetings / or at a 4 weekly period, to be agreed with **tie**. In addition cost summary information shall be provided for inclusion in the Progress Reports.

The Infraco cost reports shall contain comprehensive information and shall be structured in a manner that is commensurate with **tie**'s own reporting structure. The cost reports shall be required to provide information, including the following:

- Executive summary and narrative on significant changes from the previous report;
- Actual / Planned / Forecast Spend Tables / Curves to match the achievement of major deliverables and activities within the Work Breakdown Structure;
- Change Control Schedule and background information;
- Schedule of Compensation Events and background information;
- Value management estimates / analysis;
- Schedule of status of completion of Construction Milestones and Critical Milestones;
- Copy of the progress statements included in Monthly Progress Monitor.

The Infraco shall also be required to provide value engineering estimates and reports. These reports shall be provided by Infraco from time to time, as proposed by the Infraco or as required by **tie**, for the purpose of achieving better value.

12.11 Risk Management

12.11.1 Project Objectives

tie is dedicated to ensuring that a consistent approach to risk management is adopted across the ETN, which shall enable an informed view of risk to be taken.

ETN project risk management's mission is "to successfully manage all risks to and opportunities for the project thus ensuring that a supported and fully functioning operational service is delivered within budget and on time.

The key drivers within this mission are to:

- Promote and support proactive management of risk and opportunity;
- Integrate risk awareness / management, and not risk aversion, into the project culture;
- Manage risk in accordance with best practice;
- Reduce risk exposure to acceptable levels;
- Capitalise on opportunities;
- Ensure that all identified risks are owned and managed by the party best able to manage them;
- Provide assurance and enhanced information to managers and stakeholders.

tie maintains a project risk management plan and risk register covering the strategic, project management and commercial aspects of the ETN and shall continue to do so throughout the Term and operation. **tie** seeks to have all service providers, including the Infraco, contributing towards this risk register.

12.11.2 Risk Deliverables

The Infraco shall provide various Deliverables, as described in this section, to assist **tie** in meeting **tie**'s risk management obligations associated with strategic, project management and commercial aspects of the ETN. The required procedures for managing hazards and risks associated with obligations associated with safety are not covered in this section.

The Infraco shall be responsible for the production, management, development, regular maintenance and necessary updating and distribution of the documentation included within the table below. The documentation shall be held by the Infraco in electronic format with hard and soft copies being made available as required.

Risk Documentation shall be submitted to **tie**, in paper copy and electronically, for their approval in accordance with the Review Procedure and the required dates and frequencies are included in the table below.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
The Infraco shall provide assurance that they shall manage design and construction risk to the satisfaction of **tie** and in order to fulfil the objectives described in12.11.1. As part of this obligation the Infraco shall be responsible for the production, development and maintenance of a Infraco Risk Management Plan ("IRMP") for the management of all risk aspects of the Edinburgh Tram Network throughout the Term. The IRMP shall focus on the risk factors related to the Infraco managed activities related to the Infraco Works for the delivery of the Edinburgh Tram Network including the risk deliverables noted below. The IRMP shall identify individuals and their responsibility in relation to risk.	Agree format and delivery date for the IRMP with **tie**'s designated risk manager within one month of the Commencement Date. The Infraco shall update and maintain the IRMP throughout the Term. The Infraco shall issue an update to the IRMP at least bi-annually throughout the Term.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
The Infraco shall be responsible for the development and maintenance of an Infraco Risk Register ("IRR"), to best present all capex, opex, lifecycle, programme and quality risks to the Edinburgh Tram Network. The IRR shall also detail the proposed and completed mitigation of such risks. The platform used shall include the ability to generate reports, highlight risks to **tie**, key programme and cost impacts. The Infraco shall be responsible for the identification of commercial risks associated with all interfaces related to the works and shall facilitate and coordinate the inputs from stakeholders and other parties requested by **tie** from time to time. The IRR shall include analysis of each risk in terms of 'likelihood' and 'impact' providing detail on the inherent risk significance and current residual risk significance. Each risk shall have a designated responsible owner and the Infraco shall provide dashboard type graphical summaries of the risk profile and management actions being taken to mitigate. The risks to be addressed should include technical, operational, infrastructure, interface, economic, legal and regulatory, organisational and environmental risks. The Infraco should review the IRR on a four weekly basis to ensure that it is current. The Infraco shall meet with **tie** on a four weekly basis in line with the tram period calendar to discuss the control of key risks by the Infraco.	Agree format assessment criteria, platform and delivery date with **tie**'s designated risk manager within one month of the Commencement Date. The Infraco shall update and maintain the IRR as required on a four weekly basis and shall distribute the IRR to **tie** on a four weekly basis throughout the Term. Assessment criteria must be compatible with **tie**'s own risk register and assessment criteria.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
It is recognised that the identification, monitoring and progress of risk shall be discussed at regular workshops. The Infraco shall provide to **tie** a schedule of and undertake workshops, regarding risk matters to assist **tie** in ensuring the effective management of risk in relation to the Edinburgh Tram Network, **tie**, the Operator and/or relevant suppliers should receive timely notification of these in order to be able to attend. It is noted that **tie** may routinely request to attend workshops in order to be able to evaluate Infraco's approach to and performance in relation to risk. Infraco shall also attend meetings and workshops with **tie**'s project and risk management team and other ETN suppliers, the Operator and service providers as instructed by **tie** to take part in update of existing project risk and identification of new risks. The representatives attending such workshops shall be qualified and shall have sufficient knowledge of the ETN project to be able to contribute pertinent information within these workshops.	Provide and agree workshop schedule for the coming 6 months within the risk progress report to **tie**'s designated risk manager within 2 months of the Commencement Date.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
The Infraco shall be responsible for the preparation and maintenance of a Commissioning Risk Control Report which shall detail the plans for mitigating risks associated with the commissioning of the Edinburgh Tram Network. This should cover commissioning, operational and design risks, but not limited to the trams, the tracks, the power supply and the tram depot. The Commissioning Risk Control Report shall concentrate primarily on the (commercial risk) associated with the commissioning process, but shall also refer to ongoing issues which also affect the construction and/or operation or part operation of the Edinburgh Tram Network .	Agree format of the Commissioning Risk Control Report to **tie**'s designated risk manager (as notified to the Infraco from time to time) within 6 month of the Commencement Date. Final report to be delivered at least 3-months prior to start of the Testing and Commissioning. The Infraco shall update the Commissioning Risk Control Report as required until the Service Commencement Date..
The Infraco shall be responsible for the preparation and maintenance of a Residual Risk Control Report ("RRCR") that will detail the plans for mitigating the risks arising from the construction and commissioning of the Edinburgh Tram Network, which are still of ongoing importance. The RRCR should clearly detail the areas of importance that could affect the ETN after the Service Commencement Date until the end of the Term. These areas could be associated with design, operational and defects factors. Risks to be noted in the RRCR may include, but shall not be limited to commercial risk associated with, snagging, claims, specification defects and other commercial concerns.	Agree format of RRCR with **tie**'s designated risk manager (as notified to the Infraco from time to time) within 12 months of the Commencement Date. Final report to be delivered at least three months prior to the Service Commencement Date. The Infraco shall update the RRCR as required throughout the Term.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
The Infraco shall prepare and maintain an Operational and Maintenance Risk Register ("OMRR") that will detail the identified risks associated with provision of the Maintenance Services in relation to the Edinburgh Tram Network and management actions being taken to mitigate. The Infraco shall liaise with its Sub-Contractors and the Operator and any other relevant party as required in relation to the creation, development and updating of the OMR	Agree format and assessment criteria of the OMRR with **tie**'s designated risk manager (as notified to the Infraco from time to time) within 12 months of the Commencement Date. First formal report to be delivered at least three months prior to the Service Commencement Date. The Infraco shall update the OMRR in line with the four weekly tram period calendar

Table 27 - Table showing required actions from the Infraco

12.12 Traffic Management / Temporary Traffic Regulation Orders (TTROs)

The Infraco shall be responsible for the preparation of a Traffic Management Plan (TMP) and Work Site Staging Plan (WSSP). The TMP and WSSP shall comply with instructions issued by **tie** and shall be drafted in consultation with **tie** and CEC. The Infraco shall be responsible for the preparation of a Traffic Management Plan (TMP) and Work Site Staging Plan (WSSP). The plans shall apply to all work required in connection with the Infraco and including wider area traffic management measures associated with the construction of the main works. The TMP and WSSP shall comply with instructions issued by **tie** and shall be drafted in consultation with **tie** and CEC.

The TMP and WSSP shall identify and account for interfaces with parallel works, including the MUDFA Works.

The TMP and WSSP shall also include all necessary survey work, temporary traffic diversion modelling, assessment and design which will take account of the works, network constraints and the traffic control requirements.

The design shall identify the required alterations to road layouts, regulatory changes to be enacted through TTRO, altered/additional traffic signal equipment, new traffic signal installations and advance/local road signage.

The design shall also determine the locations of temporary bus stops and taxi ranks, alterations to parking and access/servicing arrangements for residents and businesses in works areas.

The TMP and WSSP shall be submitted within four weeks of the Commencement Date by the Infraco to **tie** and CEC for approval in accordance with the Review Procedure and as detailed in the current CEC-**tie** Interface Protocol relating to TTROs (Protocol Ref: TECH – 01).

The TMP and WSSP submission packages shall be as described in the Protocol and the plans shall include temporary works method statements, and shall identify general traffic, bus and pedestrian diversionary routes, access routes for emergency vehicles, and alternative arrangements for bus stops, parking and loading. The plans shall also include assumptions registers, issues logs and any other means to ensure prompt resolution of issues which could affect the progress and economic execution of the Infraco Works.

Leaflets and other approved publicity material as reasonably required shall be prepared for the information of the public/stakeholders/media showing temporary traffic management arrangements and traffic diversions and how these will operate.

Prior to implementation the TMP and WSSP shall be presented for review and approval to the **tie**/CEC/ Police/TEL Traffic Management Review Panel (TMRP) in-line with the agreed protocols and timescales which include procedures to give stakeholders advanced notification of the proposed arrangements to be implemented during the works.

The TMP and WSSP shall also include all necessary drawings, diagrams and supporting information to show the mobilisation, erection and dismantling of Temporary Works, traffic and pedestrian management during any pre-diversion works and the Infraco Works, access to properties, details of fencing and security measures.

The Infraco shall update the TMP and WSSP every two weeks throughout the duration of the Infraco Works for review at fortnightly design meetings and every four weeks at stakeholder and third part meetings.

The Infraco shall be responsible for the preparation of draft TTROs which shall be submitted to **tie** for onward submission to CEC, in its capacity as Roads Authority, for approval, again as described in the current CEC-**tie** Interface Protocol relating to TTROs (Protocol Ref: TECH – 01). The submission packages shall be as described in the Protocol.

TTRO submissions will adhere to the programme detailed in the Protocol.

The Infraco shall also attend meetings in relation to the TTROs, as required by **tie**, including representations to the **tie** / CEC Roads Working Group Committee, which convenes quarterly.

The Infraco shall develop a set of requirements in relation to TTROs and traffic management, which shall be based on information supplied to the Infraco by **tie** and/or **tie** ("TTRO Obligations and Traffic Management Plan") and shall take account of the interface on traffic management that will be required in relation to the MUDFA Works.

The Infraco shall prepare and develop project-specific procedures for complying with the TTRO Obligations and Traffic Management Plan, and these procedures shall be submitted for approval by **tie** and CEC in sufficient time to avoid disruption to the Programme.

By appropriate induction, the Infraco shall ensure all site-based personnel, management staff, operatives and visitors are fully aware of and understand the procedures contained within these Employer's Requirements.

The designated project or site manager appointed by the Infraco shall be accountable for the implementation and compliance with these requirements and procedures.

The Infraco shall ensure that the overriding considerations expressed in these procedures and requirements shall be the safety of road users, minimising disruption caused by the Infraco Works, pedestrian management and ensuring that traffic and pedestrian disruption is kept to a minimum.

This shall include taking such measures as CEC, in its capacity as roads authority, may reasonably require.

The Infraco shall ensure that reasonable access to all business, residential premises and properties (having regard to Infraco's obligation to comply with the Programme) along the route of the Edinburgh Tram Network is maintained at all times. Infraco shall not be obliged by virtue of this provision to provide access which is more extensive than the access agreed in any Third Party Agreement.

12.13 Stakeholder Management

12.13.1 General

A Stakeholder and Communications Management Plan has been developed by **tie**. The Infraco shall comply with the requirements of this document.

The Infraco shall be, jointly with **tie**, accountable for minimising any possible adverse impact of the implementation of the Edinburgh Tram Network on stakeholders (both statutory and non statutory), local businesses and the general public.

12.13.2 Design

The Infraco shall incorporate the following requirements into the design in addition to any other requirements as defined:

- Securing, implementing and incorporating into the design all necessary Network Rail, BAA and other third party agreements;
- Assisting by providing all technical details relevant to the compulsory purchase order process and land acquisition process (including wayleaves and servitudes); including integration with **tie**'s stakeholder and GIS systems.
- Liaising with CEC, Scottish Executive, Historic Scotland, World Heritage Trust, Scottish Natural Heritage and others as required by **tie** in relation to the performance of the Infraco Works.

12.13.3 Liaison and Public Information

The Infraco shall appoint a liaison officer to manage all public relations, information and press related matters relating to the Infraco Works, who shall along with the necessary technical, commercial and other Infraco resource, liaise with **tie**, and if so requested by **tie**, with CEC, other statutory bodies, members of the public, local businesses, the press and the media as may be

necessary on all matters relating to the Infraco Works. Except where expressly stated in the Agreement, the Infraco shall not make any publicity or media statements or make any other formal disclosure of information regarding the Infraco Works without the prior approval of **tie**.

The liaison obligation referred to in the above paragraph shall include, but shall not be limited to the following matters:

- From time to time as directed by **tie**, Infraco shall be required to participate in business, stakeholder and community liaison groups, public meetings and consultation meetings as the progress of the Infraco Works dictate.

- From time to time as directed by **tie**, Infraco shall be required to provide proactive input, information and comment into information initiatives organised by or on behalf of **tie** and attending as requested by **tie** at any relevant consultation meetings

- As directed by **tie Infraco** will assist with the development and maintenance of, and adherence to, a communications protocol for dealing with all stakeholders, businesses and members of the public affected by the Infraco Works. In particular this will require strict adherence to timescales determined by **tie**.

- Assisting with the development and maintenance of procedures developed by **tie** in relation to stakeholder management by way of the provision of information relating to the Infraco Works

- Provision of weekly updates to **tie** on the progress of the Infraco Works and all planned Infraco Works in a form reasonably requested by **tie**.

- Depending upon the type of communication, Infraco shall give **tie** a minimum of two weeks notice in advance of all plans for any formal communication with stakeholders, businesses and members of the public (e.g. for major customer works governed by the Customer Interaction Cycle far more weeks would be required). The form and content of such formal communication shall be subject to **tie**'s prior approval

- Provision to **tie** of all information reasonably requested by **tie** in respect of the Infraco Works planned in a form prescribed by **tie** and timescales and frequency agreed with **tie**.

- **tie** and Infraco will be jointly involved in the appointment of appropriately qualified "Tram Helpers". They will be directly managed by **tie,** but integrated into Infraco work areas and teams through joint induction and briefing; appropriate cross training; "Tram Helper" visibility in Infraco work areas; "Tram Helper" involvement in the direct management of stakeholder issues on site;

direct engagement by "Tram Helpers" or appropriate Infraco management and staff to assist in the resolution of on site issues; provision of appropriate Infraco uniform and equipment, etc. "Tram helpers" are to be recruited and in place four weeks prior to commencement of notification.

- Provision and use of approved branding materials, PPE kit and signage at all operational Work Sections. No such materials, kit or signage shall be erected at any Work Section without the prior approval of **tie**.

- The provision and distribution of traffic routing maps which conform to the terms of the TTROs for all areas affected by the Infraco Works in advance of the Infraco Works starting in any particular location as may be requested by **tie**. In the event that **tie** requires that such material is for public issue, public issue shall not occur before the form and content has been approved by **tie**. Infraco shall ensure that all public statements (including by way of media referred to in the sections below (customer care centre, website, weekly newsletter, monthly newsletter, call centre and communication log) in relation to the Infraco Works are consistent with (**tie**'s) Communications Strategy and integrated with **tie**'s systems and procedures.

12.13.4 Information Centre

The Infraco shall provide all information and documentation regarding the Infraco Works as may be reasonably required by **tie** in respect of the mobile and fixed information centres being operated jointly by **tie** and Infraco in relation to the Edinburgh Tram Network. The frequency of update and version control of information shall be subject to a process agreed with **tie**.

12.13.5 Website

The Infraco shall provide all information regarding the Infraco Works, reasonably requested by **tie**, in order to populate the website, which shall be maintained and operated by **tie** throughout the progress of the Infraco Works, in respect of the Edinburgh Tram Network. The frequency of update and version control of information shall be subject to a process agreed with **tie**.

12.13.6 Weekly Newsletter

The Infraco shall produce and publish weekly newsletters every Wednesday, detailing the Infraco Works to be undertaken in the forthcoming week and outlining, with appropriate maps, drawings and diagrams, the impact on the general public, businesses and in particular any alterations to road traffic circulation patterns required by the coming week's Infraco Works.

Each newsletter, the contents and format of which shall have the prior approval of **tie**, will also be issued, if requested by **tie**, by fax and email to: local and national newspapers and other news media, CEC, Lothian and Borders Police, the emergency services, to any party or parties requested by **tie** and to any other persons or organisations that have requested receipt of the newsletters.

The newsletters shall also be distributed door to door by the Infraco in affected locations and the Infraco shall advise **tie** when such distribution is occurring.

The Infraco shall monitor and record the distribution of newsletters, recording who is carrying out such distribution, the intended recipients etc, so as to enable **tie** to carry out its own audit and monitoring of such distribution. Infraco to ensure, by regular surveys that circulation data is accurate and up to date.

Sufficient free distribution take-away hard copies of these newsletters shall be delivered to and placed in the information centre by the Infraco before 08:00 every Thursday morning.

The Infraco is required to submit a draft of each issue of the newsletters to **tie** no later than midday on the Monday immediately preceding the proposed issue of the newsletters on the Wednesday. **tie** shall respond before 17.00 hours the same day.

12.13.7 tie Monthly Newsletter

The Infraco shall provide all information and assistance reasonably requested by **tie** in relation to the publication by **tie**, of a monthly newsletter in relation to the progress of and future plans for the Edinburgh Tram Network.

12.13.8 Customer Contact Centre

The telephone number, fax number and e-mail address of the call centre to be operated jointly by **tie** and Infraco in relation to the Edinburgh Tram Network (the "hotline") shall be publicised through the press and the weekly newsletter and clearly displayed on all appropriate PPE kit, site signage, hoardings and at other suitable locations within and throughout the vicinity of the Infraco Works. All letters, e-mails, customer queries shall be answered by Infraco within timescales, to be agreed in advance with **tie**.

12.13.9 Communication Log

All contacts, communications, complaints, comments and queries howsoever received by the Infraco shall be registered in a suitable electronic log (the "communication log").

The Communications Log shall be developed and maintained by Infraco in a manner that allows it to be fully integrated with **tie**'s Stakeholder Database and GIS systems. The communication log shall set out each contact under the type (e.g. General, Traffic, Safety, Vibration, Noise, Dirt, Disruption, Injury, Parking, Access, RTA, publicity, suggestions etc).

The method of approach shall also be logged (e.g. phone, direct, letter, email, etc.) as well as the time and date.

The log shall be so constructed such that statistical analysis of the different communications can be presented as part of the data to be provided to **tie**. It shall be a requirement that the Infraco shall deliver an "above average" customer satisfaction level, with criteria, frequency and method of assessment to be agreed by **tie**. In order to demonstrate this, there shall be a requirement for the Infraco (and as required **tie**) to undertake internal (and external) audits of the overall engagements with the stakeholders. All this information shall be summarised by the Infraco in its monthly progress report.

Infraco shall take such steps as are required to address any such contact, communication, complaint, comment or query in accordance with the response requirements set out in Table 28 - Notification Hierarchy and in line with the agreed enquiry management process.

To the extent that a stricter response requirement is otherwise required under the Agreement, the stricter response requirement shall apply.

To the extent that Table 26 provides for the recovery of any amount by **tie** from the Infraco, such amount may be deducted from any monies due to or to become due to the Infraco or, alternatively, may be recovered from the Infraco as a debt.

A record of all remedial actions taken shall be maintained.

In the event of the Infraco receiving a complaint, a follow up letter or electronic communication shall be passed to the complainant by the Infraco within 24 hours of their receipt of the complaint, outlining the complaint and details and timing of the remedial action being undertaken by the Infraco.

An up to date copy of the communications log shall be compiled daily by the Infraco, together with a report on the progress of any actions.

The communications log shall be inspected and signed daily by a nominated senior representative of the Infraco and shall be counter signed by the Infraco's Representative at least once per week.

The Infraco's Representative shall write a report to **tie** and/or the Nominated City Officer of CEC (as notified by **tie** from time to time) at a frequency determined by **tie** (at least once per month) containing a list of any breaches of the requirements as defined within this section and also Schedule 3 (Code of Construction Practice and Code of Maintenance Contract) occurring within the previous month, setting out:

- the nature of the breach;
- the duration of the breach;
- the action taken by the Infraco to mitigate the breach; and
- the steps taken to minimise the likelihood of a subsequent occurrence of the breach.

Subject to the Infraco obtaining **tie**'s prior approval, a copy of each week's communication log shall be placed every Friday in the information centres, where it will remain until completion of the Infraco Works.

Any person, including representatives of **tie** and CEC's nominated representatives may freely inspect all deposited copies of the communications log during the normal opening hours of the information centres.

The version of communications log on public display should not breach any data protection legislation or other Law.

Copies of the communication log shall be forwarded to **tie**'s Representative and/or and CEC's Nominated City Officer once per week.

The master communication log shall be available for **tie**'s Representative and CEC's Nominated City Officer to inspect at any other time during normal working hours.

Level of Urgency	Category of Notification	Required Response Time
1	**High urgency** Involves an immediate threat to persons or property or the circumstances otherwise require immediate rectification.	Immediate action required. If response not completed by the Infraco within 4 hours, **tie** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Infraco.
2	**Medium urgency** No immediate threat to persons or property, but circumstances require rectification within 24 hours.	Remedial action requires to be completed within 24 hours. If the Infraco does not complete the required response within 24 hours, **tie** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Infraco.
3	**Issue requires rectification** but no immediate threat to persons or property and the circumstances do not otherwise require immediate rectification.	Timescales for rectification to be agreed between the Infraco and **tie**. In the event that the Infraco does not comply with the agreed timescales, **tie** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Infraco.

Table 28 - Notification Hierarchy

13 Permits / Approvals

The Infraco shall obtain all necessary permits and approvals prior to undertaking investigations or works on Site, in accordance with paragraph 3 of the Code of Construction Practice.

13.1 Method Statements

The Infraco shall prepare method statements in respect of all investigation and work activities, as detailed in this Section and paragraph 3.2 of the Code of Construction Practice and submit these in accordance with paragraph 3.3 of the Code of Construction Practice.

The Infraco shall produce a method statement entitled "Procedures for dealing with Unidentified Apparatus or Unrecorded Artificial Obstructions", which shall be submitted by Infraco in accordance with paragraph 3.3 of the Code of Construction Practice. This method statement shall contain procedures which shall confirm the processes for dealing with unforeseeable events or circumstances, the discovery of unidentified apparatus (including live services) or unrecorded artificial obstructions. The final version of the method statement and procedures shall be agreed with the relevant key third parties, Approval Bodies, the Utilities and the emergency services The method statement shall be updated and a final version produced which shall be finalised by the Infraco in accordance with paragraph 3.3 of the Code of Construction Practice.

13.2 Existing Structures Which May Affect Progress and relationship with Third Parties

The Infraco shall undertake works to address the condition of existing structures where such condition may affect the progress of the Infraco Works. Where such work is completed the Infraco shall take appropriate photographs to fully demonstrate the quality of the reinstatement works.

The Infraco shall undertake survey inspections associated with buildings and structures which may be at risk of physical damage as a result of the Infraco Works.

For such structures and buildings the Infraco shall compile an appropriate schedule of such buildings / structures, and produce surveys / records similar to those described under paragraph 18.2.1 of Schedule 3 (Code of Construction and Code of Maintenance Practice).

Early warning must be given to **tie** where any third party is, or is likely to start, acting unreasonably. In these situations, **tie** will seek to resolve any issues with the third party to assist Infraco.

13.3 Network Rail

The Infraco shall ensure that the requirements of the Network Rail GRIP process are implemented on the works for which they are responsible whilst working in accordance with all relevant Network Rail Group Standards.

The contract requirements for Network Rail with regard to health and safety are included within the Network Rail document NR/SP/OHS/008. The project specific requirements are identified within the Safety Clause Menu against the requirements of Network Rail document NR/SP/OHS/008 and indicated with 'ticks' in the contractor column sections 51 to 59 inclusive of the safety clause menu and any other requirements that the Infraco is proposing by virtue of his method of undertaking the Infraco Works. The safety clause menu shall be signed off by the Infraco to confirm its proposals.

The Infraco Works shall be undertaken as Third Party Works as identified within the Network Rail document (RT/LS/P/043).

14 Human Factors

The Infraco shall provide systems and working practices that are:

- As easy to use as possible;
- Unlikely to cause annoyance or stress to users of the Edinburgh Tram Network, whether members of the public, operators, or maintainers; and
- Likely to promote safety to all.

The Infraco shall systematically and comprehensively:

- identify all the human factors issues associated with the engineering of the Edinburgh Tram Network, using task analysis;
- determine which of these human factors issues pose the most significant risk to the efficiency, productivity, safety and health of the Edinburgh Tram Network; and
- describe the organisational arrangements and processes the Infraco intends to put in place to manage these significant human factors issues as part of the engineering of the Edinburgh Tram Network

The Infraco shall produce and maintain in accordance with the submittals schedule a human factors management plan, covering the requirements summarised above, and where appropriate, shall undertake human factors studies to recommend solutions.

Areas of particular concern are:

- The human computer interfaces in the Control Centre;
- The layout of the driver's cabs;
- The facilities to enable maintenance of equipment:
  - In the workshop and Depot;
  - At trackside;

- In substations;
- At the Tramstops; and
- In the Control Centre.

The Infraco shall adopt all applicable best practice and guidelines for human factors. In designing the environment in the Control Centre, the Infraco shall comply with BS EN 50126 and ISO 11064 "Ergonomic Design of Control Centres.

15 Reliability, Availability and Maintainability

15.1 Reliability and Availability

The Edinburgh Tram Network is made up of many different subsystems, most of which may affect the reliability of operation of the ETN as a whole. In respect of achieving and maintaining reliability, the Infraco shall design, construct and maintain the Edinburgh Tram Network in accordance with Good Industry Practice, subject to the reasonable constraints of cost. Where necessary, the ETN should be made resilient to single point equipment and cable failure by employing suitable levels of equipment/cable redundancy and duplication.

On equipment or cable failure, subsystems shall be designed in a fail-safe manner, with graceful degradation. Limited back-up facilities shall be provided to maintain services under specified partial failure conditions.

Defined below are the requirements for availability of individual subsystems (each of which is given a definition), and also the availability of individual components of the subsystems.

In addition to the above, the overall availability of the Edinburgh Tram Network and its subsystems must support the tram punctuality requirement that is set out in these Employer's Requirements. Consequently it may be necessary to increase the minimum requirements that are set out below, especially as the consequences of the actions that third parties may take, including delays caused by other road users, need to be included in the punctuality analysis for the Edinburgh Tram Network.

For all components and subsystems, assume a Mean Time to Repair (MTTR) of 4 hours.

Any downtime required for planned maintenance can be discounted from the determination of availability, provided that such maintenance can be reasonably undertaken at a time when the maintenance has no impact on the operation of the ETN. This will often be during overnight shut downs.

15.2 Traction Power System

Component or Subsystem	Minimum Availability
AC circuit breaker, where its availability is defined as the probability that it either fails to conduct electricity when commended to be closed.	99.99%
Transformer / rectifier where its availability is defined as the probability that it either fails to provide the nominal 750VDC when energised.	99.99%
DC circuit breakers and busbars, where its availability is defined as the probability that traction power is not available from the DCCB when commanded to be closed, provided that 750 VDC is available at from the rectifier	99.99%
Transformer / rectifier where its availability is defined as the probability that it fails to provide the nominal 750VDC when energised by the HV input.	99.99%
Substation battery and charger, where its availability is defined as the probability that control voltage is not available from the battery at any time during its normal operation, regardless of the state of the incoming LV supply	99.99%
Substation, where its availability is defined as the probability that 750VDC voltage is not available for the OLE when the substation is commanded to provide 750VDC	99.75%

Table 29 - Substation Equipment

Component or Subsystem	Minimum Availability
OLE System, where its availability is defined as the probability that in any linear km of the OLE system, trams are not able to operate at the normal operational speed due to defects in the OLE. This is based on an 8 hour incident once every 3 years, 20hr/day operation and (20 route-km plus depot, about 50 track-km)	99.99925% for each km

Table 30 – Overhead Line Equipment

15.3 Supervisory and Communications Systems.

Component or Subsystem	Minimum Availability
ODN node	99.99%
Fibre Optic Cabling	99.99%
Patch Panels and Connectors	99.99%
ODN network, where its availability is defined as the probability that any message from a given input to a node reaches its intended destination node correctly and could be transmitted onwards by that node.	99.99%

Table 31 - Operational Data Network

Component or Subsystem	Minimum Availability
Transponder (if used)	99.9%
Loop Detector	99.9%
TPDS Trackside Controller	99.9%
TPDS subsystem, where its availability is defined as the probability that any given tram has its position detected and passed to the signal controller and to Control Centre operators correctly, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional	99.75%

Table 32 - Tram Position and Detection System

Component or Subsystem	Minimum Availability
Passenger Information Display	99.9%
Local Controller (if required)	99.9%
PID subsystem, where its availability is defined as the probability that the appropriate message is displayed correctly at a given PID, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional	99.75%

Table 33 – Passenger Information Display

Component or Subsystem	Minimum Availability
Telephone Handset	99.9%
PABX	99.99%
Telephone network, where its availability is defined as the probability that any 30 second conversation between a given telephone and another given telephone is heard clearly and completely by the caller and the intended recipient, assuming that the ODN is fully functional.	99.75%

Table 34 – Telephone Network

Component or Subsystem	Minimum Availability
PA speaker	99.9%
PA controller	99.9%
Microphone and speaker	99.9%
PA subsystem, where its availability is defined as the probability that an operator can make an intended announcement clearly at a given platform, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional.	99.75%

Table 35 - Public Address System

Component or Subsystem	Minimum Availability
Base Station	99.95%
Mobile Handset (Tram, Vehicle, or Hand Held)	99.7%
Central Switch	99.99%
Operational Radio subsystem, where its availability is defined as the probability that a 10 second call (voice) or short data message can be received clearly by the intended recipient, assuming that the ODN is fully functional and that the hardware component of the Control Centre workstations is fully functional	99.75%

Table 36 - Operational Radio System

Component or Subsystem	Minimum Availability
Help / Emergency Help Point	99.9%
Help Point subsystem, where its availability is defined as the probability that a member of the public can contact the Control Centre operator and can carry out a Help Point conversation lasting 20 seconds, clearly and without interruption, assuming that the ODN is fully functional and that the PABX is fully functional	99.75%

Table 37 - Passenger Help / Passenger Emergency Help System

Component or Subsystem	Minimum Availability
CCTV camera	99.95%
Digital Video Recorder	99.95%
CCTV Matrix	99.95%
CCTV subsystem, where its availability is defined as the probability that an image is displayed correctly and in the specified sequence at the Control Centre, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional	99.9%
Recording and replay subsystem, where its availability is defined as the probability that an image is displayed from any given time in the past (within the recorded period) can be retrieved and displayed correctly, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional	99.9%

Table 38 - CCTV System

Component or Subsystem	Minimum Availability
SCADA RTU (including I/O cards and interface cards)	99.95%
SCADA subsystem, where its availability is defined as the probability is the lesser of (a) that an indicator is read correctly at the RTU, transmitted to the SCADA Master Station in the Control Centre, and displayed correctly on any SCADA display that is in use within four seconds: and (b) that a control is effectively transmitted to an outstation within two seconds, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional	99.75%

Table 39 - SCADA System

Component or Subsystem	Minimum Availability
Servers (if necessary, by use of hardware and software redundancy)	99.99%
Workstations	99.9%
Printers	99.5%
CCTV Matrix Controller	99.9%
LAN Switches, Routers and Hubs	99.99%

Table 40 - Central Control Equipment

15.4 Maintainability

The ETN and its components shall be designed with maintainability in mind. To this end, the following shall be observed:

- Important equipment shall be in a redundant configuration, so that a component may be replaced while standby equipment takes over its duty;
- Equipment shall be replaceable, if possible, as field replaceable units, so that defective components can be replaced without the need to power down the overall piece of equipment; and
- Equipment, particularly at trackside and on Tramstops, shall be positioned so that where possible it is accessible for maintenance or replacement without the necessity to halt tramway traffic or to close the Tramstop and without the need to use access equipment such as steps.

15.5 Supportability

The equipment selected for use on the Edinburgh Tram Network shall be selected so that:

- It has a long design life, as specified in section 6 of these Employer's Requirements.
- It shall be based on standard Commercial Off-the Shelf (COTS) equipment as far as appropriate, so that replacement parts may be easily obtained and integrated into the ETN without the necessity of resorting to the original subsystem or equipment suppliers.

16 Electromagnetic Compatibility

16.1 EMC Directive

On 20th July 2007 a new EMC Directive came into force in the European Union. Statutory Instrument 2006 No.3418 implements the new EMC Directive 2004/108/EC in UK law. The rules for the new EMC Directive have changed significantly from the old Directive (89/336/EEC). After 19th July 2009 declarations made will require appropriate "Technical Documentation". This means that the Declaration of Conformity made using the old conformance mechanisms will have to be updated to use "Technical Documentation". The Infraco must be aware of the relevance of the 19th July 2009 date and insist that suppliers provide documentation accordingly.

16.2 Essential Protection Requirements

The purpose of the EMC Directive is to ensure that electrical/electronic equipment does not cause or be susceptible to electromagnetic disturbance. The protection requirements required of all electrical/electronic equipment/systems/installations are as follows:

- the electromagnetic disturbance generated shall not exceed the level above which radio and telecommunications equipment or other equipment cannot operate as intended; and

- they shall have a level of immunity to the electromagnetic disturbance to be expected in their intended use which allows them to operate without unacceptable degradation of that intended use.

The Infraco must produce an Edinburgh Tram Network specific EMC strategy document in accordance with the Submittal Programme that clearly defines its strategy for achieving compliance with these essential protection requirements and shall submit it to **tie** for its approval.

17 Health, Safety, Quality and Environment

17.1 Quality Management

The Infraco shall undertake the Infraco Works fully in compliance with quality management processes and procedures referenced in ISO 9001 and ISO 9004.

The Infraco shall develop a Quality Plan to meet the requirements of ISO 10005 - 1995, and which fully defines all quality aspects of the Infraco Works. The Quality Plan shall be submitted in accordance with the Review Procedure. The Quality Plan shall demonstrate an integrated quality management system relating to the design, construction, testing, commissioning and maintenance of the Edinburgh Tram Network and shall show how Infraco and its Sub-Contractors shall comply with the requirements of the Quality Plan.

The Infraco shall have all associated documentation readily available for internal review and review by **tie**. Regular internal audits shall be undertaken by the Infraco to ensure full compliance with ISO 9001 and ISO 9004 in accordance with paragraph 5.1 of the Code of Construction Practice. The Infraco shall prepare and submit in accordance with the Review Procedure a "Schedule of Internal Audits" for agreement with **tie**. This shall define the planned nature and timing of the internal audits. Furthermore **tie** reserves the right to undertake external audits in accordance with paragraph 5.2 of the Code of Construction Practice.

The Infraco shall ensure that its management system for the Infraco Works is developed to ensure that it aligns with the requirements of the Tram Project Quality Policy Statement (DEL.HSQE.103).

Quality control including materials and works on Site shall also be undertaken by the Infraco in accordance with the requirements of paragraph 3.2 of the Code of Construction Practice and the Project Safety and Quality Interface Document. The Infraco shall be required to comply with the requirements of this document including the completion of forms and other systems in order to assist **tie** in complying with **tie's** own safety and quality management systems.

17.2 Health & Safety

17.2.1 Safety Management Plan

The Infraco shall submit a safety management plan that is over-arching with regard to safety and defines the management procedures that shall be put in place to ensure health and safety for the design, construction, testing, commissioning and maintenance of the Edinburgh Tram Network. This document shall be stand alone and separate from other safety deliverables such as health and safety plan, system safety management plan, case for safety development etc. The Safety Management Plan shall address all issues relating to the safety of the Infraco Works, staff and third parties, however specific details relating to the items below are required and shall be submitted by the Infraco in accordance with the Submittal Programme:

- The plan shall detail the approach and all management procedures relating to health and safety for the Edinburgh Tram Network;
- The plan shall show how the Infraco will ensure that its Sub-Contractors apply all relevant health and safety policies and procedures to all Sub-Contractors;
- Details of all interfaces associated with safety and the procedures of how these shall be managed. Interfaces shall include Roads Authorities, Health and Safety Executive; any other relevant statutory authorities, HMRI; Competent Person (ROGS); Network Rail; Police; Fire and Rescue Services; Ambulance Service; and all applicable Law;
- Proposed Safety Initiatives;
- How the Infraco proposes that a safety culture shall be cascaded and enforced throughout the team including with Sub-Contractors;
- Infraco proposals for how safety shall be incentivised throughout the team, including with Sub-Contractors;
- The emergency procedures which the Infraco propose to implement;
- Details of how the Infraco shall implement accident and incident reporting and promotion of an open culture;
- The Infraco's safety inspection & safety tour regime;

- An outline of the Infraco's procedures relating to safety for compliance with **tie**'s Drugs & Alcohol Policy and procedures and details of the Infraco's own similar policy and procedures;
- Details of any particular safety issues the Infraco considers would be significant and initial mitigation measures the Infraco considers necessary;
- Commissioning of the Edinburgh Tram Network;
- Driver Training on the Edinburgh Tram Network;
- Maintenance of the Edinburgh Tram Network.

17.2.2 Occupational Health & Safety Management System

The Infraco shall adopt an occupational health & safety management system consisting of the implementation and use of those processes and procedures referenced in BS 8800, OHSAS 18001-2007 and/or HSG 65 (Successful H&S Management).

17.2.3 Project Health & Safety Plan and Health & Safety File

The Infraco shall develop a construction phase plan and supply all necessary information for the Project Health & Safety File in accordance with the Construction (Design and Management) Regulations 2007 and L144 Managing Health and Safety in Construction and as described in the pre-construction information. The construction phase plan shall require to be submitted in accordance with the Review Procedure.

17.2.4 Interface with tie's Safety Systems

The Infraco shall ensure that the management system for the Infraco Works is developed to ensure that it aligns with the requirements of the Tram Project Safety Policy Statement (DEL.HSQE.105). Section 32 of the Agreement contains the Project Safety (and Quality) Interface Document. The Infraco shall be required to comply with the requirements of this document including the completion of forms and other systems in order to assist **tie** in complying with **tie**'s own safety and quality management systems.

17.2.5 System Safety Management Plan (SSMP)

The Infraco shall be responsible for the development of the SSMP.

The SSMP shall define the engineering process that shall ensure, and provide a record of, assurance that the tramway has achieved an acceptable level of performance. This is achieved through a staged "case for safety" submission (refer below) process to signify that safety has been engineered into the design of the Edinburgh Tram Network. The SSMP shall define the process, activities and requirements for the preparation for a "case for safety" at the relevant design stage. The SSMP shall also define the system safety management organisation and the strategy to achieve the individual hazard system safety targets. The SSMP is concerned with only with those hazards that could give rise to an increased level of risk to passengers, staff and the general public from the operating system. (All health and safety hazards related to the risk to workers, staff and the general public from the construction activities should be covered under the safety management plan.)

17.2.6 The Railways and Other Guided Transport Systems (Safety) Regulations 2006

The Edinburgh Tram Network shall be delivered in accordance with The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS).

The Infraco shall design and execute the Infraco Works using safety management and procedures to demonstrate that the Edinburgh Tram Network is safe to introduce into service as defined by the Safety Management System under ROGS. This shall also include the development of the Case for Safety to the satisfaction of the Competent Person and the Project Safety Certification Committee. These aspects form an integral part of the design of the Edinburgh Tram Network and are detailed in this section of these Employer's Requirements.

The Infraco shall undertake all Infraco Works in accordance with the written safety verification scheme requirements prepared by **tie**. Safety verification will be undertaken by **tie**. The Competent Person shall assure the process and its outputs. The Infraco shall allow **tie** and the Competent Person access to undertake safety verification activities, such as system safety audits. The Infraco shall develop a safety management system for when the Edinburgh Tram Network is operational which complies with the requirements of ROGS and other relevant legislation to the satisfaction of the Competent Person and **tie/TEL**.

Whilst there is no requirement in ROGS for projects such as the ETN to be notified to or given prior consent or approval by HMRI, HMRI have been involved in the development of the Edinburgh Tram

Network scheme to date and it is **tie**'s intention to continue this involvement. The Infraco shall assist **tie** in any liaison with the HMRI when requested to do so.

17.2.7 Health and Safety Management

The health and safety responsibilities and CDM/ROGs application are defined in the matrix below for each phase of the project.

Table 41 – Matrix showing Contractual Responsibilities – Health & Safety Management

		Infraco					Revenue services	
RESPONSIBILITIES	**MUDFA**	**Pre Novation Design**	**Post Novation Design**	**Construction / Installation**	**Commissioning / Test running ***	**Shadow running**	**Operation**	**Maintenance.**
tie Ltd.	CDM Client.	CDM Client. **ROGS duty holder.**	CDM Client. **ROGS duty holder.**	CDM Client. **ROGS duty holder.**	CDM Client. **ROGS duty holder. ****	- **ROGS duty holder. ****	-	-
Transdev.		Adviser to **tie**.	Adviser to **tie**.	Adviser to **tie**.	Driver training. Inputting into hazard log.	Operator of tram system. Inputting into hazard log.	Operator of tram system.	-
SDS	Designer.	Designer. Managing hazard log.	Designer. Inputting into hazard log.	-	-	-	-	-
MUDFA contractor.	Principal contractor	-	-	-	-	-	-	-
Infraco.	-	-	Design manager. Managing hazard log.	Principal contractor. Managing hazard log.	Principal contractor. Managing hazard log.	-	-	Contractor/Principal contractor. Maintainer–infrastructure.
Tramco.	-	-	Designer. Inputting into hazard log.	Contractor. Inputting into hazard log.	Contractor. Inputting into hazard log.	-	-	Maintainer–vehicles.
TEL.	-	-	-	-	-	-	**ROGS duty holder.**	CDM Client.
CEC.	-	-	-	-	-	-	-	-Maintainer - roads
REGULATIONS								
CDM Regs	Yes – Construction Phase Plan, Residual Risk Register. Health & safety file initiated.	Yes – Pre-construction information, Residual Risk Register. Health & safety file progressed.	Yes – Pre-construction information, Residual Risk Register. Health & safety file progressed.	Yes – Construction Phase Plan. Health & safety file progressed.	Yes – Construction Phase Plan. Health & safety file completed & handed over to TEL.	No – no longer construction work.	No.	Yes – where maintenance works are "construction works". (Notifiable works last more than 30 days or 500 man days).
ROGS Regs	No.	Yes – Safety Verification Scheme. Appointment of Independent Competent	Yes – Safety Verification Scheme. NoNOs from ICP.	Yes – Safety Verification Scheme. NoNOs from ICP.	Yes – Safety Verification Scheme + Safety Management System. NoNOs from ICP.	Yes – Safety Verification Scheme + Safety Management System. Final NoNO from ICP.	Yes – Safety Management System.	Yes – Safety Management System.

		Person (ICP).						
SAFETY MANAGEMENT SYSTEMS								
Safety Management Systems	AMIS SMS – construction. SDS SMS – design.	**tie** SMS – safety verification. SDS SMS - design.	**tie** SMS – safety verification. Infraco SMS – design management. SDS SMS – design. Tramco SMS – design.	**tie** SMS – safety verification. Infraco SMS – construction/installation Tramco SMS – manufacture/installation.	**tie** SMS – safety verification. Infraco SMS – installation/operation. Tramco SMS – installation. Transdev SMS – operation.	**tie** SMS – safety verification. Infraco SMS - operation. Transdev SMS – operation.	TEL SMS. Transdev SMS - operation.	TEL SMS. Infraco SMS – maintenance. Tramco SMS – maintenance.

* The project moves into this stage in phases once key milestones have been achieved e.g. the energisation of the OLE within the depot.

** This is flexible. TEL may assume the role of **ROGS duty holder** during this phase.

KEY

Responsibilities under the CDM Regulations

Responsibilities under the ROGS Regulations

17.3 Environmental Management

17.3.1 Environmental Management System

The Infraco shall adopt an environmental management system consisting of the implementation and use of those processes and procedures referenced in ISO 14001.

Documentation developed to meet the requirements of the environmental management system shall be submitted in accordance with the Review Procedure.

The Infraco shall ensure that the management system for the Infraco Works is developed to ensure that it aligns with the requirements of the Tram Project Environmental & Sustainability Policy Statement (DEL.HSQE.101).

17.3.2 Environmental and Sustainability Action Plan

The Infraco shall submit and maintain an Environmental & Sustainability Action Plan (EAP). This shall be based on SDS Environmental Mangement Plan and shall cover environmental issues for the duration of the Infraco Works, including design and construction stages. It shall describe the management process, procedures and interface requirements associated with meeting the Infraco's environmental responsibilities.

It shall then develop in detail the potential impacts on environmental resource, mitigation measures and responsibilities associated with all stages of the Infraco Works.

The EAP shall be prepared using the following sources of information.

- the Environmental Statements;
- The Design Manual;
- The Noise and Vibration Policy as contained within the Code of Maintenance Practice;
- The Code of Construction Practice;
- The Landscape and Habitat Management Plan for the Roseburn Corridor;
- The Badger Mitigation Plan for the Roseburn Corridor;
- Agreements made with statutory bodies; and

- Parliamentary agreements.

The EAP shall be amended by the Infraco to reflect any changes to the tramway design or engineering solutions and the results of surveys..

17.3.3 Construction Environmental Management Plan (CEMP)

The Infraco shall prepare a construction environmental management plan (CEMP) including method statements, as necessary, to convey the required level of information during the construction stage of the Infraco Works.

Site specific EMPs shall be prepared for each geographical section and intermediate geographical section as appropriate. These plans shall be produced by the Infraco prior to any works commencing on Site and must be reviewed by **tie** before work starts. The site specific EMPs must separately address the following sites and/or issues:

- Site accommodation, compound and offices and storage areas;
- Site clearance;
- Geographical sections and intermediate geographical sections of the Tram route;
- The Depot;
- Structures, such as sub-stations not already included in the above; and
- Road, cycleway and footway works, including drainage, signage and lighting.
- A series of site specific and topic related EMPs shall also be produced by the Infraco that shall address all the environmental issues, landscape, ecology etc. These shall cover the general control and protection measures for each topic as it relates to each of the site specific sections in the plan area. The Infraco shall have responsibility for the production, content and implementation of the Site Specific EMPs.
- The Infraco shall submit to **tie** the site specific EMPs 8 weeks prior to the commencement of the relevant section of the Infraco Works.

- **tie** shall comment on the plan(s) submitted, in accordance with the Review Procedure and agree the final plans prior to the commencement of any work on the relevant section or activity.

17.3.4 Requirement of Site Specific EMPs

The Infraco shall develop the site specific EMPs to include the following details:

- **A description of the works to be undertaken**
- List of all separate work activities that fall within the scope of the works.
- **A detailed programme of the construction activities**
- Proposed dates and sequence of the works (showing how environmental impacts are affected by potential changes to the Programme);
- Details of proposed normal working hours and intended start up and close down times; and
- Outline of any works which may require construction activities outside of normal working hours.
- **Location of the works, including a site plan, showing construction site boundaries**
- This shall show the position of plant and position of any sensitive receptors e.g. watercourses, local residents, etc.
- **Personnel access routes/points**
- Location plan of each access route/point;
- List of activities for which each access point is to be used
- **Vehicular access routes/points**
- Location plan of each access route/point;
- List of activities for which each access point is to be used
- **Equipment and plant to be used (including type, make and expected number)**
- **Method of delivery/removal of materials and plant**

- **Details of proposed site accommodation**
- **Details of how public right of way and access to property will be retained and managed**
- A list of Consents/permissions obtained or to be obtained for the works
- **External Consultation**
- A list of those notified of the works and the date notified
- A list of proposed notifications and dates
- **Significant environmental impacts relating to each activity.**
- (This should draw upon the definitions of significant impacts used in the Environmental Statement).
- **Significant environmental risks relating to each activity.**
- **Receptors which are likely to be affected by the works.**
- **On-site mitigating measures for each impact and risk.**

These will be transferred onto site management statements which will briefly state the key risks and mitigating measures which have been agreed. The site management statement will be attached to the construction method statement for the works to ensure that it is brought to the attention of all site staff. The Site Management Statement will be briefed out to all site based staff as a toolbox talk.

- **Monitoring proposals that shall include:**
- The receptors for which monitoring will be undertaken;
- Frequency of monitoring;
- Factors against which the monitoring results will be analysed;
- Threshold levels;

- Timescales within which results will be analysed;
- List of organisations/individuals to whom results will be distributed; and
- Actions to be taken in the event that thresholds are breached.

17.3.5 Permits to Work

Prior to being granted access to commence construction works, the Infraco shall complete and submit to **tie** for its autorisation, the required Permits to Work.

Further details of the Permits to Work process are included within the Code of Construction Practice, the Project Safety & Quality Interface Document and Section 39 of the Employer's Requirements.

18 Cabling and Ducting

This Section sets out the requirements with the Infraco must comply with in relation to cabling and ducting.

18.1 Cabling

All cables must be mechanically protected such that they cannot be accessed by the public without using tools to remove separate mechanical protection.

Cables and associated supports must be rated such that neither the cables nor the supports degrade due to thermal or mechanical stress during their design life.

Cables must operate satisfactorily under all foreseeable fault, and loading conditions.

Cables must operate satisfactorily under all foreseeable environmental conditions. This must include the effects of sunlight, dampness, temperature, and exposure to water. Cables must be selected to recognise risk that they may be submerged in water.

Cables must be designed to last for the durations that are set out in Table 22 - Equipment Design Life.

Cable terminations must not impose any stress on the cables, and sufficient spare length must be provided in all cables to permit foreseeable maintenance and repair work.

Cables must be identified in accordance with requirements agreed with **tie**.

Where joints in cables are required, and cannot be reasonably avoided, they must be located in draw pits and identified on the as-built drawings. Joints in draw pits must be both suitably supported and accessible. This may require draw pits that are larger than normal size to be used to contain cable joints.

All cables in all draw pits will be identified with a suitable label.

18.2 Ducts

Spare ducts shall be provided on all duct routes as follows:

Number of ducts in cable route	Minimum number of spare (unused) ducts	Minimum size of spare duct
2	0	N/A
3 or more	20% of the number of ducts	Maximum size of used ducts

Table 42 – Ducts

All ducts, and all individual ducts in banks of ducts, must contain draw ropes of sufficient mechanical integrity to enable additional new or replacement cables to be pulled through the duct.

All ducts, including ducts that are installed but not used for cables, must be free from debris and free from obstructions.

All installed ducts, including ducts that are installed but not used for cables, must not be crushed. All internal dimensions of the duct as built must never less than 90% of duct's nominal dimensions.

Ducts must be provided with drainage that is integrated with the specification of the cables used such that there is no foreseeable risk of degradation from any water that may be in the ducting system.

Ducts must be of sufficient mechanical integrity to protect both themselves and the cables contained in the ducts from all foreseeable damage, degradation and vandalism.

The bending radii of ducts must be integrated with the requirements of the cables to be installed such that the cables can be installed, replaced and terminated without damage.

Ducts must be provided in sufficient number and size to ensure that there is no degradation in the cables due to thermal effects or chafing of cables. It shall be possible to remove and replace any individual cable in the ducting system without the need to remove or significantly disturb any other cables from the system.

Cable ducts shall be installed with appropriate warning arrangement to anyone who may be undertaking excavation work that may damage the ducts. This may be achieved by the installation of plastic warning tape in the ground above the ducts.

Where cables are installed in segregated parts of the tramway, they shall not be installed in cable troughs unless specifically agreed by **tie**. Any proposals for the use of cable troughs must include:

- Locked lids or equivalent to minimise the risk of vandalism and/or theft;
- Where cable troughs form part of the walkway along the tram route, a proven design of locked lids that will eliminate any rocking of the lids must be used; and
- Troughs must be secured against any lateral movement.

For the avoidance of doubt, where cable troughs form part of a structure, the above requirements still apply.

Where ducts are used on the off street tramway, these are preferred to be placed under the walkway with draw pit covers forming part of the walkway.

Any slipping and/or tripping hazards associated with draw pits that are located in a walkway must be eliminated.

Some cables terminate in equipment on ballasted track. These include:

- traction return bonding connected to the rails;
- connections to loops; and
- possibly some connections to some Point Position Indicators.

These cables are to be installed such that the risk of damage to the cables due the activities of track maintenance equipment, vandalism and people walking on the track is minimised.

18.3 Duct Chambers and Draw pits

Duct chambers must be structurally sound and built to the requirements of the cabling network as specified in this section 18.

The design of the location of draw pits must such that they can be safely accessed without stopping the operation of the tramway or requiring a road closure, unless specifically agreed by **tie**.

The integration of draw pit covers into the surfacing in the surrounding area shall be included in the design. This will include the orientation and the surfacing of the cover.

Draw pit covers will be of a family, such that the number of different keys needed to lift draw pit covers is minimised.

The Infraco shall provide sufficient draw pit keys and access equipment to adequately operate and maintain the system.

18.4 Cable separation

Sufficient separation between cables must be provided in order to:

- ensure that any risk of damage to the insulation of the cables that could cause potential risks of energising other circuits is minimised. All cables carrying +750V dc must not be in physical contact with any other cables unless the cables are permanently bonded together,
- ensure that electromagnetic compatibility between cables is provided, and
- permit access to cables and any essential cable joints for maintenance purposes

18.5 Other requirements

Where cables are installed inside conducting items that are not earthed, such as OLE poles, the insulation and the mechanical protection of the cables must be sufficient to mitigate any associated hazards.

As built drawings will accurately identify:

- the cables that are contained in each duct, to aid cable location and fault finding; and
- the location of all draw pits and all duct runs.

19 Cabinets

This Section 19 sets out the requirements which the Infraco must comply with in relation to cabinets and the environmental conditions as defined in Section 3.6.4.

Cabinets, cubicles and equipment housings will be required in the following instances as a minimum:

- To house communications equipments at the Tramstops;
- To house SCADA equipment within substations;
- To house radio equipment at base stations; and
- To house points control, points indicator control, points heaters and Tram control equipment at rail junctions.

All cabinets that are located externally shall meet the following requirements:

- They shall provide an ingress protection rating of 55 (BS EN 60529 Specification for Degrees of Protection Provided by Enclosures) as a minimum;
- They shall be coated with materials that inhibit graffiti and assist with its removal;
- Equipment housing, enclosures, cable routes etc. shall allow for an increase of temperature caused by the equipment, whereby the housing itself shall not cause any harm to the functionality of the equipment or the temperature reached at the surface of the enclosure
- All cabinets shall provide an entry for cabling, with no cables visible or accessible without opening the cabinet;
- All cabinets are provided with a robust lock, satisfying the **tie** lock suiting requirements set out in these Employer's Requirements;
- The cabinet doors shall be equipped with a multi point locking mechanism that complies with the Edinburgh Tram Network security locking policy;
- In the event of the equipment cabinets being opened, an alarm shall be transmitted to the Supervisory Control and Data Acquisition system so that staff in the Control Centre can be alerted;

- The equipment contained within the cabinets shall be of a modular construction that shall allow rapid replacement should that become necessary;

- When the cabinet doors are open, they do not obstruct tramway operation, road vehicles, passengers or other members of the public; and

- Work can be carried out safely on the contents without affecting tramway operations or requiring temporary traffic management.

In addition, those cabinets located at Tramstops shall be designed to integrate visually with the Tramstop furniture. The external colour and appearance of the cabinets, shall match and complement the architectural finishes and materials of the structures of the Tramstop where the cabinet is to be mounted.

20 NOT USED

21 Utilities / MUDFA

Where Infraco is instructed by a **tie** Change to carry out utilities diversions, relocation or protective works to deliver the Edinburgh Tram Network the following shall apply.

The philosophy adopted for the MUDFA Works is to clear the ground of utilities such that the track can be installed in ground that has no live utilities within it. The MUDFA Works considers utilities that lie below the area of land that is described by the tram's DKE. It is assumed that the width of ground needed for the construction of the track slab is no more than the width of the tram's DKE.

Where utilities lie below 1200mm from the surface, they are left in-situ.

Where utilities occupy ground that is within 600mm of the existing road surface, they are removed and replaced.

Where utilities lie between these two limits, they are considered on a case by case basis. Generally, utilities that cross the tramway are protected (sleeved for example) and left in position. Where utilities run along the tramway, they are diverted and placed outside the tram's DKE.

Special arrangements are made for major utilities such as the HV cables and the service tunnel along Leith Walk.

Schedule 46 details specific locations and utility types which shall be either left in situ or be diverted by Infraco as a **tie** Change. Where utilities' scope decisions and responsibilities fall outside this schedule Infraco and tie shall jointly agree the most appropriate party (either MUDFA or Infraco) to undertake the diversion works.

The generic allocation of responsibility for relocating utilities is set out in Section 21 of these Employers Requirements. Infraco will only be responsible for relocating such utilities after receiving a **tie** Notice of Change instructing such relocation.

Tie will obtain designs for all utility diversion works and issue them to Infraco.

Infraco shall deliver the utilities diversion works instructed in accordance with designs provided.

Infraco shall ensure that the Programme as amended in accordance with Clause 80 contains adequate allowance for these utility diversion works.

Infraco responsibilities in respect of utilities diversions instructed as a **tie Change** shall also include:

1. Where diversion works are to be delivered by Statutory Utilities (SUs) supporting tie in the development and agreement of utilities diversions works package agreements with the SUCs. Such support mean supporting tie and providing all necessary information to enable tie to negotiate contracts for diversion works with SUCs, assembling and checking work package agreements, defining detailed scope, providing constructability advice and agreeing programme of works with SUC's and co coordinating such so that impact on programme for delivery of the Infraco Works is minimised, agreeing construction and delivery methodologies with SUCs, finalising the scope of Utilities diversion works and the boundary of responsibility between work to be delivered by Infraco and that of SUCs.
2. Providing all enabling, traffic management requirements, ancillary building, civil engineering, electrical and mechanical works in connection and all attendances required to enable SUCs to carry out and complete their works.
3. Coordinate the works of SUCs with each other and with that of the Infraco.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
Water	Connections	Connections to new mains will be required before old main can be decommissioned. This is part of the advance diversion scope of MUDFA.	If any connections are missed by MUDFA and subsequently identified by Infraco, they must be carried out at the time of Infraco. However, this risk is small as missed connections would usually lead to immediate customer complaints when the old service was decommissioned.	Note that this is not intended to be the primary mitigation of this risk: site investigation and planning should ensure that connections are identified and dealt with by MUDFA.
	Diversion (other than 800mm at Depot)	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out by (or at the same time as) Infraco. Extensive site investigation has been carried out to reduce this risk, but it cannot practically be eliminated.	
	Diversion of 800mm at Gogar Depot.	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out by (or at the same time as) Infraco.	There is little, if any, risk of encountering any other water service in the Gogar Depot area that has not been dealt with by MUDFA.
	External Protection	Part of the advance diversion scope of MUDFA.		Long longitudinal protection would not be acceptable for water mains

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	Insurance Pipes	Part of the advance diversion scope of MUDFA.		

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
Waste water	Diversions and manhole construction	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, or where the designs of works have been unable to be sufficiently progressed prior to MUDFA vacating the Work Sections, the diversions must be carried out by (or at the same time as) Infraco. Extensive site investigation has been / will be carried out to reduce this risk, but it cannot practically be eliminated.	Sewer design and agreement with SUC (Scottish Water) regarding treatment required to existing sewers is not currently complete and the programmed completion of the telecoms cabling works is such that existing services cannot be abandoned to allow the manhole and sewer construction works to be undertaken for significant periods of time after all the ducts and other utility diversions are complete. This may result in sewer diversion works to be undertaken after all other MUDFA programmed works in Work Sections are complete. Works may be undertaken by either MUDFA or Infraco.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	Internal Refurbishment	Part of the advance diversion scope of MUDFA.		
	External protection	Where crossing or short longitudinal - part of the advance diversion scope of MUDFA.	Where long longitudinal: would be relatively easy to incorporate into Infraco - for a section, excavation would be deeper with (e.g.) concrete placed - this would avoid double excavation by MUDFA and Infraco.	
	Connections to new sewers	Connections to new mains will be required before old main can be decommissioned. This is part of the advance diversion scope of MUDFA.	If any connections are missed by MUDFA and subsequently identified by Infraco, they must be carried out at the time of Infraco. However, this risk is small as missed connections would usually lead to immediate customer complaints or evidence of flooding when the old service was decommissioned.	This is not intended to be the primary mitigation of this risk: site investigation and planning should ensure that connections are identified and dealt with by MUDFA.
	Existing connections	An existing connection to an existing (and left in place) sewer may have to be repositioned. This would be part of the advance diversion scope of MUDFA.	A connection may not be identified at the time of MUDFA, and uncovered by Infraco. The connection must be repositioned at the time of Infraco.	

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	Manhole access level change (eg raise height of access cover)	St Andrews Square and North & South St Davids Street will be undertaken by MUDFA as part of the road realignment and construction works required to accommodate the proposed Traffic Regulation Order (TRO).	Manhole access level changes must be adjusted at the time of Infraco. Manhole lids to be flush with the finished road surface.	It will also mean that new manholes installed by MUDFA may have to be modified by Infraco.
	New Gully connections	St Andrews Square and North & South St Davids Street will be undertaken by MUDFA as part of the road realignment and construction works required to accommodate the proposed Traffic Regulation Order (TRO).	Infraco shall install road gulleys. These will have to be installed at the same time as the road construction is carried out.	If a new road gully is required at a place where the road level is not to be changed, MUDFA could install it. However this situation is unlikely, and for consistency and avoidance of confusion Infraco should probably do all of this.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
Telecoms	Protect	Where crossing or short longitudinal - part of the advance diversion scope of MUDFA. Where long longitudinal: would be part of the advance diversion scope of MUDFA allowing Infraco a "clear run". However would necessitate double - excavation of a long length of the tram foundation area.		Where long longitudinal: would be relatively easy to incorporate into Infraco - for a section, excavation would be deeper with (e.g.) concrete placed - this would avoid double excavation by MUDFA and Infraco*.
	Slew/Lower	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out as Infraco Works. Extensive site investigation has been carried out to reduce this risk, but it cannot practically be eliminated.	

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	Divert (inc manhole construction)	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out as Infraco Works. Extensive site investigation has been carried out to reduce this risk, but it cannot practically be eliminated.	
	Insurance Ducts	Part of the advance diversion scope of MUDFA.		
	Manhole access level change (eg raise height of access cover)	St Andrews Square and North & South St Davids Street will be undertaken by MUDFA as part of the road realignment and construction works required to accommodate the proposed Traffic Regulation Order (TRO).	Manhole access level changes must be adjusted at the time of Infraco. Manhole lids to be flush with the finished road surface.	This will also mean that new manholes installed by MUDFA may have to be modified by Infraco.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
Gas	Divert	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out as Infraco Works. Extensive site investigation has been carried out to reduce this risk, but it cannot practically be eliminated.	
	Protect	Part of the advance diversion scope of MUDFA.		Long longitudinal protection would not be acceptable for gas mains
	Insurance Pipes	Part of the advance diversion scope of MUDFA.		
	Connections	Connections to new mains will be required before old main can be decommissioned. This is part of the primary scope of MUDFA.	If any connections are missed by MUDFA and subsequently identified by Infraco, they must be carried out as part of Infraco Works. However, this risk is small as missed connections would usually lead to immediate customer complaints when the old service was decommissioned.	This is not intended to be the primary mitigation of this risk: site investigation and planning should ensure that connections are identified and dealt with by MUDFA.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
Electricity	Divert	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out as part of Infraco Works. Extensive site investigation has been / will be carried out to reduce this risk, but it cannot practically be eliminated.	
	Protect	Where crossing or short longitudinal - part of the advance diversion scope of MUDFA.	Where long longitudinal: would be relatively easy to incorporate into Infraco - for a section, excavation would be deeper with (e.g.) concrete placed - this would avoid double excavation by MUDFA and Infraco.	Where long longitudinal: would be part of the advance diversion scope of MUDFA allowing Infraco a "clear run". However would necessitate double - excavation of a long length of the tram foundation area.
	Insurance ducts	Part of the advance diversion scope of MUDFA.		

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	Domestic + Business connections	Connections to new cables will be required before old cable can be decommissioned. This is part of the primary scope of MUDFA.	If any connections are missed by MUDFA and subsequently identified by Infraco, they must be carried out as part of Infraco Works. However, this risk is small as missed connections would usually lead to immediate customer complaints when the old service was decommissioned.	This is not intended to be the primary mitigation of this risk: site investigation and planning should ensure that connections are identified and dealt with by MUDFA.
Street Furniture (eg street lighting, traffic lights, lighted bollards, bus stops, etc)	Existing power & telecoms Divert	St Andrews Square and North & South St Davids Street will be undertaken by MUDFA as part of the road realignment and construction works required to accommodate the proposed Traffic Regulation Order (TRO).	All existing power and telecoms diversions required must be carried out by (or at the same time as) Infraco. Depth of cover and the final road infrastructure alignment and construction to be finalised by and carried out by Infraco.	Extensive site investigation has been / will be carried out to reduce this risk, but it cannot practically be eliminated.
	Protect	St Andrews Square and North & South St Davids Street will be undertaken by MUDFA as part of the road realignment and construction works required to accommodate the proposed Traffic Regulation Order (TRO).	All existing power and telecoms diversions required must be carried out by (or at the same time as) Infraco. Depth of cover and the final road infrastructure alignment and construction to be finalised by and carried out by Infraco.	.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	New connections	For future street furniture, appropriate ducting would be installed by MUDFA where (1) design details are available sufficiently in advance, (2) the road/tram alignment is formally finalised and (3) the future ground levels are such that new ducts can be buried beneath the existing ground level, without either excessively deep excavation or inadequate (or no) cover.	Where design is not available in time for MUDFA, or where future road levels do not facilitate advance installation, duct installation work must be carried out as part of Infraco Works.	
Other	SP transmission cables	If the design agreed with Scottish Power requires external protection beyond that provided by the track slab in that area, and if the design is available in good time, then MUDFA could undertake these works if required.	Infrastructure design will have to take account of the specific requirements to avoid diverting these cables. This will include special track slab construction (for Leith Walk) and careful bridge abutment/pier design (for 3 other areas). Should this design be impossible, the diversion work would be carried out by Scottish Power directly.	This would not be possible before 2008 (at the time of writing; lead time requires a notification before October in one year for work in the summer of the following year). Consultation between utilities and infrastructure design teams should facilitate this design.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	BT cables at A8 by Gogar		Infrastructure designs shall take account of the specific requirements to avoid diverting these cables.	This may include a deeper excavation for the tunnel under the A8 than had previously been envisaged, plus provision of temporary support for the cables during the construction of the tunnel. Should this design be impossible, the diversion work would be carried out under MUDFA terms and conditions. Consultation between utilities and infrastructure design teams should facilitate this design. Trial holes have been undertaken on behalf of BT to confirm the depth of the existing cables – the initial, informal, impression from BT is the cables are higher than anticipated which indicates the cables may not require diversion but incorporation into the infrastructure design.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	BT cables at Roseburn street		Infrastructure design will have to take account of the specific requirements to accommodate these cables. Infraco shall consider the design solution for cabling installation as part of the Infraco Works.	This will include careful bridge abutment/pier design. The cabling element of this work is to be carried out by BT following diversion works, and may impact on the Infraco programme. Consultation between utilities and infrastructure design teams should facilitate this design. Note: a design solution for the cables as part of the Infraco works has been agreed with BT.
	Utility work dependent on prior structures work, eg cables in bridge decks		Will require structures work to be completed before utility work can be started. Infraco shall complete any and all utility diversions, utility protections works etc. including design (by SDS) following (or at the same time as) the Structures are completed.	

Table 42a – Table showing the responsibility for diversion/protection work on the utilities for the Edinburgh Tram project

22 Locks and Key Suiting

22.1 General

The Edinburgh Tram Network will have many locks installed to provide a suitable level of secure access to equipment and rooms. The locks and keys used shall be integrated into appropriate key suiting families. The philosophy is to strike an appropriate balance between the following two extremes:

- A single fully integrated key suiting arrangement for the whole of the Edinburgh Tram Network;
- No suiting, with every lock needing a different key;

The Infraco shall propose key suiting arrangements that are subject to approval by **tie**. In developing the proposals, Infraco shall consider:

- The need for staff to be able to undertake their duties without having to carry large numbers of keys with then to access the places that their duties require;
- Future expansion of the Edinburgh Tram Network;
- Changes to the key suiting that are likely to be needed as the system matures, and any key suiting must bear be sufficiently flexible to enable such changes to be made; and
- The ongoing costs of providing keys to staff during the life of the Edinburgh Tram Network;

22.2 Key Suiting System

A key suiting system that is based by the Infraco on the following is likely to be acceptable to **tie**.

A stand alone suite of keys, hierarchically structured to provide access to equipment such as:

The suiting documentation will list all locks to be installed on the Edinburgh Tram Network, including any locks that are not proposed to be included in the suites. There should be 4 completely separate suiting systems, as set out below:

22.2.1 Tram

- The Infraco shall procure all keys that are required for operating each tram. It is anticipated that each tram driver will need to carry no more than two keys for each Tram in order to undertake their duties. One key would permit access onto the tram, into the cab, and enable the Tram to be driven. The second key would open any panels that the driver may need to access and may also provide for such tasks as locking doors out of use;

- A different key would permit staff such as cleaners to access the inside of the Tram and the Tram cabs, but would not enable the Tram to be driven;

- Tram Maintenance staff may also need additional keys to access sensitive or potentially dangerous equipment.

22.2.2 Substations and Power

A stand alone suite of keys, hierarchically structured to provide access to equipment such as:

- Isolator cabinets, to check the position of isolators and to fit isolation padlocks;

- Substation LV areas;

- Substation HV areas in substations;

- Isolators, to permit hand operation;

- Equipment within the substations may also have a multitude of locks that may be suited, depending on the Infraco maintenance philosophy.

Separate individual locks with a single key will be used for securing isolations. There will be no suiting whatsoever for these.

22.2.3 Depot and buildings

A stand alone suite of keys, hierarchically structured to provide access at doors in the Depot building and other buildings in the Depot area such as the Depot plant building. A low level key in this structure could be used for any trackside gates that are required along the alignment.

22.2.4 Signalling and Communication Equipment

A stand alone suite of keys, hierarchically structured, to provide access to all trackside cabinets, including:

- Points control;
- Points heating;
- Signalling and;
- Tramstop.

Isolator cabinets are substations are excluded from this suite because they are included in the substations and power suite of keys.

23 Testing and Commissioning

23.1 Systems Acceptance

23.1.1 Scope

This section of the Employer's Requirements is to define the systems acceptance requirements applicable to the Edinburgh Tram Network (ETN) which the Infraco must comply with.

23.1.2 General Description and Principles

The process for acceptance of the Edinburgh Tram Network set out in this document is designed to ensure that the ETN is delivered in an acceptably safe, compliant, and efficient manner. The objectives of the process are to ensure that system performance, integrity, reliability, availability, and safety are rigorously tested and that throughout all stages of the delivery process the many sub-systems and the overall System are validated and verified against **tie**'s requirements and applicable standards. The detailed sequence and scope of infrastructure testing and commissioning prior to System Acceptance Testing shall be programmed out and proposed by the Infraco.

The acceptance process is heavily dependent on the delivery of the planned service timetables, the Operational Timetable (see 2.8 of these Employer's Requirements) and the Enhanced Timetable (see 2.8 of these Employer's Requirements). Details regarding the tram service frequency, number of trams and the phased opening of the Edinburgh Tram Network are contained in 2.8 of these Employer's Requirements.

Pre-system acceptance testing includes both Factory Acceptance Tests (FATs), Site Acceptance Tests (SATs), Sub-system Integration Tests (SITs) and System Commissioning Tests (SCTs).

Once a Section of the ETN is physically completed and the System Integration Tests are satisfactorily completed then the formal acceptance process requires the Infraco to carry out and pass a series of System Acceptance Tests (SATS) in order to achieve Sectional Completion. These tests are:

Table 43 - Description of the Acceptance Tests

Test	Test Name	Test Description	Programme
T1	Post Commissioning Test	The test shall demonstrate and prove that each Section of the ETN in sequence is able to perform in an acceptably safe manner and deliver the required run times. Please refer to relevant section below. This is the gateway test to driver training.	Post Commissioning Test will immediately follow the successful commissioning of the nominated section and is a requirement for progressing into the Driver Training.
T2	Performance Test 1	After Section D has passed Test T1 then this test shall demonstrate and prove that Phase 1a of the ETN is able to perform satisfactorily to move into the three-month Shadow Running period. Please refer to relevant section below. This is the gateway test to shadow running.	Performance Test 1 will immediately preceed the Shadow Running period and is a requirement for progressing to this phase of the programme.
T3	Pre-operations Test	The test shall cover a seven day period during the latter part of the Shadow Running phase of the programme. The Test is the operation of the initial entry into service timetable and includes infrastructure, trams, and operations systems – Please refer to relevant section below.	Pre-operations Test shall immediately precede the Service Commencement Date.
T4	Network Performance Test	The Test shall be carried out over a 28 day period in Passenger Service to establish that the ETN can reliably operate the Operational Timetable – please refer to Please refer to relevant section below.	To be completed within twelve months of the Service Commencement Date.
T5	Network Reliability Test	Reliability Testing of certain sub-systems in Passenger Service – please	To be completed within twelve months of the Service

		refer to Please refer to relevant section below.	Commencement Date.

The Post Commissioning Test (T1), Performance Test 1 (T2) and Pre-operations Test (T3) have to be passed before the Edinburgh Tram Network (or Sections thereof) can open for passenger carrying service and are therefore to be scheduled during the test running and driver training and shadow running phases.

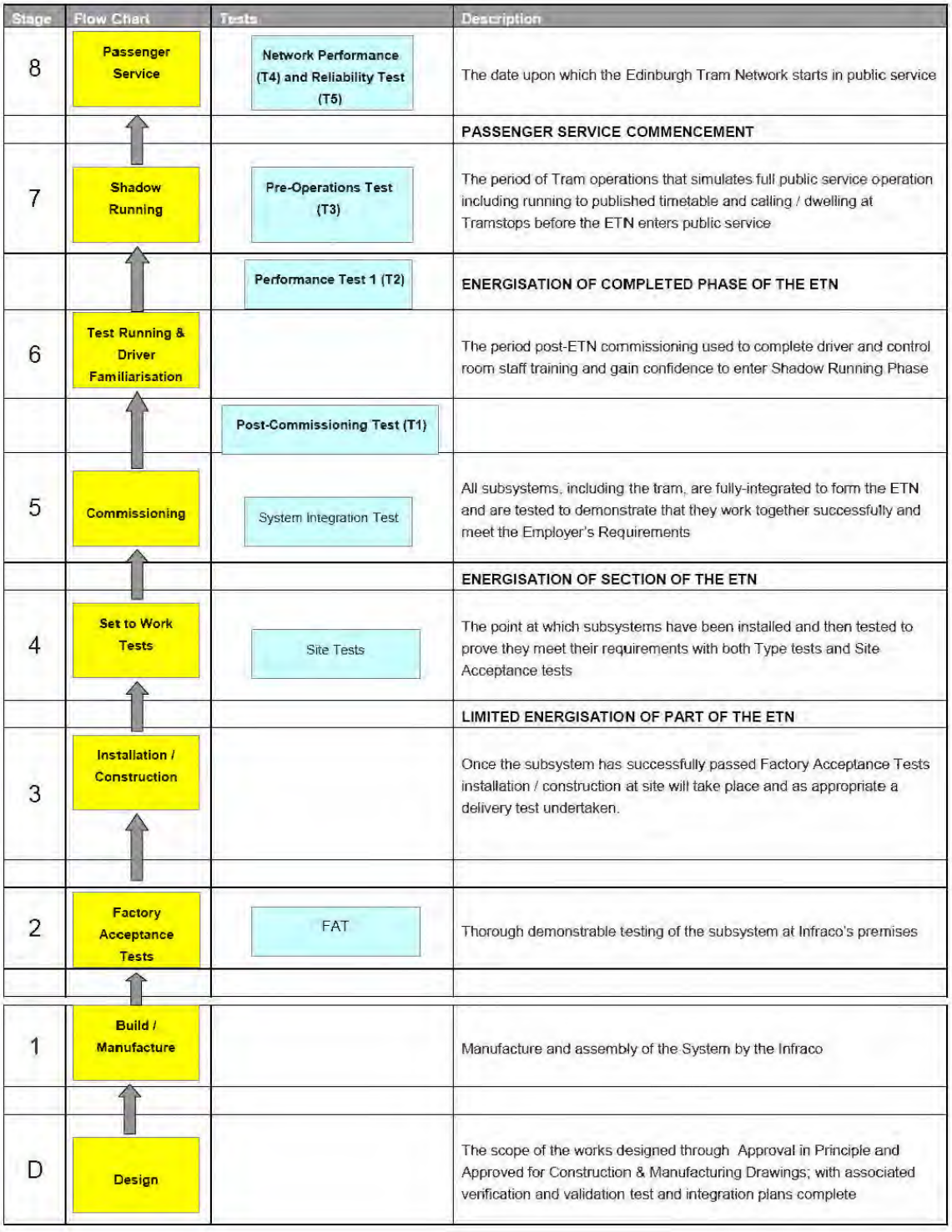
The Post Commissioning Tests (T1) can be undertaken in isolation for each Section.

Performance Test 1 (T2) and the Pre-operations Test (T3) can only be undertaken for that/those section(s) that are to be opened for passenger carrying service immediately thereafter.

The Network Performance (T4) and Network Reliability Test (T5) shall not be carried out until Passenger carrying Service has commenced on the whole Edinburgh Tram Network.

The figure on the next page shows the structure of the tests.

Figure 10 - Edinburgh Tram Network: Extract from System Life Cycle Model



Stage	Flow Chart	Tests	Description
8	Passenger Service	Network Performance (T4) and Reliability Test (T5)	The date upon which the Edinburgh Tram Network starts in public service
			PASSENGER SERVICE COMMENCEMENT
7	Shadow Running	Pre-Operations Test (T3)	The period of Tram operations that simulates full public service operation including running to published timetable and calling / dwelling at Tramstops before the ETN enters public service
		Performance Test 1 (T2)	ENERGISATION OF COMPLETED PHASE OF THE ETN
6	Test Running & Driver Familiarisation		The period post-ETN commissioning used to complete driver and control room staff training and gain confidence to enter Shadow Running Phase
		Post-Commissioning Test (T1)	
5	Commissioning	System Integration Test	All subsystems, including the tram, are fully-integrated to form the ETN and are tested to demonstrate that they work together successfully and meet the Employer's Requirements
			ENERGISATION OF SECTION OF THE ETN
4	Set to Work Tests	Site Tests	The point at which subsystems have been installed and then tested to prove they meet their requirements with both Type tests and Site Acceptance tests
			LIMITED ENERGISATION OF PART OF THE ETN
3	Installation / Construction		Once the subsystem has successfully passed Factory Acceptance Tests installation / construction at site will take place and as appropriate a delivery test undertaken.
2	Factory Acceptance Tests	FAT	Thorough demonstrable testing of the subsystem at Infraco's premises
1	Build / Manufacture		Manufacture and assembly of the System by the Infraco
D	Design		The scope of the works designed through Approval in Principle and Approved for Construction & Manufacturing Drawings; with associated verification and validation test and integration plans complete

23.2 Test Planning

The efficient programming of the tests is vital to the success of the system acceptance test process. Infraco shall, therefore, consider and incorporate, in a coordinated manner at each stage of the implementation of this process, the relevant documentation, the required tram availability and commissioning site availability and staff (from all concerned parties), into the overall Infraco test plan.

The Infraco shall prepare and present the Infraco test plan for review no later than six months after the Effective Date. The Infraco test plan shall describe how the Factory Acceptance Testing, Site Testing and Commissioning, Test Running and Driver Training and Shadow Running, as well as the Network Performance and Network Reliability tests are to be undertaken. The definition of these tests is shown in Figure 10. The programming of the tests shall be in accordance with the Programme as described in Section 39 of these Employer's Requirements. Infraco shall ensure that the PSCC and the Independent Competent Person (or the appropriate approval regime in force) are satisfied that the testing process is robust, comprehensive and satisfies all of the safety issues legislated and mandated for the system.

As the project evolves the Infraco Test Plan/Risk Register/Hazard Log shall be maintained by the Infraco. Infraco shall demonstrate that the issues raised in this log have been mitigated or that the tests have demonstrated the risk has been resolved. It is therefore important that the testing procedures and results are correlated with the Project Risk Register and Hazard Log.

23.3 Pre-Systems Acceptance Testing (before starting the systems acceptance process)

The following should be noted with regards to any tests to be undertaken:

- The individual test documentation / specifications shall be submitted to **tie** for acceptance in accordance with Schedule 14 (Review Procedure) and **tie**'s approval obtained before the test can take place;

- A notice period of at least seven working days shall be given to **tie** prior to any test in order that **tie**, and/or its representative(s), can arrange, at their option, to witness the test. The Operator's staff shall also be invited to witness all testing activities;

- Factory Acceptance Tests (FAT) and Site Acceptance Tests (SAT) test results shall be submitted to **tie** for review;

- **tie** reserves the right to be present during any of the tests to be undertaken; and
- Any such review will be undertaken in accordance with Schedule 14 (Review Procedure).

The following tests shall be carried out in advance of the systems acceptance testing sequence.

23.4 Factory Acceptance Tests (FAT)

23.4.1 Overview

Factory Acceptance Tests consist of a series of progressive activities all of which are undertaken at the sub-system manufacturer's premises.

Initial testing at the component manufacturer's premises of components to be used as part of a sub-system shall be undertaken to verify that the components behave as predicted in the design and satisfies the Employer's Requirements for that component.

Initial testing undertaken at the manufacturer's premises shall be undertaken to verify that the sub-system **or** component behaves as predicted in the design and meets the requirements of the design specification and provides correct functionality.

Once sub-systems or components have been successfully tested they shall be incrementally integrated and tested to verify that the sub-systems behave as predicted in the design and meet the requirements of the design specification and provide correct functionality.

Part of the FATs are first article inspections or type tests. These shall be undertaken on the first production item. This inspection shall verify that the Quality and functionality of the product is acceptable and that the manufacturers' quality control processes and procedures have been implemented.

The test specification(s) shall be produced by Infraco and shall be subject to acceptance in accordance with the Review Procedure. **tie** agreement to all proposed component, sub-system and Factory Acceptance Test specifications is required at least ten business days prior to the date of the component, sub-system and FAT tests identified above and any additional tests required by Infraco.

23.4.2 Pass Criteria

FAT testing shall demonstrate that the individual sub-systems or components and equipment fully meet the requirements and are suitable for the subsequent release from the factory environment, delivery to site and installation.

FATs demonstrate the integration of the modules and sub-systems under factory conditions and their reliable operation under cyclical testing.

As far as applicable the FAT will demonstrate that the sub-system or components has been successfully exercised through simulation, including a demonstration on how the alarm handling manages the worst case alarm flood. This test will be subject to **tie** approval.

23.5 Site Tests

23.5.1 Overview

The objective of site tests is to demonstrate that:

(a) Construction/installation activities have been completed correctly by demonstrating that the design specification and functionality of these Employer's Requirements have been achieved;

(b) The sub-systems, in isolation and before passengers are carried, function and behave at site as designed and tested in the FAT;

(c) The infrastructure sub-systems and the tram will then be integrated with each other insofar as is possible to prove that they collectively function and behave at Site as designed and tested in the FAT; and

(d) The ETN functions and behaves at Site as designed and tested in the FAT. This is defined as system commissioning tests and involves the integration of the infrastructure sub-systems and the tram.

The Independent Competent Person as defined under the ROGS Regulations, other regulatory bodies and the PSCC shall need to be satisfied that the ETN is safe to operate before commencement of system commissioning activities. In order to verify this it shall be necessary for the Infraco to address the issues raised by the Independent Competent Person, PSCC, HMRI (or the appropriate approval regime in force) and Approval Bodies. This may necessitate defining specific tests or incorporating additional Network Performance Test details into the suite of verification commissioning tests. Often the areas of interest to these bodies do not become clear until the majority of issues on the risk register and hazard log have been closed out. Typically these may include items such as:

- pedestrian collision, and the risk of a person being "run over " by a tram;
- gauging and possible entrapment of people in pedestrian areas;
- failed tram recovery;
- control room operational procedures; and
- Recovery from derailments, including rerailing a tram.

It is assumed that **tie** shall procure all electrical power and that a supply is available for the complete on site test procedures until commencement of passenger service.

23.6 Sub-system Integration Tests (SIT)

23.6.1 Overview

Sub-system Integration Tests cover items 23.5.1 of these Employer's Requirements. They shall be undertaken on Sections.

The Infraco shall produce the suite of SIT testing specifications for acceptance by **tie** no later than three months prior to the commencement of the tests through the Review Procedure.

23.6.2 Pass Criteria

The tests are passed when:

- Each sub-system, module or component of the system functions in isolation as designed and does not deviate from FAT results.

- All sub-systems for the given section of tramway are demonstrated to collectively perform in accordance with the operations and performance, and all of these Employer's Requirements.

23.7 System Commissioning and Integration Tests (SCT)

23.7.1 Overview

System Commissioning and Integration Tests shall be undertaken on Sections.

Such activities include the running of tram(s) over section(s) of the Edinburgh Tram Network for which Sub-system Integration Tests have been successfully completed. This will verify that the ETN behaves as predicted and as demonstrated as far as was practical in previous tests.

Infraco shall liaise with both **tie** and the Operator to ensure that sufficient competent operational personnel are available to conduct the required activities, including tram drivers and control room staff.

23.7.2 Pass Criteria

The tests are passed when:

- Each sub-system, module or component of the system functions collectively as designed and do not deviate from FAT results.

All sub-systems for the given section of tramway are demonstrated to collectively perform in accordance with the operations and performance, and all of the Employer's Requirements for a representative number of consecutive passes of a tram in each direction over the given section of the network.

- The integration testing shall include demonstrating that the control room systems and control centre equipment connected to a representative sample of the substation SCADA and other

equipment required for Tramstops can be effectively exercised under a robust simulation of trams progressing around the ETN.

23.8 System Acceptance Activities and System Acceptance Tests

The Infraco shall produce the suite of System Commissioning Test specifications for review by **tie** no later than three months before commencement of the tests. These will be reviewed in accordance with the Review Procedure

23.9 Operations and Maintenance Staff Training

The object of this series of activities is to complete driver, control room and maintenance staff training and provide said staff with greater system familiarisation, demonstrating competence to enter Shadow Running phase upon the passing both of the Post Commissioning and Performance Test 1 (T1 and T2). It therefore forms an integral part of the driver-route familiarisation and training programme.

Staff Training shall achieve the following objectives:

- Enables control room staff to gain experience running a tramway without passenger pressures;
- Allow operational staff to fulfil their duties; and
- Enables the drivers to gain route knowledge and familiarity with the trams and procedures without passenger pressures.

The activities undertaken during this phase are designed to demonstrate confidence in the system performance and system safety by means of passing the post commissioning test and performance test T1, and to gain approval of the Independent Competent Person, PSCC and HMRI. (or the appropriate approval regime in force) to progress to Shadow Running.

Infraco shall liaise with the Operator to undertake careful integration of the operational training programme and testing needs in order to avoid conflicts between operational requirements and the technical validation/verification. These comprise items 4, 5 and 6 of the system commissioning model in Figure 10 – Edinburgh Tram Network –Extract From System Lifecycle Model.

23.10 Shadow Running

The Shadow Running phase will last three months and shall:

- Build and validate the operating pattern up to the Service Commencement Date;
- Carry out any further emergency exercises;
- Demonstrate that the ETN can be safely operated in a routine manner and can recover from emergency situations and emerging perturbations;
- Resolve any issues in respect of operating practices;
- Demonstrate that reliability growth is being monitored and corrective action taken as necessary;
- Allow mileage accumulation to be carried out on the trams;
- Permit infrastructure and tram maintenance staff to familiarise themselves with the procedures, practices and operations regimes and to demonstrate competence development;
- Ensure experience is gained in the gathering and evaluation of the performance monitoring regime data in accordance with Schedule 7 of this Agreement; and
- Allow minor adjustments and tuning of systems.

This comprises item 7 of the system commissioning Model in Figure 10 – Edinburgh Tram Network – Extract From System Lifecycle Model.

The evaluation of Shadow Running is the pre-operations test (T3), the passing of which is the gateway to moving into operation, provided all necessary HMRI (or the appropriate approval regime in force) consents are obtained.

23.11 Final System Acceptance Tests in the Operations and Maintenance Phase

Within twelve months of opening the ETN to passenger service Infraco shall undertake and pass the Network Performance (T4) and Network Reliability Test (T5) (as described in Sections 23.16 and 23.17).

23.12 Emergency Exercises

The Infraco and the Operator shall prepare a plan for review by tie and the Competent Person and following approval of the plan, the Operator shall perform with support from the Infraco a series of exercises with the emergency services and other stakeholders such as Network Rail and BAA. The planning for these exercises will require close liaison by the Infraco and the Operator with the various emergency services. They will be planned to take place in the commissioning period, test running or in the shadow running phase. The nature of the exercises will require detailed planning with Fire, Police, and Ambulance services but are likely to include, as a minimum:

- A simulated road traffic accident at a major road junction;
- A major tram collision/derailment including emergency isolations; and
- A rescue of persons trapped underneath a tram.

23.13 Post Commissioning Test Specification – T1

This sub-section sets out the Performance Test assumptions applicable to all Performance Tests. Should the Infraco be able to prove to the reasonable satisfaction of **tie**'s Representative that any of the Performance Test pass criteria have been exceeded by reason of a Performance exclusion then the test results will be amended to discount the effects of such Performance Test exclusions.

The following exclusions shall apply:

- Operator staff in the Control Room causing or significantly contributing to delays in the operation of the System;
- Failure to provide the correct number of trained Tram Drivers as defined in the DPOFA save where the failure is as a result of the Infraco's own failure in respect of its own obligations in the Agreement;
- Failure of the Tram Drivers to consistently drive the Trams to good industry practice;
- Failure to procure all electrical power that is required for the operation of the System. Periods when the electrical supply is not available will be discounted from the Test and the test period shall be extended by an equivalent period;

- A failure by the Operator to comply with the relevant parts of the Operations and Maintenance Manuals; and

- Damage caused by the Operator.

However, in no event shall any allowances or relief or Network Performance Test exclusion be granted to the Infraco where any delays or failure to pass the Network Performance Test has been caused or contributed by:

(a) Any default, breach or omission by the Infraco or its subcontractors;

(b) Infraco Defects or Snagging;

(c) Equipment undergoing modification or rectification by the Infraco and;

(d) TRAMCO's failure pursuant to the Tram Maintenance Contract.

The burden of proof shall be on the Infraco to show that such failures of the Operator were caused by reasons for which the Infraco was not responsible and for which the Operator should be properly accountable for by reason of the Operator's default, omission, negligence or breach of statutory duty. The Infraco shall develop and agree audit procedures with **tie**, and the Operator in respect of the Network Performance Test exclusions set out in this paragraph.

Dwell times at Tramstops shall be regulated; as set out in the Employer's Requirements.

23.13.1 Overview of Post Commissioning Test

This section describes the requirements for the Post Commissioning Tests, their execution, monitoring and completion. Post Commissioning Tests form part of the requirements for the final system acceptance.

23.13.2 Test Objectives

This Post Commissioning Test seeks to achieve the following objectives:

Prove that the system is capable of controlling an 'off-street' section of Edinburgh Tram Network in an acceptably safe manner; and

Prove that the system is capable of controlling an 'on-street' section of Edinburgh Tram Network in an acceptably safe manner.

23.13.3 Network Performance Test Description

The Post Commissioning Test is a multi part test, with each part of the test required to be passed in sequence before the entirety of the Post Commissioning Test can be passed. It cannot be conducted until Phase 1a of the Edinburgh Tram Network has been successfully commissioned.

23.13.4 Features

The Infraco shall demonstrate that Gogar Depot and Phase 1a of the Edinburgh Tram Network can be monitored and controlled in accordance with the Case for Safety.

Tests shall provide for:

- Demonstration of the run times as defined below.
- Forty end-to-end tram movements on the nominated section of which twenty are in each direction; and
- Trams will dwell at each Tramstop, and will exercise opening and closing of the doors at each Tramstop, the minimum period of doors being fully opened at each Tramstop will be 13 seconds.

The undertaking of the test shall essentially be an operational function led by Infraco but in conjunction with the Operator. Infraco shall manage the preparation for the tests with technical and maintenance support and monitoring by Infraco (along with representatives from **tie)**.

For the demonstration of run time, the following conditions shall apply:

- Targets of the run time demonstrations shall be developed in accordance with Section 2.12 of the Employers Requirements and agreed between the parties from the agreed maximum journey times and associated assumptions detailed in Section 2.11 of the Employers Requirements during the design phase, as further details of tram performance and traffic lights are available;
- For avoiding of influences due to public traffic, run time demonstrations shall take place during night times only;
- tie will be responsible for the communication with local authorities like CEC, UTC or police;
- run time demonstration to be performed in both directions and shall include the following two demonstrations:
  - run allowing tram priority at each traffic junction along the route
  - run following the regulations and phasing of traffic lights under regular conditions
- Sufficient runs shall be carried out in both directions to provide a level of confidence that the target runtimes have been achieved as agreed in accordance with Section 2.12 of the Employers Requirements.
- Infraco shall undertake and pass the Post Commissioning Test (T1) before proceeding to the Performance Test 1 (T2).

tie shall be given thirty working days advance notice of the finalisation of the Post Commissioning Test plan and seven working days written notice of the Test commencement date.

23.13.5 Pass Criteria

Subject to the exclusions defined in23.13 above, the following shall define the pass criteria for the T1 test.

- All test results from previous tram and system and sub-system tests are to be available and signed off as accepted by **tie**, including all the closed out Snagging Rectification Certificates.

- The test shall have been successfully completed when:

  - At least 95% of the end-to-end tram movements are within the agreed target runtime; and

  - Acceptance of the Case for Safety and test results by the Independent Competent Person and where appropriate Her Majesty's Railway Inspectorate (or the appropriate approval regime in force) and approval or "No Objection to Proceed" respectively for full driver training has been obtained.

23.13.6 Monitoring and Reporting of Test Performance

Appropriate levels of observation by Infraco shall be conducted to satisfy **tie** that the auto-generation of reports from the systems is accurate.

23.14 Performance Test 1 Specification – T2

23.14.1 Overview

This section describes the requirements of Performance Test 1 and the proposals for its execution monitoring and completion. Performance Test 1 forms part of the requirements for the final System Acceptance.

23.14.2 Test Objectives

Performance Test 1 seeks to achieve the following objectives:

- Demonstrate that the Edinburgh Tram Network (or sections thereof) can be operated in an acceptably safe manner;

- Demonstrate that the completed Operator training programme has achieved an adequate competency to proceed in Shadow Running; and

- Demonstrate the mobilisation and competency of the maintenance teams provided by the Infraco.

23.14.3 Network Performance Test Description

Performance Test 1 builds upon Post Commissioning Test and cannot be undertaken until Post Commissioning Test has been passed.

23.14.4 Features

The Infraco shall demonstrate that the Edinburgh Tram Network can start Shadow Running and can be monitored and controlled in accordance with the Case for Safety.

Performance Test 1 shall provide for:

- Operation from 07:00 to 20:00 hrs on three consecutive days (none of which are Saturday, Sunday or Bank Holidays);
- The System will run to the Operational Timetable with headways extended by no more than 50%. For the avoidance of doubt, the trips scheduled for this test are the same as in the Operational Timetable as set out in Sections 2.11 and 2.12 of these Employer's Requirements; and
- Trams shall dwell at each Tramstop and shall exercise opening and closing of the doors at each Tramstop. The minimum period of doors being fully opened shall be 13 seconds at each Tramstop.
- The undertaking of the test shall be an operational function led by Infraco but in conjunction with the Operator. Infraco shall manage the preparation for the Tests with technical and maintenance support and monitoring by Infraco (along with representatives from **tie**).
- Infraco shall undertake and pass Test T2 before proceeding to the Shadow Running phase.
- **tie** shall be given twenty working days advance notice of the Performance Test 1 plan and seven working days written notice of the Test commencement date.

23.14.5 Pass Criteria

The following define the pass criteria for the T2 test.

All test results from previous tram and system and sub-system tests are to be available and signed off as accepted by **tie**. Any Defect Correction lists shall be available and agreed as being programmed to be remedied.

The test shall have been successfully completed when:

- At least 95% of the end-to-end tram movements meet the requirements of the Performance Regime in terms of Punctuality Service Element as defined in 2.16.

- Acceptance of the Case for Safety and test results by the PSCC , the Independent Competent Person and where appropriate Her Majesty's Railway Inspectorate (or relevant approval body) and their approval or 'Letter of No Objection to proceed" into Shadow Running.

23.14.6 Monitoring and Reporting of Test Performance

The primary data used to evaluate the test shall be automatically generated from the Supervisory Control & Communications performance monitoring sub system and validated independently.

23.15 Pre-Operations Test Specification – T3

23.15.1 Overview

This section describes the requirements of the Pre-Operations Test and the proposals for its execution monitoring and completion. The Pre-operations Test shall be conducted during the Shadow Running phase of the project and forms part of the requirements for the final System Acceptance.

23.15.2 Test Objectives

The Pre-operations Test seeks to prove that the Edinburgh Tram Network, or section thereof, in the event of sectional opening operates to a sustained level of performance determined by the Opening Timetable and the performance regime such that:

- The Operator can safely commence passenger carrying revenue earning service;
- The Infrastructure and Tram Maintainers can commence the Planned Maintenance proposed for passenger carrying revenue earning service; and
- The Edinburgh Tram Network passes the ride quality criteria in Tables 62 & 63 of the Employers Requirements.

23.15.3 Network Performance Test Description

Pre-operations Test is a four-part test upon successful completion of all parts of which the Edinburgh Tram Network or section(s) thereof can be opened to public service. The Pre-Operations test cannot be undertaken ahead of the successful completion and passing of the respective Performance Test 1.

23.15.4 Features

The Infraco shall demonstrate that the entire Edinburgh Tram Network or section(s) thereof can be operated to the defined levels of performance, reliability and availability and in accordance with the operational Case for Safety.

The Part 1 test shall comprise:

- Five consecutive days (none of which are Saturday, Sunday or Bank Holidays) of testing in accordance with the Operational Timetable. This test is to be undertaken no sooner than two weeks after commencement of the Shadow Running phase;

The Part 2 test shall comprise:

- Five consecutive days (none of which are Saturday, Sunday or Bank Holidays) of testing in accordance with the Enhanced Timetable, which cannot commence until two weeks from successful completion of the Part 1 test, and must be completed at least two weeks prior to the end of the Shadow Running phase, unless agreed otherwise by **tie**.

For both the Part 1 and Part 2 tests, trams shall dwell at each non-terminus Tramstop for a nominal 25 seconds and the doors shall normally remain closed.

The Part 3 test (which can be undertaken at any time during shadow running) shall comprise:

- One of the fleet of trams shall be selected by **tie** to be instrumented and monitored. The selected tram shall provide results for 100 journeys of the selected tram consecutively over all sections of the ETN;

- Measurement of lateral, longitudinal and vertical accelerations to be taken on the floor of the trailing cab of the tram.

- All tram journeys during the test period that provide data for this test shall be completed within a tolerance of plus or minus 10% of the journey times that are setout in the Operational Timetable;

- Analysis to be performed as follows:

    - For each journey between Tramstops a root mean square average of the combined lateral, longitudinal and vertical accelerations (RSS addition) is to be determined in accordance with ISO 2631.

The Part 4 test shall comprise:

- One tram from the fleet will be loaded to AW0
- Measurement of lateral, longitudinal and vertical accelerations to be taken on the floor of the trailing cab of the tram
- Entire Edinburgh Tram Network to be covered within 10% of the journey times that are setout in the Operational Timetable
- Load the tram to AW2 and repeat steps above; and
- Analysis to be performed as follows:
    - Select the greater of the results (AW0 or AW2) for each of the journeys to be used as a benchmark for each individual tram for any particular journey.

The undertaking of the test shall essentially be an operational function led by Infraco but in conjunction with the Operator. Infraco shall manage the preparation for the Tests with technical and maintenance support and monitoring by Infraco (along with representatives from **tie**).

Infraco shall undertake and pass Pre-operations Test before proceeding to the Service Commencement Date.

tie must be given thirty working days advance notice of the Performance Test 1 plan and seven working days written notice of the Test commencement date.

23.15.5 Pass Criteria

The following define the pass criteria for the T3 test.

All test results from previous tram and system and sub-system tests shall be available and signed off as accepted by **tie** including the clearance of all Defect Correction lists unless dispensation has been proposed by Infraco and agreed by tie acting reasonably.

23.15.6 Part 1 and 2 Pass Criteria

Each Pre-operations Test can only be successfully completed:

- As soon as 99% Punctuality Service Element as defined in chapter 2.16 has been achieved in accordance with the Infraco and Tram Maintainer performance regimes.

For the avoidance of doubt any delays caused by road traffic shall not be included in the delay measurement.

23.15.7 Part 3 and 4 Pass Criteria

Part 3 test can be deemed to be passed when none of the 100 journeys have an rms of the combined lateral, longitudinal and vertical accelerations exceeding 30mg.

Part 4 test can be deemed to have been passed when the instrumented tram from the fleet has attained a Ride Index equal to or less than as shown in the tables below in accordance with ISO 2631:

Speed	Wz Vertical	Wz Lateral
40 km/h	2,32	1,58
70 km/h	2,96	2,36

Table 44 - Ride Index in the Drivers Cab

Speed	Wz Vertical	Wz Lateral
40 km/h	2,24	1,64
70 km/h	2,82	2,28

Table 45 - Ride Index in the Passenger Compartment

23.15.8 Consents

This is in addition to passing the above tests.

All consents to achieve full passenger service must have been obtained and evidenced as part of Test T3.

23.15.9 Monitoring and Reporting of Test Performance

The primary data used to evaluate Parts 1 and 2 of this test shall be automatically generated from the Supervisory Control & Communications performance monitoring sub system and validated independently.

During the Pre-operations Test monitoring period Infraco will undertake audits, to the satisfaction of **tie**, of the collection and communication of fault and tram punctuality data against each of the performance indicators.

23.16 Network Performance Test Specification – T4

23.16.1 Overview

This section describes the requirements of Network Performance Test (T4) and the proposals for its execution monitoring and completion. Network Performance Test forms part of the requirements for the final System Acceptance.

The Test shall cover a 28 day consecutive period, which shall be undertaken after the Edinburgh Tram Network has entered Public Service until the Test is satisfactorily passed or, unless otherwise agreed by **tie**.

The Test is the operation of the complete ETN to the Operational Timetable each day for the duration of the test. The timetable used for the test shall be agreed with **tie**.

The undertaking of the test will be an operational function carried out by the Operator. Infraco shall manage the preparation for the Tests with technical and maintenance support and monitoring by Infraco (along with representatives from **tie**).

Infraco shall undertake and pass the Network Performance Test within twelve months after the Service Commencement Date of the whole Edinburgh Tram Network.

tie shall be given thirty working days advance notice of the Network Performance Test plan and seven working days written notice of the Pre-operations Test commencement date.

23.16.2 Pass Criteria

The test will measure the Punctuality Service Element over twenty-eight days.

The test shall be passed once the criteria stated in the Employer's Requirements Operational and Performance Section (Section 2) have been demonstrated to be met.

The Infraco may discount any one day from the calculation but shall not be a day on which a Special Demonstration shall be planned.

For the avoidance of doubt the exclusions in Section 23.13 shall apply.

23.16.3 Special Demonstrations

During the Network Performance Test a number of demonstrations will be performed, these are described in the following two sub-sections.

23.16.4 Substation and UPS Demonstrations

Infraco shall demonstrate that the system can operate with two of the traction supplies from a substation taken out of use, one at a time, for a period of two hours during the peak service. The substations concerned and the times for their disconnection will be selected by **tie**.

The disconnection of the substations and placing them into bypass will be undertaken in accordance with the Operator's normal procedures for such switching.

Operation of the Uninterruptible Power Supplies (UPS) at two tram stops for four hours shall also be demonstrated. During this period the electrical supply to the chosen tram stop UPS's shall be disconnected. The tram stop UPS's concerned and the time for their disconnection shall be chosen by **tie**.

The Infraco shall prepare a plan detailing the programme for the above events and include this in the test arrangements that will be submitted to **tie** in accordance with the review procedure.

23.16.5 Tram Change Over

The Infraco shall demonstrate, during peak hours, a Tram changeover by which a Tram in service shall be substituted with the "hot spare".

tie will give Infraco thirty minutes notice of this test.

23.16.6 Monitoring and Reporting of Test Performance

The Punctuality Service Element shall be obtained. The results for the previous day shall be ratified in accordance with the Performance Regime in Schedule 7 of this Agreement and the Operator Performance Regime under the DPOFA Agreement.

A meeting will take place daily where the performance up to that date is reviewed and any investigations concluded and data accepted. The meeting will be recorded and minutes distributed to each party by the meeting secretary within three working days.

During the Network Performance Test monitoring period **tie** may undertake audits of the collection and communication of fault data against each of the performance indicators.

23.16.7 Network Performance Test Timetable

The Enhanced Timetable delivering the ultimate capacity of the ETN as contracted shall be prepared by the Operator as that which shall be the ultimate timetable to be used in Passenger Service, proposed by the Infraco, and agreed by **tie**.

23.17 Network Reliability Test Specification – T5

23.17.1 Overview

This sub-section describes the requirements of Network Reliability Test and the proposals for execution, monitoring and achievement of System Acceptance.

Network Reliability Test is a set of sub-system reliability tests each measured over a twenty-eight day period. Each specified sub-system has its own specified target detailed within 23.17.2. The tests may start on the same date as T4 (on or after Service Commencement Date) and as each subsystem is individually demonstrated to meet its contractual target that subsystem reliability test is then considered completed. Network Reliability Test is only passed when all the sub-systems meet their targets.

The undertaking of the test will essentially be a maintenance function carried out by the Infraco. However, it requires Infraco management of the preparation for the Tests with technical support and monitoring by Infraco, (along with representatives from **tie** during the Test).

Infraco shall undertake and pass Network Reliability Test within twelve months after the Service Commencement Date of the whole Edinburgh Tram Network to pass Network Reliability Test.

If any part of the works or part of the ETN fails to pass Network Reliability Test then rectification, repair, modification or reinstatement of that part shall be undertaken. The defect correction period on that part of the system or any sub-system which fails the test shall be extended a further twelve months beyond the time of rectification, repair or modification. Infraco will propose and undertake the necessary remedial action and retest to achieve acceptance.

tie must be given 20 working days advance notice of the Network Reliability Test plan and fourteen working days written notice of the test commencement date.

23.17.2 Sub-Systems Subject to Network Reliability Test and Reliability targets

Table 46 - Network Reliability Test

TEST	TARGET VALUE
Tram Reliability	Please refer to Tram Supply Agreement.
Passenger Information Display System	As set out in the Employer's Requirements 99.75% availability over six consecutive Periods.
Passenger Help/Emergency Help Point System	As set out in the Employer's Requirements 99.75% availability over six consecutive Periods.
On Street Track & Formation	Achieves 99.995% availability over six consecutive Periods.
Off Street Track & Formation	Achieves 99.995% availability over six consecutive Periods.
Point Machines	Achieves 99.995% availability over two consecutive Periods.
Traction Switchgear	Achieves 99.99% availability over two consecutive Periods.
OLE Equipment	Achieves 99.999% availability over two consecutive Periods.
Earthing & Bonding	No reported stray current instances, or rail to earth voltages that exceed 60 volts as defined in the EN50122/1, for four consecutive Periods
Operational Radio	Achieves 99.75% availability over two consecutive Periods.
Operational Data Network	Achieves 99.99% availability over two consecutive Periods.
UTC Interface	Achieves 99.75% availability over four consecutive Periods.
Wheel/Rail Interface	No proven instances of Noise and Vibration exceedence have occurred in a six month periods
CCTV System	Achieves 99.9% availability over two consecutive Periods.
Tram Position Detection System	Achieves 99.9% availability over two consecutive Periods.
Traction SCADA System	Achieves 99.75% availability over two consecutive Periods.
Tramstop Lighting	Achieves 98.5% availability over two consecutive Periods.

23.17.3 NOT USED

23.17.4 Assumptions and Exclusions

General Exclusions and Assumptions

Should the Infraco be able to prove to the satisfaction of **tie** that any of the reliability tests would have been exceeded by means of one or more of the following exclusions then, in consultation with **tie**, the test results shall be amended to discount the effects of such proven Network Reliability Test exclusions.

The Network Reliability Test exclusions and Network Reliability Test assumptions set out in this section relate only to the Network Reliability Test and shall not be used or relied upon in any circumstances in any connection with any other test.

When the tests have commenced, neither **tie,** the Operator or Third Parties shall be entitled to interfere, interrupt or influence the tram operation or service or the tests in such a way that it disadvantages Infraco, or has an impact on the testing process, the results, or causes the non acceptance of the tests.

Operator Influences

Defects caused by the Operator's failure to:

Provide properly trained staff as defined in the DPOFA, exercising a reasonable duty of care to good industry practice.

Exclusions

The Infraco must demonstrate by reasoned argument that failures or loss of availability resulting from Operator actions were caused by reasons for which the Infraco was not responsible (eg Operating Manuals and supplier training). The Infraco shall develop and agree audit procedures with **tie** and the Operator in respect of the Network Reliability Test exclusions set out in this paragraph.

However, in no event shall any allowances or relief or Reliability Network Reliability Test exclusion be granted to the Infraco where any delays or failure to pass Network Reliability Test has been caused or contributed to by:

- Any default, breach or omission of the Infraco;
- Infraco defects; and
- Equipment undergoing repair, modification or rectification by the Infraco.

Realistic long term response times to repair defects shall be provided by Infraco during the period of the test.

It is assumed that **tie** shall procure all electrical power and that a supply is available for the tests.

Any failures resulting from inappropriate actions or omissions by the Operator or his contracted staff shall be discounted. as set out in the DPOFA .

For the avoidance of doubt, the impact of third party vandalism shall be excluded.

23.17.5 Monitoring & Reporting of Test Performance

The scoring of faults should be achieved by first reviewing the fault logs and performance reports using them as a filter to establish which faults need to go forward into the review. The review meeting will then be used to discuss and allocate the responsibility of faults under the performance regime.

The review meeting will take place daily where the performance of each system will be reviewed for the previous day. Representatives of Infraco, Tramco, **tie** and the Operator will attend this meeting. Each sub-system will be reviewed and agreement reached on all failures. The meeting will be recorded and the resulting daily report distributed to each party within 3 Business Days.

23.17.6 Audit Procedures

During the Network Reliability Test monitoring period, **tie** may undertake audits of the collection and communication of fault data against each of the sub-system tests and also audit the response times to rectification of notified faults.

23.17.7 Services in Connection with the Operator

The Operator shall be appointed separately by **tie** to provide various services in conjunction with the construction, commissioning and operation of the Edinburgh Tram Network. The Operator's Scope of Supply shall include the following:

Provision of representatives during the Construction, Commissioning and Operation stages to provide the Operator's Services, including liaison with the Infraco.

Observing and reporting on the acceptability of the proposed design and the quality of infrastructure, trams and equipment;

Supporting obtaining the necessary consents for commissioning and Public Operation;

Assisting Infraco in development of a Testing & Commissioning Plan (in conjunction with Infraco)

Appointment and training of staff in support of any commissioning process.

Notwithstanding the Operator's responsibilities described above, the Infraco responsibilities (associated with the interface with the Operator) shall include, but not be limited to, the following:

- providing support to obtain operational approvals and consents in respect of the Edinburgh Tram Network;
- providing technical support on systems integration
- providing technical support on the development of operational plans and management systems; and
- provide technical support with regard to operational interfaces with CEC traffic management systems. This shall include phasing sequence drawings of key junctions
- Preparing and submitting plans for driver training and the training of other operational staff. Undertaking training of the Operator's trainers (8-10 trainers) and control room staff (18-21 staff)
- Prepare and submit plans for maintenance and operations manuals
- Provide support required for System Acceptance, including the development of a Testing and Commissioning Plan;
- Work to mitigate any delays to the system construction and commissioning howsoever caused.

Comm. Model Ref	Infraco	Operator
	The following table represents a guide of the key responsibilities associated with the Infraco and the Operator during the various phases of the Life Cycle Model. Further details are provided within these Employer's Requirements and the DPOFA. The Infraco Contract (refer to the Code of Construction Practice) allows for the potential for Sectional Completion. Accordingly, where Sectional Completion was to apply, then it would follow that the (System Commissioning Model) stages for each Sectional Completion would apply at different times in the programme (e.g. possible to have "Shadow Running" ongoing for Section A, whilst "Commissioning" for Section B on-going). The listed responsibilities would equally apply to each Sectional stage. Items are listed under the most appropriate stage, but this does not exclude the associated activity from being required during other stages	
	GENERAL OBLIGATIONS	
	The general provision of all the technical and management services as defined within these Employer's Requirements. This shall include design, programming, installation, testing, system acceptance, training and maintenance. The Infraco shall be required to work closely with the Operator to successfully deliver the project.	Liaising and working closely (and timely) in partnership with the Infraco to meet the requirements of the Project associated with design, installation, system acceptance, delivery into service and maintenance, taking account of the Infraco's Scope of Supply. The Operator shall also be responsible for Operator Maintenance.

	Management and implementation of a liaison process, with the assistance of the Operator, to ensure that all parties are fully informed and resources arranged adequately.	Provision of staff resources during the Commissioning, Construction and Operation stages to provide the Operator's Services, including liaison with the Infraco. Provide and keep updated the training and recruitment plan describing the roles of each member of the Operations staff with specific instructions for the proper performance of their duties and training requirements.
		Ensuring that all relevant operational and maintenance subcontracts are in place and that appropriate subcontractor staff training programmes are implemented.
	Responsibility for adherence to the programme	Monitoring Progress
	Responsibility for complying with the functional and non-functional requirements as defined within these Employers Requirements.	Observing and commenting on the acceptability of the design and installation.
	Production of risk deliverables and register in accordance with these Employer's Requirements.	Provision of risk advice (from the Operator's viewpoint) to Infraco and commenting / liaising on risk documentation produced by Infraco.
	Under the CDM Regulations, the Infraco shall be responsible as Principal Contractor and shall comply with all associated CDM Responsibilities relating to the design and construction activities until Services Commencement Date (and beyond, where appropriate). Beyond the Services Commencement Date, the Infraco may be required to undertake certain elements of work (including maintenance) which fall within the remit of CDM Regulations. In such a scenario the Infraco would be responsible as Principal Contractor for the duration of such works.	As with any party working on a "CDM site", the Operator shall be responsible for complying with CDM Regulations and the Principal Contractors Safe Systems of working (e.g. permit to work system). Notwithstanding the Infraco's over-arching responsibility as Principal Contractor up to Services Commencement Date, once the network is energised (and trams begin to operate) the Operator shall have a key role in managing the "operational end" of systems (e.g. the Operator would be responsible for developing and managing a permit to isolate systems within the context of the over-arching Infraco's systems).

	There shall be a requirement for the Infraco to comply where appropriate with the Operators Systems and procedures associated with the Operator's responsibility to manage operational safety.	The Operator shall be responsible for Operational Safety. This shall include developing Operational Plans, timetables and Management Systems and Operating Procedures for the Operational Phase. Operational safety responsibilities shall, by definition, occur once any part of the system is energised (anticipated to be between Stages 4 and 5, "Set to Work Tests" and "Commissioning", respectively.
DD	**DETAILED DESIGN STAGE**	
	Completing the full design and meeting all the deliverables as defined within the SDS Providers Agreement with **tie**, which is being novated and which is included in Volume 7 of the Infraco ITN.	Observing and reporting on the acceptability of proposed designs against the Design Manual and the Employers Requirements and the ability of the proposals to meet operational objectives
	Obtaining all approvals and consents in respect of the Edinburgh Tram Network;	Supporting the obtaining of necessary consents for Commissioning and Public Operation (and any consents which are relevant to the Operator).
	Managing and undertaking all interfaces with CEC traffic management systems.	Assisting Infraco with the interfaces with CEC, which are relevant to the Operator.
	Developing and updating a Testing and Commissioning Plan (TCP) for each element of the System including programmes and procedures with controls and acceptance criteria.	Providing input to a Testing and Commissioning Plan (TCP) for each element of the System including programmes and procedures with controls and acceptance criteria.

	Assisting the Operator with the development of a process for the handover for Operational purposes of the infrastructure and equipment from Infraco.	Developing a process for the handover for Operational purposes of the infrastructure and equipment from Infraco.
	Scheduling, and coordinating with the Operator, driver training, and the training of other operational and maintenance staff. The scope of the training shall cover all aspects of maintenance (as defined within these Employer's Requirements) and all operations. The Infraco shall be responsible for developing coordinated Training Plans in accordance with section 40 (Maintenance) of these Employer's Requirements.	Assisting the Infraco in the development of coordinated Training Plans and the specification of training documentation requirements from Infraco and Sub-suppliers.
	Complying with, and undertaking internal audits, associated with the Code of Construction Practice	Reviewing Infraco's compliance with the Code of Construction Practice, associated with any operator related issues.
1	**BUILD / MANUFACTURE**	
	Managing and implementing the manufacture and assembly of the System in accordance with the general provision of all the technical and management services as defined within these Employer's Requirements	Observing and reporting on the quality and functionality of Infrastructure and Equipment provision / manufacture and its compliance with Specifications where it affects the operational objectives.
	Liaising with the Operator to address any associated issues, and where necessary rectifying any works.	
2	**FACTORY ACCEPTANCE TESTS**	
	Managing and implementing the Testing process in accordance with the TCP. FAT tests (initial tests and integrated testing) shall be undertaken to verify that the components / system behave as planned in the design, meet the requirements of the design specification and provides correct functionality.	Assisting and providing advice to Infraco to manage the Testing process in accordance with the TCP.
		Observation if necessary and appropriate of any factory acceptance tests on equipment to be provided.

3	INSTALLATION / CONSTRUCTION	
	Managing and implementing the installation and construction at the Site in accordance with the general provision of all the technical and management services as defined within these Employer's Requirements.	Observing and reporting on the quality and functionality of Infrastructure and Equipment provision and installation, and its compliance with Specifications where it affects the operational objectives
	Liaising with the Operator to address any associated issues, and where necessary rectifying any works.	
4	SET TO WORK TESTS	
	Managing and implementing the Testing process in accordance with the TCP. These site tests (System Integration Tests) in accordance with section 6 of Part 1c – Tram Testing and Commissioning of the Employer's Requirements shall be undertaken to demonstrate that the construction / installation has been undertaken satisfactorily and that the systems behave as intended in the design.	Assisting and providing advice to Infraco to manage the Testing process in accordance with the TCP
		In accordance with the TCP; witnessing and reporting on the implementation tests
		Attending Tests
		Managing the Operational Safety of the Testing and Commissioning process in support of Infraco once the system is energised and trams begin to operate. Develop a system of management of safety during testing and commissioning (including the training of staff and contingency provisions)
	Obtaining Consents and Approvals required to allow the system to be energised and trams to operate to the extent not the responsibility of **tie** under Clause 19.	Supporting the obtaining of Consents and Approvals for the system to be energised and trams to operate.
	Reviewing and commenting on the proposed Commissioning Phase Operating Procedures.	Developing Commissioning Phase Operating Procedures.

5	COMMISSIONING	
	Managing and implementing the Testing and Commissioning process in accordance with the TCP. This includes the site commissioning testing as defined within this Section at 23.20.1.	Assisting and providing advice to Infraco to manage the Testing and Commissioning process in accordance with the TCP
		In accordance with the TCP; witnessing and reporting on the implementation tests
		Attending Tests
		Managing the Operational Safety of the Testing and Commissioning process in support of Infraco once the system is energised. Develop a system of management of safety during testing and commissioning (including the training of staff and contingency provisions)
	Providing technical support on the development of operational plans, timetables and management systems and Operating Procedures; and	Developing Operational Plans, timetables and Management Systems and Operating Procedures for Operational Phase
	preparing and submitting plans, manuals & procedures for maintenance and operations in accordance with these Employer's Requirements, in time for System Energisation.	Reviewing and commenting on the acceptability of plans, manuals & procedures for maintenance and operations.
6	TEST RUNNING AND DRIVER FAMILIARISATION	
	Scheduling, and coordinating with the Operator, driver training and the training of other operational staff as part of the Commissioning activities prior to the start of Shadow Running. Implementing training plans including the undertaking of training of the Operator's trainers (8-10 trainers) and control room staff (18-21 staff).	Appointing and training of Operator staff and Operational rules and procedures training for Infraco. The Operator shall be responsible for training the drivers (utilising the training plans / information developed by Infraco and the Operator Trainers, who shall have been assessed as competent by Infraco on the operation of their systems and equipment).
	Demonstrating that the completed Operator training programme has produced a level of adequate	Assisting Infraco to demonstrate that the completed Operator training programme has

	competency to proceed to shadow running.	produced a level of adequate competency to proceed to shadow running.
T1	The implementation of the T1 Post Commissioning Test: follows successful commissioning of the nominated section, test to demonstrate and prove the system is able to perform in a safe manner and delivers the required end to end run times (these may be up to 5% greater than target runtimes).	Assisting and providing advice to Infraco to manage the Testing and Commissioning process in accordance with the TCP
T2	The implementation of the T2 Performance Test: precedes Shadow Running: test to demonstrate and prove the system is able to perform satisfactorily to move into the 3 month Shadow Running Period (The T2 Performance Test is performed over 3 days and 95% of runtimes must be within target runtime; whilst service headways may be increased by up to 50% of those of the operating timetable).	
		In accordance with the TCP; witnessing and reporting on the tests
		Attending Tests
		Managing the Operational Safety of the Testing and Commissioning process. Develop a system of management of safety during testing and commissioning (including the training of staff and contingency provisions)
	Infraco to review to prepare Go Live timetable to be tested during shadow running.	Operator to prepare the Opertional Timetable to be tested during shadow running.
	Obtaining Consents and Approvals required to allow the system to start shadow running to the extent not the responsibility of **tie** under Clause 19.	Supporting the obtaining of Consents and Approvals for the system to commence shadow running.

7	**SHADOW RUNNING**	
	Implementing the Shadow Running Phase to cover the requirements. Please refer to relevant section below.	
T3	Implementing the T3 Pre-Operations Test: precedes Service Commencement, the test is undertaken during the Shadow Running Period, the test is the operation of the initial entry into service timetable and includes infrastructure, trams and operations systems (T3 is over 2 x 5 days and 99% performance must be achieved).	In accordance with the TCP; witnessing and reporting on the tests
		Attending Tests
		Managing the Operational Safety of the Testing and Commissioning process
		Developing a system of management of safety during shadow running and public operation (including the training of staff and contingency provisions)
	Obtaining the necessary Consents and Approvals for Public Operation to the extent not the responsibility of **tie** under Clause 19.	Supporting the obtaining necessary consents for Public Operation
8	**SERVICE COMMENCEMENT DATE**	
	Infraco shall support the preparation for the T4 Network Performance Test with technical and maintenance support and monitoring. (T4 is over a 28 consecutive day period on a rolling basis in passenger service with the ultimate timetable in operation. 1 day in the period may be discounted. The test is to show that reliable operation is achieved.)	The Operator shall manage the preparation for the T4 Network Performance Test with technical and maintenance support and monitoring by the Infraco. The implementation of the T4 Network Performance Test.

	Demonstrations during the Network Performance Test e.g. sub-stations / UPS – demonstration of operation where a sub-station can be taken out of service for 2 hours during peak service.	
	Review, comment and provide support in preparation of the Test and Ultimate Timetables.	Preparation of an agreed Network Performance Test Operational Timetable and Enhanced Timetable as that which shall be the ultimate timetable to be used in Passenger Service.
	Infraco management for the preparation of the T5 Network Reliability Test with technical support and monitoring by Infraco.	The implementation of the T5 Network Reliability Test: the reliability testing of certain sub-systems in Passenger Service (within 12 months of opening).
	In accordance with the TCP; witness and report on the tests	Managing the Operational Safety of the Testing and Commissioning process. Develop a system of management of safety during testing and commissioning (including the training of staff and contingency provisions)

Table 47 - Table showing a guide of the key responsibilities associated with the Infraco and the Operator during the various phases of the Life Cycle Model

23.18 Tram Testing and Commissioning

23.18.1 Document Scope

The scope of this section of the document is to define the Tram Testing & Commissioning requirements that are applicable to all elements of the Edinburgh Tram Network (ETN).

23.18.2 General Requirements

This document defines the process for the testing and commissioning of the ETN that shall be carried out by the Tram Supplier together with the requirements of the Tram Tests that must be carried out to meet the Employer's Requirements and all relevant regulatory bodies as to the quality, performance and compliance of the Trams. It also identifies the tests to be carried out to meet the requirements for System Acceptance testing (involving Trams) of the completed Edinburgh Tram Network.

For certain of the type tests it may be acceptable to reference relevant tests previously undertaken on similar systems. The Tram Supplier will justify to the Tram Inspector all instances where this approach is applicable. This approach will only be possible in areas where there has not been anything other than very minor design changes. Where this approach is proposed, the final test reports and supporting data must be provided to allow the information to be assessed and accepted or rejected. It will be the Tram Supplier's responsibility to obtain any necessary permissions for the use of the test results and data concerned.

23.18.3 Test Plan

The Tram Supplier shall create and adhere to a Test Plan, which will comply with the requirements of EN50215 and encompass a logical build up of testing that leads to acceptance of the vehicles. The Test Plan shall include sufficient testing to demonstrate that all the Employer's Requirements have been met and to ensure that all relevant consents for passenger operation can be achieved from all relevant bodies. It must also be created in such a way as to maximise off-site testing.

The Tram Supplier shall carry out the Tram tests in accordance with this document, the Test Plan and the Tram commissioning and delivery programme. The Tram Supplier shall submit the Test Plan for agreement by the Infraco. Detailed Test Specifications for all tests shall also be submitted for agreement as part of the design scrutiny process and not less than eight weeks prior to the commencement of the tests.

The Test Plan shall be provided in Microsoft Project, together with any commentary, specifications and all results following completion of the Tram tests, in Microsoft Word/Excel format. The relevant supplied drawings shall be provided in electronic format and as hard copy. Test reports for each Tram Test shall be submitted, within two weeks following the completion of the Tram Test.

23.18.4 Tram Test Categories

The Tram Tests shall be divided into five discrete stages:

- Factory Acceptance Tests ("FAT")
- Delivery Acceptance Tests ("DAT")
- Site Commissioning Tests ("SCT")
- System Integration Tests ("SIT")
- System Acceptance Tests ("SAT")

With the exception of the Factory Acceptance Tests, which shall be carried out at the Tram Supplier's Factory, all other tests are to be carried out after the Trams are delivered to the Depot. All the tests are to be carried out by the Tram Supplier, except for the System Integration and System Acceptance Tests, which will be managed by Infraco.

Each category of Tram test can comprise two sub-categories:

- Type tests shall be performed to demonstrate that the vehicle design complies with the relevant section of these Employer's Requirements and all relevant Legislation and regulations;
- Routine tests shall be carried out on each vehicle prior to delivery/handover. The routine tests shall include the agreed measurements and checks to confirm the compliance of each Tram.

The Tram Supplier shall provide all necessary support to the Infraco during the testing and commissioning activities in Edinburgh, from the delivery of the first Tram and until the completion of the System Acceptance Tests. This will include input to the development of the necessary specifications and procedures. The support for the Tram tests to be undertaken in Edinburgh shall include, but be not be limited to, a testing manager and technicians (who will be based in Edinburgh throughout the delivery and testing of the trams), full logistics support for the despatch of urgent and routine spares during the testing process, documentation authors and administrative support for the production and control of test specifications, reports, and supporting documentation.

23.18.5 Test Certificates

Upon the successful completion of each of the Tram tests the Tram Inspector will issue the following test certification:

- Factory Acceptance Type Test Certificate;
- Factory Acceptance Routine Test Certificate;
- Certificate of Tram Delivery; and
- Site Commissioning Type Test Certificate.

Upon successful completion of all the tests for any individual Tram the Tram Inspector will issue the following test certification:

- Certificate of Tram Commissioning.

23.19 Factory Acceptance Tests (FAT)

Factory Acceptance Tests– This group of tests shall be undertaken at the Tram Supplier's Factory and upon successful completion the Tram Supplier will be issued with a Factory Acceptance Type Test Certificate and/or Factory Acceptance Routine Test Certificate by the Tram Inspector. The Factory Acceptance Tests shall be conducted in accordance with the Tram Manufacturing, Delivery Programme and the Test Plan. The FAT will be broken down into Factory Acceptance Type Tests and a series of Factory Acceptance Routine Tests and will comprise both static inspections and dynamic tests. The Factory Acceptance Type Tests shall be undertaken on a single Tram. This shall be the first Tram unless agreed otherwise in writing by the Tram Inspector.

Static inspections and tests shall be conducted at the Tram Supplier's Factory or at the sub-suppliers' premises during normal working hours during which the Tram Inspector will be entitled to inspect, examine and witness testing of all major systems, sections, apparatus, equipment, components, internal seating, fixtures and fittings and devices, including all structural, electrical, hydraulic and other major components and assemblies (except where the items concerned have been previously tested to the Tram Inspector's satisfaction and the appropriate test certificate issued).

Dynamic tests shall be conducted on the test track at the Tram Supplier's Factory or an alternative location subject to the Tram Inspectors agreement.

The Tram Inspector shall be given adequate prior notice of all tests. **tie** may, at its sole discretion, waive its right to attend or witness any test.

Whether or not the Tram Inspector is in attendance the Tram Supplier shall keep, and make available to the Tram Inspector on request, true and accurate records of the tests, the performance of the Tram during such tests, and any faults which developed or became apparent during the course of such tests.

The Tram Inspector may require evidence that the Tram has operated an agreed number of kilometres/hours in order to fulfil the requirements of the Test and Commissioning Plan under the agreed test track conditions without major faults or breakdown and has met the performance standards set out in this section throughout such period before issuing the Factory Acceptance Routine Test Certificate and/or Factory Acceptance Type Test Certificate. The distance travelled during the dynamic test on the test track will be limited and the main objective will be to check functions and performances not endurance, hence the distance travelled will relate to an agreed schedule to prove these functions.

The Factory Acceptance Routine Tests and the Factory Acceptance Type Tests referred to in the following tables shall include such examinations and tests as the Tram Inspector may reasonably require to satisfy himself that the Trams qualify or do not qualify for a Factory Acceptance Routine Test Certificate and/or and a Factory Acceptance Type Test Certificate. This will include but not be limited to; the checking of individual manufacturing and inspection records, module and sub-assembly tests including as-built dimensional checks where appropriate, for major items such as but not limited to bogie frames, wheel sets, traction and brake equipment.

The Tram Supplier shall make available to the Tram Inspector throughout the Factory Acceptance Routine Tests and/or Factory Acceptance Type Tests qualified staff and, where appropriate, its major sub-contractors to conduct, supervise and record the results of all such inspections, tests and examinations as are referred to in this document and to respond to all enquiries about the condition or performance of the Trams or its major sub-systems.

Table 48 - Factory Acceptance Tests: Static Type Tests

TEST	LOCATION	EN 50215 Reference	COMMENTS
Overall dimensional checks	Static test, at the Tram Supplier's Factory	8.1	To include external static envelope, internal dimensions, door widths and openings.
General examination and security check.	Static test, at the Tram Supplier's Factory		To establish accuracy and security of fixing of fixtures and fittings,
Coefficient of flexibility	Static test, at the Tram Supplier's Factory	8.2	Static test with a maximum cant of 100mm simulated. Horizontal and vertical flexibility.
Lifting ability	Static test, at the Tram Supplier's Factory	8.3	Body Lifting and major component removal. Bogie handling.
Tram weight	Static test, at the Tram Supplier's Factory	8.4	Tram and axle weights, including individual wheel and axle loading. Load testing of the complete vehicle and the checking of critical dimensions and clearances under a range of loading conditions. Suspension deflections and door entrance height measurement.
Sealing	Static test, at the Tram Supplier's Factory	8.5	Resistance of body structure to water ingress, humidity and snow.
Electrical insulation	Static test, at the Tram Supplier's Factory	8.6	High voltage insulation tests. Withstand and impedance of all cabling.
Bonding & return circuits	Static test, at the Tram Supplier's Factory	8.7	Continuity and integrity of all safety earth bonds and return current circuits.
Hydraulic system	Static test, at the Tram Supplier's Factory	8.9	Pumps and pipe-work. Pressure tests and leakage.
Braking System	Static test, at the Tram Supplier's Factory	8.10	Friction brake system

TEST	LOCATION	EN 50215 Reference	COMMENTS
Parking brake	Static test, at the Tram Supplier's Factory	8.11	Clamping force measurement
Auxiliary Power Supply	Static test, at the Tram Supplier's Factory	8.12	Power supplies and associated equipment.
Battery charging system	Static test, at the Tram Supplier's Factory	8.13.1	Batteries, battery chargers and associated equipment. Battery capacity for emergency working.
Auxiliary and control system	Static test, at the Tram Supplier's Factory	8.14	Vehicle control and management system. Software validation. Drivers' controls and instruments.
Doors	Static test, at the Tram Supplier's Factory	8.14.3	Passenger Doors, driver's doors. Emergency access and egress. Operation and timing.
Heating, ventilation & air-conditioning	Static test, at the Tram Supplier's Factory	8.14.4	System operation and effectiveness at the ambient conditions of the test location Thermostats, air flows. Hot/cold areas.
Lighting	Static test, at the Tram Supplier's Factory	8.14.5	Interior and exterior lighting.
Monitoring equipment	Static test, at the Tram Supplier's Factory	8.14.7	CCTV System, cameras and displays.
Event recorder	Static test, at the Tram Supplier's Factory	8.14.7	OTMR, (as far as practicable at the test location).
Communications and passenger information systems	Static test, at the Tram Supplier's Factory	8.14.7	Radios, PA, emergency communications (as far as practicable at the test location). Warning tones. Passenger information system. Passenger Emergency Help Points.
Configuration control	Static test, at the Tram Supplier's Factory	8.14.8	Determination of defined software and firmware status for all sub-systems. Modification status for all major and critical components and others as appropriate.

TEST	LOCATION	EN 50215 Reference	COMMENTS
Traction system	Static test, at the Tram Supplier's Factory	8.16	Motors, gearboxes, control equipment, power supplies and current collection.
Tram control system	Static test, at the Tram Supplier's Factory	8.16	Tram central control system and interfaces, fault monitoring and diagnostics.
Operability and maintainability	Static test, at the Tram Supplier's Factory	8.17	Verification of conformity with the proposed and agreed design. Operator and maintainer access to all appropriate areas.
Safety systems	Static test, at the Tram Supplier's Factory	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop. Emergency pushbutton, Track brakes. Horns/warning devices.
Windscreen washers, wipers and demisters	Static test, at the Tram Supplier's Factory	9.18	System operation and effectiveness, demisters.
Pantograph	Static test, at the Tram Supplier's Factory	9.12	Operation. Contact forces.
Sanding system	Static test, at the Tram Supplier's Factory		System operation. Sand delivery rate. Coherence between VTCU output and the correct sanding unit.
Flange lubrication system.	Static test, at the Tram Supplier's Factory	9.11	Set-up of equipment.
Visual examination of all client defined features	Static test, at the Tram Supplier's Factory	HMRI, RVAR	Interior layout, seating, livery and signage.
Emergency coupler	Static test, at the Tram Supplier's Factory		Check of mountings / space envelope. manual operation.

Table 49 - Factory Acceptance Tests: Dynamic Type Tests

TEST	LOCATION	EN50215 Reference	COMMENTS
Traction system performance	Dynamic test, at the Tram Supplier's Factory test track	9.1	Dynamic performance, acceleration and braking rates. Jerk rates. Current collection. Degraded modes. Speed attainment. Power consumption. Wheelslip correction and sanding. Simulated locked axle detection
Braking system	Dynamic test, at the Tram Supplier's Factory test track	9.3	Friction brake system, service and emergency deceleration rates and stopping distances. Dynamic brake operation and blending with friction brake, jerk rates. Wheelslide correction and sanding. Track brake operation.
Thermal capacity	Dynamic test, at the Tram Supplier's Factory test track	9.4	Temperature rise monitoring of traction, braking & auxiliary equipment during repeated duty cycles. Including degraded modes and emergency duty.
Motion resistance	Dynamic test, at the Tram Supplier's Factory test track	9.5	Demonstration/derivation of Tram resistance to motion.
Coupling test	Dynamic test, at the Tram Supplier's Factory test track	9.8	Coupled Tram operation with emergency couplers, as far as practical and subject to availability of two Trams.
Ride quality	Dynamic test, at the Tram Supplier's Factory test track	9.9	Assessment of Tram ride quality, (providing that the test is meaningful at this location).
Flange lubrication system.	Dynamic test, at the Tram Supplier's Factory test track	9.11	System operation.
Pantograph	Dynamic test, at the Tram Supplier's Factory test track	9.12	Operation, Functional check.

TEST	LOCATION	EN50215 Reference	COMMENTS
Electromagnetic compatibility	Dynamic test, at the Tram Supplier's Factory test track	9.14	Electromagnetic radiation and susceptibility of vehicle systems. See also EN 50121, within the constraints of the test track.
Voltage interruption and jump	Dynamic test, at the Tram Supplier's Factory test track	9.15	Reaction of traction/dynamic brake/auxiliary power systems to supply voltage interruptions jumps. Operation over the full-specified voltage range covered by the type test certificate of the traction and auxiliary equipment (as far as practicable at the test location).
Windscreen washers, wipers and demisters	Dynamic test, at the Tram Supplier's Factory test track	9.18	System operation and effectiveness, including demisters.
Tram control system	Dynamic test, at the Tram Supplier's Factory test track	9.19	Interfaces between traction, braking, auxiliary, control and safety systems. Tram management systems, displays and diagnostics.
Monitoring equipment	Dynamic test, at the Tram Supplier's Factory test track	9.19	CCTV System, cameras and displays.
Event recorder	Dynamic test, at the Tram Supplier's Factory test track	9.19	OTMR, (as far as practicable at the test location).
Communications & passenger information systems	Dynamic test, at the Tram Supplier's Factory test track	9.19	Radios, PA, emergency communications. Warning tones. Passenger information system as far as practicable at the test location.
Safety systems	Dynamic test, at the Tram Supplier's Factory test track	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop and speed inhibit. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer calibration.

TEST	LOCATION	EN50215 Reference	COMMENTS
Operability & maintainability	Dynamic test, at the Tram Supplier's Factory test track	8.17	Demonstration of degraded modes
Parking brake	Dynamic test, at the Tram Supplier's Factory test track	8.11	System operation and pull away test
Noise and vibration	Dynamic test, at the Tram Supplier's Factory test track	9.16	Noise and vibration measurements, as far as practicable at the test location.

Table 50 - Factory Acceptance Tests: Static Routine Tests

TEST	LOCATION	EN 50215 Reference	COMMENTS
Overall dimensional checks	Static test, at the Tram Supplier's Factory	8.1.2	Reduced overall dimension check.
General examination and security check.	Static test, at the Tram Supplier's Factory		To establish accuracy and security of fixing of fixtures and fittings.
Tram weight	Static test, at the Tram Supplier's Factory	8.4.3	Tram, and axle, weights.
Sealing	Static test, at the Tram Supplier's Factory	8.5.2	Resistance of body structure to water ingress
Electrical insulation	Static test, at the Tram Supplier's Factory	8.6	High voltage insulation tests. Withstand and impedance of all cabling.
Bonding and return circuits	Static test, at the Tram Supplier's Factory	8.7	Continuity & integrity of all safety earth bonds and return current circuits.
Hydraulic system	Static test, at the	8.9	Pumps and pipe-work. Pressure tests. Leakage.

TEST	LOCATION	EN 50215 Reference	COMMENTS
	Tram Supplier's Factory		
Braking System	Static test, at the Tram Supplier's Factory	8.10.2	Friction brake system functional test including parking brake
Auxiliary power supply	Static test, at the Tram Supplier's Factory	8.12.2	Power supplies and associated equipment.
Battery charging system	Static test, at the Tram Supplier's Factory	8.13.2	Batteries, battery chargers and associated equipment.
Auxiliary and control system	Static test at the Tram Supplier's Factory	8.14.1	Tram control and management system. Drivers' controls and instruments.
Doors	Static test, at the Tram Supplier's Factory	8.14.3	Passenger doors, driver's doors. Emergency access and egress. Operation & timing
Heating, ventilation and air-conditioning	Static test, at the Tram Supplier's Factory	8.14.4	System operation and effectiveness. Thermostats, air flows. Hot/cold areas. Duct sealing. Functional check
Lighting	Static test, at the Tram Supplier's Factory	8.14.5	Interior and exterior lighting. Functional check.
Monitoring equipment	Static test,at the Tram Supplier's Factory	8.14.7	CCTV System, cameras and displays.
Event recorder	Static test, at the Tram Supplier's Factory	8.14.7	OTMR, (as far as practicable at the test location).
Communications and passenger information systems	Static test, at the Tram Supplier's Factory	8.14.7	Radio, PA, emergency communications (as far as practicable). Warning tones. Passenger information system.
Configuration control	Static test, at the Tram Supplier's Factory	8.14.8	Verification of defined software and firmware status for all sub-systems. Modification status for all major and critical components and others as appropriate.

TEST	LOCATION	EN 50215 Reference	COMMENTS
Traction system	Static test, at the Tram Supplier's Factory	8.16	Motors, gearboxes, control equipment, power supplies and current collection.
Tram control system	Static test, at the Tram Supplier's Factory	8.16	Tram central control system and interfaces, fault monitoring and diagnostics.
Operability and maintainability	Static test, at the Tram Supplier's Factory	8.17	Fault handling, diagnostics and indications. Safety isolations.
Safety systems	Static test, at the Tram Supplier's Factory	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop. Emergency pushbutton, Track brakes. Horns/warning devices.
Windscreen washers, wipers and demisters	Static test, at the Tram Supplier's Factory	9.18	Functional check including demisters.
Pantograph	Static test, at the Tram Supplier's Factory	9.12	Operation. Contact forces
Sanding system	Static test, at the Tram Supplier's Factory		System operation. Sand delivery rate.
Flange lubrication system.	Static test, at the Tram Supplier's Factory	9.11	Set-up of equipment.
Visual examination of all client defined features	Static test, at the Tram Supplier's Factory		Interior layout, seating, livery and signage.

Table 51 - Factory Acceptance Tests: Dynamic Routine Tests

TEST	LOCATION	EN 50215 Reference	Comments
Traction system performance	Dynamic test, at the Tram Supplier's Factory test track	9.1.2	Dynamic performance, acceleration and braking rates. Current collection. Speed attainment. Wheelslip correction and sanding.
Braking system	Dynamic test, at the Tram Supplier's Factory test track	9.3.2	Friction brake system, service and emergency deceleration rates and stopping distances. Dynamic brake operation and blending with friction brake, Wheelslide correction and sanding. Track brake operation.
Flange lubrication system.	Dynamic test, at the Tram Supplier's Factory test track	9.11	System operation, as far as practicable.
Tram control system	Dynamic test, at the Tram Supplier's Factory test track	9.19	Interfaces between traction, braking, auxiliary, control and safety systems. Tram management systems, displays and diagnostics.
Monitoring equipment	Dynamic test, at the Tram Supplier's Factory test track	9.19	CCTV System, cameras and displays.
Event recorder	Dynamic test, at the Tram Supplier's Factory test track	9.19	OTMR, (as far as practicable at the test location).
Communications and passenger information systems	Dynamic test, at the Tram Supplier's Factory test track	9.19	PA, emergency communications. Warning tones. Passenger information system (as far as practicable at the test location).
Safety systems	Dynamic test, at the Tram Supplier's Factory test track	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop and speed inhibit. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer calibration.

23.20 Delivery Acceptance Tests (DAT)

These tests shall be carried out by the Tram Supplier upon the delivery of each Tram. They shall establish that the Tram has not been damaged or affected in any way by the delivery process and that it remains in the condition in which it was inspected prior to despatch from the Tram Supplier's factory. On satisfactory completion of the DAT the Tram Inspector will issue a Certificate of Tram Delivery.

TEST	LOCATION	EN 50215 Reference	Comments
Overall dimensional checks	Static test, at the Depot		Reduced to any parts or components which will been adjusted/removed during the transport.
General examination and security check.	Static test, at the Depot		To establish accuracy and security of fixing of all fixtures and fittings, transit damage. Visual inspection
Hydraulic system	Static test, at the Depot	8.9	Pumps and pipe-work. Visual inspection and checks for leakage.
Tram weight	Static test, at the Depot		Measurement of as-delivered tare weight, plus sand and fluids.

Table 52 – Table showing Delivery Acceptance Tests

23.20.1 Site Commissioning Tests

The Site Commissioning Type Tests shall be undertaken on the Tram(s) as appropriate, when they are delivered to the Depot and following the completion of the DAT. Upon successful completion the Tram Supplier will be issued with a Site Commissioning Type Test Certificate by the Tram Inspector. The tests shall comprises Static and Dynamic tests and will include, but not be limited to, the tests referred to in the tables on the following page.

For the avoidance of doubt the Tram Inspector shall not issue a Type Test Certificate even if by a lack or fault of the system infrastructure a test is failing or cannot be executed.

Table 53 – Site Commissioning Tests: Static Type Tests

TEST	LOCATION	EN 50215 Reference	Comments
Monitoring equipment	Static test, at the Depot	8.14.7	CCTV System, cameras and displays.
Tram location and detection system	Static test, at the Depot	8.14.7	Tram location and detection system.
Event recorder	Static test, at the Depot	8.14.7	OTMR
Communications and passenger information systems	Static test, at the Depot	8.14.7	Radios, PA, emergency communications. Warning tones. Passenger information system.
Noise.	Static test, at the Depot	8.18	Noise (outstanding from factory), internal & external. At same time as dynamic and performed on specified track section.
Safety systems	Static test, at the Depot	8.19	Brake control systems, emergency brake, passenger emergency. Driver's Deadman system, door safety loop. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer
Pantograph	Static test, at the Depot	9.12	Operation. Contact forces.
Electromagnetic compatibility	Static test, at the Depot	9.14	Electromagnetic radiation and susceptibility of Tram systems. Completion of the Tram FAT type test.

Table 54 – Site Commissioning Tests: Dynamic Type Tests

TEST	LOCATION	EN 50215 Reference	Comments
Traction system performance	Dynamic test, at designated test site	9.1.1	Dynamic performance, acceleration & braking rates. Jerk rates. Acceleration and control on gradients. Roll-back protection. Current collection. Speed attainment. Power consumption. Wheelslip correction and sanding. Emergency duty.
Braking system	Dynamic test, at designated test site	9.3.1	Friction brake system, service and emergency deceleration rates and stopping distances. Dynamic brake operation and blending with friction brake, jerk rates. Wheelslide correction and sanding. Track brake operation.
Thermal capacity	Dynamic test, at designated test site	9.4	Temperature rise monitoring of traction, braking and auxiliary equipment during repeated duty cycles. Including degraded modes and emergency duty.
Tram/track interaction	Dynamic test, at designated test site	9.8	Wheel rail interaction. Load testing of the complete vehicle and the checking of critical dimensions and clearances under a range of loading conditions. Suspension deflections and inter-vehicle clearances. Safety against derailment. Coupled Tram operation
Ride quality	Dynamic test, at designated test site	9.9	Assessment of Tram ride quality.
Kinematic gauging	Dynamic test, at designated test site	9.10	Dynamic performance, kinematics and gauging. Load testing of the complete vehicle and the checking of critical dimensions, swept path and clearances under load conditions. Suspension deflections. Pantograph sway,

TEST	LOCATION	EN 50215 Reference	Comments
Flange lubrication system.	Dynamic test, at designated test site	9.11	System operation.
Pantograph	Dynamic test, at designated test site	9.12	Included in Kinematic gauging
Electromagnetic compatibility	Dynamic test, at designated test site	9.14	Electromagnetic radiation and susceptibility of Tram systems.
Noise and vibration	Dynamic test, at designated test site	9.16	Noise and vibration tests performed on the specified section of track.
Safety Systems	Dynamic test, at designated test site	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop and speed inhibit. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer. Event Recorder (OTMR).
Tram location and detection system	Dynamic test, at designated test site	8.14.7	Tram location and detection system.
Operability and maintainability	Dynamic test, at designated test site	8.17	Coupling test and recovery.
Parking brake	Dynamic test, at steepest gradient	8.11	System operation, effectiveness on steepest available gradient.

The Site Commissioning Routine Tests shall be performed on each Tram and comprise static and dynamic tests. This shall comprise of a full functional test, both statically and dynamically, of the Tram, including inspection, examination or testing of all major systems, sections, apparatus, equipment, components, internal seating, fixtures and fittings and devices (including testing the same whilst in operation); with the further inclusion of electrical, hydraulic and other major components and assemblies, as far as practical, at the test location.

The Site Commissioning Routine Test will be designed to establish that each individual tram functions in accordance with the design. It is not intended that the routine test should be a full re-working of the either the type test or the factory tests merely confirmation through carefully targeted testing that the build was correct., It will confirm that it is in a suitable condition to operate safely on the system. Upon successful completion of the Routine Tests the Tram Supplier will be issued with a Certificate of Tram Commissioning by the Tram Inspector.

Whether or not the Tram Inspector is in attendance at a Site Commissioning Test, the Tram Supplier shall keep and make available to the Tram Inspector on request true and accurate records of the Site Commissioning Test conducted, the performance of the Tram during such tests and any faults which developed or became apparent during the course of such tests.

23.20.2 Re-Testing

The Tram Supplier shall, if requested by the Tram Inspector, undertake such further examinations and tests as the Tram Inspector may reasonably require to satisfy himself that a Tram and/or the Trams qualify for a Certificate of Tram Commissioning

23.20.3 Testing Support

The Operator shall make the following available where required by the Testing and Commissioning Plan, (and agreed by Infraco):

- Depot and workshop facilities at the Depot;
- Reasonable assistance from its drivers, maintenance and other staff; and
- Track, power supplies and other facilities, as agreed, to meet the needs of the Tram Testing and Commissioning Plan.

All parties involved and their respective representatives and staff shall:

- Observe such reasonable requirements as may be notified in writing by the Operator or to preserve health and safety, protect the Trams against damage and avoid unnecessary disruption to the Operator's operations.
- Use all reasonable endeavours to avoid risks to health and safety, damage to the Trams or unnecessary disruption to the Operator's operations.
- The Tram Supplier shall make available throughout the Tram Commissioning Tests qualified staff from the Tram Supplier's organisation and, where appropriate, its major sub-contractors to:
  - Conduct, supervise and record the results of all such inspections, tests and examinations as are referred to in this document; and
- Respond to all reasonable enquiries about the condition or performance of the Trams or the major systems, sections, apparatus, equipment, components, internal seating, fixtures and fittings and devices, including all structural, electrical, hydraulic and other major components and assemblies and to rectify any failures of the same.

Table 55 – Site Commissioning Tests: Static Routine Tests

TEST	LOCATION	EN 50215 Reference	Comments
Braking system	Static test, at the Depot	8.10.2	Friction brake system, including parking brake
Monitoring equipment	Static test, at the Depot	8.14.7	CCTV System, cameras and displays.
Event recorder	Static test, at the Depot	8.14.7	OTMR,
Tram location and detection system	Static test, at the Depot	8.14.7	Tram Location and Detection equipment.
Communications and passenger information	Static test, at the Depot	8.14.7	Radios, PA, emergency communications. Warning tones. Passenger information system.

TEST	LOCATION	EN 50215 Reference	Comments
systems			
Configuration control	Static test, at the Depot	8.14.8	Verification of defined software and firmware status for all sub-systems. Modification status for all major and critical components and others as appropriate.
Traction system	Static test, at the Depot	8.16	Motors, gearboxes, control equipment, power supplies and current collection.
Safety systems	Static test, at the Depot	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer.
Windscreen washers, wipers and demisters	Static test, at the Depot	9.18	System function
Pantograph	Static test at the Depot		Contact forces and operation.
Sanding system	Static test, at the Depot		System function.
Doors	Static test at the Depot		Cycle times.
Heating, ventilation and air-conditioning	Static test, at the Depot	8.14.4	Functional check

Table 56 – Site Commissioning Tests: Dynamic Routine Tests

TEST	LOCATION	EN 50215 Reference	Comments
Traction system performance	Dynamic test, at designated test site	9.1.2	Dynamic performance, acceleration & braking rates. Speed attainment. Operation through supply interruptions and at varying line voltages.
Braking system	Dynamic test, at designated test site	9.3.2	Friction brake system, service and emergency deceleration rates and stopping distances. Dynamic brake operation and blending with friction brake, sanding. Track brake operation.
Ride quality	Dynamic test, at designated test site	9.9.2	Subjective ride test to discern any obvious ride irregularity.
Flange lubrication system.	Dynamic test, at designated test site	9.11	System function.
Noise and vibration	Dynamic test, at designated test site	9.16.2	Subjective noise and vibration assessment to discern any obvious irregularity.
Tram control system	Dynamic test, at designated test site	9.19	Interfaces between traction, braking, auxiliary, control and safety systems. Tram management systems, displays and diagnostics.
Monitoring equipment	Dynamic test, at designated test site	9.19	CCTV System, cameras and displays.
Event recorder	Dynamic test, at designated test site	9.19	OTMR
Tram location and	Dynamic	9.19	Tram location equipment

TEST	LOCATION	EN 50215 Reference	Comments
detection system	test, at designated test site		
Communications and passenger information systems	Dynamic test, at designated test site	9.19	Radios, PA, emergency communications. Warning tones. Passenger information system (as appropriate).
Safety systems	Dynamic test, at designated test site	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman's system, door safety loop and speed inhibit. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer calibration.
Parking brake	Dynamic test, at designated test site	8.11	System function Part of braking test

23.21 System Integration Tests (SIT)

The System Integration Tests consist of tests carried out to prove that the ETN as a whole can function as intended. All infrastructure, operation and control systems shall be exercised during these tests. The Tram Supplier will provide reasonable input to the development of the SAT specifications as well as participation in, and support to, the tests whenever reasonable technical support is needed in reference to the Trams.

The System Integration Tests will include, but will not be limited to, the following:

- Comprehensive gauging and dimensional checks under a range of loading conditions;
- Run time tests;
- Interface checks to all items of workshop plant and equipment including the wheel lathe, Tram washing machine, sanding plant, cranes and hoists;
- Access and handling checks for all major items of equipment, sub-assemblies and major capital spares items;
- Validation of the radio communication system; and
- Validation of the tram position detector system.

The System Integration Tests will involve carrying out gauging runs over all parts of the ETN in order to establish that the Trams (when operating individually or in conjunction with other Trams) accord with the Tram Section and the agreed detailed interface arrangements in terms of the alignment geometry, clearances, loads, pantograph dynamics, wheel rail interface, traction power system, communications and route setting equipment, compliance with operational procedures and Tram performance values. In particular it shall be demonstrated that there is sufficient clearance between passing Trams on the Network and between Trams and other Network equipment and installations to ensure that the Trams can be operated safely and without damage to themselves and to the other parts of the System.

There shall be static and dynamic tests to verify that the pantograph conforms to the requirements of the Employer's Requirements.

There shall be a series of tests to demonstrate the ability of one Tram to recover another failed Tram, including on the most severe gradient on the ETN and potentially in a degraded mode.

The testing of the systems, including but not limited to; power supplies, overhead line, Depot equipment, and EMC tests will require the use of a number of Trams running at the same time.

Table 57 – System Integration Tests: Static Type Tests

TEST	LOCATION	EN 50215 Reference	Comments
Lifting ability	Static test, at the Depot	8.3	Body Lifting and major component removal. Bogie handling.
Battery charging system	Static test, at the Depot	8.13	Battery access for maintenance and topping up. Operation and suitability of external battery chargers.
Monitoring equipment	Static test, at the Depot	8.14.7	CCTV System, Interface with the Depot systems.
Event recorder	Static test, at the Depot	8.14.7	OTMR, Interface with the Depot systems.
Tram location and detection system	Static test, at the Depot	8.14.7	Tram location equipment.
Communications and passenger information systems	Static test, at the Depot	8.14.7	Radios, PA, emergency communications. Warning tones. Passenger information system. Interface with the Depot systems.
Traction system	Static test, at the Depot	8.16	Power supply interaction.
Operability and maintainability	Static test, at the Depot	8.17	Review and demonstration of accessibility and removal of components. Fault handling, diagnostics and indications. Safety issues.
Noise and vibration.	Static test, at the Depot	8.18	Noise and vibration levels, internal and external.
Pantograph	Static test, at	9.12	Operation. Contact forces.

TEST	LOCATION	EN 50215 Reference	Comments
	the Depot		
Sanding system	Static test, at the Depot		Refilling system. Verification that the fill level can be observed from inside the tram.
Flange lubrication system.	Static test, at the Depot	9.11	Refilling.
Visual examination of all client defined features	Static test, at the Depot	HMRI, RVAR	Interior layout, seating, livery and signage
Electromagnetic compatibility	Static test, at the Depot	9.14	Electromagnetic radiation and susceptibility of vehicle systems.

Table 58 – System Integration Tests: Dynamic Tests

TEST	LOCATION	EN 50215 Reference	Comments
Tram/track interaction	Dynamic test, at designated test site	9.8	Wheel rail interaction. Load testing of the complete vehicle and the checking of critical dimensions and clearances under a range of loading conditions. Suspension deflections and inter-vehicle clearances.
Kinematic gauging	Dynamic test, at designated test site	9.10	Dynamic performance, kinematics and gauging. Load testing of the complete vehicle and the checking of critical dimensions, swept path and clearances under a range of loading conditions. Suspension deflections. RVAR and HMRI requirements.
Platform gauging	Dynamic test, at designated test site	9.10	Platform stepping distance and heights, tare and loaded conditions. RVAR requirements.
Flange lubrication system.	Dynamic test, at designated test site	9.11	Effectiveness.
Pantograph	Dynamic test, at designated test site	9.12	Operation, contact forces, sway. OLE deflection.
Electromagnetic compatibility	Dynamic test, at designated test site	9.14	Electromagnetic radiation and susceptibility of vehicle systems.
Voltage interruption and jump	Dynamic test, at designated test site	9.15	Reaction of traction/dynamic brake/auxiliary power systems to supply voltage interruptions, jumps and short circuits. Operation over full-specified voltage range.
Noise and vibration.	Dynamic test, at designated test site	9.16	Noise and vibration levels.
Monitoring equipment	Dynamic test, at designated	9.19	CCTV System, cameras and displays.

TEST	LOCATION	EN 50215 Reference	Comments
	test site		
Tram location and detection system	Dynamic test, at designated test site	9.19	Tram location equipment, throughout the available route. Road junction and point motor control.
Communications and passenger information systems	Dynamic test, at designated test site	9.19	Radios, PA, emergency communications. Reception and effective communication with the Depot throughout the available route. Warning tones. Passenger information system
Operability and maintainability	Dynamic test, at designated test site	8.17	Review of all systems as required. Demonstration of degraded modes and recovery practices. Coupling test
Traction supply	Dynamic test, at designated test site		Sub-station load tests, sub-station outages. Regeneration. Overload protection, touch voltage and stray current tests.
Section run times	Dynamic test, throughout the System		Proving of the System infrastructure in stages as it becomes available to operate.

23.21.1 System Acceptance Testing

Tram testing will be undertaken in support of the system acceptance testing set out in these Employer's Requirements.

24 Trams

24.1 Scope

This section defines the requirements for Trams that are applicable to the Edinburgh Tram Network and with which the Infraco must comply.

24.2 General Technical Specification

The Trams shall be of a high quality in design and construction and comply with the following general design criteria:

- High safety standards including, but not limited to:
  - Compliance with Railway Safety Publication 2 - Guidance on Tramways, issued by the Office of the Rail Regulator;
  - Compliance with Rail Vehicle Accessibility Regulations, 1998;
- High reliability, minimum maintenance requirement and ease of repair;
- Proven design and technology;
- Low floor access;
- Easy to clean;
- Modern and attractive appearance;
- Low weight;
- Low environmental impact;
- Meets access requirements for the disabled;
- Minimum use of energy;
- The Trams will be required to have a minimum operating capability of at least 100,000 km per year; and

The Trams shall be designed to have a minimum service life in accordance with Section 6 of these Employer's Requirements.

The Trams shall be articulated in order to negotiate the track alignment. They will be fully bi-directional and capable of being driven from either end and shall have passenger doors on both sides. They will be capable of being operated by one person.

Normal service Trams shall comprise one vehicle, but shall be capable of running coupled together for the purpose of one Tram recovering another failed Tram from any point on the system.

The Tram should be designed and constructed in accordance with a Quality Plan (as prescribed under ISO9001), which should also include a delivery plan and a Test Plan.

A full-scale Tram mock-up shall be provided to demonstrate areas critical to operation and access as part of the formal design process and for use in public consultation. The mock-up shall include the entire cab and a representative portion of one saloon, including a vestibule with at least one operational pair of bi-parting doors and space reserved for wheelchair use. The mock-up shall show the exterior form and livery. The mock-up shall be weatherproof and shall be delivered to a location in Edinburgh designated by **tie.**

24.3 Wheel / Rail Interface

The Trams shall have a wheel profile and suspension characteristic that is compatible with the rail profiles used throughout the System in terms of risk of derailment, noise, wear and vibration. The wheel profile shall allow for flange running at crossings. The Tram will be designed to operate in conjunction with a track gauge of 1,435mm and a flange back-to-back dimension consistent with the rail types to be used on the Edinburgh Tram Network.

24.4 Tramway Path

Trams shall be compatible with the System track alignment and the geometric constraints as outlined in Section 26 of these Employer's Requirements, which gives the alignment criteria and the assumed Tram characteristics. From this the developed kinematic envelope ("DKE") calculations and any other information, to show compatibility with the alignment, shall be provided by the Infraco. The Trams shall negotiate the minimum radius horizontal and vertical curves, and maintain acceptable wheel flange wear.

Minimum clearances to existing structures, Tramstops, overhead line equipment structures and all other road furniture shall be maintained in accordance with the agreed DKE and it shall always be possible for one Tram to pass another, at any point on the system. The Infraco shall ensure that the Tram Supplier shall provide supporting information to enable a reduced DKE to be developed for use in locations where restricted speeds are or may require to be applied.

24.5 Supervisory, Control & Communications Systems

The Trams shall be fitted with equipment to automatically indicate their position to, and communicate with, a central control centre.

Additionally, a bus tracker box will be fitted.

A voice radio system will be permanently available between the driver and the central control centre. This equipment will be supplied by Infraco and will be free-issue to the Tram Supplier, to be installed and tested as part of the Tram manufacturing process.

The supply and integration of the free-issue equipment will be controlled through a system interface register, to be developed from Schedule 22 of the TSA and managed by Infraco.

All on-board systems with real-time clocks shall be updated and synchronised from a common source, throughout the working life of the Tram.

24.6 Depot Facilities

The Trams shall be maintained at the Depot and a system interface register shall be used to ensure that the Trams and the equipment provided for their routine maintenance and operation are compatible.

The Trams shall be compatible with a mechanised sand filling system at the Depot (see Section 29 of these Employer's Requirements), enabling the sand system on the Trams to be replenished within five minutes and by one driver alone. The Infraco shall ensure that the Tram Supplier shall provide a specification for the sand, and contact details for a UK-based commercial supplier of this sand.

The Trams shall have a key suiting system that provides a logical hierarchy of access to cleaners, inspectors, drivers and maintenance staff. It shall not be part of the same suite as detailed in Section 22 of these Employer's Requirements.

The Trams shall be supplied with a nominal 24VDC shore supply, socket compatible with battery charging equipment in the depot.

24.7 Electro-Magnetic Compatibility

The Trams and their sub-systems shall not generate excessive, nor be susceptible to, electro-magnetic interference and shall comply with EN 55013, EN 50121 and EN 50122 as appropriate.the requirements of the specification as detailed in section 16 of these Employer's Requirements.

24.8 Climate and Environment

The Trams shall operate normally in all climatic and environmental conditions found in the Edinburgh area on the proposed route, including operation in a marine environment having a saline atmosphere and being subject to fine wind-blown sand. This shall also include conditions where ice forms on the overhead line and wind speeds of up to 120km/h.

The Trams shall function, without deterioration in performance and for their whole design working life, within the weather conditions anticipated within the Edinburgh area as described elsewhere in Section 3.6.4 of these Employer's Requirements - taking into account the previously quoted wind speed. All equipment housings/enclosures that contain electronic equipment shall be so equipped to avoid the occurrence of condensation. The Trams shall be capable of being started up normally under the range of weather conditions as outlined above after no less than 72 hours of being left in the open in a shutdown condition.

24.9 Interface Management

The Infraco shall procure that the Tram Supplier participates in the interface engineering process. The Tram interfaces are identified in the TSA. The management of the interfaces will be carried out by Infraco using the system interface register.

24.10 Systems Assurance

The Infraco shall ensure that the Tram Supplier shall implement a System Assurance engineering process in accordance with the requirements of the Edinburgh Tram Network. This process shall cover all aspects of design, manufacture, integration, testing and commissioning of the Tram, and all interfaces with the system, to demonstrate compliance with the reliability, availability, maintainability and safety requirements of **tie**.

The Infraco shall ensure that the Tram Supplier shall follow the approach of BS EN 50126:1999 "Railway Applications – The specification and demonstration of RAMS".

The Infraco shall ensure that the Tram Supplier shall implement a reliability, availability and maintainability management process and will detail it in a Reliability, Availability and Maintainability Plan (RAMP).

The Infraco shall ensure that the Tram Supplier shall implement a System Safety Management Plan (SSMP), which shall define the process, activities and requirements for the preparation of a 'Case for Safety' during the design and handover stages of the project. The plan shall also define the system safety management organisation and the strategy to achieve the individual hazard system safety targets.

All foreseeable system safety hazards are to be identified, evaluated and recorded in a Hazard Log that will be managed and maintained throughout the project lifecycle. The Infraco shall ensure that the Tram Supplier shall implement a hazard management process to identify hazards through hazard analysis and the means to mitigate these hazards.

24.11 Noise and Vibration

Trams shall at all times meet the requirements of the **tie** Noise and Vibration Policy (NVP/001/V1.01). Trams shall operate as quietly as is reasonably possible. The proposed design shall incorporate wheel damping, side skirts with sound-deadening linings and resilient mounting of electrical equipment likely to generate noise. The Infraco shall ensure that the Tram Supplier shall provide the anticipated noise levels of the proposed Tram. Noise tests shall be carried out in Edinburgh to determine the frequency peaks generated, in particular by the wheels. The results of these tests shall be used to determine the type and extent of any tuned vibration dampers that should be fitted to the wheels.

24.12 Specific Technical Requirements

The Tram body shall be a nominal width of 2.65m externally. Note that external door sills may be required in order to comply with Rail Vehicle Accessibility Regulations.

The total Tram length shall be a nominal value of up to 44m.

The following loading conditions shall apply in this document:

- AW0 = Tram tare weight (empty car)
- AW1 = AW0 + full load of seated passengers
- AW2 = AW1 + weight of standing passengers at 4 persons/m^2

- AW3 = AW1 + weight of standing passengers at 5 persons/m_2
- AW4 = AW1 + weight of standing passengers at 6 persons/m_2
- AW5 = AW1 + weight of standing passengers at 8 persons/m^2

Where the mean passenger weight is taken to be 70.5kg.

The passenger capacity of the tram shall be at least 230 persons, of which a minimum of 80 shall be seated, on fixed seats. There shall in addition be provision for wheelchairs in accordance with Rail Vehicle Accessibility Regulations. There shall also be provision for luggage racks.

At least 66% of the floor area available for standing must be low-floor, with a height above rail level of between 300mm and 400mm. High floor areas shall be minimised. All doorways shall allow level boarding access at a height between 300-350mm above the top of the rail. The slope of the floor at the entrance shall be in accordance with disabled access regulations. Suitable means of adjustment shall be provided to compensate for wheel wear in order to remain within these limits.

The Tram shall have a maximum operating speed of up to 70km/h. However, a speed of 80km/h must be achievable, though not sustainable for a prolonged period.

The Tram structure will incorporate a strong and stiff underframe capable of supporting a buffing load in compliance with EN 12663 category V without permanent deformation. The structure shall not deform, crack, fracture, corrode or suffer loosening of rivets or bonding during the normal service life of the vehicle. It shall be, and remain, watertight against rain, passing through standing water and passing through the washing plant throughout its working life.

The tram structure shall be designed and tested to accommodate a passenger loading of AW5 as defined earlier in this clause.

All cavities in the floor structure, body sides and ceiling will be well drained and constructed in such a way that water does not collect and corrosion does not occur. Insulation material will fill all void spaces to minimise noise, vibration and heat loss.

The articulated joints will provide a wide gangway and resistance to vehicle climbing in the event of a collision. The articulation will require minimum maintenance and be capable of being dismantled to separate the Tram bodies with a minimum of equipment.

Where different metals are in contact, due regard shall be given to preventing the effects of dissimilar metal corrosion. All metal surfaces shall be treated to resist corrosion. All body panels will be interchangeable between vehicles and all exterior panels will be lined with water resistant, sound absorbing and heat insulating materials to minimise the possibility of resonance.

Easily replaceable energy absorption devices shall be provided at both ends of the Tram such that frontal and rearward collisions, at speeds up to 5 km/hr shall be fully absorbed without causing permanent deformation of the body structure. The front skirts and lower body side panels shall be mechanically fastened so as to allow easy replacement and shall be interchangeable between Trams. Each panel must be able to be replaced by one person in ten minutes.

The Trams shall be designed to be resistant to fire in accordance with the standard BS6853 Category 2, or the equivalent European Standard.

The maximum axle load at AW4 loading, and including all consumables, shall be 11.5 tonnes.

The windscreen shall be compliant to the equivalent International Regulation ECE 43 (Uniform Provisions Concerning the Approval of Safety Glazing and Glazing Materials (Rev1 08.1990). The windscreen and cab side windows shall consist of laminated glass panes made of safety glass. There should be no diffraction effects or colour distortions in the cab windows. Any glass screens dividing the driver's cab from the saloon shall be treated to minimise reflections. All internal glazing shall be made from safety glass.

The side windows (including the door windows) will be made from heat reflecting safety glass. The glazed area shall be maximised within the limits set by structural integrity, solar gain and passenger modesty. Passengers must have a clear view to the exterior whether seated or standing. Tinted windows shall be used to minimise dazzling.

The windows shall allow permeability for radio waves with frequencies for Global System for Mobile telecommunications, and other public-domain transmissions.

All windows, (including the driver's windscreen) shall be easily replaceable using standard methods and tooling available in the Depot. All glass surfaces must be replaceable within two hours and should be secured so as to be watertight and draught-proof. Bonded glass is not preferred, unless it can be demonstrated that the bonded glazed units can be easily interchanged in less than two hours. Bonding to a mechanically-fixed window frame, or securing using a rubber section, is preferred.

If the windows used are bonded, they should have a black, printed ceramic silk screen print to cover the bonding zone and protect the bonding material from ultra violet transmission, on which the ultra violet -Transmission should be less than 0,1% at 400-600 nm.

Opening hopper windows will be fitted throughout the passenger compartment. All interior glass surfaces in the Tram passenger compartments shall be fitted with Ultra Violet light reducing and shatter resisting film on the inside surface, which shall be easily replaceable as a maintenance task when required yet give good visibility when in place. This film shall also provide effective protection against damage to the glass by 'etching'-type graffiti.

24.13 Driver's Cab

The driver's cab shall be arranged so that at least 95% of adult persons can comfortably access the cab desk and all the controls located within the cab, whilst retaining the appropriate field of view out of the cab. The design of the cab shall be undertaken to good human factors practice.

The driver's cabs shall be air-conditioned and the temperature shall be thermostatically controllable by the driver. Air conditioning in both cabs shall be switched on or off from either cab. Temperature selection shall be only available from the cab in use.

An effective windscreen demisting system shall be fitted, suitable for the climatic conditions encountered in Edinburgh. The demisting system shall be able to clear the windows of condensation within ninety seconds of a cab being made operational.

The cab may extend to the full width of the Tram, and be separated from the passenger area by a glazed partition providing good passenger visibility through the cab windscreen. A mirror providing the driver with a view into the saloon (when sat at the controls) shall be provided.

An internal cab to saloon door is required, which must be lockable from the saloon side and cab side but capable of being opened at any time from inside the cab. The door must latch automatically when closed.

An inward opening, hinged and lockable external cab door may be provided. It shall be capable of being locked and unlocked from both inside and outside the cab.

The cab lighting level shall be 250-300 LUX at 1.0m above floor level. The driver shall have the control of switching this lighting on or off.

A generally translucent mesh fabric sunblind shall be provided, with an opaque strip extending 150mm up from the bottom edge. The blind must be able to be deployed by the driver whilst in the driving position. It need only be retractable at stops.

Cab windscreens and cab windows shall maximise the degree of all round vision available to the driver. A clear unobstructed view of the road/track ahead shall be provided with clear and unrestricted sight lines, particularly low down in front of the cab.

The partition between the Cab and Saloon and other glazing surfaces shall minimise the incidence of reflections at all times and in all expected environmental conditions. Blinds or curtains shall be provided to screen the saloon lighting from the cab at night.

The following features that relate to instruction of Tram drivers shall be provided:

- A Tram driver can be under instruction when a Tram is in passenger service, consequently it must be possible for an instructor and a driver to be inside the cab with the cab/saloon door closed, and the instructor must be comfortably and safely located in the cab.
- The instructor must be able to apply the Tram security brakes quickly.
- The instructor must be seated and secure in the cab to the extent that he can apply the brakes even when the Tram is performing unpredictably.
- The instructor's seat may be a portable item,supplied with the Tram.

The driver's seat, unless purpose-designed for a Tram, shall be a seat specifically designed for bus applications rather than for other vehicles such as heavy rail or heavy goods vehicles, as it must be capable of being adjusted frequently without any damage. The seat must be of ergonomic design, easy to clean and easily removable from the cab. The seat cushions shall be easily removable for cleaning.

The driver's seat must be easily adjustable so that 95% of adult persons may be seated comfortably with effective reach to the drivers' controls, and maintain unrestricted lines of sight through the windscreen.

Both cabs on each Tram shall provide stowage for:

- A points handle, typically a steel bar about 1m long (supplied by others). This must be placed so the driver can easily take it with him when leaving the cab, and so it must be stowed and un-

stowed without risk of damage to the cab finishes or equipment. When not in use it must be secured so as to prevent becoming a hazard in the event of an emergency stop or a collision.

- A first-aid box (supplied by others)
- A fire extinguisher to be supplied with the Tram.
- A place to hang a driver's coat, where it will not interrupt the view in any direction.
- A place to hold two A5 ring binders of timetables, information and procedures.
- A place to clip an A5 sheet of paper, which can be conveniently referred to by the driver (whilst at a Tram stop), and which does not obscure any controls or gauges.
- A hand lamp (supplied by others)

Provision shall be made within each cab to allow two operational personnel to separately and securely store personal effects

There shall be provision in each cab for a secure cash box (supplied by others). The dimensions of this are to be provided by **tie**.

There shall be charging points in each cab for a portable radio and a hand-held ticket machine.

The tram shall be fitted with holders in each cab for a destination board, for the purpose of indicating additional destinations of public interest. This board is to be placed in position by the driver so as to be seen from in front of the tram. The dimensions of the board are to be provided by **tie**.

24.14 Tram Controls

The layout of controls, switches and instrumentation shall be agreed with **tie** on the mock-up, by use of design submittals and the use of the mock-up. The desk panels shall be made of material that is wear resistant and free from reflections.

It shall be possible to drive the Tram from each cab. Insertion of the driver's key and the operation of one switch in either cab shall switch on all of the equipment needed to enable the Tram to be driven from that cab. Essential sub-systems shall not be separately switched.

The Tram acceleration and braking shall be controlled from a combined controller handle, incorporating a dead man safety device. This shall normally be locked out of use until released by the driver's key, which shall remain captive in the controller until the controller is placed in the off

position. It shall not be possible to operate the Tram with more than one controller in use at any one time.

The controller shall include a slow speed mode, for driving through the Tram washing plant.

The following controls shall be conveniently placed for the driver's free hand when the Tram is in motion:

First priority

- Audible warnings (bell, horn);
- Track brake (in addition to the emergency brake on the driver's controller);
- Indicators;
- Pantograph emergency drop.

Second priority

- Manual sand (in addition to the automatic sanding system);
- Windscreen washer and wiper controls;
- Headlamp dip/main beam;
- Panic Alarm;
- Tram punctuality display against timetable or headway.

The following controls shall be conveniently placed for use when the Tram is at a Tram stop:

- Door controls;
- Rear-view normal mode push-button;
- Tram Ready To Start (junction calling when at a Tramstop close to the junction);
- Hazard and marker lights;

- Air-conditioning and temperature controls;
- Saloon heating control;
- Fault reset push-button;
- Public Address controls;
- Radio controls;
- Cab light switch;
- Saloon lighting;
- Pantograph control;
- Windscreen demister.

At least one cab shall display an odometer calibrated in km. Both cabs shall display a speedometer calibrated in km/h and mph.

Windscreen wiper control shall be by means of a multi-position switch having intermittent, continuous slow and continuous fast positions. Wipers shall be self-parking to a position close to and parallel with the edge of the windscreen.

There shall also be a separate push button, which operates wipers and windscreen washers for as long as it is held down, and provides one additional sweep of the wipers after it is released.

Each cab shall be equipped with an indicator to inform the driver whether the Tram is running early or late, and by how much.

24.15 Rear View Equipment

Rear-views shall be provided by close circuit television equipment which shall function as follows:

The 'normal' view, displayed whenever the Tram is in motion, shall have two screens in the cab integrated into the desk: one on the left side of the desk and one its right. The images in them shall be the same as would be seen in mirrors.

The 'Tram stop' view shall be displayed in the time between the doors being enabled at a stop and all doors being proved closed. In this view, the monitor on the platform side (the side on which the doors are enabled) shall show the same as in normal view. The other monitor shall display the image from the rear camera on the platform side, to enable the driver to view passengers disembarking and embarking and to ensure that doors are clear before they are closed.

Note that the images of views back from the cab will be laterally inverted and those forward from the rear of the Tram will not.

A separate push button conveniently located on the cab desk shall provide the driver with a changeover facility from 'Tram stop' to 'normal mode' for as long as it is held down, to allow a driver to check that nothing is overtaking the Tram at an on-street stop whilst the doors are closing.

Closed circuit television images must remain clear enough to see a cyclist overtaking the Tram before the Tram sets off from an in-street Tram stop, even whilst it is raining, dark, under street lighting and there are car headlamps shining towards the cameras. The tram supplier will be required to demonstrate that the CCTV coverage allows drivers to effectively see all passengers boarding and alighting, as well as being sufficient for the needs of driving the tram on street.

The images from the cameras shall be displayed in the cab to the driver on colour flat-screens with manually adjustable brightness. Images on these screens shall be viewable by the driver under all ambient lighting and weather conditions and at as wide an angle as possible. Care shall be taken to ensure that 'flaring' of the image from brightly lit, wet, road surfaces is avoided. Special consideration shall be given to the use of this equipment in wet weather and poor lighting conditions, when it may be necessary to remove rain droplets or prevent them from forming on the camera lens.

Rain affects closed circuit television both by creating additional reflections from wet road surfaces and by settling on the camera housings themselves. The system must cope adequately with both.

24.16 Interior

Care and attention shall be given to provide a safe passenger environment. Passenger movement within the Tram shall be made as safe as practicable, and able-bodied passengers shall be able to move along the entire length of the passenger saloon of the Tram.

The free and safe movement and loading of passengers shall be facilitated by the incorporation of handrails, grab-poles and an interior free of tripping hazards and sharp corners throughout the Tram. The gangway width between seats shall be not less than 650mm. Hand-holds will be provided to maximise the use of standing space, particularly in vestibules and articulations.

Steps may be included to permit the movement of passenger's to or from areas where there is a difference in the height of the floor of the Tram. Steps shall not exceed 200mm in height and the quantity should be as few as possible. There shall be a minimum of 16 seats accessible to passengers without using steps.

All seats shall be at least 450mm wide, ergonomically designed, resistant to damage and soiling and have easily replaceable covers. The seats shall as far as possible not be placed on pedestals, i.e. shall not require a step up for passengers when taking a seat. Wherever practicable seats should be cantilevered from the vehicle side so as to leave a clear floor area to facilitate cleaning. Seat rows shall be pitched no closer than 752mm.

The non-slip, easy clean floor covering shall also continue up the vehicle sides and seat pedestals so that there are no corners that can act as dirt traps. The floor covering shall be hardwearing with minimal openings and continuous welded or seamless glued joints. The edges of the floor covering shall be sealed to prevent water penetration to the structure of the Tram.

The floor covering shall be highly resistant to staining from any source.

The actual floor area available for standing passengers shall be clearly identified. From this the total standing capacity shall be calculated, respecting Rail Vehicle Accessibility Regulations and the limitations of standing room in areas such as articulations. Seating shall generally be arranged transversely with minimum longitudinal seating.

The tram shall be fitted with luggage racks, distributed evenly about the vehicle and situated as close as practicable to the vestibules. The luggage racks shall occupy a floor space of up to $10m^2$ and extend the full height of the interior and have two intermediate shelves. At floor level a horizontal bar shall extend across the opening into the saloon to prevent objects rolling out of the luggage space. Luggage shall be effectively prevented from excessive movement out of the racks, either under high rates of braking or lateral acceleration. The luggage racks should be easily replaced by seating (or standing areas if appropriate) should **tie** require to do so.

The tram is to be provided with information screens so as to be visible from within most parts of the saloon. The screen should be able to display video information for events and places of public interest, and should also be able to display selected views from the closed-circuit television system. All passenger areas of Trams shall be provided with windows in all sidewalls to maximise visibility for passengers. This requirement shall also apply to draught screens and separation walls to the driver's cabs.

The Tram shall provide data on the number of passengers boarding and disembarking at each Tramstop. This data shall be easily downloaded each day when the tram returns to the Depot. Software to allow analysis of the data shall be provided.

The passenger counting facility shall be incorporated on 6 of the trams in the fleet only. It shall be possible, with minimum disruption to wiring looms, body panels and major equipment, to retro-fit passenger counting equipment should this be required after the vehicles have been delivered.

Passenger stop request buttons shall be provided in the saloon area in accordance with Rail Vehicle Accessibility Regulations.

Interior saloon lighting shall provide glare free, uniformly distributed illumination in passenger areas, to a level of between 280-350 lux. The lighting diffusers shall be easily cleanable.

Emergency internal lights must function after disconnection from the overhead power supply (at all operating temperatures) in accordance with the battery back-up and load-shedding requirements below. Emergency internal lighting shall provide a minimum illumination of 30 lux at floor level and shall be evenly distributed in each passenger area of the Tram. The operation shall be independent from the overhead line power supply. Uniformity of illumination shall not be less than a factor of 0.4 Headroom throughout the seating areas shall be at least 2.1m to ceiling.

There shall be litter bins provided at each vestibule on both sides of the tram, each being able to be filled with typical soft drink cans. The litter bins shall be easily emptied.

All passenger areas of Trams shall be provided with a heating and ventilation system that maintains a constant acceptable ambient temperature during transit between Tram stops and during boarding and alighting at Tram stops when operating in all prevailing climatic and environmental conditions on the proposed route.

The arrangement of heating devices shall prevent excessive draughts caused by high airflow rates, due to the even warm air distribution inside the Tram. With the appropriate arrangement of the

vents, the air inside the Tram shall be heated and distributed over a large area through natural convection. Pockets of hot and cold air shall be avoided.

The interior of each Tram shall be fitted with reserved spaces for on-board advertising and passenger information notices. These spaces shall allow cardboard panels, 210mm deep, to fit snugly into retaining grooves. A clear smooth surface at least 160mm deep shall be available between the grooves to allow for the fixing of vinyls. There shall be a route map above the inside of every passenger doorway. The Infraco shall ensure that the Tram Supplier shall produce and fix all notices required by law or the Safety Management System, and fix free-issue logos, route maps and other notices, using appropriate materials and attachment methods, against a schedule which shall be agreed by **tie** on the mock-up.

Trams shall be fitted with racks close to the vestibule areas for holding information leaflets and newspapers. The arrangement and design of these racks is to be agreed by **tie** on the mock-up.

Two night partitions shall be provided which are fully retractable and can be securely stowed when not in use. These partitions shall be located adjacent to the articulations on either side of the wheelchair area towards the centre of the tram.

This night partition should be included in the mock-up.

The function of these partitions shall be to enable the rearmost portion of the tram to be securely locked out of use by the on-board inspector in order to enable him to more closely supervise the passengers in the forward portion of the tram whilst retaining the wheelchair facilities, as required by RVAR.

The partitions themselves shall be simple to operate by one person in the range of 5th percentile female to 95th percentile male. It shall be possible to lock the partitions in either the stowed or fully deployed position using a key which is carried by the on-board inspector as part of his normal duties. It shall be possible to deploy and stow the partition within 2 minutes. When deployed or stowed the partition shall be robust enough to withstand a person falling against it without sustaining damage.

A key operated control, located such that it may be conveniently operated by the on-board inspector with the partition deployed, from either side of the partition, shall cause the lights in the rearmost (isolated) portion of the tram to be reduced to emergency lighting levels, and disable the external door pushbuttons in order to prevent passengers accessing this portion of the tram. Under all circumstances the crew entry functionality at the single end doors shall remain operable and it shall be possible to operate the emergency door release throughout the tram. Additionally the Passenger

Emergency Communication Units shall remain active in all parts of the tram. The activation of the key operated control shall be indicated in the active driving cab but shall not cause a fault alarm.

In order to assist with the design the following information gives the anticipated normal method of operation.

At a terminus where the partition is to be put in place:

- The passenger doors will be opened in the normal way to allow passengers to exit and enter the tram (at this point they may board at any point in the tram);
- The driver will close and remove the enable command from all doors before closing down the cab and walk to the other cab;
- The on-board inspector will move any passengers in the area to be closed off to the portion of the tram forward of the partition;
- The inspector will then secure the partition in place and operate the key switch to deactivate the rearmost door controls and dim the lights;
- The driver will activate the forward cab and enable the doors for passenger boarding in the normal manner prior to departing.

Consideration should be given to providing an indication on the side passenger information displays to indicate to intending passengers that boarding is at the forward end of the tram only.

Tram loading will be uneven when the partition is deployed. The implications on load compensation in traction and braking control of the tram shall be considered and should continue to function appropriately when this condition is in force.

Interior ceiling and coving panels should be securely retained, so that they do not fall onto the maintainer when the catch is released. All interior panels should be small enough to be handled and lifted by one person unaided.

The interior livery shall be developed as part of the system identity and branding package and is to incorporate the features set out in the Design Guidelines. Typically this shall include the following factors:

- Paint finishes should use the same colours as for the exterior;
- GRP interior panels / door interiors / lower finisher trim for bonded glazing shall be Blue RAL 5005;
- Roof / coves / sides laminates shall be the same colour as Perstorp PP5650U Cezanne;
- Seats and wheelchair backrests shall be covered in Holdsworth Edinburgh Tartan – W218ET (including priority moquette);
- Driver's seat covering shall be Black hide material;
- Floor colours shall be as per Taraflex Luna NT Lewis (Taraflex Red BEF 53/01) and Taraflex Polaris NT Arran (Taraflex Blue BEF 33/01);
- Floor covering weld cord – Yellow;
- Seat backs shall be in Lothian Blue; and
- Hand rails and stanchions shall be in Red RAL 3020.

Passenger seats shall be of a similar style to the Grammar Pratico 2845 Low backrest, as currently deployed on Lothian Buses.

24.17 Bogies

The vehicle will have a minimum of 66% adhesive weight on motored axles.

The bogies shall be of proven design and have been used successfully in another Tram project.
The bogies will incorporate suspension systems to give a high-quality ride characteristic. The suspension system will be self-adjusting or adjustable for wheel wear so that ride heights can be closely maintained.

The ground clearance (from top of rail) fully laden with worn wheels shall not be less than 50mm to any part of the bogie structure except a track guard.

Each axle on the motor bogies will have a spring-applied friction brake. It shall be possible to release the spring-applied brake manually in the event of failure of the actuation system. Under normal operation the parking brake will release and apply automatically when the driver's controller is activated.

Each bogie shall have two electro-magnetic track-brakes, one suspended over each rail between the wheels.

The wheels shall incorporate resilience and damping in order to minimise noise and vibration. Tuned vibration absorbers will be fitted after carrying out tests to determine their most effective parameters.
Effective under-run protection arrangements shall be provided. The end bogies will carry adjustable track guards on their outer ends, to conform to Railway Safety Publication 2 – Guidance on Tramways, issued by the Office of the Rail Regulator requirements for under-run protection. The motor bogies will be interchangeable with each other.

Removal of components such as brake actuators, suspension units, etc. will be facilitated to allow on-site repair and replacement of major items such as motors or wheels to take place with the minimum of Tram down-time.

The ride comfort levels measured according to the ISO 2631 Standard on a ballasted straight and level track in good condition shall be no worse than:

Speed	Wz vertical	Wz lateral
40 km/h	2,32	1,58
70 km/h	2,96	2,36

Table 59 - Ride Comfort in the Driver's Cab

Speed	Wz vertical	Wz lateral
40 km/h	2,24	1,64
70 km/h	2,82	2,28

Table 60 - Ride Comfort in Passenger Compartment

At least two wheelsets of the Tram shall be equipped with flange lubrication equipment on all wheels. Both sides of the flange shall be lubricated. It shall be capable of being programmed to operate on the basis of either location, or of a time interval, or a combination of these.

24.18 Re-Railing

The Trams shall be capable of being returned to the running track in case of derailment with the minimum amount of equipment and in the shortest possible time. The Infraco ensure that the Tram Supplier shall indicate the best methods for re-railing and the equipment required, for all track forms used on the system.

If the Tram design includes suspended body sections, then articulation locks shall be procured by the Infraco from the Tram Supplier.

24.19 Propulsion Equipment

The Tram shall not export additional risk onto Network Rail infrastructure. In particular, the harmonic generation from the propulsion and control equipment shall not interfere with train-borne or trackside systems or other third party systems and infrastructure.

The traction equipment shall detect and automatically manage wheel slip and wheel slide, so as to maintain performance and stopping distances in all track conditions and without damage to the wheel treads. When slip or slide is detected sand will automatically be applied to the rails in front of the leading axle. Sanding must not take place due to spurious wheelslip/slide detected at flange running crossings, pointwork or sharply curved or transitional track. The traction equipment shall tolerate variations in wheel diameter.

The Trams will have the following performance when motoring, on straight and level track and with a nominal line voltage of 750V dc:

Speed (km/h)	Load	Performance	Notes
0 -> 30	Up to AW4	1.2 m/s^2	Instantaneous
0 -> 70	Up to AW4	0.8 m/s^2	Average

Table 61 - Tram Performance Levels

The effect of variation of the line voltage (within the prescribed system limits) on the Tram performance, shall be provided by the Tram Supplier on behalf of the Infraco. The maximum line current, and the conditions when it shall be demanded by the Tram, shall also be provided by the Tram Supplier on behalf of the Infraco.

The Trams shall provide safe operation on all gradients under degraded performance modes as imposed by the traction equipment. In particular, the Trams shall be able to complete any journey on the System with one complete traction drive unit isolated.

The traction and braking control system shall be optimised to provide smooth and low jerk values in starting from rest, acceleration, braking and stopping, on level track and on all gradients that are encountered, under all loading and environmental conditions, while protecting against unintended downhill movement.

The Tram may be fitted with a short-time rated emergency mode, with a higher tractive effort, to assist in recovering other Trams.

24.20 Braking Equipment

The Tram Braking Equipment shall be designed to comply with BS EN 13452 Part 1 except where stated below.

The service brake application shall be capable of retardation at an acceptable rate (as defined in Tables 3 and 4 of BS EN 13452 Part 1) at all specified laden conditions and the jerk rate shall be limited so as to not cause discomfort to standing passengers. The service brake shall normally consist of a regenerative electro-dynamic brake, (that as far as is practicable shall return the braking energy to the overhead line) and a friction brake. The electro-dynamic brake shall normally take precedence over the friction brake.

The regenerated voltage shall not exceed 900V. Should the overhead line become unreceptive, the braking energy shall be dissipated in naturally cooled resistors. Transition between regenerative and rheostatic modes shall be automatic, instantaneous and free from jerk. Braking distances and deceleration rates shall be unaffected by transitions during braking.

The brake resistors shall be protected from overheating. Malfunction of the dynamic brake system must be detected and recorded by the fault monitoring system.

Electro-dynamic and friction brakes shall be blended. In normal operation the friction brake will take over from the electric brake at a low speed. In addition, sand will be applied automatically during braking when triggered by the wheel slip/slide control system. Should the electro-dynamic brake be unavailable on any particular traction drive then the friction brake will be automatically applied to compensate, without jerk or loss of performance.

For emergency braking applications the jerk rate shall be limited without compromising emergency braking performance. The friction braking system should be capable of repeated full service or emergency brake applications.

The Tram parking brake shall be of sufficient performance for a Tram (whether laden or unladen) to hold without movement and for an indefinite period another unladen Tram without brakes on the steepest gradient on the Edinburgh Tram Network under all adhesion conditions.

The braking function and performance of the Tram shall be in accordance with Tables 3 and 4 of BS EN 13452 Part 1. The definitions of the braking modes given in these tables are as defined at Section 3.2 of the Standard.

When the Emergency brake is applied, the track brakes should be released immediately before the Tram comes to rest in order to minimise jerk to passengers.

All braking and jerk rates shall comply with the requirements defined in Standard EN 13452.

24.21 Run Time

The Trams will be capable of being operated continuously for twenty hours in each day.

A runtime simulation will be carried out by the Infraco to demonstrate the required end-to-end journey times. The Trams shall have sufficient performance and ratings to meet the requirements for these run times and end to end journey times. The inputs to the simulation shall be based on theoretical Tram performance validated by type test measurements with similar Trams in service elsewhere. The infrastructure and operational assumptions for the runtime shall include, but not be limited to:

- Alignment information, including speed restrictions due to geometry and sighting restrictions;
- Location of Tram stops and assumed dwell times;

- Speed restrictions due to the presence of pointwork;
- Service brake rates including agreed allowances for driver variation and technique, and varying adhesion conditions;
- Jerk rate and acceleration compliant with the requirements;
- Assumed delays due to operation in mixed traffic, which may be in the form of assumed speeds or time delays;
- Assumed delays due to the operation of the traffic-signal-controlled junctions, which may be in the form of assumed speeds or time delays;
- Tram loading;
- Wheel wear; and
- Traction system supply voltage.

24.22 High-Voltage Equipment

All Tram-borne high voltage equipment shall be adequately rated for operation at the line voltage. All high voltage equipment other than the pantograph will be securely enclosed in rigid, metal and earthed equipment cases.

The high-voltage sub-systems will be protected by high-speed circuit-breakers or fuses, which shall be enclosed so that their operation does not cause alarm or danger to persons standing near to the Tram. The length of electrically unprotected cabling between the pantograph and the protection devices shall be minimised.

Wherever feasible, there will be duplication of primary assemblies in order to minimise the potential for single-point failures. There will be a minimum of two self-contained traction groups, so that failure of a traction drive on one bogie does not immobilise the Tram.

24.23 Auxiliary Power Supply Systems

The auxiliary supply converter(s) shall start when fed from the overhead line, irrespective of the state of charge of the batteries.

The converter outputs for auxiliary supplies and battery charging derived from the overhead supply shall be isolated from the overhead supply to prevent any possibility of excessive voltages appearing on the low-voltage circuits.

The saloon heating units (if mounted in the saloon area) shall be provided with appropriate protection and insulation for the heating elements and their terminal connections.

The charging system for the batteries will be appropriate to the type and size of battery provided.

A suitable socket for connecting a 24V battery charging supply shall be provided.

The batteries shall be of a low maintenance type suitable for traction applications and enclosed in electrolyte-proof containers to contain environmental pollution in case of damage. There shall be absolutely no possibility of spillage from the batteries entering the passenger saloon or the cab. The battery enclosure shall be vented to prevent the build-up of gases.

In the event of loss of the 750V overhead supply, the batteries will allow all essential systems to operate for a minimum of thirty minutes. Certain critical functions will continue to operate for up to one hour from battery supply:

After ten minutes:

- The saloon lighting system shall revert to emergency lighting only.

For up to thirty minutes, the following systems shall remain in operation:

- Brake system;
- Public Address system ;
- Emergency lighting; and
- Door system.

For up to one hour the following systems shall remain operational:

- Pantograph;
- Minimum exterior lighting; and
- Radio communication system.

24.24 Faults and Diagnostic System

The Trams will have a condition and fault monitoring system integral with the vehicle control system, to give indication to the driver of the status of equipment and to allow control of degraded modes. Failures or events requiring maintenance intervention shall be recorded by an on-board system that shall retain all pertinent details after the Tram has been shut down, for downloading and analysis by maintenance staff. This system will have sufficient capacity to store such information at least for the interval between scheduled maintenance examinations, on a first-in, first-out basis. There shall be a visible indication that at least one day's worth of recording remains available.

The downloading of data shall be accomplished using a commonly available lap-top computer or related portable device. Any software or special equipment or licences required to download or analyse the data from the Trams shall be provided by the Tram Supplier.

The display for the driver shall also provide unambiguous information of the status of the Tram, and the severity of any faults present. In particular, the system shall continuously indicate one of the following fault states according to the condition of the Tram:

- Tram OK;
- Minor fault, report to control and continue;
- Major fault, report to control and continue in degraded mode;
- Major fault, Tram must be immediately taken out of service; and
- Major fault, Tram inoperative.

The Tram shall perform a self-check automatically whenever it is started up from a shut-down condition.

24.25 Sanding System

The Tram shall be equipped with a system, which deposits sand immediately ahead of the driven wheels in the direction of travel to rectify any poor adhesion conditions at the wheel/rail interface. The system shall be activated both automatically whenever wheelslip or wheelslide is detected, and manually when under control of the driver. Sand will also be automatically applied whenever the emergency or security brakes are used.

Sand shall be deposited on at least two locations on each rail per direction of travel. The rate of sand deposition shall be no more than that required to correct the poor adhesion. The automatic sanding system shall be inhibited when the Tram is stationary, unless activated manually. The sanding unit response time shall be effectively instantaneous.

The Tram-mounted sand boxes shall have sufficient capacity for a full day's service under all conditions of weather and loading.

The sand filler covers shall have seals to keep the sand content dry under all weather conditions, and when the vehicle is being washed.

A means of ascertaining the sand level in the sandboxes shall be provided, visible from within the Tram.

The Tram sandboxes shall be filled from outside of the Tram using a sand dispensing plant at the Depot. The sandbox arrangement will be compatible with the sand dispensing plant such that it is possible for the driver of the Tram to completely fill all the sandboxes in five minutes. In the event of failure of the plant, it shall also be possible to fill the sandboxes manually, and if any special equipment is required for this, the Infraco shall ensure that the Tram Supplier shall provide it.

24.26 Passenger Doors

The Tram will be equipped with at least four pairs of bi-parting sliding-plug doors, plus two single doors, on each side of the vehicle for the passenger saloon and one internal cab door per cab with a clear opening of not less than 610mm. The doors shall be equipped so that rainwater does not drip onto passengers when the doors are opened.

The passenger saloon doors shall be fitted on both sides of the vehicle in the low-floor area. The doors will be of the following characteristics:

- The double door clearance width shall not be less than: 1300 mm
- The double door clearance height shall not be less than: 2025 mm
- The closing force shall be: <200N
- The opening force shall be: <250N

The doors will be opened and closed by the driver or simply released by the driver so that the passengers will be able to open the doors themselves using door push buttons. The push buttons will be illuminated when they are activated. The doors shall stay open for a fixed time before closing automatically. A warning tone shall be sounded when the doors are released and a different tone shall sound to give warning of door closure.

Devices will be incorporated into the individual door control mechanisms, or in the leading edge of the door, to detect and protect against door obstruction. Slow or defective door mechanisms will be indicated to the driver by the vehicle fault management system. The driver shall be able to isolate any door by using the driver's key to operate an isolation switch local to each door. Such a door shall be secured from all forms of operation other than emergency release.

It shall be possible to open each door manually in case of emergency (including any door that has been isolated). An internal emergency handle will be provided at each door entrance. Operation of the handle shall cause an immediate application of the emergency brake and unlock the door such that it can then be moved open by hand after the vehicle is stationary. The emergency handle will only be able to be reset using the driver's key.

The door edges shall be fitted with weather-proof seals that are soft enough to allow a person's fingers to be withdrawn after the doors have closed. The seals shall be effective against all likely weather conditions and in the Tram washing plant and shall not offer a hand-hold to allow persons to ride on the outside of the Tram.

The Tram shall accept a door enable command from the driver when the Tram speed is below 10km/h, but the doors shall not become enabled until the Tram is at a standstill. If, having been enabled, the Tram speed then rises above 10km/h, the enable command shall automatically be cancelled.

The time from the Tram coming to rest to doors being fully open in response to a prompt passenger demand, plus the time from the driver pressing the door close button to the Tram moving off, shall be less than 12 seconds. This time shall include all necessary delays for RVAR-required tones. The doors themselves shall move from closed to fully open or vice versa in 3.5 seconds or less.

The door guidance mechanism shall not be a swing plug mechanism nor a folding door.

The following controls shall be fitted in each cab for driver control of the doors:

- Separate door-enable controls for the left and right sides. It must be possible to enable both sides simultaneously. The 'enable' buttons of the Tram should each be located on the appropriate side of the cab desk.

- One door 'open' button, which will open any doors previously enabled, but not opened by passengers, provided the Tram is at a stand still.

- One door 'close' button, which will close all doors that are open. This will be the normal mode of door closing at Tram stops other than termini.

- To prevent the doors being enabled on the wrong side, the door enable shall be interlocked and programmed with the correct side for the platform at each Tram stop along the route. This feature shall be capable of being over-ridden by the driver (for example, if the Tram uses an unusual platform at a terminus), but such over-ride shall require the driver to press at least one additional button, which shall not be located adjacent to the other door controls in the cab. It shall be possible to open all the doors when the Tram is in the Depot.

The door enabled indicator lights at the doors shall illuminate and the door enabled tone start, simultaneously with the door actually becoming available.

A door shall re-close automatically, with warning tone, if no obstacle is detected for twenty seconds (configurable). This will be the normal mode of door closing at termini.

When all doors are closed and traction is available, an audible signal, distinct from all other tones and quieter and less offensive than any alarm tone, shall sound in the cab in use. This is preferred to a lamp or other visual signal as the driver already has to view the platform and check ahead before moving off.

Unless a separate external cab door is provided, the door nearest each cab on each side (four doors in total) of the Tram shall be provided with local internal and external 'door open' and 'door close' switches operated by the driver's key. These shall be spring-loaded centre-off, turned one way to open and the other to close. Any door opened using a local switch shall be capable of being closed either using the appropriate local switch or the 'door close' button in any active cab. The purpose of these switches is to allow local control of the door by a driver who needs to leave and re-enter a passenger-carrying Tram, for example to operate points, at a place which is not a Tramstop. In addition, unless a separate cab door is provided, a separate control shall be provided in the cab to allow the Tram driver to open and close the nearside front passenger door separately from the cab. This is to allow the driver to open and close this door separately at the crew change halt at the Depot. An exterior emergency door release shall be incorporated to comply with the requirments of Railway Safety Publication 2,

The door-enabled tone required by Rail Vehicle Accessibility Regulations 1998 (as amended) shall be audible from both inside the Tram and on the platform. This may require an additional external sounder if, in order to be heard outside, the internal one is uncomfortably loud for passengers on the Tram.

24.27 Communication and Monitoring Systems (CCTV)

Spatial provision shall be made in the most appropriate part of the Tram for the operational radio system, driver control units and tram position and detection system equipment, including the associated cabling, support equipment, microphones, speakers, antennae and power supplies. The cabling shall be installed and tested by the Tram Supplier.

These sub-systems will be supplied by the Infraco as free-issue items to the Tram Supplier, and shall be installed and functionally tested during the Tram manufacturing process. The Infraco and Tram Supplier shall work with the suppliers of these sub-systems to define and agree the interface requirements.

The Tram shall be fitted with cab-to-cab intercom facilities. The intercom facility will also provide communication between all four cabs when two Trams are coupled during the recovery of a defective Tram. This facility shall be fully duplex and hands-free.

The Tram shall be fitted with internal cameras that record digital images covering:

- The whole of the saloon, (including the passenger help points) with sufficient clarity to enable individuals to be identified for evidential purposes; and

- The views ahead/back from the cabs.

The resolution of recorded images and recording speed of images shall be of a quality from which it would be capable of being reliably used as part of an accident investigation, and in respect of the saloon images shall be of a quality to enable a conviction in the event of illegal activity. Appropriate labelling in accordance with regulations governing the use of such equipment shall be put in place.
The cameras shall be of a hemispherical type without any detectable direction of the camera view. Additional information, i.e. time, date, camera number and the Tram number will be added to every image recorded.

The recorded Closed Circuit Television images will be capable of being retained on the Tram for not less than 72 hours at which point the system will restart recording and erase the retained image. Minimum frame rate shall be 16fps, per camera. Consideration should be given to providing a push-button in the cab to enable the driver to add an index-point to the recorded images.

Closed Circuit Television images shall be taken from the Tram for subsequent retention and analysis. This shall be done using a removable data storage medium rather than by data transfer. It shall be readily apparent to the Tram driver and to maintenance staff when the storage medium is not present on the Tram. The data storage medium shall be retained by a secure locking device, that is not released by a Tram system key. All data storage devices shall be interchangeable between trams.

All software required for off-Tram viewing, editing and analysis, shall be procured by the Infraco from the Tram Supplier. This shall include any non-standard supporting hardware and any associated licences.

24.28 Event Recorder

The Tram shall include a data recorder capable of providing time, speed and distance information at 1.0m resolution or better for the last day's operations, and at 10.0m resolution or better for the last seven days' operations. Additionally, the start and end of the following events shall be recorded:

- Horn;
- Bell;
- Traction;
- Brake;
- Hazard brake;
- Safety brake;
- Track brake;
- Driver's Safety Device;
- Door enable left present;
- Door enable right present;
- Manual sand command present;
- Tram Ready to Start;

- Hazard lights;
- Left indicator;
- Right Indicator; and
- Passenger Help Point.

Software enabling event recorder download data to be interrogated and displayed in both graphical and tabular format shall be provided. The software shall also enable all of the data to be exported into Microsoft Excel for further analysis.

The data shall be recorded onto a secure, removable data storage medium. The data recorded shall include the Tram number and date. The data shall be retained and be retrievable at least until 48 hours after the Tram has been shut down. The data storage medium shall be retained by a secure locking device,that is not released by a Tram system key. All data storage devices shall be interchangeable between trams.

The Infraco shall ensure that the Tram Supplier shall indicate how the distance base of the recorder shall be recalibrated in normal usage.

24.29 Public Address System

Automatic, audible announcements for destination and stops shall be made by means of a digital voice announcement system. The Tram Supplier shall supply a copy of any necessary equipment and software needed to upload new and amended announcements or to alter the times and places at which announcements are made. The system should allow for a sound quality of RASTI 0.7, or better.

Additionally, the Tram shall be fitted with both internal and external public address systems, selectable individually by the driver, to allow the driver to make direct announcements.

The following are additional to the requirements of the Rail Vehicle Accessibility Regulations 1998 (as amended):

- Rail Vehicle Accessibility Regulations permit audible announcements between stops to be omitted where the run time between stops is less than two minutes. This option is to be used wherever possible.

- Where stops are omitted the system shall automatically allow for this without intervention of the driver.

- At a stop, in addition to the Rail Vehicle Accessibility Regulations requirement of announcing the next stop and destination, the equipment must also be capable of announcing the current stop. The form of the announcement to be provided initially shall be:

  "This is <name of current stop>. This Tram is for <name of destination>. The next stop is <name of next stop>."

It shall be initiated by the door enable, and there shall be a short delay so that the door-enable tone is finished before the announcement starts.

24.30 Passenger Information System

The Tram shall be fitted with six external destination displays, one at each end above the cab and two on each side, one near each end. The side displays should not be obscured by open doors. These displays shall be capable of displaying as a minimum a service number and the ultimate destination of the Tram. The displays should be legible from an oblique viewing angle.

In addition to the text indicating the destination of a tram on both the side and cab exterior displays an area immediately preceding the text shall be reserved for a single symbol. This symbol shall be displayed in an array of LEDs of the same size and resolution as that of a text character. The symbol shall be in a single colour which is the same as that of the text display. It shall be possible to display a variety of characters including simple geometric shapes and representative symbols (e.g. an aeroplane to indicate AIRPORT as the destination). It shall be possible to select an appropriate symbol during the programming of the system which will then appear on the display when the driver selects his route.

The purpose of this feature is to assist passengers with reading difficulties to ensure that they board a tram on the correct route for their requirements.

Internal saloon displays shall be used to show information concerning the next stop and additionally a "Tram Stopping" sign. They shall also display the local time, and should also be able to display public service information. The number and location of these displays shall be such that the information shall be easily visible to passengers within any part of the Tram.

The internal visual displays shall display, successively:

- Screen 1: Tram to
- Screen 2: <Destination>
- Screen 3: Next Stop
- Screen 4: <Next Stop>

Stepping to the next stop name shall take place on arrival at a stop once the doors are enabled. Where stops are omitted, the displays shall take account of this automatically without the intervention of the driver.

The size of the Passenger Information Display font shall conform to the requirements of the Rail Vehicle Access Regulations 1998 (as amende). The brightness of the displays shall compensate for ambient light quality.

After leaving the stop before a terminus, the external destination indicators shall change to show the destination of the next trip, so that the Tram arrives at the terminus with the correct next destination already displayed.

24.31 Passenger and Inspector Alarm System

Passenger alarm devices shall be located in the saloon area, at every door area and at the disabled passengers area. These devices shall allow communication with the driver and the location of the active device shall be indicated on the driver's display. The communication system shall be fully duplex.

Request 'Stop' buttons shall be provided and shall be compliant with Rail Vehicle Accessibility Regulations 1998 (as amended) and shall:

- Become operable when doors are proved closed at a Tramstop;
- When the first one is pressed, sound a single audible warning in the cab, illuminate a warning light in the cab and illuminate the Tram stopping indicators (required by the Rail Vehicle Accessibility Regulations) 1998 (as amended) in the saloon;
- No further audible warning in the cab from subsequent button pushes; and

- Be positioned such that they can be easily activated by any passenger intending to disembark, but should not be positioned such that they can be inadvertently activated by standing passengers.

Request stop from the wheelchair spaces shall:

- Illuminate a different warning light in the cab.
- Create a door open request for the nearest door, so it opens as soon as enabled.
- Override the automatic close on that door for the next opening.

All request stop indications shall be cancelled by the next door enable command.

Devices shall be provided that enable the on-board inspector, working within the saloon or on an adjacent platform, to alert the tram driver to an incident.

The handheld, pocket sized device to be carried by the on-board inspector shall have 2 modes of operation. Mode 1 will provide an alarm to the driver to indicate that the inspector is experiencing difficulties or feels under threat. Mode 2 will alert the driver to an immediate emergency e.g. the inspector is under physical attack.

When the inspector initiates a Mode 1 alarm the handheld device will operate silently. If a Mode 2 alarm is initiated a loud 'panic alarm' sound will be emitted from the handheld device in order to deter the attacker.

The inspector's device shall be stored in a charger/holder in the Depot Duty Room for Drivers and Inspectors and picked up by the inspector as he begins his duty on the tram. The Inspector's device shall be equipped with a mounting device and sized such that it can be conveniently and comfortably be carried on the ticket issuing machine shoulder strap. Each cab of the tram shall be equipped with a receiver capable of responding to all alarm Modes transmitted within range.
It shall be possible to replace either the handset or the receiver with a spare in the event of failure or loss.

The handheld device and related system shall operate satisfactorily in the electromagnetic environment which will be encountered on the Edinburgh Tram Network.

24.32 Hauling or Propelling a Defective Tram

An emergency coupler will be provided at each end of each Tram. It will be used only for hauling or propelling a defective Tram. The couplers will normally be concealed behind a removable cover. Coupling must be possible at all locations on the Edinburgh Tram Network.

An empty Tram shall be capable of both hauling and propelling (but not both simultaneously) another empty Tram, which is incapable of movement under its own power, between any two points.

As well as mechanical coupling, the following control facilities shall be provided on a coupled pair of Trams:

- Track brake control of both Trams from the cab in use, assuming that each Tram's batteries have sufficient charge;
- Through intercom between all cabs; and
- Through control and power to hazard lights, brake lights and marker lights.
- The intercom, marker lights, brake lights and hazard lights shall be operational on both Trams even if the Tram being assisted has no battery power available.
- The Tram will have a true reverse direction capability from a leading cab, to allow the uncoupling of one Tram from another. This will be enabled with the use of a sealed switch.

24.33 Exterior Details and Livery

The exterior livery shall be as set out in Section 5 of these Employer's Requirements.

The paint shall typically be water based and should allow for the application and removal of advertising vinyl coverings without damage.

The Infraco shall ensure that the repair methods for the Tram shall be defined by the Tram Supplier and shall not import undue risk with regard to the processes and materials used.

The external lighting shall comply with Her Majesty's Railway Inspectorate Railway Safety Publication, Part 2, The Road Vehicles Lighting Regulations, 1989 and the amendment 1994.

The external lighting shall consist of Light Emitting Diode (LED) arrays wherever practicable, and shall be composed of:

Facing forward

- Two white dip-able symmetric headlights;
- Two white front position lights (integrated in the headlight cluster)(side lights);
- One fixed white centre headlight located centrally above the windscreen;
- Two amber direction indicators; and
- Two end outline marker light (white, at high level).

Facing rearward

- Two red rear position lights (tail lights);
- Two red brake lights;
- Two high intensity rear fog lights (red);
- Two amber direction indicators; and
- Two end outline marker lights (red) (at high level).

Side Markers. Four, or more, amber LED combination lights down both sides working as:

- Side marker lights;
- Direction indicators; and
- Side reflectors.

The Tram exterior shall be designed so as to prevent surfing by any individual.

The Tram exterior finish shall allow for easy repair to accidental damage and severe attacks of graffiti. The finish shall allow for the easy application and removal, if required in the future, of special finishes for advertising, such as self-adhesive vinyl.

24.34 Roof-Mounted Equipment

Much of the electrical traction and auxiliary equipment will be housed in equipment cases located on the roof of the Tram. The equipment cases will be robust, weatherproof and suitable for storage and operation in an exposed position. All enclosures will minimise the risk of condensation, and provide adequate and effective ventilation for cooling where required. The normal working of the roof-mounted equipment shall not be adversely affected by dust, wind, rain, snow or ice.

Access to the equipment within the equipment cases will be quick and straight-forward for suitably qualified and trained staff, working from high-level platforms. Standing areas shall have non-slip surfaces. Due regard will be given to the safety requirements considering the location at height and the working voltage. Specific measures will be required to mitigate the risk from charged capacitors and batteries, and equipment likely to be at high temperature. All metal enclosures shall be suitably earthed to the vehicle structure.

All the roof-mounted assemblies shall be easily removable with the minimum amount of disruption to the Tram, to allow repair by replacement. The use of plugs and sockets to allow quick connection and disconnection of assemblies is preferred. Cabling and piping shall be protected from accidental damage.

As far as is practicable, the equipment will be equally divided between the two end sections of the Tram to equalise weight distribution.

The location of the pantograph will be determined by the layout of the Tram and shall be mounted above a bogie and as near to the centre of the Tram as possible.

24.35 Pantograph

Infraco shall ensure that the pantograph for the tram fleet shall be supplied by Tramco.

The governing specifications for the pantograph shall be BS EN 50206-2, BS EN 50119 and Railway Safety Publication 2 - Guidance on Tramways, issued by the Office of the Rail Regulator.

The wire height requirements shall be confirmed, including the operational wire heights within the depot buildings, over-bridges and high load route areas.

A single roof mounted pantograph shall be provided compatible with the Edinburgh Tram Network OLE.

Failure of any porcelain insulators on the lightning protection or other equipment shall not allow flexible cables to fall onto the vehicle roof.

The pantograph mechanism shall raise and lower using an electric drive system. In the event of failure or emergency situation, it shall be possible to lower the pantograph using a hand-crank operated from inside the Tram.

In developing the OLE design, the following pantograph / OLE characteristics have been assumed.

- Maximum wire height 6.8 m
- Minimum wire height 4.3 m
- Profile to be developed
- Overall Collector Head width 1850mm assumed
- Carbon length 1000mm minimum
- Collector Head Depth 250mm
- Along track length to be developed
- Head mass (to be as low as reasonably achievable)
  - (a) Carbon 13.0 kg assumed
  - (b) Metallised Carbon 15.0 kg assumed
- Articulation (frame) dynamic mass 12.0 / 16.0 kg
- Head suspension 12000 N / m
- Frame damping raising 60 / 100 N sec / m
- Frame damping lowering 60 / 100 N sec / m
- Head suspension damping 8 / 12 N sec / m
- Quasi-static contact force 90 N / 180 N
- Friction frame hinge 8 N / 10 N

25 Tramstops

This Section of the Employer's Requirements defines the Tramstop requirements applicable to the Edinburgh Tram Network which the Infraco must comply with.

25.1 General

The Edinburgh Tram Network shall have Tramstops provided at the locations shown in Figure 1 – Edinburgh Tram Phases 1a and 1b Network Diagram of these Employer's Requirements.

All elements of the Edinburgh Tram Network infrastructure shall be designed, manufactured and installed to provide a layout and a suite of furnishings reflecting a fully integrated system and shall be of an economical design and construction that shall reflect economy of use, maintenance, overhaul and renewal.

Provision shall be made, in the form of space, agreed fixing details, local cable routes for data, power and lighting (where appropriate) for a local termination point (Tramstop equipment cabinet), to be provided at all Tramstops.

The Tramstop design aesthetic shall extend to the design of the associated street furniture cabinets, trackside isolator cabinets, point control, point heater cubicles, road junction control cabinets, detector loop cabinets, etc. which shall be visually compatible with the Tramstop furniture. Particular note shall be paid to the requirements laid down in the Tram Design Manual to ensure compliance.

The emphasis on this co-ordination shall ensure an integrated design approach within the urban environment.

25.2 Tramstop Definition

Tramstops shall provide passengers waiting for, entering or leaving the tram system with safe, comfortable, environmentally friendly, informative, high quality access and egress facilities.

Tramstops shall be of the following three types:

- Island platform stops;
- Side platform stops; and
- Combined side and island platform stops.

Platforms shall be long enough to cater for nominal tram vehicles with the extreme distance between the outer edges of the end passenger doors of the vehicle of up to 38.13 m.

Side platform stops shall provide passengers with an effective circulation area and shall be a minimum of 3.0 metres wide. Island platform stops shall be a minimum of 4.0 metres wide unless otherwise agreed with **tie**. A stopping tolerance of plus/minus 2.0m shall be allowed for in the platform length.

All platforms shall contain a minimum clear unobstructed envelope.

The platform height shall match the requirements of the tram to ensure level access in accordance with RVAR (Rail Vehicle Accessibility Regulations).

The layout of architectural elements on the platform shall be arranged to provide the user with ease of access and passage on / off the trams.

Access routes serving the platform shall be appropriate for the level of pedestrian activity and be, where practical, a direct route from key passenger generators.

Key views and vistas of the City of Edinburgh shall not be unnecessarily interrupted.

Platforms shall provide passengers with a clear view of approaching trams.

Tramstops shall maintain consistency of alignment with the track.

A Tramstop shall be defined as:

- That area bounded by the rear of any platform structure and the track crossing points at either end; (or for central stops the external track edge between the track crossing points at either end);
- Including any underground service ductwork and cabinet specifically associated with the stop, outside this zone in the immediate vicinity;
- Including all dedicated access routes to the nearest public road or key passenger generator; and
- Including all structures, systems (including cabinet), finishes etc required to deliver the functionality of the Tramstop.

25.3 Tramstop Requirements

25.3.1 General

Tramstop architecture shall reflect a coordinated design consistent with the overall design aspirations as outlined in the Tram Design Manual and in the CEC Code of Practice for Access and Mobility and shall be subject to the approval of **tie**.

All components used in the construction of the Tramstop shall comply fully with relevant British and European Standards.

Tramstops shall be compliant with amongst others:

- The requirements of the Tram Design Manual;
- Railway Safety Publication 2 – Guidance on Tramways, issued by the Office of the Rail Regulator;
- Disability Discrimination Act requirements;
- The outcome of consultation with the Mobility and Access Committee for Scotland (MACS);
- The Department for Transport Inclusive Mobility Guide to Best Practice on Access on Pedestrian and Transport Infrastructure; and
- The Building Regulations (Part M).

Reference should also be made to:

- Mobility-impaired access and egress to and from each platform, the minimum width of ramps provided on the Edinburgh Tram Network System shall be 2.0m between handrails;
- Ramps, if required, shall have a maximum gradient of 1 in 20;
- No ramp shall be longer than 10m without the incorporation of a landing;
- Landings shall be no shorter than the width of the ramp; and

- Mobility impaired tram access/egress points shall be clearly defined within the platform finish if required by the tram design and consistent with tram stopping tolerances.

Tramstops shall be of a design that ensures the mobility impaired are able to use them and all parts thereof without hindrance or confusion. All walking routes approaching or within the Tramstop area shall be clear of any form of obstruction.

Provision shall be made for those who require to use canes e.g. inclusion of tapping rails. Guardrails shall be provided with handrails.

Where appropriate, Tramstops shall be provided with handrails, balustrades, and general platform furniture, other than seating, of a design that inhibits their use as seating or as a climbing medium.

Tactile surfacing shall be provided as appropriate e.g. at platform edges, stairs or ramps (if applicable), and at dropped kerbs.

25.3.2 Platform Surface

The general platform surface shall be in accordance with the Tram Design Manual and will vary dependant upon location, but in all instances provision shall be made for tactile strips (400mm wide) to assist the visually impaired along the platform edge. The platform edge shall have a suitable 65mm wide delineation of the white or alternative inset line to the leading edge of the line-side coping, or other equivalent visual feature.

Disabled boarding points shall be indicated, if required, by use of tactile material indicating the position of the relevant tram doors.

Platform surfaces shall have a nominal cross fall away from the platform edge of 1:40 to a slot drainage system. Platform drainage will be dependant upon local topographical criteria.

The platform top surfaces shall be slip resistant and durable. Transition zones shall be provided, free of trip hazards, which can be clearly differentiated by those who are visually impaired.

25.3.3 Tramstop Furniture and Equipment

All Tramstop furniture and equipment on the platforms shall be constructed of materials and finishes that are resistant to scratching and ensure the easy removal of graffiti.

Emphasis shall be given to the reduction of 'clutter' and where possible elements shall be combined to provide a dual functionality.

The Tramstop furniture and equipment shall be designed to allow easy replacement of damaged components without affecting equipment, lighting and seating.

Tramstop furniture and equipment shall be designed to support the passenger service without maintenance intervention that results in any form of disruption to the service during service hours.
The equipment provided at each location shall be appropriate to that location to limit any unnecessary clutter at Tramstops.

Tramstop furniture and equipment shall be of a modular design based around simple geometric shapes and of modular construction to enable their rapid replacement.

Components and materials shall be of a quality suitable for use in a densely populated and marine environment.

The design of the Tramstop furniture and equipment shall ensure that minor inspection, repairs and maintenance, including lamp replacement, can be carried out during the operational day with the minimum of disruption to passengers, and without disruption to passenger services.

25.4 Description of Tramstop and Street Furniture

25.4.1 General

Each Tramstop shall include the following components:

- Passenger Shelter / Canopied Waiting Area;
- Passenger Help Point;
- Passenger Emergency Call Point;
- Closed Circuit Television Cameras;
- Real Time Passenger Information Display Bus Tracker Reporting (where identified);
- Braille assistance;

- Public Address;
- Information Panel;
- System Logo and Stop Name;
- A perch rail/seat; and
- Advertising panel (6 sheet) - if permitted by Planning Authority;
- Ticket Vending Machines;
- Lighting;
- Litter bins.

Equipment placed on platforms shall not prohibit passengers from having a clear view of an arriving tram.

25.4.2 Shelters and Canopied Waiting Areas

Each platform shall contain facilities to provide passengers with weather protection (e.g., wind, snow and rain) in the form of a canopy or shelter designed and constructed to provide maximum visual transparency with minimum visual impact, consistent with offering the required protection.

Tramstop shelters shall be of a modular design based around simple geometric shapes, providing the necessary requirements for passenger use and comfort. A clear uninhibited view of arriving trams shall be available to passengers from within the shelter area.

Tramstop shelters shall permit future easy alteration to the capacity in terms of volume of passengers and equipment to meet emerging needs.

Lighting within the shelter shall provide a minimum of 50 Lux evenly distributed (controlled by sensor).

All shelters shall be provided with adequate drainage facilities to ensure all rainwater is carried away into the Tramstop drainage system.

Side infill panels together with back panels shall be of toughened transparent glass to provide a light visual appearance and with the Roof panel of complementary quality to provide passengers with protection from the weather. The design shall be such that it provides a safe environment for passengers in the event that glass panels are missing from the shelter as a result of breakage. The design of the shelter shall also take account of access requirements for maintenance and repair purposes.

Side panels shall provide sufficient depth to give weather protection but not obstruct the safe use of the Passenger Emergency Call and Help Points and shall meet the requirements of the visually impaired.

Shelter roofs shall be profiled to prevent build up of litter / debris on the top surface. The shelter structure, roof and wall panels shall, as far as is possible, be made from proprietary components in order to facilitate ease of replacement and repair.

25.4.3 Tramstop Lighting Columns

Platforms shall be provided with a minimum illumination level of 30 Lux.

Lighting shall be low energy, avoid glare to tram drivers and road users, have good colour rendition and be provided throughout the whole of the area occupied by the Tramstop.

The Tramstop lighting shall differ from the adjacent urban and or city lighting and shall emphasise the presence of the Tramstop to enable passengers to identify the Tramstop from a distance. Consideration should be given to the requirement to make use of local ambient lighting (which may need to be enhanced) to avoid additional clutter at the Tramstop.

Access routes to the stops shall, wherever practical, use existing street lighting as the sole or primary means of illumination. Where this is not possible then lighting of a similar level to the local road lighting shall be provided.

All platform shelter / canopy lighting shall enhance security in the waiting area.

Tramstop lighting shall not conflict with the requirements for Closed Circuit Television coverage and shall permit the attachment of other stop furniture or equipments as required.

Hinged columns, hinging parallel to the track, shall be provided for ease of maintenance.

Tramstop emergency lighting facilities shall be provided in all shelters where the adjacent road lighting would be inadequate in the event of a Tramstop power supply failure.

25.4.4 Tramstop Name Signs

Each Tramstop shall include an illuminated pole mounted Logo, or more than one if there are more than one access points from a public road, or a sign incorporating the Edinburgh Tram Network corporate identity visible from a distance of 50m.

Each Tramstop shall be provided with Tramstop name signage as part of the general furniture arrangement on each platform.

Tramstop name signs shall be legible to tram-borne passengers as early as possible on their approach to the platform.

An appropriate number of stand-alone Tramstop name signs shall be provided along the length of each platform. The construction and materials shall form part of the "family" of components forming the Tramstop furniture.

The Tramstop name sign support structures shall be incorporated within the line of any guardrails, should these be provided, and into the advertising / information display.

The Tramstop name signs and Logo shall be illuminated and shall be displayed on the tram arrival side of the shelter as well as along the platform.

25.4.5 Advertising / Information Signs and Displays

A Real Time Passenger Information Display (double sided) shall be provided at each platform.

This shall take the form of a dynamic multi line visual display which is legible in all weather conditions to passengers having normal vision and standing at a distance of 10.0m away.

The Real Time Passenger Information Display shall comply with the requirements described in the Employer's Requirements.

Passenger information regarding the tram service and safety notices shall be provided at all Tramstops in both writing and Braille.

All passenger-operated equipment shall be provided with clear unambiguous operating instructions in both writing and Braille.

A suitably enclosed weatherproof map (part of the Tramstop furniture) of the local area, bearing the words 'You are Here', shall be located in each platform shelter.

A suitably enclosed weatherproof information display or displays (indicating the locations of adjacent bus stops and bus related information, hospitals, local amenities and places of interest) shall also be located at each platform access/egress position.

At appropriate key interchange locations (refer to 35.4.1 - Overview to the Passenger Information Display System), provision shall be made within the Tramstop layout to provide a bus tracker information panel, which shall be provided and installed by others.

25.4.6 Litter Bins

Litter bins, where provided, shall be stainless steel (Minimum Grade 304 to BS 5135) to facilitate easy cleaning and shall have a lockable removable bin liner.

The location of bins shall not obstruct the main passenger circulation routes and shall ensure convenience of use.

A minimum of two litter bins per platform shall be provided each positioned mid-point between the shelter and the end of the platforms.

Lockable access covers shall be provided and the bins shall be designed to limit entry and retention of liquids.

The bin size shall be determined on the basis of a single collection per day.

25.4.7 Public Address

Speakers shall be provided at each lighting pole location and within the shelter to enable passengers to receive messages without volume settings being high and causing nuisance outside the area of the platform.

Induction loops shall be provided within the central area around the shelter position.

Further details of the public address system are contained in Section 35.13.2 – Workstation Capabilities.

25.4.8 Tramstop CCTV

Closed Circuit Television (pan, tilt and zoom) digital colour cameras shall be provided on each platform to enable colour pictures to be displayed at the Control Centre and other Closed Circuit Television monitoring authorities.

The canopies / shelters, stop lighting and publicity / information displays shall not inhibit the Closed Circuit Television coverage of the Tramstop or platform.

The total number of cameras on each Tramstop shall be dictated by the physical restraints associated with each individual Tramstop, however, a minimum of one per platform shall be provided.

25.4.9 Passenger Help Points and Passenger Emergency Help Points

Tramstops will be provided with one combined Passenger Help Point and one Passenger Emergency Help Point on each platform, providing two-way (duplex) audio communication between a person located on the platform and the operator located at the Control Centre.

The Passenger Help Points / Passenger Emergency Help Points detailed arrangements shall be in accordance with Section 35.13.2 – Workstation Capabilities.

25.4.10 Guardrails, Handrails and Cycle Racks

Platform guardrails shall be provided to the rear of any platform where there is a potentially dangerous interface with passing road vehicles, Network Rail or a significant change in level.

Splashguards shall be provided in vulnerable locations.

Where provided, guardrails shall be set at 1150mm above platform level and comply with the requirements for the mobility impaired.

Cycle parking frames will be provided at each Tramstop, where this is appropriate. These will be positioned within view of the Closed Circuit Television surveillance system.

25.4.11 Seating

Bench seats (with integral arm rests and perforated seating structure) shall be positioned on each platform and within each shelter a perch rail / seat shall be provided, designed to prevent the retention of liquids. In all instances the under seat space shall be open to meet security requirements.

25.4.12 Ticket Vending Machines (TVMs)

Ticket vending machines shall be located within or adjacent to the shelters. The TVMs shall be positioned in an appropriately shaded location to assist users in reading the machine's visual display. Ticket vending machines will be supplied to the Infraco, as free issue, by TEL.

Infraco shall make provision for the power and communication cable routes, cables and draw wires from the Tramstop equipment cabinet to the proposed ticket vending machine locations.

Sufficient spare ways within the power and equipment cabinet to accommodate ticket vending machines and a local ticket vending machine network connection will be provided. Further details regarding ticket vending machines can be obtained in 36.5 of these Employer's Requirements.

25.5 Electrical (LV) and Communication Facilities

All Tramstop electrical (LV) and communication equipment shall be accommodated within a Tramstop equipment cabinet. LV supplies shall be provided to the equipment cabinet from which local electrical supplies to Tramstop equipment will be fed.

A 230V, 13A or equivalent socket shall be provided within the Tramstop equipment cabinet.

A 110V supply shall be provided at a suitable location on each platform for cleaning purposes.

All power requirements for the Tramstop infrastructure and adjacent infrastructure equipment will be sourced from the local Distribution Network Organisation supply. All power supplies shall be adequately rated to support the requirements of the Tramstop equipment.

25.6 Layover Facilities

Layover facilities shall be provided in accordance with Section 2.15.

26 Track

This Section of the Employer's Requirements defines the Track requirements applicable to the Edinburgh Tram Network which the Infraco must comply with.

26.1 Track Layout

The Infraco shall ensure that the track layout shall be in accordance with ETN Diagram at Figures 2 & 3 – Edinburgh Tram Phases 1a and 1b Network Diagram

26.2 Components

Trackwork components to be provided shall include, but are not limited to, the following:

- Rails (relate to Wheel / Rail interface: N.B. inc. hardness related to welding repair);
- Sleepers and points and crossing bearers;
- Turnouts;
- Points and points motors;
- Points baseplates and slippers;
- Points rollers;
- Crossings;
- Check rails and check rail fastening systems;
- Guard rails and guard rail fastening systems;
- Transition rails;
- Rail joints (fishplated and welded);
- Insulated rail joints;
- Isolatable rail joints and provisions for access to associated rail/cable connections;

- Rail movement joints;
- Rail fastening systems;
- Rail pads;
- Baseplates;
- Resilient baseplate systems;
- Rail embedment for street running track;
- Paved trackbed and concrete trackbed systems;
- Grooved rail drainage systems (including boxes);
- Buffer stops and vehicle arrestor systems;
- Ballast;
- Granular filtering;
- Granular blanketing;
- Geotextile membranes;
- Plastics membranes;
- Geosynthetic reinforcement;
- Provision and installation of signs and markers; and
- Grasstrack.

26.3 General Requirements

Tracks shall be designed and constructed for left-hand running under line of sight operation.

The maximum design speed shall be 80 km/h.

Where the Edinburgh Tram Network runs within an urban environment on non-segregated sections of tramway, the speed limit shall be the same as that for motor vehicle traffic.

The trackforms shall be applied as indicated at the documents System wide trackform Surface Finishes Version 3 ULE90130-SW-DRG-00069.PDF, ULE90130-SW-DRG-00070.PDF and ULE90130-SW-DRG-00071.PDF

The track shall facilitate ease of construction and minimise disruption to other road users and the public during the construction phase on all roads and across all junctions between Haymarket and Ocean Terminal via Princes Street.

The track shall minimise the potential for stray current and be in accordance with the requirements and codes of practice for stray current and the **tie** Earthing and Bonding Policy document. As the valid standard the EN 50122 shall be in force.

Ensure simplicity of overall maintenance and ease of rail replacement and relaying, minimising the disruption to other road users.

The track shall comply with the operational noise and vibration requirements as stated in the **tie** Noise and Vibration Policy. Detailed technical solutions will be determined during the Detailed Design Phase for areas identified as sensitive to Noise and Vibration. The assessment of these solutions shall be in line with the characteristics of the vehicles, the existing sub-structure and the structures adjacent to the track-bed.

The track shall integrate fully with roads, such that differences in roads surfaces, specifically finished levels and skid resistance, are minimised as far as is reasonably practicable.

The track shall integrate fully with surrounding area functionality and appearance, to ensure that hazards to pedestrians, the mobility impaired and cycle users are minimised as far as is reasonably practicable, and such that track surface finishes are in accordance with all design requirements, guidance and aspirations.

Adequate track formation shall be provided to facilitate the secure foundation for track installation.

The in-street track formation shall be of shallow design such that it permits minimum amount of public utility diversions and aids the high speed construction of the tramway.

The surface at pedestrian crossing points shall be level with the top of the running rails and surfaced in non-slip materials. These materials shall be chosen to be reasonably consistent with the character of the locality whilst providing clear indication to all users (including the visually impaired) of the correct point to cross the track and the extent of the Edinburgh Tram Network environment.

Track shall be a standard tramway track with steel rails set to Standard Gauge (1.435m) and shall be compatible with the Edinburgh Tram Network trams.

On ballasted sections of the route, road/rail equipment will be used for maintenance tasks such as tamping. These machines shall be equipped with suitably profiled wheels.

26.4 DKE, Structure Gauge and Clearances

The DKE adopted shall be the "Assumed Tram for Design", as presently defined in the SDS design documents.

Structure gauge and clearance drawings shall include the standards for staff maintenance walkways and tram evacuation walkways.

Adequate walkways are required throughout the route off-street. Appropriate signing shall be included to indicate the walkway.

26.5 Trackforms

Various trackforms, as presently shown in the SDS design documents, are required to suit the different domains in which the track lies along the route and in the Depot and sidings. The different trackforms provided shall comprise, but not necessarily be limited to:

- Flush-finished track in road areas and at Tramstops, including mixed operation with traffic of various kinds, or not; and with a variety of surface finishes;
- Track with grass flush finish;
- Track with plain concrete flush finish (e.g. in the depot and for certain structures, e.g. the A8 Underpass);
- Direct fixation track on structures;
- Ballasted track; and

- Special trackforms in the depot or at Tramstops.

The trackforms shall be designed and installed to take full account of the requirements for future maintenance of components, e.g. life-extension of rails by welding in situ, and the adjustment of the levels of rails and the adjacent surfaces, and of sectional renewal.

26.6 Specific Technical Requirements

Retention of alignment on small radius curves in the case of ballasted track where rails are continuously welded shall be considered. A minimum radius shall be established for the application of ballasted track, with an appropriate alternative trackform applied elsewhere.

For in-street track construction, and in the absence of sleepers or similar, a means of retaining the lateral and rotational position, such as tie-bars of the rail together with the track gauge shall be provided.

A standard trackform shall be provided which shall comprise a slab that shall be suitable for any of the road, pavior / block / sett and grass surface finishes. In effect the surface finishes shall be interchangeable without having necessarily to redesign or reconstruct the whole slab.

A special track form shall be used at sensitive locations to mitigate against ground borne noise and vibration. These locations will be identified by the Infraco in agreement with **tie**.

At the end of all terminating tracks, provision shall be made for a device for arresting Trams. These devices may include sliding friction or fixed type buffer stops, sand drags, architectural features such as planters, wheels stops or other means. The choice of such device(s) shall be made through risk analysis of the location, taking into account the risk to passengers, pedestrians and staff and to the vehicles and surrounding environment.

Rail shall be continuously welded wherever possible. The use of fish-plated joints shall be avoided although fishplated track may be proposed in the Depot to avoid the requirement for rail movement joints at turnouts.

26.7 The Wheel / Rail Interface

A report has been produced by SDS (ref: ULE 90130-SW-REP-00130 v3) which shall form the basis of development of this critical interface. The key factors will be recorded here.

26.8 Drainage

Drainage from trackwork shall be interfaced with the road and civils drainage systems. Adequate drainage within the trackwork system shall be provided such that the integrity of the installations is secure.

The Edinburgh Tram Network shall have a drainage system that, as a minimum, achieves accepted EU or BS standards and Good Industry Practice.

The drainage of all new bridge structures shall be positive and, unless otherwise required by the relevant local authority, all surface water shall be piped to the local storm water sewer systems by a defined drainage path.

Particular attention shall be paid to ensure that surface water drainage systems in the vicinity of traction substations and cable ducts are routed to avoid any risk of flooding of electrical equipment areas, point machine chambers, and the ducts themselves.

For on-street track, the track drainage system shall incorporate an insulated break from the storm water system.

Drainage proposals including any new flows into existing drains and the method of connection shall be approved by Scottish Water, SEPA and the City of Edinburgh Council Roads Department as appropriate.

26.9 Technical Requirements for Points and Crossings

All turnouts, crossings and interruptions to the continuity of the rail head shall be equipped with flange running sections or other design which minimises joint noise.

The design shall minimise flange squeal through tight radii and through junctions.

Points shall be provided with two movable blades so mounted to allow the use of magnetic track brakes and their safe passage through the point and crossing.

All points shall be freely trailable without damage to the blades or mechanism.

Points and crossings shall be designed so that they are capable of through stressing as required.

All points on the main line, likely at some time or another to be taken in the facing direction (including trailing, emergency crossovers), shall be equipped with detection and indication. Indication of trailing points likely to be taken at high speed shall be considered.

All points, when operated by hand lever, shall be capable of being thrown fully, by one throw of the lever, by a male or female person of slight build, without undue effort or strain. To this end, the maximum required effort to change the points shall not normally exceed 230Nm.

Some form of indication shall be incorporated into the mechanism to indicate that the point has thrown fully. Lever mechanisms requiring repeated operation to throw the points are not acceptable.

Efforts should be made to reduce friction and the effort to throw the points. Flange relief of the point tongues is one such feature.

Point tongue profiles and movement on all points shall conform to the same dimensions and tolerances.

Design tolerances shall be maintained in service with a relatively low level of attention.

Designs with potential for high wear rates or other high maintenance features are not acceptable.

Designs with the potential for lengthy infrastructure replacement periods are not acceptable, particularly in on-street areas.

Adequate, functional drainage must be provided to ensure that rail grooves and point machine pits are kept clear of rainwater, sand and rubbish from the street etc.

Pointwork in the depot site area shall be installed in a flush-finished trackform for 9 turnouts and 1 crossing at the beginning of the depot area. This flush-finished trackform will be designed for re-railing purposes only.

26.10 Technical Requirements for Point Operation

26.10.1 Point Machines and Mechanisms in General

All point machines, whether powered or not, shall be from the same family of machines and provided by the same supplier.

Point machines shall allow the points to be 'freely' trailable without damage to the blades or mechanism.

In street running track, point machines shall be installed between the rails of the track.

On ballasted track, in order to facilitate maintenance, they shall be installed to the side of the track, on the outside of a typical two track layout.

Point machines shall be capable of manual operation in a single throw by tram drivers using a removable point bar to be carried in the Tram drivers cab. Only one form of point bar shall be utilised on the system.

It shall be possible for the points to be changed by a male or female person of slight build, without undue effort or strain when the points are not affected by snow or ice. To this end, the maximum required effort to change the points shall not normally exceed 230Nm.

When operated by hand using the standard points operating bar, it shall not be possible to inadvertently partially throw the points, which shall always throw sufficiently to make the respective detection circuits at each lie of the points with a single movement of the lever.

A total number of 70 point operating bars shall be supplied.

All combinations of points and point machines shall be validated to demonstrate that:

- The machines shall exert sufficient force under all foreseeable circumstances to move the points blade into the required position;
- The points shall close and lock reliably under all foreseeable operating conditions;
- Detection settings shall have adequate maintenance tolerances to ensure that points detection setting testing shall be required no more than monthly on all points;
- The wheel/rail interface at the toes of the points shall be such that there is no derailment risk under all combinations of wheel wear, rail wear, and detection settings;
- Any tram driver shall be able to operate all points safely and without risk of injury; and

The enclosing case of the Point Machine shall be to Class IP 67 and be drained.

Point Machines shall not be overstressed in performing its duty. Efforts should be made to minimise friction and the effort to throw the points. Flange relief of the point tongues is one such feature and there are others such as PTFE slides and supporting rollers.

The flangeway in advance of the point tips shall not be less than 41mm. It shall be consistent with the wheel/rail interface report.

The amount by which nominally 'closed' point tongues may be open at their tips whilst still providing detection, shall be agreed as a part of the wheel/rail interface criteria.

Each Point Machine shall be clearly identified and robustly labelled.

Point Machines of all types and their drive and detector rods shall be insulated from the running rails and from the surrounding earth. Separate earthing connections for the drive motor (where fitted) and the machine case shall be provided.

Point Machines of all types shall normally not require maintenance more frequently than at three-monthly intervals although inspection may be carried out more frequently.

All Point Mechanisms shall incorporate at least one volt-free change-over contact in both the 'Normal' and 'Reverse' positions, in addition to those required for detection purposes.

In the case of Point Machines incorporating an over-centre device, it shall not be possible for the machine to be set in the 'null' position during powered or sprung operation, as applicable.

26.10.2 Specific Requirements for Motorised Point Machines

The Point Machines will operate from a 230Vac supply.

The Point Machine shall be capable of operating the two point tongues for the full throw required to provide the standard 'blades open' gap, to clear the backs of the flanges of the wheels. However, the throw shall not be so great as to flex the tongues further than necessary, thereby introducing unnecessary stress in the track components and load on the operating machine mechanism. This dimension 50mm,+5/-0mm will be finalised after the wheelset profile has been determined and the Wheel-Rail Interface Report has been finalised in the Detailed Design Phase.

26.10.3 Specific Requirements for Sprung Point Mechanisms

The Spring Point Mechanism shall be capable of being biased to effect a route to either lie of the points. The mechanism shall normally set the points in their 'Normal' position but by adjustment, they shall be capable of being set in the 'Reverse' position.

In both cases, it shall be possible to change the lie of the points using the standard points operating bar with an effort not exceeding 230Nm.

Only the incursion of a foreign body in the space between the point tongue and the stock rail shall prevent a satisfactory change in the lie of the points.

The lie of the points shall be continuously maintained in the 'Normal' (or if adjusted, 'Reverse') position by adequate spring pressure.

After having been forced across by the passage of a tram, the mechanism shall positively return the points to the 'Normal' position and provide the standard 'blades open' gap, to clear the backs of the flanges of the wheels.

If possible, by the rearrangement of components, the Spring Point Mechanism shall be convertible into a Bistable Point Mechanism for the avoidance of spares duplication.

26.10.4 Specific Requirements for Bistable (flip-flop) Point Mechanisms

The Bistable Point Mechanism shall be capable of being biased to effect a trailing route through either lie of the points, by use of a standard points operating bar. The mechanism shall normally retain the points in the position last trailed. However, by operation using the approved points operating bar, they shall be capable of being set in the alternative position.

Only the incursion of a foreign body in the space between the point tongue and the stock rail shall prevent a satisfactory change in the lie of the points.

The lie of the points will be continuously maintained in the position last trailed by adequate spring pressure.

After having been forced across by the passage of a tram, the mechanism shall positively leave both blades of the points held firmly across with the 'closed' point against the stock rail and provide the required 'blades open' gap, to clear the backs of the flanges of the wheels on the other side.

The amount by which nominally 'closed' point tongues may be open at their tips shall be within the same tolerances specified for points operated by powered Point Machines.

If possible, by the rearrangement of components, the Bistable Point Mechanism shall be convertible into a Spring Point Mechanism for the avoidance of spares duplication.

26.10.5 Specific Requirements for Hand-Operated Point Mechanisms (Point Levers)

Points operated by Hand-Operated Point Mechanisms shall normally be traversed in the facing direction subject to a 10 km/h track speed limit.

One throw of the lever shall fully throw the points to either 'Normal or 'Reverse' positions. Levers which require one or more attempts to complete the operation are not acceptable.

It shall not be possible to inadvertently partially throw the points, which shall always throw sufficiently to allow the respective 'points thrown' indication at each lie of the points to be given with a single movement of the lever.

Only the incursion of a foreign body in the space between the point tongue and the stock rail shall prevent a satisfactory change in the lie of the points.

After having been thrown, the mechanism shall positively leave both blades of the points held firmly across with the 'closed' point against the stock rail and provide the required 'blades open' gap to clear the backs of the flanges of the wheels on the other side.

The amount, by which nominally 'closed' point tongues may be open at their tips, shall be within the same tolerances specified for points operated by powered Point Machines.

26.11 Technical Requirements for Point Control and Indication

26.11.1 Detection

Where detection and indication is required, the mechanism shall be fitted with detection equipment capable of differentiating between a 'safe' and 'unsafe' gap. When closed, the detectors must be capable of detecting a minimum gap of 1.5mm although the 'unsafe' gap detection including a safety margin will be slightly greater than this at 2.5mm, +0/-0.5mm between the closed point tongue and the corresponding stock rail at each lie of the points. To be confirmed with wheel/rail interface criteria.

Each point tongue shall be independently detected through a separate mechanical connection to the point tongues, independent of the drive rod connection and as close as practicable to the tip of the tongue. Totally enclosed proximity switches are preferred for this duty.

26.11.2 Control

The Point Controller shall receive information from the Tram Position and Detection System (TPDS) and set the Points and Point Indicators and shall be driven by the output from the point detection.

The Point Controller shall acknowledge the requests from TPDS and make all the necessary safety checks before commanding the point machine to move the points.

When the Point Controller causes the Point Machines to change the points, it shall monitor the detection contacts in the associated Point Machine(s) to determine whether the points have fully thrown.

Once the points have been satisfactorily operated (i.e. been fully thrown), the Point Indicator shall show a sloping row of lights (or LED clusters), corresponding to the lie of the point to approaching trams. If the points have not fully thrown, a horizontal row of lights (or LED clusters) shall be displayed.

If an appropriate command has been set by personnel in the Control Centre, the Point Controller shall block any associated points requested by the tram on-board computer from its route code.

The Point Controller shall report to the adjacent Tram Position and Detection System and or SCADA when any of the following conditions apply:

- Failure of the Point Machine supply;
- Failure of the Point Indicator supply;
- Receipt of an indication of faulty point detection; and
- Failure of the Point Heaters supply.

When the relevant track circuits or mass detectors detect the presence of a tram in a prescribed area, the Point Controller will lock the points against any further signals to change them until the tram has left the prescribed area.

The Point Controller shall also afford the facility to set and control the associated points locally.

26.11.3 Indication

The lie of the points shall be indicated to trams approaching the toe of the points in a facing direction. Indication of trailing points likely to be taken at high speed shall also be considered. The specific requirements at each location are defined on the track layout diagram.

The basic technology and design of the point indicator shall be same as the tram signals. The colour shall not be white, red or green.

Point indicators shall exhibit the following standard aspects to drivers:

- Points set to left hand route: diagonal row of lights sloping upwards towards the left;
- Points set to right hand route: diagonal row of lights sloping upwards towards the right; and
- Points not detected: horizontal bar

The indicator shall be placed for visibility to the tram driver in the same basis as tram signals.

The means of illumination shall be by LEDs.

A minimum of five clusters in each row shall be provided.

All Point Indicators shall be located in agreement with the Operator and shall be co-located where relevant with tramway signals.

Each Point Indicator shall be clearly identified and robustly labelled.

The aspect shall be clearly visible in all weather conditions.

The Point Indicators shall normally not require maintenance more frequently than at three-monthly intervals although inspection may be carried out more frequently.

26.11.4 Control Cabinet

Controls to set and control the associated points locally shall be provided in a cabinet. These shall be operable while the relevant points are in direct view of the person operating them.

The Point Controller cabinet shall contain the power supply for the operation of the associated points and to all associated Point Indicators.

The Point Controller cabinet shall contain and control with an input from the SCADA system, the power supply to the point heaters mounted on the associated points.

The Point Controller shall not require maintenance more frequently than at six-monthly intervals although inspection may be carried out more frequently.

26.12 Indication of Hand Operated Point Mechanisms (Point Levers)

The lie of the points shall be indicated to trams approaching the toe of the points in a facing direction.

Upon the operating lever being thrown, a simple mechanical device will detect that the closing point tongue has closed to within the permitted tolerances specified above.

Detection of the fully thrown condition shall cause a mechanical indicator to display a corresponding indication to the tram driver. The indicator shall present an indication equivalent to that shown on lit indicators and be visible from the normal tram driver's operating position in the cab, when the tram is 5 metres to the rear of the point tips, in daylight and illuminated by the tram's headlights after dark. Failure to close the tongue to within this tolerance shall not allow the indicator to show a 'points thrown' indication. Both point tongues shall be detected, either individually or as a coupled pair.

26.13 Technical Requirements for Points Heating

Points heating systems will allow the efficient operation of points in low temperatures and shall be such that the components will not intrude into the surrounding infrastructure.

Points heating shall be electrically powered and shall be controlled automatically by sensing when the predefined temperatures for activation and deactivation have been reached.

Point Heating devices shall provide health status information via the SCADA to the Control Centre.

Point Heaters shall be capable of being manually activated and/or deactivated locally and from the Control Centre.

The locations at which point heating shall be provided will be agreed and shown on the track layout diagram.

Where more than one heater is controlled from a Point Controller, it shall energise each of them in sequence in order to limit the inrush current demanded.

The Point Controller shall monitor the local ambient temperature and humidity and control the supply to the point heaters accordingly.

The settings at which the point heaters are energised shall be adjustable within the limits of 0°C to + 5°C.

26.14 Tolerances

The following definition of construction and maintenance tolerances shall be developed and agreed between Infraco and **tie**.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Speed	Shared running	Maximum	kph		**50**	**50**	**50**
Speed	Segregated running	Maximum	kph		**80**	**80**	**80**
Speed	Depot	Maximum	kph		**15**	**15**	**20**

Table 62 - Speed assumptions and normal limitations

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Geometric element	Minimum length		m		**15**	**12**	**6**

Table 63 - Geometric Elements - Element lengths are tied to the tram length, specifically distance between bogies

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Horizontal radius - Minimum	Running lines	Slab track	m		50	30	25
Horizontal radius - Minimum	Depot lines		m		50	40	20
Horizontal radius curves	Distance between opposite flexure	Radii dependant - no transition curves	m	Considered minima dependant upon tram data	15	10	6

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Horizontal radius curves	Distance between opposite flexure	With transitions on adjacent opposite flexure curves	m	Exceptional to be considered individually (also refer wheelbase)	10	8	6
Horizontal radius curves	Distance between curves of opposite flexure	Turnouts - theoretical tangent points at switch toe to next tangent pt (of opposite flexure)	m	Considered minimums dependant upon tram data (wheelbase)	10	8	6
Horizontal radius curves	Distance between curves of opposite flexure	Turnouts - theoretical tan.pt. at switch toe to tan.pt. (of similar flexure)	m	Considered minimums dependant upon tram data (bogie axle ctrs)	5	3	2
Horizontal radius curves	Tramstops		m	Absolute minimums	Infinity	2000	1000

Table 64 - Horizontal Curves: Minimum requirements for horizontal curves including distances between similar and opposite flexure. Similar requirements also for horizontal curvature up to turnouts and through Tramstops.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Cant	Platforms		mm		0	0	0
Cant	Tangent track	Facilitate drainage	mm		0	15	15
Cant	Fixed Obtuse crossings		mm		0	15	30
Cant	Curves		mm	Subject to Tram	75	75	100
Cant	Plain line track – depot		mm		0	0	15

Table 65 – Cant: Maximum cant values

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Negative cant	Plain line		mm		0	15	15
Negative cant	Turnouts	Turnouts - when turnout is facing downhill on a grade	mm		0	0	15
Negative cant	Turnouts	Turnouts and acute diamond crossings	mm		0	0	15
Negative cant	Turnouts	Obtuse crossings in diamonds	mm		0	0	0

Table 66 - Negative Cant: Maximum allowable values which are particularly important with regard to turnouts and obtuse crossings.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Cant excess			mm	Subject to Tram	0	25	50

Table 67 - Cant Excess - Normally applied where slow speed running may be encountered, but does have some bearing in this concept.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Cant deficiency	Plain line		mm	Maximum	40	60	75
Cant deficiency	Plain line - Depot		mm		40	75	100
Cant deficiency	Through route of turnout	On tangent or curved track	mm		0	40	60
Cant deficiency	Turnout route		mm		40	60	75
Cant deficiency	Based on theoretical radius at switch toe	Cant deficiency based on theoretical radius formed by shortest wheel-base placed centrally at switch toe	mm		40	40	50
Cant deficiency - jerk	At switch toes Consider shortest wheelbase	Maximum permitted jerk rate at switch toes using theoretical radius formed by shortest wheel-base	m/s3	jerk = 0.2 m/s3	0.3	0.4	0.5
Cant deficiency - jerk	Plain line Consider shortest wheelbase	Maximum permitted jerk rate as a result of the geometry change and shortest wheel-base	m/s3		0.25	0.35	0.45

Table 68 - Cant Deficiency: Deficiency at the switch toe will require careful consideration, effectively setting speed restrictions. Particular impact on the criteria will be to assess jerk with reference to the shortest wheelbase.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Transition curves	Virtual Transition	Length basis	m	Subject to Tram	No use	1.8	1.8
Transition curves	Clothoid	Minimum length	m	Subject to Tram	15	10	6

Table 69 - Transition Curves - Dimensional requirements with some relationship to the tram dimensions

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Cant gradient	Cant gradient - Maximum permitted	RoCC may be overwritten by other minimums		Consider RoCC	RoCC	600	300
Cant gradient	Cant gradient - Minimum permitted				1500	2000	3000
Cant gradient	Switch toes				0	0	0
Cant gradient	Crossings and diamonds				0	0	0

Table 70 - Cant Gradient: Permitted maximums which, in effect, define twist parameters (dealt with later). Note: All the following apply only in the cases of applied cant on track on zero grade. For track on a grade or a vertical curve, where a twist in the track will arise from a horizontal curve, the maximum gradient that arises from applied cant must be less than the following limits (i.e. one in (value greater than following limits)) because an element of effective cant gradient will result from the combinations of horizontal curve and grade / vertical curve. In the latter cases the gradients that arise from applied cant are governed by the overall twist limits which are specified in table 78 below.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Rates of change – cant		Rate of change of cant	mm/s	Subject to Tram	35	55	68
Rates of change - cant def		Rate of change of cant deficiency - plain line	mm/s	Subject to Tram	35	55	68
Rates of change - cant def		Rate of change of cant deficiency - S&C	mm/s	Subject to Tram	35	55	80

Table 71 - Rates of change of cant (RoCC) & Rates of change of cant deficiency (RoCCD) - Rate of change in lateral acceleration.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Vertical alignment	Sag	Vertical curve radius - minimum	m	Subject to Tram	1000	625	500
Vertical alignment	Hog	Vertical curve radius - minimum	m	Subject to Tram	1000	625	500
Vertical alignment	Vertical acceleration		% of g		2	2	4
Vertical alignment	Turnouts and diamonds	Vertical curve radius. Proximity of vertical curve tangent point to switch toe and crossing of turnouts and diamonds.	m		15	10	6
Vertical alignment	Advance sws - xng & sws	Vertical curve radius	m		0	0	0
Vertical alignment		Minimum curve element length	m		20	15	10

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Vertical alignment	Instantaeneous change in grade		%		None	0.1	0.2
Vertical alignment	Grade distance between adjacent curves (similar flexure)	Preferred situation	m		None	None	None
Vertical alignment	Grade distance between vertical curves of opposite flexure	With combined average radius ***less than*** 3125m	m		15	10	6
Vertical alignment	Grade distance between vertical curves of opposite flexure	With combined average radius ***greater than*** 3125m.	m		15	10	0

Table 72 - Vertical Alignment - Some elements require consideration from the tram supplier, others refer again to element lengths

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Vertical geometry	Tramstops	Radius through tramstops (without exceeding gradient criteria)	m		Infinity	2000	1000

Table 73 - Vertical Geometry: Tramstop requirements

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Gradients			%		5.0	6.7	8.0
Gradients	Tramstops		%		1.0	2.0	2.5

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Gradients	Stabling	Maximum – includes locations where tram driver is routinely required to leave driving position	%		0.0	0.1	0.2
Gradients	Turnouts and junctions	Dependant upon twist and negative cant	%		0.2	3.0	6.5

Table 74 – Gradients: Maximum gradients in various locations

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Twist (as part of the design)	Short wave (over bogies)		$^0/_{00}$	Subject to Tram	1.5	2.0	3.3
Twist (as part of the design)	Long wave over length of vehicle	Project Tram geometric capability 10m @ 3mm $^0/_{00}$ + 10mm -- i.e. 30+10 = 40 (or 4 $^0/_{00}$)	$^0/_{00}$	Subject to Tram	1.5	2.0	3.3

Table 75 - Twist

The above represents the limits on the overall twist in the track that is a summation of: any gradient arising from applied cant; effective combinations of horizontal curves and grades / vertical curves; and other twisting effects (e.g. resulting from induced crossfalls for road drainage).

Twist is introduced into the track whenever cant is applied and when track with zero cross-level has a combination of horizontal curvature and vertical curvature or gradient.

Such geometry creates a twist, which has to be negotiated by the tram vehicle. Clearly the tram has to be capable of handling such geometric situations. Certain manufacturers may define these criteria in their own way, an interpretation of which is indicated below.

Twist in the long wave is measured over the wheelbase (bogie centres); short wave being measured over the axle centres of the bogie. Short wave twist also leads to wheel un-loading, not, as yet, defined here.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Vert / Horiz alignment	Horizontal radius - 25	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	1600	1200	1000
Vert / Horiz alignment	Horizontal radius - 30	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	1333	1000	833
Vert / Horiz alignment	Horizontal radius - 40	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	1000	750	625
Vert / Horiz alignment	Horizontal radius - 50	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	800	600	500
Vert / Horiz alignment	Horizontal radius - 60	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	667	500	n/a
Vert / Horiz alignment	Horizontal radius - 80	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	500	n/a	n/a

Table 76 - Vertical/horizontal alignment combinations

Taking the comments above regarding twist, it can be seen the certain combinations of vertical and horizontal alignment can cause undesirable geometric situations. The tables below define, using a simple product rule, the limitations.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Track spacing	Plus allowance for DKE	Double track main line - track centres - side poles	mm	- 3100			
Track spacing	Plus allowance for DKE	Double track main line - track centres - centre poles	mm	- 3600			
Track spacing	Plus allowance for DKE	Depot tracks and sidings - track centres		TBA Subject to Tram			
Track spacing	Plus allowance for DKE	Depot tracks and sidings - track centres - working space		TBA Subject to Tram			

Table 77 - Track Spacing. Note: straight track on radii larger than 350 metres on fixed non-ballasted trackform

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Gauge	Track gauge				1435	1435	1435
Gauge	Track gauge widening				0	0	0
Gauge	Track gauge-flange-running			TBA Subject to Tram			
Gauge	Check flangeway			TBA Subject to Tram			

Table 78 – Gauge: Standard data that requires further review/approval

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Rail inclination		Inclination - Vertical street grooved rail		TBA			
Rail inclination		Inclination - Non grooved rail		TBA Subject to Tram			

Table 79 - Rail Inclination

27 Roads and Utilities

This Section of the Employer's Requirements defines the roads and utilities requirements applicable to the Edinburgh Tram Network with which the Infraco must comply.

27.1 General

The roads works and utilities shall consist of all the necessary road works and associated accommodation works required to fully integrate the Edinburgh Tram Network into the urban road environment, including those relevant areas that are not trafficked.

The road works, utilities and associated accommodation works shall be provided in accordance with the Design Manual for Roads and Bridges (DMRB), except as amended by the requirements of, or otherwise agreed with, the relevant authority including where such requirements are more onerous.

The roads and utility works shall include but not be limited to the following:

- Road and junctions (including all necessary off-alignment works);
- Site clearance;
- Safety barriers and fencing;
- Drainage works including track drainage;
- Earthworks;
- Surfacing;
- Road lighting;
- Traffic signage and road markings;
- Traffic signals and tram signals;
- Landscaping;
- Temporary and permanent traffic measures;
- All associated cable ducting required for the works;

- Depot access and utilities, including within the Depot;

- Utility diversion works where not carried out by MUDFA; and
- Removal of all redundant services and apparatus affecting the works.

The works shall take account of MUDFA.

27.2 System-Wide Requirements

The tram network shall be segregated from the road wherever feasible using a variety of means as appropriate to the features and constraints of the individual locations. These include the use of road markings and varying surface types for visual or textural delineation. The design of the segregation details shall optimise their effectiveness without significantly compromising safety and operational factors, including the operation of junctions and emergency and maintenance access.

27.3 General Requirements

All works shall be carried out in accordance with the provisions of the Tram Legislation. All works on adopted roads shall be to a standard to allow subsequent re- adoption by the Roads Authority.

Wide-area modelling of traffic impacts consequent to the design shall be provided as a pre-requisite to approval, and prior agreement with the City of Edinburgh Council on the Traffic Regulation Orders and Temporary Traffic Regulation Orders necessary to implement the design and complete the works.

In addition to roads that have been adopted by the Roads Authority, the route for the tramway also uses roads that are currently in private ownership. In all cases the owners of private roads shall be consulted and their input and approval sought during the design process. Road works within these areas shall be to the same standard as that used for the roads adopted by City of Edinburgh Council (similarly, new and extended roads shall follow the same process). Where third parties are affected by a new or extended road their inputs and approvals where necessary shall be sought during the consultation process.

27.4 Stray Current

Refer to Stray Current of these Employer's Requirements at section 32.

27.5 Roads

27.5.1 General

The general requirements for the design of the roadworks shall meet the relevant Standards set out in Section 3.6 of these Employer's Requirements with emphasis on the following:

- Design Manual for Roads and Bridges (DfT);
- City Development Transport – Development Quality Handbook – Movement and Development (CEC);
- Edinburgh Standards for Streets (CEC); and
- Tram Design Manual (CEC).

27.5.2 Roads Design

The roads and track alignment shall be integrated in a manner that best uses the available space and optimises the alignment of both systems. Horizontal clearances between kerb lines of roads and tram network structures shall be not less than those set out in the relevant Department for Transport technical memoranda and the Department for Transport publication "Roads and Traffic in Urban Areas" and shall meet the guidance in ORR RSP2.

The requirements for geographical sections of the design and construction shall be discussed and agreed with **tie** and the City of Edinburgh Council to determine the extent of the proposed re-modelling, roadworks and (temporary and/or permanent) traffic management.

All surfacing materials shall comply with the DMRB requirements and consider City of Edinburgh Council's preferences. The integration of the Edinburgh Tram Network alignment, road design and road markings shall minimise the risk of road vehicles skidding on the rails. The finished works shall meet the serviceability requirements, balanced with commercial, social and environmental considerations. In particular, the following factors shall be taken into account:

- Make the best use of existing infrastructure;
- The requirements of the promoter (**tie** and CEC);

- Minimise the disruption to traffic;
- Minimise the public perception of waste and unnecessary disruption;
- Minimise the construction cost;
- Maximise the maintainability;
- Minimise the construction time;
- Minimise the excavation, material usage and hence vehicle movements; and
- Meet the needs of properties fronting onto the route of the tramway.

The Roads Design shall include but not be limited to:

- Identification of constraints and provision of typical sections;
- Tram / road interface review in the light of outputs from the design process;
- Provision of integrated tram/road design model;
- Assessment of the impact of the track alignment on the road design and layout;
- Assessment of the impact of the OLE design on the road design and layout;
- Layout drawings including extent of the works;
- Drawings detailing discrete locations where the vertical track alignment deviates from existing ground levels, this will include cross-sections and contoured plans as required;
- Standard details;
- Drawings to show changes to existing car parking provisions along the route, for example at Rosebery House, Haymarket including new access;
- Access and general arrangement layout to the Depot at Gogar;

- Consultation with City of Edinburgh Council, Scottish Environment Protection Agency and Scottish Water during the initial drainage design process identifying potential outfall locations and surface water treatment requirements for both roads and tram;
- Location of existing surface water drainage networks and outline routing of surface water from track and road drainage over the entire route;
- Standard details of drainage connections, sand traps, manholes, etc.;
- Pedestrian guardrails and boundary fencing;
- Interpretation of outputs from the traffic modelling process;
- Identification of junctions where existing traffic signals may need modification. Identification of locations where new traffic signals may require to be installed;
- Preparation of information to support the Traffic Regulation Orders and Temporary Traffic Regulation Orders. This will be based on the roads design, or the latest road design available. Prior to submission for the Statutory Process the TROs will be reviewed against the latest design;
- Safety audits for all stages;
- Compliance with the approvals process;
- Layout drawings for tram / road interface at 1:500 scale;
- Final junction register;
- Integration of traffic and tram signalling systems determined by the traffic model and tram run-time simulation;
- Three-dimensional MX model for all roads design;
- Details including any special measures at specific locations;
- Detailed General Arrangement of new access to car park at Haymarket including any modifications to car park layout;

- General Arrangement and vertical alignment for new access road to the Depot at Gogar;
- 1:200 scale drawings for each junction;
- Detailed design of surface water drainage networks modelled using appropriate software;
- Detailed design of site clearance layout, boundary fencing, safety barrier and pedestrian guardrail, pavement, earthworks, signs and markings, kerbing, footways, traffic signal layouts and road lighting;
- Determination of the extent of modifications to existing traffic signals and new installation requirements. Preparation of a traffic signal equipment performance specification; and
- Links with the CEC UTC;
- Compliance with all side agreements entered into by CEC (whether final or in draft) with respect to the Parliamentary Tram Acts.

27.5.3 Road User Safety Audit

Road User Safety Audits shall be carried out as required by The City of Edinburgh Council and sufficient to demonstrate the integrity of the design process to HMRI (or the appropriate regime in force).

27.5.4 Cycleways

Where it is required that cycleways are provided as part of the Infraco Works these shall be designed and constructed in accordance with the relevant guidelines including:

- Design Manual for Roads and Bridges;
- City of Edinburgh Council "Roads Development Guidelines";
- Scottish Executive's "Cycle by Design"; and
- SUSTRANS "Cycle Friendly Infrastructure Guidelines for Planning and Design".

27.6 Drainage Including Track Drainage

All roads drainage shall be designed and constructed in accordance with The Design Manual for Roads and Bridges, Volume 4 and comply with The City of Edinburgh Council's requirements and the Scottish Environment Protection Agency standards. Where appropriate during the design process Scottish Water shall be consulted. The design parameters defined by these design codes and agreed by **tie** / CEC / SEPA / Scottish Water as being appropriate for the area and system shall be accommodated within the finished works.

At locations where the tramway drainage is connected to any other drainage system measures shall be taken to ensure that any by-products of the tram system are accounted for (e.g. provision of sand interceptors). Where necessary early involvement of the Scottish Environmental Protection Agency (SEPA) shall be sought to define and agree surface water outfall locations.

Provisions shall be included for the proper and effective drainage of grooved rails and point machine pits in road running track detailed in the relevant section of these Employer's Requirements.

Provision shall be made in trackwork for the interception of entrained debris in the system that drains surface water from grooved rails, to enable the easy collection and removal of detritus by means of planned maintenance.

Outlets from the grooved rail and point machine pit drains shall be connected directly to the roads drainage system. For on-street track, the track drainage system shall incorporate an insulated break from the storm water system.

Provision shall be made in trackwork for the effective drainage of the track structure on grass track, ballasted and other off-road running sections (except on bridges, viaducts and the like). Outlets from these drainage systems shall be connected to collector drains running alongside the track. Chambers for access to clean and maintain the collector drain pipes and for the interception and removal of entrained debris and detritus shall be incorporated in the collector system. Collector drain systems shall be connected to other systems or outfalls as appropriate for the local regime and existing drainage systems, and in accordance with the requirements of the relevant water utility, the Scottish Environmental Protection Agency, the roads authorities and all other authorities as appropriate.

The drainage of all new bridge structures shall be positive and, unless otherwise required by the relevant local authority, all surface water shall be piped to the local storm water sewer systems by a defined drainage path.

Particular attention shall be paid to ensure that surface water drainage systems in the vicinity of traction substations and cable ducts are routed to avoid any risk of flooding of electrical equipment areas, point machine chambers, and the ducts themselves.

27.7 Road Signs, Traffic Signals and Urban Traffic Control

Road signs shall comply with the Traffic Signs Regulations and General Directions 2002 and the Traffic Signs Manual. The works shall be consistent with the requirements stated in the Edinburgh Standards for Streets (CEC). The signage provided for the tramway and the mandatory road signs shall be considered holistically and measures shall be taken to avoid clutter that could lead to a confusing environment for road users.

The traffic and tram signalling systems shall support the run-time of the tramway whilst minimising the impact on other road users. It shall be fully integrated with the City of Edinburgh Council's urban traffic control system. A protocol will require to be developed with the City of Edinburgh Council regarding the installation and integration of the traffic and tram signals. The signalling system shall incorporate recent/current technological developments, as appropriate, to optimise the combined efficiency of the tram and traffic signals.

The traffic management system shall accommodate the direct and consequential impacts of the Tram system and will be subject to approval by **tie** and CEC Wide-area modelling of traffic impacts consequent to the design shall be provided as a pre-requisite to approval, and prior agreement with the City of Edinburgh Council to implement the design and complete the works.

27.8 Road Lighting and Road Furniture

The road lighting shall conform to the Council strategy on lighting applying current street lighting standards and the Tram Design Manual. The lighting columns and Overhead Line Equipment (OLE) poles shall be rationalised to minimise road clutter and ensure safety of all users. Similarly, the quantity and disposition of road furniture shall also be rationalised for visual and safety reasons. OLE is subject to prior approval of the CEC planning authority and is to be obtained through the design process.

Lighting and road furniture will require to conform with safety guidelines and pass all relevant stages of road safety audit which are to be undertaken within the road design for tram implementation.

27.9 Utilities

The Edinburgh Tram Network shall be designed and constructed such that there is a minimal requirement to divert existing public utilities.

The final alignment shall take cognisance of the need to avoid the diversion of utilities' system-critical apparatus such as high-voltage oil-filled cables, fibre-optic communication cables, and high-pressure gas mains, wherever possible. Any protection required to such utilities shall be instructed as a **tie** Change and follow the principles of Section 21.

Utility diversions that are not covered under the advance Multi Utilities Diversion Framework Agreement (MUDFA) including unknown apparatus that is found during the Infraco Works shall be instructed as a **tie** Change and follow the principles of Section 21.

27.10 OLE Poles

Location of Overhead Line Equipment poles will be designed so as to minimise the risk of traffic impact. Collision barriers shall be provided where there is a reasonably foreseeable risk of a collision between a road vehicle and an OLE pole. However, collision barriers are not the preferred solution and all reasonable mitigation efforts shall be made, and careful consideration given, in the location of poles to avoid the necessity for collision barriers. Should this not be achievable, the collision barriers shall be functional, practical and maintenance free with anti-climbing measures to prevent the public from climbing and standing on top of barriers. Details of such barriers shall be approved by the City of Edinburgh Council in their capacity as Roads Authority as well as for visual impact through the prior approvals process.

28 Structures

28.1 General

The Edinburgh Tram Network requires the construction, or modification to, a number of structures throughout its length. The work involved in the Edinburgh Tram Network will impact on bridges and retaining structures. This Section 28 sets out the requirements which the Infraco must comply with in relation to structures.

28.2 Structures List

The following is a list of the principal structures along the Edinburgh Tram Network.

Table 80 - Structures Schedule

Structure Ref.	Section	Structure Name	Description
S19	2A	Haymarket Station Viaduct	New underbridge
S18	1D	Leith Walk Railway Bridge	Existing underbridge over single railway line
S1	3A	Roseburn Terrace Bridge	Existing single span plate girder underbridge.
S2	3A	Coltbridge Viaduct	Existing three span masonry arch underbridge
S3	3A	St George's School Access Bridge	Existing single span masonry arch overbridge.
S4	3A	St George's School Footbridge	Single span steel truss footbridge
S5	3A	Ravelston Dykes Bridge	Existing single span masonry arch overbridge.
S6	3A	Craigleith Drive Bridge	Existing single span masonry arch underbridge.
S7	3A	Holiday Inn Access Bridge	Existing three span composite overbridge
S8	3A	Queensferry Road Bridge	Existing single span masonry arch overbridge.

Structure Ref.	Section	Structure Name	Description
S9	3A	Groathill Road South Bridge	Existing single span masonry arch underbridge.
S10	3A	Telford Road Bridge	Existing single span overbridge.
S12	3B	Crewe Road Gardens Bridge	Existing single span RC structure
S20	2A	Russell Road Bridge	New underbridge at Russell Road delta
W3	5A	Russell Road Retaining Wall One	New retaining wall required due to level difference.
W4	5A	Russell Road Retaining Wall Two	New retaining wall required due to level difference.
W18	5A	Murrayfield Tramstop Retaining Wall	
S21A	5A	Roseburn Street Bridge	New underbridge
S21B	5A	Murrayfield Stadium Retaining Wall	New retaining wall required due to level difference.
S21C	5A	Murrayfield Stadium Underpass	New underbridge
S21D	5A	Murrayfield Training Pitches Retaining Wall	New retaining wall required due to level difference.
S21E	5A	Water of Leith Bridge	New underbridge
S23	5B	Carrick Knowe Underbridge	New underbridge (Intersection Bridge)
S24	5B	Existing Saughton Road Bridge	Existing WEBS structure
S25	5B	Existing Broomhouse Road Bridge	Existing WEBS structure

Structure Ref.	Section	Structure Name	Description
S26	5B	South Gyle Access Road Bridge	New underbridge
W11	5B	Bankhead Drive Retaining Wall	New retaining wall required due to level difference.
S27	5C	Edinburgh Park Station Bridge	New underbridge (Intersection Bridge)
S28	5C	A8 Underpass	New underpass
W16	5C	A8 Retaining Wall	Now replaced by a slope.
W19	5C	Gyle Stop Retaining Wall	New retaining wall required due to level difference.
S32	6	Depot Access Bridge	New structure required to provide vehicular access from Gogar Burn roundabout to the new depot.
S29	7A	Gogar Burn Bridge	New underbridge
S33	7A	EARL Underbridge	No longer required.
W14	7A	Gogar Burn Retaining Wall One	New retaining wall required due to level difference.
W15	7A	Gogar Burn Retaining Wall Two	New retaining wall required due to level difference.
W100	3A	Roseburn Corridor Retaining Walls	
S17	1D	Tower Place Bridge	Existing underbridge at Leith Docks

Structure Ref.	Section	Structure Name	Description
S16	1D	Victoria Dock Entrance Bridge	Existing underbridge at Leith Docks
W1	1D	Lindsay Road Retaining Wall	Existing modular retaining wall adjacent to Lindsay Road.
S30	7A	Gogar Culvert One	New culvert
S31	7A	Gogar Culvert Two	New culvert
S34	7A	Gogar Culvert Three	New culvert
W8	5A	Baird Drive Retaining Wall	New retaining wall required due to level difference.
S22	5A	Balgreen Road Bridge	New underbridge
W9	5A	Balgreen Road Retaining Wall One	New retaining wall required due to level difference.

28.3 Proposed Structural Form

The approval for all structures and civil engineering works shall be in accordance with the Consents Programme and Schedule 14 (Design Management Plan). The proposals at all structures listed above shall be subject to review/acceptance by **tie** prior to application for consent being made to the City of Edinburgh Council, or Approval to Network Rail as appropriate.

28.4 Listed Structures

Due cognisance shall be taken by the Infraco of the historical status of any of the structures affected by the Infraco Works. Work on such structures will be subject to the relevant approval process, as described in the Consents Programme and Schedule 14 (Design Management Plan).

28.5 Vibration and Noise

Structures and civil engineering works shall be designed in accordance with **tie**'s Noise and Vibration Policy at 10.1.5.

28.6 Bearings and Movement Joints

The design shall minimise the need for bearings and movement joints within all the structures. Integral structures shall be adopted where feasible.

Where bearings are required, either elastomeric or pot type bearings shall be used to accommodate the longitudinal and transverse translations and rotations while minimising lateral loads on sub-structures.

All bearings shall be replaceable under full live loading.

The use of movement joints shall be minimised, but where proposed they shall be easily maintainable and replaceable.

28.7 Design Life

The design life of all structures is set out in Section 6 (Design Life) of these Employer's Requirements.

28.8 Design Standards

All structures shall be designed in accordance with the appropriate design standards – See Section 8 (Standards) of these Employer's Requirements. Adopted design standards should be listed by the Infraco in the Approval in Principle Form 'A', or equivalent, submitted to **tie** for individual structures.

28.9 Structure Loading

Structures supporting the ETN shall be designed to carry 0.5RL loading as defined in the Design Manual for Roads and Bridges (DMRB and BS5400 Part 2). The maximum allowable tram axle load is determined in 24.12 of these Employer's Requirements.

During the design of structures due cognisance shall be given to the loadings imposed by construction and maintenance vehicles. Any constraints upon the operation of construction and maintenance vehicles shall be identified and advised to **tie**.

28.10 Rail Break

All elements shall be designed and provided to cater for tensile breakage of one rail at any location at ultimate limit state only. The other unbroken rails and the supporting structure shall resist the unbalanced force from a broken rail. The force resisted by any element shall be the lesser of:

- The force resulting from the rail and concrete deck temperatures and shrinkage, or
- The sum of the clip resistances between the movement joints bounding the break.

The effect of rail break shall be considered in conjunction with rail tensile temperature effects and the tram dynamic weight, centrifugal, nosing and braking and/or traction effects. The partial load factor shall be taken as 1.0.

28.11 Clearances

As a minimum, clearances shall be to RSPG 2 Tramways requirements.

Structural designs shall take due cognisance of the potential developed kinematic envelope of Trams that may be operated on the ETN.

28.12 Finishes

Finishes to all concrete components of the Infraco Works shall comply with the following:

▪ All buried and permanently submerged surfaces	F1, U1
▪ Pier tops, bearing shelves and hidden surfaces	F2, U2
▪ Parapet Coping, Exposed surfaces	F3, U3
▪ Main bridge deck	U4
▪ Special finishes – where deemed appropriate these are to be agreed with **tie** and all relevant authorities (e.g. CEC structures department) taking cognisance of all cost and construction impacts.	Note

Table 81 - Finishes

28.13 Protection

Structural steelwork shall be protected by a paint system in accordance with the appropriate standard. Steel surface preparation and the application of high performance paint coatings shall provide a design life to the first maintenance intervention in excess of twenty years. This requirement takes precedent over other standards.

The top surface of the any bridge deck shall be protected with a proprietary sprayed waterproofing system in accordance with BD 47/99.

All buried concrete surfaces shall receive two coats of bitumen; and Pavix (or equivalent) is to be applied to all concrete surfaces exposed to salt spray. A risk based assessment is to be undertaken for approval by **tie** to identify the extent of anti-graffiti treatment to be applied to exposed concrete surfaces.

28.14 Infrastructure Maintainability

The infrastructure shall be designed to minimise maintenance requirements. In particular the design should allow access which will not adversely impact systems operation of the Edinburgh Tram Network for the completion of routine work.

Structures will be subject to regular general inspections and a principal inspection at a frequency of every six years. The principal inspection shall entail amongst others a close visual inspection of all

elements of a structure. Details of the inspection and maintenance regimes are to be developed by Infraco and approved by **tie**. Maintenance Requirements are detailed further in Table 92 – Structures at Section 40 of these Employer's Requirements.

28.15 Provision for Inspection and Maintenance

Access to the underside of decks for inspection and maintenance shall be via vehicular-mounted inspection platforms operating from ground level, where access is feasible within contracted design parameters. For maintenance of metal parapets, for example, access shall be from the walkways. For bridges across Network Rail infrastructure it will be necessary to undertake such inspections in accordance with Network Rail requirements.

28.16 Bearings

Mechanical bearings shall be replaceable by jacking up the structure's deck a nominal amount, which minimises disruption and physical works. Where this is required, track will be designed such that only the bridge track is displaced. The bearings shall not require replacement for at least 50 years. Where bearings are provided, suitable inspection and maintenance galleries shall be provided.

Unauthorised access to these galleries shall be prevented through the incorporation of suitable measures.

No specific provisions shall be made for inspection and maintenance of the bearings on piers. Access to these bearings will be via a hydraulic access platform.

28.17 Expansion Joints

Bridge expansion joints shall be of the sealed type and provision shall be made to carry any water seeping through the joint into the deck drainage system. Expansion joints shall be easily maintained and replaced.

28.18 Earthing and Bonding

Structures shall be designed to comply with the Earthing and Bonding Policy at Earthing and Bonding of these Employer's Requirements.

28.19 Protection against Stray Current

Where trackform is an integral part of the structures, it shall be designed to comply with Stray Current Section 32 of these Employer's Requirements.

28.20 Third Party Relationships

28.20.1 Road Closure and Traffic Management

All Infraco Works affecting road traffic will be subject to the granting of permissions from relevant parties and may involve road closures or traffic management measures approved by CEC or the owner of the affected road. All such approvals are to be in place in advance of of any traffic impacts and comply with the requirements of Project Management Processes

In particular, the following works are expected to have a significant effect on traffic movements and may require particular consideration:

- Groathill Road Bridge and Craigleith Drive Bridge may require road closures for the duration of the Infraco Works;
- Construction of the abutments and new deck for Roseburn Terrace Bridge will require temporary closure of the A8 and partial workings within the carriageway;
- The construction of a structure, passing under the A8 to the east of Gogar roundabout, shall require significant traffic management to minimise disruption to traffic during construction. Additionally consideration will be required for the traffic impacts to the construction of the Depot Access Bridge and A8 retaining wall structures;
- Ocean Drive Bridge widening may require road closure for the duration of the Infraco Works;
- Roseburn Corridor Structures will be impacted an may require temporary traffic constraints (Ravelston Dykes Bridge, Holiday Inn Access Bridge, Queensferry Road Bridge, Telford Road Bridge, Crew Road Gardens Bridge;
- Tram bridges to be constructed over live roads may require some traffic constraints including Haymarket Station viaduct, Russell Road Bridge, Roseburn Street Viaduct, Balgreen Road Bridge, South Gyle Access Bridge.

28.20.2 Other Interested Parties

All relevant third parties shall be consulted by Infraco as required during the course of. In particular, this will include in relation to structures:

- Network Rail – noting particularly the Carricknowe and Edinburgh Park Bridges;
- Forth Ports;
- Edinburgh Airport Limited;
- Edinburgh Park Management Limited / New Edinburgh Limited; and
- Scottish Rugby Union.

28.20.3 Landscaping and Boundary Treatment

The Design Manual sets out the parameters of the design elements of the environmental mitigation measures to be implemented. The design guidance and requirements contained within the Design Manual shall be considered by the Infraco taking into account the CEC's own Development Quality Guidelines. (They include: Quality of Landscaping in New Developments, Biodiversity, Tree protection and Urban Forestry.)

A Landscape and Habitat Management Plan (LHMP) shall also be identified and prepared for the approval of **tie** and subsequent presentation to the CEC. It should be noted that there is a requirement for the LHMP applicable to the Roseburn Corridor to be specifically approved by the CEC Planning Committee.

A Boundaries Treatment Management Plan shall be created and updated by the Infraco to reflect emerging issues regarding boundary interface design matters between the track and adjoining ownerships. In general, all landscaping and boundary measures shall be in keeping with the surrounding environment and shall be consistent with the local character of the relevant area.

Where it is determined that fencing is required either to physically segregate the tram track or to separate the tram from other parties (for example Network Rail) the fencing shall be of a type and standard that provides the necessary separation and satisfy the requirements of the other party. In the case of Network Rail it must conform to their Group and Company Standards. The design will take into account concerns with respect to an individual having safety space in a fenced route.

Boundary treatments shall take cognisance of the need for appropriate noise mitigation measures, as well as other appropriate ecological works (e.g. badger mitigation) ensuring all Infraco Works have achieved all relevant approvals. In particular it is required that such boundary treatment and noise mitigation measures meet with the requirement to provide an end result which is no worse than the environmental impact assessment and presented in the Environmental Statement which was presented as part of the parliamentary submission.

29 Depot

29.1 Scope

This Section of the Employer's Requirements defines the Depot requirements applicable to the Edinburgh Tram Network (ETN) which the Infraco must comply with.

29.2 Depot, Buildings and Associated External Works

The Depot shall be of an economical design which reflects economy of use and maintenance in providing all the functionality required by **tie**.

The Depot shall provide the facilities to operate, service, repair and maintain a reliable passenger service.

29.3 The Site

The Depot site in Gogar is located in the vicinity of Edinburgh International Airport and has constraints imposed upon its design by the Civil Aviation Authority due to the proximity of the emergency runway at the airport. Factors to be accommodated in the design and construction of the Depot include height restrictions that shall necessitate detailed discussions with the aviation authorities.

29.4 Staff Halt

At a location to be agreed by **tie**, shelters shall be provided for the sole use of tram crew and other staff working on the Edinburgh Tram Network so as they can board the Trams. The staff halt shall comprise of shelters not less than 2.5m x 2m which shall provide weather protection. The staff halt will be linked to the Depot by a designated walking route leading to a controlled gate in the Depot boundary fence. The shelters shall be monitored by CCTV cameras, if they are not visible from the Depot Control Centre. The shelters will be provided with telephones providing a dedicated link to the Depot Control Centre.

The staff halt shall not introduce any speed restriction to the passage of Trams.

29.5 Drainage

The general site area shall be lowered to ensure that all structures are below the flight path. As a result of this excavation, both foul and surface water drainage may need to be pumped from the permanent works to off-site outfalls.

29.6 Access

Road access from the A8 Gogar roundabout link road shall provide both entry and exit for normal Depot operations traffic and also for delivery and egress of Trams with the minimum of impact on other facilities. Height restrictions on vehicle loads shall be verified in relation to the Airport operations. The link road giving access to the Depot may be extended by others and will cross the Tram route to the Airport, and the Depot entry track.

29.7 Utilities

Existing utilities and sewers crossing the Depot Site site shall be protected or re-located as appropriate and shall be instructed as a **tie** Change and follow the principles of Section 21.

29.8 Depot Site Layout

The configuration of the Depot and the use of the equipment contained therein shall minimise disturbance to neighbours.

Allowance shall be made in the site layout adjacent to the Depot building to accommodate temporary office facilities that may be needed during the construction, testing and commissioning phases of the Infraco Works. This shall include the provision of temporary electricity and water services.

The Depot site shall accommodate a zone within which the required accommodation can be located.

The Depot shall be secure and be provided with security systems as appropriate.

- The Depot shall have a suitably robust security fence 2.4m high shall enclose the Depot site with controlled entry points for Trams, vehicles and pedestrians. The security entry points shall be unmanned with security control systems providing the means of operation. These shall be centred on the Depot reception during normal office hours with transfer to the Control Centre at other times.

- The Depot shall incorporate two separate access points to the running lines.

- The entire Depot external operating area within the perimeter fence shall be provided with a comprehensive CCTV surveillance system, the images from which shall be displayed in real-time in the Control Centre. The cameras shall form part of the network CCTV system (refer to Section 35 (Supervisory Control and Communications Systems) of these Employer's Requirements. In particular a CCTV system shall be provided to view the Depot vehicular and

pedestrian entrances. It shall be integrated with the entry systems and shall be centred on the Depot reception during normal office hours with transfer to the Control Centre at other times.

The current reference design sets the Depot site below existing ground level and retaining structures shall be constructed as necessary along the A8 site boundary. These structures shall also form the ramp for the through track of the tram system to the Airport.

- The stabling area and its configuration shall be established by the combination of track requirements and the Depot building footprint. The Depot layout shall accommodate a minimum of 36 berths. The stabling facility shall be built to accommodate an initial 27 x 44m Trams. Adequate provision shall be made to allow cleaning personnel to move around berthed Trams.

- Set between the stabling roads shall be access paths alternately at least 1.0m and 2.0m wide with service points to provide facilities for Tram cleaning and minor maintenance on the 2.0m width paths.

- The desirable longitudinal gradient of all tracks within the Depot shall be zero. The absolute maximum longitudinal gradient shall be 0.4%. Cross-level gradient (cant) of all tracks shall be zero (see Section 26 (Track) of these Employer's Requirements).

- At the ends of any tracks that terminate, a Tram-arresting device shall be provided.

- A track shall be provided to enable Trams to be loaded and off loaded onto/from road transportation.

- A servicing track shall be provided complete with a tram wash plant and hand windscreen cleaning points. Road access shall be provided for detergent deliveries to the wash plant.

- The wash plant shall be located inside a shelter (the shelter need not extend the full length of the Tram being washed) – see Table 83 - Depot Plant and Equipment to be Provided of these Employer's Requirements, where the operating temperature range is set out. The facility will be provided with suitable devices to remove excess moisture from the washed vehicles. High quality results, at least as good as those achieved by Lothian Buses on their fleet, shall be delivered by this facility.

- Sand filling points within an enclosed structure shall be installed on the servicing track. The bulk sand silo (capacity at least 30t) and associated feeder equipment shall be located close by, along with the provision of road access for sand deliveries.

- A suitably drained bogie wash point shall be provided in the apron at the front of a Tram entry point to the workshop which allows demounted bogies to be easily manoeuvred in and out of the workshop. Plant used for this operation shall be transportable and housed within the main workshop. Power and water shall be provided to allow the tram pressure washer to be utilised at this location. Treatment of wastewater, to meet appropriate standards prior to connecting to the site drainage system, shall be provided.

- Car parking shall be provided for one third of the personnel employed on the Depot site. Within this provision, visitor car parking shall be provided close to the Depot entrance for no less than six vehicles.

- Servicing areas for external stores and containment of waste shall be provided.

- A sub-station for both traction power (main line and depot feeds) and domestic Depot supplies shall be provided.

- Due to the proximity of the Airport runway, planting and landscaping within the Depot site shall be restricted and consistent with CAA guidance to prevent bird strikes. Native species of plants shall be used where possible and shall be compatible with Tram operations.

- The Depot site shall be appropriately lit.

29.9 Depot Building

The following identify the principal features of the Depot building:

- The main Tram workshop, other workshops, stores, management, administration, operations and maintenance offices, staff welfare facilities (support accommodation) and the Control Centre for the complete Edinburgh Tram Network, shall be contained within a steel framed building clad in an insulated panel cladding system. The roof of the building shall be insulated to a suitable standard with the minimum number of penetrations.

- The building workshop shall accommodate a minimum of two tram maintenance roads, a wheel lathe road and a further tram service road.

- The support accommodation shall be arranged on two floors set to one side of the main tram maintenance workshop. The Control Centre shall be located at first floor level with the equipment room set below. A view of the depot external stabling area and tram entry/exit point shall be provided to Control Centre staff from within the Control Centre.

- The Depot shall be provided with the appropriate electricity supplies including 400V for individual items of workshop equipment both inside and outside the building, 230V for internal domestic use and 110V for small tools.

- Natural light in offices shall be maximised and all rooms shall be placed within the building in locations appropriate to their function. This shall be supplemented by artificial lighting consistent with the tasks undertaken and the hours of operation of the facility.

- Additional service space shall be provided for the accommodation of domestic services as well as for the accommodation and systems directly linked to the Tram operations.

- Full heating and ventilation will be provided throughout the building with air conditioning to the cControl Centre, equipment room, training and meeting rooms.

- Fire alarms and fire extinguishing systems shall be provided throughout the Depot building. Fire suppression shall be provided in the technical equipment room(s).

- Suitable office furniture shall be provided for all areas within the Depot building.

The following schedule of accommodation shall form the basis of the design for the office and welfare facilities attached to the Depot.

29.10 Schedule of Staff Numbers

The Depot shall accommodate the number of staff identified in the "Establishment with Expansion" column set out below.

Note: The locker rooms should have sufficient capacity for approximately 5% spare capacity on these numbers to cope with staff turnover and associated training overlap.			**Max Number on duty in the Depot at one time**	
Anticipated Job Title	**Establishment for Phase 1a/1b**	**Establishment with Expansion**	**Phase 1a/1b**	**With Expansion ratioed up**
OPERATIONS				
CORPORATE MANAGEMENT				
General Manager	1	1	1	1
Operations Manager	1	1	1	1
Commercial Manager	1	1	1	1
OPERATIONS				
Duty Managers	11	12	4	4
Operations Supervisor	9	9	2	2
Operations Assistant	1	1	1	1
Drivers	112	126	11	12

Anticipated Job Title	Establishment for Phase 1a/1b	Establishment with Expansion	Phase 1a/1b	With Expansion ratioed up
OPERATIONS				
Engineering Manager	1	1	1	1
Vehicle Engineer	1	1	1	1
Infrastructure Engineer	3	3	3	3
Safety and Standards Manager	1	1	1	1
Performance Regime Manager	1	1	1	1
Clerk	1	1	1	1
FINANCE				
Finance Manager	1	1	1	1
Accounts Assistant	2	2	2	2
Administration				
Secretaries	1	1	1	1
Admin. Staff	2	2	2	2

Anticipated Job Title	Establishment for Phase 1a/1b	Establishment with Expansion	Phase 1a/1b	With Expansion ratioed up
REVENUE PROTECTION STAFF				
Inspectors	112	126	11	11
Cashiers	1	1	1	1
Revenue Protection Manager	1	1	1	1
INFRASTRUCTURE / VEHICLE CLEANING				
Cleaning Manager	1	1	1	1
Cleaners	20	23	10	11
SUB TOTAL	**285**	**318**	**59**	**67**
TRAM MAINTENANCE				
Office Staff	3	3	3	3
Storeman	1	1	1	1
Technicians	30	34	15	16

Anticipated Job Title	Establishment for Phase 1a/1b	Establishment with Expansion	Phase 1a/1b	With Expansion ratioed up
SUB TOTAL	**34**	**38**	**19**	**21**
INFRASTRUCTURE MAINTENANCE				
Office Staff	4	4	4	4
Storeman	1	1	1	1
Technicians	37	42	18	20
SUB TOTAL	**42**	**47**	**23**	**25**
SUMMARY				
Operations	285	318	59	67
Tram Maintenance	34	38	19	21
Infrastructure Maintenance	42	47	23	25

Table 82 – Schedule of Staff Numbers

29.11 Accommodation (First floor)

The first floor is to be occupied by the Operator. The accommodation set out below is required as a minimum and must be related in all respects to the numbers of staff to be employed and based at the Depot as set out in Table 82 – Schedule of Staff Numbers, where not otherwise specified. Appropriate account is also to be taken by the Infraco of the maximum numbers of staff indicated as being on the premises at any one time in sizing toilets, messing facilities etc.

- A Control Centre to include the equipment as defined in paragraph 35.13 and allow a good ergonomic layout for the functions carried out therein.

- A room adjacent to the Control Centre, with sufficient space for the incorporation of the necessary furniture and technical equipment used to store and manage the handheld radios and ticketing equipment and their batteries, together with one desk space.

- A cash office adjacent to the Control Centre, with adequate space for two staff members and the associated equipment for cash counting and sorting, as well as a safe of an appropriate size.

- A viewing area shall be provided for visitors to view the Control Centre without disrupting the activity within.

- Windows shall be provided to provide a view into the tram workshop from the first floor. Suggested locations are adjacent to the Control Centre (if not inside, then integrated with the viewing area referred to above), adjacent to the engineering office, and in the viewing area.

- Adequate toilets and showers (Male, Female, Disabled).

- Access from the ground floor with at least two staircases and one lift (for disabled access and, unless other arrangements are available, for the lifting of equipment and furniture required on the first floor).

- One set of stairs is to give direct access between an external door (itself adjacent to the visitor's parking spaces) and the first floor. A reception area is to be provided at the first floor landing including an allowance for a reception desk and a minimum of four waiting chairs. A second set of stairs is to be adjacent to the Control Centre and provide a direct link, to a route from the staff parking/external access gate and the locker rooms, and to the walking routes onwards into the stabling sidings and to the access gate in the Depot fence to the staff halt on the main line.

- Office for the General Manager, sized for one person with meeting table for six people.
- Office for the Operations Manager, sized for two people. To be situated close to the Control Centre.
- Office for the Safety and Performance Managers, sized for two people.
- Engineering office, sized for three people, with meeting area for four people.
- Office for the Duty Manager and Supervisors, sized for three people.
- Office for the Finance and Commercial Managers, sized for two people.
- General office, sized for eight people.
- Messing facility, including limited self-service kitchen facility.
- Cleaning office and store.
- Interview room, close to the office of the Operations Manager.
- Meeting room for 10 people, close to the Reception.
- Two training rooms, one sized for 30 people and one for 15 people. The larger should be able to be subdivided, broadly in half. Note that this may be required to be on a permanent basis once the complete system is open for service.
- Space to locate the PABX and a computer server for the Operator.
- Locker Rooms, male and female in suitable proportion for the total relevant staff numbers and with an allowance for flexibility in recruitment. The design shall allow for flexibility in the division to allow for long-term changes in the proportions. The locker rooms should be placed conveniently for the Control Centre and messing facility. The space allowance for lockers should be based on two-thirds height/interleaved lockers.
- A store for uniforms and other small operational equipment.
- A records store.

- A location for photocopying.

29.12 Workshop General Requirements

- In the main workshop, all roads shall have traction power. The wheel lathe shall be placed in a central position to enable the workshop doors to be closed whilst the lathe is in operation;
- Gantry structures, for access to the Tram roof area from both sides, shall be provided for a minimum of two berths;
- Under-track pits shall be provided on no fewer than four tram maintenance berths incorporating access and egress stairs. Pits shall have adequate lighting, drainage and power tool sockets;
- 'Built-in' jacking points (i.e. lifting under the Tram bogies) shall be provided to one of the roads, which shall be provided with traction power, the pits containing this equipment shall be adequately drained;
- Battery charging equipment shall be provided for Tram batteries, fork lift trucks and all other battery powered equipment with associated ventilation equipment, in a dedicated area off the main workshop;
- Hydraulic and electronic workshop facilities, including bespoke test benches, shall be provided appropriate to the Trams. Fixed equipment, for the servicing and testing of hydraulic and electronic equipment shall be provided. The areas shall be capable of being separated from the main workshop area by closure of an industrial door; and
- Both heavy and light stores areas shall be provided complete with the necessary racking systems to suit the storage requirements of the spare parts required for all systems, equipment and Trams being supplied. Forklift truck access to these areas shall be provided. Stores are to be segregated between those required for the Tram Maintainer and those for Infraco.

29.13 Accommodation on Ground Floor

29.13.1 General Facilities

The ground floor is to be principally occupied by the Infraco. The accommodation requirements set out below is required as a minimum.

The design of the accommodation must be related in all respects to the numbers of relevant staff to be employed and based at the Depot as set out in Table 82 – Schedule of Staff Numbers, where not

otherwise specified. Appropriate account is also to be taken by the Infraco of the maximum numbers of staff indicated as being on the premises at any one time in sizing toilets, messing facilities etc.

The different spaces should be arranged grouped logically together and with respect to accesses etc. The workshop areas must also accommodate all relevant equipment listed in the Plant and Equipment Schedule – see Table 83 - Depot Plant and Equipment to be Provided.

- The equipment room shall be underneath the Control Centre. Necessary domestic plant rooms.
- A store for tram and infrastructure cleaning equipment.
- First aid room (suitable for all staff at the depot, accessible from the first floor and to an external vehicle access).

29.13.2 Facilities

- Staff access shall be arranged preferably, adjacent to the locker rooms and convenient for external access and with appropriate security.
- Adequate toilets and showers shall be provided (Male, Female, Disabled) serving both contractors.
- A messing facility, including limited self-service kitchen facility.
- Locker rooms, male and female in suitable proportion for the total relevant staff numbers and with an allowance for flexibility in recruitment. The design shall allow for flexibility in the division to allow for long-term changes in the proportions. The space allowance for lockers should be based on a full-height lockers for each relevant person. There should be dry locker rooms, sufficient for all Infraco staff, based on full-height lockers, and a drying room to include additional full-height lockers for all of the Infrastructure and Tram Maintenance staff.
- machine tool area, open to the tram workshop. This might be linked to the dirty workshop.

29.13.3 Tram Maintainer Specific Facilities

- A small store for workshop cleaning equipment.
- A location for a computer server for the Tram Maintainer.
- Tram Maintenance Managers Office, sized for one person with meeting area for four persons.

- Tram Maintenance General Office, sized for five persons.
- Tram Stores including office, small items store and large items store with access for fork-lift truck. The size of these shall be agreed with the relevant contractor.
- Battery store and charging area
- Clean workshop(s) for electronics and hydraulics
- Dirty workshop for bogie, with cross access track from the main vehicle workshop underneath the travelling crane; area could be linked with machine tool area

29.13.4 Infrastructure Maintainer Specific Facilities

- A location for a computer server for the Infrastructure Maintainer.
- Infrastructure Maintenance Manager's office, sized for one person with meeting area for four persons.
- Infrastructure Maintenance general office, sized for five persons.
- Infrastructure stores including small office, small items store and large items store with access for fork-lift truck. The size of these shall be agreed with the relevant contractor.
- Clean workshop for electronics
- Dirty workshop which could be the machine tool area.

29.14 Provisional Schedule of the Plant and Equipment

The plant and equipment to be provided and installed shall include, but not be limited to, the following:

Table 83 - Depot Plant and Equipment to be Provided

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
1		Cleaning Equipment										
	1.1	Tram Cleaning Equipment	Equipment for cleaning of tram interiors	110V Industrial vacuum cleaning equipment, ≥ 2kW power Equipment to allow removal Floor polishing equipment	P	Generally used in stabling areas However can be used throughout the Depot	T	O	O	O	O	6

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.2	Tram pressure washer	Industrial washer for general tram cleaning within the Depot including bogie washing	Self powered Hot water/steam - self heating Pressure variable up to ≥200 bar Flow rate ≥12 l/min Lance and hose ≥10m Detergents compatible with Tram external finishes	M	Throughout Depot	T	T	T	T	T	1
	1.3	Infraco pressure washer	Removal Removal of fly posters General cleaning	Features as per Tram pressure washer Mobile towable bowser with capacity for up to one shift of cleaning Infraco to ensure	M	Across the ETN	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				interchangability with tram pressure washer Readily transportable on back of road-rail and other road vehicles								

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.4	Tram Washing Plant	Fixed plant for cleaning of Tram exterior	Unidirectional >15 tph continuously Minimised water consumption, maximised water recirculation controllable and monitored from Control Centre via SCADA system Self contained Pre-wet One pair application brushes Automatic end wash Two pair water wash brushes	F	Alongside main workshop	I	O	O	O	O	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Dryer Operates from -5°C ambient external temperature within shelter Final details TBD with tram supplier ≥70% water recycling Backflow prevention devices shall be installed. Treatment of wastewater to meet appropriate standards prior to connecting to site drainage system shall be provided.								

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.5	Rail Groove Cleaning Equipment	P-way cleaning	Vacuum equipment to remove detritus/debris from grooved track including drain boxes and points Able to clean drains and gullies employing water jets Transportable on road/rail vehicle, lifted with crane or fork lift truck Self powered for full shift Easy collection/disposal of detritus/debris	M	Across the ETN	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.6	Parts washer	Infrastructure/Tram component cleaning & degreasing in dirty workshop	Able to wash components ≤100kg, ≤750mm diameter	F	Within dirty workshop	I	I/T	I	I	User	1
	1.7	Floor scrubber	Depot floor cleaning	Industrial vacuum/brush scrubber equipment Compatible with floor finishes	M	Within Depot building	T	T	T	T	T	1
2		Mechanical Handling										
	2.1	Shunter	Manouveuring Trams within workshop	Battery powered Road/rail capability Capable of towing/propelling single Trams Speed up to 3 km/h	M	Throughout Depot tracks Road capability to move	T	O/T	I/T	O	User	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Local and remote control Charging facilities Coupler at each end		between tracks on hardstanding						
	2.2	Tram lifting system and stands	Lifting Trams to allow routine maintenance and removal of bogie(s)	Fixed underfloor system providing flush floor when not in use. Ability to lift fully functional, unladen tram. Synchronised lift from single control panel. Ability to stop and lock lift at any vertical positionInterlocking to	F	Main workshop	I	T	T	T	T	1 set

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				protect Tram in event of system/component failure. Manually positioned stands to be provided Interlocking with OLE if required.								
	2.3	Fixed high level access platforms	To allow access to all equipment mounted on Tram roof	Capable of providing access to all roof mounted equipment on tram Decking to prevent tools or small to components falling through Handrails and toeboards to prevent	F	Main workshop	I	T	I	T	T	2 sets

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				personnel/material falling Access/egress gates interlocked with OLE End protection								
	2.4	Overhead crane	Bridge type crane spanning 2 roads within the workshop to allow all material within main workshop to be transported up to and including size/weight of motor bogie	≥6.3 tonne capacity Vertical clearance <960 mm from hook (fully raised) to top of crane Traverses below OLE Interlocked with OLE Remote control using hand held device Multi-speed faciltiy - lift, traverse and travel	F	Main workshop	I	T/I	T	T	User	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Long and cross travel to cover all areas over the two roads								
	2.5	Mobile crane	Facilitate removal of miscellaneous equipment including bogie components within the dirty workshop	≥2t capacity Powered operation	M	Throughout workshops	T	T/I	T	T	User	1
	2.6	Bogie workstands	To allow dismounted bogies to be maintained	Allows bogie to be manoeuvred along the stub track in the dirty workshop Wheel locks Capable of supporting	M	Dirty workshop	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				both trailer and motor bogie								
	2.7	Other tram equipment stands	Various stands to allow items of equipment to be stored and readily maintained when dismounted from the Tram	Infraco to propose depending on tram design Expected to include stands for doors, windows, body panels etc…	M	Throughout Depot	T	T	T	T	T	
	2.8	Accommodation bogies	To allow Trams to be moved within workshop once bogies have been removed or the Tram has been split at any articulation	Allows Tram to be manoeuvred throughout the depot once any combination of bogies has been replaced Allows entire tram to	M	Throughout Depot	T	T	T	T	T	

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				be manoeuvred throughout the depot once any articulation has been split								
	2.9	Fork lift truck	Lifting and transporting miscellaneous equipment	Battery powered Charging facilities Road wheels >3 t lifting capacity Drum handling equipment Crane arm Capable of accessing all shelving and racking in stores-Infraco to demonstrate	M	Throughout the Depot but limited to hard standing areas when outside	T & I	T/I	T/I	T	User	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.10	Pallet truck	Lifting & Transporting equipment particularly in stores	Manually manoeuvred, hydraulic lifting the Infraco to propose requirements. Infraco to provide integrated solution	M	Throughout the Depot but limited to hard standing areas when outside	I	T/I	T/I	T	User	The Infraco to propose
	2.11	Hand trolleys	Transporting tools and spares	Unpowered the Infraco to propose requirements. Infraco to provide integrated solution	M	Throughout the Depot but limited to hard standing areas when outside	I	T/I	T/I	T	User	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.12	Infraco lifting slings	General slings for lifting infrastructure heavy components on system and in Depot building	Infraco to propose. Stand for storage	P	Use on system infrastructur e	I	I	I	I	I	The Infraco to propose
	2.13	Tram lifting slings	Specific lifting gear to allow all equipment to be removed and replaced.	Raised hook on overhead crane can be no more than 5390 mm ARL the Infraco to propose Stand for storage	M	Use in Depot building only	T	T	T	T	T	Tramco to propose
	2.14	Windscreen/window removal equipment	For use in replacing tram windscreens and side windows	Mobile stand capable to being used to access both windscreen and side windows Electrically powered vacuum beam with	M	Use in Depot building only	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				suckers adapted to windscreen design Audio/visual alarm in the event of suction loss								
	2.15	Re-railing equipment	For use in rerailing trams out on the System	Variety of jacks/beams/slides to be proposed by the Infraco Airbags Slew locking devices Capable of being readily transported on the road/rail vehicle	M	Used any where on system including Tramstops	T	T	T	T	T	1 set
	2.15	Stop boards	To indicate the presence of equipment/personnel/tram	The Infraco to propose requirements. Infraco	P	Throughout System	I	T/I	I	T/I	User	≥20

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
			s on the tracks	to develop integrated solution								
3		Workshop & Stores Furniture										
	3.1	Shelving and racking	Storage of spares and other material	Heavy duty The Infraco to propose requirements. The Infraco to develop integrated solution	F	Stores	I	T/I	I	T/I	User	The Infraco to propose
	3.2	Tram staging	for Tram inspections/repairs	The Infraco to propose any additional staging required	M	Used within Depot building	T	T	T	T	T	The Infraco to propose
	3.3	General staging	For infrastructure inspections/repairs	The Infraco to propose any additional staging	M	Across Edinburgh Tram	I	I	I	I	I	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				required		Network						
	3.4	Shelving	Storage of minor items/documents	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose
	3.5	Workbenches	Equipment maintenance	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose
	3.6	Cupboards	Storage of minor items/documents	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	3.7	COSHH cupboard	Storage of COSHH items	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Dirty workshop	I	T/I	I	T/I	use r	The Infraco to propose
	3.8	Workshop stools	Personnel comfort when working	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	Us er	The Infraco to propose
4		Fixed Plant										
	4.1	Air conditioning maintenance equipment	Specialist tools for filling/emptying refrigerant	The Infraco to propose	F	Anywhere in Depot building	T/I	T/I	T/I	T/I	T/I	The Infraco to propose
	4.2	Tyre replacement equipment	Specialist tools for tyre splitting/removal/balancing /bearing replacement	The Infraco to propose	F	Dirty workshop	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	4.3	Underfloor wheel lathe	In-situ reprofiling of Tram tyres	Capable of producing a range of wheel profiles. Tolerances to be agreed between the Infraco Swarf conveyed to skip for removal by means of forklift truck capable of turning all wheels on one Tram within eight hour shift	F	Within Depot building.	I	T	T	T	T	1
	4.4	Sand Plant	Refilling of Tram sanding equipment	Minimum silo capacity 30 tonnes Capable of receiving sand delivery directly from road vehicle Allows Tram driver to	F	Dedicated facility	T	O	O	O	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				fill an empty tram within 5 minutes Rate of fill to be sustainable for 30 minutes. In no circumstances shall the interval between the filling of two Trams exceed 10 minutes The physical condition of the sand shall not deteriorate when stored Sand deliveries to a Tram shall stop automatically when								

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				the tram sand box is full Sand filling nozzles to be compatible with the sand filling inlets on the trams Signal interlocking to inhibit the movement of a tram if the sand filling nozzles are not returned to their correct storage position.								
	4.5	Machine tools	General machine tools required for maintenance	The Infraco to propose requirements. The Infraco to develop	F	Dirty workshop	I	T/I	T/I	T/I	User	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				integrated solution								
	4.6	Paint booth	Respraying of removable Tram panels	For use with water based paints integrated compressor	F	Outside workshop	T	T/I	T/I	T	User	1
	4.7	Pantograph maintenance & load test jig	to calibrates and align tram pantograph off Tram roof	The Infraco to propose	F	Throughout workshops	T	T	T	T	T	1
	4.8	Suspension setting equipment	To allow suspension to be set/shimmed without using tram lift	The Infraco to propose	M	Throughout workshops	T	T	T	T	T	1
	4.9	Diesel generator	Back up power source	Capable of connection to the depot LV switchboard and other plant requiring an external	M	Across network	*	I	I	I		*To be rented by the Operator if and when required.

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				energy source. Capable of providing at least three day continuous operation.								
5		Hand & Mobile Tools										
	5.1	Infrastructure tools	Hand tools	The Infraco to propose	P	Across ETN	I	I	I	I	I	The Infraco to propose
	5.2	Tram tools	Hand tools	The Infraco to propose	P	Across ETN	T	T	T	T	T	Tramco to propose
6		Welding Shop Equipment										
	6.1	Ferrous welding equipment	General infrastructure repairs	The Infraco to propose requirements. Infraco to develop integrated solution	F	Dirty workshop	I	T/I	I	T/I	Us er	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	6.2	Aluminium welding equipment	Specialist Tram and Tram shelter repairs	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Dirty workshop	I	T/I	I	T/I	User	The Infraco to propose
7		Battery Shop Equipment										
	7.1	Tram battery charger	To recharge Tram Batteries	The Infraco to propose	P	Battery room	T	T	T	T	T	The Infraco to propose
	7.2	Infrastructure battery chargers	To recharge various batteries used in power supply, control and comms equipment	The Infraco to propose and develop solution compatible with tram battery charger	P	Battery room	I	T	T	T	T	The Infraco to propose
8		Instrumentation and Test Equipment										

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	8.1	Tram test equipment	To allow testing of measurement and testing of tram equipment	The Infraco to propose. Note any overlap with "Special Tools" to be highlighted. As a minimum, proposal to include; headlight tester, tools to allow event recorder to be downloaded and interrogated, tools to allow CCTV systems to be downloaded and interrogated, tools to allow PA and PID announcements to be re-configured.	M/P	The Infraco to propose	T	T	T	T	T	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	8.2	Infrastructure and Fixed systems test equipment	To allow measurement and testing of infrastructure and fixed systems	The Infraco to propose. Note any overlap with "Special Tools" to be highlighted as a minimum, proposal to include; OLE height and stagger gauge, stray current data loggers, noise measurement equipment, ride measurement equipment, point setting detection equipment, ≥3 sets of live line testing	M/P	The Infraco to propose	I	I	I	I	I	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				equipment								
9		Infrastructure Maintenance Equipment										
	9.1	Portable P&C grinders	To dress points and crossings	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.2	Track welding equipment	to build up profiles/replace sections of track	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.3	Portable tamping equipment	To build up track ballast to realign track	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.3	Portable lighting equipment	To illuminate work/collision sites	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.4	Portable generators	To power site tools/lights	The Infraco to	P	On Site	I	I	I	I	I	2

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				propose								
	9.5	Track measuring Equipment	To allow track line and levels to be measured	The Infraco to propose	P	On site	I	I	I	I	I	1 set
10		Road Vehicles										
	10.1	Road - rail vehicle	To move about the system carrying mobile equipment and personnel	Able to operate on UK roads Able to operate on all parts of the ETN To be equipped with demountable ≥2 man-basket to enable OLE inspection throughout the ETN Capable of towing a tram including ability to apply tram brakes from cab of road-rail	M	Mobile throughout ETN and road network	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				vehicle Capable of having snow plough attached in both road and rail mode Crane with capacity ≥6t and a reach (reduced capacity) of at least 4m. Able to transport other equipment items as set out elsewhere in this list Able to transport ≥3 personnel in cab Payload capability ≥10t							

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				This will make it a requirement that the driver has a LGV driving license. Powered winch with ≥8t pulling capacity								
	10.2	Other road vehicles	Miscellaneous vehicles to be proposed by Infraco	The Infraco to propose	M	Throughout road network	I	I	I	I	I	The Infraco to propose
	10.3	Road/rail trailer	Trailer with large man lift for OLE inspection/repairs	Capable of being towed to site by	M	Throughout road	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				road/rail vehicle or truck		network						

29.15 Overhead Line Equipment

The Depot tracks shall be equipped with overhead line equipment. This will be in compliance with the Employer's Requirements for Overhead Line Equipment in Section 31.

Electrical and safety interlocking with the craneage and other plant and equipment shall be provided.

29.16 Depot Substation Buildings and Associated External Works

The requirements for the Depot substation building and associated external works are as follows:

- The Depot sub-station requirements and facilities shall accommodate the needs of the traction power loads within the Depot and to service the adjacent sections of main line, the Depot domestic supplies and the requirements of the Distribution Network Operator.
- A separate 11kV/400V LV transformer and distribution switchgear shall be accommodated fed from the main 11kV supply located in the Depot substation.
- The depot LV switchboard shall be capable of being energised from an external / mobile generator via socket and plug with an interlocked isolator. This shall provide 400 V ac supplies to essential services within the Depot complex.
- Provision shall be made for the switchboard generator apron and clear access to the connection point.

29.17 Depot Systems

29.17.1 Electrical Supplies

The power supply to the traction sub-station is described in Section 30 (Traction Power) of these Employer's Requirements.

Scope

The requirements on the Infraco shall include but not be limited to:

- Main (11kV) power transformer and LV switchboard;
- Sub-mains distribution and main equipment;
- Small power distribution;
- Power supply to mechanical plant and controls;
- Back-up supplies (fixed standby generator);
- Uninterruptible power supplies;
- Data distribution and information technology systems supplies (including operations IT systems);
- Fire protection system supplies;
- Power supplies to CCTV, security and access control systems supplies;
- Power supplies to lighting – internal and external, emergency lighting supplies;
- Cable containment;
- Lightning protection and Depot equipment earthing; and
- Commissioning of systems and training.

Auxiliary Power Supplies

Auxiliary supplies shall be provided with a suitably sized uninterruptible power supply. The uninterruptible power supply room shall be provided with cooling in order to maintain battery life (along with ventilation to offset hydrogen build-up if required).

110 Volt Power Supplies

Appropriate networks of 110 V shall be provided:

- 110 V power shall be distributed within the stabling area;
- 230 V/110 V transformers shall provide 110 V supplies throughout the workshops, the main LV switchroom, the plantroom, the wash plant and the sand filling plant.

Control Centre

Electrical supplies shall be configured such that in the event of a single failure there shall be no loss of data and no requirement for excessive actions on the part of the Control Centre staff.

A dual supply changeover arrangement, with high integrity circuit breakers is preferred to a single large uninterrupted power supply. The power changeover function shall not in itself cause the failure of any system so powered, the loss of information or an interruption to the availability to any sub-system for more than 20 seconds.

- Two, suitably sized uninterrupted power supplies shall be connected in parallel and supplied from the Depot substation to provide supplies to critical loads, i.e. Control Centre and equipment room supplies;
- The equipment room electrical systems to provide heating, ventilation, air conditioning, lighting, power and other building services to provide effective habitation for the centralised terminals of all sub systems deployed upon the Edinburgh Tram Network and the human/computer interfaces thereof shall be provided; and
- Lighting to equipment room shall be provided in accordance to CIBSE Codes. Emergency lighting within equipment room shall be at least 50% of normal to allow operations to be carried out even during mains failure.

An appropriate means of facilitating uninterrupted data and voice communication between the equipment room and Control Centre shall be provided for those sub-systems that are present at the operator workplaces, mimic diagrams, display banks and any emergency override facilities. Dedicated containment (and riser, depending on the room's orientation) for cabling between the two rooms shall be provided.

29.17.2 Specific Sub-System Technical Requirements

Access Control

A complete access control system shall be provided to relevant standards with a clearly defined access control strategy.

Controlled entry for pedestrians, Trams and road vehicles shall be provided with appropriate access control for each. Access control shall be switchable between a reception area (for daytime use) and the Control Centre. The Depot road entrance shall have two separate vehicle gates for entry and exit, and additionally a pedestrian gate on the footway. The vehicle gate shall be capable of being opened, and the pedestrian gate released, from either the Control Centre or the Depot reception, or by a member of staff presenting a security card to a reader at the gate.

The vehicle gate shall re-close once a vehicle has passed through. The pedestrian gate shall close automatically and re-lock when it closes. The vehicle exit gate shall open automatically when a vehicle approaches it from within the Depot.

Tram entry / exit locations shall be provided with manual gates, which shall normally be left open. At these gateways, there shall be a microwave or equivalent detector, which shall sound a single brief distinct audible warning in the Control Centre whenever the beam is interrupted by a person or larger object.

Intercoms shall be provided from each of the two entry gates (pedestrian and vehicle) to reception and Control Centre. There shall be two intercom positions on the same pole, one at convenient height for car drivers and one for heavy goods vehicle drivers, who shall be able to use them whilst in the driving seats of their vehicles. here shall be one security card reader at the lower position and one with the intercom at the pedestrian gate. Any equipment in centre of the road shall be removable if required to allow tram movement by road if designed to be through the same access. An intercom system shall operate in line with the access control system.

IT Systems

IT Systems including network cabling containment throughout the Depot building for the independent supply of IT systems shall be provided in accordance with Good Industry Practice.

- Data cabling shall be provided to appropriate standards;
- All equipment finishes shall be appropriate to area and type of use within the Depot building and shall be in materials with a long life in an environment that is in continuous use;
- All accessories used shall be from approved suppliers/manufacturers. Lifespan of finishes / accessories shall be verified with relevant supplier. Correctly (IP) rated items shall be installed as appropriate to the environment; and
- All materials used shall comply with their appropriate standards. Where necessary, finishes / accessories to carry the appropriate 'test pass' mark.

Data collection facilities shall be provided for the management of information provided by all relevant equipment including the underfloor wheel lathe, SCADA, wash plant etc.

Adequate data points shall be provided to enable data collection facilities to be connected.

Lighting

Natural light in offices shall be maximised and all rooms shall be placed within the building in locations appropriate to their function.

Office lighting shall be to CIBSE document 'Lighting Guide 7: Office Lighting'. The document encourages the maximum use of daylight in offices. Use of lighting controls (i.e. daylight sensing, presence detection) shall also be provided, hence saving energy by utilising daylight wherever and whenever possible.

Lighting in main workshop and other areas shall be placed such that light is given where required for work to take place, including when Trams are present. Each lighting element shall also be safely accessible for maintenance during the continuous operating hours with the OLE over one Tram berth isolated.

- Lighting shall be provided so as to provide the required lighting levels (to CIBSE Guides) even when Trams are occupying the workshop. Task lighting shall be provided by luminaires placed close to the task, also supported by portable lamps connected to local supplies;

- Appropriate switching and control strategies shall be implemented; and

- Verification of lighting levels shall be supported by lighting calculations and also by taking post-installation light meter readings.

29.17.3 Workshop Doors

Workshop Tram access doors shall be bi-parting, bi-folding with clear panels for through visibility. The doors shall be power-operated with push-button controls both inside and outside. The open and close button shall be press and hold whilst the door moves, rather than press and walk away to ensure door does not open or close onto an obstruction or person.

- A top-hung door with a bottom track shall be provided and allowed for when sizing the electric motor;

- The actuating mechanism shall be such that it can be maintained without the need to isolate the overhead line equipment;

- In the event of power or door operating equipment failure, it shall be possible for one person to operate the doors manually from ground level;

- The doors shall be provided with a suitably located insulated aperture to accommodate the live overhead line;

- Overdoor heaters, if proposed, shall operate only when doors open via interlinks and integral thermostats.

Door leaves shall be bonded to earth so that should they inadvertently come into contact with the overhead line equipment, the fault resistance shall be sufficiently low to ensure immediate circuit breaker trip without damage to doors or equipment.

29.17.4 Hazardous Material Storage

Facilities for the storage of hazardous materials and road access for their delivery and off loading shall be provided.

29.18 Equipment Room

29.18.1 Fire Alarms / Fire Extinguishing System

The equipment room shall have a means of locally activating the fire alarm via a wall-mounted panel.

The equipment room shall be fitted with smoke and temperature alarms.

The equipment room shall also be fitted with an automatic and manually operated extinguishing system, which shall not damage the equipment when activated. The extinguishing system chosen shall be designed subject to a risk assessment based on criticality etc.

In the event of the loss of the primary power supply, the alarm system shall function for a minimum of six hours. This system shall be integrated with the durations and functionality of all other UPS systems.

29.18.2 Heating and Ventilation

The equipment room shall be environmentally controlled to minimise the effects of room heating due to equipment dissipation.

The heat exchanger vents shall not be positioned over the work area of the maintainers nor directly above equipment cubicles, and shall be placed in position to minimise localised chilling effects.

The room shall be positively ventilated to prevent dust ingress.

All equipment fitted with fans shall ensure that fan failure shall not compromise system functionality.

29.18.3 Lighting

Lighting within the equipment room shall be either incandescent or fluorescent type fittings.

In the event of power failure, emergency lighting shall be fitted which shall operate for four hours and maintain the level of illumination in the room.

The lighting shall be positioned to illuminate the front and rear of the equipment cubicles, but not directly above equipment cubicles.

29.18.4 Cable / Conduit Entry

Cable routing shall be primarily through floor-recessed conduit.

The main cable entry / exit shall be via an aperture located in the floor, which provides entry or access for cables external to the Depot.

Cable access shall be through the equipment room ceiling.

Particular care shall be taken to ensure that electro-magnetic compatibility is not degraded when cables are closely located.

Cables shall be continuously screened through the wall / floor / ceiling apertures.

Appropriate strain relief or clamping shall be provided.

All cables and conduits shall be clearly marked with cable identifiers or suitable permanent marking which shall last for the expected lifespan of the cable or conduit.

29.18.5 Architectural Requirements

Equipment shall be laid out in the equipment room to afford easy accessibility.

Cubicle doors, when opened shall not impinge on access.

Appropriate 'safe' walkways shall be clearly identified on the floor of the room.

Equipment shall be placed such that cabling runs are minimised.

Antenna, low signal or high frequency cable runs shall be minimised and the equipment positioning optimised to ensure a majority of these runs are compliant.

The equipment room floor shall be sealed to minimise dust ingress into the equipment and the surface shall ensure that no static build-up occurs.

29.18.6 Security Requirements

In the event of security and access control system failure, this shall be logged accordingly and displayed to the Control Centre staff.

29.18.7 Equipment Room Furniture

The equipment room shall be furnished with modern ergonomic furniture to assist the maintainers and reduce fatigue.

There shall be two maintainer's desk positions in the room.

The design of the equipment room furniture shall include provision for the effective management of cabling, and equipment and maintenance power supply distribution.

Each desk position shall have personal storage of a minimum of three lockable drawers.

Positioning of storage shall not inhibit the work-envelope of the maintainer.

Additional tool storage locations shall be located in appropriate areas of the equipment room

29.19 Mechanical and Public Health

29.19.1 General

The mechanical and public health services works to be provided shall include the main Depot, and comprise heating, fresh air ventilation, toilet accommodation extract ventilation, specialist extract ventilation, comfort cooling systems, control systems, incoming natural gas supplies and distribution, fire alarm systems, fire suppression system, incoming mains water supplies, domestic hot water generation, domestic hot and mains water distribution, rainwater collection, waste and soil pipework systems, and underground surface water and foul drainage immediately local to the main Depot (connecting into main services systems).

29.19.2 Water

Cold water shall be provided to each stabling road.

Mains water shall be supplied to areas such as the vehicle workshop (and other special purpose workshops), plant room and wash plant. Backflow prevention devices shall be employed.

Domestic hot water shall be centrally generated and stored. The calorifiers and circulation plant shall be housed in the appropriate plant room.

29.19.3 Air Conditioning

Air conditioning shall be provided in the Control Centre, and all administration areas.

A 'free-cooling' system shall be provided for the equipment room.

Duplicate cooling systems, each capable of 100% duty, shall be installed to serve the Control Centre and equipment room.

29.19.4 Ventilation

Dedicated extractor systems shall be provided to suit specific items of equipment (i.e., lathes, paint spraying booths. vehicle battery charging and uninterrupted power supply system).

29.19.5 Drainage Pad

A drainage pad shall be provided adjacent to the pressure washer with a water and power supply for a pressure washer.

Treatment of wastewater to meet appropriate standards prior to connecting to site drainage system shall be provided.

29.19.6 Mechanical Systems

The systems shall be configured such that in the event of a single failure there shall be no loss of data and no requirement for excessive actions on the part of the Control Centre staff.

All centralised mechanical services plant shall be located in the plant room with sufficient space allocation for maintenance and / or plant removal. The only exception to this may be the heat rejection plant necessary for the air conditioning/comfort cooling installations, which are likely to located externally. Should equipment be required to be located externally the impact on the overall visual appearance of the Depot shall be considered.

30 Traction Power

The scope of this Section of the Employer's Requirements is to define the traction power (substations) requirements applicable to the Edinburgh Tram Network which the Infraco must comply with.

30.1 General Requirements

The provision of traction power shall be derived from a number of suitably located traction substations distributed around the Edinburgh Tram Network.

Each Edinburgh tram traction power substation shall include:

- The traction substation enclosure;
- The associated Scottish Power HV (11 kV) three-phase power supplies with associated HV switchboard, metering and local emergency tripping facility;
- 230V LV services with associated metering and distribution equipment for substation services i.e. lighting, small power etc;
- Traction substation transformer-rectifier/s and equipment;
- Traction dc switchboards;
- Feeder and bypass isolators;
- Substation earthing;
- Negative busbars;
- Batteries / charger;
- SCADA interface marshalling panels or agreed equivalent;
- Associated internal power and control cabling; and
- Miscellaneous items to complete.

Substations shall be containerised at all locations where this is practicable.

Provision shall also be made for a 11 kV supply to the Depot services transformer.

30.2 Traction Substations

30.2.1 General

A sufficient number of traction substations (including a separate substation for the Depot) shall be provided, as described later in this Section 30.

The equipment to be provided for each of the eight traction substations for Phase 1a shall comprise:

- Appropriate HV supply arrangements from a Scottish Power circuit breaker (as part of their HV switchboard to be located in a separate section of the substation building);
- A single indoor transformer-rectifier unit;
- A 750 V dc switchboard with direct acting overload protection, impedance protection, earth fault protection and transfer tripping;
- A negative busbar cubicle;
- A tripping and closing battery and charger; and
- All associated internal power and control cabling, and earthing.

The layout and disposition of all equipment contained within all substations shall be identical where this is practical.

Separate personnel access shall be provided to the compartment housing LV control, protection and instrumentation equipment and associated multicore cabling terminations. This compartment shall be fully segregated from the HV / traction voltage compartments by means of a cage or similar. An access door shall be provided between the two compartments, with a locking system that is to be agreed with **tie**.

Two track feeder isolators with earthing function and a motorised bypass isolator shall be provided.

At all substations, control and indication information shall be provided to SCADA by suitable remote communication interface.

30.2.2 Russell Road Track Paralleling Hut (applicable to Phase 1b only)

Consideration shall be given to the provision of a Russell Road track paralleling hut, which shall be provided with similar equipment as all other substations, however an HV supply from Scottish Power will not be provided and the substation shall be used as a track paralleling hut in the first instance.

The design shall consider the future detailed provision for the installation of such an HV Supply, in configuration of the substation which shall be identical, as far as practicable, to all other substations to be provided within the Edinburgh Tram Network.

Cable ducts into the building shall be provided to enable the future installation of a HV Supply with the minimum of disturbance to the ongoing operation of the location.

30.2.3 Gogar Depot Substation

The equipment at the Depot traction and services substation shall comprise three HV supply cables from three Scottish Power circuit breakers, or ring main units feeding two indoor transformer-rectifier units for depot stabling traction and main line traction, and the other to the services transformer in the Depot building.

One four-panel 750V dc switchboard with direct acting overcurrent protection, relay overcurrent protection, thermal image, earth fault protection on three (two for the yard and one for the workshop) track feeder circuit breakers and direct acting reverse current protection on the rectifier circuit breaker. (Alternatively, a fused rectifier may be used, whereby no direct acting reverse current protection on the rectifier circuit breaker is needed at all. An isolator may be offered in place of a rectifier circuit breaker. If the fused rectifier option is chosen, then this will be fed from one rectifier transformer; a three panel 750V dc switchboard feeds the main line in the usual way as described above.

The whole of the Depot yard shall be earthed on the negative side including the workshop traction supplies.

The enclosure of the yard and workshop circuit breaker shall be solidly earthed, and also connected to the rectifier negative pole.

Two negative busbar cubicles (one for the yard rectifier and the other for the main line rectifier), a tripping and closing battery and charger, all associated internal power and control cabling, and earthing shall be provided.

In an annex segregated from the main enclosure for fire detection, two motorised track feeder isolators with motorised earthing function and a motorised load break bypass isolator with over-current detection and tripping relay shall be provided.

30.3 System Protection Settings

As well as complying with the **tie** requirements for as built documentation, all calculations used to determine protection settings shall be provided by the Infraco in a format allowing complete checking of methodology results without any additional sources of information.

30.4 Power System Design Principles

The 11 kV feeds to each traction substation shall be derived from and form part of the local Distribution Network Providers (Scottish Power) Network ring with a dedicated ring main unit or switchboard feeding the Edinburgh Tram Network the traction substation.

HV switchgear shall be provided to meet the requirements of the DNO (Scottish Power).

The 750 V dc traction power system shall provide a very high degree of reliability. Thus, small single-rectifier, substations shall be provided at close spacing, arranged to feed the 'in' and 'out' lines in permanent cross-connection between substations.

The OLE feeding shall be arranged so that the use of locally operated manual feeder isolators can facilitate the remote isolation and earthing of the overhead line; alternative solutions may also be offered.

Each traction substation shall also be configured so it can be isolated from the main line and bypassed without an impact on the Tram service.

The auxiliary switches of the bypass isolator shall, on the bypass isolator closing, re-configure the hard wire inter-tripping pilots to bypass the isolated substation. In the event of a fault, the over-current relay of the bypass isolator shall trip the feeding circuit breakers at both ends of the extended section, and give SCADA indication of the direction in which the fault current flow was detected. Other procedures for indication of fault location may also be offered.

Equipment located within the substations and the remote motorised isolators, including the earthing function, shall be controlled and monitored over the SCADA system.

11 kV supplies at the Depot and control centre will be taken from two 11 kV Scottish Power feeders, via a Scottish Power switchboard affording three 11 kV feeds to the Edinburgh Tram Network.

One feed shall supply the traction transformer-rectifier for the Depot yard, workshop and stabling area roads that have the track solidly earthed.

The second feed shall supply the traction transformer-rectifier for a normal main line feeding configuration.

The third feed shall supply the transformer, adequately-sized for the Depot and control centre LV ac services.

Maximum use of the standard traction transformer rectifier unit shall be achieved for the System by providing a high degree of reliability. This will be afforded by deriving traction supplies from two separate Scottish Power feeders at each substation.

In the particular case of the Depot, in the event of loss of the 400 V ac supply, essential equipment (principally the Control Centre) shall continue to function on UPS supplies and from a separate generator (see Section 29 (Depot) of these Employer's Requirements).

The 11 kV incoming supply to all traction substations shall be able to be individually tripped by the system controller located in the Control Centre via SCADA, and by staff locally by means of a dedicated 11kV trip push button to be located in each substation lobby.

The OLE shall also be able to be tripped in either direction by the system controller from the Control Centre via SCADA.

The OLE shall be able to be tripped in both directions simultaneously via a hard wire emergency mass trip button to be located in the Control Centre that shall trip all substations in the designed groups.

The OLE shall be able to be tripped locally in both directions simultaneously by means of an emergency push button located in each substation lobby.

The substations are named, referenced and located as shown below:

Table 84 - Substation Abbreviations

Substations	Nomenclature
Phase 1a	
Leith Sands Substation	LSE

Leith Walk Substation	LWE
Cathedral Substation	CAE
Haymarket Terrace Substation	HTE
Jenner's Depository Substation	JDE
Bankhead Drive Substation	BDE
Gogar Depot Substation	GDE
Ingliston Park and Ride Substation	IPE
Phase 1b	
Craigleith Substation	CGE
Granton Mains East Substation	GME
Granton Road Substation	GRE

The 750 V dc feeder circuit breakers at each substation shall be arranged to feed the OLE locally through manual feeder isolator / earth switches located in their own compartment of the traction substation. Motorised load break bypass isolators shall be provided in these compartments or at suitable location to link adjacent OLE sections in an emergency.

Intermediate sub-sectioning points shall be provided, comprising section isolators in trackside pillars (depot: pole mounted will be acceptable) to give operational flexibility during emergencies. With the exception of 'tail end' feeds, most sections of OLE shall be double end fed, and provided as second level protection with transfer tripping through private pilot cables.

30.5 Scottish Power Interface (DNO)

All Scottish Power 11 kV supplies connections, together with all associated protection, emergency tripping and tariff metering equipment shall be procured by the Infraco.

The provision of a separate Scottish Power LV supply connection for lighting and auxiliary services within the traction substation buildings, excluding the depot traction substation shall be procured by the Infraco.

The ratings and protection of the Scottish Power supplies shall be suitably co-ordinated with the characteristics of the power conversion equipment.

SCADA indications shall be made available and SCADA cable tails shall be provided for Scottish Power to wire into their equipment. A maximum number of up to 5 in-/output connections are to be considered as sufficient.

30.6 Multicore and Control Cabling

All necessary multicore and control cables within the substation, and LV ac supplies to the substation equipment, shall be provided.

Each substation LV ac supply shall be drawn from a suitably rated LV ac consumer unit.

The provision and installation of all the necessary intertripping pilot cables to and from the dc switchgear located within each substation shall be included.

Cables for all LV ac and LV dc protection, control, alarm and indications shall have copper conductor with XLPE or PVC insulation and an overall PVC oversheath and galvanized steel wire armour where cables are to be installed without armoured conduit or trunking or other adequate mechanical protection.

The conductors shall be plain annealed copper wire complying with BS EN 60447 – 2007 as applicable or equivalent and all cores shall be clearly identified by printed numbers at regular intervals.

The minimum conductor size shall be not less than seven strands of 0.67 mm diameter wire, or in the case of single wire conductors the minimum cross-sectional area shall be not normally be less than 2.5 mm^2. In special cases for light current installations single strand, annealed copper conductors with a cross-section of 1.5 mm^2 may be used but only with the specific written approval of **tie**.

All cable sheaths shall be free from defects and impervious to water.

Multicore and control cables shall be terminated in accordance with the manufacturer's recommendations and the cable cores shall be left long enough to be terminated without the addition of separate tails.

All detail diagrams shall be cross-referenced and shall show multicore cable schedule reference numbers to facilitate cable identification.

30.7 Transformer Rectifiers

30.7.1 General Arrangement

Each unit shall consist of a dry type, Class F AN cooled transformer to BS EN 60726. Each unit shall be suitable for environmental conditions E1 and ambient temperatures C1. The rectifier shall

comprise silicon diodes mounted on heat sinks, the whole to BS EN 60146, and cooled by natural circulation of air, enclosed in a cubicle with a rigidly constructed fabricated steel framework. The steel framework shall be completely clad in sheet steel to the extent as shall be consistent, by the provision of screened openings, with the requirements of natural cooling and ability to assess readily by direct vision from outside the cubicle any unhealthy condition of the major internally mounted components. Drip-proof top covers shall be fitted. The outer surfaces of the cubicles shall be Grey Shade 631 Semi Gloss to BS 381C 1996 or similar, e.g. RAL 7047. Adequate ventilation provision shall be made in the substation buildings without jeopardising the security of the building to ensure the equipment is able to perform correctly.

Alternatively, a separate close-coupled transformer cubicle may be offered. Substation floor area shall be considered at a premium, so an important consideration is compactness of layout without jeopardising operating and maintenance requirements.

All equipment shall comply with the requirements of BS EN 60076 and BS EN 60146, and the degree of enclosure shall be IP31 of BS EN 60529.

30.7.2 Rating

The rating of the transformer-rectifiers shall be declared as the 100 per cent continuous rated output at 750 V dc on all transformer tappings. Each combined unit shall have an overload rating according to the rating class of BS EN 60146 stated in the Schedules. The impulse voltage withstand rating shall be 75 kV for the nominal system voltage of 11 kV.

30.7.3 Voltage Regulation

The overall voltage regulation of each combined transformer - rectifier shall be 5 per cent with a tolerance of ±5 per cent of the regulation from 5 to 100 per cent rated load.

30.7.4 Voltage Ratio & Connections

The HV primary winding shall be delta connected, and two secondary windings, one star and one delta, arranged for series bridge rectifier operation in accordance with circuit diagram 12 of BS EN 60146 to produce 750 V dc at 100 per cent rated load and nominal tapping.

30.7.5 Voltage & Phase Tapping

Tappings shall be provided on the HV windings in order to make an off-circuit HV voltage selection, by means of bolted links.

30.7.6 Transformer Cores

The cores shall be built up of cold rolled grain oriented silicon steel sheets in accordance with the guaranteed maximum total loss stated in BS EN 10107. When a transformer is connected on the nominal tapping, and operating at rated voltage and frequency, the flux density at any point in the magnetic circuit shall not exceed 1.6 Tesla.

The magnetic circuit shall be insulated from all structural parts and be capable of withstanding a test voltage to the frame of 2 kV rms for one minute. A link shall be provided for earthing the magnetic circuit to the enclosure.

30.7.7 Performance Under External Short Circuit

The performance of the rectifier transformer under external short circuit conditions shall be in accordance with BS EN 60076 (BS 171 is withdrawn). In applying the values stated therein it is to be assumed that the voltage at the terminals of one side of the transformer is maintained at the full rated value for the duration of the short circuit when there is a short circuit between the phases or to earth on the other side of the transformer, or between poles on the rectifier output.

30.7.8 Losses

The no-load and load losses shall be as low as is consistent with reliability and economical use of materials.

30.7.9 HV Cable Terminations

A cable termination chamber for top or bottom entry shall be provided suitable for dry type terminations and the HV cable.

30.7.10 Diodes

The type of diode used shall have been proved in service and have an assessed reliability generally in accordance with valid and current European Standards ((actual BS 9300 seems not to standardise diodes for traction rectifiers)). A fuse-less design of diode bridge shall be provided. Alternatively fused diode bridges with monitored fuses in combination with fuse-less, but short circuit proof resistor/capacitor circuits may also be offered (refer to section30.7.11).

Each diode shall be capable of withstanding voltages having a peak value not less than 2.5 times the peak working reverse voltage rating.

Particular attention shall be paid to the method used for mounting the diodes, and it shall be possible to replace easily any individual diode without disturbing other components.

30.7.11 Surge Protection

Each rectifier shall be fitted with surge protection to ensure that the reverse voltage is shared equally across series connected diodes and bridges and that the voltage across individual diodes is limited to the peak transient reverse voltage rating of the diode.

In order to attenuate surge voltages caused by lightning strikes, pantograph arcing or similar effects, a surge protection circuit comprising two separately fused resistor/capacitor networks shall be provided. The design of the surge circuit shall be such that resonant effects with significant

harmonics present in the open circuit voltage are minimised. . Alternatively, a non-fused short-circuit proof resistor/capacitor circuit may also be offered.

Adequate protection against lightning and over-voltages, however caused shall be afforded to the substation equipment. The characteristics of all surge diverters to be used on the Edinburgh Tram Network shall be correctly co-ordinated with those of the rectifier surge circuits, so as to limit over-voltages to acceptable levels and minimise resonance effects.

30.7.12 Temperature Rise

The rectifier transformer temperature rise shall be limited to 800 K at rated output. The maximum operating temperature of any rectifier component, including busbars and connections, shall not exceed the limits permitted by BS EN 60146.

30.7.13 Protective Services

The following devices shall be provided:

- Diode heat sink and transformer winding over-temperature alarm and trip, with alarm contacts for SCADA indication and local alarm lamp indication (amber) or, alternatively, indicated on substation control & protection display;
- Surge circuit fuse failure alarm, operating for the failure of either or both circuits, with alarm contacts for SCADA indication and local alarm lamp indication (amber) or alternatively indicated on the substation control & protection display; if a non fused solution is provided (refer to Section 30.7.11 Surge Protection then no indication is required.
- A supply supervision device shall be provided to monitor the presence of the main supply to the transformer-rectifier and to give a supply failure alarm through the SCADA system; and
- An extreme inverse over-current/earth fault relay protection on the 11 kV incoming circuit for tripping the Scottish Power rectifier feeder circuit breaker, with alarm contacts for SCADA indication.

30.7.14 Instrumentation

Each rectifier shall be fitted with a shunt or dc current transducer with connection to an ammeter mounted on the front of the cubicle. Each rectifier shall be fitted with a fused voltage divider connected to a rectifier output voltmeter mounted alongside the ammeter.

The overall accuracy of the shunt / dc current transducer and ammeter, and of the voltage divider and voltmeter, shall be to Class Index 1.3.

Alternatively, this instrumentation may be located in the rectifier feeder cubicle of the DC switchgear or the values may be shown on substation control & protection displays.

All 750 V dc connections, relays and instruments and any stray current monitoring instruments shall be capable of withstanding the test voltage stipulated in BS EN 50124-1 2001.

30.7.15 Negative Isolation

The negative connection from each rectifier shall include a disconnection facility by means of an isolator, either as part of the rectifier or part of the negative busbar cubicle.

30.8 A.C. HV Switchgear

Provision is to be made for a 'Scottish Power' emergency trip facility (located in each substation lobby) to allow mobile tramway staff, who may not be authorised for access to the traction substations, to trip the Scottish Power in-feed to a substation in the event of a failure of the SCADA system.

30.9 D.C. Traction Supply Switchgear

30.9.1 General

The switchgear shall be of the high-speed air break type in accordance with BS EN 50123-2, suitable for use on a 750 V dc traction overhead line system, with floating track negative return circuit.

Circuit breakers shall be of the carriage-mounted 'withdrawable' type, within cubicles.

The switchboard shall comply with BS EN 50123 Part 6 and be capable of sustaining without damage, the electrical and mechanical stresses produced by fault conditions up to the prospective system short circuit rating.

The entire switchboard enclosure shall be insulated from earth and there shall be no inadvertent earthing of the switchboard other than via the main earth bar passing through the low impedance earth fault sensor.

Each cubicle shall be of rigid folded sheet steel construction suitable for all normal and fault conditions, and withstand repeatedly without distortion or failure, shocks caused by closing and opening impacts. Enclosures shall have a degree of protection to IP 31.

Removal of covers on any cubicle to permit access to components shall not cause exposure of live conductors in the adjacent cubicles.

The design of the cubicles shall ensure complete dispersion of ionised effluent from the circuit breaker to atmosphere without hazard to personnel or the possibility of establishing a conducting path to the switchboard frame.

The switchgear assembly shall be designed in compliance with, and have certified test reports to demonstrate compliance with clause 6.6.3 of BS EN 50123-6 1998. Front access doors to compartments with exposed metalwork connected to the primary circuit shall be insulated against arcing to the door (3 mm polycarbonate screen or equivalent) and have a fault rated flexible earth strap at the top of the door between door and cubicle frame. Hinges and door latches shall be substantial and keep engaging on door closure.

Outgoing cable boxes shall be suitably sized to accommodate the DC cables. Feeder cable boxes shall be furnished with a surge arrester coordinated with the OLE and rectifier surge protection ratings.

Other DC switchgear, proved and tested in similar applications providing same or similar functionality in compliance with relevant, current and valid European Standards may also be provided.

30.9.2 Busbars

The busbars shall be rigidly supported and fully insulated throughout their length, including tee-off connections and joints between adjacent chambers.

The busbars shall be completely enclosed in an earthed metal chamber, access to which shall be by means of bolted panels. Removal of these panels shall not give access to outgoing circuits. No small wiring or other equipment shall be mounted in busbar chambers.

Other solutions providing same or similar functionality and electrical safety may also be provided.

30.9.3 System Voltage and Fault Level

The normal system traction working voltage shall be taken as 750 V DC, with a tolerance in accordance with BS EN 50163.

The switchgear shall be capable of withstanding the electrical and mechanical stresses when clearing short circuit currents up to the maximum prospective level of the system, assuming that normal voltage will be maintained at the primary terminals of the rectifier transformer.

The switchgear shall be capable of interrupting the following currents:

- Terminal short circuits;
- Overhead line faults adjacent to a substation;
- Overhead line faults remote from substations, and including faults at the most distant point fed under the most onerous outage conditions tolerable;
- All values of traction load currents likely to be encountered in service, passing through the switchgear in either the forward or reverse direction; and
- Load currents of tramcar auxiliaries, under both starting and running conditions, passing through the switchgear in either the forward or reverse directions.

All electrical clearances in air and insulator creepage distances shall be adequate to withstand all specified steady state voltages and all transient voltages likely to arise in service.

30.9.4 Temperature Rise

Each current carrying component of the equipment supplied shall be capable of continuous operation at the specified ratings without exceeding the maximum temperature rises stated in the appropriate European Standard.

30.9.5 Circuit Breaker Isolation

Each complete circuit breaker together with its auxiliary switches and operating mechanism shall be arranged on a 'withdrawable' carriage to permit full accessibility for maintenance purposes and as a means of isolating the circuit.

Indication of circuit breaker `open/closed' status, and circuit breaker position, shall be visible through a window in the cubicle access door or by other suitable means (e.g. after opening the cubicle access door and, in addition, on substation protection and control display)..

The circuit breaker carriage shall remain within the confines of the cubicle when in the service or isolated positions.

A positive stop shall be provided to indicate when the circuit breaker has been fully moved into the service position.

Mechanical interlocks shall be provided so that it is neither possible to withdraw the circuit breaker without having first tripped the operating mechanism, nor to replace the circuit breaker if in the closed position. Means shall also be provided to enable the circuit breaker to be operated electrically or by hand when in the isolated position. A padlocking facility shall be provided on the isolating handle aperture. The main isolating contacts of the fixed portion shall be equipped with shutters arranged automatically to cover all live parts on both busbar and outgoing circuits. Provision shall be made for padlocking each individual shutter in the closed position.

Secondary isolating contacts shall be provided as necessary and arranged so that when in the isolated position all auxiliary supplies to the circuit breaker carriage are still connected.

Facilities shall also be provided so that the circuit breaker and its associated electrical auxiliary circuits can be operated electrically when the carriage is completely withdrawn from the cubicle enclosure.

The circuit breaker carriage shall be equipped with suitable wheels for movement on normal floor surfaces and also to act as guides in conjunction with suitable alignment rails, pins and sockets to ensure correct and accurate engagement of the plug and socket contacts.

Steel ramps and tracks of suitable section and robust construction shall be provided for the movement of the carriage into and out of the stationary portion of the cubicle. The arrangement shall positively and accurately align the main and secondary plugs of the carriage with the respective stationary portion plugging contacts and during all movements under service conditions maintain such alignment and earthing contact. The ramps shall be designed to permit easy movement of the carriage between cubicle and floor without shock or damage to the equipment or floor.

Plugging or scraping contacts with copper current paths shall be provided to ensure a satisfactory and positive connection of the metalwork of the circuit breaker carriage to the switchboard earth bar established in the isolated position before any 750 V connections are made.

30.9.6 Circuit Breakers

All circuit breakers shall have a continuous current rating in accordance with BS EN 50123 and BS EN 60439 where applicable, shall be identical in arrangement and fully interchangeable with each other, where appropriate. Rectifier and feeder circuit breakers shall not be interchangeable, in -case Rectifier circuit breakers are provided (in case of Fused Rectifier diodes, Rectifier disconnectors are sufficient and to be provided).

The closing circuit shall contain an anti-pumping feature which shall prevent automatic re-closure should the closing signal be retained indefinitely either by operator action or resulting from a failure on the supervisory control system. The circuit breaker shall not respond to a close signal when open and a trip signal is present.

Closing and tripping circuits shall be capable of satisfactory operation within the limits of 70 per cent (tripping of feeder circuit breaker trip coils) 80 per cent (closing) and 120 per cent, of the rated dc auxiliary supply voltage.

The 'trip' coils of the dc rectifier circuit breakers shall, if needed (see above), take the form of 'under voltage release' coils after Network Rail practice, so that loss of auxiliary voltage will cause the rectifier circuit breaker to drop out, leaving the feeder breakers closed up as a track paralleling hut (TPH).

The circuit breaker shall be capable of being closed and tripped manually in the service position while still retaining its full fault making and breaking capacity. Under such manual operation it shall be possible to disconnect the auxiliary dc supply without interfering with the operation of the breaker.

Provision shall also be made for the slow manual closing of circuit breakers when withdrawn for maintenance purposes and one device for this purpose shall be provided per switchboard. The slow closing device shall be such that the moving portion of the circuit breaker can be halted at any point in the travel, to enable checks to be made at all points of the closing stroke.

Mechanical indicators shall be provided to show whether the circuit breaker is open or closed. An operations counter shall be fitted.

Shunt tripping coils shall be wired in series with circuit breaker auxiliary contacts arranged so that the supply to these coils is automatically cut off on completion of a successful operation.

All contacts shall be easily and quickly replaceable.

The arc chutes shall be so arranged that any emission of flame, hot gases or metal particles during operation of the circuit breaker will be contained within the cubicle and not cause damage. Arc-chutes shall be designed for convenient handling and removal during inspection and maintenance.

The design of the arc control chutes shall be such that erosion caused by the arc and emission of ionised effluent during operation of the circuit breaker is minimal. The materials used in them shall be non-hygroscopic.

Each circuit breaker carriage shall be fitted with a label holder and an easily removable blank white sandwich plastic label.

The front and rear of each cubicle shall display a prominent label showing the circuit identification by name and approved reference number.

30.9.7 Interlocks

A system of mechanical or electronic interlocks (substation control and protection) shall be provided which automatically imposes a fixed sequence of events designed to prevent mal-operation of the circuit breaker unit as a whole.

30.9.8 Protection Devices

Each feeder circuit breaker shall be fitted with a uni-directional series instantaneous overload device, with a calibration range chosen to be a standard for the system. It shall also be fitted with a multi-functional device to afford instantaneous, programmable and thermal image protection. Rate of rise protection is disallowed (may be a standard part of the multi function relay, provided it can be disabled) but impedance protection will be considered.

Each feeder circuit breaker shall be fitted with a line proving device to prove the circuit onto which the circuit breaker has been instructed to close is not faulted. The maximum current that may flow due to the 'line proving', in the event of a short circuit shall not exceed 40 amps. The relay that measures the residual resistance in the circuit and blocks the circuit breaker against closing shall have a setting range of 2 to 50 ohms as a minimum. In addition to blocking the circuit breaker from closing a SCADA indication shall also be given that the closing has been blocked.

A combined intertripping and earth fault protection scheme shall be provided. Each switchboard shall be equipped with a low impedance earth fault detector, arranged to initiate a local mass trip of all dc circuit breakers and to intertrip corresponding feeder breakers at adjacent substations for all causes of feeder CB tripping. 'Intertrip receive' protection relays or related control equipment shall be fitted with a manual reset flag or similar (e.g. display), showing when the protection is operated. Intertrip by-pass facilities shall be provided, by means of auxiliary switches in the substation bypass isolators reconfiguring automatically when the isolator is closed. Inter-trip, in/out of service, switches shall be provided in order to inhibit the intertripping when OLE is sub-sectioned. Provision shall be made for SCADA 'opening' of the feeder circuit breakers without causing a mass trip or intertrip.

Contacts shall be provided to give individual trip alarms from main and back-up protections through the SCADA system.

The SCADA system will include a remote trip facility. In order to maximise reliability, the incoming SCADA control signal for this facility shall be arranged not only to trip the appropriate local feeder circuit breaker but also to trip the corresponding feeder circuit breaker at the remote end of the OLE section via the intertripping pilot wire system.

Each circuit breaker shall be fitted with a push button and lamp (white) to provide a local trip 'circuit healthy' indication on demand with the breaker closed. The current path for this feature shall include the actual circuit breaker trip or actuation coil.

Additionally, a voltage operated relay fitted with a self reset flag indicator shall be provided to supervise the tripping supplies to the switchboard. Contacts shall be provided to give an alarm through the SCADA system.

Each outgoing d.c. feeder cable box shall be equipped with a surge diverter.

30.9.9 Control and Instrumentation

All equipment shall comply with relevant and valid European Standards.

Auxiliary control supply shall be from a floating LV d.c. supply. Individual panels shall have both polarities of the supply fused, or protected by magnetic circuit breakers.

Current measuring devices shall be fed from either shunts or transducers. All 750 V connections and associated relays and instruments shall be capable of withstanding the test voltages according to relevant and valid European Standards.

Main items to be included on each panel shall include:

- Circuit breaker control switch (open/close);
- Circuit breaker control selector switch (local/supervisory); and
- Indication lamps (open/closed - green/red).

All control and control selector switches shall be suitable for locking by means of a padlock. Indication lamps shall be of the LED type to ensure long life.

Each feeder circuit breaker panel shall be provided with an ammeter, of overall accuracy including the shunt to Class Index 1.5.

Each rectifier panel shall be provided with a voltmeter fed from the rectifier side of the circuit breaker, or the rectifier voltage transducer.

Alternatively, listed control and indication elements may also be provided by means of the substation protection and control units (e.g. display). In this case, therefore, padlocking is not applicable.

30.9.10 Overhead Line Emergency Trip

A facility to ensure the fail-safe hard wire emergency mass trip of traction substation dc circuit breakers by the system controllers shall be provided within the Control Centre.

Separate emergency trip push buttons shall be provided for the following two groups:

- Haymarket to Newhaven
- The rest of the Edinburgh Tram Network including the Depot,

This facility shall take the form of a suitably located and identified wall mounted box containing all equipment and push buttons necessary to provide this function.

The equipment to be provided in each traction substation and TP hut for this feature shall comprise a hold-in relay energised from the tripping batteries of the traction substation and a remote normally-closed contact in the Control Centre or other substation. The system shall be provided with trimming resistances to keep the relay current within limits for varying distances to the remote contact. The system is envisaged to be stable at up to 15 km with 1.5 sq mm pilot cores. The mass

trip relay shall have sufficient circuits to trip all feeder circuit breakers and dc rectifier circuit breakers. It is not envisaged to use the rectifier circuit breaker trip and an open link shall be provided in this circuit. Two further normally-open and normally-closed contacts shall be provided for use in cascading the trip to other traction substations in a similar manner.

Provision shall be made for an overhead line emergency trip facility (located in each substation lobby) to allow mobile tramway staff, who may not be authorised for access to the traction substations, to trip the overhead lines in both directions from a substation in the event of a failure of the SCADA system. The logic of this trip facility will be integrated in the central station controller of each substation.

30.9.11 Circuit and Busbar Earthing

Means shall be provided at each panel for applying a safety earthing device to busbar or circuit connections in order to comply with safety legislation. A dedicated earthing truck or other suitable earthing equipment, as needed for the installed equipment, shall be provided at each substation for such purposes.

30.9.12 Isolator Motorised Operation

Where motorised isolators are provided, operation of the feeder isolator and earth switch functions shall be from the substation tripping battery.

Operational commands shall be via SCADA signals hard wired from the SCADA outstation within the substation to relays in the isolator panel.

Both OLE feeder terminals shall have 'live line' detection arranged to inhibit opening of the feeder isolator and this detection shall be brought back to the Control Centre via SCADA.

It shall not be possible to earth a feeder unless the bypass and feeder isolator are both open.

It shall not be possible to close a feeder isolator unless both the earth has been removed and the adjacent bypass isolator is open.

It shall not be possible to close the bypass isolator unless both adjacent feeder isolators are open. SCADA position indication shall be provided for all switching elements in all positions.

In the event of loss of rectified Scottish Power LV supply the operation shall auto change over to a battery supply.

For isolators located in the Depot, this section is not applicable, because of manual operation.

30.9.13 Bypass Isolator Over-current Feature

The bypass isolator when closed shall reconfigure the 'pilot wire' inter-tripping between adjacent substations to bypass the substation in which the bypass isolator is accommodated.

In case protection of contact line cannot be provided by adjacent substations when bypass-isolator is closed, the bypass isolator shall have a 'line current' trip feature where the current passing through the bypass isolator is measured and operates one of two relays depending on the direction of current flow through the isolator to trip both remote substations in the event of detecting a current in excess of setting.

The setting range to be approved by **tie**.

The relays shall be powered from a dedicated battery with a minimum of four hours standby time.

This battery shall be supplied from the substation tripping battery supply. There shall be SCADA indication of loss of battery voltage.

30.10 Batteries and Chargers

30.10.1 Scope and System Voltage

One 100 per cent duty battery, 100 per cent duty charger and dc distribution board unit shall be provided for each traction substation, for the purposes of providing tripping, closing and control supplies for the 750 V dc and ac switchgear. The battery charger will be supplied from the Scottish Power LV ac supplies in the substation. Neither polarity shall be deliberately earthed and the supply shall function unaffected with either pole inadvertently earthed.

It is to be noted that such supplies for the Scottish Power 11 kV switchgear will be derived from a battery and charger to be supplied and installed by Scottish Power themselves (Electricity Supply Regulations requirement).

The nominal battery voltage, suitable for the switchgear, shall be in accordance with BS 2618. The charger supply shall be 230 V, single phase, 50 Hz, and the complete equipment shall be a manufacturer's standard product.

30.10.2 Batteries

The batteries shall be of the high performance type, and shall be designed for a life expectancy of at least ten years under the conditions of service likely to be encountered. Battery cases shall be of high impact polystyrene translucent plastic. The batteries shall be such that maintenance shall be required at not less than twelve month intervals.

30.10.3 Battery Duties

The rating of each battery shall be sufficient to meet the requirements of the most arduous duty cycle at any one of the substations including:

- The continuous standing load; and
- On the assumption the battery is charged to 80 per cent of its rated capacity and the charger supply is then lost, the battery shall then be able to supply the standing load for twenty-four hours and then have sufficient capacity to carry out the closure and tripping of a 750 V circuit breaker twelve times in quick succession.

30.10.4 Battery Accommodation

Each battery together with its associated charger and dc distribution load shall be accommodated in a single, self-contained, ventilated, sheet steel cubicle of rigid construction.

The cells shall be so mounted that ready access is provided to the tops of all cells for maintenance purposes. The battery enclosure internal metalwork shall be treated with electrolyte-resisting paint.

30.10.5 Battery Chargers

Each battery charger shall be of the automatic constant voltage type and shall be suitable for supplying the constant load and at the same time maintaining the battery in a fully charged condition while floating across the load and charger.

Arrangements shall be made such that, in the event of the battery becoming discharged, the rate at which recharging commences is as high as possible consistent with maintaining the automatic charging constant voltage feature and with the connections remaining undisturbed, as for normal service.

Each charger shall also incorporate a boost charge feature, which shall, after having been started, provide an automatically controlled high charge rate sufficient to restore a fully discharged battery to the fully charged state within twelve hours without excessive gassing or any form of damage to the

battery. The boost charge shall be initiated manually but reset to float automatically, and shall not cause damage to any connected equipment. Each charger shall be capable of automatically and continuously supply the constant load with the battery disconnected. Under such conditions, the charger shall still maintain the nominal system voltage without any damage to itself, and the ripple of dc output shall not exceed ±15 per cent.

30.10.6 Alarm Devices

The following shall be provided:

- Undervoltage detection equipment to give local indication (amber lamp) and supervisory alarm when the system voltage falls to below 80 per cent nominal. A time delay shall be incorporated to prevent initiation during temporary voltage dips;
- Charge fail detection equipment to give local indication (amber lamp) and supervisory alarm if the voltage from the charger falls below the nominal floating charge voltage. Blocking diodes shall be provided to prevent the battery voltage being supplied to the equipment, so that only the charger voltage is effective in causing the alarm. The device shall not operate on switching surges or transient loss of ac supply; and
- Earth fault detection equipment to give local indication (amber lamp) and supervisory alarm of the occurrence of an earth fault, and to give local discrimination between positive and negative faults.

The above alarms shall be given separate SCADA alarm channels.

30.10.7 Instrumentation

The following shall be provided:

- Charger output/output voltmeter;
- Output dc load ammeter; and
- Centre zero battery ammeter.

30.10.8 Battery Distribution Board

The following shall be provided:

- Provision for isolating the battery (withdrawing the main fuses);

- Main and subsidiary fuses in both polarities; and

- Subsidiary fuses to dc switchboards (three in Depot traction substation, one in each of the other substations), ac switchgear transformer rectifier units, feeder and bypass isolators, two spare circuits.

30.11 Earthing, Bonding, Surge Protection & Ancillary Equipment

30.11.1 Earthing Systems

Each substation shall be equipped by Scottish Power with an earth system for their equipment which may be available for connection to the Edinburgh Tram Network substation earthing system and equipment, but only by agreement between the parties.

A earthing installation at each traction substation shall also be provided capable of specified performance alone, without recourse to connection to the Scottish Power earth system. Where Scottish Power allows interconnection, the Edinburgh Tram Network earth system shall connect to the Scottish Power earth terminal via a disconnectable link.

The Edinburgh Tram Network earthing systems shall be constructed employing copper conductors, including all necessary junctions, connectors and supports. The installation shall comply with relevant, current and valid European Standards.

The earth systems shall comprise a continuous main earth bar installation, located where possible in the cable trench, and around the inside walls of the substation, with branch connections to equipment and metalwork.

Each earthing conductor shall either be solid copper with a minimum cross-sectional area of 80 mm2 or stranded PVC sheathed copper with a minimum cross-sectional area of 70 mm^2.

All joints and bonds shall be made by proven methods to the current carrying ability of the earth conductor and full details shall be submitted for **tie**'s approval.

Attention is drawn to manufacturers' instructions on the earthing of traction dc switchgear via to low impedance earth fault protection equipment.

An Edinburgh Tram Network local earth rod system, of resistance to earth less than 2 ohm, shall be provided at each traction substation and connected to the substation earth system through a

disconnection link by means of stranded PVC sheathed copper cable with a minimum cross-sectional area of 70 mm^2 per cable. The earth rod system shall be in a minimum of two near equal sections (~4 Ohm) each connected back to the substation earth system as described. The resistance between any point of the earth system and a group of earth rods shall not exceed 0.1 ohm. This assumes earth interconnection with the Scottish Power system.

30.11.2 Traction Negative Busbar System

A negative busbar, insulated from earth and mounted within a sheet steel enclosure, shall be provided at each traction substation. The enclosure shall also incorporate an off-load isolator for the connection cables to the rectifier negative terminal. The negative busbar shall provide the connection point for the outgoing negative feeder cables to the tram track. The enclosure shall be able to accommodate four 1000 square millimetre section aluminium cables to the running rails. The enclosure shall be arranged to facilitate visual inspection of the connections inside. The enclosure shall be provided with robust insulated terminals adjacent to the negative busbar for terminating the stray current monitoring cables. Alternative stray current monitoring system can also be provided whereas no stray current monitoring cables may be necessary.

In order to minimise the flow of stray return currents in the earth and buried services, the negative pole of the traction supply, comprising rectifiers, negative busbars, feeder cables and tram track, shall not be deliberately earthed at any point.

The traction negative busbar of each traction substation shall be connected to the substation earth bar either via a minimum of one BB HVL and two Alstom 'Interval of discharge' (Soule 2 RAY's) in parallel, or via an equivalent circuit (e.g. Siemens Sitras® SCD), to control the touch voltage of the traction negative circuit and provide a fault return path. These shall be accommodated within the sheet steel negative busbar enclosure or in a separate cubicle.

The metalwork of the negative busbar enclosure shall be connected to the substation earth system.

30.11.3 Surge Diverters

Adequate protection against lightning and atmospheric overvoltages shall be afforded to the substation equipment. The characteristics of all surge diverters shall be correctly co-ordinate with those of the rectifier surge circuits, so as to limit overvoltages to acceptable levels and minimise resonance effects.

The equipment connected to the OLE shall be protected against surges by surge diverters.

Each feeder isolator shall be equipped with a non-linear resistor gapless surge diverter connected positive pole to earth at the cable terminations in the substation. The surge diverters shall be of the zinc oxide type, enclosed in the dc feeder circuit breaker cable box.

The surge diverters shall be so designed and constructed to combine a high discharge capacity and low residual voltage with mechanical robustness.

30.11.4 Substation Ancillary Equipment

The following ancillary equipment shall be provided in each substation:

- 2 No. suitable sized and rated fire extinguishers of approved type and size;
- 1 No. fully-stocked first aid cabinet of approved type;
- 2 No. `Electric Shock' wall-mounted framed safety instruction cards;
- 1 No. substation operation diagram printed on a plastic medium and framed;
- 6 No. double-sided rigid plastic notices 100 mm x 600 mm with cord loop attachment, "Danger-Live";
- 12 No. double-sided rigid plastic notices 100 mm x 60 mm with cord loop attachment, "Caution - do not interfere with this apparatus"; and
- 4 No. key safes, approximately 150 mm x 250 mm of approved type.

Sufficient padlocks for all switchgear shall be provided. The structured key security system shall be agreed with **tie**.

All substation door access keys shall be in accordance with the structured key security system set out in Section 22 of these Employer's Requirements.

30.12 Cables & Accessories

30.12.1 General

All cables shall comply with the current applicable specifications of the relevant European Standard and the supplementary requirements of these Employer's Requirements.

30.12.2 Types of Cables

Categories of cables shall be allocated series of reference numbers as follows:

- HV supply cables (1000 series)
- 750 V dc traction cables (positive) (2000 series)
- 750 V dc traction cables ((negative) (3000 series)
- Stray current monitoring cables (4000 series)
- LV supply cables (5000 series)
- Pilot cables (dc transfer trip) (6000 series)
- Telecoms multipair cables (7000 series)
- Fibre optic cables (8000 series)

30.12.3 11kV A.C. Cable

AC cables shall be provided for the interconnection of the Scottish Power HV switchgear, the a.c. circuit breaker, and the transformer rectifier units.

The cables shall be in compliance with Scottish Power standard and may be three phase or single phase with sheaths connected also in accordance with Scottish Power standards.

30.12.4 Traction Supply Cables

Single core 750 V DC copper cables shall be used for the connection of rectifier (positive) to dc switchgear, and rectifier (negative) to negative busbars.

Cables from rectifiers to DC switchgear positive and negative busbars shall be dimensioned taking into account the rating of the transformer/ rectifier unit, including their overload class.

Negative cables may have a reduced insulation level commensurate with the reduced voltage withstand required.

The cables shall be manufactured in accordance with appropriate European Standards.

Conductors shall be stranded tinned copper wires to BS EN 60228.

The insulation shall be butyl rubber (BR) or ethylene propylene rubber (EPR) to BS 6899 type GP2.

Alternatively XLPE may be considered by **tie** with adequate reference application and justification.

Cables shall be anchored at terminations by mechanical plastic glands, where gland plates must be traversed, and if necessary supported by non-hygroscopic resin-bonded laminated wood, hardwood or similar non-metallic approved clamps.

Conductor terminations shall be by means of indented or annular-compressed tinned copper lugs, with heat-shrinkable tube oversheath.

Cable conductors shall be jointed with indented or annular compressed ferrules with an approved compression tool, the joint made up by an approved jointing kit and sheathed by an approved heat-shrinkable tube.

Compression tools shall be certified as calibrated, and shall only be used when within the calibration period.

Cables to be utilised within the permanent works shall be drummed up and provided to site to ensure maximum cable lengths are installed throughout to minimise the necessity for through joints.

30.12.5 Low Voltage Supply and Multicore Control Cables

The cable construction shall comply with European standards.

Cables shall have copper conductor with XLPE insulation, PVC oversheath and, where not installed with mechanical protection, galvanized steel wire armour.

The conductors shall be plain annealed copper wire complying with BS EN 60447 circular or shaped conductors. All cores shall be identified by phase colours, or in case of control cables, by printed numbers.

All sheaths shall be free from defects and impervious to water.

LV supply cables shall be terminated in accordance with the manufacturer's recommendations and the cable cores shall be left long enough to be terminated without the addition of separate tails.

Cables to be utilised within the permanent works shall be drummed up and provided to site to ensure maximum cable lengths are installed throughout to minimise the necessity for through joints.

31 Overhead Line Equipment

31.1 Scope

This Section of the Employer's Requirements defines the overhead line equipment (OLE) requirements that are applicable to the Edinburgh Tram Network which the Infraco must comply with.

31.2 General Requirements

The information provided in this section supplements any information provided in the Tram Design Manual and other documentation provided by **tie**.

Unless otherwise stipulated, all requirements pertaining to overhead line equipment shall be compliant with BS EN 50119.

31.3 Equipment Overview

Appearance of the overhead line equipment is of paramount importance throughout the Edinburgh Tram Network. The appearance must be appropriate to the location, and visual intrusion shall be minimised.

The type of equipment provided (including, for example, auto-tensioned, fixed termination, catenary support; central mast with balanced bracket arms, side masts with cantilever arms, span wire construction etc.) over each section of the Edinburgh Tram Network shall be appropriate to the area and to the tramway operating speed requirement in that location. The use of building fixings shall be maximised.

31.4 Electrical Power Characteristics

The overhead line equipment shall be energised at a nominal 750V in accordance with BS EN 50163: 2005: Railway Applications - Supply Voltages of Traction Systems.

The overhead line equipment system shall comply with the following electrical and operational parameters:

- System voltage;
- Conductor of suitable cross sectional area;

- Traction buried reinforcing DC cables;
- The required operational speeds; and
- All in-service loading conditions.

31.5 Environmental Considerations

The overhead line equipment system shall fully comply with the environmental criteria as set out in these Employer's Requirements.

31.5.1 Ice Loading

The conventional ice loading of 10mm radial shall be used when assessing the ice-loading on overhead conductors.

31.5.2 Pollution

The creepage path and creepage distance of insulators shall accommodate the implications of atmospheric pollution in accordance with EN 50119:2001, pollution level "medium", and for areas close to the sea, "heavy"..

31.6 Material for Equipment

Standard materials shall be used with the exception of the route sections from Newhaven Road to Ocean Drive and Caroline Park to Granton Square Tramstops, where stainless steel or aluminium material (for tubes and fittings) shall be provided.

If 'parafil' or an equivalent material is to be considered, rigorous quality control fully documented and certified measures for the application, installation and long-term maintenance of the material shall be implemented. These measures are subject to specific approval by **tie**.

31.7 Pole and Cantilever Tube Deflection Criteria

The deflection of poles, cantilever tubes and other structural elements under normal and transient loading conditions shall be such as to not detract from the minimum safety functionality or appearance of the overhead line equipment system.

31.8 Mechanical and Electrical Clearances

Mechanical and electrical clearances shall, as a minimum, be in accordance with BS EN 50119 and the guidelines specified in ORR's publication "Guidance on Tramways", Railway Safety Publication 2 (**"RSP 2"**). In addition, a 'safe working zone', shall be incorporated.

31.9 Contact Wire Gradient and Geometry

Contact wire gradients adopted shall take account of the planned tram operating speed in the area and shall follow BS EN 50119 requirements. The contact wire gradient shall be such that at all times and under all environmental and operating conditions, contact with the pantograph is maintained.

The overhead line equipment horizontal geometry shall be arranged so that the contact wire is always in contact with the working width of the pantograph under all environmental and operational conditions.

31.9.1 Contact Wire Height

The governing requirement for the establishment of rules for contact wire heights shall be as clause 5.2.8 of BS EN 50119. For safety considerations, in areas where tram path is shared with the public traffic the contact wire height and the profiling of the wire shall take into account:

- ORR's RSP2 requirement for minimum wire heights where a support has failed;
- Minimise the risk of contact with wire from people and/or objects on open top double decker buses, over-height road vehicles, window cleaners carrying ladders and any third party work;
- Activities associated with the Edinburgh festival, Christmas fun-fair on Princes Street, and similar public events; and
- Provide the necessary clearance for designated high-load routes.

31.10 Structural Integrity

All proposed structures within the overhead line equipment system shall be designed to comply fully with the design parameters and codes of practice specified for the project.

31.11 Electromagnetic Compatibility

The overhead line equipment shall comply with Electromagnetic Compatibility Section of these Employer's Requirements.

31.12 Dynamic Performance

The dynamic performance of the overhead line equipment/pantograph interface shall be in accordance with the requirements of Clause 5.2.1 of BS EN 50119.

The performance of the overhead line equipment/pantograph interface shall be validated by a full dynamic simulation study undertaken during the design phase. The governing specification for all design activities is BS EN 50119.

The study method shall be validated in accordance with the requirements of BS EN 50317 and BS EN 50318.

31.13 Design Life

The design life of the overhead line equipment is set out in Design Life of these Employer's Requirements.

31.14 Auto-Tensioned Equipment Types

31.14.1 Form of Equipment

Low visual impact equipment is required throughout the Edinburgh Tram Network. Thus, anywhere along the route of the Edinburgh Tram Network, where line speed and/or pantograph interaction with the overhead line equipment demands, auto tensioned trolley wire equipment will generally be the appropriate solution.

31.14.2 Conductors and Tensioning Devices

The overhead line equipment shall utilise a single contact wire system, with additional parallel (buried) feeders or catenary system outside the city centre where the messenger wire replaces the parallel feeders..

The contact wire size shall be confirmed by electrical modelling studies and by pantograph/ overhead line equipment dynamic modelling.

Should mechanically tensioned balance weight system be proposed, the tensioning device shall comprise a counterweights and pulleys system of discrete and compact design. For example, the counterweight stack must be incorporated inside the pole structure. The system shall utilise a fail-safe mechanism with vandal proof features.

31.14.3 Tension Lengths

The maximum tension length between anchor locations shall be chosen so as to minimise the number of anchor points but without undue drag, localised hard spots and overloading of the equipment.

31.14.4 Span Length

The pole positioning, and hence span length along the track, shall be chosen:

- To maximise the structure spacing to achieve economy;
- To maintain the technical parameters referred to elsewhere in this document, e.g. geometry, clearance, dynamic performance, etc;
- For visual and aesthetic appearance issues, in accordance with the Tram Design Manual, and
- The achievement of all relevant consents and approvals.

31.14.5 Parallel Feeders

Aerial parallel feeders shall not be permitted. All parallel feeders shall be buried, located in suitable ducts running along the tracks and with cross feeding to the overhead line equipment conductors at suitable intervals. Outside Edinburgh city centre other options, like catenary system may also be offered by the Infraco for approval by **tie**.

31.15 Fixed Termination Equipment Types

31.15.1 Form of Equipment

Fixed termination trolley wire equipment shall be considered as an appropriate and cost effective solution for highly sensitive areas and/or where lower operational running speeds are required.

31.15.2 Reduced Conductor Tension System

At junctions and sharp corners, where the operational speeds are limited by the track geometry, a variant of the fixed termination unsupported wire shall be considered which utilises a reduced conductor tension system.

31.16 Depot Equipment Type

In the Depot area, a fixed termination single contact wire system (supported or unsupported) shall be provided which shall accommodate the wire height constraints.

31.16.1 Equipment Support and Registration

Cantilevers

For both auto-tensioned and fixed termination systems the cantilevers shall consist of a horizontal registration tube insulated and hinged at the face of the pole, and supported by a tie wire.

As an option, fully insulated tubes and steady arms (glass fibre plastic or equivalent) may be proposed and offered for review by **tie**.

Cross Span Wire Supports

In Edinburgh city centre areas, as an alternative to cantilever on pole equipment option, the simple cross span wire support assembly may be considered. These can be constructed between poles or attached to suitable buildings, along the route of the Edinburgh Tram Network. The choice of material and the method of construction of cross span wires shall be subjected to the approval of the planning authority.

All fittings, clamps and accessories shall be standard proprietary items, capable of being sourced freely from the market.

For minimising the visual impact of the equipment the use of non-corroding material (particularly stainless steel) shall be considered by the Infraco.

Jumpers and Feeders

All feeders and jumpers shall be electrically and mechanically compatible with the environmental and operational conditions. The visual impact due to connecting buried feeder cables to overhead conductors shall be considered when selecting appropriate feeder pole locations.

Insulation

All overhead line equipment support and registration assemblies shall be double insulated or equivalent. Failure of any single insulator shall not create an unsafe condition.

Section Insulators

Apart from the entrance to the Depot maintenance workshop, all section insulators shall be of the 'make before break' type.

31.17 Overhead Line Equipment Poles and Equipment Enhancement

Where poles are provided, the shape and colour shall be considered as part of the visual approach. The objective shall be to minimise their overall visual impact. It should be noted that the Tram Design Manual identifies a preference for circular poles.

Consideration shall be given to individual replacement of building fixings by poles in the future, should building alterations require their removal on a temporary or permanent basis.

The appearance around the base of support poles is of importance in certain areas. Consideration shall be given to minimise the impact to and ease of replacement of poles if damaged, e.g., by errant road vehicles.

The paint finish, if painting is required, shall be fully applied at the manufacturers works. However, following installation on site, the paint finish may have to be re-applied in some areas. The paint system to be used shall be offered for approval by **tie**.

Special attention shall be given to avoid damage to painted surfaces during delivery and installation. Specific approval shall be sought to make good any damage to paint work, following installation on site and **tie** reserves the right to reject equipment on the grounds of damaged paintwork alone.

31.17.1 Combined OLE / Lighting Poles

An integrated design of overhead line equipment poles and street lighting is required. This shall seek to optimise the spacing of support poles and minimise visual intrusion of the OLE and road lighting as a whole. An appropriate electrical feeding and earthing scheme shall be provided. This shall minimise the additional components required to be attached to support poles and shall take account of the maintenance approach to be adopted for the road lighting. The general requirements

for bonding and earthing of the system are contained in Earthing and Bonding of these Employer's Requirements.

Poles carrying overhead wiring along Princes Street shall not interrupt axial views down the streets connecting to Princes Street, shall be located between tram lines and shall be placed at regular intervals.

It should be noted that the Tram Design Manual prohibits fixings for wiring to buildings or structures on the north side of Princes Street.

31.17.2 Anchor Bolts, Foundations and Ties

Tie-back anchors shall be permitted in the off-street sections of the Edinburgh Tram Network with adequate anti-climbing protection, the design of which shall be subject to specific approval by **tie**.

Any anchor bolt connections and fasteners shall be fully secured and vandal proofed.

31.17.3 Foundations

For the ease of construction and where applicable the preferred type of foundations shall be of side bearing concrete, cast in-situ. These shall be either mechanically or hand dug, depending on the access and limited space availability for plant and equipment. This type of foundation shall be provided in Edinburgh city centre and populated areas, particularly where underground utilities are closely spaced or not easily detectable.

In certain areas within the Edinburgh Tram Network where the track alignment and construction of the track slab permits, the overhead line equipment foundations may be incorporated within the track slab design.

31.17.4 Fixing to Masonry and Concrete Structures

There are a significant number of buildings, particularly within the World Heritage Site categorised for their architectural or heritage values.

Fixings to buildings listed in schedule 10 of each of the Edinburgh Tram (Line One) Act 2006 and Edinburgh Tram (Line Two) Act 2006 require full listed building consent.

31.18 Safe Working On The System

The configuration of the overhead line equipment shall take into account the project requirements for a safe working zone of 2.0m (measured horizontally from the near rail and also vertically above

the ground). All electrical and mechanical clearances shall comply BS EN 50119 and with the recommendations and guidance provided by HMRI RSP2.

31.19 Switching and Sectioning Requirements

31.19.1 Sectioning

The overhead line shall be divided by means of OLE section insulators into separate electrical sections and subsections, the lengths of which are determined by the locations of the traction substations and operational requirements.

31.19.2 Isolation Facilities

At substation feeder points, off-load, positive polarity, SCADA controlled, motor operated isolator/earth switches (termed 'feeder isolators') shall be provided to isolate and earth each overhead line section from its respective feeder cable. Additionally, positive polarity, SCADA controlled, motor operated load brake isolators (termed 'bypass isolators') shall be provided to interconnect adjacent overhead line sections when the intervening substation is out of service. These shall be connected across the line side of the two feeder isolators, and will normally be open. At key overhead line sectioning points, positive polarity manually operated isolator/earth switches (termed "section isolators") shall be provided to isolate sub-sections from other sub divisions of the section and (in some cases) earth the isolated section.

At the section insulator and the insulated rail joint between Depot and main line, a mechanically coupled double pole section isolator is to be provided to bypass the section insulator and insulated rail joint. The isolator is intended to be used solely to power the Depot and stabling and fans from the main line in the event of failure of the depot traction power supply. It is not intended to be used to power the main line from the depot stabling traction power supply.

31.20 Isolator Enclosures

Feeder isolators and bypass isolators shall be provided.

Section isolators shall be provided. For on-street sections these 'section isolators' shall be totally enclosed in trackside cubicles, referred to as 'section pillars'.

Section pillars shall be of stainless steel construction to IP 65, free-standing with a base set on a concrete foundation. The pillars shall be factory-built assemblies, of rationalised widths to suit the range of isolator numbers required per unit.

The enclosure shall be bonded to the tram track via an insulated 'earth' cable from an internal stainless steel stud, and the arrangements of which shall comply with Earthing and Bonding of these Employer's Requirements.

The isolator/earth switch 'earth' bar shall be bonded to the section pillar and connected to the tram track via suitable cable(s) additional to the above.

The dimensions of the pillars shall be the minimum compatible with standard creepage and clearance distances because physical clearances on the tramway are restricted.

An A4 size document holder shall be provided on the inside of the enclosure door.

The doors shall be outward opening through 180 degrees, hinged internally and fitted with stays. The doors shall be fitted with heavy-duty stainless steel locks operated by dedicated keys, which shall be provided in accordance with the operation and maintenance requirements for the **tie** structured key security system described in Section 22 of these Employer's Requirements.

It shall be possible to view the status of the isolator and any locking without opening the doors.

31.20.1 Paint Finish

The paint finish, if painting is required, shall be fully applied at the manufacturers works. However, following installation on site, the paint finish may have to be re-applied in some areas. The paint system to be used shall be offered for approval by **tie**.

Special attention shall be given to avoid damage to painted surfaces during delivery and installation. Specific approval shall be sought from **tie** to make good any damage to paint work, following installation on site and **tie** reserves the right to reject equipment on the grounds of damaged paintwork alone.

31.20.2 Labelling

Front panel legends, fitted centrally to the door consisting of approved 'Danger 750 V' - labels (black letters on a yellow background), and 'pillar description - reference number labels' with black letters on a polished stainless background, shall be provided on each pillar door.

31.20.3 Isolators

Isolators within an enclosure shall be arranged in groups where possible. The physical position of each isolator within each group shall correspond with the actual direction of the overhead line connected to it, and a standard layout shall be adopted throughout the system.

The isolator blades shall be of copper, and the isolator assembly and its insulation shall be suitable for the required current carrying capacity within the environment of the enclosure.

Feeder and section isolators and operating mechanisms shall be suitable for off-load breaking and fault making in respect of both 'closing' and 'earthing' operations. The operating mechanism for manual operation shall have a firm distinct stop in the operation at each stage of operation. It shall not be possible to move from closed to earth positions, or the reverse, without the operator coming to a definite halt at the 'open' position before moving to the earth position by a separate operator movement.

Bypass isolators and their operating mechanisms shall be suitable for on-load breaking and fault making in respect of 'closing' operations.

The construction of the isolator shall be such that live parts are fully shrouded from the operator, by 8 mm of polycarbonate or equivalent arc resistant material, whilst allowing the position of the isolator contacts to be clearly visible with the enclosure door open.

The isolator mechanism shall be such that it can be locked by means of a padlock in the closed, open or earthed position.

Each isolator mechanism shall be clearly labelled with its unique identifier reference code in accordance with the electrical nomenclature scheme.

31.21 Power Feeder, Reinforcing and Bonding Cables

31.21.1 Feeder Cables

Single core 750 V dc cables shall be used for:

- The connection of substations (positive) to the OLE;
- OLE parallel reinforcing cables;
- Negative cables from substation negative busbars to the track; and
- Negative track parallel cables and rail and track cross bonding cables.

OLE parallel reinforcing cables shall be sized in accordance with the design of the overall traction system.

Feeder cables shall be sized to match the rating of the OLE / reinforcing cable combination of each section.

Feeder cables from the traction substation feeder isolators to the OLE parallel reinforcing cable junctions shall be buried cable ducts running track side. A maximum of two cables may be carried per 150 mm diameter duct.

Cables for different circuits shall not share a common duct. The choice of cable material shall also minimise the number of bi-metallic cable joints.

Positive and negative cables shall not share a common duct.

Reinforcing cables shall be installed in buried ducts along the track. They shall run from OLE feeder point to feeder point with connections to the OLE via single core suitably rated copper cables to 'inbound' and 'outbound' lines. These feeds shall be at traction substations and maximum intervals of 450 m. Cables shall be drummed and supplied at maximum lengths to avoid and/or minimize cable through joints. Where joints cannot be avoided they shall be located in suitable cable drawpits or in neat, small dimension pillars of minimum intrusion on the streetscape. Joints between drum lengths of reinforcing cable, where no OLE connection is involved, may be in pillars or drawpits at the discretion and agreement as to specific installation method statements by **tie**. The insulation system employed at connection points shall meet the requirements of EN 50124-1 2001 to level 0.9 kV and OV4.

At nominal mid points between the OLE feeds and a maximum 250m from an OLE feed point there shall be suitably rated copper cross connections between the 'inbound' and 'outbound' OLE contact wires via the shortest practicable visually acceptable cable route. There shall be no joints in these cables.

Positive reinforcing and feeder cables shall be terminated in compression cable lugs of proprietary appropriate size and material for the cable used. Proprietary crimping tools designated for the cable lug to be crimped shall be used. Such crimping tools shall be under quality assurance control and within their calibration period. The appropriate flat stainless washer shall be used between cable lug and fixing bolt head. At all bi-metallic connections a suitable bi-metal connector piece shall be employed such that dissimilar metals are not connected other than by molecular fusion.

Feeder cables to the OLE shall be copper cored flexible, where required, installed in the OLE support poles in a neat and unobtrusive manner. As installed the cables shall meet the requirements for double insulation such that two distinct insulation layers can be identified to the

satisfaction of HMRI (or the appropriate regime in force). There shall be no joints between connection to the contact wire and the connection to the reinforcing cable(s).

The bi-polar section isolator at the eastern Depot entrance shall have one side of the positive pole cabled to the main line OLE parallel reinforcing cable by duplicate suitably rated cables. The other side of the positive pole shall be cabled to the Depot east isolator panel by duplicate suitably rated cables. The negative pole shall have suitable cables to each side of the isolator, one to each rail either side of the insulated rail joints.

Negative cables may have a reduced insulation level commensurate with the reduced voltage withstand required.

31.21.2 Track to Traction Substation (TSS) Negative Return Cables

Each of the four running rails in the vicinity of the TSS shall have a cable brought back to the negative busbar of the TSS.

A nominal one metre from the position on the running rails of the connections mentioned in the above, the cess running rail of each track shall be connected to the six-foot rail of the other track by a single cable. These are also classed as 'return' cables.

31.21.3 Rail to Rail and Track to Track Traction Cross Bonds

The rails of each track shall be connected together with a single suitably rated cable at suitable intervals.

At every second connection in the above, the six-foot rails of each track shall be connected together with a single suitably rated cable.

31.21.4 Running Rail Continuity Cables

Where 'along track continuity bonding' is required for negative return traction current return, 'along track' bonding cables shall be installed. Places requiring such bonding are:- Insulated rail joints to be normally bonded out, fishplated rail joints, rail sliding expansion joints (breathers), points and crossings, or other designated places.

'Along track bonding' shall comprise duplicate copper or steel cables as a minimum for each running rail to be so bonded.

31.21.5 General Requirements for Cables

All cables shall be terminated in compression cable lugs of proprietary appropriate size and material for the cable used. Proprietary crimping tools designated for the cable lug to be crimped shall be used. Such crimping tools shall be under quality assurance control and within their calibration period. The appropriate flat stainless washer shall be used between cable lug and fixing bolt head. All return cables shall be connected to the running rails via proprietary connector plates to connect with the running rails using duplicate 'Cembre' or equivalent connectors, by milled holes in the rail web with connector thimbles expanded into the holes on a spacing not less than that allowed by the track designer. Bolt and connection sizes shall be coordinated with the rating of the cable size to be connected. Simpler single 'Cembre' type connections (or similar approved) may be used for cross bonding cables and duplicated continuity cables mentioned in the above.

The cables shall be manufactured to European standards, appropriate to their application.

Cables shall be anchored at terminations by mechanical plastic glands, where gland plates must be traversed, and if necessary supported by non-hygroscopic resin-bonded laminated wood, hardwood or similar non-metallic approved clamps. Conductor terminations shall be by means of indented or annular-compressed lugs to suit the cable, with heat-shrinkable tube over-sheath.

Cable conductors shall be jointed with indented or annular compressed ferrules with an approved compression tool, the joint made up by an approved jointing kit and sheathed by an approved heat-shrinkable tube. Compression tools shall be certified as calibrated, and within the calibration period.

31.21.6 Cable Ducts

Power cables shall be laid in suitably sized UPVC/polyethylene cable ducts. Parallel reinforcing cables for the OLE will require a minimum of 200 mm diameter ducts.

Draw pits shall be sized to suit the particular cables installed within the cable run and shall facilitate the installation of the cables without damage to the cable. Particular attention shall be made to ensure the cable loop can be installed without damage to the cable when installing at mid point.

Suitable draw wires shall be installed in each of the ducts when they are laid, and the draw wires shall remain in the ducts after the installation of the cables to aid any future modification or repair work.

31.21.7 Installation of Cables

The arrangement of cables and all methods of laying and installation, including any special methods that may be necessary, shall be submitted by the Infraco for approval by **tie**.

Unless it has been agreed that the construction of cables is such as to permit laying at sub-zero temperatures, cable laying shall take place only when the ambient temperature is above 0°C and has been at this temperature for at least 24 hours, and approved special precautions have been taken to maintain the cable above this temperature to avoid risk of damage during handling. The recommendations of the cable manufacturer must also be taken into account.

All cables shall be installed with a bending radius not less than that recommended by the cable manufacturer.

Cable installation shall take account of the physical properties of the cables and the manufacturer's recommendations shall be clearly detailed on all cable pulling schedules.

All joints and terminations shall be made by proven methods to the current carrying ability of the cable and full details shall be provided to **tie**.

31.21.8 Surge Diverters

Surge diverters shall be positioned at the junction of each feed point and the OLE at traction substations on the OLE side of the isolator, and at over-bridges.

Surge diverters shall be of the gapless, metal oxide type with a rated discharge current of at least 10kA. The earthing terminal of the arrester will be connected to buried rods to provide an earthing resistance of less than 5 ohms. Surge arrestors' design, material and performance shall conform to the requirements of power supply specified standards for the Edinburgh Tram Network.

31.21.9 Bonding

The earthing and bonding requirements shall comply with **tie**'s Earthing and Bonding Policy (see Section 34 of these Employer's Requirements).

32 Stray Current

The ETN shall be designed in accordance with BS EN 50122-2.

In order to keep the stray currents caused by the traction return current as low as possible, permanent conductive connections between the return circuit and earth, including drainage diodes, are disallowed. The rail insulation against earth shall be at least five times better than recommended in BS EN 50122-2 before commencement of the Testing and Commissioning Phase.

Voltage limiting devices between return circuit and earth shall be dimensioned such, that they do not short-circuit the return circuit and earth during normal operation of the ETN, but ensure that accessible voltages do not exceed 60 V limit stated in RSP2 clause 183.

Where track substructures are steel-reinforced in longitudinal direction, a sufficient amount of reinforcement bars, i.e. at least four per track, shall be longitudinally interconnected by welding. At both sides of expansion gaps in the substructure, these bars shall have welded cross-connections and shall be interconnected in longitudinal direction by means of a conductor with suitable mechanical flexibility. This interconnected system shall not be connected to the return circuit at any point.

The Infraco must produce an Edinburgh Tram Network specific Stray Current Mitigation Strategy document that clearly defines its strategy for achieving as low as reasonably practicable protection requirements for the stray current effects and must submit such strategy to **tie** for their approval. Additionally, as part of that Stray Current Mitigation Strategy, the Infraco must produce a "Code of Practice for Stray Current Corrosion Control" and submit it to **tie** for their approval.

33 Low Voltage Architecture

The LV supplies shall be arranged by the Infraco with the DNO, and this shall also include all necessary metering equipment or agreements for provision of unmetered supplies. The LV supplies shall include all those required for illuminated road signs, other road furniture, street lighting, traffic signal controllers, points actuation, tram signals, communications equipment, and Tramstop equipment.

The LV supplies shall provide the necessary security of supply to achieve the overall ETN reliability requirements, for individual elements and as a whole.

The LV supplies shall allow cabinet sizes in areas of visual concern to be minimised.

Provision shall be made by the Infraco for the attachment of local generators at critical points in the ETNin the case of local supply outages (e.g. at Tramstops).

The system architecture provided by the Infraco shall take account of the known statistical history of local power outages such that the overall ETN system and subsystems availability is achieved.

In establishing the capacity and duration of any UPSs provided, the time that the Infraco maintenance staff may need to mobilise and install a temporary generator shall be considered by the Infraco and advised to **tie**. This time shall be demonstrated by the Infraco to **tie** during the commissioning period. **tie** shall give at least two weeks notice that the test may be required. **tie** may then require the test to be undertaken by the Infraco immediately with no further prior notice at a time and location to be determined by **tie**. This time shall be appropriately included in the overall availability analysis for the ETN.

LV power design by the Infraco shall take account of local system requirements e.g. for additional lighting and for specific loads, such as the passenger lift at Murrayfield Tramstop and drainage pumps where installed.

The LV architecture shall reflect the fact that isolated supplies will be required trackside and remote from Tramstops or substations at such as pointwork and signals at tramway junctions, and isolated TPDS cabinets.

Particular attention must be given by the Infraco to suitable redundancy for critical equipment such as drainage pumps and the communications systems.

LV supplies to substations shall be provided as part of the Infraco's arrangements with the DNO unless these supplies are provided from elsewhere.

Where UPSs are to be provided by the Infraco, careful consideration of appropriate loads to be supplied should be given by the Infraco. Automatic load-shedding schemes shall be considered where appropriate to support the required overall System availability.

Proposals for remote metering of substations shall be provided by the Infraco for the approval of **tie**.

34 Earthing and Bonding

The requirements for earthing and bonding are set out in the latest version of the document "System Earthing Policy", reference ULE90130-SW-REP-00071 and the Infraco shall comply with such requirements in respect of carrying out the Infraco Works.

35 Supervisory Control and Communications Systems

35.1 Scope

The scope of this section of the document is to define the Supervisory Control & Communications requirements that are applicable to the Edinburgh Tram Network (ETN).

It is split into three parts:

- Specific technical requirements of the various telecommunication subsystems;
- Components of those subsystems located at the Control Centre;
- Common considerations applying to these subsystems.

35.2 Specific Technical Requirements

This describes the various subsystems of the Supervisory Control and Communications System:

- The Tram Position and Detection Subsystem;
- The Passenger Information Display System;
- The Telephone Network;
- Operational Radio System;
- Passenger Help / Passenger Emergency Help Points;
- Closed Circuit Television (CCTV) System;
- Supervisory Control and Data Acquisition;
- Operational Data Network.

1.3 sets out considerations that apply to all Communications Subsystems that are included in 1.2.

The detailed interfaces between Infraco and Tramco shall be developed. Consequently the statements made in the ERs concerning the scope split between Infraco and Tramco may be subject to change.

35.3 Tram Position and Detection System

35.3.1 Overview

The Tram Position and Detection System shall provide the information needed to monitor the efficient and effective movement and to implement the overall regulation of trams running on the Edinburgh Tram Network. The Tram Position and Detection System shall include both tram borne and trackside equipment.

Each tram driver shall be responsible for safe tram operation using 'Line Of Sight' principles, with the Tram Position and Detection System identifying and setting the correct route ahead of the tram and providing tram signals.

The Tram Position and Detection System shall provide monitoring facilities to the Control Centre staff.

The Tram Position and Detection System shall collect the following data from each tram as is passes over the loops for transmission to the Control Centre in real time:

- Tram number;
- Tram run number;
- Tram destination;
- Driver staff identity number;
- Driver duty number; and
- Whether the Tram is in service or out of service.

The Tram Position and Detection System shall provide a number of functions which shall include:

- Tram identification;
- Tram position on network (outside of depot);

- Tram progress monitoring;
- Route setting;
- Processing of manual 'Tram ready to start' and automatic advance signal demand requests from trams;
- Provide demands to the Points Controllers to permit trams to safely traverse points junctions;
- Provide demands to the local Traffic Signal Controller(s) to permit trams to safely traverse tram/road crossings; and
- Tram signals to provide controlled entry to and exit from the depot berthing and maintenance facilities;
- Store data concerning the times each tram arrives at and departs from all of the Tramstops. This will be passed to the Central Data Recorder to allow the daily performance of the system to be calculated by the Performance Monitoring System.

The Tram Position and Detection System shall convert relevant Tram Position and Detection System data into a format to update the Real Time Passenger Information Display system.

On the approach of a tram to each Tramstop and at the termini, the Tram Position and Detection System shall provide updates to the Passenger Information Display system such that the Tramstop Passenger Information Displays are updated and display information as stated in 35.4.1.

On each day, the TPDS shall enter the details of journeys for the particular tram for each entire operating day into the tram on-board computer at the commencement of service. The tram driver shall input his own driver code and the tram diagram number for the day. Alternatively, the TPDS may transmit this data to the tram. Any change to this data e.g. as the result of an incident affecting the service shall be initiated by the driver.

The Tram Position and Detection System will include the ability to:

- Display to the Driver how early or late he/she is at each stop;
- Allow the Driver to issue 'Tram Ready-to-Start' commands at selected Tramstops;
- Allow the Driver, when his/her tram is on the approach to a diverging junction, to manually demand that the points move left or right by operating controls in the cab.

35.3.2 Technical Requirements

Key locations where Tram Position, Route Setting and Detection Equipment shall be provided shall include:

- At the approach to, and exit from, tramway/ road junctions;
- Entry to, and exit from, the Depot;
- At the approach to, and at, all Tramstops;
- At the approach to, and exit from, points and crossings.

Trackside Equipment at each of these locations shall be connected to the Edinburgh Tram Operational Data Network.

In the event that this Operational Data Network fails, the Trackside Tram Position and Detection System Equipment at each of these locations shall continue to operate autonomously until network connections are restored, at which point normal operations shall resume without Control Centre staff intervention.

The TPDS shall pass the times at which each tram arrives and leaves each Tramstop to the Performance Monitoring System (PMS), so that the PMS can calculate the operational performance of the Tram System according to specified algorithms.

Tramway signal heads shall be positioned at all signal controlled Track and Road Junctions and Pedestrian Crossings to allow optimum sighting for the tram driver. Local environmental conditions and the requirements of all interested parties, including that of HMRI (or the appropriate regime in place), shall be taken into consideration when choosing the positions of these signals.

Tramway signal heads shall display different proceed aspects for different routes if they are signalled separately. In such cases the Tram Position and Detection System shall pass the appropriate direction request to the road traffic signal controller as well as the point controller.
Tramway signal heads shall indicate the acceptance of the signal demand by the system to the tram drivers.

The lie of all facing points shall be detected and displayed by point indicators. These are in the scope of the Points Control System, and are described in the section of this document dealing with the Track. However, although Signals and Points Indicators shall be clearly distinguishable, they should also be in similar style, and it will require some co-ordination with the Points Controller supplier to ensure compatibility.

Tramway signal heads shall utilise Light Emitting Diodes (LED's) and not incandescent lamps.

At all signal controlled tram and road junctions there shall be an interface installed between the Edinburgh Tram Network Tram Position and Detection System and the local traffic Signal Controllers. All tram signals at signalled controlled tram and road junctions shall be driven directly by the Traffic Signal Controller, through demands from the Tram Position, Route Setting and Detection System. The Tram Position and Detection System/Urban Traffic Control System interface shall implement an agreed Tram Priority at each signal controlled junction.

Each Tram Position and Detection System/Urban Traffic Control System interface shall incorporate the facility for the initiation of a "tram proceed" signal in the event of either tram detection failure or local Urban Traffic Control System interface failure. This facility shall be available at all times for use by the Control Centre Staff. Trackside facilities for tram drivers to make manual requests of the UTC are not required. A foreseeable single point failure shall not cause a tram to be presented with a tram stop signal on the street that causes the tram to stop for more than 5 minutes. A FMEA analysis shall be produces within 8 months of contract close that satisfactorily demonstrates that the proposed solution meets this requirement.

The failure of the Tram Position and Detection System equipment at any signal-controlled road crossing shall initiate the immediate operation of the junction into a predetermined (adjustable) priority cycle sequence. All such failures shall be monitored, reported and logged to the Tram Control Centre via SCADA and passed to the PMS System.

The implementation of the detection system at Tramstops and other trackside locations will be permitted to use the Tram Position and Detection System hardware in lieu of a Supervisory Control and Data Acquisition Remote Termination Unit for the passage of alarms and indications, should this prove a more efficient use of hardware resources.

35.3.3 Tram-Borne Equipment

The Tram Position and Detection System shall include equipment to be installed on the trams. This equipment shall include:

- A Driver's Panel and keypad, to be installed in each cab;
- Communications equipment, to provide transmission of messages between the tram and the trackside equipment;
- Vehicle fault / maintenance indications / alarms transmission interface.

This equipment shall utilise the on-tram power supply.

All operations data messages etc. to or from the tram-borne Tram Position and Detection System shall be monitored and recorded in the equipment room for future reference or fault investigation.

35.4 Passenger Information Display System (PIDS)

35.4.1 Overview

Each Tramstop platform shall be equipped with a real time passenger information display system that shall be connected to the Control Centre by the Operational Data Network.

PIDs shall allow a limited selection of messages and free-form text to be displayed, at selected individual, selected groups or at all Tramstops on command from the Control Centre.

Each platform shall be equipped with at least one double-sided display; the display shall be in the form of a dynamic three line display.

Each display shall conform to the requirements of "DfT Inclusive Mobility - Guide to best practice in access to transport infrastructure". They shall each have the following characteristics:

- It shall be double sided;
- It shall be based on LED technology;
- Each side shall have three dynamic information lines, the third of which shall also provide a time display;

- Each line shall have at least 32 characters;
- Each character shall be at least 50 mm high;
- Characters shall be bright yellow on a black background;
- The PID shall adjust to ambient light levels making it legible in all weather and lighting conditions.

Each Passenger Information Display shall be sited so that it is visible to anyone standing within the Tramstop shelter, and from as much of the platform area as possible.

Passenger Information Displays shall also be provided at the following locations:

- Ingliston Park and Ride facility;
- Edinburgh Airport passenger terminal;
- Ocean Terminal Shopping Centre; and
- Haymarket Railway Station.

Alternative types of display may be used at these locations subject to agreement with **tie**.

At termini, the Passenger Information Displays shall display a departure time, which shall be the later of the scheduled departure time and the arrival time plus one minute. At other Tramstops, the Passenger Information Displays shall show variable messages including the destination and time to arrival (in minutes) of the next three tram service arrivals, or arrivals within the next 30 minutes, which ever is the less at the particular platform.

Tramstop Passenger Information Displays shall be able to display Lothian Buses 'BUSTRACKER' information as an overall capability. Real-Time data shall be provided over an internet connection by the client in an agreed format.

The following Tramstops shall have Passenger Information Displays that display the arrivals of both buses and trams at the Tramstop:

- Ocean Terminal
- Foot of the Walk
- Picardy Place
- Saint Andrew Square
- Princes Street
- Haymarket
- Edinburgh Park Station
- Airport
- Crewe Toll
- Granton

Passenger Information Displays on Tramstops, including those with bus/tram interchange facilities, shall be capable of prefacing the destination of the tram service being displayed by a two or three digit 'trip number' and of any required bus service by a three digit route number.

Each Passenger Information Display shall incorporate a digital time display (synchronised to the Edinburgh Tram Network time server derived from the Rugby Radio Clock or its successor or similar) as part of the display.

The colour and contrast of the lettering that is displayed by the Passenger Information Display shall fully take into account the requirements of the visually impaired. In particular DfT guidelines e.g. 'Inclusive Mobility - relating to provision for the visually impaired' and the requirements of Mobility and Access Committee for Scotland (MACS) shall be considered.

The Passenger Information Display System shall incorporate the necessary degree of redundancy and duplication to enable the systems availability targets to be achieved without losing the ability to handle faults and accept necessary upgrades.

The equipment shall be consistent with the design of the structural elements of the Tramstop.

The Passenger Information Displays shall have 3 line LEDs and configured as lines, scrolling functionality should be possible.

35.5 Telephone Network

35.5.1 Overview

The Edinburgh Tram Network shall be provided with a Telephone Network that shall provide two-way voice communications between all staff at fixed locations throughout the Edinburgh Tram Network. The main Operator interface with the Telephone Network shall be provided by an integrated workstation at each Control Centre staff position.

The Operator's interface shall be designed to carry out control functions in an ergonomically efficient manner.

The Telephone Network shall comprise of the following sub-systems:

- A central Private Automatic Branch Exchange (PABX):
- Public Switched Telephone Network;
- Depot extensions (via the Depot structured cabling scheme);
- Passenger Help / Emergency Help Points (via the Operational Data Network);
- Public Address System (via the Operational Data Network);
- Substation extensions (via the Operational Data Network); and
- A Voice Recorder;
- Control Centre Human Computer Interface (HCI) for the telephony services; and
- Call logging and maintenance facilities.

To facilitate management and maintenance of the PABX, it shall be provided with a maintainer's workstation, located in close proximity to the equipment.

The PABX shall provide:

- Digital call recording;
- Digital call logging;
- Maintenance and subscriber management; and
- All recording of the Telephone Network is to be digital to the current best medium.

All recording as described above should be carried out to the data recorders.

The Telephone Network shall include all PABX equipment, all necessary interfaces, configuration of the system elements, the connecting cables and management and diagnostic facilities.

The Telephone Network shall provide voice communications to external agencies including the emergency services and the urban traffic controllers.

The Telephone Network shall provide maintenance and administrative staff within the depot and substations telephone communications facilities appropriate to their needs.

35.5.2 Technical Requirements

The Telephone Network shall provide voice communication with all internal Edinburgh Tram Network organisation members and external parties but not with trams.

The Telephone Network and all associated components shall be of sufficient capacity to meet the current and future needs of the Edinburgh Tram Network.

All elements of the Telephone Network shall be designed to operate in an integrated manner.

The Telephone Network shall use the Operational Data Network for call routing to remote locations, e.g. Tramstops and traction power substations.

Suitable operator equipment shall be provided for the depot receptionist.

Suitable telephone handset equipment shall be provided for depot operational, administrative and maintenance staff.

Suitable telephone handset equipment shall be provided for traction power substations.

Access to the Public Switched Telephone Network shall be configurable at all telephones, including those within the depot and substations, in order to change call barring and security measures.

PABX equipment shall be located in the Equipment Room. A multi-pair tie cable shall be provided to interconnect the PABX with the depot structured cabling patch panel.

The Telephone Network shall be equipped with a Maintainers' Workstation, also situated in the Equipment Room, for network management and diagnostics.

The Maintainers' Workstation shall allow the:

- Display of system status and alarms;
- Download of call and system logs to removable media;
- Configuration of the Telephone Network;
- Management of subscribers;
- Provision for updating system software; and
- Reporting of real time status and alarms to external equipment.

35.6 Public Address System

35.6.1 Overview

Loudspeakers and Audio Loops located at each Tramstop platform shall form part of the Edinburgh Tram Network Public Address System. The Operational Data Network, details of which are contained in Section 35.6.1 shall connect the associated amplifiers/controllers to the Control Centre.

35.6.2 Technical Requirements

Each Tramstop shall constitute a zone.

An appropriate number of low output speakers shall be provided at each platform to prevent the possibility of announcement intrusion into adjoining properties, yet clearly audible without distortion on all areas of the platform. The speakers and their mountings shall be visually unobtrusive.

The Control Centre shall have the ability to make direct announcements to any Tramstop or groups of Tramstops, or turn off individual Tramstops or groups of Tramstops.

There shall be automatic switching between the volume setting for day / night time for each day of the week at the appropriate time of day.

Each Tramstop platform shall also be equipped with an audio loop to provide Public Address facilities for those who use hearing aids. The messages conveyed by these audio loops shall be identical to those issued by the standard Public Address equipment.

Park and Ride facilities shall be considered as a single Tramstop for Public Address purposes.

A 'library' of pre-recorded Public Address announcements shall be available to the Control Centre. Facilities shall be provided in the Control Centre for suitably trained operational staff to record additional announcements.

The approach and passing of 'Out of Service' trams shall be capable of initiating an automatic announcement at the stop advising passengers of the approach of the 'Out of Service' tram as it passes through the network.

35.7 Operational Radio System (ORS)

35.7.1 Overview

The ORS shall meet the mobile communications requirements for operation and maintenance requirements of the trams, and the tram network, and have sufficient capacity to meet the known future needs as defined in these Employer's Requirements.

An ORS shall be provided to enable safe and effective two-way communication enabling voice and data exchanges between the Control Centre staff and:

- Drivers on board an individual Tram, groups of Trams and/or all trams;
- Drivers of road and other support vehicles for the Edinburgh Tram Network; and
- Individually, or in groups, other mobile Edinburgh Tram Network operations and/or maintenance staff using hand portable equipment along the Edinburgh Tram Network and in the Depot.

Reliable voice communications shall be available throughout the length of the route, and to all areas used by operations or maintenance staff in the course of their duty so that messages of normal, priority or emergency status can be conveyed with high reliability.

The main operator interface with the ORS shall be provided by workstations installed in the Control Centre (for Control Centre staff), and tram mounted mobiles (for tram crews), road vehicle mounted mobiles and hand portable equipment for other mobile staff. Infraco shall supply 130 sets of radios with two spare batteries each and carrying cases. These sets will be supported by suitable re-charge racking and storage facilities.

The ORS shall comprise:

- A trunking controller;
- Sufficient base-stations to provide acceptable and reliable coverage to the satisfaction of **tie**;
- Integrated Control Centre operators' equipment;
- Mobile equipments for tram, road vehicle or hand-portable operation; and
- All communications links and configuration of the system.

35.7.2 General Requirements

The ORS shall use trunking technology capable of group and broadcast calls with normal or emergency priority.

Base-station equipment in close proximity to the Edinburgh Tram Network shall connect to the trunking controller via the Operational Data Network.

The radio system or two-way communication shall not be affected by the failure of the Control Centre systems or supplies.

The ORS shall operate within allocated frequencies administered by OfCom. Operating licences and consents for the ORS shall be obtained from OfCom and any other relevant authorities, e.g. Civil Aviation Authority (CAA). The Operator shall be required to hold all such licences and permits obtained.

Communication shall be reliable, continuous and free from interference as set out in the RAMsS section of this document.

The Operational Radio System shall have all voice communications digitally recorded by the central voice recorder. Recording of the Operational Radio System voice communications shall be integrated with recording of the Telephone Network.

All recording of the Operational Radio System is to be digital to the current best medium.

35.7.3 Short Codes

The Operational Radio System shall be able to send 'short codes' to Trams. It shall be possible to send such short codes to individual trams, groups of trams or to all trams and shall be configurable by the Operator's administrator.

The short codes shall be:

Table 85 - Radio Short Codes

Status Message	Status Meaning	Control to Tram	Tram to Control
CHANGE	Change Active Unit		✓
ACK MESS	Status message acknowledge		✓
ACK CALL	Group Voice Call Acknowledge		✓
###-DEP	Departure from departure points, where ### is the three letter code for each departure Tramstop.		✓
DELAY	Delay to Report		✓
FAULT	Defect to Report		✓
NEWCREW	Crew Change Complete		✓
HELP	Police Required		✓ (see notes below)
EXIT	Depot Exit Request		✓
ENTRY	Depot Entry Request		✓
RELIEF	Crew Relief Request		✓
XO-DONE	Crossover / Turnback complete		✓
STABLED	Tram Stabled		✓
CREWGONE	Driver Leaving Tram – will report back		✓

ALL-STOP	Stop Immediately	✓	
STOPNEXT	Wait Next Stop	✓	
FIREMEN	Beware Fire Engines	✓	
FIREGONE	Fire Engines Clear	✓	

Notes

The 'HELP' code shall also be able to be sent from the hand portable and from the road vehicle radios; and

The emergency call functionality shall also require the use of short codes.

There shall be at least 30 codes.

The Operational Radio System including all mobiles radios and hand-portables shall be capable of being reconfigured by the Operator to operate with amended or additional status messages.

35.7.4 Physical Considerations

The Radio System Trunking Controller shall be installed in the Equipment Room. It shall communicate with either the maintainer's workstation or as a separate dedicated workstation, located in close proximity to the equipment.

All base station antennae shall be fitted with adequate surge protection measures.

Provision shall be made for charging racks sufficient for the for hand-portable radio equipment. Charging racks are to be located in the Control Centre.

All masts required to support base station equipment shall be capable of withstanding all foreseeable wind loading. They shall be fitted with anti-climb protection.

35.7.5 Radio Maintainers' Workstation

The Operational Radio System shall be equipped with a Radio Maintainers' Workstation for network management and diagnostics.

The Maintainers' Workstation shall allow the:

- Display of system status and alarms;
- Download of system logs to removable media;
- Configuration of the Operational Radio System;
- Subscriber management;
- Provision for updating system software;
- Reporting of real time status and alarms to external equipment; and

The Operational Radio System maintainers' workstation shall be situated in the Equipment Room.

Fault and downtime information shall be transmitted to the PMS system.

35.7.6 Road Vehicle Mobile Radio Equipment

The Operator and Maintainers will operate road vehicles requiring Operational Radio System mobile radio equipment. As a minimum all road vehicles shall be equipped with:

- Mobile transceiver;
- Cable harness, feeder and antenna;
- Display, keypad, speaker & microphone; and
- Necessary power supplies.

All road vehicle mobile equipment shall be equipped with a keypad and alphanumeric display unit and be capable of displaying and storing short data messages.

Road vehicle mobiles shall translate status codes into meaningful textural messages.

All vehicle mobiles shall be equipped with an emergency call facility.

35.7.7 Hand-Held Mobile Radio Equipment

Certain Operational and Maintenance staff will be mobile and require hand portable mobile radio equipment. As a minimum the equipment shall include one hundred and thirty sets of:

- Hand-held radios with battery;
- Carrying cases for the hand-held radios;
- Two spare batteries for each radio;
- All necessary operational accessories, such as lapel microphones; and
- Sufficient charging racks suitable for 230VAC 50Hz operation to ensure availability of fully charged radios.

As a minimum the handportable radio shall use batteries with a life of 10 hours when used with a 90%rx / 10%tx duty Cycle.

Battery chargers shall fully charge a battery in less than 4 hours.

All hand portable radios shall be weatherproof and suitable for continuous use on or about the person in the outdoor environment.

All hand portable mobile equipment shall be equipped with a keypad and alphanumeric display unit and be capable of displaying and storing short data messages.

Hand portable mobiles shall translate status codes into meaningful textural messages.

All hand portable mobiles shall be equipped with an emergency call facility. The hand portables shall operate effectively and clearly within the trams and along the route of the Edinburgh Tram Network.

35.7.8 Tram borne Radio Equipment

Radio equipment shall be fitted to each driver's cab to enable two-way voice communications between drivers and controllers at the depot.

The Operational Radio Network equipment fitted to the tram shall include, as a minimum:

- Mobile transceiver;
- Keypad and display compatible with MAP27 interface protocol;
- Radio antenna, to be mounted on the tram roof.

The above equipment shall be free issued to the Tram Supplier for installation.
This radio equipment will utilise equipment supplied by the Tram Supplier, including:

- Gooseneck microphone;
- Emergency call button or kick switch and interface to the ORS;
- All necessary interconnections between Operational Radio Equipment in both cabs provided; and
- All necessary interconnections to other on-tram systems including power supply.

All voice communications involving the tram driver shall be via a hands-free method incorporating the touch-screen console and the gooseneck microphone so as to minimise distraction of the driver from his/her driving responsibilities. The integration of these functions shall be undertaken by Infraco.

When the tram is required to change direction of travel; e.g. after arrival at a terminus, the tram driver shall not be required to make any input to the Operational Radio System as he/she takes up occupation of the 'now leading' cab and the 'Change' status message shall be automatically generated.

Tram radios shall translate status codes into meaningful textual messages and display these to the driver.

All radio calls received during on-board Public Address announcements shall be clearly indicated to the driver at the time of receipt.

All tram-borne radios shall be equipped with an emergency call facility.

35.7.9 Tram-Borne Interfaces

The interfaces for tram-borne Operational Radio Network equipment with other tram-borne systems shall include:

- Passenger Emergency Help Points;
- Public Address System; where the tram driver instigates an on-board Public Address, this shall take precedence over any incoming radio calls received during the duration of public address. The tram driver shall be alerted to the presence of an incoming radio call;
- Radio voice communications and an attack alarm shall be provided between the tram drivers and the inspectors on board each tram.

35.8 Passenger Help / Passenger Emergency Help Points

35.8.1 Overview

Each Tramstop platform shall be equipped with at least one Passenger Help / Passenger Emergency Help Point that shall be connected to the Control Centre by the Operational Data Network.

Each Passenger Help / Passenger Emergency Help Point shall be sited so that it is visible by the platform Closed Circuit Television camera.

Provision shall be provided for the connection of future additional Passenger Help/Passenger Emergency Help Points, as a minimum, at Ingliston Park and Ride facility.

All Passenger Help / Passenger Emergency Help Points System Equipment shall comply with the latest disability advice from the Department for Transport.

35.8.2 Technical Requirements

Each Passenger Help / Passenger Emergency Help Point shall be provided with a two-way speech connection between the user on the Tramstop platform and the Control Centre Staff.

Each Passenger Help / Passenger Emergency Help Point shall be clearly visible and signed, and mounted in a manner that restricts its vulnerability to vandalism.

Each Passenger Help / Passenger Emergency Help Point shall be capable of being activated in two modes, normal and emergency, and there shall be a clearly marked and separate activation button for each function. Initiation of a call at the Passenger Help / Passenger Emergency Help Point shall be by pushing the appropriate call button.

Initiation of a call shall initiate the immediate recording of the subsequent voice communication that shall be time and date related.

Initiation of a call at the Passenger Emergency Help Point shall also cause the relevant Closed Circuit Television camera to focus on the Passenger Help / Passenger Emergency Help Point, overriding any sequential scanning for that camera. The recording rate of the CCTV camera will be increased during the PEHP conversation to the rate specified at section 35.14.13 of these Employer's Requirements.

35.9 Closed Circuit Television

35.9.1 Overview

The Edinburgh Tram Network shall be provided with a digital colour Closed Circuit Television (CCTV) System.

The tram CCTV system shall interface to the City of Edinburgh Council citywide CCTV system as 35.9.2.

Each Tramstop platform shall be equipped with at least one Closed Circuit Television camera. Additional Closed Circuit Television cameras shall be provided if adequate coverage of the access and egress routes at Tramstops and park and ride facilities cannot be achieved using the platform Closed Circuit Television cameras. Additional Closed Circuit Television cameras shall be provided to give full coverage of Park and Ride facilities.

Images from the CCTV cameras shall be transmitted to a Digital Video Recorder where they shall be recorded and time-stamped.

The Closed Circuit Television System shall comply with the requirements outlined in the Home Office guidelines for digital CCTV and the related UK Police Guidance notes and shall provide clear images of 'evidential quality' under all weather and lighting conditions to be made available at the Control Centre for operational purposes and for the recording for evidential purposes.

The Edinburgh Tram Network Depot complex will be equipped with a digital CCTV System as part of the Depot Security System. This CCTV System shall be interfaced to the Passenger CCTV System detailed in this Section. The requirements for the Depot CCTV System are described in 29.8 - Depot Site Layout.

(Please note: As of 11/12/2007, the calculation of the number of CCTV cameras and the bandwidth required on the ODN – See 35.11 for a definition – is based on two cameras per Tramstop, plus ten cameras at the depot and none at Sub-stations. This gives a requirement for 54 new cameras. The ODN also needs to allow for 7 existing, plus two new, cameras at the Ingliston Park & Ride.

35.9.2 Technical Requirements

Cameras shall be of the dome type, vandal resistant and mounted on Tramstop infrastructure or special CCTV poles. The mounting arrangements for each camera shall ensure stability and limit any vibration to acceptable limits so as not to interfere with image quality.

CCTV cameras located at the Park and Ride facilities shall be positioned to cover all of the car park paths, locations identified for Ticket Vending Machines, shelters, buildings, any other structures and both pedestrian and vehicle access points.

The CCTV System at Park and Ride facilities shall provide a clear image of vehicles including the ability for operators to read their registration plates.

The CCTV viewing system shall normally cycle through a pre-defined list of camera images and carry this out over a pre-programmed time period.

All CCTV cameras shall be provided with pan, tilt and zoom facilities both automatically within preset limits and under manual control, and be programmed to zoom in on the Passenger Help / Passenger Emergency Help Point when they are used and to a Ticket Vending Machine location when a TVM alarm is initiated. The Control Centre Staff shall be able to override automatic operation and control the cameras.

The CCTV cameras shall incorporate configurable 'no-dwell' zones to ensure the privacy of adjacent buildings and shall be suitably adjusted at the time of camera installation.

The CCTV System shall be provided with appropriate electrical / electronic interfaces to facilitate the presentation of images to an Edinburgh Tram Network display located within the Lothian & Borders Police Centre, the Lothian Buses Control Centre (Annandale Street) and one located at the Edinburgh in View CCTV Centre. This interface will also enable the transmission of images from the CEC's CCTV system to the ETN such that an appropriate subset of the CEC's CCTV images can be viewed in the Control Centre.

These interfaces shall be physically located in the Equipment Room. They shall include the provision and installation of the necessary connections and extensions to the Tram communication system to provide the necessary interfaces to third parties, and shall remain under the control of the Edinburgh Tram Network.

The selection of individual images by any of the above mentioned third parties for their further interrogation on their local monitors shall only be provided following telephone authority being obtained by them from the Control Centre Operator and shall not inhibit the continued use or availability of images to the Control Centre Operator.

Facilities shall be provided to enable any images generated by cameras that are part of the other interconnected CCTV systems to be selected by the Control Centre Operator and displayed within the Control Centre. Facilities shall be provided to "screen print" images for expediency.

35.10 Supervisory Control and Data Acquisition

35.10.1 Overview

A Supervisory Control and Data Acquisition (SCADA) System shall be provided to monitor and control remote equipment.

The SCADA System shall comprise of a central host, which is used to scan the outlying equipment that is connected to Remote Terminal Units (RTUs) or "Intelligent Relays" shall regularly scan the attached equipment for status or to set/reset the associated controls and, in turn, will be scanned periodically by the central system. Alternatively, electronic subsystems like e.g. traction substation control & protection systems can be directly connected to overall SCADA by means of e.g. a databus or network connection.

The primary interface to the SCADA System shall be a diagram displayed to the Control Centre operators. The SCADA System shall transmit system data received, in real-time, from the RTUs to the mimic display.

The SCADA System will comprise four main functional elements as follows:

- Traction Power SCADA;
- Tramstop SCADA;
- Trackside SCADA; and
- Ticket Vending Machine alarm indications shall be transmitted via the SCADA system. Further details are contained in Employer's Requirements Integrated Fare Collection Section.

The current status of the Traction Power System as presented by the SCADA System shall be available as a display to the Control Centre Staff at all times.

35.10.2 General Requirements

The SCADA itself shall not be a safety critical system, however, it shall provide the facility for the Control Centre staff to make requests of remote equipment to execute actions on behalf of the Control Centre staff, and provide indications for sub-systems.

These sub-systems are:

- Safety related - the traction power control system and remote terminal at each substation;
- Security related - the Passenger Help / Passenger Emergency Help Points at each Tramstop together with the associated Closed Circuit Television camera; and
- Security related - The transmission of Intruder Alarms.

The SCADA system shall pass data relating to equipment failure to the Performance Monitoring System (PMS), to allow the PMS to calculate operational performance relating to equipment availability.

The implementation of the SCADA System at Tramstops and other trackside locations may use the Tram Position and Detection System hardware in lieu of a SCADA RTU for the passage of alarms and indications, should this prove to be more efficient option.

Each SCADA System RTU shall contain a minimum of 30% spare capacity for the future in addition to those specified in the sections below, for the addition of further controls and indications across the Edinburgh Tram Network.

At Tramstops the SCADA Remote Termination Units shall be housed in the Tramstop equipment cabinet with the other Tramstop Supervision, Control and Communication Equipment.

Within Substations the SCADA Control and Monitoring Modules shall be wall or cabinet mounted. SCADA Remote Termination Units shall also be installed within the Points Controller cabinet at all electrically heated points. Further details are contained in 26.11.2 of these Employer's Requirements.

It shall be assumed that the signals to be monitored and controlled by the SCADA system will be concentrated into an interface rack. Connection shall be made from the SCADA Modules to the interface rack.

Individual Tramstop systems control and communications equipments shall be designed to integrate with the Tramstop furniture wherever possible.

35.10.3 Traction Power SCADA

The Edinburgh Tram Network Traction Power Supply System has substations placed along the Edinburgh Tram Network as detailed in Employer's Requirements Traction Power (Substations) Section.

Each Traction Power Control Unit should provide as a minimum:

- 128 Digital Inputs;
- 16 Digital Outputs;
- 16 Analogue Inputs.

It shall be possible to put each substation into a bypass mode remotely by using SCADA, in order to guard against equipment and power failures or to allow maintenance.

The SCADA System shall contain a series of 'macros' that shall enable the Control Centre staff to isolate and earth all electrical sections between adjacent sub-stations or between a sub-station and the end of the Edinburgh Tram Network route by making no more than two mouse clicks, or equivalent, from the SCADA Human Computer Interface power diagram. This operation will initiate a sequence of switching operations, the progress and completion of which shall be indicated to the Control Centre staff via the SCADA Human Computer Interface power diagram. Should any operation in this sequence 'time out', or fail, a visual and audible alarm shall be generated to the Control Centre staff and the sequence be suspended by the system.

Facilities shall be provided to enable the switching sequences to be created, edited and deleted by a person with the appropriate rights of SCADA access to the system shall be provided.

The following SCADA System controls and indications provided for each substation shall include, but not be limited to:

- Fire Alarms;
- Equipment Over Temperature Alarms;
- Intruder Alarms;

- Low Voltage Power Supply Fault indication;
- DC power fault indication (e.g. output circuit failure, etc.);
- Over Voltage Trip Alarms;
- Under Voltage Trip Alarms (if Under Voltage Trips are generated);
- Line Live;
- Line Earthed;
- Stray current monitoring, if provided;
- Power data, volts and amps in real time;
- 'UPS status for communications equipment;
- Battery and Battery Charger Status;
- DNO indications;
- Status of all isolators; and
- Status of all circuit breakers and control of them.

The Edinburgh Tram Overhead Line Equipment shall be arranged such that it is possible to isolate all or parts of the overhead traction supply. Feeder and Bypass Isolators are located at the line side in electrical cabinets or within the nearest substation. Further details are available in Employer's Requirements Overhead Line and Pantograph Section.

The SCADA System controls and indications to and from these Isolators shall include:

- Control command for opening and closing of individual Bypass Feeders at each substation;
- Indication of all individual Feeder Isolator position (open / closed / earthed / indeterminate); and
- Indication and Control of all individual Bypass Isolators.

Where a Control Command is instigated by an Operator, the display shall ask him / her to confirm the action before proceeding. In any case, each Control Command shall be handled at the protocol level by a Request – Check – Confirm sequence to ensure that the possibility of the wrong control being performed is minimised. SW and HW interlocking may be realised in the traction power station by means of the substation control and protection system in each substation, which may also be required for local operation.

Information presented to the Operator shall be accurate under all feasible circumstances and shall include the status of all sub-section isolators. Manual input of the status of sub-section isolators may be proposed by Infraco with the appropriate risk analysis.

35.10.4 Tramstop SCADA

Tramstop Equipment shall be monitored by the Control Centre Operating staff via the SCADA System.

Such equipments shall include, but not be limited to:

- Operation of Passenger Help / Passenger Emergency Help Point and status;
- 'No-Break' Power Supply failure alarms;
- Communications Systems Status & Alarms;
- CCTV fault status;
- Public Address System volume level control, fault status and controls;
- Passenger Information Display fault status;
- Passenger Help/Passenger Emergency Help Point activation;
- Passenger Help/Passenger Emergency Help Point fault status;
- Tramstop equipment intruder alarms (including Fare Collection System Alarms – see below);
- Tramstop electrical supply status (including Tramstop lighting supplies).

Each Tramstop RTU should provide as a minimum:

- 64 Digital Inputs;
- 16 Digital Outputs;
- 4 Analogue Inputs.

35.10.5 Trackside SCADA

The SCADA System shall monitor trackside equipment as follows:

- Point Controls and Indications;
- Failure of Points to move within a given time of the request;
- Point Heater Controls and Indications (The Operator shall be able to command the heating of points in the event of the thermostatic control failing);
- Tram Wash equipment; and
- Sand replenishment equipment - inclusive of sand levels etc;
- Status of lift(s);
- Pumps.

It is possible that the Trackside SCADA system will share an RTU with the Tramstop SCADA system, and the trackside SCADA requirements will vary at different points along the alignment. The I/O counts are included within the Tramstop I/O count. However, note that an extra RTU will be necessary in the Depot for the specialised equipment there, for which the allowance below should be made:

- 64 Digital Inputs;
- 4 Analogue Inputs.

35.10.6 Fare Collection SCADA

Ticket Vending Machine Alarms shall be brought to the attention of the Control Centre Operating staff via the SCADA System.

The TVMs provided by **tie** shall contain normally closed relay contacts (contacts open on occurrence of fault) for the following alarms to the SCADA system, and shall include:

- TVM Vandal Alarm;
- TVM coin jam;
- TVM printer malfunction;
- TVM card unit malfunction;
- TVM tickets low;
- TVM Cash Vault(s) ¾ full;
- TVM doors open.

TVMs shall be procured by TEL and issued to Infraco for installation.

The I/O for the TVMs is already included in the count in the Tramstop SCADA.

35.11 Operational Data Network

35.11.1 Overview

An Operational Data Network (ODN) shall be provided to ensure two-way voice and data transmission to fixed locations along the entire Edinburgh Tram Network, with high reliability, availability and low latency.

The ODN shall provide the communications 'backbone' between Tramstops, substations, other remote equipment and the Depot, and shall convey data for a variety of applications including:

- Tram Positioning, Routing and Detection System;
- Passenger Information Displays;
- Telephone Network;
- Public Address;
- Operational Radio Network (optional);
- Passenger Help / Passenger Emergency Help Points;
- Closed Circuit Television;
- Point Control and Indication;
- Point Heating Control and Indication;
- Supervisory Control And Data Acquisition; and
- Ticket Vending Machines (separation of data shall be provided, one secure encoded stream for revenue, ticketing and fare collection data and the other for Ticket Vending Machine alarms, administration and management).

The ODN shall use a fibre optic transmission system. A multi-core fibre shall connect all ODN nodes.

The ODN shall include all master and outstation node equipment, interface cards, configuration of the system elements, the connecting cables and management and diagnostic facilities. Fibre optic repeaters between nodes shall not be employed.

The ODN Control Centre Node shall be equipped with sufficient communications capacity to allow the interconnection of all traction power substation nodes, Tramstop nodes point control nodes and Depot equipment.

Where appropriate, Depot subsystems shall be connected to the ODN via the secure Local Area Network.

The ODN shall support the emergency relocation of Control Centre staff to alternative location(s) served by the ODN following a Control Centre evacuation, where they will be able to continue operation of the Edinburgh Tram Network albeit in a degraded mode.

The ODN shall not be a safety critical system. However it shall convey safety or security related messages to and from the following sub-systems:

- Safety related - Traction Power Supervisory Control And Data Acquisition; and
- Security related - Passenger Help / Passenger Emergency Help Points and the associated Closed Circuit Television images;
- Security related - The transmission of Intruder Alarms.

The ODN shall provide a bandwidth sufficient for the satisfactory transfer of all data, telephone and other signals required for controlling, monitoring and communicating with equipment distributed throughout the Edinburgh Tram Network.

In addition, the associated ODN communications paths and power supplies shall themselves incorporate similar levels of redundancy / diversity.

The ODN shall be configured such that in the event of single failure there shall be no loss of data and no requirement for any immediate actions on the part of the Control Centre staff. It shall be configured so as to provide automatic re-routing in the event of failures such that any loss of facility is confined to that given locality and does not affect the operation of the transmission system and facilities at any other location.

The ODN shall incorporate the necessary degree of redundancy and duplication to enable the commitment to be achieved without losing the ability to handle faults and accept necessary upgrades.

Where there are connections or any exchange of data between subsystems, each system shall be such that any failure in another system shall not cause a failure of the system, (except in the functionality between the two systems concerned).

There shall be commonality of design between all types of ODN nodes.

The transmission latency of the ODN shall be such that it does not contribute any appreciable delay to any voice or data applications.

The ODN shall provide an expansion capability of 200% to allow for system growth or to enable further interfaces to be added or an increase in the bandwidth requirements of existing applications or known future enhancements of the Edinburgh Tram Network.

35.11.2 Location of Nodes

Remote ODN Nodes shall be located so that together they serve all locations along the alignment which require communications with the Control Centre, including Tramstops, substations, and points control and points heating cabinets. ODN nodes shall be provided at all Tramstops. Nodes shall also be provided at other locations if it not within the immediate vicinity of a Tramstop node.

Tramstop Nodes

Each Tramstop Node shall be equipped with communications interfaces to allow the interconnection of the following two-way voice or data services throughout the Edinburgh Tram Network:

- Digital Closed Circuit Television cameras and associated controls;
- Passenger Help / Passenger Emergency Help Points;
- Public Address;
- Ticket Vending Machines;
- Passenger Information Displays;
- Supervisory Control And Data Acquisition Remote Telemetry Units;
- Tram Position and Detection System Equipment; and
- Edinburgh Tram Network timeserver.

Where appropriate, a Tramstop Node shall be equipped with additional communications interfaces to allow the interconnection of the following two-way voice or data services throughout the Edinburgh Tram Network:

- Radio base station equipment or
- Other Control Centres e.g. Police. Fire, Ambulance and other Emergency Services, Traffic Control Centre.

Traction Power Substation Node

If required separately, a Substation Node shall be equipped with communications interfaces to allow the interconnection of the following two-way voice and data services throughout the Edinburgh Tram Network:

- Supervisory Control And Data Acquisition Remote Telemetry Units;
- Private Automatic Branch Exchanges extensions; and
- Edinburgh Tram Network timeserver.

Where appropriate, an ODN Substation Node shall be equipped with additional communications interfaces to allow the interconnection of the following two-way voice or data services throughout the Edinburgh Tram Network

- Digital Closed Circuit TV cameras and associated controls;
- Tram Position and Detection System equipment;
- Radio base station equipment or
- Other Control Centres e.g. Police.

Points Control Node

If required separately, a Points Cabinet Node shall be equipped with communications interfaces to allow the interconnection of the following two-way voice or data services throughout the Edinburgh Tram Network:

- Supervisory Control And Data Acquisition Remote Telemetry Units; and

- Tram Position and Detection System equipment.

Where appropriate, a Points Cabinet Node shall be equipped with additional communications interfaces to allow the interconnection of the following two-way voice or data services throughout the Edinburgh Tram Network:

- Radio base station equipment or
- Other Control Centres e.g. Police.

35.11.3 General Requirements

For all ODN nodes, the multi-core fibre shall be terminated at a fibre patch panel situated adjacent to the node.

Tramstop node equipment shall be mounted in the Tramstop Equipment Cabinet. Traction Power Substation node equipment shall be either rack or wall mounted dependent upon its location. Control Centre Node equipment shall be fitted within an equipment rack located in the Equipment Room.

The ODN shall be equipped with a Maintainers' Workstation (which may be shared with other subsystems) running a Network Management System for network management and diagnostics.

The Maintainers' Workstation shall allow the:

- Display of system status and alarms;
- Download of system logs to removable media;
- Configuration of the Operational Data Network;
- Provision for updating system software; and
- Reporting of real time status and alarms to external equipment.

The ODN maintainers' workstation shall be situated in the Equipment Room at the Control Centre.

35.12 Considerations applying to all Communications Subsystems

This sub-section details those considerations which apply to all the subsystems these are:

- Electrical Connections;
- Cabinets;
- Alarming of Faults.

35.12.1 Electrical Connections

All powered equipment described above, with the exception of the Passenger Information Display System and Ticket Vending Machine, shall be provided with a 'No-Break' power supply, via a UPS system, located in the nearest Tramstop Cabinet or Substation, as appropriate. LV Supplies will be in accordance with 33 these Employer's Requirements.

All electrical connections shall be made in such a way that the public shall not have access to any cabling. All cabling and wiring must comply with the Cabling and Ducting section of these Employer's Requirements.

The cable routes shall avoid close contact with, or interference from, high voltage electrical supplies and for this reason a 3.0 metre separation shall be achieved in any plane between any communication cable routes and high voltage electrical supplies.

Wherever practicable, communication between two or more items of trackside equipment and from trackside equipment to the Control Centre shall be by such means that permits minimal trackside cabling and an acceptable level of system integrity.

All powered equipment described in this section shall be provided with a connection to an earth. The earthing and bonding requirements are described in **tie**'s Earthing and Bonding Policy Document.

35.12.2 Cabinets

All Tramstop control equipment, forming part of the subsystems, as described above, shall be mounted in cabinets located on or adjacent to the Tramstop platforms. Within substations, cabinets may be wall or floor-mounted as appropriate. The requirements on cabinets in general are detailed in 19 of these Employer's Requirements.

35.12.3 Alarming of Faults

It is essential that malfunctioning of equipment is brought to the attention of the operators, in a unified manner, as quickly as possible. This shall be achieved through the medium of the SCADA System.

Where possible, this may be achieved through network monitoring of the subsystems, and a connection between the network monitoring system and the SCADA system. Where this is not possible, it shall be achieved through a contact connected into an RTU connected in turn to the appropriate SCADA system.

35.13 Control Centre

This describes the components of the various subsystems described above are located in the Control centre. It divides those systems into:

- Those components within the Control Centre;
- Those components within the Equipment Room.

35.13.1 Control Centre - Overview

The Control Centre shall be the focal point for the control and operation of the Edinburgh Tram Network. Its purpose shall be to provide a working place for the operational employees to manage and coordinate day-to-day activities associated with system operations. The Control Centre shall be located on the first floor of the Depot building.

The Control Centre comprises of a number of workstations, at which Control Centre staff sit and use equipment to remotely control or retrieve data from the system. The operator interface shall be designed to carry out control functions in an ergonomically efficient manner.

These workstations are:

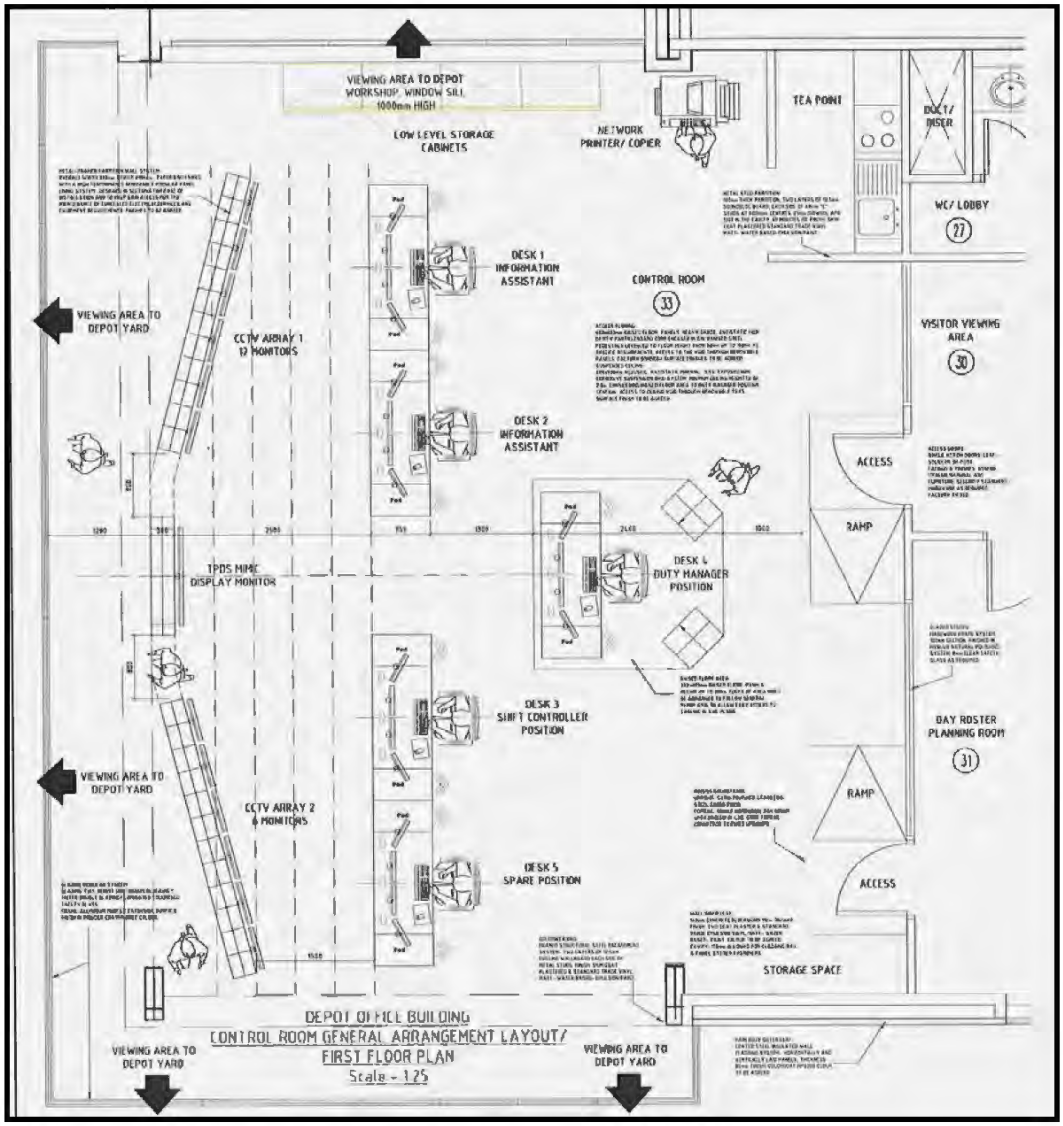
- The Duty Manager;
- The Shift Controller;
- The Information and Security Supervisor;

- There are also two workstations that have been identified for future expansion of the system.

A Monitor Matrix shall be provided, to be positioned either on the front wall or in close vicinity to the Control Centre desks. The matrix shall be of sufficient size to be viewed by all Control Centre staff.

A typical Control Centre Layout is shown in the diagram below. This shows the Control Centre with the addition of the two workstations that have been identified for future expansion.

Figure 11 - Typical Control Centre Layout



35.13.2 Workstation Capabilities

Each Control Centre Workstation shall have the capability to provide indication and control of all subsystems and services: however, it will normally be restricted by logon status to the duties normally associated with the position. The various control and monitoring capabilities are described by subsystem:

- Tram Position and Detection Subsystem;
- SCADA System;
- Operational Radio System;
- Passenger Information Displays;
- Public Address;
- Closed Circuit Television;
- Passenger Help / Passenger Emergency Help Point System;
- Telephone System.

There shall be at least three screens attached to each workstation. The three screens shall be able to form a continuous display. The status of the dynamic data shall be regularly updated, at a frequency of not less than once every five seconds.

Through the top-level diagram it shall be possible to access additional nested menus or screens to gain additional information from the subsystems and facilities.

The presentation of the menus and 'human computer interface', to the Control Centre operators, shall be subject to the approval of **tie**.

Each workstation shall be equipped with at least one keyboard, and some or all of a mouse, joystick, or touch screen capability to navigate around the screens. The keyboard (s) shall be retractable when not in use.

Differential alarm tones shall be provided for each of:

- Operational Radio Network normal calls;
- Operational Radio Network emergency calls;
- Passenger Help Point activation;
- Passenger Emergency Help Point activation;
- Internal and external telephones; and
- Emergency Telephone lines

Tram Position and Detection Subsystem

The Workstation shall present a diagrammatic representation of the entire Edinburgh Tram Network both as an overview display and a series of overlapping sectional displays

Each display shall provide the following as a minimum:

- Last known position of each tram;
- Run / Route number of each tram;
- Number of each tram;
- Punctuality of each tram;
- Driver staff identity for each tram;
- Tram in service / out of service;
- Tram destination; and
- Status of each tramway signal;
- Lie of points;
- Input a tram signal demand via the UTC system;

The Control Centre Workstation(s) controls are only intended for use when the system is disrupted, in emergencies, engineering works, equipment failure conditions, or at the run out and run in of trams to/form the depot. Under normal operating conditions the Tram Position and Detection System will automatically control signals, points and routing of the trams and without the intervention of Control Centre staff. They shall be designed in such a way as to not compromise the safe running of the tram system at any time.

SCADA System

The Workstation shall present a diagrammatic representation of the entire Edinburgh Tram Network both as an overview display and a series of overlapping sectional displays, upon which shall be displayed the control, monitoring and alarm functions associated with the following:

- Electrical Power Substation Equipment for each Electrical Supply Point, the actual position and status of circuit breakers and motorised section isolators;
- Tramstop Equipment;
- Trackside Equipment; and
- Vending Machine Alarms. Details available in Employer's Requirements, Integrated Fare Collection.

The controls and indications shall be displayed in real time and synchronised with the Edinburgh Tram Network Time system.

SCADA Alarms

All alarm events shall generate an alarm message, which shall be electronically logged and displayed to the targeted Control Centre operator.

Each alarm message shall identify the system that has generated it.

Each alarm message shall be assigned a priority level.

High priority alarms shall generate an audible tone.

Alarms shall be presented in a hierarchical manner, with sufficient gradation to ease handover between Control Centre staff.

The Control Centre staff shall have the facility to accept alarms individually or as a 'page' of alarms.

The alarm list shall have the facility to display alarms in chronological order, with the latest alarm first.

Each alarm entry shall include the date and time of occurrence, location and plant identity.

The silencing of alarms shall not inhibit the annunciation of further alarms nor constitute an acknowledgement of the alarm.

Alarm Sequence

Onset of Alarm

This shall be indicated by a flashing alarm message and sounding an audible alarm at the Workstation. There is also a simultaneous logging in the fault log and printing of the alarm on a printer situated in the equipment room.

Acknowledgement of the Alarm by the Control Centre Staff

The alarm message shall be steady, the audible alarms shall revert to a low level, and the acknowledgement shall be logged in the fault log and printed on a printer situated in the equipment room.

Acknowledgement of Reset of the Alarm by the Control Centre Staff

The reset alarm message shall be steady, the low level audible alarms shall cease, and the acknowledgement shall be logged in the fault log and printed on the Supervisory Control and Data Acquisition System printer situated in the Equipment Room.

Operational Radio System

The Workstation shall permit (preferably via a touch screen interface):

- Initiation / receipt of radio calls to any/all tram(s) and other vehicles fitted with the Operational Radio System;
- Initiation / receipt of radio calls to any/all portable radio handsets;

- Provides audible and visual alarms for emergency radio calls received. Such alarms shall be displayed so as to clearly differentiate between normal events and emergency events; and

- Use of 'short radio codes'.

Primary means of initiating radio calls to individual trams from the Control Centre staff shall be achieved by mouse click(s) on the relevant tram represented on the Tram Position Detection System display.

The attention of Control Centre staff to a tram making a radio call to the Control Centre shall be achieved by appropriate graphics symbols on both the Tram Position Detection System and Operational Radio System Human Computer Interfaces accompanied by an audible signal.

All Operational Radio System communications shall be via the Control Centre: direct calling between outstation radios is not required and shall not be available.

When an outstation user wishes to call the Control Centre, they shall insert a call request message. The Control Centre staff will then call them back.

When Control Centre staff call an outstation, the outstation radio shall 'ring' and the outstation operator shall answer the call and speak first.

All radio calls shall also be capable of being made and received via the Control Centre Workstations.
When an emergency call is received at the Control Centre, a distinct audible and visual alarm shall appear on the Workstation. It shall not be possible for a Control Centre member of staff to cancel an emergency call without answering it.

Nomenclature for tram radio call signs shall be the same as the tram number.

When Control Centre staff send a single voice message to all trams and request the tram drivers to acknowledge receipt, the radio system shall present a list of all trams and their status to the Control Centre staff via the Operational Radio System Human Computer Interface.

The status shall be coloured to identify:

- Trams that have acknowledged the message, in green;

- Trams that do not have active radios, in amber;

- Trams that have not acknowledged the message in red.

This will enable the Control Centre staff to identify any trams that have not acknowledged the call. A similar arrangement shall apply to status codes sent to trams.

The Operational Radio System shall support the emergency relocation of Control Centre staff to alternative location(s) served by the Operational Data Network following a Control Centre evacuation, where they will be able to continue operation of the Edinburgh Tram Network albeit in a degraded mode.

The system shall digitally record all outgoing and incoming radio messages.

Passenger Information Displays

The Passenger Information Display System shall be accessible to the Control Centre staff via the Control Centre Workstations.

Normally, the Platform Information Display System shall be automatically updated from the Tram Position Detection System. However, the Control Centre staff shall have the ability to display a selection of pre-recorded messages and free form text on individual Platform Information Displays or groups of displays.

Details and times of the application of pre-recorded messages and free form text shall be logged by the Central Data Recording System.

Public Address

The Control Centre staff shall have the ability to initiate and transmit direct announcements to individual Public Address System Platforms, zones or groups of zones via the Control Centre telecommunications console.

The Control Centre staff shall be able to alter the volume setting of individual Public Address System zones or groups of zones.

Details of all Control Centre staff interventions and direct announcements shall be logged by the Central Data Recording System.

Closed Circuit Television

Colour pictures shall be transmitted to the Control Centre from the Tramstops, substations, park & ride facility and surrounding areas.

The system shall normally display a continuous cycle of Closed Circuit Television. The system shall interrupt this cycle to automatically display the image of the location where a Passenger Help Point / Passenger Emergency Help Point is activated: this shall cause the relevant camera image to be transferred to the Control Centre Staff's local Closed Circuit Television display. This should be able to be overridden by the Control Centre staff. After termination of a Passenger Help / Passenger Emergency Help Point call, the associated Close Circuit Television Camera shall revert to the normal scanning sequence.

The Operator shall be able to select those images that are required to be displayed in predetermined viewing patterns on the Monitor Matrix at the front on the Control Centre near that of the support workplace. Priority of selection shall be adjustable, to be governed by the current Edinburgh Tram Network operating procedures. This shall be adjustable and the system shall allow new viewing patterns to be created, amended and deleted as required by the Control Centre staff to suit individual operational circumstances.

Operation of a Ticket Vending Machine alarm shall similarly cause the local Closed Circuit Television image to be automatically displayed on a pre-selected monitor in the Control Centre.

The selection of the camera for control shall cause the image to be transferred to the Control Centre Staff's local Closed Circuit Television display.

The Control Centre Staff shall have a joystick that shall allow control of the pan, tilt, zoom and focus camera attributes.

The Closed Circuit Television Graphical User Interface shall allow the Control Centre operator to switch any camera image to be recorded at high rate to the central data recorder, to be viewed on any monitor or his own workstation.

The control of the video switching shall be completely transparent to the user.

Location, time and date stamped recording facilities shall be activated if the emergency button is activated on a Passenger Help / Passenger Emergency Help Point, the image from the relevant camera shall be automatically routed to a designated screen in the Control Centre.

Video and textual information shall be displayed on the local display when swapped from the monitor matrix display and shall maintain camera identity, status and location.

All characters overlaid on a Closed Circuit Television image shall provide clearly legible letters and characters on a dark background. Character generation shall be separate from the video image such that the location of a camera failure can be clearly identified.

The Control Centre shall provide facilities to capture a video image displayed on the Control Centre operator's display and print the image via a high quality video printer.

Passenger Help / Passenger Emergency Help Point System

The Passenger Help / Passenger Emergency Help Points System shall be accessible to the Control Centre staff via the Control Centre Workstations for alarm presentation, and via the Control Centre telecommunications console for communication with the person initiating the alarm or help request. Activation of a Passenger Help / Passenger Emergency Help Point shall give an immediate flashing indication and associated audible alarm on all Control Centre staff workstations and the Control Centre Overview Display. If this is an Emergency Help point activation, the image of the associated CCTV camera shall be automatically called to the Monitor Matrix.

The alarm message shall be steady and the audible alarm shall be silenced upon acknowledgement by the Control Centre staff.

Upon termination by the Control Centre staff of a Passenger Help / Passenger Emergency Help Point call, the reset alarm message shall be steady.

Telephone System

There shall be a touch screen interface to the Telephone, (and Public Address and Passenger Help Point / Passenger Emergency Help Point sub-systems if not provided for otherwise) that provides for:

- Initiation / receipt of telephone calls to any / all users on the exchange provided;
- Priority and high integrity initiation / receipt of telephone calls to / from emergency services;
- Audible and visual alarms for Passenger Help Point / Passenger Emergency Help Point calls received; and
- Making of public address announcements at individual, grouped or all Tramstops and / or park & ride sites.

All Control Centre staff positions shall be identical, with functionality determined by user 'log-in'.
All voice communications to and from the Control Centre shall be recorded and be capable of being played back.

Recorded voice communications shall be stored as detailed in 35.14.14.

Emergency telephone lines shall be provided to allow contact with and from the organisations detailed in 35.13.4, regardless of any failure of the main Private Automatic Branch Exchange.

Such facilities need not necessitate individual handsets but may consider a single handset (on the relevant operator workplaces) with priority displays and call buttons.

The Workstation shall incorporate:

- Information displays: (Supervision of extensions and exchange lines);
- Call processing and routing: Traffic and console status; and
- Ability to provide user input via keyboard entry.

The Workstation shall provide:

- Interactive voice greetings and messaging;
- Advanced call monitoring;
- Line engaged signal;
- Waiting time or queuing status;
- Called / calling parties identity;
- Pre-programmed numbers;
- Hands-free / wireless operation;
- Time display, synchronised by the Time Server;
- Conference calling;
- Audio control;
- Programmable functions;
- A local loudspeaker;

- An adjustable ring tone;
- Public Address System Interface; and
- Number ID

35.13.3 Control Centre Philosophy

The Control Centre shall provide Control Centre staff, and especially the shift controller and duty manager, with clear visibility of the entrance and exit tracks and associated infrastructure of the Depot complex with the main tramway and at least one end of Depot shed tracks and stabling apron tracks.

All Workstations shall be of similar design to maintain the aesthetics of the Control Centre.

Each Control Centre Staff position shall be able to control the local lighting, so that screen light reflections shall be reduced.

The Control Centre shall provide positions for the following operations personnel:

Operations Duty Manager

The Duty Manager will be responsible for overall control of the Edinburgh Tram Network and the safety of its operation.

The Operations Duty Manager is required to 'book' Tramcrew on / off duty and needs to see crew before they take their turn of duty in order to be convinced that they are in an appropriate condition to commence duty. The Control Centre shall provide for this without the need for Tramcrew to enter the Control Centre.

The Duty Manager's workstation will be identical to all other workstations.

Operations Shift Controller

The shift controller is responsible for the minute by minute operation of the Edinburgh Tram Network ensuring service perturbation risks are minimised and Tramcrew are aware of the current state of the Edinburgh Tram Network.

Operations Information & Security Supervisor

The information & security supervisor provides support to the duty manager and shift controller by monitoring the positions of trams, monitoring and editing of Passenger Information Displays, monitoring of Closed Circuit Television and Passenger Help / Passenger Emergency Help Points. This post will also take the primary role in ensuring passenger information and security.

Duty Manager

The duty manager's work place shall be located such that he can clearly see and interact with all the operations of the Control Centre.

The duty manager's workplace shall provide facilities to monitor and control the following subsystems:

- Tram Position and Detection;
- Supervisory Control and Data Acquisition;
- Operational Radio System;
- Closed Circuit Television;
- Telephones.

Shift Controller

The operator workplace provided for the shift controller shall be a complete replica of that provided for the duty manager.

In addition, the shift controller shall be given clear visibility of the mimic display and the bank of CCTV displays located at the front of the Control Centre.

Information & Security Supervisor

The information and security supervisor workplace shall be identical to the other workstations.

Monitor Matrix

A monitor matrix shall be mounted either on the front wall or in close vicinity to the Control Centre desks. The matrix shall be of sufficient size to be viewed by all Control Centre staff.

It shall display CCTV images. Textual information shall be displayed on the displays to provide camera identity, status and location. Characters shall provide clearly legible letters and characters on a dark background. Character generation shall be separate from the video image such that the location of a camera failure can be clearly identified, and shall not be generated by the camera itself.

The Monitor Matrix shall cycle through a user-definable set of images over a period of time.

Positioning of the images or sequencing in the matrix shall reflect the geographical layout of the Edinburgh Tram Network. The sequencing and display time of these images shall be user configurable.

The Information and Security Operator shall be able to select those images that are required to be displayed in specified viewing patterns on Monitor Matrix. Priority of selection shall be adjustable, to be governed by the current Edinburgh Tram Network operating procedures. This shall be adjustable and the system shall allow new viewing patters to be created, amended and deleted as required by the Control Centre staff to suit individual operational circumstances.

When activated by the Passenger Help / Passenger Emergency Help Points System interface, the Monitor Matrix shall display the associated CCTV image for that Passenger Help/Passenger Emergency Help Point.

35.13.4 Emergency Telephone Lines

The Control Centre shall have dedicated 'direct' lines between itself and the following locations as a minimum:

- Fire Brigade Control Centre;
- Lothian & Borders Police Control Centre;
- Lothian Buses Control Centre (Annandale Street);
- Edinburgh in View CCTV Centre;

- Ambulance Control Centre;
- Airport Control Centre;
- Network Rail Edinburgh Waverley Power Signal Box;
- Network Rail Electrical Control Centre at Cathcart; and
- City of Edinburgh Urban Traffic Control.

The primary telephone interface providing these facilities shall be through the single integrated audio telecommunications device at each desk, with a secondary hand-held unit for back up. Multi facilities will not be acceptable.

Any incoming calls from emergency services shall be brought to the attention of the Control Centre staff, via messages on the display, audible alarms and / or indicators on the handsets.

All voice communications and messages critical to safe operation shall be recorded on the central data recording system.

All Control Centre communications between control-room staff shall also be recorded and stored for at least thirty-one days.

35.13.5 Local Area Network

All of the Workstations situated within the Control Centre shall be connected to a dual redundant Local Area Network, which shall in turn be connected to the Servers and Systems in the Equipment Room and thence to the Operational Data Network.

The Local Area Network cabling standard shall be category 5/5e or higher.

Each Control Centre staff position shall have two Local Area Network connections per Local Area Network and these shall be accessible through the floor mounted recessed sockets.

The Local Area Network shall accommodate the connection of further terminals for the requirements of future expansion of the Edinburgh Tram Network.

35.13.6 Control Centre Time Display

The Control Centre shall have one or more wall-mounted digital display clocks, mounted so that all Control Centre operators have full view of the displayed time.

These clocks shall show the day, date, hours, minutes and seconds.

The clocks shall be synchronised with the Rugby time signal or its successor or similar.

35.13.7 Safety Requirements

The Control Centre will not house safety critical systems, however, it will provide controls and indications for sub-systems that can be considered to be safety or security related.

These sub-systems are:

- Safety related - the Traction Power Control System and Supervisory Control and Data Acquisition at each substation;
- Security related - the Passenger Help / Passenger Emergency Help Point communications to each Tramstop; together with the associated Closed Circuit Television equipment; and
- Safety related - the Tram Position, Route Setting and Detection System.

35.13.8 Electrical Requirements

The equipment located in the Control Centre shall run from 230/240VAC 50Hz electrical supplies.

Appropriate switched mains sockets shall be located on the walls and in the floor area close to each Control Desk locations for miscellaneous mains powered equipment.

There shall be no 110VAC or 415VAC 50 Hz available in this room. Power tools which require 110VAC 50Hz shall utilise a step-down / isolation transformer to achieve this.

Each mains socket shall be rated for a current of 13A.

The Control Centre equipment shall be supported by the provision of Uninterruptible Power Supply / diverse electrical supplies, further details are available in the Employer's Requirements Depot Section. An Uninterruptible Power Supply mains distribution panel shall be available in the Control Centre to provide a fault tolerant supply for all the equipment in the room. The connection of the

equipment to the Uninterruptible Power Supply distribution panel shall be through a system which has the same standard three-pin plug and sockets as normal 240v supplies, but is differentiated from the normal supply by means of appropriate labels and/of colour.

The design shall include full details of the future capacity that shall be provided for Edinburgh Tram Network expansion, and the method proposed for the work necessary to incorporate, install and commission future extensions.

All Control Centre cables and equipment shall be identified by permanent labelling in an approved format as detailed in the overall system-wide requirements.

The system wiring shall be sized to permit a minimum of 35% increase in power consumption for any additional equipment added as part of future Edinburgh Tram Network enhancements.

The main cable entry shall be via an aperture located in the floor, which provides entry or access for cables into the equipment room.

Particular care shall be taken to ensure that Electro-Magnetic Compatibility is not degraded when cables are closely located.

Cables shall be continuously screened through the aperture in the floor.

Appropriate strain relief or clamping shall be provided.

All cables and conduits shall be clearly marked with cable identifiers or suitable permanent marking which shall last for the expected system lifespan.

Local cabling between the Control Centre and the Equipment Room ducts shall be such that new cabling shall be capable of being installed without disruption to the operations including impact on the connections to the workstations.

35.13.9 Logging

In addition to voice image and message recording, there are two additional log facilities:

- Fault log; and
- Day log.

Fault Log

An electronic fault log shall be created which shall log status messages from Supervisory Control and Data Acquisition and communications systems.

The fault log records all system faults for further investigation.

Data storage shall be provided which shall record data on a 'first in-first out' basis.

Data shall be backed up on a removable storage medium and the system shall automatically do this or notify the Control Centre operator that backup is required before overwriting.

Data shall be backed up on a removable storage medium and the system shall automatically do this or notify the Control Centre operator that backup is required before overwriting.

Fault reports shall be automatically generated.

Day Log

An electronic log of day-to-day operations shall be implemented, from which a hard copy can be generated.

35.13.10 Central Data Recording

The Control Centre shall have a means of digitally recording/replaying the following information:

- All Operational Radio System voice communications;
- All Telephone Network calls to or from the Control Centre;
- All calls via the emergency telephone lines;
- Public Address announcements;
- Closed Circuit Television images, (at variable speed controlled by the viewer);
- Textual changes to Passenger Information Display; and
- The data shall be stored on non-volatile memory storage for the purposes of review or incident investigation.

The Control Centre staff shall be able to replay the data recorder from each desk position.

Information shall be recorded in a tamper-proof manner to evidential standards and be retained for a minimum period of one month.

35.13.11 Printers

The Control Centre shall house local printers for the printing of logs of maintenance or diagnostic data or colour prints of Closed Circuit Television frames.

35.13.12 Control Centre Furniture

The Control Centre shall be furnished with modern ergonomic furniture to assist the Control Centre staff and reduce fatigue.

Each desk position shall have personal storage of a minimum of three lockable drawers. Positioning of storage shall not inhibit the work-envelopes of the Control Centre Staff.

Additional storage equipment shall be located to the sides of the Control Centre.

The design of the Control Centre furniture shall include provision for the effective management of cabling, and equipment and maintenance power supply distribution.

Each of the Control Centre staff shall have the following functionality:

- Computer / workstation with dual flat screen displays, plus retractable keyboard;
- Integrated audio communications device comprising of handset and headset for (Public Address, Operational Radio, Telephones and Passenger Help / Passenger Emergency Help Points). The Telephone System (PABX) and the Operational Radio System shall be provided separately;
- Emergency telephones;
- Local light dimming control;
- Joystick control, (movement zoom and focus of Closed Circuit Television Cameras;
- Pointing device such as a mouse or tracker ball and keyboard; and
- Passenger Help / Passenger Emergency Help Point identification display.

The integrity of Controls and Indications shall be commensurate with the extent to which safety depends upon their correct operation, in both normal and degraded modes.

35.13.13 Spare Capacity / System Expansion

Following installation of the initial Edinburgh Tram Network Control Centre System:

- All conduits, troughing, trunking, and apertures shall be only 50% full of cables;
- All multi-pin connectors shall have a minimum of 10% capacity available for expansion; and
- All multi-way termination blocks shall provide a minimum of 20% capacity for expansion.

35.14 Equipment Room

35.14.1 Overview

The Equipment Room shall be situated either directly adjacent to, or directly below the Control Centre. The primary purpose of the Equipment Room is to provide a location to house the bulk of equipment, which supports the operational monitoring, management and operation of the Edinburgh Tram Network.

The equipment shall primarily be contained in freestanding cabinets located in the Equipment Room. Cabling from the equipment exits from the cabinets and shall be routed to sub-systems located outside the Depot or routed through an aperture into the Control Centre.

Within the Equipment Room will be maintainer desks, which shall be used for maintaining equipment associated with the running of the system.

It is proposed that the Equipment Room shall house the servers which host the following systems (subject to the required performance, reliability, safety and maintainability characteristics):

- Tram Position and Detection subsystem;
- Passenger Information Display subsystem;
- Telephone Network Private Automatic Branch Exchange;
- Public Address subsystem;
- Operation Radio Network Trunking Controller and base station (if required);

- Passenger Help / Passenger Emergency Help Point subsystem;
- Closed Circuit Television subsystem;
- Matrix controller;
- Supervisory Control and Data Acquisition subsystem;
- Operational Data Network Control Central Node;
- Performance Monitoring System;
- Central Data Recording and Storage;
- Radio Clock;
- Security and Access Controller;
- Fire alarm system;
- Voice recording and playback;
- Printers (if required).

35.14.2 Maintainer's Positions

Where appropriate, a Maintainer's Workstation shall be provided for a subsystem, along with any printer. The maintainer's position shall be supplied with any additional diagnostic equipment that cannot be integrated into the maintainer's workstation as part of the suite of software. Any additional special adapters or cables and connectors shall also be provided.

35.14.3 Security and Access Control

The security and access control system shall be housed in the Equipment Room.

The security and access control system shall also monitor the entry and exit to the Equipment Room.

Abnormal or illegal entry messages shall be sent to the Control Centre. These actions shall also be logged in the central data recorder.

35.14.4 Layout

The layout of the Equipment Room shall not be detrimental to maintenance and movement of equipment.

The positioning of cabinets and equipment shall take into consideration the cable and conduit entries and exits into the room.

The maintainer's workstations shall be situated with a full view of the equipment.

35.14.5 Equipment Housings and Mounting

Where possible, the equipment shall be placed in sealed, lockable cabinets, which provide a minimum of IP34 sealing.

Where indicators or diagnostic light emitting diodes/displays are used on equipment the cabinets shall have a glass door to assist in easy viewing from the maintainer's workstation.

Wherever possible, equipment shall be rack mounted or modular to aid replacement and maintenance.

To assist with installation all cabinets and equipment shall be fitted with suitable craneage or lifting points.

35.14.6 Diagnostic, Maintenance or Offline Mode Indications

If the equipment in the Equipment Room is placed into a diagnostic, maintenance or offline mode, this shall be communicated to the Control Centre staff and shall not compromise system safety or the performance of other systems.

35.14.7 Equipment Power Supplies

All powered equipment shall be connected to an Uninterruptible Power Supply in an adjacent room. This shall deliver 230V a.c. 50 Hz or 400 V a.c. 50 Hz.

Switched mains sockets shall be located on the walls and in the floor area close to the equipment locations. Further details are available in the Employer's Requirements - Depot. There shall be provision for 110V a.c. 50Hz in this room to enable the connection of power tools and the sockets shall be clearly marked accordingly.

Each 230V ac 50Hz mains socket shall be rated for a current of 13A.

A Supply distribution panel shall be mounted to the wall to enable disconnection of supplies in the event of an emergency.

The system wiring shall be sized to permit a minimum of 25% increase in power consumption to accommodate additional equipment required for Edinburgh Tram Network expansion.

The power loading and performance characteristics of equipment shall be stated at the extremes of temperature, normal running and transient conditions.

35.14.8 Storage

The Equipment Room shall provide storage for both personal and vocational items. This shall be in the form of lockable cupboards and units.

All main data storage shall be carried out on servers or equipment located in the equipment room where access is restricted. All system or program data must be shown to be retrievable in the instance of a system re-build.

Adequate shelving and filing cabinets etc shall be provided to locate equipment, handbooks, files and storage of electronic data.

Printers and miscellaneous equipment shall be sited in the locale of the maintainers in order to afford easy access.

35.14.9 Spare Capacity / System Expansion

All conduits, troughing, trunking, or apertures shall be only 50% full of cables. All multi-way termination blocks shall provide a minimum of 20% capacity for expansion. All multi-pin connectors shall have a minimum of 10% capacity available for expansion.

Each cabinet shall only be populated up to 75% to provide additional space for system enhancements.

Cabinets containing equipment which may be affected by the future Edinburgh Tram Network enhancements shall have enough spare capacity to accommodate those changes or demonstrate that the expansion or upgrade can be achieved with the minimum amount of changes or use of personnel.

All patch panels and terminals shall have the capacity for equipment used by the future Edinburgh Tram Network enhancements.

35.14.10 Master Clock and System Clocks

Within the Equipment Room, a Master Clock System shall be installed.

The Master Clock shall source a time signal from the standard Rugby clock signal (or its successor) or similar and broadcast the time signal to all systems that require accurate time synchronisation.

The Master Clock shall broadcast the time signal over the Local Area Network or directly via wired connections to the appropriate equipment.

In the event of Rugby time signal failure the system shall continue to generate time signals based on an accurate battery-backed clock. In the event of Master Clock failure, each of the systems that require the Rugby time signal shall continue operating using their own local clock signal. The failure of the Master Clock shall be logged accordingly and displayed to the Control Centre staff.

The time shall be sent to each of the systems to allow logging to resolution of 10ms or better.

A digital display clock shall be situated in a position, which can be easily seen by the maintainers at their workstation position. The clock shall source its time from the master clock. It shall show the day, date, hours, minutes and seconds.

35.14.11 Performance Monitoring System

The Performance Monitoring System shall be connected to the equipment room Local Area Network and be accessible by all designated users with appropriate user group login and password protection.

It shall receive data from the Tram Position and Detection Subsystems and the SCADA systems, which will allow it automatically to calculate those measures of performance of the Tram Network that can be calculated automatically. The relevant Performance Measures are all of those measures that form Performance Measurement System, as set out in Schedule 6 to the Infraco Agreement. This system shall produce appropriate daily and other periodical reports in both paper and software format. The reports shall to provide a suitable audit trail for the calculation of the PMS. The detailed specification for this system shall be subject to further development with **tie** and subject to **tie**'s approval.

The Performance Monitoring System shall also be accessible remotely through a Local Area Network firewall, via the Internet.

35.14.12 Monitor Matrix Display Driver

The Monitor Matrix Controller shall receive data from the Closed Circuit Television System cameras and display the images onto the Matrix of displays in the Control Centre.

It shall be connected to the dual redundant Local Area Network and / or Closed Circuit Television System.

It shall have the capability of being expanded to accommodate the expansion of the Edinburgh Tram Network closed circuit television system.

35.14.13 Central Data Recording

The Central Data Recorder shall be housed in a cabinet separate to all other equipment. The cabinet shall be sealed and locked and have suitable tamperproof fittings. The door shall be fitted with an alarm to indicate when it has been opened, which shall be logged, printed, and displayed to the Control Centre staff.

The data shall be stored in secure manner such that no tampering can be achieved. The maintainers shall have easy access to the system in order to backup/archive data. The system shall have the capability of supporting connections to a Local Area Network based digital recording system held in the Equipment Room.

The system shall provide playback facilities within both the Control Centre and one of the administration offices.

All recorded Control Centre communications shall be time stamped to the nearest second, updated from the Edinburgh Tram Network Time Server in the Equipment Room. Recordings shall be archived to transportable media.

The archiving process shall not interrupt the recording process. The viewing of recorded Closed Circuit Television images shall not interrupt the recording of further Closed Circuit Television images.

The quality of data stored shall be suitable for legal interpretation and proceedings.

The data shall be stored on a system, which shall have the capacity to store at least thirty-one days worth of system communications, Closed Circuit Television images and text information.

Each camera shall be recorded at a minimum rate of 16 frames per second (fps): however, the images shall be recorded at a higher frame rate of 25 fps when:

- An Emergency Help point has been activated;
- A TVM alarm is detected;
- A designated zone has been entered;
- The Control Centre staff manually command the Closed Circuit Television image to be recorded.

The data shall be recorded in a circular buffer where the oldest data is overwritten by the latest data ('first in-first out') and is subject to the storage capacity of 31 days referred to above.

The data shall be stored in secure manner such that no tampering can occur.

The images shall be overlaid by security coding of time/date and location.

Freeze frame facilities shall be provided.

In the above cases, the system will interrogate the Operator at the end of every three minutes to determine whether or not the high recording rate should be continued.

The central data recorder shall provide conversion facilities to adjust the optimisation of the images but not the pictorial content.

The storage device shall provide an audible warning that the storage capacity is within 5% of capacity and that the Control Centre staff are required to archive data to a non-volatile medium.

The status of the data recorder shall be conveyed to Control Centre staff.

Each DVR shall be connected to the Operational Data Network, to allow images to be transferred between locations to allow remote viewing.

35.14.14 Voice Recording

The Equipment Room shall house a Local Area Network based digital recording system that shall record all voice communications both into and out of the Control Centre.

The Central Voice Recorder shall be housed in a cabinet separate to all other equipment.

The cabinet shall be sealed and locked and have suitable tamperproof fittings.

The door shall be fitted with an alarm to indicate when it has been opened, which shall be logged, printed, and displayed to the Control Centre staff.

The voice recordings shall be stored in a secure manner such that no tampering can be achieved. The maintainers shall have easy access to the system in order to backup / archive data.

The system shall provide playback facilities within both the Control Centre and in one of the administration offices.

All recorded Control Centre communications shall be time stamped to the nearest second, updated from the Time Server in the Equipment Room.

Recordings shall be archived to removable media.

The archiving process shall not interrupt the recording process.

The quality of data stored shall be suitable for legal interpretation and proceedings.

The voice recordings shall be stored on a system, which shall have the capacity to store at least thirty-one days worth of voice communications.

The data shall be recorded in a circular buffer where the oldest data is overwritten by the latest data ('first in-first out').

The data shall be stored in secure manner such that no tampering can be achieved.

The storage device shall provide an audible warning that the storage capacity is within 5% of capacity and that the Control Centre staff are required to archive data to a non-volatile medium.

The status of the voice recorder shall be conveyed to Control Centre staff.

35.14.15 Equipment Room Maintainer Desks

Two workstations shall be provided for the maintainers, which comprise a local display, 'man-machine interface' and keyboard to enable the interrogation of the server or other related equipment for diagnostic or maintenance purposes.

The Workstations in the Equipment Room shall be of similar design to their equivalents in the Control Centre but their users shall require a greater level of more detailed access. Such access shall be governed by password and user group membership.

The Equipment Room workstations shall comprise:

- Display, mouse and keyboard for interaction with the Tram Position and Detection System and Passenger Information Display sub-system, the Operational Radio System and the UTC sub-system, the latter via the Tram Position, Route Setting and Detection System;
- Touch screen interface to the Telephone Network, Public Address system, and Passenger Help/Passenger Emergency Help Point systems;
- Touch screen interface to the Operational Radio System;
- Displays and console for the selection and monitoring of Closed Circuit Television images from remotely located cameras;
- Display, mouse and keyboard for interaction with the Supervisory Control and Data Acquisition System; and
- Human computer interfaces for the purpose of archiving and retrieving logged data.

Each maintainer's position shall have two-off Local Area Network connections per Local Area Network and these shall be accessible through recessed sockets.

Each maintainer's position shall have a Telephone Network handset.

35.14.16 Equipment Room Local Area Network Requirements

Each of the maintainer's workstation computers situated within the Equipment Room shall be connected to a Local Area Network.

The Local Area Network cabling standard shall be category 5/5e or higher.

Each Equipment Room maintainer's positions shall have two Local Area Network connections that shall be accessible through recessed sockets.

The Equipment Room Local Area Network shall accommodate the connection of further terminals for the requirements of future Edinburgh tram Network expansion.

35.14.17 Other Systems

A repeat of the 'System Overview' display that is located in the Control Centre staff shall be made available on the Operator's Local area network, updated at least every 5 seconds. This is to enable **tie** to use this image for purposes such as for onward transmission to the TEL /Lothian Bus information centres and in the depot mess room to assist staff with timing crew changes.

36 Integrated Fare Collection

36.1 Scope

The scope of this Section of these Employer's Requirements is to define the integrated fare collection requirements that are applicable to the Edinburgh Tram Network.

36.2 Procurement

Ticket Vending Machines (TVMs) and Ticket Validators for installation at Tramstops will be 'free issued' by **tie** to the Infraco at the Depot. The Infraco shall be required to provide the necessary foundations, ducting, power supply and communications linkage to the TVM and Ticket Validator locations at the Tramstops. The Infraco shall be responsible for the installation of agreed quantities of TVMs and Ticket Validators at the agreed locations.

36.3 General Technical Specification

The hand held TVM docking stations shall be 'free issued' by **tie** to the Infraco at the Depot and the Infraco shall provide appropriate power and comms interface connections, together with appropriate racking to store and charge.

36.4 Integrated Fare Collection

tie/TEL shall be responsible for the Edinburgh Tram integrated fare collection system which shall provide passengers with tickets and ticket validation on and/or off Trams for multi modal seamless bus and Tram journeys within the confines of the Lothian Bus operational area for ticket sales and throughout the SESTRAN area for validation.

Static Ticket Vending Machines will be provided at Tramstops, and hand held ticket vending machines that can also validate tickets will be carried by an Inspector on board each Tram. The fare collection system shall consist of a number of items of equipment each providing elements of the overall System functionality.

These shall include:

- Ticket Vending Machines providing ticket purchasing facilities – these are to be provided separately to the Infraco by **tie** and 'free issued' for installation by the Infraco;
- Tramstop ticket Validators – these are to be provided separately to the Infraco by **tie** and 'free issued' for installation by the Infraco;

- Docking stations for hand-held ticket issuing and smart-card validation machines and associated support apparatus (including docking stations) – these are to be provided separately to the Infraco by **tie** and 'free issued' to the Infraco. The Infraco shall provide power and communications interface connections to the Depot local area network, together with appropriate racking to store and charge the hand held ticket machines.

The elements of the IFC system shall use the system wide communications backbone that shall be provided by Infraco to provide the wide area connections for data transfer and equipment control.

The Infraco shall provide connections for the Ticket Vending Machines and Ticket Validators to be connected locally to the communications network at Tramstops.

The Infraco shall provide a connection for the ticketing central management system to be connected to the communications network and local area operational network at the depot / operational control centre.

The Infraco shall provide for the ticketing central management system to be connected to the outside world by means of a secure IP address.

36.5 Ticket Vending Machines and Validators

36.5.1 General

There shall be a minimum of two TVMs per Tramstop. Exact numbers of TVMs and Ticket Validators are to be agreed for each Tramstop.

The Infraco shall include in the design of the Tramstops suitable foundations for the TVMs and the Ticket Validators and provide 230 volt ac power and communications links to the units as appropriate.

36.5.2 Docking Stations for Hand-Held Ticket Machines

Docking stations and chargers shall be 'free issued' by **tie** to the Infraco. The Infraco shall provide power and communications interface connections to the depot local area network, together with appropriate racking to store and charge the hand held ticket machines. These will be connected to the Central Management System.

Table 86 - Hand Held Ticket Machine Quantities

Equipment	Quantity	Comments
Docking Stations	*35*	As determined in the design and implementation phases

36.5.3 Equipment Interfaces

The following equipment interfaces are required to be provided by the Infraco:

Table 87 - System Interfaces

Interface	Interface with Discipline	Interface Definition	Interface Management
Central Management System	System wide	Integrated Fare Collection	Individual sub systems
Ticket Vending Machine	Tramstop / Buildings	Integration Fare Collection	Buildings
Ticket Vending Machine	Supervisory, Control and Communications System	Integrated Fare Collection	Supervisory, Control and Communications System
Smart Card Validators	Tramstop / Buildings	Integration Fare Collection	Buildings
Smart Card Validators	Supervisory, Control and Communications System	Integrated Fare Collection	Supervisory, Control and Communications System
Hand Held Ticket Machines	Central Internal Financial Control system and SC&C	Integrated Fare Collection	Integrated Fare Collection

The interfaces identified above will be further developed by the Infraco to include details of programme requirements for interface resolution. The detailed interfaces and management thereof will be carried out according to the system integration process for the Edinburgh Tram Network.

37 System Integration

37.1 Introduction

A tramway has many constituent parts and therefore integration is a crucial factor when designing, implementing and operating a successful tramway.

tie shall be provided by the Infraco with a totally integrated Edinburgh Tram Network with all systems, subsystems and interfaces working efficiently and harmoniously together as one and able to be operated and maintained in full compliance with the requirements of the Edinburgh Tram Network and appropriate Consents. To achieve this, the Infraco shall be responsible for successfully undertaking comprehensive co-ordination and system integration roles within the Infraco Works. The system integration responsibility shall exist throughout all phases of the Infraco Works.

This Section of the Employer's Requirements outlines these responsibilities and provides details of the extent of co-ordination and system integration.

37.2 Definitions

System Integration shall include the collation, identification, recording and management of all elements of the Infraco Works, including but not limited to, the project management, design, procurement, manufacturing, factory testing, delivery, offloading, erection, construction, equipping, testing, commissioning, system acceptance testing, shadow running, operation and maintenance of the ETN.

Such integration shall include both the 'hard' integration elements in terms of system and sub-system functionality etc and 'soft' integration elements associated with approvals and Consents, people interfaces, plans, processes and procedures, and land/property agreements.

Also included shall be the production and delivery of all associated documentation (training and maintenance manuals and "As Built" documentation), all spare parts and special tools etc to allow the safe and efficient fulfilment of all operation and maintenance obligations, including dependability criteria, for the projected life time of the Edinburgh Tram Network.

System interfaces shall mean where two or more main elements or subsystems meet or interact or are intended to meet or interact in a manner which is necessary for the expedient and necessary progress of the Infraco Works and the safe and efficient operation and maintenance of the Edinburgh Tram Network.

37.3 Principle

System Integration is a fundamental project requirement and shall include the efficient and effective leadership of the system engineering and associated processes, coordination of the processes for the design, implementation and bringing the Edinburgh Tram Network into public service, complete technical direction and configuration management of the existing system design and system and subsystem interfaces to facilitate the Infraco Works.

37.4 Inter-contract Integration, Integration of third party and free issue equipment

The Infraco shall be responsible for managing all activities required to ensure that the Edinburgh Tram Network is successfully integrated with the equipment and subsystems being provided by the Infraco Parties and others. This over-arching integration role shall include as a minimum the following activities:

- undertaking a design co-ordination system and subsystem development function between contracts;
- lead in the system integration of the ticketing machines, ticket validators and bus passenger information displays;
- lead in the system integration of the subsystems and equipment being provided under the ETN project together with, systems and equipment, such as the "free issue components" or as indicated by **tie**;
- provision of an integrated testing and commissioning plan; and
- implementation of an integrated testing and commissioning programme.

37.5 Formal Roles to be undertaken by the Infraco

37.5.1 System Design Authority

The Infraco shall be responsible for the management of the design and interface processes in respect of systems and equipment being provided under or supplied pursuant to this Agreement. The system design authority role shall be deemed to include leadership of the System engineering process, co-ordination of the design process, configuration management of the System design, System and subsystem interfaces and all associated documentation including general technical direction.

37.5.2 System Integrator

The Infraco shall perform the system integrator role with the aim of meeting the objectives of system integration as set out in this Section. This responsibility shall exist in all phases of the contract from initial requirements analysis, final sign-off of the ETN for operational use and during maintenance.

The Infraco shall be responsible for the practicalities of how the role of system integrator shall be executed, however as a minimum the role is deemed to include the management of the following activities:

- Systems assurance;
- Electromagnetic compatibility including stray current;
- Electromagnetic interference and any associated immunisation of Network Rail signalling systems or assets;
- Environmental issues – noise and vibration;
- System acceptance inclusive of testing and commissioning and training;
- Inter-contract integration;
- Third party issues and consents;
- System safety; and
- Verification and validation.

The Infraco shall:

- Produce a comprehensive system integration management plan, to be implemented and regularly updated by the Infraco throughout the duration of the Infraco Works. Such a plan shall form a fundamental part of the Infraco's overall operational & maintenance plan and design & implementation plan.
- Establish and document appropriate arrangements for the identification, management and monitoring of system integration at the scheme, system, and sub-system levels;

- Provide demonstrable assurance throughout the technical development, procurement and implementation of the ETN that the system and sub-systems form an integrated whole (both in terms of physical, functional and organisational fit, and the operation performance and dependability)

- Identify and integrate the System and all systems as defined in these Employer's Requirements. and equipment being provided under for the ETN project together with, subsystems and equipment provided by others as detailed in 37.4.

- Maintain the integrity of the scheme configuration; and

- Provide and demonstrate compliance and traceability between the scheme requirements and the design and implemented solution and evidence to support the phased and final cases for safety.

All Deliverables shall be:

- submitted in soft copy as required by **tie**;

- Produced in accordance with the ISO 9000 series and in a format approved by **tie**;

- Clearly written, without jargon, with terminology defined; figures, data, calculations and information used shall be clearly traceable and justified; all assumptions shall be stated and justified; and

- Be updated as necessary throughout the Term or as requested by **tie**.

38 Location Specific Requirements

The requirements set out in this section of the Employer's Requirements are mostly applied either system wide or common to particular elements throughout the ETN. The principal exceptions are in relation to the Depot, the Specific Agreements made during the Parliamentary process and the Third Party Agreements as detailed in Schedule 13 (Third Party Agreements). Specific requirements have been identified through the design process. These have been developed by the SDS Provider through the design process over the past years, in particular the following processes:

- The SDS design process, preliminary and detailed (still ongoing) including (in no specific order and not limited to;
- Initial briefing from **tie** and their designers from the Parliamentary stage on issues within the STAG drawings and that had arisen subsequently, either during or in parallel with the Parliamentary process;
- Consultation with CEC as Promoter/Undertaker, as Planning Authority and with their Transport function, including as Roads Authority;
- Consultation with Stakeholders, including major bodies such as BAA, RBS, New Edinburgh Limited, Network Rail and First Scotrail, Historic Scotland, the World Heritage Trust, Forth Ports, and the emergency services. Note that some of these have Agreements as referred to above, but that further consultation and the passage of time has identified additional, changed and/or more detailed requirements to those set out in the Agreements;
- Consultation with other affected landowners, who may not have specific design requirements built into Agreements, as referred to above;
- Consultation with the Operator and with TEL (including Lothian Buses);
- Consultation with HMRI;
- Consultation with other affected bodies such as SEPA, Scottish Power, and the other Utilities;
- Specific consultation with frontagers;
- Specific consultation with general interest groups, relating to e.g. environmental matters, disability issues and cycling;
- Consultations with those submitting planning applications along the tram route;

- Public consultation.

39 Project Programme

39.1 Introduction

This Section of the Employer's Requirements provides an account of the programme restrictions that will impact on the Programme. The Section also contains details of the format in which programmes should be submitted and how costs should be broken down in the Work Breakdown Sheet.

39.2 Key Dates

- Key dates in respect of the Edinburgh Tram Network and the provision of the works, services and supplies by the Infraco are set out below. The tram depot at Gogar shall be complete and commissioned ready to accept first tram delivery by the end of November 2009.

Delivery into service for Phase 1a and Phase 1b shall bein accordance with the Programme.

In addition to the Programme dates included above, there are further Programme restrictions within which Infraco must work. These are constraint dates which shall not necessarily affect the whole Works but may do so. Infraco shall take due cognisance of these and the Programme dates outlined above. The constraint dates are as listed below:

- Table of overall Programme Constraints;

Constraint	Dates
Embargos	August Embargo – from the first Sunday in August until the first Sunday in September Christmas Embargo – from the Thursday preceding the first Sunday in December until the first working day of the New Year annually
MUDFA	Latest revision of programme as agreed with **tie** through formal progress meetings.
Design	Latest revision of programme as agreed with **tie** through formal progress meetings.
Others	All other Constraints as shown in Schedule 13 – Third Party Agreements, Code of Construction Practice and Network Rail Possessions

Table 88 – Table of overall Programme Constraints

- Further working time restrictions are imposed on the Infraco by the Construction Code of Practice;

- Network Rail potential possession dates..

39.3 Basis for Programme

- Infraco shall base its programme on the project management requirements at 12 of these Employer's Requirements;

- The Work Breakdown Structure (WBS) for building and coding the programme that is to be used to develop the Infraco programme is that used in **tie**'s master programme;

- The P3e Activity Code Dictionary (Mandatory Codes as below); and

39.4 Third Party Agreements

Infraco shall include these constraints and obligations resulting from Schedule 13 – Third Party Agreements. Infraco shall demonstrate to **tie** that these constraints and obligations have been considered and resolved in the programme.

tie acknowledge their supporting role in the delivery of the obligations contained within these Third Party Agreements.

39.5 P3e Activity Code Dictionary (Mandatory Codes)

The following codes shall be used by the Infraco in the preparation and development of their programme. These codes can only be modified with the express permission of **tie**.

Activity Code		Description
Geographical Sections		
01	Section 01	Newhaven Road to Haymarket
02	Section 02	Haymarket Corridor
03	Section 03	Haymarket to Granton Square
04	Section 04	Granton Square to Newhaven Road – (Future Development)
05	Section 05	Roseburn Junction to Gogar
06	Section 06	Gogar Depot
07	Section 07	Gogar to Edinburgh Airport
08	Section 08	Ingliston Park & Ride to Newbridge – (Future Development)
Intermediate Geographical Sections		
01A		Newhaven Road (inclusive) to Foot of the Walk (exclusive)
01B		Foot of the Walk (inclusive) to McDonald Road (exclusive)
01C		McDonald Road (inclusive) to Princes Street West (exclusive)
01D		Princes Street West (inclusive) to Haymarket (exclusive)
02A		Haymarket (inclusive) - Roseburn Junction (inclusive)
03A		Roseburn Junction (exclusive) to Crewe Toll (inclusive)
03B		Crewe Toll (exclusive) to Caroline Park (inclusive)
03C		Caroline Park (exclusive) to Granton (inclusive)
04A		Granton (exclusive) to Lower Granton Road (inclusive) - Future Development
04B		Lower Granton Road (exclusive) to Newhaven Road (exclusive) - Future Development
05A		Roseburn Junction (exclusive) to Balgreen Road (inclusive)
05B		Balgreen Road (exclusive) to Edinburgh Park (inclusive)
05C		Edinburgh Park (exclusive) to Gogarburn (inclusive)
06A		Gogar Depot
07A		Gogarburn (exclusive) to Edinburgh Airport (inclusive)
08A		Ingliston Park & Ride to Newbridge North - Future Development

Sub-Section (Tram Stop)

00	Intermediate Section Wide
01	Depot
02	Depot Stop (exclusive) - Gogarburn (inclusive)
03	Gyle (exclusive) - Depot Stop (inclusive)
04	Gogarburn (exclusive) to Ingliston Park & Ride (inclusive)
05	Ingliston Park & Ride (exclusive) to Edinburgh Airport (inclusive)
06	Edinburgh Park Central (exclusive) - Gyle (inclusive)
07	Edinburgh Park Station (exclusive) - Edinburgh Park Central (inclusive)
08	Bankhead (exclusive) - Edinburgh Park Station (inclusive)
09	Saughton Road North (exclusive) - Bankhead (inclusive)
10	Balgreen Road (exclusive) - Saughton Road North (inclusive)
11	Murrayfield Stadium (exclusive) - Balgreen Road (inclusive)
12	Roseburn Junction (exclusive) to Murrayfield Stadium (inclusive)
13	Haymarket (inclusive) - Roseburn Junction (inclusive)
14	Shandwick Place (inclusive) - Haymarket (exclusive)
15	Princes Street West (inclusive) - Shandwick Place (exclusive)
16	St. Andrew's Square (exclusive) - Princes Street West (exclusive)
17	Picardy Place (inclusive) - St. Andrew's Square (exclusive)
18	McDonald Road (inclusive) - Picardy Place (exclusive)
19	Balfour Street (inclusive) - McDonald Road (exclusive)
20	Foot of the Walk (inclusive) - Balfour Street (exclusive)
21	Bernard Street (inclusive) - Foot of the Walk (exclusive)
22	Port of Leith (inclusive) - Bernard Street (exclusive)
23	Ocean Terminal (inclusive) – Port of Leith (exclusive)
24	Newhaven Road (inclusive) - Ocean Terminal (exclusive)
25	Roseburn Junction (exclusive) to Roseburn (inclusive)
26	Roseburn (exclusive) - Ravelston Dykes (inclusive)
27	Ravelston Dykes (exclusive) - Craigleith (inclusive)
28	Craigleith (exclusive) - Telford Road (inclusive)
29	Telford Road (exclusive) - Crewe Toll (inclusive)
30	Crewe Toll (exclusive) - West Pilton (inclusive)
31	West Pilton (exclusive) - Caroline Park (inclusive)
32	Caroline Park (exclusive) - Saltire Square (inclusive)
33	Saltire Square (exclusive) - Granton Square (inclusive)
34	St. Andrew's Square

Discipline Codes

ACCB	Accommodation and Boundary Works
APPR	Approvals
APPP	Prior Approvals – Detail Design
APPT	Technical Approvals – Detail Design
ARCH	Architecture
AUXI	Auxilliary Power
BLDS	Buildings
BRDG	Bridges
CECS	CEC Services
CHAR	Charette Changes
COMM	Commissioning
DASB	Design – As Builts
DEMO	Demolition
DEPO	Depot
DRAN	Drainage
EART	Earthworks / Embankments
ELEC	Electricity
ENVI	Environmental
GASS	Gas
GEOT	Geotechnical
HIGH	Highways
HMRI	Railway Inspectorate
JNCS	Junctions
LAND	Landscaping
LIGH	Lighting
MANA	Management
MECH	Mechanical
MILE	Milestones
MISC	Miscellaneous
MODL	Modelling
MULT	Multi-Discipline
NETR	Network Rail
OHLE	OHLE
OTHW	Other Works
PLAT	Platforms
POWR	Power (Traction)
ROAD	Roads / Paths / External Works

SEWR	Sewerage
SIGN	Signalling
STAK	Stakeholder
STRL	Street Lighting
STRU	Structures / Retaining Structures
SUBM	Submissions
SUBS	Sub-Stations
SURV	Surveys
SYSC	Systems Communications
SYSE	Systems Engineering
TELC	Telecoms (Including Data)
TRAM	Tram Vehicles
TRCK	Track
TRMS	Tram Stops
TROS	Traffic Order
TTRO	Temporary Traffic Order
TUNN	Underpasses / Tunnels
UTIL	Utilities
WATR	Water Supply

Phase Codes

D	DEVELOPMENT (Management)
L	LAND & PROPERTY (Management)
J	JRC (Management)
S	SDS DESIGN
ID	INFRACO DESIGN
M	MUDFA (Utilities - Construction)
A	ADVANCED WORKS (Construction)
I	INFRACO (Construction)
T	TRAMCO (Construction)
W	SYSTEM WIDE As Built Design
P	PROJECT WIDE

Scope Type Codes

O	Original Scope
A	Approved Change to Original Scope
U	Unapproved Change to Original Scope

Line Codes

00	Common
1a	Phase 1a - Airport to Newhaven Road
1b	Phase 1b - Roseburn Junction to Granton Square
02	Phase 02 - Granton Square to Newhaven Road
03	Phase 03 - Ingliston Park & Ride to Newbridge North - Future Development

40 Maintenance

40.1 Scope

The scope of this section is to define the maintenance requirements with which the Infraco must comply.

It is anticipated that the Edinburgh Tram Network will have been delivered, tested and commissioned and taken into operation in accordance with the other parts of these Employers Requirements.

The maintenance scope is to maintain the delivered Edinburgh Tram Network functionality for the Term according to this Section of the Employer's Requirements and the Agreement.

40.1.1 General

The Infraco maintenance responsibilities during the Term are detailed here and apply to both the Edinburgh Tram Network infrastructure and Trams. This section also details the Infraco's obligation to develop a maintenance strategy and plan for the Edinburgh Tram Network as a whole, for delivering a maintenance service. The strategy and plan shall include planned inspections and interventions, lifecycle replacement and response to unplanned equipment failures and damage for whatever reason. For the avoidance of doubt, in accordance with the Infraco Agreement, repair of damage due to accidents, vandalism, graffiti, theft, derailments, external influences, force majeure, and repair of damages due to improper handling or operation of the system, where this is not the responsibility of Infraco, entitles Infraco to payment for additional labour and material required in accordance with the Schedule of Agreed Prices.

In response to these requirements the Infraco shall develop a maintenance strategy to support and enable the Edinburgh Tram Network to maintain the performance standards, and a Maintenance Plan for all Infrastructure and Tram systems and elements under their responsibility, that make up the Edinburgh Tram Network. The Maintenance Plan shall be submitted to **tie** and reviewed and agreed in accordance with the Review Procedure.

The Infraco's performance in delivering effective maintenance will be measured, monitored and managed through a combination of the key performance indicators and availability criteria, and assessed by **tie** through a series of qualitative tests in accordance with the Agreement.

40.1.2 Overall Objectives

The main objective of the Edinburgh Tram Network is to provide a safe, reliable, punctual, clean, easily accessible, comfortable and environmentally friendly transport service.

The Maintenance Plan shall form part of the Infraco integrated management system. This shall also include the following objectives, procedures and processes:

- The Parties shall co-operate to achieve the aims under the Agreement;
- The Infraco shall demonstrate how it will meet the Employer's specific requirements under the Infraco Agreement, particularly the requirements for the availability of the ETN and defined sub-systems;
- The Infraco shall manage all their Infraco Parties to ensure they fulfil the requirements of their contracts;
- The Infraco shall ensure that the activities of all Infraco Parties do not compromise the operations, safety and life expectancy of the ETN;
- The Infraco shall set up and adhere to schedules and programmes for all planned work, including adherence to the relevant Operations & Maintenance Specifications and Manuals provided by Infraco;
- The Infraco shall in discharging its obligations minimise any downtime on the system for the Operator;
- The Infraco shall co-operate with **tie** and interfacing parties including the Operator, CEC, Network Rail shall co-operate and, in particular, shall support any obligations they respectively have under their safety management system;
- The Infraco shall be aware of, and be compliant with Law and standards governing operation and maintenance of tram network infrastructure, systems, equipment, and any changes thereto; and
- The Infraco shall establish and maintain lines of communication with all interfacing and affected parties by means of scheduled meetings, consultation, notices, and when required by tie publicity, in regard to maintenance works.

Each year the Infraco shall plan and undertake programmes to review and improve the levels of system availability, safety, performance, and delivery of the infrastructure and trams. The Infraco shall develop a performance improvement plan which shall be developed in conjunction with the Operator and shall be included in future issues of the infrastructure maintenance plan. Infraco shall update the Maintenance Plan in the light of operational experience and resubmit for approval in accordance with the Review Procedure in Schedule 14 of the Agreement.

The Infraco performance payment regime set out in Schedule 7 of the Agreement shall provide a financial incentive for Infraco to provide reliable systems and assets for operation and to undertake effective maintenance of the Edinburgh Tram Network.

40.2 Infrastructure Maintenance Requirements

40.2.1 Purpose

This Infrastructure Maintenance Requirements section identifies the output specification that the Infraco shall meet. This includes delivering planned preventative (cyclical), life cycle and corrective maintenance to the infrastructure of the Edinburgh Tram Network and all relevant plant and equipment for which Infraco is responsible. The Infrastructure Maintenance Plan, which shall be developed by Infraco in response to these Requirements, shall specify objective plans and specifications for maintenance from the pre-operational period and over the Term and shall contain a strategy complying with 40.2.4 of this Section. These Employer's Requirements may be reviewed as necessary during the operational period by agreement with **tie**. The Infrastructure Maintenance Requirements shall be read in conjunction with the other sections of these Employer's Requirements and with such 'as-built' technical documentation, design standards and Operation & Maintenance standards and manuals as are developed by the Infraco.

The Infrastructure Maintenance Plan shall be a fully controlled issue document. Updates shall be shown as a draft version until these are agreed by **tie**. It shall take into account all statutory, regulatory and contractual requirements in force at the time of issue.

40.2.2 Scope

The Infrastructure Maintenance Plan shall cover all maintenance activities, including but not exclusively, the response to unplanned equipment failures and damage for whatever reason, to the infrastructure, plant and equipment that make up the Edinburgh Tram Network. The following responsibilities matrix identifies the general scope for which the Infraco is responsible. The Infraco responsibility for Depot Plant and Equipment maintenance is identified in Table 83 - Depot Plant and Equipment to be Provided.

The Infraco detailed responsibilities in respect of road related obligations are contained in table 90 – Roads, structures in table 92 – Structures (as carried out by the Infraco or others) and landscaping (trees and vegetation).

Table 89 – Infrastructure and Equipment Responsibilities Allocation Matrix

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Tram Stop Structure																
Platform surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Platform Inclined Approach		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Canopy		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Inside surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Internal Roof surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External Roof surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Integral Lighting		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Internal seating		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Tram Stop Furnishings																
Stop Name Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Static Information Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Guard Rails/Barriers (as applicable)		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Lighting Columns		N/A	N/A	N/A	✗	✗	✗	✓	✗	✗	✓	✗	✗	✗	✗	✓
Lighting Lanterns		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Litter Bins		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External seating		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Platform Edge White Line		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Advertising Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Stop Equipment																
CCTV Cameras		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Public Address Loudspeakers		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Hearing Loops		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Passenger Information Displays		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Passenger Alarm/Help points		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Ticket Vending Machines (maintained & serviced by TEL)		N/A	N/A	N/A	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓
Drainage (Interface defined in Table 93)		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Trackside Equipments																
Stop Equipment Cabinets		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Stop Equipment Cabinet Equipment		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Traction Isolator Cabinets		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Traction Isolator Cabinet Equipment		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Point Control Cabinets		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Point Control Cabinet Equipment		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Point Heater Cabinets, Point Heaters & Controls		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Road Junction Cabinets		N/A	N/A	N/A	✘	✘	✔	✘	✘	✘	✘	✘	✘	✘	✔	✘
Road Junction Cabinet Equipment		N/A	N/A	N/A	✘	✘	✔	✘	✘	✘	✘	✘	✘	✘	✔	✘
Point Machines (including Manual Control)		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
OLE Contact Wire & Supports		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
OLE Poles		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
OLE Pole mounted Equipments		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
OLE Wall Fixings		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
OLE Wall fixed Equipment		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Tram Signal Heads (Roadside)		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✓
Tram Signal Posts (Trackside)		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Signals Posts		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Detector Loops		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Lighting on OLE Masts		N/A	N/A	N/A	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trackside cable ducts		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trackside cables		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Cable drawpits		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Structures (Bridges, Retaining Walls etc)																
Over Bridges See Table 95 for split		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Under bridges See Table 95 for split		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Retaining walls		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Misc Structures		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Swept Path		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Swept Path Markings		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Track																
Trackwork		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Points & Crossings		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Track Drainage		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Field' Stray Current Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Sub Stations																
Sub Station Buildings		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Sub Station Equipments		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Sub Station Compounds		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Sub Station Parking Facilities		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Stray Current Monitoring Points		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Stray Current Equipments		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Earthing Equipments		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Trams																
Free issue' tram mounted equipments		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Trams		N/A	N/A	N/A	✘	✘	✘	✔	✘	✔	✘	✘	✘	✘	✘	✔
Tram saloon & Drivers cabs		N/A	N/A	N/A	✘	✘	✘	✔	✘	✔	✘	✘	✘	✘	✘	✔
Radio																
Portable radios		N/A	N/A	N/A	✘	✘	✘	✔	✔	✘	✘	✘	✘	✘	✘	✔
Radio Base stations		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Landscaping																
Soft landscaping		N/A	N/A	N/A	✘	✘	✘	✔	✔	✘	✘	✘	✘	✘	✘	✔
Hard Landscaping		N/A	N/A	N/A	✘	✘	✘	✔	✔	✘	✘	✘	✘	✘	✘	✔

Floor	Room No.	Description	User Competence Assessor	Used by			Cleaned by			Maintained by			Access Controlled by		
				Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	Transdev
Stores, Workshops and Maintenance Area															
Ground Floor Level		Stores Office Centrally located	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✓	✗
		Heavy Store (Infraco)		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Heavy store (Tramco)		✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Visitors Entrance Hall	n.a	✓	✓	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓
		Workshop Cleaners Room	n.a	✓	✓	✗	✗	✓	✗	✓	✗	✗	✓	✓	✗
		Light Store (Infraco)		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Light Store (Tramco)		✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Infrastructure Workshop		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Dirty Workshop / Machine Shop		✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Clean Workshop (Infraco)		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Clean workshop (Tramco)		✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Lobby	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Male Toilets	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Male Showers	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Female Toilets	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Female Showers	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Staff Corridor	n.a	✓	✓	✓	✗	✗	✓	✓	✗	✗	✗	✗	✗
		Infrastructure Admin	n.a	✓	✗	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Maintenance (Tramco) Admin	n.a	✗	✓	✗	✗	✗	✓	✓	✗	✗	✗	✓	✗
		First Aid	n.a	✓	✓	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓
		Switchroom		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Infrastructure Manager	n.a	✓	✗	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Maintenance (Tramco) Manager	n.a	✗	✓	✗	✗	✗	✓	✓	✗	✗	✗	✓	✗
		Store Room (Cleaners?)	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗
		Staff Entrance Hall	n.a	✓	✓	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓
		Drying Room	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✓	✗
		Tram Batteries		✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Equipment Room		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		UPS Room		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Compressor Room - Air tools		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Tram Maintenance Area		✗	✓	✓	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Maintenance Area Transit Zone		✓	✓	✓	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Inspection Pits		✗	✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗
First Floor office accommodation			n.a	✗	✗	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓
Furnishings - Used, Cleaned, Maintained and Controlled as appropriate															
Chairs, Desks, Tables, Filing cabinets etc			As Appropriate	✗	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
Kitchen and Catering Equipment				✗	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
Reception Desk & Furnishings				✗	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
Control Room Furnishings				✗	✗	✓	✗	✗	✓	✓	✗	✓	✗	✗	✓
Lockers, Coat Rails etc				✗	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
Training Room furnishings (Projector, Screen etc)				✗	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
External															
Depot Yard				✗	✗	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓
Depot Stabling Area				✗	✗	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓
Electrical Sub Station				✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
Power Energy Building (Electric, Gas etc)				✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
Depot Car Park				✗	✗	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Miscellaneous																
Communication & Control links		N/A	N/A	N/A	✗	✗	✗	✗	✔	✗	✗	✗	✗	✗	✗	✔

LEGEND	
	Provided by Tram Maintainer
	Provided by the Infraco
✔	Responsible
✗	Not Responsible

Table 90 – Roads

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
Defects reporting CLARENCE, walking surveys, etc	Rail and rail containment	Infraco			Sharing of information between CEC & Infraco call centres. All part of the routine 28 day inspection, work arising dealt with below
	Tram Stops	Infraco			
	Overhead Line Equipment	Infraco			
	Tram duct access chambers	Infraco			
	Tram vehicle detection loops	Infraco	-	-	
	Non-tram vehicle detection loops	CEC	1 working hour		
	Temporary tram signs	CEC	28 days	-	
	Coloured/textured surfacing for tram	CEC	28 days	-	
	All other road related defects	CEC	28 days	-	
Defect repairs	Rail and rail containment	Infraco			
	Tram Stops	Infraco			
	Overhead Line Equipment	Infraco			
	Tram duct access chambers	Infraco			
	Tram vehicle detection loops	Infraco			
	Temporary tram signs	Infraco			
	Coloured/textured surfacing for tram	CEC		3 months	Resurfacing only to be undertaken when it is agreed that it is required.
	All other road related defects	CEC	-	Emergency* (7 days) Non Emergency (3 months)	* Likely to result in injury (CEC liability, conscious decision by CEC on timescale)
Signals	Tram detection loops and cable to the UTC controller	Infraco		1hr	
	Traffic and tram signal equipment	CEC		4hrs	24 hr response already contracted by CEC.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	Traffic detection	CEC		4hrs	
	CEC Traffic Control Centre	CEC		5mins	Telephone contact with CEC Control Centre except when this is unmanned when Tram control will be able to make a junction call themselves.
Lighting	On OLE poles	Infraco		* 2hr	Response required when 6 or more adjacent lights fail.
	Platforms	Infraco		* 1hr	Response required when 2 or more adjacent lights fail.
	Street Lighting	CEC		* 2hr	Response required when 6 or more adjacent lights fail.
	All other illuminated road signs and bollards	CEC		28 days	
Winter Maintenance	Roads	CEC		* 2hrs	
	Cycleways/footways	CEC		* 2hrs	
	Platforms on-street	CEC		* 2hrs	
	Platforms off-street	Infraco		* 2hrs	
Removal of obstructions	On road/footway including non-segregated tramway path, platforms and platform ramps	CEC		* 1hr	May involve Lothian and Borders Police
	On tramway (segregated sections)	CEC		*1hr	
	On platform (segregated sections)	CEC		*1hr	
CCTV	For roads	CEC		28 days	
	For tram	Infraco		2 days	

Table 91 – Roseburn Corridor

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
Defects reporting CLARENCE, walking surveys, etc	Cycleway/footway	CEC	28 days		
	Retaining walls	CEC	28 days		
	Lighting	CEC	28 days		
	Embankment/cutting and its vegetation	CEC	28 days		
	Kick-rail	Infraco			Demarcation between areas
	Fencing – between cycleway/footway and	Infraco			
	tramway - all other fencing	CEC			
	Noise Barriers	Infraco			If required and do not form a part of the perimeter fencing.
	Grass track	Infraco			
	Drainage	Infraco			
	Tram Stops	Infraco			
	Overhead Line Equipment	Infraco			
	Tram duct access chambers	Infraco			
	Tram vehicle detection loops	Infraco			
	Temporary tram signs	Infraco			
	Coloured/textured surfacing for tram	Infraco			
Defect repairs	Cycleway/footway	CEC		Emergency* (7 days) Non Emergency (3 months)	
	Retaining walls	CEC			
	Lighting	CEC			

	Embankment/cutting and its vegetation	CEC			
	Kick-rail	Infraco			
	Fencing	Infraco			
	Noise Barriers	Infraco			
	Grass track	Infraco			
	Drainage	Infraco			
	Tram Stops	Infraco			
	Overhead Line Equipment	Infraco			
	Tram duct access chambers	Infraco			
	Tram vehicle detection loops	Infraco			
	Temporary tram signs	Infraco			
	Coloured/textured surfacing for tram	Infraco			
Winter Maintenance	Cycleways/footways	CEC		* 2hrs	
	Platforms	Infraco		* 2hrs	
Removal of obstructions	On cycleway/footway	CEC		* 1hr	May involve Lothian and Borders Police
	On tramway and platform	Infraco		* 1hr	
CCTV	At Tramstops	Infraco		2 days	

Table 92 – Structures

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
Structures	S01 Roseburn Terrace Bridge Existing structure to carry trams and cycles	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance (see Definitions below). Existing deck to be removed by the Infraco and fascia to be incorporated within new structure. The existing abutments will be retained to support the embankments but will not support the new bridge deck. Inspection report available. No major defects noted that would present a future maintenance liability.
	S02 Coltbridge Viaduct Existing structure to carry trams and cycleway	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) and assessed. The existing structure will carry the proposed tramway with a new steel walkway attached to the western elevation. Any defects noted during the inspection will be rectified by the Infraco during the construction of the walkway and new deck slab.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S03 St George School Access Bridge Existing road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance (if CEC own it). Infraco will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides vehicular access over the proposed tramway.
	S04 St George School footbridge Existing footbridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance (if CEC own it). CEC to be responsible for polycarbonate sheets. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides pedestrian access over the proposed tramway.
	S05 Ravelston Dykes Bridge Existing bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. TEL will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides vehicular access over the proposed tramway.
	S06 Craigleith Drive Bridge Existing bridge to carry trams and cycles	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. The structure have been inspected (report is available) and assessed. The structure has capacity to carry the proposed tramway. No major defects were noted.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S07 Holiday Inn Access Bridge Existing road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides vehicular access over the proposed tramway.
	S08 Queensferry Road Bridge Existing road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides vehicular access over the proposed tramway.
	S09 Groathill road South Bridge Existing bridge to carry trams	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. The structure have been inspected (report is available) and assessed. The structure has capacity to carry the proposed tramway. No major defects were noted.
	S10 Telford Road Bridge Existing road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides vehicular access over the proposed tramway.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S11 Drylaw Drive Bridge Existing bridge to be demolished				Structure to be demolished by the Infraco.
	S12 Crewe Road Gardens Bridge Existing road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. Structure to be extended by the Infraco over the proposed tramway. No inspection or assessment has been undertaken. A full set of construction drawings for the structure were provided.
	S16 Victoria dock Entrance Bridge Existing bridge carrying to carry trams and general traffic	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. An inspection of the structure was undertaken (inspection report is available), however, no assessment has been undertaken to date.
	S17 Tower Place Bridge Existing bridge carrying to carry trams and general traffic	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. An inspection of the structure was undertaken (inspection report is available), however, no assessment has been undertaken to date.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S18 Leith Walkway Railway Bridge Existing	Network Rail			The structure has been inspected and assessed (reports are available). The structure has capacity to carry the proposed tramway. The major defected noted during the inspection, leaking water main, has now been rectified. However, the next routine inspection should confirm that no adverse affects have occurred to the substructures.
	S19 Haymarket Station Viaduct New	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.
	S20 Russell Road Bridge New	Infraco			Infraco to be responsible for all maintenance.
	S21A Roseburn Street Bridge New	Infraco			Infraco to be responsible for all maintenance.
	S21B Murrayfield Stadium Retaining Wall New	Infraco			Infraco to be responsible for all maintenance.
	S21C Murrayfield Stadium Underpass New	Infraco			Infraco to be responsible for all maintenance.
	S21D Murrayfield Training Pitches R/W New	Infraco			Infraco to be responsible for all maintenance.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S21E Water of Leith Bridge New	Infraco			Infraco to be responsible for all maintenance.
	S22 Balgreen Road Bridge New	Infraco			Infraco to be responsible for all maintenance.
	S23 Carrick Knowe U/B New bridge carrying trams and cycles	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.
	S24 Saughton Road Bridge Existing WEBS bridge	Infraco			Infraco to be responsible for all maintenance. This structure was constructed as part of the WEBS project. Full construction drawings were supplied to ensure that the structure is integrated into the tram system without any modification. An assessment report confirming this is available.
	S25 Broomhouse Road Bridge Existing WEBS bridge	Infraco			Infraco to be responsible for all maintenance. This structure was constructed as part of the WEBS project. Full construction drawings were supplied to ensure that the structure is integrated into the tram system without any modification. An assessment report confirming this is available.
	S26 South Gyle Access Bridge New tram only bridge	Infraco			Infraco to be responsible for all maintenance.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S27 Edinburgh Park Station Bridge New tram only bridge	Infraco			Infraco to be responsible for all maintenance.
	S28 A8 Underpass New	Infraco			Infraco to be responsible for all maintenance.
	S29 Gogar Burn Bridge New	Infraco			Infraco to be responsible for all maintenance.
	S30-31-34 Gogar Culverts New	Infraco			Infraco to be responsible for all maintenance.
	S32 Depot Access Bridge New road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.
	S33 No longer required				
	W01 Lindsay Road Retaining Wall New	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.
	W02 Ferry Road Retaining Wall New	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.
	W03-04 Russell Road Retaining walls 1&2 New	Infraco			Infraco to be responsible for all maintenance.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	W08 Baird Drive Retaining wall New	Infraco			Infraco to be responsible for all maintenance.
	W09 Balgreen Road Retaining wall 1 New	Infraco			Infraco to be responsible for all maintenance.
	W11 Bankhead Drive Retaining. Wall New	Infraco			Infraco to be responsible for all maintenance.
	W14 & W15 Gogar Burn Retaining Walls New	Infraco			Infraco to be responsible for all maintenance.
	W16 A8 Retaining Wall New	Infraco			Infraco to be responsible for all maintenance.
	W17 Depot Internal Retaining Walls New	Infraco			Infraco to be responsible for all maintenance.
	W18 Murrayfield Tramstop Retaining Wall New	Infraco			Infraco to be responsible for all maintenance.
	W19 Gyle Stop Retaining Wall New	Infraco			Infraco to be responsible for all maintenance.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	W100 Roseburn Corridor Retaining. Structures New	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.

Clarification of terms used in Tables 89 to 92 inclusive of the Employers Requirements.

Tram Stop:
Shall comprise: shelters, lighting, passenger information, platform and ramps including the paving, kerbing/cope and soft landscaping, drainage, cleansing and waste removal, seats, cycle racks (where these are directly associated with the tramstop, ticket machines and waste bins).

Rail and Rail Containment

Shall comprise: the rail and rail drainage (up to the point where this ties in to existing road drainage), and the structural elements that contain its permanent placement, and any associated road repairs where these are a consequence of the tramway maintenance. In the case of Roseburn Corridor it shall also include the grass track, up to and including the kick-rail and fencing separating the tramway from the cycleway/footpath.

Overhead Line Equipment

Shall comprise: the pole, the overhead power line and any necessary equipment to allow the permanent placement of the overhead power line.

Tram duct access chambers

Shall comprise: chamber/manholes and permanent covers to access points to the tram related duct access points along the route.

Temporary tram signs

Shall comprise: traffic signs, including temporary speed restriction signs, which are erected from time to time for limited periods over and above permanent tram signs.

Coloured/textured surfacing for tram

Shall comprise: specialist coloured and textured surfacing, including skid-resistant and edge demarcation surfacing, which is laid specifically for hazards directly associated with the tram track over and above that required for general traffic.

Grass Track

Shall comprise: the rail and rail drainage and the structural elements that contain its permanent placement, and any associated repairs, all within the boundaries defined by kick-rails and/or fence/retaining walls.

Structures

"Day-to-day" maintenance of structures will comprise cosmetic treatments including cleaning, the removal of graffiti and localised repairs of paintwork where this is required as a result of graffiti removal.

"Structural maintenance" of any structures will comprise renewal of waterproofing and associated road surfacings; repairs to brickwork, masonry, concrete or steel; repairs to facings and cladding; repair and/or replacement of bearings; repairing 3rd party damage; and any other maintenance activity not mentioned in the "day-to-day" activities above. Where this will require the removal of the rails or its containment is required prior to the structural maintenance then this will be undertaken in all instances by Infraco and reinstated upon completion of the works.

Where activities are the obligation of the Infraco or the Infraco's Sub-contractors, or the Infraco is supporting other parties' roads, structures and Roseburn Corridor obligations, Infraco shall ensure that such obligations are fulfilled, to ensure the safety of the Edinburgh Tram Network is not degraded and that the ability of Infraco, Tram Maintainer, **tie** and the Operator to achieve their objectives is not frustrated.

40.2.3 Maintenance Approach

The approach to maintenance of the Edinburgh Tram Network (**"ETN"**) shall be as follows:

- All day to day maintenance and inspection activities and planned life cycle renewals and refurbishments shall be planned, organised, undertaken and safely handed back to the Operator in an operational condition as required by the Infrastructure Maintenance Plan and the specifications (against which the ETN is built) and procedures;

- All activities carried out under the scope of the Infrastructure Maintenance Plan shall be the responsibility of the Infraco manager responsible for the maintenance obligations;

- All day to day maintenance, inspection activities and life-cycle replacement works shall be carried out in accordance with agreed procedures and method statements, in the knowledge of, and in liaison with, the Operator;

- Infraco will maintain system interfaces (e.g. Wheel / Rail or Pantograph / OLE), to the best effect for the ETN as a whole.

- Maintenance and life-cycle replacement works shall be classified as planned or unplanned activities arising from condition assessment which has been determined by planned inspection and testing;

- Unplanned maintenance activities shall include rapid response to unplanned equipment failure and damage from whatever cause, and shall be monitored in accordance with the fault rectification times. The approach to each of these categories will be different but there shall be two managers (the Tram Maintainer and the Infraco, with one to be designated as the lead manager) liaising with the Operator's engineering manager, who are responsible for undertaking works in their area of responsibility. These managers shall be able to call upon the services of contractors to carry out all or part of these works.

40.2.4 Maintenance Strategy

Preventative Maintenance

The Infraco shall schedule interventions such that all components that make up the infrastructure shall be subject to checks, repairs and conditioning treatments in order to maximise the asset and component lives, and in advance of critical tolerances being reached which would have affected operation, or have reduced their performance in the service for which they were designed.

Two types of preventative maintenance shall be undertaken:

- Systematic preventative maintenance that follows a predetermined schedule based upon time, usage and data gained through operational and maintenance experience such as:

  - Condition inspection and safety checks; for example, grooves for excessive wear, damage, or debris;

  - Cleaning of equipment and drains;

  - Functional tests to reveal faults; and

  - Adjustments to enable optimum operation.

- Conditional preventive maintenance including carrying out planned inspections to establish if the performance or operation of infrastructure sub systems are within pre-determined measurable parameters such as:

  - Vibration and noise levels ;

- Temperature thresholds in substation transformers etc.;
- Wear limits on rail, and wire height and stagger, etc.;
- Including non-destructive testing as appropriate; and
- Points operation times and geometric limits.

The Infraco shall take the necessary corrective maintenance action arising as a consequence of the conditions where these are out of tolerance.

Reactive and Fault Correction Maintenance

The Infraco shall repair or change damaged or faulty equipment, following the observation of any failures and/or the occurence of incidents. This involves two kinds of intervention:

- Breakdown in service requiring specific intervention shall be limited to re-establishing safe, robust and sound operating conditions. This shall require a specific intervention, to be carried out by Infraco staff within the limits of the equipment and operating rules and procedures agreed with the Operator and **tie**.
- Repairs: this covers interventions that shall be undertaken following incidents or failures that occur in operation, potentially involving a longer stoppage of equipment including overhauls of parts of a sub-system or section of the line. This is an intervention of lasting character, carried out by maintenance staff or contractors. After repair, if equipment has been replaced, then it shall conform to its original specifications or such alternative standards as agreed with **tie**; or in the event that the equipment is reconditioned then it shall conform with allowable tolerances.

Response times for reactive and fault correcting maintenance will be based on the potential impact of the incident or failure. A response to an incident is to be initiated within the time limits specified in Clause 52 of the Agreement. Fault Correction times are detailed in the table on the following page.

Table 93 - Fault Correction Requirements

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description
1	1 hour to attend and make safe and functional. 2 hours to Breakdown Intervention	2 hours to attend and make safe and functional. Rectified by 07:30	Critical issue such as Health & Safety risk, or failure halting the operation of the tram network in whole or part thereof, failure of major system
2	2 hours	3 hours	Failure impacting the punctuality of the tram network, or having potential to impact.
3	8 hours	9 hours	Failure or incident not having immediate impact on network operation, but impacting the quality of the Transport Services as monitored by the Edqual Service elements in Schedule 7 of this Agreement
4	1 week	1 week	Failure or incident not impacting network operation, nor quality of the Transport Services as monitored by the Edqual Service elements in Schedule 7 of this Agreement
Tramstop lighting Fault	2 days	2 days	
Tramstop telephone Fault	3 days	3 days	
Fault causing the lift at Murrayfield Tramstop or depot to be out of operation	6 hours	6 hours	

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description
Tramstop electronic passenger information display Fault	2 days	2 days	
Tramstop PA system Fault	24 hours	24 hours	
Tramstop CCTV Fault	2 days	2 days	
Defect, fault or other disrepair that restricts access to all or part of a Tramstop or otherwise interferes with its use	1 day	1 day	
Defect, fault or disrepair causing a trip hazard at an Tramstop (including unintended changes of floor levels or protrusions from the floor of more than 25mm)	24 hours	24 hours	
Defect degrading system access to	6 days	6 days	

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description
below DDA requirements			
Broken glass at a Tramstop or the depot	2 hours	2 hours to attend, make safe and functional. Rectified by 07:30	
Overflowing / damaged gutter at a Tramstop or the depot	24 hours	24 hours	
Structural defect, fault or other disrepair at a Tramstop or the depot	28 days	28 days	
Any other defect, fault or other disrepair at a Tramstop or the depot (including in relation to shelters, seats, canopies, signage, cycle parking, litter bins and poster cases) but excluding blocked	5 days	5 days	

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description
drains, overgrown vegetation and fencing faults.			
Blocked drain other than on a street running section of the Edinburgh Tram Network System	24 hours	24 hours	
Blocked drain on a street running section of the Edinburgh Tram Network System	2 hours	By 07:30 if notified between 22:01 and 05:30	
Overgrown vegetation	3 days	3 days	
Defect, fault or disrepair fencing such that access to the track or buildings and equipment is not prevented	6 hours	6 hours	
Defect, fault or disrepair in respect of a Monitoring Point or any other	24 hours	24 hours	

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description
electronic monitoring equipment			
Structural defect, fault or disrepair other than at a Tramstop or the depot	28 days	28 days	
Any other defect, fault or disrepair other than at a Tramstop or the depot	2 days	2 days	

Note:

The foregoing table concentrates on elements not covered by the punctuality and qualitative criteria of the Performance Monitoring Regime set out in Schedule 6 to the Agreement.

The Infraco shall develop an electronic system for the management of reactive and faulting maintenance. The system shall be based upon the electronic Event Logger which will be situated in the Control Centre and shall enable the accurate analysis, reporting and logging of faults and other reactive maintenance requirements (including cleaning) including the time and date when they were reported and the time and date when they were cleared. Infraco shall manage all faults through to a satisfactory resolution and will provide a full record and audit trail including details of how the resolution was achieved and the time taken to achieve it. The full details of the system to be agreed with **tie** and shall form part of the asset management system as referred to in these Employer's Requirements.

Life Cycle Maintenance

The Infraco shall refurbish and replace elements of infrastructure before its performance deteriorates below the design, stated tolerances or equipment has become obsolete and/or is incurring disproportionately high maintenance costs as assessed by the Infraco and proposed to **tie**.

The initial lifecycle replacement plan will be based upon the manufacturer's stated design life, Infraco's previous experience, and assumptions on the impact of designed use.

Subsequent annual updates will take into account condition and reliability data gathered during the inspection, maintenance and operational use.

Further Maintenance Activities

In respect of the ETN, the Infraco shall in addition to preventive, life cycle and reactive maintenance undertake the:

- Removal of graffiti;
- Repair vandalism and accident damage; and
- Cleaning.

Repair of vandalism and accident damage and removal of graffiti will be undertaken by the Infraco and, where this is not caused by the Infraco or any of the Infraco Parties, the Infraco shall be entitled to payment for additional labour and material required in accordance with the Schedule of Agreed Prices.

40.2.5 Organisation, Training and Competency

Staffing Plan, Recruitment and Training Plan

The description of the Infraco organisation for all aspects of maintenance and all management and administrative support shall be set out in Infraco human resources plans (staffing plan and recruitment and training plan). These documents shall contain all details of:

- Organisational structure;
- Job descriptions and required competencies;
- Standard training courses;
- Compliance with all appropriate Law and regulations;
- and the procedures required to:
  - Recruit staff to fulfil the various employee roles and maintain the required establishment;
  - List the scope of items to be sub-contracted by the Infraco;
  - Monitor the performance and competency of maintenance staff whether direct labour or contractors; and
  - Secure and review the required competencies and associated training courses.

The maintenance documents submitted in draft form with the Infraco Proposals shall subsequently be developed and agreed with **tie** and Operator as part of the Infraco Works. This will include the identification of key staff. These documents shall be reviewed and updated when necessary, and at least annually.

It is to be expected that there will be an element of staff turn-over during the contract period. The Infraco shall include in the plan their process of ensuring quality is maintained and knowledge is managed and maintained. The proposed replacement of any key staff member of Infraco shall be notified to **tie** and to the Operator.

40.2.6 Quality, Health, Safety and Environmental

Health and Safety

For all matters relating to Health and Safety, Infraco shall produce and maintain a Safety Management Plan, which shall comply with the requirements of ISO18001 and be certified by an ISO approved body. The Safety Management Plan shall be reviewed and updated when necessary, and at least annually.

Environmental and Sustainability Management

For all matters relating to environmental and sustainability management Infraco shall produce an Environmental Management Plan. This shall set out the various environmental legal and regulatory requirements that Infraco shall comply with and the Infraco standards, processes and procedures that will enable compliance with such environmental, legal and regulatory requirements, to also meet its obligations under the various agreements to which it is a party, the **tie** Environmental and Sustainability policy and shall in all respects comply to the requirements of ISO 14001 and be certified by an ISO approved body.

The Environmental Management Plan shall be submitted to **tie** prior to completion of Section A on Site, and shall be reviewed and updated when necessary, and at least annually.

Quality

The Infraco HSQE Manager shall be responsible for providing a Quality Management Plan within the Quality Management System which shall comply with the requirements of ISO 9001 and be certified by an ISO approved body. The Quality Management Plan shall be available at least three months in advance of any maintenance activities commencing. The Infraco HSQE Manager shall be responsible for auditing and inspecting the requirements of all Infraco plans, processes and procedures.

The Quality Management Plan shall be submitted to **tie**, and shall be reviewed and updated when necessary, and at least annually.

Safety

The Infraco shall develop, to the satisfaction of **tie**, the Independent Competent Person as defined under the ROGs regulations, HMRI and other Approval Bodies, a generic safety management system for the commissioning and operation of the ETN that complies with the ROGs regulations.

The generic safety management system shall be capable of development to a full and final version prior to commencement of commissioning of the ETN.

The preliminary work on the safety management system will include the production of a safety justification framework document that will indicate the likely format and some of the detail of the eventual Case for Safety that the Operator, Infraco and Tram Maintainer will be required to present to, and gain approval from, the Competent Person as defined under the ROGs Regulations.

The framework document will be drafted in conjunction with the Operator and **tie** and in consultation with the Competent Person, as defined under the ROGs Regulations and other relevant Approval Bodies describing how system safety is achieved through system design supported by system maintenance and system operation. It shall embrace the following subject areas:

- Description of system design, maintenance and operation: Introductory section giving general description of the ETN, identification of safety responsibilities and reporting mechanisms;
- Arrangements during construction and initial access to the lines: organisation and management of working staff, safety, emergency arrangements, identification of staff, insurance, safety audit, arrangements for keeping and distributing records;
- Arrangements for testing and staff training: organisation and management of staff, safety arrangements including staff working on the tramway, emergency arrangements, identification of staff, insurance, fault analysis, safety audit, arrangements for keeping and distributing records;
- Infrastructure management: track, speed limits, public crossings (surface and bridges), fencing, Tramstop infrastructure, monitoring and reporting systems;
- Tram operation arrangements: operating arrangements including fitness and training of staff, certification of staff, tram preparation, defect repair and breakdown procedures and communications;
- Tramstop arrangements: access for contractors, control of access and vandalism and security;
- Tram maintenance arrangements: engineering and operational acceptance of tram vehicles, competence of staff engaged on maintenance, quality assurance, technical audit, monitoring, reporting of defects, procedure for imposing operating restrictions, acceptance of trams for the transport services;
- Infrastructure maintenance: inspection procedures, accreditation, control and monitoring, reporting procedures, emergency arrangements, communications, signage and warnings in the operating environment;
- Interfaces with other organisations: liaison with emergency services, HMRI and Roads authorities;

- Risk assessment: assessment of the risks associated with all aspects of the project operations including groups of people most at risk, severity of failure event and likelihood of event occurring;

- Health and safety policy: policy statement, monitoring arrangements, alcohol and drug policy including testing and disciplinary action; and

- Code of practice for working on or near the line;

- Control of safety critical work.

40.2.7 Liaison with tie and Other Parties on Maintenance Related Issues

Infraco Communications Plan

The Infraco shall create a Communications Plan (which shall be agreed with **tie** as part of the finalisation of the Infrastructure Maintenance Agreement) for all matters related to communications between the Infraco, the Operator, Tram Maintainer, **tie**, TEL, CEC and if required by **tie** other third parties.

A Communications Plan shall be submitted to **tie** prior to commencement on Site, and shall be reviewed and updated when necessary and at least annually.

The Infraco shall establish effective lines of communication with the Operator and **tie**, through the control centre and planning staff in order to plan maintenance activities around tram service requirements. The Infraco shall pay particular attention to communication in respect of the planning and undertaking of works having a direct impact on the operation of the ETN, the return to full service following completion of the maintenance and unplanned maintenance activities or repairs covering day to day operations and tie/third party long-term contractual matters.

The Infraco shall provide details of how effective lines of communication with the Operator and **tie** will be set up and maintained throughout the Term. This will include details of how key staff and expertise will be provided "on call" at all times to the Operator in the event of unforeseen breakdowns etc. Infraco shall after liasing with the Operator propose a process for system / equipment handover after the completion of maintenance activity to be agreed with **tie** and a programme of daily meetings to discuss punctuality performance (and associated deductions) and infrastructure availability.

The Communications Plan shall be aligned with that of the Operator and Tram Maintainer to ensure communication in critical areas, such as health and safety management, access arrangements for maintenance and response, and permits to work, are coordinated.

40.2.8 Reporting

Annual Review

Infraco shall prepare an annual review report, "The Annual Review Report". The content of the Annual Review Report shall be agreed with **tie** and address the following, as a minimum:

- Health and safety, environmental and quality annual performance reports and proposals for improvement;
- Annual report on planned, reactive and lifecycle maintenance activities carried out against programme, together with impact of shortfalls and proposals for recovery;
- Overall system performance, trends in condition or failures and recommendations based on learning though the process of delivering maintenance; and
- Summary and classification of complaints and significant events, together with actions taken / recommended.
- Recommendations based on learning though the process of delivering maintenance.

Infraco shall be responsible for arranging each year's Annual Review Meeting, to take place, as nearly as possible, twelve months after the previous year's Annual Review Meeting.

Infraco shall issue the meeting agenda and all required management reports and papers, as agreed with **tie**, no later than five working days in advance of each meeting.

Reporting period review

The reporting period review report shall include comprehensive details to cover as a minimum the following information for the relevant Reporting Period:

- Output from performance measurement system with associated performance deduction calculations as Schedule 7;
- Details of all events after associated with failures to provide Available Infrastructure and Available Trams;
- Health and safety, environmental and quality reports;

- Maintenance report showing progress against Annual Maintenance Plan and detailing the programme for the upcoming eight weeks, including;
    - A statement on planned maintenance, including cleaning, performance during the Reporting Period and any backlog;
    - Report on reactive and fault correcting maintenance, including cleaning, required during the Reporting Period, impact on Tram service, and any wider implications to the service and the Maintenance;
    - Any planned future works to be carried out within the eight week period, howsoever arising, which have the potential to disrupt the operation of the Edinburgh Tram Network service; and
    - Infrastructure condition, failures in the Period and mitigation undertaken in Period and with recommendations and actions to be taken, complaints and any significant events.

Infraco shall schedule the Four weekly Review Meetings no less than one month in advance of each meeting.

Infraco shall issue the meeting agenda and all required management reports and papers, as agreed with **tie**, later than five working days in advance of each meeting.

Records

Infraco shall maintain all records necessary for the effective delivery of the maintenance services. All records shall to be up to date within ten Business Days of the end of the relevant Reporting Period relating to the specific record. Records are to be the property of **tie**, access to the records will be afforded to **tie** within five days of a request being made. Records will be kept for the longer of the Term or 6 years from the day the maintenance service was performed.

The record details, including format, storage medium, recovery procedure, administration and access, are to be proposed within the draft Communication Plan, and discussed and agreed with **tie** in conjunction with the final Communications Plan.

The agreed method of communicating a request will be included within the Communications Plan.

40.2.9 Infrastructure Maintenance Plan - Overview

Infraco shall develop and deliver a Maintenance Plan that ensures that all the Infrastructure assets and equipment safely continue to meet their designed operational performance or specification, meet the availability targets identified within the Contract, and support the achievement of the performance regime.

40.2.10 Development of the Plan

An Infrastructure Maintenance Plan shall be developed by Infraco and submitted to **tie** prior to commencement of maintenance activities. This shall detail how maintenance will be delivered in response to the infrastructure maintenance requirements; where it is not possible to include elements of detail at the time, a development plan will be included, identifying exactly what information is outstanding, and when it will be provided.

The completed Infrastructure Maintenance Plan will be submitted by the date identified in the development plan and agreed with **tie**.

During the operational phase Infraco shall submit to **tie** an annual infrastructure maintenance plan for review and approval three months before the anniversary of the Service Commencement Date of the Edinburgh Tram Network or part thereof. The new plan will detail the planned and life cycle maintenance for the following year in order to provisionally approve planned works. The process of approval is to be agreed with **tie** during the tender stage.

Life Cycle Requirements

A Lifecycle Replacement Plan shall be included within the Infrastructure Maintenance Plan. This will detail all planned lifecycle replacement works over the Term.

The annual updates to the Infrastructure Maintenance Plan will include an updated Lifecycle Maintenance Plan detailing life cycle replacement works until the end of the maintenance period.

The planned maintenance strategy (including cyclical and life-cycle maintenance) should be such that the performance of the Edinburgh Tram Network should never fall below that of the designed operational performance or specification, within the Term.

Reactive Maintenance Requirements

The Infraco Maintenance Plan shall detail Infraco's assumptions on the volume and type of reactive maintenance likely to be experienced in the relevant period, and should detail how their resource planning has been prepared to respond to it.

Frequencies

The Infraco Maintenance Plan shall indicate the frequency and sequence to which maintenance will be undertaken; based upon statutory obligations, manufacturer's and best practice recommendations, Contractor's experience and operational performance and availability requirements.

Maintenance Codes

A standard Work Breakdown Structure, consistent with that defined for the construction phase, shall be established to identify maintenance tasks to various infrastructure sub-systems.

40.2.11 Tools

The Infraco shall maintain and replace as appropriate, a full set of tools sufficient for the maintenance of the ETN in good condition and calibrated where necessary.

40.2.12 Availability and Warranty

The availability requirement for the Edinburgh Tram Network is contained within the performance regime.

Lack of availability of key systems or the late running of trams due to failures which are the Infraco responsibility will give rise to the imposition of performance deductions from the fee payable under Schedule 6. Details of the performance regime are set out in the Schedule 6.

During any warranty period or extended warranty period associated with any part and during the Term (as set out in the Agreement), a robust process shall be in place to manage the return and replacement of parts thus contributing to optimal operational service, whilst optimising the management of warranty claims under the Agreement.

40.2.13 Asset Management System

An integrated asset maintenance management and recording system shall be provided and utilised by Infraco in order for data obtained from the tram and infrastructure sub-systems or other sources to be collated and analysed. This will enable the Infraco to assess safety and performance issues and to facilitate modifications and changes, where necessary, to the maintenance plan and working practices including the asset management system itself.

A computerised asset management system shall be established, in a form to be agreed with **tie**, to facilitate maintenance of the assets and allow data obtained from the infrastructure sub-systems, trams or other sources to be collated and analysed. This will include development of an asset register.. This will enable technical staff to assess safety and performance issues and to facilitate modifications and changes, where necessary, to the maintenance plan and working practices.

In addition to recording all the assets as they arrive on site, the asset management system shall record against each discrete item provided with a serial number:

- Its date of registration;
- Its location(s), including transfers from one site or equipment to another;
- Its maintenance history, with references etc.;
- Its fault history;
- Its maintenance prognosis (when maintenance is next due etc.); and
- Overdue inspection / maintenance.

The functional details of the asset management system will be integrated with the hard copies of the suite of operation and maintenance manuals and comply with the requirements specification for an asset management system.

40.2.14 Work Instructions

Infraco shall verify that they and all sub-contractors have carried out the necessary planning to undertake all proposed maintenance activities in accordance with the Infrastructure Maintenance Plan and all necessary risk assessments, method statements and work instructions.

For each maintenance activity type, detailed work instructions will be broken down against equipment type and artisan skill set to facilitate planning of the work. Each work instruction will provide a step by step breakdown of the work involved including information about how any equipment to be worked on should be accessed and / or made safe.

40.2.15 Minimum Spare Parts Holdings

In order to cover all planned infrastructure maintenance and arising corrective maintenance, sufficient spares shall be held by the Infrastructure Maintainer throughout the duration of the Infrastructure Maintenance Agreement to ensure that delays in completing planned or corrective maintenance are not experienced due to parts unavailability.

Infraco will provide details of its planned spares holding within the Infrastructure Maintenance Plan.

The Infrastructure Maintainer shall be required to maintain, at all times, a minimum holding of certain spare parts. The schedule of minimum spare parts holding will be developed by **tie** and Infraco as part of the finalisation of the Infrastructure Maintenance Agreement. The level of minimum spare parts holding will also be reviewed every year to ensure that it is appropriate on the basis of operational experience and Infraco's ongoing requirements.

For the avoidance of doubt, the initial stock / holding of spares shall be provided as part of the initial capital expenditure by Infraco. The Infraco maintainer shall be responsible for the replacement of any spare part used and the stock / holding shall be maintained at the same level, subject to adjustments approved by **tie**, based upon experience, once the ETN is operational. Where repair is to be undertaken in-situ, information shall be provided of any special facilities or equipment required. Where equipment is to be returned to the original equipment manufacturer (or any other organisation) for repair, it shall be demonstrated that the holding is sufficient to allow for predicted turnaround times.

Wherever reasonably practicable and where cost efficient the Infrastructure Maintainer shall source as many consumable spare parts and as much repair work from approved local suppliers in the interests of cost efficiency and minimisation of lead times.

40.2.16 Maintenance Records

All maintenance work performed shall be logged for record, monitoring and audit purposes. This shall be recorded in a log book and in the asset management system.

40.2.17 Indicative Scope

Infraco shall develop their Infrastructure Maintenance Plan to include all fixed Infrastructure and mobile equipment under their responsibility; this includes, but is not limited to those identified in table below.

The maintenance of Infrastructure shall generally be based on the recommendations of the manufacturer or designer, and as set out in the operating and maintenance manual. Specific additional requirements are listed in the second column.

Table 94 - Infrastructure Maintenance Plan Scope

System, Element or Service	tie Specific Requirements
Overhead Line Electrification	
Control and Communications Systems	The common failure reporting of the SCADA system, the log files of computers and the recording devices shall be used for the detection of failures in addition to fault reports provided by the Operator. As the Closed Circuit Television (CCTV) and the Public Address System (PA) at the Tramstops and in the depot area are crucial for the security of the site, their proper functioning shall be monitored. CCTV cameras need to be cleaned regularly and recording media made available. Quick repair of any faulty or damaged CCTV equipment shall be conducted to maintain Tramstop security. It is equally essential that the information given over the PA system be clear and audible, taking into account ambient noise level at Tramstops.
Power Supplies and Sub-Stations	
Tramstops	Regular maintenance is essential to ensure that features, which were designed to prevent crime and improve the environment, do not deteriorate and present opportunities for crime and raise fears for personal security. It is also crucial to ensure that Help Points are clearly signed and well lit so that their location is clear to passengers on the Tramstop. Therefore, the quick repair of faulty or damaged equipment is essential.
Pest Control	Special planned maintenance shall be considered for vermin

System, Element or Service	tie Specific Requirements
	control, pigeon shoots and the removal/ cleaning of birds' droppings and nests. These activities shall be scheduled as required and every six months intervals maximum throughout the ETN.
Depot Building and Yard	Special planned maintenance shall be considered for vermin control, Pigeon shoots and the removal/cleaning of birds' droppings and nests. These activities shall be scheduled as necessary and every six months intervals maximum. Infraco will ensure that safe, secure, access and use of the facilities is not impeded by adverse weather conditions such as snow and ice.
Lighting for Depot Building, Depot Yard, Tramstops, P&R Site, Control Centre and Offices	
Track Work and Roads	
Landscaping	A landscape and vegetation plan shall be developed and adhered to by Infraco to summarise the responsibilities and frequency and scope of the management of trees on, or closely adjacent to, the System (see Third Party Agreements (Schedule 13) and the Code of Maintenance Practice).
Structures	Regular drain clearing
Internal Workshop Equipment	This equipment should be supplied to Infraco with the corresponding operating instructions, which also contain instructions for proper maintenance.
External Workshop Equipment	
Infraco Road Vehicles	Maintenance of vehicles shall be in line with best practice and legislative requirements

40.2.18 Cleaning Maintenance Plan

Within the Infrastructure Maintenance Plan Infraco shall include a cleaning plan which shall detail the cleaning schedule for all infrastructures and equipment for which Infraco have responsibility. In addition to scheduled cleaning, if required by **tie,** Infraco shall provide a reactive cleaning service to respond to specific incidents causing litter or hazards. Where this requires additional material or labour, the scope and costs shall be agreed in advance in writing in accordance with the Agreement.

40.2.19 Track and Infrastructure Cleaning

The Infraco shall ensure that all locations for which Infraco has responsibility are kept free of rubbish and litter. The locations shall be cleaned in accordance with the location categories defined in any Regulations made under the Environmental Protection Act 1990. These categories are:

- Category 1 Walkways linking to public rights of way or road;
- Category 9 Railway embankments in urban areas.

The complete ETN shall be litter picked once every six months on average with the area within the Tramstop being litter picked every month.

Infraco cleaning of Tramstops shall be limited to the following:

- CCTV cameras;
- Passenger Information Displays; and
- Public Address speakers.

40.2.20 Depot Building and Yard, Offices and Car Park

Infraco shall ensure that all locations for which Infraco has responsibility are kept free of rubbish and litter. The areas within the Depot shall be cleaned in accordance with the frequencies stipulated in the Infrastructure Maintenance Plan, but no less than the following:

- Toilets – once a day;
- Canteen areas – once a day;
- Offices – once a day;
- Corridors and communal areas – once a day;
- Workshop area – once a day; and
- Car Park and Depot Yard – once a week.

40.2.21 Cleaning Records

All cleaning work performed shall be logged for record, monitoring and audit purposes. This shall be recorded in a log book and in the CMS.

40.3 Tram Maintenance Strategy

40.3.1 Purpose

The purpose of this tram maintenance section is to describe how Infraco shall procure that Tram Maintainer shall meet its obligations under the Tram Maintenance Agreement and its obligations under the Operators safety justification document in respect of maintenance and all references to Tram Maintainer responsibilities in this section shall be read as Infraco responsibilities and the Infraco shall have overall responsibility for the compliance. This includes the fleet of trams supplied under the Tram Supply Agreement and any relevant plant and equipment for which the Tram Maintainer is responsible. The final version of the Tram Maintenance Plan, to be developed by Tram Maintainer in response to these Employer's Requirements, will set out the specific objectives for the pre-operational period and the first twelve years of operation, following which this document may be reviewed. This Tram Maintenance section should be read in conjunction with the Tram Maintenance Agreement, and with such 'as-built' technical documentation and operation and maintenance manuals as shall be provided by the Tram Supplier.

The Tram Maintenance Plan shall be a fully controlled document. The Infraco shall procure that Tram Maintainer will take into account all mandatory requirements in force at the time of issue. It shall be updated annually allowing a three month review period to take cognisance of operational experience.

40.3.2 Scope

This Tram Maintenance section covers the maintenance activities for the following:

- Tram servicing & maintenance (planned activities);
- Tram repairs (unplanned activities); and
- Cleaning of the trams (primarily the responsibility of the Operator).

Where certain activities are the obligation of parties other than Tram Maintainer, the Tram Maintenance section will describe how the Tram Maintainer shall ensure that such maintenance obligations are fulfilled, so as to ensure the safety of the ETN, is not degraded and that the ability of the Operator to achieve its objectives is not frustrated.

Table 89 – Infrastructure and Equipment Responsibilities Allocation Matrix and Table 83 - Depot Plant and Equipment to be Provided identifies the scope for which the Tram Maintainer is responsible.

Overall Objectives

The overriding objective is to operate a safe, reliable, punctual, clean, easily accessible, comfortable, and environmentally friendly transport service which meets **tie**'s expectations.

The Tram Maintenance Plan will be developed to deliver this objective by:

- Co-operation with Infraco to achieve the aims of the Tram Maintenance Agreement;
- Meeting the specific requirements under the Tram Maintenance Agreement, particularly the defined performance standards in respect of tram availability and reliability;
- Diligent management of subcontractors to ensure they fulfil the requirements of their subcontracts;
- Adherence to the relevant Operations and Maintenance Manuals;
- Setting up and adherence to schedules and programmes for all planned work;
- Co-operation with interfacing parties and in particular the support of any obligations they have under a 'Safety Case', 'Safety Management System' or Legislation;
- Awareness of, and compliance with, legislation, statutes, regulations, and standards governing the operation of the Tramway and any changes thereto. (This will include reviews to identify any necessary changes to any established operating procedures for Phases 1a and 1b); and
- Establishing and maintaining lines of communication with all interfacing and affected parties by means of scheduled meetings, public meetings and consultation. Each year the Tram Maintainer shall undertake programmes to improve the safety, performance, and delivery of the Tram service. These programmes shall be developed in the form of a performance improvement plan which shall be included in future issues of the Operations and/or Tram Maintenance Plan.

Maintenance Approach

The approach to maintenance of the Trams shall be as follows:

- All day to day maintenance and inspection activities and any "special works" are to be planned, organised, carried out and safely handed back to an operational status under the requirements of this Tram Maintenance section and Infraco and/or Operator procedures and regulations;

- All activities carried out under the control of the Tram maintenance plan are the responsibility of a named Tram Maintainer manager (or his named deputy) responsible for the maintenance obligation;

- Maintenance activities are classified as planned, or unplanned arising from condition determined from planned inspection and testing;

- The approach to each of these classifications will be different but essentially there will be two managers (Tram Maintainer and Infraco) liaising with the Operator's Engineering Manager, for carrying out the works in their area of responsibility with Infraco having overall responsibility. Subject to prior approval, these managers may call upon the services of approved sub-contractors to carry out some of these works; and

- Tram maintenance staff will have been trained to drive the Trams within the Depot and will do so when Operator drivers are unavailable to do so.

- The Tram Maintainer shall minimise the operational downtime of the tram vehicles or any other equipment under its control for maintenance.

Table 95 - Maintenance Plan

Maintenance Activity	Planned Frequency	Responsible Manager	Contracted out to External Supplier – Tenderer to complete
Inspection of Trams	Yes See Appendix 1	Tram Maintainer Manager	
Servicing of Trams	Yes See Appendix 1	Tram Maintainer Manager	
Maintenance & overhaul of Trams	Yes See Appendix 1	Tram Maintainer Manager	
Cleaning of trams Sanding, consumable replenishment	Yes See Appendix 1	Operator	N/A
Repairs as required to trams to deliver the timetable (including	Unplanned	Tram Maintainer Manager	

accident damage and vandalism repairs)			

40.3.3 Organisation, Training, and Competency

Staffing Plan, Recruitment & Training Plan

The description of the Tram Maintainer organisation for all aspects of the operation, maintenance, and all management and administrative support of Phases 1a and 1b shall be set out in the Tram Maintainer human resources plans, staffing plan and recruitment and training plan. These documents will contain details of:

- Job descriptions and required competencies; and
- Standard training courses;
- and the procedures required to:
  - effectively recruit staff to fulfil the various employee roles;
  - monitor their performance; and
  - secure and review the required competencies and associated training courses.

These documents shall be agreed with **tie** as part of the finalisation of the Tram Maintenance Agreement.

40.3.4 Quality, Health, Safety, & Environment

Health and Safety

For all matters relating to health and safety the Tram Maintainer shall produce a Safety Management Plan which shall be agreed with **tie** as part of the finalisation of the Tram Maintenance Agreement. This Plan shall set out all relevant or appropriate regulatory requirements that the Tram Maintainer has to comply with, and the Tram Maintainer standards and procedures that it will have to develop to comply with legislation. The Plan will also meet the obligations under the Tram Maintenance Agreement. The Safety Management Plan must not prejudice the Operator safety case. The Tram Maintainer shall operate complaint to ISO 18001.

Environment

For all matters relating to environmental management, the Tram Maintainer shall produce an Environmental Management Plan which shall be agreed with **tie** as part of the finalisation of the Tram Maintenance Agreement. This Plan shall set out all relevant and appropriate regulatory requirements that the Tram Maintainer shall comply with, and the Tram Maintainer Standards and Procedures that it will have to develop to comply with legislation. The Plan will also meet the obligations under the various Agreements. The Tram Maintainer shall operate in compliance within EN14001.

Quality

The Tram Maintainer shall be responsible for quality in so far as implementing the requirements of the above two plans in respect of auditing and inspecting the requirement of all Tram Maintainer plans and procedures. The Tram Maintainer shall operate to and achieve accreditation to ISO 9002.

40.3.5 Liaison with Promoter & Other Parties on Maintenance Related Issues

Communications Plan

The Tram Maintainer shall create a Communications Plan (which shall be agreed with **tie** as part of the finalisation of the Tram Maintenance Agreement) for all matters related to communications within Infraco, the Operator, and all relevant third parties and stakeholders.

It is critical that the Tram Maintainer establishes effective lines of communication with the Operator, through their Control Centre, in order to plan the maintenance activities around service requirements. This specifically relates to the withdrawal of Trams for planned preventative maintenance and returning of Trams for service following completion of these activities and unplanned maintenance activities or repairs.

The Tram maintainer will provide details of how effective lines of communication with the Tram Operator will be set up and maintained throughout the period of the Tram Maintenance Agreement. This will include details of how key staff and expertise will be provided 'on-call' at all times to the Operator in the event of unforeseen tram breakdowns etc. It will also include a system for Tram handover after the completion of Tram Maintenance activity and a programme of daily meetings to discuss punctuality performance (and associated deductions), tram defect status and future Tram utilisation.

40.3.6 Tram Servicing and Maintenance Plan

Fleet Overview

The Tram fleet for Phases 1a and 1b will consist initially of 27 Trams, each capable of carrying about 250 passengers.

The Trams will be maintained at a new purpose-built depot.

40.3.7 Maintenance Plan Overview

All planned and preventative inspection and maintenance shall be carried out using a programme that shall be agreed annually between **tie** and Infraco. A balanced programme is required for this type of rolling stock, enabling the most efficient use of Tram downtime.

Maintenance schedules and examination job titles in this document have been drawn from general experience of similar vehicle types, and do not relate to any particular vehicle. It should be noted that all exams, sequences and frequencies mentioned are indicative at this stage, and will be reviewed once further fleet and maintenance contractor details are known.

Unplanned repair activities are not included in this Tram Maintenance section but shall be provided by the Tram Maintainer in terms specified in the Tram Maintenance Agreement.

40.3.8 Maintenance Strategy

Tram Planned Preventative Maintenance

There are two types of preventative maintenance which are to be carried out:

- Systematic preventative maintenance which follows a predetermined schedule such as:
  - Condition inspection and safety checks;
  - Cleaning of equipment;
  - Functional tests to reveal faults; and
  - Adjustments to enable optimum operation.

- Conditional preventative maintenance consists of carrying out regular inspections to determine that the performance, or operation of, Tram sub-systems remain within pre-determined measurable parameters, such as:
  - Vibration and noise levels;
  - Temperature threshold; motors and cooling circuits, etc.;
  - Wear threshold; wheel diameter, suspension heights/clearances, and pantograph height, etc.; and
  - Door operation times.

Tram Corrective Maintenance

This type of maintenance entails repairing or changing faulty equipment, through observation of failures. It involves three kinds of intervention:

- Breakdown in service requiring specific intervention. Immediate repairs are to be carried out rapidly to clear the line as quickly as possible. This activity is limited to re-establishing sound operating conditions and assisting the Operator to re-establish operational headways. Unless a repair can be rapidly undertaken to ensure safe, normal operation of the affected Tram for the remainder of the day, the affected Tram should be withdrawn from service and returned to the Depot where a more permanent repair, under controlled conditions, may be carried out.

- Repairs. This covers interventions carried out following incidents or failures that occur in operation, or identified from routine maintenance activity, generally involving a longer stoppage of equipment including overhauls of an entire Tram or major Tram component or operating system. This is an intervention of lasting character, carried out by maintenance staff (or approved sub-contractors). After repair, the Tram must conform to its original specifications.

- Whilst not strictly a breakdown, the Tram Maintainer shall also be required to assist with the recovery of any Tram derailment occurring on the line and carry out the appropriate re-railing technique, irrespective of the cause of the derailment. The Tram Maintainer will advise the Operator of the safe condition, or otherwise, when re-railing of the Tram has been completed.

Further Maintenance Operations

Preventive maintenance and corrective maintenance must be complemented by:

- Operations that contribute to the good image of public transport (appearance and comfort) such as removal of graffiti and re-applying freshening up paintwork, that cannot be achieved by the Operator through routine cleaning methods; and

- Checks on wheel condition (profile and flats).

The final version of the Tram Maintenance Plan shall include the proposed programme for all Tram preventative maintenance and further maintenance operations.

The periodicity/interval and duration or all planned preventative maintenance activities shall be specified in the final version of the Tram maintenance plan. It is anticipated that most intervals will be fixed-time intervals based upon calculated scheduled service distances, to be specified by the Tram Supplier. If any activities are specifically based upon a kilometreage based interval, which cannot readily be related to elapsed time, this should be made clear in the proposal.

The various examination types, based on their interval shall be categorised by code letter and the activities to be undertaken shall be fully detailed. The information should be summarised in the form of a matrix or star/dot chart where the breakdown of exam type is shown labelled on one axis and equipment or sub-system to be worked on is labelled on the other axis.

The Tram Maintainer will also create a list of standard repair times for items that are susceptible to damage or failure in service, such as replacement of glazing, lower front skirts, pantograph etc. Where possible, standard durations for repair and fixed prices for these repairs shall be established.

Maintenance Codes

A standard set of maintenance codes should be established to identify maintenance tasks to various Tram sub-systems:

The following standard set of codes is proposed (and are used in the Star Charts) and should be developed further as the details of the Tram design and recommended maintenance approach are understood:

Table 96 - Star Charts

Code	Area
A	Sanding System
B	Brakes
C	Bodywork
E	Battery and Control Systems
F	Radio and communications systems
G	Pantograph
H	Heating and Ventilation
I	Interior Trim and Fittings
M	Electrical Machines
O	Doors
P	Electrical Traction Power Equipment
T	Mechanical Transmission
U	Underframe and Bogies
Z	Emergency Equipment

Maintenance star charts setting out the indicative periodicities for maintenance activities shall be developed as part of the Maintenance Plan.

These star charts are to be developed in line with the finalisation of the Tram Maintenance Agreement and Tram Supplier's recommendations.

40.3.9 Availability and Warranty

The availability requirement for phases 1a and 1b of the ETN will be established in detail during the tendering process. Where possible, at peak periods and for special events, all trams should be made available.

Any lack of availability will give rise to the imposition of availability deductions from the fee payable under the Tram Maintenance Agreement. Details of the availability performance regime are set out in the Tram Maintenance Agreement. This also sets out the requirement for a 'hot spare' Tram and for Trams to be available for training purposes outside of peak hours.

During the Warranty and Extended Warranty period (as set out in the Tram Supply Agreement) a robust process must be in place to manage the return and replacement of parts thus ensuring optimal operational service, whilst optimising the management of warranty claims under the Tram Supply Agreement.

40.3.10 Technical Management

An integrated, computer-based maintenance management and recording system (CMS) should be utilised in order for data obtained from the maintenance of the Trams or other sources to be collated and analysed. This will enable the technical team to assess safety and performance issues and to facilitate modifications and changes, where necessary, to the Tram Maintenance Plan and working practices.

The CMS shall also provide a real-time configuration management control system of the Trams by recording serial numbers of all components on the Trams. This record shall also be updated whenever components are exchanged or replaced during maintenance or repair of the Trams.

The CMS will need to be capable of interfacing with Infraco and/or **tie**'s systems to facilitate remote access to maintenance management data.

40.3.11 Work Instructions

In order for Infraco to be able to verify that the Tram Maintainer has carried out the necessary planning to undertake all proposed preventative maintenance activities in accordance with the Tram Maintenance Plan, details of the work activities shall be submitted for information only.

For each exam type detailed work instructions will be broken down against equipment type and artisan skill-set to facilitate planning of the work. Each work instruction will provide a step-by-step breakdown of the work involved including information about how any equipment to be worked on should be accessed and/or removed from the Tram.

Each work instruction should, as a minimum, include details of:

- Health and safety precautions;
- Key skills and competencies required to undertake the work;
- Consumable components to be replaced;
- Special tooling (if any);

- Particular Depot facilities required; and
- Agreed time to complete the task.

40.3.12 Minimum Spare Parts Holdings

In order to cover all planned Tram Preventative Maintenance and arising Corrective Maintenance, sufficient spares shall be held by the Tram maintainer throughout the duration of the Tram Maintenance Agreement to ensure that a Tram is seldom unavailable for service due to parts unavailability.

Spares fall into the following categories:

- Consumables (brake pads, filters, bulbs etc.);
- Line Replaceable Units (repair on site);
- Line Replaceable Units (return to OEM for repair); and
- All other equipment.

The Tram Maintainer shall provide details of its planned spares holding and into which of each of the above categories each item falls.

In order to facilitate a seamless transition of Tram Maintenance services from one Tram Maintainer to another on the expiry or earlier termination of the Tram Maintenance Agreement, the Tram Maintainer shall be required to maintain, at all times, a minimum holding of certain spare parts. The schedule of minimum spare parts holding will be developed by **tie** and the Tram Maintainer as part of the finalisation of the Tram Maintenance Agreement. The level of minimum spare parts holding will also be reviewed after three years to ensure that it is appropriate on the basis of operational experience and Infraco's ongoing requirements.
Failure to maintain the minimum spare parts holding will give rise to an availability deduction being made in respect of the maintenance fee.

Where repair is to be undertaken on site, information shall be provided of any special facilities or equipment required. Where equipment is to be returned to the original equipment manufacturer (or any other organisation) for repair, it shall be demonstrated that the holding is sufficient to allow for predicted turnaround times. Estimated lead times for all other spares shall also be provided.

Where line replaceable units (LRUs) are exchanged as part of normal Tram preventative maintenance (to be brought up to optimum condition off the vehicle), the appropriate work

instruction should be explicit regarding this fact and should also state the approved time for exchange of such components. The spares holding of LRUs should be sufficient to cater for this method of working.

Wherever possible the Tram maintainer shall source as many consumable spare parts and as much repair work from approved local suppliers in the interests of cost efficiency and minimisation of lead times.

40.3.13 Cleaning Maintenance Plan

Tram Cleaning

Internal and external cleaning of Trams is the responsibility of the Operator. This will also include the removal of graffiti, except where this cannot be removed by normal cleaning methods or requires replacement of the panel(s) concerned. In such cases the panels will be replaced or made good by the Tram Maintainer. This shall also include the replacement of window glazing due to damage by etching.

The Tram Maintainer must ensure that adequate quantities of interior and exterior body panels, glazing and window sealing materials are kept in stock to meet this obligation.

40.4 Maintainability, Maintenance and Spares

40.4.1 General

An asset register shall be produced by the Infraco and the Tram Maintainer and populated by them with equipment data, serial numbers etc. The asset register shall be available prior to the commencement of delivery of equipment and materials. All spares, tools and test equipment which are delivered as part of the Works, shall be entered in the asset register.

Performance, reliability, fault / failure data shall be available that enables analysis of the Edinburgh Tram Network for product improvement.

Data shall be presented to maintenance staff such that potential causes of faults / failures are clearly identified.

Hardware components shall be easily accessible and not require specialist equipment for their removal or replacement.

Connectors shall be used which permit fast and easy disconnection and replacement of faulty / failed components and prevent dirt and moisture ingress and are suitably supported and specified for the operating environment in which they are used.

Maintenance regimes, component replacement programmes and spares holding levels shall be determined through fault tree, cause-consequence and Markov analysis, as appropriate, and ratified through the verification and validation process.

Spares that have potential long lead times, or minimum order quantities, shall be identified and adequate quantities held on site in order to achieve the performance requirements of the system including repair times.

The Edinburgh Tram Network shall be designed to facilitate inspection, repair, maintenance and fault finding without interruption to the ETN operations and performance.

Spares provided shall be sufficient to ensure the continuous operation of the system from the date of the Edinburgh Tram Network handover to **tie**. These spares shall include provision for damage and vandalism. The Edinburgh Tram Network design shall be underwritten such that all equipment / system suppliers shall warrant that all equipment in the design shall be available for the design lives specified and that they shall give **tie** a minimum of twelve months notice where after that period they intend to cease supply of that component.

Equipment housings / enclosures and their contents, e.g. racks etc. shall not exceed 2.0m in height unless specifically agreed by with **tie**.

The lowest mounting point, plug-in group or terminal block shall not be less than 0.4m above floor level unless specifically agreed by with **tie**.

Cables shall be clearly identified at each end of the cable connections by clearly visible and indelible labels. Related drawings shall describe the labelling conventions.

The maximum use shall be made of readily available and fully proven 'industry standard' materials and components. These shall remain readily available for the projected life of the Edinburgh Tram Network and which shall be supported in the market place on an ongoing basis.

Provision for handling the possible obsolescence of any of the components during the projected life of the ETN without degrading the ongoing performance of the Edinburgh Tram Network shall be individually addressed prior to supply/construction.

The detailed arrangements for the delivery, storage, management, and control of spare parts shall be agreed between the Infraco, the Tram Maintainer and the Operator as part of the arrangements for the ongoing operation and maintenance of the ETN.

In addition, Infraco shall procure that an adequate supply of consumables and spares shall be available to support the testing, commissioning and shadow running.

The Infraco / Tram Maintainer shall establish and maintain a log of all such consumables and spares used during this process and an updated copy shall be presented with each monthly progress report.
Where cables are to be provided, they shall contain sufficient slack to permit reasonable disturbance during maintenance.

40.4.2 Structures and Civil Engineering

As the bulk of these features will be static, the quantity of spares shall include those items that may suffer attrition as a result of accidents and vandalism such as signage, bollards, etc., and any special features bespoke to the ETN.

If not readily available, small quantities of special surfaces, e.g. tactile paving, etc., shall be stocked but it is anticipated that common wearing surfaces will be repaired using materials commonly available to the trade.

40.4.3 Track

In respect of track and ancillaries, the levels and numbers of spare holdings of major replacement elements, such as rails, sleepers, switch half-sets and full-sets, and crossings – 'standard' supply and more importantly of bespoke design – are considered to be of critical importance. At least one point machine, point indicator and hand operated mechanism shall be provided. Additionally, quantities of small parts and day-to-day maintenance items, together with special equipment such as buffer stops, are to be provided, based on instructions contained in the maintenance manual and on forecast component lives. In proposing the numbers of all spares holdings, the objective will be to ensure, as far as will be reasonably practicable, uninterrupted operation of the tram services.

40.4.4 Training

An indicative training plan for all parties involved in the maintenance and operation of the Edinburgh Tram Network System shall be produced and submitted to **tie** within six months of the Commencement Date. This shall be updated as required thereafter and as a minimum, be submitted to **tie** every eight months.

40.4.5 Infrastructure and Trams

Training and Competency

Staff training and competency assessments shall be carried out in accordance with best practice. The requirements of the ROGs regulations for safety critical work shall be observed.

Training Plan

An indicative training plan for all staff of the Edinburgh Tram Network System shall be produced within six months of the Commencement Date.

Both operating and maintenance training courses shall be provided for all of the items of supply associated with the Edinburgh Tram Network, including the operation and maintenance of all specialist plant and tools provided or required. All training materials and classes shall be in the English language.

The training may take place either at an individual contractor's premises or, locally on the tramway system or at other facilities to be agreed with the Operator/Maintainer and made available by the training supplier. All these arrangements shall be with the prior agreement of the Operator/Maintainer. "Maintainer" in this Section regarding Training in maintenance and operation means both Infraco and Tram Maintainer.

A training plan shall be provided for each group of trainees (i.e. Operator and Maintainer) covering all the items of supply. The plan will set out in a logical manner the order, duration, location and the content of the training to be given, the type (i.e. classroom, practical hands on) and the scope (i.e. operation, routine maintenance, first line repair, second line repair etc).

The Training Plan shall take due account of the Operator's proposed operational plan and the maintainer's proposed maintenance plan and any manufacturer's or otherwise recommended maintenance intervals for the scope of equipment supplied as well as all manufacturer's maintenance intervals for the equipment provided.

The Training Plans will clearly set out the course objectives. These will ensure that:

- All appropriate grades of operational and maintenance staff are able to perform, in a proper, effective and safe manner all necessary scheduled and reasonably foreseeable unscheduled tasks in order to functionally operate, maintain, fault find and safely restore in the shortest time in the event of any failure, the full functionality of the systems and equipment forming the Edinburgh Tram Network.

- All appropriate operational and maintenance staff are able to comprehend environmental and operational conditions, safety concepts and the health and safety requirements when carrying out their duties.

- All appropriate operational and maintenance staff are able to correctly interpret and make proper correct safe and effective use of all operational electronic data, displays and printed/written documentation presented to them in the course of their duties.

- The competence of all of the trainees shall be certified in a format that is compliant with all of the obligations placed on the employers of the trainees.

- The Training Plans shall clearly set out the level of testing of trainees, and how the certification of trainees will be achieved and documented. It shall also set out the method of participant feedback to be used following the completion of the training. Where appropriate, the testing and certification process will be split where appropriate to ensure competency on particular items of equipment, systems and methods.

- The training plans shall be agreed with **tie** and the operator prior to the commencement of the training.

Training Material

Infraco will provide, inter alia, the following training materials appropriate to the individual training session.

- Twelve sets of all training material and two sets of the Training plans and trainer's course material and notes, together with copy discs, drawings and artwork shall be provided to enable the Operator/ Maintainer to provide future training courses for himself when necessary.

- All training material, including master discs, drawings and artwork, will be updated within four months of the completion of the training on the basis of the formal feedback from attendees and the Operator/ Maintainer of 'lessons learnt' and from its practical application on the tramway on a routine basis and shall reflect all changes made to the system such that the system and training are fully aligned.

- In the event of any of the systems or equipment supplied and installed having to be modified or amended or the maintenance requirements for the same being revised within the Warranty period, the training material shall be revised and updated to reflect the changes to equipment, components or procedures that have become necessary.

Training Costs

All relevant costs, including travel and accommodation, associated with the effective training of the Operator/Maintainer's staff, on site or remote, shall be at the expense of the training provider, including materials, classrooms and instructors, but excluding the time cost for the trainees.

40.4.6 Maintenance Training

All relevant costs associated with the effective training of the Operator/Maintainer's staff, on site or remote, shall be at the expense of the training provider, including materials, classrooms and instructors, but excluding the time cost for the trainees.

Training courses and materials shall be provided in line with the Training Plans. These shall cover all operations necessary for the maintenance, repair and renewal of all the infrastructure and equipment forming the ETN systems throughout its life including items such as fault diagnosis, replacement and repair of equipment, software maintenance, system structure, integration and interfaces and hardware and software set-up.

The training shall include training on all the specialist tools and test equipment and software required to maintain and operate the system.

The training shall be structured as set out in the training plan to cover the basic theory, system operation overview, routine maintenance, first line fault rectification, second line fault rectification, renewals and software maintenance.

The training documentation shall include reference to manufacturer's documentation and also include all documentation, drawings, and technical data required to provide a single reference for the items covered by the training. The documentation will include fault identification and rectification process flow charts to assist maintenance personnel in identifying and rectifying faults. The initially recommended periodicity of inspections, tests and routine maintenance or rectification processes shall include 'pass' or 'fail' criteria. In the case of a 'failed' test, the appropriate course of action, with remedies for such inspections, tests and maintenance shall be detailed. Course documents, course content and notes shall be submitted for approval by **tie**.

Risk assessments shall be carried out on all of the proposed maintenance methods and where found to be appropriate safe systems of work shall be included within the training material and training. COSHH assessments will be carried out on all substances to be used in the training and proposed for the maintenance of the equipments. All such documentation shall be submitted to **tie** for approval.

Personal Protective Equipment for course attendees shall be provided, as appropriate, by Infraco.

Testing and certification of the attendees shall be carried out. Upon completion of the training on each section of the equipments and systems, all attendees shall be required to pass a written and practical test for evaluation and certification purposes by the trainer to confirm that personnel are competent to carry out all necessary tasks. The certification process and documentation shall be submitted to **tie**. The individual results and certification shall be fully documented and presented to **tie** and the Operator / Maintainer for their records.

40.4.7 Operational Training

Sufficient Operational Training Courses shall be provided in line with the Training Plan for all the various grades of the Operator/Maintainer's staff, to ensure that safe and proper operation of the system can be achieved throughout its life, commencing with the formal take-over of the ETN.

The training shall be structured as set out in the training plan to cover the operation of the ETN under all operating conditions, including normal running and working in the many degraded modes, and in the recovery from degraded modes.

The training shall include operator familiarisation and functional training in conjunction with the Factory and Site Acceptance Tests of the integrated system and Control Centre systems.

The training shall provide comprehensive hands-on training on the equipment and systems for all operational equipment including trams.

This shall include the simulation of a service and all associated equipments and failures.

The training shall include full details of the functionality of the tramway and control systems.

The training documentation shall include reference to manufacturers' documentation and also include all documentation, drawings, and technical data required to provide a single reference for the items covered by the training. The documentation shall include fault identification process flow charts to assist the Operator / Maintainer in identifying faults and to assist in the deployment of the correct maintenance personnel.

40.5 Information Procedures, Records and Manuals

40.5.1 General

All designers, suppliers, installers and maintainers of the Edinburgh Tram Network shall provide comprehensive documentation in support of their works. Such documentation shall be prepared in

accordance with the contractual requirements, Employer's Requirements and any other relevant documentation.

This information will be included in the form of the Project Health and Safety File. The file will be divided into Sections and Volumes in a manner to be agreed with **tie**. Each Section will be numbered in sequence and may comprise more than one volume. The volumes shall be identified by an integrated sequential numbering system.

40.5.2 Information

Information to be provided shall include, but shall not necessarily be limited to:

- Product literature;
- Design parameters, specifications, data and drawings;
- Product specifications;
- Illustrated parts lists;
- Product usage and examples of use service;
- Whole life cycle evidence and documentation;
- Maintenance and fault finding;
- Spares management, product storage and handling; and
- Health and Safety considerations and documentation.

40.5.3 Operation and Maintenance Manuals Information

Infraco shall produce for the Edinburgh Tram Network operating instructions for the system as a whole and for all individual sub-systems consolidated into an overall suite of bespoke Operations and Maintenance Manuals. This data shall be produced in hard copy form and shall also be available as an on-line database to operations and maintenance personnel.

The Edinburgh Tram Network shall have maintenance instructions for the system as a whole and for all individual sub-systems consolidated into an overall suite of Operations and Maintenance Manuals.

This data shall be produced in hard copy form and available as an on-line database available to maintenance personnel. The technical documents and manuals shall be compiled electronically in a universal format such as XTML.

Maintenance instructions shall be available in hard copy form and for download to remote/portable diagnostics terminals.

The Operations Manuals and Maintenance Manuals shall be comprehensively indexed and cross-referenced. They shall meet all requirements of an ISO 9000 Quality Plan, ISO 14000 Environmental Plan and ISO 18000 Health and Safety Plan. They shall take into account the relevant legal requirements and customary practices existing in Scotland. They shall be of a quality at least as good as that outlined in the SDS Maintenance Documentation Specification (reference number ULE90130-SW-SPN-00064).

They shall be prepared in accordance with a uniform approach, combining together the contributions from different contributors. They shall be consistent in terms of the page layout, indexing, language, tense, person and methodology of maintenance of each item of equipment on the system in a clear and concise manner.

The Maintenance Manuals shall include initial planned maintenance schedules and all inspection and maintenance frequencies. These frequencies shall include, but not necessarily be limited to, post commissioning, daily, weekly, specific and periodic inspection and procedural activities. All such activities shall be fully co-ordinated and integrated to minimise the frequency of visits and thus the possible disruption of the tram service.

The contributors shall update the manuals' information at periods considered appropriate to their equipment and/or installation supply throughout during the contracted period of maintenance and/or warranty agreement. Notwithstanding such interim updates, a full review and update will be undertaken at the end of such maintenance and/or warranty agreement. Such updating material shall be carried out and provided by the appropriate maintainer.

The master copy of the Manuals shall be held electronically and be accessible via the Internet using an appropriate access permission regime. The access arrangements shall record who accesses individual sections and when.

The information to be included in the manuals from the relevant subcontractors through the Infraco and Tram Maintainer shall include, but not be limited to the following:

- System Overview (including explanation of manuals content)

Landscaping Manuals, comprising:

- Area Descriptions;
- Inspection and Maintenance Manual; and
- Planting Stock Lists.

Structures Manuals, comprising:

- Structures descriptions, etc.;
- Inspection and maintenance manual; and
- Illustrated parts list.

Power supply Mmanuals, comprising:

- Equipment Description and Operation Manual (how the equipment works);
- Maintenance Manual (including inspection and day-to-day maintenance procedures);
- Overhaul Manual; and
- Illustrated Parts List.

Overhead Line, Manuals, comprising:

- Equipment Description and Operation Manual (how the equipment works);
- Inspection and Maintenance Manual (including erection procedures, etc.);
- Overhaul Manual; and
- Illustrated Parts List.

Permanent Way Manuals, comprising:

- Equipment Description and Operation Manual (how the equipment works);

- Inspection and Maintenance Manual;
- Overhaul Manual; and
- Illustrated Parts List.

Tramstops Manuals, comprising:

- Tramstop descriptions, Lighting, Seating, Signs, etc.;
- Inspection and Maintenance Manual; and
- Illustrated Parts List;
- Supervisory Control and Communications Systems Manuals, comprising:
- Equipment Description and Operation Manual;
- Inspection and Maintenance Manual; and
- Illustrated Parts List.

Tram Manuals, comprising:

- Information to be included in a Drivers Handbook;
- Equipment Description and Operation Manual;
- Maintenance Manual (including inspection and day-to-day maintenance procedures);
- Overhaul Manual (larger overhauls are unlikely to be carried out by **tie** and this will be required by their eventual overhaul contractor); and
- Illustrated Parts List.
- A full suite of vehicle design drawings.

Gogar Maintenance Depot Manuals, comprising:

- Description of Depot and its Equipment (including road and on-track maintenance vehicles);
- Maintenance Manual (covering all equipment including integrated equipment maintenance schedule) under the following headings:
  - Fixed equipment;
  - Mobile equipment;
  - Portable equipment; and
  - Hand tools.
- Illustrated Parts Lists for each of the above.

Central Control Centre Manuals, comprising:

- Operational Procedures (these may be included in System Operation manuals);
- Equipment Description and Operation Manual; and
- Illustrated Parts List.

Signalling, including:

- Equipment Description and Operation;
- Inspection and Maintenance Manual; and
- Illustrated Parts List.

40.5.4 Asset Register

The Operations and Maintenance Manual shall be linked to an Asset Register within the computerised Asset Management System that shall be provided by the Infraco . This shall be populated with actual equipment data, serial numbers etc. This asset register shall be capable of being linked to a graphical information system (GIS) and include as-built, maintenance and other drawings and records.

Performance, reliability, fault/failure data shall be included, presented and made available to enable analysis for product improvement.

40.5.5 Provisional List of Operating Procedures and Standards

A – Operating Procedures (To be developed in conjunction with the Operator)

1. Permit to work;
2. Power switching and isolation;
3. Switching and Safety Interlocking with Inspection Platforms in Depot;
4. Track Safety;
5. Issue and use of Personal Protection Equipment;
6. First Aid;
7. Communication with OCC (Trackside);
8. Communication with OCC (Tram);
9. Depot & Yard Tram Movements & Parking;
10. Use of Wheel Lathe;
11. Lifting & Safe Handling;
12. Recording of Maintenance & Repair in Infraco Records System;
13. Risk Assessments (Safety, and Environment);
14. COSHH Risk Assessments;
15. Preparation and Approval of Method statements;
16. Materials Procurement & Control;
17. Waste Disposal;
18. Evacuation of Depot;

19. Detailed maintenance procedures (as supplied by the Tram Maintainer & Infraco);

20. Monitoring the medical condition of employees;

B – Infraco Standards (to be developed by Infraco prior to Section A completion)

1. Tram (pantograph parameters, door parameters, wheel profile, suspension/coupler heights & clearances, brake parameters and wear limits);

2. Tram Driver routine preparation;

3. Tram Cleaning;

4. Tram related Noise and Vibration (To be developed in conjunction with the Tram Maintainer);

5. Tram clearances with Tramstops (To be developed in conjunction with the Tram Maintainer).

Part 2: Tram Documentation

Refer to Tram Manuals set out at clause 40.5.3 of the Employer's Requirements

Part 3: Training Schedule

The Tram Supplier shall provide, at its own cost, training courses suitable to provide ample knowledge to the Operator's driver trainers and managerial staff for them to be able to operate the trams safely and efficiently on the Edinburgh system. The courses shall teach (as a minimum but not be limited to) the following subjects:-

- a detailed explanation of all of the tram systems and how they work with the technical content suitable for a person of Operations Supervisor level
- handling of the tram including preparation, setting off, driving, normal braking, hazard braking, emergency braking and stabling
- setting off on a gradient
- use of all controls normally accessible to the driver and inspector
- explanation of all warnings and alarms on the vehicle including a comprehensive list of the faults to be displayed on the fault annunciator panel
- recovery of a failed tram by another tram
- re-railing techniques (which shall include a real re-railing exercise using a tram)
- basic inspection of the vehicle to assess it's suitability for service
- provision on the courses for a suitable third party to describe the function and use of the freely supplied equipment (e.g. radio; BusTracker; TPDS)

As much as practicable, the course shall take place with full access to a fully functioning tram at the Edinburgh depot.

The Tram Supplier must provide a written assessment of the trainees' understanding of the course at the end of each day and again at the end of the course, providing a detailed and scored record of each person's progress through the course..

Any poor performance from or poor ability amongst the trainees shall be reported at the earliest opportunity to the Operator. If necessary individual coaching shall be given to trainees in order to bring their understanding up to an acceptable level but the costs associated will be borne by the customer, unless there is negligence by the Tram Supplier on the teaching process. To minimise the risk of this happening, the Operator shall agree the course content in advance and the Tram Supplier shall conduct the course using suitably-qualified instructors.

It shall be assumed by the Tram Supplier that a suitable room in a location at the depot or other suitable site shall be provided.

There shall be a maximum of two courses each for up to 10 attendees. The programme for the two courses shall be agreed with **tie** and the Operator.

The Operator Training Plan and Maintenance Training Plan included hereafter are indicative of the activities envisaged.

OPERATOR TRAINING PLAN

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1. INTRODUCTION

This document describes the training course for drivers which CAF intends to run, in collaboration with TIE, to provide courses in the operation/driving of the Edinburgh train units.

2. PURPOSE

To provide the necessary training for the operation of the train unit which allows the instructors and drivers attending the course to gain sufficient knowledge regarding the operation of the vehicle to carry out their work as drivers under normal service conditions and more foreseeable abnormal conditions.

The course shall mainly be aimed at the training of instructors, so that these can later train the various drivers.

This training course is limited to the operation/driving of the trains. The plan and contents of the maintenance courses for the train units shall be detailed in a separate document.

3. COURSE STRUCTURE

The course shall basically consists of two parts: One shall be theoretical-practical and the other essentially practical.

- **Theoretical-Practical Part**

This part of the course shall last for five days, and although it may include general explanations, it shall focus on getting to know the vehicle and its specific equipment.

The planned schematic for the course is as follows:

1. Description of the vehicle and its operation.
2. Operation of the traction and braking equipment.
3. Operation of the auxiliary equipment
4. Analysis of electric and pneumatic schematics.
5. Driving the vehicle.

See Appendix 1 where a preliminary detail list of contents is attached of the material to be studied in the course.

The theoretical explanations shall be studied in the mornings and visits shall be made to the vehicles in the afternoons (vehicles being tested on the track or in the final finish of the production process) to contrast that studied and eventual clarifications.

The staff attending the course shall be provided with the following documentation:

- Descriptive manual (provisional) of the vehicle.
- Vehicle drivers manual (provisional).
- Descriptions of the main equipment of the vehicle.
- Functional schematics.

This course shall be taught by High or Medium level technicians that have taken part in the project, tests and production of the vehicles, with the participation of the companies that supply the various items of equipment.

- **Practical Part:**

This shall take place in line with the customer's design on some of the first supplied vehicles and shall last for four days.

Obviously this course shall be aimed at the staff who have taken part in the first phase.

4. COURSE DATES

The dates for these courses shall be agreed to with the customer taking into account the availability of vehicles and drivers.

5. NUMBER OF ATTENDEES

One course is envisaged, in principle, for a maximum of 8 instructors and/or drivers.

6. CHARACTERISTICS OF THE ATTENDEES

The courses are mainly aimed at the instructors but also at drivers, who must have basic knowledge of passenger transport vehicle driving (preferably rail transport, and under all circumstances a bus driver's license is indispensable) guaranteeing their knowledge of the traffic and road safety laws and regulations currently in effect.

7. COURSE FORMS: INSTRUCTORS AND DRIVERS

The course is planned to be given in two slightly different forms, one for instructors and another for drivers.

The instructor training shall be given in a first cycle where they shall receive a normal driving course, and once this has been studied, a specific presentation (SGMA) shall be given, more focused on how to teach the various parts of the course.

8. RESOURCES REQUIRED TO GIVE THE COURSE

In order to teach the course, the customer must provide the following necessary resources:

- Appropriate classroom for the course capacity.
- Projector.
- Access to train units being tested for the theoretical-practical course.
- Operational train unit for the practical course.

9. MATERIAL EXPLICITLY EXCLUDED FROM THE DRIVING COURSE

The following subjects are explicitly excluded from the scope of this course as the content exceeds the scope of this driver course:

- Track Safety.
- Driving standards and regulations established by the customer.
- Rail traffic regulations (signalling, operation in sheds, etc.)
- Track circulation regulations (on shared track).
- Personal safety and well-being.
- Accident reports.
- Run over accidents.
- Operation of the signalling systems of the fixed parts (not on-board) according to the final contract.
- Use of the safety systems (towing system, rerailing system on public track), except for those relating to resources fitted on the trains (lifting points, coupling points, etc.)
- Operating system: Control post, safety installations, communication installations and power supply installations.
- Vehicle maintenance (see separate document relating to the maintenance courses).

APPENDIX 1

PRELIMINARY LIST OF CONTENTS OF THE DRIVER TRAINING COURSE

INTRODUCTION AND FAMILIARISATION

A. Course introduction

1. Introduction
2. General perspective of the vehicle

B. Vehicle description

3. Exterior arrangement and lighting
4. Distribution of equipment in boxes
5. Arrangement of underfloor equipment
6. Interior arrangement
7. Cab arrangement

C. Discussion

DESCRIPTION OF THE SYSTEMS AND VISIT TO THE VEHICLE

A. Systems

8. Coupler
9. Access doors
10. Electric Systems
11. Dynamic braking and traction
12. Cab air conditioning and fan/heating unit.
13. Communications system

B. Vehicle visit

C. Discussion

CAB EQUIPMENT

D. Identification and location of items:

14. Master Controller
15. Microphone:
16. Central control console:
17. Dead man, emergency brake, gong
18. Electric cabinets
19. Driver seat

E. Discussion

VEHICLE OPERATION

F. Operations prior to the commissioning of the unit

20. Inspections of the exterior of the vehicle
21. Commissioning operations
22. Equipment checks

G. Normal driving mode

23. Traction drive
24. Brake
25. Emergency braking

H. Coupling and uncoupling

26. Safety measures
27. Coupler
28. Coupling
29. Uncoupling

I. Cab change

J. Operations to be performed to put the train to out of service

K. Various operations

30. Windscreen wipers

31. Lighting

32. Gong

33. Air conditioning

L. Door equipment operation

M. Service under abnormal conditions

34. Traction system fault

35. Door lock-off

36. emergency lighting

37. Manual pantograph operation

N. Discussion

COMMUNICATIONS

O. System Operation

38. Radio

39. Passenger information system and intercoms

40. Destination indication panels

41. Automatic station announcer

P. Discussion

FAULT ISOLATION

Q. Vehicle systems fault isolation

42. Doors

43. Lighting

44. Air conditioning

45. Power sources
46. Traction
47. Brake
48. Communications

R. Discussion

S. Conclusions

49. Course revision
50. Assessment

MAINTENANCE TRAINING PLAN

INDEX

1. INTRODUCTION....2
2. PURPOSE....2
3. COURSE STRUCTURE....2
4. COURSE DATES....3
5. NUMBER OF ATTENDEES....3
6. CHARACTERISTICS OF THE ATTENDEES....3
7. RESOURCES REQUIRED TO GIVE THE COURSE....3
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1. INTRODUCTION

This document describes the training course for the maintenance staff that CAF shall run, in collaboration with the customer, to give courses for the maintenance of train units.

2. PURPOSE

To provide the necessary training in maintenance of the train unit supplied by CAF, that permits the maintenance staff who attend the course to have sufficient knowledge to provide service, maintenance and repair the vehicle systems and their related components.

3. COURSE STRUCTURE

Basically the course shall consist of a theoretical part and another which is essentially practical, where the knowledge acquired in the theoretical classes shall be put into practice. The course shall be held at the premises and depot of the customer.

This course shall last 10 days and shall focus on familiarising the maintenance staff with the train units and providing sufficient knowledge to perform inspections, periodic maintenance, isolate operation faults, and perform corrective maintenance.

The planned schematic for the course is as follows:

1. Description and operation of the train components/equipment.
2. Fault localisation and solution.
3. Maintenance and service.

See attached Appendix 1 figuring a preliminary details of the material to be studied in the course.

The theoretical explanations shall be given in the mornings and in the afternoons the vehicles shall be visited in the depot to perform on site practice of the maintenance tasks taught.

The maintenance staff who attend the course shall be provided with a paper copy of those parts of the operation and maintenance manuals relating to each part of the course.

This course shall be taught by upper and medium level technicians who have taken part in the project, tests and production of the vehicles, with the participation of technicians from the companies that supply the various items of equipment.

4. COURSE DATES

The dates of these courses shall be agreed to with the customer, taking into account the availability of vehicles and maintenance staff

5. NUMBER OF ATTENDEES

In principle, a course for a maximum of 10 persons is planned.

6. CHARACTERISTICS OF THE ATTENDEES

The courses are aimed as maintenance staff who must be familiar with the usual existing systems on rail vehicles.

7. RESOURCES REQUIRED TO GIVE THE COURSE

To teach this course, the following resources must be provided by Málaga Metro:

- Appropriate classroom for the course capacity
- Projector
- Access to metro units in the depot with the necessary tools to give practical classes.
- Access to depot parts and/or spare parts for practical parts of the course which do not necessarily require train units.

APPENDIX 1

PRELIMINARY TABLE OF CONTENTS OF THE MAINTENANCE STAFF TRAINING COURSE

CARBODY

A. Introduction and familiarisation

B. Description and operation

1. Carbody exterior.
2. Carbody interior

C. Fault localisation and solution.

D. Planned maintenance

3. Inspection and cleaning of intercom, windows, fairing, flooring, etc.
4. Replacing of windows, polyester parts, seats, hand rails, etc.
5. Lifting of carbody and placing on track.
6. Repair polyester parts, paintwork, etc.

CAB

A. Introduction and familiarisation

B. Description and operation

7. Control console
8. Thermal magnetic switches cabinet.
9. Relays and contactors cabinet

C. Fault localisation and solution.

D. Planned maintenance

COUPLER

E. Introduction and familiarisation

F. Description and operation

G. Fault localisation and solution.

H. Planned maintenance

ACCESS DOORS

I. Introduction and familiarisation

J. Description and operation

10 Leaves

11 Mechanism,

12. Indicators

13. Emergency control

K. Fault localisation and solution.

L. Planned maintenance

14 Visual inspections

15 Door adjustment

16 Replacement of leaves, mechanism, etc.

AIR CONDITIONING AND VENTILATION UNIT

M. Introduction and familiarisation

N. Description and operation

17 Compressor

18 Evaporator

19 Condenser

20. Control

O. Fault localisation and solution.

P. Planned maintenance

21. Access, replacement, inspection, and cleaning of compressor, evaporator, condenser, expansion valve, pipe , control

22. Control parameters

LIGHTING

Q. Introduction and familiarisation

R. Description and operation

23. Exterior lighting

24. Interior lighting

25. Emergency operation

S. Fault localisation and solution

T. Planned maintenance

26. Light and ballast replacement

BATTERY CHARGER AND CONVERTER

U. Introduction and familiarisation

V. Description and operation

27. Auxiliary converter

28. Battery charger

W. Fault localisation and solution.

X. Planned maintenance

29. Inspection and replacement of parts of the battery charger and converter

30. Safety standards

BATTERY

Y. Introduction and familiarisation

Z. Description and operation

AA. Fault localisation and solution.

BB. Planned maintenance

31. Inspection, cleaning and filling of battery.

32. Safety standards

TRACTION EQUIPMENT

CC. Introduction and familiarisation

DD. Description and operation

33. Master Controller

34. Inverter

35. Motor

36. Circuit breaker

37. Brake resistors

EE. Fault localisation and solution.

FF. Planned maintenance

38. Inspection and cleaning of the traction items.

39. Replacement of lightning arrestors, circuit breaker, inverter, brake resistors, motor, etc.

40. Safety standards

BOGIES

GG. Introduction and familiarisation

HH. Description and operation

41. Underframe

42. Gear unit

43. Wheels

44. Axle-boxes

45. Primary & secondary suspension

46. Bogie brake

II. Fault localisation and solution

JJ. Planned maintenance

47. Visual inspections

48. Wheel wear

49. Height adjustment

BRAKING SYSTEM

KK. Introduction and familiarisation

LL. Description and operation

50. Hydraulic central unit

51. Hydraulic pipe

MM. Fault localisation and solution

NN Planned maintenance

52. Inspection, cleaning and replacement of the brake items.

53. Safety standards

COMMUNICATIONS SYSTEM

OO. Introduction and familiarisation

PP. Description and operation

QQ. Fault localisation and solution.

RR. Planned maintenance

PANTOGRAPH

SS. Introduction and familiarisation

TT Description and operation

UU. Fault localisation and solution

VV. Planned maintenance

PNEUMATIC EQUIPMENT

WW. Introduction and familiarisation

XX. Description and operation

54. Air production

55. Sanders

56. Flange lubrication

YY. Fault localisation and solution.

ZZ. Planned maintenance

Item	Description	Assumed no. (per Tram)	Minimun Spares Holding	Price (per unit)	Total price (Minimum Spares Holding x Price per Unit)	Total price (Minimum Spares Holding x Price per Unit)
1	Motor bogie (complete)	3	4	182.118 €	728.473 €	£539.216
2	Trailer bogie (complete)	1	2	135.760 €	271.521 €	£200.980
3	Traction set including :	3	1	466.192 €	466.192 €	£345.075
	IGBT Traction inverter					
	Traction control unit ECON					
	Traction motors					
	Braking resistor					
	High speed circuit breaker					
	Mater controllers			Included above		
4	Gearbox	12	6	24.548 €	147.290 €	£109.024
5	Brake actuator (for motor bogie)	12	6	6.167 €	37.004 €	£27.391
6	Brake actuator (for trailer bogie)	4	2	6.374 €	12.747 €	£9.436
7	Wheel sets (complete, for one motor bogie)	6	6	24.548 €	147.290 €	£109.024
8	Wheel sets (complete, for one trailer bogie)	2	2	32.055 €	64.110 €	£47.454
9	Wheel rims (1 set)	1 set	2	7.912 €	15.824 €	£11.713
10	Emergency coupler	2	2	9.009 €	18.017 €	£13.336
11	Pantograph	1	2	13.232 €	26.465 €	£19.589
12	Battery charger	1	1	19.799 €	19.799 €	£14.656
13	Battery	1	1	6.990 €	6.990 €	£5.174
14	High Voltage control box	3			Included in traction	Included in traction
15	Cab air conditioning unit	2	3	18.110 €	54.329 €	£40.214
16	Saloon heating and ventilation unit	3	2	27.330 €	54.661 €	£40.460
17	Tram control computer	1	1	62.076 €	62.076 €	£45.949
18	Brake pump / Central hidraúlica	4	4	12.278 €	49.114 €	£36.354

Item	Description	Assumed no. (per Tram)	Minimun Spares Holding	Price (per unit)	Total price (Minimum Spares Holding x Price per Unit)	Total price (Minimum Spares Holding x Price per Unit)
19	Brake discs	16	16	2.059 €	32.947 €	£24.387
20	EVENT RECORDER	2	2	19.179 €	38.358 €	£28.392
21	Cab desk panel (without equipment) set	2	2	11.773 €	23.547 €	£17.429
22	Drivers seat	2	2	1.632 €	3.264 €	£2.416
23	Windscreen	2	8	4.186 €	33.489 €	£24.789
24	Door mechanism and leaf (double door)	10	5	10.175 €	50.873 €	£37.656
25	Door mechanism and leaf (single door)	4	2	8.593 €	17.186 €	£12.721
26	Saloon side window 1 set per tram	1 set	2	14.872 €	29.743 €	£22.016
27	Body front skirt (2 sets)	2 sets	6	3.257 €	19.541 €	£14.464
28	Body side skirts (2 sets)	2 sets	6	18.030 €	108.182 €	£80.076
29	Passenger seat unit (1 set per tram)	1 set	0	62.165 €	15.541 €	£11.504
30	Passenger seat squab (1 set per tram)	1 set	1	28.648 €	28.648 €	£21.205
31	Handrails (1 set)	1 set	1	13.752 €	6.876 €	£5.090
32	Cameras (1 set)	1 set	1	39.808 €	39.808 €	£29.466
33	Passenger Display unit (interior) (1 set)	1 set	2	25.700 €	51.400 €	£38.046
34	Passenger Display unit (exterior) (1 set)	1 set	2	6.853 €	13.706 €	£10.145
35	Complete Articulation assembly	5	3	22.349 €	67.048 €	£49.629
36	Sanding units (1 set)	1 set	1	10.361 €	10.361 €	£7.669
37	Suspension items (1 set)	1 set	1	27.013 €	27.013 €	£19.995
38	Energy absorption device (2 sets)	2 sets	2	18.394 €	36.788 €	£27.230
39	Flange Lubrication System	1 set	1	1.214 €	1.214 €	£898
40	Cab Front Shell Moulding	2	2	14.468 €	28.935 €	£21.418
41	Under-run Guard	2	2	6.785 €	13.570 €	£10.045
42	Exterior Ligthing Units		2	6.185 €	12.369 €	£9.156

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Item	Description	Assumed no. (per Tram)	Minimun Spares Holding	Price (per unit)	Total price (Minimum Spares Holding x Price per Unit)	Total price (Minimum Spares Holding x Price per Unit)
43	Axle End Earthing Brush Units complete		4	3.394 €	13.576 €	£10.049
44	Speed Probes		1	1.885 €	1.885 €	£1.395
45	Roof Equipment Set of cases complete with fittings		0	To be defined	To be defined	To be defined
46	Cab Sun Blind	2	2	128 €	257 €	£190
47	Swan-neck cab microphone		4	342 €	1.368 €	£1.013
48	Electro-magnetic track brake unit complete		4	9.423 €	37.691 €	£27.899
49	Cab door complete with fittings		2	613 €	1.227 €	£908
50	Interior ligthingd cover(s)		1	7.387 €	7.387 €	£5.468
51	Pantograph head assembly		6	1.713 €	10.277 €	£7.607
52	Windscreen wiper arms complete		6	429 €	2.571 €	£1.903
53	Cab rear view camera		2	2.833 €	5.665 €	£4.193
	TOTAL				**2.974.212 €**	**£2.201.512**

NOTE: Currency hedged as per 29 April 2008 (0,7402 euro/GBP)

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Part 5: Special Tools

The Tram Maintainer shall provide, at its own cost, any Special Tools or equipment necessary for the efficient and effective provision of the Services, either at the tram depot or other location as appropriate. Such Special Tools shall comprise any item or assembly of items that cannot be purchased from a normal industrial tool supplier within the UK and should include as a minimum, when necessary, but not be limited to:-

- diagnostic equipment including software for fault finding and system parameter setting (see table below)
- bogie-to-wheel lathe interface equipment. This Special Tools shall be supplied by Tramco if Tramco is the supplier of the wheel lathe. If Infraco is the supplier of the wheel lathe, then Infraco will be responsible for the supply of this Special Tools
- sub-system assembly jigs and fixtures
- hydraulic brake servicing equipment
- testing and maintenance equipment that must be designed, assembled or provided by the sub-system equipment manufacturers

This includes any Special Tool required at any time throughout the 30 year service life of the trams and shall include the updating or modification of any Special Tool that may be necessary during this period.

Item No.	Description	Assumed No.
1	HVAC Diagnostic Software	1
2	Traction Equipment Diagnostic Software	1
3	Brake Equipment Diagnostic Software	1
4	Door Equipment Diagnostic Software	1

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 3 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 3

DEPOT SUB-LICENCE

1. In accordance with Clause 37 (*Use of the Depot*) of this Agreement the Client grants to the Tram Supplier a sub-licence to occupy and use the Depot on a non-exclusive basis on the terms set out below:

   1.1 subject to the Tram Supplier complying with the undertakings set out in paragraph 2 below, the Tram Supplier shall have the right during the Term to enter into, remain in and occupy those parts of the Depot within the area shaded yellow on the Depot Plan for the purposes of carrying out and performing the Tram Works and other obligations assumed by the Tram Supplier in accordance with this Agreement, including the use of those offices and facilities shaded yellow on the Depot Plan in connection with the performance of such Tram Works and other obligations; and

   1.2 the Client and the Tram Supplier agree that:

      1.2.1 the right to occupy granted pursuant to paragraph 1.1 above shall terminate on the earlier of the Termination Date or the Expiry Date;

      1.2.2 the Tram Supplier's occupation of the Depot will be as a sub-licensee only and shall confer on the Tram Supplier no greater interest than that of sub-licensee and in particular the sub-licence granted by paragraph 1.1 above shall not create a relationship of landlord and tenant;

      1.2.3 the benefit of the sub-licence granted by paragraph 1.1 above is personal to the Tram Supplier, its contractors and Sub-contractors and its and/or their work persons, servants and agents and is not assignable and the rights given in paragraph 1.1 above may only be exercised by the Tram Supplier, its contractors and Sub-contractors of any tier and its and/or their work persons, servants and agents.

2. The Tram Supplier agrees and undertakes to the Client that it shall (and shall procure that its sub-contractors shall):

   2.1 carry out the Tram Works with the minimum disruption to neighbouring properties to the Depot;

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2.2 use the Depot only for, and to the extent necessary for, the purposes of carrying out and performing the Tram Works;

2.3 keep the Depot as clean and tidy as practicable and not make any physical alterations thereto;

2.4 provide cleaning, maintenance and access control services as required under Appendix 2 of this Licence;

2.5 not display any signs or notices at the Depot without the prior written consent of the Client, (such consent to be at the Client's absolute discretion);

2.6 upon termination of the licence, make good any damage which the Tram Supplier has caused to the Depot and remove all equipment and apparatus which it has brought into the Depot; and

2.7 not cause unreasonable interference to the other users of the Depot.

3. The Tram Supplier acknowledges that the Operator shall have responsibility for the co-ordination of health and safety issues at the Depot and the Tram Supplier hereby agrees to comply with any instruction from the Operator in relation to health and safety issues at the Depot.

EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)
at
on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

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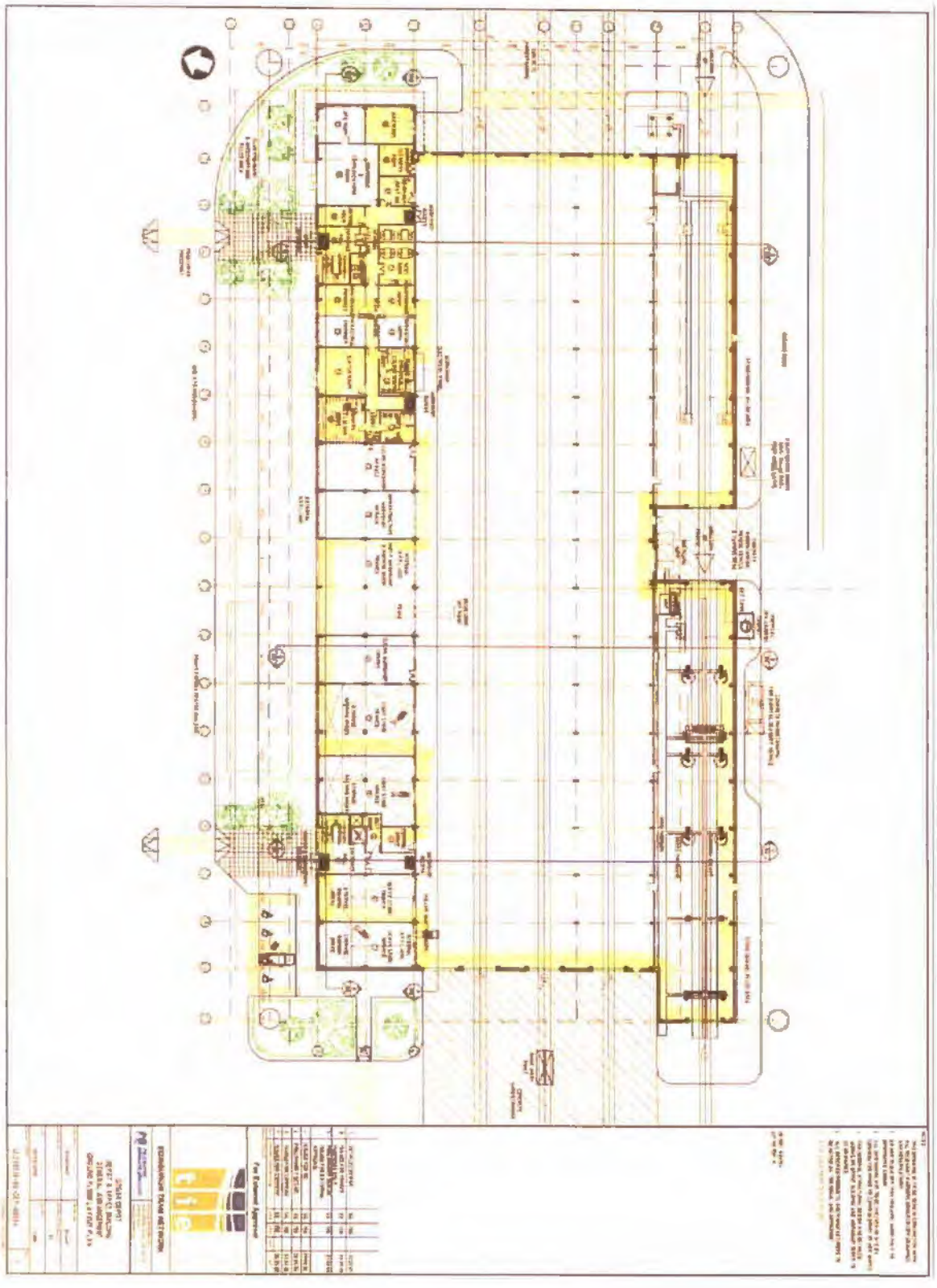
APPENDIX 1

DEPOT PLAN



APPENDIX 2

See Schedule 2 Employer's Requirements Section 40 Table 83 and Table 89

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 4 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 4

PROGRAMME

Part 1: Tram Manufacturing and Delivery Programme

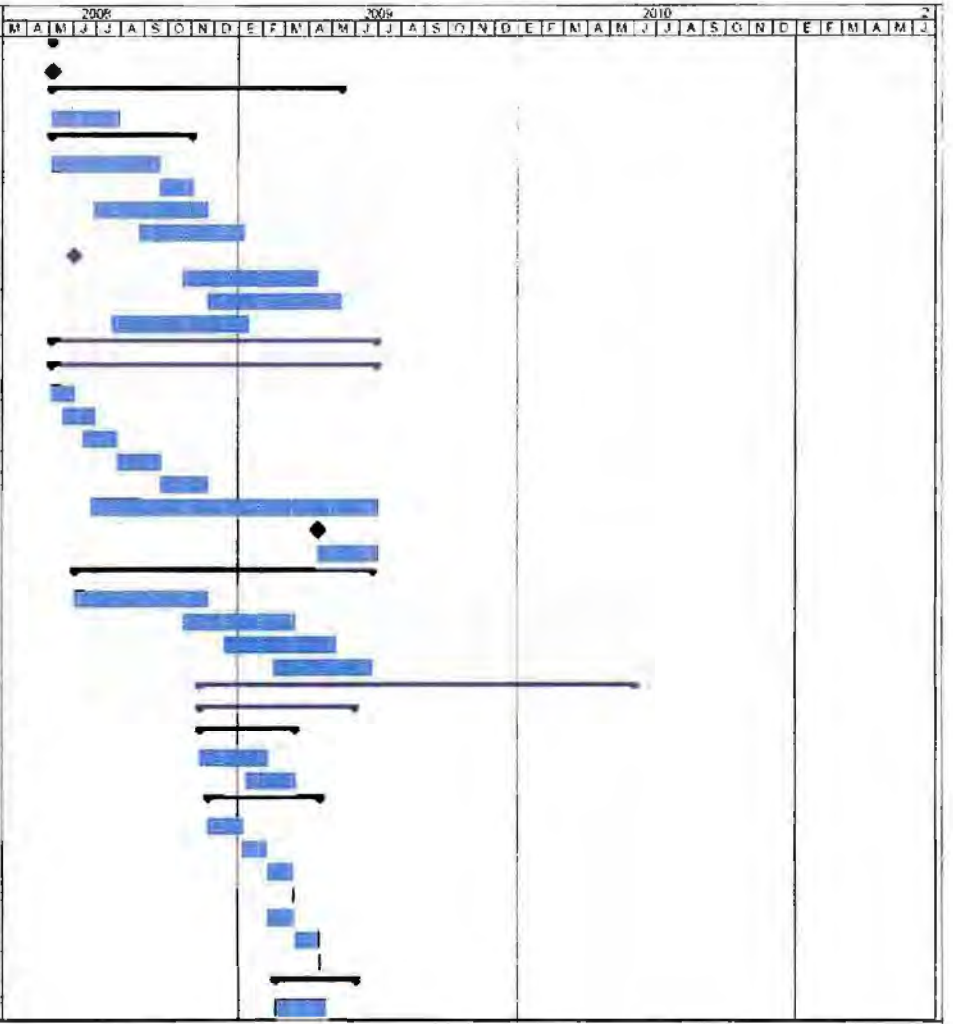
For the purposes of Clause 41.22, the Agreed Commissioning Dates shall be:

Tram	Agreed Commissioning Date
1	11/06/10
2	11/06/10
3	11/06/10
4	11/06/10
5	11/06/10
6	12/07/10
7	12/07/10
8	11/08/10
9	11/08/10
10	11/08/10
11	10/09/10
12	10/09/10
13	12/10/10
14	12/10/10
15	12/10/10
16	11/11/10
17	11/11/10
18	11/11/10
19	10/12/10
20	10/12/10
21	10/12/10
22	11/01/11
23	11/01/11
24	11/01/11
25	11/02/11
26	11/02/11
27	11/02/11

SUPPLY OF 27 TRAMS FOR THE EDINBURGH TRAM NETWORK

PROJECT PLANNING

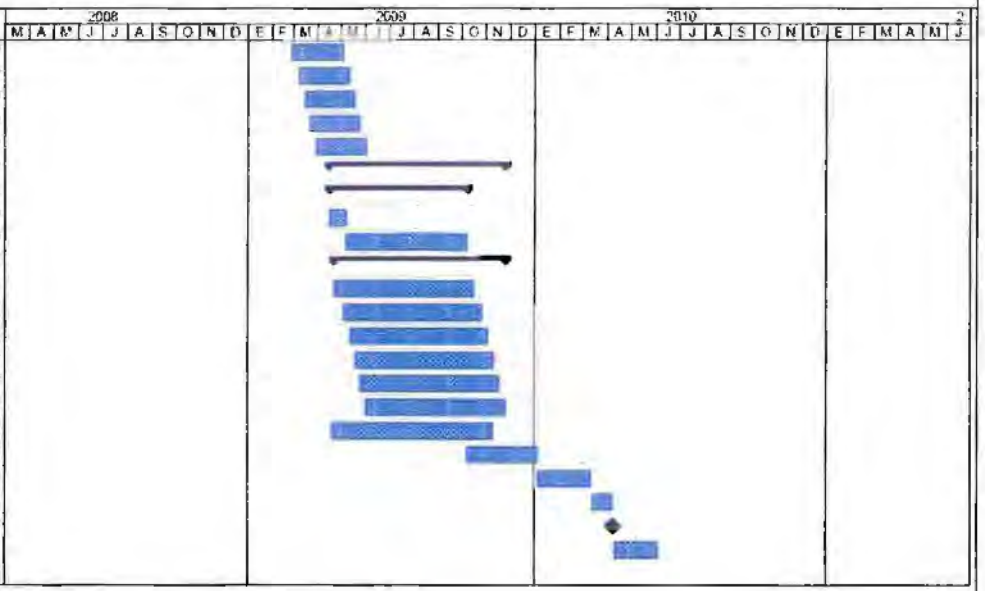
Id	Name	Start	Finish
1	**GENERAL**	**05/05/08**	**05/05/08**
2	NTP	05-05-08	05-05-08
3	**ENGINEERING**	**05/05/08**	**15/06/09**
4	BASIC ENGINEERING	05-05-08	31/07/08
5	MOCK UP	**05/05/08**	**03/11/08**
6	DESIGN & MANUFACTURING MOCK-UP	05-05-08	22/09/08
7	APPROVAL MOCK-UP	23/09/08	03.11/08
8	UNDERFRAME DESIGN	01/07/08	24/11/08
9	CARBODY DESIGN	29/08/08	08/01/09
10	LIST OF STEEL MATERIALS	04/06/08	04/06/08
11	INSTALLATIONS DESIGN	24/10/08	14/04/09
12	INTERIORS & FINISHING DESIGN	25-11-08	15/05/09
13	BOGIES DESIGN	23/07/08	15/01/09
14	**1st TRAMSET PROCUREMENT**	**05/05/08**	**01/07/09**
15	SYSTEMS	**05/05/08**	**01/07/09**
16	SPECIFICATIONS	05-05-08	04/06/08
17	SELECTION OF SUPPLIERS	21-05-08	01/07/08
18	ORDERS	17/06/08	29/07/08
19	INTERFACE 1- Systems Interface Basic Definition	30/07/08	24/09/08
20	INTERFACE 2- Systems Interface Complete Definition	25-09-08	24/11/08
21	MANUFACTURING & PURHASHING & TESTING	27/05/08	01/07/09
22	DELIVERY PREASSEMBLIES COMPONETS	15/04/09	15/06/09
23	DELIVERY FRIST EQUIPMENT	15/04/09	01/07/09
24	OTHERS COMPONENTS & MATERIALS	**05/05/08**	**26/06/09**
25	STEEL MATERIALS	05-05-08	24/11/08
26	CARBODY COMPONETNS	24/10/08	16/03/09
27	INSTALATIONS COMPONENTS	15/12/08	08/05/09
28	INTERIORS & FINISHING COMPONENTS	17/02/09	25/03/09
29	**1st TRAM MANUFACTURING & TESTING**	**14/11/08**	**04/08/10**
30	BODYSHELLS MANUFACTURING	**14/11/08**	**02/06/09**
31	**JIGS & TOOLING MANUFACTURING**	**14/11/08**	**16/03/09**
32	FRAME TOOLING	14/11/08	09/02/09
33	BODYSHELL TOOLING	12/01/09	16/03/09
34	**1st BODYSHELL MANUFACTURING**	**26/11/08**	**16/04/09**
35	FIRST PIECES LOT	25/11/08	07/01/09
36	FRAME'S SUBASSEMBLIES	08/01/09	06/02/09
37	FRAME ASSEMBLY & WELDING	09/02/09	12/03/09
38	FRAME FAI	13/03/09	13/03/09
39	BODYSHELL'S SUBASSEMBLIES	09/02/09	13/03/09
40	BODYSHELL ASSEMBLY & WELDING	16/03/09	15/04/09
41	BODYSHELL FAI	15/04/09	16/04/09
42	REMAINING BODYSHELLS MANUFACTURING	**18/02/09**	**02/06/09**
43	2nd BODYSHELL MANUFACTURING	18/02/09	22/04/09



SUPPLY OF 27 TRAMS FOR THE EDINBURGH TRAM NETWORK

PROJECT PLANNING

Id	Name	Start	Finish
44	3rd BODYSHELL MANUFACTURING	27/02/09	04/05/09
45	4th BODYSHELL MANUFACTURING	09/03/09	12/05/09
46	5th BODYSHELL MANUFACTURING	16/03/09	19/05/09
47	6th BODYSHELL MANUFACTURING	23/03/09	26/05/09
48	7th BODYSHELL MANUFACTURING	30/03/09	02/06/09
49	FINISHING	17/04/09	25/11/09
50	1st MODULE FINISHING	17/04/09	08/10/09
51	PAINTING	17/04/09	08/05/09
52	FINISHING	08/05/09	08/10/09
53	REMAINING MODULES FINISHING	23/04/09	25/11/09
54	2nd MODULE FINISHING	23/04/09	16/10/09
55	3rd MODULE FINISHING	05/05/09	27/10/09
56	4th MODULE FINISHING	13/05/09	04/11/09
57	5th MODULE FINISHING	20/05/09	11/11/09
58	6th MODULE FINISHING	27/05/09	18/11/09
59	7th MODULE FINISHING	03/06/09	25/11/09
60	1st TRAMSET BOGIES MANUFACTURING	20/04/09	10/11/09
61	1st TRAM FACTORY TESTS	09/10/09	05/01/10
62	1st TRAM DYNAMIC TESTS	06/01/10	12/03/10
63	1st TRAM TRANSPORT	15/03/10	08/04/10
64	DELIVERY OF THE 1st TRAM	09/04/10	09/04/10
65	COMMISSIONING OF THE 1st TRAM	12/04/10	04/06/10
66			



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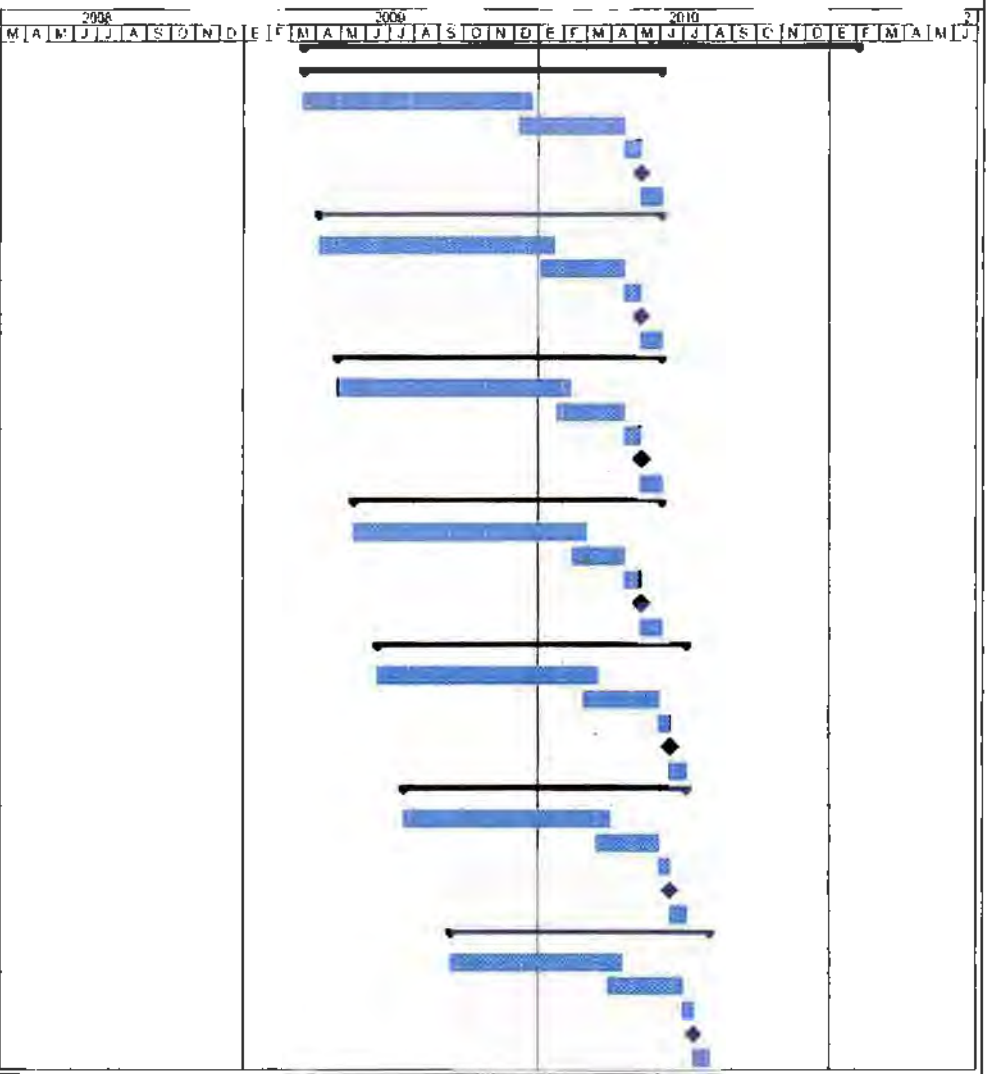
SUPPLY OF 27 TRAMS FOR THE EDINBURGH TRAM NETWORK

PROJECT PLANNING

Id	Name	Start	Finish
67	**REMAINING TRAM's**	19/03/09	04/02/11
68	**2nd Tram**	19/03/09	04/06/10
69	BODYSHELLS MANUFACTURING & FINISHING	18/03/09	24/12/09
70	FACTORY & DYNAMIC TESTS	09/12/09	19/04/10
71	TRANSPORT	19/04/10	10/05/10
72	DELIVERY OF THE TRAM	10/05/10	10/05/10
73	COMMISSIONING OF THE TRAM	10/05/10	04/06/10
74	**3rd Tram**	07/04/09	04/06/10
75	BODYSHELLS MANUFACTURING & FINISHING	07/04/09	20/01/10
76	FACTORY & DYNAMIC TESTS	05/01/10	19/04/10
77	TRANSPORT	19/04/10	10/05/10
78	DELIVERY OF THE TRAM	10/05/10	10/05/10
79	COMMISSIONING OF THE TRAM	10/05/10	04/06/10
80	**4th Tram**	29/04/09	04/06/10
81	BODYSHELLS MANUFACTURING & FINISHING	29/04/09	09/02/10
82	FACTORY & DYNAMIC TESTS	25/01/10	19/04/10
83	TRANSPORT	19/04/10	10/05/10
84	DELIVERY OF THE TRAM	10/05/10	10/05/10
85	COMMISSIONING OF THE TRAM	10/05/10	04/06/10
86	**5th Tram**	20/05/09	04/06/10
87	BODYSHELLS MANUFACTURING & FINISHING	20/05/09	01/03/10
88	FACTORY & DYNAMIC TESTS	12/02/10	19/04/10
89	TRANSPORT	19/04/10	10/05/10
90	DELIVERY OF THE TRAM	10/05/10	10/05/10
91	COMMISSIONING OF THE TRAM	10/05/10	04/06/10
92	**6th Tram**	19/06/09	05/07/10
93	BODYSHELLS MANUFACTURING & FINISHING	19/06/09	16/03/10
94	FACTORY TESTS	26/02/10	01/06/10
95	TRANSPORT	01/06/10	15/06/10
96	DELIVERY OF THE TRAM	15/06/10	15/06/10
97	COMMISSIONING OF THE TRAM	15/06/10	05/07/10
98	**7th Tram**	21/07/09	05/07/10
99	BODYSHELLS MANUFACTURING & FINISHING	21/07/09	31/03/10
100	FACTORY TESTS	15/03/10	01/06/10
101	TRANSPORT	01/06/10	15/06/10
102	DELIVERY OF THE TRAM	15/06/10	15/06/10
103	COMMISSIONING OF THE TRAM	15/06/10	05/07/10
104	**8th Tram**	17/09/09	04/06/10
105	BODYSHELLS MANUFACTURING & FINISHING	17/09/09	15/04/10
106	FACTORY TESTS	30/03/10	01/07/10
107	TRANSPORT	01/07/10	15/07/10
108	DELIVERY OF THE TRAM	15/07/10	15/07/10
109	COMMISSIONING OF THE TRAM	15/07/10	04/08/10



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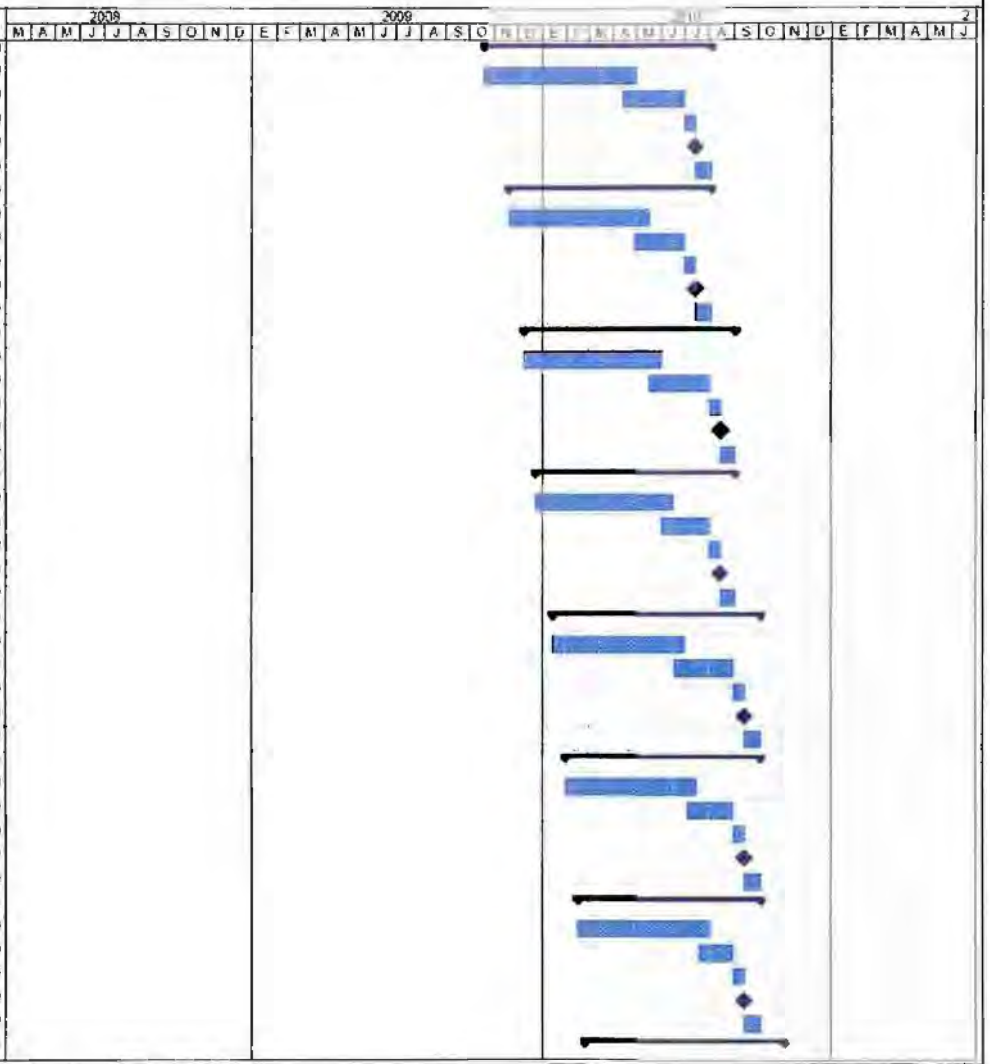
SUPPLY OF 27 TRAMS FOR THE EDINBURGH TRAM NETWORK

PROJECT PLANNING

Id	Name	Start	Finish
110	9th Tram	20/10/09	04/08/10
111	BODYSHELLS MANUFACTURING & FINISHING	20/10/09	30/04/10
112	FACTORY TESTS	14/04/10	01/07/10
113	TRANSPORT	01/07/10	15/07/10
114	DELIVERY OF THE TRAM	15/07/10	15/07/10
115	COMMISSIONING OF THE TRAM	15/07/10	04/08/10
116	10th Tram	20/11/09	04/08/10
117	BODYSHELLS MANUFACTURING & FINISHING	20/11/09	17/05/10
118	FACTORY TESTS	29/04/10	01/07/10
119	TRANSPORT	01/07/10	15/07/10
120	DELIVERY OF THE TRAM	15/07/10	15/07/10
121	COMMISSIONING OF THE TRAM	15/07/10	04/08/10
122	11st Tram	09/12/09	03/09/10
123	BODYSHELLS MANUFACTURING & FINISHING	09/12/09	01/06/10
124	FACTORY TESTS	18/05/10	02/08/10
125	TRANSPORT	02/08/10	16/08/10
126	DELIVERY OF THE TRAM	16/08/10	16/08/10
127	COMMISSIONING OF THE TRAM	16/08/10	03/09/10
128	12nd Tram	24/12/09	03/09/10
129	BODYSHELLS MANUFACTURING & FINISHING	24/12/09	16/06/10
130	FACTORY TESTS	02/08/10	02/08/10
131	TRANSPORT	02/08/10	16/08/10
132	DELIVERY OF THE TRAM	16/08/10	16/08/10
133	COMMISSIONING OF THE TRAM	16/08/10	03/09/10
134	13rh Tram	15/01/10	06/10/10
135	BODYSHELLS MANUFACTURING & FINISHING	15/01/10	01/07/10
136	FACTORY TESTS	18/06/10	01/09/10
137	TRANSPORT	01/09/10	15/09/10
138	DELIVERY OF THE TRAM	15/09/10	15/09/10
139	COMMISSIONING OF THE TRAM	15/09/10	05/10/10
140	14th Tram	01/02/10	06/10/10
141	BODYSHELLS MANUFACTURING & FINISHING	01/02/10	15/07/10
142	FACTORY TESTS	05/07/10	01/09/10
143	TRANSPORT	01/09/10	15/09/10
144	DELIVERY OF THE TRAM	15/09/10	15/09/10
145	COMMISSIONING OF THE TRAM	15/09/10	05/10/10
146	15th Tram	16/02/10	06/10/10
147	BODYSHELLS MANUFACTURING & FINISHING	16/02/10	02/08/10
148	FACTORY TESTS	20/07/10	01/09/10
149	TRANSPORT	01/09/10	15/09/10
150	DELIVERY OF THE TRAM	15/09/10	15/09/10
151	COMMISSIONING OF THE TRAM	15/09/10	05/10/10
152	16th Tram	25/02/10	04/11/10



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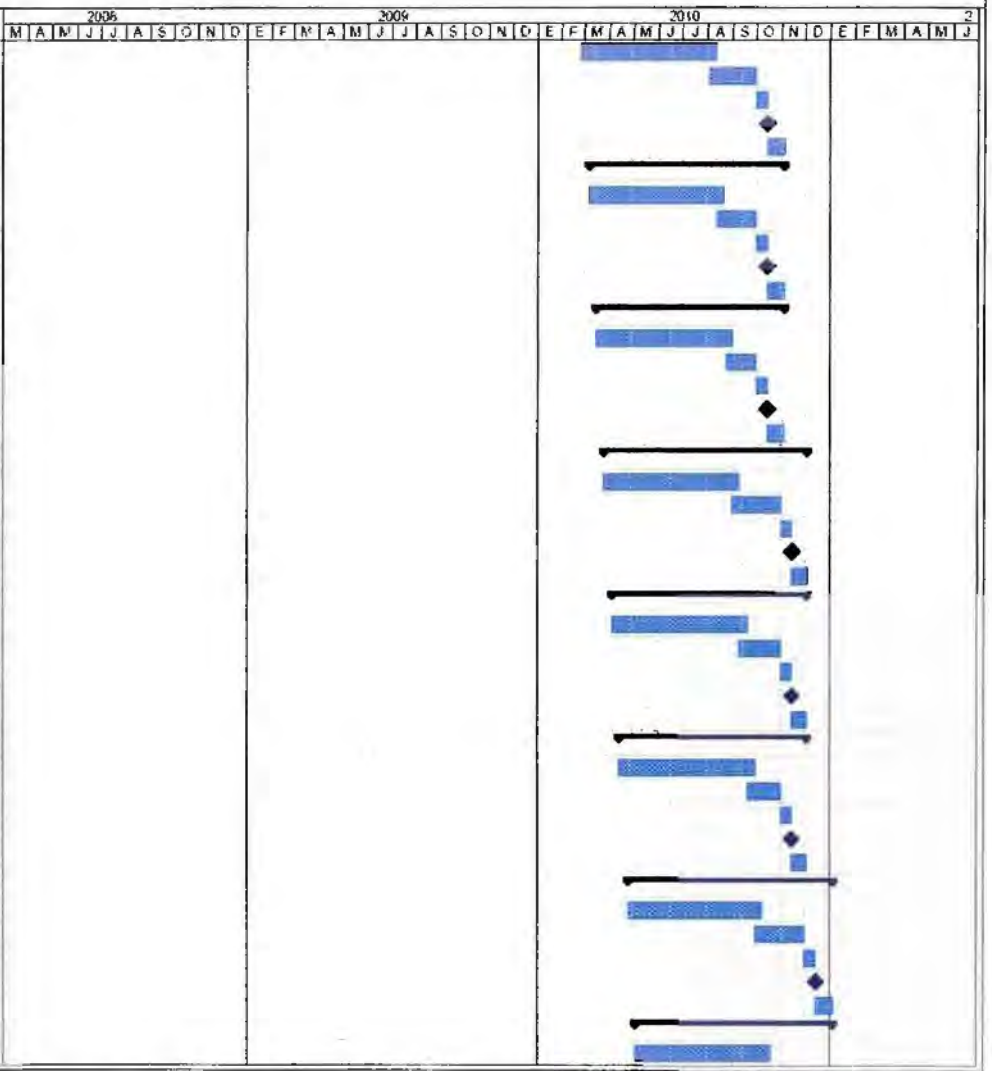
SUPPLY OF 27 TRAMS FOR THE EDINBURGH TRAM NETWORK

PROJECT PLANNING

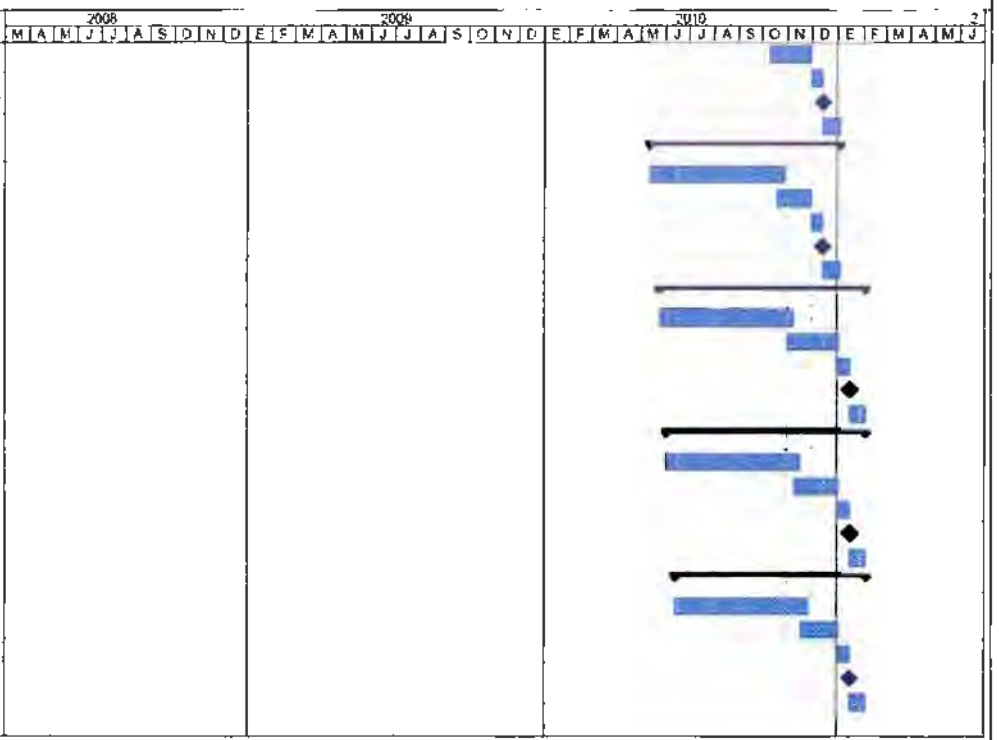
Id	Name	Start	Finish
153	BODYSHELLS MANUFACTURING & FINISHING	25/02/10	11/08/10
154	FACTORY TESTS	04/08/10	01/10/10
155	TRANSPORT	01/10/10	15/10/10
156	DELIVERY OF THE TRAM	15/10/10	15/10/10
157	COMMISSIONING OF THE TRAM	15/10/10	04/11/10
158	17th Tram	08/03/10	04/11/10
159	BODYSHELLS MANUFACTURING & FINISHING	08/03/10	20/08/10
160	FACTORY TESTS	13/08/10	01/10/10
161	TRANSPORT	01/10/10	15/10/10
162	DELIVERY OF THE TRAM	15/10/10	15/10/10
163	COMMISSIONING OF THE TRAM	15/10/10	04/11/10
164	18th Tram	17/03/10	04/11/10
165	BODYSHELLS MANUFACTURING & FINISHING	17/03/10	31/08/10
166	FACTORY TESTS	25/08/10	01/10/10
167	TRANSPORT	01/10/10	15/10/10
168	DELIVERY OF THE TRAM	15/10/10	15/10/10
169	COMMISSIONING OF THE TRAM	15/10/10	04/11/10
170	19th Tram	26/03/10	03/12/10
171	BODYSHELLS MANUFACTURING & FINISHING	26/03/10	09/09/10
172	FACTORY TESTS	01/09/10	01/11/10
173	TRANSPORT	01/11/10	15/11/10
174	DELIVERY OF THE TRAM	15/11/10	15/11/10
175	COMMISSIONING OF THE TRAM	15/11/10	03/12/10
176	20th Tram	06/04/10	03/12/10
177	BODYSHELLS MANUFACTURING & FINISHING	06/04/10	20/09/10
178	FACTORY TESTS	10/09/10	01/11/10
179	TRANSPORT	01/11/10	15/11/10
180	DELIVERY OF THE TRAM	15/11/10	15/11/10
181	COMMISSIONING OF THE TRAM	15/11/10	03/12/10
182	21st Tram	15/04/10	03/12/10
183	BODYSHELLS MANUFACTURING & FINISHING	15/04/10	29/09/10
184	FACTORY TESTS	21/09/10	01/11/10
185	TRANSPORT	01/11/10	15/11/10
186	DELIVERY OF THE TRAM	15/11/10	15/11/10
187	COMMISSIONING OF THE TRAM	15/11/10	03/12/10
188	22nd Tram	26/04/10	04/01/11
189	BODYSHELLS MANUFACTURING & FINISHING	26/04/10	08/10/10
190	FACTORY TESTS	30/09/10	01/12/10
191	TRANSPORT	01/12/10	15/12/10
192	DELIVERY OF THE TRAM	15/12/10	15/12/10
193	COMMISSIONING OF THE TRAM	15/12/10	04/01/11
194	23rd Tram	05/05/10	04/01/11
195	BODYSHELLS MANUFACTURING & FINISHING	05/05/10	19/10/10



SUPPLY OF 27 TRAMS FOR THE EDINBURGH TRAM NETWORK

PROJECT PLANNING

Id	Name	Start	Finish
196	FACTORY TESTS	11/10/10	01/12/10
197	TRANSPORT	01/12/10	15/12/10
198	DELIVERY OF THE TRAM	15/12/10	15/12/10
199	COMMISSIONING OF THE TRAM	15/12/10	04/01/11
200	24th Tram	**14/06/10**	**04/01/11**
201	BODYSHELLS MANUFACTURING & FINISHING	14/06/10	29/10/10
202	FACTORY TESTS	20/10/10	01/12/10
203	TRANSPORT	01/12/10	15/12/10
204	DELIVERY OF THE TRAM	15/12/10	15/12/10
205	COMMISSIONING OF THE TRAM	15/12/10	04/01/11
206	25th Tram	**25/06/10**	**04/02/11**
207	BODYSHELLS MANUFACTURING & FINISHING	25/06/10	08/11/10
208	FACTORY TESTS	01/11/10	03/01/11
209	TRANSPORT	03/01/11	17/01/11
210	DELIVERY OF THE TRAM	17/01/11	17/01/11
211	COMMISSIONING OF THE TRAM	17/01/11	04/02/11
212	26th Tram	**03/06/10**	**04/02/11**
213	BODYSHELLS MANUFACTURING & FINISHING	03/06/10	17/11/10
214	FACTORY TESTS	10/11/10	03/01/11
215	TRANSPORT	03/01/11	17/01/11
216	DELIVERY OF THE TRAM	17/01/11	17/01/11
217	COMMISSIONING OF THE TRAM	17/01/11	04/02/11
218	27th Tram	**14/06/10**	**04/02/11**
219	BODYSHELLS MANUFACTURING & FINISHING	14/06/10	26/11/10
220	FACTORY TESTS	19/11/10	03/01/11
221	TRANSPORT	03/01/11	17/01/11
222	DELIVERY OF THE TRAM	17/01/11	17/01/11
223	COMMISSIONING OF THE TRAM	17/01/11	04/02/11
224			



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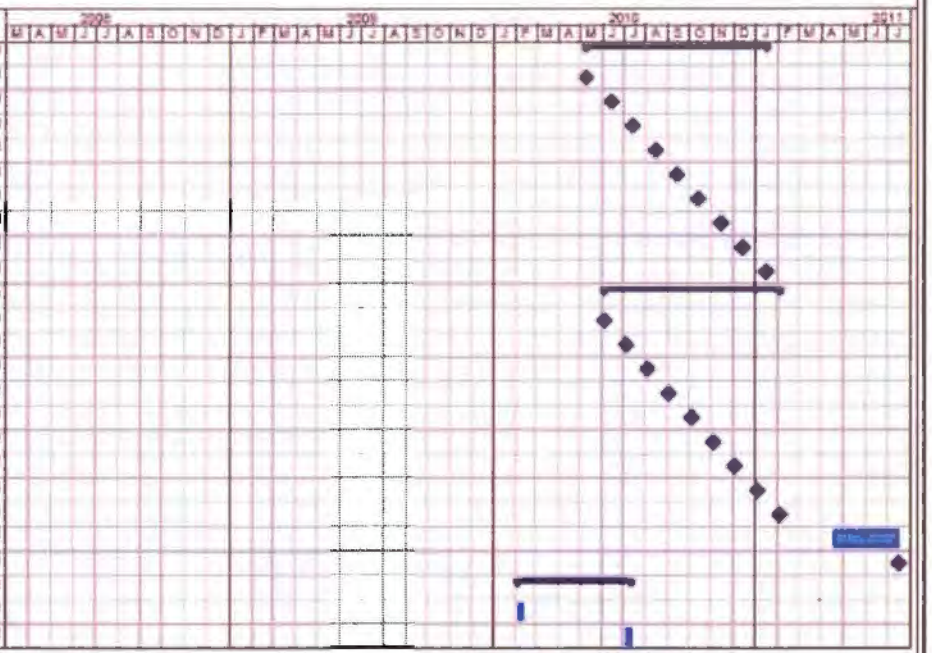
SUPPLY OF 27 TRAMS FOR THE EDINBURGH TRAM NETWORK

PROJECT PLANNING

ID	Name	Start	Finish	Duration
225	REMAINING TRAM's DELIVERIED	[illegible]	[illegible]	150 d
226	2nd, 3rd, 4th & 5th Trams	Mon 15/03/10	Mon 15/03/10	0 d
227	6th & 7th Trams	Tue 15/06/10	Tue 15/06/10	0 d
228	8th, 9th & 10th Trams	Thu 15/07/10	Thu 15/07/10	0 d
229	11st & 12nd Trams	Mon 16/08/10	Mon 16/08/10	0 d
230	13rd, 14th & 15th Trams	Wed 15/09/10	Wed 15/09/10	0 d
231	16th, 17th & 18th Trams	Fri 15/10/10	Fri 15/10/10	0 d
232	19th, 20th & 21st Trams	Mon 15/11/10	Mon 15/11/10	0 d
233	22nd, 23rd & 24th Trams	Wed 15/12/10	Wed 15/12/10	0 d
234	25th, 26th & 27th Trams	Mon 17/01/11	Mon 17/01/11	0 d
235	REMAINING TRAM's COMMISSIONED	Fri 04/06/10	Fri 04/03/11	175 d
236	2nd, 3rd, 4th & 5th Trams	Fri 04/06/10	Fri 04/06/10	0 d
237	6th & 7th Trams	Mon 05/07/10	Mon 05/07/10	0 d
238	8th, 9th & 10th Trams	Wed 04/08/10	Wed 04/08/10	0 d
239	11st & 12nd Trams	Fri 03/09/10	Fri 03/09/10	0 d
240	13rd, 14th & 15th Trams	Tue 05/10/10	Tue 05/10/10	0 d
241	16th, 17th & 18th Trams	Thu 04/11/10	Thu 04/11/10	0 d
242	19th, 20th & 21st Trams	Fri 03/12/10	Fri 03/12/10	0 d
243	22nd, 23rd & 24th Trams	Tue 04/01/11	Tue 04/01/11	0 d
244	25th, 26th & 27th Trams	Fri 04/02/11	Fri 04/02/11	0 d
245	SHADOW RUNNING	Mon 16/04/11	Sat 16/07/11	65 d
246	OPENING PASSENGER CARRYING SERVICE	Sat 16/07/11	Sat 16/07/11	0 d
247	TRAINING COURSE	Fri 05/03/10	Mon 12/07/10	112 d
248	1st course	Fri 05/03/10	Thu 11/03/10	5 d
249	2nd course	Tue 06/07/10	Mon 12/07/10	5 d



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Part 2: Tram Documentation Delivery Programme

General

The following programme presents the Tram Documentation which will be produced by CAF in order to define the vehicle, its driving practice and Maintenance. This programme is based on a four step basis, as follows:

Step 1: Format and outline contents

Step 2: Draft documents for the first two years (until mid 2009)

Step 3: Issue 1 (for two years during on track testing)

Step 4: Final documents (Nov 2010)

As an aid for reference, general time plan with some milestones which will be defined throughout this Schedule:

Step 1. Format and outline contents

In order to start up with engineering process of Tram definition, a drawing format proposal will be issued to **tie** during the next two weeks after the Effective Date.

This format proposal will typically include suggestion from CAF of drawings sizes (from A1 to A4 formats) and part table contents (to incorporate any logo and information **tie** may want to include). As a reference, please refer to drawings presented within CAF BAFO.

In addition to this, during this first stage the tram supplier will also produce and deliver to **tie** a general drawing index and structure, based on the general organisation by engineering groups followed by the tram supplier for all their vehicles design and construction projects.

Step 2. Documents for the first two years

As a general comment, the objective during the time period from the beginning of the project until the first stages of on track testing is to advance on providing Tram Documentation, in some cases as a draft to be reviewed by **tie** prior to the first formal issue. The following documents, a brief description of their contents and time schedule are provided below.

- **Style Guide**

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This document is a reference one used to define and specify the general format, overall contents and basic preliminary indexes of the different manuals to be produced (see below). The Style Guide is to be used in order to define such details with the documentation generated by the different suppliers of equipments involved in the Tram.

The Style Guide will be issued by August 2008 and will be submitted to tie for comments. After this **tie** review, due to the impact further modifications would suppose, Style Guide will be considered as final issue and will be distributed to suppliers.

All documentation will be produced using xml or html formats, and copies of all documents will be delivered in electronic format.

- **Tram Final Design Submission**

"Tram Final Design Submission" shall include all drawings representing the Final Stage Submission as designed in accordance with the Specification.

The tram supplier shall provide digitally formatted copy in standard vector image file format (.plt).

The levels of drawings are organised from general Group, general assemblies and subassemblies down to final individual components and parts. The tram supplier shall provide drawings level 0 (Groups), level 1 (General assemblies) and eventually, level 2 (Main subassemblies) where this is found necessary to complement the level 1 description. It should be noted that, as the Edinburgh Tram project will be based on previous vehicle projects as Sevilla Tram, any non modified part or assembly will keep its former drawing and occasionally could be integrated within the Tram Design Drawings delivered to **tie**.

Drawing Language: All text shall be in British English, together with the corresponding Spanish translation.

The "Tram Final Design Submission" will be delivered to **tie** during August 2008.

- **Tram Final Design Drawings**

"Tram Final Design Drawings" shall include all drawings representing the finished Vehicle or Unit in its entirety as designed in accordance with the Specification-

The tram supplier shall provide digitally formatted copy in standard vector image file format (.plt).

TIE00899939_1005

The levels of drawings are organised from general Group, general assemblies and subassemblies down to final individual components and parts. The tram supplier shall provide drawings level 0 (Groups), level 1 (General assemblies) and eventually, level 2 (Main subassemblies) where this is found necessary to complement the level 1 description. It should be noted that, as the Edinburgh Tram project will be based on previous vehicle projects as Sevilla Tram, any non modified part or assembly will keep its former drawing and occasionally could be integrated within the Tram Design Drawings delivered to **tie**.

Drawing Language: All text shall be in British English, together with the corresponding Spanish translation.

The first collection of Tram Final Design Drawings will be delivered to tie during the final engineering stages, that is, beginning of 2009.

Approvals/Consents

Documenting evidence that all required approvals and consents have been obtained require to be provided prior to January 2009.

- **Operating Manual - draft**

This document is principally for use by traincrew and other operating staff and shall be in a style and format to present simple descriptions. The documents shall contain details of requirements for preparation and disposal of the Units by traincrew, fault finding procedures for traincrew, driving and operating instructions for traincrew. The document shall contain a description of the Unit with a General Arrangement drawing of the Tram, figures and pictures to facilitate its use.

A draft Operating Manual will be delivered to **tie** for their review and comments, two months in advance of the beginning of track tests.

- **Maintenance Manual (Commissioning) - draft**

In order to allow proper maintenance during the on track tests and shadow running, CAF will produce a reduced Maintenance Manual, focussed on the required maintenance jobs that are necessary for this period. A more detailed description of contents from the complete Maintenance Manual can be found below (refer to Step 4. Final Documents – Maintenance Maintenance)

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A draft Maintenance Manual will be delivered to **tie** for their review and comments, two months in advance of the beginning of on track tests.

Step 3. Issue 1

In coincidence with the beginning of the on track dynamic testing, CAF will issue the first formal version of the following documents:

- **As Built Drawings**

  With the definition of 'As Built Drawings' CAF will deliver to **tie** the same level of information as per Tram Design Drawings, updated to the time As Built Drawings are issued.

  Those As Built Drawings update will incorporate all design modifications introduced from the first Tram Design Drawings, mainly generated to apply improvements found necessary during the Factory tests and Tram inspections.

- **Operating Manual – Issue 1**

  First Issue of this document will be delivered to **tie** incorporating their comments and amendments from the draft Operating Manual provided as per above. This Manual will be also used as the main reference documentation during Drivers operational training.

- **Maintenance Manual (Commissioning) – Issue 1**

  As well as per Operational Manual, a first Issue of this Maintenance Manual (Commissioning) will be delivered to **tie** incorporating their comments and amendments from the draft document provided as per above.

Step 4. Final documents

Finally, as the main milestone in the documentation delivery, CAF will issue definitive versions of the already issued documents, covering all different modifications and amendments generated during the on track dynamic testing of the Trams. In addition, CAF will deliver the rest of Manuals that complete the full set of documentation, with brief descriptions of their contents as follows:

- **As Built Drawings**

  In this point, the As Built Drawings update will incorporate all the rest of design modifications introduced, mainly generated due to improvements found during on track tests.

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The final collection of As Built Drawings will be delivered to **tie** on October 2010.

- **Maintenance Manual**

Taking the reduced Maintenance Manual for Commissioning as the basis document, CAF will complete the full contents of this Manual for a comprehensive maintenance of the Trams with no time limitation. The contents of this Manual would typically include the following:

a) Vehicle Maintenance Instruction (VMI)

The VMI is principally for use by staff involved in servicing and Maintenance. It shall cover job descriptions for examination work and any other jobs required on a seasonal basis, or following equipment failure.

This will include seasonal precautions and post incident testing. The VMI shall also include the periodicities at which the specific Maintenance is to be carried out. Any changes to such periodicities must be discussed with and agreed in writing with the Purchaser before implementation.

Technical procedures required as a result of work arising from an examination shall be included and indexed in a separate Maintenance procedure section of each schedule. Alternatively, the information required may be obtained by reference to another document, e.g. the Vehicle Overhaul Instruction or the Component Overhaul Instructions.

b) Vehicle Overhaul Instruction (VOI)

The VOI is principally for use by staff involved in overhaul. It shall contain overhaul requirements, the periodicities, abnormal work arising and details for removal/refitting and on Vehicle testing of components. It shall make reference to component overhaul instructions, and other documents relevant to overhaul, i.e. drawings and safety data sheets.

The Maintenance Manual will be delivered to **tie** on November 2010.

- **Technical Instruction Manual (TIM)**

The aim of the TIM is to provide information for reference when more difficult faults or problems occur. It will also be used for future reference by technical staff, particularly by the Purchaser. It shall contain sections as general descriptions, functional description included detailed fault finding instructions, which will be used in conjunction with drawings and

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schematics; details of special tools and equipment, instructions for their use, maintenance and calibration; and Fault Finding Booklet (FFB).

Technical Instruction Manual will be delivered to **tie** on December 2010.

- **Illustrated List of Components**

This document will contain a list of spare components and parts within the Tram design, with illustrated figures in 3D (where possible, 2D figures as a complement), in order to allow for an easy identification.

Illustrated List of Components will be delivered to **tie** on February 2011.

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Part 3: NOT USED

Edimburgh tramnetwork

QUALITY PLAN

Revision level: Issue 1.00, 27.09.2006 for Tender

Approved:	Antonio Campos	Project Manager	27.09.06	
Checked:	Aitor Galarza	CAF Quality Manager	27.09.06	
Produced:	Javier Ganuza	Project Quality Manager	27.09.06	
	Name	Function	Date	Signature

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REVISIONS

Issue	Date	Revised in document	Remarks
1.00	27.09.2006	First Edition	For Tender purpose

DISTRIBUTION

Copy No.	Name	Function / Department

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1. INTRODUCTION

1.1 Purpose

The Quality Plan describes the procedures and controls that will be applied by Construcciones y Auxiliar de Ferrocarriles, S.A. (CAF) in order to satisfy the requirements of the Agreement between Edimburgh tramnetwork and CAF to design, manufacture, supply, deliver and maintenance of the tram units

The present document is titled "Quality Plan" and it will subsequently be supported by an specific Test and Inspection Plan described in section 4.5 of the present document.

1.2 Scope

This Quality Plan is mandatory on all stages of the contract from initial review of the contract to delivery, acceptance, maintenance and warranty period of the trains.

2. RELATED DOCUMENTS

ISO 9001/2000	Quality Systems
CAF	Quality Assurance Manual, Vehicles Division
CAF	Procedures Manual
EN287	Approval Testing of Welders for Fusion Welding
EN288	Specification and Approval of Welding Procedures for Metallic Materials

3. GLOSSARY

CAF	Construcciones y Auxiliar de Ferrocarriles, S.A, Spain
Purchaser	Edinburgh tramnetwork, represented by the Chief Mechanical Engineer. Any reference to approvals or submissions to the Purchaser will refer to the Chief Mechanical Engineer.
Quality Plan	A document setting out the Quality Assurance policies and management organisation for the execution of the contract.
Test and Inspection Plan	A document setting out the specific inspections and quality controls to be carried out at every stage of the project.

4. QUALITY SYSTEM

The project will be undertaken within the framework of the quality assurance requirements detailed in the International Standards Organisation specifications ISO 9001.

This Standard is satisfied within UK and Spain by national standards, which are identical to the ISO 9001 standard.

Lloyds, Spain, registration number 950266 registers CAF as satisfying the requirements of UNE EN ISO 9001.

The Quality System of CAF is detailed in the Quality Assurance Manual. This manual contains a Quality Policy Statement signed by the General manager.

The Quality Manager holds copy of this manual.

4.1 Document Review

Prior to submission to the Purchaser this document has been reviewed by and approved by the Project Manager and the Quality Manager.

The document will be reviewed and approved by the Purchaser prior to be issued and distributed.

Any further issue of the present document will follow the same review and approval process.

4.2 Procedures

Documented procedures will be used according to the Quality System to control all the processes employed in every stage of the project.

These procedures are included in the Procedures Manual. A list of these procedures is also stated in Appendix 1.

4.3 Work Instructions

Work instructions will be prepared, if necessary, to detail particular processes, which require further detail than given in the Procedures Manual.

5. MANAGEMENT RESPONSABILITIES

The Quality Policy applicable to the supply of Railway Vehicles has the objective of supplying products and services conforming to our Customer's and legislative requirements.

To achieve this objective, this Quality Management System has been implemented as a device that allows the provision of objective proof in the form of data and information on the efficiency of our organisation and quality of our products. This shall lead to:

- Our Company attaining the desired quality at an optimum cost.
- Our customers increased satisfaction and their trust in our products.

The maintenance of this Quality Management System will allow us to establish "solid bases" on which the required activities shall be developed to promote the continuity and progressive improvement of our Company.

I request each Division and Department involved to strictly comply with the Quality Assurance Programme described in this manual.

[redacted]

Signed: **Andrés Arizkorreta**

General Manager

CAF Procedure P-02.01-BZ " Structure and Organization" describes and establishes in detail the functions and responsibilities for each of the CAF Departments managers.

Within the procedure P-05.05.BZ "Organization, planning and development of the project" it is established CAF appointment and entitlement of the key personal who will constitute the Project team. Additionally to the Project Manager, Quality Project Managerand and Project Lead Engineer, the Enginering department constitutes the different working teams and responsibles for each sub-department in the Technological Area.

6. TRAINING OF CAF PERSONNEL

Comprehensive training programmes are conducted to ensure that all CAF personnel are trained to a level commensurate with the tasks placed on them. The training is conducted for both technical and management skills. Training Programmes are co-ordinated by the Training Department. Where appropriate, personnel need to be certified to carry out specific safety related tasks.

7. PLANNING

7.1 Contract review

A contract review will be undertaken within the 3 months after the Contract signature or as described in other formal specific agreement between CAF and the Customer. The purpose of this review is to ensure that the requirements of the Contract are clearly understood by the project team, and can be achieved effectively and to ensure due emphasis is placed on the Quality requirements by all personnel involved in the Contract.

A record of the Contract Review meeting will be prepared and held within the Project records.

In addition there will be external reviews with the Purchaser or his representatives on contractual matters.

7.2 Project Time Plans

A Project Time Plan will be prepared for the Project and will include relevant input from major sub-contractors. The plan will show the design stages and time scales identifying key events in the programme such as Design Review, Manufacturing, Factory Acceptance Testing, Transport, Delivery, Commissioning and Acceptance testing. This processes are detailed in the related procedures P-05.05.BZ "Organization, planning and development of the project" and P-05.02-BZ "Design Development", P-05.03-BZ "Design verification and validation" and P-05.04 BZ. "Design Review"

The Project Time Plan will be reviewed on a regular basis. These reviews will be documented and all actions arising from the reviews recorded and followed.

7.3 Project Reporting

The Project Manager will report to the Purchaser about the status of the project at every project status meeting.

The Project Manager will meet with the Project Team on weekly basis to review project progress and prepare the project progress meetings.

Senior management meetings will be scheduled on a regular basis.

7.4 DESIGN & DEVELOPMENT CONTROL

7.4.1 General

All stages of the design will be documented. The procedures to be adopted during these stages are specified in the Quality Assurance Manual and supporting documentation.

7.4.2 Design Authority

The Design Authority is responsible for ensuring that the performance of the units satisfies both the design requirements and the contract conditions.

The Design Authority for this contract is the Project Engineer.

7.4.3 Internal Design Review

The Design Review Process will be employed to rigorously assess the suitability of the design for its intended task. Internal Design Reviews will be held at predetermined stages in the design.

The Design Review Process which will be employed is detailed in the procedure:

CAF Design Review P-05.04-BZ

7.4.4 External Design Review

In addition to the Internal Design Review process detailed in paragraph 5.3, External Design Reviews will also be undertaken with the Purchaser or representatives, according to the Contract as detailed in the Project Time Plan, and will be used as the control mechanism to formally approve the Design.

7.4.5 Monitoring and Assessment

Performance monitoring of the rolling stock will be undertaken to record all defects and these will be assessed and categorised.

7.4.6 Configuration management & Change Control

Configuration Management will be adopted to ensure control of all documentation, drawings, hardware and software.

All documentation and software will be formally controlled from the corresponding review.

Automated tools will be used by some parts of the organisation to achieve effective configuration management.

Configuration management process is detailed in the procedure:

- Modifications P-05.01-BZ

7.4.7 Concessions

All concessions will be dealt with according to the contract. This will cover all changes to the contract and must be agreed by both parties before carrying out the change.

7.5 PURCHASING

7.5.1 Vendor Control

The term "Vendor" includes suppliers of proprietary products and sub-contractors who supply products and services specifically tailored to the requirements of this project i.e. non-proprietary.

According to the Quality System all vendors are approved by CAF prior to contracts being placed and a list of approved vendors will be held within the Purchasing Department.

In the Purchased Materials Inspection and Test Plan (within the Test and Inspection Plan) it will be stated the controls imposed over each purchased material.

7.5.2 Purchase Orders

Purchase orders will only be placed with approved vendors according to CAF procedures. Orders need to be approved prior to issue.

7.5.3 Purchaser Supplied Material

Should any material be free issued by the Purchaser for use on the units then it will be held in store under the same conditions and procedures as for all other material required for the Project, except for being labelled as a Purchaser owned property.

7.6 MANUFACTURING CONTROL

Manufacturing will take place in accordance with the relevant documented procedures, a list of which is given in Appendix 1.

Manufacturing control procedures are mandatory on all stages of the manufacturing process and are supplemented by detailed work instructions where required.

Welders employed by CAF in the manufacturing of the bogies and body shells will be assessed and certified in accordance with EN 287. Welding will be undertaken in accordance with the requirements of EN 288. Other processes associated with the manufacture of the vehicle, e.g. the painting process, will employ skilled personnel.

7.6.1 Special Processes

Within the project the below listed "Special Processes" are defined.

The "Special Processes" are those which require a particularly detailed level of work instructions or operator skills in order to ensure that quality, safety and reliability is achieved. As the design advances additional Special Processes may be identified.

Painting Procedure	P-10.03-BZ Checking Painting Processes
Welding Procedure	P-10.04-BZ Checking Welding Processes
Cable Preparation Procedure	P-10.11-BZ Checking Cable Preparation Process

7.6.2 Quality Records

7.6.2.1 General Records

Records of the performance of the Quality System are held in accordance with the requirements of ISO 9001.

General Records include:

- Management Reviews
- Quality Audits and Reviews
- Training
- Calibration
- Procurement
- Manufacturing
- Purchaser Complaints

7.6.2.2 Project Specific Records

In addition to the above recording, project specific information will also be held including but not limited to:

- Contract Review
- Design Reviews
- As Made Drawings
- Test Reports
- Spare Parts
- Manuals

7.6.3 Inspection and Test Plan

According to the Quality System a Test and Inspection Plan will be produced to identify the controls to be applied at all stages of the project.

This Inspection and test Plan will be composed of three different documents:

- Purchased materials Inspection and Testing Plan.
- Manufacturing Inspection and Testing Plan.
- Test Plan (including factory and site testing).

The Test and Inspection Plan will be submitted to the Purchaser for review and approval.

This review allows for input from the Purchaser to indicate activities, which the Purchaser may wish to witness or declare as a mandatory hold point requiring his authorisation to proceed.

7.6.4 Project Documentation

Project specific documentation will be prepared as appropriate in agreement with the Purchaser.

7.6.5 Document Control

Document Control will be undertaken in accordance with the operating procedures of CAF Quality System, within the quality assurance requirements detailed in the ISO 9001.

7.7 IDENTIFICATION AND TRACEABILITY

Part identification will ensure that all components and sub-assemblies are controlled and ensure that only the correct part will be fitted to a higher level assembly.

Major assemblies will be marked with a serial number to ensure traceability of all assembly, inspection and test processes.

7.8 INSPECTION

7.8.1 Purchased Materials Receiving Inspection

The controls imposed to the purchased materials will be stated in the Purchased Materials Inspection and Test Plan (within the Test and Inspection Plan).

Inspection of all purchased materials and products is controlled by applicable procedures which identify the inspection criteria to be applied. Where applicable the procedures may be implemented prior to the material or product leaving the vendor's premises i.e. source inspection.

If the Purchaser requires his own material or product inspection prior to delivery this will be stated on the purchase order and will be highlighted in the Test and Inspection Plan.

Any work found to be unacceptable would be subject to the following courses of action:

- Reject material
- Re-work material
- material accepted by concession

When a decision to accept the material by concession is made then the process detailed in paragraph 6.2 will be applied.

7.8.2 In Process and Final Inspection

The controls imposed to the manufacturing process will be stated in the Manufacturing Inspection and Test Plan (within the Inspection and Test Plan).

Inspections at the appropriate stages defined in the Manufacturing Inspection and Test Plan will be undertaken to the appropriate standards. Evidence of inspection having been carried out will be held within the manufacturing documentation.

7.9 TESTING

Testing will be carried out in accordance with the Test Plan.

The Test Plan will include factory and site tests, type and routine tests.

7.10 CONTROL OF INSPECTION, MEASURING AND TEST EQUIPMENT

Inspection, measuring and test equipment used for product verification is periodically reviewed and calibrated.

The calibration process and the calibration period are stated in the corresponding procedures and standards of the Quality System.

7.11 HANDLING, STORAGE, PACKING AND DESPATCH

Finished products, having been finally inspected will be stored, packed and despatched in such a manner that no deterioration is guaranteed.

The process to manipulate, store, pack and deliver finished products will be conducted according to the corresponding procedures within the Quality System.

7.12 COMMISSIONING

Any commissioning activity will be undertaken in accordance with the corresponding procedures.

7.13 PURCHASER VERIFICATION

The Inspection and Test Plan will indicate activities in which the Purchaser wishes to be involved.

Two levels of Purchaser involvement has been identified:

Witness (W) Defined as a point in the programme, in which has been defined that the Purchaser witness is required. The Purchaser will be informed of the date, time and location of the activity. In case of non-attendance of the Purchaser the activity will continue as scheduled.

Hold (H) Defined as a point in the programme in which has been defined that the Purchaser wish to stop further progress of an activity until he witnessing it. Should the Purchaser fail to attend during a "Hold" activity then the Project Manager will immediately be informed and an appropriate course of action sought.

The Inspection and Test Plan submitted to the Purchaser will specify the planned locations for each activity. The specific official communication for the planned tests will be agreed (fax, email...).

7.14 ACCOMMODATION AND ASSISTANCE

The Purchaser or his representative will be permitted reasonable access to all facilities used during all stages of the Project.

It will be made available the following:

- Minutes of design review meetings
- Drawings and documents required for Design Review
- Manuals, procedures and instructions used within the Project.

8. MEASUREMENT, ANALISYS AND IMPROVEMENT

8.1 CUSTOMER SATISFACTION

These activities will be performed in accordance with P-08.02-BZ procedure.

8.2 CONTROL OF NON-CONFORMING MATERIAL

All non-conforming material will be identified and returned to its place of origin. This may be either external suppliers or internal departments.

The process to document an dispose of non-conforming materials will be conducted according to the corresponding procedures within the Quality System.

8.3 QUALITY AUDITS

Regular internal quality audits are conducted within the Quality System in accordance with the operating procedure:

- Internal Audits P-18.01-BZ

The Purchaser may wish to undertake audits. The Project Manager will provide facilities and assistance to allow such audits to take place at CAF or at his subcontractor's venues.

The Project Quality Manager will address actions arising from these audits.

APPENDIX 1. CAF'S PROCEDURES. PAGE 1 OF 2

CODE	DESCRIPTION
P-02.01-BZ	STRUCTURE AND ORGANISATION
P-02.02-BZ	SYSTEM REVIEW
P-03.01-BZ	QUALITY PLANNING
P-04.01-BZ	CONTRACT REVIEW
P-04.02-BZ	TENDERS
P-05.01-BZ	MODIFICATIONS
P-05.02-BZ	DESIGN DEVELOPMENT
P-05.03-BZ	DESIGN CHECKING AND VERIFICATION
P-05.04-BZ	DESIGN REVIEW
P-05.05-BZ	ORGANISATION, PLANNING AND DEVELOPMENT OF THE PROJECT
P-06.01-BZ	PROCEDURE PREPARATION AND CHECKING
P-06.02-BZ	DOCUMENT CHECKING
P-07.01-BZ	APPROVING SUPPLIERS
P-07.02-BZ	SUPPLIERS QUALITY SYSTEM AUDITS
P-07.03-BZ	PURCHASE MANAGEMENT OF MAIN EQUIPMENTS
P-07.04-BZ	PURCHASE DOCUMENTS
P-07.07-BZ	CONTINUAL DELIVERY ASSESSMENT
P-08.01-BZ	PRODUCTS SUPPLIED BY THE PURCHASER
P-08.02-BZ	CUSTOMER SATISFACTION MEASUREMENT
P-09.01-BZ	IDENTIFICATION AND TRACEABILITY
P-10.01-BZ	PREPARATION AND PUBLICATION OF PARTS LIST
P-10.02-BZ	CHECKING FINISHED PRE ASSEMBLY AND ASSEMBLY PROCESSES
P-10.03-BZ	CHECKING PAINTING PROCESSES
P-10.04-BZ	CHECKING WELDING PROCESSES
P-10.05-BZ	CHECKING STRUCTURE PROCESSES
P-10.06-Z	CHECKING DOOR-MANUFACTURING PROCESSES
P-10.07-BZ	CHECKING BOILER-SHOP PROCESSES
P-10.08-BZ	IRON/STEEL SURFACE TREATMENT
P-10.09-B	CHECKING FINISHED BOGIE ASSEMBLY PROCESS
P-10.11-BZ	CHECKING CABLE PREPARATION PROCESS

P-10.12-B	CHECKING TUBE MANUFACTURING PROCESS

APPENDIX 2. CAF'S PROCEDURES. PAGE 2 OF 2

CODE	DESCRIPTION
P-10.13-BZ	MAINTENANCE OF MANUFACTURE EQUIPMENTS
P-10.14-B	CHECKING OF MECHANISING PROCESS
P-10.15-B	CHECKING ASSEMBLY PROCESS
P-10.16-BZ	CHECKING ADHESIVE AND SEALING PROCESS
P-11.01-BZ	PLANNING MANUFACTURING QUALITY
P-11.02-BZ	FINAL TESTS AND TRIALS
P-11.03-BZ	INSPECTIONS AND TESTS ON RECEPTION
P-12.01-BZ	CHECKING INSPECTION, MEASURING AND TESTING EQUIPMENT
P-13.01-BZ	INSPECTION AND TEST STATUS
P-14.01-BZ	TREATMENT OF UNSUITABLE PRODUCTS DETECTED DURING MANUFACTURE
P-14.02-BZ	TREATMENT OF UNSUITABLE PRODUCTS AT RECEPTION
P-15.01-BZ	CORRECTIVE ACTIONS
P-16.01-BZ	HANDLING, STORAGE, PACKAGING AND DELIVERY
P-17.01-BZ	QUALITY RECORDS
P-18.01-BZ	INTERNAL AUDITS
P-19.01-BZ	TRAINING
P-20.01-BZ	TREATMENT OF T.A.S. INFORMATION
P-20.02-BZ	TRAINING OF T.A.S. PERSONNEL
P-20.03-BZ	T.A.S. MATERIAL MANAGEMENT
P-20.04-BZ	POST-SALES TECHNICAL ASSISTANCE
P-20.05-BZ	ORGANISATION OF THE POST-SALES TECHNICAL ASSISTANCE
P-21.01-BZ	STATISTICAL METHODS

Part 5 Tram Deliverables Programme

No	Deliverables	Date of deliverable	Requirement	Milestone Payment as detailed in Schedule 5 Part 1	Date of Milestone payment	Signing off Process
1	General drawing index and structure	10/06/2008	This is to be based on the general organisation by engineering groups followed by the tram supplier for all their vehicles design and construction projects.	Approval of Preliminary Design (Pre-Works Development Services)	21/06/2008	Tram Inspector is provided with all information and accepts information provided
2	Style Guide	12/02/2009	Style guide will be submitted to tie for comments	Approval of Final Design/Mock-Up (Pre-Works Development Services) date 08/11/2008. This will now extend to 28/02/08 as date of deliverable changed	28/02/2009	Tram Inspector is provided with all information and accepts information provided
3	Tram design drawings	05/05/2009	Drawings representing the finished vehicle or Unit in its entirety as designed in accordance with the specification	Obtaining Approvals and Consents for Tram (Pre-Works Development Services)	30/05/2009	Tram Inspector is provided with all information and accepts information provided
4	Operating Manual - draft	12/01/2010	The documents shall contain details of requirements for preparation and disposal of the Units by traincrew, fault finding procedures for traincrew, driving and operating instructions for traincrew. The document shall contain a description of the Unit with a General Arrangement drawing of the Tram, figures and pictures to facilitate its use.A draft Operating Manual will be delivered to tie for their review and comments, two months in advance of the beginning of on track tests.	Delivery of Preliminary Tram Maintenance Manuals	06/02/2010	Tram Inspector is provided with all information and accepts information provided
5	Maintenance manual (commissioning) - draft	12/01/2010	CAF will produce a reduced Maintenance Manual, focussed on the required maintenance jobs that are necessary for track tests and shadow running. A more detailed description of contents from the complete Maintenance Manual can be found below (refer to Step 4. Final Documents – Maintenance Maintenance). A draft Maintenance Manual will be delivered to tie for their review and comments, two months in advance of the beginning of on track tests.	Delivery of Preliminary Tram Maintenance Manuals	06/02/2010	Tram Inspector is provided with all information and accepts information provided

No	Deliverables	Date of deliverable	Requirement	Milestone Payment as detailed in Schedule 5 Part 1	Date of Milestone payment	Signing off Process
6	As Built Drawings - Issue 1	10/02/2010	With the definition of 'As Built Drawings' CAF will deliver to **tie** the same level of information as per Tram Design Drawings, updated to the time As Built Drawings are issued. Those As Built Drawings update will incorporate all design modifications introduced from the first Tram Design Drawings, mainly generated to apply improvements found necessary during the Factory tests and Tram inspections.	Delivery of 6th Tram	26/06/2010	Tram Inspector is provided with all information and accepts information provided
7	Operating Manual - issue 1	12/03/2010	First Issue of this document will be delivered to **tie** incorporating their comments and amendments from the draft Operating Manual draft. This Manual will be also used as the main reference documentation during Drivers operational training.	Delivery of 8th Tram	24/07/2010	Tram Inspector is provided with all information and accepts information provided
8	Maintenance manual (commissioning) - Issue 1	12/03/2010	A first Issue of this Maintenance Manual (Commissioning) will be delivered to **tie** incorporating their comments and amendments from the Maintenance manual draft document .	Delivery of 8th Tram	24/07/2010	Tram Inspector is provided with all information and accepts information provided
9	As Built Drawings - Final documentation	24/01/2011	In this point, the As Built Drawings update will incorporate all the rest of design modifications introduced, mainly generated due to improvements found during on track tests.	Delivery of all final Documentation	25/06/2011	Tram Inspector is provided with all information and accepts information provided
10	Maintenance Manual - Final documentation	05/03/2011	Taking the reduced Maintenance Manual for Commissioning as the basis document, CAF will complete the full contents of this Manual for a comprehensive maintenance of the Trams with no time limitation. The contents of this Manual would typically include vehicle Maintenance Instruction and vehicle Overhaul Instruction	Delivery of all final Documentation	25/06/2011	Tram Inspector is provided with all information and accepts information provided

No	Deliverables	Date of deliverable	Requirement	Milestone Payment as detailed in Schedule 5 Part 1	Date of Milestone payment	Signing off Process
11	Technical Instruction Manual - Final Documentation	05/04/2011	TIM is to provide information for reference when more difficult faults or problems occur. It will also be used for future reference by technical staff, particularly by the Purchaser. It shall contain sections as general descriptions, functional description included detailed fault finding instructions, which will be used in conjunction with drawings and schematics; details of special tools and equipment, instructions for their use, maintenance and calibration; and Fault Finding Booklet	Delivery of all final Documentation	25/06/2011	Tram Inspector is provided with all information and accepts information provided
12	Illustrated List of Components - Final Documentation	05/06/2011	This document will contain a list of spare components and parts within the Tram design, with illustrated figures in 3D (where possible, 2D figures as a complement), in order to allow for an easy identification.	Delivery of all final Documentation	25/06/2011	Tram Inspector is provided with all information and accepts information provided

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 5 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 5

PAYMENTS

Part 1: Milestone Payment Schedule

PAYMENT MILESTONE SCHEDULE 1 to 27 TRAMS

TIE00899939_1030

TIE00899939_1031

TIE00899939_1032

PAYMENT MILESTONES SCHEDULE DEPOT EQUIPMENT

SCHEDULE 5 - PAYMENT MILESTONES SCHEDULE: DEPOT EQUIPMENT

PAYMENT MILESTONES SCHEDULE: DEPOT EQUIPMENT						
No	Milestone Description	Revised forecast date fixed on signature on 12th May 2008	Milestone Payment Proposed	€ of Total Milestone Payments	Revised forecast (monthly period period	
	Depot equipment		€740,009.03			
	Revised date	16/07/2008	20.00%	€148,001.81	04/2008-2009	
1	Delivery of equipment	26/01/2010	65.00%	€481,005.87	01/2009-2010	
2	Acceptance test of equipment	26/04/2010	10.00%	€74,000.90	01/2010-2011	
3	Certificate of reliability	26/07/2010	5.00%	€37,000.45	04/2010-2011	
			100.00%	€740,009.03		

Payment Period

Period End Date	Application for payment	Clause 38.6 Issue of Interim Certificate	Clause 38 & VAT Certificate to Client	Clause 38 payment of Interim Certificate	Amount to be paid
	within 3 Dutensia days	10 Business days from application date	7 days from issue of interim certificate	20 Business days from issue of VAT certificate	
16/07/2008	22/07/2008	29/07/2008	12/08/2008	09/09/2008	€148,001.81
26/01/2010	02/02/2010	09/02/2010	23/02/2010	31/03/2010	€481,005.87
26/04/2010	03/05/2010	10/05/2010	24/05/2010	23/06/2010	€74,000.90
26/07/2010	02/08/2010	09/08/2010	23/08/2010	15/09/2010	€37,000.45

€740,009.03

Cm/SS CHECKS

TIE00899939_1033

Part 2: Liquidated Damages for Weight

1. The Tram Supplier shall following the issue of the first Certificate of Tram Commissioning of a Tram arrange for that Tram to be weighed at the Depot (or such other place within the United Kingdom reasonably agreed by the Client) using independently operated and calibrated weighing equipment to determine the weight of the Tram, such weight to be verified and certified by the independent operator of the weighing equipment ("**Calibrated Tram Weight**").

2. If the Calibrated Tram Weight is greater than the Maximum Tram Weight then the Client will calculate the liquidated damages payable on the following basis:

$$LD = [CTW - MTW] \times AFK \times EP \times D \times NPV$$

where:

LD is the liquidated damages payable for excess tram weight;

CTW is the Calibrated Tram Weight;

MTW is the Maximum Tram Weight;

AFK is the annual fleet kilometres which shall be 2,695,055 per annum

EP is the unit cost of electricity to the Client (measured in £ per Kilowatt hour) as determined by the Client, acting reasonably, on the date that the Tram is weighed pursuant to paragraph 1 above;

D is the excess energy differential factor which shall be 0.0856 kilowatt-hours per tonne-kilometre.

NPV is the adjustment to give the Net Present Value over the design life of the Trams, which shall be 21.725. If LD is a value less than zero or zero, no liquidated damages will be payable under this provision.

3. Where the Tram Supplier makes any further modifications to any Tram which the Client believes (acting reasonably) to have materially increased the weight of the Tram, the Client shall be entitled to re-weigh the Tram in accordance with paragraph 1 above. If the Calibrated Tram Weight has increased the Client shall be entitled to recalculate the liquidated damages payable pursuant to paragraph 2 above, and shall pay the increase as liquidated damages representing the increased cost of running the modified Tram fleet.

TIE00899939_1034

Part 3: Tram Pricing Schedule

Tram Supply Figure Calculation **Date:- 'Based on hedged figures at 29th April 2008**

			Recommended Final Deal w/ currency hedge	Tram Price	Depot Equipment	Capital Maintenance mobilisation
BAFO figure (£77,504,671)			£53,780,037.00	£53,780,037.00		
Omit figure for final design work negotiated in discussions with CAF			£721,491.00	£721,491.00		
Revised figure			£53,058,546.00	£53,058,546.00		
Add mandatory variants (these are all savings)						
Mandatory Variant MV 5 flange lubrication (for 6 trams)			£0.00	£0.00		
Mandatory Variant MV 4 Exterior Displays with Shape Route (for 27 trams)						
Revised price confirmed 11th March 2008			£68,744.21	£68,744.21		
Mandatory Variant MV 5 Passenger Counting system (for 5 trams)			-£486,236.55	-£486,236.55		
Sub total			£52,671,053.66	£52,671,053.66		
Maintenance Mobilisation (new below as not subject to discount)			£0.00			£0.00
Sub Total			£52,671,053.66	£52,671,053.66		£0.00
Add options in variant bid that should be in base bid (these are all savings)						
CAF Variant CAF V2 compliance with EN standards instead of BS regarding smoke and fire			-£425,544.27	-£425,544.27		
CAF Variant Spare parts saving			-£293,202.00	-£293,202.00		
Additional sub mounting agreed by tie			£10,026.32	£10,026.32		
CAF Variant saving to Mock up			£0.00	£0.00		
Sub Total			£52,052,333.71	£52,052,333.71		£0.00
Discount for 20% first milestone (Tram Supply only)		1.00%	-£520,523.34	-£520,523.34		£0.00
			£51,531,810.38	£51,531,810.38		£0.00
Depot Equipment - Firm See below						
Depot Equipment - Provisional see below						
Maintenance Mobilisation			£2,130,696.00			£2,130,696.00
Sub Total			£53,662,496.38	£51,531,810.38	£0.00	£2,130,696.00
Currency fluctuation	BAFO £/Euro	0.693				
	Hedged £/Euro	0.7362	£3,345,194.58	£3,212,372.59	£0.00	£132,821.98
	% change	6.23%				
Sub total			£57,007,690.96	£54,744,182.97	£0.00	£2,263,507.98
	BAFO £/Euro	0.7362				
	Hedged £/Euro	0.7462	£309,740.24	£297,441.91	£0.00	£12,298.33
	% change	0.54%				
Depot equipment (includes hedging at 0.7399 as revised figures in Euros)			£739,709.11		£739,709.11	
Depot Equipment add hedging to (0.7402) 29th April 2008	BAFO £/Euro	0.7399				
	Hedged £/Euro	0.7462				
	% change	0.04%	£299.92		£299.92	
Revised method for sanding (proposed saving)			£0.00		£0.00	
Adjustment for CAF share of currency risk on supply, mobilisation, currency fluctuation but not on depot equipment	Half of 1%	0.50%	£0.00	£0.00	£0.00	£0.00
Total			£58,067,440.22	£55,041,624.88	£740,009.03	£2,275,806.32
Other costs						
Model (will be paid separately)			£5,000.00			
Total Price			**£58,063,440.22**	**£55,041,624.88**	**£740,009.03**	**£2,275,806.32**

Summary

1. Tram	£55,041,624.88	
2. Depot equipment	£740,009.03	
3. Capital maintenance	£2,275,806.32	[illegible]
Total for contract	£58,057,440.22	£73,434,601
4. model (paid separately but has to be included in budget)	£5,000.00	
Grand Total	**£58,063,440.22**	

Note: Although in the overall cost calculation the cost of the model has been paid separately

Note: No Adjustment for CAF on share of currency risk now as Depot equipment has changed

"Agreed Tram Price" (Tram price and Depot equipment) **£55,781,633.91**

Part 4: Depot Equipment Pricing Schedule

COLUMN 1	COLUMN 3/4		
Depot Equipment	**CAF Scope - Prices as per December 2007 Proposal**	**ER Section 29 Table 82 Ref.**	**CAF €**
			0.7399
Sand filling plant incorporated tents (under discussion)	112,821	4.4	151,400
Overhead gantry crane	[redacted]	2.4	44,300
Wheel lathe	[redacted]	4.3	863,000
Paint booth (spec Boston) (under discussion)	270,359	4.6	365,400
Vehicle cleaning & washing facility	[redacted]	1.4	482,200
Tram lifting system	[redacted]	2.2	943,200
Spares & depot stock storage	[redacted]	3.1	
Forklift truck	[redacted]	2.9	37,800
High eve access platform	[redacted]	2.3	
Shunter	131,850	2.1	176,200
Road/Rail vehicle & trailer	[redacted]	10.1 & 10.3	726,000
Rail groove cleaning equipment	[redacted]	1.5	
Tram cleaning equipment	21,975	1.1	29700
Tram pressure washer	3,418	1.2	4620
Floor scrubber	2,603	1.7	3518
Bogie workstands	2,442	2.6	3300
Other tram equip stands	21,096	2.7	28513
Tram lifting slings	2,930	2.13	3960
Windscreen remover	11,720	2.14	15840
Re-railing equipment	78,133	2.15	105600
Tram staging	1,172	3.2	1584
Tyre replacement equipment & wheel hub removal equipment	42,973	4.2	58080
Pantograph maintenance and load testing	7,813	4.7	10560
Suspension setting equipment	2,442	4.8	3300
Tram battery charger	3,251	7.1	6448
Other workshop equipment	204,989	(1)	
Infraco Pressure washer	[redacted]	1.3	
Parts Washer		1.6	
Mobile crane	20,510	2.5	27720
Accomodation Bogies	0	2.5	26400
Pallet Truck	[redacted]	2.10	
Hand Trolleys		2.11	
Infraco Lifting Slings		2.12	
General Staging		3.3	
Shelving		3.4	
Workbenches		3.5	
Cupboards		3.6	
COSHH Cupboard		3.7	
Workshop stools		3.8	
Machine tools		4.5	
Diesel generator		4.9	
Hand & Mobile tools		5.1	
Ferrous welding equipment		6.1	
Aluminium welding equipment		6.2	
Infrastructure battery chargers	See above	7.2	
Infrastructure & Fixed Systems test equipment	[redacted]	8.2	
Portable P&C grinders		9.1	
Track welding equipment		9.2	
Portable tamping equipment		9.3	
Portable lighting equipment		9.4	
Track measuring equipment		9.5	
Other road vehicles		10.2	
	739,709		

Note: Movement from Euro to Pound of 0.7399 upward to 0.7402 results in an additional £299.82 as a result the final fixed price for Depot Equipment carried forward to the summary table is £740,009.03.

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

TIE00899939_1036

This is Schedule 6 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 6

KEY PERSONNEL

Name	**JORGE PIQUERAS SERRANO – Deputy Technical Leader**		
Current Employer	**CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES – CAF**		
Professional Qualifications	**MECHANICAL ENGINEER**		
Availability			
Relevant Experience to the Tram Supply Agreement			
Project	**Role and Responsibility (including identity of employer)**	**From**	**To**
NIR C3K DMU Vehicles	**PROJECT ENGINEER**	**2004**	**2007**
-	**Engineer of Structures Area (Technical Office)**	**2006**	**2007**

Name	ALBERTO ALVAREDO ROMERO - Technical Leader		
Current Employer			
Professional Qualifications	ENGINEER		
Availability	YES		
Relevant Experience to the Tram Supply Agreement			
Project	Role and Responsibility (including identity of employer)	From	To
SEVILLE TRAM	PROJECT LEADER	2003	2007
VELEZ MALAGA TRAM	PROJECT LEADER	2005	2006
MALAGA TRAM	PROJECT LEADER	2006	2008
ALGIERS TRAM	PROJECT MANAGER	2003	
OSLO METRO	PROJECT MANAGER	2002	
ATHENS METRO	PROJECT MANAGER	2001	
NORTHERN SPIRIT	PROJECT MANAGER	2000	
ROMA METRO	PROJECT MANAGER	2000	
BUCAREST METRO	PROJECT MANAGER	1999	
BUENOS AIRES METRO	PROJECT MANAGER	1999	

Name	**ALEJANDRO URRIZA – Project Manager**		
Current Employer	**CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES – CAF**		
Professional Qualifications	**BACHELOR SCIENCE IN INDUSTRIAL ENGINEERING**		
Availability			
Relevant Experience to the Tram Supply Agreement			
Project	**Role and Responsibility (including identity of employer)**	**From**	**To**
2900 DMU - IRISH RAIL	**DEPUTY PROJECT MANAGER**	**2002**	**2003**
INTERCITY - IRISH RAIL	**DEPUTY PROJECT MANAGER**	**2003**	**2005**
ÖBB – Vienna	**Export Department - Area Manager**	**2005**	**2006**
Tram Algiers - EMA	**Export Department - Area Manager**	**2005**	**2006**
RS2 – DMRC – New Delhi	**Export Department - Area Manager**	**2005**	**2006**
RS3 – DMRC – New Delhi	**Export Department - Area Manager**	**2006**	**2007**
Tram Edinburgh -Tie	**Export Department - Area Manager**	**2006**	**2007**
Metro Cairo - NAT	**Export Department - Area Manager**	**2006**	**2007**
Airport link – DMRC – New Delhi	**Export Department - Area Manager**	**2007**	**2007**

Name	**EDUARDO GÁLVEZ – Overall Technical Manager**		
Current Employer	**CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES – CAF**		
Professional Qualifications	**INDUSTRIAL (ELECTRICAL) ENGINEER (M. Eng)**		
Availability			
Relevant Experience to the Tram Supply Agreement			
Project	**Role and Responsibility (including identity of employer)**	**From**	**To**
Barcelona Metro s.3000 y 4000. **Madrid Metro s.2000 y s.5000.**	**Project Electric Engineer**	**1982**	**1990**
Barcelona Metro s2000 **Monterrey Metro** **EMU s.112 (F.G.C.)**	**Engineering Project Manager**	**1990**	**1994**
EMU Class 332 (Heathrow Express)	**Principal Project Manager**	**1994**	**1996**
-	**Head of "Engineering Projects Area"**	**1996**	**2004**
CIVIA Train (RENFE)	**Principal Project Manager**	**2.000**	**2002**
-	**Head of Engineering and Technical Office.**	**2004**	**Present day**

Name	**F. JAVIER LUCIA – Vehicle Safety Manager**		
Current Employer	**CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES – CAF**		
Professional Qualifications	**INDUSTRIAL (ELECTRICAL) ENGINEER (M. Eng)**		
Availability			
Relevant Experience to the Tram Supply Agreement			
Project	**Role and Responsibility (including identity of employer)**	**From**	**To**
EMU Class 332 (Heathrow Express)	**Systems Engineer & Deputy Safety Manager**	**1995**	**1997**
EMU Class 333 (Northern Spirit)	**Systems Engineer & Deputy Safety Manager**	**1998**	**1999**
DMU Class 3000 (NIR)	**Safety Manager**	**2002**	**2004**
-	**Head of Systems Area (Technical Office)**	**1998**	**2007**
-	**Head of Regulations / RAMS Area (Technical Office)**	**2007**	**Present day**

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 7 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 7

NOT USED

TIE00899939_1042

This is Schedule 8 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 8

ESCROW AGREEMENT



Single Licensee
Software Escrow Agreement

Date	
Owner	[Ownername]
Agreement Number	[Agreement#]

Notice: The parties to this Agreement are obliged to inform NCC Escrow of any changes to the Package or in their circumstances (including change of name, registered office, contact details or change of owner of the intellectual property in the Package)

Version 11.07

TIE00899939_1043

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Escrow Agreement Dated

Between:

(1) [Ownername] whose registered office is at [Owneraddress] (CRN: [Ownercrn]) ("Owner")

(2) [licenseename] whose registered office is at [licenseeaddress] (CRN: [Licenseecrn]) ("Licensee"); and

(3) NCC ESCROW INTERNATIONAL LIMITED, a company registered in England, whose registered office is at Manchester Technology Centre, Oxford Road, Manchester M1 7EF, ENGLAND (CRN: 3081932) ("NCC Escrow").

Background

(A) The Licensee has been granted a licence to use the Package which comprises computer programs.

(B) Certain technical information and/or documentation relating to the software package is the confidential information and intellectual property of the Owner or a third party.

(C) The Owner acknowledges that in certain circumstances such information and/or documentation should be required by the Licensee in order for it to continue to exercise its rights under the Licence Agreement.

(D) The parties therefore agree that such information and/or documentation should be placed with a trusted third party, NCC Escrow, so that such information and/or documentation can be released to the Licensee should certain circumstances arise.

Agreement

In consideration of the mutual undertakings and obligations contained in this Agreement, the parties agree that:

1 Definitions and Interpretation

1.1 In this Agreement the following terms shall have the following meanings:

"Agreement" means the terms and conditions of this escrow agreement set out below, including the schedules hereto.

"Confidential Information" means all technical and/or commercial information, not in the public domain and which is designated in writing as confidential by any party together with all other information of any party which may reasonably be regarded as confidential information.

"Full Verification" means the tests and processes forming NCC Escrow's Full Verification service and/or such other tests and processes as may be agreed between the parties for the verification of the Material.

"Independent Expert" means a suitably qualified and independent advisor or barrister.

"Integrity Testing" means those tests and processes forming NCC Escrow's Integrity Testing service in so far as they can be applied to the Material.

"Intellectual Property Rights" means any copyright, patents, design patents, registered designs, design rights, utility models, trademarks, service marks, trade secrets, know how, database rights, moral rights, confidential information, trade or business names, domain names and any other rights of a similar nature including industrial and proprietary rights and other similar protected rights in any country or jurisdiction, together with all registrations, applications to register and rights to apply for registration of any of the aforementioned rights and any licences of or in respect of such rights.

"Licence Agreement" means the agreement under which the Licensee was granted a licence to use the Package.

"Material" means the Source Code of the Package and such other material and documentation (including updates and upgrades thereto and new versions thereof, as are necessary to be delivered or deposited to comply with clause 2 of this Agreement.

"Order Form" means the order form setting out the details of the order placed with NCC Escrow for setting up this Agreement.

"Package" means the software package together with any updates and upgrades thereto and new versions thereof licensed to the Licensee under the Licence Agreement details of which are set out in schedule 1.

"Release Purposes" means the purposes of understanding, maintaining, modifying and correcting the Package exclusively for and on behalf of the Licensee together with such other purposes (if any) as are permitted under the Licence Agreement.

"Source Code" means the computer programming code of the Package in human readable form.

"Third Party Material" means Source Code which is not the confidential information and intellectual property of the Owner or the Licensee.

1.2 This Agreement shall be interpreted in accordance with the following:

1.2.1 headings are for ease of reference only and shall not be taken into consideration in the interpretation of this Agreement;

1.2.2 all references to clauses and schedules are references to clauses and schedules of this Agreement; and

1.2.3 all references to a party or parties are references to a party or parties to this Agreement.

2 Owner's Duties and Warranties

2.1 The Owner shall:

2.1.1 deliver a copy of the Material to NCC Escrow within 30 days of the date of this Agreement;

2.1.2 deliver a further copy of the Material to NCC Escrow each time that there is a change to the Package;

2.1.3 ensure that each copy of the Material deposited with NCC Escrow comprises the Source Code of the latest version of the Package used by the Licensee;

2.1.4 deliver to NCC Escrow a replacement copy of the Material within 30 days after the anniversary of the last delivery of the Material to ensure that the integrity of the Material media is maintained;

2.1.5 deliver a replacement copy of the Material to NCC Escrow within 14 days of a notice given to it by NCC Escrow under the provisions of clause 4.1.3;

2.1.6 deliver with each deposit of the Material the following information:

2.1.6.1 details of the deposit including the full name of the Package (i.e. the original name as set out under schedule 1 together with any new names given to the Package by the Owner), version details, media type, backup command/software used, compression used, archive hardware and operating system details; and

2.1.6.2 password/encryption details required to access the Material;

2.1.7 deliver with each deposit of the Material the following technical information (where applicable):

2.1.7.1 documentation describing the procedures for building, compiling and installing the software, including names and versions of the development tools;

2.1.7.2 software design information (e.g. module names and functionality); and

2.1.7.3 name and contact details of employees with knowledge of how to maintain and support the Material; and

2.1.8 if required by the Licensee, deposit a backup copy of the object code of any third party software package required to access, install, build or compile or otherwise use the Material.

2.2 The Owner warrants to both NCC Escrow and the Licensee at the time of each deposit of the Material with NCC Escrow that:

2.2.1 other than any third party object code referred to in clause 2.1.8 or any Third Party Material, it owns the Intellectual Property Rights in the Material;

2.2.2 in respect of any Third Party Material, it has been granted valid and ongoing rights under licence by the third party owner(s) thereof to deal with such Third Party Material in the manner anticipated under this Agreement and that the Owner has the express authority of such third party owner(s) to deposit the Third Party Material under this Agreement as evidenced by a signed letter of authorisation in the form required by NCC Escrow;

2.2.3 in entering into this Agreement and performing its obligations under it, it is not in breach of any of its ongoing express or implied obligations to any third party(s);

2.2.4 the Material deposited under clause 2.1 contains all information in human-readable form (except for any third party object code deposited pursuant to clause 2.1.8) and is on suitable media to enable a reasonably skilled programmer or analyst to understand, maintain, modify and correct the Package; and

2.2.5 in respect of any third party object code that the Owner, at its option, or, at the request of the Licensee, deposits with NCC Escrow in conjunction with the Material pursuant to clause 2.1.8, it has the full right and authority to do so.

3 Licensee's Responsibilities and Undertakings

3.1 The Licensee shall notify NCC Escrow of any change to the Package that necessitates a

replacement deposit of the Material.

3.2 In the event that the Material is released under clause 6, the Licensee shall:

3.2.1 keep the Material confidential at all times;

3.2.2 use the Material only for the Release Purposes;

3.2.3 not disclose the Material to any person save such of the Licensee's employees or contractors who need to know the same for the Release Purposes. In the event that Material is disclosed to its employees or contractors, the Licensee shall ensure that they are bound by the same confidentiality obligations as are contained in this clause 3.2;

3.2.4 hold all media containing the Material in a safe and secure environment when not in use; and

3.2.5 forthwith destroy the Material should the Licensee cease to be entitled to use the Package under the terms of the Licence Agreement.

3.3 In the event that the Material is released under clause 6, it shall be the responsibility of the Licensee to obtain the necessary licences to utilise the object code of any third party material deposited by the Owner pursuant to clause 2.1.8.

4 NCC Escrow's Duties

4.1 NCC Escrow shall:

4.1.1 at all times during the term of this Agreement retain the latest deposit of the Material in a safe and secure environment;

4.1.2 inform the Owner and the Licensee of the receipt of any deposit of the Material by sending to both parties a copy of the Integrity Testing report or Full Verification report (as the case may be) generated from the testing processes carried out under clause 10; and

4.1.3 notify the Owner and the Licensee if it becomes aware at any time during the term of this Agreement that the copy of the Material held by it has been lost, damaged or destroyed so that a replacement may be obtained.

4.2 In the event of failure by the Owner to deposit any Material with NCC Escrow, NCC Escrow shall not be responsible for procuring such deposit and may, at its sole discretion, notify the Licensee of the Owner's failure to deposit any Material.

4.3 NCC Escrow may appoint agents, contractors or sub-contractors as it deems fit to carry out the Integrity Testing and the Full Verification processes. NCC Escrow shall ensure that any such agents, contractors and sub-contractors are bound by the same confidentiality obligations as are contained in clause 8.

4.4 NCC Escrow has the right to make such copies of the Material as may be necessary solely for the purposes of this Agreement.

5 Payment

5.1 The parties shall pay NCC Escrow's standard fees and charges as published from time to time or as otherwise agreed, in the proportions set out in Schedule 2. NCC Escrow's fees as published are exclusive of value added tax.

5.2 NCC Escrow shall be entitled to review and vary its standard fees and charges for its services under this Agreement from time to time but no more than once a year and only upon 45 days written notice to the parties.

5.3 All invoices are payable within 30 days from the date of invoice. NCC Escrow reserves the right to charge interest in respect of the late payment of any sum due under this Agreement (both before and after judgement) at the rate of 2% per annum over the prevailing base rate of HSBC Bank Plc accruing on a daily basis from the due date thereof until full payment.

6 Release Events

6.1 Subject to: (i) the remaining provisions of this clause 6; and (ii) the receipt by NCC Escrow of its release fee and any other fees and interest (if any) outstanding under this Agreement, NCC Escrow will release the Material to a duly authorised officer of the Licensee if any of the following events ("**Release Event(s)**") occur:

6.1.1 if the Owner is a company:

6.1.1.1 an order is made for the winding up of the Owner, the Owner passes a resolution for winding up (other than for the purposes of a solvent reconstruction or amalgamation), or a liquidator of the Owner is appointed; or

6.1.1.2 an order is made for the appointment of an administrator of the Owner or an administrator of the Owner is appointed; or

6.1.3 the Owner enters into a compromise or arrangement with creditors; or

6.1.4 the Owner has a receiver, administrative receiver or manager appointed over all or any part of its assets or undertaking; or

6.1.5 the Owner is dissolved; or

6.1.2 if the Owner is an individual:

6.1.2.1 the Owner enters into a compromise or arrangement with creditors; or

6.1.2.2 the Owner is declared bankrupt; or

6.1.2.3 the Owner dies; or

6.1.3 if the Owner is a partnership:

6.1.3.1 any of the partners in the Owner are declared bankrupt or enter into a compromise or arrangement with creditors; or

6.1.3.2 the Owner is wound up or dissolved; or

6.1.3.3 the Owner enters into a compromise or arrangement with creditors; or

6.1.3.4 a partnership administration order is made in respect of the Owner; or

6.1.4 any similar or analogous proceedings or event to those in clauses 6.1.1 to 6.1.3 above occurs in respect of the Owner within any jurisdiction outside England; or

6.1.5 the Owner ceases to carry on its business or the part of its business which relates to the Package; or

6.1.6 the Owner assigns its rights to the Intellectual Property Rights in the Material to a third party ("Assignee") and the Assignee fails, within 60 days of all parties' knowledge of such assignment, to continue escrow protection for the benefit of the Licensee by failing to enter into either:

6.1.6.1 a novation agreement with the Licensee and NCC Escrow for the assumption of the Owner's rights and obligations under this Agreement by the Assignee; or

6.1.6.2 a new escrow agreement with the Licensee for the Package which offers the Licensee substantially similar protection to that provided by this Agreement without significantly increasing the overall cost to the Licensee;

provided that if the Assignee offers to enter into a novation or new escrow agreement within 60 days of all parties' knowledge of the assignment and the Licensee fails to accept the Assignee's offer within 30 days of such offer being notified to the Licensee, there shall be no Release Event under this clause; or

6.1.7 the Owner or, where relevant, its agent, parent, subsidiary or associated company is in material breach of its obligations as to maintenance or modification of the Package under the Licence Agreement or any maintenance agreement entered into in connection with the Package and has failed to remedy such default notified by the Licensee to the Owner within a reasonable period.

6.2 The Licensee must notify NCC Escrow of the Release Event specified in clause 6.1 by delivering to NCC Escrow a statutory or notarised declaration ("**Declaration**") made by an officer of the Licensee declaring that such Release Event has occurred, setting out the facts and circumstances of the Release Event, that the Licence Agreement and any maintenance agreement for the relevant Package was still valid and effective up to the occurrence of such Release Event and exhibiting such documentary evidence in support of the Declaration as NCC Escrow shall reasonably require.

6.3 Upon receipt of a Declaration from the Licensee claiming that a Release Event has occurred:

6.3.1 NCC Escrow shall submit a copy of the Declaration to the Owner by courier or other form of guaranteed delivery; and

6.3.2 unless within 14 days after the date of despatch of the Declaration by NCC Escrow, NCC Escrow receives a counter-notice signed by a duly authorised officer of the Owner stating that in their view no such Release Event has occurred or, if appropriate, that the event or circumstance giving rise to the Release Event has been rectified, as shown by documentation in support thereof,

NCC Escrow will release the Material to the Licensee for its use for the Release Purposes.

6.4 Upon receipt of the counter-notice from the Owner under clause 6.3.2, NCC Escrow shall send a copy of the counter-notice and any supporting evidence to the Licensee by courier or other form of guaranteed delivery.

6.5 Upon receipt by the Licensee of the counter-notice from NCC Escrow, or in any event, within 90 days of despatch of the counter-notice by NCC Escrow, the Licensee may give notice to NCC

Escrow that they wish to invoke the dispute resolution procedure under clause 7.

6.6 If within 90 days of despatch of the counter-notice by NCC Escrow to the Licensee, NCC Escrow has not been informed by the Licensee that they wish the dispute resolution procedure under clause 7 to apply, the Declaration submitted by the Licensee will be deemed to be no longer valid and the Licensee shall be deemed to have waived their right to release of the Material for the particular reason or event specified in the original Declaration.

6.7 For the avoidance of doubt, where a Release Event has occurred under clauses 6.1.1 to 6.1.5, a subsequent assignment of the Intellectual Property Rights in the Material shall not prejudice the Licensee's right to release of the Material and its use for the Release Purposes.

7 Disputes

7.1 NCC Escrow shall notify the Owner of the Licensee's request for dispute resolution. Unless the Owner or the Licensee objects, NCC Escrow's Chief Executive Officer for the time being will appoint an independent Expert to resolve the dispute. If the Owner or the Licensee objects to this appointment, they shall endeavour to appoint a mutually acceptable independent Expert within 7 days of registering their objection. If they fail to appoint an independent Expert within this 7 day period, NCC Escrow shall request that the President of the Law Society appoints an independent Expert to resolve the dispute. Any appointment of an independent Expert under this clause shall be binding upon the parties.

7.2 Within 5 working days of the appointment of the independent Expert, the Owner and the Licensee shall each provide full written submissions to the independent Expert together with all relevant documentary evidence in their possession in support of their claim.

7.3 The independent Expert shall be requested to give a decision on the matter within 14 days of the date of referral or as soon as practicable thereafter and to send a copy of that decision to the Owner, Licensee and NCC Escrow. The independent Expert's decision shall be final and binding on all parties and shall not be subject to appeal to a court in legal proceedings except in the case of manifest error.

7.4 If the independent Expert's decision is in favour of the Licensee, NCC Escrow is hereby authorised to release and deliver the Material to the Licensee within 5 working days of the decision being notified by the independent Expert to the parties.

7.5 The parties hereby agree that the costs and expenses of the independent Expert shall be borne by the party against whom the decision of the independent Expert is given.

8 Confidentiality

8.1 The Material shall remain at all times the confidential and intellectual property of its Owner.

8.2 In the event that NCC Escrow releases the Material to the Licensee, the Licensee shall be permitted to use the Material only for the Release Purposes.

8.3 NCC Escrow agrees to keep all Confidential Information relating to the Material and/or the Package that comes into its possession or to its knowledge under this Agreement in strictest confidence and secrecy. NCC Escrow further agrees not to make use of such information and/or documentation other than for the purposes of this Agreement and, unless the parties should agree otherwise in writing, will not disclose or release it other than in accordance with the terms of this Agreement.

9 Intellectual Property Rights

9.1 The release of the Material to the Licensee will not act as an assignment of any Intellectual Property Rights that the Owner or any third party possesses in the Material.

9.2 The Intellectual Property Rights in the Integrity Testing report and any Full Verification report shall remain vested in NCC Escrow. The Owner and the Licensee shall each be granted a non-exclusive right and licence to use such report for the purposes of this Agreement and their own internal purposes only.

10 Integrity Testing and Full Verification

10.1 NCC Escrow shall bear no obligation or responsibility to any party to this Agreement or person, firm, company or entity whatsoever to determine the existence, relevance, completeness, accuracy, operation, effectiveness, functionality or any other aspect of the Material received by NCC Escrow under this Agreement.

10.2 As soon as practicable after the Material has been deposited with NCC Escrow, NCC Escrow shall apply its Integrity Testing processes to the Material.

10.3 Any party to this Agreement shall be entitled to require NCC Escrow to carry out a Full Verification. Subject to clause 10.4, NCC Escrow's prevailing fees and charges for the Full Verification processes and all reasonable expenses incurred by NCC Escrow in carrying out the Full Verification processes shall be payable by the requesting party.

10.4 If the Material fails to satisfy NCC Escrow's Full Verification tests as a result of being defective or incomplete in content, NCC Escrow's fees, charges and expenses in relation to the Full Verification tests shall be paid by the Owner.

10.5 Should the Material deposited fail to satisfy NCC Escrow's Integrity Testing or Full Verification tests under clauses 10.3 or 10.4, the Owner shall, within 14 days of the receipt of the notice of test failure from NCC Escrow, deposit such new, corrected or revised Material as shall be necessary to ensure its compliance with its warranties and obligations in clause 9. If the Owner fails to make such deposit of the new, corrected or revised Material, NCC Escrow will issue a report to the Licensee detailing the problem with the Material as revealed by the relevant test.

11 NCC Escrow's Liability

11.1 Nothing in this clause 11 excludes or limits the liability of NCC Escrow for fraudulent misrepresentation or for death or personal injury caused by NCC Escrow's negligence. Save as aforesaid, the following provisions set out the entire financial liability of NCC Escrow (including any liability for the acts or omissions of its employees, agents and sub-contractors) to the other parties:

11.1.1 NCC Escrow shall not be liable for any loss or damage caused to either the Owner or the Licensee, either jointly or severally, except to the extent that such loss or damage is caused by the negligent acts or omissions of or a breach of any contractual duty by NCC Escrow, its employees, agents or sub-contractors and, in such event, NCC Escrow's total liability in respect of all claims arising under or by virtue of this Agreement or in connection with the performance or contemplated performance of this Agreement shall not exceed the sum of £1,500,000 (one million, five hundred thousand UK pounds); and

11.1.2 NCC Escrow shall not be liable to the Owner or the Licensee for any indirect or consequential loss or damage, whether for loss of profit, loss of business, depletion of goodwill or otherwise, howsoever or whatsoever caused, which arise out of or in connection with this Agreement, even if such loss was reasonably foreseeable or NCC Escrow had been advised of the possibility of incurring the same by the Owner, the Licensee or any third party.

11.2 NCC Escrow shall not be liable in any way to the Owner or the Licensee for acting in accordance with the terms of this Agreement and specifically, without limitation, for acting upon any notice, written request, waiver, consent, receipt, statutory declaration or any other document furnished to it pursuant to and in accordance with this Agreement.

11.3 NCC Escrow shall not be required to make any investigation into and shall be entitled, in good faith, without incurring any liability to the Owner or the Licensee, to assume (without requesting evidence thereof) the validity, authenticity, veracity and due and authorised execution of any documents, written requests, waivers, consents, receipts, statutory declarations or notices received by it in respect of this Agreement.

12 Indemnity

12.1 Save for any claim falling within the provisions of clause 11.1.1, the Owner and the Licensee jointly and severally agree at all times to indemnify and hold harmless NCC Escrow in respect of all of its legal and all other costs, fees and expenses incurred, directly or indirectly, as a result of being brought into or otherwise becoming involved in any form of dispute resolution proceedings or any litigation of any kind between the Owner and the Licensee in relation to this Agreement to the extent that this Agreement does not otherwise provide for reimbursement of such costs.

12.2 The Owner shall assume all liability and shall at all times indemnify and hold harmless NCC Escrow and its officers, agents, sub-contractors and employees from and against any and all liability, loss, damages, costs, legal costs, professional and other expenses and any other liabilities of whatever nature, awarded against or agreed to be paid or otherwise suffered, incurred or sustained by NCC Escrow, whether direct, indirect or consequential, as a result of or in connection with any claim by any third party(s) for alleged or actual infringement of Intellectual Property Rights arising out of or in connection with all and any acts or omissions of NCC Escrow in respect of the Material as contemplated under this Agreement.

13 Term and Termination

13.1 This Agreement shall continue until terminated in accordance with this clause 13.

13.2 If the Owner or the Licensee, as the case may be, fails to pay an invoice addressed to it for services under this Agreement within 30 days of its issue, NCC Escrow reserves the right to give that party written notice to pay the outstanding invoice within 30 days. If the Licensee has not paid its invoice by the expiry of the 30 day notice period, this Agreement will automatically immediately terminate. If the Owner has not paid its invoice by the expiry of the 30 day notice period, NCC Escrow will give the Licensee a period of 15 days to pay the Owner's invoice. If the Owner's invoice has not been paid by the expiry of the 15 day optional payment period given to the Licensee, this Agreement will automatically immediately terminate. Any amounts owed by the Owner but paid by the Licensee will be recoverable by the Licensee direct from the Owner as a debt and, if requested, NCC Escrow shall provide appropriate documentation to assist in such

recovery

13.3 Upon termination under the provisions of clause 13.2, for 30 days from the date of termination NCC Escrow will make the Material available for collection by the Owner or its agents from the premises of NCC Escrow during office hours. After such 30 day period NCC Escrow will destroy the Material.

13.4 Notwithstanding any other provision of this clause 13, NCC Escrow may terminate this Agreement by giving 30 days written notice to the Owner and the Licensee. In that event, the Owner and the Licensee shall appoint a mutually acceptable new custodian on similar terms and conditions to those contained herein. If a new custodian is not appointed within 14 days of delivery of such notice, the Owner or the Licensee shall be entitled to request the President for the time being of the British Computer Society (or successor body) to appoint a suitable new custodian upon such terms and conditions as he/she shall require. Such appointment shall be final and binding on the Owner and the Licensee. If NCC Escrow is notified of the new custodian within the notice period, NCC Escrow will forthwith deliver the Material to the new custodian. If NCC Escrow is not notified of the new custodian within the notice period, NCC Escrow will return the Material to the Owner.

13.5 The Licensee may terminate this Agreement at any time by giving written notice to NCC Escrow. Upon such termination, NCC Escrow will return the Material to the Owner.

13.6 If NCC Escrow discovers that a Release Event has occurred and the Licensee has failed to exercise its right to claim for release of the Material under clause 6.2, NCC Escrow shall have the right to terminate this Agreement upon 30 days written notice to the Owner and the Licensee. The Licensee shall have the option of applying for release in accordance with clause 6 during this notice period, but if it fails to do so, upon the expiry of this notice period, this Agreement shall automatically terminate and, unless otherwise instructed by the Owner or the Assignee prior to expiry of the notice period, NCC Escrow shall destroy the Material.

13.7 If the Intellectual Property Rights in the Material have been assigned to a third party and the proviso in clause 6.1.6 applies such that there has been no Release Event under that clause, NCC Escrow shall be entitled to terminate this Agreement immediately by written notice to the Owner and the Licensee and upon such termination, unless otherwise instructed by the Owner or the Assignee, NCC Escrow shall destroy the Material.

13.8 If the Licence Agreement has expired or has been lawfully terminated, then the Licensee shall give notice to NCC Escrow within 14 days thereof to terminate this Agreement, failing which, the Owner shall be entitled to give written notice to NCC Escrow to terminate this Agreement. Upon receipt of such a notice from the Owner, NCC Escrow shall notify the Licensee of the Owner's notice to terminate. Unless within 14 days of NCC Escrow giving such notice to the Licensee, NCC Escrow receives a counter-notice signed by a duly authorised officer of the Licensee disputing the termination of the Licence Agreement, then the Licensee shall be deemed to have consented to such termination and this Agreement shall immediately automatically terminate. Any disputes arising under this clause shall be dealt with in accordance with the dispute resolution procedure in clause 7. Upon termination under this clause, NCC Escrow shall return the Material to the Owner.

13.9 Subject to clause 13.8, the Owner may only terminate this Agreement with the written consent of the Licensee.

13.10 This Agreement shall automatically immediately terminate upon release of the Material to the Licensee in accordance with clause 6.

13.11 If this Agreement is superseded and replaced by a new agreement in respect of the Material, this Agreement shall, upon the coming into force of the new agreement, automatically terminate. The relevant party or parties shall request NCC Escrow to either transfer the Material to the new agreement or ask the owner under the new agreement to deposit new material. If new material is deposited, upon its receipt, NCC Escrow shall, unless otherwise instructed, destroy the Material.

13.12 The provisions of clauses 1, 3.2, 3.3, 5, 8, 9, 10.1, 11, 12, 13.12 to 13.14 (inclusive) and 14 shall continue in full force after termination of this Agreement.

13.13 On and after termination of this Agreement, the Owner and/or the Licensee (as appropriate) shall remain liable to NCC Escrow for payment in full of any fees and interest which have become due but which have not been paid as at the date of termination.

13.14 The termination of this Agreement, however arising, shall be without prejudice to the rights accrued to the parties prior to termination.

14 General

14.1 A party shall notify the other parties to this Agreement, within 30 days of its occurrence, of any of the following:

14.1.1 a change of its name, registered office, contact address or other contact details; and

14.1.2 any material change in its circumstances that may affect the validity or operation of this Agreement.

14.2 Within 14 days of any assignment or transfer by the Owner of any part of its Intellectual Property Rights in the Material, the Owner shall notify

14.2.1 NCC Escrow and the Licensee of such assignment and the identity of the Assignee; and

14.2.2 the Assignee of the provisions of clause 6.1.6.

14.3 The formation, existence, construction, performance, validity and all other aspects of this Agreement shall be governed by and construed in accordance with the laws of England and the parties submit to the exclusive jurisdiction of the English courts.

14.4 This Agreement, together with the Order Form and any relevant NCC Escrow standard terms and conditions represent the whole agreement relating to the escrow arrangements between NCC Escrow and the other parties for the Package and shall supersede all prior agreements, discussions, arrangements, representations, negotiations and undertakings. In the event of any conflict between any of these documents, the terms of this Agreement shall prevail.

14.5 Unless the provisions of this Agreement otherwise provide, any notice or other communication required or permitted to be given or made in writing hereunder shall be validly given or made if delivered by hand or courier or if despatched by first class recorded delivery (airmail if overseas) addressed to the address specified for the parties in this Agreement (or such other address as may be notified to the parties from time to time) or if sent by facsimile message to such facsimile number as has been notified to the parties from time to time and shall be deemed to have been received:

(i) if delivered by hand or courier, at the time of delivery;

(ii) if sent by first class recorded delivery (airmail if overseas), 2 business days after posting (6 days if sent by airmail);

(iii) if sent by facsimile, at the time of completion of the transmission of the facsimile (with facsimile machine confirmation of transmission to the correct facsimile number of all pages of the notice).

14.6 The Owner and the Licensee shall not assign, transfer or subcontract this Agreement or any rights or obligations hereunder without the prior written consent of the other parties.

14.7 NCC Escrow shall be entitled to transfer or assign this Agreement upon written notice to both the Owner and the Licensee.

14.8 This Agreement shall be binding upon and survive for the benefit of the successors in title and permitted assigns of the parties.

14.9 If any provision of this Agreement is declared by any court, tribunal or administrative body of competent jurisdiction to be wholly or partly illegal, invalid, void or unenforceable, it shall, to the extent of such illegality, invalidity or unenforceability, be deemed severable and the remaining part of the provision and the rest of the provisions of this Agreement shall continue in full force and effect.

14.10 Save as expressly provided in this Agreement, no amendment or variation of this Agreement shall be effective unless in writing and signed by a duly authorised representative of each of the parties to it.

14.11 The parties shall not be liable to each other or be deemed to be in breach of this Agreement by reason of any delay in performing, or failure to perform, any of their obligations under this Agreement if the delay or failure was for a reason beyond that party's reasonable control (including, without limitation, fire, flood, explosion, epidemic, riot, civil commotion, any strike, lockout or other industrial action, act of God, war or warlike hostilities or threat of war, terrorist activities, acts denial or malicious damage, or any prohibition or restriction by any governments or other legal authority which affects this Agreement and which is not in force on the date of this Agreement). A party claiming to be unable to perform its obligations under this Agreement (either on time or at all) in any of the circumstances set out above must notify the other parties of the nature and extent of the circumstances in question as soon as practicable. If such circumstances continue for more than six months, any of the other parties shall be entitled to terminate this Agreement by giving one month's notice in writing.

14.12 No waiver by any party of any breach of any provisions of this Agreement shall be deemed to be a waiver of any subsequent or other breach and, subject to clause 6.6, no failure to exercise or delay in exercising any right or remedy under this Agreement shall constitute a waiver thereof.

14.13 This Agreement is not intended to create any right under the Contracts (Rights of Third Parties) Act 1999 which is enforceable by any person who is not a party to this Agreement and the rights of any third party under the said act are hereby expressly excluded.

14.14 This Agreement may be executed in any number of counterparts and by different parties in separate counterparts. Each counterpart when so executed shall be deemed to be an original and all of which together shall constitute one and the same agreement.

Signed for and on behalf of [Ownername]

Name: ..... | .....

Position: ..... | [Authorised Signatory]

Signed for and on behalf of [Licenseename]

Name: ..... | .....

Position: ..... | [Authorised Signatory]

Signed for and on behalf of NCC ESCROW INTERNATIONAL LIMITED

Name: ..... | .....

Position: ..... | [Authorised Signatory]

Schedule 1

The Package

The software package known as "[illegible]" or any other name as may be given to it by the Owner from time to time.

Schedule 2

NCC Escrow's Fees

	DESCRIPTION	OWNER	LICENSEE
1	Annual Fee (payable on completion of this Agreement and in advance of each anniversary thereafter)	[OwnerAnnual]	[LicenseeAnnual]
2	Unchecked Update Fee (Initial Unchecked Deposit in any one year payable on completion of this Agreement and in advance of each anniversary thereafter)	[OwnerUnchecked]	[LicenseeUnchecked]
3	Unchecked Update Fee (per unchecked deposit)	[OwnerUnchecked]	[LicenseeUnchecked]
4	Release Fee (plus NCC Escrow's reasonable expenses)	[illegible]	100%

Additional fees will be payable to NCC Escrow by the Licensee unless otherwise agreed between the parties) for the following where applicable:

- Storage Fee for deposits in excess of [illegible] cubic foot
- Any novation or replacement of this Agreement at the request of the Owner or the Licensee
- Integrity Testing Fee for deposits consisting of more than 5 media items

Version 11/07 11

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 9 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 9

REVIEW PROCEDURE

PART A

1. INTRODUCTION

1.1 Except where otherwise agreed in writing, the provisions of this Schedule 9 (*Review Procedure*) shall apply whenever any Deliverable or course of action is required to be reviewed, approved, agreed, consented to or otherwise processed in accordance with the Agreement.

1.2 Each submission by the Tram Supplier to the Client's Representative under the Review Procedure shall be accompanied by three hard copies and a soft copy (in agreed appropriate format) of the proposed Deliverable (in appropriate agreed format) to be reviewed or a statement of the proposed course of action (the entire contents of a submission being referred to as a "Submitted Item"). In relation to each Submitted Item, the provisions of this Schedule 9 (*Review Procedure*) shall apply.

2. METHOD STATEMENTS

2.1 Method statements shall be reviewed using the procedure set out in the Client "Method Statement Review Policy" (as updated from time to time by **tie**). The current version of the "Method Statement Review Policy" is rev 0.1 and is included as Part B of this Schedule.

2.2 The Tram Supplier shall submit a method statement and risk assessment for a package of work not less than 10 working days (or such other period as the Parties may agree in writing) before the work in question is due to be commenced.

2.3 No works shall commence until a method statement has been written, accepted in accordance with the Client "Method Statement Review Policy" and briefed to all related staff, for the works concerned.

2.4 Where a method statement is submitted to the Client for acceptance, within 8 Business Days of the date of receipt of a submission (or re-submission, as the case may be) of the method statement to the Client's Representative (or such other period as the Parties may agree), the Client's Representative shall return one copy of the method statement to the Tram Supplier endorsed (subject to and in accordance with paragraph 3 (Grounds of Objection)) "Level A - no objection", "Level B - proceed subject to comments" or "Level C - resubmit".

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2.5 If the Client's Representative fails to return a copy of any method statement within 8 Business Days (or within such other period as the Parties may agree in writing) of the date of its submission to the Client's Representative, then the Tram Supplier shall re-submit the method statement stating that it is a re-submitted item. If the Client's Representative fails to return a copy of any method statement within 5 Business Days of any re-submission, then the Tram Supplier may, at its discretion refer the matter for determination in accordance with the Dispute Resolution Procedure.

2.6 If the Client's Representative makes an objection to any method statement in accordance with paragraph 3 (Grounds of Objection), the Client's Representative shall state the ground upon which such objection is based and the evidence or other information necessary to substantiate that ground.

2.7 For the avoidance of doubt, the Client's Representative shall be entitled to make such comments on any method statement on any grounds as he sees fit but, to the extent that the Client's Representative comments on a method statement other than on the grounds specified in paragraph 5 (Grounds of Objection), or fails to comply with the provisions of this paragraph 2, the Tram Supplier may, at its discretion request written clarification of the basis for such comments and, if clarification is not received within 10 Business Days of such request by the Tram Supplier refer the matter for determination in accordance with the Dispute Resolution Procedure.

2.8 Where any information that has been provided is updated, the new issues shall be provided promptly to the Client as soon as reasonably possible.

2.9 The Tram Supplier shall ensure that each method statement shall contain sufficient detail and shall be accompanied by sufficient information to enable the Client's Representative to assess the method statement in accordance with this Schedule 9 (Review Procedure).

2.10 Where a revised method statement is submitted, the Tram Supplier shall also ensure that such revision clearly identifies what revision to the method statement was made.

3. DESIGN DELIVERABLES

3.1 Design Deliverables shall be reviewed using the procedure set out in the Design Management Plan (as updated from time to time by the Client). The current version of the Design Management Plan is version 5.3 and is included as Part C of this Schedule.

3.2 Within 20 Business Days of the date of receipt of a submission (or re-submission, as the case may be) of the Submitted Item to the Client's Representative (or such other period as the

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Parties may agree), the Client's Representative shall return one copy of the relevant Submitted Item to the Tram Supplier endorsed (subject to and in accordance with paragraph 5 (Grounds of Objection)) "Level A - no objection", "Level B - proceed subject to comments" or "Level C - resubmit".

3.3 If the Client's Representative fails to return a copy of any Submitted Item within 20 Business Days (or within such other period as the Parties may agree in writing) of the date of its submission to the Client's Representative, then the Tram Supplier shall notify the Client that the submitted items have not been returned. If the Client's Representative fails to return a copy of any Submitted Item within 5 Business Days of any such notification, then the Client's Representative shall be deemed to have returned the Submitted Item to the Tram Supplier endorsed "Level A - no objection".

3.4 If the Client's Representative makes an objection to any Submitted Item in accordance with paragraph 5 (Grounds of Objection), the Client's Representative shall state the ground upon which such objection is based and the evidence or other information necessary to substantiate that ground.

3.5 For the avoidance of doubt, the Client's Representative shall be entitled to make such comments on any Submitted Item on any grounds as he sees fit but, to the extent that the Client's Representative comments on a Submitted Item other than on the grounds specified in paragraph 3 (Grounds of Objection), or fails to comply with the provisions of this paragraph 3, the Tram Supplier may, at its discretion request written clarification of the basis for such comments and, if clarification is not received within 10 Business Days of such request by the Tram Supplier refer the matter for determination in accordance with the Dispute Resolution Procedure.

3.6 Where any information that has been provided is updated, the new issues shall be provided promptly to the Client as soon as reasonably possible.

3.7 the Client's Representative shall be entitled to instruct the Tram Supplier that a defined class of Deliverable or course of action may be submitted "for information" and not for review in accordance with this Schedule 9 (Review Procedure).

3.8 The Tram Supplier shall ensure that each Submitted Item shall contain sufficient detail and shall be accompanied by sufficient information to enable the Client's Representative to assess the Submitted Item in accordance with this Schedule 9 (Review Procedure).

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3.9 Where a revised Submitted Item is submitted, the Tram Supplier shall also ensure that such revision clearly identifies what revision to the Deliverable was made.

4. FURTHER INFORMATION

4.1 The Tram Supplier shall submit any further or other information, drawings, data and documents (including details of calculations) that the Client's Representative reasonably requires to act in accordance with this Schedule 9 (*Review Procedure*). If the Tram Supplier does not submit any such information, data and documents, the Client's Representative shall be entitled to object to the Submitted Item:

4.1.1 on the basis of the information, data and documents which have been provided; or

4.1.2 on the grounds that insufficient information, data and documents have been provided to enable the Client's Representative to act in accordance with this Schedule 9 (*Review Procedure*).

5. GROUNDS OF OBJECTION

5.1 the Client's Representative may object to any Submitted Item on the grounds set out in paragraph 4 (*Further Information*) above but otherwise may make objections in relation to a Submitted Item if, on the balance of probabilities, implementation of that Submitted Item:

5.1.1 would not be in accordance with this Agreement; and/or

5.1.2 would result in an increase to the Client's liabilities or potential or contingent liabilities under this Agreement; and/or

5.1.3 would be inefficient as to expenditure of resource/costs; and/or

5.1.4 would lead to a health and safety risk to any person or property; and/or

5.1.5 would lead to a breach of any Law or the terms of any Consent or Land Consent (as defined in the Infraco Contract); and/or

5.1.6 would necessitate the obtaining of a new Law or the obtaining of a variation to an existing Law; and/or

5.1.7 would not be in accordance with any relevant environmental requirements; and/or

5.1.8 would not be in accordance with the Employer's Requirements; and/or

5.1.9 would adversely impact on the flexibility or ease of operation, run time, reliability, operating maintenance costs of revenues of the Edinburgh Tram Network; and/or

5.1.10 would materially adversely affect the Tram Supplier's ability to perform its obligations under this Agreement; and/or

5.1.11 would materially adversely affect the Client's ability to perform its obligations or enforce its rights under this Agreement; and/or

5.1.12 is not in accordance with the Tram Supplier's quality plans; and/or

5.1.13 would not be in accordance with Good Industry Practice; and/or

5.1.14 would prevent efficient construction, completion and/or commissioning of the Edinburgh Tram Network or under the Tram Supply Agreement; and/or

5.1.15 would prevent a Certificate of Service Commencement being achieved by any of the Planned Service Commencement Dates.

6. EFFECT OF REVIEW

6.1 Any Submitted Item which is returned or deemed pursuant to paragraph 3.3 to have been returned by the Client's Representative endorsed "Level A - no objection" shall be complied with and implemented by the Tram Supplier.

6.2 If the Client's Representative returns the Submitted Item endorsed other than "Level A - no objection", the Tram Supplier shall:

6.2.1 where the Client's Representative has endorsed the Submitted Item "Level B - proceed subject to comments", proceed with the performance of the Tram Supplier Works in accordance with the Programme but acknowledge and take into account the Client's Representative's comments;

6.2.2 where the Client's Representative has endorsed the Submitted Item "Level C - resubmit", not act upon the Submitted Item, amend the Submitted Item to respond to the Client's Representative's objections and requirements, and re-submit the same to the Client's Representative in accordance with paragraph 6.3 unless the Tram Supplier disputes that any such objection or proposed requirement is on grounds permitted by this Agreement, in which case the Tram Supplier or the Client's Representative may refer the matter for determination in accordance with the Dispute Resolution Procedure and the Tram Supplier shall not act on the Submitted Item until such matter

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is so determined or otherwise agreed provided that any referral to the Dispute Resolution Procedure is at the risk of the Tram Supplier.

6.3 Where the Submitted Item has been endorsed "Level C", the Tram Supplier shall within 10 Business Days of receiving the returned Submitted Item, resubmit the Submitted Item as amended to the Client's Representative and the provisions of paragraphs 1.2 to 6 of this Schedule 9 *(Review Procedure)* shall apply (mutatis mutandis) to such re-submission.

6.4 The return or deemed return of any Submitted Item endorsed "Level A - no objection" or otherwise endorsed in accordance with paragraph 6.2.1 ("Level B - proceed subject to comments") shall mean that the relevant Submitted Item may be used or implemented (subject to any comments made in accordance with paragraph 6.2.1) for the purposes for which it is intended. However, the return or deemed return of any Submitted Item howsoever endorsed shall not:

6.4.1 relieve the Tram Supplier of its obligations under this Agreement; nor

6.4.2 constitute an acknowledgement, admission or acceptance by the Client that the Tram Supplier has complied with such obligations.

7. DISCLAIMER

7.1 No review, objection, comment or silence by the Client shall operate to (i) exclude or limit the Tram Supplier's obligations or liabilities under this Agreement (or the Client's rights under this Agreement) or (ii) fix the Client with any express or implied obligations, duties or liabilities with respect to the Submitted Item.

7.2 For the avoidance of doubt, this information is supplementary to information required to be produced by the Tram Supplier in order to satisfy the approval requirements of and Consents from other third parties and Approval Bodies. These include those required for:

7.2.1 CEC in its capacity as planning authority

7.2.2 CEC in its capacity as roads authority;

7.2.3 HMRI;

7.2.4 Network Rail;

7.2.5 the Utilities;

7.2.6 Transport Scotland;

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7.2.7 Historic Scotland;

7.2.8 SEPA; and

7.2.9 SNH.

7.3 The Tram Supplier shall promptly provide copies of all such submissions to the Client together with the responses to them as a matter of routine.

8. DOCUMENTATION FORMAT AND MANAGEMENT

8.1 The Tram Supplier shall issue three hard copies and a soft copy (in appropriate agreed format) of all Submitted Items to the Client and compile and maintain a register of the date and contents of the submission for each Submitted Item.

8.2 The Tram Supplier shall compile and maintain a register of the date of receipt and content of all Submitted Items that are returned or deemed to be returned by the Client's Representative.

8.3 All drawings shall be presented as A3 sized paper copies and drawings shall be prepared at their original size in a manner that allows them to be readily legible when reduced to A3 size. Original drawings shall not be greater than A0 in size.

9. VARIATIONS

9.1 No review, objection or comment or any failure to make objection or comment under this Schedule 9 (*Review Procedure*) by the Client shall constitute a Client Change

9.2 If, having received comments from the Client's Representative, the Tram Supplier considers that compliance with those comments would amount to a Client Change, the Tram Supplier shall within 5 Business Days of any comments being received, before complying with the comments, notify the Client of the same and, if it is agreed by the Parties or determined pursuant to the Dispute Resolution Procedure that a Client Change would arise if the comments were complied with, the Client may proceed with the matter in accordance with Clause 20 (*Changes*)

9.3 Any failure by the Tram Supplier to notify the Client within 5 Business Days (or such other period of time as agreed by the Client acting reasonably) of comments being received that it considers compliance with such comments of the Client's Representative would amount to a Client Change shall constitute an irrevocable acceptance by the Tram Supplier that any compliance with the Client's comments shall be without cost to the Client and without any entitlement to any extension of time or other relief.

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9.4 No alteration or modification to the scope, quality, quantity or nature of the Tram Supplier Works arising from the development of the detailed design or from the co-ordination or integration of the Design shall be construed or regarded as a Client Change.

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PART B

tie METHOD STATEMENT REVIEW POLICY

1. PURPOSE

The purpose of this procedure is to ensure that we have a standard process for the preparation, contents, review and acceptance/ approval of all method statements whether created in-house or submitted by a contractor. This procedure is created to meet the requirements of the company Integrated Management System (IMS) which reflect the criteria specified in International Standards Organisation (ISO) BS EN ISO 9001, 14001 and Occupational Health and Safety Assessment Services (OHSAS) 18001.

2. SCOPE

The scope of this procedure shall address all method statements which are produced for all elements of work and that any risks and impacts associated with the work element are assessed and appropriate control measures are put in place to allow the work to be undertaken safely and in an environmentally compliant manner and in accordance with contract requirements.

When writing the method statement the author/ contractor shall ensure that all necessary items are covered and the format and consistency of information is achieved in accordance with the work being carried out.

All Contractors and Sub contractors shall provide method statements with consistent content and the appropriate approvals, prior to commencing work. Method statements shall be specific to the work content and shall NOT BE OF A GENERIC NATURE ensuring that adequate coverage of all safety, quality and environmental aspects are addressed.

A formal system for acceptance of all Method Statements detailing the contractors proposed work activities within each work site shall be assured in accordance with this procedure, prior to site works commencing.

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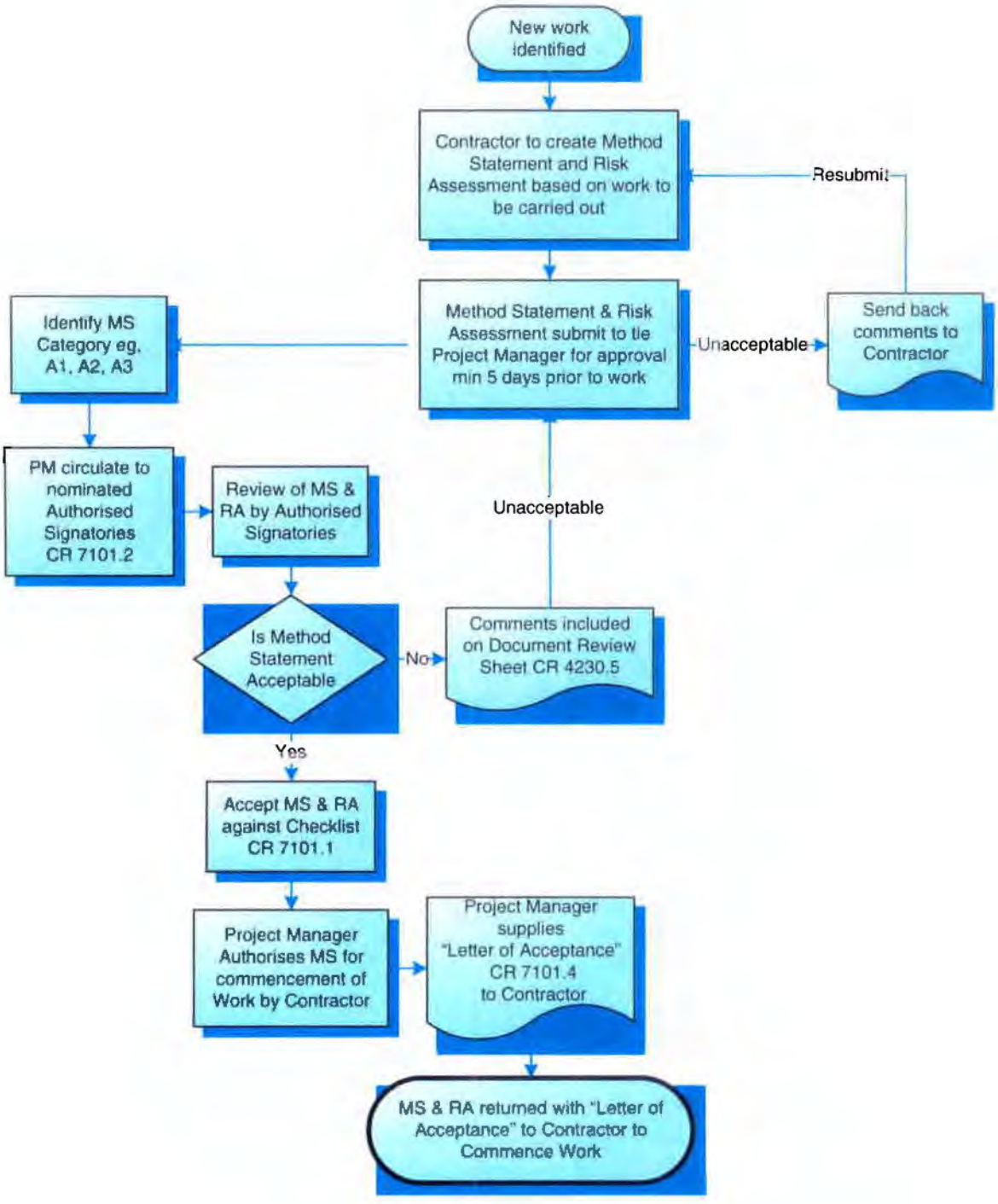
3. FLOWCHART



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4. RESPONSIBILITIES

4.1 Company Responsibility

The company is responsible for ensuring that everyone works in a safe and environmentally friendly fashion, which includes not only employees but all associated 3rd party contractors whilst undertaking work at any **tie** worksite.

4.2 Management Responsibilities

4.2.1 Project Director

The Project Director is responsible for nominating the authorised signatories for the signing of method statements.

4.2.2 Project Managers

Project Managers are responsible for reviewing the procedure for suitability and implementation in operation including liaison with designated responsible persons and contractor personnel, as well as acting as the key contact person in liaison with the contractors over the accuracy and content of the method statement to meet the requirements of the contract. Project Managers shall record all related method statements, maintaining and updating the method statement tracker database. final acceptance/ sign-off of the method statement lies with the Project Manager.

4.2.3 Construction Manager

The Construction Manager is responsible for implementing the procedure and liaising with designated responsible persons and contractors in ensuring the supply of adequate method statements and risk assessments to address all related construction work on the project.

4.2.4 Project HSQE Manager

The Project Health, Safety, Quality and Environmental (HSQE) Manager is responsible for the monitoring of this procedure. Further responsibilities include liaising with the Project Manager and designated responsible persons and contractors over the accuracy and content of the method statement to meet the requirements of the contract.

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4.2.5 Project Administrator

The Project Administrator is responsible for the registering, filing and retrieval of all records associated with this procedure.

4.2.6 Contractor

The Contractor is responsible for the submission of all relevant method statements and relevant documentation associated with their aspects of the contract, in sufficient time for **tie** to review, accept and where discrepancies/ comments are identified, to resubmit prior to commencement of any associated work.

5. PROCEDURE

All work elements shall require a method statement to cover the methodology, safety, quality and environmental aspects of the work. Method statements must be contract, and site specific and relevant to the work being carried out.

All method statements shall be submitted through the document control process, to allow correct transmittal and tracking of these documents.

No works shall commence until a method statement has been written, accepted and briefed to all related staff, for the works concerned.

The Project Manager shall ensure that method statements are written and provided by contractors, and that they are correctly reviewed and accepted by the authorised signatories. Final acceptance/ sign-off of the method statement lies with the Project Manager. The Letter of Acceptance sign-off sheet must be completed and received by the contractor, before any work commences.

The following categories identified below can be used as guidance to assess the risk associated with the work addressed in any method statements and ensure that all relevant authorities address the review of the document prior to implementation on a project.

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5.1 Categorisation of Method Statements

CATEGORY	RISK	AUTHORISATION
A1	**Low risk.** *Minimum implications on Human life or the Project* *E.g., Fixed parts protruding into passageways, excessive storage, sharp edges on equipment, low level fumes/ dust, non intrusive surveys.* *Subject to contractors review & approval process*	***Prepared** by Contractor/ Sub Contractor* ***Approved** by Contractor/ Sub Contractor*
A2	**Medium risk.** *Possibly implications on Human life or the Project* *E.g., Electrical equipment which is electrically untested or worn un-inspected slings for lifting duties, intrusive surveys.* *Provided to **tie** for information*	***Prepared** by Contractor/ Sub Contractor* ***Approved** by Contractor/ Sub Contractor* ***For Information tie** Ltd Project Manager*
A3	**High risk.** *Major implications on Human life or the Project.* *E.g., Equipment with inadequate guarding, or electrical equipment with damaged cabling, piling, earthworks.* *Due to high risk **tie** acceptance required.*	***Prepared & Approved** by Contractor/ Sub Contractor* ***Accepted** by **tie** Ltd Project Manager*

A useful mnemonic to remember when addressing the Risk associated with equipment is "**GASP**" – **G**ood condition, **A**dequate strength, **S**ound condition & free from **P**atent defect.

Contractors shall be supplied with a copy of the **tie** Method Statement Requirements CR 7101.2 as guidance for the creation of method statements to suit the company requirements. This allows the checking and acceptance process to be simplified while giving the contractor the opportunity to provide the necessary information under the requisite headings.

Method statements must be submitted at least 5 working days prior to being required for operations, to avoid possible delays in revisions to content and the seeking of project acceptance signatories.

The method statement must be accepted at least 2 working days prior to the works commencing.

Any comments concerning the method statement and its content shall be recorded by the accepters using the Method Statement Review Checklist CR 7101.1 and issued to the Project Manager for subsequent review. This shall ensure that there is no duplication of comments prior to submission to the contractor.

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The flowchart which forms part of this procedure, explains the process of submission, review and re-submission.

All method statements and associated relevant information shall be briefed to the work force prior to starting work. This briefing is recorded by the contractor on their relevant briefing record attached to the method statement.

5.2 Method Statement Content

Method statements are to be compiled by the Contractor or internally using the Method Statement Requirements CR 7101.2 as guidance. This procedure and the associated requirements indicate what items should be covered within the method statement, as a minimum requirement.

Method statements shall have a validity period from date of being prepared until completion of identified work. Method statements are required to be reviewed and amended, if necessary, when a work process changes ensuring that all details are still valid.

There are 17 Sections detailed within the "Method Statement Requirements" that must be addressed within a method statement, if applicable. Each heading has a guidance list as Bullet Points, detailed in the Method Statement Requirements and in the Method Statement Checklist CR 7101.1; this allows each heading to be completed using the italic notes as pointers. Other specific and pertinent information may be added if required.

Section 17 indicates what supporting information must be attached to the method statement. The list of supporting information is itemised in the table of contents and shall be ticked against each itemised aspect identifying the relevant information addressed accordingly.

The method statement must be signed by all **tie** authorised persons designated by the Project Director on the Authorised Signatories List CR 7101.3 in accordance with the "Categorisation of Method Statements" in Section 5.1 above. Prior to being copied to site; the "Letter of Acceptance" CR 7101.4 supplied by the Project Manager must accompany the method statement, this is confirmation that the method statement on site is the current issue.

The contractor shall ensure that the method statements are briefed to the operators who will be undertaking the identified work. Records of evidence of compliance showing that operators having been briefed, by a competent person must be available as proof that briefing have been carried out. Signed briefings are objective evidence, of staff understanding, of the application of the method statement relevant to the work that they have to carry out.

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5.3 Further Supporting Information

Additional information such as risk assessments, Control of Substances Hazardous to Health (COSHH) assessments, environmental impacts, permits to work, drawings, design details, hazard directory/ log and sectional appendices including extracts may also be required to fully support the information in completing a method statement. If this information is required, it shall be annotated and attached to the method statement.

6. HEALTH, SAFETY AND ENVIRONMENTAL REQUIREMENTS

This procedure directly impacts on the health, safety and environmental requirements of the individuals and related project work.

7. REFERENCES

7.1 External Documents

The following external documents are referenced herein.

Doc Type/ Number	Document Title
BS EN ISO 9001	Quality Management Systems – Requirements
BS EN ISO 14001	Environmental Management Systems – Specification with guidance for use
OHSAS 18001	Occupational Health & Safety Management Systems – Specification

7.2 Internal Company Documents

The following **tie** documents are referenced herein.

All identified records are deemed part of the company management system and shall be maintained in the live files for a period of one year and then in archive for a period of 5 years.

Doc Reference Number	Document Title
CP 6220	Learning and Development Procedure
CR 7101.1	Method Statement Review Checklist
CR 7101.2	Method Statement Requirements
CR 7101.3	Authorised Signatories List
CR 7101.4	Letter of Acceptance

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8. DEFINITIONS & ACRONYMS

The following definitions and acronyms apply to this document.

Word or Acronym	Definition
Acceptance	The process of reviewing and acknowledging the content of the method statement, as suitable to ensure that the identified risks have been mitigated and controlled.
COSHH	Control of Substances Hazardous to Health
GASP	Good condition, Adequate strength, Sound condition & free from Patent defect
Hazard	Anything that has the potential to cause harm.
HSQE	Health, Safety, Quality and Environment
High Risk	A condition or practice likely to cause:- loss of life/ plant/ equipment or property; or a dangerous occurrence reportable under RIDDOR.
IMS	Integrated Management System
ISO	International Standards Organisation
Low Risk	A condition or practice which may result in:- minor, non disabling injury or illness which results in little of no lost time; or minor non-disruptive damage to plant, equipment or property.
Medium Risk	A condition of practice which is likely to:- cause serious injury or illness resulting in temporary disability to one or more persons; or damage to plant, equipment or property, which results in disruption to normal activities.
OHSAS	Occupational Health & Safety Assessment Services
Risk	The level of harm that will arise from a hazard with or without control measures in place.
tie	The Limited Company

9. TRAINING

Education and Training associated with this procedure shall be carried out in accordance with Company Procedure for Learning and Development CP 6220.

All **tie** employees, consultants and contractors are required to be made aware of the requirements of this procedure and the relevant legislation associated with its implementation. All operators shall be briefed on method statements relevant to their area of work.

10. DOCUMENTATION CHANGE CONTROL HISTORY

Revision	Date	DCR No	Reason for Change
0.0	25/09/07	0017	1st Issue
1.0	18/12/2007		Re-define of use on comments from Project Managers

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PART C

DESIGN MANAGEMENT PLAN

1. Purpose

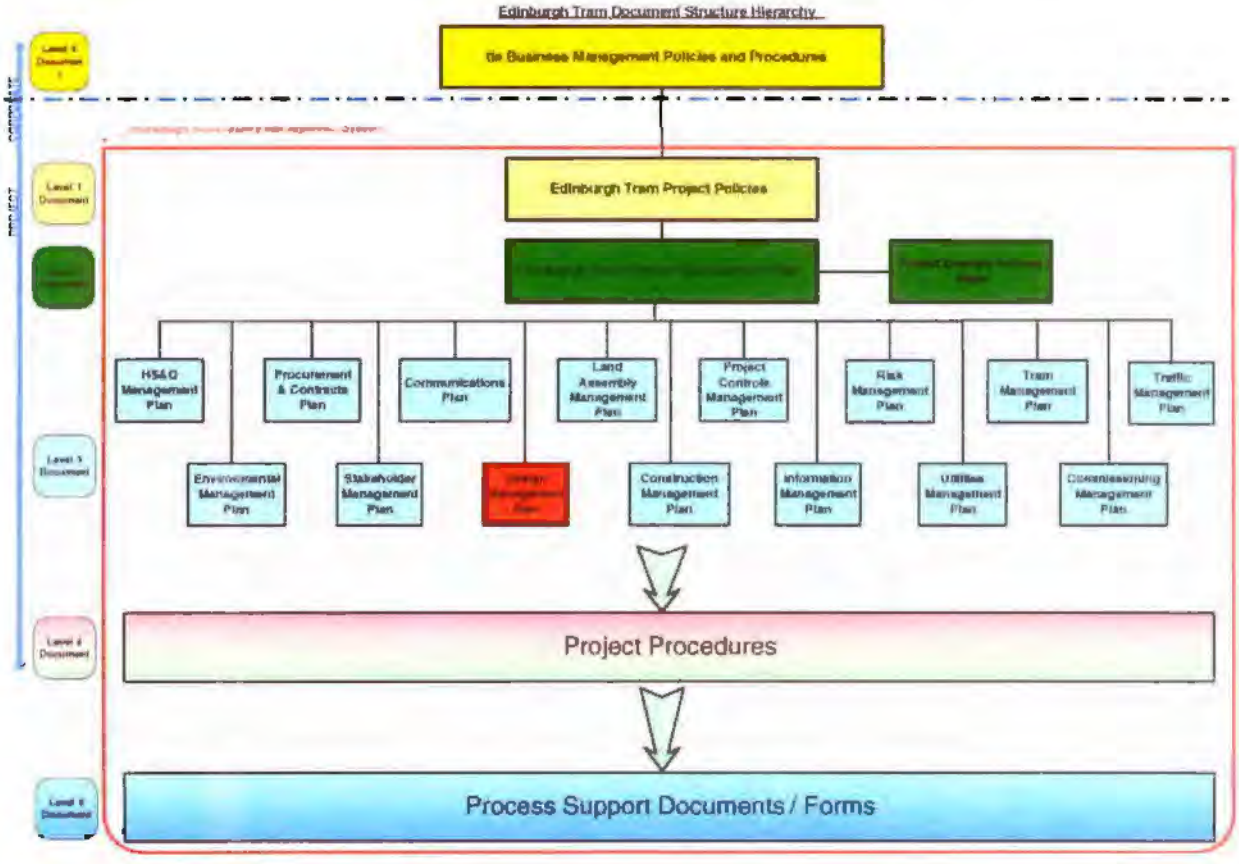
1.1. Plan Objectives

1.1.1. To provide the overall strategy for the detailed design of ETN and its subsequent review.

1.1.2. This plan will be reviewed regularly to ensure effectiveness.

1.2. Documentation Structure

1.2.1. The following chart highlights where the Design Management Plan sits in relation to the overarching Edinburgh Tram Project Management Plan and the various other work stream plans developed specifically for the Edinburgh Tram Project. The Design Management Plan is viewed as a Level 3 Document within the Hierarchy, whereby any associated procedures and support documents will be referenced within it.



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2. Overview

2.1. Detailed Design

2.1.1. Post-novation of the SDS Agreement, and the Tramco Agreement respectively, the complete Tram system detailed design, which is relevant for the Infraco scope of works, will be delivered by Infraco.

2.1.2. Infraco is the principal party in respect of design, with the SDS and Tramco contracts for design and build novated to them. In the notes below, where the term 'SDS/Infraco/Tramco' is used, it is intended to refer to a process managed by Infraco in respect of these novated arrangements.

2.1.3. The effectiveness of detailed design is critical to the success of ETN. It:

- allows the Infraco to construct and maintain the works within the constraints of the Infraco Agreement;
- delivers a wide range of statutory and non-statutory approvals;
- achieves system safety to the requirements of safety legislation via the ICP; and
- provides a design which complies with the requirements of the Parliamentary Acts and within the constraints set out by Promoter.

2.1.4. Detailed design takes the preliminary design forward to achieve a series of deliverables, which are tailored to obtain consents and approvals and to provide all information required to allow the Infraco works to be constructed.

2.1.5. In addition to the design covered by SDS, certain design elements will be produced directly by Infraco. This also includes all necessary system integration activity, including integration of the tram vehicle into the system.

2.1.6. Through Infraco, Tramco will design the tram vehicle and any necessary activity to ensure that the vehicle can be integrated into the tram system, as defined by Infraco.

2.2. Design Review Process

2.2.1. As required, designs will each be reviewed, for, or under:

2.2.1.1. '**Prior Approvals**' - a CEC planning approvals process, which is in lieu of a

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full council Planning Committee application for matters of public interest which require such approvals (as defined in the relevant Acts). Documents submitted for Prior Approval generally present outline design information that will require further development to detailed design standard after Planning Permission has been granted. Note: the tram vehicle as well as any temporary works and temporary traffic management measures are not subject to Prior Approval (see para 2.6.1). **Prior Approvals** comprise:

- An Informal Consultation: a period of consultation of 8 weeks duration with CEC Case Officers to allow a good understanding of design content and basis.

- The Prior Approval itself: an administrative process of 8 weeks duration carried out with the delegated authority of the CEC Planning Committee which provides formal planning consent to designs which require it. This **element of the process causes designs to be made public following Informal** Consultation. A protocol exists to deal with exceptions to this process which requires a full application to the Planning Committee

2.2.1.2. **Technical Approvals** of the designs provide formal technical approvals for the various design elements by the relevant competent authority. Usually, these will be sought from CEC, in respect of their statutory authority role. However, others will also be needed from bodies such as the Scottish Environment Protection Agency, Scottish Natural Heritage and the Department for Transport. Unless otherwise agreed with CEC a review period of 8 weeks shall apply for all Technical Approvals associated with CEC. Technical Approvals may include, as appropriate:

- **Approvals in Principle (AIP)** for structures in accordance with the requirements of CEC or Network Rail in their role as Technical Approval Authority. Documents submitted for AIP generally present outline design information that will require further development to detailed design standard after AIP has been granted.

2.2.1.3. A **tie**-led 4-week **Design Review** process, which includes stakeholders and BBS, SDS, CAF and Transdev whose purpose is to review selected design packages for the effective integration of design elements to create an operationally acceptable tram system. The tram vehicle design will itself be subject to this design review process.

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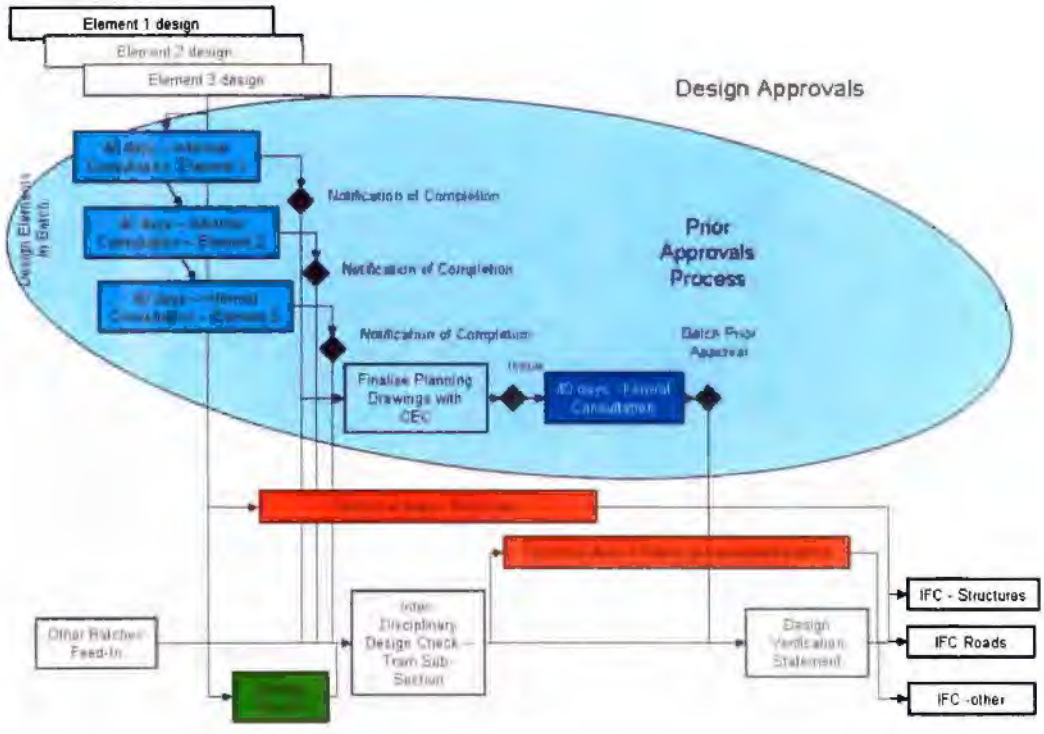
[Omit flow chart]



2.2.2. The management arrangements and associated accountabilities are defined in Section 2.9, below.

2.3. Revision of design

2.3.1. It is possible that revision of some completed design elements may be required from time to time. This may occur, for example, because a Value Engineering opportunity is identified, **tie** issues a Change Order, or SDS/Infraco/Tramco issue a Change Request. For major changes, whatever the source of initiation of the change of design, the new design must undergo all necessary design processes to ensure IDC and overall compliance with requirements.

2.3.2. Minor design changes can be agreed between SDS/Infraco/Tramco and **tie** outside the formal design review process. Minor design changes are defined as those changes that do not affect the nature, scale and principal detailing of a design proposal.

2.3.3. Typical examples for minor design changes are:

- Alternative rebar arrangements required to suit construction methods
- Adjustments to pipe / duct runs to avoid potential underground features

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- Local adjustments to the positions of highway features such as re-positioning of signs to avoid clashes with underground services
- Correction of errors by the designer
- Clarifications on drawings, such as adding dimensions

2.3.4. It should be noted that the list of minor design changes above is not exhaustive. Through an appropriate process, as part of their management system, it is for SDS/Infraco/Tramco to make the case for each such change to be designated as minor.

2.4. Submission of Designs

2.4.1. SDS/Infraco/Tramco will submit packages of design to **tie** electronically, to an agreed programme. Before this happens SDS/Infraco/Tramco will have been an integral part of a number of interfacing activities, whose purpose it is to inform detailed design such that it is most likely to be as expected at first submission and to ensure that all technical interfaces are co-ordinated.

2.5. Technical Approvals

2.5.1. Technical Approvals requirements will be defined by any or all of **tie,** CEC, Network Rail, Department for Transport. Matters which require Technical Approval by CEC are defined by the Council's duties under the Roads (Scotland) Act 1984. These are primarily concerned with the structural integrity of the completed design and with roads design. It is CEC's practice to handle as much as possible within the roads Technical Approval so that, for example, roads construction consent and overall roads design approval are dealt with in a single submission. The systems design and tram vehicle are not subject to CEC Technical Approval; they are subject to design review by **tie.**

2.6. Prior Approvals

2.6.1. 'Prior Approvals' requirements will be defined by CEC. Matters which require Prior Approvals are defined by Section 73 of the Edinburgh Tram Acts and Class 29 in Part 11 of Schedule 1 to the Town and Country Planning (General Permitted Development) (Scotland) Order 1992. These are mainly the structures, the overhead line equipment, lighting, tramstops and any buildings. The tram vehicle as well as any temporary works and temporary traffic management measures are not subject to Prior Approval.

2.7. Design Review

2.7.1. The purpose of the **tie**-led Design Review process is to take selected packages of submitted design and review them for the fit of the design with stated requirements. It is primarily concerned with providing assurance that **tie** can demonstrate to the Independent Competent Person that the requirements of ROGS are being met. It does so by addressing the design as an effective integration of design elements to create an operational tram system which meets the requirements. **The design review is not an approval process and does not does not dilute the accountability of SDS/Infraco/Tramco for good-quality, fit-for-purpose design and securing approval for that design.** In the event of a clash between offered design and stated requirements the review will include the taking of a decision as to the required outcome.

2.7.2. Issues which emerge comprise a Record of Review (RoR), co-ordinated by **tie** which then will be addressed by SDS/Infraco/Tramco and transferred into other similarly applicable designs.

2.7.3. The overall permanent works design comprises several hundred design elements. Generally, SDS/Infraco/Tramco shall prepare Design Assurance Statements (DAS) for the combination of all design elements relevant for each geographic sub-section and submit these together with the design data for **tie** review.

2.8. Design Assurance Statement

2.8.1. Packages of design will be submitted to **tie** by SDS/Infraco/Tramco with an associated Design Assurance Statement, which will detail how the design complies with statutory, stated and best-practice requirements.

2.8.2. When packages of design have been submitted for review, the review will comprise examination of how each package demonstrates:

- How it meets the Employers Requirements
- How it meets stakeholder requirements
- How it meets the Approvals and Consents requirements (including CEC and other 3rd Parties)
- How it closes issues raised in previous Records of Review

- How it complies with engineering standards – or how it handles non-compliances (SDS to specify following initial review period)
- How it meets the Verification and Validation requirements
- How it mitigates hazards from the Hazard Log
- How it meets the Detailed Design Case for Safety
- How it meets the CDM requirements
- How it is "Fit for Purpose"
- How it meets the CEC Street's Design manual
- How it meets the CEC Tram Design Manual
- How it meets requirements, comments or ROR issues raised at PD, TDWG or RDWG and by CEC at PD1
- How it meets with run-time requirements
- How it meets with RAMS definitions

2.8.3. Where sub-packages of design are submitted for review, whilst a full DAS may not be available, a written statement of conformance with the maximum possible inclusion of the main points above is required.

2.9. Key Responsibilities

2.9.1. **tie's** Engineering Services Director is responsible for the overall management of this Plan, chairing the **tie**-led design reviews; arbitrating where during design review a conflict arises over offered design and stakeholder requirements; and ensuring that this Plan is effective and is complied with. He shall also assist Infraco during the design approval and consultation process, noting that final accountability for gaining approvals rests with Infraco.

2.9.2. SDS/Infraco/Tramco is responsible for detailed design and for management of the external approvals process to ensure successful approval of the design, first time. Infraco is the principal party in respect of design with the SDS and Tramco contracts for design

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and build novated to them. Where the term 'SDS/Infraco/Tramco' is used it is intended to refer to a process managed by Infraco in respect of these novated arrangements.

2.9.3. **CEC** is responsible for ensuring their compliance with timescales within this plan and for attendance at necessary meetings required during the process.

2.9.4. Stakeholders are responsible for appropriately resourcing the requirements of this Plan such that their needs are covered.

2.10. Definitions

- **CEC**: City of Edinburgh Council. Promoter of the Edinburgh Tram Network (ETN).
- **Stakeholder:** a party who has a stated requirement to be complied with.
- **SDS**: The Systems Design Services contractor – i.e. Parsons Brinckerhoff and its sub-contractors.
- **Infraco:** The appointed Infraco - i.e. BBS
- **Tramco:** The appointed Tramco - i.e. CAF
- **TSS**: The Technical Services and Support contractor – i.e. Scott Wilson and its sub-contractors.
- **ICP**: The Independent Competent Person, as defined in the ROGS regulations; a person independent of the project appointed by **tie** to signify his non-objection to the overall tram system's construction, operation and maintenance.

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3. Key Activities

3.1. Overview

3.1.1. The "RACI" Chart below details key tasks and their associated functional roles:

	Key Tasks	Functional Roles				
		Engineering Services Director	SDS/Infraco/Tramco	TSS	CEC, TEL, Transdev	tie HSQE Manager
Processes to inform detailed design	Set up meetings	A	R	CI	CI	CI
	Attend meetings and ensure appropriate people in attendance	A	R	C	C	C
	Prepare minutes of meetings	A	R	CI	CI	CI
	Raise RFIs and incorporate changes	A	R	CI	CI	C
	Respond to RFIs and raise changes	A R	C I	C I	C I	C
Detailed design	Raise issues for resolution	A	R	CI	CI	CI
	Incorporate all requirements	A	R	CI	CI	CI
	Verify design adequacy and quality	CI	AR	CI	CI	CI
	Prepare package delivery schedule	CI	AR	CI	CI	CI
	Prepare package verification detail	C	AR	C	C	C
Procedure Audit	Set up audit plan to cover this Design Management procedure	A	C	C	C	R
	Conduct audit and report results	A	CI	CI	CI	R
Design Review	Manage process	AR	CI	C	CI	CI
	Monitor programme	AR	CI	CI	CI	
	Compile management reports	A R	CI	CI	CI	CI

RACI is an acronym for:

R = Responsible – owns the delivery of the Activity

A = to whom "R" is **Accountable** – must sign-off (approve) the output of the Activities

C = to be **Consulted** – has information or capability to contribute to the activity

I = to be **Informed** – must be notified of results

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3.2. Reporting

3.2.1. The Engineering Services Director will report 4 weekly to the Project Director.

3.3. Monitoring, Reviewing and Auditing

3.3.1. The Engineering Services Director shall regularly monitor the effectiveness of this Plan and shall formally review it at least once every three months.

The HQSE Manager shall audit compliance with this procedure to a schedule commensurate with the perceived risk.

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 10 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 10

BONDS AND COLLATERAL WARRANTY

Part A

Reliability Bond

BETWEEN

(1) **[◆]**, a company incorporated in **[◆]** under company number **[◆]** whose registered office is at **[◆]** ("**the Surety**"); and

(2) [ ], a company incorporated in Scotland under number [ ] and having its registered office at [ ] (the "**Client**").

WHEREAS

A. The Client entered into an agreement for the appointment of a contract (hereinafter referred to as the "**Tram Supply Agreement**") dated **[◆]** with **CAF** ("**Tram Supplier**") to provide trams for use on the light rapid transit system in Edinburgh known as the Edinburgh Tram Network.

B. Clause 44 (*Reliability Bond*) of the Tram Supply Agreement obliges the Tram Supplier to provide to the Client an unconditional irrevocable Reliability Bond on the conditions and in the form set out in Schedule 10 (*Bonds and Collateral Warranty*) to the Tram Supply Agreement, issued by a surety acceptable to the Client and callable subject only to written notification by the Client.

C. In consideration of the Client accepting the Surety's obligations set out below in discharge of the Tram Supplier's undertaking to provide a reliability bond under Clause 44.3 (*Reliability Bond*) of the Tram Supply Agreement, the Surety hereby irrevocably and unconditionally agrees and undertakes to pay to the Client a sum not exceeding **5% of the Aggregate Tram Price** (the "**Bonded Amount**")

and the Surety accordingly covenants with the Client and agrees as follows:

1. Upon receipt by the Surety of a demand or demands ("**Demand Notice**") from the Client certifying that the Tram Supplier has failed to establish Reliability of the Trams in accordance with clause 44.4 of the Tram Supply Agreement, and without being entitled or obliged to make any enquiry or proof or contestation or impose any further conditions on the Client (or

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the Tram Supplier) and without the need for the Client to take any legal action against or to obtain the consent of the Tram Supplier and without any right of set-off, abatement or counterclaim, the Surety shall forthwith (and in any event no later than five business days following receipt of the Demand Notice) pay to the Client the amount or amounts specified in such Demand Notice(s) in immediately available funds by electronic transfer to the account nominated in the Demand Notice, not exceeding in aggregate the Bonded Amount; it being confirmed that the Client may make as many separate demands hereunder as the Client thinks fit. The Client shall not be obliged to exercise any other right or remedy the Client may have before making a demand under this Reliability Bond.

2. A Demand Notice received from the Client in accordance with paragraph 1 above shall be conclusive evidence of the Surety's liability to pay to the Client and of the amount of the sum or sums which the Surety is liable to pay. The Surety's obligation to make payment under this Reliability Bond shall be a primary, independent and absolute obligation and the Surety shall not be entitled to delay or withhold payment for any reason. The Surety's obligation hereunder shall not be affected by any act, omission, matter or thing which, but for this provision, might operate to release or otherwise exonerate the Surety from the obligations hereunder in whole or in part, including without limitation and whether or not known to the Surety or to the Client:

2.1 any time or waiver granted to the Client or to the Tram Supplier;

2.2 the taking, variation, compromise, renewal or release of or the refusal or neglect to perfect or to enforce any rights, remedies or securities against the Client or the Tram Supplier;

2.3 any legal limitation, disability or incapacity relating to the Client or the Tram Supplier;

2.4 any variation of or amendment to the Tram Supply Agreement (or related documentation) or the works or services to be performed thereunder or any other document or security so that references to the Tram Supply Agreement in this Reliability Bond shall include each such variation and amendment;

2.5 any unenforceability, invalidity or frustration of any rights or obligations of the Client or the Tram Supplier under the Tram Supply Agreement or any other document or security; and

2.6 any other fact, circumstance, provision of statute or rule of law which might, were the Surety's liability to be secondary rather than primary, entitle the Surety to be released or discharged in whole or in part from the Surety's undertaking.

3. NOT USED

4. NOT USED

5. NOT USED

6. The Surety's liability under this Reliability Bond shall not be affected or reduced by the insolvency of the Tram Supplier or its liquidation, receivership or other like temporary or permanent status.

7. The Client shall be at liberty to compromise, release, waive or neglect any security as it sees fit, without impairment of their rights under this Reliability Bond.

8. This Reliability Bond shall cease to have effect ninety days after the earlier of the date of expiry or the date of termination of the Tram Supply Agreement, save in connection with any Demand Notice issued to the Surety in writing prior to the expiry of the said period of ninety days.

9. The Client shall be entitled to assign this Reliability Bond without the consent of the Surety.

10. Any notice to be served under this Reliability Bond must be in writing and must be delivered by hand or by registered post or recorded delivery at Construcciones y Auxiliar de Ferrocarriles S.A. CAF, J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa), Spain. Service shall take effect, if given by hand, on the date of delivery. If given by post, it shall take effect 2 days after posting, excluding Saturdays, Sundays and statutory holidays.

11. This Reliability Bond shall be governed by and construed in accordance with the Laws of Scotland and the Parties hereby agree to submit to the exclusive jurisdiction of the Court of Session over any claim arising out of this Reliability Bond.

12. A person who is not a party to this Reliability Bond shall have no right to enforce any of the terms of this Reliability Bond.

13. In this Reliability Bond:

13.1 the words and expressions have the same meanings as in the Tram Supply Agreement and we shall be deemed to have full knowledge of the terms and conditions of the Tram Supply Agreement;

13.2 "person" includes any firm and any entity having legal capacity; and

13.3 the definitions given in the recitals apply to the rest of this Reliability Bond.

IN WITNESS WHEREOF

EXECUTED for and on behalf of **[THE SURETY]** at
on 200[◆] by:
Director/Authorised Signatory _____
Full Name _____
Witness Signature _____
Full Name _____
Address _____
_____

EXECUTED for and on behalf of [ ] at
on 200[◆] by:
Director/Authorised Signatory _____
Full Name _____
Witness Signature _____
Full Name _____
Address _____
_____

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APPENDIX 1

DEMAND NOTICE

[date]

SURETY
[Address]
Attention: [Responsible Officer]

Dear Sirs

Reliability Bond [◆] [Ref: ◆]
Edinburgh Tram Network - Construcciones y Auxiliar de Ferrocarriles S.A.

This is our formal demand for payment pursuant to Clause 1 of the above instrument issued by you in our favour for the amount of £2,787,951. Please pay the sum of £[◆] forthwith by electronic transfer to [◆ ***bank account details***].

We hereby certify that Construcciones y Auxiliar de Ferrocarriles S.A.(CAF) has failed to establish Reliability in respect of any Tram after the expiry of 13 full Reporting Periods from the commencement of Passenger Services. In accordance with Clause 2 of the Reliability Bond, we attach a certified copy of the relevant default notice.

Yours faithfully,

_____

_____
Director and authorised signatory
for and on behalf of [ ]

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Part B

TRAM SUPPLIER COLLATERAL WARRANTY

(1) [*OTHER THIRD PARTY BENEFICIARY*]

- and -

(2) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

COLLATERAL WARRANTY IN FAVOUR OF [*THIRD PARTY BENEFICIARY*] FROM CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

relating to

THE TRAM SUPPLY AGREEMENT

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AGREEMENT

BETWEEN

(1) **[[third party beneficiary]** [(company number [◆]) whose registered office is at [◆]] ***OR*** [carrying on business together in partnership under the name of [◆] at [◆]]] [("**Beneficiary**") which expression shall include its successors and permitted assignees.; and

(2) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 whose registered office is at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa), Spain ("**Tram Supplier**").

BACKGROUND

A By an agreement in writing dated [◆] (the "**Tram Supply Agreement**"), **tie** appointed the Tram Supplier to design, manufacture and supply Trams and supply documentation and associated equipment in connection with the Edinburgh Tram Network.

B It is a term of the Tram Supply Agreement that the Tram Supplier shall enter into this Agreement with the Beneficiary.

IT IS AGREED as follows:

1. **DEFINITIONS AND INTERPRETATION**

In this Agreement:

1.1 the following words and expressions have the following meanings, unless the context requires otherwise:

"**Agreement**" means this document (as amended from time to time pursuant to clause 11);

"**Deliverables**" means all documents, information, reports, diagrams, records, method statements, risk assessments, manuals, schedules, databases, photographs, formulae, plans, designs, specifications, drawings, details, calculations, models and simulations, the outputs and reports based on any models, programmes and all other material created and/or provided by the Tram Supplier (or any other third party) in the performance of the Tram Works and the Tram Supplier 's obligations under the Tram Supply Agreement;

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"**Edinburgh Tram Network**" means the tramway which is to be designed, constructed and maintained in Edinburgh in Phase 1a (forming part of Line One and Line Two as described in the Tram Legislation) and Phase 1b, or either of them (as may be amended from time to time together with any modification, line extension, spur, interconnection and any additional line which may be instructed), to be constructed in accordance with the Tram Legislation together with all associated works and facilities including all civil engineering and track works, Trams, infrastructure, plant, machinery and equipment installed or used for such tramway;

"**Good Industry Practice**" means using standards, practices, methods and procedures conforming to Law and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably be expected from a large, reputable, professionally qualified, competent and skilled organisation experienced in carrying out activities of a similar nature, scope and complexity to those comprised in the Tram Works, and seeking in good faith to comply with its contractual obligations and all duties owed by it;

"**Insurance Period**" means the period of 12 years from the date of issue of the last certificate of substantial completion in respect of the Tram Works, as established pursuant to and for the purposes of the Tram Supply Agreement (or, if sooner, 12 years after termination of the employment of the Tram Supplier under the Tram Supply Agreement);

"**Intellectual Property Rights**" means any rights in or to any patent, design right, utility model, trade mark, brand name, service mark, trade name, business name, logo, invention (whether registered or unregistered), domain name, semi-conductor right, topography right, software designs and/or other materials, source code, copyright, moral right, know-how, or rights in databases and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or for an extension, revival or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the law of Scotland or of any other jurisdiction;

"**Law**" means:

(a) any Act or instruments of the Scottish Parliament or the United Kingdom Parliament or subordinate legislation within the meaning of section 21(1) of the Interpretation Act 1978, any exercise of the Royal Prerogative, and any

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enforceable community right within the meaning of section 2 of the European Communities Act 1972;

(b) any applicable guidance, direction or determination issued by any regulatory body with which **tie**, CEC, the Client and/or the Tram Supplier is bound to comply; and

(c) any applicable judgment of a relevant court of law which is a binding precedent,

in each case in force, or applicable, in Scotland;

"**Line One**" means the tramway works as authorised by the Edinburgh Tram (Line One) Act 2006;

"**Line Two**" means the tramway works as authorised by the Edinburgh Train (Line Two) Act 2006;

"**Party**" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

"**Tram Supply Agreement**" means the contract dated [ ] made between the Client and the Tram Supplier;

"**Tram Works**" means the works and services to be undertaken by the Tram Supplier under the Tram Supply Agreement;

"**TEL**" means Transport Edinburgh Limited a company incorporated under the Companies Act with registered number SC269639 and having its registered office at 55 Annandale Street, Edinburgh, Midlothian, EH7 4AZ which shall include its successors in title and permitted assignees;

"**Trams**" means the tram vehicles to be provided for operation on the Edinburgh Tram Network;

"**Tram Legislation**" means the Edinburgh Tram (Line One) Act, the Edinburgh Tram (Line Two) Act and such other legislation relative to the Edinburgh Tram Network as may be enacted from time to time; and

1.2 unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender include all other genders.

1.2.2 a reference to:

1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a clause is a reference to a clause in this Agreement.

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation.

1.4 Where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

2. STANDARD OF CARE

2.1 The Tram Supplier warrants and undertakes to the Beneficiary that it has carried out and shall carry out the Tram Works and its other duties and obligations under the Tram Supply Agreement subject to and in accordance with the terms thereof.

2.2 In addition to and without derogation from clause 2.1, the Tram Supplier warrants to the Beneficiary that:

2.2.1 in the performance of the Tram Works and its other obligations under the Tram Supply Agreement it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent contractor experienced in carrying out works and services similar to the Tram Works in connection with projects of a similar type, nature and complexity;

2.2.2 any design produced by the Tram Supplier will satisfy in every respect any relevant performance specification or any requirement included or referred to in the Tram Supply Agreement and will be suitable in every respect for the

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purposes included in or reasonably to be inferred from the Tram Supply Agreement; and

2.2.3 any design produced by the Tram Supplier will fully comply with Law.

2.3 The Tram Supplier shall owe a duty of care to the Beneficiary in carrying out its duties and obligations under the Tram Supply Agreement.

3. MATERIALS

3.1 The Tram Supplier warrants to the Beneficiary that it has not and shall not use any materials which at the time of use:

3.1.1 are known to be deleterious in the particular circumstances in which they are used (either to health and safety or to the durability of any works on which the Tram Supplier is employed by the Client); or

3.1.2 contravene any relevant standard or code of practice issued from time to time by the BSI Group or under a European directive relating to standards; or

3.1.3 do not accord with the guidelines contained in the edition of the publication "Good Practice in Selection of Construction Materials" (Ove Arup & Partners) current at the date of specification of use; or

3.1.4 contravene Good Industry Practice.

4. COPYRIGHT LICENCE

4.1 The Tram Supplier hereby grants to the Beneficiary a royalty-free and exclusive licence to use such Intellectual Property Rights in the Deliverables as may be necessary, for operation and maintenance of the trams but, not in any case, for manufacturing purposes, for the Beneficiary to use in relation to the [[Trams] ***OR*** [*other appropriate use*]]. This licence shall carry the right to grant sub-licences, and be transferable to third parties, subject to the prior written agreement of the Tram Supplier.

4.2 In so far as ownership of the copyright and any other Intellectual Property Rights in any Deliverable prepared or provided by the Tram Supplier in connection with the Edinburgh Tram Network is vested in any person other than the Tram Supplier, the Tram Supplier shall procure for the Beneficiary the benefit of such a licence as is referred to in clause 4.1 for the purposes referred to therein.

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4.3 The Tram Supplier shall, if so requested at any time, execute such documents and perform such acts as may be required fully and effectively to assure to the Beneficiary or any third party the rights referred to in this clause 4.

4.4 The Tram Supplier shall provide to the Beneficiary a copy of any of the Deliverables as soon as reasonably practicable after receipt by the Tram Supplier of a written request from the Beneficiary to do so, unless already delivered to tie.

4.5 The Tram Supplier undertakes to the Beneficiary that the use by the Beneficiary of any of the Deliverables for any purpose provided for in this clause 4 shall not infringe the rights of any third party in relation to the Deliverables.

5. REQUIRED INSURANCES

5.1 The Tram Supplier undertakes that:

5.1.1 it has maintained and shall maintain during the performance of its obligations under the Tram Supply Agreement and the Insurance Period each of the insurances as follows:

5.1.1.1 professional indemnity insurance with an insurer authorised to carry out insurance business in the United Kingdom for an amount not less than £80,000,000 on an each and every claim basis and £80,000,000 on an aggregate basis in respect of pollution and contamination claims and date recognition claims, in respect of the legal liability of the Tram Supplier as a result of any negligent act, error or omission in the performance of the professional activities and duties in connection with the Tram Works and in the performance of its obligations under the Tram Supply Agreement; and

5.1.1.2 further insurances held by the Tram Supplier as contained in Schedule 11 of the Tram Supply Agreement.

51.2 cover under the professional indemnity insurance is extended to include the Tram Supplier 's liabilities under this Agreement;

5.1.3 this Agreement has been disclosed to the Tram Supplier's current professional indemnity insurers or brokers (as the case may be) and shall be disclosed to any future professional indemnity insurers or brokers providing the insurance required by this Agreement; and

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5.1.4 the Tram Supplier shall abide by the terms and conditions of insurance and shall not do or omit to do anything that might prejudice the cover or its right to make a claim.

5.2 As and when reasonably required by the Beneficiary, the Tram Supplier shall produce for inspection documentary evidence that such insurance is being properly maintained.

5.3 If the insurer makes or attempts to make any material alteration or purports to withdraw the Tram Supplier 's professional indemnity cover, or if the Tram Supplier is unable to obtain professional indemnity insurance, the Tram Supplier shall promptly give notice of this to the Beneficiary.

6. ASSIGNATION

6.1 The Tram Supplier shall not assign, novate or otherwise transfer the whole or any part of the Agreement without the prior written agreement of the Beneficiary.

6.2 The Beneficiary shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

6.2.1 to the Scottish Ministers, TEL, CEC, Transport Scotland or any local authority; or

6.2.2 to any body with no worse financial standing than that of **tie** who takes over all or substantially all of the functions of **tie**; or

6.2.3 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to the Tram Supplier acting reasonably) by **tie** or a person falling within Clause 69; or

6.2.4 to the Operator; or

6.2.5 without the consent of the Tram Supplier to any person listed above provided that no more than two such assignations will be permitted. Any assignations by the Beneficiary to a subsidiary or associated company of the Beneficiary or a member of the same group of companies will not count as an assignation;

6.2.2 with the prior written consent of the Tram Supplier (such consent not to be unreasonably withheld or delayed)

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6.3 The Tram Supplier undertakes to the Beneficiary not to contend in any court proceedings under this Agreement that any person to whom the Beneficiary assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this clause is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that the Beneficiary is named under this Agreement or any intermediate assignee of the Beneficiary escaped loss resulting from such breach by reason of the disposal of its interest in the same.

7. LIABILITY OF THE TRAM SUPPLIER

7.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by the law of contract, delict or otherwise.

7.2 The responsibility of the Tram Supplier under this Agreement is not to be reduced or in any way released or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by the Beneficiary against a third party.

7.3 The rights and benefits conferred upon the Beneficiary by this Agreement are in addition to any other rights and remedies that the Beneficiary may have against the Tram Supplier including (without prejudice to the generality of the foregoing) any remedies in delict.

7.4 Subject to the other provisions of this Agreement, the liability of the Tram Supplier to the Beneficiary is to be determined in all respects in accordance with the terms of the Tram Supplier Agreement and, in the event of any claim by the Beneficiary under this Agreement, the Tram Supplier shall be entitled to rely upon any defence, right, limitation or exclusion under the Tram Supplier Agreement as though the Beneficiary were named as the Client under it, except that:

7.4.1 the Beneficiary shall not be affected by any subsequent variation of the Tram Supplier Agreement which would adversely affect the obligations owed by the Tram Supplier or the waiver, compromise or withdrawal of any claim made by the Client;

7.4.2 for the avoidance of doubt except under general law, nothing in this Agreement shall expose any Party to the application of Indirect Loss, and

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7.4.3 the Tram Supplier shall not be entitled to exercise any right of set-off, retention or withholding against the Beneficiary to which the Tram Supplier may be entitled against the Client.

8. NOTICES

8.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

8.2 Any notice given pursuant to this clause, if sent by special or recorded delivery, is deemed to have been received on proof of delivery.

9. RIGHTS OF THIRD PARTIES

9.1 A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

10. INVALID TERMS

10.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

10.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

10.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

11. VARIATIONS AND WAIVERS TO BE IN WRITING

11.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

12. WAIVER

12.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further

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exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

12.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

13. JURISDICTION AND LAW

13.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

IN WITNESS WHEREOF these presents on this and the preceding [◆] pages are executed as follows:

EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF) at
on 200[◆] by:

Director/Authorised Signatory _____
Full Name _____
Witness Signature _____
Full Name _____
Address _____
_____

EXECUTED for and on behalf of ***[third party beneficiary]*** at
on 200[◆] by:

Authorised Signatory _____
Full Name _____
Witness Signature _____
Full Name _____
Address _____
_____

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Part C

ADVANCE PAYMENT BOND

(1) ACE EUROPEAN GROUP LIMITED

- in favour of -

(2) tie LIMITED

ADVANCE PAYMENT BOND

ADVANCE PAYMENT BOND

BETWEEN

(1) **ACE EUROPEAN GROUP LIMITED**, a company incorporated in the United Kingdom under company number 1112 892 whose registered office is at ACE Building, 100 Leadenhall Street, London, EC3A 3BP ("**the Surety**"); and

(2) **TIE LIMITED**, a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh EH1 1YJ ("**tie**") which expression shall include its successors, permitted assignees and transferees.

WHEREAS

A. **tie** entered into an agreement for the appointment of a contractor (hereinafter referred to as the "**Tram Supply Agreement**") dated [◆] with Construcciones y Auxiliar de Ferrocarriles S.A. (the "**Tramco**") to provide trams for use on the light rapid transit system in Edinburgh known as the Edinburgh Tram Network.

B. Clause 44 of the Tram Supply Agreement obliges the Tramco to deliver to **tie** an unconditional irrevocable bond on the conditions and in the form set out in Part C of Schedule 10 (*Bonds and Collateral Warranty*) to the Tram Supply Agreement, issued by a surety acceptable to **tie** and callable subject only to written notification by **tie** in terms of this Bond.

C. In consideration of **tie** accepting the Surety's obligations set out below in discharge of the Tramco's undertaking to provide a bond under Clause 44 of the Tram Supply Agreement, the Surety hereby irrevocably and unconditionally agrees and undertakes to pay to **tie** a sum not exceeding a total aggregate value of £11,008,325 (the "**Bonded Amount**") and the Surety accordingly covenants with **tie** and agrees as follows:

1. The Surety hereby covenants with **tie** that following receipt by the Surety of a notice in writing from **tie** in the form set out in Appendix 1 ("**Demand Notice**") that there has been an Insolvency Event in relation to the Tram Supplier, the Surety shall, promptly and in any event no later than four business days following receipt of the Demand Notice, pay to **tie** in full and without any deductions whatsoever or any right of set-off, abatement or counterclaim, the sum stated in the Demand Notice in immediately available funds by electronic transfer to the account nominated in the Demand Notice, not exceeding in aggregate the Bonded Amount.

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2. Any Demand Notice must be made in writing signed by an authorised representative of **tie** and a copy of the written statement identifying the Insolvency Event must accompany the Demand Notice.

3. Upon receipt by the Surety of a Demand Notice from **tie** the Surety shall neither be entitled nor obliged to make any enquiry or proof or contestation or impose any further conditions on **tie** (or the Tramco) and **tie** shall not need to take any legal action against or to obtain the consent of the Tramco. **tie** may make as many separate demands hereunder as **tie** thinks fit. **tie** shall not be obliged to exercise any other right or remedy **tie** may have before making a demand under this Bond.

4. A Demand Notice received from **tie** in accordance with Clause 1 above shall be conclusive evidence of the Surety's liability to pay to **tie** and of the amount of the sum or sums which the Surety is liable to pay. The Surety's obligation to make payment under this Bond shall be a primary, independent and absolute obligation and the Surety shall not be entitled to delay or withhold payment for any reason. The Surety's obligation hereunder shall not be affected by any act, omission, matter or thing which, but for this provision, might operate to release or otherwise exonerate the Surety from the obligations hereunder in whole or in part, including without limitation (and whether or not known to the Surety or to **tie**):

   4.1 any time or waiver granted to **tie** or to the Tramco;

   4.2 the taking, variation, compromise, renewal or release of or the refusal or neglect to perfect or to enforce any rights, remedies or securities against **tie** or the Tramco;

   4.3 any legal limitation, disability or incapacity relating to **tie** or the Tramco;

   4.4 any variation of or amendment to the Tram Supply Agreement (or related documentation) or the works or services to be performed thereunder or any other document or security so that references to the Tram Supply Agreement in this Bond shall include each such variation and amendment;

   4.5 any unenforceability, invalidity or frustration of any rights or obligations of **tie** or the Tramco under the Tram Supply Agreement or any other document or security;

   4.6 any proceedings, formalities, intervention or appointment arising from the Insolvency Event; and

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4.7 any other fact, circumstance, provision of statute or rule of law which might, were the Surety's liability to be secondary rather than primary, entitle the Surety to be released or discharged in whole or in part from the Surety's undertaking.

5. NOT USED.

6. NOT USED

7. NOT USED.

8. **tie** shall be at liberty to compromise, release, waive or neglect any security as it sees fit, without impairment of their rights under this Bond.

9. This Bond shall cease to have effect on ***[Insert date falling 18 months after the date on which the Advance Payment was made to Tramco]***, save in connection with any Demand Notice issued to the Surety in writing at any time up to 30 days from such date.

10. **tie** shall be entitled to assign or transfer this Bond without the consent of the Surety subject to giving notice to the Surety.

11. Any Demand Notice to be served by **tie** pursuant to this Bond shall be sent by **tie** to the Surety, to the Surety's address at the ACE Building, 100 Leadenhall Street, London, EC3A 3BP (and if sent by special or recorded delivery shall be taken as having been received by the Surety on the date of receipt by the Surety as evidenced by the relevant certificate of delivery) or shall be delivered personally to the Surety at the address set out in this Clause (and shall be deemed to have been received at the time of delivery).

12. NOT USED

13. This Bond shall be governed by and construed in accordance with the Laws of Scotland and the Parties hereby agree to submit to the exclusive jurisdiction of the Court of Session over any claim arising out of this Bond.

14. A person who is not a party to this Bond shall have no right to enforce any of the terms of this Bond.

15. In this Bond:

15.1 the words and expressions have the same meanings as in the Tram Supply Agreement and the Surety shall be deemed to have full knowledge of the terms and conditions of the Tram Supply Agreement;

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15.2 "person" includes any firm and any entity having legal capacity; and

15.3 the definitions given in the recitals apply to the rest of this Bond.

IN WITNESS WHEREOF

EXECUTED for and on behalf of **ACE EUROPEAN GROUP LIMITED** at

on 2008 by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **TIE LIMITED** at

on 2008 by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

APPENDIX 1

DEMAND NOTICE

[date]

ACE EUROPEAN GROUP LIMITED
ACE Building
100 Leadnehall Street
LONDON
EC3A 3BP
Attention: [Responsible Officer]

Dear Sirs

Advance Payment Bond [◆ April 2008] [Ref: ◆]
Edinburgh Tram Network - Construcciones y Auxiliar de Ferrocarriles S.A.

This is our formal demand for payment pursuant to Clause 1 of the above instrument issued by you in our favour for the amount of £11,003,863. Please pay the sum of £11,003,863 forthwith by electronic transfer to [◆ ***bank account details***].

We hereby certify that Construcciones y Auxiliar de Ferrocarriles S.A.(CAF) has suffered an Insolvency Event [◆ ***describe insolvency event***].

Yours faithfully,

_____

_____
Director and authorised signatory
for and on behalf of **tie** Limited

Part D



(1) [◆][SURETY]

- in favour of -

(2) THE CLIENT

PERFORMANCE BOND

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PERFORMANCE BOND

BETWEEN

(1) [◆], a company incorporated in [◆] under company number [◆] whose registered office is at [◆] ("**the Surety**"); and

(2) **[THE CLIENT]**, a company incorporated in [◆] under company number [◆] whose registered office is at [◆] (the "**Client**") which expression shall include its successors, permitted assignees and transferees

WHEREAS

A. The Client entered into an agreement for the appointment of a contractor (hereinafter referred to as the "**Tram Supply Agreement**") dated [◆] with **Construcciones y Auxiliar de Ferrocarriles S.A.** (the "**Tramco**") to supply trams for use on the light rapid transit system in Edinburgh known as the Edinburgh Tram Network.

B. Clause 44 of the Tram Supply Agreement obliges the Tramco to deliver to the Client an irrevocable performance bond on the conditions and in the form set out in Part D of Schedule 10 (*Bonds and Collateral Warranty*) to the Tram Supply Agreement, issued by a surety acceptable to the Client and callable subject only to written notification by the Client in terms of this Performance Bond.

C. In consideration of the Client accepting the Surety's obligations set out below in discharge of the Tramco's undertaking to provide a performance bond under Clause 44 of the Tram Supply Agreement, the Surety hereby irrevocably and unconditionally agrees and undertakes to pay to the Client a sum not exceeding a total aggregate value of £2,787,951 (the "**Bonded Amount**") and the Surety accordingly covenants with the Client and agrees as follows:

1. The Surety hereby covenants with the Client that following receipt by the Surety of a notice in writing from the Client in the form set out in Appendix 1 ("**Demand Notice**") that there has been an event of default by the Tramco, the Surety shall, promptly and in any event no later than five business days following receipt of the Demand Notice, pay to the Client in full and without any deductions whatsoever or any right of set-off, abatement or counterclaim, the sum stated in the Demand Notice in immediately available sterling (£) funds by electronic transfer to the account nominated in the Demand Notice, not exceeding in aggregate the Bonded Amount.

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2. Any Demand Notice must be made in writing signed by an authorised representative of the Client and a certified copy of the written statement identifying the event of default and notifying Tramco of this must accompany the Demand Notice.

3. Upon receipt by the Surety of a Demand Notice from the Client, the Surety shall neither be entitled nor obliged to make any enquiry or proof or contestation or impose any further conditions on the Client (or the Tramco) and the Client shall not need to take any legal action against or to obtain the consent of the Tramco subject to clause 1 above, the Client may make as many separate demands under this Performance Bond hereunder as the Client thinks fit. The Client shall not be obliged to exercise any other right or remedy the Client may have before making a demand under this Performance Bond.

4. A Demand Notice received from the Client in accordance with Clause 1 above shall be conclusive evidence of the Surety's liability to pay to the Client and of the amount of the sum or sums which the Surety is liable to pay. The Surety's obligation to make payment under this Performance Bond shall be a primary, independent and absolute obligation and the Surety shall not be entitled to delay or withhold payment for any reason. The Surety's obligation hereunder shall not be affected by any act, omission, matter or thing which, but for this provision, might operate to release or otherwise exonerate the Surety from the obligations hereunder in whole or in part, including without limitation (and whether or not known to the Surety or to the Client):

4.1 any time or waiver granted to the Client or to the Tramco;

4.2 the taking, variation, compromise, renewal or release of or the refusal or neglect to perfect or to enforce any rights, remedies or securities against the Client or the Tramco;

4.3 any legal limitation, disability or incapacity relating to the Client or the Tramco;

4.4 any variation of or amendment to the Tram Supply Agreement (or related documentation) or the works or services to be performed thereunder or any other document or security so that references to the Tram Supply Agreement in this Performance Bond shall include each such variation and amendment;

4.5 any unenforceability, invalidity or frustration of any rights or obligations of the Client or the Tramco under the Tram Supply Agreement or any other document or security;

4.6 any proceedings, formalities, intervention or appointment arising from or causing the event of default;

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4.7 any novation, transfer or other arrangement made by the Tramco whereby it no longer has a direct contractual relationship with the Client through the Tram Supply Agreement; and

4.8 any other fact, circumstance, provision of statute or rule of law which might, were the Surety's liability to be secondary rather than primary, entitle the Surety to be released or discharged in whole or in part from the Surety's undertaking or to suspend its obligations.

5. NOT USED

6. NOT USED

7. NOT USED

8. The Client shall be at liberty to compromise, release, waive or neglect any security as it sees fit, without impairment of its rights under this Performance Bond.

9. This Performance Bond shall cease to have effect on the date on which five trams have been certified by the Tram Inspector (appointed by **tie**) to have been delivered to Edinburgh by the Tramco and each has received a Certificate of Tram Commissioning and when a copy certified by **tie** as true and accurate of these certifications has been delivered by Tramco to the Surety, save in connection with any Demand Notice issued to the Surety in writing at any time up to 30 days after such date.

10. The Client shall be entitled to assign or transfer this Performance Bond without the consent of the Surety, subject to only giving notice to the Surety of any assignation.

11. Any Demand Notice to be served by the Client pursuant to this Performance Bond shall be sent by the Client to the Surety, to the Surety's address at [*Insert Address*] (and if sent by special or recorded delivery shall be taken as having been received by the Surety on the date of receipt by the Surety as evidenced by the relevant certificate of delivery) or shall be delivered personally to the Surety at the address set out in this Clause (and shall be deemed to have been received at the time of delivery).

12. [The Surety hereby appoints [◆] for service of process in Scotland. **If overseas bank is proposed as surety**]

13. This Performance Bond shall be governed by and construed in accordance with the Laws of Scotland and the Parties hereby agree to submit to the exclusive jurisdiction of the Court of Session over any claim arising out of this Performance Bond.

14. Saving following assignation, a person who is not a party to this Performance Bond shall have no right to enforce any of the terms of this Performance Bond.

15. In this Performance Bond:

15.1 the words and expressions have the same meanings as in the Tram Supply Agreement and the Surety shall be deemed to have full knowledge of the terms and conditions of the Tram Supply Agreement;

15.2 "person" includes any firm and any entity having legal capacity; and

15.3 the definitions given in the recitals apply to the rest of this Performance Bond.

IN WITNESS WHEREOF

EXECUTED for and on behalf of **[THE SURETY]**
at

on by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

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EXECUTED for and on behalf of **THE CLIENT**
at

on by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

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APPENDIX 1

DEMAND NOTICE

[date]

SURETY
[Address]
Attention: [Responsible Officer]

Dear Sirs

Performance Bond [◆] [Ref: ◆]
Edinburgh Tram Network - Construcciones y Auxiliar de Ferrocarriles S.A.

This is our formal demand for payment pursuant to Clause 1 of the above instrument issued by you in our favour for the amount of £2.787,951. Please pay the sum of £[◆] forthwith by electronic transfer to [◆ ***bank account details***].

We hereby certify that Construcciones y Auxiliar de Ferrocarriles S.A. (CAF) has failed to [◆ *describe default*] and has failed to rectify that default as at the date of this Demand. In accordance with Clause 2 of the Performance Bond, we attach a certified copy of the relevant default notice.

Yours faithfully,

_____

_____
Director and authorised signatory
for and on behalf of the Client

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 11 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 11

REQUIRED INSURANCES

Part 1

Required Insurances

1 PROPERTY DAMAGE AND BUSINESS INTERRUPTION INSURANCE – PREMISES RISKS

Insured Parties:	The Tram Supplier any Tram Supplier Party each for its respective rights and interests
Coverage:	All risks of physical loss, destruction or damage to the Insured Property from any causes not otherwise excluded. <u>Insured Property</u> All real and personal property used by the Insured Parties in connection with the activities forming the subject of this Agreement including but not limited to – Buildings Contents including improvements and alterations Machinery, plant, tools and equipment Stock including raw materials, work in progress and finished goods <u>Business Interruption</u> Loss of gross profit or revenue and increased costs of working following loss or destruction of or damage to property used by the Insured Parties in connection with the activities forming the subject of this Agreement
Limit of Indemnity:	The full replacement value of the Insured Property at the time of reinstatement The amount of gross profit or revenue for the maximum indemnity period First loss basis will be considered
Period of Insurance:	From the earlier or the Effective Date or the commencement of the activities forming the subject of this Agreement until completion of the works specified in the Agreement including the period of any defect period or extended warranty period or the expiry of the maximum indemnity period if later.
Territorial Limits:	Anywhere within Europe including whilst in transit by road or rail

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Exclusions:	loss of any of the Insured Property by theft or disappearance when the loss is revealed only in the course of an inventory undertaking
	the cost of making good wear and tear, gradual deterioration, etc. but not resulting damage
	war, invasion, acts of foreign enemies, hostilities, civil war, rebellion, revolution, insurrection or military or usurped power
	nuclear risks
	sonic bangs
Extensions:	The insurance must include the following minimum extensions:
	professional fees including surveyors', consulting engineers' and legal fees
	removal of debris
	temporary repairs
	automatic reinstatement of sum insured
	local authority Clause including European Union, railway inspectorate or Health and Safety Executive
	full value terrorism cover within Great Britain
	off-site storage
	property at supplier's premises
	waiver of subrogation between insured parties
	non-invalidation
	utilities/suppliers/customers/property stored extensions
	denial of access extension
Maximum Permitted Deductible:	GBP 40,000 each and every occurrence or all occurrences attributable to one source or original cause

2. PROPERTY DAMAGE INSURANCE – MARINE CARGO

Insured Parties:	**tie** The Tram Supplier any Tram Supplier Party The Client (if not **tie** or Infraco) any Client Party the Infraco, each for its respective rights and interests
Coverage:	Marine Cargo - All risks of physical loss, destruction or damage to the Insured Property from any causes not otherwise excluded. Cover to include mechanical or electrical breakdown. Insured Property Trams including all works, materials, equipment, components, parts, consumables, furnishing and Spare Parts
Limit of Indemnity:	The full replacement value of the Insured Property at the time of reinstatement, including all necessary retooling costs
Period of Insurance:	From the earlier or the Effective Date or the commencement of the activities forming the subject of this Agreement until completion of the activities specified in the Agreement including the period of any defect period or extended warranty period or until the delivery of all items under the Agreement which are subject to marine transit.
Territorial Limits:	By whichever routes required to effect delivery
Extensions:	Institute Cargo Clauses "A" CL.252 dated 1/1/82 Unpacked/unpainted steelwork and non-containerised cargo on deck Excluding rust, oxidation and discolouration, unless caused by peril recoverable under Institute Cargo Clause "C" No Deck Cargo Clause exclusion Institute War Clauses (Cargo) CL.255 dated 1/1/82 Institute Strikes Clauses (Cargo) CL.256 dated 1/1/82 Institute Radioactive Contamination Exclusion Clause CL.356 dated 1/10/90 Institute Replacement Clause CL.161 dated 1/1/94 Institute Classification Clause CL.354 dated 1/8/97

	Institute Marine Policy General Provision (Cargo) CL.269 dated 1/10/82
	Paramount War Clause
Maximum Permitted Deductible:	GBP 40,000 each and every occurrence or all occurrences attributable to one source or original cause

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3 PUBLIC AND PRODUCTS LIABILITY INSURANCE

To be retained to cover liability risks not insured by the OCIP i.e. Tram Supplier's own premises risks

Insured Parties:	**tie** The Tram Supplier Any Tram Supplier Party Any party forming the Client should the Client not be **tie** or the Infraco Any Client Party The Infraco each for its respective rights and interests.
Coverage:	To indemnify the insured parties against legal liability for damages or compensation arising out of bodily injury including death, illness, disease and psychiatric damage and loss of or damage to physical property including obstruction, interference, loss of amenities, nuisance, trespass, stoppage of traffic, infringement of light, easement or quasi easement, or any like cause happening during the Period of Insurance and arising out of or in connection with the activities of the parties in respect of the works forming the subject of the Agreement.
Limit of Indemnity:	£80,000,000 any one occurrence/unlimited in the aggregate (other than in respect of sudden and accidental pollution which shall be in the aggregate),
Period of Insurance:	From the earlier or the Effective Date or the commencement of the activities forming the subject of this Agreement until completion of the activities specified in the Agreement including the period of any defect period or extended warranty period.
Territorial Limits and Jurisdiction:	Worldwide
Exclusions:	fines, penalties, punitive or exemplary damages. war, invasion, acts of foreign enemies, hostilities (whether declared or not), civil war, rebellion, revolution, insurrection of military or usurped power. nuclear risks seepage, pollution or contamination unless caused by a sudden, unintended and unexpected happening. professional indemnity, but not excluding property damage or bodily injury.
Extensions:	cross liabilities clause claimants' and defence costs and expenses in addition to limits of

	indemnity
	waiver of subrogation between insured parties
	Health and Safety at Work Act Clause
	the Insured includes the respective officers, directors, agents, servants and employees of an insured party
	contractual liability clause
	non invalidation-non-vitiation clause
	cover is to be primary with no contribution with any other policies effected by or on behalf of the insured parties
	Defective Premises Act liability
	Data Protection Act liability
Maximum Permitted Deductible:	GBP 25.000 each and every occurrence or all occurrences attributable to one source or original cause in respect of property damage (personal injury claims will be paid in full)

4. ERRORS AND OMISSIONS INSURANCE

Insured Parties:	The Tram Supplier including any Tram Supplier Party
Coverage:	To indemnify the Insured Parties against legal liability for damages or compensation made against them during the Period of Insurance arising out of or in consequence of or as a result of any act, error, or omission by the Insured Parties or the designer, their subcontractors and consultants in the performance of their professional activities and duties in connection with the activities forming the subject of this Agreement
Limit of Indemnity:	Minimum GBP 8,000,000 on an each and every occurrence basis and in the aggregate during each twelve month Period of Insurance subject to one reinstatement of the limit of indemnity for each twelve month Period of Insurance.
Period of Insurance:	From the Effective Date for twelve months and thereafter each further twelve month period until the earlier of twelve years from the completion of the activities forming the subject of this Agreement including any defect period or extended warranty period or twelve years from the date of termination of this Agreement.
Extensions:	The insurance must include the following minimum extensions:
	Libel or slander
	Dishonesty of employees

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Innocent non-disclosure

Liability for acts of specialist designers, consultants, sub-consultants and sub-contractors of any tier employed by the Insured

Breach of intellectual property rights

Loss of documents

Waiver of subrogation between Insured Parties

Indemnity to tie

Inclusion of directors, officers, partners and employees as Insured Parties

Maximum Permitted Deductible: GBP 25,000

5. EMPLOYERS' LIABILITY INSURANCE

Insured Party: The Tram Supplier and any Tram Supplier Party

Coverage: To indemnify the Insured Party against legal liability for damages or compensation arising out of bodily injury including death, illness, disease and psychiatric damage sustained by any employee arising out of and in the course of the employee's employment caused during the Period of Insurance.

Limit of Liability Minimum limit of indemnity of GBP10,000,000 any one occurrence or series of occurrences arising from one original cause or event, unlimited during the Period of Insurance.

Period of Insurance: From the Effective Date for twelve months and thereafter each further twelve month period until the earlier of the end of the defect period or extended warranty period or the date of termination of this Agreement.

Minimum Extensions The insurance must include the following minimum extensions:

Contractual liability

Claimant's and defence costs and expenses

Indemnity to principals

Cross liabilities

Inclusion of directors, officers, partners and employees as Insured Parties

Health and Safety legislation prosecution costs including costs of an appeal

Unsatisfied court judgements

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	Compensation for court attendance
	Definition of employee to include as a minimum persons under a contract of service or apprenticeship, labour only subcontractors, self-employed persons, labour masters or persons supplied by them, operators and drivers of hired in plant
Maximum Permitted Deductible:	NIL

6. COMPREHENSIVE MOTOR INSURANCE

Insured Party:	The Tram Supplier
	tie or the Client (if not **tie**)
Coverage:	Comprehensive in respect of loss or damage to Own Vehicles.
	Legal Liability for death, injury, illness or disease or loss of or damage to Third Party Property.
Limit of Liability	Own Damage - Market Value/Cost of Repairs
	Third Party: Bodily Injury - Unlimited.
	Property Damage by Cars £20,000,000 any one occurrence
	Property Damage by Commercial Vehicles:
	- £5,000,000 any one occurrence
	- unlimited during the Period of Insurance
Period of Insurance:	From the Effective Date for twelve months and thereafter each further twelve month period until the expiry or earlier termination of this Agreement.
Minimum Extensions	The insurance must include the following minimum extensions:
	Contingent motor liability
	Passenger indemnity and negligence of passengers
	Occasional business use by employees
	Unauthorised movement
	Indemnity to principals
	Unauthorised use by employees
Maximum Permitted	GBP 25,000 in respect of own damage

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Deductible: GBP NIL in respect of third party liability

7. DIRECTORS' & OFFICERS' LIABILITY

Insured Party:	The Tram Supplier (Insured Organisation) The Directors and Officers of the Tram Supplier (insured Persons)
Coverage:	A – Directors' & Officers' Liability To pay on behalf of each Insured Person the loss to the extent they are not indemnified by the Insured Organisation B – Corporate Reimbursement To pay on behalf of the Insured Organisation the loss to the extent the Insured Organisation has indemnified the Insured Person
Limit of Liability	GBP 10,000,000 any once occurrence and in the aggregate during any twelve month Period of Insurance
Period of Insurance:	From the Effective Date for twelve months and thereafter each further twelve month period until the expiry or earlier termination of this Agreement.
Minimum Extensions	The insurance must include the following minimum extensions: Defence costs in respect of pollution and contamination Outside directorships Provision for run-off cover and extended claim reporting period on expiry Bilateral discovery period
Exclusions	No insured versus insured exclusion in respect of claims outside the United States of America Bodily injury and property damage – "for" language to be used
Maximum Permitted Deductible:	A - GBP NIL in respect of Directors' & Officers' liability B - GBP 25,000 in respect of Corporate Reimbursement

Part 2

BROKER'S LETTER OF UNDERTAKING

To: **tie Limited]**

Dear Sirs

We confirm in our capacity as insurance brokers that the Required Insurances specified in Clause 40 (*Required Insurances*) and Schedule 11 *(Required Insurances)* of the Tram Supply Agreement dated ◆ between Construcciones y Auxiliar de Ferrocarriles S.A. (CAF) (the "**Tram Supplier**") and Client as defined therein ("**Agreement**") are, as at the date hereof, in effect in respect of the risks set out in the attached cover notes.

We have arranged the Required Insurances on the basis of the information and instructions given by the Tram Supplier. We have not made any particular or special enquiries regarding the Required Insurances beyond those that we would normally make in the ordinary course of arranging the insurances on behalf of our insurance broking clients.

The confirmations set out in this letter are given by reference to our state of knowledge at the date hereof.

Pursuant to instructions received from the Tram Supplier, we hereby undertake in respect of the interests of the Tram Supplier and the Client in the Required Insurances referred to in the attached cover notes:

1. to use reasonable endeavours to have endorsed on each and every policy evidencing the Required Insurances when the same is issued, endorsements substantially in the form set out in Schedule 11 (*Required Insurances*) of the Agreement;

2. to advise the Client:

   2.1 promptly after receiving notice of any insurer's cancellation or suspension of any of the Required Insurances or receiving notice of the intended cancellation or suspension of any of the Required Insurances;

   2.2 promptly upon our receipt from the Tram Supplier of any notice of any changes proposed to be made to the Required Insurances which, if effected, would result in a material reduction in limits or coverage (including in respect of extensions of cover) or in an increase in deductibles, exclusions or exceptions;

   2.3 of any default in the payment of any premium for any of the Required Insurances;

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2.4 at least twenty days prior to the expiry of any of the Required Insurances if we have not received written renewal instructions from the Tram Supplier or if we receive written instructions to renew, to advise the Client of the details thereof; and

2.5 on receipt of notice of any act or omission of the Tram Supplier or any Sub-Contractor which will invalidate or render unenforceable in whole or in part, any of the Required Insurances;

3. no later than 10 days (in respect of certificates) and as soon as reasonably practicable in respect of policies and other documents, to supply you and/or your insurance advisors (or your or their authorised representative) copies of all placing slips, certificates, cover notes, renewal receipts and confirmations of renewal and payment of premiums and all policy documents (or confirmation of the terms of such policy documents where such policy documents cannot be made available) in respect of the Required Insurances, or upon request, to make available to you the originals of any or all such documents held by us;

4. to disclose to the insurers any fact, change of circumstance or occurrence is material to the risks insured against under the Required Insurances;

5. to treat as confidential all information in relation to the Required Insurances supplied to us by the Tram Supplier or any Sub-Contractor or the Client and not to disclose, without the written consent of the Client, such information to any third party other than the insurers under the Required Insurances, unless required to do so by law or any regulatory authority; and

6. to notify the Client as soon as reasonably practicable prior to our ceasing to act as brokers to the Tram Supplier, unless impracticable because of circumstances beyond our control, in which case we shall notify the Client as soon as reasonably practicable upon becoming aware that we shall cease, or have ceased, so to act.

Where insurers wish any of the Required Insurances to be cancelled for reasons of non-payment of premium, we will request those insurers to give you a reasonable opportunity of paying such amounts outstanding before issuing notice of cancellation on behalf of such insurers.

The above undertakings are given subject to our continuing appointment for the time being as insurance brokers to the Tram Supplier in relation to the Required Insurances concerned and the monitoring and handling of claims in relation to the Tram Supplier, and our obligations set out in this letter shall automatically cease upon termination of our appointment.

For the avoidance of doubt all undertakings and other confirmations given in this letter relate solely to the Required Insurances. They do not apply to any other insurances and nothing in this letter should

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be taken as providing any undertakings or confirmations in relation to any other such insurance that ought to have been placed or may at some future date be placed by other brokers.

This letter is given by us on the instructions of the Tram Supplier and with the Tram Supplier's full knowledge and consent as to its terms as evidenced by the Tram Supplier's signature below.

This letter shall be governed by and shall be construed in accordance with Scots Law and any dispute as to its terms shall be submitted to the exclusive jurisdiction of the courts of Scotland.

Yours faithfully

.....
For and on behalf of (Insurance Broker)

.....
For and on behalf of (The Tram Supplier

Part 3

Insurance Questionnaire

ALL CLASSES OF REQUIRED INSURANCES	
Do your current insurance policies comply with the full scope of cover required for each class of Required Insurance as detailed in the Schedules? **If NO, please identify the class of Required Insurance and provide full details**	Yes, regarding PD/BI pre-delivery risks. Mainly yes regarding PD/BI premises risks, but there are some clauses which are not known in our market and we should need to have more information: **Under the Property Damaged** - expediting expenses - local authority clause including EU, railway inspectorate or health and safety executive - full value terrorism cover within Great Britain. To be bought locally - free issue materials - Promoter's clauses including non-vitiation/non-invalidation and severability of interest clause on terms no more restrictive than set out in the agreement - Damaged to insured property caused by emergency braking - No condition of average - Property or replacement of undamaged property to achieve compatibility **Under the Liability** - Health and safety at work act clause - Non vitiation-non invalidation clause - Defective premises act liability Data protection act liability (this clause is not provided from the Spanish insurers, It is not under the liability wordings)
Where your current insurance policies do not comply with the full scope of the Required Insurances	
(a) can your policies be amended or extended and if so please provide cost implications, or	**No, in respect to Professional liability**
(b) please provide reasons why the full scope of	Guarantees and limit required are

insurance as detailed in the Schedules will not be carried	wider than the coverage provided under the liability program. We think that the covered CAF actually has, is enough for the risk CAF has regarding this type of contract.
1.0 PROPERTY DAMAGE – PRE-DELIVERY RISKS (ERECTION ?)	
1.1 Name and Address of Insurers	ZURICH
1.2 Policy Number(s)	9404620487 AND 9511620008
1.3 Renewal Date	JANUARY 1st
1.4 Limit of Indemnity	9404620487: £2.023.500 PER CLAIM 9511620008: £4.047.000 PER CLAIM
1.5 What are the territorial limits of the policy?	WORLDWIDE
1.6 What cover applies in respect of defective design, materials or workmanship?	Need clarification to this question
1.7 Are testing and commissioning risks including breakdown included?	YES
1.8 Will cover apply whilst the trams are in use on road and highway, e.g. during trial running or driver training??	YES
1.9 What excesses apply?	£ 8.944
2.0 PROPERTY DAMAGE AND BUSINESS INTERRUPTION – PREMISES RISKS	
2.1 Name and Address of Insurers	ZURICH
2.2 Policy Number(s)	9831347910
2.3 Renewal Date	JANUARY 1st
2.4 Limit of Indemnity	£ 103.217.472
2.5 Does the policy include the full range of extensions specified in the schedule of required insurances? If not, please advise which are not covered.	YES
2.6 What excesses apply?	£ 10.119,36 - PROPERTY DAMAGE 48h BUSINESS INTERRUPTION
3.0 PROPERTY DAMAGE – MARINE CARGO	
3.1 Name and Address of Insurers	ZURICH
3.2 Policy Number(s)	984631877-3
3.3 Renewal Date	MARCH 1st
3.4 Limit of Indemnity	£ 4.864.592 (EXPORT) £ 2.432.296 (IMPORT)
3.5 Details of the Institute clauses which apply to your policy.	ICC (A)
3.6 Full details of all warranties and	

limitations which apply to your policy	
3.7 What excesses apply?	£ 810,76
4.0 PUBLIC AND PRODUCTS LIABILITY	
4.1 Name and Address of Insurers	ZURICH
4.2 Policy Number(s)	458323
4.3 Renewal Date	JANUARY 1ST
4.4 Limit of Indemnity in respect of (please state whether any one occurrence or in the aggregate)	£ 80.954.880 PER CLAIM
a. Public Liability	£ 80.954.880 PER CLAIM
b. Products Liability	£ 80.954.880 PER CLAIM AND AGGREGATE
c. Subsidence, collapse, vibration or removal or weakening of support	CLAUSED NOT KNOWN
d. Fire and explosion	£ 80.954.880 PER CLAIM
e. Pollution	£ 80.954.880 PER CLAIM
f. Any other "inner" limit	£ 8.095.448 PER CLAIM – TENANT'S LIABILITY
4.5 Is the policy subject to a heat warranty or condition of any sort and/or any height or depth restrictions? If so attach copies.	NO
4.6 Is Contractual Liability included?	YES, OVER THE LEGAL LABILITY
4.7 Does the policy include liability in respect of damage to premises temporarily occupied for the performance of works therein or thereon?	YES
4.8 Does the policy include a cross liability provision and a General Indemnity to Principals/Main Contractors Clause?	YES
4.9 What limitations apply in respect of cover for loss or damage due to defective design, workmanship or materials?	GOOD LOCAL STANDARD
4.10 What excesses are applicable?	£ 10.119,36
4.11 Is the policy extended to include financial loss?	YES (If yes state limit . £ 1.349248)
4.12 Does the policy include liability for the acts of subcontractors?	YES
4.13 Does the policy respond to judgements made outside UK?	YES
4.14 Is the cover subject to any material exclusions or limitations? (If YES please supply copies thereof?	NO
4.15 Have you ever undertaken or are you currently undertaking work on behalf of Network Rail or British Airports Authority?	

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(If YES please state which or both?	
4.16 Does your policy extend to include the minimum insurance requirements of either Network Rail or British Airports Authority?	
(If YES please state which or both)	
5.0 PROFESSIONAL INDEMNITY – COVERED UNDER THE GENERAL LIABILITY POLICY	
5.1 Name and Address of Insurers	SAME AS LIABILITY POLICE
5.2 Policy Number(s)	SAME AS LIABILITY POLICE
5.3 Renewal Date	SAME AS LIABILITY POLICE
5.4 Limit of Indemnity	i. any one event £ 8 095488 ii. in the aggregate £ 8 095 488
5.5 Scope of professional duties insured as stated in the policy.	CLAIMS DUE TO PROFESSIONAL LIABILITY MADE BY TECHNICAL & QUALIFIED SPECIALIST WORKING ON BEHALF OF CAF
5.6 What excess(es) are applicable?	£ 10.119.36
5.7 Is cover included for sub-consultants?	NO
5.8 Is cover included for the costs of mitigation of loss	YES
5.9 Does the policy include a General Indemnity to Principals/Main Contractors Clause?	NO
5.10 Is cover subject to any material exclusions or limitations? (If YES please supply copies thereof)	NO
5.11 Does the policy respond to judgements made outside UK	YES
6.0 EMPLOYERS' LIABILITY – NO APPLICABLE IN SPAIN (SOCIAL SECURITY)	
6.1 Name and Address of Insurers	
6.2 Policy Number(s)	
6.3 Renewal Date	
6.4 Limit of Indemnity	£
6.5 Is the policy subject to a heat warranty or condition of any sort and/or any height or depth restrictions? If so attach copies.	YES/NO
6.6 Is Contractual Liability included?	
6.7 What is the definition of "employee"?	
6.8 Does the policy include a cross liability provision and a General Indemnity to Principals/Main Contractors Clause?	
6.9 Does the policy respond to judgements made outside UK?	
7.0 COMPREHENSIVE MOTOR INSURANCE – NOT APPLICABLE	

7.1	Name and Address of Insurers	
7.2	Policy Number(s)	
7.3	Renewal Date	
7.4	Limits of Indemnity in respect of (Please state whether any one occurrence or in the aggregate)	
	a. Third Party Property Damage	£
	b. Third Party Bodily Injury (if any)	£
7.5	Is the policy subject to a Deductible or excess? If so please provide details	
7.6	Are there any restrictions on usage or types of drivers? If so please provide details.	
8.0	DIRECTORS' and OFFICERS' LIABILITY INSURANCE	
8.1	Name and Address of Insurers	CHUBB
8.2	Policy Number(s)	82001331
8.3	Renewal Date	APRIL 10TH
8.4	Limits of Indemnity (Please state whether any one occurrence or in the aggregate)	£ 10.792.000 PER CLAIM
8.5	Is the policy subject to a Deductible or excess? If so please provide details.	£ 53.960 IN U.S.A.
8.6	Is cover subject to any material exclusions or limitations? If YES so please provide details.	
8.7	Please confirm what the provisions of your policy are in respect of – Extended reporting period Bodily injury and property damage exclusion Insured versus Insured claims	
9.0	SELF –INSURANCE ARRANGEMENTS – NOT APPLICABLE	
9.1	Please advise if any of the above classes of business are completely self-insured and provide details of the arrangements (self-insurance funds, captive insurers etc)	
9.2	Please advise if significant elements or levels of the covers required are self-insured and provide details of the arrangements	

DECLARATION:

We confirm that the foregoing details are accurate and that the above policies are subject to no special terms, conditions and exceptions other than those referred to above. We a so confirm that all premiums due to date have been paid.

Signed.....

Position INSURANCE BROKER - CAT

Name JUAN MAZARRASA

Date 2006/9/26

For and on behalf of

AON GIL Y CARVAJAL

This form should be completed by your Insurers or your Registered Insurance Brokers ONLY.

The above information is agreed on behalf of the Candidate by the Candidate's Authorised Representative:

Name Ignacio Escoz

Signed [redacted]

For and on behalf of.....

Date 27 / Sept. / 2006

AON Gil y Carvajal, Correduría de Seguros Sociedad Unipersonal

Part 4

CONSTRUCTION OWNER CONTROLLED INSURANCE

SUMMARY OF COVER

This document is a summary of the cover arranged. For full details of cover reference must be made to the policy.

INSURED: **Sections 1 – Construction All Risks and Section 2 – Third Party Liability**

(i) **tie** Limited as Principal

(ii) The Main Contractors as declared under the MUDFA, Infraco and Tramco contracts (Tram Supply and Tram Maintenance)

(iii) Trade Contractors, Co-contractors and/or Sub-Contractors of any tier and any other Contractors including Advance Works Contractors and the maintenance contractors

(iv) Architects and/or Engineers and/or Suppliers and/or Consultants not forming part of (ii) or (iii) above as regards their on-site activities only

(v) Local authorities and utility providers including private utility owners as required

(vi) Transdev Edinburgh Tram Limited

(vii) Transport Edinburgh Limited (TEL)

(viii) Any other party having an insurable interest (and not mentioned above) to the extent that the Insured (i) is required by contract or agreement to provide insurance to such parties

(ix) The Scottish Ministers/Scottish Executive, Transport Scotland and City of Edinburgh Council

(x) Network Rail Infrastructure Ltd in respect of the Asset Protection Agreement only

Section 3 – Delay in Start Up

Insured (i) (vi) and (vii) above.

PERIOD: From: 23rd July 2007 To: 25th January 2011

plus the balance of the maintenance/defects liability period thereafter

INTEREST: All work including design, engineering, procurement, demolition, fabrication, construction, erection, installation, testing, commissioning (including trial running of trams) and defects maintenance including all ancillary and associated works and activities

Section 1 – Construction All Risks

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- Contract works whether permanent or temporary
- Property or goods the property of the Insured or for which they may be responsible for in connection with the works
- Plant, equipment, temporary buildings, camps and contents owned, leased or hired by the Insured (insured sub (ii), (iii) and (iv) are excluded) *(note - no items currently insured under this head of cover)*

Section 2 – Third Party Liability

To indemnify the Insured against all sums (including claimants' costs and expenses) arising out of:

- death or bodily injury to or illness or disease or psychiatric damage suffered by any person, invasion of privacy, wrongful arrest, libel and slander
- loss or damage to physical property;
- obstruction, loss of amenities, nuisance, trespass, stoppage of traffic, infringement of any easement or right of air, light, water or way or any like cause

happening or consequent upon a cause occurring during the Period of Insurance and arising out of or in connection with the Edinburgh Tram Network Construction Phase

Section 3 – Delayed Start Up

To indemnify the Insured (i), (vi) and (vii) against loss of

- anticipated gross revenue
- standing charges
- increased costs or working

following an indemnifiable loss under Section 1

SUMS INSURED /LIMITS OF INDEMNITY:

Section 1 – Construction All Risks

Estimated Contract Value £341.9m for 1a.

Cover for MUDFA applies in respect 1a and 1b areas.

Existing Structures –limit £6,000,000 any one occurrence

Section 2 – Third Party Liability

£155m any one occurrence

£155m any one occurrence and in the aggregate during the Period of Insurance in respect of products liability

£155m any one occurrence and in the aggregate during the Period of Insurance in

respect of pollution or contamination

Unlimited liability for bodily injury as required under Road Traffic Acts

Section 3 – Delayed Start Up

£24m - To cover loss of revenue resulting from delay in commencement of passenger operations caused by insured damage to the Property Insured under Section 1

Maximum indemnity period 24 months

Additional increase in cost of working – Limit £250,000

EXCESS:

Section 1 Construction All Risks

£20,000 each and every occurrence and/or series of occurrences increasing to

£40,000 each and every occurrence in respect of storm, tempest, flood, earthquake, water damage, subsidence, collapse, landslip, frost and claims arising out of maintenance or testing and commissioning activities

£250,000 each and every occurrence in respect of LEG 3 (design) claims

Section 2 Third Party Liability

£10,000 each and every occurrence and/or series of occurrences in respect of property damage and bodily injury

Section 3 Delayed Start Up

60 days aggregate time excess

TERRITORIAL LIMITS:

Anywhere in the European Union (including inland transits and transits by ro/ro ferries and off-site storage) but worldwide excluding the USA/Canada in respect of Section 2

CONDITIONS:

Section 1 Construction All Risks

- Full (Guarantee) maintenance for first 12 months, followed by 12 months extended maintenance
- Defective design, materials and/or workmanship LEG 3
- Professional fees clause – Limit £1,000,000 any one occurrence
- Debris removal clause – Limit 15% of loss and a maximum of £1,000,000 any one occurrence
- 72 hour clause – storm, tempest, flood, earthquake, riot, civil commotion
- Principal supplied materials clause
- Automatic increase clause (25%)
- Expediting expenses – Limit 15% of loss and a maximum of £500,000 any

one occurrence

- Public, Local Authorities and European Union reinstatement clause – Limit £1,000,000 any one occurrence
- Preventive measures clause/minimisation of loss – Limit £250,000 any one occurrence and £500,000 in the aggregate during the Period of Insurance
- Waiver of subrogation
- Munitions clause
- Terrorism to full value within Great Britain – via Pool Re. Terrorism outside Great Britain excluded
- Plans and documents including computer records - £250,000 any one occurrence
- Marine 50/50 clause
- Payments on account
- Temporary repairs
- Automatic reinstatement of sum insured at additional premium to be agreed but not exceeding pro-rata and nil for losses not exceeding £1,000,000
- Non-vitiation and severability of interest clauses
- Off-site storage and specified suppliers - Limit £2,500,000 any one occurrence (limit does not apply to trams if stored in CAF depots or in Edinburgh worksite
- Transit by road, rail, inland waterway or sea (roll on/roll off ferries only) including during loading/unloading, transhipments and storage en route – Limit £2,000,000 any one occurrence
- Undamaged foundations clause
- Testing and Commissioning of the Works
- Testing, commissioning and trial running of trams for passenger service – 4 months limit per tram. Excludes testing, commissioning and trial running outside the United Kingdom
- Recovery of immobilised plant
- Plant and Hired in Plant / Continuing hire charges / Negligent breakdown of hired-in plant – Excludes first 48 hours of hire charges – Limit £1,000,000 any one occurrence
- Existing property and principal's property as required – Limit £6,000,000 any one occurrence
- Buildings due for demolition

- Fire Brigade Charges
- Emergency Braking
- Operator Error
- **Section 2 Third Party Liability**
- Contractual liability
- Claimants' and defence costs and expenses in addition to the Limit of Indemnity
- Personal representatives
- Cross liabilities clause
- Indemnity to Principals
- Unauthorised movement of vehicles
- Inclusion of directors, officers and employees as insured parties
- Waiver of subrogation
- Non-vitiation clauses
- Testing and Commissioning of the Works
- Testing and trial running for passenger service
- Motor Contingent Liability – limited to Great Britain, Northern Ireland, the Channel Islands, the Isle of Man
- Defective Premises Act Clause.
- Data Protection Act Defence Costs.
- Compensation for Court Attendance
- Sudden and Accidental Pollution Clause.
- Health and Safety at Work
- Munitions of War Clause.
- Consumer Protection Act
- Food Safety Act
- Project Supervisory Design and Construction Stage
- Wrongful Arrest

- Contracts (Rights of Third Parties) Act 1999
- JCT 21.2.1 – Limit £50m any one occurrence
- Pure financial loss – Limit £1m in the aggregate during the Period of Insurance, deductible £10,000, claims made basis of cover

Section 3 Delayed Start Up

- off-site storage and premises of specified suppliers where materials/plant/equipment for incorporation into the works is in the process of manufacture or being stored - damage by fire, lightning, explosion or aircraft only covered – Limit £2,500,000 any one occurrence
- prevention of access - Limit £2,500.000 any one occurrence, limited to damage to property within a radius of 1km of the site of the contract or within 1km of either side of the proposed tram route
- damage to the supply of water, gas, electricity or telecommunications systems to any site – Limit £1,000,000 any one occurrence
- delay caused by damage to the Insured Property during transit by road, rail or sea(roll on/roll off ferries only) including during loading/unloading, transhipments and storage en route – Limit £6,000,000 any one occurrence
- terrorism to full value – via Pool Re within Great Britain. Terrorism outside Great Britain is excluded
- non-vitiation and severability of interest clauses
- Including consequential losses arising from loss or damage to Constructional Plant and Equipment
- Professional Fees – Limit 15% of finally-agreed settlement or £500,000 any one occurrence whichever is the lower.

PRINCIPAL EXCLUSIONS:

Section 1 – Construction All Risks

- Consequential loss
- Wear and tear and corrosion but not consequent damage
- Inventory losses
- Claims deductibles
- Acts of fraud or theft committed by employees
- Building contractors and sub contractors plants, tools and equipment
- Liquidated damages
- War, invasion, acts of foreign enemies, hostilities, civil war, rebellion, revolution, insurrection or military or usurped power

- Nuclear risks
- Sonic bangs
- Design Exclusion LEG 3
- Aircraft or marine vessels
- Vehicles licensed for road use other than tool of trade risk (exclusion does not apply to trams during testing, commissioning and trial running
- Money
- Tyres by the application of brakes, punctures, cuts or bursts
- Suspension of work in excess of three months
- Normal upkeep or normal making good
- Electronic data exclusion – cover limited to physical damage caused by fire, explosion, collision, derailment
- Piling exclusions and restrictions
- Pre-existing defects in respect of existing structures

Section 2 – Third Party Liability

- Employers' Liability
- Liability arising out of the use of, ownership or possession of any motor vehicle in circumstances where the Road Traffic Acts require compulsory insurance or security. The exclusion does not apply to trams whilst undergoing testing, commissioning and trial running
- Liability arising out of the use of, ownership or possession of any aircraft or waterborne craft
- Asbestos exclusion (cover applies to bodily injury or damage to material property following accidental discovery of asbestos on a claims made basis – limit £1,000,000 in the aggregate during the Period of Insurance, deductible £10,000)
- Liquidated damages
- Fines, penalties, punitive or exemplary damages
- War, invasion, acts of foreign enemies, hostilities (whether declared or not), civil war, rebellion, revolution, insurrection or military or usurped power.
- Nuclear risks
- Seepage, pollution or contamination unless caused by sudden, unintended and unexpected happening.

- Professional indemnity, but not excluding personal or bodily injury or damage to tangible property.
- Liability arising out of performance warranties
- Property belonging to the Insured or in their care, custody or control
- Repairing or making good faulty, defective or incorrect workmanship, design or specification, materials, goods or other property supplied or installed or erected
- Excluding use of explosives or extent of cover to be agreed
- Product recall, product guarantee
- Terrorism
- Deductibles

Section 3 – Delay in Start Up

- Public authority delay
- Rectification of defects
- Non-availability of funds
- Modifications
- Costs incurred to reduce delay during Claims Deductible period
- Suspension, lapse or cancellation of licence after commencement of operations

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

TIE00899939_1135

SCHEDULE 12

CERTIFICATES

Part 1: Factory Acceptance Routine Test Certificate

FACTORY ACCEPTANCE ROUTINE TEST CERTIFICATE

This document is Applicable to Tram Number: ..... and certifies in accordance with Clause 28 that this tram has passed to the satisfaction of the authorised Tram Inspector the tests and inspections agreed/approved by tie and Infraco as being necessary for a tram to qualify for the issue of this Certificate. The necessary Test and Inspections are listed in Annex 1 to this Certificate.

Tram Inspector

Signature

.....

Name (in Block Capitals).....

Original Certificate to be issued to : tie
Copies to be issued to : Infraco, Tramco, Tram Inspector

ANNEX 1
Schedule of Agreed Tests and Inspections

	Pass	Fail
FACTORY ACCEPTANCE ROUTINE TESTS		

TIE00899939_1137

FACTORY ACCEPTANCE TYPE TEST CERTIFICATE

This document is Applicable to Tram Number: ..... and certifies in accordance with Clause 28 that this tram has passed to the satisfaction of the authorised Tram Inspector the tests and inspections agreed/approved by tie and Infraco as being necessary for a tram to qualify for the issue of this Certificate. The necessary Test and Inspections are listed in Annex 1 to this Certificate.

Tram Inspector

Signature
.....

Name (in Block Capitals).....

Original Certificate to be issued to : tie
Copies to be issued to : Infraco, Tramco, Tram Inspector

ANNEX 1
Schedule of Agreed Tests and Inspections

	Pass	Fail
FACTORY ACCEPTANCE TYPE TESTS		

Part 3: Certificate of Tram Delivery

CERTIFICATE OF TRAM DELIEVRY

This document is Applicable to Tram Number: ..... and certifies in accordance with Clause 30 that this tram has passed to the satisfaction of the authorised Tram Inspector the tests and inspections agreed/approved by tie and Infraco as being necessary for a tram to qualify for the issue of this Certificate. The necessary Test and Inspections are listed in Annex 1 to this Certificate.

Tram Inspector

Signature

.....

Name (in Block Capitals).....

Original Certificate to be issued to : tie
Copies to be issued to : Infraco, Tramco, Tram Inspector

TIE00899939_1140

ANNEX 1
Schedule of Agreed Tests and Inspections

Pass **Fail**

CERTIFICATE OF TRAM DELIVERY

TIE00899939_1141

Part 4: Tram Site Commissioning Type Test Certificate

TRAM SITE COMMISSIONING TYPE TEST CERTIFICATE

This document is Applicable to Tram Number: ..... and certifies in accordance with Clause 31 that this tram has passed to the satisfaction of the authorised Tram Inspector the tests and inspections agreed/approved by tie and Infraco as being necessary for a tram to qualify for the issue of this Certificate. The necessary Test and Inspections are listed in Annex 1 to this Certificate.

Tram Inspector

Signature
.....

Name (in Block
Capitals).....

Original Certificate to be issued to : tie
Copies to be issued to : Infraco, Tramco, Tram Inspector

ANNEX 1
Schedule of Agreed Tests and Inspections

Pass

Fail

TRAM SITE COMMISSIONING TYPE TESTS

TRAM SITE COMMISSIONING ROUTINE TEST CERTIFICATE

This document is Applicable to Tram Number: ..... and certifies in accordance with Clause 31 that this tram has passed to the satisfaction of the authorised Tram Inspector the tests and inspections agreed/approved by tie and Infraco as being necessary for a tram to qualify for the issue of this Certificate. The necessary Test and Inspections are listed in Annex 1 to this Certificate.

Tram Inspector

Signature

.....

Name (in Block Capitals).....

Original Certificate to be issued to : tie
Copies to be issued to : Infraco, Tramco, Tram Inspector

ANNEX 1
Schedule of Agreed Tests and Inspections

Pass **Fail**

TRAM SITE COMMISSIONING ROUTINE TESTS

TIE00899939_1145

Part 6: Tram Rejection Notice

TRAM REJECTION CERTIFICATE

This document is Applicable to Tram Number: ..... and certifies in accordance with Clause 28/30/31 (delete if not applicable) that this tram has not passed to the satisfaction of the authorised Tram Inspector the tests and inspections agreed/approved by tie and Infraco as being necessary for a tram to qualify for the issue of a Factory Acceptance Routine Test/Factory Acceptance Type Test/Site commissioning Routine Test/Site commissioning Type Test Certificate or Certificate of Tram Delivery (delete if not applicable). The Test and Inspections which are deemed to have not met the Tram Inspector's requirements are identified in Annex 1 to this Certificate.

Tram Inspector

Signature .....

Name (in Block Capitals).....

Original Certificate to be issued to : tie
Copies to be issued to : Infraco, Tramco, Tram Inspector

ANNEX 1
Schedule of Agreed Tests and Inspections

	Pass	Fail
FACTORY ACCEPTANCE ROUTINE TEST CERTIFICATE		
FACTORY ACCEPTANCE TYPE TEST CERTIFICATE		
CERTIFICATE of TRAM DELIVERY		
TRAM SITE COMMISSIONING TYPE TEST CERTIFICATE		
TRAM SITE COMMISSIONING ROUTINE TEST CETIFICATE		

TRAM RELIABILITY CERTIFICATE

This document is Applicable to Tram Number: ..... and certifies in accordance with Clause 44 of the Tram Supply Agreement that this tram is Reliable to the satisfaction of the authorised Tram Inspector by operating for two consecutive Reporting Periods in passenger carrying service without being a Tram Maintainer Late Tram and that during the same two Reporting Periods it has travelled a distance in excess of 10000 kilometers. The necessary Test results are listed in Annex 1 to this Certificate including the agreed Exclusions that have been applied.

Tram Inspector

Signature

.....

Name (in Block Capitals).....

Original Certificate to be issued to : tie
Copies to be issued to : Infraco, Tramco, Tram Inspector

ANNEX 1
Schedule of Agreed Tests and Inspections

(to be completed when necessary)

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 13 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 13

DISPUTE RESOLUTION PROCEDURE

1. The Parties agree that this Schedule 13 (*Dispute Resolution Procedure*) shall have effect for the resolution of any Dispute.

2. Any Dispute shall, in the first instance, be referred to the Internal Resolution Procedure in accordance with paragraph 10.

3. Neither Party shall commence any court proceedings until the procedures in paragraphs 9 to 57.3 have been completed, under exception that the provisions of this Schedule 13 (*Dispute Resolution Procedure*) shall not apply so as to prevent either Party seeking an interim order, or interim relief, in the Scottish courts.

4. In the event that any court proceedings whatsoever are initiated by either Party against the other, the Parties agree that the Court of Session, Scotland, shall have exclusive jurisdiction.

5. Neither Party shall be entitled to suspend the performance of its undisputed obligations under this Agreement merely by reason of the reference of any Dispute to the Dispute Resolution Procedure contained in this Schedule 13 (*Dispute Resolution Procedure*).

6. Subject to the Tram Supplier's and the Client's discretionary rights set out in paragraphs 55 to paragraph 57.2 to require that a Dispute and a Related Dispute (as defined in paragraph 55) be dealt with together at an appropriate stage of the Dispute Resolution Procedure, the provisions of this Schedule 13 (*Dispute Resolution Procedure*) are mandatory and binding upon the Parties. For the avoidance of doubt, nothing in this Schedule Part 9 shall be intended to disapply section 80(2) and 79(2) of the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006 (together the "**Tram Acts**") respectively.

7. Except in relation to the matters provided for in paragraphs 14 to 54 and subject to the provisions of paragraph 9, in the event that either Party following the referral of any Dispute then pursues such Dispute under the Dispute Resolution Procedure, and in the event that such Party fails to observe any time limit or timescale provided for in this Schedule 13 (*Dispute Resolution Procedure*) in relation to the pursuit or progression of such Dispute, such Party shall, upon such failure occurring and upon the expiry of 90 days following written notification from the other Party requiring the first Party to pursue the Dispute Resolution Procedure, be deemed to have irrevocably waived any right to pursue or progress such Dispute any further. In that event, such Party shall be deemed to have elected not to have referred

such Dispute or to have withdrawn such Dispute from the Dispute Resolution Procedure and shall be deemed to have irrevocably waived any right to refer any Dispute arising from the same or substantially the same Dispute or similar circumstances to the Dispute Resolution Procedure and shall be liable for payment of the whole fees incurred by any mediator or adjudicator who has acted in respect of such Dispute. This paragraph 7 is without prejudice to the rights of either Party to raise in defence to any Dispute any defence (including, without prejudice to the foregoing generality, any defence of retention, compensation or set-off) which would otherwise be available to it.

8. Notwithstanding the provisions of paragraph 7, in the event that a Party who pursues any Dispute under the Dispute Resolution Procedure fails to observe any time limit or timescale provided for in this Schedule 13 (*Dispute Resolution Procedure*) in relation to the pursuit or progression of the Dispute or fails to take action following a notification from the other Party pursuant to paragraph 7 above, the other Party may elect to waive such failure, in which event the time limit or timescale to which such failure relates shall be extended at the discretion of such other Party and the Dispute shall progress in accordance with the Dispute Resolution Procedure, subject that all other time limits and timescales provided for in this Schedule 13 (*Dispute Resolution Procedure*) which are affected by such extension shall be deemed to have been extended to give effect to such extension of the time limit or timescale to which such failure relates.

Internal Resolution Procedure

9. The following procedure is the Internal Resolution Procedure referred to in paragraph 2:

9.1 In the event of any Dispute arising, the Tram Supplier's Representative and the Client's Representative shall seek to resolve the Dispute at a meeting to be convened within three Business Days of written notification by either Party to the other that it wishes to initiate the Internal Resolution Procedure in respect of that Dispute ("Notification"). Such Notification shall be given in accordance with the provisions of Clause 68 (*Notices*) of this Agreement.

9.2 If following the meeting referred to in paragraph 9.1, the Dispute is not resolved or in the event that a meeting has not been convened within 3 Business Days of pursuant to paragraph 9.1, each Party shall, before the expiry of the period of seven Business Days from Notification, serve, in accordance with the provisions of Clause 68 (*Notices*) of this Agreement, a written position paper ("**Position Paper**") upon the other Party. Each Party's Position Paper shall state in reasonable detail that Party's

position and required objectives in relation to the Dispute; any required redress, and, where possible, any comments on the other Party's position.

9.3 Upon such service of a Position Paper by the Party initiating or pursuing the Dispute, the Chief Executive (or equivalent) of the Tram Supplier and the Chief Executive (or equivalent) of the Client (or their respective deputies in the event of their unavailability) shall seek to resolve the Dispute by meeting in good faith to discuss and negotiate upon the Dispute without recourse to legal or other proceedings.

9.4 In the event that resolution of the Dispute is achieved by the Chief Executive (or equivalent) of the Tram Supplier and the Chief Executive (or equivalent) of the Client, the resolution shall be reduced to writing and, once it is signed by the duly authorised representatives of both Parties, shall be binding on the Parties.

9.5 Unless concluded by a written legally binding agreement, all discussions and negotiations connected with the Dispute shall be conducted in confidence and without prejudice to the rights of the Parties in any future legal or other proceedings. Nor may such matters be produced or relied upon in evidence in any such proceedings.

10. In the event that any Dispute is not resolved by the Internal Resolution Procedure within a period of twenty Business Days from Notification (or longer if so agreed by the Parties) then the following provisions of this paragraph 11 shall apply;

10.1 The Chief Executive (or equivalent) of the Tram Supplier and the Chief Executive (or equivalent) of the Client (or their respective deputies in the event of their unavailability) shall, within a further period of five Business Days, seek to agree that the Dispute shall be resolved by any one of the following procedures:

10.1.1 mediation in accordance with paragraphs 11 to 13; or

10.1.2 adjudication in accordance with paragraphs 14 to 54; or

10.1.3 litigation before the Court of Session, Scotland, in which event the Summons in any such litigation shall be signeted and served within ten Business Days of the date of expiry of the period of sixty Business Days following the conclusion of the internal resolution procedure under paragraphs 9 and 10.

In the event that the Chief Executive (or equivalent) of the Tram Supplier and the Chief Executive (or equivalent) of the Client (or their respective deputies in the event of their unavailability) are unable to agree that the Dispute be resolved by the

procedures described in paragraphs 10.1.1, 10.1.2 or 10.1.3, the Party initiating or pursuing the Dispute shall refer the Dispute to mediation (and thereafter adjudication, if necessary) in accordance with paragraphs 11 to 13 or in the case of a Related Dispute conjoined by either Party pursuant to paragraph 55 or where a Related Dispute has already been referred to the decision of an adjudicator to adjudication in accordance with Paragraphs 14 to 54 (without the need to first refer the Dispute to adjudication).

Mediation

11. The Parties shall attempt in good faith to resolve the Dispute by a procedure of mediation in accordance with the Centre for Effective Dispute Resolution mediation rules or Model Mediation Procedure in force at the commencement of the mediation, (or in the event that the Centre for Effective Dispute Resolution has ceased to exist as at the time of the commencement of the mediation, mediation rules or a model mediation procedure offered by any other body offering commercial mediation services which shall be selected by agreement between the Parties (failing such agreement by the Party referring the Dispute to mediation)). In the event that any provision of such mediation rules or model mediation procedure conflicts with any provision of this Schedule 13 (*Dispute Resolution Procedure*), the provisions of this Schedule 13 (*Dispute Resolution Procedure*) shall take precedence. In the event that any timescales contained in such mediation rules or model mediation procedure conflicts with the timescales referred to in this Schedule 13 (*Dispute Resolution Procedure*), the timescales contained in such mediation rules or model mediation procedure shall be amended accordingly, such that the timescales referred to in this Schedule 13 (*Dispute Resolution Procedure*) shall be adhered to.

12. In the event that resolution of the Dispute is achieved in consequence of such mediation procedure, such agreed resolution shall be recorded in writing and, once it is signed by the duly authorised representatives of both Parties, shall be binding on the Parties. Unless concluded by a written legally binding agreement, all discussions and negotiations (including written submissions made and documents produced in relation thereto) connected with the mediation procedure referred to in paragraph 11 shall be conducted in confidence and without prejudice to the rights of the Parties in any future legal or other proceedings. Nor may such matters be produced or relied upon in evidence in any such proceedings.

13. If any Dispute to which this Schedule 13 (*Dispute Resolution Procedure*) relates is not resolved by the mediation procedure referred to in paragraphs 11 and 12 within a period of 30 Business Days from the referral of the Dispute to mediation (or longer if so agreed by the

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Parties), the mediation procedure shall be terminated and, unless the Party initiating or pursuing the Dispute withdraws the Dispute, the Dispute shall within sixty days of the termination of the mediation procedure, be referred to adjudication in accordance with paragraphs 14 to 54.

Adjudication

14. In the event that either Party refers a Dispute to adjudication in terms of paragraph 10.1.2 or 13, or exercises a statutory right available to it under the Housing Grants Construction and Regeneration Act 1996 to raise adjudication proceedings in relation to "construction operations" (within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996) which are not Authorised Works as defined in the Tram Acts, such adjudication shall be conducted in accordance with paragraphs 14 to 54, wherein any reference to "days" is a reference to calendar days.

15. Where a Related Dispute (as defined in paragraph 55) relates or is claimed by the other party to a Related Contract to relate to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 and where such other party to a Related Contract claims to exercise a statutory right available to it under the Housing Grants, Construction and Regeneration Act 1996, then reference of the Dispute arising under this Agreement to mediation shall not be a precondition to the commencement of adjudication proceedings. In the foregoing circumstances, the Tram Supplier or the Client shall be entitled to refer a Dispute at any time to adjudication in terms of paragraphs 14 to 54 hereof.

Notice of intention to seek adjudication

16. Either Party may give written notice (the "**Notice of Adjudication**") of its intention to refer the Dispute to adjudication and the Party giving such notice shall be the "**Referring Party**".

17. The Notice of Adjudication shall be given to the other Party and the Party receiving the Notice of Adjudication shall be the "**Responding Party**".

18. The Notice of Adjudication shall set out briefly:

    18.1 the nature and a brief description of the Dispute and of the parties involved;

    18.2 details of where and when the Dispute has arisen;

    18.3 the nature of the redress which is sought; and

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18.4 the names and addresses of the Parties (including the addresses which the Parties have specified for the giving of notices).

19. The adjudicator selected to consider the Dispute shall be selected from one of the panels ("**Panels**") appointed by the Parties in accordance with the following:

19.1 there shall be three Panels, one in respect of legal matters, ("**Legal Panel**"), one in respect of construction matters and operational matters ("**Construction/Operational Panel**") and one in respect of financial matters ("**Financial Panel**").

19.2 each Panel shall be comprised of at least four members, who are listed in Schedule 14 (*Panels for the Dispute Resolution Procedure*) to the Agreement.

19.3 if any member of a Panel resigns or dies or becomes incapax or ill to the extent of being unable to reasonably discharge his duties as a member of the Panel, a replacement shall be appointed by the Parties as soon as practicable. Any such replacement shall be wholly independent of **tie**, any **tie** party, TEL, Transport Scotland, the Client, any Client Party, the Tram Supplier, any Tram Supplier Party, CEC or any Relevant Authority, any Approvals Body, the Tram Maintainer, any Tram Maintainer Party, the Infraco, any Infraco Party, the Operator or any equipment supplier or any party associated with the Edinburgh Tram Network, and any successor to or subsidiary or parent of any of the aforementioned parties. If the Parties are unable to agree on the identity of such replacement(s), the President or Vice President for the time being of The Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland shall appoint such replacement(s) within thirty days of any application for such appointment by either Party.

20. The Referring Party shall at the same time as giving the Notice of Adjudication to the Responding Party, send to each of the members of the relevant Panel a copy of the Notice of Adjudication and a request that each member of the relevant Panel advises both Parties within three days of the date of the Notice of Adjudication as to whether or not he is able and willing to act. The Referring Party shall (acting reasonably) be entitled to select which of the Panels is the relevant Panel in light of the subject matter of the Dispute. The Parties shall attempt to agree within two further days as to which one of the members of the relevant Panel who responded indicating that they are able and willing to act shall be requested to act as adjudicator. In the event that such agreement is reached, the Referring Party shall, within a further period of one day, request the member of the relevant Panel upon whom agreement has been reached to act as adjudicator. In the event that such agreement is not reached, the

Responding Party shall, within a further period of two days, select one of the members of the relevant Panel who responded indicating that they are able and willing to act and the Referring Party shall request that member to act as adjudicator.

21. If no member of the relevant Panel indicates that he is able and willing to act within three days of receiving a request to act as adjudicator, the Referring Party shall request the President or the Vice President for the time being of The Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland to select a person to act as adjudicator.

22. Any person appointed, requested or selected to act as adjudicator in accordance with paragraphs 19, 20, 21, 24 and 25 shall be a natural person acting in his personal capacity. A person appointed, requested or selected to act as an adjudicator shall be wholly independent of the **tie**, any **tie** Party, TEL, Transport Scotland, Client, any Client Party, the Tram Supplier, any Tram Supplier Party, City of Edinburgh Council or any Relevant Authority, any Approvals Body, the SDS Provider, the Tram Maintainer, any Tram Maintainer Party, the Infraco, any Infraco Party, the Operator or any equipment supplier or any party associated with the Edinburgh Tram Network, and any successor to or subsidiary or parent of any of the aforementioned parties.

23. The requests referred to in paragraphs 20 and 21 shall be accompanied by a copy of the Notice of Adjudication.

24. The Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland must communicate the selection of an adjudicator to the Referring Party within three days of receiving a request to do so.

25. If the Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland fails to comply with paragraph 24, the Referring Party may:

    25.1 agree with the other Party to the Dispute to request a specified person to act as adjudicator; or

    25.2 request any other adjudicator nominating body to select a person to act as adjudicator. An "adjudicator nominating body" shall mean a body (not being a natural person and not being a Party to the Dispute) which holds itself out publicly as a body which will select an adjudicator when requested to do so by a Referring Party.

26. The person requested to act as adjudicator in accordance with the provisions of paragraph 20 or 21 shall indicate whether or not he is willing to act within two days of receiving the request.

27. Where an adjudicator has been selected and appointed in accordance with paragraphs 19, 20 or 21 within seven days of the date of the Notice of Adjudication, then the Referring Party shall refer the Dispute in writing (the "**Referral**") to the adjudicator within that seven day period. Where an adjudicator has not been selected within and appointed within seven days of the Notice of Adjudication, then the Referral shall be made immediately upon such selection and appointment. Any failure on the part of the Referring Party to make the Referral within seven days of the date of the Notice of Adjudication shall not invalidate the decision of the adjudicator.

28. The Referral shall be accompanied by copies of, or relevant extracts from the Agreement and such other documents as the Referring Party intends to rely upon.

29. The Referring Party shall, at the same time as he sends to the adjudicator the documents referred to in paragraphs 27 and 28, send copies of those documents to the Responding Party.

30. The adjudicator may, with the consent of the parties to those Disputes, adjudicate at the same time on more than one Dispute under the Agreement.

31. The Parties may agree to extend the period within which the adjudicator may reach a decision in relation to all or any of these Disputes.

32. An adjudicator may resign at any time on giving notice in writing to the Parties.

33. An adjudicator must resign where the Dispute is the same or substantially the same as one which has previously been referred to adjudication, and a decision has been taken in that adjudication.

34. Where an adjudicator ceases to act under paragraph 32 or 33, or dies or becomes incapax or ill to the extent of being unable to reasonably discharge his duties:

    34.1 the Referring Party may serve a fresh notice in accordance with paragraphs 16 to 18 and shall in accordance with paragraphs 19 to 29 request an adjudicator to act; and

    34.2 if requested by the new adjudicator, the Parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

35. The Parties to a Dispute may at any time agree to revoke the appointment of the adjudicator and in such circumstances the fees and expenses of that adjudicator shall, subject to paragraph 36, be determined and payable in accordance with paragraphs 52 and 53.

36. Where the revocation of the appointment of the adjudicator is due to the default or misconduct of the adjudicator, the Parties shall not be liable to pay the adjudicator's fees and expenses.

Powers of the Adjudicator

37. The adjudicator shall:

37.1 act impartially in carrying out his duties and shall do so in accordance with any relevant terms of the Agreement and shall reach his decision in accordance with Scots law; and

37.2 avoid incurring unnecessary expense.

38. The adjudicator may take the initiative in ascertaining the facts and the law necessary to determine the Dispute, and shall decide on the procedure to be followed in the adjudication. In particular, he may:

38.1 request either Party to supply him with such documents as he may reasonably require including, if he so directs, any written statement from either Party supporting or supplementing the Referral and any other documents given under paragraphs 28 and 29;

38.2 conduct the adjudication in the English language and decide whether a translation of any document is to be provided and, if so, by whom, by when, and at whose cost;

38.3 meet and question either Party and their representatives;

38.4 subject to obtaining any necessary consent from a third party or the Parties, make such site visits and inspections as he considers appropriate, whether accompanied by the Parties or not;

38.5 subject to obtaining any necessary consent from a third party or the Parties, procure the carrying out of any tests or experiments, and make directions as to the conditions for and responsibility for the cost of the same;

38.6 obtain and consider such representations and submissions as he requires, and, provided he has notified the Parties of his intention, appoint experts, assessors or legal advisers;

38.7 give directions as to the timetable for the adjudication, any deadlines, or limits as to the length of written documents or oral representations to be complied with; and

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38.8 issue other directions relating to the conduct of the adjudication.

39. The Parties shall comply with any request or direction of the adjudicator in relation to the adjudication.

40. If, without showing sufficient cause, a Party fails to comply with any request, direction or timetable of the adjudicator made in accordance with his powers, fails to produce any document or written statement requested by the adjudicator, or in any other way fails to comply with a requirement under these provisions relating to the adjudication, the adjudicator may:

40.1 continue the adjudication in the absence of that Party or of the document or written statement requested;

40.2 draw such inferences from that failure to comply as may, in the adjudicator's opinion, be justified in the circumstances;

40.3 make a decision on the basis of the information before him, attaching such weight as he thinks fit to any evidence submitted to him outside any period he may have requested or directed;

40.4 disqualify any part or parts of that Party's submissions affected by the failure to comply; and

40.5 grant the other Party proper opportunity to consider and respond to any evidence or representation made late.

41. Subject to any agreement between the Parties to the contrary, either Party may be assisted by, or represented by, such advisers or representatives (whether legally qualified or not) as he considers appropriate.

42. The adjudicator shall consider any relevant information submitted to him by either Party and shall make available to them any information to be taken into account in reaching his decision.

43. The adjudicator and the Parties shall not disclose to any other person any information or document provided in connection with the adjudication which the Party supplying it has indicated is to be treated as confidential, except to the extent that disclosure is required by law or is necessary for the purposes of, or in connection with, the adjudication, or the information is already in the public domain.

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Adjudicator's Decision

44. Unless otherwise agreed in accordance with paragraph 56.1 or 57.1 the adjudicator shall reach his decision not later than:

44.1 twenty eight days after the date of the Referral as defined in paragraph 27;

44.2 forty two days after the date of the Referral if the Referring Party so consents; or

44.3 such period exceeding twenty eight days after the Referral as the Parties may, after the giving of that notice, agree.

45. Where the adjudicator fails, for any reason, to reach his decision in accordance with paragraph 44;

45.1 either of the Parties to the Dispute may serve a fresh notice in accordance with paragraphs 16 to 18 and shall request an adjudicator to act in accordance with paragraphs 19 to 29; and

45.2 if requested by the new adjudicator the Parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

46. As soon as possible after he has reached a decision, the adjudicator shall deliver a copy of that decision to each of the Parties.

47. The adjudicator shall decide the matters in Dispute and may make a decision on different aspects of the Dispute at different times.

48. The adjudicator may take into account any other matters which the Parties agree should be within the scope of the adjudication or which are matters under the Agreement which he considers are necessarily connected with the Dispute and, in particular, he may

48.1 open up, review and revise any decision taken or any notice certifying payment given by any person referred to in the Agreement, unless the Agreement states that the decision or notice certifying payment is final and conclusive;

48.2 decide that any of the Parties to the Dispute is liable to make a payment under the Agreement (whether in sterling or some other currency) and, subject to the terms of the Agreement, when that payment is due and the final date for payment;

49. The adjudicator shall provide written reasons for his decision.

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Effect of the Decision

50. In his decision, the adjudicator may, if he thinks fit, order either or both of the Parties to comply (forthwith) with his decision or any part of it. In the absence of any directions by the adjudicator relating to the time for performance of his decision, the Parties shall be required to comply with any decision of the adjudicator immediately on delivery of the decision to the Parties in accordance with paragraph 46.

51. The decision of the adjudicator shall be binding on the Parties, and they shall comply with it, until the Dispute is finally determined by legal proceedings or by agreement between the Parties.

52. The adjudicator shall be entitled to the payment of such reasonable amount as he may determine by way of fees and expenses incurred by him and the Parties shall be jointly and severally liable to pay that amount to the adjudicator.

53. Without prejudice to the right of the adjudicator to effect recovery from either Party in accordance with paragraph 52, the adjudicator may by direction determine the apportionment between the parties of liability for his fees and expenses, or otherwise the Parties shall each be liable to pay one-half share of the adjudicator's fees and expenses.

54. The adjudicator shall not be liable for anything done or omitted in the discharge or purported discharge of his functions as adjudicator unless the act or omission is in bad faith, and any employee or agent of the adjudicator shall be similarly protected from liability.

Related Disputes

55. Notwithstanding the terms of paragraphs 2, 3 and 6 to 9 above, in the event that a dispute or potential dispute under, or in connection with any contract associated with the Edinburgh Tram Network (referred to in this Schedule 13 (*Dispute Resolution Procedure)* as "**Related Contracts**")), has arisen or arises out of substantially the same issues of fact and/or law (as the case may be) as a Dispute under the Agreement (a "**Related Dispute**"), then providing that the Related Contract contains dispute resolution provisions in terms substantially the same as set out in this Schedule 13 (*Dispute Resolution Procedure*) (save for necessary changes), either Party may require and direct that the Dispute and the Related Dispute be dealt with together at an appropriate stage of the Dispute Resolution Procedure.

56. In the event that a Related Dispute has already been referred to the decision of an adjudicator in accordance with the provisions of the Related Contract, and the Client is of the opinion that a Dispute is to be (but has not yet been) referred to adjudication under this Schedule 13

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(*Dispute Resolution Procedure*), the Client or the Tram Supplier may refer the Dispute, or may by notice in writing to the Tram Supplier require that the Dispute be referred (as the case may be) to the adjudicator appointed under the Related Contract to decide upon the Related Dispute, with the intention that such adjudicator shall, insofar as is relevant, practicable and appropriate, come to the same conclusion as to the facts and apply the same reasoning and analysis in reaching a decision on the Dispute as the adjudicator's conclusions, reasoning and analysis applied by him as the adjudicator in the Related Dispute and:

56.1 the adjudicator shall, if practicable, hear the Dispute at the same time as the Related Dispute and shall request such extension of time for producing his decision or award as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The Parties shall agree to such request for an extension of time, except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the adjudicator);

56.2 except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the adjudicator), the adjudicator shall have power (if so requested by the Client) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the Parties to the Dispute and the Related Dispute, and to the adjudicator; and

56.3 the Client shall procure that, as soon as practicable, the other party or parties to the Related Dispute shall give the Tram Supplier copies of the Related Contract, the Referral Notice in the Related Dispute and any other documentation provided to the adjudicator by any party to the Related Dispute.

57. In the event that a Dispute has already been referred to the decision of an adjudicator, and the Client is of the opinion that a Related Dispute is to be (but has not yet been) referred to adjudication, the Client may refer the Related Dispute to the adjudicator appointed under this Schedule 13 (*Dispute Resolution Procedure*) to decide upon the Dispute, and:

57.1 the adjudicator shall, if practicable, hear the Related Dispute at the same time as the Dispute and shall request such extension of time for producing his decision or award

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as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The Parties shall agree to such request for an extension of time, except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator).

57.2 except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the adjudicator), the adjudicator shall have power (if so requested by the Client) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the Parties to the Dispute and the Related Dispute, and to the adjudicator;

57.3 as soon as practicable, the Client shall give to the Tram Supplier copies of the Related Contract, the Referral Notice in the Related Dispute and any other documentation provided to the adjudicator by any party to the Related Dispute.

[redacted]

Director/Authorised Signatory
tie LIMITED

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Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

TIE00899939_1163

This is Schedule 14 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 14

PANELS FOR THE DISPUTE RESOLUTION PROCEDURE

CONSTRUCTION/OPERATIONAL

Alan Wilson
[redacted]
Chesterfield
DERBYSHIRE
[redacted]

Tony Canham
[redacted]
NORWICH
[redacted]

Peter Chapman
[redacted]
OXSHOTT
SURREY
[redacted]

Guy Cottam
[redacted]
BATH
[redacted]

FINANCIAL

Nigel Lowe
Nigel Lowe Consulting Limited
[redacted]
LONDON
[redacted]

Bryan Porter
[redacted]
GLASGOW
[redacted]

John Hunter
Hunter Consulting
[redacted]
STIRLING
[redacted]

Eric Mouzer
[redacted]
BIRMINGHAM
[redacted]

LEGAL

Lord Dervaird (Prof. John Murray QC)
[redacted]
EDINBURGH
[redacted]

Gordon Coutts, QC
[redacted]
EDINBURGH
[redacted]

Robert Howie, QC
[redacted]
EDINBURGH
[redacted]

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 15 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 15

RISK MANAGEMENT

Required Action from the Tram Supplier	Timing/Frequency applicable to the Tram Supplier
The Tram Supplier shall support the Client in the development of the **Project Risk Management Plan** ("**PRMP**"). The PRMP will detail the management of commercial, environmental, safety and security risk aspects of the Edinburgh Tram Network. The PRMP shall be focused on the risk factors related to the implementation of the Edinburgh Tram Network and shall outline the management arrangements to facilitate the inclusion of input from third parties. The risk management process will be applied and coordinated throughout the Term. The PRMP shall indicate the critical success factors, key areas of focus and individuals involved.	Input from the Tram Supplier as required by the Client to facilitate the delivery of the PRMP within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Supplier on an ongoing basis during the Term to allow periodic updates of the PRMP to be issued.
The Tram Supplier shall support the Client with contribution to the **Project Assumptions Register** ("**PAR**") , which shall record and report all capex, opex, lifecycle, revenue, programme, quality, functionality and approvability assumptions and consequent risks in relation to the Edinburgh Tram Network throughout the Term. The PAR shall be one central register with input from a number of parties, which the Client will co-ordinate. The Tram Supplier shall document all relevant assumptions made in relation to the performance of the Tram Works.	Input from the Tram Supplier as required by the Client to facilitate the delivery of the PAR within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Supplier on an ongoing basis during the Term to allow periodic updates of the PAR to be issued.
The Tram Supplier shall support the Client with contribution to the **Project Risk Register** ("**PRR**") to be developed by the Client. The PRR should summarise all capex, opex, lifecycle, revenue, programme, quality, functionality and approvability risks to the Edinburgh Tram Network. The PRR will also detail the proposed and completed mitigation of such risks. The PRR shall include analysis of each risk in terms of 'likelihood' and 'impact' prior to and following mitigation to allow effectiveness of mitigation to be assessed, responsible owner of each risk and graphical summaries of risk profile.	Input from the Tram Supplier as required by the Client to facilitate the delivery of the PRR within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Supplier on an ongoing basis during the Term to allow periodic updates of the PRR to be issued.

Required Action from the Tram Supplier	Timing/Frequency applicable to the Tram Supplier
The risks to be addressed should include strategic, commercial, economic, legal and regulatory, organisational, environmental, technical, operational and infrastructure risks. The Client will continue to use "Active Risk Manager", and the Client shall bear all the costs for license agreements and access costs for its use by the Client and any other party with the consent of the Client.	
The Tram Supplier shall prepare and submit a **Progress Report** on risk to the Client on the status of risk management and mitigation in relation to the Tram Works giving a summary of new risks identified, new assumptions, key matters to be resolved and achievements, including risks that have been closed out. The Progress Report must demonstrate how identified risks are being actively managed by the Tram Supplier. The Progress Report should indicate "**Red-Amber-Green**" **(RAG)** status on key components including specification compliance, incomplete design and programme for outstanding work.	Delivery by the Tram Supplier to the Client within 1-month of the Effective Date. The Tram Supplier shall provide an updated Progress Report on a monthly basis throughout the Term.
The Tram Supplier shall support the Client in the preparation and maintenance of a **Cost and Programme Contingency Report** (**"CPCR"**) for the construction phase of the Edinburgh Tram Network. The CPCR shall indicate the recommended capital cost and programme contingency allowances to be considered. The CPCR to be provided by the Client will also include a detailed quantitative risk analysis using the Monte Carlo simulation (*@RISK*4.5 and *Pertmaster Project Risk* or equivalents) for both cost and programme components. The CPCR shall also summarise the recommended mitigation for the construction phase and also include the commissioning and defects phases of the project.	Input from the Tram Supplier to facilitate delivery of the CPCR within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Supplier on an ongoing basis during the Term to allow periodic updates of the CPCR to be issued

Required Action from the Tram Supplier	Timing/Frequency applicable to the Tram Supplier
The Tram Supplier shall engage in liaison with the Client and any other party requested by the Client regarding risk matters to ensure effective management of risk. Liaison to include participation in risk management meetings and workshops and assistance with development of the risk identification procedures relevant to the implementation of the Edinburgh Tram Network.	The Tram Supplier shall be available for monthly meetings with the Client and any other party requested by the Client. The Tram Supplier shall also engage in ongoing liaison (including participation in risk workshops) with such parties as required by the Client throughout the Term.
The Tram Supplier shall support the Client in the preparation of a **Construction Risk Control Report** ("**CRCR**"), which shall indicate the risks identified by the Client during the construction phase of the Edinburgh Tram Network, including, but not limited to, construction sequence, construction methodologies, access, quality, approvals, security, safety and compliance. The Tram Supplier shall assist in demonstrating how risks are to be managed and co-ordinated with other relevant parties, including the use of 'informed' registers, co-ordinating plans and summarising plans.	Input from the Tram Supplier to facilitate delivery of the CRCR within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Supplier on an ongoing basis during the Term to allow periodic updates of the CRCR to be issued.
The Tram Supplier shall support the Client in the preparation a **Commissioning Risk Control Report** which shall detail the plans for mitigating the risks associated with the commissioning of the Edinburgh Tram Network. The Commissioning Risk Control Report shall identify the areas where the largest commissioning risks may appear. This should cover operational and design risks that could be associated with the whole project including, but not limited to, the trams, the tracks, the power supply and the tram depot. The Commissioning Risk Control Report shall concentrate on the commissioning process, but shall also refer to ongoing issues which also affect the construction and/or operation of the Edinburgh Tram Network.	Input from the Tram Supplier to facilitate delivery of the Commissioning Risk Control Report within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Supplier on an ongoing basis during the Term to allow periodic updates of the Commissioning Risk Control Report to be issued
The Tram Supplier shall support the Client in the preparation a **Residual Risk Control Report** ("**RRCR**") that will detail the plans for mitigating the risks arising from the construction and commissioning of the Edinburgh Tram Network which are still of ongoing importance. The RRCR should clearly detail the areas of importance that could affect the project	Input from the Tram Supplier to facilitate delivery of the RRCR within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Supplier on an ongoing basis during the Term to allow periodic updates of the RRCR to be issued

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Required Action from the Tram Supplier	Timing/Frequency applicable to the Tram Supplier
that will require to be addressed at the start of the project. These areas could be associated with design, operational and defects factors. Risks to be noted in the RRCR may include, but shall not be limited to, snagging, claims, specification defects and commercial concerns.	
The Tram Supplier shall support the Client in the preparation and maintenance of an **Operational and Maintenance Report** ("**OMR**") that will detail the identified risks associated with the provision of maintenance services in relation to the Edinburgh Tram Network.	Input from the Tram Supplier to facilitate delivery of the OMR within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Supplier on an ongoing basis during the Term to allow periodic updates of the OMR to be issued.

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Director/Authorised Signatory
tie LIMITED

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Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

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This is Schedule 16 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 16

COMMERCIALLY SENSITIVE INFORMATION

CAF considers as Commercially Sensitive Information any information delivered at any moment, to **tie** or the Client or any of the parties working, collaborating with **tie** or the Client, related with:

- Prices, including, but not limited to, overall amounts, partial amounts, options prices and payments milestones;
- Detailed technical drawings; and/or
- Detailed technical calculations.

[redacted]

Director / Authorised Signatory
tie LIMITED

[redacted]

Director / Authorised Signatory
CONSTRUCCIONES Y
AUXILIAR DE FERROCARRILES SA
(CAF)

This is Schedule 17 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 17

CODE OF CONSTRUCTION PRACTICE AND CODE OF MAINTENANCE PRACTICE

Part 1 - CODE OF CONSTRUCTION PRACTICE

1. MANAGEMENT SYSTEMS

1.1 The Tram Supplier shall implement and comply with the following management systems:

1.1.1 a "quality management system" in accordance with ISO 9001;

1.1.2 a "safety management system" in accordance with OHSAS 18001 or HSG65; and

1.1.3 an "environmental management system" in accordance with ISO 14001.

2. INSTRUCTION AND TRAINING

2.1 The Tram Supplier shall ensure that its employees, Sub-Contractors, agents and others on Site undertake a number of inductions. These shall comprise:

2.1.1 project-specific induction for the Tram Supplier Works (provided by the Tram Supplier); and

2.1.2 worksite and task-specific-induction including a method statement briefing and toolbox talk, (provided by the Tram Supplier).

2.2 Any persons who have not received the induction, for example visitors, shall be escorted on Site by a competent inducted person.

2.3 The Tram Supplier shall maintain induction and training records in order that **the Client** can inspect them. These records shall identify the scope of the induction and training and the persons who received them.

3. SAFE SYSTEMS

3.1 **Risk Assessments**

3.1.1 The Tram Supplier shall prepare risk assessments for all work activities being undertaken.

3.1.2 Each risk assessment shall include as a minimum the following details:

3.1.2.1 Document control

3.1.2.1.1 document title and number;

3.1.2.1.2 revision status;

3.1.2.1.3 authorisation for use; and

3.1.2.1.4 reference to supplementary documentation.

3.1.2.2 identification of any hazards;

3.1.2.3 identification of those who might be harmed, and how; and

3.1.2.4 an evaluation of the risks and, in relation to each risk, the control measures required to reduce the risk to an appropriate level.

3.2 **Method Statements**

3.2.1 The Tram Supplier shall prepare method statements for all work activities which fall within the definition of "construction work" under the Construction (Design & Management) Regulations 2007. Each method statement shall relate to the relevant work location.

3.2.2 Categorisation of Method Statements

Method statements shall be categorised as detailed below:

CATEGORY	RISK	APPROVAL PROCESS
A1	**Low risk.** Minimum implications on Human life or the Project	**Prepared** by Contractor / Sub Contractor **Approved** by Contractor / Sub Contractor
A2	**Medium risk.** Possibly implications on Human life or the Project	**Prepared** by Contractor / Sub Contractor **Approved** by Contractor / Sub Contractor **For Information** the Client Ltd Project Manager
A3	**High risk.** Major implications on Human life or the Project.	**Prepared & Approved** by Contractor/ Sub Contractor **Accepted** by **the Client** Ltd HSQE Advisor **Accepted** by **the Client** Ltd Project Manager

3.2.3 Each method statement shall include as a minimum the following details:

3.2.3.1 Document control

3.2.3.1.1 document title and number;

3.2.3.1.2 revision status;

3.2.3.1.3 contractor prepared and approved; and

3.2.3.1.4 **the Client** acceptance for use (as defined below).

3.2.3.2 Scope of work

3.2.3.3 Hazards identified

3.2.3.4 Public interface arrangements

3.2.3.5 Protection of existing infrastructure

3.2.3.6 Environmental protection arrangements

3.2.3.7 Plant, equipment and materials

3.2.3.8 Emergency procedures

3.2.4 The documentation referred to in paragraph 3.2.3 above shall be developed so that it is specific to the Tram Supplier Works. The Tram Supplier shall ensure that revisions and updates can be identified.

3.2.5 The Tram Supplier shall issue a copy of its procedure for the production of method statements and risk assessments to **the Client** for approval in accordance with the Review Procedure.

3.3 **Submission of Risk Assessments & Method Statements**

3.3.1 A 4-week "look ahead" schedule identifying the required scope of the Tram Supplier Works shall be issued to **the Client** by the Tram Supplier. This schedule shall identify the relevant risk assessments and method statements which are required in respect of each such scope. **the Client** shall identify which risk assessments and method statements require to be provided by the Tram Supplier to **the Client** based upon the categorisation of method statements in accordance with paragraph 3.3.2 above.

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3.3.2 The Tram Supplier shall issue risk assessments and method statements to **the Client** a minimum of 20 Business Days prior to the commencement of the Tram Supplier Works which are the subject of the method statements and risk assessments.

3.3.3 The Tram Supplier shall not undertake any Tram Supplier Works for which a risk assessment or method statement has been requested without the agreement of **the Client**.

3.3.4 **the Client** shall supply a letter of acceptance with all requested and returned Method Statements and Risk Assessments, which are found to be acceptable for site use. No requested Method Statement work activities shall commence on site without this letter of acceptance.

3.3.5 Irrespective of whether or not **the Client** has reviewed a risk assessment and method statement produced by the Tram Supplier, the Tram Supplier shall issue one copy of the risk assessment and method statement to **the Client** for information purposes before any work shall commence.

3.4 **Permit to Commence Works**

3.4.1 The Tram Supplier shall comply with **the Client**'s system for controlling access to undertake work activities, which shall require the Tram Supplier to obtain an approved permit to commence works from **the Client** (**"Permit to Commence Works"**) for each Work Site and agreed scope of construction works.

3.4.2 In so far as not otherwise submitted pursuant to this Agreement, the Tram Supplier shall submit a form for each required Permit to Commence Works (**"Permit to Commence Works Form"**) which is required, to **the Client** a minimum of 5 Business Days in advance of the access being required.

3.4.3 The Tram Supplier shall advise **the Client** of the persons within its organisation who are competent to authorise the Permit to Commence Works Forms.

3.4.4 Each Permit to Commence Form shall identify the necessary licences, third party approvals and notifications that have been obtained / granted to enable the works to be undertaken, together with the specific control measures that

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require to be implemented under the Tram Supplier's safety management system.

3.4.5 The Tram Supplier's personnel who will implement the Permit to Commence procedure shall be required to undergo training by **the Client.**

3.5 **Permits to Work**

3.5.1 The Tram Supplier shall implement a "permit to work" system for the following activities as a minimum:

3.5.1.1 hot works;

3.5.1.2 entry into confined spaces;

3.5.1.3 work affecting services;

3.5.1.4 access to live facilities; and.

3.5.1.5 works on private land controlled by third parties.

The Tram Supplier shall implement a procedure for managing third party permits to work

3.5.2 The Tram Supplier shall issue a copy of its permit to work procedures to **the Client** for approval in accordance with the Review Procedure.

3.5.3 The Tram Supplier shall advise **the Client** of the competent persons within its organisation who shall be competent to authorise permits to work.

3.6 **Personal Protective Equipment**

3.6.1 The Tram Supplier shall provide all necessary personal protective equipment (**"PPE"**) for its employees and provide them with all necessary information, instruction and training on its use.

3.6.2 The Tram Supplier shall ensure that all persons on any Work Site (including any Tram Supplier Parties and visitors) wear the necessary PPE.

3.6.3 **the Client's** specific requirements for PPE with regard to particular tasks are as follows:

3.6.3.1 head protection conforming to BS 5240 or BS EN 397;

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3.6.3.2 protective footwear complying with BS EN 345 (safety boots which provide ankle support and contain steel midsoles shall be required for works which are carried out on railway land);

3.6.3.3 yellow high visibility clothing to comply with BS EN 471:1994, Table 1, Class 2 or 3, which shall be worn at all times; the clothing shall comply with the requirements of Clause 4.2.3(b) in all cases; jackets with sleeves in accordance with Clause 4.2.4 and to Class 3 shall be worn on dual carriageway roads with a speed limit of 50 mph or above, unless operatives stay within the working space at all times; and

3.6.3.4 orange high visibility clothing complying with GO/RT 3279 shall be worn where any works are carried out on railway land.

3.7 **Work Site Completion Certificates**

3.7.1 The Tram Supplier shall comply with **the Client**'s system for certifying the completion of the relevant work activities within each Work Site, which shall require the Tram Supplier to complete a completion certificate (**"Work Site Completion Certificate"**) for each Work Site in relation to which the relevant Tram Supplier Works have been completed.

3.7.2 The Work Site Completion Certificate shall be completed by the Tram Supplier to identify and cross reference the quality control records, testing and commissioning records and any other relevant records identified within Schedule 2 (*Employer's Requirements*) and this Schedule 3 (*Code of Construction Practice*), together with details of any outstanding works which are required and the timescales for undertaking them.

4. REPORTING

4.1 The Tram Supplier shall report the following information to **the Client** within the same working day or 24 hours of the event occurring:

4.1.1 details of any accident or incident;

4.1.2 details of any environmental event; and

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4.1.3 details of any visit by either the Health & Safety Executive or SEPA, together with details of any report issued or enforcement action that resulted.

4.2 The Tram Supplier shall include the following information within its four weekly progress report which is to be provided to **the Client** as part of the Tram Supplier Works:

4.2.1 an update on any events referred to in paragraphs 4.1.1 to 4.1.3;

4.2.2 details of any near misses;

4.2.3 details of any accident investigation reports raised by the Tram Supplier including details of corrective and preventative actions which have been taken;

4.2.4 the accident incident rate (**"AIR"**) and accident frequency rate (**"AFR"**) for the Tram Supplier Works (including details of total hours worked and number of persons employed);

4.2.5 a summary of the monitoring and internal auditing activities undertaken by the Tram Supplier in the period, including details of any corrective or preventative actions raised or closed out; and

4.2.6 details of the programme of monitoring and auditing planned for the subsequent four-weekly period.

5. AUDITING AND MONITORING

5.1 The Tram Supplier shall be responsible for carrying out, auditing and monitoring of its site establishment and work activities.

5.2 **the Client** shall undertake regular auditing and monitoring of the Tram Supplier's activities and site establishment and documentation records, and the Tram Supplier shall action any findings which are raised by **the Client**.

6. NON-CONFORMANCE, COMPLAINTS AND DISCIPLINARY MATTERS

6.1 **the Client** shall implement a process for recording and processing breaches by the Tram Supplier of the requirements of this Schedule 3 (*Code of Construction Practice*) and complaints.

6.2 The Tram Supplier shall take such steps as are required by **the Client** to remedy any such infringement or address any such complaint and the following priority levels for action shall apply:

Level of Urgency	Category of Notification	Required Response Time
1	High urgency. Involves an immediate threat to persons or property or the circumstances otherwise require immediate rectification.	Immediate action required. If response not completed by the Tram Supplier within 4 hours, **the Client** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Tram Supplier.
2	Medium urgency. No immediate threat to persons or property, but circumstances require rectification within 24 hours.	Remedial action requires to be completed within 24 hours. If the Tram Supplier does not complete the required response within 24 hours, **the Client** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Tram Supplier.
3	Issue requires rectification, but no immediate threat to persons or property and the circumstances do not otherwise require immediate rectification.	Timescales for rectification to be agreed between the Tram Supplier and **the Client**. In the event that the Tram Supplier does not comply with the agreed timescales, **the Client** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Tram Supplier.

If the Tram Supplier fails to take any remedial action required by **the Client** pursuant to the table above, **the Client** shall be entitled to employ and pay other persons to carry out the same and all costs incurred by **the Client** shall be recoverable from the Tram Supplier by **the Client** and may be deducted by **the Client** from any monies due or to become due to the Tram Supplier or, alternatively, recoverable from the Tram Supplier as a debt.

6.3 Without prejudice to Clause 27 (*Removal of Tram Supplier's Employees*) of the Agreement, **the Client** shall implement a process for initiating disciplinary actions which could arise from complaints received in respect of Tram Supplier staff or breach by any member of the Tram Supplier's staff in respect of the requirements of Schedule 2 (*Employer's Requirements*) or this Schedule 3 (*Code of Construction Practice*). These comprise:

6.3.1 Black Card: issued for gross misconduct, or the aggregation of two Red Cards or three Yellow Cards - results in employment on the Edinburgh Tram project being terminated for the individuals involved.

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6.3.2 Red Card: issued for serious misconduct, or the aggregation of two Yellow Cards.

6.3.3 Yellow Card: issued for misconduct.

7. IDENTIFICATION

7.1 The Tram Supplier shall ensure that all site construction staff are easily identifiable to the public by use of photo identity cards.

7.2 The Tram Supplier shall ensure that all site construction staff identify their employer by means of their company logo on their high visibility waistcoat / jacket and safety helmet.

8. HOURS OF WORKING

8.1 Normal maximum hours of permissible working for the Tram Supplier Works shall be:

Monday – Friday **0700 – 1900 hours**

Saturday **0800 - 1300 hours**

8.2 These hours of work shall not apply to equipment which is required to operate continuously (e.g. for safety or environmental reasons) or to work undertaken within fully enclosed areas such as buildings.

8.3 **Work Outside Normal Hours**

8.3.1 In certain circumstances work outwith these hours may be undertaken with the prior approval of **the Client** and CEC. These circumstances may include:-

8.3.1.1 Sunday and evening/night working on public roads and in the vicinity of the railway network, where such working is required to minimise disruption to other traffic; or

8.3.1.2 where, through consultation with local residents and businesses adjacent to the proposed Tram Supplier Works to be undertaken outwith the normal hours of working, it is deemed by the Tram Supplier acting reasonably and having due and proper regard to the

said consultation to be less disruptive to those businesses and residents by having the Tram Supplier working extended hours outwith the normal hours of working, or

8.3.1.3 where Tram Supplier Works are taking place in areas where there are no residents adjacent to the proposed Tram Supplier Works.

8.3.2 Application for prior approval must be made by the Tram Supplier at least two weeks in advance.

8.4 Where Sunday or evening and night working has the potential to disturb nearby land users and occupiers, the Tram Supplier shall notify such users and occupiers seven days in advance with a description of the work to be carried out, measures which will be taken to control noise or other disturbance, and proposed hours of working.

8.5 No works shall be undertaken between Haymarket at Magdala Crescent to Leith Walk Junction of London Road from and including the following dates:

Festival 03rd August 2008 until 07th September 2008;

Festival 02nd August 2009 until 06th September 2009;

Festival 01st August 2010 until 05th September 2010;

Christmas 07th December 2008 until 02nd January 2009;

Christmas 06th December 2009 until 04th January 2010; and

Christmas 05th December 2010 until 04th January 2011.

9. SITE ARRANGEMENTS

9.1 Site Housekeeping

9.1.1 A 'good housekeeping' policy shall be applied by the Tram Supplier at all times; this shall include, but not necessarily be limited to, the following requirements:

9.1.1.1 all working areas, including offices, shall be kept in a clean and tidy condition;

9.1.1.2 all working areas shall be a no-smoking area; specific areas within the Site shall be designated as smoking areas and shall be equipped with containers for smoking waste; these shall not be located at the boundary of the Site and adjacent to neighbouring land;

9.1.1.3 open fires shall be prohibited at all times;

9.1.1.4 all necessary measures shall be taken to minimise the risk of fire and the Tram Supplier shall comply with the requirements of the local fire authority;

9.1.1.5 radios (other than two-way radios used for the purposes of communication related to the Tram Supplier Works) and other forms of audio equipment shall not be operated on the Site;

9.1.1.6 any waste susceptible to spreading by wind or liable to cause litter shall be stored in enclosed containers;

9.1.1.7 rubbish shall be removed at frequent intervals and the Site kept clean and tidy;

9.1.1.8 hoardings shall be frequently inspected, repaired and re-painted as necessary;

9.1.1.9 eating and drinking shall only permitted within the Tram Supplier's designated welfare area;

9.1.1.10 adequate toilet facilities shall be provided for all Site staff;

9.1.1.11 food waste shall be removed frequently;

9.1.1.12 the Tram Supplier's personnel (including any Sub-Contractors) shall be required to conform to a reasonable dress code;

9.1.1.13 any behaviour that is lewd or likely to cause offence shall not be permitted; and

9.1.1.14 wheel washing areas shall be brushed clean frequently.

9.1.2 The Tram Supplier shall inspect all working areas at least weekly and shall provide a four weekly written report on compliance with paragraph 9.1.1

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above. **the Client**, **the Client's** Representative or any other party authority by either of them may carry out inspections of the Site at any time without prior notice of time and place of the inspections. Access to all areas of the Tram Supplier Works shall be given to visiting inspectors and the Tram Supplier shall give inspectors all reasonable assistance during their Site inspection.

9.1.3 The Tram Supplier shall register the project with the Considerate Constructors Scheme.

9.2 **Welfare**

9.2.1 The Tram Supplier shall be responsible for ensuring that adequate welfare facilities are provided; adequate facilities shall comprise:

9.2.1.1 sufficient toilet facilities for all staff at readily accessible locations, including adequate supplies of toilet paper;

9.2.1.2 facilities for changing, storing and drying clothes, for heating water and for washing and drinking (the latter must have seating for each person and wipe-clean mess table tops);

9.2.1.3 washing facilities near every toilet facility and changing room; the washing facilities shall include a supply of hot and cold or warm water, soap or cleaning agent and towels or hot air drier;

9.2.1.4 clean, wholesome drinking water, clearly marked as such;

9.2.1.5 a means of heating food; and

9.2.1.6 rest facilities.

9.2.2 The Tram Supplier shall keep all welfare facilities clean and shall not use them for the storage of materials, plant and other working equipment.

9.2.3 The Tram Supplier shall provide suitable and sufficient fire fighting equipment for all on-site accommodation.

9.2.4 Where there is the possibility of female employees or visitors being present on the Site, the Tram Supplier shall provide separate toilet, washing and changing facilities.

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9.3 **Fencing and Hoardings**

9.3.1 The Tram Supplier shall ensure that all working areas are sufficiently and adequately fenced to prevent the public and animals from straying on to the working area; hoardings shall be provided to suit the individual location by carrying out an appropriate risk assessment, but may be:

9.3.1.1 adjacent to a pedestrian route;

9.3.1.2 a modular wire mesh fence, a minimum of 1.8 metres in height, where appropriate for minimum security needs; or

9.3.1.3 a 2.4 m minimum height, plywood faced, timber framed boundary hoarding, of a surface density of not less than 7kg/m² or other hoarding providing equivalent security and noise attenuation, in the vicinity of noise sensitive neighbours;

9.3.1.4 in locations identified by the Client a proprietary steel panelled hoarding system a minimum of 2.4m in height;

9.3.1.5 a 2.4m minimum height, plywood faced, timber framed boundary hoarding, of a surface density of not less than 7kg/m² together with a covered walkway over a pedestrian route;

9.3.1.6 adjacent to a live road carriageway;

9.3.1.7 as for a pedestrian route, but in conjunction with a vehicle restraint system which complies with containment level T1 and T2 of BS EN 1317 - 2:1998, where determined by the risk assessment;

9.3.1.8 in areas not adjacent to a live carriageway or pedestrian route;

9.3.1.9 as for a pedestrian route;

9.3.1.10 a post and wire fence 1.2m in height erected on the line of the Permanent Land;

9.3.1.11 other designs, where a particular level of risk mitigation appearance or acoustic rating is considered to be required and is agreed with **the Client** and CEC; and

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9.3.1.12where the Tram Supplier Works to be undertaken are of a minor nature, and subject to the approval of the Client, barriers comprising post and planks or similar proprietary systems can be used.

All fencing and hoardings shall comply with Chapter 8 of the Traffic Sign Manual.

All access and egress to worksites shall be via designated positions within the fencing and hoardings, which shall remain closed and secured when not in use.

9.3.2 All fencing and hoardings that create poorly lit pedestrian routes shall have appropriate lighting fitted by the Tram Supplier, and these shall be illuminated at all times when the adjacent street lighting is lit.

9.3.3 The Tram Supplier shall ensure that the location and design of Site boundaries, hoarding and temporary structures on the public road shall permit adequate visibility at junctions and proper forward visibility along the roads in accordance with the National Roads Directorate advice notes and the requirements of CEC.

9.3.4 The Tram Supplier shall ensure that where hoardings are provided, they are painted on the side facing away from the working area in a colour and style to be approved by **the Client** and CEC, and that the public side of the hoarding carries signs which identify the project and give appropriate contact information for the Tram Supplier.

The Tram Supplier shall ensure that where fencing is provided the fence panels are covered by material that complies with the requirements of Loss Prevention Standard LPS 1215 *Flammability Requirements and Tests for LPCB Approval of Scaffolding Materials.* The material shall be printed in a colour and style to be approved by **the Client** and CEC, and carries signs which identify the project.

9.3.5 All hoardings shall be maintained by the Tram Supplier in a neat and tidy condition at all times, 24 hours, 7 days a week.

9.3.6 The Tram Supplier shall be expressly prohibited from displaying or allowing to be displayed any advertisement or notice including illicit bill or fly posting on the hoardings. The Tram Supplier shall ensure that all graffiti, fly posting

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or defacement to the hoardings is removed and made good or obscured within 24 hours.

9.3.7 An information board shall be provided by the Tram Supplier at each working area detailing information on the work programme and estimated duration of the Tram Supplier at that working area, together with the location of the information centre, the web address and a 24-hour telephone number for use by members of the public who wish to lodge complaints or comments or additional information.

9.3.8 All fencing and hoarding shall be removed as soon as reasonably practicable after the completion of any part of the Tram Supplier.

9.4 **Lighting and Visual Intrusion**

9.4.1 The Tram Supplier shall site construction buildings, equipment and lighting so as to minimise visual intrusion and light spillage at nearby residential properties, in so far as is consistent with the safe and efficient operation of each Work Site. Lighting shall be removed as soon as is consistent with the safe and efficient operation of each Work Site.

9.4.2 Site lighting shall be positioned and directed by the Tram Supplier so as to minimise nuisance to residents and to minimise distractions or confusion to passing drivers on adjoining public roads. This provision shall apply particularly to working areas where work after dark will be carried out and the Tram Supplier shall provide appropriate lighting for these sites.

9.4.3 So far as is practicable, all power to temporary traffic signals, lighting and the like shall be taken by the Tram Supplier from mains supplies rather than from portable generators. Where portable generators are used, industry best practice shall be followed to minimise noise and pollution from such generators.

9.4.4 The Tram Supplier shall comply with the Institute of Lighting Engineers' document *Guidance Notes on Reduction of Light Pollution 2000* in so far as is reasonably practicable and applicable to the Tram Supplier.

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9.5 **Access and Loading**

9.5.1 The Tram Supplier shall ensure that lorries shall enter and exit the Site in a forward direction at designated locations, except where space restriction does not permit this. If the reversing of vehicles into public spaces is required, then a responsible person observing the rear of the vehicle shall properly control the movement. The sounding of audible reversing alarms shall not be permitted outside normal working hours, except where this has been approved by **the Client** and CEC in connection with Tram Supplier Works permitted under paragraph 8.3 above). Entry and exit conditions shall be subject to prior approval by **the Client**, CEC and the Lothian and Borders Police before implementation.

9.5.2 Access to and egress from the Site shall be carried out by initiating a left turn wherever reasonably practicable.

9.5.3 All loading and unloading of vehicles shall take place off the public road as far as is reasonably practicable.

9.6 **Security**

9.6.1 Adequate security shall be exercised by the Tram Supplier to protect the public and prevent unauthorised entry to or exit from the Site. Site gates, where used, shall be closed and locked when there is no Site activity and Site security measures shall be implemented.

9.6.2 Site security cameras, where used, shall be placed in locations which will not unduly infringe upon the privacy of local residents.

9.7 **Living Accommodation**

9.7.1 No living accommodation shall be provided by the Tram Supplier within any construction working area. Mess rooms, locker rooms, toilets and showers shall be permitted at Work Sites.

9.8 **Clearance of Site on Completion**

9.8.1 The Tram Supplier shall clear and clean all utilities apparatus (where relevant to the Tram Supplier Works), working areas and accesses as work proceeds and when no longer required for the carrying out of the Tram Supplier Works.

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9.8.2 All surplus soil and materials, rubbish, Temporary Works (including temporary roads and hardstandings), Tram Supplier's Equipment, sheds, offices and temporary fencing shall be removed, post holes filled and the surface of the ground restored as near as practicable to its original condition, or to such condition as has previously been agreed with **the Client** and CEC in accordance with this Agreement and/or the Specification (as appropriate).

9.9 **Pest Control**

9.9.1 The Tram Supplier shall ensure that the risk of infestation by pests or vermin is minimised by adequate arrangements for the disposal of food waste or other material attractive to pests. If infestation occurs, the Tram Supplier shall take such action to deal with it as required by **the Client** and CEC.

10. REQUIREMENTS RELATING TO WORKS AFFECTING EDINBURGH AIRPORT

10.1 The Tram Supplier shall comply with the requirements of Edinburgh Airport Limited in relation to aerodrome safeguarding, including those requirements included within the Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas) (Scotland) Direction 2003 (SEDD Circular 2/2003).

10.2 The Tram Supplier shall have regard to, and comply (where relevant) with all BAA and CAA guidelines, including, (but not necessarily limited to):

10.2.1 CAP 168 Licensing of Aerodromes.

10.2.2 CAP 680 Aerodrome Bird Control.

10.2.3 CAA Safeguarding of Aerodromes Advice Note 1 (Safeguarding – An Overview).

10.2.4 CAA Safeguarding of Aerodromes Advice Note 2 (Lighting near Aerodromes).

10.2.5 CAA Safeguarding of Aerodromes Advice Note 4 (Cranes and Other Construction Issues).

10.2.6 BAA Standard Conditions for Aerodrome Safeguarding.

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10.3 The Tram Supplier shall prepare for approval by **the Client** and Edinburgh Airport Limited a "Construction Management Strategy" as defined within CAA Safeguarding of Aerodromes Advice Note 4 (Cranes and Other Construction Issues). The Construction Management Strategy shall address as a minimum the following issues:

10.3.1 use of cranes or other tall construction equipment;

10.3.2 control of activities likely to produce dust or smoke clouds

10.3.3 the design of temporary lighting to avoid distracting pilots (see Advice Note 2);

10.3.4 storage of materials, particularly compliance with height limits;

10.3.5 control and disposal of waste, to prevent attraction of birds; and

10.3.6 site restoration, to prevent attraction of birds.

11. REQUIREMENTS RELATING TO WORKS AFFECTING THE RAILWAY

11.1 The Tram Supplier shall comply with the requirements of Network Rail in relation to railway safeguarding.

11.2 The Tram Supplier shall comply with all Network Rail standards and guidelines, including but not limited to "*Contract Requirements (NR/SP/OHS/008)*" including the Safety Clause Menu and "*Health and Safety Management of Third Party Works (RT/LS/P/043)*".

12. HEALTH & SAFETY REQUIREMENTS

12.1 Safety Signage

The Tram Supplier shall be responsible for the provision of all safety signage required for the work activities being undertaken. Safety signage shall comply with the Health and Safety (Safety Signs and Signals) Regulations 1996.

12.2 Hazardous Substances

12.2.1 The Tram Supplier shall maintain a register of safety data sheets for all materials and substances used.

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12.2.2 The Tram Supplier shall be responsible for undertaking "COSHH" assessments for materials and substances used or with which contact will be made on the Site.

12.2.3 The Tram Supplier shall liaise with **the Client** regarding proposals for storage of hazardous substances in open air, in buildings, within the workplace and the decanting, disposal of empty containers, tanks and cylinders.

12.3 **Electricity**

12.3.1 The Tram Supplier shall use electrical tools and equipment which operate at a voltage no greater than 110V. Where there is a requirement to operate tools and equipment using a voltage greater than 110V, the approval of **the Client** shall be obtained in writing.

12.3.2 Electrical tools shall be double insulated and used in conjunction with a RCD.

12.3.3 Tools shall be connected to a 240V supply via a portable 110V centre tapped transformer.

12.3.4 The lead between the 240V supply and the transformer shall be as short as is reasonably possible.

12.3.5 All temporary electrical systems shall possess a current inspection certificate.

12.3.6 All tools shall have passed an electrical safety test and shall be identified with a label which states the unique identification, the test date, the next test date and the organisation which carried out the electrical safety test.

12.4 **Provision and Use of Work Equipment**

12.4.1 The Tram Supplier shall be responsible for ensuring the inspection of all work equipment. Records of inspections shall be retained at the Site.

12.4.2 Work equipment shall only be used by authorised personnel, who have received appropriate training and certification.

12.5 **Lifting Operations and Lifting Equipment**

12.5.1 The Tram Supplier shall be responsible for ensuring that all lifting equipment is accompanied by current test and examination certificates.

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12.5.2 Safe working loads shall be shown on all lifting equipment.

12.5.3 Lifting equipment and lifting operations shall only be used by authorised personnel, who have received appropriate training and certification.

12.6 **Height Gauges for Low Structures**

A height gauge in the form of a rigid "goal post" type structure shall be erected at:

12.6.1 all egress points from the worksites. The height that the cross bar is set to shall be dependent upon the minimum height of any obstruction that a vehicle will encounter on public or third party land; and

12.6.2 all access points to the worksites or in the proximity of an on site obstruction. The height to which the crossbar requires to be set shall be subject to review during the course of the Tram Supplier Works to ensure that it takes cognisance of the ongoing Tram Supplier Works.

The height gauge shall comprise a form that shall alert the driver of contact with the crossbar and shall be located in a position that shall enable the driver to take avoiding action prior to contacting any obstruction.

12.7 **Overhead Power Lines**

Where plant and equipment is working in the vicinity of an overhead power line, the distance between the plant and equipment and the overhead line should be at least:

12.7.1 15m (plus the length of the jib) if the lines are suspended from steel towers; or

12.7.2 9m (plus the length of the jib) if the lines are supported on wooden poles.

In cases where approach is likely, stout, distinctive barriers should be erected at ground level to prevent access. Where work is to take place close to overhead lines, detailed precautions should be discussed with the owner of the overhead lines. However, the responsibility for ensuring that precautions are adequate remains with the Tram Supplier, not with the owner of the power lines.

In addition to the specific precautions required when working in the vicinity of overhead power lines, the following shall be undertaken:

12.7.3 barriers shall be erected at least 6m away, to prevent inadvertent approach by other site vehicles; and

12.7.4 crossing points shall be clearly marked beneath the lines by means of a rigid "goal post" structure at a height specified by the electrical supplier.

Storage of materials shall be prohibited in the area between the overhead lines and the ground-level barriers.

13. FIRE PREVENTION

13.1 The requirements of the document "*Fire Prevention on Construction Sites: The Joint Code of Practice on the Protection from Fire of Construction Sites and Buildings Undergoing Renovation* (published by the Construction Confederation and the Fire Protection Association) shall apply to the Tram Supplier Works.

13.2 All temporary protective coverings shall comply with the requirements of the Loss Prevention Standard LPS 1207 'Fire Requirements for Protective Covering Materials'.

13.3 All scaffold cladding materials shall comply with the requirements of the Loss Prevention Standard LPS 1215 'Flammability Requirements for Scaffold Cladding Materials'.

13.4 The Tram Supplier shall, as appropriate to the work activities, appoint "a fire marshall" who shall be responsible for day to day fire safety.

13.5 A permit to work shall be implemented for all "hot works".

13.6 The use of halogen lighting shall be prohibited.

14. FIRST AID

14.1 the Tram Supplier shall be responsible for providing first aid provision for its personnel (including any Sub-Contractors) in accordance with the Health and Safety (First Aid) Regulations ("Regulations") 1981. This shall include the provision of:

14.1.1 a first aid box, the size of which shall be commensurate with the number of workers on Site; and

14.1.2 the required number of first aiders or appointed persons required by the Regulations.

15. INSPECTIONS

15.1 The Tram Supplier shall be responsible for undertaking the statutory inspections required in terms of the Construction (Health, Safety and Welfare) Regulations 1996 that relate to the Tram Supplier Works being carried out. The records of the inspections shall be retained on the Site.

16. ROADS AND FOOTPATHS, CYCLEWAYS AND BRIDLEWAYS

16.1 General

16.1.1 The Tram Supplier shall submit to **the Client** a statement setting out the proposed measures (including specified traffic routes) to be taken with respect to traffic and road safety for the duration of the Tram Supplier Works, to enable the development including all relevant information in relation to the Tram Supplier obtaining Temporary Traffic Regulation Orders (**"TTROs"**) and the equivalent of such orders as are applicable to third parties (for example Edinburgh Airport Limited), for approval before the Tram Supplier Works commence. The Tram Supplier shall circulate the approved statement to all bodies identified by **the Client** and CEC and any other bodies reasonably requested by **the Client**.

16.1.2 The measures to be taken with respect to traffic and road safety shall include, but not necessarily be limited to:

16.1.2.1use of TTROs; the Tram Supplier shall consult with **the Client,** CEC and other third parties on the arrangements for agreeing and implementing TTROs to facilitate road closures and the like; the use of TTROs shall take into account the requirement for, and availability of, suitable alternative routes;

16.1.2.2use of temporary signing and lining where required by **the Client** and CEC to identify places where construction is taking place;

16.1.2.3use of temporary signing to restrict vehicle types and sizes and define routes for construction traffic;

16.1.2.4use of appropriate temporary signing and lighting wherever the Tram Supplier Works are in progress to ensure the safety of all road users; and

16.1.2.5preparation and implementation of a programme agreed by Tram Supplier with **the Client** and CEC for road closures and temporary traffic signal arrangements.

16.2 **Temporary Road Closures And Diversions**

16.2.1 The Tram Supplier shall finalise the arrangements for required closures and diversions of specified highways, footpaths and cycle ways with **the Client** and CEC, BAA or any private landowner, to suit its Programme.

16.2.2 Before breaking up, closing or otherwise interfering with any street or footpath to which the public has access, the Tram Supplier shall make such arrangements with **the Client** and CEC as may be reasonably necessary to cause as little interference with the traffic in that street or footpath during the Tram Supplier Works as shall be reasonably practicable.

16.2.3 Temporary road closures which result in the diversion of bus routes shall be agreed by the Tram Supplier with the relevant bus operators who will in turn notify the Traffic Commissioner.

16.2.4 Pedestrian access to properties shall be maintained at all times where practicable, unless otherwise agreed with **the Client** and CEC and the owners and tenants of affected properties. Access to and from public facilities shall be maintained at all times unless otherwise agreed with the relevant administrating bodies.

16.2.5 Wherever the Tram Supplier Works interfere with the existing public or private roads or other ways over which there is a public or private right of way for any traffic, the Tram Supplier shall construct diversion ways as necessary. The standard of construction and lighting shall be suitable in all respects for the class or classes of traffic using the existing ways and the widths of the diversions shall not be less than that of the existing way unless otherwise agreed with **the Client** and CEC or the owner of the private road.

16.2.6 Diversion routes shall be constructed in advance of any interference with the existing ways, shall be kept as short as reasonably practicable and shall be

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maintained by the Tram Supplier to provide adequately for the traffic flows. All diversion routes shall be removed and the road returned to **the Client** and CEC as soon as is reasonably practical after completion of the Tram Supplier Works. Liaison shall be undertaken with **the Client** and CEC regarding any special events such as the Edinburgh Festival, Christmas, New Year, sporting events and filming which might interact with the diversions.

16.2.7 Adequate horizontal clearance of 0.6 metres minimum shall be provided from the kerb line, to avoid fouling by vehicles. The minimum headroom beneath any projection over the road shall be 5.3 metres.

16.3 **Parking Provision for Construction Traffic**

16.3.1 Areas and locations of parking provision for site and construction traffic shall be agreed by the Tram Supplier with **the Client** and CEC prior to the commencement of Tram Supplier Works.

16.3.2 No daytime or overnight parking of site or construction vehicles outside any construction compounds or work sites shall be allowed except where the delivery or removal of materials is taking place at that location and with prior agreement with **the Client** and CEC, as required under paragraph 8.3 above.

16.4 **Pedestrian Routes, Cycle Routes and Bridleways**

16.4.1 The Tram Supplier shall ensure that all existing pedestrian routes, cycle routes and bridleways are maintained throughout the Tram Supplier Works unless otherwise agreed with **the Client** and CEC. Any temporary replacement footway or cycleway shall meet the following requirements:

16.4.1.1 all temporary and diverted footways, which replace footways which are currently accessible to wheelchairs and pushchairs, shall continue to be usable by such users where reasonably practicable and take into account DDA access requirements;

16.4.1.2 tactile paving shall be used where present on existing pedestrian facilities unless otherwise agreed with **the Client** and CEC;

16.4.1.3 any temporary footways and cycle ways shall have uniform surfaces; there shall be no steps and any longitudinal gradients shall be suitable for the prevailing conditions, preferably 1 in 20 and no

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greater than 1 in 12; cross-falls shall be suitable for disposal of surface water run off, but ideally shall not exceed 1 in 30;

16.4.1.4ramps shall be provided at all junctions of footways and cycle ways with carriageways; gradients shall be appropriate to the circumstances, not exceed 1 in 12, and the base of the ramps shall be flush with the carriageway; all temporary footways and cycle way ramps shall be surfaced in non-slip material and kept free from mud and debris; the Tram Supplier shall ensure that there is no ponding at any junction;

16.4.1.5existing footway and cycle way widths shall be maintained where practicable; footway and cycle way widths shall not be reduced without the prior agreement and approval of CEC;

16.4.1.6clear signing and protection measures shall be provided at all times for each pedestrian and cycle route or bridleway affected by the Tram Supplier Works, in accordance with Chapter 8 of the Traffic Signs Regulations and General Directions 1981 and relevant safety legislation; the Tram Supplier shall liaise and agree the signing requirements of all pedestrian and cycle routes affected by the Tram Supplier Works with **the Client** and CEC, and shall provide any additional signage and/or protection measures required and agreed with **the Client** and CEC; and

16.4.1.7headroom clearance over footways and cycle ways shall be appropriate for the circumstances and a minimum of 2.3 metres; a horizontal clearance of 0.6 metres shall be provided from the kerb line, where practicable, for any hoarding to avoid fouling by vehicles; the minimum headroom beneath any projection over the highway shall be 5.3 metres, but will be higher for abnormal load routes; where a path is a designated bridleway, headway clearance shall be appropriate for the circumstances and a minimum of 3.6 metres; all pedestrian routes diverted onto the carriageway shall be clearly defined by continuous barriers, constructed to the reasonable requirements of **the Client** and CEC.

16.5 **Maintenance and Repair of the Road**

16.5.1 The Tram Supplier shall carry out a pre-construction inspection and take photographs of the public roads, footpaths and cycle ways in the vicinity of the Site in conjunction with **the Client** and CEC. The Tram Supplier shall produce a report of the results of the joint inspection. The report shall establish the general road conditions within and in the vicinity of the Site, the residual life of the road and the level of reinstatement likely to be required in order to comply with the requirements of this Agreement, including the Specification. The report shall be agreed and signed by both the Tram Supplier, **the Client** and CEC as appropriate.

16.5.2 The Tram Supplier shall take every reasonable precaution to prevent its operations from unnecessarily damaging the roads and footpaths within the Site and in the vicinity of the Tram Supplier Works.

16.5.3 The Tram Supplier shall carry out all maintenance works as are necessary to maintain the roads and footpaths affected by the Tram Supplier Works in a safe and serviceable condition to the reasonable satisfaction of CEC and **the Client**.

16.5.4 Reinstatements of the road shall be carried out in accordance with the RAUC(S) "*Specification for the Reinstatement for Openings of Roads*", October 2003.

16.6 **Existing Street Furniture**

16.6.1 No street furniture or other features within the vicinity of the Site and the Tram Supplier Works, but outwith the area covered by the Tram Legislation shall be unnecessarily disturbed or altered by the Tram Supplier Works, except as expressly required by **the Client** in accordance with this Agreement. Any damage to street furniture consequent upon construction activities connected with the Tram Supplier Works shall be reported to **the Client** and the appropriate owner or authority (unless the appropriate owner cannot be identified) immediately on discovery of the damage. Any damage shall be replaced or made good as soon as practicably possible and to the reasonable satisfaction of the owner of the street furniture or other feature.

16.6.2 Any street furniture or other obstructions outside the area to be occupied by the Tram Supplier but which are required to be moved in order to gain access to the Site shall, subject to the prior consent of the owner thereof, be removed and reinstated or replaced as appropriate, on completion of the Tram Supplier Works. Any costs associated therewith shall be borne by the Tram Supplier, including the costs of reinstatement or replacement.

16.7 **Vehicle Movements and Access to the Site**

16.7.1 The Tram Supplier and its Sub-Contractors and suppliers moving loads, construction plant, materials and spoil (including vehicles used for carrying such when empty) shall limit the use of the public roads for such purposes as far as reasonably practicable.

16.7.2 All access routes shall be agreed with **the Client** and CEC prior to the commencement of the relevant part of the Tram Supplier Works.

16.7.3 Vehicles arriving or leaving the Site shall do so during the normal working hours as specified in paragraph 8.1 above, unless otherwise agreed with **the Client** and CEC. Access (which is deemed to include both the route and entrance to any Work Site) by lorries shall be as agreed with **the Client,** CEC and the Lothian and Borders Police. Access to and egress from the Site shall be carried out by initiating a left turn wherever reasonably practicable.

16.7.4 All vehicles operating on the Site shall be fitted with roof mounted yellow flashing beacons and reversing alarms.

16.7.5 The Tram Supplier shall take all reasonable measures to ensure that delivery vehicles do not remain stationary on the road unnecessarily prior to entering the Site. In exceptional circumstances, for example where the Site is very constrained, it may be necessary to have the potential for a limited number of vehicles to stand on the road. The location of such standing areas their size and the duration of any standing periods shall be subject to prior agreement with **the Client,** CEC and the Lothian and Borders Police.

16.7.6 The Tram Supplier shall ascertain and comply with any restrictions in respect of abnormal load routes as they may affect access to the Site.

16.8 **Mud on Roads**

16.8.1 The Tram Supplier shall take strict measures to minimise the spillage of mud and loose materials on roads arising from the Tram Supplier Works and ensure that the roads are safe at all times. These shall include, but not necessarily be limited to:

16.8.1.1 the provision of easily cleaned hard standings for vehicles entering, parking and leaving the Site or construction compound;

16.8.1.2 the provision of wheel washing facilities at construction compounds and construction sites, including, where practicable, mechanical wheel spinners, adequate provision for drainage via settlement tanks and regular maintenance of settlement tanks;

16.8.1.3 where mechanical wheel wash facilities are not practicable at construction sites, the use of manual techniques to ensure that the wheels of vehicles are clean prior to them leaving the construction site;

16.8.1.4 the use of mechanical road sweepers and surface flushing apparatus to clean the hard standing and to remove any mud or debris deposited by site vehicles on roads, footpaths, and in gullies or drains in the vicinity of the Site; the road sweepers or other equipment shall be readily available whenever the need for cleaning arises;

16.8.1.5 the loading and sheeting of vehicles are in such a manner as to prevent material falling off during their journey;

16.8.1.6 compliance with the requirements regarding the control of dust outlined in paragraph 19 below; and

16.8.1.7 compliance with the requirements regarding the control of waste water, mud, debris from wheel washing outlined in paragraph 21 below.

16.9 **Provision, Erection and Maintenance of Traffic Safety and Control (Traffic Safety Measures)**

16.9.1 The Tram Supplier shall provide, erect and maintain such traffic signs, road markings, lamps, barriers and traffic control signals and such other measures as may be necessitated by the construction of the Tram Supplier Works in accordance with the requirements of the Agreement and to the approval of **the Client** and CEC. The Tram Supplier shall not commence any work which affects the public road until all traffic safety measures necessitated by the work are fully operational.

16.9.2 The Tram Supplier shall keep clean and legible at all times all traffic signs, road markings, lamps, barriers and traffic control signals and shall position, replace, reposition, cover or remove them as required by the progress of the Tram Supplier Works and to the reasonable requirements of **the Client** and CEC.

16.9.3 The Tram Supplier shall ensure that all barriers, footpath space and temporary footpaths (including the requirement for kerb ramps where use has to be made of the carriageway) shall comply with the requirements of the document *Inclusive Mobility A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure* issued by the Mobility and Inclusion Unit of the Department for Transport.

16.9.4 So far as practicable, all power to temporary traffic signals and lighting shall be taken by the Tram Supplier from mains supplies rather than from portable generators. Where portable generators are used all reasonable measures will be taken to minimise noise and pollution from such generators.

16.10 **Implementation of the Closure of Roads and Access to Frontages**

16.10.1 The Tram Supplier shall not close any roads or private accesses until immediately before the area is required for construction in accordance with this Agreement and the Programme. The construction of the Tram Supplier Works shall follow in the area of a temporary closure expeditiously and shall be carried out efficiently and in a continuous manner to ensure that all temporary closures are re-opened as quickly as possible.

16.10.2 The Tram Supplier shall, in carrying out the Tram Supplier Works, take all reasonable precautions to prevent or reduce any disturbance or inconvenience to the owners, tenants or occupiers of adjacent properties, and to the public generally. The owners, tenants or occupiers of affected properties shall be informed of the Tram Supplier Works to be undertaken, their planned duration, road and access closures and alternative access routes (where required) in writing and by locally posted public notices at least one calendar month prior to work starting.

16.10.3 The Tram Supplier shall render all necessary assistance to occupiers of premises affected by the Tram Supplier Works so as to enable them to accept and send out deliveries to and from their premises during their normal working hours.

16.11 **Access for Emergency Vehicles**

16.11.1 The routes proposed by the Tram Supplier for emergency service vehicles and personnel to gain access to the Site, the construction corridor and neighbouring sites along the route shall be agreed by the Tram Supplier with the emergency services and **the Client** and CEC prior to the start of construction.

17. NOISE

17.1 **Noise Control**

17.1.1 The Tram Supplier shall take all practicable measures to minimise nuisance from noise. The noise limits specified in this paragraph 17.1 or which may be otherwise agreed with CEC shall not be regarded as a licence to make noise up to the stated limit.

17.1.2 Subject to the specific requirements of CEC and other affected third parties the following minimum requirements shall be met:

17.1.2.1 during normal working hours, as defined in paragraph 8.1 above the maximum noise levels measured 1 metre from any occupied dwelling or other building used for residential purposes, generated by construction plant and equipment shall not exceed the following limit:

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Monday to Friday (inc.) 0700-1900 hours $L_{Aeq\ 12\ hour}$ 75 dB

Saturday 0800 - 1300 hours $L_{Aeq\ 5\ hour}$ 75 dB

17.1.2.2outside normal working hours, the following limits shall apply:

Period	**Hours**	**Limit**
Monday to Friday (inc.)	1900-2200	$L_{Aeq\ 3\ hours}$ 65 dB
Saturday	1300-2200	$L_{Aeq\ 9\ hour}$ 65 dB
Sunday & Bank Holidays	0800-2000	$L_{Aeq\ 12\ hours}$ 65 dB

17.1.2.3the default noise limit for any night time (2200 hours (or 2000 hours on Sundays and Bank Holidays) to 0700 (or 0800 on Saturdays, Sundays and Bank Holidays)) construction work shall be $L_{Aeq\ 1\ hour}$ 55dB at residential buildings; higher noise levels may be permitted where ambient noise levels are higher.

17.1.2.4the maximum noise levels measured 1 metre from any school, college or other teaching facility resulting from construction work shall not exceed the following limits:

At any time when occupied $L_{Aeq\ 1\ hour}$ 65 dB

17.1.2.5 the maximum noise level measured 1 metre from any office building or other building used for office purposes during normal working hours shall be as defined in paragraph 17.1.2.1 above.

17.1.3 In order to ensure that the best practicable means are used to meet the levels set out above, a programme of on-site monitoring by a suitably qualified practitioner shall be agreed between the Tram Supplier, **the Client** and CEC. This monitoring programme shall include the location and frequency of readings, and shall define to whom the results shall be made available. Monitoring shall be undertaken by the Tram Supplier at locations identified in the Environmental Statements as those where mitigation measures may be necessary to avoid significant noise disturbance.

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17.1.4 In exceptionally difficult circumstances, essential work causing noise above these limits may be permitted with the prior approval of **the Client** and CEC. Where not otherwise required in accordance with this Agreement, application for prior approval must be made at least two weeks in advance of the relevant Tram Supplier Works commencing, and shall be fully justified and kept to the minimum necessary. Conditions may be attached to any permission for such Tram Supplier Works.

17.1.5 In the event that measurements indicate noise has exceeded the limits in paragraph 17.1.2 above of this clause, the Tram Supplier shall stop the operation in a safe manner and take all practicable measures to prevent recurrence. If this does not enable the limits to be met, exceptional permission must be applied for under the terms of paragraph 17.1.4 above.

17.1.6 Without prejudice to the other requirements of this paragraph 17, the Tram Supplier shall comply with the recommendations set out in BS 5228, '*Noise Control on Construction and Open Sites*'; insofar as these are reasonably practicable and applicable to the Tram Supplier Works, and in particular with the following requirements:

17.1.6.1 all vehicles and mechanical plant used for the purpose of the work shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order;

17.1.6.2 all compressors and generators shall be 'sound reduced' models fitted with properly lined and sealed acoustic covers, which shall be kept closed whenever the machines are in use, and all pneumatic percussive tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers;

17.1.6.3 all machines in intermittent use shall be shut down in the intervening periods between work or throttled down to a minimum; noise emitting equipment which is required to run continuously shall be housed in a suitable acoustic enclosure (see BS5228 Part 1:1997, Figures B.1, B.2 and B.3 (or later issue));

17.1.6.4 stationary equipment with significant noise output shall be sited away from sensitive site boundaries as far as is practicable;

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17.1.6.5 temporary noise barriers shall be used to reduce noise levels where appropriate and practicable; barriers shall be located as close to the plant as possible, and shall have a mass per unit area of at least 7kg/m^2;

17.1.6.6 no deliveries shall arrive at the Site before 0700 hours;

17.1.6.7 the engines of all parked vehicles or vehicles waiting to enter any work area shall be switched off within two minutes of arrival; and

17.1.6.8 work compounds shall be laid out so that accesses and loading areas are located as far away from sensitive neighbours as practicably possible and so that temporary structures screen noisy areas where practicable.

17.1.7 Without prejudice to the requirements of this paragraph 17 set out above, the Tram Supplier shall comply with the City of Edinburgh Department of Environmental and Consumer Service's document *Construction Site Noise: A Guide for Contractors*, August 2000 (or current issue, if subsequent amendments have been issued), and shall liaise with that department in accordance with the requirements therein.

17.2 **Communications Regarding Noise**

17.2.1 The Tram Supplier shall give 7 days notice to local residents who may be adversely affected by noise from the proposed programme of Tram Supplier Works, providing a description of the work to be carried out, measures that will be taken to control noise or other disturbance, and the proposed hours of working.

17.2.2 The Tram Supplier shall provide **the Client** and any other party requested by **the Client** with a list of contacts who will be responsible for investigating and resolving noise issues in respect of the carrying out of the Tram Supplier Works.

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18. VIBRATION

18.1 Vibration Control

18.1.1 Subject to the specific requirements of **the Client** and CEC, the following minimum requirements shall be met:

18.1.1.1 to protect residents and users of buildings from nuisance and harm the Tram Supplier shall, as far as practicable, not exceed the Vibration Dose Values specified in BS6472:1992 as resulting in a 'low probability of adverse comment'; and

18.1.1.2 to protect buildings and other structures from physical damage, peak particle velocity levels shall not exceed 5mm/sec except for particularly sensitive buildings or structures where the level shall not exceed 3mm/sec.

18.1.2 If vibration levels are predicted to exceed the criteria specified in paragraph 18.1.1 above, then the Tram Supplier shall procure that a suitably qualified practitioner undertakes monitoring during the activity and the Tram Supplier shall adopt alternative methods of working to reduce vibration levels to those prescribed in above. The monitoring programme shall be agreed between the Tram Supplier, **the Client** and CEC. This programme shall include the location and frequency of readings and will identify to whom the results should be made available.

18.1.3 In order to ensure that these levels are not exceeded, a programme of on-site monitoring by a suitably qualified practitioner shall be agreed between the Tram Supplier, **the Client** and CEC. This programme shall include the location and frequency of readings, and to whom the results should be made available and, as a minimum, shall cover all locations identified as 'significantly affected' in the Environmental Statement.

18.2 Inspection of Buildings and Other Structures

18.2.1 The Tram Supplier shall be responsible for the compilation of a schedule of all buildings or other structures, including scheduled monuments and listed buildings that are located within the Site, or which are located directly adjacent to such Work Sites, which may be at risk of physical damage or damage caused by vibration generated during the Tram Supplier Works. The

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said schedule is to be subject to agreement with CEC, CEC having the power to add, or subtract, buildings from the schedule as they deem fit. The agreed schedule is to be published in accordance with the requirements of Schedule 2 (*Employer's Requirements*). A notice of inclusion within the schedule is to be delivered to each scheduled building, attachment of a notice to the building shall be sufficient evidence that notice has been served. Subject to the granting to the Tram Supplier of free and unhindered access to the building or structure, a record of the condition and survey of any defects in the building or structure shall be prepared prior to the commencement of any Tram Supplier Works. Certified copies of the building record and condition survey shall be made available free of charge by the Tram Supplier to the owners of the examined buildings or structures, on their presentation of proof of title to the building. The best practicable means shall be undertaken by the Tram Supplier to avoid damage, or to minimise damage where it is unavoidable. The condition of the buildings and other structures listed in the schedule shall be monitored at reasonable intervals during the Tram Supplier Works and for a period of one year after the completion of the said Tram Supplier Works. The results of the aforesaid monitoring shall be made available free of charge by the Tram Supplier to the owners of the examined buildings, on their presentation of proof of title to the building.

18.2.2 The results of this record of the conditions and survey of any defects shall be provided to **the Client** and CEC, the property owner and occupier and, in the case of scheduled or listed features, to CEC and Historic Scotland by the Tram Supplier.

18.2.3 Without prejudice to the provisions of Clause 36 (*Examination of Work Before Covering Up*), after the Tram Supplier Works have been completed and at any time up to two years after their completion, the owners of properties identified under paragraph 18.2.1 above may, upon providing reasonable evidence of damage, request that a second defects survey is undertaken. Any damage which is identified as being caused by the Tram Supplier Works shall be repaired by the Tram Supplier within a reasonable time of identification at the expense of the Tram Supplier to the reasonable satisfaction of the property owner and so that the property is returned no worse than the standard of repair and stability existing before the Tram Supplier Works commenced.

19. DUST AND AIR POLLUTION

19.1 Dust and Other Air Pollution

19.1.1 The Tram Supplier shall take all necessary measures to avoid creating a dust nuisance during the Tram Supplier Works.

19.1.2 Particular consideration shall be given by the Tram Supplier to Tram Supplier Works affecting the operations of Edinburgh Airport Limited. Details of the specific mitigation measures shall be included within the Construction Management Strategy identified under paragraph 10.3 above.

19.1.3 Measures to prevent dust shall include the following:

19.1.3.1 the provision of easily cleaned hardstandings for vehicles;

19.1.3.2 the enclosure of material stockpiles at all times and damping down of dusty materials, using water sprays during dry weather;

19.1.3.3 the hard surfacing of heavily used areas which will be kept clean by regular brushing and water spraying;

19.1.3.4 control of dust released from cutting or grinding of materials on the Site; any mobile crushing plant which is used during the Tram Supplier Works shall be appropriately licensed and sited so as to minimise dust annoyance to any persons who may be liable to be affected by emissions; the Tram Supplier shall notify SEPA in advance of any mobile crushing plant being brought onto the Site;

19.1.3.5 the complete sheeting of all vehicles carrying spoil and other dusty materials;

19.1.3.6 watering of unpaved surfaces and roads; and

19.1.3.7 a limit on vehicle speeds on unpaved surfaces of 20 kph.

19.1.4 Where dust generating Tram Supplier Works (such as excavation and demolition) are undertaken close to buildings so that there is a potential for soiling of windows and ledges with dust, the Tram Supplier shall clean such windows and ledges as frequently as is necessary (and as a minimum, at least once per week) during periods of dust generating work and on completion of

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the Tram Supplier Works at that Work Site. The Tram Supplier shall take precautions to prevent damage occurring as a consequence of cleaning works.

19.1.5 The Tram Supplier shall take precautions to prevent the emission of smoke or fumes from construction vehicles, site plant and stored materials including volatile substances. Vehicles and plant shall be well maintained and measures shall be taken by the Tram Supplier to ensure that engines and motors are not left running for long periods when not directly in use.

19.1.6 The engines of all parked vehicles or vehicles waiting to enter any work area shall be switched off within two minutes of arrival.

19.1.7 Work compounds shall be laid out by the Tram Supplier so that accesses and loading areas are located as far away from sensitive neighbours as is practicably possible, and so that temporary structures screen noisy areas where practicable.

19.1.8 There shall be no burning of waste on the Site.

20. DISPOSAL OF WASTE AND CONTAMINATED MATERIALS

20.1 Waste

20.1.1 A waste management plan (**"WMP"**) shall be developed in accordance with "*Site Waste Management Plans: Guidance for Contractors and Clients*" (DTI 2004). The Tram Supplier shall be responsible for the preparation of the WMP to address all of the approvals and consents which require to be obtained and thereafter, the Tram Supplier shall be responsible for the development of the WMP to document the control measures and mitigation measures that shall be implemented. The plan shall in particular identify:

20.1.1.1 responsibilities for waste management;

20.1.1.2 the types and quantities of waste materials likely to be generated;

20.1.1.3 measures to be taken to minimise generation of waste;

20.1.1.4 proposals for recycling and/or re-use;

20.1.1.5measures to be adopted for management of waste on the Site including enclosure, segregation, secure storage, sorting for recovery, and other on-site handling;

20.1.1.6proposed treatment and disposal routes; and

20.1.1.7licensing arrangements.

20.1.2 The Tram Supplier shall implement and comply with the WMP.

20.1.3 The Tram Supplier shall undertake monthly audits to demonstrate compliance with Statutory Requirements and the WMP. The Tram Supplier shall set out its audit programme in the WMP and shall provide copies of the audit report to **the Client**.

20.1.4 Spoil or other waste materials arising from the Tram Supplier Works shall be used, wherever reasonably practicable, in the Tram Supplier Works.

20.1.5 The disposal of waste, including any surplus spoil, shall be managed by the Tram Supplier, so far as is reasonably practicable, to maximise the environmental and development benefits from the use of surplus material to minimise the removal of surplus spoil from the Site and to reduce any adverse environmental effects of disposal.

20.2 **Contaminated Land and Materials**

20.2.1 The Tram Supplier shall identify all areas within the Site where contaminated land, including land contaminated by invasive alien species listed in Part 2 of Schedule 9, of the Wildlife and Countryside Act 1981 (as amended), may be encountered. In each of these areas, the Tram Supplier shall:

20.2.1.1carry out appropriate additional site investigations as instructed by **the Client** to the satisfaction of **the Client** and CEC to determine the extent and type of contaminants present on the Site;

20.2.1.2identify potential sources, pathways and receptors and assess the risk of harm to receptors;

20.2.1.3liaise with **the Client,** CEC and SEPA to address their reasonable requirements and to agree control or protection measures necessary for dealing with identified risks;

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20.2.1.4obtain any necessary licences for the storage, treatment and disposal of contaminated material (including dewatering discharge); and

20.2.1.5ensure that removal and disposal of contaminated materials complies with a strict consignment note system and that delivery is to appropriately licensed disposal facilities.

20.2.2 The Tram Supplier shall develop management procedures to be followed in the event that contaminated or hazardous materials are discovered on the Site during construction.

20.2.3 If the Tram Supplier identifies contamination on the Site which has not been previously identified , no further development shall take place (except to the extent that would not disturb that contamination) until a site investigation has been carried out in accordance with paragraph 20.2.1 above.

20.2.4 The Tram Supplier shall comply with the guidance in the Health & Safety Executive document "*Protection of Workers and the General Public during the Development of Contaminated Land*" (1991) and to the DEFRA document "*Helping to Prevent the Spread of Invasive Non-native Species, Horticultural Code of Practice*" (March 2005), in so far as this is reasonably practicable and applicable to the Tram Supplier Works. Invasive alien species listed on Schedule 9, Part II of the Wildlife and Countryside Act 1981 as amended by the Nature Conservation (Scotland Act) 2004, will be treated in accordance with the Environmental Protection Act 1990. Japanese knotweed and giant hogweed and soils containing particles of these plants are regarded as controlled waste.

20.2.5 Appropriate precautions shall be taken if materials containing asbestos are encountered. The Tram Supplier shall observe the exposure limits and measurement methods for asbestos, set out in the Health & Safety Executive Guidance Note EH 10 (2001), and shall also comply with Health & Safety Executive "*Guideline Note MS13 - Asbestos*" (2005), the Health & Safety Commission document "*Approved Code of Practice and Guidance Note Work with Asbestos Insulation, Asbestos Coating and Asbestos Insulating Board*" (2002), in so far as these are applicable to the Tram Supplier Works.

21. PROTECTION OF THE WATER ENVIRONMENT

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21.1 **Waste Water and Run-off**

21.1.1 A construction site drainage plan (**"CSDP"**) shall be prepared, in consultation with SEPA. The Tram Supplier shall be responsible for the preparation of the CSDP to address all of the approvals and consents which require to be obtained. Thereafter, the Tram Supplier shall be responsible for the development of the CSDP to document the control measures and mitigation measures that shall be implemented. The CSDP shall include measures to ensure that surface water runoff is contained and managed appropriately and that appropriate measures are taken to prevent inundation of the Site. "Sustainable Urban Drainage System" (**"SUDS"**) measures shall be included within the Tram Supplier Works where reasonably practicable and applicable, in accordance with Law and the guidance in:

21.1.1.1 "*Interim Code of Practice for SUDS*" (CIRIA 2004);

21.1.1.2 "*Sustainable Urban Drainage System – Design Manual for Scotland and Northern Ireland*" (CIRIA C521); and

21.1.1.3 "*Sustainable Urban Drainage Systems – Best Practice Manual*" (CIRIA C523).

21.1.2 The Tram Supplier shall implement and comply with the CSDP.

21.1.3 The Tram Supplier shall ensure that there shall be no washout from temporary construction laydown and storage areas into watercourses.

21.1.4 No water shall be discharged into watercourses, but shall be stored in settlement lagoons or tanks, or filtered prior to discharge, or discharged onto a grassy area to soak away.

21.1.5 Waste water and site discharges to surface water or sewer shall only be permitted where the effluent quality and discharge location is acceptable to SEPA or Scottish Water (as appropriate). Water Environment (Controlled Activities) (Scotland) Regulations 2005 (**"CAR"**) discharge authorisation shall be obtained by the Tram Supplier if required prior to discharge.

21.1.6 The Tram Supplier shall ensure that all treatment facilities are regularly inspected and maintained and that a full record is kept of inspection, maintenance and other measures to maintain equipment performance.

21.1.7 Approval from SEPA shall be obtained by the Tram Supplier prior to any excavation below the water table, including any site de-watering and discharge. Contact should be made with SEPA at least one month prior to the relevant operation to establish the level of CAR authorisation required. Cut-off ditches may be used to prevent water from entering excavations.

21.1.8 The Tram Supplier shall comply with BS 6031: 1981 "*Code of Practice for Earthworks*", regarding the general control of site drainage is so far as this is applicable to the Tram Supplier Works.

21.1.9 The Tram Supplier shall ensure that areas of exposed ground and stockpiles are minimised to reduce silty runoff. Geotextiles or other equivalent measures shall be used by the Tram Supplier where necessary to prevent silty run-off from soil mounds close to watercourses.

21.1.10 The Tram Supplier shall ensure that any water that has come into contact with contaminated materials is disposed of in accordance with the requirements of SEPA or Scottish Water (as appropriate).

21.1.11 The Tram Supplier shall take suitable precautions to prevent the entry of pollutants into any bodies of water, and report any incidents to SEPA and Scottish Water.

21.1.12 Procedures for responding to potentially polluting incidents or inundation of the site by floodwaters shall be implemented in accordance with SEPA guidance (with reference to paragraph 21.6 below).

21.1.13 Cementicious mixtures are highly alkaline and corrosive and shall be prevented from entering watercourses and drains. The Tram Supplier shall make suitable provision for washing out ready mix concrete lorries, skips, concrete pumps and the like.

21.2 Storage of Polluting Materials

21.2.1 The Tram Supplier shall make provision to ensure that oil drums and containers or other potential contaminants stored on the Site are properly isolated and bunded and that no oil or other contaminants are allowed to reach watercourses or groundwater, including aquifers. Oil storage containers (both fixed and mobile) with a 200 litre capacity or greater shall be stored in compliance with the Water Environment (Oil Storage) (Scotland)

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Regulations 2006, where applicable. Drip trays and other secondary containment measures shall be used by the Tram Supplier where necessary to prevent spills during refuelling and operation of small static and mobile equipment. Storage locations for such materials shall be positioned away from watercourses. All surface water or other contaminated water which accumulates in bunds shall be removed by the Tram Supplier by manually controlled positive lift pumps, and not by means of a gravity drain.

21.2.2 Refuelling shall be carried out by the Tram Supplier in a designated area which is away from watercourses and drains.

21.2.3 Spill response kits containing equipment appropriate to the quantity and types of materials present on site shall be available for use by the Tram Supplier in the event of a fuel spillage. Personnel shall be trained in their use.

21.3 **Protection of Aquifers**

21.3.1 The Tram Supplier shall have due regard for protection of underlying aquifers and adhere to the SEPA "*Groundwater Protection Policy for Scotland*". In all instances, measures to ensure appropriate protection of aquifers shall be undertaken, subject to prior approval of SEPA. Prior approval shall be sought by the Tram Supplier in writing, prior to commencement of the relevant Tram Supplier Works.

21.4 **Control and Management of Foul Drainage**

21.4.1 Where permanent facilities are not accessible foul water and sewage effluents produced by the construction workforce shall be contained by temporary foul drainage facilities. A licensed contractor engaged by the Tram Supplier shall dispose of all foul water collected off-site.

21.5 **Tram Supplier Works in the Vicinity of Water**

21.5.1 The Tram Supplier shall take suitable precautions to prevent the entry of pollutants, including sediments and dusts, into any bodies of water, and report any incidents to SEPA.

21.5.2 Crossings of watercourses shall be constructed by the Tram Supplier so as not to impede the flow, obstruct the movement of floodwater or exacerbate

erosion of the channel and banks and shall require CAR authorisation from SEPA.

21.5.3 In watercourses which support migratory fish, Tram Supplier Works shall be avoided during upstream and downstream fish migration, spawning, incubation and hatching periods.

21.5.4 Where bankside habitat is temporarily affected, it shall be reinstated by the Tram Supplier to its original form on completion of the Tram Supplier Works at that Work Site.

21.5.5 Areas of bankside adjacent to working areas shall be fenced off during construction to prevent damage to the banksides.

21.5.6 Stripping of surface vegetation near water by the Tram Supplier shall be kept to a minimum. Exposed surfaces shall be seeded or reinstated by the Tram Supplier with vegetation, as soon as is practical after construction in that working area is complete.

21.5.7 Where culverting is required as Temporary Works, such culverting shall be subject to CAR authorisation from SEPA. Culverting that is so authorised shall be designed by the Tram Supplier and constructed to permit the passage of fish and other aquatic fauna under normal flow conditions.

21.6 **Guidance**

21.6.1 The Tram Supplier shall comply with all relevant SEPA "pollution prevention" guidelines, including, but not necessarily limited to:

21.6.1.1PPG1 General guide to the prevention of water pollution.

21.6.1.2PPG2 Above ground oil storage tanks.

21.6.1.3PPG3 The use and design of oil separators.

21.6.1.4PPG4 Disposal of sewage where no mains drainage is available.

21.6.1.5PPG5 Works in, near or liable to affect watercourses.

21.6.1.6PPG6 Working at construction and demolition sites.

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21.6.1.7PPG7 Refuelling facilities

21.6.1.8PPG8 Storage and disposal of used oils.

21.6.1.9PPG13 High pressure water and steam cleaners.

21.6.1.10 PPG18 Control of spillages and fire fighting runoff.

21.6.1.11 PPG19 Garages and vehicle service centres.

21.6.1.12 PPG21 Pollution incident response planning.

21.6.1.13 PPG22 Dealing with spillages on roads.

21.6.1.14 PPG23 Maintenance of structures over water.

21.6.1.15 PPG26 Pollution prevention storage and handling of drums and intermediate bulk containers.

21.7 **Water Environment (Controlled Activity) (Scotland) Regulations 2005**

Without prejudice to the foregoing terms of this paragraph 21, the Tram Supplier shall comply with the terms of CAR where relevant to the Tram Supplier Works.

22. ECOLOGY

22.1 Encroachment into Wildlife Areas

22.1.1 The Tram Supplier shall take all reasonably practicable measures to minimise harm to and disturbance of wildlife caused by noise and vibration, dust and other air pollution, including:

22.1.1.1 minimising habitat loss by keeping the working corridor and extent of working areas to the minimum necessary for the Tram Supplier Works; removal of habitats and new planting shall be undertaken in consultation with Scottish Natural Heritage (**"SNH"**), **the Client** and CEC;

22.1.1.2 fencing off adjacent habitat to prevent unnecessary incursion or damage; staff shall be made aware of the need to avoid damage to adjacent retained areas;

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22.1.1.3 the reinstatement or replacement of areas of habitat disturbed during construction in areas not required for the Tram Supplier Works on completion of the Tram Supplier Works in accordance with the Landscape and Habitat Management Plan ("**LHMP**"). The Tram Supplier shall be responsible for the preparation of the LHMP to address all of the approvals and consents which require to be obtained and thereafter, the Tram Supplier shall be responsible for the development of the LHMP to document the control measures and mitigation measures that shall be implemented ; and

22.1.1.4 compliance with the guidelines set out in British Standard (BSI *Code of Practice for Earthworks* (BS6031) in relation to soil stripping, storage and placing.

22.1.2 Approval shall be obtained by the Tram Supplier from **the Client**, SNH, SEPA, Scottish Executive Environment Group Wildlife Habitats Division ("**SEEG WHD**") and CEC, for detailed method statements for any Tram Supplier Works proposed in designated sites, including Special Protection Areas (SPA)/Ramsar sites, Sites of Special Scientific Interest (SSSI), Sites of Interest for Nature Conservation (SINC) and Wildlife Sites.

22.1.3 Applications for approval shall be made by the Tram Supplier at least one calendar month prior to relevant Tram Supplier Works commencing.

22.2 **Protected Species**

22.2.1 In advance of any Tram Supplier Works, the Tram Supplier shall employ suitably qualified professionals to check all working areas and any land within 30 metres of the boundary of the working area (unless there is a boundary with a private third party within the 30 metres, in which case no checks shall be taken within the private land), or 100m from any piling operations or use of explosives for the presence of species protected by statute. Where protected species are identified, appropriate mitigation measures shall be agreed in advance with the relevant authorities and any appropriate licences obtained in accordance with any requirements for licensing. The Tram Supplier shall implement any mitigation measures agreed in accordance with this paragraph 22.2.1.

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22.2.2 Where any habitat has to be cleared in the breeding bird season, typically March to June or July for most species, the habitat must be checked prior to removal for the presence of nesting wild birds, their nests and eggs and young. If found, no habitat shall be removed until nesting is complete, or unless other suitable mitigation is agreed in advance between the Tram Supplier and SNH.

22.2.3 The Tram Supplier shall be responsible for obtaining a licence from SNH for any work that may cause disturbance to a badger or involves the damage or destruction of a sett. Licence applications shall be made for any Tram Supplier Works within 10m, heavy machinery operating within 30m, and for piling or use of explosives within 100m, and no Tram Supplier Works shall proceed until the required licences are obtained. Alternative setts shall be provided in the event of and in advance of any loss.

22.2.4 The Tram Supplier shall be responsible for obtaining a licence from SEEG WHD for any work which may cause disturbance to otters or involve damage or destruction to an otter holt or lying up site or if any Tram Supplier Works are proposed within 30m of an otter holt or lying up site. Alternative holts or lying up sites shall be provided in the event of and in advance of any loss.

22.2.5 The Tram Supplier shall be responsible for ensuring that all bridges and other built structures and mature and dead trees within the working area shall be checked by a licensed bat handler for their use by roosting or hibernating bats prior to felling or other potentially damaging operations. If found, mitigation measures shall be agreed between the Tram Supplier and SNH and SEEGWHD and implemented, including review of the design to seek ways of avoiding loss of the roost. If avoidance is not possible, a licence shall be applied for by the Tram Supplier from SEEG WHD for disturbance to a European Protected Species and / or destruction or damage to a breeding site or resting place. Alternative roost sites shall be provided in advance of any loss. Any loss of feeding habitat shall be compensated for by new habitat creation as detailed in the LHMP. All mitigation measures for protected species shall be installed by the Tram Supplier as early as possible during the construction process so that use can be established at an early stage.

22.2.6 Where appropriate use of mitigation measures by target species will be positively encouraged using a variety of techniques e.g. feeding.

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22.2.7 Permanent mitigation structures for protected species including mammal fencing and tunnels and artificial badger setts shall be checked during construction and approved on completion by a suitably qualified ecologist and reported to SNH. Should these structures not be to the required standard specified, remedial measures shall be taken by the Tram Supplier .

22.2.8 Mitigation shall aim to compensate for loss of foraging specifically for badgers through creation of appropriate grassland and scrub habitat wherever possible within the Limits of Deviation in the Tram Legislation in line with the Civil Aviation Authority Advice Note 3 – "*Potential Bird Hazards from Amenity Landscaping and Building Design*".

22.2.9 The Tram Supplier's personnel and personnel engaged by any Sub-Contractors shall be briefed by a suitably qualified professional on measures for protected species as part of site induction.

22.3 **Protection of Mature Trees**

22.3.1 For the purposes of this paragraph, "trees" are defined as trees with a diameter of over 10cm girth at a height of 1.5 m above ground level.

22.3.2 Loss of trees shall be avoided as far as reasonably practicable. The Tram Supplier shall comply with the guidelines set out in British Standard (BS) 5837:1991 "Trees in Relation to Construction" insofar as these are reasonably practicable and applicable to the Tram Supplier Works.

22.3.3 All tree surgery operations shall comply with the British Standard (BS) 3998 "*Recommendations for Tree Work*" and a method statement addressing safety of workers and the public shall be prepared and implemented.

22.3.4 Felling shall be carried out in accordance with the Forestry Commission document "*Forest and Water Guidelines 2004*", which relates to the influence that woodland and trees can have on the freshwater environment, insofar as this is reasonably practicable and to the extent that they are applicable to the Tram Supplier Works.

22.3.5 Prior to felling, the Tram Supplier shall procure that trees suitable as bat roosts are checked by a licensed bat handler for roosting and hibernating bats, and should any be identified, mitigation measures shall be agreed by the

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Tram Supplier with SNH and SEEG WHD and the Tram Supplier shall obtain any relevant licences.

22.3.6 Woody material generated shall be retained on the Site as far as is reasonably possible and used as part of habitat creation measures.

22.3.7 Adverse effects on all trees within or in the vicinity of the Site shall be minimised by the adoption of suitable mitigation measures. These may include, but shall not be limited to, the following:

22.3.7.1 selective removal of lower branches in an approved manner, to reduce mechanical damage by construction plant;

22.3.7.2 control of construction activities to minimise compaction of the ground beneath the entire canopy of the tree; no heavy materials or plant shall be stored, and construction traffic movements shall be controlled, by fencing or other means, so as to minimise vehicle movement within the canopy;

22.3.7.3 the use of matting around the root zone to minimise soil compaction; and

22.3.7.4 the use of chestnut paling around the trunk to prevent damage.

22.4 **Tree Replacement**

Where trees are removed, damaged or die as a consequence of the Tram Supplier Works, they shall be replaced by the Tram Supplier by at least 2 trees for every one removed, which replacement trees shall be of similar or approved size and in a location as close as possible to the original position. All tree planting shall be agreed with **the Client** and CEC, and shall be in accordance with the LHMP. The supply, storage, handling, planting and maintenance of new planting shall be undertaken in accordance with the appropriate British Standards, including, but not necessarily limited to;

22.4.1 (BS5837) "Trees in Relation to Construction";

22.4.2 (BS3998) "Recommendations for Tree Works"; and

22.4.3 (BS4428) "Code of Practice for General Landscape Operations (excluding hard surfaces)".

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22.5 **Control of Invasive and Alien Species**

22.5.1 If any invasive alien species listed in Schedule 9, Part II of the Wildlife and Countryside Act 1981 (as amended), are identified along the route, including Japanese Knotweed (*Fallopia japonica*), Giant Hogweed (*Heracleum mantegazzianum*) or Himalayan Balsam (*Impatiens glandulifera*), a strategy shall be developed and implemented by the Tram Supplier prior to the commencement of the Tram Supplier Works to manage their presence. The strategy will ensure appropriate treatment of invasive alien species in advance of construction in accordance with approved methodology and will prevent the spread of the species within and outside the development area. The soil containing these species or plants thereof shall be dealt with as contaminated material and disposed of in accordance with paragraph 20.2 above;

22.5.2 The Tram Supplier shall comply with the strategy for the control of invasive and alien species.

23. ARCHAEOLOGY AND CULTURAL HERITAGE

23.1 **Archaeological and Heritage Mitigation Plan**

23.1.1 In advance of the commencement of the Tram Supplier Works, an "Archaeological and Heritage Mitigation Plan" (**"AHMP"**) shall be prepared. The Tram Supplier shall be responsible for the preparation of the AHMP to address all of the approvals and consents which require to be obtained and thereafter, the Tram Supplier shall be responsible for the development of the AHMP to document the control measures and mitigation measures that shall be implemented. The AHMP will identify the level of mitigation proposed at each site of archaeological or historic significance (as defined by statute and/or Historic Scotland), taking into account the measures outlined in the Environmental Statements. These may include:

23.1.1.1prior archaeological evaluation by trial excavations;

23.1.1.2a detailed photographic record prior to construction;

23.1.1.3a watching brief during construction;

23.1.1.4a detailed standing building survey and salvage;

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23.1.1.5archaeological excavation;

23.1.1.6preservation in situ;

23.1.1.7further documentary research and archiving; or

23.1.1.8other such measures as may be approved.

23.1.2 The Tram Supplier shall implement and comply with the AHMP.

23.1.3 No development within or immediately adjacent to an area which is, in the opinion of **the Client** and CEC, of known or suspected archaeological importance, shall commence until a scheme to deal with any archaeological remains on the Site has been submitted to and approved by **the Client** and CEC and implemented. The Tram Supplier shall apply for prior approval at least two calendar months in advance of the relevant Tram Supplier Works commencing.

23.1.4 No development within or adjacent to an area which is designated as a Scheduled Ancient Monument shall commence without the Tram Supplier confirming whether Scheduled Monument Consent is required from Historic Scotland, and where necessary obtaining such consent. The AHMP shall identify the Scheduled Ancient Monuments and Listed Buildings which shall be affected, and shall outline the Tram Supplier Works that can take place in proximity to them and will detail the necessary mitigation.

23.1.5 All records obtained through the mitigation shall be lodged with the National Monuments Record of Scotland (**"NMRS"**).

23.1.6 The AHMP shall outline the appropriate procedures that shall be followed should any significant archaeological remains be found during the pre-construction excavations.

23.1.7 Any archaeological works carried out on the Site by the Tram Supplier shall be undertaken by a suitably qualified investigating body acceptable to **the Client** and CEC. The results shall be provided to the property owner and occupier and, in the case of scheduled or listed features, to **the Client,** CEC and Historic Scotland.

23.1.8 The Tram Supplier shall take all reasonable precautions to prevent employees, any Sub-Contractors, their employees, or any other persons from removing or damaging any fossils, coins, articles of value or antiquity, structures or other remains or any other thing of archaeological or historical interest during investigations and during all the Tram Supplier Works. The AHMP shall outline the legal obligations placed on those who discover portable antiquities or disturb human remains.

23.1.9 The Tram Supplier shall appoint a suitably qualified professional person to record the condition of all scheduled and listed buildings and structures or parts thereof, within or adjacent to the construction working areas which are identified as at risk from physical damage or vibration. This will have been carried out in accordance with the Institute of Field Archaeologists Standards and Guidance. The results shall be provided to the property owner and occupier and in the case of scheduled or listed features, to CEC and Historic Scotland.

23.1.10 At least one month prior to commencement of the relevant excavation works, a copy of each survey undertaken under paragraph 23.1.9 above shall be provided by the Tram Supplier to **the Client**, the property owner and occupier and, in the case of scheduled or listed features, to **the Client**, CEC and Historic Scotland.

23.1.11 After the Tram Supplier Works have been completed and at any time up to two years after the opening of the tram, the above parties may, upon providing **the Client** or the Tram Supplier with reasonable evidence of damage, request that a second defects survey is undertaken. Any damage which is identified as being caused by the Tram Supplier Works shall be repaired within a reasonable time of identification at the expense of the Tram Supplier to the reasonable satisfaction of the property owner and such that the property is returned to the standard of repair and stability existing before the Tram Supplier Works commenced.

23.2 **Guidance**

23.2.1 All archaeological investigations, watching briefs or other activities shall be carried out in accordance with the following guidance from the Institute of Field Archaeologists, particularly – but not necessarily limited to standards and guidance for:

23.2.2 field evaluation;

23.2.3 excavation;

23.2.4 archaeological watching brief;

23.2.5 archaeological investigation and recording of standing buildings or structures;

23.2.6 collection, documentation conservation and research of archaeological materials;

23.2.7 the IFA policy statement on Environmental Protection;

23.2.8 the IFA Code of Conduct; and

23.2.9 the British Archaeologists and Developers Liaison Group Code of Practice.

Part 2

PART B - CODE OF MAINTENANCE PRACTICE

1. MANAGEMENT SYSTEMS

1.1 The Tram Supplier shall implement and comply with the following management systems:

1.1.1 a "quality management system" in accordance with ISO 9001;

1.1.2 a "safety management system" in accordance with ISO 18001 or HSG65; and

1.1.3 an "environmental management system" in accordance with ISO 14001.

2. INSTRUCTION AND TRAINING

2.1 The Tram Supplier shall ensure that its employees, Sub-Contractors, agents and others on the Edinburgh Tram Network for whom the Tram Supplier has responsibility undertake a number of inductions. These shall comprise:

2.1.1 specific induction for the Maintenance Services (provided by the Tram Supplier);

2.1.2 worksite and task-specific-induction including a method statement briefing and toolbox talk, (provided by the Tram Supplier).

2.2 Its employees, Sub-Contractors, agents and others on the Edinburgh Tram Network for whom the Tram Supplier has responsibility who have not received the induction, for example visitors, shall be escorted on Edinburgh Tram Network non-public areas at all times by a competent inducted person and receive a site briefing.

2.3 The Tram Supplier shall maintain induction and training records in order that the Operator and **the Client** can inspect them. These records shall identify the scope of the induction and training and the persons who received them.

3. SAFE SYSTEMS

3.1 Risk Assessments

3.1.1 The Tram Supplier shall prepare risk assessments for all work activithe Clients being undertaken by its employees, Sub-Contractors, agents and

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others on the Edinburgh Tram Network for whom the Tram Supplier has responsibility.

3.1.2 Each risk assessment shall include as a minimum the following details:

3.1.2.1 Document control

(a) document title and number;

(b) revision status;

(c) authorisation for use; and

(d) reference to supplementary documentation.

3.1.2.2 identification of any hazards (as a minimum they should address the following – access to the work site, security of the work site, interface with the public, potential for vandalism, interface with the tram system and interface with traffic);

3.1.2.3 identification of those who might be harmed, and how; and

3.1.2.4 an evaluation of the risks and, in relation to each risk, the control measures required to reduce the risk to an appropriate level.

3.2 Method Statements

3.2.1 The Tram Supplier shall prepare method statements for all maintenance activithe Clients to be carried out by Tram Supplier.

3.2.2 Each method statement shall include as a minimum the following details:

3.2.3 Document control

(a) document title and number;

(b) revision status;

(c) authorisation for use; and

(d) reference to supplementary documentation.

3.2.3.1 General information

(a) description and scope of work;

(b) location and boundaries (including sketch or site plan if appropriate); and

(c) access routes for personnel and materials and equipment.

3.2.3.2 Resources

(a) number and competences of personnel (including function and role);

(b) contacts; and

(c) lines of communication.

3.2.3.3 Details of work activities

(a) detailed work sequence;

(b) plant, equipment and tools to be used;

(c) personal protective equipment required;

(d) delivery requirements;

(e) wastes produced, and means of disposal; and

(f) inspection and testing requirements, including details of:

(i) acceptance criteria;

(ii) quality control checklists and record forms to be used;

(iii) frequencies of inspections and testing; and

(iv) documentation which is required prior to the issue of a handover checklist in accordance with [Clause 52.2] of the Agreement [This reference requires to be aligned with latest Tram Supplier Draft].

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3.2.3.4 Specific control measures

(a) permits and authorisations required; and

(b) temporary amended systems, subject to agreement with the Operator through the appropriate change control arrangements as developed and agreed between the Tram Supplier, the Client and the Operator during the mobilisation phase.

3.2.3.5 Emergency procedures

(a) Evacuation and rescue from locations where Tram Supplier and Subcontractors are performing Maintenance Services

(b) Interface with the Operator / Control Centre and Emergency Services.

3.2.3.6 Supplementary documentation

(a) risk assessments; and

(b) COSHH assessments.

3.2.4 The documentation referred to in paragraph 3.2.2 above shall be developed so that it is specific to the Maintenance Services. The Tram Supplier shall ensure that revisions and updates can be identified .

3.2.5 The Tram Supplier shall issue a copy of its procedure for the production of method statements and risk assessments to **the Client** for approval.

3.3 Access Permit

3.3.1 The Tram Supplier shall comply with the Operator's system, as developed and agreed between the Tram Supplier, the Client and the Operator during the mobilisation phase, for controlling access to undertake work activities as notified to the Tram Supplier by **the Client**, which shall require the Tram Supplier to obtain an approved access permit (**"Access Permit"**) from **the Client** for works that will necessitate interruption or restriction of the Transport Services and all that are safety related.

3.3.2 In so far as not otherwise submitted pursuant to this Agreement, the Tram Supplier shall submit a form for each required Access Permit (**"Access**

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Permit Form") which is required, in accordance with Clause 17.12 of this Agreement to **the Client** in advance of access being required. In the event of emergency works or essential unplanned Maintenance Services a reduced period of notice can be applied in accordance with Clause 17.13 of the Agreement.

3.3.3 The Tram Supplier shall advise **the Client** of the persons within its organisation who are competent to authorise the Access Permit Forms.

3.3.4 Each Access Permit Form shall identify the risk assessments, method statements and permits to work which have been raised under the Tram Supplier's safety management system.

3.3.5 Each Access Permit Form shall identify any requirements for system interruption or isolation.

3.3.6 The Tram Supplier shall agree with **the Client** the "start work date and time" and "stop work date and time" for each work activity or group of work activities to be included in each Access Permit.

3.3.7 The Tram Supplier shall identify within each Access Permit Form any special control measures which require to be implemented including:

3.3.7.1 requirement for a temporary speed restriction;

3.3.7.2 requirement for alteration or disablement of traffic signals ;

3.3.7.3 traffic management requirements under Chapter 8 of the UK traffic signs manual for segregating the work sites from the operational Edinburgh Tram Network or road traffic; and

3.3.7.4 requirement to undertake works outwith the conditions included within the noise and vibration policy referred to in the Tram Legislation.

3.3.7.5 Temporary modifications. These are subject to Change Control agreement with the Operator.

3.3.8 On completion of the work activity or group of work activities, or the "stop work time" (which ever is sooner) the Tram Supplier shall return the relevant Access Permit to **the Client** for cancellation.

3.3.9 The Tram Supplier's authorised persons shall be required to undergo training by **the Client** (with the input of the Operator) in the operation of the Access Permit system.

3.4 Permits to Work

3.4.1 The Tram Supplier shall implement a "permit to work" system for the following activities as a minimum:

3.4.1.1 breaking the ground;

3.4.1.2 hot works;

3.4.1.3 entry into confined spaces;

3.4.1.4 work affecting services;

3.4.1.5 access to live facilities; and

3.4.1.6 works on private land controlled by third parties.

3.4.2 The Tram Supplier shall implement a procedure for managing third party permits to work.

3.4.3 The Tram Supplier shall issue a copy of its permit to work procedures to **the Client** for approval.

3.4.4 The Tram Supplier shall advise the Operator and **the Client** of the competent persons within its organisation who shall be competent to authorise permits to work.

3.5 Personal Protective Equipment

3.5.1 The Tram Supplier shall provide all necessary personal protective equipment (**"PPE"**) for its employees and provide them with all necessary information, instruction and training on its use.

3.5.2 The Tram Supplier shall ensure that all persons on any Work Site (including any representatives of the Operator, **the Client** and visitors) wear the necessary PPE.

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3.5.3 **the Client**'s specific requirements for PPE with regard to particular tasks are as follows:

3.5.3.1 yellow high visibility clothing to comply with BS EN 471:1994, which shall be worn at all times when working on the Edinburgh Tram Network or roads.

3.5.3.2 orange high visibility clothing complying with GO/RT 3279 shall be worn where any works are carried out on railway land.

4. REPORTING

4.1 The Tram Supplier shall report the following information to the Operator and **the Client** within 24 hours and as soon as reasonably practicable of the event occurring:

4.1.1 details of any accident or incident which requires notification to the Health & Safety Executive (the Tram Supplier shall copy all notifications in full to the Operator and to **the Client**);

4.1.2 details of any environmental event which requires notification to the Scottish Environmental Protection Agency (**"SEPA"**);

4.1.3 details of any visit by either the Health & Safety Executive or SEPA, together with details of any report issued or enforcement action that resulted; and

4.1.4 details of any incidents or near misses.

4.2 The Tram Supplier shall report the following information to **the Client** and, if requested by **the Client**, to any other relevant third party on a four weekly reporting cycle:

4.2.1 details of any accident investigation reports raised by **the Client** including details of corrective and preventative actions which have been taken;

4.2.2 the accident frequency rate (**"AFR"**) for the Maintenance Services (including details of total hours worked and number of persons employed);

4.2.3 a summary of the monitoring and internal auditing activities undertaken by the Tram Supplier in the period, including details of any corrective or preventative actions raised or closed out; and

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4.2.4 details of the programme of monitoring and auditing planned for the subsequent four-weekly period.

5. AUDITING AND MONITORING

5.1 The Tram Supplier shall be responsible for carrying out and recording, auditing and monitoring of its maintenance work activities.

5.2 **the Client** any other party reasonably requested by **the Client** may undertake auditing and monitoring of the Tram Supplier's maintenance work activities, and the Tram Supplier shall action any findings which are raised **the Client** or the relevant other party.

6. NON-CONFORMANCE, COMPLAINTS AND DISCIPLINARY MATTERS

6.1 **the Client** shall implement a process for recording and processing breaches by the Tram Supplier of the requirements of this Part B of Schedule 3 (*Code of Construction Practice and Code of Maintenance Practice*) and complaints.

6.2 The following represent a backstop, the Tram Supplier response times are detailed in clause 52 of the Tram Supplier Agreement and the target correction times for these events are contained in Section 40 of the Employers Requirements.

6.3 The Tram Supplier shall take such steps as are required by **the Client** to remedy any such infringement or address any such complaint and the following priority levels for action shall apply:

Level of Urgency	Category of Notification	Required Response Time
1	High urgency. Involves an immediate threat to persons or property or the circumstances otherwise require immediate rectification.	Immediate action required as detailed in Clause 52 of the Agreement. If response is not initiated and actions commenced to resolve the issue by the Tram Supplier within 4 hours, **the Client** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Tram Supplier .
2	Medium urgency. No immediate threat to persons or property, but there is an impact o n the delivery of the Transport Services, require rectification within 24 hours.	Remedial action requires to be initiated and actions commenced to resolve the issue within 24 hours. If the Tram Supplier does not take this action, **the Client** may procure that the relevant work is carried out and the costs

Level of Urgency	Category of Notification	Required Response Time
		of so doing shall be recovered from the Tram Supplier .

If the Tram Supplier fails to take any remedial action required by **the Client** pursuant to the table above, **the Client** shall be entitled to employ and pay other persons to carry out the same and all costs incurred by **the Client** shall be recoverable from the Tram Supplier by **the Client** and may be deducted by **the Client** from any monies due or to become due to the Tram Supplier or, alternatively, recoverable from the Tram Supplier as a debt

7. IDENTIFICATION

7.1 The Tram Supplier shall ensure that all staff undertaking Maintenance Services are easily identifiable to the public by use of photo identity cards.

7.2 The Tram Supplier shall ensure that all personnel undertaking maintenance activities identify their employer by means of their company logo on their high visibility and protective clothing and, if applicable to be worn according to the task being completed, on their safety helmet.

8. SITE ARRANGEMENTS

8.1 Site Housekeeping (excluding Depot)

8.1.1 A 'good housekeeping' policy shall be applied by the Tram Supplier at all times; this shall include, but not necessarily be limited to, the following requirements:

8.1.1.1 all working areas, including offices, shall be kept in a clean and tidy condition;

8.1.1.2 all working areas shall be a no-smoking area; specific areas within the Site shall be designated as smoking areas and shall be equipped with containers for smoking waste; these shall not be located at the boundary of the Site and adjacent to neighbouring land;

8.1.1.3 open fires shall be prohibited at all times;

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8.1.1.4 all necessary measures shall be taken to minimise the risk of fire and the Tram Supplier shall comply with the requirements of the local fire authority;

8.1.1.5 radios (other than two-way radios used for the purposes of communication related to the Maintenance Services) and other forms of audio equipment shall not be operated on the Site;

8.1.1.6 any waste susceptible to spreading by wind or liable to cause litter shall be stored in enclosed containers;

8.1.1.7 rubbish shall be removed at frequent intervals and the Site kept clean and tidy;

8.1.1.8 eating and drinking shall only be permitted within the Tram Supplier's designated welfare area unless required due to the specific nature and location of the works being undertaken, in which case appropriate arrangements must be made;

8.1.1.9 adequate toilet facilities shall be provided for all maintenance staff;

8.1.1.10 food waste shall be removed frequently;

8.1.1.11 the Tram Supplier's personnel (including any Sub-Contractors) shall be required to conform to a reasonable dress code;

8.1.1.12 any behaviour that is lewd or likely to cause offence shall not be permitted; and adequate supervision must be provided by Tram Supplier with swift follow-up and disciplinary action taken in accordance with the Tram Supplier disciplinary procedure of any breaches;

8.1.2 The Tram Supplier shall inspect all working areas weekly or as otherwise agreed and shall provide a four weekly written report on compliance with paragraph 8.1.1 above. **the Client** or any other party authorised by it may at reasonable times visit the Site without prior notice of time and place of the visit. Access to all areas of the Maintenance Services shall be given to visiting inspectors and the Tram Supplier shall give inspectors all reasonable assistance during their Site inspection.

8.2 Temporary Fencing

8.2.1 The Tram Supplier shall ensure that where appropriate, all working areas are sufficiently and adequately protected to prevent the public and animals from straying on to the working area;, A risk assessment shall determine the need for any temporary fencing around work sites.

8.2.2 All temporary fencing shall comply with Chapter 8 of the [Traffic Sign Manual].

All access and egress to worksites shall be via designated positions within the temporary fencing, which shall remain closed and secured when not in use.

8.2.3 All temporary fencing that creates poorly lit pedestrian routes shall have appropriate lighting fitted by the Tram Supplier, and these shall be illuminated at all times when the adjacent street lighting is lit.

8.2.4 The Tram Supplier shall ensure that the location and design of temporary fencing and temporary structures on the public road shall permit adequate visibility at junctions and proper forward visibility along the roads in accordance with the National Roads Directorate advice notes and the requirements of CEC.

8.2.5 All temporary fencing shall be maintained by the Tram Supplier in a neat and tidy condition at all times, 24 hours, 7 days a week responding within a maximum of 1 hour to any reported problems with the temporary fencing.

8.2.6 The Tram Supplier shall be expressly prohibited from displaying or allowing to be displayed any advertisement or notice including illicit bill or fly posting on the temporary fencing. The Tram Supplier shall ensure that all graffiti, fly posting or defacement to the temporary fencing is removed and made good or obscured within 24 hours.

8.2.7 All temporary fencing shall be removed as soon as reasonably practicable after the completion of any part of the Maintenance Services.

8.3 Lighting and Visual Intrusion

8.3.1 Site lighting shall be positioned and directed by the Tram Supplier so as to minimise nuisance to residents and to minimise distractions or confusion to

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passing drivers on adjoining public roads. This provision shall apply particularly to working areas where work after dark will be carried out and the Tram Supplier shall provide appropriate lighting for these sites. Lighting shall be removed as soon as is consistent with the safe and efficient operation of each Work Site.

8.3.2 So far as is reasonably practicable, all power to temporary traffic signals, lighting and the like shall be taken from mains supplies rather than portable generators. Where portable generators are used to provide power to temporary traffic signals, lighting and the like the Tram Supplier shall ensure Good Industry Practice is followed to minimise noise and pollution from such generators.

8.3.3 The Tram Supplier shall comply with the Institute of Lighting Engineers' document *Guidance Notes on Reduction of Light Pollution 2000* in so far as is reasonably practicable and applicable to the Tram Supplier .

8.4 Access and Loading

8.4.1 The Tram Supplier shall ensure that lorries shall enter and exit the Site in a forward direction at designated locations, except where space restriction does not permit this. If the reversing of vehicles into public spaces is required, then a responsible person observing the rear of the vehicle shall properly control the movement. The sounding of audible reversing alarms shall not be permitted outside normal working hours, except where this has been approved by **the Client** and CEC in connection with the Maintenance Services. Entry and exit conditions shall be subject to prior approval by **the Client**, CEC and the Lothian and Borders Police before implementation.

8.4.2 Access to and egress from the Site shall be carried out by initiating a left turn wherever reasonably practicable.

8.4.3 All loading and unloading of vehicles shall take place off the public road as far as is reasonably practicable.

8.5 Living Accommodation

8.5.1 No living accommodation shall be provided by the Tram Supplier within any maintenance working area. Mess rooms, locker rooms, toilets and showers shall be permitted at designated positions agreed with **the Client**.

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8.6 Clearance of Maintenance Work Site on Completion

8.6.1 The Tram Supplier shall clear and clean all working areas and accesses as work proceeds and when no longer required for the carrying out of the Maintenance Services.

8.6.2 All surplus materials, rubbish, Temporary Works, Tram Supplier's Equipment, and temporary fencing shall be removed, and the surface of the ground restored as near as reasonably practicable to its original condition, or to such condition as has previously been agreed with **the Client** in accordance with this Agreement.

8.7 Pest Control

8.7.1 The Tram Supplier shall ensure that the risk of infestation by pests or vermin is minimised by adequate arrangements for the disposal of food waste or other material attractive to pests. If infestation occurs, the Tram Supplier shall take such action to deal with it as required by **the Client**.

9. REQUIREMENTS RELATING TO WORKS AFFECTING EDINBURGH AIRPORT

9.1 The Tram Supplier shall have regard to, and comply (where relevant) with all BAA and CAA guidelines when working on or adjacent to [Edinburgh Airport].

9.2 For Maintenance Services to be carried at Edinburgh airport, the Tram Supplier shall prepare for approval by **the Client** and any other party reasonably requested by **the Client** a "Construction Management Strategy" as defined within CAA Safeguarding of Aerodromes Advice Note 4 (Cranes and Other Construction Issues). The Construction Management Strategy shall address as a minimum the following issues:

9.2.1 use of cranes or other tall construction equipment;

9.2.2 control of activities likely to produce dust or smoke clouds

9.2.3 the design of temporary lighting to avoid distracting pilots (see CAA Safeguarding of Aerodromes Advice Note 2 Lighting near Aerodromes);

9.2.4 storage of materials, particularly compliance with height limits;

9.2.5 control and disposal of waste, to prevent attraction of birds; and

9.2.6 site restoration, to prevent attraction of birds.

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10. REQUIREMENTS RELATING TO WORKS AFFECTING THE RAILWAY

10.1 The Tram Supplier, where working in proximity to Network Rail infrastructure, shall comply with the reasonable requirements of Network Rail necessary in relation to railway safeguarding and at all times keep **the Client** and the Operator informed of any and all dealings with Network Rail.

11. REQUIREMENTS RELATING TO WORKS AFFECTING OTHER THIRD PARTIES

11.1 The Tram Supplier shall comply with the reasonable requirements of other affected third parties in relation to procedural requirements e.g. notifications, implementation of Permit to Work systems as defined within Third Party Agreements or as may be reasonably required by **the Client**.

12. ROADS AND FOOTPATHS, CYCLEWAYS AND BRIDLEWAYS

12.1 General

12.1.1 The measures to be taken with respect to traffic and road safety shall include, but not necessarily be limited to: [Note: It is not clear whether the Client or Tram Supplier are responsible for the list which follows.]

12.1.1.1 use of TTROs; the Tram Supplier shall consult with **the Client** and other third parties notified by **the Client** on the arrangements for agreeing and implementing TTROs to facilitate road closures and the like; the use of TTROs shall take into account the requirement for, and availability of, suitable alternative routes; and

12.1.1.2 use of temporary signing to restrict vehicle types and sizes and define routes for construction traffic;

12.1.1.3 use of appropriate temporary signing and lighting wherever the Maintenance Services are in progress to ensure the safety of all road users; and

12.1.1.4 preparation and implementation of a programme agreed by the Tram Supplier with **the Client** and CEC for road closures and temporary traffic signal arrangements.

12.2 Temporary Road Closures And Diversions

12.2.1 The Tram Supplier shall finalise the arrangements for required closures and diversions of specified roads, footpaths and cycle ways with **the Client**, the Operator, CEC and where roads, footpaths and cycle ways at Edinburgh Airport, BAA, any private landowner or relevant bus operator.

12.2.2 Before closing or otherwise interfering with any street or footpath to which the public has access, the Tram Supplier shall make such arrangements with **the Client**, and if requested by **the Client**, with the Operator and CEC as may be reasonably necessary to cause as little interference with the traffic in that street or footpath during the Maintenance Services as shall be reasonably practicable.

12.2.3 Pedestrian access to properties shall be maintained at all times where reasonably practicable, unless otherwise agreed with **the Client**, and if requested by **the Client**, with the Operator and CEC and the owners and tenants of affected properties. Access to and from public facilities shall be maintained at all times unless otherwise agreed with the relevant administrating bodies.

12.2.4 Wherever the Maintenance Services interfere with the existing public or private roads or other ways over which there is a public or private right of way for any traffic, the Tram Supplier shall construct diversion ways as necessary. The standard of construction and lighting shall be suitable in all respects for the class or classes of traffic using the existing ways and the widths of the diversions shall not be less than that of the existing way unless otherwise agreed with the Tram Supplier, and, if requested by **the Client**, with the Operator and CEC or the owner of the private road.

12.2.5 Diversion routes shall be constructed in advance of any interference with the existing ways, shall be kept as short as reasonably practicable and shall be maintained by the Tram Supplier to provide adequately for the traffic flows. All diversion routes shall be removed and the road returned to **the Client** and CEC as soon as is reasonably practical after completion of the Maintenance Services. Liaison shall be undertaken with **the Client** and CEC regarding any special events such as the Edinburgh Festival, Christmas, New Year, sporting events and filming which might interact with the diversions.

12.2.6 Adequate horizontal clearance of 0.6 metres minimum shall be provided from the kerb line, to avoid fouling by vehicles. The minimum headroom beneath any projection over the road shall be 5.3 metres.

12.3 Parking Provision for Construction Traffic

12.3.1 Areas and locations of parking provision for site and construction traffic shall be agreed by the Tram Supplier with **the Client** and CEC prior to the commencement of the Maintenance Services.

12.4 Maintenance and Repair of the Road

12.4.1 The Tram Supplier shall take every reasonable precaution to prevent its operations from unnecessarily damaging the roads and footpaths within the Site and in the vicinity of the Maintenance Services.

12.4.2 The Tram Supplier shall carry out all Maintenance Services as are necessary to maintain the roads and footpaths affected by the Maintenance Services in a safe and serviceable condition to the reasonable satisfaction of **the Client**, the Operator and CEC.

12.4.3 Reinstatements of the road shall be carried out in accordance with the RAUC(S) "*Specification for the Reinstatement for Openings of Roads*", October 2003.

12.5 Existing Street Furniture

12.5.1 No street furniture or other features within the vicinity of the Site and the Maintenance Services, but outwith the area covered by the Tram Legislation shall be unnecessarily disturbed or altered by the Maintenance Services. Any damage to street furniture consequent upon construction activities connected with the Maintenance Services shall be reported to **the Client** and the appropriate owner or authority (unless the appropriate owner cannot be identified) immediately on discovery of the damage. Any damage shall be replaced or made good as soon as practicably possible and to the reasonable satisfaction of the owner of the street furniture or other feature.

12.5.2 Any street furniture or other obstructions outside the area to be occupied by the Tram Supplier but which are required to be moved in order to gain access to the Maintenance Services shall, subject to the prior consent of the owner

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thereof, be removed and reinstated or replaced as appropriate, on completion of the Maintenance Services. Any costs associated therewith shall be borne by the Tram Supplier, including the costs of reinstatement or replacement.

12.6 Vehicle Movements and Access to the Site

12.6.1 The Tram Supplier and its Sub-Contractors and suppliers moving loads, construction plant, materials and spoil (including vehicles used for carrying such when empty) shall limit the use of the public roads for such purposes as far as reasonably practicable.

12.6.2 All access routes shall be agreed with **the Client** and CEC prior to the commencement of the relevant part of the Tram Supplier Works.

12.6.3 Access (which is deemed to include both the route and entrance to any Work Site) by lorries shall be as agreed with **the Client**, CEC and the Lothian and Borders Police. Access to and egress from the Site shall be carried out by initiating a left turn wherever reasonably practicable.

12.6.4 All vehicles operating on the Site shall be fitted with roof mounted yellow flashing beacons and reversing alarms and these shall be used.

12.6.5 The Tram Supplier shall take all reasonable measures to ensure that delivery vehicles do not remain stationary on the road unnecessarily prior to entering the Site. In exceptional circumstances, for example where the Site is very constrained, it may be necessary to have the potential for a limited number of vehicles to stand on the road. The location of such standing areas their size and the duration of any standing periods shall be subject to prior agreement with **the Client,** CEC and the Lothian and Borders Police.

12.6.6 The Tram Supplier shall ascertain and comply with any restrictions in respect of abnormal load routes as they may affect access to the Site.

12.7 Provision, Erection and Maintenance of Traffic Safety and Control (Traffic Safety Measures)

12.7.1 The Tram Supplier shall provide, erect and maintain such traffic signs, road markings, lamps, barriers and traffic control signals and such other measures as may be necessitated by Maintenance Services in accordance with the requirements of the Agreement and to the approval of **the Client**, the

Operator and CEC. The Tram Supplier shall not commence any work which affects the public road until all traffic safety measures necessitated by the work are fully operational.

12.7.2 The Tram Supplier shall keep clean and legible at all times all traffic signs, road markings, lamps, barriers and traffic control signals and shall position, replace, reposition, cover or remove them as required by the progress of the Maintenance Services and to the reasonable requirements of **the Client**, the Operator and CEC.

12.7.3 The Tram Supplier shall ensure that all barriers, footpath space and temporary footpaths (including the requirement for kerb ramps where use has to be made of the carriageway) shall comply with the requirements of the document *Inclusive Mobility A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure* issued by the Mobility and Inclusion Unit of the Department for Transport.

12.7.4 Where portable generators are used to provide power to temporary traffic signals, lighting and the like the Tram Supplier shall ensure Good Industry Best practice be followed to minimise noise and pollution from such generators.

12.8 Implementation of the Closure of Roads and Access to Frontages

12.8.1 The Tram Supplier shall not close any roads or private accesses until immediately before the area is required for undertaking the Maintenance Services in accordance with this Agreement and the Maintenance Programme. The Maintenance Services shall follow in the area of a temporary closure expeditiously and shall be carried out efficiently and in a continuous manner to ensure that all temporary closures are re-opened as quickly as possible.

12.8.2 The Tram Supplier shall, in carrying out the Maintenance Services, take all reasonable precautions to prevent or reduce any disturbance or inconvenience to the owners, tenants or occupiers of adjacent properties, and to the public generally. The owners, tenants or occupiers of affected properties shall be informed of the Maintenance Services to be undertaken, their planned duration, road and access closures and alternative access routes (where required) in writing and by locally posted public notices at least one calendar month prior to work starting.

12.8.3 The Tram Supplier shall render all necessary assistance to occupiers of premises affected by the Maintenance Services so as to enable them to accept and send out deliveries to and from their premises during their normal working hours.

12.9 Access for Emergency Vehicles

12.9.1 During Maintenance Services involving any likely disruption to roads and access routes the Tram Supplier shall propose suitable access routes for emergency service vehicles and personnel to gain access to the Edinburgh Tram Network. These shall be agreed by the Tram Supplier with **the Client**, Emergency Services, the Operator and CEC prior to the start of the Maintenance Services.

13. NOISE

13.1 Noise Control

13.1.1 The Tram Supplier shall take all reasonably practicable measures to minimise nuisance from noise.

13.2 Communications Regarding Noise

13.2.1 Except in the case of emergency work, the Tram Supplier shall give seven days notice to local residents who may be adversely affected by noise from the proposed programme of Maintenance Services, providing a description of the work to be carried out, measures that will be taken to control noise or other disturbance, and the proposed hours of working.

14. VIBRATION

14.1 Vibration Control

14.1.1 The Tram Supplier shall take all reasonably practicable measures to minimise damage caused due to vibration.

15. DUST AND AIR POLLUTION

15.1 Dust and Other Air Pollution

15.1.1 The Tram Supplier shall take all necessary measures to avoid creating a dust nuisance during the Maintenance Services.

15.1.2 Particular consideration shall be given by the Tram Supplier to works affecting the operations of Edinburgh Airport Limited. Details of the specific mitigation measures shall be included within the Construction Management Strategy identified under paragraph 9.2 above.

15.1.3 Measures to prevent dust shall include the following:

15.1.3.1 the hard surfacing of heavily used areas which will be kept clean by regular brushing and water spraying;

15.1.3.2 control of dust released from cutting or grinding of materials on the Maintenance Services;

15.1.3.3 the complete sheeting of all vehicles carrying dusty materials;

15.1.4 Where dust generating works are undertaken close to buildings so that there is soiling of windows and ledges with dust, the Tram Supplier shall clean such windows and ledges as frequently as is necessary (and as a minimum, at least once per week) during periods of dust generating work and on completion of the Maintenance Services at that location. The Tram Supplier shall take precautions to prevent damage occurring as a consequence of cleaning works.

15.1.5 The Tram Supplier shall take precautions to prevent the emission of smoke or fumes from vehicles and plant. Vehicles and plant shall be well maintained and measures shall be taken by the Tram Supplier to ensure that engines and motors are not left running for long periods when not directly in use.

16. DISPOSAL OF WASTE AND CONTAMINATED MATERIALS

16.1 Waste

16.1.1 A waste management plan (**"WMP"**) shall be developed in accordance with "*Site Waste Management Plans: Guidance for Contractors and Clients*" (DTI 2004). The Tram Supplier shall be responsible for the preparation of the WMP to address all of the approvals and consents which require to be obtained and the control measures and mitigation measures that shall be implemented. The WMP shall be subject to the approval of the Operator and **the Client**. The WMP shall in particular identify:

16.1.1.1 responsibilities for waste management;

16.1.1.2the types and quantities of waste materials likely to be generated;

16.1.1.3measures to be taken to minimise generation of waste;

16.1.1.4proposals for recycling and/or re-use;

16.1.1.5measures to be adopted for management of waste on the Site including enclosure, segregation, secure storage, sorting for recovery, and other on-site handling;

16.1.1.6proposed treatment and disposal routes; and

16.1.1.7licensing arrangements.

16.1.2 The Tram Supplier shall implement and comply with the WMP.

16.1.3 The Tram Supplier shall undertake monthly audits to demonstrate compliance with Statutory Requirements and the WMP. The Tram Supplier shall set out its audit programme in the WMP and shall provide copies of the audit report to the Operator and Tram Supplier.

17. PROTECTION OF THE WATER ENVIRONMENT

17.1 Waste Water and Run-off

17.1.1 The Tram Supplier shall ensure that by means of well maintained interceptors or other suitable means there shall be no contamination of run-off water by the Maintenance Services that makes its way into watercourses.

17.1.2 No water shall be discharged into watercourses, but shall be filtered prior to discharge, or discharged onto a grassy area to soak away.

17.1.3 Waste water and site discharges to surface water or sewer shall only be permitted where the effluent quality and discharge location is acceptable to SEPA or Scottish Water (as appropriate). Water Environment (Controlled Activities) (Scotland) Regulations 2005 ("CAR") discharge authorisation shall be obtained by the Tram Supplier if required prior to discharge.

17.1.4 The Tram Supplier shall take suitable precautions to prevent the entry of pollutants into any bodies of water, and report any incidents to SEPA and Scottish Water.

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17.1.5 Procedures for responding to potentially polluting shall be implemented in accordance with SEPA guidance.

17.2 Storage of Polluting Materials

17.2.1 The Tram Supplier shall make provision to ensure that oil drums and containers or other potential contaminants are properly isolated and bunded and that no oil or other contaminants are allowed to reach watercourses or groundwater, including aquifers. Oil storage containers (both fixed and mobile) with a 200 litre capacity or greater shall be stored in compliance with the Water Environment (Oil Storage) (Scotland) Regulations 2006 (where applicable). Drip trays and other secondary containment measures shall be used by the Tram Supplier where necessary to prevent spills during refuelling and operation of small static and mobile equipment. Storage locations for such materials shall be positioned away from watercourses. All surface water or other contaminated water which accumulates in bunds shall be removed by the Tram Supplier by manually controlled positive lift pumps, and not by means of a gravity drain.

17.2.2 Refuelling shall be carried out by the Tram Supplier in a designated area which is away from watercourses and drains.

17.2.3 Spill response kits containing equipment appropriate to the quantity and types of materials present on site shall be available for use by the Tram Supplier in the event of a fuel spillage. Personnel shall be trained in their use.

17.3 Works in the Vicinity of Water

17.3.1 The Tram Supplier shall take suitable precautions to prevent the entry of pollutants, including sediments and dusts, into any bodies of water, and report any incidents to SEPA.

17.4 Water Environment (Controlled Activity) (Scotland) Regulations 2005

Without prejudice to the foregoing terms of this paragraph 17 , the Tram Supplier shall comply with the terms of CAR where relevant to the Tram Supplier.

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18. ECOLOGY

18.1 Encroachment into Wildlife Areas

18.1.1 The Tram Supplier shall take all reasonably practicable measures to minimise harm to and disturbance of wildlife caused by noise and vibration, dust and other air pollution.

18.1.2 Approval shall be obtained by the Tram Supplier from Scottish Natural Heritage, SEPA, Scottish Executive Environment Group Wildlife Habitats Division ("**SEEG WHD**") and CEC, for detailed method statements for any Maintenance Services proposed at designated sites, including Special Protection Areas ("**SPA**")/'Ramsar' sites, Sites of Special Scientific Interest ("**SSSI**"), Sites of Interest for Nature Conservation ("**SINC**") and wildlife sites.

18.1.3 Where reasonably practicable, applications for approval shall be made by the Tram Supplier at least one calendar month prior to relevant Maintenance Services commencing.

18.2 Protected Species

18.2.1 In advance of any disruptive to the environment non-routine works, the Tram Supplier shall employ suitably qualified professionals to check all working areas and any land within 30 metres of the boundary of the working area (unless there is a boundary with a private third party within the 30 metres, in which case no checks shall be taken within the private land) for the presence of species protected by statute. Where protected species are identified, appropriate mitigation measures shall be agreed between the Tram Supplier and the relevant authorities.

18.2.2 Where any habitat has to be cleared in the breeding bird season, typically March to June or July for most species, the habitat must be checked by the Tram Supplier prior to removal for the presence of nesting wild birds, their nests and eggs and young. If found, no habitat shall be removed until nesting is complete, or unless other suitable mitigation is agreed in advance between the Tram Supplier and Scottish Natural Heritage.

18.2.3 The Tram Supplier shall be responsible for obtaining a licence from Scottish Natural Heritage for any non-routine work that may cause disturbance to a

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badger or involves the damage or destruction of a sett. Licence applications shall be made by the Tram Supplier for any works within 10m, heavy machinery operating within 30m, and no works shall proceed until the required licences are obtained.

18.2.4 The Tram Supplier shall be responsible for obtaining a licence from SEEG WHD for any non-routine work which may cause disturbance to otters or involve damage or destruction to an otter holt or lying up site or if any Maintenance Services are proposed within 30m of an otter holt or lying up site.

18.2.5 The Tram Supplier shall be responsible for ensuring that all bridges and other built structures and mature and dead trees within the working area shall be checked by a licensed bat handler for their use by roosting or hibernating bats prior to felling or other potentially damaging operations. If found, mitigation measures shall be agreed between the Tram Supplier, Scottish Natural Heritage and SEEG WHD and implemented, including review of the design to seek ways of avoiding loss of the roost. If avoidance is not possible, a licence shall be applied for by the Tram Supplier from SEEG WHD for disturbance to a European Protected Species and / or destruction or damage to a breeding site or resting place. Alternative roost sites shall be provided in advance of any loss. Any permanent loss of feeding habitat shall be discussed between the Tram Supplier and **the Client** and agreement shall be reached as to how to compensate for by providing new habitat creation as detailed in the landscape and habitat management plan prepared and issued to the Tram Supplier by **the Client**.

18.2.6 Where appropriate use of mitigation measures by target species will be positively encouraged using a variety of techniques e.g. feeding.

18.2.7 The Tram Supplier's personnel and personnel engaged by any Sub-Contractors shall be briefed by a suitably qualified professional on measures for protected species as part of site induction.

18.3 Protection of Mature Trees

18.3.1 For the purposes of this paragraph, "trees" are defined as trees with a diameter of over 10cm girth at a height of 1.5 m above ground level.

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18.3.2 All tree surgery operations shall comply with the British Standard (BS) 3998 "*Recommendations for Tree Work*" and a method statement addressing safety of workers and the public shall be prepared by the Tram Supplier and implemented.

18.3.3 Felling shall be carried out in accordance with the Forestry Commission document "*Forest and Water Guidelines 2004*", which relates to the influence that woodland and trees can have on the freshwater environment, insofar as this is reasonably practicable and to the extent that they are applicable to the Maintenance Services.

18.3.4 Prior to felling, the Tram Supplier shall procure that trees suitable as bat roosts shall be checked by a licensed bat handler for roosting and hibernating bats, and should any be identified, mitigation measures shall be agreed by the Tram Supplier with Scottish Natural Heritage and SEEG WHD and the Tram Supplier shall obtain any relevant licences.

18.3.5 Woody material generated shall be retained on the site as far as is reasonably possible and used as part of habitat creation measures.

18.4 Control of Invasive and Alien Species

18.4.1 If any invasive alien species listed in Schedule 9, Part II of the Wildlife and Countryside Act 1981 (as amended), are identified along the route, including Japanese Knotweed (*Fallopia japonica*), Giant Hogweed (*Heracleum mantegazzianum*) or Himalayan Balsam (*Impatiens glandulifera*), the Tram Supplier shall develop a strategy to manage their presence. The strategy will ensure appropriate treatment of invasive alien species in accordance with approved methodology and will prevent the spread of the species within and outside the Edinburgh Tram Network

18.4.2 The Tram Supplier shall comply with the DEFRA document "*Helping to Prevent the Spread of Invasive Non-native Species, Horticultural Code of Practice*" (March 2005), in so far as this is reasonably practicable and applicable to the Maintenance Services. Invasive alien species listed on Schedule 9, Part II of the Wildlife and Countryside Act 1981 as amended by the Nature Conservation (Scotland Act) 2004, will be treated in accordance with the Environmental Protection Act 1990. Japanese knotweed and giant

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hogweed and soils containing particles of these plants are regarded as controlled waste.

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 18 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 18

SUB-CONTRACTOR DIRECT AGREEMENT

(1) [SUB-CONTRACTOR]

- and -

(2) [tie LIMITED] or [*OTHER THIRD PARTY BENEFICIARY*]

- and -

(3) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

SUB-CONTRACTOR DIRECT AGREEMENT

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AGREEMENT

BETWEEN

(1) **[*SUB-CONTRACTOR*]** [(company number [◆]) whose registered office is at [◆]] *OR* [carrying on business together in partnership under the name of [◆] at [◆]] ("**Sub-Contractor**")];

(2) **[[tie LIMITED** (Company Number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ] OR **[[Other third party beneficiary]** [(company number [◆]) whose registered office is at [◆]] ***OR*** [carrying on business together in partnership under the name of [◆] at [◆]]] [("**Beneficiary**") which expression shall include its successors and permitted assignees.; and

(3) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa) – Spain ("**Tram Supplier**").

BACKGROUND

A By an agreement in writing dated ◆ 200 ◆ (the "**Tram Supply Agreement**"), **tie** appointed the Tram Supplier to design, manufacture and supply Trams and supply documentation and associated equipment in connection with the Edinburgh Tram Network.

B It is a term of the Tram Supply Agreement that the Tram Supplier shall procure that the Sub-Contractor enter into this Agreement with the Beneficiary.

C The Sub-Contractor has been appointed by the Tram Supplier as [◆] in terms of the Sub-Contract (as hereinafter defined).

D It is a term of the Sub-Contract or has otherwise been agreed that the Sub-Contractor enters into this Agreement with the Beneficiary in relation to the Sub-Contract Works.

IT IS AGREED as follows:

1. **DEFINITIONS AND INTERPRETATION**

In this Agreement:

1.1 the following words and expressions have the following meanings, unless the context requires otherwise:

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"**Agreement**" means this document (as amended from time to time pursuant to clause 13);

"**Edinburgh Tram Network**" means the tramway which is to be designed, constructed and maintained in Edinburgh in Phase 1a (forming part of Line One and Line Two as described in the Tram Legislation) and Phase 1b, or either of them (as may be amended from time to time together with any modification, line extension, spur, interconnection and any additional line which may be instructed), to be constructed in accordance with the Tram Legislation together with all associated works and facilities including all civil engineering and track works, Trams, infrastructure, plant, machinery and equipment installed or used for such tramway;

"**Good Industry Practice**" means using standards, practices, methods and procedures conforming to Law and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably be expected from a large, reputable, professionally qualified, competent and skilled organisation experienced in carrying out activities of a similar nature, scope and complexity to those comprised in the Sub-Contract Works, and seeking in good faith to comply with its contractual obligations and all duties owed by it;

"**Insurance Period**" means the period of 12 years from the date of issue of the last certificate of substantial completion in respect of the Sub-Contract Works, as established pursuant to and for the purposes of the Sub-Contract (or, if sooner, 12 years after termination of the employment of the Sub-Contractor under the Sub-Contract);

"**Intellectual Property Rights**" means any rights in or to any patent, design right, utility model, trade mark, brand name, service mark, trade name, business name, logo, invention (whether registered or unregistered), domain name, semi-conductor right, topography right, software designs and/or other materials, source code, copyright, moral right, know-how, or rights in databases and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or for an extension, revival or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the law of Scotland or of any other jurisdiction;

"**Law**" means:

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(a) any Act or instruments of the Scottish Parliament or the United Kingdom Parliament or subordinate legislation within the meaning of section 21(1) of the Interpretation Act 1978, any exercise of the Royal Prerogative, and any enforceable community right within the meaning of section 2 of the European Communities Act 1972;

(b) any applicable guidance, direction or determination issued by any regulatory body with which **tie**, CEC, the Tram Supplier and/or the Sub-Contractor is bound to comply; and

(c) any applicable judgment of a relevant court of law which is a binding precedent,

in each case in force, or applicable in Scotland;

"**Line One**" means the tramway works as authorised by the Edinburgh Tram (Line One) Act 2006;

"**Line Two**" means the tramway works as authorised by the Edinburgh Tram (Line Two) Act 2006;

"**Party**" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

"**Sub-Contract**" means the sub-contract dated [□] made between the Tram Supplier and the Sub-Contractor;

"**Sub-Contract Works**" means the works and services to be undertaken by the Sub-Contractor under the Sub-Contract;

"**Sub-Contractor Deliverables**" means all documents, information, reports, diagrams, records, method statements, risk assessments, manuals, schedules, databases, photographs, formulae, plans, designs, specifications, drawings, details, calculations, models and simulations, the outputs and reports based on any models, programmes and all other material created and/or provided by the Sub-Contractor (or any other third party) in the performance of the Sub-Contract Works and the Sub-Contractor's obligations under the Sub-Contract;

"**TEL**" means Transport Edinburgh Limited a company incorporated under the Companies Act with registered number SC269639 and having its registered office at

55 Annandale Street, Edinburgh, Midlothian, EH7 4AZ which shall include its successors in title and permitted assignees;

"**Trams**" means the tram vehicles to be provided for operation on the Edinburgh Tram Network;

"**Tram Legislation**" means the Edinburgh Tram (Line One) Bill and the Edinburgh Tram (Line Two) Bill, and after such Bills are enacted means the Edinburgh Tram (Line One) Act, the Edinburgh Tram (Line Two) Act and such other legislation relative to the Edinburgh Tram Network as may be enacted from time to time; and

1.2 unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender include all other genders.

1.2.2 a reference to:

1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a clause is a reference to a clause in this Agreement.

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation.

1.4 Where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

2. STANDARD OF CARE

2.1 The Sub-Contractor warrants and undertakes to the Beneficiary that it has carried out and shall carry out the Sub-Contract Works and its other duties and obligations under the Sub-Contract subject to and in accordance with the terms thereof.

2.2 In addition to and without derogation from clause 2.1, the Sub-Contactor warrants to the Beneficiary that:

2.2.1 in the performance of the Sub-Contract Works and its other obligations under the Sub-Contract it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent contractor experienced in carrying out works and services similar to the Sub-Contract Works in connection with projects of a similar type, nature and complexity;

2.2.2 any design produced by the Sub-Contractor will satisfy in every respect any relevant performance specification or any requirement included or referred to in the Sub-Contract and will be suitable in every respect for the purposes included in or reasonably to be inferred from the Sub-Contract; and

2.2.3 any design produced by the Sub-Contractor will fully comply with Law.

2.3 The Sub-Contractor shall owe a duty of care to the Beneficiary in carrying out its duties and obligations under the Sub-Contract.

3. MATERIALS

3.1 The Sub-Contractor warrants to the Beneficiary that it has not and shall not use any materials which at the time of use:

3.1.1 are known to be deleterious in the particular circumstances in which they are used (either to health and safety or to the durability of any works on which the Sub-Contractor is employed by the Tram Supplier); or

3.1.2 contravene any relevant standard or code of practice issued from time to time by the BSI Group or under a European directive relating to standards; or

3.1.3 do not accord with the guidelines contained in the edition of the publication "Good Practice in Selection of Construction Materials" (Ove Arup & Partners) current at the date of specification of use; or

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3.1.4 contravene Good Industry Practice.

4. COPYRIGHT LICENCE

4.1 The Sub-Contractor hereby grants to the Beneficiary an royalty-free and exclusive licence to use such Intellectual Property Rights in the Sub-Contractor Deliverables as may be necessary for the Beneficiary to use in relation to the operation and maintenance of the trams but, not in any case, for manufacturing purposes, [[Edinburgh Tram Network] ***OR*** [*Where beneficiary is not* ***tie*** *an appropriate use should be included*]]. This licence shall carry the right to grant sub-licences, and be transferable to third parties, prior written approval of the Tram Supplier.

4.2 In so far as ownership of the copyright and any other Intellectual Property Rights in any Sub-Contractor Deliverable prepared or provided by the Sub-Contractor in connection with the Edinburgh Tram Network is vested in any person other than the Sub-Contractor, the Sub-Contractor shall procure for the Beneficiary the benefit of such a licence as is referred to in clause 4.1 for the purposes referred to therein.

4.3 The Sub-Contractor shall, if so requested at any time, execute such documents and perform such acts as may be required fully and effectively to assure to the Beneficiary or any third party the rights referred to in this clause 4.

4.4 The Sub-Contractor shall provide to the Beneficiary a copy of any of the Sub-Contractor Deliverables as soon as reasonably practicable after receipt by the Sub-Contractor of a written request from the Beneficiary to do so, unless already delivered to **tie**.

4.5 The Sub-Contractor undertakes to the Beneficiary that the use by the Beneficiary of any of the Sub-Contractor Deliverables for any purpose provided for in this clause 4 shall not infringe the rights of any third party in relation to the Sub-Contractor Deliverables.

5. REQUIRED INSURANCES

5.1 The Sub-Contractor undertakes that:

5.1.1 it has maintained and shall maintain during the performance of its obligations under the Sub-Contract and the Insurance Period each of the insurances as follows:

5.1.1.1 professional indemnity insurance with an insurer authorised to carry out insurance business in the United Kingdom for an amount not less than £[□] on an each and every claim basis and £[□] on an aggregate basis in respect of pollution and contamination claims and date recognition claims, in respect of the legal liability of the Sub-Contractor as a result of any negligent act, error or omission in the performance of the professional activities and duties in connection with the Sub-Contract Works and in the performance of its obligations under the Sub-Contract; and

5.1.1.2 [◆] [*Detail any further insurances held by the Sub-Contractor*]

5.1.2 cover under the professional indemnity insurance is extended to include the Sub-Contractor's liabilities under this Agreement;

5.1.3 this Agreement has been disclosed to the Sub-Contractor's current professional indemnity insurers or brokers (as the case may be) and shall be disclosed to any future professional indemnity insurers or brokers providing the insurance required by this Agreement; and

5.1.4 the Sub-Contractor shall abide by the terms and conditions of insurance and shall not do or omit to do anything that might prejudice the cover or its right to make a claim.

5.2 As and when reasonably required by the Beneficiary, the Sub-Contractor shall produce for inspection documentary evidence that such insurance is being properly maintained.

5.3 If the insurer makes or attempts to make any material alteration or purports to withdraw the Sub-Contractor's professional indemnity cover, or if the Sub-Contractor is unable to obtain professional indemnity insurance, the Sub-Contractor shall promptly give notice of this to the Beneficiary.

6. STEP-IN

6.1 The Sub-Contractor shall not exercise nor seek to exercise any right of determination of its employment under the Sub-Contract or to rescind the Sub-Contract or to discontinue the performance of any of the Sub-Contractor's obligations in relation to the Sub-Contract by reason of breach on the part of the Tram Supplier (or otherwise) without giving to the Beneficiary not less than twenty one days' written notice of its

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intention to do so and specifying in such notice the grounds for the proposed determination. The Sub-Contractor will for the period of any such notice diligently and properly continue to perform the Sub-Contractor's obligations under the Sub-Contract.

6.2 Any period stipulated in the Sub-Contract for the exercise by the Sub-Contractor of a right of determination will nevertheless be extended as may be necessary to take account of the period of notice required under clause 6.4.

6.3 Compliance by the Sub-Contractor with the provisions of clause 6.1 will not be treated as a waiver of any breach on the part of the Tram Supplier giving rise to the right of determination nor otherwise prevent the Sub-Contractor from exercising its rights after the expiration of the notice unless the right of determination has ceased under the provisions of clause 6.4.

6.4 The right of the Sub-Contractor to determine its employment under the Sub-Contract or to rescind the Sub-Contract or to discontinue the performance of any of its obligations in relation to the Sub-Contract shall cease if within the period of twenty one days referred to in clause 6.1 the Beneficiary gives written notice to the Sub-Contractor:

6.4.1 requiring the Sub-Contractor to continue with the performance of all its obligations under the Sub-Contract;

6.4.2 acknowledging that the Beneficiary is assuming all the obligations of the Tram Supplier under the Sub-Contract; and

6.4.3 undertaking to the Sub-Contractor to discharge all amounts payable to the Sub-Contractor under the terms of the Sub-Contract.

6.5 Upon compliance by the Beneficiary with the requirements of clause 6.4 the Sub-Contract will continue in full force and effect as if the right of determination on the part of the Sub-Contractor had not arisen and in all respects as if the Sub-Contract had been made between the Beneficiary and the Sub-Contractor to the exclusion of the Tram Supplier.

6.6 Notwithstanding that as between the Tram Supplier and the Sub-Contractor the Sub-Contractor's right of determination of its engagement under the Sub-Contract may not have arisen the provisions of clause 6.5 shall nevertheless apply if the Beneficiary

gives written notice to the Sub-Contractor and the Tram Supplier to that effect and the Beneficiary complies with the requirements on its part under clause 6.4.

6.7 The Sub-Contractor does not need to be concerned or required to enquire whether, and will be bound to assume that, as between the Tram Supplier and the Beneficiary, the circumstances have occurred permitting the Beneficiary to give notice under clause 6.6.

6.8 By acting in accordance with the provisions of this clause 6 , the Sub-Contractor will not incur any liability to the Tram Supplier.

6.9 Unless and until the Beneficiary has given notice under this clause 6:

6.9.1 the Beneficiary has no liability whatsoever to the Sub-Contractor in respect of amounts payable to the Sub-Contractor under the Sub-Contract; and

6.9.2 the Beneficiary has no authority to issue any direction or instruction to the Sub-Contractor in relation to the performance of the Sub-Contractor's duties under the Sub-Contract.

6.10 Without prejudice to the provisions of clauses 6.1 to 6.9 inclusive, if prior to the service of any notice under clause 6.4 the employment of the Sub-Contractor under the Sub-Contract is determined for any reason whatsoever the Sub-Contractor shall, if requested in writing so to do by the Beneficiary no later than 12 weeks after the date of such determination, forthwith enter into a new agreement with the Beneficiary in relation to the carrying out of the Sub-Contract Works on the same terms as the Sub-Contract, but with such revisions as the Beneficiary and the Sub-Contractor may reasonably require to reflect altered circumstances and the fact that it is the Beneficiary and not the Tram Supplier employing the Sub-Contractor.

7. ASSIGNATION

7.1 The Sub-Contractor shall not assign, novate or otherwise transfer the whole or any part of the Agreement without the prior written agreement of the Beneficiary.

7.2 The Beneficiary shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

[[*Include where the Beneficiary is* ***tie***]

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[7.2.1 to the Scottish Ministers, TEL, the City of Edinburgh Council or any local authority; or

7.2.2 other body with no worse financial standing than that of the Beneficiary who takes over all or substantially all the functions of the Beneficiary; or

7.2.3 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form acceptable to the Sub-Contractor acting reasonably) by the Beneficiary or a person falling within clause 7.2.1; or

7.2.4 with the prior written consent of the Tram Supplier (such consent not to be unreasonably withheld or delayed) to any person not covered by clauses 7.2.1 or 7.2.2.]

7.2.5 without the consent of the Sub-Contractor to any person provided that no more than two such assignations will be permitted. Any assignations by the Beneficiary to a subsidiary or associated company of the Beneficiary or a member of the same group of companies will not count as an assignation;

7.2.2 with the prior written consent of the Sub-Contractor (such consent not to be unreasonably withheld or delayed).]]

7.3 The Sub-Contractor undertakes to the Beneficiary not to contend in any court proceedings under this Agreement that any person to whom the Beneficiary assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this clause is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that the Beneficiary is named under this Agreement or any intermediate assignee of the Beneficiary escaped loss resulting from such breach by reason of the disposal of its interest in the same.

8. LIABILITY OF THE SUB-CONTRACTOR

8.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by the law of contract, delict or otherwise.

8.2 The responsibility of the Sub-Contractor under this Agreement is not to be reduced or in any way released or limited by any enquiry or inspection by or on behalf of any

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person notwithstanding that such enquiry or inspection may give rise to a claim by the Beneficiary against a third party.

8.3 The rights and benefits conferred upon the Beneficiary by this Agreement are in addition to any other rights and remedies that the Beneficiary may have against the Sub-Contractor including (without prejudice to the generality of the foregoing) any remedies in delict.

8.4 Subject to the other provisions of this Agreement, the liability of the Sub-Contractor to the Beneficiary is to be determined in all respects in accordance with the terms of the Sub-Contract and, in the event of any claim by the Beneficiary under this Agreement, the Sub-Contractor shall be entitled to rely upon any defence, right, limitation or exclusion under the Sub-Contract as though the Beneficiary were named as the Tram Supplier under it, except that:

8.4.1 the Beneficiary shall not be affected by any subsequent variation of the Sub-Contract which would adversely affect the obligations owed by the Sub-Contractor or the waiver, compromise or withdrawal of any claim made by the Tram Supplier; and

8.4.2 the Sub-Contractor shall not be entitled to exercise any right of set-off, retention or withholding against the beneficiary to which the Sub-Contractor may be entitled against the Tram Supplier.

8.5 In no event the Sub-Contractor r shall be responsible for indirect or consequential damages.

9. CONSENT OF TRAM SUPPLIER

9.1 The Tram Supplier consents to the terms of this Agreement.

10. NOTICES

10.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

10.2 Any notice given pursuant to this clause, if sent by special or recorded delivery, is deemed to have been received on proof of delivery.

11. RIGHTS OF THIRD PARTIES

11.1 A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

12. INVALID TERMS

12.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

12.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

12.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

13. VARIATIONS AND WAIVERS TO BE IN WRITING

13.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

14. WAIVER

14.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

14.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

15. JURISDICTION AND LAW

15.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

[[*Include where the Beneficiary is* ***tie***]

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15.2 The Parties agree that any dispute in relation to this Agreement shall be conducted in accordance with Clause 64 (*Dispute Resolution*) of the Tram Supply Agreement and the provisions of the said Clause 64 (*Dispute Resolution*) and Schedule 13 (*Dispute Resolution Procedure*) and Schedule 14 (*Panels for Dispute Resolution Procedure*) of the Tram Supply Agreement are deemed to be incorporated mutatis mutandis in respect of this Agreement provided that any reference to "Parties" in the Tram Supply Agreement shall be deemed to refer to the Beneficiary and the Sub-Contractor and the reference in the Tram Supply Agreement to "Clause 68 (*Notices*)" shall mean clause 10 of this Agreement.

IN WITNESS WHEREOF these presents on this and the preceding [◆] pages are executed as follows:

EXECUTED for and on behalf of **[SUB-CONTRACTOR]** at

on 200[◆] by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **[[tie LIMITED]** ***OR* [*other third party beneficiary*]** at

on 200[◆] by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

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EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at

on 200[◆] by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 19 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 19

ADDITIONAL TRAMS

COMBINED PRICE SCHEDULE & PAYMENT MILESTONES - ADDITIONAL TRAMS (28 to 31 TRAMS)					
No.	Milestone Description	Forecast Date	Price in €	% of Total Milestone Payments	Cumulative
1	Contract Award	Apr 2009 (NTP)	2 159 665 €	20,00%	20,00%
2	Delivery of 28th Tram	Oct 2010 (NTP+18)	2 024 686 €	18,75%	38,75%
3	Commissioning of 28th Tram	Nov 2010 (NTP +19)	134 979 €	1,25%	40,00%
4	Delivery of 29th Tram	Oct 2010 (NTP+18)	2 024 686 €	18,75%	58,75%
5	Commissioning of 29th Tram	Nov 2010 (NTP +19)	134 979 €	1,25%	60,00%
6	Delivery of 30th Tram	Nov 2010 (NTP +19)	2 024 686 €	18,75%	78,75%
7	Commissioning of 30th Tram	Dec 2010 (NTP+20)	134 979 €	1,25%	80,00%
8	Delivery of 31st Tram	Nov 2010 (NTP +19)	2 024 686 €	18,75%	98,75%
9	Commissioning of 31th Tram	Dec 2010 (NTP+20)	134 979 €	1,25%	100,00%
10	Delivery of Spares	--	0 €	0,00%	100,00%
11	Delivery of all final Documentation	--	0 €	0,00%	100,00%
12	Delivery of Special Tools	--	0 €	0,00%	100,00%
13	Completion of Driver Training	--	0 €	0,00%	100,00%
14	Completion of Maintainer Training	--	0 €	0,00%	100,00%
15	Completion of Integrated System Testing	--	0 €	0,00%	100,00%
16	Commencement of Shadow Running	--	0 €	0,00%	100,00%
17	Opening for Passenger Carrying Service	--	0 €	0,00%	100,00%
TOTALS			10.798.325 €	100,00%	

NOTE 1
The answer in "Further additional Trams" (32 to 35) regarding (a) price and (b) indexation is also applicable to "Additional Trams" (28 to 31)

NOTE 2
The Forecasted Dates are applicable if the purchase order is made before may 2009

NOTE 3.
The Mobilisation Cost mentioned on "Further additional Trams" .NOTE 2 is applicable to Additional Trams if purchased after NTP+17

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	PRICE SCHEDULE - FURTHER ADDITIONAL TRAMS (32 to 35 TRAMS)	€
a	Price for further additional 4 Trams that may be ordered by tie / TEL at some in the future for greater service capacity, beyond the main production run.	2.699.581 €

b	Basis of proposed indexation of price (please insert details below):	
	The system for indexation of price will be based on the Spanish Consumer Price Index (IPC Indice de Precios al Consumo) published by the Instituto Nacional de Estadistica (Office for National Statistics) of Spain.	

c	Date for which the above mechanism will remain valid (31 March 2015 is minimum).	31 March 2015

NOTE 1:
The conditions described for 32 to 35 trams is also applicable to the set 28 to 31 trams if the purchase order is 17 month after the NTP.

NOTE 2:
There is a mobilisation fixed cost of 2.886.000 euros. This cost applies to any option that goes beyond the main production run; thus, it is applicable for 32 to 35 optional Trams and for 28 to 31 trams if production must be stopped

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 20 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 20

TIE AND CEC POLICIES

Trams for Edinburgh

Tram Project Environmental & Sustainability Policy Statement

The Edinburgh Tram project will deliver a new tram network for the City of Edinburgh.

tie recognises that the achievement of excellence in the delivery of such projects is underpinned by a systematic approach where concern for environmental and sustainability matters is fundamental and forms an integral part of its operations.

tie will adopt an environmental management system which conforms to the principles and requirements of BS EN ISO 14001 2004 Environmental Management Systems.

The management team:

- Is committed to good environmental management practice, including building sustainability into the project and the prevention of pollution,
- Shall promote a positive culture on environmental and sustainability issues through leadership and communication,
- Use effective communication within the team as a primary enabler of environmental good practice,
- Shall put in place suitable management arrangements for ensuring environmental matters are integral to the execution of the Tram project,
- Is committed to continual improvement of its environmental management arrangements,
- Will set environmental and sustainability objectives which shall be monitored and reviewed for effectiveness and suitability,
- Shall work with the relevant statutory bodies to comply with or exceed applicable legislation, regulations and contractual obligations.

It is recognised that everyone involved with tie has responsibilities for reducing our impact on the environment; good environmental practice must be considered a core value that is to be taken into account by all tie personnel and tie suppliers in all those activities they undertake for tie.

This policy will be communicated to tie personnel and tie suppliers so ensuring that they are aware of their own responsibilities within it. Additionally it will be made available to other interested third parties who may require it.

This policy shall be reviewed annually for continuing suitability.

Signed

Matthew Crosse
Project Director
27th February 2007

DOC NO	VERSION	STATUS	DATE	PROJECT	SHEET
DEL.HSQE.101	2.0	Approved	27 Feb. 07	Edinburgh Tram Network	1 of 1

Trams for Edinburgh

Tram Project Safety Policy Statement

The Edinburgh Tram project will deliver a new tram network for the City of Edinburgh.

The project will adopt a safety management system which conforms to the principles and requirements of OHSAS **18001** : 1999 Occupational health and safety management systems - Specification or **HSG65: 2000** Successful Health & Safety Management.

tie recognises that the control of health and safety aspects arising from the Edinburgh Tram project is an essential feature of our efficient operation.

tie also recognises and accepts the responsibility of the Health and Safety at Work etc Act 1974 and associated legislation to provide and maintain safe working conditions and a healthy environment for all persons who may be affected by the Edinburgh Tram project. The management team:

- shall provide plant and systems of work that are safe and free from risks to health,
- shall provide such information, instruction, training and supervision as is necessary to ensure the health and safety at work of all employees and those who may be affected by our work,
- shall maintain in a condition that is safe and free from risk to health, any place of work under **tie**'s control and provide adequate facilities and arrangements for the welfare of employees at work,
- shall safeguard visitors to all areas within **tie**'s control and any member of the public who may be affected by **tie**'s activities,
- shall ensure that all information concerning health and safety pertaining to the Edinburgh Tram project is provided, where appropriate, to external sources,
- shall encourage and promote a safety culture which will show best practises on the Edinburgh Tram project by showing leadership and commitment to health and safety issues,
- set health and safety objectives which shall be monitored and reviewed for effectiveness and suitability.

It is recognised that everyone involved with the Edinburgh Tram project is responsible for health and safety. Health and safety must be considered as a core value that is to taken into account by Edinburgh Tram project staff and suppliers in all their project related activities.

This policy shall be communicated to Edinburgh Tram project staff and suppliers.

This policy shall be reviewed annually for continuing suitability.

Signed

[redacted]

Matthew Crosse
Project Director
26th July 2007

DOC NO	VERSION	STATUS	DATE	PROJECT	SHEET
DEL.HSQE 105	3.0	Approved	26 Jul 07	Edinburgh Tram Network	1 of 1

	Cover Approval Sheet	Doc Ref:	PS 625
		Rev:	0.0
	Company Policy	Status:	Approved
		Owner:	HR Department

DRUGS & ALCOHOL POLICY

Document Approval

	Signature	Title	Date
Prepared By:	[redacted]	tie HSQE Manager	02/08/07
Approved By:		Engineering & Procurement Director	02/08/07
Authorised By:		HR & Corporate Affairs Director	02/08/07

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DRUGS & ALCOHOL POLICY	Doc Ref.	PS 625
	Rev	0.0
Company Policy	Status	Approved
	Owner	HR Department

tie has a responsibility to provide a safe and healthy working environment and recognises that this may be jeopardised by those who misuse alcohol and/or drugs within the working environment, or in a way that may affect themselves or others.

The tie policy reflects the requirements of the Transport and Works Act 1992.

tie will take all reasonable steps to ensure that employees, consultants and contractors are made aware of the content of this statement, legislation, standards and client requirements and the implications therein.

Specific arrangements are detailed in the tie Drugs and Alcohol procedure.

It is a requirement of tie that no employee, consultant or contractor shall:

- Report or endeavour to report for duty in an unfit state due to alcohol or illegal drugs abuse;
- Be in possession of alcohol or illegal drugs in the workplace
- Consume alcohol or illegal drugs whilst on duty.

When medication is prescribed or advised to an employee, they must advise the medical practitioner or pharmacist of the nature of their work so that appropriate information on the possible affects and the potential effect on workplace safety can be given. The employee must inform their manager and provide relevant and accurate details of the medication involved in order that they may obtain advice on what, if any, restrictions apply. The employee must comply with any restrictions imposed by their manager.

tie policy permits assistance with the rehabilitation of employees that voluntarily seek help for alcohol or drug dependency or misuse problems. Staff must, however, seek assistance at the earliest opportunity. Subsequent discovery or disclosure prompted by an impending screening will not be acceptable.

A programme of screening is in place within tie to:

- Detect the use of drugs and/or alcohol by potential employees via employment medical screening;
- Detect the use of drugs and/or alcohol by any person(s) via "random testing";
- Detect the use of drugs and/or alcohol by any person(s) involved in a safety critical incident via "for cause" testing where there are grounds to suspect that the actions of the person(s) led to the incident, and
- Detect the use of drugs and/or alcohol via "for cause" testing where abnormalities of behaviour prompt managerial intervention.

tie require full compliance with this policy and shall take the appropriate disciplinary action in the event of any infringement.

[redacted]

Willie Gallagher
Executive Chairman
02 August 2007

Confidential and Proprietary Information of tie Limited

1.0 DOCUMENT CHANGE CONTROL HISTORY

Revision	Date	CR No	Reason for Change	Authorisation
A	16/11/2006		1st Issue of new document	
0.0	02/08/2007	0015	Re-draft in company template	02/08/2007

TIE00899939_1271

Trams for Edinburgh

Tram Project Quality Policy Statement

The Edinburgh Tram project will deliver a new tram network for the City of Edinburgh.

The project will adopt a quality management system which conforms to the principles and requirements of BS EN ISO 9001:2000 Quality Management Systems.

tie recognises that the achievement of the objectives set for the Edinburgh Tram project requires that the project is underpinned by a systematic approach with a "right first time" attitude. The management team:

- shall promote a positive culture through leadership and communication,
- use effective communication within the team as a primary enabler of quality,
- shall put in place suitable management arrangements for the effective execution of the Edinburgh Tram project,
- is committed to continual improvement of its management arrangements throughout the project life cycle,
- set quality objectives which shall be monitored and reviewed for effectiveness and suitability,
- will deliver a tram network that is fit for purpose, meeting the technical requirements of the project's stakeholders and being delivered to time and cost.

It is recognised that everyone involved with the Edinburgh Tram project is responsible for the quality of the delivery. Quality must be considered as a core value that is to taken into account by Edinburgh Tram project staff and suppliers in all their project related activities.

This policy shall be communicated to Edinburgh Tram project staff and suppliers.

This policy shall be reviewed annually for continuing suitability.

Signed [redacted]

Matthew Crosse
Project Director
27th February 2007

DOC NO	VERSION	STATUS	DATE	PRODUCT	SHEET
DEL HSQE 103	2.0	Approved	27 Feb 07	Edinburgh Tram Network	1 of 1

EDINBURGH TRAM LINES ONE AND TWO

NOISE AND VIBRATION POLICY

DECEMBER 2005

1 INTRODUCTION

This policy statement sets out the approach the promoter proposes to adopt to mitigate noise from the operation of Edinburgh Tram Lines One and Two. Impacts during construction will be covered by the Edinburgh Tram Lines One and Two Code of Construction Practise.

This policy has been developed in the absence of any statutory requirements for noise mitigation from rail systems in Scotland. Unlike the situation for new roads throughout the UK, and for new railways in England and Wales, there are no noise insulation regulations or other statutory requirements to control noise from railways in Scotland. The promoter therefore proposes to implement a noise scheme based upon non-statutory standards set out in this policy statement. These are set at significantly lower noise levels than apply for statutory noise insulation elsewhere and mitigation will be provided wherever it is reasonably practicable to do so. It is important to recognise that this is a non-statutory arrangement and there will be cases where there are practical limitations as to what can be achieved. This Policy clarifies how these circumstances will be addressed.

2 APPROACH

The promoter will undertake measures to mitigate significant noise impacts for residents and other noise sensitive receivers in the vicinity of the routes, following a tiered approach. In this, different options for mitigation will be considered in turn, taking into account what is reasonably practicable and acceptable to affected parties in the circumstances of each location potentially affected by noise. This policy will be applied in accordance with the principle of best practicable means [1].

[1] Best Practicable Means are defined in section 72 of the Control of Pollution Act 1974 as those measures which are "reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to financial implications".

- Firstly, the promoter will define and apply strict noise emission standards when procuring all tram vehicles.

- Secondly, the promoter will use all reasonably practicable measures to avoid significant noise impacts through design of the track and trackbed.

- Thirdly, where these measures are not sufficient to mitigate significant impacts, the promoter will provide noise barriers to attenuate noise between the track and sensitive receivers.

- Fourthly, the promoter will offer noise insulation within residential properties where, after all reasonably practicable and acceptable attenuation at source is provided, residual noise levels would exceed given thresholds

Noise sensitive receivers are defined to include all types of dwellings, schools, libraries, hospitals, theatres and concert halls, and places of worship currently bordering the route.

In defining what is reasonably practicable (ie what constitutes best practicable means), the promoter will take into account engineering feasibility, maintenance of driver sight lines, safe operation of the tram, safe interaction with road traffic, the safety of pedestrians and cyclists, and security and crime considerations. It will also take into account the cost of any proposed mitigation measure and the level of benefit achieved in terms of number of properties affected, the degree of noise reduction and the resulting noise levels, such that costs are not disproportionate to the benefits achieved. In defining what is acceptable the promoter will consult affected residents and take into account impacts on their amenity and that of other parties such a recreational user of facilities, and any other environmental concerns.

The application of these principles is further described below. A key aspect of their application is the definition of what constitutes a significant impact and this is set out in the next section before describing how this applies to the selection of appropriate noise mitigation measures at the four levels in the mitigation hierarchy.

3 *DEFINITION OF SIGNIFICANT NOISE IMPACT*

As noted above there are no statutory requirements for mitigating tram noise in Scotland. It is therefore necessary to define criteria to establish when noise mitigation should be considered. These have been based on the approach used in the Environmental Impact Assessments for Edinburgh Tram Lines

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One and Two. The likelihood of exceeding these criteria will be determined in advance of construction by noise modelling [1].

Options for noise mitigation will start to be considered if the free-field noise level outside the window of any sensitive receiver exceeds either of the following noise target levels:

- for daytime noise, $L_{Aeq\ 0700\text{-}2300\ hours}$ 55 dB;

or

- for night time noise, $L_{Aeq\ 2300\text{-}0700\ hours}$ 45 dB

Where tram noise is predicted to be more than 3dB [2] above either of these thresholds, mitigation measures to reduce the adverse impact of noise will be considered according to the extent to which the pre-existing ambient ($L_{Aeq,\ 1\ hour}$) noise level is increased, as follows:

- Increase of 3-5 dB - mitigation considered on a case by case basis, and implemented if reasonably practicable and acceptable to affected parties.

- Increase of greater than 5 dB – mitigation implemented if reasonably practicable and acceptable to affected parties.

4 THE MITIGATION HIERARCHY

4.1 TRAM VEHICLE PROCUREMENT

The promoter will define and apply strict noise emission standards in the procurement of all tram vehicles. These will be decided following a review of achievable performance standards at the time of procurement of the tram vehicles and will be designed to reflect prevailing good standards at the time. The tram vehicle and the tram rails will be designed in a coordinated manner, so as to achieve the required performance standard in the circumstances to be encountered on the Edinburgh Tram system.

4.2 TRACK DESIGN

The promoter will adopt all reasonably practicable and acceptable measures to reduce noise at source by design of the track to attenuate noise. A variety of

(1) Predictions will be made at the final design stages by modelling and will take into account details of the track alignment and surrounding ground form between the track and the nearest building facade, the presence of natural barriers, the selected tram vehicle and the operating schedule.
(2) Exceedances of up to 3 dB are considered to be of marginal significance. In line with current guidance, 3 dB is taken as the limit of perception of change in environmental noise.

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measures may be available to contribute to noise reduction at source and the promoter will consider all current developments in the field in developing the final design for the scheme. These will include the use of grass track which is already planned along some sections of the route and installation of acoustic plenum structures alongside the tram rails if this is acceptable to HM Railways Inspectorate.

4.3 *Noise Barriers*

Where significant noise impacts are still predicted to occur, the promoter will consider the provision of noise screening structures within the tram corridor. The dimensions (length and height) and form of each structure will be determined by modelling and in consultation with affected properties. Where an attenuating structure proves not to be reasonably practicable or acceptable, or is only possible with reduced dimensions, the promoter will consider whether there are additional special measures that can be taken to mitigate noise that are proportionate in the circumstances of the case.

4.4 *Noise Insulation*

If approved the provisions of the Edinburgh Tram Line One and Two Bills will empower the promoter to set up a noise insulation scheme. This scheme will be as defined in the Noise Insulation (Railways and Other Guided Systems) Regulations 1996, which apply in England and Wales. Under this scheme noise insulation will be provided for residential properties, if tram noise reaches the qualifying façade levels:

- 68 dB $L_{Aeq\ (0630\ -\ 0000\ hours}$ during the day and evening; and
- 63 dB $L_{Aeq\ (2300\ -\ 0630\ hours}$ at night

Further details of the qualifying criteria and of the noise insulation package that will be offered are as set out in the Regulations.

Also, although it is intended that wheel squeal [1] on bends will be minimised through good design and operational practices, to address the possibility that this characteristic form of noise could, if it were to occur, cause sleep disturbance at night in residential properties, the promoter will also have discretionary powers to offer noise insulation (as otherwise prescribed under the Regulations) to affected residential properties taking account of the frequency and level of wheel squeal.

In addition, to address the possibility that for a particular reason a high peak noise level from the tram cannot be mitigated in an area where existing peak noise is currently low, noise insulation will be offered irrespective of tram L_{Aeq}

(1) Wheel Squeal is the distinctive tonal noise sometimes generated on very tight bends where tram wheel/track geometry or conditions are poor.

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levels as follows. Where the tram free-field level exceeds $L_{Amax,slow}$ 82 dB more than twice an hour at night (2300-0700 hours) insulation will be offered provided the tram $L_{Amax,slow}$ is above the pre-existing ambient $L_{Amax,slow}$ by at least 5dB (or 3dB at the discretion of the promoter, depending on frequency and local circumstances). The ambient $L_{Amax,slow}$ will be the night-time $L_{Amax,slow}$ from all other noise sources that is routinely exceeded at least twice an hour in the hours when the tram operates. This noise insulation offer would be over and above any others that may be offered under this policy.

5 *VIBRATION*

Trackforms will be designed adjacent to sensitive receptor buildings using Best Practicable Means to keep within the guideline levels of Vibration Dose Value (VDV) given in BS6472, 1992 below which the probability of adverse comments is low

- Day (0700-2300 hours) 0.2 $m/s^{1.75}$; and
- Night (2300-0700 hours) 0.13 $m/s^{1.75}$.

In addition the specification for the design of the tramway will include a Peak Particle Velocity (PPV) level no higher than 2mm/s at 2m from the rails

6 *MAINTENANCE AND MONITORING*

The promoter is committed to maintaining the tram system, and in particular the wheel and rail surfaces, so as to minimise noise at sensitive receivers. For each section of the route a noise and vibration monitoring scheme will be established and results will be regularly reported. The noise and vibration monitoring scheme will be agreed with the City of Edinburgh Council's Environmental and Consumer Services department. Appendix 1 gives details of the proposed noise monitoring system and how it will avoid unnecessary increase in noise levels

The Promoter will give due notice to the City of Edinburgh Council's Environmental and Consumer Services department and potentially affected residents of plans to carry out any potentially noisy maintenance activities at night such as rail grinding

The operator will establish a policy on the appropriate use of vehicle audible warning devices in accordance with safe working practices, which will be

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reviewed from time to time, for example if repeated complaints are received in certain areas.

The operator will co-operate with the City of Edinburgh Council's Environmental and Consumer Services Department in establishing appropriate sound levels for tram stop Public Address systems if complaints are received from occupiers of noise sensitive premises

APPENDIX 1

NOISE MONITORING PROCEDURES

A list of representative noise monitoring locations will be agreed with the City of Edinburgh Council's Environmental and Consumer Services department in consultation with local residents groups. The list will be reviewed from time to time.

Tram noise measurements will be carried out as prescribed below in the following circumstances

- During commissioning of the scheme
- 3-6 months after commencement of passenger service.
- At intervals not exceeding 1 year thereafter.
- Upon reasonable request by the City of Edinburgh Council's Environmental and Consumer Services department.

At the agreed monitoring locations, measurements will be taken of the $L_{Aeq,5min}$ and SEL noise levels of a pass-by of each of the vehicles on each track under normal operation. In the case of new works, the rails will be free from visible defects. The results of the noise monitoring will be published on the internet.

At any location, if the mean of the noise levels of all the vehicles measured on any one track is found to be 5 dB(A) or more greater than the mean measured on any previous occasion for an equivalent set of vehicles, then the track will be reground, or other appropriate work will be undertaken, as soon as reasonably practicable, assuming noise from particular vehicles has not skewed either average

Monitoring will also be used to prevent any particular vehicle becoming excessively noisy, as follows. In the event that the maximum noise level of any vehicle is found to be 5 dB(A) or more greater than the mean then the wheels of that vehicle will be scheduled for re-turning as soon as reasonably practicable

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

TIE00899939_1278

This is Schedule 21 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 21

REPORTING PERIOD END DATES

PERIOD END DATES (all Saturdays except 31st March)

CONSTRUCTION PERIOD					
	2007 / 08	**2008 / 09**	**2009 / 10**	**2010 / 11**	**2011 / 12**
1	28/04/2007	26/04/2008	02/05/2009	01/05/2010	30/04/2011
2	26/05/2007	24/05/2008	30/05/2009	29/05/2010	28/05/2011
3	23/06/2007	21/06/2008	27/06/2009	26/06/2010	25/06/2011
4	21/07/2007	19/07/2008	25/07/2009	24/07/2010	23/07/2011
5	18/08/2007	16/08/2008	22/08/2009	21/08/2010	20/08/2011
6	15/09/2007	13/09/2008	19/09/2009	18/09/2010	17/09/2011
7	13/10/2007	11/10/2008	17/10/2009	16/10/2010	15/10/2011
8	10/11/2007	08/11/2008	14/11/2009	13/11/2010	12/11/2011
9	08/12/2007	06/12/2008	12/12/2009	11/12/2010	10/12/2011
10	05/01/2008	03/01/2009	09/01/2010	08/01/2011	07/01/2012
11	02/02/2008	31/01/2009	06/02/2010	05/02/2011	04/02/2012
12	01/03/2008	28/02/2009	02/03/2010	05/03/2011	03/03/2012
13	31/03/2008	31/03/2009	31/03/2010	31/03/2011	31/03/2012

SERVICE PERIOD					
	2012 /13	**2013 / 14**	**2014 / 15**	**2015 / 16**	**2016 / 17**
1	28/04/2012	27/04/2013	26/04/2014	02/05/2015	30/04/2016
2	26/05/2012	25/05/2013	24/05/2014	30/05/2015	28/05/2016
3	23/06/2012	22/06/2013	21/06/2014	27/06/2015	25/06/2016
4	21/07/2012	20/07/2013	19/07/2014	25/07/2015	23/07/2016
5	18/08/2012	17/08/2013	16/08/2014	22/08/2015	20/08/2016
6	15/09/2012	14/09/2013	13/09/2014	19/09/2015	17/09/2016
7	13/10/2012	12/10/2013	11/10/2014	17/10/2015	15/10/2016
8	10/11/2012	09/11/2013	08/11/2014	14/11/2015	12/11/2016
9	08/12/2012	07/12/2013	06/12/2014	12/12/2015	10/12/2016
10	05/01/2013	04/01/2014	03/01/2015	09/01/2016	07/01/2017

11	02/02/2013	01/02/2014	31/01/2015	06/02/2016	04/02/2017
12	02/03/2013	01/03/2014	28/02/2015	05/03/2016	04/03/2017
13	31/03/2013	29/03/2014	31/03/2015	31/03/2016	31/03/2017
	2017 / 18	**2018 / 19**	**2019 / 20**	**2020 / 21**	**2021 / 22**
1	29/04/2017	28/04/2018	27/04/2019	02/05/2020	01/05/20
2	27/05/2017	26/05/2018	25/06/2019	30/05/2020	29/05/2021
3	24/06/2017	23/06/2018	22/06/2019	27/06/2020	26/06/2021
4	22/07/2017	21/07/2018	20/07/2019	25/07/2020	24/07/2021
5	19/08/2017	18/08/2018	17/08/2019	22/08/2020	21/08/2021
6	16/09/2017	15/09/2018	14/09/2019	19/09/2020	18/09/2021
7	14/10/2017	13/10/2018	12/10/2019	17/10/2020	16/10/2021
8	11/11/2017	10/11/2018	09/11/2019	14/11/2020	13/11/2021
9	09/12/2017	08/12/2018	07/12/2019	12/12/2020	11/12/2021
10	06/01/2018	05/01/2019	04/01/2020	09/01/2021	08/01/2022
11	03/02/2018	02/02/2019	01/02/2020	06/02/2021	05/02/2022
12	03/03/2018	02/03/2019	29/02/2020	06/03/2021	05/03/2022
13	31/03/2018	31/03/2019	31/03/2020	31/03/2021	31/03/2022
	2022 / 23	**2023 / 24**	**2024 / 25**	**2025 / 26**	**2026 / 27**
1	30/04/2022	29/02/2023	27/04/2024	26/04/2025	02/05/2026
2	28/05/2022	27/05/2023	25/05/2024	24/05/2025	30/05/2026
3	25/06/2022	24/06/2023	22/06/2024	21/06/2025	27/06/2026
4	23/07/2022	22/07/2023	20/07/2024	19/07/2025	25/07/2026
5	20/08/2022	19/08/2023	17/08/2024	16/08/2025	22/08/2026
6	17/09/2022	16/09/2023	14/09/2024	13/09/2025	19/09/2026
7	15/10/2022	14/10/2023	12/10/2024	11/10/2025	17/10/2026
8	12/11/2022	11/11/2023	09/11/2024	08/11/2025	14/11/2026
9	10/12/2022	09/12/2023	07/12/2024	06/12/2025	12/12/2026
10	07/01/2023	06/01/2024	04/01/2025	03/01/2025	09/01/2027
11	04/02/2023	03/02/2024	01/02/2025	31/01/2026	06/02/2027
12	04/03/2022	02/03/2024	01/03/2025	28/02/2026	06/03/2027
13	31/03/2022	31/03/2024	31/03/2025	31/03/2026	31/03/2027

Notes

- The later dates are more likely to change over time.
- The Reporting Periods run each year from 1st April to 31st March.
- Period One (P1) starts the first of April and generally finishes on the 4th Saturday following that date.
- Period Two (P2) starts on the next day (generally the 4th Sunday) and finishes on the 4th Saturday from that date.
- Periods Three through to Twelve follow at four weekly intervals.
- Period Thirteen starts the Sunday after the end Saturday of P12 and finishes on 31st March.

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 22 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 22

INEO BUSTRACKER VEHICLE LOCATION SYSTEM

The Ineo BusTracker Vehicle Location System (VLS) is additional to (and discrete from) any system supplied under the TPDS (Tram Position & Detection System) heading.

The BusTracker system is already employed by Lothian Buses and **tie** wish to be able to display to Bus Control the position and status of the city's trams in relation to their buses in real time.

This will mean that points and traffic light/signals control for the tramway will remain with TPDS, and TPDS will show the tram's position on the network to the Tram Control room only.

To enable this, the following equipment needs to be fitted to each tram. This equipment will be supplied free of charge to the Tramco for incorporation into each vehicle at the factory. Maintenance of the system will be the responsibility of the equipment manufacturer (Ineo):-

- Main Module – to be fitted at the "A" end of the tram (size 110mm deep x 380mm wide x 500mm high)
- Aerial – to be fitted at the "A" end of the tram in a position to allow ready connection to the main module, yet away from obvious sources of e.m.i. (size 160mm diameter x 80mm high)
- Driver Consoles – one to be fitted in **each cab** dashboard (size 230mm wide x 105mm high x 40mm deep – recessed into dashboard. The exact location will need to be agreed between Tramco and **tie**/OpCo.
- A smoothed 24 volt dc electrical supply to the main unit at the "A" end
- A combined data/power cable (specification to follow) to be run from the "B" end cab console to the Main Module at the "A" end. This will need to be installed through the vehicle cabling runs including across the articulations. This cabling must meet the same fire criteria as the rest of the tram wiring.

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 23 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 23

TRAM SUPPLIER'S PROPOSALS

See separate Schedule 23

Where there is any conflict between the information contained therein and the ER's, the ER's shall take precedence.

The exterior styling will be developed from the indicative option included in the BAFO.

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

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1. GENERAL

The proposed vehicle is an autonomous, bidirectional, double-cab articulated 100% low-floor LRV. The general layout of the tram is shown in drawings Q.00.072.10 H1 and H2.

The interior layout of the proposed tram is modular in design so that the number and position of the luggage racks can be modified easily any time, changing them by a 3 module seat assembly.

The main characteristics of the proposed tram are:

- Autonomous, bidirectional, double cab, articulated unit
- 100% Low Floor
- Capacity of 248 (4p/m^2) passengers with 80 (32,2%) seated passengers.
- 2 wheelchair spaces
- Approx. 7,6 m^2 of floor surface for luggage racks.
- Consisting of 7 articulated modules with total length of 42.3 metres and maximum width of 2,650 metres
- Supported on 4 bogies: 3 motor bogies and a trailer bogie
- 6 doors per side for the ease of passenger boarding.
- Self supporting low alloy steel carbody structures; high elastic limit (corten) structure in the underframe and ferritic stainless steel on the sides and roof (easy to repair).

The tram's general architecture is ready to modify the number of its modules with minor works.

As described in section 3. of this proposal, the tram has been designed with a really strong structure, which will give to the LRV a service life of more than thirty years; and with ferritic stainless steel sides and roof, which will make really easy (and cheap) the reparability of the trams (the repair and welding methods will be equivalent to those ones used in buses).

The tram consists of seven modules:

- Two end modules, each with a cab, supported on a motor bogie, with a single leaf access vestibule, and articulated on the intermediate carbodies.

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- Two central modules on the ends of which the intermediate carbodies are supported. One of this central bogie, on which a pantograph is located, is supported by a trailer bogie and the other central modules is supported on a motor bogie.

- Three intermediate modules, suspended between the end carbodies and the central carbodies, where the double leaf access vestibules are located.

The floor is at a height of 350 mm along the passenger saloon. There are no ramps at the entrances and therefore, they are at a 350mm height.

The cabs are located at the end carbodies and they extend across the whole width of the carbody.

The central carbodies has an area designated for 2 persons with disabilities. Persons with reduced mobility can access this area via the 4 double leaf doors of the carbody. To this end, the access doors of this car shall be fitted with an exterior PRM access indicator.

The unit is not equipped with specific items to aid PRM access as the recommended access from the platforms is easy, thanks to the low floor level. All the disabled access requirements are met by the offered tram.

➢ **Carbody**

The carbodies are self supporting structures constructed with a low-alloy steel and high elastic limit (Corten) structure in the underframe and ferritic stainless steel on the sides and roof.The following are just some of the characteristics of the units:

- ➢ PRM area with the specific functionality of the nearest doors. This area can be used to transport bicycles.

- ➢ Unobstructed gangways along the whole of the unit.

➢ **Main Onboard Equipment**

- Traction equipment

The system has three independent traction units and each contains the traction inverter, the brake resistors and four traction motors. Each traction inverter is double, with each controlling 2 motors.

The two level inverters, directly connected to the catenary, are based on the latest generation of IGBT power transistors. These are specifically used to obtain the best rail traction performance.

The system is designed to assure the required functionality and to obtain the highest reliability, availability, maintainability and safety performances.

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- Auxiliary Equipment

  Each unit shall be fitted with 2 auxiliary converters located in the B module, powered at 750 Vdc, to supply the 3x400Vac line.

  The 24 Vdc direct current loads are supplied from the G module battery charger, which shall also perform the controlled charging of the battery.

  The proposed Auxiliary Converters are based upon the use of the latest generation of IGBTs with a variable voltage and frequency inverter (VVVF). They are prepared to start when fed from the overhead line, irrespective of the state of charge of the battery (Flat Battery Start).

  Along with the auxiliary generation equipment, the units shall also be equipped with the following auxiliary equipment:

  - 1 pantograph + lightning arrestor + circuit breaker
  - Latest generation Ni-Cd battery
  - Hydraulic brake equipment.
  - Independent Air Conditioning System for the driver cab.
  - Heating and Ventilation System for passenger saloon.
  - Electric sliding plug type doors.
  - Pneumatic compressor to supply sanders and flange lubricators.
  - Passenger communication and information system which includes the PA system, exterior and interior signs, station announcer.
  - Tram event recorder (Black Box).
  - Onboard computer equipment.
  - Rear view cameras.
  - …

- Onboard Computer Equipment and Train Control

  The system shall consist of a Central Control unit in each cab car, which shall support direct Inputs and Outputs via car bus RS-485.

  It shall also consist of a Cab Terminal on the driver cab desks, connected via an RS-485 series line to the Central Unit, and a signal panel.

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➢ **Bogies**

The vehicle is supported on 4 bogies, with three motor bogies (end bogies and one of the intermediates) and a trailer bogie.

The motor bogies have four motors, which are assembled together with their shafts longitudinally, each of which is firmly attached to the gear unit cases to form one single assembly. This gear-motor unit is completely suspended from the bogie frame, with a number of interspaced rubber elastic components.

The trailer bogies are identical to the motor bogies except for the motoring facilities.

➢ **Design**

The design procedure follows the most avant-garde standards regarding comfort, best use of space, harmonious environments, etc., without neglecting those elements that, due to the stress they could be subjected to, are the product of a specific design.

The offer considers the exterior and interior design proposals which figure in Annex 1.2.1“Tram Drawings and Designs”.

A full scale tram mock-up will be manufactured to demonstrate areas critical to operation and access. The mock up will include the entire cab and a representative portion of one saloon, including a vestibule with at least one operational pair of bi parting doors and space reserved for wheelchair use. The mock-up will show the exterior form and livery.

1.1. ELECTRO MAGNETIC COMPATIBILITY

The Trams and their sub-systems will not generate excessive, nor be susceptible to, electro-magnetic interference and will comply with EN 50121 as appropriate.

Different design criteria will be implemented from the start of the design process in order to comply with these standards.

We understand that Infraco is responsible for establishing the criteria in matter of Edinburgh Tram Network infrastructure. Tramco will contribute with Infraco in order to comply with the established criteria.

These are the tests that will be conducted regarding EMC issues.

- Radiated Emissions Measurement according to EN 50121

- Measurement of EMC levels (miliTesla) inside the train.

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2. PERFORMANCE

2.1. ACCELERATION

The unit, under maximum load, has an average acceleration of 1.2 m/s^2 from 0 to 35 Km/h. and an average acceleration of 0.8 m/s^2 from 0 to 80 km/h.

The calculation conditions for acceleration are as follows:

- The supply voltage for the performance calculation is 750 V.
- Rotating masses: 7 % of the Tare
- Level track section
- Wheel half worn
- Maximum load conditions (AW4)
- Jerk of 1 m/s^3.

Over acceleration shall be limited to 1 m/s^3 but this can be regulated in a range of 0.5 – 1.2 m/s^3.

2.2. MAXIMUM SPEED

The maximum rated speed is 70 Km/h with a maximum specific speed of 80 Km/h (in tramway sections and distances previously studied by CAF). The traction equipment shall gradually reduce the effort so that the unit does not exceed 80 km/h. Should the unit exceed a speed of 82 km/h (due to a slope on the track) the traction equipment shall automatically apply the brake regardless of the status of the traction master controller until the speed falls below 80 km/h.

The maximum nominal speed shall be calculated with new wheels for normal service and under AW4 load conditions.

2.3. BRAKE PERFORMANCE

The electrodynamic brake is the priority braking system for the units with the purpose of reducing the application of the friction brake to a bare minimum.

The friction brake shall be applied to complement the electric brake to reach the required braking effort (“blending”). This friction brake shall also operate in the event of a complete or partial electric brake fault.

Service deceleration between 0 – 80 km/h in accordance with the specifications is 1.20 m/s^2 +/-0.05 (Jerk: 0.8-1.0 m/s^3).

The above performances shall be calculated for the following conditions:

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- Any supply voltage
- Maximum load conditions (AW4)
- Rotating masses: 7 % of the Tare
- Level track section

2.4. REDUCED PERFORMANCE

The units will be designed so as to meet the service conditions outlined in the following cases:

- **Unit with 1 traction drive unit isolated.**

  Start up on a slope under maximum load to provide service up to the end of the journey with a certain amount of degraded performance.

  Also the traction operation is designed so that the maximum speed is automatically limited to the preset value for this type of traction fault. The traction equipment shall gradually reduce the effort so that the unit does not exceed 40 km/h. Should the unit exceed a speed of 42 km/h (due to a slope on the track) the traction equipment shall automatically apply the brake regardless of the status of the traction master controller until the speed falls below 40 km/h.

- **Empty Unit Pushing a Unit with Maximum Load**

  Rail traction performance is such that this operation can be carried out safely on a maximum gradient to the end of the line or to a point on the line where replacement has been planned.

  An extremely high level of adhesion is required along with good track conditions.

2.5. POWER

The nominal power for the vehicle, in accordance with the standard CEI 60349 (previously CEI 349) is 61kW per motor at 1541 rpm. The total nominal power of the vehicle is 732kW.

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3. CARBODIES

3.1. GENERAL CONSIDERATIONS

The carbody has been designed to meet the transport requirements in the technical fields of operation and aesthetics.

The carbodies are designed to provide adequate protection to the passengers should an accident occur. This is especially the case for driving personnel should there be a head on collision with another train, cars, and also specific protection by means of a barrier should a member of the public be run over.

Regarding the interior arrangement and decoration, solutions have been found to maximise the interior comfort based on accessibility, ergonomics, visibility, comfort and safety criteria. Also, a pleasant environment has been developed using warm tones and ample lighting.

As well as maximising passenger comfort, work was focused on reducing maintenance and cleaning times. To reduce these times we have focused on assembly simplicity and accessibility to all vehicle items. In this way we have removed all areas which were difficult to access or that could lead to the accumulation of paper or dirt.

The carbodies are self supporting with low-alloy steel structures for the underframe, and stainless steel structures for the sidewalls and roof.

One of the main characteristic of the proposed materials (described in the following sections) is their easy solderability by conventional ways; characteristic that facilitates the repairing of damaged elements, in comparison with other materials as the aluminium or austenitic type steels. The repair and welding methods will be equivalent to those ones used in buses.

Both carbody ends have fibreglass-reinforced polyester body-ends with a metal shell to protect the driver in the event of an accident.

The interior decoration is functional and is mainly moulded fibre glass reinforced phenolic resins with a M1 fire rating or higher.

The general dimensions of the proposed vehicle are included in the drawing Q.00.072.10 B H1 and H2 and can be summarize in the following ones:

Maximum length over carbody structure	42.7m
Maximum width of LRV	2.65m
Saloon low floor height above rail level	350mm
Passenger Door clearance height	2028mm

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Double Passenger door width (free opening)	1300mm
Single Passenger door width (free opening)	800mm
Seat Width per passenger	min. 450mm
Interior Headroom	2183mm
Gangway width	min. 650mm
LRV under-floor clearance, from top to rail, fully laden with fully worn wheels	50mm (bogie area)

3.2. STRUCTURE

The structures of the modules are self-supporting, i.e. the load bearing structure of the underframe, the sides, the body-ends and the roof. The assembly in this way is able to withstand those loads laid down in standard EN12663 – 2000 for P-V type vehicles.

The underframe is Corten steel, and the sidewalls and roof are ferritic stainless steel.

From a structural viewpoint, the sides of the vehicle constitute the web of a conceptual beam represented by the structure of the carbodies. These consist of a number of pillars and rails lined with an outer sheet for the purposes of continuity, and the entire unit is firmly attached to the underframe and the roof to form a comprehensive whole. Openings are made for doors and windows in this shell, and in all cases these are framed by pillars and rails to prevent deformations in the lining sheets. The material used is ferritic stainless steel.

The roofing structure consists of two cant rails over which trusses have been attached, and sheet steel has been used as lining. This material is also ferritic stainless steel.

The project includes the construction of a polyester body-end for the cab body-end to enhance the aesthetics of the vehicle. Behind this a resistant structure shall be fitted to ensure driver safety.

The proposed carbody structure is manufactured by different type of steels depending on the placement and the loads to withstand:

- S355J2G1W/WP according to UNE-EN 10155: Low alloy Corten type steel with high elastic limit for interior and exterior frame sills, head stocks, beams and frame supports

- S355J2G3 according to UNE-EN 10025: Carbon steel in profiles and thick plates of the frame.

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- X2CrNi12 according to UNE-EN 10088: Ferritic Stainless Steel (or equivalent) in the rest of the carbody structure except the frame.

The inter-car body-end consists of vertical pillars and one cross member.

The carbody resistance shall be supported with calculations for equivalent existing carbodies.

3.3. DRIVER CAB

The two end modules have a driver cab which extends across the whole available width. Necessary apparatus for driving and control of the train are located in this cab and the driver position is slightly off centre.

The inside of the cab shall be adjusted correctly to the capacities and requirements of the driver taking account of the accessibility to apparatus and systems for the maintenance staff.

3.3.1. Energy Absorption device

The cab structure will include an energy absorption system with an anticlimber element integrated.

This system will permit to absorb all the crash energy in frontal and rearward collisions without causing permanent deformation of the body structure at speeds of 5km/h or below.

The system will consist on the following elements:

- Anticlimber central plate

- 2 energy absorbers:

The central anticlimber plate will be attached to the cab frame by 2 energy absorbers. The absorbers are made by aluminium fuses and will be easily changeable in case of important crash. Before and after a crash it will be easy to verify the status of the aluminium fuses.

The system will be installed at a similar height as the cars and trucks fenders.

3.3.2. Driving desk

A control desk is fitted in each end car cab for train driving, where the apparatus, indicators, controls and items necessary for the running of the convoy are located. This is under the complete control of the driver, always in accordance with the requirements established in the Technical Conditions, with regards to apparatus such as lighting, clearances, etc.

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The construction of this desk is conceived in accordance with the most recent ergonomic considerations with the application of finishing techniques that provide pleasant looks with prolonged duration. Changes required by TIE regarding the design of the desk such as position of the controls etc. will be considered in the Design Stage.

For those items to be laid in the driver desk, as well as those to be located in auxiliary cab cabinets, or in the upper part of the desk, several factors such as the frequency of use, and the response speed they involve shall be taken into account .

The cabs have a rear view camera at both sides of each cab-end providing the driver with a good view of the side areas. There is also a rear view mirror inside the cab, allowing the driver to see the passenger area, and a front camera allowing reverse circulation.

The layout of driver controls will be subject to ergonomic study in order to reduce the multiplicity of commands and to simplify the task of driving the LRV.

To this end:

- the organisation of the driver's console is divided in the following manner:
    - a primary zone, comprising information and controls of primary importance directly linked to the driving of the LRV and operation of the doors, easily accessible from the seated position
    - a secondary zone comprising controls and information of secondary importance used occasionally while driving and easily accessible from the seated position.
    - a tertiary zone comprising controls and lights of tertiary importance not used while driving. In order to activate these controls, the driver may have to leaf the normal seated position.
- the tram diagnostic system will provide the driver with a display facility (screen and luminous lights) situated in the primary control zone, which indicates the condition of the tram, in particular:
    - the functions or equipment which are isolated;
    - the status of each door (by way of a diagram);
    - the status of the power system;
    - the status of the Pantograph (raised / lowered);
    - the status of each braking system / unit;
    - each fault affecting normal operation;

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- procedures to follow in order to correct this fault if within the scope of the operating regulations.

The system will also appropriately record faults to allow fault diagnosis to be carried out at the depot by maintenance personnel. The type of faults recorded in this manner, their identity and the memory capacity of this function will be subject to tie approval at the design phase.

The “Reverse/Forward” selector will be monitored by the event recorder.

The following figure shows a layout of driver controls used in a previous LRV project:

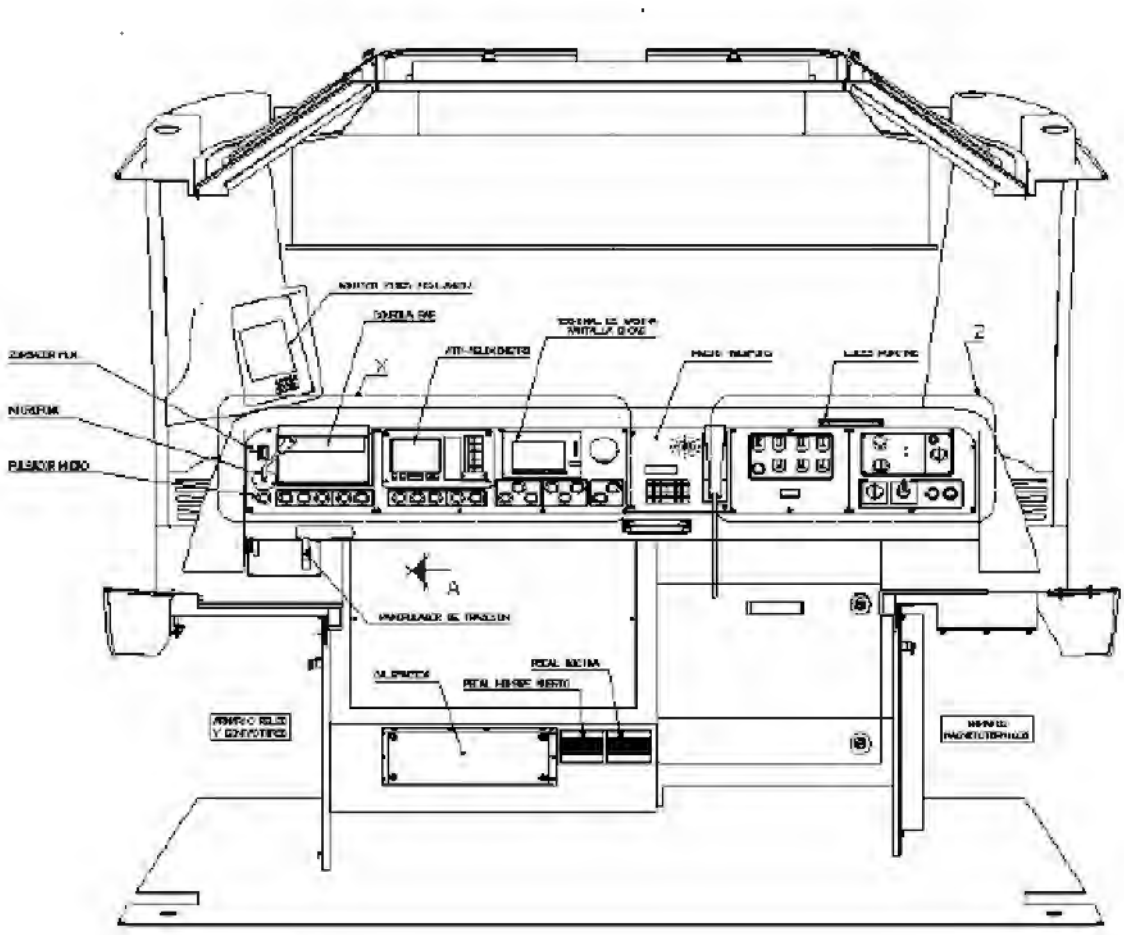

Figure 1. Driver Controls layout of Seville Project

On leaving the driver’s cab, the LRV remains prepared but secure from interference from unauthorised persons with driving and power controls isolated. The following steps must be followed to change the driving cab maintaining the LRV prepared:

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- Stop the tram and locate the traction/braking handle in position “0”.
- Push the “cab change” pushbutton.
- Locate the “reverse forward” selector in position “0”
- Remove the cab enabling key from the cab
- Insert and turn till “HAB” the cab enabling key in the other cab

(NOTE: Pushing the “cab change” pushbutton, the Supervisory Control and Communication System (SCCS) energizes the “cab change” relays during 15 minutes to give to the driver enough time to arrive and habilitate the other cab; during this 15 minutes the battery remains connected to the loads. If during this time no cab is habilitated, the SCCS proceeds to invalidate the “cab change” function and shut offs the LRV.)

3.3.3. Driver seat

The driver seat shall be the result of an ergonomics investigation which shall contemplate various aspects such as the location of the desk, sizes, etc. The cab will also be provided with a portable seat for the instructor, this being easily able to reach the emergency brake control. In order to meet TIEs requirements the redesign of the cab interior layout is foreseen. Thus, the location of the instructor portable seat will be decided at the Desing Stage, once the cab layout has been totally defined.

A grab handle is located in the vicinity of this seat.

The following figure shows a driver seat used in a previous tram project:

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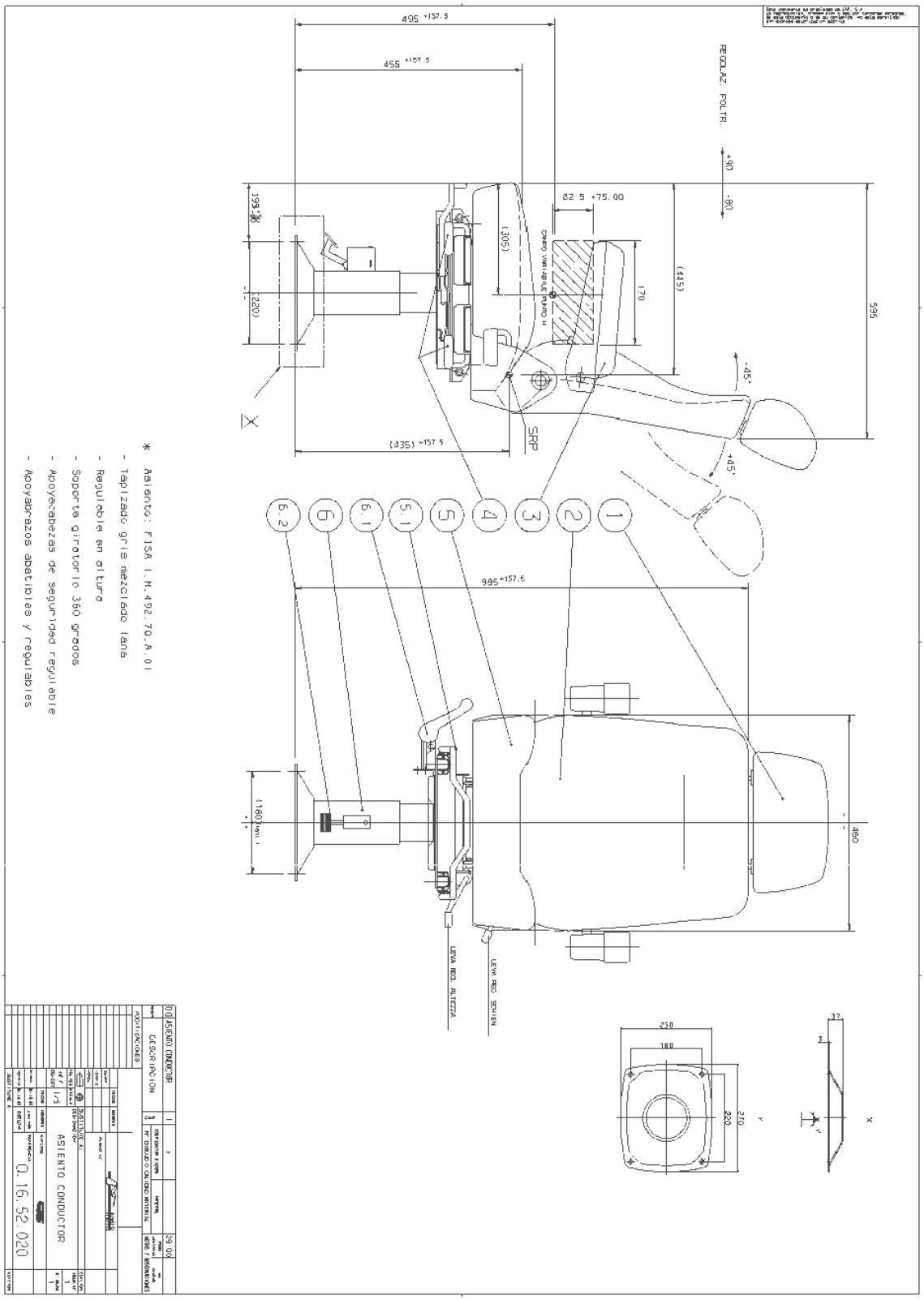

Figure 2. LRV Driver Seat used in Sevilla Project

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USB00000086_0021

3.3.4. Front End

Both carbody ends have fibreglass-reinforced polyester body-ends providing the possibility for improved aesthetics. There shall be a metal frame behind this body providing adequate protection to the driver should there be an accident.

The sizing of the cab glazing panels gives drivers perfect visibility of the track and signals, and also of passenger access areas.

The front glazing panels are shock-proof laminates and can withstand the impact that could occur at maximum speed with passengers due to an obstacle or similar occurrence. The glazing panels have a non-visible demisting system which covers most of the surface area.

Each of the cab are provided with a fabric sunblind and a mirror which gives the driver a view into the saloon when sat at the driver's seat.

3.3.5. Cabinets

At the rear of the driver cab, cabinets which contain the electronic control systems for equipment, such as, communications or black box, are located.

3.3.6. Interface with Passengers

The cab is segregated from the passenger saloon by a glazed partition. Access to/from the saloon will be by means of a glazed, manually-operable, hinged door. The partition is easy to open by the driver and will have a reliable locking mechanism that prevents unauthorised entry to the cab. The cab door is provided with a handle to allow the driver to evacuate the cab quickly in an emergency.

It is possible to retain the door in an open position when required.

All partition glazing is toughened to facilitate emergency egress in the event of lock failure.

The following figure shows the glazing partition offered and used in a previous tram project:

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Figure 3. Cab glazing partition

3.3.7. HVAC

The tram is fitted with one air conditioning unit per cab.

The air conditioning unit is compact, divided on the inside in a compressor-condenser area, which contains a compressor and a condenser coil, and an evaporator area, containing an evaporator coil, electric heating elements and an impeller fan.

Temperature measuring probes are also located inside: for the return air and impelled air.

The cab air conditioning general capabilities and characteristics are the following ones:

Refrigerate Power ..... 4000 W

Heating Power ..... 3500 W

Refrigeration Capability (with 28ºC and 45% Humidity)..... 24ºC (with and airflow of 620m^3/h)

Heating Capability (with -5ºC)..... 21ºC

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3.3.7.1 Air Circulation

The air conditioning area of the HVAC unit takes in exterior air via the exterior air filter side hatch and takes in return air via the lower trapdoor of the return air filter.

The condensation fan forces the flow of exterior air via the condenser coil to sink both the heat generated inside the cab and in the compressor circulation operation. This fan only operates when the cooling system so requires.

The impeller fan circulates the mixture of exterior and return air in the evaporator coil, which is activated or deactivated depending on the energetic demand of the cab. This fan is always operating and impels air through the plenum ducting.

3.3.7.2 Cooling System

The liquid coolant in the liquid tank flows through a pipe to the expansion valve. The purpose of this valve is to regulate the amount of coolant flowing through the pipe to produce the required cooling and to distribute this liquid via the evaporator coil, where it evaporates, cooling the tubes of this coil and hence, cooling the air circulating through them.

The cold coolant gas coming out of the evaporator coil at low pressure is compressed by the compressor where it leaves in gas form at high pressure and overheated. Once compressed, the coolant gas reaches the condenser coil, restarting the cycle.

3.3.7.3 Heating System

Heating is realised by means of two electric heating elements capable of heating the air impelled towards the cab.

3.3.7.4 Preheating Conditions

The required power in order to preheat the two driving cabs from a temperature of 0ºC to 18ºC is of 4kW. The required time is aprox. 60min.

3.4. PASSENGER SALOON

3.4.1. Passage Between Cars

Tram modules are interconnected by unobstructed gangways which allow continuity between them with hardly any narrower sections.

Passengers may move through this area easily and safely when the tram is moving over curves.

The connection between the unit carbodies is realised by means of mechanical articulated connections at the underframe and roof level. The gangway is installed between this upper and lower mechanical connection.

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The gangway is designed to adapt to all the movements and stresses that could occur whilst the tram is in motion, providing a water tight connection with the maximum possible safety guarantee.

The proposed vehicle provides an unobstructed gangway in the lower 1400 mm floor area. In this way there is ample clearance at the shoulder height of the passengers.

3.4.1.1 Articulation

The seven carbodies making up the unit are semi-rigidly coupled, forming a single operating unit. The mechanical connection between the ends of each carbody is performed by means of a main articulation at the underframe level and by means of another auxiliary articulation at the roof level.

The design of this articulation permits free rotation between carbodies with respect to the vertical and transversal axes, maintaining at all times twisting rigidity with respect to the longitudinal axis.

The main articulation consists of two steel castings, one upper and one lower, and one axial articulation bearing. These components are connected by the bearing. Both articulation bodies are screwed to the lower stand. In combination with the upper articulation point, this connection combined with a hinge articulation only permits movements around the Z-axle, whereas the combination with a pitching articulation permits movements around the Z- and Y-axle.

The hinge articulations, are located in 4 of the 6 gangways, prevent rotation with respect to the transversal axis, providing the unit with the required rigidity for circulation in a single unit. The gangway with pitching articulation allows the unit to travel along sections of track with vertical curves. These roof level connections help the main articulation in the transmission of the lateral efforts during the transmission of torsional loads.

To uncouple the cars the gangway must be released together with the upper and lower mechanical connections.

3.4.1.2 Gangway

The passenger saloons of the cars making up the unit are interconnected by unobstructed gangways which allow continuity between them with hardly any narrower sections.

The gangway consists of the following items:

Fixing Frame

The fixing frame is the item that supports the undulated bellow and fixes it to the car body end. It is comprised of an upper item, a right side item and a left side item.

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The rubber section is fitted on the outside of the fixing frame elements and serves to ensure water tightness between the undulated bellow and the fixing frame when the unit is mounted.

Undulated Bellow Assembly

The undulated bellow assembly comprises of an undulated bellow and two floor covering valances, a roof, a false ceiling and connection fabrics.

- **Corrugated Bellow**

The bellow, with its wave shape, is made up of special, flexible fabrics and bellow frames. The fabric waves are produced using special bellow fabric, sewn and fitted under pressure on aluminium sections that connect the waves to each other. The frames provide stability to the shape and the fabric provides the flexibility of the bellow. Both form the structure giving rigidity and maintaining the shape of the assembly. Each wave has a liquid drain hole in a low central position.

- **Floor Covering Valance**

The floor covering valances, like the undulated bellow, consist of waves of flexible fabric fitted between aluminium sections.

The floor covering valances are fixed to the lower surface of the bellow and on each bellow frame. They are fixed to the car by means of screwed-on strips at the valance connection flaps.

- **False ceiling**

The false ceiling, like the undulated bellow, is made up of waves of flexible material. The false ceiling serves to conceal the air conditioning ducting from view where it passes along the roof area.

Special attention shall be given to the optimization of this area where the air passes to minimise load losses, to ease air circulation from one end to the other of the units should an HVAC unit fail.

- **Roof**

The roof is fixed in the upper part of the undulated bellow and serves as an aesthetic seal with the side edge of the vehicle.

3.4.2. Windows

Fixed windows shall be fitted on the sidewalls of the passenger area of the unit. It shall be possible to open the windows to ventilate the vehicle in an emergency situation should the HVAC system break down. The windows that can be opened shall remain locked by means of a square lock once opened or closed.

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The window arrangement shall provide a good outside view of the passengers in a seated or standing position.

Tempered glass of 5mm with anti-reflection properties are used for the saloon side windows.

3.4.3. Interior Seating Arrangement

The seating arrangement can be seen in drawing Q.00.072.10. The seating arrangement is modular in design and can be change modifying the luggage rack space (replacing a luggage racks by a 3 seat module) or by changing the numbers of door per side.

It is worth pointing out that for all of these we have aspired to optimise the following parameters:

- Transport capacity
- Luggage Rack space
- Ease of circulation inside the vehicle and smooth flow between the vehicle and platform.
- Aesthetics and general comfort inside the car.
- Safety.
- Average journey times

We have also taken into account the conditions required to guarantee the location and mobility of persons with disabilities.

3.4.4. Seats

The proposed seats are ergonomic and the material used is easy to maintain and vandal proof. They are cushioned type seats. The fabric used for the seats will be Edinburgh Tartan (Holdsworth or any other supplier).

During the design phase anthropometric designs will be taken into account (height, length, width, feet, etc.) with respect to the population in their forecast evolution over the next fifteen years.

They have a high resistance to fire and low emission of smoke and are designed to resist the most common types of vandalism, with designs tested on multiple rail systems. They comply with BS 6853, Cat 2.

The width of each seat will be 450 mm. In this way a wider gangway is achieved in the 2+2 areas, and hence increased passenger flow, without reducing the comfort of the seated passengers. Seat rows will be pitched at least at a distance of 752mm.

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Due to the lack of any floor height difference within the available area of the tram, all the seats in the offered tram are accessible without using steps.

Vertical poles will be fitted on the backrests on the gangway side of the seats in order to facilitate the passenger flow and the comfort of the standees.

Please see drawings of a possible seat in Annex 1.2.1.

3.4.5. Luggage Racks

The luggage Racks arrangement can be seen in drawings Q.00.072.10 B H1 and H2. The proposed luggage racks are distributed evenly about the vehicle and are situated over the bogies, near to the vestibules. Two of the luggage racks will have enough space at floor level, without any pedestal, facilitating the access of heavy and big luggage. The racks will be made by metallic profiles and with 2 intermediate shelves made by glass or metal. The Floor surface occupied by the luggage racks will be of approx. 7,6 $m^{2.}$

The luggage racks will be easy to be dismounted and the luggage racks space will be easily replaceable by a 3 seats module.

Please see drawings Q.000.72.47 and Q.000.72.48 in order to see the design of the luggage racks.

3.4.6. Handgrips

The number and location of the poles and handgrips for passengers has been thoroughly investigated so that when the car is full the maximum amount of passengers of all sizes can be held and in a way that access and alighting via the doors and movement along the cars is not obstructed.

The proposed handgrips/poles are tubular or solid soft shaped items with no loose ends.

They consist of tubular items made of stainless steel. They shall be smooth, with no loose ends and adaptable to the hand.

Vertical poles will go from one side of the seat backrest to the tram ceiling and they will be arranged in a way that the movement along the tram results easy.

Please see drawing Q.00.072.34 in order to see the arrangement of the grab poles.

3.4.7. Lighting

The number of lamps proposed is sufficient to achieve uniform lighting protected by a specially designed technical false ceiling.

The lighting arrangement is lengthways, in two parallel lines on both sides of the gangway. The lights are supplied with a continuous voltage of 24Vdc.

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The passenger saloon lighting is at a height of 1 m from the floor, with a value between 280-350 lux.

The proposed lighting fixtures are produced in painted steel with the polycarbonate diffuser with M1F1 characteristics.

The passenger saloon and driver cab lighting is constantly on, even during short interruptions of the supply voltage (interruptions of up to 30 seconds).

The unit is also fitted with emergency lighting. These lights guarantee the minimum level of lighting required according to the applicable standards, for at least one hour.

3.4.8. Interior Linings

3.4.8.1 Floor lining

The proposed floor lining has the following characteristics:

- Resistance to heat and sudden changes of temperature.
- Good sound and heat insulation.
- Resistance to vibrations.
- Prevents water ingress underneath.
- Resistant against chemical agents.
- Fireproof.
- Rot-proof.
- Punch and tear proof.
- Slip-proof.
- Easy to fit when partial or total replacement is required, with a minimum colour contrast with the rest of the surface.
- Easy to procure as a spare part.
- Easy to clean with water, without the floor or supporting structures being damaged.

The proposed floor consists of 14mm thick birch plywood with a 0,5mm thick aluminium skin with M1F1 characteristics. The assembly thickness shall be 15 mm. This type of panel provides excellent water tightness, resistance, soundproofing and fireproofing.

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A synthetic rubber (Mondo), complying with BS6853 Cat.2 standard, is bonded to the floor. The entire thickness of this flooring has good heat and sound insulation and slip proof characteristics, even in humid conditions.

3.4.8.2 Wall Coating

The wall coating consists of fibre glass reinforced phenolic resin panel modules with a gel coat coating, treated such that it cannot splinter or burn, M1F1 qualification, and is hard enough to prevent passengers scratching it.

The interior of the side wall coatings is insulated with glass wool panels with an aluminium face (M1 F1). CAF believes that the characteristics provided by this type of material are appropriate as we are dealing with vehicles which usually travel on the surface.

3.4.8.3 Ceiling lining

With regards to the wall interior, it is proposed to use painted aluminium plates (M0F0) and fibreglass reinforced phenolic resin panels. It should be pointed out that the use of aluminium sections reduces the possibilities of the geometry of these coatings due to the difficulty to form the metal materials with curves on different planes (rounding). For this reason, for those parts of the ceiling with a complex shape it is proposed that fibreglass reinforced phenolic resin panels be used (M1F1 characteristic).

Just as with the side walls, glass wool panels with aluminium face (M1F1) are used to insulate the ceiling coatings.

3.4.9. Fire Protection

The proposed materials have been chosen, considering the functional resistance, durability, safety and maintenance requirements.

All the materials which are to be used have been studied according to two aspects:

- On an individual basis according to their particular characteristics.
- Globally as part of an assembly, taking into special consideration for this case the possible effect on the passenger due to its performance facing a fire source and the consequences: emission of toxic gases, opaque gases, etc.

DESCRIPTION	PROPOSED MATERIAL	FIRE /SMOKE CHARACTER. (NF F 16 101)
Floor	Syntethic rubber (Mondo)	BS 6853 Cat.2
Floor panels	Plywood	M1 F1
Side wall coatings	Phenolic resin	M1 F1

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DESCRIPTION	PROPOSED MATERIAL	FIRE /SMOKE CHARACTER. (NF F 16 101)
Ceiling linings (Material according to the geometry)	Phenolic resin Painted aluminium	M1 F1 M0 F0
Lighting ceiling fitting	Aluminium	M0 F0
Lighting diffuser	Polycarbonate	M1 F1
Saloon seat shroud	Phenolic resin	M1 F1
Saloon seat frame	Copper steel	M0F0
Ceiling insulation	glass wool with aluminium sheet	M1 F1
Side wall insulation	glass wool with aluminium sheet	M1 F1
Rear body end insulation	glass wool with aluminium sheet	M1 F1

The Trams are designed to be resistant to fire in accordance with the relevant UK standard (BS6853, Cat 2) or the international equivalent.

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4. BOGIES

The vehicle is supported on 4 bogies, with three motor bogies, drawing L.00.480.00, and a trailer type bogie, L.00.480.10.

The motor bogies have four motors, which are assembled together with their shafts longitudinally, each of which is firmly attached to the gear unit cases to form one single assembly. This gear-motor assembly is completely suspended from the bogie frame, with a number of interspaced rubber elastic components.

Each motor drives a gear unit, which transmits traction torque to the wheel axle via a toothed coupling, and this allows movement caused by the strokes of the primary suspension. A resilient star type coupling is mounted between the motor and the gear unit.

The primary suspension is based on bell-type rubber and steel components which also steer the axles over the horizontal plane.

The secondary suspension consists of coil springs, together with progressive elastic components at the end of the stroke. Damping is carried out externally by hydraulic dampers in parallel with the springs.

Carbody support on bogies is directly on the 4 coil springs of the secondary suspension which support directly above the bogie frame. Traction and braking efforts are transmitted via two drag links.

The planned braking system is 1 disk per wheel, which are attached to the wheels. In the event of an emergency, two electromagnetic rail brakes are used on each bogie. The brake operation is electro-hydraulic and accumulator spring.

The parking brake is also by an accumulator spring. To release it a pressure chamber and a secondary piston are fitted allowing the brake to be released from the cab via a secondary source of oil pressure. There is also a manually operated rapid mechanical release device acting on the brake callipers themselves.

The main characteristics of the bogies are as follows:

Wheel diameter (new/used).....590/510 mm

Wheelbase.....1800 mm.

Primary suspension ..... Rubber-steel

Secondary suspension .....Coil springs

Type of brake .....Disk

Number of disks per bogie.....4

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Brake actuation:..... Hydraulically-operated floating clamp with accumulator spring

Electromagnetic rail shoes, per bogie.....2

Maximum Speed ..... 70 Km/h.



Figure 4. Motor Bogie Photo

4.1. BOGIE FRAME

The bogie frame consists of two longitudinal members interconnected by two cross-members.

Both the cross-members and the longitudinal members are box-section, and consist of plate welded using electric arc welding. The material used is S 355 NL grade steel according to EN 10113.

The frame is H shaped and all the required frame supports are appropriately machined for fixing of the primary suspensions, the drag links, etc.

A number of these supports are E300-520 M grade cast steel in accordance with the UIC 840-2 specification.

Once the frame has been assembled and welded, it is subject to annealing to remove any stress caused by welding.

The geometry has been designed for a rational distribution of efforts, preventing concentration of stresses on joints between parts and sharp changes in section.

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The admissible stress levels as well as the fatigue limits are considered to correspond to those indicated in Rapport ORE Question B12/RP 17 for this type of material. The working limits of the material considered for work under exceptional loads is the elastic limit of the material.

The soundness of the main welds on the frame shall be checked by contrasting ultrasonic and magnetic particle procedures.

The various checking and control sheets for finished components shall be drawn up, as shall the monitoring and control modes for the major stages of manufacture.

4.2. COMPLETE WHEELSET

4.2.1. General

The wheelsets are freewheel type, and consist of a welded box-type beam, the ends of which have, on a higher plane, cylindrical journals. The wheels are assembled on to journals via bearings.

The current return devices and sensors shall be mounted on the wheelset assembly.

4.2.2. Axle Body

There are no wheelsets as such in the bogie assemblies, where the wheels are freewheeling, with the support journal boxes of each pair of wheels being connected by means of a box-shaped structure fabricated by means of welding. Thus the assembly formed is similar to a wheelset assembly but does not link the rotation of the two wheels.

The wheel hubs which incorporate the bearings to allow free movement are assembled onto these journals.

All the welding of these items, given that they are safety parts, shall be manufactured using a process similar to that of the frame and controlled the same as this when in non-destructive magnetic particle and ultrasonic tests.

4.2.3. Braking items in the wheelset assembly

The brake components included on the wheelsets are the brake discs. These are mounted on one side of the wheel hub, with one per wheel.

The discs are self-ventilating on which a friction ring is fitted, manufactured in special cast iron. The fastening system absorbs thermal expansion caused during the braking processes.

4.3. WHEELS

Elastic wheels are proposed, consisting of a series of resilient blocks between the hub and tyre. Regarding the material, the elastic wheel uses C3N steel material (to/

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UIC 812-1) at the centre of the wheel and ring, and B6T steel (to/ UIC 810-1) in the tyre assembly.

The bogies are planned for the profiling of the wheels in the service pit, and for this reason some areas have been projected to support of the load arms.

The proposed design will incorporate wheel damping equipment in order to reduce noise levels. Please see information in Annex 1.2.2.8.

4.4. AXLE-BOXES

The axle box does not operate as such since they do not have bearings, and therefore consist merely of a yoke on which to rest the primary suspension springs, firmly attached to the false shaft since the wheels run freely over it. It can be called “axle-box bridge”.

The assembly is projected to prevent ingress of dirt and also to prevent any grease from escaping.

The upper section of the body has a rubber stop, the function of which is to prevent metal-to-metal contact in the event of a breakdown in the primary suspension.

The bearings housed inside the axle box have an interior diameter of 170 mm. The make is a well-known railway equipment supplier.

The bearings are lubricated using lithium soap-based grease with additives, under extreme pressure, consistency 2 type Shell 2760 B.

The bogies shall have current return devices isolated in the axle box by means of a suitable adaptor. Their function is to return the traction current to the rail via the axle, and to protect people against accidental high voltage diversions. To this end, the facility has been provided with devices with the sole function of returning current, and others with the function of protecting staff.

There are 2 per bogie.

These devices shall have replaceable brushes of an appropriate section for the current which is to run through them.

Their general arrangement shall be carried out in accordance with the VDE 0115 and DIN 57115 specifications.

4.5. SUSPENSION

The vehicle's suspension comprises of two stages, primary and secondary, thus achieving optimum vertical and transverse comfort levels and proper running of the bogie on straights and curves alike.

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4.5.1. Primary suspension

The axle steering system, is responsible for transmitting the steering stresses from the axles to the bogie frame, as well as the traction, brake and transverse stresses (i.e. the stresses that occur on a horizontal plane).

This is performed by the primary suspension springs themselves, which have been designed to be free of any elements subject to friction.

The rigidity of the primary suspension springs on the horizontal plane provides the proper longitudinal and transversal union between axles and bogie frame. The rigidity values chosen in the two directions for these springs, allow stable running of the vehicle throughout the speed range up to 70 km/h and proper curve negotiation and low track aggression. It also allows vertical displacement of the primary suspension.

The system is arranged to allow wheel turning on a pit lathe.

The primary suspension is responsible for transmitting the vertical load between the bogie frame and the wheelsets.

This is by means of rubber-steel bell-type springs fitted between the axle box bridges and the respective supports provided on the bogie frame. Its vertical flexibility has also been studied to achieve not only correct steering but also suitable performance vis-à-vis vertical irregularities in the track, ensuring as uniform a loading distribution as possible between bogie wheels and consequently taking optimal advantage of the adherence.

This rubber suspension has its own damping capacity, which makes it unnecessary to use external dampers.

The compression stop of the suspension, located on top of the axle-box, is fitted with a rubber part in order to prevent direct metal-to-metal contact. To limit the extension, there is a flange which limits the stroke of this suspension, thus allowing the bogie to be lifted with the axles hanging.

4.5.2. Secondary Suspension

The secondary suspension consists of 4 coil springs, mounted directly between the carbody and bogie frame having elastic items in between. The rotation of the carbodies vis-à-vis the bogie is absorbed by transverse deformation of the coil springs.

This suspension has a rubber stop system, concentric with the coil spring that comes into operation when the maximum load situation is reached, making the suspension progressive and limiting the maximum stroke.

Vertical damping of this suspension is hydraulic, for which purpose vertical hydraulic dampers are provided for each side of the bogie.

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The suspension is fitted with the corresponding stops to limit displacement (extension and compression), allowing the carbody to be lifted with the bogies hanging during re-railing procedures.

The suspension also has a system of wheel wear compensation to keep the height of the floor constant. This consists of shims fitted beneath the springs in the secondary suspension.

The transverse suspension uses the same suspension springs, and for this purpose they have adequate transversal rigidity. This suspension is complemented with elastic stops with progressive rigidity to absorb the dynamic impact produced in this direction, limiting the maximum admissible displacement. A transverse hydraulic damper is also provided to damp any oscillations which may occur in this direction.

4.6. DAMPERS

Bogies are equipped with secondary suspension vertical dampers as well as transverse dampers. Both are hydraulic. Their selection was made considering the maximum number of strokes allowed by the suspension, so that their stroke limit shall never be reached. The dampers are fastened by means of maintenance-free elastic rubber joints.

4.7. CARBODY-BOGIE CONNECTION

The carbody rests directly on the 4 secondary suspension springs with elastic items in between. Vertical load is thus transmitted onto the springs, whilst load corresponding to the horizontal plane is transmitted through the crossways twisting of said springs.

Progressive rubber stops are provided to limit relative movement between the body and the bogie.

4.8. TRACTION MOTORS

As mentioned in the section on general characteristics, each motor bogie has four motors which are fully suspended and mounted with their shafts arranged lengthways to the track.

The bogie is equipped with four asynchronous propulsion motors each of which is bolted to its corresponding gear unit, thus forming a rigid assembly. This assembly is suspended from two points of the corresponding frame supports located on the cross members by means of a system of elastic parts.

The gear-motor assembly can be dismantled from the side of the TRAM without having to lift the carbodies.

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4.9. GEAR UNITS

This assembly is located in the cinematic chain between the motor and coupling which transmits the gear efforts to the wheel.

Gear units are hypoid type.

Gear units are directly bolted to motors and are fully suspended.

The gear unit is dimensioned in such a way as to transmit the maximum efforts in both propulsion and braking, as well as those efforts arising from the vibrations caused by the rolling of the axles.

This type of gear unit offers silent operation.

The gear unit case is manufactured by casting and is suitably machined to allow for interior assembly of the gears and bearings.

Lubrication is by means of oil splashing for the gear wheel and by gravity for the pinion and bearings. To this end, an oil scraping system is installed which operates by concentrating part of the oil in a small container located on top of the gear unit, and by conduits machined in the case to channel the oil to the bearings.

The gear unit is fitted with an inspection lid for checking the interior condition of the gears, as well as with the corresponding drain and fill plugs and level indicator. One of the plugs is equipped with a magnetic separation system for metallic particles.

Protection against oil leaks or dirt ingress is provided by a system of labyrinths with no moving parts which could become subject to wear.

All the gear units will be subject to a rig running test to establish the corresponding control range, which will be subject to prior approval.

4.10. ENGINE-GEAR UNIT COUPLING

The two gear units are driven directly by the motor shafts by means of a star type resilient coupling. These couplings are designed to absorb the minor misalignments of the assembly and allow for detachment of the gear unit from the motors.

4.11. GEAR UNIT-WHEEL HUB COUPLING

The couplings are included as part of the cinematic transmission chain of torque between the gear unit and the wheels.

These parts are designed to transmit torque and are able to absorb the relative misalignments and shifts between their input and output shafts imposed by the movements of the shafts both on the vertical and horizontal plane.

They are toothed type, mounted between the cover of the hollow shaft at the gear unit output and the wheel hub.

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The coupling is balanced and homokinetic, creating no vibrations during operation.

4.12. BOGIE BRAKE EQUIPMENT

The bogie brake unit is a disc braking system. There is one per wheel and they are mounted on one side on the wheel hubs.

In addition, and to act as an emergency brake, two electromagnetic brake shoes are incorporated, arranged one on each side. These shoes provide additional braking power in the event of an emergency.

The unit is basically made up of the following parts:

- Disks.
- Braking callipers.
- Brake linings
- Parking brake.
- Electromagnetic rail brake shoes.
- Brake callipers

Activation of the brake pads against the discs is carried out by means of a hydraulic calliper system.

The number of callipers used is 1 per disc in all cases. In the case of motor bogies the brake callipers are fixed to the gear unit cases and in the case of the trailer bogies they are fixed to the axle box.

The callipers of the bogies consist of accumulator coil so that in the event of loss of hydraulic fluid, the brake pads are applied to the discs offering maximum braking. Therefore, the system operates with built-in safety. Under normal operation, the disc type accumulator springs incorporated in the callipers are held back by the hydraulic pressure being applied to the hydraulic pistons of the clamps. Upon braking, the pressure in the circuit is reduced so that the force of the accumulator springs is partially applied.

The brake units are equipped with an automatic gap adjustment system between pad and disc so that the gap remains constant regardless of the wear accumulated in both.

4.12.1. Brake linings

The quality of the material is one habitually used for these units, with no asbestos, zinc or lead in its composition.

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4.12.2. Parking brake

The parking brake for these bogies is by means of an accumulator spring. They are applied by releasing the hydraulic pressure in the circuit. Should it be necessary to release this brake to move the vehicle when the hydraulic brake equipment cannot be used there is a pressure chamber and a secondary piston allowing the brake to be released from the cab via a secondary source of oil pressure. There is also a manually operated rapid mechanical release device acting on the hexagonal nuts themselves on each of the pistons in the motor-bogie callipers.

This brake is designed to be capable of immobilising the Unit under maximum load on the maximum gradient.

4.13. AUXILIARY BOGIE EQUIPMENT

This heading includes several items that while not directly related with the bogies, are nevertheless mounted on them. It consists of the following:

- Electrical equipment.
- Slip protection equipment.
- Flange lubrication equipment.
- Tachograph and speedometer sensors.
- Sanding equipment.
- Electromagnetic brake shoes.

Most of these items are described below.

4.13.1. Electrical equipment

This heading covers the following elements:

- The current return device.
- Wiring.

The bogies are equipped with shunts between the axle boxes and the bogie frame, between the traction motors and the bogie frame, and between the bogie and the car body. These shunts allow the HV return current, or any fault currents that may be produced, to flow to the rails.

For connection between the axle boxes and the wheelsets, brushes are mounted specifically to carry these currents.

Four of these devices are mounted on the motor units, two for current return and two as earthing devices.

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Their location on the vehicle is in accordance with the specifications of VDE 0115 and DIN 57115.

The motor power-supply cables are attached to the bogies by insulated cable clamps and are connected to the cables from the car in junction boxes placed close to the bogies, to enable easy disconnection.

Connections to the auxiliary equipment on the bogies are via PMA-type flexible electrical cables that connect the car to the bogie via a fast-release main connector mounted in an accessible location. These connectors are waterproof and suitable for outdoor use.

4.13.2. Flange lubrication equipment.

The first axle of each end bogie incorporates a flange-lubrication system to reduce wear at curves. Its operation is interlocked with the position of the reversing system, in such a way that only the system on the leading axle will operate whichever way the car is moving.

An option with the provision of this equipment in only 6 trams is mentioned in chapter 1.2.4 “Tender Variants” of this tender.

4.13.3. Sanding equipment.

Track-sanding systems are located next to the four corner wheels of the 3 motor bogies, to improve adhesion between the wheels and the rails when necessary. This way, the sand shall be deposited on two locations on each rail per direction of travel. Operation of the sanders is interlocked with the direction of motion, so that only two sanders per bogie are active at any one time, depending on the direction.

The sand-boxes and the ejectors are mounted on the car bodies, while the bogies only carry the supports that hold and direct the flexible tubes that conduct the sand from the ejectors.

The ejectors are electro-pneumatic and the system is fitted with a small motor-compressor unit to generate the air pressure that ejects the sand.

Sand specification and contact details for a UK-based commercial supplier of this sand will be provided during de design phase.

4.13.4. Electromagnetic Shoe

For additional braking power in emergency situations, two electromagnetic rail brake shoes are mounted on the bogies, one on each side of the bogie.

The rail shoes are suspended from supports attached to the arms of the axle boxes. Suspension is by means of coil springs with a mechanism to regulate the height above the rails. This system has a bronze regulation nut to prevent seizing and to ease manipulation.

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Supports, to absorb the longitudinal and transversal braking efforts produced in these elements, are mounted onto the bogie frame.

The rail shoes are replaceable fixed-pole pieces with the magnetising coils inside them.

4.13.5. Corrosion Protection

Once the frame and cross member have been assembled, welded and treated, they are cleaned by sandblasting and then given a protective coating of rustproof primer.

Following this, they receive a double coat of paint, to achieve a total thickness of 120μ.

In the case of the general hardware, the sandblasting is substituted by degreasing, and these elements are given a paint thickness of 80μ.

4.13.6. Re-Railing

These are the most common methods used for re-railing motor bogies:

- **By means of a crane:**

With the help of NYLON slings or support beams, the end carbody is lifted, horizontally displaced and positioned back on the track.

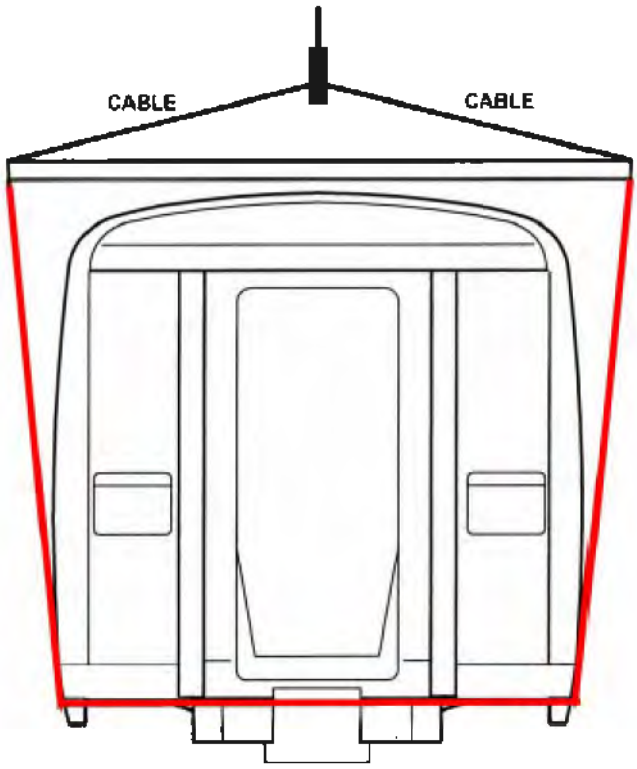

Figure 5. Re-railing procedure with nylon slings

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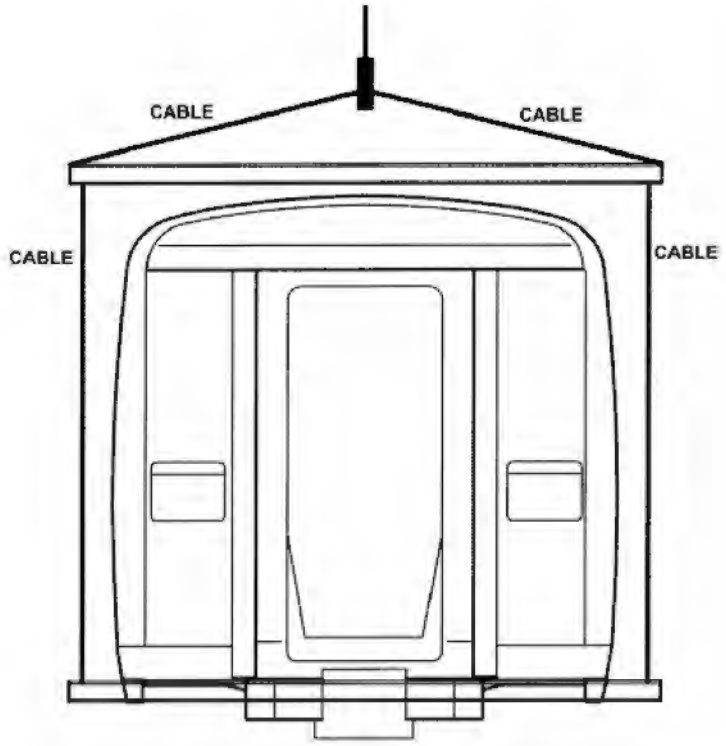

Figure 6. Re-railing procedure with support beams

- **By means of pneumatic bags and a re-railing equipment:**

The procedure is analogous to the one previously described.

Find bellow the position of the pneumatic air bags.

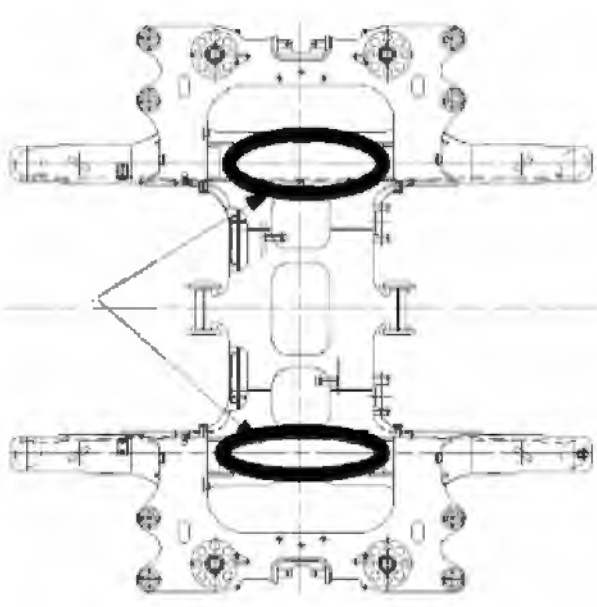

Figure 7. Position of the pneumatic air bags.

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5. COUPLERS

The tram is provided with a permanently fitted “Albert” type coupler. This coupler is easily manoeuvrable and is designed such that it will perform as required on the worst combination of horizontal and vertical curves on the system.

For electrical connection between the units, an electrical hose with connectors at both ends is assembled between the two front sections separate from the couplers, and this provides continuity for the signal circuits required for control.

The following functions will be maintained in the rescue situation:

- release of brakes on the failed tram from the rescuing tram;
- phone communication between the cabs on both trams;
- use of the horn on both trams in case of a phone failure;
- ability to activate the safety brake in the leading cab of the failed tram when being pushed and thereby cutting traction on the rescuing tram;
- full use of exterior indicator lights on both trams;
- power supply to and control of the electric bell on the failed tram from the rescuing tram;
- control of the points control system from the front cab when the rescuing tram is pushing.

No tools will be required by drivers when coupling trams together in a rescue situation.

It will be arranged such that coupling can be effected with minimum delay.

The driver display in the active cab of the rescuing tram will indicate the brake status of tram being rescued.

The coupler has a draft bar equipped with an articulation which allows the bar to bend and hide itself or stow the automatic coupler below the carbody when it is not in use.

The couplers are stowable, concealed on the front section beneath a flap door, which must be opened by hand to carry out the coupling procedure.

A fairing allows the coupled vehicle to travel on the curvature radii on the track, without interferences in normal circulation conditions.

For the couplers to be positioned for coupling, two locking bolt devices holding them in place must be manually released. Once these have been released, the two

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sections of the coupler body which were folded away must be placed in the operational position using a locking system. For the reverse stowing procedure, the locking system must be released manually prior to refolding and concealment beneath the front section.

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6. TRACTION

A description of possible Traction System equipment is shown in Annex 1.2.2.1. The Dynamic Performance calculated with parameters described in document "Operations Simulations Report" can also be found in Annex 1.2.2.2.

6.1. PANTOGRAPH

Further information about the pantograph and drawings are included in Annex 1.2.2.6.

The pantograph receives the 750 Vdc high voltage current from the catenary, via the collection shoes and transmits it along its frame, supplying electricity to the whole vehicle.

The pantograph will be compatible with the Overhead Catenary System and the design will ensure that excessive wear of the carbon strips is avoided.

The design and functioning of the pantograph will conform to the European standard: EN 50206-2 'Railway Applications – Rolling stock – Pantographs: Characteristics and Tests – Pantographs for Metros and Light Rail Vehicles'.

Technical Specification

- Pantograph type/suppliers reference — Schunk
- Minimum height with insulators — 426 + 20 mm
- Minimum working height — 635 mm
- Maximum working height — 3800 mm
- Pan head width — 1981.2 mm
- Maximum length in lowered position — 2757 mm
- Total weight — 247 kg

Carbon strips

- Length — 1371.6 mm
- Material — Metalized graphite-carbon

Voltage

- Minimum — 525 VDC
- Nominal — 750 VDC

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- Maximum 950 VDC

Current

- Running (maximum) 1200 A
- Peak 1800 A
- Static upward force on carbon strips 70 N ± 10 N
- Maximum operating speed 80 - 100 km/h
- Type Air
- Lowering time 5 - 7 seconds
- Rising time 5 - 7 seconds

6.2. LIGHTNING ARRESTOR

The lightning arrestor protects the traction unit from high voltage peaks in the catenary caused by lighting bolts striking the catenary or some other type of discharge.

It shall be located close to the pantograph for total effectiveness and via a plate with a cross section of at least 16 mm^2.

6.3. CIRCUIT BREAKER

The train unit shall have one UR6-31 type Secheron, single pole, direct current, bidirectional circuit breaker to directly protect the traction circuit from short-circuit failures. In addition, the CB shall permit remote controlled opening and closing for connection and disconnection of the train and opening in differential faults.

The CB shall be housed in the standard Secheron casing for this CB and prepared to be mounted on the ceiling.

6.3.1. Technical Information

- Rated voltage ..... 1000 V DC
- Rated Current (In) ..... 1000 A
- Actuation time ..... 2 ms with di/dt >= 5.10 6 A/s
- Breaking capacity ..... 30 kA where τ = 15 ms
- Nominal thermal current: ..... 1850 A CC (preliminary)

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- Breaking capacity: ..... 30 kA where τ = 15 ms
- Temperature range (In = 1000 A) .....-25 °C…+40 °C
- Temperature range (In = 750 A) .....-25°C…+80°C
- Protection grade..... IP 55 (standardised insulated housing)

Solenoid details (electrical retention):

- Rated voltage ..... 24 V DC
- Making nominal power ..... 835 W
- Nominal retention power ..... 2.5 W

Auxiliary contacts

- Rated voltage/current.....1 A / 24 V DC
- Type .....6 NA and 6 NC

6.4. TRACTION INVERTER

6.4.1. Line Voltage

The traction system shall measure the line voltage after the high speed circuit breaker

This measurement shall be made in the traction inverter and this information shall be sent to the control and monitoring equipment on the train via the serial connection. The information shall be presented to the driver.

6.4.2. Line current and detection of differential fault

The traction inverter shall detect the differential faults that may occur in the equipment.

For the differential fault control, the line current transducer(s) can be used together with the return transducers (installed within the traction box) or differential relays also installed inside the inverter.

In case of differential fault detection the traction system shall open the circuit breaker control loop resulting in immediate opening.

6.4.3. Input contactors

The inverter shall be equipped with an input contactor so that the traction inverter can be disconnected. These contactors shall allow the isolation of the inverters even when the inverter is working at maximum power.

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It shall be possible to isolate each of the 2 inverters separately from the cab.

6.4.4. Input Filter

The filter characteristics are appropriate to:

- Reduce the catenary voltage ripple.
- Protect the inverter against over-voltages and sudden voltage drops.
- Have a high impedance before the harmonics generated by the inverter itself.

The inverter is fitted with a preload circuit (contactor + preload resistance) which shall allow the condenser charge current to be limited during start up. The pre-charge circuit (including the resistor) is housed inside the inverter box.

6.4.5. Power electronics

The brake chopper comprises of two independent circuits discharged on each of the brake resistors.

The traction inverter must always maximise the current returned to the catenary. Only when the catenary voltage reaches the limit established in standard IEC 60163 shall the brake chopper be activated.

The traction inverter consists of two independent semi-inverters. Each of these semi-inverters shall supply two motors.

The inverters are three phase, connected directly to the catenary.

The inverter shall be based on IGBT technology with the following characteristics:

- Maximum locking voltage: ..... 1700 V
- Maximum current of collector: ..... 800 A
- Manufacturers: Eupec, Mitsubishi

6.4.6. Traction Control Electronics

The traction system has an adequate processing unit which shall permit the following interfaces with the train:

- Series RS-485 interface with the train control and monitoring equipment.
- Wiring interface with the friction brake and with other train equipment.

The traction control electronics are fitted in the traction inverter (inside the same box).

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The main functions of the electronics are as follows:

- Traction equipment control
- Communication with the other inverter
- Control of the power modules
- Data storage for diagnosis
- Pre-charge Control
- Wheel Slide Protection control
- …

6.5. TRACTION MOTOR

6.5.1. General characteristics

Three phase motors are used with a self-ventilation and closed design. They are squirrel cage type motors. They are rigidly connected on the side opposite to the drive. Each motor couple–gear-unit makes up a drive unit. Two traction units with gear units are mounted on a motor bogie with resilient mounts.

Self ventilated and closed motors have been chosen for their greater reliability. The cooling system for each motor consists of an internal and an external air circuit. Each air circuit is operated by its own fan. The two air circuits are strictly separated. The interior circuit cools the winding covers and the stator winding. The exterior fan provides cold air, taken from the air inlet, via the holes in the stator's iron core. The air inlet is fitted with a grill. Traction motor maintenance is limited to greasing of the bearings, cleaning of residual grease at regular intervals, and periodic cleaning of the air conducts and filtering systems.

The static and dynamic balancing of the high precision rotor reduces the vibrations to a bare minimum. The traction motor is protected from dust and water splash. The materials used and the protection paint ensure resistance to environmental influences such as a salty and corrosive environment.

For thermal protection the motors are equipped with PT100 temperature sensors. Following evaluation of the PT100 signals in each motor the temperature information is read by the Traction Control Unit for later processing and the actual thermal protection of the motors.

Tested speed sensors are fitted in each motor which measure the speed of the motor on a toothed wheel, fitted in the fan, in a position that can be easily accessed. By means of a special evaluation method (ratiometric counting) the low speeds can also be processed at an optimum level in the Traction Control Units.

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6.5.2. Technical Information

- Nominal power .....61 kW (132 kW per double motor)
- Rated voltage ..... 453 V
- Rated current ..... approx. 103 A (per single motor)
- Nominal speed .....1541 rpm
- Maximum Speed .....4000 rpm
- Rated frequency..... 52 Hz
- Nominal torque.....~ 378 Nm (per single motor)
- Number of poles.....4 (2 pairs)
- Efficiency.....89 %
- Cos phi 0,84
- Type of protection: IP54
- Weight: .....~ 610 kg per double motor
- Lubrication:.....lubrication with grease
- Insulation grade..... H
- Winding type ..... Round wire winding
- Speed sensor ..... built in sensor toothed wheel
- Replacement of bearings: ..... 1 million km or a maximum of 8 years
- Bearing lubrication interval:.....150,000 km

6.6. BRAKE RESISTORS

The train unit shall be fitted with three banks of brake resistors connected to each of the traction inverters.

Each bank has two independent resistors connected to each of the brake chopper circuits of the traction inverter. The resistors are electrically independent.

The braking resistors are designed to dissipate all the electrical power generated by the motors when the catenary receptivity is zero. They are cooled via natural convection.

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The assembly shall be protected by a shroud to mechanically protect the resistors and perform the functions of a screen protecting against electromagnetic radiation and heat.

6.6.1. Insulation

The resistors have two insulation stages.

- Resistors/Bank insulation
- Bank/Train structure insulation

The voltage generated by the inverter during braking shall not exceed 1000 V.

6.6.2. Power and operating rate

The continuous rate power is approximately 2*52 kW.

6.6.3. Temperature

The traction equipment shall calculate the temperature of the resistors, measuring the ohm resistance. Therefore, there is no need to install temperature sensors or thermostats in the resistor itself.

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7. SALOON HEATING AND VENTILATION SYSTEM

The climatic comfort is achieved using energy efficient equipment so that the thermal isolation characteristics between the tram exterior and interior are achieved.

The heating and ventilation system ensures that sufficient fresh air is fed into the tram, in addition to the recirculation of air and the following sections of this specification will apply.

It is possible for the driver to de-activate the heating and ventilation system.

A comfortable tram climate for passengers is achieved using heating and ventilation equipment with automatic control systems.

Proposed Heating and ventilation system general characteristics:

The proposed HV system has the following essential characteristics:

- Secure and Reliable performance
- Service proven components
- Minimum weight commensurate with robust construction
- High efficiency
- Microprocessor based controls
- Efficient thermal and acoustic insulation
- …

The offered HV system it is based on a range of similar systems that CAF has supplied to the railway industry over a number of years.

The HV system to be installed per LRV is composed of the following main components:

- 3 HV unit (mounted on the roof of the intermediate modules (Modules B, D,G; see drawing Q.00.072.12 A
- 1 Electronic Control Rack

The unit frame is manufactured in non painted stainless steel.

The Tramway internal thermal comfort is controlled by a microprocessor based temperature controller installed on a common control rack mounted inside the tramway that controls the 3 HV units.

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Apart of the thermostatic control functions (in conjunction with the temperature sensors), the microprocessor controller also provides control intelligence and timing functions.

Thermal design data used for the proposed Heating and Ventilation System calculation:

- Average Transmission factor 3 W/m^2
- Solar transmission factor 60 %
- Solar Radiation 600 W/m^2
- Lighting / electric load 3 kW / Tram
- Supply air fan motor load 2.5 kW / Tram
- Surface temperature due to solar radiation:
  - Roof Te + 25ºC
  - Side Walls Te + 16ºC

Where: Te = Ambient Temperature

7.1. VENTILATION

The equipment design has been based on the design parameters summarized in the tables below:

Dry Bulb Temp. Exterior ºC	**Relative Humidity % RH Exterior**	**Passenger Load**
28	45	347

Figure 8. Ventilation Design Data

The fresh air airflow will be 30m^3/h per passenger. Total 10410m^3/h per Tramway.

The ventilation calculation (figure 15) shows a maximum internal temperature of 37.7 ºC with full occupancy at 28ºC of ambient temperature. See graphic below with internal temperature evolution depending on occupancy and ambient temperature.

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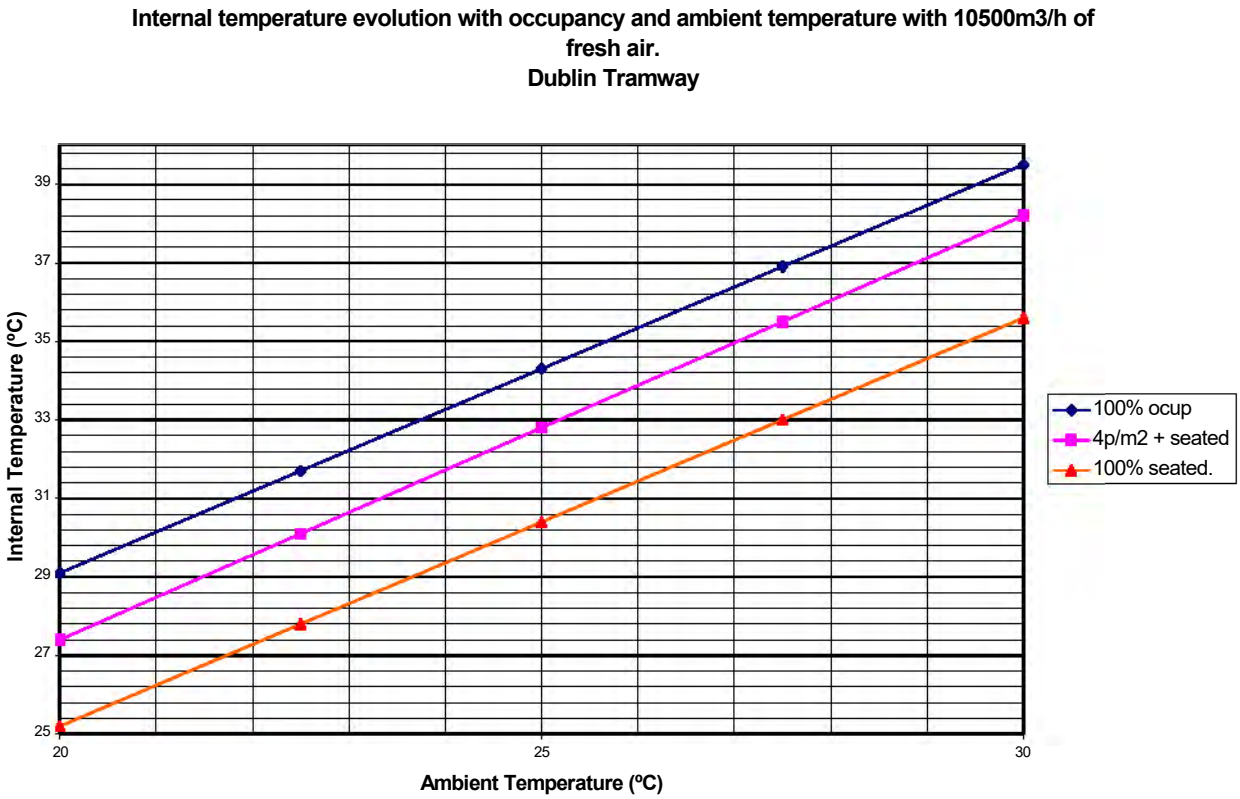

Figure 9. Internal temperature evolution depending on occupancy and ambient temperature

The air is distributed via a longitudinal duct arranged beneath the roofing structure and with outlets on both sides of the central aisle via longitudinal diffusers. The passengers are not subjected to draughts exceeding 0.5 m/s (at a height above floor level of 1.7 m). The air velocity in the ducts is low enough in order to avoid drumming and aerodynamic noise. Adequate thermal and noise insulation is provided.

The necessary air filters are installed in the fresh air and recirculation air inlet. They are easily accessible and dimensioned for ease of maintenance. Commercially available, washable or disposable types are provided.

Furthermore the ventilation achieved by the HV equipment, natural ventilation is achieved by inward opening upper sections of the passenger windows. The design of the inward-opening upper section have a maximum 30º opening angle, prevent excessive draughts and prevent passengers placing heads or limbs outside the body profile.

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DESIGN PARAMETERS

AMBIENT CONDITIONS SUMMER

	T_{DB} [°C]	R.H. [%]	S.H. [g/kg]	Solar radiation [W/m²]
Outside	28,0	45	10,59	600
Inside	37,7	26	12,65	
Vestibule	26,0			

VENTILATION

Number of persons		347
Air flow / person	[m³/h]	30,00
Total air flow	[m³/h]	10410

COIL DESIGN

Bypass factor	[%]	15

COOLING ESTIMATES

SOLAR HEAT GAIN

	Area [m²]	Factor [%]	k [W/m²/K]	ΔTsurface [K]	Intensity [W/m²]	Sensible heat [W]	Latent heat [W]
Side wall windows	27,04	50			600	8112	
Side wall (no windows)	58,76		3,00	16,0		2820	
End wall windows							
End wall (no windows)	5,28		3,00	16,0		253	
Roof	93,60	80	3,00	25,0		5616	
						16802	**0**

TRANSMISSION GAIN

	Area [m²]	k [W/m²/K]	ΔT [K]	Sensible heat [W]	Latent heat [W]
Side wall comfort area	171,60	3,00	-9,7	-5011	
Side wall vestibule					
End wall 1	5,28	3,00	-11,7	-186	
End wall 2	5,28	3,00	-11,7	-186	
Roof comfort area	93,60	3,00	-9,7	-2734	
Roof vestibule					
Floor comfort area	93,60	3,00	-9,7	-2734	
Floor vestibule					
				-10850	**0**

INTERNAL GAIN

	Quantity	Efficiency [%]	S.H./unit [W]	L.H./unit [W]	Sensible heat [W]	Latent heat [W]
Lights / internal heat sources		100	3000,00	0,00	3000	0
Evaporator fan motor(s)		100	2500,00	0,00	2500	0
Heat emission persons	347	100	64,80	50,72	22486	17600
					27986	**17600**

INFILTRATION GAIN

	Air flow [m³/h]	ΔT [K]	ΔS.H. [g/kg]	BF [%]	Sensible heat [W]	Latent heat [W]
Infiltrations	0	-9,7	-2,06		0	0
Fresh air	10410	-9,7	-2,06	15	-5091	-2641
					-5091	**-2641**

VENTILATION GAIN

	Air flow [m³/h]	ΔT [K]	ΔS.H. [g/kg]	1- BF [%]	Sensible heat [W]	Latent heat [W]
Fresh air	10410	-9,7	-2,06	85	-28846	-14963
					-28846	**-14963**

RESULTS

OVERVIEW HEAT GAINS

	Sensible [W]	Latent [W]	Total [W]
Solar heat	16802	0	16802
Transmission	-10850	0	-10850
Internal	27986	17600	45585
Ventilation+infiltration	-33937	-17603	-51540
Total	0	-4	**-3**

AIRFLOWS

Fresh air	[m³/h]	10410
Return air	[m³/h]	---
Treated air	[m³/h]	---

TEMPERATURES

Mixed air	[°C]	---
ADP	[°C]	---

Figure 10. Ventilation Calculation

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7.2. HEATING

The equipment design has been based on the design parameters summarized in the tables below:

Dry Bulb Temp. Exterior ºC	Dry Bulb Temp. Inside ºC	Passenger Load
-5	18	0

Figure 11. Heating Design Data

The fresh air airflow will be 15m^3/h per passenger. Total 5205m^3/h per LRV.

The heating calculations (figure 17) show a maximum heating requirement of approximately 64.850 kW for the tramway.

Each HV unit have an air heating capacity of 22 kW to cover the fresh air and transmissions.

The foreseen heating capacity of 66kW, covers the tramway needs, ensuring the requested performance at design conditions.

The loss of one heating unit in the tram has not a negative effect on the heating performance as long as the exterior temperature does not fall below 5°C.

It is possible for qualified personnel to adjust the settings without needing to change equipment.

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DESIGN PARAMETERS

AMBIENT CONDITIONS WINTER

	T_{DB} [°C]
Outside	-5,0
Inside	18,0
Vestibule	18,0

VENTILATION

Number of persons		347
Air flow / person	[m³/h]	15,00
Total air flow	[m³/h]	5205

HEATING ESTIMATES

TRANSMISSION LOSS

	Area [m²]	k [W/m²/K]	ΔT [K]	Sensible heat [W]
Side wall comfort area	171,60	3,00	-23,0	-11840
Side wall vestibule				
End wall 1	5,28	3,00	0,0	0
End wall 2	5,28	3,00	0,0	0
Roof comfort area	93,60	3,00	-23,0	-6458
Roof vestibule				
Floor comfort area	93,60	3,00	-23,0	-6458
Floor vestibule				
				-24757

INTERNAL GAIN

	Quantity	Efficiency [%]	S.H./unit [W]	Sensible heat [W]
Lights / internal heat sources		0	3000,00	0
Evaporator fan motor(s)		0	2500,00	0
Heat emission persons	347	0	101,50	0
				0

INFILTRATION LOSS

	Air flow [m³/h]	ΔT [K]	Sensible heat [W]
Infiltrations	0	-23,0	0
			0

VENTILATION LOSS

	Air flow [m³/h]	ΔT [K]	Sensible heat [W]
Fresh air	5205	-23	-40091
			-40091

RESULTS

OVERVIEW LOSSES

	Total heat [W]
Transmission	24757
Internal	0
Infiltrations	0
Ventilation	40091
Total	**64848**

Figure 12. Heating Calculation

7.3. PREHEATING CONDITIONS

The required power in order to preheat the passenger saloon from a temperature of 0ºC to 18ºC is of 70kW. The required time is aprox. 45min.

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7.4. ODOUR AND TOUCH

In order to exhaust unpleasant odours from the tram interior, a minimum level of ventilation is maintained at all times whether in heating or ventilation mode.

The interior layout is arranged to remove areas where liquid might otherwise settle and to eliminate areas where dirt, rubbish may otherwise accumulate.

The materials selected will not give off unpleasant odours. The interior surface finish is agreeable to touch. The interior layout is free from sharp edges, gaps and projections so as not to present hazards to passengers, staff, cabling, pipes etc.

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8. CENTRALISED CONTROL UNIT

A description of possible “Centralised Control Unit” equipment is shown in Annex 1.2.2.5.

8.1. SYSTEM FUNCTIONS

The most important functions of the diagnostics and control system are:

- Picking up discrete variables directly through the system physical inputs.
- Picking up discrete and analogue variables through the communications via serial line.
- Control of auxiliary equipment on the train by means of the execution of a PLC programme.
- Analysis of the failure conditions and display of these in real time. The analysis is performed by the PLC programme.
- Chronological record of events with environment variables to facilitate maintenance operations of the train systems.
- Serial communication support through train and car buses.
- Recorded events can be displayed and analysed in a computer external to the system.
- Configuration of functional parameters.
- Self-testing of operation.
- Presentation of the most important events, on a Panel.

8.2. SYSTEM ARCHITECTURE

The system shall consist of a Central Control unit (with PLC processing) to be installed in each cab car.

It shall also consist of a Cab Terminal to be installed on the driver cab desks, connected via communication buses to the Central Unit.

The system is completed with PC software which allows: the development and loading of the PLC programme and the downloading, analysis and visualisation of the data recorded on screen, as well as the possibility of printing off this data.

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9. DOORS

This chapter relates to the electrically driven sliding plug door mechanism (both single leaf and double leaf) which is open from the outside. The door leaf is flush with the exterior surface of the vehicle once completely closed. On opening, the leaves perform a combined lateral and longitudinal movement to slide along the side of the carbody to the fully open position.

Double Leaf Dimension:

- Opening width: .....1,550 mm
- Opening height:.....2,230 mm
- Horizontal clear width.....1,300 mm
- Vertical clear height.....approx. 2,030 mm

Single Leaf Dimension:

- Opening width: .....990 mm
- Opening height:.....2,230 mm
- Horizontal clear width.....800 mm
- Vertical clear height.....approx. 2,030 mm

Other characteristics:

- Opening/closing time: ..... 3 sec. (+0,5/-0)
- Temperature:..... -25°C - +70 °C
- Voltage range: ..... 16.8 ÷ 31.2 V
- Humidity: .....up to 95 %

Maximum and minimum clearances that will show green/no green to the conductor:

- Closed .....0-5 mm
- Open .....> 10 mm
- Adjustment .....5-10 mm
- * No of re-openings when an obstacle is detected 2

*(Value to be defined by tie.)

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The reference value is usually taken to be that the door reopens twice when an obstacle is detected, and if the obstacle remains in place, the door usually closes on the third attempt).

9.1. MECHANICAL ITEMS

9.1.1. Support Items

Support Bar:

The support bar is fixed to the vehicle structure via a support bracket for the whole of the door mechanism. The bar supports the weight of the leaves and eases the parallel positioning of the leaves with respect to the carbody on opening and closing.

Slide/Support Assembly:

The slide moves along the roller bearings along the support bar. It also transmits the efforts from the mechanism to the leaves and vice versa. It also provides parallelism between the support and the bar.

The support is attached to the slide via two ball bearings and rigidly bolted to the door leaf. Therefore it transmits all the weight and movement efforts of the leaf to the bar.

9.1.2. Plugging/Unplugging

The lateral movement of the leaves is the result of the guide rails shaping to create the appropriate lateral and longitudinal movement. The upper guide rail is fitted in the header mechanism. A roller located in the support runs along this rail.

The lower guide rail is fitted in the leaves. There is an arm with a roller attached to the structure of the vehicle which is attached to the guide rail to provide the required guidance.

These guide items only support lateral efforts, and not longitudinal or vertical efforts.

9.1.3. Drive Items (installed in the header)

The door movement is generated by an electric motor with a gear. The motor operates a spindle. The spindle nut is attached to the slides with a parallel linkage arrangement. Via the slide and the support the leaves move in an engaged manner.

9.1.4. Electromechanical Brake

The spindle is flanged to a free wheel / clutch unit. This unit remains engaged on closure and prevents opening. On opening, this unit is electromechanically released. A manual release system for the clutch / free wheel is provided in case of an emergency.

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9.1.5. Emergency Unlocking (from inside)

On the inside and in each of the doors, a handle is fitted to be able to release and open a door in the case of an emergency.

Turning this handle (50º) has the following effect:

A. An electric limit switch is activated giving a “door unlock” signal.

B. Via an unlock cable the electromechanical brake is released and the door can be opened manually when the car is at a standstill.

Once the handle has been turned it becomes locked. This lock can be reset by turning the square key, located under the handle, 90º clockwise. Once the lock has been reset, the door returns to normal operation.

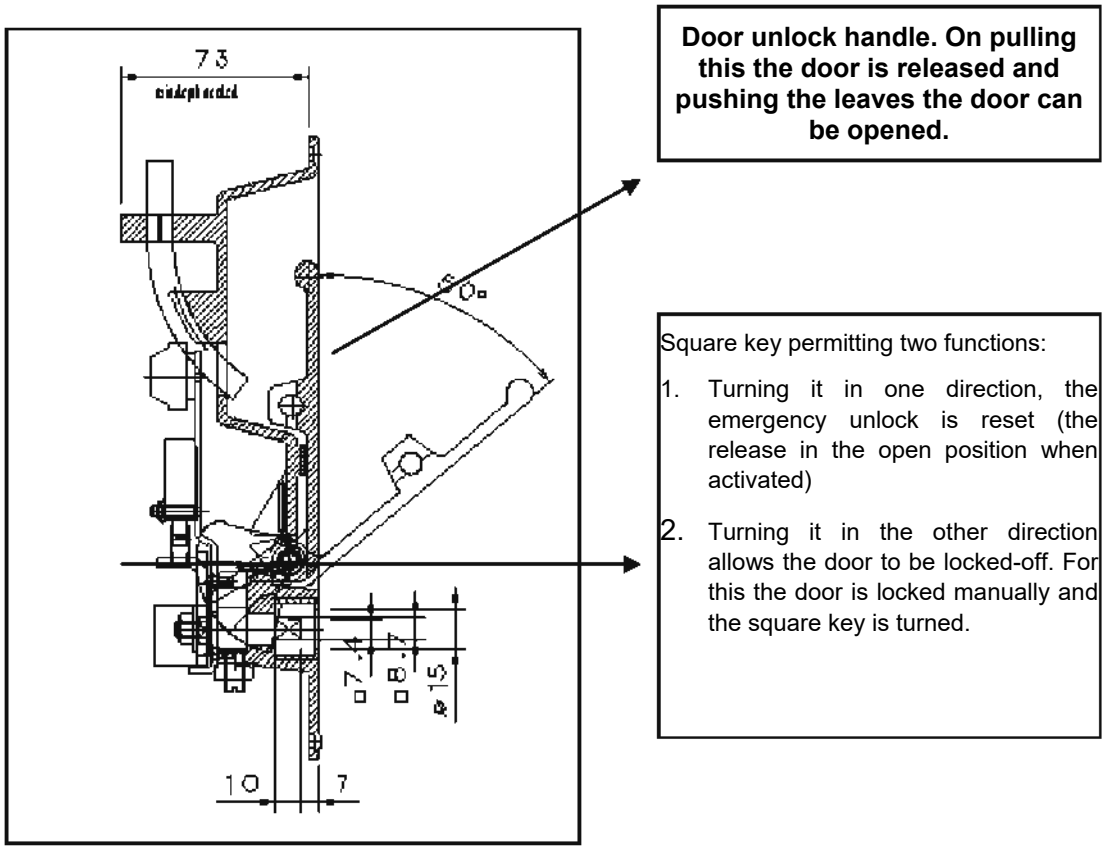

Figure 13. Interior lock/ unlock device

By means of this device, the driver (or authorised member of staff) can leave the unit via any of the doors of the tram as indicated below (It is understood that the train off case is analysed):

- Activate the door unlock device pulling the handle. The leaves shall now open slightly.

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- Reset the handle using the square key. On doing this the handle shall return to its original position. (If this action is not performed the door cannot be left closed from the outside as the door unlock system would still be actuated).

- Leave train, manually opening the leaves.

- Push the leaves by hand to close them with these now being locked.

9.1.6. Unlocking (From outside)

On the outside of each of the single leaf doors there is a device that can be operated by means of a square key which allows the driver or other authorised member of staff to access the unit via each of the passenger doors.

Turning this device (90º clockwise) leads to the following:

A. An electric limit switch is activated giving a “door unlock” signal.

B. Via the unlock cable the mechanical lock is released and the door can be opened manually when the car is at a standstill.

The emergency control can be reset by turning it to its original position. Once the emergency handle has been reset, the door returns to normal operation.

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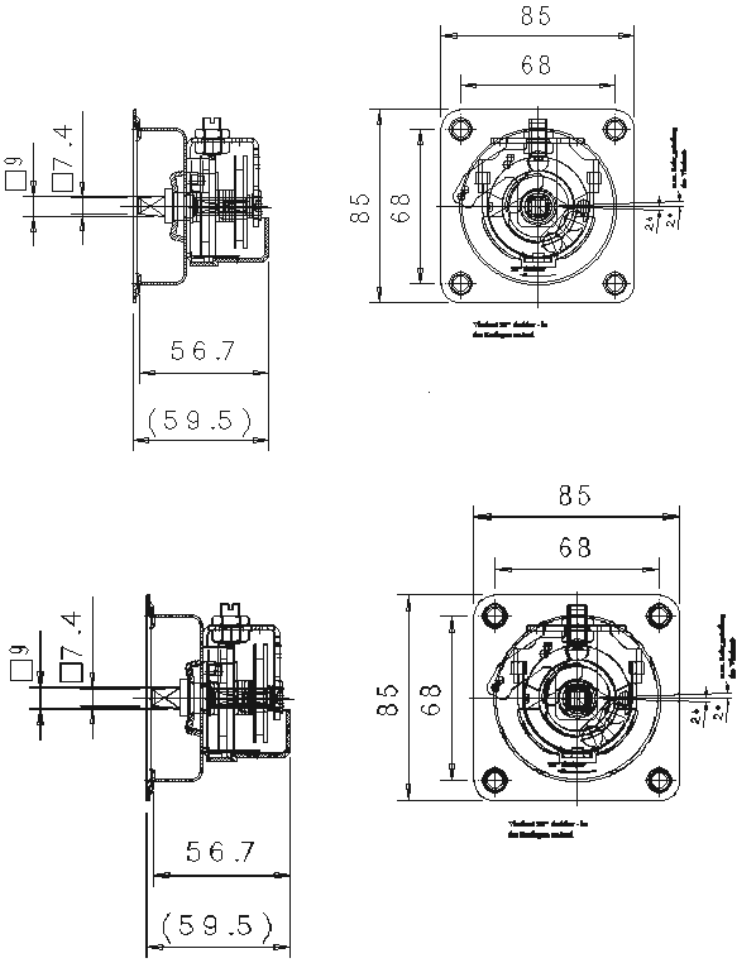

Figure 14. Exterior release device

By using the devices described above, the driver (or authorised member of staff) can access the unit, as indicated below (via the single leaf doors):

- Actuate the exterior unlock for any of the single leaf doors with the square key. At this moment the leaves will have separated slightly.
- Without removing the square key, reset the unlock by turning the key in the opposite direction so that the doors can then be closed. If the unlock is not reset this would remain actuated.
- Board the train, manually opening the leaves.
- Close the doors either manually or setting the train in operation.

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9.1.7. Lock-off Mechanism

A device is fitted inside the vehicle which allows for the door to be left out of service by means of a square key.

This device is located in the lower part of the unlock handle and allows for the door to be left out of service by turning the square key 90º clockwise, whereby the door cannot be opened electrically or manually (interior release) unless the door release is used from the outside.

9.2. DOOR LEAVES

They are produced as an aluminium sandwich construction. The frame is aluminium with a honeycombed core of the same material.

The leaf is edged with EPDM rubber sections, to provide adequate leaf water tightness. The front edge of the leaf has a special hollow EPDM rubber section to protect trapped obstacles. The rigidity or hardness of this section shall be such that an optimum compromise between the detection of obstacles with minimum dimensions and effort to remove a trapped obstacle in the shortest possible time)

These are built with 5 mm thick hardened glass.

They are equipped with an internal and external button with an indicator (4 green LEDs) which allows the passenger to open the doors once the enabled signal is activated.

9.3. ELECTRIC ITEMS

Mounted with the drive unit, the door control unit (DCU) controls the opening and closing of the doors.

9.3.1. Photocell

There is a photocell consisting of a transmitter and a receiver near to the door to prevent the door from closing when there is an obstacle in the door area.

9.3.2. Obstacle Detection

The side edges where the doors close are all sensitive to the presence of objects via a motor overcurrent detector and also via control of the position of the motor by means of an encoder. This system has a self-learning capability and considers changes in operating conditions.

This system detects obstacles of 25 mm in diameter.

10. AUXILIARY POWER SUPPLY SYSTEMS

A description of this equipment is included in Annex 1.2.2.7.

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10.1. STATIC CONVERTERS

Each unit is equipped with two static sets prepared to be supplied at 750 VDC and a battery charger.

As required in the Employer´s Requirement, they will be prepared to start when fed from the overhead line, irrespective of the state of charge of the battery (Flat Battery Start).

The auxiliary converters operate with supply voltage fluctuations of +20% and –36% (500-900 V). In the range of 570-900 V the output voltage and frequency are constant (with the tolerances defined later) and the output power is the maximum in all the range.

In the 500-570 range the output voltage and frequency are also constant but proportionally lower to maintain the torque in the loads (e.g. air conditioning compressors).

The high voltage circuit and the items used are of the latest generation (IGBT) already used and proven in various operations.

The purpose of the converter set is to generate and regulate the alternating current required to supply the alternating voltage circuits of the cars and the air conditioning units or other units that require it. The auxiliary converter is completely static.

The units supplied from 3x400 Vac are the following:

- Passenger saloon HVAC.
- Cab HVAC.
- Traction inverters ventilation.
- Battery charger
- Heated windshield

The converter circuits are connected in parallel so if any of them fail the other is automatically capable of supplying the whole unit except for the equipment mentioned above. During normal operation each converter supplies independent circuits.

The auxiliary converters can also operate with an output voltage of 60 Hz and 460 V. This allows the air conditioning compressors to be supplied at this frequency and voltage increasing its power. This possibility allows us to operate one of the converters (the one which supplies the air conditioning) at 60 Hz when more power is required by the air conditioning. The other converter continues to supply the other loads at 50 Hz. Should one converter fail then the other one still running operates at 50 Hz, supplying the loads described above.

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The output voltage characteristics are as follows:

- Voltage: ..... 400Vac ±5% For V_{HV} > 570Vdc
- Frequency: ..... 50Hz ±1% for V_{HV} > 570Vdc
- Number of phases: ..... 3 (without neutral)
- Harmonic distortion: ..... ≤ 10%
- Nominal power: 30kVA
- Protected from short circuit: ..... Yes
- Dielectric strength of this output with respect to
- earth and other circuits: ..... 2,5kV, 50/60Hz, 1 min

Note: For HV < 570Vdc the voltage and frequency of output is reduced to 360Vac and 45Hz in order to maintain the torque in the compressor motors.

The auxiliary converters are equipped with an input filter which prevents the injection of harmonics in the catenary that could cause interferences with the signalling and communication systems.

To measure or read the converter output voltage sensors and transducers of the unit can be used and the reading can be made via a laptop PC using diagnosis software. Should direct readings be required these can be taken in terminals inside the train.

The converter is hermetically closed and is designed to operate in an extreme environment due to humidity, dust, etc., and for this reason it is designed with an IP-66 level of protection according to CEI 60529 for the electronic part. The magnetic items are located in a compartment with forced ventilation, with an IP 24 level of protection, according to standard IEC 60529. These items are prepared to operate with water and dust.

The auxiliary converter is cooled via forced convection but avoiding any contact between the electronic part and the exterior air.

The main objective has been to reduce the volume and weight of the converter so as to be able to install two converters. For this to be possible, the isolation transformer has been removed and hence loads have had to be designed to support the catenary voltage. The loads which cannot support this voltage are galvanically isolated by means of a transformer.

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The converter can support sudden voltage transients due to pantograph disconnection, overhead line sectionings, etc., and are equipped with all the necessary protection to prevent interferences and shall have at least the following protections:

- Protection against internal short circuits.
- Line over-voltage and minimum voltage.
- Overloads.
- Excessive Temperature.
- Excessive reduction or increase of the battery charge.
- Start up with progressive evolution of parameters, following running through sections.

They only have galvanic isolation for loads that so require, and to this end the insulation is obtained via the battery charger transformer. Therefore the auxiliary converter alternate output is not isolated and can supply loads such as traction fans, air conditioning, battery charger, etc.

The battery charger transformer has a double secondary to permit the generation of battery voltage and an isolated 200 V alternating voltage. This isolated voltage is used for loads such as sockets where galvanic isolation is required.

The energy performance of the static converter exceeds 90% for loading rates greater than 50% and any supply voltage.

The voltage available in the battery terminals is used by the static converter as an auxiliary source of energy for control and regulation. This voltage can fluctuate between +25/-30% without this voltage variation affecting start up or operation of the static converter.

Below is the block schematic of the converter set circuits, showing the proposed filters to eliminate the harmonics that could occur.

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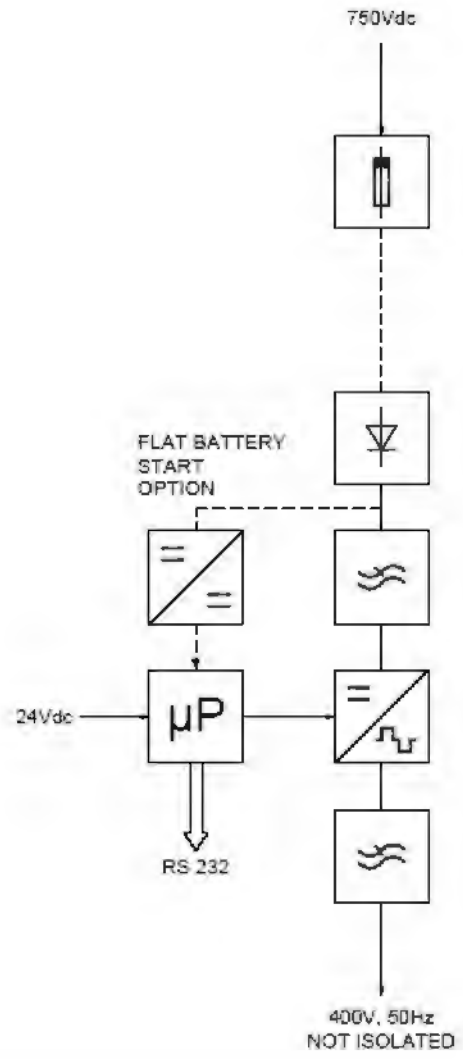

Figure 15. Block schematic of the static converter

The maximum time considered for the loss of contact between the catenary and pantograph without a lack of voltage being detected at the converter output is 9 ms.

10.2. BATTERY CHARGER

The purpose of this unit is to supply LV energy for the auxiliary services of the unit taking the energy from the 400Vca three phase line from the converters.

The unit supplies the direct current loads and the battery charge. The main loads supplied from 24 V are as follows:

- Control of units (traction, brake, HV, converter, etc...).
- Battery.
- Interior lighting.

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- Door operation.
- Body-end lights.
- Hydraulic pumps.
- Communications.
- Recorder.
- Radio.
- Various items of safety equipment.

The output voltage characteristics are as follows:

➢ Alternating current output

- Flotation voltage: 28.9Vdc
- Voltage stability: .....± 1%
- Voltage adjustment:.....± 5%
- Ripple voltage:..... <1 % rms
- Maximum current limitation:..... 208A
- Battery current limitation:..... 110A
- Permanent power .....8,5 kW
- Protected from short circuit:.....Yes
- Dielectric strength of the output with respect to earth and the other circuits: ..... 0.5kV, 50/60 Hz, 1 min

The outputs are galvanically isolated from the input line and the energy performance of the battery charger is from 80% to 100% of charge.

10.3. BATTERY

Each unit is equipped with a nickel-cadmium type battery capable of supplying the necessary circuits of the vehicle. The nominal capacity of the battery shall be 180 Ah and consists of 19 nickel-cadmium cells connected in series and grouped in blocks of 4 and 5 cells.

The vehicle's nominal voltage shall be 24 V which is normal for these types of vehicles. The range of voltages shall be 24 V-30%, +25% (16.8 V-30V) in accordance with standard EN 50155.

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Both the charge current and voltage are controlled so that:

1. The battery charge is optimal

2. Water consumption is reduced to a bare minimum and hence so is maintenance.

For this to be possible, a control is performed on the charge current and voltage.

- **Charge current**: The battery charger is equipped with a double positive output (an output for the charging and another for the battery) so that the battery charger can control which current is for charging the battery and which is used to supply the loads. This permits the charger to control the charge voltage so that the current supplied to the battery does not exceed 0.4 C (72 A in this case), which is the value proposed by the battery manufacturers so that the water consumption is not unnecessarily increased.

- **Charge Voltage**: The battery charge voltage is adapted to the battery temperature. For this to be possible, a temperature sensor is installed in the battery and the battery charger performs the reading. The temperature compensation is performed for two reasons:

    1. When the temperature is low, the battery cannot be charged unless the charge voltage is increased. The charge voltage is increased in proportion to the temperature allowing the battery to be charged at optimal levels, even at temperatures of –15ºC.

    2. For high temperatures, the charge performance is reduced and the battery cannot be charged in an optimum manner and the water consumption increases greatly. To reduce water consumption the charge voltage is reduced. This compensation for the voltage does not increase the battery charge but reduces water consumption.

The charge voltage is approximately 1.46-1.47 V/cell at 20ºC. The voltage compensation according to the temperature is 2-3 mV/ºC cell.

As well as these functions to reduce the battery filling frequency, the battery also has a centralised filling system which permits all of the cells to be filled from one single point.

The battery is connected in “parallel” and protected by a thermal magnetic switch which shall isolate it from the vehicle circuit when the current exceeds a specific value, to be established during the project. In principle the nominal current of the thermal magnetic switch is 250 A but can be adjusted within an ample range.

The connection between the battery and the vehicle circuit is also made via a contactor which permits the connection and disconnection of the battery under normal conditions.

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The battery can be charged from the exterior by connecting the 400 V three phase supply to the socket fitted for this purpose.

The battery is mounted on the unit roof in a steel housing designed for installation. This housing was designed in order to be able to evacuate the gases generated by the battery.

The battery charger has a minimum voltage device function which, depending on the battery voltage and current, determines when the battery has reached the established discharge level. When this level has been reached the charger opens the battery contactor, guaranteeing a sufficient minimum charge level to set the train unit into operation. The discharge level shall be regulated during the commissioning of the unit. This device can be cancelled for the setting into operation of the unit.

The battery meets the specific standard for nickel-cadmium IEC 60623 batteries and UIC 854 R batteries.

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11. BRAKE

The proposed tram is fitted with the following brakes.

The motor bogie braking system consists of 3 types of brakes:

- regenerative electrodynamic brake,
- hydraulic controlled friction brake,
- electromagnetic track brake.

The trailer bogie braking system consists of 2 types of brakes:

- hydraulic controlled friction brake,
- electromagnetic track brake.

Friction braking is achieved via 1 actuator per wheel on the motor bogies and 2 actuators per axle on the trailer bogies. The electrodynamic brake (ED) is the priority brake for service brake.

The replacement speed where the friction brake replaces the electric brake is approximately 7 km/h.

11.1. VEHICLE PERFORMANCE DURING BRAKING

Unless otherwise specified, the terms and the performances are verified according to the conditions indicated in standards EN-13452-1:2003.

11.1.1. Service Braking

The term service brake relates to all types of normal braking realised by the driver from the controller without reaching full service braking.

The braking demand shall be realised from the cab controller when this is within the braking zone. The braking effort shall be proportional to the position of the controller from the coasting position to that of full braking. Braking shall only occur when the controller is in the braking zone and therefore this braking can be cancelled returning the controller to the coasting position.

The wheel-slide protection shall operate to prevent sliding and in this way make the most of available adherence.

During the service braking a blending of electrodynamic and friction braking is given.

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The train will maximize the use of regenerative braking and then rheostatic braking before using friction braking. That is to say, the main brake during service braking will be the regenerative/rheostatic one (electrodynamic brake), while the friction brake will complement it, or even replace it in case that a failure would appear in the electrodynamic brake.

This blending will be given until the replacement speed of approximately 7km/h, where the friction brake fully replaces the electric brake. No blending will be then given below this speed value.

The maximum instant service deceleration will be 2 m/s2.

The minimal equivalent deceleration between any speed lower than or equal to 70 km/h and standstill will vary between 0 and 1.2 m/s2.

In service braking, the equivalent time will not exceed 1.5 seconds.

11.1.2. Emergency Deceleration

The maximum admissible instantaneous deceleration will be:

- 2.5 m/s2 in emergency braking 1 and 2
- 5 m/s2 in emergency braking 3
- 4 m/s2 in emergency braking 4

For emergency brake 3 and 4, the equivalent deceleration will be no less than 2.8 m/s2. The equivalent time shall not exceed 0.85 seconds.

For emergency brake 1 and 2, the equivalent deceleration will be no less than 1.2 m/s2.

The equivalent time will not exceed 1.5 seconds and 2 seconds respectively for emergency brakes 1 and 2.

11.1.3. Security Deceleration

The maximum instant safety deceleration will 4 m/s2.

For the security brake, the equivalent deceleration will be no less than 1 m/s2. The equivalent time will not exceed 2 seconds.

11.2. JERK

In normal operation, i.e. in all starting conditions, on application and end of service brake, the jerk will be less than 1.5 m/s³.

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In emergency braking 3 and 4, the jerk will reach a maximum value of 8 m/s³. In safety braking, as well as emergency braking 1 and 2, the jerk will not exceed a value of 4 m/s³.

11.3. STATIC PERFORMANCES

11.3.1. Holding Brake

When a mechanical braking unit fails, the line immobilisation brake will retain the vehicle in AW4 (6 pers/m²) at a standstill for 1 hour on the steepest gradient (7.5%).

11.3.2. Parking brake

With a braking unit participating with the failing parking brake, the unloaded vehicle will be maintained for an unlimited time on a gradient 4%.

11.3.3. Performance in towing/pushing mode

The unloaded vehicle towing another unloaded, completely inoperative vehicle, will be able to start and negotiate the maximum gradient of the line with a minimum acceleration of 0.1 m/s².

11.4. IMPLEMENTATION

The combination of different brake systems for each of the braking modes will be in accordance with section 6.4 of standard EN-13452-1:2003.

11.5. ELECTROHYDRAULIC BRAKE SYSTEM

11.5.1. System Description

The proposed braking system operates with an inverse type activation (with spring load) on all bogies.

When no pressure is supplied, the stable condition of the floating inverse actuator causes the application of a maximum braking effort.

In the motor bogie the TCU (traction control unit) controls the friction brakes according to the brake demands and also controls the wheel slide protection. The friction is controlled by the TCU via the autonomous HVI card. The TCU substitutes the regenerative electrodynamic brake with the friction brake. The TCU also has the function of ensuring that the brake is applied or released, the appropriate pressure in the callipers is consistent (control of the pressure switch signal and diagnostic). Only the full service brake is under the direct control of the vehicle via fixed wiring.

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In the trailer bogie, the BCU (Complete SW Electronics) controls the friction brakes (hydraulic brakes) in accordance with the brake demands and the vehicle's condition and load. If necessary, the trailer bogie friction brake can substitute part of the regenerative electrodynamic brake at low speed (below the substitution speed). The BCU controls wheel slide and the brake diagnostics. Only the emergency brake is under the direct control of the vehicle via fixed wiring.

The regenerative brake (electrodynamic brake) has the maximum priority in service braking.

The brake control unit (BCU) has an interface with the vehicle's logic and the traction control to achieve vehicle integrated and synchronised operation. The safety braking signals neutralise the BCU to increase the brake system safety.

The actuators receive the oil from hydraulic power units (HPU).

The HPUs provide the power and control of the electric hydraulic brake. Its purpose is to control brake applications and releases.

The hydraulic energy to release the brakes comes from a hydraulic accumulator which is charged by the unit's pump via the charge integrated circuit using an electronic pressure switch.

The hydraulic energy to release the brakes is stored in a service accumulator which is charged by the HPU pump.

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12. INFORMATION AND COMMUNICATION SYSTEM

A description of possible “Information and Communication System” equipment is shown in Annex 1.2.2.4.

12.1. PASSENGER INFORMATION SYSTEMS

All visual and audible information, which is specific or exceptional in character, are preceded by visual or audible warning signals.

12.1.1. Passenger Destination Information System

The Passenger Destination Information System operates based on line data, location of the train along the route and door opening/closing signals, which are provided by other systems in the train.

The Announcement system contains the stations table and their location along the route for each of the lines along which the train is to circulate. These tables include the kilometre points at which the next stop announcements are to be made.

The system has the following features:

- 2 front passenger information displays (PID) which are located in the front upper part of each driver’s cab. These displays have characters heights of 165 mm and will display up to 12 characters in one line. Its resolution is 12x169 LED diodes. This signs are fitted with yellow LED diodes on a black background and have an RS485 interface with the communication control units installed in its cars.

- 4 side external PID on both sides of the tram (two per side). They will be located at each end of the tram and will be integrated into the same control scheme. They will have same dimensions and characteristics as the internal displays.

- 8 internal PIDs; which will be easily read by all seated and standing passengers. Please see drawing Q.00.072.32 in order to see the position of the PID. This LED panels will have a resolution of 8x96 LEDs diodes instead of the usual 7x96. This is a measure taken in order to avoid raising characters such as “q” of “g” and thus, improve the readability of the signs.

- 20 internal loud speakers, 2 cab loud speakers and 2 noise sensors will be installed to provide audible information by means of pre-recorded announcements. The system automatically controls the sound level of the passenger announcements depending on speed (three discrete levels), on occupation (two discrete levels; this occupation will be deduced from the weight of the car, which will be supplied by another system in the train) and on ambient noise (one discrete level). The audible information is integrated with the visual displays.

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- 8 passenger intercoms are available (one at each vestibule and one at each wheelchair area) to enable every passenger in an AW5 loaded LRV, to communicate verbally with the driver to inform him/her of an incident or an emergency. Check drawing Q.00.072.32 to see the layout of these devices.

All displays will comply with the RVAR in matter of layout and dimensions.

The Communication Control Unit CCU controls the information to be displayed in the internal signs, in the front signs and in the external side signs. For the information to be shown in the internal signs, in the front signs and in the external side signs the Communication System will use the information provided by the driver through the Cab Terminal, which will belong to the Train Control & Monitoring System. During the trip, the signs will use the information provided by the station announcement system DVAS, which is connected with the SCCS. The system will allow the definition of the routes along which the train is to circulate and the loading of its configuration and messages into the DVAS station announcement system.

Location is reserved in the tram interior for route maps and other information.

Together with the interior Passenger Information Displays, 8“Stop Request” lamps will be provided. They will be lit every time a “Stop Request” button is pressed.

12.1.2. General Passenger Information System

This is linked into the interior Destination Information System using the same PIDs. The broadcast of this general information is normally at the discretion of the driver and will comprise:

- visual information which can be read easily by both seated and standing passengers. Temporary messages, which can be programmed in advance, will be clearly identifiable.

- audible information, using the same loudspeakers as the voice system for pre-recorded temporary announcements. The number and frequency of these messages will be left to the discretion of the person responsible for operations.

12.1.3. Passenger Safety Information System

This comprises:

- visual information, notices etc. indicating the location of the passenger emergency communication devices, door open buttons, etc.

- audible information transmitted via the public address system by the driver and/or the CCR personnel. The messages broadcast in this manner take priority over pre-recorded messages, with messages broadcast by the CCR taking priority over driver messages. The use of pre-recorded audible and visual messages will be considered for various possible events including emergency scenarios.

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- tactile information on the doors to assist visually impaired passengers in manually locating the door open buttons from the inside and from the outside of the LRV.

- The use of pictogram based information signs detailing the different emergency equipment onboard the LRV and their methods of operation will be considered in order to reduce the requirements for signage where possible.

- Signage for the emergency services will be provided where necessary.

12.2. MEDIA AND COMMUNICATIONS CONTROLLER

This system will consist on the following devices installed in each LRV:

- Media & Communication Controller, MCC.

- Eight (8) Monitor Remote Unit, MRU.

- One (1) Access Point, AP.

- Eight (8) Video Screens, VS. Additional Video Screens may be installed in order to improve the information given to the passengers.

- Three (3) Power Supplies for each two Video Screens, PS VS.

The Media & Communications Controller of the Media & Communication System will be connected to the Communication Control Unit. This Media & Communications Controller MCC will transmit video to the 8 Video Screens with enough quality. Each Video Screen will receive the video from the Monitor Remote Unit, which will set up the video for its broadcasting. In addition, the MCC will be connected to a wireless Access Point by Ethernet connection.

The contents' update of the Media & Communications Controller will be done in the depot. For this function TIE will need to install one depot's access point and the PC where the software will be installed.

The software will allow uploading the video and audio information to be displayed in the train. Each train will have a contents list and a register of the operations that will be saved in a database contained in the PC.

Please see drawing Q.00.072.32 in order to see the position of the screens.

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13. PASSENGER COUNTING INFORMATION SYSTEM

A description of a possible “Passenger Counting system” is shown in Annex 1.2.2.3

Provision will be made on all trams for the future fitment of and Automatic Passenger Counting System (APC).

The equipment that CAF propose is modular and consists of a kit including the Counting Bar and the Data Management Board. This kit ensures the counting of passengers boarding and alighting the vehicle for a maximum of 32 doors. Using the most advanced technologies in electronics, data processing and signal treatment, the Proposed Counting Bar was developed specifically in order to continuously count, with directional differentiation, the passengers entering and leaving through a door.

Each door of the vehicle will be equipped with a counting bar (MCT) composed of:

a) from 1 to 5 mixed active/passive infrared sensors, depending on the width of the door and the presence (or not) of a separation pole between the doors all integrated in an anodised aluminium cover painted to easily match the door panel and surrounding. In our case, 3 sensors will be provided for the double leaf doors and a unique sensor for the simple leaf doors.

b) an electronic management board

c) 1 or 2 detectors that communicate the opening and closing of the doors because we are only counting when the doors are opened

d) a switch that enables the definition of the counting bar’s communication bus address for the data transmission.

The counting bar is installed in such a way that the counting zone is as near as possible to the door without being obstructed by the doors’ opening and closing.

The counting technology, is a combination of active and passive infrared sensors which are able to differentiate the people entering and leaving a place. The passive sensors are sensitive to the infrared rays given off by individuals and thus detect the direction of movement. The active sensors, through the emission/reception of an invisible infrared beam, differentiate between the person and the background.

The counting module (MIP) receives from the door detector two signals indicating the door’s status:

a) Door closed (enabling the system to detect when the door begins to open)

b) Door completely open (enabling the system to detect when the door begins to close)

The Data Management Board (UCD):

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a) memorises the counting bar's counting data from each door

b) communicates this data to the information system

c) enables counting system maintenance via a portable PC

d) transmits the electricity to the counting bars to which it is connected

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14. EVENT RECORDER SYSTEM

14.1. SYSTEM FUNCTIONS

The most important functions of the system are as follows:

- Recording of speed, distance, time and variables relating to the train running safety, with judicial objectives.
- Recording of important train operation variables.
- Creation of speed levels for use in other systems and speedometers control.

The System contains self-test subroutines, and redundancy in the vital parts, in order to achieve the required safety for application and contains an own event recorder which is recorded in the removable memory together with the circulation events.

With the signal from the tachogenerators and in accordance with the wheel diameter, the speed and distance covered are obtained. This speed and distance are recorded in real time, together with the other variables, in the following conditions:

- The resolution of the event recorder can be of 1.0m for the last day's operations and of 10.0m for the last seven day's operations, as the document "Employer's Requirements (Extract)" requires. Nevertheless, an error of less than 1% has always to be taken into account due to external factors such as, heavy brake manoeuvres or wheel diameter changes.
- The memory of the event recorder could be enlarged up to 32MB and according to our experience, this should be enough to retain the data for a 48 hour period.

Via a relay contact, which remains closed when the unit operates correctly, the unit's availability is communicated to the exterior.

The software installed in this system will enable to download the registered data in either tabular or graphical format.

The System is also equipped with a Dead Man according to UIC-641-2.

14.2. DEAD MAN DEVICE

The System includes a Dead Man Device in the Central Unit with a double affect, according to UIC-641-2.

It will be placed at the master controller as requested by TIE.

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The system has a redundant circuit with double reference circuit whereby an external signal can be given should a fault occur.

There is an input allowing for the device to be cancelled should a fault occur. This cancellation input and the fault output are sent to the recording equipment to be recorded.

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15. CCTV

The equipment for the installation of the CCTV system consists of cameras to capture images inside and outside the unit, a monitor in each driver cab and a central control module.

The exterior cameras are located on both sides of the control cabs having the same function as rear view mirrors and they will used to control access to the cars.

The items are arranged in each basic unit as follows:

- A and E cars 1 front camera + 2 exterior cameras + 1 interior camera + 2 monitor and 1 central module(one of them).

- B, D and G cars 2 interior cameras

The cameras will be protected by a hemispherical dome, as requested in the Employer´s Requirement.

Position of the interior cameras will be defined in the project phase.

So the total interior video surveillance equipment in colour for the 7 cars consists of the following items:

- 2 Front Cameras

- 4 Exterior Cameras

- 8 interior Cameras

- 1 Central Unit

- 4 TFT 10.4” monitors

The Central Unit (CU) is the central unit for video capturing, processing and recording, of all connected video cameras.

The CU has removable hard disk capacity for at least 72 hours of continuous recording from all cameras in normal mode. In the recorded images there is information about camera number, car number, time, date and other information available from the Central Unit.

The system receives digital alarms, from the Centralised Control Unit. When an alarm is activated, the system displays in full-screen mode the image from the camera near the emergency. Alarm events can change automatically the recording speed on fps. Alarm events can be: passenger emergency communication, door emergency, smoke detector, temperature sensor or manual selection by the driver. This information is received from the Central Unit

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When there is an alarm event the CCTV automatically activates the monitor in the active cab and displays the picture from the camera that best shows the position of the activated alarm.

The alarm video file is recorded on a permanent area of the hard disk, until it is erased by command.

The CU will perform a self test on each power on. The test result is reported to the Central Unit system. Failures detected during CU operation are automatically reported to the Central Unit system. An automatic reset of the CU is performed only if it is necessary to recover normal operation.

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APPENDIX 2: STRUCTURAL DAMAGE REPAIR

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In this chapter the main principles for the repairing of steel and stainless steel structures in case of damages are presented.

Only personal, qualified for welding, is allowed to do the repairing work. When starting the repairing work the manufacturing worksheet (including repairing procedures and drawings) shall be at personnel's disposal.

1. DAMAGE ANALYSIS

Before starting the repairing work it shall be clarified the cause, type and extent of the damage. This clarification can also affect the selection of the required repair method.

1.1. CAUSE OF DAMAGE

The damage can be caused by a collision or other accident or by structural defects of the body. The latter case can be fatigue or corrosion. In these cases it should be discussed with the manufacturer of the car body about the corrective actions.

1.2. TYPE OF DAMAGE

The types of damages can be divided according the following list:

- Dents
- Bent sheets and/or profiles
- Twisted sheets and/or profiles
- Holes in sheets and/or profiles
- Cracks in the parent material
- Cracks in the welded joints
- Broken sections, etc.

1.3. EXTENT OF THE DAMAGE

Since hairline cracks are not visible with the naked eye in the parent material or in the welded joint zone it shall be examined after, i.e.: collisions, all the critical points carefully. Liquid Penetrant Test is suitable for this.

Then it shall be determined in which kind of structures there are damages, i.e.: Repair of profiles or thick plate structures and thin exterior sheeting structures need different repair methods.

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2. REPAIR METHODS

After damage analysis it is possible to determine the most suitable methods for each case.

Before starting the repairing work interior panels, insulation material, windows, seats, floor and, if present, housing equipment and wiring shall be removed in the area of damage. The car must rest on a plane surface supported in front and behind the area, which must be replaced, and fixed to the ground.

2.1. HAMMERING OUT DENTS

Hammering out dents can only be considered in cases of relatively minor damages. In case of small dents cold stretching or dent removal by pressing or hammering should be used. For bigger dents it is possible to use a combination of heat treatment and hydraulic press (See also 2.3).

2.2. COLD STRAIGHTENING

The restrictions for dent removal also apply for straightening.

Repair through the cold straightening method results in a permanent deformation. The degree of force required is roughly equivalent to that which caused the damage. To achieve permanent deformation the generated stress must be above σy, without attaining σu. Otherwise a cracking hazard results. See table 2.2.1.

Normally cold straightening is an unsatisfactory method. Only useful for deformations less than 2 mm/m.

Product	Alloy	Thickness Th (mm)	Mechanical Properties	
			σy (N/mm^2)	σu (N/mm^2)
LAHT Steel Sheet & Plate	S355 J2WP	Th $\leq$ 6	355	510
	S355J2G1W	6 < Th $\leq$ 20	355	490
Plate	S355J2G3	Th > 20	345	490
Stainless Steel	AISI 304L	Th < 5	240	520

Table 2.2.1 Material Properties. (σy = Material yield strength, σu = Material ultimate strength)

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2.3. HOT STRAIGHTENING

Heat the deformed area with acetylene torch and apply force with a chain or rod in the desired direction. The amount of heat depends on the magnitude of deformation to be corrected but in no case should exceed the temperatures of table 2.3.1

Thickness (mm)	Temperature (ºC)
5	700
10	750
15	800
20	850

Table 2.3.1 Maximum Temperatures for Hot Straightening

2.4. WELDING

Welding can be used as a repair method in the following cases:

- Defective welds are chipped out and must be replaced
- A crack in construction material must be closed by a weld
- A defective construction part must be removed and a spare part welded in.

For repairing existing welds it is sufficient to observe the general instructions of steel and stainless steel welding (see also chapter 1.2.3). The residual stresses caused during welding must be taken into account throughout straightening.

Before starting the repairing of cracks of parent material by welding it must be carefully examined what have caused the cracks. If the crack was caused either by fatigue or by corrosion it must be examined together with the manufacturer of the body whether the crack could be repaired by welding of a design change is needed to avoid further problems.

When a part must be removed and new part welded in the high stresses in welding area can be minimised by placing cuts in less dangerous zones. Positioning of welds in critical areas must be agreed with the manufacturer.

Satisfactory weld quality only can be achieved by reliable preparation of the weld edges and by thorough cleaning of the welding zone immediately prior to welding. Whenever possible welds should be placed in areas which allow easy access for welder so that the body shell can be in normal position.

2.5. REPLACEMENT OF DEFECTIVE PARTS

Defective parts can be replaced by welding in new parts of the same type of material. If the structural part is damaged to the extent that it must be replaced it is often advantageous to remove the damaged section and weld in an identical spare

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part following suitable edge preparation. It is often possible to avoid the complicated removal and rebuild of a complete sub assembly.

In case of minor damage (e.g. in side walls) it is often possible to replace small side wall sections by welding in plate.

2.6. DESIGN IMPROVEMENTS

If fatigue or corrosion damage occurs due to faulty design it must be examined whether not only the damage but also its cause can be eliminated at reasonable cost to prevent future reappearance's.

Damage due to fatigue occurs in zones exposed to continual dynamic stress (e.g. shaking). Abrupt cross section transitions and edges (notch effect) of any kind considerably increase the danger of damage. If it is possible to eliminate these factors successful results can be obtained. Repair of such damages must be carried out in close co-operation with the car body manufacturer.

In cases of corrosion the new element should be of a similar alloy as the replaced one. Since contact corrosion normally occurs in zones where there is a suitable electrolyte (moisture). Suitable measures must be employed during repair to ensure that condensate build up or even water pockets cannot occur any more. This can be achieved by sealing of contact surfaces.

3. SHOP-FLOOR RECOMMENDATIONS

The requirements of occupational protection concerning welding work must be completely followed. It is important that welding operations should be made in a clean and wind free area, also a correct levelling of the body shell is important to avoid deformations caused by the weld.

3.1. EXTENT OF DAMAGE

If only part of parent metal cracks or cracked weld seams are repaired the repair is of practically no value since the non repaired part of crack will spread immediately. It is therefore advisable to spray the suspected crack zone with a test solution of a suitable penetrant test procedure. This provides reliable information on the spreading of even hair-line cracks which are invisible to the naked eye.

3.2. CHIPPING OUT DEFECTIVE WELDS

The weld must be thoroughly removed by chiselling, by grinding or by milling.

3.3. EDGE PREPARATION

The shape of welding edges follows the general shapes defined for steel structures.

Make sure that there are no burrs or other irregularities on the edges left from machining.

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The longitudinal edges should be debarred and chamfered. Bevels produced by plasma cut should be reduced by grinding.

The form and dimensions of the joints must be matched with one another based on the following parameters: welding technique used, welding position, accessibility and a minimum welding volume.

The majority of internal welding defects such as cracks, pores, inclusions and lack of penetration can be avoided if the recommendations are strictly observed and welding zone is thoroughly cleaned and dried immediately prior to welding.

3.4. CUTTING OUT DAMAGED PARTS

If the extent of the damage is so extensive that the affected zone must be cut out and replaced by a new piece the total extent of the damage must first be carefully examined to ensure that the entire damage can be remedied by the repair.

If necessary paintings and sound damping materials must be removed from the entire area of suspected damage in order to be able to verify the extent of the damage. Sound damping materials are heated with propane gas flame or hot air blower until the layer flakes and can be removed with a putty knife. Provided the tar is not heated in excess of 200°C to assure no fire hazard.

High cutting speeds are generally required to obtain clean cut edges and reduced metal heating. The following equipment can satisfy these requirements:

- Plasma cutting for clean cuts even for larger material thicknesses and high cutting speeds
- Circular saws for straight, clean cuts when cutting large pieces or narrow slots
- Belt saws for thin plates
- Metal saws
- Hand routers

3.5. SELECTION OF WELDING TECHNIQUE

Apart from attaining required strength values it is important after welding to keep straightening on the body shell to an absolute minimum.

GMAW and GTAW welding are especially well suited for these welding jobs. However the optimal arc setting required calls for considerable welding experience. To ensure full penetration tack welds etc. must be chipped out before overwelding.

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The following filler metals should be used:

Base Materials	Stainless Steel + Stainless Steel	Stainless Steel + LAHT Steel	LAHT Steel + LAHT Steel
Filler wire	ER308L	ER309	ER80S Ni1

Under dry conditions at room temperature materials with thickness of 15 mm and more should be preheated to 100°C.

The advantages of using one repair technique or the other must be examined from case to case.

4. INSPECTION AND FINAL MEASUREMENTS

After the repairing work, a inspection of the new welds will by Penetrant Liquids Test should be made.

The dimensions of the re-worked area and neighbouring window and door openings should be also checked.

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Project : Tranvía Edinburgo
CAF S. A.

Study : Calc. a -15ºC

General comment :

Electrical Parameters

Technology type	Sintered PBE
System Nominal Voltage	24 V
Maximum voltage	30 V
Minimum voltage	16,8 V
Charging voltage at 20°C/68°F / Cell	1,47 V
Cranking voltage	14,28 V
Voltage drop in line	2 V
Voltage compensation	-0,003 V / °C
Operating temperature	-15 °C
State of charge coefficient	0,9
Ageing coefficient	0,9
Charge efficiency	100 %

Cell quantity

Min number (Cranking)	20
Min number (Other)	19
Min number	19
Max number	19
Minimum voltage / Cell	0,989 V

No	Time (s)	Power (W)	Current (A)	Resist. (Ohms)
1	600	4696		
2	1200	3706		
3	1800	820		

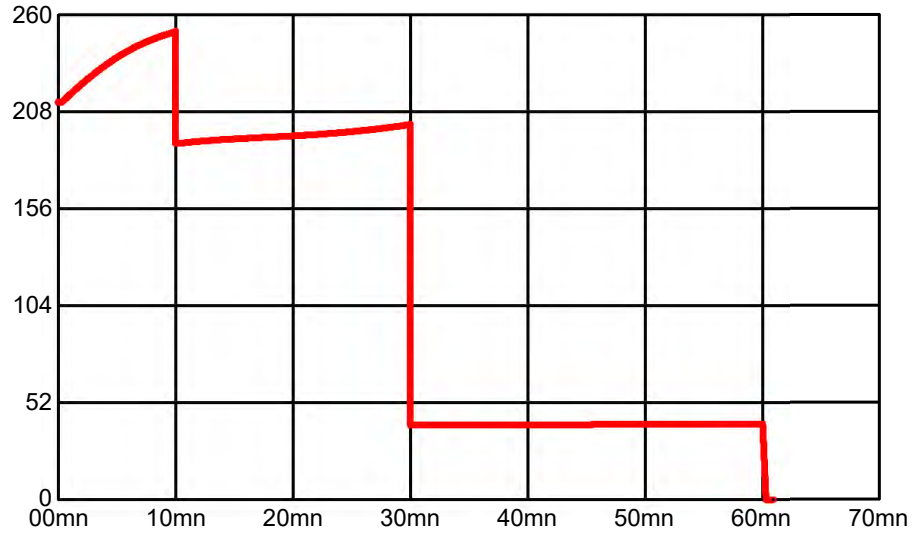
MRX 180 x 19

Battery type	19 x MRX 180 180Ah Flame retardant plastic
Number of parallel batteries	1
Sizing temperature	-15°C
Ageing coefficient (Sintered Pbe)	0,90
State of charge coefficient	0,90
Voltage drop in line	2,00 V
Discharged capacity	124 Ah
Depth of discharge	69 %
De-rated available capacity	72 %
Capacity margin (% C5)	3 %
Discharged Energy	2377 Wh
Equipment minimum voltage	17 V
Voltage margin	0,6 V

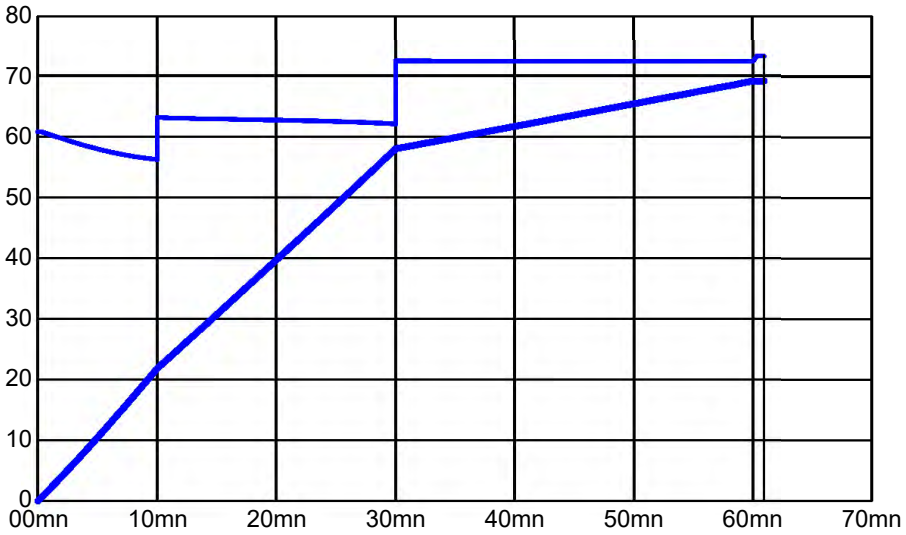
For information :

Maximum maintenance interval at 20°C	40,4 Months
Maximum maintenance interval at 45°C	18,6 Months
Reliability with no failed cell	0,94
MTBF assessment at cells level with no failed cell	2211000 Hours

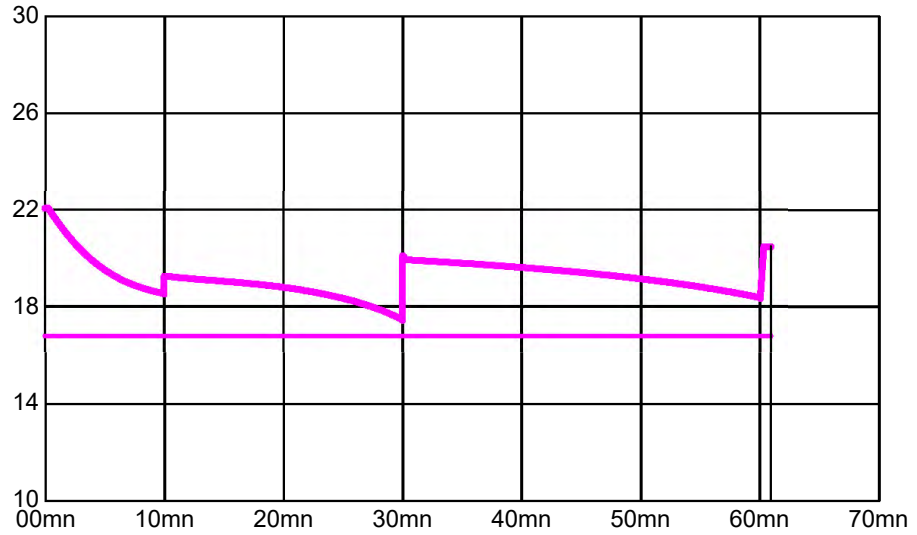
Discharge profile (A)



Discharged capacity (%)



Equipment voltage (V)



Project : Tranvía Edinburgo
CAF S. A.

Study : Calc. a 45ºC

General comment :

Electrical Parameters

Technology type	Sintered PBE
System Nominal Voltage	24 V
Maximum voltage	30 V
Minimum voltage	16,8 V
Charging voltage at 20°C/68°F / Cell	1,47 V
Cranking voltage	14,28 V
Voltage drop in line	2 V
Voltage compensation	-0,003 V / °C
Operating temperature	45 °C
State of charge coefficient	0,9
Ageing coefficient	0,9
Charge efficiency	84 %

Cell quantity

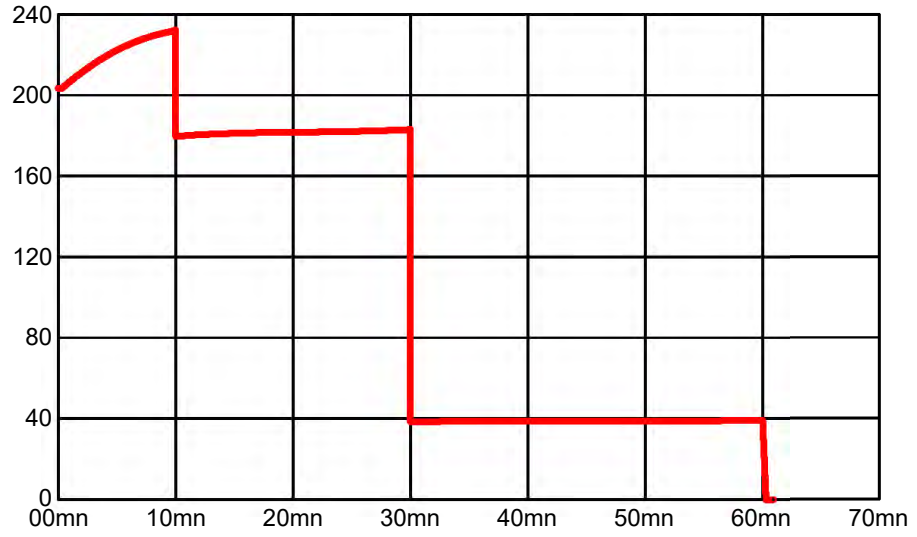
Min number (Cranking)	20
Min number (Other)	19
Min number	19
Max number	20
Minimum voltage / Cell	0,989 V

No	Time (s)	Power (W)	Current (A)	Resist. (Ohms)
1	600	4696		
2	1200	3706		
3	1800	820		

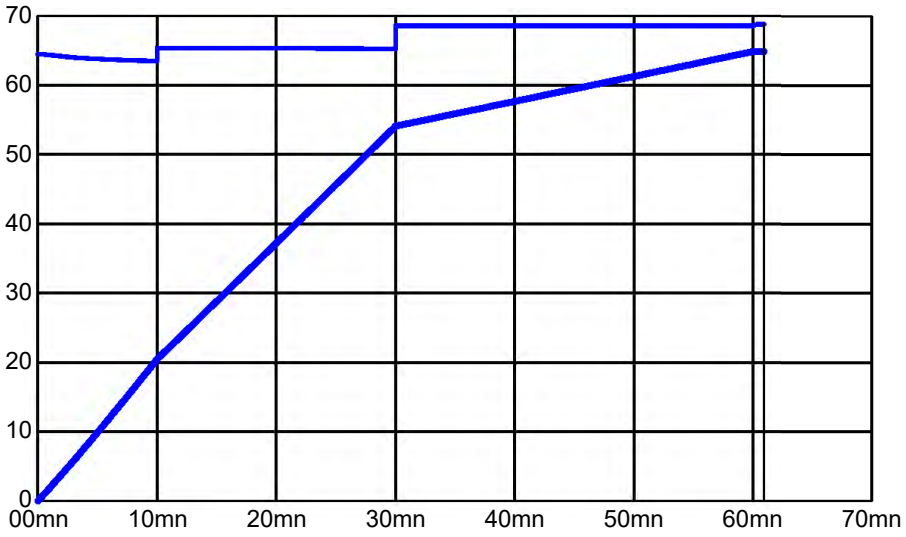
MRX 180 x 19

Battery type	19 x MRX 180 180Ah Flame retardant plastic
Number of parallel batteries	1
Sizing temperature	45°C
Ageing coefficient (Sintered Pbe)	0,90
State of charge coefficient	0,90
Voltage drop in line	2,00 V
Discharged capacity	117 Ah
Depth of discharge	65 %
De-rated available capacity	69 %
Capacity margin (% C5)	4 %
Discharged Energy	2368 Wh
Equipment minimum voltage	18 V
Voltage margin	0,9 V
For information :	
Maximum maintenance interval at 20°C	40,4 Months
Maximum maintenance interval at 45°C	18,6 Months
Reliability with no failed cell	0,94
MTBF assessment at cells level with no failed cell	2211000 Hours

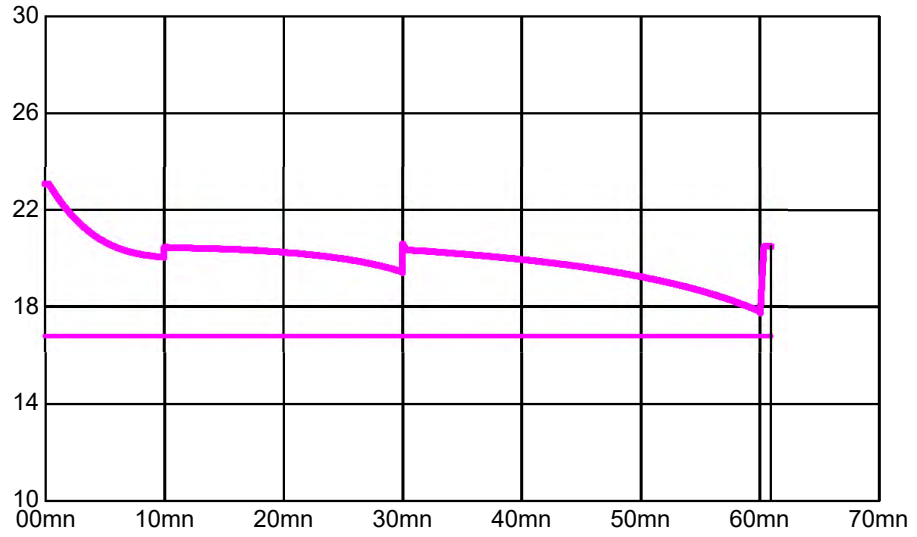
Discharge profile (A)



Discharged capacity (%)



Equipment voltage (V)



RELIABILITY, AVAILABILITY AND MAINTAINABILITY (RAM) PLAN

ISSUE 2

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1. INTRODUCTION

The enclosed document contains CAF's provisional RAM Plan for use on the Trams for the TIE project. It details CAF's general philosophy for RAM (Reliability, Availability and Maintainability) management.

This Plan (and its former version provided at the BAFO) were elaborated based on CAF's expectations related to TIE requirements on RAM for the tram. Yet these expectations have not been substantiated in any tram-specific document, to CAF's knowledge. In view of this, and also considering that, whatever the final approach selected, this shall need to be coordinated with the Infracos' own (also unknown to CAF), it is anticipated that a final RAM Plan shall need to be agreed with TIE after the TSA contract signature. Thus this document should be read as a declaration of principles made by CAF, and as a generic commitment to undertake value-added RAM studies and establish a RAM management approach, based on current best practice, as advocated by the EN 50126 and other relevant standards. It is also noted that this Plan should logically be aligned with the Safety Management Plan for the trams, which has been agreed with TIE to be updated during the design phase of the vehicles (i.e., also after TSA contract signature).

This plan thus sets out in a logical sequence the means by which CAF, in principle, intends to meet the Rolling Stock RAM requirements as laid down by TIE Technical Specification.

The RAM optimisation requires its adequate management from the early project stages. Based on this idea, CAF will consider the RAM improvement as a design parameter. Thus, the design will not be focused solely on the compliance of the performance characteristics, but also on the optimisation of the final product's RAM. With this philosophy as a basis, CAF will use the RAM improvement criterion as an additional parameter to consider when diverse technical solutions' consequences are analysed. With that aim, specific reliability and maintainability internal design reviews will be held, past performance experiences will be analysed, their applicability to this project studies and lessons learned applied accordingly.

For that reason, the proposed management strategy is based on the 'As-Practical-As-Possible' approach. The reason is that the most important objective of any RAM Plan must be to influence the design, apply improvements based on past experience and provide the tools to identify critical RAM related points. According to CAF's experience, the best way to achieve that objective is by means of a practical approach instead of a more 'theoretical' one. A clarifying example of the difference between both approaches is the reliability prediction. That prediction can be based on real field experience (from the same or similar components on other projects) or on failure rates from standards such as MIL-HDBK-217 for instance. The experience shows that the first approach gives rise to more accurate results.

The RAM Plan identifies the controlling documents, specifies the resources available, discusses typical methodologies that will be used, and references all

relevant TIE and National or International standards applicable to the present contract.

This draft issue of the RAM Plan contains CAF's provisional proposal for the management of the RAM along the project. CAF is open to analyse the contents of the present document with TIE and study any proposal or comment to modify it.

2. PURPOSE

The RAM Plan and associated program of activities includes the following objectives:

- To ensure reliability and maintenance activities are performed in a timely manner and that the outputs from the activities provide an effective input to the overall Rolling Stock design and development effort.
- To provide system engineering and design teams with detailed guidance on reliability and maintainability engineering philosophy (e.g. selection of parts/equipment/systems, de-rating, standardisation, maintenance policy etc.).
- To provide guidance on maintenance verification and acceptance criteria for Rolling Stock systems that will be provided. This will include early test and verification of proposed systems.
- To identify design weaknesses through analysis and test so that reliability can be improved by implementing changes to the design.
- To ensure through critical and timely RAM Analysis Design Reviews that the RAM Plan is proceeding in accordance with project milestones and that any risk of not meeting the TIE requirements is identified and managed.
- To provide a demonstration that the Rolling Stock design meets the TIE reliability and maintenance requirements.
- To provide guidance on reliability verification and acceptance criteria for Rolling Stock systems that are being procured Off-The-Shelf.
- To ensure that subcontractors and system suppliers adhere to and meet the TIE RAM requirements and policies.
- Initial identification and subsequent management and control of lived and critical items to determine the need for condition monitoring, performance monitoring, preventive and, corrective maintenance.
- Initial estimate and subsequent management and control of the support requirements including the need for special test equipment (built-in or separate) and any other special facilities including those for software testing and support

The overall aim is to ensure, as far as is practicable that, through the application of a program of RAM engineering, the Rolling Stock design is fault tolerant and critical failures are eliminated through the design effort and the application of condition monitoring, test and inspection and appropriate preventative and corrective maintenance policies.

3. SCOPE

The RAM Plan described in this document applies to the whole EMU including the following systems:

- Bogies and suspension
- Carbodies and interiors
- Passenger access doors
- Communication equipment
- Friction brake equipment
- Heating, Ventilation and Air Conditioning system
- Couplers
- Traction equipment
- Auxiliary converter
- Battery
- Electrónica De Diagnóstico (EDD)

Although this Plan's scope includes the whole tram with its systems, depending on the nature and criticality of the systems, different degree of analysis and documentation will be required for them. This point shall be agreed at early design stages between TIE and CAF.

The application of the present RAM Plan extends to the whole product lifecycle, from the 'Concept' phase to the 'Modification and Retrofit'.

This plan is applicable to all of CAF's assigned personnel and its suppliers and subcontractors.

4. GLOSSARY

CAF	Construcciones y Auxiliar de Ferrocarriles
EDD	Electrónica De Diagnóstico

RAM	Reliability, Availability and Maintainability
RAMS	Reliability, Availability, Maintainability and Safety
FMEA	Failure Modes and Effects Analysis
FMECA	Failure Modes and Effects Criticality Analysis
FRACAS	Failure Reporting and Corrective Action System
MIL-STD	Military Standard
MIL-HDBK	Military Handbook

5. DEFINITIONS

For the purposes of this document definitions from EN50126 apply.

6. CAF ROLLING STOCK RAM POLICY

According to CAF's policy, RAM engineering will be given equal weighting in the design process as the more traditional performance characteristics. Moreover, a key objective of CAF's policy will be to optimise RAM performance and to achieve this purpose, reliability and maintainability will be some of the parameters analysed from early design stages. The aim is to meet the performance requirements based on the identification and analysis of the TIE operational performance requirements, physical environments and Customer's resources available to support the Rolling Stock in operation. This is achieved with a policy of:

Managing the contributions to system reliability made by individual system elements and thus ensuring the selection of the correct design or system/material/product to meet the Client's requirements.

Identifying design deficiencies, which prevents from the selection of unsuitable parts and materials.

Evaluation of the maintenance and support aspects of the proposed and selected system throughout all project phases.

The overall aim is to design, develop and deliver robust Rolling Stock systems that are available, operate reliably and are easily maintainable in the specified TIE environment.

Another important aspect of CAF's approach is to appoint a single RAMS Engineer responsible for the coordination of the RAM and Safety Plans with the aim of ensuring that the detailed interactions between reliability, maintainability and safety engineering are effectively managed and controlled.

The RAMS Engineer will produce RAM guidance that will be required to provide detailed reliability design criteria, targets and general advice to the system engineers and design teams. The intention will be to explain that RAM is an inherent characteristic of the design and must be addressed during the design and development phase.

Based on our philosophy, the present RAM Plan and the activities included will be **as practical as possible**. According to this idea the following criteria will be applied:

- Past performance information will be considered as an information source of paramount importance.
- Real in-service information will be preferred to other alternative reliability data sources such as standards or engineering handbooks (such as MIL-HDBK-217, IEEE Std 500, etc).
- CAF will closely work with TIE and with its own suppliers for collecting their own past performance information, analyse that information and correct past errors.
- CAF will identify RAM critical aspects and will provide enough evidence to TIE to demonstrate their adequate management.
- The RAM Plan will be applied to the whole product lifecycle phases.
- CAF will apply a complete and standardised Failure Reporting and Corrective Action System (already in use in multiple projects on a wide variety of railway markets) with the aim to collect real in service performance information and provide the adequate means for an optimum reliability growth.

6.1. RAM DESIGN CRITERIA

According to CAF's habitual maintainability policy, the following features will be considered as design rules:

- **Accesibility**: All subsystems and components requiring preventive maintenance shall be readily accessible for service and inspection. Accessibility of components will be proportional to frequency of maintenance and repair of the components; that is, the more the need to access a component, the easier the access shall be. No active electrical or mechanical components that require maintenance shall be structurally embedded to preclude convenient access for repair or replacement.
- **Modular design**: Modular design principles shall be employed to the greatest extent practical. Components shall be packaged together in replaceable subassemblies, according to the logical function that they perform. Components or subassemblies requiring occasional removal shall preferably be plug-in units.

- **Interchangeability**: Assemblies or components that are functionally interchangeable shall be physically interchangeable. Assemblies or components that are not functionally interchangeable shall not be physically interchangeable.

- **Adjustments**: The need for adjustments shall be avoided. When adjustment points cannot be avoided, they shall be readily accessible, adequately identified, and self-locking to prevent inadvertent or drift.

- **Skills and Training**: The maintenance requirements of the train and its subsystems and components shall be in accordance with the skills and training of Authority maintenance personnel.

- **Special Tools**: The number of special tools required for maintenance and repair will be minimized.

- **Panels and Openings**: Panels and openings shall be of sufficient quantity, size, and placement to permit ready access from normal work areas and positions. Adjustment controls, fittings, safety valves, and such shall be directly accessible through panels and openings. Self-retaining fasteners shall be used whenever possible. Special access openings tools shall not be used, unless considered necessary to prevent vandalism.

- **Cable connections**: Cable connectors shall be spaced far enough apart so that they can be grasped firmly for connecting and disconnecting. Connectors shall be properly labeled and keyed so that they cannot be interchanged or improperly installed. Signal and power pins shall not be adjacent to one another.

- **Lifting Assists**: Handles, lifting lugs, or approved functional equivalents shall be provided on heavy components.

- **Visual Inspection**: Visual inspection of equipment shall be unobstructed.

- **Structural Elements**: Access to structural components shall be provided to the greatest extent practicable to allow inspection for cracks, corrosion, and structural integrity.

- **Test Points**: Built-in test points shall be provided and marked. Major components having test panels or test points shall be located for easy accessibility and shall permit external monitoring of critical functions. Test points shall be protected against environmental damage and human error.

- **Fault isolation**: Failure indicators shall be provided and identified. Systematic fault isolation procedures shall be developed and included in the maintenance manuals.

- **Labelling**: All test points, fault indicators, modules, wire junctions, pipes, tubes, wires, etc., shall be identified by name plates, color coding, number coding, or other means to assist maintenance personnel.

- **Hardware**: Standard, commercially available industrial components and hardware shall be used whenever possible.

Apart from the previous general criteria, TIE's own ones will be applied.

7. RAM MANAGEMENT AND ORGANISATION

CAF acknowledges that the key for the success of the RAM is ensuring that the RAM Plan can influence those key aspects that result in the desired levels of performance, reliability and ease of maintenance.

Reliability and maintainability requirement achievement depends on diverse areas and hence, different CAF departments will participate in the process of defining, controlling and achieving those requirements. Hence, a multidisciplinary group (called RAM Control Group) will eventually be established in CAF with the following objectives:

- Define RAM strategy
- Define measures to be adopted for RAM optimisation
- Collect and analyse service field data from other projects
- Apply experiences learned from other projects
- Assure an adequate management of the RAM along the whole project

The RAM Control Group will, in principle, be comprised of the following experts:

- RAMS Engineer
- Project Manager
- Project Lead Engineer
- Manufacturing Engineer(s)
- Systems Engineer(s)
- Field Service Support Engineer(s)
- Quality Assurance Engineer(s)

The TIE Technical Specification and applicable standards will be used as the basis for the definition of RAM engineering activities and management. RAM Engineering

requirements will be defined in the “Sub-suppliers RAMS Requirements” document that will be produced for all Rolling Stock systems. The specifications include qualitative and quantitative RAM targets and design criteria requirements.

All CAF Sub-contractors and suppliers will be responsible for providing the required verification of their systems within the terms of their contracts. The CAF Sub-supplier specification includes the relevant Quality and Reliability requirements, derived from the CAF Quality Assurance Plan and the TIE Technical Specification. CAF will give due consideration to the quantity and quality of supporting evidence offered by each sub-contractor to show compliance with the Technical Specification requirements, particularly where this evidence is in the form of actual operational usage in similar applications or environments. Sub-suppliers will be responsible for their systems’ RAM design justification and demonstration.

Following some key personnel's responsibilities are defined:

7.1. THE RAMS ENGINEER

The CAF approach is to appoint a single RAMS Engineer responsible for the coordination of the RAM and Safety Management Plans. This management policy will ensure that the detailed interactions between reliability, maintainability and safety engineering are effectively managed and controlled.

The RAMS Engineer will coordinate the efforts of CAF’s different departments in RAM related tasks and activities.

In order to assure attainment of the overall reliability and maintainability goals, it is essential the coordination of all subsystems’ suppliers to ensure that all of them know the overall system’s requirements, their own subsystems’ requirements and how CAF intends to meet those requirements. The sub-suppliers will have to define their own RAM management policies. CAF RAMS Engineer will be the responsible for coordinating all sub-suppliers’ reliability related efforts and for ensuring that all of them work with compatible particular goals.

Sub-suppliers’ reliability design justification and demonstration supporting documentation will also be reviewed by the CAF RMS Engineer before being offered to TIE for approval.

7.2. THE QUALITY ASSURANCE ENGINEER

Procedures and controls, including piece part selection and screening, manufacturing process controls, procurement controls, and test procedures to be utilised during production to assure achievement of reliability requirements will be defined in the CAF Quality Assurance Plan and the Test and Inspection Plans by the Quality Assurance Engineer. He will also control the application of these plans.

The Quality Engineer will also be the responsible to assure that the purchased material complies with the specified requirements and standards, which will be defined in the product design phase. That is, he will assure that the purchased

material has the required quality to make possible the attainment of the reliability requirements.

7.3. THE FIELD SERVICE SUPPORT ENGINEER

In line with the CAF's aim of assuring that all areas involved in RAMS related issues jointly work to achieve RAMS management optimisation, the Field Service Support Engineer will provide real service data based on CAF's experience and will assess sub-suppliers' R&M data to assure that realistic predictions are made. Furthermore, he/she will assure that proposed solutions do really improve RAM performance and that problems happened in other projects are solved.

8. RAM REQUIREMENTS

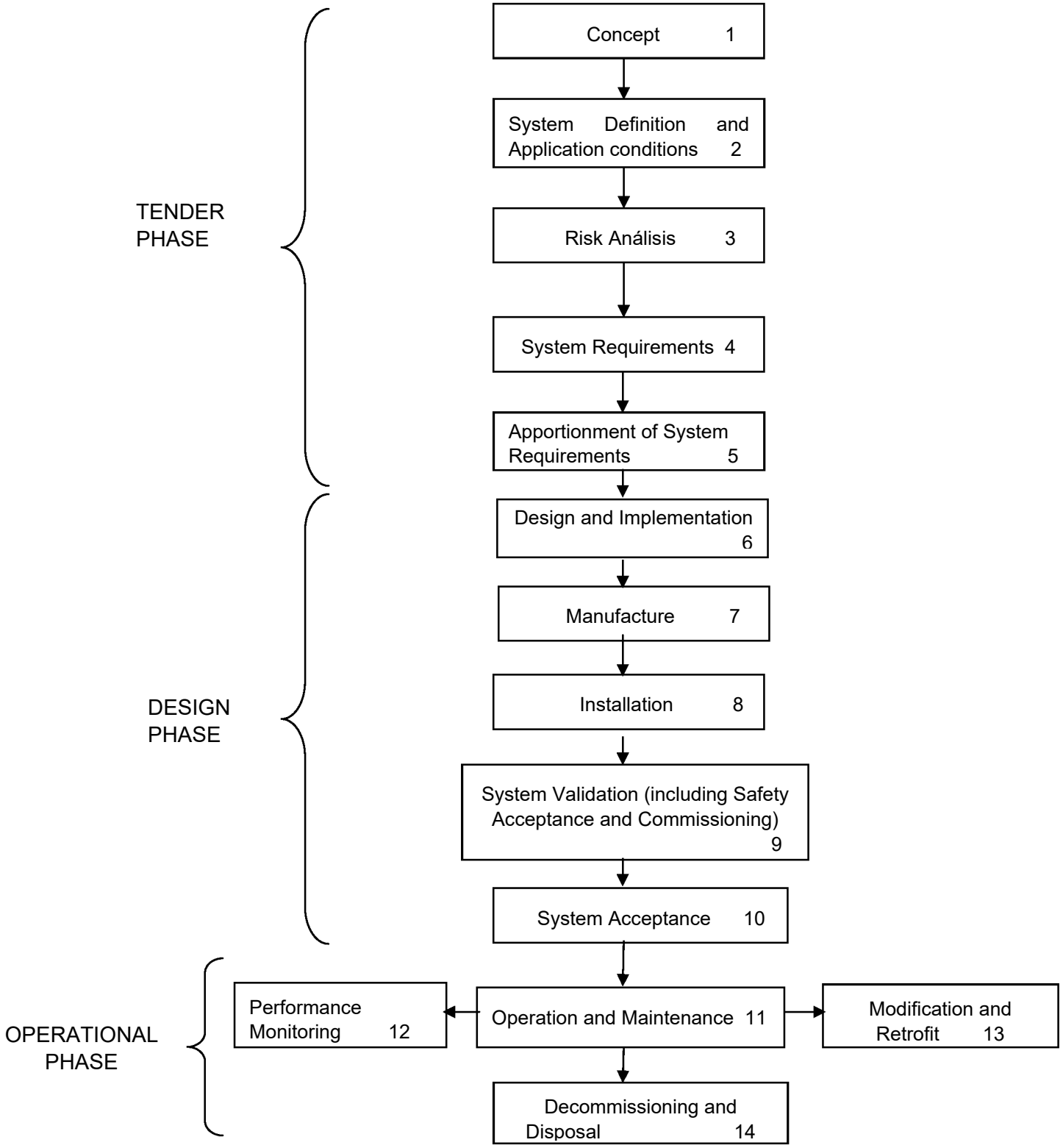
RAM requirements are not defined yet by TIE. It is assumed that these will be fixed in the TSA contract. CAF will otherwise, bona fide, apply those considered to be necessary in order to ensure that the tram manufactured presents a set RAM characteristics recognisable as compatible with current best practice.

9. PRODUCT LIFECYCLE AND RAM ACTIVITIES

As it has been stated before, the RAM Plan extends to the whole product lifecycle from the first concept phase to the Modification and Retrofit (please take into account that the phase 'Decommissioning and Disposal' is out of CAF's scope).

The following figure depicts the different system lifecycle phases for a rolling stock application:

Figure 10-1: System lifecycle phases



The activities to be carried out along the whole lifecycle are distributed as follows:

Phase 1: Concept

The objective of this phase is to develop a level of understanding of the system sufficient to enable all subsequent RAM lifecycle tasks to be satisfactorily performed. It will include the following activities:

- Analysis of TIE requirements (RAM and others)
- Obtain an understanding of the environment of the system
- Define similarities with other CAF past project. Collect past performance RAM information.

Phase 2: System definition and application conditions

The main objectives of the second phase are to decide the RAM strategy for the project, define the RAM management approach and produce the RAM Plan. The main activities to carry out are:

- Define RAM strategy for the project
- Study past performance RAM information.
- Produce the RAM Plan
- Study system's main features (using the system description) and their impact into RAM

Phase 3: Risk Analysis

This phase is mainly applicable to the Safety Plan. There are not RAM activities for this phase.

Phase 4: System requirements

The aim is to define the attainable RAM requirements. Based on that aim, during this phase the next activities will be carried out:

- Define achievable RAM figures
- Define RAM requirements. Those requirements will include both applicable requirements from TIE Technical Specification and RAM requirements defined by CAF.
- Define RAM related functional requirements

- Carry out a train level functional FMECA for the identification of the reliability critical functions (this activity can alternatively be substituted by engineering analysis of an equivalent tram existing design and performance).

Phase 5: Apportionment of system requirements

During this phase, apportionment of the RAM requirements to subsystem level is carried out. Thus, the phase will include:

- Allocate functional requirements to designated sub-systems
- Allocate RAM requirements to designated sub-systems
- Define the document describing the RAMS requirements for the sub-suppliers (sub-suppliers RAMS requirements)

Phase 6: Design and implementation

The objectives of this phase include:

- Create systems and sub-systems conforming to the defined RAM requirements
- Demonstrate that systems and sub-systems conform to the defined RAM requirements

For achieving those objectives the following activities will be carried out:

- Collect TIE's past performance experience and compare with CAF's data. Assess RAM allocation's adequacy and modify if required.
- Collect Authority's experience and identify reliability and maintainability critical items and aspects to consider
- Periodical meetings of the RAM Control Group (refer to section 8): control adequate evolution of the RAM Plan and implement the required measures to optimise RAM
- Carry out a Reliability Prediction based on real data (using subsystem level FMECAs or not).
- Manage improvement of reliability-critical points
- Define quality measures to adopt for reliability improvement
- Define quality controls for manufacturing
- Joint TIE/ CAF analysis of the tram maintainability.

Phase 7: Manufacturing

During this phase the adequate measures must be taken to assure that the manufactured systems and sub-systems meet the defined RAM requirements. For that reason, those activities will be carried out:

- Define RAM related testing procedures
- Commence Failure Reporting and Action System (FRACAS).

Phase 8: Installation

The aim of this phase is to assemble and install the total combination of sub-systems and components required to form the complete system. For that reason, the phase will encompass the next activities:

- Define the list of spare parts
- Define staff training documentation and procedures

Phase 9: System validation (including safety acceptance and commissioning)

The main aim of the phase is to validate that the final product meets the defined safety requirements. Hence, the following activities are defined:

- Control testing results and review impact into RAM

Phase 10: System acceptance

The purpose of this stage is to assess compliance of the defined RAM requirements and accept the system for entry into service. Thus, those tasks will be done:

- Collect generated RAM information and assess that they fit with the defined in the RAM Plan

Phase 11: Operation and maintenance

The objective of this phase will be to operate (within specified limits), maintain and support the system such that compliance with RAM requirements is maintained. For that purpose, those tasks will be carried out:

- Assessment of the adequacy of the information, data and other statistics produced
- Assessment of the adequacy of the methods, tools and techniques used within the phase
- Verification that changes in support arrangement are consistent with system RAM requirements

Phase 12: Performance monitoring

The objective is to maintain confidence in the RAM performance of the system. Related tasks are:

- Collection of operational performance and RAM statistics
- Acquisition, analysis and evaluation of performance and safety data
- Check that the assumptions made in the RAM Plan remain valid

Phase 13: Modification and Performance monitoring

The aim of the phase will be to control system modifications and retrofit tasks to maintain system RAM requirements. With that purpose, a procedure will be defined to implement system modifications, study their possible impact into RAM. Hence those tasks will be carried out:

- Application of FRACAS for implementation of modifications
- Study of modification impact into RAM

10. THE ROLLING STOCK RAM STUDIES AND TASKS

The RAM studies and activities to be carried out (in principle, within the limits derived from the provisional status of this Plan) are summarised in the table below:

Table 11-1 - RAM Tasks

Task No.	Description	Lifecycle phase (see section 7)												
		1	2	3	4	5	6	7	8	9	10	11	12	13
1	Define RAM Plan	-	D	-	-	-	U	-	-	-	-	-	-	-
2	RAM Allocation	-	-	-	-	A	-	-	-	-	-	-	-	-
3	Sub-suppliers RAMS requirements	-	-	-	-	A	-	-	-	-	-	-	-	-
4	Collect Authority's RAM past experience	-	-	-	-	-	A	-	-	-	-	-	-	-
5	Train level functional FMECA	-	-	-	D	-	-	-	-	-	-	-	-	-
6	Reliability Prediction (by means of subsystem level FMECAs or not)	-	-	-	-	-	D	U	-	-	-	-	-	-
7	Maintainability study	-	-	-	-	-	A	A	-	-	-	-	-	-
8	Monographic RAM meetings with Authority	-	-	-	-	-	A	A	A	-	-	-	-	-
9	List of spare parts	-	-	-	-	-	-	-	D	-	-	-	-	-
10	FRACAS and review RAM affecting results	-	-	-	-	-	-	A	A	A	A	A	A	A
11	Assessment of RAM compliance and reliability growth	-	-	-	-	-	-	-	-	-	-	-	-	A

Applicable code:

A – Activity

D – Deliverable document

U – Update if required

11. CRITERIA FOR THE TRAM SERVICE WITHDRAWAL

CAF considers the following “failures” as conditions to take a tram out of service:

- More than 3 doors of the same side locked out
- One door can be closed

- Lost of battery charger
- Lost of the Dead Man functionality
- Lost of friction brake in more than one bogie
- Total lost of radio
- Simultaneous lost of two front lights
- Simultaneous lost of two tail lights
- Lost of HV or cabin HVAC that makes the saloon or cab temperature to exceed 30ºC.

12. FRACAS AND FAILURE COLLECTING DATABASE DEFINITION

In order to assure an adequate reliability growth, the implementation of an adequate Failure Reporting and Corrective Action System (FRACAS) is of paramount importance. CAF applies a standard FRACAS in all its projects. The FRACAS includes the use of a database for RAM information collecting. For the verification of compliance of the reliability values with the Authority's requirements, CAF will use its failure collection database, known as SSAIS.

The SSAIS system contains automatic features to calculate diverse important parameters such as:

- Mean Kilometres Between Failures (MKBF) and Mean Kilometres Between Service Affecting Faults (MKBSAF) (for the overall system and for the different sub-systems and components)
- Mean Time To Repair (MTTR)
- Distribution of failures among the diverse sub-systems and components
- Man-hours required for the corrective maintenance operations

As an example, the following pictures show some of the characteristics of the database:

Figure 12-1: MKBF calculation

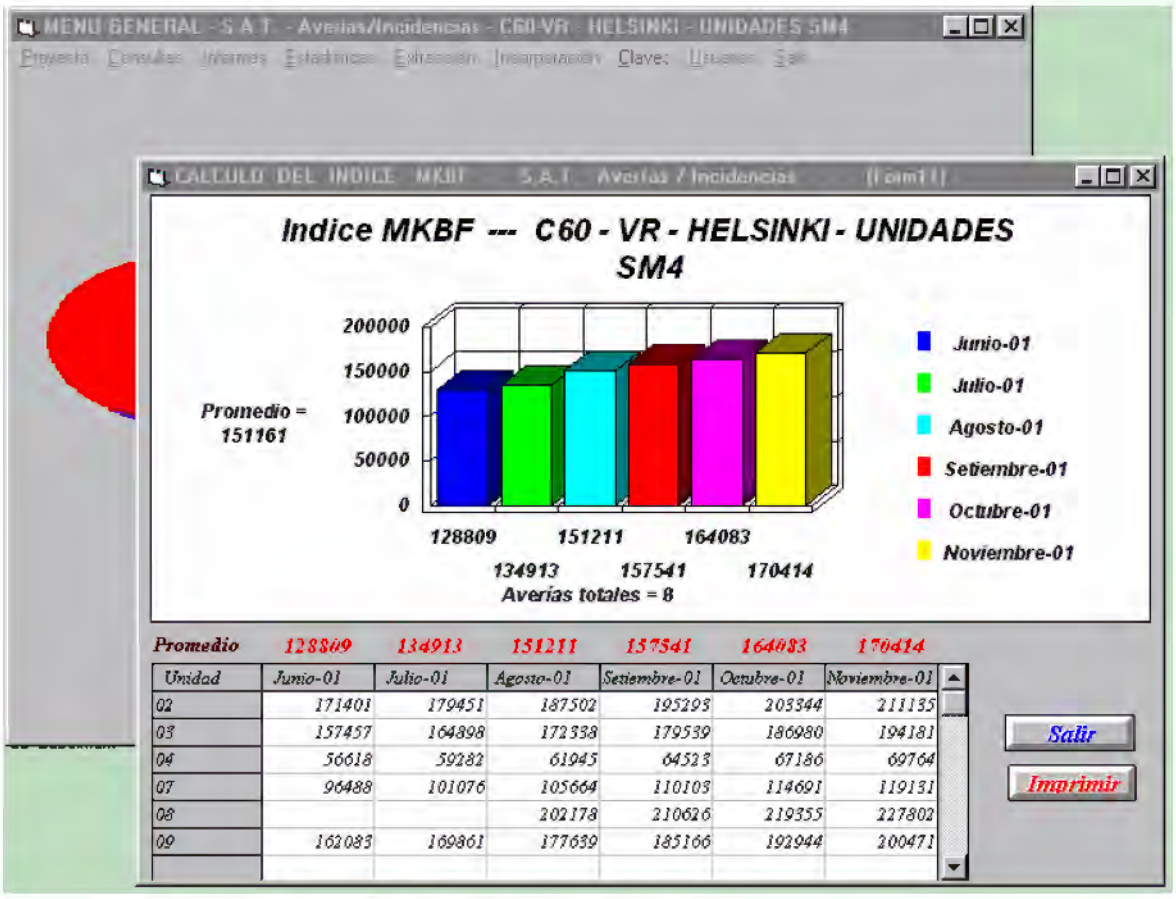


Figure 12-2: Failure evolution graph

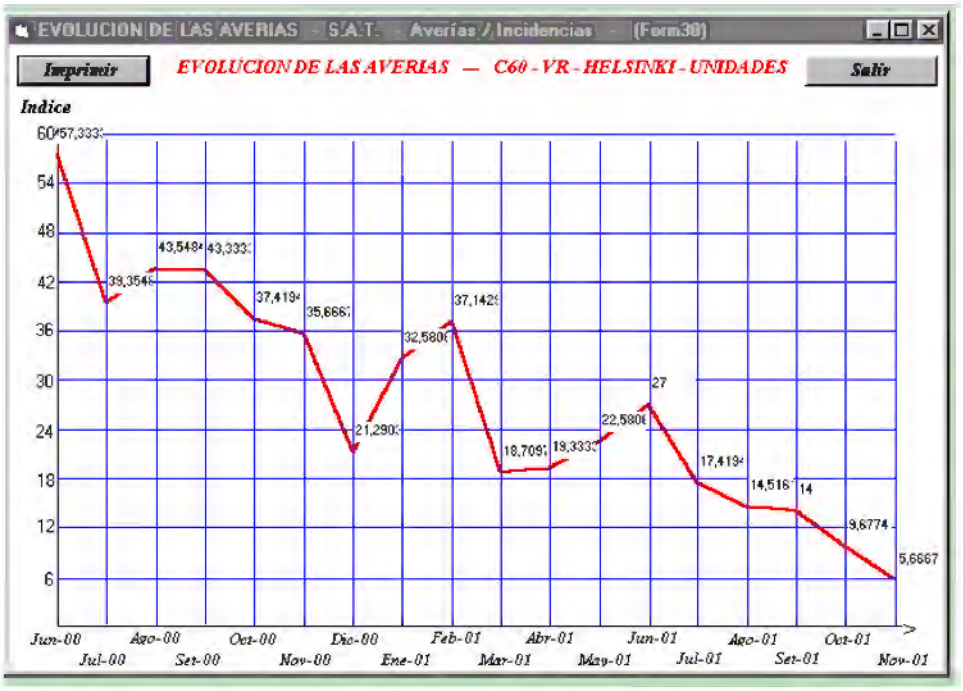


Figure 12-3: MTTR calculation

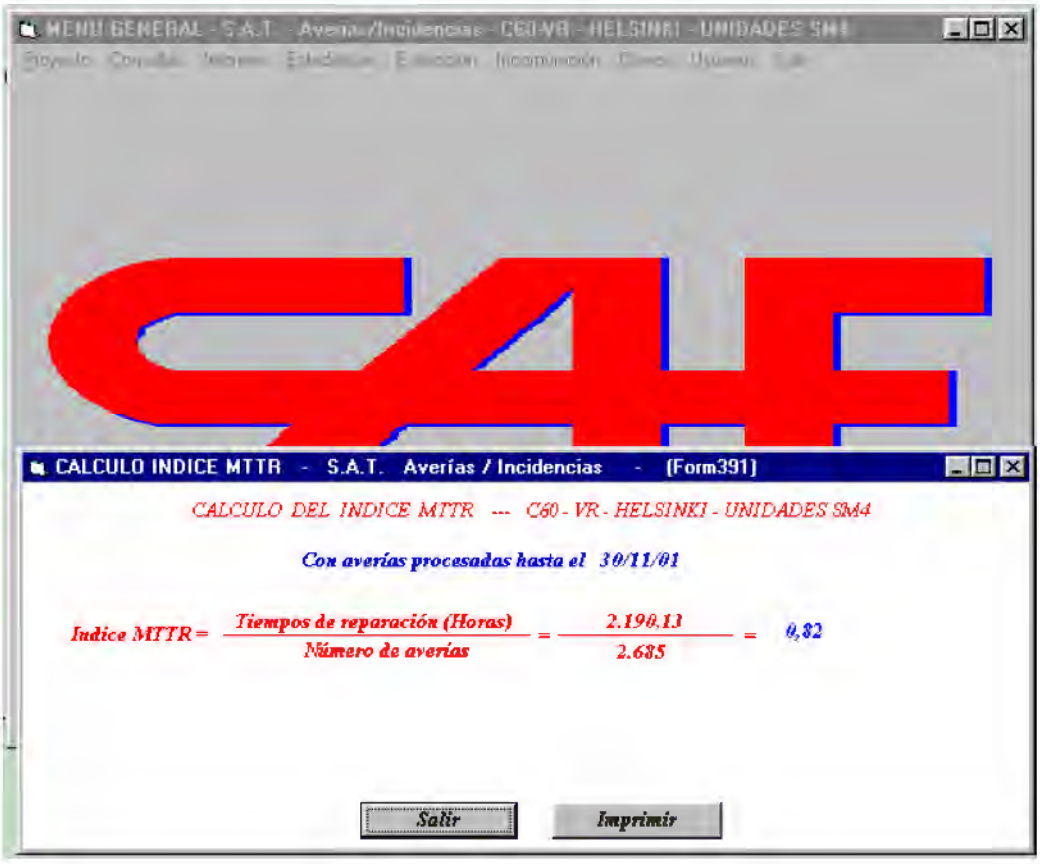
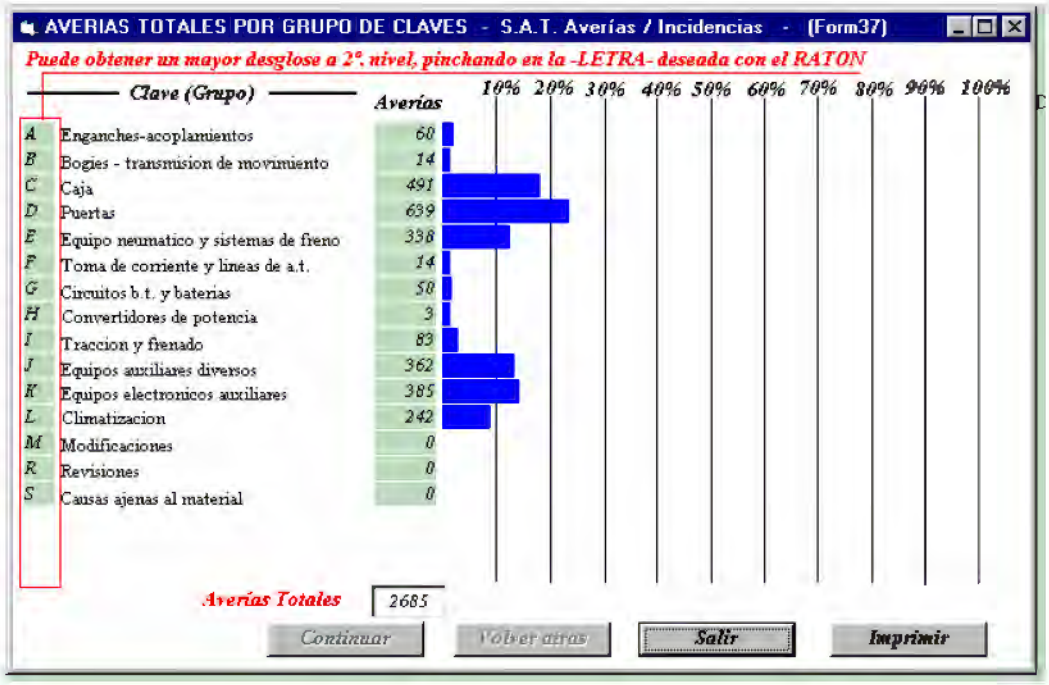


Figure 12-4: Failure distribution



CAF EDINBURGH TRAM

SAFETY MANAGEMENT PLAN

(SMP)

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USB00000086_0120

TITLE:	CAF Edinburgh Tram Safety Management Plan
REPORT NO.:	Q.00.072.900
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1. INTRODUCTION

1.1. GENERAL

This document is the Safety Management Plan for the Edinburgh Tram. The scope of the plan covers the safety management process that will be implemented and the safety engineering activities that will be undertaken during the design, manufacture, testing and commissioning phases of the Project. Maintenance, if performed by CAF, will be the subject of a separate plan.

The Tram Safety Management Plan sets out the means by which the Construcciones y Auxiliar de Ferrocarriles, SA (CAF) Project Team will ensure that all potential hazards associated with the design and development of the Tram are identified and objective evidence presented to support the claim that the safety risks have been controlled to negligible or tolerable and ALARP levels. The outputs from these activities will be documented and provide the staged Tram "Case for Safety" that is needed to gain regulatory body approval for the Edinburgh Tram Network.

1.2. OBJECTIVES

Safety will be given full consideration in all aspects of the Tram Project including management planning, design, manufacturing, installation, testing, operations and maintenance support. Hazards that exist in all stages of the system life cycle will be identified, assessed, eliminated or the risk shown to be negligible or tolerable and ALARP. Key objectives identified to successfully manage safety are:

- Early and ongoing liaison with all stakeholders and when appropriate the UK Safety Authority, through the System Assurance Manager (SAM).
- Identification of applicable engineering standards, codes of practice and client specifications and the application of a comprehensive verification and validation plan to demonstrate compliance.
- Conducting a series of hazard identification studies and analysis to identify and quantify the safety risks to passengers, staff and the general public.
- Integrating the hazard management process into the overall CAF system engineering process to ensure that suitable and sufficient design control measures are agreed to control the risk. The process will interface management with any assumptions made with regard the operation and maintenance of the trams being communicated to those responsible for their implementation.
- Ensuring that the safety analysis and assessment techniques and risk acceptance criteria are consistent with those specified in the Edinburgh Tram Network System Safety Management Plan (SSMP) [Ref. 1].
- Preparing and submission of objective evidence in a series of safety submissions during the Project life cycle that will support the progression to the next phase. As required by the Edinburgh Tram Network SSMP CAF will submit "Case for Safety" Reports at the preliminary design, final design and handover stages of the project.

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1.3. SCOPE

This Safety Management Plan encompasses all safety-related activities associated with the design and delivery of the Edinburgh Tram. There are two main areas within the scope of the plan:

- **Engineering Safety**: this covers all issues associated with designing, testing and commissioning the Trams and will support the overall demonstration that the tram working in the integrated tramway system will operate safely in respect of passengers, staff and public, including all users of roads affected by the introduction of the Tram Network.
- **Operational Safety** – For CAF this will include processes that will ensure the Tram Operator and Infrastructure Manager are advised in a timely manner of all system safety related issues that require management during commissioning and revenue service. In this respect Operation includes shadow running, service running, maintenance, disposal and decommissioning.

The CAF Safety Management System has been tailored in application to meet the specific requirements of the Project and in particular the Edinburgh Tram Network SSMP. The safety management system follows the guidance and requirements of EN 50126 [Ref. 2], the Network Rail sponsored Engineering Safety Management Issue 4 [Ref. 3] and the ORR's Railway Safety Principles and Guidance [Ref. 4]

1.4. AUTHORITY

Authority for the development and issue of the CAF Tram Safety Management Plan is derived from the CAF System Engineering process. The CAF Edinburgh Tram Project Manager will lead the safety culture and provide leadership and oversight of all safety management activities that are the responsibility of CAF. Scheduled safety management reviews will be undertaken ond when necessary amendments made to the Safety Management Plan to ensure it remains valid. All updates to the SMP will be communicated to all relevant stakeholders as part of the CAF quality management system.

1.5. GLOSSARY / ABBREVIATIONS

The following abbreviotions and definitions apply specifically to this documentation, although they may have other meanings in another context. Some terms are defined specifically in the body of the document.

Term	Definition
ALARP	The principle that no risk within the tolerability region can be accepted unless reduced As Low As Reasonably Practicable.
Risk	Is the combination of severity of harm with the likelihood of it happening.
Severity	A measure of harm done or loss. Describes how serious consequences are.
Incident	An unplanned, uncontrolled event which, under different circumstances, could have resulted in an accident
Accident	An unplanned, uncontrolled event giving rise to death, injury, occupational ill health or other loss.
Quantified Risk Assessment	Identifying the hazards which are present, making numerical estimates of their frequencies and consequences, and combining them into overall measures or individual societal risk.

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Term	Definition
Qualitative risk assessment	Subjective judgement is used to assess the degree of relative importance of each risk.
Safety	The freedom from unacceptable risks of personal harm; i.e. the avoidance of accident or incident.
Shadow running	The weeks of running to the timetable pattern to gain confidence that the tramway can enter public service.
Test running	Takes place from the point where the system or part thereof is commissioned until such time as confidence is gained that it can enter shadow running
Abbreviation	**Definition**
ALARP	As Low As Reasonably Practicable
CAF	Construcciones y Auxiliar de Ferrocarriles, S.A.
DDCS	Design Case for Safety
EMC	Electromagnetic Compatibility
FEA	Finite Element Analysis
FMECA	Failure Mades Effects and Criticality Analysis
FRACAS	Failure Reporting and Corrective Action System
HazID	Hazard Identification (study)
HazOP	Hazard and Operability (study)
HCOS	Handover Case for Safety
HMRI	Her Majesty's Railway Inspectorate
IGBT	Insulated Gate Bipolar Transistar
LRV	Light Rail Vehicle
PDCS	Preliminary Design Case for Safety
POCS	Pre-Operational Case for Safety
PRM	Persons of Reduced Mobility
PSCC	Project Safety Certification Committee
OCS	Operational Case for Safety
ORR	Office of the Rail Regulator
OSHA	Operational and Support Hazard Analysis
RAM	Reliability Availability Maintainability
ROGS	Railway and Other Guided Transport Systems
RSPG	Rail Safety Principles and Guidance
SDS	System Design Service
SMP	Safety Management Plan
SSMP	System Safety Management Plan
VVVF	Variable Voltage Variable Frequency

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2. PROJECT DESCRIPTION

2.1. INTRODUCTION

The vehicle proposed by CAF for the Edinburgh Tram is an autonomous, bidirectional, double-cab articulated 100% low-floor LRV. It is part of the family of standard, modular-designed trams produced by CAF and in operation in many European cities. The proposed vehicle benefits from technology that is proven in-service in these previous applications.

Main characteristics of the tram are:

- International gauge
- 100% Low Floor
- Capacity of 250 (4p/m²) passengers with 78 (31.2%) seated passengers.
- 2 wheelchair spaces
- Approx. 10.2 m² of floor surface for luggage racks.
- 7 articulated modules with total length of 42.3 metres and maximum width of 2,650 metres
- Supported on 4 bogies: 3 motor, 1 trailer
- 6 doors per side for the ease af passenger boarding.
- Self supporting low alloy steel carbody structures; high elastic limit (Corten) structure in the underframe and ferritic stainless steel on the sides and roof (easy to repair).

The tram has been designed with a robust structure, which will give the tram a service life of more than thirty years. Moreover, the materials used enable easy reparability of the trams: the repair and welding methods will be equivalent to those used in buses.

The tram consists of seven modules:

- Two end modules, each with a cab, supported on a motor bogie, with a single leaf access vestibule, and articulated on the intermediate carbodies.
- Two central modules on the ends of which the intermediate carbodies are supported. One of these central modules, on which a pantograph is located, is supported by a trailer bogie and the other central module is supported on a motor bogie.
- Three intermediate modules, suspended between the end carbodies and the central carbodies, where the double leaf access vestibules are located.

The tram's general architecture is ready to modify the number of its modules with minor works. The interior layout of the proposed tram is modular in design so that the number and position of the luggage racks can be modified easily any time, changing them by a 3 module seat assembly.

The floor is at a height of 350 mm along the passenger saloon. There are no ramps at the entrances.

The cabs are located at the end carbodies and they extend across the whole width of the carbody.

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The central carbodies have an area designated for 2 persons with disabilities. Persons with reduced mobility (PRM) can access this area via the 4 double leaf doors of the carbody. To this end, the access doors of this car shall be fitted with an exterior PRM access indicator.

The unit is not equipped with specific items to aid PRM access as the recommended access from the platforms is easy, thanks to the low floor level. All the disabled access requirements are met by the offered tram.

2.2. EDINBURGH TRAM

The Safety Management activities described in this plan applies to the integration of the Tram to the Network. The following section provides a description the main systems.

2.2.1. Bogies and suspension

The vehicle is supported on four bogies, three of which are motorised. The motor bogies have four motors, which are assembled with their shafts longitudinally, each of which is firmly attached to the gear unit cases to form one single assembly. This gear-motor assembly is completely suspended from the bogie frame, with a number of interspaced rubber elastic components.

Each motor drives a gear unit, which transmits traction torque to the wheel axle via a toothed coupling, allowing for movement caused by the strokes of the primary suspension. A resilient star type coupling is mounted between the motor and the gear unit.

The primary suspension is based on bell-type rubber and steel components which also steer the axles over the horizontal plane. The secondary suspension consists of coil springs, together with progressive elastic components at the end of the stroke. Damping is carried out externally by hydraulic dampers in parallel with the springs.

Carbody support on the bogies is directly via the 4 coil springs of the secondary suspension which are mounted directly above the bogie frame. Traction and braking efforts are transmitted via two drag links.

The main characteristics of the bogies are as follows:

Wheel diameter (new/used).....590/510 mm

Wheelbase.....1800 mm.

Primary suspension ..... Rubber-steel

Secondary suspension ..... Coil springs

Type of brake .....Disk

Number of disks per bogie.....4

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Brake actuation:..... Hydraulically-operated floating clamp with accumulator spring

Electromagnetic rail shoes, per bogie.....2

Maximum Speed ..... 70 Km/h.

2.2.2. Carbodies and interiors

The carbody has been designed to meet the transport requirements in the technical fields of operation and aesthetics. The carbody is designed to provide adequate protection to the passengers should an accident occur. This is especially the case for driving personnel should there be a head on collision with another train or road vehicle and also specific protection by means of a barrier should a person be run over. Both carbody ends have fibreglass-reinforced polyester body-ends with a metal shell to protect the driver in the event of an accident.

Regarding the interior arrangement and decoration, solutions have been found to maximise the interior comfort based on accessibility, ergonomics, visibility, comfort and safety criteria. Also, a pleasant environment has been developed using warm tones and ample lighting. The interior decoration is functional and is mainly moulded fibre glass reinforced phenolic resins.

As well as maximising passenger comfort, an objective of the interior design has been reduced maintenance and cleaning times. To reduce these times the design has focused on simplicity of assembly and accessibility to all vehicle items. In this way, all areas which were difficult to access or that could lead to the accumulation of debris or dirt were removed.

The general dimensions of the proposed vehicle are the following ones:

Maximum length over carbody structure.....42.7m

Maximum width of LRV.....2.65m

Saloon low floor height above rail level 350mm

Passenger Door clearance height 2028mm

Double Passenger door width (free opening) 1300mm

Single Passenger door width (free opening).....800mm

Seat Width per passenger .....min. 450mm

Interior Headroom.....2183mm

Gangway width .....min. 650mm

LRV under-floor clearance, from top to rail,

Fully laden with fully worn wheels..... 50mm (bogie area)

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2.2.3. Passenger access doors

The passenger door leaves are produced as an aluminium sandwich construction. The frame is aluminium with a honeycombed core of the same material. The leaf is edged with EPDM rubber sections, to provide adequate leaf water tightness. The front edge of the leaf has a special hollow EPDM rubber section to protect trapped abstacles. The rigidity or hardness af this section shall be such that an optimum compromise between the detection of obstacles with minimum dimensions and effort to remove a trapped obstacle in the shortest passible time). The windows in the doors are fitted with 5 mm thick hardened glass.

The doors are equipped with internal and external buttons with an indicator (4 green LEDs) which allows the passenger to open the doors once the enabled signol is activated.

The door leaf is flush with the exteriar surface of the vehicle once completely closed. On opening, the leaves perform a combined lateral and longitudinal movement to slide along the side of the carbody to the fully open position.

Double Leaf Dimension:

Opening width: ..... 1,550 mm

Opening height: ..... 2,230 mm

Horizontal clear width ..... 1,300 mm

Vertical clear height ..... approx. 2,030 mm

Single Leaf Dimension:

Opening width: ..... 990 mm

Opening height: ..... 2,230 mm

Horizontal clear width ..... 800 mm

Vertical clear height ..... approx. 2,030 mm

Other characteristics:

Opening/closing time: ..... 3 sec. (+0.5/-0)

Temperature: ..... 25°C - +70 °C

Voltage range: ..... 16.8 ÷ 31.2 V

Humidity: ..... up to 95 %

Maximum and minimum clearances that will show green/no green to the conductor:

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Closed ..... 0-5 mm

Open ..... > 10 mm

Adjustment ..... 5-10 mm

Number of re-openings when an obstacle is detected* 2
*(Value to be defined by tie.)

2.2.4. Communication equipment

Passenger Destination Information System

The Passenger Destination Information System operates based on line data, location of the train along the route and door opening/closing signals, which are provided by other systems in the train.

The Announcement System contains the stations table and their location along the route for each of the lines along which the train is to operate. These tables include the kilometre points at which the next stop announcements are to be made.

The system has the following features:

- 2 front passenger information displays (PID)
- 4 side external PID on both sides of the tram (two per side).
- 8 internal PIDs.
- 20 internal loud speakers, 2 cab loud speakers and 2 noise sensors.
- 8 passenger intercoms.

General Passenger Information System

This is linked into the interior Destination Information System using the same PIDs. The broadcast of this general information is normally at the discretion of the driver and will comprise visual and audible information.

Passenger Safety Information System

This comprises:

- *Visual* information, notices etc. indicating the location of the passenger emergency communication devices, door open buttons, etc.
- *Audible* information transmitted via the public address system by the driver and/or the CCR personnel.
- *Tactile* information on the doors to assist visually impaired passengers in manually locating the door open buttons from the inside and from the outside of the LRV.

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2.2.5. Friction brake equipment

The braking system consists of 1 disk per wheel, which is attached to the wheel. In the event of an emergency, two electromagnetic rail brakes are used on each bogie. The brake operation is electro-hydraulic and accumulator spring.

The proposed braking system operates with an inverse type activation (with spring load) on all bogies. When no pressure is supplied, the stable condition of the floating inverse actuator causes the application of a maximum braking effort.

In the motor bogie the TCU (traction control unit) controls the friction brakes according to the brake demands and also controls the wheel slide protection. The friction is controlled by the TCU via the autonomous HVI card. The TCU substitutes the regenerative electrodynamic brake with the friction brake. The TCU also has the function of ensuring that the brake is applied or released, the appropriate pressure in the callipers is consistent (control of the pressure switch signal and diagnostic). Only the full service brake is under the direct control of the vehicle via fixed wiring.

In the trailer bogie, the BCU (Complete SW Electronics) controls the friction brakes (hydraulic brakes) in accordance with the brake demands and the vehicle's condition and load. If necessary, the trailer bogie friction brake can substitute part of the regenerative electrodynamic brake at low speed (below the substitution speed). The BCU controls wheel slide and the brake diagnostics. Only the emergency brake is under the direct control of the vehicle via fixed wiring.

2.2.6. Heating, Ventilation and Air Conditioning system

Cab

The tram is fitted with one air conditioning unit per cab. The air conditioning unit is compact, divided on the inside in a compressor-condenser area, which contains a compressor and a condenser coil, and an evaporator area, containing an evaporator coil, electric heating elements and an impeller fan. Temperature measuring probes are also located inside for the return air and impelled air.

Passenger Saloon

The passenger saloon is fitted with 3 heating and ventilation units. They are controlled by means of an electronic rack. The proposed HV system has the following essential characteristics:

- Secure and reliable performance
- Service proven components
- Minimum weight commensurate with robust construction
- High efficiency
- Microprocessor based controls
- Efficient thermal and acoustic insulation

The heating and ventilation system ensures that sufficient fresh air is fed into the LRV, in addition to the recirculation of air. It is possible for the driver to de-activate the heating and ventilation system. The HV system offered is based on a range of similar systems that CAF has supplied to the railway industry over a number of years.

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2.2.7. Couplers

The tram is provided with a permanently fitted "Albert" type coupler. This coupler is easily manoeuvrable and is designed such that it will perform as required on the worst combination of horizontal and vertical curves on the system.

For electrical connection between the units, an electrical hose with connectors at both ends is assembled between the two front sections separate from the couplers, and this provides continuity for the signal circuits required for control.

The coupler has a draft bar equipped with an articulation which allows the bar to bend and hide itself or stow the automatic coupler below the carbody when it is not in use.

2.2.8. Traction equipment

The system has three independent traction units and each contains the traction inverter, the brake resistors and four traction motors. Each traction inverter is double, with each module controlling 2 motors.

The two level inverters, directly connected to the catenary, are based on the latest generation of IGBT power transistors. These are specifically used to obtain the best rail traction performance.

The four motors of each motor bogie are fully suspended and mounted with their shafts arranged lengthways to the track. Each of the motors is bolted to its corresponding gear unit, thus forming a rigid assembly.

The system is designed to assure the required functionality and to obtain the highest reliability, availability, maintainability and safety performances.

2.2.9. Auxiliary converter

Each tram will be fitted with 2 auxiliary converters, powered at 750 Vdc, to supply the 3x400Vac line.

The proposed auxiliary converters are based upon the use of the latest generation of IGBTs with a variable voltage and frequency inverter (VVVF).

The 24 Vdc direct current loads are supplied from the battery charger, which shall also perform the controlled charging of the battery.

2.2.10. Battery

Each tram is equipped with a nickel-cadmium type battery capable of supplying the necessary circuits of the vehicle. The nominal capacity of the battery is 180 Ah and consists of 19 nickel-cadmium cells connected in series and grouped in blocks of 4 and 5 cells.

The vehicle's nominal voltage is 24 V which is normal for these types of vehicles. The range of voltages shall be 24 V-30%, +25% (16.8 V-30V) in accordance with standard EN 50155.

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3. SAFETY POLICY AND CRITERIA

3.1. CAF SAFETY POLICY

As part of a rigorous process of safety assurance, CAF's strategy for the development of the staged "Case for Safety" is to ensure that the potential for the Tram or any of its systems and equipment, entering the operational phase with unacceptable safety characteristics is minimised. The primary purpose of the safety assurance process is to maximise the visibility of the hazard identification process, and the defensive safety characteristics of the Tram and associated systems, at each stage of the project.

This will be achieved through selected safety assessments and verification activities being 'integrated' with all other design engineering parameter development; that is, the integration of Performance, Reliability, Availability and Maintainability (RAM), Fire Safety, and Electromagnetic Capability (EMC) into the overall project development program.

CAF safety policy establishes the following key hazard management rules:

- Safety shall take precedence over all other performance characteristics.
- Avoid hazards by use of proven design and redundant or fail-safe components.
- Avoid or mitigate consequences of identified hazards by the use of appropriate design or material.
- Manage hazards arising from extraordinary environmental conditions and through errors in operation or maintenance.
- Ensure that safety requirements are included in the engineering requirements management documentation and demonstrated as achieved.
- Ensure that operation and maintenance control measures are reasonable and communicated to the responsible bodies.
- Ensure that later changes or modifications that are within the scope of CAF are assessed to ensure that they do not lead to a reduction in safety

3.1.1. Safety Strategy

CAF designs and delivers Products that meet the contractual safety requirements and applicable national laws, rules and regulations. CAF is committed to actively supporting the implementation of its safety policy throughaut its areas of responsibility. Endorsement of the Product Safety Policy is essential to preserve the confidence af customers, retain their business, and compete successfully in the marketplace. CAF, for each project:

- Defines product safety requirements based on applicable laws and regulatians in each particular country and based on requirements of the customer, regulators and other legitimate third parties.
- Ensures that safety requirements are fulfilled during the development and delivery of products, including compliance demonstration.
- Pro-actively analyses incidents and accidents to review the safety performance of its products.
- Continually reviews its safety management process and procedures.

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3.1.2. CAF Rolling Stock Safety Principles

The overriding principle for the design of safe rolling stock is:

- ***Develop, provide and maintain products that are safe for their intended use.***

The people covered within the understanding of "intended use" are:

- Tramway passengers and crew.
- People, property and machinery adjacent to the tram.
- People on or around the tram during maintenance.
- People with no intentional interaction with the tramway.

Having identified the people to be protected by this safety principle, the potential mechanisms for putting them at risk have been assessed and defined according to the following initial list of generic rolling stock hazards, as follows:

- Asphyxiation.
- Burns (typically caused by exposure to hot surfaces or substances, as distinct from fires).
- Exposure to biological hazards.
- Exposure to chemicals.
- Collision (of the vehicle).
- Crush.
- Cut.
- Derailment.
- Fall.
- Fire.
- Electrocution.
- Impact (people hitting walls, equipment, etc. or equipment falling onto people, usually as a result of rapid acceleration or deceleration).
- Medical equipment incompatibility.

3.1.3. Safety Criteria

The safety criteria will be defined and maintained in the design and development of the Edinburgh Tram. This will include the management of hazards and associated safety requirements by demonstrating compliance with the following:

- An agreed listing of Engineering Standards, Codes of Practice and Technical Specifications.
- Office of Rail Regulation (ORR) Railway Safety Principles and Guidance [Ref. 4].
- Risk Criteria & Probabilistic Failure Rates.

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3.1.4. Safety Training

The CAF Project Manager is responsible for ensuring that all personnel who have responsibility for system and safety engineering activities within the project lifecycle discharge those responsibilities. The safety training and competence requirements are identified as part of the start up engineering activities for any new project. CAF can confirm that it has resourced a safety management and engineering team to deliver the safety requirements and associated "Case for Safety" documentation. This is discussed in more detail within Section 4.

3.1.5. Statement of Commitment

The CAF Project Manager will ensure appropriate funds and competent resources are made available to implement the Edinburgh Tram safety requirements. Appropriate consultation will be maintained with all stakeholders (thraugh the SAM) in respect to:

- Tram design, build, testing, operation and maintenance consideratians.
- Impacts an all near neighbours.
- Operational and Maintenance Authority dialogue and agreements.
- Gaining Safety Approvals.

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4. SYSTEM SAFETY MANAGEMENT AND ORGANISATION

This plan describes the framework that will ensure that the management of Tram safety within the overall Edinburgh Tram Network Project. CAF will implement the requirements and guidance of the Edinburgh Tram Network SSMP [Ref. 1] which requires the Project to be in compliance with international best practice and applicable, current standards and procedures.

Note: The UK Safety Approvals Regulations changed during 2006. Safety Approvals of the Edinburgh Tram Project will be governed by the Railway and Other Guided Transport Systems (Safety) Regulations (ROGS) 2006 [Ref. 5]. CAF anticipate that this change will require the Edinburgh Tram Network SSMP to be amended to reflect the changes in European Safety Regulations. CAF understands this and is committed to working with all stakeholders to provide the demonstration of acceptable risk required by the UK Safety Authority.

4.1. TRAM SAFETY MANAGEMENT SYSTEM

The CAF Tram safety management system and engineering process will ensure, and demonstrate, that all systems will operate within tolerable/acceptable levels of risk to passengers, public and staff when integrated into the Edinburgh Tramway Network. The process will include a safety requirements capture stage which is an integral part of the CAF system engineering process. CAF acknowledge the requirement to consider the safety of those engaged in using, interfacing with and operating the Tramway including road users and pedestrians on the tram route.

During the initial stages of the Tram development the focus of activities will be to identify hazards and the safety requirements that are needed to control the risks to acceptable levels. The Tram Safety Management Plan will be updated to reflect the output of these studies

During the preliminary design phase the focus of the safety management system activities is to ensure that those systems and equipments critical to safety have the potential to control the risks to tolerable and ALARP levels. A summary of these activities will be reported in the Tram Preliminary Design Case for Safety.

During the detailed design phases the focus of the system safety management activities is that of verification. Verification is defined as ensuring that the design meets the defined safety targets/requirements. A summary of these activities will be reported in the Tram Detailed Design Case for Safety.

A series of unit and system validation and verification activities will be undertaken after which the DDCS will be updated to demonstrate that risks of on-track testing have been adequately controlled to permit track testing and commissioning to be commenced.

Following this, testing and commissioning will be carried out. During this phase verification evidence and analysis will be presented to demonstrate that the commissioned tram meets the defined safety targets/requirements and that the system as commissioned is safe and fit for purpose. CAF will prepare a Handover Case for Safety in support of Shadow and Revenue Running.

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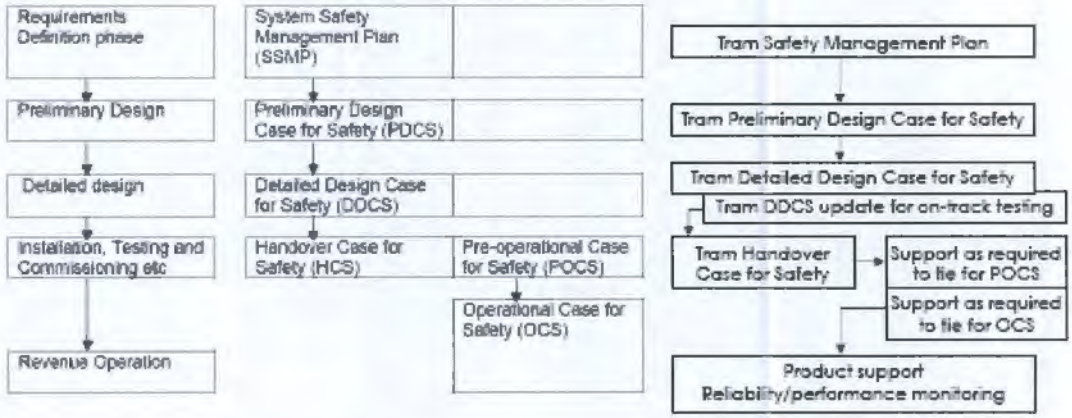
The diagram below indicates the CAF Safety Management System outputs and deliverables which have been aligned to those defined in the Edinburgh Tram network SSMP.



System Safety Management Phases **Tram Safety Management Phases**

In terms of Tram safety the main philosophy is that the hazards will initially be identified by a series of "Top Down" and "Bottom Up" hazard identification studies organised by CAF Safety Manager. The Top Down hazard identification study will build on the work done during the Tender stage and will convened to include key stakeholders in the Edinburgh Tram Network. The CAF strategy for reducing the risks of each hazard to an acceptable level will be produced, agreed with the Project and implemented. The progress in identifying and closing out Tram hazards will be recorded in a CAF Tram Hazard Log. This process will be pro-active and will ensure that hazards are identified early and, wherever possible, eliminated or mitigated at an early stage of design such that the residual risks requiring to be managed during operation are minimised.

4.2. MANAGEMENT ORGANISATION AND RESPONSIBILITIES

4.2.1. Introduction

The Edinburgh Tram Network SSMP, in implementation, requires an integrated approoch with those responsible far the Infrastructure, Operatians ond CAF working together to identify and contral the risks. CAF acknowledges its responsibility, in conjunction with other stakeholders, to ensure that the delivered Tram gains the necessary approvals to operate in trial and passenger service. Further, CAF acknowledges its responsibility to support the Project by preparing and submitting staged Tram Cose for Safety Submissions that will support the overall safety case.

4.2.2. UK Approvals Requirements and Responsibilities

The UK Approvals process will require objective evidence in a suite of safety justification documents that demonstrate compliance with the UK Approvals requirements. CAF is aware that the European and UK Regulatory requirements has been subject to significant "change" as the legislation and requirements of the European Railway Safety Directive (RSD) have been implemented. CAF will support this requirement by ensuring that the engineering assurance documentation is robust and produced in a timely manner to support the staged Approvals applications. As required by the Project,

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CAF will ensure that the activities required by this plan are documented within a series of Cases for Safety that will be staged and provide the progressive demonstration that the engineering safety risks associated with the design, build and test are such that the defined safety targets are complied with. The remainder of this section provides an overview of the requirements and the roles and responsibilities of the various stokeholders within the UK approvals process.

4.2.3. Office of Rail Regulation (ORR)

Responsibility for the regulation of health and safety on the railways has been transferred from the Health and Safety Commission (HSC) and the Health and Safety Executive to the Office of Rail Regulation (ORR). Implementation of the European Railway Safety Directive has resulted in the introduction of the ROGS. It is understood that HMRI, as the Safety Authority, will give authorisation for the introduction of the Tram Network based on submissions made by the Project. In essence, this will be the final validation that the Edinburgh Tram Network, including the new rolling stock, has been independently assessed and shown to meet the requirements of the ROGS [Ref.5].

4.2.4. Near Neighbours

CAF acknowledge its responsibility to support the Project gain safety approvals from the following organisations:

- Network Rail.
- British Airports Authority.
- City of Edinburgh Roads Department.

4.2.5. SDS Edinburgh Tram Network Team

The SDS Edinburgh Tramway Network Team will be responsible for managing the design and commissioning of the tramway, to ensure it is demonstrated as acceptably safe. The SDS Project Team will be responsible for working with the System Assurance Manager to identify and mitigate unacceptable hazards. The SDS Project Team is also responsible for providing assistance to the SDS Systems Assurance Manager in the preparation of each Case for Safety. The SDS Project Team, led by the Delivery Manager, with support from the System Assurance Manager, forms the Edinburgh Tramway Network system integrator. The roles and responsibilities of the SDS Project Team, the Operator and the Infraco, as they relate to safety, are described in detail within the Edinburgh Tram Network SSMP.

4.2.6. Construcciones y Auxiliar de Ferrocarriles, SA (CAF)

CAF acknowledges its responsibility to provide the Edinburgh Tram Network Project with the assurance that the delivered Tram complies with the defined requirements and to assist in the demonstration that it is safe to enter service. CAF has put in place a multi-disciplined management and engineering project team that has the necessary competence and skills required to design, build and support the test, commission and running phase of the project. CAF management ensure that the safety teams have the required degree of autonomy to ensure that conflicting commercial issues do not compromise safety. The CAF Project team, which will remain in place for the complete procurement, will:

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- Influence the design of the Tram by ensuring that full consideration is given to hazard identification and safety requirements management.
- In conjunction with the system engineers, provide documented verification/validation to demonstrate that the safety requirements have been achieved. The safety assessments will form key documents within the safety case submissions.
- Ensure, in conjunction with SDS, that the correct blend of design, operational and maintenance control measures are in place to provide the assurance of safety though the rolling stock life cycle.

Further, for this prestigious project CAF has retained AEGIS Engineering Systems Ltd to act as internal safety management consultant to CAF, providing guidance, advice and direction to CAF on the process to be followed in achieving the safety targets for the project and in producing and presenting the staged Case for Safety.

CAF, as the Tram provider, acknowledges its responsibility to provide the assurance that the rolling stock is demonstrably safe. This will be achieved by implementing a robust safety management system that is proven in application and takes full account of the proposed operations. The Project Safety Management Organisation is described below.

4.2.6.1 Project Manager

The Project Manager has full executive authority on behalf of CAF to manage the Project as a whole, and to direct the sequence and timing of all activities undertaken by all personnel. The CAF Project Manager is responsible for all aspects of the contract, including the safe outcome of the Project. The Project Manager is accountable for the execution of the contract within project profitability, time scale and resource deployment targets and to the Client for deliverables specified within time, quality, safety and cost requirements. Specific safety related responsibilities are:

- Ensure all members of the CAF Project Team discharge their safety responsibilities effectively.
- Communicate and liaise with relevant parties and CAF Suppliers on project matters, including safety issues.
- Ensuring that sufficient resources are planned and available for safety.
- Appoint competent and experienced individuals for safety related roles.
- Ensure that the CAF safety, quality and environmental policies are aligned, implemented and followed.
- Ensure effective safety management systems are put in place for all phases of the Project.

4.2.6.2 Safety Manager

The Tram Safety Manager is responsible for:

- CAF representative (if so requested) at the Edinburgh Tram Project Safety Certification Committee (PSCC).
- Production and maintenance of the Safety Management Plan and ensuring effective implementation of the mandated activities for the design, build, test and operational phases.
- Co-ordinating all activities related to safety carried out by other members of the CAF Project Team, including but not limited to Hazards Analyses and FMECA;

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- To identify and define the safety requirements for the Tram and ensure compliance.
- The identification and/or provision of the proper tools for Safety related activities.
- Focilitating the top down hazord identification studies and arranging suitable operator maintainer and engineering representation.
- Ensuring accurate documentation provides the results of all safety related activities.
- To manage the safety activities and analyses required to demonstrate that safety requirements have been addressed.
- Production and management of the CAF Tram Hazard Log.
- Managing the production of the staged Tram Case for safety Submissians.

4.2.6.3 Quality Assurance Management

The Quality Manager is responsible to the Project Manager for deriving and implementing the CAF Quality Management System. A Project specific Quality Assurance Plan will be the controlling document that will describes the process controls associated with the design and production of the vehicles. The CAF Quolity Management System is compliant with ISO 9001 – 2000. The Quality Manager is responsible for:

- Maintaining the CAF Quality Management System.
- Ensuring the quality assurance process for the CAF Tram Project is defined and implemented.
- Ensuring the surveillance and auditing processes and procedures are implemented effectively.
- Verifying that the assurance activities have been corried out and assurance submissions are complete.

An integral component of safety assurance is effective control of the process by which designs with high inherent safety, are converted into finished products with the same level of safety. To ensure that the controls for manufacturing meet the system safety requirements, CAF will place interface emphasis an the following areas of cantrol:

- Safety engineering will define the safety critical elements and Quality Assurance will review and approve it.
- Quality Assurance will establish controls for production variables and human errors that can introduce hazord conditions.
- Quality Assurance will review materials and process specifications for adequacy.
- Quality Assurance will provide support to Supplier evaluations, selections, establishment of supplier manufacturing and quality control requirements, as well as monitoring of supplier production progress.
- Quality Assurance will monitor non-destructive and destructive test results to verify that items comply with the engineering requirements.
- All in-house production operations, including subsystem installation and functional testing, will report all operating and hazardous conditions to the Quality Assurance Dept.

4.2.6.4 Supplier Management

It is CAF policy to develop a close working relationship with a relatively small group of selected suppliers / sub-contractors that have proven their ability to provide safe and

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reliable systems, equipment and materials. Suppliers of rolling stock systems and equipment are reputable specialists in their respective fields, with substantial experience in railway vehicle applications. The CAF Safety Management Systems, where these cover procurement of systems and equipment, include a contractual requirement for all major system suppliers and their associated sub-contractors to provide a demonstration of product safety and quality.

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5. SYSTEM ENGINEERING AND SAFETY ASSURANCE PROCESS

5.1. INTRODUCTION

CAF utilise a concurrent system engineering process compliant with EN 50126 [Ref. 2] to ensure that all requirements associated with new rolling stock are correctly identified and managed. The process of requirements capture, identification of justification arguments and associated verification activities is proven in application in previous successful rolling stock design and deliver projects.

This section of the Tram Safety Management Plan provides a summary of the safety engineering activities that, concurrent to the other system engineering and assurance activities are carried out to ensure that the safety risks associated with the design and development of the Edinburgh Tram are identified and controlled.

5.2. PRELIMINARY SAFETY ACTIVITIES

CAF acknowledges that the initial phase of any procurement is critical in terms of identifying all potential hazards associated with the scope of change and ensuring robust design engineering solutions and operational and maintenance procedures are put in place. The remainder of this Section of the SMP provides detail of the activities that are currently being implemented and a summary of the safety controls that will be in place during the later stages of the procurement.

5.3. HAZARD LOG REVIEW

The SDS Project Team is responsible for ensuring the demonstration of safety for the overall Edinburgh Tram Network is complete and timely. SDS has generated the SDS Hazard Log [Ref. 6] to provide the record for all system elements that form the Tram Network. CAF can confirm that it will align the Tram Hazard Log to the structure of the SDS Hazard Lag.

As a result of the activities described above the CAF Safety Manager will be in a position to generate the Edinburgh Tram Hazard Log. The Log will be the "Live" register of the rolling stock design hazards that have been identified and must be mitigated within the (design) cases for safety. Operational and Maintenance control measures will be passed to the appropriate body for management action and close out in support of the Pre-operational and Operational Case for Safety. The log will identify the proposed close out control measures (safety requirements) needed to eliminate or reduce the severity or likelihood of the hazard to accepted levels. A summary of the status of the Hazard Log will be made at key stages in support of the Tram Case for Safety submissions.

CAF safety management process is based on the guidelines within EN 50126 and is being aligned to meet the specific requirements of the Edinburgh Tram Network SSMP. The process encompasses the whole product lifecycle from the first concept phase to the modification and retrofit. The figure in the following section depicts the system lifecycle phases for the Edinburgh Tram application.

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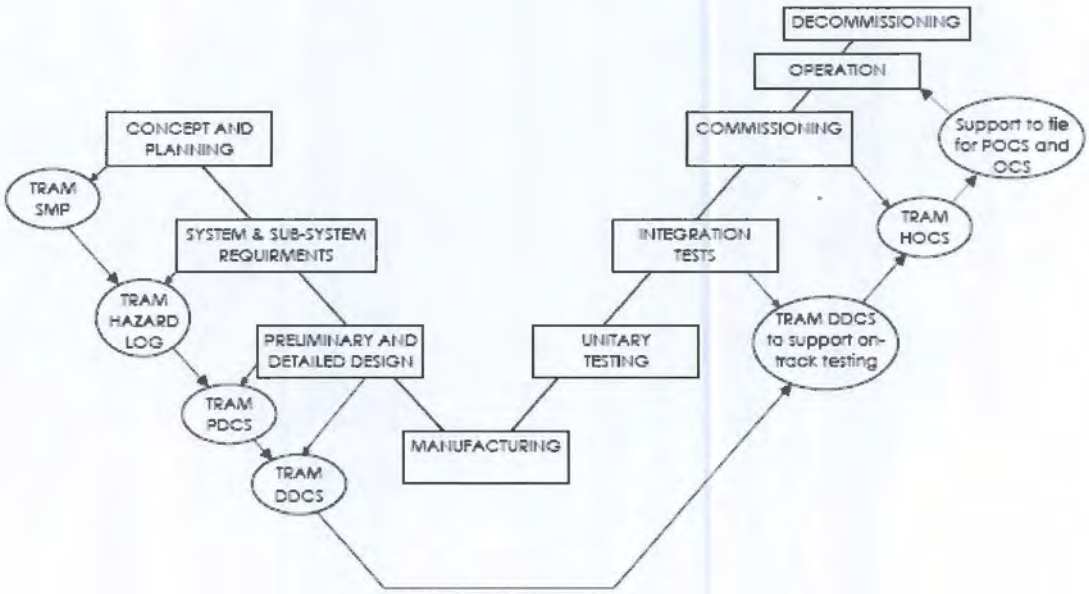
5.3.1. Engineering System- Lifecycle Phases

The project safety engineering "V" lifecycle which will be followed in the Edinburgh Tram project is shown in the graphic below. The graphic illustrates how the phased submissions of the Case for Safety are integrated with the CAF engineering lifecycle. The activities to be carried out within this process are discussed in the following sections.



5.3.2. Phase 1: Concept and Planning

During this phase CAF develops an understanding of the overall Transport System requirements, environment and baundaries in sufficient detail to enable subsequent safety lifecycle tasks to be planned. It includes the following activities:

- Analysis of transport engineering requirements (safety and others).
- Gain a full understanding of the environment that the Tram is required to operate under.
- Define similorities with other CAF past projects. Review applicability of previous engineered system and associated safety studies.

A principal objective in this phase is to identify and document the safety strategy for the project, ensuring that the CAF safety management process is fully aligned to the Edinburgh Tram Network System Safety Management Plan [Ref. 1]. The main activities undertaken are:

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- Definition of the safety strategy, organisation, responsibilities and key safety deliverables for the Project. The safety strategy will be compliant with the guidance provided in RSPG part G "Guidance for Tramways" [Ref. 4]
- Undertake project specific Preliminary Hazard Analysis by review of the operational requirements and the Tram system concept design to identify the high risk drivers and proposed mitigation.
- Define hazard severity categories and hazard frequency categories or review those imposed by the Client specification.
- Define risk matrix and tolerability criteria or review those imposed by the Client specification.
- Production of Project Safety Management Plan (this document).

During this phase a Tram level "Top Down" hazard identification study will be undertaken and will be documented within the Tram Hazard Log. The Hazard Log already generated by the SDS [Ref. 6] will be reviewed and will form a key input to this process. Thus, the main tasks of this phase will be:

- Top Down Hazard Identification Studies.
- Classification of associated safety risks and initial control measures.
- Generate and maintain the Tram Hazard Log.

Key safety assurance deliverables of this phase:

- Tram Safety Management Plan
- Tram Hazard Log

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5.3.3. Phase 2: System and Sub-System Requirements

The objective of this phase is to define the system functional and safety requirements at the Tram and the systems and equipment level. The key activities to be carried out are:

- System functional analyses will be carried out using Functional Failures Analysis and HazOP/HazID studies as appropriate; hazards identified by these analyses will be added to the Tram Hazard Log established in the previous phase.
- Define system and safety engineering requirements. Inputs to this will come from:
  - Client Technical Specification and Engineering Standards
  - Results of the Hazard Identification and Risk Assessment process.
  - Requirements of the Rail Vehicle Accessibility Regulations.

The issued criteria (Edinburgh Tram Network SSMP) for definition of risk (frequency and severity leading to tolerability category) will be applied to hazards identified and recorded in the Tram Hazard Log. These criteria are reproduced in Section 6.3 below.

A further task in this phase is the apportionment of system functional and safety requirements to the sub-system and equipment level. The outcomes of this task will be

During this phase, apportionment of the system and safety requirements to subsystem level is carried out. Thus, the phase will include:

- Functional requirements allocated to designated sub-systems.
- Safety requirements, with required integrity, allocated to designated sub-systems.

The results of this work will be recorded in system and sub-system requirement documents. Where external sub-suppliers are involved, the requirement for suitable hazard analysis, risk assessments, reduction and validation activities will be included in the supplier technical requirement documentation.

Key safety assurance deliverables of this phase:

- Updated Tram Hazard Log

5.3.4. Phase 3: Preliminary and Detailed Design

The primary objectives within this phase are:

- Create systems and sub-systems conforming to the defined safety requirements.
- Establish a complete and coherent set of system requirements documents which define the requirements for the tram and for its sub-systems and equipment.
- Provide verification through analysis that demonstrate that systems and sub-systems conform to the defined safety requirements

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To achieve these objectives the following activities will be carried out:

- Demonstration of compliance with agreed engineering standards and codes of practice.
- Design substantiation analysis to provide the verification that the safety requirements have been met. The analysis will be tailored and applicable examples are Finite Element Analysis (FEA), Failure Modes and Effects Analysis (FMEA), Fault Tree Analysis.
- Summary Safety Reports. The Safety Reports will provide the objective evidence that the hazards and associated safety risks have been controlled by the engineered systems.

A specific safety assurance task of this phase is the production of the Preliminary Design Case for Safety (PDCS). This document will provide the demonstration that the risks associated with the design, implementation and operation of the tram have been identified and that the design, at a preliminary stage, has defined requirements that in implementation will manage these risks.

In accordance with the SSMP [Ref. 1], the PDCS will:

- Review the safety assurance activities conducted up to this phase of the project
- Provide a summary of the latest version of Tram Hazard Log, demonstrating that individual hazards have adequate, if ongoing, plans for their control and mitigation.
- Identify any specific additional actions that will be required within the detailed design and later phases to ensure adequate control of safety risks.
- Provide a clause-by-clause response to the RSPD part G [Ref. 4].
- Provide a clause-by-clause response to the RVAR guidelines [Ref. 7].

Key safety assurance deliverables of this phase:

- Tram Preliminary Design Case for Safety

5.3.5. Phase 4: Release to Manufacturing

A key element of this phase will be the production of the Tram Detailed Design Case for Safety (DDCS). This document will, in compliance with the requirement of the SSMP [Ref. 1], demonstrate that the Tram has been designed to be acceptably levels of safety risk.

The Tram DDCS will:

- Summarise the safety assurance activities conducted up to this phase of the project
- Demonstrate that the technical safety of the vehicle design has been assured by the design validation activities carried out in the detailed design phase.
- Provide a summary status of the Tram Hazard Log to demonstrate that hazards have been adequately controlled and mitigated to permit the vehicle to be manufactured and tested safely.
- Report the quality management processes to be employed during manufacturing phases.
- Detail the planned vehicle test and commissioning activities

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- Identify any specific operational controls required within the testing phases to ensure adequate control of safety risks

During this phase adequate control measures must be put in place to ensure that the manufactured systems and sub-systems meet the defined safety requirements. The following activities will be carried out:

- Identification of hazards associated to human factors including manufacturing, operation and maintenance by means of an Operation and Support Hazard Analysis (O&SHA).
- Definition of the safety related quality controls.
- Define safety related testing procedures
- Commence Failure Reporting and Corrective Action System (FRACAS).

The aim of this phase is to assemble and install the total combination of sub-systems and components required to form the Tram. The phase will also encompass the following activities:

- Establish and control the application of safety-related assembly and installation procedures.
- Define staff training documentation and procedures.

Key safety assurance deliverables of this phase:

- Detailed Design Case for Safety

5.3.6. Phases 5 and 6: Unitary and Integration Testing

The aim of these phases is to complete sub-system and vehicle tests to validate that the final product meets the defined safety requirements. Hence, the following activities are defined:

- Testing results and review for any impacts on Design Case for Safety.
- Update Tram Hazard Log and include closure arguments for all test-mitigated hazards
- Update of the Tram DDCS to support request for permission to begin on-track testing

5.3.7. Phase 7: Commissioning

The purpose of this stage is to assess compliance of the defined safety requirements and demonstrate the Tram as an engineered system is capable of entry into service. Thus, the following safety assurance tasks will be done:

- Assessment of the adequacy of the generated safety-related documentation.
- Assessment of the safety related testing results and verification that their results show system acceptability.
- Final risk assessment.
- Verify that the activities and studies defined in the Safety Management Plan have been satisfactorily carried out.

In this phase the Tram Handover Case for Safety will be produced. This document will be produced to support the SDS Handover Case for Safety and will:

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- Give a complete explanation of the safety assurance activities carried out in support of the demonstration of tolerable and ALARP levels of risk.
- Provide a summary of the Tram Hazard Management process and the status of the Hazord Lag with all identified hazards, safety requirements and a reference to the close out arguments.
- Detail any remaining operational or maintenance related hazard mitigation actions, requiring acceptance by the operatar or maintainer.
- Give a summary of the validation activities undertaken within the testing and commissioning phases.

Key safety assurance deliverables of this phase:

- Tram Handover Case for Safety (to support the SDS Handover Case for Safety)

5.3.8. Phases 8 and 9: Operation and Through Life Support

The safety objective of this phase will be to support the day to day operation of the tram (within specified limits) and to maintain and support the systems such that compliance with safety requirements is maintained. To support these objectives from a sofety requirement the following will be implemented:

- Monitoring of vehicle performance through the collection and analysis of operational performance and safety data (FRACAS or DRACAS).
- Assessment of the adequacy of the information, data and ather statistics produced.
- Assessment of any proposed design changes that in implementation could compramise the Design and/or Handover Cases for Safety.
- Verification that changes in operation or maintenance support arrangements remain consistent with Case for Safety.

One of the main aims of these tasks is to maintain confidence in the safety perfarmance of the system, particularly where modifications to the system are made. Processes will be implemented to control system modifications and retrofit tasks to maintain system safety requirements. With that purpose, a procedure will be defined to implement system modifications, study their possible impact into safety and if so, modify safety documentation and reassess compliance with safety requirements. Hence those tasks will be carried out:

- Application of FRACAS for implementation of modifications
- Study of modification impact inta safety
- Repeat risk assessment (if required)
- Update Safety Report or applicable safety documentation

Note: The EN 51026 standard defines an additional phase of 'Decommissioning and disposal'. This phase is not addressed in the present report since it is out of CAF's scope, other than in as much as it concerns compliance with current environmental legislation on materials employed in the Tram.

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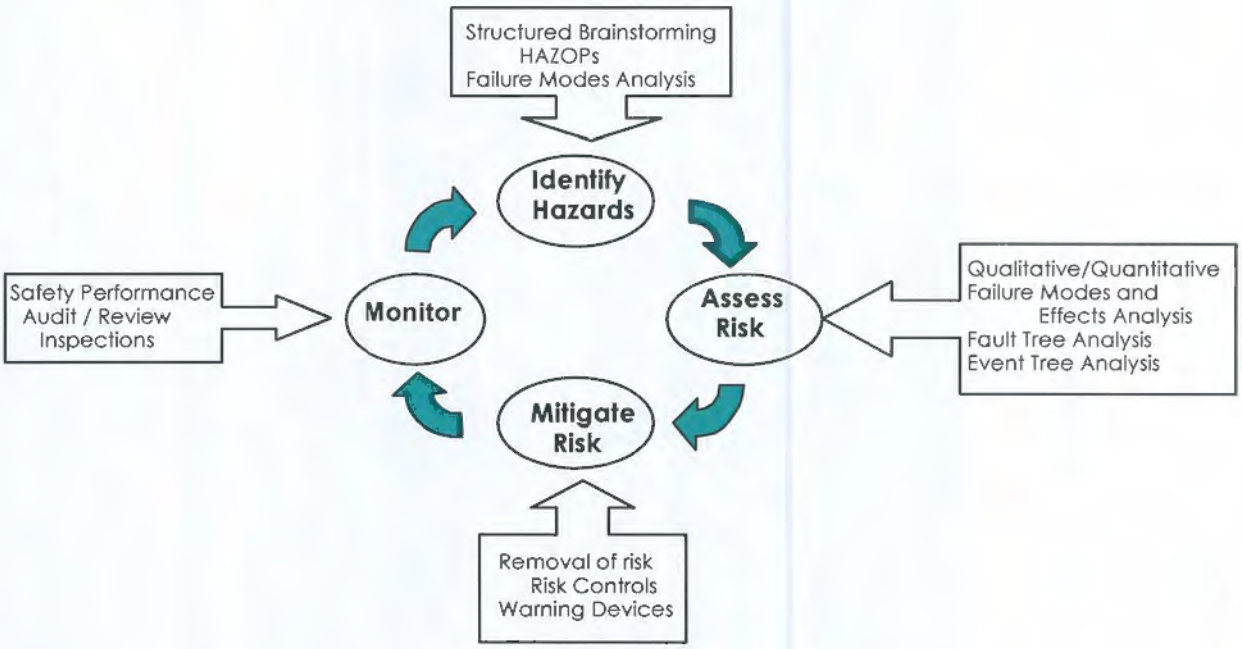
6. HAZARD IDENTIFICATION AND RISK ASSESSMENT

6.1. INTRODUCTION

Hazard identification and risk assessment methods that will be used will utilise a combination of techniques that are suitable for the system and sub-system elements under consideration. The methods adopted will include the following steps:

- Systematic hazard identification process.
- An assessment of the risk involved.
- Identification of design, operational procedures and processes to manage the risks.
- Implementation of the control measures in the design and associated operatianal and maintenance procedures.
- Monitoring the performance of the new product during its operational life.

6.2. GENERIC PROCESS MAP



The remainder of this section provides detail of the methods that will be adopted in the identification of hazards and the risk assessment in support of the Edinburgh Tram Project.

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6.3. HAZARD IDENTFICATION AND RISK ASSESSMENT (HIRA)

6.3.1. Tramway Network Level HIRA

The Edinburgh Tram Network safety requirements capture process will include a series of engineering and operational reviews with all Stakeholders that are responsible for and can contribute to the Tram safety assurance process. CAF will contribute to these Network level studies by ensuring that they are supported by experienced rolling stock engineers that are aware of the interactions between the rolling stock and the operational railway. All identified hazards and safety risks that the rolling stock can contribute to or cause will be identified and, if credible, entered in the SDS Hazard Log and the Tram Hazard Log for management action and subsequent close out.

6.3.2. System and Sub-System Hazard Identification Studies

Concurrent to the preliminary and detailed design the CAF engineering teams and Suppliers will undertake System and Sub-System Hazard Identification and Analysis for their scope of responsibility. The outputs from these safety studies will be entered into the Tram Hazard Log for management action, monitoring and close out in support of the Tram Design and Handover Cases for Safety. Systems and equipment that are already operational in service and can be validated as proven in application will be shown to have a track record of safe operation in support of close out. New and modified systems will be subject to hazard and failures analysis to ensure that they do not introduce hazard and unacceptable levels of risk.

6.3.3. System Safety Risk Ranking Matrices

The Edinburgh Tram Network SSMP mandates the system safety risks assessment classification that will be used. CAF acknowledge this requirement and has reproduced the matrices in this plan which will in turn, be issued to CAF Suppliers as the controlling safety plan. Further, CAF acknowledge that for the Project, the acceptability of safety risk to Edinburgh Tramway Network staff will be defined as ten times the level of safety risk acceptable to possengers/members of public.

6.3.3.1 Frequency of Hazardous Events

Category	Description	Freq Range	
		Passengers/Public	Staff
Frequent	Likely to occur frequently. The hazard will be continually experienced	> Monthly	> Daily
Probable	Will occur several times. The hazard can be expected to occur often	Between 1 Month and a year	Between Daily and 1 month
Occasional	Likely to occur several times. The hazard can be expected to occur several times	Between 1 and 10 years	Between 1 Month and a year
Remote	Likely to occur sometime in the system life cycle. The hazard can reasonably expected to occur	Between 10 and 100 years	Between 1 and 10 years
Improbable	Unlikely to occur but possible. It can be assumed that the hazard may exceptionally occur.	Between 100 and 1000 years	Between 10 and 100 years
Incredible	Extremely unlikely to occur. It can be assumed that the hazard may not occur.	< once per 1000 years	< once per 100 years

6.3.3.2 Hazardous Event Severity Level

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Severity Level	Consequence to Persons
Catastrophic	Multiple fatalities
Critical	Single fatality or multiple major injuries
Marginal	Major injury
Insignificant	Minor injury

6.3.3.3 Risk Evaluation and Acceptance Criteria

Frequency of occurrence of a hazardous event	Risk Levels			
Frequent	Undesirable	Intolerable	Intolerable	Intolerable
Probable	Tolerable	Undesirable	Intolerable	Intolerable
Occasional	Tolerable	Undesirable	Undesirable	Intolerable
Remote	Negligible	Tolerable	Undesirable	Undesirable
Improbable	Negligible	Negligible	Tolerable	Tolerable
Incredible	Negligible	Negligible	Negligible	Negligible
	Insignificant	Marginal	Critical	Catastrophic
	Severity Levels of Hazard Consequence			

6.3.3.4 Actions to be Applied Against Risk Categories

Risk Category	Actions to be applied against each category
Intolerable	Shall be eliminated
Undesirable	Shall only be accepted when risk reduction is impracticable and with the agreement of the ETN Authority or the Safety Regulatory Authority, as appropriate
Tolerable	Acceptable with adequate control and with the agreement of the ERN Authority
Negligible	Acceptable with/without the agreement of the ETN Authority

For the purposes of this project, the ALARP principle will be applied to hazards falling into the Undesirable and Tolerable regions.

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7. REFERENCES

1. Edinburgh Tram Network System Safety Management Plan Issue 4 ULE90130-SW-PPN-00026 V2 dated 25th September 2006

2. EN 50126. Railway applications - The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS).

3. Engineering Safety Management Issue (Yellow Book), Volumes 1 (Issue 4) & 2 (Issue 3), Fundamentals and Guidance

4. ORR Railway Safety Principles and Guidance Part 2 Sections G.

5. Railway and Other Guided Transport Systems (Safety) Regulations (ROGS) 2006.

6. Edinburgh Tram Network SDS Hazard Log ULE90130-SW-SW-MAT-00006 V4 dated 25th September 2006.

7. Rail Vehicle Accessibility Regulations 1998 and Rail Vehicle Accessibility (Amendments) Regulations 2000.

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Edinburgh Tram – Tram Technical Information
Submitted Data

Item	Description	Tram Parameter
1	General Dimensions	
1.1	Tram length - overall (m)	42.85
1.2	Length over outer doors (mm)	38132
1.3	Tram width (mm)	2650
1.4	Tram height (pantograph lowered, mm)	3800 (approx. to be confirmed once pantograph supplier is selected)
1.5	Door sill height (mm)	350
1.6	Nominal platform height (mm)	300
1.7	Total number of axles (wheel pairs)	8
1.8	Number of powered axles (wheel pairs)	6
1.9	Number of articulations	6
1.10	Bogie wheelbase (mm)	1800
1.11	Bogie pivot centres (mm)	11040
1.12	Wheel diameter (new / worn, mm)	590 / 510
1.13	Minimum bogie clearance (mm)	50
1.14	Length of end body sections (mm)	7016
1.15	Length of suspended body sections (mm)	6745
1.16	Length of Intermediate body sections (mm)	4295
1.17	Horizontal stepping distance (mm)	50
2	Weights	
2.1	Tare weight	55.85t
2.2	Fully loaded weight (AW5)	85.4t
2.3	Maximum axle load at AW5 (kg)	11426 (+/-5%)
2.4	Axle weights at tare (min-max) (kg)	6154 – 7434
2.5	Axle weights at AW4 (min-max) (kg)	9565 – 10536
2.6	Rotating mass (% of overall vehicle mass)	7%
2.7	Mass of the wheel rims	113kg

Item	Description	Tram Parameter
2.8	Bogie mass (motor, trailer) (kg) Unsprung masses (motor, trailer) (kg)	4961, 3071 1425, 1651
2.9	Mass of the body sections, less bogies (kg)	6651, 5623, 3992, 4967, 3690, 6125, 6844
3	Operational Data	
3.1	Maximum gradient capability	7.5%
3.2	Maximum operational speed (km/h)	70
3.3	Time to open / close doors (secs).	3 (+0.5/-0)
3.4	Traction motor continuous power rating	12 x 61 kW
3.5	Maximum traction current	1350 A (approx) (depending on final supplier)
3.6	Acceleration rate, (m/s^2, 40-70km/h)	1.2 - 0.8
3.7	Tractive Effort (TE); at zero speed Maximum kN, @70km/h	102kN or 106kN 50kN or 40 kN (depending on final supplier)
3.8	Braking rates: (m/s^2) Service (Equivalent decelerat. Emergency 1 & 2 as per EN-13452) Emergency 3 Emergency 4 Security	0 - 1.2 1.2 2.8 2.8 1.0
3.9	Jerk rates (m/s^3): as per EN-13452 Service Emergency 1 & 2 Emergency 3 & 4 Security	 less than 1.5 4 8 4
3.10	Auxiliary loads	66KW (saloon heating) + 66 KVA (2 auxiliary converters)
4	Capacity & Interior	
4.1	Minimum aisle width (mm)	650
4.2	Saloon internal height (mm)	2183
4.3	Floor height (mm)	350
4.4	Floor ramp gradient	0%
4.5	Step height (Internal, mm)	0

Item	Description	Tram Parameter
4.6	Maximum capacity @4ppm^2	248 + 2 wheelchairs

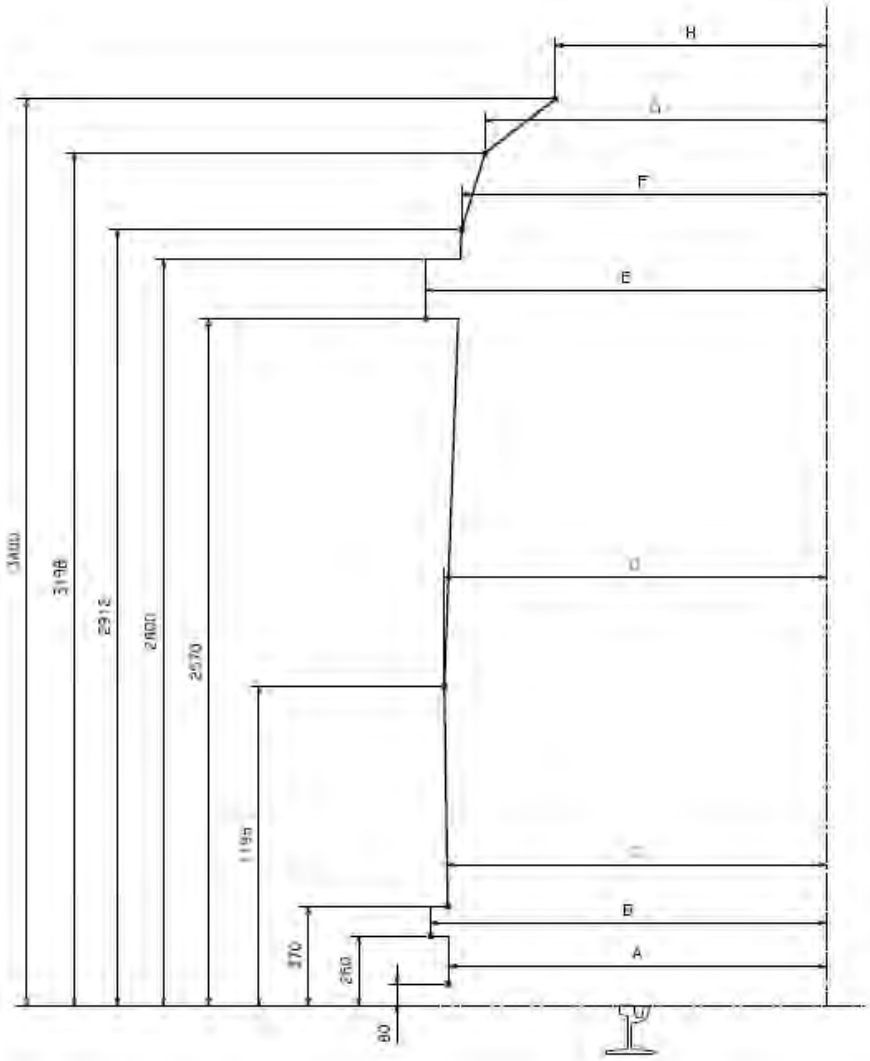
Item	Position	Operating Conditions	Assumed Noise level	Measured noise level
5		**Noise levels**		
5.1	Passenger Saloon	Standstill, HVAC working at intermediate power	Laeq = 59 dB(A)	61 dB(A)
5.2	Passenger Saloon	Standstill, HVAC working at full power	Laeq = 65 dB(A)	65 dB(A)
5.3	Passenger Saloon	40 km/h, HVAC working at full power	Laeq = 69 dB(A)	75 dB(A) (on ballast) 81 DB(A) (on concrete)
5.4	Driver's Cab	Standstill, air conditioning working with full power	Laeq = 69 dB(A)	63 dB(A)
5.5	Driver's Cab	40 km/h, air conditioning working with full power	Laeq = 70 dB(A)	72 dB(A) (on ballast) 76 dB(A) (on concrete)
5.6	Exterior Noise	Standstill, driver's air conditioning, and saloon HVAC at half power background noise 55 dB(A)	Laeq = 58 dB(A)	63 dB(A)
5.7	Exterior Noise	Standstill, driver's air conditioning, and saloon HVAC at full power background noise 55 dB(A)	Laeq = 60 dB(A)	65 dB(A)
5.8	Exterior Noise	40 km/h, driver's air conditioning and saloon HVAC at full power	Lamax= 75 dB(A)	68 dB(A) (on ballast) 76-78 dB(A) (concrete)
5.9	Exterior Noise	50 km/h, driver's air conditioning and saloon HVAC working with full power		70 dB(A) (grass) 81 dB(A) (concrete)
5.10	Exterior noise	65km/h, driver's aircon & saloon HVAC working with full power	Lamax= 81 dB(A)	73 dB(A) (on ballast)

Sound levels measured according to ISO 3381:2000 & ISO 3095:2001 & 2005.

Measurements taken in Vélez-Málaga & Bilbao

Item	Description	
6	**Tramway Path**	
6.1	Developed Kinematic Envelope (DKE), for clearances; 2-D dynamic cross-sections	See tables and charts of DKE clearances
6.2	Wheel/rail interface Rail characteristics: Gauge corner radius of 13mm, head inclination of 1:40. Grooved rail may be assumed to have a groove width of 36mm. The wheels should be capable of flange running. Wheel back-to-back dimension of 1380mm.	Ri53r13 (= 59Ri2 according to EN14811:2006) SDS wheel profile is acceptable Limited flange running is acceptable 1386mm preferred If Vignol rails are installed, for wheel wear reasons , UIC-54 type rails with an incline of 1/40 are preferred
6.3	Virtual transition length (m)	8
6.4	Track centre line to platform edge offset (for a DKE reduced to suit speed for running through Tramstops, assumed to be 35km/h)	1440
6.5	Maximum cant	100 mm
6.6	Cant gradient limit	3.3mm/m max
6.7	Maximum cant deficiency	75 mm (100 mm in Depot)
6.8	Vertical curvature limit (hog/sag)	500m
6.9	Horizontal curvature	25m on line, 20m in the depot 25m or above preferred in depot
6.10	Track alignment, gradients & curves	No perceived problems with the combined alignments

6	DKE, Track Spacing



DEVELOPED KINEMATIC ENVELOPE INSIDE CURVE													
Radius / Point	25	30	40	50	70	90	160	200	300	500	1000	2000	STRAIGHT
A	1575	1550	1518	1499	1476	1462	1457	1433	1427	1420	1418	1419	1414
B	1642	1617	1585	1566	1543	1529	1524	1501	1494	1487	1485	1486	1480
C	1577	1552	1520	1501	1478	1464	1459	1436	1429	1423	1420	1421	1415
D	1593	1567	1535	1517	1494	1480	1475	1451	1444	1438	1435	1437	1425
E	1553	1528	1496	1477	1489	1496	1498	1508	1513	1511	1509	1510	1468
F	1536	1509	1477	1458	1435	1421	1416	1393	1386	1379	1377	1378	1355
G	1447	1421	1389	1370	1348	1334	1329	1305	1298	1292	1289	1291	1266
H	1184	1159	1127	1108	1086	1072	1066	1043	1036	1030	1027	1028	1002

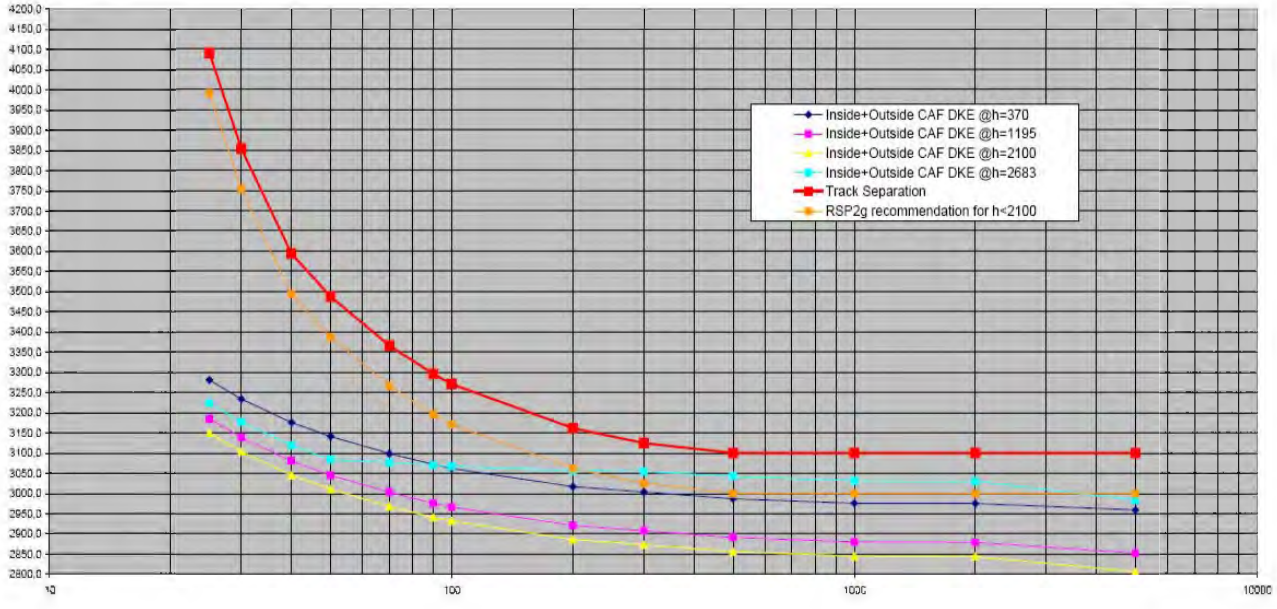
DEVELOPED KINEMATIC ENVELOPE OUTSIDE CURVE													
Radius / Point	25	30	40	50	70	90	100	200	300	500	1000	2000	STRAIGHT
A	1571	1550	1524	1508	1488	1475	1471	1449	1443	1432	1424	1422	1413
B	1639	1617	1591	1575	1556	1543	1538	1516	1510	1500	1491	1489	1480
C	1574	1552	1526	1510	1491	1478	1473	1451	1445	1435	1426	1424	1415
D	1592	1571	1544	1529	1509	1496	1492	1470	1464	1453	1445	1443	1428
E	1670	1649	1623	1607	1587	1575	1570	1548	1542	1532	1523	1521	1496
F	1539	1518	1492	1476	1457	1444	1439	1417	1411	1401	1392	1390	1363
G	1453	1432	1405	1389	1370	1357	1352	1330	1324	1314	1305	1303	1275
H	1191	1170	1144	1126	1108	1096	1091	1069	1063	1053	1044	1042	1012

Clearances

height (m)	Curve Radius (m) 25	30	40	50	70	90	100
370	809,4	618,9	417,0	345,9	266,8	223,9	208,7
1195	905,4	714,9	513,0	441,8	362,8	319,8	304,7
2100	940,1	749,6	547,6	476,5	397,5	354,5	339,4
2683	866,6	676,0	474,1	403,0	289,9	225,5	202,9

height (m)	Curve Radius (m) 200	300	500	1000	2000	Straight
370	145,2	121,2	112,8	124,0	124,8	140,3
1195	241,1	217,2	208,8	219,9	220,7	247,3
2100	275,8	251,8	243,4	254,6	255,4	294,1
2683	105,8	70,4	57,4	68,6	69,4	115,9

Table 1. Clearance (mm) for track without centre poles



7	**Pantograph**	
7.0	Pantograph type	Possible suppliers Schunk: LA type Stennmann : FB 80.73 type
7.1	Pantograph Stroke (Min & max height, above rail, 3.8- 6.9m)	3100 mm About 3300 mm
7.2	Overall collector head width, 1850mm	1981mm 1900 mm
7.3	Carbon length 1000mm minimum	1066 mm 1050 mm
7.4	Head mass, metallised carbon -15kg	See notes below
7.5	Articulation frame dynamic mass- (12-16kg)	See notes below
7.6	Static contact force, 90-180N	70 +/-10N 60 – 120 N (adjustable)

Schunk

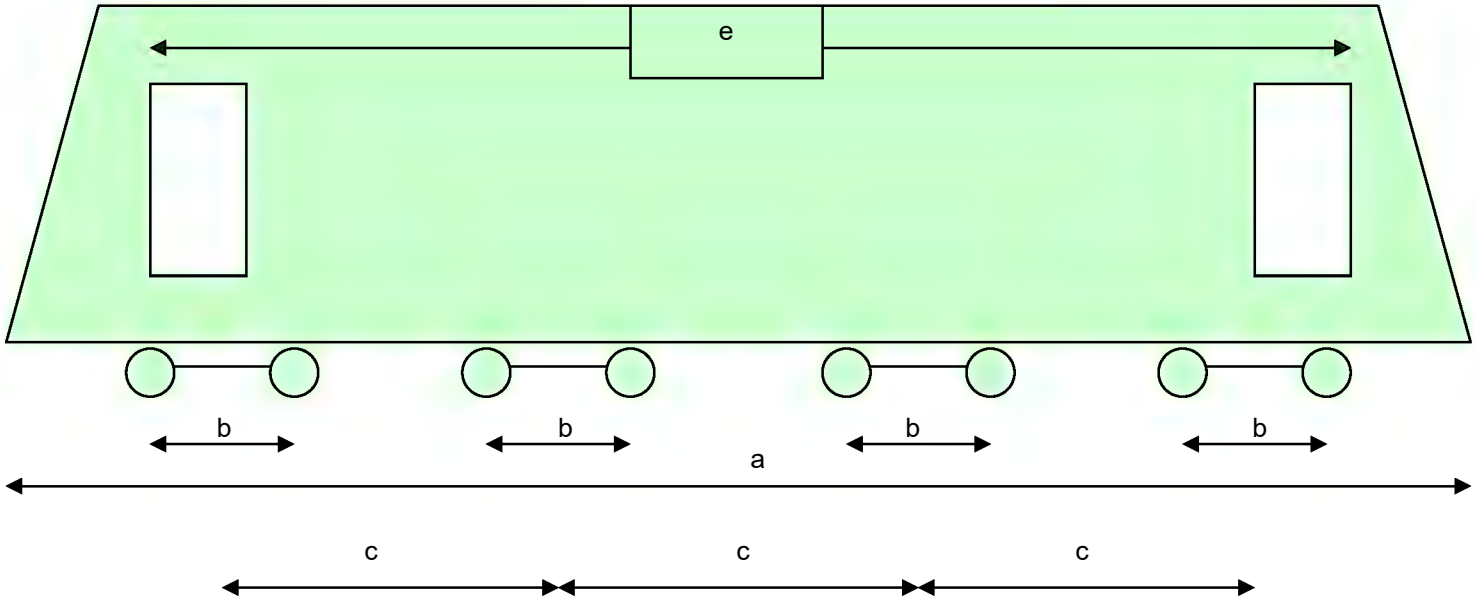
m1 = 6.34 (x2)Kg:	unsuspended mass of carbon strips
m2 = 12.1 Kg:	mass of remaining pan head + reduced rotating mass of upper frame
m3 = 29.2 Kg:	red. Mass of frame - reduced rotating mass of upper frame

Stennmann

m1 = 12.07Kg:	reduced unsprung masses of the collector head having direct contact to the catenary wire (e.g. the contact piece with attachment parts) related to the peak tube.
m2 = 8.61Kg:	springed collector head mass plus the reduced proportionate mass of the upper arm in the peak tube (1/4 of the upper arm mass and ¼ of the collector head guidance mass)
m3 = 5.47, 5.88, 6.29 Kg:	the mass of the upper and lower arm of the collector head guidance and the guide rod concentrated meant reduced in the peak tube

Tram Vehicle

General Arrangement of axle positions and end doors

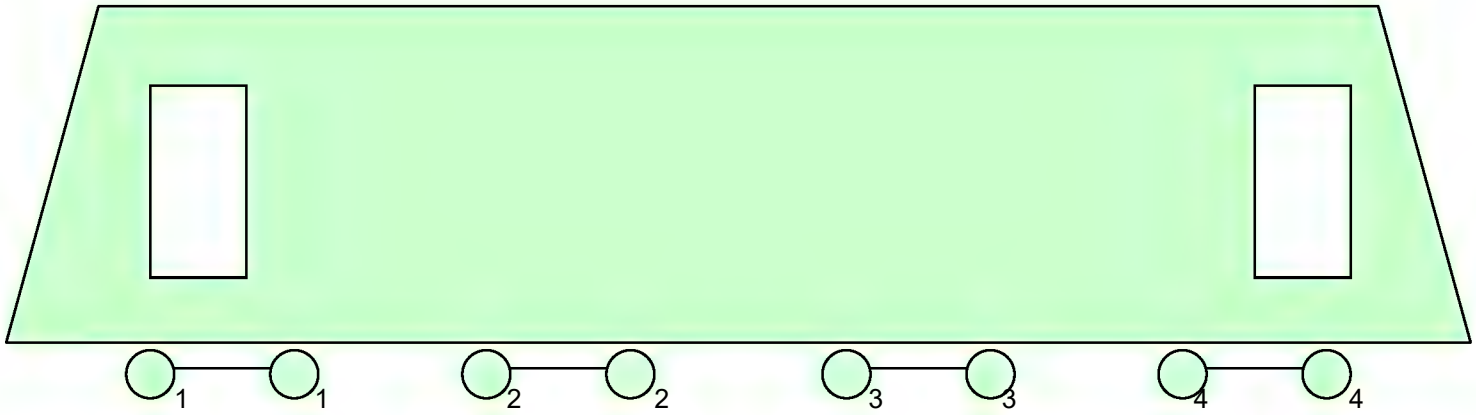


a	b	c	e
42856	1800	11040	38132

Dimensions in mm

Tram Vehicle

Distribution of axle loadings



All weights in kg at AW5 loading (8 persons/m^2):

1	2	3	4	Total
10297	11426	10456	10519	85394

ANNEX 1.2.3 TRAM TESTING AND COMMISSIONING

VEHICLE TESTING

1. VEHICLE TESTING 2

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1. VEHICLE TESTING

Prior to the final reception, the units and their items shall be submitted to a series of tests which guarantee the fulfilment of the requirements of the customer and of the corresponding standards. Also, the production process shall be controlled and the various materials and systems fitted on the units shall be submitted to tests.

The following three testing phases are distinguished:

- Equipment and materials tests: Tests of the various components and equipment at the point of origin (supplier factory) prior to their installation on the train. Verification of the fulfilment of the technical specification of each item of equipment and material, safety, functionality, fire and smoke performance, dimensional, structural and finish criteria, etc.

- In Factory Tests: Elastic tests executed during the production of the units. Verification of the production and assembly processes for the various items making up the unit. Welding, dimensions, assembly, pneumatic tests, electric tests, weight, curve negotiation, etc. controls.

- Track Testing: Tests to be executed on tracks (operation line) prior to the final acceptance of the units. Verification of the dynamic performances and of the correct overall operation of the unit. Tests for acceleration, traction and brake performance, running dynamics, noise level tests, air conditioning tests, multiple control running tests, safety equipment tests, etc.

Two types of tests are distinguished in the factory tests:

- Type tests: These are executed on the first unit produced or the first item of equipment of each system, in order to verify the fulfilment of the technical specification laid down in the contract.

- Series tests: These are performed on the other units to confirm that they fulfil the main performances verified in the type tests.

CAF shall define the test protocols of each of the items of equipment or materials fitted on the units in the various phases of the project, and, prior to their execution, they shall be submitted to the customer's approval.

As an example, generic lists of the testing phases throughout the project figure attached to this document (in Annex 1.2.3). They describe the "Test and Inspection for incoming goods", "Test and Inspection for Manufacturing" and the "Final Test and Inspections".

The testing process shall be executed in accordance to that laid down in Part 1c "Tram Testing and Commissioning" of the Employer's Requirement. Please see comment to this document in section 1.1.1 "Test and Commissioning".

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PLAN DE INSPECCION Y ENSAYOS DE ELEMENTOS DEL EXTERIOR

TEST AND INSPECTION PLAN FOR INCOMING GOODS

PROYECTO / *PROJECT : GENERAL*

PIEEE- GENERAL | -

Clave(s) Obra:

	Elemento u Operación a Controlar *Part or Operation to be Controlled*			Tipo de Control *Control Type*							Registros *Records*	
Item *Item*	**Código** *Code*	**Denominación** *Designation*	**Suministrador** *Supplier*	**Tipo** *Type*	**Fai** *Fai*	**Serie** *Routine*	**Especificación de Control** *Control Specification*	**Responsable** *Responsible*	**Frecuencia** *Frequency*	**Presencia Cliente** *Customer Presence*	**Documento** *Document*	**Entrega Cliente** *Delivery to Customer*
1.- ELEMENTOS DE SEGURIDAD												
1.- SAFETY PARTS												
1.1	varios/*various*	Piezas fundidas, forjadas, mecanizadas y soldadas (incluidos depósitos de presión) / *Cast, forging, machining and weld parts (including pressure reservoir)*	varios / *various*	O	O		según plano / *according to drawing*	C	Primer artículo / *First article*	-	informe / *report*	-
						I	según plano y PCR / *according to drawing and PCR*	C	100%	-	certificado y registro inspección / *certificate and inspection record*	-
1.2		parabrisas / *front glass*			O		s/plano / *acc. to drw.*	C	Primer artículo / *First article*	-	informe / report	-
						I	s/plano / *acc. to drw.*	C	100%	-	certificado / certificate	-
1.3		ventana completa / *complete window*			O		s/plano / *acc. to drw.*	C	Primer artículo / *First article*	-	informe / report	-
						I	s/plano / *acc. to drw.*	C	100%	-	certificado / certificate	-
1.4		mecanismo y puertas de acceso / *door mechanism and doors*		O	O		s/plano y especif. / *acc. to drw. and specific.*	C	Primer artículo / *First article*	-	informe / report	-
						I	s/plano y especif. / *acc. to drw. and specific.*	C	100%	-	certificado / certificate	-
1.5		control freno / *brake control*		O	O		s/plano y especif. / *acc. to drw. and specific.*	C	Primer artículo / *First article*	-	informe / report	-
						I	s/plano y especif. / *acc. to drw. and specific.*	C	100%	-	certificado / certificate	-

PLAN DE INSPECCION Y ENSAYOS DE ELEMENTOS DEL EXTERIOR

TEST AND INSPECTION PLAN FOR INCOMING GOODS

PROYECTO / *PROJECT : GENERAL*

PIEEE- GENERAL | -

Clave(s) Obra:

	Elemento u Operación a Controlar *Part or Operation to be Controlled*			Tipo de Control *Control Type*							Registros *Records*	
Item *Item*	**Código** *Code*	**Denominación** *Designation*	**Suministrador** *Supplier*	**Tipo** *Type*	**Fai** *Fai*	**Serie** *Routine*	**Especificación de Control** *Control Specification*	**Responsable** *Responsible*	**Frecuencia** *Frequency*	**Presencia Cliente** *Customer Presence*	**Documento** *Document*	**Entrega Cliente** *Delivery to Customer*
2.- ELEMENTOS DE CONFORT Y FUNCIONALIDAD *2.- COMFORT AND FUNCTIONALITY PARTS*												
2.1		producción y tratamiento de aire / *compressor and air treatment*		O	O		s/plano y especif. / *acc. to drw. and specific.*	C	Primer artículo / *First article*	-	informe / report	-
						I	s/plano y especif. / *acc. to drw. and specific.*	C	100%	-	certificado / certificate	-
2.2		batería / *battery*				I	s/plano y especif. / *acc. to drw. and specific.*	C	100%	-	certificado / certificate	-
2.3		cofre batería / *battery box*				I	s/plano / *acc. to drw.*	C	Primer artículo / *First article*	-	informe / report	-
2.4		compresor auxiliar y levante / *aux. compressor and lifting*		O	O		s/plano y especif. / *acc. to drw. and specific.*	C	Primer artículo / *First article*	-	informe / report	-
						I	s/plano y especif. / *acc. to drw. and specific.*	C	100%	-	certificado / certificate	-
2.5		aux. neuméticos / pneumatic aux.		O	O		s/plano y especif. / *acc. to drw. and specific.*	C	Primer artículo / *First article*	-	informe / report	-
						I	s/plano y especif. / *acc. to drw. and specific.*	C	100%	-	certificado / certificate	-
2.6		puerta pasillo intercomunicación / *gangway door*		O	O		s/plano y especif. / *acc. to drw. and specific.*	C	Primer artículo / *First article*	-	informe / report	-
						I	s/plano y especif. / *acc. to drw. and specific.*	C	100%	-	certificado / certificate	-
2.7		aire acondicionado salón / *saloon air conditioning*		O	O		s/plano y especif. / *acc. to drw. and specific.*	C	Primer artículo / *First article*	-	informe / report	-
						I	s/plano y especif. / *acc. to drw. and specific.*	C	100%	-	certificado / certificate	-

PLAN DE INSPECCION Y ENSAYOS DE ELEMENTOS DEL EXTERIOR

TEST AND INSPECTION PLAN FOR INCOMING GOODS

PROYECTO / *PROJECT : GENERAL*

PIEEE- GENERAL | -

Clave(s) Obra:

	Elemento u Operación a Controlar *Part or Operation to be Controlled*			Tipo de Control *Control Type*							Registros *Records*	
Item *Item*	**Código** *Code*	**Denominación** *Designation*	**Suministrador** *Supplier*	**Tipo** *Type*	**Fai** *Fai*	**Serie** *Routine*	**Especificación de Control** *Control Specification*	**Responsable** *Responsible*	**Frecuencia** *Frequency*	**Presencia Cliente** *Customer Presence*	**Documento** *Document*	**Entrega Cliente** *Delivery to Customer*
2.8		aire acondicionado cabina / cab *air conditioning*		O	O		s/plano y especif. / *acc. to drw. and specific.*	C	Primer artículo / *First article*	-	informe / report	-
						I	s/plano y especif. / *acc. to drw. and specific.*	C	100%	-	certificado / certificate	-
2.9		anunciador estaciones / *station announcement system*			I		s/plano y especif. / *acc. to drw. and specific.*	C	Primer artículo / *First article*	-	informe / report	-
						I	s/plano y especif. / *acc. to drw. and specific.*	C	100%	-	certificado / certificate	-
2.10		telecomunicación				I	s/plano y especif. / *acc. to drw. and specific.*	C	100%	-	certificado / certificate	-
2.11		asiento conductor / *driver seat*			I		s/plano / *acc. to drawing*	C	Primer artículo / *First article*	-	informe / report	-
						I	s/plano / *acc. to drawing*	C	100%	-	certificado / certificate	-
2.12		conductos aire acondicionado			O		s/plano / *acc. to drawing*	C	Primer artículo / *First article*	-	informe / report	-
						I	s/plano / *acc. to drawing*	C	100%	-	certificado / certificate	-
3.- ELEMENTOS CON EXIGENCIAS DE FUEGO Y HUMO												
3.- PARTS WITH FIRE AND SMOKE REQUIREMENTS												
3.1		piezas de poliéster: testero e interiorismo / *polyester parts: front end and interior*				I	s/plano / *acc. to drawing*	C	100%	-	certificado / certificate	-
3.2		aislamientos / *isolating materials*				I	s/plano / *acc. to drawing*	C	100%	-	certificado / certificate	-
3.3		cables / *cabling*				I	s/plano / *acc. to drawing*	C	100%	-	certificado / certificate	-

PLAN DE INSPECCION Y ENSAYOS DE ELEMENTOS DEL EXTERIOR

TEST AND INSPECTION PLAN FOR INCOMING GOODS

PROYECTO / *PROJECT : GENERAL*

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3.4		tableros piso salón / *saloon floor board*			O	I	s/plano / *acc. to drawing*	C	100%	-	certificado / certificate	-
3.5		tablero piso cabina / *cab floor board*			O	I	s/plano / *acc. to drawing*	C	100%	-	certificado / certificate	-
3.6		cortinillas / *curtains*				I	s/plano / *acc. to drawing*	C	100%	-	certificado / certificate	-
4.- ELEMENTOS ESTRUCTURALES												
4.- STRUCTURAL PARTS												
4.1		perfiles estructurales / *structural profiles*			O		s/plano / *acc. to drawing*	C	Primer artículo / *First article*	-	informe / report	-
						I	s/plano / *acc. to drawing*	C	100%	-	certificado / certificate	-
4.2		siderúrgico / *iron & steel*				I	s/plano y PCR/ *acc. to drawing and PCR*	C	100%	-	certificado y registro inspección / certificate and inspection record	-
5.- PINTURA												
5.- PAINTING												
5.1		pintura exterior / *exterior painting*				I	s/plano / *acc. to drawing*	C	100%	-	certificado / certificate	-

LEYENDA / *LEGEND*

Tipo de Control / *Control Type*
O : Origen / *Supplier factory*
I : Interna / *Internal*

Responsable / *Responsible*
F : Fabricación / *Manufacturing*
C : Calidad / *Quality*
T : O. Técnica / *Engineering*
S : Suministrador / *Supplier*

Presencia Cliente / *Customer Presence*
R : Revisión registros / *Records review*
A : Punto de Aviso / *Witness point*
E : Punto de Espera / *Hold point*

PLAN DE INSPECCION Y ENSAYOS DE FABRICACION

TEST AND INSPECTION PLAN FOR MANUFACTURING

PIEF- GENERAL | -

Clave(s) Obra:

PROYECTO / *PROJECT : GENERAL*

	Elemento u Operación a Controlar *Part or Operation to be Controlled*			Tipo de Control *Control Type*							Registros *Records*	
Item *Item*	**Código** *Code*	**Denominación** *Designation*	**Suministrador** *Supplier*	**Tipo** *Type*	**Fai** *Fai*	**Serie** *Routine*	**Especificación de Control** *Control Specification*	**Responsable** *Responsible*	**Frecuencia** *Frequency*	**Presencia Cliente** *Customer Presence*	**Documento** *Document*	**Entrega Cliente** *Delivery to Customer*
10.		**PROCESOS GENERALES/*GENERAL PROCESSES***										
10.1		**Procesos generales de calderería**:Corte, corte laser, corte por plasma, enderezado, lijado, esmerilado, mecanizado,plegado…/***Manufacturing general processes: cutting,*** *laser and plasma cutting, straightening, grinding, machining, bending…*	CAF (div.III y/o IV)			I	P-10.07-BZ	F	x %		según P-10.07-BZ	
10.2		**Procesos generales de fabricación de estructuras/*Estructures manufacturing general processes***				I	P-10.05-BZ	F / C	x %		según P-10.05-BZ	
10.3		Control de los procesos de soldadura/*Welding processes control*	CAF (div.III y/o IV)			I	P-10.04-BZ	F / C	x %		según P-10.04-BZ	
10.3.1.		Procesos de soldeo cualificados/*Qualified welding procedures*	CAF (div.III y/o IV)			I	EN 288	C	PTipo		Aplicación de materiales y procesos soldeo	
10.3.2		Consumibles de soldadura/ *Welding filler products*	CAF (div.III y/o IV)			I	EN 440 y N-07.04-BZ-02	C	s/N-11.03-BZ-01		Certificados de fabricante	
10.3.3		Soldadores cualificados/ Qualified welders	CAF (div.III y/o IV)			I	EN 287	F	100%		Mod. RSC	
10.3.4		Preparación de juntas a soldar (chaflanes, separaciones)/*Welding joints preparation(groove, clearances)*	CAF (div.III y/o IV)			I	Plano N-10.04-BZ-02/07	F	100%		Ficha de control/ *Control file*	

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	Elemento u Operación a Controlar *Part or Operation to be Controlled*			Tipo de Control *Control Type*							Registros *Records*	
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10.3.5		Operaciones de armado y punteado/Assembly and tack welding operations	CAF (div.III y/o IV)			I	Instrucc.de sold. N-10.04-BZ-15	F	100%		Ficha de control/ *Control file*	
10.3.6		Operación de soldar/*Welding operation*	CAF (div.III y/o IV)			I	Instrucc.de sold. N-10.04-BZ-15	F	100%		Ficha de control/ *Control file*	
							Control visual N-10.04-BZ-02/07	F	100%		Gama de Fabric. Ficha de Control	
							END: P.M.: N-10.04-BZ-03 LP: N-10.04-BZ-05 RX:N-10.04-BZ-06 US:N-10.04-BZ-08	C	(1)		planilla/*control sheet*	si
		(1) Los END-s a realizar en cada caso están reflejados en los planes de control particulares/*(1)NDT are idicated in specific TIP*										
20.		**FABRICACIÓN ESTRUCTURA CAJA/*CARBODY SHELL MANUFACTURING***										
20.1.		Traviesa pivote/Bolster beam:	CAF (div.III y/o IV)		I	I	plano, especificaciones, instrucciones FAI	C	FAI		Informe FAI/ *Fai report*	
20.4.		Cabecero delantero*/ Front high floor*	CAF (div.III y/o IV)			I	Instrucción de verificación	C	5 primeras piezas + 10%		planilla/*control sheet*	
20.5.		Cabecero trasero/*Rear high floor*	CAF (div.III y/o IV)		I		plano, especificaciones, instrucciones FAI	C	FAI		Informe FAI/ *Fai report*	
20.7.		Bastidor de coche motor*/Motor underframe*	CAF (div.III y/o IV)		I		plano, especificaciones, instrucciones FAI	C	FAI		Informe FAI/ *Fai report*	

PLAN DE INSPECCION Y ENSAYOS DE FABRICACION

TEST AND INSPECTION PLAN FOR MANUFACTURING

PIEF- GENERAL | -

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PROYECTO / *PROJECT : GENERAL*

	Elemento u Operación a Controlar *Part or Operation to be Controlled*			Tipo de Control *Control Type*							Registros *Records*	
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20.7.1		Verificación dimensional/*dimensional inspection*	CAF (div.III y/o IV)			I	Instrucción de verificación	C	5 primeras piezas + 10%	A	planilla/*control sheet*	
20.7.2		Verificación END de soldaduras/ *NDT welds control*	CAF (div.III y/o IV)			I	planilla/*control sheet*	C	100%	A	planilla/*control sheet*	Si
20.8		Bastidor de coche remolque/ *Trailer underframe*	CAF (div.III y/o IV)		I		plano, especificaciones, instrucciones FAI	C	FAI		Informe FAI/ *Fai report*	
20.8.1		Verificación dimensional/*dimensional inspection*	CAF (div.III y/o IV)			I	planilla/*control sheet*	C	100%	A	planilla/*control sheet*	Si
20.8.2		Verificación END de soldaduras/ *NDT welds inspection*	CAF (div.III y/o IV)			I	planilla/*control sheet*				planilla/*control sheet*	Si
20.9		Testero delantero/ *Front end*	CAF (div.III y/o IV)		I		plano, especificaciones, instrucciones FAI	C	FAI		Informe FAI/ *Fai report*	
20.10		Testero trasero/ *Rear end*	CAF (div.III y/o IV)		I		plano, especificaciones, instrucciones FAI	C	FAI		Informe FAI/ *Fai report*	
20.11		Techo: control de la estanqueidad/*Roof: water tightness*	CAF (div.III y/o IV)			I	Instrucciones de verificación	C	5 primeras piezas + 10%		planilla/*control sheet*	Si
20.12		Costado/ *Side walls*	CAF (div.III y/o IV)		I		plano, especificaciones, instrucciones FAI	C	FAI		Informe FAI/ *Fai report*	
20.13		**Caja de coche motor/ *Motor carbody shell***	CAF (div.III y/o IV)		I		plano, especificaciones, instrucciones FAI	C	FAI		Informe FAI/ *Fai report*	
20.13.1		Inspección al primer artículo/ *Fai*										

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PLAN DE INSPECCION Y ENSAYOS DE FABRICACION

TEST AND INSPECTION PLAN FOR MANUFACTURING

PIEF- GENERAL | -

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Item *Item*	**Código** *Code*	**Denominación** *Designation*	**Suministrador** *Supplier*	**Tipo** *Type*	**Fai** *Fai*	**Serie** *Routine*	**Especificación de Control** *Control Specification*	**Responsable** *Responsible*	**Frecuencia** *Frequency*	**Presencia Cliente** *Customer Presence*	**Documento** *Document*	**Entrega Cliente** *Delivery to Customer*
20.13.2		Verificación dimensional/*Dimensional verification*	CAF (div.III y/o IV)			I	planilla/*control sheet*	C	5 primeras piezas + 10%	A	planilla/*control sheet*	Si
20.13.3		Verificación END de soldaduras/ *NDT welds inspection*	CAF (div.III y/o IV)			I	planilla/*control sheet*	C	100%	A	planilla/*control sheet*	Si
20.14		**Caja de coche remolque/ *Trailer carbody shell***	CAF (div.III y/o IV)		I		plano, especificaciones, instrucciones FAI	C	FAI		Informe FAI/ *Fai report*	
20.14.1		Inspección al primer artículo/ *Fai*										
20.14.2		Verificación dimensional/*Dimensional verification*	CAF (div.III y/o IV)			I	planilla/*control sheet*	C	5 primeras piezas + 10%	A	planilla/*control sheet*	Si
20.14.3		Verificación END de soldaduras/ *NDT welds inspection*					planilla/*control sheet*				planilla/*control sheet*	
30.		**FABRICACIÓN ESTRUCTURA BOGIE/*BOGIE FRAME MANUFACTURING***										
30.1.		Armar y soldar largueros/ *Assembly and weld main bems*	C.A.F. (Div.III)			I	Ficha de control/ *Control file*	F	100%		Ficha de control/ *Control file*	
30.2.		Enderezar larguero/ *straighten main bems*	C.A.F. (Div.III)			I	Ficha de control/ *Control file*	F	100%		Ficha de control/ *Control file*	
30.3.		Mecanizar larguero/ *Main bems machining*	C.A.F. (Div.III)			I	Ficha de control/ *Control file*	F	100%		Ficha de control/ *Control file*	
30.4.		Armar y soldar traviesa/ Assembly and weld cross-beam	C.A.F. (Div.III)			I	Ficha de control/ *Control file*	F	100%		Ficha de control/ *Control file*	
30.5.		Enderezar traviesa/ *Straighten cross-beam*	C.A.F. (Div.III)			I	Ficha de control/ *Control file*	F	100%		Ficha de control/ *Control file*	
30.6		Armar y soldar "H" central/ Assembly and weld central "H"	C.A.F. (Div.III)			I	Ficha de control/ *Control file*	F	100%		Ficha de control/ *Control file*	
30.7		Enderezar "H" central/ *straighten central "H"*	C.A.F. (Div.III)			I	Ficha de control/ *Control file*	F	100%		Ficha de control/ *Control file*	
30.8		Mecanizar "H" central/*central "H" machining*	C.A.F. (Div.III)			I	Ficha de control/ *Control file*	F	100%		Ficha de control/ *Control file*	

PLAN DE INSPECCION Y ENSAYOS DE FABRICACION

TEST AND INSPECTION PLAN FOR MANUFACTURING

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30.9		Armar y soldar bastidor/ *assembly and weld bogie frame 1 step*	C.A.F. (Div.III)			I	Ficha de control/ *Control file*	F	100%		Ficha de control/ *Control file*	
30.10		Armar y soldar bastidor/ *assembly and weld bogie frame 2 step*	C.A.F. (Div.III)			I	Ficha de control/ *Control file*	F	100%		Ficha de control/ *Control file*	
30.11		Enderezar bastidor de bogie/*Straighten bogie frame*	C.A.F. (Div.III)			I	Ficha de control/ *Control file*	F	100%		Ficha de control/ *Control file*	
30.12		Armar y soldar soportes en bastidor/ *Assembly and weld bogie frame supports*	C.A.F. (Div.III)			I	Ficha de control/ *Control file*	F	100%		Ficha de control/ *Control file*	
30.13		Verificación de soldaduras / *Weds inspection*	C.A.F. (Div.III)			I	Visual s/N-10.04-BZ-02	F	100%		Gama Fabricación Ficha de Control	
						I	Partíc.magnétic. s/N-10.04-BZ-03	C	(1)		planilla/*control sheet*	Si
(*)						I	Ultrasonidos s/N-10.04-BZ-08	C	(1)		planilla/*control sheet*	Si
30.14		Verificación del tratamiento térmico/*Stress relieving treatment verification*	C.A.F. (Div.III)			I	planilla/*control sheet*	C	100%		planilla/*control sheet*	Si
30.15		Verificación dimensional de bastidor mecanizado/ *Dimensional verification after machining*	C.A.F. (Div.II)			I	planilla/*control sheet*	C	5 primeros + luego 10%		planilla/*control sheet*	Si
30.16		Verificación de bastidor pintado/ *Bogie frame painting control*	C.A.F. (Div.IV)			I	planilla/*control sheet*	C	100%		planilla/*control sheet*	Si
40.		**FABRICACIÓN ACABADO CAJA/ *CARBODY SHELL FINISHING ASSEMBLY***										
40.1		**Proceso de pintura/ *Painting process***										
40.1.1		Homologación de personal/*Personel cualification*	C.A.F. (Div.IV)				P-10.03-BZ	s/ P-10.03-BZ	s/P-10.03-BZ		según P-10.03-BZ	

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Clave(s) Obra:

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Item *Item*	**Código** *Code*	**Denominación** *Designation*	**Suministrador** *Supplier*	**Tipo** *Type*	**Fai** *Fai*	**Serie** *Routine*	**Especificación de Control** *Control Specification*	**Responsable** *Responsible*	**Frecuencia** *Frequency*	**Presencia Cliente** *Customer Presence*	**Documento** *Document*	**Entrega Cliente** *Delivery to Customer*
40.1.2		Homologación de materiales y proceso/ *Products and processes homologation*	C.A.F. (Div.IV)				P-10.03-BZ	s/ P-10.03-BZ	s/P-10.03-BZ		según P-10.03-BZ	
40.1.3		Control de proceso/ *Process control*	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.1.4		Verificación de la caja pintada/*Cardody shell painting control*	C.A.F. (Div.IV)			I	planilla/*control sheet*	F / C	100%		planilla/*control sheet*	Si
40.2		Equipos B.B/ *Under frame equipments*	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.3		Instalación eléctrica B.B./ *Under frame cabling*	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.4		Instalación neumatica/ *Pneumatic installation*	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.5		Aislamientos/ *Isolating materials*	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.6		Instalación eléctrica interior/ inner cabling installation	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.7		Piso y recubrimiento/ *Floor and pavement*	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.8		Lunas y ventanas/ windscreen and windows	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.9		Puertas/ doors	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.10		Revestimientos/ *Interior panels*	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.11		Armarios eléctricos/ *Electric cabinets*	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.12		Pupitre cabina	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.13		Asientos y pasamanos/ *Seats and handrails*	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	

PLAN DE INSPECCION Y ENSAYOS DE FABRICACION

TEST AND INSPECTION PLAN FOR MANUFACTURING

PIEF- GENERAL | -

Clave(s) Obra:

PROYECTO / *PROJECT : GENERAL*

	Elemento u Operación a Controlar *Part or Operation to be Controlled*			Tipo de Control *Control Type*							Registros *Records*	
Item *Item*	**Código** *Code*	**Denominación** *Designation*	**Suministrador** *Supplier*	**Tipo** *Type*	**Fai** *Fai*	**Serie** *Routine*	**Especificación de Control** *Control Specification*	**Responsable** *Responsible*	**Frecuencia** *Frequency*	**Presencia Cliente** *Customer Presence*	**Documento** *Document*	**Entrega Cliente** *Delivery to Customer*
40.14		Enganches/ *couplers*	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.15		Estribos y faldones/ *Step-board and skirts*	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.16		Inscripciones interiores/ inner stickers	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.17		Inscripciones exteriores/*outer stickers*	C.A.F. (Div.IV)			I	Ficha de control/ *Control file*	F	x %		Ficha de control/ *Control file*	
40.18		**Coche motor terminado**: Inspección a primer artículo/ ***Finished motor car:*** *Fai*	C.A.F. (Div.IV)			I	plano, especificaciones, instrucciones FAI	C	FAI	A	Informe FAI/ *Fai report*	
40.19		**Coche remolque terminado**: Inspección a primer artículo/ ***Finished trailer car:*** *Fai*	C.A.F. (Div.IV)			I	plano, especificaciones, instrucciones FAI	C	FAI	A	Informe FAI/ *Fai report*	
50		**FABRICACIÓN ACABADO BOGIE/ BOGIE *FINISHING ASSEMBLY***										
50.1		Montaje tubería neumática/ *Pneumatic piping assembly*	C.A.F. (Div.IV)			I	plano	F	100%		Ficha de control/ *Control file*	
50.2		Montaje equipo freno/ *Brake equipment assembly*	C.A.F. (Div.IV)			I	plano	F	100%		Ficha de control/ *Control file*	
50.3		Montaje de bastidor sobre eje (suspensión primaria)/ *Wheelset assembly (primary suspension)*	C.A.F. (Div.IV)			I	plano	F	100%		Ficha de control/ *Control file*	
50.4		Montaje suspensión secundaria/ *Secondary suspension airbag assembly*	C.A.F. (Div.IV)			I	plano	F	100%		Ficha de control/ *Control file*	
50.5		**Pruebas finales/ *Final tests***										

PLAN DE INSPECCION Y ENSAYOS DE FABRICACION

TEST AND INSPECTION PLAN FOR MANUFACTURING

PIEF- GENERAL | -

Clave(s) Obra:

PROYECTO / *PROJECT : GENERAL*

	Elemento u Operación a Controlar *Part or Operation to be Controlled*			Tipo de Control *Control Type*							Registros *Records*	
Item *Item*	**Código** *Code*	**Denominación** *Designation*	**Suministrador** *Supplier*	**Tipo** *Type*	**Fai** *Fai*	**Serie** *Routine*	**Especificación de Control** *Control Specification*	**Responsable** *Responsible*	**Frecuencia** *Frequency*	**Presencia Cliente** *Customer Presence*	**Documento** *Document*	**Entrega Cliente** *Delivery to Customer*
50.6		Verificación del eje montado/ *Wheelset verification*	C.A.F. (Div.II)			I	planilla/*control sheet*	F,C	100%		planilla/*control sheet*	
50.7		Pruebas neumáticas/ *Pneumatic tests*	C.A.F. (Div.IV)			I	planilla/*control sheet*	F,C	100%		planilla/*control sheet*	
50.8		Verificación final de pintura/ *Final painting verification*	C.A.F. (Div.IV)			I	planilla/*control sheet*	F,C	100%		planilla/*control sheet*	
50.9		Verificación de la resistencia eléctrica/ *Electric resistance verification*	C.A.F. (Div.IV)			I	planilla/*control sheet*	F,C	100%		planilla/*control sheet*	
50.10		Identificación de elementos/ *Parts identification*	C.A.F. (Div.IV)			I	planilla/*control sheet*	F,C	100%		planilla/*control sheet*	
50.11		Verificación de bogie bajo prensa/ *Under press bogie verification*	C.A.F. (Div.IV)			I	planilla/*control sheet*	F,C	100%		planilla/*control sheet*	
50.12		Rodaje de bogie/ *bogie running*	C.A.F. (Div.IV)			I	planilla/*control sheet*	F,C	100%		planilla/*control sheet*	

LEYENDA / *LEGEND*

Tipo de Control / *Control Type*
O : Origen / *Supplier factory*
I : Interna / *Internal*

Responsable / *Responsible*
F : Fabricación / *Manufacturing*
C : Calidad / *Quality*
T : O. Técnica / *Engineering*
S : Suministrador / *Supplier*

Presencia Cliente / *Customer Presence*
R : Revisión registros / *Records review*
A : Punto de Aviso / *Witness point*
E : Punto de Espera / *Hold point*

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PLAN DE PRUEBAS Y ENSAYOS FINALES

FINAL TEST AND INSPECTIONS

PYEF- GENERAL —

Clave(s) Obra:

PROYECTO / *PROJECT : GENERAL*

	Elemento u Operación a Controlar *Part or Operation to be Controlled*			Tipo de Control *Control Type*							Registros *Records*	
Item *Item*	**Código** *Code*	**Denominación** *Designation*	**Suministrador** *Supplier*	**Tipo** *Type*	**Fai** *Fai*	**Serie** *Routine*	**Especificación de Control** *Control Specification*	**Responsable** *Responsible*	**Frecuencia** *Frequency*	**Presencia Cliente** *Customer Presence*	**Documento** *Document*	**Entrega Cliente** *Delivery to Customer*
		Ensayos en factoría / *Tests at standstill*										
1	—	Gálibo / *Car clearances*	CAF (div. IV)	I		I	Especificación de ensayo / *Test spec.*	F	Tipo / *Type* + 100%	—	Hoja de medición y control / *record sheet*	si / *yes*
2	—	Peso / *Weighing*	CAF (div. IV)	I			Especificación de ensayo / *Test spec.*	F	Tipo / *Type*	—	Hoja de medición y control / *record sheet*	si / *yes*
3	—	Estanqueidad de instalaciones de aire comprimido / *Test for overall air-tightness and operation of compressed air equipment*	CAF (div.IV)	I		I	Especificación de ensayo / *Test spec.*	F	Tipo / *Type* + 100%	—	Hoja de medición y control / *record sheet*	si / *yes*
4	—	Equipo de freno / *brake test at standstill*	CAF (div.IV)	I		I	Especificación de ensayo / *Test spec.*	F	Tipo / *Type* + 100%	—	Hoja de medición y control / *record sheet*	si / *yes*
5	—	Ensayo de estanqueidad (caja y cofres) / *water tightness test (car body and external boxes)*	CAF (div.IV)	I		I	Especificación de ensayo / *Test spec.*	F	Tipo / *Type* + 100%	—	Hoja de medición y control / *record sheet*	si / *yes*
6	—	Ensayos de equipos / *correct operation of assembled equipements*	CAF (div.IV)	I		I	Especificación de ensayo / *Test spec.*	F	Tipo / *Type* + 100%	—	Hoja de medición y control / *record sheet*	si / *yes*
7	—	Rigidez dieléctrica / *dielectric test*	CAF (div.IV)	I		I	Especificación de ensayo / *Test spec.*	F	Tipo / *Type* + 100%	—	Hoja de medición y control / *record sheet*	si / *yes*
8	—	Tierras y Retornos / *earth and return connections*	CAF (div.IV)	I		I	Especificación de ensayo / *Test spec.*	F	Tipo / *Type* + 100%	—	Hoja de medición y control / *record sheet*	si / *yes*
9	—	Carga de baterias / *Battery charging arrangement*	CAF (div.IV)	I			Especificación de ensayo / *Test spec.*	F	Tipo / *Type*	—	Hoja de medición y control / *record sheet*	si / *yes*
10	—	Equipos eléctricos auxiliares / *Running tests on auxiliary electrical equipments and power supliers*	CAF (div.IV)	I			Especificación de ensayo / *Test spec.*	F	Tipo / *Type*	—	Hoja de medición y control / *record sheet*	si / *yes*

PLAN DE PRUEBAS Y ENSAYOS FINALES

FINAL TEST AND INSPECTIONS

PYEF- GENERAL —

Clave(s) Obra:

PROYECTO / *PROJECT : GENERAL*

	Elemento u Operación a Controlar *Part or Operation to be Controlled*			Tipo de Control *Control Type*							Registros *Records*	
Item *Item*	**Código** *Code*	**Denominación** *Designation*	**Suministrador** *Supplier*	**Tipo** *Type*	**Fai** *Fai*	**Serie** *Routine*	**Especificación de Control** *Control Specification*	**Responsable** *Responsible*	**Frecuencia** *Frequency*	**Presencia Cliente** *Customer Presence*	**Documento** *Document*	**Entrega Cliente** *Delivery to Customer*
11	—	Prevención de accidentes / *Checks for the prevention of accidents* Ensayos en linea / *On track test*	CAF (div.IV)	I		I	Especificación de ensayo / *Test spec.*	F	Tipo / *Type* + 100%	—	Hoja de medición y control / *record sheet*	si / *yes*
12	—	Ensayo de aceleración / *Acceleration test*	CAF (div.IV)	I			Especificación de ensayo / *Test spec.*	F	Tipo / *Type*		Hoja de medición y control / *record sheet*	si / *yes*
13	—	Prueba de tracción / *Traction performances*	CAF (div.IV)	I			Especificación de ensayo / *Test spec.*	F	Tipo / *Type*		Hoja de medición y control / *record sheet*	si / *yes*
14	—	Inscripción en curva / *Running on curve test*	CAF (div.IV)	I		I	Especificación de ensayo / *Test spec.*	F	Tipo / *Type* + 100%		Hoja de medición y control / *record sheet*	si / *yes*
15	—	Ensayo de freno / *Braking test*	CAF (div.IV)	I			Especificación de ensayo / *Test spec.*	F	Tipo / *Type*		Hoja de medición y control / *record sheet*	si / *yes*
16	—	Resistencia a la tracción / Test for resistance to motion	CAF (div.IV)	I			Especificación de ensayo / *Test spec.*	F	Tipo / *Type*		Hoja de medición y control / *record sheet*	
17	—	Regulación de velocidad / *speed regulation system*	CAF (div.IV)			I	Especificación de ensayo / *Test spec.*	F	Serie/*Routine*		Hoja de medición y control / *record sheet*	si / *yes*
18	—	Comportamiento dinámico / *Dynamic behaviour*	CAF (div.IV)	I			Especificación de ensayo / *Test spec.*	F	Tipo / *Type*		Hoja de medición y control / *record sheet*	si / *yes*
19	—	Equipos de seguridad / *safety systems*	CAF (div.IV)	I		I	Especificación de ensayo / *Test spec.*	F	Serie/*Routine*		Hoja de medición y control / *record sheet*	si / *yes*

PLAN DE PRUEBAS Y ENSAYOS FINALES

FINAL TEST AND INSPECTIONS

PYEF- GENERAL | __

Clave(s) Obra:

PROYECTO / *PROJECT : GENERAL*

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Item *Item*	**Código** *Code*	**Denominación** *Designation*	**Suministrador** *Supplier*	**Tipo** *Type*	**Fai** *Fai*	**Serie** *Routine*	**Especificación de Control** *Control Specification*	**Responsable** *Responsible*	**Frecuencia** *Frequency*	**Presencia Cliente** *Customer Presence*	**Documento** *Document*	**Entrega Cliente** *Delivery to Customer*
20	__	Ruido exterior / *External noise*	CAF (S.I.)	I			Especificación de ensayo / *Test spec.*	F	Tipo / *Type*		Hoja de medición y control / *record sheet*	si / *yes*
21	__	Ruido interior / *Internal noise*	CAF (S.I.)	I			Especificación de ensayo / *Test spec.*	F	Tipo / *Type*		Hoja de medición y control / *record sheet*	si / *yes*
22	__	Climatización / *Ventilation and heating test*	CAF (div.IV)			I	Especificación de ensayo / *Test spec.*	F	Serie/*Routine*		Hoja de medición y control / *record sheet*	si / *yes*
23	__	Operaciones varias (enganche, pantógrafo) / *Multiple operation test (coupling, pantographs…)*	CAF (div.IV)			I	Especificación de ensayo / *Test spec.*	F	Serie/*Routine*		Hoja de medición y control / *record sheet*	si / *yes*
24	__	Otras pruebas eléctricas / *Other electrical parts (IEC1133)*	CAF (div.IV)			I	Especificación de ensayo / *Test spec.*	F	Serie/*Routine*		Hoja de medición y control / *record sheet*	si / *yes*

LEYENDA / *LEGEND*

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Responsable / *Responsible*
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Presencia Cliente / *Customer Presence*
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Nº	TITLE	COMMENTARY
4	**TRAM TESTING AND COMISSIONING**	
4.1.	**DOCUMENT SCOPE**	This clause is only for information.
4.1.1	General Requirements	We will comply.
4.1.2	Test Plan	We will comply. Please see Annex 1.2.3 in order to see a generic Test Plan for CAF vehicles.
4.1.3	Tram Test Categories	We will comply.
4.1.4	Test Certificates	We will comply.
4.1.5	Factory Acceptance Tests (FAT)	We will comply. Comments: Dynamic Tests will be conducted at Edinburgh track in all cases. ➢ Table “FAT: Static Type Tests” Tests “Coefficient of flexibility” (ref: 8.2) will not be conducted in a practical way. Instead CAF has enough tools to simulate and calculate the flexibility parameters. The removal of components described in “Lifting ability” (ref: 8.3) will be checked during the mounting process. Tests described in “Operability and maintainability” (ref: 8.17) will be limited to main or agreed areas. “Contact forces” test mentioned in “Pantograph” (ref:9.12) will be conducted at the sub-supplier’s factory. ➢ Table 1 “FAT: Dynamic Type Tests” As mentioned before, Dynamic Tests will be conducted at Edinburgh track in all cases. Testing of the “Thermal Capacity” (ref: 9.4) will be conducted at the sub-supplier’s factory. Tests for “Tram Control System” and “Monitoring Equipment” (ref: 9.19 for both cases) could be conducted at CAF’s factory.

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		➢ Table 2 “FAT: Static Routine Tests” Regarding “Heating, Ventilation and air-conditioning test” (ref: 8.14.4) mention that openings for the air flows of the equipment will be the same as the ones adopted at the first unit. “Contact forces” test mentioned in “Pantograph” (ref:9.12) will be conducted at the sub-suppliers factory. ➢ Table 3 “FAT:Dynamic RoutineTests” As mentioned before, Dynamic Tests will be conducted at Edinburgh track in all cases. Tests for “Tram Control System” and “Monitoring Equipment” (ref: 9.19 for both cases) could be conducted at CAF’s factory.
4.1.6	Delivery Acceptance Tests (DAT)	Blank Section
4.1.7	Site Commissioning Tests	We will comply.
4.1.8	Re-Testing	We will comply.
4.1.9	Testing Support	We will comply.
4.1.10	System Integration Tests(SIT)	We will comply.
4.1.11	System Acceptance Testing	We will comply.
4.2	**SYSTEMS ACCEPTANCE**	
4.2.1	Document Scope	Noted
4.2.2	General Description and Principles	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.3	Programme and Risk Register	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.

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4.2.4	Pre-Systems Acceptanve Testing (before starting the systems acceptance process)	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.5	Factory Acceptance Tests (FAT)	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.6	Site Tests	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.7	System Acceptance Activities and System Acceptance Tests	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.8	Operations Staff Training	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.9	Shadow Running	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.10	Final System Acceptance Tests in the Operations and Maintenance Phase	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.11	Emergency Exercise	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.12	Post Comissioning Test –T1	Blank Section
4.2.13	Introduction	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.

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4.2.14	Monitoring and Reporting of Test Performance	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.15	Performance Test Specification – T2	Blank Section
4.2.16	Introduction	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.17	Monitoring and Reporting of Test Performance	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.18	Pre-Operations Test Specification – T3	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.19	Introduction	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.20	Overview	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable. For a speed of 70km/h, the average lateral acceleration measured in our previous project of Velez-Malaga is of 0.2 m/s2. For a speed of 70km/h, the average vertical acceleration measured in our previous project of Velez-Malaga is of 0.3 m/s2. It is important to note that comfort levels depend also on the conditions of the track.
4.2.21	Monitoring and Reporting of Test Performance	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.22	Network Performance Test Specification – T4	Blank section

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4.2.23	Introduction	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.24	Overview of Network Performance Test	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.25	Pass Criteria	CAF understands that this clause is out of its scope. However CAF shall support the Infraco and the Operator shall it be required.
4.2.26	Special Demonstrations	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.27	Assumptions and Exclusions	CAF understands that this clause is out of its scope. However CAF shall support the Infraco and the Operator shall it be required.
4.2.28	Monitoring and Reporting of Test Performance	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.29	Network Performance Test Timetable	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.30	Network Reliability Test Specification – T5	Blank Section
4.2.31	Introduction	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.32	Overview	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.

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4.2.33	Sub-Systems Subject to Network Reliability Test and Reliability Targets	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.34	Assumptions and Exclusions	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.35	Monitoring and Reporting of Test Performance	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.36	Audit Procedures	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.
4.2.37	Services in connection with the Operator	CAF understands that undertaking the tests shall be an operational function led by Infraco. CAF will provide reasonable input, participation and support to the tests whenever reasonable.

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1.2.4 TENDER VARIANTS

1.1. NIGHT PARTITION

Due to bidirectional driving, two doors per tram have been foreseen for the night partition option. They will be placed at both ends of car D and in any case, the wheelchair area will be within the operating tram part.

They will be sliding type doors, constructed in glass material.

When not in use, the doors will be folded and stored in both sides of the tram. The night partition will be unfolded by using an upper sliding guide. The door will be manually locked in the centre of the partition.

While in journey, at the non-operating part of the tram, lights will be off and the doors will be blocked in order to avoid people at the platform head towards the tram's non operating part.

Please see drawing Q.22.00.818 for a draft of the night partition.

Use or disclosure of the proposal data is subject to the restrictions noted on the title page of this proposal

1.2.4 TENDER VARIANTS

1.6. PORTABLE CONDUCTOR'S PANIC BUTTON FOR EACH TRAM

This will be a device which will allow the inspector to warn the driver in case of emergency.

This equipment will consist of a portable button (small size, easy to fit in the pocket) and by pressing it, a light will be lit at the cab. This will warn the driver of any emergency situation at the passenger saloon.

Any type of interference with other equipment will be avoided.

Detailed description of the equipment will be supplied in the Project Stage.

Use or disclosure of the proposal data is subject to the restrictions noted on the title page of this proposal

1.2.4 TENDER VARIANTS

1.7 OPTIONAL GUARD.

CAF propose this variant since our current tram projects will include this new and optimised under run protection.

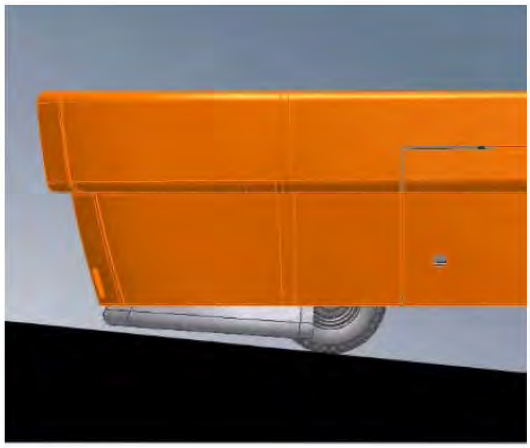
We consider that this design is closer to the design of previous under run protection mounted in UK trams such as, the one on Nottingham Tram.

Find below some drawings showing the equipment:

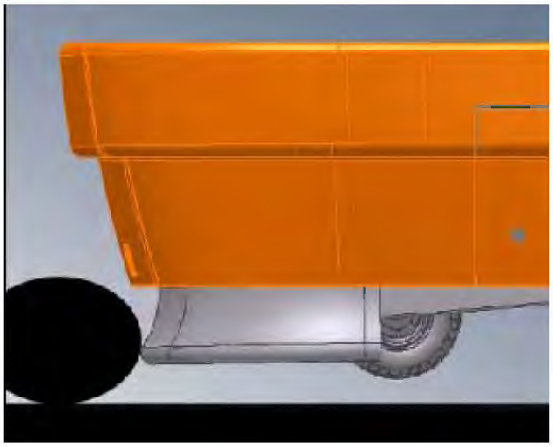
Normal Operation

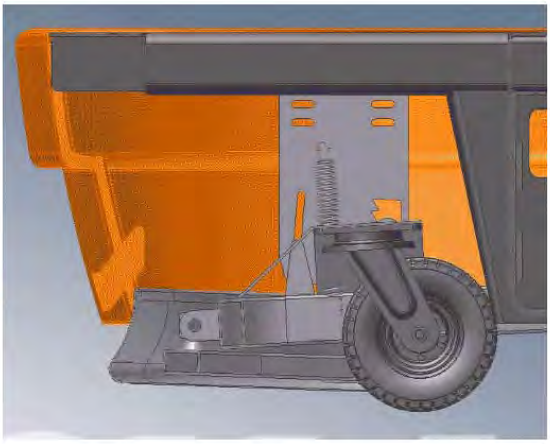


Adaptability



Obstacles





Mechanism

Use or disclosure of the proposal data is subject to the restrictions noted on the title page of this proposal

Edimburgh tramnetwork

QUALITY PLAN

Revision level: Issue 1.00, 27.09.2006 for Tender

Approved:	Antonio Campos	Project Manager	27.09.06	
Checked:	Aitor Galarza	CAF Quality Manager	27.09.06	
Produced:	Javier Ganuza	Project Quality Manager	27.09.06	
	Name	Function	Date	Signature

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REVISIONS

Issue	Date	Revised in document	Remarks
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Copy No.	Name	Function / Department

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1. INTRODUCTION

1.1 Purpose

The Quality Plan describes the procedures and controls that will be applied by Construcciones y Auxiliar de Ferrocarriles, S.A. (CAF) in order to satisfy the requirements of the Agreement between Edimburgh tramnetwork and CAF to design, manufacture, supply, deliver and maintenance of the tram units

The present document is titled “Quality Plan” and it will subsequently be supported by an specific Test and Inspection Plan described in section 4.5 of the present document.

1.2 Scope

This Quality Plan is mandatory on all stages of the contract from initial review of the contract to delivery, acceptance, maintenance and warranty period of the trains.

2. RELATED DOCUMENTS

ISO 9001/2000	Quality Systems
CAF	Quality Assurance Manual, Vehicles Division
CAF	Procedures Manual
EN287	Approval Testing of Welders for Fusion Welding
EN288	Specification and Approval of Welding Procedures for Metallic Materials

3. GLOSSARY

CAF	Construcciones y Auxiliar de Ferrocarriles, S.A, Spain
Purchaser	Edinburgh tramnetwork, represented by the Chief Mechanical Engineer. Any reference to approvals or submissions to the Purchaser will refer to the Chief Mechanical Engineer.
Quality Plan	A document setting out the Quality Assurance policies and management organisation for the execution of the contract.
Test and Inspection Plan	A document setting out the specific inspections and quality controls to be carried out at every stage of the project.

4. QUALITY SYSTEM

The project will be undertaken within the framework of the quality assurance requirements detailed in the International Standards Organisation specifications ISO 9001.

This Standard is satisfied within UK and Spain by national standards, which are identical to the ISO 9001 standard.

Lloyds, Spain, registration number 950266 registers CAF as satisfying the requirements of UNE EN ISO 9001.

The Quality System of CAF is detailed in the Quality Assurance Manual. This manual contains a Quality Policy Statement signed by the General manager.

The Quality Manager holds copy of this manual.

4.1 Document Review

Prior to submission to the Purchaser this document has been reviewed by and approved by the Project Manager and the Quality Manager.

The document will be reviewed and approved by the Purchaser prior to be issued and distributed.

Any further issue of the present document will follow the same review and approval process.

4.2 Procedures

Documented procedures will be used according to the Quality System to control all the processes employed in every stage of the project.

These procedures are included in the Procedures Manual. A list of these procedures is also stated in Appendix 1.

4.3 Work Instructions

Work instructions will be prepared, if necessary, to detail particular processes, which require further detail than given in the Procedures Manual.

5. MANAGEMENT RESPONSABILITIES

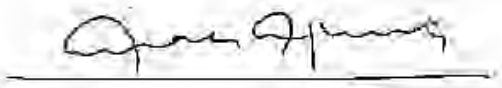
The Quality Policy applicable to the supply of Railway Vehicles has the objective of supplying products and services conforming to our Customer's and legislative requirements.

To achieve this objective, this Quality Management System has been implemented as a device that allows the provision of objective proof in the form of data and information on the efficiency of our organisation and quality of our products. This shall lead to:

- Our Company attaining the desired quality at an optimum cost.
- Our customers increased satisfaction and their trust in our products.

The maintenance of this Quality Management System will allow us to establish "solid bases" on which the required activities shall be developed to promote the continuity and progressive improvement of our Company.

I request each Division and Department involved to strictly comply with the Quality Assurance Programme described in this manual.



Signed: **Andrés Arizkorreta**

General Manager

CAF Procedure P-02.01-BZ " Structure and Organization" describes and establishes in detail the functions and responsibilities for each of the CAF Departments managers.

Within the procedure P-05.05.BZ "Organization, planning and development of the project" it is established CAF appointment and entitlement of the key personal who will constitute the Project team. Additionally to the Project Manager, Quality Project Managerand and Project Lead Engineer, the Enginering department constitutes the different working teams and responsibles for each sub-department in the Technological Area.

6. TRAINING OF CAF PERSONNEL

Comprehensive training programmes are conducted to ensure that all CAF personnel are trained to a level commensurate with the tasks placed on them. The training is conducted for both technical and management skills. Training Programmes are co-ordinated by the Training Department. Where appropriate, personnel need to be certified to carry out specific safety related tasks.

7. PLANNING

7.1 Contract review

A contract review will be undertaken within the 3 months after the Contract signature or as described in other formal specific agreement between CAF and the Customer. The purpose of this review is to ensure that the requirements of the Contract are clearly understood by the project team, and can be achieved effectively and to ensure due emphasis is placed on the Quality requirements by all personnel involved in the Contract.

A record of the Contract Review meeting will be prepared and held within the Project records.

In addition there will be external reviews with the Purchaser or his representatives on contractual matters.

7.2 Project Time Plans

A Project Time Plan will be prepared for the Project and will include relevant input from major sub-contractors. The plan will show the design stages and time scales identifying key events in the programme such as Design Review, Manufacturing, Factory Acceptance Testing, Transport, Delivery, Commissioning and Acceptance testing. This processes are detailed in the related procedures P-05.05.BZ "Organization, planning and development of the project" and P-05.02-BZ "Design Development", P-05.03-BZ "Design verification and validation" and P-05.04 BZ. "Design Review"

The Project Time Plan will be reviewed on a regular basis. These reviews will be documented and all actions arising from the reviews recorded and followed.

7.3 Project Reporting

The Project Manager will report to the Purchaser about the status of the project at every project status meeting.

The Project Manager will meet with the Project Team on weekly basis to review project progress and prepare the project progress meetings.

Senior management meetings will be scheduled on a regular basis.

7.4 DESIGN & DEVELOPMENT CONTROL

7.4.1 General

All stages of the design will be documented. The procedures to be adopted during these stages are specified in the Quality Assurance Manual and supporting documentation.

7.4.2 Design Authority

The Design Authority is responsible for ensuring that the performance of the units satisfies both the design requirements and the contract conditions.

The Design Authority for this contract is the Project Engineer.

7.4.3 Internal Design Review

The Design Review Process will be employed to rigorously assess the suitability of the design for its intended task. Internal Design Reviews will be held at predetermined stages in the design.

The Design Review Process which will be employed is detailed in the procedure:

CAF Design Review P-05.04-BZ

7.4.4 External Design Review

In addition to the Internal Design Review process detailed in paragraph 5.3, External Design Reviews will also be undertaken with the Purchaser or representatives, according to the Contract as detailed in the Project Time Plan, and will be used as the control mechanism to formally approve the Design.

7.4.5 Monitoring and Assessment

Performance monitoring of the rolling stock will be undertaken to record all defects and these will be assessed and categorised.

7.4.6 Configuration management & Change Control

Configuration Management will be adopted to ensure control of all documentation, drawings, hardware and software.

All documentation and software will be formally controlled from the corresponding review.

Automated tools will be used by some parts of the organisation to achieve effective configuration management.

Configuration management process is detailed in the procedure:

- Modifications P-05.01-BZ

7.4.7 Concessions

All concessions will be dealt with according to the contract. This will cover all changes to the contract and must be agreed by both parties before carrying out the change.

7.5 PURCHASING

7.5.1 Vendor Control

The term “Vendor” includes suppliers of proprietary products and sub-contractors who supply products and services specifically tailored to the requirements of this project i.e. non-proprietary.

According to the Quality System all vendors are approved by CAF prior to contracts being placed and a list of approved vendors will be held within the Purchasing Department.

In the Purchased Materials Inspection and Test Plan (within the Test and Inspection Plan) it will be stated the controls imposed over each purchased material.

7.5.2 Purchase Orders

Purchase orders will only be placed with approved vendors according to CAF procedures. Orders need to be approved prior to issue.

7.5.3 Purchaser Supplied Material

Should any material be free issued by the Purchaser for use on the units then it will be held in store under the same conditions and procedures as for all other material required for the Project, except for being labelled as a Purchaser owned property.

7.6 MANUFACTURING CONTROL

Manufacturing will take place in accordance with the relevant documented procedures, a list of which is given in Appendix 1.

Manufacturing control procedures are mandatory on all stages of the manufacturing process and are supplemented by detailed work instructions where required.

Welders employed by CAF in the manufacturing of the bogies and body shells will be assessed and certified in accordance with EN 287. Welding will be undertaken in accordance with the requirements of EN 288. Other processes associated with the manufacture of the vehicle, e.g. the painting process, will employ skilled personnel.

7.6.1 Special Processes

Within the project the below listed “Special Processes” are defined.

The “Special Processes” are those which require a particularly detailed level of work instructions or operator skills in order to ensure that quality, safety and reliability is achieved. As the design advances additional Special Processes may be identified.

Painting Procedure	P-10.03-BZ Checking Painting Processes
Welding Procedure	P-10.04-BZ Checking Welding Processes
Cable Preparation Procedure	P-10.11-BZ Checking Cable Preparation Process

7.6.2 Quality Records

7.6.2.1 General Records

Records of the performance of the Quality System are held in accordance with the requirements of ISO 9001.

General Records include:

- Management Reviews
- Quality Audits and Reviews
- Training
- Calibration
- Procurement
- Manufacturing
- Purchaser Complaints

7.6.2.2 Project Specific Records

In addition to the above recording, project specific information will also be held including but not limited to:

- Contract Review
- Design Reviews
- As Made Drawings
- Test Reports
- Spare Parts
- Manuals

7.6.3 Inspection and Test Plan

According to the Quality System a Test and Inspection Plan will be produced to identify the controls to be applied at all stages of the project.

This Inspection and test Plan will be composed of three different documents:

- Purchased materials Inspection and Testing Plan.
- Manufacturing Inspection and Testing Plan.
- Test Plan (including factory and site testing).

The Test and Inspection Plan will be submitted to the Purchaser for review and approval.

This review allows for input from the Purchaser to indicate activities, which the Purchaser may wish to witness or declare as a mandatory hold point requiring his authorisation to proceed.

7.6.4 Project Documentation

Project specific documentation will be prepared as appropriate in agreement with the Purchaser.

7.6.5 Document Control

Document Control will be undertaken in accordance with the operating procedures of CAF Quality System, within the quality assurance requirements detailed in the ISO 9001.

7.7 IDENTIFICATION AND TRACEABILITY

Part identification will ensure that all components and sub-assemblies are controlled and ensure that only the correct part will be fitted to a higher level assembly.

Major assemblies will be marked with a serial number to ensure traceability of all assembly, inspection and test processes.

7.8 INSPECTION

7.8.1 Purchased Materials Receiving Inspection

The controls imposed to the purchased materials will be stated in the Purchased Materials Inspection and Test Plan (within the Test and Inspection Plan).

Inspection of all purchased materials and products is controlled by applicable procedures which identify the inspection criteria to be applied. Where applicable the procedures may be implemented prior to the material or product leaving the vendor's premises i.e. source inspection.

If the Purchaser requires his own material or product inspection prior to delivery this will be stated on the purchase order and will be highlighted in the Test and Inspection Plan.

Any work found to be unacceptable would be subject to the following courses of action:

- Reject material
- Re-work material
- material accepted by concession

When a decision to accept the material by concession is made then the process detailed in paragraph 6.2 will be applied.

7.8.2 In Process and Final Inspection

The controls imposed to the manufacturing process will be stated in the Manufacturing Inspection and Test Plan (within the Inspection and Test Plan).

Inspections at the appropriate stages defined in the Manufacturing Inspection and Test Plan will be undertaken to the appropriate standards. Evidence of inspection having been carried out will be held within the manufacturing documentation.

7.9 TESTING

Testing will be carried out in accordance with the Test Plan.

The Test Plan will include factory and site tests, type and routine tests.

7.10 CONTROL OF INSPECTION, MEASURING AND TEST EQUIPMENT

Inspection, measuring and test equipment used for product verification is periodically reviewed and calibrated.

The calibration process and the calibration period are stated in the corresponding procedures and standards of the Quality System.

7.11 HANDLING, STORAGE, PACKING AND DESPATCH

Finished products, having been finally inspected will be stored, packed and despatched in such a manner that no deterioration is guaranteed.

The process to manipulate, store, pack and deliver finished products will be conducted according to the corresponding procedures within the Quality System.

7.12 COMMISSIONING

Any commissioning activity will be undertaken in accordance with the corresponding procedures.

7.13 PURCHASER VERIFICATION

The Inspection and Test Plan will indicate activities in which the Purchaser wishes to be involved.

Two levels of Purchaser involvement has been identified:

Witness (W) Defined as a point in the programme, in which has been defined that the Purchaser witness is required. The Purchaser will be informed of the date, time and location of the activity. In case of non-attendance of the Purchaser the activity will continue as scheduled.

Hold (H) Defined as a point in the programme in which has been defined that the Purchaser wish to stop further progress of an activity until he witnessing it. Should the Purchaser fail to attend during a “Hold” activity then the Project Manager will immediately be informed and an appropriate course of action sought.

The Inspection and Test Plan submitted to the Purchaser will specify the planned locations for each activity. The specific official communication for the planned tests will be agreed (fax, email...).

7.14 ACCOMMODATION AND ASSISTANCE

The Purchaser or his representative will be permitted reasonable access to all facilities used during all stages of the Project.

It will be made available the following:

- Minutes of design review meetings
- Drawings and documents required for Design Review
- Manuals, procedures and instructions used within the Project.

8. MEASUREMENT, ANALISYS AND IMPROVEMENT

8.1 CUSTOMER SATISFACTION

These activities will be performed in accordance with P-08.02-BZ procedure.

8.2 CONTROL OF NON-CONFORMING MATERIAL

All non-conforming material will be identified and returned to its place of origin. This may be either external suppliers or internal departments.

The process to document an dispose of non-conforming materials will be conducted according to the corresponding procedures within the Quality System.

8.3 QUALITY AUDITS

Regular internal quality audits are conducted within the Quality System in accordance with the operating procedure:

- Internal Audits P-18.01-BZ

The Purchaser may wish to undertake audits. The Project Manager will provide facilities and assistance to allow such audits to take place at CAF or at his subcontractor's venues.

The Project Quality Manager will address actions arising from these audits.

APPENDIX 1. CAF'S PROCEDURES. PAGE 1 OF 2

CODE	DESCRIPTION
P-02.01-BZ	STRUCTURE AND ORGANISATION
P-02.02-BZ	SYSTEM REVIEW
P-03.01-BZ	QUALITY PLANNING
P-04.01-BZ	CONTRACT REVIEW
P-04.02-BZ	TENDERS
P-05.01-BZ	MODIFICATIONS
P-05.02-BZ	DESIGN DEVELOPMENT
P-05.03-BZ	DESIGN CHECKING AND VERIFICATION
P-05.04-BZ	DESIGN REVIEW
P-05.05-BZ	ORGANISATION, PLANNING AND DEVELOPMENT OF THE PROJECT
P-06.01-BZ	PROCEDURE PREPARATION AND CHECKING
P-06.02-BZ	DOCUMENT CHECKING
P-07.01-BZ	APPROVING SUPPLIERS
P-07.02-BZ	SUPPLIERS QUALITY SYSTEM AUDITS
P-07.03-BZ	PURCHASE MANAGEMENT OF MAIN EQUIPMENTS
P-07.04-BZ	PURCHASE DOCUMENTS
P-07.07-BZ	CONTINUAL DELIVERY ASSESSMENT
P-08.01-BZ	PRODUCTS SUPPLIED BY THE PURCHASER
P-08.02-BZ	CUSTOMER SATISFACTION MEASUREMENT
P-09.01-BZ	IDENTIFICATION AND TRACEABILITY
P-10.01-BZ	PREPARATION AND PUBLICATION OF PARTS LIST
P-10.02-BZ	CHECKING FINISHED PRE ASSEMBLY AND ASSEMBLY PROCESSES
P-10.03-BZ	CHECKING PAINTING PROCESSES
P-10.04-BZ	CHECKING WELDING PROCESSES
P-10.05-BZ	CHECKING STRUCTURE PROCESSES
P-10.06-Z	CHECKING DOOR-MANUFACTURING PROCESSES
P-10.07-BZ	CHECKING BOILER-SHOP PROCESSES
P-10.08-BZ	IRON/STEEL SURFACE TREATMENT
P-10.09-B	CHECKING FINISHED BOGIE ASSEMBLY PROCESS
P-10.11-BZ	CHECKING CABLE PREPARATION PROCESS

P-10.12-B	CHECKING TUBE MANUFACTURING PROCESS

APPENDIX 2. CAF'S PROCEDURES. PAGE 2 OF 2

CODE	DESCRIPTION
P-10.13-BZ	MAINTENANCE OF MANUFACTURE EQUIPMENTS
P-10.14-B	CHECKING OF MECHANISING PROCESS
P-10.15-B	CHECKING ASSEMBLY PROCESS
P-10.16-BZ	CHECKING ADHESIVE AND SEALING PROCESS
P-11.01-BZ	PLANNING MANUFACTURING QUALITY
P-11.02-BZ	FINAL TESTS AND TRIALS
P-11.03-BZ	INSPECTIONS AND TESTS ON RECEPTION
P-12.01-BZ	CHECKING INSPECTION, MEASURING AND TESTING EQUIPMENT
P-13.01-BZ	INSPECTION AND TEST STATUS
P-14.01-BZ	TREATMENT OF UNSUITABLE PRODUCTS DETECTED DURING MANUFACTURE
P-14.02-BZ	TREATMENT OF UNSUITABLE PRODUCTS AT RECEPTION
P-15.01-BZ	CORRECTIVE ACTIONS
P-16.01-BZ	HANDLING, STORAGE, PACKAGING AND DELIVERY
P-17.01-BZ	QUALITY RECORDS
P-18.01-BZ	INTERNAL AUDITS
P-19.01-BZ	TRAINING
P-20.01-BZ	TREATMENT OF T.A.S. INFORMATION
P-20.02-BZ	TRAINING OF T.A.S. PERSONNEL
P-20.03-BZ	T.A.S. MATERIAL MANAGEMENT
P-20.04-BZ	POST-SALES TECHNICAL ASSISTANCE
P-20.05-BZ	ORGANISATION OF THE POST-SALES TECHNICAL ASSISTANCE
P-21.01-BZ	STATISTICAL METHODS

6A. – MANAGEMENT, ORGANISATION AND KEY PERSONNEL

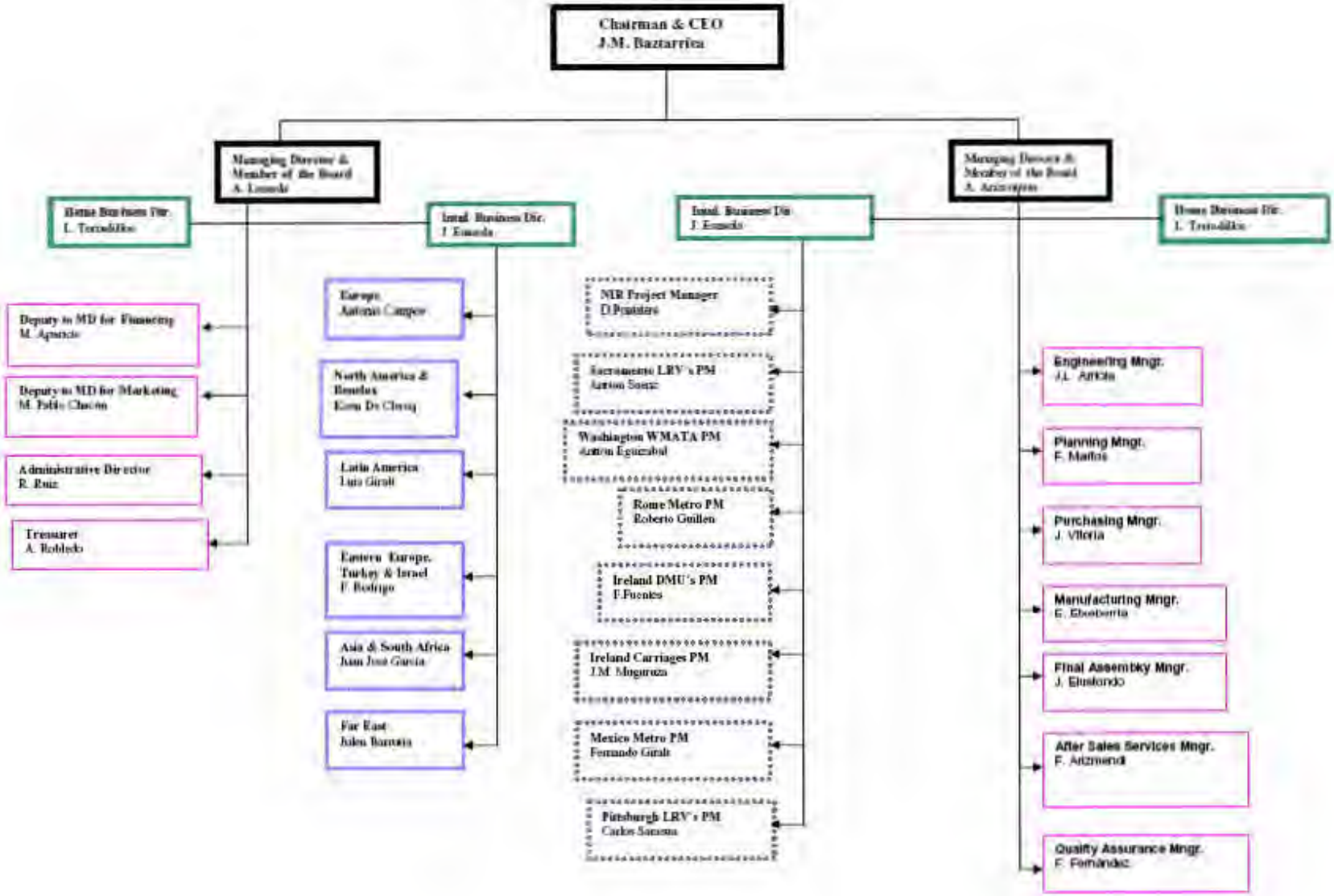
APPENDIX 7 - ORGANISATION DETAILS

1	Name and nature of your organisation (e.g. company, partnership, joint venture etc.) including: registered number; registered office/principal place of business; website URL; list of shareholders holding more than 3% of capital; nature of business; management structure; list of current directors (detailing home address) and copy of Memorandum and Articles of Association.
	Nature of the organization: Construcciones y Auxiliar de Ferrocarriles, S.A. (CAF). **Registered number:** 20001020-A **Registered office/principal place of business:** J.M. Iturrioz 26, 20200 Beasain, Guipúzcoa, Spain **Website URL:** www.caf.net **List of shareholders holding more than 10% of capital: (**)** Cartera Social, S.A. (*) 24,55% Bilbao Bizkaia Kutxa 15,63% Gipuzkoa Donostia Kutxa 10,99% (*) The shareholders of this company are also employees of the Parent Company. (**) According to Spanish exchange rules, only shareholders holding more than 10% of capital have to be identified. Information about shareholders holding more than 3% and less than 10% is not available. **Nature of business:** CAF is manufacturer of rolling stock and its spare parts. **Management structure:** Please refer to Annex 1 of this section. **List of current directors:** Jose M. Baztarrica - CEO Andrés Arizcorreta - Managing Director (Industrial) Alejandro Legarda - Managing Director (Financial) **Copy of Memorandum and Articles of Association:** Please refer to Annex 2 of this section.
2	Contact name, address, telephone and facsimile numbers and e-mail address
	Antonio Mª Campos Irujo J.M. Iturrioz 26, 20200 Beasain, Guipúzcoa, Spain Tlf.: +34 943 189232

	Fax: +34 943 18929 E-mail: acampos@caf.es
3	Where applicable, the name of your ultimate holding company including: registered number; registered office/principal place of business; website URL; nature of business; list of current directors (detailing home address); list of shareholders holding more than 3% of capital and copies of Memorandum and Articles of Association
	N/A
4	Where applicable, details of any groups of companies to which you belong.
	N/A
5	Provide details of any actual or perceived conflicts of interest and/or commercial sensitivities in providing the required supplies and services to **tie**, and explain how you would intend to deal with any such conflicts and/or commercial sensitivities. Please also take into account any conflicts of interest which may arise as a result of your selection of sub-contractors (if any).

N/A

ANNEX 1 – MANAGEMENT STRUCTURE



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ANNEX 2 – ARTICLES OF ASSOCIATION

CONSTRUCCIONES Y AUXILIAR

DE FERROCARRILES, S.A.

STATUTES

STATUTES

OF

CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES, S.A.

MADRID, JUNE 2003

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STATUTES

OF

CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES, S.A.

CHAPTER I

NAME, OBJECT, HEAD OFFICE AND TERM OF THE COMPANY

Art. 1 Name

Construcciones y Auxiliar de Ferrocarriles, S.A., CAF for short, is a Trading Company which is governed by the present Statutes and by the Law.

Art. 2 Corporate purpose

The purpose of the Company is:

1 Construction, repair, purchase, sale, renting, operation in any form, import, export:

1.1 Of all types of components, equipment, material, fixed or movable, and goods destined for the carrying out of transport activities of any type.

1.2 Of all types of products, goods and elements of the metallurgic, steel, plastic, metalworking and carpentry industries.

1.3 Of all types of industrial machinery, machine tools, public works machinery and agricultural machinery.

1.4 Of all types of products, goods and elements related to the electric, electronic, computer and defence industries and activities.

1.5 Of all types of elements, goods and materials which may have a nature that is auxiliary, complementary or derived from the activities included in the sections above.

2 The carrying out of all types of real-estate activity. The buying and selling of property, as well as its renting or transfer in any form. The carrying out of all types of works and construction projects, both public and private, for its own account or that of a third party. The promotion and sale of

buildings and works of all types, for its own account or that of a third party.

3 The provision of services of all types and, in particular, those of study, consulting, engineering and technical assistance, related with the activities of sections 1 and 2 above.

4 To participate, in the terms that the Board may determine, in the capital of other companies whose company objective is the same as that described in the sections above.

5 The carrying out of all types of industrial, commercial, financial, service, asset, real estate, agricultural, livestock and forestry activity, which have a direct or indirect relation with the activities noted above.

Art. 3 Head office

The Company has its head office in Beasain (Guipuzcoa). The Board is empowered to decide on the creation, cessation or transfer of branches, agencies or delegations.

Art. 4 Term of the Company

The term of the Company will be indefinite, except for the causes of dissolution foreseen in the present Statutes and in Law.

The financial year will coincide with the calendar year.

CHAPTER II

CAPITAL STOCK AND SHARES

Art. 5 Capital Stock

The Capital Stock is TEN MILLION THREE HUNDRED AND EIGHTEEN THOUSAND FIVE HUNDRED AND FIVE EUROS AND SEVENTY FIVE CENTS (10,318,505.75), made up of THREE MILLION FOUR HUNDRED AND TWENTY EIGHT THOUSAND AND SEVENTY FIVE (3,428,075) shares of 3.01 Euros nominal value each, totally subscribed and paid.

The shares will be represented by means of annotations in an account and will be able to gain official admission to a listing both in Spanish Stock Exchanges and those overseas, in accordance with the legislation in force.

Art. 6 Share rules

The shares, on being presented through annotations in the account, will be governed by the ruling legislation in the securities markets and other legal dispositions in force.

Changes in the characteristics of the shares represented by means of annotations in the account, will have to be published, once they have been formalized in agreement with that foreseen in the Company Law and in the governing regulation of the securities market, in the Official Daily Listing in the Register of Companies and in one of the most widely read daily newspapers in Guipuzcoa.

The Company will recognize as a legitimate shareholder those who appear confirmed in the entries of the corresponding accounting books.

When the shares are not fully paid up, this fact will be noted in the appropriate place.

Art. 7 Rights incorporated in each share

Each share, as well as representing an allocated part of the capital stock, confers on its legitimate holder the right to participate in the distribution of profits and the resultant net worth on liquidation, the right to preferential subscription for new shares or bonds convertible into shares, and any other rights that the Law may determine. Every share confers the right to vote.

Shares without the right to vote will not be issued.

In order to attend the General Meeting, it will be necessary to verify the legitimate title, to at least a hundred shares. The shareholders that do not reach the required figure can group themselves together to attend the General Meetings, under one representation.

Art 8. Indivisibility of shares

The shares are indivisible. The joint-holders of a single share will have to designate a single person for the exercising of the shareholders' rights and will be jointly responsible to the Company under the obligations which arise from their role as shareholders. An identical rule will be applied to the other co-titular holders of real rights over shares.

Art 9. Usufruct of shares

In the case of usufruct, the property rests in the remainderman. But the usufructuary will be the title-holder in the eyes of the Law.

Art. 10 Pledge and embargo of shares

In the event of pledge or embargo of the shares, the shareholders' rights correspond to the owner, thus obliging the secured creditor or the attacher to allow the exercise of such rights. If the owner did not comply with the obligation to pass on the dividends, the secured creditor or the attacher will be able to fulfil this obligation himself or, in the case of a pledge, to proceed immediately to the execution of the same.

CHAPTER III

ADMINISTRATIVE BODIES OF THE COMPANY

Art.11 Company statutory bodies

The company's statutory bodies are:

1 The General Meeting

2 The Board

CHAPTER IV

OF THE GENERAL MEETING

Art. 12 The Shareholders' General Meeting

The shareholders, made up in the General Meeting duly called, will decide by majority on the appropriate matters within the jurisdiction of the General Meeting. All the shareholders, including dissident voters and those who have not participated in the meeting, remain subject to the agreements of the General Meeting.

Art. 13 Jurisdiction of the General Meeting. Classes

The General Meeting will decide on matters within its domain in agreement with the Law and the present Statutes, particularly:

1 Appointment and removal of directors

2 Appointment of Auditors

3 Audit the management of the Company and, where appropriate, approve the accounts of the previous year, and decide upon the distribution of profits.

4 Increase and reduction of capital stock, delegating, where appropriate, in the Board, within periods set out by the Law, the ability to notify the date or dates of its execution, who will be able to make use wholly or partly of said delegation, including to refrain from doing so in view of market conditions, of the condition of the Company itself or of some fact or event of special significance that in its opinion might justify such a decision, explaining it at the first General Meeting of shareholders held after the period originally granted for its execution. To delegate in the Board the ability to increase the Capital stock in the terms of article 153.1.b) of the Company Law.

5 Issue of bonds.

6 Modification of the Statutes.

7 Dissolution, merger, split and transformation of the Company.

8 To decide on any matter that may be submitted for their decision by the Board, with which a General shareholders' Meeting will need to be called as quickly as possible, to debate and decide on the specific agreements of those included in this article which may be subjected to its decision, in the event that circumstances or relevant facts arise that affect the company, shareholders or statutory bodies, and, in any case, in the event of a tender offer for the shares issued by the Company, that does not meet with the approval of the Board.

The General Meetings can be ordinary or extraordinary.

Art. 14 Ordinary General Meeting

The Ordinary General Meeting, previously called for the purpose, will meet within the first six months of each year to judge the management of the Company and to approve, where appropriate, the annual accounts and management report of the previous year and the proposed distribution of profits, also being able to decide on the other matters which might feature in the Agenda.

Art. 15 Extraordinary General Meeting

Any General Meeting, other than that outlined in the preceding article, will be an Extraordinary General Meeting.

Art. 16 Convening of the General Meeting

All General Meetings - whether they are ordinary or Extraordinary - will have to be convened by means of an advertisement published in the Daily Listing and at least one of the major daily newspapers in circulation in the province of Guipuzcoa, at least two weeks before the date fixed for the meeting. The advertisement will contain all of the matters which have to be dealt with and will have to make clear the date on which, if it were necessary, the second convening of the General Meeting will take place, with a minimum gap between the two of 24 hours.

In the convening of an Ordinary General Meeting, express mention will be made of the right of any shareholder to obtain from the Company, immediately and free of charge, those documents which are going to be submitted for approval and the auditors' report. When the General Meeting has to decide on the modification of the statutes, the points to be modified will be noted in the convening announcement with due clarity as will the right of each shareholder to examine in the Head Office the full text of the proposed modification and the report on it, as well as the right to ask for said documents to be delivered or sent.

Art. 17 General Meeting

Notwithstanding that mentioned in the previous articles, the Meeting will be considered convened and will be validly constituted to deal with any matter provided that all the Capital stock is present and that the attendees accept unanimously the General Meeting.

Art. 18 Ability and obligation to convene

The Board will be able to call the Extraordinary General Meeting whenever it deems it to be in the Company's interest. It will be obliged to call one when shareholders of at least 5% of the Capital stock ask for one and outline in their petition the matters on which the Meeting must debate and reach

agreement.

In this case, the Meeting will have to be convened within the 30 days following the date on which the directors received notification of the need to call it. The Directors will make up the agenda, necessarily including the matters which have been the object of the petition.

Art. 19 Constitution of the Meeting

The Shareholder' General Meeting, except in the case regulated by Article 20, will be considered validly convened when the shareholders present or represented are holders of at least 25% of the subscribed voting capital. On its second convening the Meeting will be considered valid whatever the Capital holdings of those present.

Art. 20 Special matters

In order to adopt agreements on the issue of bonds, the increase or reduction of capital, the transformation, merger or splitting of the Company and, in general, any modification of the Company statutes, on the first convening the attendance will be required of shareholders present or represented holding at least 50% of the issued voting capital. On the second convening, the attendance of 25% of the aforementioned capital will be sufficient.

When shareholders attend, representing less than 50% of the issued voting Capital, the agreements which this article refers to will only be able to be adopted validly with the vote of the two thirds of the Capital present or represented in the Meeting.

Art. 21 Legitimacy to attend the Meeting

The shareholders who possess a hundred or more shares in the Company will be able to attend the General Meeting and to take part in the discussions with right to speak and to vote. Those who possess fewer shares will be able to group themselves together and give their representation to another shareholder who with them reaches a hundred or more shares.

In order to exercise the right of attendance, the shareholders will have to have the shares written under their name in the appropriate register, 5 days in advance of the date of the General Meeting.

Any shareholder who has the right to attend the General Meeting will be able to have himself represented by means of another person, even though that other person may not be a shareholder. For this, the requirements of the Law must be met.

Art. 22 Public petition of representation

In the event that the Company Directors, the entities holding the shares or any other physical or legal person asks for representation for himself or another and, in general, provided that the petition is carried out in a public

manner - as will be presumed if one person holds the representation of three or more shareholders - the document in which the authority is made clear will have to contain or bear the Agenda in Appendix form, as well as the petition of instructions for the exercising of the right to vote and the indication of the way in which the representative will vote, in the event of not receiving precise instructions. Exceptionally, the representative will be able vote in a different way when circumstances are different and the risk of harming the interests of the party he represents is run. In this case, the representative will have to inform the party he represents immediately, by means of a written communication in which he explains his reasons for voting.

Art. 23 Place and time of the Meeting

The General Meetings are held in the same area as the Head Office of the Company, on the day signalled on the convening notice, but the sessions may be extended over one or more consecutive days, if felt appropriate by the Directors or as a result of a petition by a number of shareholders who represent a quarter of the Capital present or represented in the Meeting. Whatever the number of sessions over which the meeting is held, it will be considered as one, with one set of Minutes being drawn up for all the sessions.

Art. 24 Chairmanship of the Meeting

The General Meeting will be presided over by the Chairman of the Board and, in his absence, by one of the Vice-Chairmen if there were any. Otherwise by a shareholder elected by the other shareholders attending the meeting.

The Secretary of the Board shall act as Secretary of the Meeting, and in his absence the youngest director among those present.

Art. 25 Attendance list

Before starting on the Agenda, the Secretary will draw up a list of attendees, outlining the nature or representation of each one and the number of shares they hold on their account or on behalf of others.

At the end of the list the number of shareholders present or represented will be determined, as well as the value of the capital of which they are holders, with a note on that which belongs to the shareholders with the right to vote, if the Company has issued shares without right to vote.

Art. 26 Right to information

The shareholders will be able to seek, in writing, before the General Meeting, or verbally during the Meeting, the reports or clarifications that they feel necessary about the matters covered in the Agenda. The Directors will be obliged to provide them to them, except in the cases that, in the judgement of the Chairman, the publicity would damage the interests of the Company. This exception will not be possible when the petition is supported by shareholders

holding shares with a combined value of at least a quarter of the Capital of the Company.

Art. 27 Minutes of the General Meeting

The Minutes of the meeting can be approved by the General Meeting itself after it has been held or, failing this, and within a period of two weeks, by the Chairman and two referees, named in the Meeting, one representing the majority and the other the minority. The approved Minutes will have executive effect after the date of its approval. The Secretary of the Board, in his role as the Secretary of the General Meeting, will produce the draft Minutes if this is approved at the end of the Meeting and, otherwise, will aid the Chairman and the referees in the preparation of the Minutes.

This notwithstanding, the Directors will be able to require the presence of a notary to record the Minutes of the General Meeting and they will be required to do it if, with 5 days warning prior to the date of the Meeting, this is asked for by shareholders holding at least 1% of the Capital of the Company. The Notarised Minutes will be considered the Minutes of the General Meeting without the need for the intervention of the Secretary or the Chairman.

CHAPTER V

OF THE BOARD

Art. 28 Of the Board of Directors

The Company will be represented, governed and administered by a Board of Directors, responsible to the General Meeting for its management, and must provide to the General Meeting accounts of its operations.

The responsibility of the members of the Board of Directors to the shareholders and to the Company creditors for the damage which they could cause through acts against the Law or the Statutes or carried out without the care with which their duty must be discharged will be stipulated in the terms set out by the Law.

Art. 29 Composition of the Board of Directors

The Board of Directors will be made up of a minimum of seven members and a maximum of fifteen, freely nominated by the General Meeting. It is not necessary for the Director to also be a shareholder.

The prohibitions and incompatibilities established by law will be in force.

The Directors carry out their duties over a period of five years. They can be re-elected one or more times for an equal period.

The appointment of Directors will have effect from the moment of their acceptance.

Art. 30 Representation of the Company

The representation of the Company, in court and outside, corresponds to the Board of Directors. This notwithstanding, no Director, except the person who has the capacity of Managing Director whatever name this post may be given, will be able to contract on behalf of the Company nor represent it, except under express authority carried out in his favour by the Board of directors.

The representation of the Board of Directors will be extended to all the activities covered in the Company objective.

The re-election of the members of the Board will be carried out on the expiry of the term of each one of them.

Art. 31 Constitution of the Board and adoption of agreements

The Board will be validly constituted when there are present, or represented, at the meeting half of the members plus one. The representation

should be conferred to another Director, by written notice to the Chairman, for each session, with an indication of the voting intentions on each one of the matters which make up the Agenda.

The agreements will be adopted by majority among the Directors present and represented in the session.

Art. 32 Board meetings

The Board will meet when called by its Chairman. The convocation must be at least 5 days before the proposed date for the meeting.
The Board will hold at least four meetings annually.

The Chairman will be obliged to call a Board meeting when this is requested by Directors who represent at least a third of the Statutory Body.

When the meeting is called, the Agenda will be sent to the Board members, and the meeting will in any case remain open so that any Director can introduce into the discussion matters of interest for the Company.

Art. 33 Cooption

If during the term for which Directors have been nominated, vacancies arise, the Board will be able to cover these from among the shareholders until the next General Meeting takes place.

If the vacancy arises in the post of Chairman or Managing Director, the Board will be able to cover the vacancies and nominate, temporarily, a Chairman. It will also be able to appoint a Managing Director with the support of two thirds of the Board members. These appointments will remain in full effect until the next General Meeting.

Art. 34 Powers of the Board

The Board is invested with the fullest powers to administer, govern, and represent the Company in all the matters concerning the activities of the business without any limitations other than those reserved to the knowledge of the General meeting by the Law and the present Statutes. Consequently, it will be able to carry out both administrative acts and acts of rigorous control over all types of goods, securities and rights.

Among the powers conferred on the Board, the following are included not restrictively, but explicitly:

a) To carry out and sign correspondence, to withdraw daily and certified business, declared securities, parcels and charge amounts by postal giro.

b) To draw up and sign cheques to withdraw sums from any banks or companies, including the Bank of Spain and its subsidiaries, in which the

Company may have open current accounts.

c) To draw up, accept, endorse, pay, charge, trade, refer and discount commercial and financial letters of exchange. To guarantee commercial and financial letters of exchange.

d) To open current accounts, savings accounts and credit accounts, including with pledge or mortgage guarantee, and to use them, exercising any rights that belong to the Company. To agree, open, use and cancel credits and loans. To approve account statements. To open security boxes.

e) To make and withdraw deposits in cash and securities.

f) To buy, sell and trade all types of bills and securities.

g) To guarantee credit account policies and other trading operations.

h) To demand, receive and charge from all types of entities, official and private bodies, any amounts of money, interest and bills that may be owed to the Company.

i) To honour any amounts the Company may contract by way of receipts, invoices and letters of payment.

j) To buy and sell raw materials, expendables, materials and stocks.

k) To expedite and receive remittances of materials and stocks, give their approval and file the claims that arise against those who sent them until these are finally resolved.

l) To represent the Company to all types of Ministries, Under-secretaries, Directorate Generals and Authorities, Organisations, State Corporations, Autonomous Communities, Delegations, Councils and lesser Local Bodies, as well as EU organisations, submitting written documents, petitions and reports of any kind, making all appearances required and following all types of proceedings and processes to its ultimate conclusion. To collect in any public bodies quantities or subsidies which correspond or are granted to the Company.

m) To hire and fire Company staff, fixing their remuneration.

n) To intervene in any questions or incidents that arise for labour reasons, appearing at the courts and tribunals or defending themselves before them, to absolve positions, to fix, pay or receive indemnifications and to practise as may be appropriate in labour matters and in defence of the rights of the business.

ñ) To represent the Company before the Customs, railway or navigation companies and transport agencies, filing claims and making despatches of materials.

o) To attend and take part in tenders and competitions of the EU, the State, the Autonomous Communities, and Provincial, Municipal and other Corporations, entities or individuals of any works and supplies for public and private service, to make agreements and improve these, to make up and withdraw provisional and final deposits, to present proposals in accordance with the specifications, to make claims and complaints, to accept where appropriate the adjudication of what is offered on tender and pay its price.

p) To represent the Company before the Treasury and local fiscal authorities, providing any type of inspection, to make claims against the Administration against the tax bases fixed by the Treasury Office and, in general, against any administrative action of a fiscal nature that may affect the Company.

q) To initiate, follow and process to their eventual conclusion all types of proceedings against all types of Authorities and Offices of Public Administration and Economic-Administrative Tribunals, in all degrees and instances of the respective proceedings, conferring, where appropriate, powers on counsel and solicitors with all the faculties that it deems necessary.

r) To initiate, follow and process, as initiator and defendant, any type of civil, criminal, administrative or special proceedings, including process of voluntary jurisdiction, in all degrees and instances, with the ability to compromise, conciliate, desist, ratify and appeal, conferring powers on counsel and solicitors.

To intervene in suspensions of payments, bankruptcies and creditors meetings, exercising any rights that accrue to the Company as creditor.

s) To buy, sell, encumber, mortgage and dispose of all types of goods, assets and property, or negotiable securities, subscribing in the name of the Company the necessary public and private documents.

t) To meet at the setting up of civil or trading companies, or any entities or groups, approving Statutes or regulations, subscribing and issuing shares, company holdings, subscriptions or interests designating the persons that should occupy statutory bodies or accepting appointments made in its favour, and carrying out in general any acts that were necessary for the adequate constitution of the same.

u) To carry out any class of contract of any type or nature, civil, mercantile, administrative, etc. with any entity, organisation or person.

v) To represent the Company before the Mercantile Registry and the Property Registry, as well as before the Register of Industrial or Intellectual Property- and other national and international organisations related to the matter - and any Administrative Registry, initiating the processes which it deems suitable, requesting the appropriate registrations, refuting the ones made and filing any type of appeal.

w) To compromise on any type of goods, assets or property, and

rights.

x) To appoint one or more Director Generals, granting powers which are deemed appropriate.

y) To designate, in the name of the Company, Arbitrators in Arbitration of law or equity, endorsing their judgements, as well as to seek judicial information on the judgements in a manner in keeping with legal procedure.

Art. 35 Of the Chairman

It is the Chairman's duty to call the Board meetings and, when appropriate, of the Executive Committee, if there is one, to draw up, after previous consultation with the Managing Director - or with the Board member that, whatever his title, has received the powers delegated from the Board - the Agenda of the meeting, to oversee the sessions, to allow and withdraw the right to speak of the Board members and the people linked to the Company whose presence has been required, to close discussions, to submit to the vote any question under discussion and to proclaim the outcome of that vote.

The Chairman of the Board will also be Chairman of the General Meetings.

In his absence, one of the Vice-Chairmen will assume his duties.

Art. 36 Of the Managing Director

The Managing Director - whatever the title he holds - is the permanent holder of the functions of representation, government and administration of the Company, who will act under the direction and the agreement of the Board.

His powers will be defined in the delegation agreement that the Board adopts.

Art. 37 Of the Executive Commission

The board, through the agreement of, at least, two thirds of its members, will be able to delegate all or parts of its powers to one or more Executive Commissions.

Any Executive Commission constituted by the Directors named by the Board, will be able to establish the internal rules for its own operation and, among them, those relating to its convocation. So that the Executive Commission is considered validly called, the attendance at the meeting will be required of half of the members that make it up plus one.

Art. 37 bis Board Committees

1. The Board shall have an Auditing Committee. The board shall approve the regulations of this committee, determining its functions and

establishing the procedures that shall be necessary for their execution.

2. The Auditing Committee shall consists of at least three members, who shall be appointed by the Company Executive Board; the majority of the Committee members shall be external of the company.

3. Also, the Board shall appoint a Chairman from the external members of the committee. The chairman post shall not be held for a period longer than four years and each person may be re-elected once a year has passed after dismissal.

4. The Auditing Committee shall adopt decisions by an absolute majority of the participating members who are present or represented at the session.

5. The functions of the Auditing Committee shall be those resulting from the specific Regulation and shall at least include the following:

i) To inform at the General Shareholders Meeting of the questions the shareholders have raised in their competence.

ii) Proposal to the Board for the subjection, to the General Shareholders Meeting, of the appointment of the auditors of external accounts which are referred to in article 204 of the revised text of the Limited Company Law, approved by Royal Legislative Decree 1564/1989, on 22 December.

iii) Supervision of the internal auditing services should such a body exist within the Group of Companies.

iv) Knowledge of the process of financial information and of the Company internal control systems.

v) Relations with the external auditors to receive information regarding those matters which could put at risk the independence of these and any other related to the process of accounts auditing development, as well as those other communications envisaged in the legislation of accounts auditing and in the auditing techniques standards.

Art. 38 Of the secretary

The Secretary will be appointed by the Board without it being necessary for him to be a director.

It is his duty to oversee the books of the Company, to draw up the Minutes of the meetings that its associated bodies hold, and to carry out certifications, with the approval of the Chairman at the request of the legitimate party and to keep the general records.

The Secretary of the Board will also be the secretary of the General Meetings that the Company holds.

Art. 39 Remuneration of the Board

The Board will be remunerated by means of a payment for attendance at the meetings that the Board holds, without prejudice to the incomes that each one of its members might receive for work carried out. As for the level of this remuneration, this will be determined by accepted common practice.

CHAPTER VI

OF THE ANNUAL ACCOUNTS

Art. 40 General Provisions

The Directors of the Company will formulate, within the period three months from the end of the financial year, the annual accounts, the management report, and the proposed distribution of profits. They will also present the accounts and management report consolidated with respect to the subsidiaries of Construcciones y Auxiliar de Ferrocarriles, S.A., as established in the Commercial Code.

The annual accounts will include a Balance Sheet, the Profit and Loss Account and the Directors' report. To this is added the management report.

Art. 41 Final documentation which is submitted to the Ordinary General Meeting

The documents that will have to be at the disposal of the shareholders after the convocation of the General Meeting will be the Director's report, the Balance Sheet, the Profit and Loss Account, the proposed distribution of profits, the management report and the auditors' report.

Any shareholder will be able to ask for a copy of these documents, which the Company shall have to provide him, at the former's expense. In the convocation mention will be made of this right.

Art. 42 Approval of the accounts

The Ordinary General Meeting will approve the accounts or will introduce to them the changes that it deems appropriate, being decided by a majority vote among voting shares whose holders are present or represented.

Art. 43 Distribution of profits

The Company profits, determined in accordance with the Limited Company Law and the Corporation Tax Act, will be distributed in agreement with the following distribution:

1 Endowment to legal reserves, until it reaches its legal limit.

2 Constitution of a voluntary reserve.

3 Endowment for the payment of dividends.

The Board may agree to the payment of an interim dividend, in compliance with the Law.

4 The remuneration of the Board will constitute an expense to the

business.

CHAPTER VII

OF THE DISSOLUTION AND LIQUIDATION

Art. 44 Causes of dissolution

The Company will only be dissolved by the causes which are legally stipulated. The General Meeting will designate the liquidators always in odd numbers.

CHAPTER VIII

ACCEPTANCE OF THE STATUTES, DISAGREEMENTS AND AUTHORITY

Art. 45 Authority

The shareholders are subject to the present Statutes and the differences which might arise between them and the Company will be resolved in the first General Meeting that the Company holds, with the exception of the right of the shareholders to jurisdictional protection. The claimants will write their causes to the Board of Directors or, if appropriate to the liquidators, so that the General Meeting might rule on the claim, always with the exception of the right to the effective protection of judges and courts.

For any disagreement between the shareholders and the Company, with express renunciation to any other authority to which they could correspond, they are both subject to the courts and tribunals of the head office.

TRANSITORY PROVISIONS

First. Until the moment in which that established in the first additional disposition, 5, in the revised text of Company Law is fulfilled, with respect to the representation of shares by means of annotations in account, the following dispositions will be effective:

1. The shares will be bearer and numbered, cut from a registry book, signed by the Directors and dry sealed with the Company seal. These signatures can be made by mechanical printing, in the terms established by the Law.

2. Multiple comprehensive shareholdings can be registered with many shares in each one, with their corresponding number, which will be broken down, at the request of the interested parties, into as many titles as shares represented.

3. In the title of the share the capital sum paid will always be indicated or an indication shall be made that it has been completely paid up.

4. In the event that they are not fully paid, the shares will be nominative until they are fully paid, after which they will convert into bearer shares. While the shares are nominative, they will be represented by provisional vouchers on which will be indicated the full names, or company name of the title-holder as well as those above-mentioned legal requirements. These vouchers, consecutively numbered, will be written in a receipt ledger, in which will be noted subsequent transfers and the constitution of real rights over the shares.

Second. For the purposes foreseen in the second paragraph of Article 21 of the Statutes, and until the first transitory disposition is in force, in order to exercise the right of attendance, the shareholder will have to deposit his shares at least five days before the General Meeting, in the head Office or in the organisations that are posted in the convocation announcement.

Third. As soon as it is thus established by the corresponding rules of development, the amortization of the titles currently existing will be carried out, and these will be substituted by annotations in account in the form and conditions established in the Law.

LEGITIMATION: I, JOSE LUIS MARTINEZ GIL, Notary of Madrid.---------- CERTIFY: That these printed statutes of the Company "CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES, S.A." (CAF) are those figuring in the documents authorised by the Madrid Notary, Mr. Jose Maria Alvarez Vega, on 27 June, 1990, numbered 4,050 of the protocol order; by me, on 26 February, 1990, with number 608 of protocol order; by the Ordizia Notary, Mr. Ignacio Pagola Villar, on 19 July, 1999, with number 1,121 of the protocol order; and by the Bilbao Notary, Mr. Jose Antonio Isusi Ezcurdia, on 21 July, 2003, with number 2,697 of the protocol order, which have been shown to me.----------

Madrid, on the twenty seventh of November of two thousand and three.

There follows the legitimating seal and illegible signature of Jose Luis Martinez Gil.

APPENDIX 8 - STANDARD FORM CV

Name	ALBERTO ALVAREDO ROMERO		
Current Employer	CAF		
Professional Qualifications	INGENIERO SUPERIOR		
Availability	YES		
Relevant Experience to the [Tram Supply Agreement]/[Tram Maintenance Agreement]			
Project	**Role and Responsibility (including identity of employer)**	**From**	**To**
SEVILLE TRAM	PROJECT ENGINEER	2003	2006
VELEZ MALAGA TRAM	PROJECT ENGINEER	2005	2006
MALAGA TRAM	PROJECT ENGENDER	2006	-

APPENDIX 8 - STANDARD FORM CV

Name	JOSE LIUS ARRIOLA TRUEBA
Current Employer	CAF
Professional Qualifications	INDUSTRIAL ENGINEER
Availability	YES

Relevant Experience to the [Tram Supply Agreement]/[Tram Maintenance Agreement]

Project	**Role and Responsibility (including identity of employer)**	**From**	**To**
FINLAND EMU	PROJECT MANAGER	1997	2000
SAO PAULO EMU	PROJECT MANAGER	1998	2001
RENFE DMU	PROJECT MANAGER	2001	2003
RENFE HS S/120	PROJECT MANAGER	2001	2003
BRUSSELS METRO	ENGINEERING DEPARTMENT MANAGER	2003	2006

APPENDIX 8 - STANDARD FORM CV

Name	JAVIER GANUZA
Current Employer	CAF
Professional Qualifications	INDUSTRIAL MECHANICAL ENGINEER ISO 9000/2002 CERTIFIED AUDITOR. SPECIFIC ISO QUALITY SYSTEM TRAINING COURSES RECEIVED.
Availability	COMPLETE

Relevant Experience to the [Tram Supply Agreement]/[Tram Maintenance Agreement]

Project	**Role and Responsibility (including identity of employer)**	**From**	**To**
LRVS FOR RT SACRAMENTO, CA, USA	CAF QA PROJECT MANAGER	2000	2003
BOGIES DMU´S FOR NORTHERN IRELAND	CAF QA PROJECT MANAGER	2003	2005
DMU´S INTER CITY CARRIAGES FOR IRELAND	CAF QA PROJECT MANAGER	2004	2006
BOGIES FOR METRO ROME, ITALY	CAF QA PROJECT MANAGER	2003	2006

APPENDIX 8 - STANDARD FORM CV

Name	IBON GARCIA
Current Employer	CAF
Professional Qualifications	BACHELOR SCIENCE IN INDUSTRIAL ENGINEERING
Availability	YES

Relevant Experience to the [Tram Supply Agreement]/[Tram Maintenance Agreement]

Project	**Role and Responsibility (including identity of employer)**	**From**	**To**
METROVIAS MAINTENANCE, BUENOS AIRES SUBWAY	MAINTENANCE MANAGER, CAF	1997	1999
CLASS 333, ARRIVA TRAINS	WARRANTY SERVICE MANAGER, CAF	1999	2001
INTERNATIONAL PROJECTS CAF	WARRANTY SERVICE MANAGER, CAF	2001	2004
INTERNATIONAL PROJECTS CAF	MAINTENANCE AND WARRANTY SERVICE MANAGER, CAF	2004	-

APPENDIX 8 - STANDARD FORM CV

Name	JOSE M. MUGURUZA DOMINGUEZ
Current Employer	CAF
Professional Qualifications	INDUSTRIAL ENGINEERING INDUSTRIAL ORGANIZATION QUALIFICATION
Availability	FULL AVAILABILITY

Relevant Experience to the [Tram Supply Agreement]/[Tram Maintenance Agreement]

Project	**Role and Responsibility (including identity of employer)**	**From**	**To**
67 CARRIAGES PUSH-PULL FOR IRISHRAIL (IRISH REPUBLIC)	PROJECT MANAGER	2003	2006

APPENDIX 8 - STANDARD FORM CV

Name	DAVID TAYLOR
Current Employer	CAF
Professional Qualifications	BTEC- ENGINEERING (MECHANICAL / MANUFACTURE), INSTITUTE OF MOTOR INDUSTRY- ASSOCIATE MEMBER (AMIMI) MINISTRY OF TRANSPORT- VEHICLE EXAMINER CAR, BUS, HGV.
Availability	AS DIRECTED BY CAF

Relevant Experience to the [Tram Supply Agreement]/[Tram Maintenance Agreement]

Project	**Role and Responsibility (including identity of employer)**	**From**	**To**
CAF 2900 DMU's Drogheda, Ireland.	CAF, Warranty engineer / modifications manager.	2003	Present
CAF 333 EMU's Leeds UK.	CAF, Warranty engineer / modifications manager.	2000	2003
CAF LAR (Lantau airport line) AEL and LAL EMU's, Hong Kong.	CAF, Warranty engineer / modifications manager.	1997	2000
CAF Beasain factory, Spain.	CAF, Mechanical engineer.	1995	1997
Landascar (Landrover, Suzuki) Madrid, Spain	Service / workshop manager	1993	1995

3. DRAWING LIST

- 2.050.033 - Albert type coupler
- Cab_desk_proposal_v0 – Cab desk panels
- L.00.480.00 – Motor Bogie Arrangement
- L.00.480.10 – Trailer Bogie Arrangement
- Q.00.072.11 - Capacity Calculation
- Q.00.072.12 - Roof Equipment Arrangement
- Q.00.072.20 - Saloon Lighting
- Q.00.072.28 - Flange Lubrication Mounting
- Q.00.072.45 - Horizontal Curve Inscription
- Q.00.072.46 - Vertical curve inscription
- Q.00.072.62 - Auxiliaries schematic - Car A-B
- Q.00.072.63 - Auxiliaries schematic - Car C
- Q.00.072.64 - Auxiliaries schematic - Car D-F
- Q.00.072.65 - Auxiliaries schematic - Car G-E
- Q.00.072.66 - High Voltage schematic - Car A-B
- Q.00.072.67 - High Voltage schematic - Car C
- Q.00.072.68 -High Voltage schematic - Car D-F
- Q.00.072.69 - High Voltage schematic - Car G-E
- Q.00.072.99 H1 - Bogie Shrouds E-F-C-A Cars
- Q.00.072.99 H2 - Bogie Shrouds E-F-C-A Cars
- Q.16.21.150 - Hydraulic Brake Schematic
- Q.16.87.020 - Cab Equipment Mounting GA Below Windscreen
- Q.19.42.001 - Articulation Arrangement
- Q.20.23.030 - Under-run Protection
- Q.22.00.291 - Stepping Distance

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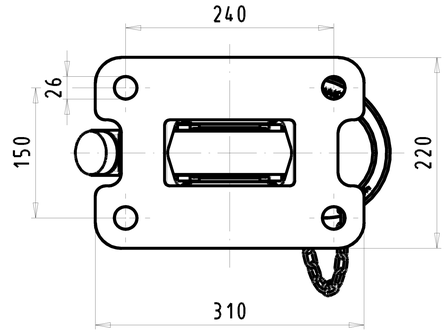
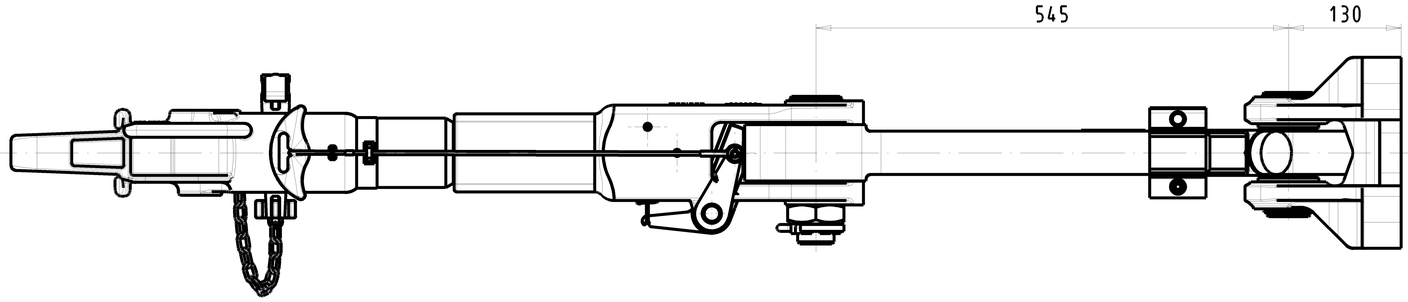
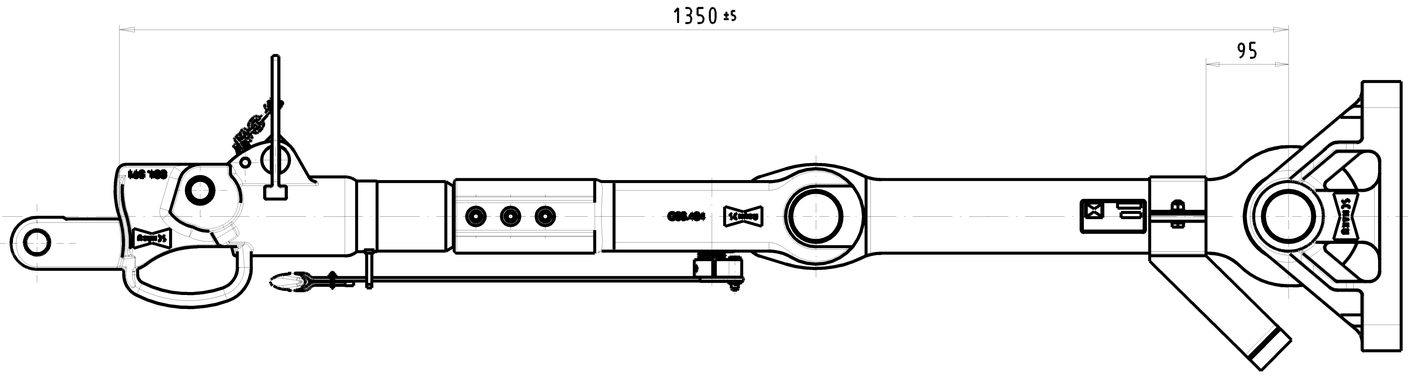
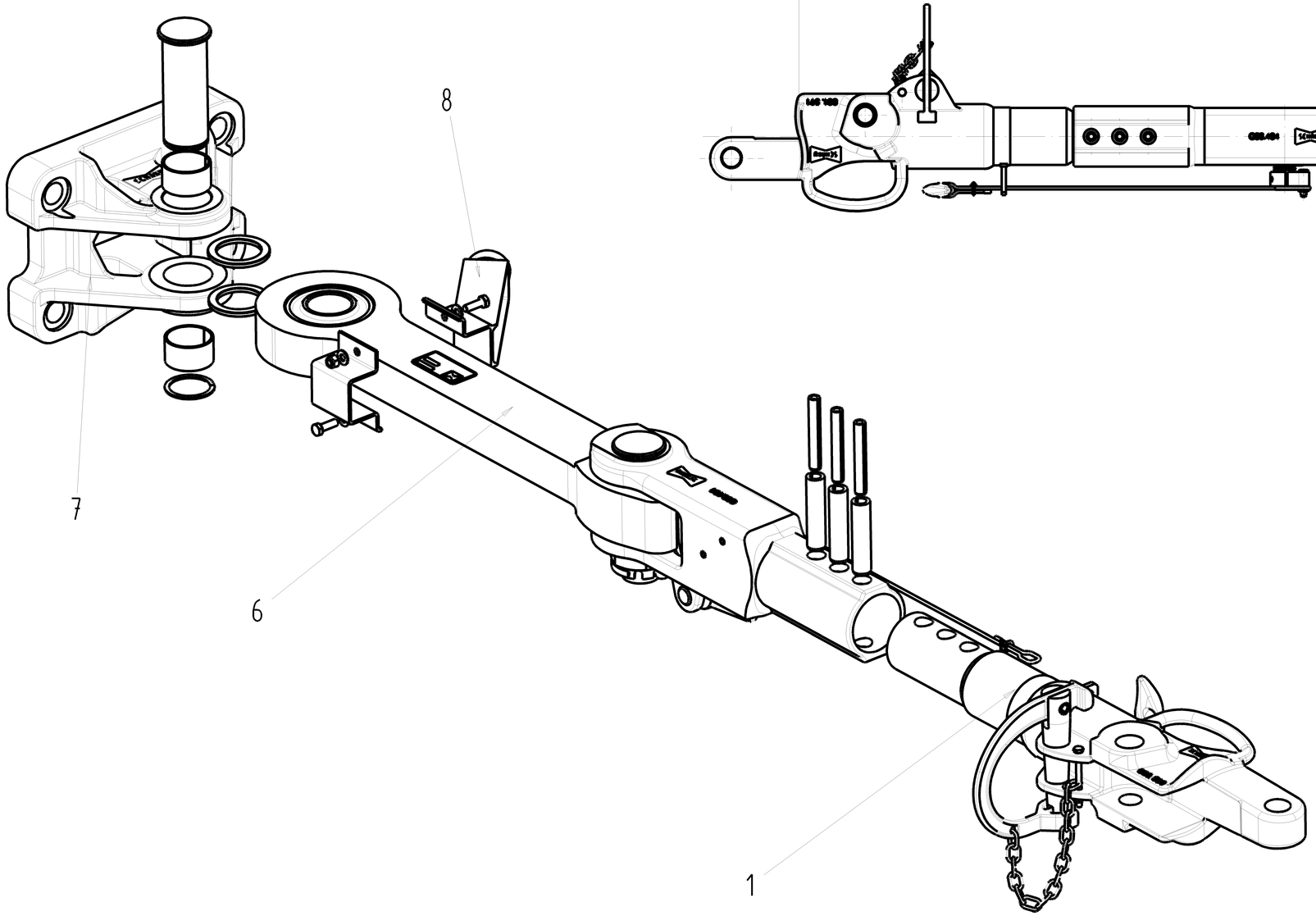
- Q.22.00.300 - Crane Lifting HVAC
- Q.22.00.301 - Pantograph Assembly. Resting Position Height
- Q.22.00.801 H1- Unit assembly (GA)
- Q.22.00.801 H2 - Unit assembly (GA)
- Q.22.00.810 - Cab Layout
- Q.22.00.811 - Cab exterior design
- Q.22.00.812 H1 - Driver Visibility
- Q.22.00.812 H2 - Driver Visibility
- Q.22.00.813 - Luggage Cupboard
- Q.22.00.814 - Luggage Cupboard
- Q.22.00.815 - Passenger Seat
- Q.22.00.816 - Passenger Information Displays and TFT Screens
- Q.22.00.817 - Weight Distribution Layout
- Q.22.00.818 - Night Partition Door
- Q.22.00.855 - Handholds
- Q.22.00.856 - Vehicle Cameras Layout
- Q.22.72.999 - TPDS Transponder Option For Assembly
- Q.22.93.101 H1 - Gauge Straight, R1000 & R2000
- Q.22.93.101 H2 - Gauge R25, R30, R40, R50 & R70
- Q.22.93.101 H3 - Gauge R90, R100, R200, R300 & R500
- Q.22.93.105 - DKE Tabular format

Use or disclosure of the proposal data is subject to the restrictions noted on the title page of this proposal









Schutzvermerk nach DIN 34 beachten.

ZEICHNUNG DARF NUR IM CAD-SYSTEM GEÄNDERT WERDEN

Verwendbar für:

Ausgabe
Datum

Allgemeintoleranzen

Oberflächen DIN ISO 1302

Maßstab 1:5 — 74,5 kg

					Datum	Name
A	058-903466	01.02	KEM	Bearb.	22.02.01	Kontetzki
B	058-903561	02.02	KEM	Gepr.	06.05.02	Lindner
C	058-903934	04.02	KEM	Norm.		
D	058-904040	04.02	KEM			

Zust. | Änderung | Datum | Name

Urspr.

Albertkupplung
coupler type "ALBERT"

980885

Scharfenbergkupplung GmbH Co. KG Salzgitter

2.050.033 — Blatt 01

CAD | IDNR 0904893 | 01 Bl.

Ers. f. | Ers. d.

DIN A2

EDINBURGH TRAM - CAB DESK PROPOSAL

Scope

This document is intended to identify the different elements that are to be implemented in the Cab desk for the new vehicles for the Edinburgh Tram.

For the location of these elements in the Cab desk, it has been followed the indications found in the ER's 3.2, Section 24 Trams, 24.14 Tram Controls:

The following controls shall be conveniently placed for the driver's free hand when the Tram is in motion:
First priority:

- *Audible warnings (bell, horn)*
- *Track brake (in addition to the emergency brake on the driver's controller)*
- *Indicators*
- *Pantograph emergency drop*

Second priority:

- *Manual sand (in addition to the automatic sanding system)*
- *Windscreen washer and wiper controls*
- *Headlamp dip/main beam*
- *Panic Alarm*
- *Tram punctuality display against timetable or headway*

The following controls shall be conveniently placed for use when the Tram is at a Tram stop:

- *Door controls*
- *Rear-view normal mode push-button*
- *Tram Ready To Start (junction calling when at a Tramstop close to the junction)*
- *Tram punctuality display against timetable or headway*
- *Hazard and marker lights*
- *Air-conditioning and temperature controls*
- *Saloon heating control*
- *Fault reset push-button*
- *Public Address controls*
- *Radio controls*
- *Cab light switch*
- *Saloon lighting*
- *Pantograph control*
- *Windscreen demister*

The following table shows the different cab controls and indicators, together with a brief description. The number associated to each component can be used to get a quick reference to the graphic information which can be found at the end of this same document, in order to facilitate its location within the Cab desk.

Nº	Elemento	Descripción
1	Alumbrado cabina	Pulsador mantenido con piloto. Activa/desactiva la iluminación de cabina. La lámpara del pulsador ilumina cuando la luz de cabina está apagada y se apaga cuando ésta se enciende.
	Cab light switch	*Illuminated pushbutton maintained action.* *Cab light connection/disconnection Pushbutton lamp is on when the cab light is switch off, and it is off when the cab light is switch on.*
2	Alumbrado pupitre	Pulsador mantenido con piloto. Activa/desactiva el encendido de las luces del pupitre y del panel de térmicos.
	Desk light switch	*Illuminated pushbutton maintained action.* *Connection/disconnection of the Desk and circuit breaker cabinet lights*
3	Conexión disyuntor	Pulsador no mantenido. Con pantógrafo arriba conecta el disyuntor.
	HSCB connection	*Pushbutton momentary action.* *HSCB connection with pantograph up.*
4	Desconexión disyuntor	Pulsador no mantenido. Desconecta el disyuntor.
	HSCB disconnection	*Pushbutton momentary action.* *HSCB disconnection.*
5	Subir pantógrafo	Pulsador no mantenido. Activa la subida del pantógrafo.
	Rise pantograph	*Pushbutton momentary action.* *Pantograph rise activation.*
6	Bajar pantógrafo	Pulsador no mantenido. Activa la bajada del pantógrafo.
	Lower pantograph	*Pushbutton momentary action.* *Pantograph down activation.*
7	Luneta térmica	Pulsador mantenido con piloto. Activa/desactiva la luneta térmica.
	Windscreen demister	*Illuminated pushbutton maintained action.* *Windscreen demister connection/disconnection.*
8	Arenero	Pulsador no mantenido. Acciona los eyectores de arena en los ejes delanteros según el sentido de marcha.
	Manual sanding	*Pushbutton momentary action.* *Sand ejector activation of forward direction axle.*
9	Alumbrado sala	Pulsador no mantenido con piloto. Activa/desactiva el encendido de la iluminación de la sala de pasajeros.
	Saloon light	*Illuminated pushbutton momentary action.* *Saloon light connection/disconnection*
10	Micrófono	
	Microphone	
11	Velocímetro	Velocímetro en Km/h y mph
	Speedomoter	*Speedometer in Km/h and mph*
12	Control limpiaparabrisas	Conmutador de 4 posiciones con pulsador. Acciona el limpiaparabrisas. Al presionar el conmutador hacia adentro, el motor de lava parabrisas produce vertido de agua en la luna. “0”: Reposo “INT”: Intermitente “1”: Velocidad lenta “2”: Velocidad rápida

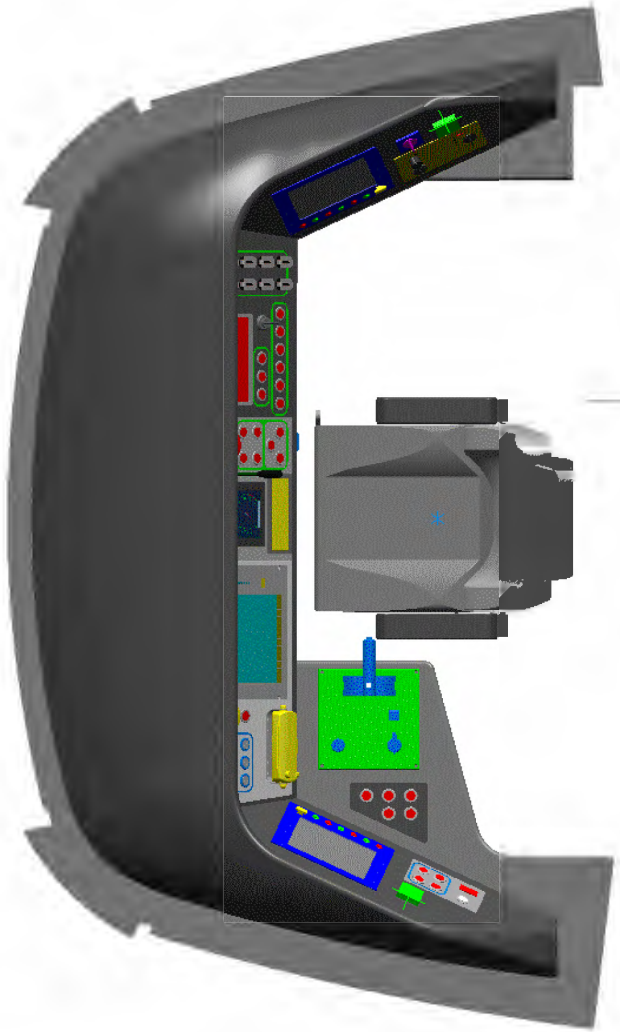
	Windscreen wiper control	*Selector switch – 4 positions + pushbutton momentary action.* *Windscreen wiper control:* *"0": Off* *"INT": intermittent activation* *"1": Continuous slow* *"2": Continuous fast* *"Push": Operates wipers and windscreen washers for as long as it is held down.*
13	Luces largas	Pulsador no mantenido con piloto. Activa/desactiva el encendido de las luces largas.
	Headlamp main beam	*Illuminated pushbutton momentary action.* *Headlamp main beam switched on/off*
14	Luces cortas	Pulsador no mantenido con piloto. Activa/desactiva el encendido de las luces cortas.
	Headlamp dip	*Illuminated pushbutton momentary action.* *Headlamp dip switched on/off*
15	Luces antinieblas	Pulsador mantenido con piloto. Activa/desactiva el encendido de las luces antinieblas traseras.
	Rear Fog light	*Illuminated pushbutton maintained action.* *Rear fog light switched on/off*
16	Activación Micrófono	Pulsador no mantenido. Al pulsar permite hablar por el micrófono.
	Microphone activation	*Pushbutton momentary action.* *Meanwhile it is pushed the microphone is enabled.*
17	Intermitente derecha	Pulsador mantenido con piloto. Activa/desactiva el encendido de las luces intermitentes derechas.
	Right direction indicator	*Illuminated pushbutton maintained action.* *Right direction indicator switched on/off.*
18	Luces de emergencia	Pulsador mantenido con piloto. Activa/desactiva el encendido de las luces intermitentes derechas e izquierdas.
	Hazard lights	*Illuminated pushbutton maintained action.* *Hazard lights switched on/off.*
19	Intermitente izquierda	Pulsador mantenido con piloto. Activa/desactiva el encendido de las luces intermitentes izquierdas.
	Left direction indicator	*Illuminated pushbutton maintained action.* *Left direction indicator switched on/off.*
20	Solicitud de parada	Piloto. Aviso de solicitud de parada.
	Passenger stop	*Indicator.* *Passenger request stop.*
21	Solicitud de parada PMR	Piloto. Aviso de solicitud de parada PMR.
	Disable Door Request	*Indicator.* *Disabled door request stop.*
22	Aviso HM	Piloto. Aviso de hombre muerto.
	Dead man indicator	*Indicator.* *Dead man indicator.*
23	Indicador Bypass actuado	Piloto. Aviso de que algún bypass ha sido actuado.
	Active bypass indicator	*Indicator.* *Some bypass switch activated.*
24	Piloto fallo freno	Piloto. Aviso de fallo de freno.

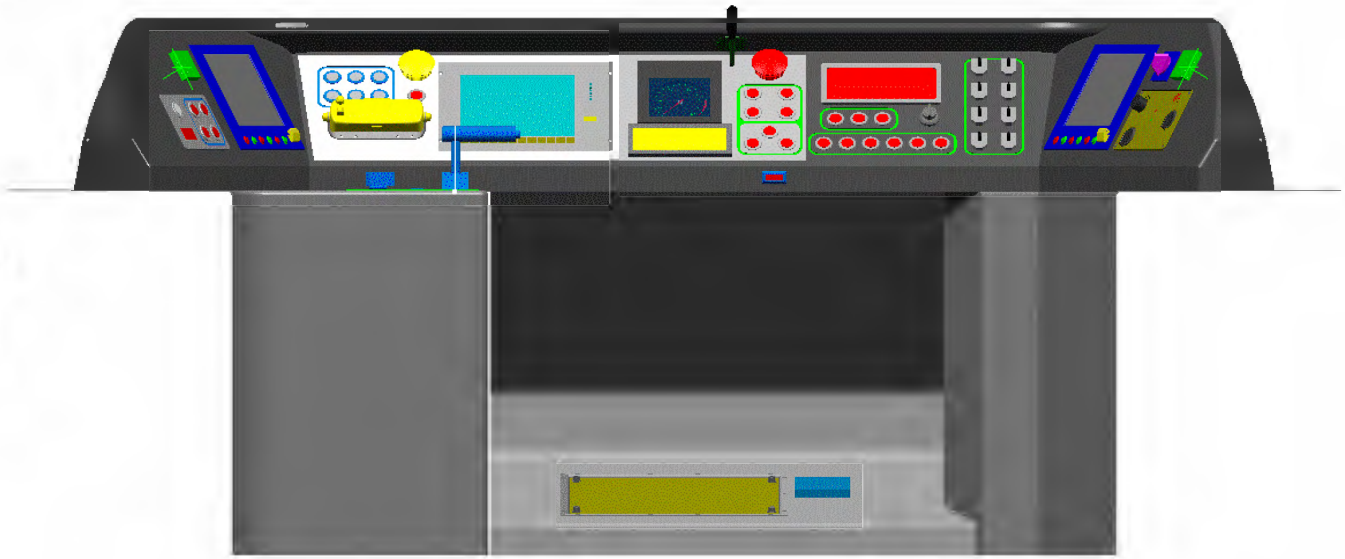
	Brake failure indicator	*Indicator.* *Brake failure indicator.*
25	Terminal Bus Tracker	
	Bus Tracker	
26	Pantalla TPDS	Incluye los siguientes controles: - 'Points' controls: 3 botones pulsadores para control de agujas de vía. - Tram Ready to Start: 1 botón pulsador Se asume que integra el indicador de puntualidad
	TPDS Monitor	Including the following controls: - 'Points' controls: 3 push buttons - Tram Ready to Start: 1 push button Assumed integrated Tram Punctuality Display
27	Terminal de Cabina (TCMS)	Terminal de control 'SICAS', CCTV.... Incluidas las siguientes funciones: - Cuentakilómetros - Index-point: Pulsador que permite al conductor añadir un index-point en las imágenes que se están grabando - Reset de fallos: Pulsador para resetear los fallos
	Tram Control monitor	*Tram control monitor (SICAS, CCTV…)* *Comprise the following functions:* - *Odomoter* - *Index-point: to enable the driver to add and index-point to the recorded images* - *Fault reset: To reset all faults*
28	Freno de emergencia	Seta (roja). Aplicación directa del freno de urgencia.
	Emergency brake	*Mushroom head pushbutton(red).* *Emergency brake activation.*
29	Habilitación de puertas derechas	Pulsador no mantenido con piloto. Habilitación de las puertas del lado derecho.
	Right door release	*Illuminated pushbutton momentary action.* *Right door release.*
30	Habilitación de puertas izquierdas	Pulsador no mantenido con piloto. Habilitación de las puertas del lado izquierdo.
	Left door release	*Illuminated pushbutton momentary action.* *Left door release.*
31	Apertura de puertas	Pulsador no mantenido con piloto. Permite abrir las puertas que previamente hayan sido habilitadas.
	Central door open	*Illuminated pushbutton momentary action.* *Central opening of previously released doors.*
32	Cierre de puertas	Pulsador no mantenido con piloto. Permite cerrar las puertas que previamente hayan sido abiertas.
	Central door close	*Illuminated pushbutton momentary action.* *Central closing of all opened doors.*
33	Apertura puerta simple cercana a cabina.	Conmutador de tres posiciones (izquierda, derecha y reposo) no mantenido. Permite abrir la puerta simple adyacente a cabina del lateral adecuado de la cabina habilitada.
	Cab door open/close selector	*Spring-loaded centre-off selector switch – 3 positions (left, right and centre).* *To allow to open and close nearside single door of the enable cab.*

34	Bypass habilitación puertas	Conmutador dos posiciones. Bypass de permiso de habilitación de lateral de puertas. Este conmutador debe estar colocado en otro lugar al del control de puertas, con el resto de bypasses.
	Door release bypass	*Selector switch – 2 positions* *Door side release bypass.*
35	Radio	
	Radio	
36	Modo degradado PWM	Conmutador. Selector 2 posiciones de modo de conducción en caso de fallo de la señal PWM - Normal - Degradado
	PWM degraded mode	*Selector switch – 2 positions.* *Driving mode selection in case of PWM signal failure.* - *Normal* - *Degraded*
37	Modo EMERGENCIA	Conmutador de dos posiciones. Para continuar la marcha ante el fallo del sistema de control del tranvía.
	EMERGENCY mode	*Selector switch – 2 positions.* *To allow the ride in case of tram system control failure*
38	Bypass VELOCIDAD CERO	Conmutador de dos posiciones. Bypass de velocidad cero.
	ZERO VELOCITY Bypass	*Selector switch – 2 positions.* *Bypass of the zero velocity signal.*
39	Bypass HOMBRE MUERTO	Conmutador de dos posiciones. Bypass de hombre muerto.
	DEAD MAN Bypass	*Selector switch – 2 positions.* *Zero velocity signal bypass.*
40	Bypass LAZO TRACCION	Conmutador de dos posiciones. Bypass de Lazo de Tracción.
	TRACTION LOOP Bypass	*Selector switch – 2 positions.* *Traction loop bypass.*
41	Bypass LAZO SEGURIDAD	Pulsador no mantenido con piloto. Bypass que permite rearmar el lazo de seguridad de puertas en el tranvía desde la cabina habilitada.
	SECURITY LOOP Bypass	*Illuminated pushbutton momentary action.* *Doors security loop bypass.*
42	Voltímetro	Pantalla. Voltímetro digital. Mide la tensión en la batería.
	Voltmeter	*Display.* *Digital voltmeter. Show battery voltage.*
43	Prueba de Lámparas	Pulsador no mantenido. A utilizar por el personal de mantenimiento. Enciende todos los pilotos del pupitre.
	Indicator lamp test	*Illuminated pushbutton momentary action.* *Focus on maintenance screw. Switch on all desk indicators.*
44	Zumbador	Zumbador. Aviso sonoro Hombre Muerto (HM). Aviso sonoro de que todas las puertas están cerradas y se dispone de tracción.
	Buzzer	*Buzzer.* *Dead man audible warning.* *All doors are closed and traction is available audible signal.*

45	Panel de mando HVAC	Panel de mando del aire acondicionado. Tendrá los siguientes controles: - Conmutador 3 posiciones (off, ventilación baja, ventilación alta) - Selector de la temperatura de la cabina propia - Conmutador ON/OFF cabina contraria - Conmutador 4 posiciones (off, ventilación, automático y calefacción) - Piloto de avería - Piloto de conexión
	HVAC command panel	*HVAC command panel with the following controls:* *- 3 position selector switch (off, low ventilation and high ventilation)* *- Temperature regulator for cab in use* *- Selector switch – ON/OFF for the other cab.* *- 4 position selector switch (off, ventilation, automatic and heating)* *- Connection and failure telltale.*
46	Desconexión Manual	Pulsador no mantenido. Inicia la secuencia de apagado del tren.
	Manual disconnection	*Pushbutton momentary action.* *To start with the train shutdown*
47	Conjunto manipulador	El conjunto manipulador incorpora las siguientes funciones: - Llave habilitación cabina: Para habilitar la cabina y tomar el mando, hay que introducir la llave y accionar el switch. - Inversor de marcha: Selector de 3 posiciones (AD: marcha hacia delante; 0: Neutro; AT: Marcha hacia atrás) - Pulsador marcha atrás: Pulsador precintado para habilitar la marcha atrás. - Palanca manipulador: • Tracción y freno • Freno emergencia • Maniobra a velocidad reducida • Pulsador de hombre muerto
	Combined Controller	*The controller has the following functions:* *- Key lock switch: To cab enable.* *- Direction controller: Forward direction* *Reverse direction* *- Reverse direction pushbutton.* *- Controller handle:* • *Traction and brake* • *Emergency brake* • *Low speed mode* • *Dead man safety device*
48	Bocina	Pedal
	Horn	*Pedal*
49	Timbre	Pulsador no mantenido
	Bell	*Pushbutton momentary activation*
50	Monitores CCTV	2 monitores TFT de 10,4''
	CCTV monitors	*Two 10,4'' TFT screens*
51	Cargador de radio portátil	Enchufe de 230 V
	Portable radio charging point	*230 V charging point*
52	Cargador de máquina de billetes	Enchufe de 230 V

	Hand-held ticket machine charging point	*230 V charging point*
53	Modo visualización espejos retrovisores	Pulsador no mantenido. Para forzar el cambio de modo de visualización de 'Tram stop' a 'Nomal mode' mientras el tranvías está parado. Cambia la imagen mientras el pulsador está sostenido.
	Rear view mode	*Pushbutton momentary action.* *Changeover facility from 'Tram stop' to 'normal mode' for as long as it is held down.*
54	Selector OnStreet-OffStreet	Conmutador 2 posiciones. Permite seleccionar el tipo de iluminación del tranvía.
	OnStreet-OffStreet mode selection	*Selector switch – 2 positions.* *To allow the selection of the tramway illumination mode.*
55	Emergencia pantógrafo	Seta amarilla. Bajar el pantógrafo en caso de emergencia.
	Pantograph emergency drop	*Mushroom head pushbutton(yellow).* *Pantograph emergency drop.*
56	Señal "Panic Alarm"	Piloto de aviso de que el inspector se encuentra en problemas. Dispone de dos modos de señalización según la categoría de la situación de peligro.
	Panic Alarm	*Visual alarm to indicate that the inspector is experiencing difficulties. There are two signalisation modes depending on the emergency situation grade.*
57	Pulsador Calientapiés	Pulsador mantenido con piloto. Activa/Desactiva la resistencia calientapiés.
	Foot-warmer control	*Illuminated pushbutton maintained action.* *Foot-warmer connection/-disconnection.*
58	Fallo automáticos cabina	Piloto luminoso. Indica si algún magnetotérmicos que protegen la alimentación de los circuitos de habilitación cabina y conexión batería, está abierto.
	Cab enable circuit breaker opened	*Indicator.* *Enable cab or connection battery circuit breaker is opened.*





DRIVER´S DESK EQUIPMENT DISPOSITION

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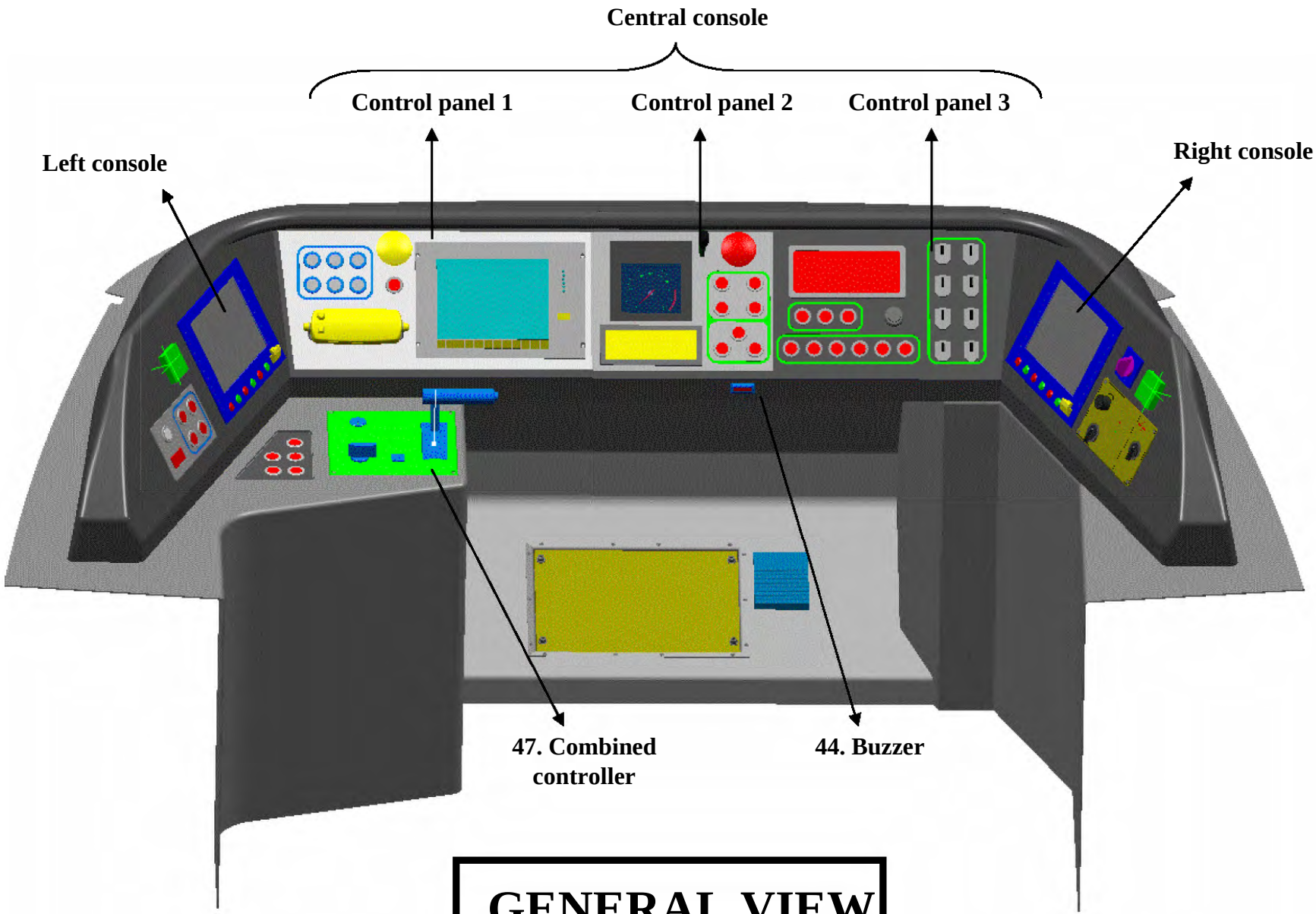

GENERAL VIEW

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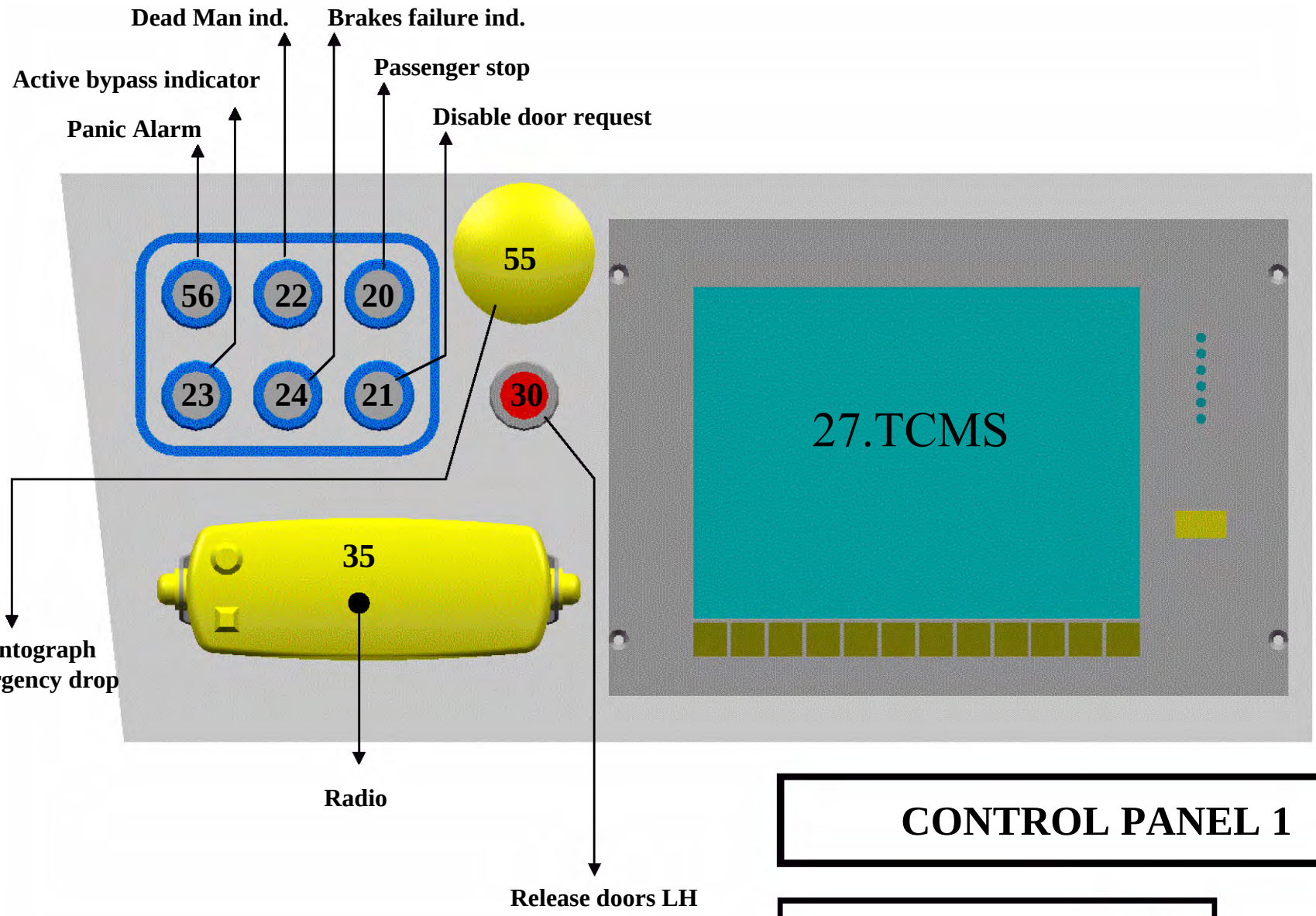


CONTROL PANEL 1

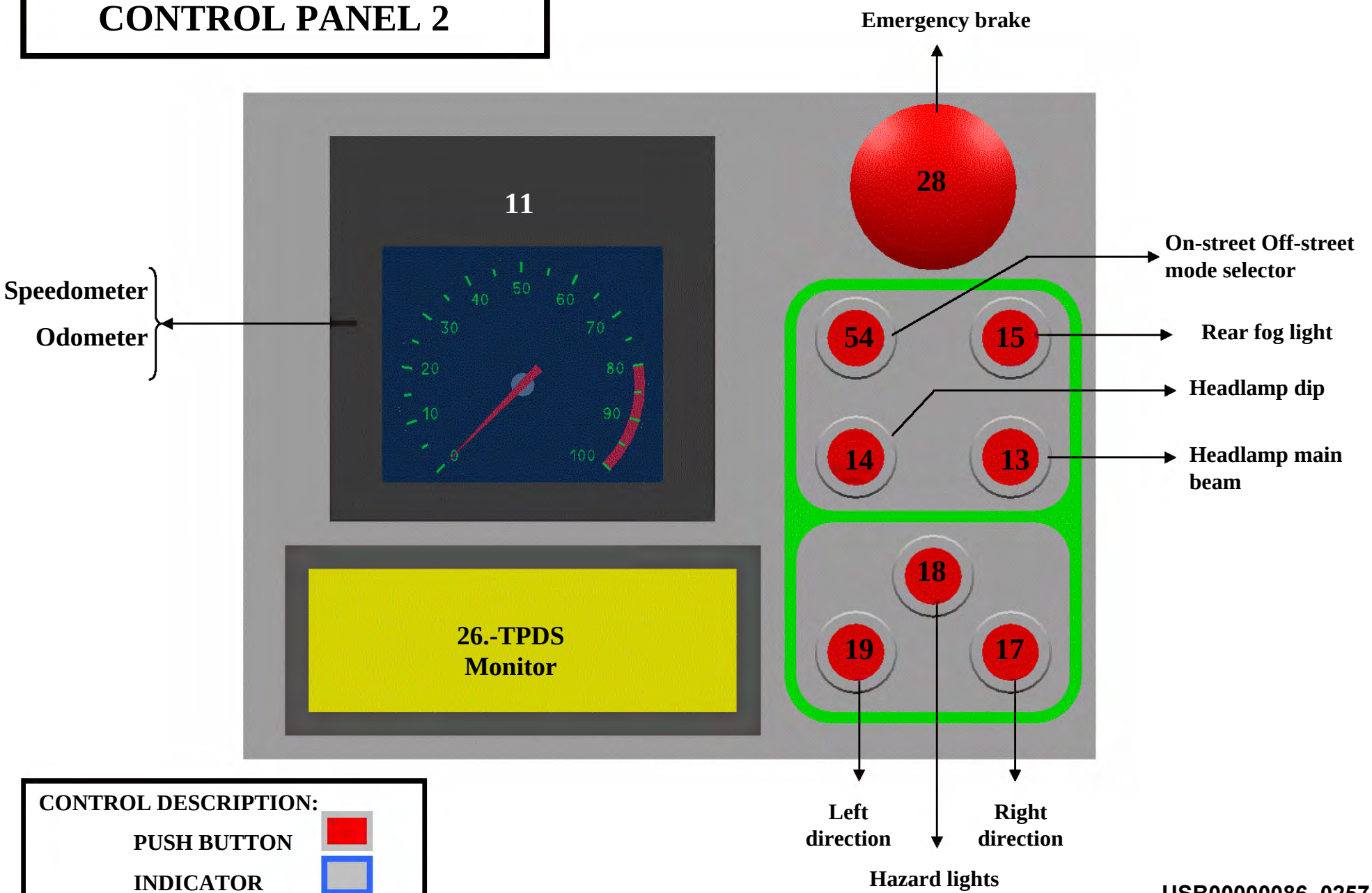
CONTROL DESCRIPTION:

PUSH BUTTON

INDICATOR

USB00000086_0256

CONTROL PANEL 2

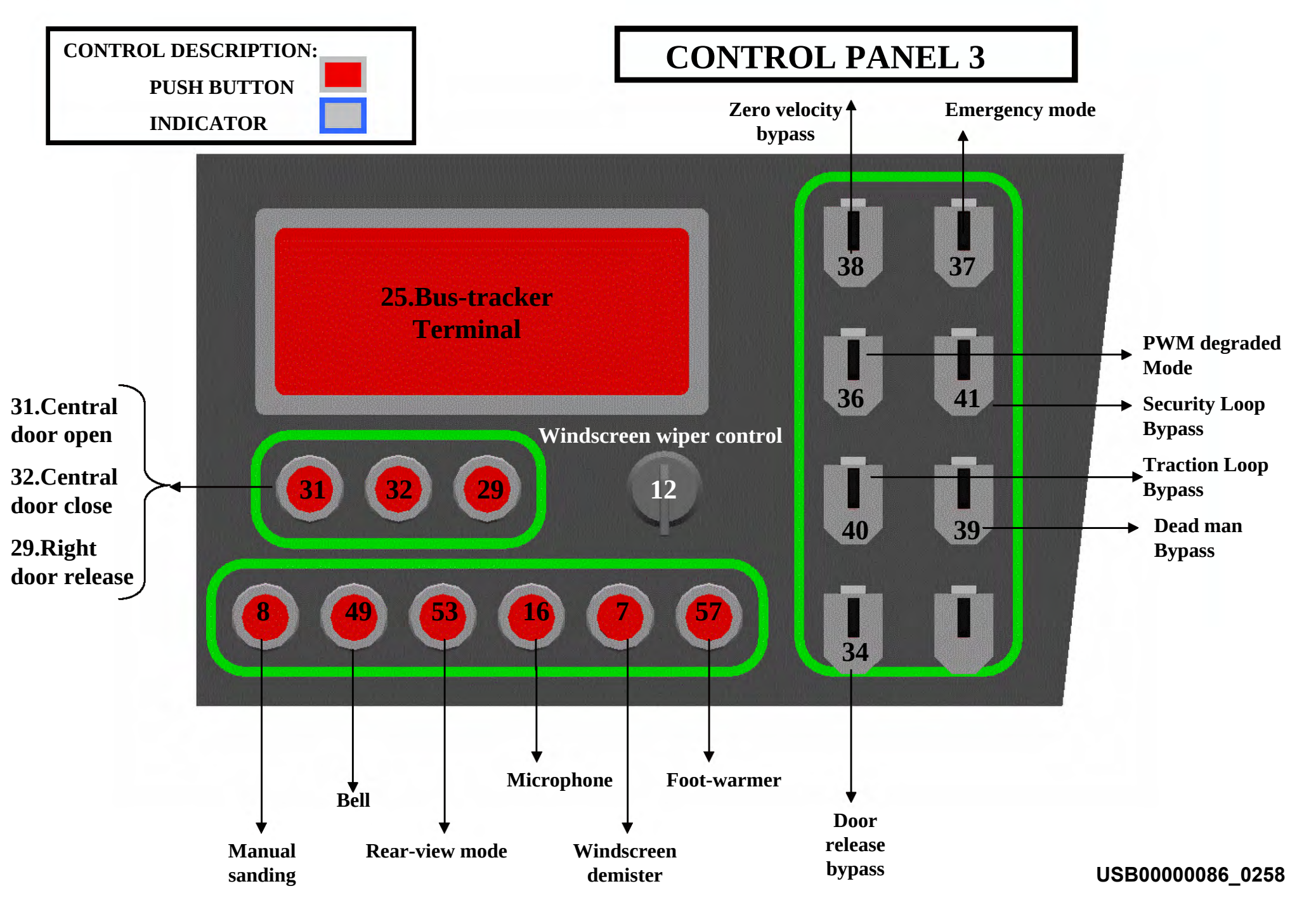


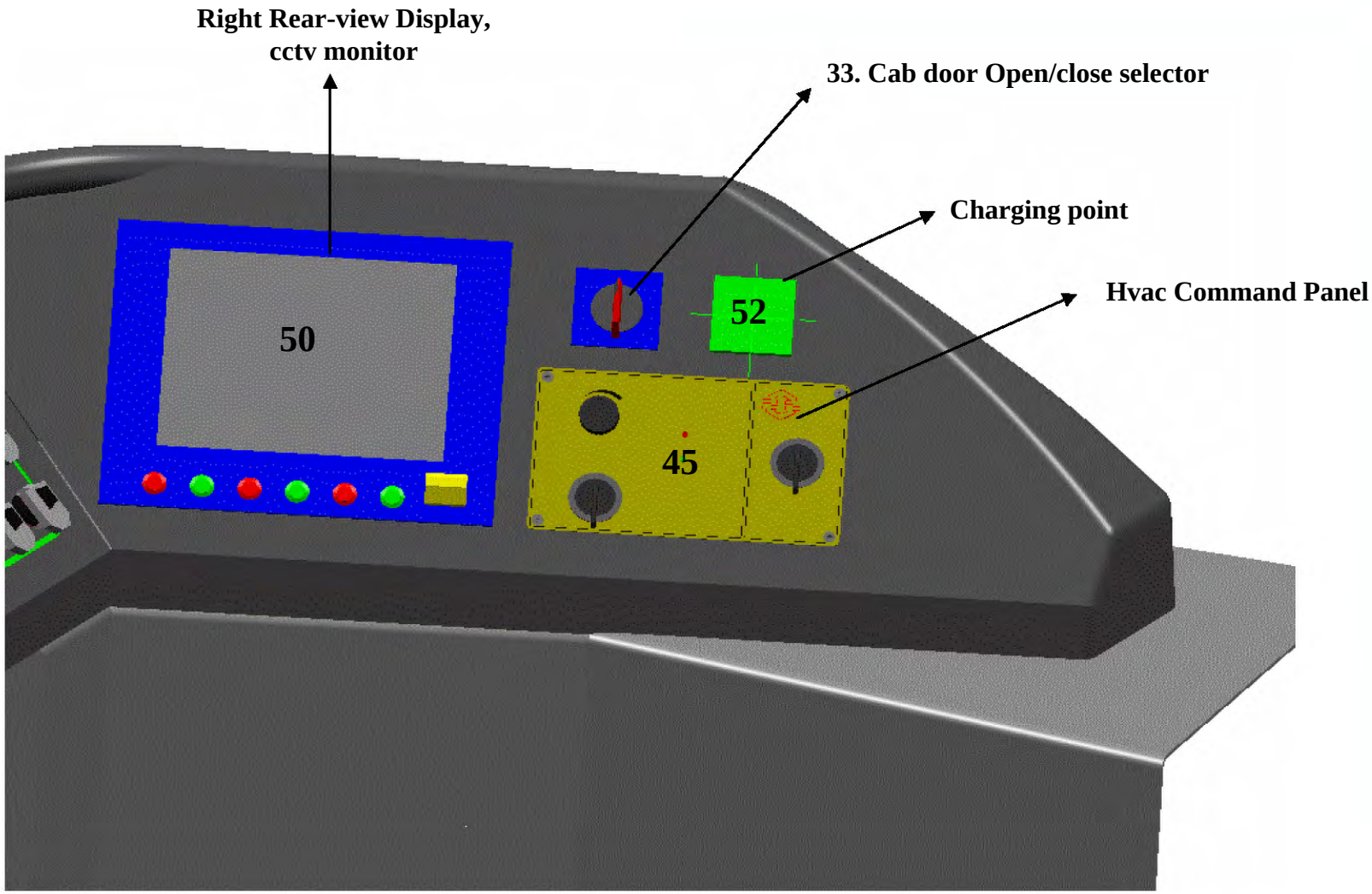
CONTROL DESCRIPTION:

PUSH BUTTON

INDICATOR

USB00000086_0257


CONTROL DESCRIPTION:
PUSH BUTTON
INDICATOR
CONTROL PANEL 3
Zero velocity bypass
Emergency mode
25.Bus-tracker Terminal
38
37
36
41
40
39
34
PWM degraded Mode
Security Loop Bypass
Traction Loop Bypass
Dead man Bypass
Windscreen wiper control
12
31
32
29
31.Central door open
32.Central door close
29.Right door release
8
49
53
16
7
57
Manual sanding
Bell
Rear-view mode
Microphone
Windscreen demister
Foot-warmer
Door release bypass
USB00000086_0258



RIGHT CONSOLE

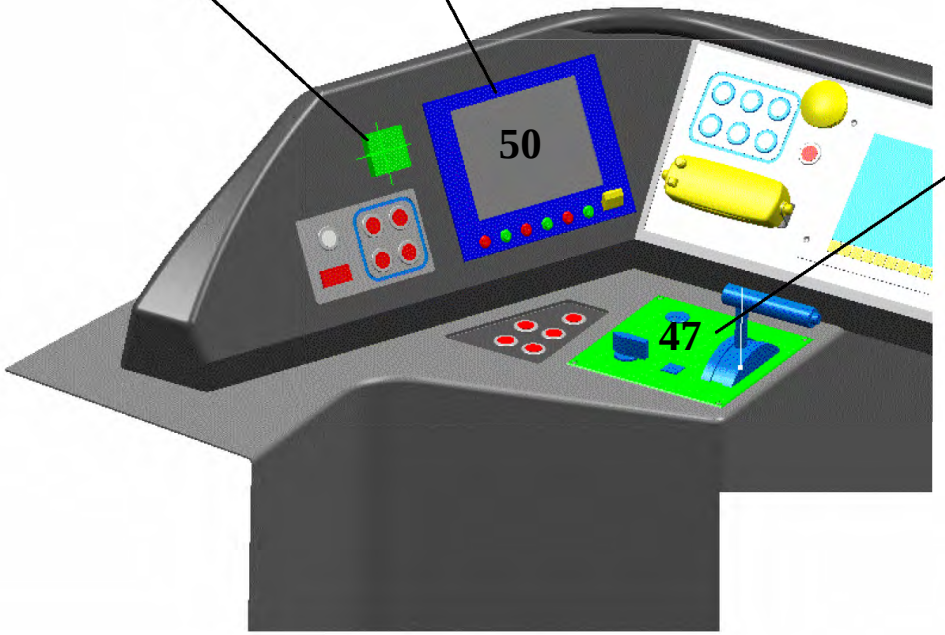
USB00000086_0259

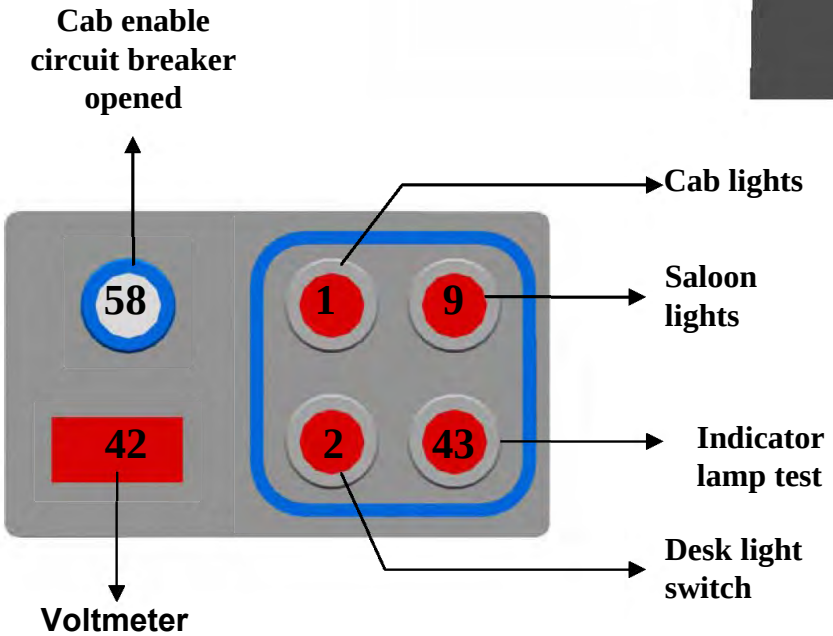
LEFT CONSOLE

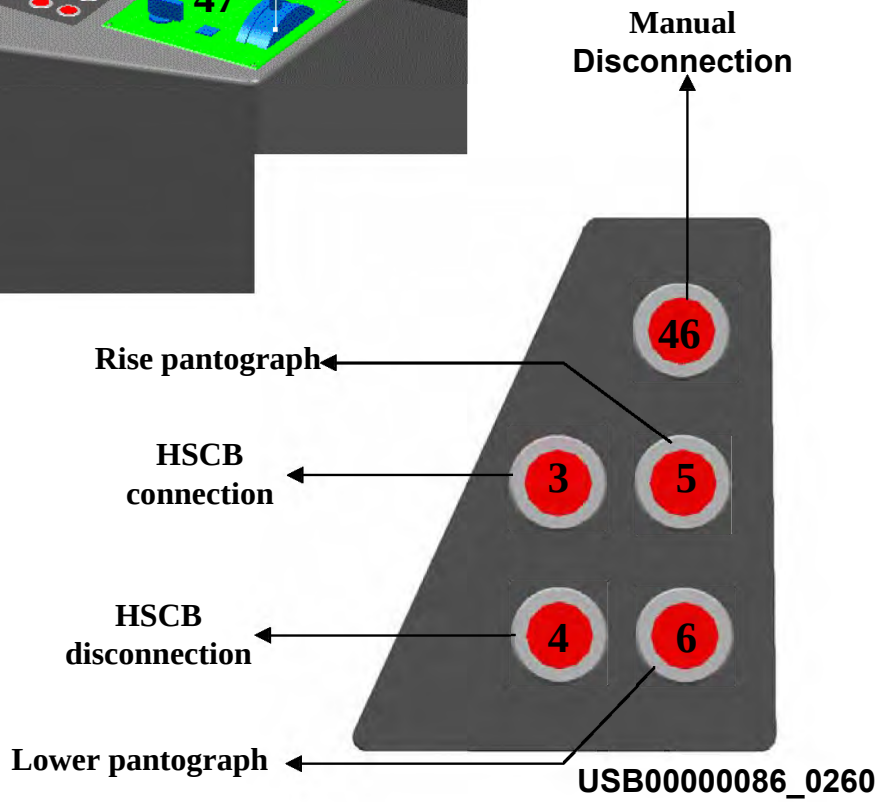
CONTROL DESCRIPTION:

PUSH BUTTON

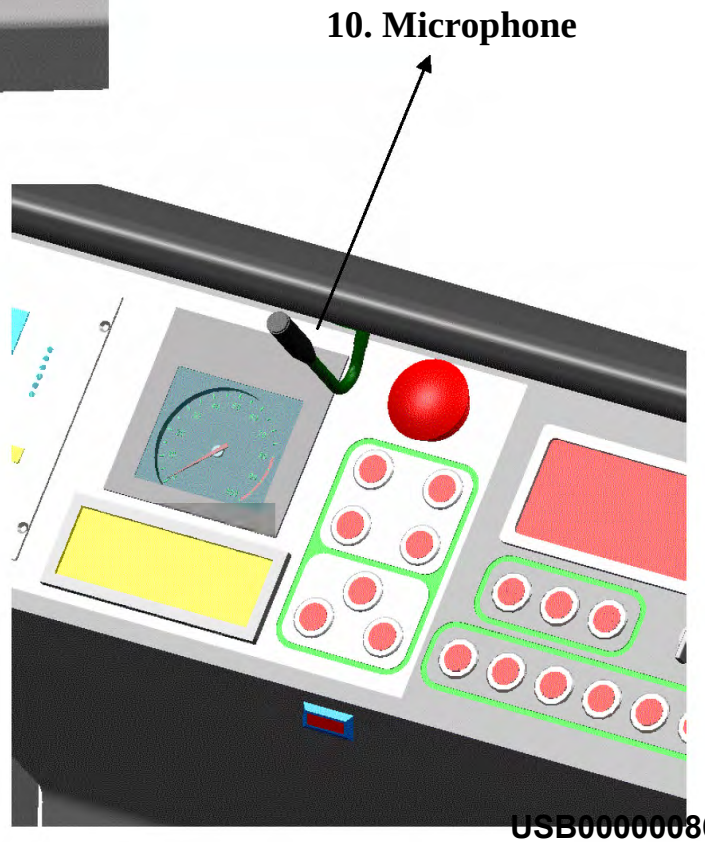
INDICATOR





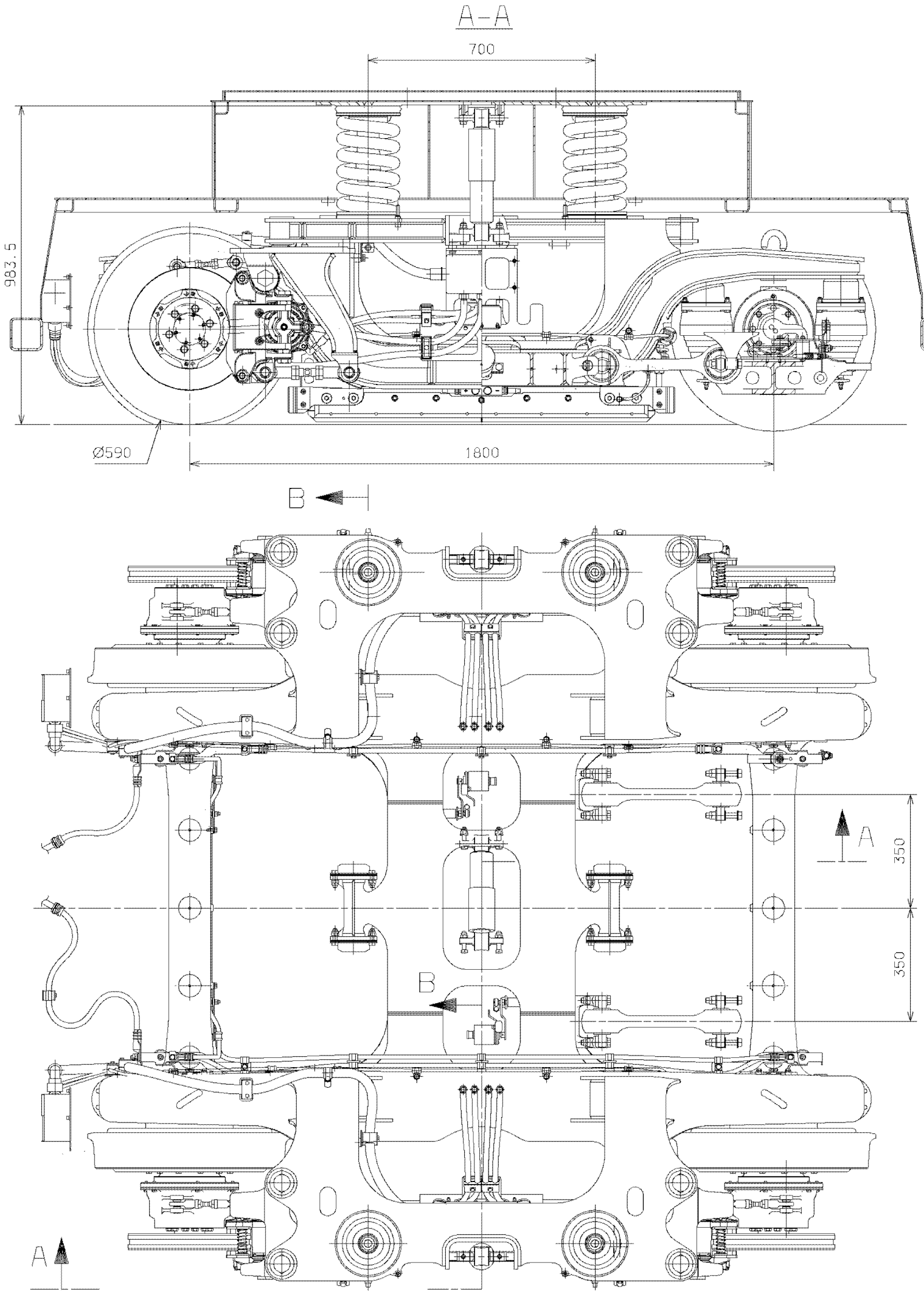


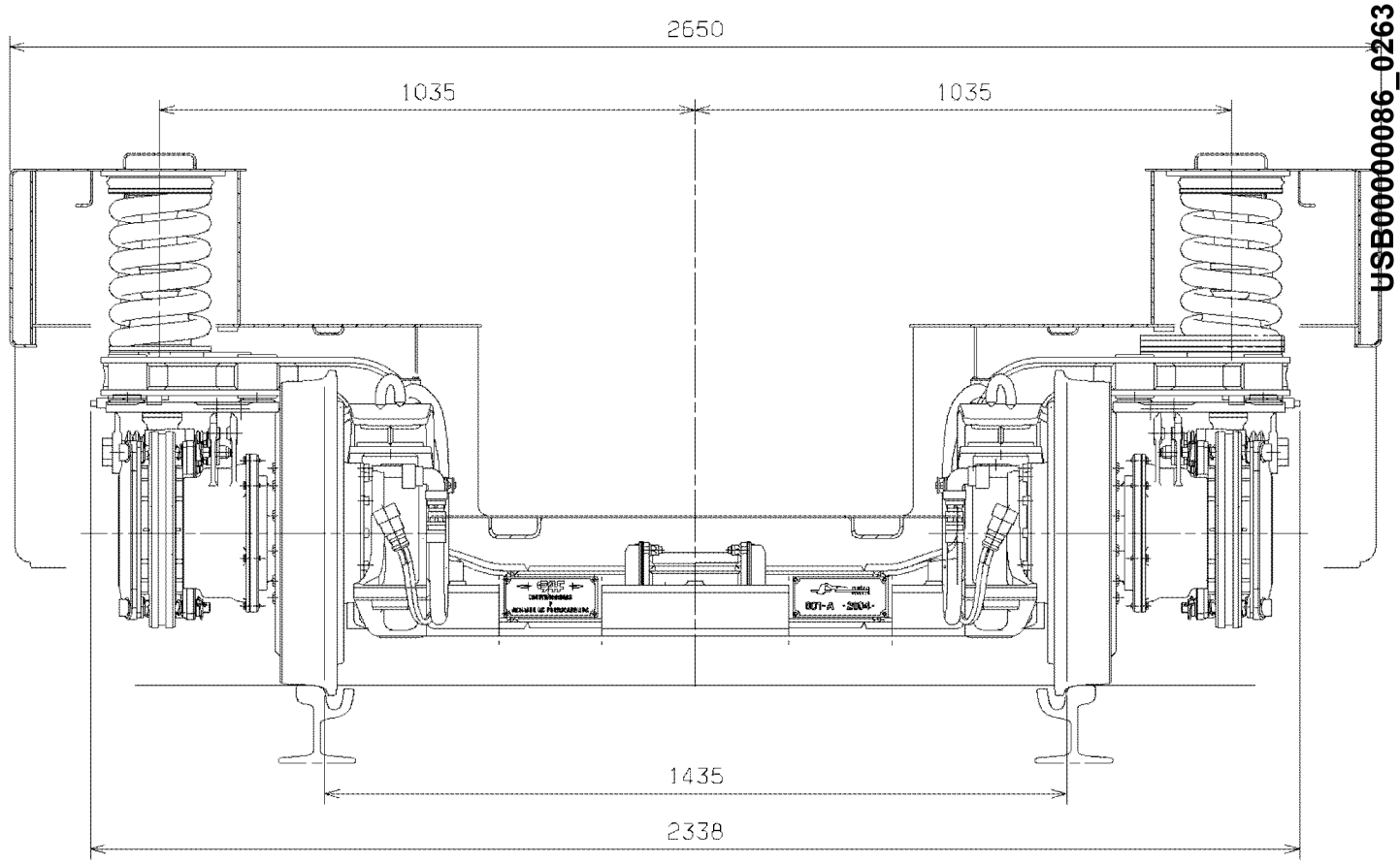


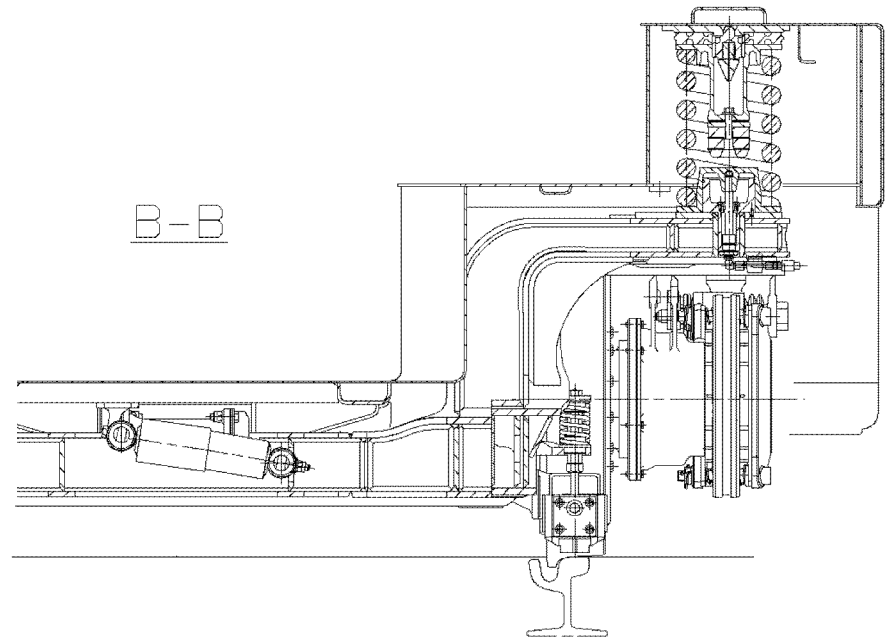


USB00000086_0261

| MODIFICACIONES | | |







MODIFICACIONES				
	FECHA	NOMBRES		
COMPR.			PLANO N°	
VERIFIC.				
HOMOL.				
			SUSTITUYE A:	EDICION
TOL. GEN.	ESCALA		DESIGNACION:	HOJA N° 1
NF F 00-037	1/10		TRAILER BOGIE ARRANGEMENT	N° DE HOJAS 1
APLICACIONES	FECHA	NOMBRES	ENTIDAD: CAF-BEASAIN	
DIBUJ.	26-09-06		REFERENCIA: L.00.480.10	
VERIFIC.	26-09-06			
TRAMWAY EDINBOURGH	SUSTITUYE A :			EDICION

USB00000086_0263



TOTAL AREA=42.[illegible]m²

PACKS AREA=1.2IX6=7.62m²

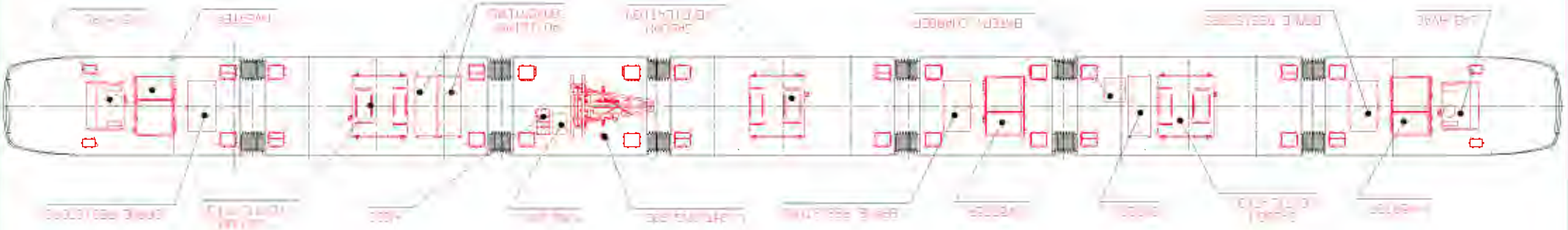
	[illegible]	[illegible]	[illegible]	[illegible]
Standing	168	[illegible]	[illegible]	237
Seated	[illegible]	[illegible]	[illegible]	[illegible]
TOTAL	248	[illegible]	332	417

CAPACITY

CAP-BERGAIN

USB00000086_0264







USB0000086_0265

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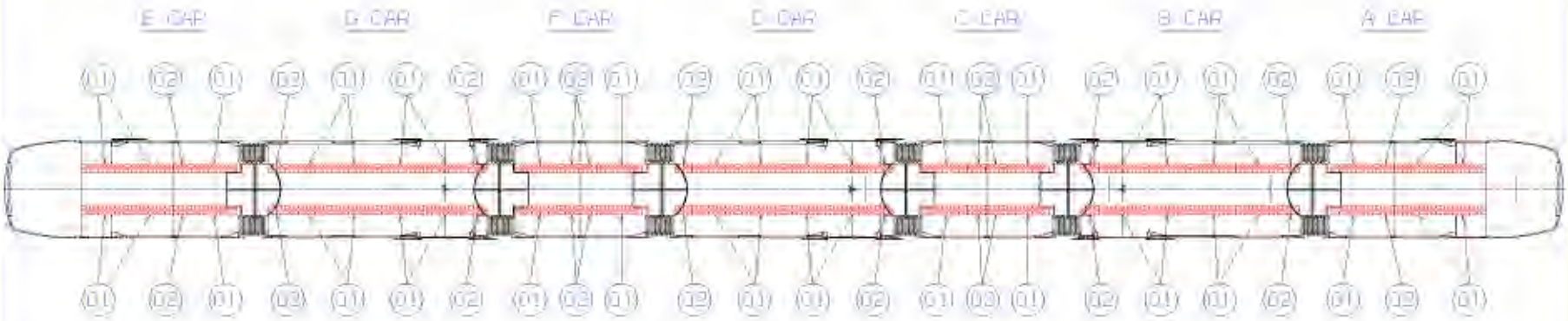


(01) 36W lighting; total length 1200mm.

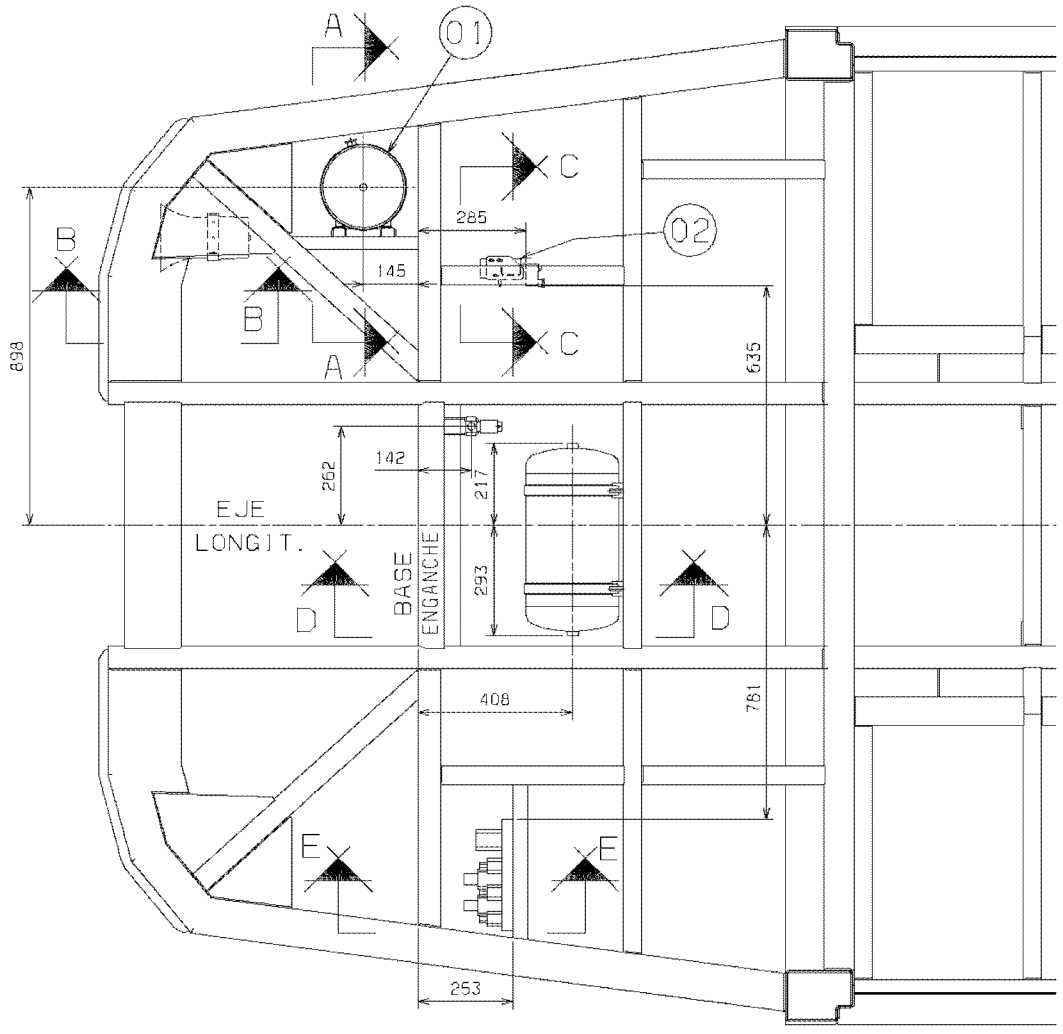
(03) 15W lighting; total length 454mm.

SALOON LIGHTING

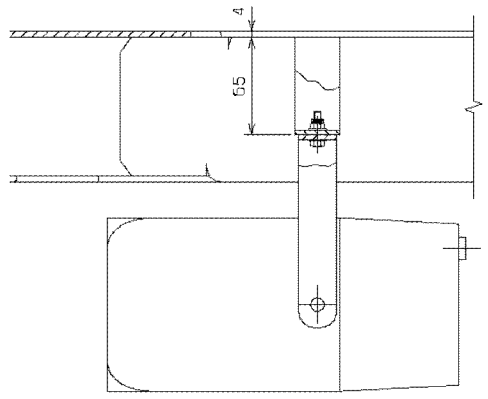
CAF-BERGAMO

USB0000086_0267

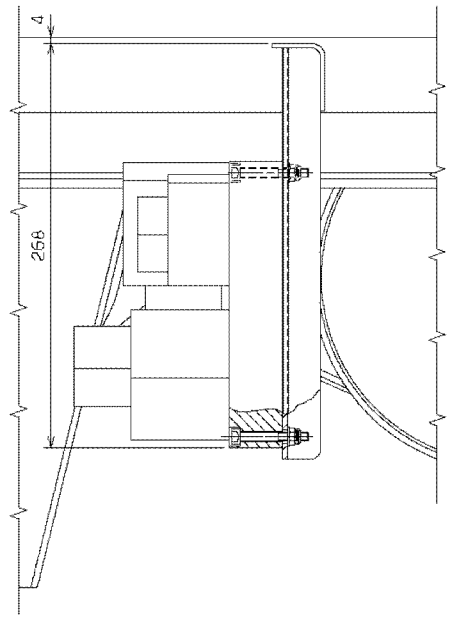
LADO B



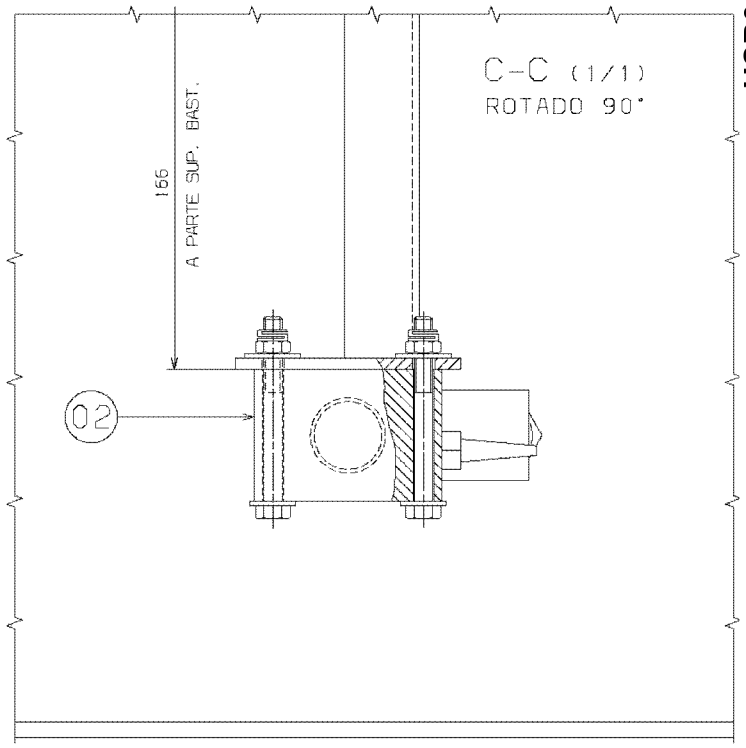
B-B (1/2.5)



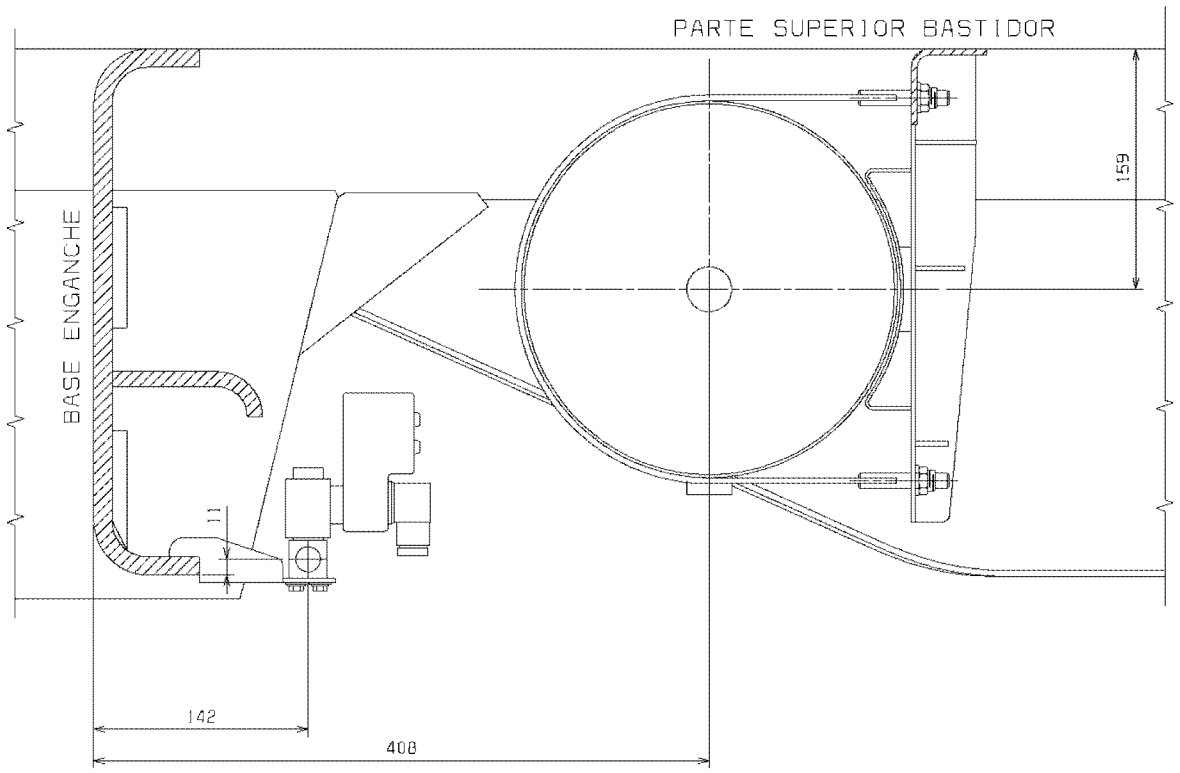
E-E (1/2.5)



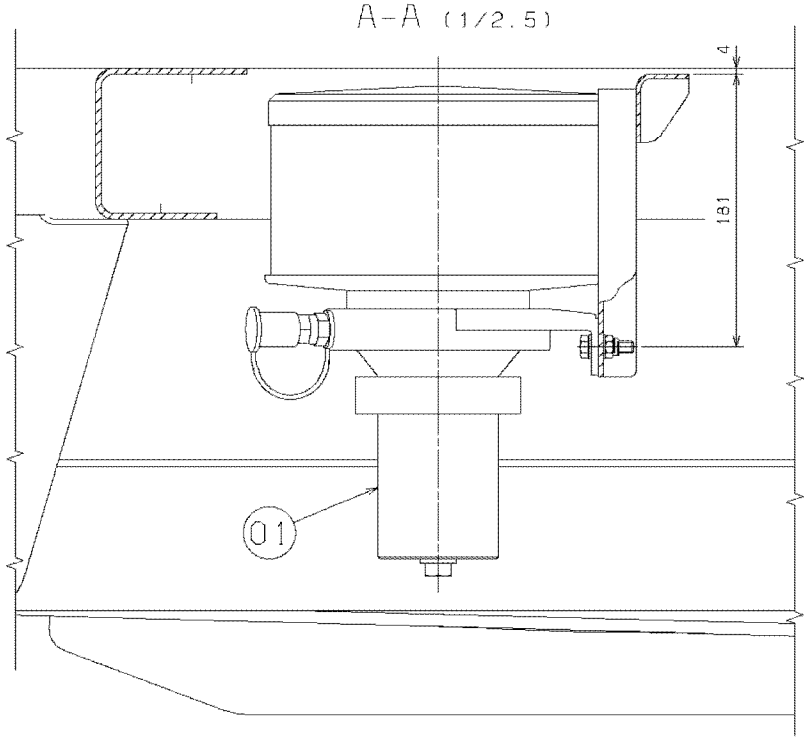
C-C (1/1)
ROTADO 90°



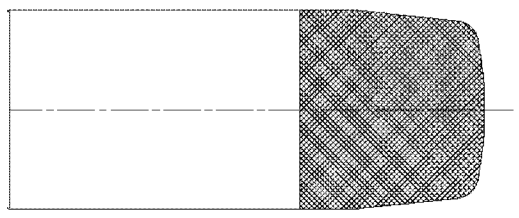
D-D (1/2.5)



A-A (1/2.5)

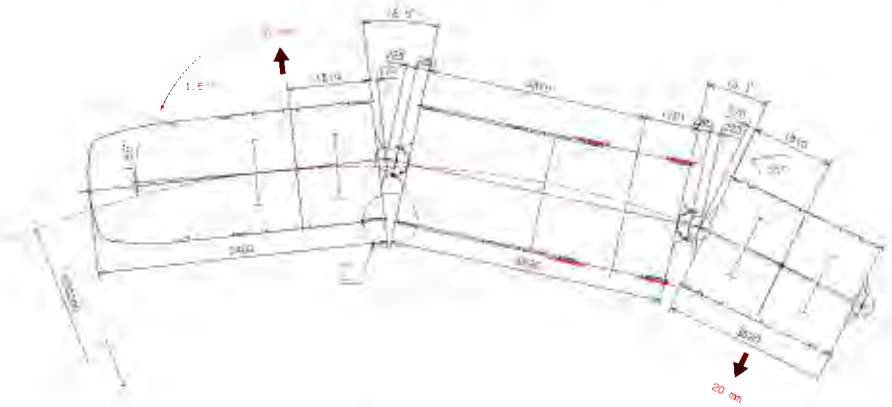


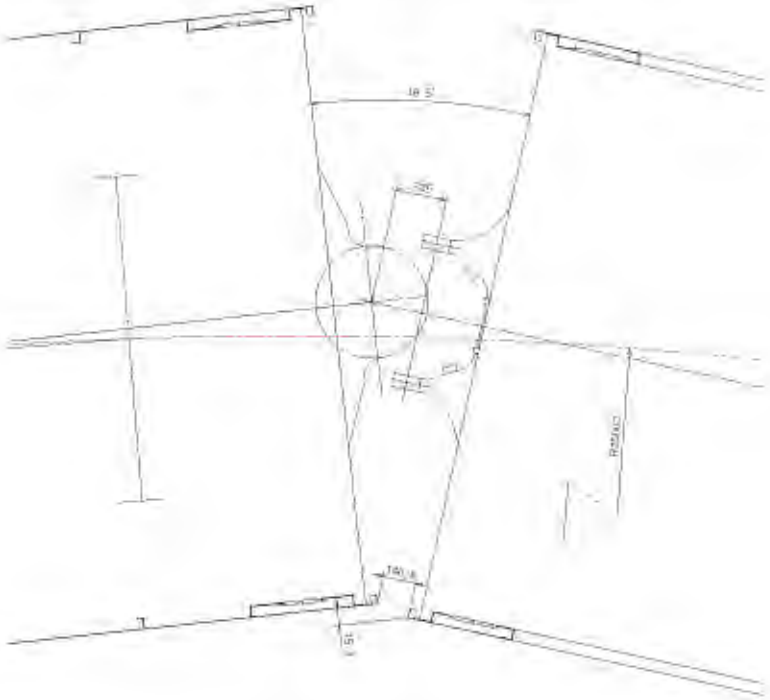
A-E

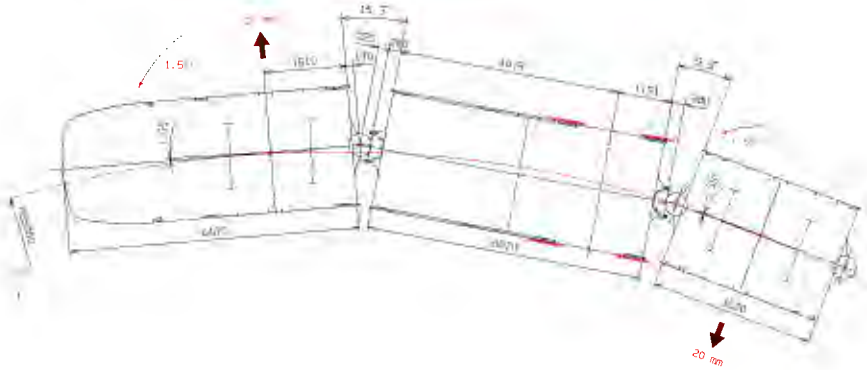


02	FLUNGE LUBRICATION ELECTROVALVE
01	OIL PUMP AND TANK

MODIFICACIONES					
		FECHA	NOMBRES		
	COMPR.			PLANO Nº	
	VERIFIC.				
	HOMOL.				
				SUSTITUYE A:	EDICION
	TOL. GEN	ESCALA		DESIGNACION:	HOJA Nº
	NF F 00-037	1/10		FLUNGE LUBRICATION MOUNTING	Nº DE HOJAS 1
APLICACIONES		FECHA	NOMBRES	ENTIDAD: CAF-BEASAIN	
	DIBUJ.	29-09-06		REFERENCIA: Q.00.072.28	
	VERIFIC.	29-09-06			
	SUSTITUYE A :				EDICION







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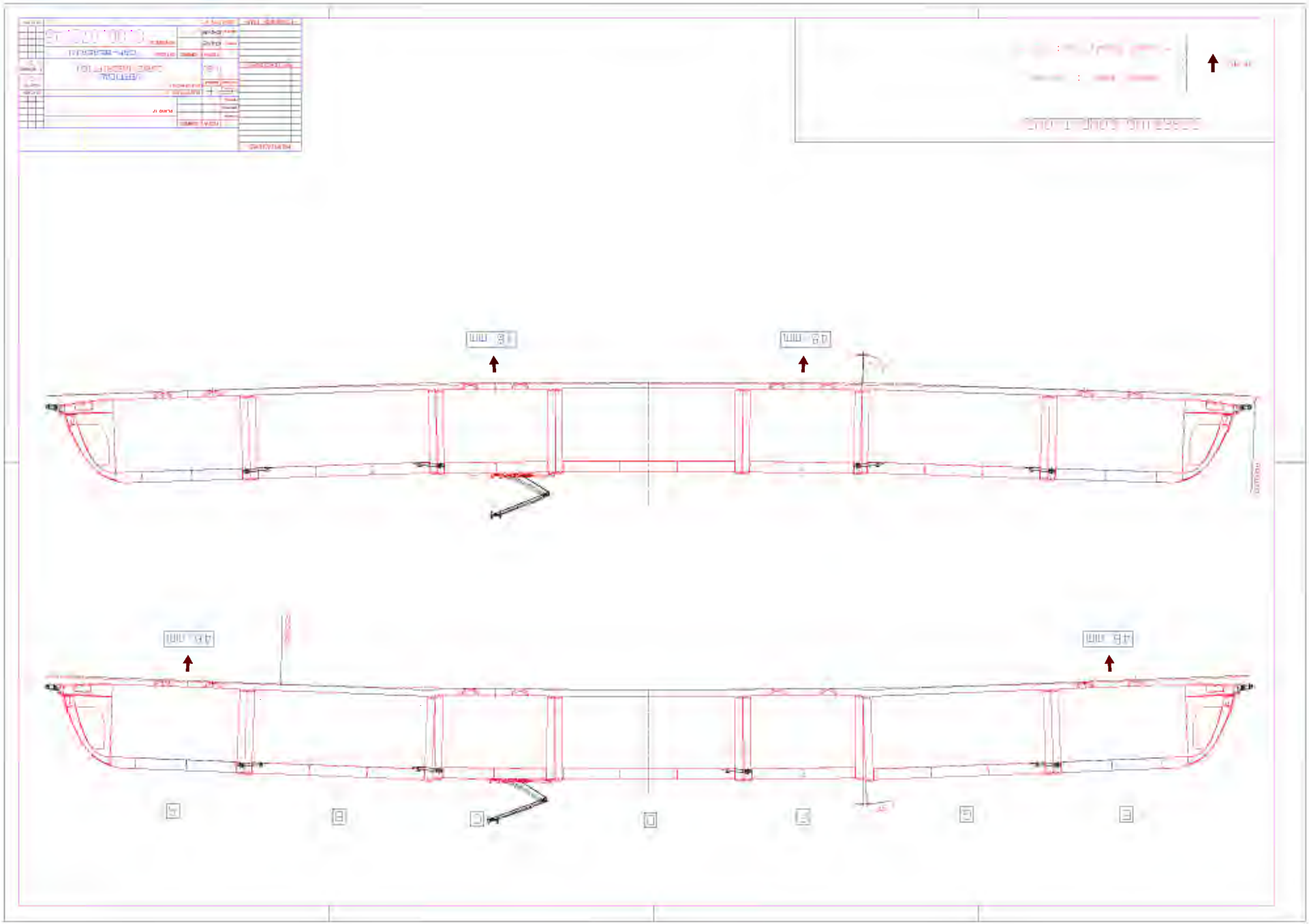

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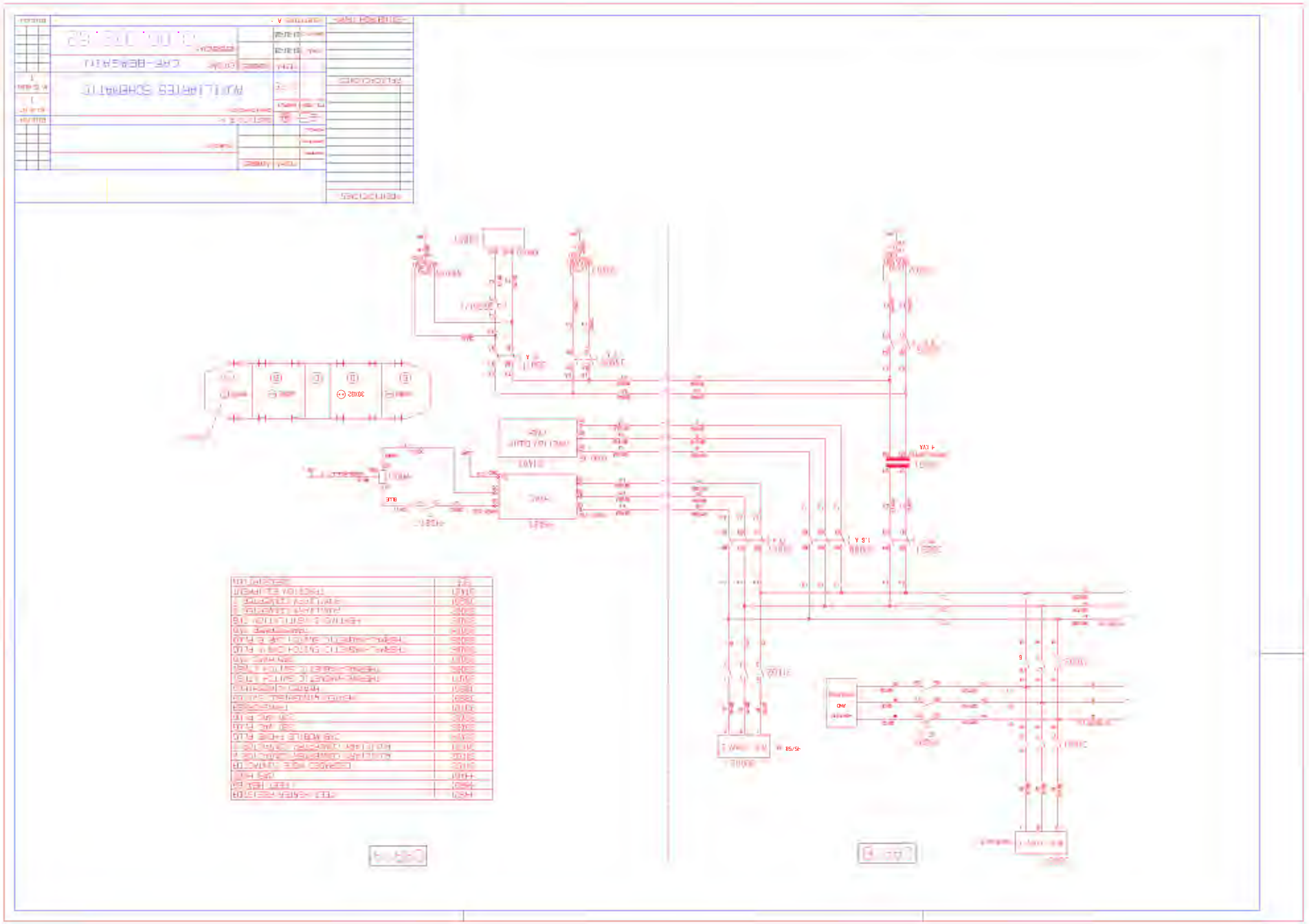

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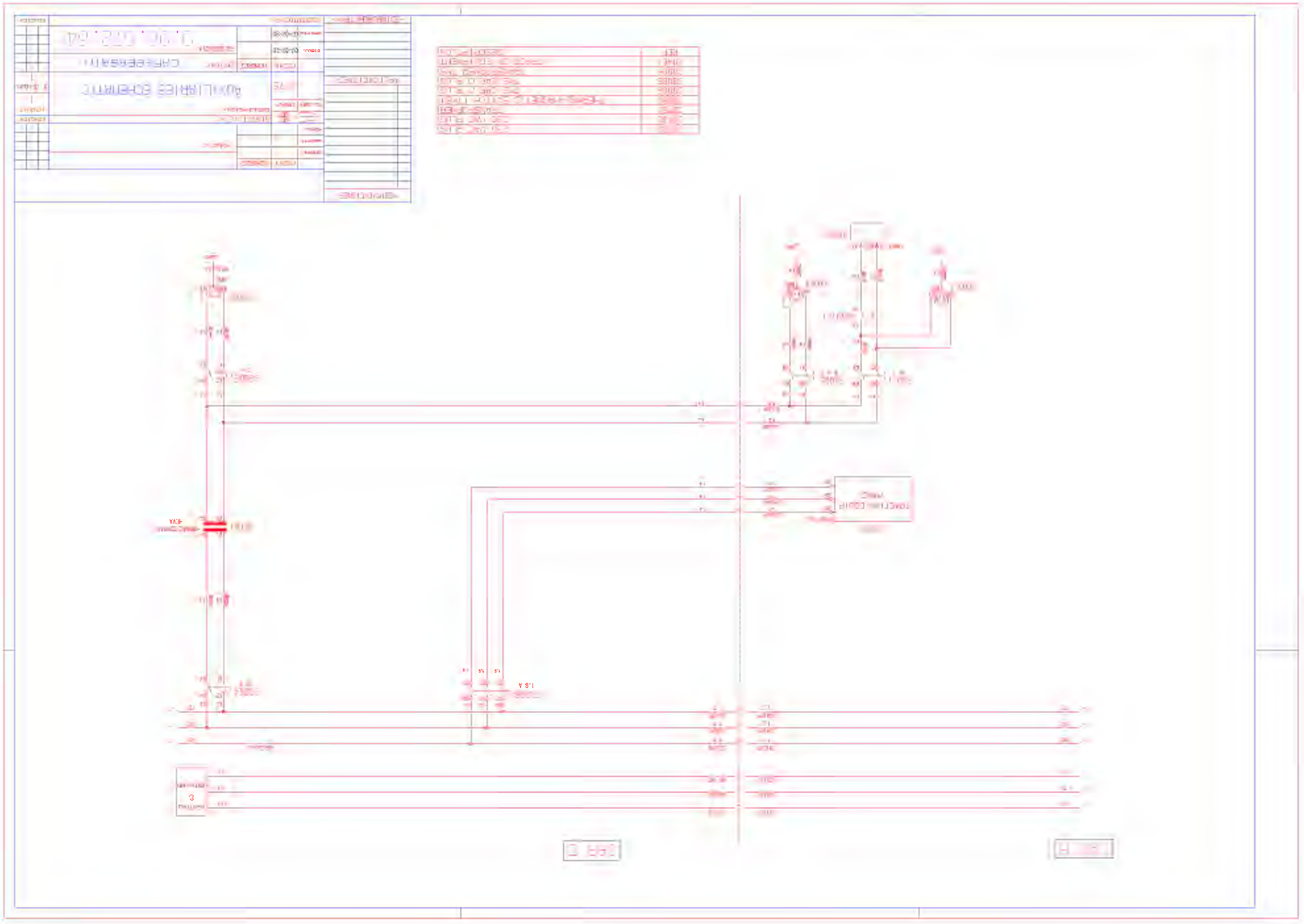

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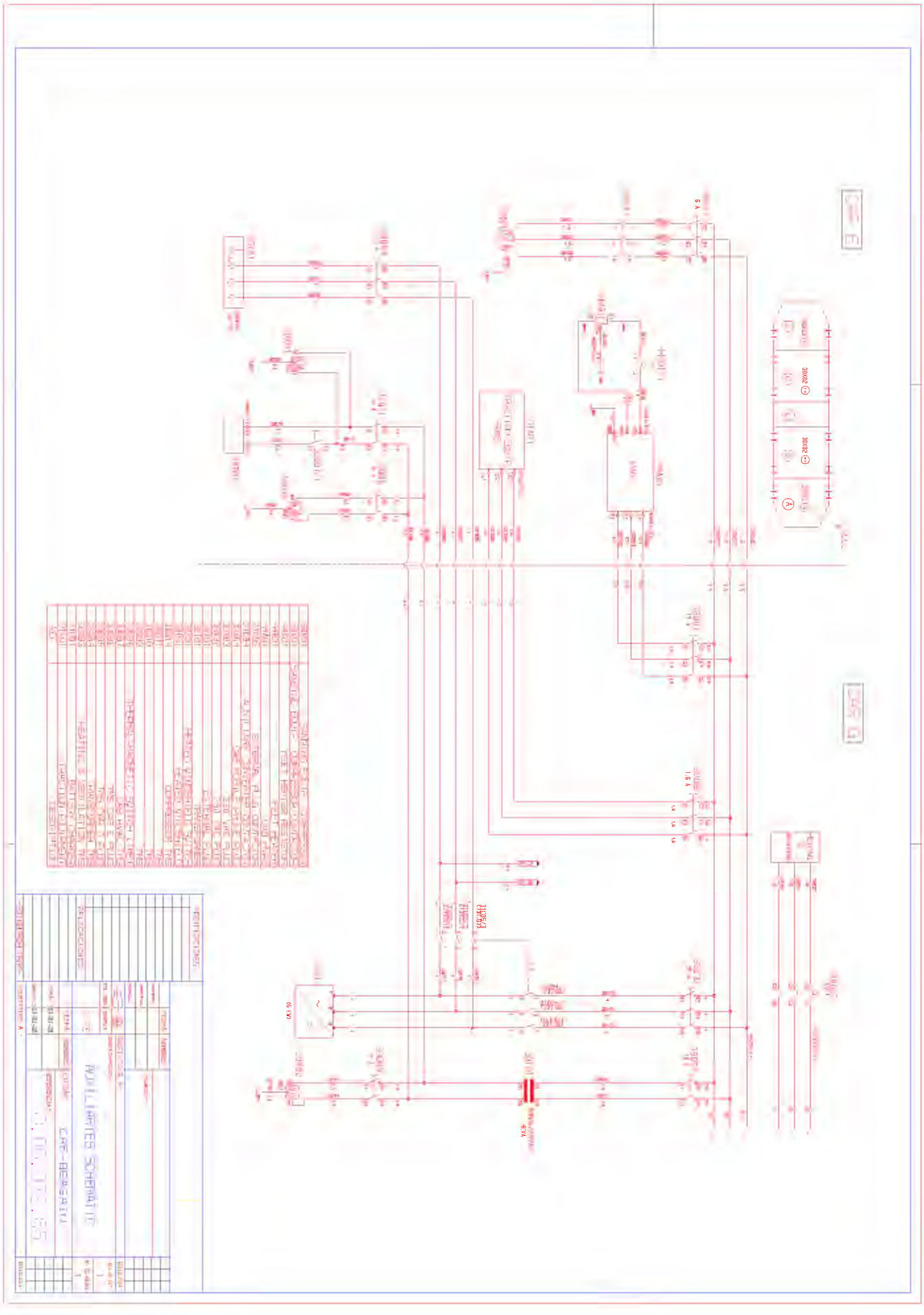

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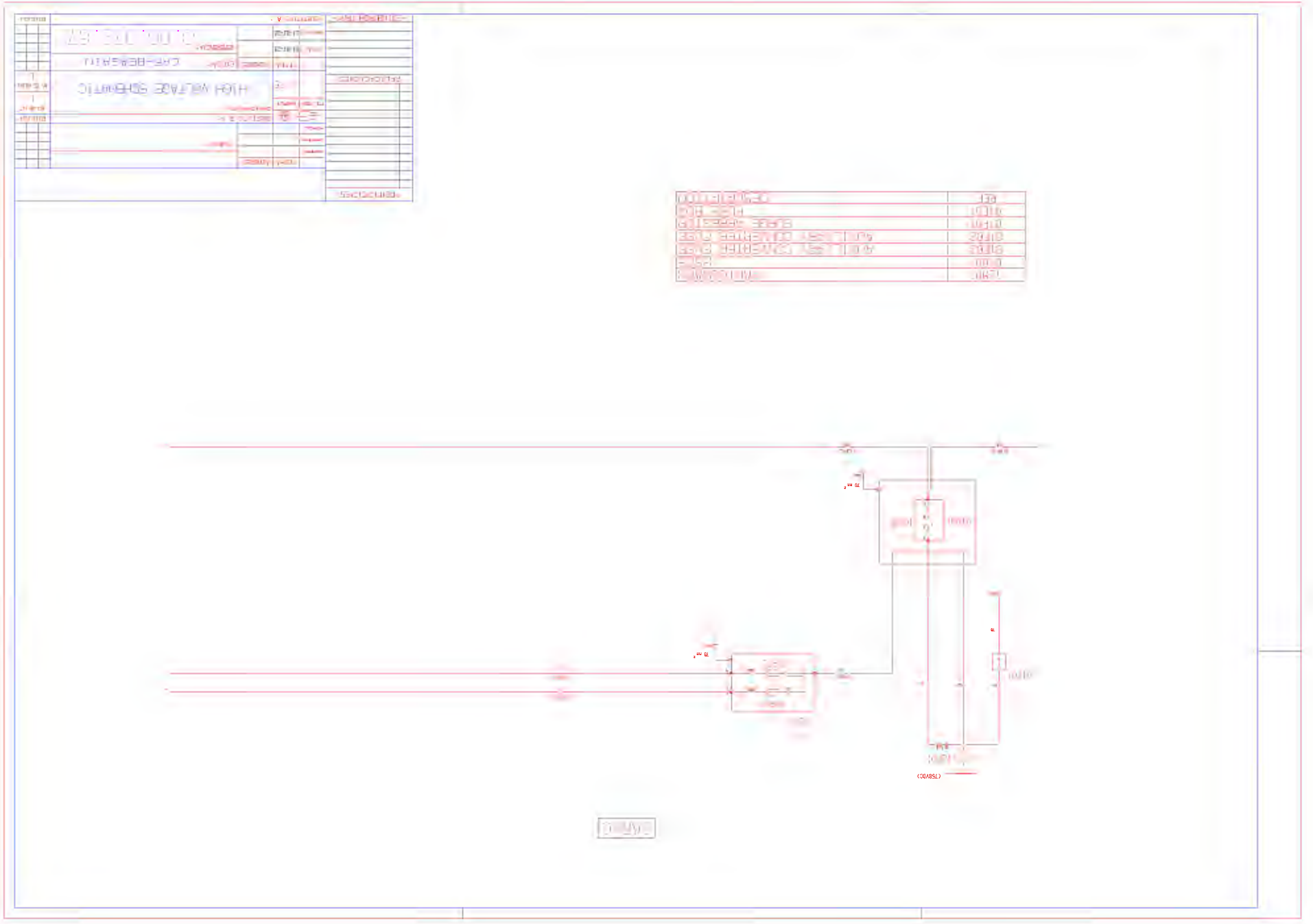
USB00000086_0274



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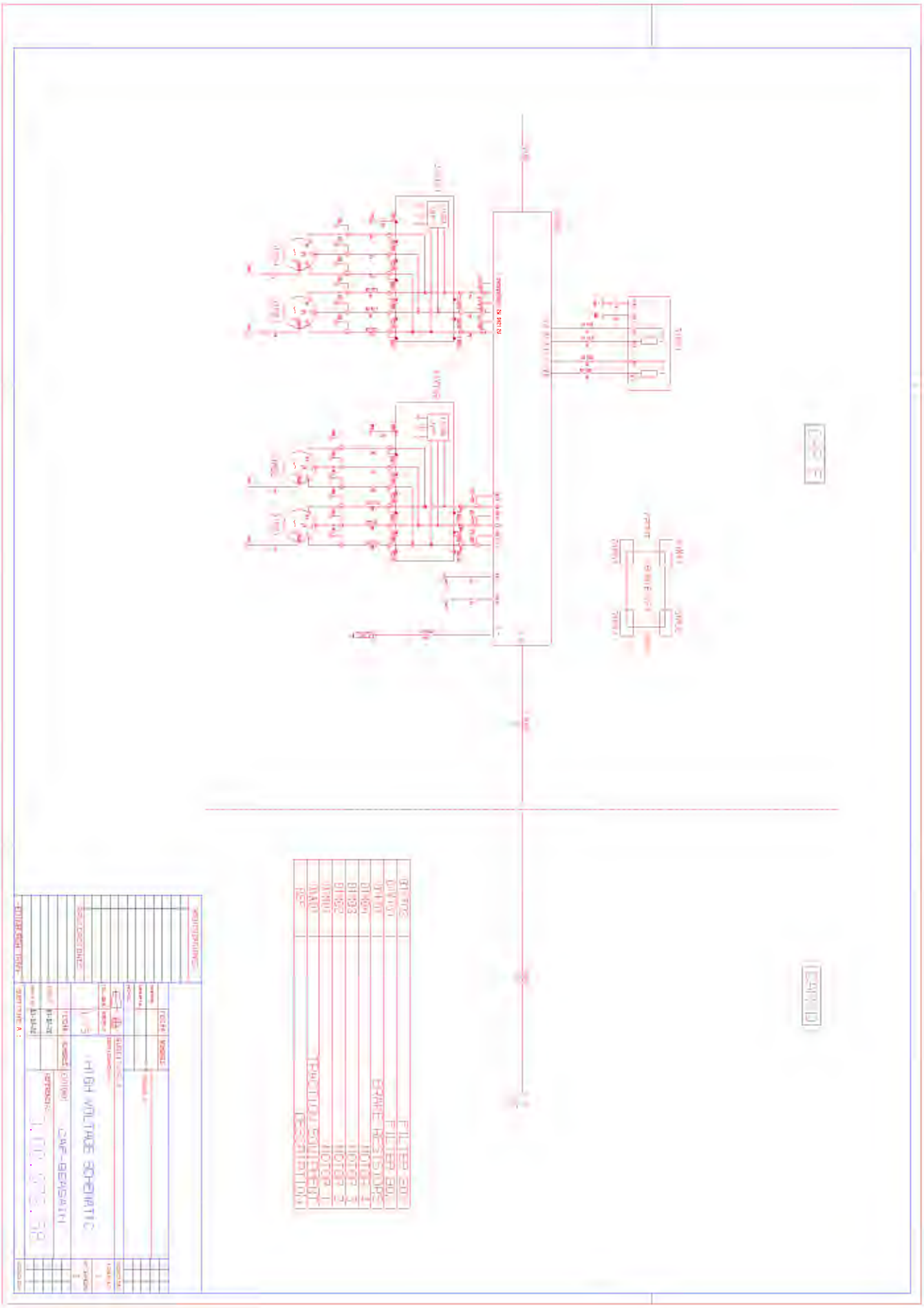
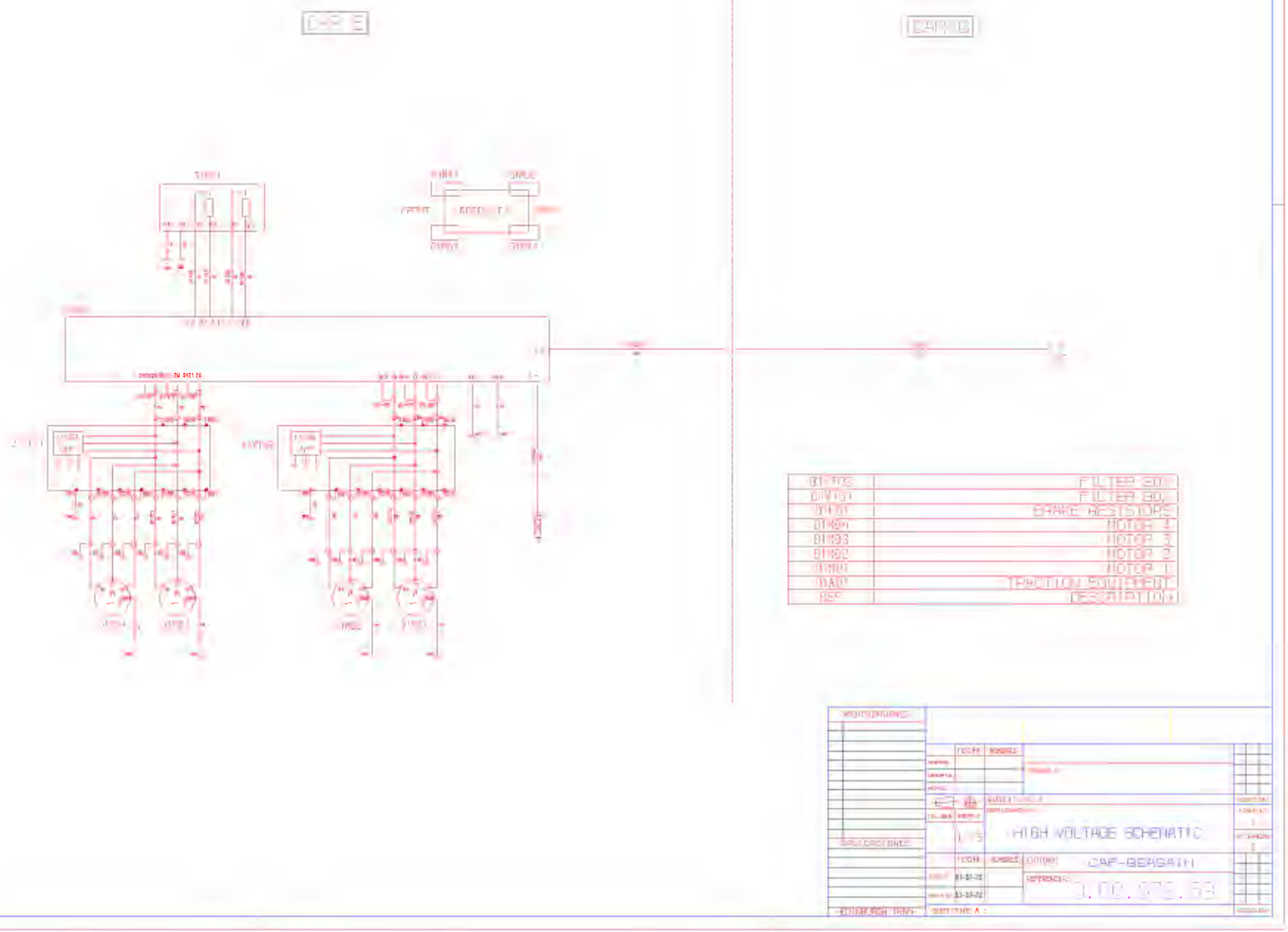
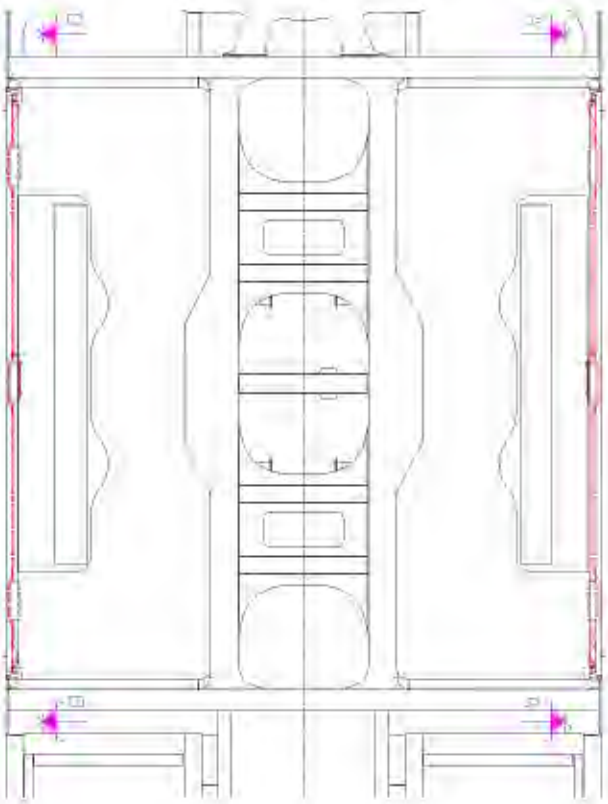
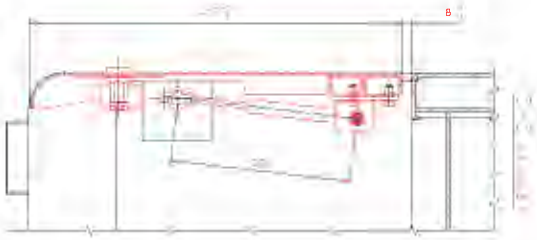

HIGH VOLTAGE SCHEMATIC
CAF-BEASAIN
FILTER 80
FILTER 80
BRAKE RESISTORS
MOTOR 4
MOTOR 3
MOTOR 2
MOTOR 1
TRACTION SQUIRREL
DESCRIPTION

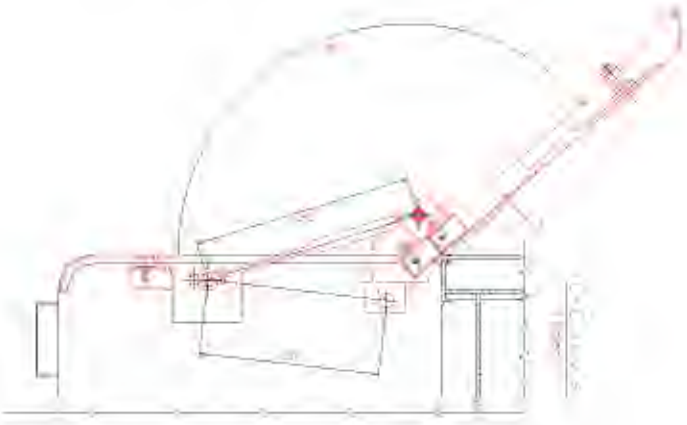

HIGH VOLTAGE SCHEMATIC
CAF-BEASATI



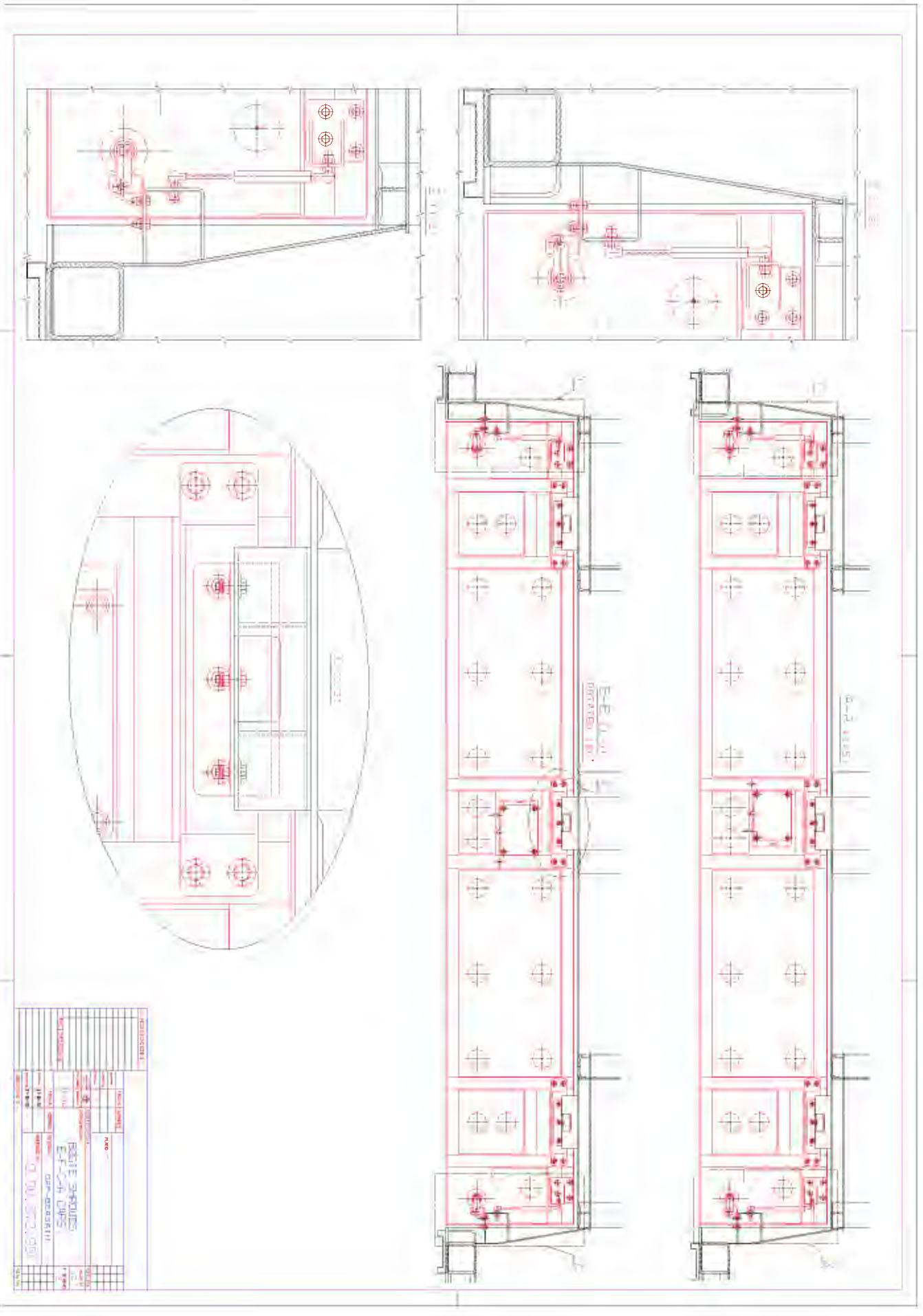












MARCA	DESCRIPCION	CANT.	CODIFICACION O NORMA	MATERIAL	PESO UNITARIO	DIMENS. EXTERIOR
00	ESQUEMA HIDRAULICO FRENO	1			0,000	

N°. DIBUJO O CALIDAD MATERIAL:	NOTAS Y OBSERVACIONES

MODIFICACIONES

A 13-05-04 Actualiz.	SAB WABCO	SH-3-158-7	Ed.H
D GRAL ESTILS			
B 16-09-04 Actualiz.			
D GRAL ESTILS			

DIBUJ.	30-01-04	LLAMENTZI	
VERIF.	30-01-04		

SUSTITUYE A:			
REFERENCIA:	Q.16.21.150		B
ENTIDAD:	NOMBRES		

	FECHA		
	Nº F		
	ESCALA	TOL.GEN.	
	Q0-037		
		ESQUEMA HIDRAULICO FRENO	
		DES.GRAFICA:	HOJA Nº.
			1
			Nº HOJAS
			1

SUSTITUYE A:

EDICION

PLANO Nº.:

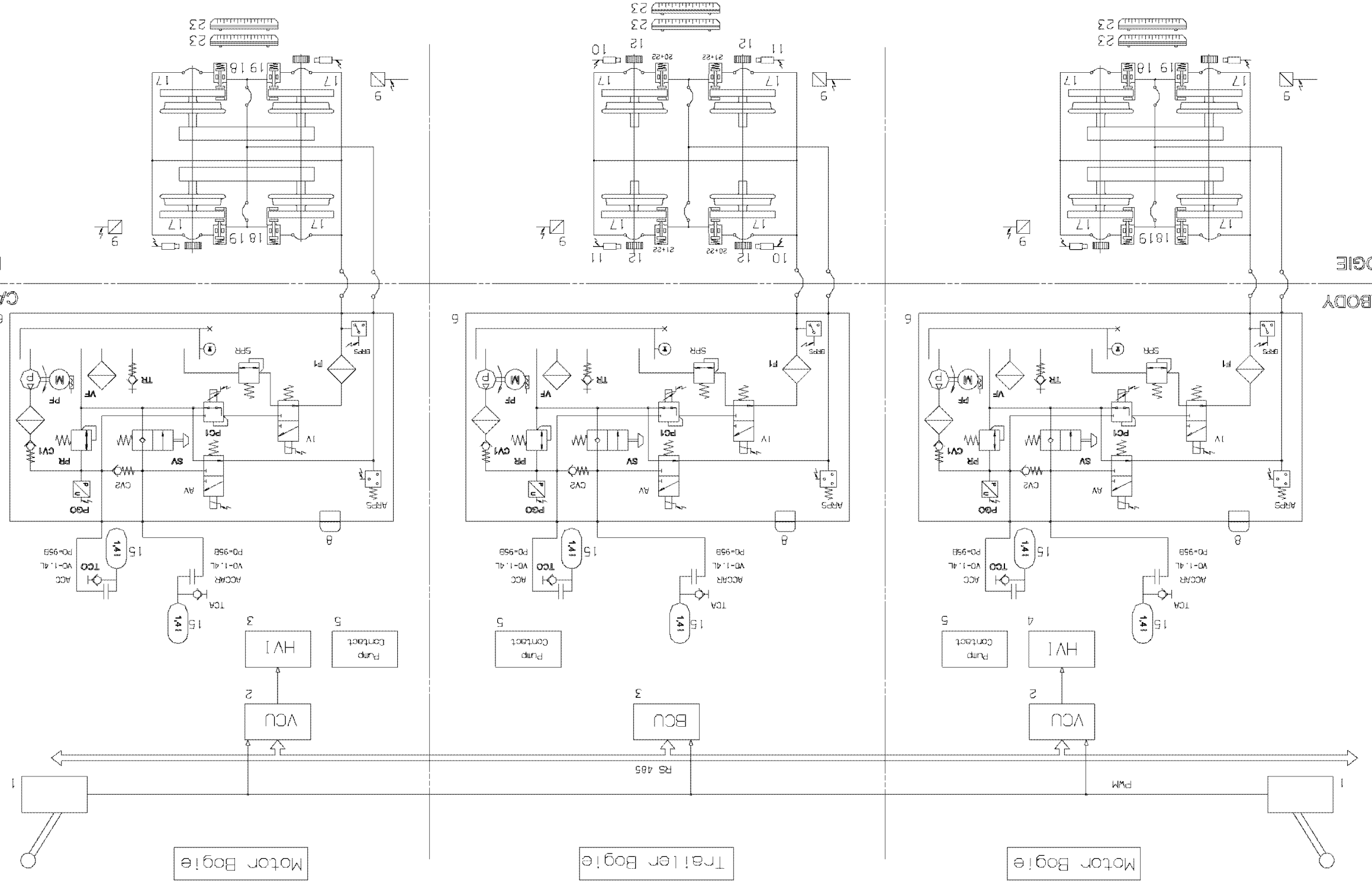
GUADALMETRO

EDICION

A	02/12/03	M. PLAZA	PGUAL		First Release
B	23/12/03	M. PGUAL	PGUAL		Up-dated according to MT comments
C	27/12/03	M. PGUAL	PGUAL		Up-dated for speed sensor reference
D	19/01/04	M. PGUAL	PGUAL		Up-dated for distance sensor
E	19/04/04	S. DUEÑAS	PGUAL		Up-dated according to meeting dated on 18th March 2004
F	19/05/04	S. DUEÑAS	PGUAL		Up-dated further to distance sensor modification
G	01/06/04	S. DUEÑAS	PGUAL		Up-dated according to CAF email on 25/05
H	09/09/04	S. DUEÑAS	PGUAL		Up-dated for accumulator inflated pressure

NUMB.	LIV	DATE	DRAWN	APP.	DESCRIPTION

CONFIGURATION



USB00000086_0280

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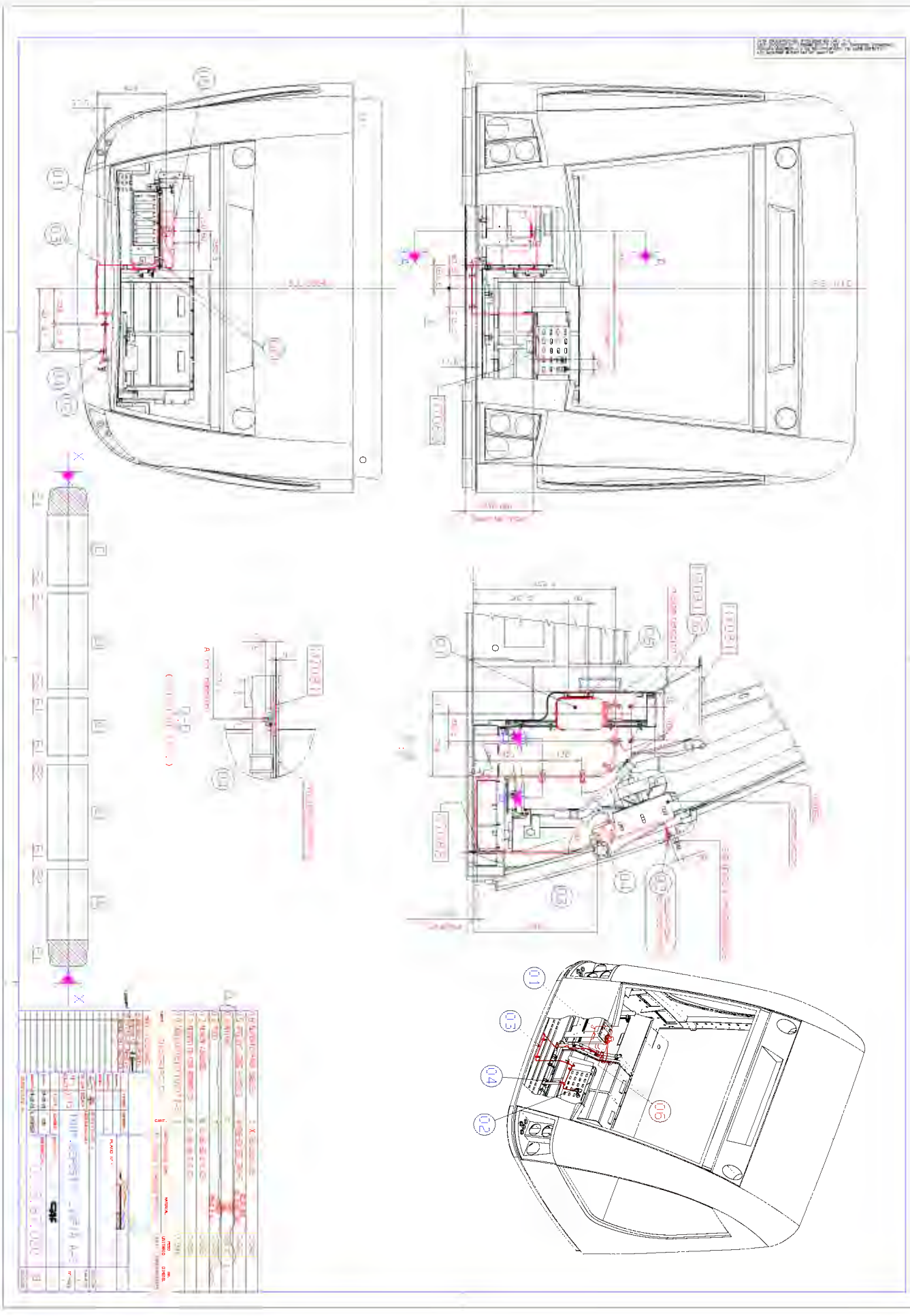

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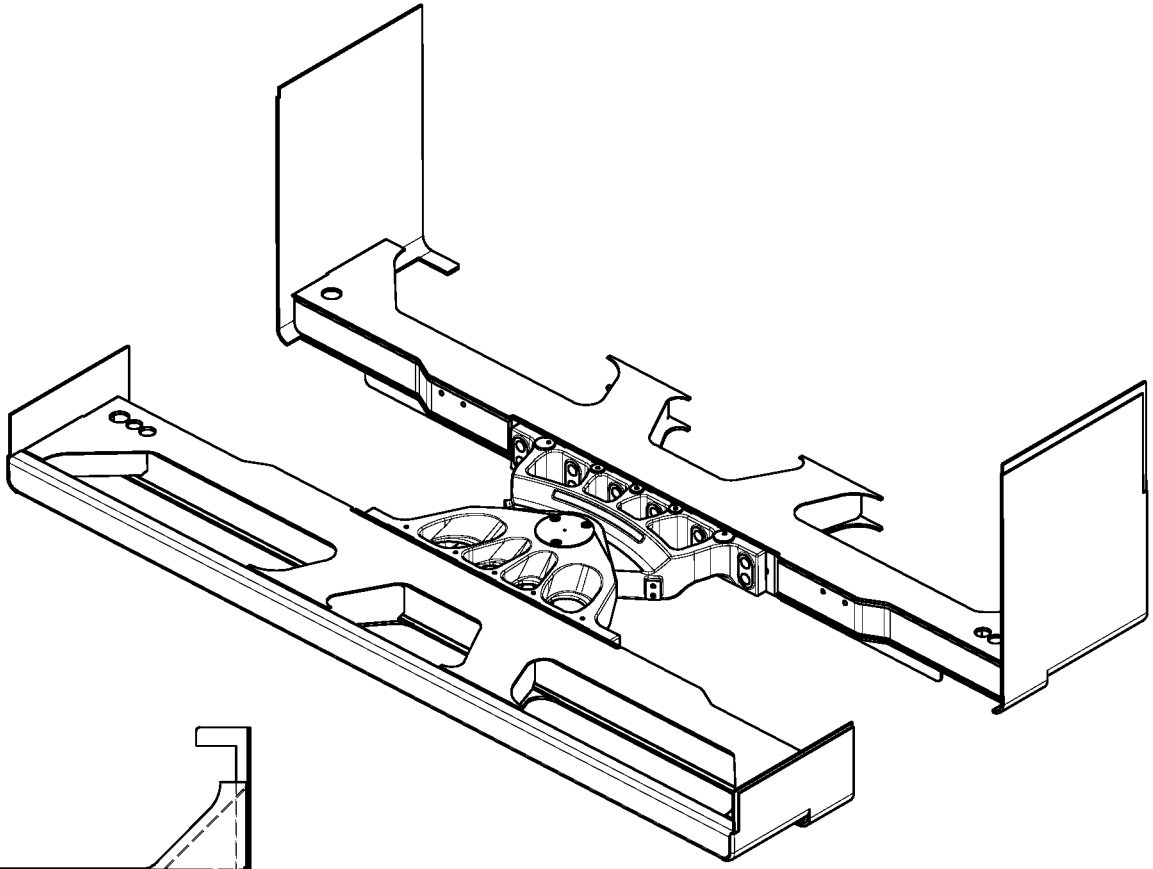
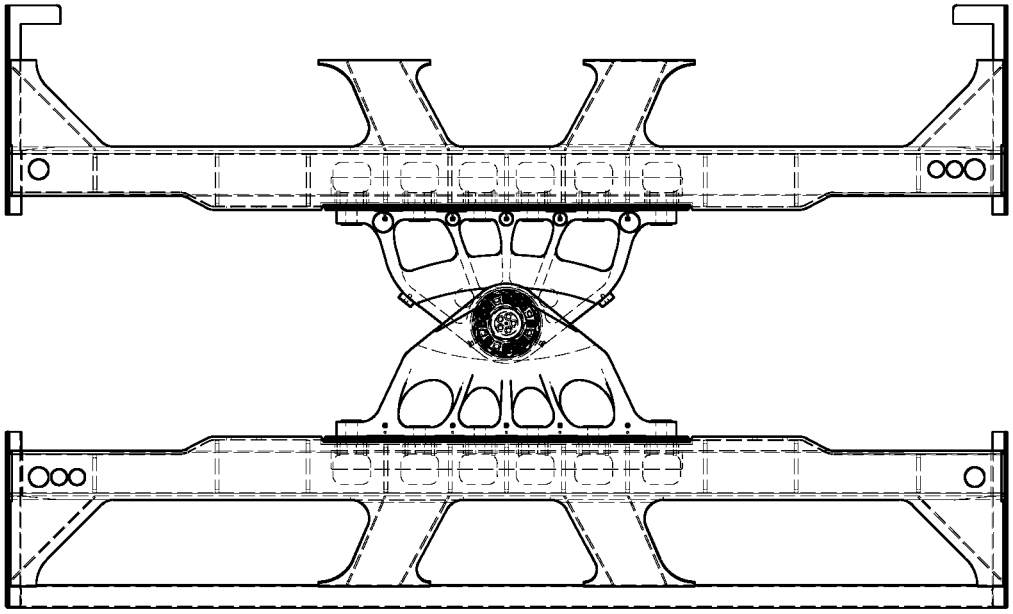


COCHES A-C-E



COCHES B-D

Para detalles de montaje ver plano Q.19.42.010.01

MARCA	DESCRIPCION	CANT.	CODIFICACION O NORMA	MATERIAL O REFERENCIA	PESO UNITARIO	(mm) DIMENSIONES
			Nº DIBUJO O CALIDAD MATERIAL:		NOTAS Y OBSERVACIONES	
01	ROTULA	1	Q.19.42.010.01		150.9	
00	MONTAJE ROTULA	1			150.9	

MODIFICACIONES

	FECHA	NOMBRES	
COMPR.			metro Málaga
VERIFIC			PLANO Nº
HOMOL.			

SUSTITUYE A:

EDICION

DESIGNACION:

MONTAJE ROTULA

HOJA Nº

Nº DE HOJAS 0

	FECHA	NOMBRES
DIBUJ.	26-07-07	10550
VERIFIC.	26-07-07	10244

ENTIDAD: CAF

REFERENCIA: Q.19.42.001

A2

SUSTITUYE A :

EDICION

TOL.GEN	ESCALA
NF E 00-037	1/10

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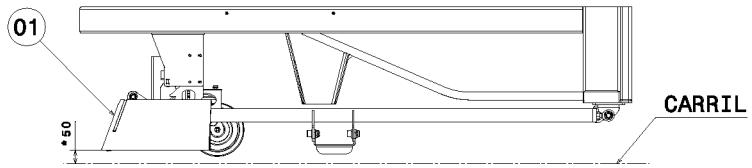
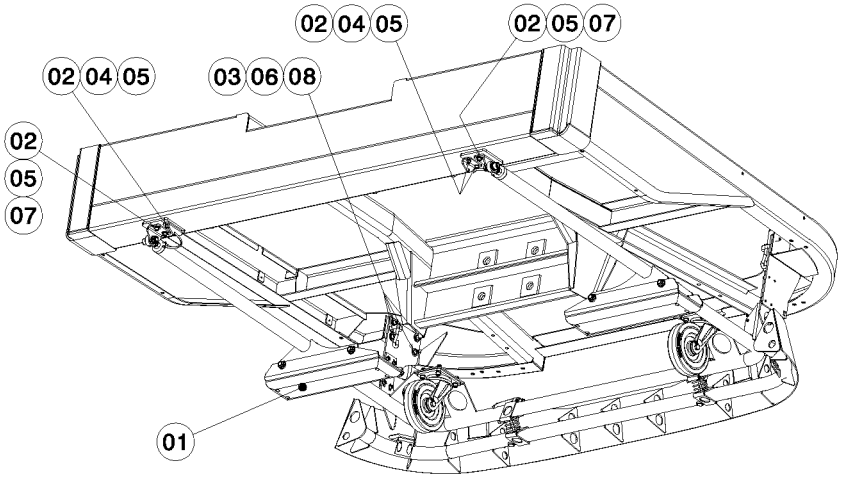
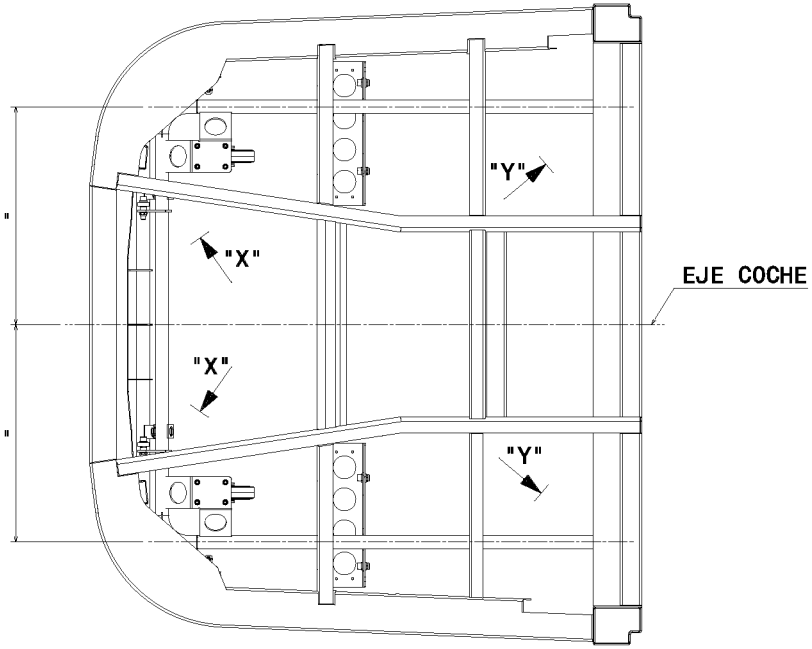
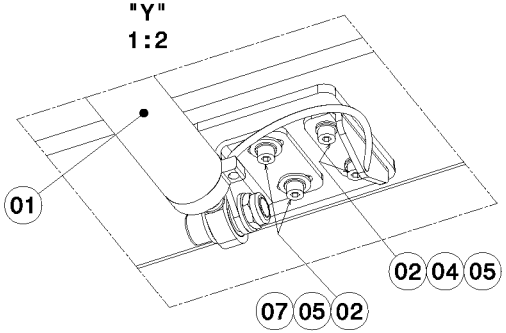


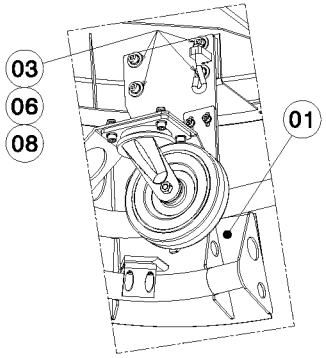




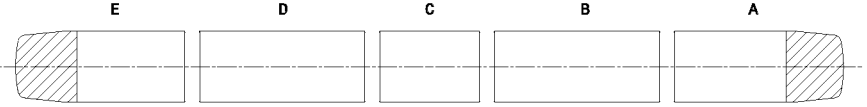
"Y"
1:2



"X"
1:5



* EL SISTEMA ANTIATRAPAMIENTO PERMITE UNA REGULACION DE ALTURA A CARRIL DE 50mm A 150mm.



08	ARANDELA PLANA 10	B	ISO 7093	A2-70 ISO 3508	0.012	
07	ARANDELA PLANA 8	4	ISO 7093	A2-70 ISO 3508	0.008	
06	TORN CAB HUE HEX M10X30	B	ISO 4762	A2-70 ISO 3508 -	0.028	
05	TORN CAB HUE HEX M8X25	B	ISO 4762	A2-70 ISO 3508 -	0.016	
04	ARANDELA PLANA M8	4	NFE 25514 M	A2-70 ISO 3508	0.002	
03	ARAND CONTACT MED M10	B	X.55.00804.09	NOMEL 55.10.22.83	0.008	
02	ARAND CONTACT MED M8	B	X.55.00804.07	NOMEL 55.08.21.83	0.003	
01	SISTEMA ANTIATRAPAMIENTO	X	Q.20.23.040.00		92.00	
00	MONT.SIST.ANTIATRAPAMIENTO	1			92.55	
MARKA	DESKRIBAPENA	KOP.	NORMA EDO KODEA	MATERIALA/ERREFERENTZIA	PISUA (Kg.)	NEURRIAK (mm.)

ALDAKETAK		ESKALA	HORNITZAILEA:		
		1/10	MONT.SIST.ANTIATRAPAMIENTO		
		PERDOI ORDOKORRA	HARRAPA.EKIDETEKO SIST.MONT.		
		NF F 00-037			
		MARRAZTUA	DATAMOSTR.	EGILEA:	...ORDEZTEN DU
		10741	10491	CAF	Q.20.23.030
		2007-11-06	2007-11-08	ERAKUNDEA:	
ERABILERAK:	BASTEIZkO TRAMITA			EuskoTren	A1

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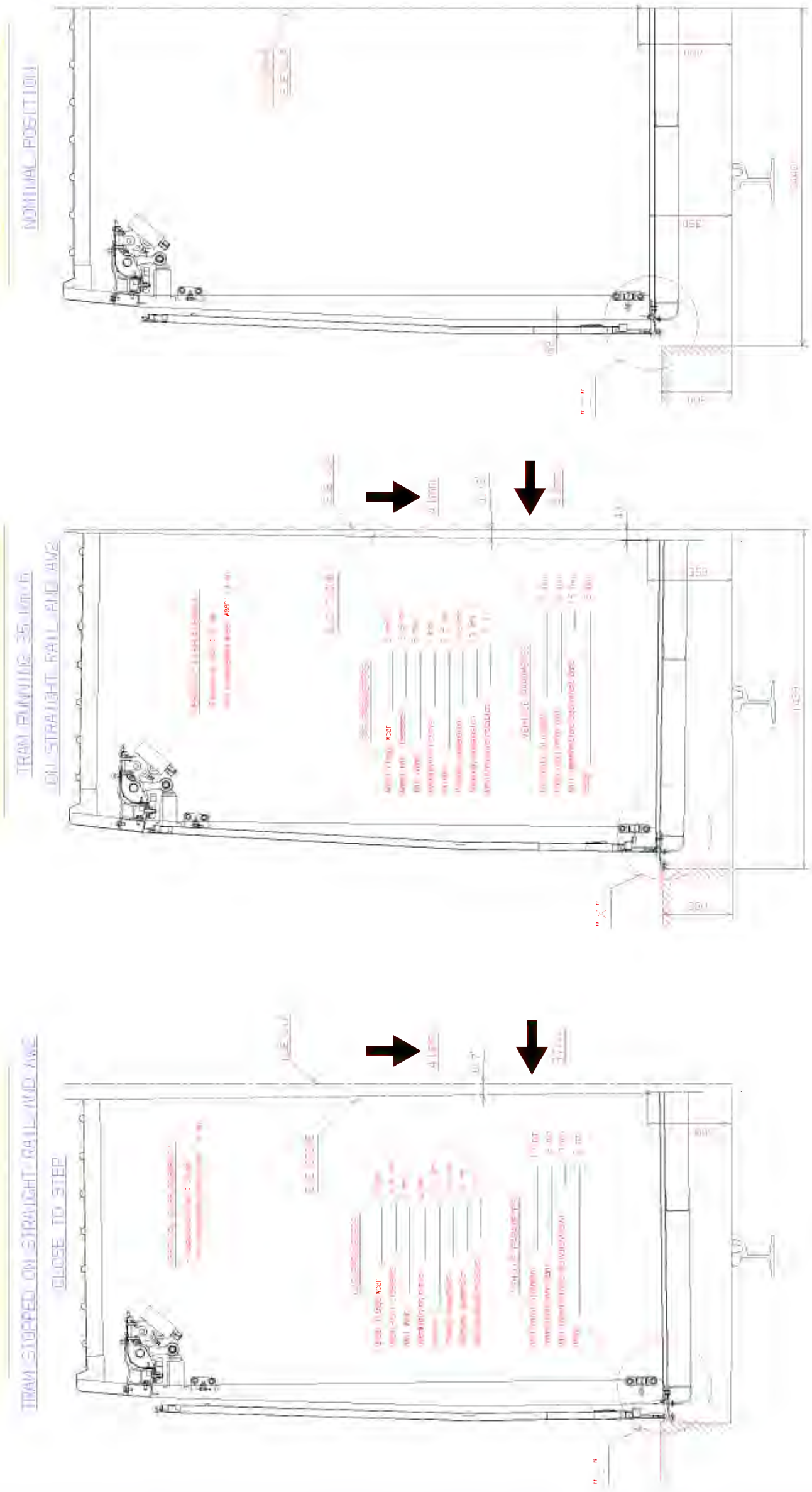

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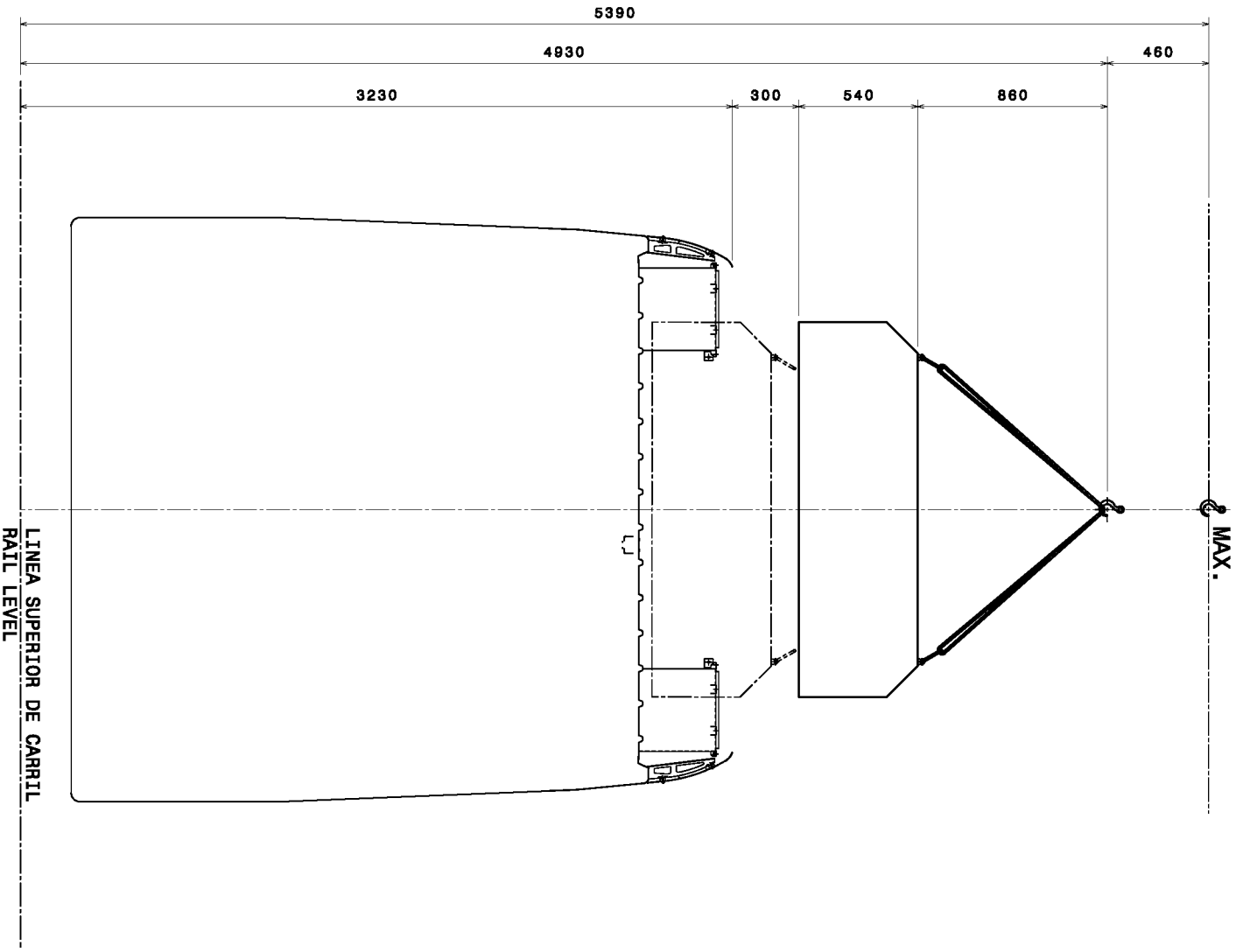


ITEM	DESCRIPTION	QTY.	CODIFICATION OR STD.	MATERIAL	KG. WEIGHT	NOTES AND OBSERVATIONS
			DRAWING Nº OR MATERIAL QUALITY:		mm. DIMENS.	

MODIFICATIONS

	DATE	NAMES
CHECK.		
VERIF.		
HOMOL.		

DRAWN Nº

SUBSTITUTES TO:

DRAWING TITLE:

GRUA HVAC

	DATE	NAMES
DRAWN.	17-09-08	F.CANTUEGLA
VERIF.	17-09-08	I.ABUELO

SUBSTITUTED TO :

CAF CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES, S.A.

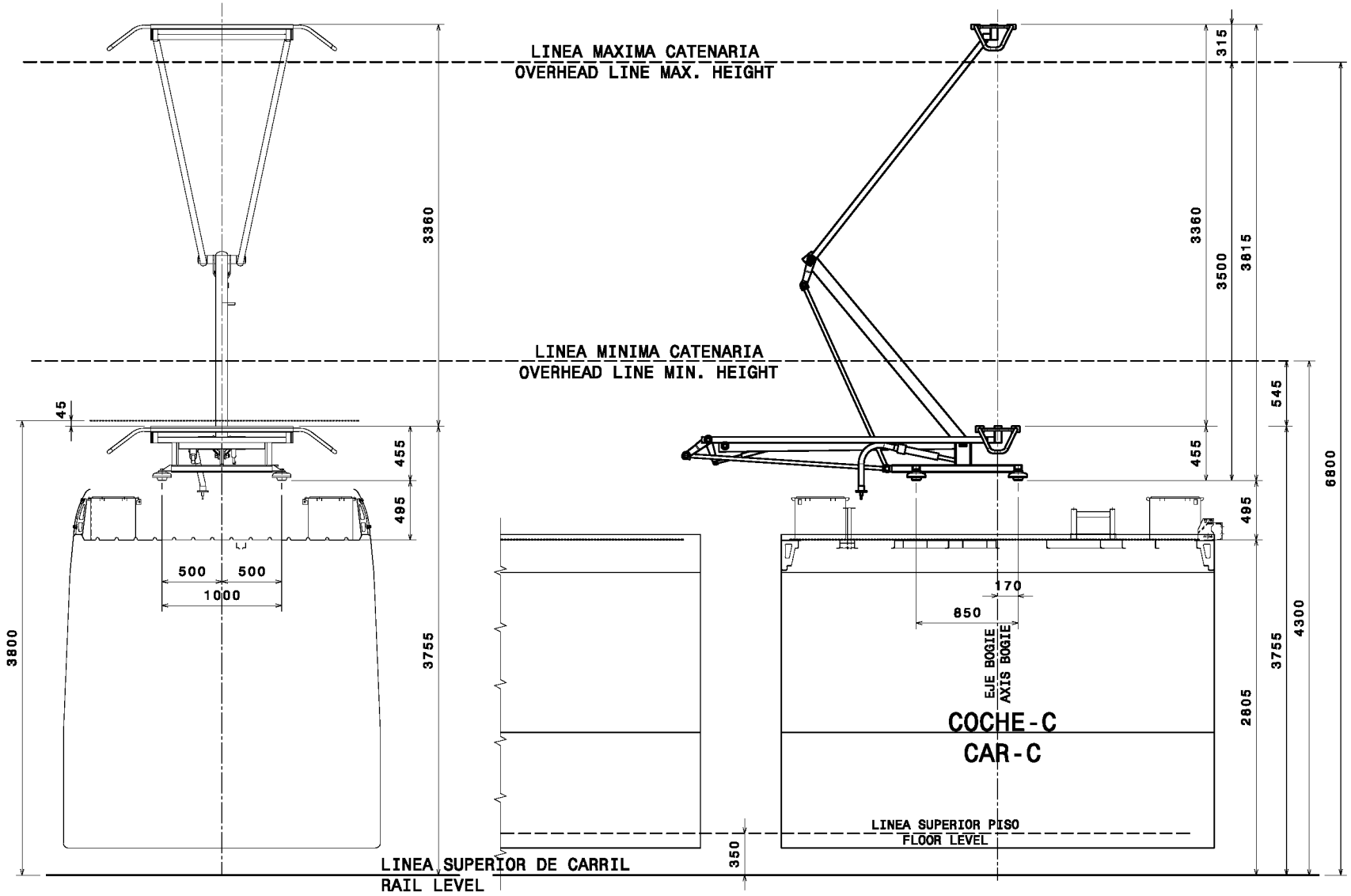
REFERENCE: Q.22.00.300

WEB. TOL.	SCALE	EDITION
ISO 2768 cK	1/15	

SHEET	Nº SHEETS	EDITION
1	1	

A2

USB00000086_0285



USB0000086_0286

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ITEM	DESCRIPTION	QTY.	CODIFICATION OR STD.	MATERIAL	Kg. WEIGHT	mm. DIMENS.
			DRAWING N° OR MATERIAL QUALITY:			NOTES AND OBSERVATIONS

MODIFICATIONS

	DATE	NAMES
CHECK.		
VERIF.		
HOMOL.		

DRAWN N°

SUBSTITUTES TO:

EDITION

DRAWING TITLE:

TRAZ. PANTOGRAFO CUBIERTA
ASSEMBLY OF PANTOGRAPH

GEN. TOL.	SCALE
ISO 2768 ck	1/25

SHEET 1

N° SHEETS 1

	DATE	NAMES
DRAWN.	17-03-08	A.ORNAD
VERIF.	17-03-08	I.AGUELO

CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES, S.A.

A2

REFERENCE: Q.22.00.301

SUBSTITUTES TO :

EDITION

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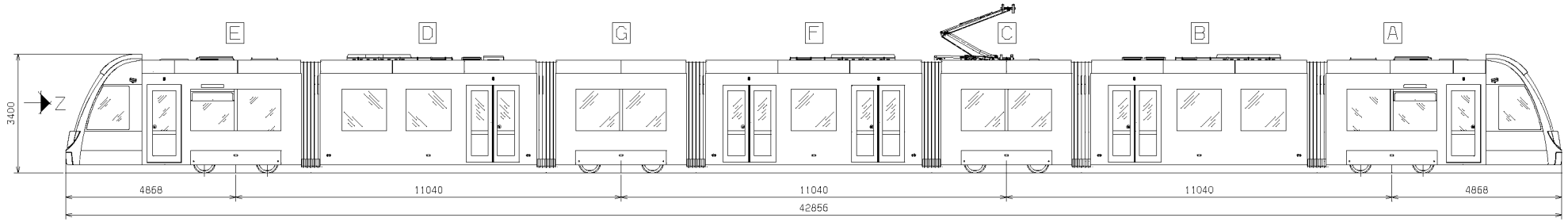

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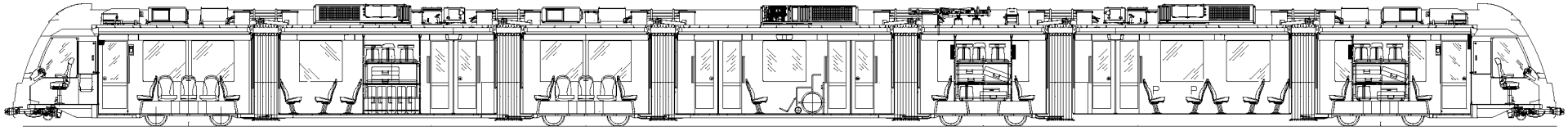
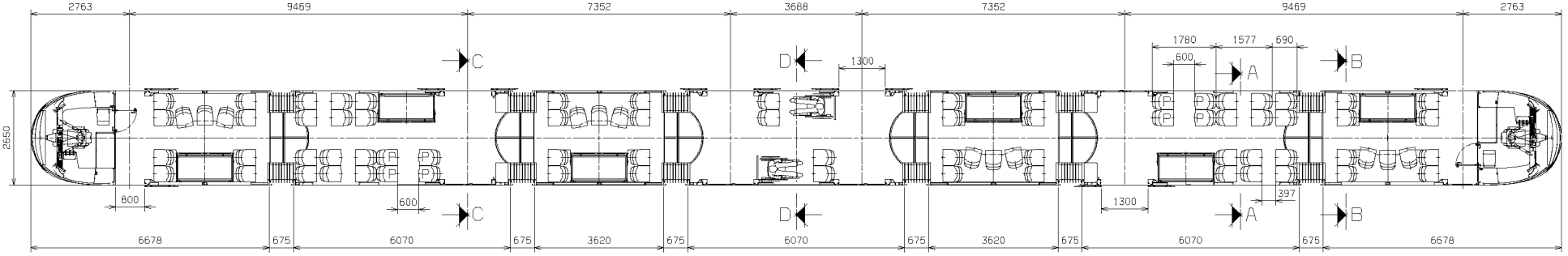




P: PRIORITY SEAT

N° SEAT QTY.		
	4 PERSONS/SQ.M.	6 PERSONS/SQ.M.
SEATING PASSENGERS	80+(2 PMR)	80+(2 PMR)
STANDING PASSENGERS	168	252
TOTAL PASSENGERS	248+(2 PMR)	332+(2 PMR)

VERSION 2
PLANO PROVISIONAL

MARCA	DESCRIPCION	CANT.	Nº SUMINISTRADOR O NORMA FABRICANTE / Nº DIBUJO O CALIDAD MATERIAL	PESO UNITARIO	NOTAS Y OBSERVACIONES
MODIFICACIONES					

	FECHA	NOMBRES
COMPR.		
VERIFIC.		
NORMAL.		

PLANO Nº

SUSTITUYE A:

EDICION

TOL. GRL.	ESCALA
Nº F 00-037	1/60

DESIGNACION:

CONJUNTO UNIDAD
UNIT ASSEMBLY

HOJA Nº 1

Nº DE HOJAS 2

APLICACIONES

	FECHA	NOMBRES
DIBUJ.	29.02.08	
VERIFIC.	29.02.08	

ENTIDAD: CAF-ZARAGOZA

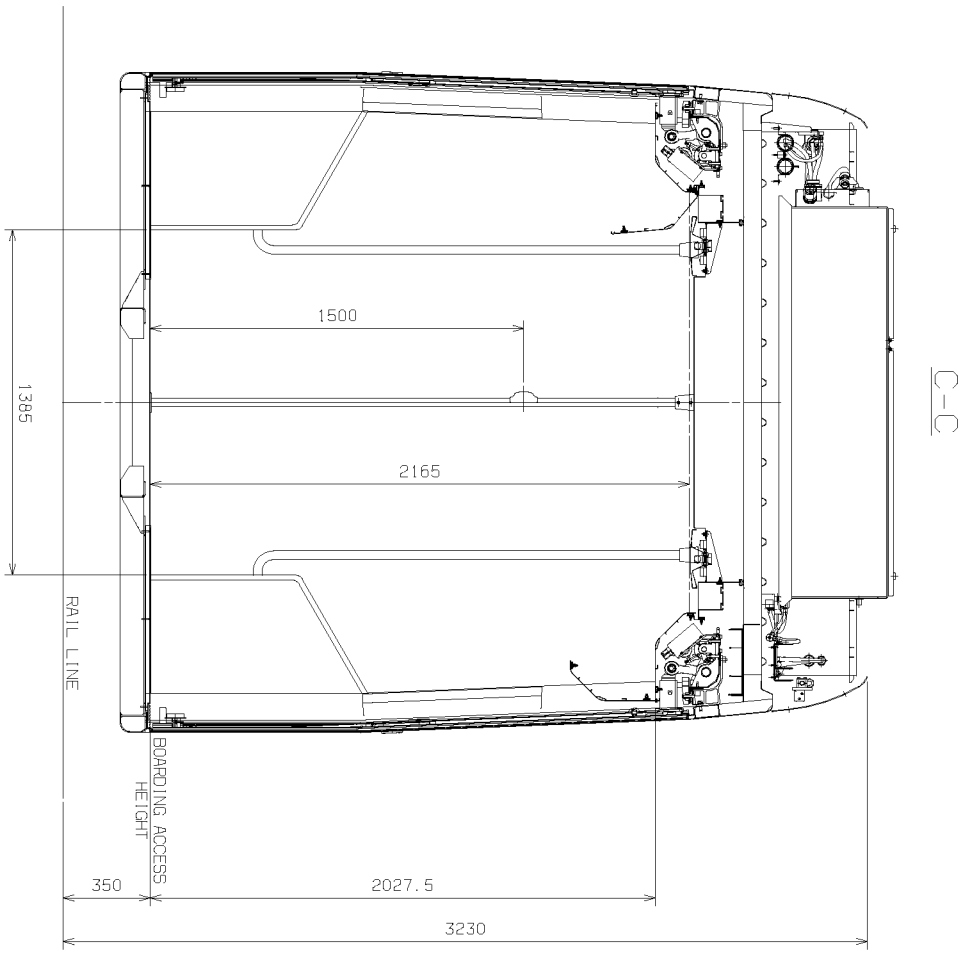
REFERENCIA: Q. 22. 00. 801

-EDINBURGH TRAM-

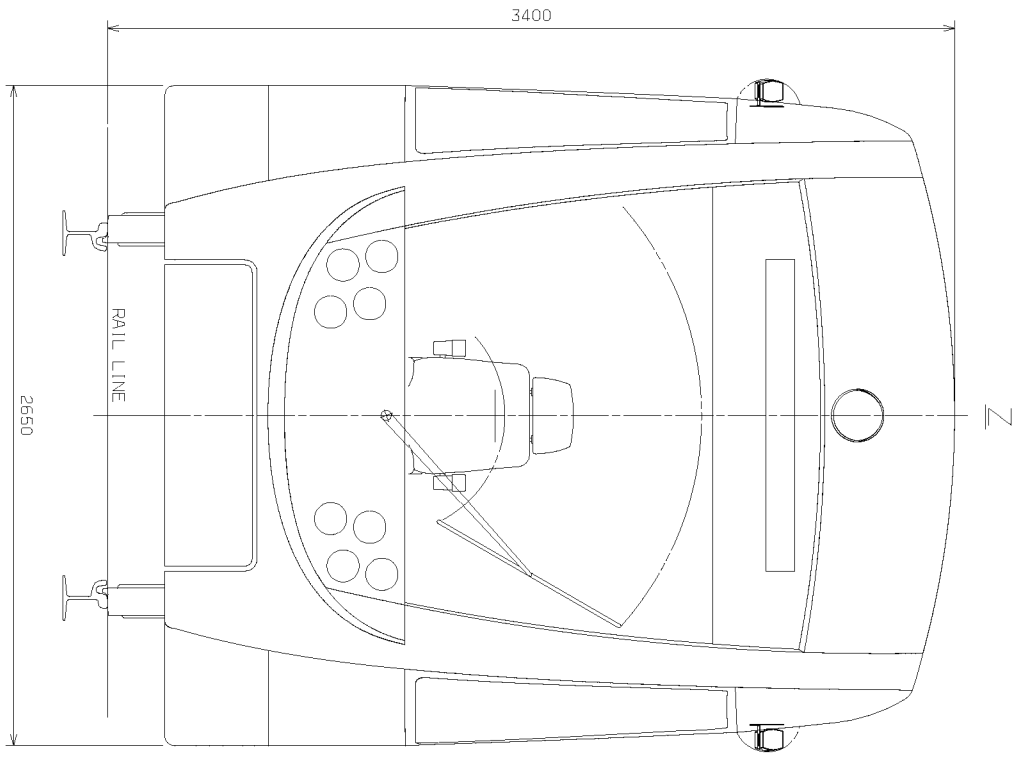
SUSTITUYE A :

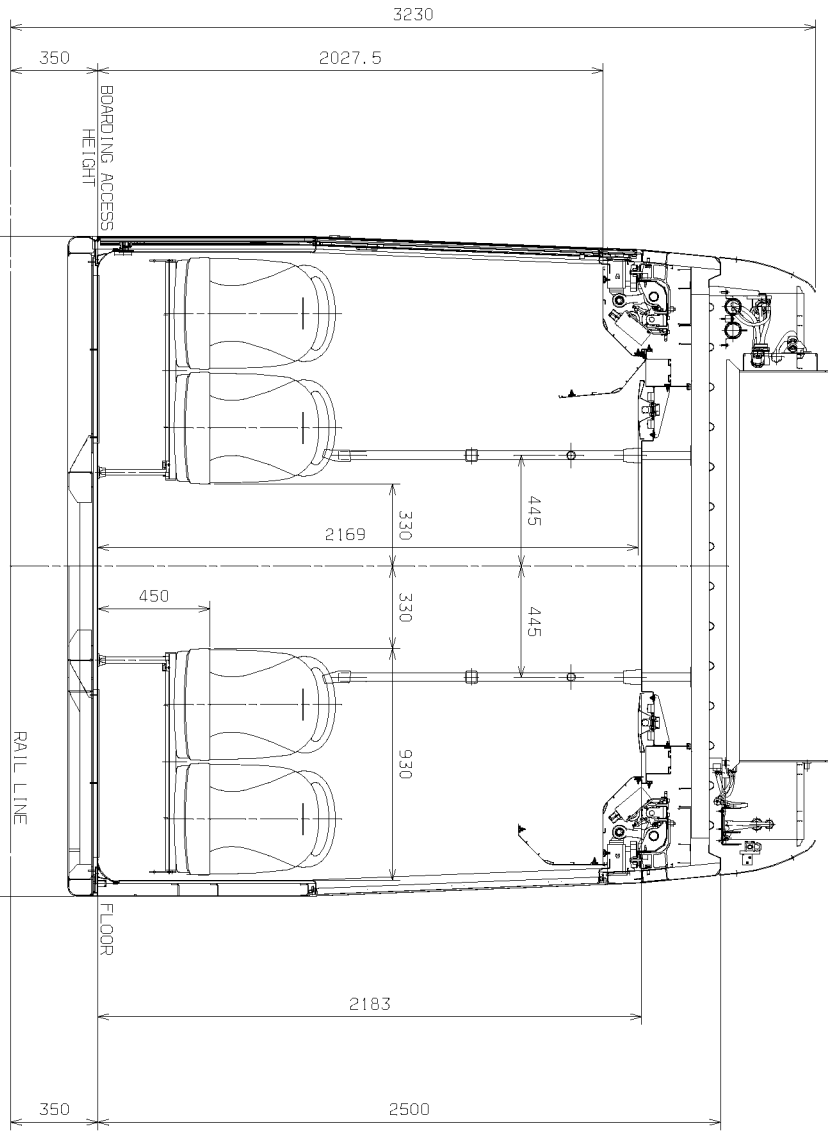
EDICION

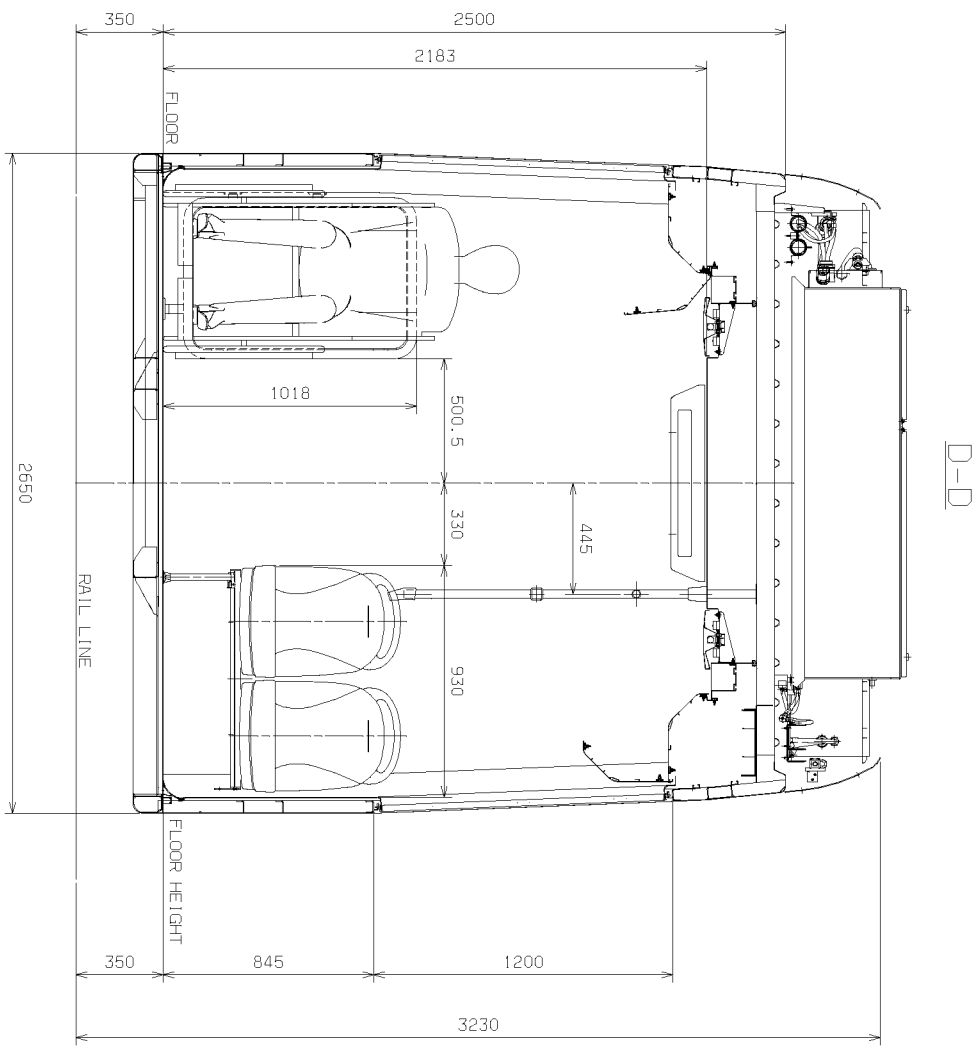
23389 FRAME 1 MARCH 18, 2008 13.25.56



C-C

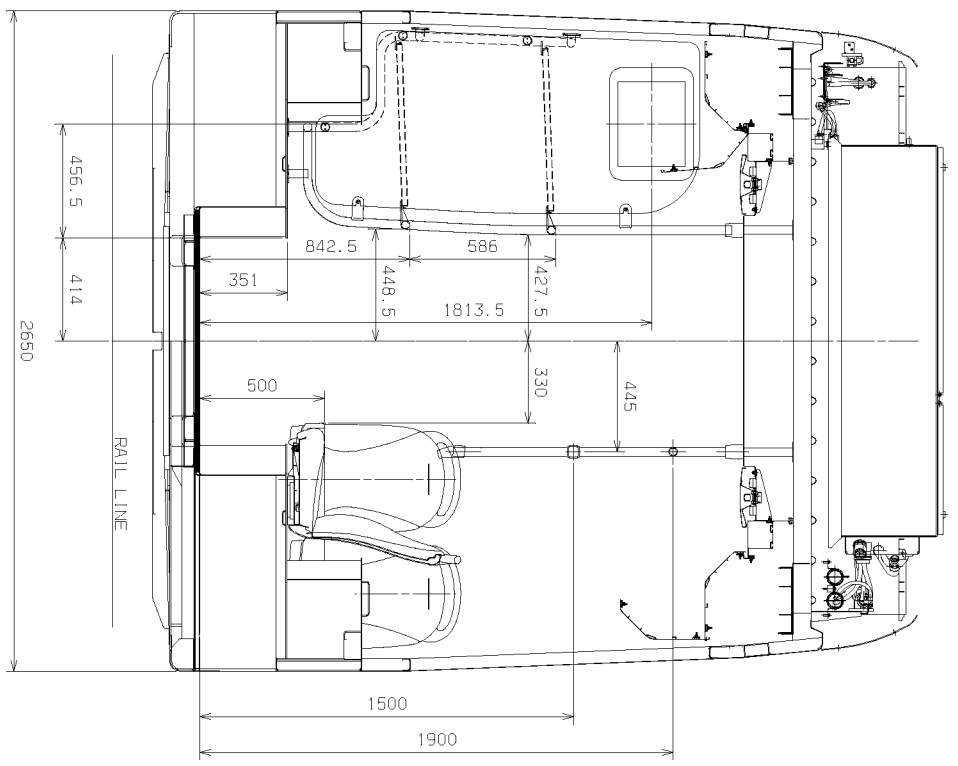






D-D

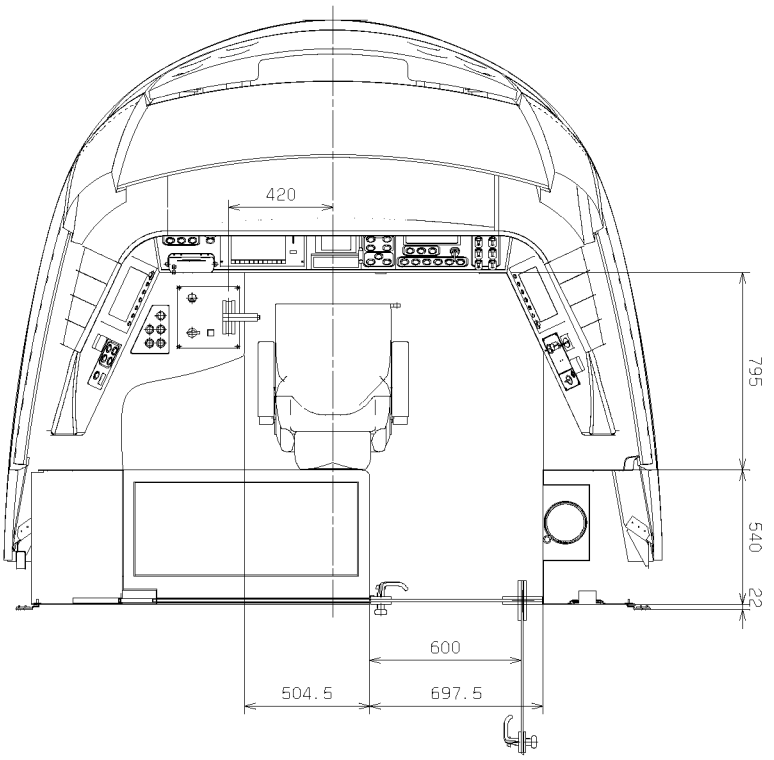
A-A

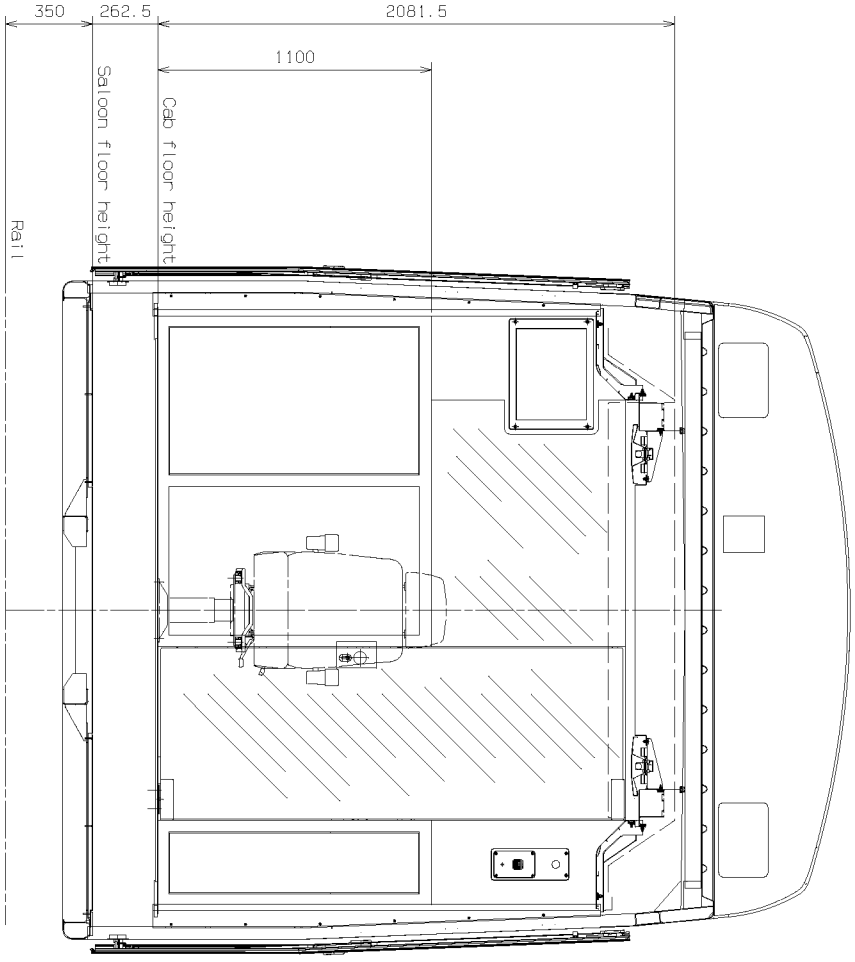


B-B

VERSION 2
PLANO PROVISIONAL

| | | |





MODIFICACIONES

APLICACIONES

-EDINBURGH TRAM-

COMPR.	FECHA	NOMBRES	
VERIFIC.			
HOMOL.			
TOL. GEN.	ESCALA	SUSTITUYE A:	
	1/10	DESIGNACION: CAB LAYOUT	
DIBUJ.	FECHA 18-03-08	NOMBRES	ENTIDAD: CAF-BEASAIN
VERIFIC.	18-03-08		REFERENCIA: Q.22.00.810

SUSTITUYE A : Q.00.072.17 ED.-A

PLANO Nº

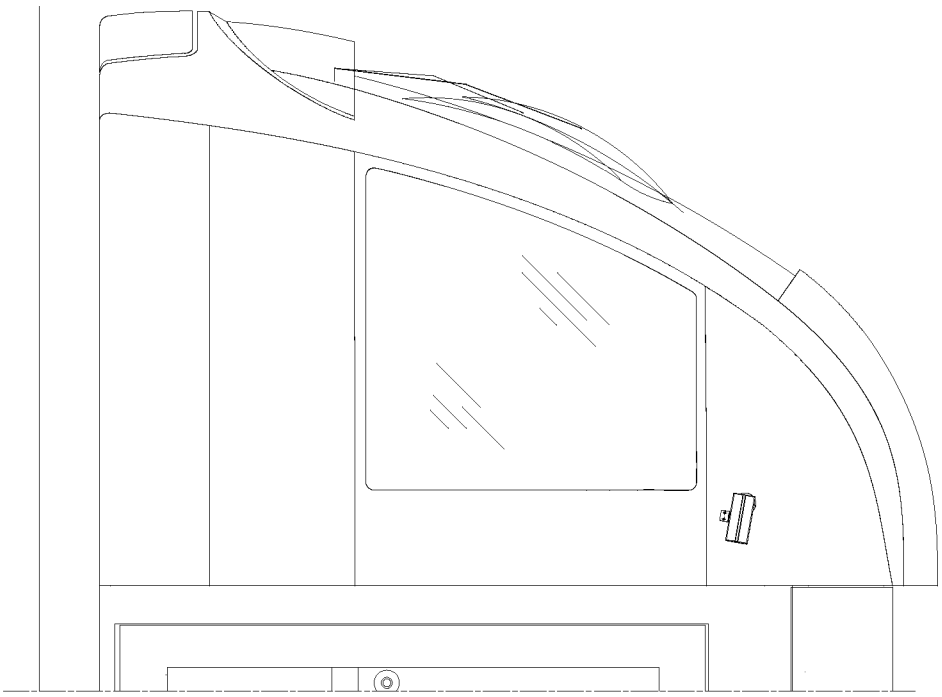
EDICION

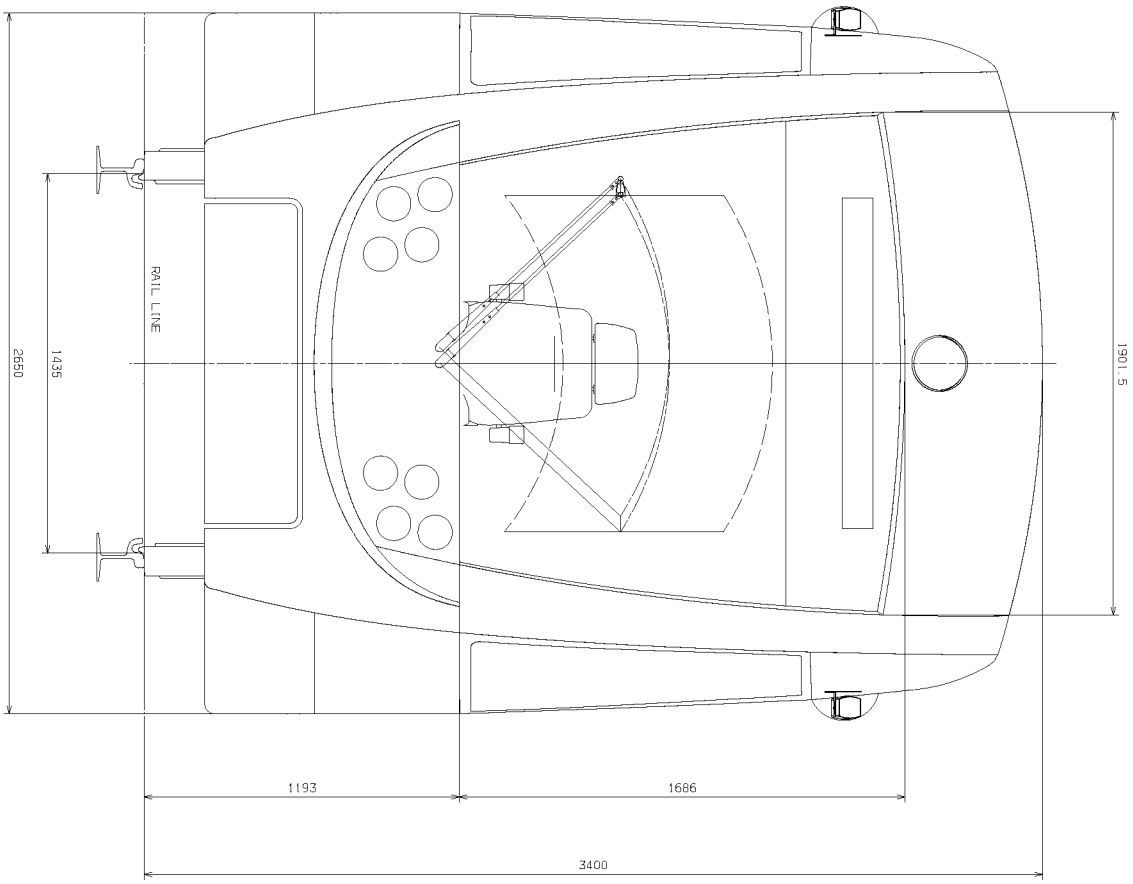
HOJA Nº 1

Nº DE HOJAS 1

EDICION

USB00000086_0289

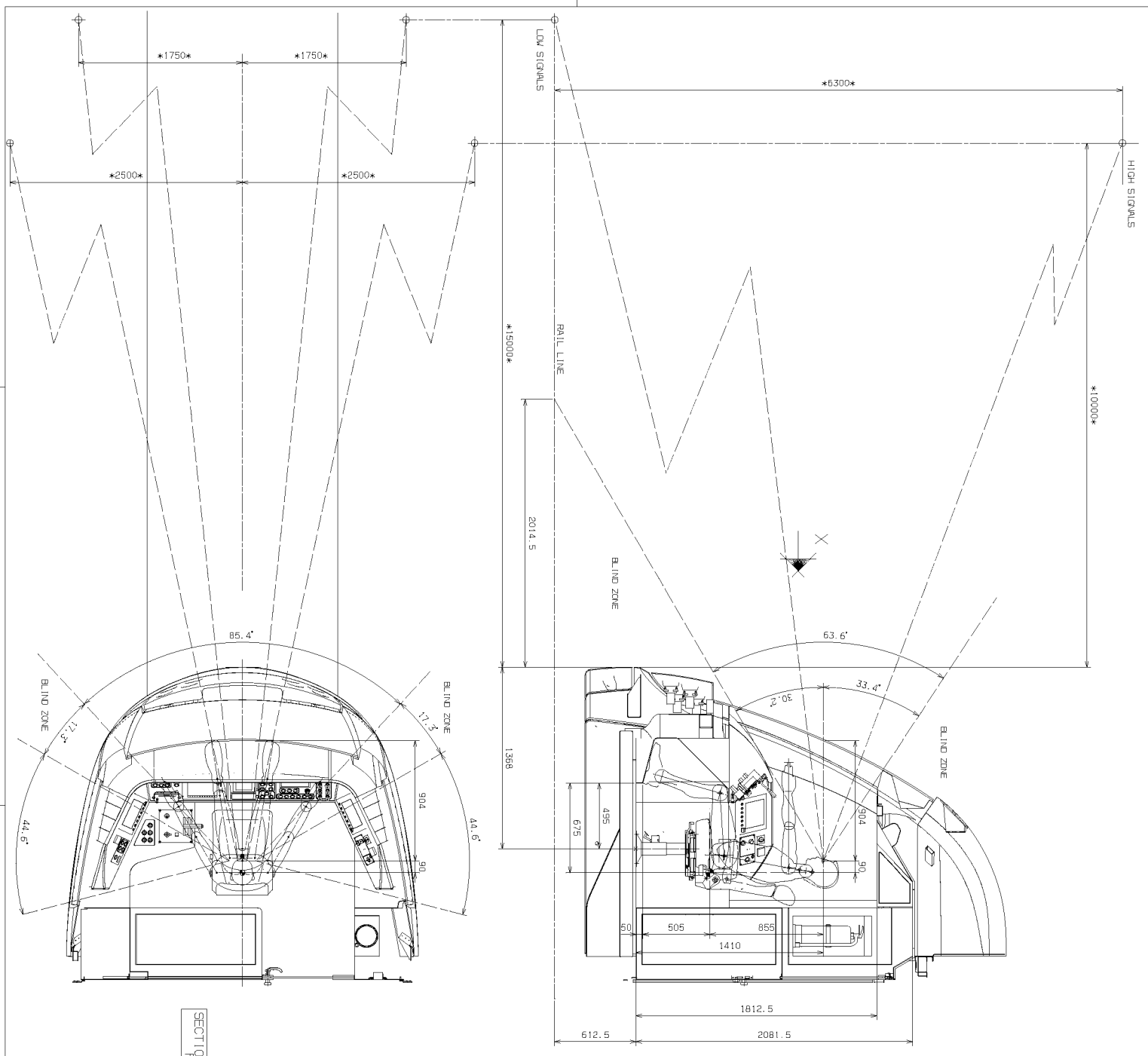




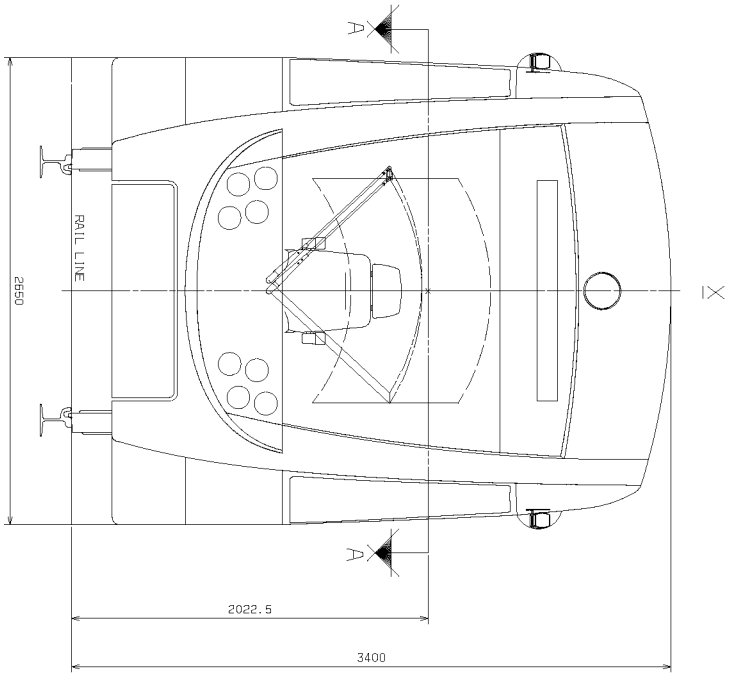
MODIFICACIONES

EDINBURGH TRAM

APLICACIONES



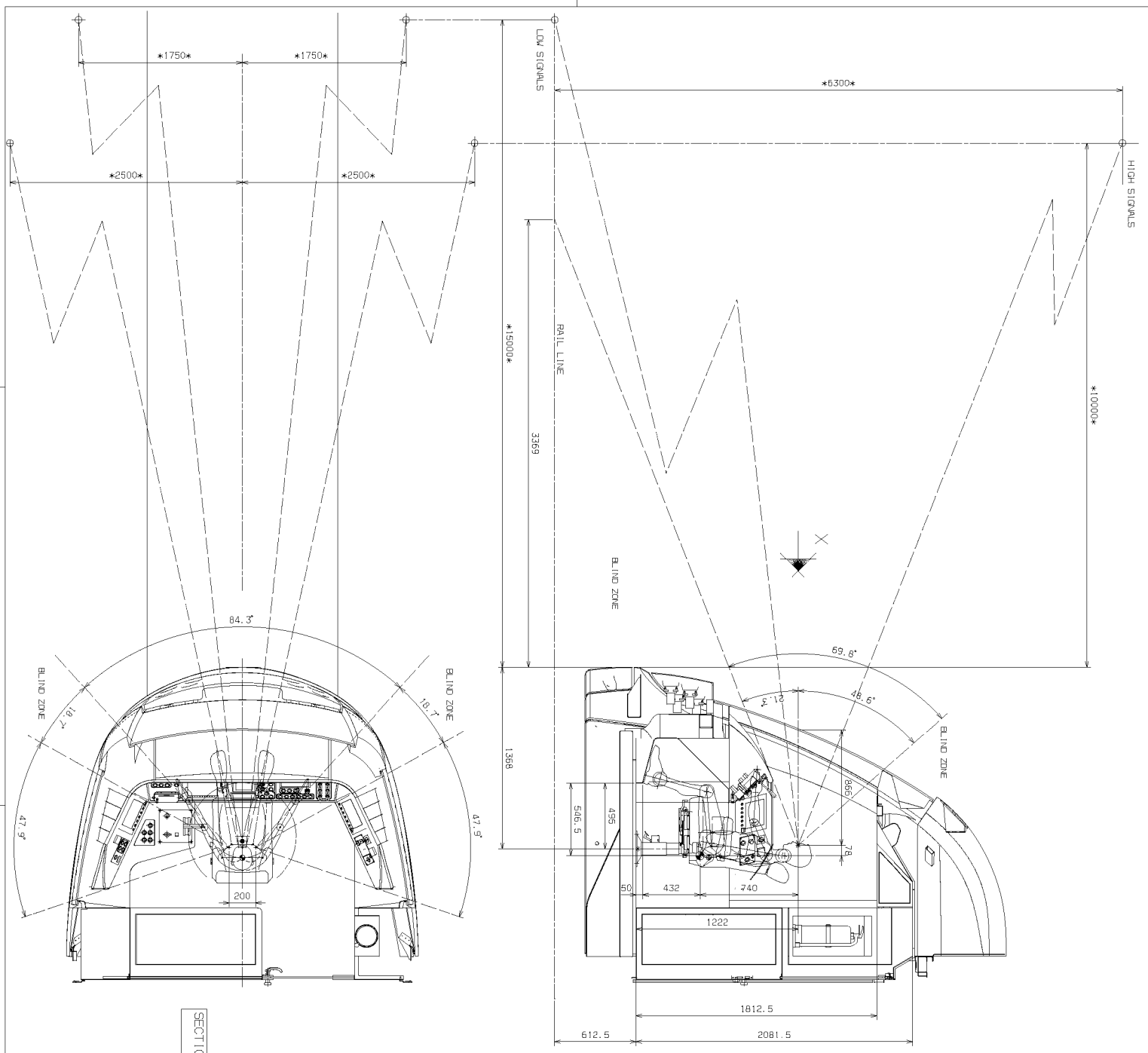
SECTION A-A AT FLOOR LEVEL 1410 mm



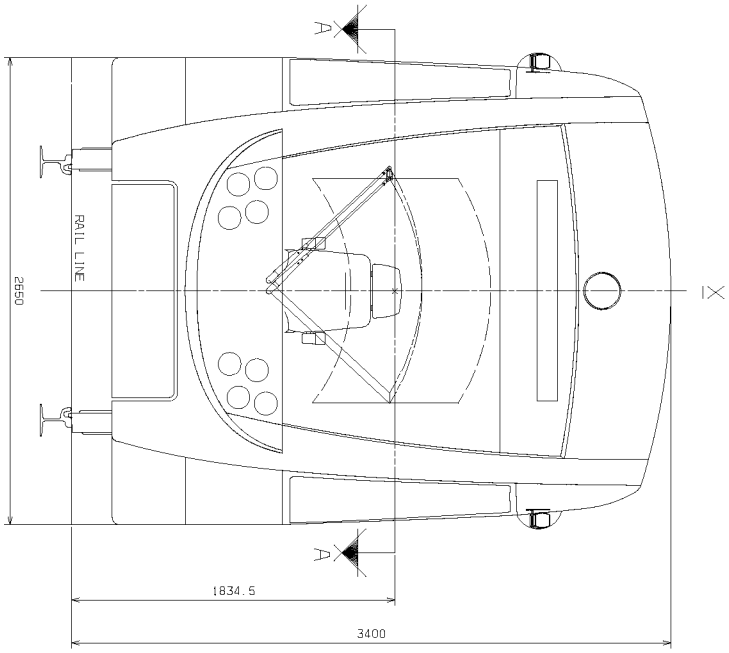
VISIBILITY ACCORDING STANDARD UIC 651

DRIVER HEIGHT: 1900 mm.

| | | |



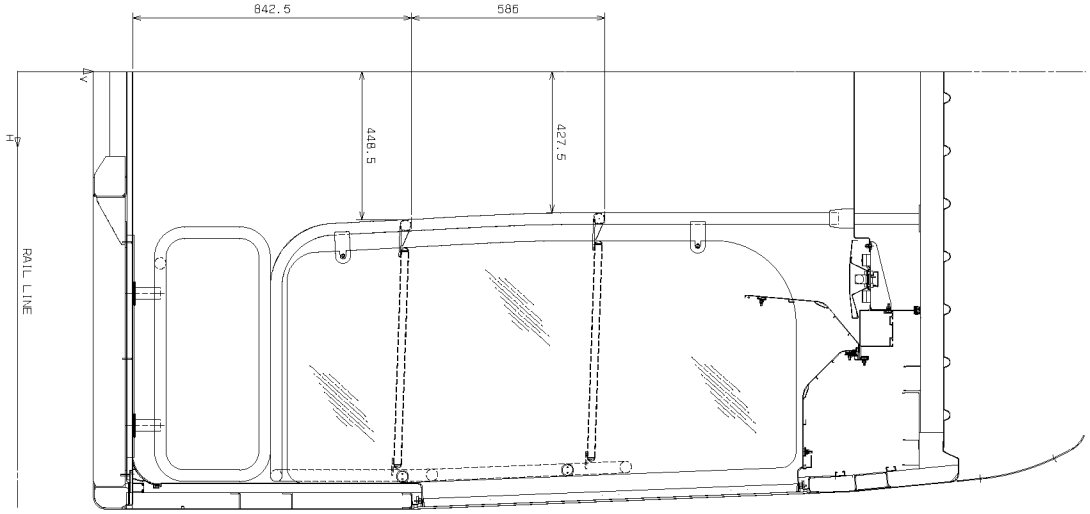
SECTION A-A AT FLOOR LEVEL 1222 mm

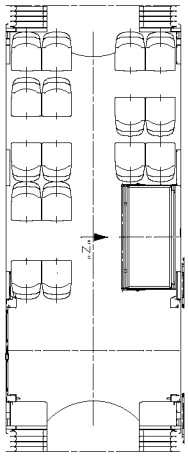


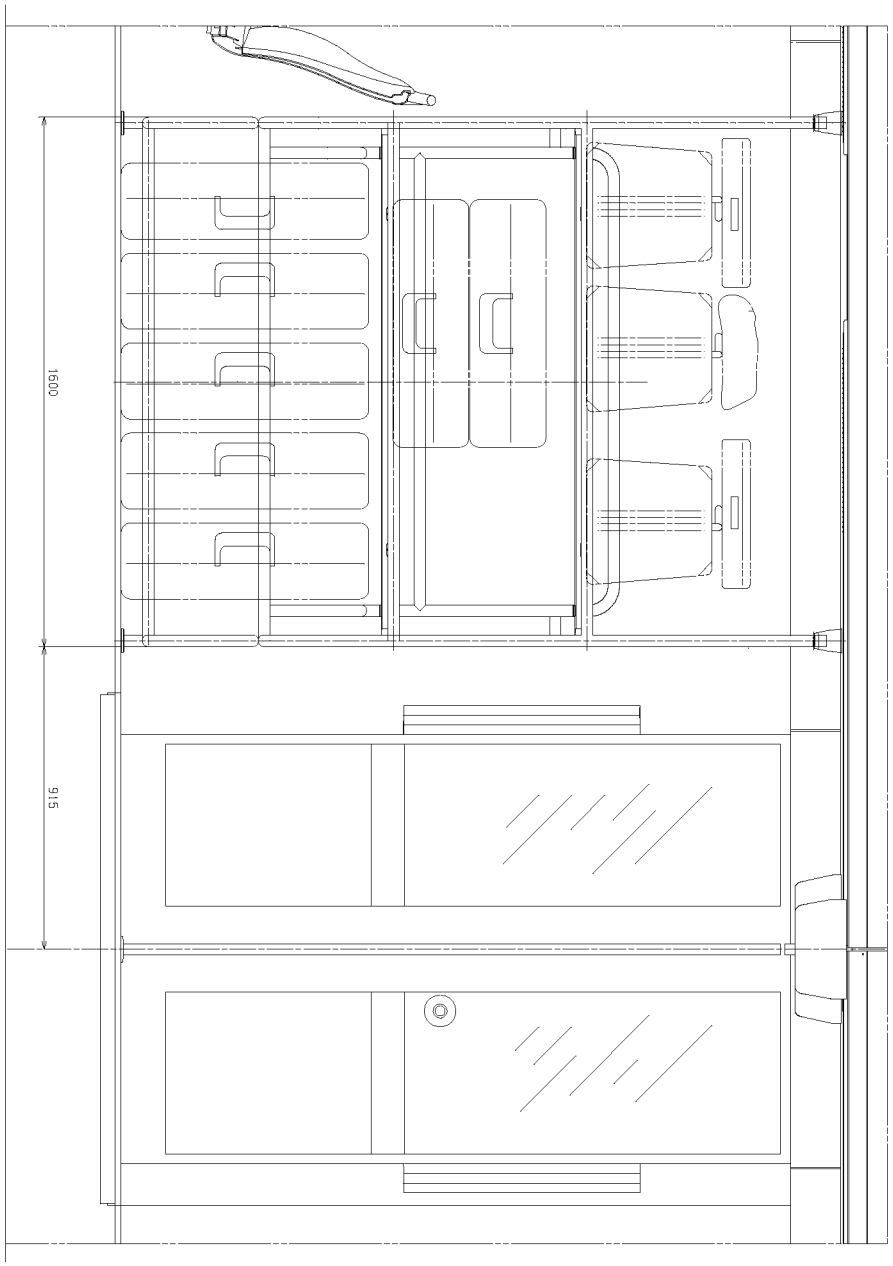
VISIBILITY ACCORDING STANDARD UIC 651

DRIVER HEIGHT: 1600 mm.

| | | |







MODIFICACIONES

APLICACIONES

FECHA NOMBRES

COMPR.

VERIFIC.

MODEL

TOL. GEN. ESCALA 1/8

SUSTITUYE A:

DESIGNACION:

PLANO Nº

DIBUJ. 17-03-08

VERIFIC. 17-03-08

REFERENCIA: Q.22.00.813

EDITADO: CAF-BEASAIN

LUGGAGE CUPBOARD

EDICION

HOJA Nº 1

Nº DE HOJAS 1

-EDINBURGH TRAM-

SUSTITUYE A: Q.00.072.48

EDICION

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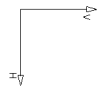

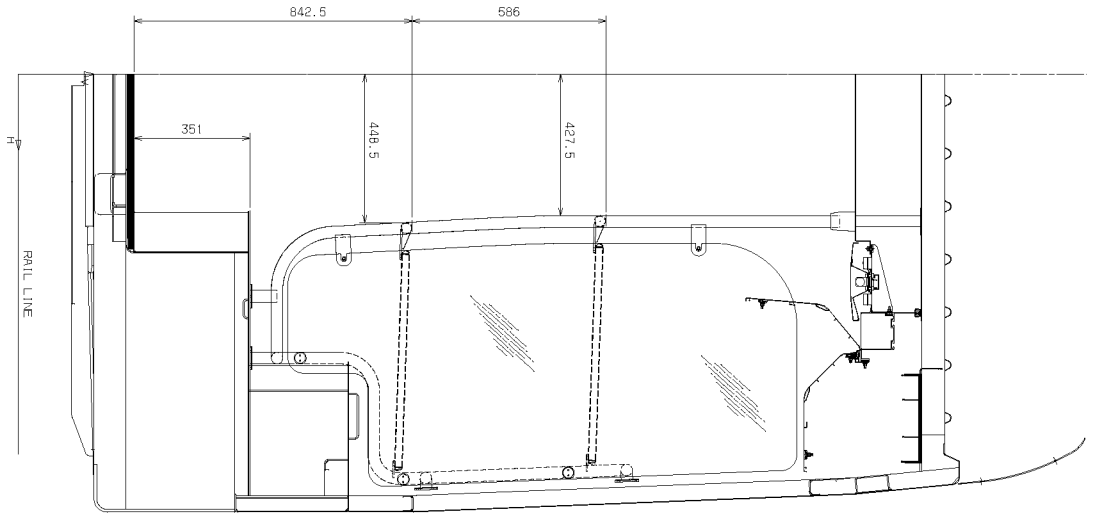

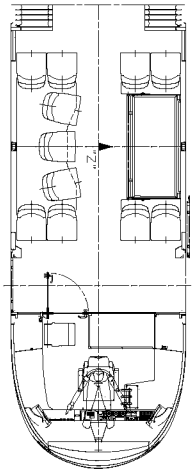

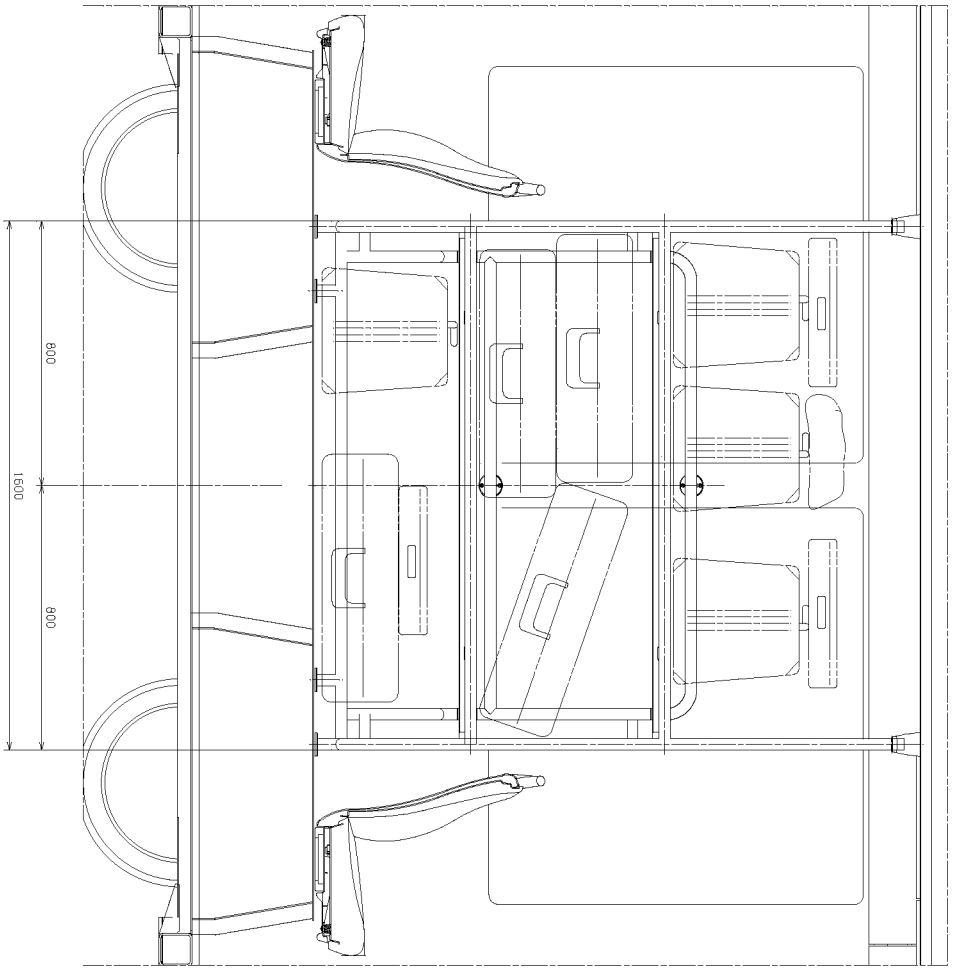

MODIFICACIONES

APLICACIONES

- EDINBURGH TRAM -

SUSTITUYE A : Q 00 072 47

REFERENCIA: Q.22.00.814

CAF-BEASAIN

LUGGAGE CUPBOARD

1/8

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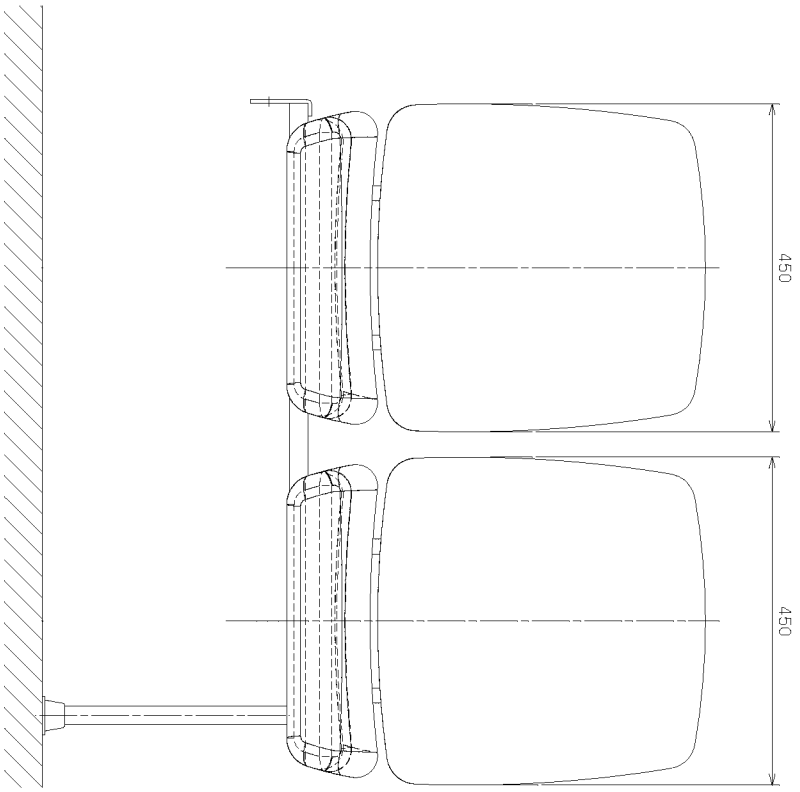
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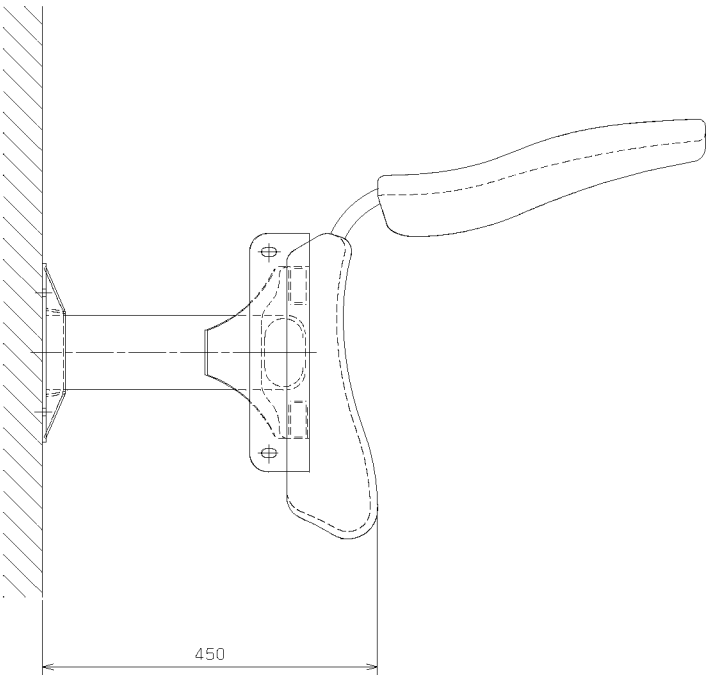
450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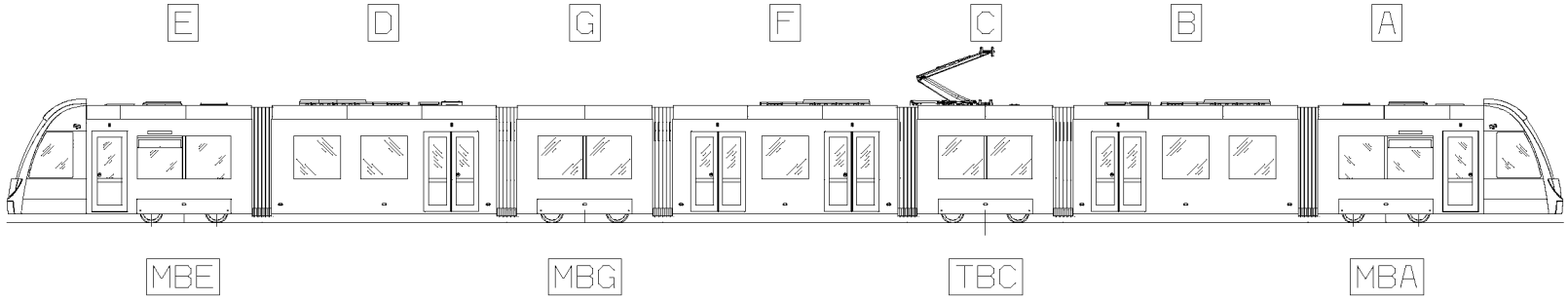


TARE	E	D	G	F	C	B	A	TOTAL
Carbody Weight	6650,7	5622,9	3992,4	4967,4	3690,2	6124,9	6843,7	37892,2
Bogie Weight	4961,0		4961,0		3071,0		4961,0	17954,0
TOTAL Tram Weight	11611,7	5622,9	8953,4	4967,4	6761,2	6124,9	11804,7	55846,2

Vehicle Weight	E	D	G	F	C	B	A	TOTAL
AW0 Tare	11611,7	5622,9	8953,4	4967,4	6761,2	6124,9	11804,7	55846,2
AW1 (full seated)	12457,7	6750,9	9728,9	5249,4	7536,7	7252,9	12650,7	61627,2
AW2 (4p/m2)	13740,8	8944,8	10665,1	8306,3	8472,9	9446,8	13933,8	73510,6
AW3 (5p/m2)	14061,6	9493,3	10899,2	9070,5	8707,0	9995,3	14254,6	76481,5
AW4 (6p/m2)	14382,4	10041,8	11133,3	9834,8	8941,1	10543,8	14575,4	79452,4
AW5 (8p/m2)	15023,9	11138,8	11601,4	11363,2	9409,2	11640,8	15216,9	85394,1

AXLE LOAD	E	D	G	F	C	B	A	TOTAL
AW0 Tare	7211,6		7124,3		6153,7		7433,6	
AW1 (full seated)	7916,565		7864,5225		6893,9225		8138,565	
AW2 (4p/m2)	9106,605		9645,3525		8674,7525		9328,605	
AW3 (5p/m2)	9404,115		10090,56		9119,96		9626,115	
AW4 (6p/m2)	9701,625		10535,7675		9565,1675		9923,625	
AW5 (8p/m2)	10296,645		11426,1825		10455,5825		10518,645	

MODIFICACIONES

APLICACIONES

-EDINBURGH TRAM-

	FECHA	NOMBRES
COMPR.		
VERIFIC.		
HOMOL.		
TOL. GEN.	ESCALA	
	1/100	
DIBUJ.	18-03-08	
VERIFIC.	18-03-08	

PLANO Nº

SUSTITUYE A:

EDICION

DESIGNACION:

WEIGHT DISTRIBUTION LAYOUT

HOJA Nº 1

Nº DE HOJAS 1

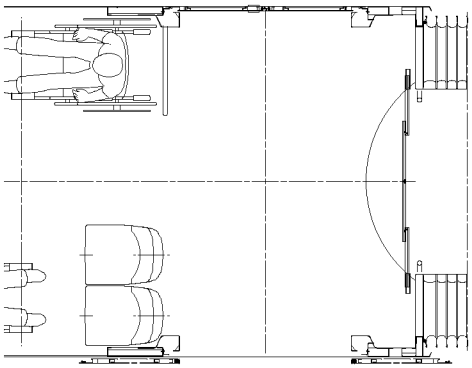
ENTIDAD: CAF-BEASAIN

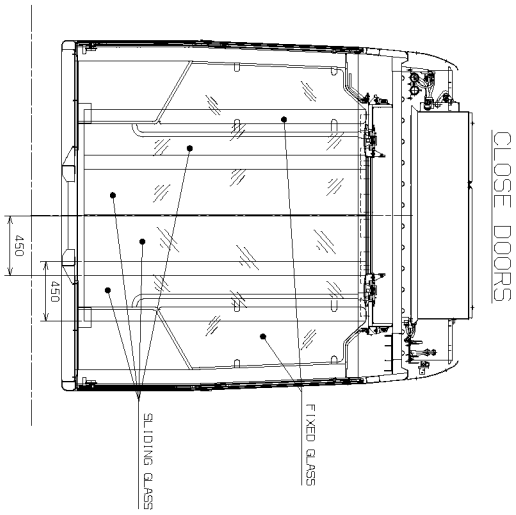
REFERENCIA: Q.22.00.817

SUSTITUYE A : Q.00.072.27 EDIC."A"

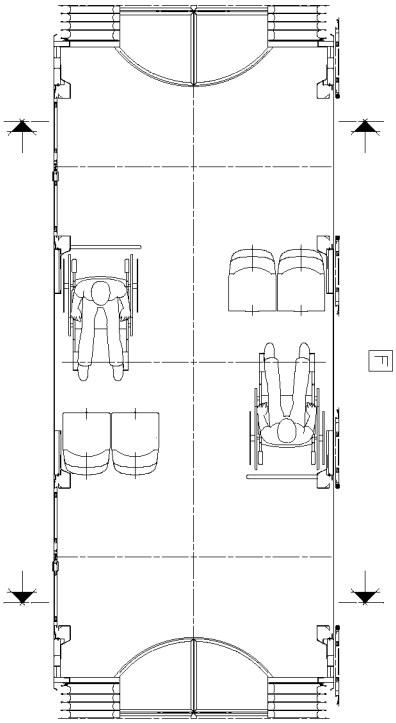
EDICION

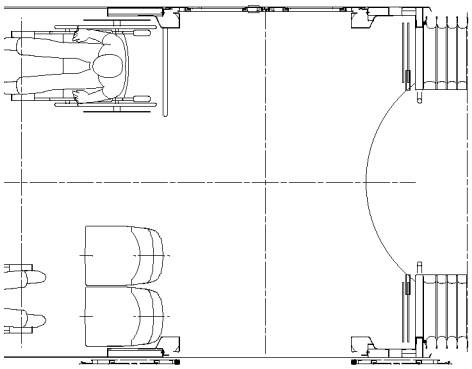
23389 FRAME 1 MARCH 18, 2008 12.28.09

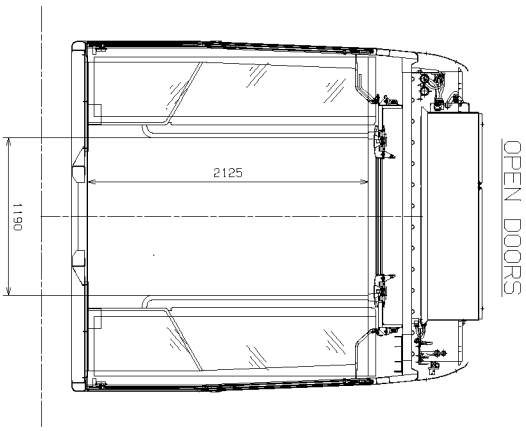




CLOSE DOORS

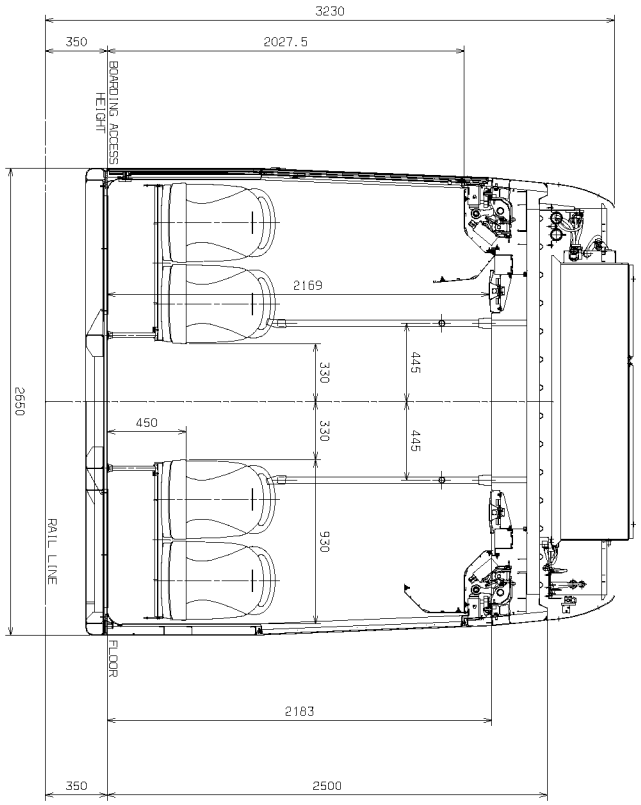


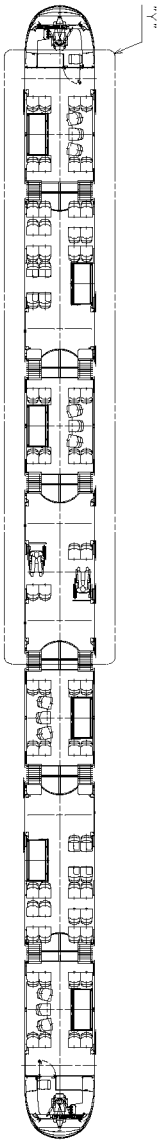




OPEN DOORS

EDINBURGH TRAM											
SUSTITUYE A :											


3230
350
2027.5
BOARDING ACCESS HEIGHT
2169
330
445
450
330
445
2650
930
RAIL LINE
FLOOR
2183
350
2500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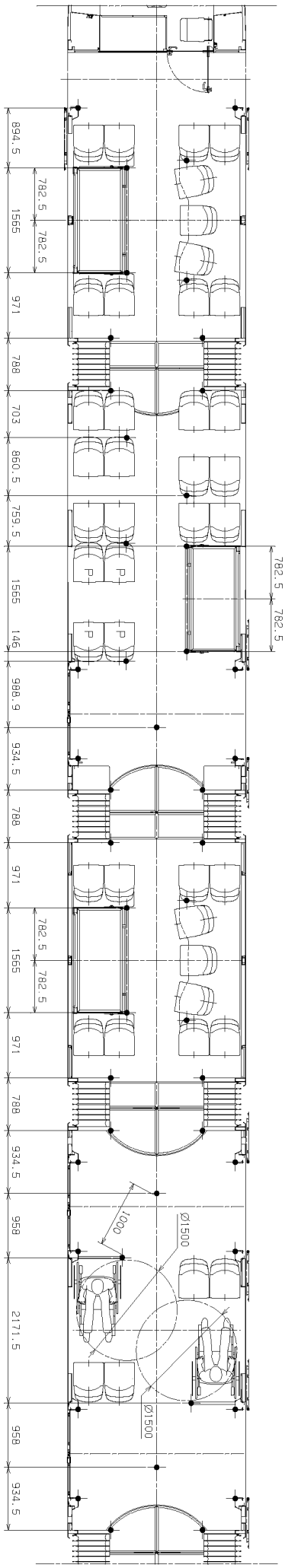
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782.5
1565
782.5
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788
703
860.5
759.5
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146
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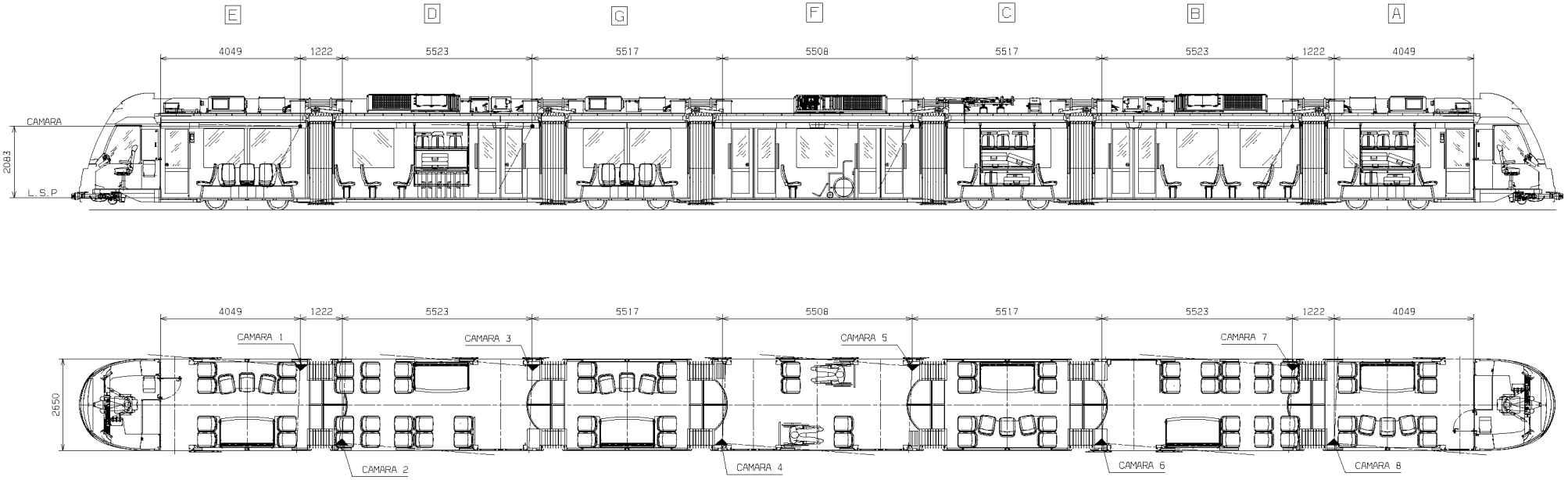
788
971
782.5
1565
782.5
971
788
934.5
958
2171.5
958
934.5
782.5
782.5
P
P
P
P
"Y"
100
Ø1500
Ø1500

HANDHOLDS

| | | |

USB0000086_0300



MARCA	DESCRIPCION	CANT.	Nº SUMINISTRADOR O NORMA FABRICANTE / Nº DIBUJO O CALIDAD MATERIAL	PESO UNITARIO	NOTAS Y OBSERVACIONES
	MODIFICACIONES				

	FECHA	NOMBRES
COMPR.		
VERIFIC.		
NORMAL		

PLANO Nº

SUSTITUYE A:

EDICION

TOL. GRAL.	ESCALA
Nº F 00-037	1/60

DESIGNACION:

DISPOSICION CAMARAS CCTV

HOJA Nº 1

Nº DE HOJAS 1

APLICACIONES

	FECHA	NOMBRES
DIBUJ.	22.01.08	
VERIFIC.	22.01.08	

ENTIDAD: CAF-ZARAGOZA

REFERENCIA: Q. 22. 00. 856

-EDINBURGH TRAM-

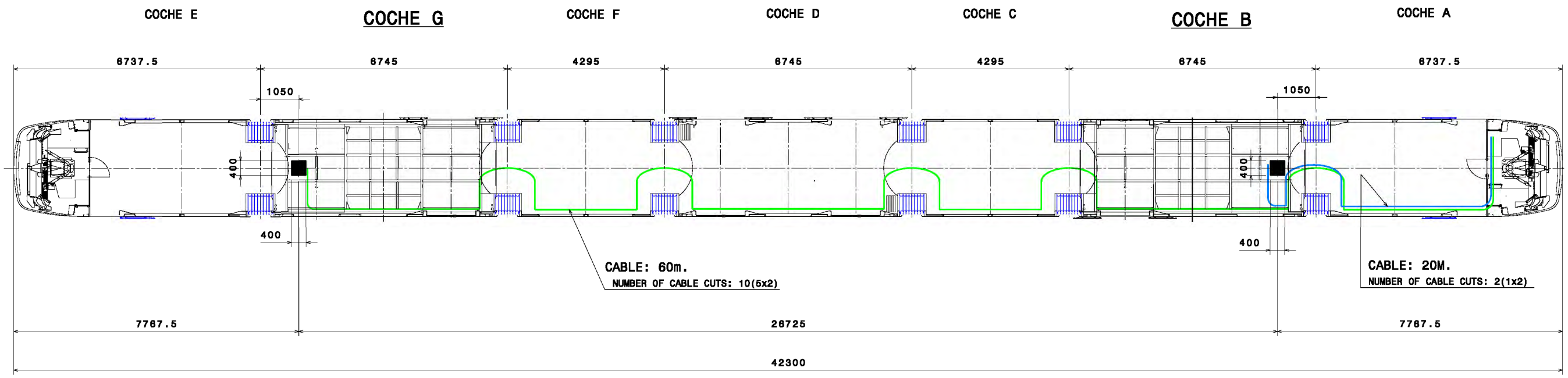
SUSTITUYE A :

EDICION

25091 FRAME 1 FEBRUARY 1, 2008 09.38.48

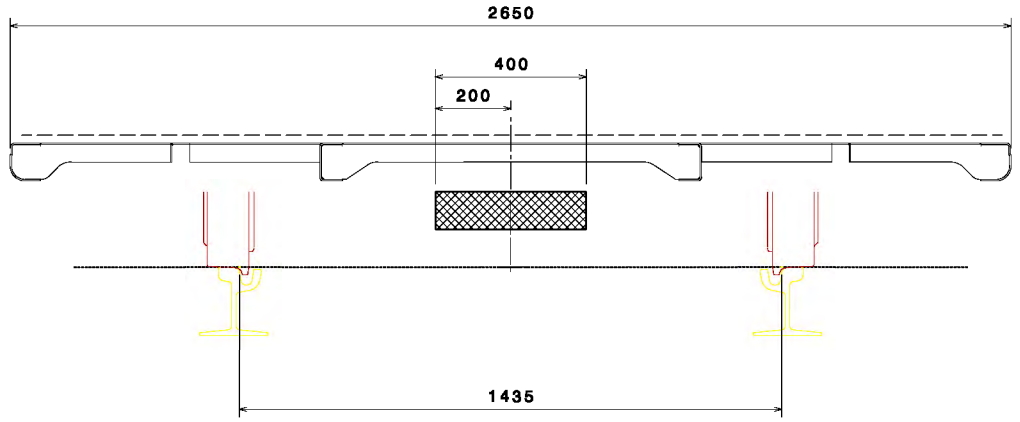
USB00000086_0301

UNIT LAYOUT



TRANSVERSE SECTION

SCALE 1:10



NOTE:
TRANSPONDER DIMENSIONS &
INSTALLATION CONDITIONS
TO BE CONFIRMED BY SUPPLIER

TRANSVERSAL DISPLACEMENT OF TPDS TRANSPONDER, FROM RAIL CENTER LINE

- R= 25m. CURVE _____ 121,85mm.
- R= 2000m. CURVE _____ 87,42mm.

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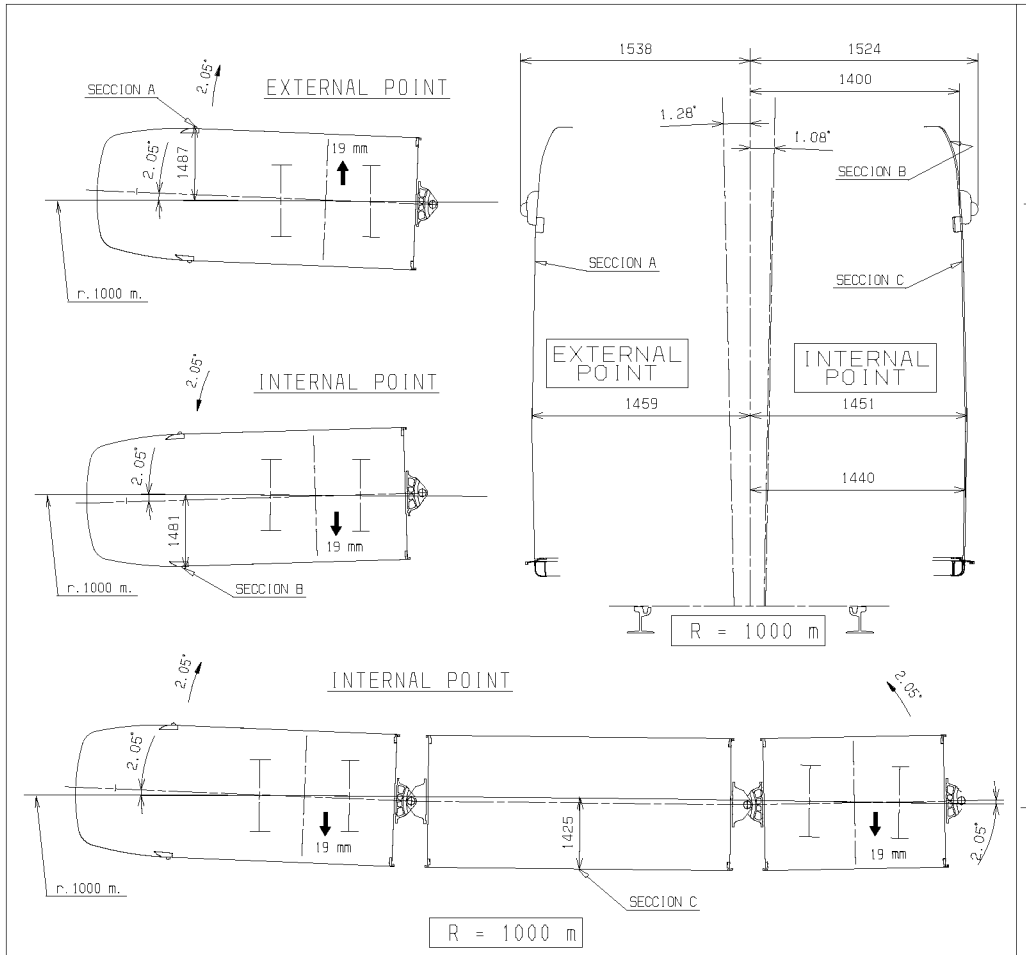
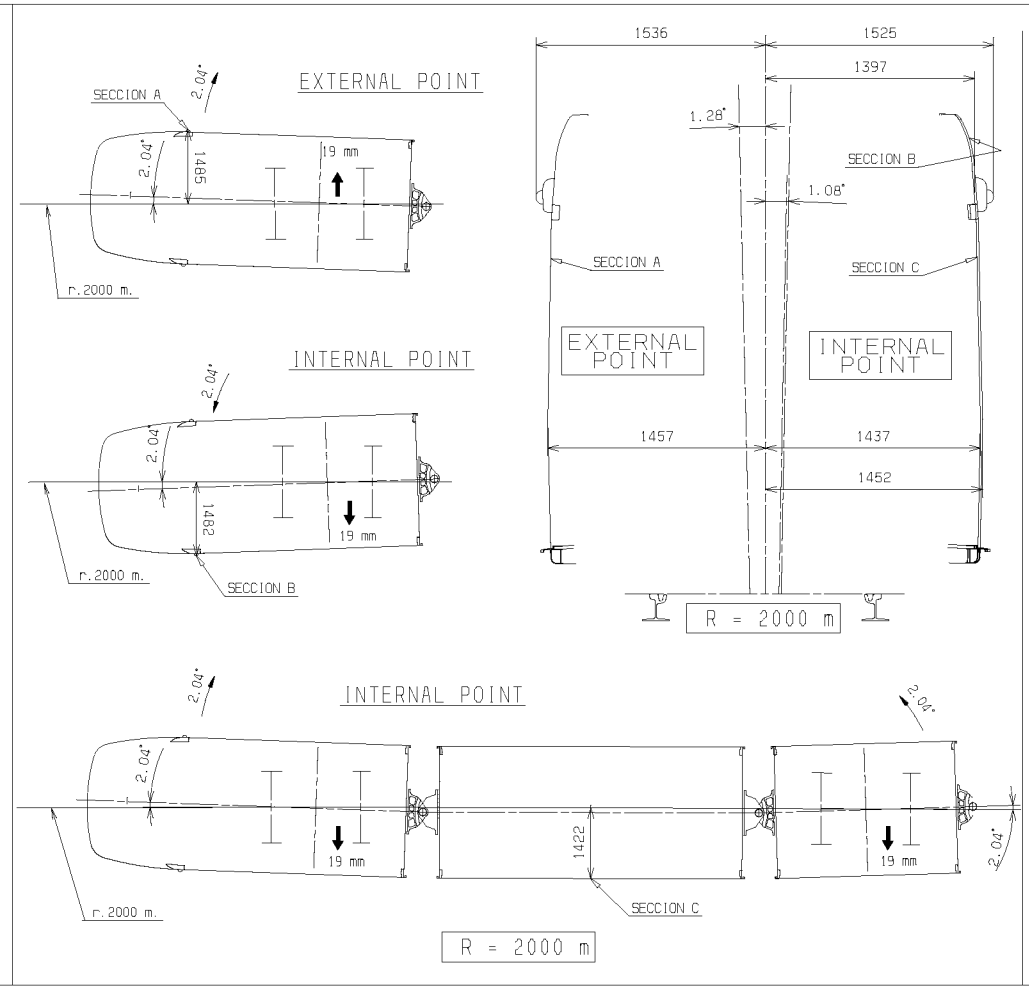
MARCA	DESCRIPCION	CANT.	CODIFICACION O NORMA / Nº DIBUJO O CALIDAD MATERIAL:	MATERIAL O REFERENCIA	PESO UNITARIO	(mm) DIMENSIONES / NOTAS Y OBSERVACIONES
	MODIFICACIONES					

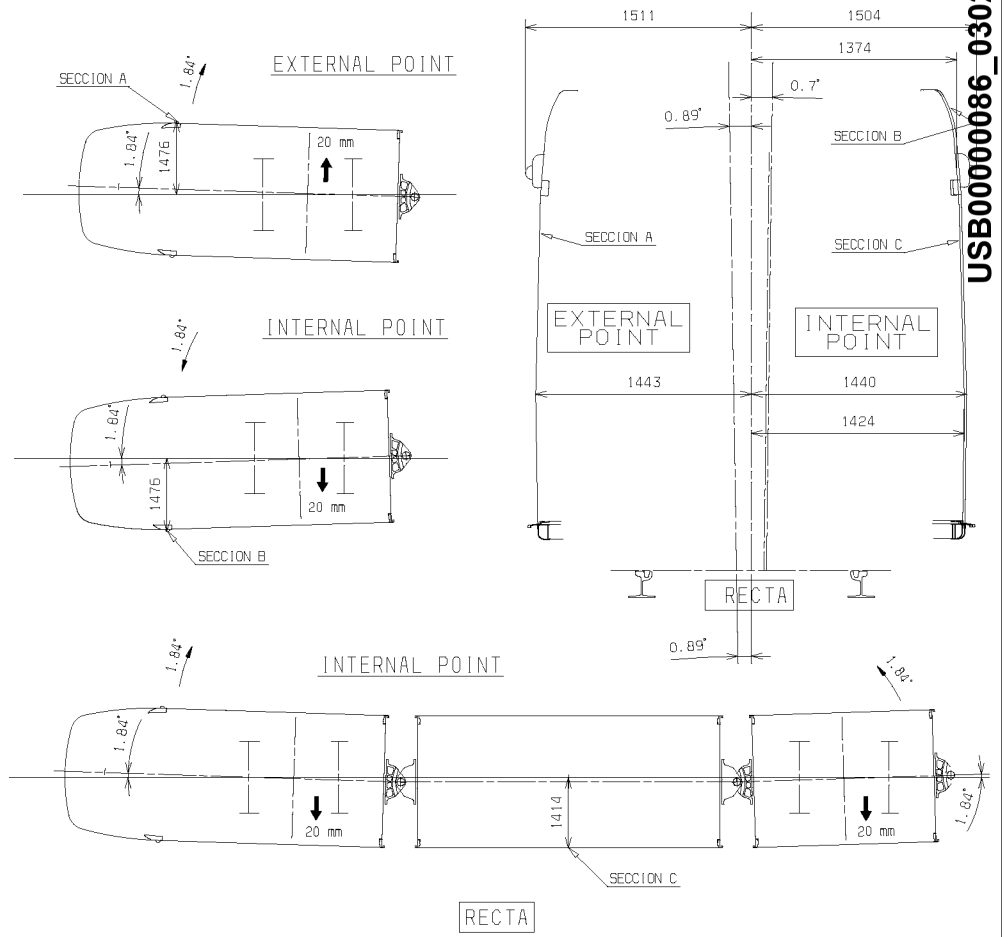
	FECHA	NOMBRES	
COMPR.			PLANO Nº
VERIFIC			
HOMOL.			
			SUSTITUYE A:
TOL. GEN	ESCALA		DESIGNACION: TPDS TRANSPONDER OPTION FOR ASSEMBLY
	1:80		
	FECHA	NOMBRES	ENTIDAD: CAF
DIBUJ.	4-12-07	CUADRADO	REFERENCIA: Q.22.72.999
VERIFIC.	4-12-07	I.ADUELO	
EDINBURGH TRAM			SUSTITUYE A :

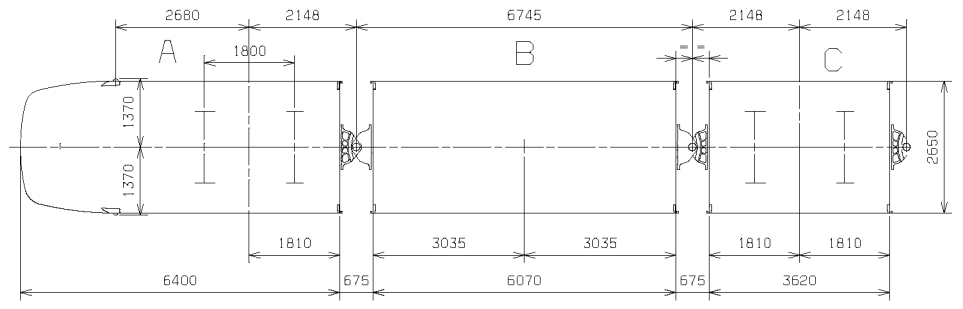
EDICION
HOJA Nº 1
Nº DE HOJAS 1
A1
EDICION

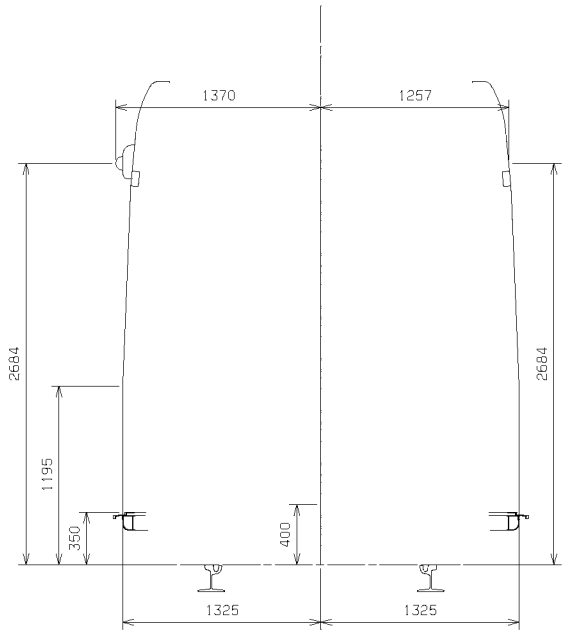
USB00000086_0302











NOTE.-FULL ACCUMMULATION OF RAIL WEAR
AND TOLERANCES CONSIDERED.
PLEASE REFER TO Q.22.93.105 FOR ACCURATE VALUES
OF DKE CONSIDERING STATISCAL DISTRIBUTION
OF RAIL WEAR/TOLERANCES

THIS DRAWING CONSIST ON THREE SHEETS

DATA Transverse Displacements:

- $\frac{l-d}{2}$ = 28.5 mm
  - Max. flage wear: 2 mm
  - Wheel-rail clearance: 3.5 mm
  - Gauge (+10mm-Rail wear) 5 mm
  - Horiz. alignm.(+15mm-Rail wear): 10 mm
  - Rail wear : 5 mm
- q = 3.4 mm
  - Axlebox: 0.4 mm
  - Primary suspension: 3 mm
- Secundary suspension displacement: 20 mm

- Bogie spin due to traction rod clearances: (max)0.8°
- Bogie spin due to $\frac{l-d}{2}$ + q: 1.84°
- Hc: 400 mm.
- Souplesse: 0.1
- Exterior
  - *Cant deficiency(100mm) w/s= 0.38°
  - *Asymmetrical loading: 0.45°
  - *Dinamyc oscillations: 0.44°
  - *Vertical alignement: 0.25°

- Interior(Dynamic effects not considered)
  - *Cant deficiency(100mm) w/s= 0.38°
  - *Asymmetrical loading: 0.45°
  - *Vertical alignement: 0.25°

MARCA	DESCRIPCION	CANT.	Nº SUMINISTRADOR O NORMA FABRICANTE	PESO UNITARIO
			Nº DIBUJO O CALIDAD MATERIAL	NOTAS Y OBSERVACIONES

MODIFICACIONES

	FECHA	NOMBRES
COMPR.		
VERIFIC.		
NORMAL.		
TOL. GEN.	ESCALA	

PLANO Nº

SUSTITUYE A:

EDICION

DESIGNACION:

GAUGE

HOJA Nº 1

Nº DE HOJAS 3

APLICACIONES

	FECHA	NOMBRES
DIBUJ.	06.02.08	
VERIFIC.	06.02.08	J.Piqueras

ENTIDAD: CAF-ZARAGOZA

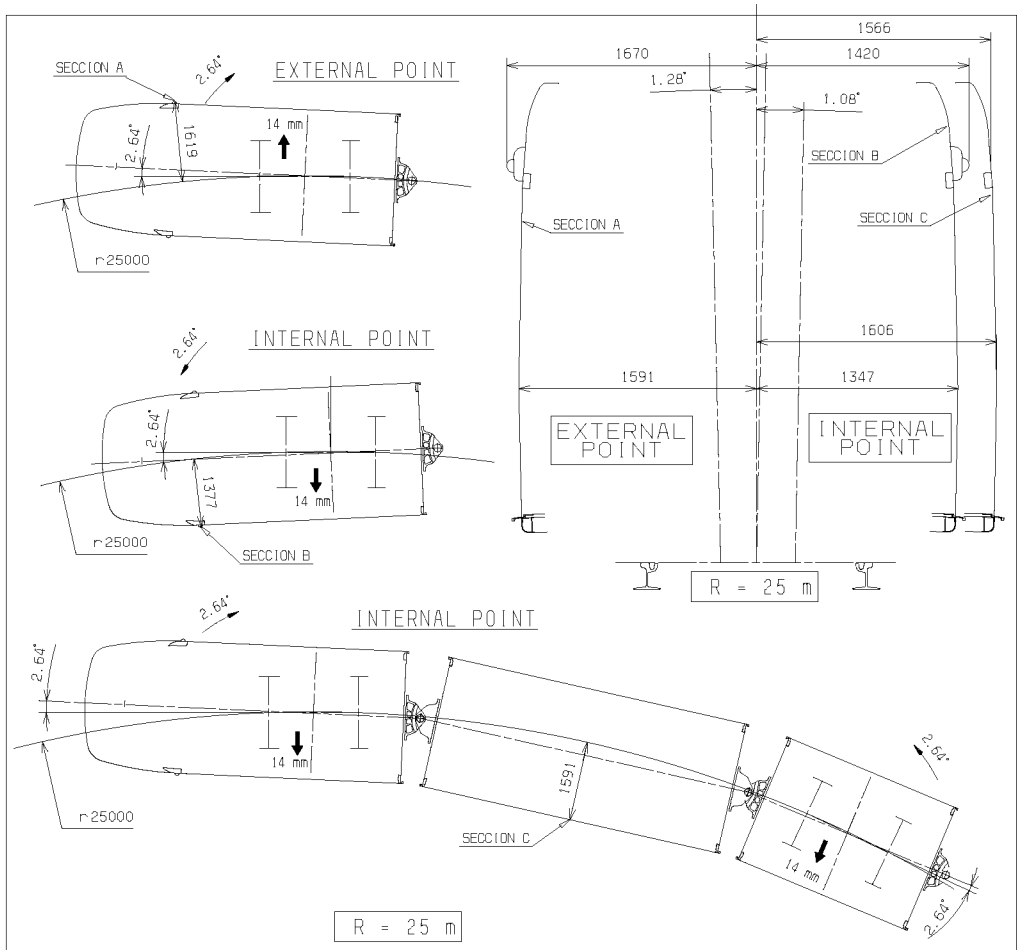
REFERENCIA: Q. 22. 93. 101

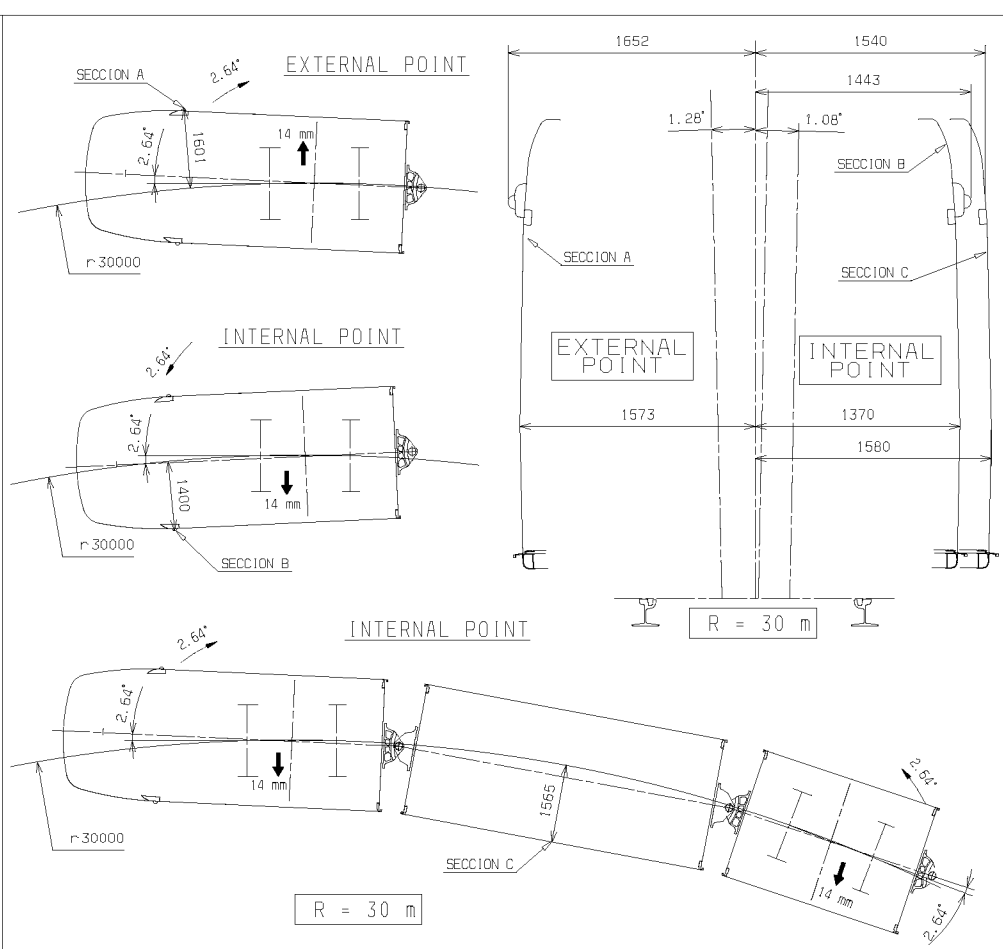
-EDINBURGH TRAM-

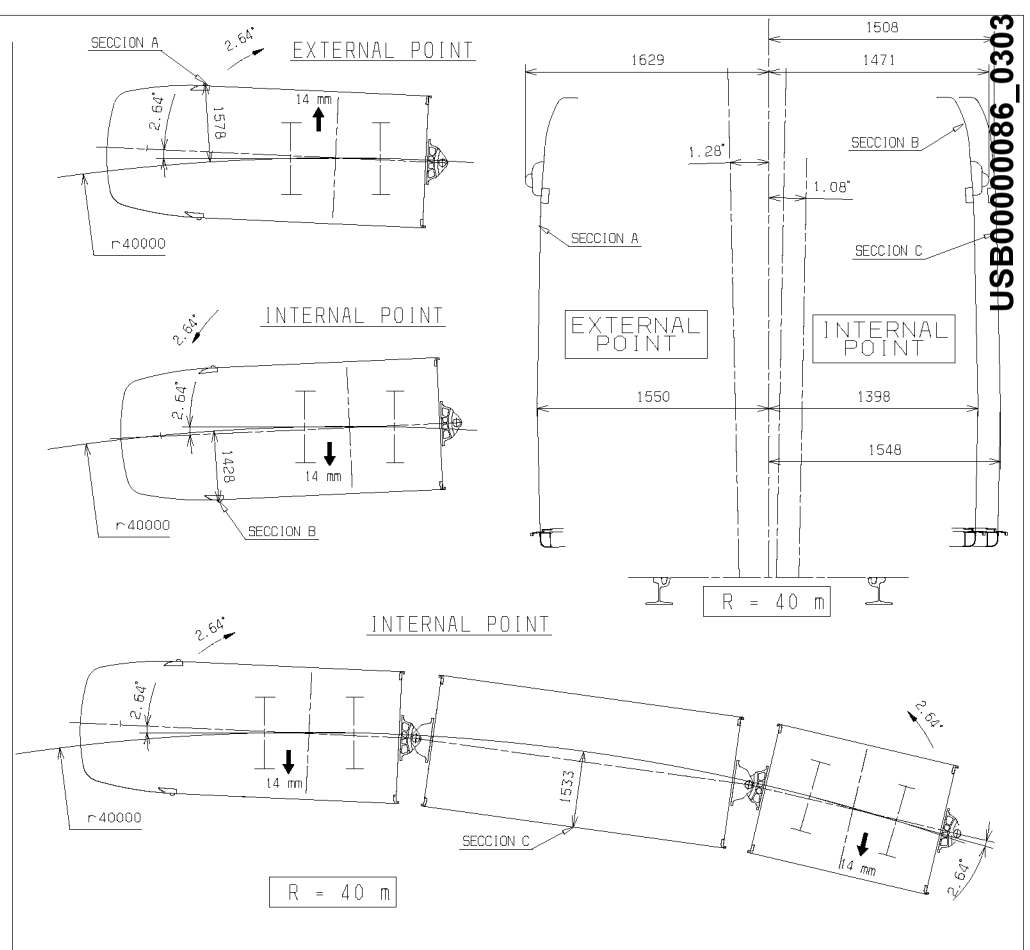
SUSTITUYE A :

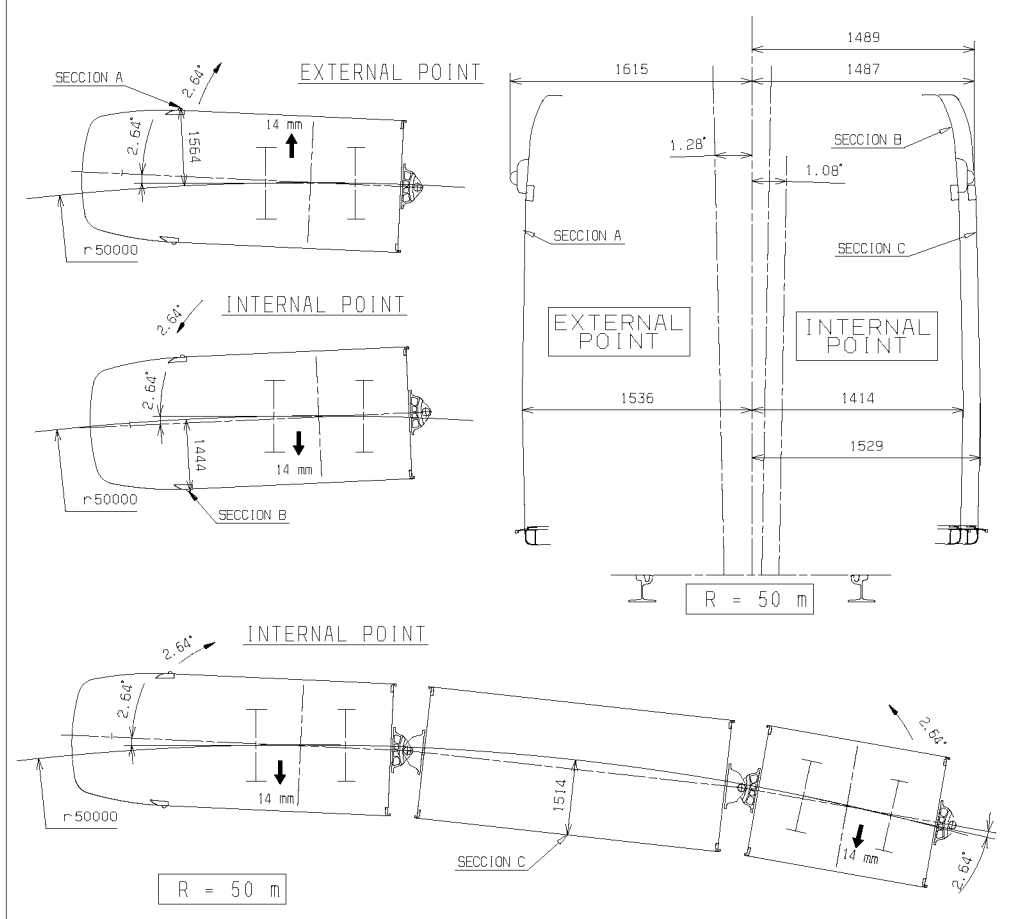
EDICION

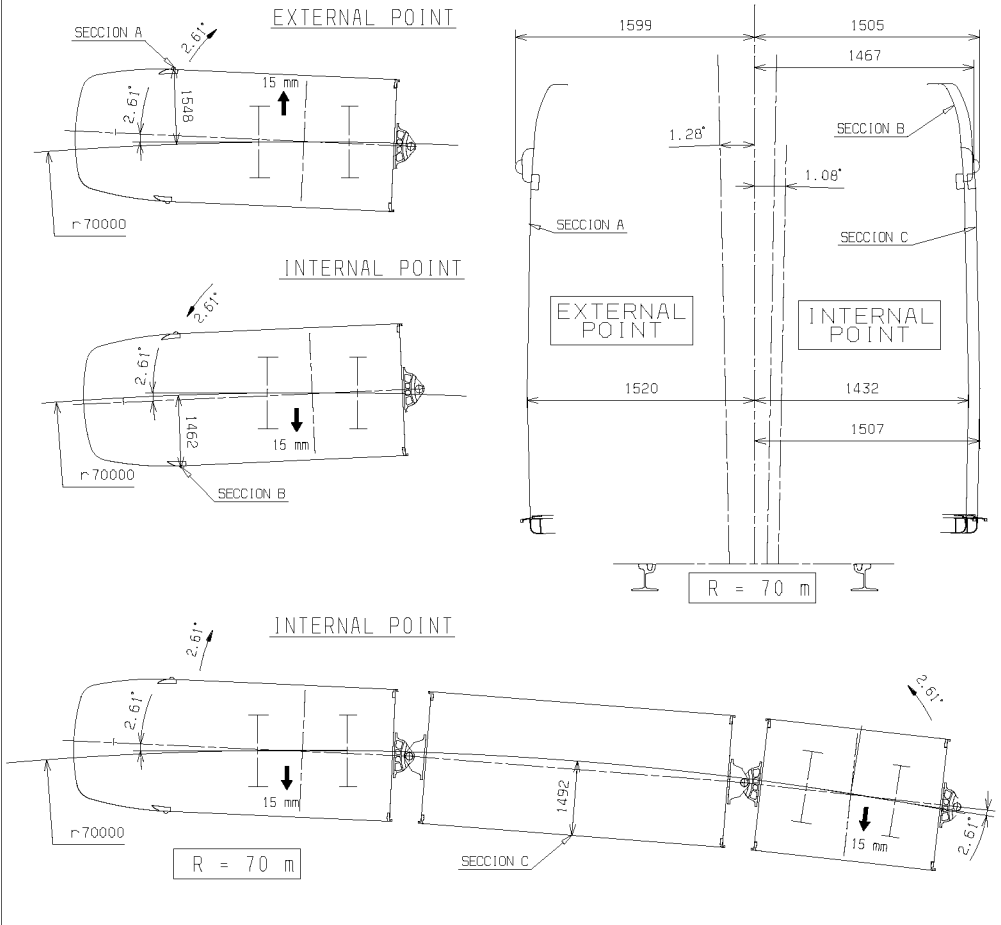
23337 FRAME 1 MARCH 17, 2008 13.38.51







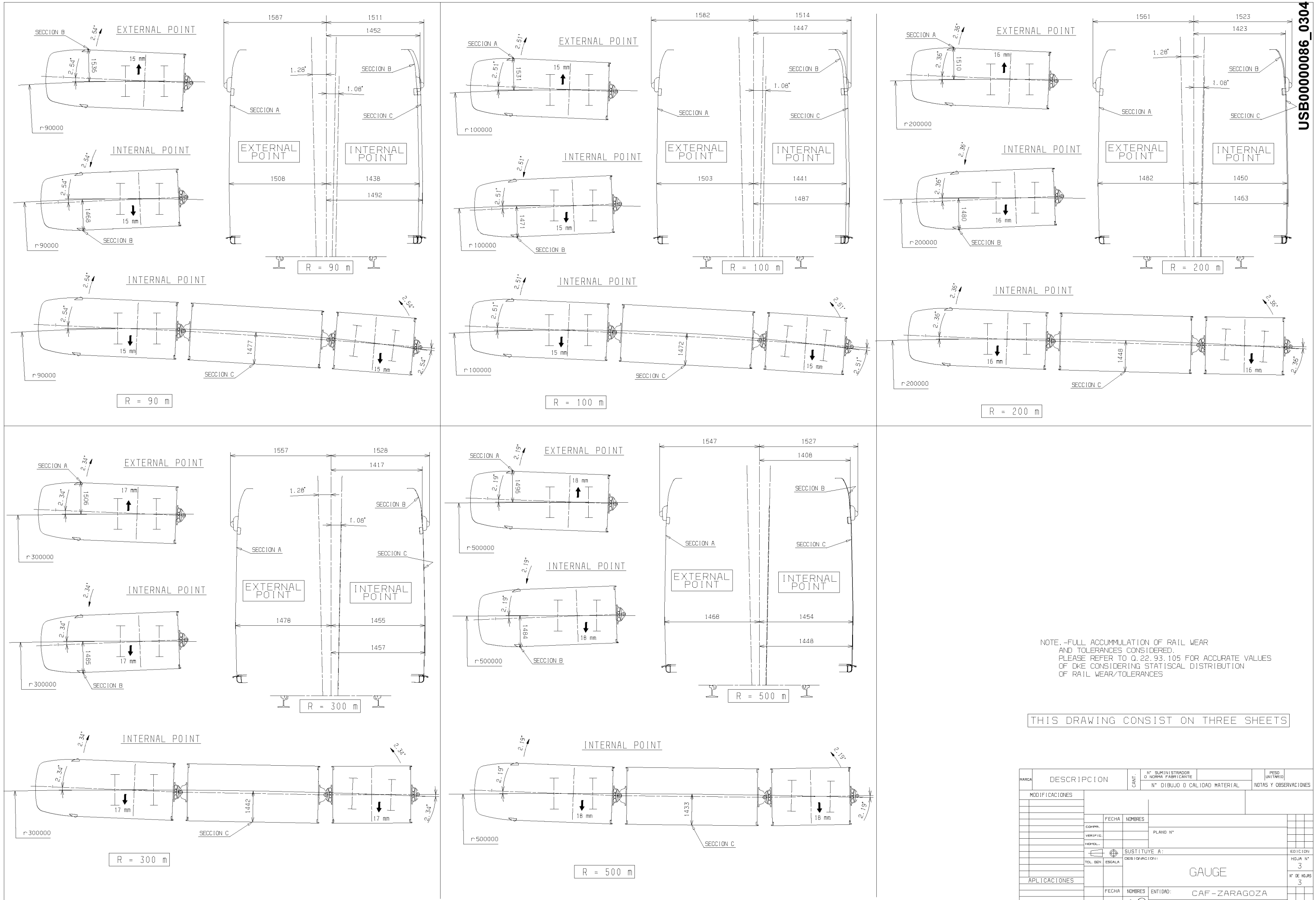




NOTE.-FULL ACCUMMULATION OF RAIL WEAR
AND TOLERANCES CONSIDERED.
PLEASE REFER TO Q.22.93.105 FOR ACCURATE VALUES
OF DKE CONSIDERING STATISCAL DISTRIBUTION
OF RAIL WEAR/TOLERANCES

THIS DRAWING CONSIST ON THREE SHEETS

MARCA	DESCRIPCION	CANT.	Nº SUMINISTRADOR O NORMA FABRICANTE		PESO UNITARIO
			Nº DIBUJO O CALIDAD MATERIAL		NOTAS Y OBSERVACIONES
MODIFICACIONES					



NOTE.-FULL ACCUMMULATION OF RAIL WEAR
AND TOLERANCES CONSIDERED.
PLEASE REFER TO Q.22.93.105 FOR ACCURATE VALUES
OF DKE CONSIDERING STATISCAL DISTRIBUTION
OF RAIL WEAR/TOLERANCES

THIS DRAWING CONSIST ON THREE SHEETS

MARCA	DESCRIPCION	CANT.	Nº SUMINISTRADOR O NORMA FABRICANTE / Nº DIBUJO O CALIDAD MATERIAL	PESO UNITARIO / NOTAS Y OBSERVACIONES

MODIFICACIONES

APLICACIONES

-EDINBURGH TRAM-

	FECHA	NOMBRES
COMPR.		
VERIFIC.		
HOMOL.		
TOL. GEN.	ESCALA	

PLANO Nº

SUSTITUYE A:

DESIGNACION: GAUGE

EDICION

HOJA Nº 3

Nº DE HOJAS 3

	FECHA	NOMBRES
DIBUJ.	06.02.08	
VERIFIC.	06.02.08	J.Piqueras

ENTIDAD: CAF-ZARAGOZA

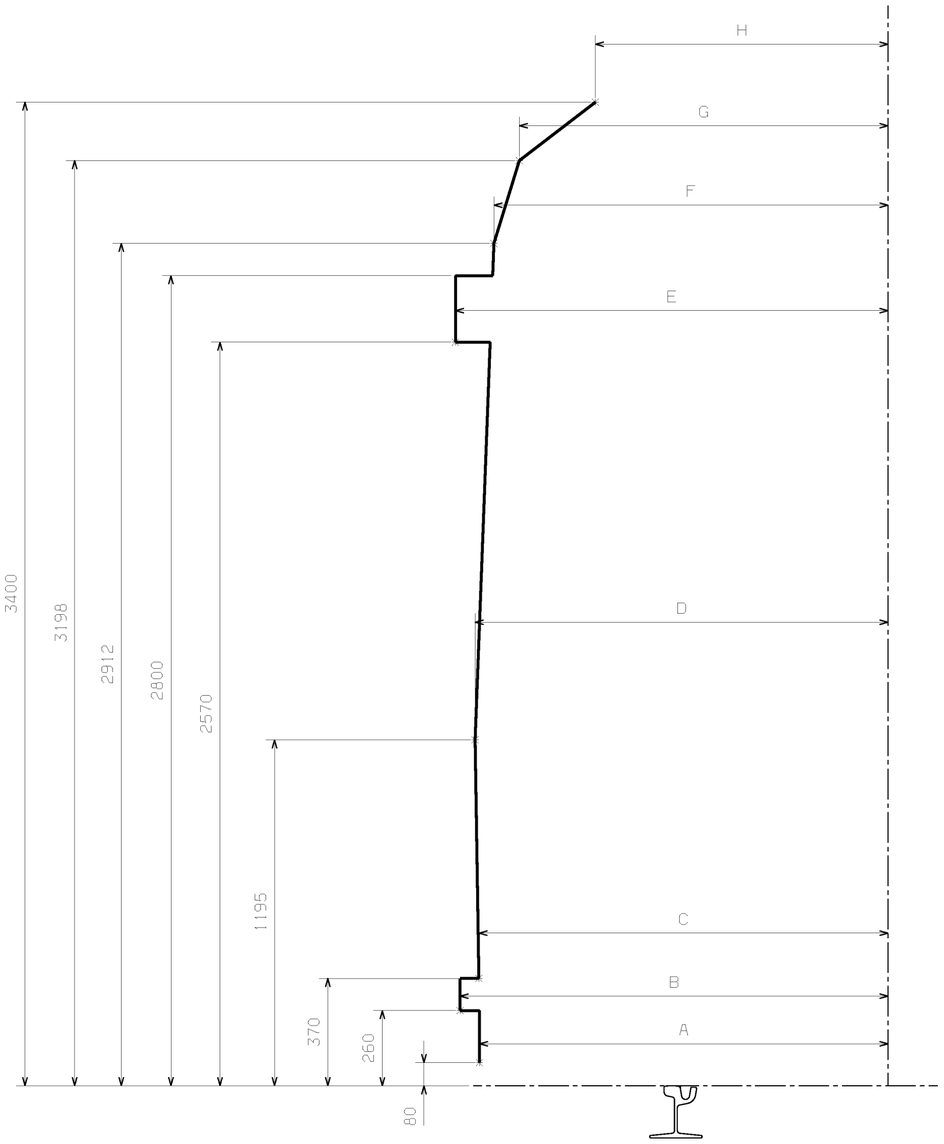
REFERENCIA: Q.22.93.101

SUSTITUYE A :

EDICION

USB00000086_0304

23337 FRAME 1 MARCH 17, 2008 13.41.55



DEVELOPED KINEMATIC ENVELOPE INSIDE CURVE													
Radius / Point	25	30	40	50	70	90	100	200	300	500	1000	2000	STRAIGHT
A	1575	1550	1518	1499	1476	1462	1457	1433	1427	1420	1418	1419	1414
B	1642	1617	1585	1566	1543	1529	1524	1501	1494	1487	1485	1486	1480
C	1577	1552	1520	1501	1478	1464	1459	1436	1429	1422	1420	1421	1415
D	1593	1567	1536	1517	1494	1480	1475	1451	1444	1438	1435	1437	1425
E	1553	1528	1496	1477	1489	1496	1498	1508	1513	1511	1509	1510	1488
F	1534	1509	1477	1458	1435	1421	1416	1393	1386	1379	1377	1378	1355
G	1447	1421	1389	1370	1348	1334	1329	1305	1298	1292	1289	1291	1266
H	1184	1159	1127	1108	1086	1072	1066	1043	1036	1030	1027	1028	1002

DEVELOPED KINEMATIC ENVELOPE OUTSIDE CURVE													
Radius / Point	25	30	40	50	70	90	100	200	300	500	1000	2000	STRAIGHT
A	1571	1550	1524	1508	1488	1475	1471	1449	1443	1432	1424	1422	1413
B	1639	1617	1591	1575	1556	1543	1538	1516	1510	1500	1491	1489	1480
C	1574	1552	1526	1510	1491	1478	1473	1451	1445	1435	1426	1424	1415
D	1592	1571	1544	1529	1509	1496	1492	1470	1464	1453	1445	1443	1428
E	1670	1649	1623	1607	1587	1575	1570	1548	1542	1532	1523	1521	1496
F	1539	1518	1492	1476	1457	1444	1439	1417	1411	1401	1392	1390	1363
G	1453	1432	1405	1389	1370	1357	1352	1330	1324	1314	1305	1303	1275
H	1191	1170	1144	1128	1108	1096	1091	1069	1063	1053	1044	1042	1012

MARCA	DESCRIPCION	CANT.	Nº SUMINISTRADOR O NORMA FABRICANTE		PESO UNITARIO
			Nº DIBUJO O CALIDAD MATERIAL		NOTAS Y OBSERVACIONES

MODIFICACIONES

APLICACIONES

-EDINBURGH TRAM-

	FECHA	NOMBRES
COMPR.		
VERIFIC.		
HOMOL.		
DIBUJ.	19.02.08	
VERIFIC.	19.02.08	

PLANO Nº

SUSTITUYE A:

SUSTITUYE A :

DESIGNACION:

DEVELOPED KINEMATIC ENVELOPE

TOL. GEN. | ESCALA: 1/15

EDICION

HOJA Nº 1

Nº DE HOJAS 1

ENTIDAD: CAF

REFERENCIA: Q.22.93.105

USB00000086-0385

EDINBURGH TRAM NETWORK

Tender Query

No: 1001	**Date: 28-09-07**

Query:

In the document '*Tram Technical Information'* as amended by CAF (doc ref: UKPB1-#52182-v7-Tram_Technical_Information-CAF-v1.doc) CAF have indicated the following values:

Item	Description	
6.5	Maximum cant	100mm
6.6	Cant gradient limit	3mm/m max
6.7	Maximum cant deficiency	75mm

In the SDS document '*Track Alignment Criteria'* (doc ref: ULE90130-SW-SPN-00001 v2) these items are defined in the context of the Edinburgh Tram Network design and desirable, limiting and exceptional values are given for these. These are design values and allowance needs to be made for tolerances in the construction and maintenance of the infrastructure. The exceptional values may never be exceeded.

At the technical meeting between **tie** and CAF on 20th June this year SDS presented the document *Track Construction and Maintenance Tolerances for use in Calculation of DKE for Initial Comparison Purposes.* This document contains construction and maintenance tolerances that SDS consider appropriate to the System design. CAF have responded to this presentation with their document *Maximum Cant Negotiation*, but this contains no values for the parameters mentioned.

For item 6.5, the value indicated by CAF in *Tram Technical Information* for the maximum cant is the same as for the exceptional value. What allowance do CAF make for construction and maintenance tolerances in staying within this limit?

For item 6.6, the cant gradient limit indicated by CAF in *Tram Technical Information* equates to a gradient of 1:333. In the *Track Alignment Criteria* the exceptional value of the cant gradient is 1:300, and allowance for construction and maintenance tolerances would imply a vehicle characteristic in the region of 1:250. Can CAF please explain how their design will be compliant with the system design in this respect?

For item 6.7, the maximum cant deficiency indicated by CAF in *Tram Technical Information* is the same as that for the exceptional value for plain line. In the depot area an exceptional value of 100mm is specified. Can CAF please explain how their design will comply with these values, taking allowance for construction and maintenance tolerances into account?

Tender Query

Response:

For item 6.5:

CAF has accepted the values of maximum cant described at the ER, 100mm in this case. CAF also confirms the compliance with the values mentioned in document *Track Construction and Maintenance Tolerances for use in Calculation of DKE for Initial Comparison Purposes.*

For item 6.6:

The ER requires the compliance with the following information:

Element	Qualifier	Exceptional Limiting Value
Twist (as part of the design)	Short wave (over bogies)	**3.3**
Twist (as part of the design)	Long wave over length of vehicle	**3.0**

CAF will comply with these two values

Additionally CAF has confirmed the compliance with the short wave twist value of 4mm/m (1:250) described at the document *Track Construction and Maintenance Tolerances for use in Calculation of DKE for Initial Comparison Purposes.* This values is more demanding that the one at the ER.

Document *Track Construction and Maintenance Tolerances for use in Calculation of DKE for Initial Comparison Purposes* does not define a value for the long wave over length of the vehicle.

Thus, CAF confirms that complies with the following values described at the ER and the document *Track Construction and Maintenance Tolerances for use in Calculation of DKE for Initial Comparison Purposes*::

	Element Qualifier	Exceptional Limiting Value
Twist	Short wave (over bogies)	**4**
Twist	Long wave over length of vehicle	**3.0**

For item 6.7:

We see no problem in having a cant deficiency of 100m at the accesses of the depot.

Thus, CAF accepts the values of maximum cant deficiency described at the ER, 100mm in this case. CAF also confirms the compliance with the values mentioned in document *Track Construction and Maintenance Tolerances for use in Calculation of DKE for Initial Comparison Purposes.*

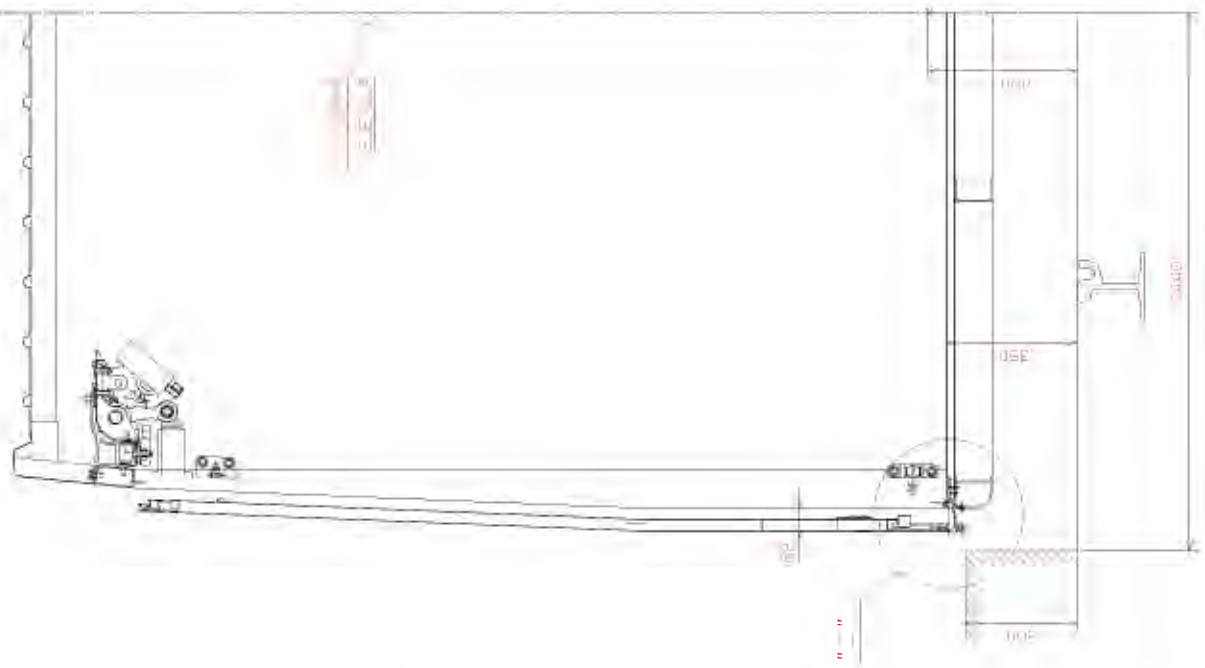
EDINBURGH TRAM NETWORK

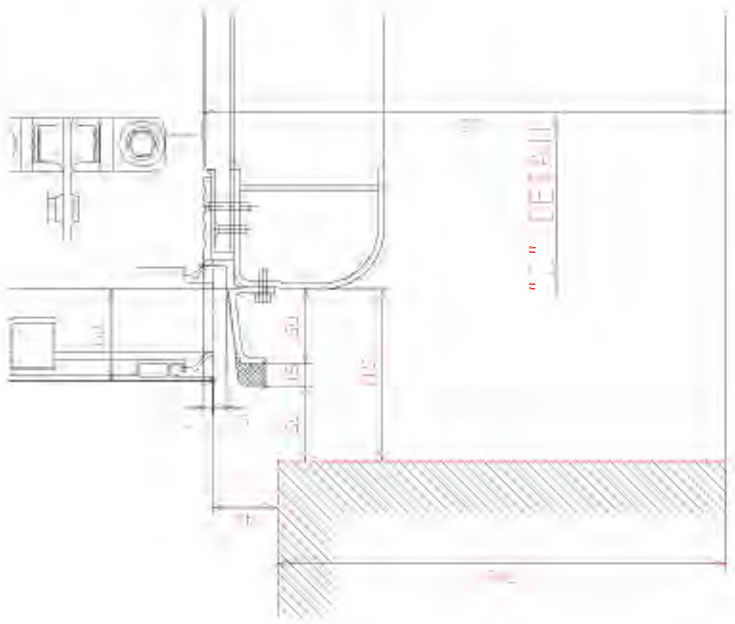
Tender Query

No: 1002	**Date: 11-10- 07**
Query:	In the CAF drawing Q.00.072.14 (mod B) the transverse stepping distance is shown as being 61 mm. This is derived from the platform edge distance (from 'rail axle', presumed to mean track centre-line) being shown as 1410 mm, and the distance to the outside edge of the vehicle being shown as 1349 mm (also to the rail axle). The ORR requirement is that the stepping distance should never exceed 75mm throughout the life of the system (Railway Safety Publication 2, clause 162) in order to comply with RVAR regulations. In order to achieve this, the ORR recommend (note 1 to clause 162) that the initial design clearance should be no more than 40mm, and this is what our current design allows for. Can CAF please explain how, with new wheels and new rails, the stepping distance will be maintained within the design limit of 40 mm.
Response:	

USB00000086_0309

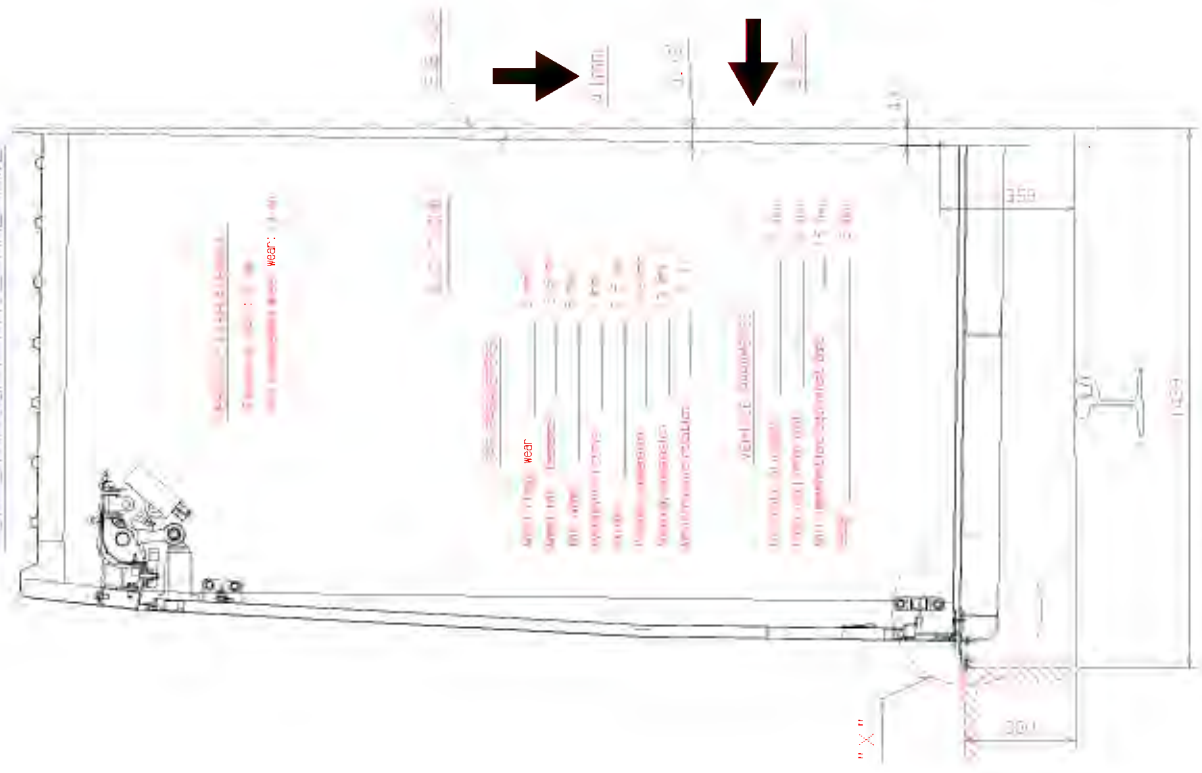
NOMINAL POSITION

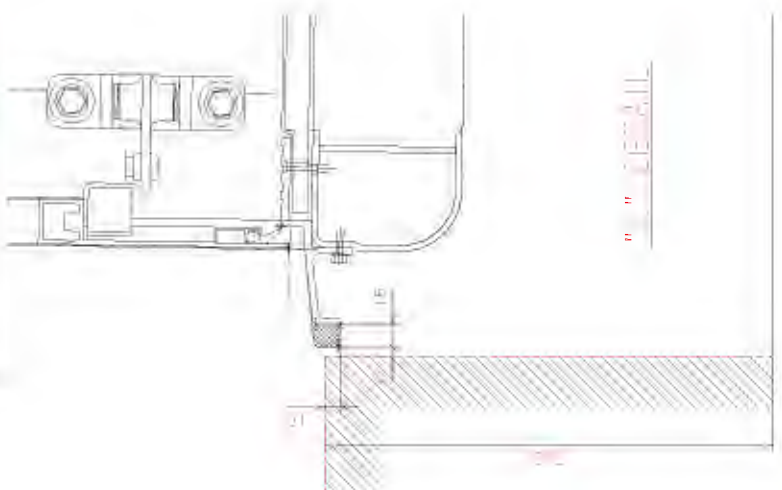




TRAM RUNNING 35 km/h

ON STRAIGHT RAIL AND AW2

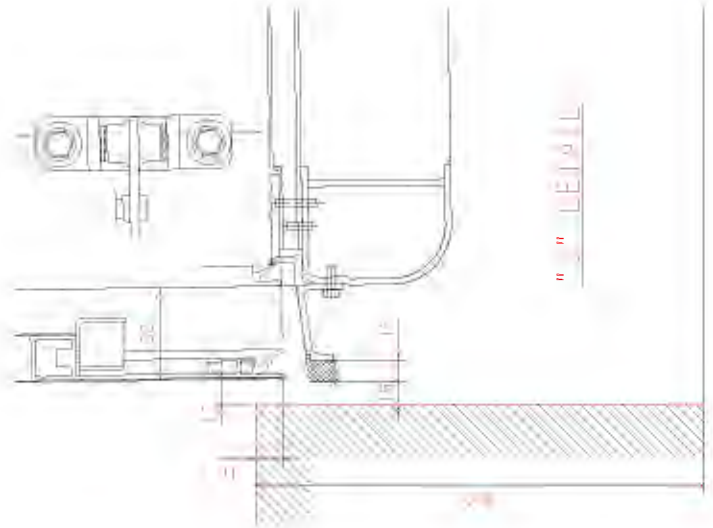




TRAM STOPPED ON STRAIGHT RAIL AND AW2

CLOSE TO STEP



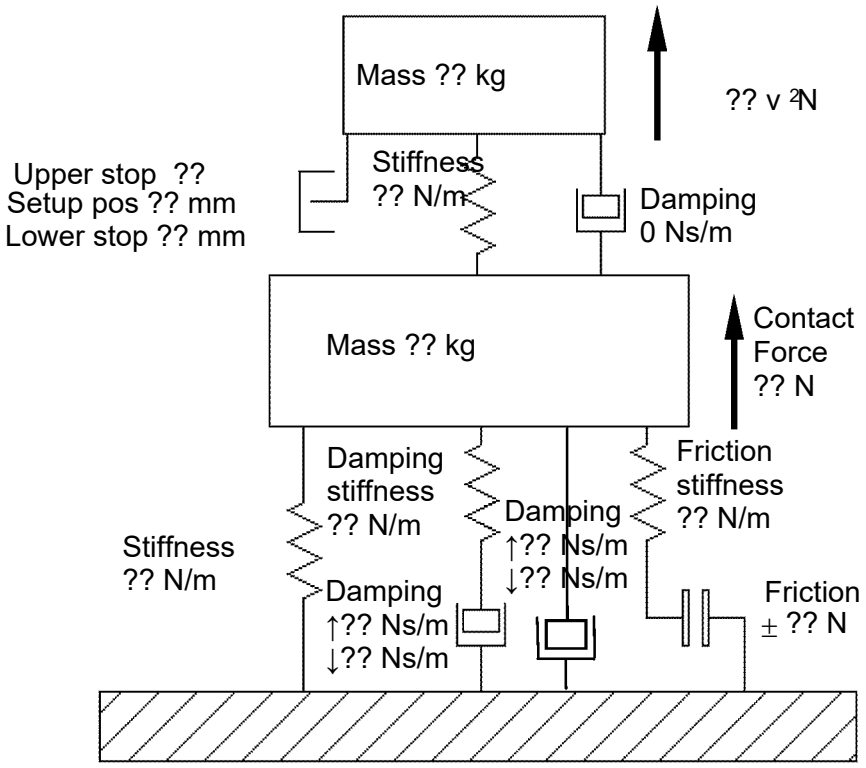


EDINBURGH TRAM NETWORK

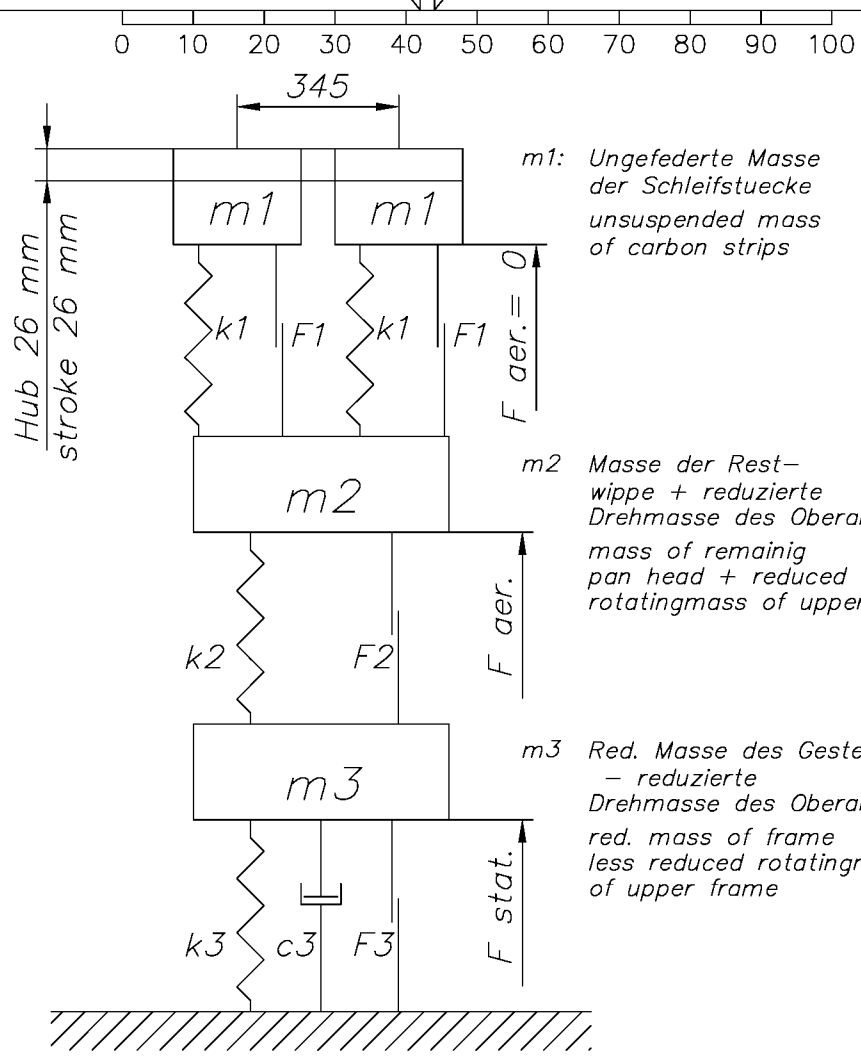
Tender Query

No: 1003	Date: 15-11- 07
Query:	In order to progress simulation modelling of the pantograph and catenary interaction, please can CAF provide the values for the pantograph parameters as shown on the attached sketch.
Response:	

Pantograph Details – Schunk Pantograph Option 1



Number of contact strips =
Strip separation =
Head inertia =



m1: Ungefederte Masse der Schleifstuecke
unsuspended mass of carbon strips

m2 Masse der Rest–wippe + reduzierte Drehmasse des Oberarms
mass of remainig pan head + reduced rotatingmass of upper frame

m3 Red. Masse des Gestells – reduzierte Drehmasse des Oberarms
red. mass of frame less reduced rotatingmass of upper frame

Daten fuer mittlere Arbeitshoehe von 1500mm:
Data for median woking height of 1500 mm:

m1 = 6.34 kg	m2 = 12.1 kg	m3 = 29.2 kg
c1 = 0 Ns/m	c2 = 0 Ns/m	c3 = 50 Ns/m (with blocked raising mechanism)
k1 = 7330 N/m	k2 = 7140 N/m	k3 = 2940 N/m
F1 = ±2 N	F2 = ±2.5 N	F3 = ±2.5 N

F stat. = 85 N
F aer. = 10 N (Spiessgang v = 120 km/h) open direction — min. Arbeitshoehe = 0.15 m min. working position
F aer. = 10 N (Kniegang v = 120 km/h) closed direction — max. Arbeitshoehe = 3.05 m max. working position

Die unbefugte bzw. bestimmungswidrige Verwendung dieser Unterlage ist nicht gestattet und wird gerichtlich verfolgt

Verwendbar fuer:
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Maszstab		

Allgemeintoleranzen DIN ISO 2768 mittel DIN EN ISO 13920 A, E

Oberflaechen DIN ISO 1302

	Datum	Name
Bearb.	22.5.01	Santner
Gepr.	22.5.01	Pardeller
Norm.		

Massenmodell SBE 922
massmodel SBE 922

Schunk Bahntechnik GmbH Salzburg

4–702R.5722

Blatt 01 / 01 Bl.

Zust.	Aenderung	Datum	Name	Ursprung	Ers.f.	Ers.d.

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Dynamische Kenngrößen vom Einholm-Stromabnehmer FB801.00



Ausgabe : - 0 -

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1 Definitionen

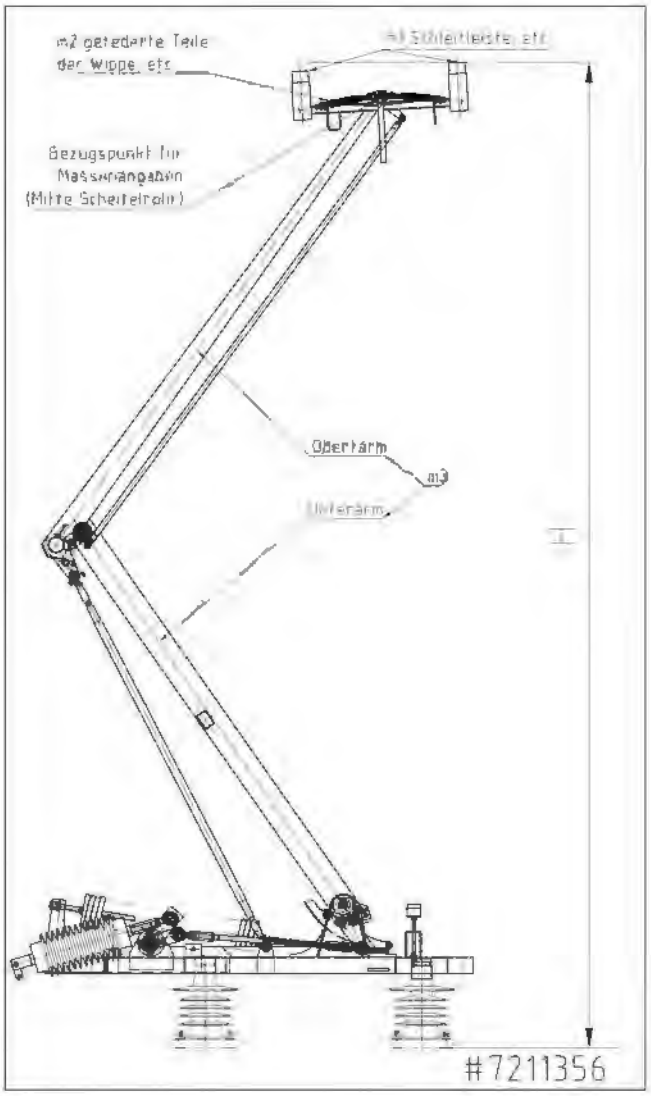

Bild 1 Stromabnehmer

BILD 1 beschreibt die für eine dynamische Berechnung relevanten Komponenten und Bezugspunkte am Stromabnehmer 1FB801.00.

Elemente, die Verbindungsglieder zwischen zwei Massen darstellen, wie z.B. die Strombänder zwischen den Stegen und dem m_2-Anteil des Oberarms, werden mit jeweils 50% zu den entsprechenden Massen addiert. Bezeichnungen und Definitionen an DSA-Stromabnehmern.

Entsprechend der Massenverteilung wird das Modell mit den zugehörigen Massen-, Feder- und Dämpfungskennwerten gebildet. BILD 2 beschreibt die Modellbildung gültig für alle DSA-Bauarten.

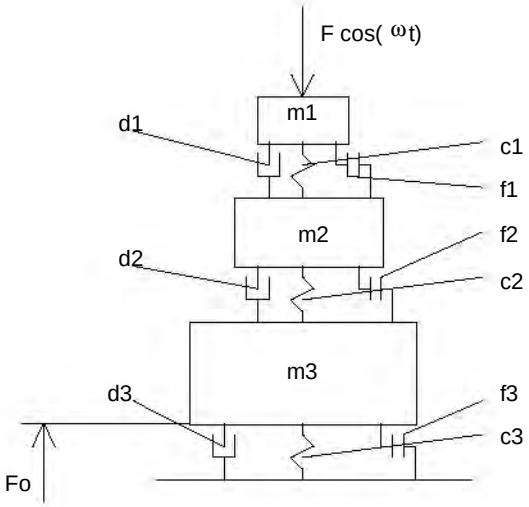

Bild 2 Modell

m_1 bildet sich dabei hauptsächlich aus der Masse der Schleifleisten, den Verbindungsstegen zwischen den Schleifleisten, dem 50%-Anteil an der Wippenfederung und dem Anteil an den Stromverbindern im Wippenbereich

m_2 vereinigt alle im Scheitelpunkt wirkenden Massen, d.h. alle Anbauteile im Bereich des Scheitelrohres, die restlichen Anteile an Stromverbindern und Wippenfedern und zusätzlich jeweils ¼ der Massen des Oberarmes und der Wippenfürung

m_3 bildet sich aus der vertikal schwingenden Masse des Stromabnehmergestells. (Ermittlung siehe Punkt 2) Schwingungsmodell des Stromabnehmers

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2 Relevante Massen für die Berechnung

m_1 = reduzierte ungefederte Massen der Wippe, die direkt am Fahrdraht anliegen (z.B. die Schleifstücke mit Befestigungsteilen) bezogen auf das Scheitelrohr.

SA-Typ	**1FB801.00**
m_1 in kg	**12,07**

m_2 = gefederte Wippenmasse zuzüglich der im Scheitelrohr reduzierten anteiligen Masse des Oberarms (¼ der Oberarmmasse und ¼ der Masse der Wippenführung.

$$m_2 = m_{\text{Wippe gefedert}} + m_{\text{Oberarm(1/4)}} + m_{\text{Wippenführung(1/4)}}$$

SA-Typ	**1FB801.00**
m_2 in kg	**8,61**

m_3 = im Scheitelrohr konzentriert gedachte reduzierte Masse des Ober- und Unterarms der Wippenführung und der Lenkerstange. (lt. Sachs ohne m_2 und m_1 ermittelt)
Die bereits in m_2 enthaltenen Teile aus Oberarm und Wippenführung werden abgezogen.

$$m_3 = m_{\text{red gemessen}} - m_{\text{Oberarm(1/4)}} - m_{\text{Wippenführung(1/4)}}$$

SA-Typ	**1FB801.00**	**Arbeitshöhe über UK-Isolator**
m_3 in kg	**5,47**	**1819 mm (4800 mmTOR)**
	6,29	**2519 mm (5500 mmTOR)**
	5,88	**3319 mm (6300 mmTOR)**

Die Angaben gelten Hubhöhe (H siehe Bild 1), gemessen von Unterkante Isolator bis Oberkante Kohleschleifleiste der Wippe.

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3 Relevante Steifigkeiten für die Berechnung

$\mathbf{c_1}$ = Primäre Federung der Wippe (bei Bauart DSA, mittels 4 Zugfedern) in vertikaler Richtung. Bei der Modellbildung werden die 4 Federn zu einer Feder mit vierfacher Steifigkeit zusammengefasst, dadurch ist eine einfachere Modellbildung möglich.

Die vertikale Kraft Fv in Abhängigkeit der Einfederung a wird mit folgender Ersatzfederkennlinie für vier Federelement hinreichend genau beschrieben:

Fc1= Fv = 0,058 (N/mm^2) *a^2 + 5,1132 N/mm *a + 169,72 N

a bedeutet die Einfederung der Wippe (unbelastet a = 0 mm, voll belastet a = 60 mm)

Die Ersatzfederkonstante der Wippe ergibt sich zu c1= ΔF/Δa

c1 = 0,116 (N/mm^2) *a + 5,1132 N/mm

Für die unbelastete und voll belastete Feder ergeben sich nachfolgende Werte:

Unbelastet bedeutet Einbauzustand (Vorspannung), belastet bedeutet vollständig eingefedert.

SA-Typ	**1FB801.00**
c_1(unbelastet)	5,11 N/mm
c_1(belastet)	12,07 N/mm

$\mathbf{c_2}$ = Biegesteifigkeit des Gestells, bestehend aus Ober- und Unterarm. Die ermittelte Steifigkeit bezieht sich fast ausschließlich auf den Oberarm, da der Unterarm ein sehr steifes Bauteil ist.

SA-Typ	**1FB801.00**	**Arbeitshöhe über UK-Isolator**
c_2 in N/mm	**2,49**	**1819 mm (4800 mmTOR)**
	3,82	**2519 mm (5500 mmTOR)**
	3,45	**3319 mm (6300 mmTOR)**

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Die Angaben gelten Hubhöhe (H siehe Bild 1), gemessen von Unterkante Isolator bis Oberkante Kohleschleifleiste der Wippe.

c_3 = Steifigkeit des Antriebs, in erster Linie durch die Feder hervorgerufen, wird durch das Kurvenblech neutralisiert. Die Anpresskraft wird nahezu konstant über die Arbeitsbereich angenommen. Daher wird die Federsteifigkeit des Antriebs sehr klein. Als geschätzter Wert wird hier 0,001 N/mm zunächst angenommen..

SA-Typ	**1FB801.00**
c_3	0,001 N/mm

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4 Relevante Dämpfungen für die Berechnung

d_1 = Eine Dämpfung der ungefederten Massen ist konstruktiv nicht vorgesehen, ergibt sich aber aus der Reibwirkung in den Gelenkköpfen der Federelemente. Die Dämpfung ist jedoch gering und kann vernachlässigt werden.

d_2 = Eine Dämpfung im Gestell ist nicht vorgesehen aber durch Lagerreibung in den Gelenkpunkten minimal vorhanden. Auch sie wird bei der Modellbildung nicht berücksichtigt.

d_3 = Antriebs- und Fahrdämpfung ist nicht vorhanden

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5 Relevanten Reibungen für die Berechnung

Für die Berechnung relevanten Reibungen

f_1 = Reibung in den Gelenkköpfen der Federaufhängungen der Wippenfederungen. Bleibt unter Windlast nahezu konstant.

SA-Typ	**1FB801.00**
f_1	+/- 0.5 N (geschätzt)

f_2+ f_3 = Die Reibungen f_2 und f_3 können nur in ihrer Gesamtheit aus Hysterese - Messungen ermittelt werden. Da die genaue Verteilung der Gesamtkraft auf f_2 und f_3 nicht ermittelt werden kann, wird eine 50/50 Aufteilung angenommen.

SA-Typ	**1FB801.00**
f_2	+/- 2,5 N
f_3	+/- 2,5 N

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6 Intern Ermittlung der Kenngrößen

6.1 Ermittlung der Massen

6.1.1 Ermittlung m1

Bezeichnung [-]	Artikel-Nr. [-]	Stückzahl [-]	Masse [kg]	Anteilige Masse für m1 [kg]	Gesamtanteilige Masse für m1 [kg]	Bemerkungen [-]
Schleifleiste	21716	2	4,8	4,8	9,6	Gewicht mit Befestigungselementen
Querverstrebung incl		1	0,08	0,04	0,04	
Gewindebolzen M6x250	1211597	1	0,024			
Gelenkkopf KJ6	5540	2	0,028			
Stromband 1 3FB801.00.00.0.109	20258	2	0,17	0,085	0,17	
Steg	1212801 (wie 122041)	2	0,72	0,72	1,44	
Federelement	2207513	4	0,24	0,12	0,48	
Schraubverbindung	-	4	0,02	0,02	0,08	Pos: 50,70, 80 aus Artikel-Nr. 2208148
Windleitblech	1213472	4	0,055	0,055	0,22	
Sicherungsschraube Mu M6 DIN982 A2 Scheibe 6,4 DIN 125	1209874 4548 16432	4	0,01	0,01	0,04	

Daraus ermittelt sich die Masse für m1 wie folgt:

m1 = 12,07 kg

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6.1.2 Ermittlung m2

Die Wippe nach Artikel-Nr. 2208018 wiegt 17,1 kg.

Bezeichnung [-]	Artikel-Nr. [-]	Stück-zahl [-]	Masse [kg]	Anteilige Masse für m2 [kg]	Gesamt-anteilige Masse für m2 [kg]	Bemerkungen [-]
Wippe	**2208018**	**1**			**17,1**	**bestehend aus**
Schleifleiste	21716	2	4,8	9,6		Gewicht mit Befestigungselementen
Halter vst rechts mit Stromband, Hebel, Auflaufhorn,		1	3,5	3,5		
Halter vst links mit Stromband, Hebel, Querverstrebung, Auflaufhorn,		1	4,0	4,0		
Achse	20098	1	0,62	0,62		

Zur Ermittlung der Masse m2 muss folgende Massen m1 subtrahiert werden.

abzüglich Wippenmasse m1			12,07	12,07	**-12,07**	

Die folgenden Massen werden zur Wippenmasse addiert:

Wippenführung	2208017	1	1,02	0,26	0,255	7
Schraubverbindung		4	0,02	0,02	0,08	
Oberarm	2208016	1	10,5	2,63	2,625	
Summe zu addierende Massen					**2,96**	
ermittelte Massen m2					**8,61**	

Daraus ermittelt sich die Masse für m2 wie folgt:

m2 = 8,61 kg

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6.1.3 90

6.1.4 Ermittlung m3

C_{Feder} = 474,15 N/m

Versuch [-]	Dauer für 10 Schwingungen [s]			Dauer T für 1 Schwingung [s]		
	1819	2519	3319	1819	2519	3319
1	8,4	8,8	8,6	0,84	0,88	0,86
2	8,4	8,8	8,6	0,84	0,88	0,86
3	8,4	8,8	8,6	0,84	0,88	0,86
4	8,4	8,8	8,6	0,84	0,88	0,86
5	8,4	8,8	8,6	0,84	0,88	0,86
Die mittlere Dauer für 1 Schwingung beträgt: =				**0,84**	**0,88**	**0,86**

Hieraus ergibt sich nach der Formel $m_{dyn} = T^2 \bullet c / (4 \bullet \Pi^2)$ folgende dynamische Masse:

$m_{dyn} = (0{,}84s)^2 \bullet 474{,}15\ (N/m) / (4 \bullet \pi^2) =$

H in [mm]	1819	2519	3319
m_{dyn} in kg	8,47	9,30	8,88

Die folgenden Massen werden von der dynamischen Masse subtrahiert:

Bezeichnung [-]	Artikel-Nr. [-]	Stückzahl [-]	Masse [kg]	Anteilige Masse für m3 [kg]	Gesamtanteilige Masse für m3 [kg]	Bemerkungen [-]
Feder	-	1	0,54	0,18	-0,18	
Adapter	-	1	0,2	0,2	-0,2	
Oberarm	2208016	1	10,5	2,63	-2,63	
					-3,00	

Daraus ermittelt sich die Masse für m3 wie folgt:

m3 =f(Arbeitshöhe)

H in [mm]	1819	2519	3319
m3 in kg	5,47	6,29	5,88

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6.2 Ermittlung der Federkonstanten

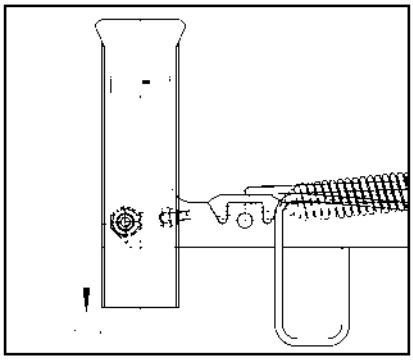
6.2.1 Ermittlung der Federkonstanten c1 von der primären Federung der Wippe

Die Feder hat folgende Daten:

L_0 = 93 mm

F_0 = 20 N

c_{Feder} = 12,792 N/mm



Die Federelemente nach Z.-Nr. 3DSA200.12.07.1 sind so vorgespannt, dass sie bei einer Länge von 263,5 mm, gemessen über Mitten der Gelenkköpfe, eine Federkraft von 325 N (das entspricht einer Federlänge 116,84 mm) von entwickeln.

Des weiteren sind die Federelemente bei Wippe in Ruhelage (Steg am oberen Anschlag des Halters Geschweißt) auf eine Länge von 262,2 mm und bei Wippe in voll belasteter Lage (Steg am unteren Anschlag des Halters Geschweißt) auf eine Länge von 276,8 mm vorgespannt.

Ermittlung der Federkonstanten siehe excel-Datei Dynamische Kenngrössen 1FB801.00.xls[Ermittlung c1)

Aus der Diagonalkomponente lässt sich der für die Simulation erforderliche vertikale Anteil herleiten.

Die vertikale Kraft Fv in Abhängigkeit der Einfederung a wird mit folgender Ersatzfederkennlinie für ein Federelement hinreichend genau beschrieben:

Fv= f(a) = 0,0145 (N/mm^2) * a^2 + 1,2783 N/mm * a + 42,43 N

Mit vier Federelementen in der Wippe resultiert daraus eine Gesamtvertikalkraft

Fv = f(a)= 4 *(0,0145 (N/mm^2) * a^2 + 1,2783 N/mm * a + 42,43 N)

Fc1= Fv = 0,058 (N/mm)^2 *a^2 + 5,1132 N/mm *a + 169,72 N

Die Ersatzfederkonstante der Wippe ergibt sich zu c1= dF/da

c1 = 0,116 (N/mm^2) *a + 5,1132 N/mm

Für die unbelastete und voll belastete Feder ergeben sich nachfolgende Werte:

SA-Typ	**1FB801.00**
c_1(unbelastet)	5,11 N/mm
c_1(belastet)	12,07 N/mm

6.2.2 Ermittlung der Federkonstanten c2 des Gestells

siehe Datei „Dynamische Kenngrössen 1FB801.00.xls[Ermittlungc2]

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Daraus ergibt sich die Federkonstante für c2:

SA-Typ	**1FB801.00**	**Arbeitshöhe über UK-Isolator**
c_2 in N/mm	**2,49**	**1819 mm (4800 mmTOR)**
	3,82	**2519 mm (5500 mmTOR)**
	3,45	**3319 mm (6300 mmTOR)**

6.2.3 Ermittlung der Federkonstanten c3 des Antriebs

siehe Datei „Dynamische Kenngrössen 1FB801.00.xls[Ermittlungc2]

Steifigkeit des Antriebs. In erster Linie durch die Feder hervorgerufen. Beim Stromabnehmer FB801 wird die Federkraft der Antriebsfeder durch das Kurvenblech in eine konstante Anpresskraft umgewandelt. Daher wird die Federsteifigkeit des Antriebs sehr klein. Als geschätzter Wert wird hier 0,001 N/mm zunächst angenommen.

SA-Typ	**1FB801.00**
c_3	0,001 N/mm

6.3 Ermittlung der Reibung

6.3.1 Ermittlung der Reibung f2 und f3 des Antriebs

Die Reibungen f_2 und f_3 können nur in ihrer Gesamtheit aus Hysterese - Messungen ermittelt werden. Da die genaue Verteilung der Gesamtkraft auf f_2 und f_3 nicht ermittelt werden kann, wird eine 50/50 Aufteilung angenommen.
Aus Anpresskraft wird eine Reibungskraft von ca. 5 N ermittelt. Die Reibung teilt sich in
f2=f3 = ±2,5 N auf

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Dynamische Kenngrößen des DSA Stromabnehmers
Dynamic Characteristics of the DSA Pantograph

Just provided for English translation of Dynamische Kenngrößen vom Einholm-Stromabnehmer FB801.00

1. Definitionen/*Definitions*

BILD 1 beschreibt die für eine dynamische Berechnung relevanten Komponenten und Bezugspunkte am DSA - Stromabnehmer.
Picture 1 describes the relevant components and reference points for a dynamic calculation.

Elemente, die Verbindungsglieder zwischen zwei Massen darstellen, wie z.B. die Strombänder zwischen den Stegen und dem m_2-Anteil des Oberarms, werden mit jeweils 50% zu den entsprechenden Massen addiert.
Elements forming the connection between two masses such as bridging strands between the bars and the m_2 share of the upper arm are being added to the corresponding masses with each 50 %.

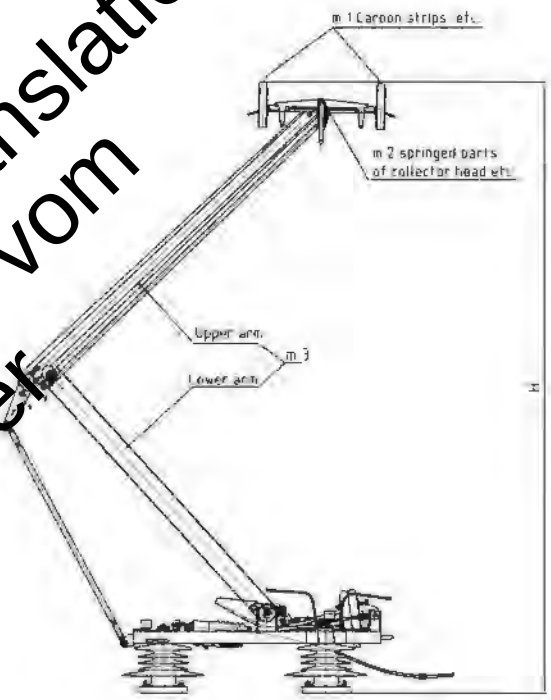

BILD 1/ *Picture 1*:
Bezeichnungen und Definitionen an DSA-Stromabnehmern
Designation and definitions at the DSA pantograph.

Entsprechend der Massenverteilung wird das Modell mit den zugehörigen Massen-, Feder- und Dämpfungskennwerten gebildet. BILD 2 beschreibt die Modellbildung gültig für alle DSA-Bauarten.
Corresponding to the masses allocation, the scheme with the associated masses, spring and damping characteristics is being elaborated. Picture 2 describes the scheme creation valid for all DSA versions.

m_1 bildet sich dabei hauptsächlich aus der Masse der Schleifleisten, den Verbindungsstegen zwischen den Schleifleisten, dem 50%-Anteil an der Wippenfederung und dem Anteil an den Stromverbindern im Wippenbereich.
m_1 mainly consists of the contact strip mass, the connecting bars between the contact strips, the 50 % share of the collector head springing and the share of the current connection in the collector head area.

m_2 vereinigt alle im Scheitelpunkt wirkenden Massen, d.h. alle Anbauteile im Bereich des Scheitelrohres, die restlichen Anteile an Stromverbindern und Wippenfedern und zusätzlich jeweils ¼ der Massen des Oberarmes und der Wippenführung
m_2 combines all masses affecting on the zeniths i.e. all components within the area of the peak tube, the remaining shares of current connections and the collector head springs and additional each ¼ of the masses of the upper arm and the collector head guidance.

m_3 bildet sich aus der vertikal schwingenden Masse des Stromabnehmergestells. (Ermittlung siehe Punkt 2)
m_3 is composed by the vertical vibrating mass of the pantograph frame. (Determination cf. item 2).

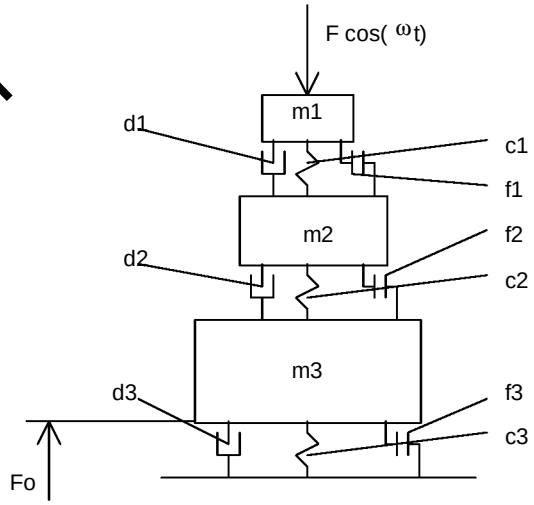

BILD 2/*Picture 2*:
Schwingungsmodell des Stromabnehmers
Vibration scheme of the pantograph

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2. Für die Berechnung relevante Massen/*For the calculation of the relevant masses*

m_1 = reduzierte ungefederte Massen der Wippe, die direkt am Fahrdraht anliegen (z.B. die Schleifstücke mit Befestigungsteilen) bezogen auf das Scheitelrohr.

m_1 = reduced unsprung masses of the collector head having direct contact to the catenary wire (e.g. the contact piece with attachment parts) related to the peak tube.

m_2 = gefederte Wippenmasse zuzüglich der im Scheitelrohr reduzierten anteiligen Masse des Oberarms (¼ der Oberarmmasse und ¼ der Masse der Wippenführung.

m_2 = springed collector head mass plus the reduced proportionate mass of the upper arm in the peak tube (1/4 of the upper arm mass and ¼ of the collector head guidance mass)

$$m_2 = m_{\text{Wippe gefedert/}\textbf{head springed}} + m_{\text{Oberarm(1/4)/}\textbf{upper arm (1/4)}} + m_{\text{Wippenführung(1/4)/}\textbf{Head Guidance (1/4)}}$$

m_3 = im Scheitelrohr konzentriert gedachte reduzierte Masse des Ober- und Unterarms der Wippenführung und der Lenkerstange. (lt. Sachs ohne m_2 und m_1 ermittelt)
Die bereits in m_2 enthaltenen Teile aus Oberarm und Wippenführung werden abgezogen.

m_3 = the mass of the upper and lower arm of the collector head guidance and the guide bar concentrated mount reduced in the peak tube (acc. to Sachs determined without m_2 and m_1)

$$m_3 = m_{\text{red gemessen/}\textbf{red measured}} - m_{\text{Oberarm/}\textbf{Upper arm}(1/4)} - m_{\text{Wippenführung/}\textbf{Head Guidance}(1/4)}$$

3. Für die Berechnung relevante Steifigkeiten/*For the calculation of the relevant stability*

c_1 = Primäre Federung der Wippe (bei Bauart DSA, mittels 4 Zugfedern) in vertikaler Richtung.
Bei der Modellbildung werden die 4 Federn zu einer Feder mit vierfacher Steifigkeit zusammengefasst, dadurch ist eine einfachere Modellbildung möglich.
Unbelastet bedeutet Einbauzustand (Vorspannung), belastet bedeutet vollständig eingefedert.

c_1 = Primary springing of the collector head (in case of version DSA by means of 4 tension springs) in vertical direction.

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In case of scheme elaborating the 4 springs are being summarized to one spring with 4-fold stability. Thereby a more simple scheme elaboration is possible. Unloaded means installation state (pre-tensioned); loaded means completely compressed.

c_2 = Biegesteifigkeit des Gestells, bestehend aus Ober- und Unterarm. Die ermittelte Steifigkeit bezieht sich fast ausschließlich auf den Oberarm, da der Unterarm ein sehr steifes Bauteil ist.

c2 = Bending stability of the rack, consisting of the upper and lower arm. The determined stability refers nearly solely to the upper arm because the upper arm is a very rigid component.

Die Angaben gelten für eine Hubhöhe (H siehe Bild 1) von 1500 mm, gemessen von Unterkante Isolator bis Oberkante Kohleschleifleiste der Wippe.
The details are valid for a raising height (H cf. picture 1) of 1500 mm measured from lower edge insulator up to upper edge carbon strip of the collector head.

c_3 = Steifigkeit des Hubantriebes. In erster Linie durch den Balgzylinder hervorgerufen.
Bei allen Stromabnehmern DSA baugleich.

c_3 = Stability of the hoist drive. In first instance by means of the bellow cylinder. Same design at all DSA pantographs.

4. **Für die Berechnung relevante Dämpfungen/*For the calculation of the relevant damping***

d_1 = Eine Dämpfung der ungefederten Massen ist konstruktiv nicht vorgesehen, ergibt sich aber aus der Reibwirkung in den Gelenkköpfen der Federelemente. Die Dämpfung ist jedoch gering und kann vernachlässigt werden.

d_1 = A damping of the unsprung masses is not intended by design however occurs due to the friction effect in the swivel heads of the spring elements. The damping however is low and can be waived.

d_2 = Eine Dämpfung im Gestell ist nicht vorgesehen aber durch Lagerreibung in den Gelenkpunkten minimal vorhanden. Auch sie wird bei der Modellbildung nicht berücksichtigt.

d_2 = Damping within the rack is not intended but minimally existing by bearing friction in the joint points. These will not be considered for the scheme, either.

d_3 = Antriebs- und Fahrdämpfung. Ein hydraulischer Dämpfer ist die einzig konstruktiv vorgesehene Dämpfung am Stromabnehmer. Er dient in erster Linie der Dämpfung des Absenkvorgangs. Seine Kennlinie ist so aus- gelegt, das er seine optimale Dämpfung in nahezu eingefahrener Stellung des Stromabnehmers, kurz vor dem Aufsetzen in Senkstellung, also unterhalb der minimal zu berücksichtigenden Fahrdrahtlage, erreicht.

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Bei größeren Anregungsamplituden während der Fahrt hat er jedoch auch einen Einfluß auf das schwingungstechnische Verhalten des Stromabnehmers.
Der Dämpfer ist bei allen DSA gleicher Bauart.

d_3 = Drive and travelling damping. A hydraulic damper is the only intended damping at the pantograph. In first instance this serves for the damping of the lowering movement. Its characteristic is designed in that way that the optimum damping is reached in nearly closed position of the pantograph shortly prior to coming to lowered position – thus below the minimum catenary wire position to be considered.

5. **Für die Berechnung relevanten Reibungen/*For the calculation of the relavant friction***

f_1 = Reibung in den Gelenkköpfen der Federaufhängungen der Wippenfederungen. Bleibt unter Windlast nahezu konstant.

f1 = Friction in the swivel heads of the spring suspension of the collector head springing. Remains nearly constant under wind load.

f_2+ f_3 = Die Reibungen f_2 und f_3 können nur in ihrer Gesamtheit aus Hysterese-Messungen ermittelt werden. Da die genaue Verteilung der Gesamtkraft auf f_2 und f_3 nicht ermittelt werden kann, wird eine 50/50 Aufteilung angenommen.

f_2 + f_3 = The friction f_2 and f_3 can only be determined out of the Hysterese measurement as a whole. Due to the fact that the exact share of the whole force on f_2 and f_3 cannot be determined a 50/50 share is being assumed.

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6. Ermittelte dynamische Kenngrößen des DSA –Stromabnehmers / *Calculated dynamic characteristics of the DSA Pantograph*

Stromabnehmer Typ *Pantograph Type*	**DSA200.27 < 200 km/h**
Wippelänge Collector head length	1950 mm
Kenngrößen / *Parameters*	
m_1 [kg]	18,05
m_2 [kg]	8,04
m_3 [kg]	7,73
c_1 (unbelastet/*unloaded*) [N/mm]	5,3
c_1 (belastet/ *loaded*) [N/mm]	8,8
c_2 [N/mm]	7,70
c_3 [N/mm]	0,08
d_1 [Ns/m]	0
d_2 [Ns/m]	0
d_3 [Ns/m]	70
f_1 [N] (geschätzt / *estimated*)	+/- 0,5
f_2 [N]	+/- 3,5
f_3 [N]	+/- 35

Änderungsstand/*Index*

Zustand/ **State**	Änderung/**Revision**	Datum/**Date**	Name
00	- Erstausgabe / **First Version**	2007-11-21	HT

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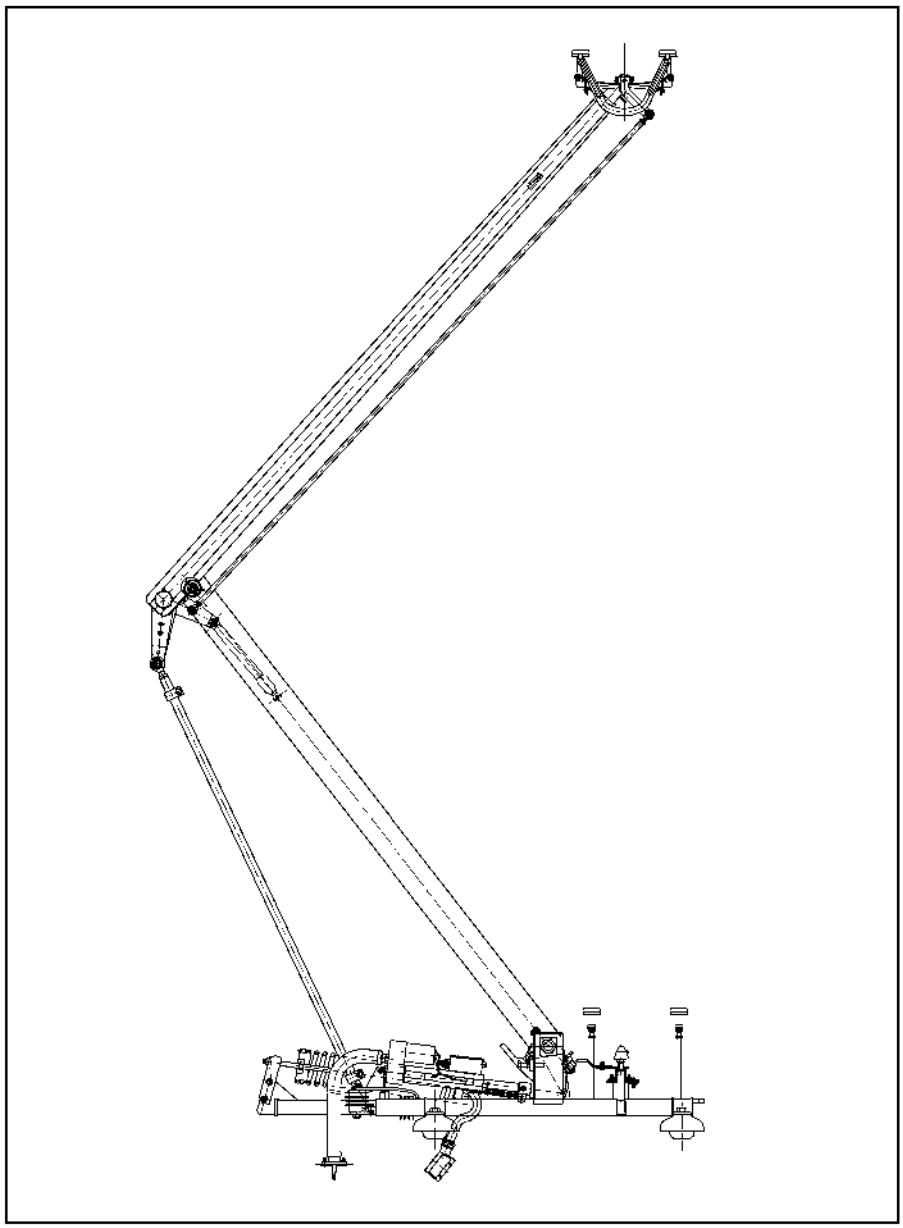
Dynamische Kenngrößen vom
Einholm-Stromabnehmer
FB801.00

Responsable division: BS	Responsable bureau: Lightrail	Type of document: Technical Documentation		
Prepared: 2007-11-21 MU		Component-Description	State of document: Released	
Checked: 2007-11-21 MG				
Released: 2007-11-21 MG		Filename: Fb80.73_Description_01.doc	Revision: 00	Language: e / Page: 1/9
Client:		Date: / Approved:	Issue: 01	Date: 2007-11-21

Single Arm Pantograph
Fb80.73



Issue : **- 1 -**

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Proof of change

Issue	Date	Cause of revision	Page(s)
1	2007-11-21	First issue	all

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1 Technical data

Equipment designation:	Pantograph
Design:	single arm
Type:	Fb 80.73
Nominal system voltage:	1500 V
Rated current:	1500 A (metal impregnated contact strips)
Peak current:	2250 A (metal impregnated contact strips)
Static contact force:	60 – 120 N adjustable
Supply voltage:	24 V DC
Velocity:	up to 120 km/h
Raising:	approx. 5 s
Lowering:	approx. 5 s
Weight:	approx. 166 kg

Material

Base frame:	steel
Lower strut:	steel
Lower guide rod:	aluminium-alloy / stainless steel
Upper strut:	aluminium-alloy / stainless steel
Upper guide rod:	aluminium-alloy / stainless steel
Collector head:	aluminium-alloy / stainless steel

1.1 Spindle drive

max. mechanical load:	4500 N
rated voltage:	24 V (DC)
permitted voltage range:	16,8 – 30 V (DC)
Amperage (load-dependent at 24 V DC):	
at 0 N load:	2,5 A (as, when pantograph is raised)
at 2500 – 3000 N load:	approx. 8 – 9 A (as, when pantograph is lowered)
10 A fuse required	
at max. load of 4500 N:	13 A
Stroke:	150 mm
Spindle pitch:	5,08 mm
Feeding speed (linear, load-dependent)	
at 0 N load:	30 mm/s
at 4500 N load:	18 mm/s
Gear reduction ratio:	1:10
cyclic duration factor period (temperature dependent)	
Periodic duty:	10 % ED (bei 25°C)
Protection class:	IP 65
Operating temperature:	-25°C / +65°C

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\\Stemmann1\docs\docs\BS\Handbuch\Fb80\Fb80.73\Fb80.73_Description_01.doc

1.1.1 Data of limit switch (spindle drive)

Magnetic sensor: art.-no. 4146 (normally open) and 4147 (normally closed)

Switching capacity:	10 W
max. voltage:	100 V (DC)
max. current:	0,5 A (DC)
max. switching resistance:	0,2 Ω
Operating voltage:	24 V (DC)
Operating current:	0,417 A (DC)
Operating temperature:	-25°C / +65°C
Housing material:	Polyester
Protection class:	IP 67

1.1.2 Data of emergency device at the spindle drive

(flexible shaft with protective tubing)

Manual crank:

Quantity of turns: approx. 80

(to cover the full stroke, 150 mm stroke length)

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2 Description of pantograph and pantograph components

The pantograph conducts electric current from the overhead contact wire to the railway-vehicle. The pantograph consists of a base frame, frame, collector head, raising and lowering arrangement

2.1 Base frame

The base frame is mounted on the railway-vehicle roof. It consists of square hollow tubing, angle steels and plates in welded construction. It carries the mounting supports of the lower strut, the bearing block for the guide rod, the suspensions of the tension spring and spindle drive. Furthermore it carries the buffered supports for the lower strut and the upper strut and the mounting plate for the latching. The main electrical connection is located also at the base frame and clad with copper.

2.1.1 Insulators

The pantograph rests on 4 insulators. The insulators are made of cycloaliphatic cast resin with a stainless-steel M20 pressed-in nut on either side for mounting on the pantograph or on the railway-vehicle roof. The insulators for the mounting base frame – spindle drive are also made of cycloaliphatic cast resin and possess for mounting to the base frame and the spindle drive a stainless-steel M16 pressed-in nut.

The insulators are according DIN 43169 and they are applicable for rated current of 1500 V.

2.2 Frame

The pantograph frame is the pantograph component to which the collector head is mounted and which permits the collector head to move vertically to a reference plane. The kinematics ensure very good contact with the overhead contact wire. Height variations of the overhead contact wire are compensated by the pantograph frame.

2.2.1 Lower strut

The lower strut is welded together from several seamless cold drawn precision steel tubes and is supporting the bearings for the lower strut axle and the centre hinge.

The lower bearings consists of sealed self-aligning ball bearings. The bearings in the middle joint as well as the remaining bearing locations of the strut frame consists of sealed needle bearings.

Welded to the principal axis are the mounting plates for the chain guide plate of the tension spring and the bearing brackets for the tackle lever of the electric spindle drive.

2.2.2 Lower guide rod

The lower guide rod guides the polygonal joint. It consists of aluminium tubing. Its length is set on the left/right handed joint heads on either end.

2.2.3 Upper strut

The upper strut consists of a welded aluminium construction in closed frame design.

It consists of drawn profile tubing, a round upper strut cross tube and the upper struts joint welded plates for the lower guide rod und the damper. The bearings for the lower strut are welded into the profile tubing.

The frame is braced by diagonal bracings of stainless steel.

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2.2.4 Upper guide rod

The upper guide rod guides the collector head. It is made of aluminium tubing. Its length is set on the right-handed joint heads on either end.

2.3 Collector head

The collector head is the pantograph component carried on the frame by carbon contact strips and end horns.

It is the direct contact element to the overhead contact wire. The weight of the collector head in relation to the pantograph frame has been minimized as far as possible. The carbon contact strips are mounted on flat springs. The collector head on the upper end of the upper strut is mounted pivoting.

The collector head is guided in the upper guide rod.

2.3.1 Contact strips

The carbon contact strip is the part of the collector head that draws current from the overhead contact wire. The carbon contact strip consists of the carbon and the contact strip holder.

Carbon contact strips and contact strip holder are clamped, brazed or bonded together.

2.3.2 End horns

The end horn is a downward-bent component on either end of a contact strip that prevents lateral contact of the overhead contact wire.

This pantograph is equipped with 2 closed end horn made of aluminium.

2.4 Raising and lowering arrangement

The raising and lowering arrangement controls the extension of the pantograph frame to raise/lower the carbon contact strips in/out of contact with the overhead contact wire. The required raising force is produced by a tension spring and the lowering force is generated by the electric spindle drive.

2.4.1 Tension spring

To raise the pantograph and generate contact force between the carbon contact strips and the overhead contact wire two tension spring are mounted between the base-frame and the principal axis of the lower strut.

The tension spring consists of a helical steel spring. The spring force causes a roller chain to generate a torque on the lower strut. The roller chain is guided along the chain guide plate and coupled to the principal axis of the lower strut. The shape of the chain guide plate varies the effective length of the lever so that the contact force is essentially uniform across the full working range.

2.4.2 Spindle drive

The spindle drive is mounted in insulated form between the base and the lower strut principal axis.

The pantograph is lowered by the linear motion of the electric spindle drive applying a pressure to the principal axis from outside. The spindle drive counteracts the upward force of the tension spring. The force of the spindle drive, through a tackle (= freewheeling effect) generates the required torque to lower the frame. The stop brake of the spindle drive is lifted mechanically when the direct-current motor (24 V

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input voltage) starts running. When the motor stops, the brake automatically prevents the spindle from turning.

Mounted on the spindle drive are 4 magnetic sensors (see circuit diagram). Two of these act as limit switches B1 and B2 (part-no. 535071, article no. 4147) for the spindle and one each to signal highest position - B4 and lowest position B3 (part-no. 535070, art.-no. 4146).

2.4.3 Emergency operation

The spindle drive has an emergency operation by flexible shaft and manual crank that can be used from inside the car.

Mounted on the gear of the spindle drive is a flexible shaft with angle drive connected with a lead through in the roof of the railway-vehicle. The crank is installed in the roof duct from inside the railway-vehicle.



HINT!

Some 80 turns of the crank are needed to fully raise the pantographs. To raise or lower the pantograph rotate the crank until the safety clutch engages!

The particular advantage of this design is that the safety clutch ensures that only a small torque acts on the crank if by chance the drive is powered by motor while the pantograph is being cranked. This is a major safety aspect of the construction.

2.4.4 Description of the spindle drive

(see also wiring diagram 4Fb700.sp1)

By activating the key-switch “**Raising**” the spindle drive is closed via a contactor K1. The pantograph is brought into contact with the overhead contact wire. When the spindle drive is at extreme upper position, the active face of magnetic sensor B1 that is mounted on the spindle drive is covered by the magnet on the thrust tube (inside the housing). The magnetic sensor B1 turns off contactor K1 and along with this, the spindle drive.

The output signal of the extreme upper position sensor (magnetic sensor B4) is available to the user. The extreme upper position sensor sends a signal that the spindle drive has reached the extreme position in which the wire is contacted.

By activating the key-switch “**Lowering**” the spindle drive is closed via contactor K2. The pantograph is removed from contact with the overhead contact wire. When the spindle drive is at extreme lower position, the active face of magnetic sensor B2, that is mounted on the spindle drive is covered by the magnet on the thrust tube (inside the housing). The magnetic sensor B2 turns off contactor K2 and along with this, the spindle drive. At this point the collector head is at the lowest position.

The output signal of the extreme down position sensor (magnetic sensor B3) is available to the user. The extreme down position sensor sends a signal that the spindle drive has reached the extreme down position.

2.5 Damper

A damper is mounted in the knee joint of the pantograph between the lower strut and the upper strut. It damps mainly the raising movement of the pantograph and avoid therefore that the pantograph builds up.

2.6 Latching

The latching, mounted to the base frame, fix the pantograph in lowest position. At raising of the pantograph to the overhead contact wire the latching will be relaxed automatically.

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2.7 Current transmission

The current flow from the carbon contact strip to the main connection on the base frame is via the pantograph frame and the highly flexible bridging strands. All bearings are protected from the negative impact of the current by their insulated mounting.

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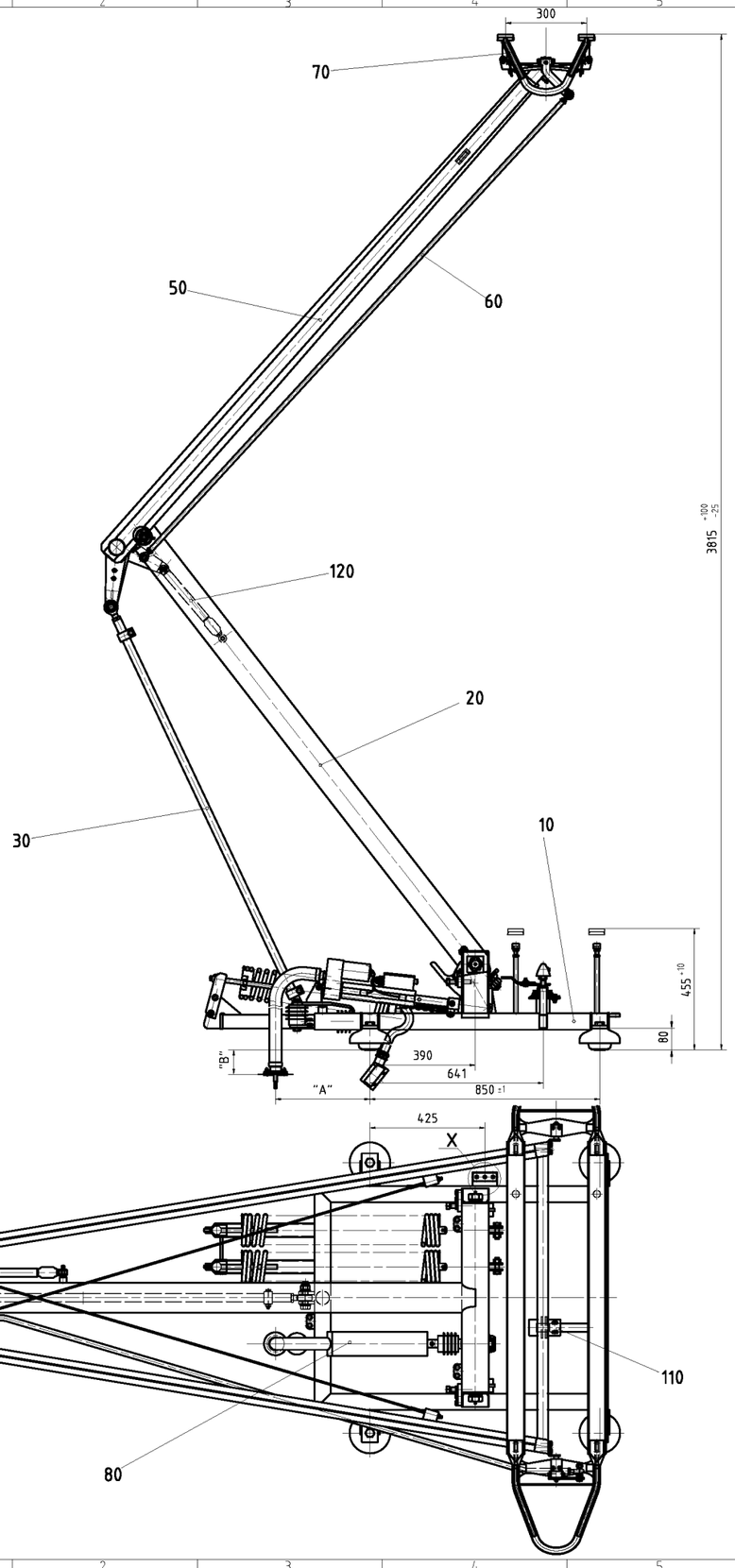
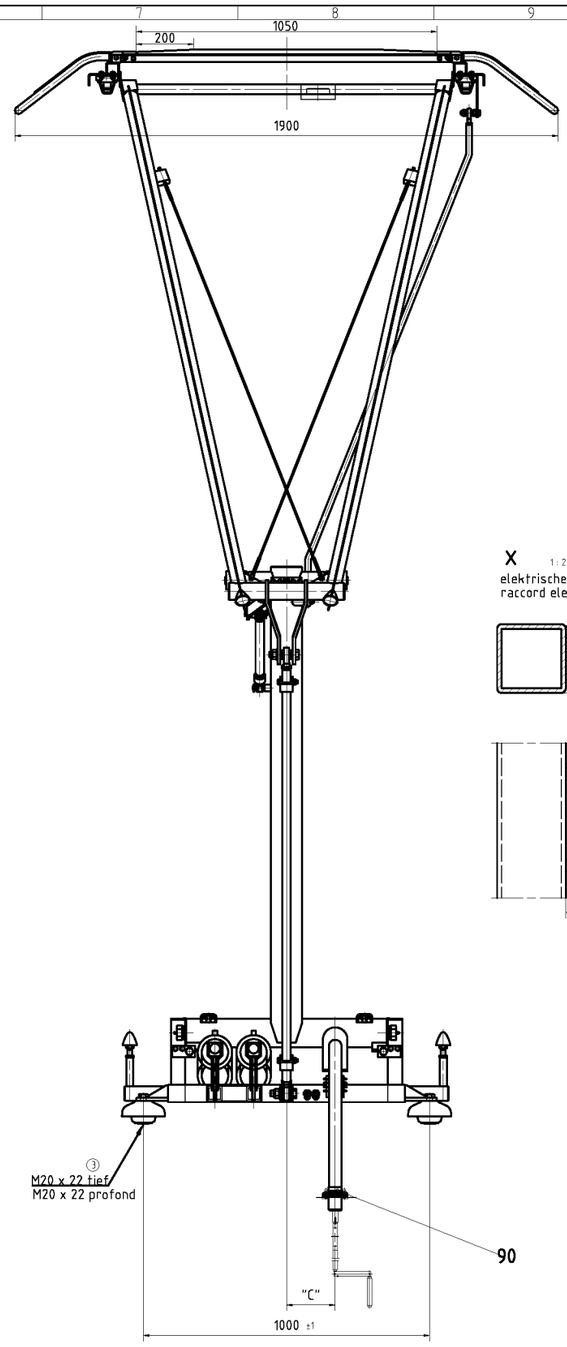
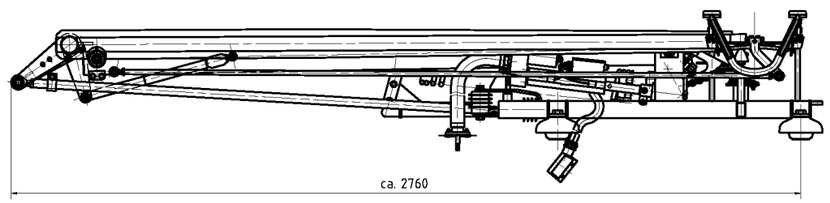
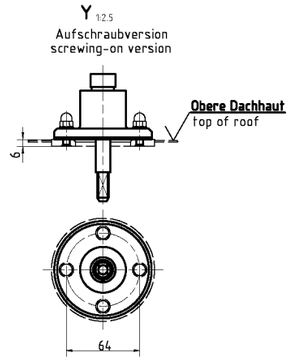
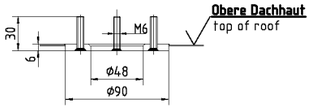


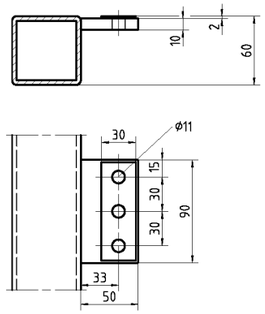






Dachflansch
roof-flange
(gehört nicht zu unserem Lieferumfang)
(is not part of our delivery scope)





Kundenspezifische Angaben zur Notbetätigungseinrichtung
Données des spécifications du client par commande de secours

Kunde client	biegsame Welle Länge longeur d' axe souple	Dachdurchführung Maße mesures d'ouvertures dans le toit A	B	C	Klemmversion version pincée	Aufschraubversion version vissée
Bilbao	850					X

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Pos.	Stk.	Bl.	Benennung	Sachnr/Norm/Lieferant	Werkstoff	Artikelnr.	Teilenr.
110	1	1	Verklinkung manual crank	-	-		
100	1	1	Anord. d. Überbrückungsl. arrangement of bridging strands	-	-		
090	1	1	Handkurbel manual crank	-	-		
080	1	1	Spindelantrieb komplett spindle drive	-	-		
070	1	1	Wippe collector head	-	-		
060	1	1	obere Lenkerstange upper guide rod	-	-		
050	1	1	Oberschere upper strut	-	-		
040	1	1	Federzug tension spring	-	-		
030	1	1	untere Lenkerstange lower guide rod	-	-		
020	1	1	Unterschere lower strut	-	-		
010	1	1	Rahmen base frame	-	-		

Art. Nr.: 7211204

Verwendbar für:
Fb80.73

Ausg.
Datum

Maße ohne Toleranzangabe.
ISO 2768-cL
ISO 13920-BF

Oberfläche DIN ISO 1302

Maßstab: 1:10

	Datum	Name
Bearb.	04.05.2009	CW
Gepr.	19.07.2009	DF
Norm		

Einholmstromabnehmer
single arm pantograph

STEINEMANN TECHNIK

1 Fb80.73

Blatt 01
01 Bl

Zust.	Änderung	Datum	Name	Ursprung	Ers. f.	Ers. d.
0				1Fb80.71		

!GENTITLE-LL

USB00000086_0341

EDINBURGH TRAM NETWORK

Tender Query

No: 1004	**Date: 15-11- 07**
Query:	The DKE gauging drawings provided by CAF show that the camera housings of this vehicle do not respect the minimum track centreline clearances as set out in the SDS document '*Track Alignment Criteria v2', (section 19 Track Spacing)*, on large radius curves and on straight track. CAF need to explain how their vehicle will be able to negotiate the alignment throughout the System, whilst also ensuring that two trams may pass anywhere on the System. Given that a substantial amount of the System will be operated at a 50km/h speed limit, is there scope to reduce any of the DKE offsets to take account of this (where appropriate)? If so, can additional gauge drawings please be provided similar in format to CAF drawings Q.00.072.56-60 but with the maximum offset for each curve radius limited to that which would apply for a maximum speed of 50kph? These drawings should show the maximum offset over the body up to a height of 2.1m and the maximum offset over the camera housings, for the interior and exterior of each curve radius.
Response:	

Confirmation of designed track spacing compatibility against Edinburgh Tram CAF vehicle DKE

Scope

Tie has requested recently a review of the Edinburgh Tram CAF vehicle DKE, in order to check its compatibility with the design of track spacing and other parameters from the infrastructure of the ETN system which affect to the dynamics of the vehicle on track.

CAF has produced some information to clarify this situation and this has been submitted to **tie** during the final stages of the tendering process. This document is prepared with the aim of summarising with accuracy all the information and references used, the targets of the study and the calculations produced for the demonstration of compatibility between track spacing definition and the DKE of the vehicle proposed by CAF for the ETN.

1. Information from tie used by CAF for DKE analysis

- Track Construction and Maintenance Tolerances for use in Calculation of DKE for Initial Comparison Purposes (document ref Track Tolerances for DKE Calc 070618a.doc, attached). This document shows relevant information as rail sidewear, horizontal alignment, etc. not covered in any other document, as the Employers Requirements document.

- Maximum cant and cant deficiency values taken from ER version 3.2 (issued on 16.01.2008). These values correspond to those shown in ETN Track Alignment Criteria issued on 23.02.2007 (document ref ULE90130-SW-SPN-00001 V2, attached)

- Track Spacing: the information about distance between track centrelines can be found in different documents, as follows:

  ER version 3.2 (issued on 16.01.2008):

  - Track spacing Plus allowance for DKE Double track main line – track centres – side poles Subject to Tram - 3150mm. (No information neither about whether this applies to straight or curves, nor about evolution of track spacing with reduced radius curves)
  - Track spacing Plus allowance for DKE Double track main line – track centres – centre poles Subject to Tram - 3650mm. (No information neither about whether this applies to straight or curves, nor about evolution of track spacing with reduced radius curves)

ETN Track Alignment Criteria (issued on 23.02.2007 - document ref ULE90130-SW-SPN-00001 V2):

- Track spacing Double track main line – track centres – side poles 3100mm. Separations appropriate for tangent track and curves of radii greater than 450m. (No information about evolution of track spacing with reduced radius curves)
- Track spacing Double track main line – track centres – centre poles 3600mm. Separations appropriate for tangent track and curves of radii greater than 450m. (No information about evolution of track spacing with reduced radius curves)

Typical Tramway Cross Sections (i.e. drawings ref ULE90130-SW-DRG-00031 rev 6 and ref ULE90130-SW-DRG-00032 rev 6, both dated on 23.03.2006, attached):

- Track spacing Double track main line – track centres – side poles 3100mm. Separation applicable to Horizontal radii of 350m or above including straight track. This dimension will increase for curved alignments (refer to tables included in the Assumed Design Tram Vehicle report) with consequential increase in the overall tramway width.
- Track spacing Double track main line – track centres – centre poles 3600mm. Separation applicable to Horizontal radii of 350m or above including straight track. This dimension will increase for curved alignments (refer to tables included in the Assumed Design Tram Vehicle report) with consequential increase in the overall tramway width.

Note: ADTV Report previously referred and used by CAF is ETN Asumed Design Tram Vehicle (issued on 15.03.2006 - document ref ULE90130-SW-SPN-00010 V3, attached)

CAF has worked with the information reflected in the Typical Tramway Cross Sections as per above paragraph, as this is the most restrictive and comprehensive definition of Track Spacing.

2. Objectives

- To accomplish with the ORR RSPG Part 2 Section G 'Guidance on Tramways' (Nov 2006), Point 3 Tramway Clearances, Clearances between Trams, paragraph 110:

110 The clearances between the DKEs of two adjacent trams should be not less than:

(a) without centre traction poles - 100 mm;

(b) with traction poles between the two DKEs - 600 mm (but at least 100 mm from the face of the nearest side of a pole to each DKE).

Note: These clearances are minimum clearances up to 2100 mm above ground level. At heights above 2100 mm, reduced clearances may be acceptable.

- Comply with the RVAR 1998 Guidance, Regulation 23 – Boarding devices, in order not to require a boarding device in Wheelchair compatible doorways:

  Regulation 23 - Boarding devices

  23(1) When a wheelchair-compatible doorway in a regulated rail vehicle is open at a platform at a station or a tram stop a boarding device must be fitted between that doorway and the platform or stop if a disabled person in a wheelchair wishes to use that doorway, unless the gap between the edge of the door sill of that doorway and the edge of the platform or stop is not more than 75 millimetres measured horizontally and not more than 50 millimetres measured vertically.

  And trying to follow the recommendation from RSPG 2G, Point 5 Tramstops, Platform Clearances, paragraph 162

  162 Horizontal clearance between platforms and door thresholds must not exceed 75 mm at doors which are intended to be used by mobility-impaired passengers.12

  Note 1: The dimension of 75 mm is the maximum that must be maintained over the life of the system and it is recommended that at installation a figure of 40 mm is achieved to help ensure compliance with the Rail Vehicle Accessibility Regulations 199812 over the life of the system.

3. Reported information generated by CAF to provide adequacy to the Objectives (2), according to the Information (1) available

- Stepping Distance CAF drawing ref Q.22.00.291 (attached), where a door sill of 65 mm (aluminium extrusion of 50mm + rubber end of 15mm) is proposed, together with a Platform to Track centre distance of 1440mm (at 300mm height).

  This arrangement, in nominal (tare, no wear/tolerances) conditions, provides a gap of just 50mm in horizontal and vertical directions, while protects from any chance of contact between door leaf and platform when opening doors, and allows for reduced speed circulation through stops.

- Updated Developed Kinematic Envelope -DKE- for the CAF Tram Vehicle, drawing ref Q.22.93.105 (attached) and note 'Summary of updates for Edinburgh Tram CAF DKE analysis' (attached) just briefly covering what it has been already communicated to **tie** in recent e-mails in this topic.

- 'Clearance verification – Edinburgh Tram CAF DKE analysis' note (attached) showing adequacy of gaps as required by RSPG 2G, based on the Updated DKE of CAF and the Track Spacing most restrictive information available.

  As a result of this, for any curve radius (and straight) it is demonstrated that more than 100mm of clearance exists at a height up to 2100mm between DKEs of trams crossing in track sections without centre traction poles, while slightly reduced clearances for higher positions (rearview cameras) are obtained, judged as acceptable as per the RSPG 2G Guiadance. No possibility of physical contact exists at any point in these conditions.

  The same rationales and comment applies for clearances between DKEs of trams crossing in track sections with centre traction poles, where values greater than 600mm are found (again for heights up to 2100mm, slightly reduced for higher positions). No possibility of physical contact exists at any point in these conditions.

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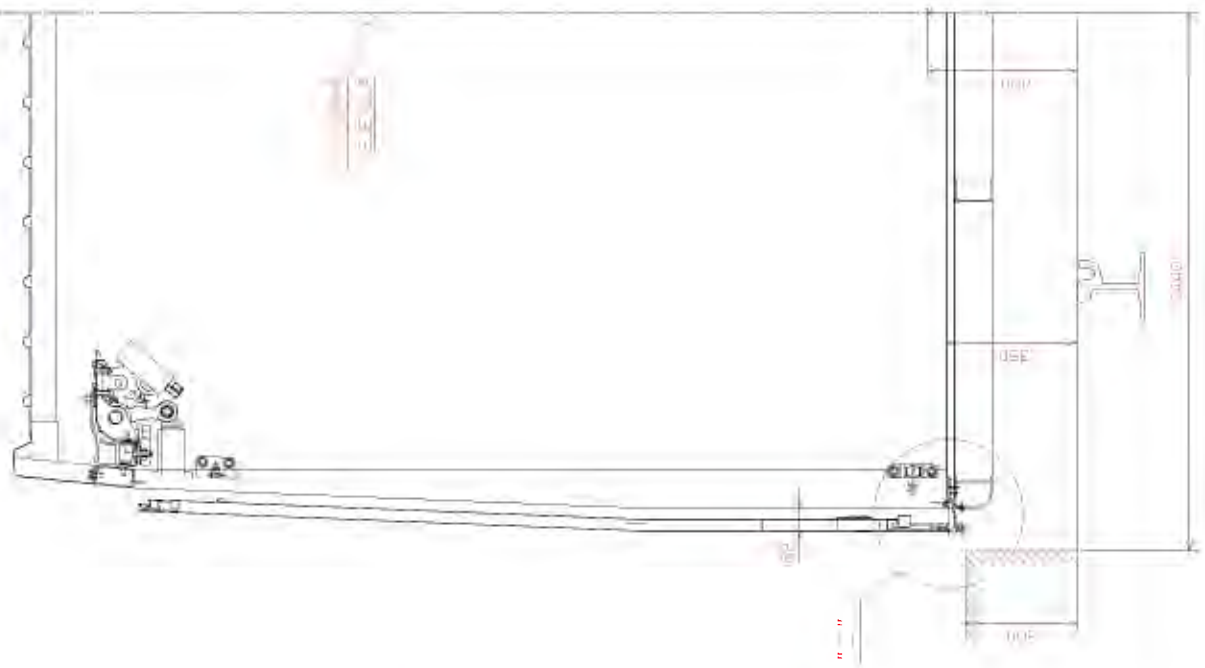
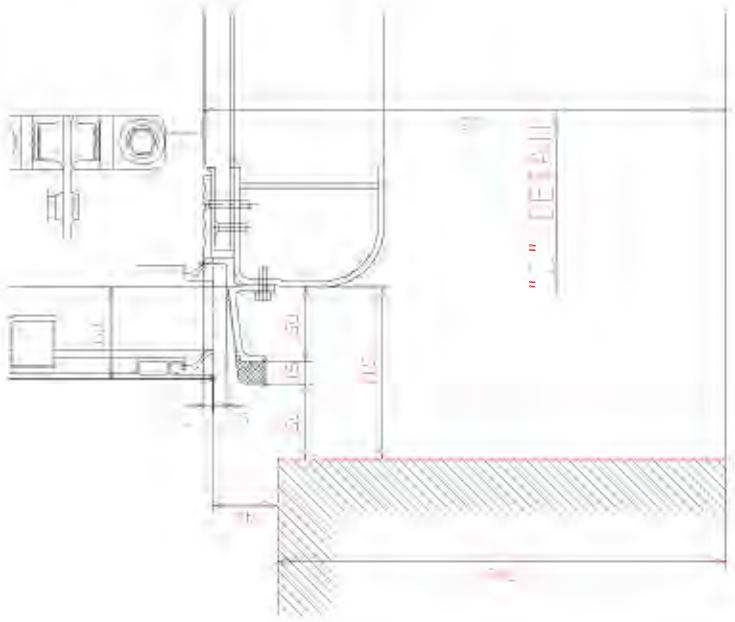
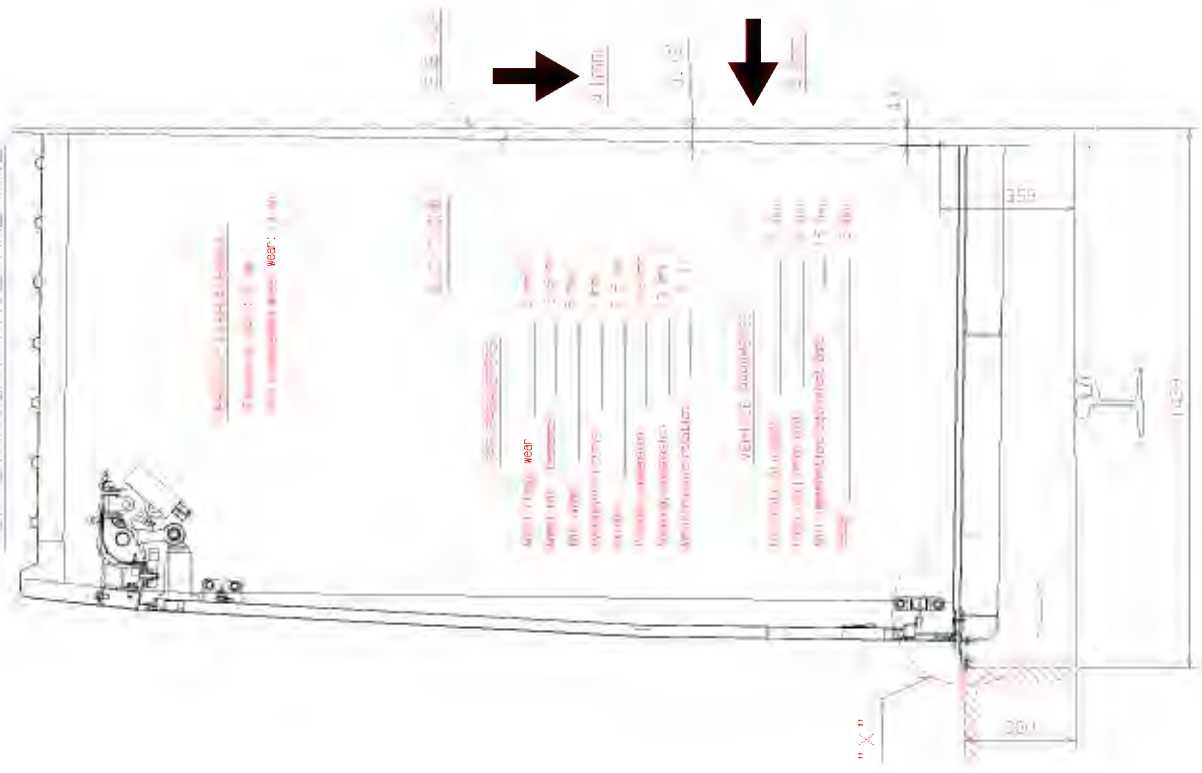
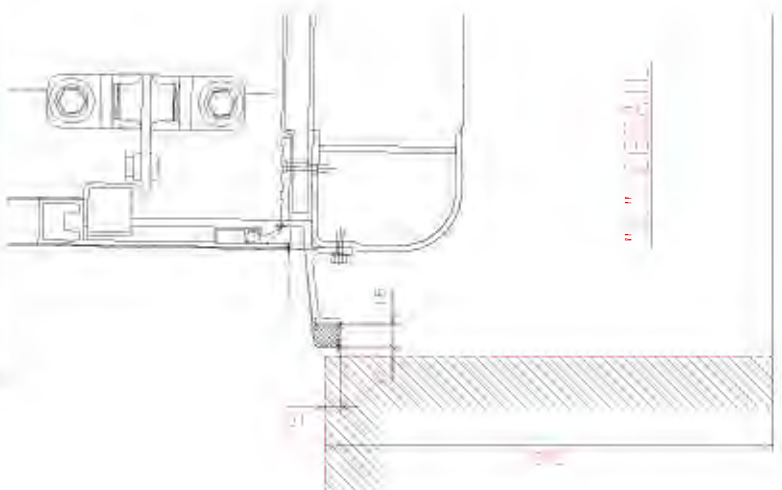
NOMINAL POSITION





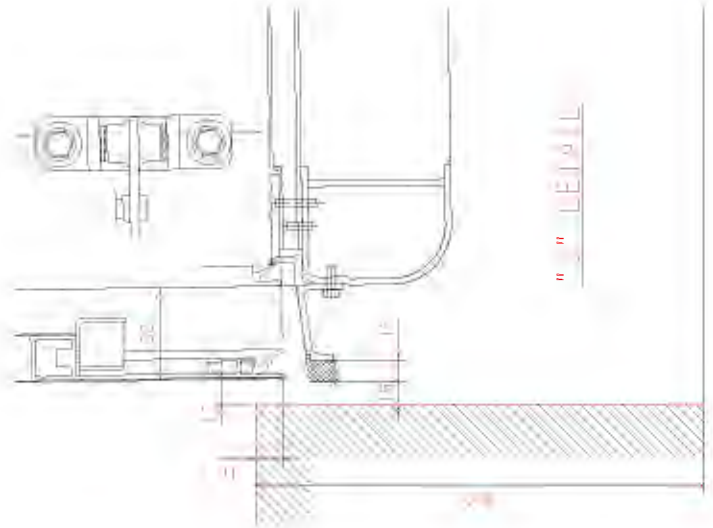
TRAM RUNNING 35 km/h
ON STRAIGHT RAIL AND AW2

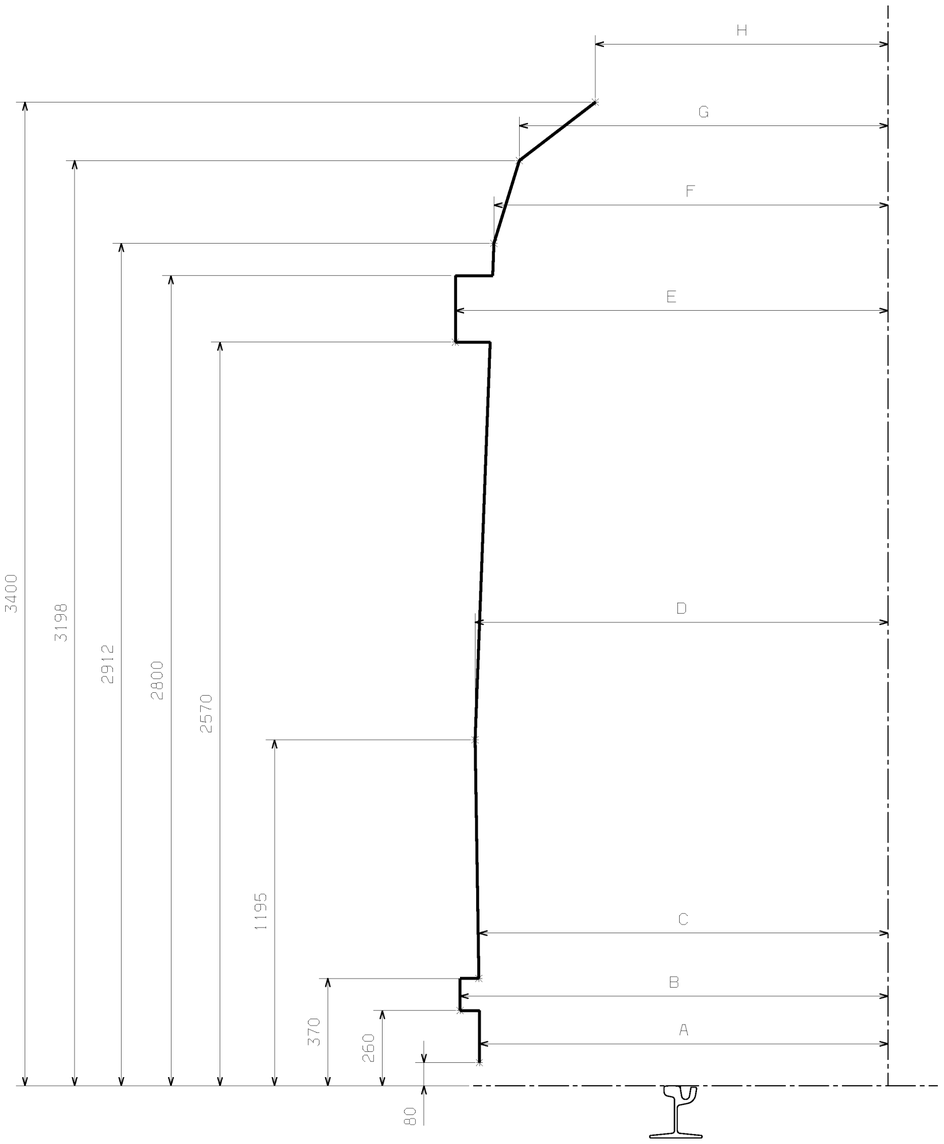




TRAM STOPPED ON STRAIGHT RAIL AND AW2
CLOSE TO STEP







DEVELOPED KINEMATIC ENVELOPE INSIDE CURVE													
Radius / Point	25	30	40	50	70	90	100	200	300	500	1000	2000	STRAIGHT
A	1575	1550	1518	1499	1476	1462	1457	1433	1427	1420	1418	1419	1414
B	1642	1617	1585	1566	1543	1529	1524	1501	1494	1487	1485	1486	1480
C	1577	1552	1520	1501	1478	1464	1459	1436	1429	1422	1420	1421	1415
D	1593	1567	1536	1517	1494	1480	1475	1451	1444	1438	1435	1437	1425
E	1553	1528	1496	1477	1489	1496	1498	1508	1513	1511	1509	1510	1488
F	1534	1509	1477	1458	1435	1421	1416	1393	1386	1379	1377	1378	1355
G	1447	1421	1389	1370	1348	1334	1329	1305	1298	1292	1289	1291	1266
H	1184	1159	1127	1108	1086	1072	1066	1043	1036	1030	1027	1028	1002

DEVELOPED KINEMATIC ENVELOPE OUTSIDE CURVE													
Radius / Point	25	30	40	50	70	90	100	200	300	500	1000	2000	STRAIGHT
A	1571	1550	1524	1508	1488	1475	1471	1449	1443	1432	1424	1422	1413
B	1639	1617	1591	1575	1556	1543	1538	1516	1510	1500	1491	1489	1480
C	1574	1552	1526	1510	1491	1478	1473	1451	1445	1435	1426	1424	1415
D	1592	1571	1544	1529	1509	1496	1492	1470	1464	1453	1445	1443	1428
E	1670	1649	1623	1607	1587	1575	1570	1548	1542	1532	1523	1521	1496
F	1539	1518	1492	1476	1457	1444	1439	1417	1411	1401	1392	1390	1363
G	1453	1432	1405	1389	1370	1357	1352	1330	1324	1314	1305	1303	1275
H	1191	1170	1144	1128	1108	1096	1091	1069	1063	1053	1044	1042	1012

MARCA	DESCRIPCION	CANT.	Nº SUMINISTRADOR O NORMA FABRICANTE		PESO UNITARIO
			Nº DIBUJO O CALIDAD MATERIAL		NOTAS Y OBSERVACIONES

MODIFICACIONES

APLICACIONES

-EDINBURGH TRAM-

	FECHA	NOMBRES
COMPR.		
VERIFIC.		
HOMOL.		
DIBUJ.	19.02.08	
VERIFIC.	19.02.08	

PLANO Nº

SUSTITUYE A:

SUSTITUYE A :

TOL. GEN. | ESCALA: 1/15

DESIGNACION:

DEVELOPED KINEMATIC ENVELOPE

EDICION

HOJA Nº 1

Nº DE HOJAS 1

ENTIDAD: CAF

REFERENCIA: Q.22.93.105

USB00000086-0348

EDICION

Summary of updates for Edinburgh Tram

CAF DKE analysis

Scope

This document just summarises the updates introduced over the DKE analysis presented within the CAF BAFO, and is merely a copy of what it has been communicated to **tie** during the later stages of the Pre Works Mobilisation Agreement.

Summary of Updates

- Roll stiffness (souplesse): the former DKE drawings presented by CAF within the BAFO were produced assuming a roll stiffness factor of 0,25, which is not proper for this kind of vehicles. The right value to be used is 0,1, which represents a stiffer roll behaviour of the carbody on the bogie.

- Bogie - carbody spin angle: the former DKE drawings presented by CAF were showing a value of 0,17deg (produced by traction rods clearance); this is due to the presence of 2 traction rods between bogie and carbody. The current development of CAF for tram bogies (including the bogie to be used with Edinburgh Tram) make use of a single traction rod instead of two (this generates a number of benefits, mainly a reduction of wheel wear and noise). As a consequence, the maximum bogie-carbody relative angle can reach up to 1,17 deg. However, in order to meet a compromise between this feature and the DKE increase, it is limited to a maximum of 0,8 deg.

- Dynamic behaviour: making use of CAF R&D simulation tools, it has been simulated the circulation of the tram though different curves at maximum allowed velocity, taking into consideration the maximum cant deficiency of 100mm. As a result of this, it has been obtained the 'real' bogie to carbody relative angle for every single curve radius. These values are the ones used for this updated DKE, considering this cannot be higher than 0,8 deg as per above point. It is worth to mention that only this bogie to carbody rotation has been adjusted in the DKE analysis to the reflect what it has been obtained from the simulation model.

- In addition, it has been also included the DKE study at a height of H=370mm (near the floor height), as we CAF recently realised about the reduced width of the Assumed Design Tram Vehicle (see ULE90130-SW-DRG-00038, attached) starting from H=768mm downwards. The CAF vehicle does not present such a width reduction at this level and that is why a comparison of DKE between ADTV and CAF vehicle has been included at an intermediate H=370mm, in order to highlight such a difference.

- Finally, it has been implemented an additional representation of DKE at Door sill (at H=370mm), again compared vs the ADTV at this same height. For this purpose, the current proposal of door sill of 65mm (as per our CAF drawing Q.22.00.291 - Stepping Distance) has been used. It must be pointed out that ADTV was not presenting any protrusion from carbody to account for such door sill.

- In addition, CAF has considered the application of a statistical distribution for the rail wear and tolerances (gauge rel. variation and horizontal alignment rel. variation).

  This consists on applying the following formula:
  Wheel – track max clearance = wheel sidewear + wheel rail clearance + 1.2 x SQRT (Gauge variation^2 + Rail sidewear^2 + Horizontal alignm variation^2), instead of adding all parameters.

  Slight improvements have been obtained due to this consideration (as an example, for straight at door sill it has been improved just 16 mm due to this hypothesis)

The following effects are considered for DKE evaluation:

- Geometric swept envelope
- Bogie to track rotation (due to wear and tolerances as per below figures)
- Carbody to bogie rotation
- Transverse displacement (secondary suspension remaining available)
- Roll movement

Also for information, the following parameters are used for the DKE analysis:

- Max Wheel sidewear = 2mm
- Wheel – rail clearance = 5mm
- Gauge rel variation = 5mm
- Rail sidewear = 5mm
- Horizontal align. Rel variation = 10mm

- Primary suspensión transverse displacement = 3.4mm
- Secondary suspensión transverse displacement = 20mm

- Carbody to bogie max spin angle = 0,8º

- Roll pívot axis height = 400mm
- Souplesse = 0,1
- Max cant deficiency = 100 mm
- Max cant = 100 mm
- Equivalent cant due to rail imperfections = 50mm
- Equivalent cant due to Cross level error = 6mm
- Roll angle due to asymmetric passenger loading = 0,45º

Clearance verification – Edinburgh Tram CAF DKE analysis

Scope

This document briefly presents the method to determine the clearance between DKEs of trams crossing track sections without centre pole, making use of the updated DKE of the CAF vehicle for ETN and the available information about Track Spacing. It is also justified the reason why the same rationales can be applied for trams crossing track sections with centre pole.

As a result of this, it is demonstrated the compliance of the CAF vehicle with the RSPG 2G guidance in terms of Tramway clearances.

Method used to determine clearance

For every single curve radius and for relevant tram heights, it has been added the inside DKE of one CAF vehicle with the outside DKE of the crossing CAF vehicle.

In curve radius greater than 350m, the track spacing is constant and equal to 3100mm (for track sections without centre pole). For radius lower than 350m, the track spacing is determined as follows:

Track spacing = inside DKE (cross section) + outside DKE (cross section) + 100mm

Just as an example:

Track spacing for R=50m = 1649 + 1738 +100 = **3487mm**
(find data of DKE cross sections in the Table of drawing ref ULE90130-SW-DRG-00038 Rev 2).

Then, clearance has been calculated for each radius and height as:

Clearance = Track Spacing – (inside DKE CAF vehicle + outside DKE CAF vehicle)

Results in a tabular format can be found at the end of this same document. As a summary, find below clearances (mm) for every single combination of height and radius:

height (m)	Curve Radius (m) 25	30	40	50	70	90	100
370	809,4	618,9	417,0	345,9	266,8	223,9	208,7
1195	905,4	714,9	513,0	441,8	362,8	319,8	304,7
2100	940,1	749,6	547,6	476,5	397,5	354,5	339,4
2683	866,6	676,0	474,1	403,0	289,9	225,5	202,9

height (m)	Curve Radius (m) 200	300	500	1000	2000	Straight
370	145,2	121,2	112,8	124,0	124,8	140,3
1195	241,1	217,2	208,8	219,9	220,7	247,3
2100	275,8	251,8	243,4	254,6	255,4	294,1
2683	105,8	70,4	57,4	68,6	69,4	115,9

Table 1. Clearance (mm) for track without centre poles.

Brief results discussion

The gaps determined for every single combination for heights up to 2100mm are greater that 100mm then complying with RSPG 2G guidance. For heights greater than 2100mm there are few combinations where this clearance value is lower (ranging from 57.4mm to 70.4mm), but equally complying with the RSPG 2G, as reduced gaps are allowed at this height, which corresponds to rearview cameras.

It is also worth to mention that gaps for tighter curves are quite important and clearly higher than 100mm.

In order to provide a graphical interpretation, it has been represented the (inside DKE + outside DKE) for each height, and it has been compared with the Track Separation; this allows to check that no physical contact can take place. Moreover, to check compliance with RSPG 2G of 100mm of clearance (for h ≤ 2100mm), this same comparison is also provided vs. a curve showing Track Separation – 100mm.

Finally, all these rationales and comments are equivalent for track with centre poles, as the nominal track spacing is 3600mm and the clearance recommended in RSPG 2G is 600mm.

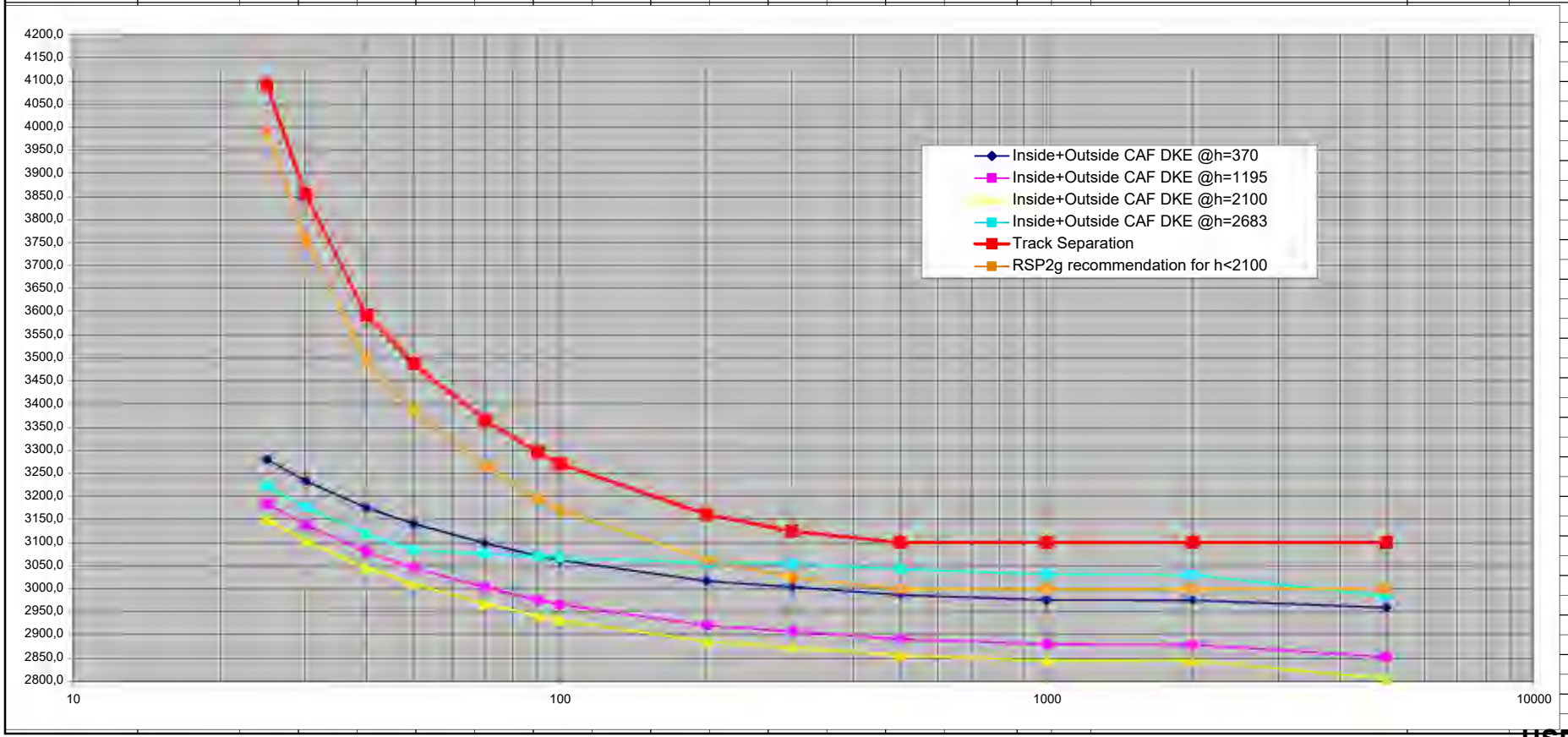
Track without centre poles

Outside from one tram + inside from the other crossing tram, according to CAF DKE 20.02.2008

Comparison with Track Separation as per Cross Section 1 of ULE90130-SW-DRG-00031 Rev 6

27/02/2008

		Curve Radius												Straight			
	height	25	30	40	50	70	90	100	200	300	500	1000	2000	5000			
door sill	370	3280,6	3234,1	3176,0	3141,1	3099,2	3072,1	3062,3	3016,8	3003,8	2987,2	2976,0	2975,2	2959,7		inside+outside CAF DKE	*RSPG ask for 100mm gap*
		809,4	618,9	417,0	345,9	266,8	223,9	208,7	145,2	121,2	112,8	124,0	124,8	140,3	gap	=Track Separation - (inside+outside CAF)	*for heights below 2100*
	1195	3184,6	3138,1	3080,0	3045,2	3003,2	2976,2	2966,3	2920,9	2907,8	2891,2	2880,1	2879,3	2852,7		inside+outside CAF DKE	
		905,4	714,9	513,0	441,8	362,8	319,8	304,7	241,1	217,2	208,8	219,9	220,7	247,3	gap	=Track Separation - (inside+outside CAF)	
	2100	3149,9	3103,4	3045,4	3010,5	2968,5	2941,5	2931,6	2886,2	2873,2	2856,6	2845,4	2844,6	2805,9		inside+outside CAF DKE	
		940,1	749,6	547,6	476,5	397,5	354,5	339,4	275,8	251,8	243,4	254,6	255,4	294,1	gap	=Track Separation - (inside+outside CAF)	
rear view camera	2683	3223,4	3177,0	3118,9	3084,0	3076,1	3070,5	3068,1	3056,2	3054,6	3042,6	3031,4	3030,6	2984,1		inside+outside CAF DKE	*RSPG allows less than 100mm*
		866,6	676,0	474,1	403,0	289,9	225,5	202,9	105,8	70,4	57,4	68,6	69,4	115,9	gap	=Track Separation - (inside+outside CAF)	*for heights above 2100*
	full height	3990	3753	3493	3387	3266	3196	3171	3062	3025	2994	2972	2962	2950		inside+outside Cross Sections DKE	
		100	100	100	100	100	100	100	100	100	106	128	138	150		Track Separation - (inside+outside Cross Sections DKE)	
		4090	3853	3593	3487	3366	3296	3271	3162	3125	3100	3100	3100	3100		Track separation	
		3990	3753	3493	3387	3266	3196	3171	3062	3025	3000	3000	3000	3000		Track separation - 100mm	RSP2g recommendation for h<2100
		Curves of Raidus < 350m									Curves of Radius R>350m						



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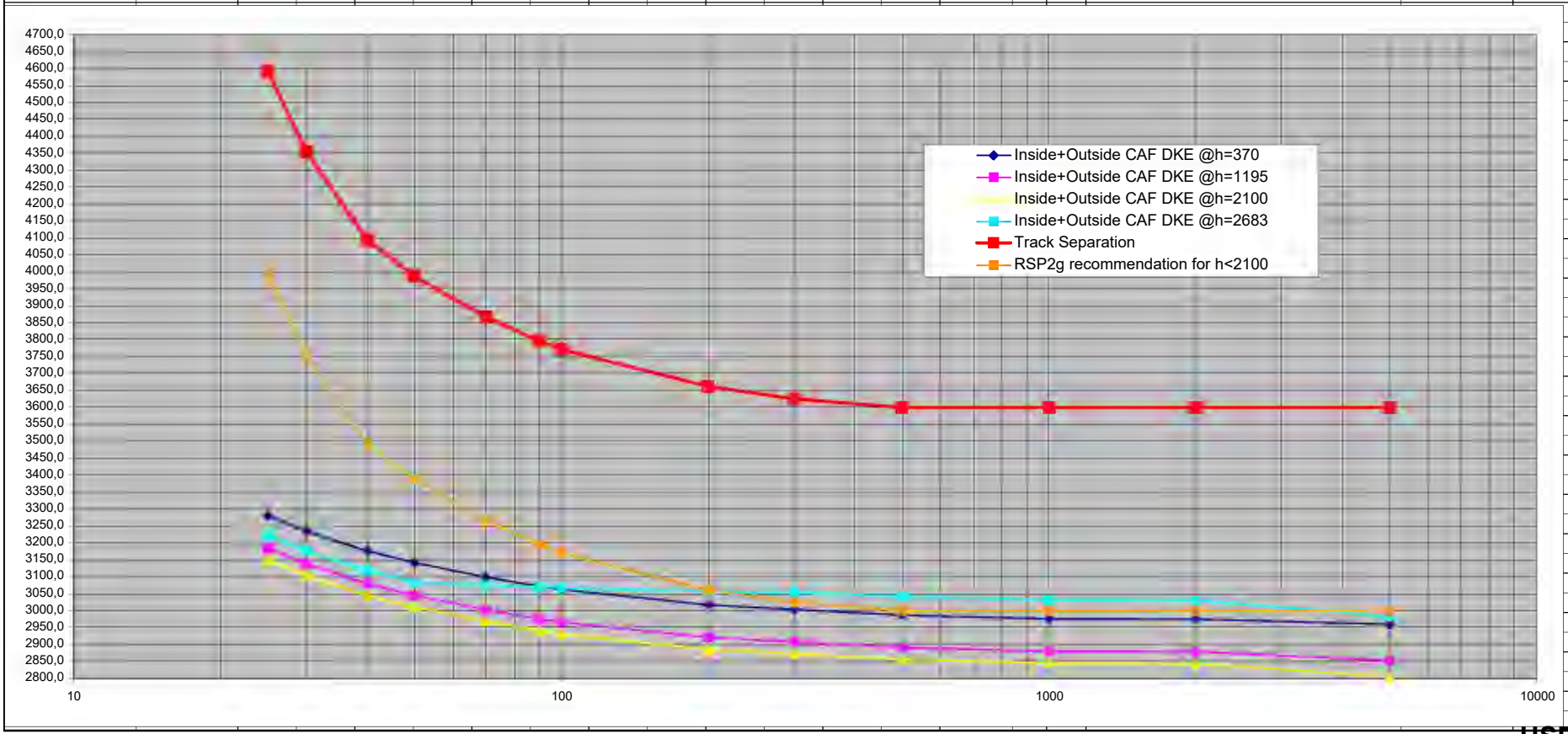
Track with centre poles

Outside from one tram + inside from the other crossing tram, according to CAF DKE 20.02.2008 — 27/02/2008

Comparison with Track Separation as per Cross Section 6 of ULE90130-SW-DRG-00032 Rev 6

		Curve Radius												Straight			
	height	25	30	40	50	70	90	100	200	300	500	1000	2000	5000			
door sill	370	3280,6	3234,1	3176,0	3141,1	3099,2	3072,1	3062,3	3016,8	3003,8	2987,2	2976,0	2975,2	2959,7		inside+outside CAF DKE	*RSPG ask for 600mm gap*
		1309,4	1118,9	917,0	845,9	766,8	723,9	708,7	645,2	621,2	612,8	624,0	624,8	640,3	gap	=Track Separation - (inside+outside CAF)	*for heights below 2100*
	1195	3184,6	3138,1	3080,0	3045,2	3003,2	2976,2	2966,3	2920,9	2907,8	2891,2	2880,1	2879,3	2852,7		inside+outside CAF DKE	
		1405,4	1214,9	1013,0	941,8	862,8	819,8	804,7	741,1	717,2	708,8	719,9	720,7	747,3	gap	=Track Separation - (inside+outside CAF)	
	2100	3149,9	3103,4	3045,4	3010,5	2968,5	2941,5	2931,6	2886,2	2873,2	2856,6	2845,4	2844,6	2805,9		inside+outside CAF DKE	
		1440,1	1249,6	1047,6	976,5	897,5	854,5	839,4	775,8	751,8	743,4	754,6	755,4	794,1	gap	=Track Separation - (inside+outside CAF)	
rear view camera	2683	3223,4	3177,0	3118,9	3084,0	3076,1	3070,5	3068,1	3056,2	3054,6	3042,6	3031,4	3030,6	2984,1		inside+outside CAF DKE	*RSPG allows less than 600mm*
		1366,6	1176,0	974,1	903,0	789,9	725,5	702,9	605,8	570,4	557,4	568,6	569,4	615,9	gap	=Track Separation - (inside+outside CAF)	*for heights above 2100*
	full height	3990	3753	3493	3387	3266	3196	3171	3062	3025	2994	2972	2962	2950		inside+outside Cross Sections DKE	
		600	600	600	600	600	600	600	600	600	106	128	138	150		Track Separation - (inside+outside Cross Sections DKE)	
		4590	4353	4093	3987	3866	3796	3771	3662	3625	3600	3600	3600	3600		Track separation	
		3990	3753	3493	3387	3266	3196	3171	3062	3025	3000	3000	3000	3000		Track separation - 600mm	RSP2g recommendation for h<2100
		Curves of Raidus < 350m									Curves of Radius R>350m						



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Track Construction and Maintenance Tolerances for use in Calculation of DKE for Initial Comparison Purposes.

Introduction

This document indicates values of combined track Construction and Maintenance tolerances to be assumed in the derivation of DKE dimensions.

These dimensions necessarily combine both construction and maintenance limits and are provided by SDS solely to facilitate the initial calculation of DKE by Tramcos and to ensure a common basis for comparison, evaluation and design. Both construction and maintenance limits are ultimately the responsibility of the Infraco and so final values will be established by them on appointment. The values given here reflect the SDS view of likely values.

Construction tolerances are also listed for information but it is the combined construction and maintenance limits which are relevant to the calculation of the DKE. These values are primarily related to plain line and are for calculation of DKE Only.

Criterion	**Slab Track** (including embedded grooved Rail)		**Ballasted Track**		**Comments**
	Construction & Maintenance	Construction	**Construction & Maintenance**	Construction	
Gauge (from 1435mm) Relative Variation	+10mm to –0mm 1:500	+2mm to -0mm 1:1000	+10mm to –0mm 1:500	+2mm to -0mm 1:1000	Including for max 5mm rail sidewear.
Horizontal Alignment Relative Variation	+/- 15mm 1:500	+/- 5mm 1:1000	+/- 35mm 1:500	+/- 5mm 1:1000	Horizontal Alignment tolerance **incorporates** movement of the tram centreline due to maximum rail sidewear (5mm).
Vertical Alignment Relative Variation	+5mm to -15mm 1:500	+/- 5mm 1:1000	+/- 35mm 1:500	+/- 5mm 1:1000	**Including** for effect on rail level of max headwear (5mm)
Cross Level Error Variation from Design Cant Gradient	+/- 3mm 1:750	+/- 2mm 1:1000	+/- 5mm 1:750	+/- 2mm 1:1000	5mm cross level error could equate to 10mm error over bogie centres which the Track Alignment Criteria assumed to be at 10m spacing. Cross level error includes for differential headwear between rails 1:750 equates to difference between 1:300 max design twist and 1:250 assumed project tram capability. **Tramcos need to agree to these values.**
Short wave twist (ie measured over wheel centres)	1:250	1:400	1:250	1:400	Short wave twist principally a Maintenance issue but also a factor where the combinations of horizontal and vertical geometry induce twist. **Tramcos need to confirm this value is acceptable to their tram** Design attempts to limit short wave twist due to combinations of H & V geometry to 1:400 over 1.8m

Note: The Design Criteria attempts to limit twist due to cant gradient and/or combinations of horizontal and vertical geometry to 1:300 (long wave) 1:400 (short wave) (exceptional design limits). Tramcos should examine the track alignment design in relation to their own vehicle configuration to **confirm** their vehicle can negotiate the alignment. Attention is drawn to the section of the route between Princes Street and York Place. In particular, between North St Andrew Street and York Place.

Edinburgh Tram Network

Track Alignment Criteria

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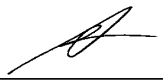
Reviewer	A Jory	Track Design Team Leader		21/02/07
Approver	S Reynolds	Project Director		

Revision History

Ver No	**Date**	**Description**	**Prepared By**
1	16 Mar 06	Draft Issue to **tie** Requiring Further Development	D J Tyson
2	23 Feb 07	Revisions following comments and internal review	D J Tyson

Distribution

Ver No	**Date**	**Name**	**Role**	**Company**
1	16 Mar 06	Willie Fraser	Contract Representative	**tie**
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1 INTRODUCTION

Intrinsic to any tram system is a satisfactory interface between the track, specifically the rails, and the tram, specifically its wheels and axles. Essential to this interface is a compatible fit between the geometry of the track and the operational constraints of the tram. Without an approved, evaluated and thoroughly considered interface, the use, safety and operational reliability of the system will be compromised.

2 PURPOSE

The purpose of this report is to define the geometric data upon which the track will be designed and incorporated into the infrastructure. These geometric requirements will have a direct influence on the operational characteristics of the tram.

The report is very likely to require review and further consideration once the tram vehicle supplier and the infrastructure contractor are appointed.

This report does not consider, as a matter of analysis and dimensional evaluation, aspects concerning rail / wheel interface. A separate report evaluates this interface but does, clearly, call upon information contained in this document.

3 SCOPE

This report applies to all tracks in the Edinburgh Tram Network, including, for the avoidance of doubt, the tracks in the depot.

4 DERIVATION OF TRACK ALIGNMENT CRITERIA

The track alignment criteria have been derived from the following:

- reference to criteria for similar tramways and adaptation of these to the Edinburgh Tram Network, specifically with regard to **tie**'s requirements and assumed characteristics of the tram vehicle (see 6 Future Review and Further Development);
- reference to 'Transport Cooperative Research Program Report 57 Track Design Handbook for Light Rail Transit' by Parsons Brinckerhoff Quade & Douglas Inc;
- reference to 'Modern Railway Track' 2nd edition, by C Esveld;
- reference to Railway Safety Publication 2 - Guidance on Tramways, pub Office of Rail Regulation;
- reference to 'Inclusive Mobility' by P R Oxley, pub DfT (application of the Disability Discrimination Act (Amendment) Regulations 2003);

- reference to 'Business Process Document Track Design Handbook' by Network Rail (ref NR/SP/TRK/0049, Issue 9, June 2006).

5 TRACK ALIGNMENT CRITERIA

5.1 Track Alignment Criteria

The Track Alignment criteria are in Appendix A.

5.2 Format of the Track Alignment Criteria

For each parameter of the track alignment there are three criteria as follows:

- Desirable (all endeavour must be made in the design to comply with this criterion);
- Limiting (the Desirable criterion may be exceeded on a case by case basis, up to this maximum, provided there is a net benefit to the Edinburgh Tram Network, due consideration being given to any adverse effect of exceeding the Desirable criterion);
- Exceptional (the Desirable and Limiting criteria may only be exceeded in exceptional cases, up to this maximum, when circumstances and conditions (eg geographical constraints) dictate that this design is unavoidable, provided all risks associated with the effects of exceeding the Desirable and Limiting criteria are assessed, measures to mitigate against adverse effects are implemented, and the residual risks are acceptable).

The exceptional criteria must not be exceeded under any circumstances.

5.3 Track Alignment Criteria with Commentary

A version of the Track Alignment Criteria, annotated with a commentary, is in Appendix B.

5.4 Format of commentary

The commentary comprises three parts as follows:

- notes (in black text);
- additional notes including derivation of criterion where appropriate (in blue text);
- items requiring further clarification, possible future review and further development (see 6 Future Review and Further Development) (in red text).

6 FUTURE REVIEW AND FURTHER DEVELOPMENT

Attention is drawn to those criteria which are very likely to require clarification, review and further development following appointment of the tram vehicle supplier (TramCo) and at such a stage or stages in the Edinburgh Tram Project when it is deemed that sufficient information about the tram vehicle is available. These particular criteria are highlighted in the Track Alignment Criteria with Commentary in Appendix B, where the specific areas for future review and further development are included in the commentary.

Particular attention is drawn to the need for the following in respect of the combination of horizontal and vertical curves (and the effective cant gradients) at the junction between North St Andrew Street and York Place and the criteria upon which these curves have been designed:

- a clear and unambiguous demonstration by the appointed tram vehicle supplier that the criteria, resulting restricting alignment and the impact of these on the tram vehicle design have been fully understood by the tram vehicle supplier;
- a clear and unambiguous demonstration by the appointed tram vehicle supplier that the tram vehicle is capable of negotiating the track alignment in this critical location for both the design and operating conditions, allowing for all tram and infrastructure tolerances and wear in construction and in service.

APPENDIX A Track Alignment Criteria

APPENDIX A TRACK ALIGNMENT CRITERIA

		Key	unit	50	80	20
01		Speed assumptions and normal limitations				
	.01	Speed - Shared running - maximum	kph	50	50	50
	.02	Speed - Segregated running – maximum	kph	80	80	80
	.03	Speed - Depot - maximum	kph	15	15	20
02		Geometric element				
	.01	Minimum length	m	15	12	6
03		Horizontal Curves				
	.01	Note				
	.02	Horizontal radius - Minimum - Running lines - Slab track	m	50	30	25
	.03	Horizontal radius - Minimum - Depot lines	m	50	40	25
	.04	Horizontal radius curves - Distance between curves of opposite flexure	m	15	10	6
	.05	Horizontal radius curves - Distance between curves of opposite flexure	m	10	6	0
	.06	Horizontal radius curves - Distance between curves of opposite flexure. Turnouts - theoretical tangent points at switch toe to next tangent pt (of opposite flexure)	m	10	8	6
	.07	Horizontal radius curves - Distance between curves of similar flexure formed by a curve and a turnout - theoretical tangent point at switch toe to tangent point of a curve of similar flexure	m	5	3	2
	.08	Horizontal radius curves – At Tramstops	m	Infinity	2000	1000
04		Cant - maximum cant values				
	.01	Cant – Platforms	mm	0	0	0
	.02	Cant - Tangent track	mm	0	15	15
	.03	Cant - Fixed Obtuse crossings	mm	0	0	15
	.04	Cant – Curves	mm	75	75	100
	.05	Cant - Plain line track – depot	mm	0	0	15
05		Negative cant				
	.01	Note				
	.02	Negative cant - Plain line	mm	0	15	15
	.03	Negative cant – Turnouts	mm	0	0	15
	.04	Negative cant – Turnouts	mm	0	0	15
	.05	Negative cant – Turnouts	mm	0	0	0
06		Cant excess				
	.01	Note				
	.02	Cant excess	mm	0	25	50
07		Cant deficiency				
	.01	Note				
	.02	Cant deficiency - Plain line	mm	40	60	75
	.03	Cant deficiency - Plain line – Depot	mm	40	75	100
	.04	Cant deficiency - Through route of turnout	mm	0	40	60
	.05	Cant deficiency - Turnout route	mm	40	60	75
	.06	Cant deficiency - Based on theoretical radius at switch toe	mm	40	40	50
	.07	Cant deficiency - jerk - Plain line	m/s3	0.25	0.35	0.45
	.08	Cant deficiency - jerk - At switch toes	m/s3	0.3	0.4	0.5
08		Transition curves				
	.01	Note				
	.02	Transition curves - Virtual Transition	m	No use	10	10
	.03	Transition curves - Clothoid - Minimum length	m	15	10	6

09		Cant gradient				
	.01	Note				
	.02	Cant gradient - Cant gradient - Maximum permitted		RoCC	600	300
	.03	Cant gradient - Cant gradient - Minimum permitted		1500	2000	3000
	.04	Cant gradient – At switch toes		0	0	0
	.05	Cant gradient – Through turnouts, crossings and diamonds		0	0	0
10		Rates of change of cant (RoCC)				
	.01	Note				
	.02	Rates of change - cant	mm/s	35	55	68
11		Rates of change of cant deficiency (RoCCD)				
	.01	Note				
	.02	Rate of change of cant deficiency - plain line	mm/s	35	55	68
	.03	Rate of change of cant deficiency - S&C	mm/s	35	55	80
12		Cant - applied/gradient/deficiency Decision process				
	.01	Note				
	.10	Note				
	.11	Decision process - Cant	mm	75		
	.12	Decision process - Cant deficiency	mm	40		
	.13	Decision process - Cant gradient	1 in	RoCC		
	.14	Decision process - Rates of change - cant	mm/s	35		
	.15	Decision process - Rates of change - cant deficiency	mm/s	35		
	.20	Note				
	.21	Decision process - Cant	mm		75	
	.22	Decision process Cant deficiency	mm		60	
	.23	Decision process Cant gradient			600	
	.24	Decision process Rates of change - cant	mm/s		55	
	.25	Decision process Rates of change - cant deficiency	mm/s		55	
	.30	Note				
	.31	Decision process Cant	mm		75	
	.32.	Decision process Cant deficiency	mm		60	
	.33	Decision process Cant gradient	1 in			300
	.34	Decision process Rates of change - cant	mm/s		55	
	.35	Decision process Rates of change - cant deficiency	mm/s		55	
	.40	Note				
	.41	Decision process Cant	mm			100
	.42	Decision process Cant deficiency	mm		60	
	.43	Decision process Cant gradient				300
	.44	Decision process Rates of change - cant	mm/s		55	
	.45	Decision process Rates of change - cant deficiency	mm/s		55	
	.50	Note				
	.51	Decision process Cant	mm			100
	.52	Decision process Cant deficiency	mm			75
	.53	Decision process Cant gradient				300
	.54	Decision process Rates of change - cant	mm/s		55	68
	.55	Decision process Rates of change - cant deficiency	mm/s		55	68
13		Vertical alignment				
	.01	Note				
	.02	Vertical alignment – Sag	m	1000	625	500
	.03	Vertical alignment - Hog	m	1000	625	500
	.04	Vertical alignment - Vertical acceleration	% of g	2	2	4
	.05	Vertical alignment - Turnouts and diamonds	m	None	None	None
	.06	Vertical alignment - Advance sws - xng & sws	m	None	None	None

.07	Vertical alignment - Turnouts and diamonds	m	15	10	6
.08	Vertical alignment - Minimum curve element length	m	20	15	10
.09	Vertical alignment - Instantaneous change in grade	%	none	0.1	0.2
.10	Vertical alignment – Grade distance between curves of opposite flexure	m	15	10	6
.11	Vertical alignment - Distance between opposite flexure Grade distance between vertical curves (opposite flexure)	m	15	10	0
.12	Vertical alignment - Grade distance between vertical curves (Similar flexure)	m	None	None	None

14 Vertical geometry

.01	Vertical geometry – Tramstops Radius through tramstop (without exceeding gradient criteria)	m	Infinity	2000	1000

15 Gradients

.01	Note				
.02	Gradients	%	5.0	6.7	8.0
.03	Gradients Tramstops	%	1.0	2.0	2.5
.04	Gradients Stabling Maximum	%	0.0	0.1	0.2
.05	Gradients Turnouts and junctions	%	0.2	3.0	6.5

16 Twist (as part of the design)

.01	Note				
.02	Twist (as part of the design) Long wave over length of vehicle	‰	1.5	2.0	3.3
.03	Twist (as part of the design) Short wave (over bogies)	‰	1.2	1.8	2.5

17 Vertical / horizontal alignment combinations

.01	Note				
.02	Vert / Horiz alignment - Horizontal radius – 25	m	1600	1200	1000
.03	Vert / Horiz alignment - Horizontal radius – 30	m	1333	1000	833
.04	Vert / Horiz alignment - Horizontal radius – 40	m	1000	750	625
.05	Vert / Horiz alignment - Horizontal radius – 50	m	800	600	500
.06	Vert / Horiz alignment - Horizontal radius – 60	m	667	500	n/a
.07	Vert / Horiz alignment - Horizontal radius – 80	m	500	n/a	n/a

18 Vertical / horizontal alignment combinations Preferences

.01	Note				
.02	Vert / Horiz alignment Combination preferences	m	1st		
.03	Vert / Horiz alignment Combination preferences	m		2nd	
.04	Vert / Horiz alignment Combination preferences	m			3rd

19 Track spacing

.01	Note		
.02	Track spacing - Double track - track centres - side poles	mm	3100
.03	Track spacing - Double track - track centres - centre poles	mm	3600
.04	Track spacing - Depot tracks and sidings - track centres	mm	TBA
.05	Track spacing - Depot tracks and sidings - track centres - working space	mm	TBA

20 Clearances

.01	Note		
.02	Passing Clearances - Between adjacent tracks (DKE's)	mm	100

21		Gauge				
	.01	Note				
	.02	Gauge Track gauge widening		0	0	0
	.03	Gauge Track gauge- flange-running	mm	TBA		
	.04	Gauge Check flangeway	mm	TBA		
22		Rail inclination				
	.01	Note				
	.02	Rail inclination - Inclination – None–Vertical, street grooved rail		TBA		
	.03	Rail inclination - Inclination - Non grooved rail		TBA		

APPENDIX B Track Alignment Criteria with Commentary

APPENDIX B TRACK ALIGNMENT CRITERIA – WITH COMMENTARY

		Key	unit	50	80	20	Desirable design parameter Desirable (all endeavour must be made in the design to comply with this criterion); Limiting normal design Limiting (the Desirable criterion may be exceeded on a case by case basis, up to this maximum, provided there is a net benefit to the Edinburgh Tram Network, due consideration being given to any adverse effect of exceeding the Desirable criterion) Exceptional criteria which may be subject to review Exceptional (the Desirable and Limiting criteria may only be exceeded in exceptional cases, up to this maximum, when circumstances and conditions (eg geographical constraints) dictate that this design is unavoidable, provided all risks associated with the effects of exceeding the Desirable and Limiting criteria are assessed, measures to mitigate against adverse effects are implemented, and the residual risks are acceptable). Dialogue in black qualifies the criteria Additional dialogue serves to add clarification and reasoning Areas requiring further clarification shown in red
01		Speed assumptions and normal limitations					
	.01	Speed - Shared running - maximum	kph	50	50	50	Limited by road traffic regulations and speeds
	.02	Speed - Segregated running – maximum	kph	80	80	80	A maximum speed has been specified by tie – (Schedule 16 System-wide Non-Functional Requirements – cl.6.2.5.2 – C8)
	.03	Speed - Depot - maximum	kph	15	15	20	Speed determined by radii of turnouts and curves within the confines of the depot
02		Geometric element					
	.01	Minimum length	m	15	12	6	Element design lengths Lengths are tied to the tram length, specifically distance between bogies Geometric length based on 12m distance between bogies (worst case scenario) Review required when vehicle data known. To be refined to suit tram
03		Horizontal Curves					
	.01	Note					Minimum requirements for horizontal curves including distances between similar and opposite flexure. Similar requirements also for horizontal curvature up to turnouts and through tramstops
	.02	Horizontal radius - Minimum - Running lines - Slab track	m	50	30	25	Slab track offers greater stability
	.03	Horizontal radius - Minimum - Depot lines	m	50	40	25	Vehicle negotiability, track stability and wear important Exceptional criteria raised to 25m (from 20m) at tie's request Considered minimums dependent upon tram data To be refined to suit tram

.04	Horizontal radius curves - Distance between curves of opposite flexure	m	15	10	6	Radii dependent - no transition curves The sharpness of the curves of opposite flexure (and hence the offset to the tangent line) has direct impact on the length of tangent (straight) track between the curves. Geometric length based on 12m distance between bogies although 10m seen as being appropriate being the approximate length between 'inside' axles of the adjacent bogies. Considered minimums dependent upon tram data To be refined to suit tram
.05	Horizontal radius curves - Distance between curves of opposite flexure	m	10	6	0	With transitions on adjacent opposite flexure curves (with some verification on sharp curves) Exceptional to be considered individually (also refer wheelbase) Rates of change of cant and cant deficiency must match on opposite curves. Direct reverses with pure horizontal curves should be avoided, but large radii may be acceptable as an exception.
.06	Horizontal radius curves - Distance between curves of opposite flexure. Turnouts - theoretical tangent points at switch toe to next tangent pt (of opposite flexure)	m	10	8	6	It is established that it is a good practice to provide a section of tangent track between curves of opposite flexure. The amount of such track is very much dependent upon the wheelbase and behaviour of the vehicles using the track. The wheelbase does, therefore, contribute to the definition of this criterion. The ideal situation would be to enable the whole length of the longest component of the vehicle to be placed on tangent track between reversing curves. Equally, it is obviously good practice to place the vehicle on tangent track geometry prior to entry to the switch area of the turnout - the vehicles attitude is, as a consequence, correctly aligned and stable. Excessive lateral jerk is avoided (passenger comfort) and derailment risk (considering bogie centres) is reduced. Considered minima partially dependent upon tram data
.07	Horizontal radius curves - Distance between curves of similar flexure formed by a curve and a turnout - theoretical tangent point at switch toe to tangent point of a curve of similar flexure	m	5	3	2	Wheelbase does, to some extent, define this criterion. However, it is good practice to place the vehicle on tangent track prior to entry to the switch area of the turnout. It is not so obvious that this could be a requirement and as such cause a problem especially considering that the curves are of similar flexure (as opposed to opposite flexure). However, placing a curve tangent point close to the switch toe can lead to derailment depending upon the manufacturing geometry of the turnout. The intention here is to ensure that the bogie (over the two axles) is placed on tangent track immediately prior to entry to the switches of the turnout. If the switches are manufactured with a theoretical tangent point outside the lead of the turnout, and if a similar flexure curve encroaches on to this point, derailment could occur. Considered minimums dependent upon tram data (bogie axle ctrs)

	.08	Horizontal radius curves – At Tramstops	m	Infinity	2000	1000	The absolute minimum in accordance with tie's requirements (Schedule 16 System-wide Non-Functional Requirements – cl.6.2.5.1 – C8), is infinity, ie straight track, for all conditions. The desirable criterion herein conforms to the above tie requirement, however, where prevailing conditions, alignment requirements and other restraints dictate that some degree of curvature (horizontal and vertical) will be essential. The criteria defined are considered appropriate for such situations and will be avoided if at all possible. Taking the mid ground (1500m radius) the versine on a typical vehicle of 10 meters in length would equate to 8 mm which should be within design, installation and maintenance tolerances for stepping distances. A case by case study will be undertaken should this criterion be deemed necessary. Reference to door positions on the Tram will also be considered. Not likely to be re-considered despite un-confirmed tram data although review will be undertaken when vehicle known.
04		Cant - maximum cant values					
	.01	Cant – Platforms	mm	0	0	0	Cant can be applied to curves at tramstop platforms but, considering that all trams would normally stop (i.e. no through running) it would be preferable that none is installed from a point of view of passenger access and comfort
	.02	Cant - Tangent track	mm	0	15	15	In order to facilitate drainage and overcome geometric problems adjacent to tangent track
	.03	Cant - Fixed Obtuse crossings	mm	0	0	15	In order to overcome geometric problems adjacent to the obtuse crossings. Obtuse crossings should be laid without cross-fall considering the difficulties of checking the obtuse crossing.
	.04	Cant – Curves	mm	75	75	100	Cant application As part of the assessment of determining cant values, due regard has to be paid to type of vehicle and the passengers using the system. Trams operate at relatively slow speeds with sharp radius curves. The calculation to establish the track's geometric speed capabilities relates directly to the applied cant and consequential cant deficiency. Given that the curve radii can be small, minor variations in the tram's speed could significantly alter the effectiveness (positively or otherwise) of an applied cant with equally disturbing effects on cant deficiency. Bearing in mind the above, cant is kept to a lower threshold (with obvious implications on the speed) which also recognises the comfort and safety of a high percentage of standing passengers. Trams operating in a street environment would be subject to slowing and speed changes as a result of other traffic sharing the route, prohibiting the application of high cant values on grounds of comfort factors associated with slow running. High cant values would also be unacceptable from a point view of highway construction and usage. However, notwithstanding the above, there could be occasions where speeds could be predicted to have some consistency, for example on long segregated sections which may also be on former railway alignments. High cants would then be permissible in these situations, provided that they are acceptable to the vehicle. Exceeding the exceptional criteria value (100mm) in conjunction with the above would be subject to special review and would be directly related to the capabilities of the vehicle for which data is still not confirmed.

	.05	Cant - Plain line track – depot	mm	0	0	15	Exceptional value of cant to be applied only to provide a nominal application on long suitable sections of track. Cant would be installed on cant gradients placed centrally about the tangent point of the curve.
05		Negative cant					
	.01	Note					Maximum allowable values which are particularly important with regard to turnouts and obtuse crossings
	.02	Negative cant - Plain line	mm	0	15	15	Criteria which may be un-avoidable Normally considered as to be avoided. The main use of negative cant would be to provide some cross-fall for drainage purposes.
	.03	Negative cant – Turnouts	mm	0	0	15	Only on the turnout route Criteria which may be un-avoidable Where turnouts are installed in situations where they are on a grade (specifically a down grade when viewed from the switch toe) negative cant is generated on the turnout route when the grade follows the straight route of the turnout. Steeper grades and sharper turnout curves will produce higher values of negative cant.
	.04	Negative cant – Turnouts	mm	0	0	15	Elsewhere within the turnouts and diamonds Criteria which may be un-avoidable Normally considered as to be avoided. The main use of negative cant would be to provide some cross-fall for drainage purposes
	.05	Negative cant – Turnouts	mm	0	0	0	Obtuse crossings Despite any geometric problems adjacent to the obtuse crossings, negative cant is not permitted. Due to the difficulties of checking the obtuse crossing, and consequential derailment risk, there cannot be any relaxation on this criterion.
06		Cant excess					
	.01	Note					Normally applied where slow speed running may be encountered, but does have some bearing in this concept
	.02	Cant excess	mm	0	25	50	Areas where high cant values have been installed, slow speed running (or even un-scheduled stopping) will require assessment. Values prevent un-necessary passenger discomfort and will, to some extent, have an impact on mitigating excessive low rail head wear. Normally associated with heavy rail systems. The criteria also controls the application of high cant values where compound curves exist and cant application remains the same for both curves thus easing construction by avoiding cant transitions (ramping up or down).

07		Cant deficiency					
	.01	Note					Acceptable criteria As part of the assessment of determining cant deficiency values, due regard has to be paid to type of vehicle and the passengers using the system. Trams operate at relatively slow speeds with sharp radius curves. The calculation to establish the track's geometric speed capabilities relates directly to the applied cant and consequential cant deficiency. Given that the curve radii can be small, minor variations in the tram's speed could significantly alter the actual values of cant deficiency with potentially serious effects on passenger comfort and safety. Bearing in mind the above, cant deficiency is kept to a sensible threshold (with obvious implications on the speed) recognising the comfort and safety of the passengers and also noting a high percentage of standing passengers. Allied to the above and with reference to minor speed variations (increases), keeping cant deficiency values lower affords headroom between acceptable running (cant deficiency value) and one which would have a negative impact on tram operation and passenger comfort. Capabilities of the vehicle still to be confirmed.
	.02	Cant deficiency - Plain line	mm	40	60	75	Considered appropriate. Value reflects consideration to the greater percentage of standing passengers compared with the number normally seated in heavy rail situations which operate with higher cant deficiency recommendations. Notwithstanding the above, consideration must be given to over-speed situations as defined in 07.01 above recognising also the passenger's perceive expectations for ride quality in this type of transportation system. Review required to assess any impact on tram
	.03	Cant deficiency - Plain line – Depot	mm	40	75	100	Considered appropriate. Review required to assess any impact on tram
	.04	Cant deficiency - Through route of turnout	mm	0	40	60	Considered appropriate. Should it be necessary to design turnouts with a curved through route, cant deficiency values should be reduced because of the greater occurrence of rail discontinuities. Review required to assess any impact on tram
	.05	Cant deficiency - Turnout route	mm	40	60	75	Considered appropriate. Being no applied cant, cant deficiency through the turnout curved route will require consideration in order to set the operating speed Review required to assess any impact on tram

	.06	Cant deficiency - Based on theoretical radius at switch toe	mm	40	40	50	Cant deficiency measured at switch toe The theoretical cant deficiency at this point is calculated by using an effective radius which is formed by placing a chord (actually the smallest wheelbase of the tram) symmetrically about the switch toe. The switch tongue rail design, and its associated geometry, will define the versine (and therefore, effective radius) produced by such a chord, the length of which is also dependent upon the tram's wheelbase dimensions. This criterion therefore makes due allowance for non-tangental switch tips. As an example, with a switch tongue design that also has a coincidental tangent point at the toe, the effective radius (on which cant deficiency is calculated) doubles from that of the switch radius. Review required once detailed turnout (particularly switch) designs are established. Review required to assess any impact on tram Shortest wheelbase data requires confirmation.
	.07	Cant deficiency - jerk - Plain line	m/s3	0.25	0.35	0.45	Jerk rate Relates to comfort and safety effects of the length of time taken to acquire acceleration forces as a result of the geometry change and the shortest wheel-base. Exceptional values slightly in excess of tie's requirements – (Schedule 16 System-wide Non-Functional Requirements – cl.6.2.5.2 – C6) – but rates of change of cant deficiency [11.01; 11.02] will rule, these accelerations relating, approximately and somewhat conservatively, to a vehicle with a wheelbase of 7.5 metres. Depending upon the wheelbase (or axle configurations) exceptional criterion should never be reached. Review required to assess any impact on tram Must consider impact of shortest wheelbase (which requires confirmation)
	.08	Cant deficiency - jerk - At switch toes	m/s3	0.3	0.4	0.5	Maximum permitted jerk rate at switch toes. As 07.07 above but slightly increased to reflect values at switch toe. Consider shortest wheelbase. Comfort and safety effects of the length of time taken to acquire acceleration forces evident at switch toe. Review required to assess any impact on tram Must consider impact of shortest wheelbase (which requires confirmation)
08		Transition curves					
	.01	Note					Dimensional requirements with some relationship to the tram dimensions.
	.02	Transition curves - Virtual Transition	m	No use	10	10	Length basis. Where no transition curve is provided, speed calculation and vehicle negotiability is base on the principle of virtual transition. The vehicle will form it own transition curve over the geometry change with a length equal to the distance between bogies (or wheelbase) - the virtual transition. 10m used (worst case scenario) for tram wheelbase assuming conventional bogied stock. The use of the virtual transition should normally be avoided. Virtual transition is directly related to the vehicle – confirmation required

	.03	Transition curves - Clothoid - Minimum length	m	15	10	6	Transition curve minimum lengths. Clothoid spirals preferred for the sharper radii curves associated with tram systems. Judgement required assessing effectiveness of transition curve length when related to curve radii and hence actual lateral shift. Application of cant control by transition length and consequential cant gradient.
09		Cant gradient					
	.01	Note					Permitted maximums. The way in which cant is applied to the track. These parameters effectively define twist. (dealt with later). Consultation with tram supplier essential
	.02	Cant gradient - Cant gradient - Maximum permitted		RoCC	600	300	Exceptional parameter to be avoided if at all possible. The maximum gradient is controlled by the vehicle characteristics and its capability to negotiate the twist created by cant gradient. Sometimes referred to as bogie equalisation, this is the change in wheel loading that occurs when one wheel moves above or below the plane of the other three wheels on a two-axle bogie. If a wheel unloads significantly, it may climb the rail and lead to derailment. Therefore, the expected track vertical surface alignment has to be wholly compatible with the tram's bogie capabilities. Rate of change of cant (RoCC) may overwrite these criteria. Essential review required with tram supplier.
	.03	Cant gradient - Cant gradient - Minimum permitted		1500	2000	3000	Minimum gradients Cant gradients can be difficult to construct, especially on ballasted track, when grades are very flat.
	.04	Cant gradient – At switch toes		0	0	0	None permitted Severe risk of derailment should gradients occur over the switches. Operation of the switches would be impaired.
	.05	Cant gradient – Through turnouts, crossings and diamonds		0	0	0	None permitted Severe risk of derailment should gradients occur in this region. Construction would also be virtually impossible.
10		Rates of change of cant (RoCC)					
	.01	Note					Rates of change in lateral acceleration Criterion defined using norms that are well proven and established by other organisations – for example, reference Network Rail and, Modern Railway Track by C Esdvelt. The exceptional criterion is less than that found on heavy rail systems reflecting the comfort and safety of the passengers, noting a high percentage of standing passengers and acknowledging that, with sharp curves and slow speeds, minor variations in speed could have significant impact. Review required to assess any impact on tram
	.02	Rates of change - cant	mm/s	35	55	68	Considered acceptable

11		Rates of change of cant deficiency (RoCCD)					
	.01	Note					Rates of change in lateral acceleration Criterion defined using norms that are well proven and established by other organisations - for example, reference Network Rail and, Modern Railway Track by C Esdvelt. The exceptional criterion is less than that found on heavy rail systems reflecting the comfort and safety of the passengers, noting a high percentage of standing passengers and acknowledging that, with sharp curves and slow speeds, minor variations in speed could have significant impact. Review required to assess any impact on tram
	.02	Rate of change of cant deficiency - plain line	mm/s	35	55	68	Considered acceptable
	.03	Rate of change of cant deficiency - S&C	mm/s	35	55	80	Considered acceptable Higher value considered reasonable given the stability of the turnout and the perceived acceptability of the ride through these areas.
12		Cant - applied/gradient/deficiency Decision process					
	.01	Note					Preferred, acceptable, limiting and exceptional criteria and the designer's decision process
							1st choice - Preferred
	.10	Note					The obvious preferred choice
	.11	Decision process - Cant	mm	75			
	.12	Decision process - Cant deficiency	mm	40			
	.13	Decision process - Cant gradient	1 in	RoCC			
	.14	Decision process - Rates of change - cant	mm/s	35			
	.15	Decision process - Rates of change - cant deficiency	mm/s	35			
	.20	Note					2nd choice - Acceptable
							Acceptable but ordinarily limiting. Passenger comfort still acceptable
	.21	Decision process - Cant	mm		75		
	.22	Decision process Cant deficiency	mm		60		
	.23	Decision process Cant gradient			600		
	.24	Decision process Rates of change - cant	mm/s		55		
	.25	Decision process Rates of change - cant deficiency	mm/s		55		
	.30	Note					3rd choice - Tolerable
							Acceptable but passenger comfort and vehicle attitude affected
	.31	Decision process Cant	mm		75		
	.32.	Decision process Cant deficiency	mm		60		
	.33	Decision process Cant gradient	1 in			300	1:300 cant gradients are normally to be avoided so as not to encroach on vehicle twist characteristics and passenger comfort. Passenger comfort affected Vehicle capabilities have to be understood
	.34	Decision process Rates of change - cant	mm/s		55		

.35	Decision process Rates of change - cant deficiency	mm/s	55		
.40	Note				4th choice - To be used in exceptional circumstances Maximum cant application has to be considered in conjunction with location, trackform and the application of cant deficiency. The speed (civil limiting speed) calculation has to give headroom for over-speed risks etc.
.41	Decision process Cant	mm		100	Maximum cant has to be considered in conjunction with cant deficiency.
.42	Decision process Cant deficiency	mm	60		
.43	Decision process Cant gradient			300	Passenger comfort affected Vehicle capabilities have to be understood
.44	Decision process Rates of change - cant	mm/s	55		
.45	Decision process Rates of change - cant deficiency	mm/s	55		
.50	Note				5th choice - To be used in exceptional circumstances – following review Passenger comfort definitely affected in certain combinations of criteria. Non-ballasted tracks only Maximum cant application has to be considered in conjunction with location, trackform and the application of cant deficiency. The speed (civil limiting speed) calculation has to give headroom for over-speed risks etc.
.51	Decision process Cant	mm		100	Maximum cant has to be considered in conjunction with cant deficiency.
.52	Decision process Cant deficiency	mm		75	Cant deficiency raised to maximum as a last resort.
.53	Decision process Cant gradient			300	Passenger comfort affected Vehicle capabilities have to be understood
.54	Decision process Rates of change - cant	mm/s	55	68	High rates of change must be considered carefully
.55	Decision process Rates of change - cant deficiency	mm/s	55	68	High rates of change must be considered carefully
13	Vertical alignment				
.01	Note				Accepted criteria for vertical alignment These values are in excess of tie's requirements – (Schedule 16 System-wide Non-Functional Requirements – cl.6.2.5.3 – V1,V1.1,V1.2) However, it has been established that the various vehicle manufacturers have trams that would be physically capable of negotiating the vertical curves defined below. More over, should the tie requirements for crest and dip curves be incorporated the vertical alignment on the system will be impossible. The real issue is, therefore, to ensure vertical accelerations are not unacceptable from a passenger comfort point of view. 13.02 and 13.03 define the physical criterion 13.04 defines acceleration limits Some elements require consideration from the tram supplier (when known)

.02	Vertical alignment – Sag	m	1000	625	500	Vertical curve radius – minimum It has been established that the various vehicle manufacturers have trams that would be physically capable of negotiating the vertical curves defined here. Subject to Tram
.03	Vertical alignment - Hog	m	1000	625	500	Vertical curve radius – minimum It has been established that the various vehicle manufacturers have trams that would be physically capable of negotiating the vertical curves defined here. Subject to Tram
.04	Vertical alignment - Vertical acceleration	% of g	2	2	4	Considered acceptable 2% of g calculates virtually the same radius as the square of the speed (kph) – another method of arriving at the vertical curve. 4% of g has, on Network Rail, been increased to 4.25 and 6.0%
.05	Vertical alignment - Turnouts and diamonds	m	None	None	None	Vertical curve radius Considered acceptable Severe risk of derailment should gradients occur over the switches. Operation of the switches would be impaired. Construction would also be virtually impossible.
.06	Vertical alignment - Advance sws - xng & sws	m	None	None	None	Vertical curve radius Considered acceptable Severe risk of derailment should gradients occur over the switches. Operation of the switches would be impaired. Construction would also be virtually impossible.
.07	Vertical alignment - Turnouts and diamonds	m	15	10	6	Proximity of vertical curve tangent point to switch toe and crossing In order to provide a stable approach for the tram vehicle as it enters the special trackwork.
.08	Vertical alignment - Minimum curve element length	m	20	15	10	Constructability and ride quality
.09	Vertical alignment - Instantaneous change in grade	%	none	0.1	0.2	Limiting difference in grade. Grade changes without vertical curve There are occasions where grades join at such a flat intersection angle as to make the provision of a vertical curve un-necessary. The criterion has been derived from the following: - 10m wheelbase vehicle placed over 10,000m radius curve would produce an angular change in vertical grade of 0.057 degrees which equates to 1:1000 or 0.1% - The vertical offset at the centre of this vertical curve would be approximately 1.25mm
.10	Vertical alignment – Grade distance between curves of opposite flexure	m	15	10	6	Combined average radius of 3125 or less Provided for passenger comfort, vehicle capability and constructability of the track. The exceptional value is important here. Taking a 500m radius vertical curve, a 10m wheelbase and 6m of tangent track, the tram would be negotiating 4m of curve with a vertical offset of 16mm. The offset reduces in proportion to the radius increasing. Therefore, we can reduce the amount of tangent track between reversing curves by increasing the vertical radii of the opposing curves. At 3125m radius a 10m wheelbase placed wholly on the curve will produce the same 16mm offset in vertical shift thereby permitting a zero amount of tangent track separating similar reversing curves. However, despite being able to reduce the amount of tangent track between the curves of varying magnitude by equally varying amounts, for expediency, it is decided that the 6m minimum must still apply. Review required to assess any impact on tram

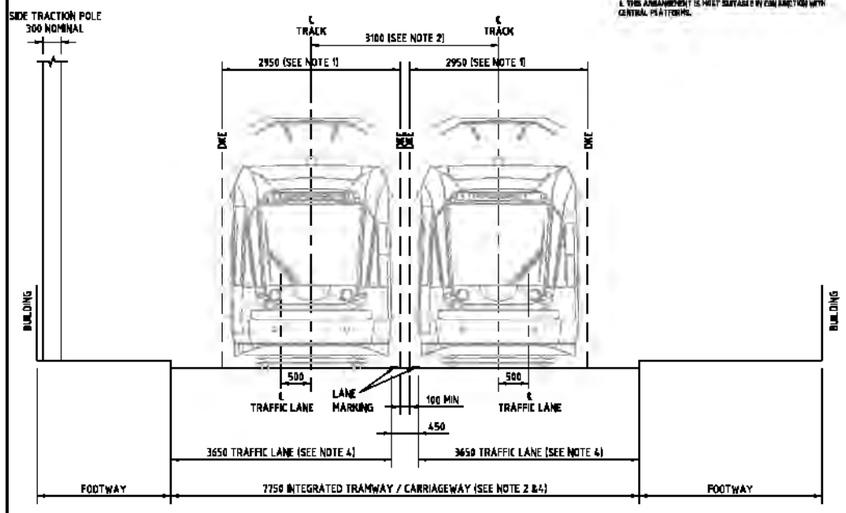
	.11	Vertical alignment - Distance between opposite flexure Grade distance between vertical curves (opposite flexure)	m	15	10	0	Combined average radius greater than 3125 Provided for passenger comfort, vehicle capability and constructability of the track. As explained in 13.10 above, the offset and vertical deflection becomes insignificant at this radius and therefore, zero tangent track between reversing vertical curves of radii greater than 3125m can be permitted. Review required to assess any impact on tram
	.12	Vertical alignment - Grade distance between vertical curves (Similar flexure)	m	None	None	None	Grade section between curves of similar flexure. None required. Indeed, it is preferable that there is no such provision especially if it is very short in length.. This becomes an issue of providing sufficient grade section between the curves so as to provide a stable running section from a passenger comfort point of view.
14		Vertical geometry					
	.01	Vertical geometry – Tramstops Radius through tramstop (without exceeding gradient criteria)	m	Infinity	2000	1000	Tramstop requirements Generally has to be considered with reference to door positions on the Tram Review required to assess impact on tram
15		Gradients					
	.01	Note					Maximum gradients in various location scenarios
	.02	Gradients	%	5.0	6.7	8.0	Maximum Avoids excluding the use of a 2/3rds motored tram configuration.
	.03	Gradients Tramstops	%	1.0	2.0	2.5	Reference: "Inclusive Mobility" (published DfT) by PR Oxley in recognition of DDA Regulations
	.04	Gradients Stabling Maximum	%	0.0	0.1	0.2	Derivation is, in part, from clause 145, Guidance on Tramways – Railway Safety Publication 2 (ORR)
	.05	Gradients Turnouts and junctions	%	0.2	3.0	6.5	Dependent upon twist and negative cant Subject to satisfying other related parameters

16		Twist (as part of the design)					
	.01	Note					Twist is introduced into the track whenever cant is applied. Twist is also introduced when track is designed with zero cross-level and has a combination of horizontal and vertical curvature or vertical curvature and gradient. The twist has to be negotiated by the tram vehicle which must be capable of handling such geometry. Certain manufacturers may define these criteria in their own way, an interpretation of which is indicated below. Twist in the long wave is measured over the wheelbase (bogie centres); short wave being measured over the axle centres of the bogie. Short wave twist also leads to wheel un-loading, not, as such, defined here, although observance of the criterion should avoid the situation. Discussions with tram supplier are essential
	.02	Twist (as part of the design) Long wave over length of vehicle	$^0/_{00}$	1.5	2.0	3.3	Project Tram geometric capability: 10m [wheelbase] @ 3mm $^0/_{00}$ + 10mm ->>- i.e 30+10 = 40 (or 4 $^0/_{00}$) Taking the formula above, the 'Project Tram' should be capable of handling 4 $^0/_{00}$ twists, i.e 1:250. The track alignment criteria for twist would, theoretically, produce at worst, 3.3$^0/_{00}$ twist, i.e. 1:300. The difference between the two sets of figures, apart from providing a margin, would allow for some scope for installation and maintenance tolerances Data conjecture at the moment - 10m wheelbase Discussions with tram supplier are essential
	.03	Twist (as part of the design) Short wave (over bogies)	$^0/_{00}$	1.2	1.8	2.5	Twist can obviously occur across the bogie. As short wave twist can lead to wheel un-loading, the desirable twist criterion is strengthened slightly – in other words short local twists must be less than overall long wave twists. Typically, a 1.8m bogie with 2. 5$^0/_{00}$ twist may result in 4.5mm wheel un-loading. Wheel un-loading will, of course, depend on the vehicle's bogie characteristics. Data conjecture at the moment – 1.8m bogie axle centres Discussions with tram supplier are essential
17		Vertical / horizontal alignment combinations					
	.01	Note					Certain combinations of vertical and horizontal alignment can cause undesirable geometric situations, namely, twist. The tables below define, using a simple empirically derived product rule, vertical/horizontal geometry combination limitations. The table does not take into account additional twist as a result of the resultant gradient [see note 16.01]. The tram's ability to negotiate the geometry has to be considered. Additionally, based on experience, combinations in horizontal and vertical geometry also lead to difficulties and limitations in pre-curving and restraint of the rails and the construction of the track. Review/approval is required with tram supplier (when known).
	.02	Vert / Horiz alignment - Horizontal radius – 25	m	1600	1200	1000	Vertical curve radius - minimum Product rule: [Horiz.R x Vert.R] = 40k,30k, or 25k Review required to assess impact on tram

	.03	Vert / Horiz alignment - Horizontal radius – 30	m	1333	1000	833	Vertical curve radius - minimum Product rule: [Horiz.R x Vert.R] = 40k,30k, or 25k Review required to assess impact on tram
	.04	Vert / Horiz alignment - Horizontal radius – 40	m	1000	750	625	Vertical curve radius - minimum Product rule: [Horiz.R x Vert.R] = 40k,30k, or 25k Review required to assess impact on tram
	.05	Vert / Horiz alignment - Horizontal radius – 50	m	800	600	500	Vertical curve radius - minimum Product rule: [Horiz.R x Vert.R] = 40k,30k, or 25k Review required to assess impact on tram
	.06	Vert / Horiz alignment - Horizontal radius – 60	m	667	500	n/a	Vertical curve radius - minimum Product rule: [Horiz.R x Vert.R] = 40k,30k, or 25k Review required to assess impact on tram
	.07	Vert / Horiz alignment - Horizontal radius – 80	m	500	n/a	n/a	Vertical curve radius - minimum Product rule: [Horiz.R x Vert.R] = 40k,30k, or 25k Review required to assess impact on tram
18		Vertical / horizontal alignment combinations Preferences					
	.01	Note					Combinations preferences Out with the twist implications of vertical/horizontal alignment combination, from a point of view of constructability, certain combinations are preferable. These are listed accordingly.
	.02	Vert / Horiz alignment Combination preferences	m	1st			No vertical geometry within horizontal PURE curves and TRANSITION curves
	.03	Vert / Horiz alignment Combination preferences	m		2nd		No vertical geometry within horizontal TRANSITION curve
	.04	Vert / Horiz alignment Combination preferences	m			3rd	No vertical geometry CHANGES within horizontal TRANSITION curve
19		Track spacing					
	.01	Note					Requires definition following review/approval with tram supplier (when known)
	.02	Track spacing - Double track - track centres - side poles	mm	3100			Separations appropriate for tangent track and curves of radii greater than 450m Plus allowance for DKE Envelope requires review once tram data known
	.03	Track spacing - Double track - track centres - centre poles	mm	3600			Separations appropriate for tangent track and curves of radii greater than 450m Plus allowance for DKE Envelope requires review once tram data known
	.04	Track spacing - Depot tracks and sidings - track centres	mm	TBA			Plus allowance for DKE Envelope requires review once tram data known
	.05	Track spacing - Depot tracks and sidings - track centres - working space	mm	TBA			Plus allowance for DKE Envelope requires review once tram data known

20		Clearances					
	.01	Note					Requires definition following review/approval with tram supplier (when known)
	.02	Passing Clearances - Between adjacent tracks (DKE's)	mm	100			Clearance to DKE's Envelope requires review once tram data known
21		Gauge					
	.01	Note					Standard data Requires review/approval with tram supplier (when known)
	.02	Gauge Track gauge widening		0	0	0	Subject to tram requirements and Rail/Wheel Interface
	.03	Gauge Track gauge- flange-running	mm	TBA			Subject to tram requirements and Rail/Wheel Interface
	.04	Gauge Check flangeway	mm	TBA			Subject to tram requirements and Rail/Wheel Interface
22		Rail inclination					
	.01	Note					Standard data Rail sections to be defined
	.02	Rail inclination - Inclination – None–Vertical, street grooved rail		TBA			Vertical Subject Rail/Wheel Interface conclusions
	.03	Rail inclination - Inclination - Non grooved rail		TBA			Subject Rail/Wheel Interface conclusions

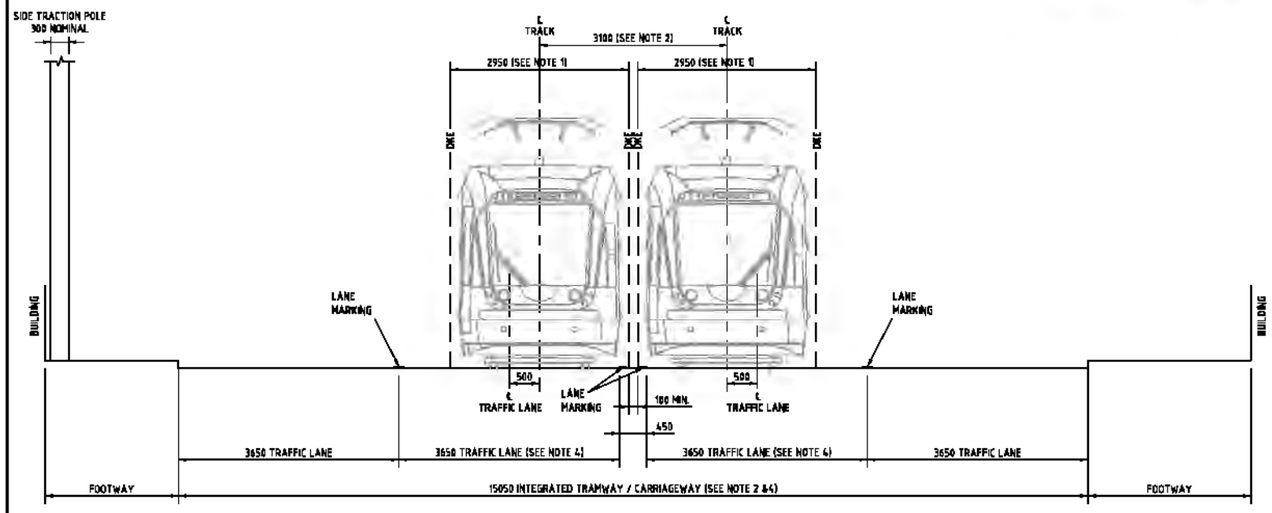
NOTES:
1. DIMENSIONS ARE BASED ON 2.65m WIDE ASSUMED DESIGN TRAM VEHICLE AND RELATE TO STRAIGHT TRACK. THESE DIMENSIONS WILL INCREASE FOR CURVED ALIGNMENTS. REFER TO TABLES INCLUDED IN ASSUMED DESIGN TRAM VEHICLE REPORT)
2. THE TRACK SEPARATION DIMENSION IS BASED ON 2.65m WIDE ASSUMED DESIGN TRAM VEHICLE AND IS APPLICABLE TO HORIZONTAL RADII OF 25m AND ABOVE INCLUDING STRAIGHT TRACK. THIS DIMENSION WILL INCREASE FOR CURVED ALIGNMENTS (REFER TO TABLES INCLUDED IN ASSUMED DESIGN TRAM VEHICLE REPORTS WITH CONSEQUENTIAL INCREASE IN THE OVERALL TRAMWAY WIDTH.
3. CLEARANCES AND DIMENSIONS INDICATED ARE MINIMUMS UNLESS OTHERWISE STATED. ALIGNMENT AND ROAD INTEGRATION CONSIDERATIONS MAY NECESSITATE THE ADOPTION OF LARGER DIMENSIONS AT SPECIFIC LOCATIONS.
4. REDUCING THE LANE WIDTH TO 3250mm (THE MINIMUM SUGGESTED BY RSPGB) WILL REDUCE THE OVERALL INTEGRATED TRAMWAY / CARRIAGEWAY WIDTH TO 7750mm AND INCREASE THE WIDTH BETWEEN THE CENTRAL LANE MARKINGS TO 850mm.
5. THE ARRANGEMENT ILLUSTRATED DOES NOT SPECIFICALLY MAKE PROVISION FOR THE TRAM TO PASS CYCLISTS. REFER TO RSPGB, PART 3, SECTION 8, CLAUSE 74.
6. THIS ARRANGEMENT IS MOST SUITABLE IN CONJUNCTION WITH CENTRAL PLATFORMS.



CROSS SECTION 1

INTERGRATED ON-STREET TRAMWAY
TWO LANE SHARED RUNNING TRAM CENTRE LINES OFFSET TO INSIDE OF TRAFFIC LANE CENTRE LINES.

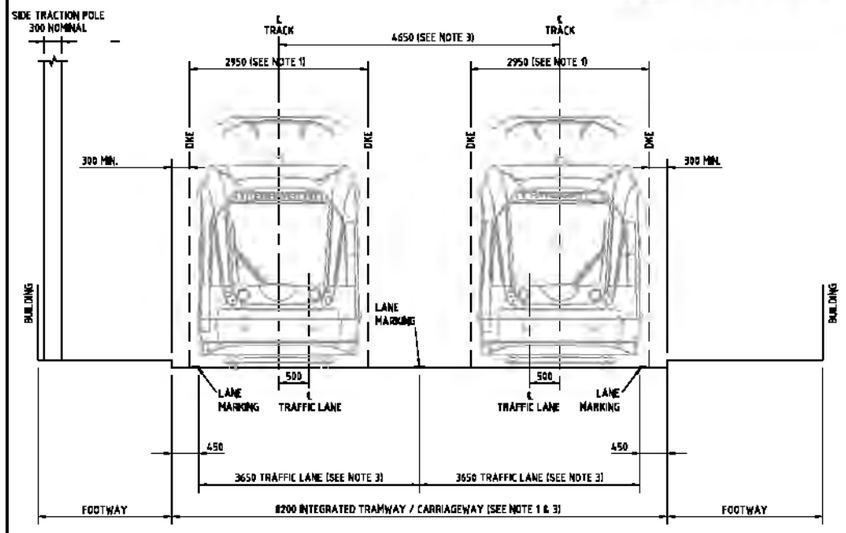
NOTES:
1. DIMENSIONS ARE BASED ON 2.65m WIDE ASSUMED DESIGN TRAM VEHICLE AND RELATE TO STRAIGHT TRACK. THESE DIMENSIONS WILL INCREASE FOR CURVED ALIGNMENTS. REFER TO TABLES INCLUDED IN ASSUMED DESIGN TRAM VEHICLE REPORT)
2. THE TRACK SEPARATION DIMENSION IS BASED ON 2.65m WIDE ASSUMED DESIGN TRAM VEHICLE AND IS APPLICABLE TO HORIZONTAL RADII OF 25m AND ABOVE INCLUDING STRAIGHT TRACK. THIS DIMENSION WILL INCREASE FOR CURVED ALIGNMENTS (REFER TO TABLES INCLUDED IN ASSUMED DESIGN TRAM VEHICLE REPORTS WITH CONSEQUENTIAL INCREASE IN THE OVERALL TRAMWAY WIDTH.
3. CLEARANCES AND DIMENSIONS INDICATED ARE MINIMUMS UNLESS OTHERWISE STATED. ALIGNMENT AND ROAD INTEGRATION CONSIDERATIONS MAY NECESSITATE THE ADOPTION OF LARGER DIMENSIONS AT SPECIFIC LOCATIONS.
4. REDUCING THE LANE WIDTH TO 3250mm (THE MINIMUM SUGGESTED BY RSPGB) WILL REDUCE THE OVERALL INTEGRATED TRAMWAY / CARRIAGEWAY WIDTH TO 7750mm AND INCREASE THE WIDTH BETWEEN THE CENTRAL LANE MARKINGS TO 850mm.



CROSS SECTION 3

INTERGRATED ON-STREET TRAMWAY
FOUR LANE SHARED RUNNING WITH TRAM IN CENTRE LANES.
TRAM CENTRE LINES OFFSET TO INSIDE OF TRAFFIC LANE CENTRE LINES.

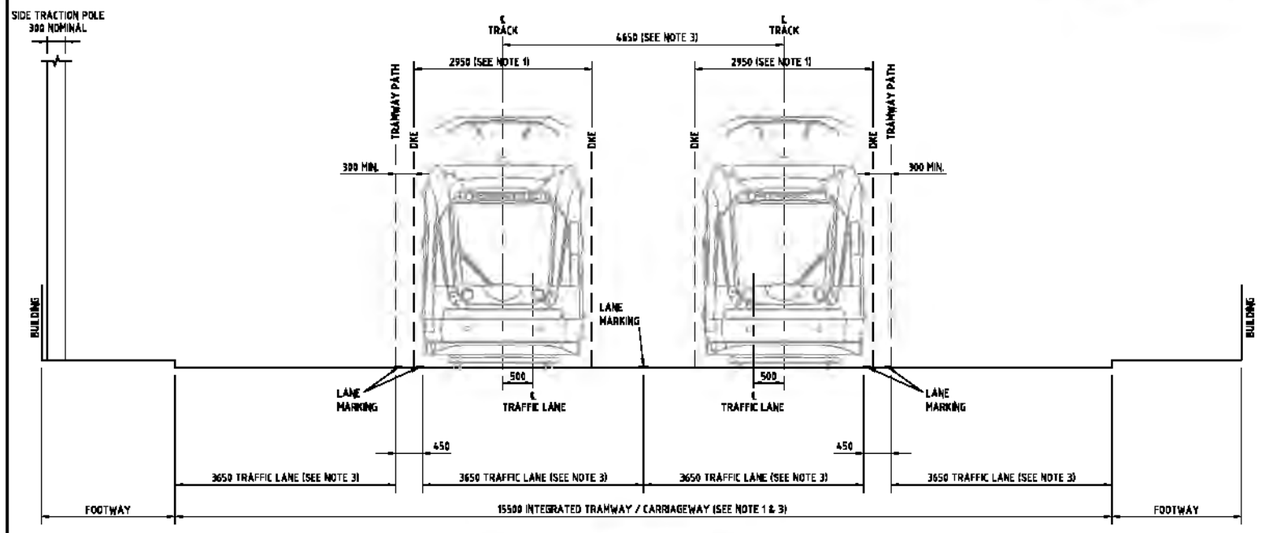
NOTES:
1. DIMENSIONS ARE BASED ON 2.65m WIDE ASSUMED DESIGN TRAM VEHICLE AND RELATE TO STRAIGHT TRACK. THESE DIMENSIONS WILL INCREASE FOR CURVED ALIGNMENTS. REFER TO TABLES INCLUDED IN ASSUMED DESIGN TRAM VEHICLE REPORT) WITH CONSEQUENTIAL INCREASE IN THE OVERALL TRAMWAY WIDTH.
2. CLEARANCES AND DIMENSIONS INDICATED ARE MINIMUMS UNLESS STATED OTHERWISE. ALIGNMENT AND ROAD INTEGRATION CONSIDERATIONS MAY NECESSITATE THE ADOPTION OF LARGER DIMENSIONS AT SPECIFIC LOCATIONS.
3. REDUCING THE LANE WIDTHS TO 3250mm (THE MINIMUM SUGGESTED BY RSPGB) WILL REDUCE THE OVERALL INTEGRATED TRAMWAY / CARRIAGEWAY WIDTH TO 14 300mm AND REDUCE THE DISTANCE BETWEEN TRACK CENTRELINES TO A MINIMUM OF 4250mm. THE WIDTH BETWEEN THE SHARED LANES AND OUTER LANES WOULD INCREASE TO 6550mm.
4. THE ARRANGEMENT ILLUSTRATED DOES NOT SPECIFICALLY MAKE PROVISION FOR THE TRAM TO PASS CYCLISTS. REFER TO RSPGB, PART 3, SECTION 8, CLAUSE 74.
5. THIS ARRANGEMENT IS MOST SUITABLE IN CONJUNCTION WITH KERB PLATFORMS.



CROSS SECTION 2

INTERGRATED ON-STREET TRAMWAY
TWO LANE SHARED RUNNING. TRAM CENTRE LINES OFFSET TO OUTSIDE OF TRAFFIC LANE CENTRE LINES.

NOTES:
1. DIMENSIONS ARE BASED ON 2.65m WIDE ASSUMED DESIGN TRAM VEHICLE AND RELATE TO STRAIGHT TRACK. THESE DIMENSIONS WILL INCREASE FOR CURVED ALIGNMENTS (REFER TO TABLES INCLUDED IN ASSUMED DESIGN TRAM VEHICLE REPORT) WITH CONSEQUENTIAL INCREASE IN THE OVERALL TRAMWAY WIDTH.
2. CLEARANCES AND DIMENSIONS INDICATED ARE MINIMUMS UNLESS STATED OTHERWISE. ALIGNMENT AND ROAD INTEGRATION CONSIDERATIONS MAY NECESSITATE THE ADOPTION OF LARGER DIMENSIONS AT SPECIFIC LOCATIONS.
3. REDUCING THE LANE WIDTHS TO 3250mm (THE MINIMUM SUGGESTED BY RSPGB) WILL REDUCE THE OVERALL INTEGRATED TRAMWAY / CARRIAGEWAY WIDTH TO 14 300mm AND REDUCE THE DISTANCE BETWEEN TRACK CENTRELINES TO A MINIMUM OF 4250mm. THE WIDTH BETWEEN THE SHARED LANES AND OUTER LANES WOULD INCREASE TO 6550mm.
4. GENERALLY THE ARRANGEMENT SHOWN ON CROSS SECTION 4 IS PREFERABLE TO THE ARRANGEMENT SHOWN IN THIS CROSS SECTION.



CROSS SECTION 4

INTERGRATED ON-STREET TRAMWAY
FOUR LANE SHARED RUNNING WITH TRAM IN CENTRE LANES.
TRAM CENTRE LINES OFFSET TO OUTSIDE OF TRAFFIC LANE CENTRE LINES
NB. THIS CONFIGURATION IS NOT CURRENTLY IDENTIFIED WITH ANY SPECIFIC LOCATIONS BUT MAY HAVE LIMITED APPLICATIONS AS THE DESIGN DEVELOPS.

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. REFER TO DRAWING ULE-98138-SW-SW-TRK-DRG-00023 LINE 1 ROUTE PLAN PROPOSED TRAMWAY CATEGORY FOR SECTION LOCATIONS.
3. THIS DRAWING IS NOT FOR CONSTRUCTION.
4. DWG HUMMINGBIRD REF: 24329
PDF REF: 24350

REV.	DESCRIPTION OF REVISION	DRN.	CHKD.	APP.	DATE
6	ULE POLE RELOCATED TO REAR OF FOOTWAY, ISSUED FOR TENDER PURPOSES ONLY.	RAH	AJ	CM	25/09/06
5	SHEET NOW 1 OF 8	DB	NG	AJ	24/05/06
4	SHEET NOW 1 OF 5	CC	NG	AJ	03/05/06
3	INTEGRATION COMMENTS INCORPORATED	CC	NG	AJ	01/04/06
2	REVISIONS TO PRELIMINARY ISSUE	CC	NG	AJ	24/03/06
1	PRELIMINARY ISSUE FOR COMMENTS	CC	NG	AJ	23/03/06

DRAWING STATUS
For Tender Purposes Only

tie

EDINBURGH TRAM NETWORK

PB PARSONS BRINCKERHOFF
SDS
CITY POINT
65 HAYMARKET TERRACE
EDINBURGH EH12 5HD

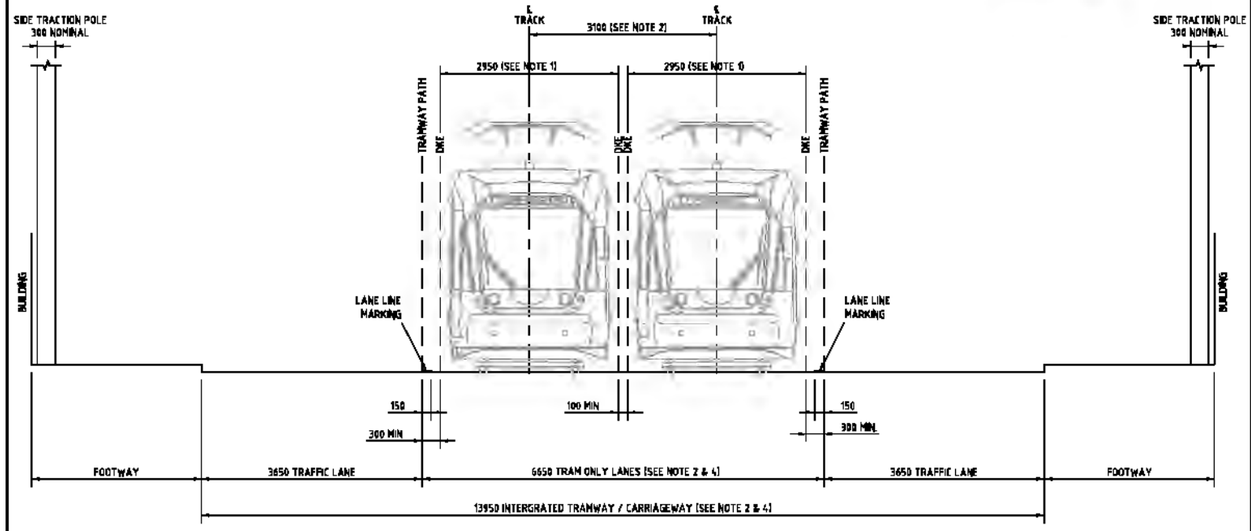
SYSTEM WIDE TYPICAL TRAMWAY CROSS SECTIONS SHEET 1 OF 8

DRAWN BY: COXC	CHECKED BY: JORYA
APPROVED BY: MASONC	ORIGINAL DRAWING SIZE: A1
DATE: 23/03/2006	SCALE(S): 1:50
DRAWING NUMBER: ULE90138-SW-DRG-00031	REV.: 6

PB INTERNAL VERSION NUMBER "F"

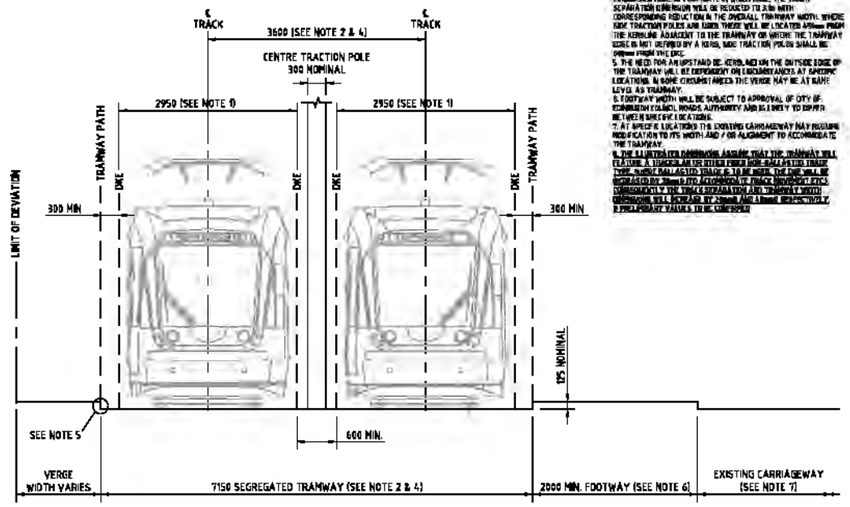
USB00000086_0382

NOTES:
1. DIMENSIONS ARE BASED ON 2.65m WIDE ASSUMED DESIGN TRAM VEHICLE AND RELATE TO STRAIGHT TRACK. THESE DIMENSIONS WILL INCREASE FOR CURVED ALIGNMENTS. REFER TO TABLES INCLUDED IN ASSUMED DESIGN TRAM VEHICLE REPORT.
2. THE TRACK SEPARATION DIMENSION IS BASED ON 2.65m WIDE ASSUMED DESIGN TRAM VEHICLE AND IS APPLICABLE TO HORIZONTAL RADII OF 25m AND ABOVE INCLUDING STRAIGHT TRACK. THIS DIMENSION WILL INCREASE FOR CURVED ALIGNMENTS REFER TO TABLES INCLUDED IN ASSUMED DESIGN TRAM VEHICLE REPORTS WITH CONSEQUENTIAL INCREASE IN THE OVERALL TRAMWAY WIDTH.
3. CLEARANCES AND DIMENSIONS INDICATED ARE MINIMUMS UNLESS OTHERWISE STATED. ALIGNMENT AND ROAD INTEGRATION CONSIDERATIONS MAY NECESSITATE THE ADOPTION OF LARGER DIMENSIONS AT SPECIFIC LOCATIONS.
4. INCREASING THE LANE WIDTHS TO 3250mm (THE MAXIMUM SUGGESTED BY NSRG) WILL REDUCE THE OVERALL INTEGRATED TRAMWAY / CARRIAGEWAY WIDTH TO 13650mm.



CROSS SECTION 5
INTERGRATED ON-STREET TRAMWAY
FOUR LANE CARRIAGEWAY / TRAMWAY
CENTRE LANES RESTRICTED TO TRAM ONLY

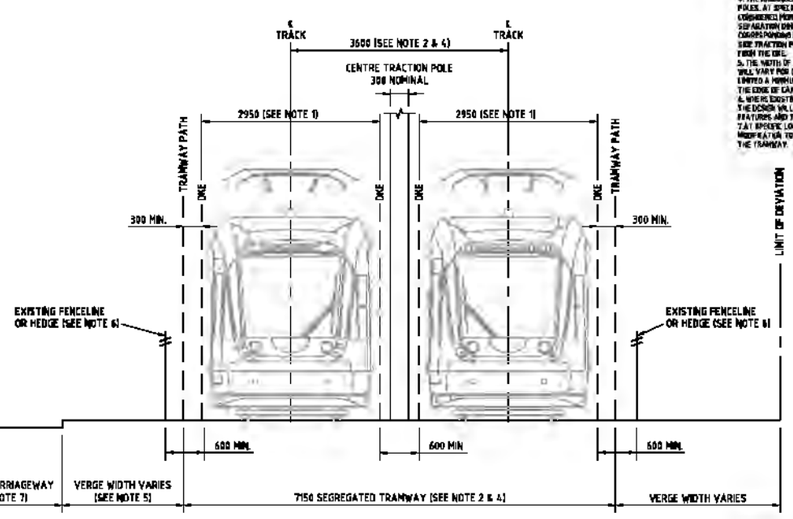
NOTES:
1. DIMENSIONS ARE BASED ON 2.65m WIDE ASSUMED DESIGN TRAM VEHICLE AND RELATE TO STRAIGHT TRACK. THESE DIMENSIONS WILL INCREASE FOR CURVED ALIGNMENTS. REFER TO TABLES INCLUDED IN ASSUMED DESIGN TRAM VEHICLE REPORT.
2. THE TRACK SEPARATION DIMENSION IS BASED ON 2.65m WIDE ASSUMED DESIGN TRAM VEHICLE AND IS APPLICABLE TO HORIZONTAL RADII OF 25m AND ABOVE INCLUDING STRAIGHT TRACK. THIS DIMENSION WILL INCREASE FOR CURVED ALIGNMENTS REFER TO TABLES INCLUDED IN ASSUMED DESIGN TRAM VEHICLE REPORTS WITH CONSEQUENTIAL INCREASE IN THE OVERALL TRAMWAY WIDTH.
3. CLEARANCES AND DIMENSIONS INDICATED ARE MINIMUMS UNLESS OTHERWISE STATED. ALIGNMENT AND ROAD INTEGRATION CONSIDERATIONS MAY NECESSITATE THE ADOPTION OF LARGER DIMENSIONS AT SPECIFIC LOCATIONS.
4. THE ARRANGEMENT ILLUSTRATED INCORPORATES CENTRE TRACTION POLES. AT SPECIFIC LOCATIONS SIDE TRACTION POLES MAY BE CONSIDERED MORE APPROPRIATE IN WHICH CASE, THE TRACK SEPARATION DIMENSION WILL BE REDUCED TO 2.8m WITH CORRESPONDING REDUCTION IN THE OVERALL TRAMWAY WIDTH. WHERE SIDE TRACTION POLES ARE USED THESE SHALL BE LOCATED 600mm FROM THE KERBLINE ADJACENT TO THE TRAMWAY OR WHERE THE TRAMWAY KERB IS NOT DEFINED BY A KERB, SIDE TRACTION POLES SHALL BE 600mm FROM THE DKE.
5. THE NEED FOR AN UPSTAND BE KERB, AND ON THE OUTSIDE EDGE OF THE TRAMWAY WILL BE DEPENDENT ON BOUNDARIES AT SPECIFIC LOCATIONS. IN SOME CIRCUMSTANCES THE VERGE MAY BE AT KERB LEVEL AS TRAMWAY.
6. FOOTWAY WIDTH WILL BE SUBJECT TO APPROVAL OF CITY OF EDINBURGH COUNCIL ROADS AUTHORITY AND IS LIKELY TO DIFFER BETWEEN SPECIFIC LOCATIONS.
7. AT SPECIFIC LOCATIONS THE EXISTING CARRIAGEWAY MAY REQUIRE MODIFICATION TO ITS WIDTH AND / OR ALIGNMENT TO ACCOMMODATE THE TRAMWAY.
8. THE ILLUSTRATED DIMENSIONS ASSUME THAT THE TRAMWAY WILL FEATURE A TRACKFORM OR OTHER FIXED NON-BALLASTED TRACK TYPE, WHERE BALLASTED TRACK IS TO BE USED THE DKE WILL BE INCREASED BY 30mm TO ACCOMMODATE TRACK MOVEMENT ETC. CONSEQUENTLY THE TRACK SEPARATION AND TRAMWAY WIDTH DIMENSIONS WILL INCREASE BY 30mm AND 60mm RESPECTIVELY. ALTERNATIVE VALUES TO BE CONFIRMED.



CROSS SECTION 7
SEGREGATED ON-STREET TRAMWAY IN SIDE RESERVATION
FOOTWAY BETWEEN TRAMWAY AND CARRIAGEWAY

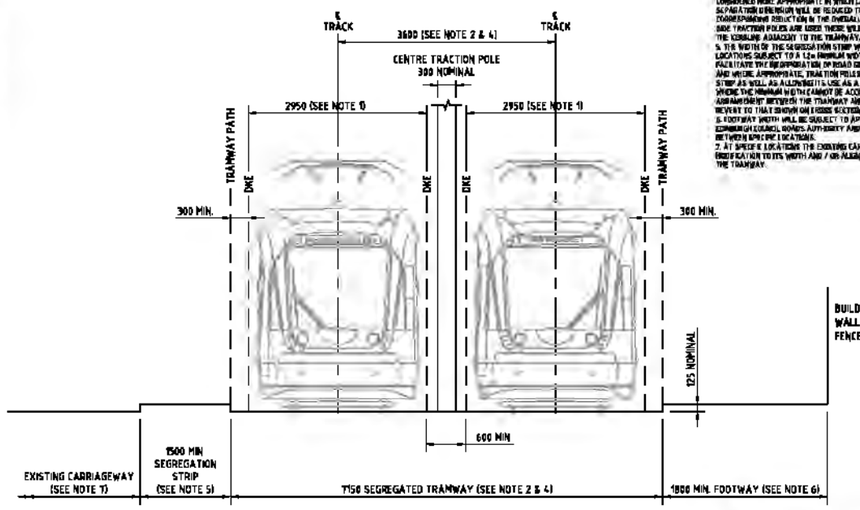
NOTES:
1. DIMENSIONS ARE BASED ON 2.65m WIDE ASSUMED DESIGN TRAM VEHICLE AND RELATE TO STRAIGHT TRACK. THESE DIMENSIONS WILL INCREASE FOR CURVED ALIGNMENTS. REFER TO TO TABLES INCLUDED IN ASSUMED DESIGN TRAM VEHICLE REPORT.
2. THE TRACK SEPARATION DIMENSION IS BASED ON 2.65m WIDE ASSUMED DESIGN TRAM VEHICLE AND IS APPLICABLE TO HORIZONTAL RADII OF 25m AND ABOVE INCLUDING STRAIGHT TRACK. THIS DIMENSION WILL INCREASE FOR CURVED ALIGNMENTS REFER TO TABLES INCLUDED IN ASSUMED DESIGN TRAM VEHICLE REPORTS WITH CONSEQUENTIAL INCREASE IN THE OVERALL TRAMWAY WIDTH.
3. CLEARANCES AND DIMENSIONS INDICATED ARE MINIMUMS UNLESS OTHERWISE STATED. ALIGNMENT AND ROAD INTEGRATION CONSIDERATIONS MAY NECESSITATE THE ADOPTION OF LARGER DIMENSIONS AT SPECIFIC LOCATIONS.
4. THE ARRANGEMENT ILLUSTRATED INCORPORATES CENTRE TRACTION POLES. AT SPECIFIC LOCATIONS SIDE TRACTION POLES MAY BE CONSIDERED MORE APPROPRIATE IN WHICH CASE, THE TRACK SEPARATION DIMENSION WILL BE REDUCED TO 2.8m WITH CORRESPONDING REDUCTION IN THE OVERALL TRAMWAY WIDTH. WHERE SIDE TRACTION POLES ARE USED THESE SHALL BE LOCATED 600mm FROM THE KERBLINE ADJACENT TO THE TRAMWAY.
5. THE NEED FOR AN UPSTAND BE KERB, AND ON THE OUTSIDE EDGE OF THE TRAMWAY WILL BE DEPENDENT ON BOUNDARIES AT SPECIFIC LOCATIONS. IN SOME CIRCUMSTANCES THE VERGE MAY BE AT KERB LEVEL AS TRAMWAY.
6. FOOTWAY WIDTH WILL BE SUBJECT TO APPROVAL OF CITY OF EDINBURGH COUNCIL ROADS AUTHORITY AND IS LIKELY TO DIFFER BETWEEN SPECIFIC LOCATIONS.
7. AT SPECIFIC LOCATIONS THE EXISTING CARRIAGEWAY MAY REQUIRE MODIFICATION TO ITS WIDTH AND / OR ALIGNMENT TO ACCOMMODATE THE TRAMWAY.
8. THE ILLUSTRATED DIMENSIONS ASSUME THAT THE TRAMWAY WILL FEATURE A TRACKFORM OR OTHER FIXED NON-BALLASTED TRACK TYPE, WHERE BALLASTED TRACK IS TO BE USED THE DKE WILL BE INCREASED BY 30mm TO ACCOMMODATE TRACK MOVEMENT ETC. CONSEQUENTLY THE TRACK SEPARATION AND TRAMWAY WIDTH DIMENSIONS WILL INCREASE BY 30mm AND 60mm RESPECTIVELY. ALTERNATIVE VALUES TO BE CONFIRMED.

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. REFER TO DRAWING ULE-90138-SW-SW-TRK-DRG-00023 LINE 1 ROUTE PLAN PROPOSED TRAMWAY CATEGORY FOR SECTION LOCATIONS.
3. THIS DRAWING IS NOT FOR CONSTRUCTION.
4. DWG NUMBER(BRD REF- 24330 PDF REF- 24351



CROSS SECTION 6
SEGREGATED ON-STREET TRAMWAY IN SIDE RESERVATION
TRAMWAY IN VERGE

NOTES CONT:
8. THE ILLUSTRATED DIMENSIONS ASSUME THAT THE TRAMWAY WILL FEATURE A TRACKFORM OR OTHER FIXED NON-BALLASTED TRACK TYPE, WHERE BALLASTED TRACK IS TO BE USED THE DKE WILL BE INCREASED BY 30mm TO ACCOMMODATE TRACK MOVEMENT ETC. CONSEQUENTLY THE TRACK SEPARATION AND TRAMWAY WIDTH DIMENSIONS WILL INCREASE BY 30mm AND 60mm RESPECTIVELY. ALTERNATIVE VALUES TO BE CONFIRMED.



CROSS SECTION 8
SEGREGATED ON-STREET TRAMWAY IN SIDE RESERVATION
SEGREGATION STRIP BETWEEN TRAMWAY AND CARRIAGEWAY.
FOOTWAY TO OUTSIDE OF TRAMWAY

NOTES CONT:
8. THE ILLUSTRATED DIMENSIONS ASSUME THAT THE TRAMWAY WILL FEATURE A TRACKFORM OR OTHER FIXED NON-BALLASTED TRACK TYPE, WHERE BALLASTED TRACK IS TO BE USED THE DKE WILL BE INCREASED BY 30mm TO ACCOMMODATE TRACK MOVEMENT ETC. CONSEQUENTLY THE TRACK SEPARATION AND TRAMWAY WIDTH DIMENSIONS WILL INCREASE BY 30mm AND 60mm RESPECTIVELY. ALTERNATIVE VALUES TO BE CONFIRMED.

REV.	DESCRIPTION OF REVISION	DRN.	CHKD.	APP.	DATE
6	SIDE DLE POLE RELOCATED TO REAR OF FOOTWAY. ISSUED FOR TENDER PURPOSES ONLY	RMH	AJ	CM	25/09/06
5	SHEET NOW 2 OF 8	DS	MG	AJ	24/05/06
4	SHEET NOW 2 OF 5	CC	MG	AJ	03/05/06
3	INTEGRATION COMMENTS INCORPORATED	CC	MG	AJ	01/04/06
2	REVISIONS TO PRELIMINARY ISSUE	CC	MG	AJ	24/03/06
1	PRELIMINARY ISSUE FOR COMMENTS	CC	MG	AJ	23/03/06

DRAWING STATUS
For Tender Purposes Only

tie

EDINBURGH TRAM NETWORK

PB PARSONS BRINCKERHOFF
SIDE
CITY POINT
65 HAYMARKET TERRACE
EDINBURGH EH12 5HD

SYSTEM WIDE TYPICAL TRAMWAY CROSS SECTIONS SHEET 2 OF 8

DRAWN BY: COXC	CHECKED BY: JORYA
APPROVED BY: MASONC	ORIGINAL DRAWING SIZE: A1
DATE: 23/03/2006	SCALE(S): 1:50
DRAWING NUMBER: ULE90138-SW-DRG-00032	REV.: 6

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Edinburgh Tram Network

Assumed Design Tram Vehicle

Doc. Ref: ULE90130-SW-REP-00010 V3

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15th March 2006

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Description

Ver No	**Date**	**Description**	**Prepared By**
1	17 Feb 06	1st Draft for Internal Comment	M Gillespy
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3	15 March 06	Formal Issue to **tie**	M Gillespy

Distribution

Ver No	**Date**	**Name**	**Role**	**Company**
1	1 March 06	Attendees at Internal Meeting	Discussion of Draft Document	SDS
2	2 March 06	T Jory	PB Reviewer	SDS
3	15 Mar. 06	Willie Fraser	Contract Representative	**tie**

EXECUTIVE SUMMARY

The objective of this Report is to establish an Assumed Design Tram Vehicle to be used in the development of the design for both track alignment design and associated infrastructure changes during the Design Stage of the development of Edinburgh Tram Network by the SDS.

Currently the preferred tram vehicle to be used for the Edinburgh Tram Network has yet to be established and is to be the subject of a competitive tender process and as such is unlikely to be firmly established for several months (or longer). In the meantime programme requirements necessitate that the track alignment and infrastructure design are advanced from the Pre SDS designs that formed the basis of STAG and Parliamentary Bill Submission. Thus it is necessary for the SDS Track designers to establish a Design Tram Vehicle that is representative of the type that will eventually be selected for the Network in relation to the size of its Developed Kinematic Envelope and the 'Tramway Path' derived from this.

Previous (Pre SDS) design work has used an assumed design tram vehicle based on a Seimens "Duewag" tram similar to that in use in Sheffield, this being perceived as a representative vehicle by the pre SDS Designers at the time of the commencement of the initial design work.

In establishing the Assumed Design Tram Vehicle it is important that the vehicle is representative of a type that may ultimately be chosen for the system, but not too conservatively large or small that the track design is at risk when the vehicle is eventually chosen. It is important to recognise that it is the overall spatial requirement of the Developed Kinematic Envelope and thus the 'Tramway Path' that result from the Design Tram Vehicle that are the critical factors, rather than the precise physical make up and configuration of the vehicle itself.

In order to ensure that the Developed Kinematic Envelope produced by the Assumed Design Tram vehicle is representative of that which would result from any of the currently available tram vehicles, a comparison of the static envelope widths and off-sets for different tram vehicles has been undertaken. The conclusion from this work is that it is necessary to consider an alternative to the Duewag for the future design work.

The comparison confirms that the Flexity-Swift would serve as an Assumed Design Vehicle for the development of the Design of the Track Alignment prior the selection of a preferred tram vehicle.

The overall envelope width produced by this vehicle is larger than others considered but not excessively so. Consequently its use as an Assumed Design Tram Vehicle can be justified. The resulting alignment design should be sufficient to accommodate the trams currently under consideration for the Edinburgh Tram Network.

The static envelope to define the Developed Kinematic Envelope for the Assumed Design Tram Vehicle will be 150mm to each edge of the static envelope (ie 300mm increase in the overall envelope width).

The Assumed Design Developed Kinematic Envelope dimensions based on the Assumed Design Tram Vehicle and applicable to slab track or other fixed, non-ballasted track types based are presented in the Report. **In cases where ballasted track type is proposed, a further allowance will need to be added into the Developed Kinematic Envelope** to account for the fact that ballasted track is not fixed and thus will tend to shift position (within set maintenance limits) during service.

It should be appreciated that while the overall spatial provision for the tramway that is established by the Assumed Design Tram should be sufficient, further alignment design modifications are almost inevitable when an actual tram vehicle is selected. This is necessary because the balance between the width of centre-throw and end throw varies between different tram types

It is important to also appreciate that the Assumed Design Tram Vehicle will not necessarily prejudice or prescribe the eventual choice of vehicle, though it will assist in informing this process as the Developed Kinematic Envelope and other alignment characteristics of vehicles under consideration can be compared with that of the Assumed Design Tram Vehicle and the extent of design change associated with a particular vehicle and potential impact on identified alignment constraints along the route of the tramway can be established.

The vehicle procurement process will require manufacturers to supply static and dynamic profile data and dimensions of the static envelope and Developed Kinematic Envelope associated with their vehicles.

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1 INTRODUCTION

1.1 Document Purpose

1.1.1 The objective of this Report is to establish an Assumed Design Tram Vehicle to be used in the development of the design for both track alignment design and associated infrastructure changes during the Design Stage of the development of Edinburgh Tram Network by the SDS.

1.2 Document Scope

1.2.1 This document and the Assumed Design Tram Vehicle that it describes are applicable to the Alignment and Infrastructure design including the associated spatial requirements for the entire Edinburgh Tram Network.

2 APPROACH TO ALIGNMENT AND INFRASTRUCTURE DESIGN

2.1 Developed Kinematic Envelope (DKE)

2.1.1 In order to develop and verify the alignment design for The Edinburgh Tram Network it is necessary to establish the Developed Kinematic Envelope associated with the proposed track alignment and proposed tram vehicle. The Developed Kinematic Envelope is based upon the static and dynamic envelope for a tram vehicle and takes into account permitted tolerances in track gauge, alignment, level and cross level and dynamic and static effects of track wear (ie the kinematic envelope). The Developed Kinematic Envelope also takes account of the effects of curvature, including superelevation of the track and end throw and centre throw of the tram. It is also speed dependent, but is unique to the particular location at a given speed.

2.1.2 The track and infrastructure design should allow adequate lateral clearances to be provided, to allow trams to pass one another on adjacent tracks, or between trams and other road vehicles on adjacent carriageways. Additional clearances between trams and fixed structures should be provided to allow for the presence of people.

2.2 Tramway Path

2.2.1 The necessary clearances between the Developed Kinematic Envelope and features, described in 2.1.2 above, are given by HM Railway Inspectorate in Railway Safety Principles and Guidance Part 2 Section G Guidance on Tramways.

2.2.2 The Tramway Path is the name given to the area enclosed by the Developed Kinematic Envelope with the addition of these clearances.

2.3 Design Tram Vehicle

2.3.1 Currently the preferred tram vehicle to be used for the Edinburgh Tram Network has yet to be established and is to be the subject of a competitive tender process. Consequently the preferred tram vehicle is unlikely to be firmly established for several months (or longer). In the meantime programme requirements necessitate that the track alignment and infrastructure design are advanced from the Pre SDS designs that formed the basis of STAG and Parliamentary Bill Submission. Thus it is necessary for the SDS Track designers to establish a Design Tram Vehicle that is representative of the type that will eventually be selected for the Network in relation to the size of its Developed Kinematic Envelope and the 'Tramway Path' derived from this.

2.3.2 In establishing this Assumed Design Tram Vehicle it is important that the vehicle is representative of a type that may ultimately be chosen for the system, but not too conservatively large or small that the track design is at risk when the vehicle is eventually chosen. It is important to recognise that it is the overall spatial requirement of the Developed Kinematic Envelope and thus the 'Tramway Path' that result from the Design Tram Vehicle that are the critical factors, rather than the precise physical make up and configuration of the vehicle itself.

2.3.3 Thus while it is relevant that the Assumed Design Tram Vehicle is based on a real tram that is currently available it is important that the chosen vehicle generates a Developed Kinematic Envelope that is representative of that generated by a range of current vehicles. In this way the SDS designer will meet the objective that the Tramway Path for the track design is representative but not too conservatively large or small that it is at risk when the vehicle is eventually chosen.

2.3.4 It is important to also appreciate that the Assumed Design Tram Vehicle will not necessarily prejudice or prescribe the eventual choice of vehicle, though it will assist in informing this process as the Developed Kinematic Envelope and other alignment characteristics of vehicles under consideration can be compared with that of the Assumed Design Tram Vehicle and the extent of design change associated with a particular vehicle and potential impact on identified alignment constraints along the route of the tramway can be established.

3 ESTABLISHMENT OF ASSUMED DESIGN TRAM VEHICLE

3.1 Strategy

3.1.1 In order to ensure that the Developed Kinematic Envelope produced by the Assumed Design Tram vehicle is representative of that which would result from any of the currently available tram vehicles, a comparison of the static envelope widths and off-sets for different tram vehicles has been undertaken and the results of this are indicated in Table 1 in Appendix A.

3.1.2 In choosing the vehicles for this comparison consideration has been given to any known requirements that **tie** and **Transdev** have declared in respect of the tram vehicle for the Edinburgh Tram Network, and which are included in the Tram Requirements Specification. Clause 3.31 of the Tram Requirements Specification states that "The tram body shall be a nominal width of 2.65m externally."

3.1.3 Note has also been made of Clause 3.6.1 Door Description, the requirements of which, precludes those tram types that feature large single sliding doors rather than bi-parting pairs of doors.

3.1.4 Consideration has also been given to the fact that currently the use of 40m long vehicles is considered as a possibility.

3.1.5 The fact that at this stage there is the possibility of either a 100% low floor or 70% low floor tram vehicle being chosen for the Edinburgh Tram Network has also been taken into account. The majority of currently available 100% low floor trams have body widths that are less than 2.65m. Current experience also shows that though a 100% low floor tram will tend to produce a narrower static envelope than a 70% low floor vehicle, the margin between the static envelope and the Developed Kinematic Envelope is greater for a 100% low floor than for a 70% low floor, particularly at small to mid range curves and consequently the Developed Kinematic Envelope for a 100% low floor has the potential to be as large as that for a 70% low floor. This is despite the fact that overall body width of the 100% low floor may be narrower.

3.1.6 There is the potential that the Developed Kinematic Envelope for a 2.65m wide 100% low floor tram could be excessively wide. The vehicle selection process will need to ensure that vehicle manufacturers provide sufficient details of the static and dynamic profiles as well as dimensions of the Developed Kinematic Envelope for their proposed vehicles, particularly where 100% low floor trams are being proposed. In order that a realistic comparison can be made between the Developed Kinematic Envelope for proposed vehicles with that for the Assumed Design Tram.

3.2 Comparison of Static Envelopes

3.2.1 The static envelopes for several tram vehicles have been considered and compared for a range of horizontal curve values and this is shown in Table 1 of Appendix A. Details of the vehicles considered are given in Table 2.

3.2.2 The envelopes were produced using the AutoTRAM software running the tram models around the indicated horizontal curves. The Sheffield, Dublin, Montpellier,Houston and Lyon (Citadis 302) tram models were taken from the suite of vehicles supplied with the AutoTRAM Programme and the model for the Merseytram was that 'built' by Parsons Brinkerhoff as part of their work on the Merseytram Project. This was based on the Bombardier Flexity-Swift.

3.2.3 The Sheffield "Duewag" tram has been included in the comparison because this vehicle was chosen by **tie's** previous Designers during the development of the pre-SDS design work. The other vehicles are all representative of modern currently available tram vehicles and as such represent types that may ultimately be selected for the Edinburgh Tram Network.

3.2.4 The Merseytram "Flexity-Swift" tram is a 30m long vehicle. It is understood that **tie** and Transdev wish to consider the possible use of 40m long vehicles. The modular architecture of modern tram vehicles is such that longer vehicles will usually feature additional units utilising the same generic vehicle makeup. There are examples of this in relation to Bombardier's Flexity-Swift model, the Rotterdam version of which is extended to over 40m by the inclusion of an additional 3rd body unit between the two end units. Consequently the static envelope produced by the 30m long version considered here can be reasonably confidently predicted to be representative of the envelope which would be produced by a longer version.

3.2.5 The Dublin tram model represents a 2.4m wide 40m long "Citadis 401" vehicle. It is understood that manufacturers Alstom have indicated in their expressions of interest that for Edinburgh they would develop a 2.65m wide version of this vehicle.

3.2.6 The Montpellier tram model represents a 2.65m wide 30m long "Citadis 301" vehicle. By observation and comparison with the results from the longer and narrower "Citadis 401" (Dublin) vehicle, and considering the potential addition of a further 125mm to the offsets for the narrower vehicle to reflect a 2.65m body, it would appear that the envelope produced by the "Citadis 301" is likely to be representative of an envelope that would be generated by a 2.65m wide version of the longer "Citadis 401".

3.2.7 The Houston tram model represents a 2.65m wide 30m long "S70" type vehicle manufactured by Siemens and identified by them as a potential vehicle for use on the Edinburgh Tram Network. Though regarded a physically large vehicle the static envelope dimensions produced are less than those produced by the Merseytram and Montpellier vehicles, as discussed below.

3.2.8 The "Citadis 302" tram model is representative of the five car 100% low floor vehicle manufactured by Alstom and in use in several locations including Lyon, Bordeaux and Melbourne. As would be expected with a multi-articulated vehicle of this type, the static envelope for this is smaller than that for the 70% low floor vehicles (including the Duewag) but as discussed in 3.1.5 above the margin between the static envelope and the Developed Kinematic Envelope has the potential to be larger for a 100% low floor tram because of the way these vehicles are configured and behave dynamically. The implications of this in relation to the choice of an Assumed Design Tram Vehicle are considered further in Section 4 of this Report.

3.2.9 Highlighted on Table 1 are the critical (ie largest) values for offset from centre line to the edge of the static envelope both outside and inside the curves and also for the width of the envelope overall.

3.2.10 Table 1 illustrates that the majority of the more modern trams are producing larger envelopes than the Duewag tram, that was the design vehicle for the earlier work on Edinburgh and so clearly there is a need to consider an alternative design vehicle for the development of the SDS track design during the Preliminary Design and subsequent Design Stages.

3.2.11 The table also illustrates that the 2.65m wide "Citadis 301" (Montpellier) tram is the most critical in terms of size of off-set on the outside of the curve, ie defined by the vehicle 'end-throw'. By observation these offsets are 147mm larger than the Flexity-Swift for 25m radius, reducing to 102mm difference at 40m radius, 41mm at 100m and 9mm at 500m.

3.2.12 The Flexity-Swift (Merseytram) tram is generally the most critical in terms of size of offset on the inside of the curve, ie defined by the vehicle 'centre-throw'. By observation these offsets are 226mm larger than the Citadis 301 for 25m radius, reducing to 140mm difference at 40m radius, 55mm at 100m and 11mm at 500m.

3.2.13 Finally the table also illustrates that the overall swept envelope widths are most critical for the Flexity-Swift and in comparison with the previous design vehicle (the Duewag) the envelope is 188mm wider at 25m radius, 29mm at 40m, 25mm at 100m and 4mm at 500m.

3.2.14 In comparison with the Citadis 301 the variations to the Flexity-Swift envelope are generally less; 79mm at 25m radius, 38mm at 40m, 14mm at 100m and 2mm at 500m.

3.3 Proposed Assumed Design Tram Vehicle

3.3.1 The conclusion from the above work is that it is necessary to consider an alternative to the Duewag for the future design work.

3.3.2 The figures in Table 1 confirm that the Flexity-Swift would serve as an Assumed Design Vehicle for the development of the Design of the Track Alignment prior to the selection of a preferred tram vehicle.

3.3.3 As discussed above the Flexity-Swift is the most critical in terms of the size of offset to static envelope on the inside of the curves whilst the Citadis 301 is the most critical in terms of offset on the outside of the curve. One approach considered for the definition of the design envelope would be the combination of the worst case offsets for inside and outside offsets for the different trams to produce a "worst case envelope", however as Table 1 and paras 3.2.11 and 3.2.12 illustrate this approach would lead to an overly large envelope and consequently this would not be representative of that which would result from any of the currently available tram vehicles.

3.3.4 Consideration of the results in Table 1 suggest that a preferable approach to the definition of the Assumed Design Tram Vehicle is to consider the overall envelope widths produced by each of the tram vehicles and select the Assumed Design Tram Vehicle on that basis.

3.3.5 The overall envelope width produced by the Flexiy-Swift vehicle is larger than others considered but not excessively so. Consequently its use as an Assumed Design Tram Vehicle can be justified. The resulting alignment design should (subject to the provisos below) be sufficient to accommodate the trams currently under consideration for the Edinburgh Tram Network.

3.3.6 It should be appreciated that while the overall spatial provision for the tramway that is established by the Assumed Design Tram should be sufficient, further alignment design modifications are almost inevitable when an actual tram vehicle is selected. This is necessary because the balance between the width of centre-throw and end throw varies between different tram types as is illustrated in Table 1.

3.3.7 This said, particular care will also be needed to ensure that manufacturers supply static and dynamic profile data and dimensions of the static envelope and Developed Kinematic Envelope associated with their vehicles (particularly any 100% low floor trams). This data should be sufficient and accurate to ensure that the actual Developed Kinematic Envelope values associated with proposed vehicles are not excessive in comparison with those assumed for the Design Tram Vehicle, and also so that any excedences can be identified and the potential implications of these on the track and infrastructure design be understood

3.3.8 Details of the design Tram Vehicle proposed by this report are illustrated in Appendix B

4 DETERMINATION OF TRAMWAY PATH FROM DESIGN TRAM VEHICLE

4.1 Establishing Developed Kinematic Envelope

4.1.1 To define the Developed Kinematic Envelope it is necessary to add allowances to the static envelope to account for the dynamic behaviour of the tram vehicle in motion and then add further allowances to account for the static and dynamic implications of permitted tolerances in track gauge, alignment, level and cross level and dynamic and static effects of track wear.

4.1.2 The magnitude of these allowances will vary between vehicle types and is also dependent on the track construction and maintenance tolerances that are applied to the system. Experience suggests that an allowance of 125mm to either side of the static envelope is a reasonable assumption for a 75% low floor tram design. The allowance for the further effects of track construction and maintenance is dependent of the severity of the construction and maintenance specification to be established for the Edinburgh Tram Network and will also vary between trackwork that is mounted on slabs or other rigid or semi-rigid constructions and any ballasted track areas. Again based on experience an assumed further allowance of 25mm is suggested to take account of the effects of track construction and maintenance for slab track and other fixed, non-ballasted track types.

4.1.3 Thus the total suggested addition to the static envelope to define the Developed Kinematic Envelope for the Assumed Design Tram Vehicle, when operating over slab track or other fixed non-ballasted track types, will be 150mm to each edge of the static envelope (ie 300mm increase in the overall envelope width).

4.1.4 The Assumed Design Developed Kinematic Envelope dimensions based on the Assumed Design Tram Vehicle and applicable to slab track or other fixed, non-ballasted track types based are presented in Table 3 of Appendix A to this Report.

4.1.5 **In cases where ballasted track is proposed, a further allowance will need to be added into the Developed Kinematic Envelope** to account for the fact that ballasted track is not fixed and thus will tend to shift position (within set maintenance limits) during service.

4.2 Determination of Tramway Path

4.2.1 The minimum passing clearance between Developed Kinematic Envelopes of opposing trams is recommended by the HMRI (in RSPG Pt 2 Sec G chapter 3 para 110) as follows:-

- Without centre traction poles – 100mm
- With traction poles between DKEs – 600mm (but at least 100mm from the face of the nearest side of the pole to each DKE).

4.2.2 The HMRI (in RSPG Pt 2 Sec G chapter 3 para 111) recommends minimum clearances to be applied between the Developed Kinematic Envelope and various features and 'structures' in order to define the "Tramway Path" these are summarised as follows:-

- To the edge of a traffic lane – 200mm
- To an isolated obstruction in the centre of the carriageway or on a side reservation - 100mm
- To a kerb – 300mm
- To a continuous obstruction in the centre of the carriageway or on a side reservation - 600mm

4.2.3 In cases where the tramway is running integrated on-street (ie shared running with road traffic) then the relationship between the tramway and the traffic lanes will usually dictate that minimum passing clearance requirements given in 4.2.1 can not be simultaneously be combined with the minimum clearances given in 4.2.2.

4.2.4 The minimum dimensions to define the tramway path based on the Assumed Design Tram Vehicle are presented in Tables 4 and 5 in Appendix A of this Report.

4.2.5 In respect of the on-street running sections of the Edinburgh Tram Network and other locations where on site constraints mean that space is at a premium, the assumption at this stage of the scheme development is that slab track or other fixed trackforms will be used and so the dimensions in Tables 3,4 and 5 will be applicable. In cases where ballasted track is proposed, **a further allowance will need to be added** to account for the fact that ballasted track is not fixed and thus will tend to shift position (within set maintenance limits) during service. The use of ballasted track forms is a possibility for segregated running areas particularly for Line 2 of the Edinburgh Tram Network, this does not impact on the principle of the use of an Assumed Design Tram Vehicle as presented in this Report other than the need to add a further allowance as discussed above.

4.3 Assessment of Implications for design Developed Kinematic Envelope in Event that 100% low floor vehicle is chosen.

4.3.1 As has previously been explained the margin between the static envelope and the Developed Kinematic Envelope has the potential to be larger for a 100% low floor tram compared with a 70% low floor because of the way the 100% vehicles are configured and behave dynamically. The implications of this in relation to the Developed Kinematic Envelope produced by the Assumed Design Tram Vehicle are considered in Table 6 included in Appendix A of this Report.

4.3.2 Table 6 compares the static envelopes produced by both the "Flexity Swift" (The Assumed Design Tram Vehicle) and the "Citadis 302" an example of a current 100% low floor vehicle that is one of those in contention for Edinburgh. The widths for the "Citadis 302" have been increased to account for the fact that the AutoTRAM model used is only 2.4m wide compared with the 2.65m width required for Edinburgh.

4.3.3 The table illustrates that, as would be expected, (even with allowance for additional body width) the multi-articulated "Citadis 302" vehicle has a static envelope that is considerably smaller than that of the 70% low floor "Flexity Swift". However because of its likely dynamic behaviour the margin between the static envelope and Developed Kinematic Envelope for "Citadis 302" is likely to be more than the 150mm per side addition added to the static envelope of The Assumed Design Tram Vehicle.

4.3.4 Providing that the actual margins required for the Citadis 302 do not exceed the values indicated on the bottom lines of Table 6 then any design based on The Assumed Design Tram Vehicle would not be compromised by the adoption of a 100% low floor tram similar to the Citadis 302. As the Table demonstrates there is considerable scope for margin increase for lower radii though this reduces for larger curves.

4.4 Input to Tram Vehicle Procurement Process

4.4.1 This highlights the importance to ensure that the vehicle procurement process requires manufacturers supply dynamic profile data and dimensions of the Developed Kinematic Envelope associated with their vehicles (particularly any 100% low floor trams). This data should be sufficient and accurate to ensure that the actual Developed Kinematic Envelope values associated with proposed vehicles are not excessive in comparison with those assumed for the Design Tram Vehicle.

4.4.2 A copy of Table 3 should be included in the ITT document to be issued to the prospective tram vehicle suppliers. Tenderers will also be required to complete a blank version of the table, providing the same dimensions in relation to the vehicle they propose for the Edinburgh Tram Network and identifying values that are significantly larger than the Assumed Design Tram Vehicle. As part of the tender evaluation process for vehicle supply a comparison will be made of the Developed Kinematic Envelope dimensions for the proposed vehicles with the dimensions for the Assumed Design Vehicle.

4.4.3 This comparison will also include an assessment of the implications in respect of the completed Track and Infrastructure design and the extent of design change associated with a particular vehicle as well as the potential impact on identified alignment constraints along the route of the tramway.

5 APPLICABLE STANDARDS

5.1 General

5.1.1 The overriding requirements, standards and guidance applicable to this report are contained in:-

- Her Majesty's Railway Inspectorate's Railway Safety Principles and Guidance Part 2, Section G.
- Tram Requirements Specification Doc No ULE 90130–SW-SW-SPN-00059-V1.
- Geometric Requirements for Track: Edinburgh Tram.

6 APPENDIX A: TABLES

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Table 1: Summary of Static Envelope Widths for Different Tram Types

Horizontal Radius (m)	25	30	40	50	70	90	100	200	300	500	1000	2000	Straight
Tram Type/ Dimension													
Siemens Sheffield "Duewag"													
CL to Static Envelope Outside of Curve	1.756	1.735	1.577	1.504	1.455	1.427	1.417	1.372	1.356	1.344	1.334	1.330	1.325
CL to Static Envelope Inside of Curve	1.746	1.677	1.587	1.534	1.474	1.441	1.429	1.377	1.360	1.346	1.335	1.330	1.325
OA Static Envelope Width	3.502	3.412	3.164	3.038	2.929	2.868	2.846	2.749	2.716	2.690	2.669	2.660	2.650
Bombardier "Flexity Swift"													
CL to Static Envelope Outside of Curve	1.835	1.688	1.539	1.499	1.452	1.425	1.415	1.371	1.356	1.343	1.334	1.330	1.325
CL to Static Envelope Inside of Curve	1.855	1.765	1.654	1.588	1.513	1.471	1.456	1.391	1.369	1.351	1.338	1.332	1.325
OA Static Envelope Width													2.650
Alstom Dublin "Citadis 401" 2.40m wide body													
CL to Static Envelope Outside of Curve	1.928	1.755	1.551	1.484	1.405	1.360	1.345	1.273	1.249	1.229	1.215	1.207	1.200
CL to Static Envelope Inside of Curve	1.507	1.452	1.390	1.351	1.308	1.283	1.275	1.237	1.225	1.215	1.208	1.204	1.200
OA Static Envelope Width	3.435	3.207	2.941	2.835	2.713	2.643	2.620	2.510	2.474	2.444	2.423	2.411	2.400
Alstom Montpellier "Citadis 301" 2.65m wide body													
CL to Static Envelope Outside of Curve													1.325
CL to Static Envelope Inside of Curve	1.629	1.579	1.514	1.475	1.433	1.409	1.401	1.362	1.350	1.340	1.333	1.329	1.325
OA Static Envelope Width	3.611	3.398	3.155	3.056	2.943	2.879	2.857	2.753	2.719	2.692	2.671	2.661	2.650
Siemens Houston "S70 LRV"													
CL to Static Envelope Outside of Curve	1.608	1.520	1.475	1.448	1.414	1.395	1.389	1.357	1.347	1.338	1.332	1.328	1.325
CL to Static Envelope Inside of Curve	1.785	1.709	1.610	1.554	1.487	1.452	1.438	1.382	1.361	1.347	1.336	1.331	1.325
OA Static Envelope Width	3.393	3.229	3.085	3.002	2.901	2.847	2.827	2.739	2.708	2.685	2.668	2.659	2.650
Alstom "Citadis 302" 100% low floor 2.40m wide body													
CL to Static Envelope Outside of Curve	1.349	1.326	1.295	1.277	1.255	1.243	1.239	1.220	1.213	1.208	1.204	1.202	1.200
CL to Static Envelope Inside of Curve	1.496	1.445	1.384	1.346	1.305	1.282	1.275	1.237	1.225	1.215	1.207	1.204	1.200
OA Static Envelope Width	2.845	2.771	2.679	2.623	2.560	2.525	2.514	2.457	2.438	2.423	2.411	2.406	2.400
Alstom "Citadis 302"100% low floor 2.65m wide body (these dimensions obtained by adding 125mm to the off-sets for the 2.40m wide tram)													
CL to Static Envelope Outside of Curve	1.474	1.451	1.420	1.402	1.380	1.368	1.364	1.345	1.338	1.333	1.329	1.327	1.325
CL to Static Envelope Inside of Curve	1.621	1.570	1.509	1.471	1.430	1.407	1.400	1.362	1.350	1.340	1.332	1.329	1.325
OA Static Envelope Width	3.095	3.021	2.929	2.873	2.810	2.775	2.764	2.707	2.688	2.673	2.661	2.656	2.650

Critical/Largest offset on Outside of the Curve Critical/Largest offset on Inside of the Curve

Table 2: Tram Summary Details

Manufacturer	Model	Where Used/ Proposed	Body Width	Overall Length	Floor Configuration	Comments
Siemens	Duewag	Sheffield	2.65m	35.36m	70% Low	This was the design vehicle for Pre-SDS design. However this Tram is no longer available.
Bombardier	Flexity Swift	Merseytram	2.65m	29.65m	70% Low	It is anticipated (by PB) that a longer version of the Flexity Swift would be formed by adding a third body unit between the same front and rear units as used on the 29.65m long model. Thus static envelope figure would be similar with longer version.
Alstom	Citadis 401	Dublin	2.4m	40.81m	70% Low	Current Dublin Tram is 2.4m wide. Edinburgh version would need to be to be 2.65m. Thus the dimensions above might reasonably be expected to increase by 125mm, to each side, to reflect a 2.65m 40m tram. Alternatively the envelope produced by the Montpellier version of the Citadis that is 2.65m wide but 30m long could be considered as representative of the longer vehicle.
Alstom	Citadis 301	Montpellier	2.65m	29.826m	70% Low	40m versions of this vehicle are apparently now proposed for Montpelier though the AutoTRAM suite of vehicles features the 30m version.
Siemens	S70	Houston	2.65m	29.372m	70 % Low	70% low floor 3 car tram similar to that suggested by Siemens for Edinburgh.
Alstom	Citadis 302	Lyons/Bordeaux	2.40m	35.518m	100% Low	100% low floor version of Citadis, comprising 5 car vehicle. The AutoTRAM model represents 2.4m wide version. Edinburgh version would need to be to be 2.65m (see below).
Alstom	Citadis 302	?	2.65m	35.518m	100% Low	For **comparison purposes** only, the off-set dimensions for the 2.4m Citadis 302 have been increased by 125mm (to each side ie 250mm O/A) to illustrate the **potential** static envelope dimensions associated with a 2.65m wide version of this tram.

Table 3: Static Envelope and Developed Kinematic Envelope Dimensions (m) for Assumed Design Tram Vehicle on Slab Track or other fixed non-ballasted track types.

Horizontal Radius (m)	25	30	40	50	70	90	100	200	300	500	1000	2000	Straight
CL to Static Envelope Outside of Curve	1.835	1.688	1.539	1.499	1.452	1.425	1.415	1.371	1.356	1.343	1.334	1.330	1.325
CL to Static Envelope Inside of Curve	1.855	1.765	1.654	1.588	1.513	1.471	1.456	1.391	1.369	1.351	1.338	1.332	1.325
OA Static Envelope Width	3.690	3.453	3.193	3.087	2.965	2.896	2.871	2.762	2.725	2.694	2.672	2.662	2.650
CL to DKE Outside of Curve	1.985	1.838	1.689	1.649	1.602	1.575	1.565	1.521	1.506	1.493	1.484	1.480	1.475
CL to DKE Inside of Curve	2.005	1.915	1.804	1.738	1.663	1.621	1.606	1.541	1.519	1.501	1.488	1.482	1.475
OA DKE Envelope Width	3.990	3.753	3.493	3.387	3.265	3.196	3.171	3.062	3.025	2.994	2.972	2.962	2.950

Important

A copy of this table shall be included in the ITT document to be issued to the prospective tram vehicle suppliers. Tenderers will also be required to complete a blank version providing the same dimensions in relation to the vehicle they propose for the Edinburgh Tram Network and identifying values that are significantly larger than the Assumed Design Tram Vehicle. As part of the tender evaluation process for vehicle supply a comparison will be made of the Developed Kinematic Envelope dimensions for the proposed vehicles with the dimensions for the Assumed Design Vehicle.

This comparison will also include an assessment of the implications in respect of the Track and Infrastructure design and the extent of design change associated with a particular vehicle as well as the potential impact on identified alignment constraints along the route of the tramway.

Table 4: Minimum 2-way Tramway Path for Slab Track or other fixed non-ballasted track types with Centre Poles.
(Assuming 400mm max pole diameter and edge of tramway defined by kerbline)

Horizontal Radius (m)	25	30	40	50	70	90	100	200	300	500	1000	2000	Straight
CL of Track 1 to edge of tramway on Outside of Curve	2.285	2.138	1.989	1.949	1.902	1.875	1.865	1.821	1.806	1.793	1.784	1.780	1.775
CL of Track 1 to CL of Track 2	4.590	4.353	4.093	3.987	3.865	3.796	3.771	3.662	3.625	3.594	3.572	3.562	3.550
CL of Track 2 to edge of tramway on Inside of Curve	2.305	2.215	2.104	2.038	1.963	1.921	1.906	1.841	1.819	1.801	1.788	1.782	1.775
Overall Tramway Width	9.180	8.706	8.186	7.974	7.730	7.592	7.542	7.324	7.250	7.188	7.144	7.124	7.100

NB These dimensions are minimum based on Assumed Design Tram Vehicle and do not allow for any influence on passing clearances due to integration with traffic lanes. ie they are related primarily to a segregated tramway with Paved or Slab Track.
Table assumes edge of tramway is defined by kerbline. Where tramway edge is defined by other feature adjustment should be made to take account of appropriate clearance requirement from RSPG Pt2 Section G Ch 3 Para 110

Table 5: Minimum 2-way Tramway Path for Slab Track or other fixed non-ballasted track types with Side Poles or Span Wires.
(Assuming edge of tramway defined by kerbline)

Horizontal Radius (m)	25	30	40	50	70	90	100	200	300	500	1000	2000	Straight
CL of Track 1 to edge of tramway on Outside of Curve	2.285	2.138	1.989	1.949	1.902	1.875	1.865	1.821	1.806	1.793	1.784	1.780	1.775
CL of Track 1 to CL of Track 2	4.090	3.853	3.593	3.487	3.365	3.296	3.271	3.162	3.125	3.094	3.072	3.062	3.050
CL of Track 2 to edge of tramway on Inside of Curve	2.305	2.215	2.104	2.038	1.963	1.921	1.906	1.841	1.819	1.801	1.788	1.782	1.775
Overall Tramway Width	8.680	8.206	7.686	7.474	7.230	7.092	7.042	6.824	6.750	6.688	6.644	6.624	6.600

NB These dimensions are minimum based on Assumed Design Tram Vehicle and do not allow for any influence on passing clearances due to integration with traffic lanes. ie they are related primarily to a segregated tramway with Paved or Slab Track.
Table assumes edge of tramway is defined by kerbline. Where tramway edge is defined by other feature adjustment should be made to take account of appropriate clearance requirement from RSPG Pt2 Section G Ch 3 Para 110

Table 6: Assessment of Implications on Assumed Developed Kinematic Envelope in Event that 100% low floor vehicle is chosen for Edinburgh.

Horizontal Radius (m)	25	30	40	50	70	90	100	200	300	500	1000	2000	Straight
Assumed Design Tram Vehicle (Bombardier "Flexity Swift")													
CL to Static Envelope Outside of Curve	1.835	1.688	1.539	1.499	1.452	1.425	1.415	1.371	1.356	1.343	1.334	1.330	1.325
CL to Static Envelope Inside of Curve	1.855	1.765	1.654	1.588	1.513	1.471	1.456	1.391	1.369	1.351	1.338	1.332	1.325
100% low floor 2.65m wide tram (Alstom "Citadis 302" dimensions obtained by adding 125mm to the off-sets for the 2.40m wide tram)													
CL to Static Envelope Outside of Curve	1.474	1.451	1.420	1.402	1.380	1.368	1.364	1.345	1.338	1.333	1.329	1.327	1.325
CL to Static Envelope Inside of Curve	1.621	1.570	1.509	1.471	1.430	1.407	1.400	1.362	1.350	1.340	1.332	1.329	1.325
Difference between Static Envelope of Flexity Swift and 2.65m Citadis 302 with off sets widened by 125mm													
CL to Static Envelope Outside of Curve	0.361	0.237	0.119	0.097	0.072	0.057	0.051	0.026	0.018	0.010	0.005	0.003	0.000
CL to Static Envelope Inside of Curve	0.234	0.195	0.145	0.117	0.083	0.064	0.056	0.029	0.019	0.011	0.006	0.003	0.000
Largest potential margin between Static Envelope and Developed Kinematic Envelope for Citadis 302 if Developed Kinematic Envelope for Assumed Design Tram is not to be exceeded													
CL to Static Envelope Outside of Curve	0.511	0.387	0.269	0.247	0.222	0.207	0.201	0.176	0.168	0.160	0.155	0.153	0.150
CL to Static Envelope Inside of Curve	0.384	0.345	0.295	0.267	0.233	0.214	0.206	0.179	0.169	0.161	0.156	0.153	0.150

7 APPENDIX B: DETAILS OF DESIGN TRAM VEHICLE



AutoTrack Vehicle Details Ref:

Vehicle Name: Type: Category: **MERSEYTRAM** Tram
Classification: (Unspecified) (Unspecified)

Source:

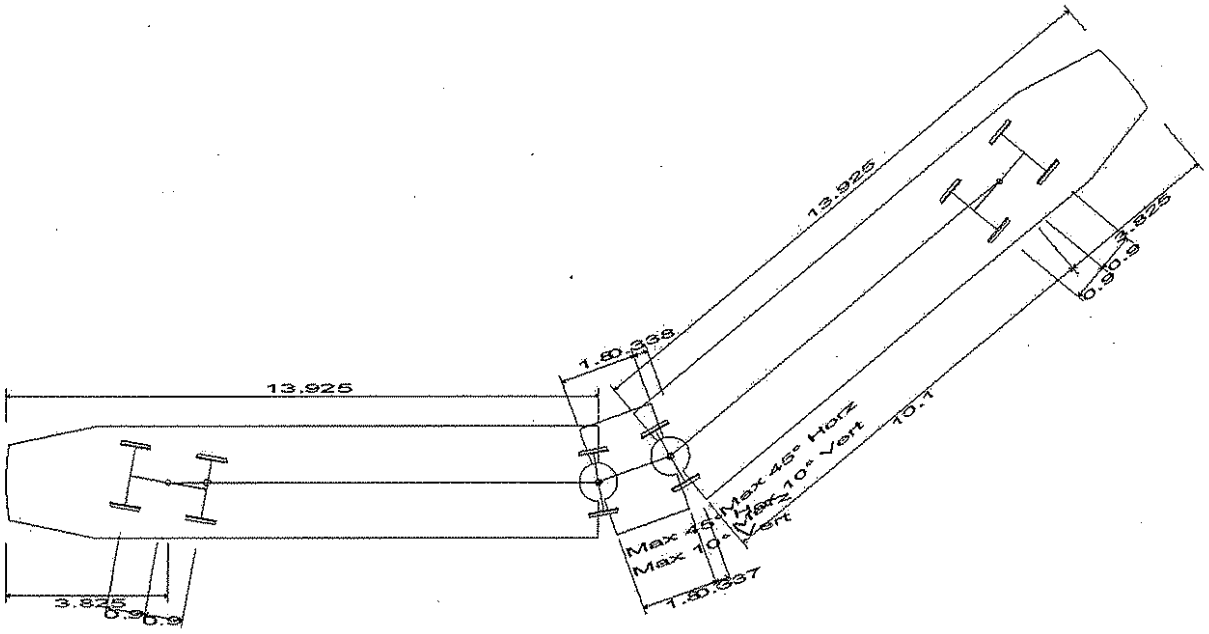
Description:

Notes:

Unit 1 Name: MERSEYTRAM Tractor

Unit 2 Name: MERSEYTRAM Trailer 1

Unit 3 Name: MERSEYTRAM Trailer 2



MERSEYTRAM	
Overall Length	29.650m
Overall Width	2.650m
Overall Body Height	3.482m
Min Body Ground Clearance	0.157m
Track Width	1.435m

AutoTrack Vehicle Details Ref:

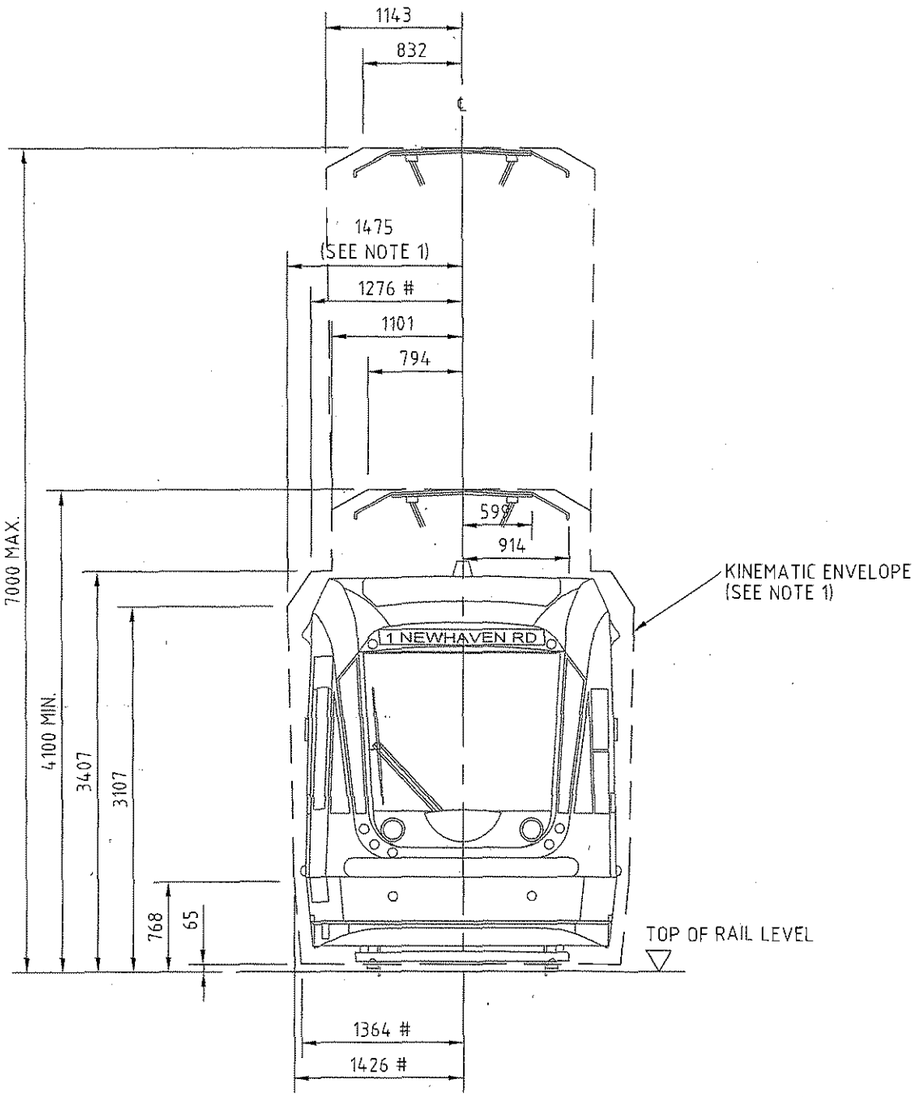
Unit Name:	**MERSEYTRAM Tractor**
Type:	Tram / guided unit (no steering)
Body style:	Light Rail Unit Front (Single Front Bogie)
Classification:	(Unspecified)
Source:	No data
Description:	No data
Notes:	No data
Datum:	Front Primary Axle
Front Axles:	2 Bogie (common axle pivot) (All axles identical)
Primary Front Axle Offset:	0.000m (Innermost Axle behind Front Primary Axle)
Effective Front Axle Offset:	-0.900m (Auto Calculated)
Maximum Wheel Angle:	Unlimited
Front Axle Spacing:	1.800m
Status:	Active Non Self-Steered
Rail Gauge:	1.435m
Total Wheels:	2 (positioned at the ends of the axle)
Wheel Thickness:	0.144m (Auto Calculated - proportion of Rail Gauge)
Wheel Diameter:	0.502m (Auto Calculated - proportion of Rail Gauge)
Rear Axles:	None
Front Coupling:	Generic
Coupling Offset:	0.000m (in front of Front Primary Axle)
Coupling Height:	0.718m (Auto Calculated - proportion of Tyre Diameter)
Capability:	Can tow or be towed
Max. Horizontal Articulation Angle:	90.000deg
Max. Vertical Articulation Angle:	0.000deg
Rear Coupling:	Generic
Coupling Offset:	9.200m (behind Front Primary Axle)
Coupling Height:	0.718m (Auto Calculated - proportion of Tyre Diameter)
Capability:	Can tow or be towed
Max. Horizontal Articulation Angle:	45.000deg
Max. Vertical Articulation Angle:	0.000deg
Body outline (plan):	
Outline Type:	Tram or rail car body
Offset (X,Y):	-4.725m, 0.000m
Length / Width:	13.925m / 2.650m
Front end Radius:	6.000m
Front taper Length / Width:	2.100m / 0.440m
Rear end Radius:	-0.450m
Rear taper Length / Width:	0.000m / 0.000m
Pantograph:	
Outline Type:	Rectangle
Offset (X,Y):	13.775m, 0.000m
Length / Width:	0.100m / 1.828m

AutoTrack Vehicle Details Ref:

Unit Name:	**MERSEYTRAM Trailer 1**
Type:	Towbar
Body style:	Light Rail Unit Intermediate (Front and Rear Bogies)
Classification:	(Unspecified)
Source:	No data
Description:	No data
Notes:	No data
Datum:	Front Coupling
Maximum Articulation Angle:	45.000deg (to previous unit)
Front Axles:	1 Bogie (common axle pivot)
Primary Front Axle Offset:	0.000m (Innermost Axle behind Front Coupling)
Effective Front Axle Offset:	0.000m (Auto Calculated)
Maximum Wheel Angle:	Unlimited
Rear Axles:	1 Bogie (common axle pivot)
Primary Rear Axle Offset:	1.800m (Innermost Axle behind Front Coupling)
Effective Rear Axle Offset:	1.800m (Auto Calculated)
Maximum Wheel Angle:	Unlimited
Front Coupling:	Generic
Coupling Offset:	0.000m (in front of Front Coupling)
Coupling Height:	0.718m (Auto Calculated - proportion of Tyre Diameter)
Capability:	Can tow or be towed
Max. Horizontal Articulation Angle:	45.000deg
Max. Vertical Articulation Angle:	0.000deg
Rear Coupling:	Generic
Coupling Offset:	1.800m (behind Front Coupling)
Coupling Height:	0.718m (Auto Calculated - proportion of Tyre Diameter)
Capability:	Can tow or be towed
Max. Horizontal Articulation Angle:	45.000deg
Max. Vertical Articulation Angle:	0.000deg
Body outline (plan):	
Outline Type:	Tram or rail car body
Offset (X,Y):	0.000m, 0.000m
Length / Width:	1.800m / 2.650m
Front end Radius:	-0.450m
Front taper Length / Width:	0.000m / 0.000m
Rear end Radius:	-0.450m
Rear taper Length / Width:	0.000m / 0.000m

AutoTrack Vehicle Details Ref:

Unit Name:	**MERSEYTRAM Trailer 2**
Type:	Tram / guided unit (no steering)
Body style:	Light Rail Unit Back (Single Rear Bogie)
Classification:	(Unspecified)
Source:	No data
Description:	No data
Notes:	No data
Datum:	Front Coupling
Maximum Articulation Angle:	45.000deg (to previous unit)
Front Axles:	None
Rear Axles:	2 Bogie (common axle pivot) (All axles identical)
Primary Rear Axle Offset:	9.200m (Innermost Axle behind Front Coupling)
Effective Rear Axle Offset:	10.100m (Auto Calculated)
Maximum Wheel Angle:	Unlimited
Rear Axle Spacing:	1.800m
Status:	Active Non Self-Steered
Rail Gauge:	1.435m
Total Wheels:	2 (positioned at the ends of the axle)
Wheel Thickness:	0.144m (Auto Calculated - proportion of Rail Gauge)
Wheel Diameter:	0.502m (Auto Calculated - proportion of Rail Gauge)
Front Coupling:	Generic
Coupling Offset:	0.000m (in front of Front Coupling)
Coupling Height:	0.718m (Auto Calculated - proportion of Tyre Diameter)
Capability:	Can tow or be towed
Max. Horizontal Articulation Angle:	45.000deg
Max. Vertical Articulation Angle:	0.000deg
Rear Coupling:	None
Body outline (plan):	
Outline Type:	Tram or rail car body
Offset (X,Y):	0.000m, 0.000m
Length / Width:	13.925m / 2.650m
Front end Radius:	-0.450m
Front taper Length / Width:	0.000m / 0.000m
Rear end Radius:	6.000m
Rear taper Length / Width:	2.100m / 0.440m



Developed Kinematic Envelope
Width In Curves

Horizontal Radius (m)	CL to DKE Outside of Curve (m)	CL to DKE Inside of Curve (m)	OA DKE Envelope Width (m)
25	1.985	2.005	3.990
30	1.838	1.915	3.753
40	1.689	1.804	3.493
50	1.649	1.738	3.387
70	1.602	1.663	3.265
90	1.575	1.621	3.196
100	1.565	1.606	3.171
200	1.521	1.541	3.062
300	1.506	1.519	3.025
500	1.493	1.501	2.994
1000	1.484	1.488	2.972
2000	1.480	1.482	2.962
Straight	1.475	1.475	2.950

6. THE ILLUSTRATED DIMENSIONS ASSUME THAT THE TRAMWAY WILL FEATURE A TRACKSLAB OR OTHER FIXED NON-BALLASTED TRACK TYPE. WHERE BALLASTED TRACK IS TO BE USED, THE DKE WILL BE INCREASED BY 20mm* (TO ACCOMMODATE TRACK MOVEMENT ETC.). CONSEQUENTLY THE TRACK SEPARATION AND TRAMWAY WIDTH DIMENSIONS WILL INCREASE BY 20mm* AND 40mm* RESPECTIVELY.
*PRELIMINARY VALUES TO BE CONFIRMED

NOTES

1. DRAWING ILLUSTRATES KINEMATIC ENVELOPE AND THUS STRAIGHT LINE DKE VALUES. THE CRITICAL STRAIGHT-LINE DIMENSION IS 1475mm. THE CORRSPONDING WIDTH IN CURVES ARE INDICATED ON THE TABLE. DIMENSIONS MARKED # WILL INCREASE BY SAME AMOUNT IN CURVES.

2. DRAWING ILLUSTRATES THE ANTICIPATED MAXIMUM AND MINIMUM PANTOGRAPH OPERATING HEIGHTS WITH CORRESPONDING KINEMATIC WIDTHS. THE KINEMATIC WIDTHS FOR PANTOGRAPH ARE NOT ANTICIPATED TO WIDEN IN CURVES OWING TO THE POSITION OF THE PANTOGRAPH ABOVE THE VEHICLE WHEELS.

3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

4. DWG HUMMINGBIERD REF: 24568

5. CLEARANCES FROM THE DKE ARE TO BE CALCULATED IN ACCORDANCE WITH HMRI'S RAILWAYS SAFETY PRINCIPLES AND GUIDANCE (RSPG) PART 2, SECTION G

6. DRG HUMMINGBIRD REF: 24568
PDF HUMMINBIRD REF: 30068

REV.	DESCRIPTION OF REVISION	DRN.	CHKD.	APP.	DATE
2	FOR TENDER PURPOSES ONLY	CC	MG	AJ	25/10/06
1	PRELIMINARY ISSUE FOR COMMENTS	CC	MG	AJ	05/04/06

DRAWING STATUS: For Tender Purposes Only

EDINBURGH TRAM

PARSONS BRINCKERHOFF
PARSONS BRINCKERHOFF
MANCHESTER TECHNOLOGY CENTRE
OXFORD ROAD
MANCHESTER M1 7ED

SYSTEM WIDE

ASSUMED DESIGN TRAM VEHICLE
DEVELOPED KINEMATIC ENVELOPE

DRAWN BY: CDXC	CHECKED BY: GILLESPYM
APPROVED BY: JORYA	ORIGINAL DRAWING SIZE: A3
DATE: 05/04/2006	SCALE(S):
DRAWING NUMBER: ULE90130-SW-DRG-00038	REV.: 2

USB00000086_0410

EDINBURGH TRAM NETWORK

Tender Query

No: 1005	**Date: 15-11- 07**
Query:	In the meeting with CAF in Edinburgh on 20.06.07 SDS requested the minimum length of straight track required in advance of the top of a tramstop platform ramp. The CAF response was given in their document *'Response to Minutes Edinburgh 200607'*, where a dimension of 5m was suggested, which corresponded to the distance from the tram leading point to the bogie centre, plus the length of the coupling. Please can CAF reconsider this, taking into account the following: 1. The coupler will normally be retracted 2. CAF's previous response is based on the assumption that the straight before the stop needs to be long enough to accommodate the end unit of the vehicle. Has consideration been given that the straight needs to be long enough to also accommodate the second unit of the vehicle? 3. The situation where a tram runs non-stop through a platform at a maximum speed of 35 km/h. 4. Normal tram operation, with the tram braking from the operational line speed to stop in the platform. 5. The standard boarding gap of 40mm will be required.
Response:	CAF has reviewed this value and, according to above point 2, the minimum length of strait track required in advance of the top of a tramstop platform ramp should be **6.75m** instead of 5m. This value is yield from the distance between pivot points of the second unit of the vehicle (6745mm) slightly increased. The rest of considerations (3, 4 and 5) are related to the Tender Query 1002, which will be answered shortly.

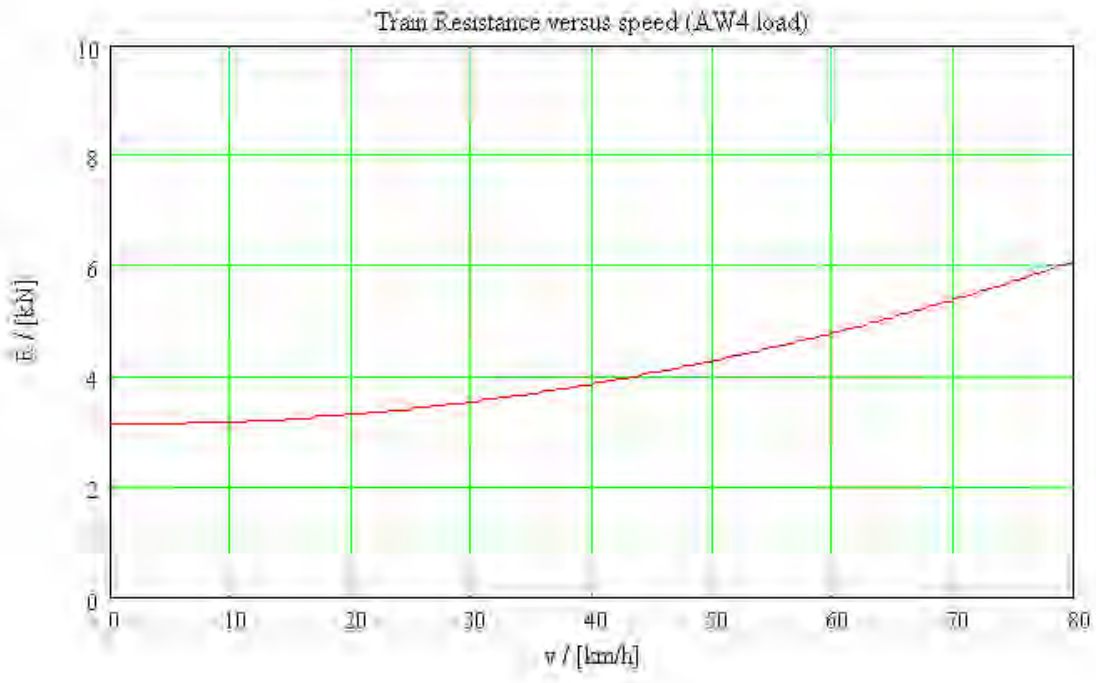
EDINBURGH TRAM NETWORK

Tender Query

No: 1007	Date: 10-1- 08
Query:	Resistance Curve In order to allow more accurate modelling of the system performance, please provide a train resistance curve for the tram, for each of the traction equipment supplier options.
Response:	If the infrastructural modelling can not give sufficient accurate results for the performance of the complete transportation system, the proposed propulsion equipment from Vossloh Kiepe is flexible to allows the fine tuning of the performances directly on the vehicle during the Commissioning phase of the Contract. For the calculations of the traction proprieties like air resistance the following curve was used:

$$\frac{R}{[N]} = 39.24 \times \frac{m}{[t]} + 0.463 \times \left(\frac{v}{[km/h]} \right)^2$$

R = Train Resistance
m = mass of the train
v = speed



EDINBURGH TRAM NETWORK

Tender Query

No: 1008	Date: 10-1- 08
Query:	Kiepe Voltage characteristics In order to allow more accurate modelling of the system performance, please provide data of the Kiepe traction equipment showing the maximum and minimum voltages that the regenerative braking mode is active for. Please also confirm the minimum traction voltage that the Kiepe traction equipment will operate down to.
Response:	Vossloh Kiepe GmbH (VKD) will deliver the equipment compliant to the standard EN 50163 Part 7. The maximum and the minimum voltage of the Power Supply Line is settable, and are dependent on the requirement of the substations. Considering the standard EN 50163 the maximum may be 1000 V DC and the minimum 400 V DC. Considering the flexible proprieties of VKD – Equipment the minimum may be optionally also 350 V DC or lower (for example 60 V DC for wash facility) and the maximum 1095 V DC. The traction characteristics will change respectively. For your information, please find enclosed an extract from the standard EN 50163 Part 7, regarding the power supply

4.1 **Großbritannien**

Für bestehende Netze, die dieser Europäischen Norm entsprechen, müssen die Werte für die niedrigste nichtpermanente Spannung U_{min2} sein wie folgt (bei üblichen Betriebsbelastungen, bei denen aber die Stromversorgungseinrichtungen außerhalb der Produktnormen konstruiert sind):

– 400 V anstelle von 500 V im britischen DC 750 V-Netz mit dritter Schiene;

– 14 000 V im 25 000 V-Netz, kleinste Spannung, bei der ein Zug in der Lage sein muss, f bis zu 10 min weiterhin betrieben zu werden ohne Schaden zu nehmen;

– 12 500 V im 25 000 V-Netz, kleinste Spannung, bei der ein Zug in der Lage sein muss, f bis zu 2 min weiterhin betrieben zu werden ohne Schaden zu nehmen.

Bei bestehenden Netzen, bei denen es keine Einrichtung für feine Spannungsregelung gibt, darf U_{max1} überschritten werden.

Datenbankausdruck aus „VDE-Vorschriftenwerk auf CD-ROM". Verwendung nur gemäß Nutzungsvertrag. Alle Rechte vorbehalten.

4 Spannungen und Frequenzen von Bahnstromsystemen

4.1 Spannungen

Die Kennwerte der wichtigsten Spannungssysteme (mit Ausnahme der Überspannungen) sind in Tabelle 1 angegeben.

Tabelle 1 – Nennspannungen und ihre zulässigen Grenzen bezüglich Werten und Dauer

Stromversorgungssystem	Niedrigste nichtpermanente Spannung U_{min2} V	Niedrigste Dauerspannung U_{min1} V	Nennspannung U_n V	Höchste Dauerspannung U_{max} V	Höchste nichtpermanente Spannung U_{max2} V
Gleichstrom (Mittelwerte)	400	400	600	720	800
	500[a]	500	750	875	1 000
	1 000	1 000	1 500	1 800	1 950
	2 000	2 000	3 000	3 600	3 900
Wechselstrom (Effektivwerte)	11 000	12 000	15 000	17 250	18 000
	17 500[b]	19 000[c]	25 000	27 500[c]	29 000
Besondere nationale Bedingungen auf Frankreich siehe Anhang B					

[a] Für künftige Gleichstrom-Bahnnetze für Straßenbahnen und Nahverkehrsbahnen sollten Nennspannungen von 750 V, 1 500 V oder 3 000 V verwendet werden.

[b] Besondere nationale Bedingungen auf Belgien siehe Anhang B.

[c] Besondere nationale Bedingungen auf das Vereinigte Königreich siehe Anhang B.

Die folgenden Anforderungen müssen erfüllt werden:

a) Die Dauer der Spannung zwischen U_{min1} und U_{min2} darf 2 min nicht übersteigen.

b) Die Dauer der Spannung zwischen U_{max1} und U_{max2} darf 5 min nicht übersteigen.

c) Die Spannung an der Sammelschiene des Unterwerks darf im Leerlauf U_{max1} nicht überschreiten. Bei Gleichstrom-Unterwerken darf diese Spannung im Leerlauf U_{max2} betragen, wobei vorausgesetzt wird, dass die Spannung am (an den) Stromabnehmer(n) eines Zuges der Tabelle 1 und ihren Anforderungen entspricht.

d) Unter bestimmungsgemäßen Betriebsbedingungen muss die Spannung im Bereich $U_{min1} \leq U \leq U_{max2}$ liegen.

e) Unter außergewöhnlichen Betriebsbedingungen dürfen Spannungen im Bereich $U_{max2} \leq U \leq U_{min1}$ in Tabelle 1 keine Beschädigungen oder Ausfälle verursachen.

ANMERKUNG 1 Der Einsatz von Einrichtungen zur Leistungsbegrenzung auf Triebfahrzeugen kann das Auftreten von Unterspannung an der Fahrleitung begrenzen (siehe EN 50388).

EDINBURGH TRAM NETWORK

Tender Query

No: 1009	**Date: 07-02-08**
Query:	When the tram is stabled with the pantograph raised is it possible to turn off the saloon and cab heating?
Response:	Yes, this is considered in these HV saloon and HVAC cab systems specification: The proposed HV Saloon system will present a selector switch in the Cab with: - Disconnection - Ventilation - Automatic (ventilation / heating) - Heating The proposed HVAC Cab system will also present a selector switch in the Cab with: - Disconnection - Ventilation In addition, this Cab equipment will incorporate a Cab temperature regulation selector (ranging from 18Celsius to 26Celsius)

Document Type: **Technical Specification**

Identif.: TS6/3135E	Issue: 1	Date: 14-03-2008

Title: CABIN EQUIPMENT FOR HVAC EDIMBURG TRAMWAY

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CONTROL OF ISSUES AND MODIFICATIONS

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1	14-03-2008	Revised according to CAF EEFAE

0	14-03-2008	P. Barandalla	B.Paradela
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1 Introduction

MERAK has a long history of association with the railway industry and has supplied similar air conditioning systems world-wide. For information, we can provide a copy of our reference list, which gives the schedule of our experience.

MERAK is able to call on this wide experience to offer equipment capable of reliable operation under the arduous operating conditions that are synonymous with railway transportation systems.

The HVAC system we are offering has the following essential characteristics:

1. Secure and Reliable performance
2. Service proven components
3. Minimum weight commensurate with robust construction
4. High efficiency
5. Future proof, environmentally friendly refrigerant R407C
6. Microprocessor based controls
7. Efficient thermal and acoustic insulation

2 Requirements

2.1 Scope of Supply

For the HVAC Cabin system, our offer covers the following main scope of supply per cabin:

1 Cabin Compact unit for cabin.

1 kit of plug connectors for unit.

2.2 Design Conditions

The equipment design has been based on the requirements specified in EN-14813-1/2
The design parameters are summarized in the tables below, base on most loaded car .

Dry Bulb Temp. Exterior ºC	Dry Bulb Temp. Inside ºC	Passenger Load
-10	22	0

Table 1 Heating Design Data

Dry Bulb Temp. Exterior ºC	Relative Humidity % RH Exterior	Dry Bulb Temp. Inside ºC	Relative Humidity % RH Interior	Passenger Load
Condenser Inlet Temperature 40ºC				
28	80	24	40	1

Table 2 Cooling Design Data

The fresh air airflow will be 30 m^3/h per cabin.

2.2.1 Thermal design data

Average Transmission factor	3.5 W/m^2 Summer 3.7 W/m^2 Winter
Solar transmission factor frontal window	57 %
Solar transmission factor side window	57%
Solar Radiation	600 W/m^2
Lighting / electric load	500 W
Supply air fan motor load	0,3 kW
Surface temperature due to solar radiation: Roof Side Walls Where: Te = Ambient Temperature	 Te + 25ºC Te + 16ºC

3 Thermal Analysis and Calculations

3.1 Heating Capacity

The heating calculations show a maximum heating requirement of approximately 3 kW for the car.

Based in our experience Merak offers HVAC Cabin unit with an air heating capacity of 3.5 kW that fulfills with requirements, having 0.5 kw more than calculations to improve performances as preheating time.

3.2 Cooling Capacity

The cooling calculations show a maximum cooling requirement of approximately 3.7 kW.

Based in our experience Merak offers HVAC Cabin unit with an air cooling capacity of 4 kW that fulfills with requirements,

4 Heating and Cooling Capacity Calculations

4.1 Heating Estimate

DESIGN PARAMETERS

AMBIENT CONDITIONS WINTER

	T_{DB} [°C]
Outside	-10,0
Inside	22,0
Vestibule	-10,0

VENTILATION

Number of persons		1
Air flow / person	[m³/h]	30,00
Total air flow	[m³/h]	30

HEATING ESTIMATES

TRANSMISSION LOSS

	Area [m²]	k [W/m²/K]	ΔT [K]	Sensible heat [W]
Side wall comfort area	7,20	3,70	-32,0	-852
Side wall vestibule				
End wall 1	8,40	3,70	-32,0	-995
End wall 2	6,50	3,70	-4,0	-96
Roof comfort area	1,33	3,70	-32,0	-157
Roof vestibule				
Floor comfort area	5,30	3,70	-32,0	-628
Floor vestibule				
				-2728

INTERNAL GAIN

	Quantity	Efficiency [%]	S.H./unit [W]	Sensible heat [W]
Lights / internal heat sources		0	500,00	0
Evaporator fan motor(s)		0	300,00	0
Heat emission persons	1	0	83,15	0
				0

INFILTRATION LOSS

	Air flow [m³/h]	ΔT [K]	Sensible heat [W]
Infiltrations	0	-32,0	0
			0

VENTILATION LOSS

	Air flow [m³/h]	ΔT [K]	Sensible heat [W]
Fresh air	30	-32	-321
			-321

RESULTS

OVERVIEW LOSSES

	Total heat [W]
Transmission	2728
Internal	0
Infiltrations	0
Ventilation	321
Total	**3049**

4.2 Cooling Estimate

DESIGN PARAMETERS

AMBIENT CONDITIONS SUMMER

	T_{DB} [°C]	R.H. [%]	S.H. [g/kg]	Solar radiation [W/m²]
Outside	28,0	80	19,09	600
Inside	24,0	40	7,40	
Vestibule	24,0			

VENTILATION

Number of persons		1
Air flow / person	[m³/h]	30,00
Total air flow	[m³/h]	30

COIL DESIGN

Bypass factor	[%]	15

COOLING ESTIMATES

SOLAR HEAT GAIN

	Area [m²]	Factor [%]	k [W/m²/K]	ΔTsurface [K]	Intensity [W/m²]	Sensible heat [W]	Latent heat [W]
Side wall windows	1,00	57			600	342	
Side wall (no windows)	2,60		3,50	16,0		146	
End wall windows	3,72	57			600	1272	
End wall (no windows)	4,68		3,50	16,0		262	
Roof	1,33	80	3,50	25,0		93	
						2115	**0**

TRANSMISSION GAIN

	Area [m²]	k [W/m²/K]	ΔT [K]	Sensible heat [W]	Latent heat [W]
Side wall comfort area	7,20	3,50	4,0	101	
Side wall vestibule					
End wall 1	8,40	3,50	4,0	118	
End wall 2	6,50	3,50	4,0	91	
Roof comfort area	1,33	3,50	4,0	19	
Roof vestibule					
Floor comfort area	5,30	3,50	4,0	74	
Floor vestibule					
				402	**0**

INTERNAL GAIN

	Quantity	Efficiency [%]	S.H./unit [W]	L.H./unit [W]	Sensible heat [W]	Latent heat [W]
Lights / internal heat sources		100	500,00	0,00	500	0
Evaporator fan motor(s)		100	300,00	0,00	300	0
Heat emission persons	1	100	73,97	42,22	74	42
					874	**42**

INFILTRATION GAIN

	Air flow [m³/h]	ΔT [K]	ΔS.H. [g/kg]	BF [%]	Sensible heat [W]	Latent heat [W]
Infiltrations	0	4,0	11,69		0	0
Fresh air	30	4,0	11,69	15	6	43
					6	**43**

VENTILATION GAIN

	Air flow [m³/h]	ΔT [K]	ΔS.H. [g/kg]	1- BF [%]	Sensible heat [W]	Latent heat [W]
Fresh air	30	4,0	11,69	85	34	244
					34	**244**

RESULTS

OVERVIEW HEAT GAINS

	Sensible [W]	Latent [W]	Total [W]
Solar heat	2115	0	2115
Transmission	402	0	402
Internal	874	42	916
Ventilation+infiltration	40	287	328
Total	3431	330	**3761**

AIRFLOWS

Fresh air	[m³/h]	30
Return air	[m³/h]	773
Treated air	[m³/h]	**803**

TEMPERATURES

Mixed air	[°C]	24,1
ADP	[°C]	**9,3**

5 GENERAL DESCRIPTION OF EQUIPMENT

The offered HVAC Cabin unit it is based on a range of similar units that MERAK has supplied to the railway industry over a number of years.

The Cabin HVAC unit will be rated to provide 4 kW of cooling capacity when operating under the specified design conditions. The calculated cooling requirements are given in section 4.

This unit is to be mounted on the roof and located at both ends of the tramway.

The Cabin HVAC unit is provided with 3.5 kW of air heat to cater for winter operation. The calculated heating requirements are also enclosed in section 4.

The unit frame is fabricated from painted carbon steel.

The cabin internal thermal comfort is controlled by a microprocessor based control provided on a common control rack mounted inside the unit.

Apart of the thermostatic control functions (in conjunction with the temperature sensors, the microprocessor also provides control intelligence and timing functions.

6 Specific Description Equipment

6.1 HVAC unit

The principal components of the Cabin HVAC unit are as follows:

Compressor – 1
Condenser fan / motor unit – 1
Evaporator blower assembly – 1
Evaporator coil – 1
Heater assembly – 1
Condenser coil – 1
Refrigerant filter drier – 1
Expansion valve – 1
Liquid line solenoid valve – 1
Air Filter – 1

The unit internal arrangement is divided into 2 basic sections viz.:

Condenser section

Comprising the compressor, condenser coils with axial type condenser fan and motor unit, safety switches, filter/drier unit, etc.

Condenser air is drawn in from the side through the coil and discharged vertically downwards by the fans.

Evaporator Section

The evaporator section comprises, evaporator fan-motor, evaporator coil with expansion valve, refrigeration controls, air heater and condensate water drainage tray. The air is blown out at frontal of the unit.

6.2 Control panel

The Cabin HVAC unit will contain the control panel with the electromechanical AC contactors, relays etc. necessary for the switching of the unit.

The electronic temperature control by microprocessor will be installed inside the unit.

6.3 Components - Specification

6.3.1 Compressor

Type	Hermetic piston
Manufacturer	Maneurop
Inrush current	30 A
Voltage	400V 3ph 50Hz
Refrigerant	R-407C

6.3.2 Condenser Coil

Tube/Fin Material	Cu/Al
Framework	Stainless Steel
Fins pitch	3.5 mm
Fins thickness	0.18 mm
Tubes	3/8” diameter (1 inch equilateral pitch)
Refrigerant	R-407C

6.3.3 Condenser fan and motor unit

Fan characteristics:

Type	Axial – multi-blade

Motor characteristics:

Type	Totally enclosed air-stream rated
Voltage	400V 3ph 50Hz
RPM	1.500
Inrush current	10 Amp
Insulation	IP-56, Class F
Standard	EN 60349-2
Thermal protection	Internal auto-reset thermostats

6.3.4 Evaporator coil

Tube/Fin Material	Cu/Al
Framework	Stainless Steel
Fins pitch	2.54 mm
Fins thickness	0.18 mm
Tubes	3/8” diameter (1 inch equilateral pitch)
Refrigerant	R-407C

6.3.5 Thermostatic Expansion Valve

Type	Welded connection with External equalizer
Refrigerant	R-407C

6.3.6 Filter / Drier

Type	Welded connection.
Capacity	according to ARI norm ARI-710-64

6.3.7 Drain Pan

Condensate water at the evaporator coil is drained into Stainless Steel fabricated pan. The drain pan has two drainage points, which drain from the bottom of the unit to the car-builders connection.

Drain pans are suitably baffled to prevent spillage due to train motion and are insulated to prevent condensation.

6.3.8 Evaporator Fan and Motor

Fan characteristics:

Type	centrifugal single inlet

Motor characteristics:

Type	Totally enclosed air-stream rated
Voltage	400V 3ph 50Hz
RPM	1000
Inrush Current	7.5 amp
Insulation	IP 54, Class F
Standard	EN 60349-2
Thermal protection	Internal auto-reset thermostats.

6.3.9 Air Filters

Type	Comercial disposable
Clasification	G4 (EN779)

6.3.10 Air Heating

Type	Stainless Steel elements
Voltage	400V 3ph 50Hz
Capacity	3,5 kW

6.3.11 Frame

Painted zincor Steel

6.3.12 Command panel

The panel is fitted in the cabin providing and easy access to the driver.

With this panel the driver will be able to control manually the start and stop of the HVAC unit and the interior temperature in a range of ± 3ºC from set temperature.

7 Air distribution

This chapter will try to describe the air distribution principal proposed by MERAK. This duct system do not belong to Merak's scope of supply, but we will provide the car builder with all the necessary information to design this duct system.

7.1 Fresh air

The fresh air inlet grill is located in the sidewall of the unit.

7.2 Return air

The return air is taken from the cabin by the inlet under the unit.

7.3 Supply air

The supply air is distributed to the car through the cabin ceiling by the frontal of the unit.

8 Electrical controls

The control system has been designed as an integral part of the air conditioning system of the HVAC cabin unit and is based on a microprocessor, which is the heart of the system.

The microprocessor provides control of all the normal functions i.e. cooling, heating and ventilation.

Thermostatic functions are controlled by the microprocessor in association with temperature sensors mounted in the return air, supply air stream and fresh air intake of the unit.

System monitoring and fault diagnosis is provided by the microprocessor to an RS 232 outlet that can be accessed with the aid of a laptop computer (PTU) and the appropriate software (provided by MERAK under separate order).

Controls are selected for operation from battery supply to ensure stable operation.

The Cabin HVAC microprocessor control is mounted inside the cabin HVAC unit.

Electrical switchgear, (contactors, circuit breakers and relays) are mounted on the control panel inside the cabin unit. The contactors, circuit breakers and relays are manufactured per IEC norms.

9 Power requirements

The power requirements for the equipment are detailed below:

9.1 Normal cooling mode

Item	Per HVAC Cabin		
	Battery	400V 3ph 50Hz	
	kW	kW	kVA
Compressor motor	-	2	2.8
Condenser fan motors	-	0.3	0.4
Evaporator fan motors	-	0.25	0.36
Controls	0.15	-	-
Totals	0.15	2.55	3.56

9.2 Heating mode

Item	Per HVAC Cabin		
	Battery	400V 3ph 50Hz	
	kW	kW	kVA
Evaporator fan motor	-	0.25	0.36
Heaters	-	3.5	3.5
Controls	0.15	-	-
Totals	0.15	3.75	3.86

9.3 Ventilation mode.

Item	Per HVAC Cabin		
	Battery	400V 3ph 50Hz	
	kW	kW	kVA
Evaporator fan motor	-	0.25	0.36
Controls	0.15	-	-
Totals	0.15	0.25	0.36

10 Drawings

Item	Document Reference	Weight
Dimensional outline drawing of Cabin HVAC unit	L-0050303	165 Kg ± 5%

Document Type: **Technical Specification**

Identif.: TS6/3134E	Issue: 1	Date: 14-03-2008

Title: PASSENGER AREA HV EQUIPMENT FOR EDIMBURG TRAMWAY

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1 Introduction

MERAK has a long history of association with the railway industry and has supplied similar air conditioning systems world-wide. For information, we can provide a copy of our reference list, which gives the schedule of our experience.

MERAK is able to call on this wide experience to offer equipment capable of reliable operation under the arduous operating conditions that are synonymous with railway transportation systems.

The HV system we are offering has the following essential characteristics:

1. Secure and Reliable performance
2. Service proven components
3. Minimum weight commensurate with robust construction
4. High efficiency
5. Future proof, environmentally friendly refrigerant R407C
6. Microprocessor based controls
7. Efficient thermal and acoustic insulation

2 Requirements

2.1 Scope of Supply

For the HV system, our offer covers the following main scope of supply per Tramway:

	Qty / Tram
Passenger area HV unit	3
Kit of plugs for pass. Area HV unit	3
Exhaust motors	4
Control Rack	1
Kit of plugs for Cntrol Rack	1

2.2 Design Conditions

The equipment design has been based on the requirements specified in EN-14750-1/2

The design parameters are summarized in the tables below, based on the tramway:

Dry Bulb Temp. Exterior ºC	Dry Bulb Temp. Inside ºC	Passenger Load
-10	18	0

Table 1 Heating Design Data

The fresh air airflow will be 8 m^3/h per passenger. Total 2000 m^3/h per Tramway.

Dry Bulb Temp. Exterior ºC	Relative Humidity % RH Exterior	Passenger Load
28	45	250

Table 2 Ventilation Design Data

The fresh air airflow will be 30 m^3/h per passenger. Total 7500 m^3/h per Tramway.

2.2.1 Thermal design data

Average Transmission factor	3.5 W/m^2 summer 3.7 W/m^2 summer
Solar transmission factor	57 %
Solar Radiation	600 W/m^2
Lighting / electric load	2 kW / Tram
Supply air fan motor load	3 kW / Tram
Surface temperature due to solar radiation:	
Roof	Te + 25ºC
Side Walls	Te + 16ºC
Where: Te = Ambient Temperature	

3 Thermal Analysis and Calculations

3.1 Heating Capacity

The heating calculations show a maximum heating requirement of approximately 59.6 kW for the Tramway.

Each HV unit will have an air heating capacity of 20 kW to cover the fresh air and transmissions.

The foreseen heating capacity of 60 kw , will cover the Tramway needs, ensuring the requested performance at design conditions.

3.2 Ventilation

The ventilation calculations show a maximum internal temperature of 34.9 ºC with full occupancy and full radiation at 28ºC of ambient temperature.

4 Heating Calculations

4.1 Heating Estimate

DESIGN PARAMETERS

AMBIENT CONDITIONS WINTER

		T_{DB} [°C]
Outside		-10,0
Inside		18,0
Vestibule		18,0

VENTILATION

Number of persons		250
Air flow / person	[m³/h]	8,00
Total air flow	[m³/h]	2000

HEATING ESTIMATES

TRANSMISSION LOSS

	Area [m²]	k [W/m²/K]	ΔT [K]	Sensible heat [W]
Side wall comfort area	191,50	3,70	-28,0	-19839
Side wall vestibule				
End wall 1	6,63	3,70	0,0	0
End wall 2	6,63	3,70	0,0	0
Roof comfort area	101,50	3,70	-28,0	-10515
Roof vestibule				
Floor comfort area	101,50	3,70	-28,0	-10515
Floor vestibule				
				-40869

INTERNAL GAIN

	Quantity	Efficiency [%]	S.H./unit [W]	Sensible heat [W]
Lights / internal heat sources		0	1500,00	0
Evaporator fan motor(s)		0	3000,00	0
Heat emission persons	250	0	101,50	0
				0

INFILTRATION LOSS

	Air flow [m³/h]	ΔT [K]	Sensible heat [W]
Infiltrations	0	-28,0	0
			0

VENTILATION LOSS

	Air flow [m³/h]	ΔT [K]	Sensible heat [W]
Fresh air	2000	-28	-18753
			-18753

RESULTS

OVERVIEW LOSSES

	Total heat [W]
Transmission	40869
Internal	0
Infiltrations	0
Ventilation	18753
Total	**59623**

4.2 Ventilation Estimate

DESIGN PARAMETERS

AMBIENT CONDITIONS SUMMER

	T_{DB} [°C]	R.H. [%]	S.H. [g/kg]	Solar radiation [W/m²]
Outside	28,0	45	10,59	600
Inside	34,9	30	15,22	
Vestibule	37,0			

VENTILATION

Number of persons		250
Air flow / person	[m³/h]	30,00
Total air flow	[m³/h]	7500

COIL DESIGN

Bypass factor	[%]	15

COOLING ESTIMATES

SOLAR HEAT GAIN

	Area [m²]	Factor [%]	k [W/m²/K]	ΔTsurface [K]	Intensity [W/m²]	Sensible heat [W]	Latent heat [W]
Side wall windows	27,04	57			600	9248	
Side wall (no windows)	68,71		3,50	16,0		3848	
End wall windows							
End wall (no windows)	6,63		3,50	16,0		371	
Roof	101,50	80	3,50	25,0		7105	
						20571	**0**

TRANSMISSION GAIN

	Area [m²]	k [W/m²/K]	ΔT [K]	Sensible heat [W]	Latent heat [W]
Side wall comfort area	191,50	3,50	-6,9	-4639	
Side wall vestibule					
End wall 1	6,63	3,50	-8,9	-207	
End wall 2	6,63	3,50	-8,9	-207	
Roof comfort area	101,50	3,50	-6,9	-2458	
Roof vestibule					
Floor comfort area	101,50	3,50	-6,9	-2458	
Floor vestibule					
				-9969	**0**

INTERNAL GAIN

	Quantity	Efficiency [%]	S.H./unit [W]	L.H./unit [W]	Sensible heat [W]	Latent heat [W]
Lights / internal heat sources		100	200,00	0,00	200	0
Evaporator fan motor(s)		100	3000,00	0,00	3000	0
Heat emission persons	250	100	14,32	113,81	3580	28453
					6780	**28453**

INFILTRATION GAIN

	Air flow [m³/h]	ΔT [K]	ΔS.H. [g/kg]	BF [%]	Sensible heat [W]	Latent heat [W]
Infiltrations	0	-6,9	-4,63		0	0
Fresh air	7500	-6,9	-4,63	15	-2607	-4268
					-2607	**-4268**

VENTILATION GAIN

	Air flow [m³/h]	ΔT [K]	ΔS.H. [g/kg]	1- BF [%]	Sensible heat [W]	Latent heat [W]
Fresh air	7500	-6,9	-4,63	85	-14775	-24184
					-14775	**-24184**

RESULTS

OVERVIEW HEAT GAINS

	Sensible [W]	Latent [W]	Total [W]
Solar heat	20571	0	20571
Transmission	-9969	0	-9969
Internal	6780	28453	35233
Ventilation+infiltration	-17382	-28452	-45834
Total	0	0	**0**

AIRFLOWS

Fresh air	[m³/h]	7500
Return air	[m³/h]	---
Treated air	[m³/h]	---

TEMPERATURES

Mixed air	[°C]	---
ADP	[°C]	---

5. GENERAL DESCRIPTION OF EQUIPMENT

The offered HV system it is based on a range of similar systems that MERAK has supplied to the railway industry over a number of years.

The HV system that we recommend to be installed per Tramway is composed of the following main components:

- 3 HV unit
- 4 exhaust motors
- 1 Electronic Control Rack

This unit is to be mounted on the roof.

The HV system is provided with 60 kW of overhead heating capacity, which will cater for winter operation. The calculated heating requirements are also detailed in section 4 of this technical specification.

The unit frame is manufactured in non painted stainless steel.

The Tramway internal thermal comfort is controlled by a microprocessor based temperature controller installed on a common control rack mounted inside the tramway that controls the 3 HV units.

Apart of the thermostatic control functions (in conjunction with the temperature sensors), the microprocessor controller also provides control intelligence and timing functions.

5 Specific Equipment Description

5.1 HV unit

The principal components of the HV unit are as follows:

Evaporator blowers – 2
Heater assembly – 2
Return air damper – 1
Fresh air damper – 2
Fresh Air Filter – 2

5.2 Control panel

The control panel will contain the command elements like electromechanical AC contactors, relays etc. necessary for the HV system. The protection high voltage circuit breakers are to be installed by the Tramway builder and do not belong to our scope of supply.

This panel will be located within the HV unit.

5.3 Components - Specification

5.3.1 Fan Motors

Fan characteristics:

Type	centrifugal single inlet

Motor characteristics:

Type	Asynchronous
Voltage	400V 3ph 50Hz
Inrush current	9.8 Amp
Insulation	Class F
Protection	IP 54
Thermal protection	Internal auto-reset thermostats.

5.3.2 Air Filters (fresh and return air)

Type	Disposable
Classification	G4 (EN779)

5.3.3 Air Heating

Type	Stainless Steel elements
Voltage	750 Vdc
Heating power	13000 + 7000
Stages:	2

5.3.4 Frames

HV unit	Stainless Steel

5.3.5 Exhaust Motors

Fan characteristics:

Type	radial single inlet

Motor characteristics:

Type	External Rotor
Voltage	400V 3ph 50Hz
Inrush current	8.75 Amp
Insulation	Class F
Protection	IP 44
Thermal protection	Internal auto-reset thermostats.

6 Air Distribution

6.1 Fresh air

The fresh air inlet grills are located 2 side wall of the HV unit, which will allow the fresh air to penetrate directly into the HV unit .They are equipped with one electrical damper each one to ensure the different air flow configurations and the preheating times.

6.2 Return air damper.

The HV unit will include one electric return air damper located just behind the unit after the return air grill, and will be closed during summer time to ensure different fresh air flows according to EN 14750.

6.3 Return air

The HV units are installed above of the Tramway. The return air intake will be placed just below the unit taking the air directly from the platform or from other grills placed in other areas to be agreed with the Tramwaybuilder.

6.4 Supply air

The supply air is blown to tramway ducting through the supply opening placed in the bottom of the unit.

7 HV system working modes

7.1 Temperature regulation:

In regulation mode, the electronic control of the HV system will measure the ambient, supply and Tramway internal temperatures in order to decide over the corresponding functioning mode eg. ventilation or heating position and capacity to achieve the desired set-point temperature in the interior of the Tramway.

7.1.1 Heating mode:

The unit will works in heating mode when internal temperature was below set point. In this case the total fresh air will be 2000 m3/h to get a minimum renewal of internal air of 8m3/h per passenger per hour. This fresh air will be mixed with return air, heated and blown to the saloon.

7.1.2 Ventilation mode.

The unit will work in ventilation mode when internal temperature was equal or higher than set point one. In case of having a ambient temperature higher than 20ºC and a internal temperature higher than 24ºC the total fresh air flow will be increased to 7500 m3/h per unit to have a fresh air flow rate of 30 m3/h per passenger. In this case return air damper will be closed.

7.2 Degraded mode:

In case of electronic control failure one thermostat installed within the HV unit allows the unit to work in heating mode when internal temperature is below the set point of the thermostat. If the internal temperature is above the thermostat set point the unit will works in ventilation mode. The return air damper will be opened during this conditions.

8 Electronic control

8.1 Introduction

The control system has been designed as an integral part of the air conditioning system and is based on a microprocessor, which is the heart of the system.

The microprocessor provides control of all the normal functions i.e., heating and ventilation.

Thermostatic functions are controlled by the microprocessor in association with temperature sensors mounted in the return air, supply air stream and fresh air intake of the unit.

System monitoring and fault diagnosis is provided by the microprocessor to an RS 232 outlet that can be accessed with the aid of a laptop computer (PTU) and the appropriate software (provided by MERAK under separate order).

Controls are selected for operation from battery supply to ensure stable operation.

The HV microprocessor control is mounted inside an electrical rack inside the saloon.

8.2 Microprocessor Description

8.2.1 General

The microprocessor hardware can be divided into 4 operating blocks:

A *Microprocessor Block*

The microprocessor block consists of the Central Processor Unit CPU.

Microprocessor firmware is stored in a FLASH memory as this provides a very stable environment for the microprocessor and avoids any possibility of corruption by exterior noise.
Minor changes to the operating software are possible by use of the onboard FLASH-memory and can be made without change of firmware.

B *Communication Block*

The communication block comprises a RS232 interface that can be accessed with the aid of a laptop computer (PTU) and the appropriate software (provided by MERAK under separate order).

C *Input / Output Block*

The input / output block function is for communication with the exterior environment to drive outputs and to receive various inputs.
Inputs are both digital (from contacts, push buttons etc.) and analogue (from the temperature sensors, pressure transducers etc).

Outputs are digital to drive relays, lamps etc.

C *NOVRAM Data Storage Block*

The NOVRAM block is a combination of RAM and EEPROM. This block is used for storage of operating data and fault registration. The use of NOVRAM avoids the use of additional batteries and provides a convenient means of storing data.

8.2.2 Microprocessor Specification

Power Supply

Input Voltage	Battery
Voltage range	70% < Nominal value < 125%
Output voltage	5V, 11V, and 24V.
Maximum absorbed power	30 watts (digital inputs absorbed power not considered)
Input / Output isolation voltage	1500 V 1 minute
Over voltage Protection	IEC-571-1
Working temperature range	-30^0C to +70 ^{0}C

Digital Inputs

Maximum quantity	40 and 24 more if necessary (optional)
Digital level 1	70% < Nominal value < 125%
Digital level 0	0v (0 to 10V)
Input current	higher than 8 mA at nominal battery voltage

Digital Outputs

Maximum quantity	28 (voltage free relay contact) and 16 more if necessary (optional)
Maximum voltage	250 V AC - 5 Amp 100V DC – 0.5 Amp

Analog Inputs

Quantity	8+8 opto-coupled and 8 more if necessary (optional)
Voltage	0 - 5v DC with common reference.
Digital resolution	10 bit (1024).

Microprocessor

CPU	STR7
Manufacturer	ST Microelectronics
Clock frequency	16 MHz
CPU Internal RAM memory	64 KB
Firmware and software application	
FLASH internal memory of CPU:	256 KB
Data NOVRAM memory	128 KB
A/D Converter resolution	12 bits

Serial interfaces

RS485 exchange data link	2 ports for the TMS
RS232 Interface	1 port for the PTU

9 Power requirements

9.1 Normal heating mode.

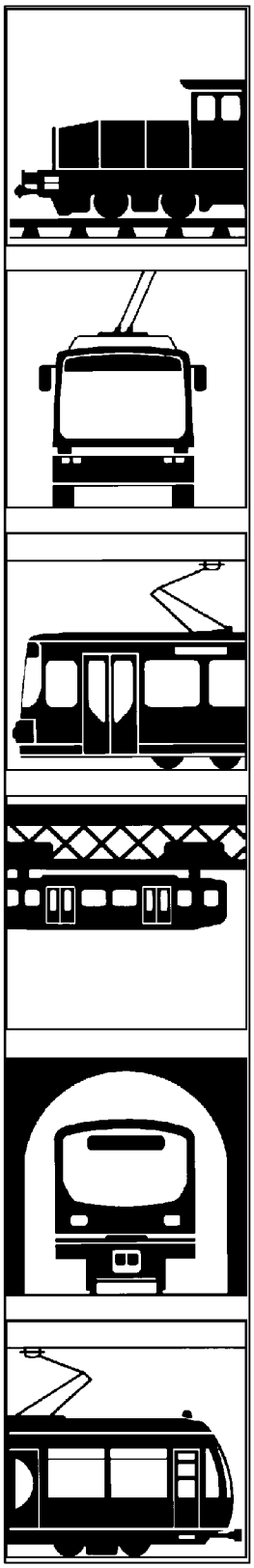
Item	Per HV / Tramway		
	Battery		
	kW	kW	kVA
Fan motors (400 Vac, 50 Hz ·3ph)	0	3	4.3
Exhaust motors		2.5	3.2
Heaters (750 VDC)	0	60	60
Controls	0.2	-	-

9.2 Ventilation mode

Item	Per HV / Tramway		
	Battery		
	kW	kW	kVA
Fan motors (400 Vac, 50 Hz ·3ph)		3	4.3
Exhaust motors		2.5	3.2
Controls	0.2	-	-

10 Drawings

Item	Document Reference
Outline drawing of HV unit	L-0050302 rev.B



Technical Description

of the propulsion equipment

for

CAF – Edinburgh Tram

Addendum 2

CAF - Edinburgh Tram

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Abbreviations

DGG	Dachgerätegehäuse	roof container
DPU	Direktpulsumrichter	direct pulse inverter
USM	Umrichtersteuermodul	inverter control module
BNU	Bordnetzumrichter	static auxiliary converter
ASM	Antriebssteuermodul	traction control module
ZLG	Zentrales Leitgerät	train control unit
BSG	Bremssteuergerät	brake control unit
BSM	Bus Steuermodul	train control interface
HSCB	Schnellschalter	high-speed-circuit-breaker

1 GENERAL

This document is a functional description of Vossloh KIEPE's scope of delivery, i.e. the propulsion equipment consisting of master controller, high-speed-circuit-breaker, traction inverters, braking resistors and traction motors for the 100%-low-flow tram Edinburgh.



Figure 1: Tram Concept

Technical data Vehicle	
Max. Speed	70 km/h
Overhead line voltage (DIN EN 50163)	DC 750 V
Overhead line voltage, dynamic braking (adjustable)	DC 900 V
Length	40 m
Width	2.65 m
Height	3.385 m
Weight (AW0)	53,311 kg
Weight (AW 4)	81,591kg
Performance 0 -> 30 km/h	1.2m/s² up to AW4, instantaneous
Performance 0-> 70 km/h	0.8m/s² up to AW4, average
Service brake, electric-dynamic	1.2m/s²

2 LAYOUT OF THE EQUIPMENT

Each roof equipment container (DGG) houses two traction inverter. These containers are easily accessible and thus enable easy maintenance and repair work to be carried out simply and quickly.

The electronic equipment is specially designed for railway application. The E.S.R.A. (Electronic System for Railway Application) is proven technology. The experiences from previous projects (refer to reference list) have been used to develop an E.S.R.A. that particularly fits for railway service due to

- shock and vibration proven design
- high temperature range
- low weight
- high reliability
- low life cycle costs
- easy maintenance
- high diagnostic aid and fault analysis via standard PC
- 30 years service life

The E.S.R.A. is of shock and vibration proven design. In addition to that the roof containers are mounted with an elastic suspension (Megi Konus) in order to prevent against shock and vibration forces.

The equipment on the roof is housed in waterproof aluminium containers. All electric materials inside the car as well as in the containers are halogen-free and fire-retardant.

All parts of the Vossloh KIEPE equipment complies with the requirements given by the actual European standards and the state-of-the-art technology valid at the time of preparing this tender. Especially the equipment is designed to be resistant to fire in accordance with the relevant UK standard (BS6853, Cat. 2).

3 SCOPE OF SUPPLY

Components:

3 pcs	roof container DGG 25x, containing: 2 pc traction inverter DPU 1 pc line contactor 1 pc traction control module with a train control interface (RS485)
3 pcs	breaking resistor
12 pcs	traction motor (mechanically assembled to 6 pears, but electrically independent)
1 pc	high-speed-circuit-breaker
2 pcs	master controller

4 PROPUSION SYSTEM

4.1 General description

4.1.1 Concept

The traction equipment is based on a three-phase driving concept with asynchronous machines as the traction motors (M). Two independent traction inverters (DPU) will be installed in each of the three Vossloh KIEPE roof containers (DGG) supplied per vehicle. Each DGG includes a traction control module (ASM) which contacts the master controller (SGW).

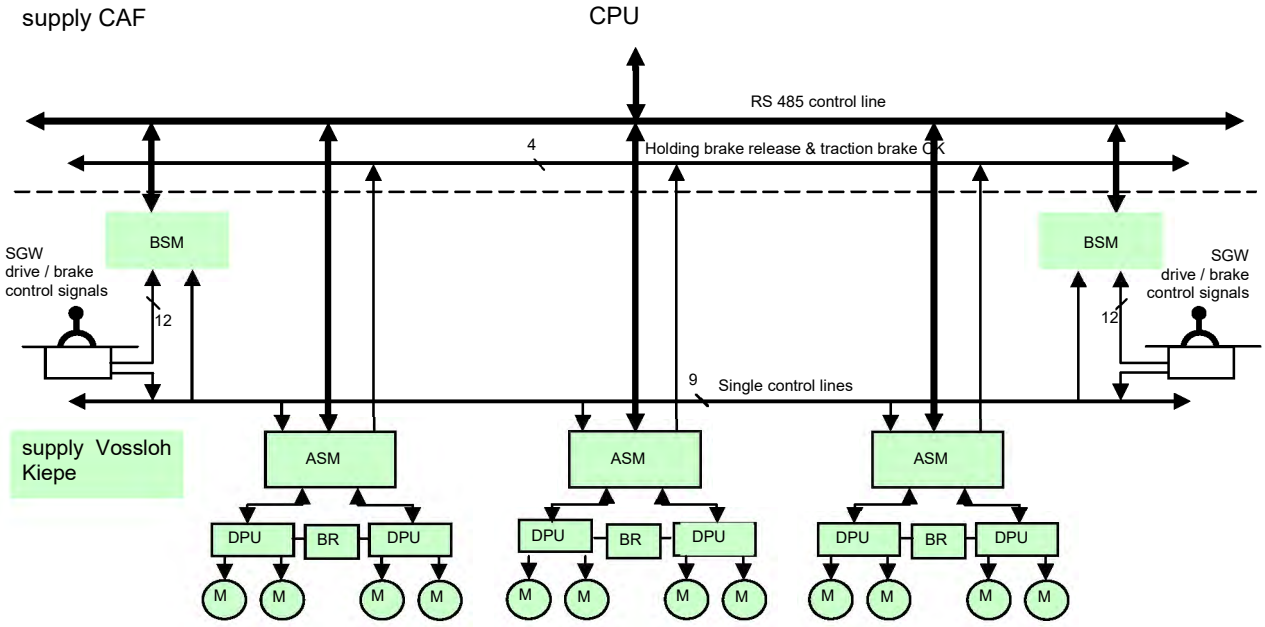
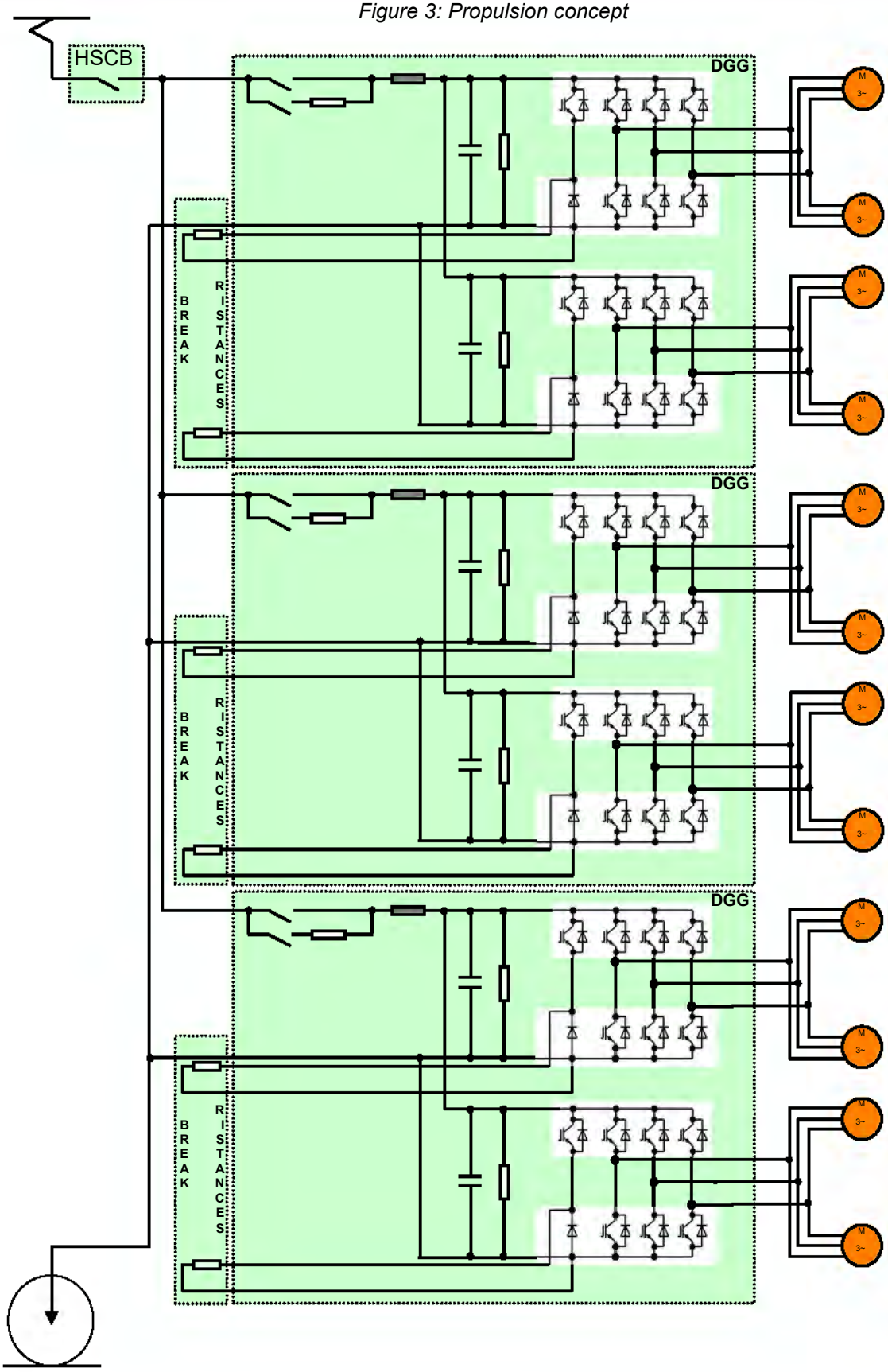


Figure 2: Control Concept

This design ensures easily accessible components, that are wired and completely tested in our factory. This gives following advantages:

- EMC
- low weight
- wiring in the vehicle reduced
- completely tested components to minimize time to put into service
- efficient cooling

Figure 3: Propulsion concept



4.1.2 Propulsion – Concept

Each of the three propulsion packages are identical. Each package is made up of the following components:

- 1 Line contactor
- 1 Line filter
- 1 traction control interface (ASM).
- 2 Direct pulse inverter with integrated brake chopper (DPU) and inverter control module (USM)
- 2 Braking resistors
- 4 Three-phase asynchronous motors

4.1.3 Roof-container - Concept

Each roof-container (DGG) comprises:

- two IGBT direct pulse inverter DPU
- Brake chopper
- Temperature and over-current supervision
- two inverter control modules USM
- switching devices, filters, blower, current and voltage measuring devices
- traction control and diagnosis interface module ASM

The DPU assembly features an effective forced air cooling system. The cooling fins are insulated from the semiconductors.

The power input of the DGG is connected directly to HSCB. According to our experience a line protection with melting fuses may be sufficient necessary to fulfil the safety requirements for the electronic power units. Thus a high speed circuit breaker is not stringently required!

The braking resistors are not part of the DGG. The three DGG are mounted on the roof, each for one motorised bogie, whereas each DPU in the DGG powers the 2 traction motors per side.

Technical data – DGG 25X - Roof container	
Dimensions (L x B x H)	1620 mm x 1160 mm x 453,5 mm
Weight	Appr. 425 kg
Cooling	Forced air cooled
Class of protection	IP 54 according to EN 60 529
Ambient temperature	-25°C until +45°C

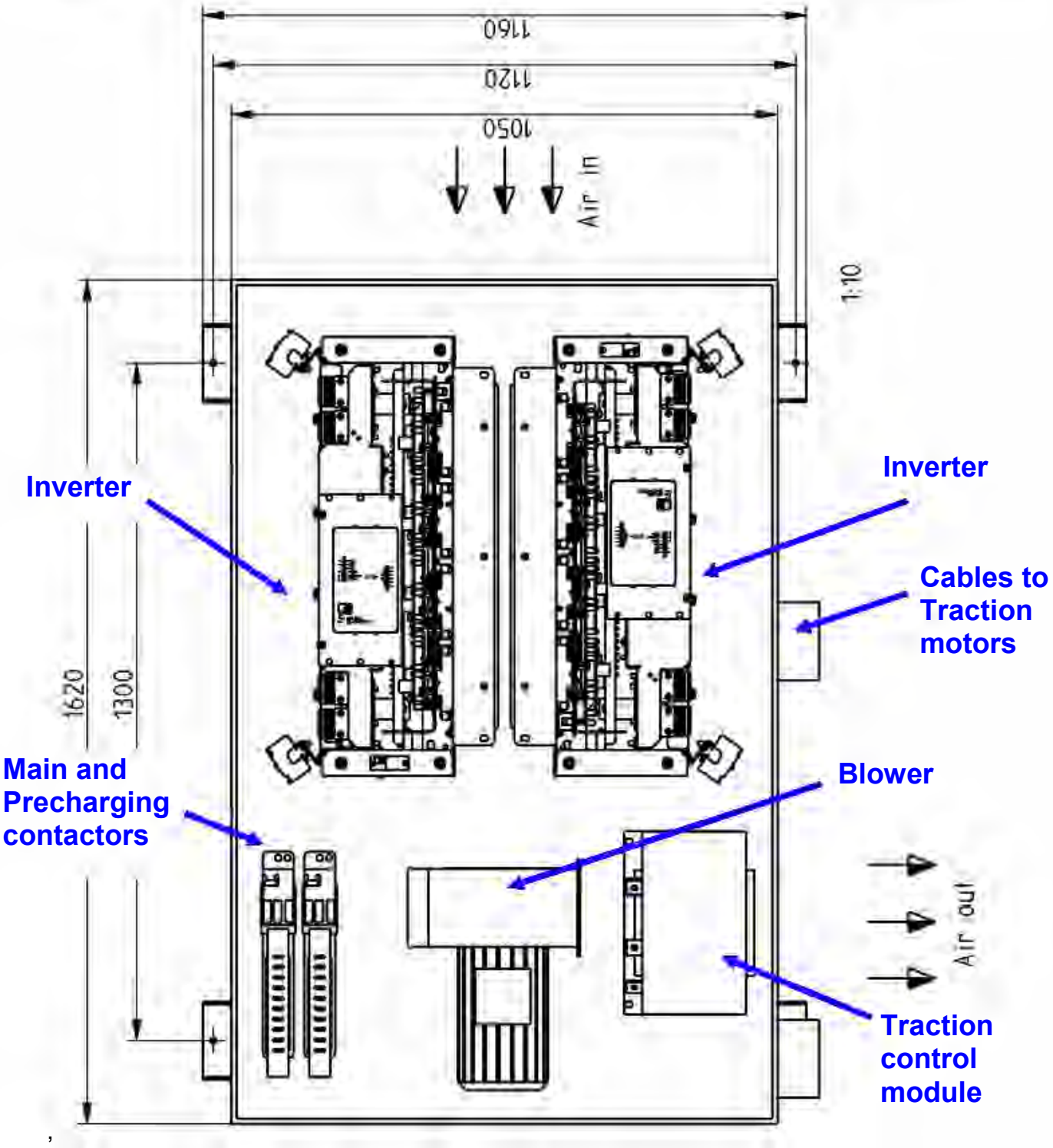


Figure 4: Roof container DGG 25x – Traction inverter

4.1.4 Propulsion Inverter – Concept

Each inverter-DPU consists of the following components:

- Line filter (line capacitor with charging and discharging device plus line inductor)
- IGBT direct pulse inverter

- Brake chopper
- Temperature and over-current supervision
- Power supply, diagnostic data, control modules for the fibre optics cables

Technical data – traction inverter	
Max. overvoltage	entsprechend VÖV 6.030.5 (together with a surge arrestor)
Rated output per inverter	160 kW
Max. output per inverter	400 kW für t < 60 s
Control voltage	DC 24 V +25 %, -30 %
Isolation voltages - first isolation (service isolation) - second isolation	 3,55 kV, f = 50 Hz, t = 1 min. 2,2 kV, f = 50 Hz, t = 1 min.
Dimensions (L x B x H)	App. 844 mm x 440 mm x 332 mm
Weight	App. 90 kg
Cooling	Forced air cooled
Class of protection	IP 00 nach EN 60 529
Ambient temperature	-25°C until +45°C

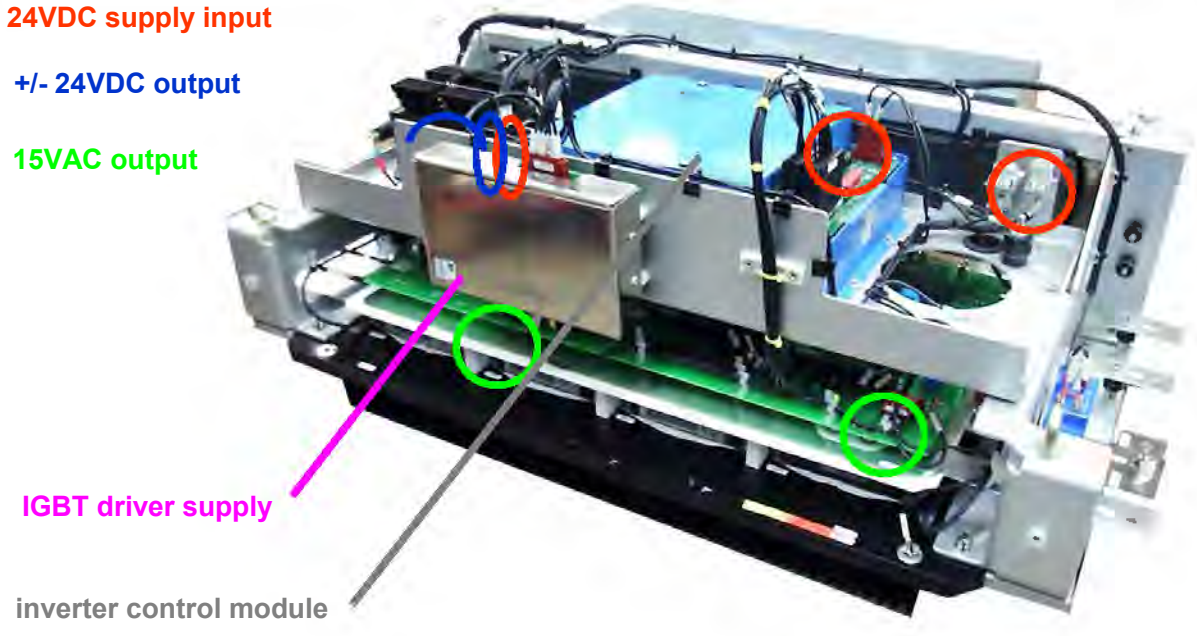


Figure 5 Direct pulse inverter – Traction inverter

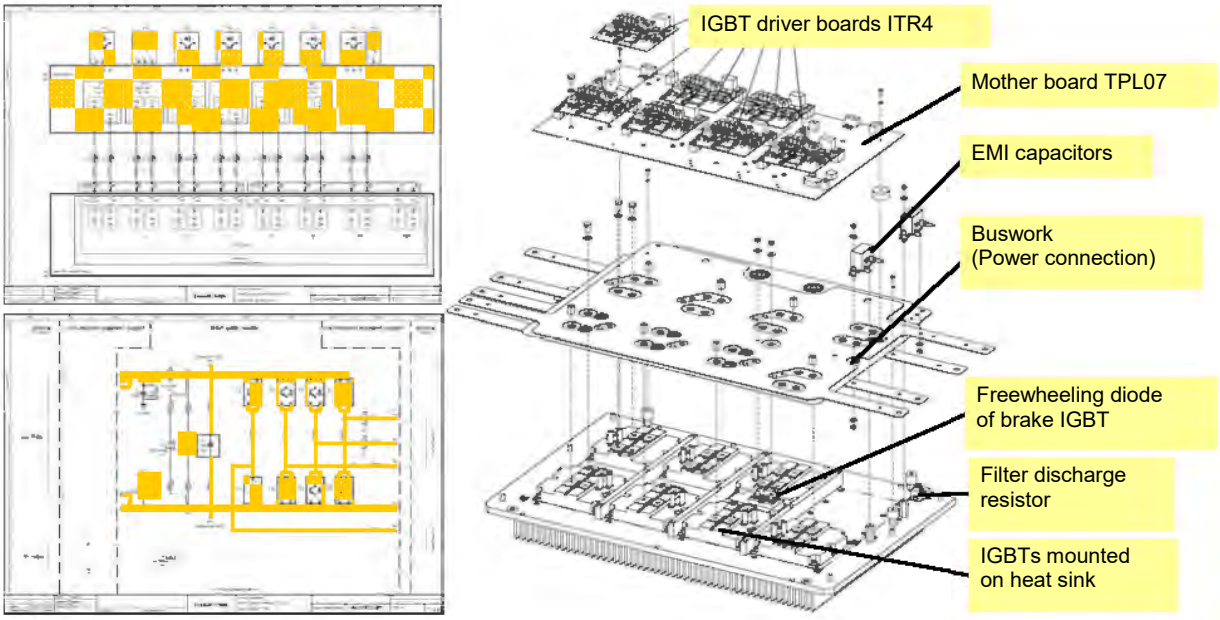


Figure 6: Direct pulse inverter – Traction inverter

4.1.5 Control - Concept

The control for driving and braking consists of devices carried out in microprocessor technique as follows:

- traction control module ASM with the functions
  - Wheel spin / slide protection device
  - Jerk limitation
  - Limitation of the maximum speed
  - Limitation of line current and voltage returns on braking
  - Weight computation
  - Wheel diameter consideration
  - Recording of diagnostic data (fault file and occurrence file)
  - Revolutions per minute (RPM) recording and evaluation
  - Interface to the RS 485 vehicle bus and to the assigned USM
  - RS232 interface for diagnosis
  - Control of different internal and auxiliary components.
- inverter control module USM with the functions
  - Control of the asynchronous motors with pulse-width modulation from the direct pulse inverter (DPU)
  - Computation of pulse pattern
  - Control of the brake chopper
  - Controlled charging and discharging of the line filter capacitor in the DPU
  - Monitoring of the overhead current

- CAN interface to the assigned ASM
- Control of different components such as:
  - Temperature of the traction motors, temperature, over-current and overload in the DPU, inverter power supply, current and voltage measuring devices

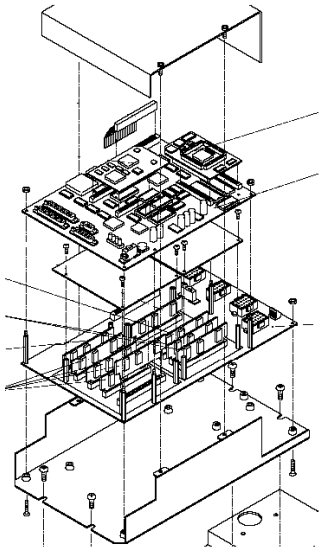


Figure 7: Control for Driving – Invertor control module USM

The electronic drive/brake control systems are supplied with information and commands by a train control unit (scope of CAF).

4.1.6 Pre-set value processing in the ASM

The pre-set value provided by the master controller is used to compute the torque nominal value in the ASM. The following parameters have an influence on the nominal torque value:

- Speed-/ torque characteristic
- Jerk limitation
- Passenger load
- Wheel diameter
- Wheel spin / slide protection

The passenger load of the vehicle and thus its weight is computed by the control units. Thus a mechanical weight measurement device is not required. Any load of up to 2/3 of the total load does not have in impact on acceleration and deceleration of the vehicle due to the load compensation characteristic of the drive control module (ASM). A load information will be supplied by CAF.

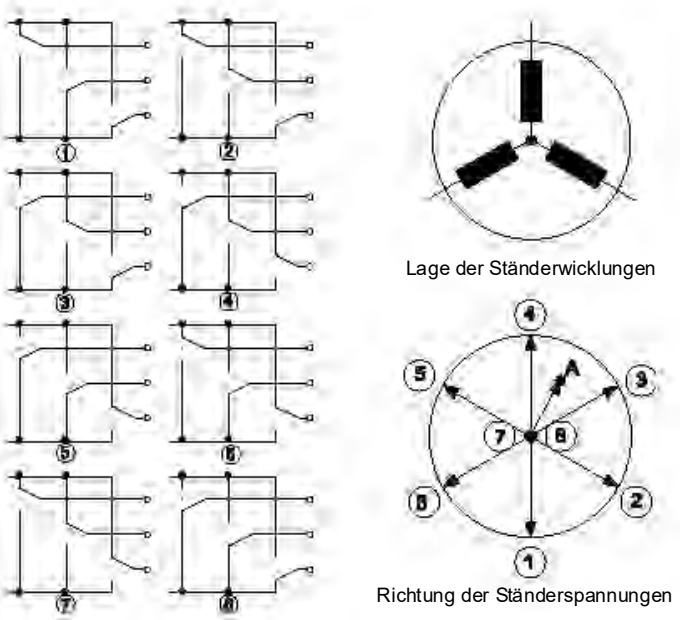
4.1.7 Nominal value processing in the USM

By the principle of field oriented vector control, the flux and the torque are controlled. The output of the field orientated vector control is transformed by a motion controller into an appropriate pulse pattern for the IGBTs.

4.2 Function of the traction equipment

Two asynchronous traction motors are powered by one traction inverter DPU directely fed by the DC line voltage. The inverter system converts the mains voltage U_N and current I_N into corresponding alternating quantities of variable frequency f_1 and an adjustable fundamental-wave amplitude U_1 for the traction motors. The inverter is of voltage-source type.

The torque of the asynchronous motor is controlled according to the principles of the field orientated control. All measurable physical variables such as currents, voltages, frequencies etc. are collected in each microprocessor controlled system. Further parameters such as torques, rotation speeds and temperatures can be calculated from the primary variables. This avoids the need for a large number of delicate sensors and measuring devices, further enhancing the dependability of KIEPE control systems. As a matter of fact, no additional sensors are required for diagnostic purposes. The amplitude and frequency of the voltage is adjusted by pulse width modulation (PWM).



The running direction is changed by altering the pulse sequence between the bridge arms of the inverter. As well, switching over from driving to braking is also performed only electronically, without any contactors.

Figure 8: Running direction is changed by altering the pulse

4.2.1 Driving

In the driving mode, the energising direct voltage supplies the electric power which is converted in the pulse-controlled inverter and changed into mechanical power in the asynchronous machines.

The desired operating point, according to the operation, is adjusted by pulsing the alternating voltages in the three phases and the stator frequency. In the driving mode, the stator frequency f_1 is always greater than the mechanical rotational frequency f_n in order to operate the asynchronous machine as a motor.

4.2.2 Braking

The braking system comprises the generator brake, the electro-hydraulic spring-loaded brake and the magnetic track brake. The different brake systems (service, emergency, parking brake) are actuated by the control according to the commands of the driver or of the safety monitoring system.

In normal operation the service brake is generatoric; the friction brake is only used for stopping and securing the vehicle (speed lower than approx. 3 km/h).

In the braking mode, the asynchronous motors are used as generators. The converter adjusts the stator frequency f_1 so that it is lower than the mechanical rotational frequency f_n. The traction motor supplies the electromotive force to the converter, which works as a rectifier.

For electro-dynamic braking a combined regenerative and rheostatic brake is applied. If the overhead contact network can accept the regenerated power not completely, the braking energy is dissipated by resistors. The rheostatic braking is activated electronically using IGBT. This case is detected by monitoring the line capacitor voltage. If the voltage exceeds its maximum value of 900 V (according to the BOStrab reglementations), rheostatic braking is actuated automatically. During emergency braking the generator brake works only as a rheostatic brake for safety reasons. The limiting voltage is adjustable.

The braking controller thus can achieve any desired braking characteristic even with rheostatic braking. It is possible to use regeneration in braking down to standstill. The concept based on a generatoric brake performance of the propulsion equipment of 1.2m/s².

4.2.3 Overvoltage protection and fuses

Protection against line overvoltages has to be assured by a cathode fall arrestor that has to be delivered by CAF.

The power circuit of the propulsion inverters has a HSCB as protection.

4.2.4 System line filters

A separate input filter is assigned to each DGG unit. The input filter limits voltage and current harmonic distortions from the feeder network and those involved with the pulse control operation. It acts as a decoupling network.

The network filter consists of a line inductor and a network capacitor. The line inductor is of the air-core type and is sited in the cooling air duct. As the air-core inductor does not exhibit saturation phenomena, the resonance frequency and thus the filter property keeps fixed.

The network capacitor is designed as an electrolytic capacitor. Thus it combines the advantages of high-voltage and high-current capability and of high capacity at small volume. In order to avoid current overratings, the capacitor is charged and discharged via resistors.

4.2.5 Braking resistors

The braking resistor is used to absorb the re-energised electric power if the network is not capable of doing so. Low-inductance resistors are used and placed very close to the inverter. Every inverter is a resistor allocated.

The resistors are designed in accordance with IEC 77 and IEC 322 and allow braking by employing exclusively the brake resistors. They are constructed for self-cooling and mounted on the roof. Two brake resistors are in one housing.

Each resistor consists of resistor coils. On their bottom they are isolated by a steel plate to prevent overheating of the vehicle roof.

The resistor coils are made from high quality, particularly non-corrosive steel. All the electric connections are designed as welded or hard soldered connections inside the package.

Since the resistors have a double layer of insulation, they can be mounted directly onto the roof.



Figure 9: braking resistor

For Dimensions please find attached the dimension drawing “Braking Resistor.pdf”.

Techical data – brake resistor:

Resistor value	2 x 2.1 ohms
Tolerance	-+3%
Thermal current	121 A (per resistor)
Material	NiCr 3020
Class of protection	IP 00
Nominal voltage	DC 750 V
Dimensions	1610x800x430mm (LxBxH)
Weight	appr. 130 kg
Ambient temperature	-25°C - +45°C

4.3 Auxiliaries

The power supply for the control electronics of the DPU has several separate, insulated outputs and will be fed by the DC 24 V onboard power supply (CAF). If a disturbance in the power supply appears, then the cause can be determined by an error code that can be displayed using the diagnostic software tool.

The control signals for the power semiconductors are insulated using fibre optic cables. The control of the driver steps and the pulse pattern computation are carried out by the inverter control module (USM), one is assigned to each DPU.

The fan of the DGG will be fed by the AC 400 V 50 Hz onboard power supply (CAF).

4.4 Protective Equipment – HSCB

Characteristics

Basically the Vossloh Kiepe GmbH (VKD) electronic control system is designed in such way that a separate High Speed Circuit Breaker (HSCB) is not stringently necessary. The line protection and the cases of short circuit may be served by a fuse installed close to

pantograph. All other failures of the traction equipment, such as over voltage, overload and internal equipment faults are safely controlled via fuses in the VKD control units and the main contactor. The protection against line over voltage will be also assured by the cathode fall arrestor.

Description



Figure 10 : HSCB

The UR6-31 is a trip-free DC high-speed current limiting air cooled circuit-breaker, single pole unit, bi-directional, with electromagnetic blowout, direct instantaneous over-current release, natural air-cooling and electrical operating system. It has been designed to ensure a rapid opening of its main contact, on detection of a short circuit, and to quickly extinguish the arc by generating a constant over-voltage during the whole interruption process. The UR6-31 is mainly used to protect propulsion and auxiliary equipments mounted on rolling stock and can also be delivered enclosed in a special protective box for vehicle roof or underframe mounting. The circuit-breaker is made of independent mounted sub-assemblies, corresponding to the different functions.

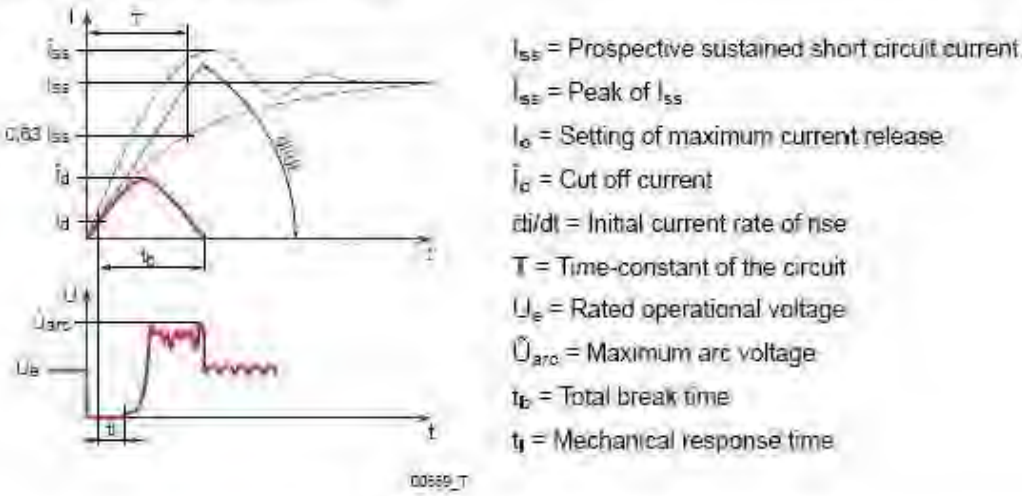
Characteristics

- Two hard silver contact lugs
- Breaking capacity at 110 VDC: 1 A (ohmic)
- Minimum let-through current: 10 mA for 24 V (for clean and dry environment)
- Possible connections: screws M3.

Auxiliary contacts

Six double-contacts switches of the type S 826 are mounted in the auxiliary housing and are wired as ab (NONC) contacts.

Breaking current parameters



Opening time

Relationship between opening time t_m and the initial rate of rise of current di/dt for direct over-current instantaneous release.

Example for an initial rate of rise of current of $2 \cdot 10^6$ A/s: the opening time is about 2.8 ms.

Remark: for a shorter opening time the option "indirect release" can be used (refer to "option" paragraph).

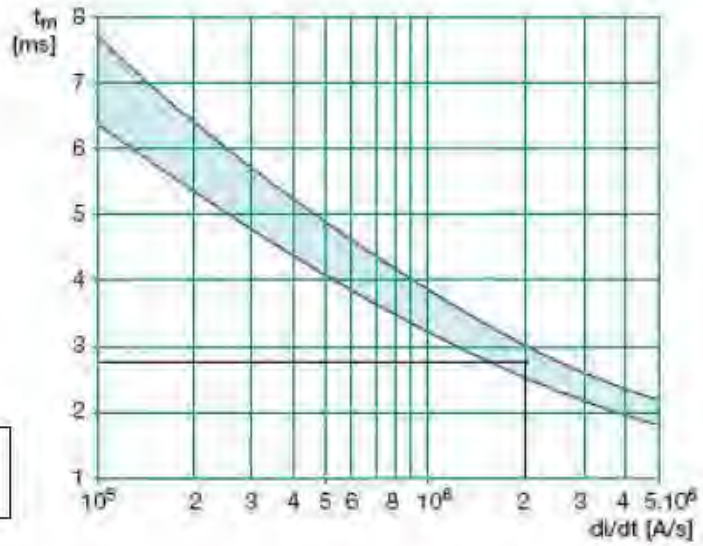
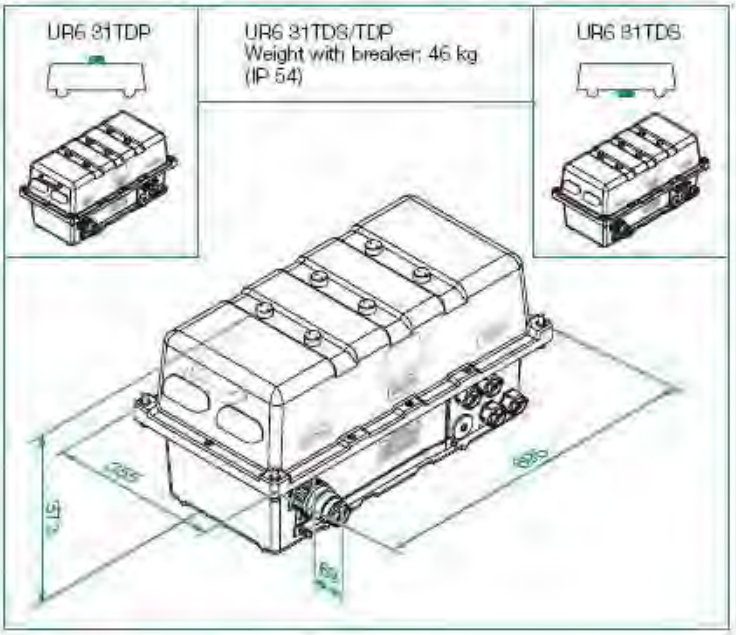


Figure 11 : Timing Diagram

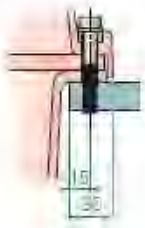
Figure 12: Weight and dimensions

Protective enclosures

The TDP/TDS enclosures for UR6-31 or UR6-32 can be directly mounted on the vehicle's roof or under the vehicle's frame

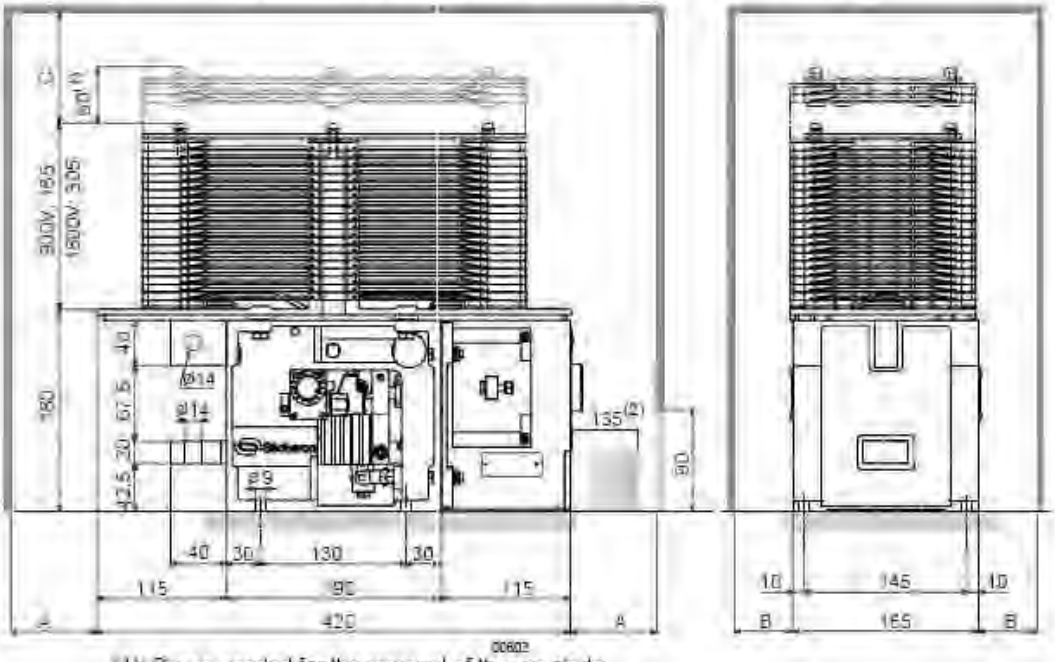


Example of TDP box's fixation on the vehicle's roof



CAF - Edinburgh Tram

Weight	UR 6-31	UR 6-32
Circuit-breaker (standard, without options):	27 kg	37 kg



(1): Space needed for the removal of the arc chute.

(2): Space needed for the removal of the auxiliary box.

Clearances to be observed in operating position

Minimum distances to:	A	B	C
Insulating wall	90	55	0
Earth (metal wall)	350	200	150

Main circuit

	Unit	UR 6-31	UR 6-32
Rated operational voltage	U_e	900 V	1800 V
Rated insulation voltage	U_i	2000 V	
Rated operational current	I_e	1000 A	
Conventional free air thermal current (at T_{amb} = 40°C)	I_{th}	1000 A	
Rated short-circuit breaking and making capacity Rated time constant T1 Rated time constant T2 Rated time constant T3 Rated time constant T4	I_{cs}/T	 NA 30 kA/15 ms 30 kA/50 ms 30 kA/150 ms	 NA 30 kA/15 ms 30 kA/40 ms 30 kA/100 ms
Direct over-current release	Id	0.45 - 0.9 kA 0.6 - 1.2 kA 0.9 - 1.8 kA 1.2 - 2.4 kA 1.5 - 3.2 kA	
Maximum arc voltage	$\hat{U}_{arc}$	1.5 - 2.1 U_e	

Refer to the corresponding data sheet for complementary information.

Control circuit

Nominal voltage	U_n	24, 36, 48, 72, 87, 96, 110, 220 VDC
Supply voltage limits ($-25°C < T_{amb} < +40°C$)		$0.7U_n$ to $1.25U_n$

Operating conditions

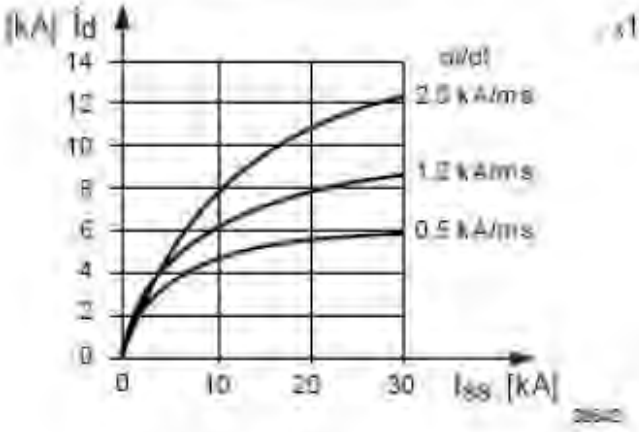
Ambient outdoors temperature	T_{amb}	-25 °C to +70 °C
Humidity:		Class 5K2
Altitude	h	≤ 1400 m
Flammability: according to standards:		NF F 16-101 - NF F 16-102 – NF ISO 1928 / DIN 5510 / BS 6853 - BS 476 / ASTM E 162 – ASTM E 662 – BSS 7239 - SMP800-C

UR 6-31 breaking diagrams

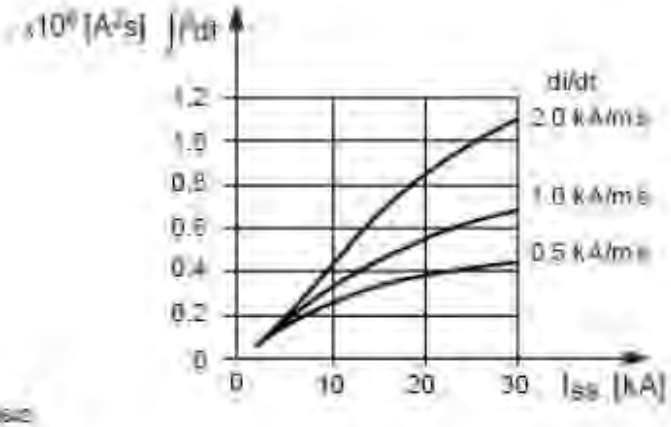
U_d = 1000 V, I_d = 2000 A

I_{ss}: prospective current

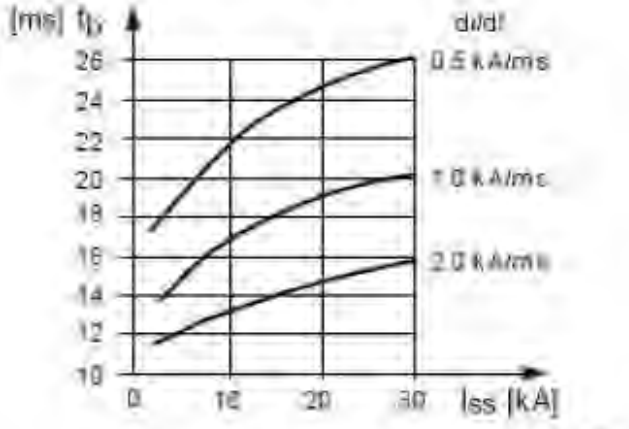
Cut off current



Integral I^2dt



Total break time



For other applications, please contact Sécheron.

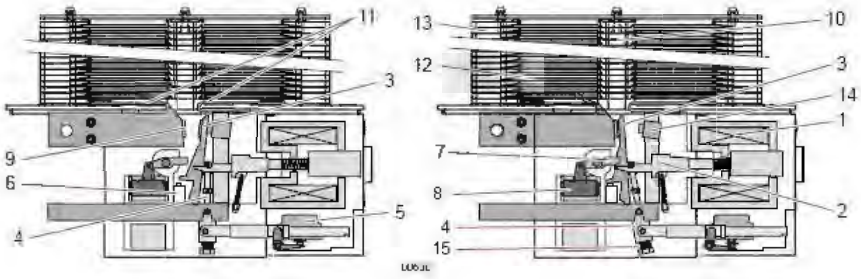
Figure 13: HSCB Overview



1. Fixed insulating frame made of glass-fibre reinforced insulating material.
2. Main circuit, consisting of a lower connection terminal (21), a moving contact (22), an upper connection terminal (23), a fixed contact with horn (24) and another horn (25).
3. Over-current release.
4. Arc chute.
5. Closing device and fork.
6. Auxiliary contacts assembly.

Functions

Figure 14: HSCB Details



Closing

When a closing pulse is received, the closing device (1) moves the fork (2), which closes the ,moving contact (3) and applies the contact pressure to the main contacts (3 & 9). The guide (4), linked to the moving contact (3), actuates the auxiliary contacts (5). The closing shock is damped by the shock absorbers (6).

Holding

Once the main contact is closed, the contact pressure is maintained by the closing device (1), either with a reduced holding current (E type) or without current (M type).

Opening

The circuit-breaker opens either through an over-current tripping or through an appropriate opening order:

• An over-current, that exceeds the maximum current setting value, lifts the core (8) and causes the lever (7) to push the fork (2) downward, thus releasing the moving contact (3). See "Operation" for details.

• An opening remote order given to the circuit-breaker cuts off the holding current (E type) or applies a reverse pulse (M type), which moves the fork (2) toward the closing device (1). The spring (15) then opens the moving contact (3) and the guide (4) actuates the auxiliary contacts (5). The opening shock is damped by the shock absorber (14). The arc that is generated between the main contacts (3 & 9) moves upwards between the horns (11) into the arc chute (10) and is split by the baffles (12). The ionized gases are mostly neutralised by the de-ionizing plates (13).

Breaker control

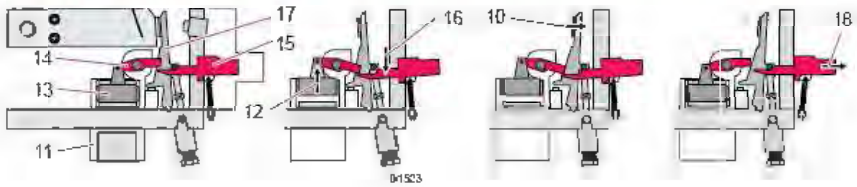
The circuit-breaker can be maintained in the closed position using either a reduced holding current (E type) or without current (M type).

Note! Sécheron recommends the protection of the closing device coil using an automatic circuit breaker with thermic protection, which have the following characteristics: a closing pulse duration of 0.5-1 sec, the ability to trigger the circuit-breaker several times consecutively and a holding current that is limited to 5% of the closing current.

Over-current release operation

When excess current flows through the main circuit, it creates a magnetic field in the tripping device (11), inducing (12) an upwards movement of its moving magnet (13). This movement trigger the lever (14) and presses the fork (15) downwards (16), releasing (10) the moving contact (17).

Important!
When the circuit-breaker trips following an over-current, the fork (15) remains in closed position and need to be reset (18) to its open position by giving an "OFF" order to the closing coil.



Technical data – HSCB:

Type	UR 6-31 TDS
Rated thermal current	1000 A
Rated voltage Housing	DC 900V Yes
Control voltage	DC 24 V
Control contacts	2 NO + 2 NC
Dimensions	695x360x380mm (LxBxH)
Weight	Appr. 46 kg
Ambient temperature	-25°C - +45°C

4.5 Traction motor

Four air-cooled three-phase asynchronous motors are provided for one motor bogie of the vehicle, by three motor bogies per vehicle. The four traction motors are fitted longitudinally to the direction of traffic on one motor bogie and fed by two inverter. The torque of the motor is transferred to the wheel via a gear box. The gear box and motor fastening is scope of supply of CAF.

1 Technical data *Traction motor*	**Asynchronous motor**
Weight (double motor)	m = 720 kg
Rated power	P_N = 2 x 70 kW
Rated speed	n_N = 1627 min-1
Rated voltage	U_N = 485 V
Rated current	I_N = 2 x 112 A
Rated frequency	f_N = 55 Hz
Power factor	0,81
Cooling system	IC411, Air flow (self ventilated)
Protection (motor / terminal box)	IP55 / IP65
Insulation class	200
Insulation system	VPI
Execution / mounting	special design

Code designations / abbreviations

DACS	Double Air Cooled System
NS / NDE	Nicht-Antriebsseite / non drive end
AS / DE	Antriebsseite / drive end
QTY	Unit of quantity

Traction motor construction

Three-phase cage induction motor

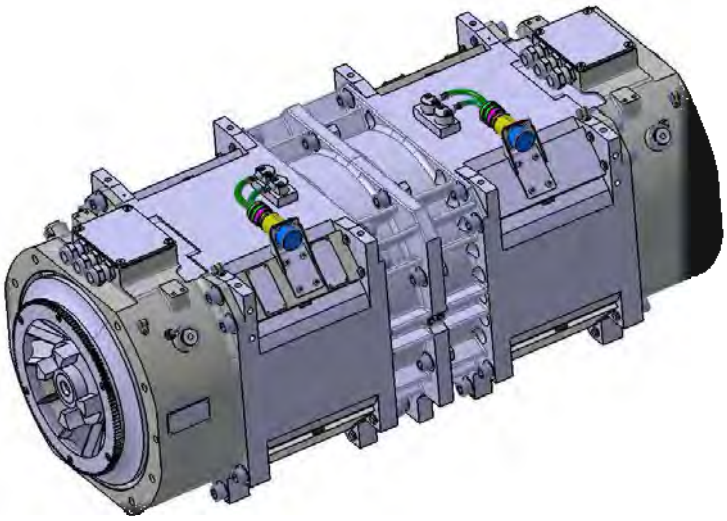
The traction motor (double motor) consists of two identical individual motors. In the following, this document describes the motor principle, the relevant motor sub-assemblies and related topics in detail.

Design principles:

Please find attached the dimension drawing “Double Motor.pdf” of the “Traction motor in double mechanically set for the project Edinburgh”.

In the completely enclosed machine there is in – opposite direction to the external air circuit – an inner air circuit arranged. A special fan, which is mounted on the rotor guarantees a continuous air circulation at all speed ranges inside the machine. In the stator as well as in the rotor there are axial holes for the inner air ventilation located.

For the two motors are screwed together and mounted as a double motor in one bogie. The shafts of the two motors are not connected together. The traction motor is especially reliable and sturdy. By walling off the aggressive environmental impacts, the reliability of the voltage tensioned parts of the machine can be guaranteed.



General:

In the stator built-in temperature sensors are arranged redundantly. These are connected to a separate terminal board. For safety protection a perforated sheet metal is mounted on the air suck side. To get rid of the condensation water a special system is included. The lifting threads are provided with thread protection.

Figure 15 Traction motor in double mechanically set for the project Edinburgh

Please find attached the dimension drawing “Double Motor.pdf”.

Stator

The stator is made of laminated dynamo sheet metal and forms, together with the two press plates, and the rails in between, the basic mechanical structure of the motor (“frameless“ type of construction).

Stamped stator steel sheets are welded together with press plates. This steel corset gives even without a stator housing the construction its stability.

The stator winding is carried out as profiled wire copper. It is connected with switching rings into a terminal box.

The stator winding consists of coils made of profiled, insulated copper wire, which are banded with additional coil insulation and inserted in the lined slot. The stator coils are connected (wired up) at the drive end (DE).

The stator winding is insulated according to VDI silicone insulation and complies with insulation class 200.

The temperature permissible stress of the winding corresponds to class 200.

The end shields on both ends are casted.

Rotor

The rotor sheet-metal package consists also of laminated dynamo sheet metal. The complete sheet-metal package is put on the shaft and held under pressure by two rotor press rings.

The rotor sheets are shrinked on the shaft. Press plates on both sides yield a permanent-press basic framework for the copper short-circuit cage. These stick ring combination is solded.

The fine balancing necessary for quiet running is carried out on the two fans of the rotor.

Motor connections

The motor is electrically connected by means of the terminal box arranged on top of the end shield. In order to lead in the connecting cable, each individual motor is provided with 3 bore holes with EMC screwed cable glands.

The electrical connection must be made according to the enclosed schematic diagram in the terminal box. The protective earth conductor must be connected to the frame. The terminal box cover is earthed with the stator frame by means of fastening screws.

PT100 temperature sensor

For monitoring the stator temperature, 2 pieces of PT100 temperature sensors are positioned in the iron package for each individual motor. The connecting lines are guided to a circular connector, which is mounted to the stator.

Speed sensor

An inductive speed sensor is used to determine the speed of the motor shaft. The tooth wheels are installed on each drive end. The speed sensors are mounted to the gearbox.

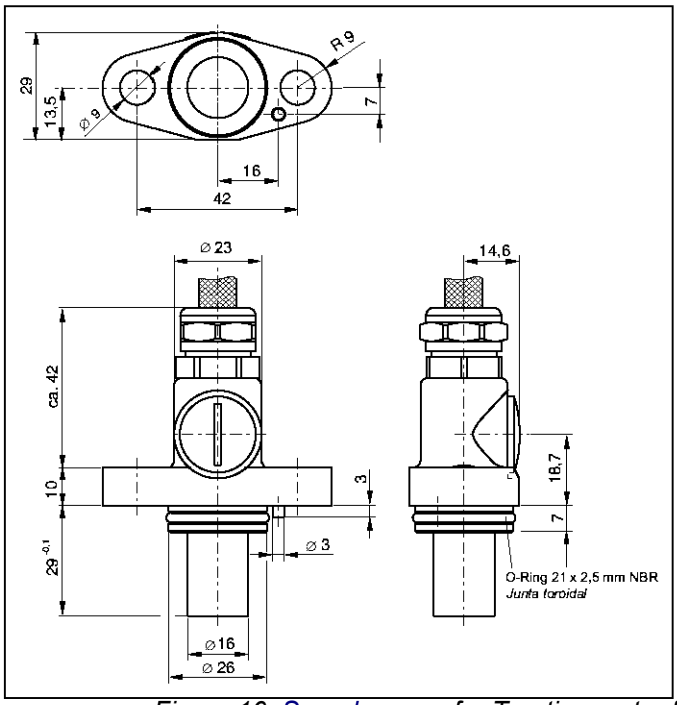


Figure 16: Speed sensor for Traction motor for the project Edinburgh

Motor bearing

The machine is designed with two isolated bearings with a regreasing device each.

The double motor consists of 2 motor units and has a total of 4 bearings. The motor shaft of one motor unit is mounted according to the fixed/movable bearing concept.

On the drive end a ball bearing and on the non drive end a cylindrical roller bearing is used.

The bearings have to be lubricated approximately every two years.

Cooling system

The cooling is designed according to the DACS principles (Double Air Cooled System).

The DACS principle cools the motor with two cooling circuits, which are connected in the stator via a heat exchanger according to the counter-flow principle. The first, inner cooling circuit circulates through the inner fan, passes the winding overhang, stator boring, winding overhang and rotor boring. This ventilation circuit is insulated towards the outside of the motor to prevent any dirtying of the motor inside. The second, external cooling circuit goes from the ambient air through the outer fan to the stator boring and then back into the ambient air again.

5 BRAKE EQUIPMENT

The vehicle is equipped with three different brake systems:

- dynamic brake
- spring loaded brake, operated electrohydraulically (not included in this proposal)
- electromagnetic rail brake (not included in this proposal)

The dynamic brake works together with the electrohydraulic brake system depending on the load and is controlled using a state-of-the-art wheel slip/slide protection.

Dynamic brake

During braking the asynchronous motors are used as generators. The stator frequency is set at a lower value by the inverter as the mechanical rotational frequency. The traction motor delivers the voltage to the inverter and it works as a rectifier. In case of service braking the energy is regenerated and fed back to the overhead line (network). If the overhead line can not take up the energy, e.g. if the line filter capacitor voltage has reached its maximum operational value the energy is automatically converted into heat in the braking resistors via the brake chopper.

In case of emergency braking the line contactor is opened for safety reasons.

Convection-cooled braking resistors are mounted on the roof of the vehicle. The braking resistors are appropriately dimensioned thus it is not required to monitor the temperature of the braking resistors.

Service Braking

In general, service braking is performed by the dynamic brake using the traction motors. Because of the decreasing brake effect of the dynamic brake at low speeds a jerk free blending to the mechanical brake is performed shortly before the vehicle comes to a standstill. A dynamic brake down to standstill can be supplied as an option.

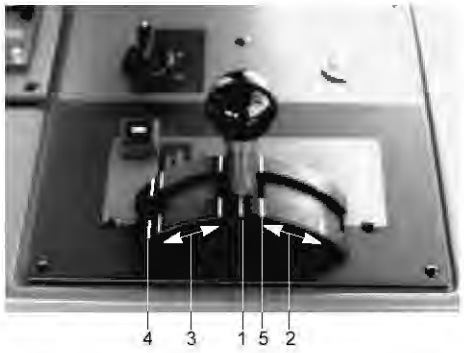
In case of a partial failure of the dynamic brake the disc brake is used as the second service brake. If the dynamic brake of one bogie or a mechanical brake unit fails, the maximum speed of the vehicle is electronically limited to 30 km/h.

A powerful wheel slip/slide protection for optimal utilisation of the existing adhesion coefficients is integrated into the traction system. Mechanical load sensors are not required as the acceleration and deceleration is controlled. The innovative control includes a load compensation that also compensates the effects of the track gradient. Automatic load compensation is featured for loads up to 2/3 load (i.e. normal load).

6 MASTER-CONTROLLER WITH INTEGRATED DEAD MAN'S SWITCH

The pre-set value for the drive and brake functions are specified by the driver within a range of 0% to 100% by a hand-operated master-controller. The master-controller has lockable positions "0" and "emergency" brake settings. In addition the master-controller is equipped with a 'cruise control' setting, which allows the vehicle to maintain a constant speed (breaks are not automatically applied in this mode).

A dead man's switch is integrated into the master controller. It is operated in accordance with the requirements of BOStrab (the German Federal Regulations on the Construction and Operation of Light Rail Transit Systems) and DIN 5566 T3.



1: Neutral position
2: Driving
3: Braking
4: Emergency brake
5: Cruise control

Figure17: KIEPE Master-controller SGW 211

6.1 Start-up Lock and Operating Mode Selector

Protection against unauthorised use is provided by a key-operated activation lock. The mode selector has the following positions:

0: Vehicle switched off, master-controller mechanically blocked, preheating operation of the air cooling (option) and heating unit for the passenger compartment is possible,

* : All functions possible except driving,

V: Driving possible in the forward direction,

R: Driving possible in the reverse direction (max. 5 km/h).

The operating mode selector can only be set into the position 'R' if the button 'R' is pressed simultaneously. While reversing the speed is automatically limited to 5 km/h by reducing the thrust (brakes are not applied automatically).

Only the driver's cab can be started up by means of electronic interlocking mechanisms. In case of an attempt to start up a second driver's cab, an automatic train stop is activated.

Please find attached the dimension drawing SGW_1SK11578-12.tif and the detailed description of the mastercontroller series SGW 2XX GW_200_GB_DINA5_060322.pdf.

6.2 Dead Man's switch

The dead man's switch is actuated by pressing down the master-controller (*). If it is not actuated, e.g. if the driver feels unwell, an automatic train stop is actuated after an acoustical warning signal and a delay of 4 s.

(*) Alternative Methods may be optionally discussed.

7 DIAGNOSTIC SYSTEM

The KIEPE DIAGNOSTIC AID provides the transit authority operating the LRVs with a comprehensive management system for the electrical systems and electronic controls installed in the vehicles.

The DIAGNOSTIC AID consists of two complex functional units. The first block comprises recording of service data of the individual units which is integrated in these devices, for example in the KIEPE traction converter or in any KIEPE control unit. The second block consists of evaluation software which can be run on any Windows personal computer.

All measurable physical variables such as currents, voltages, frequencies etc. are collected in each micro-processor controlled system of KIEPE. Further parameters such as torques, rotation speeds and temperatures can be calculated from the primary variables. This avoids the need for a large number of delicate sensors and measuring devices, further enhancing the dependability of KIEPE control systems. As a matter of fact, no additional sensors are required for diagnostic purposes. Additional data is available from subsystems such as air conditioning units (HVAC), auxiliary power supply. The diversity of data which can be collected from the entire system is virtually unlimited and individually configurable.

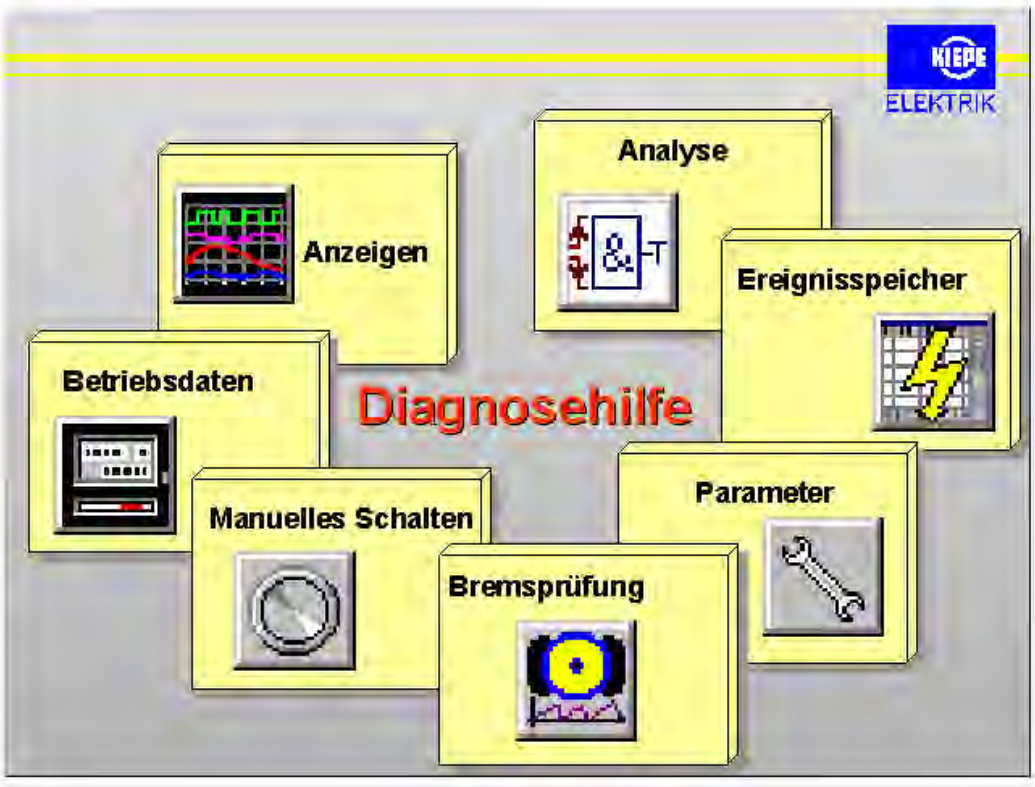


Figure 18: Main functions of the diagnostic system

The data collected and stored in the intermediate memory on board the vehicle can be transferred to a personal computer for evaluation. This can be carried out via a serial data interface cable connecting the equipment control units in the vehicle to a portable commercial Windows computer. Data transmission by data radio LAN is possible as an option. Assistance can be obtained via the public telephone network using a modem to contact the KIEPE service organization.

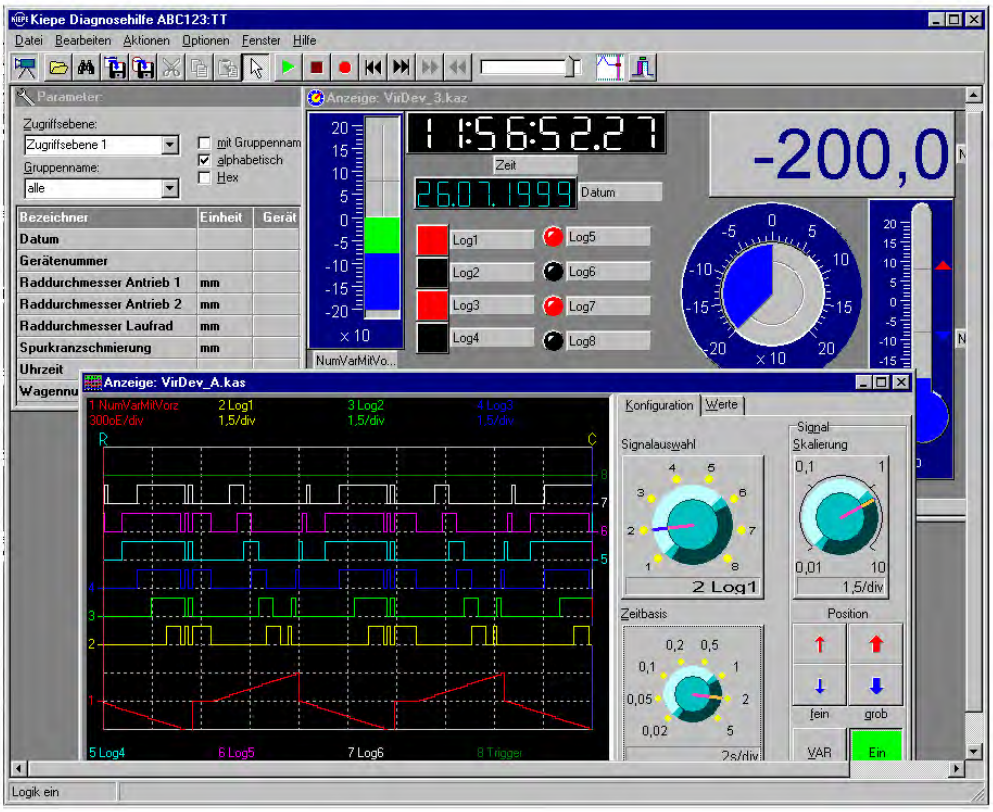


Figure 19: KIEPE diagnostic software

7.1 Diagnostic aid

The KIEPE diagnostic aid program presents itself to the operator with a user interface which is easy to operate. Functions are selected from menus with cursor movements or using a mouse. Detailed on-screen help texts for these functions can be called at any time.

7.2 Display

Status variables from the connected control unit can be displayed on the screen of a computer via its serial data interface without any need for setting up measuring equipment. The information can be displayed graphically (e.g. analog bar chart) or in the form of numerical values in a detailed table. A freely configurable combination of both display forms is possible too. The measurement sequences can be stored and displayed on the computer screen at a later time outside the vehicle. The status variables can be selected from a predefined table.

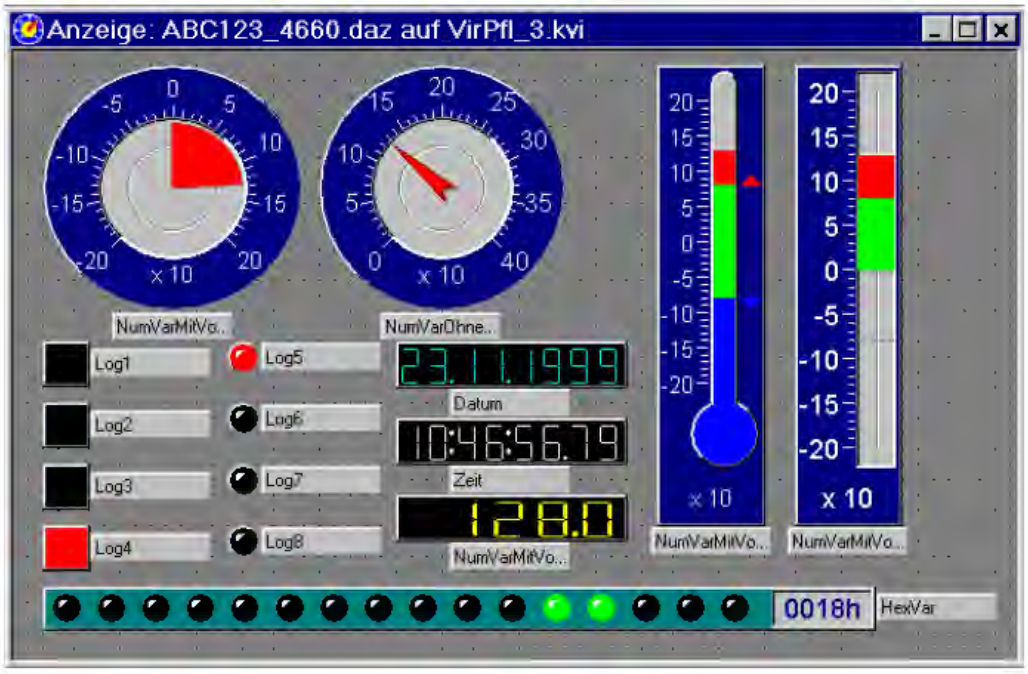
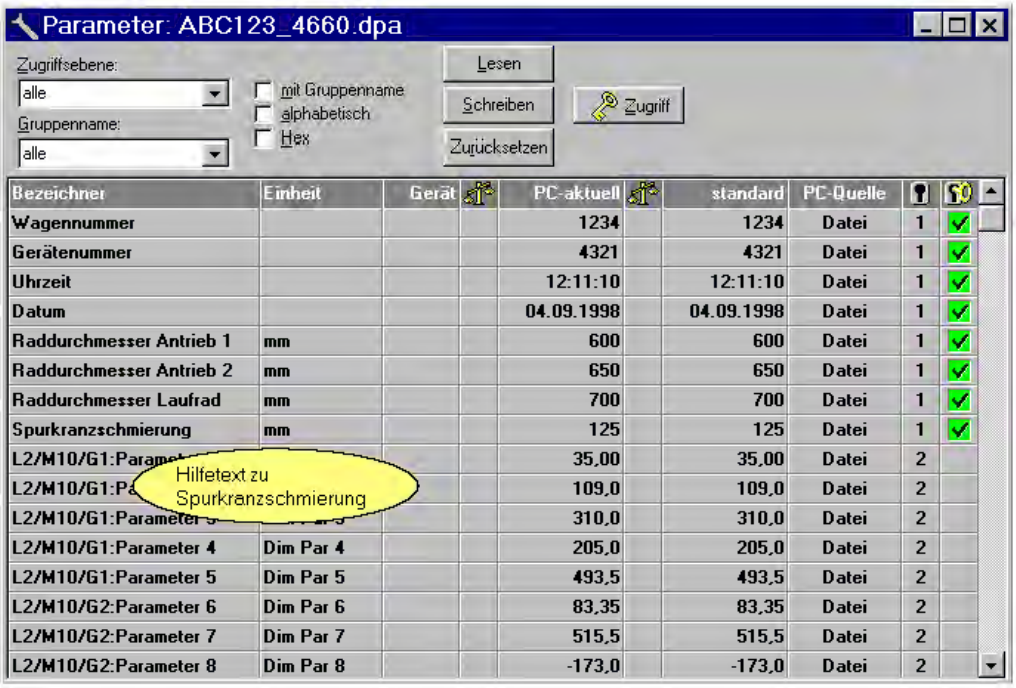


Figure20: measurement sequences

7.3 Parameters

All parameters required for the control unit can be displayed synoptically in a table or printed. These values are always shown together with their correct physical units. With the aid of this table, parameters such as the limit values for speeds, currents and voltages or torques can be changed and transferred back into the electronic memory of the control equipment. Certain parameters are protected against unauthorized alteration by pass-words (PIN-code).



Bezeichner	Einheit	Gerät	PC-aktuell	standard	PC-Quelle		
Wagennummer			1234	1234	Datei	1	✓
Gerätenummer			4321	4321	Datei	1	✓
Uhrzeit			12:11:10	12:11:10	Datei	1	✓
Datum			04.09.1998	04.09.1998	Datei	1	✓
Raddurchmesser Antrieb 1	mm		600	600	Datei	1	✓
Raddurchmesser Antrieb 2	mm		650	650	Datei	1	✓
Raddurchmesser Laufrad	mm		700	700	Datei	1	✓
Spurkranzschmierung	mm		125	125	Datei	1	✓
L2/M10/G1:Parame			35,00	35,00	Datei	2	
L2/M10/G1:Pa			109,0	109,0	Datei	2	
L2/M10/G1:Parameter			310,0	310,0	Datei	2	
L2/M10/G1:Parameter 4	Dim Par 4		205,0	205,0	Datei	2	
L2/M10/G1:Parameter 5	Dim Par 5		493,5	493,5	Datei	2	
L2/M10/G2:Parameter 6	Dim Par 6		83,35	83,35	Datei	2	
L2/M10/G2:Parameter 7	Dim Par 7		515,5	515,5	Datei	2	
L2/M10/G2:Parameter 8	Dim Par 8		-173,0	-173,0	Datei	2	

Figure21: parameters

7.4 Data memory

Readout of the data memory is a useful instrument for maintenance of the total system. Events are counted, supplemented with date and time as well as other auxiliary data and then stored. Certain operating states can be reconstructed with the aid of these recordings for assessing the behavior of the control equipment.

Measured data can be displayed on the screen of a Windows computer online during operation in the field. Extensive measuring apparatus is no longer required because the measured data can be displayed simultaneously. The Windows computer can also be used to change parameter settings of the control units such as current limits, speed settings, acceleration limits and other parameters.

The diagnostic aid program incorporates a comfortable user interface and can be controlled with menus which appear on the screen when selected with the cursor or mouse.

Context-related help information is always available on the screen. The information provided by this help system makes it unnecessary for the user to carry the extensive operator manual.

Numerous values can be displayed on the screen and printed, for example statistical information for the transit authority such as

- Power consumption and recuperation (as an option)
- Operating hours, vehicle mileage
- Number of operation of electromagnetic contactors
- Fault incidents (e.g. overcurrent trips) with time records

Numerical and/or logical variables can be displayed in the course of trouble shooting, testing or commissioning. The variables can be freely configured on the screen and observed while the vehicle is moving. With this facility, the individual values required for assessing certain operational conditions are continually visible.

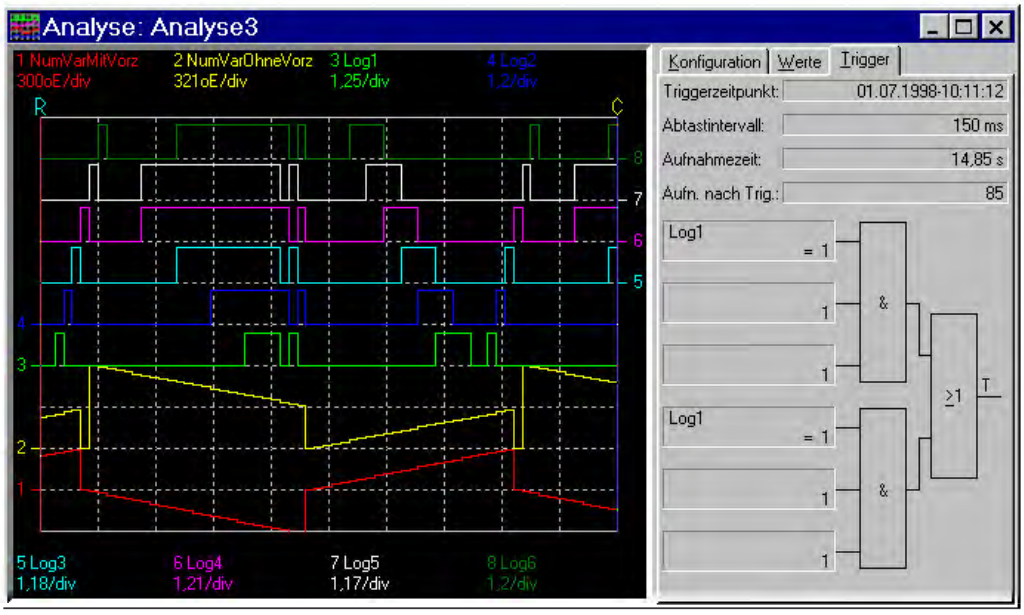


Figure22: analysis

Thereby the numerical and analogue values are displayed synoptically on the screen graphically together with the physical dimensions, for example torques in Nm, accelerations in m/s², speeds in km/h, currents in A, voltages in V, etc. This display mode avoids manual conversion calculations which are otherwise a common source of errors. The displays are provided in real time and can be recorded within certain limits.

Sporadic faults or operating conditions which are not easily reproducible can often be traced only with considerable effort when using *conventional* technology. In this case extensive test equipment and personnel are required, long downtimes are involved and usually a good measure of luck is needed. With the DIAGNOSTIC AID the user can freely define the event-trigger conditions. When one of the predefined conditions arises (for example a vehicle speed > 50 km/h together with a braking deceleration of - 0.5 m/s² and at the same time a feedback current < 183 A), all electrical data around the time of the trigger condition are stored and the trigger-event is displayed. This reduces the amount of data to the required minimum, but nevertheless, the data storage time before and after the event can be chosen within wide limits. This leads to a considerable reduction of the data volume. Subsequent evaluation of the recordings and possibly redefinition of the trigger conditions can be carried out on an office PC or in the field on board the vehicle with a laptop PC.

Useful test routines are incorporated in the diagnostic software to enable the user to check correct functioning of the control equipment. The software can be adapted in the case of system extensions. When faults are detected, the possible causes can be displayed together with instructions for suitable remedies.

A designation can be assigned to identify the connected unit, e.g. the vehicle number or a device number. All recordings then contain this number to facilitate subsequent association. This also facilitates further processing and evaluation of the collected data.

Limit value settings (e.g. maximum or minimum currents, voltages, speeds, set-points, etc.) can be changed via an access authorization system using a PIN.

7.5 Supplementary data

The data stored in the data memory unit can be displayed in tabulated form together with further supplementary information. This makes possible exact evaluation of the operating states. It is also possible to use this data in other external programs for statistical evaluation.

7.6 Trigger function

Freely selectable trigger functions make it possible to log operating states in detail. A composite condition consisting of status variables such as currents, speeds or switching states of certain contactors can be defined for starting continuous recording of the desired data and measurement readings when the condition appears. Faults can be detected and analyzed by subsequent evaluation of the recorded data.

7.7 File management

The file management is a very important function of the diagnostic aid software. It can be used for convenient sorting and administration of the numerous collected data without re-sorting to utility programs outside the diagnostic aid software.

8 TECHNICAL DOCUMENTATION

The following performances are included within the system planning. The language is English.

- Technical documentation (description of propulsion control, maintenance instructions, spare parts lists)
- Commissioning/testing documents (Testing and electrical measuring instructions).
- Preparation of circuit diagrams and bills of material
- Preparation of propulsion perfermance diagrams
- Preparation of detailed dimension drawings (components, spare parts)

9 SOFTWARE

The software supplied by Vossloh Kiepe is subject to copyright or trademark or patent. If you place an order with us we grant you a non-transferable and non-exclusive right to use for your own internal purposes in connection with above-mentioned equipment. Use for other purposes is prohibited. Please ensure that our software and the respective documentation are not made available to third parties.

10 SPARE PARTS AND MAINTENANCE

Provision of fit and function compatible spare parts is guaranteed for the nominal service life of 30 years. Experience has shown that provision of spare parts beyond this period is usually also ensured.

The equipment offered is so designed that it works with minimum maintenance. Maintenance can be performed with simple means; no special tools are required for this task. Moreover, our diagnostic aid makes it possible to rapidly localize the reason for a disabled state.

11 ACCEPTANCE

CAF is responsible for the approval of the vehicles, the type test and the acceptance by the safety regulatory authority. Vossloh Kiepe prepare the documents concerning the equipment supplied by Vossloh Kiepe available to CAF, based on the requirements of BOStrab.

The simulated perfomances are described by traction diagrams. Representative the maximum performance diagram as follows, for the other diagrams please consider the attached file “Edinburgh_Diagramme.pdf”.

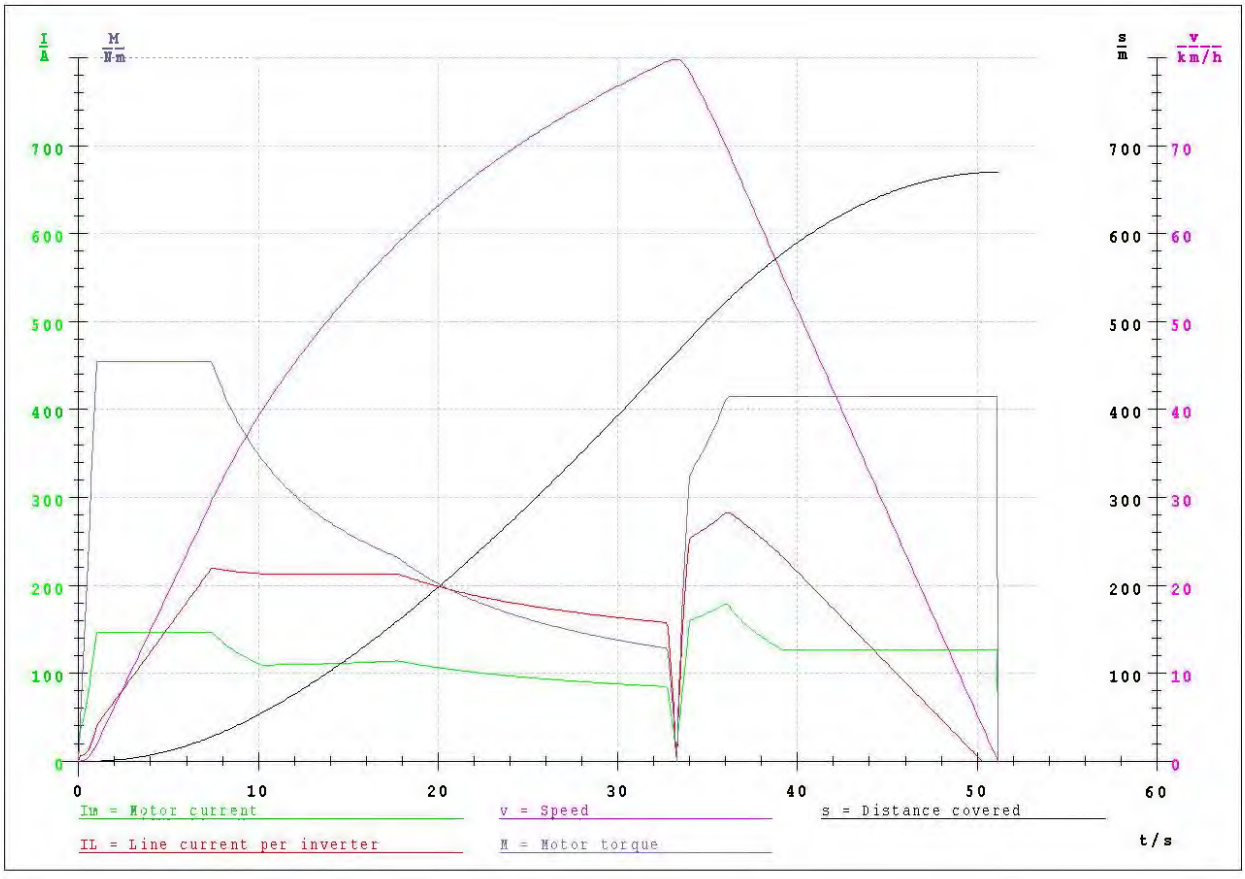
CAF - Edinburgh Tram

Vossloh KIEPE GmbH 13.07.07
DÜSSELDORF 13070700
Abt. E2

Edinburgh Tram Network

Performance Diagram
AW2 load

Weight of vehicle	54.84t
Pay load	18.47t
Line voltage Mo/Br	750V/ 900V
Grade	0.00%
Distance between stops	670.0m
Dwell time	25.0s
Wheel diameter	590mm
Gear ratio	5.440/ 1
Max. acceleration	1.20m/s²
Mean acceleration 0 - 70 km/h	.80m/s²
Max. deceleration	1.30m/s²
Mean deceleration	1.20m/s²
Adhesion coefficient Mo/Br	.17 / .17
RMS line current tot/Mo	888A/ 718A
Journey speed	31.7km/h
RMS motor current	99A
Energy drawn from line	7235.3Wh
Dynamic brake energy	4124.1Wh
Total energy consumption	3111.2Wh



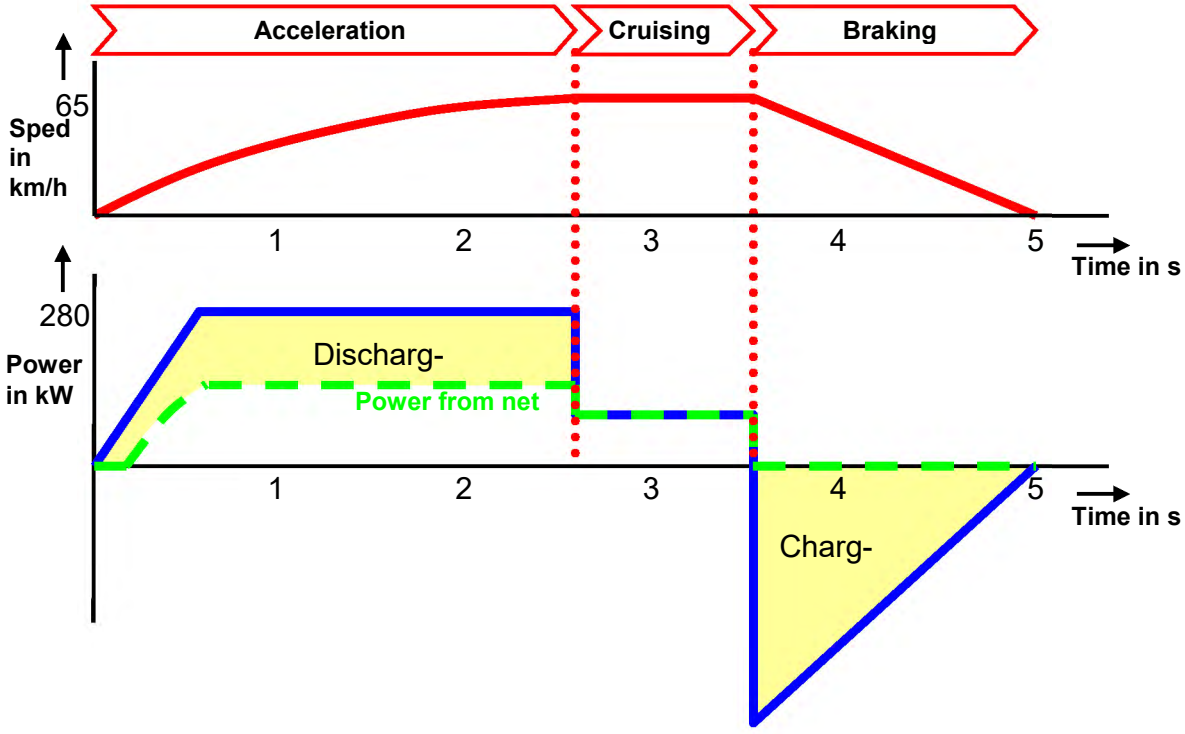
12 EMC CONCEPT

Our equipment has been tested in accordance with the valid EMC directives EN 50121. By way of screening the pulse-loaded lines and separate laying we try to keep the electro-magnetic emission through the power laying as low as possible. CAF is deemed responsible for the EMC concept of the entire vehicle.

13 OPTIONAL EQUIPMENT : ULTRA- CAPS FOR INCREASED ENERGY SAVINGS

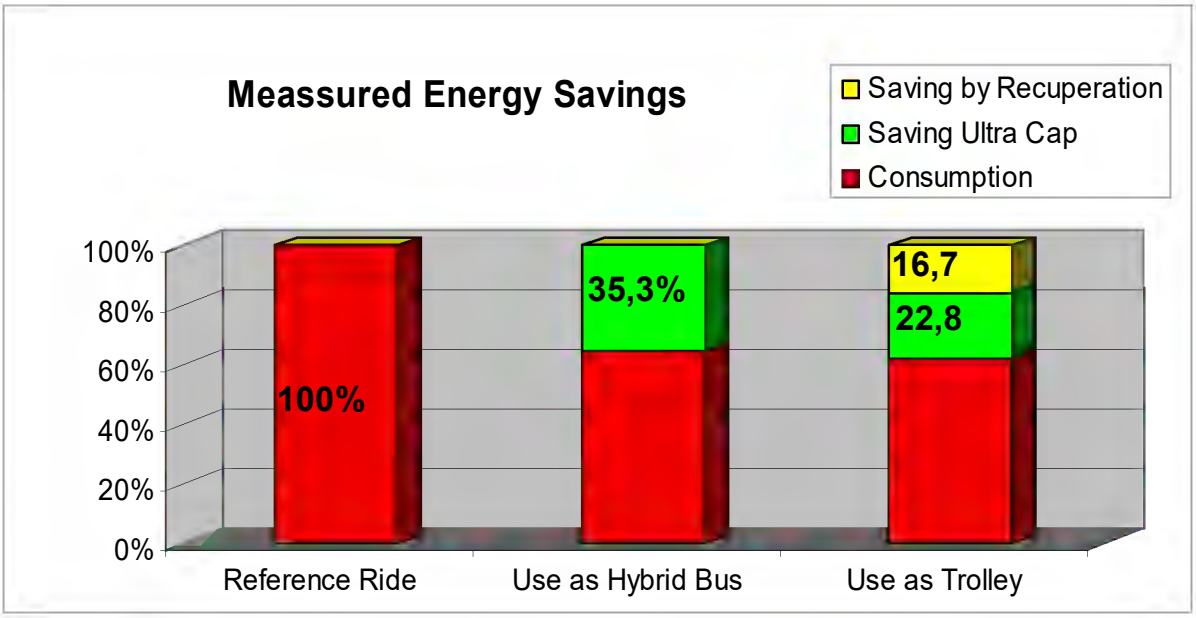
The experience of various trams systems and its explotations shows that use of recuperated brake energy is important and in fact executed, but there is room for optimisation. In several applications it was measured that the overhead line is not always receptive and is not allowing recuperation. In these cases the energy is given to the brake resistor and transformed into heat.

The use of Ultra Cap shall avoid the dissipation of brake energy in the brake resistor as much as possible. The surplus of energy which is not accepted by the overhead line is stored into the Ultra Cap and used for the next acceleration movement of the tram.



Depending of the capacity of the Ultra Cap and the structure of the overheadline (sections, bridged areas ,directions) a variable portion of energy can be saved.

The Ultra Cap was already installed in a trolley bus application and in addition to a recuperation ratio to the overhead network of 16,8% it was possible to store another 22,8% by use of the Ultra Caps.



13.1 Ultra Cap Modules

The Ultra Caps are grouped in modules of which each has a capacity for storing 0,25kW/h of energy.



Picture: 2 Ultra Cap modules

Technical data –Ultra Cap module	
Stored energy	0,25kWh

Weight	150 kg
Dimensions	1100*600*250mm

13.2 Step up inverter

The energy management and controll of the Ultra Caps is done in the Step-Up-Inverter. This unit attaches the Ultra Cap voltage to the vehicle power line.

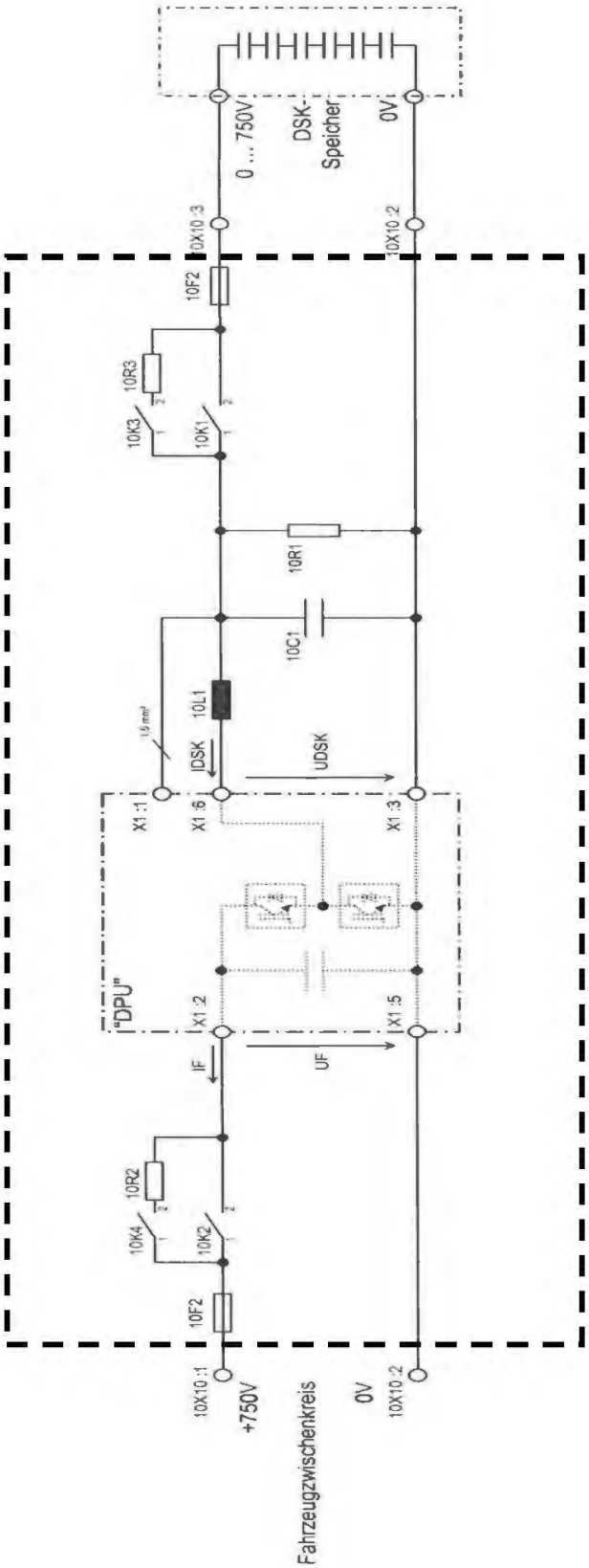
Technical data – Step Up Inverter	
Voltage	0-750V
Control voltage	DC 24 V +25%- 30 %
Weight	90Kg
Dimensions of the container	950*500*400mm

13.3 Allocation on vehicle

The position of the components allows certain flexibility to the vehicle manufacturer.

The cable length between step-up- inverter and each Ultra cap module is to be determined by the expected dynamic energy flow but to our expectation is should be in the range of up to 8-10 m

CAF - Edinburgh Tram



Picture: Electrical circuit of Step-up- Inverter

14 OTHER MATTERS

This offer is based on the presupposition that the quoted devices can be adapted to the installation spaces in the Edinburgh LRV without considerable changes in design.

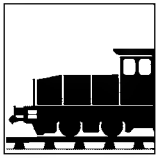
Vossloh Kiepe's equipment does not require a compressed air supply. A compressor is not included in this tender.

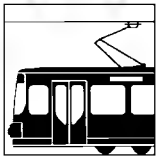
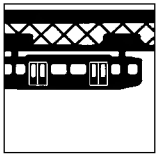
15 WORK ON THE PROJECT:

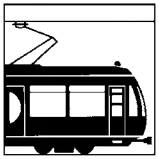
- system development,
- calculations,
- documentation, spare-parts catalogues, maintenance instructions,
- circuit diagrams for Vossloh Kiepe equipment
- production of test reports.

Basis for our offer is our technical description (printed above).

According to our scope of supply, the equipment is tested in the Vossloh Kiepe factory but will be installed, wired and connected by CAF. Vossloh Kiepe will support CAF with the commissioning of our equipment for the first unit. Commissioning of the other vehicles by our experienced technicians is available as an option.





Operating Device for Driving and Braking Series SGW 200

KIEPE ELEKTRIK

Device ID No.: 91.050 101.001 – /.003, /.006 – /.009 und /.011, /.014, /.015
91.049 172.001; 91.053 223.001



OPERATING INSTRUCTIONS

USB00000086_0491

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1 For your own Safety

1.1 Intended Use

The operating device models SGW for driving and braking are used to control the driving direction as well as the drive and brake power in electrical track vehicles. The operating device for driving and braking meets the high requirements of the appropriate rail transport regulations.

Applications other than specified and unauthorized modifications to the device or its components may lead to injury to persons and damage to the device for which the manufacturer is **not liable**.

"Intended Application" means that any work performed with the device or on the device must be carried out in accordance with these **operating instructions**. Only **qualified personnel** that are familiar with the **regulations for the prevention of accidents** as well as the standard safety rules, are allowed to work on the device.

This will ensure that you protect yourself and prevent damage to the device!

1.2 Symbols

Please pay particular attention to the text passages that are marked with the following symbols:



Danger!
Information that must be observed under all circumstances in order to prevent the operator from being injured.



Attention!
Information that must be observed in order to prevent damage to the device.



Helpful additional information.



2 Transport, Packing, Storage, and Disposal

2.1 Transport and Packing

Choose a suitable packing in order to prevent damage to the device during transport or when sending devices or components to Vossloh Kiepe GmbH for repair. Take great care that the device is protected against shocks and humidity. Thus, damage due to transport is prevented, for which the manufacturer is not liable.

2.2 Storage

Avoid significant variations in temperature that may cause the formation of condensation water, as this might damage the device.

The permissible storage temperature is between -25°C to +70°C.



Attention!
Keep the device clean and dry.

2.3 Disposal

If possible, reuse the **packing material** or dispose of it in an environmentally friendly way.

Send **defective devices and components** to Vossloh Kiepe GmbH for correct recycling or disposal *(see company address on back page)*.

3 Structure and Function

3.1 Structure

The operating device model SGW for driving and braking is a tough, electromechanical device for the mounting into electrical track vehicles. It is used to control the driving direction and the drive and brake power and thus the speed. Moreover the driver‘s ability to act is monitored by means of a dead man function. The operating device contains the following **operating elements**, which are described in *section 3.2 (s. fig. 3-1)*:

- a drive-brake lever (**1**) with integrated dead man function,
- a driving direction selection switch (**2**),
- a key-operated switch (**3**), and
- a button "R" (**4**).

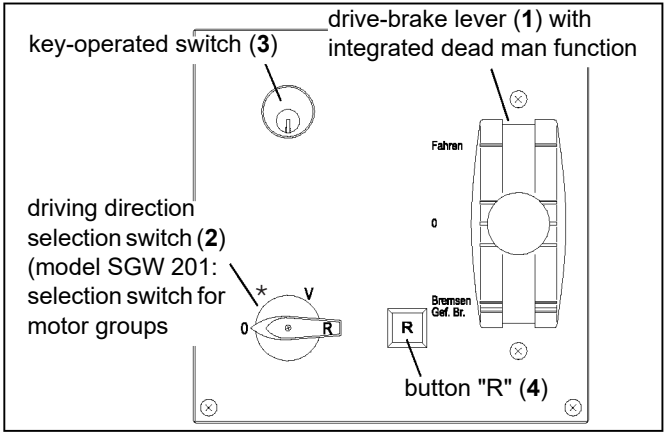


Fig. 3-1: Operating device model SGW – operating elements

By means of the operating device model **SGW 201** you are *not* enabled to change the driving direction but to select motor groups (1 + 2, 1 only, or 2 only) with the selection switch (**2**). Thus, it is possible to switch off a defective drive unit *(s. fig. 4-2)*.

The operating device model **SGW 208** is additionally equipped with the buttons "cleaning", "battery on", "battery off", and "light" *(s. fig. 4-5)*.

The **mechanical** and **electrical systems** are assembled on a mounting base plate, which is located below the cover plate (**5**) *(s. fig. 3-2)*. They are protected by a hood (**6**). The operating device is inserted into the control panel of the driver‘s cabin, so that only the cover plate (**5**) and the operating elements are visible.

The electrical connection is done by two 24-pole connection plugs (**8**) X1 and X2 *(s. fig. 3-2)*. The operating device model SGW 208 is provided with another 24-pole connection plug (**9**) X3 for connecting additional buttons *(see enclosed wiring diagram)*.

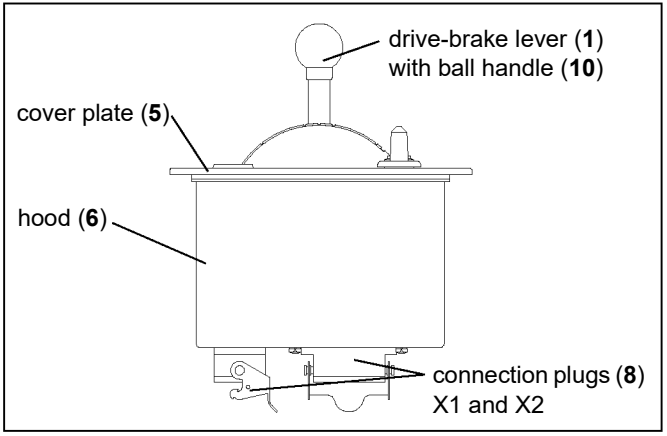


Fig. 3-2: Operating device model SGW

3.2 Function

By means of the **key-operated switch (3)** you lock and unlock the drive-brake lever (**1**) and the driving direction selection switch (**2**) *(see chapter 6 „Operation“)*. It is only possible to pull out the key if the drive-brake lever (**1**) is set to 0° (rest position) and the driving direction selection switch (**2**) to „0“, „✶“, or „1“ *(s. fig. 3-3 and 3-5)*.

The selection switch (**2**) for the motor groups of the operating device model **SGW 201** can only be turned if the key-operated switch (**3**) is set to position OFF *(s. fig. 3-3)*. The key can only be pulled out, if the drive-brake lever (**1**) is set to the rest position.

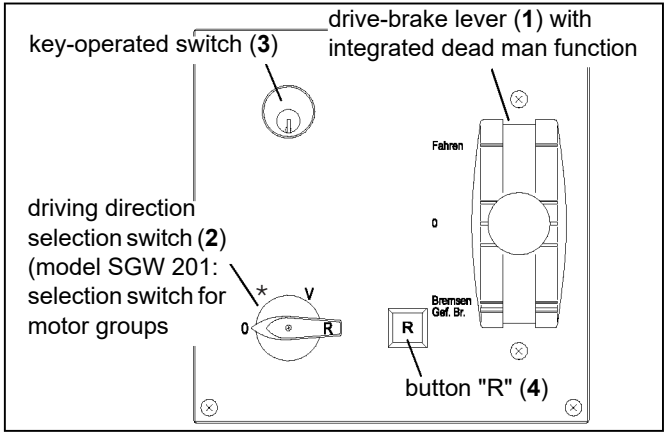


Fig. 3-3: Operating device model SGW – operating elements

The operating device is operated with the **drive-brake lever (1)** *(s. fig. 3-3)*. The drive-brake lever (**1**) has five operating ranges, which are marked on the scale (**11**) *(s. fig. 3-4)*:

Operating range	deflection
drive	+ 37.8° to + 9°
cruise control	+ 9°
rest position	0° to + 9° or 0° to – 9°
brake	– 9° to – 37.8°
hazard brake	– 37.8° to – 43.8°

The drive-brake lever (**1**) is moved from the *rest position* to the operating ranges *drive* or *brake*. The operating device for driving and braking SGW is designed so that the more you move the drive-brake lever (**1**) to the range *drive* or *brake*, the larger is the acceleration or the slowing down. If you want to drive at constant speed *(cruise control)*, pull the drive-brake lever (**1**) to the operating range cruise control (+ 9°) at the required speed after having accelerated. However, the drive control determines the performance of this function.

In case of a dangerous situation you can activate additional brake systems by setting the drive-brake lever (**1**) to the operating range *hazard brake*.

To avoid activating the *dead man function*, the ball handle (**10**) of the drive-brake lever (**1**) must be pressed during driving, otherwise a forced brake is released.

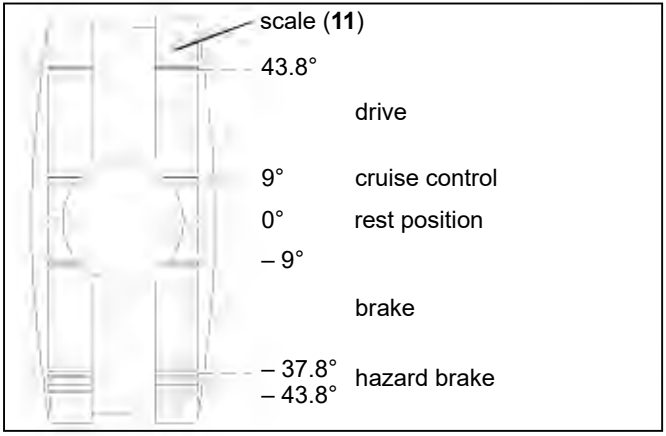


Fig. 3-4: Operating ranges of the drive-brake lever

The drive-brake lever (**1**) can only be moved if the **driving direction selection switch (2)** is set to position ✶ or R *(s. fig. 3-5)*. By means of the driving direction selection switch (**2**) the following operating modes can be set:

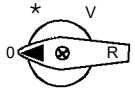
0 vehicle in rest position

✶ **or 1** retrofitting the vehicle

V drive forwards

R drive backwards

Position 0:



Vehicle in rest position

The drive-brake lever (**1**) must be set to position „0“ and is blocked in this position. By means of the key-operated switch (**3**) you can lock and remove the key.

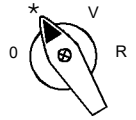
driving direction selection switch (**2**)	key-operated switch (**3**)	deflection of the drive-brake lever (**1**)
0	unlocking the cylinder lock	hazard brake / in pos. 0 blocked
✶ or 1[1]	key can be pulled out	
V	cylinder lock locked	brake[2] / position 0 / drive[2]
R	key cannot be taken out	

[1]The driving direction selection switch (**2**) can be set to position 0 when the key is taken out.

[2]In this range the driving direction selection switch (**2**) is blocked.

Fig. 3-5: Function diagram

Position ✶ or 1: Retrofitting the vehicle



The drive-brake lever (**1**) must be set to position „0“ and is blocked in this position. The driving direction selection switch (**2**) must be unlocked with the key-operated switch (**3**).

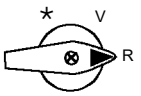
If the driving direction selection switch (**2**) is in position "✶" or "1", the key-operated switch (**3**) can relock and the key can be taken out. The vehicle stays retrofitted, but cannot be moved. Nevertheless, the driving direction selection switch (**2**) can be reset to position 0.

Position V: Drive forwards



The drive-brake lever (**1**) is unlocked. Driving forwards is released. The key-operated switch (**3**) is locked and the key cannot be taken out. If the drive-brake lever (**1**) is moved to range *drive* or *brake*, the driving direction selection switch (**2**) is locked.

Position R: Drive backwards



In order to turn the driving direction selection switch (**2**) into position R, button "R" (**4**) must simultaneously be pressed.

The drive-brake lever (**1**) is unlocked. Driving backwards is released. The key-operated switch (**3**) is locked and the key cannot be taken out. If the drive-brake lever (**1**) is moved to range *drive* or *brake*, the driving direction selection switch (**2**) is locked.

With the operating device model **SGW 201** you cannot change the driving direction, but select the motor groups of the cars with the selection switch (**2**). The selection switch (**2**) can only be turned when the key-operated switch (**3**) is set to OFF. It is possible to select the motor groups 1 + 2 simultaneously or individually *(s. fig. 4-2)*.



4 Technical Data

4.1 Overview of Models

Device model	Device ID no.	Wiring diagram	Operating modes	Particularity
SGW 201	91.049 172.001	3 SP 2976 / 2	0 – 1+2 – 1 – 2	possible to switch off a drive unit
SGW 202	91.050 101.001	3 SP 3088 / 2	0 – 1 – V – R	
SGW 203	91.050 101.002	3 SP 3095 / 2	0 – ✶ – V – R	
SGW 204	91.050 101.003	3 SP 3088 / 2	0 – ✶ – V – R	
SGW 205	91.053 223.001	3 SP 3198 / 2	Off – Aux only – For	no backwards
SGW 206	91.050 101.006	3 SP 3222 / 2	0 – 1 – V – R	
SGW 207	91.050 101.007	3 SP 3326 / 2	0 – 1 – P – T	with Polish labelling
SGW 208	91.050 101.008	3 SP 3328 / 2 and /4	0 – ✶ – V – R	additional buttons for cleaning, battery on and off, and light off
SGW 209	91.050 101.009	3SP3398 / 2	0 – 1 – V – R	
SGW 211	91.050 101.011	3SP3426 / 2	0 – ✶ – V – R	
SGW 214	91.050 101.014	3 SP 3740 / 2	0 – 1 – V – R	
SGW 215	91.050 101.015	3 SP 3740 / 2	0 – 1 – V – R	shorter drive-brake lever (**1**)

4.2 General Technical Data

Rated operating voltage	24 V DC, permissible tolerance 16.8 V to 30 V
Permissible ambient temperature	- 25 °C to + 70 °C (VDE 0660, part 14)
Type of protection	IP 20 according to DIN VDE 0470, part 1 (EN 60529)

Mechanical fastening	four appropriate countersunk screws M 5
Mounting dimensions	*(s. section 4.3 Dimensions)*
Weight	approx. 8 kg

Angle encoder

Code and resolving	8 bit Petherick; 100 steps/rotation 2 bit-running *(s. wiring diagram)*
Rated operating voltage	10 V DC to 30 V
Current consumption	100 mA (24 V, without load)
Interface	10 bit-parallel outlet
Outlets	NPN (N-switching) towards internal PULL-Up 12 kΩ (max. 100 mA)
Switching frequency	50 kHz
Checkvoltage	U_p = 500 V AC, 50 Hz (t = 1 min) (VDE 0660 part 1; DIN 43321)

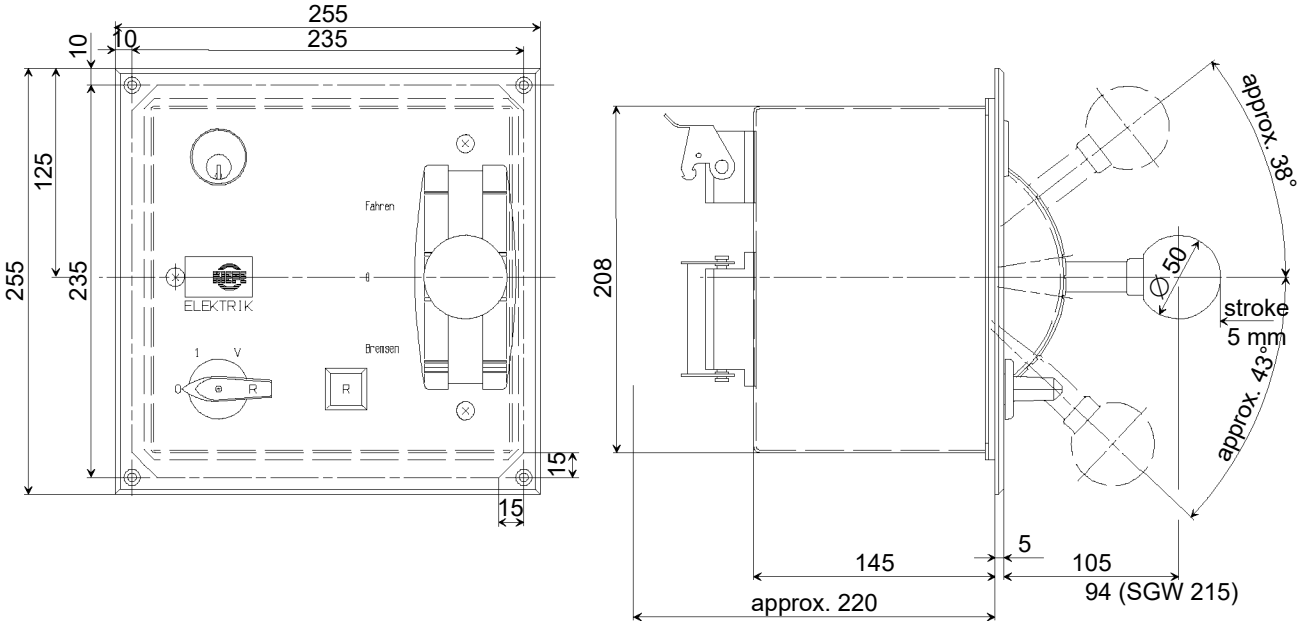
Snap switch (dead man device, key-operated switch and switch block)

Mechanical service life	at least 10 million switching operations
Rated continuous current I_{th}	6 A
brief peak load	10 A
Actuating force (dead man function)	approx. 6 N

Driving direction selection switch

Rated operating voltage	6 – 72 V DC
Rated continuous current I_{th}	6 A
Switching capacity	AC-21A: 24 V / 5 A; DC-1 (τ < 1 ms): 24 V / 2.2 A

4.3 Dimensions



If not listed differently, the various models have the same mounting dimensions.
The mounting dimensions only differ in different cover plate models.

Fig. 4-1: Mounting dimensions of the operating devices SGW 203, 206, 207, 209, 214 and 215

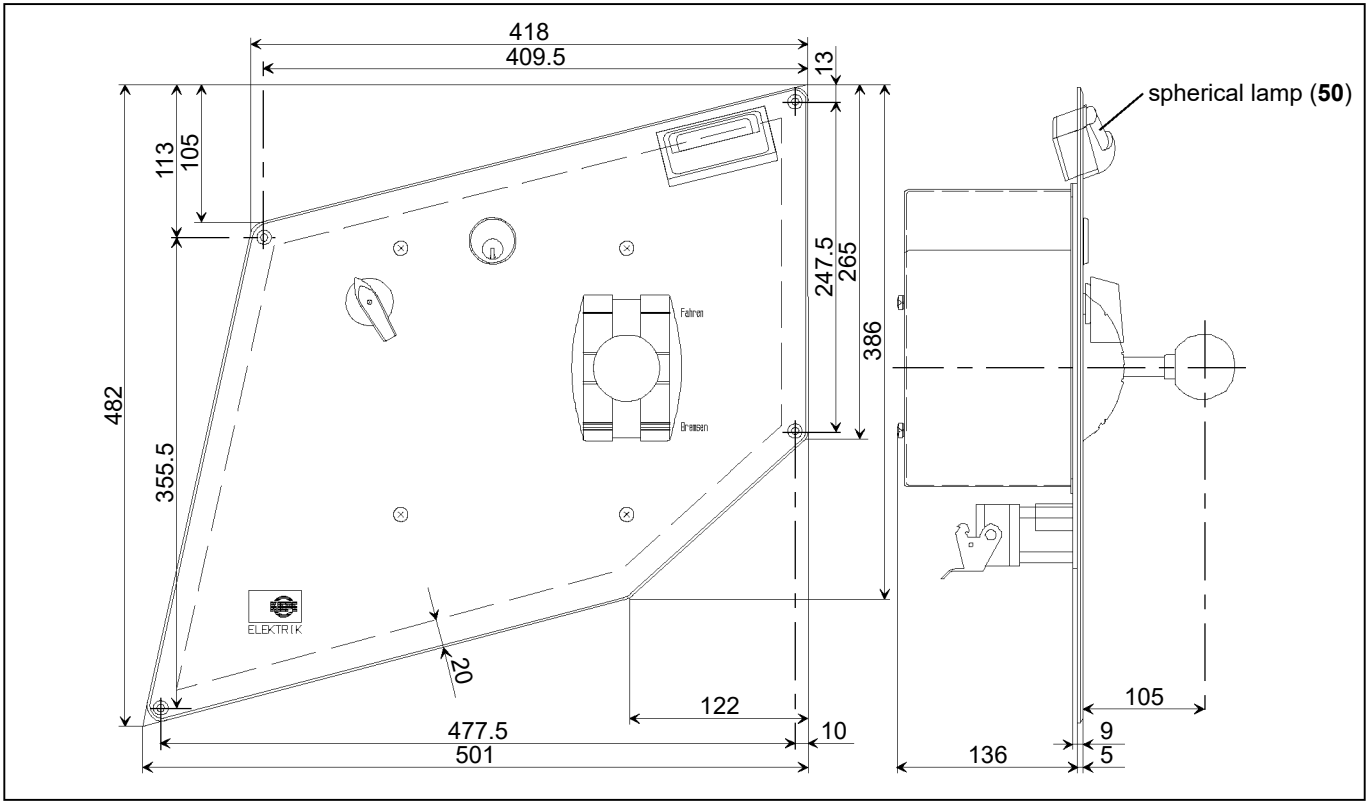


Fig. 4-2: Mounting dimensions of the operating device SGW 201

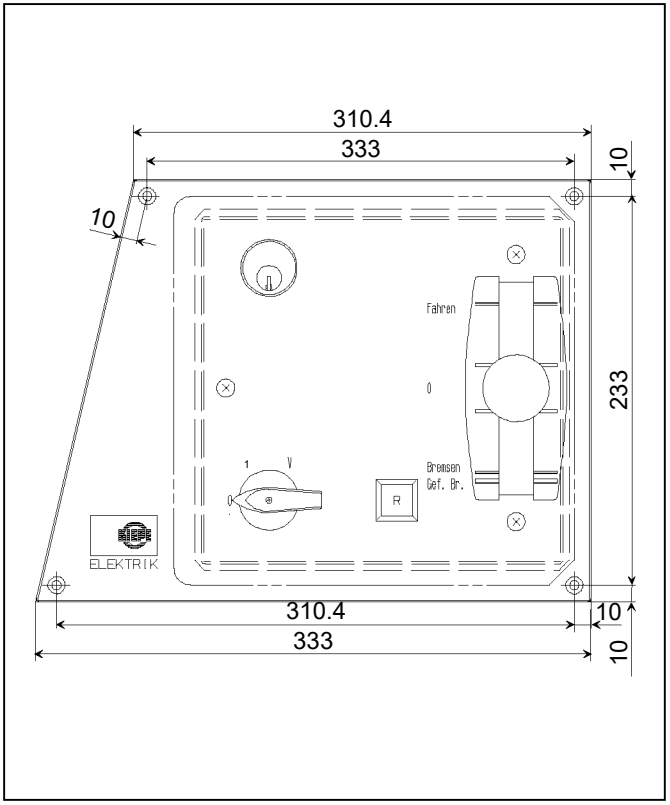


Fig. 4-3: Mounting dimensions of the operating device SGW 202 and SGW 211

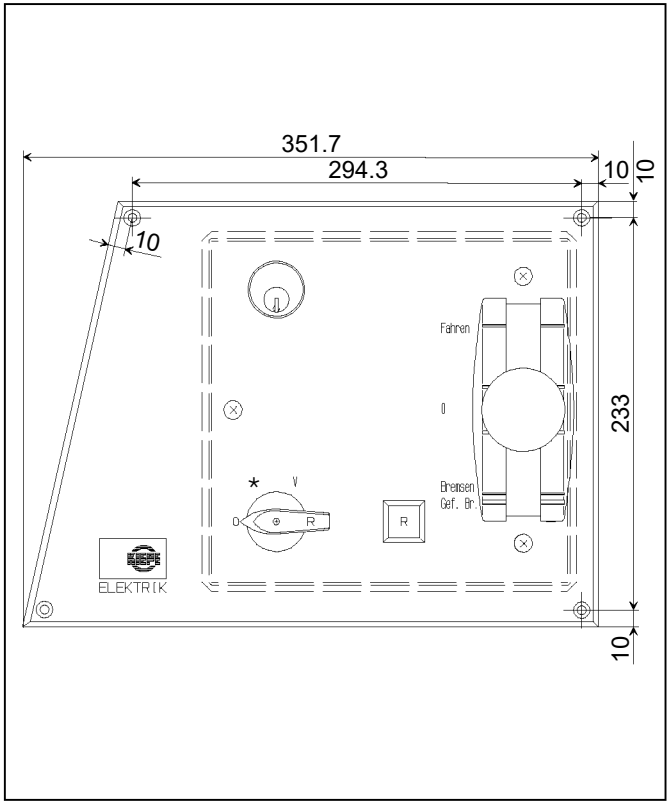


Fig. 4-4: Mounting dimensions of the operating device SGW 204

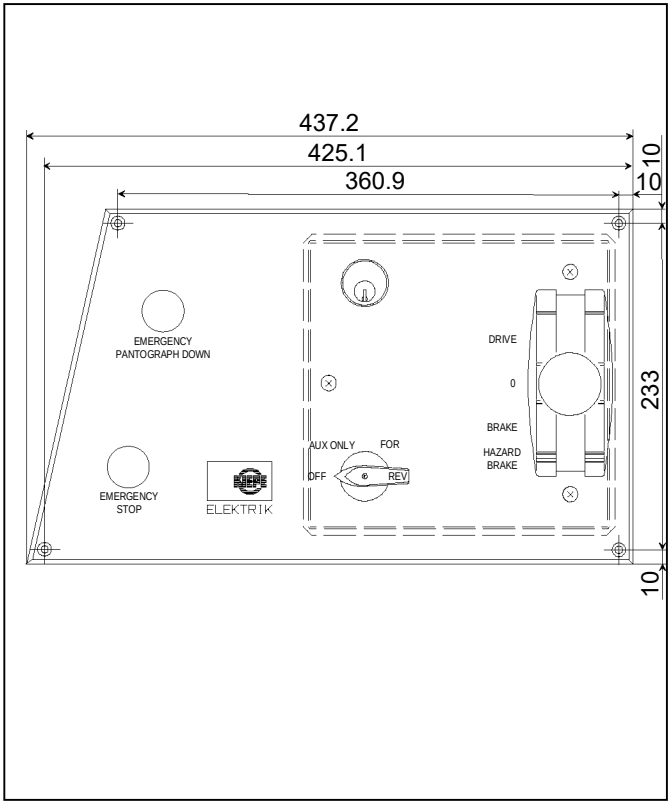


Fig. 4-5: Mounting dimensions of the operating device SGW 205

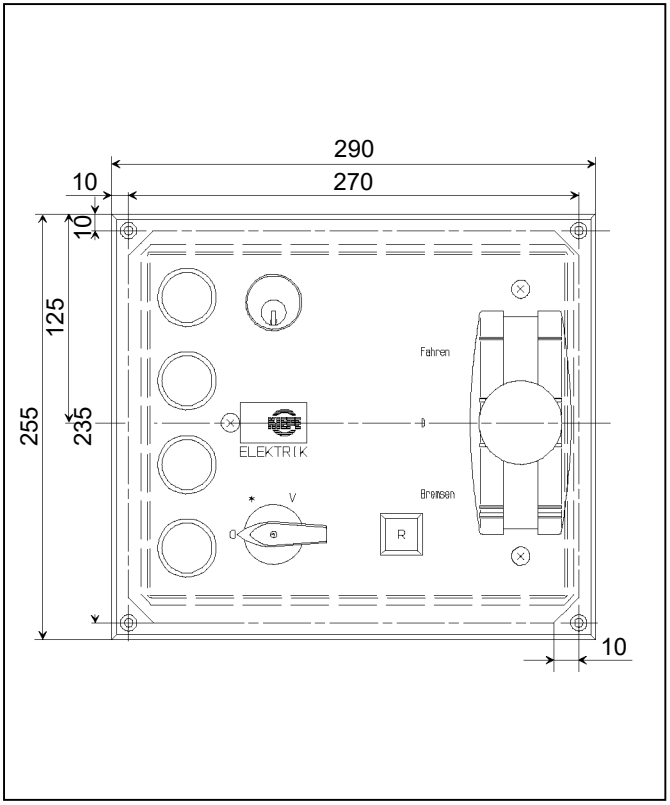


Fig. 4-6: Mounting dimensions of the operating device SGW 208

5 Mounting and Dismounting

5.1 Scope of Delivery

The operating device for driving and braking is supplied in a ready to mount state. The electrical connection is done by two or three 24-pole connection plugs (**8**). These operating instructions and a wiring diagram are also part of the scope of delivery *(s. section 4.1 Overview of Models)*. Screws for the mechanical fixing do not belong to the scope of delivery.

5.2 Mounting

Danger!
Secure the vehicle against rolling away.

Danger!
Before starting to mount, disconnect the machine from the power supply. Secure the machine against being switched on again.

Caution!
The operating device has a weight of approx. 8 kg. Always mount or dismount with two persons, in order to protect the operating device from being damaged.

Caution!
The installation site must be dry, free from aggressive gases and vapours, as well as almost free from dirt.

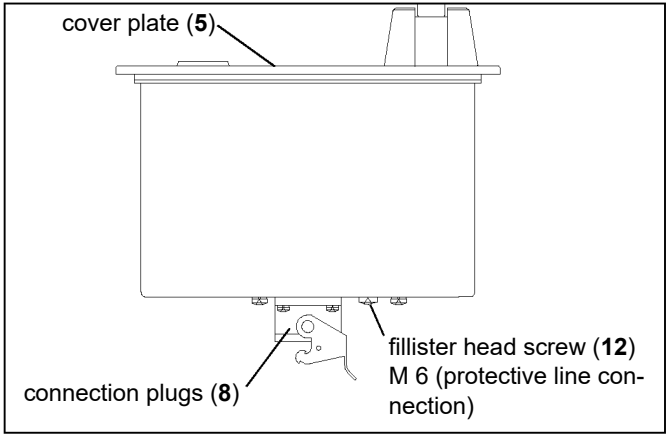


Fig. 5-1: Mounting the operating device – connection

1. Secure the vehicle against rolling away.
2. Before starting to mount, disconnect the machine from the power supply and secure the machine against being switched on again.
3. Prepare the installation site. Please take the dimensions of the required installation site from *section 4.3 Dimensions*.
4. Carefully insert the operating device into the corresponding recess of the control panel of the driver‘s cabin, so that you can connect the operating device.

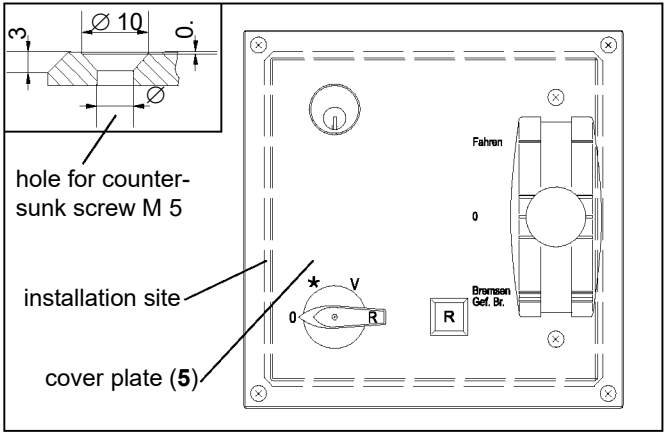


Fig. 5-2: Mounting the operating device – fastening

Danger!
Observe the enclosed wiring diagram *(see section 4.1 Overview of Models)*!

5. Connect the operating device with the connection plugs (**8**) X1 and X2 *(s. fig. 5-1)*.
   SGW 208: Additionally connect the buttons by means of the connection plug (**9**) X3.
6. Connect the protective line to the fillister head screw (**12**) M 6.
7. Completely insert the operating device into the control panel of the driver‘s cabin.
8. Fix the operating device with four appropriate countersunk screws M 5 to the outer corners of the cover plate (**5**). Secure the countersunk screws with a screw lock agent *(s. fig. 5-2)*.
9. Accurately check the function of the operating device after having finished the mounting *(s. chap. 3 and particularly fig. 3-5)*.

5.3 Dismounting

Danger!
Secure the vehicle against rolling away.

Danger!

Disconnect the machine from the power supply before starting to dismount. Secure the machine against being switched on again.

Caution!

The operating device has a weight of approx. 8 kg. Always mount or dismount with two persons, in order to protect the operating device from being damaged.

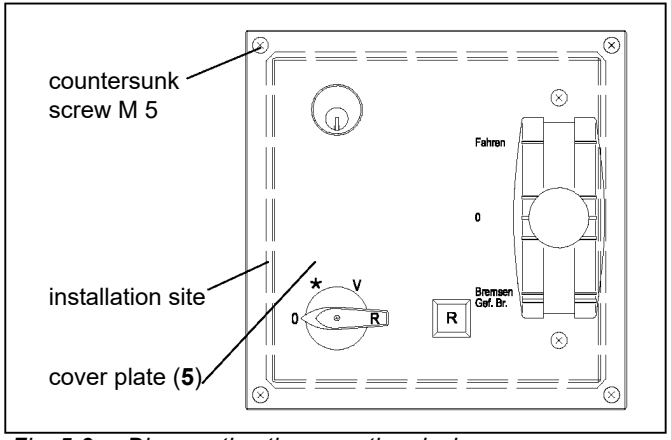


Fig. 5-3: Dismounting the operating device

1. Secure the vehicle against rolling away.
2. Before starting to mount, disconnect the machine from the power supply and secure the machine against being switched on again.
3. Loosen the four countersunk screws M 5 in each corner of the cover plate (**5**) *(s. fig. 5-3)*.
4. Carefully lift out the operating device, so that the connection plugs (**8**) X1 and X2 and the protective line can be loosened.

   Also loosen the connection plug (**9**) X3 of the SGW 208.
5. Now completely lift out the operating device of the installation site.

6 Operation

Danger!

Operating during driving mode must only be performed by personnel authorised by the tranport services.

Read the function description, before operating the operating device for the first time *(see section 3.2 Function)*.

By means of the drive-brake lever (**1**) you control the nominal value indicator *(s. fig. 6-1 and 6-2)*. The more you press the drive-brake lever (**1**) to range *drive*, the larger the acceleration. If you press the drive-brake lever (**1**) to range *brake*, the vehicle gets slower until it stops.

The range *hazard brake (Gef.-Br.)* is provided for **dangerous situations**. If you pull the drive-brake lever (**1**) to range *hazard brake (Gef.-Br.)*, all brake systems of

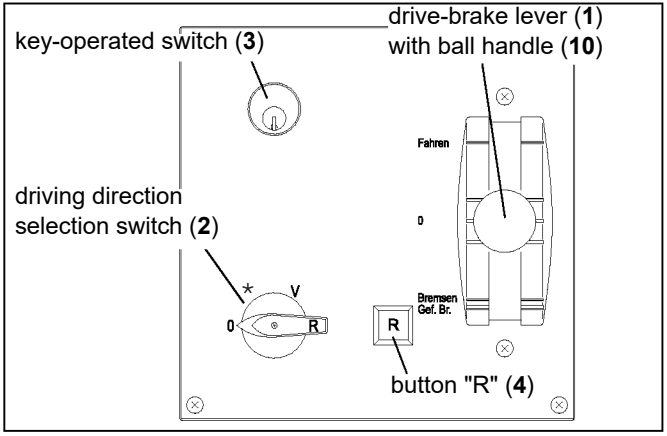


Fig. 6-1: Operating elements of the SGW

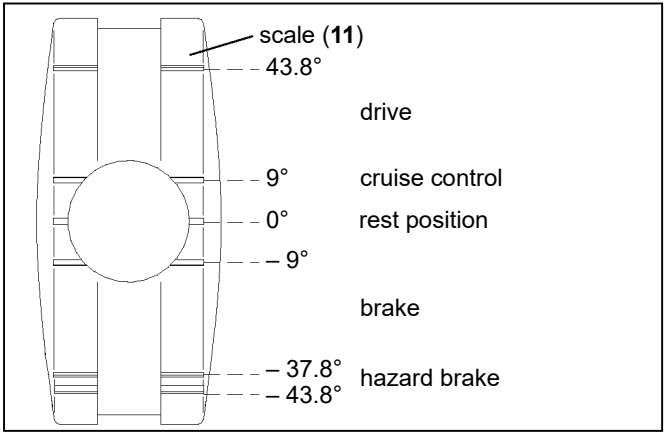


Fig. 6-2: Operating ranges of the drive-brake lever

the vehicle are released for stopping the vehicle as soon as possible.

As an additional safety device, a **dead man button** is integrated into the operating device, which monitors the driver‘s ability to act during the operation period. If you do not keep on pressing the drive-brake lever (**1**) for a certain period of time during driving, a forced brake is released.

Danger!

The drive control dermines the performance of this function. Before starting to drive, inform yourself about the drive control model of your vehicle.

6.1 Start

Model SGW 201

You can only turn the selection switch (**2**) for the motor groups, if the key-operated switch (**3**) is still in position OFF *(s. fig. 4-2)*.

1. Select one of the positions 1 + 2, 1, or 2.
2. Turn the key in the key-operated switch (**3**) by 90° in order to switch on the operating device.

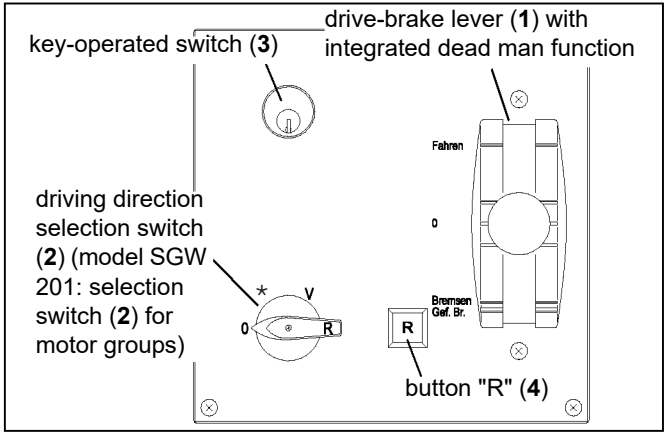


Fig. 6-3: Operating elements of the operating device model SGW

Models SGW 202 to 209 and 211, 214, 215

3. Put the key into the key-operated switch (**3**) and turn it clockwise by 90° for unlocking the drive-brake lever (**1**) and the driving direction selection switch (**2**) *(s. fig. 6-3)*.
4. Turn the driving direction selection switch (**2**) to position ✶ or 1 for retrofitting the vehicle.
5. Select the driving direction with the driving direction selection switch (**2**):

The operating device model SGW 205 is not provided for driving backwards.

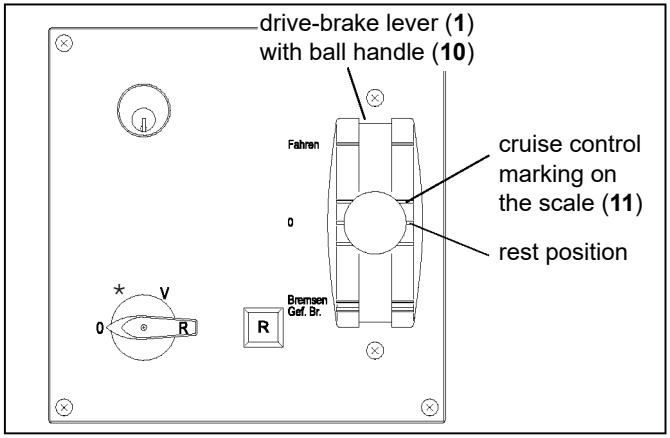


Fig. 6-4: Operating elements of the SGW – cruise control

– Forwards
  Turn the driving direction selection switch (**2**) to position „V“.
– Backwards
  Press button "R" (**4**) and simultaneously turn the driving direction selection switch (**2**) into position „R“.

6.1.1 Drive

1. Press the drive-brake lever (**1**) for activating the dead man function *(s. fig. 6-3)*.

Danger!
Keep the drive-brake lever (1) continuously pressed during driving, as otherwise a forced brake is released.

2. Move the drive-brake lever (**1**) to range *drive*.

The more you press the drive-brake lever (**1**) to range *drive*, the larger is the acceleration.

3. Accelerate the vehicle, unitil it has reached the required speed.
4. For keeping the vehicle at a constant speed *(cruise control)*, pull back the drive-brake lever (**1**) to the first marking of the scale (**11**) *(s. fig. 6-4)*.

6.1.2 Brake

1. Press down the drive-brake lever (**1**) for activating the dead man function *(s. fig. 6-5)*.

Danger!
Continuously keep the drive-brake lever (1) pressed during braking, as otherwise a forced brake is released.

2. Pull the drive-brake lever (**1**) to range *brake*.
   The more you pull the drive-brake lever (**1**) to range *brake*, the more the vehicle slows down.
3. Set the drive-brake lever (**1**) to *rest position 0* when the vehicle has stopped.

6.1.3 Hazard Brake

In dangerous situations (e. g. a person or object on the rails) the rapid standstill of the vehicle can save life!

In such a situation *immediately* pull the drive-brake lever (**1**) to range *hazard brake (Gef.-Br.)* for stopping the vehicle as soon as possible *(s. fig. 6-5)*!

6.2 Interrupt Driving

1. Stop the vehicle and set the drive-brake lever (**1**) to *position 0 (s. fig. 6-5)*.
2. Set the parking brake.

Model SGW 201

3. Turn the key in the key-operated switch (**3**) counter-clockwise by 90° to position OFF and take out the key.
4. Turn the selection switch (**2**) for motor groups to *position 0*.

Models SGW 202 to 209 and 211, 214, 215

5. Turn the driving direction selection switch (**2**) to position ✶ or 1.

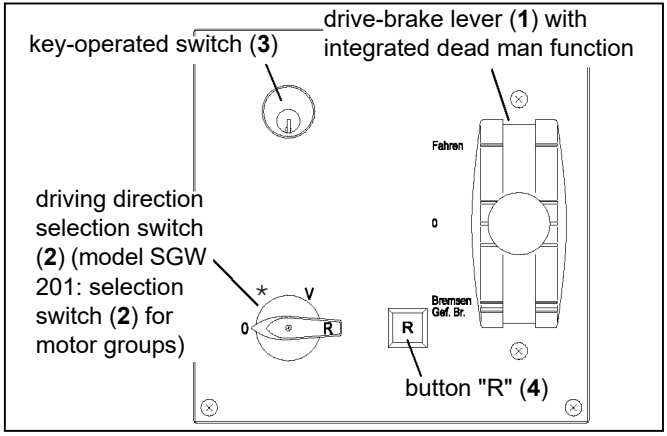


Fig. 6-5: Operating elements of the operating device model SGW

6. Turn the key in the key-operated switch (**3**) counter-clockwise by 90° for locking the driving direction selection switch (**2**) and take out the key.

6.3 Stop Driving

1. Stop the vehicle and set the drive-brake lever (**1**) to *position 0 (s. fig. 6-5)*.
2. Set the parking brake.

Model SGW 201

1. Turn the key in the key-operated switch (**3**) counter-clockwise by 90° to position OFF and take out the key.
2. Turn the selection switch (**2**) for motor groups to position 0.

Models SGW 202 to 211

1. Turn the driving direction selection switch (**2**) to position 0.
2. Turn the key in the key-operated switch (**3**) counter-clockwise by 90° for locking the driving direction selection switch (**2**) and take out the key.



7 Maintenance



Danger!

The operating device for driving and braking model SGW is a safety device. Thus, we recommend you to have the maintenance work done by Vossloh Kiepe GmbH.

If you carry out this work on your own, Vossloh Kiepe GmbH will not accept reliability for unintended performance and resulting damage and danger *(see section 1.1 Intended use)*.

The operating devices for driving and braking SGW must be maintained in a **main check** (every eight years or every 500,000 km). For maintenance purposes, send the operating device to the manufacturer Vossloh Kiepe GmbH *(see company address on back page)*.



8 Repair



Danger!

The operating device for driving and braking model SGW is a safety device. Thus, we recommend you to have the repair work done by Vossloh Kiepe GmbH.

If you carry out this work on your own, Vossloh Kiepe GmbH will not accept reliability for unintended performance and resulting damage and danger *(see sector 1.1 Intended use)*.

Send defective devices to the manufacturer Vossloh Kiepe GmbH for repair *(see company address on back page)*.

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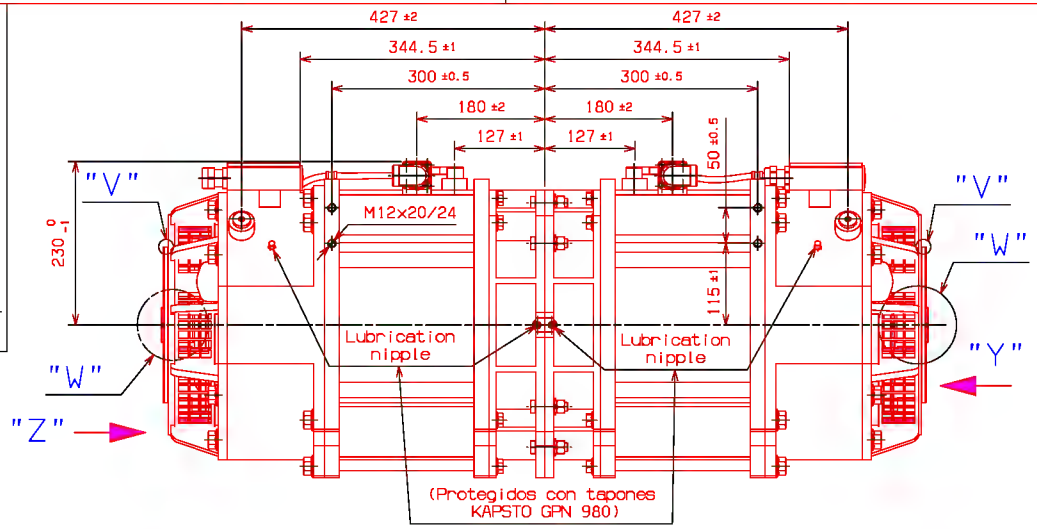

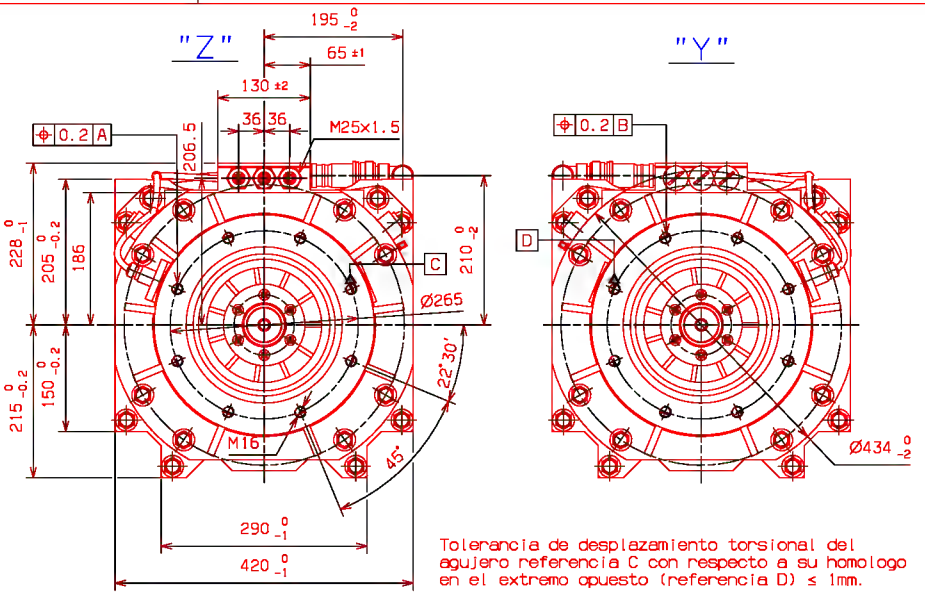

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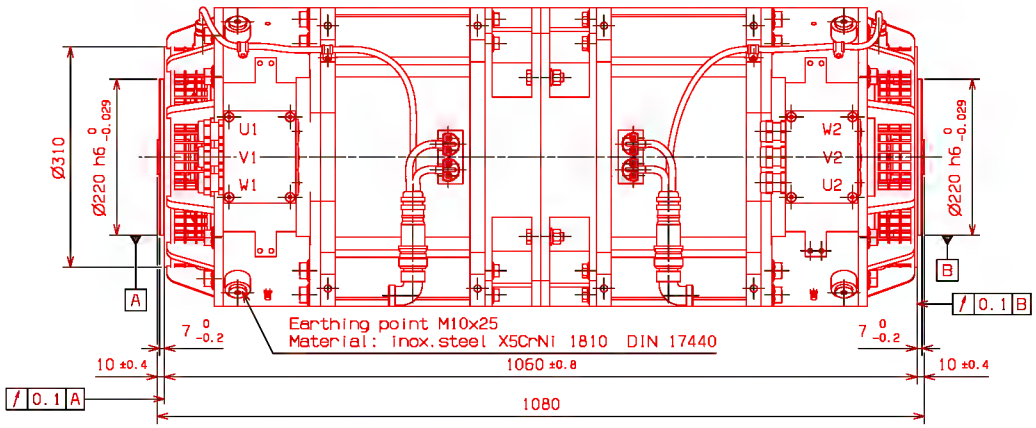

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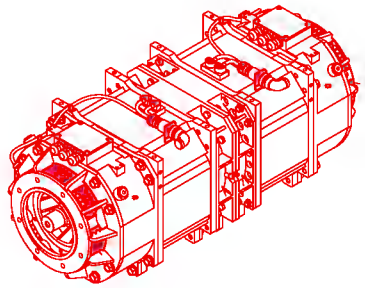
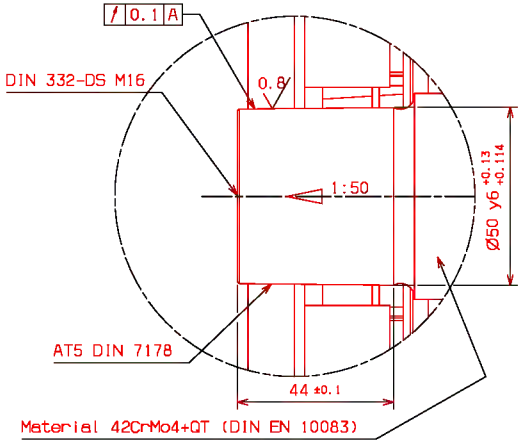
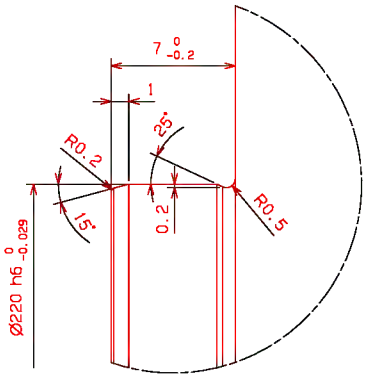


"W" (1/1)



Material 42CrMo4+QT (DIN EN 10083)

"V" (5/1)



MARCA	DESCRIPCION	CANT.	CODIFICACION O NORMA / N° DIBUJO O CALIDAD MATERIAL:	MATERIAL	PESO UNITARIO	MM. DIMENS. / NOTAS Y OBSERVACIONES
00	MOTOR DE TRACCION	1				

MODIFICACIONES

	FECHA	NOMBRES
COMPR.		
VERIFIC.		
HOMOL.		
DIBUJ.	26-04-04	
VERIFIC.	26-04-04	-

PLANO N°:
SUSTITUYE A:
EDICION
DESIGNACION: MOTOR DE TRACCION
HOJA N° 1
TOL. GEN. NF F 00-037
ESCALA 1/5
N° HOJAS 1
ENTIDAD: CAF
REFERENCIA:
SUSTITUYE A:
EDICION

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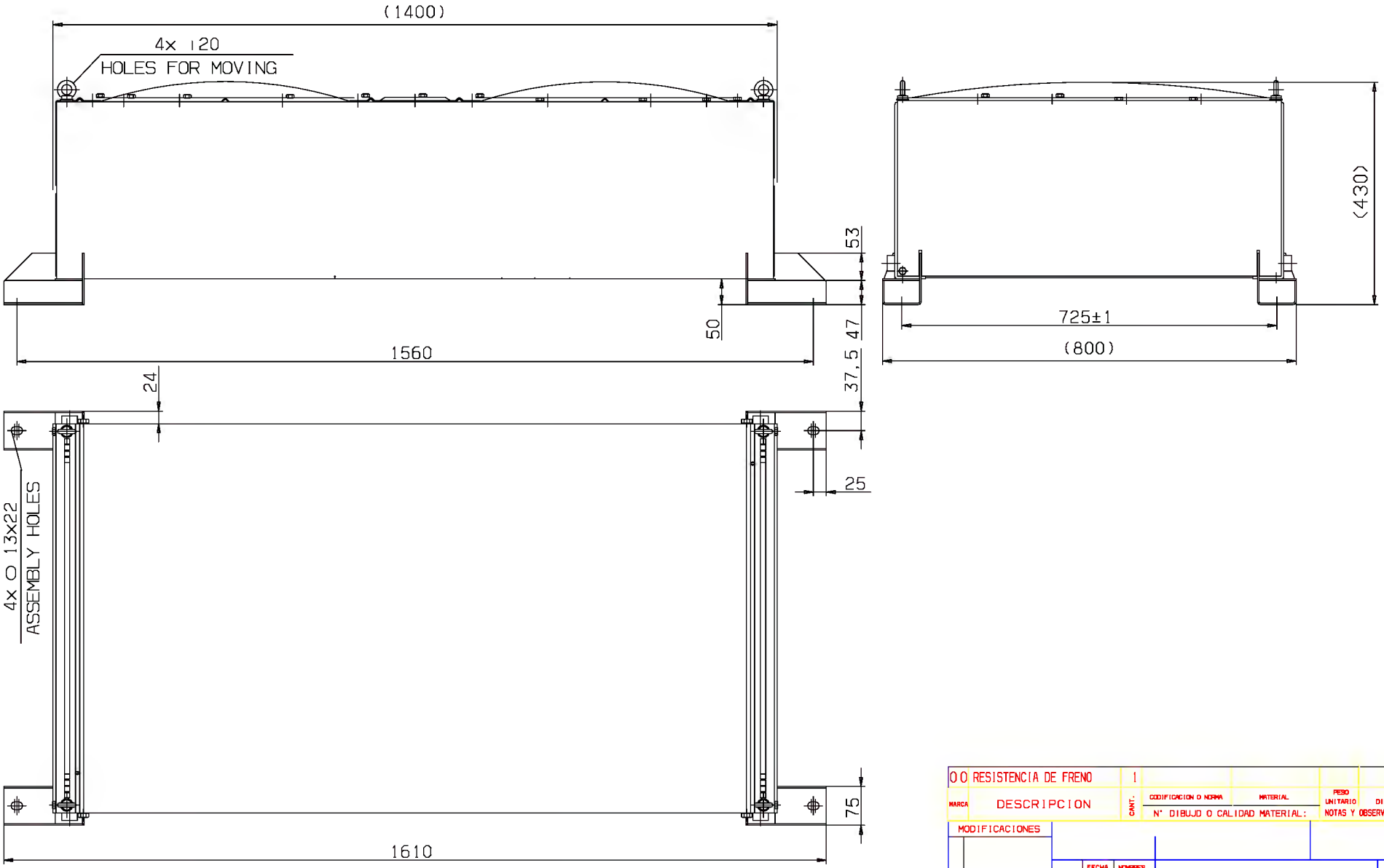

MARCA	DESCRIPCION	CANT.	CODIFICACION O NORMA / N° DIBUJO O CALIDAD MATERIAL:	MATERIAL	PESO UNITARIO	MIN. DIMENS. / NOTAS Y OBSERVACIONES
00	RESISTENCIA DE FRENO	1				

MODIFICACIONES

	FECHA	NOMBRES
COMPR.		
VERIFIC.		
HOMOL.		

PLANO N°:

SUSTITUYE A:

EDICION

HOJA N°

N° HOJAS

DESIGNACION:

RESISTENCIA DE FRENO

TOL. GEN.	ESCALA
NF F 00-037	1/5

	FECHA	NOMBRES
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Technical Description “Propulsion System”

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1 Introduction

This Technical Description gives an overview to the configuration of the traction system and the components used within the system.

The ELIN EBG Traction propulsion system is a modern traction equipment with state of the art components.

The ELIN Traction Inverter System (ETRIS) and it's integrated ELIN Traction Control System (ELTAS ECON) are designed specifically to achieve the highest performance in rail vehicles, urban transport- and special vehicles.
Standardised concepts, using track proven components and allowing a number of variations, ensures high reliability and safety due to proven design simultaneously fitting optimised for individual requirements. The compact and modular design makes the unit ideal for use in modern urban transport vehicles.

2 Description of Propulsion System

2.1 General

Due to its clear advantages, modern electrical vehicles are exclusively equipped with three phase alternating current traction technology. The power supply system in urban transport is usually a DC voltage system. For variable speed drives, a three-phase alternating current, with variable frequency and variable voltage, is needed. For this reason, powerful inverter and control systems are used to convert the DC voltage into a three-phase alternating voltage supplying the traction motors.

The propulsion system consists of all necessary equipment to condition the power supply from the catenary system into a fully useable power supply to drive the traction motors under fully controlled conditions with respect to speed, acceleration and deceleration by regenerative or rheostatic braking.

Traction motors are fed by traction inverters based on IGBT-technology. Traction motors as well as traction inverters are air cooled.

2.2 Electrical Traction System

The propulsion system of ELIN EBG Traction consists of the following main components:

- High speed circuit breaker
- Traction Inverter (ETRIS T1000 DWRG 750/2x800-LD 750V)
- Brake resistor
- Traction motor including speed sensor
- Master controller

The description is based on the scheme given below.

The vehicle consists of three motor bogies and one trailer bogie. Each motor bogie is equipped with an independent, microprocessor controlled propulsion system.
The propulsion system of each motor bogie consists of one traction inverter which powers the two double traction motors and one brake resistor. The three traction inverters are directly linked via a CAN-Databus.

A voltage surge arrester close to the pantograph protects electrical equipment on the tram from overvoltages due to switching activities or lightning strokes.

Following to the pantograph a high speed circuit breaker is arranged. The high speed circuit breaker is a heavy duty, transit proven type. It disconnects the propulsion systems in case of a short circuit and prevents cables and traction inverters from damage caused by operation above the name plate ratings. The breaker is equipped with electromagnetic as well as thermal release.

After the high speed circuit breaker (HSCB) the main circuit is divided into parallel branches for each propulsion system. Neither the auxiliary inverter nor the air condition system is fed via the HSCB.

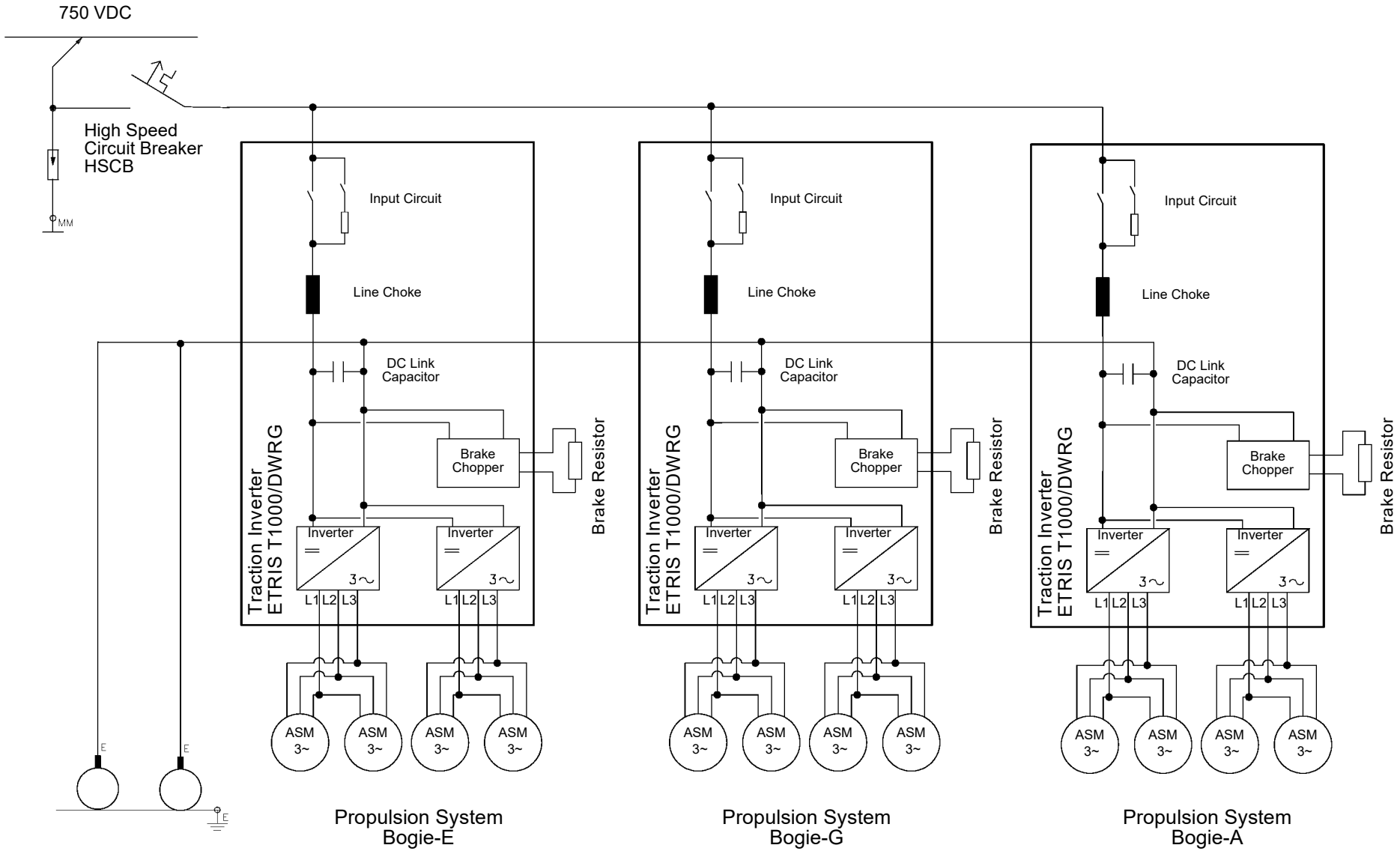
The traction inverter system is based on IGBT-technology and air cooled. It converts the DC voltage from the catenary line into a three-phase AC voltage. This three-phase AC voltage is used to feed the traction motors.

The traction inverter also contains the line choke, the charging unit and main contactor. The line choke decreases electromagnetic interference to an admissible limit. The charging unit reduces the inrush current during power-on of the traction inverter system and the main contactor is used to disconnect the inverter during urgency braking, emergency braking and to gear down the propulsion system.

The motors are three phase asynchronous motors with a short circuit rotor and air cooling. They are self ventilated and of an enclosed design. That means that there are two independent air circuits – an inner and an outer circuit. Both air circuits are maintained by its own axle mounted fan. This design avoids pollution of the windings, increases the reliability of the motors and reduces maintenance requirements. They are self ventilated by means of an axle-fastened fan that takes air through an air input grate and cools the surface of the motor. They are mounted lateral of the vehicle and power the wheels via the gears and couplings.

The brake resistors are designed to dissipate the complete electrical braking energy when recuperation is not possible. They are roof-mounted and cooled by natural convection supplemented by the airflow caused by vehicle speed.

Main Circuit of Propulsion System (Scheme)



2.3 Traction Control System

In this project the Traction Control Unit (ECON) is integrated in the traction inverter which powers the four motors of one motor bogie. All three traction inverters utilised in the train are configured identically.

The communication between the three traction inverters (Bus-Slaves) with the higher ranking Vehicle Control Unit VCU and the Brake Control Units BCU (both are not scope of Elin) is performed via a RS485 - Databus (see scheme given below).

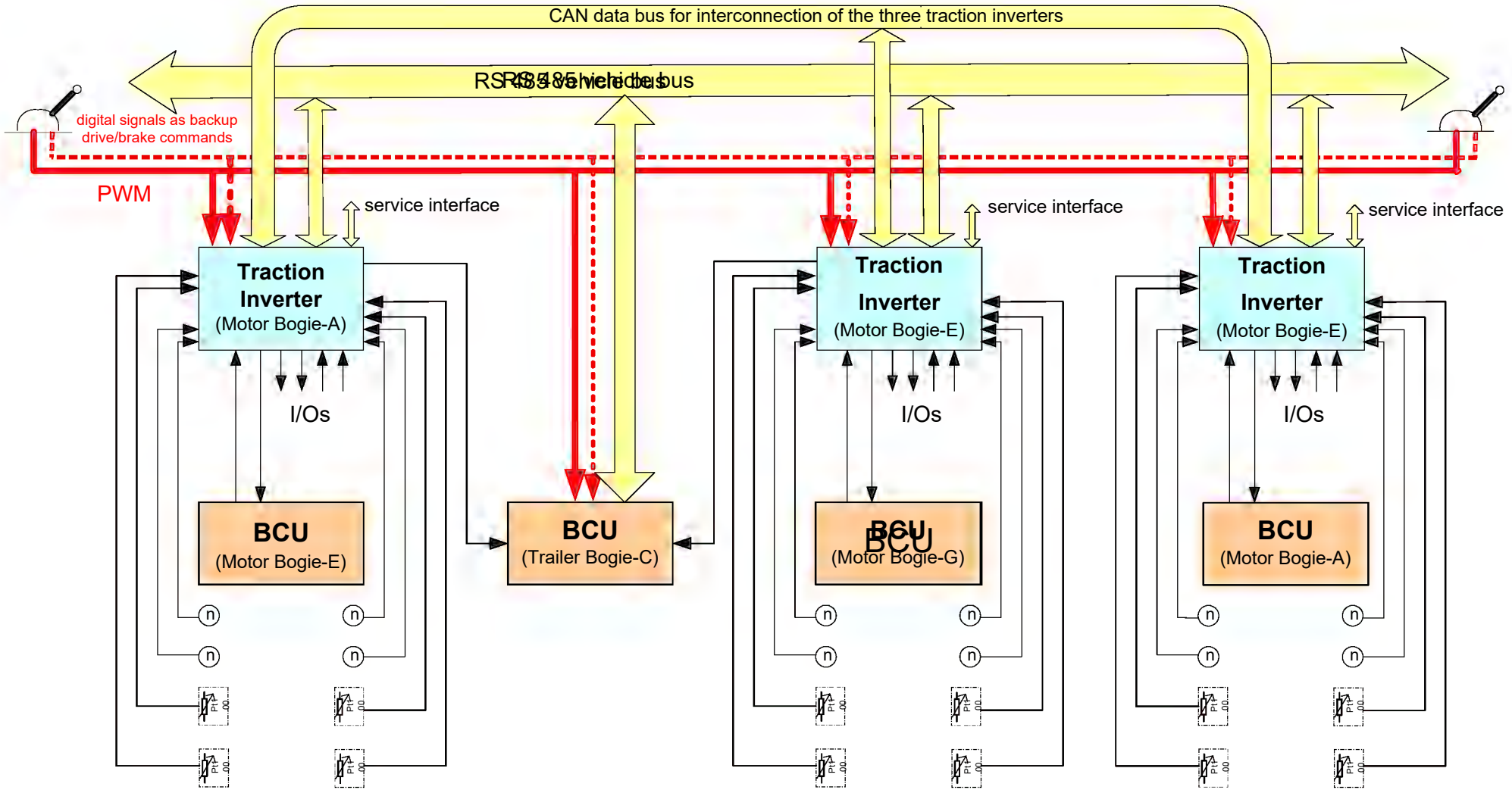
Additionally, for a degraded mode, in case of failure of the bus system, the traction inverters are supported with necessary information (e.g. driving direction, traction, brake, coast) from the trainlines via digital In- and Outputs.

Beside providing the databus interface and processing the Inputs / Outputs, the ECONs of the traction inverters also generate the optimised pulse pattern for the IGBT semiconductor and perform some basic control functions. The control of the IGBT semiconductor is done via potential free signals, which ensures a safe isolation between the inverter's interfaces (inputs, outputs, databus) and the internal power electronic.

Every motor is eqipped with one speed sensor and one PT100 temperature sensor. The signals are processed by the traction inverters to assure an optimal control and monitoring of the motors.

The traction and braking demand provided by the master controller is transferred to the three ECONs and to the BCU as a PWM signal.

Traction Control System (scheme)



3 Description of System Components

3.1 Traction Inverter ETRIS T1000/DWRG

3.1.1 General

The ETRIS T1000 (ETRIS = **E**LIN **T**raction **I**nverter **S**ystem) represents a compact and modular system which is composed of the newest technology and therefore offers ideal conditions for the traction equipment and vehicle. The inverter and the brake chopper are carried out in IGBT technology. The two branches of the inverter output (each feeding two motors) are controlled independently by one common Traction Control Unit.
The cooling of the Traction Inverter is realised by means of forced ventilation.

3.1.2 Functional description

During operation, the ETRIS T1000 DWRG converts the supply DC voltage into pulse modulated three-phase alternating voltage to drive the asynchronous motors. During electrical braking energy is fed back into the supply network or is dissipated by utilising the brake resistors, if the network cannot absorb all or only a part of the braking energy.

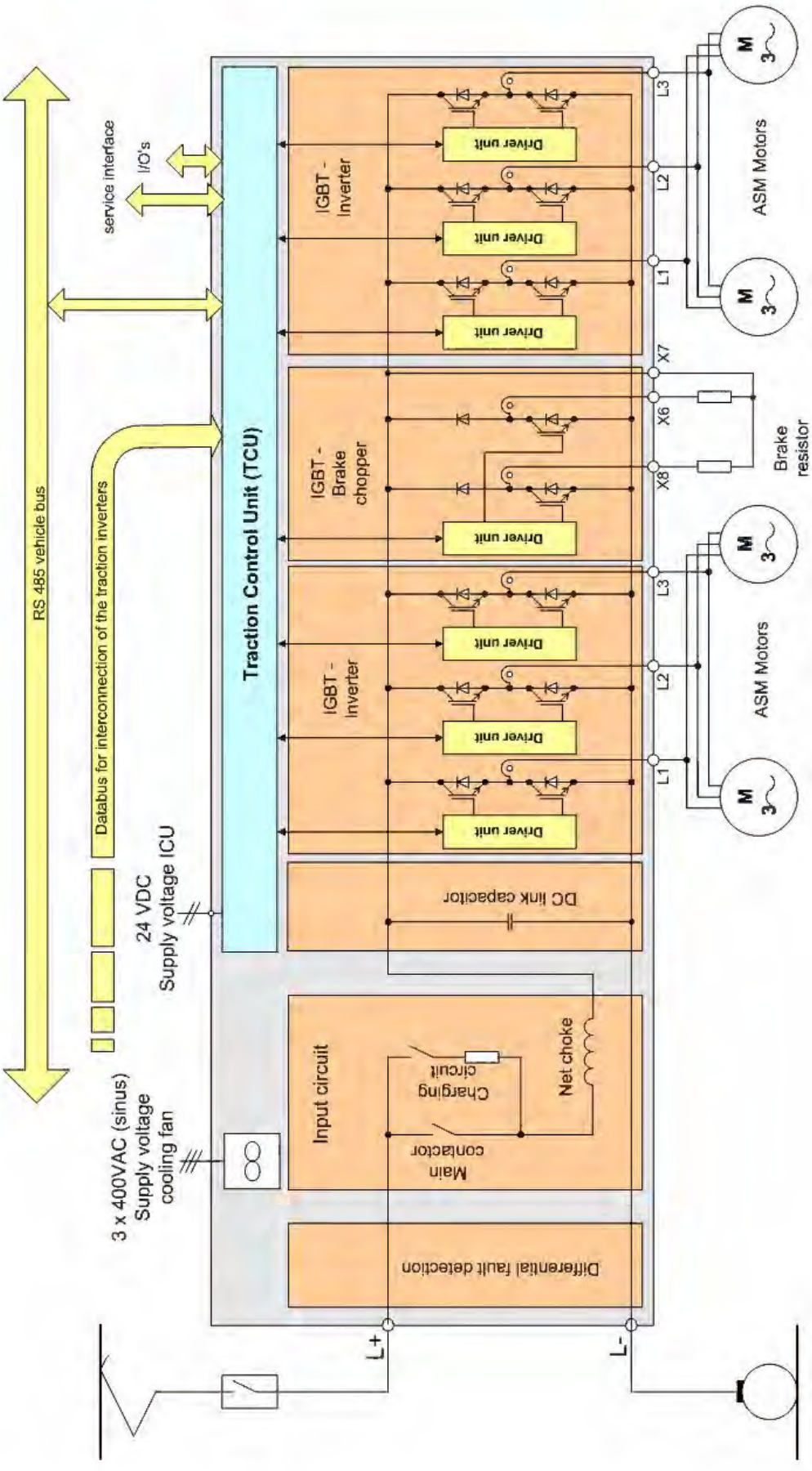
The control of output voltage and output frequency works on the principle of the pulse width modulated voltage inverter. The high switching frequency of the IGBT-modules with an optimised modulation of the pulses minimises noise emissions and improves the overall efficiency of the propulsion system.

The ETRIS T1000 is provided with over-temperature protection, which initiates a reduced level of performance from the affected unit. Upon temperatures returning to normal, the performance automatically resets to normal level. The over-temperature is announced to the vehicle control system.

A temperature protection of the brake resistors is realised utilising existing sub-components. Measuring the brake resistor's current at actual voltage results in a resistance value. An evaluation of these values based on the temperature coefficient of the brake resistors gives the necessary temperature information for protection.

All internal components of the ETRIS T1000 are designed to minimise electromagnetic emission within the inverter. The combination of the choice of a suitable case as well as the correct cabling on the vehicle avoids the radiation of electromagnetic fields to its greatest possible extent. The electromagnetic compatibility of components delivered by ELIN EBG Traction complies with relevant standards.

Functional diagram ETRIS T1000 DWRG



For a functional description the ETRIS T1000 DWRG can be configured into following main devices.

3.1.2.1 Input circuit

The input circuit consists of the main contactor and the loading circuit. When the vehicle is geared up, the loading circuit is switched on and the DC link capacitor is charged to line voltage by means of a charging resistor (limits inrush current). The main contactor performes a direct connection of the capacitor to the supply voltage and disconnects the converter from the line in case of emergency stop or when turned off. The main contactor is constantly monitored by the ECON.
For safe relevant shut-off the main contactor is linked hard wired to the emergency train-line and switched off directly if this signal becomes low.

3.1.2.2 DC link capacitor

The DC link capacitor stabilises the input voltage on the inverter. The capacitor and the line choke work as a LC input filter that keeps the harmonics of the supply current low and that limits the supply current when supply voltage disturbances occur.
For safety reasons, in parallel connection to the capacitor a fixed discharging device is arranged, which discharges the capacitor after separating from the supply voltage, also in case of failure of the brake choppers, which discharge the capacitor during normal shut-off via the brake resistors.

3.1.2.3 IGBT inverter

The inverter consists of IGBT-modules with anti-parallel free-wheeling diodes and associated Gate Drive Control units (GDC). It transforms the DC input circuit into three-phase AC current by means of pulse modulated triggering of the IGBTs. Therefore the traction unit is particularly efficient and has improved dynamics control behaviour. The efficiency in traction and braking is also optimised to a maximum.

3.1.2.4 IGBT brake chopper

The brake chopper consists of an IGBT-chopper module with an associated Gate Drive Control unit (GDC). The chopper module connects the DC-link capacitor with an external brake resistor.

Task of the brake chopper is to discharge energy to the brake resistors:

- if the network can absorb only a part or none of the generated braking energy, it is absorbed by the brake resistors
- active protection of the converter from over-voltage; when an upper limit is exceeded, the brake chopper is automatically activated
- active absorption of the LC input filter during network interference
- discharging of the input capacitor by means of the brake resistors when the converter is geared down.

3.1.2.5 Gate Drive Control units (GDC)

The GDC enables a separated triggering of the IGBT-modules. They receive the commands from the Traction Control Unit and return failure and switching signals. Furthermore current, temperature and voltage signals are levelled and transmitted via the GDC to the Traction Control Unit. The trigger

impulses are defined by the Traction Control Unit, which evaluates in real time the ideal pulse pattern from the nominal set values and measured values.

3.1.2.6 Current sensors

For control and protective measures the currents of power outputs i.e. motor and brake resistor are measured and transmitted to the Gate Drive Control units (GDC).

3.1.2.7 Differential fault current detection

The input of the propulsion inverter incorporates a differential fault current detection to protect from current levels which are excessive (> 30A), but below the triggering of over current protection devices.
The two supply lines (+ 750VDC and GND) of the inverter pass a current sensor which measures the current difference. The signal of the sensor is proportional to the difference of the supply current. The signal is processed by the Traction Control Unit ECON.
Upon detection of a ground fault, the high speed circuit breaker will be released. A failure message can be transfered via the Vehicle Databus to a Vehicle Control Unit and / or Monitoring System.

3.1.2.8 Cooling system

The traction inverter is cooled by a radial fan. Fresh air is drawn through the heat sink bars, on which the IGBT semiconductors are placed and blown out through the line filter (line choke) on the opposite side of the inverter. The air circulation is completely separated by seals from the inverter's electronic, only the heat sink bars are exposed to the air flow. The air temperature at the air outlet may have 80°C under most unfavourable circumstances.
The radial fan has to be supplied from 3x400 V AC (sinus) vehicle supply system and turns over a volume of max.1400m³/h of air.

3.1.2.9 Traction Control Unit (ECON)

The Traction Control Unit (ECON) performs at one hand the communication to other equipment via bus and train lines and on the other hand the control of the IGBT modules.
It processes drive related tasks like spin/slide control, torque determination and analysis of speed signals. This is achieved by analysing and comparison of the demanded driving signals received by the master controller, the speed signal from the traction motors and other signals with the current possible traction forces concerning overhead voltage, speed, wheel slip and thermal state of the traction components.
Furthermore the ECON performs the field oriented control of the asynchronous machine, generates the corresponding pulse pattern and passes the set values on to the Gate Drive Control unit (GDC) of the IGBT modules.

The Traction Control Unit handles the following tasks:

- control of the traction inverter
- communication via CAN-Bus to the second traction inverter
- communication to the VCU via RS 485
- receives the torque set values from the master controller (PWM input)
- provides digital inputs and outputs, e. g. control of brakes etc.
- provides analogue inputs for temperature signals of the traction motors
- provides digital inputs for the speed sensor signal
- control of IGBT pulse inverter and brake chopper
- gives the set values for the IGBT elements
- collects measurement and diagnose values
- rapid protective measures in case of malfunction (e.g. over- and under-voltage, over-current, over-temperature etc.)
- ensures safe separation of the auxiliary voltage and the 750 Vdc input
- controls the loading circuit line filter and main contactor
- wheel spin/slide control

3.1.2.10 Wheel Spin/Slide Control

The traction systems are equipped with a wheel spin/slide detection system to eliminate damage and unnecessary wear to wheel treads. This system maximises the utilisation of available wheel/rail adhesion under low adhesion conditions. Spin/slide is detected on a per wheel basis, and due to the system configuration independently controlled for each bogie side.

Wheel spin and wheel slide conditions are detected with highest efficiency mainly based on two different criteria:

- Evaluating the speed of each wheel: A spin/slide condition is detected if the change of a wheel speed exceeds values applicable to the current acceleration/deceleration during driving and braking. Tolerances in detecting are implemented for gradients depending on track alignment data which cannot be taken into consideration but influencing acceleration and deceleration values.
- Comparing speeds of different wheels and subsequent correcting these conditions the efficiency of the spin/slide control is increased to the possible maximum. The speed signal of the bogie wheels shall be submitted from the BCU via the RS485 vehicle bus with sufficient short refreshing rate.

In the event of detecting wheel spin/slide a reduction of traction respectively braking demand is initiated in order to adjust the effort according to the available adhesion. This reduction is calculated taking into consideration acceleration / deceleration respectively including differences to reference wheel speeds and takes place for a short period until wheel speed approaches respective train speed. Subsequently traction / braking effort is readjusted by increasing to values for optimised utilisation of available adhesion providing highest efficiency and avoiding repeating spin/slide conditions.

High dynamic detection and correction of spin/slide conditions provide lowest spin/slide resulting in the advantage of minimised wheel wear and highest utilisation of traction / electrical braking effort.

For the necessary speed evaluation each traction motor is equipped with a speed sensor, measuring the motor speed at a tooth-wheel. By means of a special evaluation method– the ratiometric counting – low speeds can also be optimally processed by the RPM logging and evaluation board installed in the Traction Control Units. Monitoring features are incorporated to the system to detect malfunction of speed sensors which are also logged in the fault memory.

3.1.2.11 Software

The application program is designed on a standard PC (or Laptop) with the help of a graphical function plan language based on a „Windows" surface. Pre-programmed functions can be picked as modules from a menu. Control functions as well as complex regulation tasks can thus be obtained by linking these pre-defined functional blocks. As soon as programming is finished, it is translated and it can be transferred to the Traction Control Unit.

A name can be given to every input- or output-signal of the functional plan. These signals can be scanned online during operation. To visualise them, a PC (or Laptop) is connected to the service interface. To represent the signals clearly, calculation factors are used which enable to monitor values of parameters in real units like e.g. km/h, Ampere, Volt.

3.1.2.12 Diagnostics

A Laptop can be connected via an Ethernet service interface to the Traction Control Unit, to allow a detailed monitoring and diagnosis of these parameters or to download the fault memory containing fault data, operating and ambient parameters for further detailed analysis. Special software provides multiple possibilities such as the filtering of errors, representation of particular operational situations, time limits etc. by utilising individual configured masks and therefore quick and easy diagnostic of a failure. Utilising the capabilities of the system provides detailed information and enables efficient diagnostics and identification of replaceable components and sub-components for maintenance-personnel.

The utilised Traction Control Unit (ECON) has many detection, memory and evaluation functions. Whenever a fault occurs in the propulsion system, it is registered in a non-volatile fault memory in real time and together with digital and analogue ambient data and operating parameters. Relevant data are monitored via the vehicle control and monitoring system to the driver.

3.1.2.13 Communication interfaces

Communication with the VCU is performed via a RS 485 interface. Parameters are not defined in detail yet.
Data that should be exchanged between ECON and VCU will be defined during the project.

For download of the fault history the ECON provides an extra interface. Since in the fault history a big amount of data is registered, the interface will be the Ethernet service interface. Ethernet interfaces are almost a standard feature of Laptops.

The traction inverters will be interconnected via an independent CAN bus system in order to optimize their function.

3.1.3 Technical data

Inverter data:	nominal input voltage	=	750 VDC
	min. service voltage	=	500 VDC
	max. service voltage	=	937 VDC
	2 x three-phase output voltage	=	3 x 0 ... 565 V (input voltage 750 V)
	nominal output current	=	2 x 200 Aeff
	max. output current	=	2 x 350 Aeff
	output frequency	=	0 .. 200 Hz
	switching frequency	=	1500 Hz
	nominal power	=	385 kVA (equal to 385 kW at cosφ = 1)
IGBT Modules:	max. collector-emitter voltage	=	1700 V
	max. DC-collector current (Tc=80°C)	=	800 A
	Manufacturer	=	EUPEC, Mitsubishi
Auxiliary voltage:	Traction Control Units, contactors	=	24 VDC (+25%; -30%)
	supply voltage for cooling fan	=	400 VAC (50Hz sinus) (to be supplied externally)
Dimensions:	width x length x height	=	1620 x 1160 x 453,5 mm
	weight	=	appr. 390 kg

Power Interfaces

24VDC inverter supply:	24 VDC (16,8…31,2 VDC) Supply voltage (5,5A@16,8V)	
Main contactor supply	24 VDC (16,8…31,2 VDC, 5 A at 31,2V continously)	
Fan supply:	supply voltage cooling fan, 3 x 400 VAC (appr. 1,5 A)	
Brake resistor:	2 x 1,55 Ohm, brake resistor (two resistor branches in one housing)	
Power output:	1U, 1V, 1W	3 x 0…565 VAC output voltage for traction motors
Power input:	L+, L-	750 V DC input voltage

Line Filter Characteristics

Inductance of line choke:	2,15 mH
Capacity of filter capacitor:	6 mF
Impedance at 50 Hz:	0,14 Ω

3.1.4 Electronic I/O Interfaces:

Each traction inverter is equipped with following Interfaces:

Input Signals:

- 32 x Digital Input

  The ECON logs digital switching status of 32 Inputs (E0…E31) with a nominal voltage of 24VDC. When switching the input, an inrush current of appr. 20mA occurs during a periode of 10ms which cleans the contacts from oxid layer of the extern switching element, thus ensures a low resistance of the contact.

Max. static input voltage:	31,2 V
Input level: High:	≥12 V
Low:	<7 V
Input Current:	2 mA (at 24 VDC)
Input Inrush Current:	20 mA for 10ms (at 24 VDC) in order to keep mechanical contacts of exernal relais clean

- 2 x Analogue Input

  The ECON provides 2 ground isolated analoge inputs, which can be selectively used as current or voltage input.

  Voltage input:
  Nominal input voltage: ±10 VDC

  Current input:
  Nominal input current: ±20 mA

- 4 x Analogue Input PT100

  The ECON is equipped with 4 ground isolated analogue inputs for PT100 sensors.

  PT100 analogue input data:
  Temperature range: -50….250°C

- 5 x Speed sensor Input

  A maximum of 5 speed sensor channels can receive selectively the A/B signals or the frequency/direction signals from the speed sensors. The speed detector inputs are separated from the electronic parts by means of an opto-coupler.

Input level: High:	> 10 V (nominal 15 V)
Low:	< 3,5 V
Input Current:	15 mA (at 30 VDC)

- 1 x signal: Traction Enable **TE** (opto coupler 24 VDC)

  The triggering of the IGBT-modules is blocked, if this input is "low". In this state the traction inverter do not power the motors. Neither tractive force, nor electrodynamic braking can be applied.

Max. static input voltage:	31,2 V
Input level: High:	≥12 V
Low:	<7 V
Input Current:	2 mA (at 24 VDC)
Input Inrush Current:	20 mA for 10ms (at 24 VDC) in order to keep mechanical contacts of exernal relais clean

- 1 x PWM Input

Input Frequency:	100 Hz….1000 Hz
Input level: High:	> 12 V (nominal 15 V)
Low:	< 7 V
Input Current:	<4 mA

- 1 x Main Contactor Supply **MCS** (max. input current 4,2 A at 30V)

  This input supplies the coils of main contactor and charging contactor. When this input is energized, main and charging contactors can be activated, depending on internal inverter logic. When connector is de-energized, neither main contactor nor charging contactor can be activated.

Output Signals:

- 16 x Digital Output DO

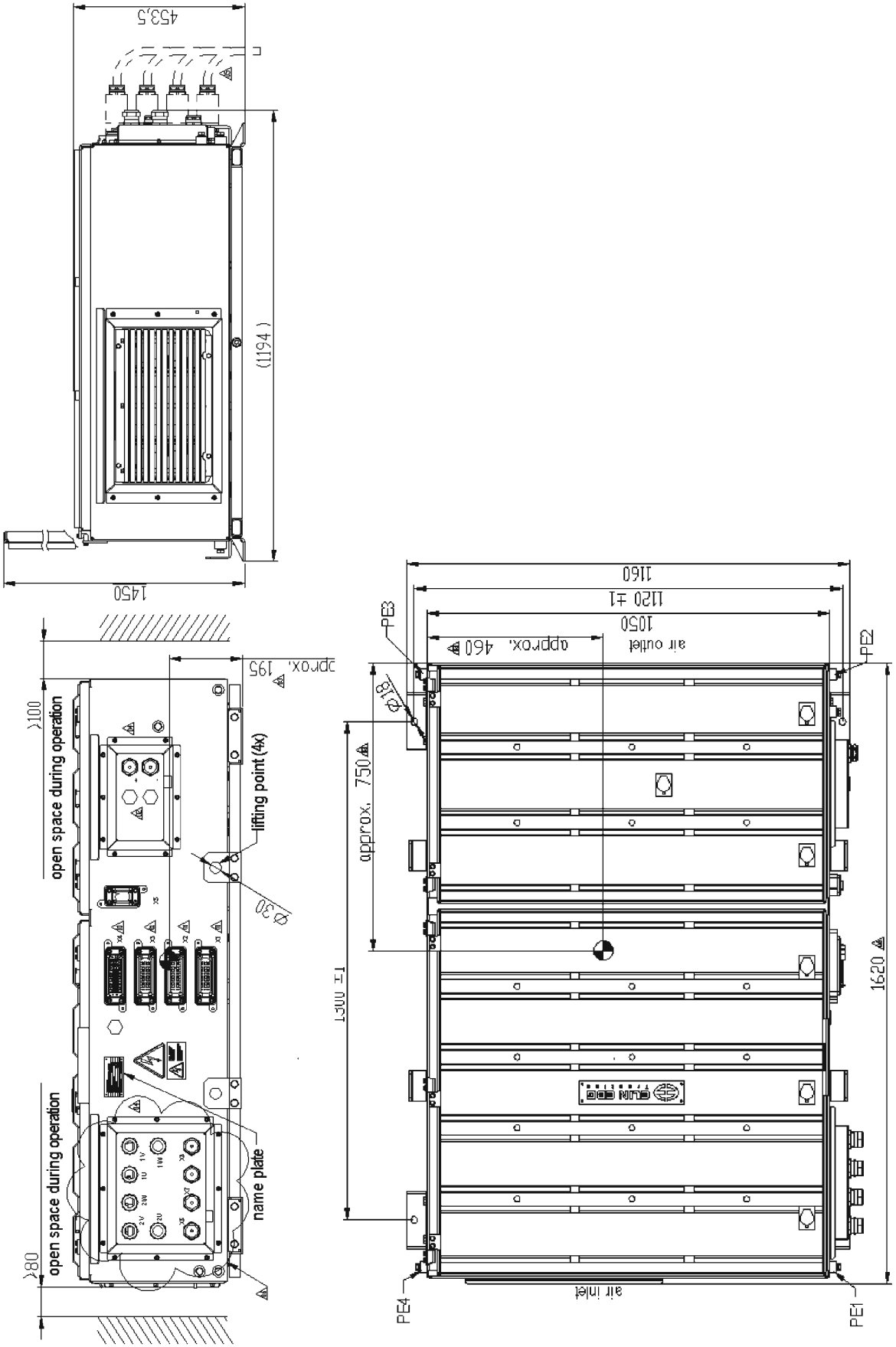
  The ECON contains 16 digital outputs (A0..A15) for switching actors, light indicator etc. with an operating voltage of 24 VDC.

Permanent output current:	1 mA … 1,2 A
Output High level:	>16,3 V

- 1 x Main Contactor Open **MCO**

  This is a potential free auxiliary contact (normally closed) of the main contactor, in order to avoid switching on the main circuit breaker when main contactor is energized.

3.1.5 Dimensions



3.2 Brake resistor

3.2.1 General

The brake resistors are roof-mounted and cooled by natural convection supplemented by the airflow caused by vehicle speed. Three double brake resistors (each 2 x 1,55 Ohm) are installed per vehicle. They are designed to dissipate the complete electrical braking energy when recuperation is not possible.

The brake resistors are pulsed with 1500 Hz, the respective triggering is controlled by the Traction Control Unit.

ETRIS T1000 prevents exceeding of temperature limit by measurement of brake resistor current and calculation of ohmic resistance, which directly shows the temperature of the resistor grid. This is enabled by using a resistor material with a suitable temperature coefficient. The allocated material is NICROFER or equivalent.

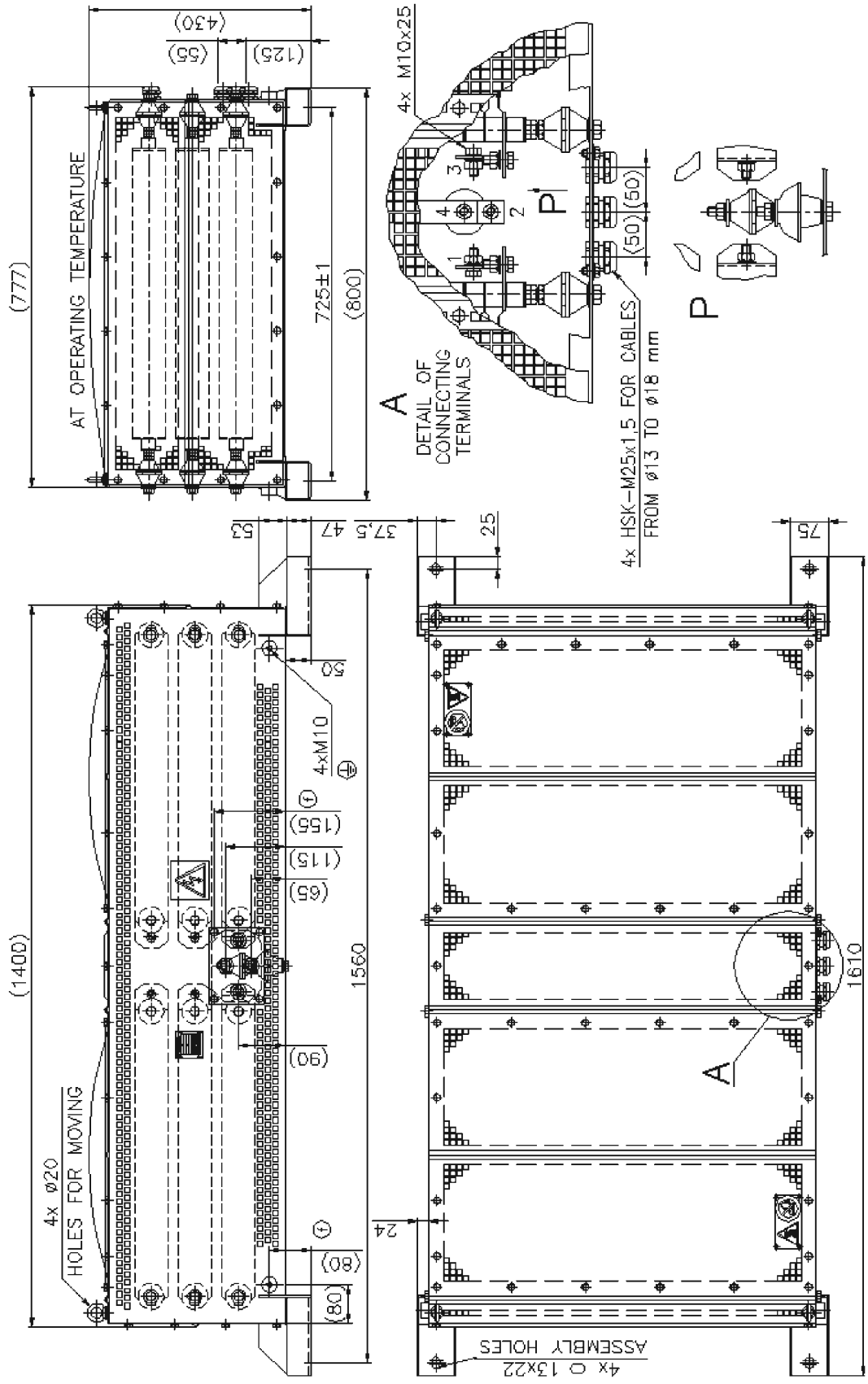
Adequate shielding is provided to protect surrounding equipment from excessive heat dissipation; the resistor grid is suspended by a gliding fixation to handle the occurring dilatations as a result of the heat exposure.

3.2.2 Technical data

Preliminary data per double brake resistor:

ohmic resistance nominal:	2 x 1,55 Ohm, -7% / +5% (two resistors in one housing)
max. inductivity:	< 12 µH
max. power to dissipate:	2 x 240 kW
rated power to dissipate:	2 x 52 kW
Dimensions (l x w x h):	1610 x 800 x 430 mm
Weight:	130 kg, +/-10%

3.2.3 Dimensions



3.3 Traction Motor

3.3.1 General

The motors are 3-phase asynchronous machines in a self-ventilating, enclosed design. They are of a squirrel cage type. Two motors at a time are rigidly mounted to each other at the non-driven end. Two motors and two gear boxex together form a drive unit. Two drive units are mounted via the gear boxes resilient to a motor bogie.

Because of highest reliability self-ventilated, enclosed traction motors have been chosen. The cooling system for each motor consists of an inner and an outer air circuit. Each air circuit is maintained by it's own fan. The two air circuits are strictly divided. The inner circuit cools the winding overheads and the stator winding. The outer fan brings fresh air, sucked in through the air inlet, through holes in the stator iron core. The air inlet contains a grid.The maintenance of the traction motor is limited to greasing of bearings, removing waste grease at wide regular intervals and periodically cleaning of air ducts and filter systems.

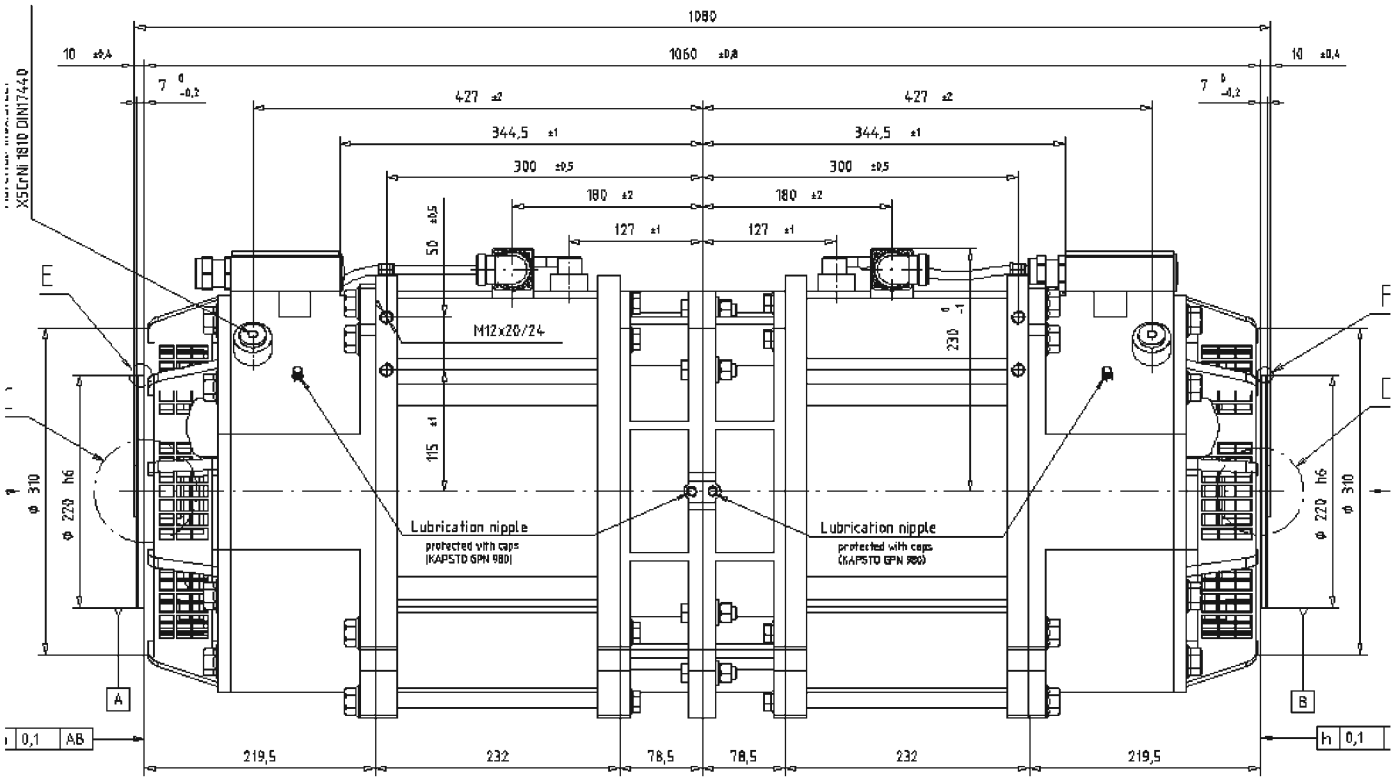
Both static and dynamic balancing of the rotor with high accuracy minimizes the generating of vibrations. The traction motor is dust-protected and protected against ingress of splashing water. The utilized materials and protection paintings ensure resistance to environmental influences like salty and corrosive atmosphere.

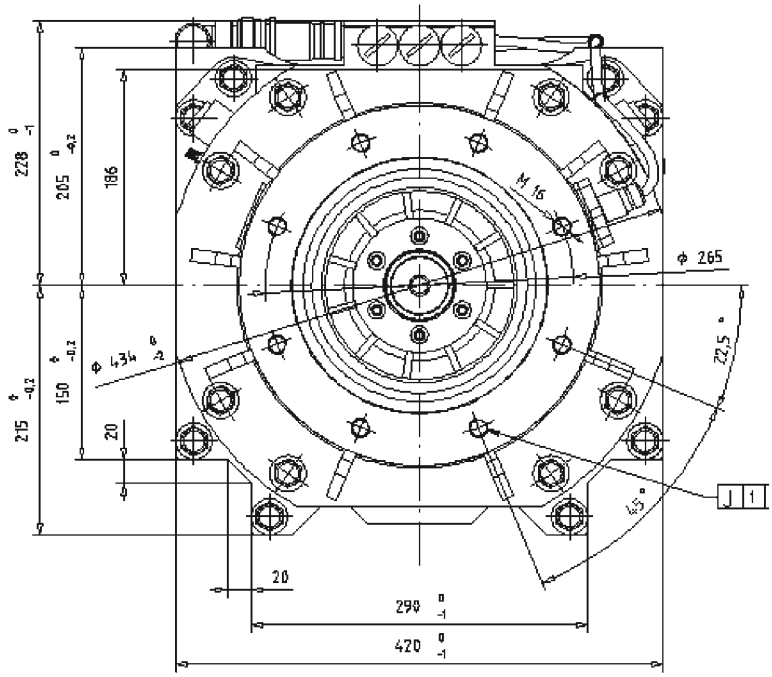
For thermal protection the motors are equipped with PT100 temperature sensors. Subsequent to the evaluating of the PT100 signals in each motor the temperature information is read into the Traction Control Unit for further processing and temperature protection of the motors.
Transit proven speed sensors, measuring the motor speed at a tooth-wheel, integrated to the fan, are installed at each traction motor in an easy accessible position. By means of a special evaluation method – the ratiometric counting – low speeds can also be optimally processed by the Traction Control Units.

3.3.2 Technical data

Motor type	2 x TMR36-19-4
Nominal power	61 kW (132 kW per double motor)
Nominal voltage	425 V
Nominal current	109 A (per single motor)
Nominal speed	1538 rpm
Maximal speed	3968 rpm
Nominal frequency	52 Hz
Nominal torque	~ 378 Nm (per single motor)
Number of poles	4 (2 pairs)
Efficiency	93 %
Cos phi	0,82
Type of protection:	IP54
Weight:	625 kg per double motor
Lubrication:	grease lubrication
Isolation class	H (180K)
Winding type	round wire winding
Speed sensor	tooth wheel for sensor integrated
Bearing overhaul:	1 Mio km or maximum 8 years
Bearing lubrication interval:	150.000 km

3.3.3 Dimensions





3.3.4 Motor Speed Sensors

3.3.4.1 General

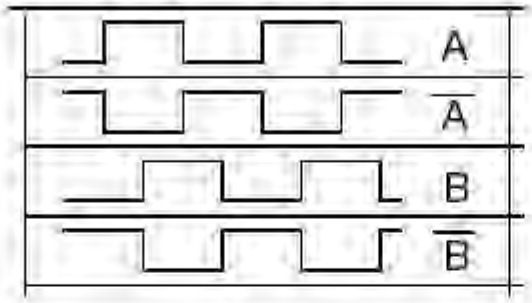
Each traction motor is equipped with one inductive motor speed sensor. The sensor's metallic housing is of protection class IP 68. It has a standard flange for simple mounting without adjustment.

The power supply is provided by the Traction Control Unit (ECON). It is isolated from the 24VC board network. Outputs of the speed sensors are short-circuit proof.

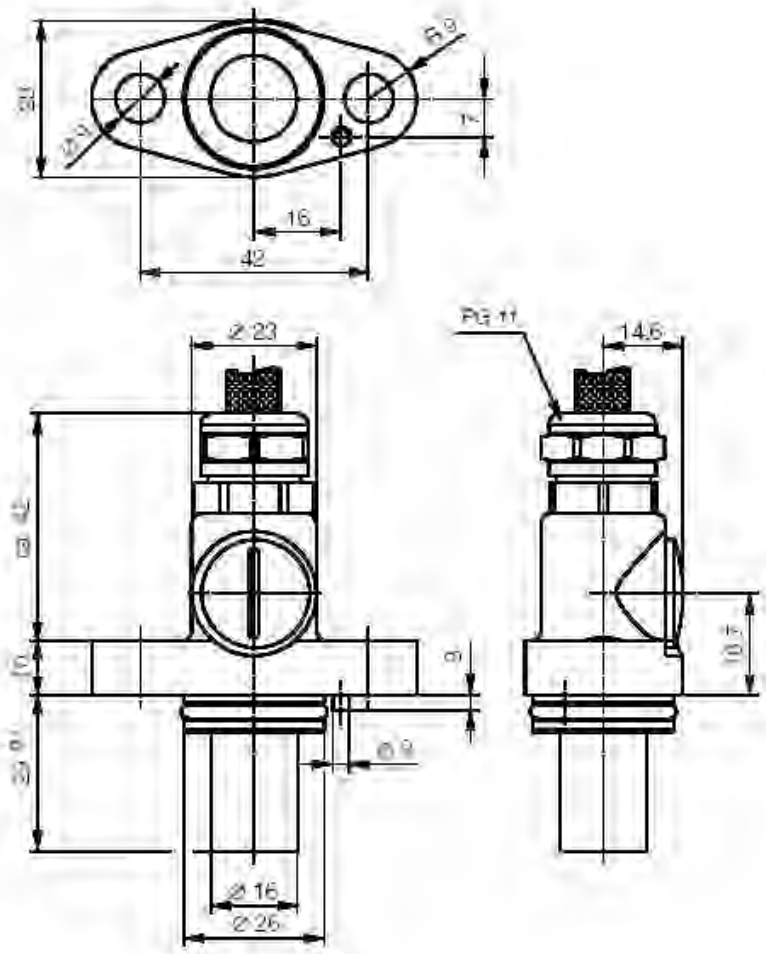
3.3.4.2 Technical Data

Type of output signal:	digital
Nominal supply voltage:	24 VDC +/- 10%
Nominal supply current:	≤ 40 mA (per channel)
Output current:	≤ 20 mA, short-circuit proof
Output frequency:	0…25 kHz
High level:	VCC...(VCC – 3V)
Low level:	0…2 V
Temperature range:	-40°C … +120°C
Protection class:	IP 68

The speed sensors provide two digital signals with 90° phase shift. The sensors generate also the invers signal to each signal. This ensures high interference immunity and reliable function even under adverse operating conditions.



3.3.4.3 Dimensions



3.4 High Speed Circuit Breaker

3.4.1 General

In order to sense line currents exceeding operational limits that might damage cables or equipment, the power supply of the tram is protected by a heavy duty, transit-proven, high-speed circuit breaker capable of handling the short circuit capacity. The HSCB is type UR6-31 (Secheron).

3.4.2 Technical data

Nominal voltage	1000 V DC
Nominal current (In)	1000 A (T_{amb} = 40°C)
Intervention time	2 ms with di/dt >= 5.10 6 A/s
Breaking capacity	30 kA with τ = 15 ms
Direct over current release:	1900 A DC
Ambient temperature	-25 °C…+50 °C
Protection degree	IP 55 (standardised insulated housing)

Coil data (electric holding):

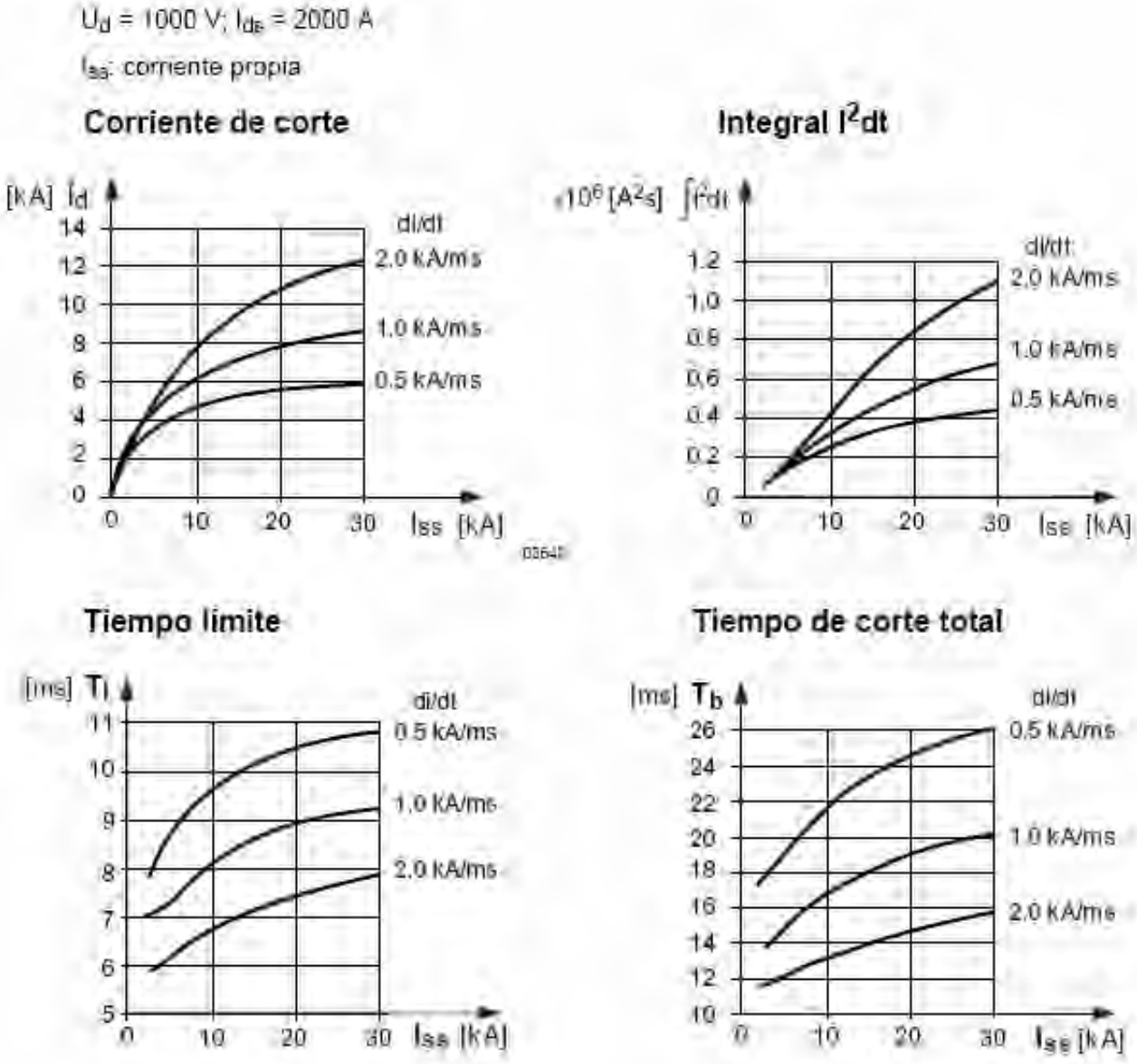
Nominal voltage	24 V DC
Rated power for closing	835 W
Rated power for holding	2,5 W

Auxiliary contacts:

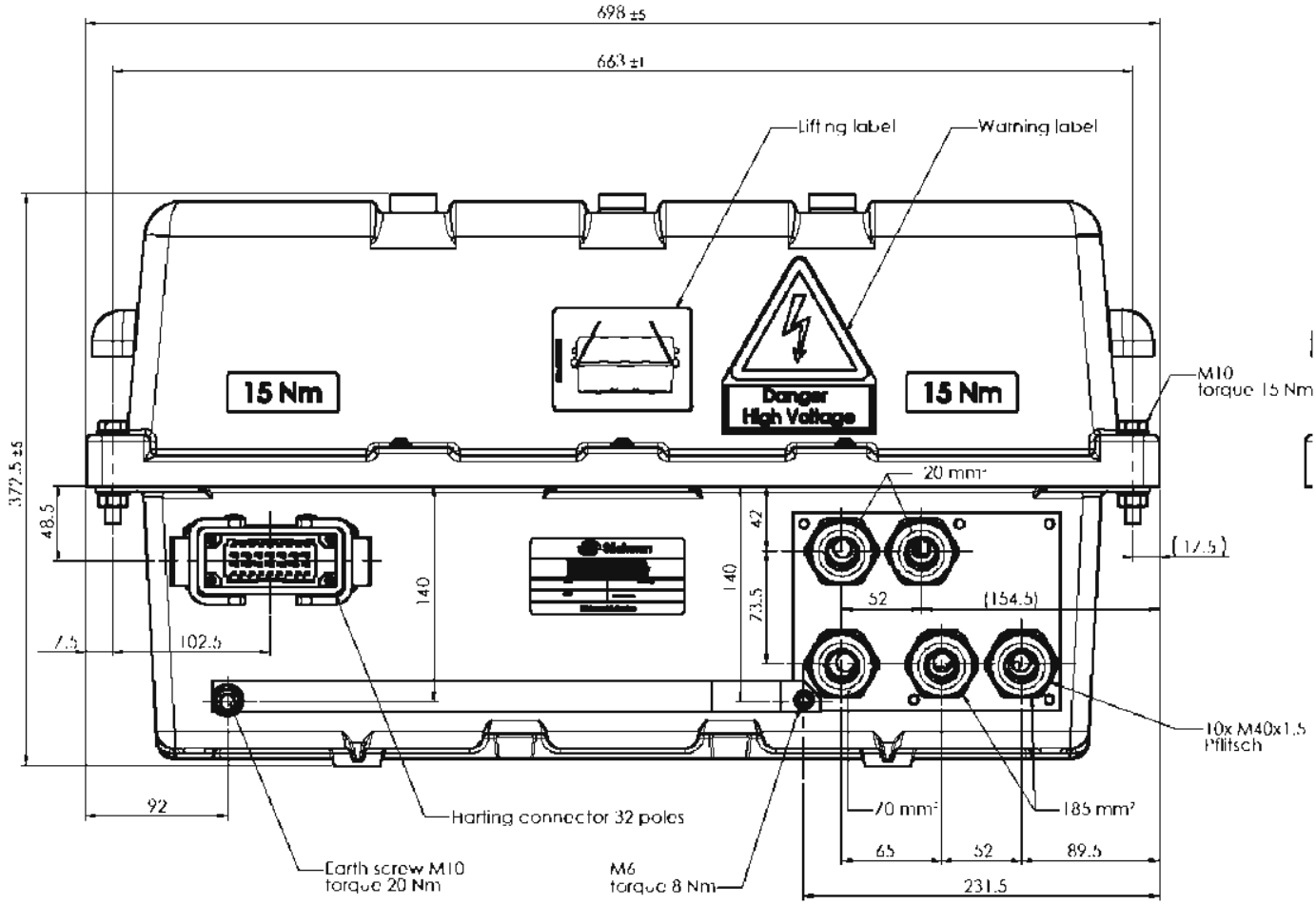
Nominal current / voltage	1 A / 24 V DC
Type	6 normally open contacts and 6 normally closed contacts

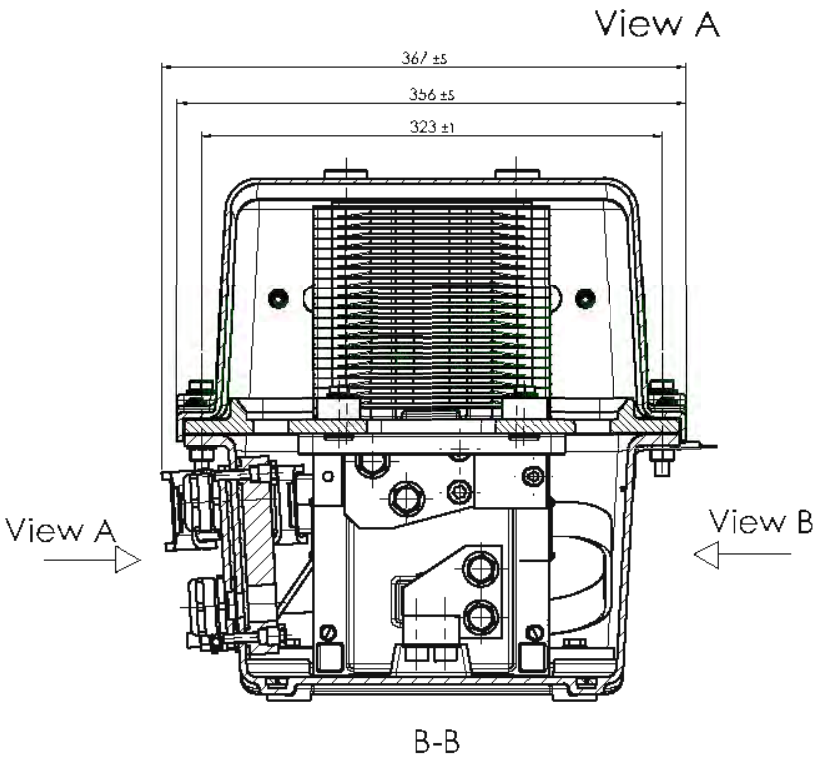
3.4.3 Characteristics

Breaking current and other values are depending on the net characteristics. Therefore they can determined not before the net characteristics are defined. The following figure shows the principal characteristics.



3.4.4 Dimensions





3.5 Master Controller

3.5.1 General

The set values for tractive/braking effort are derivated from the deflection of the master controller's T-handle.

The master controller is designed to be moved linearly with the left hand.

There are three detents, notifying the transition from:

- zero position to propulsion position
- zero position to brake position
- brake position to emergency brake position

The master controller has contacts that inform the train of the position of the controller as follows:

- Propulsion position: 2 NO (+ 1 NO for degraded mode)
- Braking position: 2 NC and 1 NO (+ 1 NO for degraded mode)
- Emergency braking position: 2 NC and 2 NO

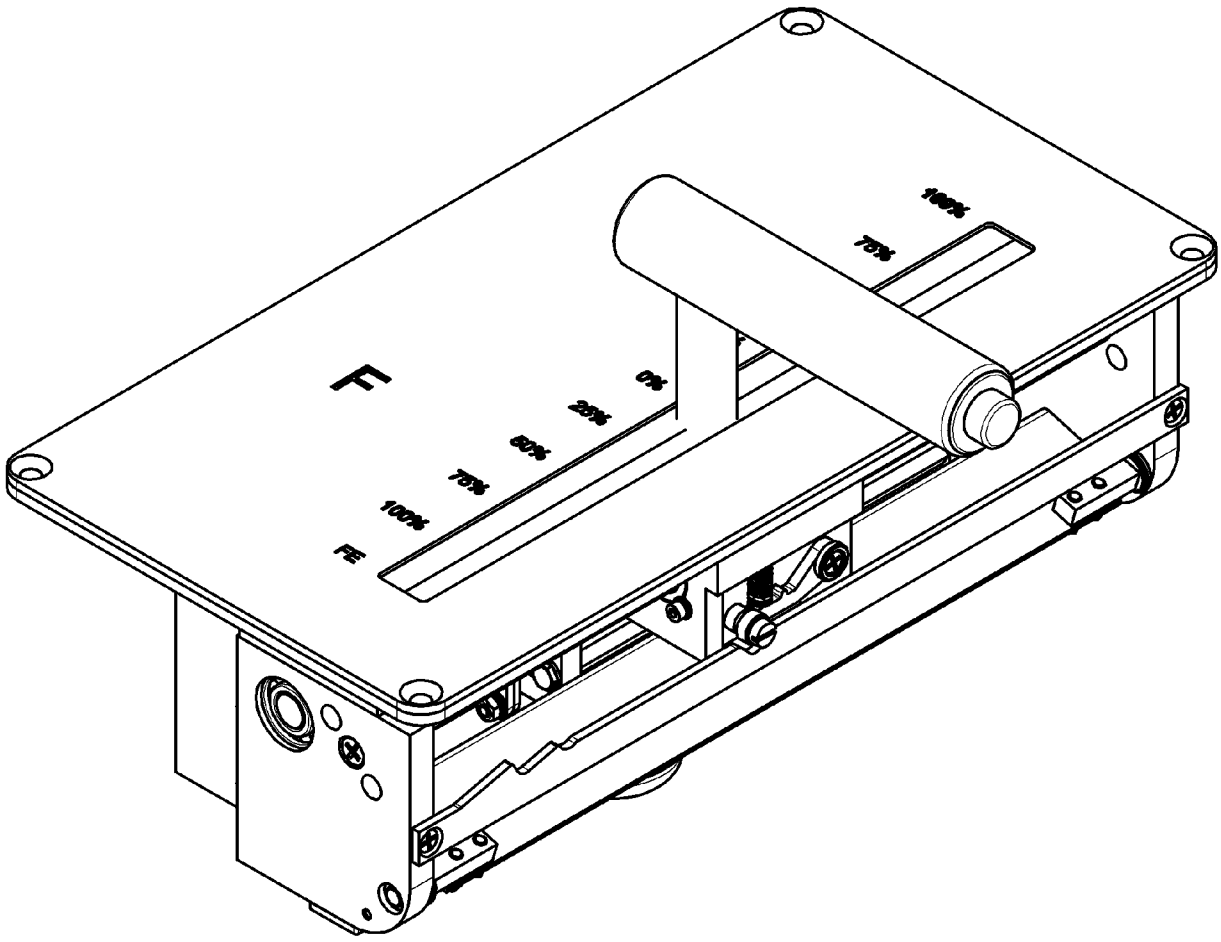
The master controller is also equipped with a deadman switch in shape of a press button on the handle to be operated by the driver's thumb.

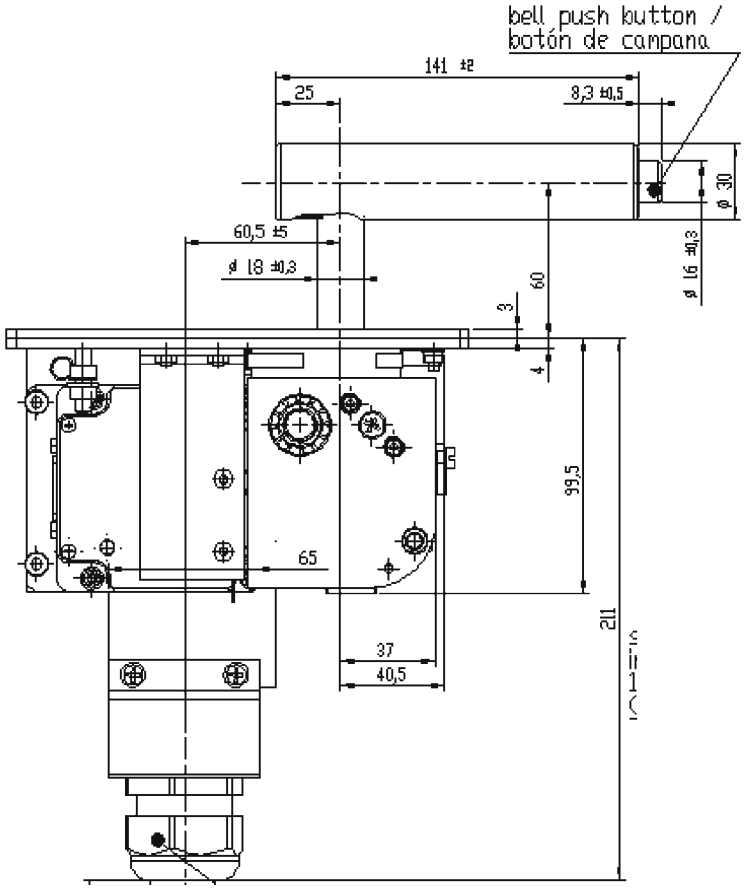
All components of the master controller, except the handle, are situated under the surface of the drivers desk.

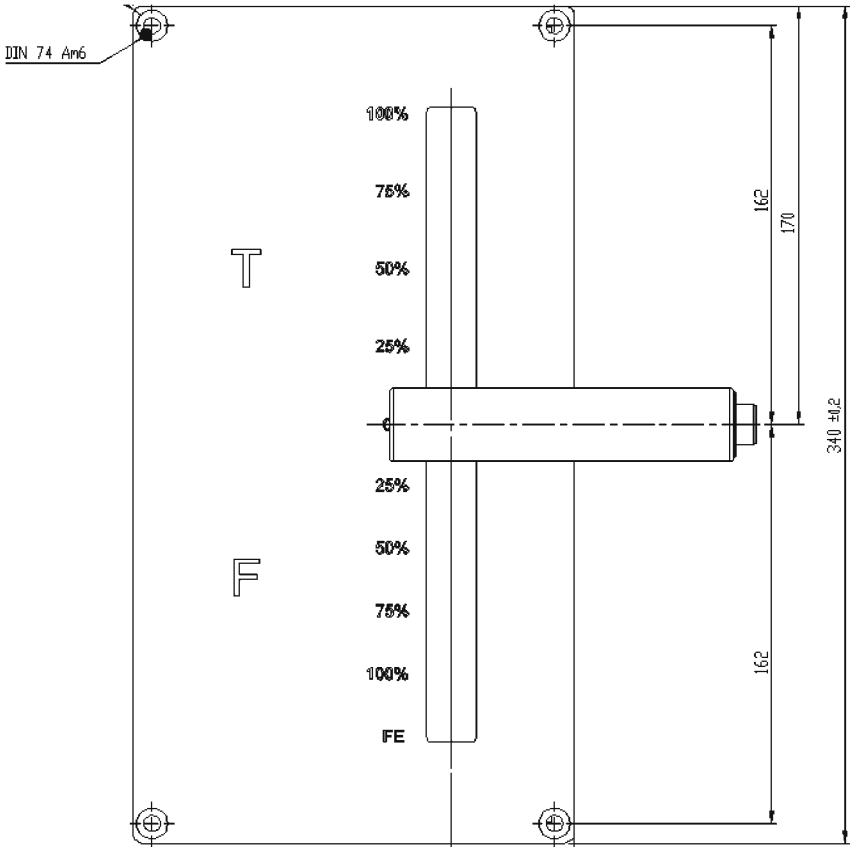
3.5.2 Technical data

Nominal supply voltage:	30VDC (18…35 VDC)
Auxiliary contacts:	In total 10 switches. Each switch provides one potential free normally closed (NC) and one potential free normally open (NO) contact (max. 2A / 24VDC). Two switches of them have gold plated contacts (max. 40mA / 24VDC).
Dead man contacts:	One switch provides one NC and one NO for deadman function (deadman function has to be realized externally; the master controller provides only the contacts). The contacts of this switch are gold plated (max. 40mA / 24VDC).
Type of protection:	IP00
Encoder Type:	Opto electronic encoder with PWM output with frequency 1 kHz

3.5.3 Drawings




bell push button /
botón de campana
141 ±2
25
8,3 ±0,5
ø 30
60,5 ±5
ø 18 ±0,3
ø 16 ±0,3
3
60
4
99,5
65
211
37
40,5


DIN 74 Am6
100%
75%
50%
25%
T
F
162
170
340 ±0,2
FE

Weight of vehicle	54.841	t
Pay Load	18.471	t
Wheel diameter	590	mm
Gear ratio	5.440	/ 1
Linevoltage motoring mode	750	V
Linevoltage braking mode	900	V
max. acceleration (90%)	1.08	m/s^2
Mean deceleration (75 %)	0.90	m/s^2
Efficiency of gear box	96	%
Number of inverters per car	6	
Number of motors per inverter	2	
Number of brake resistors	6	

Ocean Terminal - Edinburgh Airport

	station		distance in m	dwell time in s	ride time in s	journey time in s	receipted energy in Wh	regenerated energy in Wh	RMS motor current in A	RMS line current in A	brake time in s	brake power in kW
1	Ocean Terminal	OCT	837	25	121	146	5477	2426	65	426	24	364
2	Ocean Drive	OCD	483	25	74	99	2705	807	58	292	14	208
3	Constitution Street	COS	548	25	84	109	5751	1782	72	465	16	401
4	Foot of the Walk	FOW	564	25	61	86	5795	1262	69	538	14	325
5	Balfour Street	BAS	638	25	66	91	6219	1141	66	524	14	293
6	McDonald Road	MDR	560	25	64	89	7725	1173	77	631	14	302
7	Picardy Place	PIP	696	25	91	116	8742	2291	78	619	26	317
8	St Anrew Square	SAS/NSA	718	25	88	113	2871	2106	60	325	20	379
9	Princes Street	PSW	673	25	68	93	5588	3030	76	598	20	545
10	Shandwick Place	SHP	594	25	74	99	2609	2049	65	416	15	492
11	Haymarket ROJ included	HAY	1221	25	167	192	6222	3525	58	379	24	529
12	Murrayfield	MUR	1057	25	84	109	7011	3389	72	624	20	610
13	Balgreen Road	BAR	1642	25	150	175	11244	5142	64	528	35	529
14	Saughton Road North	SRN	1263	25	85	110	8569	4457	78	716	18	891
15	South Gyle Access	SGA	786	25	62	87	6469	2722	75	668	20	490
16	Edinburgh Park South	EPS	795	25	91	116	5106	2797	65	452	14	719
17	Edinburgh Park	EDP	828	25	64	89	5405	3045	74	644	20	548
18	Gyle DEH included	GYL	1096	25	129	154	6899	2391	60	413	18	478
19	Gagarburn	GOG	1756	25	170	195	9176	5712	67	499	32	643
20	Ingliston Park and Ride	IPR	823	25	64	89	4755	3411	65	565	22	558
	Edinburgh Airport	AIR										
	Total		**17578**			**2357**	**124338**	**54658**	**68**	**516**		

Results of teh calculation:

Energy drawn from line	124.34 kWh	7.07 kWh/km
Dynamic brake energy	54.66 kWh	3.11 kWh/km
Total energy consumption	69.68 kWh	3.96 kWh/km

Journey time	39.28	min
Journey speed	26.85	km/h
RMS motor current	68	A
Average power of each brake resistor	14	kW

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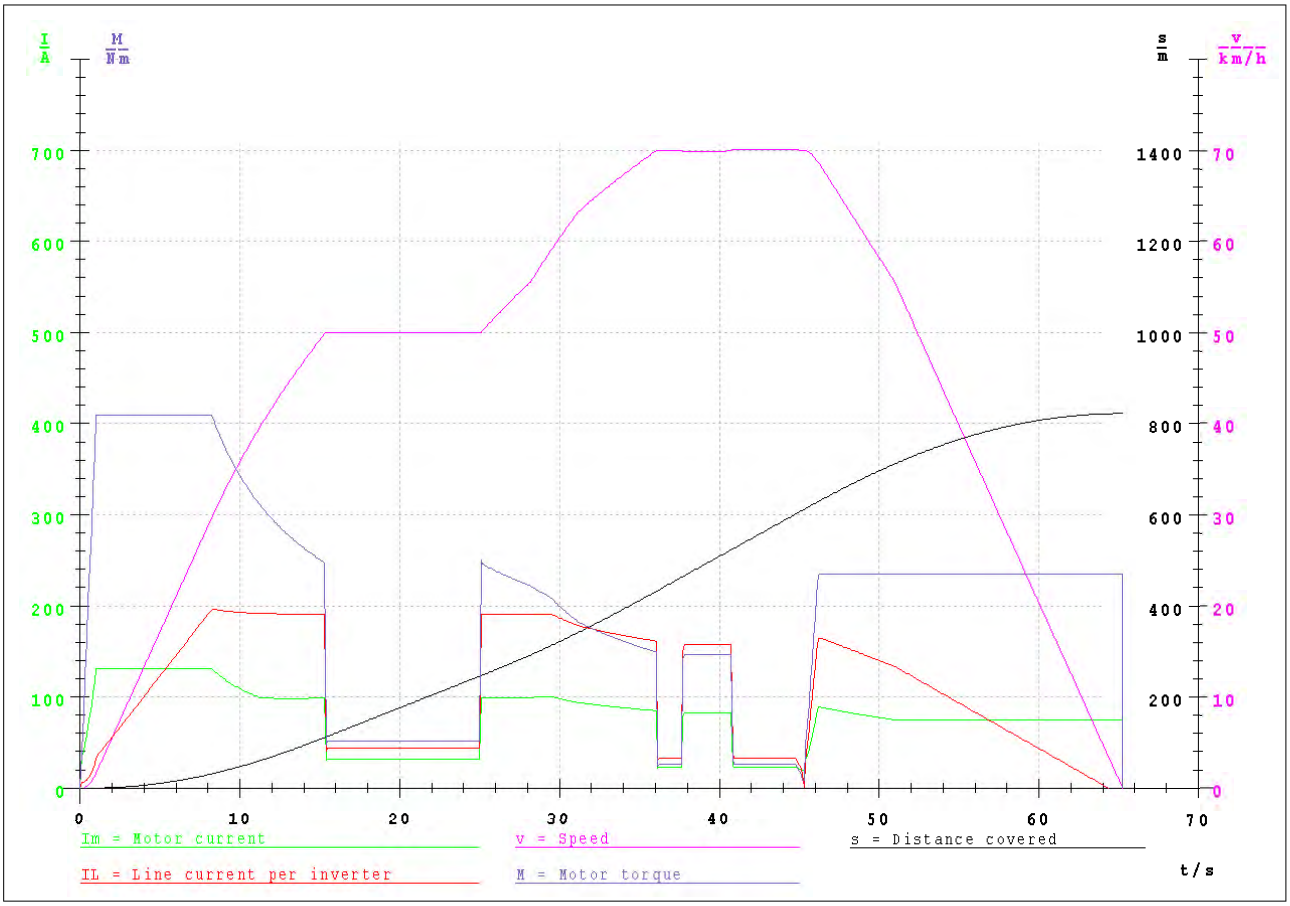
09070700

Edinburgh Tram Network

Tram-AIR-OCT
Edinburgh Airport-Ingliston Park and Ride

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	823.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.08m/s²
Max. deceleration.....	1.09m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .09
RMS line current tot/Mo.....	642A/ 578A
Journey speed.....	32.8km/h
RMS motor current.....	71A
Energy drawn from line.....	6644.4Wh
Dynamic brake energy.....	2517.9Wh
Total energy consumption.....	4126.5Wh

109m/ 0.0%/ 50km/h - 136m/ .9%/ 50km/h
44m/ .9%/ 70km/h - 50m/-2.4%/ 70km/h
120m/ 0.0%/ 70km/h - 60m/ 3.5%/ 70km/h
190m/ 0.0%/ 70km/h - 114m/ 3.6%/ 70km/h



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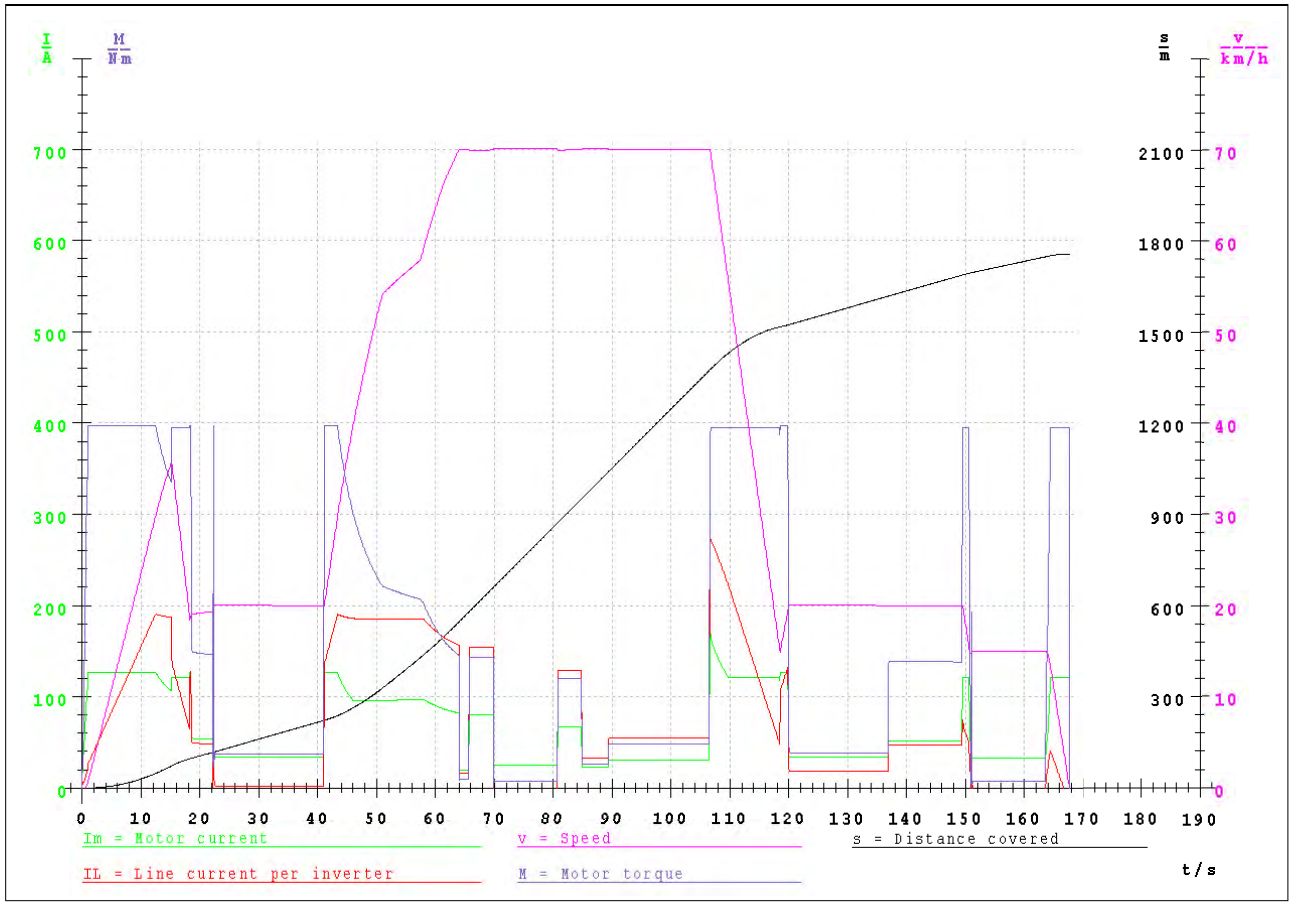
Edinburgh Tram Network

Tram-AIR-OCT AW2
Ingliston Park and Ride-Gogarburn

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	1756.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.20m/s²
Max. deceleration.....	1.15m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .16
RMS line current tot/Mo.....	565A/ 565A
Journey speed.....	32.8km/h
RMS motor current.....	71A
Energy drawn from line.....	11855.4Wh
Dynamic brake energy.....	3592.6Wh
Total energy consumption.....	8262.8Wh

72m/ 3.6%/ 70km/h -	44m/ 3.6%/ 20km/h
106m/-1.7%/ 20km/h -	104m/-1.7%/ 70km/h
100m/ 3.9%/ 70km/h -	70m/-1.6%/ 70km/h
80m/ -.5%/ 70km/h -	80m/ 3.4%/ 70km/h
210m/-1.0%/ 70km/h -	80m/ 2.8%/ 70km/h
90m/ 0.0%/ 70km/h -	336m/ .7%/ 70km/h
244m/ .7%/ 20km/h -	70m/ 3.6%/ 20km/h



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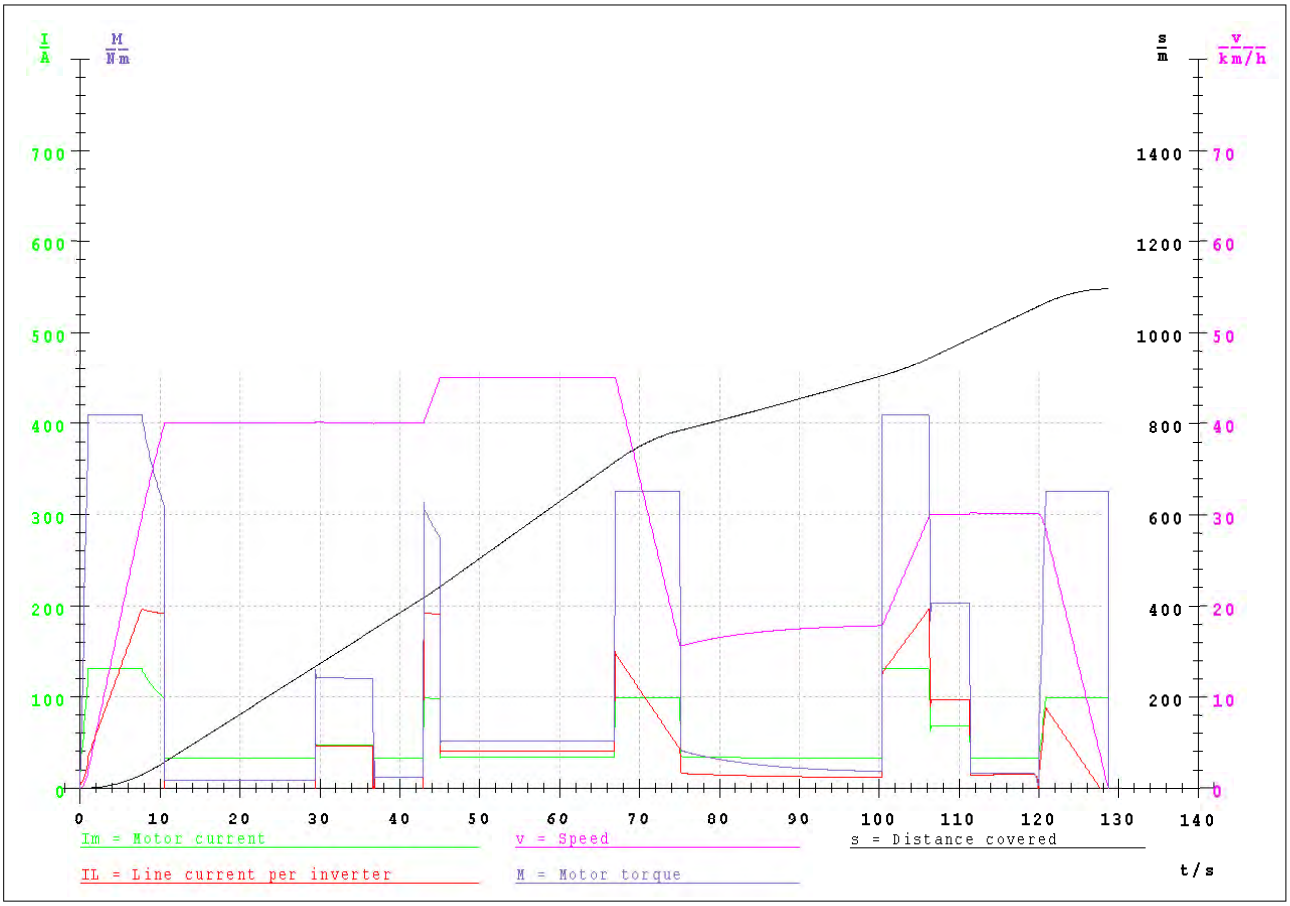
09070702

Edinburgh Tram Network

Tram-AIR-OCT AW2
Gogarburn-Gyle DEH included

Weight of vehicle	54.84t
Pay load	18.47t
Line voltage Mo/Br	750V/ 900V
Distance between stops	1096.0m
Dwell time	25.0s
Wheel diameter	590mm
Gear ratio	5.440/ 1
Max. acceleration	1.15m/s²
Max. deceleration	1.01m/s²
Mean deceleration	.90m/s²
Adhesion coefficient Mo/Br	.16 / .13
RMS line current tot/Mo	393A/ 386A
Journey speed	25.7km/h
RMS motor current	61A
Energy drawn from line	5708.8Wh
Dynamic brake energy	2143.0Wh
Total energy consumption	3565.8Wh

264m/ -.8%/ 40km/h	-	80m/-4.4%/ 40km/h	
72m/ -.9%/ 40km/h	-	298m/ .9%/ 45km/h	
190m/ 0.0%/ 18km/h	-	80m/ 5.5%/ 30km/h	
112m/ 0.0%/ 30km/h	-	0m/ 3.4%/ 70km/h	



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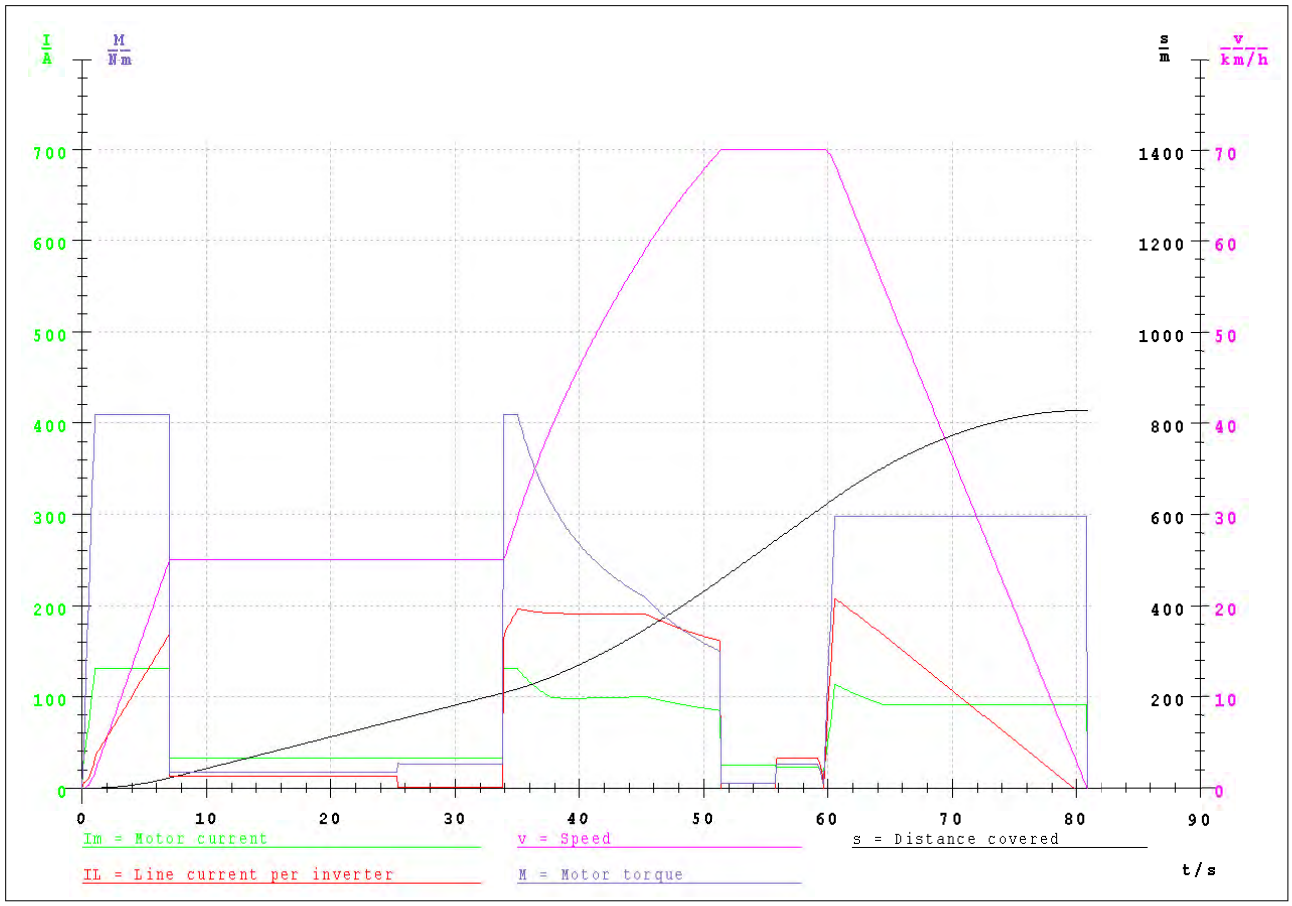
09070703

Edinburgh Tram Network

Tram-AIR-OCT AW2
Gyle-Edinburgh Park

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	828.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.08m/s²
Max. deceleration.....	.95m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .12
RMS line current tot/Mo.....	576A/ 481A
Journey speed.....	28.2km/h
RMS motor current.....	69A
Energy drawn from line.....	5289.1Wh
Dynamic brake energy.....	3160.6Wh
Total energy consumption.....	2128.5Wh

148m/ 0.0%/ 25km/h - 60m/-1.3%/ 25km/h
330m/ -.9%/ 70km/h - 290m/ 0.0%/ 70km/h



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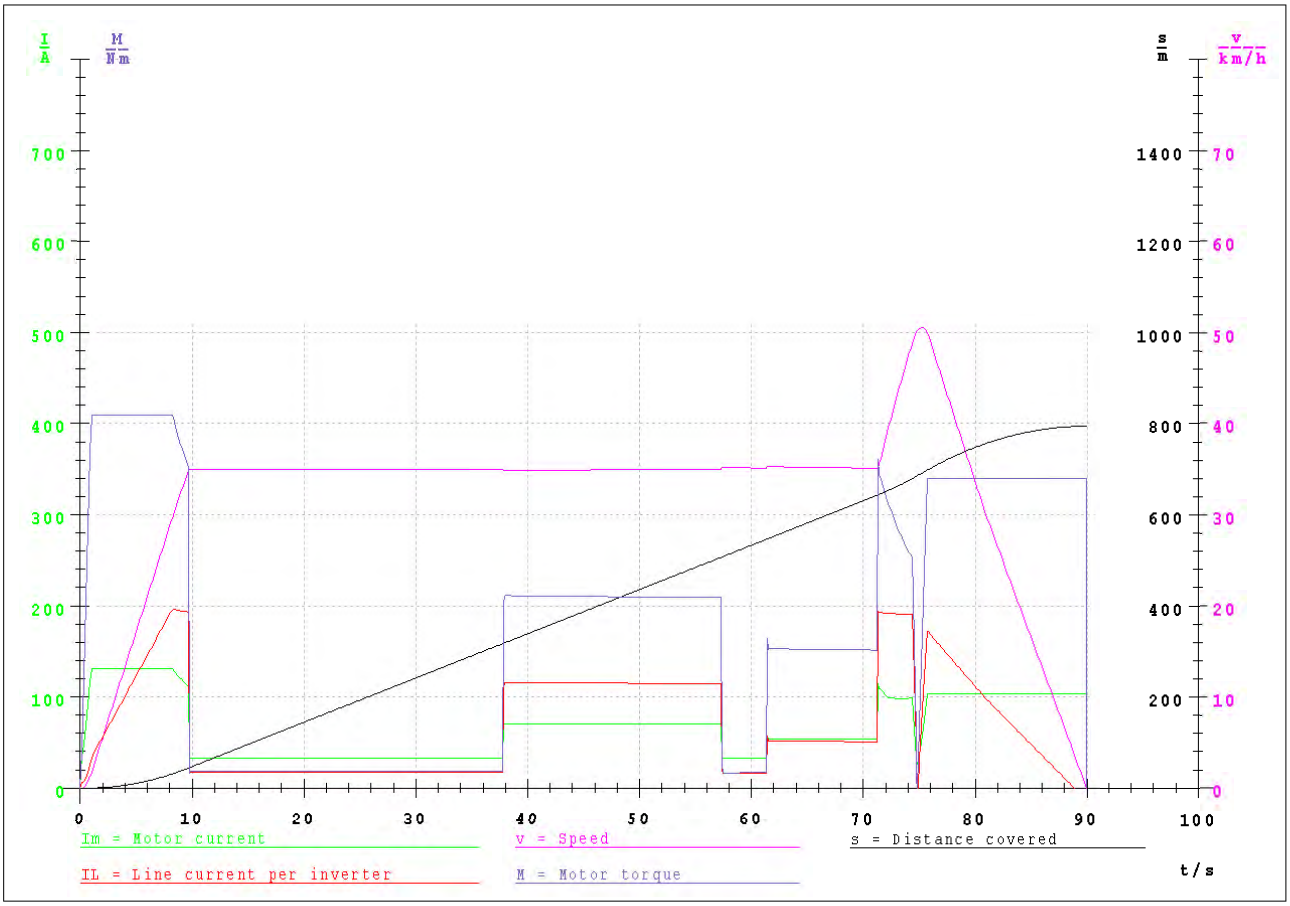
09.07.07
09070704

Edinburgh Tram Network

Tram-AIR-OCT AW2
Edinburgh Park-Edinburgh Park South

Weight of vehicle	54.84t
Pay load	18.47t
Line voltage Mo/Br	750V/ 900V
Distance between stops	795.0m
Dwell time	25.0s
Wheel diameter	590mm
Gear ratio	5.440/ 1
Max. acceleration	1.08m/s²
Max. deceleration	1.07m/s²
Mean deceleration	.90m/s²
Adhesion coefficient Mo/Br	.15 / .14
RMS line current tot/Mo	473A/ 427A
Journey speed	24.9km/h
RMS motor current	66A
Energy drawn from line	5700.9Wh
Dynamic brake energy	2507.4Wh
Total energy consumption	3193.5Wh

315m/ 0.0%/ 35km/h -	190m/ 5.7%/ 35km/h
40m/ 0.0%/ 35km/h -	97m/-5.4%/ 35km/h
53m/-5.4%/ 70km/h -	60m/ 0.0%/ 70km/h
40m/-1.4%/ 70km/h -	0m/ 0.0%/ 70km/h



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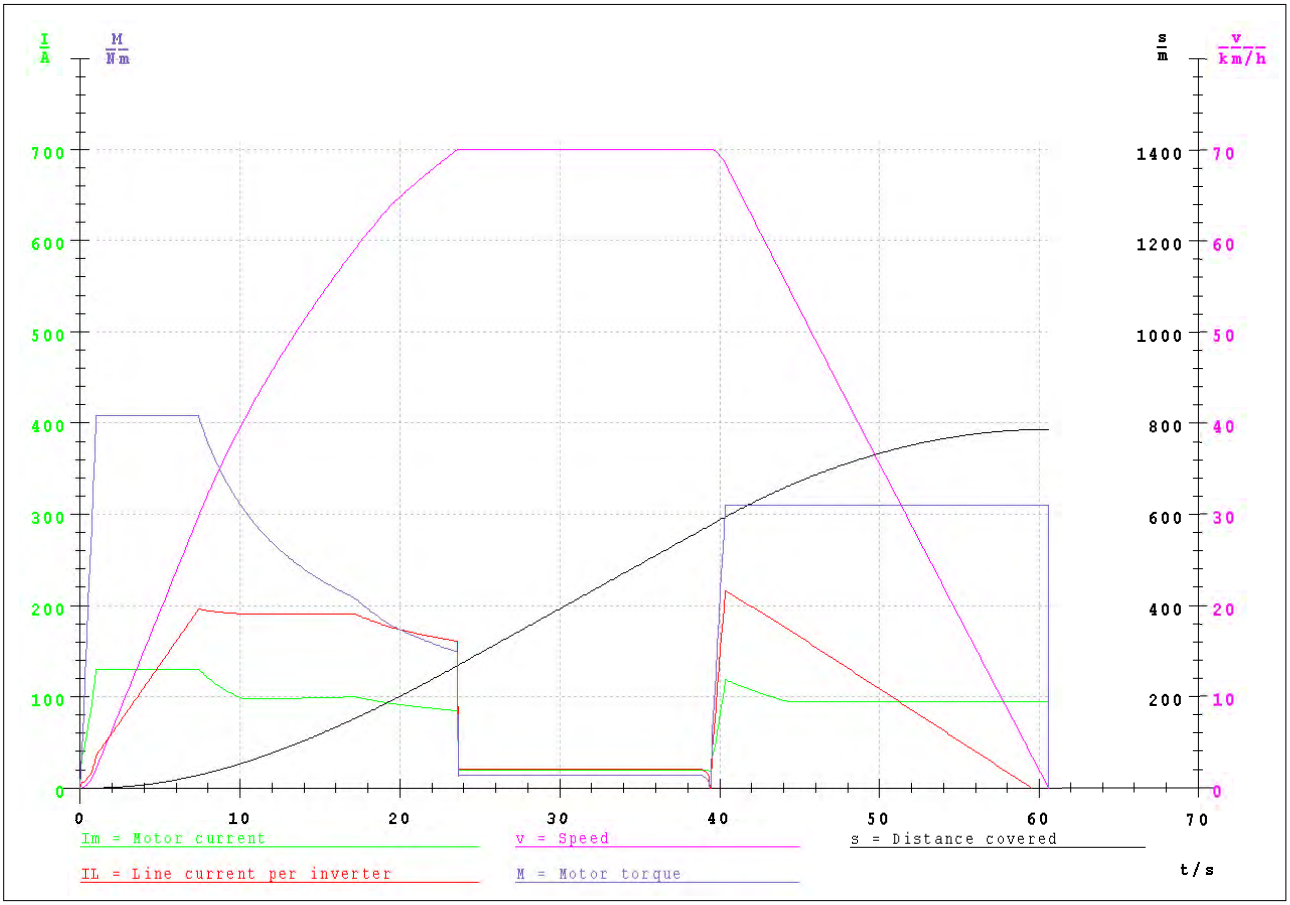
09070705

Edinburgh Tram Network

Tram-AIR-OCT AW2
Edinburgh Park South-South Gyle Access

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	786.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.20m/s²
Max. deceleration.....	.96m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .13
RMS line current tot/Mo.....	641A/ 526A
Journey speed.....	33.1km/h
RMS motor current.....	74A
Energy drawn from line.....	5090.1Wh
Dynamic brake energy.....	3282.4Wh
Total energy consumption.....	1807.7Wh

190m/-1.4%/ 70km/h - 596m/ -.3%/ 70km/h



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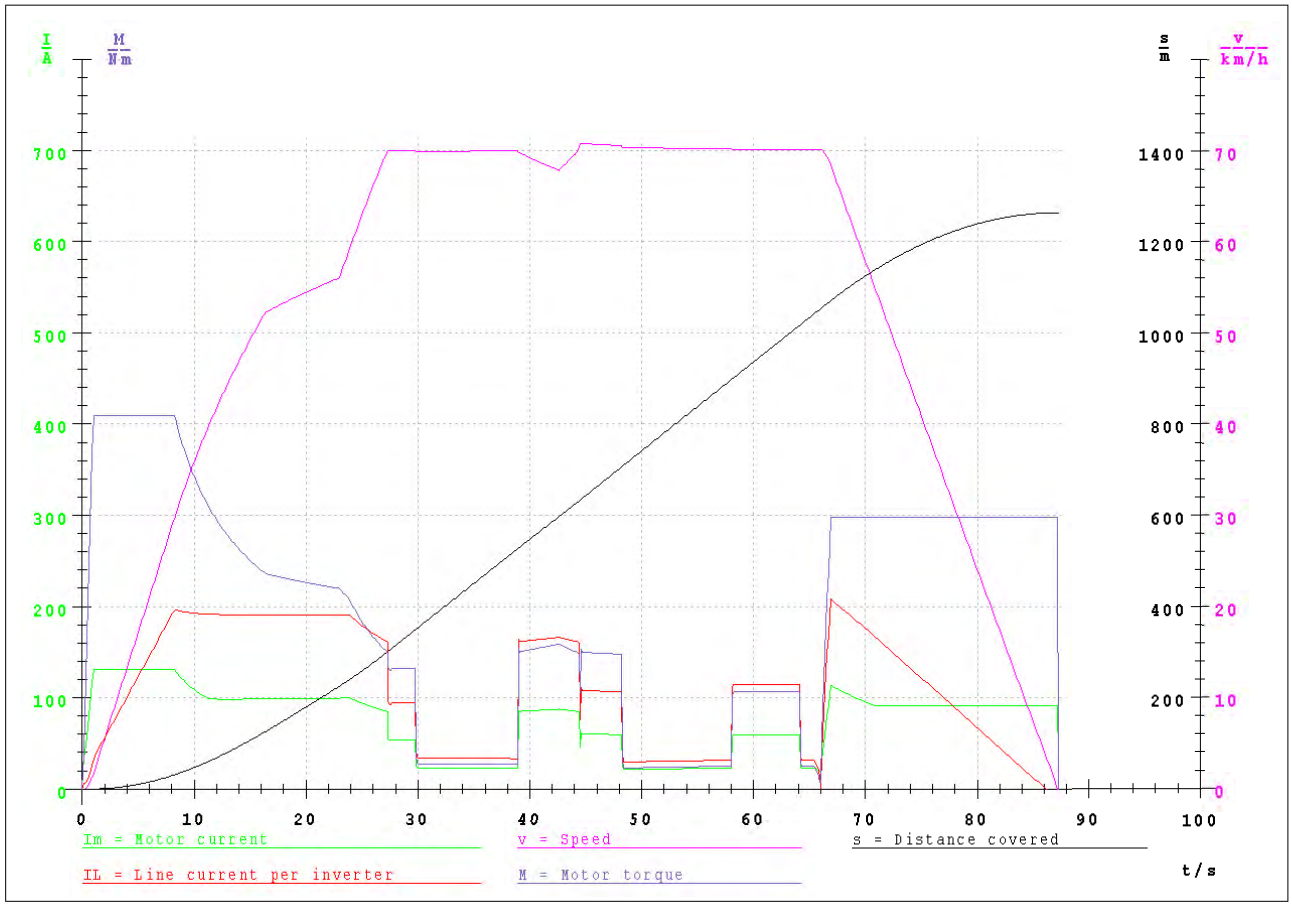
09.07.07
09070706

Edinburgh Tram Network

Tram-AIR-OCT AW2
South Gyle Access-Saughton Road North

```
Weight of vehicle.............  54.84t
Pay load......................  18.47t
Line voltage Mo/Br............  750V/ 900V
Distance between stops.........  1263.0m
Dwell time....................  25.0s
Wheel diameter................  590mm
Gear ratio....................  5.440/ 1
Max. acceleration.............  1.08m/s²
Max. deceleration.............   .95m/s²
Mean deceleration.............   .90m/s²
Adhesion coefficient Mo/Br.....  .15 / .12
RMS line current tot/Mo........  670A/ 595A
Journey speed.................  40.5km/h
RMS motor current.............   73A
Energy drawn from line.........  8384.3Wh
Dynamic brake energy...........  4118.6Wh
Total energy consumption.......  4265.7Wh
 124m/ 0.0%/ 70km/h -  100m/ 4.3%/ 70km/h
 120m/-5.0%/ 70km/h -  180m/ 0.0%/ 70km/h
  70m/ 5.5%/ 70km/h -   30m/ 0.0%/ 70km/h
  80m/-5.4%/ 70km/h -  190m/ 0.0%/ 70km/h
 120m/ 2.4%/ 70km/h -  249m/ 0.0%/ 70km/h
```



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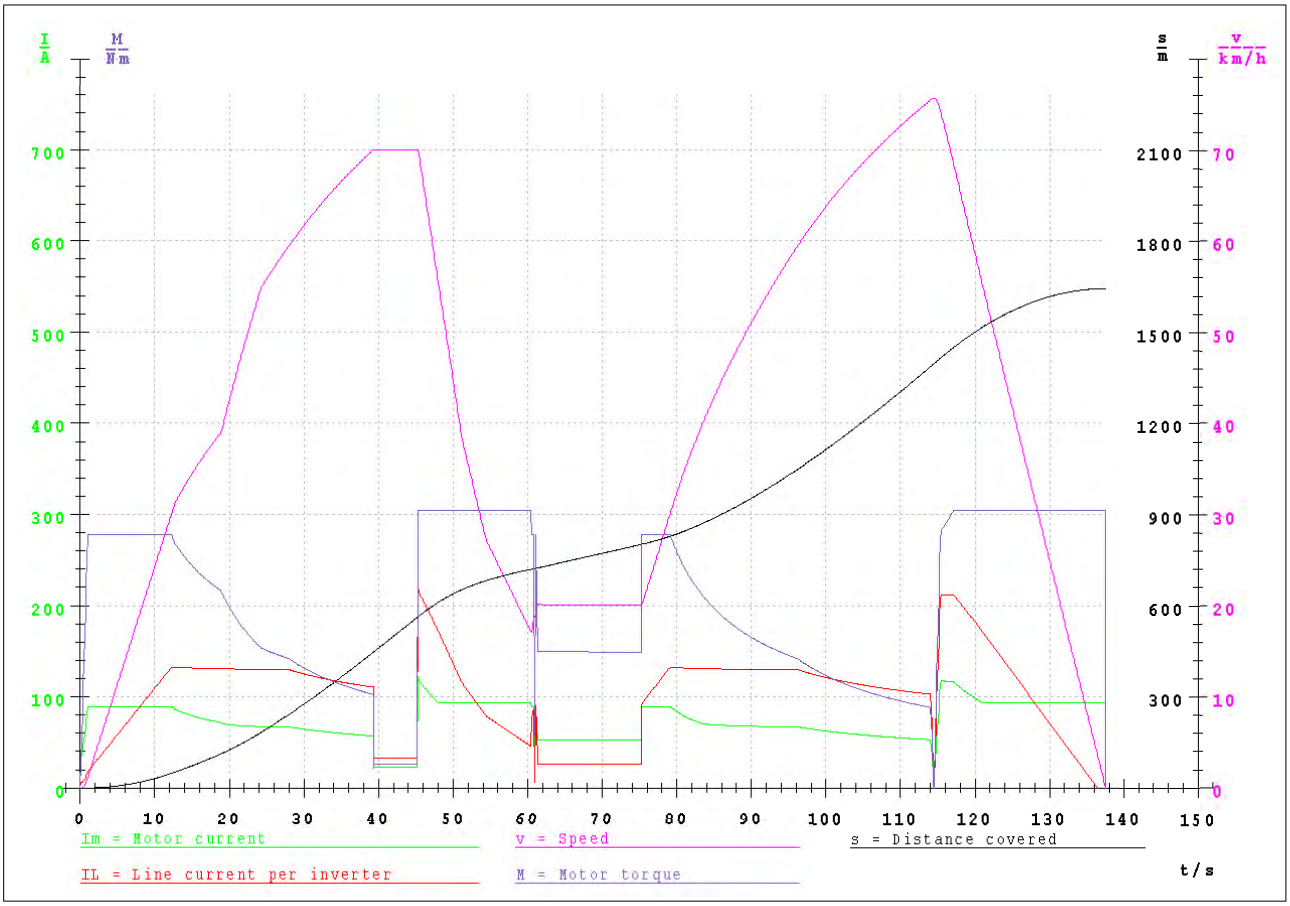
09070707

Edinburgh Tram Network

Tram-AIR-OCT AW2
Saughton Road North-Balgreen Road

```
Weight of vehicle.............  54.84t
Pay load......................  18.47t
Line voltage Mo/Br............  750V/ 900V
Distance between stops..... 1642.0m
Dwell time....................  25.0s
Wheel diameter................  590mm
Gear ratio....................  5.440/ 1
Max. acceleration.............  1.20m/s²
Max. deceleration.............   .95m/s²
Mean deceleration.............   .90m/s²
Adhesion coefficient Mo/Br.....  .10 / .13
RMS line current tot/Mo.......  616A/ 542A
Journey speed.................  36.4km/h
RMS motor current.............   70A
Energy drawn from line..... 11548.3Wh
Dynamic brake energy..........  6850.8Wh
Total energy consumption.....  4697.5Wh
  51m/ 0.0%/ 70km/h -   60m/ 2.8%/ 70km/h
  70m/-4.1%/ 70km/h -  380m/ 0.0%/ 70km/h
  90m/ 5.8%/ 20km/h -   30m/ 0.0%/ 20km/h
 120m/-5.3%/ 20km/h -  841m/ -.2%/ 80km/h
```



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Abt. E2

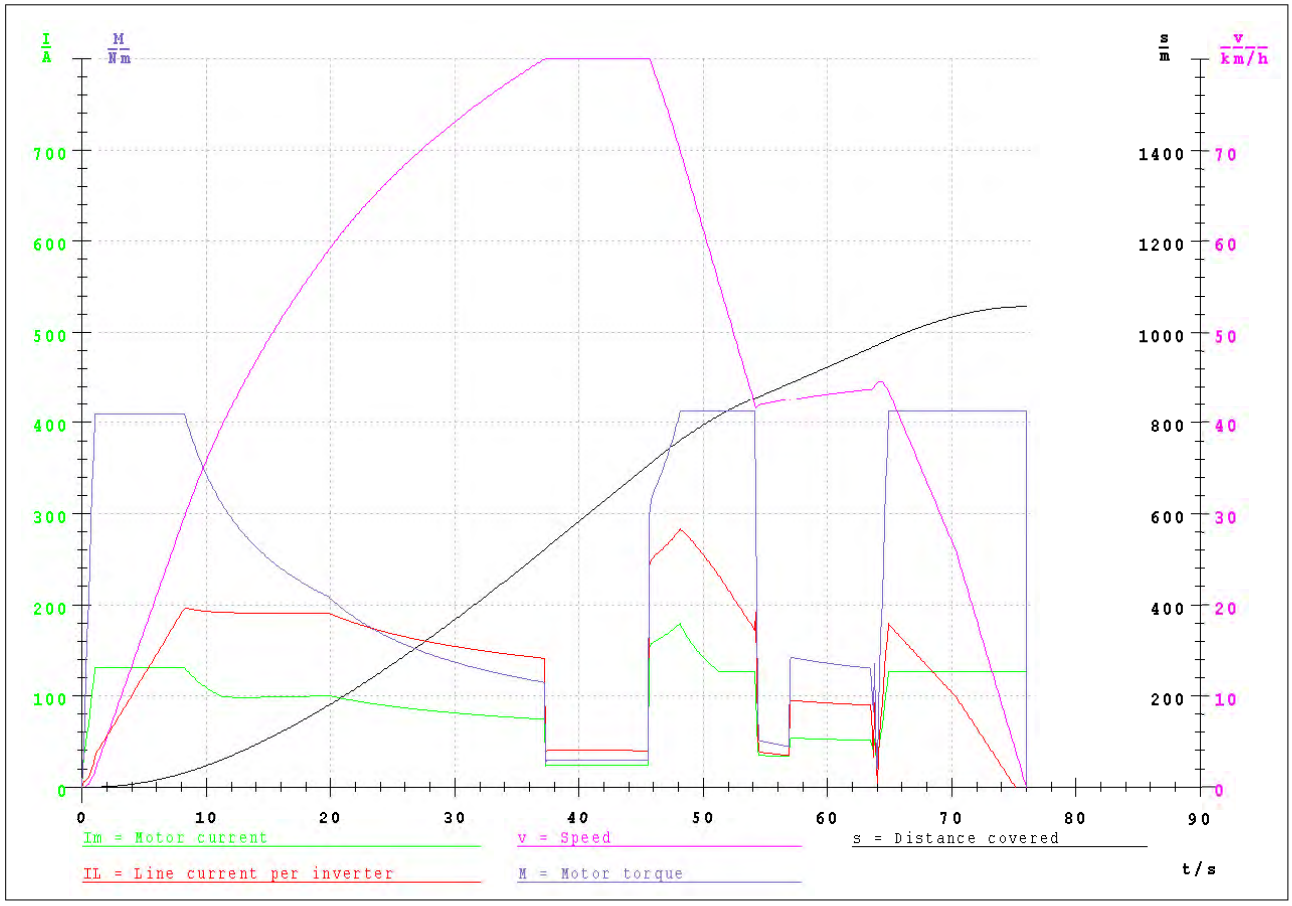
09.07.07
09070708

Edinburgh Tram Network

Tram-AIR-OCT AW2
Balgreen Road-Murrayfield

Weight of vehicle	54.84t
Pay load	18.47t
Line voltage Mo/Br	750V/ 900V
Distance between stops	1057.0m
Dwell time	25.0s
Wheel diameter	590mm
Gear ratio	5.440/ 1
Max. acceleration	1.08m/s²
Max. deceleration	1.27m/s²
Mean deceleration	.90m/s²
Adhesion coefficient Mo/Br	.15 / .17
RMS line current tot/Mo	780A/ 749A
Journey speed	37.6km/h
RMS motor current	88A
Energy drawn from line	8673.4Wh
Dynamic brake energy	4721.5Wh
Total energy consumption	3951.9Wh

706m/ 0.0%/ 80km/h - 179m/ 0.0%/ 45km/h
80m/ 2.9%/ 45km/h - 70m/-4.0%/ 45km/h
22m/ 0.0%/ 20km/h - 0m/ 0.0%/ 20km/h



Vossloh KIEPE GmbH
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Abt. E2

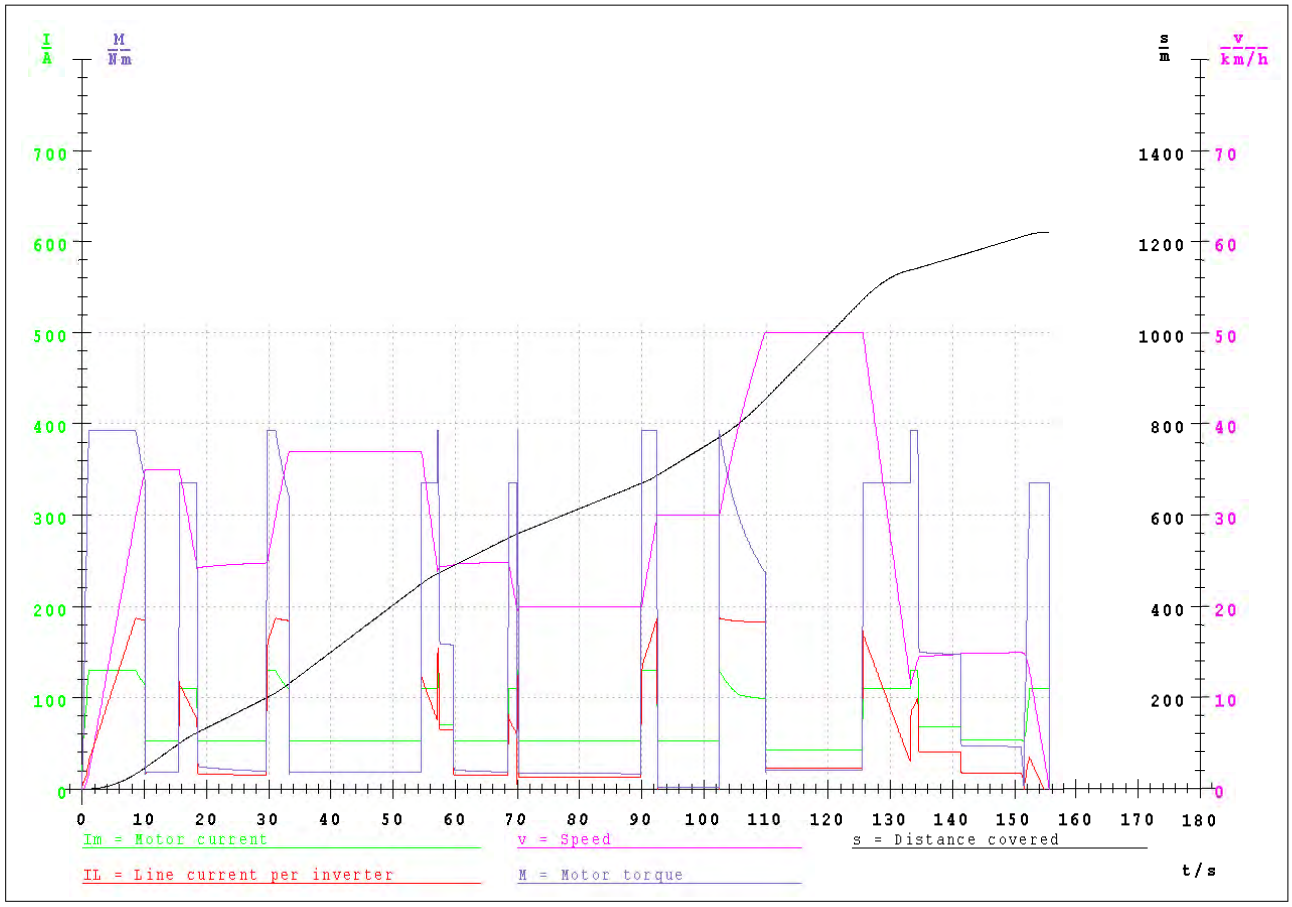
09.07.07
09070709

Edinburgh Tram Network

Tram-AIR-OCT AW2
Murrayfield-Haymarket ROJ included

Weight of vehicle	54.84t
Pay load	18.47t
Line voltage Mo/Br	750V/ 900V
Distance between stops	1221.0m
Dwell time	25.0s
Wheel diameter	590mm
Gear ratio	5.440/ 1
Max. acceleration	1.08m/s²
Max. deceleration	1.12m/s²
Mean deceleration	.90m/s²
Adhesion coefficient Mo/Br	.15 / .13
RMS line current tot/Mo	402A/ 402A
Journey speed	24.3km/h
RMS motor current	71A
Energy drawn from line	7174.9Wh
Dynamic brake energy	2091.9Wh
Total energy consumption	5083.0Wh

99m/ 0.0%/ 35km/h	-	100m/ 0.0%/ 25km/h
249m/ 0.0%/ 37km/h	-	40m/ 4.0%/ 25km/h
61m/ 0.0%/ 25km/h	-	120m/ 0.0%/ 20km/h
100m/ -.6%/ 30km/h	-	300m/ 0.0%/ 50km/h
100m/ 3.8%/ 15km/h	-	52m/ .9%/ 15km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

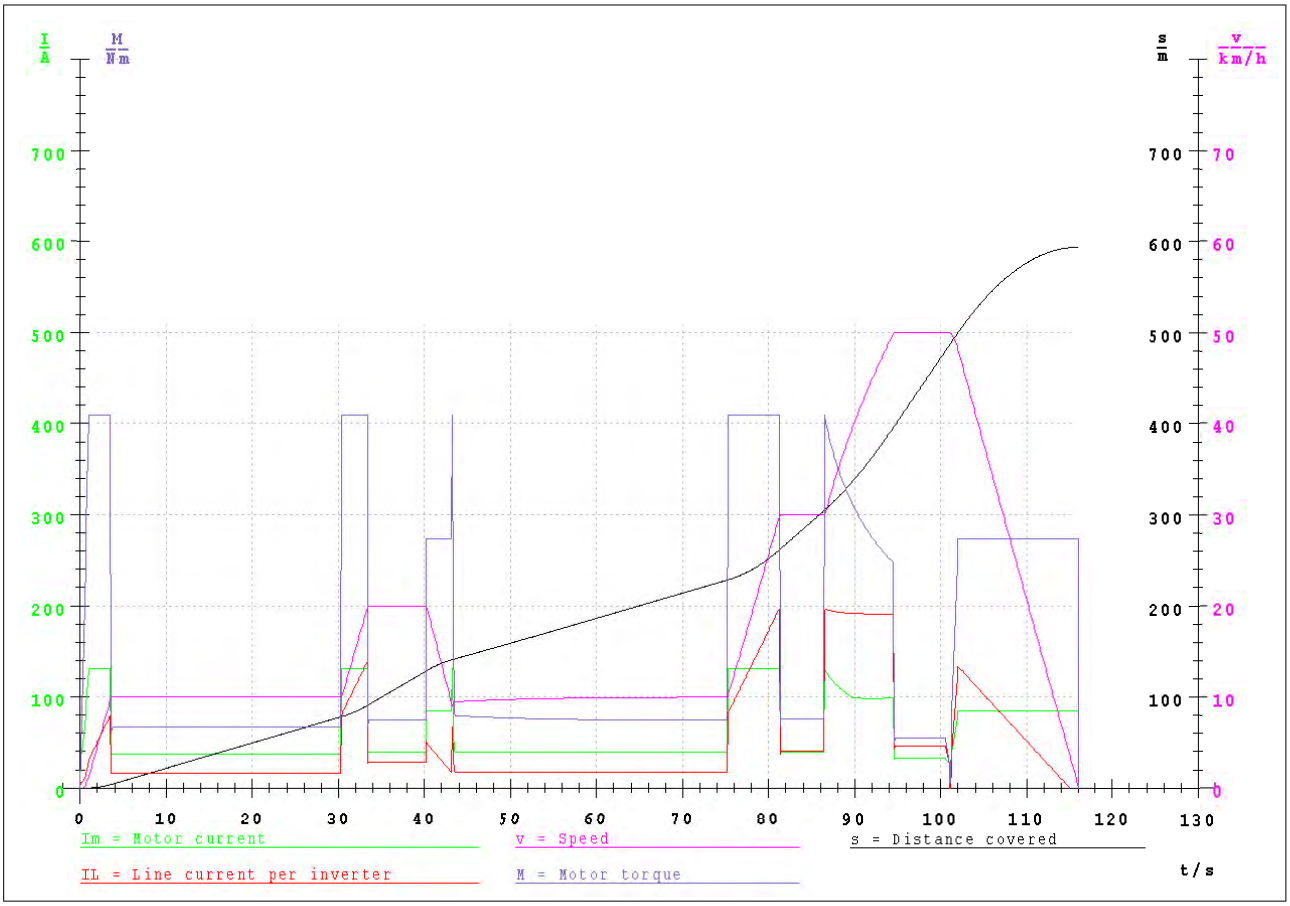
09.07.07
09070710

Edinburgh Tram Network

Tram-AIR-OCT AW2
Haymarket-Shandwick Place

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	594.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	.94m/s²
Max. deceleration.....	.96m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .11
RMS line current tot/Mo.....	392A/ 364A
Journey speed.....	15.2km/h
RMS motor current.....	62A
Energy drawn from line.....	5753.3Wh
Dynamic brake energy.....	1539.9Wh
Total energy consumption.....	4213.4Wh

78m/ 1.5%/ 10km/h -	50m/ 1.7%/ 20km/h
100m/ 1.7%/ 10km/h -	76m/ 1.7%/ 30km/h
80m/ 1.1%/ 50km/h -	144m/ 1.0%/ 50km/h
66m/ 1.0%/ 40km/h -	0m/ 0.0%/ 0km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

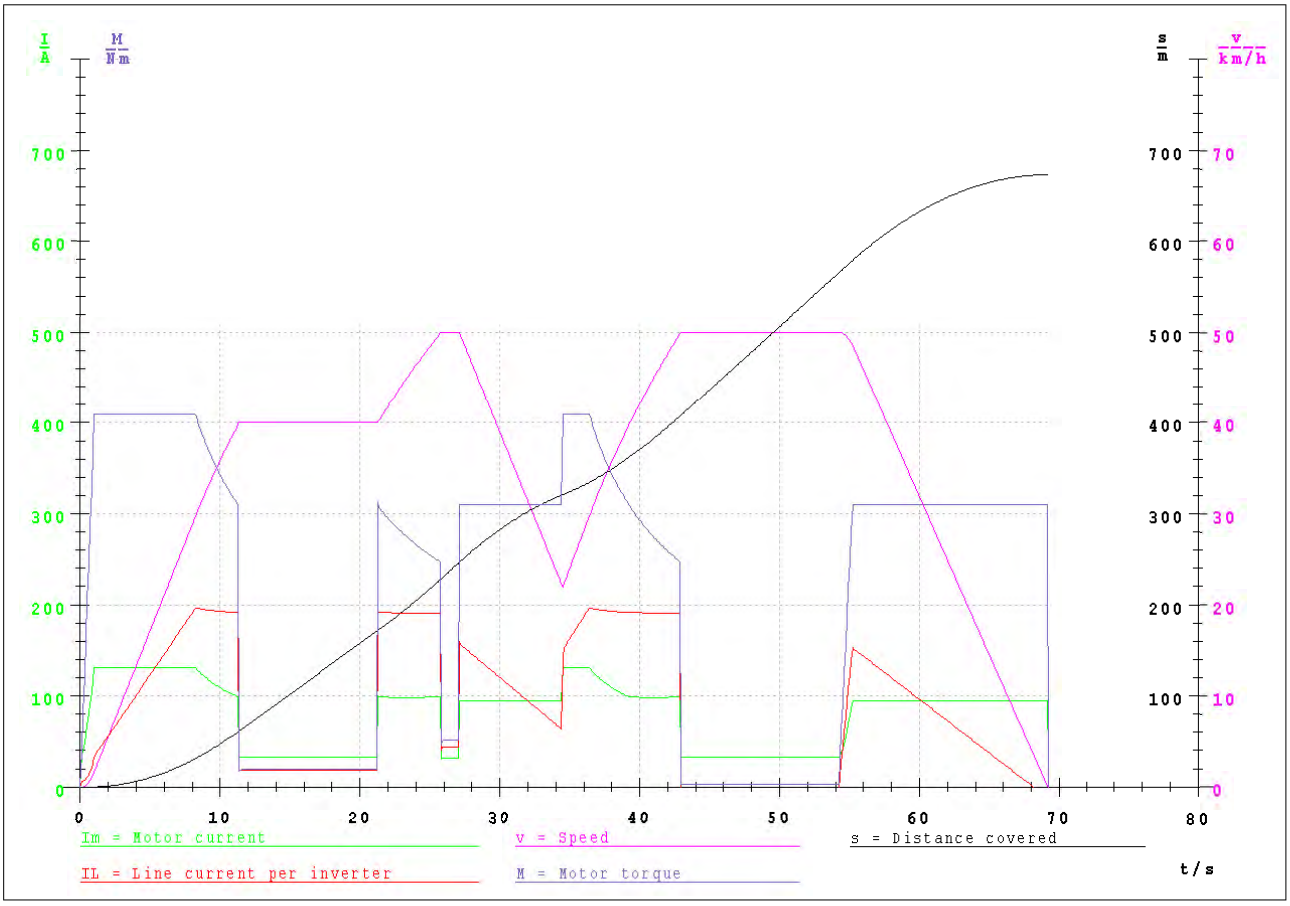
09.07.07
09070711

Edinburgh Tram Network

Tram-AIR-OCT AW2
Shandwick Place-Princes Street

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	673.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.08m/s²
Max. deceleration.....	.98m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .13
RMS line current tot/Mo.....	589A/ 553A
Journey speed.....	25.7km/h
RMS motor current.....	76A
Energy drawn from line.....	5200.3Wh
Dynamic brake energy.....	2716.3Wh
Total energy consumption.....	2484.1Wh

170m/ 0.0%/ 40km/h - 75m/ .9%/ 50km/h
75m/ .9%/ 20km/h - 260m/ -.7%/ 50km/h
93m/ 0.0%/ 50km/h - 0m/ 1.0%/ 50km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

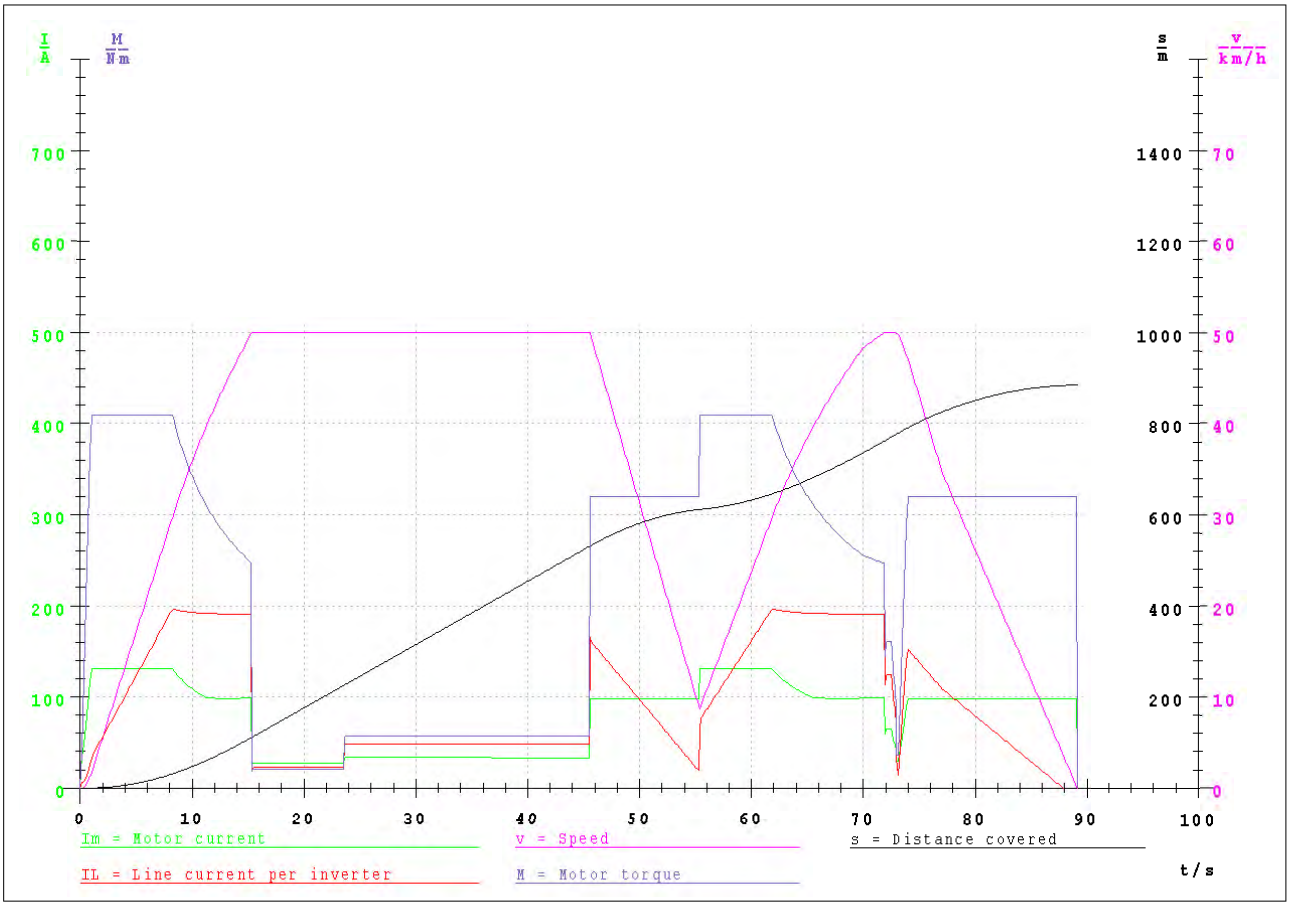
09.07.07
09070712

Edinburgh Tram Network

Tram-AIR-OCT AW2
Princes Street-St Andrew Square

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	884.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.08m/s²
Max. deceleration.....	1.13m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .13
RMS line current tot/Mo.....	600A/ 572A
Journey speed.....	27.9km/h
RMS motor current.....	79A
Energy drawn from line.....	7972.7Wh
Dynamic brake energy.....	2920.5Wh
Total energy consumption.....	5052.2Wh

224m/ 0.0%/ 50km/h - 305m/ 1.1%/ 50km/h
82m/ 1.9%/ 10km/h - 123m/ 1.9%/ 50km/h
50m/ 4.1%/ 50km/h - 40m/ 1.3%/ 50km/h
60m/-2.1%/ 50km/h - 0m/-2.1%/ 50km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

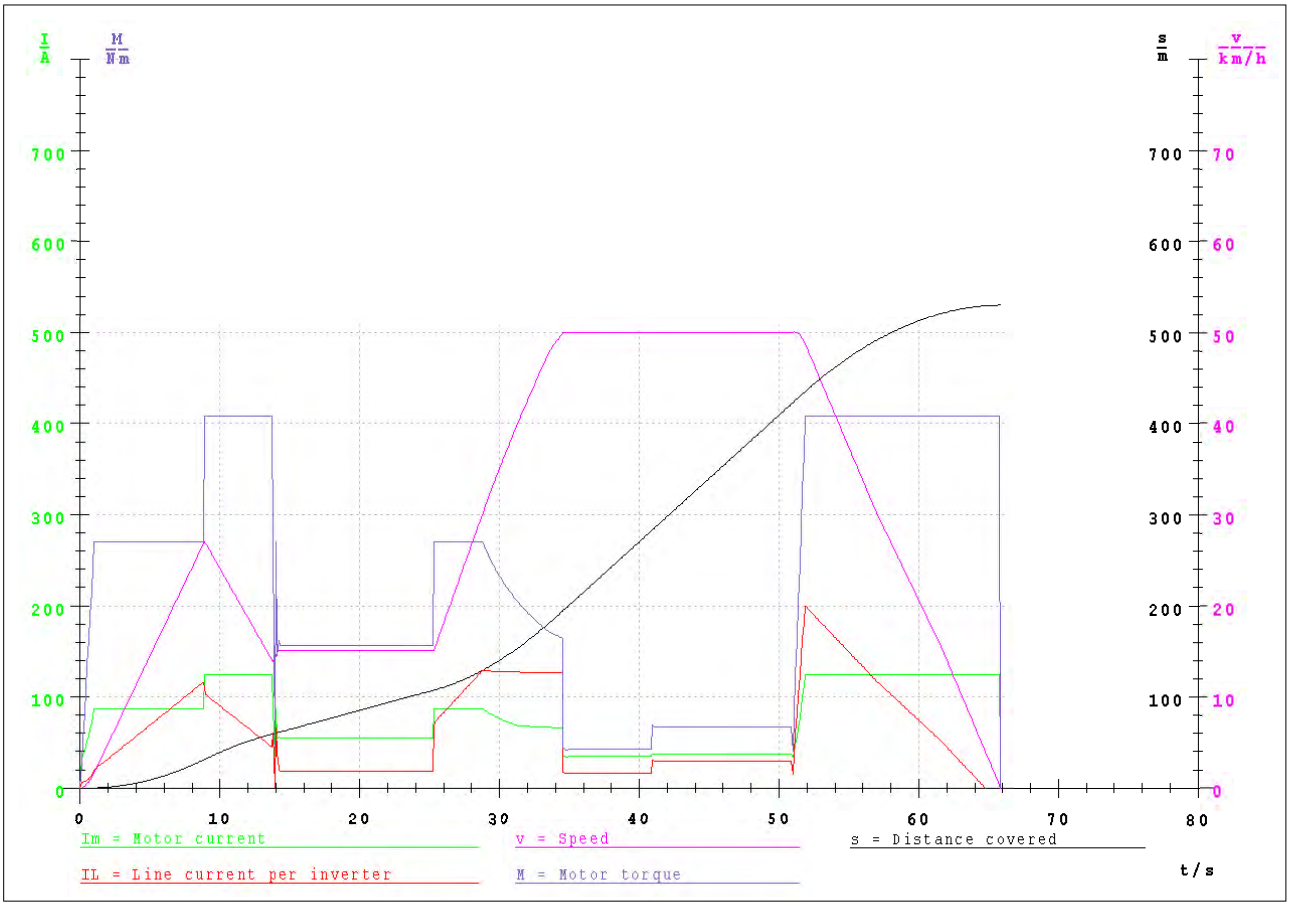
09.07.07
09070713

Edinburgh Tram Network

Tram-AIR-OCT AW2
St Andrew Square-Picardy Place

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	530.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.20m/s²
Max. deceleration.....	1.01m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.10 / .17
RMS line current tot/Mo.....	397A/ 293A
Journey speed.....	21.0km/h
RMS motor current.....	72A
Energy drawn from line.....	2058.0Wh
Dynamic brake energy.....	3513.1Wh
Total energy consumption.....	-1455.1Wh

30m/-2.1%/ 50km/h -	77m/-5.5%/ 15km/h
73m/-5.5%/ 50km/h -	100m/-2.0%/ 50km/h
210m/-2.8%/ 50km/h -	30m/-4.0%/ 50km/h
10m/-2.6%/ 40km/h -	0m/ 0.0%/ 50km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

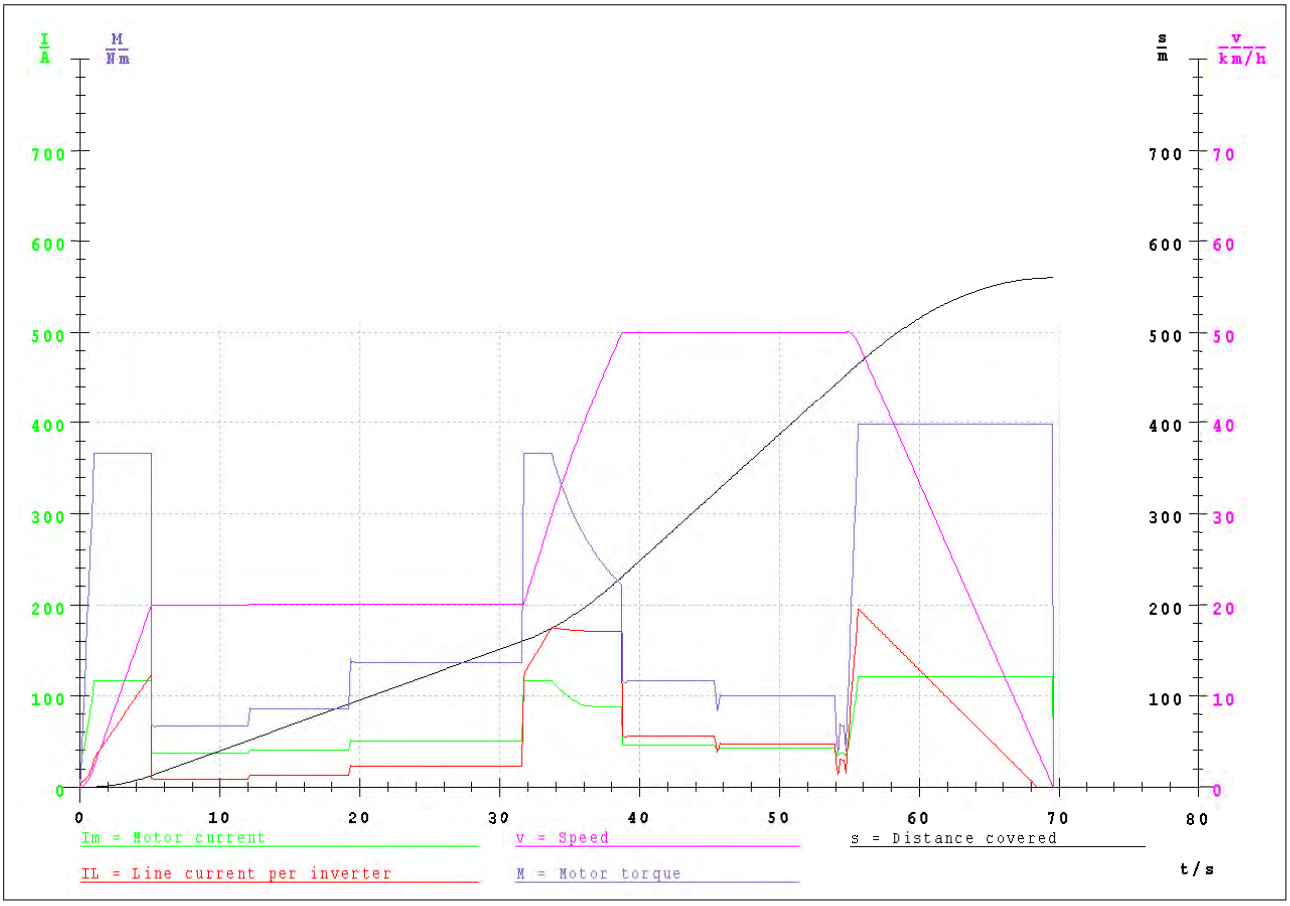
09.07.07
09070714

Edinburgh Tram Network

Tram-AIR-OCT AW2
Picardy Place-McDonald Road

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	560.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.20m/s²
Max. deceleration.....	.98m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.14 / .16
RMS line current tot/Mo.....	413A/ 322A
Journey speed.....	21.3km/h
RMS motor current.....	67A
Energy drawn from line.....	1886.1Wh
Dynamic brake energy.....	3860.4Wh
Total energy consumption.....	-1974.3Wh

50m/-2.6%/ 20km/h - 40m/-3.2%/ 20km/h
70m/-4.9%/ 20km/h - 160m/-4.3%/ 50km/h
120m/-3.8%/ 50km/h - 120m/-2.8%/ 50km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

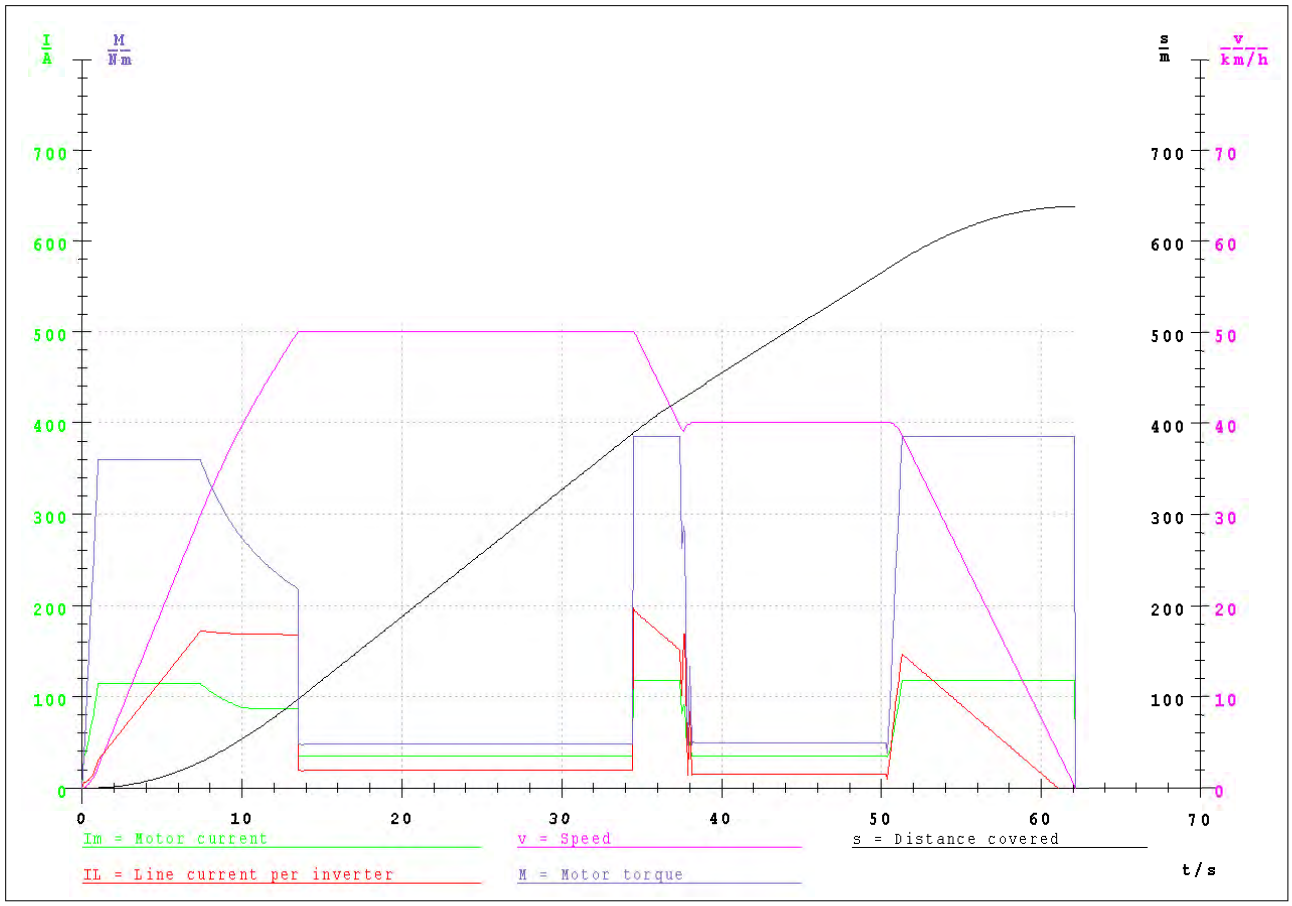
09.07.07
09070715

Edinburgh Tram Network

Tram-AIR-OCT AW2
McDonald Road-Balfour Street

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	638.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.20m/s²
Max. deceleration.....	.99m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.13 / .16
RMS line current tot/Mo.....	426A/ 386A
Journey speed.....	26.4km/h
RMS motor current.....	66A
Energy drawn from line.....	2186.9Wh
Dynamic brake energy.....	2846.5Wh
Total energy consumption.....	-659.7Wh

50m/-2.8%/ 45km/h - 337m/-2.2%/ 50km/h
200m/-2.2%/ 40km/h - 51m/-2.2%/ 30km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

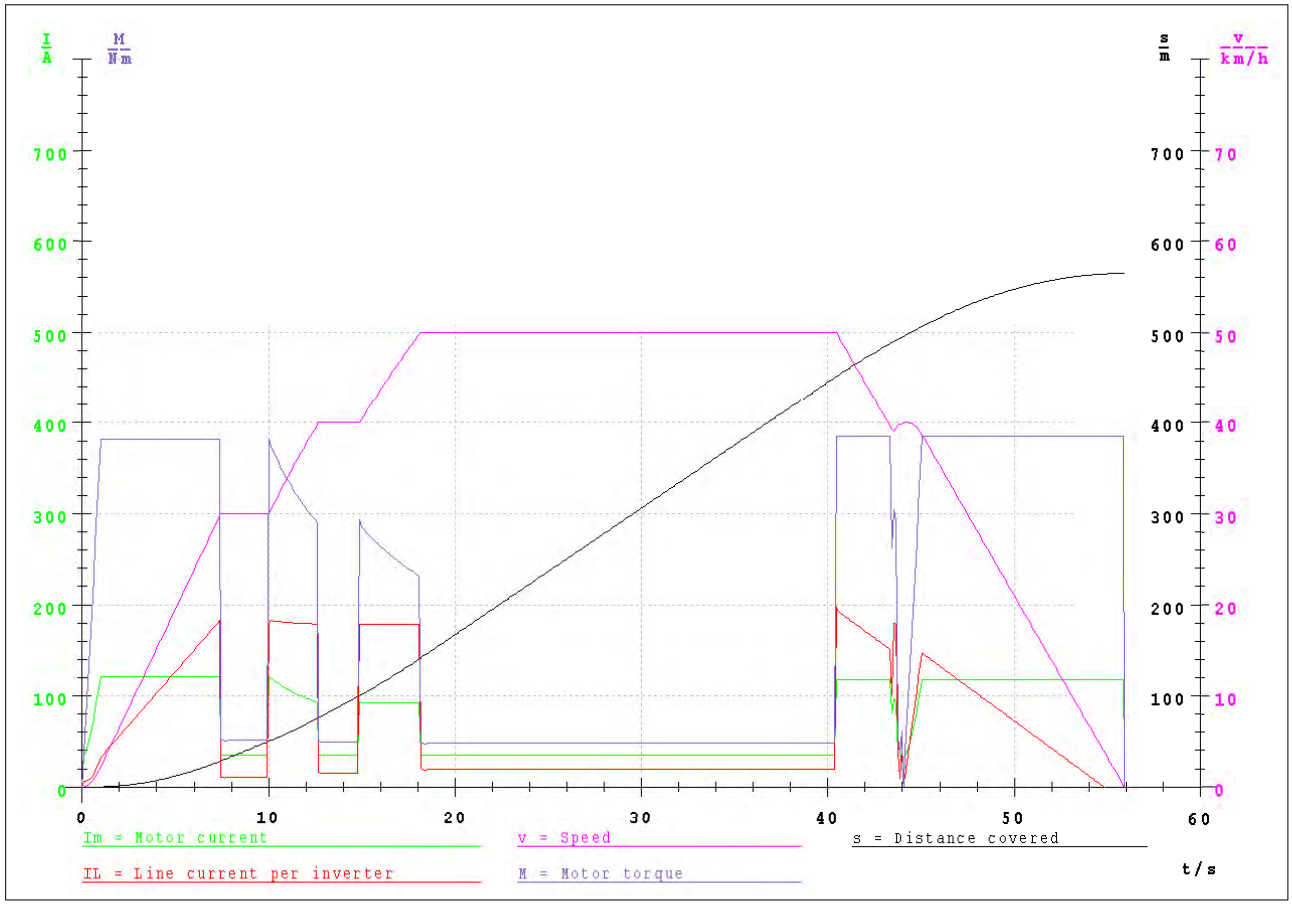
09.07.07
09070716

Edinburgh Tram Network

Tram-AIR-OCT AW2
Balfour Street-Foot of the Walk

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	564.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.20m/s²
Max. deceleration.....	.99m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.14 / .16
RMS line current tot/Mo.....	455A/ 416A
Journey speed.....	25.1km/h
RMS motor current.....	70A
Energy drawn from line.....	2293.5Wh
Dynamic brake energy.....	2693.6Wh
Total energy consumption.....	-400.0Wh

49m/-2.2%/ 30km/h - 50m/-2.2%/ 40km/h
83m/-2.2%/ 50km/h - 267m/-2.2%/ 50km/h
50m/-2.2%/ 40km/h - 65m/-2.2%/ 30km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

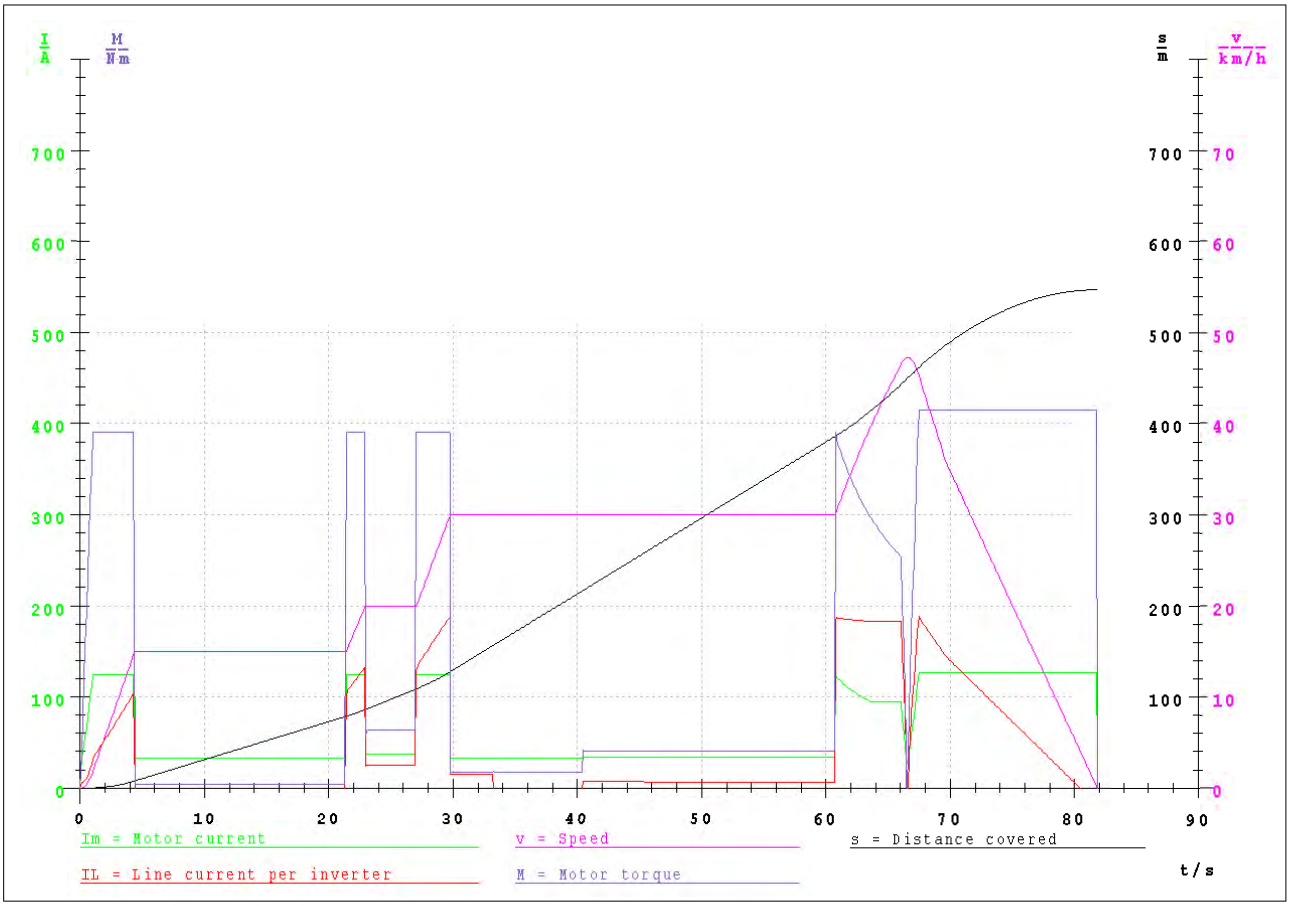
09.07.07
09070717

Edinburgh Tram Network

Tram-AIR-OCT AW2
Foot of the Walk-Constitution Street

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	548.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.08m/s²
Max. deceleration.....	1.21m/s²
Mean deceleration.....	.88m/s²
Adhesion coefficient Mo/Br.....	.15 / .17
RMS line current tot/Mo.....	390A/ 320A
Journey speed.....	18.4km/h
RMS motor current.....	67A
Energy drawn from line.....	2578.0Wh
Dynamic brake energy.....	2043.9Wh
Total energy consumption.....	534.1Wh

78m/ -.6%/ 15km/h - 30m/ 1.4%/ 20km/h
47m/ 0.0%/ 30km/h - 60m/-1.1%/ 30km/h
170m/-1.8%/ 30km/h - 100m/ -.8%/ 50km/h
63m/-5.0%/ 40km/h - 0m/ 0.0%/ 50km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

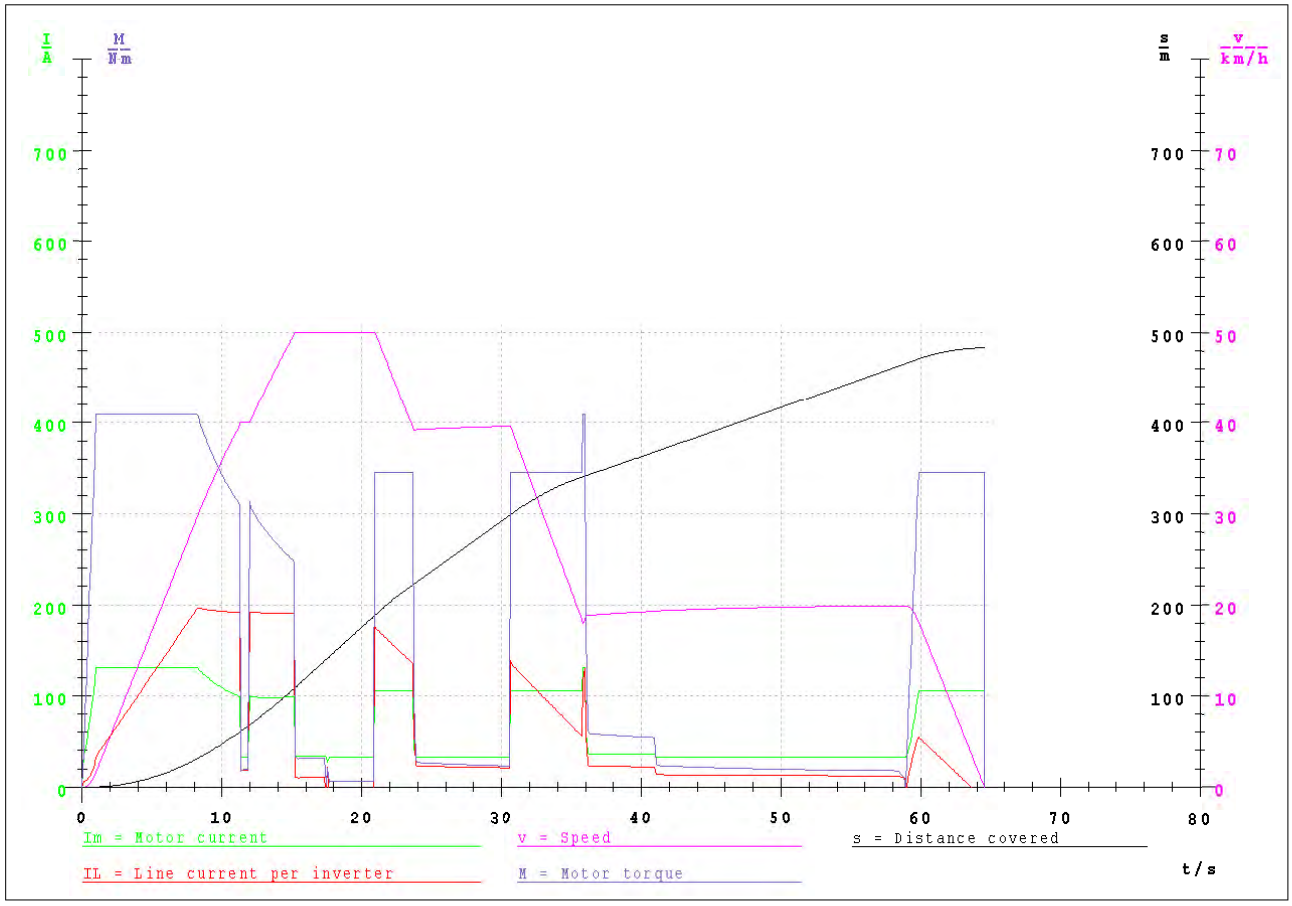
09.07.07
09070718

Edinburgh Tram Network

Tram-AIR-OCT AW2
Constitution Street-Ocean Drive

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	483.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.08m/s²
Max. deceleration.....	1.07m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .14
RMS line current tot/Mo.....	441A/ 439A
Journey speed.....	19.4km/h
RMS motor current.....	66A
Energy drawn from line.....	3264.6Wh
Dynamic brake energy.....	1593.6Wh
Total energy consumption.....	1671.0Wh

67m/ 0.0%/ 40km/h - 70m/-1.6%/ 50km/h
50m/ -.8%/ 50km/h - 110m/ 0.0%/ 40km/h
70m/ .9%/ 20km/h - 116m/ 0.0%/ 20km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

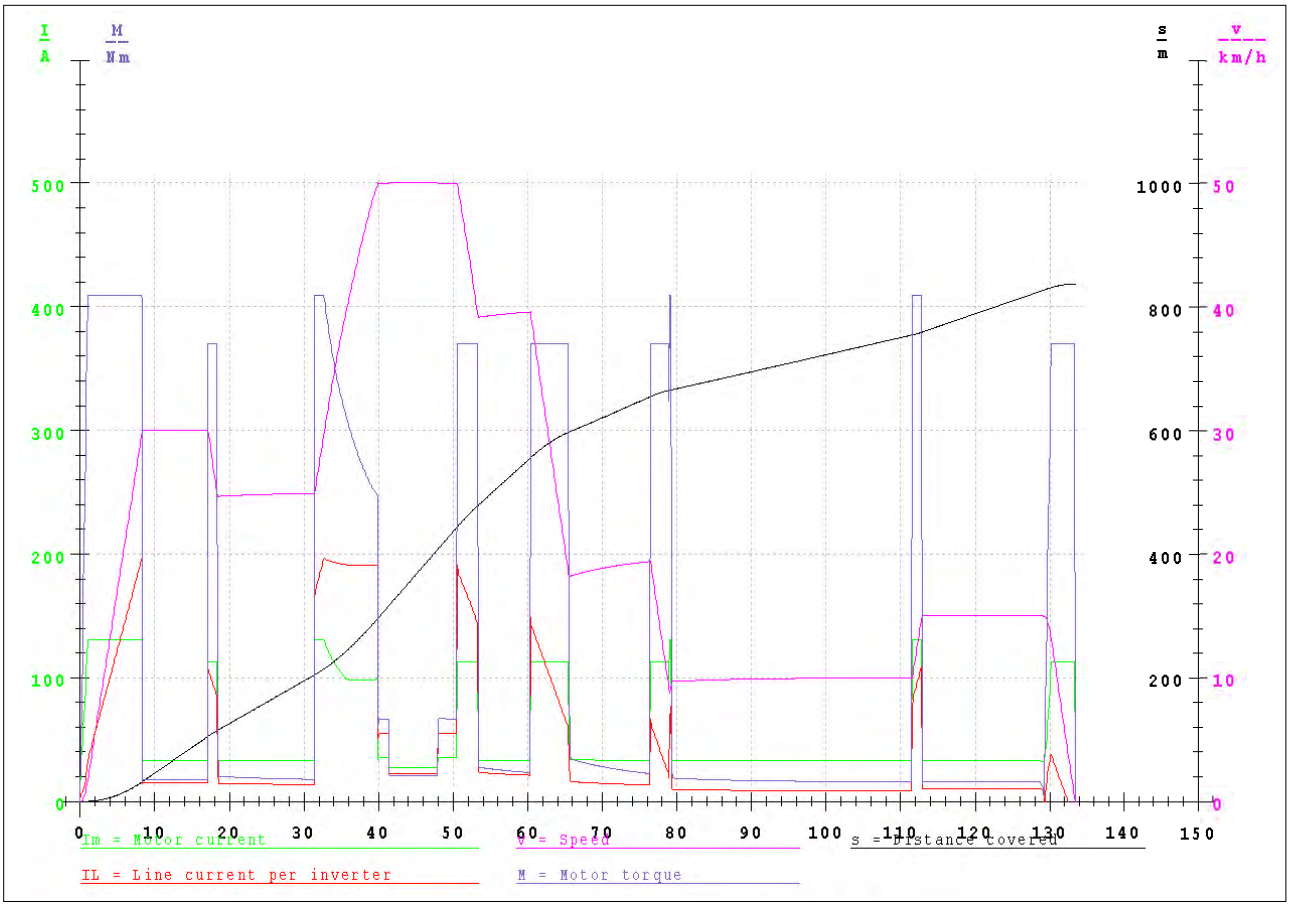
09.07.07
09070719

Edinburgh Tram Network

Tram-AIR-OCT AW2
Ocean Drive-Ocean Terminal

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	837.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.08m/s²
Max. deceleration.....	1.14m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .15
RMS line current tot/Mo.....	377A/ 377A
Journey speed.....	19.0km/h
RMS motor current.....	60A
Energy drawn from line.....	5123.2Wh
Dynamic brake energy.....	1935.9Wh
Total energy consumption.....	3187.3Wh

104m/ 0.0%/ 30km/h -	100m/ 0.0%/ 25km/h
80m/ 0.0%/ 50km/h -	30m/ 1.3%/ 50km/h
90m/ 0.0%/ 50km/h -	38m/ 1.3%/ 50km/h
24m/-1.3%/ 40km/h -	88m/ 0.0%/ 40km/h
100m/ 0.0%/ 20km/h -	100m/ 0.0%/ 10km/h
83m/ 0.0%/ 15km/h -	0m/ 0.0%/ 70km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

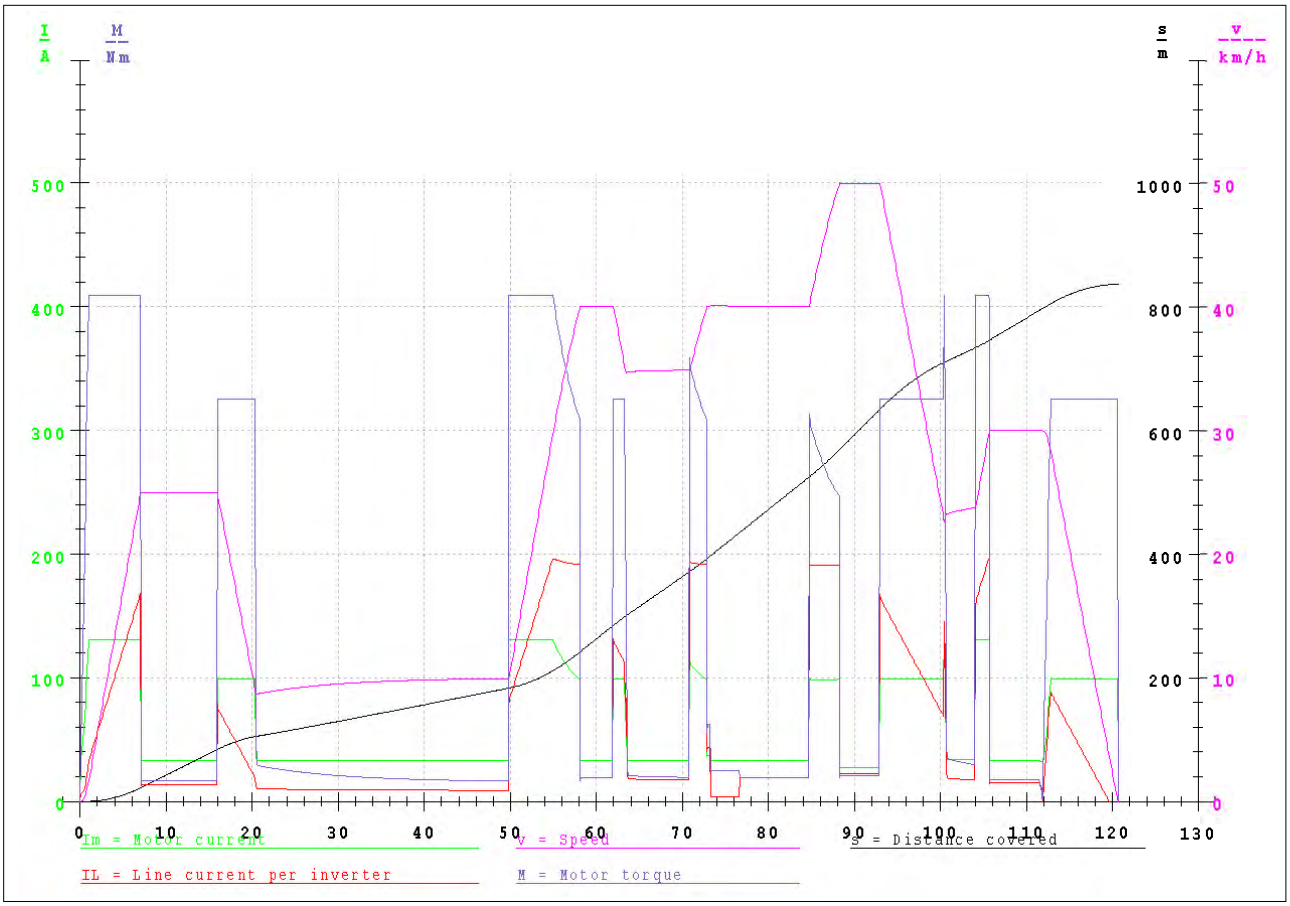
12.07.07
12070700

Edinburgh Tram Network

Tram-OCT-AIR AW2
Ocean Terminal-Ocean Drive

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	837.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.08m/s²
Max. deceleration.....	1.01m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .13
RMS line current tot/Mo.....	426A/ 421A
Journey speed.....	20.7km/h
RMS motor current.....	65A
Energy drawn from line.....	5477.0Wh
Dynamic brake energy.....	2426.2Wh
Total energy consumption.....	3050.8Wh

83m/ 0.0%/ 25km/h -	100m/ 0.0%/ 10km/h
100m/ 0.0%/ 40km/h -	88m/ 0.0%/ 35km/h
24m/ 1.3%/ 40km/h -	38m/-1.3%/ 40km/h
90m/ 0.0%/ 40km/h -	30m/-1.3%/ 50km/h
80m/ 0.0%/ 50km/h -	100m/ 0.0%/ 25km/h
104m/ 0.0%/ 30km/h -	0m/ 0.0%/ 70km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

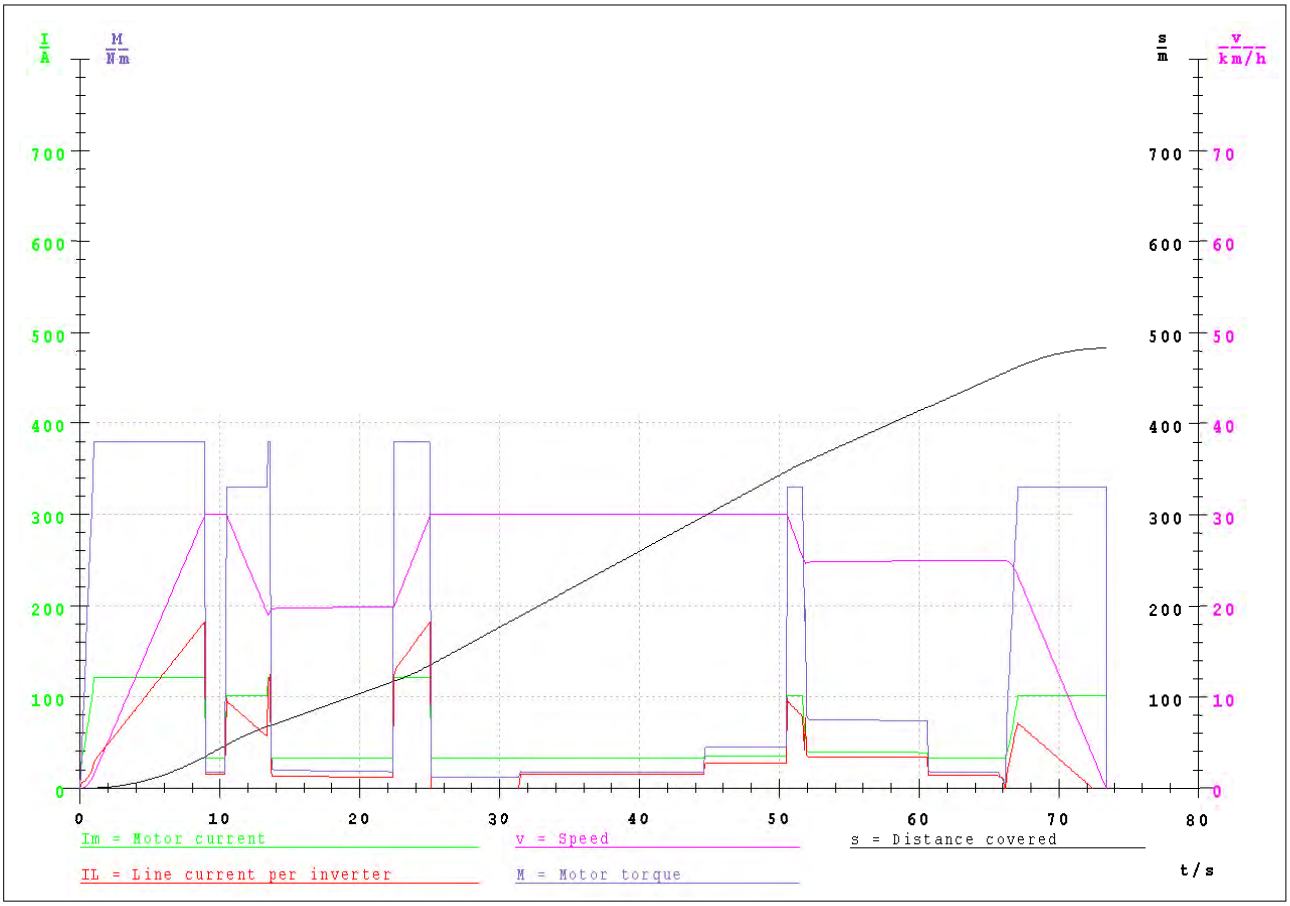
12.07.07
12070701

Edinburgh Tram Network

Tram-OCT-AIR AW2
Ocean Drive-Constitution Street

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	483.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.08m/s²
Max. deceleration.....	1.02m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.14 / .13
RMS line current tot/Mo.....	292A/ 285A
Journey speed.....	17.7km/h
RMS motor current.....	58A
Energy drawn from line.....	2705.5Wh
Dynamic brake energy.....	807.2Wh
Total energy consumption.....	1898.4Wh

46m/ 0.0%/ 30km/h -	70m/ 0.0%/ 20km/h
70m/ -.9%/ 30km/h -	110m/ 0.0%/ 30km/h
50m/ .8%/ 30km/h -	70m/ 1.6%/ 25km/h
67m/ 0.0%/ 25km/h -	0m/ 0.0%/ 50km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

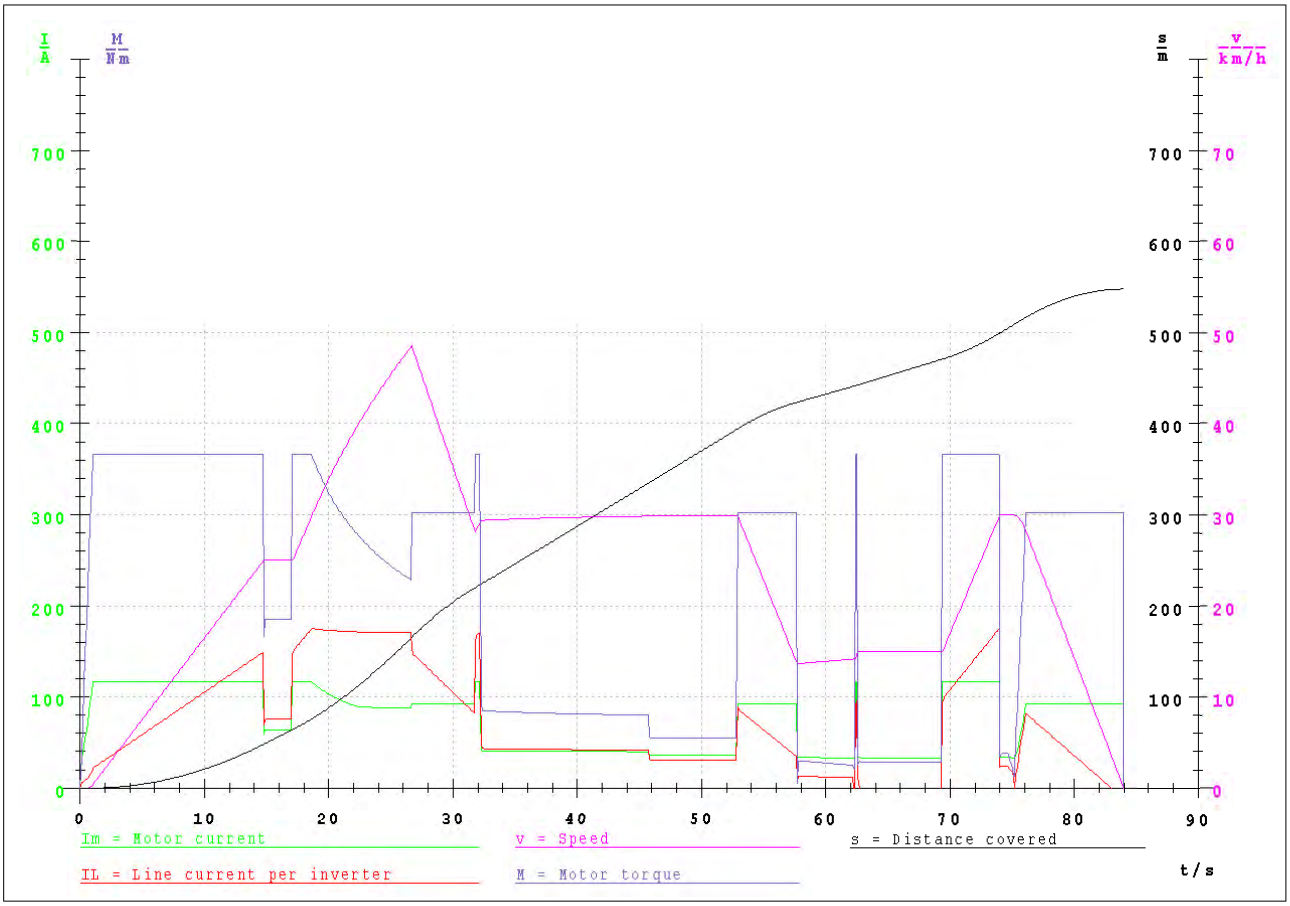
12.07.07
12070702

Edinburgh Tram Network

Tram-OCT-AIR AW2
Constitution Street-Foot of the Walk

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	548.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.08m/s²
Max. deceleration.....	1.00m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.14 / .12
RMS line current tot/Mo.....	465A/ 458A
Journey speed.....	18.1km/h
RMS motor current.....	72A
Energy drawn from line.....	5750.9Wh
Dynamic brake energy.....	1781.8Wh
Total energy consumption.....	3969.1Wh

13m/ 5.0%/ 30km/h - 50m/ 5.0%/ 25km/h
100m/ .8%/ 50km/h - 170m/ 1.8%/ 30km/h
60m/ 1.1%/ 30km/h - 47m/ 0.0%/ 15km/h
30m/-1.4%/ 15km/h - 78m/ .6%/ 30km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

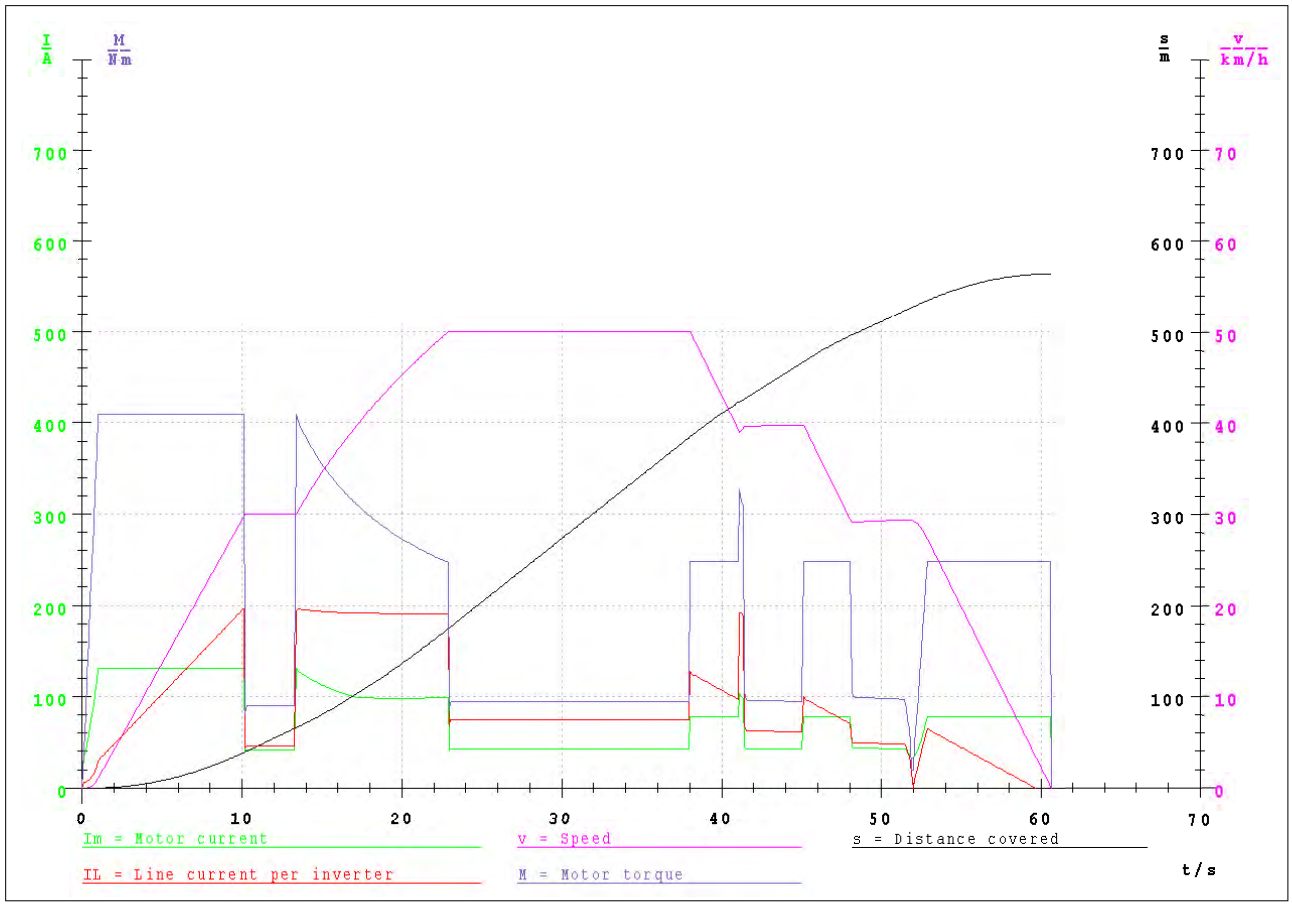
12.07.07
12070703

Edinburgh Tram Network

Tram-OCT-AIR AW2
Foot of the Walk-Balfour Street

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	564.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	.88m/s²
Max. deceleration.....	.98m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .10
RMS line current tot/Mo.....	538A/ 534A
Journey speed.....	23.7km/h
RMS motor current.....	69A
Energy drawn from line.....	5794.6Wh
Dynamic brake energy.....	1262.2Wh
Total energy consumption.....	4532.5Wh

65m/ 2.2%/ 30km/h - 317m/ 2.2%/ 50km/h
83m/ 2.2%/ 40km/h - 99m/ 2.2%/ 30km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

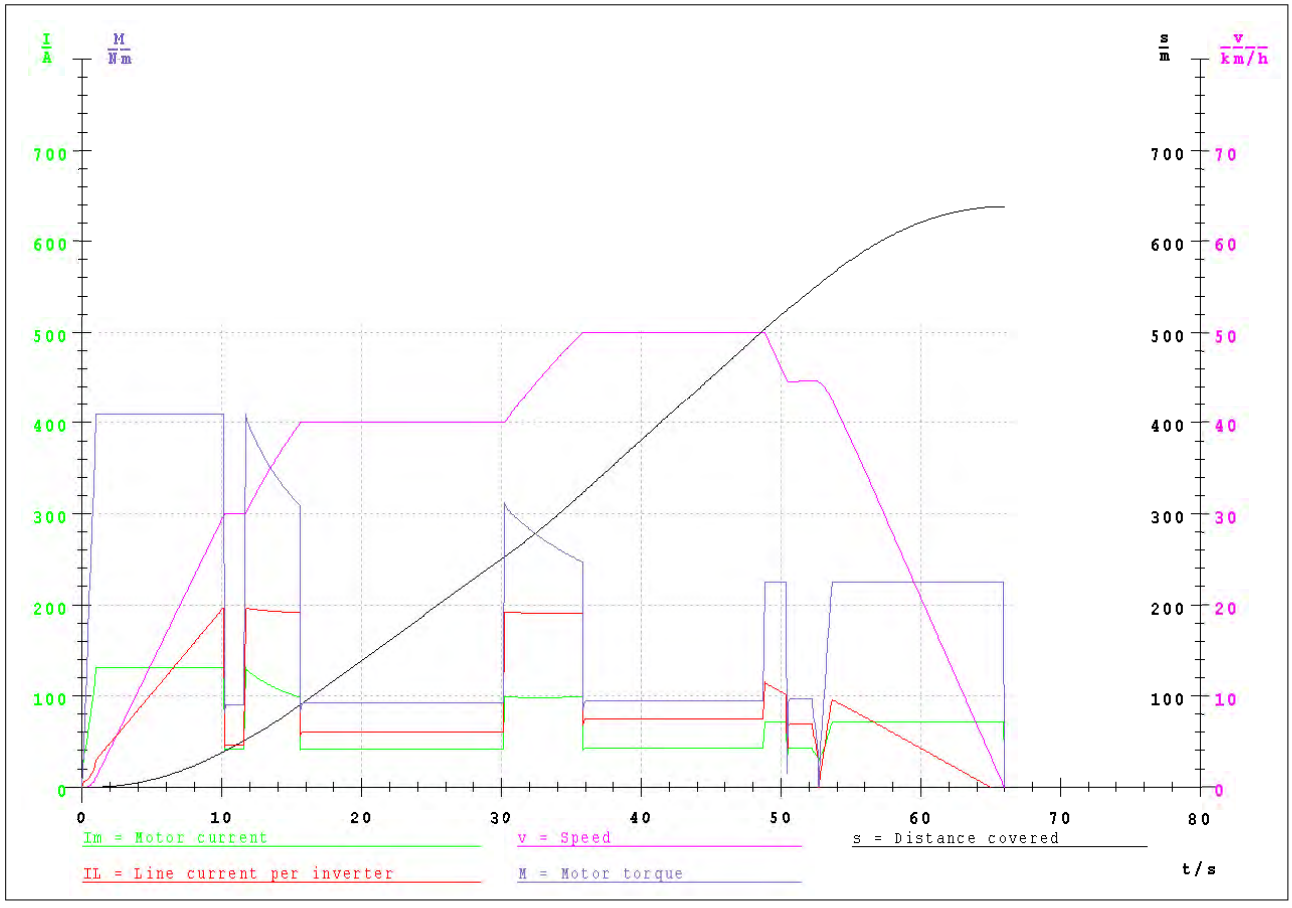
12.07.07
12070704

Edinburgh Tram Network

Tram-OCT-AIR AW2
Balfour Street-McDonald Road

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	638.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	.88m/s²
Max. deceleration.....	.97m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .09
RMS line current tot/Mo.....	524A/ 509A
Journey speed.....	25.3km/h
RMS motor current.....	66A
Energy drawn from line.....	6218.6Wh
Dynamic brake energy.....	1140.7Wh
Total energy consumption.....	5077.9Wh

51m/ 2.2%/ 30km/h - 200m/ 2.2%/ 40km/h
250m/ 2.2%/ 50km/h - 87m/ 2.2%/ 45km/h
50m/ 2.8%/ 40km/h - 0m/ 0.0%/ 15km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

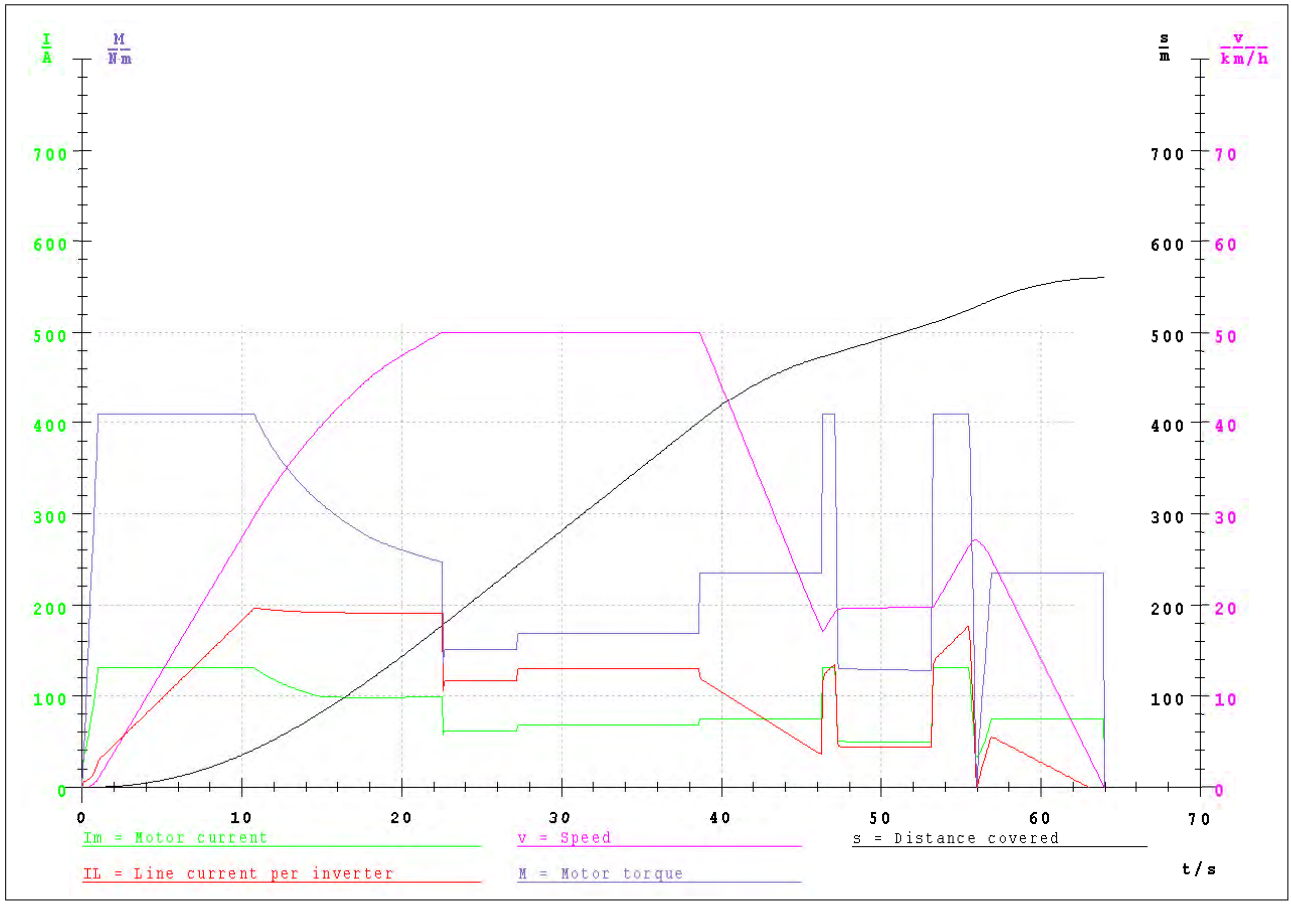
12.07.07
12070705

Edinburgh Tram Network

Tram-OCT-AIR AW2
McDonald Road-Picardy Place

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	560.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	.83m/s²
Max. deceleration.....	.99m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .09
RMS line current tot/Mo.....	631A/ 628A
Journey speed.....	22.7km/h
RMS motor current.....	77A
Energy drawn from line.....	7724.9Wh
Dynamic brake energy.....	1173.4Wh
Total energy consumption.....	6551.5Wh

120m/ 2.8%/ 50km/h - 120m/ 3.8%/ 50km/h
160m/ 4.3%/ 50km/h - 70m/ 4.9%/ 20km/h
40m/ 3.2%/ 20km/h - 50m/ 2.6%/ 50km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

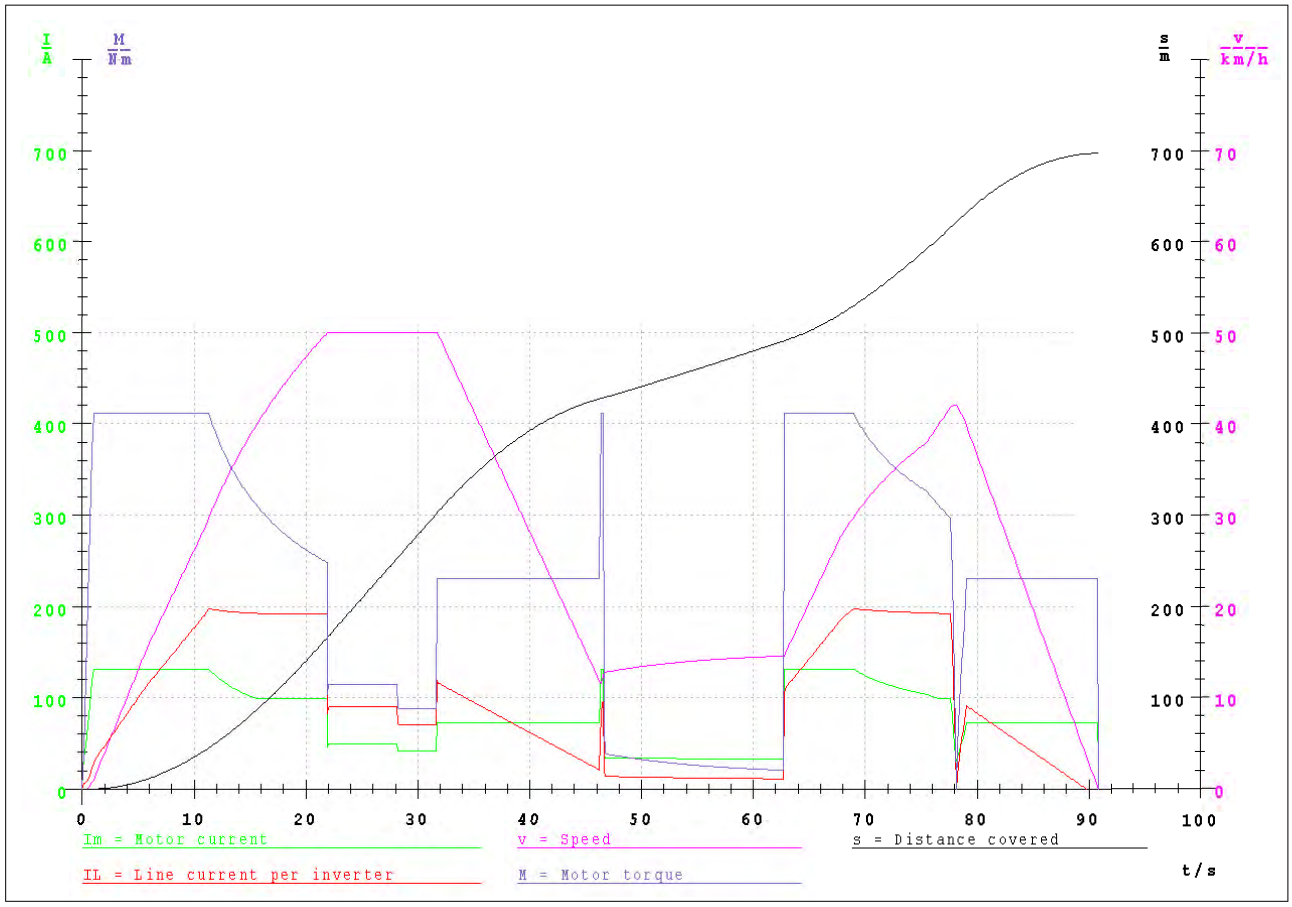
12.07.07
12070706

Edinburgh Tram Network

Tram-OCT-AIR AW2
Picardy Place-St Andrew Square

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	696.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.08m/s²
Max. deceleration.....	.97m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.16 / .09
RMS line current tot/Mo.....	619A/ 611A
Journey speed.....	21.7km/h
RMS motor current.....	78A
Energy drawn from line.....	8742.0Wh
Dynamic brake energy.....	2291.2Wh
Total energy consumption.....	6450.9Wh

10m/ 2.6%/ 50km/h -	30m/ 4.0%/ 50km/h
210m/ 2.8%/ 50km/h -	50m/ 2.0%/ 50km/h
190m/ 0.0%/ 15km/h -	30m/ 3.9%/ 50km/h
70m/ 6.4%/ 50km/h -	40m/ 3.3%/ 50km/h
66m/ 2.3%/ 50km/h -	0m/ 0.0%/ 50km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

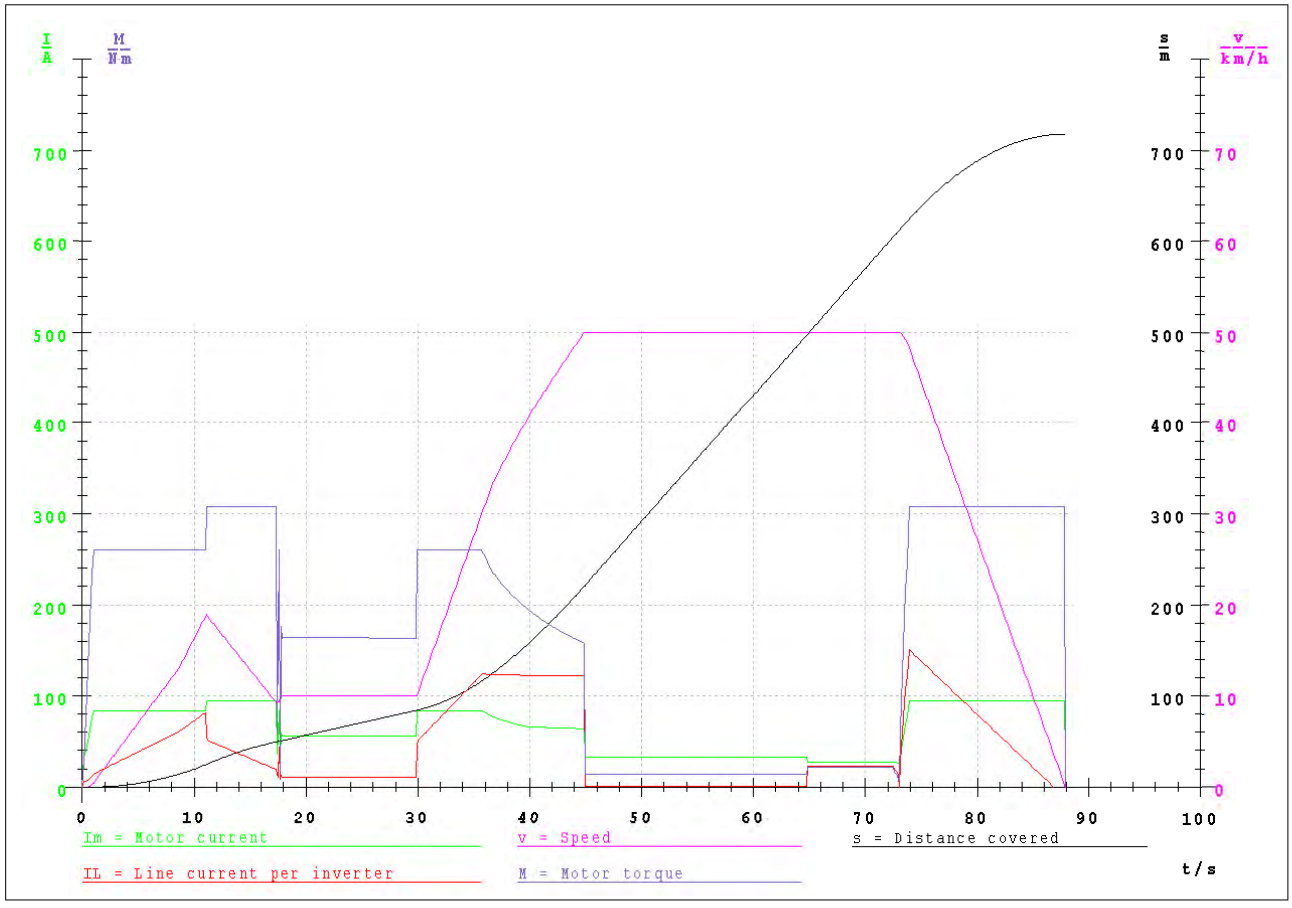
12.07.07
12070707

Edinburgh Tram Network

Tram-OCT-AIR AW2
St Andrew Square-Princes Street

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	718.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.20m/s²
Max. deceleration.....	.97m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.10 / .13
RMS line current tot/Mo.....	325A/ 268A
Journey speed.....	22.9km/h
RMS motor current.....	60A
Energy drawn from line.....	2870.9Wh
Dynamic brake energy.....	2106.3Wh
Total energy consumption.....	764.6Wh

14m/ 2.3%/ 50km/h - 10m/ 0.0%/ 50km/h
60m/-5.7%/ 10km/h - 40m/-3.1%/ 50km/h
370m/-1.1%/ 50km/h - 224m/ 0.0%/ 50km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

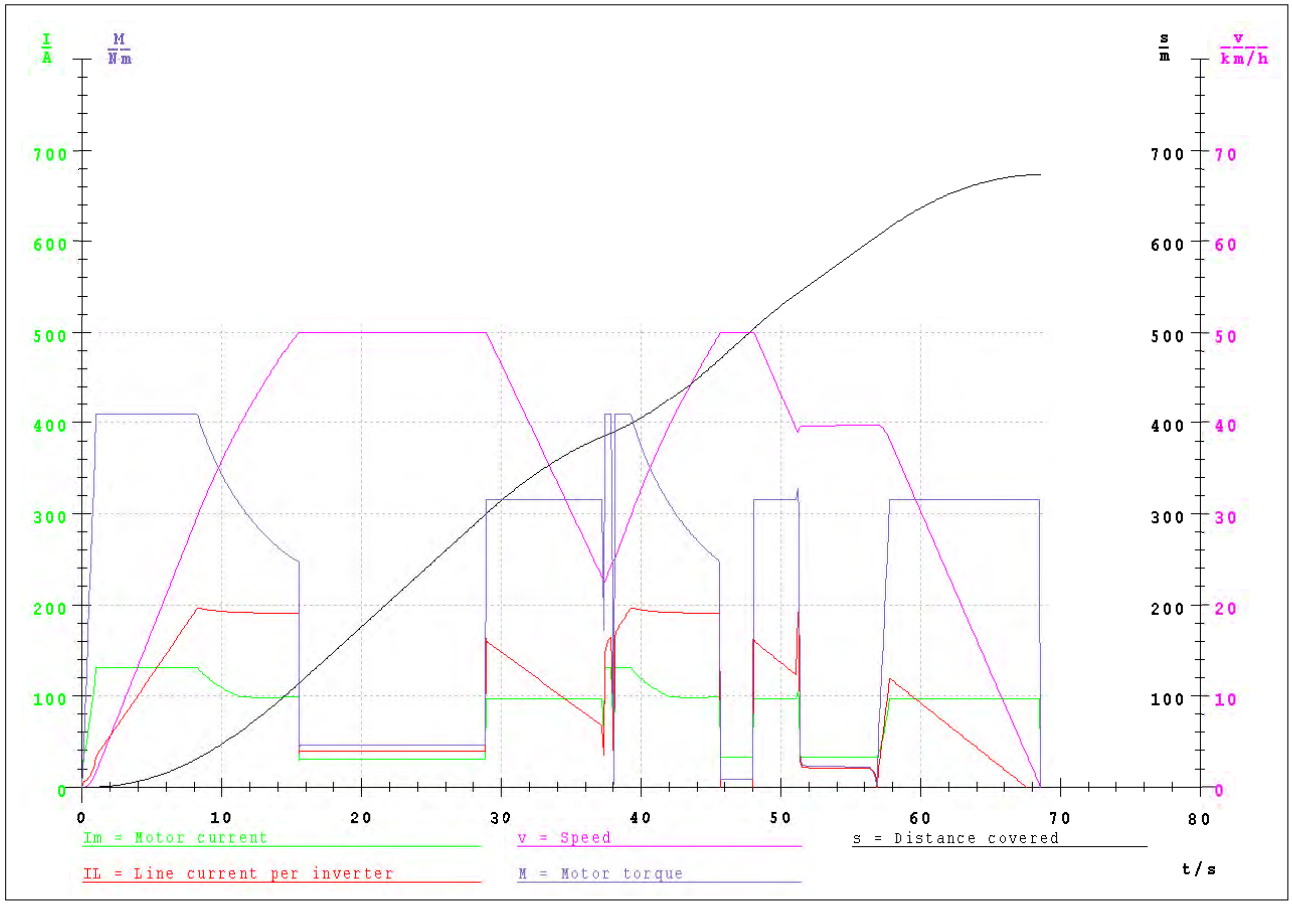
12.07.07
12070708

Edinburgh Tram Network

Tram-OCT-AIR AW2
Princes Street-Shandwick Place

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	673.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.08m/s²
Max. deceleration.....	.99m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .13
RMS line current tot/Mo.....	598A/ 582A
Journey speed.....	25.9km/h
RMS motor current.....	76A
Energy drawn from line.....	5587.7Wh
Dynamic brake energy.....	3030.4Wh
Total energy consumption.....	2557.3Wh

93m/ 0.0%/ 50km/h - 205m/ .7%/ 50km/h
91m/ -.9%/ 25km/h - 114m/ -.9%/ 50km/h
170m/ 0.0%/ 40km/h - 0m/ 0.0%/ 50km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

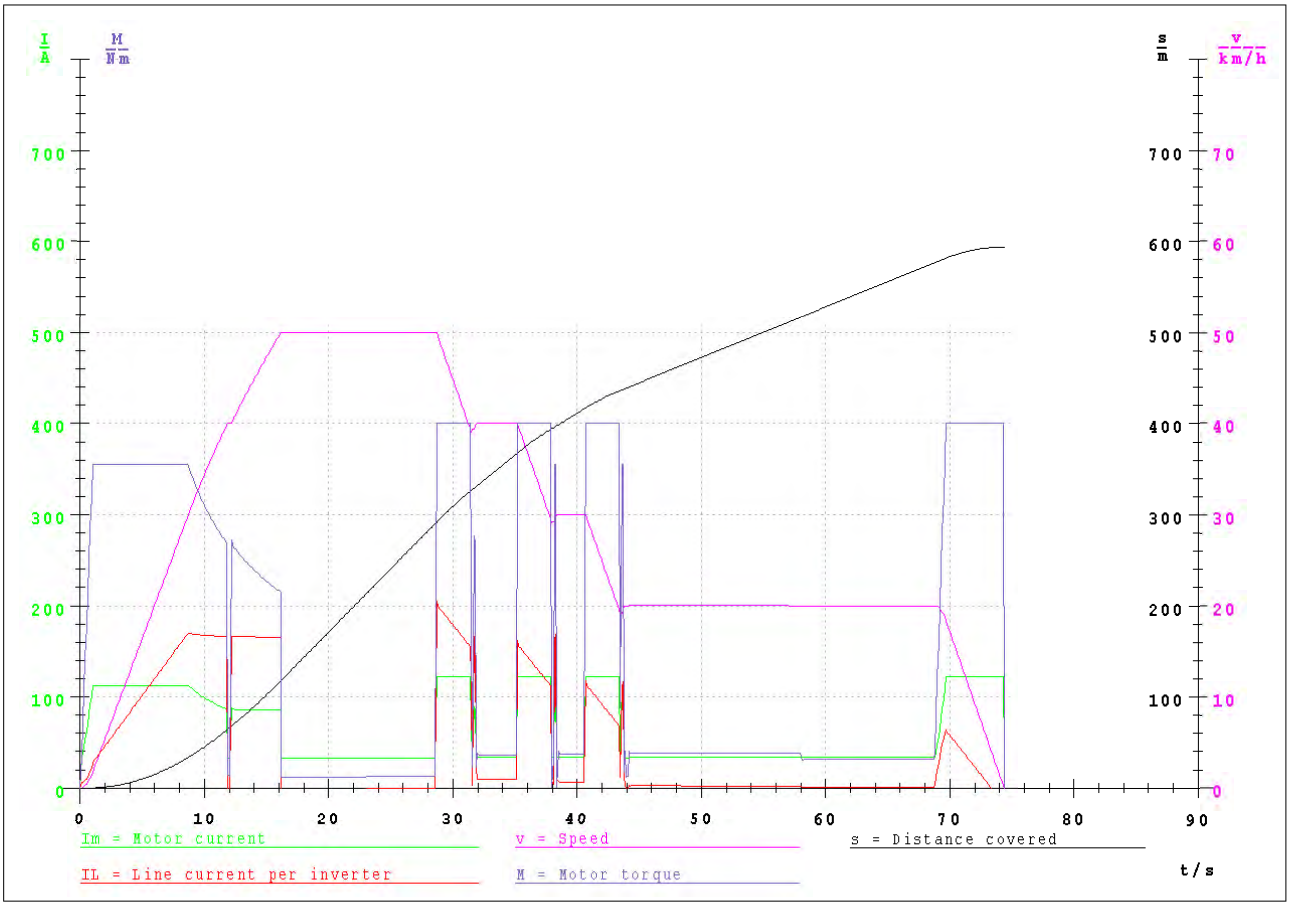
12.07.07
12070709

Edinburgh Tram Network

Tram-OCT-AIR AW2
Shandwick Place-Haymarket

Weight of vehicle	54.84t
Pay load	18.47t
Line voltage Mo/Br	750V/ 900V
Distance between stops	594.0m
Dwell time	25.0s
Wheel diameter	590mm
Gear ratio	5.440/ 1
Max. acceleration	1.08m/s²
Max. deceleration	1.09m/s²
Mean deceleration	.90m/s²
Adhesion coefficient Mo/Br	.13 / .16
RMS line current tot/Mo	416A/ 413A
Journey speed	21.5km/h
RMS motor current	65A
Energy drawn from line	2608.8Wh
Dynamic brake energy	2049.0Wh
Total energy consumption	559.8Wh

66m/-1.0%/ 40km/h -	144m/-1.0%/ 50km/h
80m/-1.1%/ 50km/h -	76m/-1.7%/ 40km/h
50m/-1.7%/ 30km/h -	100m/-1.7%/ 20km/h
78m/-1.5%/ 20km/h -	0m/ 0.0%/ 0km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

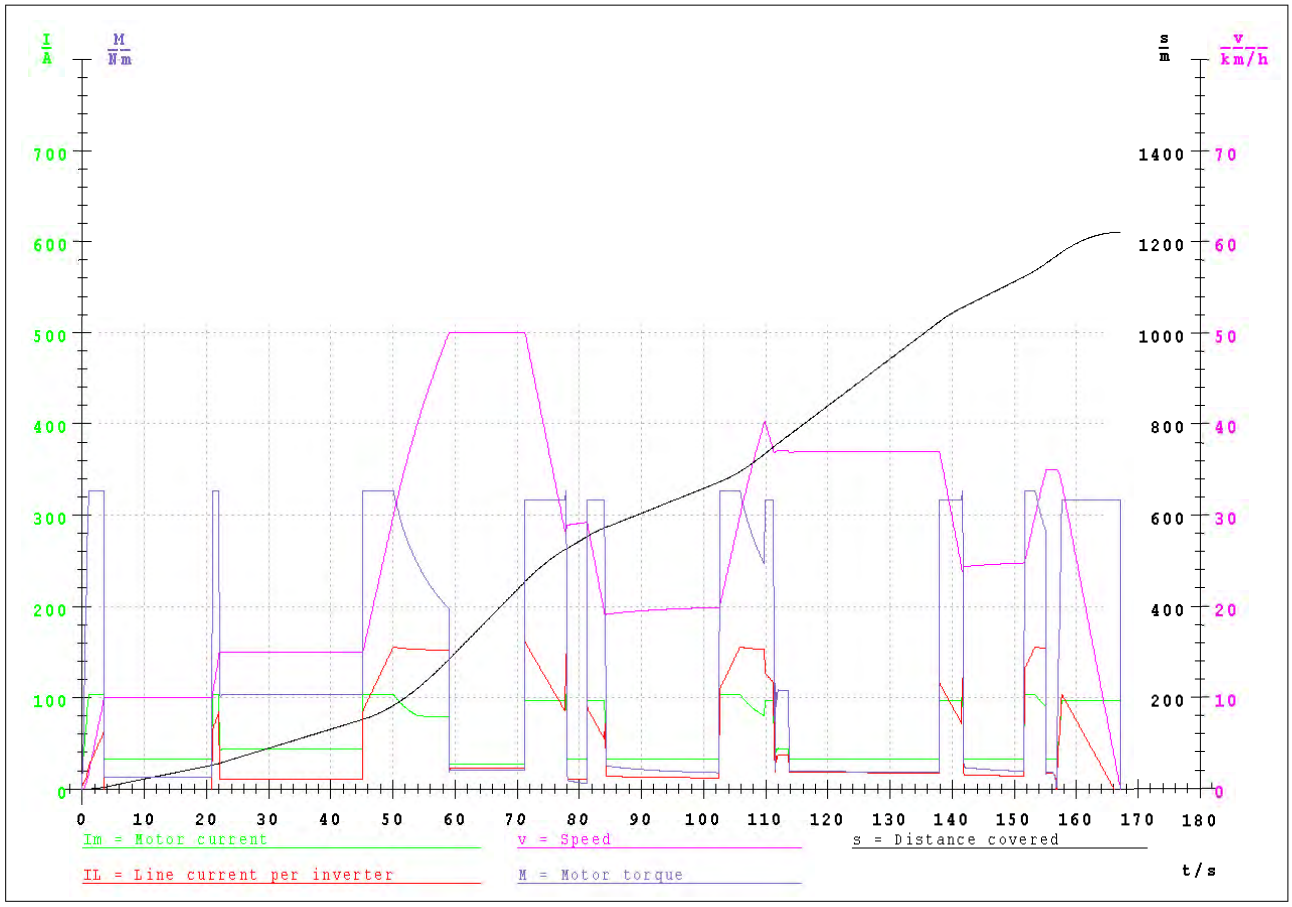
12.07.07
12070710

Edinburgh Tram Network

Tram-OCT-AIR AW2
Haymarket-Murrayfield ROJ included

Weight of vehicle	54.84t
Pay load	18.47t
Line voltage Mo/Br	750V/ 900V
Distance between stops	1221.0m
Dwell time	25.0s
Wheel diameter	590mm
Gear ratio	5.440/ 1
Max. acceleration	1.20m/s²
Max. deceleration	.99m/s²
Mean deceleration	.90m/s²
Adhesion coefficient Mo/Br	.12 / .13
RMS line current tot/Mo	379A/ 371A
Journey speed	22.9km/h
RMS motor current	58A
Energy drawn from line	6221.7Wh
Dynamic brake energy	3524.8Wh
Total energy consumption	2696.9Wh

52m/ -.9%/ 10km/h	100m/-3.8%/ 15km/h
300m/ 0.0%/ 50km/h	100m/ -.6%/ 30km/h
120m/ 0.0%/ 20km/h	61m/ 0.0%/ 70km/h
40m/-4.0%/ 37km/h	249m/ 0.0%/ 37km/h
100m/ 0.0%/ 25km/h	99m/ 0.0%/ 35km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

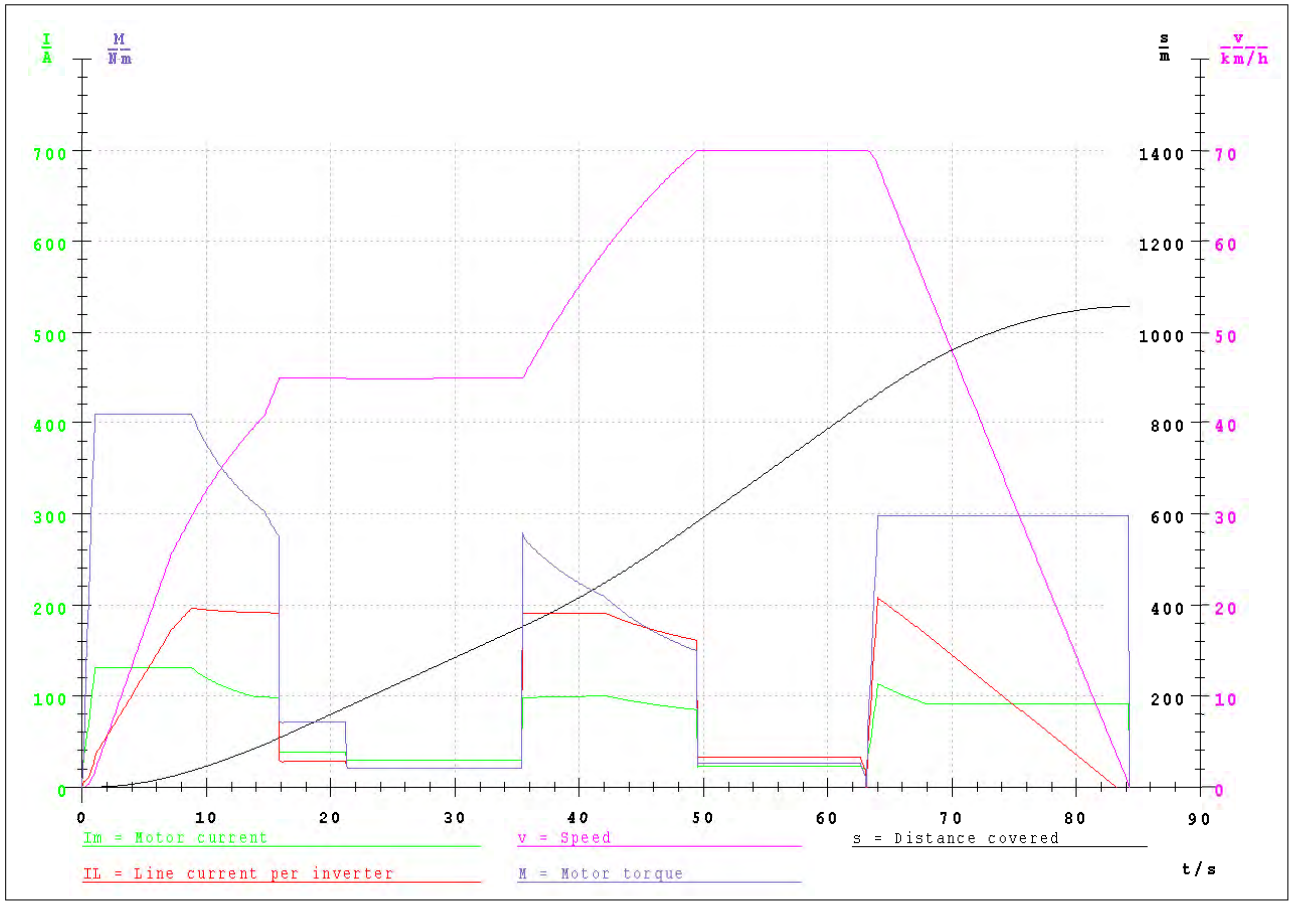
12.07.07
12070711

Edinburgh Tram Network

Tram-OCT-AIR AW2
Murrayfield-Balgreen Road

Weight of vehicle	54.84t
Pay load	18.47t
Line voltage Mo/Br	750V/ 900V
Distance between stops	1057.0m
Dwell time	25.0s
Wheel diameter	590mm
Gear ratio	5.440/ 1
Max. acceleration	1.08m/s²
Max. deceleration	.95m/s²
Mean deceleration	.90m/s²
Adhesion coefficient Mo/Br	.15 / .12
RMS line current tot/Mo	624A/ 540A
Journey speed	34.8km/h
RMS motor current	72A
Energy drawn from line	7011.3Wh
Dynamic brake energy	3388.7Wh
Total energy consumption	3622.7Wh

22m/ 0.0%/ 35km/h - 70m/ 4.0%/ 45km/h
80m/-2.9%/ 45km/h - 179m/ 0.0%/ 45km/h
706m/ 0.0%/ 70km/h - 0m/ 0.0%/ 70km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

12.07.07
12070712

Edinburgh Tram Network

Tram-OCT-AIR AW2
Balgreen Road-Saughton Road North

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Weight of vehicle.............  54.84t
Pay load......................  18.47t
Line voltage Mo/Br............  750V/ 900V
Distance between stops..... 1642.0m
Dwell time....................  25.0s
Wheel diameter................  590mm
Gear ratio....................  5.440/ 1
Max. acceleration.............  1.20m/s²
Max. deceleration.............  1.31m/s²
Mean deceleration.............   .90m/s²
Adhesion coefficient Mo/Br.....  .10 / .12
RMS line current tot/Mo........  528A/ 493A
Journey speed.................  33.8km/h
RMS motor current.............   64A
Energy drawn from line..... 11244.2Wh
Dynamic brake energy..........  5141.7Wh
Total energy consumption.....  6102.5Wh
 841m/  .2%/ 70km/h -   23m/ 5.3%/ 70km/h
  97m/ 5.3%/ 18km/h -   30m/ 0.0%/ 18km/h
  90m/-5.8%/ 18km/h -   63m/ 0.0%/ 18km/h
 317m/ 0.0%/ 70km/h -   70m/ 4.1%/ 70km/h
  60m/-2.8%/ 70km/h -   51m/ 0.0%/ 70km/h
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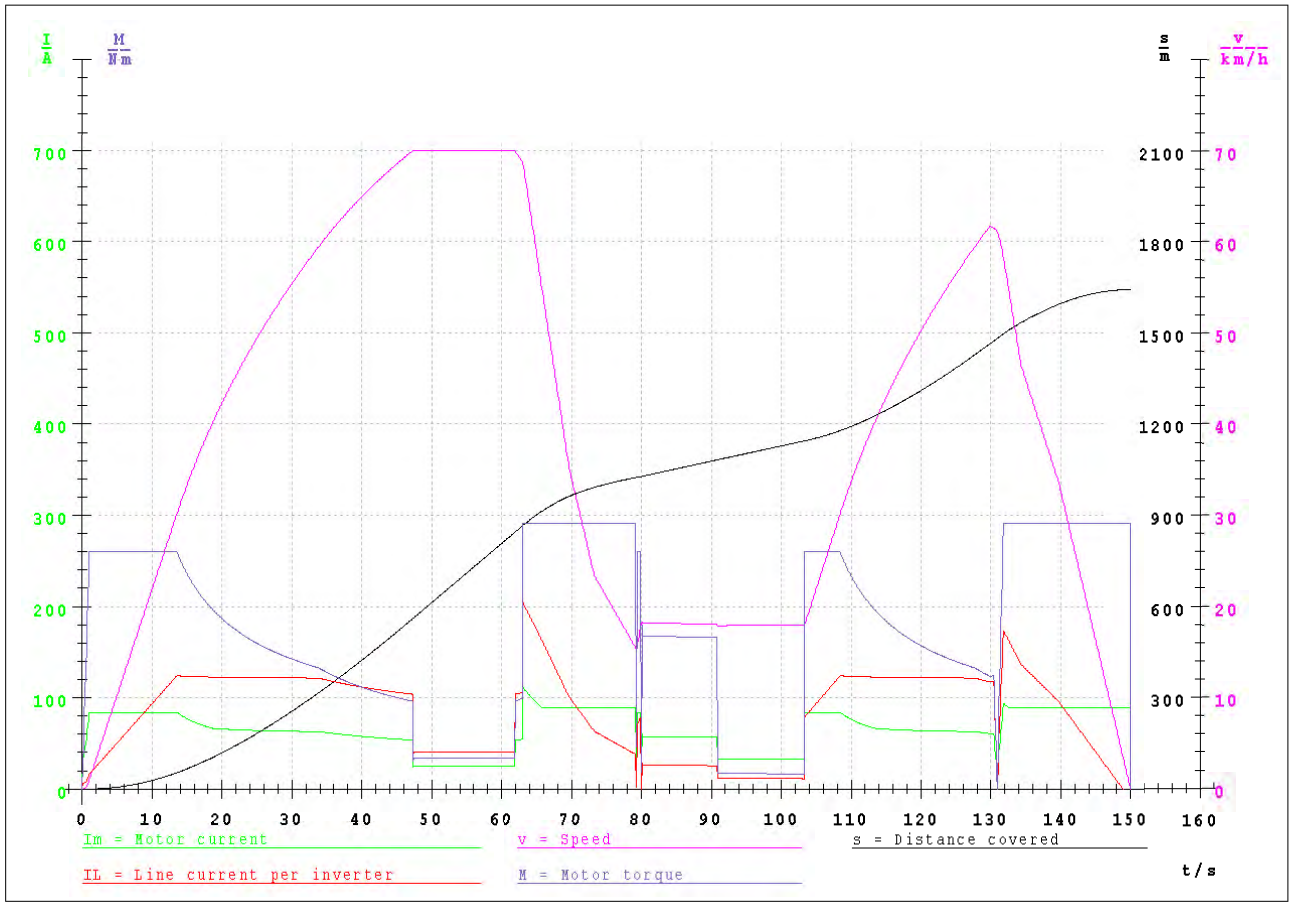


Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

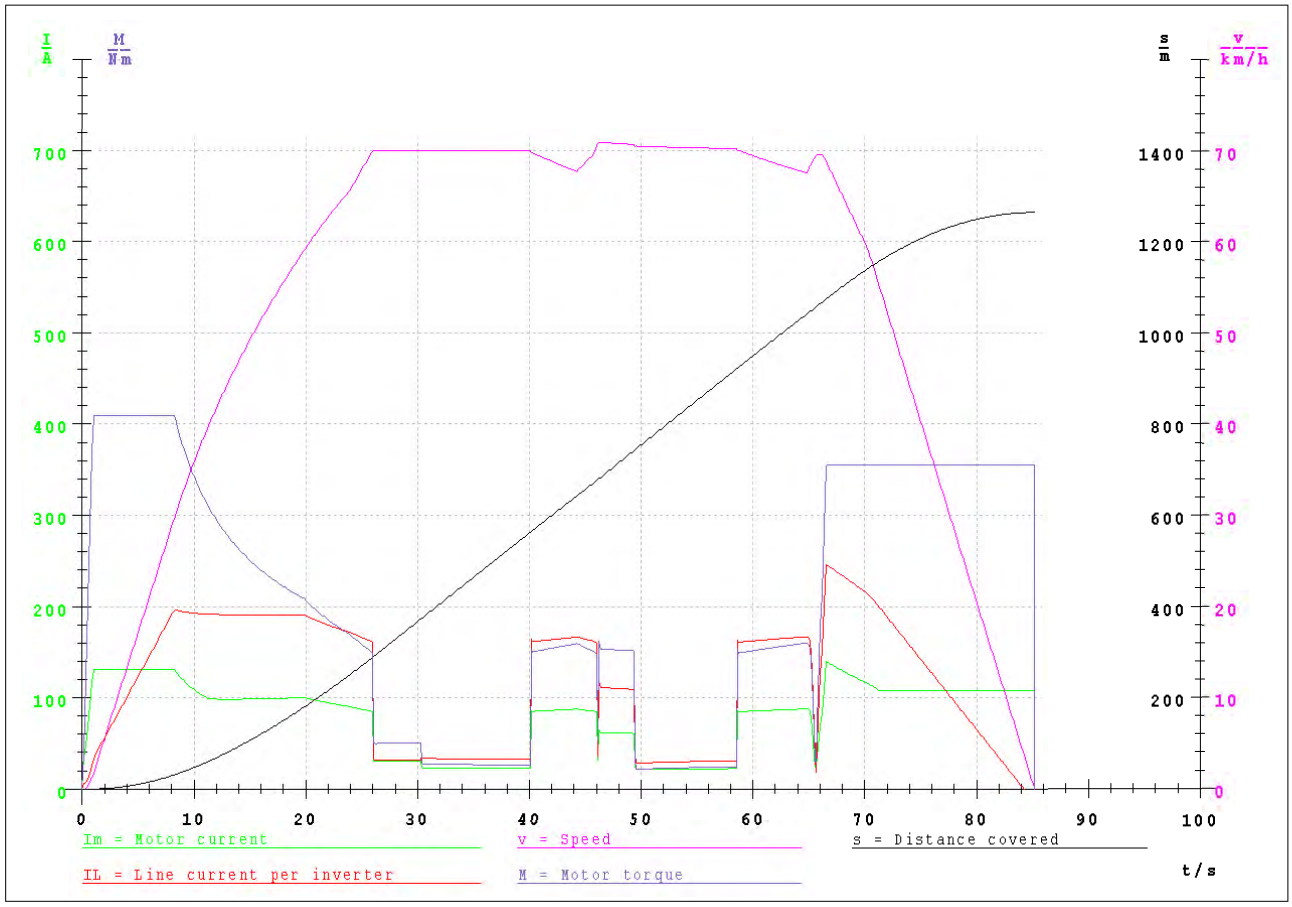
12.07.07
12070713

Edinburgh Tram Network

Tram-OCT-AIR AW2
Saughton Road North-South Gyle Access

Weight of vehicle	54.84t
Pay load	18.47t
Line voltage Mo/Br	750V/ 900V
Distance between stops	1263.0m
Dwell time	25.0s
Wheel diameter	590mm
Gear ratio	5.440/ 1
Max. acceleration	1.08m/s²
Max. deceleration	1.12m/s²
Mean deceleration	.90m/s²
Adhesion coefficient Mo/Br	.15 / .15
RMS line current tot/Mo	716A/ 609A
Journey speed	41.3km/h
RMS motor current	78A
Energy drawn from line	8568.6Wh
Dynamic brake energy	4457.4Wh
Total energy consumption	4111.2Wh

249m/ 0.0%/ 70km/h - 120m/-2.4%/ 70km/h
190m/ 0.0%/ 70km/h - 80m/ 5.4%/ 70km/h
30m/ 0.0%/ 70km/h - 70m/-5.5%/ 70km/h
180m/ 0.0%/ 70km/h - 120m/ 5.0%/ 70km/h
100m/-4.3%/ 70km/h - 124m/ 0.0%/ 70km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

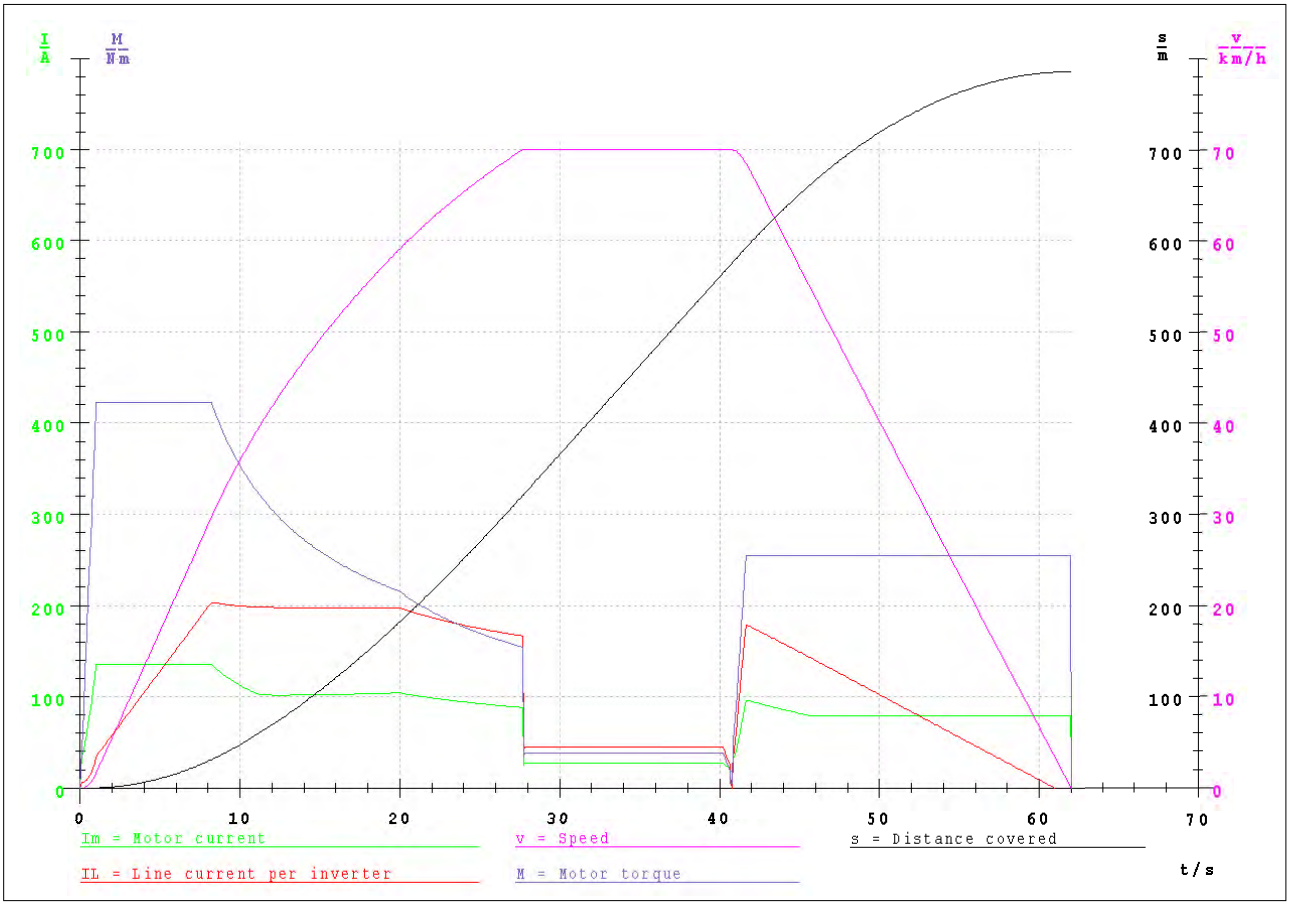
12.07.07
12070714

Edinburgh Tram Network

Tram-OCT-AIR AW2
South Gyle Access-Edinburgh Park South

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	786.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.08m/s²
Max. deceleration.....	.95m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.16 / .10
RMS line current tot/Mo.....	668A/ 597A
Journey speed.....	32.5km/h
RMS motor current.....	75A
Energy drawn from line.....	6468.7Wh
Dynamic brake energy.....	2721.6Wh
Total energy consumption.....	3747.1Wh

596m/ .3%/ 70km/h - 190m/ 1.4%/ 70km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

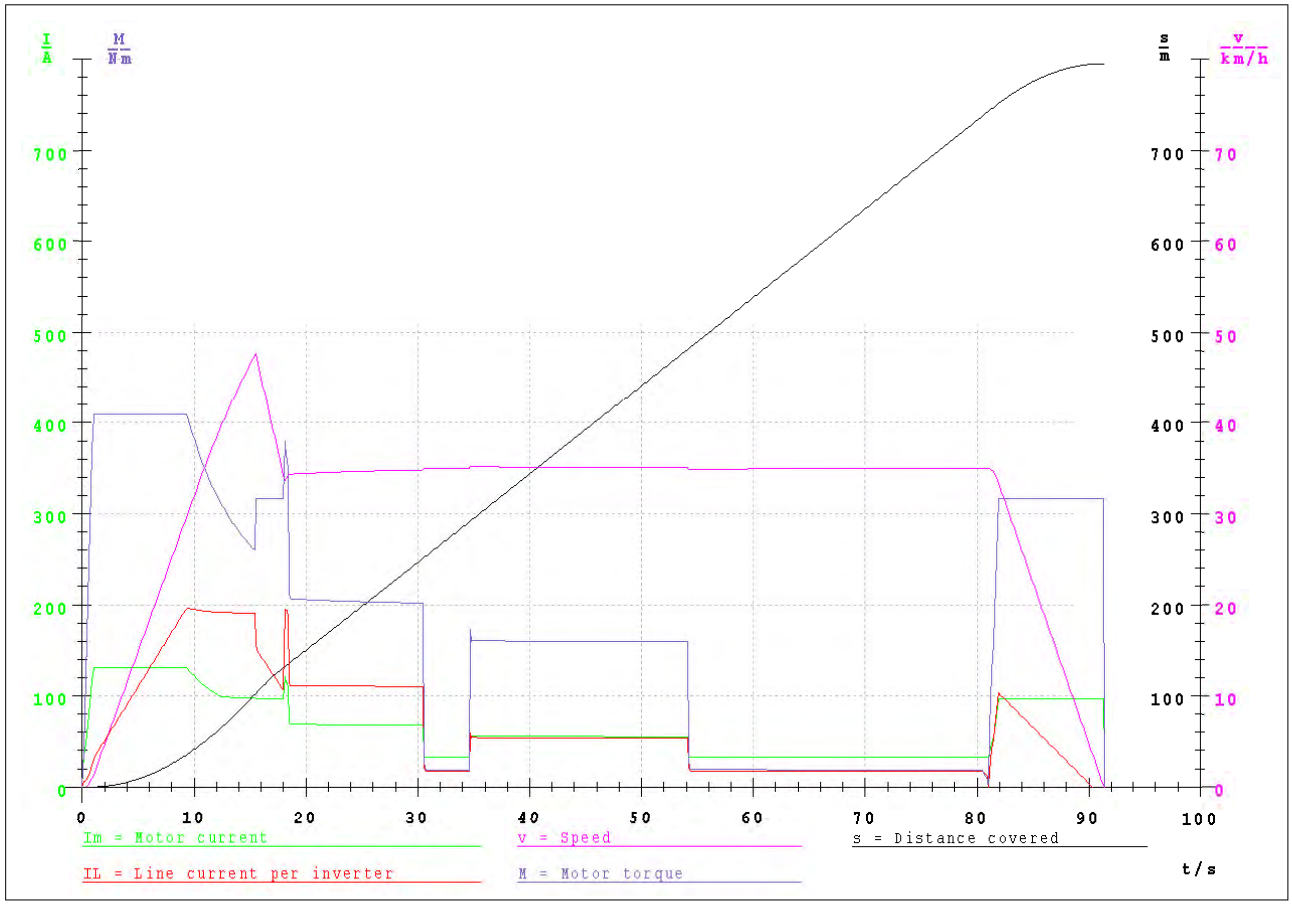
12.07.07
12070715

Edinburgh Tram Network

Tram-OCT-AIR AW2
Edinburgh Park South-Edinburgh Park

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	795.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	.95m/s²
Max. deceleration.....	.99m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .13
RMS line current tot/Mo.....	452A/ 440A
Journey speed.....	24.6km/h
RMS motor current.....	65A
Energy drawn from line.....	5106.4Wh
Dynamic brake energy.....	2796.6Wh
Total energy consumption.....	2309.8Wh

40m/ 1.4%/ 70km/h - 60m/ 0.0%/ 70km/h
150m/ 5.4%/ 35km/h - 40m/ 0.0%/ 35km/h
190m/-5.7%/ 35km/h - 315m/ 0.0%/ 35km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

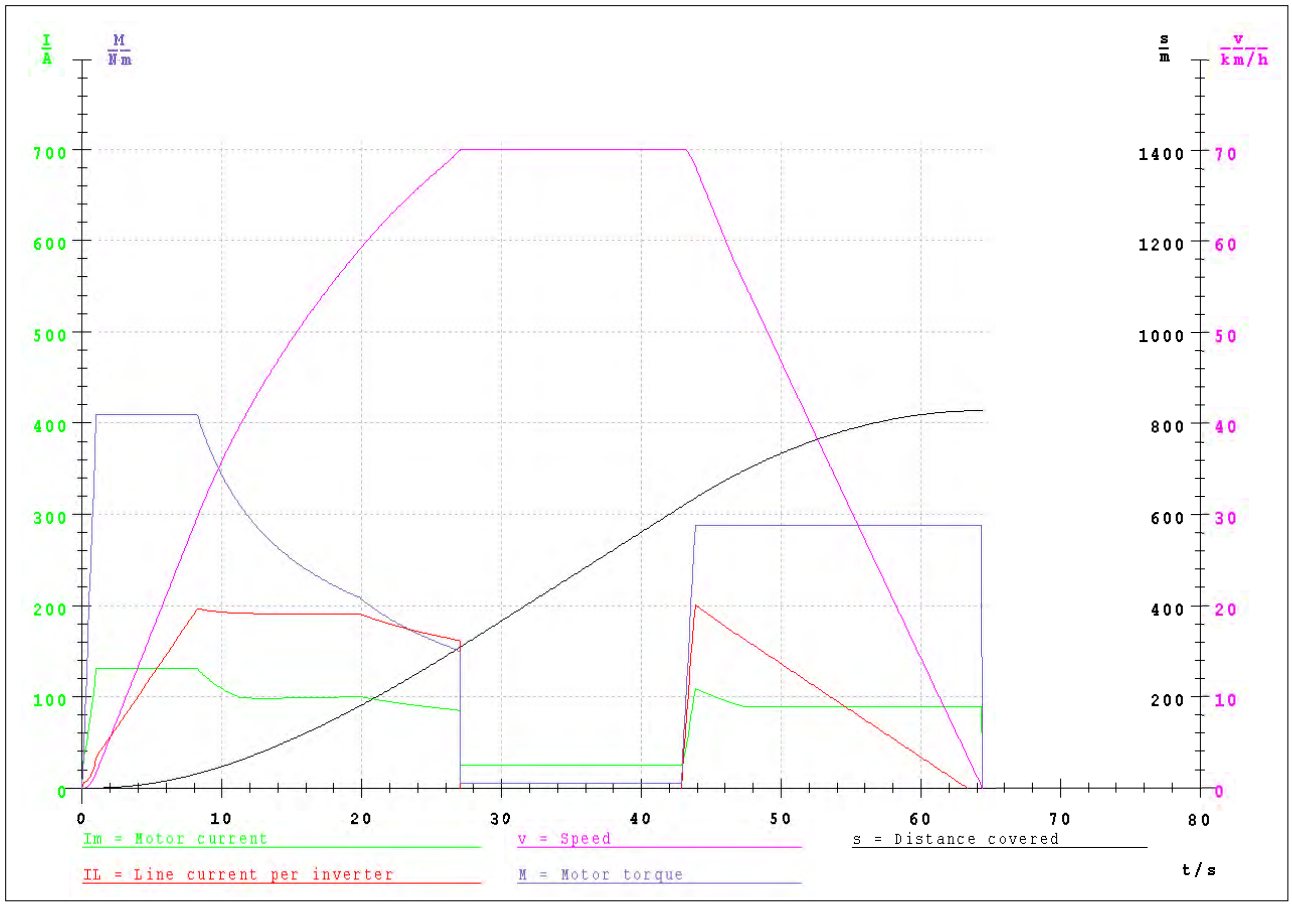
12.07.07
12070716

Edinburgh Tram Network

Tram-OCT-AIR AW2
Edinburgh Park-Gyle

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	828.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.08m/s²
Max. deceleration.....	1.05m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.15 / .12
RMS line current tot/Mo.....	644A/ 552A
Journey speed.....	33.3km/h
RMS motor current.....	74A
Energy drawn from line.....	5405.2Wh
Dynamic brake energy.....	3045.0Wh
Total energy consumption.....	2360.1Wh

290m/ 0.0%/ 70km/h - 330m/ -.9%/ 70km/h
60m/ 1.3%/ 25km/h - 148m/ 0.0%/ 25km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

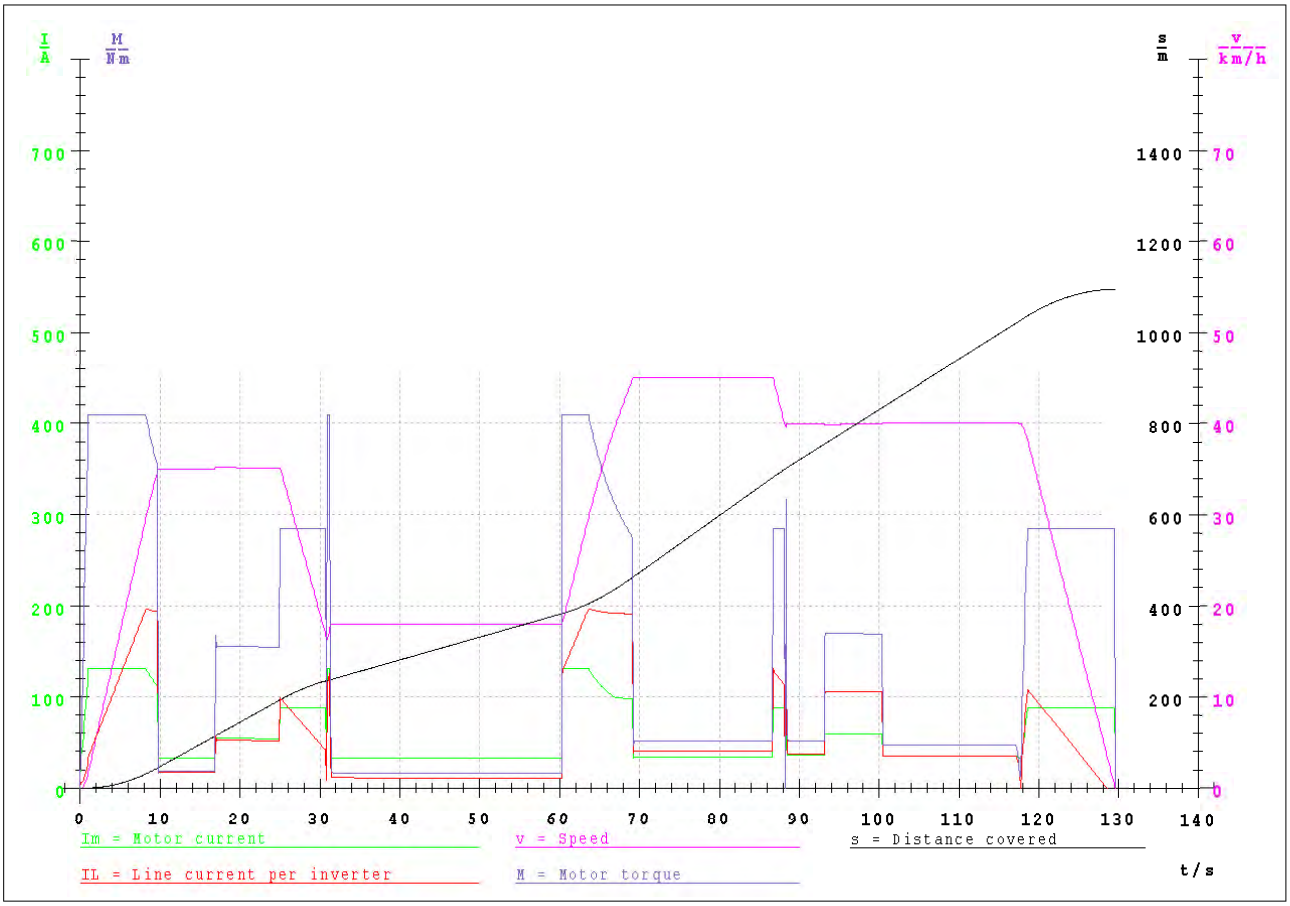
12.07.07
12070717

Edinburgh Tram Network

Tram-OCT-AIR AW2
Gyle-Gogarburn DEH included

Weight of vehicle	54.84t
Pay load	18.47t
Line voltage Mo/Br	750V/ 900V
Distance between stops	1096.0m
Dwell time	25.0s
Wheel diameter	590mm
Gear ratio	5.440/ 1
Max. acceleration	1.08m/s²
Max. deceleration	.97m/s²
Mean deceleration	.90m/s²
Adhesion coefficient Mo/Br	.15 / .11
RMS line current tot/Mo	413A/ 401A
Journey speed	25.5km/h
RMS motor current	60A
Energy drawn from line	6899.2Wh
Dynamic brake energy	2391.3Wh
Total energy consumption	4507.9Wh

112m/	0.0%/ 35km/h	80m/	-5.5%/ 35km/h
190m/	0.0%/ 18km/h	298m/	.9%/ 45km/h
72m/	.9%/ 40km/h	80m/	4.4%/ 40km/h
264m/	.8%/ 40km/h	0m/	5.0%/ 70km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

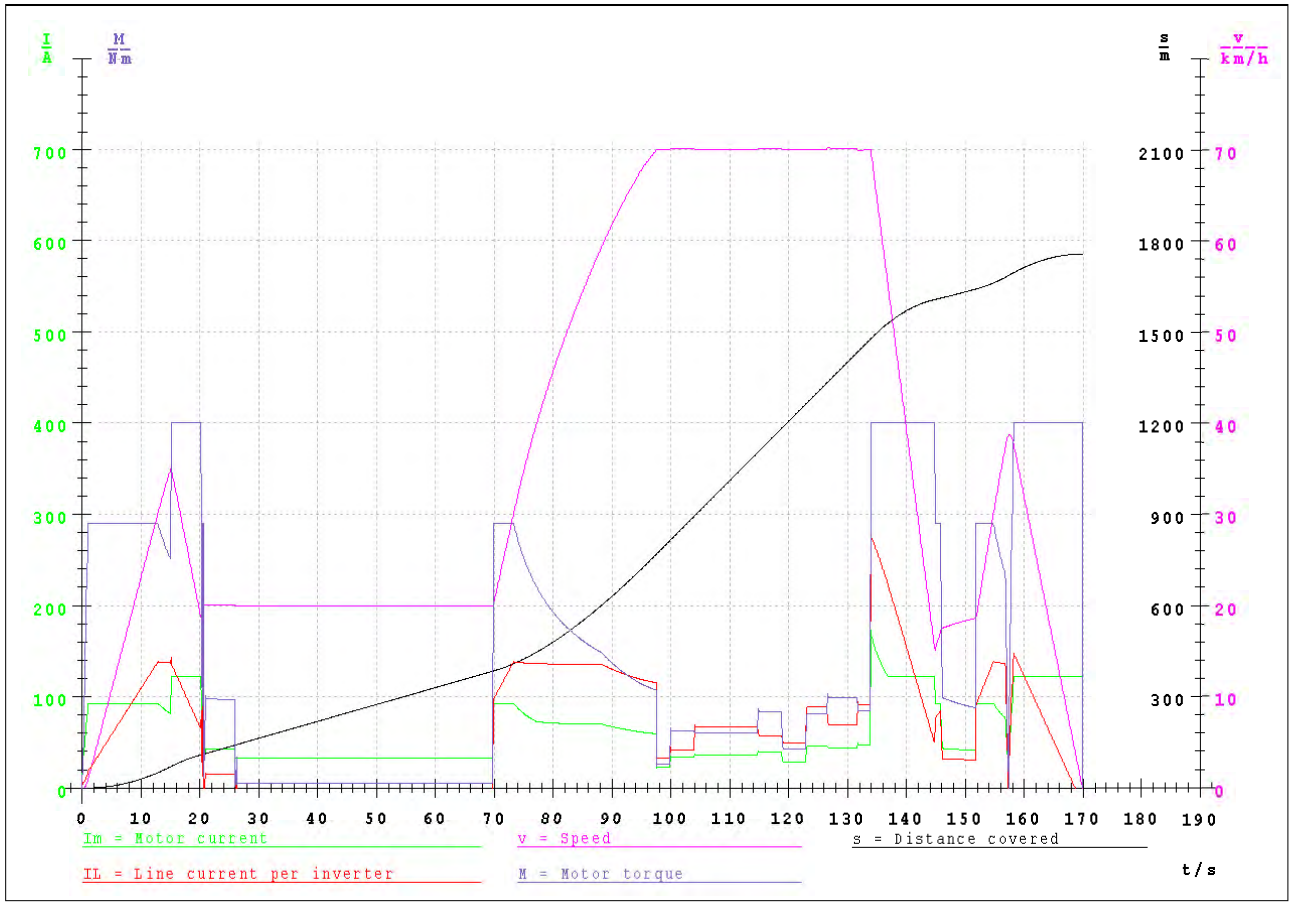
12.07.07
12070718

Edinburgh Tram Network

Tram-OCT-AIR AW2
Gogarburn-Ingliston Park and Ride

Weight of vehicle	54.84t
Pay load	18.47t
Line voltage Mo/Br	750V/ 900V
Distance between stops	1756.0m
Dwell time	25.0s
Wheel diameter	590mm
Gear ratio	5.440/ 1
Max. acceleration	1.08m/s²
Max. deceleration	.90m/s²
Mean deceleration	.81m/s²
Adhesion coefficient Mo/Br	.11 / .16
RMS line current tot/Mo	499A/ 483A
Journey speed	32.4km/h
RMS motor current	67A
Energy drawn from line	9175.6Wh
Dynamic brake energy	5712.4Wh
Total energy consumption	3463.2Wh

70m/ .7%/ 40km/h	70m/-3.6%/ 20km/h
244m/ -.7%/ 20km/h	336m/ -.7%/ 70km/h
90m/ 0.0%/ 70km/h	80m/-2.8%/ 70km/h
210m/ 1.0%/ 70km/h	80m/-3.4%/ 70km/h
80m/ .5%/ 70km/h	70m/ 1.6%/ 70km/h
100m/-3.9%/ 70km/h	44m/ 1.7%/ 70km/h
166m/ 1.7%/ 20km/h	116m/-3.6%/ 70km/h



Vossloh KIEPE GmbH
DÜSSELDORF
Abt. E2

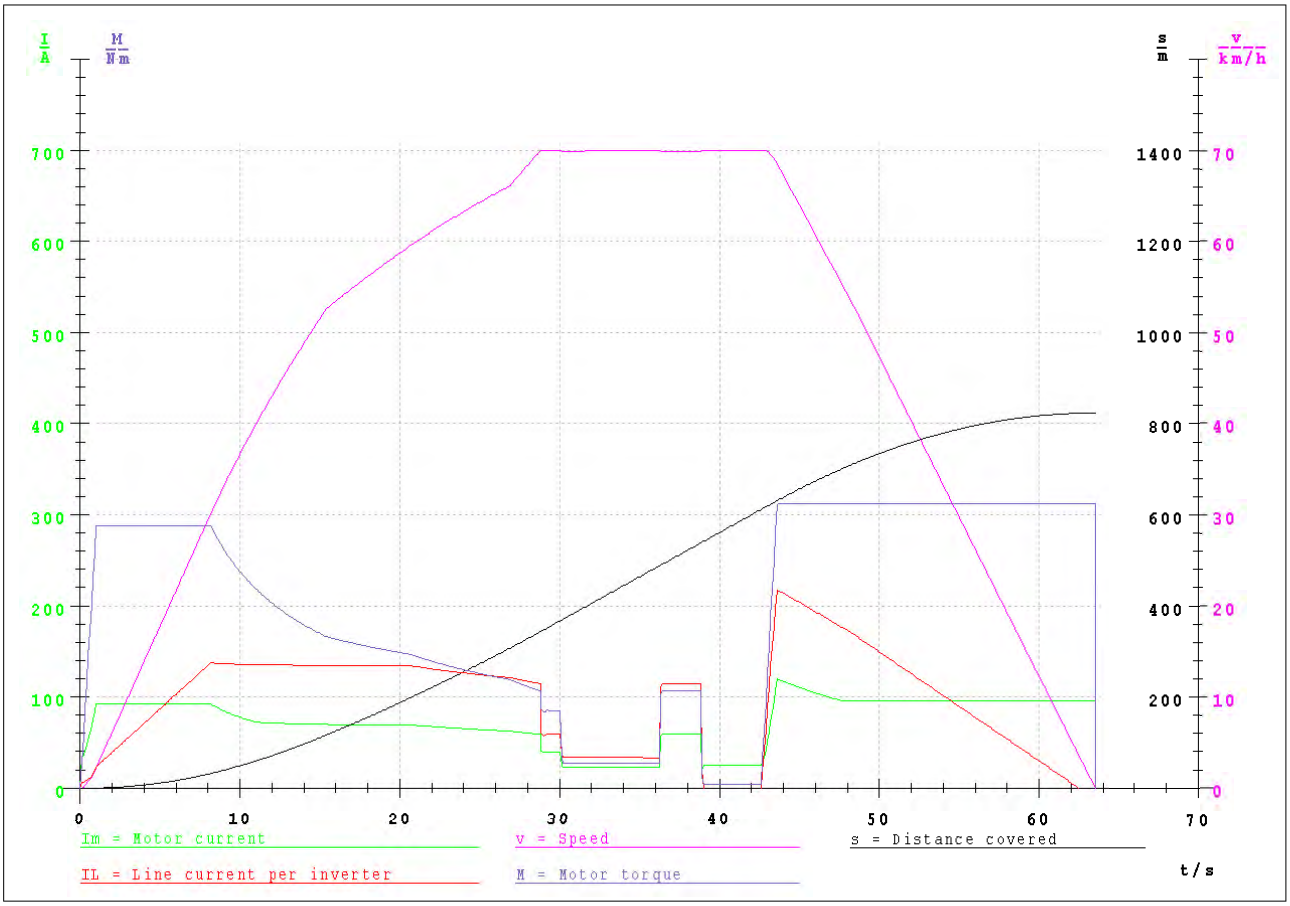
12.07.07
12070719

Edinburgh Tram Network

Tram-OCT-AIR AW2
Ingliston Park and Ride-Edinburgh Airport

Weight of vehicle.....	54.84t
Pay load.....	18.47t
Line voltage Mo/Br.....	750V/ 900V
Distance between stops.....	823.0m
Dwell time.....	25.0s
Wheel diameter.....	590mm
Gear ratio.....	5.440/ 1
Max. acceleration.....	1.08m/s²
Max. deceleration.....	.98m/s²
Mean deceleration.....	.90m/s²
Adhesion coefficient Mo/Br.....	.11 / .13
RMS line current tot/Mo.....	565A/ 430A
Journey speed.....	33.5km/h
RMS motor current.....	65A
Energy drawn from line.....	4755.4Wh
Dynamic brake energy.....	3410.6Wh
Total energy consumption.....	1344.8Wh

114m/-3.6%/ 70km/h - 190m/ 0.0%/ 70km/h
60m/-3.5%/ 70km/h - 120m/ 0.0%/ 70km/h
50m/ 2.4%/ 70km/h - 180m/ -.9%/ 70km/h
109m/ 0.0%/ 70km/h - 0m/ 0.0%/ 70km/h



Weight of vehicle	54.841	t
Pay Load	18.471	t
Wheel diameter	590	mm
Gear ratio	5.440	/ 1
Linevoltage motoring mode	750	V
Linevoltage braking mode	900	V
max. acceleration (90 %)	1.08	m/s^2
Mean deceleration (75%)	0.90	m/s^2
Efficiency of gear box	96	%
Number of inverters per car	6	
Number of motors per inverter	2	
Number of brake resistors	6	

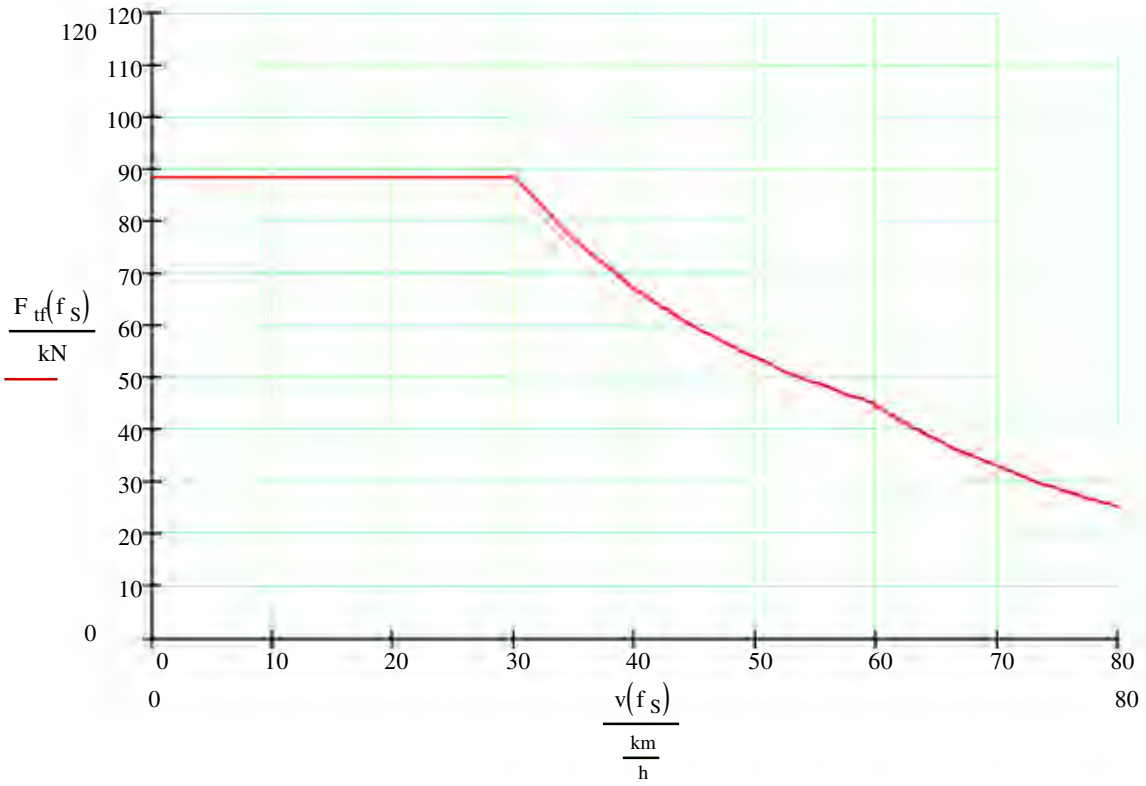
Edinburgh Airport - Ocean Terminal

	station		distance in m	dwell time in s	ride time in s	journey time in s	receipted energy in Wh	regenerated energy in Wh	RMS motor current in A	RMS line current in A	brake time in s	brake power in kW
1	Edinburgh Airport	AIR	823	25	65	90	6644	2518	71	642	18	504
2	Ingliston Park and Ride	IPR	1756	25	168	193	11855	3593	71	565	18	719
3	Gogarburn DEH included	GOG	1096	25	129	154	5709	2143	61	393	16	482
4	Gyle	GYL	828	25	81	106	5289	3161	69	576	20	569
5	Edinburgh Park	EDP	795	25	90	115	5701	2507	66	473	15	602
6	Edinburgh Park South	EPS	786	25	61	86	5090	3283	74	641	20	591
7	South Gyle Access	SGA	1263	25	87	112	8384	4119	73	670	21	706
8	Saughton Road North	SRN	1642	25	138	163	11548	6851	70	616	36	685
9	Balgreen Road	BAR	1057	25	76	101	8673	4722	88	780	20	850
10	Murrayfield ROJ included	MUR	1221	25	156	181	7175	2092	71	402	23	327
11	Haymarket	HAY	594	25	116	141	5753	1540	62	392	18	308
12	Shandwick Place	SHP	673	25	69	94	5200	2716	76	589	24	407
13	Princes Street	PSW	884	25	89	114	7973	2921	79	600	25	421
14	St Andrew Square	SAS/SSD	530	25	66	91	2058	3513	72	397	18	703
15	Picardy Place	PIP	560	25	70	95	1886	3860	67	413	16	869
16	McDonald Road	MDR	638	25	62	87	2187	2847	66	426	16	641
17	Balfour Street	BAS	564	25	56	81	2293	2694	70	455	14	693
18	Foot of Walk	FOW	548	25	82	107	2578	2044	67	390	16	460
19	Constitution Street	COS	483	25	64	89	3265	1594	66	441	13	441
20	Ocean Drive	OCD	837	25	134	159	5123	1936	60	377	18	387
	Ocean Terminal	OCT										
	Total		**17578**			**2359**	**114384**	**60654**	**68**	**502**		

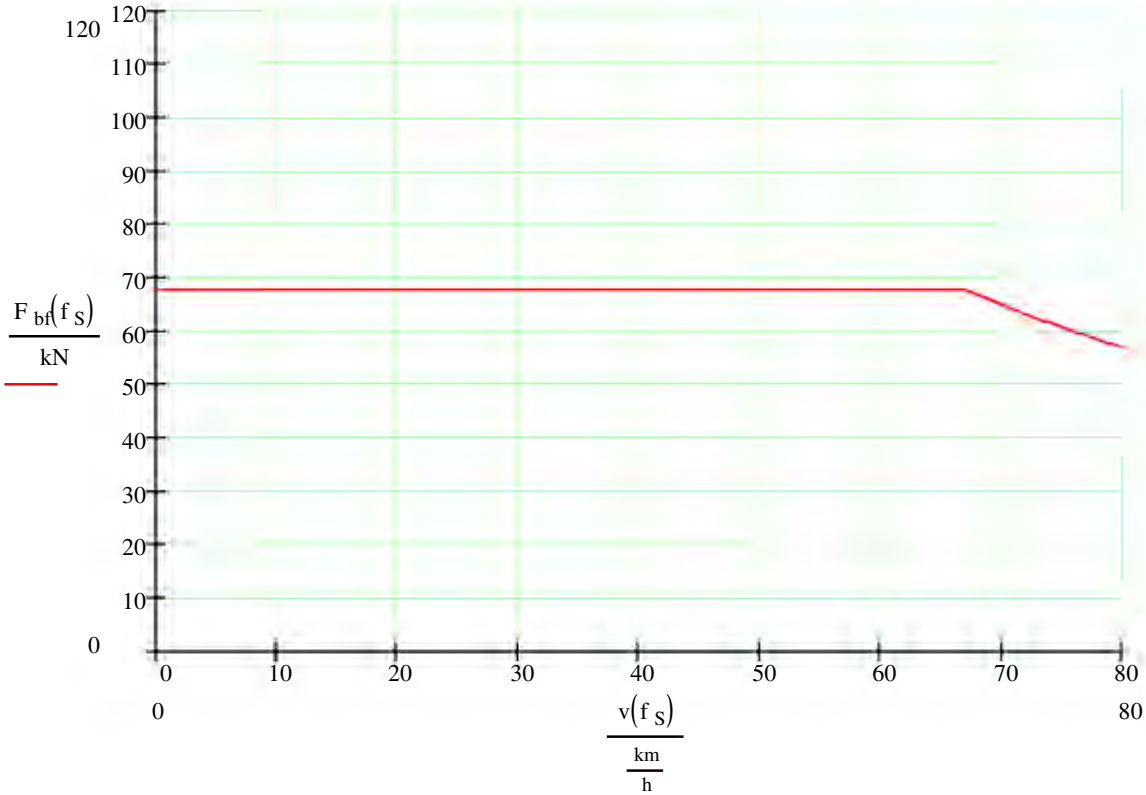
Results of teh calculation:

Energy drawn from line	114.38 kWh	6.51 kWh/km
Dynamic brake energy	60.65 kWh	3.45 kWh/km
Total energy consumption	53.73 kWh	3.06 kWh/km
Journey time	39.32 min	
Journey speed	26.83 km/h	
RMS motor current	68 A	
Average power of each brake resistor	15 kW	

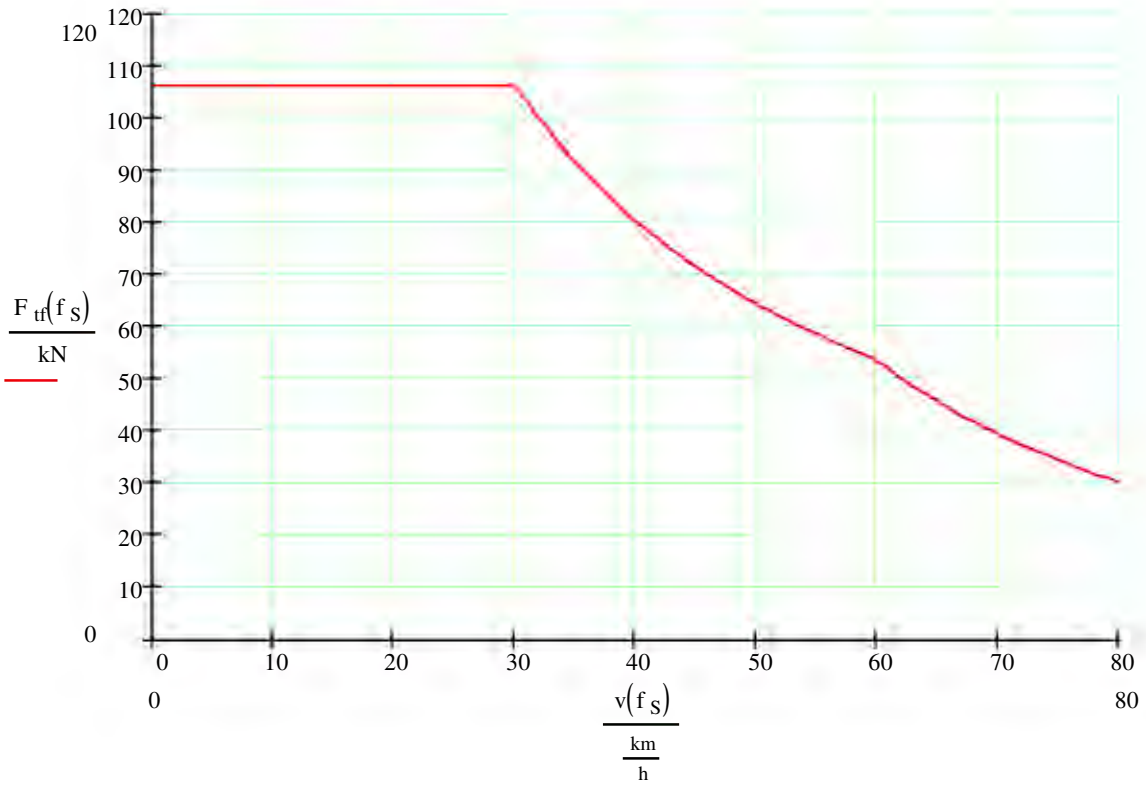
1. Tractive force diagram at AW2 load and 90 % tractive effort (a_{max} = 1.08 m/s^2)



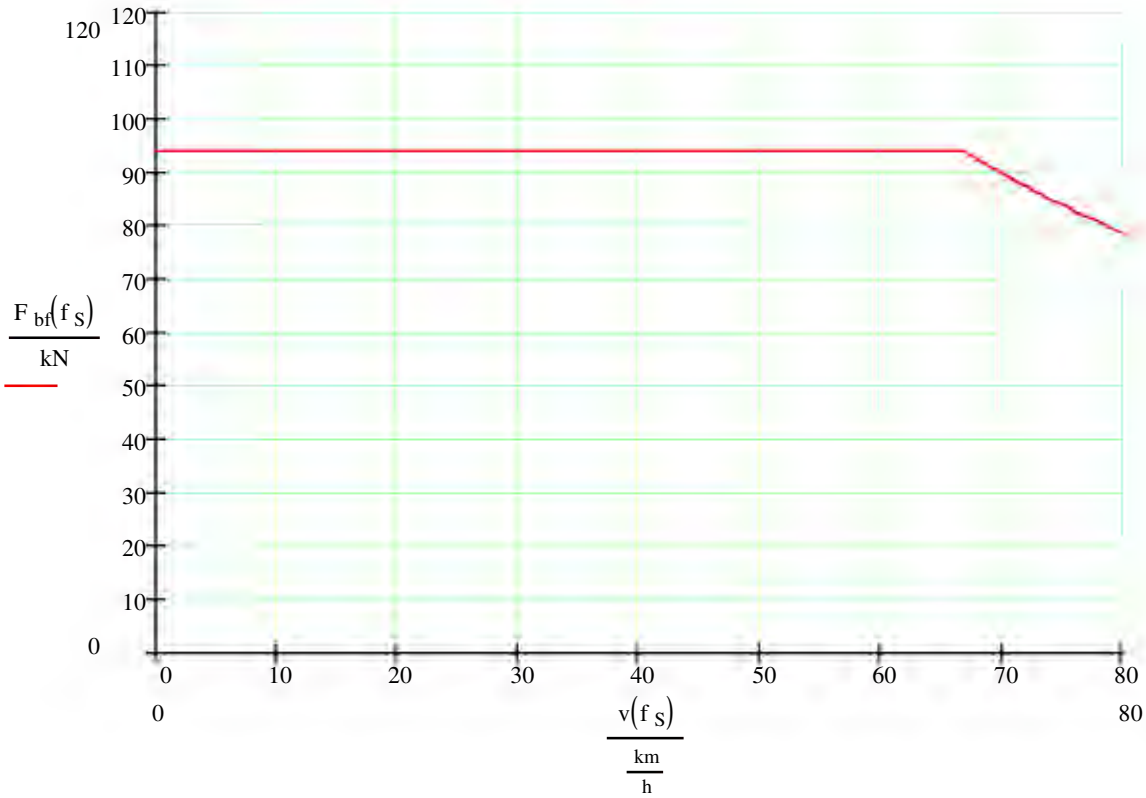
2. Braking force diagram at AW2 load and 75 % braking effort (a_{mean} = - 0.9 m/s^2)



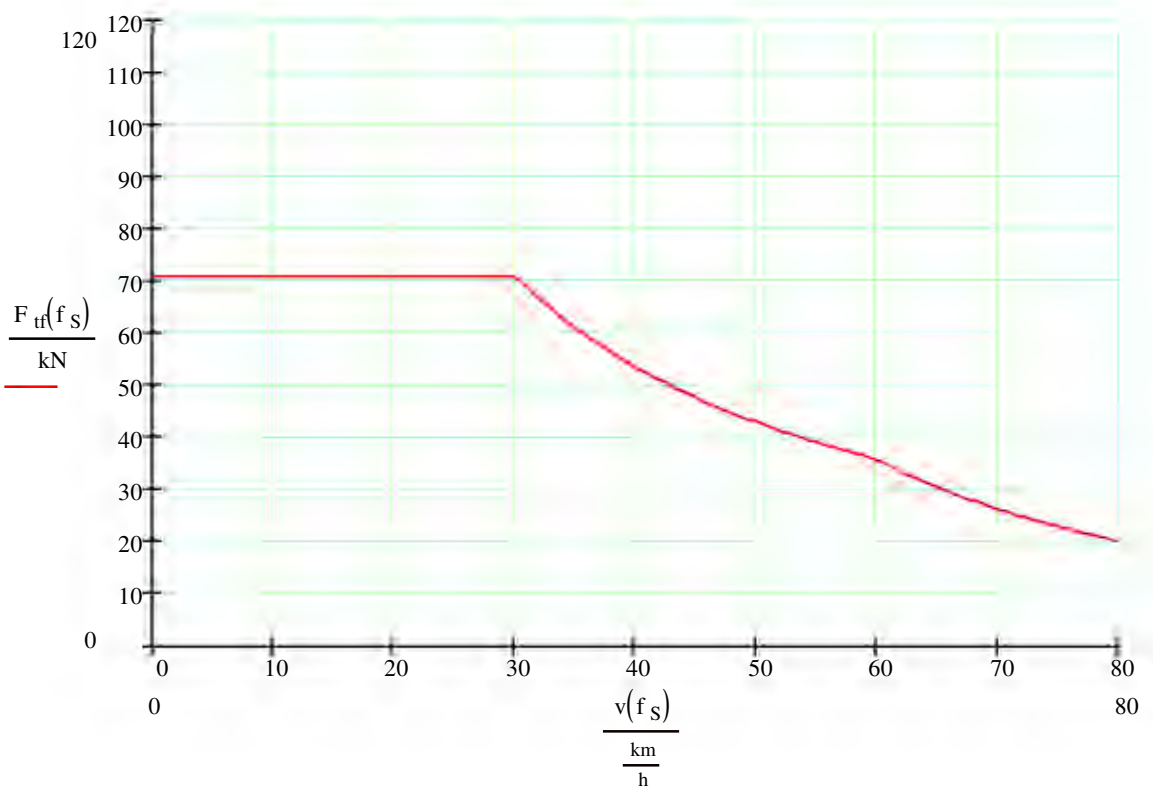
3. Tractive force diagram at AW4 load (a_{max} = 1.2 m/s^2)



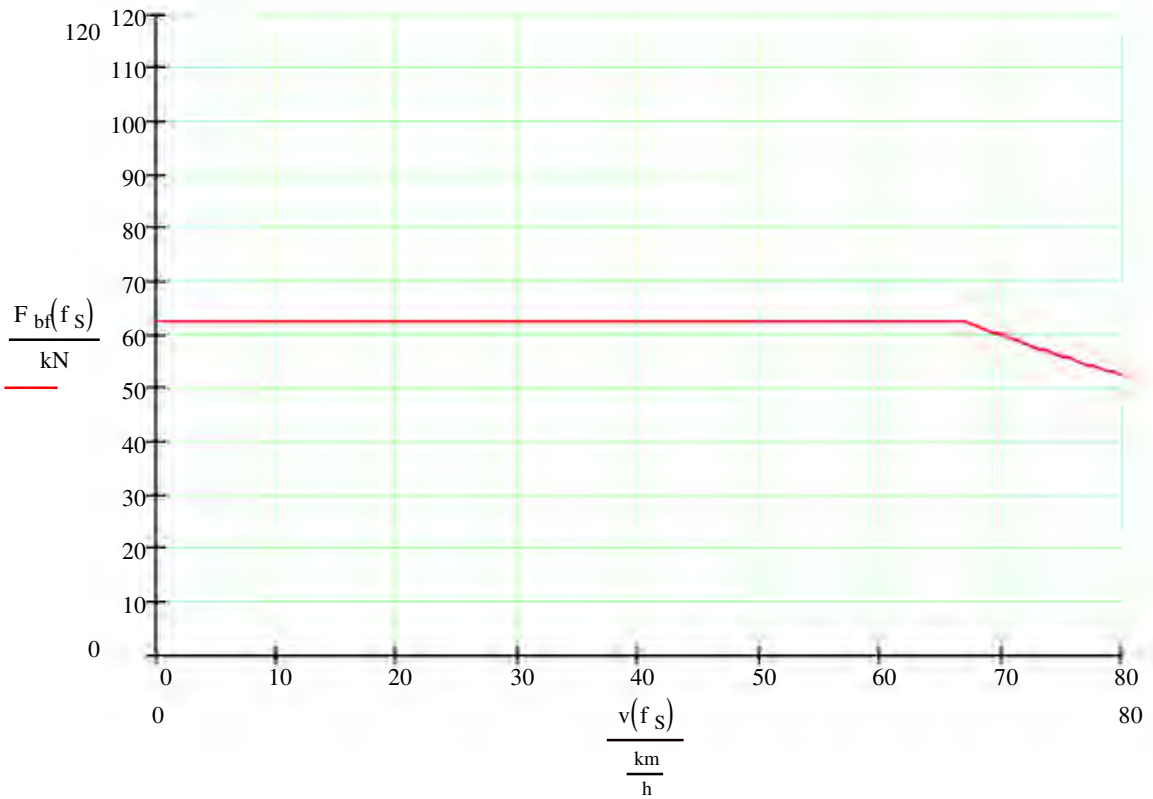
4. Braking force diagram at AW2 load (a_{mean} = - 1.2 m/s^2)



5. **Tractive force diagram at AW4 load and 66 % propulsion (degraded mode) (a_{max} = 0.78 m/s^2)**



6. **Tractive force diagram at AW2 load and 66 % propulsion (degraded mode) (a_{mean} = - 0.83 m/s^2)**



Tram Edinburgh

Dynamic Performance

Edition: 01

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Signature/ Name:	Kainz Reinhard	Kainz Reinhard	Dirnbacher Helmut	Dirnbacher Helmut

Update service, revision control:

Section:	Issue:	Description:
	00	First Edition
All	01	Complete document revised because of new vehicle weights

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1 General

This description shows a standard duty cycle simulation and diagrams for Edinburgh.

The run trip simulations show following function at AW2 load.

- v = f(s) velocity as a function of distance
- v_{civ} = f(s) lcivil speed limit as a function of distance
- alt = f(s) relative altitude as a function of distance

Furthermore following dynamic diagrams are shown:

- v = f(t) velocity as a function of time
- a = f(t) acceleration as a function of time
- ā = f(s) mean acceleration as a function of time
- F = f(v) tractive force as a function of velocity

These functions are performed with AW4 load (acceleration diagrams), AW2 load (braking diagrams) and AW0 load (towing mode) at different gradients 0% and 8,0%.

1.1 Assumptions and parameters for all simulations

It is assumed that for all cases during braking the voltage can be increased up to 900 V. Generally the simulation presumes sufficient adhesion between wheel and rail and optimal environmental conditions.

Line current during deceleration is the current that could be recuperated to a full receptive line. The accuracy of the simulation is limited by the tolerances in numeric calculation and approximation errors of modelling. Therefore the characteristics of the real vehicle might vary from the results of this simulation in a certain range.

Following data are applied to all simulations:

Initial acceleration:	1,20 m/s²
Max. service brake (elec.):	-1,33 m/s²
Average service brake (0km/h to 80km/h):	-1,20 m/s²
Jerk limitation (traction):	0,9 m/s³
Jerk limitation (service braking):	0,9 m/s³
Braking voltage:	900 VDC
Ambient temperature for simulations:	43°C
Station dwell time	25 sec
End station dwell time:	25 sec
Traction inverter efficiency:	97% constant
Gear box efficiency:	97% constant
Gear box ratio:	5,444:1
Motor efficiency:	efficiency versus frequency (see document “Type Test Report of Traction Motor” submitted to CAF (Mr. Imaz) by April 20th, 2005
Weight distribution:	according from document “WeightDistribution.doc” submitted by CAF on January 15th, 2007
Civil speed limit:	according from document “Stage3 (Preliminary Design) operations simulations report.pdf” Fig. 3.1.5 – Fig.3.1.8 submitted by CAF on January 15th, 2007

Weight:	AW0 (54,841t)	AW2 (73,312t)	AW3 (76,483t)	AW4(79,657t)	AW5(86,003t)
Motor bogie A:	26,0%	24,7%	24,5%	24,3%	24,0%
Trailer bogie C:	22,3%	24,0%	24,3%	24,5%	24,9%
Motor bogie E:	26,1%	26,9%	27,0%	27,2%	27,4%
Motor bogie G:	25,6%	24,4%	24,2%	24,0%	23,7%

Brake blending below 3 km/h is not shown in the dynamic diagrams.

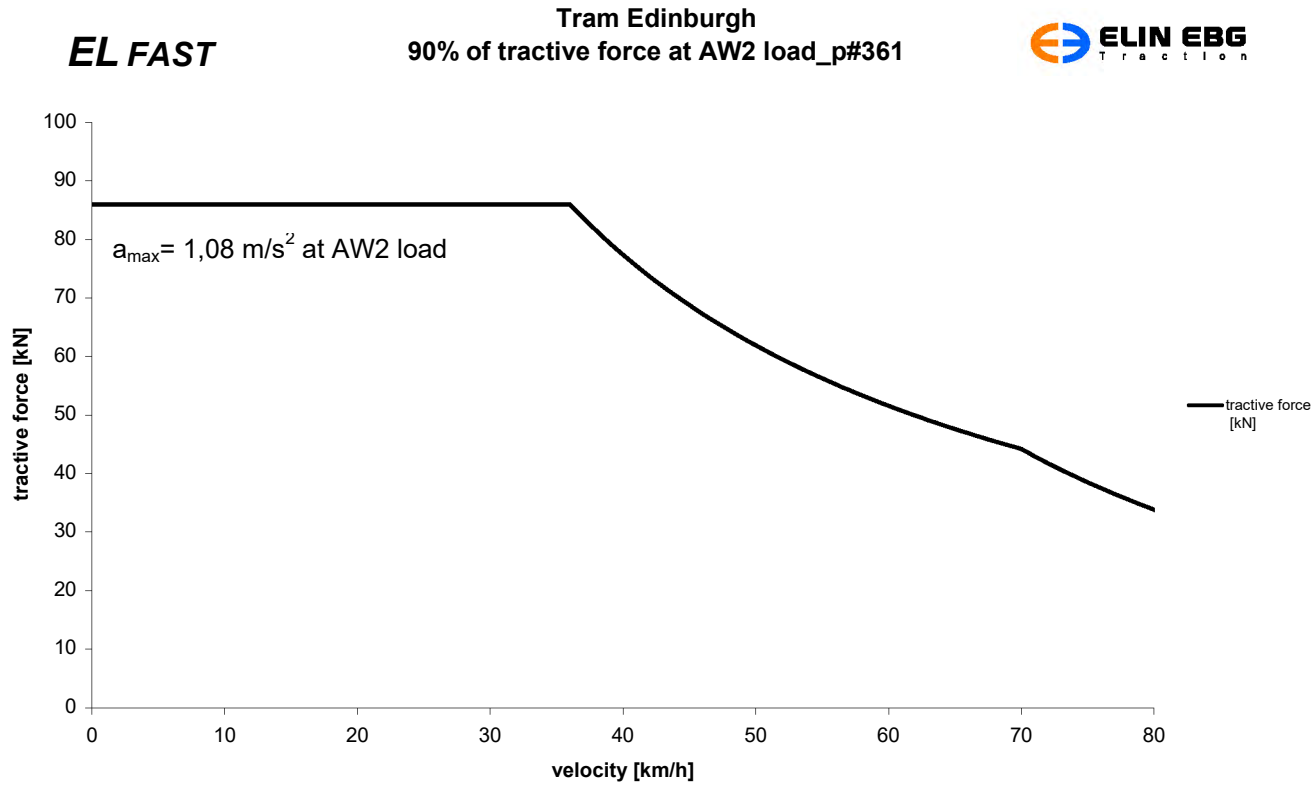
2 Run trip simulations with 100% propulsion

The vehicle consists of three motor bogies and one trailer bogie. The following simulations were made under the assumption that all three available propulsion systems are working properly.
It is assumed that during deceleration the line current could be recuperated to a full receptive line.

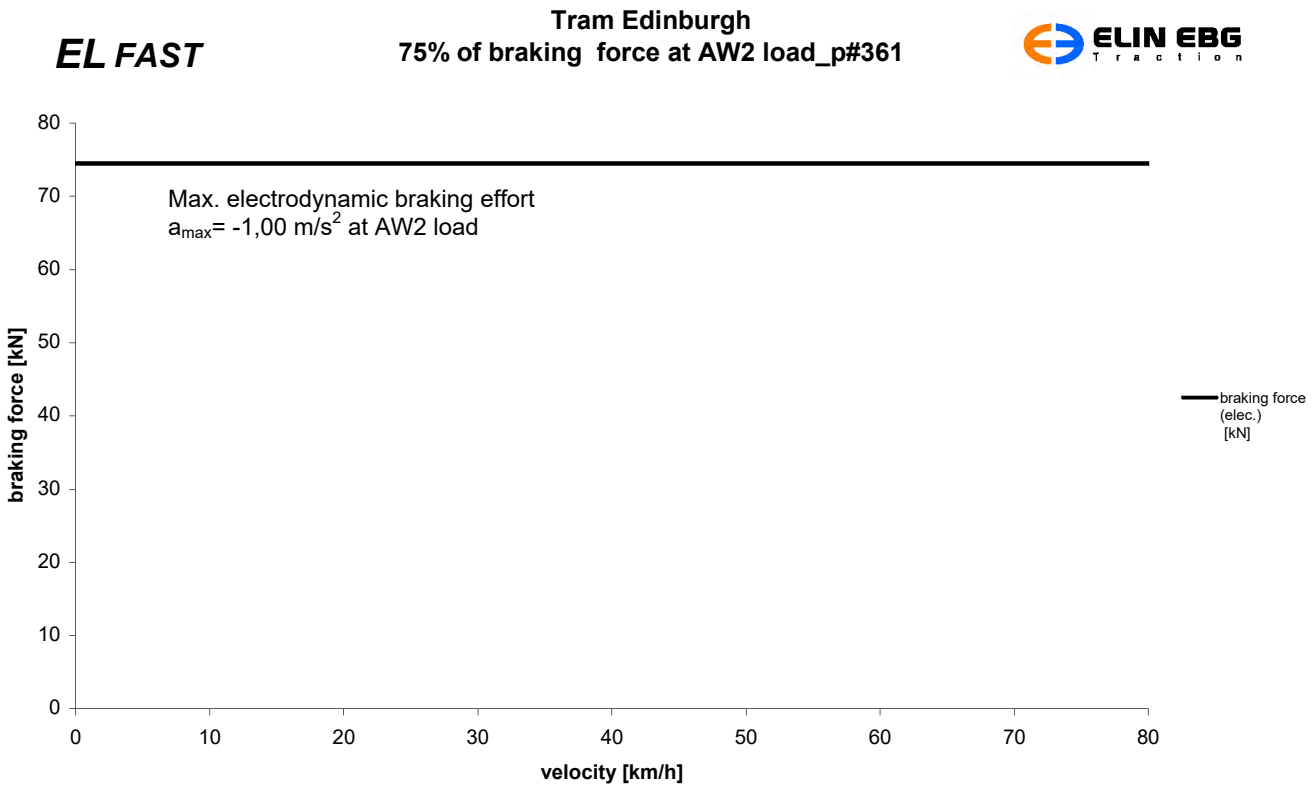
2.1 Parameters for run trip simulation with AW2 load

Catenary voltage for simulation:	750 VDC
Mean wheel diameter:	550 mm
Adhesion coefficient (traction):	min 0,16
Adhesion coefficient (braking):	min 0,14
Nominal loaded vehicle:	73,312 tons (AW2) and rotating mass of 4,11 tons
Parameters for all simulations:	see section 1.1
Recuperation to catenary:	100%
Dwell time:	25 sec
Tractive effort:	90% of Tractive force at AW2 load
Braking effort:	75% of Braking force at AW2 load

2.2 Tractive force diagram at AW2 load and 90% tractive effort

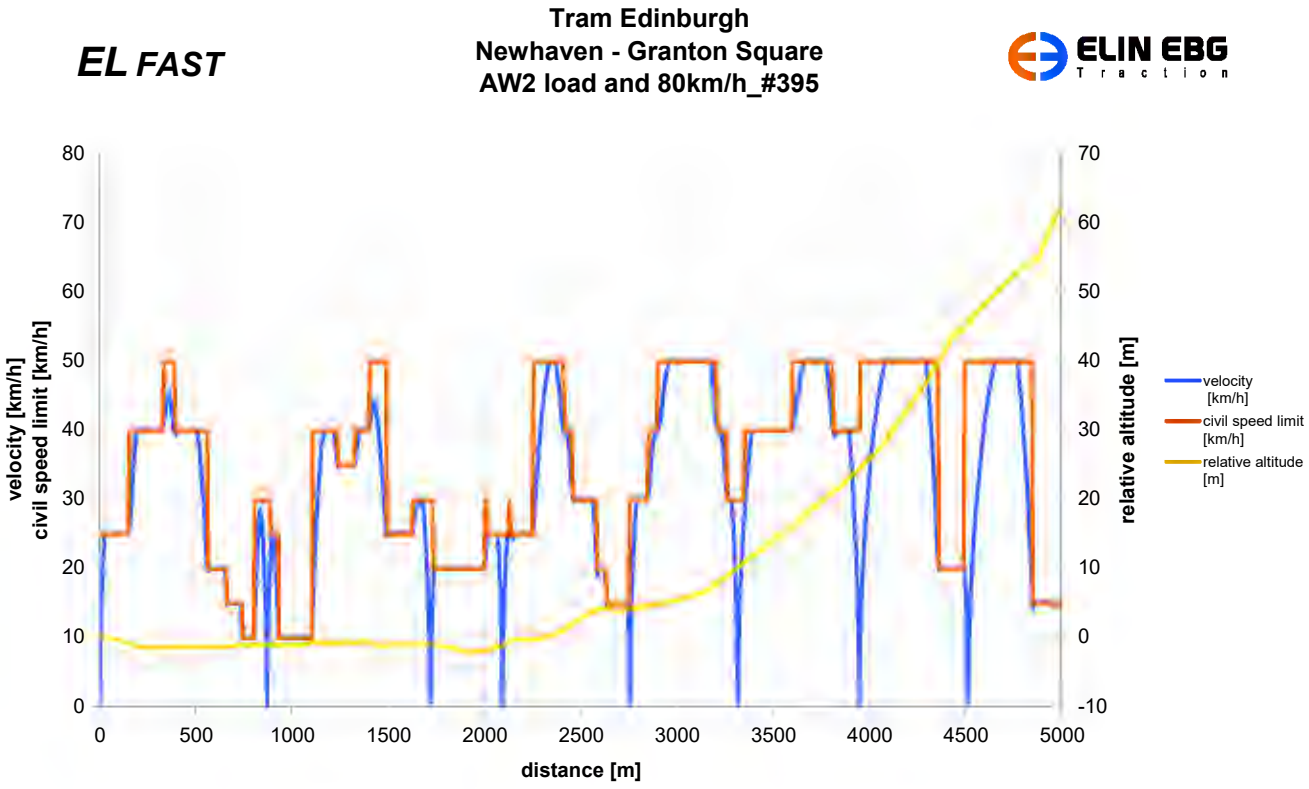


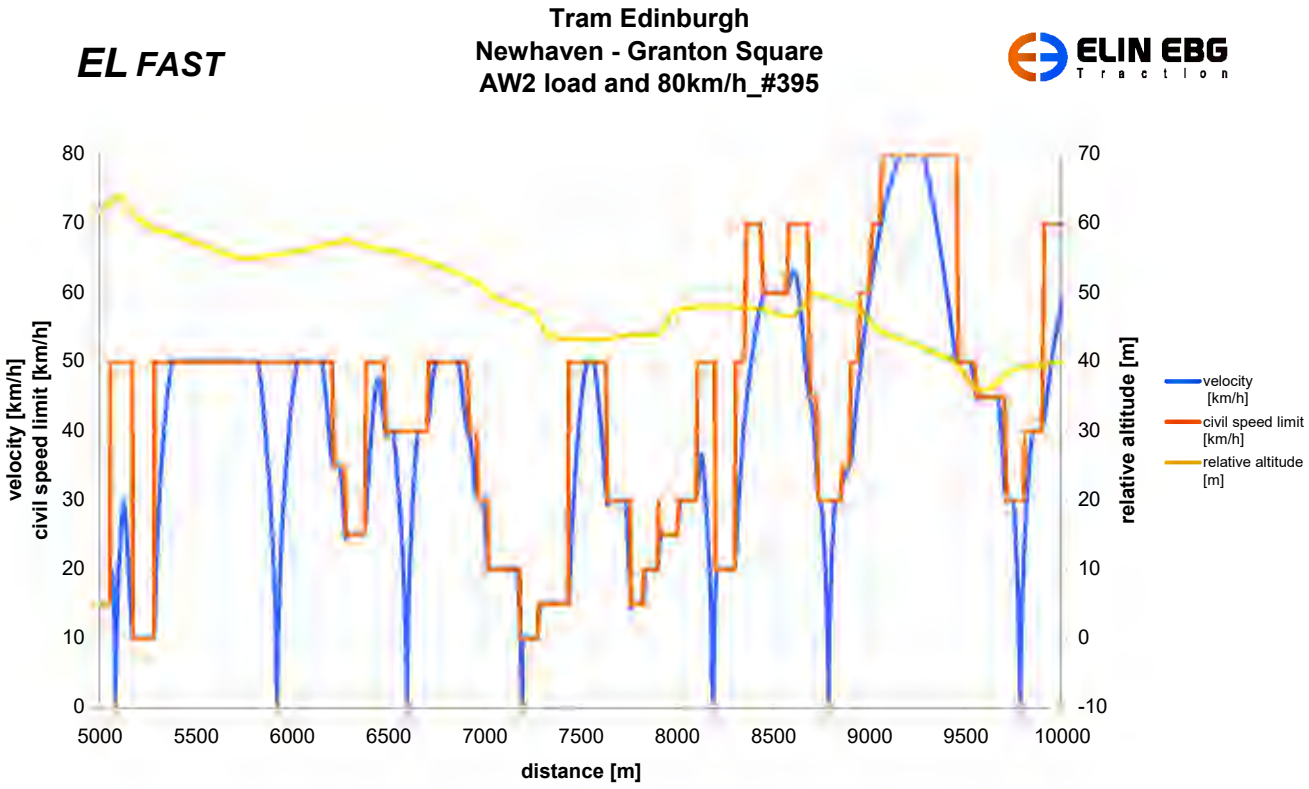
2.3 Braking force diagram at AW2 load and 75% braking effort



2.4 Route Newhaven – Granton Square (max. velocity 80km/h)

v = f(s), v_{civ} = f(s), alt = f(s) velocity, civil speed limit and relative altitude as a function of distance

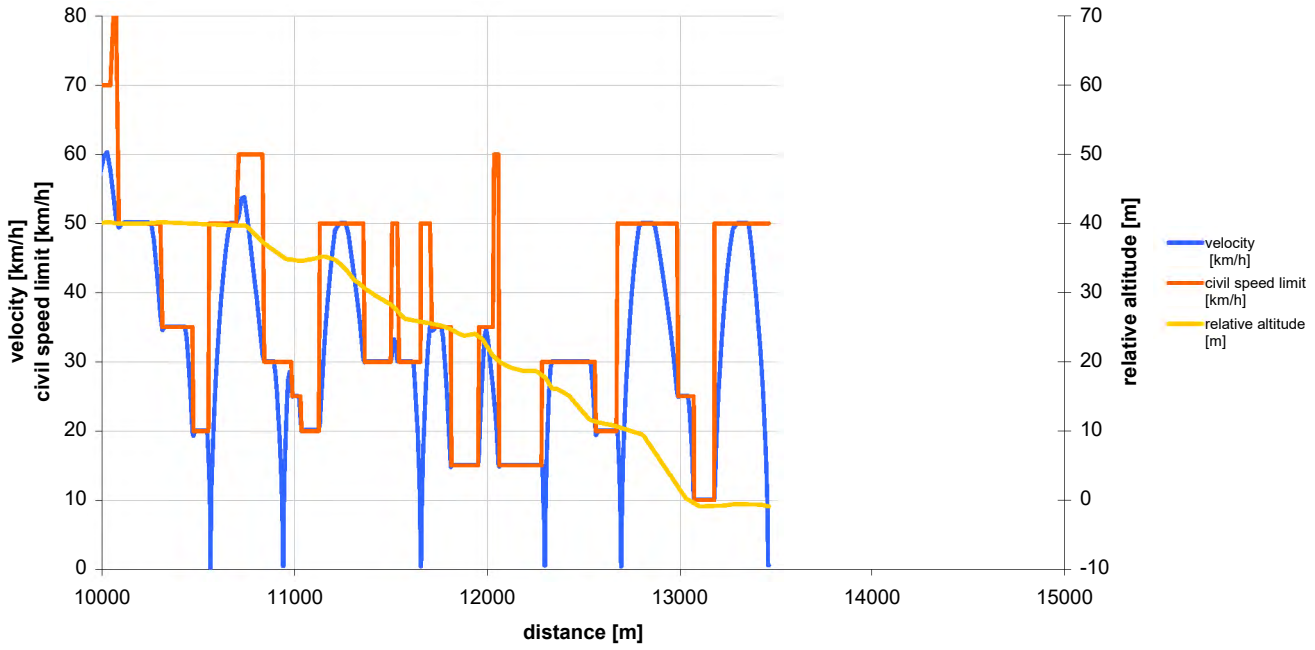




EL FAST

Tram Edinburgh
Newhaven - Granton Square
AW2 load and 80km/h_#395

ELIN EBG Traction

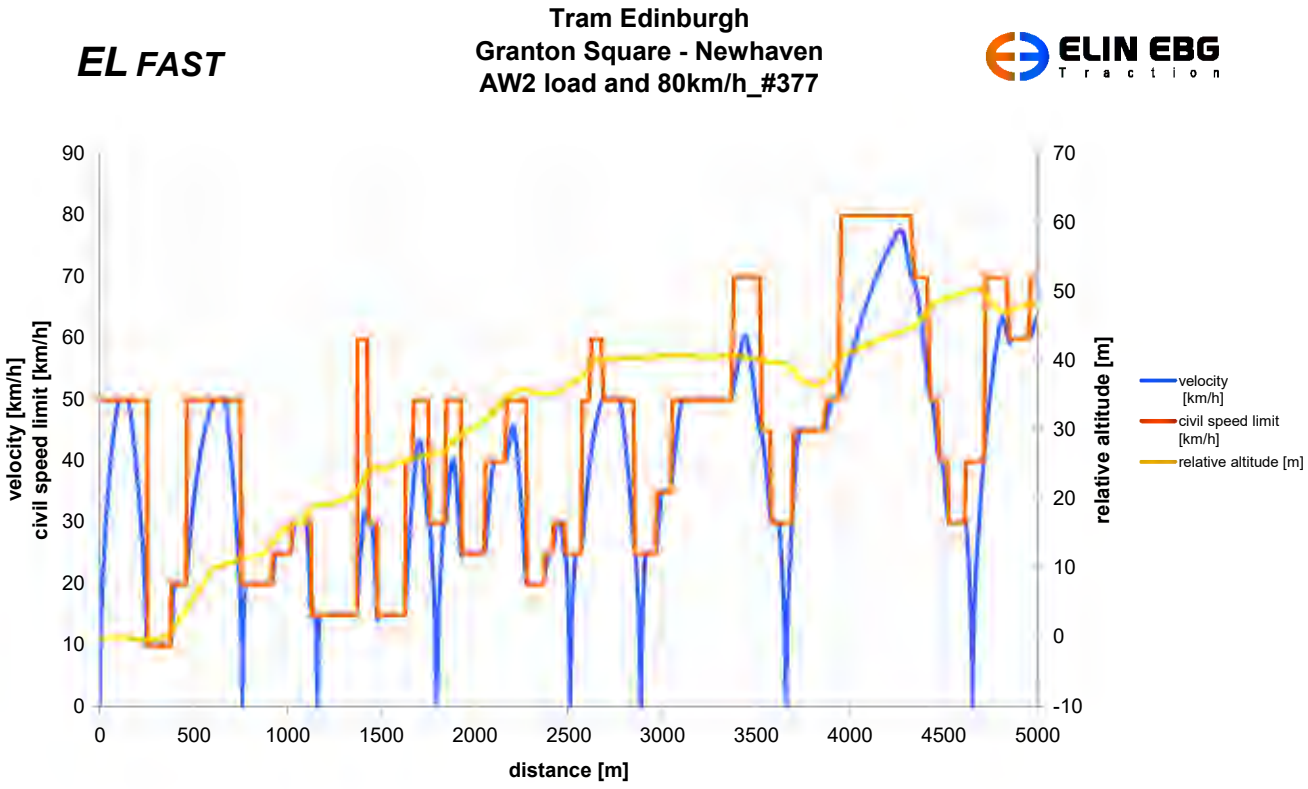


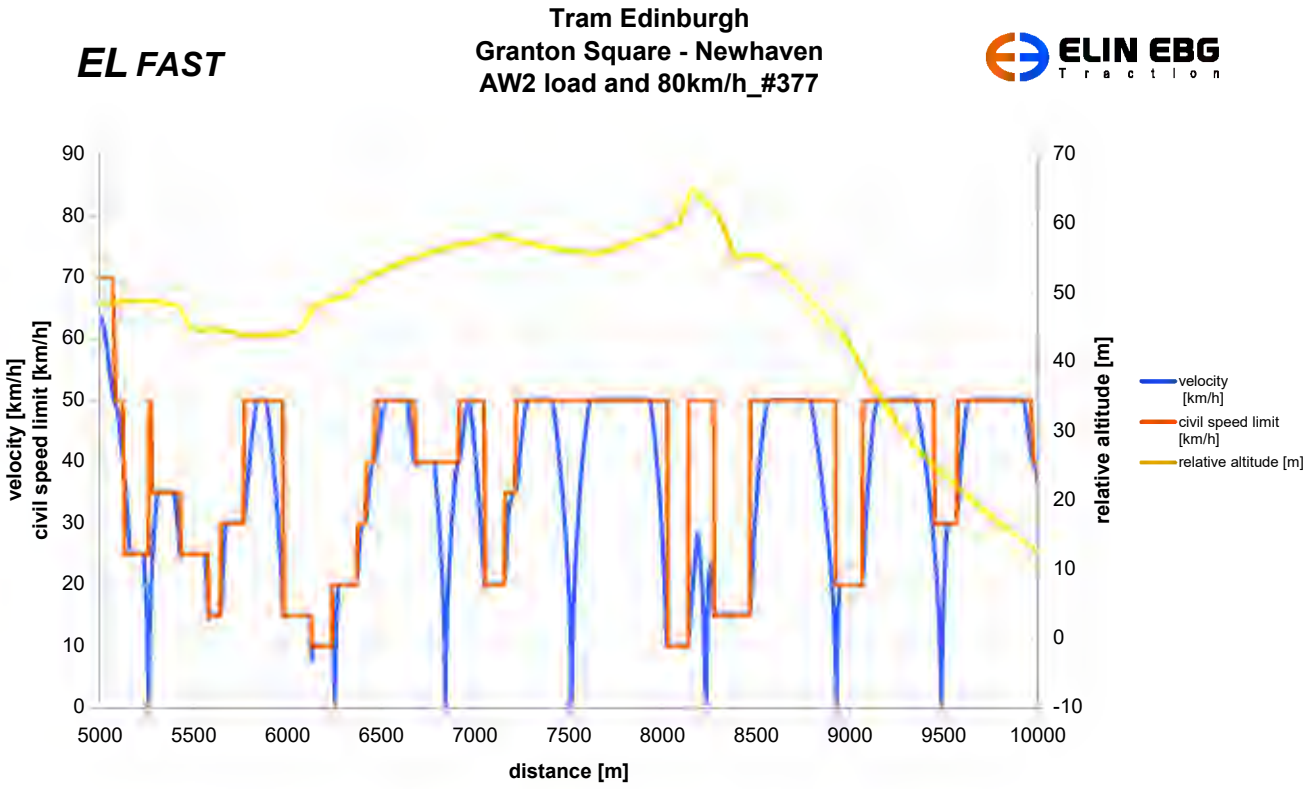
Station	Arrival [sec]	Departure [sec]	Inter stop time [sec]
NER		0	0
OCT	140	165	140
OCD	316	341	151
COS	411	436	70
FOW	537	562	101
BAS	622	647	60
MDR	712	737	65
PIP	808	833	71
NSA	926	951	93
PSW	1067	1092	116
SHP	1169	1194	77
HAY	1272	1297	78
ROS	1473	1498	176
RAD	1564	1589	66
CRA	1670	1695	81
WGH	1779	1804	84
CRT	1850	1875	46
WGA	1969	1994	94
CAP	2125	2150	131
GRW	2213	2238	63
GRS	2353		115
Total:	2353	39min 13 sec	

All time values +/-10% Tolerance

2.5 Route Granton Square – Newhaven (max. velocity 80km/h)

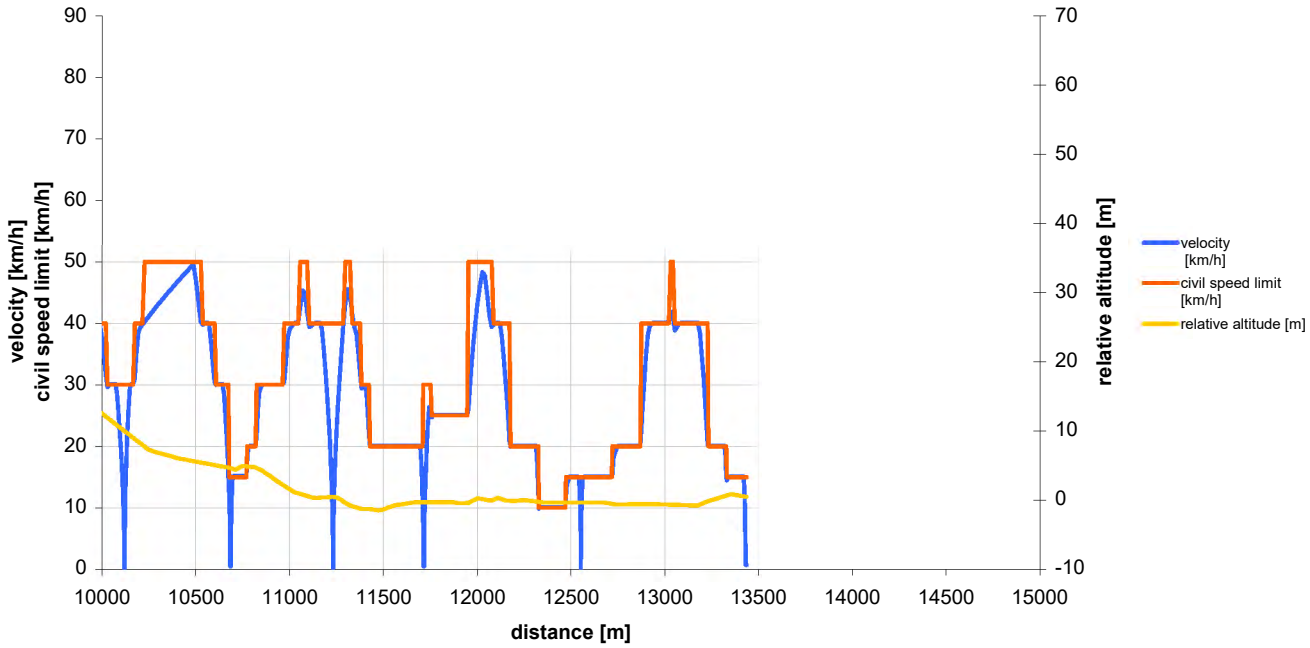
v = f(s), v_{civ} = f(s), alt = f(s) velocity, civil speed limit and relative altitude as a function of distance





EL FAST

Tram Edinburgh
Granton Square - Newhaven
AW2 load and 80km/h_#377

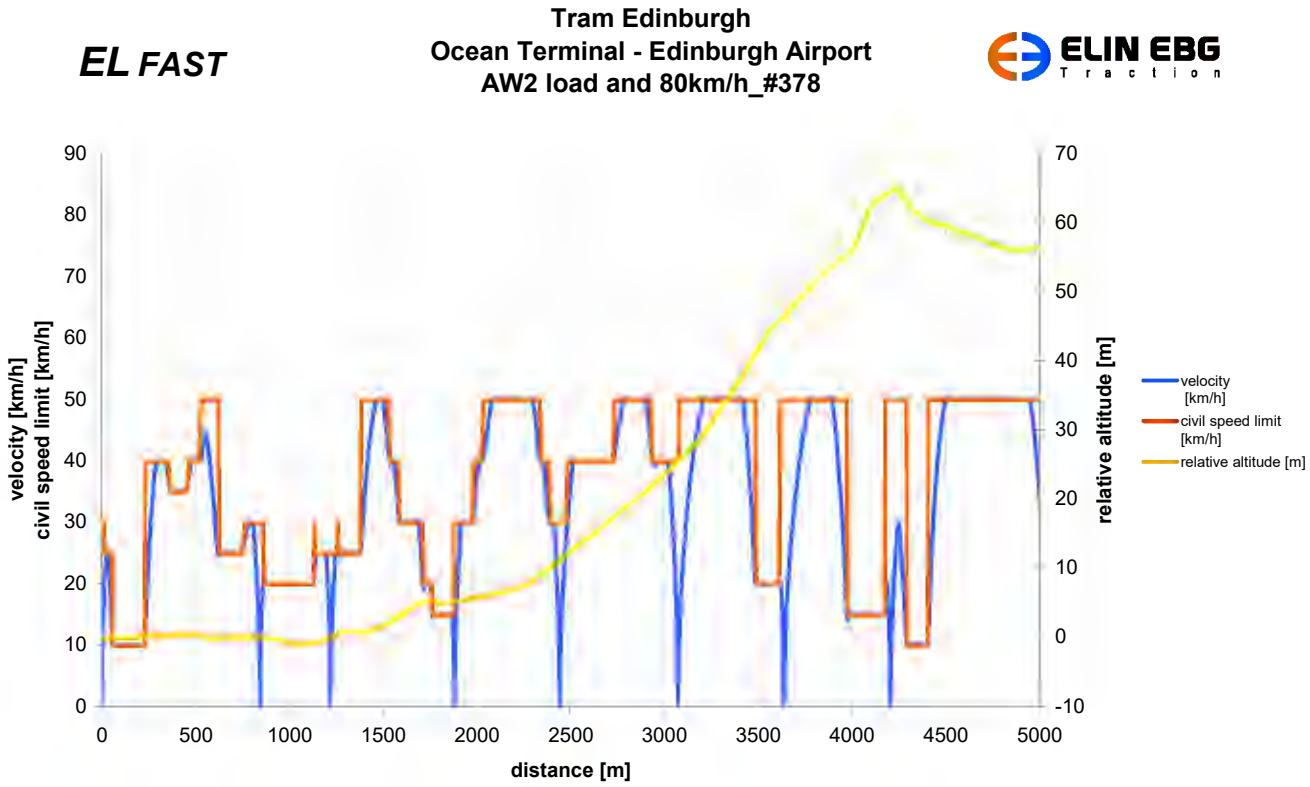


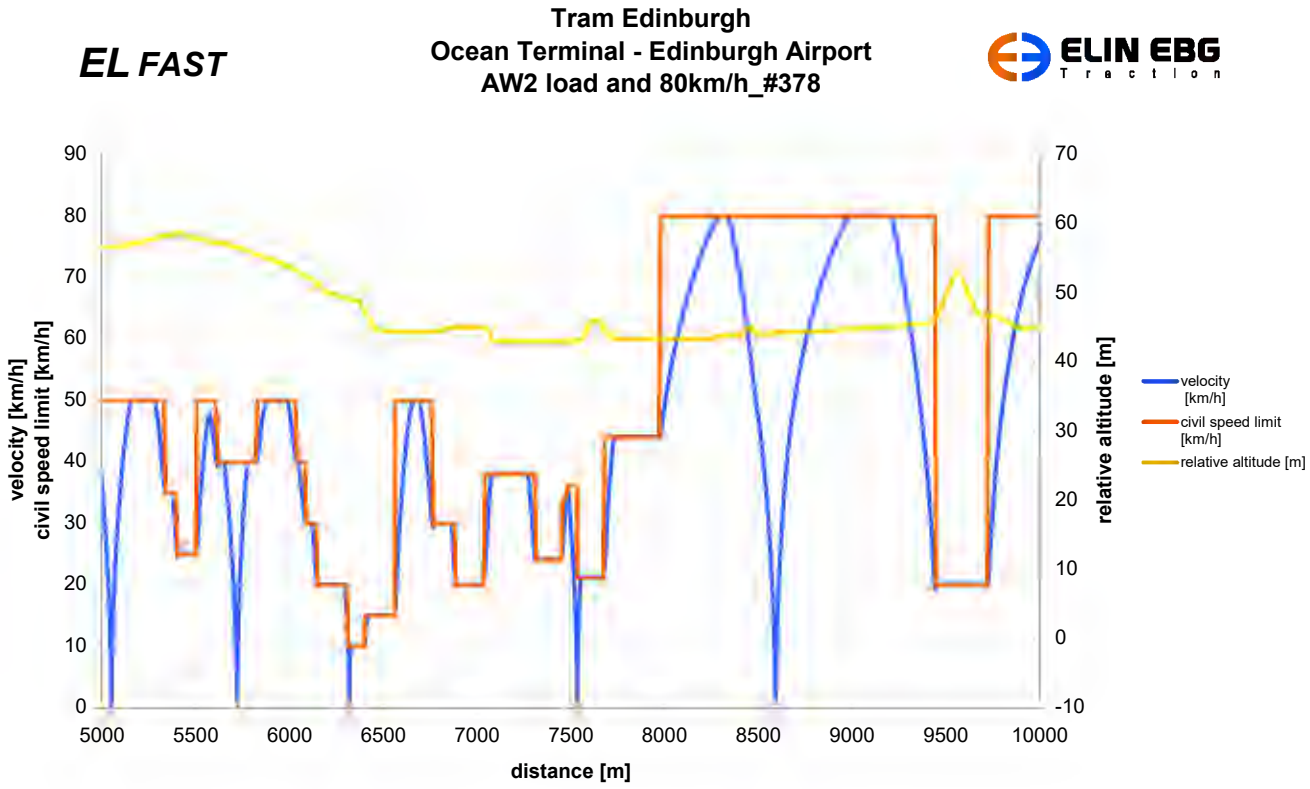
Station	Arrival [sec]	Departure [sec]	Inter stop time [sec]
GRS		0	
GRW	124	149	124
CAP	220	245	71
WGA	372	397	127
CRT	496	521	99
WGH	567	592	46
CRA	670	695	78
RAD	778	803	83
ROS	863	888	60
HAY	1066	1091	178
SHP	1163	1188	72
PSW	1270	1295	82
SSD	1404	1429	109
PIP	1531	1556	102
MDR	1625	1650	69
BAS	1717	1742	67
FOW	1803	1828	61
COS	1908	1933	80
OCD	2013	2038	80
OCT	2199	2224	161
NER	2375		151
Total:	2375	39min 35sec	

All time values +/-10% Tolerance

2.6 Route Ocean Terminal – Edinburgh Airport (max. velocity 80km/h)

v = f(s), v_{civ} = f(s), alt = f(s) velocity, civil speed limit and relative altitude as a function of distance

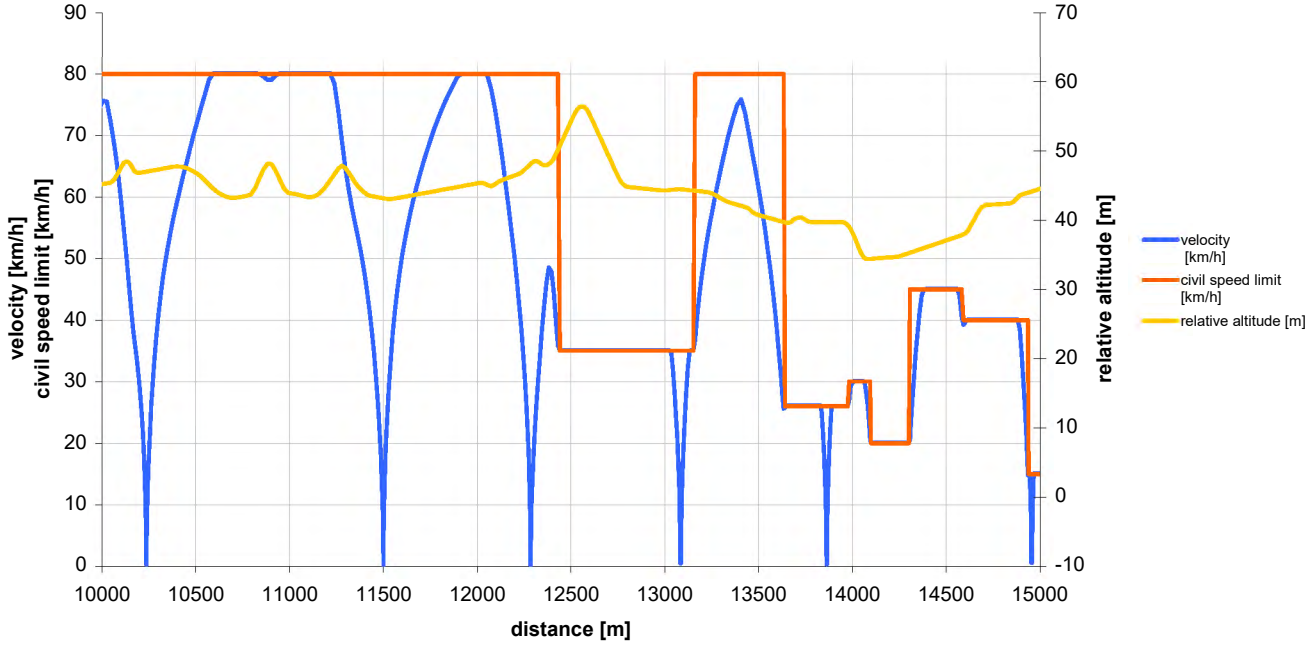




EL FAST

Tram Edinburgh
Ocean Terminal - Edinburgh Airport
AW2 load and 80km/h_#378

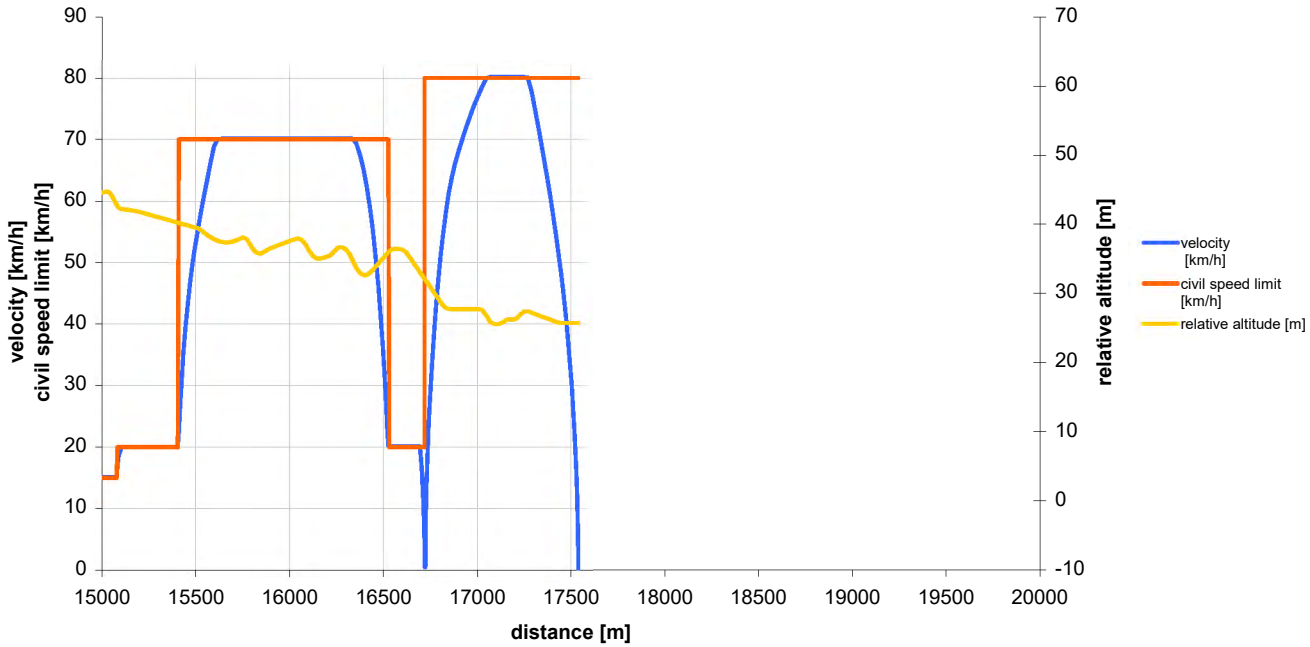
ELIN EBG Traction



EL FAST

Tram Edinburgh
Ocean Terminal - Edinburgh Airport
AW2 load and 80km/h_#378

ELIN EBG Traction

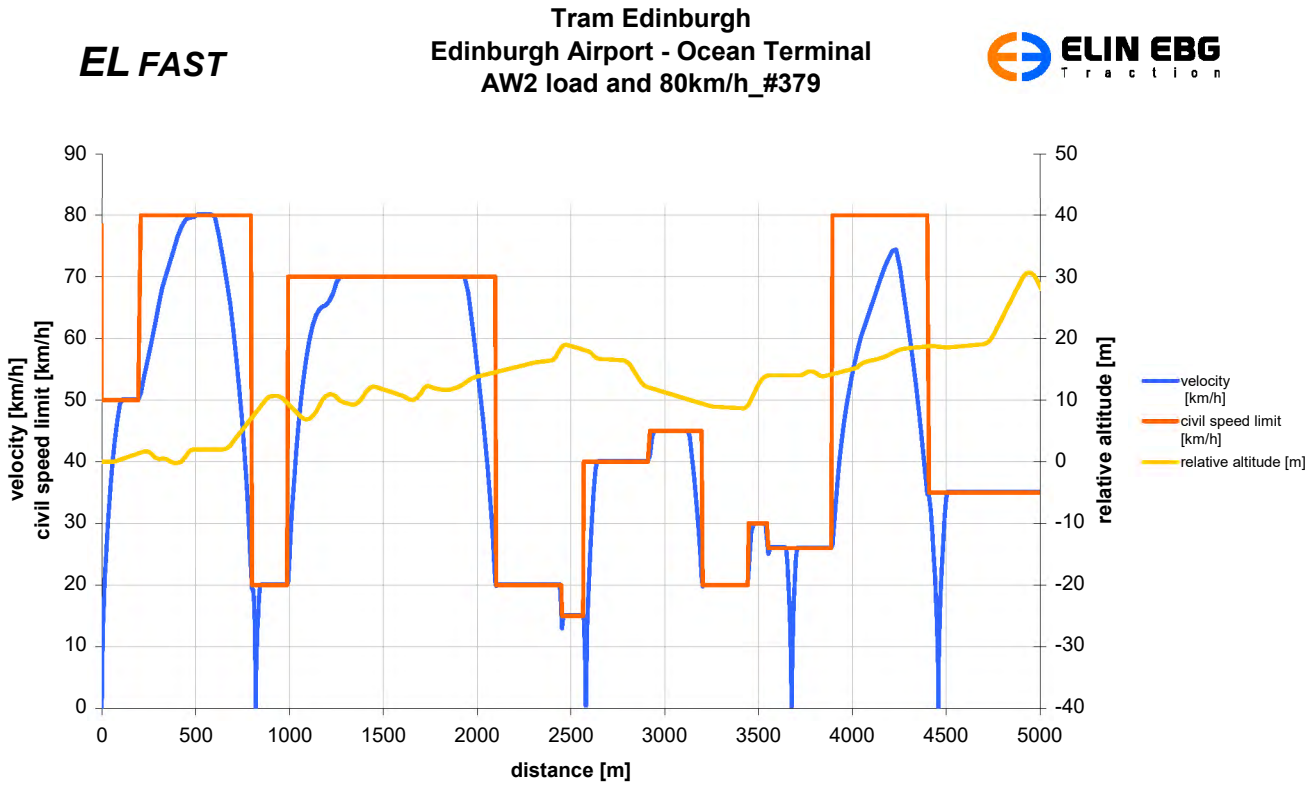


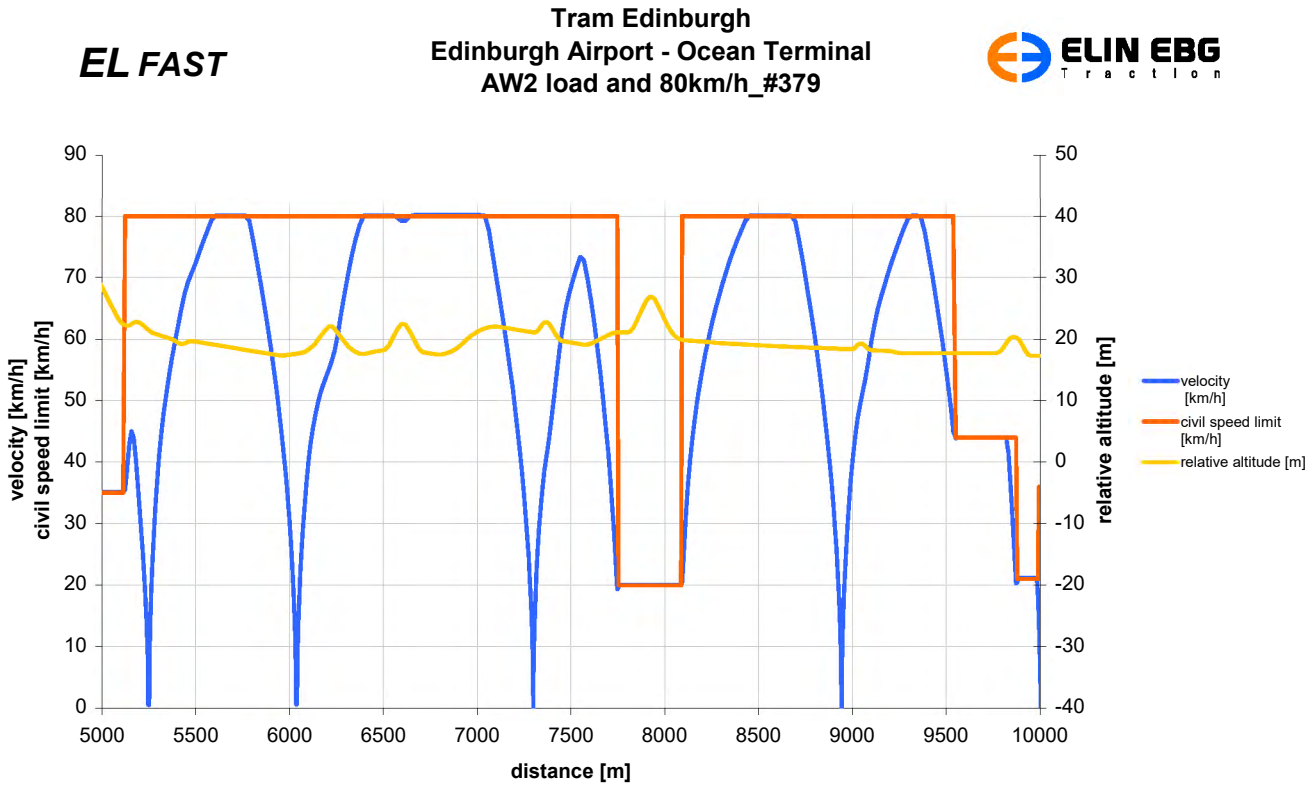
Station	Arrival [sec]	Departure [sec]	Inter stop time [sec]
OCT		0	0
OCD	151	176	151
COS	248	273	72
FOW	373	398	100
BAS	458	483	60
MDR	549	574	66
PIP	644	669	70
NSA	762	787	93
PSW	903	928	116
SHP	1005	1030	77
HAY	1109	1134	79
MUR	1329	1354	195
BAR	1451	1476	97
SRN	1625	1650	149
SGA	1732	1757	82
EPS	1815	1840	58
EDP	1932	1957	92
GYL	2036	2061	79
GOG	2198	2223	137
IPR	2420	2445	197
AIR	2504		59
Total:	2504	41min 44 sec	

All time values +/-10% Tolerance

2.7 Route Edinburgh Airport - Ocean Terminal (max. velocity 80km/h)

v = f(s), v_{civ} = f(s), alt = f(s) velocity, civil speed limit and relative altitude as a function of distance

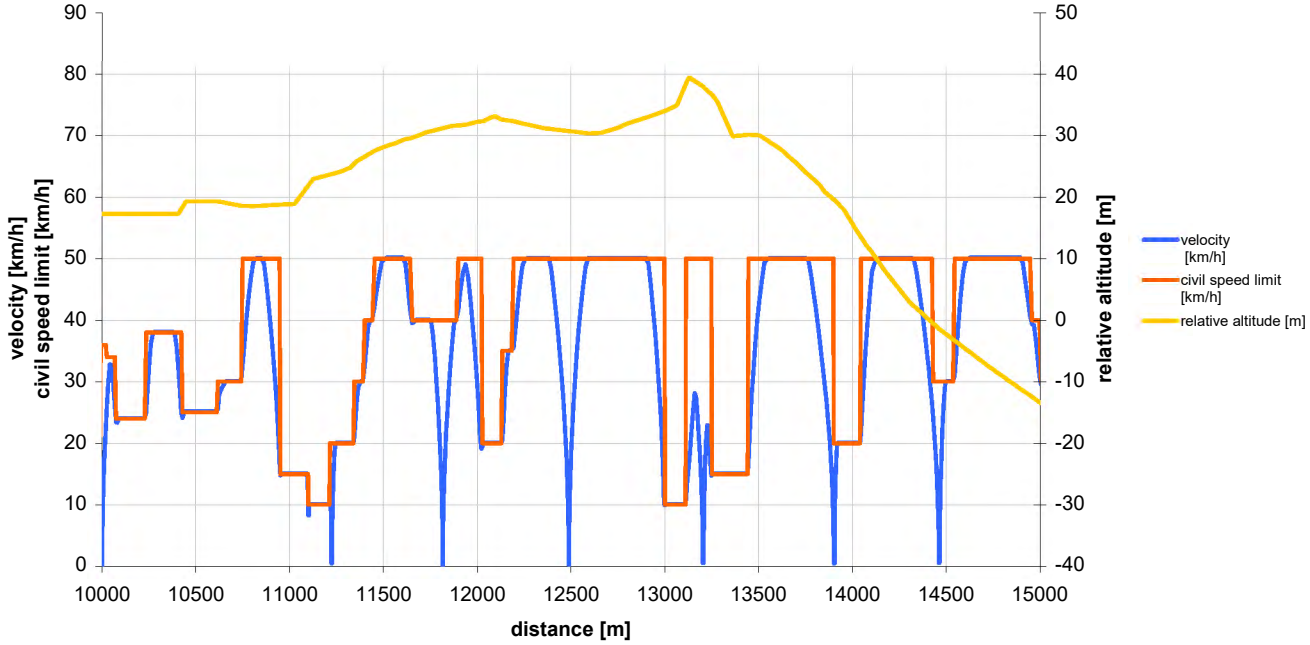




EL FAST

Tram Edinburgh
Edinburgh Airport - Ocean Terminal
AW2 load and 80km/h_#379

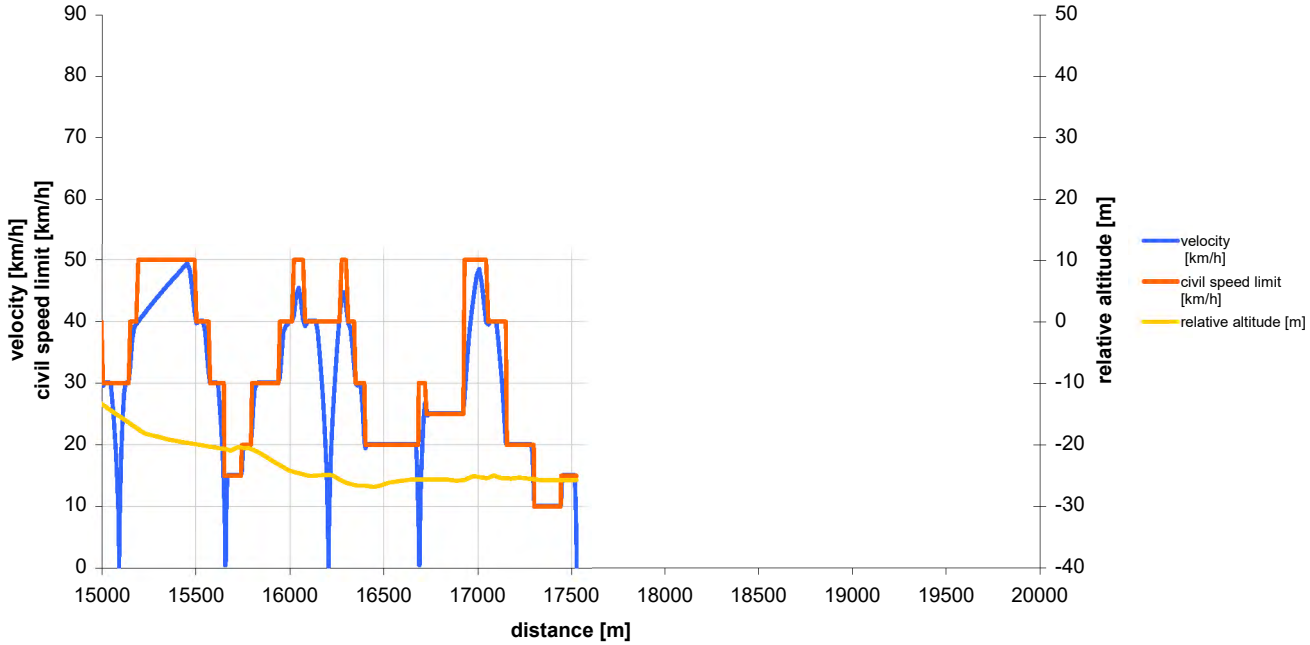
ELIN EBG Traction



EL FAST

Tram Edinburgh
Edinburgh Airport - Ocean Terminal
AW2 load and 80km/h_#379

ELIN EBG Traction

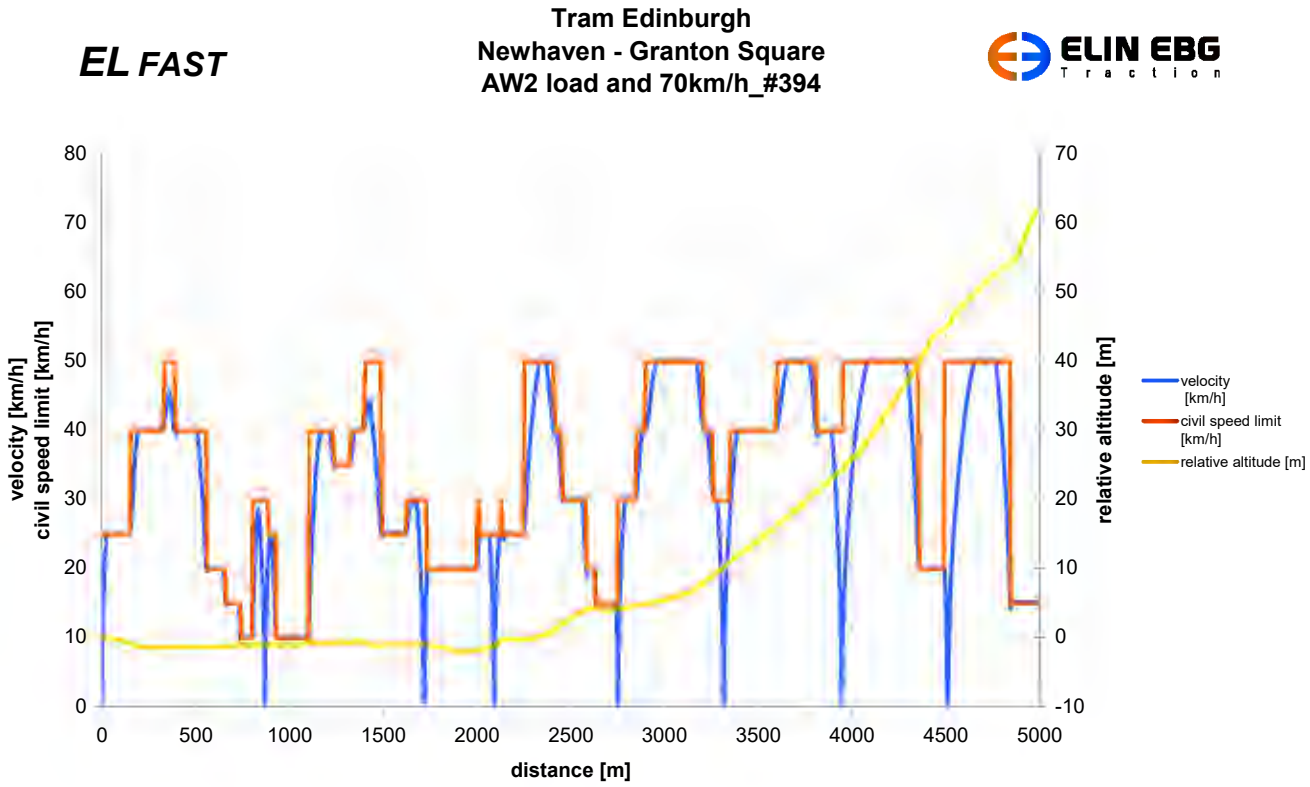


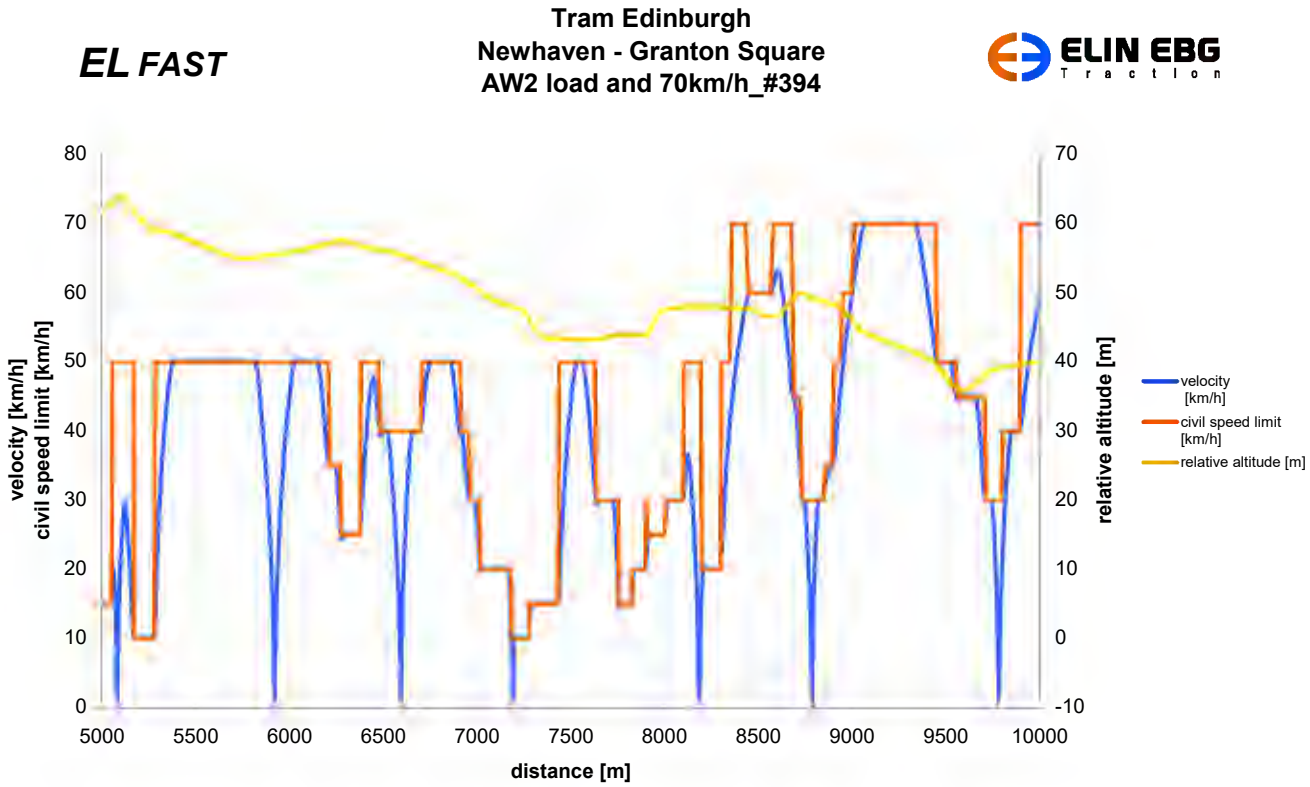
Station	Arrival [sec]	Departure [sec]	Inter stop time [sec]
AIR		0	
IPR	63	88	63
GOG	287	312	224
GYL	451	476	227
EDP	554	579	327
EPS	671	696	344
SGA	753	778	409
SRN	860	885	451
BAR	1043	1068	592
MUR	1163	1188	571
HAY	1389	1414	818
SHP	1486	1511	668
PSW	1593	1618	925
NSA	1727	1752	802
PIP	1855	1880	1053
MDR	1950	1975	897
BAS	2040	2065	1143
FOW	2127	2152	984
COS	2232	2257	1248
OCD	2336	2361	1088
OCT	2522		1434
Total:	2522	42min 02 sec	

All time values +/-10% Tolerance

2.8 Route Newhaven – Granton Square (max. velocity 70km/h)

v = f(s), v_{civ} = f(s), alt = f(s) velocity, civil speed limit and relative altitude as a function of distance

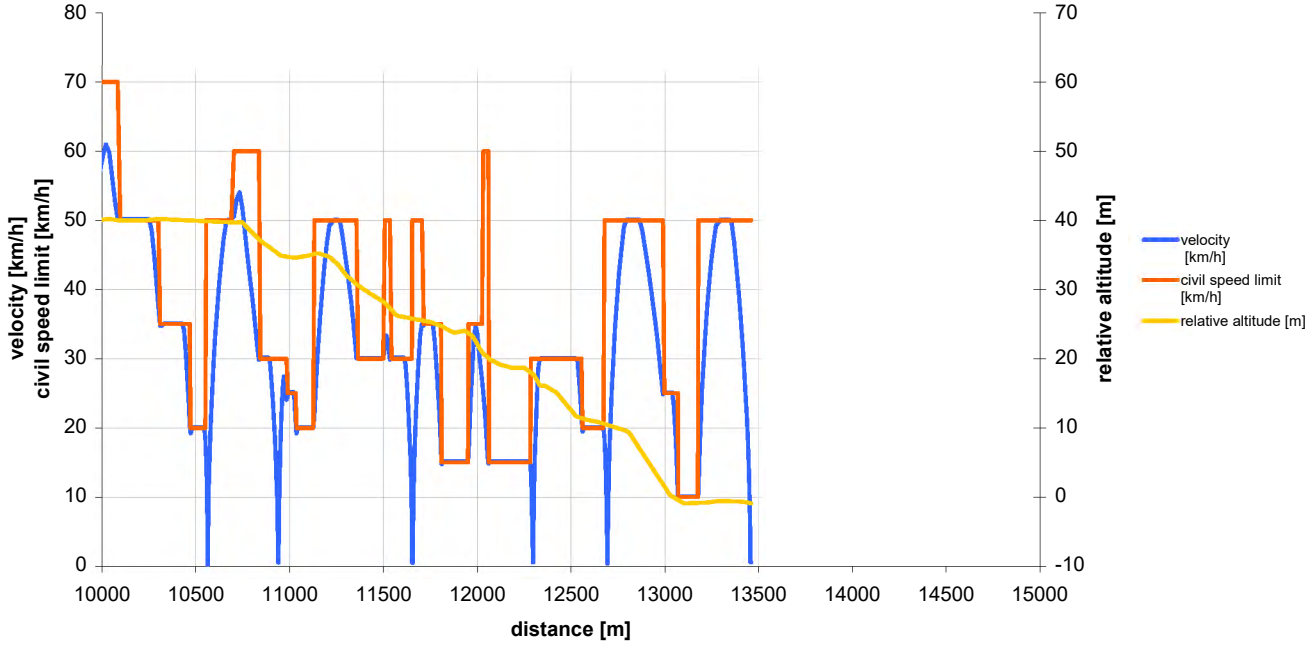




EL FAST

Tram Edinburgh
Newhaven - Granton Square
AW2 load and 70km/h_#394

ELIN EBG Traction

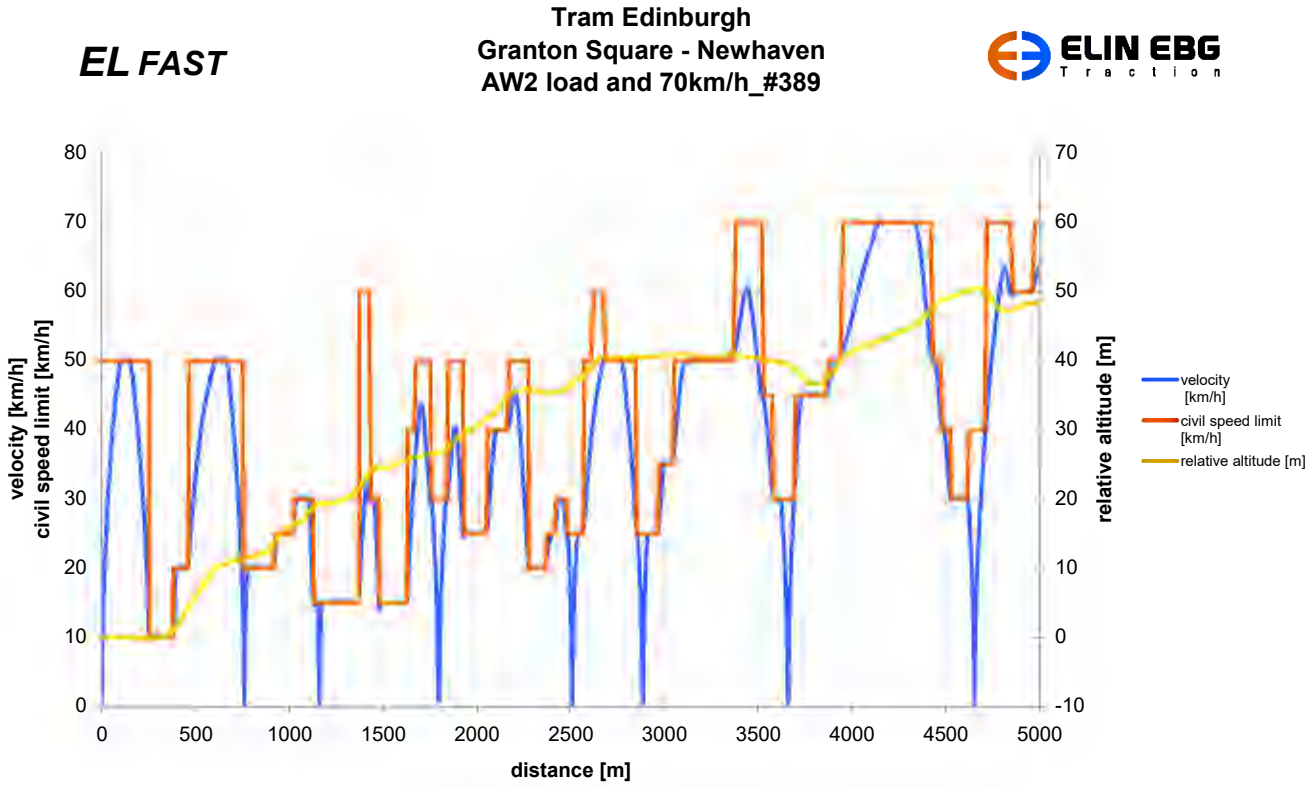


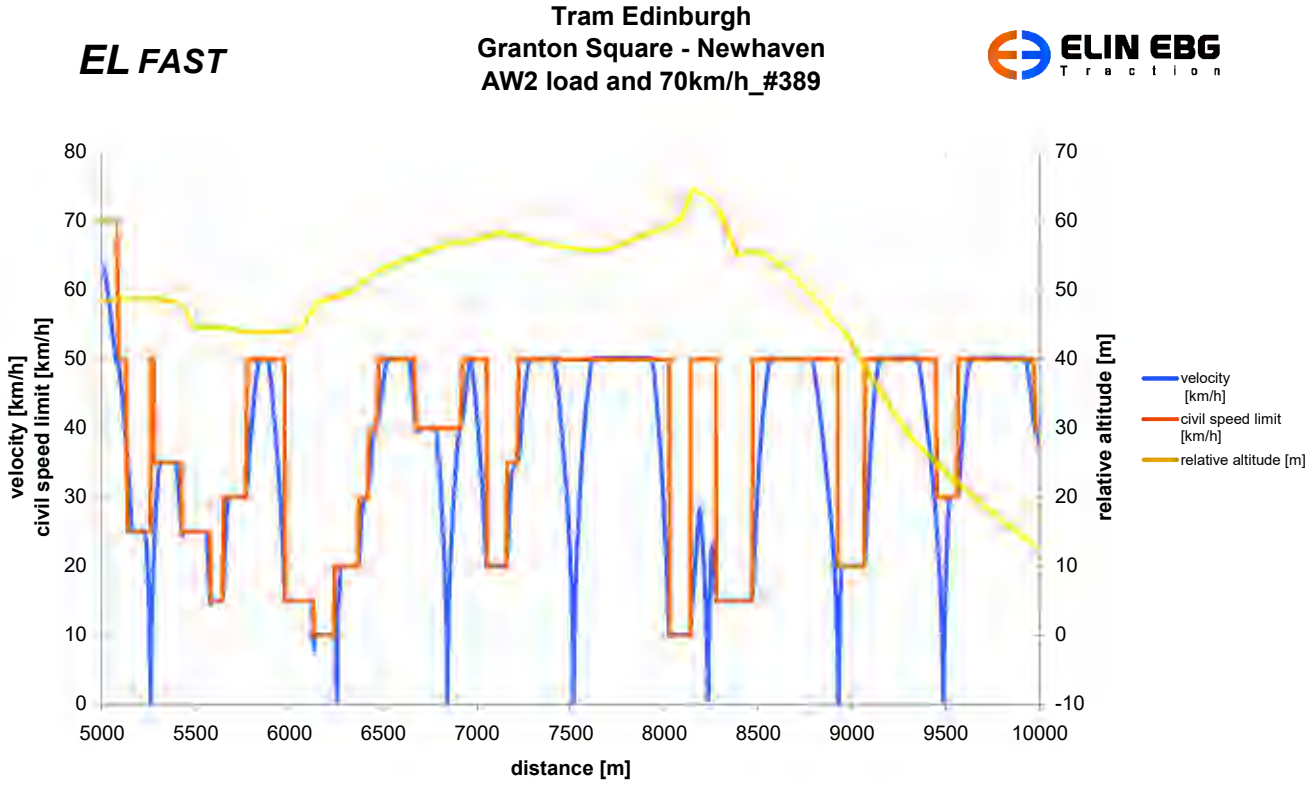
Station	Arrival [sec]	Departure [sec]	Inter stop time [sec]
NER		0	0
OCT	140	165	140
OCD	316	341	151
COS	411	436	70
FOW	537	562	101
BAS	622	647	60
MDR	712	737	65
PIP	808	833	71
NSA	926	951	93
PSW	1067	1092	116
SHP	1169	1194	77
HAY	1272	1297	78
ROS	1473	1498	176
RAD	1564	1589	66
CRA	1672	1697	83
WGH	1780	1805	83
CRT	1851	1876	46
WGA	1970	1995	94
CAP	2126	2151	131
GRW	2214	2239	63
GRS	2355		116
Total:	2355	39min 15 sec	

All time values +/-10% Tolerance

2.9 Route Granton Square – Newhaven (max. velocity 70km/h)

v = f(s), v_{civ} = f(s), alt = f(s) velocity, civil speed limit and relative altitude as a function of distance

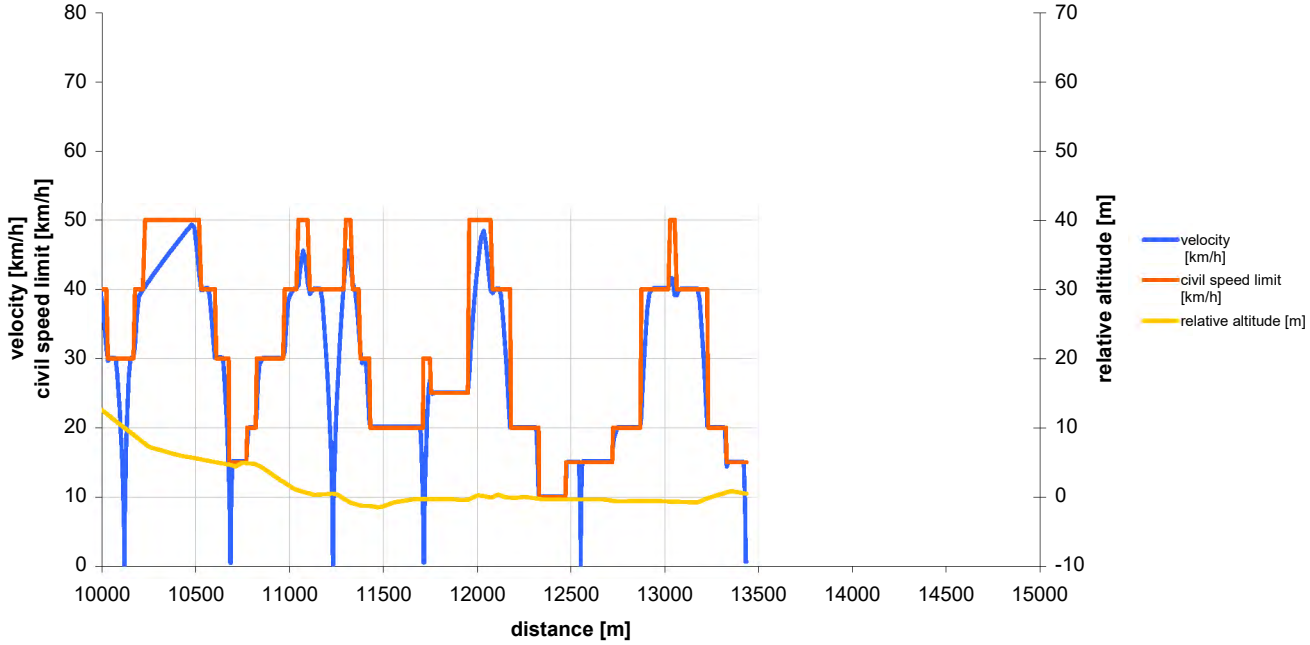




EL FAST

Tram Edinburgh
Granton Square - Newhaven
AW2 load and 70km/h_#389

ELIN EBG Traction

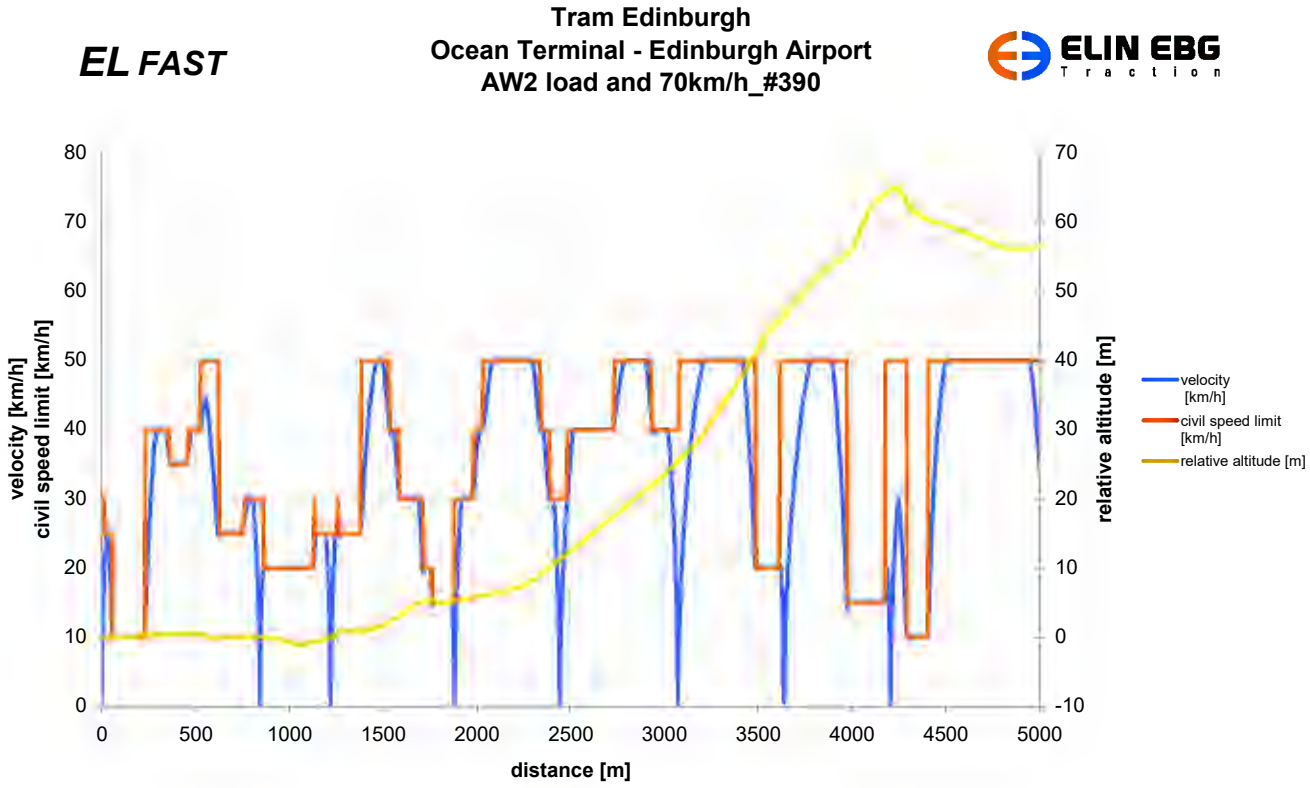


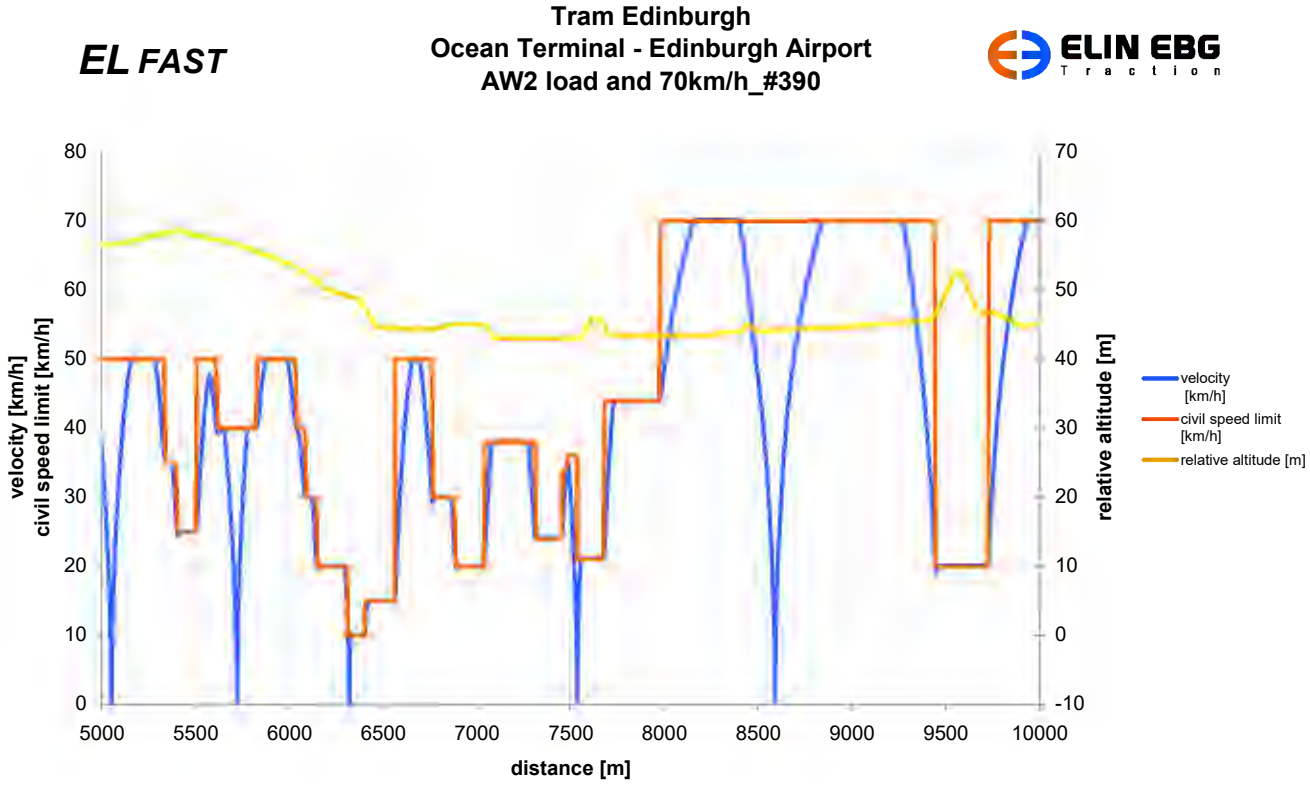
Station	Arrival [sec]	Departure [sec]	Inter stop time [sec]
GRS		0	
GRW	124	149	124
CAP	220	245	71
WGA	372	397	127
CRT	496	521	99
WGH	567	592	46
CRA	670	695	78
RAD	778	803	83
ROS	863	888	60
HAY	1067	1092	179
SHP	1164	1189	72
PSW	1271	1296	82
SSD	1405	1430	109
PIP	1532	1557	102
MDR	1627	1652	70
BAS	1718	1743	66
FOW	1804	1829	61
COS	1909	1934	80
OCD	2014	2039	80
OCT	2199	2224	160
NER	2376		152
Total:	2375	39min 36sec	

All time values +/-10% Tolerance

2.10 Route Ocean Terminal – Edinburgh Airport (max. velocity 70km/h)

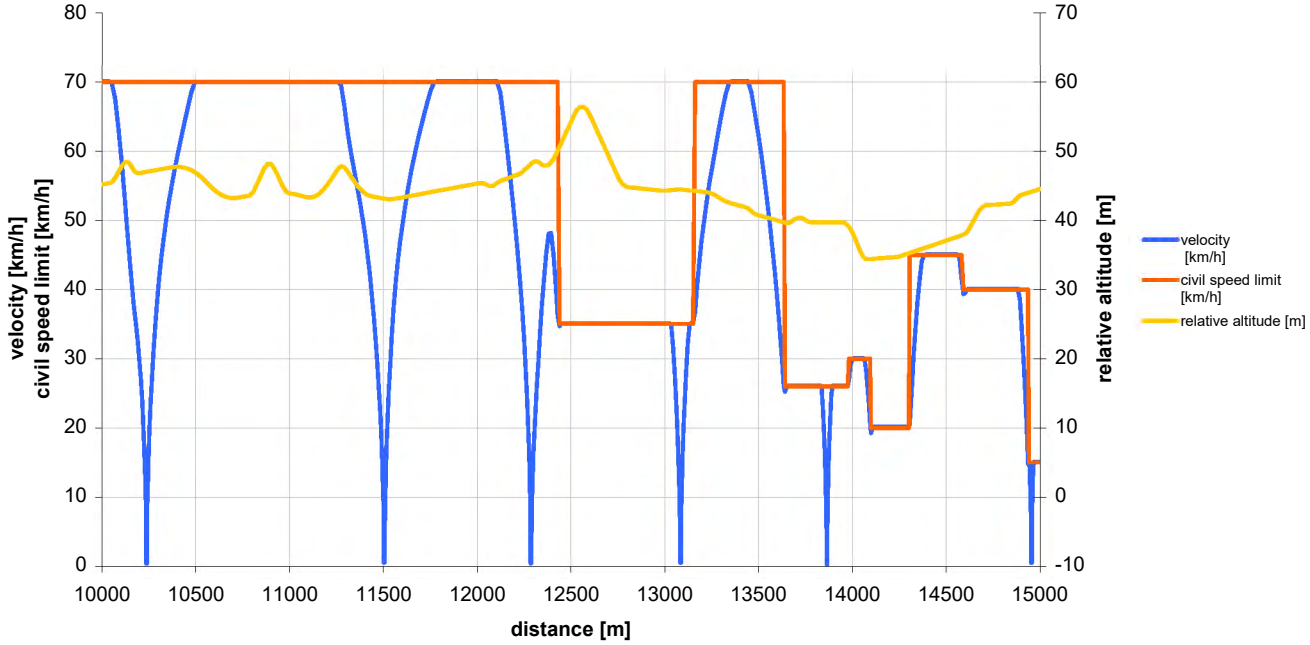
v = f(s), v_{civ} = f(s), alt = f(s) velocity, civil speed limit and relative altitude as a function of distance





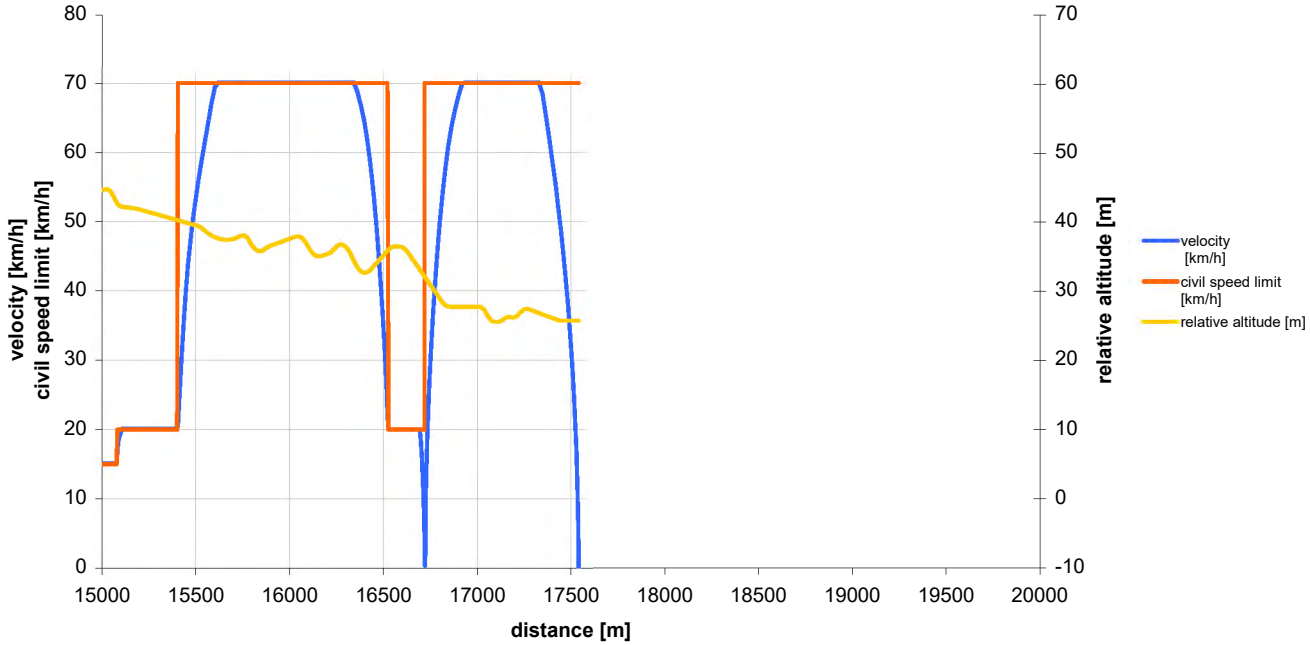
EL FAST

Tram Edinburgh
Ocean Terminal - Edinburgh Airport
AW2 load and 70km/h_#390



EL FAST

Tram Edinburgh
Ocean Terminal - Edinburgh Airport
AW2 load and 70km/h_#390

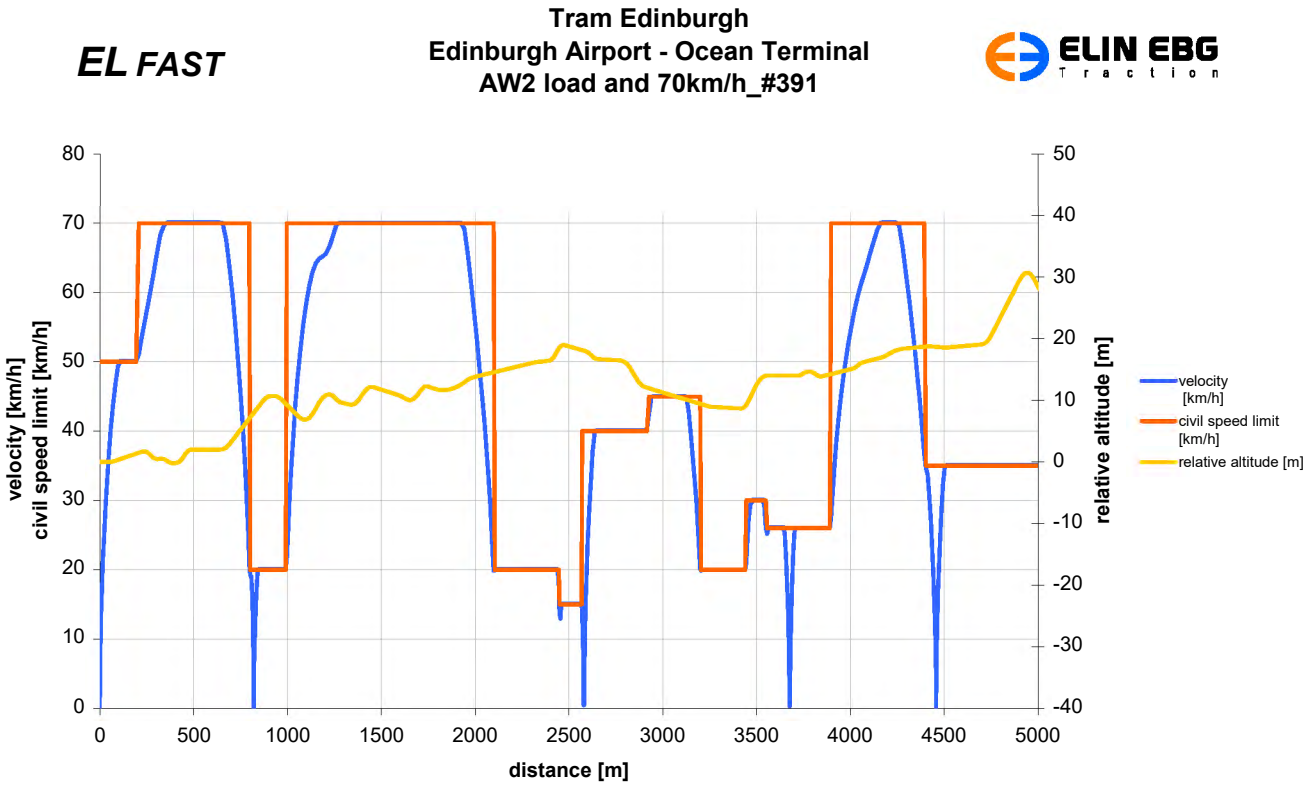


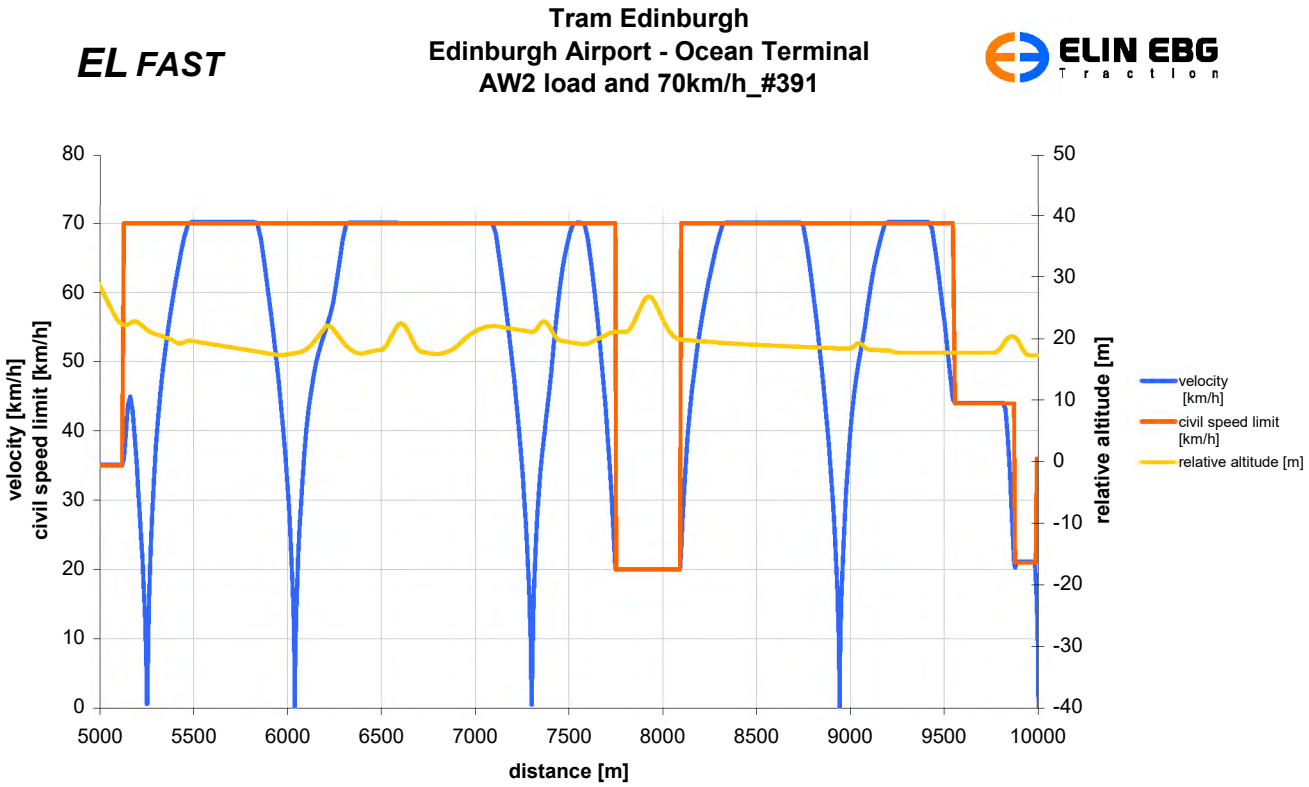
Station	Arrival [sec]	Departure [sec]	Inter stop time [sec]
OCT		0	0
OCD	151	176	151
COS	248	273	72
FOW	373	398	100
BAS	458	483	60
MDR	549	574	66
PIP	644	669	70
NSA	762	787	93
PSW	903	928	116
SHP	1005	1030	77
HAY	1109	1134	79
MUR	1329	1354	195
BAR	1452	1477	98
SRN	1629	1654	152
SGA	1740	1765	86
EPS	1824	1849	59
EDP	1941	1966	92
GYL	2045	2070	79
GOG	2207	2232	137
IPR	2429	2454	197
AIR	2515		61
Total:	2515	41min 55 sec	

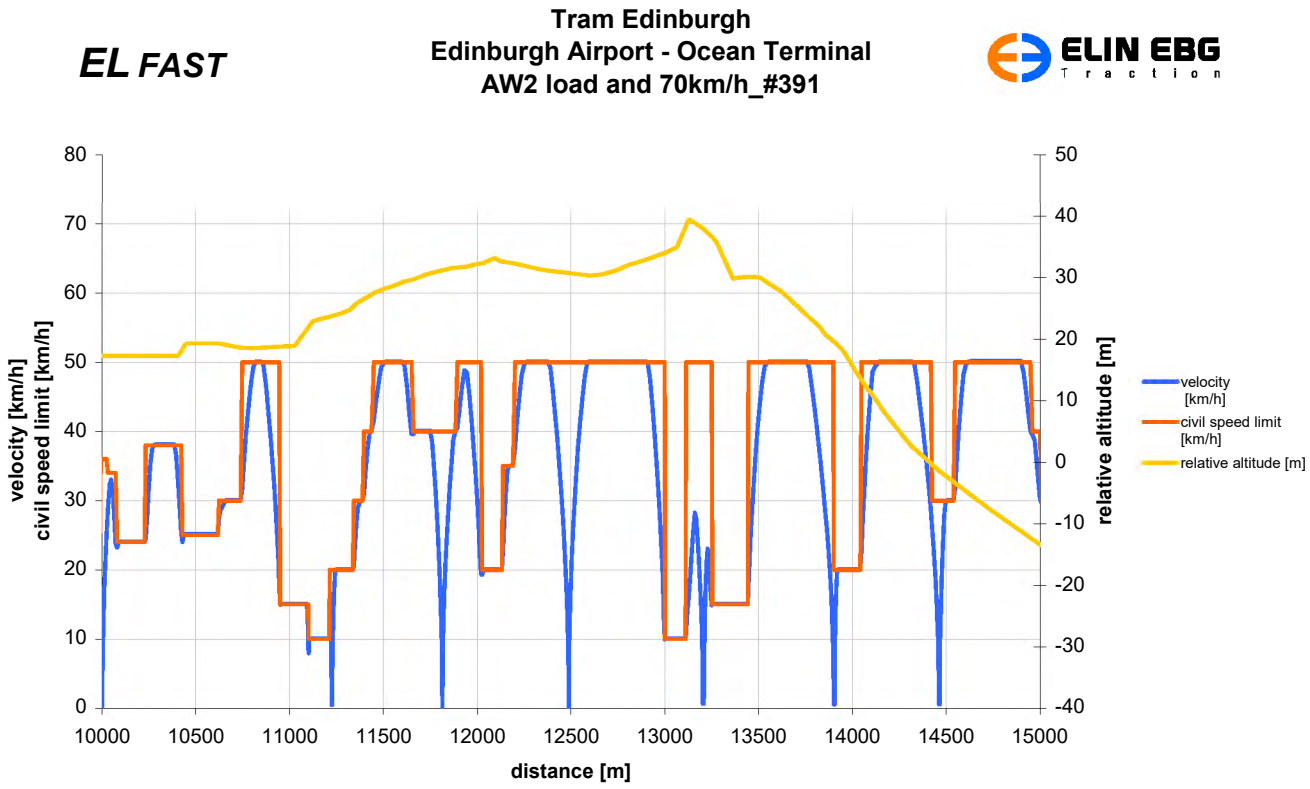
All time values +/-10% Tolerance

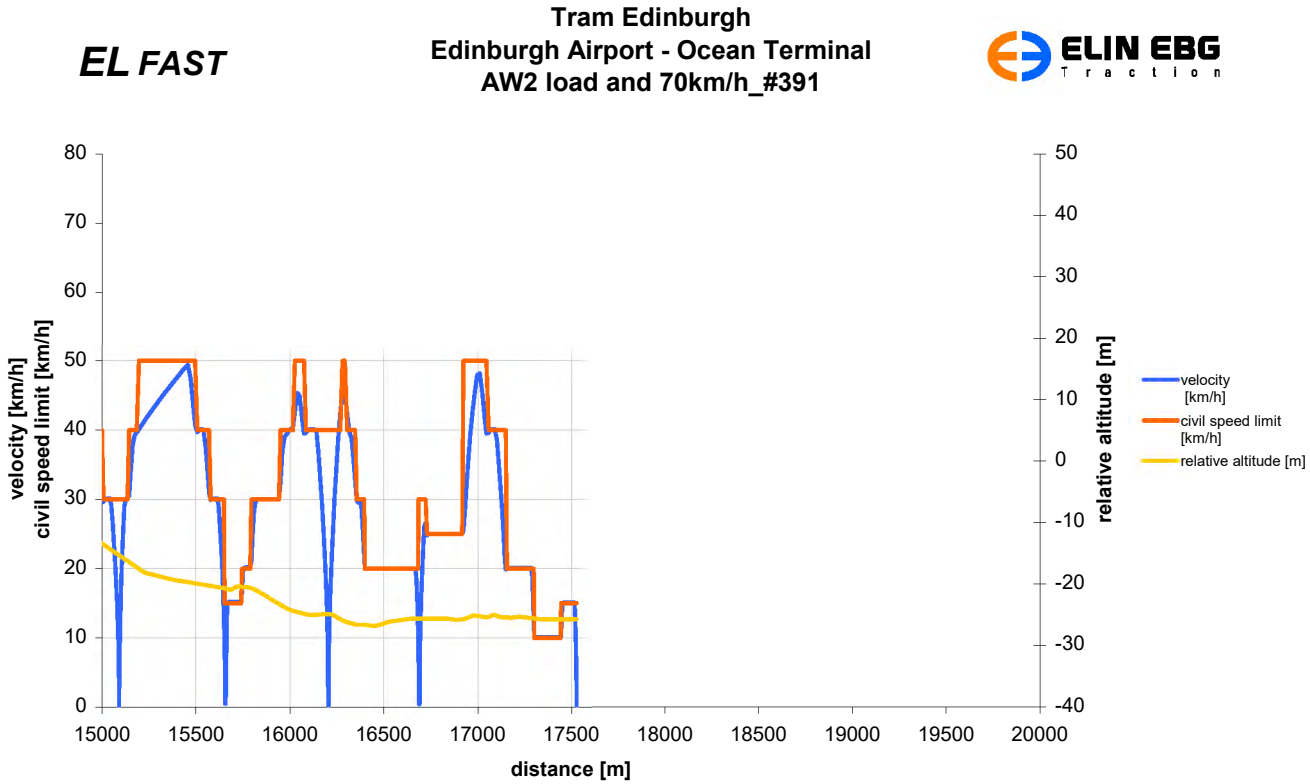
2.11 Route Edinburgh Airport - Ocean Terminal (max. velocity 70km/h)

v = f(s), v_{civ} = f(s), alt = f(s) velocity, civil speed limit and relative altitude as a function of distance






EL FAST
Tram Edinburgh
Edinburgh Airport - Ocean Terminal
AW2 load and 70km/h_#391
ELIN EBG Traction
velocity [km/h]
civil speed limit [km/h]
relative altitude [m]
distance [m]


EL FAST
Tram Edinburgh
Edinburgh Airport - Ocean Terminal
AW2 load and 70km/h_#391
ELIN EBG Traction
velocity [km/h]
civil speed limit [km/h]
relative altitude [m]
distance [m]

Station	Arrival [sec]	Departure [sec]	Inter stop time [sec]
AIR		0	
IPR	64	89	64
GOG	288	313	224
GYL	452	477	228
EDP	556	581	328
EPS	672	697	344
SGA	757	782	413
SRN	869	894	456
BAR	1053	1078	597
MUR	1174	1199	577
HAY	1401	1426	824
SHP	1497	1522	673
PSW	1605	1630	932
NSA	1738	1763	806
PIP	1866	1891	1060
MDR	1961	1986	901
BAS	2051	2076	1150
FOW	2137	2162	987
COS	2242	2267	1255
OCD	2347	2372	1092
OCT	2533		1441
Total:	2533	42min 13 sec	

All time values +/-10% Tolerance

3 Dynamic simulations with 100% propulsion

The vehicle consists of three motor bogies and one trailer bogie. The following simulations were made under the assumption that all three available propulsion systems are working properly.

3.1 Parameters for dynamic simulation

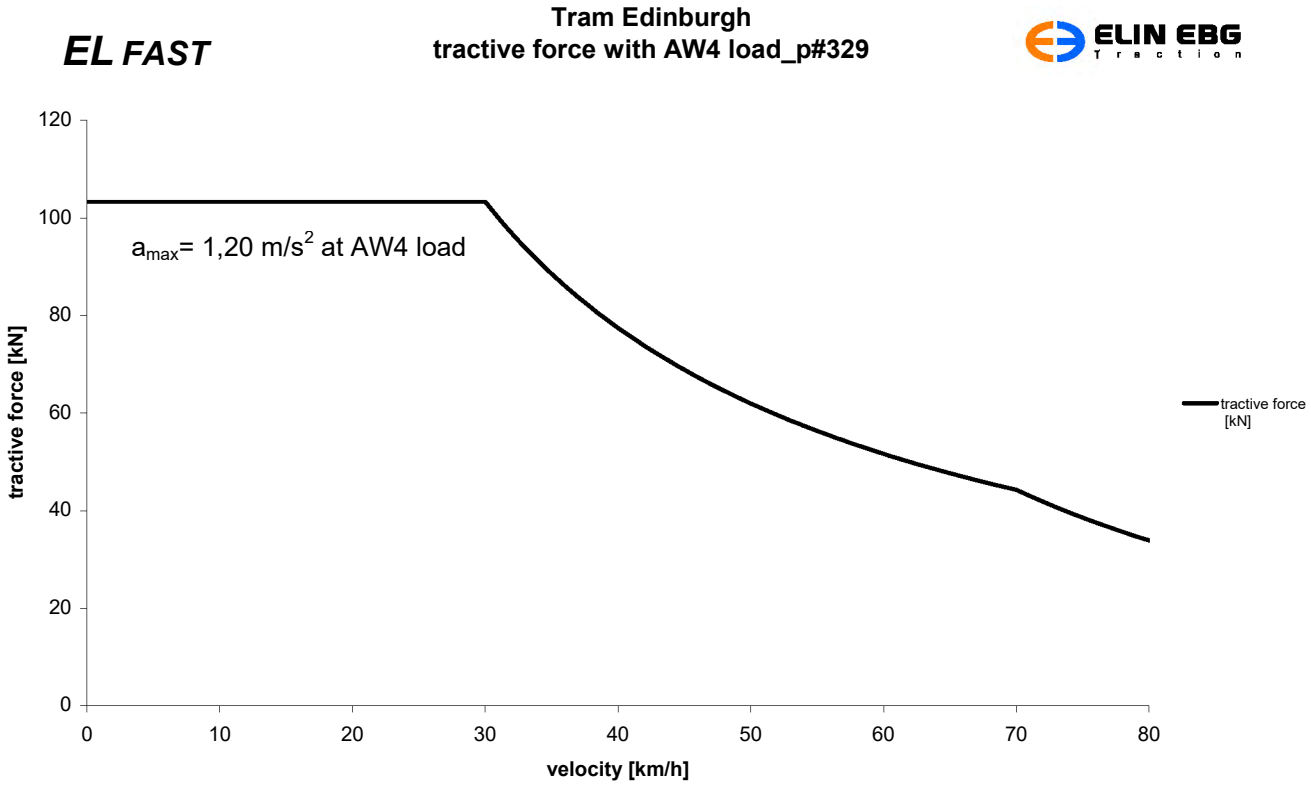
Catenary voltage for simulation:	750 VDC
Maximum velocity	80 km/h
Max. wheel diameter:	590 mm
Adhesion coefficient (traction):	min 0,17
Adhesion coefficient (braking):	min 0,18
Rotating mass	4,11 tons
Parameters for all simulations:	see section 1.1

The dynamic behaviour is investigated at loads of 73,312 tons (AW2 load) of 79,657 tons (AW4 load) and different gradients 0% and 8,0%.

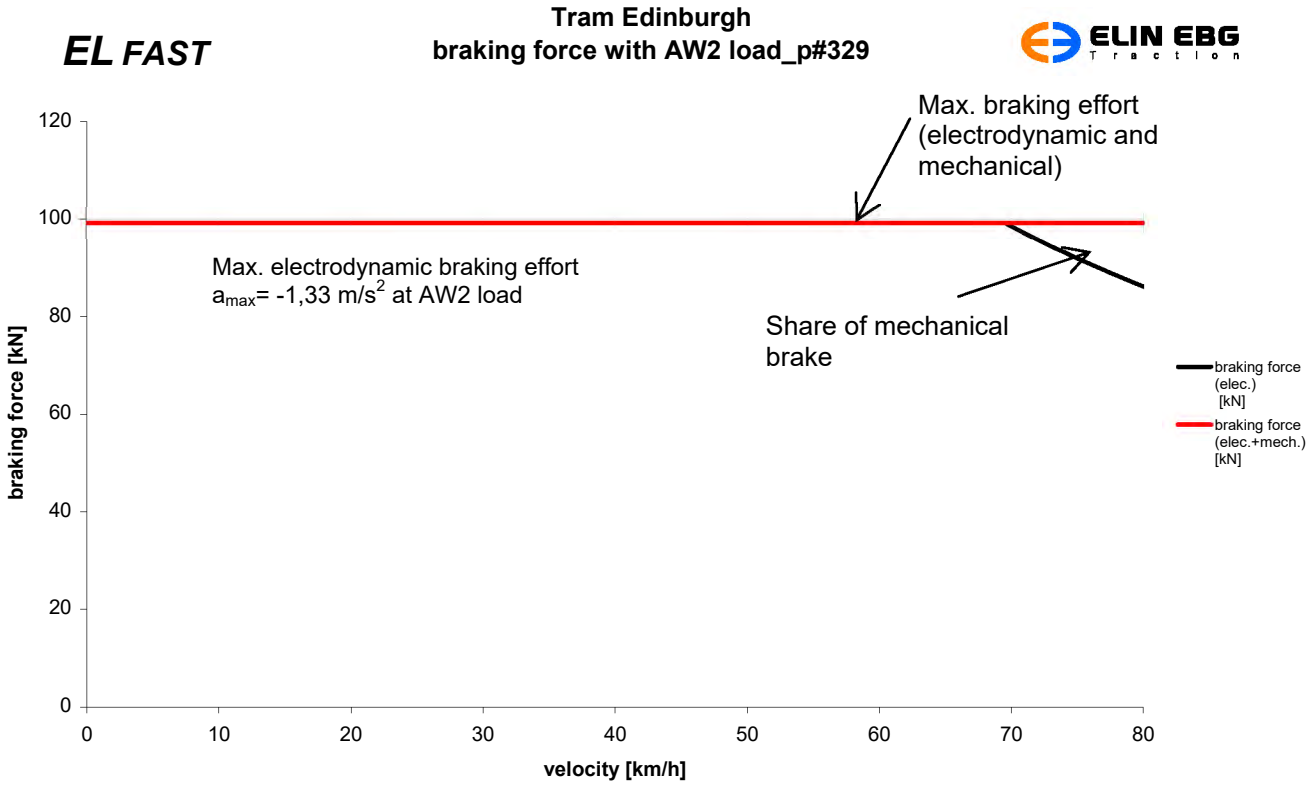
3.2 Tractive force diagram at AW4 load and braking force diagram at AW2 load

Following diagrams show the maximum tractive and braking forces for the performance simulations. For loadings bellow AW4 (tractive force) and AW2 (braking force) the forces will be reduced for comfort reasons (limiting of max. acceleration).
The maximum tractive and braking forces are only given by full elevation of the master controller.
In the case of exceptional operation (66% propulsion available and towing) the tractive and braking forces will be adapted by activating a switch on the drivers desk (speed limitation 40 km/h).

F = f(v) tractive force as a function of velocity

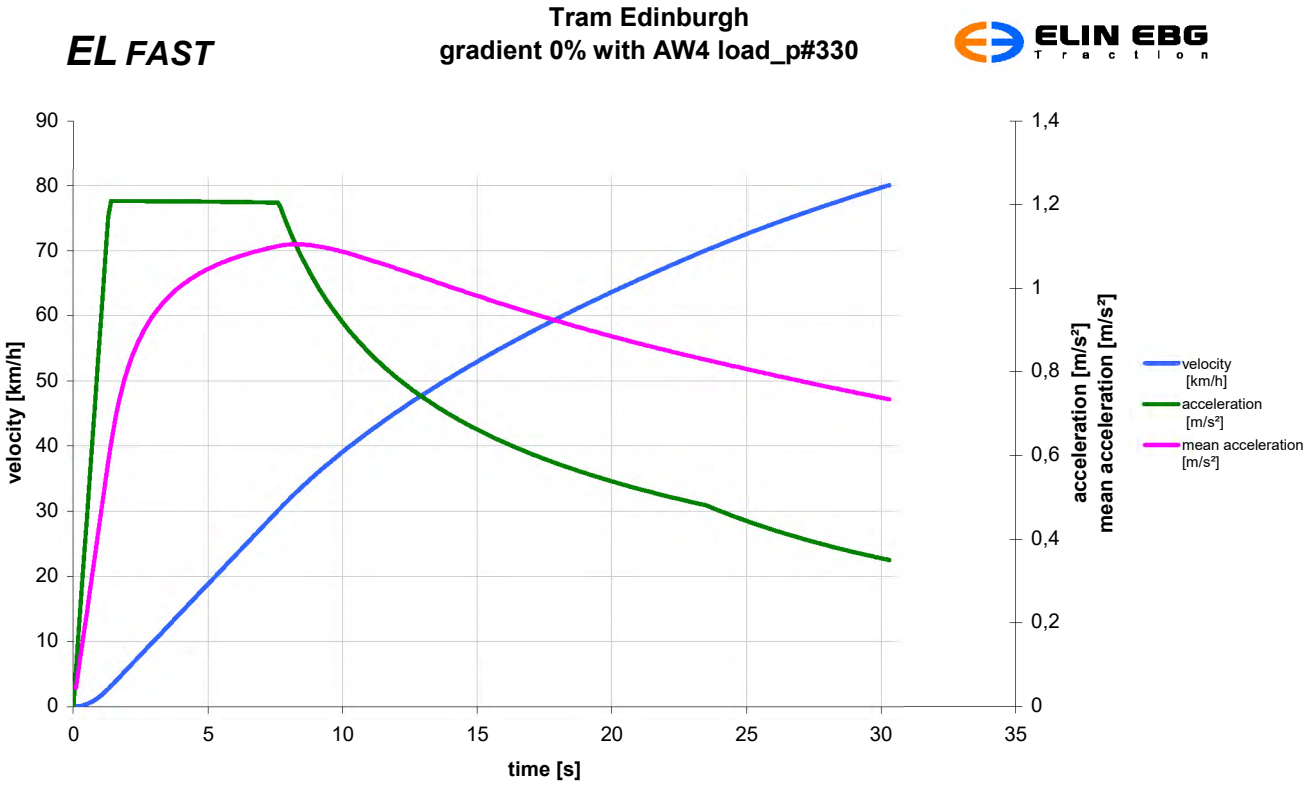


F = f(v) braking force as a function of velocity



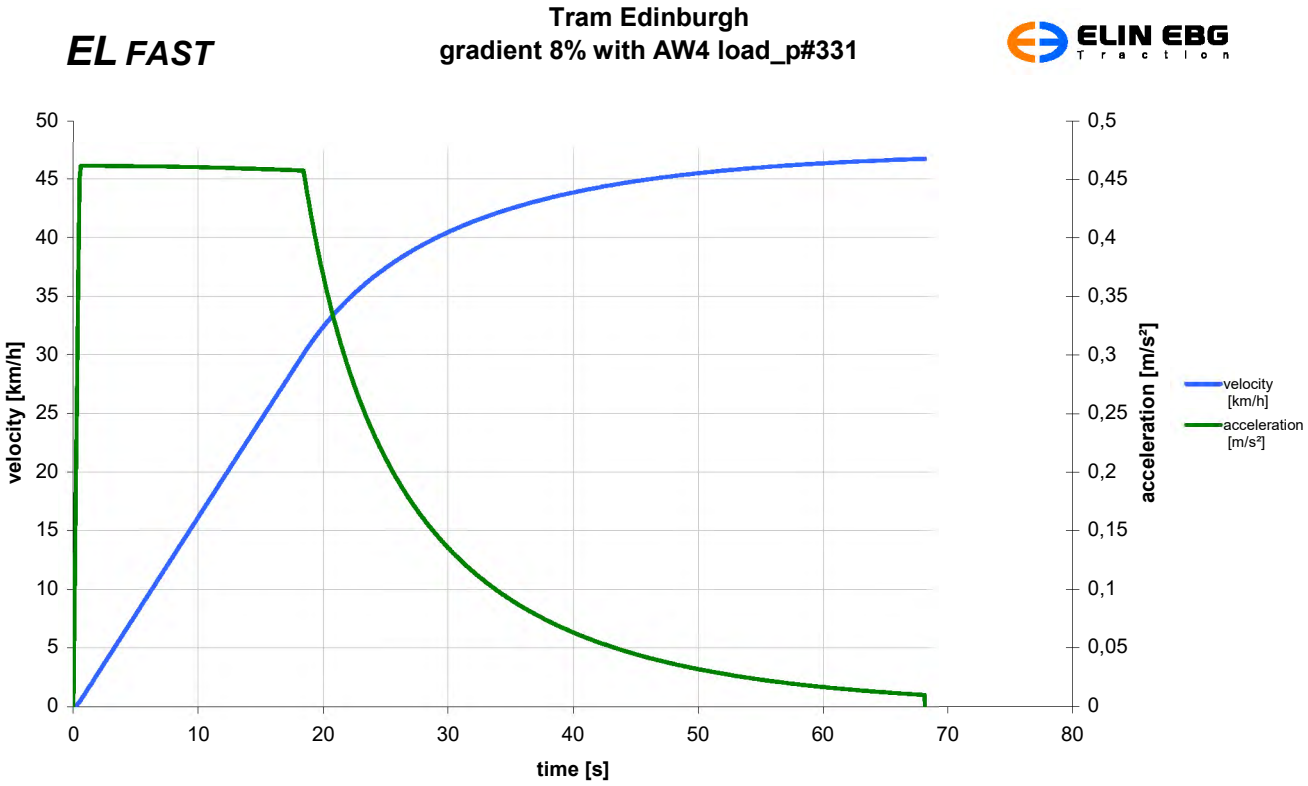
3.3 Accelerations with AW4 load and 0% gradient

v = f(t), a = f(t) velocity, acceleration and mean acceleration as a function of time



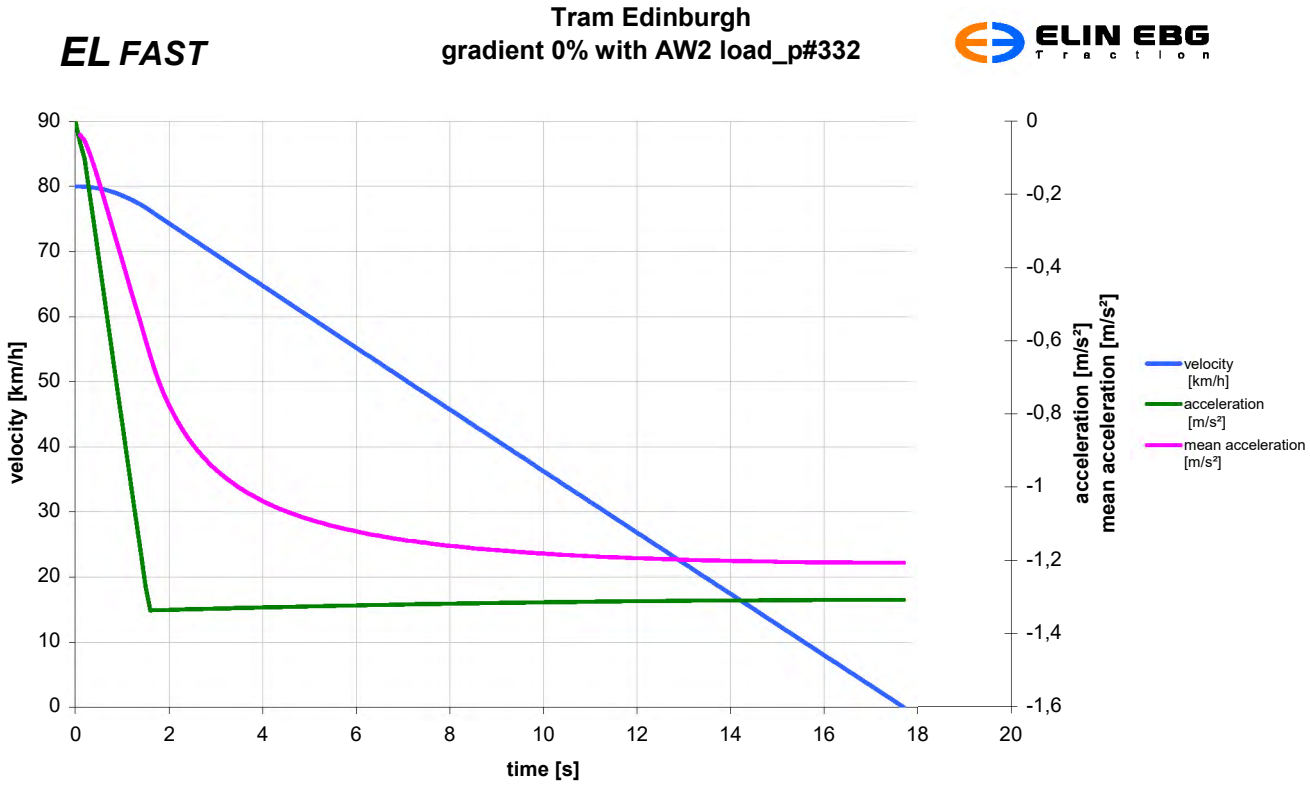
3.4 Accelerations with AW4 load and 8% gradient

v = f(t), a = f(t) velocity and acceleration as a function of time



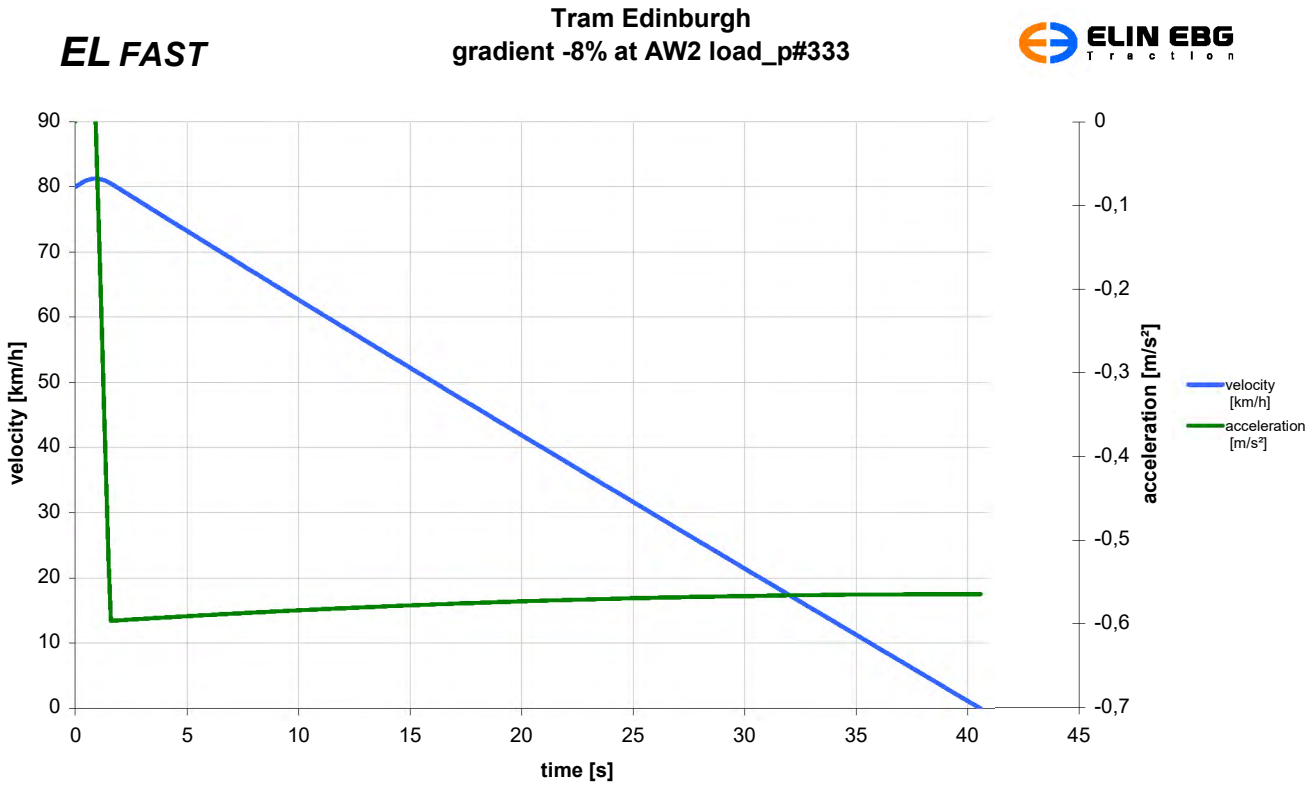
3.5 Decelerations with AW2 load and 0% gradient

v = f(t), a = f(t), ā = f(t) velocity, deceleration and mean deceleration as a function of time



3.6 Decelerations with AW2 load and -8,0% gradient

v = f(t), a = f(t) velocity, and deceleration as a function of time



4 Dynamic simulations with 66% propulsion (degraded mode)

The vehicle consists of three motor bogies and one trailer bogie. The following simulations were made under the assumption that one of three available propulsion systems has a breakdown.
The tractive and braking forces will be adapted by activating a switch on the drivers desk (speed limitation 40 km/h).

4.1 Parameters for dynamic simulation

Catenary voltage for simulation:	750 VDC
Maximum velocity	40 km/h
Wheel diameter:	590 mm
Rotating mass	4,11 tons
Parameters for all simulations:	see section 1.1

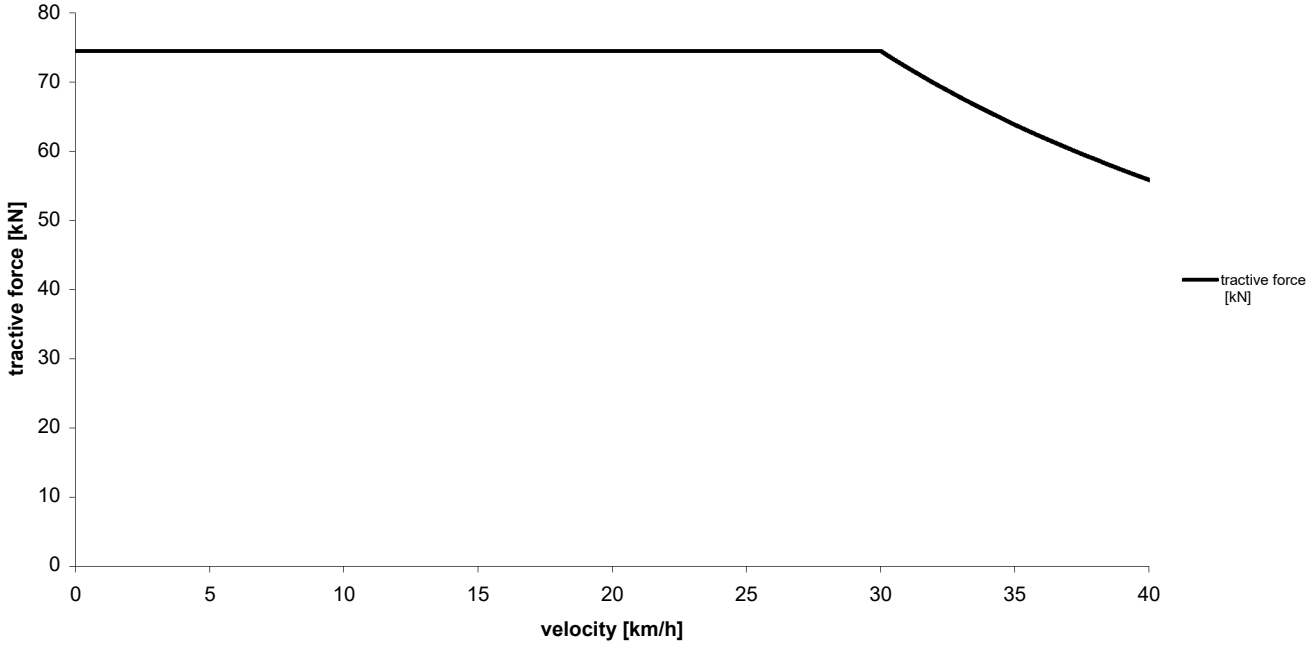
The dynamic behaviour is investigated at 0% and 8% gradients and loads of 73,312 tons (AW2 load) and 79,657 tons (AW4 load).

4.2 Tractive force diagram at AW4 load and braking force diagram at AW2 load in degraded mode

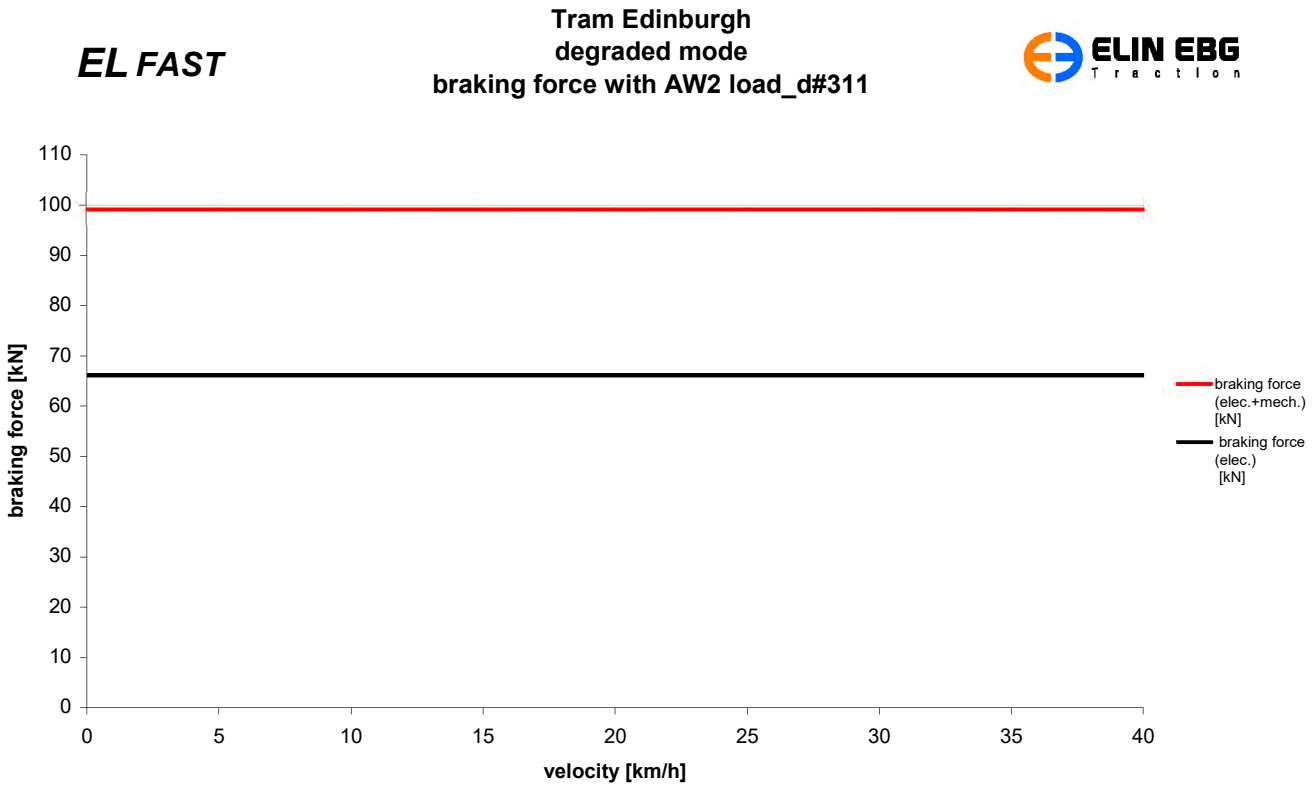
F = f(v) tractive force as a function of velocity

EL FAST

Tram Edinburgh
degraded mode
tractive force with AW4 load_d#311

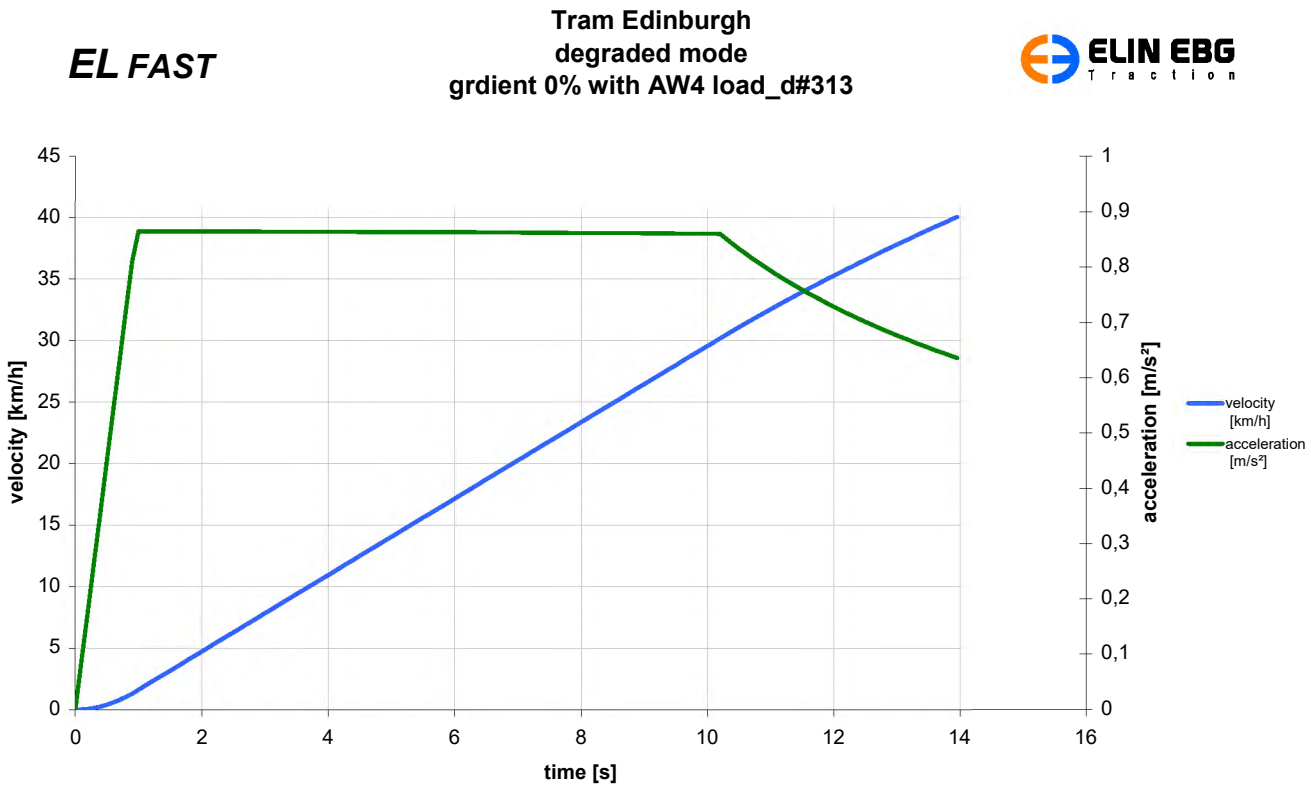


F = f(v) braking force as a function of velocity



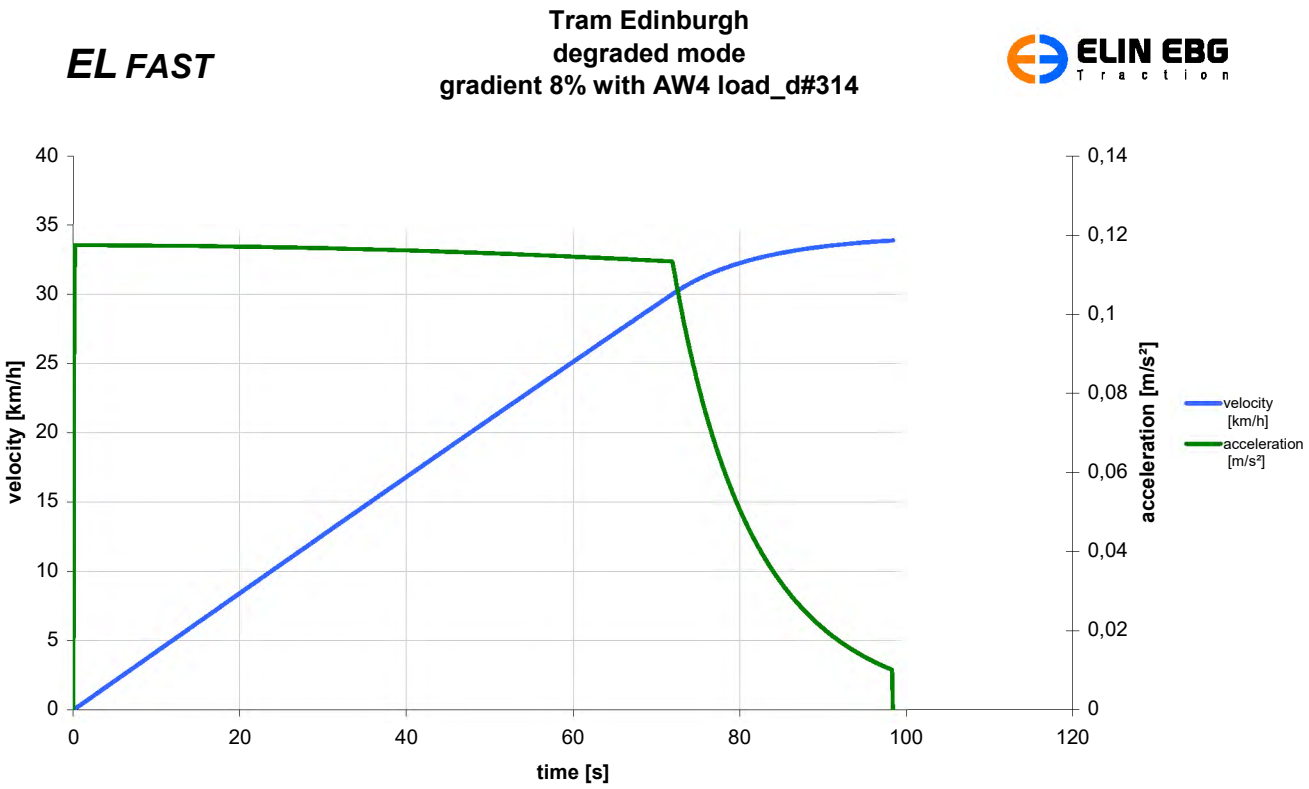
4.3 Accelerations with AW4 load and 0% gradient

v = f(t), a = f(t) velocity and acceleration as a function of time



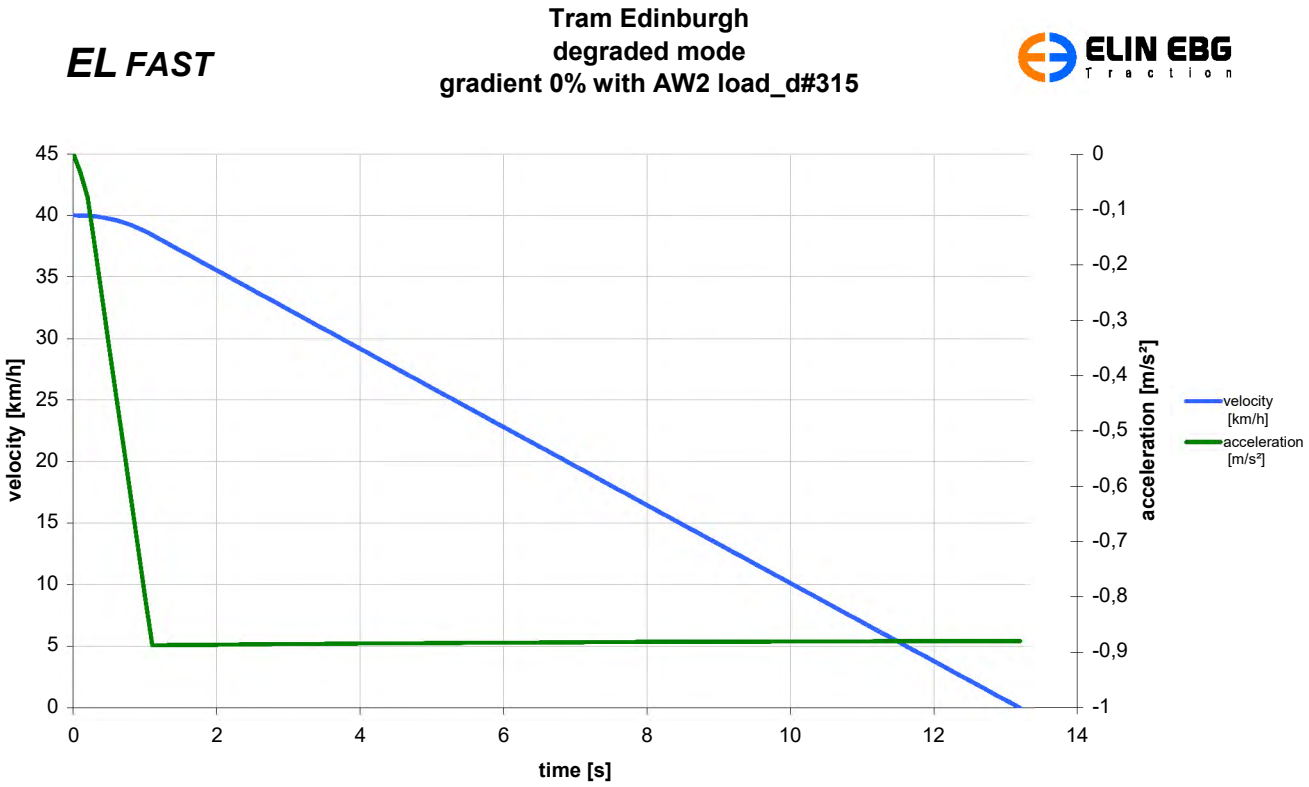
4.4 Accelerations with AW4 load and 8,0% gradient

v = f(t), a = f(t) velocity and acceleration as a function of time



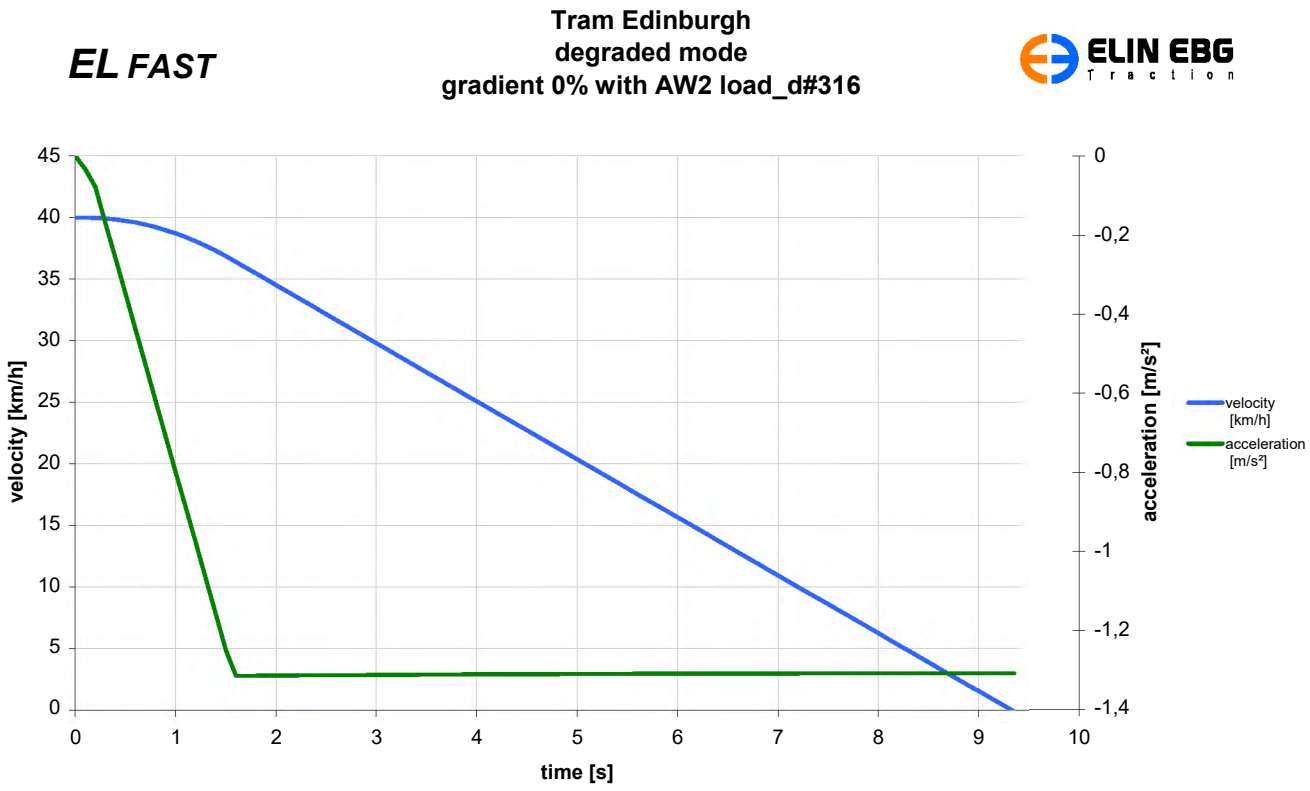
4.5 Decelerations with AW2 load and 0% gradient (only electrodynamic brake)

v = f(t), a = f(t) velocity and deceleration as a function of time



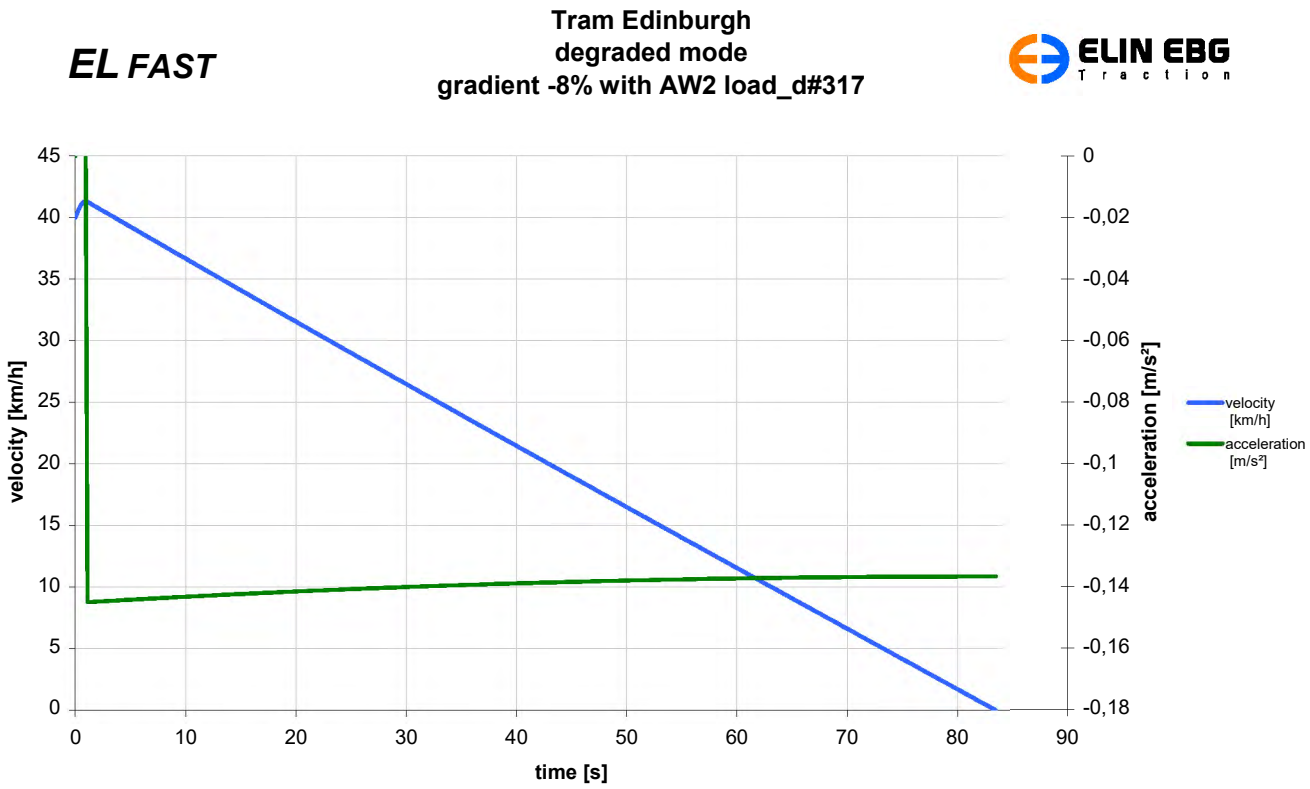
4.6 Decelerations with AW2 load and 0% gradient (electrodynamic and mechanical brake)

v = f(t), a = f(t) velocity and deceleration as a function of time



4.7 Decelerations with AW2 load and -8,0% gradient (only electrodynamic brake)

v = f(t), a = f(t) velocity and deceleration as a function of time



4.8 Decelerations with AW2 load and -8,0% gradient (electrodynamic and mechanical brake)

v = f(t), a = f(t) velocity and deceleration as a function of time



5 Dynamic simulations for towing

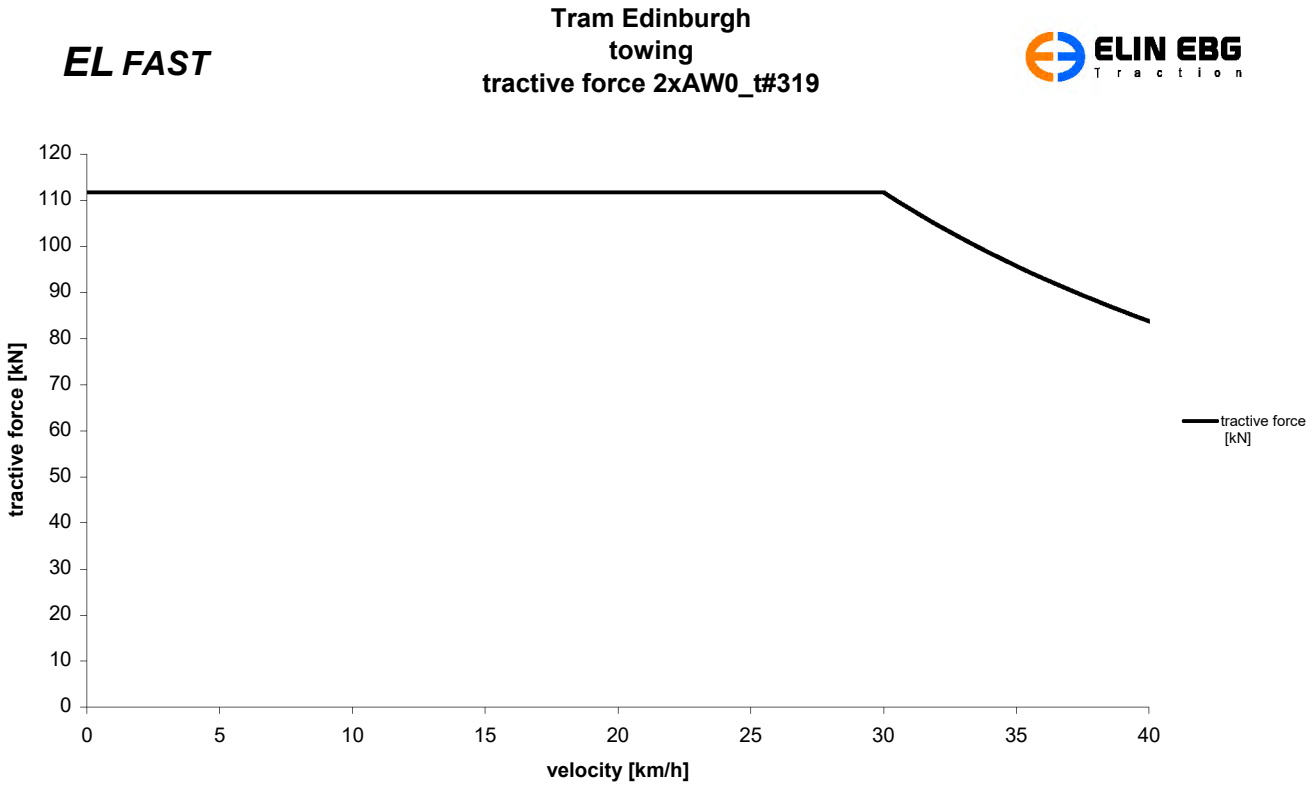
The following simulations were made under the assumption that one vehicle (AW0 load) with 100% available propulsion tows a vehicle (AW0 load) with 0% propulsion.
The tractive and braking forces will be adapted by activating a switch on the drivers desk (speed limitation 40 km/h).

5.1 Parameters for dynamic simulation

Catenary voltage for simulation:	750 VDC
Maximum velocity	40 km/h
Wheel diameter:	590 mm
Rotating mass per vehicle:	4,11 tons
Parameters for all simulations:	see section 1.1

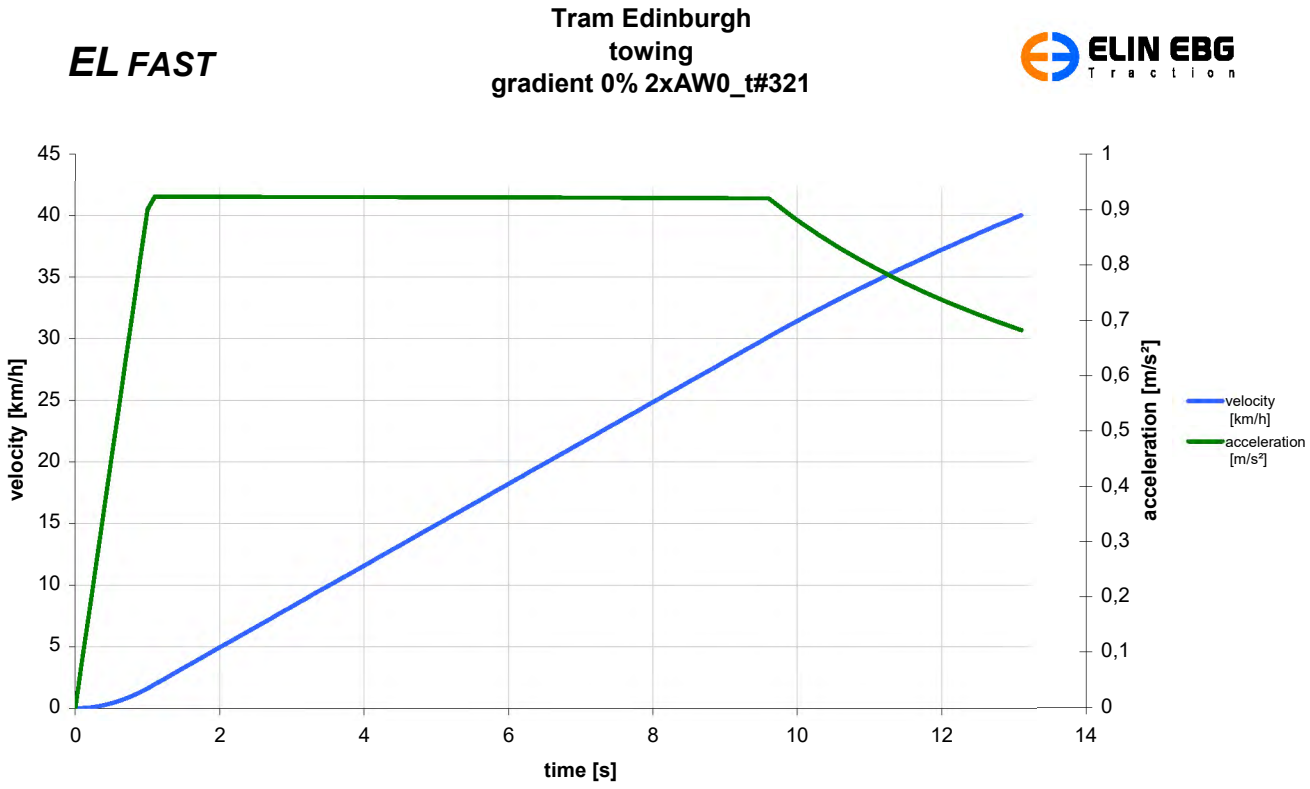
5.2 Tractive force for towing with 2x AW0 load

F = f(v) tractive force as a function of velocity



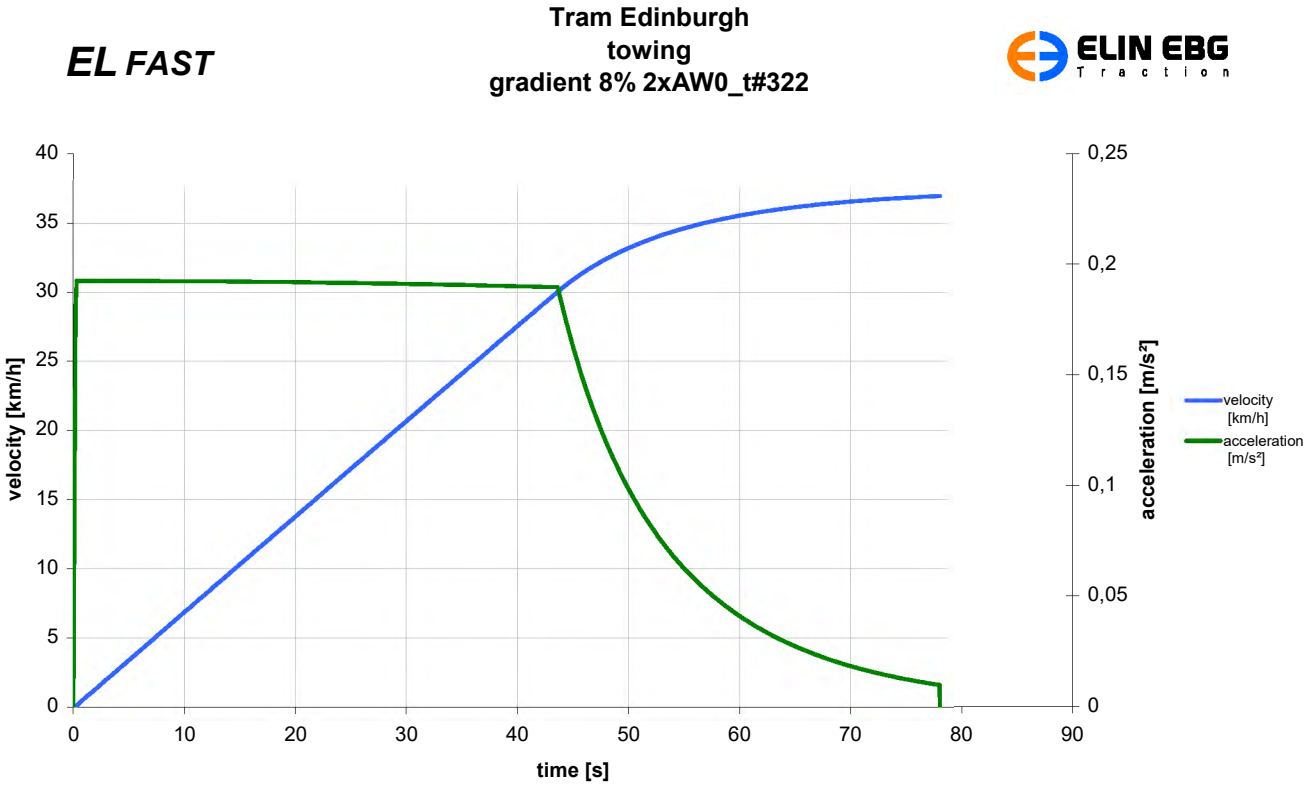
5.3 Accelerations for towing with 2x AW0 load and 0% gradient

v = f(t), a = f(t) velocity and acceleration as a function of time



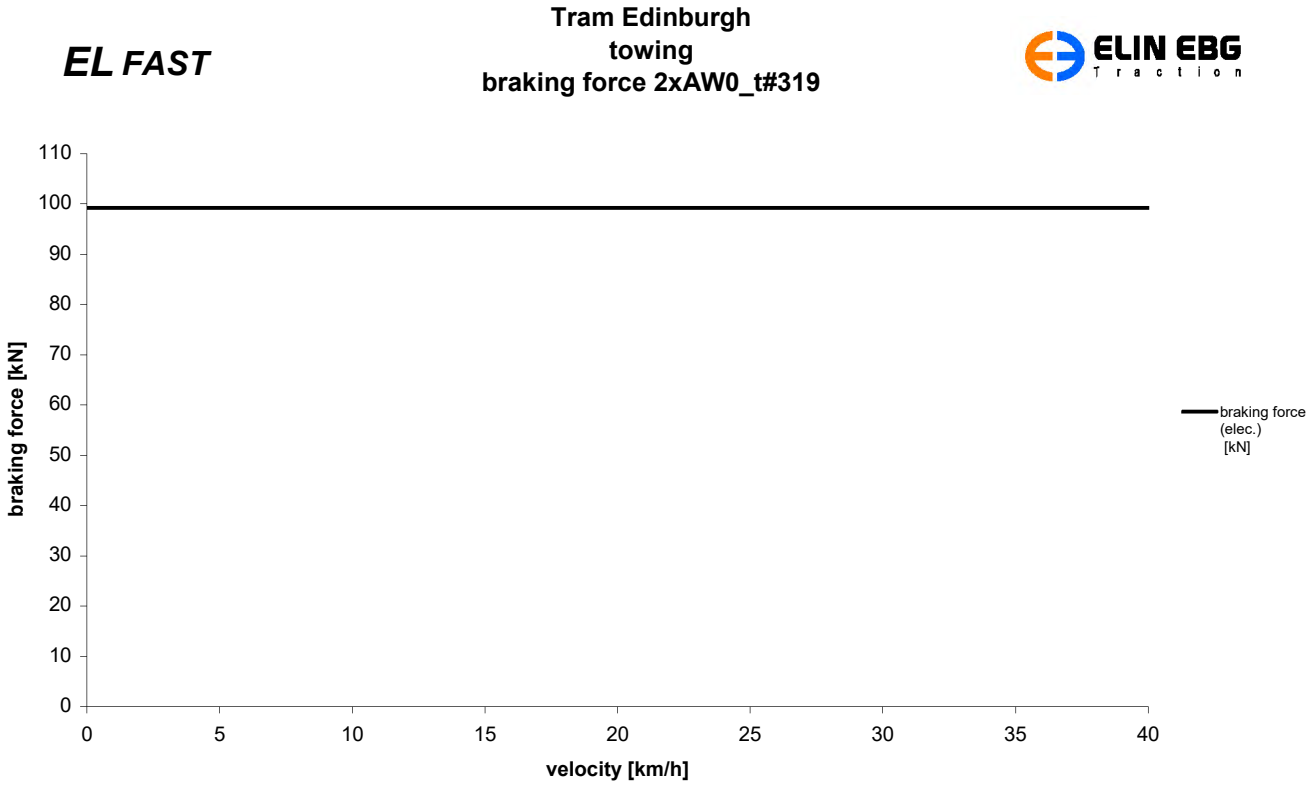
5.4 Accelerations for towing with 2x AW0 load and 8,0% gradient

v = f(t), a = f(t) velocity and acceleration as a function of time



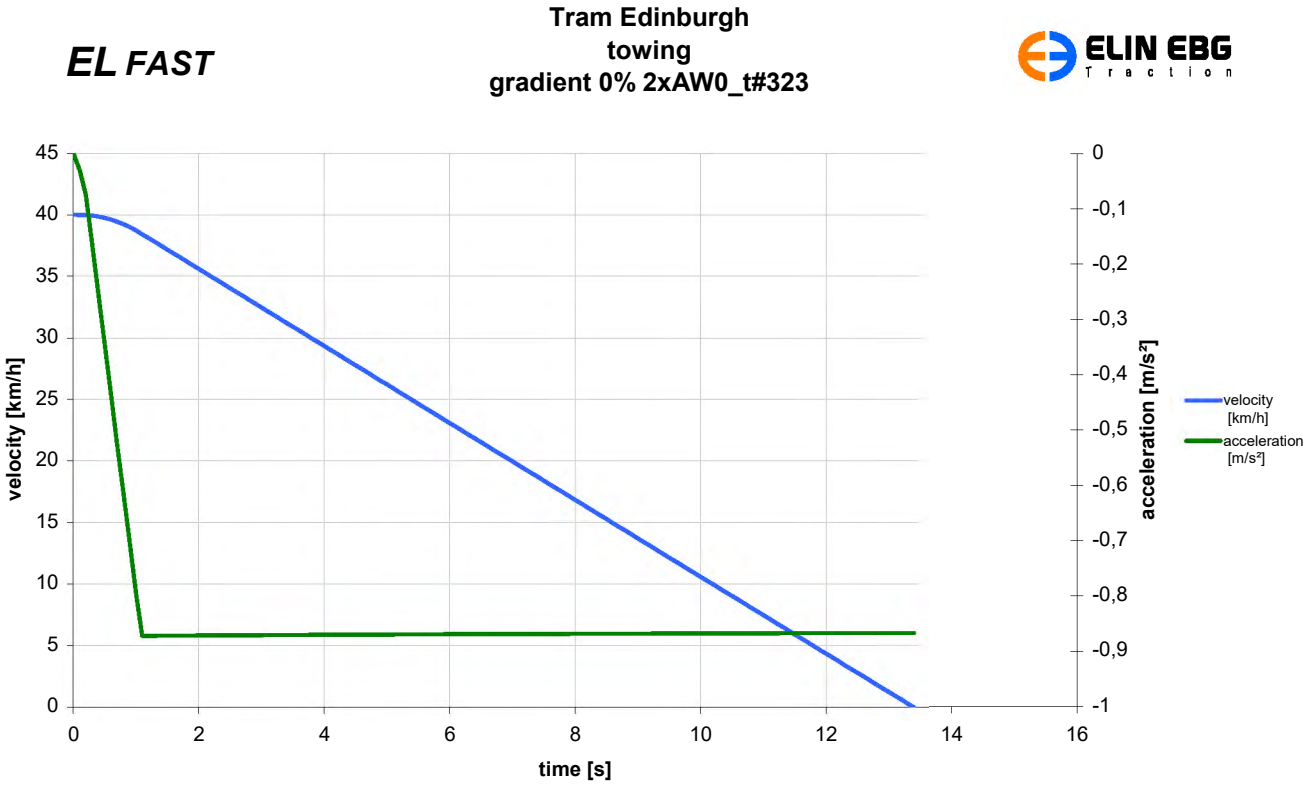
5.5 Electrodynamic braking force for towing with 2x AW0 load

F = f(v) electrodynamic braking force as a function of velocity



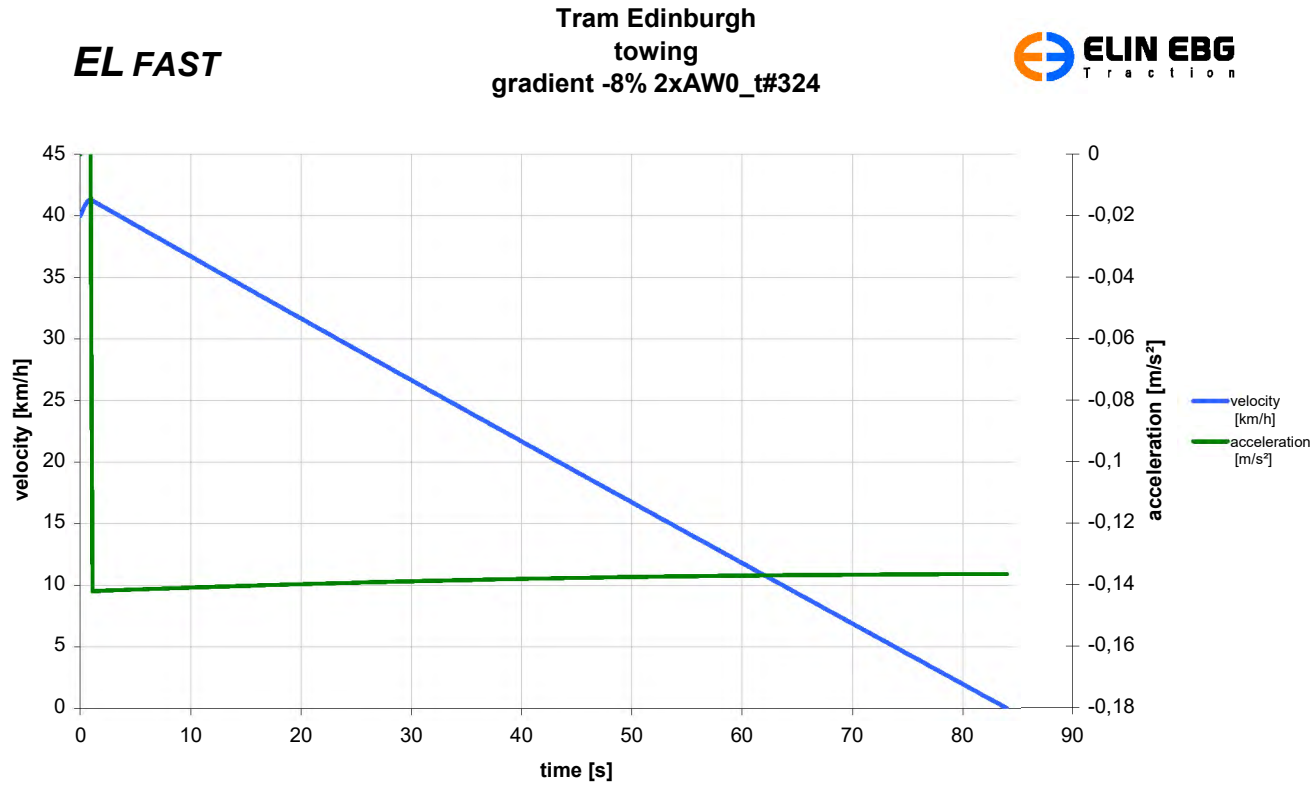
5.6 Decelerations for towing with 2x AW0 load and 0% gradient

v = f(t), a = f(t) velocity and deceleration as a function of time



5.7 Decelerations for towing with 2x AW0 load and -8,0% gradient

v = f(t), a = f(t) velocity and deceleration as a function of time



AUTOMATIC PASSENGER COUNTING SYSTEM FOR TRAMWAYS

ACOREL COUNTING EQUIPMENT SPECIFICATIONS FOR A TRAIN WITH OPTION GPS & GPRS

3, rue Paul LANGEVIN
F-07130 SAINT-PERAY

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AUTOMATIC PASSENGER COUNTING SYSTEM FOR TRAINS

ACOREL COUNTING EQUIPMENT SPECIFICATIONS
FOR TRAIN WITH OPTION GPS & GPRS

Ref. : SP0140	**Rev. : 2**

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Approuved by	***JL. GAYTE***	*Project Manager*		
Authorised by	***R. GRAND***	*Sales & Marketing Director*		

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Revision	Pages	Date	Description
0	13	09/11/2005	Creation
2	All	24/02/2006	Adaptation

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1. General

1.1. PURPOSE OF DOCUMENT

The purpose of this document is to instruct the client on how to install the cabling and mechanics of the counting equipment and the GPS/GPRS antennae for a train.

This document primarily explains the technical specifications and the dimensions of the GPS and GPRS equipment. This equipment is used to locate the train (with the GPS), data which is incorporate with that of the passenger counting system, and then to transmit the data (via the GPRS) to a PC-CPT.

1.2. ABBREVIATIONS

. **UCD** : Data Management Board
. **MCT** : Train Counting Module, integrates the counting bar and its fixtures
. **PM** : Maintenance Handheld, Maintenance tool with infrared tag
. **SIE** : Passenger Information System
. **SAE** : Automatic Vehicle Location System
. **MESD** : Entry / Exit Module Sent to the SIE
. **PC-CPT** : Central Counting Data Management PC
. **UTV** : Maintenance software for the maintenance handheld
. **GPS** : Global Positioning System
. **GPRS** : General Packed Radio Service
. **MIP** : Door Interface Module
. **MGPRS** : GPRS Module
. **MGPS** : GPS Module

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2. List of counting equipment

The Acorel Onboard Counting System is a standard product used throughout numerous public transport networks. The equipment that we propose is modular and consists of a kit including the Counting Bar, the Data Management Board, and the cables to connect to a IBIS bus. This kit ensures the counting of passengers boarding and alighting the vehicle for a maximum of 32 doors. Using the most advanced technologies in electronics, data processing and signal treatment, the Acorel Counting Bar was developed specifically in order to continuously count, with directional differentiation, the passengers entering and leaving through a door.

Each door of the vehicle is equipped with a counting bar (MCT) composed of :

a) from 1 to 5 mixed active/passive infrared sensors, depending on the width of the door and the presence (or not) of a separation pole between the doors all integrated in an anodised aluminium cover painted to easily match the door panel and surroundings

c) an electronic management board

d) 1 or 2 detectors that communicate the opening and closing of the doors because we are only counting when the doors are opened

e) a switch that enables the definition of the counting bar's IBIS address for the data transmission.

The counting bar is installed in such a way that the counting zone is as near as possible to the door without being obstructed by the doors' opening and closing.

The counting technology, developed with 10 years of experience, is a combination of active and passive infrared sensors which are able to differentiate the people entering and leaving a place. The passive sensors are sensitive to the infrared rays given off by individuals and thus detect the direction of movement. The active sensors, through the emission/reception of an invisible infrared beam, differentiate between the person and the background.

The counting module (MIP) receives from the door detector two signals indicating the door's status:

a) Door closed (enabling the system to detect when the door begins to open)

b) Door completely open (enabling the system to detect when the door begins to close)

The Data Management Board (UCD):

a) memorises the counting bar's counting data from each door

b) communicates this data to the information system

c) enables counting system maintenance via a portable PC

d) transmits the electricity to the counting bars to which it is connected

The UCD can be equipped with additional interfaces according to the exploitation needs of the client (GPS, E/R HF, GPRS modem)

The UCD can be installed anywhere in the vehicle, but is normally found in a technical cupboard near the front of the vehicle.

The equipment produced depends on:

a) the number of doors on the vehicle (one counting rod per door)

b) the width of the doors (this dictates the required number of sensors needed in the bar with a sensor placed every 45 cm)

c) the presence of a separation pole between the doors

d) the presence of door detectors (Acorel can supply the detectors)

e) the existence of cables compliant with Acorel's needs

f) the existence of a management board that can

- collect the maintenance and counting data from each door
- memorise and transmit the data to the main PC
- transmit the vehicle coordinates, the route information, and the stop coordinates

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For each project, the vehicle integration of the Acorel equipment will be explained in detail in an installation document defining all the sub-components, their placements within or around the access way, and their interconnecting cables.

2.1. List of onboard equipment

ACOREL delivers all the necessary fixtures, connectors, and screws for equipment installation and cabling.

2.1.1. For the TRAIN

- 1 UCD connected to the IBIS bus
- 1 GPS/GPRS ANTENNAE
- 1 GPRS MODULE with Subscription
- 1 GPS MODULE
- 1 Cable Kit to interconnect all the counting equipments.

2.1.2. For each DOOR

- 1 MCT connected to the MIP box
- 1 MCT Fixture Kit

  Note: The MCT brackets are delivered pre-installed on the MCT and to be mounted onsite.
- 1 door detector kit that includes a microswitch for the end of the run and a cam that is attached to the mobile part of the door mechanism.

  Note: The microswitch and the cam are specified by the door manufacturer. The microswitch is attached to the MCT brackets: it is delivered pre-attached to the MCT, but its position must be adjusted during installation.
- 1 MIP connected to the IBIS bus

  Note: A simple MIP will be used for each door.
- 1 Cable kit to interconnect the counting equipment.

2.2. List of static equipment

2.2.1. For the MATERIEL

- 1 PC AT ACOREL FOR THE DATA COLLECTION VIA GPRS

2.2.2. For the SOFTWARE

- 1 GPRS OPERATING LICENCE *(option)*
- 1 DATA MANAGEMENT SOFTWARE *(option)*

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3. Equipment specifications

3.1. Data Management Board (UCD)

3.1.1. Functions

The ***Data Management Board*** (**UCD**) collects the counting information from each door's equipment (MCT). At each stop the UCD integrates the location of the train (GPS) and backs up the information. The data is then transmitted to the central server via a GPRS modem.

The UCD contains:

- a IBIS interface for the MCT communication
- one RS232 channel for the maintenance PC interface
- one RS232 channel for the GPRS modem interface

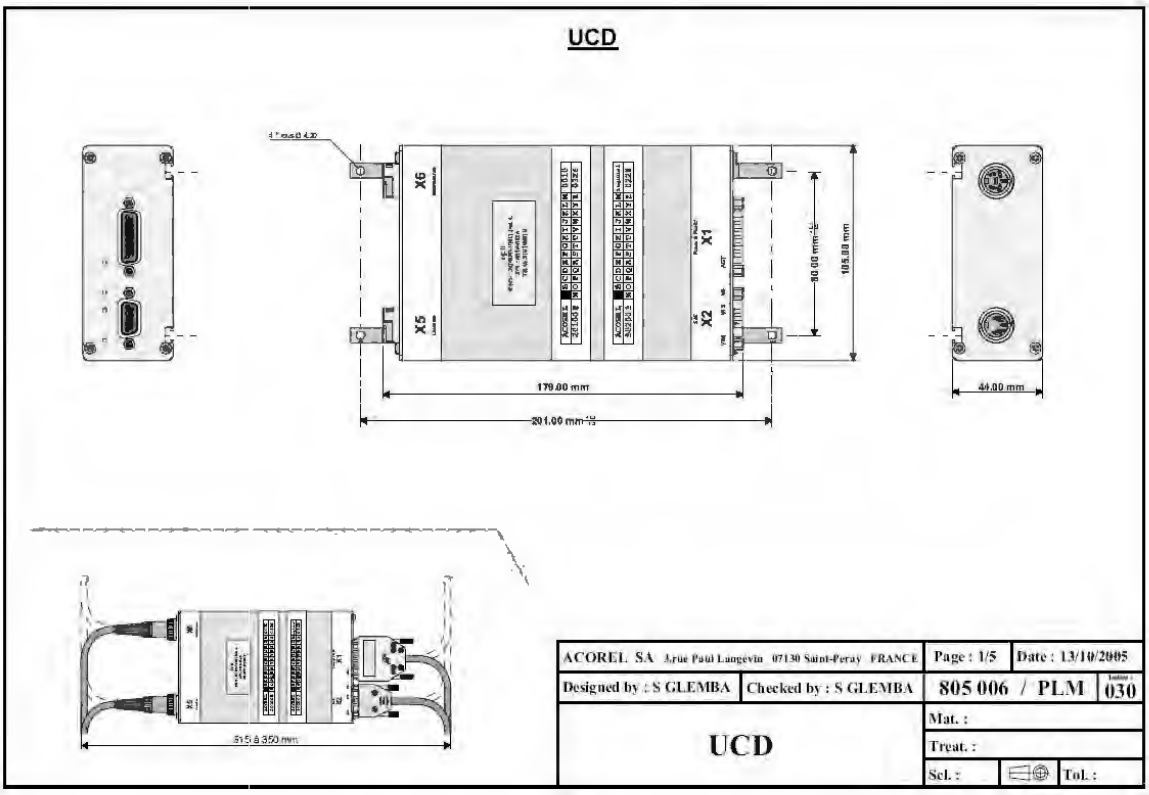
3.1.2. Implementation of the UCD and its peripheral devices (GPS & GPRS)

The primary factors to take into consideration for the implementation of the UCD and its peripheral devices are:

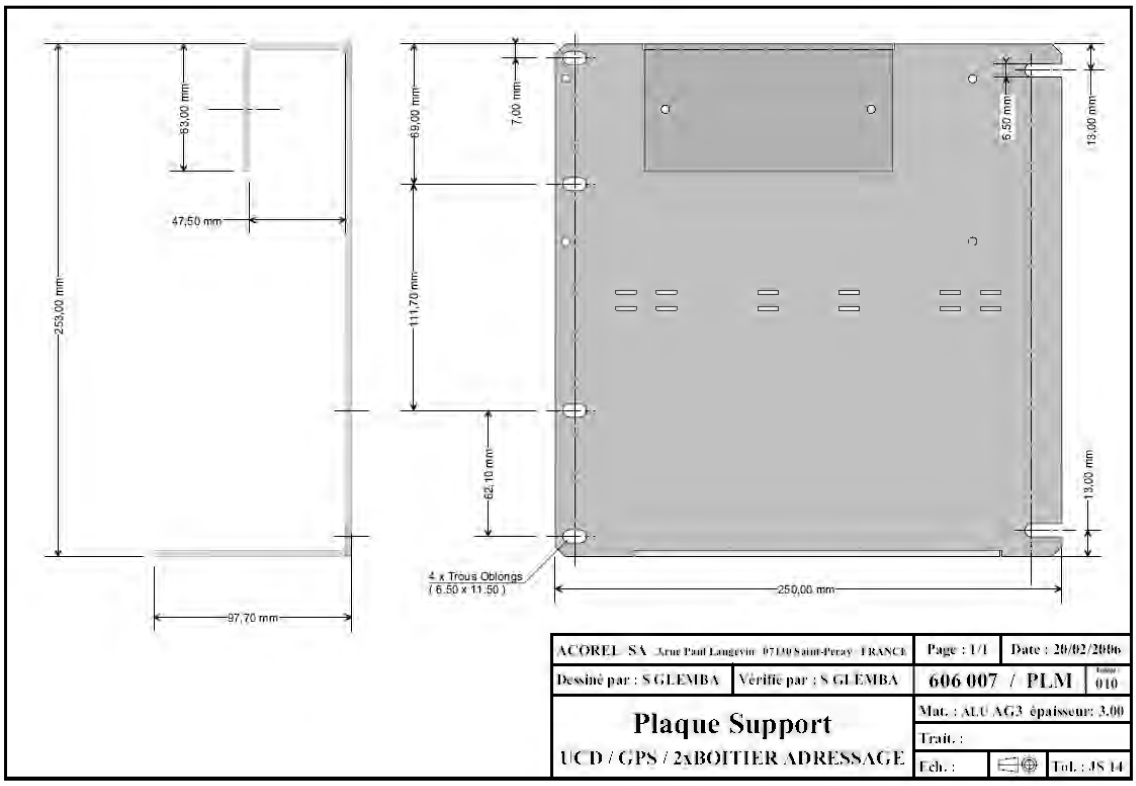
- The UCD must be easily accessible in order to allow for easy cable connection to the maintenance PC, and for maintenance operations including diagnostic interventions and/or system updates.
- The distance between the UCD and the GPS and GPRS modules must be less than 5m.
- The distance between the GPS/GPRS antennae and the GPS and GPRS modules must be less than 5m.

3.1.3. Mecanical and fixture space

N.B.: This diagram is valid only for use in the evaluation of the mechanical and fixture space required for the UCD. It cannot be used for connections or any other matter.



This diagram shows the fixing plate for the UCD.



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3.2. ANTENNAE GPS/GPRS *(option)*

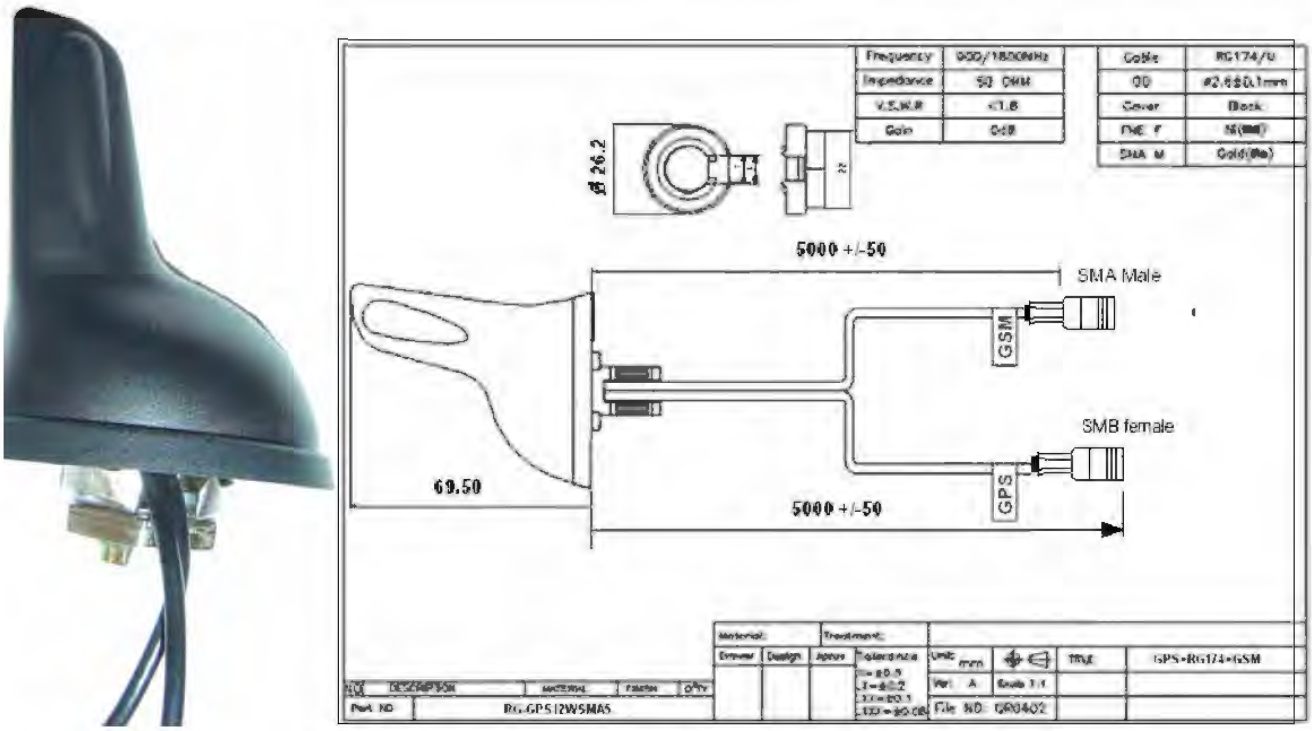
GPS & GSM-DCS antennae installed on the exterior of the train

SMB-F and SMA-M connectors allow for a direct connection of the GPRS Module (MGPRS) and the GPS Module (MGPS). Directly powered by the MGPRS, the GPS' internal amplification offers a maximum gain of +27dB. The distance between the GPS/GPRS antennae and the GPS and GPRS modules must be less than 5m.

3.2.1. Technical characteristics

	GPS Characteristics	GSM / DCS Characteristics
Frequency	1,57542 GHz ± 1,0023 MHz	GSM: 880/960 DCS: 1710/1860 MHz
Impedance	50Ω	50Ω
Gain	Typical max 27 dB	0 dB
Noise	< 1,5 dB	
V.S.W.R	2,0 max	1.5:1
Power Supply	DC: 3,3V ± 0,6V	
Consumption	15 mA @ 3,3VDC	
Cable type	RG174	RG174
Cable length	5000 ± 50 mm	5000 ± 50 mm
Connector	Female SMB	Male SMA
T°C use	-30°C to +80°C	
Installation	To be drilled for a horizontal surface	
Weight	175g ± 10 g	
Dimensions	57 mm x 43 mm x 70 mm	

3.2.2. Dimensions



3.3. GPS/GPRS MODULE *(option)*

This module can be used both as a GPS and a GPRS.

3.3.1. Technical characteristics

3.3.1.1.Operating conditions

Temperatures
- Operating: -35°C to +85°C
- Storage: -40°C to +85°C

Humidity without Condensation
- Operating: HR < 70% @ +55°C

Atmospheric Pressure: normal
Weight: 95 grams

3.3.1.2.Power supply & consumption

Power Supply
- 5-32VDC GSM / DCS / Class 2 GPRS / GPS
- 5,5-32VDC Class 10GPRS

The modem is protected from over-voltage:
- internally for picks / transition >32VDC
    - by the fuse that is integrated into the power supply cable provided for the continuous >32VDC ; the modem is disconnected from the power supply.

CONDITIONS		E-GSM/GPRS 900MHz and GPS OFF	
		I name(mA)	I Max(mA)
Idle mode	5,5V	17,5	23
	12V	11,7	16,5
	32V	8,6	11,5
Idle mode 32K	5,5V	12	14,5
	12V	9,2	11,3
	32V	7,7	9,7
In com GSM 1RX/1TX Power (2W/1W)	5,5V	182,5	195,5
	12V	96	103,5
	32V	40	44,5
In com GPRS CL10 3RX/2TX Power (2W/1W)	5,5V	320	341
	12V	165	177
	32V	67	72
During TX bursts Power (2W/1W)	5,5V	1178	1400
	12V	600	712
	32V	230	274

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3.3.1.3.Performances

The RF performances are ETSI GSM 05.05 compliant.
The primary reception parameters are:

- For E-GSM900 the sensitivity is from -104 dBm
- For E-GSM1800 the sensitivity is from -104 dBm
- Selectivity is 200kHz: >9 dBc
- Linear flexible band : 63 dB
- Signal rejection for the same channel: >= 9 dBc

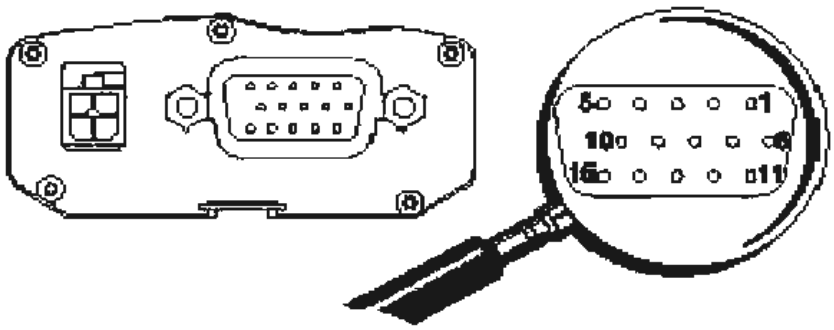
The primary emission parameters are:

- For E-GSM900 the maximum power is 33 dBm at the ambient temperature
- For E-GSM1800 the maximum power is 33 dBm at the ambient temperature
- For E-GSM900 the minimum power is 5 dBm +/- 5 dB at the ambient temperature
- For E-GSM1800 the minimum power is 0 dBm +/- 5 dB at the ambient temperature

3.3.1.4.MGPRS Protections

- By a fuse on the power supply cable : 2,5A 5x20mm
- Against any voltage below +32VDC
- Against polarised inversion of the continuous power +VDC

3.3.1.5.Connectors



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3.3.1.6.Conformance

Complies with : **- R&TTE 1999/5/EC Directive,**

- Regulations of standard ETSI EN 301 489-7 (02)

- 95/54/EC Automotive Directive : e24*02*0997*00 ("e" Mark)

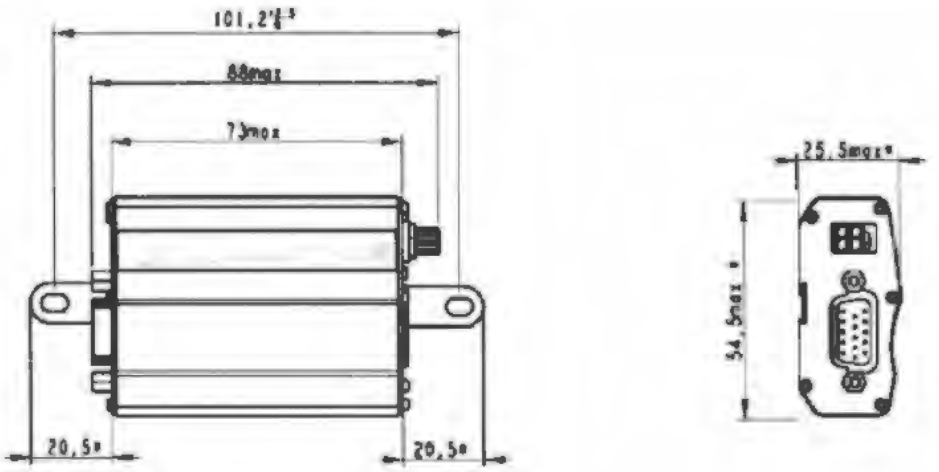
Safety :	EN 60950 : 2000 3rd Edition	
EMC :	EN 55022 : 1994	Conducted disturbance measurement
	EN 61000-4-2 : 1995	Electrostatic discharges immunity
	EN 61000-4-3 : 1996	Radiated radiofrequency disturbances immunity
	EN 61000-4-4 : 1995	Fast transient burst immunity
	EN 61000-4-6 : 1996	Conducted radiofrequency disturbances immunity

ISO 7637-1 Ed. 1990 Road Vehicles

CE

3.3.2. Dimensions

The MGPRS consists of an electronic card placed in a 73x54.5x25.5mm (not including connectors) aluminium box.



NB. : In order to anticipate the eventual use of a different GPRS module, it is suggested to leave a bit more space than what is necessary for the modem herein described. The designated space (not including connectors) should correspond to the following dimensions:

Length (not including connectors) x width x height = 135mm x 155mm x 45mm

In front are:

- The Micro-Fit 3.0™ female 4 Point connector for the power supply at 2 E/S
- The Sub-D HD 15 point connector for the 24V connections, transmission and GPS

Behind are:

- The SMA-F connector for the GSM antennae connection
- The GSM modem operating light
- The SMB-M connector for the GPS antennae connection
- The GPS operating light
- The SIM card drawer

On the bottom of the box is:

- The CE compliance sticker at the IMEI No.

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3.4. Train Counting Module (MCT)

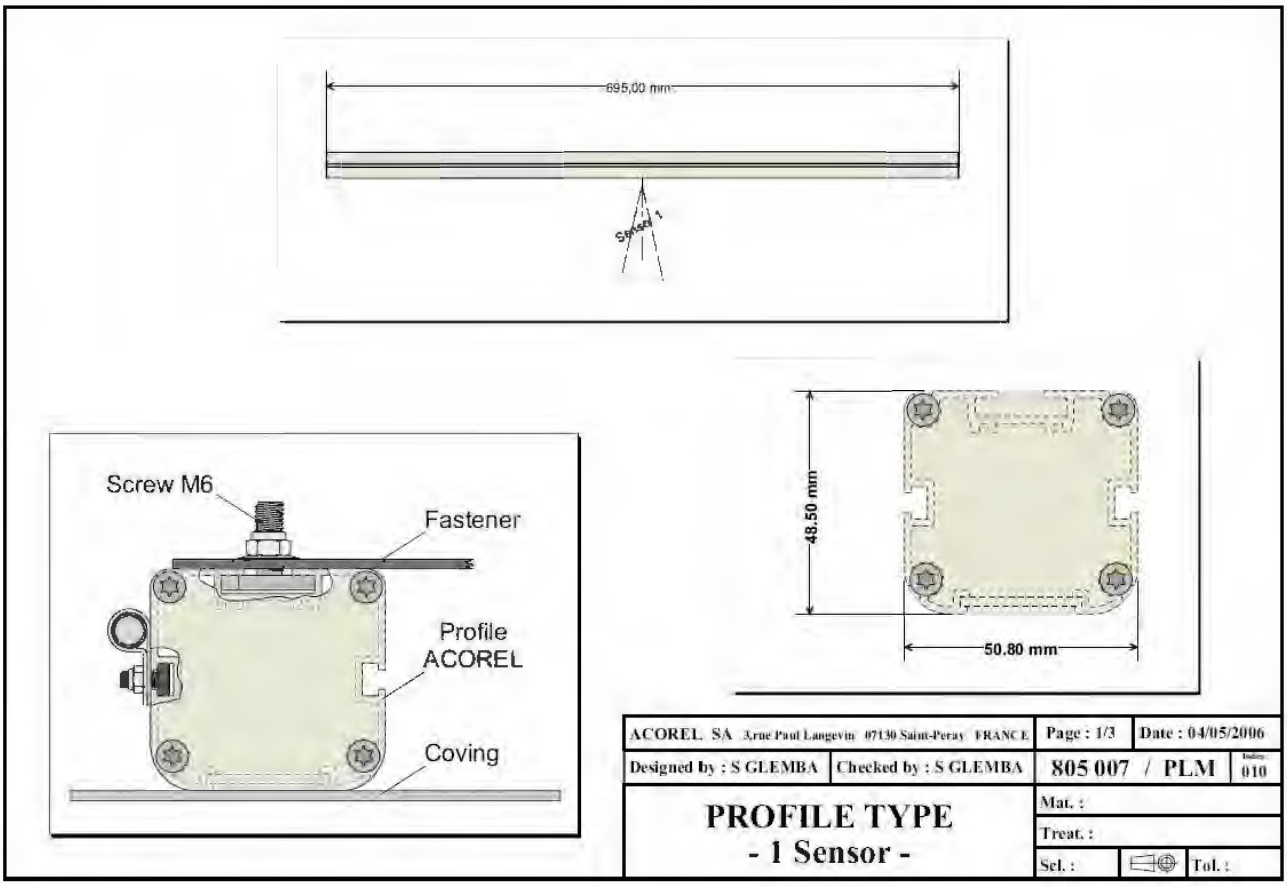
3.4.1. Functions

The MCT, enclosed in a small profile, includes the sensors and the electronics that control the counting at each door. Each MCT is connected to a Door Interface Module (MIP), which is also connected to the UCD.

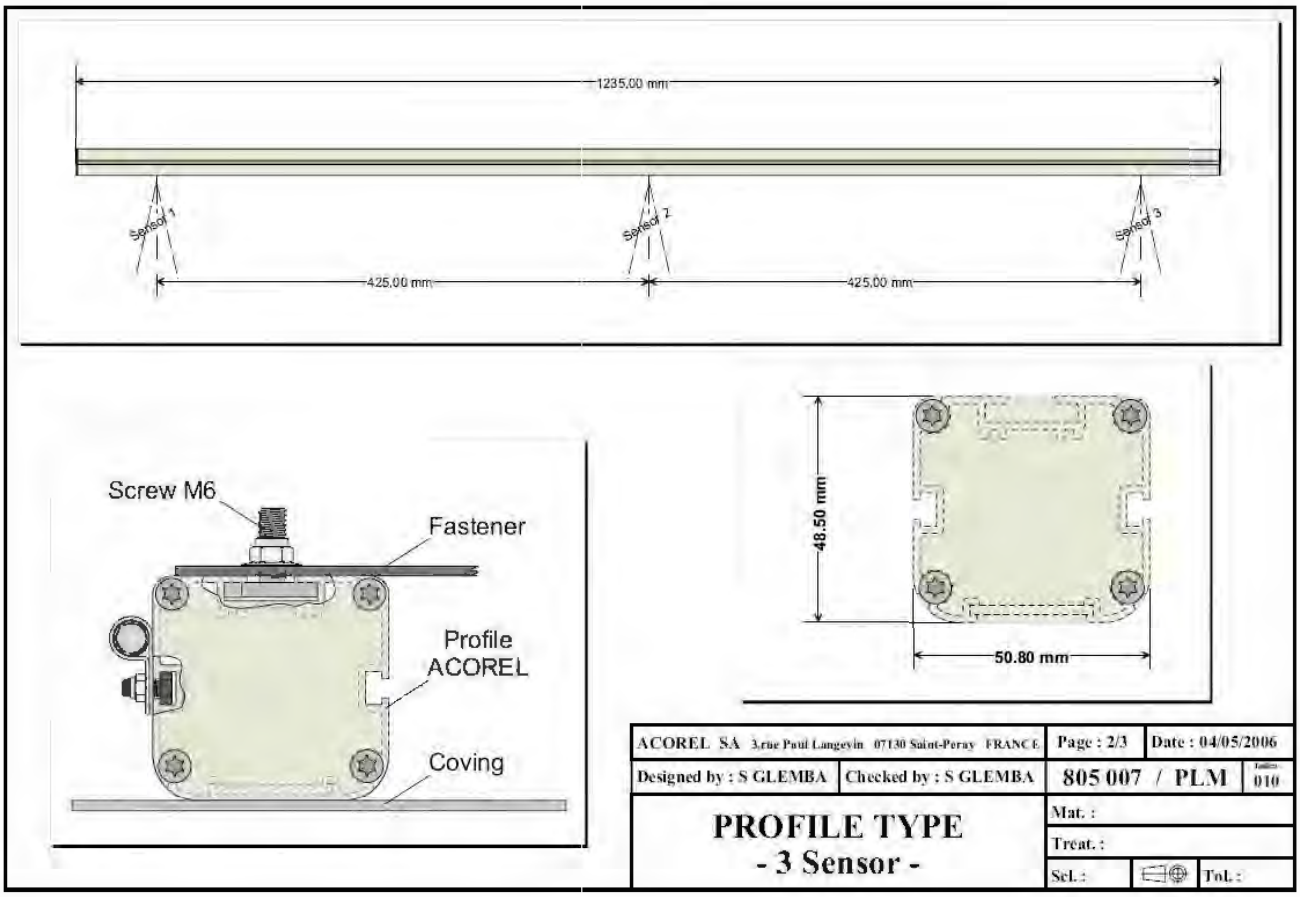
The MCT role is to do :

- directional counting
- manage all maintenance tests and messages
- build a file every day with counting and maintenance information
- store data up to 30 days if there is a communication break

3.4.2. MCT Diagram – small door – 1 sensor



3.4.3. MCT Diagram – large door – 3 sensors



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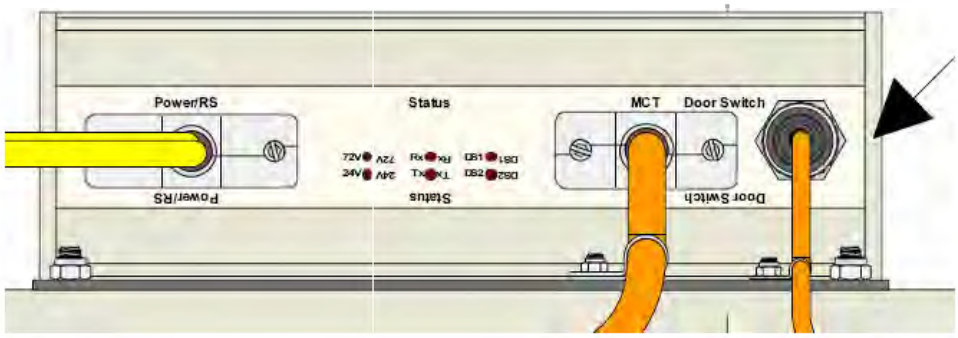
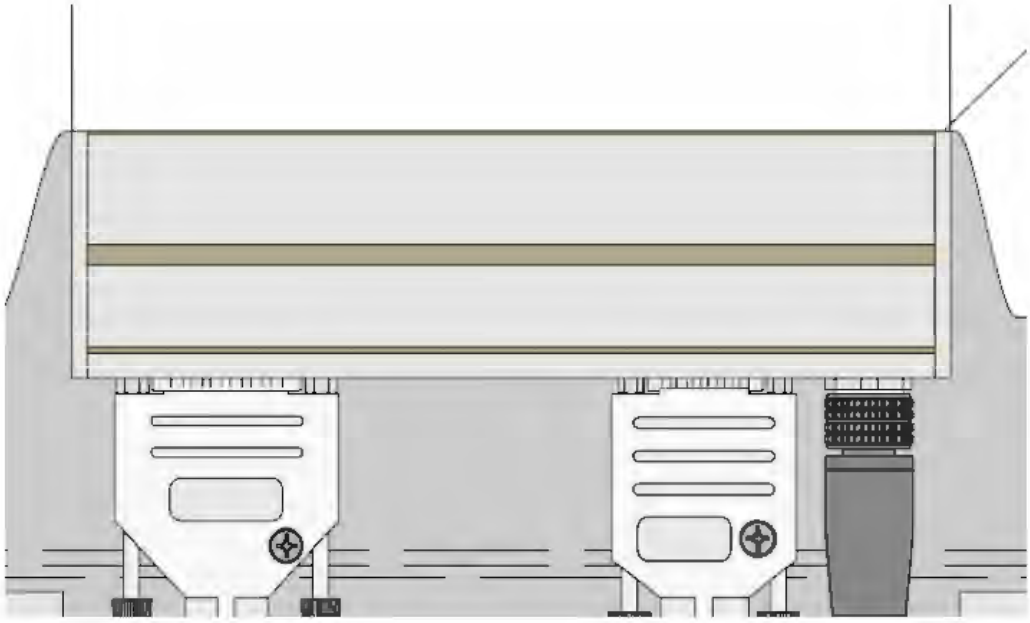
3.5. Door Interface Module (MIP)

3.5.1. Definition

Each MCT is connected to a Door Interface Module (MIP), which is also connected to the UCD.
The MIP allows communication between UCD and MCT.
The MIP role is to do :

- interconnect the MCT to the UCD via the IBIS bus
- interconnect the MCT to the power supply by the door
- tell the MCT the door status (open or close) so the MCT does not count when doors are closed





3.5.2. Dimensions

L 180mm x h 48.5mm x D 50.8mm

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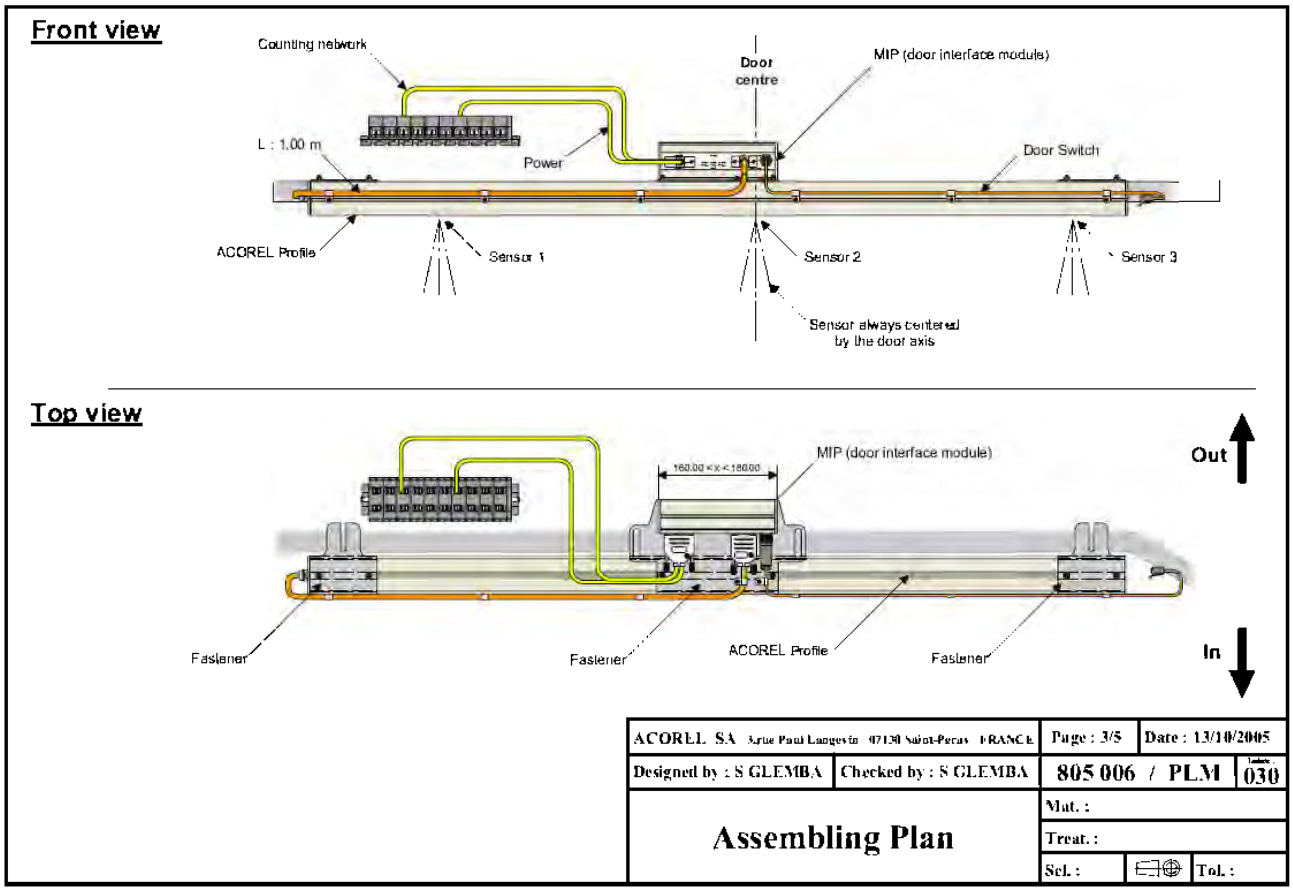
3.6. Pre-assembled KIT « MCT + MIP + Fixture kit + Microswitch »

The different equipment (MCT + MIP + Fixture kit + Microswitch) and the corresponding interconnecting cables are delivered pre-assembled for each door as shown in the following diagram.



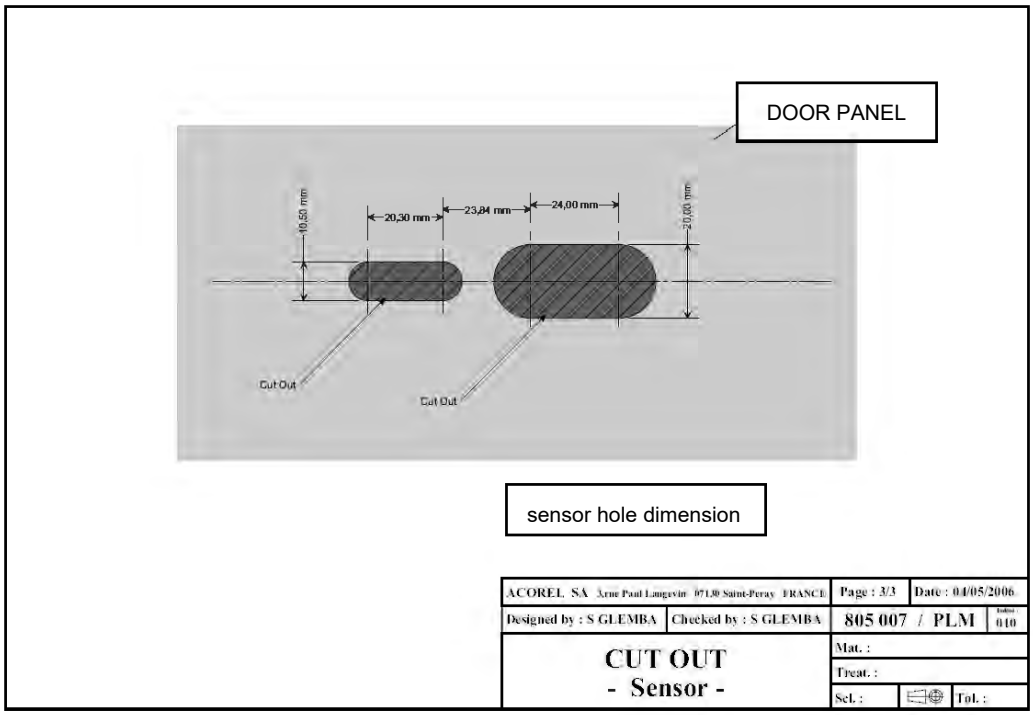
3.7. PROTECTION GRATES

3.7.1. Definitions

Empty (space between 2 wires) 1.9 mm
Wire Diameter: 0.25 mm
Visibility percentage 78%
Weight in m2 0.35Kgs

3.7.2. Dimensions

The following dimensions used to calculate the length and width of the hole to be done in the door panel.



3.8. Cabling

Next to each MCT is a MIP that connects the equipment to the IBIS bus and to the continuous power supply (72Vdc and 0Vdc).

The pre-cabling between MCT & MIP is using a 0.6mm² screened triple cable (Cable reference: FLAMEX 24 16 3x0.60 BLG) enabling all the counting equipment to be ultimately connected to the UCD.

Note: The continuous screened cabling is only available for the car. Continuity is not guaranteed during the articulation integration.

3.8.1. Module Cables « UCD/GPRS/GPS »

_ 72V Power supply: screened twisted cable (FLAMEX 24 16 2x0.60 BLG)
_ IBIS bus 1: TbD
_ IBIS bus 2: TbD

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3.8.2. Module Cables « MCT/MIP »

_ 72V Power supply: screened twisted cable (FLAMEX 24 16 2x0.60 BLG)

_ IBIS bus: TbD

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3.9. Norms

3.9.1. General criteria

a) Guaranteed daily performance: 95% after qualification per access way type
b) Factory return: less than 0,1% on 10 years
c) MTBF Sensor: 200 000 H
d) MTBF Electronic Cards: 35 000 H
e) MTTR : 1 H
f) Average production time : 2 months

3.9.2. Specific criteria

STANDARDS:

Temperature Range: Unable temperature -25°C to +70°C with no freezing or condensing at low temperature.
Storage Temperature: -30°C to +80°C.
Protection Degree: IP54
Vibrations: EN50155 & CE177 or NF.F60002 compliant
Lightning & Sun : 30 000 lx max
Rain & Snow : Humidity 15 to 85% R.H (with no freezing or condensation)

COMPLIANCES:

EN50155 – 10.2.1
EN50155 – 10.2.2
EN50155 – 10.2.3
EN50155 – 10.2.4
EN50155 – 10.2.5
EN50155 – 10.2.6, EN50121-3-2, EN61000-4-2 & EN61000-4-5
EN50155 – 10.2.7, EN50121-3-2 & EN61000 4-4
EN50155 – 10.2.8, EN50121-3-2, EN55011, EN61000-4-3 & EN61000-4-6
EN50155 – 10.2.9
EN50155 – 10.2.10
EN50155 – 10.2.11
EN50155 – 10.2.12
EN50155 – 10.2.13
EN50155 – 10.2.14

EMC:

Certificates delivered by an independent certified normalisation company

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7, rue Georges Méliès www.aemc-measures.fr
69680 CHASSIEU chassieu@aemc-measures.fr
France

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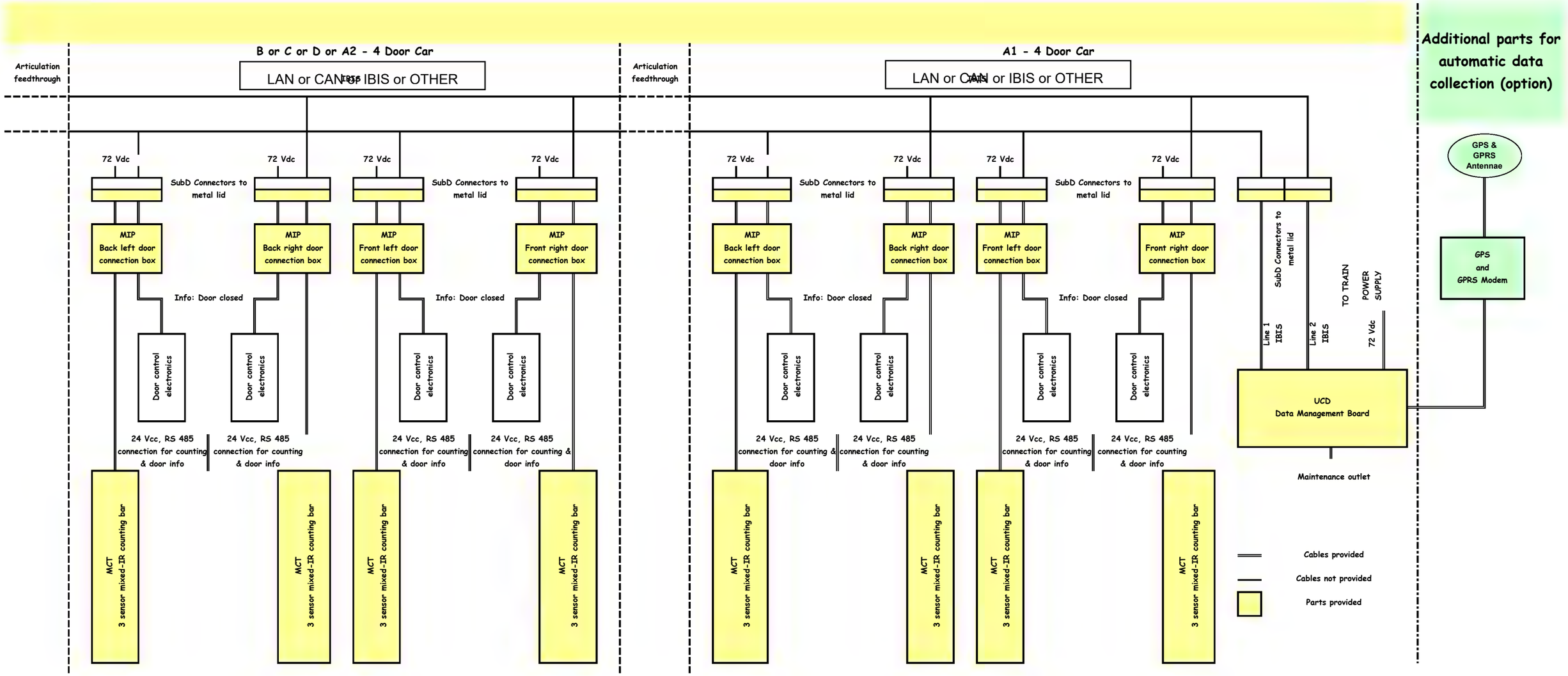
3.9.3. Cabling synoptic



Document E-T01968	Edition 03	Date 07/07/17

Technical Specification

IRIS+VD - EDINBURGH

PASSENGER INFORMATION SYSTEM

for

EDINBURGH TRAM NETWORK (ETN)

CAF

SISTEMAS ELECTRONICOS DE POTENCIA, S.A.

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CONTROL OF EDITIONS AND MODIFICATIONS

EDITION	MODIFICATIONS
00	Base edition
01	Video Information system included in the base offer
	New front sign included in the base offer
	Included optional external side sign
02	Modified Chapter 8 and 9
03	Modified Chapter 3 and Chapter 8: T26
	Added Chapter 9: Option 2, Option 3 and Option 4

EDITION	DATE	PREPARED	REVISED	APPROVED
03	07/07/17	M. Baudet	G. Mateos	P. de la Antonia
02	07/01/22	M. Baudet	G. Mateos	P. de la Antonia
01	06/11/17	M. Baudet	G. Mateos	P. de la Antonia
00	06/09/27	M. Pesquera	G. Mateos	P. de la Antonia

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1.- OBJECT

This specification is applicable to the IRIS+VD Edinburgh, Passenger Information System – Edinburgh Tram Network.

2.- SCOPE

The present technical Specification defines the functional and technical requirements of the Passenger Information System (PIS) offered for its installation on the Edinburgh Tram Network to be furnished by CAF.

3.- APPLICABLE REFERENCES

[1] **Edinburgh Tram Network, Tram Requirements Specification. Employer Requirements,** Doc Ref: ULE90130-SW-SW-SPN-00059 V7

[2] **General Diagram,** SEPSA, S046732-E, ed. B

[3] **Communication Control Unit CCU,** SEPSA, S046738-E, ed. B

[4] **Front Sign,** SEPSA, S046744-E, ed. B

[5] **Front Sign (Colour Option),** SEPSA, S049142, ed A

[6] **Internal Sign,** SEPSA, S046747-E, ed. C

[7] **External Side Sign,** SEPSA, S046750-E, ed. C

[8] **External Side Sign (Colour Option),** SEPSA, S049143, ed A

[9] **Interior Loudspeaker,** S046758-E, ed. B

[10] **Cab Loudspeaker,** S046759-E, ed. B

[11] **Intercom,** S046760-E, ed. B

[12] **Noise Sensor,** SEPSA S046761-E, ed. B

[13] **Microphone,** SEPSA, S046762-E, ed. B

[14] **Video Screen Power Supply,** SEPSA, S046763-E, ed. B

[15] **Monitor Remote Unit,** SEPSA, S046765-E, ed. B

[16] **Media & Communications Controller,** SEPSA, S046766-E, ed. B

[17] **Video Screen ,** SEPSA, S046767-E, ed. B

[18] **Access Point,** SEPSA, S047570, ed. A

[19] **EN 50155. Railway applications. Electronic equipment used on rolling stock. Nov. 1995.**

[20] **EN 50128. Railway applications. Communications, signalling and processing system. Software for railway control protection systems.**

[21] **NF F 16101. Matériel roulant ferroviaire. Comportement au feu. Choix des matériaux.**

[22] **NF F 16102. Matériel roulant ferroviaire. Comportement au feu. Choix des matériaux, application aux équipements électriques.**

[23] **EN 50126. Railway applications. The specification and demonstration of Reliability, Maintainability, and safety (RAMS). September 1999.**

[24] **IEC 61373, 1999-01. Railway applications – Rolling Stock Equipment – Shock and Vibration Tests.**

[25] **EN 50121-3-2, June 2001. Railway Applications Electromagnetic Compatibility Part 3-2: Railway Stock. Apparatus.**

[26] **IEC 60529. Degrees of protection provided by enclosures (IP code).**

NOTE: The drawings which form part of the technical offer give an approximate idea, however not a definitive one, of the system. They can be adapted during the project phase as a result of requirements, which emerge during the project development.

4.- DEFINITIONS AND ACRONYMS

ATP	Automatic Train Protection
BV	Battery Voltage
CAF	Construcciones y Auxiliar de Ferrocarriles S.A
CCU	Central Communication Control Unit
CSp	Cab Loudspeaker
DVAS	Digital Voice Announcement System
DV+	Central Media & Communication Unit
ER	Event Recorder System
FS	Frontal sign
IRIS	Información y Registro Integrado de SEPSA **(**SEPSA's PIS)
IS	Internal Sign
ISp	Public Loudspeaker
MCC	Monitor and Communications Controller
MDS	Monitoring and Diagnostic System
MRU	Monitor Remote Unit
PC	Personal Computer
PIS	Passenger Information System
PTT	Push To Talk
SEPSA	Sistemas Electrónicos de Potencia, S.A
SS	External Side Sign
TU	Train Unit
TCMS	Train Control & Monitoring System
VGA	Video Graphics Array
VS	Video Screen

5.- RESPONSIBILITIES

It is the responsibility of the Project Manager to maintain and update this Technical Specification.

6.- SYSTEM GENERAL DESCRIPTION

6.1.- Operation Background

The communication system will be integrated in the trams of Edinburgh Tram Network to be furnished by CAF.

The tram will be composed of a number of articulated modules car forming a unique Train Unit. The train units will be operated in train-lengths of one (1) train unit. Additionally, in a failure situation, two units could be couple in order to be towed

Each train unit will have two driving cabs and a permanently fitted emergency coupler so that two train units can be coupled.

A more complete description of the train unit is provided in document references.

The system will be conceived so that it can be operated and can interact with other systems in the train such as the Train Control & Monitoring System, the Event Recorder System, etc. with which it will share the train unit bus. The Communication System will be connected to the train unit bus.

6.2.- System Functions

The most important functions of the Communication System are the following:

- Direct capture of discrete variables through their physical inputs.
- Support for the Passenger Information Systems.
- Management of the public address connections enabling communications such as: Cab- Intercom, Cab-Cab, Cab-Public Address, Announcer-Public Address, Radio-Public Address and Cab-Control Centre.
- Selection of line and route to be taken.
- Voice and Visual announcement for the next station along the route, connections, and other special messages associated with each station for the passengers on board.
- Voice and Visual announcement of special messages in relation to unit operational conditions.
- Indication of train location to passengers inside the train and those on platforms.
- Indication of train destination to passengers inside the train and those on platforms.
- Support of configuration/change of lines and routes on which the train will circulate.
- Control of the audio level in the train unit as a function of occupation (estimated from the car's weight supplied by another system), as a function of speed and as a function of ambient noise.
- Support of serial communications through the RS485 train bus and through the train Public Address and Intercom Audio Lines.
- Support of communications through the RS485 car buses.
- Configuration of functional parameters.
- Operation self-checking mechanism.
- Generation of warning tones.
- Support of a Media & Communications System integrated within the basic Passenger Information System.

6.3.- System Architecture

The system architecture is shown in drawing S046732-E.

The system consists of 2 Front Signs FS, 4 External Side Signs SS, 6 Internal Signs IS, 20 Interior Loudspeakers ISp, 2 Cab Loudspeakers CSp, 2 Noise Sensors NS, 2 Microphones MIC, 8 Passenger Intercoms INT, 8 Monitor Remote unit, 8 Video screen, 4 Video Screen Power Supply, 1 Access Point, 1 Communication Control Unit with Digital Voice Announcement System DVAS and connection to the train bus and 1 Media and communication Controller with connection to the CCU.

All Signs and Passenger Intercoms INTs are offered with RS485 interface to Communication Control Units car buses.

The Media & Communication Controller will have the following features:

- It will have a Wireless Access Point which allows multi client broadcast access and fast data transfer with wireless external routers within a minimum 50 metres radius of a stationary point.
- The Wireless AP will be based on WiFi technology fulfilling the IEEE 802.11g standards.
- Software necessary to carry out its functionalities.
- It will be configurable to ensure that all external connectivity will be controlled and secured.
- It will be able to receive and handle messages from the Passenger Destination Management System, the Passenger Counting System, the Passenger Surveillance System and the Passenger Audio System by means of exchange of files.
- However, it will not be possible to oversee the files and information of the systems not supplied by SEPSA during the train operation (for example the Passenger Counting System).
- Internal connectivity that will allow high-speed streaming of high-bandwidth multi-media content, and which will prevent any external interference.
- It will be scalable in order to manage a range of other hardware configurations.

The Media & Communications Controller of the Media & Communication System will be connected to the CCU. This Media & Communications Controller MCC will transmit video to the 8 Video Screens with enough quality. Each Video Screen will receive the video from the Monitor Remote Unit, which will set up the video for its broadcasting. In addition, the MCC will be connected to a wireless Access Point by Ethernet connection.

The contents' update of the Media & Communications Controller will be done in a yard. For this function SEPSA will supply one yard's access point and the software necessary to carry out the update. SEPSA will not supply the PC where this software will be installed.

It will be possible to connect the Access Point to a Switch Ethernet in a LAN having the PC located in a different room or area, but always connected to the same LAN than the

Switch Ethernet and the WiFi access point. The software will allow uploading the video and audio information to be displayed in the train. Each train will have a contents list and a register of the operations that will be saved in a database contained in the PC.

The communication system is completed with the PC software to configure the routes, to upload the text messages for to signs and the MP3 audio messages to be broadcasted in the train according to its location along the route.

7.- SYSTEM FUNCTIONAL REQUIREMENTS

The IRIS - VD System functional features are the following:

F.1 Each Communication Control Unit will capture the status of direct discrete inputs proceeding from the statuses of potential free contacts, contacts supplied at BV or supplied at 24 Vdc. An antirebound filtering will be applied to the above-mentioned direct discrete inputs.

For every discrete captured signal there will be a mask, which will allow the signal's standby status to be set in such a way that its activation will always appear as a logic '1' in memory.

F.2 It will have the capacity to exchange information via serial communication with other systems through the train unit/car bus RS-485. The information to be exchanged will be: discrete variables, analogue variables, driving parameters, texts for the announcement signs, configuration parameters, etc.

F.3 It will automatically control the sound level of the passenger announcements depending on speed (three discrete levels). The speed will be supplied by any other system in the train (Monitoring System MDS or ATC system).

F.4 It will automatically control the sound level of the passenger announcements depending on occupation (two discrete levels). This occupation will be deduced from the weight of the car, which will be supplied by another system in the train (Monitoring System MDS).

F.5 It will automatically control the sound level of the passenger announcements depending on ambient noise (one discrete level).

F.6 Management of the two available audio lines for establishment of the required public address connections, allowing two connections to be simultaneously established (i.e. Cab-Intercom and Public Address), if these do not share resources.

F.7 The connections for the communication system are:

- Generation of the door close tone (beep-beep).
- Cab with Cab.
- Intercom with Cab.

- Cab with Public Address.
- Audio announcements pre-recorded automatically or manually and controlled from the cab.
- Station Announcement System with Public Address.
- Radio with Public Address.
- Radio with cab.

F.8 The interruption/cancellation of an established connection can be set if another having higher priority is established. The priorities will be established during the project phase

F.9 The Digital Voice Announcement System (DVAS) will operate based on line data, location of the train along the route and door opening/closing signals, which will be provided by other systems in the train (MDS, the ER system or the ATP system).

F.10 The Announcement system will contain the stations table and their location along the route for each of the lines along which the train is to circulate. These tables will include the kilometre points at which the next stop announcements are to be made.

F.11 The Announcement system will also provide support for other station-related messages, in particular: connections with other routes, ends of price-zones and other messages.

F.12 The Communication Control Unit CCU will control the information to be displayed in the internal signs, in the front signs and in the external side signs.

F.13 For the information to be shown in the internal signs, in the front signs and in the external side signs the Communication System will use the information provided by the driver through the Cab Terminal, which will belong to the Train Control & Monitoring System.

F.14 During the trip, the signs will use the information provided by the station announcement system DVAS.

F.15 The system will allow the definition of the routes along which the train is to circulate and the loading of its configuration and messages into the DVAS station announcement system.

F.16 The system will permit the uploading of the digital audio for the station messages and of the data for the signs messages associated to the stations where the trains are to circulate. This is also applicable to other special audio messages handled by the announcement system.

F.17 The Communication Control Unit CCU will include suitable human/machine interfaces for the display of system operation and failure statuses.

F.18 The Communication Control Unit CCU will be fitted with suitable human/system interfaces for local parameter configuration and operation conditions, either by means of a laptop computer connected to the CCU or using a screen and a keyboard incorporated in the central unit CCU itself.

F.19 Using the Communication Control Unit human / machine interface the system will be able to show:

- Versions of the programs being executed in its equipment.
- The version of the configuration tables of the above.
- The system operational/failure status.
- The value of the configured parameters.
- The values of adjustment variables, etc.
- The date and time of the internal clock.
- The statuses of the discrete captured variables.
- Audio matrix output relays statuses, which establishes the public address connections.

Part of this information could be sent to the Monitoring and Diagnostic System MDS.

F.20 The Communication Control Unit human / machine interface will permit to:

- Configure the Serial Number in which the Communication Control Unit is installed.
- Carry out front, external side and internal signs tests to check communications and LED diodes integrity.
- Carry out tests of the announcement system to verify correct configuration of each line and suitable message texts and station name audio digitisation.
- Modify the date and time of the internal clock.
- Change the password.
- Define the stand-by status masks for the discrete captured signals.
- Modify the audio levels for each public address connection.
- Modify speed thresholds for public address levels correction.
- Modify noise thresholds for public address levels correction.
- Modify occupation thresholds for public address levels correction.
- Provide a test location to the Digital Voice Announcement System.
- Load the announcement system configuration tables.
- Carry out test “walk through” of signs and emergency intercoms.

Part of this information could be sent to the Monitoring and Diagnostic System MDS.

F.21 All the system’s configuration operations will be protected by a password, which will be modifiable.

F.22 The system will have the necessary means to prevent its permanent blocking due to program failure (watchdog).

F.23 The system's interface with the operator will show its performance status and internal failures detected by its self-checking mechanism. The system's interface with the operator will be by means of the Cab Terminal as well as a screen and a keyboard incorporated in the central unit Communication Control Unit CCU as well as the laptop computer.

F.24 The IRIS data could be shown on others displays which belong to different systems such as the Monitoring and Diagnostic System.

F.25 There will be two Cab Terminals per train unit composed of a touchscreen TFT 10.4'' display. These Cab Terminals will be shared with the TCMS. Additionally, the system will permit to install dedicated Cab Terminals for PIS functionalities.

F.26 The equipment will adjust its time to commands received from any other system in the train or entered through the Cab Terminal.

F.27 The system will incorporate a record of its own events.

F.28 The Communication Control Unit CCU will have the capability of performing a self-test.

F.29 Every pair of doorways will be equipped with Passenger Intercoms. Each intercom station will consist of a speaker, a microphone and an activation button.

F.30 The activation of the associated intercom will signal the crew in the cab. Thus, the crew will be able to establish a communication circuit with that Intercom when it has been activated. The crew will also have the ability to put that Intercom "On Hold" in order to use the radio or establish a Cab-Cab communication.

F.31 If more than one Intercom station is activated, the crew will have the ability to answer them in the order received, and to put other Intercom stations "on hold" as needed. The crew will also have the ability to disconnect a station if person keeps activating the intercom.

F.32 The IRIS Communication Control Unit CCU will be equipped with an Ethernet port to download its events record to a laptop computer (Portable Test Unit PTU).

F.33 The Communication system will be commanded from the Cab Terminal.

F.34 In addition a Cab Loudspeaker and a gooseneck microphone will be supplied in each cab to manage the Public Address and the Intercom Communication. Besides, it will be capable of addressing the speakers broadcasting a message to the internal speakers. It will also be composed of an intercom chime and a potentiometer to control the Intercom Speaker Volume Control.

F.35 Every destination name shown in the signs will be in English.

F.36 The signs will be capable to display characters like “q” or “p” without raising these characters at the same level of characters like “a” or “c”.
It can be explained better in the following figures:

Raising the characters



No raising the characters.



8.- SYSTEM TECHNICAL REQUIREMENTS

The IRIS - VD System technical features are the following:

T.1 The Communication Control Unit and the signs will work supplied with train battery voltage Vb +25% / -30% according to regulation EN 50155. The rest of the equipment will be supplied from the Communication Control Unit.

T.2 IRIS system operating temperature range will be compliant with category T3 according to regulation EN 50155 except for the memory module.

T.3 IRIS system storage temperature range will be compliant with category T3 according to regulation EN 50155 except for the memory module.

T.4 The degree of protection of equipment’s casing installed in the cabinet in addition to equipment installed in the cabs and in the passenger saloons such as intercoms, the public loudspeakers will be IP30 according to regulation IEC 60529.

T.5 The degree of protection of the casing of the signs in its side visible to the passengers will be IP65 according to regulation IEC 60529.

T.6 The degree of protection of the Communication Control Units CCU will be IP20 according to regulation IEC 60529.

T.7 The equipment will withstand vibrations according to regulation IEC 61373 of 1999-01 Category 1 Class B.

T.8 The equipment will withstand impacts according to regulation IEC 61373 of 1999-01 Category 1 Class B**.**

T.9 The equipment's dielectric strength will withstand 1000Vrms 50Hz for 1 minute, applied between the chassis and the power supply terminals according to regulation EN 50155.

T.10 The level of insulation between the chassis and the power supply terminals will be greater than 20MΩ at 500Vdc according to regulation EN 50155.

T.11 All the equipment will meet the EMC requirements and the electrical service conditions specified in paragraph 3 of regulation EN 50155 and will meet the requirements of the tests specified in section 10 of that standard.

T.12 All the equipment will meet the EMI/EMC requirements according to regulation UNE-EN 50121-3-2.

T.13 The Digital Voice Announcement System will be equipped with enough memory to store configurations of a minimum of 5000 seconds of audio distributed in a minimum of 240 different stations names, a minimum of 16 characters to be distributed between station names and a minimum of 20 special messages.

T.14 The recorded messages will be stored in MP3 format.

T.15 The bandwidth of the amplifiers will be 200Hz < f < 10000Hz.

T.16 The total harmonic distortion will be less than 1% at 1 kHz for a power of 12 + 12 Vrms.

T.17 The construction materials for the system equipment will fulfil the requirements of regulations NF N 16101 and NF F 16102 level A1 with regard to fireproofing and fume emissions (trains for tunnel service).

T.18 The discrete inputs will be able to detect potential free contacts with a contact-cleaning circuit, contacts supplied at Vb draining 1mA and contacts supplied at 24Vdc draining 10mA. They will have a contact cleaning circuit.

T.19 The Passenger Emergency Intercom will be vandal resistant and will be equipped with a heavy-duty faceplate.

T.20 The audio control is to be furnished and installed in each operator's cab and will consist of:

- Gooseneck microphone;

- Mode buttons to select the Public Address PA mode or the Passenger Intercom mode;
- Push-To-Talk button;
- Intercom Speaker Volume Control;
- Intercom chime and indication light.

Buttons will be vandal resistant and will be equipped with indication lights.

T.21 Internal signs will be fitted with yellow LED diodes on a black background.

T.22 Internal signs will display characters of 50 mm high.

T.23 Internal signs will have a resolution of 8x96 LED diodes.

T.24 Internal signs will have an RS485 interface with the communication control units installed in its cars.

T.25 Front signs will be fitted with yellow LED diodes on a black background.

T.26 Front signs will have characters heights of 165 mm and may display up to 12 characters in one line. Its resolution is 24x168 LED diodes.

T.27 Front signs will have an RS485 interface with the communication control units installed in its cars.

T.28 External side signs will be fitted with yellow LED diodes on a black background.

T.29 External side signs will be display characters of 50 mm high.

T.30 External side signs will have a resolution of 8x96 LED diodes.

T.31 External side signs will have an RS485 interface with the communication control units installed in its cars.

9.- OPTION

1: Colour External Frontal Signs

As an option SEPSA offers to change the basic frontal signs for other ones which are capable to display different colours (three different colours) squares in front of the destination message.



These signs will be fitted with 24x8 tri-colour LED diodes and 24x168 yellow LED diodes on a black background and they have an RS485 interface with the communication control units installed in its cars.

The dimensions and details of these optional signs may be seen in drawing S049142-E.

2: Colour External Side Signs

As an option SEPSA offers to change the basic side signs for other ones which are capable to display different colours (three different colours) squares in front of the destination message.



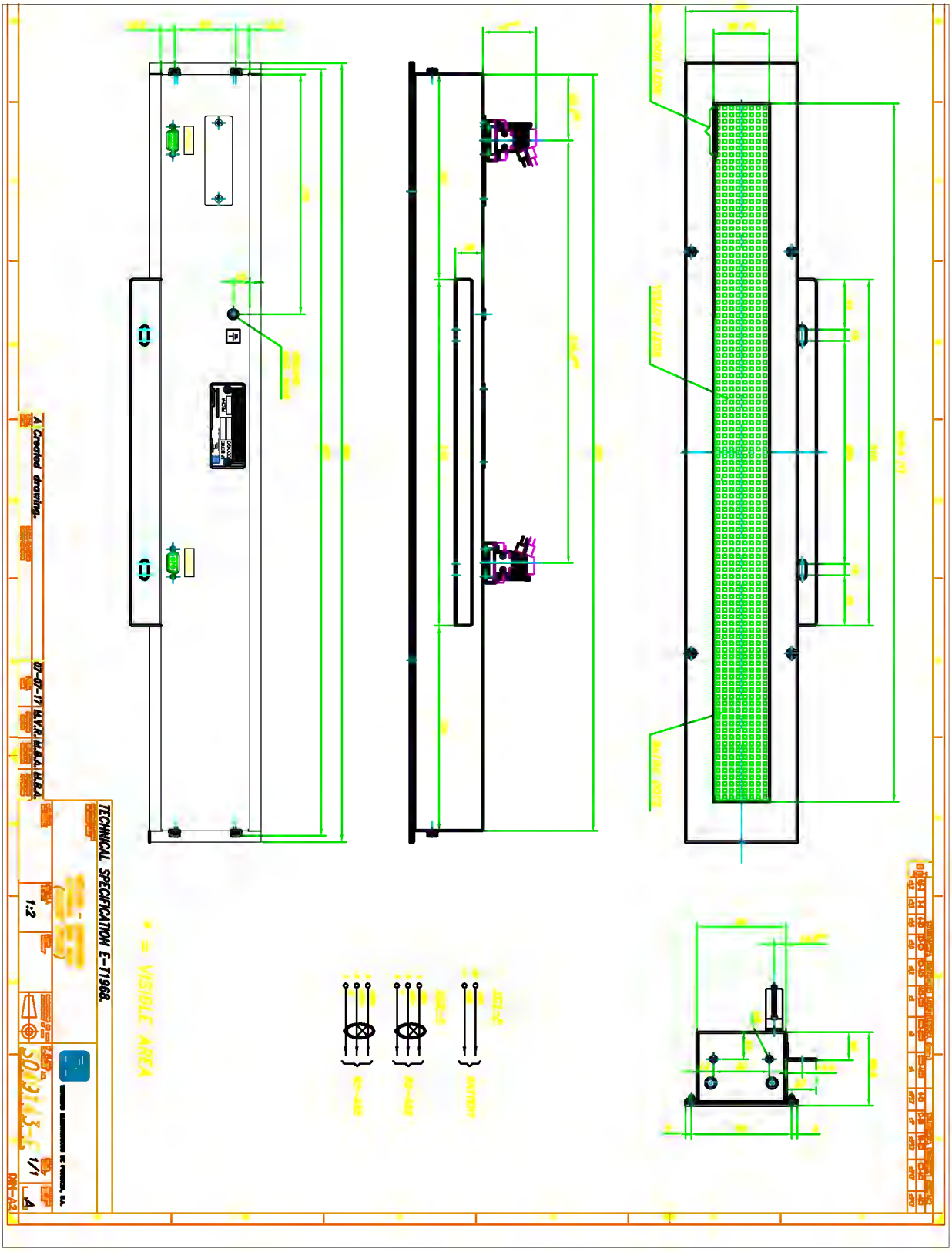
These displays have characters heights of 50mm and may display up to 12 characters in one line.

External side signs will be fitted with 8x8 tri-colour LED diodes and 8x96 yellow LED diodes and on a black background and they will have an RS485 interface with the communication control units installed in its cars.

The dimensions and details of these optional signs may be seen in drawing S049143-E.

10.- SCOPE OF SUPPLY

If there is any difference between the scope of supply of this technical specification and the scope of supply of the economic offer only the scope of supply of the economic quotation will be taken into account.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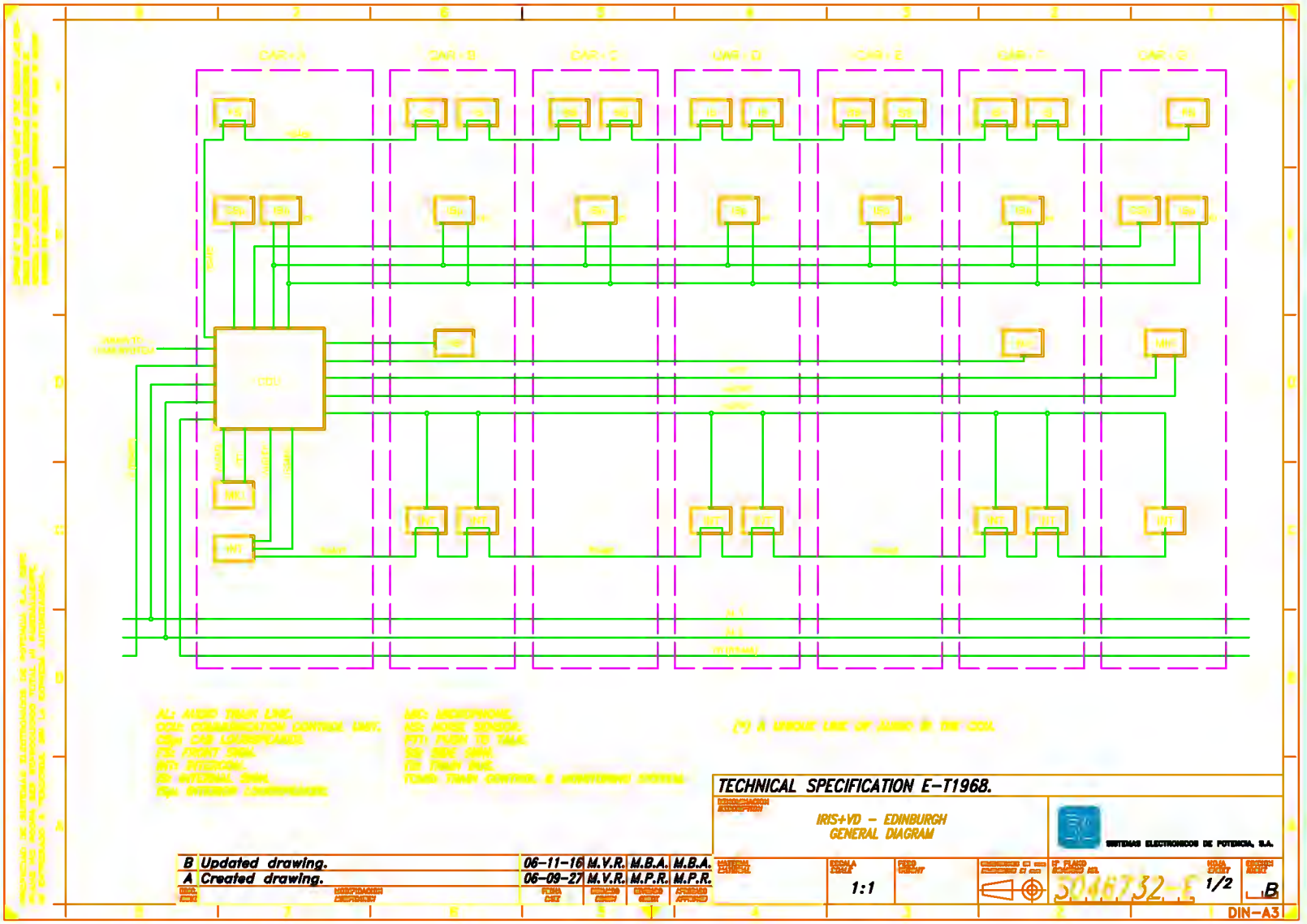

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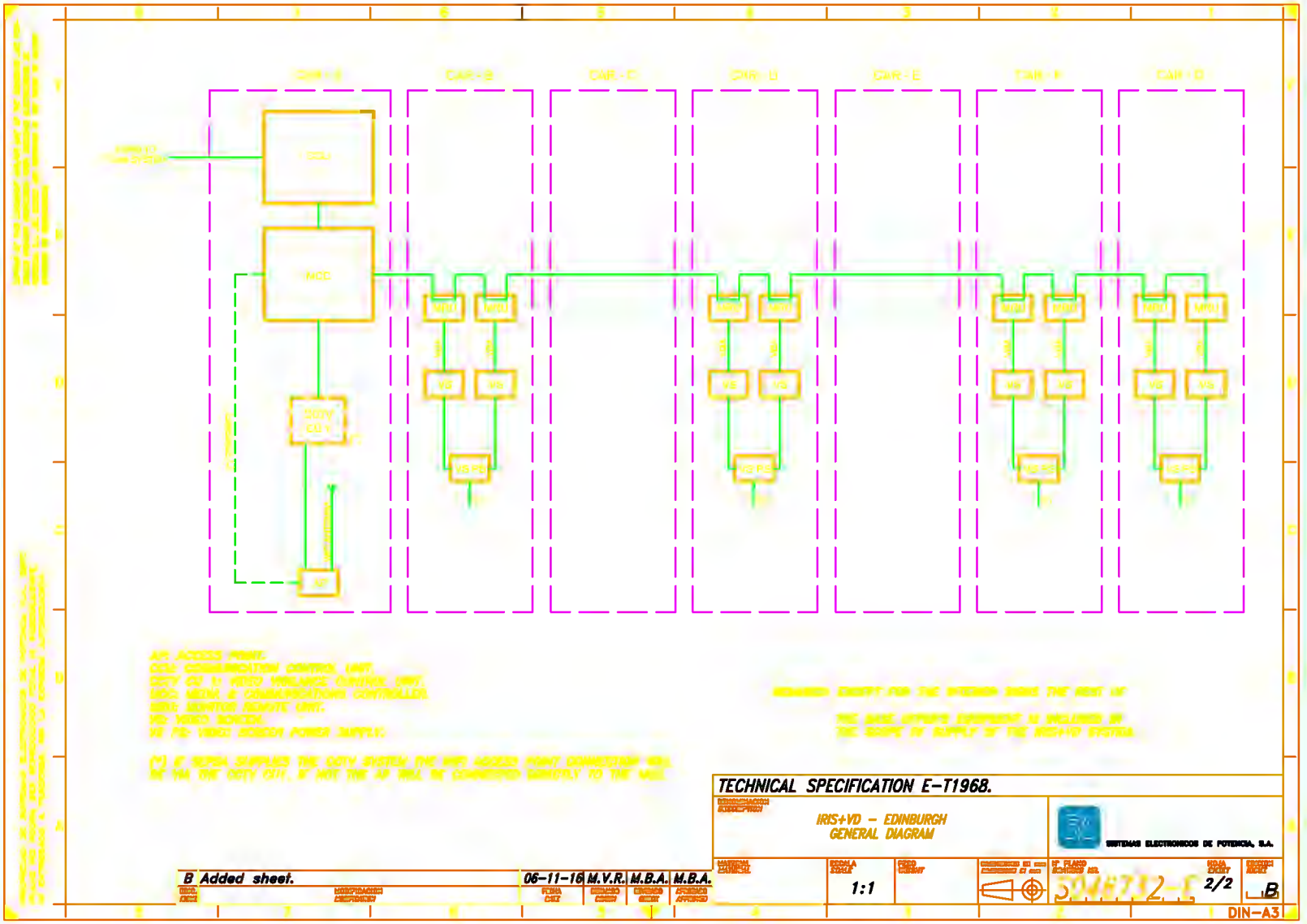

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TECHNICAL SPECIFICATION E-T1968.

IRIS+VD - EDINBURGH
GENERAL DIAGRAM

SIEMENS ELECTRONICOS DE POTENCIA, S.A.

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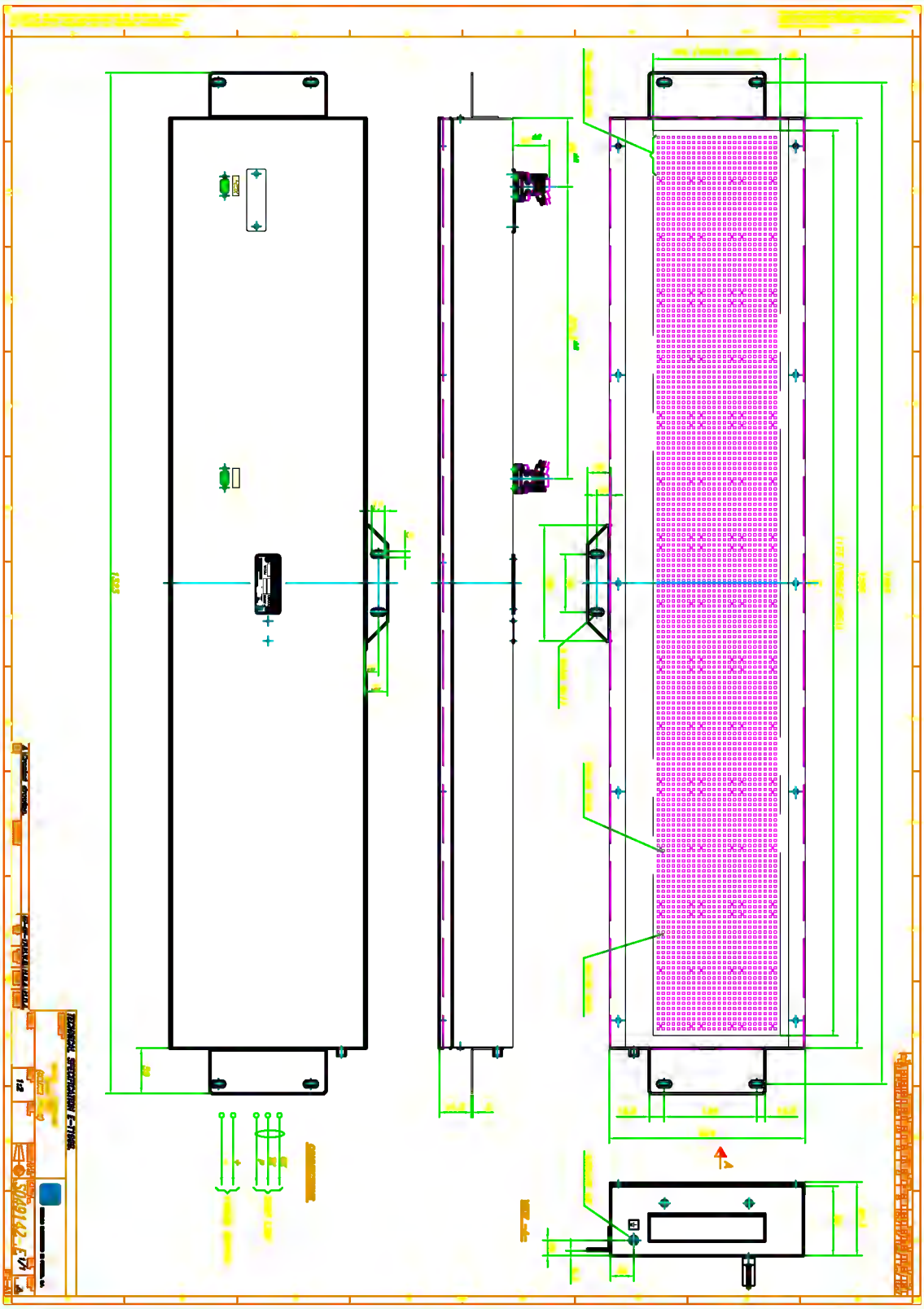

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Technical Specification

SICAS – EDINBURGH

For

Edinburgh Tram Network (ETM)

CAF

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1.- OBJECT

This Technical Specification defines the functional and technical requirements of the SICAS – EDINBURGH.

2.- SCOPE

This Technical Specification is applicable to the SICAS for its installation on the Edinburgh Tram Network to be furnished by CAF.

3.- APPLICABLE REFERENCES

[1] **Tram Requirements Specification,** Edinburgh Tram Network ULE90130-SW-SW-SPN-00059 V7, April 2006.

[2] **General Diagram**, SEPSA, S046779-E, ed. A

[3] **Cab Terminal,** SEPSA S046823-E, ed. A

[4] **Central Unit,** SEPSA, S046780-E, ed. A

[5] **EN 50155. Railway applications. Electronic equipment used on rolling stock. Nov. 1995.**

[6] **NF F 16101. Matériel roulant ferroviaire. Comportement au feu. Choix des matériaux.**

[7] **NF F 16102. Matériel roulant ferroviaire. Comportement au feu. Choix des matériaux, application aux équipements électriques.**

[8] **EN 50128. Railway applications. Communications, signalling and processing systems. Software for railway control and protection systems. March 2001.**

[9] **EN 50126. Railway Applications. The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS). September 1999.**

[10] **ICE 61373, 1999-01. Railway Applications – Rolling Stock Equipment – Shock and Vibration Tests.**

[11] **EN 50121-3-2, June 2001. Railway Applications Electromagnetic Compatibility Part 3-2: Railway Stock. Apparatus.**

[12] **IEC 60529. Degrees of protection provided by enclosures (IP code).**

[13] **IEC 61375-1. Electric railway equipment. Train Bus Part 1. Train Communication Network. Sep. 1999.**

NOTE: The drawings that form part of the technical bid give an approximate (but not definitive) idea of the system. They may be adapted during the design phase as and when needs arise.

4.- DEFINITIONS AND ACRONYMS

BV	Battery Voltage
CAF	Construcciones y Auxiliar de Ferrocarriles S.A.

CESIS	Central Estática de Seguridad Información de SEPSA (Event Recording System)
CT	Cab Terminal
IRIS	Sistema de Información y Comunicación de SEPSA **(**SEPSA's Passenger Information and Communication System)
MVB	Multifunction Vehicle Bus. Train Communication Network bus
PC	Personal Computer
SEPSA	Sistemas Electrónicos de Potencia, S.A.
SICAS	Sistema Integrado de Control de Auxiliares de SEPSA (SEPSA's Train Control and Monitoring System)
TCM	Terminal de Configuración y Mantenimiento (Portable Configuration and Maintenance Unit)
UT	Unidad de Tren (Train Unit)

5.- RESPONSIBILITIES

The Project Manager is responsible for maintaining and updating this Technical Specification.

6.- GENERAL DESCRIPTION OF THE SYSTEM

6.1.- Operation Context.

The communication system will be integrated in the trams of Edinburgh Tram Network to be furnished by CAF.

The tram will be composed of a number of articulated modules car forming a unique Train Unit. The train units will be operated in train-lengths of one (1) train unit. Additionally, in a failure situation, two units could be coupled in order to be towed.

Each train unit will have two driving cabs and a permanently fitted emergency coupler.

A more complete description of the train unit is provided in document references.

The system will be integrated to function in conjunction with CESIS, IRIS, auxiliary systems, etc., with which it will share the standard data communication network (TCN) and/or the car bus (RS485).

6.2.- System Functions.

The most important functions of the SICAS system are:

- Direct capture of discrete and analogue variables through its physical inputs.
- Capture of discrete and analogue variables through serial line communications.

- Monitoring of the train's auxiliary systems by running a PLC programme. In this bid, no control function provided by the PLC is supplied by SEPSA.
- Analysis of fault conditions and presentation of these conditions in real time. The analysis is performed by the PLC programme.
- Chronological recording of events with environment variables in order to facilitate maintenance of the train's systems.
- Serial communication support through the MVB bus of the TCN.
- Serial communication support through the RS-485 car bus.
- The recorded events can be displayed and analysed on an external computer (external to the system)
- Configuration of functional parameters.
- Auto-check of functioning.

6.3.- System Architecture.

The system's architecture is represented in drawing S046779-E.

Each car with cab will incorporate a Cab Terminal and two Central Units giving support to direct inputs and outputs and inputs and outputs through MVB train unit bus and through RS485 car buses.

The Cab Terminals will also support the running of the train's PLC, which will be centralized. Both terminals will run the PLC program but only one of them will refresh the System's outputs. If a failure occurs in the active PLC, the PLC application of the other car with cab will take control of the train.

The Cab Terminals to be installed in the driving station desks of the cars with cab will have the following interface with the MVB bus:

- A class 4 interface with the MVB bus to communicate process variables and messages, as well as to perform the MVB Bus Administrator tasks.
- An Ethernet interface for connection to a PC to perform configuration and maintenance tasks.
- An RS485 interface to communicate with systems that can not be connected to the MVB bus.

The Centrals Units will have the following interface with the MVB bus:

- A class 1 interface with the MVB bus to communicate process variables.

The System includes the PC programmes for running, debugging and uploading the PLC programme, analysing and displaying recorded data, and converting the historical record file into a text format compatible with any commercial software such as Excel, or a database.

7.- FUNCTIONAL REQUIREMENTS OF THE SYSTEM

The functional requirements of the system are:

F.1. It will capture the state of a number of direct discrete inputs in each car. These inputs will come from the state of contacts fed at +BV, contacts fed at 0BV or contacts fed at 24Vdc. The corresponding debounce filtering will be applied to these discrete inputs.

For each discrete signal captured there will be a mask that allows the signal's standby state to be adjusted so that its activation is always presented by a logical 1 in memory.

The system will capture the following number of discrete inputs in each car per train unit:

CAR A	CAR B	CAR C	CAR D	CAR E	CAR F	CAR G
72	0	0	0	0	0	72

F.2. It will control the state of a number of direct relay outputs in each car by means of the corresponding PLC programme.

For each relay output there will be masks that allow the standby state of the relays to be defined.

The system will control the following number of discrete outputs in each car per train unit:

CAR A	CAR B	CAR C	CAR D	CAR E	CAR F	CAR G
48	0	0	0	0	0	48

F.3. It will capture the state of 4 analogue inputs in A and G cars.

F.4. The System will allow two emergency states to be defined for the relay outputs.

The System will switch to emergency state when the information in the MVB bus is not refreshed within a certain period of time. The emergency state -one or two- will be selected according to a special digital input, and the state of each output can be defined for each emergency state.

F.5. It will have the capacity to communicate data via serial line with other systems through the train network's MVB bus and/or through the RS485 buses. The data will be: discrete variables, analogue variables, driving parameters, configuration parameters, etc.

F.6. The System will permit the running, simulation and debugging of the train unit control PLC programmes. Running will be facilitated through a standard interface (ISaGRAF), simulation will be performed in a PC environment, and debugging will be in real time in direct connection with the systems installed in the trains and acting on them through the debugging tools (forcing of PLC variables).

F.7. The System will have the means for being able to upload the PLC programmes in the memory of the Terminals of each end car.

F.8. As there are two Terminals with PLC programme per train unit, the system will manage the redundancy of the system, in such a way that if one of them fails the other one takes control.

F.9. The SICAS System will provide the capacity to enable the PLC programme to evaluate the conditions of up to 5.000 events or incidents per train unit.

F.10. The SICAS System will show the abovementioned 5.000 events or incidents to the driver and/or maintenance staff through the Cab Terminal. Each fault can be identified with a text and associated with a graphic icon. The total number of incidents that can be represented in the terminal will be 5.000 per train unit.

F.11. Texts containing recommendations to be followed by the operator can be provided for each one of the events or incidents.

F.12. Each one of the abovementioned 5.000 events or incidents per train unit will be recorded together with the corresponding date and time, and a series of variables such as: environment variables, analogue variables, discrete input/output variables, parameters, etc., to be determined during the project.

It will be possible to fix the number of photos of the state of the variables that form part of the environment to be captured before and after the moment when the fault appears, with a maximum of 10 snapshots before and 10 after. The control and monitoring system will have 128 MB of Flash memory for recording variables and events.

F.13. The System will provide the necessary means for extracting data from the abovementioned historical record of events through an Ethernet interface.

F.14. The System will provide the necessary means for analysing and displaying the recorded data on a computer screen, making it possible to:

- See the car's serial number and the type of train to which the data under analysis belong.
- Show the information about the analogue and discrete signals belonging to an event's environment variables.
- Present the environment variables according to the date and time.
- Show the values of the analogue variables and the state of the discrete variables at a selected instant associated with an event.
- Show the value of the recorded parameters (Train Number, Driver Number, etc.) at the top of the PC screen at the instant selected with a cursor.
- Convert the recorded data on screen into a format that a commercial database can work with.

F.15. The Central Units will have appropriate man/system interface for showing the system's functioning/fault state (link with the MVB bus).

F.16. By using the man/machine interface obtained by connecting a computer to the Terminal's Ethernet port, it will be possible to:

- Configure the Serial Number and the type of train in which the Central Unit is installed.
- Change the date and time of the internal clock.
- Initialize and delete the historical record of events.
- Change the access code.

F.17. By using the Configuration and Maintenance Terminal TCM (laptop computer), the System will be able to:

- Show the versions of programmes running in the TCM.
- Insert the value of the parameters to be configured in the Terminal.
- Show the state of the captured discrete variables.
- Show the state of the output relays.
- Show the existing faults in the train.
- Show the train's running data: Train Number, Driver Number.
- Show the train event record.
- Upload the PLC control programmes.
- Extract the recorded data from the historical record.

F.18. By using the Cab Terminal it will be possible to:

- Display the versions of the programmes running in the Cab Terminal.
- Display and change the data and time of the system.
- Display the state of the captured discrete variables.
- Display the state of the output relays.
- Display the existing faults in the train.
- Display the data of the train's auxiliary systems connected to the MVB train bus. The time period in which these signals are refreshed will depend on the capacity of the bus.
- Display and select the train's running data: Train Number, Driver Number, Line on which it is running, Destination, etc.
- Adjust and communicate to the brake, traction and CESIS systems, etc. the wheel diameter of each one of the bogies that support the train.
- Change the date and time of the internal clock.

F.19. The most important man/machine interface of the SICAS System is the Cab Terminal.

F.20. The Cab Terminal will incorporate supervision of the execution of its processes (watchdog).

F.21. The Cab Terminal will be supported by a TFT screen and a functional keyboard.

F.22. The screens shown on the Cab Terminal will have a graphic format based on windows and menus.

F.23. All the system configuration operations will be protected with an access code, which will be adjustable.

F.24. The System will have the necessary means for preventing permanent blocking due to programme failure (watchdog).

F.25. The System will show, in the interface with the operator, its operating state and internal faults detected in its auto-check.

8.- TECHNICAL REQUIREMENTS OF THE SYSTEM

The technical requirements of the system are:

T.1. The systems will operate at battery voltage BV Vdc +25% -30%.

T.2. The working temperature for the system's control units will be T3 according to EN50155, and the storage temperature will be -25ºC < t < 85ºC.

T.3. The working temperature for the system's Cab Terminal will be -25ºC < t < 70ºC and -10ºC < t < 55ºC for its display, and the storage temperature will be -25ºC < t< 85ºC.

T.4. The degree of protection provided by the enclosure of the systems installed in cupboard (Centrals) will be IP20.

T.5. The degree of protection provided by the enclosure of the systems installed on the desks of the driver's cabs will be IP20. The front of the Cab Terminal will have degree of protection IP64.

T.6. The systems will withstand vibrations according to IEC 61373, Category 1 Class B.

T.7. The systems will withstand impacts according to IEC 61373, Category 1 Class B**.**

T.8. The dielectric rigidity of the systems will withstand 1000Vef 50Hz for 1 minute applied between the chassis and the connector terminals according to EN 50155.

T.9. The level of insulation between the chassis and the connector terminals will be greater than 20MΩ at 500Vdc according to EN 50155.

T.10. All the systems will meet the EMC requirements and the electric service conditions specified in section 3 of EN 50155 and in accordance with the tests referred to in section 10 of this standard.

T.11. The Control and Monitoring System will have a non-volatile memory with capacity to store 128 Mbytes of data in the terminals that run the PLC process for recording variables and for the historical record of events.

T.12. The recording memory will store the recorded information without switching on the power supply.

T.13. The screens and indicators to be used in the interface with the operator will incorporate the appropriate technology for providing the best display conditions. The control of these screens and that of the lighting system will have the necessary means for adjusting the light intensity according to the existing natural light, both manually and automatically.

These facilities must be accompanied by suitable installation conditions that prevent the screens from being exposed to excessive lighting.

T.14. The contacts of the output relays will have a current cut-off capacity of 0.4A at 110Vdc L/R<30ms. They will have an RC circuit for reducing excess currents.

T.15. For the direct relay output cards it will be possible to select for each output the standby state of the contact (NC or NA) and the relay states (excited or not excited) for each one of the two emergency states.

T.16. The direct discrete inputs will be able to detect contacts fed at battery voltage with a drain of 1mA and contacts fed at 24Vdc with a drain of 10mA. They will have a "contact cleaning" circuit.

T.17. The construction materials of the constituent parts of the system must meet the requirements of the NF N 16101 and NF F 16102 standards, grade A1 as regards fire resistance and emission of smoke (trains for service in tunnel).

T.18. The functional keyboard of the Cab Terminal will consist of a 10.4" screen, with touchscreen.

T.19. All the inputs and outputs of the SICAS system will be protected against short-circuits, excess currents, polarity inversions, overheating and EMC disturbances.

9.- SYSTEM SUPPLY LIST

If the scope of supply of this technical specification differs from that of the economic bid, that of the economic bid will prevail.

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USB00000086_0699

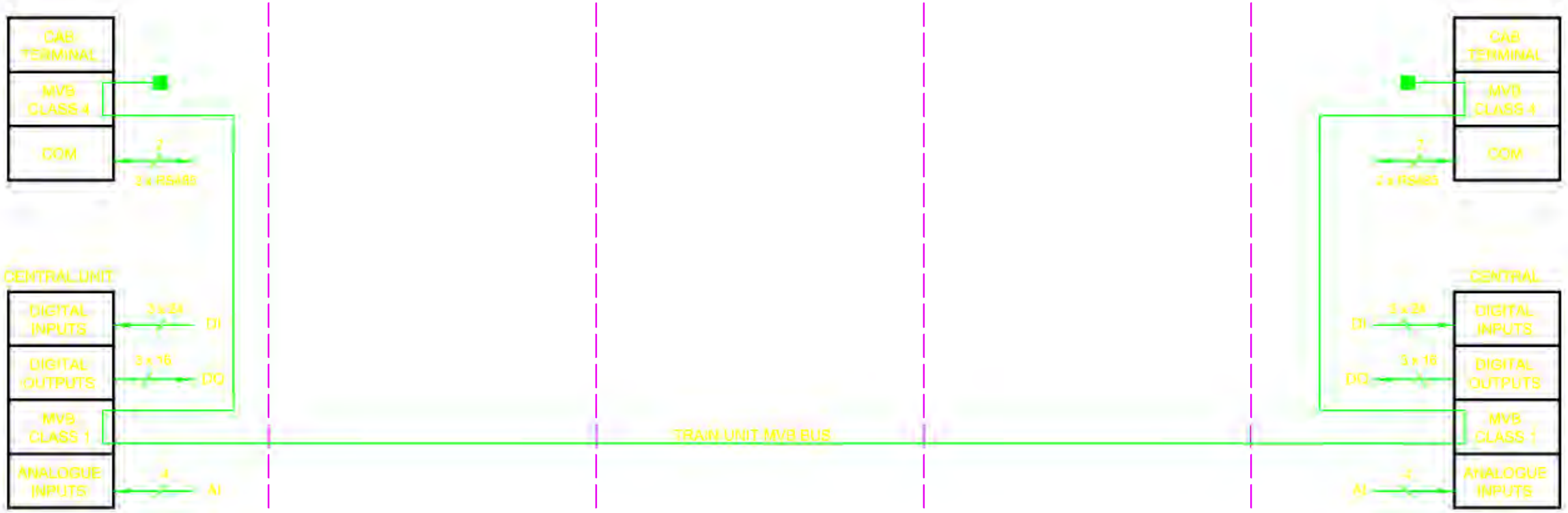
CAR A

CAR B

CAR C / D / E

CAR F

CAR G



PROPIEDAD DE SISTEMAS ELECTRONICOS DE POTENCIA S.A. ESTE PLANO NO PODRA SER REPRODUCIDO TOTAL NI PARCIALMENTE, NI ENTREGADO A TERCEROS, SIN LA EXPRESA AUTORIZACION.

TECHNICAL SPECIFICATION E-T1970

DENOMINACION
DESCRIPTION

SICAS - EDINBURGH
GENERAL DIAGRAM

SISTEMAS ELECTRONICOS DE POTENCIA, S.A.

EDIC. ISSUE	MODIFICACION MODIFICATION	FECHA DATE	DIBUJADO DRAWN	COMPROBADO CHECKED	APROBADO APPROVED
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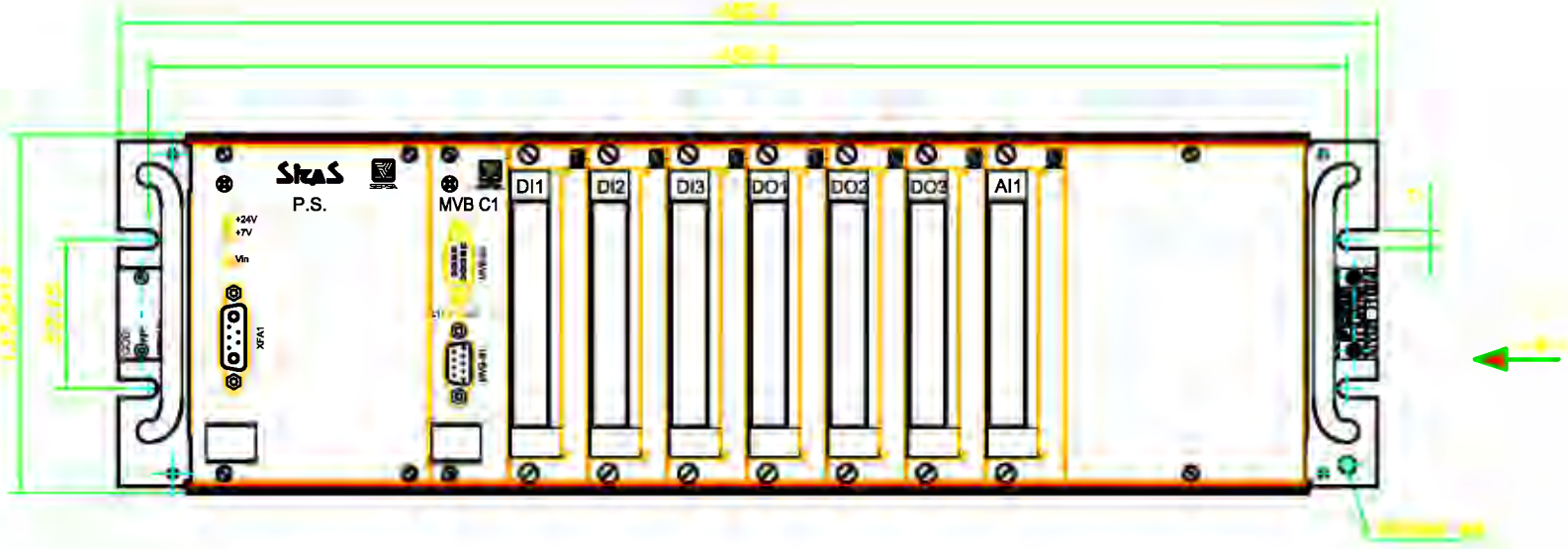
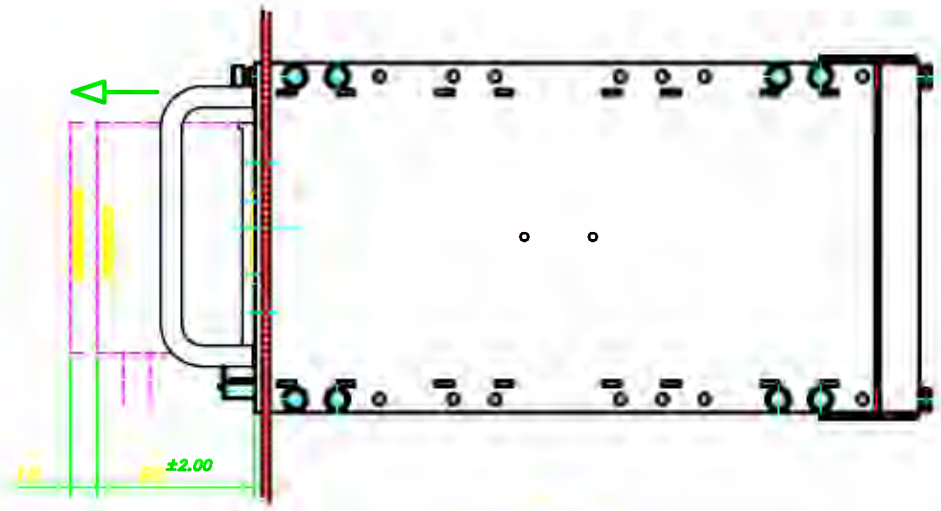
				S046779-E	1/1	A

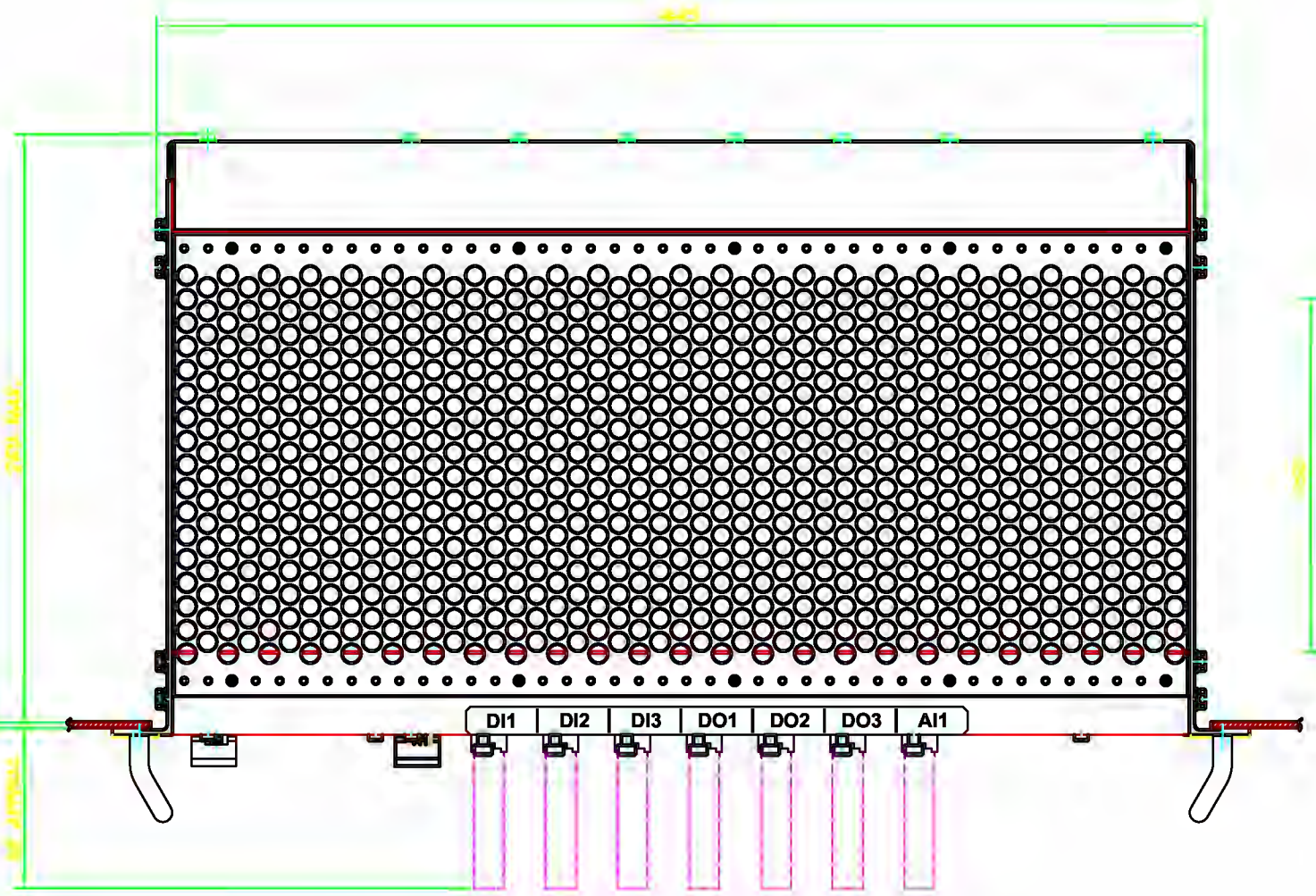
DIN-A3

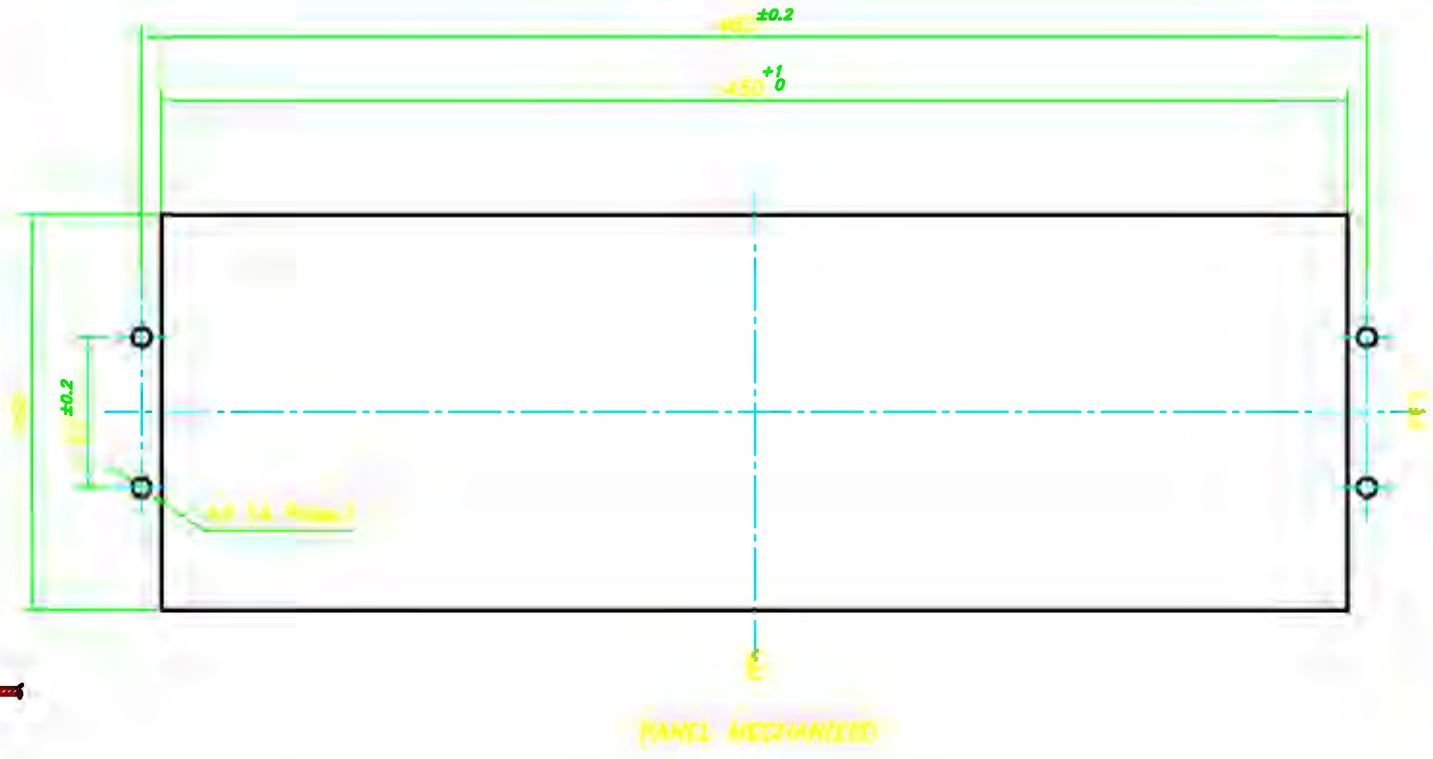
ISO 2768-c	TOLERANCIA DIMENSION LONGITUDINAL (mm)								TOLERANCIA DIMENSION ANGULAR				
	0,5-3	3-6	6-30	30-120	120-400	400-1000	1000-2000	2000-4000	0-10	10-50	50-120	120-400	>400
	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±1°30'	±1°	±0°30'	±0°15'	±0°5'

USB00000086_0700









TECHNICAL SPECIFICATION E-T1970.

DENOMINACION / DESCRIPTION: SICAS - EDINBURGH CENTRAL UNIT

SISTEMAS ELECTRONICOS DE POTENCIA, S.A.

EDIC. / ISSUE	MODIFICACION / MODIFICATION	FECHA / DATE	DIBUJADO / DRAWN	REVISADO / CHECK	APROBADO / APPROVED
A	Created drawing.	06-10-02	M.V.R.	M.B.A.	M.B.A.

MATERIAL / MATERIAL	ESCALA / SCALE	PESO / WEIGHT	ACOTACION EN mm / DIMENSIONS IN mm	Nº PLANO / DRAWING NR.	HOJA / SHEET	EDICION / ISSUE
	1:2			10448780-E	1/1	A

ISO 2768-c	TOLERANCIA DIMENSION LONGITUDINAL (mm)								TOLERANCIA DIMENSION ANGULAR				
	0,5–3	3–6	6–30	30–120	120–400	400–1000	1000–2000	2000–4000	0–10	10–50	50–120	120–400	>400
	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±1°30'	±1°	±0°30'	±0°15'	±0°

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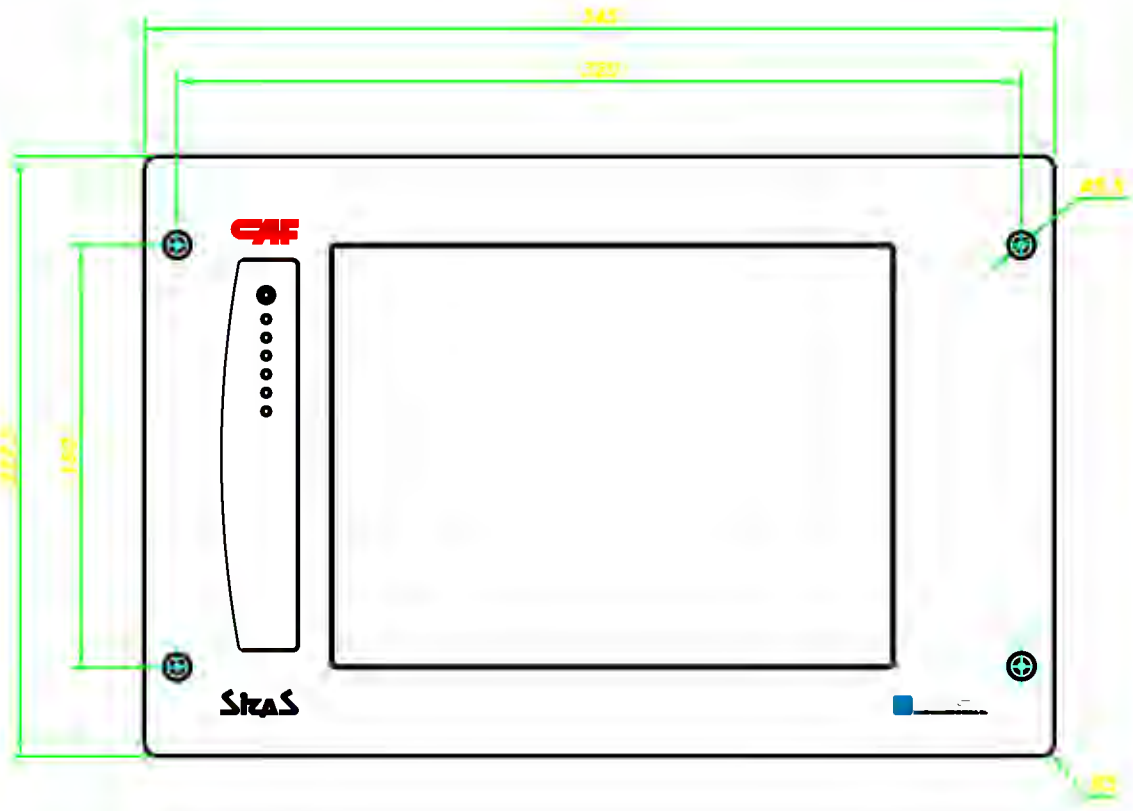

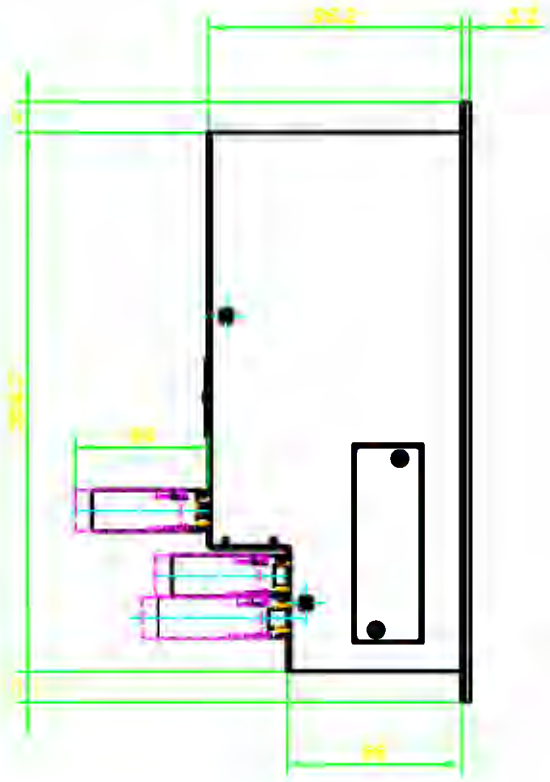

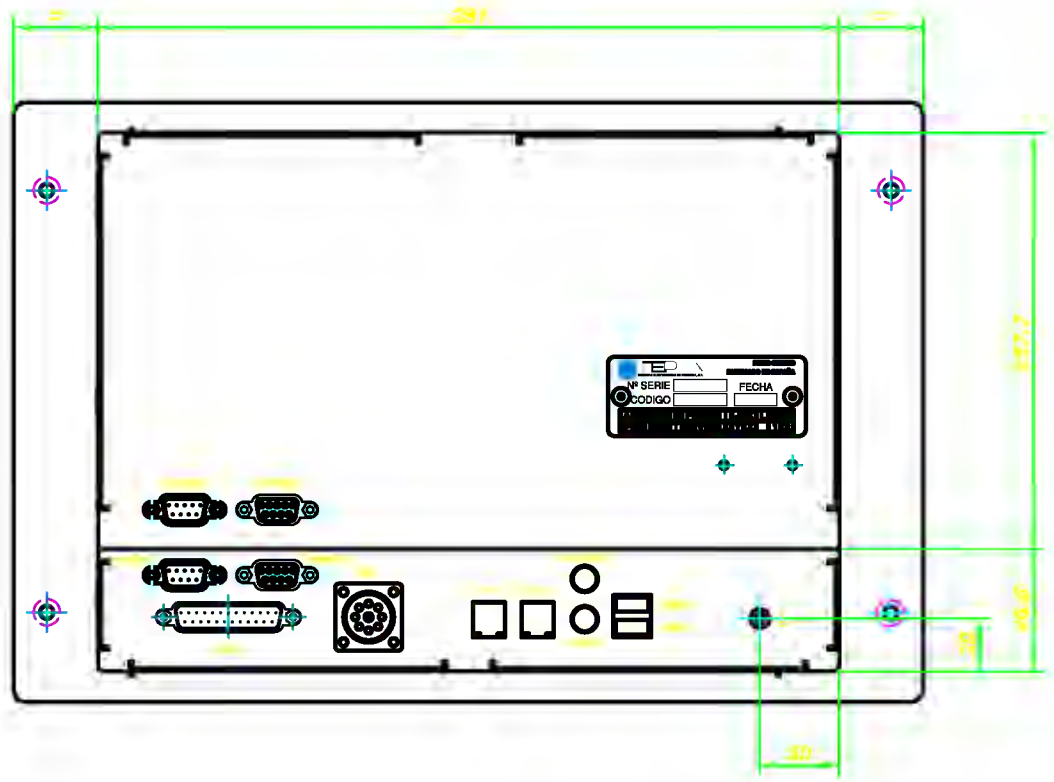

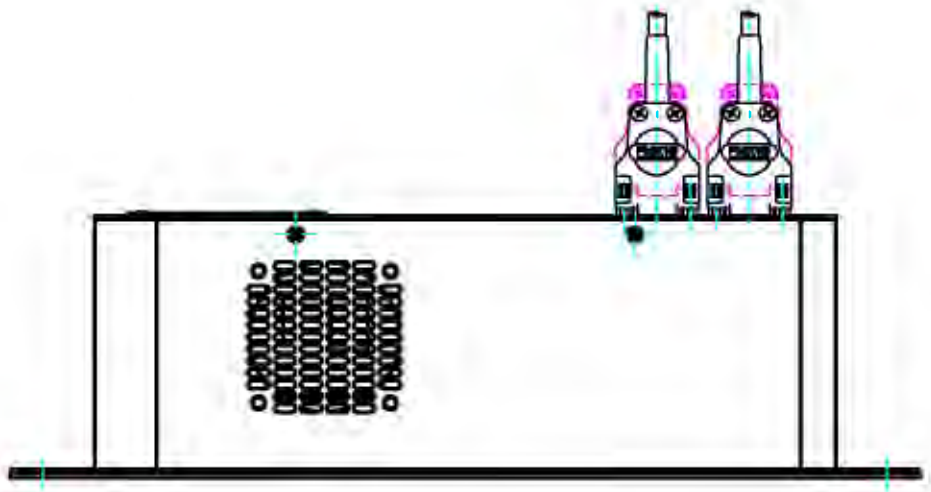

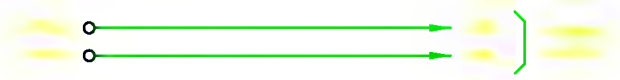

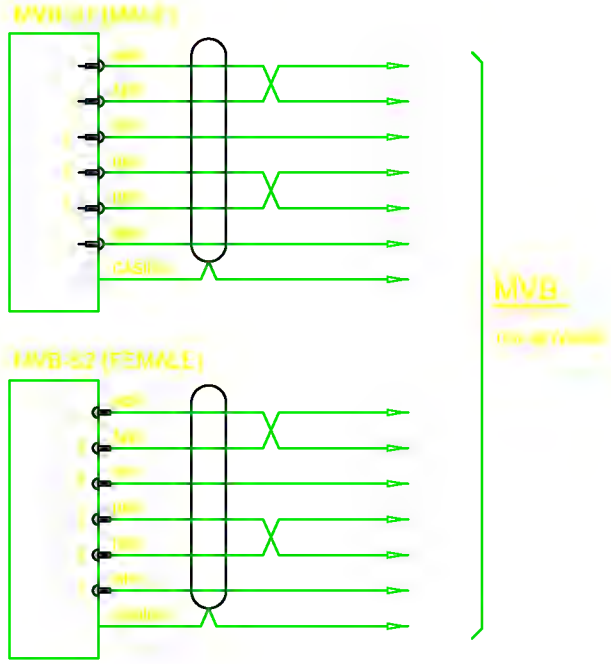

A	Created drawing.	06-10-02	M.V.R.	M.B.A.	M.B.A.	
EDIC. ISSUE	MODIFICACION MODIFICATION	FECHA DATE	DIBUJADO DRAWN	REVISADO CHECK	APROBADO APPROVED	

TECHNICAL SPECIFICATION E-T1970.

DENOMINACION DESCRIPTION: SICAS – EDINBURGH CAB TERMINAL -CT-

SISTEMAS ELECTRONICOS DE POTENCIA, S.A.

MATERIAL MATERIAL	ESCALA SCALE	PESO WEIGHT	DIMENSIONES EN mm ACOTACIONES EN mm	Nº PLANO DRAWING NR.	HOJA SHEET	EDICION ISSUE
	1:2	±5% 12,1 Lb.		5046825-E	1/1	A

DIN-A2

COSMOS

TECNICAL DESCRIPTION OF THE COSMOS SYSTEM FOR TRAM EDINBURGH

Code: CS.TRAM EDINBURGH.DT
Edition:00
Edition Date: 25.07.2007

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1 REVISIONS REGISTRATION

Edition	Comments	Edition Date
00	Draft Version	25.07.2007

Prepared by:	Reviewed by:
Nerea Arrillaga	
Date: 25.07.2007	Date:

USB00000086_0704

2 DEFINTIONS AND ABBREVIATIONS

COSMOS	Control and Supervision System of the Train
MVB	Multifunction Vehicle Bus
RENFE	Spanish Railway Network
TCN	Train Communication Network
WTB	Wired Train Bus

3 REFERENCES

[Ref. 1] IEC61375-1: Train Communication Network.

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4 INTRODUCTION

Cosmos is a modular system for control and supervision of the train based on the train communication network standard [Ref. 1]. All of its modules have been designed and manufactured to work within railway rolling material, complying with the present railway standard.

The system has three fundamental functions:

1. Management of the communication between the elements (modules) of a unit and in between units. The System gives access to a TCN communication channel and manages all the transmission data at the bus level for both the Vehicle Bus (MVB) and the Train Bus (WTB).
2. Interface with the train through the input/output channels and implementation of the train logic. The COSMOS System contains IO modules with digital and analogical Input/Ouput connections and RS485/422 serial communication access. These modules are distributed throughout the train to capture its status and behave in agreement with the programmed automatism logic or control units.
3. Supervision, monitoring and registration of the train behaviour. From the drivers terminal, not only it can be used to insert driving parameters and to configure the train, but also it can be used to see the status of the different elements of the train. The different errors and faults that could occurred during the function of the system will be registered and recorded, for the drivers or maintenance employees further supervision and required action.

The modularity and flexibility of the system allows to cover the different requirements of each specific application by changing the modules configuration, each of which are form by a small number of basic elements. The purpose of this document is to described the technical aspects of the COSMOS System for Tram Edinburgh.

5 SYSTEM TOPOLOGY AND FUNCTION

The network topology of the control and supervision system of Electric multiple unit N Zelanda units is shown in Figure 5.1. It shows a train unit of two cars, which can be attached to a second unit two form standard unit of Electric multiple unit N Zelanda.
The Cosmos System is composed of the following modules:

1. **MVB Bus Administrator Module: CCU/BA**

   In each unit there is the need to manage the data exchange between all the modules connected to the bus. This is the function assume by the bus administrator modules BA1 and BA2, as specified in Chapter 3 from [Ref. 1]. The two administrators are completely independent, that is, once the configuration tables are loaded they execute periodically the commands to send data through MVB. The configuration tables from the BA modules contain the parameters from all the data transmitted through MVB, whether this transmission is between modules from the Cosmos System or between other equipment also with attached to the bus. The configuration of the Bus Administrator module must be in coherence with the configuration of all of the modules and equipment connected to the bus. The bus administrator (BA) equipment is integrated with the Control unit (CCU).

2. **Train Control Module: CCU/BA**

   The CCU modules are in charge of executing the logic of the global functioning of the train, of managing the redundancies in the system, and what signals must be used in each moment. In each unit, the active CCU (one of the two available) will detect the drivers position (whether he is in the same unit or another one coupled) and filter the commands, for the purpose of sending to the other modules only those commands coming from the active cabine, and not from any other cabine. The CCU operating system allows the execution of the applications in real time. The applications can be programmed to be executed cyclically. In each case or particular application the number of cyclic tasks and its periods will be different.

   In every moment, there will be only one active CCU, while the other is in passive state, waiting to be ask to intervene.

3. Cabine Display: HMI

The cabins display delivers the human machine interface (HMI) of the system. It is the interface point with the driver, the maintenance personal and the staff in charge for the commissioning of the system. It permits to graphically visualize the different train states, as well as notifying the alarms that may occur. An equipment will be present in the two extreme cars of the unit.

In N Zelanda's train, the HMI equipment will also include the diagnosis and monitoring functionalities for the maintenance of the history log for events and alarms.

4. Input/Output Modules

These modules contain different number of digital and analogical channels for inputs and outputs, and a RS485/422 communication channel per module.

Figure 5.1 describes the bus topology used for each UT at the bus level (MVB), for both basic and redundant configuration.

The COSMOS modules configuration for each EMU unit is fixed, and identical for all the units.

5. Gateway Module: GW

This module manages the communication at the train bus level. When the system is power up the different gateways of the system communicate between each other to determine the present train configuration. This process is called "Train's Inauguration". Once this process is finished, one of the gateways becomes the master and takes control and manages the communication in the WTB as determine by the gateways configuration.

For this project, there are two gateway (GW) included in each unit for redundancy.

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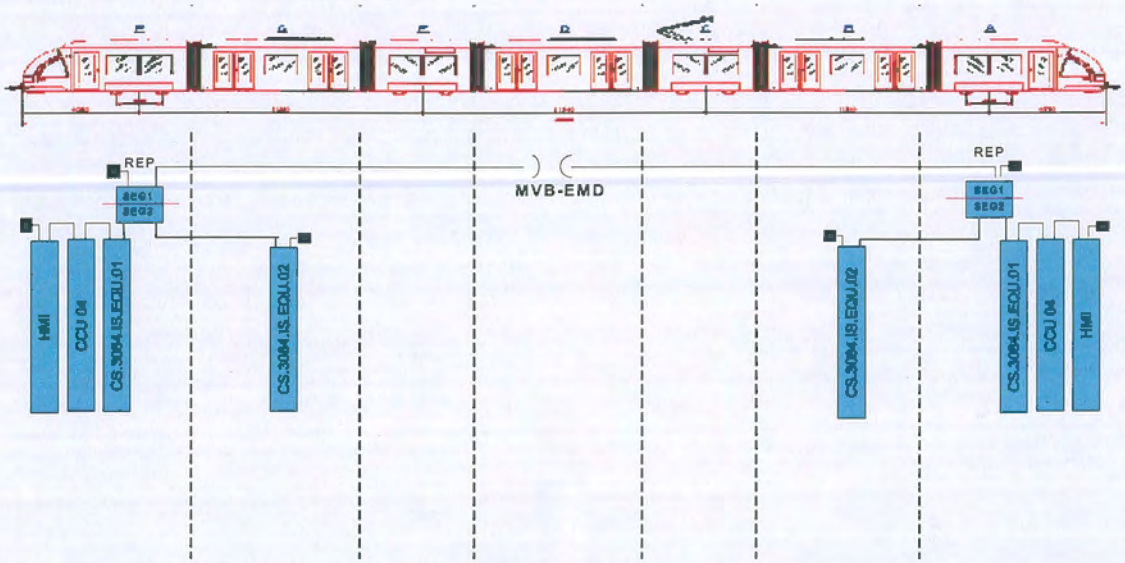

Cars A & F:
1 módulos CS.3084.IS.EQU.01 con: 4 DI, 6 DO, 1 AI, 2 RS485

Cars B & G:
1 módulo CS.3084.IS.EQU.02 con: 2 DI, 2 DO, 1 RS485

TRAM EDINBURGH

traintic
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Figure 5.1: COSMOS System of a two car unit configuration.

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6 TECHNICAL DESCRIPTION OF THE EQUIPMENT

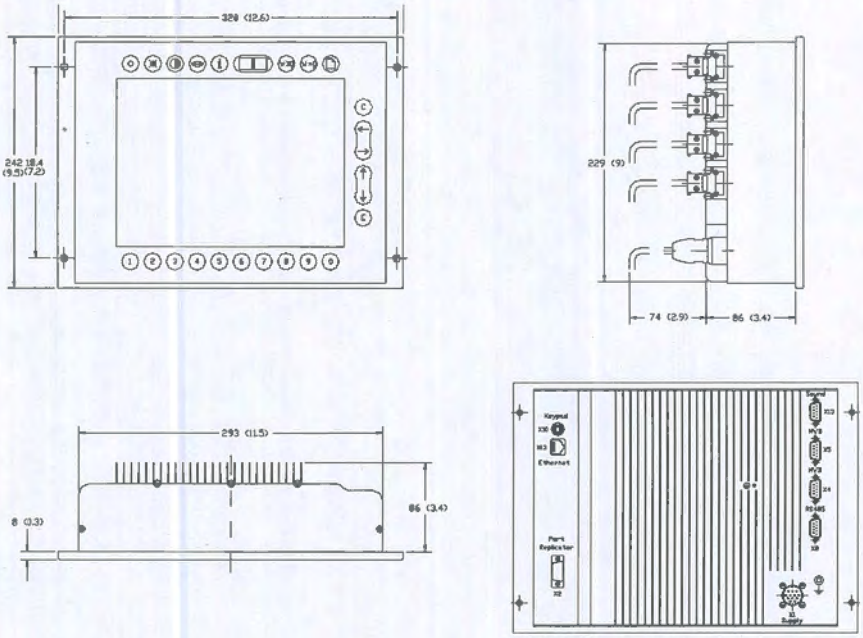
6.1 *COSMOS-IU.04*

- Main Technical Characteristics:

- Screen 10,4 " TFT-Color, VGA 640X480 resolution.
- Integrated keyboard supported
- 256 Mbyte RAM
- 128 Mbyte Flash
- 4 Mbyte graphic memory
- Equipment Design complying with EN50155
- Connection to the MVB in compliance with IEC61375-1
- Working Temperature: -25 a 75 ºC
- Power Consumption: < 30 W
- IP 67 (front)

- Approx. Mechanical Characteristics:

Height x Width x Depth: 227mm x 345mm x 118mm



- Interfaces: MVB, RS485, USB, Ethernet, Sound output

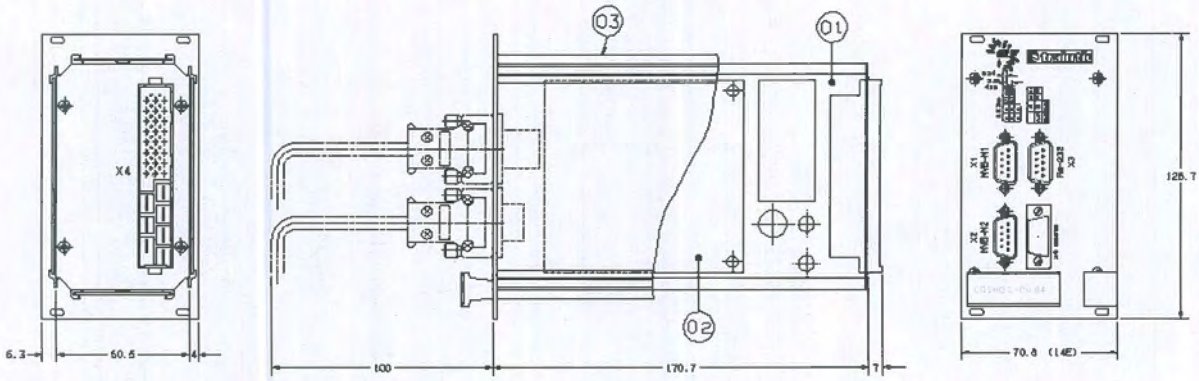
USB00000086_0710

6.2 COSMOS-CU.04

- Main Technical Characteristics:

- 2 Mbyte RAM
- 2 Mbyte Flash
- Composed of one configuration interface and two MVB connectors.
- Provided with LEDs to detect failures and maintenance helping
- Equipment Design complying with IEC 31375 and EN50155
- Working Temperature: -25 to 85 ºC
- Supply voltage : 24-110 VDC
- Power Consumption: < 3 W

- Mechanical Characteristics:



DIMENSIONS:

APROX. WEIGHT: 1 Kg.

USB00000086_0711

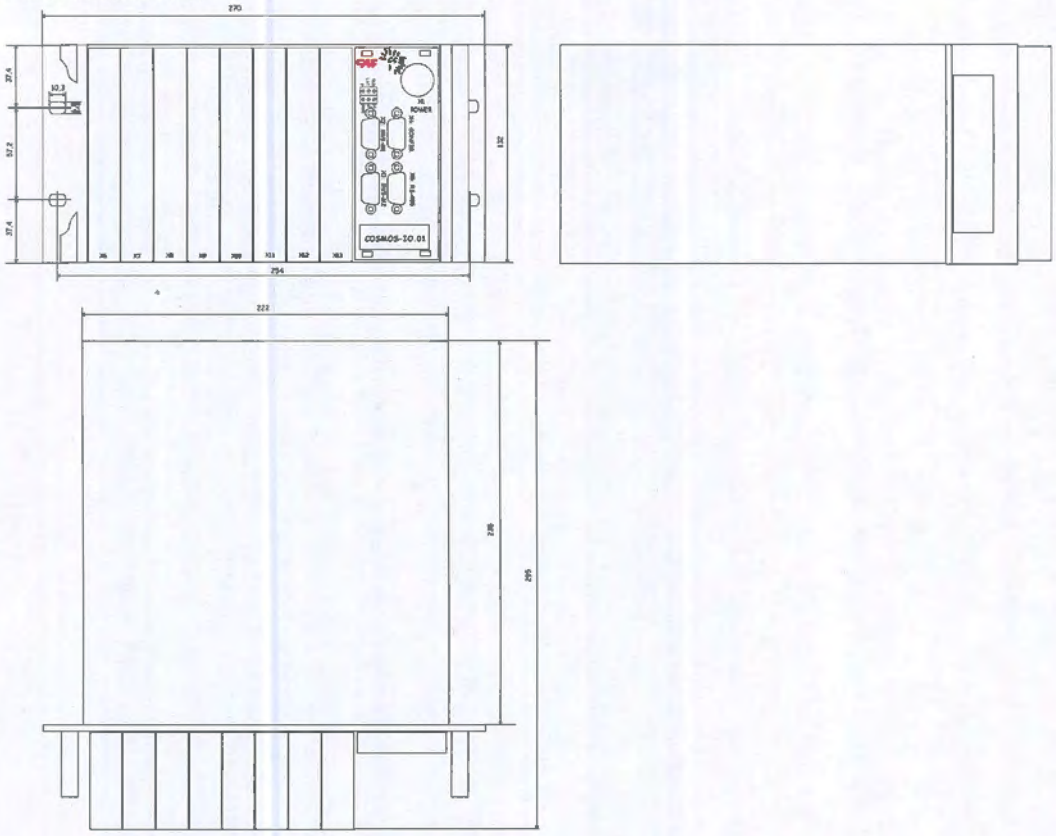
6.3 COSMOS-IO.02

- Main Technical Characteristics:

- IO Module with flexible configuration: cards for digital or analogical inputs/outputs.
- 1 RS485 connection per module COSMOS-IO
- Equipment designed in compliance with IEC 61375-1 and EN50155
- Class 2 module
- Working Temperature: -25 a 85 ºC
- Protected against over current, inverse polarity, over voltage, ...
- Automatic self-test of each input/output channel
- Possibility to access status of the device from all points connected to the MVB bus
- Digital outputs use MOSFET (longer life and better reliability than mechanical relays)

- Mechanical Characteristics:

DIMENSIONS:



APROX. WEIGHT:5 Kg.

USB00000086_0712

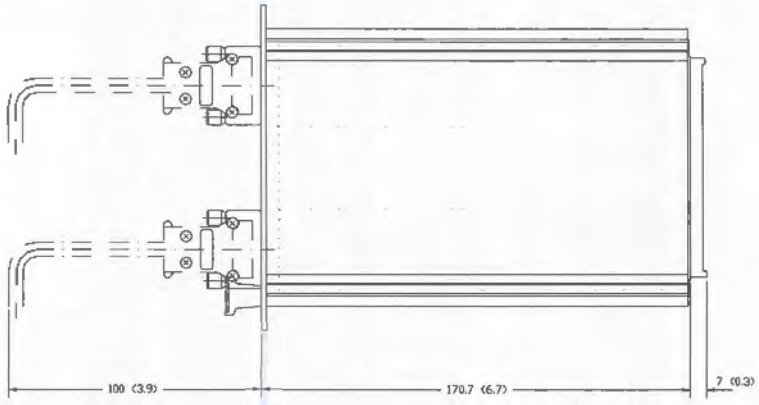
6.4 COSMOS-RP.02

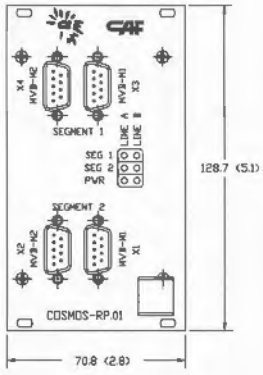
- Main Technical Characteristics:

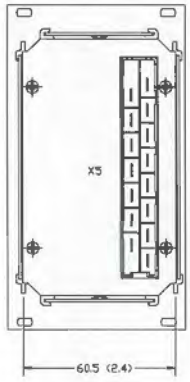
- 2 Channel repeater (A and B) completely independent
- Provided with two MVB connectors per channel.
- Equipment designed in compliance with IEC 61375-1 and EN50155
- Working Temperature: -25 a 85 ºC
- Supply Voltage: 24-110 VDC
- Power Consumption: 10W Max.

- Mechanical Characteristics:

DIMENSIONS:







APROX. WEIGHT: 1 Kg.

USB00000086_0713

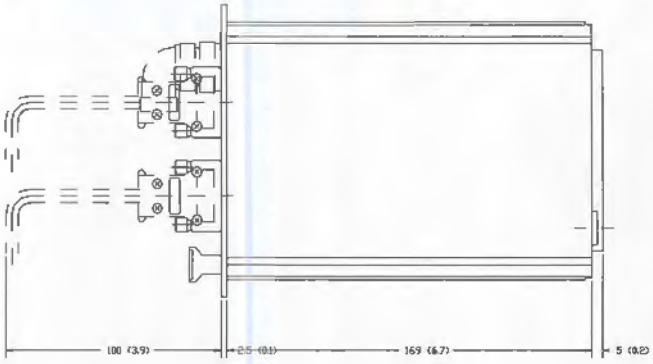
6.5 COSMOS-GW.02

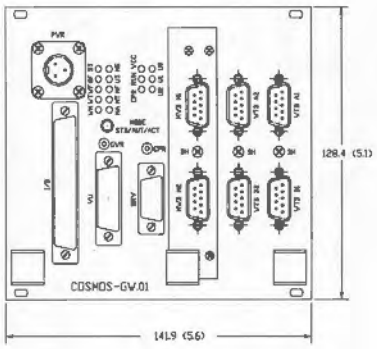
- Main technical characteristics:

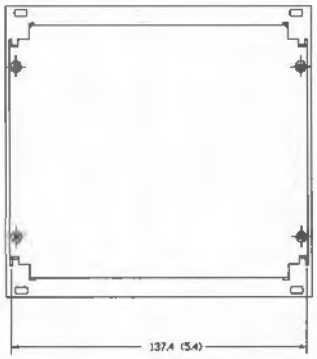
- It's provided with a configuration interface.
- It has 2 WTB connectors and 1 MVB connector per segment.
- Provided with LEDs to detect failures and maintenance helping
- Equipment Design in compliance with IEC 61375-1,UIC 556 and EN50155
- Working Temperature: -25 a 85 ºC
- Supply Voltage:24- 110 VDC
- Power Consumption: 20 W Máx.

- Mechanical Characteristics:

DIMENSIONS:







APROX. WEIGHT: 2 Kg.

USB00000086_0714

7 REDUNDANCY

The COSMOS system posses different levels of redundancy as define by the TCN normative [ref.1].

1) Line Redundancy (MVB bus).
2) Device Redundancy. The following redundant devices are independently power:
    a. Control Unit Function Module (CCU): a strategy is implemented so that both redundant modules, in a specific moment in time, can agree upon who will take the role to execute the active and passive task. Therefore, the active role will execute those tasks related to the train's control logic, while the CCU with the passive role stays on hold.
    b. Bus Administrator Function Module (BA): In each specific moment in time, one of the bus administrators will govern the communication in the MVB bus. Periodically, or in case of failure of the active administrator, the other will take the active role.
    c. Input/Output Function Module (IO): Each of the input and output channels can be made redundant. When the modules are configured, the redundant strategy to be followed must be decided for each input/output and it is treated automatically by software in accordance with certain criteria.
3) Data Redundancy: Different strategies can be followed by the equipment accessing to the data, in order to make decisions that allow differentiating among the redundant data transmitted through the bus, and take the most appropriate one at each moment in time.

USB00000086_0715

TECHNICAL SPECIFICATION OF THE EVENT RECORDER, DRIVER'S SAFETY DEVICE AND SPEEDOMETER

Prepared by:
Name: Sergio Gascón
Date: 13/03/08

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1. OBJECT

[1.1] This Technical Specification defines the functional and technical requirements of the Event Recorder, Driver's Safety Device and Speedometer for Edinburgh Tram.

2. GENERAL TECHNICAL DESCRIPTION OF THE SYSTEM

[2.1] The System is made up of the following equipment:

a) One Event Recorder Central per tram, including Driver's Safety Device.

b) Two Speedometer per tram (one at each cab).

c) One odometer calibrated in km.

d) Software to download, display and analyzed the registered data.

3. EVENT RECORDER CENTRAL

[3.1] One cab of the Tram will be equipped with a Event Recorder Central.

[3.2] The Recorder Unit is the main element in the System and is responsible to managing and controlling the rest of the System's equipment, carrying out tasks of recording.

[3.3] The most important functions of the System are:

- Measurement of the speed and the distance covered by the train.
- Direct capture of the discrete and analogue variables through physical inputs.
- Capture of discrete and analogue variables through serial data MVB communications.
- Supervision of speed levels and activation of the corresponding relay outputs.
- Chronological register of events, speeds, distance, and time.
- Analysis and display of the recorded events.
- Configuration of functional parameters.
- Speedometer and Odometer control
- Self-check of operation.
- Real-time clock for the rest of the equipment.

[3.4] The System will register the following Tram configuration parameters:

- Tram number
- Line
- Driver identification
- Wheel diameter

[3.5] The System will register the following operation dates:

- Driver's Safety Device signals.
- Event Recorder failure.

- Driver's Safety Device failure.
- Driver's Safety Device by-pass.
- Distance
- Speed
- Date and time.

[3.6] Additionally, the start and end of the following events will be recorded at least: horn, bell, traction, brake, hazard brake, safety brake, track brake, door enable left present, door enable right present, manual sand command present, tram ready to start, hazard lights, left indicator, right indicator and passenger help point.

[3.7] The distance covered will be calculated based on the number of pulses received from the tachometer generators and the previously-configured wheel diameter and pulses per turn parameters.

[3.8] The Event Recorder Central is capable of providing time, speed and distance information at 1.0 m resolution for the last day's operations, and at 10.0 m resolution for the last seven day's operations.

[3.9] The speed will be calculated based on the distance covered and a precise internal time base (internal clock) and will be sent via MVB.

[3.10] The System will monitor the integrity of the signals received from the tachometer generators and will take advantage of their redundancy to obtain increased availability in case of failure.

[3.11] The Event Recorder Central will have 5 relays to define different speed levels.

[3.12] The System also includes the PC programs that allow the analysis, screen display and printing of recorded data.

[3.13] The software also enable all of the data to be exported into Microsoft Excel for further analysis.

[3.14] The Recorder Unit will provide the physical means in order to connect the System to the MVB bus of the train.

[3.15] The System will be capable of exchanging data via serial connection with other systems through the MVB bus.

[3.16] The Event Recorder Unit will allow the register to be extracted which a Laptop.

[3.17] The data to be exchanged over the MVB ports may include: discrete variables, analogue variables, driving parameters, and configuration parameters.

Driver's Safety Device

[3.18] The Event Recorder Central contains a Driver's Safety Device.

[3.19] The purpose of the Driver's Safety Device is to supervise the actions that the driver carries out in the traction unit, ensuring ideal vehicle control and conditions. In cases in which the driver does not carry out the necessary actions on the System, the Driver's Safety Device system will activate an emergency braking process.

[3.20] The driver's attention is monitored by activating/deactivating the button placed at the master controller. In this way it is possible to control the tram if the driver dies or falls asleep.

[3.21] The function carried out by the Driver's Safety Device system is called "Double Effect". The driver's attention is determined by the failure to press, or over pressing the corresponding cab control. It may comply with the UIC-641.

[3.22] When the system does not receive inputs during the time periods indicated, it begins an automatic

action. This consists of the activation in order of system outputs to alert the driver of a possible reduction in the level of alertness, and if the driver does not respond, the emergency braking of the train unit is triggered.

[3.23] There is an input allowing for the device to be cancelled in case that a system failure. This cancellation input and the failure output are sent to the recording equipment to be recorded.

Removable Recorder Module (MRE)

[3.24] This System will be equipped with a 32 MB non-volatile crash-protected memory.

[3.25] The data will be retained and be retrievable at least until 48 hours, after the Tram has been shut down.

[3.26] The Register will have a ring structure, overwriting the oldest information when the maximum size is reached.

[3.27] The removable recorder module will have a security locking device, that is not released by a Tram system key.

[3.28] All removable recorder module will be interchangeable between trams.

[3.29] The lack of the removable memory will be indicated as a failure.

4. SPEEDOMETER AND ODOMETER

[4.1] Each cab will be equipped with a Speedometer.

[4.2] The Speedometer acts as the System's main man-machine interface.

[4.3] The speedometer will have two different scales, calibrated in km/h and mph.

[4.4] The speedometer will have a indicator to signal a 90% occupancy of the memory.

[4.5] The speed and distance measurements will have a precision better than 1 % and a resolution of 1 m.

[4.6] The will be and odometer with 1 m resolution and with the displaying capacity up to 9.999.999 km by means of 7 digit display (1 km resolution).

5. STANDARDS

[5.1] The System will comply with the following standards:

EN 50121	Railway applications – Electromagnetic compatibility. Sep. 2000.
EN 50126	Railway applications – The specification and demostration of Reliability, Maintainability, and Safety.
EN 50128	Railway applications. Communications, signalling and processing system. Software for railway control protection systems.
EN 50129	Railway applications. Communications, signalling and processing systems. Safety related electronic systems for signalling.
EN 50155	Railway applications – Electric Equipment used on Rolling Stock
IEC 61373	Railway applications – Rolling Stock Equipment – Shock and Vibration Tests.

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CONSTRUCCIONES Y AUXILIAR
DE FERROCARRILES S.A

TECHNICAL SPECIFICATION OF CCTV

Prepared by:
Name: Olga Sisamón
Date: 13/03/08

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1. OBJECT

[1.1] This Technical Specification defines the functional and technical requirements of the CCTV for Edinburgh Tram.

2. GENERAL DESCRIPTION

[2.1] The **technical purposes** of the system shall be:

- Cab display of the images captured by the rear view cameras located on both sides of the driver cabs (Rear View System).
- To record the images captured by the interior and front cameras of each driver cab (Video Surveillance System).

[2.2] The system shall at least consist of the following items:

- One (1) Recording/Control Central Unit per Tram.
- Eight (8) Interior Cameras.
- Two (2) Front Cameras.
- Four (4) Rear View Cameras.
- Four (4) Cab Terminals.

3. GENERAL DESCRIPTION OF THE REAR VIEW SYSTEM

[3.1] The Rear View System of the Tram shall be based on a closed circuit television.

[3.2] The four (4) rear view cameras shall be installed on each side of both cabs, and these shall capture the images of the Tram sides and surroundings, serving as rear view mirrors.

[3.3] Two Terminals shall be fitted in each cab where the images captured by the rear view cameras shall be displayed, according to the operation mode selected at each moment.

[3.4] One Terminal shall be fitted on the right hand side of the driver desk and the other on the left hand side.

[3.5] The terminals screen shall be flat and large enough to provide for the correct operation of the Rear view system.

[3.6] The images displayed on the terminals shall be in colour.

[3.7] The terminal brightness shall be adjusted manually.

[3.8] The images displayed on the cab terminals must be visible to the driver, under all cab lighting conditions.

[3.9] The images must be clear enough to see a cyclist overtaking the tram, both in movement and at a standstill (at traffic lights, stops, etc...).

[3.10] The images shall be visible, regardless of the outside conditions (rain, dark, street lights, car lights in the rear view cameras, brught lights reflecting on damp or wet surfaces, etc...)

[3.11] The system shall cover the greatest angle of visibility possible.

[3.12] The system shall be prepared to deal with additional reflection generated on wet asphalted surfaces and the possible accumulation of rain water on the camera casings.

4. FUNCTIONAL CHARACTERISTICS OF THE REAR VIEW SYSTEM

[4.1] The rear view mirror shall have two operation modes:

- Normal.
- Stop.

[4.2] The Normal mode shall be automatically selected whenever the Train is in motion.

[4.3] In Normal mode, each cab terminal shall display the images captured by the rear view camera adjacent to the driver cab, as if looking through a rear view mirror. The right hand terminal shall display the images captured by the right camera and the left terminal those captured by the left camera. The images shall be laterally inverted for the “rear view mirror” effect.

[4.4] The Stop mode shall be automatically selected when the doors are enabled at the stop and until all the doors are closed.

[4.5] In Stop mode, the enabled side cab terminal shall display the same images as in Normal mode. The other terminal shall display the images of the rear view camera of the tail end cab enabled side (with no lateral inversion of the image). In this way, the driver can see the passengers boarding and alighting all the way along the Tram.

[4.6] The desk shall be fitted with an unlocked button to change from Stop to Normal mode when the button is activated. This shall allow the driver to ensure that nothing overtakes the Train whilst at the stop when the doors are closing.

5. GENERAL DESCRIPTION OF THE VIDEO SURVEILLANCE SYSTEM

[5.1] At least the eight (8) interior cameras shall be fitted inside the Tram so that there are images of the whole inside of the Tram, including the passenger assistance points, with adequate clarity and probative value for the identification of individuals.

[5.2] There shall be two (2) front cameras in the Tram cabs to provide images of the front/rear view from the cabs.

[5.3] The images captured by the front and interior cameras shall be recorded in the Control/Recording Unit.

[5.4] The Control/Recording Unit shall have a recording capacity to guarantee the images for at least the last 72 hours.

[5.5] The recorded images can be extracted from the Tram for analysis and conservation. For this reason, it is preferable that removable image storage hard drive be used.

[5.6] If the image storage hard drive is not on the Tram, this situation shall be clearly indicated to the driver and the maintenance personnel.

[5.7] The storage hard drive can only be removed using a security key, different to the Tram key system.

[5.8] All software (licences included) required to view, edit and analyse the images off the Tram, shall be included in the scope of supply of the system.

[5.9] All non-standard software (licences included) required to view, edit and analyse the images off the Tram, shall be included in the scope of supply of the system.

[5.10] As an option, the images relating to the Trams rear view system could be recorded.

6. FUNCTIONAL CHARACTERISTICS OF THE VIDEO SURVEILLANCE SYSTEM

[6.1] Each captured image shall at least be recorded with the following additional information:

- Time.
- Date.
- Camera number.
- Tram Number.

[6.2] Images shall be recorded in a loop. When the hard drive is full, the first images recorded shall be overwritten.

[6.3] The recording speed and resolution of the images captured by the interior and front cameras shall ensure that they can be used reliably as part of accident investigations.

[6.4] Regarding the images captured by saloon cameras, it shall be guaranteed that these can be used as proof for conviction should any illegal activity occur on the Tram.

[6.5] The minimum recording speed per camera shall be 16 fps.

[6.6] The front cameras allow the Tram to be reversed.

[6.7] The driver desk shall be equipped with a button that shall allow the driver to insert a quick search time line in the recorded images.

[6.8] The system shall be capable of processing digital alarm signals (passenger alarm, emergency handle, smoke detector, temperature sensor, selection by the driver, etc...).

[6.9] When a digital alarm signal is activated, the system shall display the camera images that best show the position of the activated alarm on a full screen on the enabled cab terminals.

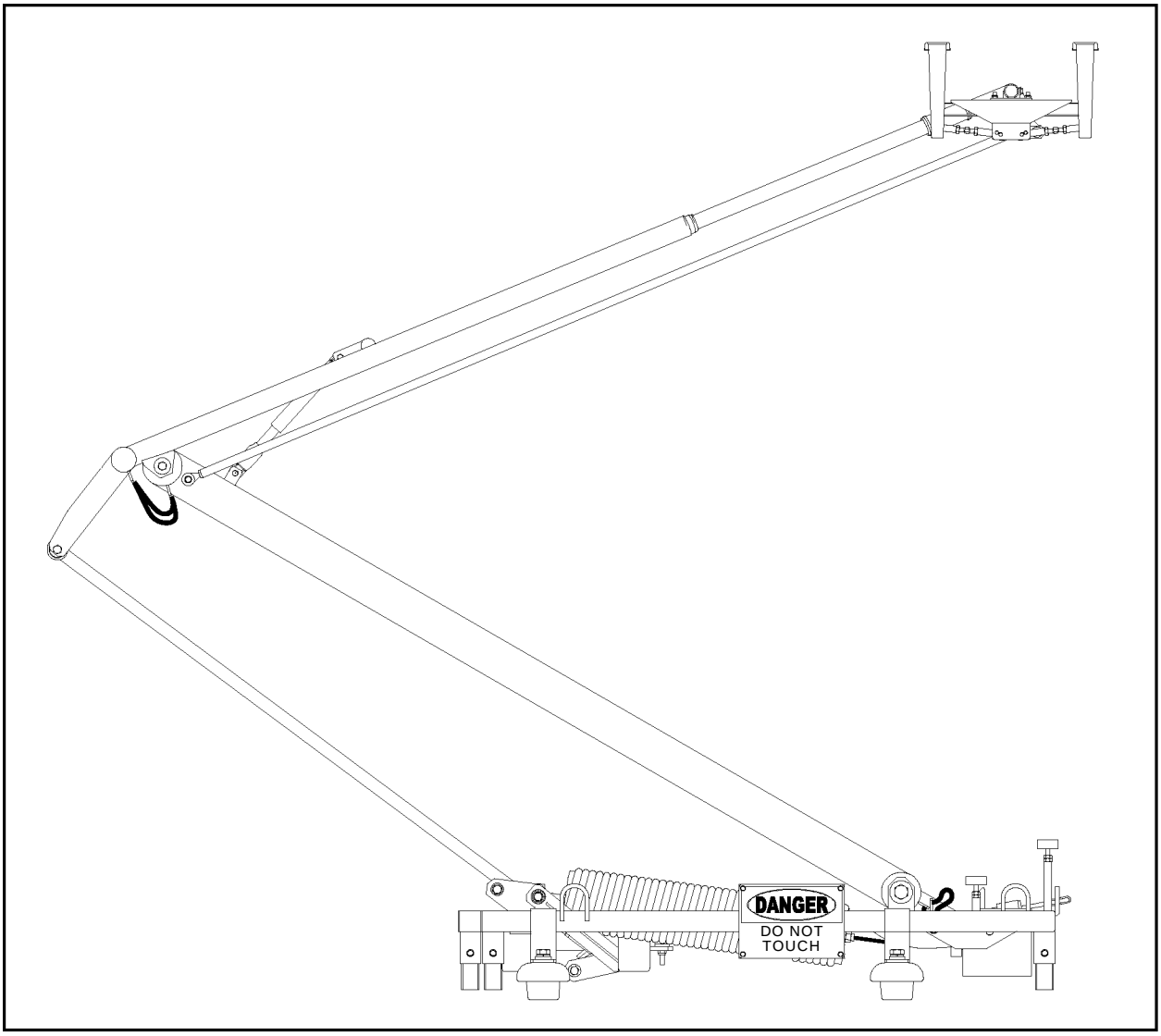
[6.10] If a digital alarm signal is activated, the system can change the recording speed automatically.

[6.11] The alarm images shall be recorded permanently on an area of the image storage hard drive, until they are deleted on command.

[6.12] The images can also be extracted via data transfer, without having to remove the image storage hard drive.

[6.13] There shall be an interface between the Video Surveillance / Rear View System and the Entertainment Video system which shall permit the selected images of the Video Surveillance / Rear View System to be displayed on the Tram Interior screens.

WBR PANTOGRAPH
Maintenance Manual
Los Angeles Light Rail Vehicle



SAFETY SUMMARY

WARNING: An operation or maintenance procedure, practice, condition, statement, etc., which if not strictly observed, could result in injury to or death of personnel.

CAUTION: An operation or maintenance procedure, practice, condition, statement, etc., which if not strictly observed, could result in damage to, or destruction of equipment, or loss of its effectiveness.

WARNING

Operating voltage and current in systems employing the pantograph are high enough to be lethal. Do not touch or even approach any part of the pantograph while the carbon strips are in contact with the overhead wire. Switch off the catenary before performing any maintenance on the pantograph.

Before working on a pantograph that is equipped with a safety system, always install the yellow safety pin. Leaning on the upper or lower frame or applying downward force in some other way could cause the shear pin to break. The pantograph would then collapse, injuring anyone who has a limb or other body part within the envelope of the pantograph.

To remove safety pin, reach under pantograph, keeping remainder of your body outside the envelope of the pantograph. The safety pin should be loose in hole. Do not force safety pin from hole. A tight safety pin could indicate that the shear pin is fractured, causing pantograph to collapse when safety pin is removed.

Attach an appropriate warning tag to the pantograph up/down switch in the cab if service work is to be performed on a pantograph. Unexpected lowering or raising of the pantograph while performing service work could cause serious injury.

CAUTION

Lift the pantograph only by the lifting lugs located on the base frame. Attempting to lift the pantograph at any other point could cause structural damage. Secure the latch down hook to the latch keeper on the upper frame with wire or rope to prevent accidental raising during lifting or moving.

The lowering cylinder must be extended before raising the pantograph. If the pantograph is allowed to be raised, without the air cylinder extended to restrict the speed, the spring force plus the raising inertia of the pantograph could cause damage or injury. To prevent this the air cylinder should be extended either by a "down" command from the vehicle controls or if air is not available by the manual reset lever

provided on the pantograph. When using the reset lever it should be pulled at a slow steady rate. Excessive force on the lever will not cause the air cylinder to extend faster and will only cause damage to the lever and it's linkage. By design the hydraulic system will only operate at a steady rate regardless of the force exerted.

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Insert latest changed pages and destroy superseded pages.

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1.0 GENERAL INFORMATION

This maintenance manual is designed specifically to cover the single arm Pantograph, Part Number 351-05701, designed by Schunk Bahntechnik Ges.mbH, manufactured by UKM Co., Inc., Kulpsville, PA 19443.

The pantograph is designed for mounting on the roof of a locomotive or other electrically powered vehicle. Its function is to collect current from an overhead conductor wire and feed the current into the vehicle for distribution to the drive motors, utility circuits, and the environmental systems associated with the vehicle. The pantograph design allows travel in either direction.

Relative to its light weight, the pantograph is very durable and possesses a high current carrying capability. Its simple design means that the pantograph requires a minimum of periodic maintenance and few repairs in normal use. Incorporation of proven bearing technology and patented hydraulic damper are important factors in the low maintenance design.

1.1 How To Use Manual

To repair the Pantograph properly, a knowledge of the components, and how they are assembled is necessary. This manual is divided into chapters covering Functional Description, Installation, Scheduled Maintenance, Troubleshooting, Adjustments, and Overhaul and Repair.

The parts lists in this manual are represented in a breakdown format with major assemblies identified first followed by its attached subassemblies and detail parts. Assembly relationship is indicated by using an indenture system. The indenture system is illustrated as follows:

Section-Figure-Index	QTY	Description 1 2 3 4 5
		Major Assemblies
		• Attached Sub Assembly
		• • Detail Parts of Sub Assembly
		• Detail Parts of Major Assemblies

Table 1.0-1: Specifications

Minimum height with insulators	426 + 20 mm (16.77 + 0.8 in.)
Minimum working height	635 mm (25 in.)
Maximum working height	3800 mm (149.61 in.)
Pan head width	1981.2 mm (12 ft, 5.60 in.)
Maximum length in lowered position	2757 mm (9 ft 1in.)
Total weight	247 kg (545 lb)
Carbon strips	
Length	1371.6 mm (54.00 in.)
Material	Metalized graphite-carbon
Voltage	
Minimum	525 VDC
Nominal	750 VDC
Maximum	950 VDC
Current	
Running (maximum)	1200 A
Peak	1800 A
Static upward force on carbon strips	70 N ± 10 N (15.5 lb ± 2.25 lb)
Maximum operating speed	80 - 100 km/h (50 - 62 mph)
Type	Air
Lowering time	5 - 7 seconds
Rising time	5 - 7 seconds

2.0 FUNCTIONAL DESCRIPTION

The following paragraphs describe the function and operation of the component assemblies that comprise the pantograph.

2.1 Base Frame Assembly

The base frame provides the means of mounting the pantograph to the top of the vehicle, as well as the support for the pantograph. It is a welded structure, consisting of two longitudinal bars and two transverse bars.

The bearing assemblies that support the lower frame pivots are located in mounting blocks on either longitudinal bar. These bearings (two on each side) are retained in the mounting blocks using snap rings. A cap screw extends through the bearing mounting shaft on each side, and threads into the end of the lower frame main shaft, thus supporting the lower frame main shaft and effectively locking it to the bearings.

The base frame also provides the anchor points for the raising springs, lowering cylinder, and rubber stops which the pantograph lower and upper frames rest on when in the lowered position.

2.2 Raising Springs

The raising springs are anchored to the base frame and are connected to pivot brackets on the lower frame through lengths of steel cable.

The raising springs are extension type springs, which are pulled into their extended positions as the pantograph is lowered by the lowering cylinder. When the latch is released, the springs raise the pantograph. As the springs compress, they pull on the steel cables and cause the lower frame to pivot upward.

The compressing force of the raising springs is adjustable. The amount of spring compression determines the force of contact between the pan head carbon strips and the overhead wire.

2.3 Air System

The air system provides means to lower, latch, and raise the pantograph. An air cylinder, tandem mounted with a hydraulic cylinder for speed control, is used to lower the pantograph. The two cylinders are mounted in line with their piston rods attached together. The hydraulic cylinder is filled with aircraft hydraulic fluid. The front and rear ports are connected together through two flow control valves working in opposite directions. During operation fluid is displaced from one end of the cylinder to the other through these valves. One providing speed control in the raising direction and the other in the lowering direction. By adjusting the flow of these valves separate speed control is possible for each direction to any speed desired.

A latch mechanism mounted to the base frame is used to secure the pantograph in the lowered position. The upper frame has a latch keeper which strikes the latch hook when the

pantograph is lowered. The hook is spring loaded and retracts over the keeper. To raise the pantograph an air cylinder is used to unlatch the hook. If there is no air supply the latch mechanism has a manual override. Attached to the hook is a loop that can be pulled with an insulated pole to unlatch the pantograph.

When raising the pantograph the air cylinder is also used to control the raising speed. As the lower frame rotates upwards it pushes on the air cylinder forcing it to retract. The retraction speed it restricted by the controlled flow of the hydraulic cylinder flow control valves. In the event that the air cylinder is not extended and the pantograph needs to be raised, a manual reset lever is mounted to the base frame. This lever connects to the air cylinder through a linkage. Pulling the lever at a slow steady rate will extend the cylinder. **Excessive force on the lever will not cause the air cylinder to extend faster and will only cause damage to the lever and it's linkage. By design the hydraulic system will only operate at a steady rate regardless of the force exerted.**

2.4 Lower Frame Assembly

The lower frame assembly is a welded tubular structure which is bearing mounted to the base frame. The top end of the lower frame is joined to the upper frame using bearings in an identical configuration as which the bottom end of the lower frame is mounted to the base frame. Provisions are also made to attach the hydraulic damper and pan guide rod.

2.5 Upper Frame Assembly

The upper frame assembly is also a welded tubular structure. It is attached to the top end of the lower frame. The pan head is mounted on the upper end of the upper frame. The hydraulic damper is connected between points on the upper and lower frames.

As the raising springs pull the lower frame upward, the upper frame assembly is pivoted upward simultaneously through the action of an adjustable coupling rod assembly. Refer to the following paragraph for a description of the coupling rod assembly.

2.6 Coupling Rod Assembly

The function of the coupling rod assembly is to cause the upper frame to pivot upward as the raising springs pull the lower frame assembly upward. On pantographs equipped with the safety system, the coupling rod assembly is also used to transmit the breakdown force from the upper frame to the breakdown safety device.

The coupling rod is mounted on each end using a double bearing arrangement similar to the one used to mount both ends of the lower frame. The yokes at each end of the coupling rod are held in place by a cap screw and nut. The bearings are retained in the coupling rod yokes by snap rings.

2.7 Pan Head Assembly

The pan (pantograph) head is attached to the top end of the upper frame. It includes the carbon strips and the suspension components that support the carbon strips and keep them in proper alignment with the overhead wire.

The pan head assembly pivots around a shaft (spindle) that is secured to the inside of the upper frame cross member by two keys.

Each carbon collector includes a metal impregnated graphite/carbon contact strip. The carbon strip is soldered to the carrier.

The carbon strips are suspended on each end by flat leaf springs. By attaching the leaf springs solidly in the center, the ends can flex independently and the actual effect of independent suspension is achieved. The ends of the leaf springs are joined to the carbon strip assemblies through clamps that are attached solidly to the ends of the leaf springs and are allowed to pivot around a hollow pin as the associated carbon strip assembly moves up and down.

The pan head horns are aluminum carriers which extend beyond the carbons on both sides of the pantograph. Their purpose is to conduct current from an overhead wire that is excessively non-centered over the car, and to prevent damage from the wire becoming caught under the pan head.

2.8 Pan Guide

The pan guide rod keeps the pan head parallel with the overhead wire. It is attached to a lever that is secured to one of the rocker suspensions that support the pan head suspensions. When properly adjusted, this rod will keep the pan head parallel during all movements.

2.9 Oscillation Damper

The oscillation damper is connected between the upper and lower frames. Its function is to dampen all oscillations that occur as the vehicle moves down the track. By absorbing these oscillations, the damper allows the carbon strips to maintain constant contact with the overhead wire.

2.10 Safety System

The safety device is designed to prevent severe damage to the pantograph or the overhead wire system as a result of extreme contact between the pan head and an overhead obstruction. If sufficient force should result from such contact, the force is transmitted through the coupling rod and into the safety system where a shear pin will break, by design. The safety system will activate, releasing tension from one spring, and the pantograph will collapse to its lowered position.

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3.0 SPECIAL TOOLS AND MATERIALS

With the exception of the spanner wrench, no special tools are required to assemble the pantograph. All hardware used on the pantograph is metric DIN standard. Air and hydraulic fittings are U.S. inch size.

3.1 Spanner Wrench

The spanner wrench (UKM #351-05990) is used to secure the raising springs from rotating when turning the adjustment bolts. Each of the spring caps have two holes to accept the prongs of the spanner wrench.

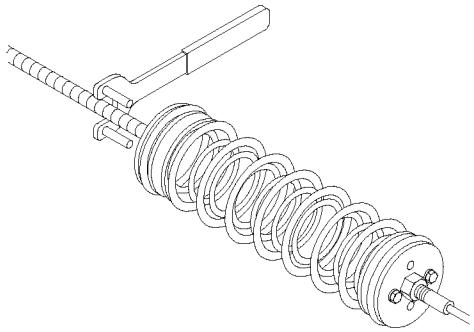

Figure 3.1-1: Spanner Wrench

WARNING

Do not use your hand to prevent the spring from rotating. As the spring contracts your fingers could get pinched between the coils.

3.2 KM 11 Gauge

The contact pressure of the pantograph, in its entire range of operation, is an important parameter, which has a direct effect on the life of the carbon strips and in particular the catenary. The KM 11 Gauge has been designed to measure the static force of pantographs,

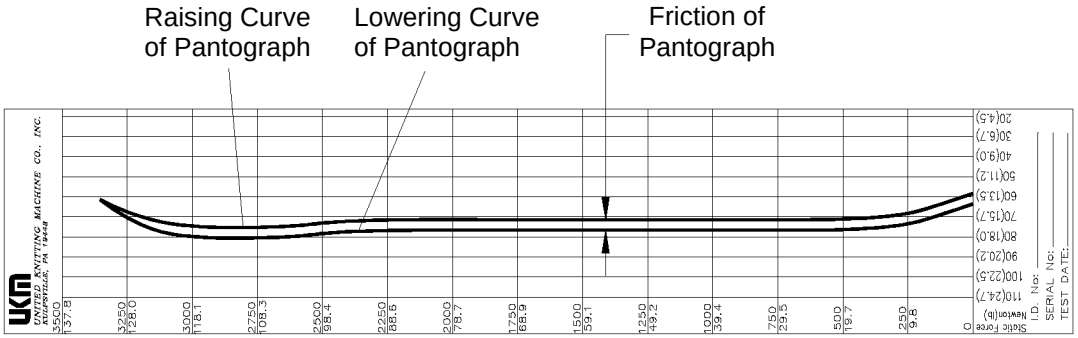

Figure 3.2-1: Static Force Chart

recording the upward force over the whole raising height during both raising and lowering of the pantograph. The Gauge can be used either stationary or as a mobile unit.

3.3 Grease

Only the use of *AUTOL-TOP 2000* grease (referred to as *Top 2000* grease throughout this manual) is recommended. It can be supplied through UKM Co., Inc. It is a high quality synthetic waterproof grease that is used in underwater applications. This grease only needs to be applied when the pantograph is assembled and will not need to be reapplied until the next overhaul of the pantograph.

3.4 Electrical Contact Grease

The use of NOALOX®, manufactured by IDEAL INDUSTRIES, INC., Sycamore, IL 60178, (referred to as *electrical contact grease* throughout this manual) is recommended for all electrical connections e.g.: shunt connections, mating surfaces of horns and carbon strips to prevent corrosion and provide good electrical contact. Other products of equal or better quality may be used.

3.5 Hydraulic Oil

The oil used in the hydraulic cylinder is Texaco Aircraft Hydraulic Oil 5606G. This is the only oil that should be used. Aircraft Hydraulic Oil 5606G is a mineral oil based fluid. It contains a low viscosity base oil, oxidation inhibitors, and anti-wear agents. It is dyed a distinctive red color.

3.6 Locktite

Two types of loctite are used on the pantograph. The first is Loctite #242. It is a removable thread locker used in several places where other locking methods are not practical. The second is Loctite #592. It is a pipe thread sealant used on the hydraulic fittings.

4.0 INSTALLATION

WARNING

Before working on a pantograph that is equipped with a safety system, always install the yellow safety pin. Leaning on the upper or lower frame or applying downward force in some other way could cause the shear pin to break. The pantograph would then collapse, injuring anyone who has a limb or other body part within the envelope of the pantograph.

To remove safety pin, reach under pantograph, keeping remainder of your body outside the envelope of the pantograph. The safety pin should be loose in hole. Do not force safety pin from hole. A tight safety pin could indicate that the shear pin is fractured, causing pantograph to collapse when safety pin is removed.

Attach an appropriate warning tag to the pantograph up/down switch in the cab if service work is to be performed on a pantograph. Unexpected lowering or raising of the pantograph while performing service work could cause serious injury.

CAUTION

Lift the pantograph only by the lifting lugs located on the base frame. Attempting to lift the pantograph at any other point could cause structural damage. Secure the latch down hook to the latch keeper on the upper frame with wire or rope to prevent accidental raising during lifting or moving.

The lowering cylinder must be extended before raising the pantograph. If the pantograph is allowed to be raised, without the air cylinder extended to restrict the speed, the spring force plus the raising inertia of the pantograph could cause damage or injury. To prevent this the air cylinder should be extended either by a "down" command from the vehicle controls or if air is not available by the manual reset lever provided on the pantograph. When using the reset lever it should be pulled at a slow steady rate. Excessive force on the lever will not cause the air cylinder to extend faster and will only cause damage to the lever and it's linkage. By design the hydraulic system will only operate at a steady rate regardless of the force exerted.

4.1 Installation

1. Attach the insulators to the vehicle roof.

2. Install the pantograph on top of the insulators and fasten with 3/4" bolts, lock washers, and flat washers. Apply a thin coat of *Top2000* grease to the threads of the bolts to prevent rust. Torque the bolts to 140-150 ft.-lbs.

3. Attach the vehicle main power cables to the high voltage tap on the pantograph base frame. Apply electrical contact grease under the electrical connection to prevent corrosion.

4. Attach air lines to the lowering cylinder and latch air connections.

4.2 Pre-operational Checks

1. Remove rope or chain securing pan head in lowered position and any lifting straps or chains.

2. Raise the pantograph using the vehicle controls and inspect for proper operation. Check for proper raising time and adjust if necessary.

3. Check that the pantograph reaches the maximum operating height.

4. Check the contact force with a spring scale for quick checks or use the KM 11 gauge for more precise measurements. Adjust if necessary.

5. Check the pan head for free movement and suspension.

6. Place a straight edge across the carbon strips and check for parallelism. To assure uniform wear, and proper contact with the wire, it is important that any deviations are corrected.

7. Remove the yellow safety pin from the safety system and place in the storage bracket.

5.0 SCHEDULED MAINTENANCE

The pantograph requires a minimum of scheduled maintenance to keep it in good working order. The visual inspections, if carried out at the recommended intervals, as described below will reveal any impending problems. Corrective action can be taken before the problem becomes serious.

WARNING

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Table 5.0-1: Scheduled Maintenance	
Interval	**Inspection**
30 Days	Inspect carbon strips. See Section 5.3
	Check the base frame insulators for dirt accumulation.
	Check lowering cylinder assembly for air or oil leaks.
	Check oil level of the lowering cylinder assembly's hydraulic cylinder.
	Check ball bearings for excessive weeping or leaking seals.
	Check latch for proper latching and unlatching.
60 Days	Check all attaching screws and nuts for looseness or damage. Pay particular attention to the carbon strip assembly attaching screws.
	Inspect all shunt cables for breaks, corrosion or loose connections.
	Inspect raising springs for corrosion, distortion, cracks, or other defects. Also check the cable assemblies that connect the raising springs to the lower frame for breaks, corrosion, or loose attaching nuts.
90 Days	Check for proper operation. See Section 5.4
6 Months	Check contact force.
	Inspect ball bearings. See Section 5.1
	Inspect bushings. See Section 5.2
I Year	Inspect oscillation damper. Remove damper and check for leaks. Extend and compress through its stroke. The damper should extend freely and provide restriction when compressing.

5.1 Ball Bearing Inspection

The base frame and upper frame pivot bearings feature a fixed, and floating, sealed double bearing arrangement. The coupling rod also features fixed bearings at each end. These bearings require no lubrication or periodic maintenance. The space between the two bearings is packed with *Top 2000* grease to prevent condensation and rust. This space should be repacked with grease every 6 years or if bearing replacement is necessary.

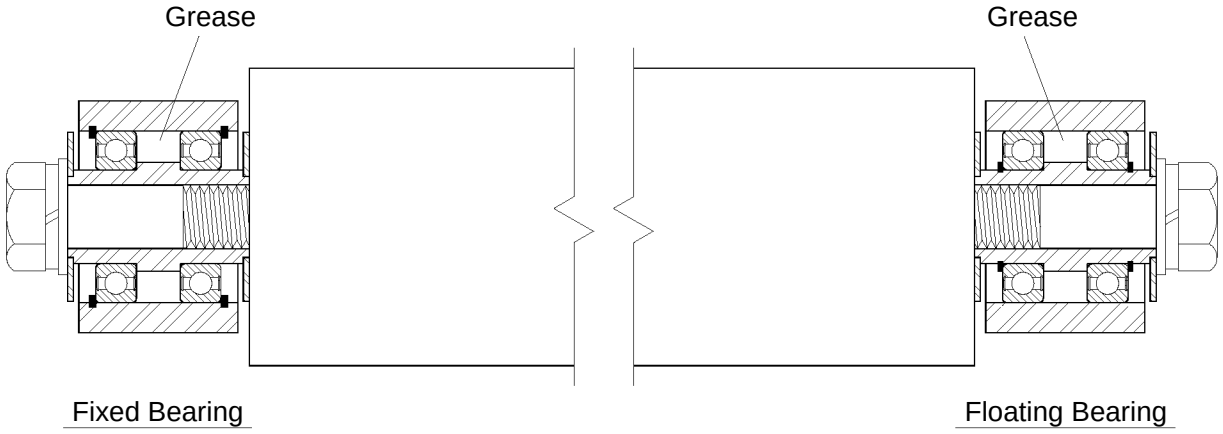

Figure 5.1-1: Bearings

To properly inspect the bearings would require disassembly of the pantograph, however the

following inspections can reveal problems in the bearings:

1. When checking the contact force using the KM 11 gauge, bad or rough rotating bearings will show on the graph. There will either be excessive variation between the raising and lowering forces or erratic waves in the chart. This should be checked every 6 months when checking the contact force or more frequently if necessary.

2. Check all bearing locations for excessive weeping or leaking seals every 30 days.

5.2 Bushing Inspection

Bushings used on the pantograph are made from non metallic material or Teflon coated bronze and are maintenance free. However they should be checked for damage, dirt, or wear. Any bushings with stiff movement should be inspected, cleaned, or replaced if necessary. When replacing bushings a coat of *Top 2000* grease should be appled.

5.3 Carbon Strip Inspection

Carbon strips should be checked at every vehicle inspection for damage and/or wear. Damage and abnormal wear can be detected in their early stages.

It is important that both carbon strips are parallel to each other to insure proper wear and good contact. A straight edge should be placed across the carbon strips. If they are not parallel adjustment is necessary. See Section 7.3

Even, gradual wear is normal since the carbon strips are in constant contact with the overhead wire. Normal wear will occur if the overhead wire system is in good condition, wire stagger is correct, and the two carbon strips are parallel. Excessive contact force will cause rapid premature wear.

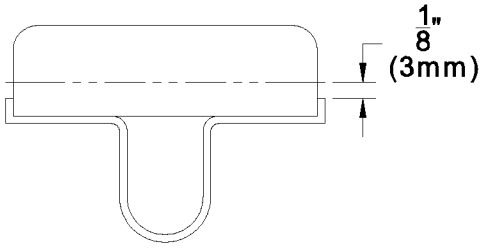

Figure 5.3-1: Carbon Wear

The minimum allowable carbon thickness is 1/8"(3mm) at any point on either carbon strip. A carbon thickness below this value will risk contact between the overhead wire and the metal carrier of the carbon strip. Contact between the overhead wire and any metal edge can cause damage or rapid wear to the wire.

If the carbon strips are chipped or cracked they must be replaced to prevent further damage. If there is excessive wearing on the end horns they should be replaced. Normally the end horns will need to be replaced once for every 2-3 sets of carbon strips.

When replacing carbon strips apply electrical contact grease between the carbon strips and horns. It may be necessary to grind a smooth transition between the carbon and horns in order to allow the overhead wire to run smoothly between them.

Both carbon strips need to be replaced at the same time. Replacing only one strip will cause uneven carbon height resulting in poor contact to the wire, rapid carbon wear, and possible arcing.

5.4 Operation Inspection

At 90 day intervals raise and lower the pantograph several times and inspect for damage or improper operation. Pull down on pan head. Rotate and pivot the pan head suspension by hand. Check for rough operation or damage. Repair or replace any damaged components.

6.0 TROUBLESHOOTING

The following table is a guide for locating and correcting troubles with the pantograph.

Table 6.0-1: Troubleshooting		
DEFECT	**PROBABLE CAUSE**	**CORRECTION**
Pantograph does not raise or low	No current supply from the vehicle.	Check supply battery.
		Check electrical connections.
	The inner friction of the pantograph is too high.	Check pantograph for damage.
		Check for damaged bearings.
	Broken or weak springs.	Replace springs.
Pantograph raises or lowers slowly.	The inner friction of the pantograph is too high.	Check pantograph for damage.
		Check for damaged bearings.
	Flow control valves on lowering cylinder not adjusted properly.	Adjust valves.
Frequent interruption of current transmittal (strong arcing).	Contact force is too low.	Check contact force.
	The inner friction of the pantograph is too high.	Check pantograph for damage.
		Check for damaged bearings.
	Cracks or chips in carbon strip.	Replace carbon strip.
	Pan head suspension works too slow.	Check for damaged bushings and flat springs.
	Carbon strips are not adjusted parallel.	Adjust carbon strips so they are parallel.
	Pan guide not properly adjusted, restricting pan head rotation.	Adjust pan guide properly.
Uneven wear on carbon strip.	Carbon strips are not adjusted parallel.	Adjust carbon strips so they are parallel.
	Pan guide not properly adjusted, restricting pan head rotation.	Adjust pan guide properly.
Current flash over from base frame to vehicle roof.	Pantograph mounting insulators are dirty.	Clean insulators with mild non-abrasive detergent and rinse clean.
Pantograph does not latch.	Check for damage to latch.	Repair damage.

Table 6.0-1: Troubleshooting		
DEFECT	**PROBABLE CAUSE**	**CORRECTION**
	Base frame bumpers not adjusted properly, preventing pantograph from lowering completely.	Adjust bumpers.

7.0 ADJUSTMENTS

With the exception of contact force, the following adjustments will not need to be re- adjusted unless performing some type of repair or service. All the following adjustments should be checked or performed after assembly and/or prior to putting the pantograph in service.

7.1 Diagonal Cables

The purpose of the diagonal cables is to provide stiffness to the upper frame and to center it to the pantograph.

Loosen turnbuckle jam nuts(9 & 10) and adjust turnbuckle(6) so that there is equal thread to allow adjustment. Mark the center of the upper frame, and the center of the base frame with pieces of masking tape. Tighten the cables until they are snug and the upper frame is centered. Do not over tighten. This will cause a twist in the upper frame. Tighten turnbuckle jam nuts. (Figure 8.0-4)

7.2 Pan Guide

Secure the pantograph at 65" above resting position with a rope or chain. Place a level across the carbon strips. If not level, adjust as follows. (Figure 8.0-13)

1. Remove locknut(8), washers(6 & 7), and socket(5).
2. Loosen jam nut(3).
3. Pull rod end(2) from bolt(4).
4. Turn rod end as necessary until pan head it level.
5. Replace socket(5), washers(6 & 7), and locknut(8).
6. Tighten jam nut(3).

7.3 Parallelism of Carbon Strips

Loosen jam nuts on guiding units. Place a straight edge across carbon strips. Adjust turnbuckles in or out as necessary until the contact strips are parallel throughout their entire length. Tighten jam nuts. (Figure 7.3-1)

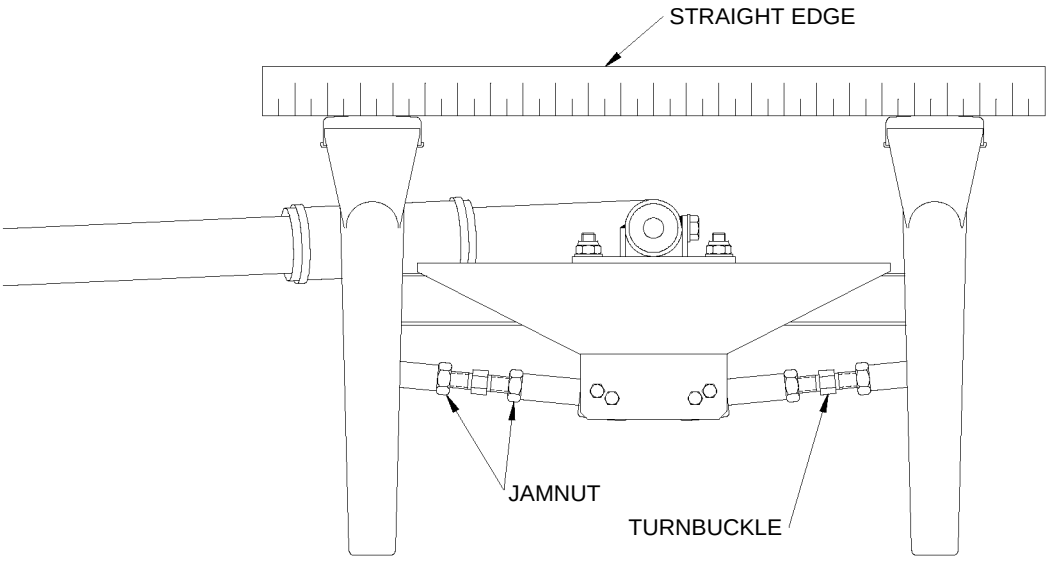

Figure 7.3-1: Parallelism of Carbon Strips

7.4 Coupling Rod

Adjustments to the coupling rod directly effect the contact force. Once set the coupling rod should not need readjustment. See section 7.5 for coupling rod adjustment.

7.5 Contact Force

Before checking or adjusting the contact force disconnect one end of the oscillation damper because in dynamic motion the damper causes an increase in the contact force. The contact force is a static measurement taken through a continuous motion.

1. Loosen jam nuts(4 & 5) and adjust the coupling rod turnbuckle(3) so that the upper frame and lower frame contact their respective bumpers simultaneously. Adjustment of the bumpers may be required. The base frame, lower frame, and upper frame should be fairly level to each other. (Figure 8.0-12)

2. Check the contact force throughout its entire range. To accurately check the contact force, it is recommended to use the Schunk KM 11 gauge. A spring scale can be used to get a quick, less accurate reading. The readings should be within +/-2.25Lbs. of the nominal value.

3. If the values are out of tolerance in the lower range the cam adjustment bolts(8) should be adjusted clockwise to increase or counter clockwise to decrease contact force. The bolts should be adjusted equally. Before adjusting bolts(8) loosen nuts(13). When finished tighten jam nuts(9) and nuts(13). (Figure 8.0-3)

4. If the values are still out of tolerance the coupling rod should be adjusted. Shortening the coupling rod will increase the contact force while lengthening the coupling rod will decrease the contact force. Tighten jam nuts(4 & 5) when finished. (Figure 8.0-12)

5. Check the contact force again through the entire range. It may be necessary to perform steps 3 and/or 4 again.

6. If necessary adjust the raising springs to achieve the proper nominal contact force.

7.6 Height of Pantograph

Loosen jam nut(7). Turning adjustment bolt(6) clockwise will lower the height or turning the adjustment bolt counterclockwise will raise the height. After proper height is achieved tighten jam nut(7) while holding adjustment bolt(6) to prevent it from turning. Recheck the height. (Figure 8.0-3)

7.7 Raising and Lowering Speed

The pantograph is shipped from the factory preset to raise at 7 seconds and lower at 7 seconds. Several factors such as contact force, oil viscosity, higher summer temperatures, lower winter temperatures, air pressure, and cylinder wear in can cause these values to change slightly, thus requiring adjustment.

To adjust the lowering speed loosen the locknut on the lowering control valve. Turn the adjustment screw clockwise to decrease the speed and counterclockwise to increase the speed. The screw provides very precise adjustment. Only turn the screw 1/4 turn or less at a time and then check the lowering speed. **Excessive adjustment can cause the flow through the valve to be too high and allow the pantograph to lower at a fast rate causing damage or injury.** After the speed is satisfactorily set tighten the locknut.

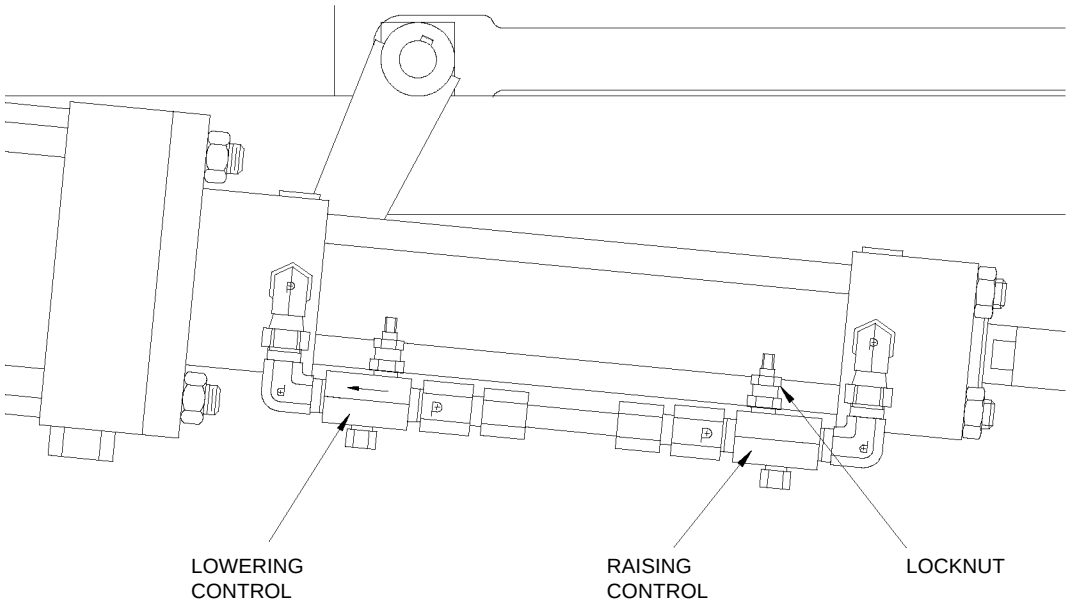

Figure 7.7-1: Raising and Lowering Speed

To adjust the raising speed loosen the locknut on the raising control valve. Turn the adjustment screw clockwise to decrease the speed and counterclockwise to increase the speed. The screw provides very precise adjustment. Only turn the screw 1/4 turn or less at a time and then check the lowering speed. **Excessive adjustment can cause the flow through the valve to be too high and allow the pantograph to lower at a fast rate causing damage or injury.** After the speed is satisfactorily set tighten the locknut.

When installing a new air cylinder assembly, or adjusting one where the speed setting is unknown, loosen the locknuts on both valves and turn the adjustment screws clockwise completely. This will close the valves, locking the cylinder in it's position, preventing damage or injury from fast raising or lowering. Back off the adjustment screws counterclockwise in 1/4 turn increments and check raising and lowering speed after each adjustment. Continue until the speed is satisfactory then tighten the locknuts.

8.0 OVERHAUL AND REPAIR

This section covers the procedures for overhaul and repair of the pantograph. If new parts are required only OEM or OEM approved parts should be used. Repair should only be required when there is damage to the pantograph. Overhaul of the pantograph should be performed every 8-10 years providing that scheduled inspection and maintenance has been performed regularly.

WARNING

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Attach an appropriate warning tag to the pantograph up/down switch in the cab if service work is to be performed on a pantograph. Unexpected lowering or raising of the pantograph while performing service work could cause serious injury.

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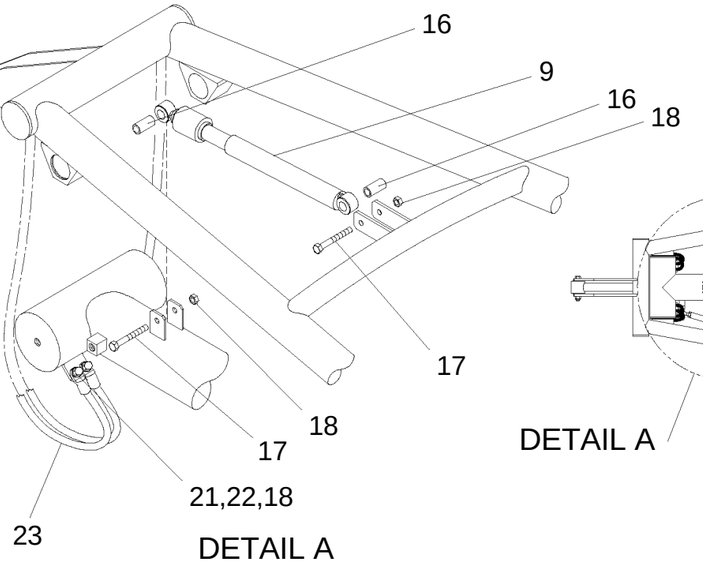
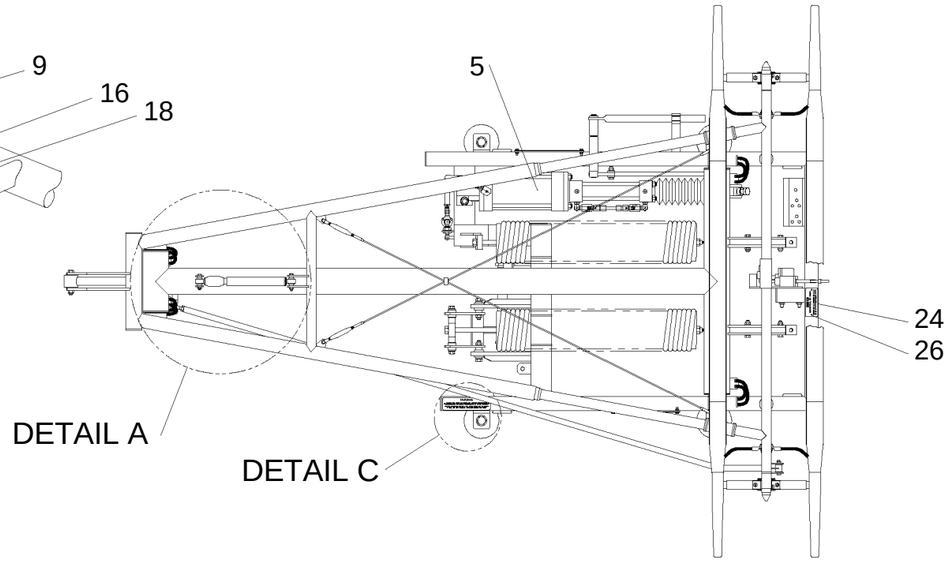
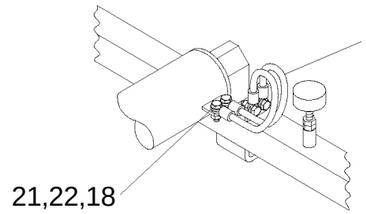
The following figures provide a detailed breakdown. Refer to these figures for a proper understanding of how the pantograph is assembled.



DETAIL A





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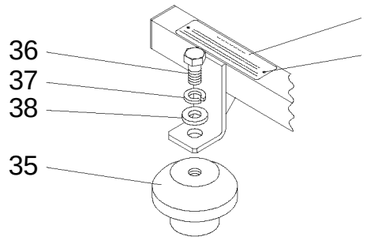

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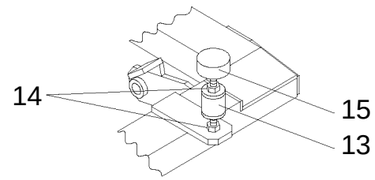

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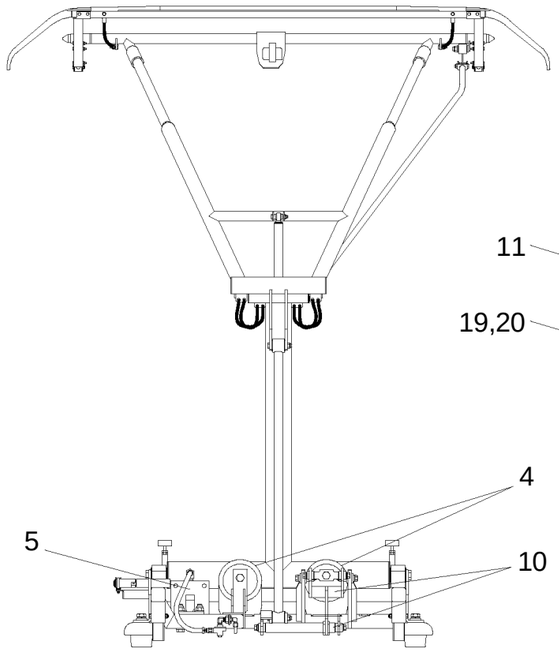

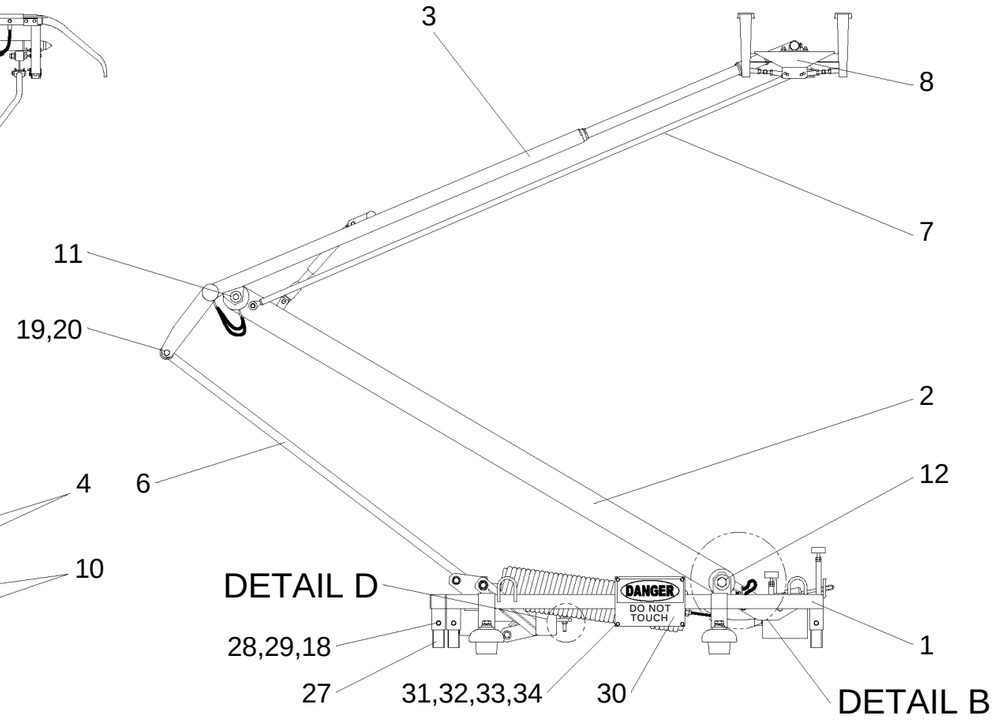

Figure 8.0-1: Pantograph

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-1-		Pantograph
8.0-1-1	1	• Base Frame Assembly (See Figure 8.0-2)
8.0-1-2	1	• Lower Frame Assembly (See Figure 8.0-3)
8.0-1-3	1	• Upper Frame Assembly (See Figure 8.0-4)
8.0-1-4	1	• Raising Mechanism (See Figure 8.0-5)
8.0-1-5	1	• Pneumatic System (See Figure 8.0-7)
8.0-1-6	1	• Coupling Rod (See Figure 8.0-12)
8.0-1-7	1	• Pan Guide Assembly (See Figure 8.0-13)
8.0-1-8	1	• Pan Head (See Figure 8.0-14)
8.0-1--9	1	• Hydraulic Oscillation Damper
8.0-1-10	1	• Safety System (See Figure 8.0-15)
8.0-1-11	1	• Upper Frame Bearing Assembly (See Figure 8.0-4)
8.0-1-12	1	• Base Frame Bearing Assembly (See Figure 8.0-2)
8.0-1-13	1	• Bumper Mount
8.0-1-14	2	• Nut, Hex
8.0-1-15	1	• Bumper
8.0-1-16	2	• Axle
8.0-1-17	2	• Screw, Hex Cap
8.0-1-18	22	• Nut, Nylon Lock
8.0-1-19	2	• Nut, Nylon Lock
8.0-1-20	2	• Screw, Hex Cap
8.0-1-21	16	• Screw, Hex Cap
8.0-1-22	16	• Washer, Spring
8.0-1-23	8	• Shunt
8.0-1-24	1	• Name Tag, UKM/Schunk
8.0-1-25	1	• Name Tag, Safety Pin
8.0-1-26	4	• Drive Screw
8.0-1-27	4	• Leg
8.0-1-28	4	• Screw, Hex Cap
8.0-1-29	8	• Washer

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-1-30	2	• Danger Sign
8.0-1-31	8	• Screw, Hex Cap
8.0-1-32	8	• Washer, Rubber Backed
8.0-1-33	8	• Washer
8.0-1-34	8	• Nut, Nylon Lock
8.0-1-35	4	• Insulator
8.0-1-36	4	• Screw, Hex Cap
8.0-1-37	4	• Washer, Lock
8.0-1-38	4	• Washer, Extra Thick

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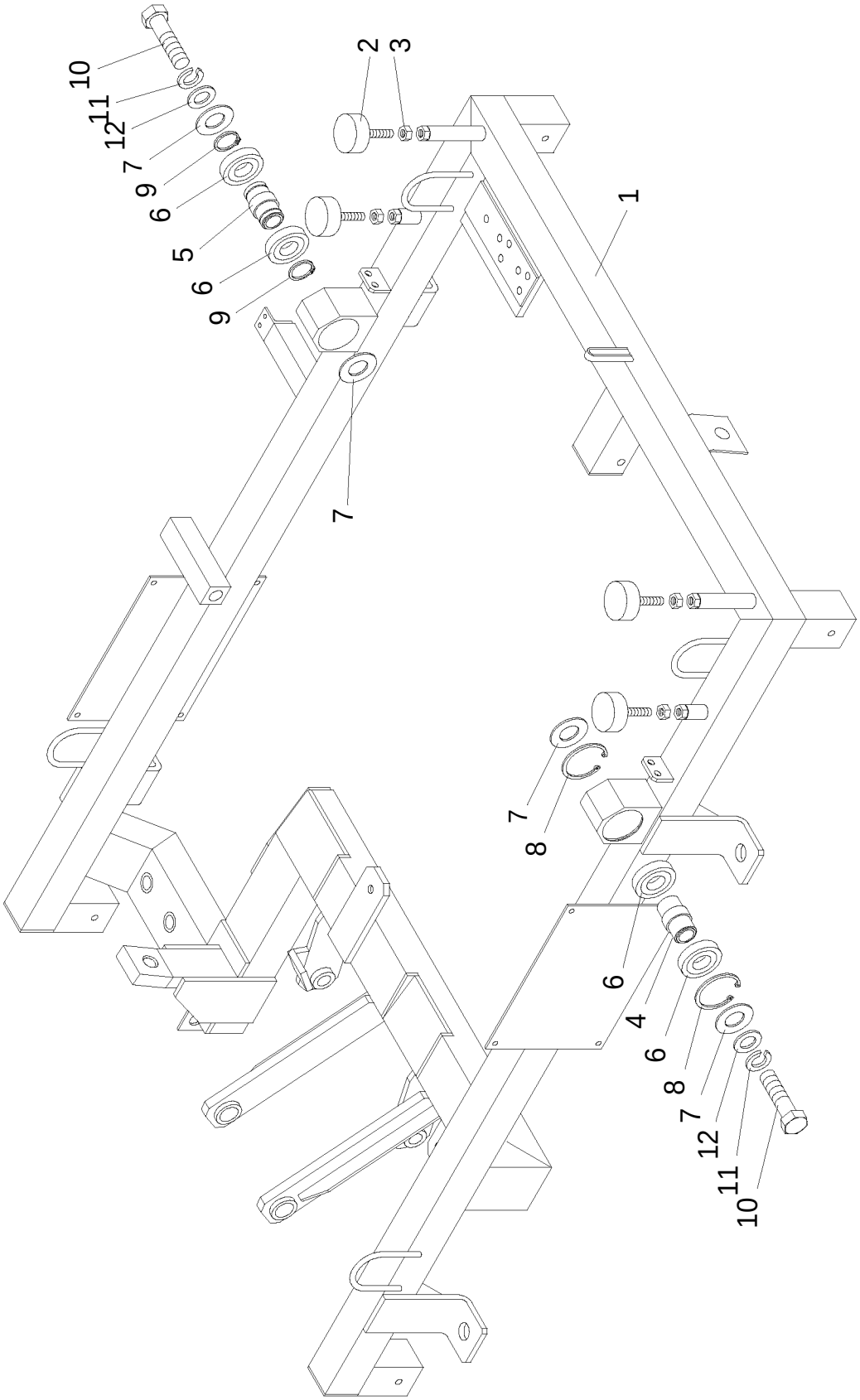

Figure 8.0-2: Base Frame Assembly

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-2-		Base Frame Assembly
8.0-2-1	1	• Base Frame
8.0-2-2	4	• Bumper
8.0-2-3	4	• Nut, Hex
8.0-2-		Base Frame Bearing Assembly
8.0-2-4	1	• Bearing Shaft, Fixed
8.0-2-5	1	• Bearing Shaft, Floating
8.0-2-6	4	• Bearing
8.0-2-7	4	• Washer, Special
8.0-2-8	2	• Retaining Ring, Internal
8.0-2--9	2	• Retaining Ring, External
8.0-2-10	2	• Screw, Hex Cap
8.0-2-11	2	• Washer, Lock
8.0-2-12	2	• Washer, Flat

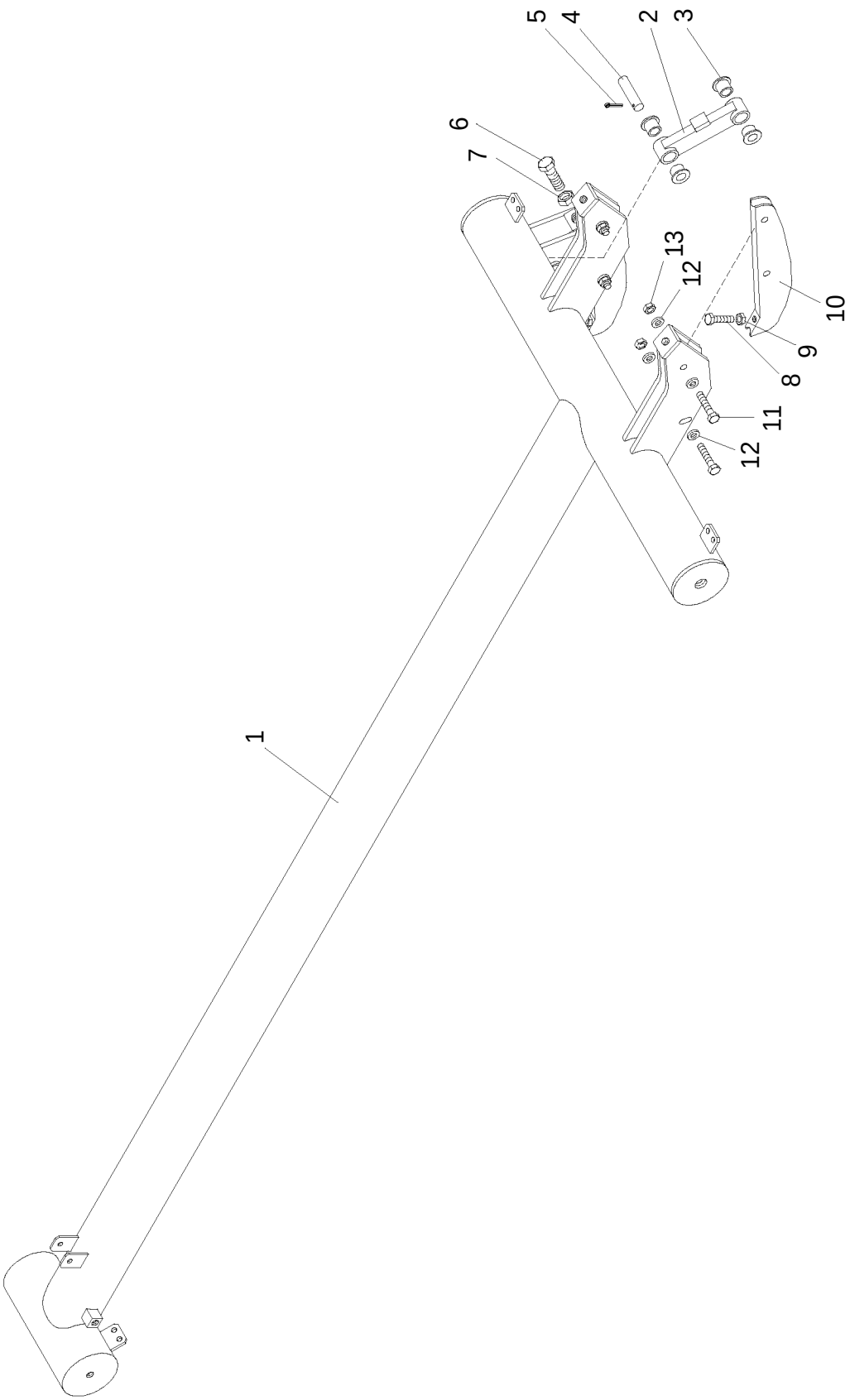

Figure 8.0-3: Lower Frame Assembly

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-3-		Lower Frame Assembly
8.0-3-1	1	• Lower Frame
8.0-3-2	1	• Lever
8.0-3-3	4	• Flanged Bushing
8.0-3-4	1	• Shaft
8.0-3-5	1	• Pin, Cotter
8.0-3-6	1	• Screw, Hex Cap
8.0-3-7	1	• Nut, Hex
8.0-3-8	2	• Screw, Hex Cap
8.0-3-9	2	• Nut, Hex
8.0-3-10	2	• Cam
8.0-3-11	4	• Screw, Hex Cap
8.0-3-12	8	• Washer
8.0-3-13	4	• Nut, Nylon Lock

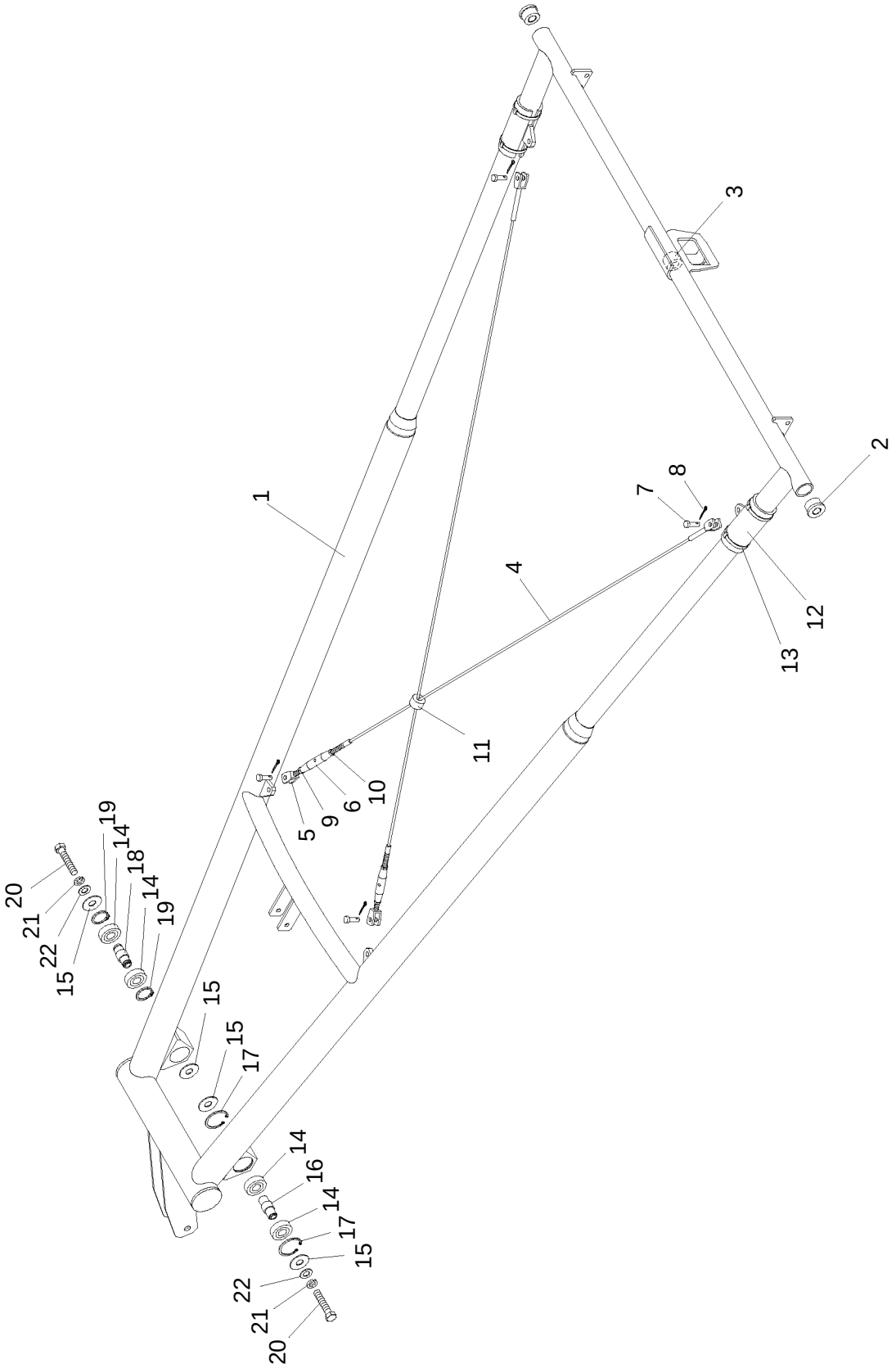

Figure 8.0-4: Upper Frame Assembly

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-4-		Upper Frame Assembly
8.0-4-1	1	• Upper Frame
8.0-4-2	2	• Bushing
8.0-4-3	1	• Bushing
8.0-4-	2	• Diagonal Cable
8.0-4-4	1	• • Cable Assembly
8.0-4-5	1	• • Yoke
8.0-4-6	1	• • Turnbuckle
8.0-4-7	2	• • Clevis Pin
8.0-4-8	2	• • Pin, Cotter
8.0-4-9	1	• • Nut, Hex
8.0-4-10	1	• • Nut, Hex, Left Hand
8.0-4-11	1	• Protector
8.0-4-12	2	• Protector
8.0-4-13	1	• Cable Tie
8.0-4-		Upper Frame Bearing Assembly
8.0-4-14	4	• Bearing
8.0-4-15	4	• Washer, Special
8.0-4-16	1	• Bearing Shaft, Fixed
8.0-4-17	2	• Retaining Ring, Internal
8.0-4-18	1	• Bearing Shaft, Floating
8.0-4-19	2	• Retaining Ring
8.0-4-20	2	• Screw, Hex Cap
8.0-4-21	2	• Washer, Lock
8.0-4-22	2	• Washer

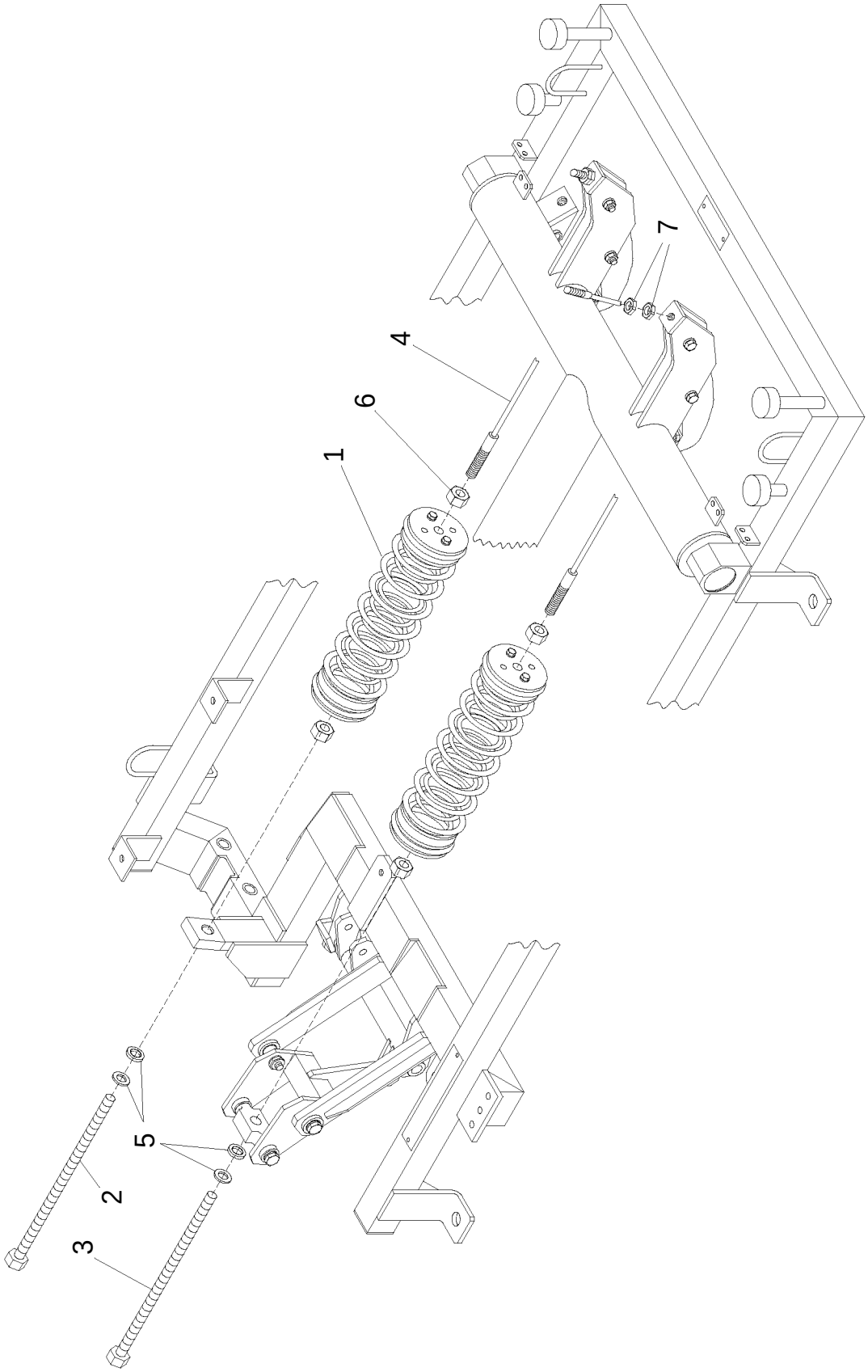

Figure 8.0-5: Raising Mechanism

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-5-		Raising Mechanism
8.0-5-1	1	• Spring Assembly (See Figure 8.0-6)
8.0-5-2	1	• Bolt
8.0-5-3	1	• Bolt
8.0-5-4	2	• Cable
8.0-5-5	2	• Spherical Washer Set
8.0-5-6	4	• Nut, Hex
8.0-5-7	4	• Nut, Hex

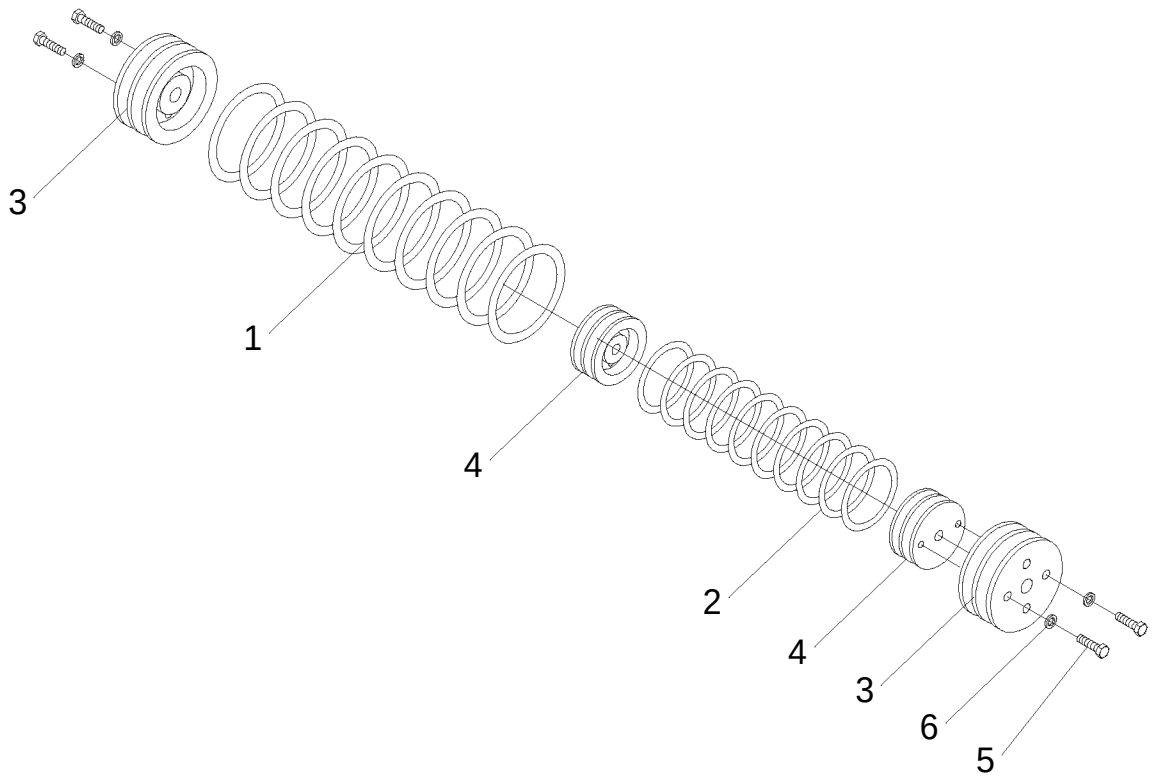

Figure 8.0-6: Spring Assembly

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-6-		Spring Assembly
8.0-6-1	1	• Spring, Large
8.0-6-2	1	• Spring, Small
8.0-6-3	2	• Cap, Large
8.0-6-4	2	• Cap, Small
8.0-6-5	4	• Screw, Hex Cap
8.0-6-6	4	• Washer, Conical Spring

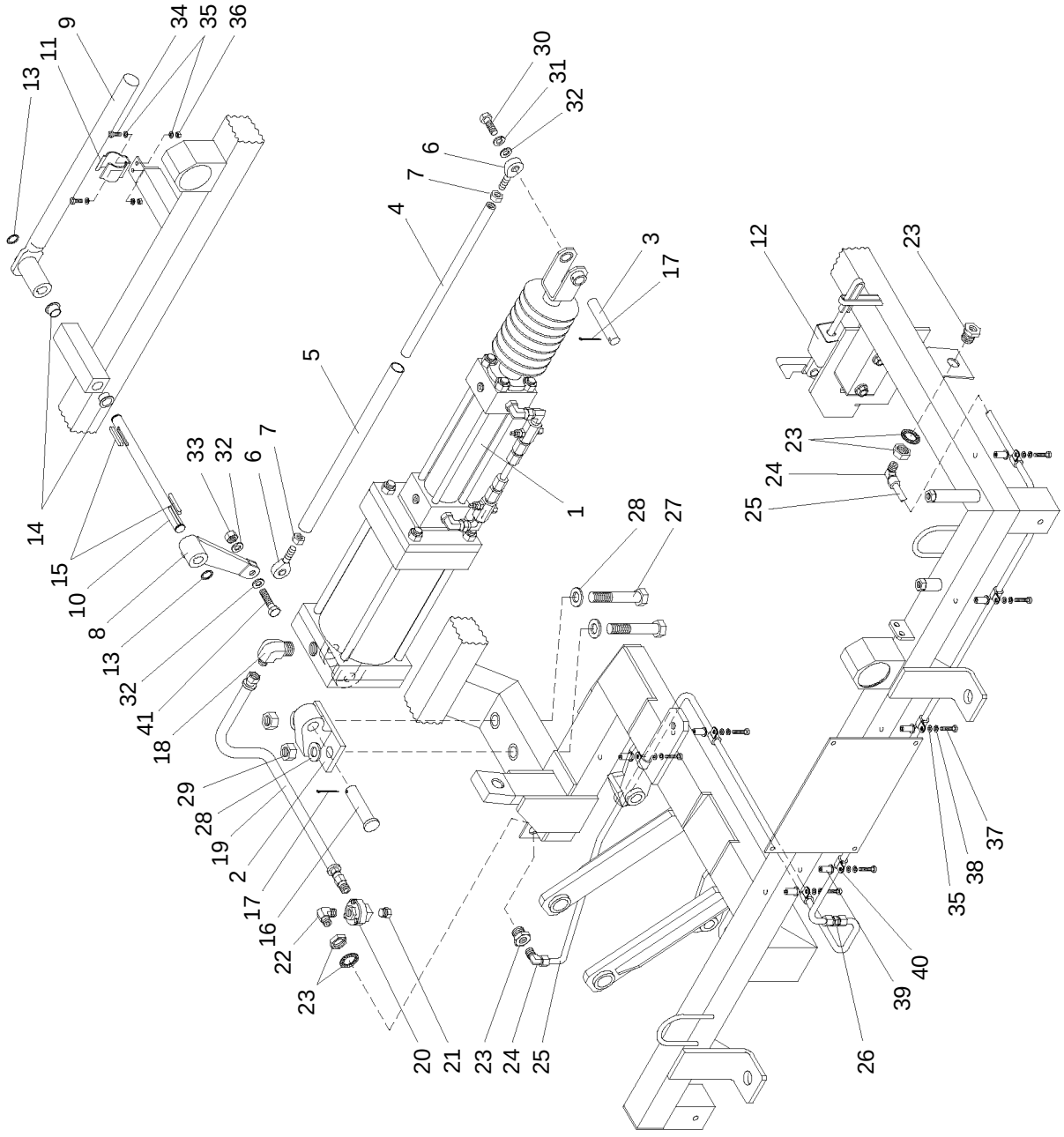

Figure 8.0-7: Pneumatic System

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-7-		Pneumatic System
8.0-7-1	1	• Air Cylinder Assembly (See Figure 8.0-8)
8.0-7-2	1	• Pivot
8.0-7-3	1	• Shaft
8.0-7-	1	• Tie Rod
8.0-7-4	1	• • Rod
8.0-7-5	1	• • Tube
8.0-7-6	2	• • Rod End
8.0-7-7	1	• • Nut, Hex
8.0-7-8	1	• Lever
8.0-7-9	1	• Handle
8.0-7-10	1	• Shaft
8.0-7-11	1	• Clamp
8.0-7-12	1	• Latch Assembly (See Figure 8.0-11)
8.0-7-13	2	• Retaining Ring, External
8.0-7-14	2	• Flange Bushing
8.0-7-15	2	• Key
8.0-7-16	1	• Clevis Pin
8.0-7-17	2	• Cotter Pin
8.0-7-18	1	• Elbow, Male 90°
8.0-7-19	1	• Hose Assembly
8.0-7-20	1	• Quick Exhaust Valve
8.0-7-21	1	• Breather
8.0-7-22	1	• Elbow, Male
8.0-7-23	2	• Anchor Coupling
8.0-7-24	2	• Elbow, Male
8.0-7-25	N/A	• Tubing, Copper
8.0-7-26	1	• Union
8.0-7-27	2	• Bolt
8.0-7-28	4	• Washer
8.0-7-29	2	• Nut, Nylon Lock
8.0-7-30	1	• Screw, Hex Cap
8.0-7-31	1	• Washer, Lock
8.0-7-32	3	• Washer
8.0-7-33	1	• Nut, Nylon Lock
8.0-7-34	2	• Screw, Phillips Pan Head
8.0-7-35	11	• Washer

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-7-36	2	• Nut, Nylon Lock
8.0-7-37	7	• Screw, Phillips Pan Head
8.0-7-38	7	• Washer, Lock
8.0-7-39	7	• Well Nut
8.0-7-40	7	• Clamp, Cushioned
8.0-7-41	1	• Screw, Hex Cap

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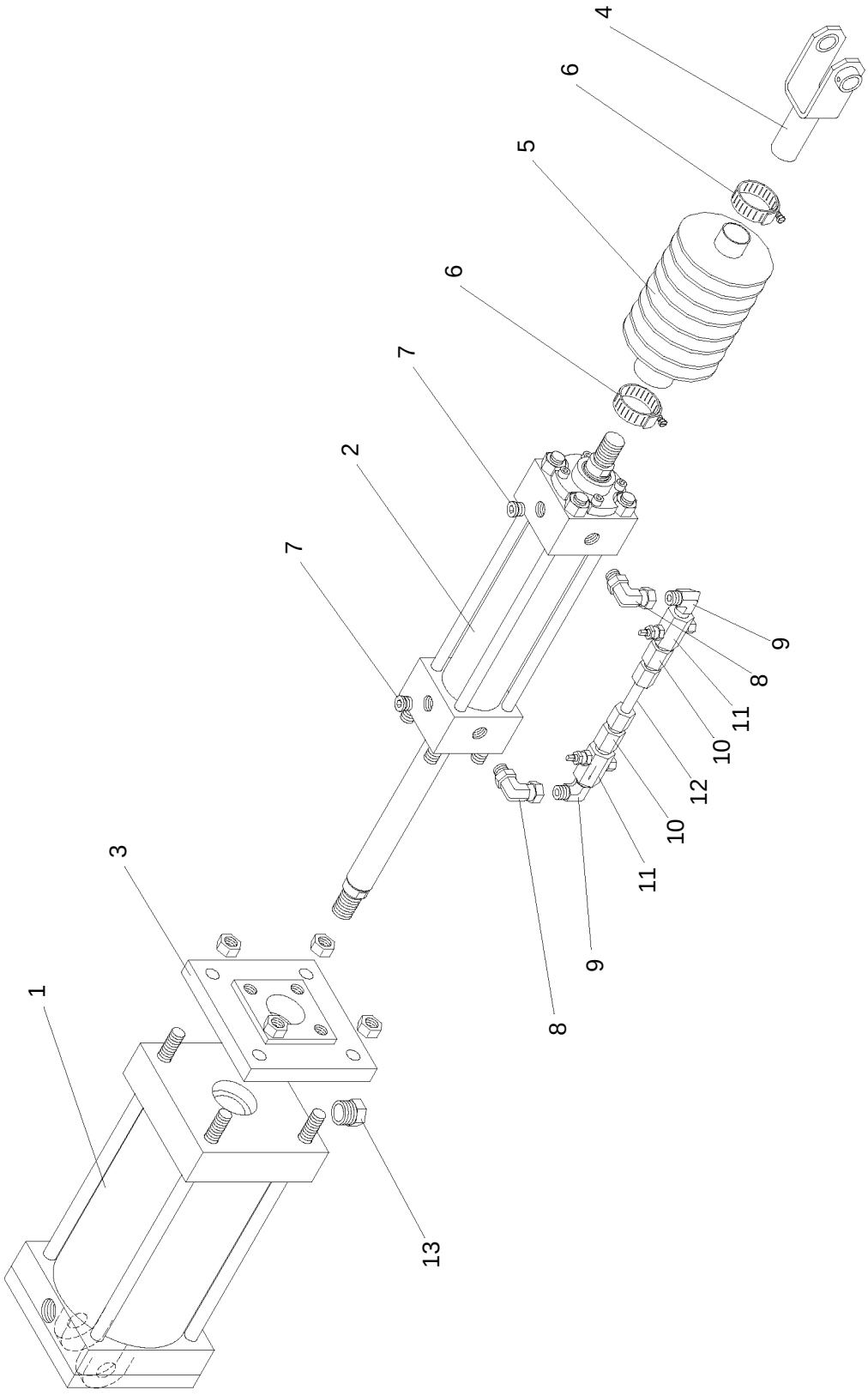

Figure 8.0-8: Air Cylinder Assembly

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-8-		Air Cylinder Assembly
8.0-8-1	1	• Air Cylinder (See Figure 8.0-9)
8.0-8-2	1	• Hydraulic Cylinder (See Figure 8.0-10)
8.0-8-3	1	• Adapter Plate
8.0-8-4	1	• Clevis
8.0-8-5	1	• Bellows
8.0-8-6	1	• Hose Clamp
8.0-8-7	2	• Plug, Hollow Hex2
8.0-8-8	2	• Elbow, 90°
8.0-8-9	2	• Elbow, 90°
8.0-8-10	2	• Female Connector
8.0-8-11	2	• Flow Control Valve
8.0-8-12	N/A	• Tube, Steel

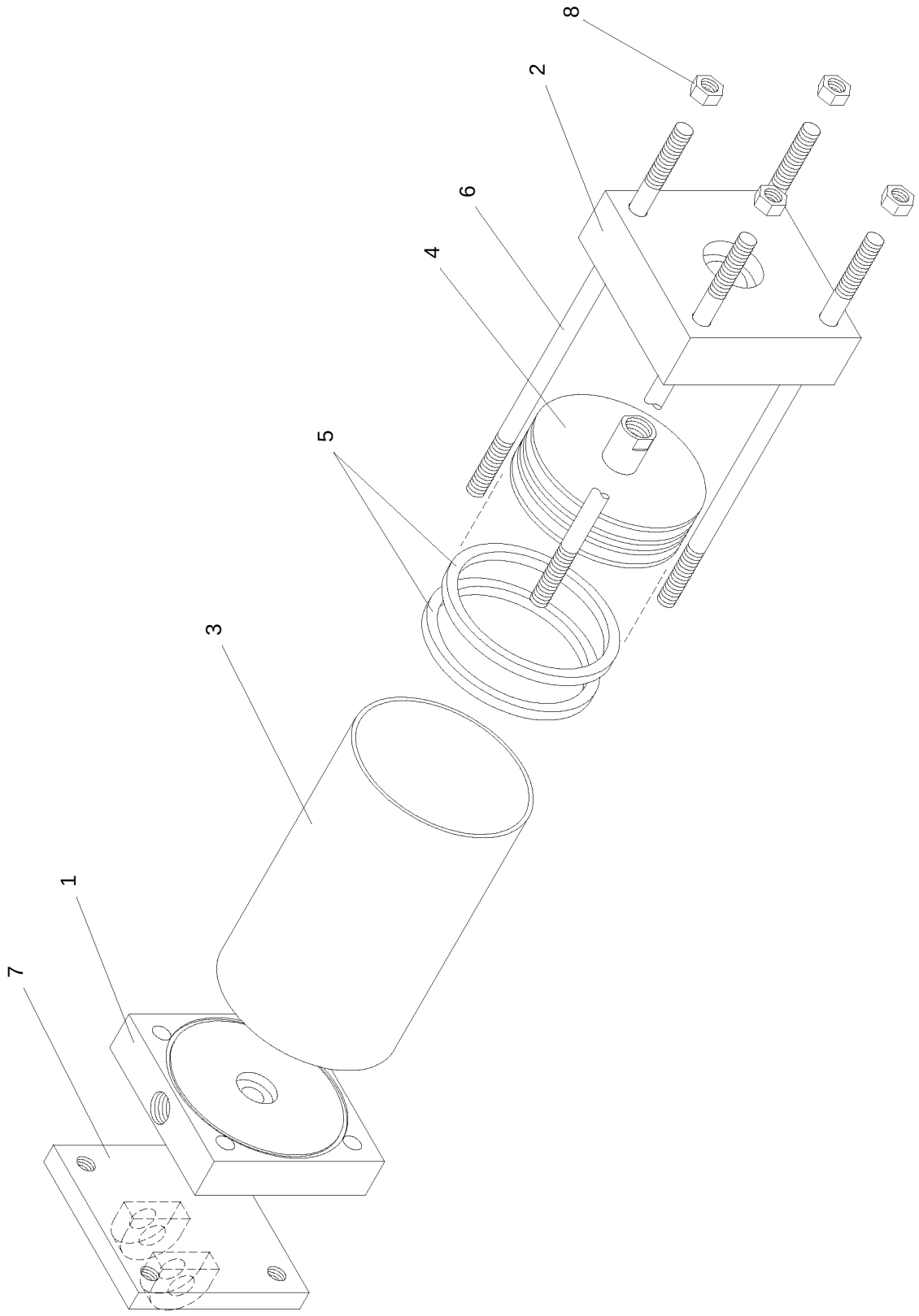

Figure 8.0-9: Air Cylinder

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-9-		Air Cylinder
8.0-9-1	1	• Cap
8.0-9-2	1	• Head
8.0-9-3	1	• Tube
8.0-9-4	1	• Piston
8.0-9-5	1	• Piston Seal
8.0-9-6	4	• Tie Rod
8.0-9-7	1	• Mount
8.0-9-8	4	• Nut, Hex

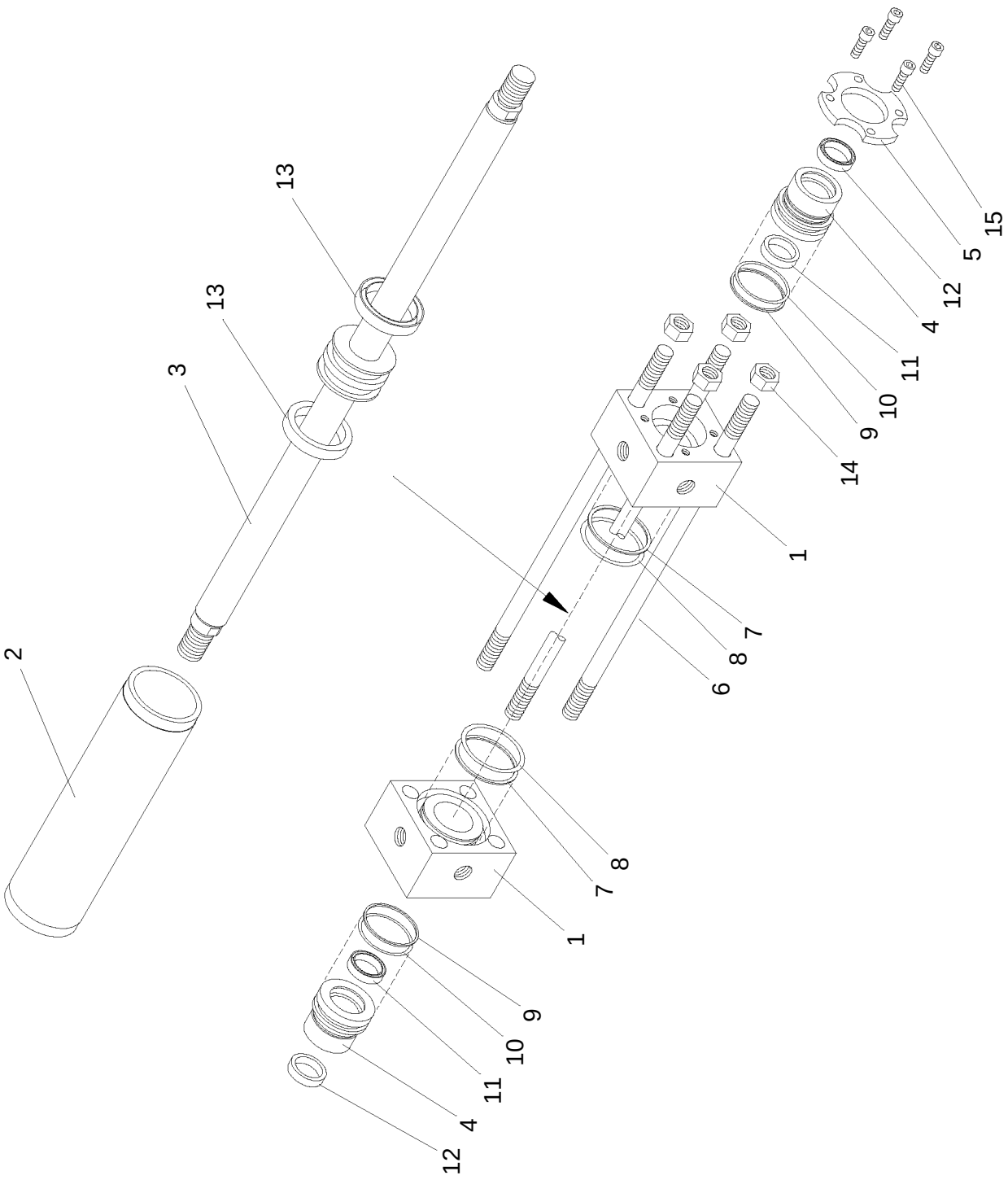

Figure 8.0-10: Hydraulic Cylinder

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-10-		Hydraulic Cylinder
8.0-10-1	2	• Head
8.0-10-2	1	• Tube
8.0-10-3	1	• Piston
8.0-10-4	2	• Rod Gland Cartridge
8.0-10-5	1	• Retainer Plate
8.0-10-6	4	• Tie Rod
8.0-10-7	2	• Backup Ring
8.0-10-8	2	• O-Ring
8.0-10-9	2	• Backup Ring
8.0-10-10	2	• O-Ring
8.0-10-11	2	• Shaft Seal
8.0-10-12	2	• Rod Wiper
8.0-10-13	2	• Piston Seal
8.0-10-14	4	• Nut, Hex
8.0-10-15	4	• Screw, Socket Head Cap

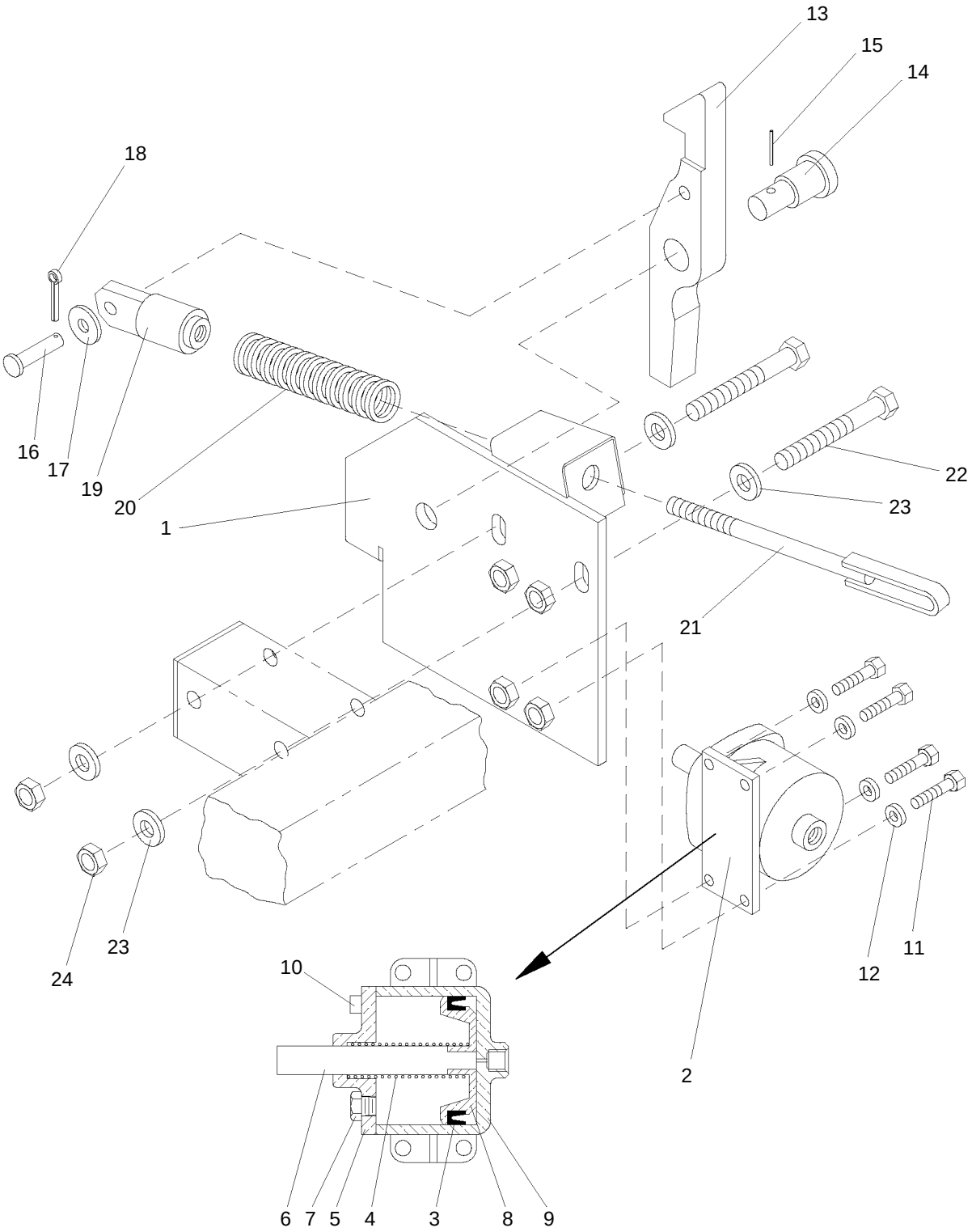

Figure 8.0-11: Latch Assembly

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-11-		Latch Assembly
8.0-11-1	1	• Plate
8.0-11-2	1	• Air Cylinder
8.0-11-3	1	• • Piston Cup
8.0-11-4	1	• • Spring
8.0-11-5	1	• • Cover
8.0-11-6	1	• • Rod
8.0-11-7	1	• • Breather
8.0-11-8	1	• • Piston
8.0-11-9	1	• • Housing
8.0-11-10	1	• • Screw
8.0-11-11	4	• Screw, Hex Cap
8.0-11-12	4	• Washer
8.0-11-13	1	• Latch
8.0-11-14	1	• Pin
8.0-11-15	1	• Pin, Spring
8.0-11-16	1	• Pin
8.0-11-17	1	• Washer
8.0-11-18	1	• Pin, Cotter
8.0-11-19	1	• Latch Link
8.0-11-20	1	• Spring
8.0-11-21	1	• Lever Link
8.0-11-22	2	• Screw, Hex Cap
8.0-11-23	4	• Washer
8.0-11-24	2	• Nut, Nylon Lock

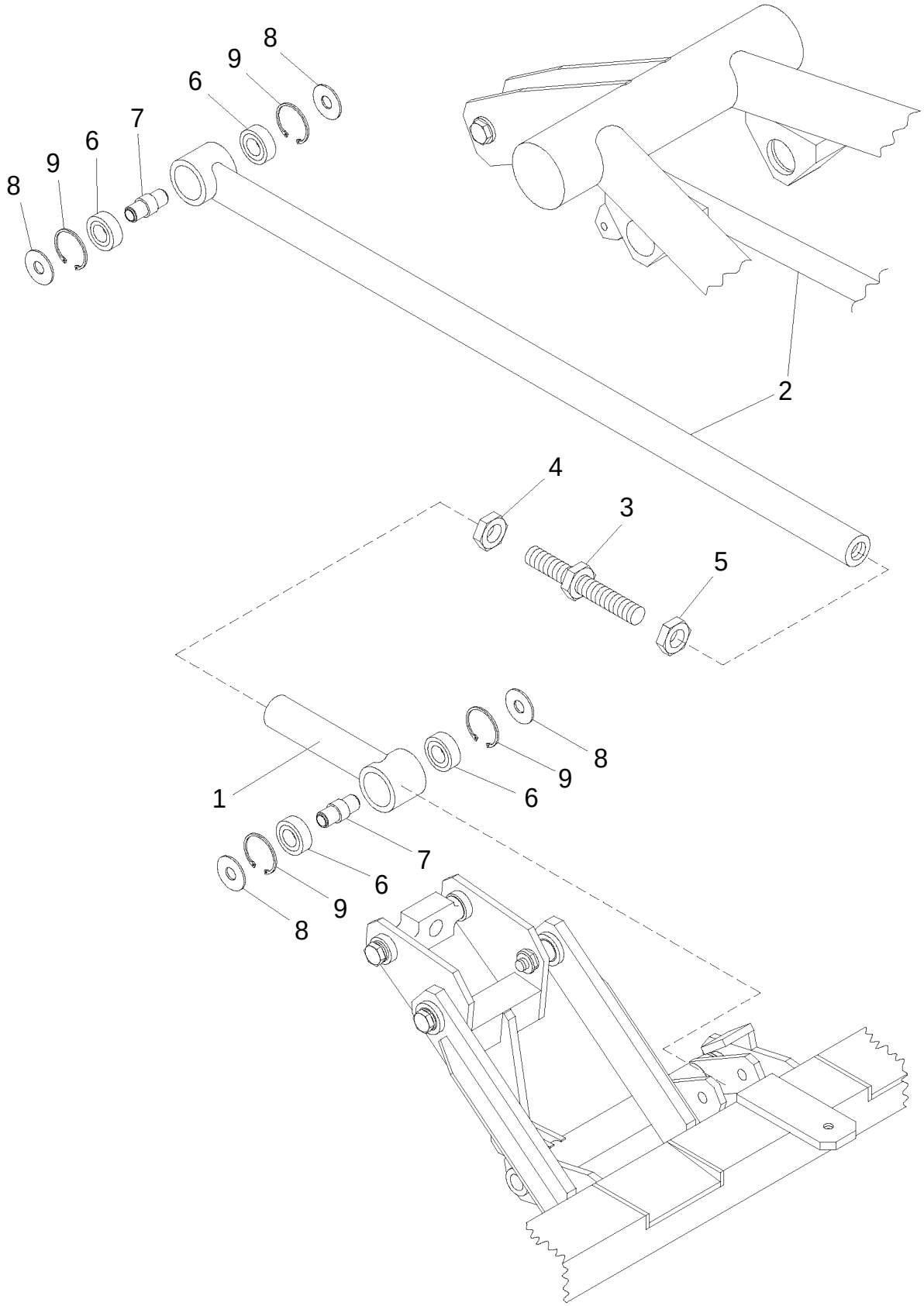

Figure 8.0-12: Coupling Rod

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-12-		Coupling Rod
8.0-12-1	1	• Short End
8.0-12-2	1	• Long End
8.0-12-3	1	• Turnbuckle
8.0-12-4	1	• Nut, Hex, Left Hand
8.0-12-5	1	• Nut, Hex
8.0-12-6	4	• Bearing
8.0-12-7	2	• Bearing Shaft
8.0-12-8	4	• Washer, Special
8.0-12-9	4	• Retaining Ring, Internal

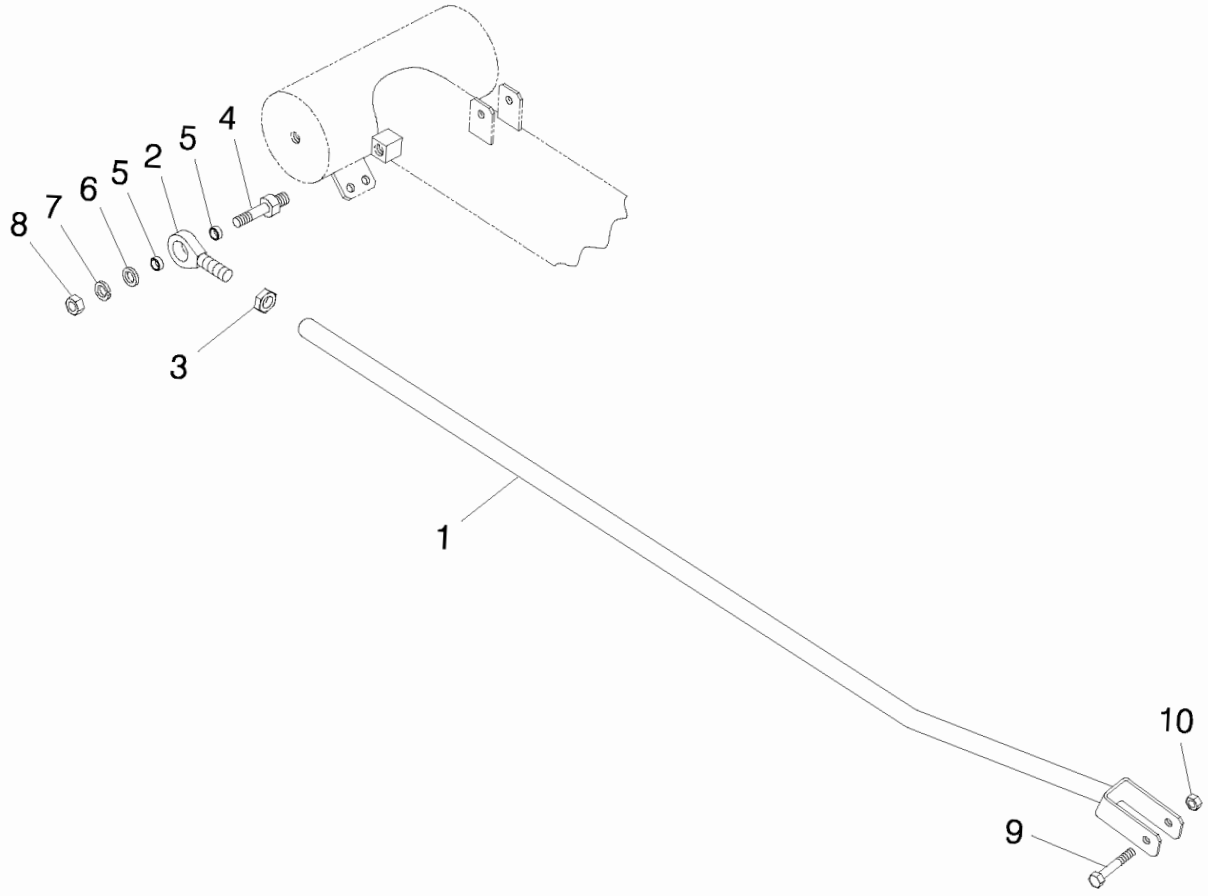

Figure 8.0-13: Pan Guide Assembly

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-13-		Pan Guide Assembly
8.0-13-1	1	• Pan Guide
8.0-13-2	1	• Rod End
8.0-13-3	1	• Nut, Hex
8.0-13-4	1	• Bolt
8.0-13-5	2	• Socket
8.0-13-6	1	• Washer
8.0-13-7	1	• Washer, Lock
8.0-13-8	1	• Nut, Nylon Lock
8.0-13-9	1	• Screw, Hex Cap
8.0-13-10	1	• Nut, Nylon Lock

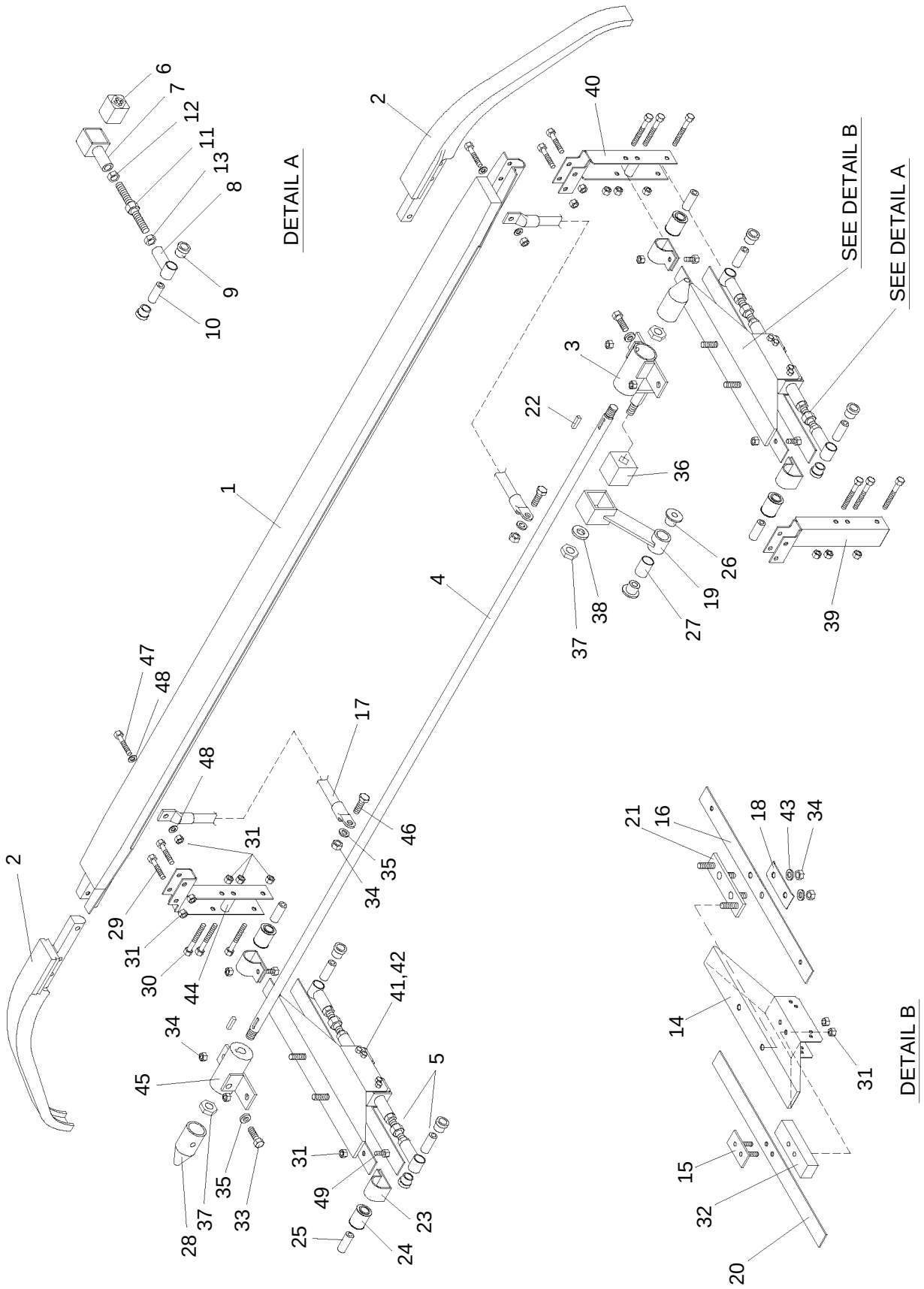

Figure 8.0-14: Pan Head

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-14-		Pan Head
8.0-14-1	2	• Carbon Strip
8.0-14-2	4	• Horn
8.0-14-3	1	• Rocker Suspension
8.0-14-4	1	• Spindle
8.0-14-5	4	• Guiding Unit
8.0-14-6	1	• • Silent Block
8.0-14-7	1	• • Guiding Unit
8.0-14-8	1	• • Eye Bolt
8.0-14-9	2	• • Flange Bushing
8.0-14-10	1	• • Shaft
8.0-14-11	1	• • Turnbuckle
8.0-14-12	1	• • Nut, Hex
8.0-14-13	1	• • Nut, Hex, Left Hand
8.0-14-14	2	• Rocker Box
8.0-14-15	2	• Mounting Plate
8.0-14-16	2	• Flat Spring
8.0-14-17	4	• Shunt
8.0-14-18	2	• Underlying Spring
8.0-14-19	1	• Guiding Piece
8.0-14-20	2	• Limiting Spring
8.0-14-21	2	• Connecting Plate
8.0-14-22	2	• Shaft Key
8.0-14-23	4	• Clamp
8.0-14-24	4	• Bushing
8.0-14-25	4	• Axle
8.0-14-26	2	• Flange Bushing
8.0-14-27	1	• Bushing
8.0-14-28	2	• Stopper Plug
8.0-14-29	8	• Screw, Hex Cap
8.0-14-30	12	• Screw, Hex Cap
8.0-14-31	32	• Nut, Nylon Lock
8.0-14-32	2	• Intermediate Plate
8.0-14-33	2	• Screw, Hex Cap
8.0-14-34	12	• Nut, Nylon Lock
8.0-14-35	6	• Washer, Spring
8.0-14-36	1	• Silent Block
8.0-14-37	3	• Nut, Nylon Lock
8.0-14-38	1	• Washer, Spring

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-14-39	2	• Rocker Holding Fixture
8.0-14-40	2	• Rocker Holding Fixture
8.0-14-41	8	• Screw, Hex Cap
8.0-14-42	8	• Nut, Nylon Lock
8.0-14-43	4	• Washer
8.0-14-44	4	• Bushing
8.0-14-45	1	• Rocker Suspension
8.0-14-46	4	• Screw, Hex Cap
8.0-14-47	4	• Screw, Hex Cap
8.0-14-48	8	• Washer
8.0-14-49	4	• Screw, Hex Cap

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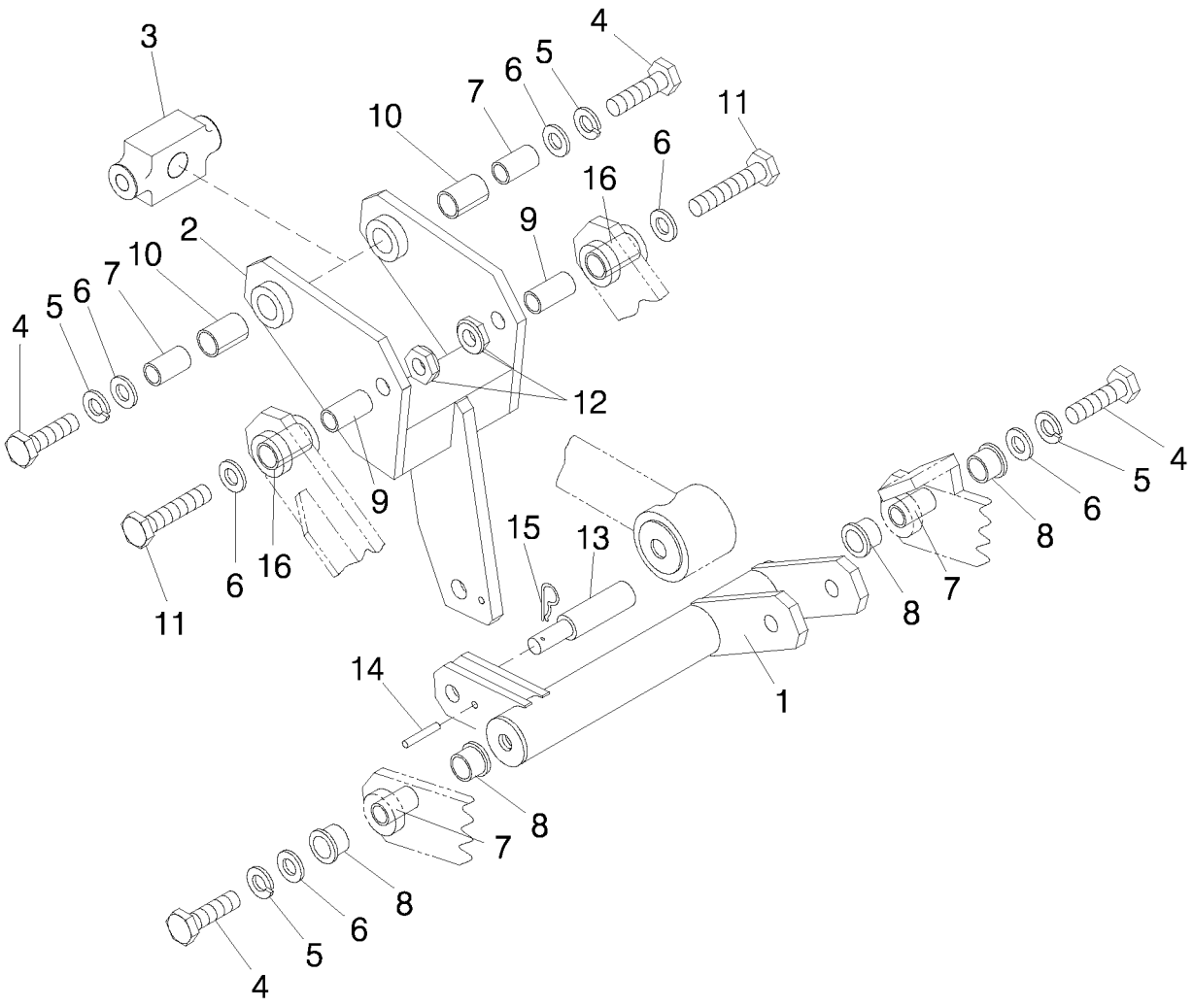


Figure 8.0-15: Safety System

Section-Figure-Index	QTY	Description 1 2 3 4 5
8.0-15-		Safety System
8.0-15-1	1	• Spindle
8.0-15-2	1	• Lever
8.0-15-3	1	• Trestle Block
8.0-15-4	4	• Screw, Hex Cap
8.0-15-5	4	• Washer, Lock
8.0-15-6	6	• Washer, Flat
8.0-15-7	4	• Shaft
8.0-15-8	4	• Bushing
8.0-15-9	2	• Shaft
8.0-15-10	2	• Bushing
8.0-15-11	2	• Screw, Hex Cap
8.0-15-12	2	• Nut, Nylon Lock
8.0-15-13	1	• Safety Pin
8.0-15-14	1	• Shear Pin
8.0-15-15	1	• Pin, Spring Cotter
8.0-15-16	2	• Bushing

8.1 Removal From Vehicle

1. Disconnect the air connections from the pantograph.

2. Disconnect the vehicle main power cables from the high voltage tap on the pantograph base frame.

3. Secure the latch down hook to the latch keeper on the upper frame with wire or rope to prevent accidental raising during lifting or moving.

4. Remove the pantograph mounting bolts from the insulators.

5. Lift the pantograph using the lifting lugs located on the base frame.

8.2 Disassembly

The pantograph should be completely disassembled and cleaned. Any components that are rusty or have poor paint coverage should primed and repainted. Prior to painting clean off all loose rust or paint with a pressure washer or by sand blasting. If sand blasting, mask off all machined surfaces.

Complete disassembly can be accomplished by one person with the help of a second person or overhead crane to lift the larger assemblies. Disassembly should begin with the pan head, and continue to the upper frame, lower frame, and base frame.

WARNING

Remove raising springs before disassembling any parts. Failure to do so could cause injury. The spanner wrench(351-05990) must always be used to prevent fingers from being pinched in the coils of the raising springs.

1. Back off spring tension bolts (2 & 3), using spanner wrench(351-05990) to prevent springs from rotating. Place supports under the springs to prevent them from dropping when bolts are removed. (Figure 8.0-5)

2. Remove the end horns(2) and contact strips(1) from the pan head. (Figure 8.0-14)

a. Remove pan guide from guiding piece(19).

b. Remove screws(33), stopper plugs(28), and locknuts(37) from rocker suspensions(3 & 45).

c. Slide the pan suspension assemblies off of the spindle(4).

3. Remove damper(9). (Figure 8.0-1)

4. Remove bolts(20) from the bearing assemblies. Disconnect shunts and coupling rod then remove upper frame from pantograph. (Figure 8.0-4)

a. Remove internal retaining rings(17) from the fixed bearing block.

b. Remove both bearing assemblies using a proper sized bearing extractor that only presses onto the bearings outer ring. **Pressing on the inner ring or seal of the bearing could cause damage.**

4. Place supports under the air cylinder assembly(1). Remove cotter pin(17), screw(30), and shaft(3). (Figure 8.0-7)

a. Disconnect hose(19) from air cylinder assembly(1).

b. Remove locknuts(29) and bolts (27) and remove air cylinder assembly(1).

c. See section 8.2.1 for disassembly of air cylinder assembly.

5. Disconnect air line to latch assembly air cylinder(2). (Figure 8.0-11)

a. Remove locknuts(24) and screws(22) and remove latch assembly.

6. Place supports under the lower frame to prevent it from dropping. (Figure 8.0-2)

a. Remove bolts(10) from the bearing assemblies. Disconnect shunts and remove lower frame from pantograph.

b. Remove internal retaining rings(8) from the fixed bearing block.

c. Remove both bearing assemblies using a proper sized bearing extractor that only presses onto the bearings outer ring. **Pressing on the inner ring or seal of the bearing could cause damage.**

7. Disassemble all parts and thoroughly clean. After parts are clean inspect carefully for signs of damage, cracks, stress, bending, etc. Repair minor damage if possible, otherwise replace damaged parts with new ones.

8. Inspect all bushings, axles, and shafts for wear or damage and replace if necessary. If wear or damage is questionable replace with new parts. Carefully check all ball bearings for rough rotation, damage, or leaking seals. If the condition of a bearing is questionable replace it with a new one.

9. Inspect all shunts for breaks or severe corrosion. Replace if necessary.

8.2.1 Disassembly of Air Cylinder Assembly

1. Remove nuts(8) from tie rods. (Figure 8.0-9)

2. Separate adapter plate(3) from air cylinder. (Figure 8.0-8)

3. The pistons of the air cylinder and the hydraulic cylinder are screwed together. Separate them by turning on the flats provided on the piston rods. **Do not clamp on the piston rods. Doing so will create nicks in the piston rods and cause damage to the seals.**

4. Remove clevis(4) and bellows(5) from hydraulic cylinder(2). (Figure 8.0-8)

5. Remove plugs(7) and drain hydraulic oil from the hydraulic cylinder(2). (Figure 8.0-8)

6. Loosen swivels on fittings(8) and remove fitting assembly. (Figure 8.0-8)

7. Remove screws(15) and retainer plate(5) from cylinder head(1). (Figure 8.0-10)

a. Remove nuts(14) from tie rods.

b. Separate heads(1) from tube(2).

c. Remove rod gland cartridges(4) from heads(1) by pushing on them from inside the heads.

d. Slide piston out from tube(2).

8. Remove and inspect all seals and o-rings. Replace any that are found to be cut, cracked, or hard. If their condition is questionable replace with new ones. If it has been several years since last overhaul it may be best to replace all seals and o-rings with new ones to insure long service life.

9. Wash all parts thoroughly using mild detergent to remove oil, grease, and dirt residue.

8.3 Assembly

NOTE: Most hardware on the pantograph is stainless steel. Do not use an impact wrench on any fasteners. Stainless steel fasteners tend to seize while being assembled, especially if an impact wrench is used. Use a light coat of Top 2000 grease on all threads to reduce the risk of seizing. This will also help prevent stainless steel fasteners that are threaded into carbon steel from rusting fast.

Table 8.3-1: Torque Chart

	M1.6	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27
Nm	0.1	0.2	0.45	1	1.7	3.4	5.9	14.9	30	50	79	101	140	176	195	223	308
Ft.Lb	0.1	0.15	0.35	0.75	1.25	2.5	4.35	11	22	37	58	74	104	130	144	164	227
	#4	#6	#8	#10	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1"	1-1/4		
In.Lb	8	12	21	30													
Ft.Lb					5	11	18	28	39	51	83	105	160	235	250		

1. Securely bolt the base frame to a table or pallet using the holes in the mounting feet.

2. Completely pack the space between each of the base frame bearing assemblies with Top 2000 grease.

a. Install the bearings into their proper bearing blocks, making sure the fixed bearing

assembly is in the fixed bearing block. (Refer to Figure 5.1-1) Use a proper sized bearing driver that only presses onto the bearings outer ring. **Pressing on the inner ring or seal of the bearing could cause damage.** The floating bearing assembly should be flush, or slightly inside, of its bearing housing. When tightening the bearing mounting bolts it will pull into place.

3. Install rubber bumpers onto base frame.

4. Mount cams(10) and lever(2) assembly to lower frame(1). Do not tighten cam mounting locknuts(13) completely. The cams will need to pivot later when adjusting the static force. (Figure 8.0-3)

a. Set the cam adjustment screws(8) to equal lengths.

5. The large washers(7) on each end of the bearing assemblies fit snugly into a groove on the bearing shafts. Applying grease to the groove helps the washers stay in place during assembly. (Figure 8.0-2)

a. Install lower frame to the base frame. Secure with bearing mounting screws(10).

6. Completely pack the space between each of the upper frame bearing assemblies with Top 2000 grease. (Figure 8.0-4)

a. Install the bearings into their proper bearing blocks, making sure the fixed bearing assembly is in the fixed bearing block. (Refer to Figure 5.1-1) Use a proper sized bearing driver that only presses onto the bearings outer ring. **Pressing on the inner ring or seal of the bearing could cause damage.** The floating bearing assembly should be flush, or slightly inside, of its bearing housing. When tightening the bearing mounting bolts it will pull into place.

b. The large washers(15) on each end of the bearing assemblies fit snugly into a groove on the bearing shafts. Applying grease to the groove helps the washers stay in place during assembly.

c. Install upper frame to the lower frame. Secure with bearing mounting screws(20).

d. Slide protector(11) over cable assemblies(4).

e. Thread turnbuckles(6) and yokes(5) onto cable assemblies(4) making sure there is equal thread engagement between the yoke and cable assembly to allow adjustment.

f. Install straight bushing(3) into upper frame cross member using a long rod or tube. Make sure the rod or tube are considerably larger than the bore of the bushing, otherwise it will push against and damage the bore of the bushing.

g. Install flange bushings(2) to upper frame.

7. Completely pack the space between the coupling rod bearing assemblies with Top 2000 grease. (Figure 8.0-12)

a. Install the bearings into the coupling rod ends. Use a proper sized bearing driver that

only presses onto the bearings outer ring. **Pressing on the inner ring or seal of the bearing could cause damage.** Secure with internal retaining rings(9).

8. Assemble safety system. (Figure 8.0-15)

a. Apply a coat of Top 2000 grease to housing bores of bushings(8,10,&16). This will prevent rusting and rust bleed-out of the steel surfaces.

b. Apply a coat of Top 2000 grease to the bores of bushings(8,10,&16).

c. Install shafts(7 & 9).

d. Attach coupling rod short end(it. 1, Figure 8.0-12) to spindle(1) using locknut(it. 19, Figure 8.0-1) and screw(it. 20, Figure 8.0-1).

e. Attach spindle(1) to base frame.

f. Attach lever(2) to base frame.

g. Check for free rotation of spindle(1), lever(2), and trestle block(3). These items should rotate very freely.

f. Line up holes between the spindle(1) and lever(2) then lightly tap shear pin(14) into place. Install and keep safety pin(13) in place throughout assembly.

9. Assemble pan head. (Figure 8.0-14)

a. Assemble rocker box assemblies. (Refer to Detail B)

b. Install spindle(4) into upper frame cross member.

c. Apply a coat of Top 2000 grease to shaft key(22) and install into spindle(4)

d. Mount rocker suspensions(3 & 45) to spindle and secure with locknuts(37). Make sure that the rocker suspension(3) is on the same side as the pan guide.

e. Attach rocker box assemblies to rocker suspensions(3 & 45) and secure with locknuts(34).

f. Install guiding piece(19) to rocker suspension(3) making sure that its arm is facing towards the pantograph.

g. Apply electrical contact grease to u-channel of carbon strips(1).

h. Install horns(2) into carbon strips(1) and secure to rocker holding fixtures(39 & 40).

i. If necessary grind a smooth transition between the horns and carbon strips.

10. Attach pan guide to lower frame and pan head guiding piece. Apply removable loctite #242 on end of bolt(4) which threads into the lower frame. (Figure 8.0-13)

11. Attach the coupling rod long end(2) to the short end(1) already attached to the safety system. (Figure 8.0-12)

a. Apply Top 2000 grease to threads of the coupling rods.

b. Adjust turnbuckle(3) to have equal engagement with both coupling rod ends.

c. Attach coupling rod to upper frame.

12. Assemble raising springs to pantograph. (Figure 8.0-5)

a. Apply a coat of Top 2000 grease to the grooves of cams(it. 10, Figure 8.0-3).

b. Attach smaller threads of cables(4) to the lower frame and the larger ends to springs(1).

c. Generously apply Top 2000 grease to bolts (2 & 3).

d. Thread bolts(2 & 3) into springs(1) making sure longer bolt(3) is on safety system side. Properly support the springs, in line with the bolts, and thread in by hand.

CAUTION

Do not allow the bolts to support the weight of the springs until they are tensioned. Doing so could damage the threads and cause failure. Only turn the bolts by hand, using a wrench, or with an air ratchet at slow rotation. Do not use an impact gun. Doing so could damage to the threads and cause failure.

e. Tension springs by turning bolts(2 & 3). Secure springs from rotating using spanner wrench(351-05990). The bolts should be adjusted to equal lengths, several inches at a time, alternating between the two bolts.

f. Tighten jam nuts(6) after contact force is properly adjusted.

13. Assembly Pneumatic System. (Figure 8.0-7)

a. Assemble and mount the latch assembly(12) to the base frame. Adjust height to properly catch the keeper plate located on the upper frame then tighten locknuts(it. 24, Figure 8.0-11)

b. Assemble air cylinder assembly(1). (See Section 8.3.1)

c. Attach pivot(2) to air cylinder assembly(1) using clevis pin(16). Secure clevis pin with cotter pin(17).

d. Mount air cylinder assembly to base frame using screws(27), washers(28), and locknuts(29). Do not completely tighten, allowing slight movement of the pivot(2).

e. Attach clevis of air cylinder assembly to the lower frame lever(it. 2, Figure 8.0-3) using shaft(3). Make sure holes in the clevis and shaft are aligned and install cotter pin(17).

f. Tighten locknuts(29) on pivot(2).

g. Apply Top 2000 grease to handle bushing housing. Install flange bushings(14).

f. Apply Top 2000 grease to flange bushings(14) and install shaft(10) making sure keyways are aligned properly.

g. Apply Top 2000 grease to keys(15) and place into keyways.

h. Apply Top 2000 grease to bores of handle(9) and lever(8). Attach handle(9) and lever(8) to shaft(10). Check that the lever and handle are in the proper location. The handle should be horizontal and secured in clamp(11) and the lever should be facing away from the pantograph. Secure with retaining rings(13).

i. Assemble tie rod(4-7). Adjust rod ends(6) to align with mounting holes of lever(8) and shaft(3) **when the air cylinder assembly(1) is completely retracted.**

14. Install all shunts making sure they are routed properly and not rubbing anywhere. Apply electrical contact grease under all shunts. The spring washers must be between the locknuts and the shunts to insure good electrical contact.

15. Refer to Section 7.0 for adjustments.

8.3.1 Assembly of Air Cylinder Assembly

1. Assemble hydraulic cylinder. (Figure 8.0-10)

a. Attach piston seals(13) to piston(3).

b. Install backup rings(7) and o-rings(8) into heads(1).

c. Install o-rings(10), backup rings(9), shaft seals(11), and rod wipers(12) into rod gland cartridges(4).

d. Install piston(3) into tube(2). Carefully work the piston seal into the tube. A light coat of oil will help. **Do not use any sharp objects to force the seal into the tube. Doing so could damage the seals.**

e. Slide heads(1) over piston(3) and press onto tube(2).

f. Slide rod gland cartridges(4) over piston(3) and press into heads(1).

g. Install tie rods(6) through heads(1) and attach to adapter plate(it. 3, Figure 8.0-8). Gradually tighten nuts(14), alternating between them, to 43 ft-lbs wet torque.

h. Attach retainer plate(5) and secure with screws(15).

2. Assembly air cylinder. (Figure 8.0-9)

a. Slide head(2) over hydraulic cylinder piston.

b. Attach air cylinder piston(4) to hydraulic cylinder piston. Apply loctite #242 to threads. Tighten by turning on the flats provided on the piston rods. **Do not clamp on the piston rods. Doing so will create nicks in the pistons rod and cause damage to the seals.**

c. Attach piston seals(5) to piston(4). Both seals should face the same direction. The cylinder is only pressurized from the rear cap.

d. Install piston(4) into tube(3). Carefully work the piston seal into the tube. A light coat of oil will help. **Do not use any sharp objects to force the seal into the tube. Doing so could damage the seals.**

e. Attach cap(1) to tube(3).

f. Check that all ports are in their proper locations.

g. Thread tie rods(6) into mount(7).

h. Install tie rods(6) through cap(1), head(2), and adapter plate. Gradually tighten nuts(8), alternating between them.

3. Finish assembly. (Figure 8.0-8)

a. Attach elbows(8) to hydraulic cylinder(2).

b. Assembly elbows(9), flow control valves(11), and female connectors(10). Use loctite #592 on pipe threads.

c. Attach elbows(9) to elbows(8) and hand tighten.

d. Measure and cut tube(12) to proper length to fit snugly between the seats of the female connectors(10). De-burr inside and outside of tube.

e. Slip nuts and ferrules of female connectors(10) onto tube. Make sure the long, straight end of the ferrules points toward tube ends.

f. Lightly lubricate the threads and ferrules with oil.

g. Hand tighten nuts onto female connectors(10).

h. Tighten swivel fittings of elbows(8) making sure both fitting assemblies remain in line with each other.

i. Tighten nuts onto female connectors(10).

j. Fill hydraulic cylinder with Texaco Oil 5606G using ports located in top of hydraulic cylinder. Install and tighten plugs(7).

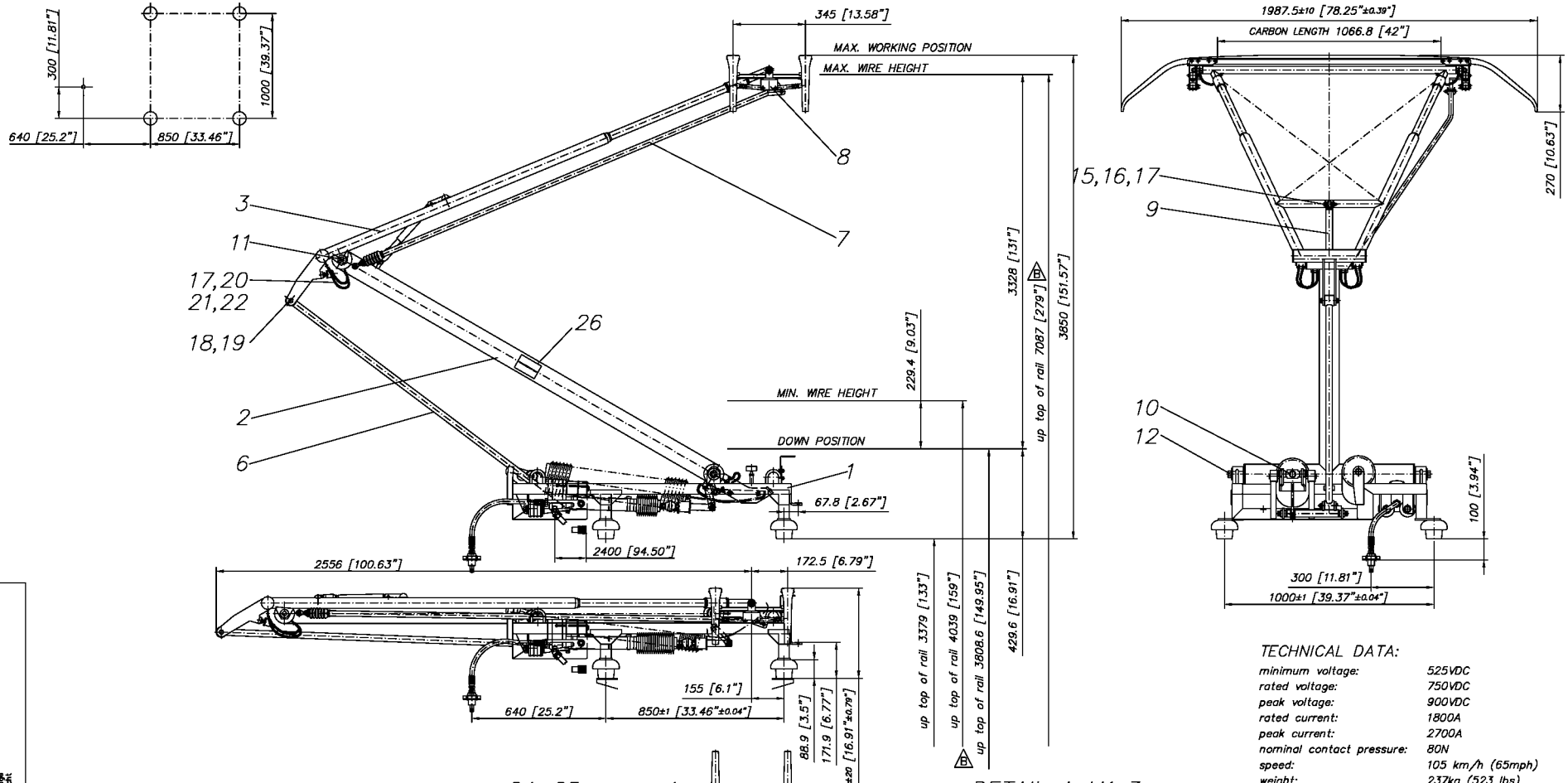
k. Open flow control valves(11) completely buy turning adjustment screws counterclockwise.

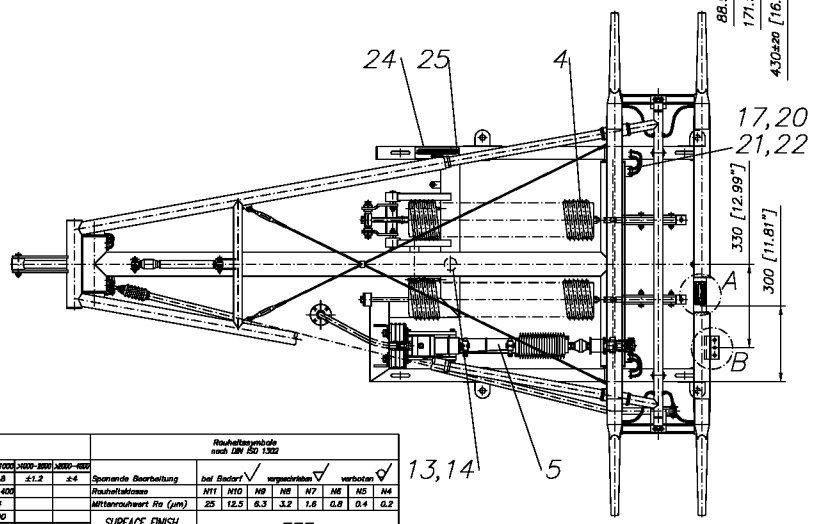
l. Cycle air cylinder assembly several times by applying air to front and rear ports of air cylinder(1).

m. Open plugs(7) and check level of oil. Top off if necessary.

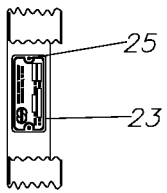
n. Repeat steps (l) and (m) until no air is remaining in hydraulic cylinder.

o. Attach bellows(5) and clevis(4) to hydraulic cylinder. Apply loctite #242 to threads of clevis. Tighten by turning on the flats provided on the piston rod. **Do not clamp on the piston rod. Doing so will cause nicks in the pistons rod and cause damage to the seals.**

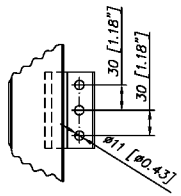




DETAIL A M1:3



DETAIL B M1:3



TECHNICAL DATA:

minimum voltage:	525VDC
rated voltage:	750VDC
peak voltage:	900VDC
rated current:	1800A
peak current:	2700A
nominal contact pressure:	80N
speed:	105 km/h (65mph)
weight:	237kg (523 lbs)
ambient temperature:	−30°C − +60°C (−22°F − +140°F)
material of collector strips:	metal impregnated carbon
standards:	EN 50206−2

Current connection from base−frame to lower−frame, lower−frame to upper−frame and upper−frame to pan−head with four shunts in each case!

Use contact−grease for current connections!

Die unbefugte bzw. bestimmungswidrige Verwendung dieser Unterlage ist nicht gestattet und wird gerichtlich verfolgt

Freimaßtoleranz nach DIN ISO 7168 mittel							
Längen-Maße	0.5–6	>6–30	>30–120	>120–400	>400–1000	>1000–2000	>2000–4000
	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±4
Kanten-brüche Radien	0.5–3	>3–6	>6–30	>30–120	>120–400		
	±0.2	±0.5	±1	±2	±4		
Winkel tol. beim kürz. Schenkel	−10	>10–50	>50–120	>120–400	>400		
	±1°	±0°30'	±0°20'	±0°10'	±0°5'		

Rauheitssymbole nach DIN ISO 1302								
Spanende Bearbeitung	bei Bedarf √		vorgeschrieben √			verboten √		
Rauheitsklasse	N11	N10	N9	N8	N7	N6	N5	N4
Mittenrauhwert Ra (µm)	25	12.5	6.3	3.2	1.6	0.8	0.4	0.2
SURFACE FINISH	---							

DARK GREY RAL7024

Verwendbar fuer:
WBR LACMTA

Masse ohne Toleranzangabe: DIN7168 mittel

Oberflaechen DIN ISO 1302

A	151.75 WAS 141.57	08-23-03	DPC		
B	Various	01-08-04	JGL	Bearb.	03.10.00 Terry
C	Up top of rail dim.	03-10-04	JGL	Gepr.	03.10.00 Pardeller
				Norm.	

Ausg. | Datum | Maszstab 1:1

HERETO PARTSLIST SHEET 01−02.

PANTOGRAPH WBR
Stromabnehmer WBR

Schunk Bahntechnik GmbH Salzburg

1−11320.5291
S10−00−5291

Blatt 01 | 01 | Ersetzt | Ersetzt

Zust. | Aenderung | Datum | Name | Urspr.

USB00000086_0801

Identif. E-T02067	Edition 00	Date 07.07.11

TECHNICAL SPECIFICATION

30kVA STATIC CONVERTER
750Vdc / 400Vac, 50Hz

Albatros, 7 y 9 (Pol. Ind. La Estación)
Teléfs. 91 495 70 00
Telefax 91 692 64 22
28320 PINTO (Madrid)

CONTROL OF EDITIONS AND MODIFICATIONS

EDITION	MODIFICATIONS
00	First edition

00	07.07.11			
		N. HERREROS	I. GONZALEZ	P. DE LA ANTONIA
EDITION	DATE	PREPARED	REVIEWED	APPROVED

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1 PURPOSE

This specification defines the design characteristics, construction and installation of the 30kVA Static Converters.

Train	Coach Builder	Railway Administration
	CAF	Edinburgh Tramway

The design and manufacturing of the equipment is done under quality assurance ISO 9001. SEPSA is a registered enterprise.

2 REFERENCE STANDARDS AND DOCUMENTS

EN 50124	Railway applications. Insulation coordination. Part 1. Clearances and creepage distances for all electrical and electronic equipment.
EN 50125	Railway applications. Environmental conditions for equipment. Part 1: Equipment on board Rolling Stock.
EN 50155	Railway applications. Electronic Equipment used on rolling stock..
ENV 50121-3-2	Railway applications. Electromagnetic compatibility. Part 3-2: requirement for rolling stock apparatus
EN 50207	Railway applications. Electronic power converters for rolling stock.
IEC 60146	Semiconductor convertors
IEC 60310	Traction transformers and inductors
IEC 60411	Single phase traction power convertors.
IEC 60529	Classification of degrees of protection provided by enclosures
IEC 60571	Electronic equipment used on rail vehicles
IEC 61287	Electronic power converters installed on rolling stock
IEC 61373	Railway applications. Rolling stock equipment. Shock and vibration test.
MIL-HDBK-472	Maintainability Prediction.
NF F 16101	Comportement au feu. Choix des matériaux.
NF F 16102	Comportement au feu. Choix des matériaux, applications aux équipements électriques.
UTE C 80-810	Recueil de données de fiabilité des composants electroniques.

3 EQUIPMENT MAIN FUNCTION

The equipment function is to provide LV energy for the Tramway auxiliary systems. It takes the energy from the HV catenary line.

The converter supplies energy to the a.c. load.

The a.c. output is not electrically isolated from the input line.

In case of using three-phase induction motors as loads that represents at least a 10% of the total AC output (kW), these shall be designed under design H according to EN 60034-12:2002 standard or under design C according to NEMA MG1 standard.

4 ELECTRICAL CHARACTERISTICS

4.1 D.C. Input Line

Nominal voltage	:	750Vdc
Voltage range	:	500Vdc to 1000Vdc
Nominal current	:	37A
Maximum overvoltages	:	IEC 61287-1
Input filter resonant frequency	:	≤45Hz
Dielectric strength test from the input to the frame and rest of circuits	:	2.5kV, 50/60 Hz, 1 min

4.2 A.C. Output

Nominal voltage	:	400Vac ±10% at HV>570Vdc
Nominal frequency	:	50Hz ±2%
Phase number	:	3
Total harmonic distortion	:	<15%
Nominal Power	:	30kVA, 25kW
Transient Power	:	60kVA, power factor <0.5,10 s
Shortcircuit protection	:	Yes
Dielectric strength test from the input to the frame and rest of circuits	:	2.5kV, 50/60 Hz, 1 min

With an input voltage of >570Vdc the voltage and the output frequency will be decreased at 360Vac and 45Hz in order to maintain motor torque to the compressor motors.

4.3 Control input supply

Nominal voltage	:	24Vdc
Voltage range	:	16.8Vdc to 30Vdc
Consumption	:	<50W

As an option: There is a power supply from HV line to start the static converter in case of dead battery.

4.4 Common Characteristics

Efficiency	:	>90% from 50% to 100% of load
Start up time after input voltage gap	:	< 3 sec

5 OTHER CHARACTERISTICS

5.1 Temperature

Internal temperature from -20ºC to +80ºC

The equipment can operate at full power with an external temperature from -20ºC to 50ºC.

The equipment can operate at lower power with higher external temperatures.

5.2 Humidity

Relative humidity : 35% to 95%

5.3 Dust

The converter can work in an ambient with the following dust particle size and composition.

- ***Size***

  less than 200μm 100% in weight
  less than 80μm 90 ÷100% in weight
  less than 20μm 40 ÷ 90% in weight

- ***Composition***

  Variable, with possibility of metallic particles presence.

5.4 Shocks and Vibrations

The converter withstands the following vibrations and accelerations typical of the railway services (IEC 61287-1):

- Longitudinal acceleration : 5 g - 10ms
- Vertical acceleration : 3 g - 10ms
- Transversal acceleration : 3 g - 10ms
- Sinusoidal vibrations :

  frequency = 1 ÷ 10Hz amplitude = 25/f mm
  frequency = 10 ÷ 100Hz amplitude = $250/f^2$ mm

5.5 Fire resistance and smoke emission

The equipment complies with the standards NF F 16101 and NF F 16102 degree A1 (Trains for under tunnel service).

5.6 Noise level

The average noise level in all directions, at a distance of 1 m from the converter and under normal running conditions, is less than 72dB (curve A).

5.7 Level of protection and cooling

The equipment electronic components are contained in a watertight enclosure with a protection level IP 65 (IEC 60529). The semiconductors are mounted on earthed heatsinks.

The magnetic elements are located in a forced ventilated cabinet. The degree of protection of this cabinet is IP 24 (IEC 60529). The elements fitted in this compartment are protected against dust and water.

The needed air flow is 600m^3/h. The air is taken from the outside.

The heatsinks are forced ventilated but the semiconductors are located in the watertight enclosure.

6 RELIABILITY

The mean time between faults (MTBF) shall be 36000 hours based on the following standards MIL-HDBK-217, IEEE 500, CNET and on the experience of the equipment in service.

The mean time to repair (MTTR) shall be 1.5 hours.

7 ELECTRICAL CONSTRUCTION

See block diagram

- ***Input Fuse*** ***100A, 750V***

  A fuse is used to protect the equipment when the other electronic protections fail or in the case of input circuit failure.

  The fuse is external to the equipment and it is not included in our supply.

- ***Input Filter*** ***750Vdc***

  It is composed of a series inductor and a parallel capacitor. The filter functions are the following ones:

  - To reduce the ripple voltage present at the input
  - To limit the harmonics in the input current with a high impedance.
  - To protect against the overvoltages and voltage drops

- ***Modulated Inverter*** ***750Vdc / 400Vac, 50Hz***

  There is an IGBT inverter with sine modulation connected at the output of the filter.

  This circuit transforms the non stabilized d.c. into three-phase alternating current

  The low frequency harmonics are eliminated with the inverter modulation.

  The output voltage is also regulated by means of this modulation.

- ***Alternating current filter*** ***400Vac***

  Its function is to reduce the high frequency harmonics produced by the converter so that the specified harmonic distortion can be achieved.

  It is formed by a series reactor and parallel capacitors.

- ***Ventilation System***

  The necessary elements for the forced ventilation, as blower motor and protections, are included in the equipment.

- ***Control circuit***

  This is based on a 16-bit microprocessor. This circuit measures the input voltages, output voltages, output currents, as well as a series of internal variables of the converter and generates all of the commands for the semiconductors and the electromechanical elements.

  It also has a series of warning detectors. In the case of a fault, the state bits are recorded in the EEPROM memory so that they can be analysed later using a portable PC. This helps equipment maintenance.

  Interface signals:

  - One input (+24V) : start-up signal
  - One relay output (+24V) : spare
  - One relay output (+24V) : failure
  - One relay output (+24V) : correct output voltage

8 MONITORING SOFTWARE DESCRIPTION

The equipment is connected to the PC through RS 232 serial line. It runs under Windows 95, 98, Me, 20000 and XP operating systems.

The software is a user-friendly visual and graphic tool to help in the system servicing.

Monitoring Software Functions

➔ Real time monitoring

- Equipment Internal and external status signals
- Analog variables (currents, voltages, etc)
- Software version installed in the equipment
- Availability to Stop/Start the equipment
- Equipment reset when it is locked out
- Availability to store a PC monitoring session into a file for later analysis using the same graphic interface.

➔ Download of events logged in the Converter Control PCB to be shown on the screen. The equipment can store up to 250 events (depending on record length).

➔ Updating of Converter Control Software

9 MECHANICAL CONSTRUCTION

The equipment is contained in a box, and is made out with easily removable subassemblies which perform clearly defined electrical functions, in order to help equipment maintenance,

The converter box is a structure made of welded steel and painted.

The covers are made from steel.

The inner brackets and frames are made of steel or of fibre glass reinforced polyester when electrical isolation is needed.

The main semiconductors are mounted on aluminium heatsinks.

Transformers and inductors are mounted on shock absorbers to reduce the mechanical stress due to vibrations of the railway.

The converter is to be mounted rigidly (without shock-absorbers) to the vehicle.

10 DIMENSIONS AND WEIGHT

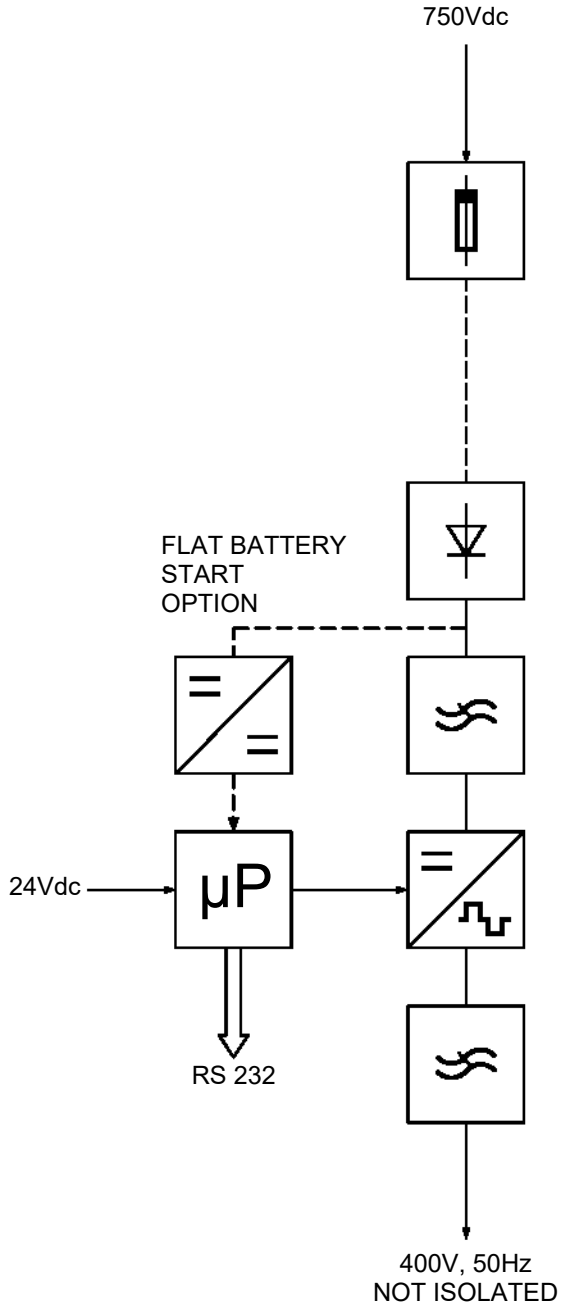
The equipment will be mounted on the roof.

The estimated dimensions and weight are:

Length	Width	Height	Weight
600 mm	1600 mm	470 mm	350 kg

Exact dimensions and fixings to be defined throughout the project.

11 BLOCK DIAGRAM



E-2067

Identif. E-T02068	Edition 00	Date 07.07.11

TECHNICAL SPECIFICATION

8kW BATTERY CHARGER
400Vac III 50Hz / 24Vdc

Albatros, 7 y 9 (Pol. Ind. La Estación)
Teléfs. 91 495 70 00
Telefax 91 692 64 22
28320 PINTO (Madrid)

CONTROL OF EDITIONS AND MODIFICATIONS

EDITION	MODIFICATIONS
00	First edition

EDITION	DATE	PREPARED	REVIEWED	APPROVED
00	07.07.11	N. HERREROS	I. GONZALEZ	P. DE LA ANTONIA

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1 PURPOSE

This specification defines the design characteristics, construction and installation of the 8kW Battery Chargers.

Train	Coach Builder	Railway Administration
	CAF	Edinburgh Tramway

The design and manufacturing of the equipment is done under quality assurance ISO 9001. SEPSA is a registered enterprise.

2 REFERENCE STANDARDS AND DOCUMENTS

EN 50124	Railway applications. Insulation coordination. Part 1. Clearances and creepage distances for all electrical and electronic equipment.
EN 50125	Railway applications. Environmental conditions for equipment. Part 1: Equipment on board Rolling Stock.
EN 50155	Railway applications. Electronic Equipment used on rolling stock.
ENV 50121-3-2	Railway applications. Electromagnetic compatibility. Part 3-2: requirement for rolling stock apparatus
EN 50207	Railway applications. Electronic power converters for rolling stock.
IEC 60146	Semiconductor convertors
IEC 60310	Traction transformers and inductors
IEC 60411	Single phase traction power convertors.
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NF F 16102	Comportement au feu. Choix des matériaux, applications aux équipements électriques.
UTE C 80-810	Recueil de données de fiabilité des composants electroniques.

3 EQUIPMENT MAIN FUNCTION

The equipment function is to provide LV energy for the Tramway auxiliary systems. It takes the energy from the 400Vac line of static converter.

The converter supplies energy to the d.c. load and battery charging.

The outputs are electrically isolated from the input line.

4 ELECTRICAL CHARACTERISTICS

4.1 A.C. Input Line

Nominal voltage	:	400Vac
Voltage range	:	360Vac to 440Vac
Nominal frequency	:	50Hz
Input voltage waveform	:	sinusoidal
Nominal current	:	18A
Power factor	:	$\approx$0.8
Dielectric strength test from the input to the frame and rest of circuits	:	2.5kV, 50/60 Hz, 1 min

4.2 D.C. Output

Floating voltage	:	28.9Vdc
Voltage stability	:	±1%
Voltage adjustment	:	±5%
Ripple voltage	:	<1% rms
Maximum current limit	:	277A
Battery current limit	:	TBD
Permanent Power	:	8kW
Shortcircuit protection	:	Yes
Dielectric strength test from the output to the frame and rest of circuits	:	0.5kV, 50/60 Hz, 1 min

4.3 Control input supply

Nominal voltage	:	400Vac
Consumption	:	50W

4.4 Common Characteristics

Efficiency	:	>80% at 100% of load

5 OTHER CHARACTERISTICS

5.1 Temperature

Internal temperature from -20ºC to +80ºC

The equipment can operate at full power with an external temperature from -20ºC to 50ºC.

The equipment can operate at lower power with higher external temperatures.

5.2 Humidity

Relative humidity : 35% to 95%

5.3 Dust

The converter can work in an ambient with the following dust particle size and composition.

- ***Size***

  less than 200μm 100% in weight
  less than 80μm 90 ÷100% in weight
  less than 20μm 40 ÷ 90% in weight

- ***Composition***

  Variable, with possibility of metallic particles presence.

5.4 Shocks and Vibrations

The equipment withstands the following vibrations and accelerations typical of the railway services (IEC 61287-1):

- Longitudinal acceleration : 5 g - 10ms
- Vertical acceleration : 3 g - 10ms
- Transversal acceleration : 3 g - 10ms
- Sinusoidal vibrations :

frequency = 1 ÷ 10Hz amplitude = 25/f mm
frequency = 10 ÷ 100Hz amplitude = $250/f^2$ mm

5.5 Fire resistance and smoke emission

The equipment complies with the standards NF F 16101 and NF F 16102 degree A1 (Trains for under tunnel service).

5.6 Noise level

The average noise level in all directions, at a distance of 1 m from the converter and under normal running conditions, is less than 70dB (curve A).

5.7 Level of protection and cooling

The equipment electronic components are contained in a watertight enclosure with a protection level IP 65 (IEC 60529). The semiconductors are mounted on earthed heatsinks.

The magnetic elements are located in a forced ventilated cabinet. The degree of protection of this cabinet is IP 24 (IEC 60529). The elements fitted in this compartment are protected against dust and water.

The needed air flow is 500m^3/h. The air is taken from the outside.

The heatsinks are forced ventilated but the semiconductors are located in the watertight enclosure.

6 RELIABILITY

The mean time between faults (MTBF) shall be 80000 hours based on the following standards MIL-HDBK-217, IEEE 500, CNET and on the experience of the equipment in service.

The mean time to repair (MTTR) shall be 2 hours.

7 ELECTRICAL CONSTRUCTION

See block diagram

- ***Input circuit breaker*** ***60A, 500V***

  A circuit breaker is used to protect the equipment when the other electronic protections fail or in the case of input circuit failure.

  The circuit breaker is external to the equipment and it is not included in our supply.

- ***Isolation transformer*** ***400Vac / 27Vac***

  A transformer with 1 secondary adapts the voltage level between the input and output.

  It also provides the electrical isolation necessary among the different circuits.

- ***Rectifier*** ***27Vac / 24Vdc***

  It is supplied from an output of the transformer. It provides a d.c. regulated voltage.

  It is based on a controlled rectifier and an output filter.

- ***Ventilation System***

  The necessary elements for the forced ventilation, as blower motor and protections, are included in the equipment.

- ***Control circuit***

  This is based on electronic circuits of conventional software. This circuit measures the input voltages, output voltages, output currents, as well as a series of internal variables of the converter and generates all of the commands for the semiconductors and the electromechanical elements.

8 MECHANICAL CONSTRUCTION

The equipment is contained in a box, and is made out with easily removable subassemblies which perform clearly defined electrical functions, in order to help equipment maintenance,

The converter box is a structure made of welded steel and painted.

The covers are made from steel.

The inner brackets and frames are made of steel or of fibre glass reinforced polyester when electrical isolation is needed.

The main semiconductors are mounted on aluminium heatsinks.

Transformers and inductors are mounted on shock absorbers to reduce the mechanical stress due to vibrations of the railway.

The converter is to be mounted rigidly (without shock-absorbers) to the vehicle.

9 DIMENSIONS AND WEIGHT

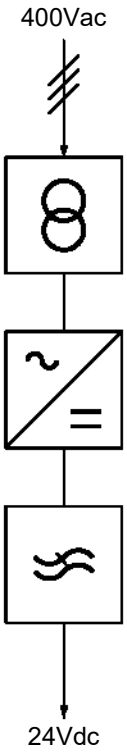
The equipment will be mounted on the roof

The estimated dimensions and weight are:

Length	Width	Height	Weight
550 mm	850 mm	480 mm	200 kg

Exact dimensions and fixings to be defined throughout the project.

10 BLOCK DIAGRAM



E-2068

INCT Innovative Noise Control Technologies

Applications for S&V wheel absorber on resilent wheels



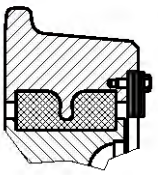


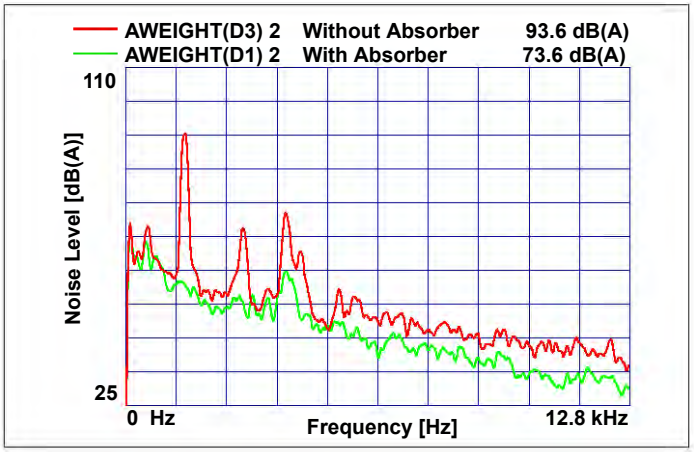
Vehicle: Gt4 / SSB

8 absorber per wheel

Fixing holes 24 x M8

Pitch circle diameter 566 mm







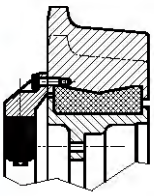


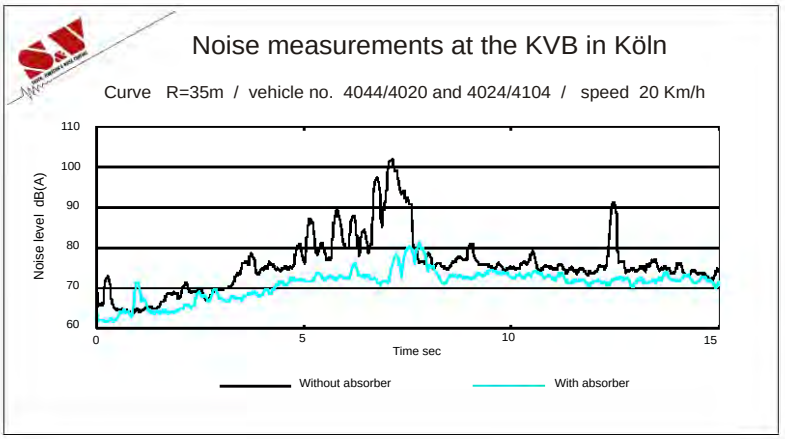
Vehicle: K4000 / KVB

4 absorber per wheel

Fixing holes 16 x M8

Pitch circle diameter 510 mm







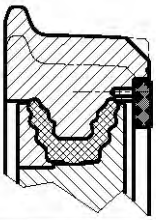


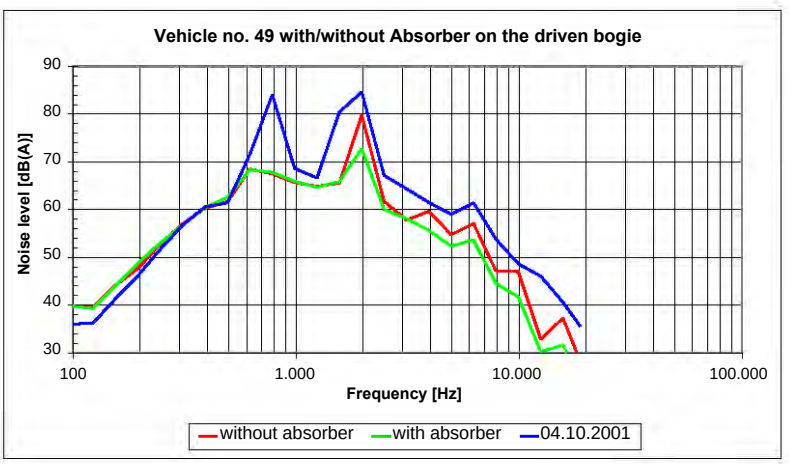
Vehicle: CITADIS / Orléans

4 absorber per wheel

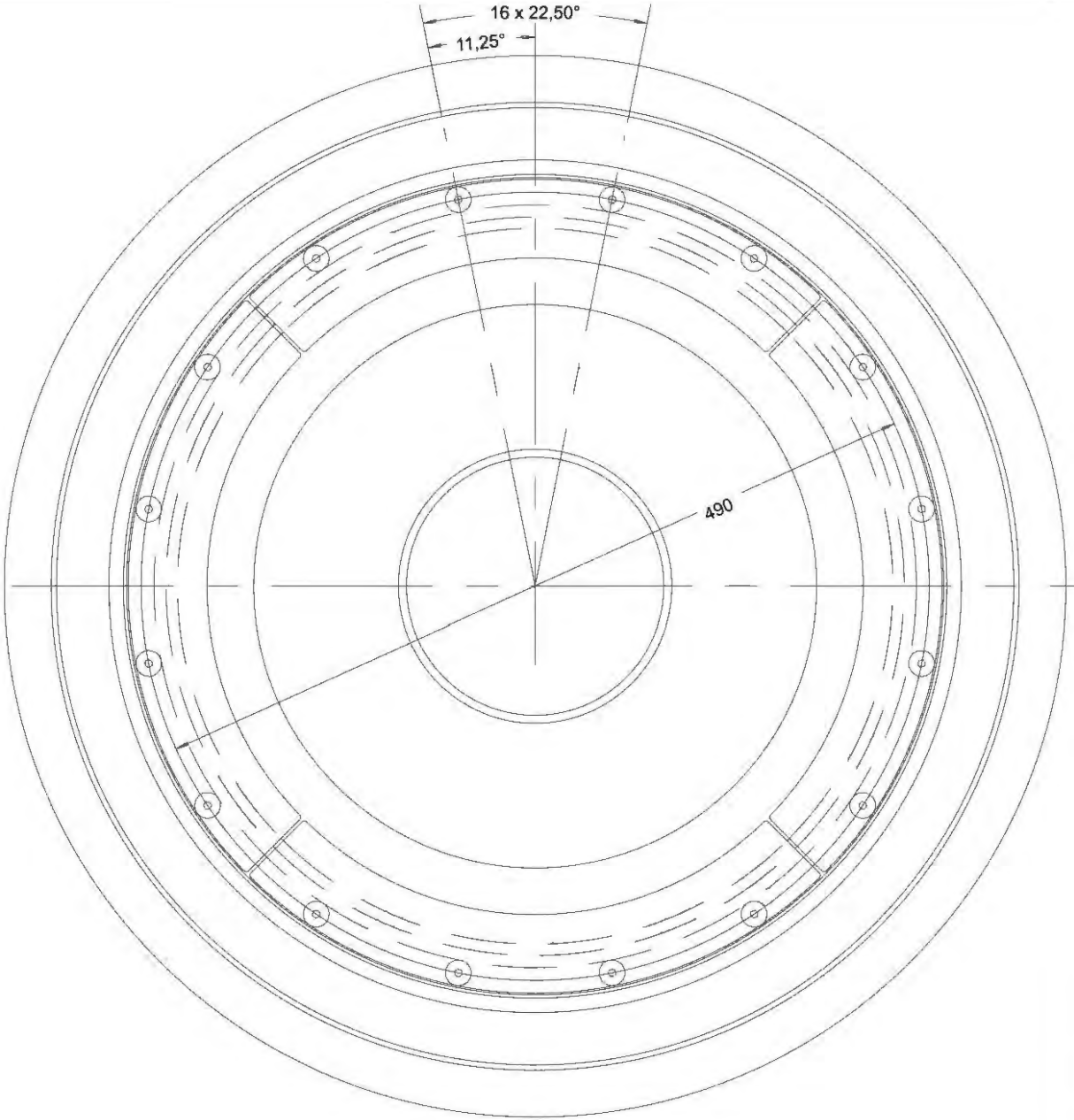
Fixing holes 16 x M8

Pitch circle diameter 492 mm

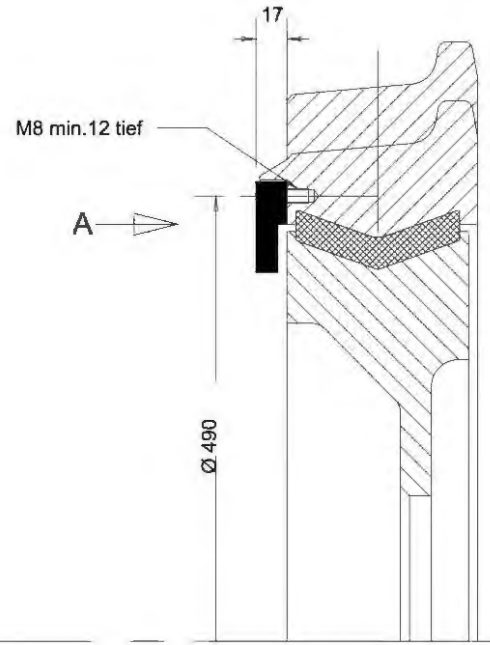


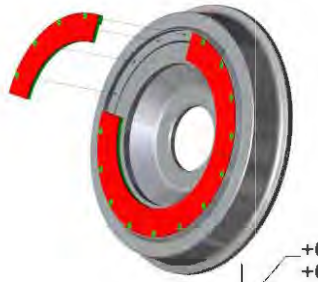


Schrey & Veit GmbH Zotzenheimer Str. 42 D-55576 Sprendlingen Tel. +49 6701 / 960170 Fax +49 6701 / 960171 www.sundv.de



Ansicht A





+0,5
+0,1

-0,1
-0,5

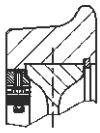
Schutzvermerk n. DIN 34 beachten

Werkstückkanten n. DIN 6784

(Zul. Abw.) Freimaßtoleranz DIN 7168-m		(Oberfläche) 6,3	(Maßstab) 1:4	(Gewicht)
			(Werkstoff)	(Oberflächenbehandlung)
	Datum	Name	(Benennung) Wheel Ø 610 Rotterdam	
Bearb.	22.08.04	Jung		
Gepr.				
Norm				
Schrey & Veit GmbH Zotzenheimerstr. 42 D-55576 Sprendlingen			(Zeichnungsnummer) 3-300919-1 USB00000086_0822	Blatt 1 Blätter
			Ers. für:	Ers. durch:

Customer reference list for S&V Vibration Absorber

ADtranz GmbH
Wheel absorber for S-Bahn Berlin, Absorber to reduce gear noise of a metro

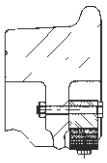




Bayerische Zugspitzbahn AG
Wheel absorber for DTW

Bochumer Verein Verkehrstechnik GmbH
Wheel absorber for trams of ADtranz

BOMBARDIER *TRANSPORTATION*
Wheel absorber for trams of Cologne (K4000), INCENTRO Nottingham





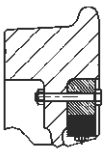
BONATRANS a.s.
Wheel absorber for locomotives

BVZ Zermatt-Bahn
Wheel absorber for coaches



HSL / NL Zermatt-Bahn
Absorber for the new highspeed line Amsterdam-Paris

MOB Montreux-Oberland Bernois
Wheel absorber for observation coaches, locomotives,
driving trailers and railcars.

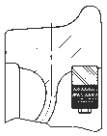




NS Technisch Onderzoek
Rail absorber for tracks in Roosendaal and Roermond / NL

Orléans
Wheel absorber for trams CITADIS / Alstom

ÖBB Österreichische Bundesbahnen
Absorber for a railway steel bridge in Vienna

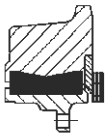




Radsatzfabrik Ilsenburg GmbH
Wheel absorber for Project "Low Noise Train" and “Appenzeller” Railway

RET Rotterdam
Wheel absorber for trams of Rotterdam CITADIS / Alstom

ROUES ET TRAINS MONTES RTM S.A.
High temperature absorber for freight cars of the Dolomiet Shuttle



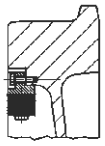


S-Bahn Berlin
Wheel absorber VICON-RSI for new vehicles BR 481/482

Siemens AG
Wheel absorber for the new Combino Tram of Amsterdam



Siemens Transportation Systems
Wheel absorber VICON-RASA for locomotive RH1016/1116 for die ÖBB and DB AG



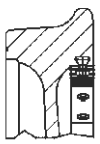
SNCF
Rail damper and absorber for steel bridges

Stadler Bussnang AG
Wheel absorber VICON-RASA for coaches of AOMC in Aigle, BVB in Bex, BVZ in Visp und others



Stuttgarter Straßenbahnen AG
Wheel absorber VICON-RASA for old and new trams /GT4, DT8.8 and DT8.10 and the rack railway

WILSON, IHRIG & ASSOCIATES, INC.
Rail absorber for TCRP C3A Project in Portland





Total number of S&V absorber systems in practical operation:

Blockabsorber VICON-RASA	46.200 units on 8.250 wheels
New absorber system VICON-RSA(I)	8.250 units on 2.740 wheels
Rail and bridge absorber VICON-AMSA	31.550 units

Customer reference list for other applications:

Dornier GmbH, Dornier Luftfahrt, FairchildDornier, EADS LFK-Lenkflugkörpersysteme, HDW Howaltswerke-Deutsche Werft GmbH, Loggers, Noske-Kaeser, SEL Verteidigungssysteme, Socitec, Siemens Krauss-Maffei, ThyssenKrupp Marine Systems, Valeo Klimasysteme, ZEPPELIN Luftschifftechnik.

THIS IS SCHEDULE PART 17 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 17

(1) TIE LIMITED

- and -

(2) BILFINGER BERGER (UK) LIMITED

- and -

(3) SIEMENS plc

-and-

(4) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

NOVATION OF A TRAM SUPPLY AGREEMENT

in respect of

EDINBURGH TRAM NETWORK

AGREEMENT

AMONG

(1) **tie LIMITED** (company number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ ("**tie**");

(2) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London EC1A 4EJ which expression shall include its successors, permitted assignees and transferees; and

(3) **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens Square, Frimley, Camberley, Surrey GU16 8QD which expression shall include its successors, permitted assignees and transferees,

(Bilfinger Berger UK Limited and Siemens plc together the "**Infraco**" and each separately an "**Infraco Member**"); and

(4) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF),** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa), Spain ("**Tramco**");

BACKGROUND

A By an agreement in writing dated ◆ . 2008 ("**Tram Supply Agreement**") **tie** appointed Tramco to design, manufacture and supply Trams and to supply documentation and associated equipment in connection with the Edinburgh Tram Network. A copy of the Tram Supply Agreement is attached to this Agreement and initialled by the parties for the purpose of identification. This Agreement is supplemental to the Tram Supply Agreement.

B **tie** and Infraco have entered into a contract ("**Infraco Contract**") under which Infraco has been appointed to carry out and/or manage the design, construction, installation, commissioning, tram procurement, system integration, infrastructure maintenance, tram maintenance and supply of related equipment and materials, trams and related infrastructure in respect of the Edinburgh Tram Network.

C **tie** and Infraco have agreed, with the consent of Tramco, that Infraco shall take over the rights and liabilities of the "Client" (as defined in the Tram Supply Agreement) under the Tram Supply Agreement and that Tramco shall owe all of the duties and obligations arising thereunder to Infraco by novating the Tram Supply Agreement from **tie** to Infraco upon and subject to the terms of this Agreement.

D **tie** wishes to be released from the Tram Supply Agreement and Tramco has agreed to release **tie**.

1. DEFINITIONS AND INTERPRETATION

1.1 The definitions given in the recitals to this Agreement apply to this Agreement.

1.2 In this Agreement the following additional words and expressions shall have the meanings set out opposite to them:

"**Effective Date**" means the last date of execution of this Agreement."

1.3 Clause headings in this Agreement are for the convenience of the parties only and do not affect its interpretation.

1.4 Unless otherwise defined hereunder, where the Tram Supply Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement.

2. RELEASE BY TRAMCO OF tie

2.1 Tramco releases and discharges **tie** from any and all duties, obligations and liabilities owed to Tramco under the Tram Supply Agreement and accepts the liability of Infraco under the Tram Supply Agreement in lieu of **tie**.

3. RELEASE BY tie OF TRAMCO

3.1 **tie** releases and discharges Tramco from the further performance of Tramco's duties and obligations under the Tram Supply Agreement.

4. ACCEPTANCE OF LIABILITY BY TRAMCO TO THE INFRACO

4.1 Tramco undertakes to Infraco to continue to perform all the duties and to discharge all the obligations of Tramco under the Tram Supply Agreement and to be bound by its terms and conditions in every way as if Infraco was and always had been a party to the Tram Supply Agreement in place of **tie**.

4.2 Tramco warrants to Infraco that, in respect of the duties and obligations which it has already performed under the Tram Supply Agreement, it has performed those duties and obligations in accordance with the standards of skill and care set out in the Tram Supply Agreement and otherwise in compliance with all of the terms and conditions thereof. Tramco warrants to Infraco that it shall be liable for any loss or damage suffered or incurred by Infraco arising out of any negligent act, default or breach by Tramco in the performance of its obligations under the Tram Supply Agreement prior to the Effective Date. Tramco shall be liable for such loss or damage notwithstanding that such loss or damage would not have been suffered or incurred by **tie** (or suffered or incurred to the same extent by **tie**).

4.3 Without prejudice to Clauses 4.2 or 4.4, Tramco shall not contend under this Agreement that its liability to Infraco is affected or diminished by reason of **tie** having suffered no loss and/or any loss claimed to have been suffered by Infraco being different in character from that suffered by **tie**.

4.4 Tramco confirms it was aware at the time of entering into the Tram Supply Agreement that Infraco could suffer losses, damages, costs, expenses, claims, demands and proceedings as a result of Tramco's breach of the Tram Supply Agreement.

4.5 Without prejudice to the generality of this Agreement, Tramco warrants and undertakes to Infraco that its duties and obligations under, the Tram Supply Agreement, whether required to be performed prior to the date hereof, have been and will be performed in accordance with the Tram Supply Agreement.

4.6 Tramco acknowledges that any breach of the warranties in this Agreement may cause Infraco to be in breach of the Infraco Contract and/or cause Infraco to suffer loss and/or damage.

4.7 The liability of Tramco to Infraco pursuant to the Tram Supply Agreement as novated by this Agreement (both in respect of the period prior to the Effective Date and after the Effective Date) shall not be affected by Infraco's assumption of liability to **tie** in respect of the Edinburgh Tram Network pursuant to the Infraco Contract.

4.8 Tramco acknowledges that Infraco has and shall continue to rely upon all Tram Works provided by Tramco under the Tram Supply Agreement as novated by this Agreement.

4.9 For the avoidance of doubt, in accordance with Clause 41.2 of the Tram Supply Agreement save where expressly provided for in the Tram Supply Agreement, nothing in this Agreement shall expose either Party to the application of Indirect Loss.

5. VESTING OF REMEDIES AGAINST TRAMCO

All rights of action and remedies against Tramco under and pursuant to the Tram Supply Agreement vested in **tie** (including their accrued rights of action and remedies) shall automatically and without the need for any further action on the part of Infraco, vest in Infraco with effect from the Effective Date.

6. ACCEPTANCE OF LIABILITY BY INFRACO

With effect from the Effective Date Infraco undertakes to perform all the duties and to discharge all the obligations of **tie** under the Tram Supply Agreement as novated by this Agreement and to be bound by its terms and conditions in every way as if Infraco was and always had been a party to the Tram Supply Agreement in place of **tie** and as if all acts and omissions of **tie** under or pursuant to the Tram Supply Agreement prior to the Effective Date were the acts and omissions of Infraco.

7. VESTING OF REMEDIES AGAINST tie

As from the Effective Date, all rights of action and remedies under or pursuant to the Tram Supply Agreement vested in Tramco shall lie against Infraco and not **tie** whether or not such rights of action or remedies may have arisen prior to, on or after the Effective Date.

8. ACKNOWLEDGEMENT OF PAYMENT

Tramco acknowledges that all payments properly due to Tramco under the Tram Supply Agreement up to the Effective Date have been paid by **tie** (subject to confirmation of pending payments and the assurance that the Tramco will not suffer payment delays due to the novation process).

9. AMENDMENT OF TRAM SUPPLY AGREEMENT

tie, Tramco and Infraco agree that the terms of the Tram Supply Agreement shall be and are varied in the manner set out in Appendix 1 to this Agreement.

10. AFFIRMATION OF TRAM SUPPLY AGREEMENT

The terms and conditions of this Agreement represent the entire agreement between the parties relating to the novation of the Tram Supply Agreement and, except as specifically amended by Appendix 1 of this Agreement, all the terms and conditions of the Tram Supply Agreement remain in full force and effect. **tie** hereby confirms that it has not exercised any rights and discretions in regard to the Tram Supply Agreement prior to the point of novation.

11. EQUIVALENT PROJECT RELIEF

tie acknowledges that in relation to any Dispute under the Infraco Contract where the Client's sole involvement in any Client Claim is in performing administrative functions in relation to the Client Claim, and not as an interested or affected party, then Infraco shall be entitled to recover its costs incurred in relation to such dispute pursuant to Clause 7A (*Tramco Equivalent Project Relief*) of the Tram Supply Agreement from **tie**. **tie** agrees to pay to the Infraco such reasonable costs unless the dispute proceeds to adjudication where such costs shall be paid as allocated between **tie** and the Tram Supplier by the adjudicator following the Dispute Resolution Procedure.

The Infraco agrees that it shall minimise as far as reasonably practicable its administrative costs in relation to Equivalent Project Relief.

The Tram Supplier agrees not to vexatiously claim under the Tram Supply Agreement or vexatiously use the Disputes Resolution Procedure.

12. RIGHTS OF THIRD PARTIES

A person who is not party to this Agreement shall have no right to enforce any term of this Agreement. This clause does not affect any right or remedy of any person which exists or is otherwise available.

13. LAW AND JURISDICTION

This Agreement shall be governed by and construed in accordance with Scots law and the Scottish Courts shall have jurisdiction with regard to all matters arising under it.

IN WITNESS WHEREOF these presents on this and the preceding [◆] pages together with Appendix 1 which is annexed and subscribed as relative hereto and the copy of the Tram Supply Agreement which is attached and subscribed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at

on 2008 by:

Director _____

Full Name _____

Director _____

Full Name _____

EXECUTED for and on behalf of **SIEMENS PLC**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Authorised Signatory _____

Full Name _____

EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

USB00000072_0009

APPENDIX 1 TO THE TRAM SUPPLY NOVATION AGREEMENT

SCHEDULE OF AMENDMENTS TO THE TRAM SUPPLY AGREEMENT

Clause 7.15

Insert at end of Clause 7.15 the following:

The Tram Supplier acknowledges that it has a copy of the Infraco Contract and is deemed to be aware of the obligations, risks and liabilities assumed by the Infraco thereunder. Without prejudice to the foregoing, the Tram Supplier shall be deemed to be fully aware of the adverse financial and other consequences for the Client which could arise under the Infraco Contract in consequence, in whole or in part, of a breach on the part of the Tram Supplier of its obligations under this Agreement.

Clause 38.11.2

Delete Clause 38.11.2 and replace with:

38.11.2 all payments under this Agreement to the Client shall be made in pounds sterling by electronic transfer of funds to:

Name and Address of Bank:

Sort Code:

Account Number:

Account Name:

Clause 58.2 - No Fault Termination

Insert the following new Clause 58.2:

58.2 In the event that the Infraco Contract is terminated, this Agreement shall terminate unless the Tram Supplier is notified that **tie** (or another nominated party) requires to step into this Agreement.

Clause 60 - Termination for Corrupt Gifts and Fraud

Delete Clause 60 (Termination for Corrupt Gifts and Fraud), in its entirety substitute therefore:

60.1 The Tram Supplier or anyone employed by it or acting on its behalf (including any Tram Supplier Party) shall not commit any Prohibited Act.

60.2 If the Tram Supplier or anyone employed by it or acting on its behalf (including any Tram Supplier Party) commits any Prohibited Act, then the Client may terminate this Agreement with immediate effect by giving notice to the Tram Supplier.

Clause 68.1.2.1.1

Delete Clause 68.1.2.1.1 and replace with:

68.1.2.1.1 in the case of notices given to the Client: Bilfinger Berger-Siemens Consortium, Lochside House, Lochside Way, Edinburgh Park EH12 9DT, fax number 0131 452 2518, attention: Project Director, or such other address or fax number in the United Kingdom as the Client may notify the Tram Supplier from time to time for that purpose; or

……
Director/Authorised Signatory
tie LIMITED

……..
Director/Authorised Signatory
BILFINGER BERGER UK LIMITED

……..
Director/Authorised Signatory
SIEMENS PLC

……..
Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)



(1) TIE LIMITED

- and -

(2) BILFINGER BERGER (UK) LIMITED

- and -

(3) SIEMENS plc

-and-

(4) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

NOVATION OF A TRAM SUPPLY AGREEMENT

in respect of

EDINBURGH TRAM NETWORK

AGREEMENT

AMONG

(**1**) **tie LIMITED** (company number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ ("**tie**");

(**2**) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London EC1A 4EJ which expression shall include its successors, permitted assignees and transferees; and

(**3**) **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens Square, Frimley, Camberley, Surrey GU16 8QD which expression shall include its successors, permitted assignees and transferees,

(Bilfinger Berger UK Limited and Siemens plc together the "**Infraco**" and each separately an "**Infraco Member**"); and

(**4**) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF),** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa), Spain ("**Tramco**");

BACKGROUND

A By an agreement in writing dated 13 May 2008 ("**Tram Supply Agreement**") **tie** appointed Tramco to design, manufacture and supply Trams and to supply documentation and associated equipment in connection with the Edinburgh Tram Network. A copy of the Tram Supply Agreement is attached to this Agreement and initialled by the parties for the purpose of identification. This Agreement is supplemental to the Tram Supply Agreement.

B **tie** and Infraco have entered into a contract ("**Infraco Contract**") under which Infraco has been appointed to carry out and/or manage the design, construction, installation, commissioning, tram procurement, system integration, infrastructure maintenance, tram maintenance and supply of related equipment and materials, trams and related infrastructure in respect of the Edinburgh Tram Network.

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C **tie** and Infraco have agreed, with the consent of Tramco, that Infraco shall take over the rights and liabilities of the "Client" (as defined in the Tram Supply Agreement) under the Tram Supply Agreement and that Tramco shall owe all of the duties and obligations arising thereunder to Infraco by novating the Tram Supply Agreement from **tie** to Infraco upon and subject to the terms of this Agreement.

D **tie** wishes to be released from the Tram Supply Agreement and Tramco has agreed to release **tie**.

1. DEFINITIONS AND INTERPRETATION

1.1 The definitions given in the recitals to this Agreement apply to this Agreement.

1.2 In this Agreement the following additional words and expressions shall have the meanings set out opposite to them:

"**Effective Date**" means the last date of execution of this Agreement."

1.3 Clause headings in this Agreement are for the convenience of the parties only and do not affect its interpretation.

1.4 Unless otherwise defined hereunder, where the Tram Supply Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement.

2. RELEASE BY TRAMCO OF tie

2.1 Tramco releases and discharges **tie** from any and all duties, obligations and liabilities owed to Tramco under the Tram Supply Agreement and accepts the liability of Infraco under the Tram Supply Agreement in lieu of **tie**.

3. RELEASE BY tie OF TRAMCO

3.1 **tie** releases and discharges Tramco from the further performance of Tramco's duties and obligations under the Tram Supply Agreement.

4. ACCEPTANCE OF LIABILITY BY TRAMCO TO THE INFRACO

4.1 Tramco undertakes to Infraco to continue to perform all the duties and to discharge all the obligations of Tramco under the Tram Supply Agreement and to be bound by its terms and

conditions in every way as if Infraco was and always had been a party to the Tram Supply Agreement in place of **tie**.

4.2 Tramco warrants to Infraco that, in respect of the duties and obligations which it has already performed under the Tram Supply Agreement, it has performed those duties and obligations in accordance with the standards of skill and care set out in the Tram Supply Agreement and otherwise in compliance with all of the terms and conditions thereof. Tramco warrants to Infraco that it shall be liable for any loss or damage suffered or incurred by Infraco arising out of any negligent act, default or breach by Tramco in the performance of its obligations under the Tram Supply Agreement prior to the Effective Date. Tramco shall be liable for such loss or damage notwithstanding that such loss or damage would not have been suffered or incurred by **tie** (or suffered or incurred to the same extent by **tie**).

4.3 Without prejudice to Clauses 4.2 or 4.4, Tramco shall not contend under this Agreement that its liability to Infraco is affected or diminished by reason of **tie** having suffered no loss and/or any loss claimed to have been suffered by Infraco being different in character from that suffered by **tie**.

4.4 Tramco confirms it was aware at the time of entering into the Tram Supply Agreement that Infraco could suffer losses, damages, costs, expenses, claims, demands and proceedings as a result of Tramco's breach of the Tram Supply Agreement.

4.5 Without prejudice to the generality of this Agreement, Tramco warrants and undertakes to Infraco that its duties and obligations under, the Tram Supply Agreement, whether required to be performed prior to the date hereof, have been and will be performed in accordance with the Tram Supply Agreement.

4.6 Tramco acknowledges that any breach of the warranties in this Agreement may cause Infraco to be in breach of the Infraco Contract and/or cause Infraco to suffer loss and/or damage.

4.7 The liability of Tramco to Infraco pursuant to the Tram Supply Agreement as novated by this Agreement (both in respect of the period prior to the Effective Date and after the Effective Date) shall not be affected by Infraco's assumption of liability to **tie** in respect of the Edinburgh Tram Network pursuant to the Infraco Contract.

4.8 Tramco acknowledges that Infraco has and shall continue to rely upon all Tram Works provided by Tramco under the Tram Supply Agreement as novated by this Agreement.

4.9 For the avoidance of doubt, in accordance with Clause 41.2 of the Tram Supply Agreement save where expressly provided for in the Tram Supply Agreement, nothing in this Agreement shall expose either Party to the application of Indirect Loss.

5. VESTING OF REMEDIES AGAINST TRAMCO

All rights of action and remedies against Tramco under and pursuant to the Tram Supply Agreement vested in **tie** (including their accrued rights of action and remedies) shall automatically and without the need for any further action on the part of Infraco, vest in Infraco with effect from the Effective Date.

6. ACCEPTANCE OF LIABILITY BY INFRACO

With effect from the Effective Date Infraco undertakes to perform all the duties and to discharge all the obligations of **tie** under the Tram Supply Agreement as novated by this Agreement and to be bound by its terms and conditions in every way as if Infraco was and always had been a party to the Tram Supply Agreement in place of **tie** and as if all acts and omissions of **tie** under or pursuant to the Tram Supply Agreement prior to the Effective Date were the acts and omissions of Infraco.

7. VESTING OF REMEDIES AGAINST tie

As from the Effective Date, all rights of action and remedies under or pursuant to the Tram Supply Agreement vested in Tramco shall lie against Infraco and not **tie** whether or not such rights of action or remedies may have arisen prior to, on or after the Effective Date.

8. ACKNOWLEDGEMENT OF PAYMENT

Tramco acknowledges that all payments properly due to Tramco under the Tram Supply Agreement up to the Effective Date have been paid by **tie** (subject to confirmation of pending payments and the assurance that the Tramco will not suffer payment delays due to the novation process).

9. AMENDMENT OF TRAM SUPPLY AGREEMENT

tie, Tramco and Infraco agree that the terms of the Tram Supply Agreement shall be and are varied in the manner set out in Appendix 1 to this Agreement.

10. AFFIRMATION OF TRAM SUPPLY AGREEMENT

The terms and conditions of this Agreement represent the entire agreement between the parties relating to the novation of the Tram Supply Agreement and, except as specifically amended by Appendix 1 of this Agreement, all the terms and conditions of the Tram Supply Agreement remain in full force and effect. **tie** hereby confirms that it has not exercised any rights and discretions in regard to the Tram Supply Agreement prior to the point of novation.

11. EQUIVALENT PROJECT RELIEF

tie acknowledges that in relation to any Dispute under the Infraco Contract where the Client's sole involvement in any Client Claim is in performing administrative functions in relation to the Client Claim, and not as an interested or affected party, then Infraco shall be entitled to recover its costs incurred in relation to such dispute pursuant to Clause 7A (*Tramco Equivalent Project Relief*) of the Tram Supply Agreement from **tie**. **tie** agrees to pay to the Infraco such reasonable costs unless the dispute proceeds to adjudication where such costs shall be paid as allocated between **tie** and the Tram Supplier by the adjudicator following the Dispute Resolution Procedure.

The Infraco agrees that it shall minimise as far as reasonably practicable its administrative costs in relation to Equivalent Project Relief.

The Tram Supplier agrees not to vexatiously claim under the Tram Supply Agreement or vexatiously use the Disputes Resolution Procedure.

12. RIGHTS OF THIRD PARTIES

A person who is not party to this Agreement shall have no right to enforce any term of this Agreement. This clause does not affect any right or remedy of any person which exists or is otherwise available.

13. LAW AND JURISDICTION

This Agreement shall be governed by and construed in accordance with Scots law and the Scottish Courts shall have jurisdiction with regard to all matters arising under it.

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IN WITNESS WHEREOF these presents on this and the preceding 5 pages together with Appendix 1 which is annexed and subscribed as relative hereto and the copy of the Tram Supply Agreement which is attached and subscribed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**

at Edinburgh

on 14th May 2008 by:

[redacted]

Authorised Signatory

Full Name LAGHER

[redacted]

Witness Signature

Full Name STEVEN BELL

[redacted]

Address LESMAHAGOW

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at Edinburgh

on 14th May 2008 by:

[redacted]

Director

Full Name RICHARD JOHN WALKER

[redacted]

Director

Full Name GARY STEVE DALTON

EXECUTED for and on behalf of **SIEMENS PLC**

at EDINBURGH

on 14 MAY 2008 by:

[redacted]

Authorised Signatory

Full Name C. ROTH

[redacted]

Authorised Signatory

Full Name M. FLYNN

EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at EDINBURGH

on 13 MAY 2008 by:

[redacted]

Authorised Signatory

Full Name JESUS ESNAOLA

Witness Signature [redacted]

Full Name ALFONSO CAMPOS

Address [redacted]

20200 Beasain

APPENDIX 1 TO THE TRAM SUPPLY NOVATION AGREEMENT

SCHEDULE OF AMENDMENTS TO THE TRAM SUPPLY AGREEMENT

Clause 7.15

Insert at end of Clause 7.15 the following:

The Tram Supplier acknowledges that it has a copy of the Infraco Contract and is deemed to be aware of the obligations, risks and liabilities assumed by the Infraco thereunder. Without prejudice to the foregoing, the Tram Supplier shall be deemed to be fully aware of the adverse financial and other consequences for the Client which could arise under the Infraco Contract in consequence, in whole or in part, of a breach on the part of the Tram Supplier of its obligations under this Agreement.

Clause 38.11.2

Delete Clause 38.11.2 and replace with:

38.11.2 all payments under this Agreement to the Client shall be made in pounds sterling by electronic transfer of funds to:

Name and Address of Bank: BARCLAYS BANK plc, 4th FLOOR APEX PLAZA, FORBURY ROAD, READING RG1 1AX

Sort Code: [redacted]

Account Number: [redacted]

Account Name: SIEMENS plc

Clause 58.2 - No Fault Termination

Insert the following new Clause 58.2:

58.2 In the event that the Infraco Contract is terminated, this Agreement shall terminate unless the Tram Supplier is notified that **tie** (or another nominated party) requires to step into this Agreement.

Clause 60 - Termination for Corrupt Gifts and Fraud

Delete Clause 60 (Termination for Corrupt Gifts and Fraud), in its entirety substitute therefore:

60.1 The Tram Supplier or anyone employed by it or acting on its behalf (including any Tram Supplier Party) shall not commit any Prohibited Act.

60.2 If the Tram Supplier or anyone employed by it or acting on its behalf (including any Tram Supplier Party) commits any Prohibited Act, then the Client may terminate this Agreement with immediate effect by giving notice to the Tram Supplier.

Clause 68.1.2.1.1

Delete Clause 68.1.2.1.1 and replace with:

68.1.2.1.1 in the case of notices given to the Client: Bilfinger Berger-Siemens Consortium, Lochside House, Lochside Way, Edinburgh Park EH12 9DT, fax number 0131 452 2518, attention: Project Director, or such other address or fax number in the United Kingdom as the Client may notify the Tram Supplier from time to time for that purpose; or

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director
BILFINGER BERGER UK LIMITED

[redacted]

...
Authorised Signatory
SIEMENS PLC

[redacted]

...
Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

THIS IS SCHEDULE PART 18 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 18



(1) TIE LIMITED

- and -

(2) BILFINGER BERGER (UK) LIMITED

- and -

(3) SIEMENS plc

-and-

(4) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

COLLATERAL WARRANTY IN RESPECT OF A TRAM SUPPLY AGREEMENT IN FAVOUR OF tie FROM TRAMCO

relating to

THE EDINBURGH TRAM NETWORK

AGREEMENT

BETWEEN

(1) **tie LIMITED** (company number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ ("**tie**");

(2) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London EC1A 4EJ which expression shall include its successors, permitted assignees and transferees; and

(3) **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens Square, Frimley, Camberley, Surrey GU16 8QD which expression shall include its successors, permitted assignees and transferees,

(Bilfinger Berger UK Limited and Siemens plc together referred to as the "**Infraco**", which term shall include its successors and permitted assignees); and

(4) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF),** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa), Spain ("**Tramco**");

BACKGROUND

A By an agreement in writing dated ◆ 2008 (the "**Tram Supply Agreement**"), **tie** appointed Tramco to design, manufacture and supply Trams and supply documentation and associated equipment in connection with the Edinburgh Tram Network.

B **tie** and Infraco have entered into a contract under which Infraco has been appointed to carry out and/or manage the design, construction, installation, commissioning tram procurement, system integration, infrastructure maintenance, tram maintenance and supply of related equipment and materials, trams and related infrastructure in respect of the Edinburgh Tram Network.

C **tie** and Infraco have agreed, with the consent of Tramco, that Infraco shall take over the rights and liabilities of the "**Client**" (as defined in the Tram Supply Agreement) under the Tram

Supply Agreement by novating the Tram Supply Agreement from **tie** to Infraco upon and subject to the terms of the Novation Agreement (as hereinafter defined).

D It is a term of the Tram Supply Agreement that Tramco shall enter into this Agreement with **tie** following the execution of the Novation Agreement.

IT IS AGREED as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement the following words and expressions shall have the following meanings, unless the context requires otherwise:

"**Agreement**" means this document (as amended from time to time pursuant to Clause 13);

"**Deliverables**" means all written or documentary outputs to be prepared and delivered by Tramco in the performance of the Tram Works and Tramco's other obligations under the Tram Supply Agreement;

"**Infraco Contract**" means the contract to be entered into or entered into by **tie** with Infraco as described in Recital B above;

"**Novation Agreement**" means the novation agreement entered into among **tie**, Tramco and Infraco relating to the novation of the Tram Supply Agreement;

"**Party**" means each and any of the parties to this Agreement and **Parties** shall be construed accordingly; and

"**Tram Supply Agreement**" means the agreement dated [◆] and originally entered into by **tie** and Tramco, which has been novated to Infraco and Tramco pursuant to the Novation Agreement.

1.2 Unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender includes all other genders.

1.2.2 a reference to:

1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a recital, clause or schedule is a reference to a recital, clause or schedule of or to this Agreement.

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation.

1.4 Where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

1.5 Unless otherwise defined hereunder, where the Tram Supply Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement.

1.6 In the case of any unintended conflict between the definition or interpretation of words or expressions in this Agreement and in the Tram Supply Agreement, the Tram Supply Agreement shall prevail save where by express words or where it is apparent from the context that the contrary is intended in this Agreement.

2. STANDARD OF CARE

Tramco warrants and undertakes to **tie** that:

2.1 it has carried out and shall carry out and discharge the Tram Works and all its other duties and obligation under the Tram Supply Agreement subject to and in accordance with the terms thereof; and

2.2 in addition to and without derogation from clause 2.1;

2.2.1 Tramco warrants to **tie** that, in the performance of the Tram Works and all its other duties and obligations under the Tram Supply Agreement it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent Tram designer and

manufacturer experienced in carrying out works similar to the Tram Works to be carried out under the Tram Supply Agreement;

2.2.2 it owes a duty of care to **tie** in carrying out its duties and obligations under the Tram Supply Agreement;

2.2.3 all obligations and duties on the part of Tramco set out in the Tram Supply Agreement which are expressed to be made in favour of or given to **tie** shall be directly enforceable by **tie** pursuant to this Agreement following the novation of the Tram Supply Agreement pursuant to the Novation Agreement.

3. COPYRIGHT LICENCE

3.1 Tramco hereby grants to **tie** a royalty-free and exclusive licence to use such Project IPR and Tram Supplier IPR as may be necessary, for operation and maintenance of the trams but, not in any case, for manufacturing purposes, for **tie** to use in relation to any projects associated with the Tram Works and or the operation and/or maintenance of the Edinburgh Tram Network, including the Trams. This licence shall carry the right to grant sub-licences, and be transferable to third parties, prior written approval of the Tram Supplier. Tramco shall be liable for the Project IPR and the Tram Supplier IPR only to the extent that it is used for the purposes for which it was intended.

3.2 In so far as ownership of the copyright and any other Intellectual Property Rights in any Deliverable prepared or provided by Tramco in connection with the provision of the Tram Works under the Tram Supply Agreement is vested in any person other than Tramco including, without limitation, any Tram Supplier Party, Tramco shall procure for **tie** the benefit of such a licence as is referred to in clause 3.1 for the purposes referred to therein.

3.3 Tramco shall, if so requested at any time, execute such documents and perform such acts (including the grant to **tie** of a licence to use any Software related with operation and maintenance) as may be required fully and effectively to assure to **tie** or any third party the rights referred to in this clause 3.

3.4 Tramco shall provide to **tie** a copy of any of the Deliverables which are to be provided to Infraco under the Tram Supply Agreement as soon as reasonably practicable after receipt by Tramco of a written request from **tie** to do so, unless already delivered to **tie**.

3.5 Tramco undertakes to **tie** that the use by **tie** of any of the Deliverables for any purpose provided for in this clause 3 shall not infringe the rights of any third party in relation to the Deliverables.

4. REQUIRED INSURANCES AND OCIP INSURANCES

4.1 Tramco undertakes to **tie** that:

4.1.1 it has maintained and shall maintain during the performance of its obligations under the Tram Supply Agreement each of the Required Insurances in accordance with the requirements of Clause 40 (*Required Insurances*) and Schedule 11 (*Required Insurances*) of the Tram Supply Agreement;

4.1.2 cover under the professional indemnity insurance is extended to include Tramco's liabilities under this Agreement;

4.1.3 this Agreement has been disclosed to Tramco's current professional indemnity insurers or brokers (as the case may be) and shall be disclosed to any future professional indemnity insurers or brokers providing the insurance required by this Agreement;

4.1.4 Tramco shall abide by the terms and conditions of insurance and not do or omit to do anything that might prejudice the cover or its rights to make a claim; and

4.1.5 it has been disclosed to it details of the OCIP Insurances and that it shall abide by the terms and conditions of the insurances contained therein and shall not do or omit to do anything that might prejudice the cover of **tie**'s right to make a claim under the OCIP Insurances.

4.2 As and when required by **tie**, Tramco shall produce for inspection documentary evidence that the Required Insurances are being properly maintained.

4.3 Tramco shall not make any material alteration to the terms of the Required Insurances without **tie**'s prior approval which approval shall not be unreasonably withheld. If the insurer makes or attempts to make any material alteration or purports to withdraw cover, or if Tramco is unable to obtain professional indemnity insurance, Tramco shall promptly give written notice of this to **tie**.

5. tie STEP-IN

5.1 Tramco shall not exercise nor seek to exercise any right of determination of the Tram Supply Agreement or to rescind the Tram Supply Agreement by reason of a Client Default or to otherwise discontinue the performance of any of Tramco's obligations in relation to the Tram Supply Agreement by reason of breach on the part of Infraco (or otherwise) without giving **tie** not less than 21 days' written notice of its intention to do so and specifying in such notice the grounds for the proposed determination. Tramco for the period of any such notice diligently and properly continue to perform Tramco's obligations under the Tram Supply Agreement.

5.2 Any period stipulated in the Tram Supply Agreement for the exercise by Tramco of a right of determination shall nevertheless be extended as may be necessary to take account of the period of notice required under clause 5.1.

5.3 Compliance by Tramco with the provisions of clause 5.1 shall not be treated as a waiver of any breach on the part of Infraco giving rise to the right of determination nor otherwise prevent Tramco from exercising its rights after the expiration of the notice unless the right of determination shall have ceased under the provisions of clause 5.4

5.4 The right of Tramco to determine the Tram Supply Agreement or to rescind the Tram Supply Agreement or to discontinue the performance of any of its obligations in relation to the Tram Supply Agreement shall cease if within the period of 21 days referred to in clause 5.1, **tie** gives written notice to Tramco:

5.4.1 requiring Tramco to continue with the performance of all its obligations under the Tram Supply Agreement;

5.4.2 acknowledging that **tie** is assuming all the obligations of Infraco (as "Client") under the Tram Supply Agreement; and

5.4.3 undertaking to Tramco to discharge all amounts payable to Tramco under the terms of the Tram Supply Agreement from the date on which such notice under this clause 5.4 is given to Tramco.

5.5 Upon compliance by **tie** with the requirements of clause 5.4, the Tram Supply Agreement shall continue in full force and effect as if the right of determination on the part of Tramco had not arisen and in all respects as if the Tram Supply Agreement had been made between **tie** and Tramco to the exclusion of Infraco.

5.6 Notwithstanding that as between Infraco and Tramco, Tramco's right of determination of its engagement under the Tram Supply Agreement may not have arisen, the provisions of clause 5.5 shall nevertheless apply if **tie** gives written notice to Tramco and Infraco to that effect and **tie** complies with the requirements on its part under clause 5.4.

5.7 Tramco does not need to be concerned or required to enquire whether, and shall be entitled to assume that, as between Infraco and **tie**, the circumstances have occurred permitting **tie** to give notice under clause 5.6.

5.8 Tramco acting in accordance with the provisions of this clause 5 shall not incur any liability to Infraco arising out of the exercise by **tie** of its rights under this clause 5.

5.9 Save as otherwise set out in this Agreement, unless and until **tie** has given notice under this clause 5:

5.9.1 **tie** has no liability whatsoever to Tramco in respect of amounts payable to Tramco under the Tram Supply Agreement; and

5.9.2 **tie** has no authority to issue any direction or instruction to Tramco in relation to the performance of Tramco's obligations under the Tram Supply Agreement.

5.10 Without prejudice to the provisions of clauses 5.1 to 5.9 inclusive, if prior to the service of any notice under clause 5.4 Tramco is determined under the Tram Supply Agreement for any reason whatsoever, Tramco shall, if required in writing so to do by **tie**, no later than 12 weeks after the date of such determination forthwith enter into a new agreement with **tie** on the same terms as the Tram Supply Agreement, but with such revisions as **tie** and Tramco may reasonable require to reflect altered circumstances and the fact that it is **tie** and not Infraco employing Tramco.

6. ASSIGNATION

6.1 Tramco shall not assign, novate or otherwise transfer the whole or any part of this Agreement without the prior written agreement of **tie**.

6.2 **tie** shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

6.2.1 to the Scottish Ministers or any local authority or other body with no worse financial standing than that of **tie**; or

6.2.2 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to Tramco) by **tie** or a person falling within clause 6.2.1; or

6.2.3 to City of Edinburgh Council or Transport Edinburgh Limited; or

6.2.4 to any other person with the prior written consent of Tramco (such consent not to be unreasonably withheld or delayed).

6.3 Tramco undertakes to **tie** not to contend in any court proceedings under this Agreement that any person to whom **tie** assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this clause is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that **tie** is named under this Agreement or any intermediate assignee of **tie** escaped loss resulting from such breach by reason of the disposal of its interest in the same.

7. LIABILITY OF TRAMCO

7.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by law of contract, delict or otherwise.

7.2 The responsibility of Tramco under this Agreement is not to be reduced or in any way reduced or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by **tie** against a third party.

7.3 The rights and remedies conferred upon **tie** by this Agreement are in addition to any other rights and remedies that **tie** may have against Tramco including (without prejudice to the generality of the foregoing) any remedies in delict.

7.4 Subject to the other provisions of this Agreement, the liability of Tramco to **tie** is to be determined in all respects in accordance with the terms of the Tram Supply Agreement and this Agreement and, in the event of any claim by **tie** under or through this Agreement, Tramco shall be entitled to rely upon any defence, right, limitation or

exclusion under the Tram Supply Agreement as though **tie** were named as Client under it, except that:

7.4.1 **tie** shall not be affected by any subsequent variation of the Tram Supply Agreement which would adversely affect the obligations owed by Tramco or the waiver, compromise or withdrawal of any claim made Infraco; and

7.4.2 Tramco shall not be entitled to exercise any right of set-off, retention or withholding against **tie** to which Tramco may be entitled as against Infraco.

7.5 The liability of Tramco under this Agreement shall be no greater in extent than the liability of Tramco under the Tram Supply Agreement.

7.6 In no event shall the Tram Supplier be responsible for indirect or consequential damages.

8. DELIVERY, TITLE TO PARTS AND OTHER PROPERTY

Notwithstanding any provision of the Tram Supply Agreement to the contrary, in respect of Tramco's performance of its obligations under the Tram Supply Agreement:

8.1 Tramco shall sell to **tie** or such other party as shall be notified by **tie** to Tramco in writing, each Tram free from all claims, charges, rights in security, liens, encumbrances, hypothecs and other third party rights of any nature.

8.2 Tramco shall transfer title:

8.2.1 to each Tram, to **tie** or such other party as shall be notified by **tie** to Tramco in writing, on the date of issue of the Certificate of Tram Delivery being issued in respect of that Tram;

8.2.2 to each item of the Tram Related Equipment to **tie** or such other party as notified by **tie** to Tramco in writing, on the later of delivery of each item of the Tram Related Equipment to Infraco and the Certificate of Tram Commissioning being issued in respect of the first Tram.

8.3 The risk of loss, theft, damage or destruction of:

8.3.1 each Tram shall pass from Tramco to **tie** or such other party as notified by **tie** to Tramco in writing on the date of issue of the Certificate of Tram Delivery being issued in respect of that Tram;

8.3.2 each item of the Tram Related Equipment shall pass from Tramco to **tie** or such other party as notified by **tie** to Tramco in writing, on the later of delivery of each item of the Tram Related Equipment and the Certificate of Tram Commissioning being issued in respect of the first Tram.

8.4 Tramco shall be responsible for each Tram completely manufactured or in the course of manufacture and for all Tram Related Equipment until such time as risk in the Trams and the Tram Related Equipment passes to **tie** (or as **tie** otherwise shall direct) in accordance with this clause 8.

8.5 Tramco undertakes to **tie** that it shall promptly replace any Tram or any part, component or material incorporated in or to be used in connection with such Tram or any Tram Related Equipment, which is lost, damaged or destroyed by whatever cause, prior to such passing of risk.

9. CONSENT OF INFRACO

Infraco consents to the terms of this Agreement.

10. NOTICES

10.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

10.2 Any notice given pursuant to this clause, if sent by registered or recorded delivery post, is deemed to have been received 48 hours after being posted.

11. RIGHTS OF THIRD PARTIES

A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

12. INVALID TERMS

12.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

12.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

12.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

13. VARIATIONS AND WAIVERS TO BE IN WRITING

13.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

14. WAIVER

14.1 Save where expressly stated, no failure or delay by any Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

14.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do no operate to exclude one another or any rights or remedies provided by law.

15. JURISDICTION AND LAW

15.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

15.2 The Parties agree that any dispute in relation to this Agreement shall be conducted in accordance with Clause 64 (*Dispute Resolution Procedure*) of the Tram Supply Agreement and the provisions of the said Clause 64 and Schedules 13 (*Dispute Resolution Procedure*) and 14 (*Panels to the Dispute Resolution Procedure*) are deemed to be incorporated mutatis mutandis in respect of this Agreement provided that any reference to "Parties" shall be deemed to refer to **tie** and Tramco, any reference to "Client" shall be deemed to refer to **tie**, and notices to be given in connection therewith shall be given in accordance with clause 10 of this Agreement.

IN WITNESS WHEREOF these presents on this and the preceding [◆] pages are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **SIEMENS PLC**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____



(1) TIE LIMITED

- and -

(2) BILFINGER BERGER (UK) LIMITED

- and -

(3) SIEMENS plc

-and-

(4) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

COLLATERAL WARRANTY IN RESPECT OF A TRAM SUPPLY AGREEMENT IN FAVOUR OF tie FROM TRAMCO

relating to

THE EDINBURGH TRAM NETWORK

AGREEMENT

BETWEEN

(1) **tie LIMITED** (company number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ ("**tie**");

(2) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London EC1A 4EJ which expression shall include its successors, permitted assignees and transferees; and

(3) **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens Square, Frimley, Camberley, Surrey GU16 8QD which expression shall include its successors, permitted assignees and transferees,

(Bilfinger Berger UK Limited and Siemens plc together referred to as the "**Infraco**", which term shall include its successors and permitted assignees); and

(4) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)**, a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa), Spain ("**Tramco**");

BACKGROUND

A By an agreement in writing dated 13 May 2008 (the "**Tram Supply Agreement**"), **tie** appointed Tramco to design, manufacture and supply Trams and supply documentation and associated equipment in connection with the Edinburgh Tram Network.

B **tie** and Infraco have entered into a contract under which Infraco has been appointed to carry out and/or manage the design, construction, installation, commissioning tram procurement, system integration, infrastructure maintenance, tram maintenance and supply of related equipment and materials, trams and related infrastructure in respect of the Edinburgh Tram Network.

C **tie** and Infraco have agreed, with the consent of Tramco, that Infraco shall take over the rights and liabilities of the "**Client**" (as defined in the Tram Supply Agreement) under the Tram

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Supply Agreement by novating the Tram Supply Agreement from **tie** to Infraco upon and subject to the terms of the Novation Agreement (as hereinafter defined).

D It is a term of the Tram Supply Agreement that Tramco shall enter into this Agreement with **tie** following the execution of the Novation Agreement.

IT IS AGREED as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement the following words and expressions shall have the following meanings, unless the context requires otherwise:

"**Agreement**" means this document (as amended from time to time pursuant to Clause 13);

"**Deliverables**" means all written or documentary outputs to be prepared and delivered by Tramco in the performance of the Tram Works and Tramco's other obligations under the Tram Supply Agreement;

"**Infraco Contract**" means the contract to be entered into or entered into by **tie** with Infraco as described in Recital B above;

"**Novation Agreement**" means the novation agreement entered into among **tie**, Tramco and Infraco relating to the novation of the Tram Supply Agreement;

"**Party**" means each and any of the parties to this Agreement and **Parties** shall be construed accordingly; and

"**Tram Supply Agreement**" means the agreement dated 13 May 2008 and originally entered into by **tie** and Tramco, which has been novated to Infraco and Tramco pursuant to the Novation Agreement.

1.2 Unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender includes all other genders.

1.2.2 a reference to:

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1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a recital, clause or schedule is a reference to a recital, clause or schedule of or to this Agreement.

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation.

1.4 Where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

1.5 Unless otherwise defined hereunder, where the Tram Supply Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement.

1.6 In the case of any unintended conflict between the definition or interpretation of words or expressions in this Agreement and in the Tram Supply Agreement, the Tram Supply Agreement shall prevail save where by express words or where it is apparent from the context that the contrary is intended in this Agreement.

2. STANDARD OF CARE

Tramco warrants and undertakes to **tie** that:

2.1 it has carried out and shall carry out and discharge the Tram Works and all its other duties and obligation under the Tram Supply Agreement subject to and in accordance with the terms thereof; and

2.2 in addition to and without derogation from clause 2.1;

2.2.1 Tramco warrants to **tie** that, in the performance of the Tram Works and all its other duties and obligations under the Tram Supply Agreement it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent Tram designer and manufacturer experienced in carrying out works similar to the Tram Works to be carried out under the Tram Supply Agreement;

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2.2.2 it owes a duty of care to **tie** in carrying out its duties and obligations under the Tram Supply Agreement;

2.2.3 all obligations and duties on the part of Tramco set out in the Tram Supply Agreement which are expressed to be made in favour of or given to **tie** shall be directly enforceable by **tie** pursuant to this Agreement following the novation of the Tram Supply Agreement pursuant to the Novation Agreement.

3. COPYRIGHT LICENCE

3.1 Tramco hereby grants to **tie** a royalty-free and exclusive licence to use such Project IPR and Tram Supplier IPR as may be necessary, for operation and maintenance of the trams but, not in any case, for manufacturing purposes, for **tie** to use in relation to any projects associated with the Tram Works and or the operation and/or maintenance of the Edinburgh Tram Network, including the Trams. This licence shall carry the right to grant sub-licences, and be transferable to third parties, prior written approval of the Tram Supplier. Tramco shall be liable for the Project IPR and the Tram Supplier IPR only to the extent that it is used for the purposes for which it was intended.

3.2 In so far as ownership of the copyright and any other Intellectual Property Rights in any Deliverable prepared or provided by Tramco in connection with the provision of the Tram Works under the Tram Supply Agreement is vested in any person other than Tramco including, without limitation, any Tram Supplier Party, Tramco shall procure for **tie** the benefit of such a licence as is referred to in clause 3.1 for the purposes referred to therein.

3.3 Tramco shall, if so requested at any time, execute such documents and perform such acts (including the grant to **tie** of a licence to use any Software related with operation and maintenance) as may be required fully and effectively to assure to **tie** or any third party the rights referred to in this clause 3.

3.4 Tramco shall provide to **tie** a copy of any of the Deliverables which are to be provided to Infraco under the Tram Supply Agreement as soon as reasonably practicable after receipt by Tramco of a written request from **tie** to do so, unless already delivered to **tie**.

3.5 Tramco undertakes to **tie** that the use by **tie** of any of the Deliverables for any purpose provided for in this clause 3 shall not infringe the rights of any third party in relation to the Deliverables.

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4. REQUIRED INSURANCES AND OCIP INSURANCES

4.1 Tramco undertakes to **tie** that:

4.1.1 it has maintained and shall maintain during the performance of its obligations under the Tram Supply Agreement each of the Required Insurances in accordance with the requirements of Clause 40 (*Required Insurances*) and Schedule 11 (*Required Insurances*) of the Tram Supply Agreement;

4.1.2 cover under the professional indemnity insurance is extended to include Tramco's liabilities under this Agreement;

4.1.3 this Agreement has been disclosed to Tramco's current professional indemnity insurers or brokers (as the case may be) and shall be disclosed to any future professional indemnity insurers or brokers providing the insurance required by this Agreement;

4.1.4 Tramco shall abide by the terms and conditions of insurance and not do or omit to do anything that might prejudice the cover or its rights to make a claim; and

4.1.5 it has been disclosed to it details of the OCIP Insurances and that it shall abide by the terms and conditions of the insurances contained therein and shall not do or omit to do anything that might prejudice the cover of **tie**'s right to make a claim under the OCIP Insurances.

4.2 As and when required by **tie**, Tramco shall produce for inspection documentary evidence that the Required Insurances are being properly maintained.

4.3 Tramco shall not make any material alteration to the terms of the Required Insurances without **tie**'s prior approval which approval shall not be unreasonably withheld. If the insurer makes or attempts to make any material alteration or purports to withdraw cover, or if Tramco is unable to obtain professional indemnity insurance, Tramco shall promptly give written notice of this to **tie**.

5. tie STEP-IN

5.1 Tramco shall not exercise nor seek to exercise any right of determination of the Tram Supply Agreement or to rescind the Tram Supply Agreement by reason of a Client Default or to otherwise discontinue the performance of any of Tramco's obligations in relation to the Tram Supply Agreement by reason of breach on the part of Infraco (or otherwise) without giving **tie** not less than 21 days' written notice of its intention to do so and specifying in such notice the

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grounds for the proposed determination. Tramco for the period of any such notice diligently and properly continue to perform Tramco's obligations under the Tram Supply Agreement.

5.2 Any period stipulated in the Tram Supply Agreement for the exercise by Tramco of a right of determination shall nevertheless be extended as may be necessary to take account of the period of notice required under clause 5.1.

5.3 Compliance by Tramco with the provisions of clause 5.1 shall not be treated as a waiver of any breach on the part of Infraco giving rise to the right of determination nor otherwise prevent Tramco from exercising its rights after the expiration of the notice unless the right of determination shall have ceased under the provisions of clause 5.4

5.4 The right of Tramco to determine the Tram Supply Agreement or to rescind the Tram Supply Agreement or to discontinue the performance of any of its obligations in relation to the Tram Supply Agreement shall cease if within the period of 21 days referred to in clause 5.1, **tie** gives written notice to Tramco:

5.4.1 requiring Tramco to continue with the performance of all its obligations under the Tram Supply Agreement;

5.4.2 acknowledging that **tie** is assuming all the obligations of Infraco (as "Client") under the Tram Supply Agreement; and

5.4.3 undertaking to Tramco to discharge all amounts payable to Tramco under the terms of the Tram Supply Agreement from the date on which such notice under this clause 5.4 is given to Tramco.

5.5 Upon compliance by **tie** with the requirements of clause 5.4, the Tram Supply Agreement shall continue in full force and effect as if the right of determination on the part of Tramco had not arisen and in all respects as if the Tram Supply Agreement had been made between **tie** and Tramco to the exclusion of Infraco.

5.6 Notwithstanding that as between Infraco and Tramco, Tramco's right of determination of its engagement under the Tram Supply Agreement may not have arisen, the provisions of clause 5.5 shall nevertheless apply if **tie** gives written notice to Tramco and Infraco to that effect and **tie** complies with the requirements on its part under clause 5.4.

5.7 Tramco does not need to be concerned or required to enquire whether, and shall be entitled to assume that, as between Infraco and **tie**, the circumstances have occurred permitting **tie** to give notice under clause 5.6.

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5.8 Tramco acting in accordance with the provisions of this clause 5 shall not incur any liability to Infraco arising out of the exercise by **tie** of its rights under this clause 5.

5.9 Save as otherwise set out in this Agreement, unless and until **tie** has given notice under this clause 5:

5.9.1 **tie** has no liability whatsoever to Tramco in respect of amounts payable to Tramco under the Tram Supply Agreement; and

5.9.2 **tie** has no authority to issue any direction or instruction to Tramco in relation to the performance of Tramco's obligations under the Tram Supply Agreement.

5.10 Without prejudice to the provisions of clauses 5.1 to 5.9 inclusive, if prior to the service of any notice under clause 5.4 Tramco is determined under the Tram Supply Agreement for any reason whatsoever, Tramco shall, if required in writing so to do by **tie**, no later than 12 weeks after the date of such determination forthwith enter into a new agreement with **tie** on the same terms as the Tram Supply Agreement, but with such revisions as **tie** and Tramco may reasonable require to reflect altered circumstances and the fact that it is **tie** and not Infraco employing Tramco.

6. ASSIGNATION

6.1 Tramco shall not assign, novate or otherwise transfer the whole or any part of this Agreement without the prior written agreement of **tie**.

6.2 **tie** shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

6.2.1 to the Scottish Ministers or any local authority or other body with no worse financial standing than that of **tie**; or

6.2.2 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to Tramco) by **tie** or a person falling within clause 6.2.1; or

6.2.3 to City of Edinburgh Council or Transport Edinburgh Limited; or

6.2.4 to any other person with the prior written consent of Tramco (such consent not to be unreasonably withheld or delayed).

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6.3 Tramco undertakes to **tie** not to contend in any court proceedings under this Agreement that any person to whom **tie** assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this clause is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that **tie** is named under this Agreement or any intermediate assignee of **tie** escaped loss resulting from such breach by reason of the disposal of its interest in the same.

7. LIABILITY OF TRAMCO

7.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by law of contract, delict or otherwise.

7.2 The responsibility of Tramco under this Agreement is not to be reduced or in any way reduced or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by **tie** against a third party.

7.3 The rights and remedies conferred upon **tie** by this Agreement are in addition to any other rights and remedies that **tie** may have against Tramco including (without prejudice to the generality of the foregoing) any remedies in delict.

7.4 Subject to the other provisions of this Agreement, the liability of Tramco to **tie** is to be determined in all respects in accordance with the terms of the Tram Supply Agreement and this Agreement and, in the event of any claim by **tie** under or through this Agreement, Tramco shall be entitled to rely upon any defence, right, limitation or exclusion under the Tram Supply Agreement as though **tie** were named as Client under it, except that:

7.4.1 **tie** shall not be affected by any subsequent variation of the Tram Supply Agreement which would adversely affect the obligations owed by Tramco or the waiver, compromise or withdrawal of any claim made Infraco; and

7.4.2 Tramco shall not be entitled to exercise any right of set-off, retention or withholding against **tie** to which Tramco may be entitled as against Infraco.

7.5 The liability of Tramco under this Agreement shall be no greater in extent than the liability of Tramco under the Tram Supply Agreement.

7.6 In no event shall the Tram Supplier be responsible for indirect or consequential damages.

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8. DELIVERY, TITLE TO PARTS AND OTHER PROPERTY

Notwithstanding any provision of the Tram Supply Agreement to the contrary, in respect of Tramco's performance of its obligations under the Tram Supply Agreement:

8.1 Tramco shall sell to **tie** or such other party as shall be notified by **tie** to Tramco in writing, each Tram free from all claims, charges, rights in security, liens, encumbrances, hypothecs and other third party rights of any nature.

8.2 Tramco shall transfer title:

8.2.1 to each Tram, to **tie** or such other party as shall be notified by **tie** to Tramco in writing, on the date of issue of the Certificate of Tram Delivery being issued in respect of that Tram;

8.2.2 to each item of the Tram Related Equipment to **tie** or such other party as notified by **tie** to Tramco in writing, on the later of delivery of each item of the Tram Related Equipment to Infraco and the Certificate of Tram Commissioning being issued in respect of the first Tram.

8.3 The risk of loss, theft, damage or destruction of:

8.3.1 each Tram shall pass from Tramco to **tie** or such other party as notified by **tie** to Tramco in writing on the date of issue of the Certificate of Tram Delivery being issued in respect of that Tram;

8.3.2 each item of the Tram Related Equipment shall pass from Tramco to **tie** or such other party as notified by **tie** to Tramco in writing, on the later of delivery of each item of the Tram Related Equipment and the Certificate of Tram Commissioning being issued in respect of the first Tram.

8.4 Tramco shall be responsible for each Tram completely manufactured or in the course of manufacture and for all Tram Related Equipment until such time as risk in the Trams and the Tram Related Equipment passes to **tie** (or as **tie** otherwise shall direct) in accordance with this clause 8.

8.5 Tramco undertakes to **tie** that it shall promptly replace any Tram or any part, component or material incorporated in or to be used in connection with such Tram or any Tram Related Equipment, which is lost, damaged or destroyed by whatever cause, prior to such passing of risk.

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9. CONSENT OF INFRACO

Infraco consents to the terms of this Agreement.

10. NOTICES

10.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

10.2 Any notice given pursuant to this clause, if sent by registered or recorded delivery post, is deemed to have been received 48 hours after being posted.

11. RIGHTS OF THIRD PARTIES

A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

12. INVALID TERMS

12.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

12.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

12.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

13. VARIATIONS AND WAIVERS TO BE IN WRITING

13.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

14. WAIVER

14.1 Save where expressly stated, no failure or delay by any Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

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14.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do no operate to exclude one another or any rights or remedies provided by law.

15. JURISDICTION AND LAW

15.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

15.2 The Parties agree that any dispute in relation to this Agreement shall be conducted in accordance with Clause 64 (*Dispute Resolution Procedure*) of the Tram Supply Agreement and the provisions of the said Clause 64 and Schedules 13 (*Dispute Resolution Procedure*) and 14 (*Panels to the Dispute Resolution Procedure*) are deemed to be incorporated mutatis mutandis in respect of this Agreement provided that any reference to "Parties" shall be deemed to refer to **tie** and Tramco, any reference to "Client" shall be deemed to refer to **tie**, and notices to be given in connection therewith shall be given in accordance with clause 10 of this Agreement.

IN WITNESS WHEREOF these presents on this and the preceding 10 pages are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**
at EDINBURGH

on 14th MAY 2008 by:

Authorised Signatory [redacted]

Full Name WILLIAM GALLAGHER

Witness Signature [redacted]

Full Name Andrew William Mackenzie

Address [redacted] Queen St
Glasgow

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EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at EDINBURGH

on 14TH MAY 2008 by:

Director [redacted]

Full Name RICHARD JOHN WALKER

Director [redacted]

Full Name GARY STEVE DALTON

EXECUTED for and on behalf of **SIEMENS PLC**

at EDINBURGH

on 14 MAY 2008 by:

Authorised Signatory [redacted]

Full Name C. KOITH

Authorised Signatory [redacted]

Full Name M. FLYNN

EXECUTED for and on behalf of **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)**

at EDINBURGH

on 13 MAY 2008 by:

Authorised Signatory [redacted]

Full Name JESUS ESNAOLA

Witness Signature [redacted]

Full Name ANTONIO CAMPOS

Address [redacted] J.M. ITURRIOZ

20200, BEASAIN - SPAIN

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THIS IS SCHEDULE PART 19 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 19

TRAM MAINTENANCE AGREEMENT

PLEASE REFER TO EXECUTED COPY OF TRAM MAINTENANCE AGREEMENT



(1) tie LIMITED

- and -

(2) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

TRAM MAINTENANCE AGREEMENT

in respect of

EDINBURGH TRAM NETWORK

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TRAM MAINTENANCE AGREEMENT

BETWEEN:

(1) **tie LIMITED** ("**tie**"), a company registered in Scotland under company number SC230949 whose registered office is at City Chambers, High Street, Edinburgh, EH1 1YJ ("**Client**") which expression shall include its successors, permitted assignees and transferees; and

(2) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa) – Spain (the "**Tram Maintainer**") which expression shall include its personal representatives, successors, permitted assignees and transferees,

to be referred to collectively as the "**Parties**" or singularly as the "**Party**" as the context requires.

WHEREAS:

(A) On 30 November 2005, **tie** published in the Official Journal of the European Union notice of its intention to seek offers for the provision and maintenance of tram vehicles in respect of the Edinburgh Tram Network and following a procurement contest conducted in accordance with the Public Supply Contracts Regulations 1995 (SI 1995/201), has appointed the Tram Maintainer for the purpose of maintaining such vehicles on the terms of this Agreement.

(B) By virtue of the Tram Legislation, CEC has been granted the requisite authorities and statutory powers to construct, operate and maintain Line One and Line Two.

(C) On 31 January 2006 **tie** published in the Official Journal of the European Union notice of its intention to seek offers for the provision of infrastructure works (including systems integration services) for Line One and Line Two. Pursuant to a procurement contest to be completed after the Effective Date, **tie** intends to appoint Infraco to provide such services.

(D) If required by **tie**, **tie** and the Tram Maintainer have agreed that this Agreement will be novated by **tie** to Infraco or another party, with the intention that such party shall take over the rights and liabilities of the "Client" under this Agreement and that such party will, thereafter, be responsible to **tie** for the maintenance of the Trams as part of its responsibilities to **tie**. The Tram Maintainer will participate in such novation on the terms set out in this Agreement.

(E) This Agreement sets out the terms on which the Client shall procure from the Tram Maintainer the maintenance of 27 Trams together with an option for the maintenance of any Additional

Trams and the provision of Spare Parts and Special Tools in respect of such Trams and/or Additional Trams.

(F) It is acknowledged that this Agreement forms part of a suite of documents which together aim to achieve a project vision (the "**Project Vision**") for the Edinburgh Tram Network. This Project Vision involves the development of a tramway which will stand favourable comparison with the best in Europe. The quality of the tramway provided will be appropriate to Edinburgh's status and role as a European capital city and its city centre's designation as a World Heritage Site. The tramway will integrate as far as possible with other transport modes to serve the existing fabric of the City of Edinburgh, and promote appropriate development and social inclusion. It is intended that this goal be achieved in a spirit of partnership, utilising modern design and construction methods and standards.

IT IS AGREED as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement unless the context otherwise requires (including the recitals above) the following words and expressions shall have the following meanings:

"**Account**" means an account established by the Tram Maintainer for the deposit of cash pursuant to paragraph 4.1 of Schedule 12 (*Return Condition*);

"**Actual Performance Level**" means the Tram Punctuality Performance achieved during any specified period, without taking into account any amendment due to Excusing Cause or other agreed adjustment;

"**Additional Insurance**" has the meaning given to it in Clause 29.16;

"**Additional Operator Trams**" has the meaning given to it in Clause 9.27.1;

"**Additional Services**" means additional services arising from a change agreed between the Parties in accordance with the Change Procedure;

"**Additional Trams**" means Tram unit(s) which may be ordered by the Client in accordance with Clause 18.1;

"**Advance Payment Bond**" means the advance payment bond as defined in the Tram Supply Agreement;

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"**Affected Party**" means a Party that is unable to comply with all or a material part of its obligations under this Agreement as a direct result of a Force Majeure Event;

"**Affiliate**" means in relation to any person, any holding company or subsidiary of that person or any subsidiary of such holding company and "**holding company**" and "**subsidiary**" shall have the meanings given to them in sections 1159 and 1160 of the Companies Act 2006;

"**Agreed Labour Hours**" has the meaning given to it in Clause 9.23.4.2 (b);

"**Agreed Repair**" means a repair detailed in the first column of the table in Schedule 11 (*Agreed Repairs*);

"**Agreed Repair Cost**" means the cost of an Agreed Repair as set out in the second column of the table in Schedule 11 (*Agreed Repairs*);

"**Agreement**" means Clauses 1 to 68 (inclusive) together with Schedules 1 to 24 (inclusive) which are annexed and signed as relative hereto, all as may be amended from time to time in accordance with this Agreement;

"**Annual Service Report**" has the meaning given to it in Clause 49.4;

"**Approval Bodies**" means any Relevant Authorities, planning authorities, roads authorities, HMRI, BAA, Network Rail and any other parties who are to issue Consents which may be required for the construction, installation, commissioning, completion, opening, maintenance, use or modification of the Edinburgh Tram Network;

"**Assets**" means all assets and rights to enable CEC, TEL, **tie** or their assignees or agents or another party to own, operate and maintain and extend the Edinburgh Tram Network in accordance with this Agreement, including:

(a) any equipment forming part of the Edinburgh Tram Network;

(b) any books and records (including the operating and maintenance manual, health and safety manuals and other know-how);

(c) any Trams, Spare Parts, Special Tools and other assets (together with any warranties in respect of assets being transferred);

(d) any contractual rights; and

(e) any Intellectual Property Rights;

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but excluding any assets and rights in respect of which CEC and/or **tie** (as appropriate) is full, legal and beneficial owner;

"**Availability Criteria**" means that a Tram:

(a) fully complies with the Tram Maintenance Specification, save for Minor Defects; and

(b) is free from Material Defects

and "**non Availability**" shall mean failure to meet the Availability Criteria;

"**Available**" means that a Tram meets the Availability Criteria;

"**Background Information**" means all and any materials, documents, drawings, plans or other information in paper, electronic or any other form, relating in any way to this Agreement or the Tram Legislation (and the parliamentary process) and made available to the Tram Maintainer by **tie**, CEC, any **tie** Party, the Client, any Client Party and/or any of their respective members, officers, agents and/or advisers in connection with this Agreement or during the procurement competition relating to this Agreement or thereafter;

"**Base Case RPIX**" means RPIX as at September 2007;

"**Best Value Improvement Plans**" means the plans referred to in Clause 49.8;

"**Business Day**" means any day other than a Saturday, Sunday or a day which is a public holiday recognised by CEC;

"**Case for Safety**" means all necessary documentation, information and other requirements for the issue of a safety certificate or a safety authorisation (as appropriate) by the Office of the Rail Regulator pursuant to the Railways and Other Guided Transport Systems (Safety) Regulations 2006;

"**CEC**" means the City of Edinburgh Council;

"**Certificate of Service Commencement**" means the certificate issued by **tie** in accordance with Clause 45.3 of the Infraco Agreement;

"**Change in Control**" means any sale or disposal of any legal beneficial or equitable interest in share capital comprising 30% of a corporation or the transfer or acquisition of the ability to direct the management and control of the corporation;

"**Change in Law**" means the coming into effect after the **14th September 2007** of:

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(a) Legislation, other than any Legislation which on or before the **14th September 2007** has been published:

(i) in a draft Bill as a part of a Scottish Executive, Scottish Parliament or United Kingdom Government consultation paper;

(ii) in a Bill;

(iii) in draft subordinate Legislation within the meaning of section 21(1) of the Interpretation Act 1978; or

(iv) as a proposal in the Official Journal of the European Union or as a common position adopted by the European Parliament; or

(b) any Guidance (other than Guidance which on the 14th September 2007 has been published (in draft or otherwise) or changes in Guidance; or

(c) any applicable judgement of a relevant court of law which changes binding precedent;

"**Change Procedure**" means the variation procedure set out in Clause 16 (*Changes*);

"**Client Change**" means any addition, modification, reduction or omission in respect of the Services or any other term of this Agreement instructed by the Client in accordance with Clause 16 (*Changes*);

"**Client Change Order**" means the written confirmation issued by the Client to proceed with a Client Change on the basis of an Estimate (as modified, if required);

"**Client Claim**" means a relief or entitlement pursuant to the Infraco Contract (other than in respect of compensation on termination payment) to which the Client is or becomes or may become entitled under the Infraco Contract which is equivalent to and/or consistent with relief or entitlement pursuant to and under the same circumstances as an EPR Claim;

"**Client Default**" has the meaning given to it in Clause 34.1 (*Client Default Termination*);

"**Client Notice of Change**" means a notice served by the Client pursuant to Clause 16.1 setting out the matters specified in Clause 16.2;

"**Client Party**" means any advisers appointed by the Client or any of the Client's employees, agents, contractors and sub-contractors of any tier and its or their directors, officers and employees (excluding the Tram Maintainer or any Tram Maintainer Party);

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"**Client's Programme**" means the programme for the Infraco Works which shall be notified to the Tram Maintainer and updated from time to time;

"**Client's Representative**" means the person or persons appointed by the Client from time to time and notified to the Tram Maintainer;

"**Code**" means the Scottish Ministers' Code of Practice on the Discharge of Functions by Public Authorities under the Freedom of Information (Scotland) Act 2002 as the same may be amended, varied or replaced from time to time;

"**Code of Construction Practice**" means the code set out in part 1 of Schedule 18 (*Code of Construction and Code of Maintenance Practice*);

"**Code of Maintenance Practice**" means the code set out in part 2 of Schedule 18 (*Code of Construction and Code of Maintenance Practice*);

"**Commencement Date**" means the date on which the Tram Maintainer has been notified by the Client that all the Conditions Precedent have been either satisfied or waived;

"**Commercially Sensitive Information**" means the subset of Confidential Information listed in Schedule 17 (*Commercially Sensitive Information*) comprised of information:

(a) which is provided by the Tram Maintainer to the Client in confidence for the period set out in that schedule; and/or

(b) that constitutes a trade secret;

"**Conditions Precedent**" means the conditions specified in part 1 of Schedule 1 (*Conditions Precedent*);

"**Confidential Information**" means any information which has been designated as confidential by either Party in writing or that ought to be considered as confidential (however it is conveyed or on whatever media it is stored) including information which relates to the business, affairs, properties, assets, trading practices, goods, services, developments, trade secrets, Intellectual Property Rights, know-how, personnel of either Party, all personal data and sensitive personal data within the meaning of the Data Protection Act 1998, and the Commercially Sensitive Information;

"**Consents**" means without limitation all permissions, consents, approvals, certificates, permits, licences, agreements and authorisations (including those required by Law), needed to

carry out the Services including any consents obtained by or on behalf of the Project Safety and Certification Committee;

"**Construction/Operational Panel**" has the meaning given to it in paragraph 19.1 of Schedule 9 (*Dispute Resolution Procedure*);

"**Control Centre**" means the control centre for the Edinburgh Tram Network to be provided by the Infraco pursuant to the Infraco Contract and operated by the Operator pursuant to the DPOFA;

"**Defective Tram**" means a Tram operating in passenger service with a Minor Defect which arrives at or departs from a Monitoring Point;

"**Deliverables**" means the Tram Maintainer's Materials, the Tram Maintenance Plan, the Tram Maintenance Programme and any other information associated with the Services provided by the Tram Maintainer from time to time;

"**Deliverables Programme**" means the programme prepared by the Tram Maintainer as set out in part 3 of Schedule 2 (*Employer's Requirements*), as may be amended from time to time in accordance with this Agreement;

"**Delivery**" means, in respect of a Tram, when the Tram is delivered to the Depot and/or the Tram Maintainer takes operational control of the Tram and "Deliver" shall be construed accordingly;

"**Depot**" means the depot at Gogar comprising maintenance facilities, stabling facilities, sidings, operations, cleaning facilities, the Control Centre, storage facilities and accommodation for operational and maintenance staff;

"**Depot Equipment**" means the equipment which is identified as being maintained and/or operated by the Tram Maintainer in table 83 of section 29 of the Employer's Requirements;

"**Depot Plan**" means the plan of the Depot annexed to the Depot Sub-Licence;

"**Depot Sub-Licence**" means the sub-licence to the Depot in the form annexed to Schedule 13 (*Depot Sub-Licence*);

"**Discriminatory Change in Law**" means a Change in Law, the terms of which apply expressly to:

(a) the Edinburgh Tram Network; and/or

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(b) the Tram Maintainer and not to other persons;

"**Dispute**" means any dispute, difference or unresolved claim between the Parties in connection with or arising from this Agreement;

"**Dispute Resolution Procedure**" means the procedure provided for in Clause 52 (*Dispute Resolution Procedure*) and set out in Schedule 9 (*Dispute Resolution Procedure*);

"**DPOFA**" means the development partnering and operating franchise agreement between **tie** and the Operator dated 14 May 2004 as amended at 20 December 2007;

"**Edinburgh Tram Network**" means the tramway which is to be designed, constructed and maintained in Edinburgh pursuant to the Infraco Contract in Phase 1a (forming part of Line One and Line Two as described in the Tram Legislation (and Phase 1b if built), together with all associated works and facilities including all civil engineering and track works, Trams, infrastructure, plant, machinery and equipment installed or used for such tramway;

"**Effective Date**" means the last date of execution of this Agreement;

"**Emergency Services**" means Lothian and Borders Police, Lothian and Borders Fire Brigade, British Transport Police, Scottish Ambulance Services and HM Coastguard;

"**Employer's Requirements**" means the requirements set out in part 1 of Schedule 2 (*Employer's Requirements*);

"**Environmental Information Regulations**" means the Environmental Information (Scotland) Regulations 2004, Scottish SI 2004/520;

"**EPR Claim**" means a relief or entitlement or payment pursuant to this Agreement to which the Tram Supplier is or becomes or may become entitled pursuant to either a:

(a) Force Majeure Event;

(b) Client Change;

(c) Change in Law; and,

(d) any other rights to claim additional payment or relief;

"**Escrow Agreement**" means the escrow agreement in Schedule 8 of the Tram Supply Agreement;

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"**Estimate**" means the estimate to be provided by the Tram Maintainer in accordance with Clause 16.4 and 16.6;

"**Euro Compliant**" has the meaning given to it in Clause 23.8;

"**Excusing Cause**" means any one or more of the following events which interrupts the operation of the Trams:

(i) a road traffic accident; or

(ii) the actions of any of the Emergency Services, CEC or Utilities Companies;

provided that, in each case:

(a) the Tram Maintainer has used all reasonable endeavours to mitigate the effect of such Excusing Cause; and

(b) the Tram Maintainer notifies the Client as soon as it becomes aware of the potential and/or actual impact on its ability to perform the Services;-

(iii) a failure on the part of **tie,** the Client or the Client's Representative in complying with its obligations under this Agreement where the Tram Maintainer can demonstrate to the Client's satisfaction that:

(a) such failure had a material impact on its ability to perform the Services; and

(b) the Tram Maintainer has used all reasonable endeavours to mitigate the effects of such failure; and

(c) the Tram Maintainer notified the Client as soon as it became aware of the potential and/or actual impact on its ability to perform the Services;

(iv) any Permitted Variation agreed to by the Parties which causes the Tram Maintainer to be unable to perform the Services but only to the extent that the Client:

(a) shall have given its prior written consent to the Services being affected in such a manner; and

(b) was informed by the Tram Maintainer of the extent of the impact on such Services as part of the process of agreeing such Client Change;

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(v) a Force Majeure Event, provided that the Tram Maintainer has complied with its obligations under Clause 36 (*Termination on Force Majeure*);

(vi) environmental conditions, which result in damage to the Edinburgh Tram Network, that are outside the environmental parameters in the Employers Requirements contained in Schedule 2 of this Agreement; or

(vii) suspension by the Client in terms of Clause 31 (*Suspension of Work*) provided that the Tram Maintainer has complied with its obligations under Clause 31 (*Suspension of Work*);

"**Expiry Date**" has the meaning given to it in Clause 4 (*Term of the Agreement*);

"**Final Persistent Breach Notice**" has the meaning given to it in Clause 33.2;

"**Financial Panel**" has the meaning given to it in paragraph 19.1 of Schedule 9 (*Dispute Resolution Procedure*);

"**First Tram**" a timetabled Tram that is the first to operate in passenger service on any route in each direction on any day;

"**FOISA**" means the Freedom of Information (Scotland) Act 2002 and any subordinate legislation made under this Act from time to time together with any guidance and/or codes of practice issued by the Scottish Information Commissioner in relation to such legislation;

"**Force Majeure Extension**" has the meaning given to it in Clause 36.4;

"**Force Majeure Event**" means the occurrence after the Effective Date of:

(a) war, civil war or armed conflict in the United Kingdom; or

(b) nuclear, chemical or biological contamination unless the source or cause of the contamination is the result of actions of the Tram Maintainer or any Tram Maintainer Party; or

(c) pressure waves caused by devices travelling at supersonic speeds; or

(d) exceptionally adverse weather conditions affecting the shipment or transportation of trams;

"**General Change in Law**" means a Change in Law which is not a Qualifying Change in Law;

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"**Good Industry Practice**" means using standards, practices, methods and procedures conforming to the Law and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably be expected from a large, reputable, professionally qualified, competent and skilled organisation experienced in carrying out a similar type of undertaking to those comprised in the design, manufacture, supply and maintenance of Trams and seeking in good faith to comply with its contractual obligations and all duties owed by it;

"**Guidance**" means any applicable guidance, policy, direction or determination issued by any regulatory body with which the Client, **tie**, CEC, the Operator, the Tram Maintainer, the Tram Maintainer Parties and/or its subcontractors are bound to comply (to include, for the avoidance of doubt, the **tie** and CEC policies) and to the extent not published or otherwise publicly available, is made available to the Tram Maintainer;

"**Handback Package**" means the information referred to in Clause 40 (*Transition on Termination or Expiry*) as may be updated from time to time in accordance with Clause 40 (*Transition on Termination or Expiry*);

"**Hazardous Materials**" means any materials, Parts or systems generally known and accepted at the time of their use by the Tram Maintainer in performing the Services to comprise or contain a toxic or other hazard to the safety or health of persons or safety of property;

"**HMRI**" means Her Majesty's Railway Inspectorate;

"**Hot Spare**" means an additional one tram in excess of the Tram Number Requirement made Available by the Tram Maintainer for use by the Operator;

"**HSQE Manager**" shall have the meaning given in Clause 60.5;

"**HSQE System**" shall have the meaning given in Clause 60.1;

"**Indemnified Liabilities**" means actions, claims (including third party claims), demands, proceedings, losses, damages, liabilities, costs and expenses (including legal and other professional charges and expenses);

"**Indemnified Parties**" shall have the meaning given to it in Clause 45.1;

"**Independent Competent Person**" means Interfleet or such other person appointed by the Client to agree and oversee the implementation of all procedures and processes to comply with the provisions of the Railway and Other Guided Transport Systems (Safety) Regulations

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2006 and to enable permitting for the testing, commissioning and operation of the Edinburgh Tram Network;

"**Indexed**" means in relation to an amount, that amount to be multiplied by the value of RPIX at the Point of Indexation, divided by the Base Case RPIX;

"**Indirect Losses**" means any damage, cost, third party claim, expense or loss incurred by a Party to this Agreement or Client Party (or an Indemnified Party) as a consequence of a breach of this Agreement or a negligent act or omission which relates to consequential or indirect loss of profits, or loss of revenue, loss of use, loss of production or output, interruption or loss of business or business opportunity or other consequential or indirect loss, loss of contract, loss of goodwill and whether or not the Party committing the breach knew, or ought to have known, that such indirect or consequential loss would be likely to be suffered as a consequence of such breach;

"**Information**" shall have the meaning given to it in section 73 of FOISA;

"**Infraco**" means the contractor to be selected and appointed by **tie** which will be responsible for carrying out and/or managing a comprehensive turnkey contract including the design, construction, installation, commissioning, tram procurement, system integration, infrastructure maintenance, tram maintenance and supply of related equipment and materials, trams and related infrastructure in relation to the Edinburgh Tram Network or any successor appointed by **tie** and notified to the Tram Maintainer by notice in writing from time to time;

"**Infraco Contract**" means the contract to be entered into by **tie** with the Infraco;

"**Infraco Party**" means each and any of the Infraco's employees, directors, officers, agents, professional advisors, consultants and contractors and its or their sub-contractors (of any tier) and shall include its or their directors, officers and employees as they are involved in relation to the Infraco Works and "**Infraco Parties**" shall be construed accordingly;

"**Infraco Works**" means as the context requires, all or any of the works to be constructed and completed and/or services to be provided and/or the plant, machinery and equipment to be supplied and installed by the Infraco in accordance with the Infraco Contract and which are necessary to deliver a fully functional tram system in Edinburgh, and to subsequently maintain such system all in accordance with the Employer's Requirements;

"**Insolvency Event**" means any of the following events:

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(a) the Tram Maintainer is unable to pay its debts as they fall due or is insolvent or admits (in writing) its inability to pay its debts as they fall due;

(b) the Tram Maintainer suspends for a period of two months making payments on all or any class of its debts or a moratorium is declared by the Tram Maintainer in respect of its indebtedness;

(c) the Tram Maintainer ceases business or announces an intention to do so;

(d) the following are entered into:

(i) a voluntary arrangement (other than a solvent one) for a composition of debts of the Tram Maintainer;

(ii) a scheme of arrangement in respect of the Tram Maintainer pursuant to the Insolvency Act 1986 or the Companies Act 1985; or

(iii) a material composition or arrangement (other than a solvent one) with the Tram Maintainer's creditors;

(e) either of the following:

(i) the winding-up of the Tram Maintainer (including passing a shareholders' resolution or the presentation of a petition by the Tram Maintainer for the purpose of winding up the Tram Maintainer); or

(ii) its administration (including where an application is made by the Tram Maintainer for, or petition is presented by the Tram Maintainer for, or any meeting of its directors or members resolves to make an application for, an administration order);

(f) an order for the winding-up or administration of the Tram Maintainer is made;

(g) any liquidator, judicial custodian, receiver, administrative receiver, administrator or the like is appointed in respect of the Tram Maintainer or any material part of the Tram Maintainer's assets;

(h) possession is taken of, or any distress, execution or other process (other than on the dependence or inhibition) is levied or enforced upon, any material part of the property (whether real or personal) of the Tram Maintainer by or on behalf of any creditor or encumbrancer of the Tram Maintainer; or

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(i) anything analogous to any of the events mentioned in paragraphs (a) to (h) above occurs in relation to the Tram Maintainer under the law of any relevant jurisdiction jurisdiction including but not limited to Spanish Law 22/2003 of July 9 and Spanish Law 1564/1989 of December 22;

"**Intellectual Property Rights**" or "**IPR**" means any rights in or to any patent, design right, utility model, trade mark, brand name, service mark, trade name, business name, logo, invention (whether registered or unregistered), domain name, semi-conductor right, topography right, software designs and/or other materials, source code, copyright, moral right, know-how or rights in databases and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or for an extension, revival or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the law of Scotland or of any other jurisdiction;

"**Interim Certificate**" shall have the meaning given to it in Clause 42.2.3;

"**Internal Resolution Procedure**" means the procedure described in paragraphs 10 and 11 of Schedule 9 (*Dispute Resolution Procedure*);

"**Key Personnel**" means those persons listed in Schedule 14 (*Key Personnel*);

"**Last Tram**" means a timetabled tram that is the last to operate in passenger service on all routes in each direction prior to the system shutting down for the night;

"**Late Tram**" means either:

(a) a Tram:

(i) that is in passenger carrying service; and

(ii) is arriving at Edinburgh Airport or departing from any other Monitoring Point; and

(iii) in the case of Edinburgh Airport its arrival, when compared to the Timetable, is more than 2 minutes (i.e. 120 seconds) late; or

(iv) its departure from any other Monitoring Point, when compared to the Timetable, is timed either more than 2 minutes (i.e. 120 seconds) late, or more than 1 minute (i.e. 60 seconds) early; or

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(b) where there is no Tram running in service at a Monitoring Point, contrary to the Timetable;

"**Law**" means:

(a) any Legislation;

(b) any Guidance; and

(c) any judgment of a relevant court of law which is a binding precedent,

in each case in force, or applicable, in Scotland;

"**Legislation**" means any Act or instruments of the Scottish Parliament or the United Kingdom Parliament or subordinate legislation within the meaning of section 21(1) of the Interpretation Act 1978, any exercise of the Royal Prerogative, any enforceable community right within the meaning of section 2 of the European Communities Act 1972 and any bye-laws of any Local (or other statutory) Authority;

"**Legal Opinion**" means a legal opinion from a law firm satisfactory to the Client acting reasonably, in a form acceptable to the Client acting reasonably;

"**Legal Panel**" has the meaning given to it in paragraph 19.1 of Schedule 9 (*Dispute Resolution Procedure);*

"**Line One**" means the tramway works as authorised by the Edinburgh Tram (Line One) Act 2006;

"**Line Two**" means the tramway works as authorised by the Edinburgh Train (Line Two) Act 2006;

"**Local Authority**" means CEC or any local authority established pursuant to the Local Government (Scotland) Act 1973 and 1994 (as these statutes may be amended) or on regional transport partnership or body established pursuant to the Transport (Scotland) Act 2005;

"**Losses**" means all damages, losses, liabilities, costs, expenses (including legal and other professional charges and expenses) and charges whether arising under statute, contract or at common law or in connection with judgments, proceedings, internal costs or demands;

"**Material Defect**" means a defect to a tram that has been advised to the Tram Maintainer and is included in part 2 of Schedule 16 (*Material Defects*), or any other defect which will affect

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the safety of operation of such Tram, or its compliance with Disability Discrimination Act 1995;

"**Maximum Performance Payment**" means the base periodic payment for services set out in part 3 of Schedule 3 (*Payment*);

"**Minimum Overall Payment Performance**" means 95% Tram Punctuality Performance;

"**Minimum Performance Payment**" means 70% of the Maximum Performance Payment

"**Minimum Periodic Payment**" means 85% of the Maximum Performance Payment;

"**Minimum Spare Parts Pool**" means the minimum level of each Spare Part or Special Tool to be held in the Spare Parts Pool as specified in the fourth column of the table in part 1 of Schedule 5 (*Spares Pool and Special Tools*);

"**Minor Defect**" means a defect to a Tram that will not affect the safety of operation of such Tram, or its compliance with Disability Discrimination Act 1995, that has been advised to the Tram Maintainer and is included in part 1 of Schedule 16 (*Defects List*);

"**Mobilisation Interim Certificate**" has the meaning given to it in Clause 42.3.3;

"**Mobilisation Milestone**" means a payment milestone for performance of Mobilisation Services set out in part 2 of Schedule 3 (*Payment*);

"**Mobilisation Milestone Date**" means the date for the performance of the relevant Mobilisation Service to meet a Mobilisation Milestone, as set out in part 2 of Schedule 3 (*Payment*);

"**Mobilisation Milestone Payment**" means the payment for achieving a Mobilisation Milestone payable in accordance with Clause 42 (*Payment*);

"**Mobilisation Period**" means the period commencing on the Commencement Date and ending on the Tram Maintenance Commencement Date;

"**Mobilisation Services**" means the services to be performed by the Tram Maintainer pursuant to part 2 of Schedule 3 (*Payment*);

"**Monitoring Point**" means the locations where the arrival or departure of Trams is recorded for the purpose of calculating Tram punctuality for the purpose of Schedule 3 (*Payment*) being:

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(a) **Phase 1A:** for the purposes of monitoring arrival and departure: Edinburgh Airport;

(b) **Phase 1A:** for the purposes of measuring departure only:

(i) Edinburgh Park Station;

(ii) Haymarket;

(iii) Foot of the Walk;

(iv) Leith (Newhaven or Ocean Terminal according to the service); and

(v) Picardy Place; and

(c) **Phase 1B:** for the purposes of measuring departure only:

(i) Crewe Toll (northbound only); and

(ii) Granton Square;

"**NCC**" has the meaning given to it in Clause 50.21;

"**New Provider**" has the meaning given to it in Clause 44.1;

"**Notice of Adjudication**" has the meaning given to it in paragraph 10.1 of Schedule 9 (*Dispute Resolution Procedure*);

"**Notification**" has the meaning given to it in paragraph 10.1 of Schedule 9 (*Dispute Resolution Procedure*);

"**Novation Agreement Escrow Letter**" means the escrow letter in the form set out in part 2 of Schedule 1 (*Conditions Precedent*);

"**Object Code**" means any form of computer program which is suitable for direct execution by a machine only and unsuitable to be read and understood by a person;

"**OCIP Insurances**" means the insurances referred to in Clause 29.14 which shall be notified to the Tram Maintainer from time to time;

"**Open Book Basis**" means the availability and disclosure (consistent with the operation of Clause 26 (*Right of Verification and Audit*)) of a reasonable level of data and calculations used by the Tram Maintainer to create and justify costings and financial analysis presented to the Client;

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"**Operating Day**" means a 24 hour period running from 3 a.m. on each day when Trams are timetabled to run;

"**Operations Performance Specification**" means the specification set out in section 2 of the Tram Employer's Requirements;

"**Operator**" means Transdev Edinburgh Tram Limited, a company incorporated in Scotland under registered number SC267598 and having its registered office at 1st Floor, City Point, 65 Haymarket Terrace, Edinburgh EH12 5HD, appointed by **tie** as operator under the DPOFA or any successor operator of the Edinburgh Tram Network as may be notified to the Tram Maintainer in writing from time to time;

"**Operator Maintenance**" means the maintenance of the Edinburgh Tram Network to be carried out by the Operator (and its required frequency) as follows:

(a) cleaning of all tramstops, access ways and car parks operated under the auspices of **tie** so as to ensure they are clean and free from all litter, dirt, debris, detritus, industrial and bodily fluids; such cleaning to be carried out not less than daily;

(b) emptying of all litter bins at tramstops or on the Trams daily or as regularly as necessary to prevent them from becoming full;

(c) promptly remove any observed or reported rubbish and debris at the tramstops or on Trams likely to create a risk of fire or other dangers;

(d) regularly remove any observed or reported litter on Trams throughout each day so as to maintain a reasonably clean travelling environment for passengers. This obligation shall also relate to the cleaning up of observed or reported fluids of any type on the Trams; and

(e) cleaning of the parts of the Depot for which the Operator is either the main user or which are shared between the Operator and others and this shall include offices, Control Centre, messing facilities, Operator locker rooms, car parking at the Depot and Depot entrances, so as to ensure such parts are clean and free from all litter, dirt, debris, detritus, industrial and bodily fluids; such cleaning to be carried out not less than daily or as may be otherwise be agreed between **tie** and the Operator;

and shall also include the carrying out of the initial response to a failure of, damage to or other incident occurring on the System which is not specifically identified as the Operator's

responsibility to resolve but actually or, in the Operator's reasonable opinion, potentially interrupts or delays the Transport Services;

"**Operator Maintenance Plan**" means the plan to be prepared by the Operator in relation to the performance of the Operator Maintenance;

"**Operator Procedures**" means all procedures to be carried out by the Operator in respect of the Tram, including daily safety checks, sanding and cleaning of the Trams;

"**Operator Safety Management System**" means the safety management system to be prepared by the Operator to form a whole and safe framework under which the Edinburgh Tram Network is operated;

"**Operator's Case for Safety**" means the case for safety that the Operator is required to maintain in respect of the operation of the Trams;

"**Overall Payment Performance**" has the meaning given to it in paragraph 1.2 of Schedule 3 (*Payment*);

"**Panels**" has the meaning given to it in paragraph 19 of Schedule 9 (*Dispute Resolution Procedure*);

"**Parent Company Guarantee**" means a guarantee to be issued by the Tram Maintainer's Parent Company in the form set out in part 2 of Schedule 1 (*Conditions Precedent*);

"**Part**" means any component or furnishing or equipment, excluding consumables, furnished within or relating to a Tram whether or not the same is installed on such Tram;

"**Passenger Services**" means the public passenger Tram services to be provided by the Operator on the Edinburgh Tram Network;

"**Peak Period**" means, as the context requires, the peak periods identified in tables 3.2 and 3.3 of part 1A of the Employer's Requirements;

"**Performance Bond**" means the performance bond in the form set out in part 1 of Schedule 23 (*Bond and Collateral Warranty*);

"**Performance Rebate**" equals, in relation to a Reporting Period:

(i) the amount by which the Performance Payment for the Services payable by the Client in relation to that Reporting Period is lower than it would otherwise have been as a

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result of the occurrence of the conditions stated in Paragraph 5.1.1 and Paragraph 5.1.2 of Schedule 3 (Payment); **less**

(ii) the Relief Threshold;

"**Performance Review Date**" means the date 3, 8, 13, 18, 23 or 28 years (as applicable) after the Service Commencement Date;

"**Performance Review Period**" means the period between Performance Review Dates (and the period between the Service Commencement Date and the first Performance Review Date);

"**Period**" means a period of time during which a certain Tram Number Requirement is specified, as set out in the third column of the table in the definition of Tram Number Requirement;

"**Permitted Variations**" means a Client Change and/or a change proposed by the Tram Maintainer which has been authorised to proceed in accordance with the provisions of this Agreement;

"**Persistent Breach Notice**" shall have the meaning given to it in Clause 33.1;

"**Phase 1a**" means Edinburgh Airport to Newhaven (inclusive) together with the Depot at Gogar and the spur at Roseburn Junction;

"**Phase 1b**" means Roseburn Junction to Granton Square (inclusive);

"**Point of Indexation**" shall be January each year to be applied annually as of 1 April each year;

"**Price**" means the price payable for the Services carried out on the Tram(s) subject to such additions thereto or deductions therefrom as may from time to time be made in accordance with this Agreement;

"**Prohibited Act**" means:

(a) offering, giving or agreeing to give to **tie**, the Scottish Executive, Transport Scotland, the Scottish Ministers, CEC or any **tie** Party or any other public body or any person owned or employed by any of them, any gift or consideration of any kind as an inducement or reward:

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(i) for doing or not doing (or for having done or not having done) any act in relation to the obtaining or performance of this Agreement; or

(ii) for showing or not showing favour or disfavour to any person in relation to this Agreement;

(b) paying commission or agreeing to pay commission to any person in connection with the award of this Agreement;

(c) committing any offence:

(i) under the Prevention of Corruption Acts 1889-1916 or in section 68(2) of the Local Government (Scotland) Act 1973;

(ii) under any Law creating offences in respect of fraudulent acts; or

(iii) at common law in respect of fraudulent acts in relation to this Agreement or any other relevant agreement with **tie**, any **tie** Party, the Scottish Executive, Transport Scotland, the Scottish Ministers, CEC or any other public body; and/or

(d) defrauding or attempting to defraud or conspiring to defraud the Scottish Executive, **tie**, any **tie** Party, CEC, Transport Scotland, the Scottish Ministers or any other public body;

Any reference within this Agreement to any "Prohibited Act" shall include acts outwith the United Kingdom and the references within the definition "Prohibited Act" to UK legislation shall be deemed to be amended to refer to legislation in other jurisdictions outside of the United Kingdom;

"**Project**" means the project to procure the construction, operation and maintenance of a two line light rail network in Edinburgh;

"**Project IPR**" means all Intellectual Property Rights created in the performance of the Services which are specific in nature to the performance of the Services including any asset management system and/or works planning or programming system created by the Tram Maintainer in connection with the performance of the Services;

"**Project Safety and Certification Committee**" or "**PSCC**" shall include representatives from **tie,** Transport Edinburgh Limited, CEC in its capacity as roads authority, the Client, the Operator, the Tram Supplier and the Tram Maintainer;

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"**Project Vision**" means the project vision referred to in recital F of this Agreement;

"**Qualifying Change in Law**" means:

(a) a Discriminatory Change in Law; and/or

(b) a Specific Change in Law;

"**Quantum**" has the meaning given to it in Schedule 12 (*Return Condition*);

"**Rectification Plan**" has the meaning given to it in paragraph 1.7 of Schedule 3 (*Payment*);

"**Referral**" has the meaning given to it in paragraph 27 of Schedule 9 (*Dispute Resolution Procedure*);

"**Referring Party**" has the meaning given to it in paragraph 16 of Schedule 9 (*Dispute Resolution Procedure*);

"**Related Contracts**" has the meaning given to it in paragraph 55 of Schedule 9 (*Dispute Resolution Procedure*);

"**Related Dispute**" has the meaning given to it in paragraph 55 of Schedule 9 (*Dispute Resolution Procedure*);

"**Relevant Authority**" means any court with the relevant jurisdiction and any local, national or supra-national agency, inspectorate, minister, ministry, official or public or statutory person of the government of the United Kingdom or of the European Union;

"**Relevant Employee**" has the meaning given to it in Clause 44.1;

"**Reliability Bond**" has the meaning given to it in the Tram Supply Agreement;

"**Relief Threshold**" means £1,000 as Indexed;

"**Reporting Period**" means a period of 28 days provided that:

(i) the first such period during the Term shall commence on the Tram Maintenance Commencement Date;

(ii) the first such period in the Term may be varied by up to 7 days by notice from the Client to the Tram Maintainer;

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(iii) each such period shall start on the day following the last day of the preceding period; and

(iv) the last such period during the Term shall end on the Expiry Date or termination of this Agreement;

"**Reporting Period End Date**" means the dates set out in Schedule 20 (*Reporting Period End Dates*);

"**Request for Information**" shall have the meaning set out in FOISA and shall include any apparent request for information under FOISA, the Environmental Information Regulations or the Code;

"**Required Insurances**" means the insurances complying with the insurance requirements set out in part 1 of Schedule 4 (*Required Insurances*);

"**Responding Party**" has the meaning given in paragraph 17 of Schedule 9 (*Dispute Resolution Procedure*);

"**Response**" means the response by the Tram Maintainer detailing its proposal to provide maintenance and associated services in respect of the Trams made on 3rd August 2007 which is included in Schedule 21 (*Response*);

"**Return Condition**" means the condition required for the Trams, Spare Parts and Special Tools upon termination or expiry of this Agreement, as set out in part 2 of Schedule 12 (*Return Condition*) and assessed in accordance with part 1 of Schedule 12 (*Return Condition*);

"**Return Condition Bond**" has the meaning given to "Return Condition Bond" in part 1 of Schedule 12 *(Return Condition)* paragraph 4.2;

"**Return Date**" has the meaning given to it in Clause 44.11;

"**Review Procedure**" means the review procedure set out in Schedule 24 (*Review Procedure*);

"**RPIX**" means the general index of retail prices for all items excluding mortgage interest payments (Office of National Statistics: Series Identifier: CHMK) as published or any replacement thereof or, in the event such index ceases to exist, such other similar index as the Parties shall agree from time to time (or, if the Parties cannot so agree, as determined under the Dispute Resolution Procedure on the referral of either Party) provided that, if the basis of computation of such index shall have changed between the two relevant months, any official reconciliation between the two bases of computation published by a United Kingdom

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government department shall be binding on the Parties and, in the absence of such official reconciliation, such adjustment shall be made to the figure of such index for the second of those months to make it correspond as nearly as possible to the method of computation for the first of those months and such adjusted figure shall be considered for the purpose of this Agreement to the exclusion of the actual published figure;

"**SDS Provider**" means Parsons Brinckerhoff Limited, a company registered in England and Wales with registered number 02554514 whose registered office is at Amber Court, William Armstrong Drive, Newcastle Business Park, Newcastle upon Tyne, NE4 7YQ which expression shall include its permitted assignees or such other system design services provider appointed by **tie** or the Client and notified to the Tram Supplier by notice in writing from time to time in relation to the Edinburgh Tram Network;

"**Security Interests**" means any mortgage, pledge, lien, hypothecation, security interest or other charge or encumbrance or any other agreement or arrangement having substantially the same economic effect and includes any security as defined in section 248(b) of the Insolvency Act 1986;

"**Self-Monitoring Plan**" means a detailed plan produced by the Tram Maintainer pursuant to Clause 30 *(Service Performance and Quality Monitoring)* setting out how it proposes to monitor its compliance with the Tram Maintenance Specification and the Employer's Requirements and its obligations under this Agreement in a way which will enable: (i) the Client and **tie** to satisfy themselves as to the level of the Tram Maintainer's compliance with the Tram Maintenance Specification and the Employer's Requirements and its obligations under this Agreement in all respects; and (ii) the Parties to perform their respective responsibilities pursuant to and as described in Clause 49 (*Best Value*);

"**Service Commencement Date**" means the first date of commencement of Passenger Services;

"**Service Quality Report**" means the report to be submitted by the Tram Maintainer to the Client in a form developed and containing the information agreed between the Tram Maintainer and the Client;

"**Service Provision Change**" has the meaning given to it in Clause 44.1;

"**Services**" means all maintenance services and other obligations to be carried out by the Tram Maintainer in accordance with this Agreement (including for the avoidance of doubt, the Mobilisation Services and the maintenance of the Depot Equipment);

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"**Services Payment**" means the payment to be made for carrying out the Services (except for the Mobilisation Services) as calculated in accordance with Schedule 3 (*Payment*);

"**Services Period**" means the period commencing on the Tram Maintenance Commencement Date and ending upon termination or expiry of this Agreement;

"**Software**" means the executable object code version of software relating to equipment installed on the Trams, which is supplied in machine readable form and already loaded upon the relevant piece of equipment or computer system to which it relates including for the avoidance of doubt all software embedded in a hardware device which is installed on the Trams;

"**Source Code**" means the source code version of Software, which is supplied in a form capable of being read and interpreted by humans, together with related interpretive information;

"**Spare Parts**" means such components, parts, consumables, equipment and furnishings as may reasonably be required from time to time to maintain, repair or replace any part of any Tram or to keep it compliant with the Tram Requirements Specification and Law for the duration of its operational life;

"**Spare Parts Pool**" the pool of Spare Parts and Special Tools owned by CEC and to be maintained by the Tram Maintainer in accordance with Clause 9.20;

"**Special Tools**" means the special tools required to carry out maintenance of the Trams, listed in part 2 of Schedule 5 (*Spares Pool and Special Tools*) as the same may be varied from time to time by written agreement of the Parties (such agreement not to be unreasonably withheld or delayed);

"**Specific Change in Law**" means any Change in Law which specifically applies to the provision of services the same as or similar to the Services (but not to the provision of other services);

"**Sub-Contractor Direct Agreement**" means an agreement in the form set out in Schedule 6 (*Sub-Contractor Direct Agreement*) to be entered into pursuant to Clause 57.6;

"**System**" the tram system to be constructed in accordance with the Tram Legislation made in respect of the Edinburgh Tram Network together with associated works and facilities and including all civil engineering and track works, tram infrastructure, plant, machinery and equipment installed or used for such tram system;

"**Systems Acceptance Tests**" means the acceptance tests to be carried out on the System as set out in section 23 of the Tram Employer's Requirements;

"**Technical Library**" has the meaning given to it in Clause 50.22.1;

"**Technical Records**" means the technical records in respect of the Trams to be retained and updated in accordance with the Tram Maintenance Specification;

"**Term**" means the period from (and including) the Effective Date until (and including) the earlier of the Expiry Date or the date of termination of this Agreement;

"**Termination Date**" means any date of early termination of this Agreement in accordance with its terms;

"**Termination Notice**" means a notice to terminate this Agreement served by either Party in accordance with the terms of this Agreement;

"**Termination Period**" has the meaning given to it in Clause 44.1;

"**Third Party Software**" means programs, the Intellectual Property Rights in which are:

(a) owned by a third party; and

(b) used by the Tram Maintainer to carry out its obligations under this Agreement;

"**Third Party Software Licence**" means a licence to use the Third Party Software;

"**tie**" means **tie** Limited, a company incorporated under the Companies Act with registered number SC230949 and having its registered office at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ which shall include its successors in title, permitted assignees and transferees;

"**tie Customer Satisfaction Survey**" has the meaning given to it in Clause 49.3;

"**tie Documents**" means all documents, drawings, handbooks or other information in whatever format provided by **tie** or the Client to the Tram Maintainer in connection with the performance of the Tram Maintainer's obligations under this Agreement including the Tram Maintenance Specification;

"**tie and CEC Policies**" means the policies included in Schedule 19 (***tie** and CEC Policies*);

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"**tie's Drug and Alcohol Policy**" means the drug and alcohol policy set out in Schedule 19 (*tie and CEC Policies*);

"**tie Party**" means any advisers appointed by **tie** or any of **tie's**, agents, employees, contractors and subcontractors of any tier and its or their directors, officers, employees (but excluding the Infraco, any Infraco Party, the Tram Maintainer and any Tram Maintainer Party), and "**tie Parties**" shall be construed accordingly;

"**tie's Representative**" means the person or persons appointed by **tie** from time to time and notified to the Tram Maintainer;

"**Timetable**" means the timetable which is developed by the Operator under the terms of the DPOFA Agreement and section 2 of the Employers Requirements, as may be notified to the Tram Maintainer by the Client from time to time;

"**Timetabled Hot Spares**" means the number of Hot Spares timetabled to be made Available by the Tram Maintainer for use by the Operator in a Reporting Period;

"**Timetabled Monitored Trams**" means the number of Trams in passenger service timetabled to pass a Monitoring Point in a Reporting Period;

"**Tram**" means any electric tram unit to be designed, manufactured, engineered, fitted out, equipped, installed and delivered in accordance with the Tram Supply Agreement including for the avoidance of doubt, Additional Trams;

"**Tram Documentation**" has the meaning given to it in Clause 9.2.1.3;

"**Tram Employer's Requirements**" means the subset of the Employer's Requirements listed in part 1 of Schedule 2 (*Employer's Requirements*) as relating to the Tram Supplier and Tram Maintainer;

"**Tram Inspector**" means the person specified as such in the Tram Inspector Agreement or such other person as the Client may notify the Tram Maintainer in writing from time to time;

Tram Inspector Agreement" means an agreement between the Tram Inspector, **tie**, and the Infraco for the inspection and certification of Trams dated on or about the date of this Agreement;

"**Tram Interface Specification**" means the interface requirements contained in Schedule 21 *(Response)*;

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"**Tram Legislation**" means the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006 which received Royal Assent on 8 May 2006 and 27 April 2006 respectively and which confer on CEC all requisite authorities and statutory powers to procure construction, operation and maintenance of the Edinburgh Tram Network;

"**Tram Maintainer Accounts**" means in respect of the Tram Maintainer such accounting records as are required to be kept under section 386 of the Companies Act 2006, to be prepared on a consistent basis for each consecutive period not exceeding one month;

"**Tram Maintainer Default**" shall have the meaning given to that term in Clause 32.1;

"**Tram Maintainer Employees**" has the meaning given to it in Clause 44.1;

"**Tram Maintainer IPR**" means:

(a) all Intellectual Property Rights (including Tram Maintainer Software) which the Tram Maintainer can demonstrate by documentary evidence were already existing and owned by or licensed to the Tram Maintainer prior to the Effective Date including any asset management system and/or works programming system operated by the Tram Maintainer which is not comprised within the Project IPR; and

(b) any modifications or developments of any of the Intellectual Property Rights listed in paragraph (a) above which are generic in nature

"**Tram Maintainer Late Last Tram**" means a Last Tram which is also a Tram Maintainer Late Tram;

"**Tram Maintainer Late Tram**" means a Late Tram that is late because of:

(a) any defect on the Tram that does not relate to damage or vandalism by a third party directly or indirectly causing the Tram to be a Late Tram;

(b) any action or omission of the Tram Maintainer; and/or

(c) a Tram not being made Available to the Operator by the Tram Maintainer;

"**Tram Maintainer Party**" means any contractors, agents, subcontractors, professional advisors or consultants engaged by the Tram Maintainer to perform, facilitate or assist with the performance of any of the Services and any of its or their subcontractors of any tier and its or their directors, officers, employees and workmen in relation to the Project and "**Tram Maintainer Parties**" shall be construed accordingly;

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"**Tram Maintainer Safety Management System**" has the meaning given in Clause 13.3.1.2;

"**Tram Maintainer's Materials**" means any and all equipment, tooling, works of authorship, products and materials specifically developed, written or prepared by (or on behalf of) the Tram Maintainer for the purpose of the provision of the Services and/or the performance of this Agreement including all drawings, details, plans, operating and maintenance manuals, specifications, schedules, reports, calculations and other materials and data, and all drafts thereof and working papers, used or prepared by (or on behalf of) the Tram Maintainer;

"**Tram Maintainer's Parent Company**" means Construcciones y Auxiliar de Ferrocarriles, S.A;

"**Tram Maintainer's Representative**" means the person appointed by the Tram Maintainer in accordance with Clause 8.1 as may be varied from time to time in accordance with Clause 8.2;

"**Tram Maintainer Software**" means programs, the Intellectual Property Rights in which are:

(a) owned by the Tram Maintainer; and

(b) used by the Tram Maintainer to carry out its obligations under this Agreement;

"**Tram Maintenance Collateral Warranty**" means a collateral warranty between **tie** and the Tram Maintainer in the form set out in part 2 of Schedule 1 (*Conditions Precedent*);

"**Tram Maintenance Commencement Date**" has the meaning given to it in Clause 9.15;

"**Tram Maintenance Novation Agreement**" means a novation agreement between a new party to this Agreement, **tie** and the Tram Maintainer in the form set out in part 2 of Schedule 1 (*Conditions Precedent*);

"**Tram Maintenance Plan**" means the plan prepared by the Tram Maintainer as referred to within the Response as updated from time to time;

"**Tram Maintenance Programme**" means the programme for the maintenance of the Trams as set out in part 2 of Schedule 2 (*Employer's Requirements*) and varied from time to time in accordance with Clause 16 (*Changes*) or adjusted from time to time in accordance with Clause 18.3;

"**Tram Maintenance Specification**" means the specification for the Services as set out in section 40 of the Tram Employer's Requirements;

"**Tram Number Requirement**" means, as the context requires, the number of Trams set out in tables 15 to 18 inclusive in section 2 of the Tram Employer's Requirements;

"**Tram Punctuality Performance**" has the meaning given to it in paragraph 2 of Schedule 3 (*Payment*);

"**Tram Related Equipment**" means the Tram Documentation, Spare Parts and Special Tools;

"**Tram Requirements Specification**" means the specification for the Trams set out in the Tram Employer's Requirements;

"**Tram Supplier**" means the party appointed by the Client to carry out the obligations of the Tram Supply Agreement;

"**Tram Supply Agreement**" means an agreement for the design, manufacture, delivery, testing and commissioning of Trams;

"**Tram Works**" means the Tram Supplier's obligations pursuant to the Tram Supply Agreement including for the avoidance of doubt the Pre Works Development Services and the supply of the Depot Equipment;

"**Transport Edinburgh Limited**" or "**TEL**" means Transport Edinburgh Limited, a company incorporated under the Companies Act with registered number SC269639 and having its registered office at 55 Annandale Street, Edinburgh EH7 4AZ;

"**Transport Scotland**" means an agency within the Scottish Executive Enterprise, Transport and Lifelong Learning Department which was established in January 2006 and having its principal office at Buchanan House, 58 Port Dundas Road, Glasgow H4 0HF;

"**Transport Services**" means the public passenger transport services to be provided by the Operator on the Edinburgh Tram Network (or any part thereof) in accordance with the DPOFA and section 2 of the Tram Employer's Requirements;

"**TUPE Employees**" has the meaning given to it in Clause 44.1;

"**TUPE Information**" shall have the meaning given to that term in Clause 44.1;

"**TUPE Regulations**" has the meaning given to "the TUPE Regulations" in Clause 44.1;

"**Underperformance Warning Notice**" means a notice issued to the Tram Maintainer by the Client in accordance with Clause 30.5 and 30.6; and

"**VAT**" means Value Added Tax.

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1.2 In this Agreement, except where the context otherwise requires:

1.2.1 words importing gender include masculine, feminine and neuter;

1.2.2 the singular includes the plural and vice versa;

1.2.3 a reference to any part, Clause, sub-Clause, Schedule or appendix is, except where it is expressly stated to the contrary, a reference to such part, Clause or sub-Clause of or Schedule or appendix to this Agreement;

1.2.4 a reference in any Schedule or appendix to any part, paragraph or sub-paragraph is, except where it is expressly stated to the contrary, a reference to such part, paragraph or sub-paragraph of that Schedule or appendix (as the case may be);

1.2.5 any reference to this Agreement or to any other document shall include any variation, amendment or supplement to this Agreement or such other document expressly permitted under the terms of this Agreement;

1.2.6 any reference to any enactment, draft enactment, order, regulation or other similar instrument (including any EU instrument) (whether specifically named or not) shall be construed as a reference to the enactment, order, regulation or instrument as amended, replaced, consolidated or re-enacted and shall include any orders, regulations, legally binding codes of practice or subordinate legislation (within the meaning of section 21(1) of the Interpretation Act 1978) made thereunder;

1.2.7 references to any items being "in the agreed form" means such items have been initialled by or on behalf of each of the Parties for the purpose of identification;

1.2.8 a reference to a person includes individuals, firms, partnerships, bodies corporate, joint ventures, government departments and any organisation capable of suing or being sued and references to any of the same include the others and their successors and assignees and transferees;

1.2.9 headings and the contents list are for convenience of reference only and do not affect the interpretation of this Agreement;

1.2.10 the ejusdem generis rule does not apply and the meaning of general words is not to be restricted by any particular examples preceding or following those general words;

1.2.11 a reference to a time of day is a reference to the time in Edinburgh;

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1.2.12 subject to the restrictions imposed by this Agreement on sub-contracting, an obligation to do something includes an obligation to procure it to be done;

1.2.13 an obligation not to do something includes an obligation not to wilfully allow it to be done; and

1.2.14 the word "including" means "including without limitation".

1.3 This Agreement shall be interpreted and construed as a whole provided that in the event of any inconsistency or conflict between the main body of this Agreement and/or the Schedules and/or the appendices, then:

1.3.1 the main body shall prevail to the extent of any such conflict or inconsistency over the Schedules and appendices; and

1.3.2 the Schedules shall prevail to the extent of any such conflict or inconsistency between the Schedules and appendices.

2. CONDITIONS PRECEDENT

2.1 The Client may by notice in writing to the Tram Maintainer waive satisfaction of any or all of the Conditions Precedent.

2.2 On the date that each of the Conditions Precedent (with the exception of any Conditions Precedent that have been expressly waived by the Client in writing) have in the Client's opinion (acting reasonably) been satisfied, the Client shall notify the Tram Maintainer of the same.

2.3 The Tram Maintainer shall use its reasonable endeavours to satisfy or procure the satisfaction of the Conditions Precedent as soon as reasonably possible after the Effective Date.

3. EFFECTIVE DATE

3.1 Except for the provisions of Clauses 1 (*Definitions and Interpretation*), 2 (*Conditions Precedent*), 4 (*Term of the Agreement*), 25 (*Confidential Information*), 29 (*Insurance*), 45 (*Liability and Indemnities*), 50 (*Copyright and Intellectual property*), 51 (*Data Protection*), 52 (*Dispute Resolution*), 53 (*Derogations*), 54 (*Variations to be in Writing*), 55 (*Waiver and Cumulative Remedies*), 56 (*Notices*), 57 (*Assignation, Changes in Legal Status, Changes in Control and Subcontracting*), 58 (*Conflict of Interest*), 59 (*Security Interests*), 62 (*Consent and Approval*), 63 (*Discrimination*), 64 (*Further Assurance*), 65 (*Applicable Law*), 66 (*No Partnership or Agency*), 67 (*Invalid Terms*) and 68 (*Third Party Rights*) of this Agreement

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which shall take effect on the Effective Date, the obligations of the Parties under this Agreement shall be conditional upon the occurrence of the Commencement Date. Upon the occurrence of the Commencement Date, the Client shall notify the Tram Maintainer of the same.

3.2 This Agreement shall terminate automatically on a date 12 months after the Effective Date or, if later, 6 months after the execution of the Infraco Contract (or on such later date as may be agreed in writing between the Parties) if the Commencement Date has not arisen on or before such date and in which event:

3.2.1 all provisions of this Agreement (other than the provisions of Clauses 1 (*Definitions and Interpretation*), 2 (*Conditions Precedent*), 4 (*Term of the Agreement*), 25 (*Confidential Information*), 45 (*Liability and Indemnities*), 50 (*Copyright and Intellectual Property*), 52 (*Dispute Resolution*), 54 (*Variations to be in Writing*), 56 (*Notices*), 61 (*Entire Agreement*), 65 (*Applicable Law*), 66 (*No Partnership or Agency*), 67 (*Invalid Terms*) and 68 (*Third Party Rights*), shall cease to have effect; and

3.2.2 such termination shall be without prejudice to any accrued rights or obligations as at that date.

4. TERM OF THE AGREEMENT

4.1 Subject to Clause 3 (*Effective Date*) this Agreement shall commence on the Effective Date and shall continue unless terminated earlier in accordance with its terms until the expiry of a period of 30 years from the Tram Maintenance Commencement Date ("**Expiry Date**").

5. NOVATION

5.1 Unless waived by the Client in accordance with Clause 2.1, it is a condition precedent to the occurrence of the Tram Maintenance Commencement Date that the Tram Maintainer shall, if required by **tie**, enter into and execute:

5.1.1 a Tram Maintenance Novation Agreement in the form set out in part 2 of Schedule 1 (*Conditions Precedent*);

5.1.2 a Tram Maintenance Collateral Warranty in the form set out in part 2 of Schedule 1 (*Conditions Precedent*); and

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5.1.3 a Novation Agreement Escrow Letter in the form set out in part 2 of Schedule 1 (*Conditions Precedent*).

6. PROJECT PARTNERING

6.1 The Parties agree to work in mutual co-operation to fulfil their agreed roles and responsibilities and apply their expertise to carry out and complete the Services in accordance with this Agreement.

6.2 The Client and the Tram Maintainer shall procure that each Client Party and each Tram Maintainer Party (as appropriate) shall work in accordance with the principles set out in Clause 6.1.

6.3 Subject to Clause 6.4, each Party ("**First Party**") undertakes to co-operate with the other ("**Second Party**") in order to facilitate the performance of this Agreement and in particular the First Party shall:

6.3.1 approach all Permitted Variations on a collaborative and Open Book Basis;

6.3.2 use reasonable endeavours to avoid unnecessary complaints, disputes and claims against or with the Second Party;

6.3.3 comply with the provisions of the Dispute Resolution Procedure in relation to any such complaints, disputes and claims with or against the Second Party;

6.3.4 not interfere with the rights of the Second Party in performing its obligations under this Agreement, nor in any other way hinder or prevent the Second Party from performing those obligations or from enjoying the benefits of its rights;

6.3.5 take reasonable steps to mitigate any foreseeable losses and liabilities of the Second Party which are likely to arise out of any failure by the First Party to take any of the steps referred to in Clauses 6.3.2 to 6.3.4 (inclusive); and

6.3.6 take all reasonable steps to manage, minimise and mitigate all costs.

6.4 Nothing in Clause 6.3 shall:

6.4.1 interfere with the right of each of the Parties to arrange its affairs in whatever manner it considers fit (in compliance with Law) in order to exercise its rights and perform its obligations under this Agreement (in compliance with Law); or

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6.4.2 relieve either Party from any obligation contained in this Agreement or from any obligation to pay any debt due and payable under this Agreement.

6.5 Senior representatives from the Parties shall meet on a quarterly basis (or as may be otherwise agreed by the Parties) to review:

6.5.1 any matter which has adversely affected or may adversely affect:

6.5.1.1 the completion of the Services;

6.5.1.2 the performance and presentation of the Edinburgh Tram Network;

6.5.1.3 the functioning of the City of Edinburgh (including other modes of transport) and the people of Edinburgh, because of the carrying out of the Services; and/or

6.5.1.4 the Tram Maintainer's ability to perform its obligations in terms of this Agreement; and

6.5.2 any proposal from either Party to:

6.5.2.1 minimise costs; and/or

6.5.2.2 optimise the performance and quality of the Edinburgh Tram Network.

6.6 Either Party may propose measures to address the matters set out in Clause 6.5.1 and a determination of what measures (if any) should be undertaken by the Tram Maintainer and/or the Client to address such matters shall be considered in accordance with and subject to each Party's existing rights, obligations and the existing contractual mechanisms under this Agreement including the rights, obligations and contractual mechanisms set out in Clause 16 (*Changes*), Clause 48 (*Qualifying Changes in Law*) and Schedule 3 (*Payment*).

6.7 Any proposal from either Party in terms of Clause 6.5.2 shall be reviewed in accordance with Clause 16 (*Changes*).

6.8 As required by the Client, the Tram Maintainer shall procure the attendance of any of the Tram Maintainer Parties at the meetings described in Clause 6.5.

7. CLIENT'S REPRESENTATIVE

7.1 The Client's Representative shall:

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7.1.1 exercise the functions and powers of the Client in relation to the Project which are identified in this Agreement as functions and powers to be carried out by the Client's Representative;

7.1.2 exercise such other functions and powers of the Client under this Agreement as the Client may notify in writing to the Tram Maintainer from time to time; and

7.1.3 be the primary point of contact for the Tram Maintainer with the Client, and the Tram Maintainer shall observe, and shall procure that any Tram Maintainer Parties observe, all reasonable instructions of the Client and the Client's Representative given in accordance with this Agreement. The Tram Maintainer shall not, and shall procure that any Tram Maintainer Parties shall not, act upon any instruction from any other party unless confirmed by the Client or the Client's Representative in writing. If the Tram Maintainer or any Tram Maintainer Parties shall receive any instructions from any other parties, the Tram Maintainer shall notify the Client or the Client's Representative immediately.

7.2 The Client's Representative shall be entitled at any time, by notice in writing to the Tram Maintainer, to authorise any other persons to exercise the functions and powers of the Client delegated to him, either generally or specifically. Until further notice from the Client, any act of any such person shall, for the purposes of this Agreement, constitute an act of the Client's Representative and all references to "the Client's Representative" in this Agreement (apart from Clauses 7.1 to 7.7) shall be taken as references to such person so far as they concern matters within the scope of such person's authority.

7.3 The Client may by notice in writing to the Tram Maintainer change the identity of the Client's Representative. Such change shall have effect on the date specified in that written notice.

7.4 During any period when a Client's Representative has not been appointed (or when the Client's Representative is unable through illness, incapacity or any other reason whatsoever to carry out or exercise his functions under this Agreement), the Client shall carry out the functions which would otherwise be performed by the Client's Representative.

7.5 No decision, act or omission of the Client or the Client's Representative shall, except as otherwise expressly provided in this Agreement:

7.5.1 in any way relieve or absolve the Tram Maintainer from, modify or act as a waiver or personal bar of any liability, responsibility, obligation or duty under this Agreement;

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7.5.2 in the absence of an express written instruction or authorisation issued by the Client under Clause 16 (*Changes*), constitute or authorise a variation; or

7.5.3 be construed as restricting or binding the Client in any way save with regard to the specific project matters to which it relates.

7.6 The Tram Maintainer shall be entitled to treat all instructions and directions of the Client's Representative in respect of any functions and powers of the Client which have been delegated to the Client's Representative in accordance with Clause 7.1 as those of the Client provided always that such instructions or directions of the Client's Representative are in writing, are not in conflict with and are consistent with this Clause 7 (*Client's Representative*) and the other provisions of this Agreement or any other express instructions or directions of the Client, and the Tram Maintainer shall not be required to determine whether an express authority has in fact been given. The Tram Maintainer shall, as soon as reasonably practicable, bring to the attention of the Client any instructions or directions that are given to the Tram Maintainer that are ambiguous or in conflict or inconsistent, and the Client will verify such instructions in writing.

7.7 If for any reason the Client's Representative considers it necessary to give any instructions or directions orally, then, provided that the Client confirms such instruction or direction in writing within five Business Days, such oral instruction or direction shall be deemed to be an express instruction or direction of the Client.

8. TRAM MAINTAINER'S REPRESENTATIVE

8.1 The Tram Maintainer shall appoint a Tram Maintainer's Representative who shall:

8.1.1 act as the principal point of contact for the Client and the Client's Representative in relation to all matters related to this Agreement;

8.1.2 have full authority to act on behalf of the Tram Maintainer for all purposes of this Agreement, and the Client and the Client's Representative shall be entitled to treat all instructions and directions of the Tram Maintainer's Representative as those of the Tram Maintainer;

8.1.3 manage and co-ordinate the provision of the Services by the Tram Maintainer (and any Tram Maintainer's Party) and the integration of provision of the Services with the tasks being performed by the Client's internal team and the other advisers appointed by the Client and/or **tie** (where such tasks have been notified to the Tram Maintainer); and

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8.1.4 liaise with the Client's Representative in relation to various matters including the scope of the Services to be carried out from time to time.

8.2 The Tram Maintainer may by written notice to the Client change the identity of the Tram Maintainer's Representative. Where the Tram Maintainer wishes to do so, it shall by written notice to the Client propose a substitute for approval, taking account of the need for liaison and continuity in respect of the provision of the Services and the Tram Maintenance Programme when the change is proposed. Such substitute shall be subject to the prior written approval of the Client (not to be unreasonably withheld or delayed).

8.3 The Tram Maintainer shall also nominate a deputy to the Tram Maintainer's Representative. During any period when the Tram Maintainer's Representative is unable through illness, incapacity, annual leave or any other reason whatsoever to carry out or exercise his functions under this Agreement, such deputy shall carry out the functions which would otherwise be performed by the Tram Maintainer's Representative.

9. TERMS GOVERNING THE SERVICES

9.1 The Services shall be executed by the Tram Maintainer in accordance with this Agreement and in consideration of which the Client shall pay the Price for the Services (in accordance with Clause 42 (*Payment*)). The Tram Maintainer undertakes that it is, and will remain during the term of this Agreement (and that any relevant sub-contractor is, and will remain during the term of this Agreement) appropriately qualified and experienced in and accredited for the purposes of carrying out work of the scope, type and complexity that is required in carrying out the Services, exercising a reasonable level of professional skill, care and diligence. The Tram Maintainer acknowledges that the Client will rely upon the skill, care and diligence of the Tram Maintainer in connection with all matters for which the Tram Maintainer is responsible under this Agreement.

9.2 Services

9.2.1 The Tram Maintainer shall during the Services Period carry out all maintenance, repair, renewals and remedial works to the Trams and any Additional Trams as is necessary to:

9.2.1.1 ensure that the Trams are Available as required to:

(a) meet the Tram Number Requirement;

(b) ensure that the Timetabled Hot Spares are Available; and

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(c) ensure any Additional Operator Trams are Available in accordance with Clause 9.27;

9.2.1.2 maintain the Trams and Depot Equipment in accordance with the Tram Maintenance Programme and the Tram Maintenance Plan; and

9.2.1.3 ensure that the requirements of the Tram Maintenance Specification are met at all times including compliance with the following documents, collectively known as the "Tram Documentation", which are individually defined or referenced by the Tram Maintenance Specification:

(a) the Operator Safety Management System;

(b) the Tram environmental management plan;

(c) the Tram staffing plan;

(d) the Tram recruitment and training plan;

(e) the Tram communication plan;

(f) the Tram safety management plan; and

(g) the Tram Maintenance Plan.

9.2.2 The Tram Maintainer shall work with the Operator to ensure the daily handover of the Trams to the Operator for operation which shall include the completion of a handover checklist confirming the Availability of such Trams.

9.2.3 The Tram Maintainer shall work with the Operator to ensure the daily handback of the Trams from the Operator to the Client following operation of the Trams and take into account any comments received from the Operator on the performance or condition of the Trams.

9.2.4 The Tram Maintainer shall provide such support, assistance and co-operation to the Client Parties in relation to the Project as the Client may reasonably request from time to time.

9.2.5 The Tram Maintainer shall, during the Mobilisation Period, carry out the Mobilisation Services on or before the appropriate Mobilisation Milestone Dates.

9.3 The Client shall procure the delivery of the Trams in accordance with the Tram Supply Agreement and the Tram Maintenance Programme to the Tram Maintainer at the Depot.

9.4 Subject to Clause 9.23, the Tram Maintainer shall in carrying out the Services at its own cost, ascertain and comply with all applicable Law relating to the carrying out of the Services and shall ensure that following the completion of the Services, the Trams shall comply with all applicable Law applicable at the time the Services are carried out.

9.5 The Tram Maintainer shall be responsible for performing the Services in accordance with the Tram Maintenance Specification, the Code of Maintenance Practice and the Code of Construction Practice (so far as these are applicable to the Services) and Good Industry Practice applicable at the time the Services are carried out. The Tram Maintainer shall further carry out all Services in a safe manner and so that the Trams are capable of being operated in a safe and efficient manner free from any unreasonable risk to the health and well being of persons using or maintaining them and free from any avoidable risk of pollution, nuisance, interference or hazard.

9.6 The Tram Maintainer warrants and undertakes that the Response, including the Tram Maintenance Plan and the asset management system to be provided by the Tram Maintainer shall comply with and meet the Tram Employer's Requirements.

9.7 The Tram Maintainer shall at all times keep itself fully informed about current professional and technical standards and about all matters relating to, or which might have a bearing on, the carrying out of the Services.

9.8 The Tram Maintainer's duties and obligations under or pursuant to this Agreement will not be released, diminished or in any other way affected by any independent inquiry into any matter which may be made or carried out by the Client or **tie** or by any firm, company or party on the Client or **tie's** behalf nor by any action or omission of any such firm, company or party whether or not such action or omission might give rise to any independent liability of such firm, company or party to the Client or **tie**.

9.9 The Tram Maintainer is deemed to have satisfied itself that it fully understands the scope and extent of the requirements in respect of its obligations pursuant to this Agreement and that it has sufficient information (including the Background Information) or will at the relevant time have sufficient information, to enable it to carry out its obligations pursuant to this Agreement. In connection with such information that it has or will have satisfied itself that it is accurate and complete before placing reliance upon it.

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Liaison

9.10 The Tram Maintainer shall (and shall procure that the Tram Maintainer Parties) liaise with the Client, any Client Party, **tie**, any **tie** Party, the Operator and any other parties as may reasonably be required by the Client or **tie** to facilitate the production, by such persons, of any information required from them, in order that the carrying out of the Services and its other obligations under this Agreement can be progressed according to the Tram Maintenance Programme. The Tram Maintainer shall (and shall procure that the Tram Maintainer Parties) liaise with the Client, any Client Party, **tie**, any **tie** Party, the Operator, and any other parties as may be reasonably required by the Client or **tie** as often as is necessary in order to ensure that the Services are carried out properly and in accordance with the terms of this Agreement.

9.11 The Tram Maintainer shall (and shall procure that the Tram Maintainer Parties shall) liaise with the Client, any Client Party, **tie**, any **tie** Party, the Operator and any other parties as may reasonably be required by the Client or **tie** and shall provide such information as may be reasonably requested by such persons in relation to the design, construction, testing, commissioning, integration, operation and maintenance of the Edinburgh Tram Network to the extent that such information is available to the Tram Maintainer, and does not constitute Tram Maintainer IPR.

Prohibited Materials

9.12 The Tram Maintainer undertakes and warrants to the Client that it has not specified for use and shall not specify for use and shall ensure that there shall not be used in relation to the Trams, any materials which at the time of specification or use (as the case may be):

9.12.1 are known to be deleterious in the particular circumstances in which they are specified to be used (either to health and safety or to the durability of the Trams); or

9.12.2 contravene any relevant standard or code of practice issued from time to time by the BSI Group or under a European directive relating to standards; or

9.12.3 do not accord with the guidelines contained in the edition of the publication "Good Practice in Selection of Construction Materials" (Ove Arup & Partners) current at the date of specification or use; or

9.12.4 contravene Good Industry Practice.

9.13 The Tram Maintainer confirms that it has studied in detail the Tram Employer's Requirements and each document comprised therein and the Background Information in relation to this

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Agreement, and has satisfied itself that no discrepancies or errors exist within the Tram Employer's Requirements and the Background Information in relation to this Agreement or between the Tram Employer's Requirements and the Response and in relation to the Background Information in relation to this Agreement has satisfied itself as to its veracity, accuracy, reasonableness, scope, materiality, currency where applicable and completeness. The Tram Maintainer acknowledges that it accepts all risks arising from any discrepancies, errors or omissions that subsequently appear within or between such documents and that it shall not be entitled to make any claim against the Client for an extension of time, additional payment, any relief or otherwise in respect of any such errors, discrepancies or omissions. The Tram Maintainer will notify the Client forthwith upon becoming aware of a discrepancy or error within the Tram Employer's Requirements or between the Tram Employer's Requirements and the Response. Where there is such discrepancy or error, the Tram Maintainer shall as soon as reasonably practicable, and in any event within 5 Business Days, provide the Client with proposals for resolving such discrepancy or error which comply with this Agreement. Unless, within 10 Business Days of receipt by the Client of the Tram Maintainer's proposals for resolving such discrepancy or error, the Client notifies the Tram Maintainer requiring it to resolve the discrepancy in a different manner (which manner shall be binding but shall be reasonable in time and cost having regard to the Tram Employer's Requirements), the Tram Maintainer shall resolve the discrepancy in the manner proposed by it.

9.14 The Tram Maintainer shall not deliver to the Client, if **tie** novates this Agreement to Infraco information relating to manufacturing, calculations and detailed design of its trams. The Tram Maintainer shall however put the mentioned information into escrow under the Escrow Agreement in case it ceases its activities in accordance with this Clause or where it is required, release information to the Tram Inspector on a confidential basis.

Commencement of Services

9.15 The Tram Maintainer shall carry out the Services in respect of each Tram and, if applicable, any Additional Trams from the date of commencement of trial operation of the Trams by the Operator at the start of the shadow running milestone as detailed in the Tram Maintenance Programme ("**Tram Maintenance Commencement Date**").

General

9.16 During the Services Period the Tram Maintainer shall be responsible for, without limitation, the provision and employment of all staff (such staff to be suitably experienced, skilled, trained and competent at their level of occupation, managerial, supervisory, skilled or semi-

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skilled) necessary to perform the Services in accordance with this Agreement and the total cost of providing the Services (including the total cost of providing Spare Parts and Special Tools for the Trams) is included in each Services Payment

9.17 During the Mobilisation Period the Tram Maintainer shall be responsible for, without limitation, the provision and employment of all staff necessary to perform the Mobilisation Services in accordance with this Agreement and the total cost of providing the Mobilisation Services is included in the Mobilisation Milestones.

Depot and other premises

9.18 Unless otherwise contemplated by the Tram Maintenance Plan, the Tram Maintainer shall carry out all of the Services (except those works carried out pursuant to Clause 9.28) at the Depot unless the consent of the Client is obtained (such consent not to be unreasonably withheld).

9.19 The Services shall comprise only materials and goods which are of satisfactory quality and, unless otherwise agreed in writing, the Tram Maintainer will supply only new materials and goods, except for those items that can be satisfactorily repaired or reused in accordance with Good Industry Practice and, where permitted under the Tram Maintenance Plan.

9.20 **Spare Parts and Special Tools**

9.20.1 The Tram Maintainer shall be responsible for the provision of all Spare Parts and Special Tools necessary or required for the Services. All such Spare Parts shall meet the technical and safety requirements of the Tram Maintenance Specification. Special Tools to be provided pursuant to this Clause 9.20 shall, as a fundamental condition of this Agreement, be provided with a valid certificate of calibration (where appropriate).

9.20.2 The Tram Maintainer shall also ensure that throughout the term of this Agreement all Special Tools which require calibration or testing in order that they shall be fit for their intended purpose shall have a valid test and/or calibration certificate and the Tram Maintainer shall give to the Client within 10 Business Days of any request by the Client a copy of the current test or calibration certificate (where appropriate).

9.20.3 The Tram Maintainer shall acquire adequate stocks of such Spare Parts and Special Tools to ensure that there is always a Minimum Spare Parts Pool at the Depot and, in any case, sufficient Spare Parts and Special Tools to enable the Tram Maintainer to carry out the Services in accordance with this Agreement and manage re-order levels

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and lead time such that at no time should such stock of Spare Parts or Spare Tools be less than the Minimum Spare Parts Pool.

9.20.4 For the avoidance of doubt, the cost of the Spare Parts and Special Tools to be provided pursuant to Clause 9.20.1 is included in the Services Payment and the Tram Maintainer shall be entitled to no further payment for any Spare Part or Special Tool.

9.20.5 The Tram Maintainer shall acquire such Spare Parts and Special Tools from the Tram Supplier or otherwise on behalf of CEC in accordance with Clauses 34.3 to 34.4 of the Tram Supply Agreement.

9.20.6 The Tram Maintainer shall transfer title to CEC of each Spare Part or Special Tool upon delivery of such item to the Depot.

9.20.7 Every Reporting Period, the Client and the Tram Maintainer shall review the level of the Minimum Spare Parts Pool in light of the requirements for Spare Parts in delivering the Services pursuant to this Agreement and the Tram Maintainer shall make recommendations to the Client in relation to any adjustments to be made to the Minimum Spare Parts Pool either in relation to the extent of the Minimum Spare Parts Pool or the quantity of any of the Spare Parts required to meet the Minimum Spare Parts Pool. The Client shall review the Tram Maintainer's recommendations and where necessary consult further with the Tram Maintainer as to the adequacy of the Minimum Spare Parts Pool in the light of ongoing maintenance pursuant to the Services and, subject to Clause 9.20.4 and the Tram Maintainer having taken such steps as are possible to rectify the situation, if the Client in its absolute discretion is of the opinion that it would be appropriate to vary the Minimum Spare Parts Pool then such variation shall be a Client Change Order varying the Minimum Spare Parts Pool as it deems appropriate in accordance with Clause 16 (Changes).

Manner of carrying out Services

9.21 The Tram Maintainer shall ensure that the Services are carried out:

9.21.1 in a safe and cost effective manner and so as to comply with all applicable Law, Consents and Good Industry Practice;

9.21.2 so as to ensure compliance with the requirements of the Tram Employer's Requirements and Tram Maintenance Specification including all safety requirements and the Operator Safety Management System and the Tram Maintainer shall ensure that its employees, agents and sub-contractors comply with such requirements, such

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that the obligations hereunder are carried out free from the risk of pollution, interference, nuisance or hazard;

9.21.3 so that the Trams are capable of being operated in a safe and efficient manner free from any unreasonable risk to the health and well being of persons using or maintaining them and free from any avoidable risk of pollution, nuisance, interference or hazard;

9.21.4 in accordance with the Code of Maintenance Practice, so far as it is applicable;

9.21.5 in accordance with the Code of Construction Practice, so far as it is applicable;

9.21.6 in such a manner so as not to endanger the health or safety of or unreasonably interfere with the proper performance of the duties of Client employees and third parties or otherwise expose the Client to liability under the Health and Safety at Work etc. Act 1974 or the Transport and Works Act 1992 or any other legislation relating to health and safety;

9.21.7 so as to ensure that no design work, redesign work, maintenance, repair work or modifications to the Trams, Parts, Spare Parts or Special Tools shall prejudice either the Operator's Case for Safety or the warranties provided by the Tram Supplier pursuant to the Tram Supply Agreement and that the Trams remain fit for purpose to comply with the Employer's Requirements, and unless agreed in writing with **tie** and the Client otherwise, for the Trams to remain compatible and inter operable with each other;

9.21.8 in accordance with any Rectification Plan;

9.21.9 in compliance with the Operator Procedures as agreed between the Tram Maintainer and the Operator and as may be varied from time to time;

9.21.10 so as to assist the Client in relation to the provision of information to **tie** in order to establish whether best value has been achieved in respect of the Services;

9.21.11 in accordance with **tie** and CEC Policies;

9.21.12 so as to ensure compliance with the Tram Legislation;

9.21.13 in such manner as not wilfully to detract from the image and reputation of **tie**, Transport Edinburgh Limited, CEC, the Scottish Ministers, Transport Scotland, the Edinburgh Tram Network and the Client;

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9.21.14 so as to ensure that sustainability is considered and discussed with the Client in relation to energy consumption and the supply of materials from sustainable sources in respect of the manufacture and operation of the Trams;

9.21.15 in a manner that is not likely to be injurious to persons or property;

9.21.16 using the Key Personnel; and

9.21.17 in compliance with all applicable environmental regulations and requirements.

9.22 If the Tram Maintainer reasonably believes or becomes aware that there is or may be:

9.22.1 a defect in a Part which has been fitted in a Tram whether or not as part of the Services; or

9.22.2 any other defect in relation to the Trams,

which may prejudice the safe or reliable operation of a Tram, the Tram Maintainer shall immediately on becoming aware of such defect notify the Client and the Operator of such defect and provide a proposal as to the most effective course of action by which such defect can be rectified.

9.23 **Tram Maintainer's obligation to repair**

9.23.1 The Tram Maintainer shall during the Services Period effect the repair of all defects in, failures of or damage to the Trams irrespective of cause. The Tram Maintainer shall effect all such repairs in a manner consistent with its obligations under this Agreement and in a manner which causes the minimum disruption to the operation of the Trams on the System and to enable the Trams to be Available at all times.

9.23.2 The Tram Maintainer shall bear all of the costs of complying with Clause 9.23.1 where any damage to a Tram is caused by:

9.23.2.1 a breach of this Agreement by the Tram Maintainer; or

9.23.2.2 any failure by the Tram Maintainer or a Tram Maintainer Party to perform the Services; or

9.23.2.3 the performance of the Services by the Tram Maintainer or a Tram Maintainer Party; or

9.23.2.4 any negligent act or negligent omission by the Tram Maintainer or any Tram

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Maintainer Party.

9.23.3 Where any damage to a Tram is not caused by:

9.23.3.1 a breach of this Agreement by the Tram Maintainer; or

9.23.3.2 any failure by the Tram Maintainer or a Tram Maintainer Party to perform the Services; or

9.23.3.3 the performance of the Services by the Tram Maintainer or any Tram Maintainer Party; or

9.23.3.4 any negligent act or negligent omission by the Tram Maintainer or any Tram Maintainer Party,

the Client shall bear the necessary, reasonable and demonstrable costs of the Tram Maintainer repairing such damage and any repairs in respect of such damage and such costs shall be calculated in accordance with Clause 9.23.4.

9.23.4 The necessary cost of the Tram Maintainer repairing damage pursuant to this Clause 9.23 shall be calculated on the following basis:

9.23.4.1 where the repair to be effected is an Agreed Repair the cost shall be the Agreed Repair Cost for such Agreed Repair (such price which shall include, for the avoidance of doubt, the cost of all parts and labour).

9.23.4.2 where the repair to be effected is not an Agreed Repair the cost shall be calculated as follows:

(a) any part which is included in part 1 of Schedule 5 (*Spares Pool and Special Tools*) shall be charged at the cost set out in such Schedule;

(b) the Parties shall agree the total number of hours of labour required ("**Agreed Labour Hours**") to effect such repair and such labour shall be charged at its actual hourly cost (to a maximum rate of £51.77 per hour exclusive of VAT) for the actual time taken to effect such repair, up to a maximum of the Agreed Labour Hours. If necessary and to demonstrate the feasibility of the repair, the Party proposing less man-hours shall demonstrate that the number of man-hours are enough to achieve the repair; and

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(c) any other part used or cost incurred shall be charged at its actual cost (as demonstrated to the reasonable satisfaction of the Client by the Tram Maintainer on an Open Book Basis) plus a mark up of 19%.

9.23.5 In determining the cost of repairs pursuant to this Clause 9.23 the Tram Maintainer shall consult with the Operator and the Client in good faith with a view to agreeing:

9.23.5.1 a suitable programme for carrying out the repairs; and

9.23.5.2 the cost calculated pursuant to Clause 9.23.4.

If, following such consultation, agreement is not reached with respect to any of the matters referred to above, the Client shall be entitled to determine such outstanding matters and the Tram Maintainer shall proceed with the repairs notwithstanding the Tram Maintainer's right to refer the matter to the Dispute Resolution Procedure.

9.23.6 In the event that no agreement can be reached as to the costs referred to in this Clause 9.23, the matter shall be resolved as set out in Clause 52 (*Dispute Resolution*).

Standard of repairs

9.24 All repairs to and replacements of the Trams shall be carried out to a standard that restores the defective, failed or damaged Tram to a condition which meets the requirements of the Tram Requirements Specification (subject to normal wear and tear) and enables the Tram Maintainer to comply with its obligations under this Clause 9 (*Terms Governing the Services*).

Temporary repairs

9.25 Where necessary the Tram Maintainer shall be entitled to carry out temporary repairs to failures or damage to the Trams subject where necessary to obtaining the prior approval of HMRI, the Operator, the Client, **tie** and all appropriate regulatory authorities. All temporary repairs shall be fully repaired at the earliest opportunity and in any event forthwith upon receipt of written notice from HMRI, **tie**, the Client or the Operator (as the case may be) stating that it no longer considers such temporary repairs to be safe and/or fit for their purpose.

9.26 **Breakdown/emergency response**

9.26.1 Where the Client and/or the Operator cannot return a Tram to the Depot without assistance, the Tram Maintainer shall provide such assistance, information and advice as the Client shall reasonably require, including such assistance as the Client shall reasonably require in:

9.26.1.1 the Tram Maintainer attending the site of the occurrence to assess the cause of the problem, with a required response time of no more than 15 minutes from the Client's request for attendance to a representative of the Tram Maintainer departing the Depot to attend;

9.26.1.2 rectifying the problem;

9.26.1.3 implementing measures to overcome and/or mitigate the effect on operation of the Trams;

9.26.1.4 implementing temporary repairs; and

9.26.1.5 recovering such Tram for repair.

9.26.2 As soon as practicable following removal or repair of the Tram, the Tram Maintainer shall provide reasonable assistance to the Client in preparing a report (where applicable) summarising the causes of such problem and providing recommendations (where applicable) to avoid the repetition of such occurrence.

9.26.3 Where the most efficient manner of dealing with such failure would be for repairs to be effected at the site of the failure, the Tram Maintainer shall carry out such repairs as can safely be carried out and within the capabilities immediately available to the Tram Maintainer at the site.

9.26.4 To the extent that according to the report produced pursuant to Clause 9.26.2 and accepted by the Client the failure of the Tram requiring action pursuant to this Clause 9.26 was attributable other than to a breach of this Agreement by the Tram Maintainer or a negligent act or omission by the Tram Maintainer or Tram Maintainer Party then the Client shall pay the cost of any repair and recovery in accordance with Clause 9.23 and the Tram Maintainer's reasonable costs of effecting such breakdown recovery. For the avoidance of doubt, the Tram Maintainer shall be solely liable for the cost of any repair and recovery to the extent it arises from the failure of the Tram Maintainer to perform the Services.

9.27 **Additional Operator Tram Availability**

9.27.1 If the Operator requires any additional Trams for its own use ("**Additional Operator Trams**"), including the training of drivers, it shall notify the Tram Maintainer and the Client of its requirements on not more than one (1) weeks' notice. The number of

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Additional Operator Trams that the Operator can request for any period shall be limited as follows:

Period	Maximum Additional Operator Trams
Peak Period	0 Trams
All other times	2 Trams

9.27.2 The Tram Maintainer shall ensure that it makes Available to the Operator the Additional Operator Trams notified to it in accordance with Clause 9.27.1. For the avoidance of doubt, an Additional Operator Tram will only be counted as having been made Available if the Tram Maintainer has already made Available Trams to meet both the Tram Number Requirement and the provision of a Hot Spare.

Operational Safety Step-In Event

9.28 In accordance with the provisions of paragraph 6 of parts A and B of Schedule 18 (*Code of Construction Practice and Code of Maintenance Practice*), if the Operator objectively detects the need of any remedial or other work or repair is necessary by reason of any emergency, accident, failure or other event giving rise to an immediate threat to health and safety (including users and/or members of the public) during the carrying out of the Services, the Operator shall so inform the Tram Maintainer and the Client with confirmation in writing. Thereafter, if the Tram Maintainer is unable or unwilling to carry out such work or repair in accordance with the appropriate time period identified in paragraph 6 of Parts A and B of Schedule 18 (*Code of Construction Practice and Code of Maintenance Practice*), the Client may itself carry out or procure the carrying out of the said work or repair. If the work or repair so carried out by the Client is work which the Tram Maintainer was liable to carry out at its own expense under this Agreement, all costs and expenses properly incurred by the Client in relation to such work shall be recovered from the Tram Maintainer by the Client and may be deducted from any monies due or to become due to the Client. If the Tram Maintainer carries out such work or repair, the Tram Maintainer shall be paid in accordance with Clause 42 (*Payment*) the amount of any direct and demonstrable costs as may be reasonable except to the extent that such extra cost results from the Tram Maintainer's default.

9.29 The Tram Maintainer acknowledges that the Client has supplied to it a copy of the Infraco Contract as at the Effective Date.

9.30 The Tram Maintainer undertakes that on the date of use or installation on any Tram, any materials supplied shall be in accordance with Schedule 2 (Employer's Requirements).

9A. EQUIVALENT PROJECT RELIEF

9A.1 Raising EPR Claims

9A.1.1 In the event that the Tram Maintainer reasonably considers it has an entitlement to an EPR Claim, then (except to the extent that the Tram Maintainer's entitlement arises out of a breach of this Agreement by the Client which has not been caused or contributed to by a corresponding breach by **tie**) the Tram Maintainer shall notify the Client's Representative of the details as are reasonably required by the Client to evidence such EPR Claim so as to enable the Client to meet its requirements in relation to the Client Claim.

9A.1.2 Provided that details of the EPR Claim are supplied in accordance with the relevant provisions of this Agreement and so as to enable the Client to meet its requirements in relation to the Client Claim the Client shall, following the appropriate procedure under the Infraco Contract, pursue or defend such EPR Claim with **tie** diligently, expeditiously and treating such claim as if the EPR Claim was its own. The Client shall identify the EPR Claim as separate from any claim the Client has under the Infraco Contract unless it can demonstrate to the reasonable satisfaction of the Tram Maintainer that it is not reasonably practicable to do so.

9A.2 Processing EPR Claims

9A.2.1 In relation to any EPR Claims the Client shall:

9A.2.1.1 keep the Tram Maintainer fully informed as to the progress of such EPR Claims and, if requested by the Tram Maintainer and at the cost of the Tram Maintainer, provide copies of all documentation relating to the same;

9A.2.1.2 act in good faith and shall not bring the good name of the Tram Maintainer into disrepute;

9A.2.1.3 not act (or omit to act) in a manner as would result in a breach of this Agreement;

9A.2.1.4 not act (or omit to act) in a manner which threatens the continuance of the Infraco Contract; and

9A.2.1.5 procure that **tie** shall consult with the Tram Maintainer and that the Tram Maintainer has the right to consult with **tie,** in relation to the EPR Claim.

9A.2.2 The Client shall notify and consult with the Tram Maintainer in relation to: (i) **tie's** and the Client's proposals to resolve the Client Claim to which the EPR Claim relates; and (ii) in the event that it is not reasonably practicable to identify the EPR Claim as separate pursuant to Clause 9A.1.2, the proportion of the Client Claim which is properly and reasonably attributable to the EPR Claim. The Tram Maintainer agrees that the EPR Claim shall not exceed any relief, entitlement and/or additional payment agreed or determine in relation to the Client Claim.

9A.2.3 The Client shall not resolve any Client Claim under the Infraco Contract to which an EPR Claim relates without the prior written consent of the Tram Maintainer, which consent shall not be unreasonably withheld or delayed. If such consent is unreasonably withheld or if the Tram Maintainer has not responded to any request for consent within ten (10) Business Days, the Tram Maintainer shall be deemed to have consented to such resolution, agreement, withdrawal, compromise or settlement as proposed to the Tram Maintainer by the Client.

9A.2.4 Should the Tram Maintainer consent to the resolution of the Client Claim as notified to it by the Client pursuant to Clause 9A.2.2, then the provisions of Clause 9A.4 (*Agreement, Certification and Payment*) shall apply.

9A.3 Dispute Resolution Procedure

9A.3.1 Should the Client or **tie** raise a dispute under the Infraco Contract in relation to an EPR Claim or the Tram Maintainer does not consent to the resolution of the Client Claim or, in the event that it is not reasonably practicable to identify the EPR Claim as separate pursuant to Clause 9A.1.2, the proportion of the Client Claim which is properly and reasonably attributable to the EPR Claim in the manner notified to it by the Client pursuant to Clause 9A.2.2, then:

9A.3.1.1 the Tram Maintainer shall be entitled to invoke the Dispute Resolution Procedure under this Agreement if not already invoked;

9A.3.1.2 the Client shall, at the request of the Tram Maintainer, invoke the Dispute Resolution Procedure under the Infraco Contract; and

9A.3.1.3 the Client shall, at the request of the Tram Maintainer, invoke the Related Disputes mechanism contained at paragraphs 55 to 57 of Schedule 9 (Dispute Resolution Procedure) and procure that **tie** invokes the Related Disputes mechanism contained in Schedule 9 (Dispute Resolution Procedure) of the Infraco Contract.

9A.3.2 The Parties agree that should there be a resolution of the Client Claim or, in the event that it is not reasonably practicable to identify the EPR Claim as separate pursuant to Clause 9A.1.2, the proportion of the Client Claim which is properly and reasonably attributable to the EPR Claim following Clause 9A.3.1:

9A.3.2.1 where such resolution was achieved following the "Internal Resolution Procedure" or "Mediation" (as described in the Dispute Resolution Procedure), then the Tram Maintainer and the Client shall, and the Client shall procure that **tie** shall, be responsible for its own costs in relation to this Clause 9A (*Equivalent Project Relief*);

9A.3.2.2 where such resolution was achieved following the "Adjudication" procedure (as described in paragraphs 15 to 54 inclusive of the Dispute Resolution Procedure), then the Tram Maintainer and the Client shall, and the Client shall procure that **tie** shall, submit to the decision of the adjudicator in respect of allocation of costs; and

9A.3.2.3 where it is agreed, as part of the Internal Resolution Procedure immediately prior to the matter proceeding to "Adjudication" (as described in paragraphs 10 and 11 of the Dispute Resolution Procedure), by **tie**, the Tram Maintainer and the Client that the Client's sole involvement in the Client Claim is in performing administrative functions in relation to the Client Claim, and not as an interested or affected party, then the Client shall be entitled to recover all its costs incurred, such Client costs shall be minimised as far as reasonably practicable in relation to this Clause 9A (*Equivalent Project Relief*) and payment of the Client costs shall be the responsibility of **tie** or payment shared as allocated between **tie** and the Tram Maintainer by the adjudicator following the "Adjudication" procedure (as described in paragraph 48.2 in the Dispute Resolution Procedure).

9A.4 Agreement, Certification and Payment

9A.4.1 The Client shall resolve the Client Claim under the Infraco Contract:

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9A.4.1.1 where consent has been given or is deemed to have been given pursuant to Clause 9A.2.3, in the manner notified to the Tram Maintainer under Clause 9A.2.2; or

9A.4.1.2 where there has been a resolution following Clause 9A.3.1, as directed by such outcome following Clause 9A.3.1.

9A.4.2 The Client's Representative shall certify such amount or extension of time as is resolved following Clause 9A.4.1 in respect of the EPR Claim to the Tram Maintainer within ten (10) Business Days of such sum or extension of time being resolved.

9A.4.3 Upon certification by the Client's Representative pursuant to Clause 9A.4.2, the Client shall make payment to the Tram Maintainer in accordance with Clause 42 (*Payment*) following the date upon which entitlement to payment in respect of the relevant Client Claim arises under the Infraco Contract, or grant the extension of time to the Tram Maintainer.

9A.4.4 Upon certification in accordance with Clause 9A.4.2, the Tram Maintainer expressly, unconditionally and irrevocably waives and abandons all its rights to recover from the Client relief, entitlement and/or additional payment greater than such certified amount or extension of time in respect of the specific circumstances giving rise thereto.

9A.5 No Equivalent Project Relief on Termination

9A.5.1 For the avoidance of doubt, the provisions of this Clause 9A (*Equivalent Project Relief*) shall not apply to the calculation of compensation on termination payments pursuant to this Agreement.

9B. NOTICES, CONSENTS, APPROVALS, CERTIFICATES AND DETERMINATIONS

9.B.1 In so far as the Client is obliged to act reasonably under this Agreement it will be deemed to have acted reasonably where it is acting on the request, instruction, opinion or other act of **tie** under the Infraco Contract and **tie** has acted reasonably in giving such request, instruction or opinion or performing such other act.

9.B.2 In the event the Tram Maintainer, acting reasonably, does not consider that the Client has acted reasonably pursuant to Clause 9.B.1, the Tram Maintainer shall be entitled to invoke the Dispute Resolution Procedure under Clause 52.

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9C. WORK TO BE TO SATISFACTION OF THE CLIENT

9C.1 The Tram Maintainer shall complete the Services in strict accordance with this Agreement to the satisfaction of Client (acting reasonably).

9C.2 The whole of the materials, Tram Related Equipment and labour to be provided by the Tram Maintainer under Clause 9 and the mode, manner and speed of the Services are to be in accordance with this Agreement.

9D. ERRORS AND OMISSIONS IN THE TRAM WORKS

9D.1 If during the carrying out of the Services the Client becomes aware of any error or omission in the carrying out of the Services or of any other breach of this Agreement, the Client shall notify the Tram Maintainer, who shall, at its own expense and in liaison with the Client, rectify any error or omission or breach, or where this is agreed by the Client to be impracticable or undesirable, take such other agreed steps to address the error or omission.

9D.2 Any reasonable and demonstrable direct costs to the Client associated with the Client remedying any such errors or omissions or breaches shall be paid by the Tram Maintainer to the Client.

9D.3 These arrangements shall in no respect diminish the Client's ability to recover damages from the Tram Maintainer for direct losses incurred by the Client consequent upon the error or omission or breach in question.

9D.4 If and to the extent that the Tram Maintainer fails to carry out the necessary rectification and/or other agreed steps in accordance with Clause 9D.1 to the Client's reasonable satisfaction and/or within a reasonable period of time, the Client shall be entitled to carry out such rectification and/or other agreed steps itself, or procure the carrying out by a third party of such rectification and/or other agreed steps in accordance with Good Industry Practice at the Tram Maintainer's expense and shall recover any costs from the Tram Maintainer as a debt.

10. USE OF THE DEPOT

10.1 On completion of the construction of the Depot, the Tram Maintainer shall enter into and execute the Depot Sub-Licence in the form set out in Schedule 13 (*Depot Sub-Licence*).

10.2 Subject to the Tram Maintainer executing the Depot Sub-Licence and complying with and procuring the Tram Maintainer Parties' compliance with the obligations in this Clause 10 (*Use*

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of the Depot) and the Depot Sub-Licence, the Tram Maintainer and the Tram Maintainer Parties shall have full right to access and use those parts of the Depot which the Tram Maintainer and the Tram Maintainer Parties properly require to so use for the purpose of carrying out the Services in accordance with this Agreement.

10.3 The Tram Maintainer agrees that:

10.3.1 the right to access and use the Depot granted pursuant to this Clause 10 (*Use of the Depot*) and the Depot Sub-Licence shall terminate on the earlier of the Termination Date or the Expiry Date; and

10.3.2 the Tram Maintainer's and the Tram Maintainer Parties' right to use such parts of the Depot shall not create any relationship of landlord and tenant.

10.4 The Client gives no warranty as to the fitness for purpose of the Depot.

10.5 Subject to the exception set out in Clause 45.2, **tie** and the Client shall not be liable for the death of or injury to persons or for damage to any property or for any losses, claims, demands, actions, proceedings, damages, costs or expenses or other liability incurred by the Tram Maintainer and/or any Tram Maintainer Parties or any person in the use of the Depot.

10.6 Nothing in this Clause 10 (*Use of the Depot*) or the Depot Sub-Licence shall restrict **tie's** and the Client's absolute right of access to any part of the Depot.

11. WARRANTIES

11.1 The Tram Maintainer represents and warrants to the Client that:

11.1.1 none of the Tram Maintainer or any officer, agent, employee of the Tram Maintainer or any Affiliate of the Tram Maintainer has committed a Prohibited Act;

11.1.2 all factual information which has been given by the Tram Maintainer or any of its respective officers, employees, agents or Affiliates in the Response or in any written response to subsequent written requests or enquiries by the Client was when given and remains as at the Effective Date true and accurate in all material respects and all projections, estimates and statements of belief in the Response or such response have been prepared with due care and attention and there is no fact or matter known to the Tram Maintainer and not already disclosed in writing to the Client's Representative which renders any such information untrue, inaccurate or misleading or might if

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disclosed, adversely affect the decision of anyone considering whether or not to contract with the Tram Maintainer;

11.1.3 the Tram Maintainer:

11.1.3.1 is duly incorporated under the laws of Spain or the United Kingdom and has the power to own its own assets and carry on its own business; and

11.1.3.2 has full power and authority (and does not require the consent, authority or licence of any third party) to enter into and perform this Agreement which constitutes a valid and binding obligation on the Tram Maintainer in accordance with its terms; and

11.1.3.3 will not, by performing its obligations under this Agreement, be in breach of any undertaking, agreement or legal obligation of any nature in respect of any third party or of any applicable Law so as to have a material adverse effect on its ability to discharge its obligations under this Agreement;

11.1.4 the Tram Maintainer and the Tram Maintainer's parent company is not involved in any dispute with HM Revenue and Customs or any other fiscal or regulatory authority in any jurisdiction concerning any matter which could materially and adversely affect the business of the Tram Maintainer, or its ability to perform the Services in any way;

11.1.5 the Tram Maintainer does not use any processes and is not engaged in any activities which involve the misuse of any confidential or proprietary information belonging to any third party;

11.1.6 the Response or responses to subsequent enquiries by the Client or any Client Parties relating to the manner in which the Tram Maintainer proposes to perform the Services does not involve the use of any designs, materials, know how, trademark, business name or processes which represent or would represent a breach of any Intellectual Property Rights belonging to any third party, or a breach of any duties of confidentiality owed to any third party, or otherwise infringe the legal rights of any third party;

11.1.7 no act has been committed or event or circumstance occurred in respect of the Tram Maintainer which constitutes a Tram Maintainer Default as at the Effective Date and no circumstances are known which make it likely that such a Tram Maintainer Default will occur during the Term;

11.1.8 no litigation, arbitration or proceeding is in progress or, to the best of the knowledge and belief of the Tram Maintainer pending or threatened, against the Tram Maintainer or any of its management or assets which might have an adverse effect on the liability of the Tram Maintainer to perform its obligations under this Agreement;

11.1.9 there has been no material adverse change to the financial condition of the Tram Maintainer or the Tram Maintainer's parent company since the audited accounts for the financial year 2007 including any matter resulting in a downgrade of the Tram Maintainer's or the Tram Maintainer's parent company's credit rating with any commercially acknowledged independent rating agency reporting on the transport sector; and

11.1.10 the performance of the Services does not create any situation in which a conflict of interest arises for the Tram Maintainer.

11.2 Each of the warranties, representations and undertakings given under Clause 11.1 shall be construed as a separate and independent warranty, representation and undertaking and shall not be limited or restricted by reference to or inference from any other terms of this Agreement.

11.3 The Tram Maintainer hereby undertakes with the Client that it will as soon as reasonably practicable (and in any event within 10 Business Days) disclose in writing to the Client any event or circumstance which may arise or become known to it after the date of this Agreement which is materially inconsistent with any of the warranties or representations set out in this Clause 11 (*Warranties*) or which has or is likely to have an adverse effect on the Project.

11.4 The warranties and representations set out in Clause 11.1 shall be deemed to be repeated by the Tram Maintainer as at the Commencement Date and thereafter on each Reporting Period End Date.

11.5 Neither **tie** nor the Client gives any warranty or undertaking or makes any representation as to the completeness, currency, accuracy or fitness for any purpose of any of the Background Information, and subject to Clause 45.2 neither the Client, **tie** nor any Client Party or any of their respective members or advisers nor any of their employees shall be liable to any party to this Agreement in contract, delict (including negligence or breach of statutory duty) or otherwise as a result of:

11.5.1 any inaccuracy, error, defect, omission, unfitness for any purpose or inadequacy of any kind whatsoever in the Background Information; and/or

11.5.2 any failure to make available to the Tram Maintainer or any of the Tram Maintainer Parties any materials, documents, drawings, plans or other information relating to the Project,

provided that nothing in this Clause 11.5 shall exclude any liability in respect of any statements made or information provided fraudulently.

12. LAWFUL AND SAFE OPERATION

12.1 Save where expressly provided otherwise in this Agreement, the Tram Maintainer shall give all notices and pay all fees required (including any licence application and renewal fees required to be given or paid under any applicable Law) in relation to the execution of the Services and performance of its obligations under this Agreement.

12.2 All operations necessary for the execution of the Tram Maintainer's duties and obligations under this Agreement shall be carried out:

12.2.1 without unreasonable noise and disturbance;

12.2.2 without unreasonable interference with the Operator or Infraco at the Depot; and

12.2.3 so as not to interfere unnecessarily or improperly with traffic or the convenience of the public or the access to, use and occupation of, public or private roads or footpaths to or of properties, whether in the possession of the Client or of any other person.

12.3 The Tram Maintainer shall not at any premises from where its employees, agents and/or sub-contractors perform the Services and/or any obligations under this Agreement at any time allow the consumption of, or work under, the influence of alcoholic liquors or drugs or give, sell or barter any alcoholic liquors or drugs or permit or suffer any such gift, sale or barter to be made by any sub-contractor, or any visitor, employee or agent of the Tram Maintainer or any sub-contractor. The Tram Maintainer and its visitors, employees and agents shall observe and comply with, and shall ensure that each sub-contractor and its visitors, employees and agents observe and comply with, all applicable Law as amended from time to time.

12.4 The Tram Maintainer shall (at its own cost and expense):

12.4.1 obtain and maintain in effect all Consents which may be required for the performance of the Services and/or pursuant to this Agreement from time to time; and

12.4.2 implement each Consent within the period of its validity and in accordance with its terms.

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12.5 The Tram Maintainer shall provide copies of such Consents to the Client's Representative.

12.6 Acknowledgement by the Client of the copies of Consents provided to them pursuant to Clause 12.5 shall not in any way affect the Tram Maintainer's obligations or relieve the Tram Maintainer from its obligations pursuant to this Clause 12 (*Lawful and Safe Operation*) or otherwise.

12.7 Where **tie's** or the Client's or the Operator's authorisation or completion of documentation in respect of compliance with any Law or the obtaining of any Consent may be required, the Tram Maintainer shall furnish the relevant documentation to **tie** or the Client or the Operator (as the case may be) and, where possible, permit **tie** or the Client or the Operator a period of 10 Business Days to authorise or complete it.

12.8 The Client shall endeavour to assist the Tram Maintainer with applications for Consents which it is required to obtain under this Agreement for the performance of the Services where the Client considers in its sole discretion that such assistance would facilitate the Tram Maintainer in obtaining any Consents. Such assistance shall in no way affect the principle set down in Clause 12.3 that it is the Tram Maintainer's obligation to obtain, maintain and implement the Consents required by this Agreement. Subject to Clause 45.6, the Client shall not incur any liability whatsoever to the Tram Maintainer in connection with its actions pursuant to this Clause 12.8.

12.9 The Tram Maintainer shall provide such information and assistance as the Client may reasonably request to assist the Client in obtaining, maintaining in effect and implementing all other consents which may be required for the purposes of the Project.

13. INTERFACE WITH THE OPERATOR

13.1 Technical Requirements

In accordance with Schedule 24 (*Review Procedure*) the Tram Maintainer shall take account of any comments made by the Client or **tie** in relation to operational issues when refining its Tram Maintenance Plan, Tram Maintenance Programme, standards, procedures and safety documentation in accordance with Schedule 2 (*Employer's Requirements*) and when supporting system integration in accordance with Clause 14 (*Support for System Integration*). The Tram Maintainer shall comment on functional and maintainability issues to the Client as a minimum at each of the Mobilisation Milestones during the Mobilisation Period and every Reporting Period during the Term, seeking to optimise the whole life asset cost of the Tram. These comments shall be delivered to **tie**, the Client and the Operator.

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13.2 **Operation and Maintenance Procedures**

13.2.1 The Tram Maintainer acknowledges that the Operator shall be responsible for Operator Maintenance of the Edinburgh Tram Network and in relation to such maintenance, the Tram Maintainer shall at all times liaise with the Operator in its performance of the responsibilities set out in the Operator Maintenance Plan and coordinate such performance with the carrying out of the Services. The Tram Maintainer and the Client agree to work in mutual cooperation to allow the Operator to perform such maintenance in accordance with the terms of the Operator Maintenance Plan with a view to ensuring that the Edinburgh Tram Network as a whole and each part of it are continuously available for the provision of Transport Services. Where, in fulfilling this obligation, the required co-operation detracts from the Tram Maintainer's ability to perform, the Tram Maintainer shall have the right to and the Client shall be obliged to raise the matter with **tie**.

13.2.2 As directed by the Client, the Tram Maintainer shall accept and act upon instructions from the Operator, acting reasonably, in respect of specific contractual rights including safety management, possession co-ordination and maintenance interaction.

13.2.3 The Tram Maintainer shall work together with the Operator with the continual objective that the Services be delivered in accordance with the Tram Employer's Requirements without interruption. The Tram Maintainer shall, without limitation:

13.2.3.1 respond promptly and in compliance with the timing commitments set out in this Agreement to any notification by the Operator that there is a requirement for the Services of which the Operator becomes aware;

13.2.3.2 promptly notify the Operator, **tie** and the Client of any requirement for Operator Maintenance of which the Tram Maintainer becomes aware; and

13.2.3.3 co-operate with the Operator in relation to the planning and execution of Operator Maintenance and the Services.

13.2.4 If, at any time after the Tram Maintenance Commencement Date, it appears likely to the Tram Maintainer that any planned works or activities to be carried out by the Tram Maintainer or the Tram Supplier will necessitate interruption to or restriction of the Transport Services on the Edinburgh Tram Network, the Tram Maintainer (as appropriate) shall:

13.2.4.1 notify the Client, **tie** and the Operator not less than 42 days prior to such

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planned works or activities that affect the tram fleet availability, and take all reasonable steps to support the Operator in notifying passengers, as soon as reasonably practicable in advance of the carrying out of such planned works or activities, of the nature of such work and the likely disruption or restriction of the Transport Services; and

13.2.4.2 take all steps, where required by the Client, which are reasonably practicable to minimise the adverse consequences of such works or activities to passengers.

13.2.5 In the event of any unplanned works or activities to be carried out by the Tram Maintainer as a result of a Tram failure, breakdown or an emergency, the Tram Maintainer shall:

13.2.5.1 notify the Client, **tie** and the Operator as soon as possible of the nature of such works or activities and the likely disruption or restriction of the Transport Services;

13.2.5.2 take all reasonable steps to support the Client in notifying passengers as soon as reasonably practicable of the nature of such works and activities and the likely disruption or restriction of the Transport Services; and

13.2.5.3 take all steps which are reasonably practicable to minimise the adverse consequences of such works and activities to passengers. The Tram Maintainer shall take such steps that shall include support to the Operator or the Client as the case may be.

Where the Operator considers that such works and activities will result in likely disruption or restriction of the Transport Services for any period, the Tram Maintainer shall, where required by the Client, take such steps that shall include support to the Operator in providing an alternative means of transportation being in service as soon as reasonably practicable. For the purposes of this Clause 13.2.5, the Parties acknowledge that it will generally be reasonably practicable for the Operator to arrange for an alternative means of transportation to be in service within 90 minutes of becoming aware of the requirement for it.

13.3 **Safety**

13.3.1 The Tram Maintainer shall provide a permanent representative for the Project Safety and Certification Committee (PSCC) who shall be responsible for the Tram

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Maintainer's mandatory participation in and technical contribution to the PSCC's output and the discharge of its responsibilities. The Tram Maintainer's obligations shall encompass as a minimum:

13.3.1.1 participation on a compulsory basis in all liaison meetings with HMRI, the Independent Competent Person and emergency services; and

13.3.1.2 the development and implementation of a safety management system (the "**Tram Maintainer Safety Management System**") which shall address such matters, including:

(a) Tram Maintainer staff competency and its continual assessment;

(b) training on all safety related issues;

(c) safety procedures;

(d) record keeping and audit;

(e) certification of materials, Special Tools and equipment;

(f) frequency and mode of internal audit by the Tram Maintainer and audit by the Client of the Tram Maintainer Safety Management System;

(g) incident response, management and review of lessons learned;

(h) continual improvement and best practice;

(i) configuration control of Tram components; and

(j) traceability of mitigation of safety hazards identified and allocated to the Tram Maintainer in the hazard log.

13.3.2 The Client, **tie** and the Operator shall be entitled to review the Tram Maintainer Safety Management System (and its implementation) at any time upon notice which is appropriate in the circumstances and in any case within no more than 3 days. For the avoidance of doubt, **tie**, the Client and the Operator shall be entitled to immediate access upon the occurrence of an incident which potentially involves the safe functioning of the Tram.

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13.3.3 Where the Operator identifies defects in the Trams through its carrying out of the Operator Procedures and notifies these defects to the Tram Maintainer and/or where a Tram has been undergoing maintenance by the Tram Maintainer, it shall be the responsibility of the Tram Maintainer to undertake and complete verification, through agreed procedure, of the safety and service readiness of the Trams prior to service start-up every morning no later than one hour (or such other time as agreed between the Parties) prior to Transport Services commencing each day on the applicable Trams and to the status to the Client, **tie** and the Operator in an agreed form.

13.3.4 In the event that the Operator can demonstrate to the Tram Maintainer that the Trams are not ready for service start up, the Tram Maintainer shall notify the Client and **tie,** and the Tram Maintainer shall rectify any deficiency in the Trams in accordance with this Agreement which is preventing the commencement of Transport Services or the shutdown of the network for the night.

13.3.5 The Tram Maintainer shall liaise effectively with the Client, **tie** and the Operator in co-ordination of health and safety issues at the Depot in accordance with the Depot Sub-Licence.

13.4 **Lifecycle Maintenance**

13.4.1 The Tram Maintainer shall give the Operator, **tie** and the Client a minimum of one month's prior notice in outline of any life cycle maintenance forming part of the Services to be carried out on any of the Trams, such initial notice to be followed by at least 14 days' notice in detail.

13.4.2 Not less than 6 months prior to the Service Commencement Date and annually thereafter during the Term, the Tram Maintainer shall provide the Client, **tie** and the Operator with a combined maintenance plan demonstrating how the effects of planned lifecycle maintenance on the provision of the Services in accordance with the Timetable shall be minimised, based upon part 1 of the Employer's Requirements.

Operational Interface and Operator Mobilisation

13.5 Following the Tram Maintenance Commencement Date, the day-to-day operation of the Edinburgh Tram Network shall be the responsibility of the Operator. To enable the efficient operation of the Edinburgh Tram Network, the Tram Maintainer shall provide technical advice free of charge to the Client, the Operator and **tie** regarding the operational deployment and integration of the various components of the Trams and any other information regarding their

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design, construction, standards, integration, operation and maintenance which the Client, the Operator and/or **tie** may reasonably request.

System Acceptance

13.6 The Tram Maintainer shall ensure that at all times it works closely and effectively with the Client and the Operator in the performance of both the Operator and the Tram Maintainer's obligations pursuant to the Systems Acceptance Tests and the associated obligations on testing and commissioning set out in part 1 of the Employer's Requirements.

13.7 **Facilities and Access**

13.7.1 The Tram Maintainer shall at all times provide to the Operator, **tie** and the Client such access to the site where the Services are being performed, during the performance of the Services as the Operator may reasonably require and in accordance with Clause 26 (*Right of Verification and Audit*) provided that such access shall not disrupt or interfere with the performance by the Tram Maintainer or any Tram Maintainer Party of the Services and the Client shall, and shall procure that the Operator shall, during any period when it or they have access to such site, comply with all rules and regulations applicable to working at those premises for the safety of persons and convenience of the public.

13.7.2 The Tram Maintainer acknowledges that the Operator, **tie** and the Client will require access to the site where the Services are being performed in order to prepare for the operation of the Edinburgh Tram Network from the Tram Maintenance Commencement Date. The Tram Supplier agrees that it will co-operate with the Operator, **tie** and the Client and plan to avoid any interference with mobilisation by the Operator. The Operator, **tie** and the Client acknowledge they should not interfere with the normal work to be performed by the Tram Maintainer.

13.7.3 The Client agrees that where any damage is caused to the Services by the Operator or by **tie**, the repair of such damage shall not be part of the Tram Maintainer's obligations under this Agreement but where the Client requires the Tram Maintainer to repair such damage, it will issue a Client Notice of Change in respect of such repair works.

13.8 **Partnering**

13.8.1 The Tram Maintainer shall use reasonable endeavours to work collaboratively with the Operator at all times in order to:

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13.8.1.1 maximise productivity in relation to the Services and minimise disruption for the public and third parties;

13.8.1.2 ensure the effective discharge of the Tram Maintainer's obligation to support system integration in accordance with Clause 14 (*Support for System Integration*);

13.8.1.3 maintain the highest standards achievable with regard to the provision of the Services;

13.8.1.4 minimise and give best advance notice to one another and to the Client and **tie** of any interruption to the Services caused by any Tram Maintainer Default, maintenance (planned or unplanned) or third party incident;

13.8.1.5 mutually support adherence to the Client's Programme and all related timelines and programmes and to share with the Client, **tie** and the Operator on a systematic basis, deliverables and key information connected with such adherence; and

13.8.1.6 safeguard proper performance of the Services and all obligations under this Agreement.

13.8.2 Where the Tram Maintainer has been notified by the Client of any proposed variation under the DPOFA which may materially affect the Tram Maintainer's performance of its obligations or the exercise of its rights under this Agreement, the Tram Maintainer shall respond with comments within 5 Business Days of being notified by the Client of any proposed variation under the DPOFA. Failure by the Tram Maintainer to respond as stipulated in this Clause shall be a bar to any claim for relief or compensation under this Agreement.

14. SUPPORT FOR SYSTEM INTEGRATION

14.1 The Tram Maintainer shall cooperate with the Client (in any way the Client acting reasonably may request, but for the avoidance of doubt additional services not included in the scope of this Agreement shall be at the cost of the Client) in ensuring that the following key elements of the system integration of the Services with the Edinburgh Tram Network are implemented and maintained throughout the Term, including:

14.1.1 determination and maintenance of the Tram performance requirements such that when the Trams are integrated they shall achieve the "Edinburgh Tram Network System

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Availability Targets" set out in the Employer's Requirements (including the Operations Performance Specification);

14.1.2 management of technical interfaces as set out in the Employer's Requirements and as developed by the Client from time to time including issues such as electro-magnetic compatibility, noise, vibration and wheel/rail interface ensuring that each and every material issue arising is satisfactorily closed out and remains closed out;

14.1.3 test management cooperation and analysis in so far as the tests relate to the Trams;

14.1.4 alignment of operations and maintenance procedures to ensure they form a whole and safe system of work in so far as they relate to the maintenance of the Trams;

14.1.5 support system activation and any subsequent extensions or enhancements of Tram service frequencies;

14.1.6 safety assurances and the Case for Safety; and

14.1.7 preparation and updating of a requirements traceability matrix which shall have the ability to trace the requirements of the Services and/or the Tram Maintenance Specification and the Employer's Requirements through the testing procedures and the operation of the Edinburgh Tram Network in so far as it relates to the Trams.

14.2 The Tram Maintainer shall cooperate with the Client in ensuring that the maintenance of the Trams is fully integrated with the Edinburgh Tram Network.

14.3 The Tram Maintainer shall carry out all of the system integration activities described in the Tram Interface Specification.

14.4 The Tram Maintainer shall liaise with and support the Operator and the Client as instructed by the Client in relation to:

14.4.1 system operation and related design issues;

14.4.2 the Systems Acceptance Tests; and

14.4.3 operational defects.

14.5 The Tram Maintainer shall cooperate with the Client in ensuring that all elements of the Trams relative to the Edinburgh Tram Network are compatible with system integration and the Tram Maintainer shall make qualified personnel available to support system integration but for the

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avoidance of doubt additional services not included in the scope of this Agreement shall be at the cost of the Client.

14.6 The Tram Maintainer shall be responsible for managing the configuration control of the modification status of the Trams, and, where relevant, the modification status of the Special Tools and Spare Parts. Specifically, but not exclusively, controlling the introduction of software changes and hardware modifications through version control and providing documentation to the Client, **tie** and the Operator detailing the operational implications of the modifications, a minimum of 10 Business Days before their planned introduction.

14.7 The Tram Maintainer shall co-operate and provide all information reasonably requested by the Client relating to the Services so as to enable the Client to discharge its obligations under the Employer's Requirements including the provision of all information referred to in Schedule 21 *(Response)*.

14.8 The Client shall, give adequate consideration to any issues relating to interface with the Tram, the Depot or tram maintenance raised in writing by the Tram Maintainer and shall ensure that **tie** is informed in writing of any such issues raised.

15. DELIVERABLES DEVELOPMENT

15.1 The Tram Maintainer shall develop and update (as appropriate and/or as required by the Client) the Deliverables in accordance with this Agreement, and the Client and **tie** shall be entitled to review the Deliverables (which shall include any amendment to any submitted item) in accordance with Schedule 24 (*Review Procedure*).

15.2 The Tram Maintainer shall submit any changes and any other Deliverables associated with any Permitted Variations to the Client's Representative for review pursuant to Schedule 24 (*Review Procedure*).

15.3 The Tram Maintainer shall allow the Client's Representative and **tie's** Representative, at any reasonable time, a reasonable opportunity to view any Deliverable at any stage of development, and this opportunity shall be made available to the Client's Representative and **tie's** Representative as soon as reasonably practicable following receipt of any written request from the Client's Representative. Where electronic versions of the Deliverables are available, the Tram Maintainer shall upload such Deliverables (including any drawings comprised within the Deliverables) on an extranet or document management system established and maintained by the Client as soon as practicable.

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15.4 The Tram Maintainer shall provide the Deliverables in accordance with the Deliverables Programme set out in part 2 of Schedule 2 (*Tram Maintenance Programme*).

15.5 During the preparation and/or update of the Deliverables, the Client and/or the Client's Representative shall be entitled to call for a meeting to discuss the development of any Deliverables and the Tram Maintainer shall give due consideration to any reasonable comments made by the Client or the Client's Representative or **tie** or **tie's** Representative at any such meetings. As soon as reasonably practicable following any such meeting, the Tram Maintainer will prepare and circulate to those attending the meeting, a report listing the Deliverables discussed and any comments made at such meeting.

15.6 If it should be found that the Deliverables do not fulfil the requirements of this Agreement or the needs of any Relevant Authority or Independent Competent Person, the Tram Maintainer shall at its own expense amend the Deliverable. Such amendment shall be made in accordance with Schedule 24 (*Review Procedure*) and such amendment and rectification shall ensure that the Deliverables shall satisfy the requirements of this Agreement and any Relevant Authority or Independent Competent Person.

15.7 The Tram Maintainer shall provide the Client with all Deliverables in accordance with the terms of this Agreement and where no timescale for provision of such Deliverables is specified in the Deliverables Programme such Deliverables shall be provided to the Client as soon as reasonably practicable. The Tram Maintainer shall provide to the Client five copies of the agreed Deliverables in hard copy form and one copy in an agreed soft copy form (as appropriate to the format of the Deliverables). In respect of any further copies of a particular Deliverable, which the Client may require or which **tie** may require, the Tram Maintainer agrees to absorb the reasonable copying charges or other reasonable charges for provision of the same to the Client or **tie** as the Client or **tie** requires and for the purposes of achieving all Consents, providing that the Client or **tie** demonstrates that the additional requirement is reasonable.

15.8 The Tram Maintainer accepts all risks arising from any conflicts, ambiguities, discrepancies, errors or omissions that subsequently appear within or between any of the Tram Maintenance Specification and any of the other Deliverables, and the Tram Maintainer shall not be entitled to make any claim against the Client for an extension of time, payment or otherwise in respect of any such conflicts, ambiguities, discrepancies, errors or omissions.

15.9 The Tram Maintainer shall within 10 Business Days notify the Client upon becoming aware of any conflicts, ambiguities, discrepancies, errors or omissions within or between any of the Tram Maintenance Specification and any of the other Deliverables. Where there are any

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conflicts, ambiguities, discrepancies, errors or omissions, the Tram Maintainer shall provide, as soon as is reasonably practicable but in any case within 20 Business Days, its proposals for resolving such conflicts, ambiguities, discrepancies, errors or omissions in compliance with this Agreement. Such proposals could include the suggestion that no action is required. The Tram Maintainer shall proceed with its proposals to resolve any such conflicts, ambiguities, discrepancies, errors or omissions as soon as reasonably practicable. If the proposal from the Tram Maintainer is that no action is required or the Client does not agree with the action proposed by the Tram Maintainer, the Client may notify the Tram Maintainer, within 10 Business Days of the Tram Maintainer's notice, to resolve any conflicts, ambiguities, discrepancies, errors or omissions in a different manner (which notification shall be binding on the Tram Maintainer).

16. CHANGES

Client Changes

16.1 Unless expressly stated in this Agreement or as may otherwise be agreed by the Parties, Client Changes shall be dealt with in accordance with this Clause 16 (*Changes*). If the Client requires a Client Change, it must serve a Client Notice of Change on the Tram Maintainer.

16.2 A Client Notice of Change shall:

16.2.1 set out the proposed Client Change in sufficient detail to enable the Tram Maintainer to calculate and provide an Estimate in accordance with Clause 16.4;

16.2.2 require the Tram Maintainer to provide the Client within 18 days of receipt of the Client Notice of Change with an estimate in accordance with Clauses 16.4 and 16.6 ("**Estimate**"), and specify whether any competitive quotes are required; and

16.2.3 set out how the Client wishes to pay or be reimbursed (as the case may be) for the proposed Client Change. Nevertheless, an agreement must be reached with the Tram Maintainer regarding payment conditions.

16.3 If, on receipt of the Client Notice of Change, the Tram Maintainer considers (acting reasonably) that the Estimate required is too complex to be completed and returned to the Client within 18 Business Days, then the Tram Maintainer shall, within 10 Business Days of receipt of such Client Notice of Change, deliver to the Client a request for a reasonable extended period of time for return of the Estimate, such extended period to be agreed by the Parties, both acting reasonably.

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16.4 As soon as reasonably practicable, and in any event within 18 Business Days after having received a Client Notice of Change (or such longer period as may have been agreed by the Parties pursuant to Clause 16.3), the Tram Maintainer shall deliver to the Client the Estimate. The Estimate shall include the opinion of the Tram Maintainer (acting reasonably) on:

16.4.1 whether relief from compliance with any of its obligations under this Agreement is required during or as a result of the implementation of the proposed Client Change;

16.4.2 any impact on the performance of the Services and changes required to be made to the Tram Maintenance Specification;

16.4.3 any impact on the Tram Maintenance Programme;

16.4.4 any amendment required to this Agreement as a result of the implementation of the proposed Client Change;

16.4.5 the proposed method of delivery of the proposed Client Change, including a programme of works;

16.4.6 proposals to mitigate the impact of the proposed Client Change;

16.4.7 any Consents, or changes to existing consents, which are required in connection with, or as a result of, the implementation of the Client Change; and

16.4.8 any increase or decrease in any sums due to be paid to the Tram Maintainer (including the Services Payments) as a result of the implementation of the proposed Client Change.

16.5 The valuation of any Client Changes made in compliance with this Clause 16 (*Changes*) shall be added to or deducted from the sums due to be paid to the Tram Maintainer as the case may be, and shall be ascertained by the Client as follows:

16.5.1 unless there are substantive reasons why, in the Tram Maintainer's reasonable opinion (which shall be set out in reasonable detail by the Tram Maintainer), such rates and prices should not apply, by measurement and valuation at the rates and prices for similar work in Schedule 11 (*Agreed Repairs*) and part 1 of Schedule 5 (*Spares Pool and Special Tools*) insofar as such rates and prices apply;

16.5.2 if the Client accepts that the rates and prices referred to in Clause 16.5.1 should not apply, by measurement and valuation at rates and prices deduced therefrom insofar as it is practical to do so;

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16.5.3 if the Client accepts that the rates and prices referred to in Clause 16.5.1 should not apply and it is not practicable to deduce rates and prices therefrom, by measurement and/or valuation at fair rates and prices; or

16.5.4 if the value of the Client Charge cannot properly be ascertained by measurement and/or valuation, by the value of the resources and labour employed thereon, as appropriate in accordance with the pricing set out in Schedule 11 (*Agreed Repairs*) and part 1 of Schedule 5 (*Spares Pool and Special Tools*),

provided that where any Client Change would otherwise fall to be valued under Clauses 16.5.1 and 16.5.2, but the Client's Representative is of the opinion that the instruction therefor was issued at such time or was of such content as to make it unreasonable for the alteration or addition to be so valued, the value of the Client Change shall be ascertained by measurement and/or valuation at fair rates and prices.

16.6 The Tram Maintainer shall include in the Estimate evidence demonstrating that:

16.6.1 the Tram Maintainer has used all reasonable endeavours to minimise (including by the use of competitive quotes where appropriate) any increase in costs and to maximise any reduction of costs;

16.6.2 the Tram Maintainer has, where required by the Client and practicable, sought competitive quotes from persons other than the Tram Maintainer Parties in pursuance of its obligation under Clause 16.6.1;

16.6.3 the Tram Maintainer has investigated how to mitigate the impact of the Client Change; and

16.6.4 the proposed Client Change will, where relevant, be implemented in the most cost-effective manner, including showing, where reasonably practicable, that when any expenditure is incurred, relevant Changes in Law that are foreseeable at the time of consideration of the specific Client Change and which relate to that Client Change, have been taken into account by the Tram Maintainer.

16.7 If the Tram Maintainer does not intend to use its own resources to implement any proposed Client Change, it shall:

16.7.1 demonstrate that it is appropriate to subcontract the implementation of such Client Change; and

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16.7.2 comply with Good Industry Practice with the objective of ensuring that it obtains best value for money when procuring any supplier or deliverable required in relation to the proposed Client Change.

16.8 As soon as reasonably practicable after the Client receives the Estimate, the Parties shall discuss and agree the issues set out in the Estimate. From such discussions the Client may modify the Client Notice of Change, and the Client may require the Tram Maintainer to seek and evaluate competitive tenders (to the extent not already sought). In each case the Tram Maintainer shall, as soon as practicable, and in any event not more than 15 Business Days after receipt of such modification, notify the Client of any consequential changes to the Estimate.

16.9 If the Parties cannot agree on the contents of the Estimate, then either Party may refer the Estimate for determination in accordance with the Dispute Resolution Procedure (unless the Client Notice of Change has already been withdrawn) provided that the Tram Maintainer shall not be obliged to implement any proposed Client Change where:

16.9.1 the Client does not have the legal power or capacity to require the implementation of such proposed Client Change; or

16.9.2 implementation of such proposed Client Change would:

16.9.2.1 be contrary to Law;

16.9.2.2 not be technically feasible;

16.9.2.3 substantially and materially increase the probability of a substantial non-compliance with this Agreement by the Tram Maintainer;

16.9.2.4 be outwith the specific competence of the Tram Maintainer either in performing the activity required by the Client Change or in supervising a Tram Maintainer Party to carry out the activity required by the Client Change; and/or

16.9.2.5 make the provision of the Services by the Tram Maintainer financially unfeasible.

16.10 As soon as reasonably practicable after the contents of the Estimate have been agreed, the Client shall:

16.10.1 issue a Client Change Order; or

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16.10.2 withdraw the Client Notice of Change in which case the Client shall pay to the Tram Supplier the reasonable costs incurred by the Tram Supplier in complying with this Clause 16 in relation to that Client Notice of Change.

For the avoidance of doubt, the Tram Maintainer shall not commence work until instructed through receipt of a Client Change Order.

16.11 Not used.

16.12 If the Client does not issue a Client Change Order within 28 Business Days of the contents of the Estimate having been agreed or determined pursuant to Clause 16.9, then the Client Notice of Change shall be deemed to have been withdrawn.

16.13 Where an Estimate has been referred to the Dispute Resolution Procedure for determination, but it is deemed by the Client (acting reasonably) that the proposed Client Change is urgent and/or has a potential significant impact on the Tram Maintenance Programme, subject to the Tram Maintainer's right to refuse to carry out a Client Change under Clause 16.9, the Client may instruct the Tram Maintainer to carry out the proposed Client Change prior to the determination or agreement of the estimate by issuing a Client Change Order to that effect.

16.14 Where the Client issues a Client Change Order under Clause 16.13, the Tram Maintainer shall implement the Client Change, and prior to determination of the Estimate shall be entitled to claim the Tram Maintainer's demonstrable costs in implementing the Client Change calculated in accordance with Clause 16.5.

Restrictions on Entitlements to Relief for a Client Change

16.15 The Tram Maintainer shall not be entitled to any extension of time, payment or relief in respect of any Client Change if and to the extent that the Tram Maintainer is in breach of this Agreement.

16.16 If, having received instructions from the Client or the Client's Representative, the Tram Maintainer considers that compliance with those instructions would amount to a Client Change, then the Tram Maintainer shall comply with the instruction and shall within 10 Business Days of any instructions being received, notify the Client of the same, such notification to include an Estimate pursuant to Clauses 16.4 and 16.6. From the date of receipt by the Client of such an Estimate, Clauses 16.4 and 16.6 shall be deemed to apply *mutatis mutandis* to the work carried out by the Tram Maintainer in complying with such instruction. If it is agreed by the Parties or determined pursuant to the Dispute Resolution Procedure that a Client Change would arise if the instructions were complied with (either Party being entitled

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to refer the matter to the Dispute Resolution Procedure if the matter has not been agreed within 10 Business Days of the Estimate being received by the Client), then the provisions of this Clause 16 (*Changes*) shall apply to such instructions.

16.17 Any failure by the Tram Maintainer to notify the Client within 10 Business Days of instructions being received that it considers that compliance with such instructions from the Client or the Client's Representative would amount to a Client Change shall constitute an acceptance by the Tram Maintainer that any compliance with the Client's or the Client's Representative's instructions shall be without cost to the Client and without any entitlement to any extension of time or other relief.

16.18 NOT USED

Change Control Register

16.19 The Tram Maintainer shall maintain a change control register which shall detail the status and give summary information on all withdrawn, potential and confirmed variations under this Agreement.

17. TRAM MAINTAINER CHANGES

17.1 Within 10 Business Days of the Tram Maintainer becoming aware of the need or desirability for a variation to the Services (such variations not to include any variation arising from the Review Procedure, including a review of the Minimum Spare Parts Pool in accordance with Clause 9.20, pursuant to which any change shall be made in accordance with the requirements of the Review Procedure), the Tram Maintainer shall notify the Client of the reasons for such variation and make proposals for the proposed variation in writing. The Client shall be free to accept or reject any proposed variation as the Client thinks fit and the Client shall determine whether such proposal is dealt with in accordance with Clause 17.2 or Clause 17.3.

17.2 If the Client wishes to proceed with a variation proposed by the Tram Maintainer, the Client shall serve a Client Notice of Change on the Tram Maintainer and Clauses 16.2 to 16.18 shall be adhered to by the Client and the Tram Maintainer provided that:

17.2.1 the Client may require that there be a reduction to the Price if such change will result in lower costs for the Tram Maintainer; or

17.2.2 in the event that the proposed Tram Maintainer change is of benefit only to the Tram Maintainer any anticipated increase to the costs of the Tram Maintainer resulting from

any change requested by the Tram Maintainer pursuant to Clause 17.1, shall not result in a variation to the Price.

17.3 If the Tram Maintainer considers that a change could effect a saving of £20,000 (as Indexed) or more, the Tram Maintainer shall propose such change in accordance with Clause 16.1 and the Tram Maintainer's proposal shall be accompanied by a value engineering report which shall include:

17.3.1 a whole life cost analysis in respect of each element of (i) the Services affected by the proposed change and/or (ii) any additional works or Services proposed to be carried out in order to effect the proposed change;

17.3.2 option appraisals and reasoned arguments to demonstrate why any particular systems, equipment, materials and the like should be selected in preference to others for incorporation into the Services, taking into account the operational life of the Tram; or

17.3.3 the Tram Maintainer's proposals for the lump sum reduction to the Price in respect of such proposal.

17.4 The Client may accept such proposal at its entire discretion and its decision in this respect shall be final and binding. If the proposed change is accepted, the reduction to the Price that is anticipated as arising as a result of such change shall be shared between the Client and the Tram Maintainer on a 50:50 basis and the Tram Maintainer's share shall be added to the Price after the saving has been made.

18. ADDITIONAL TRAMS

18.1 The Tram Maintainer acknowledges that the Client may, pursuant to the Tram Supply Agreement, by providing the Tram Supplier with a written notice, order additional Trams ("**Additional Trams**") from the Tram Supplier. If so instructed by the Client, the Tram Maintainer shall ensure, subject to Clause 18.4 that the provisions of this Agreement shall apply to such Additional Trams.

18.2 If the Client orders the Additional Trams from the Tram Supplier the provisions set out in Schedule 3 of Part 3 shall apply in relation to the Price payable by the Client for the maintenance of such Additional Trams.

18.3 If the Client orders Additional Trams, the Tram Maintenance Programme shall be adjusted so that the Tram Maintenance Programme shall be that which is applicable to the total number of

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Trams delivered to the Client pursuant to the Tram Supply Agreement. Such adjustment shall be in accordance with the provisions of Schedule 3 part 3.

18.4 Any changes to this Agreement arising out of the Client ordering any Additional Trams other than in relation to Price (which shall be determined in accordance with Clause 18.2), shall be agreed between the Client and the Tram Maintainer (both acting reasonably and in good faith) in accordance with the procedures set out in Clause 16 (*Changes*).

19. MEETINGS

19.1 The Tram Maintainer and the Client shall procure that the Tram Maintainer's Representative and the Client's Representative (respectively) attend monthly progress meetings at the Client's premises in Edinburgh (unless agreed otherwise in writing), with **tie**, any **tie** Party and/or any person authorised by the Tram Maintainer's Representative or Client's Representative in writing to review progress of the Services.

19.2 Notwithstanding the provisions of Clause 19.1, the Client's Representative or the Tram Maintainer's Representative may call a meeting at any time to review progress of the Services or any other matter provided that the Representative calling such meeting gives all other Representatives at least 5 Business Days' written notice of such meeting.

19.3 If reasonably requested by the Client, the Tram Maintainer shall attend and shall procure that the Tram Maintainer's Representative, any Key Personnel and/or Tram Maintainer Parties attend any meetings called by **tie**, **tie's** Representative, any **tie** Party, the Client, the Client's Representative or any other party.

19.4 Any relevant Party (including representatives of such Parties) may with the Client's Representative's prior written consent (such consent not to be unreasonably withheld or delayed) participate in a meeting called under this Agreement through the medium of one or more conference telephones or similar form of communication equipment, provided that all persons participating in the meeting are able to hear and speak to each other throughout such meeting.

20. KEY PERSONNEL

20.1 The Tram Maintainer shall ensure that the Key Personnel are appointed on or prior to the Effective Date. The Tram Maintainer shall obtain the prior written consent of the Client's Representative (such consent not to be unreasonably withheld or delayed) before removing or replacing any Key Personnel at any time after the Effective Date.

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20.2 The Tram Maintainer acknowledges that the Key Personnel are essential to the proper performance of the Tram Maintainer's obligations under this Agreement. The Tram Maintainer shall ensure that the role of any Key Personnel is not vacant for any period longer than 10 consecutive Business Days and shall replace any Key Personnel who leaves its employment with employees with similar levels of training expertise and experience.

20.3 If reasonably requested by the Client, the Tram Maintainer shall make available to the Client, personnel of appropriate competence, expertise and qualifications (employed either by the Tram Maintainer or any relevant subcontractor) for the purposes of dealing with matters referred to in this Agreement. In particular (but without limitation) such personnel shall:

20.3.1 attend meetings called in accordance with Clause 19.1; and

20.3.2 provide (as reasonably requested by the Client) reports, information, advice and/or assistance in relation to matters referred to in this Agreement including prior to and/or following any such meetings as referred to above.

20.4 The Client's Representative shall, acting reasonably, have the right to require the Tram Maintainer to remove or cause to be removed from the site where the Services are undertaken any person employed thereon who mis-conducts himself in the performance of his duties or fails to conform with any particular provisions with regard to safety which may be set out in this Agreement or persists in any conduct which is prejudicial to safety or health, and such persons shall not be again employed upon the site where the Services are undertaken without the permission of Client's Representative.

20.5 Any costs incurred by the Tram Maintainer in removing, or causing to be removed, a person in accordance with this Clause 20 (*Key Personnel*) shall be borne by the Tram Maintainer.

20.6 Neither Party shall, during the period of this Agreement, contract or retain as an adviser or consultant, any person currently or previously employed or engaged in the previous 3 months by the other Party unless the prior written approval of the other Party has been obtained.

20.7 The Tram Maintainer shall (and shall procure that the Key Personnel, its staff employed in the performance of the Services and the Tram Maintainer Parties) comply with all regulatory requirements appropriate to and required for the performance of the Services, **tie's** Drug and Alcohol Policy and any rules, regulations and instructions from the Client's Representative.

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21. RECORDS AND COMPUTER SYSTEMS

21.1 All the Technical Records for any Part installed, replaced, overhauled or inspected by the Tram Maintainer must be:

21.1.1 written up, maintained and kept up to date at all times by the Tram Maintainer in hard copy form (for the avoidance of doubt, after handover of such hard copy records to the Client upon Termination or Expiry of this Agreement the requirement shall be for soft copy form only to be retained by the Tram Maintainer) in accordance with the requirements of the Tram Maintenance Specification;

21.1.2 retained by the Tram Maintainer for the longer of:

21.1.2.1 the duration of this Agreement; and

21.1.2.2 six (6) years from the date on which the Services to which such Technical Records relate are provided; and

21.1.3 provided to the Client in a suitable electronic format within 10 Business Days of a request by the Client for any of such Technical Records,

and the Client will be entitled from time to time to inspect and audit such Technical Records following reasonable notice to the Tram Maintainer.

21.2 Further, for each Tram the following details shall be retained by the Tram Maintainer for not less than 6 years after completion of the Services and such details provided to the Client in accordance with the provisions of this Clause 21.1:

21.2.1 details of all Client Changes; and

21.2.2 all other quality control activity records as agreed with the Client from time to time.

21.3 The Technical Records will be written up and maintained by the Tram Maintainer in respect of all Services in accordance with this Agreement and Good Industry Practice. Such Technical Records will, subject to Clause 21.4, be stored in hardcopy and electronic form.

21.4 Upon any request by the Client for any Technical Record, or upon handover of the Technical Records pursuant to Clause 44.10, the Tram Maintainer shall provide such Technical Records in any suitable non-proprietary format as may be reasonably specified by the Client.

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21.5 The Tram Maintainer shall:

21.5.1 use all reasonable endeavours to ensure that the computer systems, equipment and other systems of the Tram Maintainer used by the Tram Maintainer in carrying out the Services, including any computer systems, equipment, other systems and parts supplied by the Tram Maintainer, are at all times free from disabling or destructive programs or devices, including bugs, viruses, logic bombs and/or Trojan horses; and

21.5.2 use all reasonable endeavours to ensure that appropriate security systems are implemented and maintained to protect the integrity and security of such computer systems, equipment and other systems from security and IT risks, including unauthorised access (both by persons external to the Tram Maintainer and the Tram Maintainer's employees, agents and sub-contractors). The Tram Maintainer in cases of software bugs or software viruses, will have a responsibility limited to the substitution of the system, not including the cost of information lost, as long as all reasonable endeavours are used to avoid these situations.

21.6 In the event of a breach of Clause 21.5, the Tram Maintainer shall conduct a full and complete review of the concerned or potentially concerned computer systems, equipment or other systems (including the security arrangements relating to such systems) to identify the source of such disabling or destructive program or device and, at its own costs and with the prior written approval of the Client (such approval not to be unreasonably withheld or delayed), take such action as may reasonably be necessary to immediately remedy as soon as reasonable feasible the breach and additionally use its best endeavours that such breach does not re-occur.

22. SURVEYS OF EDINBURGH TRAM NETWORK AND AUDITS OF MAINTENANCE PROCEDURES

22.1 **tie** or the Client may carry out or procure surveys and audits of the Edinburgh Tram Network in accordance with part 1 of Schedule 12 (*Return Condition*).

23. DELIVERY, TITLE TO PARTS AND OTHER PROPERTY

23.1 The Parties hereby acknowledge that the intention and purpose of installing any of the Parts, of whatever nature, on the Trams is to enable the Trams to be used more conveniently, safely and with greater efficiency.

23.2 Title to all Parts (including Spare Parts and Special Tools) supplied or provided by the Tram Maintainer pursuant to this Agreement, which are not already owned by CEC (pursuant to Clause 9.20 or otherwise), installed on the Trams in the course of or as a result of the Services

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shall vest in CEC free and clear of all Security Interests and other third party rights of any nature. The Tram Maintainer will at its own expense take all such steps and execute, and procure the execution of, all such instruments as tie and/or the Client may reasonably require to ensure that title so passes to CEC according to applicable Law.

23.3 Any Part at any time removed from a Tram will remain the property of CEC and the Tram Maintainer undertakes (and shall procure that its sub-contractors so undertake) so far as is practicable to clearly identify such Parts as belonging to CEC and to keep all such Parts stored separately from any third party's property. The Tram Maintainer, with the permission of the Client and CEC, shall be responsible for the disposal and/or recycling of waste materials, Parts and Spare Parts as is necessary during the period of the Services.

23.4 The Tram Maintainer shall not have or acquire title to any Tram, Parts, Special Tools, Spare Parts or Technical Records by reason of the performance of its obligations hereunder. The Tram Maintainer hereby waives and agrees not to exercise any lien the Tram Maintainer may have or acquire over any Tram, Parts, Special Tools, Spare Parts or Technical Records and the Tram Maintainer acknowledges that all Assets have been funded by CEC. The Tram Maintainer will have the right to access the Technical Records, and to store copies of such for the performance of Services under this Agreement, or for the purpose of interpretation of this Agreement.

23.5 The Tram Maintainer shall at its own expense label or otherwise clearly identify at all times as being the property of CEC any Parts and/or raw materials and/or Spare Parts for the Trams in the Tram Maintainer's or its agent's or sub-contractor's possession or control in relation to which advance payment has been made and/or title has vested in CEC pursuant to this Agreement and the Tram Maintainer shall ensure that such items shall at all times in the Tram Maintainer's (its agent's or sub-contractor's) possession or control be kept separate from the Tram Maintainer's or any third party's goods. The location of all Parts shall be tracked by the asset management system at all times.

23.6 On termination of this Agreement for any reason the Tram Maintainer shall promptly deliver to CEC, or as CEC may otherwise direct in writing, any Assets, Spare Parts, Special Tools, Tram Maintainer's Materials, CEC supplied goods or other materials the property in which is vested in CEC by virtue of this Agreement (including pursuant to Clauses 23.2 or 23.5) and if it shall fail to do so, CEC may enter any premises of the Tram Maintainer or of any sub-contractor, remove such Spare Parts, Special Tools, Tram Maintainer's Materials, CEC Supplied Goods and other materials and recover the cost of doing so from the Tram Maintainer.

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23.7 The Tram Maintainer shall ensure that:

23.7.1 the Tram Maintainer's systems are or will be Euro Compliant before any introduction of the single European currency in the United Kingdom and that the Tram Maintainer's systems will not be affected by the introduction of the single European currency in the United Kingdom;

23.7.2 the Tram Maintainer's own internal systems and procedures are or will be Euro Compliant before the introduction of the single European currency in the United Kingdom and the Services will not be affected by the introduction of the single European currency in the United Kingdom; and

23.7.3 the Tram Maintainer's systems shall at all times throughout the Term be compliant with all Law applicable in relation to the Euro in the United Kingdom, including the rules on conversion, triangulation and rounding set out in EU Regulation Number 1103/97 and any subsequent or similar regulations or Law.

23.8 For the purposes of Clause 23.7 "**Euro Compliant**" means that (i) the introduction of the Euro within the United Kingdom or any part thereof shall not affect the performance or functionality of any relevant items nor cause such items to malfunction, end abruptly, provide invalid results or adversely affect business; (ii) all currency reliant and currency related functions (including all calculations concerning financial data) of any relevant items to enable the introduction and operation of the Euro; and (iii) in particular (but without limitation) each and every relevant item shall, to the extent it performs or relies upon currency related functions (including all calculations concerning financial data):

23.8.1 be able to perform all such functions in both the national currency of the United Kingdom and in Euros;

23.8.2 during any transition phase applicable to the United Kingdom, be able to deal with the dual denominations of the Euro and national currency of the United Kingdom;

23.8.3 recognise, accept, display and print all the Euro currency symbols and alphanumeric codes which may be adopted by any government and other European Union body in relation to the Euro;

23.8.4 incorporate protocols for dealing with rounding and currency conversion;

23.8.5 recognise data expressed in, and express any output data in, the national currency of the United Kingdom and the Euro; and

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23.8.6 permit the input of data in Euros and display an outcome in Euros where such data, supporting the Client's normal business practices, operates in Euros and/or the national currency in the UK.

23.9 The Tram Maintainer shall incorporate provisions equivalent to those provided in Clauses 23.4 to this 23.9 (mutatis mutandis) in every sub-contract.

23.10 Save where provided for in the Maintenance Plan, no Tram or Tram Related Equipment shall be removed from the Depot without the written consent of the Client, which consent shall not unreasonably withheld.

24. ACCELERATION

24.1 If for any reason which does not entitle the Tram Maintainer to an extension of time, the rate of progress of the Services is at any time, in the opinion of the Client's Representative, whose opinion shall be neither unreasonable nor expressed vexatiously and with this Agreement of the Tram Maintainer (agreement not to be unreasonably withheld or delayed), too slow to ensure substantial completion in accordance with the Tram Maintenance Programme, or any previously agreed revised time for completion of the Services agreed under Clause 24.2, the Client's Representative shall notify the Tram Maintainer in writing and the Tram Maintainer shall thereupon take such steps as are necessary and to which the Client's Representative may consent to expedite the progress so as substantially to complete the Services in accordance with the Tram Maintenance Programme, such consent not to be unreasonably delayed or withheld. The Tram Maintainer shall not be entitled to any additional payment for taking such steps. For the avoidance of doubt, any dispute arising out of this sub-clause is capable of referral through the Dispute Resolution Procedure.

24.2 Where the Client desires either:

24.2.1 a date for completion of certain of the Tram Maintainer's obligations under this Agreement earlier than the date set out in the Tram Maintenance Programme current at the date of issue of the preliminary instruction under Clause 24.3; or

24.2.2 to have certain of the Services completed by the relevant date set out in the Tram Maintenance Programme where, following delays or stoppage to programme for whatever reason, the Services would not be so completed in the absence of any acceleration or resequencing arrangements,

the Client's Representative may issue a preliminary instruction under Clause 24.3.

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24.3 If the Client's Representative issues a preliminary instruction to the Tram Maintainer to accelerate the carrying out or alter the sequence and timing of any work to be executed under the provisions of this Agreement, the Client's Representative shall in such instruction set out the exact nature of the requirements of the Client with regard to the Tram Maintenance Programme as referred to in Clause 24.3 for which the preliminary instruction has been issued.

24.4 If the Tram Maintainer makes a reasonable objection to such an instruction, the preliminary instruction shall either be withdrawn or so varied as to meet such objection and may then be reissued by the Client's Representative.

24.5 As soon as reasonably practicable after receipt of the preliminary instruction (or after receipt of a preliminary instruction re-issued under Clause 24.4), the Tram Maintainer shall inform the Client's Representative in writing in respect of the proposed instruction:

24.5.1 of the amount of any additional cost to which the Tram Maintainer should be entitled as a result of compliance with the instruction when issued by the Client's Representative subject to Clause 24.3;

24.5.2 that it is not reasonably practicable to state such a sum and that the cost to the Client of compliance by the Tram Maintainer will therefore have to be ascertained in accordance with Clause 16 (*Changes*); or

24.5.3 of the earlier date for completion of the relevant aspect of the Services and the consequential amendment to the Tram Maintenance Programme.

24.6 If on receipt of the information given to the Client's Representative under Clause 24.5 the Client wishes to pay the amount referred to in Clause 24.5.1 and to accept the new planned service completion date stated by the Tram Maintainer pursuant to Clause 24.5.3, the Client shall cause the Client's Representative to issue an instruction:

24.6.1 confirming the details of the acceleration or alteration of sequence or timing required; and

24.6.2 fixing the new date for completion of the relevant aspect of the Services and the amount to which Clause 24.5.1 refers shall be included as if it were a variation.

24.7 Following any instruction under Clause 24.6 the Tram Maintainer shall revise the Tram Maintenance Programme as appropriate.

25. CONFIDENTIAL INFORMATION

25.1 Each Party:

25.1.1 shall treat all Confidential Information belonging to the other Party as confidential and safeguard it accordingly; and

25.1.2 shall not disclose any Confidential Information belonging to the other Party to any other person without the prior written consent of the other Party, or except to such persons and to such extent as may be necessary for the performance of this Agreement or except where disclosure is otherwise expressly permitted by the other provisions of this Agreement.

25.2 Each Party shall take all necessary precautions to ensure that all Confidential Information obtained from the other Party, or **tie,** under or in connection with this Agreement:

25.2.1 is given only to such of the staff, professional advisors and/or the Client Parties, Tram Maintainer Parties or **tie** in connection with this Agreement as is strictly necessary for the performance by the Tram Maintainer of the Services and its other obligations under this Agreement; and

25.2.2 is treated as confidential and not disclosed (without prior approval from the owner of the Confidential Information) or used by such staff or professional advisors and/or the Client Parties, Tram Maintainer Parties or **tie** otherwise than for the purposes of this Agreement.

25.3 Where it is considered necessary in the opinion of the owner of the Confidential Information, the other Party shall ensure that its staff or professional advisors and/or the Tram Maintainer Parties sign a confidentiality undertaking before commencing work in connection with this Agreement.

25.4 Neither Party shall use any Confidential Information it receives from the other Party or **tie** otherwise than for the purposes of this Agreement.

25.5 The provisions of Clauses 25.1 to 25.4 shall not apply to:

25.5.1 any information which is or becomes public knowledge (otherwise than by breach of this Clause 25 (*Confidential Information*));

25.5.2 any information which was in the possession of the receiving Party, without restriction as to its disclosure, before receiving it from the disclosing Party;

25.5.3 any information which is received from a third party who lawfully acquired it and who is under no obligation restricting its use or disclosure;

25.5.4 any information which is independently developed without access to the Confidential Information;

25.5.5 any disclosure pursuant to a statutory, legal, parliamentary or judicial obligation placed upon the Party making the disclosure, including any requirements for disclosure under FOISA, the Code or the Environmental Information Regulations pursuant to Clauses 25.8 to 25.12 (inclusive);

25.5.6 any disclosure by the Client of this Agreement including the Price and commercial terms, any information relating to the design of any aspect of the Edinburgh Tram Network and such other information as may be reasonably required for the purpose of conducting a due diligence exercise with any candidates for other agreements relating to the System and their advisers;

25.5.7 any disclosure by the Client of this Agreement and any related information to **tie**, any Client Party, the Operator or any **tie** Party;

25.5.8 any information which is required to be disclosed to that Party's insurers, financial advisor and/or legal advisers subject to Clauses 25.2 and 25.3;

25.5.9 any registration of information in respect of the Consents and any property registration which may be required as necessary;

25.5.10 any disclosure of information by the Client and/or **tie** to Transport Edinburgh Limited, CEC, Partnerships UK Limited, the Scottish Ministers, Transport Scotland any department, office or agency of the Scottish Executive or the UK government;

25.5.11 any disclosure for the purpose of:

25.5.11.1 the examination and certification of the Client's, **tie**'s or the Tram Maintainer's accounts; or

25.5.11.2 any examination (pursuant to any applicable Law) of the economy, efficiency and effectiveness with which **tie** has used its resources or funding made available to it including any examination pursuant to the Local Government (Scotland) Act 1973 as amended by the Local Government in Scotland Act 2003 of whether **tie** has secured best value in the performance of

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its functions; or

25.5.12 any disclosure of Confidential Information obtained from the Tram Maintainer:

25.5.12.1 to any government department or any other local government authority or public authority equivalent in status to **tie.** All government departments or any other local government authority or public authority equivalent in status to **tie** receiving such Confidential Information shall be entitled to further disclose the Confidential Information to other government departments or any other local government authority or public authority equivalent in status to **tie** on the basis that the information is confidential and is not to be disclosed to a third party which is not part of any government department or any other local government authority or public authority equivalent in status to **tie**; or

25.5.12.2 to any person engaged in providing any services to the Client for any purpose relating to or ancillary to this Agreement,

provided that in disclosing information under this Clause 25 (*Confidential Information*) the Client shall be required to disclose only the information which is necessary for the purpose concerned and requires that the information is treated in confidence and that a confidentiality undertaking will be given by the recipient of such information where appropriate.

25.6 Nothing in this Clause 25 (*Confidential Information*) shall prevent any Party from using any techniques, ideas or know-how gained during the performance of this Agreement in the course of its normal business, to the extent that this does not result in a disclosure of Confidential Information or an infringement of Intellectual Property Rights.

25.7 In the event that the Tram Maintainer fails to comply with this Clause 25 (*Confidential Information*), the Client reserves the right to terminate this Agreement by notice in writing in accordance with Clause 32 (*Tram Maintainer Default Termination*).

25.8 The Tram Maintainer acknowledges that **tie** is subject to the requirements of FOISA and the Environmental Information Regulations and shall assist and cooperate with **tie** (at the Tram Maintainer's expense) to enable **tie** to comply with these Information disclosure requirements. **tie** agrees and the Tram Maintainer acknowledges that it shall comply with the terms of the Code in respect of the discharge of its obligations under FOISA.

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25.9 The Tram Maintainer shall and shall procure that the Tram Maintainer Parties shall:

25.9.1 transfer any Request for Information to **tie** as soon as practicable after receipt and in any event within five Business Days of receiving a Request for Information;

25.9.2 provide **tie** with a copy of all Information in its possession or power in the form that **tie** requires within five Business Days (or such other period as **tie** may specify) of **tie** requesting that Information; and

25.9.3 provide all necessary assistance as reasonably requested by **tie** to enable **tie** to respond to a Request for Information within the time for compliance set out in section 10 of FOISA or regulation 5 of the Environmental Information Regulations.

25.10 **tie** shall be responsible for determining at its absolute discretion whether the Confidential Information and/or any other Information:

25.10.1 is exempt from disclosure in accordance with the provisions of the Code, FOISA or the Environmental Information Regulations; and

25.10.2 is to be disclosed in response to a Request for Information.

25.11 In no event shall the Tram Maintainer respond directly to a Request for Information unless expressly authorised to do so by **tie**.

25.12 The Tram Maintainer acknowledges that **tie** may be obliged, pursuant to the Code, FOISA or the Environmental Information Regulations to disclose Information:

25.12.1 without consulting with the Tram Maintainer, or

25.12.2 following consultation with the Tram Maintainer and having taken its views into account.

25.13 The Tram Maintainer shall ensure that all information and Deliverables produced in the course of this Agreement or relating to this Agreement are retained for disclosure and shall permit the Client and **tie** to inspect such records as requested from time to time.

25.14 The Tram Maintainer acknowledges that any lists or schedules provided by it outlining Commercially Sensitive Information are of indicative value only and that **tie** and/or the Client may nevertheless be obliged to disclose Commercially Sensitive Information or Confidential Information in accordance with Clause 25.8.

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25.15 Any public relations material, press releases, public presentations or conference engagements in relation to this Agreement planned by the Tram Maintainer shall require the Client's and **tie**'s prior written approval.

26. RIGHT OF VERIFICATION AND AUDIT

26.1 The Client's Representative and **tie's** Representative shall nominate a combined audit team, having given reasonable notice, in order to verify that the Services are being carried out in compliance with this Agreement, shall be entitled during the carrying out of the Services, either itself or using such agents or representatives as it may authorise (not being employees or competitors of the Tram Maintainer and having regard to the commercial sensitivities of the Tram Maintainer), to inspect, examine, test or audit work, processes, Technical Records (whether or not in electronic format) and other documentation which the Tram Maintainer is obliged to provide to the Client pursuant to this Agreement, and Parts and Special Tools (which belong to CEC but which may be in the Tram Maintainer's possession or control) or make such other investigation, enquiry or survey in relation thereto at the Depot or any other premises occupied by the Tram Maintainer in connection with the Edinburgh Tram Network, insofar as it is within the control of the Tram Maintainer (the Tram Maintainer having used its reasonable endeavours to obtain such rights of access and audit appropriate to enable the Client to take full advantage of the provisions of this Clause in its dealings with its material suppliers and sub-contractors), the Tram Maintainer's material suppliers or sub-contractors or at any other place where the Services are being carried out. No such inspection shall unreasonably disrupt the commercial operations of the Tram Maintainer or its material suppliers or sub-contractors (as the case may be). Written reports of such visits may be produced and forwarded to the Tram Maintainer. Such reports shall be discussed with the Client, **tie** and the Operator and any actions found as a consequence of such discussions to be required in order for the Tram Maintainer to fulfil its obligations under this Agreement shall be carried out by the Tram Maintainer promptly at its own expense. Any corrective action that is identified as a result of any verification or audit shall be dealt with in accordance with this Clause 26 (*Right of Verification and Audit*).

26.2 The Tram Maintainer shall, and shall procure that its sub-contractors shall, maintain an accurate set of records of personnel and all activities relating to the performance of the Services and all transactions related thereto and a complete up to date and orderly documentary record of all transactions entered into for the purposes of this Agreement including copies of all sub-contracts, manufacturers' specifications and details, purchase orders, documents, data and all such other information as may reasonably be required by the Client, **tie** or the Operator or as may be specified in this Agreement and such information,

records and documents shall be available at all reasonable times for inspection by the Client and the Tram Maintainer shall make available such items of clarification or substantiation as may be required by the Client in relation to the said records, documents and information, provided that the Tram Maintainer shall be entitled to delete from the documents to be disclosed to the Client any commercially sensitive information in relation to the Tram Maintainer's arrangements with its sub-contractors. Without prejudice to the aforesaid provisions of this Clause 26.2, the Tram Maintainer shall provide to the Client a copy in electronic format of any and all of the said records, documents and information free of charge within 10 Business Days of the Client's, **tie's** or the Operator's request for the same. The Tram Maintainer shall ensure that any subcontract includes a clause requiring the sub-contractor to facilitate compliance with the provisions of this Clause 26.2.

26.3 The Tram Maintainer shall supply such financial information relating to the Tram Maintainer and its Affiliates as may from time to time be reasonably requested by the Client within 10 Business Days of such request.

26.4 If the Client is required by a Relevant Authority or there are reasonable grounds upon which the Client believes that either:

(a) the Tram Maintainer is not fulfilling the obligations or is in breach of this Agreement; or

(b) there are grounds to suspect that the Tram Maintainer is not financially sound,

then the Client shall co-ordinate the application of its inspection rights together with **tie** and shall have the right to inspect the Tram Maintainer Accounts and/or conduct a detailed analysis of such Tram Maintainer Accounts provided that the Client shall:

26.4.1 ensure (insofar as reasonably practicable) that the provision of the Services by the Tram Maintainer are not unreasonably disrupted or delayed; and

26.4.2 give at least four (4) Business Days' notice of any inspection it intends to carry out.

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26.5 The Tram Maintainer shall promptly provide the Client and the Client Parties with all reasonable co-operation and assistance in relation to any inspection including to:

26.5.1 providing all information reasonably required by the Client and/or the Client Parties for the purposes of its inspection;

26.5.2 granting or procuring the grant of reasonable access to any sites at which the Tram Maintainer information requested is stored and access to any equipment on which such Tram Maintainer information requested is stored;

26.5.3 providing a reasonable number of copies of any documents or records reasonably requested by the Client and/or the Client Parties; and

26.5.4 complying with the Client's reasonable requests for access to personnel engaged in the Tram Maintainer's performance of this Agreement.

26.6 The Tram Maintainer acknowledges and agrees that **tie**, CEC and certain Relevant Authorities from time to time require, whether by virtue of Law, regulation or otherwise, to provide reports, returns and carry out audits and accordingly the Tram Maintainer agrees to provide assistance to the extent required by **tie**, CEC and such Relevant Authorities from time to time. Each of the Parties shall bear their own costs of such information provision and audits.

26.7 The Tram Maintainer shall, and shall procure that its sub-contractors shall, retain such documents and other records relating to this Agreement (except to the extent that the Client confirms that they may be disposed of), for a period of not less than six years after completion of the provision of the relevant Services. The Client shall have the right to audit any and all such documents and records for that period, notwithstanding the termination of expiry of this Agreement, and the provisions of this Clause 26 (*Right of Verification and Audit*) shall survive the termination or expiry of this Agreement.

26.8 If an audit undertaken pursuant to this Clause 26 (*Right of Verification and Audit*) reveals that a Tram Maintainer Default has occurred or that the Tram Maintainer has persistently breached any of the provisions of this Agreement that affects the performance, safety or the reliability of the Trams, the Tram Maintainer shall reimburse to the Client and/or **tie** and/or the Operator the cost of such audit and shall bear all reasonable expenses arising therefrom but in any other case the Client and/or **tie** shall meet its own costs in respect of such audit.

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27. HAZARDOUS MATERIALS

27.1 The Tram Maintainer undertakes that it is and will remain during the term of this Agreement, or that any relevant sub-contractor is and will remain during the term of this Agreement, appropriately qualified and experienced in and accredited for the purposes of carrying out work of the scope, type and complexity that is required in carrying out the Services involving the handling of any Hazardous Materials incorporated in any Tram or Part and shall maintain an up to date register recording the location, volume, type, storage condition and handling and disposal procedures for such Hazardous Materials.

27.2 The Tram Maintainer shall not use any Hazardous Materials in performing the Services except where expressly permitted to do so by the Tram Maintenance Specification, applicable Law and Good Industry Practice, or otherwise with the express prior written consent of the Client. If Hazardous Materials are used other than expressly in accordance with the Tram Maintenance Specification, applicable Law and Good Industry Practice, or with the prior written consent of the Client, the Tram Maintainer shall ensure that all such Hazardous Materials used in the provision of the Services are expressly identified in writing to the Client and the Operator by reference to this Clause 27 with reference to the hazards attached to them and the procedures that the Tram Maintainer has for managing such hazards.

27.3 The Tram Maintainer shall ensure that all Services performed under this Agreement with Hazardous Materials, including the removal, handling and disposal of those materials, are carried out in such a manner as to ensure compliance with all applicable Law (including any advisory literature provided by the Health and Safety Commission or Executive). The Tram Maintainer shall inform the Client's Representative if any Hazardous Materials which do not form part of the Services are encountered in the course of the Services and shall submit its proposed method of operation and the precautions to be taken before commencing any work involving such Hazardous Materials. Such submission shall be considered a proposal for Additional Services and shall be dealt with pursuant to the Change Procedure. If the Tram Maintainer proposes to use such Hazardous Materials, it shall comply with applicable Law (including any advisory literature provided by the Health and Safety Commission or Executive) and any additional precautions specified by the Client's Representative as to their use, handling, storage and disposal.

27.4 The Tram Maintainer shall indemnify the Client against any Losses resulting from the Tram Maintainer's failure to comply with the provisions of this Clause 27 (*Hazardous Materials*).

27.5 The Tram Maintainer acknowledges that it is aware that various health hazards may be encountered in performing the Services (which may not be immediately apparent as deliberate

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and malicious concealment of such hazards may take place). The Tram Maintainer shall take all reasonably practicable precautions for the protection of its employees and any other person who may be affected by the Services.

28. NOTICE OF ACCIDENTS

28.1 In the event of any notifiable accident or dangerous occurrence during the carrying out of the Services included in this Agreement, the Tram Maintainer shall be responsible for reporting such notifiable accident or dangerous occurrence to the Health and Safety Executive under the Reporting of Injuries and Diseases and Dangerous Occurrences Regulations 1985.

29. INSURANCE

29.1 The Tram Maintainer shall, at its own cost, procure that each of the Required Insurances is taken out and comes into effect on the relevant date specified in each "Period of Insurance" set out in part 1 of Schedule 4 (*Required Insurances*) and shall maintain the Required Insurances in full force and effect until the relevant date specified in each "Period of Insurance" set out in part 1 of Schedule 4 (*Required Insurances*), provided that each such Required Insurance is available in the EU insurance market at commercially reasonable rates and on commercially reasonable terms to contractors of the same status as at the Effective Date and of the same discipline as the Tram Maintainer.

29.2 The Tram Maintainer shall procure that all Required Insurances shall:

29.2.1 be maintained in accordance with part 1 of Schedule 4 (*Required Insurances*); and

29.2.2 be placed at all times with insurers authorised to carry out insurance business in the United Kingdom and confirmed in writing as acceptable by the Client (such written acceptance not to be unreasonably withheld or delayed).

29.3 The Tram Maintainer shall not make any material alteration to the terms of the Required Insurances (including material changes to the level of deductibles) without the Client's prior approval (which approval shall not be unreasonably withheld). If any such material alteration to the Required Insurances is made, the Tram Maintainer shall complete the questionnaire set out in part 3 of Schedule 4 (*Required Insurances*), duly endorsed by its insurance broker. If the insurer makes or attempts to make any material alteration or purports to withdraw cover, the Tram Maintainer shall promptly give notice of this to the Client.

29.4 The Tram Maintainer shall ensure that each of its insurance brokers gives the Client as soon as reasonably practicable after any policy of Required Insurance is taken out, replaced or

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renewed, a letter of undertaking in the form set out in part 2 of Schedule 4 (*Required Insurances*).

29.5 The Tram Maintainer shall provide satisfactory evidence to the Client that the Required Insurances have been effected. Thereafter, the Tram Maintainer shall upon request produce to the Client receipts for the payment of current insurance premiums or equivalent documentary evidence to confirm that such Required Insurances are being properly maintained, and on the anniversary of the Effective Date and on each subsequent anniversary thereof until the date of expiry or earlier termination, the Tram Maintainer shall complete an insurance questionnaire set out in part 3 of Schedule 4 (*Required Insurances*) in relation to the Required Insurances to be taken out by the Tram Maintainer and submit such completed questionnaire to the Client as soon as reasonably practicable. If the Tram Maintainer defaults in insuring or continuing to maintain the Required Insurances, the Client may insure against any risk in respect of which such default has occurred and recover any premiums from the Tram Maintainer as a debt immediately due and payable.

29.6 The Tram Maintainer shall:

29.6.1 procure that the Required Insurances which are to be maintained by the Tram Maintainer in accordance with part 1 of Schedule 4 (*Required Insurances*) contain a waiver of subrogation against **tie**, any **tie** Party, the Client, any Client Parties, and the Insured Parties as set out in part 1 of Schedule 4 (*Required Insurances*) save in respect of fraud or deliberate non-disclosure; and

29.6.2 where the Tram Maintainer is obliged to effect any Required Insurances, not bring any claim or action against **tie** or the Client in respect of any Losses suffered by it in circumstances where and to the extent that the Tram Maintainer could recover such Losses under such insurance (whether or not such insurance has in fact been effected or, if effected, has been vitiated as a result of any act or omission of the Tram Maintainer (or any Tram Maintainer Party), including non-disclosure or under-insurance), provided that, to avoid doubt, this Clause 29.6.2 shall not by itself prevent the Tram Maintainer from claiming against the Client (or any Client Party) in respect of a breach of this Agreement by the Client (or any Client Party) for any loss or damage arising from such breach not covered because of the level of deductibles under such insurance permitted by this Agreement or to the extent such loss or damage exceeds the greater of the insurance placed or the minimum limit of indemnity required in respect of such insurance under part 1 of Schedule 4 (*Required Insurances*).

29.7 The Tram Maintainer shall not take any action or fail to take any action or (insofar as it is reasonably within its power) permit or allow others to take or fail to take any action (in either case including failure to disclose any fact) as a result of which any of the Required Insurances may be rendered void, voidable, unenforceable, suspended or impaired in whole or in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

29.8 The supply to the Client of any insurance policy or insurance certificate or renewal certificate or other evidence of compliance with this Clause 29 (*Insurance)* shall not imply, or be taken as, acceptance by the Client that:

29.8.1 the extent of insurance cover is sufficient and its terms are satisfactory; or

29.8.2 in respect of any interests or parties not insured or any risks not insured against, an acceptance by the Client that the same were uninsurable.

29.9 Neither failure to comply nor full compliance with the provisions of this Clause 29 (*Insurance*) shall relieve the Tram Maintainer of its liabilities and obligations under this Agreement.

29.10 The Tram Maintainer shall apply any proceeds of any policies of insurance maintained in accordance with part 1 of Schedule 4 (*Required Insurances*) in satisfaction of the claim, demand, proceeding or liability in respect of which such proceeds are payable (unless already paid direct to the third party or employee by the insurer).

29.11 The Tram Maintainer undertakes with the Client in relation to the Required Insurances:

29.11.1 to comply with all requirements of the insurers; and

29.11.2 to give notice to the Client immediately upon the happening of any event which will adversely affect any policy of insurance effected in accordance with this Clause 29 (*Insurance*), including the downgrading of the credit rating below A- by Standard & Poors of any party providing any of the Required Insurances.

29.12 The Tram Maintainer shall immediately inform the Client in writing if any of the Required Insurances cease to be maintained and/or cease to be available in the EU insurance market at commercially reasonable rates provided that if the Tram Maintainer is maintaining such insurance at such rates, the Client shall undertake in writing to reimburse the Tram Maintainer in respect of half of the net cost of such insurance to the Tram Maintainer above commercially reasonable rates. If the Client undertakes in writing to reimburse the Tram Maintainer in

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respect of half of the net cost of such insurance to the Tram Maintainer above commercially reasonable rates or, if the Client effects such insurance at or above commercially reasonable rates, the Tram Maintainer shall reimburse the Client in respect of what the net cost of such insurance to the Tram Maintainer would have been at commercially reasonable rates and terms, and the cost of maintaining any such insurance at rates above commercially reasonable rates by the Tram Maintainer or by the Client shall be borne in equal proportions by the Tram Maintainer and the Client.

29.13 The Tram Maintainer shall fully co-operate with any measures reasonably required by the Client, including completing any proposals for insurance and associated documents or maintaining such insurance at rates above commercially reasonable rates if the Client undertakes in writing to reimburse the Tram Maintainer in respect of the net cost of such insurance to the Tram Maintainer above commercially reasonable rates or, if the Client effects such insurance at or above commercially reasonable rates, reimbursing the Client in respect of what the net cost of such insurance to the Client would have been at commercially reasonable rates and terms.

29.14 The Tram Maintainer acknowledges that **tie** has taken out insurances (the "**OCIP Insurances**") and agrees that it is on notice of the terms and coverage of the OCIP Insurances and agrees to comply with the requirements of the insurers with whom the OCIP Insurances are placed. The Tram Maintainer agrees that it will intimate to the Client any act, occurrence or failure which may:

29.14.1 lead to any claim being made under the OCIP Insurances; or

29.14.2 render any of the OCIP Insurances void, voidable, unenforceable, suspended or impaired in whole or in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

29.15 The Tram Maintainer shall not take any action or fail to take any reasonable action or (insofar as it is reasonably within its power) permit or allow others to take or fail to take any action (including in either case failure to disclose any fact) as a result of which any of the OCIP Insurances may be rendered void, voidable, unenforceable, suspended or impaired in whole or in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

29.16 The Client may ask the Tram Maintainer to take out and maintain any insurance from time to time in the names of the parties reasonably requested by the Client (the "**Additional Insurance**"). If Additional Insurance is required, the terms of this Clause 29 (*Insurance*)

including the provisions which are stated to apply to the "Required Insurances" shall apply with any appropriate adjustment to be agreed between the Parties as a Client Change. The Tram Maintainer shall promptly inform the Client in writing if any of the Additional Insurances cease to be available in the EU insurance market at commercially reasonable terms for tram or rail vehicle maintainers. In this event the Parties shall meet to discuss the means by which any risks previously covered by the Additional Insurances should be managed, mitigated or controlled. Any agreement shall be a Client Change. Any increased or additional premium required by insurers by reason of the Tram Maintainer's own claims record or other acts, omissions, matters or things particular to the Tram Maintainer shall be deemed to be within commercially reasonable rates and terms. The Tram Maintainer shall procure that any Additional Insurance shall:

29.16.1 (if the Client so requires) contain a provision that the Client or any other party reasonably requested by the Client is named as a co-insured party;

29.16.2 provide that any Additional Insurance shall continue in effect and unaltered for the benefit of the insured parties for at least ninety days after written notice by registered mail of any cancellation (including non-renewal), change, modification or lapse for any reason;

29.16.3 contain a provision that requires the insurer to send copies of all notices of cancellation or alteration or suspension or any other notices given under or in relation to the policy to the Client promptly upon receiving any notices of cancellation or alteration or suspension or any other notices;

29.16.4 contain a provision that a notice of a claim given to the insurer by one of the insured parties under the policy shall, in the absence of manifest error, be accepted by the insurer as valid notification of a claim in respect of the interests of all insured parties;

29.16.5 contain a provision to the effect (on the basis of non-vitiation/severability) that all the provisions of any Additional Insurance shall operate as if there were a separate policy in effect (save in respect of the sums insured, limits of liability and excesses/deductibles which shall be at the levels stated) for each named insured and that non-compliance with any policy term, condition or warranty and/or misrepresentation or non disclosure of material information by the Tram Maintainer or any other co-insured will not affect the rights and/or interests of the Client or any other co-insured party under any policies effected as Additional Insurance; and

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29.16.6 be primary, and shall not be brought into contribution with any other policy or policies effected by or on behalf of any of the insured parties.

29.17 The Tram Maintainer shall supply the Client with copies of every policy document, insurance certificate and renewal certificate relating to any Additional Insurance (or such other evidence of insurances as may be reasonably required by the Client) and documentary evidence to the effect that the Required Insurances (other than any Additional Insurance) have been taken out and are being maintained as soon as it is available but in any event no later than 10 Business Days (in respect of certificates) and sixty days (in respect of policies) after the inception of the relevant policies, together with evidence of payment of the premiums and any periodic renewal certificates.

29.18 The Tram Maintainer shall inform the Client in writing as soon as reasonably practicable after it receives a claim or becomes aware of the occurrence of any event that may give rise to a claim under any Required Insurance (if related to the Edinburgh Tram Network) or Additional Insurance and will ensure that the Client is kept fully informed of subsequent action and developments concerning the claim; such written information shall not be required in relation to any claim of less than £50,000 (as Indexed). The Tram Maintainer shall take such steps as are necessary or appropriate to ensure that each Tram Maintainer Party, in respect of any event or claim of a like nature arising out of or relating to the operation or responsibility of that Tram Maintainer Party or any event or claim of which they become aware, takes in relation to the Tram Maintainer, like action to that which the Tram Maintainer is required to take under this Clause 29.18 in relation to the Client, and shall inform the Client promptly of information thus received from any Tram Maintainer Party.

29.19 At each anniversary of the Effective Date, the Tram Maintainer shall provide the Client with a summary of all claims made under the Required Insurances, where such claims arise out of this Agreement. Such summary shall include date, circumstances, status and amounts paid and/or outstanding on each claim.

29.20 Without prejudice to any other provision of this Agreement, the Tram Maintainer undertakes to the extent it has the right to do so under the relevant policy that it will not (and that each of the Tram Maintainer Parties to the extent each respectively has the right to do so under the relevant policy will not) settle any OCIP Insurance or Additional Insurance claim above £50,000 (Indexed) without the prior written agreement of the Client (such agreement not to be unreasonably withheld or delayed).

30. SERVICE PERFORMANCE AND QUALITY MONITORING

30.1 The Tram Maintainer shall provide reasonable assistance to enable the Client to create and submit the Service Quality Report to **tie** within 3 Business Days following each Reporting Period End Date.

30.2 The Tram Maintainer shall prepare and submit to the Client an Annual Service Report pursuant to Clause 49 (*Best Value*).

30.3 The Tram Maintainer shall monitor its compliance with this Agreement in respect of the Services, and the Parties shall comply with the following provisions:

30.3.1 no later than 3 months before the Tram Maintenance Commencement Date and on each anniversary thereafter, the Tram Maintainer shall provide to the Client's Representative its proposed Self-Monitoring Plan for the ensuing 12 months; and

30.3.2 the Self-Monitoring Plan shall be designed to underpin the Client's best value obligations and the Tram Maintainer shall have full regard to the requirements of Clause 49 (*Best Value*) when preparing its Self-Monitoring Plan; and

30.3.3 no later than the date falling 20 Business Days after receipt by the Client's Representative of such proposed Self-Monitoring Plan, the Client shall notify the Tram Maintainer in writing as to whether or not it considers the Self-Monitoring Plan to be acceptable for the purposes of this Agreement; and

30.3.4 where the Client considers the relevant Self-Monitoring Plan to be acceptable, then the Self-Monitoring Plan shall be implemented by the Tram Maintainer for the relevant 12 months; or

30.3.5 where the Client does not consider the relevant Self-Monitoring Plan to be acceptable, then the Parties shall use all reasonable endeavours to reach agreement as to the contents of the Self-Monitoring Plan; and

30.3.6 until such time as the Self-Monitoring Plan has been accepted by the Client, the previous year's Self-Monitoring Plan shall remain in effect; or

30.3.7 in default of such agreement, either Party may refer the matter for determination under the Dispute Resolution Procedure, and the Tram Maintainer shall implement the Self-Monitoring Plan as so agreed or determined.

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30.4 The Tram Maintainer shall as soon as reasonably practicable provide the Client's Representative with relevant particulars of any aspects of its performance which fail to meet the requirements of this Agreement. The Tram Maintainer shall co-operate with the Client and provide such access as the Client may reasonably require to enable the Client at all reasonable times to observe, inspect and satisfy themselves (including by carrying out sample checks) as to the adequacy of the monitoring procedures implemented by the Tram Maintainer and the Tram Maintainer's compliance with this Agreement.

30.5 Without prejudice to the Client's other rights under this Agreement, if at any time the Tram Maintainer has:

30.5.1 failed to comply with any of its obligations pursuant to Clause 30.3; or

30.5.2 committed any material breach of its obligations under this Agreement,

then the Client may give an Underperformance Warning Notice to the Tram Maintainer setting out in detail the matter or matters giving rise to such notice and containing a reminder to the Tram Maintainer of the implications of such notice.

30.6 Without prejudice to the Client's other rights under this Agreement, if the Tram Maintainer receives three or more Underperformance Warning Notices in any twelve (12) month period, the Client may by notice to the Tram Maintainer increase the level of either the Client's monitoring of the Tram Maintainer (including the employment by the Client of additional performance monitoring officers) or (at the Client's option) of the Tram Maintainer's monitoring of the Tram Maintainer's performance of its obligations under this Agreement, until such time as the Tram Maintainer shall have demonstrated to the reasonable satisfaction of the Client that it will perform (and is capable of performing) its obligations under this Agreement, in which case the following provisions shall apply:

30.6.1 any such notice to the Tram Maintainer shall specify the additional measures to be taken by the Client or by the Tram Maintainer (as the case may be) in monitoring the performance of the Tram Maintainer;

30.6.2 if the Tram Maintainer (acting reasonably) objects to any of the specified measures on the grounds that they are excessive, it shall notify the Client in writing, within 5 Business Days of the receipt of the notice, of the measures objected to (and of any changes necessary in order to prevent prejudice to the Tram Maintainer's performance of its obligations under this Agreement);

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30.6.3 the measures to be taken by the Client and the Tram Maintainer (as the case may be) shall be agreed between the Parties or, in the absence of agreement within 10 Business Days of the Client's receipt of the Tram Maintainer's objection, be determined, at the referral of either Party, pursuant to the Dispute Resolution Procedure and on a basis which the relevant adjudicator considers reasonable having regard to the nature and seriousness of the breaches of this Agreement or circumstances leading to the issue of such Underperformance Warning Notices which have occurred, the likelihood of such breaches or circumstances recurring, the risks which would arise if such breaches or circumstances recurred, the level of culpability of the Tram Maintainer in relation to such breaches and circumstances and the actions being taken by the Tram Maintainer to prevent breaches of this Agreement or circumstances entitling the Client to issue further Underperformance Warning Notices recurring; and

30.6.4 the Tram Maintainer shall bear its own costs and indemnify and keep indemnified the Client on demand at all times from and against all reasonable costs and expenses incurred by or on behalf of the Client in relation to such increased level of monitoring (including an appropriate sum in respect of general staff costs and overheads but limited to direct expenses).

31. SUSPENSION OF WORK

31.1 The Tram Maintainer shall on the written order of the Client's Representative, having received the written permission of **tie**, suspend the progress of the Services or any part thereof for such time or times and in such manner as the Client's Representative may consider necessary and shall during such suspension properly protect and secure the work so far as is necessary in the opinion of the Client's Representative. Except to the extent that such suspension is:

31.1.1 otherwise provided for in this Agreement;

31.1.2 necessary by reason of some default on the part of the Tram Maintainer; or

31.1.3 necessary for the proper completion or for the safety of the Services or any part thereof in as much as such necessity does not arise from any act or default of the Client's Representative or the Client,

then if compliance with the Client's Representative's instructions under this Clause 31 (*Suspension of Work*) involves the Tram Maintainer in delay or extra cost, the Client's Representative shall take such delay into account in determining the Services Payment due to the Tram Maintainer on the basis that such delay would constitute an Excusing Cause.

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31.2 If the progress of the Services or any part thereof is suspended on the written order of the Client's Representative and if permission to resume work is not given by the Client's Representative within a period of six months from the date of suspension then the Tram Maintainer may unless such suspension is otherwise provided for in this Agreement or continues to be necessary by reason of some default on the part of the Tram Maintainer serve a written notice on the Client's Representative requiring permission within 20 Business Days from the receipt of such notice to proceed with the Services or that part thereof in regard to which progress is suspended. If within the said 20 Business Days the Client's Representative does not grant such permission, the Tram Maintainer by a further written notice so served may (but is not bound to) elect to treat the suspension where it affects part only of the Services as an omission of such part under Clause 16 (*Changes*) or where it affects the whole Services as an abandonment of this Agreement by the Client.

31.3 Within 45 Business Days of service of notice by the Tram Maintainer in accordance with Clause 31.2 to treat any suspension as an abandonment of this Agreement, this Agreement shall be terminated in whole and the provisions of Clause 38 (*Payment on Termination*) and Clause 39 (*Effect of Termination or Expiry*) shall apply.

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32. TRAM MAINTAINER DEFAULT TERMINATION

32.1 Without prejudice to any of the Client's other rights or remedies the Client may having given 7 days' notice (with the written consent of **tie**) in writing to the Tram Maintainer terminate this Agreement on any of the following grounds set out in Clauses 32.1.1 to 32.1.12 (each a "**Tram Maintainer Default**"):

32.1.1 breach of any material provision or requirement of this Agreement where the Client has by written notice requested rectification of such breach and the Tram Maintainer has failed to rectify such breach within 10 Business Days;

32.1.2 failure by the Tram Maintainer to commence any safety critical work comprised in the Services or to proceed expeditiously with the same;

32.1.3 the Tram Maintainer knowingly taking any course of action that causes the Operator's Case for Safety to be breached or materially impaired;

32.1.4 the occurrence of any Insolvency Event in relation to the Tram Maintainer, the Tram Maintainer's parent company or any Affiliate of the Tram Maintainer;

32.1.5 any Change in Control of the Tram Maintainer or any other change in legal status of the Tram Maintainer which is materially prejudicial to carrying out the Services;

32.1.6 any breach of Clause 25 (*Confidential Information*);

32.1.7 the issue of 3 or more Underperformance Warning Notices in any 12 month period;

32.1.8 NOT USED;

32.1.9 the Tram Maintainer conducts itself in a manner which **tie** reasonably considers to be incompatible with the performance of the Services and/or in a manner so as to wilfully detract from the image and reputation of **tie**, CEC, Transport Edinburgh Limited, the Scottish Executive, the Scottish Ministers or any project related to the performance of the Services;

32.1.10 any abandonment of the Services by the Tram Maintainer which has been previously notified by writing by the Client to the Tram Maintainer;

32.1.11 a Tram Punctuality Performance of:

32.1.11.1 90% or less in any Reporting Period; or

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32.1.11.2 95% or less in any 3 Reporting Periods out of any 13 consecutive Reporting Periods; and/or

32.1.12 the total liability of the Tram Maintainer under this Agreement would be in excess of the aggregate of four times the value of the Maximum Performance Payment, save for the application of Clause 42.5.

32.2 If the Client terminates this Agreement pursuant to this Clause 32 (*Tram Maintainer Default Termination*), the provisions of Clause 38 (*Payment on Termination*) and Clause 39 (*Effect of Termination or Expiry*) shall apply.

32.3 The Tram Maintainer shall immediately notify the Client of:

32.3.1 any resolution or decision by the Tram Maintainer or the board of directors of the Tram Maintainer or a decision by any director of the Tram Maintainer to seek legal or financial advice pertaining to the solvency of the Tram Maintainer; and/or

32.3.2 any presentation of any petition for the purpose of winding up the Tram Maintainer or any petition for an administration order.

32.4 In the event that the Client has grounds to serve notice pursuant to Clause 32.1, the Client may elect to require the Tram Maintainer to provide a rectification plan within 5 Business Days of the Client serving written notice requiring the Tram Maintainer to provide such plan. The Tram Maintainer shall set out in the rectification plan:

32.4.1 the actions required to be taken by the Tram Maintainer in order to achieve the sustainable rectification (measured against an agreed revised programme and production criteria over a set period) of the Tram Maintainer's poor performance; and

32.4.2 any specific alternative terms or modifications to the terms of this Agreement,

such that the Tram Maintainer shall not be in breach of this Agreement if it performs to this level.

32.5 The Tram Maintainer shall propose the rectification plan at its costs and shall participate in good faith in discussions or negotiations held by the Client regarding the implementation of the rectification plan.

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33. PERSISTENT BREACH

33.1 If a breach by the Tram Maintainer of any of its obligations under this Agreement has occurred more than once then the Client may serve a notice ("**Persistent Breach Notice**") on the Tram Maintainer:

33.1.1 specifying that it is a Persistent Breach Notice;

33.1.2 giving reasonable details of the breach; and

33.1.3 stating that such breach is a breach which, if it recurs frequently or continues, may result in a termination of this Agreement.

33.2 If, following service of such a Persistent Breach Notice, the breach specified has continued or occurred once again after the date falling 30 days after the date of service of such Persistent Breach Notice and before the date falling 365 days after the date of service of the Persistent Breach Notice, then the client may serve another notice ("**Final Persistent Breach Notice**") on the Tram Maintainer:

33.2.1 specifying that it is a Final Persistent Breach Notice;

33.2.2 stating that the breach specified has been the subject of a prior Persistent Breach Notice within the period of 365 days prior to the date of service of the Final Persistent Breach Notice; and

33.2.3 stating that if such failure is not remedied within 7 days or is remedied and occurs once or more within the 180 day period after the date of service of the Final Persistent Breach Notice, this Agreement may be terminated with immediate effect (but only if the said Final Persistent Breach Notice given under this Clause 33.2 has been countersigned by **tie**.

33.3 If the Client terminates this Agreement pursuant to this Clause 33 (*Persistent Breach*) the provisions of Clause 38 (*Payment on Termination*) and Clause 39 (*Effect of Termination or Expiry*) shall apply.

34. CLIENT DEFAULT TERMINATION

34.1 The Tram Maintainer may issue a Termination Notice to the Client to terminate this Agreement if:

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34.1.1 the Client fails to pay an undisputed sum or sums due to the Tram Maintainer under this Agreement which, either singly or in aggregate, exceeds 3 times the Maximum Performance Payment due and payable and such failure continues for sixty (60) days from receipt by the Client's Representative of a notice of non-payment from the Tram Maintainer; or

34.1.2 the Client is in material breach of this Agreement which substantially frustrates or renders it impossible for the Tram Maintainer to perform its obligations under this Agreement and if such breach is capable of remedy is not remedied by the Client within 30 days of written notice from the Tram Maintainer to the Client's Representative specifying the relevant material breach,

each a ("**Client Default**") and this Agreement shall terminate on the day falling 60 days after the day on which the Client receives the Termination Notice from the Tram Maintainer unless the Client rectifies the Client Default within the said 60 day period.

34.2 The Tram Maintainer shall not exercise, or purport to exercise, any right to terminate this Agreement (or accept any repudiation of this Agreement) except as expressly set out in this Agreement.

34.3 If the Tram Maintainer terminates this Agreement pursuant to this Clause 34 (*Client Default Termination*), the provisions of Clause 38 (*Payment on Termination*) and Clause 39 (*Effect of Termination or Expiry*) shall apply.

34.4 If a Termination Notice is issued by the Tram Maintainer in accordance with Clause 34.1 the Client and the Tram Maintainer acknowledge that **tie** may elect to exercise its rights to step into this Agreement under the terms of the Tram Maintenance Collateral Warranty.

35. PERFORMANCE REVIEW AND NO FAULT TERMINATION

35.1 The Client may terminate this Agreement, having received written authority from **tie** (save where Clause 35.10 applies), at any time after five years following the issue of the Certificate of Service Commencement, by notice in writing, and for whatever reason. This Agreement shall terminate on the date falling six months after the date of service of such written notice.

35.2 In addition to the Client's right to terminate pursuant to Clause 35.1, the Client may, having received written authority from **tie** (save where Clause 35.10 applies), between three and five years after the issue of the Certificate of Service Commencement, terminate this Agreement, by notice in writing, and for whatever reason upon giving written notice to the Client that this

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Agreement shall terminate on the date falling six months after the date of service of such written notice.

35.3 Upon termination of the Tram Maintainer's employment pursuant to Clause 35.2, then the provisions of Clause 38.8 shall apply.

35.4 If the Client terminates this Agreement pursuant to this Clause 35 (*Performance Review and No Fault Termination*) then the provisions of Clause 38 (*Payment on Termination*) and Clause 39 (*Effect of Termination or Expiry*) shall apply.

35.5 Following the end of each Performance Review Period, the Client shall review and assess the performance of the Tram Maintainer.

35.6 Pursuant to Clause 35.5, the Client will review the following:

35.6.1 the Tram Maintainer's historic performance under Schedule 3 (*Payment*);

35.6.2 whether the Tram Maintainer has complied with all of its obligations under this Agreement (and, if the Tram Maintainer is in breach of such obligations, whether the Client reasonably considers such breach(es) to have been both minor and infrequent); and

35.6.3 the Tram Maintainer's business plan for the next Performance Review Period to assess whether it is sufficiently robust to satisfy the Client, acting reasonably, that the Tram Maintainer will remain solvent for the next Performance Review Period.

35.7 If any of the criteria set out at Clause 35.6 are not satisfied then the Client may specify particular requirements in respect of those areas where the criteria set out at Clause 35.6 have not been satisfied, to be met by the Tram Maintainer by a specified interim date prior to the next Performance Review Date. If the Client specifies such interim date then the provisions of this Clause 35 will apply at the interim date, mutatis mutandis, as if that date was the original Performance Review Date (and as if the criteria set out at Clause 35.6 were the requirements specified by the Client pursuant to this Clause 35.7).

35.8 Following a Performance Review Date, the Client and the Tram Maintainer shall discuss whether it is appropriate to re-set any criteria within this Agreement from a date twelve months following the Performance Review Date, if and to the extent that the Parties and **tie** consider it reasonable to do so in accordance with but not limited to the following provisions:

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35.8.1 in determining what adjustment (if any) it requires to be made, the Parties shall have regard to:

35.8.1.1 the performance of tram maintainers on other tram networks in the UK; and

35.8.1.2 the fact that the Client would not expect to adjust the level of any such criteria unless it was reasonably satisfied that the revised standard would be consistent with sustainable levels of performance by the Tram Maintainer; and

35.8.2 the Client and the Tram Maintainer shall discuss such proposed variation in good faith, with any agreed change made pursuant to Clause 16 (*Changes*), and if the Parties cannot agree such variation, the criteria will remain the same for the following Performance Review Period.

35.9 Within 60 Business Days prior to the date of expiry of the Infraco Contract or in the event that notice has been served to terminate the Infraco Contract, the Client shall offer to **tie** to assign or otherwise transfer this Agreement to any party identified in Clause 35.11.1 and Clause 35.11.2.

35.10 If the offer to assign or otherwise transfer this Agreement pursuant to Clause 35.9 has been refused in writing by **tie** or **tie** has not responded within 30 Business Days of receipt of such offer the Client shall be entitled to terminate this Agreement in accordance with Clause 35.

35.11 If the offer to assign or otherwise transfer this Agreement pursuant to Clause 35.9 has been accepted in writing by **tie** then the Client shall assign, or otherwise transfer the whole or part of this Agreement to:

35.11.1 **tie**, the Operator, the Scottish Ministers, TEL, CEC, Transport Scotland or their successors with no worse financial standing than that of **tie**; or

35.11.2 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed by a person falling within Clause 35.11.1.

35.12 In the case of such an assignation the Tram Maintainer shall enter into a collateral warranty in favour of the Client in substantially the form set out in Schedule 1 (*Conditions Precedent*).

36. TERMINATION ON FORCE MAJEURE

36.1 Neither Party shall be entitled to bring a claim for a breach of obligations under this Agreement by the other Party or incur any liability to the other Party for any Losses or damages incurred by that other Party to the extent that a Force Majeure Event occurs and such

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Party is directly prevented from carrying out such obligations by that Force Majeure Event provided that such prohibition on bringing a claim and exclusion of liability shall not operate if and to the extent that:

36.1.1 the Affected Party could, by the exercise of reasonable foresight and diligence, have prevented or reduced the effect of the Force Majeure Event; and

36.1.2 the Affected Party could, whether before or after the occurrence of the Force Majeure Event, have reduced or eliminated the resulting breach of its obligations under this Agreement by taking reasonable steps.

36.2 On the occurrence of a Force Majeure Event, the Affected Party shall notify the other Party as soon as reasonably practicable, specifying details of the Force Majeure Event and providing evidence of its effect on the obligations of the Affected Party and any action proposed to remove or mitigate its effect.

36.3 The Parties shall enter into *bona fide* discussions with a view to alleviating and removing the effects of such Force Majeure Event as soon as reasonably practicable, and:

36.3.1 if the terms or measures to remove the effect of the Force Majeure Event cannot be agreed on or before the date falling 12 months after the date of the commencement of the Force Majeure Event or by the end of such longer period as the Parties may have agreed; or

36.3.2 such Force Majeure Event is continuing or its consequence remains such that the Affected Party is unable to comply with all or a material part of its obligations under this Agreement for a period of more than 12 months after the date of the commencement of the Force Majeure Event or by the end of such longer period as the Parties may have agreed,

either Party shall have the option to terminate this Agreement by written notice to the other.

36.4 If the Tram Maintainer gives notice to the Client under Clause 36.3 that it wishes to terminate this Agreement, then the Client shall have the option either to accept such notice or to respond in writing on or before the date falling 10 Business Days after the date of its receipt stating that it requires this Agreement to continue ("**Force Majeure Extension**"). If the Client gives the Tram Maintainer such notice, then this Agreement will not terminate until expiry of written notice (of at least 30 days) from the Client to the Tram Maintainer that it wishes this Agreement to terminate.

36.5 The Parties shall at all times following the occurrence of a Force Majeure Event use all reasonable endeavours to prevent and mitigate the effects of any delay in the performance of the Services and the Tram Maintainer shall at all times during which a Force Majeure Event is subsisting take all steps in accordance with Good Industry Practice to overcome or minimise the consequences of the Force Majeure Event.

36.6 The Affected Party shall notify the other party as soon as reasonably practicable after the Force Majeure Event ceases or no longer causes the Affected Party to be unable to comply with its obligations under this Agreement. Following such notification, this Agreement shall continue to be performed on the terms existing immediately prior to the occurrence of the Force Majeure Event.

36.7 If this Agreement is terminated pursuant to this Clause 36 (*Termination on Force Majeure*) then the provisions of Clause 38 (*Payment on Termination*) and Clause 39 (*Effect of Termination or Expiry*) shall apply.

37. TERMINATION FOR CORRUPT GIFTS AND FRAUD

37.1 The Tram Maintainer or anyone employed by it or acting on its behalf (including any Tram Maintainer Party) shall not commit any Prohibited Act.

37.2 If the Tram Maintainer or anyone employed by it or acting on its behalf (including any Tram Maintainer Party) commits any Prohibited Act, then the Client shall be entitled to act in accordance with Clauses 37.3 to 37.6.

37.3 If a Prohibited Act is committed by the Tram Maintainer or by an employee of the Tram Maintainer not acting independently of the Tram Maintainer, then the Client may terminate this Agreement by giving notice to the Tram Maintainer.

37.4 If a Prohibited Act is committed by an employee of the Tram Maintainer acting independently of the Tram Maintainer, then the Client may give notice to the Tram Maintainer of termination and this Agreement will terminate, unless within 30 days of receipt of such notice the Tram

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Maintainer terminates that employee's employment and (if necessary) procures the performance of the relevant obligations by another person.

37.5 If a Prohibited Act is committed by anyone acting on behalf of the Tram Maintainer (excluding employees of the Tram Maintainer but including any Tram Maintainer Party and their employees) and not acting independently of the Tram Maintainer, then the Client may give notice to the Tram Maintainer of termination and this Agreement shall terminate.

37.6 If a Prohibited Act is committed by anyone acting on behalf of the Tram Maintainer (excluding employees of the Tram Maintainer but including any Tram Maintainer Party and their employees) and acting independently of the Tram Maintainer, then the Client may give notice to the Tram Maintainer of termination and this Agreement will terminate (but only if the said notice given under this Clause 37.6 is countersigned by **tie**) unless, within 30 days of receipt of such notice, the Tram Maintainer procures the termination of such party's employment and procures the performance of the relevant part of the Services by another person.

37.7 Any notice of termination under this Clause 37 (*Termination for Corrupt Gifts and Fraud*) shall specify:

37.7.1 the nature of the Prohibited Act;

37.7.2 the identity of the person whom the Client believes has committed the Prohibited Act; and

37.7.3 the date on which this Agreement will terminate, in accordance with the applicable provision of this Clause 37 (*Termination for Corrupt Gifts and Fraud*).

37.8 If this Agreement is terminated pursuant to this Clause 37 (*Termination for Corrupt Gifts and Fraud*) the provisions of Clause 38 (*Payment on Termination*) and Clause 39 (*Effect of Termination or Expiry*) shall apply.

38. PAYMENT ON TERMINATION

38.1 Where the Client terminates this Agreement pursuant to Clauses 32 (*Tram Maintainer Default Termination*), Clause 33 (*Persistent Breach*) or Clause 37 (*Termination for Corrupt Gifts and Fraud*) the Tram Maintainer shall, subject to Clause 45 (*Liability and Indemnities*), be liable to the Client and shall indemnify the Client for all Losses suffered by the Client and claims brought against the Client as a result of such termination and the circumstances or events giving rise to the same.

38.2 No compensation shall be payable by the Client to the Tram Maintainer for termination of this Agreement whether under contract, delict (including negligence), breach of (or compliance with) statutory duty, restitution or otherwise but without prejudice to payments due under Clause 38.3.

38.3 Within 35 Business Days of termination of this Agreement and following receipt of a valid VAT invoice, the Client shall pay to the Tram Maintainer:

38.3.1 any undisputed sums due from the Client to the Tram Maintainer pursuant to Clause 42 (*Payment*);

38.3.2 any entitlement to demobilisation costs pursuant to Clause 38.4; and

38.3.3 where this Agreement is terminated pursuant to Clause 31 (*Suspension of Work*), Clause 34 (*Client Default Termination*) or Clause 35 (*Performance Review and No Fault Termination*), any sums due to the Tram Maintainer in respect of any work in progress, provided that the calculation of such sums have been certified as follows:

38.3.3.1 the Tram Maintainer shall have provided the Client with a reasonable valuation of all work in progress in relation to the Services; and

38.3.3.2 the Client shall, subject to any clarifications as are (acting properly and reasonably) necessary in the Client's opinion, certify by notice in writing to the Tram Maintainer that part of the work in progress which is approved by the Client and give reasons why any part of the work in progress has not been certified and the value of the sums involved no later than 10 Business Days after the date on which such valuation was received.

38.4 The Client shall make payment to the Tram Maintainer of any demobilisation costs which have been demonstrably and reasonably incurred by the Tram Maintainer in respect of:

38.4.1 termination for Client Default pursuant to Clause 34 (*Client Default Termination*); or

38.4.2 termination for no fault termination pursuant to Clause 35 (*Performance Review and No Fault Termination*); or

38.4.3 termination pursuant to Clause 31 (*Suspension of Work*).

38.5 The Tram Maintainer shall use all reasonable endeavours to minimise and mitigate any demobilisation costs payable pursuant to Clause 38.4 and the Client shall not be liable to pay the Tram Maintainer for such demobilisation costs to the extent that:

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38.5.1 the Tram Maintainer has failed to minimise or mitigate such demobilisation costs; or

38.5.2 such demobilisation costs have arisen out of the Tram Maintainer's breach of this Agreement or any negligent or wilful act or omission by the Tram Maintainer; or

38.5.3 such demobilisation costs relate to any costs incurred by the Tram Maintainer prior to the Tram Maintenance Commencement Date, other than those incurred solely in respect of the Mobilisation Services, unless such costs were incurred with the prior written agreement of the Client.

38.6 If the Tram Maintainer is obliged by this Agreement to pay to the Client any payment in respect of termination of this Agreement under this Clause 38 (*Payment on Termination*), the Tram Maintainer shall pay the amount due thereunder to the Client within 35 Business Days of the Termination Date.

38.7 When the Client and the Tram Maintainer agree, or it is determined, that the Client shall pay to the Tram Maintainer any payment in respect of termination of this Agreement under this Clause 38 (*Payment on Termination*), it shall pay such amount within 35 days of the Termination Date.

38.8 Where the Client has terminated this contract pursuant to Clause 35.2, the Tram Maintainer shall be entitled to recover, in relation to the period of the contract elapsed, all costs incurred (including any committed costs), net of payments already received; and reasonable, demonstrable costs relating to demobilisation and overheads relating to costs already incurred and an allowance for profit of 5.5% where it can be specifically demonstrated that this has not been included in any payment already received. In addition to these sums the Tram Maintainer shall, for the period that would have represented the contract period elapsed between the date of termination and the date falling five years after the issue of the Certificate of Service Commencement be entitled to payment of one period of Maximum Payment Performance.

39. EFFECT OF TERMINATION OR EXPIRY

39.1 On termination or expiry of this Agreement the Client shall be entitled in its sole and absolute discretion but with prior written notification to the Tram Maintainer to:

39.1.1 be assigned all agreements relating to the Services entered into between the Tram Maintainer and its sub-contractors;

39.1.2 be assigned any assignable warranties which have been given to the Tram Maintainer by any sub-contractor or by any manufacturer of any Part and to give notice to any

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such other party of any such assignation (in respect of which the Tram Maintainer undertakes to assist in enforcing any rights thus arising);

39.1.3 continue to use all relevant Intellectual Property Rights in accordance with Clause 50 (*Copyright and Intellectual Property*); and

39.1.4 take possession of or otherwise ensure delivery to the Client (or as the Client may direct) of the Trams, Parts, Spare Parts, Special Tools or the Tram Maintainer's Materials at the Depot or otherwise at any premises used or occupied by the Tram Maintainer (or any other premises upon which such Trams, Parts, Spare Parts, Special Tools or the Tram Maintainer's Materials are situated at such time).

39.2 On termination or expiry of this Agreement in whole, the obligations of the Parties shall cease except for:

39.2.1 any obligations arising as a result of any antecedent breach of this Agreement;

39.2.2 Clauses 1 (*Definitions and Interpretation*), 25 (*Confidential Information*), 39 (*Effect of Termination or Expiry*), 43 (*VAT*), 45 (*Liability and Indemnities*), 50 (*Copyright and Intellectual Property*), 52 (*Dispute Resolution*) and 68 (*Third Party Rights*) and any other provision of this Agreement which is expressed to survive termination or which is required to give effect to such termination or the consequences of termination; and

39.2.3 any other obligations which give effect to such termination or to the consequences of such termination or which otherwise apply (expressly or impliedly) on or after such termination or expiry.

39.3 Upon termination of this Agreement in part, only those obligations directly relating to such part of this Agreement that has been terminated shall cease.

40. TRANSITION ON TERMINATION OR EXPIRY

40.1 Twelve months prior to the Expiry Date and again on the Expiry Date or upon termination (in whole or in part thereof), the Tram Maintainer shall provide to the Client the following information ("**Handback Package**"), which shall promptly be updated with any changes to the same, as and when the same occur:

40.1.1 a list of all contracts, permits, licences, Consents or other documents which are material to the provision of the Services or which have a value in excess of £5,000 (as Indexed) showing (as appropriate) the contract account number, name, address and

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telephone number of the parties, contract price, value, term and notice period for termination or expiry date;

40.1.2 a list of all computer systems used for the provision of the Services together with a description of the systems and master passwords where applicable;

40.1.3 the Technical Records and other operational and maintenance data, spare parts usage and other technical records;

40.1.4 a list of assets forming part of the Services with a value of more than £2,500 (as Indexed) or which are otherwise key to the operation of the business;

40.1.5 the names and addresses of all insurers providing the Required Insurances along with the applicable policy numbers and other references;

40.1.6 a letter, in a form reasonably satisfactory to the Client, authorising the Client and its agents to request and to receive from the relevant insurers details of all claims paid or outstanding, relating to this Agreement, under the Required Insurances; and

40.1.7 the TUPE Information in accordance with Clause 44 (*TUPE and Handover*).

40.2 The Client shall not disclose the terms of the Handback Package to any third party, other than:

40.2.1 to the extent in the public domain, or as required by Law, or in the course of conducting, prosecuting or defending any Dispute, or following a Termination Notice; or

40.2.2 subject to the provisions of Clause 50 (*Copyright and Intellectual Property)*, for the purpose of seeking offers from third parties for the provision of any of the Services or like services following the termination or expiry of this Agreement; or

40.2.3 to a successor Tram Maintainer or its sub-contractors for the purpose of ensuring or assisting with continuity of the Services following termination or expiry of this Agreement.

40.3 The Tram Maintainer shall, as far is as commercially reasonable, maintain and manage the business of providing the Services with the intent that the Client or any successor Tram Maintainer would be able to take over that business and secure continuity of the Services on a going concern basis at any time following a Termination Notice until the Termination Date becomes effective.

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40.4 Accordingly, following the service of a Termination Notice or in the six month period preceding any anticipated termination or expiry of this Agreement, the Tram Maintainer shall (and shall procure that the Tram Maintainer Parties shall):

40.4.1 take all reasonable steps and co-operate fully with the Client and any successor Tram Maintainer so that continuation of the Services after such termination or expiry is achieved with the minimum disruption and so as to prevent or mitigate any inconvenience or risk to health or safety of any Client Parties and members of the public;

40.4.2 liaise with the Client and any successor Tram Maintainer and provide reasonable assistance and advice concerning the Services and their transfer to the Client or to such successor Tram Maintainer;

40.4.3 allow the Client and any successor Tram Maintainer access (at reasonable times and on reasonable notice) to each part of the Edinburgh Tram Network;

40.4.4 provide to the Client and to any successor Tram Maintainer such information concerning the Edinburgh Tram Network and the Services which is reasonably required for the efficient transfer of responsibility for performance of the Services;

40.4.5 at the request of the Client and/or the successor Tram Maintainer, assign any sub-contracts, guarantees and/or warranties;

40.4.6 allow, or procure that the Tram Maintainer Parties shall allow, the Client and any successor Tram Maintainer such access to any employees engaged by the Tram Maintainer or such Tram Maintainer Party in the provision of the Services as the Client or such successor Tram Maintainer shall reasonably require for the purpose of informing and consulting with such employees over the terms and conditions on which their employment will be transferred (to the extent this is the case) to the Client or any successor Tram Maintainer or sub-contractor engaged by the successor Tram Maintainer; and

40.4.7 on request, make the Handback Package available to the Client or any successor Tram Maintainer.

40.5 The Tram Maintainer shall use best endeavours to facilitate the transfer of responsibility for the Services to a successor Tram Maintainer or to the Client, as the case may be, and the Tram Maintainer shall take no action at any time which is calculated or intended to prejudice or frustrate or make more difficult such transfer. In particular, but without limitation to the

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generality of the foregoing, the Tram Maintainer shall, during the final twelve months of the Term (where this expires by effluxion of time) or during the period following service of a Termination Notice, and whilst the same remains outstanding:

40.5.1 without prejudice to Clause 9.20, not allow levels of stocks and Spare Parts, Special Tools and other spares to fall to the level which might reasonably be expected to prejudice the continuing efficient operation and maintenance of the Edinburgh Tram Network in accordance with Good Industry Practice; and

40.5.2 observe and perform the provisions of Clause 44 (*TUPE and Handover*).

40.6 As soon as reasonably practicable after service of a Termination Notice or at least 90 days prior to the Expiry Date, the Tram Maintainer shall, by notice in writing to the Client, provide (or procure that the relevant Tram Maintainer Parties provide) to the Client and any nominated successor Tram Maintainer an inventory of all Spare Parts, Special Tools, other spares, consumables and other items used in the Services which do not form part of the Edinburgh Tram Network and permit the Client or any successor Tram Maintainer to inspect and examine the same. The Tram Maintainer shall (or shall procure that the relevant Tram Maintainer Party which owns the same shall) with effect from the Termination Date or Expiry Date or, if later, within 20 Business Days of being so required to do by notice from the Client, transfer to the Client, or as it may nominate in writing to the Tram Maintainer, all such Spare Parts, Special Tools, other spares, consumables and other items as may be specified by a notice in writing from the Client to the Tram Maintainer (other than those consumed or used in the normal course of the Services prior to such transfer) with a prior agreement on the financial amount to be paid to the Train Maintainer for those items.

40.7 Subject to Clause 40.8, following the transfer of any Spare Parts, Special Tools, other spares, consumables or other items pursuant to Clause 40.6, where there has not been prior agreement on the financial amount to be paid to the Tram Maintainer for those items pursuant to Clause 40.6, the Tram Maintainer and the Client shall seek to agree the price for the spares, consumables and other items transferred under Clause 40.6 but in the event of failure to agree such a price the same shall be determined by reference to the Dispute Resolution Procedure.

40.8 The Client may request to purchase any assets owned by the Tram Maintainer which have been used in the performance of the Services or used in relation to the Edinburgh Tram Network. If the Parties agree a fair market value for any such assets, the Client shall pay the agreed sum to the Tram Maintainer and the Tram Maintainer shall deliver such assets to the Client as soon as reasonably practicable.

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40.9 The Tram Maintainer shall, to the extent required by this Agreement, handover the Assets to the Client, such handover to be in a timely and orderly fashion so as to preserve the technical and commercial integrity and goodwill and value of the Edinburgh Tram Network and to enable an efficient handover of the Assets, and the Tram Maintainer shall not be entitled to any payment in respect of the handover or any relinquishment of licence to use the Assets or perform the Services.

41. TRAM MAINTAINER TO INFORM ITSELF FULLY

41.1 The Tram Maintainer shall be deemed to have satisfied itself as to the correctness and sufficiency of the Price, as to the possibility of executing the Services and providing the Services, as to any applicable Law and other safety regulations applicable thereto, as to the condition of and all circumstances affecting the Trams in accordance with Clause 41.2, as to the availability of labour and the general labour position affecting the Services and the availability of raw materials and goods, Spare Parts and Special Tools required to complete the Services in accordance with the terms of this Agreement and to have fixed its rates and prices according to its view of these matters and all other matters necessary for the proper and timely provision of the Services in accordance with the Tram Maintenance Specification and this Agreement.

41.2 In relation to the condition of, and all circumstances affecting, the Trams, the Tram Maintainer shall be deemed to have satisfied itself as to the correctness and sufficiency of the Price in respect of the Services.

41.3 Without prejudice to its obligations under Clause 41.1, the Tram Maintainer shall be responsible for, and shall make no claim against **tie** or the Client in respect of, any misunderstanding affecting the basis of the Services or any incorrect or incomplete information however obtained (provided that nothing in this Clause 41 (*Tram Maintainer To Inform Itself Fully*) will limit **tie**'s or the Client's liability in respect of any fraudulent misrepresentation).

42. PAYMENT

42.1 Services Payment

42.1.1 Subject to the provisions of this Agreement, as consideration for the provision of the Services (except for the Mobilisation Services), the Client shall pay to the Tram Maintainer the Services Payment calculated in accordance with part 1 of Schedule 3 (*Payment*).

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42.1.2 Subject to the provisions of this Agreement, as consideration for the provision of the Mobilisation Services, the Client shall pay to the Tram Maintainer the Mobilisation Milestone Payments in accordance with this Clause 42 (*Payment*) and part 2 of Schedule 3 (*Payment*).

42.1.3 Any application for payments of sums due under this Agreement and any payment to be made shall be made in accordance with the procedures set out in this Clause 42 (*Payment*).

42.2 **Application for Services Payments**

42.2.1 The Tram Maintainer shall submit each application for payment in respect of Services Payments, any other fees, costs and/or expenses in respect of Permitted Variations or as otherwise agreed in accordance with this Agreement which are being claimed by the Tram Maintainer for the previous Reporting Period, to the Client's Representative within 15 Business Days following each Reporting Period End Date.

42.2.2 Each application for payment shall set out:

42.2.2.1 the Services Payment claimed;

42.2.2.2 the Overall Payment Performance used to calculate the Services Payment, and the following variables used to calculate such figure:

(a) Tram Punctuality Performance;

(b) Tram Maintainer Late Trams in the Reporting Period;

(c) Defective Trams in the Reporting Period;

(d) Tram Maintainer Late Last Trams in the Reporting Period; and

(e) Timetabled Monitored Trams in the Reporting Period;

42.2.2.3 any repairs made pursuant to Clause 9.23, including a breakdown of the costs by reference to the requirements of Clause 9.23.4, with any supporting evidence;

42.2.2.4 any adjustment pursuant to a Permitted Variation; and

42.2.2.5 any other agreed adjustments pursuant to Clause 42.3,

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together with reasonable supporting documentation establishing the basis of such sums being claimed.

42.2.3 The Client shall procure that the Client's Representative shall, subject to any clarifications as are in the Client's opinion (acting properly and reasonably) necessary, certify by notice in writing (an "**Interim Certificate**") to the Tram Maintainer that part of the sum claimed in the application for payment which is approved by the Client and give reasons why any part of the sum claimed has not been certified in the Interim Certificate and the value of the sums involved no later than 10 Business Days after the date on which application for payment was received by the Client.

42.2.4 The Tram Maintainer shall submit a VAT invoice in respect of the amount set out in the Interim Certificate to the Client within 10 Business Days of the date of the Interim Certificate. Payment will become due to the Tram Maintainer on the date of receipt of the said VAT invoice by the Client and subject to Clause 42.2.5 the final date for payment by the Client of such valid VAT invoice shall be twenty (20) Business Days from the date of receipt of the VAT invoice by the Client.

42.2.5 If the Tram Maintainer is late in submitting its application for payment to the Client by more than 10 Business Days after the required timescales set out in Clause 42.2.1, payment in respect of any amount certified in an Interim Certificate shall become due to the Tram Maintainer on the date of receipt of the relevant valid VAT invoice by the Client in respect of the late application for payment, and the final date for payment of such valid VAT invoice shall be made by the Client to the Tram Maintainer within twenty (20) Business Days of the first date of the Reporting Period following receipt of the valid VAT invoice.

42.2.6 If the Tram Maintainer is late in submitting a valid VAT invoice to the Client by more than 10 Business Days after the required timescales set out in Clause 42.2.4, payment in respect of any amount certified in an Interim Certificate shall become due to the Tram Maintainer on the date of receipt of the relevant valid VAT invoice by the Client in respect of the late application for payment, and the final date for payment of such valid VAT invoice shall be made by the Client to the Tram Maintainer within twenty (20) Business Days of the first date of the Reporting Period following receipt of the late valid VAT invoice.

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42.3 **Application for Mobilisation Milestone Payments**

42.3.1 The Tram Maintainer shall submit each application for payment of a Mobilisation Milestone Payment in accordance with this Agreement which are being claimed by the Tram Maintainer for the previous Reporting Period, to the Client's Representative within 5 Business Days following each Reporting Period End Date.

42.3.2 Each application for payment shall set out the Mobilisation Milestones completed in that Reporting Period and the Mobilisation Milestone Payments due in respect of the same, with all reasonable supporting evidence of satisfaction of such Mobilisation Milestone.

42.3.3 The Client shall procure that the Client's Representative shall, subject to any clarifications as are in the Client's opinion (acting properly and reasonably) necessary, certify by notice in writing (a "**Mobilisation Interim Certificate**") to the Tram Maintainer that part of the sum claimed in the application for payment which is approved by the Client and give reasons why any part of the sum claimed has not been certified in the Mobilisation Interim Certificate and the value of the sums involved no later than 10 Business Days after the date on which application for payment was received by the Client.

42.3.4 The Tram Maintainer shall submit a VAT invoice to the Client in respect of the amount set out in the Mobilisation Interim Certificate within 10 Business Days of the date of the Mobilisation Interim Certificate. Payment will become due to the Tram Maintainer on the date of receipt of the said VAT invoice by the Client and subject to Clause 42.3.5 the final date for payment by the Client of such valid VAT invoice shall be twenty (20) Business Days from the date of receipt of the VAT invoice by the Client.

42.3.5 If the Tram Maintainer is late in submitting its application for payment to the Client by more than 5 Business Days after the required timescales set out in Clause 42.3.1, payment in respect of any amount certified in a Mobilisation Interim Certificate shall become due to the Tram Maintainer on the date of receipt of the relevant valid VAT invoice by the Client in respect of the late application for payment, and the final date for payment of such valid VAT invoice shall be made by the Client to the Tram Maintainer within twenty (20) Business Days of the first date of the calendar month following receipt of the valid VAT invoice.

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42.3.6 If the Tram Maintainer is late in submitting a valid VAT invoice to the Client by more than 5 Business Days after the required timescales set out in Clause 42.3.4, payment in respect of any amount certified in a Mobilisation Interim Certificate shall become due to the Tram Maintainer on the date of receipt of the relevant valid VAT invoice by the Client in respect of the late application for payment, and the final date for payment of such valid VAT invoice shall be made by the Client to the Tram Maintainer within 30 days of the first date of the Reporting Period following receipt of the late valid VAT invoice.

42.4 **Payment of fees**

The Client shall be entitled to withhold an amount from any invoices where such amount is in dispute or where it has been agreed between the Parties that it is entitled to do so.

42.5 **Interest on late payments**

In the event of a failure by either Party to make payment in accordance with this Clause 42 (*Payment*), such Party shall pay to the other Party interest on such payment not paid by the final date for payment at a rate per annum equivalent to 2 per cent above the base rate of The Royal Bank of Scotland plc current on the date upon which such payment first becomes overdue adjusted to reflect any changes to the rate during the period over which the payment remains overdue.

42.6 **Set-off**

42.6.1 The Tram Maintainer shall not be entitled to withhold, retain or set-off any amount owed to it by the Client against any amount due to the Client by it.

42.6.2 Subject to Clause 42.6.3, the Client may deduct any amount payable by the Tram Maintainer to the Client whether by way of damages or in respect of any loss or expense sustained by the Client by reason of the Tram Maintainer's breach of this Agreement from any other payment or payments due to be made to the Client by the Tram Maintainer under this Agreement.

42.6.3 Any notice of intention to withhold payment shall be served by the Client at least 5 days prior to the final date for payment calculated in accordance with Clause 42.2.6 or 42.3.6 (as applicable) and such notice shall state the sums being withheld and the detailed reason or detailed reasons for such withholding. Where an effective notice of intention to withhold payment is given, but on the matter being referred to the Dispute

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Resolution Procedure, it is decided that the whole or part of the amount should be paid, the decision shall be construed as requiring payment not later than:

42.6.3.1 10 Business Days from the date of the decision; or

42.6.3.2 the date which, apart from the notice, would have been the final date for payment,

whichever is the later.

42.6.4 The Tram Maintainer shall be entitled to payment of interest as provided in Clause 42.5 in respect of the relevant part of any payments which have been withheld in accordance with Clause 42.6.2 but are subsequently determined as being payable by the Client to the Tram Maintainer either by agreement between the Parties or a decision following a referral to the Dispute Resolution Procedure. The interest shall be calculated for the period between the date when the relevant part of the payment should have been paid but for the notice of intention to withhold payment and the date on which payment is made by the Client in accordance with Clause 42.6.3.

42.7 **General**

42.7.1 Save as otherwise expressly stated in this Agreement:

42.7.1.1 all payments under this Agreement to the Tram Maintainer shall be made in pounds sterling by electronic transfer of funds to:

Name and Address of Bank:	CITIBANK C/ Jose Ortega y Gasset, no. 29 28006 Madrid (Spain)
Swift:	CITIESMX
IBAN:	ES19 1474 0000 1200 0693 0115
Account Number:	1474-0000-12-0006930115
Account Name:	Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

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42.7.1.2 all payments under this Agreement to the Client shall be made in pounds sterling by electronic transfer of funds to:

Name and Address of Bank:

Sort Code:

Account Number:

Account Name:

42.7.1.3 all payments payable by (or on behalf of) the Client under this Agreement are inclusive of:

(a) all costs and charges regarding technical advice and assistance to be given relating to the provision of the Services;

(b) all training costs and charges; and

(c) all fees and expenses payable by the Tram Maintainer arising out of or in connection with the performance by the Tram Maintainer of this Agreement, including all fees and expenses:

(i) incurred for or in connection with applications for or the grant of any Consent;

(ii) payable to professional advisers and otherwise in connection with the review, negotiation and entering into and enforcement of this Agreement and any related agreement;

(iii) incurred in relation to licence applications and renewals of any kind; and

(iv) incurred in procuring and maintaining relevant insurance.

42.7.2 If the due date for any payment would otherwise be a day that is not a Business Day, payment shall be made on the next Business Day.

42.7.3 No payment made by a Party to another Party under this Agreement shall prevent the paying Party from recovering any amount overpaid or wrongfully paid by the paying Party under this Agreement (however that payment may have arisen), including those paid by mistake of law or of fact.

42.7.4 The Tram Maintainer and the Client acknowledge that:

42.7.4.1 a maximum of only one application for Service Payment may be made under Clause 42.2 in any Reporting Period;

42.7.4.2 the amount to be specified for payment in any Mobilisation Interim Certificate in respect of a Mobilisation Milestone Payment shall not exceed the amount specified in part 2 of Schedule 3 (*Payment*) in relation to the achievement of the Mobilisation Milestone to which such Mobilisation Interim Certificate relates, except where otherwise agreed; and

42.7.4.3 notwithstanding anything to the contrary contained in this Agreement, the Client shall not be obliged to pay any Mobilisation Milestone Payment earlier than the Mobilisation Milestone Date.

42.7.5 The Tram Maintainer shall not suspend the performance of its obligations under this Agreement if any payment is overdue (but without prejudice to the Tram Maintainer's rights to terminate this Agreement under Clause 34 (*Client Default Termination*).

43. VAT

43.1 The Tram Maintainer shall be deemed to have allowed in its tender for the tax payable by it as a taxable person to the Commissioners of Customs and Excise (or similar authorities in any relevant jurisdiction) being tax chargeable on any taxable supplies to the Client which are to be made under this Agreement.

43.2 All certificates issued by the Client or the Client's Representative under Clauses 42.2.6 and 42.3.6 shall be net of Value Added Tax. In addition to the payments due under such certificates the Client shall separately identify and pay to the Tram Maintainer any Value Added Tax properly chargeable by the Tram Maintainer on the supply to the Client of any goods and/or services by the Tram Maintainer under this Agreement.

43.3 If any dispute, difference or question arises between either the Client or the Tram Maintainer and the Commissioners of Customs and Excise (or similar authorities in any relevant jurisdiction) in relation to any tax chargeable or alleged to be chargeable in connection with this Agreement or the Services, each shall render to the other such support and assistance as may be necessary to resolve the dispute, difference or question.

43.4 Where, under this Agreement, any amount is calculated by reference to any sum which has been or may be incurred by any person, the amount shall include any VAT in respect of that

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sum only to the extent that such VAT is not recoverable as input tax by that person (or a member of the same VAT group) whether by set-off or repayment.

43.5 Clause 52 (*Dispute Resolution*) shall not apply to any dispute, difference or question arising under this Clause 43 (*Value Added Tax*).

44. TUPE AND HANDOVER

44.1 In this Clause 44 (*TUPE and Handover*) and Schedule 7 (*TUPE Information*) the following definitions shall apply:

"**Tram Maintainer Employees**" means any employee of the Tram Maintainer or Tram Maintainer Parties or any affiliate of the Tram Maintainer or Tram Maintainer Parties engaged in the performance of the Services;

"**New Provider**" means **tie** and/or any third party who takes over (or who the Tram Maintainer is notified will be taking over) the provision of some or all of the obligations of the Tram Maintainer under this Agreement;

"**Relevant Employee**" means any employee of the Tram Maintainer or a Tram Maintainer Party employed wholly or mainly in or assigned to the provision of the Services under this Agreement as at the date of the Service Provision Change;

"**Service Provision Change**" means any termination, variation, amendment or other alteration of this Agreement which results in all or part of the Services under this Agreement being provided by **tie** or by a third party;

"**Termination Period**" means either (i) the 12 month period ending on the Expiry Date or (ii) the period of any notice determining this Agreement prior to the Expiry Date;

"**TUPE Employees**" means any person whose contract of employment may be transferred to a successor tram maintenance contractor by virtue of the operation of Law (including the TUPE Regulations as amended, replaced or substituted from time to time) or in respect of whom liabilities arising from the contract of employment or employment relationship may be transferred;

"**TUPE Information**" means the information in relation to the TUPE Employees specified in Schedule 7 (*TUPE Information*); and

"**the TUPE Regulations**" means the Transfer of Undertakings (Protection of Employment) Regulations 2006.

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44.2 NOT USED

44.3 The Tram Maintainer shall not, without the prior consent of the Client (which shall not be unreasonably withheld or delayed), vary or purport or promise to vary, the terms or conditions (as amended from time to time) of employment of any Tram Maintainer Employee (including any promise to make any additional payment or provide any additional benefit) where such variation or addition takes effect in the Termination Period unless it is in the ordinary course of business.

44.4 NOT USED

44.5 Subject to Clause 44.6, the Tram Maintainer shall at the request of the Client in the Termination Period provide the TUPE Information within 21 days of such request and thereafter until termination or expiry of this Agreement update such information in accordance with the reasonable requests of the Client subject to the Tram Maintainer's common law duties to their employees or under the Data Protection Act 1998. The Client shall treat the TUPE Information as Confidential Information to which Clause 25 (*Confidential Information*) shall apply provided that the Client shall only be permitted to use the TUPE Information for the purposes of conducting a tendering exercise for the appointment of a replacement service provider following a Service Provision Change and shall only be entitled to disclose the TUPE Information to any tenderer pursuant to such exercise and subject to such tenderers accepting a confidentiality obligation in relation to such information equivalent to the obligations set out in Clause 25 (*Confidential Information*), mutatis mutandis.

44.6 The Tram Maintainer shall use its reasonable endeavours to ensure that it will be in a position to provide TUPE Information pursuant to Clause 44.5 in respect of the TUPE Employees who are not also Tram Maintainer Employees but, subject to the Tram Maintainer having used such reasonable endeavours, the Tram Maintainer's obligation to provide TUPE Information pursuant to Clause 44.5 in respect of such TUPE Employees shall be limited to the TUPE Information covering such TUPE Employees actually in the possession of or reasonably obtainable by the Tram Maintainer.

Establishment of hand-over procedure

44.7 Notwithstanding the Tram Maintainer's obligations pursuant to Clause 40 (*Transition on Termination or Expiry*), during the Termination Period the Tram Maintainer and the Client, both acting diligently and in good faith with a view to ensuring that there shall be no material deterioration or break in the provision of maintenance services, shall establish and implement appropriate handover procedures.

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Training

44.8 Commencing during the Termination Period, the Tram Maintainer shall conduct an appropriate training programme for various categories of persons nominated by the Client who will be responsible for the provision and/or continuation of the relevant Services following the termination or expiry of this Agreement to ensure the successful continuation of the Services. The content and style of and programme for the training shall be submitted to the Client by the Tram Maintainer for review nine months prior to termination and the Tram Maintainer shall comply with the Client's reasonable requirements in relation thereto. The training shall be supported by appropriate documentation and training manuals and shall include practical fieldwork or "on-the-job" training in addition to classroom lessons.

Continued technical support

44.9 For a period of two years after termination or expiry of the Services, the Tram Maintainer shall provide the Client with such access as the Client may reasonably require to persons having the appropriate knowledge and experience of the history of the Trams and associated technical matters for the following purposes:

44.9.1 general technical advice on subjects for which the Tram Maintainer was responsible pursuant to this Agreement; and

44.9.2 interpretation of maintenance history data, drawing modifications, regulations and the like.

The Client shall reimburse the Tram Maintainer in respect of all reasonable and proper costs and expenses incurred directly by the Tram Maintainer in complying with this Clause 44.9.

Manuals and documents

44.10 Upon termination or expiry of the Services the Tram Maintainer shall procure that the Client is provided with all manuals and documentation used by the Tram Maintainer in connection with the provision of the Services (including an electronic copy of the Technical Records) and shall procure that so far as they relate to safety the Client receives any updates and/or amendments to such manuals and documentation which may be relevant to the continued maintenance of the Trams.

Trams

44.11 Upon termination or expiry of this Agreement, or as a consequence of a survey or audit undertaken by the Client pursuant to Clause 22 (*Surveys of Edinburgh Tram Network and Audits of Maintenance Procedures*), the Tram Maintainer shall ensure that the Trams, Spare Parts and Special Tools are in accordance with the Return Condition on the date of such termination or expiry ("**Return Date**") or rectification due date. Compliance of the Trams, Special Tools and Spare Parts with the Return Condition shall be assessed in accordance with part 1 of Schedule 12 (*Return Condition*).

Deemed TUPE Transfer

44.12 The Client and the Tram Maintainer acknowledge that in the event of a Service Provision Change, the TUPE Regulations may apply to such Service Provision Change. In the event that the TUPE Regulations do not apply to any Service Provision Change, the New Provider shall, with effect from the date of the Service Provision Change, offer employment to each Relevant Employee on like terms to the terms on which they would have become employed by the New Provider had the TUPE Regulations applied or, to the extent that it is not reasonably practicable to do so in respect of any such term, on terms which are not in such respect materially to the detriment of the Relevant Employee.

44.13 The New Provider shall treat the period of continuous service of each Relevant Employee or TUPE Employee with the Tram Maintainer or an Tram Maintainer Party up to the date of the Service Provision Change as continuous with such TUPE Employee's or Relevant Employee's service with the New Provider.

TUPE Transfer Indemnity

44.14 The Client shall, or shall procure that any New Provider shall, indemnify the Tram Maintainer and any Tram Maintainer Party against any losses, costs, claims, demands, actions, fines, penalties, awards, liabilities and expenses (including reasonable legal expenses) incurred by the Tram Maintainer or any Tram Maintainer Party in connection with or as a result of:

44.14.1 any claim or demand by any TUPE Employee (whether in contract, delict, under statute, pursuant to Law or otherwise) arising directly or indirectly from any act, fault or omission of the New Provider in respect of any TUPE Employee on or after the date of termination of this Agreement or the ending of the provision in whole or in part of the obligations of the Tram Maintainer under this Agreement by the Tram Maintainer or any Tram Maintainer Party;

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44.14.2 any failure by the New Provider to comply with its obligations under regulation 13 of the TUPE Regulations;

44.14.3 any claim (including any individual entitlement of a TUPE Employee under or consequent on such claim) by any trade union or other body or person representing the TUPE Employees arising from or connected with any failure by the New Provider to comply with any legal obligation to such trade union, body or person;

44.14.4 any change or proposed change in the terms and conditions of employment or working conditions of the TUPE Employees on or after their transfer to the New Provider, or to the terms and conditions of employment or working conditions of any person who would have been a TUPE Employee but for their resignation or decision to treat their employment as terminated under regulation 4(9) of the TUPE Regulations on or before the Service Provision Change as a result of any such changes; and

44.14.5 the change of identity of employer occurring by virtue of the TUPE Regulations and/or this Agreement being significant and detrimental to any of the TUPE Employees, or to any person who would have been a TUPE Employee but for their resignation or decision to treat their employment as terminated under regulation 4(9) of the TUPE Regulations as a result of the change in employer.

45. LIABILITY AND INDEMNITIES

45.1 Subject to the exception set out in Clause 45.3, the Tram Maintainer shall indemnify the Client and its officers, agents and employees ("**Indemnified Parties**") from and against any and all actions, claims (including third party claims), demands, proceedings, liabilities, damages, penalties, fines, forfeitures and the costs and expenses incident thereto (including any legal costs of defence) which any of the Indemnified Parties may hereafter incur, become responsible for or pay out as a result of or in connection with:

45.1.1 any of the Tram Maintainer's or its employees' or any Tram Maintainer Party's negligent or wilful acts or wilful omissions in the performance of the Services;

45.1.2 breach of any term or provision of this Agreement;

45.1.3 breach of any Law; and/or

45.1.4 any non-performance or delay in performance of the Tram Maintainer's obligations under this Agreement.

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45.2 The actions, claims, demands, proceedings, suits, losses, penalties, fines, forfeitures and costs and expenses referred to in Clause 45.1 shall include such actions, claims, demands, proceedings, suits, losses, penalties, fines, forfeitures and the costs and expenses, in respect of:

45.2.1 death or injury to any person;

45.2.2 loss of or damage to any property;

45.2.3 loss of or damage to any part of the Edinburgh Tram Network (including any Trams);

45.2.4 causing the Client to be in breach of any Law; or

45.2.5 infringement or alleged infringement of a third party's Intellectual Property Rights.

45.3 The exception referred to in Clause 45.1, which is the responsibility of the Client, is death of, or injury to, persons or loss of or damage to property resulting from any act, neglect or breach of statutory duty by the Client, its agents, servants or other contractors (not being employed by the Tram Maintainer or any Tram Maintainer Party) or for or in respect of any claims, demands, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto.

45.4 Subject to Clause 45.1, the Tram Maintainer shall be liable for and shall indemnify **tie** and the Client against all Losses arising from the damage, deterioration, theft, loss or destruction of any Tram occurring while such Tram is at any premises of the Tram Maintainer or otherwise under the Tram Maintainer's control (including when such Tram is at the Tram Maintainer's sub-contractor's or agent's premises or under such sub-contractor's or agent's control) arising out of any cause whatsoever save to the extent that such damage, deterioration, theft, loss or destruction is caused by the negligence of **tie**, the Client or the Operator.

45.5 Save where expressly provided for, nothing in this Agreement shall expose either Party to the application of Indirect Losses.

45.6 The Tram Maintainer's liability to indemnify the Client under Clause 45.1 shall be reduced in proportion to the extent that the act or neglect of the Client, its agents, servants or other contractors (not being employed by the Tram Maintainer or any sub-contractor) may have contributed to the said death, injury, loss or damage.

45.7 Nothing in this Agreement shall exclude or limit the liability of either Party for:

45.7.1 death or personal injury caused by that Party's negligence or the negligence of anyone for whom that Party is vicariously liable; or

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45.7.2 fraud or fraudulent misrepresentation; or

45.7.3 any breach of warranty given as to valid and marketable title, freedom from unduly onerous burdens and conditions or entitlement to possession by action of prescription; or

45.7.4 subject to Clause 45.9, any breach of this Agreement or any delict (including negligence) or other liability arising prior to termination of this Agreement,

provided that nothing in this Clause 45.7 shall confer on either Party rights or remedies they would not otherwise have.

45.8 Subject to Clause 45.3, neither party shall be entitled to claim damages for breach of this Agreement, in delict (including negligence), breach of statutory duty or on any other basis whatsoever to the extent that such damages claimed by that Party are for Indirect Losses suffered by that Party or any of the Indemnified Parties provided that for the avoidance of doubt, nothing in this Clause 45.8 or Clause 45.5 shall affect either Party's liability to the other Party or Indemnified Party, in respect of any claim, action, proceedings or demand against such other Party or Indemnified Party by a third party in connection with Indirect Losses suffered.

45.9 The Tram Maintainer shall not be relieved or excused of any responsibility, liability or obligation under this Agreement by the appointment of any Tram Maintainer Party. The Tram Maintainer shall, as between itself and the Client, be responsible for the selection, pricing, performance, acts, defaults, omissions, breaches, delict and offences of any Tram Maintainer Party. All references in this Agreement to any act, default, omission, breach, delict or offence of the Tram Maintainer shall be construed to include any such act, default, omission, breach or delict of any Tram Maintainer Party.

45.10 In no event, the liability of the Tram Maintainer, under or in connection with this Agreement, shall exceed the sum of 22.5% of the amount of the aggregate Maximum Performance Payment in one year.

45.11 Notwithstanding any other term of this Agreement, the Tram Maintainer's total liability including liquidated damages, and indemnities howsoever arising shall not exceed in aggregate the sum of 18.5% of the aggregate Maximum Performance Payment over the Term, as may be modified from time to time, and as specified in Schedule 3 *(Payment)* provided always that the calculation of the quantum of such limitation shall exclude the proceeds of the Advance Payment Bond, Reliability Bond, Performance Bond, Return Condition Bond

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together with all cash securities provided in respect of paragraph 4.1 of part 1 of Schedule 12 (*Return Condition*).

45.12 The Tram Maintainer acknowledges and agrees that the express rights provided in this Agreement in relation to termination and the calculation and payment of amounts due following such termination are exclusive and are in place of (and not cumulative with) any other rights or remedies which might arise as a consequence of such termination. The Tram Maintainer hereby waives all other rights and remedies arising from such termination, whether express or implied, arising by common law (including in delict), by statute or otherwise howsoever provided that nothing in this Clause 45.12 excludes the right of the Tram Maintainer to claim remedies expressly conferred on them by this Agreement.

45.13 Where the act or default of the Tram Maintainer or any of the Tram Maintainer Parties causes the Client to commit an offence, the Tram Maintainer shall immediately take any measure necessary to ensure that that act or default, no longer causes the Client to commit that offence.

45.14 Where the Client reasonably suspects that such an act or default is about to take place and it reasonably believes that this will result in the Client committing an offence, the Client may issue an instruction to the Tram Maintainer to remedy the act or default forthwith and the Tram Maintainer shall comply with the said instruction.

45.15 The Parties acknowledge and agree that the only rights available to them to terminate this Agreement are those expressly set out in this Agreement and that neither Party shall be entitled to exercise a right to terminate or rescind or accept the repudiation of this Agreement under any right whether arising in common law or statute or otherwise howsoever (other than for fraud or a fraudulent misrepresentation).

46. PERFORMANCE BOND AND COLLATERAL WARRANTIES

46.1 If the whole or any part of this Agreement is assigned, novated or otherwise transferred by the Client pursuant to Clause 57.2 after the Tram Maintenance Commencement Date, unless such assignation, novation or otherwise is to a competitor organisation or one that is owned by a competitor to the Tram Maintainer, the Tram Maintainer shall, notwithstanding Schedule 12 (*Return Condition*) provide to the new Client, a performance bond in the form of part 1 of Schedule 23 (*Bond and Collateral Warranty*) which has been issued by a surety approved in advance by **tie**.

46.2 The Performance Bond shall be callable by the beneficiary of such Performance Bond, on demand, and shall be for an initial amount of £1,000,000 sterling.

46.3 In the event the credit rating of either surety referred to in Clause 46.1 is downgraded to A- or a lower rating by Standard & Poors, **tie** shall be entitled to request the Tram Maintainer to procure a substitute performance bond on identical terms from a surety approved in advance by **tie**.

46.4 Within 30 days of any written request from the Client (or such longer period as the Parties, acting reasonably, may agree), the Tram Maintainer shall execute a collateral warranty (in the form set out in part 2 of Schedule 23 (*Bond and Collateral Warranty*)) or where such form is not acceptable, in a different form which is acceptable to both Parties (acting reasonably) in favour of CEC, Transport Scotland, TEL and any other party at the Client's reasonable request, in respect of carrying out the Services.

47. RISK MANAGEMENT

47.1 The Tram Maintainer shall comply with the requirements of Schedule 15 (*Risk Management*).

48. QUALIFYING CHANGES IN LAW

48.1 If a Qualifying Change in Law occurs or is to occur, then either Party may write to the other to express an opinion on its likely effects, giving details of its opinion of:

48.1.1 any necessary change in relation to the Services;

48.1.2 whether any changes are required to the terms of this Agreement to deal with the Qualifying Change in Law; or

48.1.3 whether relief from compliance with any obligations under this Agreement is required as a result of the Qualifying Change in Law,

in each case giving in full detail the procedure for implementing the Qualifying Change in Law. Responsibility for any costs of such implementation (and any resulting variation to payments due under this Agreement or other payment method at the Client's discretion) shall be dealt with in accordance with Clauses 48.2 and 48.3.

48.2 As soon as reasonably practicable after receipt of any notice from either Party under Clause 48.1, the Parties shall discuss and agree the issues referred to in Clause 48.1 and any ways in which the Tram Maintainer can mitigate the effect of the Qualifying Change in Law and the Tram Maintainer shall:

48.2.1 provide evidence to the Client that the Tram Maintainer has used and will continue to use all reasonable endeavours (including where appropriate and practicable the use of

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competitive quotes) to minimise any increase in costs and maximise any reduction in costs;

48.2.2 demonstrate how the effects of the Qualifying Change in Law will be, where possible, mitigated; and

48.2.3 demonstrate that the relevant changes will be implemented in the most cost-effective manner.

48.3 As soon as reasonably practicable after the issues referred to in Clause 48.2 have been agreed between the Parties or determined pursuant to the Dispute Resolution Procedure, the Client shall give a Client Notice of Change and the provisions of Clause 16 (*Changes*) shall apply except that the Tram Maintainer shall be obliged to implement the change in all circumstances (except to the extent that such change is not necessary to implement the Qualifying Change in Law). The Client shall issue a Client Change Order once it has been agreed or determined pursuant to the Dispute Resolution Procedure. In assessing the value of the change, the Client shall, for the first five years following the Commencement Date, pay the agreed amount less the agreed threshold of £15,000 for each and every event save that the Tram Maintainer's liability under this Clause 48 shall not exceed £150,000 in the aggregate The Client will, at its sole discretion, determine the scope of each and every event.

48.4 Further to the provisions of Clause 48.3 where a Qualifying Change of Law occurs outwith a period of five years from the Service Commencement Date, the Client shall issue a Client Notice of Change and the provisions of Clause 16 (*Changes*) shall apply.

48.5 Where a General Change in Law raises a technical, design or performance issue that requires a revision of the delivery of the Services in connection with the Trams and Tram Related Equipment and price, the Tram Maintainer shall take all possible measures to ensure that the Edinburgh Tram Network is operating in accordance with the relevant Legislation, but will not be held responsible for the cost and delivery implications of such General Change in Law.

49. BEST VALUE

49.1 The Tram Maintainer shall provide reasonable assistance throughout the Term and to the extent consistent with its obligations under this Agreement, make arrangements to secure continuous improvement in the way in which the Services are conducted having regard to the Project Vision and a combination of economy, efficiency and effectiveness.

49.2 The Tram Maintainer agrees to undertake (or refrain from undertaking) such actions as the Client shall reasonably request, and shall:

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49.2.1 prepare, support and assist the Client (in compliance with Clause 26 (*Right of Verification and Audit*)) in preparing best value performance plans and conducting best value reviews in relation to the Services;

49.2.2 complying with reasonable requests for information, data or other assistance made by the Client in pursuance of its best value assessment; and

49.2.3 complying with all requests by the Client, acting reasonably, to procure the attendance of specific officers or employees of the Tram Maintainer or Tram Maintainer Parties at any Client meetings and **tie** meetings at which the Services are to be discussed.

49.3 The Tram Maintainer acknowledges that **tie** may undertake an annual customer satisfaction survey ("**tie Customer Satisfaction Survey**") in order to:

49.3.1 assess satisfaction among the public and passengers with the quality, efficiency and effectiveness of the Services;

49.3.2 complement preparation of the Annual Service Report; and

49.3.3 monitor compliance by the Tram Maintainer with its obligations including its management of the Services.

49.4 Without prejudice to any other provision in this Agreement (and no later than two Reporting Periods prior to the end of any year), the Tram Maintainer shall, at its own cost, provide a written report (the "**Annual Service Report**") which shall review the quality and performance of the Services measured during the relevant period and show the key issues to be addressed going forward, including customer feedback, operational and maintenance issues and improvement proposals. The customer feedback shall include the results of any **tie** Customer Satisfaction Survey carried out pursuant to Clause 49.3. The Tram Maintainer shall upon written request promptly provide supporting information to verify and audit the information and other material contained in the Annual Service Report.

49.5 The Client may make comments on and/or objections to and/or specify omissions in the supporting information or the Annual Service Report and in such case shall provide the Tram Maintainer with written comments and/or objections within 40 Business Days of receipt. In the absence of such Client comments or objections, the supporting information (or the Annual Service Report) shall be deemed to have been accepted by the Client.

49.6 The Tram Maintainer shall, within 25 Business Days of receipt of the Client comments and/or objections under Clause 49.5, make revisions having regard to such comments and/or

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objections and resubmit the information and report to the Client. If the information and reports cannot be agreed by the Parties then the matter will be determined in accordance with the Dispute Resolution Procedure.

49.7 If, in the Client's reasonable opinion, the provision and performance of the Services could be more effective, efficient and economic having regard to the Annual Service Report and the **tie** Customer Satisfaction Survey, then the Client may serve a Client Notice of Change pursuant to Clause 16 *(Changes)* stating the desired nature and timing of the changes to the provision or performance of the Services (or the relevant part thereof).

49.8 The Tram Maintainer shall, in conjunction with the Client, develop plans setting out mutually agreed tasks between the Tram Maintainer and the Client to improve the delivery of the Services and demonstrate continuous improvement in the Services ("**Best Value Improvement Plans**"), and the achievement of the Project Vision.

49.9 The preparation of Best Value Improvement Plans will take into account the conclusions from the Annual Service Report and the **tie** Customer Satisfaction Surveys.

50. COPYRIGHT AND INTELLECTUAL PROPERTY

50.1 All Tram Maintainer IPR shall continue to be owned by the Tram Maintainer.

50.2 The Tram Maintainer hereby:

50.2.1 assigns by way of future assignation to the Client with full title guarantee the Project IPR which is created by it and shall procure that Project IPR created by any Tram Maintainer Party is also so assigned, for all of the residue of the term of such rights and all renewals or extensions thereof and together with all accrued causes of action in respect thereof;

50.2.2 grants to the Client a non-exclusive perpetual irrevocable royalty free licence to use such Tram Maintainer IPR as may be necessary for the Client to use in relation to the Tram Maintainer's scope of services and having regard to the operating, maintaining and repairing of the Edinburgh Tram Network, and including any and all Intellectual Property Rights which subsist at any time in:

50.2.2.1 the Tram Documentation;

50.2.2.2 the Trams; and

50.2.2.3 Spare Parts and/or Special Tools.

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For clarity, nothing within this sub-clause shall permit the Client to use Tram Maintainer IPR for any commercial or tendering purposes (except by CEC, TEL or **tie** in connection with any extension or expansion of the infrastructure of the Edinburgh Tram Network). Such Tram Maintainer IPR shall not, without the express written consent of the Tram Maintainer, be used, copied or disclosed in whole or in part by the Client other than for the purposes outlined in this Clause 50.2.2; and

50.2.3 grants to the Client, with the prior written consent of the Tram Maintainer (such consent not to be unreasonably withheld or delayed) the right to grant non-exclusive non-assignable sub-licences to third parties for such lengths of time as the Client may reasonably require and otherwise on the same terms as the licence granted to the Client pursuant to Clause 50.2.2, to use the Tram Maintainer IPR referred to in that Clause (other than in relation to Third Party Software in so far as is necessary or desirable for such third party to use such Tram Maintainer IPR in relation to any projects associated with the Tram Works including in relation to any extension or expansion of the Edinburgh Tram Network).

50.3 The Tram Maintainer shall promptly deliver to the Client copies of all Tram Maintainer IPR licensed to the Client pursuant to this Clause 50 (*Copyright and Intellectual Property*).

50.4 For the avoidance of doubt, the persons to whom the Client may grant sub-licences pursuant to Clause 50.2.3 shall include:

50.4.1 **tie** and any **tie** Party;

50.4.2 any Client Party;

50.4.3 the Operator and any party other than the Operator providing support to **tie** in relation to the System;

50.4.4 the SDS Provider;

50.4.5 the Tram Maintainer;

50.4.6 CEC and Transport Edinburgh Limited with the prior written consent of the Tram Maintainer (such consent not to be unreasonably withheld or delayed);

50.4.7 any assignee or transferee under this Agreement; and

50.4.8 any party providing maintenance in respect of the Edinburgh Tram Network.

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50.5 The Client hereby grants to the Tram Maintainer a non-exclusive revocable royalty free licence for the duration of this Agreement to use such Project IPR as is owned by it as may be necessary for the Tram Maintainer to use solely and exclusively for the purpose of performing the Tram Works.

50.6 The copyright of this Agreement and any data or software supplied to the Tram Maintainer by the Client, shall remain solely with the Client.

50.7 The Tram Maintainer shall at any time and from time to time hereafter at the request of the Client execute all such documents and do all such further acts as may be required in order to vest the rights referred to in Clause 50.2.1 in the Client.

50.8 The Tram Maintainer waives any and all moral rights held or to be held by the Tram Maintainer in the Deliverables and Project IPR and shall use best endeavours to ensure that all of the Tram Maintainer Parties who are authors of the whole or any part of the Project IPR waive and abandon in writing all moral rights.

50.9 The Tram Maintainer agrees that all rights in the Project IPR shall remain the property of the Client and the Tram Maintainer shall retain no rights in the Project IPR beyond the licence granted in Clause 50.5. The Tram Maintainer shall be entitled to use such Project IPR only on the terms set out herein and solely for the purpose of the performance of the Tram Works. In particular, otherwise as permitted in this Agreement herein, the Tram Maintainer shall not disclose, assign, sub-license, lease, rent or otherwise dispose of the Project IPR.

50.10 The Client shall be entitled to use the rights granted to it pursuant to Clause 50.2 (and to sub-license to third parties such rights) to perform its obligations and exercise its rights and allow all Client Parties to perform their obligations and exercise their rights in respect of the Project, such performance of rights and exercise of obligations to include:

50.10.1 carrying out any necessary completion of the design, manufacture, construction and commissioning of any Trams and each part thereof;

50.10.2 carrying out any and all work in relation to the design and construction, testing and operation of the System;

50.10.3 carrying out all and any necessary maintenance, repairs and work including to work to rectify any faults with the Spare Parts and Special Tools or breach of the Warranties (as defined in the Tram Supply Agreement) and to modify them to comply with any Law or other mandatory requirements or otherwise;

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50.10.4 making copies of using and reproducing in any format the Tram Documentation and all other documents which the Tram Maintainer is required to deliver in accordance with this Agreement for the purposes of maintenance and repair of the Trams and/or the maintenance of the Spare Parts and Special Tools but only such copies as may be reasonably necessary to achieve such purpose; and

50.10.5 enabling and allowing relevant third parties to perform their obligations in respect of the Project.

50.11 For the purposes of this Clause 50 (*Copyright and Intellectual Property*), "use" shall include the acts of copying, modifying, adapting and translating the material in question and/or incorporating them with other materials and the term "the right to use" shall be construed accordingly.

50.12 The Tram Maintainer:

50.12.1 hereby grants to the Client, free of charge, an irrevocable, perpetual, non-exclusive and transferable (but only to any assignee or transferee of any rights or benefits under this Agreement or upon or at any time following termination or expiry of this Agreement) licence (carrying the right to grant sub-licences) to use the Intellectual Property Rights which are or become at any time during the Term vested in the Tram Maintainer to the same extent as the Tram Maintainer has acquired such rights; and

50.12.2 shall in respect of any of the Intellectual Property Rights which the Tram Maintainer is not entitled to license to the Client pursuant to Clause 50.2, use its best endeavours to procure the grant of a licence from the owners of such Intellectual Property Rights in favour of the Client in substantially the same terms as the licence set forth in Clause 50.2.

50.13 The Client shall not exercise any of the rights licensed to it pursuant to this Clause 50 (*Copyright and Intellectual Property*) to design, construct, manufacture or commission or have designed, constructed, manufactured or commissioned any of the Trams or any part thereof unless and until:

50.13.1 the Client and the Tram Maintainer cannot agree a price and/or delivery time in relation to a Spare Part or Special Tool pursuant to Clause 34.3 of the Tram Supply Agreement (Spares and Special Tools); and/or

50.13.2 there occurs a Tram Maintainer Default.

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50.14 The Client shall not be entitled to adapt, reverse engineer, decompile, disassemble and/or modify the Tram Maintainer Software in whole or in part except:

50.14.1 as permitted by Law; and

50.14.2 to the extent that such action is legitimately required for the purposes of integrating the operation of the Tram Maintainer Software with the operation of other software or systems used by the Client or any of the Client Parties on the Edinburgh Tram Network.

50.15 All payments and royalties payable in one sum or by instalments or otherwise in connection with Intellectual Property Rights used by the Tram Maintainer in connection with or to enable the Tram Maintainer to carry out the Project or licensed to the Client shall be deemed to be included in the Services Payment and shall be paid by the Tram Maintainer to those to whom they may be due or payable.

50.16 Where a claim or proceeding is made or brought against the Client or its permitted licensees which arises out of the infringement of any Intellectual Property Rights in any materials provided by the Tram Maintainer or any Tram Maintainer Party to the Client then the Tram Maintainer shall indemnify and keep the Client indemnified on demand at all times from and against all Indemnified Liabilities arising in connection with such claim or proceedings.

50.17 The provisions of this Clause 50 (*Copyright and Intellectual Property*) shall apply during the continuance of this Agreement and after its termination howsoever arising, and immediately following termination howsoever arising, the Tram Maintainer shall provide the Client with:

50.17.1 a copy of the Object Code on media that is reasonably acceptable to the Client; and

50.17.2 a copy of all documentation, manuals and other technical information relating to the Software that is reasonably required by the Client.

50.18 The Tram Maintainer shall not reproduce or publish any document or matter relating to the Tram Works or this Agreement, either alone or in association with any other body or person, without the prior written consent of the Client.

Software

50.19 In designing and creating Tram Maintainer Software forming part of the Deliverables, the Tram Maintainer shall ensure and the Tram Inspector shall audit:

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50.19.1 that orderly auditable records of the progress of the development of the Tram Maintainer Software from the functional requirements to the final code are maintained, and that regular verification and testing occurs at each stage of the design process;

50.19.2 that it shall produce, during the development of the Tram Maintainer Software comprehensive and accurate documentation including specifications, cause and effect charts and flowcharts are produced;

50.19.3 that the documentation, access rights, details of configuration software and the like produced in accordance with Clause 50.19.1, is such as to enable an appropriately qualified independent auditor (who is not involved in the original design) to:

(a) relate the Tram Maintainer Software to the performance of the relevant equipment under normal and fault conditions;

(b) to verify its compliance with the functional requirements of that equipment; and

(c) to operate and reconfigure the Tram Maintainer Software without the assistance of the Infraco; and

50.19.4 that the Tram Maintainer Software is designed, developed and documented following an industry-recognised standard, using recognised quality control methods.

50.20 Subject to the terms of any Third Party Software Licence, the Tram Maintainer shall to a reasonable extent, create or provide:

50.20.1 coding and documentation, in machine readable form, of the final structure of the Tram Maintainer Software, and of the intermediate stages leading to it (i.e. source and object codes); and

50.20.2 where the Client so instructs, usable copies of any ancillary computer programs used to generate the code (such as compilers) provided that the Client meets the costs of any additional Third Party Software Licence.

50.21 Where the Tram Maintainer is required to provide Tram Maintainer Software as part of a Deliverable under this Agreement it shall, within thirty (30) days of acceptance of the Tram Maintainer Software by **tie** place, or shall procure the placement of, a copy of the source code of the Tram Maintainer Software in escrow with the NCC Group of Manchester Technology

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Centre, Oxford Road, Manchester ("**NCC**") or such other escrow agent as the Parties may agree. The Parties shall enter into NCC's standard escrow agreement in the form included in Schedule 8 of the Tram Supply Agreement (provided that, in the case of Third Party Software, the Tram Maintainer shall procure that the owner of such software enters into such Escrow Agreement) for a single licensee (or if no such agreement exists, the appropriate standard agreement as stipulated by NCC). The cost of such source code deposit (including all renewal costs) shall be payable by the Client.

Technical Library

50.22 The Tram Maintainer shall:

50.22.1 as soon as reasonably practicable, cooperate with the Client in the establishment by the Client of a secure, virtual electronic site for the storage of Deliverables other than the source code (the "**Technical Library**"). Such electronic site shall be capable of being accessed through a standard web browser. At the Client's request, the Tram Maintainer will in addition also cooperate with the Client in delivering and managing documents to establish a physical site with paper copies of the Technical Library; and

50.22.2 as and when Deliverables (other than the source code) are produced or updated from time to time:

50.22.2.1 where such Deliverables are produced or updated by the Tram Maintainer, promptly ensure that a copy of those Deliverables or its updated version is placed in the Technical Library;

50.22.2.2 where such Deliverables are produced or updated by any subcontractor of the Tram Maintainer, as soon as reasonably practical ensure that a copy of those Deliverables or their updated version(s) are placed in the Technical Library;

50.22.2.3 establish an index, in a format approved by the Client, of all Deliverables deposited in the Technical Library from time to time and update that index whenever any such Deliverables are deposited in the Technical Library;

50.22.2.4 deliver one copy of the index and each update established under Clause 50.22.2.3 to the Client; and

50.22.2.5 permit the Client (or its nominee) to have access to the Technical

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Library from time to time during normal business hours, and following reasonable notice from the Client (or its nominee) to the Tram Maintainer, for the purpose only of auditing its contents against the current catalogue.

50.23 Within three Business Days of the earlier of the release of the Reliability Bond pursuant to Clause 44.3 of the Tram Supply Agreement or the termination of this Agreement, the Tram Maintainer shall hand over the Technical Library, and the secure access to it, to the Client and the Tram Maintainer's obligations in relation to the further maintenance of the Technical Library shall cease. Should an audit of the contents of the Technical Library against the current catalogue reveal that the index does not contain details of categories or types of Deliverables which should be contained within the Technical Library, the Client may request, and the Tram Maintainer grants, access to the Technical Library from time to time during business hours in order to audit the contents of the Technical Library to determine whether such categories and types of Deliverables are in fact contained within the Technical Library. Any such request shall be made with reasonable notice and shall indicate with reasonable clarity the technical information or the type of Deliverable which is required for review.

51. DATA PROTECTION

51.1 For the purpose of this Clause 51 (*Data Protection*), the term "personal data" shall have the meaning given to it in the Data Protection Act 1998.

51.2 Insofar as is applicable to its obligations pursuant to this Agreement, the Tram Maintainer shall, in relation to any personal data relating to the performance of the Services in respect of which it is either the "data controller" or the "data processor" for the purposes of the Data Protection Act 1998, comply with the obligations of a "data controller" under the provisions of the seventh data protection principle as set out in schedule 1 of that Act. In addition, the Tram Maintainer:

51.2.1 shall have at all material times (and shall use its reasonable endeavours to procure that all the Tram Maintainer Parties have or will have at all material times) the appropriate technical and organisational measures in place against unauthorised or unlawful processing of personal data and against accidental loss or destruction of, or damage to, personal data held or processed by it;

51.2.2 shall (and shall use its reasonable endeavours to procure that the Tram Maintainer Parties shall) take at all material times, all reasonable steps to ensure the integrity of any of its staff with access to personal data processed in connection with the Services;

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51.2.3 shall act only on the instructions of the Client or **tie** in relation to the processing of any personal data in respect of which the Client or **tie** is the "data controller" for the purposes of that Act;

51.2.4 shall only obtain, hold, process, use and store such personal data as is necessary to perform its obligations under this Agreement; and

51.2.5 shall allow the Client or **tie** access to any relevant premises on reasonable notice to inspect its procedures referred to in Clause 51.2.1. This right to access shall be duly justified by the Client to the Tram Maintainer.

52. DISPUTE RESOLUTION

52.1 The Parties agree that any Dispute shall be dealt with in accordance with the provisions set out in Schedule 9 (*Dispute Resolution Procedure*).

53. DEROGATIONS

53.1 The Tram Maintainer shall not, without the prior written consent of the Client's Representative, apply for any exemption or derogation from or dispensation under any applicable Law which would otherwise apply to the Services and including any exemption order under section 47(3) of the Disability Discrimination Act 1995 or dispensations under the provisions of section 10 of the Railways and Other Passenger Transport Systems (Approval of Works, Plant and Equipment) Regulations 1994 or any provisions which may replace, modify or supersede such provisions.

54. VARIATIONS TO BE IN WRITING

54.1 No variation or alteration of any of the provisions of this Agreement shall be effective unless it is in writing and signed by both Parties.

55. WAIVER AND CUMULATIVE REMEDIES

55.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement will operate as a waiver of it or of any other right or remedy nor will any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

55.2 The Parties agree that no waiver shall occur or be deemed to have occurred unless or until a clear and unequivocal express waiver of a clearly identified default is contained in a written

notice by the waiving Party to the other Party expressly for the purpose of effecting such waiver.

55.3 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by Law.

55.4 Neither Party shall be entitled to recover compensation or make a claim under this Agreement in respect of any loss that it has incurred to the extent that it has already been compensated in respect of that loss pursuant to this Agreement or otherwise.

56. NOTICES

56.1 Any notice or notification required or authorised to be given under this Agreement by one Party to the other shall be:

56.1.1 in writing;

56.1.2 sent by one of the following methods:

56.1.2.1 pre-paid special or recorded delivery post or facsimile transmission addressed to the Party to which it is given at:

(a) in the case of notices given to the Client: **tie** Limited, Citypoint, 65 Haymarket Terrace, Edinburgh, EH12 5BH, fax number 0131 622 8301, attention: Tram Project Director, or such other address or fax number in the United Kingdom as the Client may notify the Tram Maintainer from time to time for that purpose; or

(b) in the case of notices given to the Tram Maintainer: Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF) address, J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa) – Spain fax number, 00 34 943 189211 attention the Edinburgh Tram Project Manager or such other address or fax number in the United Kingdom as the Tram Maintainer may notify the Client from time to time for that purpose; or

56.1.2.2 facsimile transmission addressed to the Client's Representative or the Tram Maintainer's Representative (as appropriate) at a facsimile number notified to the giving Party by the receiving Party for the service of notices under this Agreement from time to time; or

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56.1.2.3 personal delivery into the hands of:

(a) in the case of notices given to the Client, the Client's Representative; or

(b) in the case of notices given to the Tram Maintainer, the Tram Maintainer's Representative; and

56.1.3 be deemed duly served:

56.1.3.1 if sent by pre-paid special or recorded delivery post, on proof of delivery; or

56.1.3.2 if sent via facsimile transmission or personal delivery, on the day of issue of the relevant fax confirmation receipt or such personal delivery (as appropriate), unless that day is not a Business Day, or such delivery or transmission is made after 5.00pm on a Business Day, in which case it shall be deemed duly served on the next Business Day thereafter.

57. ASSIGNATION, CHANGES IN LEGAL STATUS, CHANGES IN CONTROL AND SUB-CONTRACTING

57.1 The Tram Maintainer shall not assign, novate or otherwise transfer the whole or any part of this Agreement without the prior written agreement of the Client.

57.2 In addition to and without prejudice to the provisions of Clause 5 (*Novation*) and the Tram Maintenance Novation Agreement to be entered into in accordance with Clause 5 (*Novation*), the Client shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

57.2.1 to the Scottish Ministers, TEL, CEC, Transport Scotland or any local authority; or

57.2.2 to any body with no worse financial standing than that of **tie** who takes over all or substantially all of the functions of **tie**; or

57.2.3 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to the Tram Maintainer acting reasonably) by **tie** or a person falling within Clause 57.2.1; or

57.2.4 to the Operator; or

57.2.5 with the prior written consent of the Tram Maintainer (such consent not to be unreasonably withheld or delayed) to any person not covered by Clauses 57.2.1, 57.2.2, 57.2.3 or 57.2.4 whose ongoing financial standing is no worse than **tie**.

57.3 If the legal status of the Tram Maintainer shall change in any material way the Client shall be informed by the Tram Maintainer in writing, immediately.

57.4 If there is a Change in Control in the Tram Maintainer, the Client shall be informed immediately by the Tram Maintainer in writing.

57.5 The Tram Maintainer shall not sub-contract the whole of the Services and shall not without the prior written consent of the Client (such consent not to be unreasonably withheld or delayed) sub-contract any part of the Services.

57.6 The Tram Maintainer shall in respect of any part of the Services in respect of which the Tram Maintenance Specification expressly states that a Sub-Contractor Direct Agreement will be required from a supplier in respect of which the Client shall as a condition of giving its consent to the sub-contracting of an element of the Services, require the relevant sub-contractor to enter into a Sub-Contractor Direct Agreement with the Client and **tie**, and in respect of any other sub-contractor if so requested by the Client at any time, the Tram Maintainer shall use all reasonable endeavours to ensure that such sub-contractor enters into a Sub-Contractor Direct Agreement with the Client and **tie**.

57.7 Without limitation it shall be reasonable for the Client to withhold its consent to:

57.7.1 any sub-contract or assignation where the proposed sub-contractor or assignee:

57.7.1.1 is not in the Client's opinion appropriately qualified and experienced in and/or accredited for the purposes of carrying out work of the scope, type and complexity to that required in carrying out that part of the Services to be sub-contracted to it; or

57.7.1.2 has not entered into a Sub-Contractor Direct Agreement with the Client and **tie** pursuant to Clause 57.6; or

57.7.1.3 is not approved by the Operator (acting reasonably) as being appropriate for the purposes of the requirements of the Case for Safety; and

57.7.2 any sub-contract or assignation where the proposed assignee or sub-contractor is not in the Client's absolute opinion of suitable financial standing.

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57.8 The appointment or authorisation by the Tram Maintainer of any sub-contractor, agent, officer or employee and/or any consent given by the Client to any sub-contractor, agent, officer or employee shall not relieve the Tram Maintainer of any obligation under this Agreement and the acts of and omissions of any such sub-contractor, agent, officer or employee shall, for the purposes of this Agreement, be deemed to be the acts or omissions of the Tram Maintainer.

57.9 The Tram Maintainer shall provide sufficient superintendence to ensure that the work to be carried out by sub-contractors will comply with the requirements of this Agreement and applicable Law.

57.10 Any application to the Client for consent pursuant to Clauses 57.5 shall be in writing and shall be sent to the address set out in Clause 56 *(Notices)*.

58. CONFLICT OF INTEREST

58.1 The Tram Maintainer shall (and shall procure that the Tram Maintainer Parties shall):

58.1.1 be responsible for ensuring that no conflict of interest arises in respect of its duties under this Agreement;

58.1.2 make all possible enquiries to ensure that there is no conflict of interest prior to its assuming the duties required of it under the terms of this Agreement; and

58.1.3 consult and advise the Client if the Tram Maintainer considers that a conflict of interest arises or if he considers that a conflict of interest may exist or may arise or may be foreseeable and shall furnish the Client with such information as shall enable the Client to determine whether or not a conflict of interest has arisen.

59. SECURITY INTERESTS

59.1 The Tram Maintainer shall not create or agree to create any Security Interest over any Assets or over this Agreement.

59.2 The Tram Maintainer shall not dispose of any right in respect of or interest in any Asset used in the Services or relating to the Edinburgh Tram Network if to do so would have a material adverse effect upon either the Edinburgh Tram Network, the rights in the Assets held by CEC, the position of **tie**, or the position of the Client under this Agreement, whether or not this Agreement has terminated or expired provided always that restrictions in this Clause 59 (*Security Interests*) shall not apply in the case of:

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59.2.1 disposals of redundant or obsolete assets not required for the Edinburgh Tram Network provided that the Client has procured **tie's** and CEC's consent to such disposal, and CEC receives any proceeds associated with such disposal; or

59.2.2 disposals of property or assets where such property or assets are replaced by other property or assets comparable or superior as to type and function.

60. HEALTH AND SAFETY

60.1 The Tram Maintainer shall develop and operate:

60.1.1 a health and safety management system, the standard of which shall comply with OHSAS 18001 or HSG65;

60.1.2 a quality management system, the standard of which shall comply with BS EN ISO 9001:2000; and

60.1.3 an environmental management system, the standard of which shall comply with BS EN ISO 14001: 2004,

which shall be known together as the "**HSQE System**".

60.2 The Tram Maintainer shall (and shall procure that the Tram Maintainer Parties) comply with the HSQE System and the Tram Maintainer shall develop appropriate management plans so as to ensure such compliance with the HSQE System.

60.3 If the Services have not been prepared in accordance with the HSQE System or with any other provision of this Agreement, the Client's Representative shall so inform the Tram Maintainer in writing stating the error or omission requiring to be rectified by the Tram Maintainer.

60.4 Compliance with the HSQE System shall not relieve the Tram Maintainer from any of its other duties, obligations or liabilities under this Agreement.

60.5 The Tram Maintainer shall appoint (or shall procure the appointment of) a manager (the "**HSQE Manager**") as soon as reasonably practicable following the Effective Date. The identity of the HSQE Manager (and any replacement) shall be subject to the approval of the Client's Representative (such approval not to be unreasonably withheld or delayed).

60.6 The HSQE Manager shall:

60.6.1 ensure the effective operation of the HSQE System described in this Clause 60 *(Health and Safety)*;

60.6.2 audit the HSQE System at regular intervals and report the findings of such audit to the Client's Representative;

60.6.3 review the HSQE System at intervals agreed with the Client's Representative to ensure its continued suitability and effectiveness; and

60.6.4 liaise with the Client's Representative on all matters relating to the HSQE System.

61. ENTIRE AGREEMENT

61.1 Except where expressly provided otherwise in this Agreement, this Agreement constitutes the entire agreement between the Parties in connection with its subject matter and supersedes all prior representations, communications, negotiations and understandings concerning the subject matter of this Agreement.

61.2 Each of the Parties confirms to the other that it has neither been induced to enter into this Agreement in reliance on, nor has it made, any representation or warranty except those contained or referred to in this Agreement.

61.3 Any representations or warranties other than those contained or referred to in this Agreement are superseded and extinguished by this Agreement.

61.4 Each Party irrevocably and unconditionally waives all rights and remedies which it might otherwise have had in relation to any representations or warranties other than those contained or referred to in this Agreement save in respect of any fraudulent misrepresentation.

62. CONSENT AND APPROVAL

62.1 The giving of any consent or approval by or on behalf of **tie** or the Client shall not in any way relieve the Tram Maintainer of any of its obligations under this Agreement or of its duty to ensure the correctness, accuracy or suitability of the matter or thing which is the subject of the consent or approval.

62.2 Failure by **tie** or the Client to disapprove or object to any matter or thing shall not prejudice its power subsequently to take action under this Agreement in connection therewith.

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63. DISCRIMINATION

63.1 The Tram Maintainer shall not (and the Tram Maintainer shall insert a clause to this effect in each contract with any Tram Maintainer Party) unlawfully discriminate within the meaning and scope of the provisions of the Equal Pay Act 1970, the Sex Discrimination Act 1975, the Employment Rights Act 1996, the Working Time Regulations 1998, the Part-Time Workers (Prevention of Less Favourable Treatment) Regulations 2000, the Fixed Term Employees (Prevention of Less Favourable Treatment) Regulations 2002, the Race Relations Act 1976, the Disability Discrimination Act 1995, the Employment Equality (Sexual Orientation) Regulations 2003, the Employment Equality (Religion or Belief) Regulations 2003 and the Employment Equality (Age) Regulations 2006.

64. FURTHER ASSURANCE

64.1 Each Party shall at the reasonable request and cost of the other (save where it is expressly provided that the cost of such act or execution shall be for that Party's account) do any act or execute any document that may be necessary to give full effect to this Agreement.

65. APPLICABLE LAW

65.1 This Agreement, any document completed or to be completed in accordance with its provisions and any matter arising from this Agreement or any such document shall be governed by and construed in accordance with Scots law.

65.2 Subject to Clause 52 (*Dispute Resolution*), the Parties hereby irrevocably submit to the exclusive jurisdiction of the Court of Session in relation to this Agreement, any such document and any such matter.

66. NO PARTNERSHIP OR AGENCY

66.1 Nothing in this Agreement shall be construed as creating a partnership between, the Client and the Tram Maintainer.

66.2 The Tram Maintainer shall not (and shall procure that the Tram Maintainer Parties shall not) act or purport to act as agent for **tie** and/or the Client in relation to any matter unless specifically authorised in writing under this Agreement by the Client. The Tram Maintainer shall not be entitled to bind **tie** and/or the Client in any way or to create any liability or cause of action against **tie** and/or the Client and shall not hold itself out (and shall procure that no Tram Maintainer Party shall hold itself out) as having any such authority or power.

67. INVALID TERMS

67.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

67.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

67.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

67.2 Without prejudice to any other terms of this Agreement, the Parties shall promptly consult in good faith with a view to agreeing as soon as reasonably practicable one or more provisions in lieu of the invalid provision such as will, so far as is possible under any applicable Law have the same commercial effect as the invalid provision would have had, if it had not been invalid, unlawful or unenforceable.

68. THIRD PARTY RIGHTS

68.1 Subject to any other express provision of this Agreement, a person who is not party to this Agreement shall have no right to enforce any term of this Agreement.

IN WITNESS WHEREOF these presents consisting of this and the 154 preceding pages together with Schedules 1 to 24 (inclusive) which are annexed and signed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**

at EDINBURGH

on 13th MAY 2008 by:

Authorised Signatory [redacted]

Full Name WILLIE GALLAGHER

Witness Signature [redacted]

Full Name ALASTAIR RICHARDS

Address [redacted]

EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at EDINBURGH

on 13 MAY 2008 by:

Authorised Signatory [redacted]

Full Name JESUS ESNAOLA

Witness Signature [redacted]

Full Name Antonio Campos

Address [redacted]

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This is Schedule 1 referred to in the foregoing Tram Supply Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 1

CONDITIONS PRECEDENT

PART 1: COMMENCEMENT CONDITIONS PRECEDENT

Delivery to the Client, in form and substance satisfactory to the Client (acting reasonably) of the documents listed below. Where listed as a duly certified copy, the document is to be certified by the company secretary of the Tram Supplier as being a true copy, in full force and effect:

1.1 a copy, duly certified, of its certificate of incorporation (or equivalent) and of any certificate of incorporation on change of name (or equivalent) or certificate of re-registration as a public company (or equivalent) related to it;

1.2 a copy, duly certified, of its memorandum and articles of association (or equivalent constitutional documents);

1.3 a copy, duly certified, of minutes of a meeting of its board of directors, or any other owners, representatives, committee or board entitled to bind the Tram Supplier to the terms of the Tram Supply Agreement:

1.3.1 evidencing all necessary approvals on behalf of the Tram Supplier to the execution, delivery and performance by the Tram Supplier of the Tram Supply Agreement and all documents to be executed by the Tram Supplier pursuant to the Tram Supply Agreement;

1.3.2 authorising a specified person to execute the Tram Supply Agreement, all documents to be executed by the Tram Supplier pursuant to the Tram Supply Agreement and to approve any amendments to the draft of the Tram Supply Agreement and to all documents to be executed by the Tram Supply pursuant to the Tram Supply Agreement;

1.3.3 authorising the Tram Supplier's Representative to sign and despatch all notices and other communications required or permitted to be given by the Tram Supplier under the Tram Supply Agreement and all documents to be executed by the Tram Supplier pursuant to the Tram Supply Agreement; and

1.3.4 authorising the Tram Supplier's Representative to sign and despatch all notices and other communications required or permitted to be given by the Tram Supplier under the Tram Supply Agreement and all documents to be executed by the Tram Supplier pursuant to the Tram Supply Agreement;

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1.4 evidence that all insurances to be taken out under the Tram Supply Agreement and be in force from the Effective Date have been effected on the Effective Date and that the relevant policies comply with the requirements of the Tram Supply Agreement and provision of copies of the certificates of insurance and policy documents for the insurances specified in the Tram Supply Agreement;

1.5 duly executed Subcontractor Direct Agreements in respect of the Tram Works from key Sub-Contractors, or undertakings that such Subcontractor Direct Agreements will be provided within 2 months of the Effective Date;

1.6 Legal Opinions in respect of the powers and capacity of the Tram Supplier to enter into this Tram Supply Agreement.

PART 2: CONDITIONS PRECEDENT DOCUMENTS



(1) TIE LIMITED

- and -

(2) BILFINGER BERGER (UK) LIMITED

- and -

(3) SIEMENS plc

-and-

(4) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

NOVATION OF A TRAM SUPPLY AGREEMENT

in respect of

EDINBURGH TRAM NETWORK

AGREEMENT

AMONG

(1) **tie LIMITED** (company number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ ("**tie**");

(2) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London EC1A 4EJ which expression shall include its successors, permitted assignees and transferees; and

(3) **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens Square, Frimley, Camberley, Surrey GU16 8QD which expression shall include its successors, permitted assignees and transferees,

(Bilfinger Berger UK Limited and Siemens plc together the "**Infraco**" and each separately an "**Infraco Member**"); and

(4) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF),** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa), Spain ("**Tramco**");

BACKGROUND

A By an agreement in writing dated ◆ . 2008 ("**Tram Supply Agreement**") **tie** appointed Tramco to design, manufacture and supply Trams and to supply documentation and associated equipment in connection with the Edinburgh Tram Network. A copy of the Tram Supply Agreement is attached to this Agreement and initialled by the parties for the purpose of identification. This Agreement is supplemental to the Tram Supply Agreement.

B **tie** and Infraco have entered into a contract ("**Infraco Contract**") under which Infraco has been appointed to carry out and/or manage the design, construction, installation, commissioning, tram procurement, system integration, infrastructure maintenance, tram maintenance and supply of related equipment and materials, trams and related infrastructure in respect of the Edinburgh Tram Network.

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C **tie** and Infraco have agreed, with the consent of Tramco, that Infraco shall take over the rights and liabilities of the "Client" (as defined in the Tram Supply Agreement) under the Tram Supply Agreement and that Tramco shall owe all of the duties and obligations arising thereunder to Infraco by novating the Tram Supply Agreement from **tie** to Infraco upon and subject to the terms of this Agreement.

D **tie** wishes to be released from the Tram Supply Agreement and Tramco has agreed to release **tie**.

1. DEFINITIONS AND INTERPRETATION

1.1 The definitions given in the recitals to this Agreement apply to this Agreement.

1.2 In this Agreement the following additional words and expressions shall have the meanings set out opposite to them:

"**Effective Date**" means the last date of execution of this Agreement."

1.3 Clause headings in this Agreement are for the convenience of the parties only and do not affect its interpretation.

1.4 Unless otherwise defined hereunder, where the Tram Supply Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement.

2. RELEASE BY TRAMCO OF tie

2.1 Tramco releases and discharges **tie** from any and all duties, obligations and liabilities owed to Tramco under the Tram Supply Agreement and accepts the liability of Infraco under the Tram Supply Agreement in lieu of **tie**.

3. RELEASE BY tie OF TRAMCO

3.1 **tie** releases and discharges Tramco from the further performance of Tramco's duties and obligations under the Tram Supply Agreement.

4. ACCEPTANCE OF LIABILITY BY TRAMCO TO THE INFRACO

4.1 Tramco undertakes to Infraco to continue to perform all the duties and to discharge all the obligations of Tramco under the Tram Supply Agreement and to be bound by its terms and conditions in every way as if Infraco was and always had been a party to the Tram Supply Agreement in place of **tie**.

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4.2 Tramco warrants to Infraco that, in respect of the duties and obligations which it has already performed under the Tram Supply Agreement, it has performed those duties and obligations in accordance with the standards of skill and care set out in the Tram Supply Agreement and otherwise in compliance with all of the terms and conditions thereof. Tramco warrants to Infraco that it shall be liable for any loss or damage suffered or incurred by Infraco arising out of any negligent act, default or breach by Tramco in the performance of its obligations under the Tram Supply Agreement prior to the Effective Date. Tramco shall be liable for such loss or damage notwithstanding that such loss or damage would not have been suffered or incurred by **tie** (or suffered or incurred to the same extent by **tie**).

4.3 Without prejudice to Clauses 4.2 or 4.4, Tramco shall not contend under this Agreement that its liability to Infraco is affected or diminished by reason of **tie** having suffered no loss and/or any loss claimed to have been suffered by Infraco being different in character from that suffered by **tie**.

4.4 Tramco confirms it was aware at the time of entering into the Tram Supply Agreement that Infraco could suffer losses, damages, costs, expenses, claims, demands and proceedings as a result of Tramco's breach of the Tram Supply Agreement.

4.5 Without prejudice to the generality of this Agreement, Tramco warrants and undertakes to Infraco that its duties and obligations under, the Tram Supply Agreement, whether required to be performed prior to the date hereof, have been and will be performed in accordance with the Tram Supply Agreement.

4.6 Tramco acknowledges that any breach of the warranties in this Agreement may cause Infraco to be in breach of the Infraco Contract and/or cause Infraco to suffer loss and/or damage.

4.7 The liability of Tramco to Infraco pursuant to the Tram Supply Agreement as novated by this Agreement (both in respect of the period prior to the Effective Date and after the Effective Date) shall not be affected by Infraco's assumption of liability to **tie** in respect of the Edinburgh Tram Network pursuant to the Infraco Contract.

4.8 Tramco acknowledges that Infraco has and shall continue to rely upon all Tram Works provided by Tramco under the Tram Supply Agreement as novated by this Agreement.

4.9 For the avoidance of doubt, in accordance with Clause 41.2 of the Tram Supply Agreement save where expressly provided for in the Tram Supply Agreement, nothing in this Agreement shall expose either Party to the application of Indirect Loss.

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5. VESTING OF REMEDIES AGAINST TRAMCO

All rights of action and remedies against Tramco under and pursuant to the Tram Supply Agreement vested in **tie** (including their accrued rights of action and remedies) shall automatically and without the need for any further action on the part of Infraco, vest in Infraco with effect from the Effective Date.

6. ACCEPTANCE OF LIABILITY BY INFRACO

With effect from the Effective Date Infraco undertakes to perform all the duties and to discharge all the obligations of **tie** under the Tram Supply Agreement as novated by this Agreement and to be bound by its terms and conditions in every way as if Infraco was and always had been a party to the Tram Supply Agreement in place of **tie** and as if all acts and omissions of **tie** under or pursuant to the Tram Supply Agreement prior to the Effective Date were the acts and omissions of Infraco.

7. VESTING OF REMEDIES AGAINST tie

As from the Effective Date, all rights of action and remedies under or pursuant to the Tram Supply Agreement vested in Tramco shall lie against Infraco and not **tie** whether or not such rights of action or remedies may have arisen prior to, on or after the Effective Date.

8. ACKNOWLEDGEMENT OF PAYMENT

Tramco acknowledges that all payments properly due to Tramco under the Tram Supply Agreement up to the Effective Date have been paid by **tie** (subject to confirmation of pending payments and the assurance that the Tramco will not suffer payment delays due to the novation process).

9. AMENDMENT OF TRAM SUPPLY AGREEMENT

tie, Tramco and Infraco agree that the terms of the Tram Supply Agreement shall be and are varied in the manner set out in Appendix 1 to this Agreement.

10. AFFIRMATION OF TRAM SUPPLY AGREEMENT

The terms and conditions of this Agreement represent the entire agreement between the parties relating to the novation of the Tram Supply Agreement and, except as specifically amended by Appendix 1 of this Agreement, all the terms and conditions of the Tram Supply Agreement remain in full force and effect. **tie** hereby confirms that it has not exercised any rights and discretions in regard to the Tram Supply Agreement prior to the point of novation.

11. EQUIVALENT PROJECT RELIEF

tie acknowledges that in relation to any Dispute under the Infraco Contract where the Client's sole involvement in any Client Claim is in performing administrative functions in relation to the Client Claim, and not as an interested or affected party, then Infraco shall be entitled to recover its costs incurred in relation to such dispute pursuant to Clause 7A (*Tramco Equivalent Project Relief*) of the Tram Supply Agreement from **tie**. **tie** agrees to pay to the Infraco such reasonable costs unless the dispute proceeds to adjudication where such costs shall be paid as allocated between **tie** and the Tram Supplier by the adjudicator following the Dispute Resolution Procedure.

The Infraco agrees that it shall minimise as far as reasonably practicable its administrative costs in relation to Equivalent Project Relief.

The Tram Supplier agrees not to vexatiously claim under the Tram Supply Agreement or vexatiously use the Disputes Resolution Procedure.

12. RIGHTS OF THIRD PARTIES

A person who is not party to this Agreement shall have no right to enforce any term of this Agreement. This clause does not affect any right or remedy of any person which exists or is otherwise available.

13. LAW AND JURISDICTION

This Agreement shall be governed by and construed in accordance with Scots law and the Scottish Courts shall have jurisdiction with regard to all matters arising under it.

IN WITNESS WHEREOF these presents on this and the preceding [ ] pages together with Appendix 1 which is annexed and subscribed as relative hereto and the copy of the Tram Supply Agreement which is attached and subscribed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at

on 2008 by:

Director _____

Full Name _____

Director _____

Full Name _____

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EXECUTED for and on behalf of **SIEMENS PLC**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Authorised Signatory _____

Full Name _____

EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

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APPENDIX 1 TO THE TRAM SUPPLY NOVATION AGREEMENT

SCHEDULE OF AMENDMENTS TO THE TRAM SUPPLY AGREEMENT

Clause 7.15

Insert at end of Clause 7.15 the following:

The Tram Supplier acknowledges that it has a copy of the Infraco Contract and is deemed to be aware of the obligations, risks and liabilities assumed by the Infraco thereunder. Without prejudice to the foregoing, the Tram Supplier shall be deemed to be fully aware of the adverse financial and other consequences for the Client which could arise under the Infraco Contract in consequence, in whole or in part, of a breach on the part of the Tram Supplier of its obligations under this Agreement.

Clause 38.11.2

Delete Clause 38.11.2 and replace with:

38.11.2 all payments under this Agreement to the Client shall be made in pounds sterling by electronic transfer of funds to:

Name and Address of Bank:

Sort Code:

Account Number:

Account Name:

Clause 58.2 - No Fault Termination

Insert the following new Clause 58.2:

58.2 In the event that the Infraco Contract is terminated, this Agreement shall terminate unless the Tram Supplier is notified that **tie** (or another nominated party) requires to step into this Agreement.

Clause 60 - Termination for Corrupt Gifts and Fraud

Delete Clause 60 (Termination for Corrupt Gifts and Fraud), in its entirety substitute therefore:

60.1 The Tram Supplier or anyone employed by it or acting on its behalf (including any Tram Supplier Party) shall not commit any Prohibited Act.

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60.2 If the Tram Supplier or anyone employed by it or acting on its behalf (including any Tram Supplier Party) commits any Prohibited Act, then the Client may terminate this Agreement with immediate effect by giving notice to the Tram Supplier.

Clause 68.1.2.1.1

Delete Clause 68.1.2.1.1 and replace with:

68.1.2.1.1 in the case of notices given to the Client: Bilfinger Berger-Siemens Consortium, Lochside House, Lochside Way, Edinburgh Park EH12 9DT, fax number 0131 452 2518, attention: Project Director, or such other address or fax number in the United Kingdom as the Client may notify the Tram Supplier from time to time for that purpose; or

.....
Director/Authorised Signatory
tie LIMITED

.....
Director/Authorised Signatory
BILFINGER BERGER UK LIMITED

.....
Director/Authorised Signatory
SIEMENS PLC

.....
Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

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(1) TIE LIMITED

- and -

(2) BILFINGER BERGER (UK) LIMITED

- and -

(3) SIEMENS plc

-and-

(4) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

COLLATERAL WARRANTY IN RESPECT OF A TRAM SUPPLY AGREEMENT IN FAVOUR OF tie FROM TRAMCO

relating to

THE EDINBURGH TRAM NETWORK

AGREEMENT

BETWEEN

(1) **tie LIMITED** (company number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ ("**tie**");

(2) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London EC1A 4EJ which expression shall include its successors, permitted assignees and transferees; and

(3) **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens Square, Frimley, Camberley, Surrey GU16 8QD which expression shall include its successors, permitted assignees and transferees,

(Bilfinger Berger UK Limited and Siemens plc together referred to as the "**Infraco**", which term shall include its successors and permitted assignees); and

(4) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF),** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa), Spain ("**Tramco**");

BACKGROUND

A By an agreement in writing dated ◆ 2008 (the "**Tram Supply Agreement**"), **tie** appointed Tramco to design, manufacture and supply Trams and supply documentation and associated equipment in connection with the Edinburgh Tram Network.

B **tie** and Infraco have entered into a contract under which Infraco has been appointed to carry out and/or manage the design, construction, installation, commissioning tram procurement, system integration, infrastructure maintenance, tram maintenance and supply of related equipment and materials, trams and related infrastructure in respect of the Edinburgh Tram Network.

C **tie** and Infraco have agreed, with the consent of Tramco, that Infraco shall take over the rights and liabilities of the "**Client**" (as defined in the Tram Supply Agreement) under the Tram

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Supply Agreement by novating the Tram Supply Agreement from **tie** to Infraco upon and subject to the terms of the Novation Agreement (as hereinafter defined).

D It is a term of the Tram Supply Agreement that Tramco shall enter into this Agreement with **tie** following the execution of the Novation Agreement.

IT IS AGREED as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement the following words and expressions shall have the following meanings, unless the context requires otherwise:

"**Agreement**" means this document (as amended from time to time pursuant to Clause 13);

"**Deliverables**" means all written or documentary outputs to be prepared and delivered by Tramco in the performance of the Tram Works and Tramco's other obligations under the Tram Supply Agreement;

"**Infraco Contract**" means the contract to be entered into or entered into by **tie** with Infraco as described in Recital B above;

"**Novation Agreement**" means the novation agreement entered into among **tie**, Tramco and Infraco relating to the novation of the Tram Supply Agreement;

"**Party**" means each and any of the parties to this Agreement and **Parties** shall be construed accordingly; and

"**Tram Supply Agreement**" means the agreement dated [◆] and originally entered into by **tie** and Tramco, which has been novated to Infraco and Tramco pursuant to the Novation Agreement.

1.2 Unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender includes all other genders.

1.2.2 a reference to:

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1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a recital, clause or schedule is a reference to a recital, clause or schedule of or to this Agreement.

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation.

1.4 Where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

1.5 Unless otherwise defined hereunder, where the Tram Supply Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement.

1.6 In the case of any unintended conflict between the definition or interpretation of words or expressions in this Agreement and in the Tram Supply Agreement, the Tram Supply Agreement shall prevail save where by express words or where it is apparent from the context that the contrary is intended in this Agreement.

2. STANDARD OF CARE

Tramco warrants and undertakes to **tie** that:

2.1 it has carried out and shall carry out and discharge the Tram Works and all its other duties and obligation under the Tram Supply Agreement subject to and in accordance with the terms thereof; and

2.2 in addition to and without derogation from clause 2.1;

2.2.1 Tramco warrants to **tie** that, in the performance of the Tram Works and all its other duties and obligations under the Tram Supply Agreement it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent Tram designer and manufacturer experienced in carrying out works similar to the Tram Works to be carried out under the Tram Supply Agreement;

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2.2.2 it owes a duty of care to **tie** in carrying out its duties and obligations under the Tram Supply Agreement;

2.2.3 all obligations and duties on the part of Tramco set out in the Tram Supply Agreement which are expressed to be made in favour of or given to **tie** shall be directly enforceable by **tie** pursuant to this Agreement following the novation of the Tram Supply Agreement pursuant to the Novation Agreement.

3. COPYRIGHT LICENCE

3.1 Tramco hereby grants to **tie** a royalty-free and exclusive licence to use such Project IPR and Tram Supplier IPR as may be necessary, for operation and maintenance of the trams but, not in any case, for manufacturing purposes, for **tie** to use in relation to any projects associated with the Tram Works and or the operation and/or maintenance of the Edinburgh Tram Network, including the Trams. This licence shall carry the right to grant sub-licences, and be transferable to third parties, prior written approval of the Tram Supplier. Tramco shall be liable for the Project IPR and the Tram Supplier IPR only to the extent that it is used for the purposes for which it was intended.

3.2 In so far as ownership of the copyright and any other Intellectual Property Rights in any Deliverable prepared or provided by Tramco in connection with the provision of the Tram Works under the Tram Supply Agreement is vested in any person other than Tramco including, without limitation, any Tram Supplier Party, Tramco shall procure for **tie** the benefit of such a licence as is referred to in clause 3.1 for the purposes referred to therein.

3.3 Tramco shall, if so requested at any time, execute such documents and perform such acts (including the grant to **tie** of a licence to use any Software related with operation and maintenance) as may be required fully and effectively to assure to **tie** or any third party the rights referred to in this clause 3.

3.4 Tramco shall provide to **tie** a copy of any of the Deliverables which are to be provided to Infraco under the Tram Supply Agreement as soon as reasonably practicable after receipt by Tramco of a written request from **tie** to do so, unless already delivered to **tie**.

3.5 Tramco undertakes to **tie** that the use by **tie** of any of the Deliverables for any purpose provided for in this clause 3 shall not infringe the rights of any third party in relation to the Deliverables.

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4. REQUIRED INSURANCES AND OCIP INSURANCES

4.1 Tramco undertakes to **tie** that:

4.1.1 it has maintained and shall maintain during the performance of its obligations under the Tram Supply Agreement each of the Required Insurances in accordance with the requirements of Clause 40 (*Required Insurances*) and Schedule 11 (*Required Insurances*) of the Tram Supply Agreement;

4.1.2 cover under the professional indemnity insurance is extended to include Tramco's liabilities under this Agreement;

4.1.3 this Agreement has been disclosed to Tramco's current professional indemnity insurers or brokers (as the case may be) and shall be disclosed to any future professional indemnity insurers or brokers providing the insurance required by this Agreement;

4.1.4 Tramco shall abide by the terms and conditions of insurance and not do or omit to do anything that might prejudice the cover or its rights to make a claim; and

4.1.5 it has been disclosed to it details of the OCIP Insurances and that it shall abide by the terms and conditions of the insurances contained therein and shall not do or omit to do anything that might prejudice the cover of **tie**'s right to make a claim under the OCIP Insurances.

4.2 As and when required by **tie**, Tramco shall produce for inspection documentary evidence that the Required Insurances are being properly maintained.

4.3 Tramco shall not make any material alteration to the terms of the Required Insurances without **tie**'s prior approval which approval shall not be unreasonably withheld. If the insurer makes or attempts to make any material alteration or purports to withdraw cover, or if Tramco is unable to obtain professional indemnity insurance, Tramco shall promptly give written notice of this to **tie**.

5. tie STEP-IN

5.1 Tramco shall not exercise nor seek to exercise any right of determination of the Tram Supply Agreement or to rescind the Tram Supply Agreement by reason of a Client Default or to otherwise discontinue the performance of any of Tramco's obligations in relation to the Tram Supply Agreement by reason of breach on the part of Infraco (or otherwise) without giving **tie** not less than 21 days' written notice of its intention to do so and specifying in such notice the

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grounds for the proposed determination. Tramco for the period of any such notice diligently and properly continue to perform Tramco's obligations under the Tram Supply Agreement.

5.2 Any period stipulated in the Tram Supply Agreement for the exercise by Tramco of a right of determination shall nevertheless be extended as may be necessary to take account of the period of notice required under clause 5.1.

5.3 Compliance by Tramco with the provisions of clause 5.1 shall not be treated as a waiver of any breach on the part of Infraco giving rise to the right of determination nor otherwise prevent Tramco from exercising its rights after the expiration of the notice unless the right of determination shall have ceased under the provisions of clause 5.4

5.4 The right of Tramco to determine the Tram Supply Agreement or to rescind the Tram Supply Agreement or to discontinue the performance of any of its obligations in relation to the Tram Supply Agreement shall cease if within the period of 21 days referred to in clause 5.1, **tie** gives written notice to Tramco:

5.4.1 requiring Tramco to continue with the performance of all its obligations under the Tram Supply Agreement;

5.4.2 acknowledging that **tie** is assuming all the obligations of Infraco (as "Client") under the Tram Supply Agreement; and

5.4.3 undertaking to Tramco to discharge all amounts payable to Tramco under the terms of the Tram Supply Agreement from the date on which such notice under this clause 5.4 is given to Tramco.

5.5 Upon compliance by **tie** with the requirements of clause 5.4, the Tram Supply Agreement shall continue in full force and effect as if the right of determination on the part of Tramco had not arisen and in all respects as if the Tram Supply Agreement had been made between **tie** and Tramco to the exclusion of Infraco.

5.6 Notwithstanding that as between Infraco and Tramco, Tramco's right of determination of its engagement under the Tram Supply Agreement may not have arisen, the provisions of clause 5.5 shall nevertheless apply if **tie** gives written notice to Tramco and Infraco to that effect and **tie** complies with the requirements on its part under clause 5.4.

5.7 Tramco does not need to be concerned or required to enquire whether, and shall be entitled to assume that, as between Infraco and **tie**, the circumstances have occurred permitting **tie** to give notice under clause 5.6.

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5.8 Tramco acting in accordance with the provisions of this clause 5 shall not incur any liability to Infraco arising out of the exercise by **tie** of its rights under this clause 5.

5.9 Save as otherwise set out in this Agreement, unless and until **tie** has given notice under this clause 5:

5.9.1 **tie** has no liability whatsoever to Tramco in respect of amounts payable to Tramco under the Tram Supply Agreement; and

5.9.2 **tie** has no authority to issue any direction or instruction to Tramco in relation to the performance of Tramco's obligations under the Tram Supply Agreement.

5.10 Without prejudice to the provisions of clauses 5.1 to 5.9 inclusive, if prior to the service of any notice under clause 5.4 Tramco is determined under the Tram Supply Agreement for any reason whatsoever, Tramco shall, if required in writing so to do by **tie**, no later than 12 weeks after the date of such determination forthwith enter into a new agreement with **tie** on the same terms as the Tram Supply Agreement, but with such revisions as **tie** and Tramco may reasonable require to reflect altered circumstances and the fact that it is **tie** and not Infraco employing Tramco.

6. ASSIGNATION

6.1 Tramco shall not assign, novate or otherwise transfer the whole or any part of this Agreement without the prior written agreement of **tie**.

6.2 **tie** shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

6.2.1 to the Scottish Ministers or any local authority or other body with no worse financial standing than that of **tie**; or

6.2.2 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to Tramco) by **tie** or a person falling within clause 6.2.1; or

6.2.3 to City of Edinburgh Council or Transport Edinburgh Limited; or

6.2.4 to any other person with the prior written consent of Tramco (such consent not to be unreasonably withheld or delayed).

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6.3 Tramco undertakes to **tie** not to contend in any court proceedings under this Agreement that any person to whom **tie** assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this clause is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that **tie** is named under this Agreement or any intermediate assignee of **tie** escaped loss resulting from such breach by reason of the disposal of its interest in the same.

7. LIABILITY OF TRAMCO

7.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by law of contract, delict or otherwise.

7.2 The responsibility of Tramco under this Agreement is not to be reduced or in any way reduced or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by **tie** against a third party.

7.3 The rights and remedies conferred upon **tie** by this Agreement are in addition to any other rights and remedies that **tie** may have against Tramco including (without prejudice to the generality of the foregoing) any remedies in delict.

7.4 Subject to the other provisions of this Agreement, the liability of Tramco to **tie** is to be determined in all respects in accordance with the terms of the Tram Supply Agreement and this Agreement and, in the event of any claim by **tie** under or through this Agreement, Tramco shall be entitled to rely upon any defence, right, limitation or exclusion under the Tram Supply Agreement as though **tie** were named as Client under it, except that:

7.4.1 **tie** shall not be affected by any subsequent variation of the Tram Supply Agreement which would adversely affect the obligations owed by Tramco or the waiver, compromise or withdrawal of any claim made Infraco; and

7.4.2 Tramco shall not be entitled to exercise any right of set-off, retention or withholding against **tie** to which Tramco may be entitled as against Infraco.

7.5 The liability of Tramco under this Agreement shall be no greater in extent than the liability of Tramco under the Tram Supply Agreement.

7.6 In no event shall the Tram Supplier be responsible for indirect or consequential damages.

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8. DELIVERY, TITLE TO PARTS AND OTHER PROPERTY

Notwithstanding any provision of the Tram Supply Agreement to the contrary, in respect of Tramco's performance of its obligations under the Tram Supply Agreement:

8.1 Tramco shall sell to **tie** or such other party as shall be notified by **tie** to Tramco in writing, each Tram free from all claims, charges, rights in security, liens, encumbrances, hypothecs and other third party rights of any nature.

8.2 Tramco shall transfer title:

8.2.1 to each Tram, to **tie** or such other party as shall be notified by **tie** to Tramco in writing, on the date of issue of the Certificate of Tram Delivery being issued in respect of that Tram;

8.2.2 to each item of the Tram Related Equipment to **tie** or such other party as notified by **tie** to Tramco in writing, on the later of delivery of each item of the Tram Related Equipment to Infraco and the Certificate of Tram Commissioning being issued in respect of the first Tram.

8.3 The risk of loss, theft, damage or destruction of:

8.3.1 each Tram shall pass from Tramco to **tie** or such other party as notified by **tie** to Tramco in writing on the date of issue of the Certificate of Tram Delivery being issued in respect of that Tram;

8.3.2 each item of the Tram Related Equipment shall pass from Tramco to **tie** or such other party as notified by **tie** to Tramco in writing, on the later of delivery of each item of the Tram Related Equipment and the Certificate of Tram Commissioning being issued in respect of the first Tram.

8.4 Tramco shall be responsible for each Tram completely manufactured or in the course of manufacture and for all Tram Related Equipment until such time as risk in the Trams and the Tram Related Equipment passes to **tie** (or as **tie** otherwise shall direct) in accordance with this clause 8.

8.5 Tramco undertakes to **tie** that it shall promptly replace any Tram or any part, component or material incorporated in or to be used in connection with such Tram or any Tram Related Equipment, which is lost, damaged or destroyed by whatever cause, prior to such passing of risk.

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9. CONSENT OF INFRACO

Infraco consents to the terms of this Agreement.

10. NOTICES

10.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

10.2 Any notice given pursuant to this clause, if sent by registered or recorded delivery post, is deemed to have been received 48 hours after being posted.

11. RIGHTS OF THIRD PARTIES

A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

12. INVALID TERMS

12.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

12.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

12.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

13. VARIATIONS AND WAIVERS TO BE IN WRITING

13.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

14. WAIVER

14.1 Save where expressly stated, no failure or delay by any Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

14.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do no operate to exclude one another or any rights or remedies provided by law.

15. JURISDICTION AND LAW

15.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

15.2 The Parties agree that any dispute in relation to this Agreement shall be conducted in accordance with Clause 64 (*Dispute Resolution Procedure*) of the Tram Supply Agreement and the provisions of the said Clause 64 and Schedules 13 (*Dispute Resolution Procedure*) and 14 (*Panels to the Dispute Resolution Procedure*) are deemed to be incorporated mutatis mutandis in respect of this Agreement provided that any reference to "Parties" shall be deemed to refer to **tie** and Tramco, any reference to "Client" shall be deemed to refer to **tie**, and notices to be given in connection therewith shall be given in accordance with clause 10 of this Agreement.

IN WITNESS WHEREOF these presents on this and the preceding [◆] pages are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

TIE00899940_0186

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **SIEMENS PLC**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

TIE00899940_0187

EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

TIE00899940_0188

NOVATION AGREEMENT ESCROW LETTER

DLA Piper Scotland LLP
Collins House
Rutland Square
EDINBURGH
EH1 2AA

[**Date**] 2008

Dear Sirs,

EDINBURGH TRAM NETWORK - TRAM SUPPLY AND TRAM MAINTENANCE AGREEMENTS

We refer to:

1. a Tram Supply Agreement dated ◆ between (1) **tie** Limited and (2) Construcciones Y Auxiliar De Ferrocarriles S.A. (CAF) for the design, manufacture and supply of Trams and the supply of documentation and associated equipment ("**Tram Supply Agreement**"); and

2. a Tram Maintenance Agreement dated ◆ between (1) **tie** Limited and (2) Construcciones Y Auxiliar De Ferrocarriles S.A. (CAF) for the provision of services for the ongoing maintenance of Trams and for the supply of consumables and spares for Trams ("**Tram Maintenance Agreement**").

We also refer to the documents detailed in Schedule 1 to this letter (items numbered 1 and 2 being referred to as the "**Novation Agreements**" and items 3 and 4 being referred to at the "**Collateral Warranties**") which have been signed by **tie** Limited and Construcciones Y Auxiliar De Ferrocarriles S.A. (CAF) (but which are as at today's date unsigned by Infraco) (as referred to below) (which shall be referred to as the "**Agreement Documents**").

Originals of the Agreement Documents are enclosed with this letter, and are to be held by you as escrow agent upon the following terms and conditions:

3. Whilst the Agreement Documents are held by you in escrow, they shall have no effect as between the parties thereto.

4. Upon **tie** Limited confirming to you in writing in the form set out in Schedule 2 that an agreement to be made between (1) **tie** Limited and (2) a contractor to be appointed by **tie** Limited ("**Infraco**") to carry out and/or manage the design, construction, installation, commissioning, tram procurement, system integration, infrastructure maintenance, tram maintenance and supply of related equipment and materials, trams and related infrastructure in respect of the Edinburgh Tram Network ("**Infraco Contract**") has been executed by **tie** and Infraco in accordance with the Requirements of Writing (Scotland) Act 1995 and that the

TIE00899940_0189

Infraco Contract has become unconditional in all respects save only for the execution by Infraco of the Agreement Documents ("**Infraco Completion**"), you are thereupon authorised and directed forthwith:

to deliver the Agreement Documents to Infraco for execution by Infraco in accordance with the Requirements of Writing (Scotland) Act 1995. Delivery of documents hereunder is to be by hand, by courier or by recorded first-class post.

If you do not receive notice from **tie** Limited as aforesaid that Infraco Completion has occurred before the first anniversary of the date of this escrow letter, or such later date as may be agreed in writing by the parties to this escrow letter, you shall be under no further obligation to the signatories of this letter and none of the Agreement Documents shall have any legal effect.

All of the parties to this escrow letter agree that you shall be fully entitled to act in accordance with the terms set out in this escrow letter upon receipt by you of the notice from **tie** Limited referred to in paragraph 2 above, and that in so doing you shall have no liability to us (or any of us) in any respect whatsoever connected to the performance of your duties under this escrow letter. Furthermore, upon the performance of such duties in accordance with the terms of this escrow letter, you shall be irrevocably released from the obligations arising under this escrow letter.

Please sign the acknowledgement below confirming your agreement to the above terms.

Yours faithfully

They are subscribed for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at

on 2008 by:

Authorised Signatory _____

Full Name _____

.....
Accepted and agreed:
DLA Piper Scotland LLP

TIE00899940_0190

SCHEDULE 1 OF THE NOVATION AGREEMENT ESCROW LETTER

AGREEMENT DOCUMENTS

Document No.	Document Description	Parties
	Tram Supply Agreement Novation Agreement	(1) **tie** Limited (2) Construcciones y Auxliliar de Ferrocarriles (CAF) (3) Bilfinger Berger UK Ltd and Siemens plc
	Tram Maintenance Agreement Novation Agreement	(1) **tie** Limited (2) Construcciones y Auxliliar de Ferrocarriles (CAF) (3) Bilfinger Berger UK Ltd and Siemens plc
	Tram Supply Agreement Collateral Warranty	(1) Construcciones y Auxliliar de Ferrocarriles (CAF) (2) **tie** Limited (3) Bilfinger Berger UK Ltd and Siemens plc
	Tram Maintenance Agreement Collateral Warranty	(1) Construcciones y Auxliliar de Ferrocarriles (CAF) (2) **tie** Limited (3) Bilfinger Berger UK Ltd and Siemens plc

They are subscribed for and on behalf of **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)**

at

on 2008 by:

Authorised Signatory _____

Full Name _____

They are subscribed for and on behalf of **TIE LIMITED** at

on 2008 by:

Authorised Signatory _____

Full Name _____

SCHEDULE 2 OF THE NOVATION AGREEMENT ESCROW LETTER

RELEASE LETTER

To: DLA Piper Scotland LLP
Collins House
Rutland Square
Edinburgh EH1 2AA

[Date] 200◆

We, **tie** Limited, refer to the escrow letter dated ◆ from us and Construcciones y Auxliliar de Ferrocarriles (CAF) to you and countersigned by you. Words and phrases defined in the escrow letter shall have the same meanings when used herein.

We hereby confirm to you, by reference to paragraph 2 of the escrow letter that Infraco Completion has taken place, and you are therefore hereby authorised and directed forthwith to deliver the Agreement Documents to Infraco for execution in accordance with the Requirements of Writing (Scotland) Act 1995 (by hand or courier or recorded first-class post) in accordance with paragraph 2 (a) of the escrow letter.

Director/Authorised Signatory,

For and on behalf of **tie** Limited

They are subscribed for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at

on 2008 by:

Authorised Signatory _____

Full Name _____

They are subscribed for and on behalf of **TIE LIMITED** at

on 2008 by:

Authorised Signatory _____

Full Name

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

TIE00899940_0192

This is Schedule 2 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 2

EMPLOYER'S REQUIREMENTS

This is Schedule 2 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 2

EMPLOYER'S REQUIREMENTS

SCHEDULE PART 2

EMPLOYER'S REQUIREMENTS

Erratum to Version 4

Erratum	Date	Comments
001	24/04/08	Page 48: Section 2.15: The footnote "Damian has already instructed this change." – is to be ignored.
002	24/04/08	Page 90: Section 7: The footnote "The word maximum would allow no channels to be provided and still be compliant! Two channels ok as a minimum." – is to be ignored.
003	24/04/08	Page 147: Section 10.1.5: The reference in the last sentence to Schedule 32 is incorrect. It should read "The Noise and Vibration Policy is included in Schedule Part 29 (***tie*** *and CEC Policies*)".
004	24/04/08	Page 174: Section 12.9 - The reference to Schedule 45 should refer to Schedule Part 40.
005	24/04/08	Page 209: Section 17.1: Last paragraph The reference to Section 32 should read Schedule Part 29. After Project Safety and Quality Interface Document add (40-91-PLA-002).
006	24/04/08	Page 273: Section 23.16.6 - Schedule 7 - Performance Regime is incorrect. This should now refer to Schedule Part 6.
007	24/04/08	Page 609: Section 40.1.2 – Final paragraph Performance payment regime – The reference to Schedule 7. This should now refer to Schedule Part 6.
008	24/04/08	Page 634: Section 40.2.4 Last line Reference to Clause 52 of Infraco should read as Clause 52.20.1.
009	24/04/08	Page 635: Section 40.2.4 Table 93 Fault Category 3 "Edqual Service elements in Schedule 7" should read "Equal Service elements in Schedule Part 6".
010	24/04/08	Page 645: Section 40.2.8 Last set of bullet points at bottom of page Reference to Schedule 7 Performance Measurement System should read as Schedule Part 6.
011	05/05/08	Page 40 Section 2.8 Table 2 reformatted to show entire contents (see attached)
012	05/05/08	Page 41 Section 2.8 Table 3 reformatted to show entire contents (see attached)
013	05/05/08	Page 42 Section 2.8 Table 4 reformatted to show entire contents (see attached)
014	05/05/08	Page 431 Section 29.14 Table 83 see updated version (see attached)
015	05/05/08	Page 610 Section 4.2.2 Table 89 see updated version (see attached)
016	05/05/08	Page 50 Section 2.16(b) 4th bullet - delete "Leith" and replace with "Ocean Terminal or Newhaven according to service"
017	05/05/08	Page 147 Section 10.1.7 - delete "Section 68 of the Edinburgh Tram Line Act 2006" and replace with "Section 63C of the Edinburgh Tram Line Act 2006"
018	05/05/08	Page 169 Section 12.8 Update reference to ISO 10005-1995 to ISO 10005-2005
019	05/05/08	Page 260 Section 23.13.3 - delete "Network" from section heading
020	05/05/08	Page 264 Section 23.14.3 - delete "Network" from section heading
021	05/05/08	Page 266 Section 23.15.3 - delete "Network" from section heading
022	05/05/08	Page 318 Section 24.5 Change reference to Schedule 22 of the Tram Supply Agreement to Schedule 23 of the Tram Supply Agreement
023	05/05/08	Page 318 Section 24.6 3rd paragraph should read "The Trams shall have a key suiting system that provides a logical hierarchy of access to cleaners, inspectors, drivers and maintenance staff. It shall not be part of the general suite but tram specific as detailed in Section 22.2.1 of these Employer's Requirements."

Erratum	Date	Comments
024	05/05/08	Page 622 Section 40.2.2 Table 92 Structures SO3 and SO4 - delete "(if CEC own it)" from the comments column
025	05/05/08	Page 625 Section 40.2.2 Table 92 Structures S20 to S31 - insert "the Operator is responsible for cleaning and graffiti removal" to the comments column
026	05/05/08	Page 627 Section 40.2.2 Table 92 Retaining Walls W03 to W19 - insert "the Operator is responsible for cleaning and graffiti removal" to the comments column
027	05/05/08	Page 632 Section 40.2.4 Final paragraph headed "**Further Maintenance Activities" -** delete bullet "removal of graffiti" and bullet "cleaning"
028	05/05/08	Page 644 Section 40.2.8 Under heading "Reporting Period Review", 4th bullet relating to maintenance report, sub-bullets 1 and 2 - delete "including cleaning"
029	05/05/08	Page 646 Section 40.2.10 3rd paragraph - delete "operational phase" and replace with "Term"
030	05/05/08	Page 652 Section 40.2.19 - delete section and insert "Not used"
031	05/05/08	Page 652 Section 40.2.20 - delete bullets 1 to 4, and 6
032	05/05/08	Page 662 Section 40.3.9 1st paragraph - delete "will be established in detail during the tender process" and replace with "in the Tram Maintenance Agreement"
033	05/05/08	Page 665 Section 40.4.1 9th paragraph 3rd sentence - replace with "The Edinburgh Tram Network design shall be selected such that all equipment/systems used in the design shall continue to be available for the design life specified and that the Infraco shall give tie a minimum of 12 months notice where any supplier intends to cease supply of any component. The Infraco shall recommend a strategy for managing such obsolescence and effect replacement of such components where these fail."
034	05/05/08	Page 672 Section 40.5.2 6th bullet - amend to read "evidence of product whole life cycle experience to date in other service use"
035	05/05/08	Appendix 1 – ET Brand Guidelines as referred to in Section 5 (see attached)

Employer's Requirements

Erratum 011

Table 2 (Page 40 Section 2.8)

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Network / Phasing	Service frequency commencing at:	Monday - Friday (trams per hour)					
		first tram 06:00	06:45	07:00	07:20	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Network / Phasing	Service frequency commencing at:	Saturday (trams per hour)					
		first tram 06:00	06:45	07:30	07:50	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Network / Phasing	Service frequency commencing at:	Sunday (trams per hour)					
		first tram 07:00	07:45	08:00	08:20	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Notes:

[a] from approx 23:15 Trams run from the Airport - City Centre only

[b] from approx 23:15 Trams run from Granton - City Centre only

[c] from approx 23:15 Trams run from Newhaven - Haymarket continuing in service on TL2 to Gyle

Employer's Requirements

Erratum 012

Table 3 (Page 41 Section 2.8)

TIE00899940_0199

8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario

Networking (Phasing) and Service Frequency commencing at:		06:00	06:45	07:00	07:20	07:45	09:45	15:45	19:00	19:45	23:15
1a	Airport to Ocean Terminal	0	6	8	8	8	6	6	8	6	6a
1a	Ocean Terminal to Airport	6	6	8	8	8	6	6	8	6	6
1a	Haymarket to Newhaven	0	[redacted]	6	8	8	6	6	8	6	6
1a	Newhaven to Haymarket	0		0	6	8	6	6	8d	6	6
1b	Airport to Ocean Terminal	0	6	8	[redacted]	8	6	6	8	6	6a
1b	Ocean Terminal to Airport	6	6	8		8	6	6	8	6	6
1b	Granton to Haymarket	0	6	8		8	6	6	8	6	6 b
1b	Haymarket to Granton	6	6	8		8	6	6	8	6	6c

Networking (Phasing) andService Frequency commencing at:		Saturday (trams per hour) first tram 06:00	06:45	07:30	07:50	08:15	18:30	18:50	19:15	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	8	[redacted]	8	8	6	6a	0
1a	Ocean Terminal to Airport	6	6	6	8		8	8	6	6	0
1a	Haymarket to Newhaven	0	[redacted]	6	8		8	8	6	6	0
1a	Newhaven to Haymarket	0		0	6		8	8d	6	6	0
1b	Airport to Ocean Terminal	0	6	6	[redacted]	8	8	[redacted]	6	6a	0
1b	Ocean Terminal to Airport	6	6	6		8	8		6	6	0
1b	Granton to Haymarket	0	6	6		8	8		6	6b	0
1b	Haymarket to Granton	6	6	6		8	8		6	6c	0

TIE00899940_0200

Networking (Phasing) andService Frequency commencing at:		Sunday (trams per hour)									
		first tram 07:00	07:45	07:50	08:00	08:45	18:00	18:20	18:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6		6	6		6a	0
1a	Ocean Terminal to Airport	6	6	6	6		6	6		6	0
1a	Haymarket to Newhaven	0		6	6		6	6			0
1a	Newhaven to Haymarket	0		0	6		6	6d			0
1b	Airport to Ocean Terminal	0	6		6	6	6		6	6a	0
1b	Ocean Terminal to Airport	6	6		6	6	6		6	6	0
1b	Granton to Haymarket	0	6		6	6	6		6	6b	0
1b	Haymarket to Granton	6	6		6	6	6		6	6c	0

Notes:
a) from approx 23:15 trams run from Airport - St Andrew Sq only
b) from approx 23:15 trams run from Granton - St Andrew Sq only
c) from approx 23:15 Granton trams run from Newhaven - Haymarket continuing in service on to Gyle
d) from approx 19:20 (18:50 Saturdays and 18:20 Sundays) Haymarket trams running from Newhaven - Haymarket continue in service to Gyle

Note: The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Employer's Requirements

Erratum 013

Table 4 (Page 42 Section 2.8)

Phase	Service Frequency	Saturday (trams per hour)					
		First tram					Last tram
	commencing at:	06:00	06:45	07:30	07:50	23:15	23:59
1a	Airport to Ocean Terminal	0	6	6	6	6a	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6	6	6	6a	0
1b	Ocean Terminal to Airport	6	6	6	6	6	0
1b	Granton to Newhaven	0	6	6	6	6b	0
1b	Newhaven to Granton	6	6	6	6	6c	0

TIE00899940_0203

Employer's Requirements

Erratum 014

Table 83 (Page 431 Section 29.14)

TIE00899940_0204

Table 83 - Depot Plant and Equipment to be Provided (updated 020508)

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
1		Cleaning Equipment										
	1.1	Tram Cleaning Equipment	Equipment for cleaning of tram interiors	110V Industrial vacuum cleaning equipment, ≥ 2kW power Equipment to allow removal Floor polishing equipment	P	Generally used in stabling areas However can be used throughout the Depot	T	O	O	O	O	6
	1.2	Tram pressure washer	Industrial washer for general tram cleaning within the Depot including bogie washing	Self powered Hot water/steam - self heating Pressure variable up to ≥200 bar Flow rate ≥12 l/min Lance and hose ≥10m Detergents compatible with Tram external finishes	M	Throughout Depot	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.3	Infraco pressure washer	Removal Removal of fly posters General cleaning	Features as per Tram pressure washer Mobile towable bowser with capacity for up to one shift of cleaning Infraco to ensure interchangability with tram pressure washer Readily transportable on back of road-rail and other road vehicles	M	Across the ETN	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.4	Tram Washing Plant	Fixed plant for cleaning of Tram exterior	Unidirectional >15 tph continuously Minimised water consumption, maximised water recirculation controllable and monitored from Control Centre via SCADA system Self contained Pre-wet One pair application brushes Automatic end wash Two pair water wash brushes Dryer Operates from -5°C ambient external temperature within shelter Final details TBD with tram supplier ≥70% water recycling	F	Alongside main workshop	I	O	O	O	O	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Backflow prevention devices shall be installed. Treatment of wastewater to meet appropriate standards prior to connecting to site drainage system shall be provided.								
	1.5	Rail Groove Cleaning Equipment	P-way cleaning	Vacuum equipment to remove detritus/debris from grooved track including drain boxes and points Able to clean drains and gullies employing water jets Transportable on road/rail vehicle, lifted with crane or fork lift truck	M	Across the ETN	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Self powered for full shift Easy collection/disposal of detritus/debris								
	1.6	Parts washer	Infrastructure/Tram component cleaning & degreasing in dirty workshop	Able to wash components ≤100kg, ≤750mm diameter	F	Within dirty workshop	I	I/T	I	I	User	1
	1.7	Floor scrubber	Depot floor cleaning	Industrial vacuum/brush scrubber equipment Compatible with floor finishes	M	Within Depot building	T	T	T	T	T	1
2		Mechanical Handling										
	2.1	Shunter	Manouveuring Trams within workshop	Battery powered Road/rail capability Capable of towing/propelling single Trams Speed up to 3 km/h Local and remote control	M	Throughout Depot tracks Road capability to move between tracks on	T	O/T	~~I/~~T	O	User	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Charging facilities Coupler at each end		hardstanding						
	2.2	Tram lifting system and stands	Lifting Trams to allow routine maintenance and removal of bogie(s)	Fixed underfloor system providing flush floor when not in use. Ability to lift fully functional, unladen tram. Synchronised lift from single control panel. Ability to stop and lock lift at any vertical positionInterlocking to protect Tram in event of system/component failure. Manually positioned stands to be provided Interlocking with OLE if required.	F	Main workshop	I	T	T	T	T	1 set

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.3	Fixed high level access platforms	To allow access to all equipment mounted on Tram roof	Capable of providing access to all roof mounted equipment on tram Decking to prevent tools or small to components falling through Handrails and toeboards to prevent personnel/material falling Access/egress gates interlocked with OLE End protection	F	Main workshop	I	T	I	T	T	2 sets
	2.4	Overhead crane	Bridge type crane spanning 2 roads within the workshop to allow all material within main workshop to be transported up to and including size/weight of motor bogie	≥6.3 tonne capacity Vertical clearance <960 mm from hook (fully raised) to top of crane Traverses below OLE Interlocked with OLE Remote control using hand held device	F	Main workshop	I	T/I	T	T	User	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Multi-speed faciltiy - lift, traverse and travel Long and cross travel to cover all areas over the two roads								
	2.5	Mobile crane	Facilitate removal of miscellaneous equipment including bogie components within the dirty workshop	≥2t capacity Powered operation	M	Throughout workshops	T	T/I	T	T	User	1
	2.6	Bogie workstands	To allow dismounted bogies to be maintained	Allows bogie to be manoeuvred along the stub track in the dirty workshop Wheel locks Capable of supporting both trailer and motor bogie	M	Dirty workshop	T	T	T	T	T	1
	2.7	Other tram equipment stands	Various stands to allow items of equipment to be stored and readily maintained when dismounted from the Tram	Infraco to propose depending on tram design Expected to include stands for doors,	M	Throughout Depot	T	T	T	T	T	

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				windows, body panels etc…								
	2.8	Accommodation bogies	To allow Trams to be moved within workshop once bogies have been removed or the Tram has been split at any articulation	Allows Tram to be manoeuvred throughout the depot once any combination of bogies has been replaced Allows entire tram to be manoeuvred throughout the depot once any articulation has been split	M	Throughout Depot	T	T	T	T	T	
	2.9	Fork lift truck	Lifting and transporting miscellaneous equipment	Battery powered Charging facilities Road wheels >3 t lifting capacity Drum handling equipment Crane arm Capable of accessing	M	Throughout the Depot but limited to hard standing areas when outside	T & I	T/I	T & ~~/~~I	T & I	User	1 plus 1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				all shelving and racking in stores- Infraco to demonstrate								
	2.10	Pallet truck	Lifting & Transporting equipment particularly in stores	Manually manoeuvred, hydraulic lifting the Infraco to propose requirements. Infraco to provide integrated solution	M	Throughout the Depot but limited to hard standing areas when outside	I	T/I	T/I	T	User	The Infraco to propose
	2.11	Hand trolleys	Transporting tools and spares	Unpowered the Infraco to propose requirements. Infraco to provide integrated solution	M	Throughout the Depot but limited to hard standing areas when outside	I	T/I	T/I	T	User	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.12	Infraco lifting slings	General slings for lifting infrastructure heavy components on system and in Depot building	Infraco to propose. Stand for storage	P	Use on system infrastructure	I	I	I	I	I	The Infraco to propose
	2.13	Tram lifting slings	Specific lifting gear to allow all equipment to be removed and replaced.	Raised hook on overhead crane can be no more than 5390 mm ARL the Infraco to propose Stand for storage	M	Use in Depot building only	T	T	T	T	T	Tramco to propose
	2.14	Windscreen/window removal equipment	For use in replacing tram windscreens and side windows	Mobile stand capable to being used to access both windscreen and side windows Electrically powered vacuum beam with suckers adapted to windscreen design Audio/visual alarm in the event of suction loss	M	Use in Depot building only	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.15	Re-railing equipment	For use in re-railing trams out on the System	Variety of jacks/beams/slides to be proposed by the Infraco Airbags Slew locking devices Capable of being readily transported on the road/rail vehicle	M	Used any where on system including Tramstops	T	T	T	T	T	1 set
	2.15	Stop boards	To indicate the presence of equipment/personnel/trams on the tracks	The Infraco to propose requirements. Infraco to develop integrated solution	P	Throughout System	I	T/I	I	T/I	User	≥20
3		Workshop & Stores Furniture										
	3.1	Shelving and racking	Storage of spares and other material	Heavy duty The Infraco to propose requirements. The Infraco to develop integrated solution	F	Stores	I	T/I	I	T/I	User	The Infraco to propose
	3.2	Tram staging	for Tram inspections/repairs	The Infraco to propose any	M	Used within Depot	T	T	T	T	T	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				additional staging required		building						
	3.3	General staging	For infrastructure inspections/repairs	The Infraco to propose any additional staging required	M	Across Edinburgh Tram Network	I	I	I	I	I	The Infraco to propose
	3.4	Shelving	Storage of minor items/documents	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose
	3.5	Workbenches	Equipment maintenance	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose
	3.6	Cupboards	Storage of minor items/documents	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose
	3.7	COSHH cupboard	Storage of COSHH items	The Infraco to propose requirements. The	F	Dirty workshop	I	T/I	I	T/I	user	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Infraco to develop integrated solution								
	3.8	Workshop stools	Personnel comfort when working	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	T/I	T/I	User	The Infraco to propose
4		Fixed Plant										
	4.1	Air conditioning maintenance equipment	Specialist tools for filling/emptying refrigerant	The Infraco to propose	F	Anywhere in Depot building	T/I	T/I	T/I	T/I	T/I	The Infraco to propose
	4.2	Tyre replacement equipment	Specialist tools for tyre splitting/removal/balancing /bearing replacement	The Infraco to propose	F	Dirty workshop	T	T	T	T	T	1
	4.3	Underfloor wheel lathe	In-situ reprofiling of Tram tyres	Capable of producing a range of wheel profiles. Tolerances to be agreed between the Infraco Swarf conveyed to skip for removal by means of forklift truck capable of turning all wheels on one Tram within	F	Within Depot building.	I	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				eight hour shift								
	4.4	Sand Plant	Refilling of Tram sanding equipment	Minimum silo capacity 30 tonnes Capable of receiving sand delivery directly from road vehicle Allows Tram driver to fill an empty tram within 5 minutes Rate of fill to be sustainable for 30 minutes. In no circumstances shall the interval between the filling of two Trams exceed 10 minutes The physical condition of the sand shall not deteriorate when stored Sand deliveries to a	F	Dedicated facility	T	O	O	O	~~I~~T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Tram shall stop automatically when the tram sand box is full Sand filling nozzles to be compatible with the sand filling inlets on the trams Signal interlocking to inhibit the movement of a tram if the sand filling nozzles are not returned to their correct storage position.								
	4.5	Machine tools	General machine tools required for maintenance	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Dirty workshop	I	T/I	T/I	T/I	User	The Infraco to propose
	4.6	Paint booth	Respraying of removable Tram panels	For use with water based paints integrated compressor	F	Outside workshop	T	T/I	T/I	T	User	1
	4.7	Pantograph	to calibrates and align	The Infraco to	F	Throughout	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
		maintenance & load test jig	tram pantograph off Tram roof	propose		workshops						
	4.8	Suspension setting equipment	To allow suspension to be set/shimmed without using tram lift	The Infraco to propose	M	Throughout workshops	T	T	T	T	T	1
	4.9	Diesel generator	Back up power source	Capable of connection to the depot LV switchboard and other plant requiring an external energy source. Capable of providing at least three day continuous operation.	M	Across network	*	I, T & O	~~I~~*	I		*To be rented by the Operator if and when required.
5		Hand & Mobile Tools										
	5.1	Infrastructure tools	Hand tools	The Infraco to propose	P	Across ETN	I	I	I	I	I	The Infraco to propose
	5.2	Tram tools	Hand tools	The Infraco to propose	P	Across ETN	T	T	T	T	T	Tramco to propose
6		Welding Shop Equipment										
	6.1	Ferrous welding equipment	General infrastructure repairs	The Infraco to propose requirements. Infraco	F	Dirty workshop	I	T/I	I	T/I	User	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				to develop integrated solution								
	6.2	Aluminium welding equipment	Specialist Tram and Tram shelter repairs	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Dirty workshop	I	T/I	I	T/I	Us er	The Infraco to propose
7		Battery Shop Equipment										
	7.1	Tram battery charger	To recharge Tram Batteries	The Infraco to propose	P	Battery room	T	T	T	T	T	The Infraco to propose
	7.2	Infrastructure battery chargers	To recharge various batteries used in power supply, control and comms equipment	The Infraco to propose and develop solution compatible with tram battery charger	P	Battery room	I	T	T	T	T	The Infraco to propose
8		Instrumentation and Test Equipment										
	8.1	Tram test equipment	To allow testing of measurement and testing of tram equipment	The Infraco to propose. Note any overlap with "Special Tools" to be highlighted. As a minimum, proposal to	M/P	The Infraco to propose	T	T	T	T	T	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				include; headlight tester, tools to allow event recorder to be downloaded and interrogated, tools to allow CCTV systems to be downloaded and interrogated, tools to allow PA and PID announcements to be re-configured.								
	8.2	Infrastructure and Fixed systems test equipment	To allow measurement and testing of infrastructure and fixed systems	The Infraco to propose. Note any overlap with "Special Tools" to be highlighted as a minimum, proposal to include; OLE height and stagger gauge, stray current data loggers, noise measurement equipment, ride measurement equipment, point	M/P	The Infraco to propose	I	I	I	I	I	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				setting detection equipment, ≥3 sets of live line testing equipment								
9		Infrastructure Maintenance Equipment										
	9.1	Portable P&C grinders	To dress points and crossings	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.2	Track welding equipment	to build up profiles/replace sections of track	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.3	Portable tamping equipment	To build up track ballast to realign track	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.3	Portable lighting equipment	To illuminate work/collision sites	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.4	Portable generators	To power site tools/lights	The Infraco to propose	P	On Site	I	I	I	I	I	2
	9.5	Track measuring Equipment	To allow track line and levels to be measured	The Infraco to propose	P	On site	I	I	I	I	I	1 set
10		Road Vehicles										

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	10.1	Road - rail vehicle	To move about the system carrying mobile equipment and personnel	Able to operate on UK roads Able to operate on all parts of the ETN To be equipped with demountable ≥2 man-basket to enable OLE inspection throughout the ETN Capable of towing a tram including ability to apply tram brakes from cab of road-rail vehicle Capable of having snow plough attached in both road and rail mode Crane with capacity ≥6t and a reach (reduced capacity) of at least 4m. Able to transport other equipment items as set out elsewhere in	M	Mobile throughout ETN and road network	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				this list Able to transport ≥3 personnel in cab Payload capability ≥10t This will make it a requirement that the driver has a LGV driving license. Powered winch with ≥8t pulling capacity								
	10.2	Other road vehicles	Miscellaneous vehicles to be proposed by Infraco	The Infraco to propose	M	Throughout road network	I	I	I	I	I	The Infraco to propose
	10.3	Road/rail trailer	Trailer with large man lift for OLE inspection/repairs	Capable of being towed to site by road/rail vehicle or truck	M	Throughout road network	I	I	I	I	I	1

Employer's Requirements

Erratum 015

Table 89 (Page 610 Section 4.2.2)

TIE00899940_0227

Table 89 – Infrastructure and Equipment Responsibilities Allocation Matrix

(updated 020508)

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Tram Stop Structure																
Platform surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Platform Inclined Approach		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Canopy		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Inside surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Internal Roof surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External Roof surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Integral Lighting		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Internal seating		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Stop Furnishings																
Stop Name Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Static Information Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Guard Rails/Barriers (as applicable)		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Lighting Columns		N/A	N/A	N/A	✗	✗	✗	✓	✗	✗	✓	✗	✗	✗	✗	✓
Lighting Lanterns		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Litter Bins		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External seating		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Platform Edge White Line		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Advertising Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Stop Equipment																
CCTV Cameras		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Public Address		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓

Loudspeakers																
Hearing Loops		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Passenger Information Displays		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Passenger Alarm/Help points		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Ticket Vending Machines (maintained & serviced by TEL)		N/A	N/A	N/A	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓
Drainage (Interface defined in Table 93)		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Trackside Equipments																
Stop Equipment Cabinets		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Stop Equipment Cabinet Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Traction Isolator Cabinets		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Traction Isolator Cabinet Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Point Control Cabinets		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Point Control Cabinet Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Point Heater Cabinets, Point Heaters & Controls		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Road Junction Cabinets		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗
Road Junction Cabinet Equipment		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗
Point Machines (including Manual Control)		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Contact Wire & Supports		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Poles		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Pole mounted Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Wall Fixings		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Wall fixed Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Tram Signal Heads (Roadside)		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✓

Tram Signal Posts (Trackside)		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Signals Posts		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Detector Loops		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Lighting on OLE Masts		N/A	N/A	N/A	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trackside cable ducts		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trackside cables		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Cable drawpits		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Structures (Bridges, Retaining Walls etc)																
Over Bridges See Table 95 for split		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Under bridges See Table 95 for split		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Retaining walls		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Misc Structures		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Swept Path		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Swept Path Markings		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Track																
Trackwork		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Points & Crossings		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Track Drainage		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Field' Stray Current Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Sub Stations																
Sub Station Buildings		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Sub Station Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Sub Station Compounds		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Sub Station Parking Facilities		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Stray Current Monitoring Points		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Stray Current Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Earthing Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trams																
Free issue' tram mounted equipments		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Trams		N/A	N/A	N/A	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✓

Tram saloon & Drivers cabs		N/A	N/A	N/A	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✓
Radio																
Portable radios		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Radio Base stations		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Landscaping																
Soft landscaping		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Hard Landscaping		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓

Floor	Room No.	Description	User Competence Assessor	Used by			Cleaned by			Maintained by			Access Controlled by		
				Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**
Stores, Workshops and Maintenance Area															
Ground Floor Level		Stores Office Centrally located	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✔	✘
		Heavy Store (Infraco)		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Heavy store (Tramco)		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Visitors Entrance Hall	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
		Workshop Cleaners Room	n.a	✔	✔	✘	✘	✔	✘	✔	✘	✘	✔	✔	✘
		Light Store (Infraco)		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Light Store (Tramco)		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Infrastructure Workshop		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Dirty Workshop / Machine Shop		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Clean Workshop (Infraco)		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Clean workshop (Tramco)		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Lobby	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Male Toilets	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Male Showers	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Female Toilets	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Female Showers	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Staff Corridor	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✘
		Infrastructure Admin	n.a	✔	✘	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Maintenance (Tramco) Admin	n.a	✘	✔	✘	✘	✘	✔	✔	✘	✘	✘	✔	✘
		First Aid	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
		Switchroom		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Infrastructure Manager	n.a	✔	✘	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Maintenance (Tramco) Manager	n.a	✘	✔	✘	✘	✘	✔	✔	✘	✘	✘	✔	✘
		Store Room (Cleaners?)	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✘	✘	✘
		Staff Entrance Hall	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
		Drying Room	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✔	✘
		Tram Batteries		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Equipment Room		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		UPS Room		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘

Floor	Room No.	Description	User Competence Assessor	Used by			Cleaned by			Maintained by			Access Controlled by		
				Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**
		Compressor Room - Air tools		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Tram Maintenance Area		✘	✔	✔	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Maintenance Area Transit Zone		✔	✔	✔	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Inspection Pits		✘	✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘
First Floor office accommodation			n.a	✘	✘	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
Furnishings - Used, Cleaned, Maintained and Controlled as appropriate															
Chairs, Desks, Tables, Filing cabinets etc			**As Appropriate**	✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
Kitchen and Catering Equipment				✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
Reception Desk & Furnishings				✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
Control Room Furnishings				✘	✘	✔	✘	✘	✔	✔	✘	✔	✘	✘	✔
Lockers, Coat Rails etc				✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
Training Room furnishings (Projector, Screen etc)				✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
External															
Depot Yard				✘	✘	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
Depot Stabling Area				✘	✘	✔	✔	✔	✔	✔	✘	✘	✘	✘	✔
Electrical Sub Station				✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
Power Energy Building (Electric, Gas etc)				✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
Depot Car Park				✘	✘	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Miscellaneous																
Communication & Control links		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓

	LEGEND
	Provided by Tram Maintainer
	Provided by the Infraco
✓	Responsible
✗	Not Responsible

Employer's Requirements

Erratum 035

Appendix 1 – ET Brand Guidelines



BRAND GUIDELINES JANUARY 2008

Edinburgh Trams

TIE00899940_0236

02 Forward

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Logo usage
Exclusion zone
Colours

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Marketing
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External design
Interior design

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Tram stops
Signs
Colours

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Welcome to the Edinburgh Trams brand.

The Edinburgh Trams brand plays a crucial part in our communications with our customers and in creating a strong, memorable and recognisable image for the system. The brand has been specifically developed to sit alongside Lothian Buses as part of a co-ordinated presentation of public transport in Edinburgh.
For the strategy to succeed it is vital that all those involved in the delivery and service of the system adhere to the guidelines contained in this manual.
This will ensure that the Edinburgh Trams brand remains coherent and consistent. It is a well known fact that a well managed and consistently implemented brand helps inspire public confidence and trust.
By working within these guidelines you will help contribute to that process.

Phil Wheeler



Convener, Transport, Infrastructure and Environment
City of Edinburgh Council



Willie Gallaher
Chairman tie



David Mackay
Chairman TEL

TIE00899940_0238

Introduction

The elements and architecture of the Edinburgh Trams brand draw heavily from the Lothian Buses identity. This is to reinforce the strategy that has been adopted to create a genuinely integrated public transport system for Edinburgh.

Colours, typography and graphics are consistent between the two modes and are immediately recognisable as 'family members'.

The contents of this manual define how the branding must be implemented if the integrity of the visual relationship between the two modes is to be maintained.

In essence the branding is clean, simple and easy to understand - precisely the values the tram service provides.



TIE00899940_0239

Glossary

The key terms used in this document are as follows:

The Mark

A combination of the harlequins, the logotype and the red block.



The Logotype

The text of Edinburgh Trams set in Swiss 721BT. The logotype is used with the harlequins and the block in fixed relationships to form marks.



The Exclusion Zone

The minimum area around marks or logotypes that must be kept free of other graphic elements. This is to ensure that they are reproduced clearly and legibly without interference from other visual devices.



TIE00899940_0240

Guide to using the Mark

This page describes how the mark and the red block should be used.

Some simple rules are:

1. Never extend the red block unless the extended width of the red block to the left is more than 2 times the width of the mark and the extensions bleed off the page or media as illustrated by the header above. The extension to the right edge of the media should be half the width of the mark.

2. The red block should never be reduced in height when part of the mark alone but can be extended in height when the width is extended subject to rule 1.

3. The height should only be extended if the block is to bleed off the page or media.



TIE00899940_0241

Colour Glossary

To assist those who are involved in reproducing the Edinburgh Trams identity we have described here the primary specifications for print, screen and paint.

Print

PMS
This is short for the Pantone Matching System. This system is used to specify proprietary 'spot' colours. Spot colours are individually mixed for printing.

The letter 'C' after the colour number shows a colour's appearance on coated paper stock. The letter 'U' after the number shows a colour's appearance on uncoated paper stock.

CMYK
These initials represent the colours used in the four colour printing process: Cyan, Magenta, Yellow and Black (Kohl). Different combinations and percentages of these four colours are used to make matches to the 'spot' colours.

Screen

RGB
This is short for Red, Green, Blue the primary colours of light. RGB is used for reproduction on screens and electronic display systems.

Web
To make colours that can be reproduced on internet and intranet sites, Web safe colours should be specified. Web safe colours provide a greater degree of consistency than RGB colours when there is no control over the equipment used to view the site.

Paint

NCS
This is short for Natural Color System. NCS provides a wide range of colour specifications applicable to paints and other materials.

Other systems such as RAL and British Standard BS4800 have a limited number of Edinburgh Trams colour matches. Approval needs to be sought before using these systems.

Typography

We have two fonts: Humanist 521BT for general use and Swiss 721 BT which is only used to create the Logotype.

Only Roman, Bold and Light versions of Humanist 521 should be used with italic versions as appropriate.

Humanist 521 BT

Roman Aa

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

Bold Aa

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

Light Aa

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

TIE00899940_0243

Mark usage

The mark shown here is the only acceptable version to be used.

No other colours should be used and the mark should never be stretched or the proportions altered in any way.



TIE00899940_0244

Mark usage

When using a single colour mark the version on the right shows how to reverse out of white while the version on the left demonstrates reversing from black or another colour.





TIE00899940_0245

Mark usage

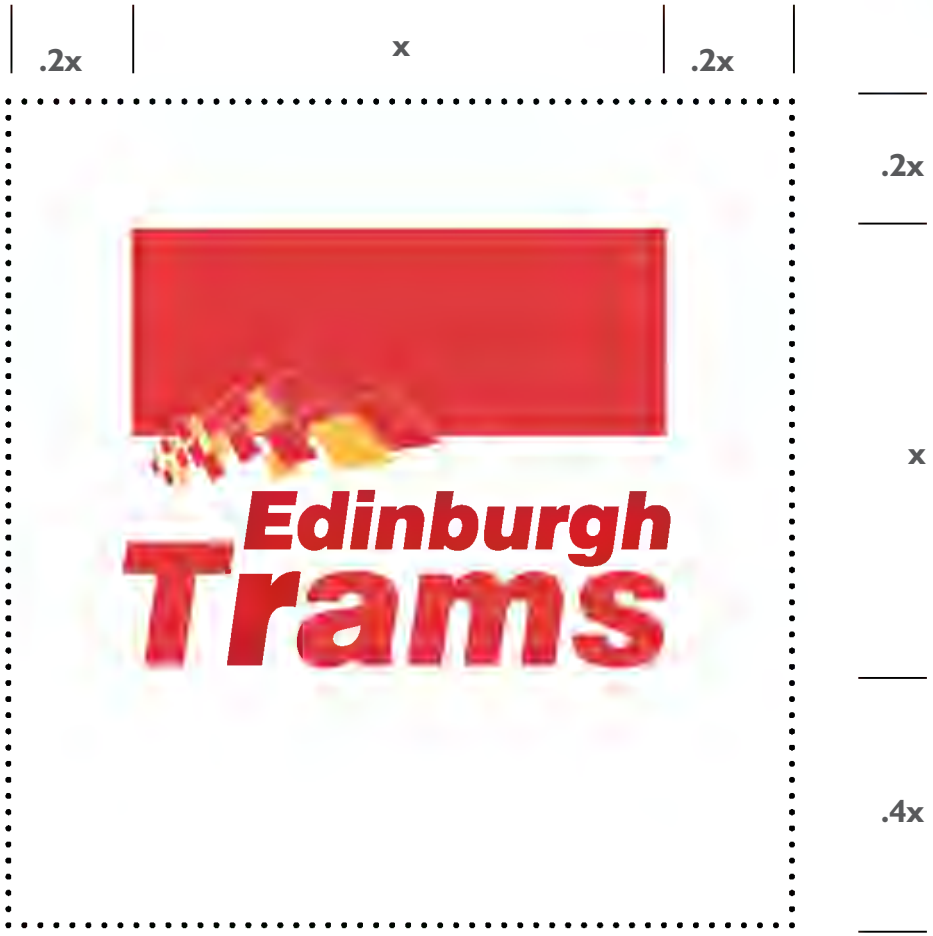
Another option when using a single colour mark, for example when positioned over an image as illustrated here, is to use a transparent mark.



TIE00899940_0246

Exclusion Zone

The dotted line indicates the zone into which no other graphic devices should be placed.



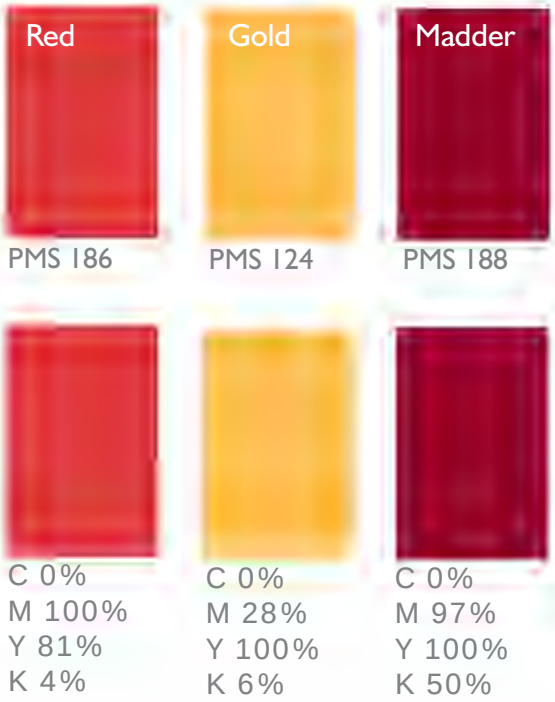
TIE00899940_0247

Colours

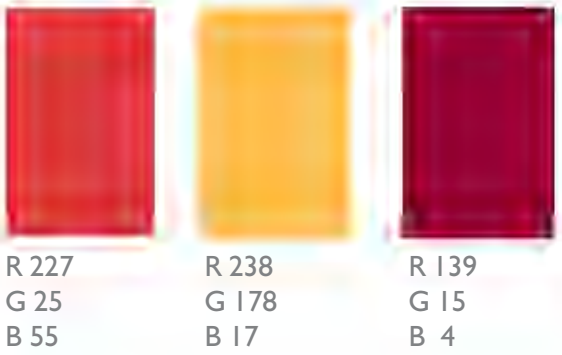
Three core colours make up the brand palette:
Red
Gold
Madder

In certain circumstances gold metallic ink in the form of PMS 873 can be used.

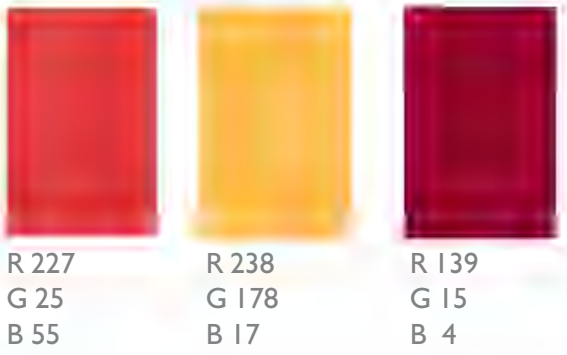
Print



Screen



Web



TIE00899940_0248

Stationery

Letterheads should follow the layout and formatting shown here. Guidance on fonts is provided in the typography section.



Edinburgh Trams

Mr G. McCluskey
19 Williams Street
Edinburgh
EH12 9QT

24th November 2007

Our ref: ETL/1234

Dear Mr McCluskey

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exercitation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat. Duis autem vel eum iriure dolor in hendrerit in vulputatevelit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi.

Yours sincerely

Andrew McKinnon

Operations Director

Edinburgh Trams Limited
City Point
Haymarket Terrace
Edinburgh
EH1 7YU

T : 0131 226 7896
F : 0131 226 7897
e mail info@tramsforedinburgh.com

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod

TIE00899940_0249

Stationery

Business cards follow the same format as the letterhead.



TIE00899940_0250

Marketing

The examples we show here illustrate the basic image and values the Edinburgh Tram brand should convey:

Clean

Simple

Easily understood



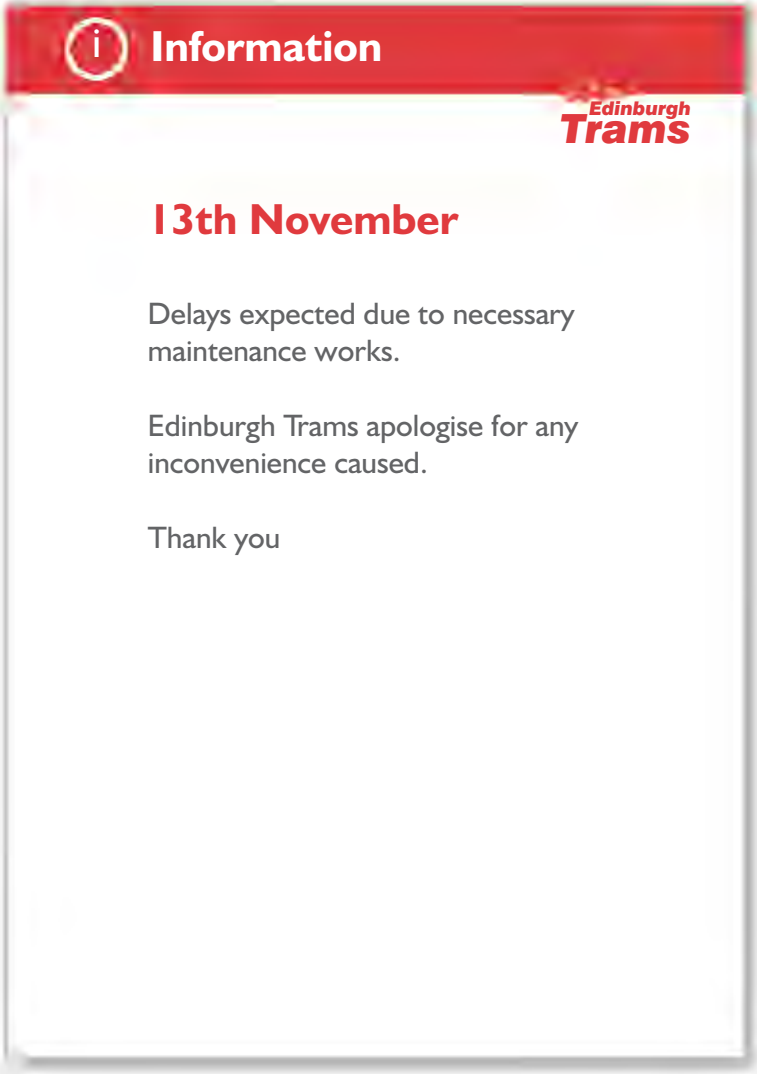
Passenger information

Again information should follow the 3 basic rules:

Clean

Simple

Easily understood



TIE00899940_0252

Passenger information

Route map



Web site

The web site should share the same layout and ‘feel’ as its sister site for Lothian Buses.

Consistency in navigation and layout help to reinforce the integrated transport concept.



TIE00899940_0254

Pictograms



Informational pictograms



Statutory pictograms



Directional pictograms



Space Bar Sample of Space Bar position

TIE00899940_0255

External design

Reinforcing the strategy of creating a visually integrated public transport system for Edinburgh, the tram livery draws from the Lothian Bus livery. Some modifications have been made in order to satisfy the Rail Vehicle Accessibility Regulations (RVAR) such as the red door colour that provides the required contrast of the doors from the tram body.

Colours follow the Brand palette with the exception of the 'gold' where, on the livery only, a gold vinyl is to be used as on Lothian Buses and not by using the specifications in this document.

Four designated advertising zones have been identified to control the revenue generating advertising presence that the business plan requires. Two trams have been allocated for 'all over' advertising and they will be subject to a strict, separate, design protocol.





TIE00899940_0256

Interior

As with the exterior the tram interior will use some of the same colours and finishes to be found on the buses. These will have to be adapted to ensure compliance with RVAR as there are strict technical guidelines on issues such as colour contrast based on Light Reflection Factors which affects all the visible surfaces within the vehicle. Compliance with RVAR is a legal requirement and the end result will be determined in consultation with the DfT Mobility Unit.

The image opposite is an early iteration of the proposed tram interior and will be developed through the process described above.



TIE00899940_0257

Tram stops

The finishes of the tram stop elements are generally of a neutral colouration.
The introduction of the Edinburgh Trams' key red as a highlight colour should therefore be used sparingly and appropriately as indicated here. The red has been introduced as an integral, functioning part of the shelter structure and serves to carry the high level stop sign. Elsewhere the red is introduced as signage or through information points.

Subtle use of the harlequins can be made on such areas as glazing manifestation as illustrated here. A further example of using the branding in a functional, rather than superficial, way.

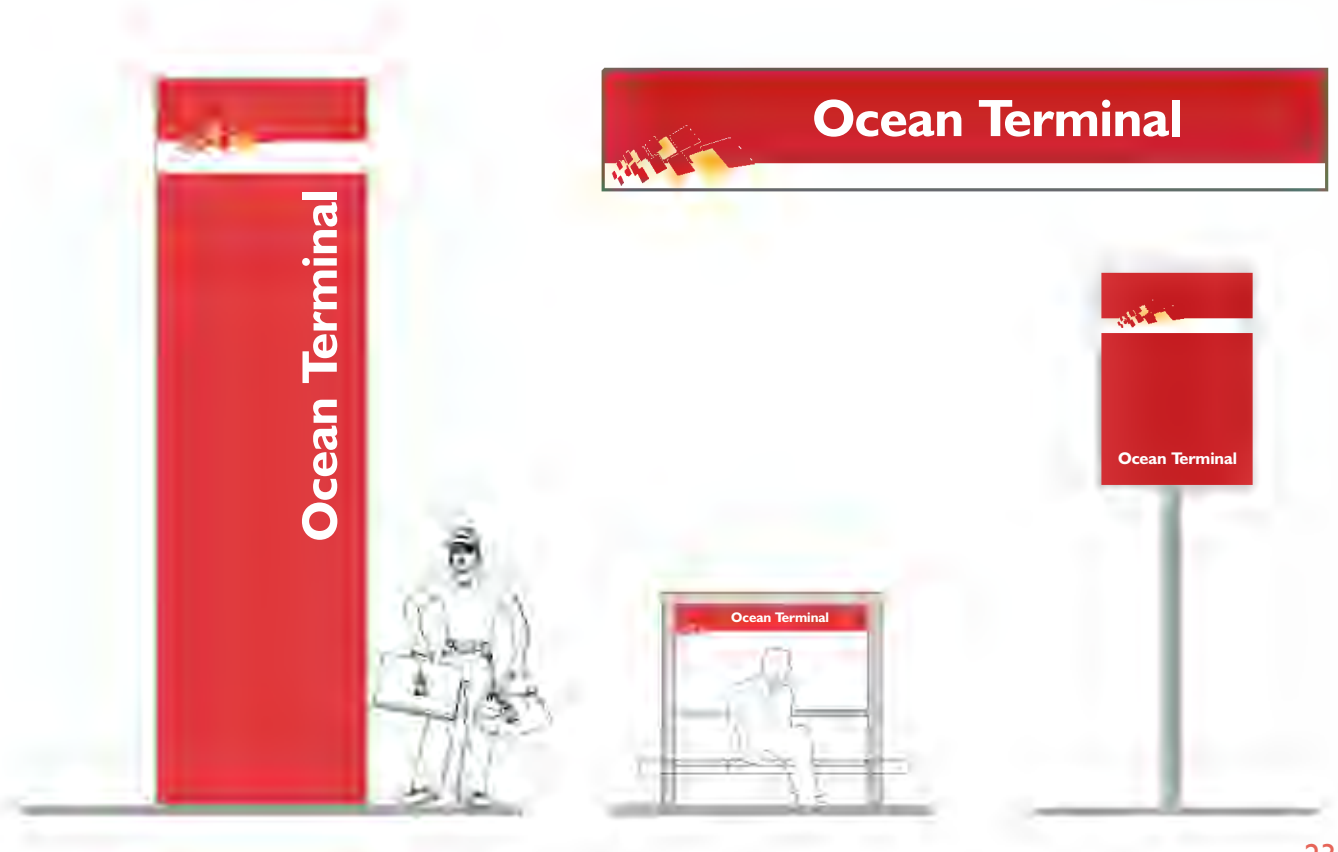


TIE00899940_0258

Signage

The signage concept has been conceived to create strong, highly visible and legible points of reference and information.

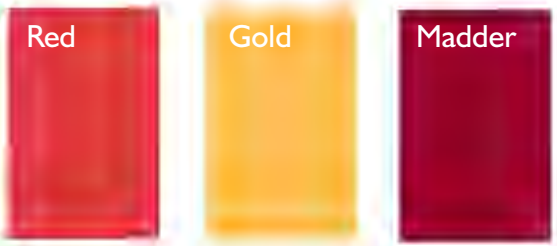
As part of the tramstop elements they follow the principle of introducing the Edinburgh Trams key red in a controlled, functional manner whilst reinforcing the identity and aiding recognition.



TIE00899940_0259

Colours

The red, madder and gold are freely available in a variety of finishes such as paint and powder coating by using the RAL specification here.



TIE00899940_0260

Uniforms

To assist those who are involved in procuring the staff uniforms the following images are intended as a simple guide to make sure the image conveyed through the uniforms is consistent with other areas of the brand's application.

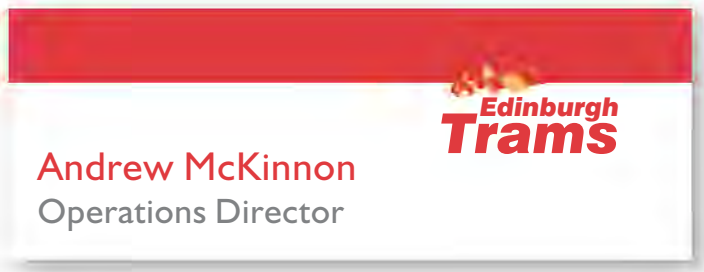
By keeping the uniforms neutral the key red can then be introduced as a detail. As with other elements of the system the red should be used sparingly as shown here.



TIE00899940_0261

Name badges

Name badges follow the guidelines established for communications.



TIE00899940_0262

Contacts

For assistance with any aspect of the contents of these guidelines please contact either:

Jen Johnston
tie limited
Citypoint
65 Haymarket Terrace
Edinburgh
EH12 5HD

Tel: 0131 622 8330
Fax: 0131 622 8301
e mail: jen.johnston@tramsforedinburgh.com

or

Iain Coupar
Marketing Director
Transport Edinburgh
55 Annandale Street
Edinburgh
EH7 4AZ

Tel: 0131 554 4494
Fax: 0131 554 3942
e mail: icoupar@transportedinburgh.com

TIE00899940_0263

This is Schedule 2 referred to in the foregoing Agreement between tie and the Tram Maintainer

SCHEDULE 2

Employer's Requirements

Part 1: Employer's Requirements

See Separate Volume V4.0

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Document Management Sheet – Employer's Requirements

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Trams for Edinburgh

..connecting our Capital

Edinburgh Tram Network

Employer's Requirements

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1 Introduction

1.1 Summary of Overall Scope

The Infraco shall be fully responsible for the works and services described in these Employer's Requirements and in the Agreement:

1.2 Infraco Works

Summary Scope of Infraco Works

Detailed requirements associated with the infrastructure and equipment for the Infraco Works are described within other Sections of these Employer's Requirements and the Agreement.

The scope defined within this section is limited to a summary of the principal elements of the Infraco Works:

- the supply of Trams in accordance with the Tram Supply Agreement;
- the provision of maintenance as defined in the Tram Maintenance Agreement and Section 40 (Maintenance) of these Employers Requirements;
- the provision of Trackwork - A total of approximately 18.8km and 5.5km (for phases 1a and 1b, respectively) of track kilometres, on street and off street trackform;
- the provision of Tramstops - A total of 22 Tramstops and 1 staff only Tramstop for Phase 1a, and 9 Tramstops for Phase 1b, together with associated infrastructure;
- the provision of Tramstop furniture, systems and equipment;
- the provision of interchange facilities as provided in the design information;
- the provision of points and crossings including point machines, their power supplies, point heating and the control thereof, detection and indication;
- the provision of traffic / tram signals;
- the provision of Tram detection system;
- the provision of all 11kv, 400volt and 230 volt power supplies;
- the provision of traction substations and d.c. traction distribution;
- the provision of OLE (Including all trackside isolators);

- the provision of supervisory control, and communication systems and sub-systems including all field, Tram (free issue for installation by Tram Supplier) network and central control and interface equipment;

- Develop and manage an EMC strategy that includes appropriate immunisation of all Third Party neighbouring systems including Network Rail.

- Accept delivery of fixed and portable Ticket Vending Machines from **tie** and then undertake the installation of such machines and the provision of the necessary supporting infrastructure (including power supplies, communication links and foundations). The maintenance of these machines is not within the scope of the Infraco;

- Provision of the Depot containing:

  - A depot building containing a maintenance workshop and associated workshops, offices, stores and equipment;

  - The Control Centre (First Floor) and associated equipment room (Ground Floor);

  - The Edinburgh Tram Network administration offices;

  - A depot yard and stabling area;

  - A traction power substation;

  - A building services transformer and associated works;

  - All necessary services and utility connections;

  - A boiler house;

  - Hard-standing for a diesel alternator; and

  - The Depot access road.

- Provision of Tram associated road works;

- Provision of traffic management;

- Provision of road furnishings;
- Provision of bridges, structures and retaining walls, including the necessary services and facilities e.g. lighting, drainage, fencing and guardrails, earthing and bonding etc.;
- Civil works including earthworks (inclusive of contamination removal, demolition, Site clearance, excavation, bridges and structures, all necessary temporary works and drainage;
- Demolition/modification of certain buildings as identified in the design phase.
- Relocating the War Memorial at Haymarket Junction (the Infraco shall be required to obtain confirmation from **tie** prior to such re-location that **tie** is satisfied that all relevant Consents have been obtained by the Infraco;
- Landscaping including, hard landscaping, soft landscaping, boundary treatments;
- Provision of lighting;
- Provision of signage;
- Provision of fencing;
- The provision of all temporary works and installations (to allow construction of the Edinburgh Tram Network and achievement of delivery of the Edinburgh Tram Network into service) including the provision of connections to appropriate power supplies.
- to carry out and/or manage to completion the design of the Edinburgh Tram Network, including the management coordination, and specification and implementation of the necessary works for the modification of the Urban Traffic Control System;
- to procure and install all materials and equipment, required for the complete operating Edinburgh Tram Network, as summarised and as further detailed within these Employer's Requirements;
- to supply documentation as defined within these Employer's Requirements, including design documentation, as-built documentation, statutory information, as-built information, maintenance documentation and training documentation;
- to energise the Edinburgh Tram Network including liaison with and management of all interested and affected parties;

- to provide access and support for driver training;
- to provide comprehensive management and technical and maintenance services and Deliverables to ensure that all of the above is delivered in full compliance with these Employer's Requirements.

1.3 Phase 1a Scope Statement Regarding Inclusion for the Phase 1b Option

Phase 1a shall meet these Employer's Requirements and provide full functionality as a standalone tram network. The scope for Phase 1a shall include the following elements in order to facilitate the addition of Phase 1b as an option instructed later under this Agreement.

1. The structure, earthworks and necessary works at Roseburn Junction shall include all sub-structure, structures, earthworks, ductwork, drainage and fitting out to bottom of rail fixing, including the provision for the OLE spur connection for Phase 1b from Phase 1a and OLE supports, for the delta connection of Phase 1b with Phase 1a. The structure, earthworks and works shall extend as a minimum such that the subsequent construction of Phase 2b does not interfere with the operation of Phase 2a except to the extent allowed by the possessions detailed below.

2. Plain line shall be installed along the Phase 1a route through the Roseburn Junction, however the Infraco shall ensure that the design and construction shall provide for the turnouts to be installed in a maximum of one 54 hour possession of the Phase 1a inbound and outbound tracks between Murrayfield and the Western end of Haymarket Yards turnback. Traction power supply sectioning shall allow the turnback of service trams throughout the possession. In addition, up to 28 normal night-time possessions shall be available for preparatory works and commissioning works.

3. The central supervisory, control and communications systems provided by the Infraco for Phase 1a shall have sufficient capacity and functionality to accommodate the incorporation of Phase 1b. This shall include all software, firmware, databases with the same control and indication functionality as for Phase 1a. All central control system hardware shall be provided to allow the connection of the Phase 1b infrastructure by means of cable connection alone.

4. The central supervisory, control and communications systems shall be designed and configured such that the commissioning of Phase 1b infrastructure shall be possible without material impact on the passenger services operating on Phase 1a or the operational Control Centre prior to assimilation of Phase 1b with Phase 1a.

5. Documentation, drawings, manuals, spare parts and training shall be provided for Phase 1a on a standalone basis, but shall be in the form that is expandable to accommodate Phase 1b as and when constructed..

2 Operations and Performance

2.1 Scope

The scope of this Section of the Employer's Requirements defines the Operations & Performance requirements applicable to the Edinburgh Tram Network (ETN) which the Infraco must comply with.

2.2 Network Description and Principles

The Edinburgh Tram Network will operate as a 'line-of-sight' tramway, with tramway signalling provided at road junctions and at tramway junctions where appropriate. A fleet of Trams will serve the ETN providing level boarding with low level platforms located along the routes.

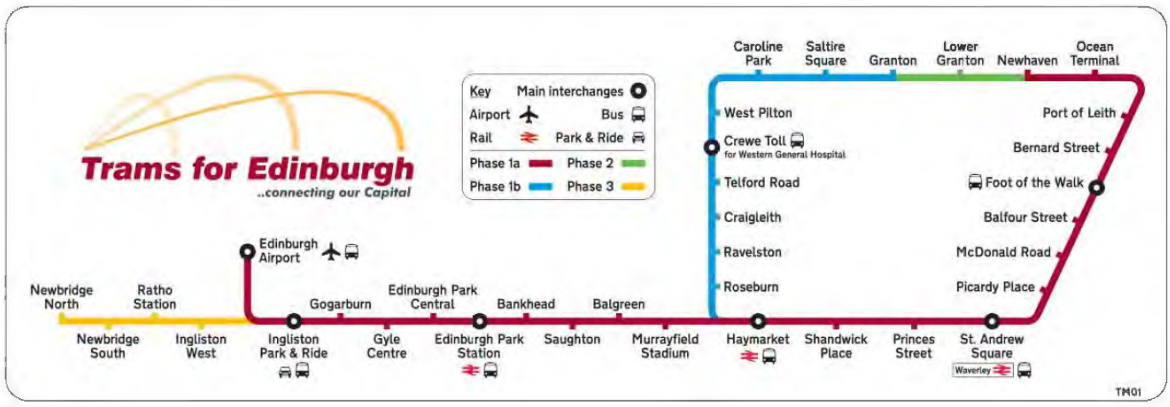


Figure 1

For ease of reference, a diagram of the Edinburgh Tramway Network is shown in Figure 1 above.

The route in the city from Newhaven to Haymarket (approximately half of Phase 1a) and from West Granton Access to Granton Square (approximately a third of Phase 1b) runs mainly on-street with varying degrees of segregation. The Roseburn corridor (approximately two thirds of Phase 1b) is a segregated off-street alignment, shared with a combined footpath and cycleway. Most of the route between Haymarket and the Airport (the remaining half of Phase 1a) is segregated from road traffic.

The whole ETN will consist of double track.

The Depot, located at Gogar, will provide maintenance and stabling facilities for the entire fleet of Trams operating on the ETN. It will also contain the administration and management offices, including an operations and Control Centre, from where the ETN will be managed and maintained.

Transport Services shall be operated in accordance to a timetable, as agreed between the Operator and **tie**, to achieve reliable and consistent operation at the required tram frequencies.

Throughout these Employer's Requirements reference is made to three timetables that shall be progressively introduced in response to patronage demand growth. These are intended to allow for reliability growth and Operator familiarisation with the Edinburgh Tram Network. The following definitions shall apply:

- **Operational Timetable**

  A timetable developed by **tie**, which provides Trams at a frequency of twelve Trams per hour in each direction on the common section between Haymarket and Ocean Terminal. Six Trams per hour in each direction are operated on the sections between Haymarket and the Airport and between Ocean Terminal and Newhaven. For Phase 1b, Trams at a frequency of six trams per hour in each direction on the section between Haymarket and Granton square shall be operated. The Operational Timetable shall be in effect from the Service Commencement Date for a minimum of one year.

- **AM and PM Peak Enhanced Timetable**:

  A timetable developed by **tie**, which provides Trams during the AM and PM peaks at a frequency of sixteen Trams per hour in each direction on the common section between Haymarket and Ocean Terminal. For Phase 1b providing Trams at a frequency of eight trams per hour in each direction on the section between Haymarket and Granton square for the AM and PM peak times only, reverting to the Operational Timetable during the inter peak period. The AM and PM Peak Enhanced Timetable shall be introduced no earlier than one year after the Service Commencement Date and shall be operated for a minimum of six months.

- **Enhanced Timetable:**

  A timetable developed by **tie**, which provides Trams at a frequency of sixteen Trams per hour in each direction on the common section between Haymarket and Ocean Terminal. For Phase 1b providing Trams at a frequency of eight Trams per hour in each direction on the section between Haymarket and Granton square. The Enhanced Timetable shall be introduced no earlier than two years after the Service Commencement Date.

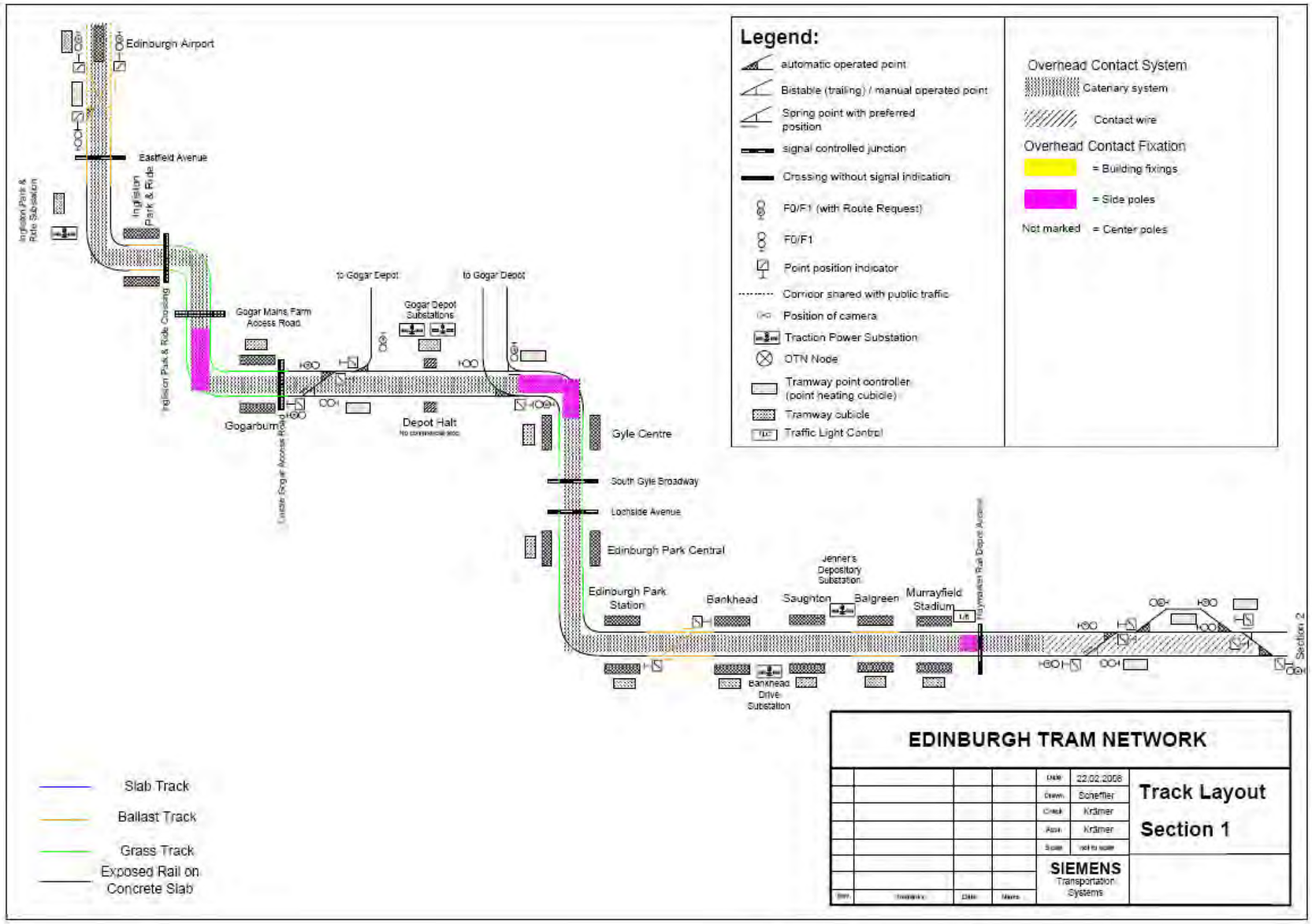


Figure 2 – Edinburgh Tram Phases 1a and 1b Network Diagram

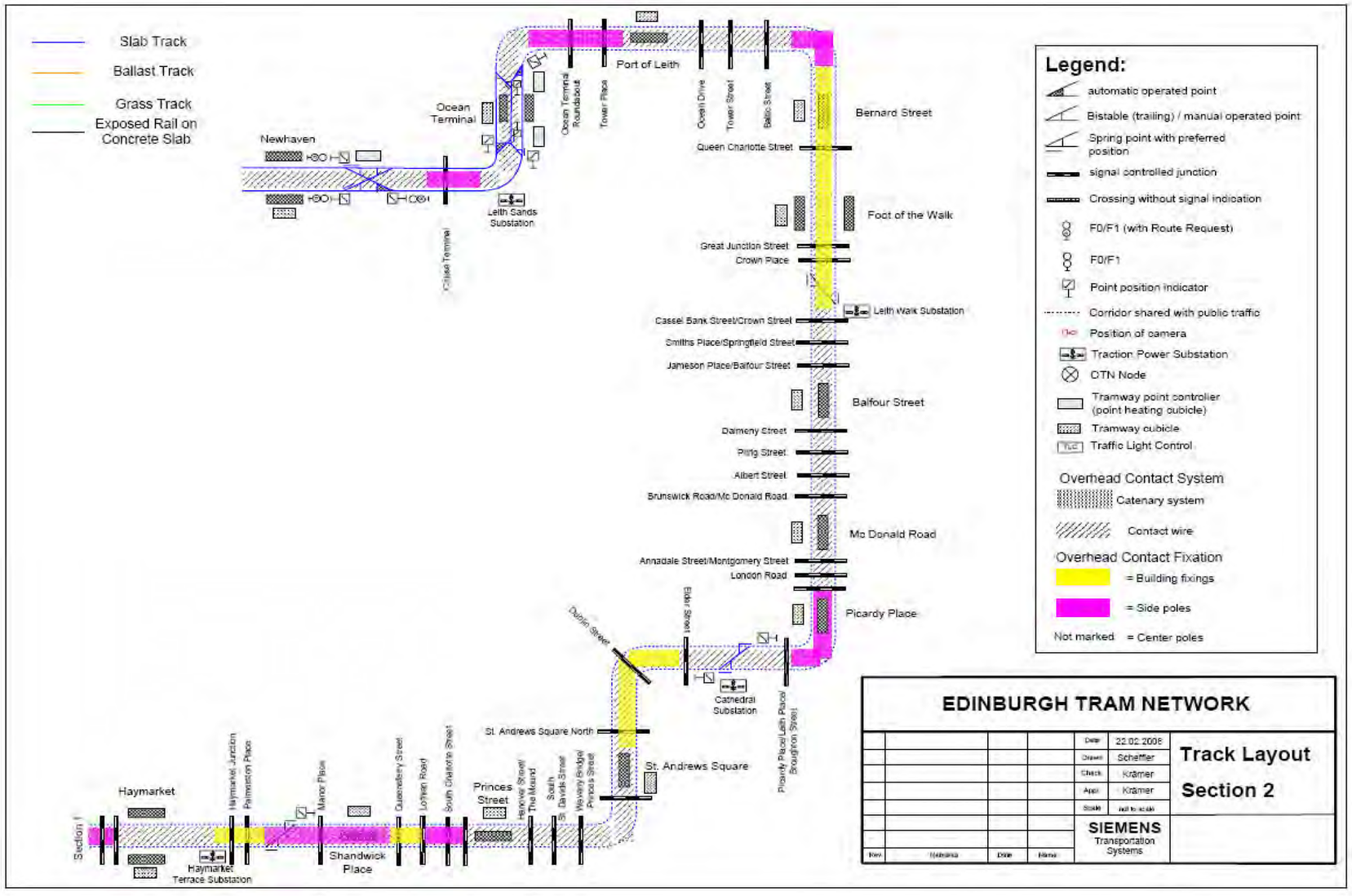


Figure 3 – Edinburgh Tram Phases 1a and 1b Network Diagram

2.3 Specific Operations and Performance Requirements

2.4 Tramstop Location and Types

The Tramstop location and types are detailed in the following table. The acronyms given are provisional.

ID	Tramstop	Platform Style
	PHASE 1a	
AIR	Edinburgh Airport	1 Centre
IPR	Ingliston Park and Ride	2 Side
GBN	Gogarburn	2 Side
DEH	Depot Halt (Staff Only)	2 Side
GYL	Gyle Centre	2 Side
EDP	Edinburgh Park Central	2 Side
EPS	Edinburgh Park Station	2 Side
BNK	Bankhead	2 Side
SGT	Saughton	2 Side
BAL	Balgreen	2 Side
MUS	Murrayfield Stadium	2 Side
HAY	Haymarket	2 Side
SHP	Shandwick Place	1 Centre
PST	Princes Street	1 Centre
SAS	St Andrew Square	1 Centre
PPL	Picardy Place	1 centre
MDR	McDonald Road	1 Centre
BFS	Balfour Street	1 Centre
FOW	Foot of the Walk	2 Side
BER	Bernard Street	1 Centre
POL	Port of Leith	1 Centre
OCT	Ocean Terminal	1 Centre, 1 Side
NEW	Newhaven	2 Side

	PHASE 1b	
GRT	Granton	1 Centre
SSQ	Saltire Square	2 Side
CPK	Caroline Park	2 Side
WPN	West Pilton	2 Side
CTL	Crewe Toll (for Western General)	2 Side
TEL	Telford Road	2 Side
CRA	Craigleith	2 Side
RAV	Ravelston	2 Side
ROS	Roseburn	2 Side

Table 1 – Edinburgh Tram Phases 1a and 1b Network Tramstop Location and Details

2.5 Expansion (including Line 3)

The Infraco shall ensure that the ETN shall be designed to permit expansion to include the following elements:

- Phased implementation of the ETN and associated fleet increases (including the implementation of the Phase 1b Option);
- Addition of Phase 2 of the ETN (as shown in Figure 1), including provision of Lower Granton Road stop, to close the loop along the sea front between Newhaven and Granton Square using the powers in the Edinburgh Tram (Line One) Act 2006;
- Addition of Phase 3 of the ETN (as shown in Figure 1), including associated stops at Ingliston West, Ratho Bridge and Newbridge South, from Ingliston Park and Ride to Newbridge using the powers in the Edinburgh Tram (Line Two) Act 2006;
- Addition of Line Three (From the junction of Princes Street/South St. Andrew Street to Royal Infirmary);

Extensions to the ETN set out above are not currently covered by these Employer's Requirements. However, the ETN must be designed in such a way as not to impede this future expansion.

For the avoidance of doubt, the following are covered by these Employer's Requirements.

- Future frequency increases beyond the enhanced service frequency of 8 & 8 tph;
- Increased operating hours beyond the scheduled last Tram of 23:59 and before the scheduled first Tram at 06:00;
- Associated impacts of increased staff numbers from 361 initially anticipated up to a maximum of 403 e.g. accommodation at the Depot.

2.6 Depot Locations

The Edinburgh Tram Network Depot is located at Gogar and shall be capable of providing capacity for the stabling of 27 trams of 44m in length, clear of fouling points in the stabling area.

The Depot shall be capable of future expansion to provide the capacity required for the identified future service frequencies and/or the requirements for Line Three, such that the Depot can be extended to stable 36 Trams of 44m in length, clear of fouling points in the stabling area.

2.7 Service Patterns, Operating Hours and Frequencies

The ETN shall support a daily service, all year round. The proposed initial service patterns, operating hours and frequencies are as follows:

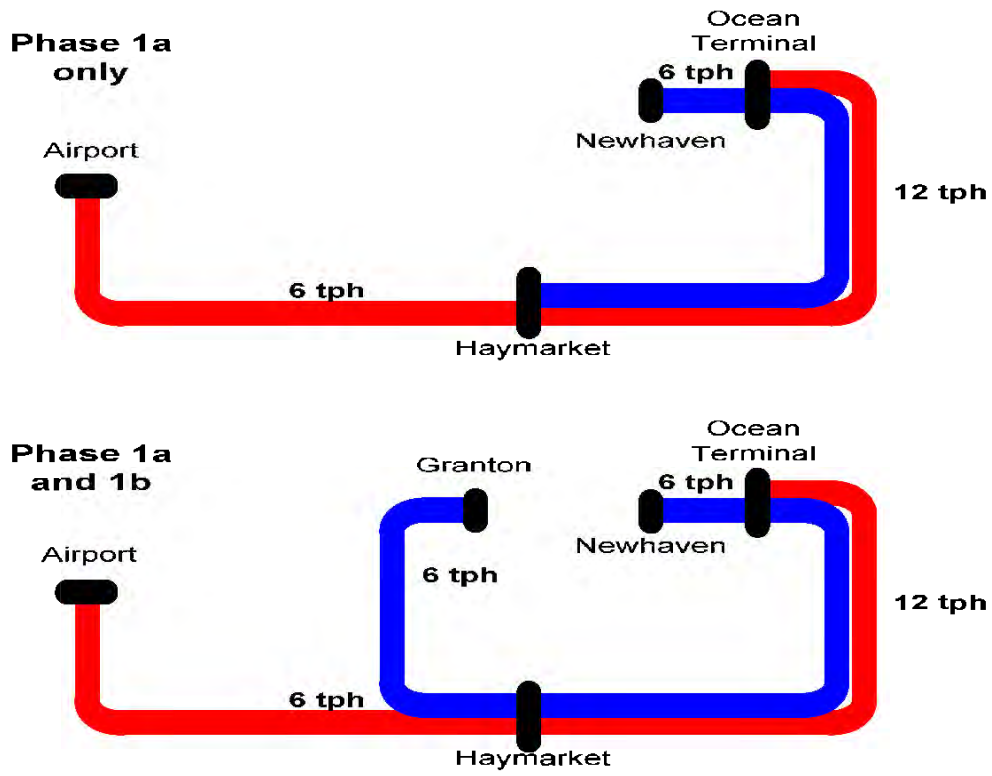


Figure 4 - Service Patterns for the Operational Timetable 6 & 6 Tram per hour scenario

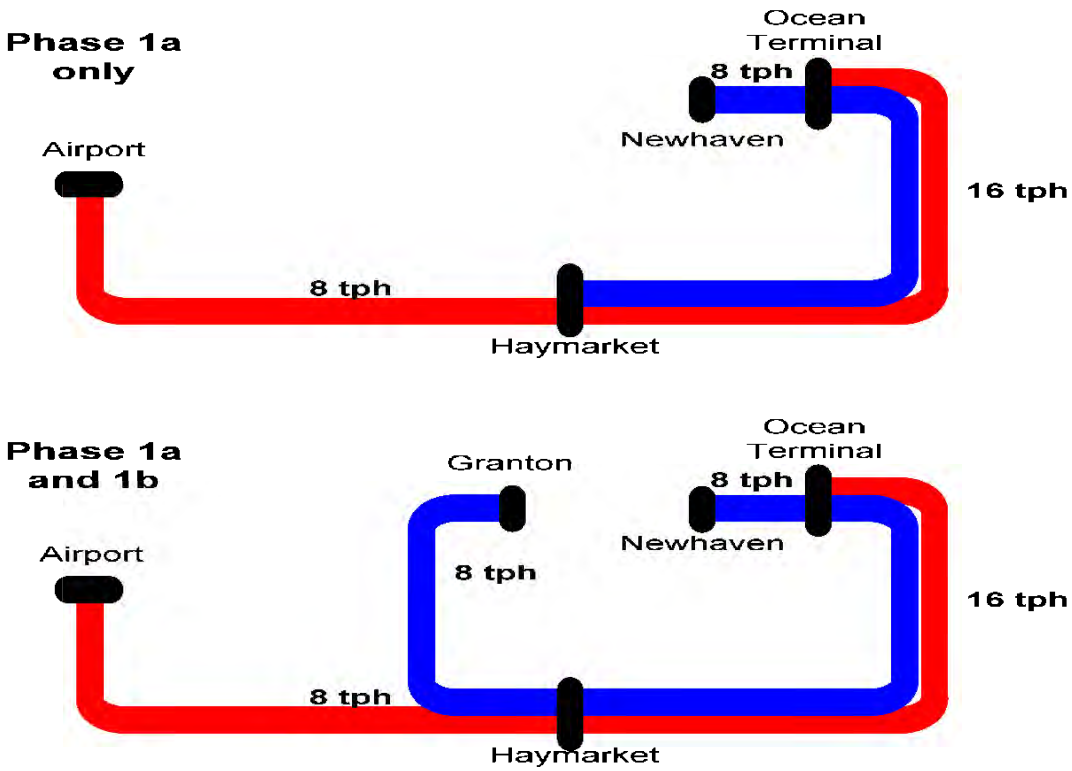


Figure 5 - Peak Service Patterns for the Enhanced AM & PM Peaks Timetable and the Enhanced Timetable 8 & 8 Tram per hour scenario

2.8 Operating Hours and Frequencies

The first and last Tram services and frequencies for 6 & 6 Tram per hour scenario are shown in Figure 4 - service patterns for the Operational Timetable 6 & 6 Tram per hour scenario and for 8 & 8 Tram per hour scenario in Figure 5.

These scenarios are based upon the following assumptions and conditions:

- The two balanced services combine to give a total of 12 or 16 Trams per hour per direction on the common section between Ocean Terminal and Haymarket are required during the daytime to replace withdrawn bus services (and therefore demand and capacity) on Leith Walk;
- For the purposes of ramping up/down service Short workings between Edinburgh Airport (Phase 1a) / Granton Square (Phase 1a & Phase 1b) or Haymarket (Phase 1a only) and St. Andrew Square are based on terminating Trams at St. Andrew Square. The location of the turnback is at York Place;
- Edinburgh Airport service Tram frequency is ramped up/down from Ocean Terminal. Granton Square (Phase 1a & Phase 1b) or Haymarket (Phase 1a only) service Tram frequency is ramped up/down from Newhaven;
- Trams going into service between Gogar Depot and Ocean Terminal/Newhaven will run "in service" from the Gyle (first tram Gyle to Ocean Terminal approx. 05:15 Monday to Saturday inclusive);
- Haymarket (Phase 1a only) or Granton Square (Phase 1a & Phase 1b) service Trams going out of service running between Newhaven and Gogar Depot will run "in service" as far as the Gyle;
- St. Andrew Square curtailed Trams going out of service running between St. Andrew Square and Gogar Depot will run "in service" as far as the Gyle;
- Edinburgh Airport service Trams going out of service will run "in service" from Ocean Terminal to Edinburgh Airport with a short "dead run" from Edinburgh Airport to Gogar Depot;

- The period of time between the last Tram returning to the depot at night and the first Tram leaving the Depot in the morning Monday to Saturday inclusive is anticipated to be 4hrs 30 min, although this may be subject to amendment. Work requiring possessions will have to be agreed with the Operator. Subject to agreed possessions, work may be allowed on the Edinburgh Tram Network infrastructure for 3 hours and 45 minutes, depending on location, each night and allowing time for the implementation and withdrawal of isolations and/or possessions; and

- The provision of Transport Services is based on the requirement to always have a Tram present at the Airport Tramstop.

Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable

1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

		Sunday (trams per hour)					
Network / Phasing	**Service frequency commencing at:**	first tram **07:00**	**07:45**	**08:00**	**08:20**	**23:15**	last tram **23:59**
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Note: The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Notes:

[a] from approx 2 23:15 Trams run from the Airport - City Centre only

[b] from approx 2 23:15 Trams run from Granton - City Centre only

[c] from approx 2 23:15 Trams run from Newhaven - Haymarket continuing in service on TL2 to Gyle

First and last Tram services and frequencies for 6 & 6 tram per hour Operational Timetable

Table 3 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario

	Networking (Phasing) andService Frequency commencing at:	06:00	06:45	07:00	07:20	07:45	09:45	15:45	19:00	19:45
1a	Airport to Ocean Terminal	0	6	8	8	8	6	6	8	6
1a	Ocean Terminal to Airport	6	6	8	8	8	6	6	8	6
1a	Haymarket to Newhaven	0		6	8	8	6	6	8	6
1a	Newhaven to Haymarket	0		0	6	8	6	6	8d	6
1b	Airport to Ocean Terminal	0	6	8		8	6	6	8	6
1b	Ocean Terminal to Airport	6	6	8		8	6	6	8	6
1b	Granton to Haymarket	0	6	8		8	6	6	8	6
1b	Haymarket to Granton	6	6	8		8	6	6	8	6

Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario

Phase	Service Frequency commencing at:	Saturday (trams per hour) First tram 06:00	06:45	07:30	07:50	23:15
1a	Airport to Ocean Terminal	0	6	6	6	6a
1a	Ocean Terminal to Airport	6	6	6	6	6
1a	Haymarket to Newhaven	0	0	6	6	0
1a	Newhaven to Haymarket	0	0	0	6	0
1b	Airport to Ocean Terminal	0	6	6	6	6a
1b	Ocean Terminal to Airport	6	6	6	6	6
1b	Granton to Newhaven	0	6	6	6	6b
1b	Newhaven to Granton	6	6	6	6	6c

Table 5 - First and Last Tram Times for the Enhanced AM & PM Peak Timetable

	Networking (Phasing) and Service Frequency commencing at:	Sunday (trams per hour) first tram 07:00	07:45	07:50	08:00	08:45	18:00	18:20	18:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6		6	6		6a	0
1a	Ocean Terminal to Airport	6	6	6	6		6	6		6	0
1a	Haymarket to Newhaven	0		6	6		6	6			0
1a	Newhaven to Haymarket	0		0	6		6	6d			0
1b	Airport to Ocean Terminal	0	6		6	6	6		6	6a	0
1b	Ocean Terminal to Airport	6	6		6	6	6		6	6	0
1b	Granton to Haymarket	0	6		6	6	6		6	6b	0
1b	Haymarket to Granton	6	6		6	6	6		6	6c	0

Notes:

a) from approx. 23:15 Trams run from Airport – St Andrew Sq. only.
b) from approx. 23:15 Trams run from Granton – St Andrew Sq. only.
c) from approx. 23:15 Granton Trams run from Newhaven – Haymarket continuing in service on to Gyle.
d) from approx. 19:20 (18:%0 Saturday and 18:20 Sundays) Haymarket Trams running from Newhaven – Haymarket continue in service to Gyle.

The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Table 6 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced Timetable

Network (phasing) and service frequency commencing at:		Monday - Friday (trams per hour)									
		06:00	06:45	07:00	07:20	07:45	19:00	19:20	19:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	8	8	8		8	8		8[a]	0
1a	Ocean Terminal to Airport	8	8	8	8		8	8		8	0
1a	Haymarket to Newhaven	0		8	8		8	8			0
1a	Newhaven to Haymarket	0		0	8		8	8[d]			0
1b	Airport to Ocean Terminal	0	8	8		8	8		8	8[a]	0
1b	Ocean Terminal to Airport	8	8	8		8	8		8	8	0
1b	Granton to Newhaven	0	4	4		8	8		4	4[b]	0
1b	Newhaven to Granton	4	4	8		8	4		4	4[c]	0

Network (phasing) and service frequency commencing at:		Saturday (trams per hour)									
		first tram 06:00	06:45	07:30	07:50	08:15	18:30	18:50	19:15	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	8	8	8		8	8		8[a]	0
1a	Ocean Terminal to Airport	8	8	8	8		8	8		8	0
1a	Haymarket to Newhaven	0		8	8		8	8			0
1a	Newhaven to Haymarket	0		0	8		8	8[d]			0
1b	Airport to Ocean Terminal	0	8	8		8	8		8	8[a]	0
1b	Ocean Terminal to Airport	8	8	8		8	8		8	8	0
1b	Granton to Newhaven	0	4	4		8	8		4	4[b]	0
1b	Newhaven to Granton	4	4	8		8	4		4	4[c]	0

Network (phasing) and service frequency commencing at:		Sunday (trams per hour)									
		first tram 07:00	07:45	07:50	08:00	08:45	18:00	18:20	18:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6		6	6		6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6		6	6		6	0
1a	Haymarket to Newhaven	0		6	6		6	6			0
1a	Newhaven to Haymarket	0		0	6		6	6[d]			0
1b	Airport to Ocean Terminal	0	6		6	6	6		6	6[a]	0
1b	Ocean Terminal to Airport	6	6		6	6	6		6	6	0
1b	Granton to Newhaven	0	6		6	6	6		6	6[b]	0
1b	Newhaven to Granton	6	6		6	6	6		6	6[c]	0

Note: The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Notes:

[a] from approx 23:15 trams run from Airport - St Andrew Sq only

[b] from approx 23:15 trams run from Granton - St Andrew Sq only

[c] from approx 23:15 Granton trams run from Newhaven - Haymarket continuing in service on to Gyle

[d] from approx 19:20 (18:50 Saturdays and 18:20 Sundays) Haymarket trams running from Newhaven - Haymarket continue in service to Gyle

2.9 Service Frequencies and Expansion

The design of the ETN shall support the Operational Timetable and Enhanced Timetable service frequencies set out in Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable, Table 3 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario and Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario. In addition to this, the ETN shall operate the same service pattern as set out in Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario above, but with the Trams per hour increased by 50% throughout without upgrade or loss of performance for up to a maximum of 2 hours between Ocean Terminal and Picardy Place, and indefinitely between Picardy Place and the Airport.

The service patterns for the ETN are defined as the Operational Timetable (as shown in Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable), the AM and PM Peak Enhanced Timetable (as shown in Table 3 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario) and the Enhanced Timetable (as shown in Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario).

A simulation indicating the power consumption of the ETN service patterns as defined above and considering the braking energy regeneratated by the Tram shall be performed during design phase.

2.10 Special Working and Degraded Operation

Special working is required at certain times of the year, as detailed in Table 8 - Reconfiguration of Service due to the Closure of Princes Street to allow for the short workings on the network routes, when sections of the ETN shall be closed to allow for example Hogmanay, the Edinburgh Festival and other special events and festivals.

The design of the ETN shall allow services to be turned back at the locations detailed in Table 7 - Turnback Locations. The precise chainages where turnbacks are to be installed is shown on the alignment drawings.

ID	Location
	PHASE 1a
EPS	Edinburgh Park Station
HAY	Haymarket Yards
SHP	Shandwick Place
PPL	Picardy Place
FOW	Foot of the Walk (Leith Walk)

OCT	Ocean Terminal
	PHASE 1b
CTL	Crewe Toll

Table 7 - Turnback Locations

Note that Trams may also be turned back at Gogar Depot, and the facility to allow this shall be provided by the Infraco.

The individual services will be reconfigured to operate using the turn-back facility nearest to the affected area. An example is the requirement to close Princes Street for Hogmanay. In this situation the services shall be reconfigured as detailed in Table 8 - Reconfiguration of Service due to the Closure of Princes Street.

Service alteration for Closure of Princes Street			
Original Route of Service	**Affected Area**	**Trams / Hour**	**Revision**
Between Airport and Ocean Terminal	Princes St. section closed	6 or 8	Services run between Airport and Shandwick Place. No service runs between Shandwick Place and Picardy Place. Services run between Picardy Place and Newhaven
Between Haymarket and Newhaven (Phase 1a only)	Princes St. section closed	6 or 8	No service runs between Haymarket and Picardy Place[a]. Services run between Picardy Place and Newhaven
Between Granton Square and Newhaven (Phase 1b)	Princes St. section closed	6 or 8	Services run between Granton Square and Shandwick Place. No service runs between Shandwick Place and Picardy Place. Services run between Picardy Place and Newhaven

a – Assumption that no services will run the short leg Haymarket to Shandwick Place when Princes Street is closed.

Table 8 - Reconfiguration of Service due to the Closure of Princes Street

2.11 Journey Time and Runtime

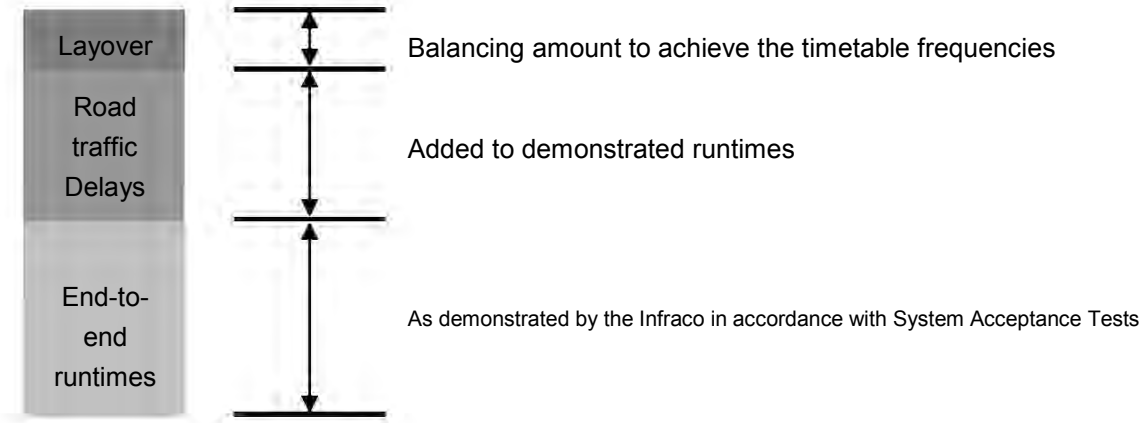


Figure 6 - Maximum Journey Times

The required maximum journey times for the Edinburgh Tram Network, quoted as operational journey time including dwell times of 25 seconds at each Tramstop, as defined during Preliminary design shall be as follows:

Phase 1a		
Airport to Ocean Terminal	in either direction including 25 secs dwells at Tramstops	42mins 18 secs
Phase 1b		
Granton Sq to Newhaven	in either direction including 25 secs dwells at Tramstops	39mins 26 secs

For the avoidance of doubt these are end to end journey times and the Infraco shall demonstrate during System Acceptance Tests defined in Section 23.18 (Testing and Commissioning) of these Employer's Requirements the trip times which can be achieved by the Trams running on the ETN infrastructure as developed and adjusted from the above base line in accordance with Section 2.12. These do not include layover time at the turnback stops as shall be agreed between the Operator and **tie** in order to develop the Operational Timetable.

2.12 Journey Time and Runtime

The Infraco shall continue to develop and refine the runtime model as the design progresses and, at a frequency of no less than every three months or upon **tie**'s request, provide updated reports demonstrating that the maximum run times can be achieved. The Infraco shall also prepare a model of the electricity consumption linked to the run time model and shall use reasonable endeavours to optimise the system design and construction to minimise electricity usage.

Reference should be made to the Runtime Simulation Stage 3 Report (ref: ULE90130-SW-REP-00238-V3) for vehicle performance characteristics and actual driver operations.

The operational and modelling assumptions that shall be used in all modelling of runtime and operational timetables are set out in Table 9 - Operational and Modelling Assumptions.

Item	Value	Notes
Door Performance	12 seconds	Defined as the time for the doors to open and close including DDA requirements and passenger and driver reaction times.
Boarding and Alighting Time	13 seconds	Defined as the time between the doors being fully open and the sounding of the door closing tone.
Dwell Times	25 seconds a constant in modelling and during end to end journey time tests, to be refined for the purposes of the timetables to be Tramstop specific	Average dwell, made up of the door performance time and the boarding and alighting time
Loading	AW2 all seated 4 pass/m2 standing	
Gradient	+/- 8% Max. Note: This value is the maximum allowable gradient for track design.	Gradient data for the complete ETN has been developed in the design phase This identified major gradients at St. Andrew Square and the line alongside Gogar Depot

2.13 Operational Allowances and Rules for Timetabling

An operational allowance will be added to the end to end runtimes demonstrated through testing to meet those quoted in this section to ensure a robust Operational Timetable is constructed.

Requirement	Allowance
Operational Journey time allowance	Newhaven to Haymarket = 1.5 minutes Ocean Terminal to Airport = 1.5 minutes Newhaven to Granton Square = 45 secs (Phase 1b only)
Layover	4 minute minimum or 10% of timetabled runtime, whichever is the greater taken at the terminus for each end to end trip with the exception of the Airport Tramstop where a Tram is required to always be present. Crew change-over locations to be determined as the Operational Timetable is refined.

Table 10 - Operational Runtime Allowances

2.14 Miscellaneous Operational Requirements

2.15 Comfort Break Facilities

Facilities shall be available for driver comfort breaks at the nominated layover locations detailed in Table 11 - Layover Facilities

Location	Comments
Edinburgh Airport	Crew Change Facility[1]
Ocean Terminal	Normal Terminus
Granton Square	Normal Terminus
Haymarket	Crew Change Facility

Table 11 - Layover Facilities

[1] *Damian has already instructed this change.*

At these locations access shall be provided to a suitable toilet with hand washing facilities.

Crew Change Facility

A crew changing facility shall be provided adjacent to the Haymarket Tramstop. This facility shall provide tram crew with access to a toilet with hand washing facilities, a drinking water supply, suitable heating, power, lighting, drainage and connection to the telephone network.

2.16 Performance and Reliability

The design and construction of the ETN shall be demonstrated by RAMS analysis to enable the individual systems availability targets stated in these Employer's Requirements to be met. It shall enable an overall tram punctuality for System technical causes of at least 99% in accordance with the calculation of the Punctuality Service Element contained in Schedule 6 of the Agreement.
As measured on a 28 day basis at the following monitoring points along the route at least 99% of the Trams shall be no earlier than one minute and no greater than two minutes late, caused by technical failure, compared to the scheduled headway.

Monitoring points

a) Phase 1a: for the purposes of monitoring arrival and departure headways between Trams:

- Edinburgh Airport.

b) Phase 1a: for the purposes of measuring departure headways between Trams only:

- Edinburgh Park Station;
- Haymarket;
- Foot of the Walk;
- Leith; and
- Picardy Place.

c) Phase 1b: for the purposes of measuring departure headways between Trams only:

- Crewe Toll (northbound only); and
- Granton Square.

The performance mechanism for Infraco is contained within this Agreement. The design of the ETN shall be such that it allows the ETN to operate safely and effectively in all modes.

Normal Mode being that used to establish the operational timetable. Degraded Mode being restricted operation due to failures or disruption on the tramway or the adjacent highway network.

2.17 Network and Service Pattern

See table 2 – Service Patterns for the Operational Timetable 6 & 6 Tram per hour scenario and table 5 – Peak Service Patterns for the Enhanced AM & PM Peaks Timetable and table 6 – the Enhanced Timetable 8 & 8 Tram per hour scenario] for further information; for daily service patterns; and note that trams are to be co-ordinated between OCT and HAY to give an even headway pattern in both directions.

2.18 Layover s

The Operational Timetable and the Enhanced Timetable developed by the Operator and the Infraco's Proposals shall allow for the following:

- An operational Tram can always be present at the Airport Tramstop;
- Additional layovers to be added to the minimum values to deliver the required headways where appropriate. This additional layover maybe apportioned along the route; and
- The minimum layover requirements are as set out in these Employer's Requirements and these shall be apportioned at the terminus Tramstops only.

Allowance for perturbations that are not road traffic delays:

- These shall be apportioned along the route, as can be seen in Figure 6 - Maximum Journey Times.

2.19 Calculation of Minimum Round Trip Times

In this section, the minimum round trip times for each of the service options are calculated. The calculations add up the elements that are required to establish the round trip times, and the source of each element is stated.

Table 12 - Ocean Terminal – Edinburgh Airport Service (Phase 1a and Phase 1b)

OCT – AIR

00:42:18	OCT - AIR (includes dwell time)[a]
00:04:52	AM junction delay (OCT - HAY)[b]
00:01:30	additional delay between HAY - AIR[c]
00:00:10	10 seconds on each leg for crossover at terminal Tramstop[d]
00:48:50	Total

AIR – OCT

00:41:59	AIR - OCT (includes dwell time)[a]
00:06:01	AM junction delay (HAY - OCT)[b]
00:01:30	additional minutes of junction delay between AIR - HAY[c]
00:00:10	10 seconds on each leg for crossover at terminal Tramstop[d]
00:49:40	Total

Layovers

00:04:55	Minimum layover at OCT end for Airport service[e]
00:10:00	Minimum layover at AIR end for Airport service[f]
00:07:30	Minimum layover at AIR end for Airport service[f]
00:14:55	Total min layover for 6 & 6 tram per hour scenario
00:12:25	Total min layover for 8 & 8 tram per hour scenario
01:53:25	Minimum round trip time for 6 & 6 tram per hour scenario
01:50:55	Minimum round trip time for 8 & 8 tram per hour scenario

Notes:

a Data from 'Edinburgh Tram Network Stage 3 Runtime Simulation Report' (Doc Ref: ULE90130-SW-REP-00238 v2).

b Data from 'Mott Macdonald Report - Traffic Interface Report' (Doc Ref: 0003048//REVC/241103). AM Junction delays between Haymarket and Leith Walk have been used as greater than PM delays.

c of additional junction delay between Haymarket and Edinburgh Airport.

d Estimate of additional time to move through the crossover at the terminus / turnback

e Layover calculated from Table 17 – Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario)

f Based on Headway of 10 or 7.5 minutes, from the requirement for Airport layover in Section 32.

Table 13 - Newhaven – Granton Square Service, (Phase 1b only)

NEW – GRT

00:02:49	NEW – OCT (includes 25s dwell time)[a]
00:36:28	OCT – GRT (includes dwell time)[a]
00:04:52	AM junction delay (NEW - HAY)[b]
00:00:45	additional delay between HAY - GRT[c]
00:00:10	10s on each leg for crossover at terminal Tramstop[d]
00:45:04	Total

GRT – NEW

00:37:00	GRT - OCT (includes dwell time)[a]
00:02:26	OCT - NEW (includes 25s dwell time)[a]
00:06:01	AM junction delay (NEW - HAY)[b]
00:00:45	additional delay between NEW - HAY[c]
00:00:10	10s on each leg for crossover at terminal Tramstop[d]
00:43:56	Total
00:04:15	Minimum layover at NEW end for Granton service[e]
00:04:07	Minimum layover at GRT end for Granton service[e]
00:08:22	Total min layover
01:37:22	Minimum round trip time

Notes:

[a] Data from 'Edinburgh Tram Network Stage 3 Runtime Simulation Report' (Doc Ref: ULE90130-SW-REP-00238v2).

[b] Data from 'Mott Macdonald Report - Traffic Interface Report' (Doc Ref: 0003048//REVC/241103)(AM Junction delays between Haymarket and Leith Walk have been used as greater than PM delays)

[c] Transdev estimate of additional junction delay between Haymarket and Granton Square.

[d] Transdev estimate of additional time to move through the crossover at the terminus / turnback

[e] Layover calculated from Table 17 – Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario).

Table 14 - Newhaven – Haymarket Service (Phase 1a only)

NEW - HAY	
00:02:49	NEW - OCT (includes 25 seconds dwell time)[a]
00:18:58	OCT - HAY (includes dwell time)[a]
00:04:52	AM junction delay (NEW - HAY)[b]
00:01:30	Additional delay between NEW - HAY
00:00:10	10 seconds on each leg for crossover at turnback[c]
00:00:54	Additional movement from HAY to turnback[e]
00:29:13	Total

HAY - NEW	
00:19:11	HAY - OCT (includes dwell time)[a]
00:02:51	OCT - NEW (includes 25 seconds dwell time)[a]
00:06:01	AM junction delay (HAY - NEW)[b]
00:01:30	Additional delay between HAY- NEW
	10 seconds on each leg for crossover at terminal
00:00:10	Tramstop[c]
00:00:54	Additional movement from turnback to HAY[e]
00:29:07	Total
00:04:00	Minimum layover at NEW end for Haymarket service[d]
00:04:00	Minimum layover at HAY end for Haymarket service[d]
00:08:00	Total min layover
01:06:20	Minimum round trip time

Notes:

a Data from 'Edinburgh Tram Network Stage 3 Runtime Simulation Report' (Doc Ref: ULE90130-SW-REP-00238v2).

b Data from 'Mott Macdonald Report - Traffic Interface Report' (Doc Ref: 0003048//REVC/241103). AM Junction delays between Haymarket and Leith Walk have been used as greater than PM delays.

c Transdev estimate of additional time to move through the crossover at the terminus / turnback

d Layover calculated from Table 17 – Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario)

e Transdev estimate of runtime between HAY and Haymarket Turnback (20kph over 300m = 5.6m/s over 300m = 54 seconds)

2.20 Summary to Establish Fleet Size

The minimum round trip times determined in Section 2.19 above are used in Tables 15 to 18 to determine the tram Peak Vehicle Requirement (PVR) and fleet size for Phase 1a & Phase 1b:

	OCT - AIR service	NER - HAY service	NER - GRS service
Service used on Phase	1a and 1b	1a only	1b only
Headway (min:sec)	10:00	10:00	10:00
Trams per hour	6	6	6
Minimum round trip time (hr:min:sec)	01:53:25	01:06:20	01:38:52
Actual round trip time needed to provide required headways and minimum layover (hr:min:sec)	02:00:00	01:10:00	01:40:00
Total additional layover to achieve headways (min:sec)	06:35	03:40	01:08
Peak number of trams	12	7	10

Table 15 - Number of Trams needed for each service (based on 6 & 6 Trams per hour scenario)

Network Option	1a	1a and 1b
PVR	19	22
Standby/maintenance/repair/training	3	3
Total tram fleet required	22	25

Table 16 - Number of Trams needed for each Phase (based on 6 & 6 Trams per hour scenario)

	OCT - AIR service	NEW - HAY service	NEW - GRT service
Service used on Phase	1a and 1b	1a only	1b only
Headway (min:sec)	07:30	07:30	07:30
Trams per hour	8	8	8
Minimum round trip time (hr:min:sec)	01:50:55	01:06:20	01:37:22
Actual round trip time needed to provide required headways & minimum layover (hr:min:sec)	01:52:30	01:07:30	01:37:30
Total additional layover to achieve headways (min:sec)	01:35	01:10	0:08
Peak number of trams	15	9	13

Table 17 - Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario)

Network Option	1a	1a and 1b
PVR	24	28
Standby/maintenance/repair/training	3	3
Total tram fleet required	27	31

Table 18 - Number of Trams needed for each Phase (based on 8 & 8 Trams per hour scenario)

2.21 Tram Fleet Kilometre Usage

The journey times and fleet sizes calculated above can be used to derive an approximate annual fleet and per Tram kilometre run of:

INITIAL OPERATING TIMETABLE

6tph	Daily	Days	Km	6tph	Daily	Days	Km
Weekdays	5531	261	1443591	Weekdays	7103	261	1853883
Saturdays	5363	52	278876	Saturdays	6950	52	361400
Sundays	5318	52	276536	Sundays	6815	52	354380
Total			**1999003**	**Total**			**2569663**
Per Tram 27 trams			**74037**	**Per Tram 27 trams**			**95173**
ENHANCED AM & PM PEAK SERVICE							
8tph	**Daily**	**Days**	**Km**	**8tph**	**Daily**	**Days**	**Km**
Weekdays	6217	261	1622596	Weekdays	7840	261	2046240
Saturdays	5363	52	320150	Saturdays	6950	52	361400
Sundays	5318	52	276536	Sundays	6815	52	354380
Total			**2219282**	**Total**			**2762020**
Per Tram 27 trams			**82196**	**Per Tram 31 trams**			**89097**
FLAT DAYTIME PEAK SERVICE							
8tph	**Daily**	**Days**	**Km**	**8tph**	**Daily**	**Days**	**Km**
Weekdays	7436	261	1940796	Weekdays	9347	261	2439567
Saturdays	7292	52	379184	Saturdays	9224	52	479648
Sundays	5318	52	276536	Sundays	6815	52	354380
Total			**2596516**	**Total**			**3273595**
Per Tram 27 trams			**96167**	**Per Tram 31 trams**			**105600**

Figure 7 – Operational Timetable

The principal assumptions are:

- 'Empty' running to and from the Depot is included;

3 General

3.1 Definitions

In these Employer's Requirements, Schedule 1 (Definitions and Interpretation) and the following definitions shall apply:

Table 19 - Definitions

Term	Definition
Act	An Act of Parliament or the Scottish Parliament following consideration and approval of a Bill
AFC	Automatic Fare Collection (see also TVM)
AIP	Approval in Principle for structures
ALARP	As low as reasonably practicable
Approval	(see Consent); also an approval of detail by an authority where consent is deemed to be granted by with prior conditions.
AutoCAD	Proprietary software used for engineering design
AW0 – AW5	Standard loading conditions for Tram Vehicles defined at Section 22.2.3
BRB	British Railways Board
BS	British Standard
CAA	Civil Aviation Authority
Case for Safety	All necessary documentation, information and other requirements pursuant to the Railways and Other Guided Transport Systems (Safety) Regulations 2006;
CAR	Corrective Action Report
CCTV	Closed Circuit Television
CIBSE	Chartered Institute of Building Services Engineers
CMS	Central Management System
COCP	Code of Construction Practice
COMP	Code of Maintenance Practice
Communications Plan	The Plan to be developed in accordance with the Employer's Requirements
COSHH	Control of Substances Hazardous to Health Regulations 1998
DAT	Delivery Acceptance Test
DCCB	Direct Current Circuit Breaker
DDA	Disability Discrimination Act
Developed	The enlarged Kinematic Envelope that takes into account all of the possible effects of

Term	Definition
Kinematic Envelope (DKE)	curvature, including superelevation of the track together with end and centre throw of the Tram. It is speed dependent and unique to a particular location at a given speed (See also Static Envelope, Dynamic Envelope and Kinematic Envelope) (See also RSPG Part 2 Section G – Guidance on Tramways).
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DSD	Drivers Safety Device
Dynamic Envelope	The Static Envelope enlarged to the maximum possible displacement of the Tram in motion on straight track. It takes into account suspension characteristics and allowances for maintenance and wear of Trams. (End and Centre throw is not included.) (See also Static Envelope, Kinematic Envelope and Developed Kinematic Envelope.) (See also RSPG Part 2 Section G – Guidance on Tramways)
EDMS	Electronic Document Management System
EIA	Environmental Impact Assessment
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMP	Environmental Management Plan
Enhanced Timetable	The Timetable described at Part 1a with 16 trams per hour Hay to Oct
ES	Environmental Statement
FAT	Factory Acceptance Test
GDPO	Town and Country Planning (General Development Procedure)(Scotland) Order 1992
GPR	Ground penetrating radar
Grandfather Rights	A longstanding right where the original reason and date of the granting of the right is unknown
GSN	Goal Structured Notation
HCI	Human Computer Interface
HF	Human Factors
HLM	High Level Model
HMRI	Her Majesty's Railway Inspectorate (or the appropriate approval regime in force)
HS	Historic Scotland
HSCB	High Speed Circuit Breaker
HVAC	Heating, Ventilating and Air Conditioning
ICP	Independent Competent Person
ISO	International Organisation for Standardisation
ITSO	Integrated Transport Smartcard Organisation - a non profit sharing, member owned organisation supported by the Department for Transport

Term	Definition
ItN	Invitation to Negotiate
JRC	Joint Revenue Committee
Kinematic Envelope (DKE)	The Dynamic Envelope enlarged to allow for the permitted tolerances in track gauge, alignment, level and cross-level and the dynamic and static effects of track wear. It is speed dependant. See also Static Envelope, Dynamic Envelope and Developed Kinematic Envelope. (See also RSPG Part 2 Section G – Guidance on Tramways)
LBC	Listed Building Consent
LHMP	Landscape and Habitat Management Plan
Lifecycle Replacement Plan	The Plan to be developed in accordance with the Employer's Requirements
Line 3	A planned extension of the Edinburgh Tram Network to the south east. Line 3 is not currently being progressed although some safeguarding provisions are required.
LRU	Line Replaceable Unit
LRV	Light Rail Vehicle
Maintainer	Infrastructure and Tram Vehicle maintenance
Markov Analysis	Reliability modelling method
MUDFA	Multi-Utilities Diversion Framework Agreement
MX	Proprietary software used for engineering design
NCR	Non Conformance Report
NR	Network Rail
OEM	Original Equipment Manufacturer
OLE	Overhead Line Equipment
Operational Timetable	The Timetable described at Table 2 – First and Last Trams for the 6 & 6 Tram per Hour Operational Timetable Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable - Hay to Oct
ORR	Office of Rail Regulation
ORS	Operational Radio System
OTMR	On Tram Monitoring and Recording
PA	Public Address System
Pan	Pantograph
PCC	Point Control Cabinet
PCS	Point Control System
PHC	Point Heating Cabinet
PHP	Passenger Help Point
PEHP	Passenger Emergency Help Point

Term	Definition
PID	Passenger Information Display
Prior Approval	Written approval by any approving body evidencing prior consent.
QA	Quality Assurance
Quality Management Plan	The Plan to be developed in accordance with the Employer's Requirements
RAMS	Reliability, Availability, Maintainability and Safety
RSPG	Railway Safety Principles and Guidance
RSP2	Ralilway Safety Publication 2 – Guidance on Tramways
RTPI	Real Time Passenger Information
RVAR	Rail Vehicle Accessibility Regulations
Safety Management Plan	The Plan to be developed in accordance with the Employer's Requirements
SAT	System Acceptance Test
SCADA	Supervisory, Control and Data Acquisition
SCC	Supervisory Control and Communications
SCT	Site Commissioning Test
SEPA	Scottish Environment Protection Agency
Shadow Running	Validation of the Operational Timetable without carrying passengers
SIT	System Integration Test
SP	Swept Path
SSSI	Site of Special Scientific Interest
STAG	Scottish Transport Assessment Guidance
Static Envelope	The maximum cross-section of Trams loaded or unloaded at rest on straight and level track, taking account of tolerances in the manufacture of the trams and the effects on the suspension of tram loading and tram loads arising from the wind and other weather. See also Dynamic Envelope, Kinematic Envelope, and Developed Kinematic Envelope. (See also RSPG Part 2 Section G – Guidance on Tramways)
Sub-System	An individual technical element e.g. communications, Tram etc.
SUC	Statutory Utility Company
SUDS	Sustainable Urban Drainage System ('soakaways')
The System	Collectively the technical sub-systems that together form the Edinburgh Tram Network.
System Interface	The interaction point between the sub-systems
Test Plan	The proposals developed by the Infraco for the structured and programmed testing of the components and the System

Term	Definition
Test T1 – T5	Formal Test requirements defined at Tests and Commissioning
TPDS	Tram Position and Detection System
Tramway Path	The area reserved for a moving tram in its environment. (See also RSP2 – Guidance on Tramways)
Transdev	"Transdev Edinburgh Tram Limited" (TETL) the Edinburgh Tram Network Operator
TRO	Traffic Regulation Order
TRY	Test Reference Year
TTRO	Temporary Traffic Regulation Order
TSS	Traction Sub-Station
TSS	Technical Support Services – advisors to **tie**.
TVM	Ticket Vending Machine (see also AFC)
UTC	Urban Traffic Control
UPS	Uninterruptible Power Supply
WBS	Work Breakdown Structure
WEBS	West of Edinburgh Busway Scheme

3.2 Infraco Services

3.3 General

This section provides a summary of the services that shall be required to be undertaken by the Infraco throughout the duration of the Infraco Works, or during particular stages of the Infraco Works, as appropriate.

3.4 Management and Technical Services

3.5 Summary of Deliverables

This section summarises the Deliverables that shall be provided by the Infraco. The Deliverables shall be provided in accordance with the requirements of the Agreement and shall be reviewed in accordance with the Review Procedure.

The Infraco shall complete the Deliverables set out hereunder, in the timescales agreed, and as identified in the Submittal Programme referred to.

In addition to the required Deliverables, this section also develops, where appropriate, the management and technical systems and services that shall be required to be provided by the Infraco to meet these Employer's Requirements. The Infraco shall develop and submit the following Deliverables for approval by **tie** in accordance with the Review Procedure.

Table 20 - Table showing Summary of Deliverables

Communications, Meetings and Reporting
Communications Plan
Meetings Schedule
Progress Photos
Progress Reports
Site Reports
Topics Register
Programme
Programme to include Design, Construction, Snagging, Commissioning, training, shadow running and opening to passenger service
Time Chainage Diagram
Management Plans
Construction Health and Safety Plan

Construction Plan
Construction Stage Environmental & Sustainability Management Plan(s)
Documentation associated with the completion of all research, surveys and inspections
Environmental Action Plan (EAP)
Infraco KPI Reporting
Infraco Performance Measurement
Network Rail Interface Plan
Overall Approvals Management Plan and Approvals Management Plan
Project Health & Safety File
Project Management Plan
Quality Forms (associated with the Project Safety and Quality Interface document)
Quality Management Plan
Research, Surveys and Inspections
Safety Forms associated with the Project Safety and Quality Interface document.
Safety Management Plan
Schedule of Internal Audits
System Safety Management Plan
Testing and Commissioning Plans
Training Plans

Design Deliverables

Earthing and Bonding Plan
Case for Safety for the Network or Geographical Sections as applicable
Design Stage Configuration Management Plan
Design Stage Verification & Validation Plan
Detailed Cause Consequence Analysis
Functional Hazard Analysis
Hazard Log & Risk Register
Interface Control Documents
Interface Schedules
List of Applicable Standards
Procurement Plan
Requirements Specification / Database
Scheme Plan
Road Network Plan of affected areas
System Architecture Specification
System Design Specification
System Design Test Specification
System Interface Management Plan
System Interface Register

Detailed drawings and other detailed design documentation

Archaeological & Heritage Mitigation Plan
Boundaries Treatment Management Plan
Construction Advice
Construction Site Drainage Plan
Initial and Final Buildability Reports
Landscape and Habitat Management Plan
Method of Working around Protected Species
Other construction advice as noted
Procedures for dealing with Unidentified Apparatus or Recorded Artificial Obstructions
Schedule 3 (Code of Construction Practice) Deliverables
Schedule and Conditional Surveys of Structures / Buildings Documentation (Dilapidation)
Strategy for controlling Invasive and Alien Species
Survey Photographs of Reinstatement Work
Temporary Works, Security and Fencing Arrangements Plan
Waste Management Plan

Cost Management

Actual / Planned / Forecast Spend Tables / Curves
Change Control Schedule and background information
Cost Loaded Programme / Earned Value Analysis based on WBS structure
Cost Report
Schedule of Compensation Events and background information
Value Management Estimates / Analysis

Risk

Commissioning Risk Control Report
Construction Risk Control Report
Infraco Assumptions Register
Infraco Risk Management Plan
Infraco Risk Register
Operational and Maintenance Report
Residual Risk Control Report
Risk Progress Reports

Traffic Management and TTROs

Access Control Permit Procedures
Access Control Permits and Permits to Work
Permits to Work and Utility Permits to Work Procedures
Traffic Management and Work Site Staging Plan
TTRO Obligations and Traffic Management Procedures

Method Statements
Method Statements
Schedule and Conditional Surveys of Structures / Buildings and Documentation (to avoid delay to the Service Commencement Date)
Survey Photographs of Reinstatement Work
Surveys of Structures which may affect Progress
Stakeholder Management Deliverables
Communications Log
Information for the **tie** monthly newsletter
Procurement Schedule
Traffic Routing Map
Weekly Newsletter
Weekly updates of Progress
Other Deliverables as defined below:
Asset Register
Documentation - As-built Design Drawings
Infrastructure Maintenance Plan
Maintenance Plan
O&M manuals
Overall Approvals Management Plan and Approvals Management Plan
Overall Test and Commissioning Plan
Simulation
Spare Parts manuals
Spare Parts, Tools & Test Equipment
Staffing Plan and Recruitment, Retention and Training Plan
System Acceptance
System Integration – including System Integration Plan

3.6 Design

3.6.1 General Obligations

The Infraco shall be responsible for the complete design of the Edinburgh Tram Network including the achievement of full compliance with the Employer's Requirements. The Infraco shall be responsible for achieving the following:

- The Deliverables necessary to enable the Edinburgh Tram Network to be procured, constructed, tested, commissioned and brought into commercial service and consistent with the requirements for training and Case for Safety (taking account of the need to fully co-ordinate these activities, including with other physically-related projects, so as to minimise overall disruption) to meet these Employer's Requirements and the Programme.
- The Infraco shall produce a tram service simulation that will demonstrate that its implementation of the design will achieve the required run times, power consumption and service performance where defined in these Employer's Requirements;
- The Infraco shall ensure that the design covers all aspects of the Edinburgh Tram Network and the associated works as defined in these Employer's Requirements;

- The Infraco shall approach the design and technical services in a structured manner using a recognised 'V' life cycle model with regard to the integration of design engineering, systems engineering and safety engineering activities;

- The Infraco shall be responsible for ensuring that there are no gaps and omissions in the specification and design of the Edinburgh Tram Network;

- The Infraco shall demonstrate that the design has properly considered and adopted the most advantageous whole life cost solutions;

3.6.2 Design Approach

The design approach shall be as set out in the SDS Agreement. The Infraco shall:

- Adopt, develop and adapt the SDS Management Plans covering Configuration Management and Verification and Validation.

- Undertake such supplementary safety analysis that will allow further development of the Case for Safety concurrent with any design undertaken to prove that the Edinburgh Tram Network is acceptably safe;

- Where any new technologies are proposed by the Infraco, submit reports and presentations analysing and assessing the options and justifying the final selections of technologies in terms of time, cost, quality, safety, risk and maintainability, for review by **tie**;
- Prepare and maintain the Risk and Hazard Log;
- Prepare and maintain the System Architecture Specification;
- Prepare and maintain the System Design Specification;
- Prepare and maintain the System Design Test Specification;
- Prepare and maintain the Functional Hazard Analysis;
- Prepare and maintain the Detailed Cause Consequence Analysis;
- Prepare and maintain the Requirements Specification / Database;
- Prepare and maintain the Scheme Plan;
- Prepare and maintain the Procurement Plan;
- Prepare and maintain the Interface Schedules;
- Prepare and maintain the Earthing and Bonding Plan;
- Prepare and maintain the detailed drawings and other detailed design documentation;

3.6.3 Transport Modelling

The Infraco shall procure that the SDS provider performs its obligations in respect of

- transport modelling as such obligations are set out in the SDS Agreement.
- detailed traffic junction design recognition and evaluation and wider area effect assessment;
- temporary traffic diversions and support to **tie** where reasonably required in respect of obtaining the Traffic Regulation Order including impact analysis as defined in section 12.12.

For detailed traffic signal modelling; Infraco shall provide adequate modelling upon which to baseits design.

3.6.4 Environmental

All equipment shall meet its required operational functionality in accordance with these Employer's Requirements. The Edinburgh Tram Network and its components shall take cognisance of, inter alia, the following factors: electrical interference, dust, vibration, supply voltage variations, radio signal variations, solar radiation, temperature, humidity, salt, mist, wind, precipitation, snow etc.

Table 21 shows average temperature and humidity conditions for the region. Based on the given information all equipment shall be suitable for a working life as defined in Design Life of these Employer's Requirements under maximum ambient temperature range from – 9° to + 28 ° C, unless otherwise agreed by **tie**.

Edinburgh (eastern Scotland)

Sunshine (average hours per day)		Temperatures								Precipitation and humidity				Wet days (more than 0.1 mm/0.004 in)	
		Average daily				Highest recorded		Lowest recorded		Relative humidity		Average monthly precipitation			
		minimum		maximum						900	x				
		°C	°F	°C	°F	°C	°F	°C	°F	%		mm	in		
Jan	2	1	34	6	42	14	57	-8	17	84		57	2	17	Jan
Feb	3	1	34	6	43	14	58	-9	15	83		39	2	15	Feb
March	4	2	36	8	46	20	68	-6	21	81		39	2	15	March
April	5	4	39	11	51	22	72	-4	25	75		39	2	14	April
May	6	6	43	14	56	24	76	-1	31	76		54	2	14	May
June	6	9	49	17	62	28	83	3	37	75		47	2	15	June
July	5	11	52	18	65	28	83	6	42	78		83	3	17	July
Aug	4	11	52	18	64	28	82	4	40	80		77	3	16	Aug
Sept	4	9	49	16	60	25	77	1	33	80		57	2	16	Sept
Oct	3	7	44	12	54	20	68	-2	28	82		65	3	17	Oct
Nov	2	4	39	9	48	19	67	-4	24	83		62	2	17	Nov
Dec	1	2	36	7	44	14	58	-7	20	84		57	2	18	Dec

Based on readings for 30 years at 55°55' N, 3°11' W, altitude 134 m/440 ft.

Where equipment is enclosed in equipment housings / enclosures the equipment contained therein shall be capable of operating at an external ambient temperature 15°C higher than the upper limit and at a temperature of 5°C lower than the figures in Table 21 taking into account any heat generated by the equipment.

All equipment housings / enclosures that contain electronic equipment shall be so equipped to minimise the occurrence of condensation within the enclosure.

The following data in Figures 8 & 9 are based on the Edinburgh Test Reference Year (TRY) as given by CIBSE. It is a synthesised weather year based on 20 years of record data. CIBSE recommend that this type of weather data be used for analysing energy use and overall environmental performance.

Temperature

Dry Bulb Temperature	MAX 26.7°C	MIN –10.1°C	MEAN 8.43°C
Wet Bulb Temperature	MAX 18.9°C	MIN –10.7°C	MEAN 6.82°C

Figure 8 - Dry Bulb Temperature Analysis 1: Number of Hours per Year That the Dry Bulb Temperature is Greater Than the Given Value

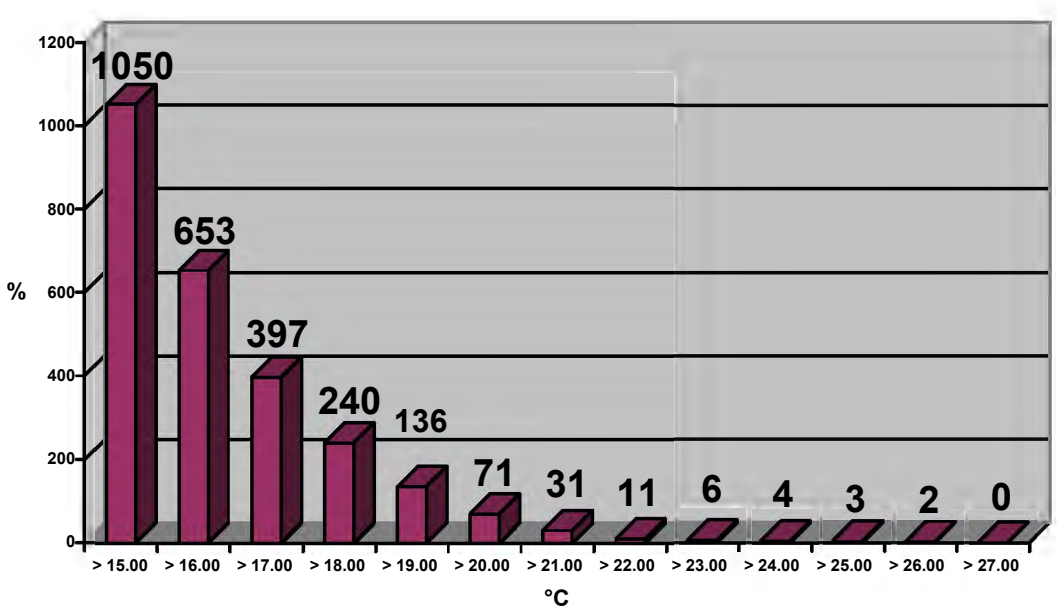
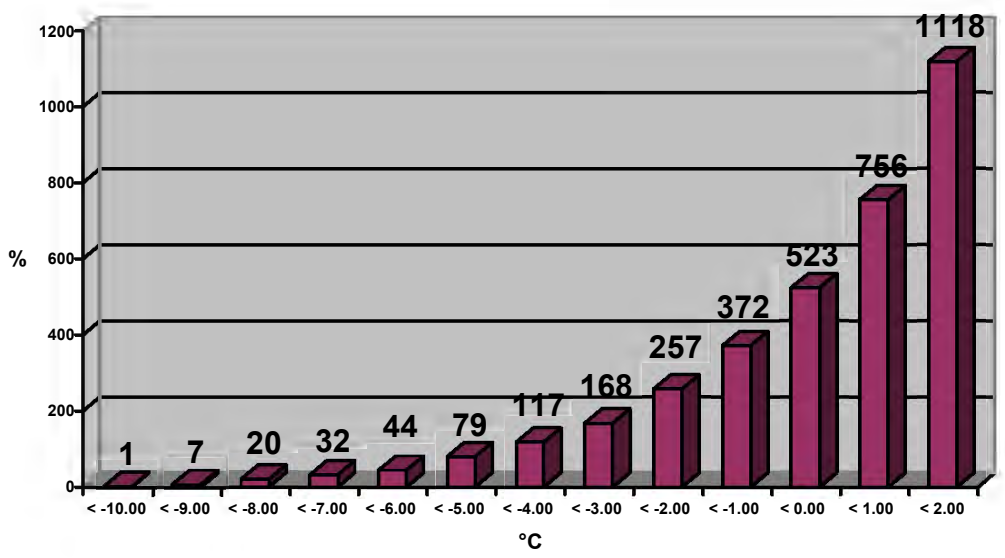


Figure 9 - Dry Bulb Temperature Analysis 2: Number of Hours per Year That the Dry Bulb Temperature is Less Than the Given Value



Wind Speed MAX 19.5m/s MIN 0m/s MEAN 4.6m/s

3.7 Construction-related Deliverables (Schedule 3 Requirements)

The following deliverables, from and with regard to *Schedule 3 (Code of Construction Practice and Code of Maintenance Practice)* are highlighted for submission in accordance with the Review Procedure:

- In accordance with Schedule 3 (Code of Construction Practice and Code of Maintenance Practice), the Infraco shall compile a schedule of all buildings, or other structures, which may be at risk of physical damage as a result of the Infraco Works. Furthermore records of the condition and surveys of any defects shall be prepared by the Infraco;

- Under Schedule 3 (Code of Construction Practice and Code of Maintenance Practice) there is a requirement for the Infraco to undertake works to address defects in existing structures, caused by the Infraco Works. Where such work is completed the Infraco shall be required to take appropriate photographs to fully demonstrate the quality of the reinstatement works;

3.8 Construction Advice and Buildability

The Infraco shall be required to develop a =Buildability Report in accordance with the Review Procedure.

The Infraco shall provide a Buildability Report in accordance with the Review Procedure, which shall address the following.

- The Infraco shall propose construction methods which shall be utilised in respect of the Infraco Works. The Infraco shall also advise **tie** on the time and cost implications of any alternative solutions proposed by the Infraco and which have been accepted by **tie**. The Infraco shall initiate the requirements for Temporary Works, and the programme for approvals for such Temporary Works and their execution.

- Notwithstanding the Infraco's obligations with respect to compliance with the third party agreements, the Infraco shall advise **tie** on the potential impact of the Infraco Works upon neighbouring occupiers and users of nearby roads, railways, buildings and airport facilities and the Infraco shall plan the execution of the Infraco Works in such a way as to minimise disruption and prevent nuisance.

- The Infraco shall advise **tie** on the provision and layout of the main site office and local Work Sector / Work Section facilities and services to be provided or secured by the Infraco. **tie**'s requirements for office accommodation at the main site office are expressed in this section.

The Infraco shall prepare, maintain and comply with plans, schedules and drawings that shall show the Infraco's proposals for temporary works, security and fencing arrangements throughout the duration of the Infraco Works ("Temporary Works, Security and Fencing Arrangements Plan").

3.9 Site Support Facilities for tie

The Infraco shall be responsible for the provision, servicing, maintenance and removal of the specified **tie** office accommodation and transport for the use of **tie** officers and staff

The Infraco shall provide and maintain fully serviced office accommodation and furnishings throughout the duration of the Infraco Works, in accordance with the following requirements:

- Office accommodation to accommodate 10 desks (Infraco supply) each with at least one secure lockable drawer, a swivel cloth upholstered chair. ;
- Three separate offices with a minimum working space of $16m^2$;
- 2 meeting rooms suitable for sitting up to 20 and 8 people respectively;
- Male and female toilets. Minimum area $3m^2$ each;
- Changing/Locker facilities;
- Kitchen facilities;
- Drying facilities;
- Male & Female shower room;
- Parking for up to 15 cars.

The Infraco shall prepare and submit an office layout based on the accommodation description set out below for approval by **tie**.

The Infraco shall integrate this accommodation with the Infraco's own accommodation and, subject to proposals which are acceptable to **tie**, the meeting rooms and welfare facilities may be shared by the Infraco.

3.9.1 Fittings and Furnishings

The Infraco shall also provide the following as minimum requirements:

General Office

- 7 x 4 drawer lockable metal filing cabinets
- 6 wall mounted notice board 1m high 1.5m wide
- 10 waste paper baskets
- 10 telephones connected to 2 lines
- 1 fax machine connected to a separate dedicated line
- 1 high output combined printer and photocopier capable of producing A4 and A3 black and white copies
- 10 connections to internet via broadband, all able to connect at same time
- 1 plan layout table 1 x 2 m
- 1 A0 drawing board and drafting equipment
- 10 desk lamps
- 10 letter tray/ filing baskets
- 2 m of book shelves at 6 of the desks
- 6 large white boards

Meeting Rooms

- Suitably sized tables and the requisite number of chairs for each of the two meeting rooms referred to above.

- 3 flip charts and flip chart paper as required and 1 large wall mounted white board in each meeting room

Changing / drying room

- Lockers c/w locks and keys for 30 people
- 4 chairs
- 30 coat pegs mounted on wall
- 1 boot pull.

General

- A security alarm system
- Access doors, fitted with five lever mortice locks and 6 sets of keys

3.9.2 Services

The Infraco shall provide, install and maintain all the services i.e. Gas, electric, water, drainage, telephone (two lines), broadband etc necessary to ensure effective occupation by **tie** of the accommodation for the duration of the Infraco Works

The Infraco shall provide install and maintain a printer/photocopier capable of producing A4 and A3 size black and white photocopies. The Infraco shall ensure that sufficient stocks of consumables (including paper and toner) are available at all times. Subject to acceptable proposals, the photocopier / fax may be shared by the Infraco and **tie**.

The Infraco shall provide tea, coffee, sugar fresh milk and a supply of drinking water for use by **tie** for the duration of the Infraco Works.

The Infraco shall arrange for the servicing and daily cleaning of the accommodation.

Toilet paper, paper towels, soap, and detergents shall be provided by the Infraco as required.

3.9.3 Equipment

The Infraco shall provide the following equipment for the exclusive use of **tie** throughout the duration of the Infraco Works:

- 10 x 10m long steel tape measures
- 10 x 50m long tape measures
- 10 x high output hand-held torches
- 2 approved electronic utility tracers for tracing/locating cables and pipes
- other consumables as may be required by **tie** (i.e. marker paint etc.).

The Infraco shall provide surveying/setting out equipment to **tie** as reasonably required, in connection with the Infraco Works.

3.9.4 Site Vehicles

The Infraco shall provide, licence, insure (comprehensive for any qualified driver together with any authorised passengers and the carriage of goods or samples), service and maintain four 4 wheeled road vehicles (suitable for the Edinburgh Tram Network) and visitor transport for the exclusive use of **tie**'s representative and staff to enable them to carry out their duties for the duration of the Agreement. The number and type shall be to the specific approval of **tie**.

The vehicles shall be delivered and maintained by the Infraco in good, roadworthy condition.

The Infraco shall provide fuel, oil and maintenance in conformity with the vehicle manufacturers' recommendations and shall clean the vehicles inside and outside as required by **tie**.

A suitable replacement vehicle shall be provided by the Infraco in the event any vehicle being out of service for more than 24 hours.

The Infraco shall ensure that each vehicle shall be fitted with approved warning beacons and any other safety equipment as required for work on roads or within the boundaries of the Edinburgh International Airport.

3.10 Spare Parts, Tools and Test Equipment

The Infraco shall be responsible for the provision, delivery, offloading and placing into stores of the necessary Spares Parts, Tools & Test Equipment.

Detailed requirements and deliverables in respect of the Spares Parts, tools and Test Equipment responsibilities are included in the Agreement.

3.11 Documentation

The Infraco shall be responsible for the provision of all as built / constructed / manufactured drawings, manufacturers information, test certification and other documentation to be provided inaccordance with the Agreement.

Detailed requirements and Deliverables in respect of the documentation responsibilities are included within the Agreement and the Maintenance section of these Employer's Requirements.

3.12 Training

The Infraco shall be responsible for all necessary initial training associated with the operation and maintenance of the Edinburgh Tram Network. Detailed requirements and deliverables in respect of the Training responsibilities are included within Section 40 (*Maintenance*) of these Employer's Requirements.

4 Use of Industry Standard Equipment

The Infraco shall base its system supply on Commercial Off the Shelf (COTS) equipment and software. The use of proprietary equipment and software which is not available on a COTS basis is prohibited unless prior written agreement has been obtained from **tie,** other than that which is specified in the Infraco Proposal.

This is to allow the maintenance, extension and modification of the ETN by third party suppliers and maintainers if necessary.

All electronic interfaces between subsystems shall use open standards and shall utilise non-proprietary protocol.

5 System Identity and Branding

A single system identity shall be applied to the ETN. This shall be developed by **tie** through a specialist contractor appointed by **tie**. The output of this contract with the specialist contractor shall be a documented set of design guidelines which shall be incorporated into these Employer's Requirements as Appendix 1 and which shall be complied with by the Infraco in respect of the Infraco Works. The design guidelines shall include the following elements:

- Logo and other elements of the ETN's graphic identity;
- Signage;
- Application of the systems identity to the following:
  - Ticket machines;
  - Stop furniture;
  - Passenger information;
  - Depot.
- Tram livery;
- Tram interior;
- Uniforms;
- Pictograms;
- Other aspects of the ETN which are visible to the public.

6 Design Life

The equipment and systems to be supplied for the Edinburgh Tram Network shall be designed and built by the Infraco to a standard that shall ensure the System as a whole is capable of continuous operation for a minimum period of 15 years from the Service Commencement Date for each Phase.

Individual items of Infrastructure and equipment shall have a design life as indicated in the table below. Where the design life for an item of equipment is not specified, a minimum of 15 years shall be assumed. All design lives are from the Service Commencement Date for each Phase.

Item of Equipment or System	Design Life
Trams	30 years
Structures	120 years
Track Bed	50 years
Track	25 years
Rails in Straight Lines	20 years
OLE	30 years
Power Cables	30 years
Substations and Substation Equipment	30 years
Tramstop Platforms	50 years
Tramstop Superstructure (including shelters and poles)	25 years
Tram Position and Detection equipment	15 years
Passenger Information Displays	10 years
Telephone Handsets	10 years
Telephone PABX	15 years
Voice recorder	15 years
PA Controller	10 years
Loudspeakers	15 years
Hand Portable Radio Handsets	5 years
Vehicle Mobile Radio Equipment	7 years

Item of Equipment or System	Design Life
Radio Base Station Equipment	15 years
Radio Masts and Antennae	15 years
Passenger Help Points	15 years
CCTV cameras	7 years
CCTV Digital Video Recorders	7 years
SCADA outstations	20 years
Fibre Optic Cabling and Patch Panels	25 years
Fibre Optic Switches, Routers, Hubs	15 years
Other communications equipment	15 years
Cabinets	25 years
UPS systems (excluding batteries)	15 years
Copper Communications Cables	25 years
Batteries (if employed)	4 years
Workstations including Monitors	5 years
Servers	5 years
Standard hand tools	5 years
Portable electrical tools	7 years

Table 22 - Equipment Design Life

7 Extensibility

Table 23 below sets out the assumptions being made in the design of Phase 1a and Phase 1b to allow Phases 2 and 3 to be added with minimum change, and also for future increase in service levels on Phase 1a/1b (over the "8+8" pattern) and for the addition on the proposed Line 3 (assumed routing Bridges-Princes St-Haymarket).

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
Track Layout	Roseburn Junction/Delta	Design for full delta	n/a		n/a	n/a
	Balgreen loop and crossover	Design for loop and crossover	n/a		n/a	n/a
	Granton Square	Design for interim terminus	Design for track continuation; build initial as over-run for terminus	n/a	n/a	n/a
	Newhaven	Design for interim terminus	Design for track continuation	n/a	n/a	n/a

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Ingliston Junction and P&R Tramstop	Make provision for Phase 3 and long-term aspirations	Alignment design not to preclude an allowance terminating Phase 3 service at Ingliston P&R and for East-West continuation from Phase 1	n/a	n/a	n/a
	Track alignment at Princes St/South St Andrew St Junction	Make Provision for Line 3	n/a	n/a	Alignment to allow pointwork and appropriate future traffic management(See CR078)	n/a
Modelling	Network modelling inc. for TSJs	To support 8+8 service	None	None	None	n/a
Traction Power	Traction Power Supply system (Substations/OLE/cabling)	To support 8+8 service +50% addition	Part of basic design	In basic design	Effectively in basic design, as an alternative use of the increased service design provision	n/a

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Definition of Power characteristics (and other parameters for modelling)	Full traction characteristic of the selected tram	n/a	n/a	n/a	n/a
Depot	Stabling sidings	Design for 35, build for 27	Inc. in 8 extra	Inc. in 8 extra	Not specifically included	n/a
	Workshop	8 Berths theoretical maximum; (practically:4 berths plus 2 service roads)	Initial design would accommodate	Initial design would accommodate	Not specifically included	n/a
	Depot staff accommodation	Numbers to be accommodated nominally match fleet that could be accommodated	Initial design would accommodate	Initial design would accommodate	Not included	n/a
	Depot car parking	See drawings	n/a	n/a	Not included	n/a
	Depot Control Centre	Design for 5 desks; provide 3	Design layout would accommodate	Initial provision would accommodate	Design layout would accommodate	n/a

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Depot stores	Design basis	Would accommodate	Would accommodate	Not included	n/a
						n/a
SCC	ODN capacity					
	General capacity	There is an initial +50% requirement above the calculated maximum usage	TBA	TBA	TBA	n/a
	Route coding capacity	3-digit route-coding included	Included in base	n/a	Included in base	n/a
	Radio system capacity	A minimum[2] of two channels at each base station	TBA	TBA	TBA	n/a
Roads	Traffic Signalled Junction design and modelling (inc. at temporary termini)	Phase 1a/1b only	Possibly ductwork at temporary termini	n/a	None	n/a

[2] *The word maximum would allow no channels to be provided and still be compliant! Two channels ok as a minimum.*

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Traffic Management layout at Princes St/South St Andrew St	Phase 1a only	n/a	n/a	None	n/a
	Traffic signalling ductwork	Design basis	n/a	n/a	n/a	Allowance in design at locations where additional signals might be provided
Tramway Ducting	Ductwork and access chambers	A minimum of 20% addition of the number of ducts	Initial design would accommodate	Initial design would accommodate	Initial design would accommodate	n/a
Utilities	Cross-track ducts	Where agreed with the SUCs, provision of secondary spare duct	n/a	n/a	n/a	Provision in design basis

Table 23 - Extensibility Assumptions

8 Standards

8.1 Principles

Where there is no relevant standard specified in the Agreement, the Infraco Works shall comply as a minimum with relevant current British or European Standards, DfT and/or Scottish Government Publications, Standards and Technical Memoranda or IEC/ISO Standards in accordance with the order of precedence set out in section 8.2.

The Infraco Works shall comply with the ORR Safety Publication 2 and with the requirements of HMRI. Where standards do not exist, the Infraco Works shall comply with Good Industry Practice and all relevant codes of practice and guidance notes. Materials or equipment provided shall be in accordance with regulations and standards appropriate to the United Kingdom or the country of manufacture, but only where in the opinion of **tie**, compliance with the regulations and standards appropriate to the country of manufacture ensures an equivalent or higher quality than the regulations and standards appropriate to the United Kingdom. In such situations, the onus will be on the Infraco to prove that they are of an equivalent or higher quality.

Where standards are specified in these Employer's Requirements, these shall include any successor or replacement standards, announced or in force before7 August 2007 and in relation to Tram Supply Obligations and Tram Maintenance Obligations only, 14 September 2007, which provide an equivalent or improved quality and standard.

The Infraco shall comply with standards reasonably required by the relevant Roads Authority, including any local standards and amendments to the Design Manual for Roads and Bridges.

The Infraco shall be responsible for identifying all proposed departures from standards: in these instances, the Infraco shall seek the formal approval of **tie**, and provide all details justifying the departure from standards.

The Infraco shall be responsible for making any necessary applications to the relevant Roads Authority for departure from standards and for complying with the resulting consequences, including those arising from the failure of an application for such departure.

The Infraco shall ensure that all materials, construction and workmanship comprised in the Infraco Works meet the requirements of the British or European standards relevant to the materials used. Materials used should have a British Board of Agrément Certificate wherever reasonably possible which identifies a lifespan for that material.

8.2 Hierarchy of Precedence.

The order of precedence shall be as follows:

1) Legislation;

2) Guidance;

3) Where not included in Guidance;

(i.) British Standards;

(ii.) Scottish Government standards and guidance;

(iii.) Local Authority standards (CEC);

(iv.) Statutory Utility standards;

(v.) International Industry standards.

8.3 The Infraco's Responsibilities

The Infraco in its system integrator role and as the system designer shall be responsible for:

- As appropriate, the development of, and compliance to, robust management processes in respect of compliance with Law and any other relevant standards or regulations included in the Agreement and section 8.2.
- The identification and selection of appropriate standards for all aspects of the Infraco Works
- The identification and definition of any application limits of such standards for all aspects and at all stages of the Infraco Works (such as design, construction, testing and commissioning, operation, and maintenance) in particular at the network, System and subsystem level.
- The identification and successful resolution of any conflicts within and between the obligations contained within this section 8 and Law.

8.3.1 Applicable Standards

Applicable standards are listed in the following table.

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 8500 – 1: 2002	Concrete – Complementary British Standard to BS EN 206-1. Method for specifying and guidance for specifier	x	x	x			x		x	x	
BS 8500 – 2: 2002	Concrete – Complementary British Standard to BS EN 206-1. Specification for constituents material and concrete	x	x	x			x		x	x	
BRE Special Digest Nr 1	Concrete in aggressive ground.	x	x	x			x		x	x	
BS 4449: 1997	Specification for carbon steel bars for reinforcement of concrete	x	x	x			x		x	x	
BS 6744: 2001	Stainless steel bars for the reinforcement and use in concrete – Requirements and test methods	x	x	x			x		x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 10210 S355 J2H	Steelwork: Hollow sections	x					x				
BS EN 10025 S355J2G3	Steelwork: All other sections	x					x			x	
BS 5400 -	Steel, Concrete and Composite Bridges	x									
BS 5400 - Part 1: 1988	General Statement (see BD 15/92)	x									
BS 5400 Part 2: 1978	Specification for Loads (See BD 37/01)	x									
BS 5400 Part 3: 2000	Code of Practice for Design of Steel Bridges	x									
BS 5400 Part 4: 1990	Code of Practice for Design of Concrete Bridges (see IA.5 and BD 24/92)	x									
BS 5400 Part 5: 1979	Code of Practice for Design of Composite Bridges (see BD 16/82)	x									
BS 5400 Part 9: 1983	Bridge Bearings (see BD 20/92)	x									
BS 5400 Part 10: 1980	Code of Practice for Fatigue (see BD 9/81)	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 5930: 1999	Code of Practice for Site Investigations	x	x	x					x	x	
BS 8666: 2000	Scheduling, Dimensioning, Bending and Cutting of Steel Reinforcement for Concrete	x	x	x			x		x	x	
BS EN 206-1: 2000	Concrete - Specification, performance, production and conformity (AMD 13189)	x	x	x			x		x	x	
BS 8500-1: 2002	Concrete – Complimentary British Standard to BS EN 206-1. Method of specifying and guidance for the specifier.	x	x	x			x		x	x	
BA 47/99 (Aug '99)	Waterproofing and Surfacing of Concrete Bridge Decks	x									
BA 41/98 (Feb '98)	The Design and Appearance of Bridges	x									
BA 42/96 (Nov '96)	The Design of Integral Bridges	x									
BA 55/00 (May '00)	The Assessment of Bridge Substructures & Foundations, Retaining Walls & Buried Structures	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BA 57/95 (Aug '95)	Design For Durability	x									
BD 2/79 (Jun '88)	Technical Approval of Highway Structures on Motorways and other Trunk Roads, Part IV: Procedures for Lighting Columns	x		x							
BD 2/89 (Oct '89)	Technical approval of DTp highway structures on motorways and other trunk roads Part 1, General Procedures	x									
BD 7/81 (Aug '81)	Weathering steel for highway structures	x									
BD 9/81 (Dec '81)	Implementation of BS 5400 Pt 10, CP for fatigue	x									
BD 12/95 (Feb '96)	Design of Corrugated Steel Buried Structures with spans not exceeding 8m (including circular Arches)	x									
BD 13/90 (Feb '91)	Design of Steel Bridges Use of BS 5400: Part 3: 1982	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BD 15/92 (Dec '92)	General Principles for the Design and Construction of Bridges Use of BS 5400: Part 1: 1988	x									
BD 16/82 (Dec '82)	Design of composite bridges - Use of BS 5400 Pt 5: 1979 including Amendment No. 1 (Dec '87)	x									
BD 20/92 (Oct '92)	Bridge Bearings Use of BS 5400: Part 9: 1983	x									
BD 21/97 (Aug '97)	The Assessment of Highway Bridges and Structures Amendment No. 1 (Aug '97)	x									
BD 24/92 (Nov '92)	Design of Concrete Highway Bridges and Structures Use of BS 5400: Part 4: 1990 Including Interim Advice Note IA.5 July 1996	x									
BD 28/87 (Jul '87)	Early thermal cracking of concrete including Amendment No. 1 (Aug '89)	x									
BD 30/87 (Jul '87)	Backfilled retaining walls and bridge abutments	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BD 31/87 (Jan '88)	Buried concrete box type structures	x									
BD 33/94 (Nov '94)	Expansion Joints for Use in Highway Bridge Decks	x									
BD 37/01 (Aug '01)	Loads for Highway Bridges	x									
BD 42/00 (May '00)	Design of Embedded Retaining Walls and Bridge Abutments	x									
BD 43/90 (Apr '90)	Criteria and Material for the Impregnation of Concrete Highway Structures	x									
BD 44/95 (Jan '95)	The Assessment of Concrete Highway Bridges and Structures Including Interim Advice Note IA.4 July 1996.	x									
BD 47/99 (Aug '99)	Waterproofing and Surfacing of Concrete Bridge Decks	x									
BD 48/93 (Jun '93)	The Assessment and Strengthening of Highway Bridge Supports	x									
BD 49/93 (Jan '93)	Design Rules for Aerodynamic Effects on Bridges	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BD 52/93 (Apr '93)	The Design of Highway Bridge Parapets	x									
BD 56/96 (Nov '96)	The Assessment of Steel Highway Bridges and Structures	x									
BD 57/95 (Aug '95)	Design for Durability	x									
BD 58/94 (Nov '94)	The Design of Concrete Highway Bridges and Structures with External and Unbonded Prestressing	x									
BD 60/94 (Apr '94)	The Design of Highway Bridges for Vehicle Collision Loads (this does not apply to existing structures).	x									
BD 70/97 (Feb '97)	Strengthened/Reinforced Soils and Other Fills for Retaining Walls and Bridge Abutments (use of BS 8006:1995)	x									
BD 74/00 (May '00)	Foundations	x					x			x	
TD 9/93 (Jun '93)	Highway Link Design	x									

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
TD 27/96 (Aug '96)	Cross sections and headrooms	x									
ASO10	Railway sleepers – Jarrah, Karri and Wandoo.		x								
ASO11	Railway crossing timbers – Jarrah.		x								
BS EN 13674-1:2003	Specification for railway rails (partially replaces BS11)		x								
BS47	Fishplates for railway rails.		x								
BS EN 13043:2002	Aggregates for bituminous mixtures and surface treatments for roads.		x	x						x	
BS64	Specification for normal and high strength steel bolts and nuts for railways rail fishplates.		x								
BS729	Specification for hot dip galvanised coatings on iron and steel articles.		x								
BS EN 1097-3:1998	Testing aggregates. (partially replaces BS812)		x								

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS970	Specification for wrought steels for mechanical and allied engineering purposes.		x								
BS1377	Methods of tests for soils for civil engineering purposes.	x	x	x			x			x	
BS3100 (withdrawn)	Specification for steel coatings for general engineering purposes.		x				x			x	
BS4921	Specification for sheradised coatings on iron and steel.		x				x			x	
BS EN 10270-1:2001	Specification for patented cold drawn steel wire for mechanical springs.		x								
BS6906	Methods of tests for geotextiles.		x								
BS EN 1562	Founding. Malleable cast irons.		x								
BS EN 1563	Founding. Spheroidal graphite cast iron.		x								
BS EN 13481-2	Performance requirements for fastening systems for concrete sleepers.		x								
BS EN 13481-3	Performance requirements for fastening systems for wooden sleepers.		x								

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 10002 – 1	Tensile testing of metallic materials (method of test at ambient temperature).		x								
BS EN 10025	Hot rolled products of structural steels. General technical delivery conditions		x							x	
ENAAA-2	Railway applications – Track – Fastening Systems Part 2: Performance requirements for fastening system for concrete sleepers.		x								
ISO/R887	Plain washers for metric bolts, screws and nuts.		x								
RT/E/S/40045	Network Rail Standard Electric Points Heating.		x								
UIC605OR	Protection from corrosion – measures to be taken on direct current catenaries to reduce the risks on adjacent piping and cable systems.		x								
UIC860	Technical specification for the supply of rails.		x								

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
UIC861-2	Standard sections for points rails adapted to the UIC54 and 60kg/m rail sections.		x								
UIC861-3	Standard 60kg/m rail profiles – types UIC60 and 60E.		x								
UIC863	Technical specification for the supply of non-treated track support (wooden sleepers for standard and broad-gauge track and crossing timbers).		x								
UIC863-1	Use of non-European timbers for the manufacture of sleepers.		x								
UIC864-1	Technical specification for the supply of sleeper screws.		x								
UIC864-2	Technical specification for the supply of steel track bolts.		x								
UIC864-3	Technical specification for the supply of spring steel washers for use in permanent way.		x								

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
UIC864-4	Technical specification for the supply of fishplates or sections for fish-plates made of rolled steel.		x								
UIC864-5	Technical specification for the supply of rail seat pads.		x								
UIC864-6	Technical specification for the supply of baseplates and for sections for baseplates made of rolled steel.		x								
UIC864-7	Rolled profiles for baseplates for UIC rails.		x								
UIC864-8	Rolled profiles for fishplates for 54kg/m and 60kg/m rails.		x								
UIC866	Technical specification for the supply of cast manganese steel crossings for switch and crossing work.		x								
BS 1363-2:1995	13A plugs, sockets-outlets and adaptors. Part 2, Spec. for 13A switched and unswitched socket-outlets				x			x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 1363-4:1995	13A plugs, socket-outlets and adaptors. Part 4, Spec. for 13A fused connection units switched and unswitched				x			x	x	x	
BS 3573:1990	Polyolefin copper-conducted telecommunications cables							x	x	x	
BS 4533-102.1:1990	Luminaires. Particular requirements. Part 102.1 Fixed general purpose luminaires				x				x	x	
BS 4579-1:1970 (withdrawn, replaced by BS EN 61238-1)	Performance of mechanical and compression joints in electric cable and wire connectors. Part 1 Compression joints in copper conductors				x	x	x	x	x	x	
BS 4579-2:1973	Performance of mechanical and compression joints in electric cable and wire connectors. Part 2 Compression joints in nickel, iron and plated copper conductors				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 4662:1970 (withdrawn. replaced by BS 4662:2006)	Specification for boxes for the enclosure of electrical accessories				x	x	x	x	x	x	
BS 4737-4.1:1987	Intruder alarm systems in buildings. Part 4.1 Codes of practice. Code of practice for planning and installation				x				x	x	
BS 5225-1:1975	Photometric data for luminaires. Part 1 Photometric measurements				x				x	x	
BS 5225-3:1982	Photometric data for luminaires. Part 3 Method of photometric measurement of battery-operated emergency lighting luminaires				x				x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 5266-1:1999	Emergency lighting. Part 1 Code of practice for the emergency lighting of premises other than cinemas and certain other specified premises used for entertainment				x				x	x	
BS 5266-3:1981	Emergency lighting. Part 3 Specification for small power relays (electromagnetic) for emergency lighting applications up to and including 32A				x				x	x	
BS 5467:1997 (equivalen european harmonisation document to be provided)	Specification for 600/1000V and 1900/3300V armoured electric cables having thermosetting insulation				x		x		x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 546:1950	2-pole and earthing-pin plugs, socket-outlets and socket-outlet adaptors. See also Supplement No 1:1960 Specification for plugs made of resilient material				x				x	x	
BS 5486-11:1989 (withdrawn, replaced by BS EN 60439)	Low-voltage switchgear and control gear assemblies. Part 11 Specification for particular requirements of fuseboards				(withdrawn, replaced by BS EN 60439)x			x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 5486-12:1989 (withdrawn, replaced by BS EN 60439)	Low-voltage switchgear and control gear assemblies. Part 12 Specification for particular requirements of type-tested miniature circuit-breaker boards				x			x	x	x	
BS 5499-1:2002	Graphical symbols and signs. Part 1 Safety signs, including fire safety signs. Specification for geometric shapes, colours and layout				x				x	x	
BS 5499-3:1990	Fire safety signs, notices and graphic symbols. Part 3 Specification for internally-illuminated fire safety signs				x			x	x	x	
BS 5499-5:2002	Graphical symbols and signs. Safety signs, including fire safety signs. Part 5 Signs with specific safety meanings				x			x	x	x	
BS 5649-2:1978	Lighting columns. Part 2 Dimensions and tolerances			x					x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 5649-5:1982	Lighting columns. Part 5 Specification for base compartments and cableways			x					x	x	
BS 5649-7:1985	Lighting columns. Part 7 Method for verification of structural design by calculation			x					x	x	
BS 5733:1995	Specification for general requirements for electrical accessories				x	x	x	x	x	x	
BS 5839-1:2002	Fire detection and alarm systems for buildings. Part 1 Code of practice for system design, installation, commissioning and maintenance				x				x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6004:2000 (equivalen european harmonisation document to be provided)	Electric cables. PVC insulated, non-armoured cables for voltages up to and including 450/750V, for electric power, lighting and internal wiring				x	(please provide equivalen european harmonisation document to be provided)x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6121-2:1989 (withdrawn, replaced by BS EN 50262)	Mechanical cable glands. Part 2 Specification for polymeric glands				(withdrawn, replaced by BS EN 50262)x	x	x(withdrawn; refer to "Power")	x	x	x	
BS 6133:1995	Code of practice for safe operation of lead-acid stationary batteries								x	x	
BS 6290-2:1999	Lead-acid stationary cells and batteries. Part 2 Specification for the high-performance Plant positive type								x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6290-4:1997	Lead-acid stationary cells and batteries. Part 4 Specification for classifying valve regulated types								x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6346:1997 (equivalent european harmonisation document to be provided)	600/1000V and 1900/3300V armoured electric cables having PVC insulation				x(please provide equivalen european harmonisation doc	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6651:1999 (withdrawn, replaced by BS EN 62305)	Code of Practice for protection of structures against lightning	x			(withdrawn, replaced by BS EN 62305)x	x	x(withdrawn; refer to "Power")	x	x	x	
BS 6701:1994	Code of Practice for installation of apparatus intended for connection to certain telecommunication systems				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6724:1997 (equivalent european harmonisation document to be provided)	600/1000V and 1900/3300V armoured electric cables having thermosetting insulation and low emission of smoke and corrosive gases when affected by fire				x	x	x	x	x	x	
BS 7001:1988	Interchangeability and safety of a standardized luminaire supporting coupler								x	x	
BS 7211:1998 (equivalent european harmonisation document to be provided)	Thermosetting insulated cables (non-armoured) for electric power and lighting with low emission of smoke and corrosive gases when affected by fire				x	x	x	(refer to "Power")x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 7430:1998	Code of practice for earthing	x			x	x	x		x	x	
BS 7654:1997	Single phase street lighting fuses (cut-outs) for low-voltage public electricity distribution systems. 25A rating for highway power supplies and street furniture			x					x	x	
BS 7671:2001	Requirements for electrical installations. IEE Wiring Regulations. Sixteenth edition			x	x	x	x	x	x	x	
BS 7919:2001 (equivalent european harmonisation document to be provided)	Electric cables. Flexible cables rated up to 450/750V, for use with appliances and equipment intended for industrial and similar environments			x	x	x	x	x(refer to "Power")	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 12613:2001	Plastic warning devices for underground cables and pipelines with visual characteristics			x	x	x	x	x	x	x	
BS EN 40-1:1991	Lighting columns. Part 1 Definitions and terms			x					x	x	
BS EN 40-3-1:2000	Lighting columns. Part 3-1 Design and verification. Specification for characteristic loads			x					x	x	
BS EN 40-3-2:2000	Lighting columns. Part 3-2 Design and verification. Verification by testing			x					x	x	
BS EN 40-5:2002	Lighting columns. Part 5 Requirements for steel lighting columns			x					x	x	
BS EN 40-6:2002	Lighting columns. Part 6 Requirements for aluminium lighting columns			x					x	x	
BS EN 50085-1:1999	Cable trunking and cable ducting systems for electrical installations. Part 1 General requirements			x	x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 50085-2-3:2001	Part 2-3 Particular requirements for slotted cable trunking systems intended for installation in cabinets				x	x	x	x	x	x	
BS EN 50086-2-1:1996	Conduit systems for cable management. Part 2-1, Particular requirements. Rigid conduit systems				x	x	x	x	x	x	
BS EN 50171:2001	Central power supply systems				x	x	x	x	x	x	
BS EN 50173-1:2002	Information technology. Generic cabling systems. General requirements and office areas				x	x	x	x	x	x	
BS EN 50174-1:2001	Information technology. Cabling installation. Part 1 Specification and quality assurance				x	x	x	x	x	x	
BS EN 50174-2:2001	Information technology. Cabling installation. Part 2 Installation planning and practices inside buildings				x	x	x	x	x	x	
BS EN 50262:1999	Metric cable glands for electrical installations				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 50310:2000	Application of equipotential bonding and earthing in buildings with information technology equipment				x	x	x	x	x	x	
BS EN 54-10:2002	Fire detection and fire alarm systems. Part 10 Flame detectors. Point detectors				X				x	x	
BS EN 54-11:2001	Fire detection and fire alarm systems. Part 11 Manual call points				X				x	x	
BS EN 54-1:1996	Fire detection and fire alarm systems. Part 1 Introduction				X				x	x	
BS EN 54-2:1998	Fire detection and fire alarm systems. Part 2 Control and indicating equipment				X				x	x	
BS EN 54-3:2001	Fire detection and fire alarm systems. Part 3 Fire alarm devices. Sounders				X				x	x	
BS EN 54-4:1998	Fire detection and fire alarm systems. Part 4 Power supply equipment				X				x	x	
BS EN 54-5:2001	Fire detection and fire alarm systems. Part 5 Heat detectors. Point detectors				X	x		x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 54-7:2001	Fire detection and fire alarm systems. Part 7 Smoke detectors. Point detectors using scattered light, transmitted light or ionization				X				x	x	
BS EN 55015:2001	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment							x	x	x	
BS EN 60051-1:1999	Direct acting indicating analogue electrical measuring instruments and their accessories. Part 1 Definitions and general requirements common to all parts				x				x	x	
BS EN 60081:1998	Double-capped fluorescent lamps. Performance specifications				x				x	x	
BS EN 60188:2001	High-pressure mercury vapour lamps. Performance specifications								x	x	
BS EN 60269-1:1999	Low-voltage fuses. Part 1 General requirements				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 60400:2000	Lamp holders for tubular fluorescent lamps and starter holders				x				x	x	
BS EN 60432-2:2000	Safety specification for incandescent lamps. Part 2 Tungsten halogen lamps for domestic and similar general lighting purposes				x				x	x	
BS EN 60439-1:1999	Specification for low-voltage switchgear and control gear assemblies. Part 1 Type-tested and partially type-tested assemblies				x	x		x	x	x	
BS EN 60439-2:2000	Specification for low-voltage switchgear and control gear assemblies. Part 2 Particular requirements for busbar trunking systems (busways)				x	x		x	x	x	
BS EN 60439-3:1991	Part 3 Particular requirements for low-voltage switchgear and control gear assemblies for installation in places where unskilled persons have access to their use.				x	x		x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 60439-4:1991	Part 4 Particular requirements for assemblies for construction sites (ACS)				x	x	x	x	x	x	
BS EN 60439-5:1996	Part 5 Particular requirements for assemblies intended to be installed outdoors in public places. Cable distribution cabinets (CDCs) for power distribution in networks				x	x	x	x	x	x	
BS EN 60454-1:1995	Pressure-sensitive adhesive tapes for electrical purposes. Part 1 General requirements				x	x	x	x	x	x	
BS EN 60529:1992	Degrees of protection provided by enclosures (IP code)				x	x	x	x	x	x	
BS EN 60598-1:2000	Luminaires. Part 1 General requirements and tests								x	x	
BS EN 60598-2-18:1994	Luminaires. Part 2-18. Particular requirements. Luminaires for swimming pools and similar applications								x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 60598-2-22:1999	Luminaires. Part 2-22. Particular requirements. Luminaires for emergency lighting								x	x	
BS EN 60598-2-23:1997	Luminaires. Part 2-23. Particular requirements. Extra low voltage lighting systems for filament lamps								x	x	
BS EN 60598-2-2:1997	Luminaires. Part 2-2. Particular requirements. Recessed luminaires								x	x	
BS EN 60598-2-3:2003	Luminaires. Part 2-3. Particular requirements. Luminaires for road and street lighting			x					x	x	
BS EN 60598-2-5:1998	Luminaires. Part 2-5. Particular requirements. Floodlights								x	x	
BS EN 60896-2:1996	Stationary lead-acid batteries. General requirements and methods of test. Part 2 Valve regulated types								x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 60898-1:2003	Circuit-breakers for overcurrent protection for household and similar installations. Part 1 Circuit-breakers for a.c. operation				x	x		x	x	x	
BS EN 60898-2:2001	Part 2 Circuit-breakers for a.c. and d.c. operation				x	x	x	x	x	x	x
BS EN 60921:1991	Ballasts for tubular fluorescent lamps. Performance requirements				x	x	x	x	x	x	
BS EN 60923:1996	Auxiliaries for lamps. Ballasts for discharge lamps (excluding tubular fluorescent lamps). Performance requirements				x	x	x	x	x	x	
BS EN 60925:1991	Performance requirements for d.c. supplied electronic ballasts for tubular fluorescent lamps				x	x	x	x	x	x	
BS EN 60927:1997	Auxiliaries for lamps. Starting devices (other than glow starters). Performance requirements				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 60929:1992	a.c. supplied electronic ballasts for tubular fluorescent lamps. Performance requirements				x	x	x	x	x	x	
BS EN 60947-2:2003	Low-voltage switchgear and control gear. Part 2, Circuit-breakers				x	x	x	x	x	x	
BS EN 60947-3:1999	Part 3, Switches, disconnectors, switch-disconnect TBA ors and fuse-combination units				x	x	x	x	x	x	
BS EN 60947-4-1:2001	Part 4-1, Contactors and motor-starters. Electromechanical contactors and motor-starters				x	x	x	x	x	x	
BS EN 61008-1:1995	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs). Part 1 General rules				x	x	x	x	x	x	
BS EN 61008-2-1:1995	Part 2-1 Applicability of the general rules to RCCBs functionally independent of line voltage				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 61009-1:1995	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs). Part 1 General rules				x	x	x	x	x	x	
BS EN 61009-2-1:1995	Part 2-1 Applicability of the general rules to RCBOs functionally independent of line voltage				x	x	x	x	x	x	
BS EN 61048:1993	Capacitors for use in tubular fluorescent and other discharge lamp circuits. General and safety requirements				x	x	x	x	x	x	
BS EN 61049:1993	Capacitors for use in tubular fluorescent and other discharge lamp circuits. Performance requirements				x	x	x	x	x	x	
BS EN 61347-2-1:2001	Lamp control gear. Part 2-1 Particular requirements for starting devices (other than glow starters)				x	x	x	x	x	x	
BS EN 61347-2-3:2001	Lamp control gear. Part 2-3 Particular requirements for a.c. supplied electronic ballasts for fluorescent lamps				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 61347-2-7:2001	Lamp control gear. Part 2-7 Particular requirements for d.c. supplied electronic ballasts for emergency lighting				x	x	x	x	x	x	
BS EN 61347-2-8:2001	Lamp control gear. Part 2-8 Particular requirements for ballasts for fluorescent lamps				x	x	x	x	x	x	
BS EN 61347-2-9:2001	Lamp control gear. Part 2-9 Particular requirements for ballasts for discharge lamps (excluding fluorescent lamps)				x	x	x	x	x	x	
BS EN 61537:2002	Cable tray systems and cable ladder systems for cable management				x	x	x	x	x	x	
BS EN 61558-1:1998	Safety of power transformers, power supply units and similar devices. Part 1 General requirements and tests				x	x	x	x	x	x	
BS EN 61558-2-9:2003	Part 2-9 Particular requirements for transformers for Class III handlamps for tungsten filament lamps				x	x	x	x	x	x	
BS EN 62035:2000	Discharge lamps (excluding fluorescent lamps). Safety specifications				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 62040-1-1:2003	Uninterruptible power systems (UPS). Part 1-1 General and safety requirements for UPS used in operator access areas				x	x	x	x	x	x	
BS EN 62040-1-2:2003	Uninterruptible power systems (UPS). Part 1-2 General and safety requirements for UPS used in restricted access locations				x	x	x	x	x	x	
BS IEC 1008-2-2:1990	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCCBs). Part 2-2 Applicability of the general rules to RCCBs functionally dependent on line voltage				x	x	x	x	x	x	
BS 5489-1:2003	Code of Practice for the Design of Road Lighting				x	x	x	x	x	x	
GM/TT0146	Lighting of Railway Premises (Railway Group Standards)								x	x	
GI/RT7010	Lighting of Railway Premises (Railway Group Standards)								x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
GI/GN7607	Guidance for Low Voltage Electrical Installations (Railway group guidance notes)				x	x	x	x	x	x	
GI/RT7007	Low Voltage Electrical Installations (Railway Group Standards)				x	x	x	x	x	x	
GPGLRP3	Good Practice – Lighting for Railway Premises				x			x	x	x	
										x	
EN50121 Pts 1-5	Railway applications electromagnetic compatibility				x	x	x	x	x	x	
2004/40/EC	European directive				x			x		x	
EN50128: 2001	Railway Applications – Communications, signalling and processing systems – software for railway control and protection systems.				(not applicable)x			x		x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
ENV50129: 1998	Safety related electronic systems for signalling.				(not applicaqble)x			x		x	
IEC61508: 1998	Functional safety of electrical/electronic/programmable electronic safety related systems.							x		x	
	Methods for assessing the safety integrity of safety related software of uncertain pedigree (SOUP), Health and Safety Executive				(not applicable)x			x		x	
	Edinburgh Tram Earthing Systems Policy	x	x		x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
EN50128: 2001	Railway Applications – Communications, signalling and processing systems – software for railway control and protection systems.				(not applicable)x	x	x	x	x	x	
IEC61508: 1998	Functional safety of electrical/electronic/programmable electronic safety related systems.				(not applicable)x			x			
MPT 1331	Code of Practice for Radio Site Engineering							x			
MPT 1362	Code of Practice for installation of mobile radio equipment in land based vehicles							x			
MPT 1327	A Signalling Standard For Trunked Private Land Mobile Radio Systems (June 1997)							x			

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
G1/RT7015	Railway Group Standard (Feb 2003)					x					
BS EN50126	Railway applications- The specification and demonstration of Dependency, Reliability, Availability, Maintainability and Safety,		x		x	x	x	x	x	x	x
BS EN50149	Railway applications – Fixed installation-Copper and Copper alloy grooved contact wire,						x				
BS EN50119	Railway applications - Fixed installation-electric traction-Overhead Lines.						x				
BS EN50206-2 –	Pantographs for Light Rail vehicles						x				
BS EN50125-1	Railway applications - Fixed installations, Environmental conditions						x				
BS EN50317,	Railway applications - Fixed installations, Requirements for and validation of measurements of dynamic interaction between pantograph and contact line						x				

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN50151	Railway applications - Fixed installations, Special requirements for composite insulators						x				
BS EN50345	Railway applications - Fixed installations, Insulating synthetic rope assemblies for support of overhead contact lines						x				
BS EN50318	Railway applications - Fixed installations, validation of the simulation of dynamic interaction between pantograph and contact line						x				
BS EN 50122-1	Railway Applications – Fixed Installations Part 1: Protective provisions relating to electrical safety and earthing				x		x				
BS EN 50122-2	Railway Applications – Fixed Installations Part 2: Protective provisions against the effects of stray currents caused by d.c. traction systems				x						

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS EN 60146	Semiconductor convertors – General requirements and line commutated convertors				x						
BS EN 50123	Railway Installations – Fixed installations – d.c. switchgear				x						
IEC 850 (IEC 60850)	Supply voltages for traction systems										
BS 2618	British Standard Specification for Electrical Traction Equipment				(not applicable)x						
BS 6290	Batteries				x						
BS 7354	Battery Duty Calculations.				x						
CP 1013	Earthing.				x						
BRB Spec. DC 112	DC Power Cables.				x		x				

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6360 (IEC 60228)	Cable Conductors.				x		x				
BS 6899 Type GP2	DC Power Cable Insulation.				x		x				
IEC 228 (BS 6360)	Conductors for Multicores.				x		x				
DMRB	The United Kingdom Design Manual for Roads and Bridges (as amended by any City of Edinburgh Council -specific requirements)	x		x							
TSM	Traffic Signs Manual			x							
MCDHW	The Manual of Contract Documents for Highway Works;			x							
SHW	Specification for Highway Works;			x							
HCD	Highway Construction Details.			x							
CEC	'Edinburgh Standards for Streets'.			x							
NRSWA	New Roads and Street Works Act 1991			x							

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
CEC	Measures Necessary Where Apparatus is Affected by Major Works (Diversionary Works)			x							
CEC	Specification for the Reinstatement of Openings in Roads			x							
	Code of Practice for the Co-ordination of Street Work and Works for Road Purposes and Related Matters			x							
	Utility specific specifications (to be advised by each utility)			x							
RSPG Part 1, 1966	Railway Safety Principles and Guidance, Safety Principles	x	x	x	x	x	x	x	x	x	x
RSPG Part 2, Section G	2005, Railway Safety Principles and Guidance, Tramways	x	x	x	x	x	x	x	x	x	x
RVAR	Railway Vehicle Accessibility Regulations								x		x
GM/RC1500	1994-12, 2001-10 Code of Practice for EMC between the railway and its neighbourhood				x	x	x	x	x	x	x

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
EN55013	Sound and television broadcast receivers and associated equipment. Radio disturbance characteristics. Limits and methods of measurements.							x		x	x
GE/RT8015, 2002	Electromagnetic compatibility between railway infrastructure and trains.										x
ECE 43	1990-08, Uniform Provisions Concerning the Approval of Safety Glazing and Glazing Materials (Rev1 08.1990).								x	X	x
prEN13129-3	2003-10, Railway Applications – Air conditioning for urban and suburban rolling stock – Part 1: Comfort parameters										x
BS EN 779	2002-12-05, Particulate air filters for general ventilation - Determination of the filtration performance									x	x
BS 857	1967-06-30, Specification for safety glass for land transport										x

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
BS 6853 1999-01-15	Code of Practice for fire precautions in the design and construction of passenger carrying trains or European equivalent Standard										x
BS EN 50121-3-1 2000-12-15	Railway Applications - Electromagnetic compatibility - Rolling stock - Train and complete vehicle										x
BS EN 50125-1	Railway Applications – Environmental conditions for equipment										x
BS EN 50155-3-1 2000-12-15	Railway Applications – Electronic Equipment used on Rolling Stock										x
BS EN 50215 1999-09-15	Railway Applications - Testing of rolling stock after completion of construction and before entry into service										x
BS EN 60077-1 2002	Railway Applications – Electric Equipment for Rolling Stock										x

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Tramstops	Depot	Trams
prEN ISO 3095 1975-09	Acoustics; Measurement of noise emitted by rail bound vehicles										x
prEN ISO 3381 1976-02	Acoustics; Measurement of noise inside rail bound vehicles										x
EN 12663-2000	Railway applications, Structural requirements of railway vehicle bodies										x
EN 13749-2005	Methods of specifying structural requirements of bogie frames										x
VDV 164 1995-04	System for fault detection, fault registration and fault message (FERM) on guided public transport vehicles										x
IEC 60494-2, 2002-08	Railway applications - Rolling stock; Pantographs; Characteristics and tests - Part 2: Pantographs for metros and light rail vehicles						x				x

Table 24 - Applicable Standards

9 Geotechnical

Where the Infraco Works may affect geotechnical and geo-environmental features, including but not limited to, aquifers, ground water and surface watercourses, the Infraco shall comply with the requirements of relevant third parties, the Scottish Environment Protection Agency (SEPA) or other statutory consultees and environmental legislation.

The Infraco shall agree the criteria and methods for the identification, classification, treatment and disposal of material with SEPA, the relevant local environmental health authority or other relevant authority as appropriate. The Infraco shall obtain all necessary consents for the removal, disposal or re-use of materials. Materials not suitable for re-use shall be transported off Site to a licensed facility in accordance with the requirements of the applicable relevant authority and environmental legislation.

The Infraco shall not carry out works or activities which would result in any Site or any land licensed to the Infraco under the Agreement or any adjacent or adjoining property being classified as contaminated land under the Environmental Protection Act 1990, the Contaminated Land (Scotland) Regulations 2000, the Contaminated Land (Scotland) Regulations 2005 and the guidance contained in the Scottish Executive Statutory Guidance for the the Contaminated Land Regime, Edition 2 dated May 2006 and/or any similar environmental legislation, or that would preclude such a classification being removed.

The Infraco shall assess the risk of the ingress of landfill gases, coalfield gases and other hazardous ground gases and implement appropriate measures to mitigate such risks.

The Infraco Works shall be designed and constructed to accommodate reasonably foreseeable changes in the existing and potential future nature and level of ground water, where reasonably practicable.

10 Environment

10.1 Environmental Considerations

10.1.1 General

Environmental Statements have been prepared for Line One and Line Two in accordance with the standing orders of the Scottish Parliament, which require that projects approved by private Act of Parliament must be subject to Environmental Impact Assessment (EIA). EIA in Scotland is governed by the Environmental Impact Assessment (Scotland) Regulations 1999 (S.I. 1999 No. 1). The Environmental Impact Assessments (EIAs) have been undertaken to identify the construction and operational effects of building and operating a tram network in Edinburgh. Each assessment has been documented in a comprehensive Environmental Statement which describes:

- The design of the project and the way it will be constructed and operated;
- Its impacts on the physical, natural and human environment; and
- The measures that will be undertaken to minimise these impacts.

The Environmental Statements report the assessment of the following environmental topics which should be considered by the Infraco:

- The proposed scheme – including an explanation of the need for the scheme, alternatives considered, route alignment and infrastructure description, construction and operational activities;
- Approach to the EIA – summarising the legal requirements, scope and methods used in undertaking this EIA;
- Policy context – provides a review of compliance of Line One and Line Two to relevant national, regional and local policies;
- Traffic and transport;
- Land use - including potential impacts to the agricultural use of land along the route;
- Geology, soils and contamination – including references to hydrogeology and waste management;

- Landscape and visual amenity;
- Ecology and nature conservation;
- Surface water – including water quality and hydrology;
- Heritage - including archaeology;
- Socio-economic effects;
- Noise and vibration;
- Air quality - including local air quality (PM10, NO2), global air quality (CO2) and dust; and
- Cumulative impacts.

The Infraco shall ensure that the environmental impact caused by the Infraco Works shall be no worse than that contained in the Environmental Statements.

10.1.2 Freedom of Access to Environmental Information

The attention of the Infraco is drawn to the requirements of the Environmental Information (Scotland) Regulations 2004 (SSI 2004/520). This Statute permits public access to environmental information held by a Scottish public authority.

10.1.3 Relevant Legislation, Regulations and Guidance

The following are a series of project specific documentation governing various aspects of the environmental considerations of the Edinburgh Tram Network design, construction and operation.

10.1.4 Code of Construction Practice

A code of construction practice was prepared in consultation with the City of Edinburgh Council (CEC), Scottish Natural Heritage (SNH), the Scottish Environmental Protection Agency (SEPA) and Historic Scotland, in order to define **tie's** minimum standards of construction practice. Compliance with this code is a legal requirement of the Edinburgh Tram (Line One) and (Line Two) Acts (2006) under Section 66 and this code has been developed by **tie** and this developed version is included in Schedule 3 (Code of Construction Practice and Code of Maintenance Practice).

The Code of Construction Practice sets out policies, legislation and guidance relating to the impact of the proposed construction works on the environment and the amenity and safety of residents, businesses, the general public and the physical surroundings adjacent to the ETN. The Code of Construction Practice also provides a list of environmental protection measures to be implemented during the construction of the ETN.

10.1.5 tie's Noise and Vibration Policy

tie's Noise and Vibration Policy (NVP/001 V1.01) sets out the mitigation approach for noise and vibration impacts during the operation of the Tram in Edinburgh. Mitigation requirements relating to noise and vibration impacts during the construction of the ETN route are outlined in the Code of Construction Practice. Compliance with the Noise and Vibration Policy is a legal requirement under Section 66 of the Edinburgh Tram (Line One) and (Line Two) Acts (2006). Other legal requirements relating to noise insulation are set out in Sections 63, 64 and 65 of the respective Acts. The Noise and Vibration Policy is included in Schedule 32 (**tie** and CEC Policies).

10.1.6 The Tram Design Manual and Urban Design Briefs

A Design Manual and urban design briefs have been prepared for the ETN. Both sets are regarded as supplemental guides to deemed consent for Line One and Line Two under the section 11 (Class 29) of the General Permitted Development (Scotland) Order 1992.

Although permitted development status exists for the ETN it is nonetheless necessary to gain prior approval from the City of Edinburgh Council before the Infraco Works can commence. The Design Manual and urban design briefs are both designed as guides in informing both the design process and the prior approval process. It is therefore important that the Infraco gives appropriate consideration to the contents of the Design Manual and the briefs as major component in the integration of a tram design into the urban fabric of the City.

10.1.7 Landscape and Habitat Management Plan

The Landscape and Habitat Management Plan (LHMP) details the proposals for retention, protection and enhancement of existing planting and habitats, within the Roseburn Corridor. It also sets out details of replacement planting and habitat which are lost as a consequence of the development. The plan will be updated by the Infraco as new information on habitat, landscape proposals and Tram design becomes available. The plan will also include proposals for noise mitigation for properties adjacent to the ETN. Revisions to the LHMP will require to be approved by the City of Edinburgh Council Planning Authority. The procedure for updating the LHMP is set out within Section 68 of the Edinburgh Tram (Line One) Act (2006).

10.1.8 Badger Mitigation Plan

The Badger Mitigation Plan sets out the scope and form of the proposed mitigation measures for avoiding/ reducing adverse impacts on badgers within the Roseburn Corridor. The Plan will be updated by the Infraco as new information on badger social groups and the ETN design becomes available. Revisions to this Plan will be agreed with SNH, CEC and the Edinburgh and Lothians Badger Group (ELBG) and approved by the CEC Planning Authority.

In preparing the detailed environmental design and implementation (including maintenance and monitoring periods) proposals for landscape and ecology the Infraco will ensure that all commitments given in the Environmental Statement and arising from the Scottish parliamentary process relating to the Tram Legislation (including the detailed agreements following discussions with stakeholders) are met.

10.1.9 Protected Species Plan

The Protected Species Plan identifies the constraints governing how all protected species (predominantly located in the Gogarburn area) are to be dealt with.

10.1.10 Archaeological Requirements

All Infraco Works are to be carried out in compliance with the approved AHMP relevant to that location.

10.1.11 Landscape Design

The landscape design shall include, for construction, aftercare and maintenance / monitoring, ongoing for the whole Term. The detailed landscape design shall be in accordance with the environmental objectives, principles and requirements given in the Environmental Statements, to ensure that the Edinburgh Tram Network as constructed and operated is in compliance with the Environmental Statements, and any subsequent side agreements entered into between the CEC, **tie** and various third parties.

10.2 Ecological Design

The ecological design shall include, for construction, aftercare maintenance and monitoring:, the ecological mitigation proposals will cover the wholeTerm.

The ecological design shall be in accordance with the environmental objectives, principles and requirements given in the Environmental Statements, to ensure that the Edinburgh Tram Network as constructed and operated is in compliance with the Environmental Statements prepared for Parliament, and any subsequent side agreements entered into between the CEC, **tie** and various third parties (e.g. Scottish Natural Heritage, New Ingliston Limited, Edinburgh and Lothian Badger Group).

The updated and ongoing ecological surveys and mitigation works to be carried out by Infraco shall take into account seasonal constraints and variations and will accommodate ongoing relevant surveys begun by other parties (e.g. biological water quality monitoring). The Infraco shall ensure that the construction, maintenance and monitoring of the Infraco Works complies with all existing UK and EU Environmental legislation concerned with the protection of species and habitats including but not limited to:

- Wildlife and Countryside Act 1981 (as amended in particular by Variation of Schedules 1988, 1992 & 1998);
- The Conservation (Natural Habitats, & c.) Regulations 1994 (as amended);
- Protection of Badgers Act 1992; and
- Countryside and Rights of Way Act 2000 in so far as it extends to Scotland.

The Infraco shall not commence works within any part of the Site until the necessary update surveys of ecological interest in respect of that part of the Site have been undertaken and a survey report has been submitted to **tie**. Any relevant findings of such surveys shall be included into the Infraco's Landscape and Habitat Management Plan and the Construction Environmental Management Plan (CEMP).

The Infraco shall ensure that:

- Details of all species protected by Law and any structure or place used for shelter or protection by any such species protected by Law within the Site are kept confidential and not disclosed to any person except insofar as is essential for carrying out the Infraco Works; and

- All necessary current licenses, and named license holders, are available before the commencement of any Infraco Works, which may affect species protected by Law and or any structure or place used for shelter or protection by any such species protected by Law.

In the event that the Infraco identifies or becomes aware of any species protected by Law, or any structure or place used for shelter or protection by any species also protected by Law, which could be directly or indirectly affected by the Infraco Works and for which appropriate protection measures have not previously been agreed, the Infraco shall notify **tie** immediately and shall:

- Cease all Infraco Works that may adversely affect such species, structure or place;

- Provide Scottish Natural Heritage and **tie** with any further information of which the Infraco is aware relating to such species, structure or place as may be requested;

- Consult upon and agree mitigation and/or monitoring measures with Scottish Natural Heritage and **tie** in relation to such species, structure or place; and

- Obtain any necessary licenses to carry out the agreed measures.

The Infraco shall ensure that all construction work is carried out with due regard to the seasonal interests of any flora, fauna or habitat and in particular, all species listed for any degree of protection under Law. The Infraco shall make due allowance for the seasonal constraints in preparing the Programme.

10.3 Construction of Ecological Measures

10.3.1 General

Special ecological measures shall include but not be limited to the requirements for carrying out the Infraco Works:

- fencing;
- safe passage for wildlife;
- the location of nesting or roosting boxes;
- the location of habitat creation measures to be inspected;
- the known location of protected species, and
- the list of licenses obtained or required for working with or within the vicinity of Protected Species; and
- maintaining access to foraging and water.

10.3.2 Site Supervision of Landscape and Ecological Works

The Infraco shall ensure that the environmental Site works shall be inspected and monitored by Infraco's environmental clerk of works who will be supported by Infraco's landscape architect and ecologist, as necessary.

10.3.3 Landscape Works

Planting, seeding and aftercare works shall be carried out by the Infraco.

The Infraco will be responsible for locating all services routes prior to any landscape work being carried out.

10.3.4 Completion of the Planting Works and Completion of the Landscape and Ecological Aftercare Works

On practical completion of the landscape and ecological implementation works and on completion of the three years landscape and ecological aftercare works. The Infraco shall submit the required certificates and arrange a formal inspection of the Infraco Works with **tie**.

A separate inspection shall be arranged with relevant landowners for any areas of off-site planting.

10.3.5 Construction Environmental Management Plan (CEMP)

The Infraco shall prepare a Construction Environmental Management Plan (CEMP) including specific management / action plans or Method Statements, as necessary, to convey the required level of information for the following:

- Drainage features, including oil interceptors and pollution control valves, treatment of run-off, (including run-off volumes) and the location and appearance of any balancing ponds and/or swales, access or proposed access to the same;
- Carriageway surfacing;
- Working times;
- Noise reduction and abatement;
- Pollution control and contingency plan (see below);
- Discharge, land drainage and abstraction licenses to comply with EA requirements;
- Protection of retained vegetation;
- Maintenance e.g. de-icing;
- Sourcing of construction materials;

- Waste disposal, including disposal of construction waste, arisings, spoil, miscellaneous solids and liquids;
- Topsoil and subsoil handling (strip, storage, amelioration and re-use);
- Management and disposal of any excess soil or spoil arising from the works; and
- Site compounds.

The specific requirements of the pollution control and contingency plan are as follows:

- Compliance with the SEPA pollution prevention guidance;
- Identification and categorisation of surface waters vulnerable to Site works and an assessment of the earthworks that are likely to give rise to silty run off, the routes this is likely to take and the methods to prevent damage from silt;
- Precautions for handling of fuel, oil and other liquids during the works, in particular, near rivers, streams and watercourses;
- Requirements for pollution control equipment;
- How mud and dust will be controlled;
- How water supply boreholes and wells will be protected;
- The measures to be taken to protect watercourses and associated wildlife from, for example, chemical spillages or the introduction of sediment-laden run off; and
- Discharge criteria for suspended solids in run off from the Site during construction and proposals for monitoring and control.

11 Surveys

Surveys and investigations shall be undertaken by the Infraco as required to facilitate the design, construction and maintenance of the Edinburgh Tram Network.

Before commencing any Infraco Works (including investigations) where either the Infraco or **tie** considers there to be potential for a future claim from adjacent property owners or occupiers, the Infraco shall carry out a detailed condition inspection of the relevant properties and infrastructure which may be affected by the Infraco Works. If any such inspection is carried out, this shall be done in conjunction with the owners or occupiers concerned. A condition survey report shall then be prepared and agreed with the owner or occupier.

Condition survey reports prepared under the preceding paragraph shall include photographic evidence of the existing condition of the relevant property or infrastructure including evidence of critical dimensions such as existing crack widths.

The Infraco shall undertake sufficient surveys to prepare a topographical survey model. Relevant sections of the topographical survey model shall be updated by the Infraco at least every six months throughout the period of the Infraco Works, where work has been undertaken in relation to the sections concerned.

The topographical survey model shall include all Works as constructed and the Infraco shall include in each updated topographical survey model all then existing fixtures including:

- principal cabling;
- street furniture;
- structures and buildings;
- trackwork;
- drainage;
- power supply systems including OLE structures;
- ducting and draw pits.

These surveys shall include aspects concerned with:

- dimensions
- condition; and
- inspection for assessment.

The Infraco shall update the photographic records (excluding aerial photographs) and other such data contained in the topographical survey model at intervals of not less than six months.

The Infraco shall provide access to and copies of, when requested, all reports of investigations carried out as part of the Infraco Works.

12 Project Management Processes

12.1 Communication – General

The Infraco shall develop and maintain a "Communications Plan" and this shall be submitted to **tie** in accordance with the Review Procedure.

The Communications Plan shall illustrate how all the communication processes, activities and issues are to be managed, progressed and satisfactorily resolved. The Communications Plan shall detail how the Infraco will communicate with Sub-Contractors, the Operator, **tie**, the MUDFA Contractor, key stakeholders and third parties. The Communications Plan shall also include the intended processes for dealing with enquiries, particularly complaints, from all sources. The Infraco shall refer to the Stakeholder Services in this Section of the Employer's Requirements, in order to ensure that the Communications Plan includes all necessary requirements.

The Infraco shall implement all the requirements of the Communications Plan.

The Infraco shall liaise with the relevant parties to ensure that the Infraco is copied into all relevant communications that are generated by others, in order to ensure that any relevant construction related issues, such as Temporary Works and practical constraints, are identified and addressed.

12.1.1 Meetings

The Infraco shall work with **tie** to develop the meetings schedules and requirements for progress reporting throughout the duration of the Infraco Works. The following table provides an outline of the minimum requirements:

Meetings	Frequency	Chaired by / Minutes taken
Safety Meeting	Weekly	Infraco
Management Review Meetings	Two monthly	**tie**/Infraco alternately
Project Progress Meetings	Four weekly (Fortnightly prior to Site start)	**tie**

Meetings	Frequency	Chaired by / Minutes taken
Design and Planning Meetings	Fortnightly	Infraco
Stakeholder & Third Party Meetings	As required	**tie**
Site Meetings	Weekly	Infraco
Cost Review Meetings	Four weekly	**tie**
Risk Review Meetings	Four weekly	**tie**

Table 25 - Table showing meeting schedules

The primary purpose of these meetings shall be to enable the Infraco to advise on:

- Any safety issues;
- The current state of the programmed Infraco Works;
- Progress made in the various activities;
- Communication issues;
- Third party issues; and
- Commercial issues (Including change control).

The Infraco shall develop and maintain a comprehensive meetings schedule indicating those meetings which the Infraco shall chair and those meetings which the Infraco shall attend.

Prior to commencement on Site, progress meetings shall be held every two weeks. The purpose of these meetings shall be to review progress made by both Parties, and identify and agree actions required.

The Infraco shall provide an agenda, for all meetings to which they are designated as chair. The Infraco shall also provide appropriate documentation in advance of each of the meetings, as defined in the following sections, or otherwise as agreed with **tie**.

12.1.2 Progress Reporting

Progress reports shall be submitted by the Infraco to **tie** no later than three Business Days before each progress meeting.

The Infraco's progress reports shall contain comprehensive information and shall be structured in a manner which is commensurate with **tie**'s own reporting structure. The various sections of the progress reports shall require to be agreed with **tie**, but should include the following:

1. Executive Summary;
2. Health & Safety Report;
3. Quality & Environment;
4. Financial Summary Report; and
5. Project Performance / Programme.

Information provided within the progress reports shall include, but not be limited to, the following:

- Health & safety report including a summary of H&S records
- Summary financial information summarised from the separate cost report including summary and headline data on planned spend/actual spend, forecast spend and summary of costs for Compensation Events and future forecast.
- Planned versus actual resource summary;
- Physical progress against Milestones anticipated/required completion dates;

- Four weekly forecast of all activities;
- Eight weekly critical impact notice (including all information on any internal or external factor which may affect programme delivery);
- Labour histograms detailing planned, actual and forecast across all disciplines;
- The activities commenced or completed since the previous report and upon what dates;
- The expected remaining duration of all activities commenced but not completed;
- Any other additional activities with expected durations, methods, and resource requirements and sequence assumptions;
- Schedule and programme for the delivery of method statements, permits and isolations for the next four weeks;
- Any changes to expected durations, method, resource requirements and sequence assumptions;
- Forecast completion dates for all Infraco Works in each geographical section and intermediate geographical section including any slippage or advance upon the Planned Service Commencement Date and/or the Planned Sectional Completion Dates (as appropriate);
- Programme comparison between actual vs. planned;
- Schedule of information received;
- Schedule of outstanding information;
- Progress photographs;
- Top 10 opportunities; and
- Top 10 risks.

12.1.3 Progress Photos

The Infraco shall on a monthly basis throughout the period until the Service Commencement Date procure that photographs covering all of the Infraco Works are taken by a professional photographer whose appointment the Project shall be approved by **tie**, such approval not to be unreasonably withheld or delayed.

tie shall determine the scope of the photographs referred above.

The Infraco shall ensure that:

- A minimum of 50 digital colour photographs shall be taken on a monthly basis;
- All photos shall be provided in electronic format in a form to be agreed with **tie**;
- One set of 10 inch x 8 inch size prints shall be prepared from the colour photographs referred to above;
- All prints referred to above shall be presented in albums with individual clear plastic wallets and marked on the reverse side with the date that the photograph was taken, the name and address of the photographer, identification reference number and a brief description of Work being undertaken and the direction from which the photograph was taken;
- All prints and negatives shall be delivered to **tie** within two weeks of being taken; and
- Except where **tie** have provided their prior written consent, the photographs shall not be used for any purpose other than as set out in the Agreement.

The Infraco shall procure that all Intellectual Property in respect of the photographs vests in **tie**.

12.1.4 Site Meeting Report

A report shall be submitted by the Infraco to **tie** no later than one Business Day before each site meeting. The report shall include reference to any significant issues (associated with safety, programme, design, cost, planning and consultee aspects), which have arisen since the previous monthly progress report.

The site meeting report shall also identify actual manpower resources (labour returns), plant and equipment that have occurred on site, for the previous week.

12.1.5 Topic Register

It is **tie**'s intention to continue to develop and maintain a "Topics Register" for the Infraco Works. The Topics Register is used to record all issues as they arise that require to be specifically addressed. The record is then amended as appropriate to track the manner in which issues have been progressed or resolved to the satisfaction of **tie**. The Infraco is required to add to, or respond to issues as appropriate and attend regular review meetings at which the Topics Register shall be updated and actions assigned by **tie**.

The Infraco shall participate in the management of the Topics Register.

12.1.6 Work Breakdown Structure

An agreed Work Breakdown Structure is included in the Introduction of these Employer's Requirements. The Infraco shall adopt this WBS to ensure a recognised, structured analysis, by all parties, when interrogating the programme and cost analysis. The WBS may be further developed by the Infraco with the written consent of **tie**.

Accordingly there shall be a requirement for the Infraco to adopt all aspects of the WBS in the development of programme and cost documentation.

12.2 Programme Management

The Infraco shall undertake programme management including the implementation, regular updating and management of a fully detailed comprehensive Programme illustrating how the Infraco proposes to execute the whole of the Infraco Works in compliance with the Project Programme.

This Infraco Programme shall be prepared using Primavera software in a version compatible with that of **tie**.

This Programme shall be in Primavera P3e (Version 6 or otherwise as agreed with **tie**) format and accompanied by a time chainage programme illustrating the same information. The Programme shall be cost and resource loaded and coded to reflect the Infraco's WBS activities as detailed in section 39 of these Employer's Requirements.

The Infraco shall be responsible for liaising directly with **tie**, CEC (and other appropriate third parties) to maximise delivery of the ETN but minimise disruption to public transport and other services, and ensuring that any necessary diversion routes are agreed in recognised time periods prior to the commencement of Infraco works. The Infraco shall also take note of the constraints as identified in 39 of these Employer's Requirements.

The Programme shall be submitted to **tie** in accordance with the Review Procedure within a period which shall ensure that the Infraco Works can be progressed and monitored by the Infraco and **tie** against the details contained therein. The Programme shall clearly identify the following:

- the commencement, construction and completion constraints for all elements of the Infraco Works, separated into sectors by WBS code;
- all Milestones;
- the constraints, procedures, documentation and approvals specified in the Agreement;
- the Infraco manufacture and construction execution strategy, Infraco Works and site testing and commissioning, all constraints, procedures, documentation and approvals periods;
- seasonal constraints and constraints applied by CEC and other third party and statutory bodies as defined in the Agreement;
- the required design approvals and notices;
- all works to be undertaken by any Sub-Contractor;
- sufficient detail to illustrate the integration of the Deliverables with the proposed dates of possessions and the commencement and completion of construction for all elements of the Infraco Works, by WBS code;
- all other projects affecting the Infraco Works and how they are integrated into the Infraco Works. For example, any street works to be carried out by CEC, and works by or on behalf of all third parties (including landowners and developers);

- any witnessing, inspections, testing etc of the Infraco Works which requires to be carried out by third parties;
- long lead time materials and works;
- the identification and duration of all advance works, other than those already underway;
- the requirements and approval periods for traffic management, TROs, TTROs, and including any third party's requirements for notices and road closures;
- the commencement, completion dates and relationships of intermediate geographical section of the Infraco Works within each geographical section of the Infraco Works;
- the links and relationships between all activities and the justification of the underpinning logic;
- all design, manufacture and construction periods;
- the identification and timing of inputs and approvals required from **tie**, third parties, and any Approval Bodies are clearly identified; and
- the interface and relationship with the MUDFA Works;

The Programme shall meet the following minimum requirements:

- shall be in Primavera P3e (Version 6) for detailed implementation;
- shall follow and fully reflect the **tie**'s Work Breakdown Structure ("WBS") included within these Employer's Requirements.
- shall be cost and resource loaded down to coded activities;
- all resource reporting and progress reporting shall be coded to suit the activities contained within the WBS;
- records of time spent against activities shall be completed weekly against planned works as generated by Primavera;

- Any deviations shall be reported in the progress report and include notification of remedial actions for authorisation by **tie**;

- weekly records shall be collated and delivered to **tie** by 09:00hrs on the Tuesday following the week to which the records relate;

- the Programme shall also take into account programming input and attendance at meetings, both as required by **tie**; and

- the Programme shall also contain cost/spend tables and cumulative curves to match the achievement of major milestones and activities within the WBS.

The Infraco shall take into account the availability of alternative materials or components when developing the Programme. The Infraco shall identify those materials and components which require advance ordering and processing. Any advanced orders which are approved shall be identified and defined in the Programme.

The Infraco shall update the Programme every four weeks in line with **tie** reporting periods to take full account of the Infraco progress in completing the Infraco Works.

A hard and soft copy updated Programme and an Infraco Progress Report shall be submitted by the Infraco to **tie** no later than three Business Days before each four weekly progress meeting.

12.3 Time Chainage

The Infraco shall also produce, manage, develop and work in accordance with its Time Chainage Diagram.

The Time Chainage Diagram shall be submitted to **tie** in accordance with the Review Procedure to ensure that the Infraco Works can be progressed and monitored by the Infraco against the details contained therein but in any case, the Time Chainage Diagram shall be submitted not later than six weeks after the Commencement Date. The Time Chainage Diagram shall be updated regularly and be available for inspection or distribution on a monthly basis, during the course of the Infraco Works.

The Time Chainage Diagram shall fully reflect, accommodate and comply with the information detailed on the Programme.

12.4 Planning and Other Consents

The responsibility for the Consents is as set out in Clause 19 of the Agreement.

12.5 Project Management Plan

12.5.1 General

The Infraco shall submit and maintain a plan describing the approach to project management for the delivery of the complete scope of the Infraco Works. This project management plan shall include sections to clearly and separately describe the approach to the specific topics set out below.

12.5.2 Resource and Competence

A description of the procedures employed to ensure that the required resource and competence level throughout the duration of the Infraco Works shall be achieved.

12.5.3 Documentation

Identify key policies and procedures to deliver such works, infrastructure and equipment to programme, specification, budget and otherwise safely and efficiently and in a manner which is fully integrated with the activities of other relevant contractors.

The approach to the development of a suite of project specific documentation, indicating how they shall effectively be integrated with, and reflect, the Infraco's corporate procedures and policies (including any Joint venture or consortia procedures).

Templates that shall be used for the procurement and delivery of the service deliverables, which shall be required to be prepared by the Infraco.

Outline proposals covering the suite of required documentation including training, maintenance and operations manuals, as-built drawings, design Information, testing procedures and proposals, and certification and records (e.g. testing).

12.5.4 Regulations

Management arrangements and procedures for ensuring/monitoring compliance with all applicable Regulations (e.g. HMRI), Law, and the requirements of the Agreement and its Schedules.

12.5.5 Procedures

Details of internal procedures for decision making and review in your management team with particular emphasis on safety, programme, budget, quality, the management and control of non-compliance and the implementation of continuous improvement.

12.5.6 Proposals on reporting and controlling design information requirements

Procedures which shall be followed in obtaining outstanding consents and approvals for the works.

Definition of the process for managing the approvals interface with **tie**, HMRI, Planning Authority, Roads Authority, Network Rail, the Operator and third parties with whom agreements have been entered into.

12.5.7 Interface Plans

Given that successful co-operation between the Operator, Infraco, and **tie** is essential to the delivery of a successful project, a description of the key areas of this interface and details which demonstrate how this is successfully achieved.

Details of supply chain process/procedures, in particular provide details of the criteria for selection of sub-contractors/suppliers for this project.

Details of how the Tram Provider shall be managed.

Details regarding the commissioning and handover of the Edinburgh Tram Network or Geographical Sections thereof to the Operator shall be provided.

12.5.8 Design

Clear definition of the areas where the Infraco shall undertake design work and an explanation of where the Infraco believes this deviates from the previous design work done.

12.6 Construction Management Plan

The Infraco shall submit and maintain a Construction Plan relating to the Programme. This Construction Plan shall include sections to clearly and separately describe the approach to the specific topics set out below.

12.6.1 Mobilisation

Detailed mobilisation plan, to incorporate comprehensive details of all aspects of mobilisation including, but not limited to, number of work sites, the facilities on each, a general arrangement drawing of main sites, lay down areas, materials storage, welfare and car parking. This should detail timescales and immediate resource availability and should also provide details of the permissions required and assumptions made.

12.6.2 Plant

A description of the plant that will be used for the construction of the project and of how long the plant will be used. This should include description in relation to plant used for specialist purposes such as rail laying or wire stringing (these should be separately identified).

12.6.3 Sub-Contractors

Details of the sub-contractor management and control process during the construction phase, including how the performance of sub-contractors will be measured and reviewed and how sub-contractor compliance with standards will be assured.

12.6.4 Method Statements

A description of the process by which method statements shall be developed and approved, and a schedule summarising those method statements that are anticipated. An initial schedule shall be submitted in accordance with the Review Procedure and this shall be updated from time to time with agreement from **tie**.

12.6.5 Avoidance of Disruption

Description of the management process for ensuring that traffic disruption is kept to a minimum, particularly in relation to Traffic Management and TTRO requirements. Details of procedures of how unforeseen works (that are out with the area covered by the Temporary Traffic Restriction Order, but are necessary to complete the Infraco Works within the TTRO area) shall be dealt with.

Proposals for maintaining reasonable access to premises at all times and what measures The Infraco might employ when access is denied taking into account the requirements of the Disability Discrimination Act 1995.

Details of how it is proposed to liaise with all potentially affected third parties, and an assessment of the likely identities of such parties.

12.7 Network Rail Interface Plan

The Infraco shall submit and maintain a plan describing the approach to managing the ongoing interface requirements with Network Rail. The plan should identify the critical activities and the key risks associated with this interface and proposals to mitigate these risks. Notwithstanding the Infraco's responsibility of complying with the Agreement (including compliance with the Third Party Agreement and the Asset Protection Agreement) the Plan should address the following issues.

- A description of procedures for gaining access to Network Rail's infrastructure both in terms of the approval process and the physical access proposals;
- Confirmation, in terms of safety and in terms of undertaking the Infraco Works, the personnel utilised shall be appropriately qualified, skilled, experienced and adequate in quantity;
- The proposed Possession Strategy for works on or adjacent to Network Rail infrastructure, to include identification of Possessions & Isolations on Programme taking cognisance of lead time;
- Summary of the required method statements for principal construction activities associated with Works adjacent to Network Rail infrastructure;
- The proposals which allow access for Network Rail to maintain their infrastructure;
- Details as to how the Railway Group & Network Rail Line standards shall be complied with;
- Specific details of how Network Rail's infrastructure and rail vehicles shall be protected from injury/damage arising from the works activities;
- Details of how staff and any third parties shall be protected from injury from Network Rail's infrastructure or vehicles using it;
- The strategy for Red & Green Zone working;

- Proposals for competencies, making specific reference to management of the certification of personnel and operatives in accordance with the National Competency Control Agency "Sentinel" systems and procedures;

- A specific accident/incident procedure with regard to Network Rail infrastructure which details action to be taken, including the communications regime;

- Proposals for security and prevention of trespass onto site, especially onto adjacent Network Rail property;

- Proposals with regard to work in and around First Scotrail's Haymarket Depot and its associated stabling & sidings. There shall be a requirement to highlight proposals for ensuring access to Haymarket Depot is maintained for staff; road and rail vehicles, especially if rail vehicles require access/egress to the depot by road. There shall be a requirement to identify how First ScotRail operations shall not be restricted.

12.8 Quality Management

The Infraco shall undertake the Works fully in compliance with quality management processes and procedures referenced in ISO 9001 and ISO 9004.

The Infraco shall develop and maintain a Quality Plan to meet the requirements of ISO 10005 - 1995, and which fully defines all quality aspects of the Works. The Quality Plan shall be submitted in accordance with the Review Procedure. The Quality Plan shall demonstrate an integrated quality management system relating to the design, construction, testing and commissioning of the system and shall show how Infraco and its Sub-Contractors shall comply with the requirements of the Quality Plan.

The Infraco shall have all associated documentation readily available for internal review and review by **tie**. Regular internal audits shall be undertaken by the Infraco to ensure full compliance with ISO 9001 and ISO 9004 in accordance with Clause 5.1 of the Code of Construction Practice. The Infraco shall prepare and submit in accordance with the Review Procedure a "Schedule of Internal Audits" for agreement with **tie**. This shall define the planned nature and timing of the internal audits. Furthermore **tie** reserve the right to undertake external audits in accordance with paragraph 5.2 of the Code of Construction Practice and Code of Maintenance Practice.

The Infraco shall ensure that their management system for the Infraco Works is developed to ensure that it aligns with the requirements of the Tram Project Quality policy Statement (DEL.HSQE.103).

Quality control including materials and works on Site shall also be undertaken in accordance with the requirements of paragraph 3.2 of the Code of Construction Practice. The Infraco shall be required to comply with these Employer's Requirements including the completion of forms and other systems in order to assist **tie** in complying with **tie**'s own safety and quality management systems.

12.8.1 Document Standards and Control

All Deliverables that are shared with, or issued to, **tie** shall be posted and reside within **tie**'s document management system. The official version of any project document shall be the version that exists within **tie**'s document management system. Access shall be granted to **tie**'s document management system on a named basis, and access levels shall be determined by **tie**. The Infraco also agrees to abide by **tie**'s document management procedure as notified to Infraco from time-to-time.

Documents from external parties should be uploaded to the project extranet for processing by document control. The extranet will also be the official conduit for issuing project information. In exceptional circumstances where documents must be exchanged by email, only the Document Control team will receive and issue this information. They will then handle all appropriate processing and distribution.

Deliverables shall conform to the following standards:

Acceptable File Types

- MS Office Suite 2003;
- MS Project 2003;
- MS Visio 2003;
- Portable Document Format (PDF) – Fully-searchable (OCR) Acrobat Reader v7 compatible;
- Compressed Files/Folders – WinZip v10 compatible;
- Graphics – GIF, TIFF, JPG, JPEG, or BMP;
- Audio – Audio files should be saved in MP3 format;
- Video – WMV or MPEG format with WMV preferred;

- Drawings – DWG (inclusive of used templates) and DCF.

Acceptable File Sizes

In general, all files should be optimised to keep their size to a minimum. For email correspondence the maximum allowable attachment size is 10MB. Individual files in excess of 50MB are only acceptable with prior agreement from **tie**.

Project Applications

- Collaboration – SharePoint 2007 (hosted by **tie**);
- Project Planning – Primavera v6;
- Risk Management – Active Risk Manager (hosted by **tie**);
- Deliverables. In addition to Deliverables conforming to the above, they should specifically be supplied in complete, self-contained and fully editable formats.

Typical examples include;

- Drawing Deliverables should be supplied as complete DWG files (inclusive of used templates) as well as the DCF print snapshot;
- Documents should be in Word 2003 (or previous) format;
- Spreadsheets should be in Excel 2003 (or previous) format and include the associated macros, equations, and functions.

Illegal Characters

As a matter of best practice the following characters should not be used in filenames to minimise the risk of error in software applications:

&	**¦**	**$**
~	**¬**	**£**
*****	**^**	**?**
%	**; (semi-colon)**	**!**
#	**, (comma)**	**@**
****	**‘ (apostrophe)**	**=**
/	**` (single quote)**	
<	**“**	
>	**. (dot)**	
{	**: (colon)**	
}		

12.9 Infraco Performance Measurement

As part of the overall project reporting regime, a four weekly report incorporating performance against Key Performance Indicators (KPI) shall be required from the Infraco. These shall be project, as opposed to company, specific.

A fundamental consideration is that the KPIs agreed must be measurable and without dispute, thus they shall be fact based. The outputs shall be compared on a four weekly basis against both four weekly and rolling targets. A colour coded "traffic light" visual warning shall be used.

The KPIs agreed are split into a number of different areas. The following provides the breakdown of components within each of the areas. Deductions against the failure to achieve the agreed KPIs are set out in Schedule 45.

Table 26 – Table showing indication of Safety KPIs

Safety
Accident Frequency Rate (AFR)
Equivalent Fatality Rate (EFR)
Lost Time Accidents (LTA)
RIDDOR
Road Traffic Injuries
Road Traffic Damage (caused by Infraco actions)
Accident Investigations (late receipt)
HSE inspections, observations, improvement notices and prohibitions
Working at height
PPE – not using/not using correctly
Review of Accident Book entries
Possible 3rd Party specific (e.g. Network Rail)
NCRs
CARs (non-completion/late response or action)
Procedure compliance
Test failures (to include concrete and welding)
Safety Tours
Safety Inspections
Security
Achievement of programme
Snagging correction

Method Statements/Risk Assessments – failure to operate in compliance therewith
Late Possessions / Overruns
Reporting
Spills
Working hours contraventions
Complaints
Pollution – water courses; noise; light; dust; others
Trespass
COSHH contraventions
Signage and warning signage
Specific parameters may need to be devised relating to programme, performance, reporting and other specific issues that are important to **tie**.

The Infraco shall submit samples, manufacturers' literature, documentation and other such materials to demonstrate compliance with the Employer's Requirements, from time to time, for review by **tie**, in advance of the associated materials or equipment being procured. The Infraco shall prepare a Schedule of Procurement Proposals to identify all such proposed submissions and their timing for approval by **tie**.

12.10 Cost Management and Reporting

The Infraco shall carry out a pro-active role in cost management and reporting. A cost report shall be submitted by the Infraco to **tie** no later than 3 Business Days before each cost review meetings / or at a 4 weekly period, to be agreed with **tie**. In addition cost summary information shall be provided for inclusion in the Progress Reports.

The Infraco cost reports shall contain comprehensive information and shall be structured in a manner that is commensurate with **tie**'s own reporting structure. The cost reports shall be required to provide information, including the following:

- Executive summary and narrative on significant changes from the previous report;
- Actual / Planned / Forecast Spend Tables / Curves to match the achievement of major deliverables and activities within the Work Breakdown Structure;
- Change Control Schedule and background information;
- Schedule of Compensation Events and background information;
- Value management estimates / analysis;
- Schedule of status of completion of Construction Milestones and Critical Milestones;
- Copy of the progress statements included in Monthly Progress Monitor.

The Infraco shall also be required to provide value engineering estimates and reports. These reports shall be provided by Infraco from time to time, as proposed by the Infraco or as required by **tie**, for the purpose of achieving better value.

12.11 Risk Management

12.11.1 Project Objectives

tie is dedicated to ensuring that a consistent approach to risk management is adopted across the ETN, which shall enable an informed view of risk to be taken.

ETN project risk management's mission is "to successfully manage all risks to and opportunities for the project thus ensuring that a supported and fully functioning operational service is delivered within budget and on time.

The key drivers within this mission are to:

- Promote and support proactive management of risk and opportunity;
- Integrate risk awareness / management, and not risk aversion, into the project culture;
- Manage risk in accordance with best practice;
- Reduce risk exposure to acceptable levels;
- Capitalise on opportunities;
- Ensure that all identified risks are owned and managed by the party best able to manage them;
- Provide assurance and enhanced information to managers and stakeholders.

tie maintains a project risk management plan and risk register covering the strategic, project management and commercial aspects of the ETN and shall continue to do so throughout the Term and operation. **tie** seeks to have all service providers, including the Infraco, contributing towards this risk register.

12.11.2 Risk Deliverables

The Infraco shall provide various Deliverables, as described in this section, to assist **tie** in meeting **tie**'s risk management obligations associated with strategic, project management and commercial aspects of the ETN. The required procedures for managing hazards and risks associated with obligations associated with safety are not covered in this section.

The Infraco shall be responsible for the production, management, development, regular maintenance and necessary updating and distribution of the documentation included within the table below. The documentation shall be held by the Infraco in electronic format with hard and soft copies being made available as required.

Risk Documentation shall be submitted to **tie**, in paper copy and electronically, for their approval in accordance with the Review Procedure and the required dates and frequencies are included in the table below.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
The Infraco shall provide assurance that they shall manage design and construction risk to the satisfaction of **tie** and in order to fulfil the objectives described in12.11.1. As part of this obligation the Infraco shall be responsible for the production, development and maintenance of a Infraco Risk Management Plan ("IRMP") for the management of all risk aspects of the Edinburgh Tram Network throughout the Term. The IRMP shall focus on the risk factors related to the Infraco managed activities related to the Infraco Works for the delivery of the Edinburgh Tram Network including the risk deliverables noted below. The IRMP shall identify individuals and their responsibility in relation to risk.	Agree format and delivery date for the IRMP with **tie**'s designated risk manager within one month of the Commencement Date. The Infraco shall update and maintain the IRMP throughout the Term. The Infraco shall issue an update to the IRMP at least bi-annually throughout the Term.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
The Infraco shall be responsible for the development and maintenance of an Infraco Risk Register ("IRR"), to best present all capex, opex, lifecycle, programme and quality risks to the Edinburgh Tram Network. The IRR shall also detail the proposed and completed mitigation of such risks. The platform used shall include the ability to generate reports, highlight risks to **tie**, key programme and cost impacts. The Infraco shall be responsible for the identification of commercial risks associated with all interfaces related to the works and shall facilitate and coordinate the inputs from stakeholders and other parties requested by **tie** from time to time. The IRR shall include analysis of each risk in terms of 'likelihood' and 'impact' providing detail on the inherent risk significance and current residual risk significance. Each risk shall have a designated responsible owner and the Infraco shall provide dashboard type graphical summaries of the risk profile and management actions being taken to mitigate. The risks to be addressed should include technical, operational, infrastructure, interface, economic, legal and regulatory, organisational and environmental risks. The Infraco should review the IRR on a four weekly basis to ensure that it is current. The Infraco shall meet with **tie** on a four weekly basis in line with the tram period calendar to discuss the control of key risks by the Infraco.	Agree format assessment criteria, platform and delivery date with **tie**'s designated risk manager within one month of the Commencement Date. The Infraco shall update and maintain the IRR as required on a four weekly basis and shall distribute the IRR to **tie** on a four weekly basis throughout the Term. Assessment criteria must be compatible with **tie**'s own risk register and assessment criteria.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
It is recognised that the identification, monitoring and progress of risk shall be discussed at regular workshops. The Infraco shall provide to **tie** a schedule of and undertake workshops, regarding risk matters to assist **tie** in ensuring the effective management of risk in relation to the Edinburgh Tram Network, **tie**, the Operator and/or relevant suppliers should receive timely notification of these in order to be able to attend. It is noted that **tie** may routinely request to attend workshops in order to be able to evaluate Infraco's approach to and performance in relation to risk. Infraco shall also attend meetings and workshops with **tie**'s project and risk management team and other ETN suppliers, the Operator and service providers as instructed by **tie** to take part in update of existing project risk and identification of new risks. The representatives attending such workshops shall be qualified and shall have sufficient knowledge of the ETN project to be able to contribute pertinent information within these workshops.	Provide and agree workshop schedule for the coming 6 months within the risk progress report to **tie**'s designated risk manager within 2 months of the Commencement Date.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
The Infraco shall be responsible for the preparation and maintenance of a Commissioning Risk Control Report which shall detail the plans for mitigating risks associated with the commissioning of the Edinburgh Tram Network. This should cover commissioning, operational and design risks, but not limited to the trams, the tracks, the power supply and the tram depot. The Commissioning Risk Control Report shall concentrate primarily on the (commercial risk) associated with the commissioning process, but shall also refer to ongoing issues which also affect the construction and/or operation or part operation of the Edinburgh Tram Network .	Agree format of the Commissioning Risk Control Report to **tie**'s designated risk manager (as notified to the Infraco from time to time) within 6 month of the Commencement Date. Final report to be delivered at least 3-months prior to start of the Testing and Commissioning. The Infraco shall update the Commissioning Risk Control Report as required until the Service Commencement Date..
The Infraco shall be responsible for the preparation and maintenance of a Residual Risk Control Report ("RRCR") that will detail the plans for mitigating the risks arising from the construction and commissioning of the Edinburgh Tram Network, which are still of ongoing importance. The RRCR should clearly detail the areas of importance that could affect the ETN after the Service Commencement Date until the end of the Term. These areas could be associated with design, operational and defects factors. Risks to be noted in the RRCR may include, but shall not be limited to commercial risk associated with, snagging, claims, specification defects and other commercial concerns.	Agree format of RRCR with **tie**'s designated risk manager (as notified to the Infraco from time to time) within 12 months of the Commencement Date. Final report to be delivered at least three months prior to the Service Commencement Date. The Infraco shall update the RRCR as required throughout the Term.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
The Infraco shall prepare and maintain an Operational and Maintenance Risk Register ("OMRR") that will detail the identified risks associated with provision of the Maintenance Services in relation to the Edinburgh Tram Network and management actions being taken to mitigate. The Infraco shall liaise with its Sub-Contractors and the Operator and any other relevant party as required in relation to the creation, development and updating of the OMR	Agree format and assessment criteria of the OMRR with **tie**'s designated risk manager (as notified to the Infraco from time to time) within 12 months of the Commencement Date. First formal report to be delivered at least three months prior to the Service Commencement Date. The Infraco shall update the OMRR in line with the four weekly tram period calendar

Table 27 - Table showing required actions from the Infraco

12.12 Traffic Management / Temporary Traffic Regulation Orders (TTROs)

The Infraco shall be responsible for the preparation of a Traffic Management Plan (TMP) and Work Site Staging Plan (WSSP). The TMP and WSSP shall comply with instructions issued by **tie** and shall be drafted in consultation with **tie** and CEC. The Infraco shall be responsible for the preparation of a Traffic Management Plan (TMP) and Work Site Staging Plan (WSSP). The plans shall apply to all work required in connection with the Infraco and including wider area traffic management measures associated with the construction of the main works. The TMP and WSSP shall comply with instructions issued by **tie** and shall be drafted in consultation with **tie** and CEC.

The TMP and WSSP shall identify and account for interfaces with parallel works, including the MUDFA Works.

The TMP and WSSP shall also include all necessary survey work, temporary traffic diversion modelling, assessment and design which will take account of the works, network constraints and the traffic control requirements.

The design shall identify the required alterations to road layouts, regulatory changes to be enacted through TTRO, altered/additional traffic signal equipment, new traffic signal installations and advance/local road signage.

The design shall also determine the locations of temporary bus stops and taxi ranks, alterations to parking and access/servicing arrangements for residents and businesses in works areas.

The TMP and WSSP shall be submitted within four weeks of the Commencement Date by the Infraco to **tie** and CEC for approval in accordance with the Review Procedure and as detailed in the current CEC-**tie** Interface Protocol relating to TTROs (Protocol Ref: TECH – 01).

The TMP and WSSP submission packages shall be as described in the Protocol and the plans shall include temporary works method statements, and shall identify general traffic, bus and pedestrian diversionary routes, access routes for emergency vehicles, and alternative arrangements for bus stops, parking and loading. The plans shall also include assumptions registers, issues logs and any other means to ensure prompt resolution of issues which could affect the progress and economic execution of the Infraco Works.

Leaflets and other approved publicity material as reasonably required shall be prepared for the information of the public/stakeholders/media showing temporary traffic management arrangements and traffic diversions and how these will operate.

Prior to implementation the TMP and WSSP shall be presented for review and approval to the **tie**/CEC/ Police/TEL Traffic Management Review Panel (TMRP) in-line with the agreed protocols and timescales which include procedures to give stakeholders advanced notification of the proposed arrangements to be implemented during the works.

The TMP and WSSP shall also include all necessary drawings, diagrams and supporting information to show the mobilisation, erection and dismantling of Temporary Works, traffic and pedestrian management during any pre-diversion works and the Infraco Works, access to properties, details of fencing and security measures.

The Infraco shall update the TMP and WSSP every two weeks throughout the duration of the Infraco Works for review at fortnightly design meetings and every four weeks at stakeholder and third part meetings.

The Infraco shall be responsible for the preparation of draft TTROs which shall be submitted to **tie** for onward submission to CEC, in its capacity as Roads Authority, for approval, again as described in the current CEC-**tie** Interface Protocol relating to TTROs (Protocol Ref: TECH – 01). The submission packages shall be as described in the Protocol.

TTRO submissions will adhere to the programme detailed in the Protocol.

The Infraco shall also attend meetings in relation to the TTROs, as required by **tie**, including representations to the **tie** / CEC Roads Working Group Committee, which convenes quarterly.

The Infraco shall develop a set of requirements in relation to TTROs and traffic management, which shall be based on information supplied to the Infraco by **tie** and/or **tie** ("TTRO Obligations and Traffic Management Plan") and shall take account of the interface on traffic management that will be required in relation to the MUDFA Works.

The Infraco shall prepare and develop project-specific procedures for complying with the TTRO Obligations and Traffic Management Plan, and these procedures shall be submitted for approval by **tie** and CEC in sufficient time to avoid disruption to the Programme.

By appropriate induction, the Infraco shall ensure all site-based personnel, management staff, operatives and visitors are fully aware of and understand the procedures contained within these Employer's Requirements.

The designated project or site manager appointed by the Infraco shall be accountable for the implementation and compliance with these requirements and procedures.

The Infraco shall ensure that the overriding considerations expressed in these procedures and requirements shall be the safety of road users, minimising disruption caused by the Infraco Works, pedestrian management and ensuring that traffic and pedestrian disruption is kept to a minimum.

This shall include taking such measures as CEC, in its capacity as roads authority, may reasonably require.

The Infraco shall ensure that reasonable access to all business, residential premises and properties (having regard to Infraco's obligation to comply with the Programme) along the route of the Edinburgh Tram Network is maintained at all times. Infraco shall not be obliged by virtue of this provision to provide access which is more extensive than the access agreed in any Third Party Agreement.

12.13 Stakeholder Management

12.13.1 General

A Stakeholder and Communications Management Plan has been developed by **tie**. The Infraco shall comply with the requirements of this document.

The Infraco shall be, jointly with **tie**, accountable for minimising any possible adverse impact of the implementation of the Edinburgh Tram Network on stakeholders (both statutory and non statutory), local businesses and the general public.

12.13.2 Design

The Infraco shall incorporate the following requirements into the design in addition to any other requirements as defined:

- Securing, implementing and incorporating into the design all necessary Network Rail, BAA and other third party agreements;
- Assisting by providing all technical details relevant to the compulsory purchase order process and land acquisition process (including wayleaves and servitudes); including integration with **tie**'s stakeholder and GIS systems.
- Liaising with CEC, Scottish Executive, Historic Scotland, World Heritage Trust, Scottish Natural Heritage and others as required by **tie** in relation to the performance of the Infraco Works.

12.13.3 Liaison and Public Information

The Infraco shall appoint a liaison officer to manage all public relations, information and press related matters relating to the Infraco Works, who shall along with the necessary technical, commercial and other Infraco resource, liaise with **tie**, and if so requested by **tie**, with CEC, other statutory bodies, members of the public, local businesses, the press and the media as may be

necessary on all matters relating to the Infraco Works. Except where expressly stated in the Agreement, the Infraco shall not make any publicity or media statements or make any other formal disclosure of information regarding the Infraco Works without the prior approval of **tie**.

The liaison obligation referred to in the above paragraph shall include, but shall not be limited to the following matters:

- From time to time as directed by **tie**, Infraco shall be required to participate in business, stakeholder and community liaison groups, public meetings and consultation meetings as the progress of the Infraco Works dictate.

- From time to time as directed by **tie**, Infraco shall be required to provide proactive input, information and comment into information initiatives organised by or on behalf of **tie** and attending as requested by **tie** at any relevant consultation meetings

- As directed by **tie Infraco** will assist with the development and maintenance of, and adherence to, a communications protocol for dealing with all stakeholders, businesses and members of the public affected by the Infraco Works. In particular this will require strict adherence to timescales determined by **tie**.

- Assisting with the development and maintenance of procedures developed by **tie** in relation to stakeholder management by way of the provision of information relating to the Infraco Works

- Provision of weekly updates to **tie** on the progress of the Infraco Works and all planned Infraco Works in a form reasonably requested by **tie**.

- Depending upon the type of communication, Infraco shall give **tie** a minimum of two weeks notice in advance of all plans for any formal communication with stakeholders, businesses and members of the public (e.g. for major customer works governed by the Customer Interaction Cycle far more weeks would be required). The form and content of such formal communication shall be subject to **tie**'s prior approval

- Provision to **tie** of all information reasonably requested by **tie** in respect of the Infraco Works planned in a form prescribed by **tie** and timescales and frequency agreed with **tie**.

- **tie** and Infraco will be jointly involved in the appointment of appropriately qualified "Tram Helpers". They will be directly managed by **tie,** but integrated into Infraco work areas and teams through joint induction and briefing; appropriate cross training; "Tram Helper" visibility in Infraco work areas; "Tram Helper" involvement in the direct management of stakeholder issues on site;

direct engagement by "Tram Helpers" or appropriate Infraco management and staff to assist in the resolution of on site issues; provision of appropriate Infraco uniform and equipment, etc. "Tram helpers" are to be recruited and in place four weeks prior to commencement of notification.

- Provision and use of approved branding materials, PPE kit and signage at all operational Work Sections. No such materials, kit or signage shall be erected at any Work Section without the prior approval of **tie**.

- The provision and distribution of traffic routing maps which conform to the terms of the TTROs for all areas affected by the Infraco Works in advance of the Infraco Works starting in any particular location as may be requested by **tie**. In the event that **tie** requires that such material is for public issue, public issue shall not occur before the form and content has been approved by **tie**. Infraco shall ensure that all public statements (including by way of media referred to in the sections below (customer care centre, website, weekly newsletter, monthly newsletter, call centre and communication log) in relation to the Infraco Works are consistent with (**tie**'s) Communications Strategy and integrated with **tie**'s systems and procedures.

12.13.4 Information Centre

The Infraco shall provide all information and documentation regarding the Infraco Works as may be reasonably required by **tie** in respect of the mobile and fixed information centres being operated jointly by **tie** and Infraco in relation to the Edinburgh Tram Network. The frequency of update and version control of information shall be subject to a process agreed with **tie**.

12.13.5 Website

The Infraco shall provide all information regarding the Infraco Works, reasonably requested by **tie**, in order to populate the website, which shall be maintained and operated by **tie** throughout the progress of the Infraco Works, in respect of the Edinburgh Tram Network. The frequency of update and version control of information shall be subject to a process agreed with **tie**.

12.13.6 Weekly Newsletter

The Infraco shall produce and publish weekly newsletters every Wednesday, detailing the Infraco Works to be undertaken in the forthcoming week and outlining, with appropriate maps, drawings and diagrams, the impact on the general public, businesses and in particular any alterations to road traffic circulation patterns required by the coming week's Infraco Works.

Each newsletter, the contents and format of which shall have the prior approval of **tie**, will also be issued, if requested by **tie**, by fax and email to: local and national newspapers and other news media, CEC, Lothian and Borders Police, the emergency services, to any party or parties requested by **tie** and to any other persons or organisations that have requested receipt of the newsletters.

The newsletters shall also be distributed door to door by the Infraco in affected locations and the Infraco shall advise **tie** when such distribution is occurring.

The Infraco shall monitor and record the distribution of newsletters, recording who is carrying out such distribution, the intended recipients etc, so as to enable **tie** to carry out its own audit and monitoring of such distribution. Infraco to ensure, by regular surveys that circulation data is accurate and up to date.

Sufficient free distribution take-away hard copies of these newsletters shall be delivered to and placed in the information centre by the Infraco before 08:00 every Thursday morning.

The Infraco is required to submit a draft of each issue of the newsletters to **tie** no later than midday on the Monday immediately preceding the proposed issue of the newsletters on the Wednesday. **tie** shall respond before 17.00 hours the same day.

12.13.7 tie Monthly Newsletter

The Infraco shall provide all information and assistance reasonably requested by **tie** in relation to the publication by **tie**, of a monthly newsletter in relation to the progress of and future plans for the Edinburgh Tram Network.

12.13.8 Customer Contact Centre

The telephone number, fax number and e-mail address of the call centre to be operated jointly by **tie** and Infraco in relation to the Edinburgh Tram Network (the "hotline") shall be publicised through the press and the weekly newsletter and clearly displayed on all appropriate PPE kit, site signage, hoardings and at other suitable locations within and throughout the vicinity of the Infraco Works. All letters, e-mails, customer queries shall be answered by Infraco within timescales, to be agreed in advance with **tie**.

12.13.9 Communication Log

All contacts, communications, complaints, comments and queries howsoever received by the Infraco shall be registered in a suitable electronic log (the "communication log").

The Communications Log shall be developed and maintained by Infraco in a manner that allows it to be fully integrated with **tie**'s Stakeholder Database and GIS systems. The communication log shall set out each contact under the type (e.g. General, Traffic, Safety, Vibration, Noise, Dirt, Disruption, Injury, Parking, Access, RTA, publicity, suggestions etc).

The method of approach shall also be logged (e.g. phone, direct, letter, email, etc.) as well as the time and date.

The log shall be so constructed such that statistical analysis of the different communications can be presented as part of the data to be provided to **tie**. It shall be a requirement that the Infraco shall deliver an "above average" customer satisfaction level, with criteria, frequency and method of assessment to be agreed by **tie**. In order to demonstrate this, there shall be a requirement for the Infraco (and as required **tie**) to undertake internal (and external) audits of the overall engagements with the stakeholders. All this information shall be summarised by the Infraco in its monthly progress report.

Infraco shall take such steps as are required to address any such contact, communication, complaint, comment or query in accordance with the response requirements set out in Table 28 - Notification Hierarchy and in line with the agreed enquiry management process.

To the extent that a stricter response requirement is otherwise required under the Agreement, the stricter response requirement shall apply.

To the extent that Table 26 provides for the recovery of any amount by **tie** from the Infraco, such amount may be deducted from any monies due to or to become due to the Infraco or, alternatively, may be recovered from the Infraco as a debt.

A record of all remedial actions taken shall be maintained.

In the event of the Infraco receiving a complaint, a follow up letter or electronic communication shall be passed to the complainant by the Infraco within 24 hours of their receipt of the complaint, outlining the complaint and details and timing of the remedial action being undertaken by the Infraco.

An up to date copy of the communications log shall be compiled daily by the Infraco, together with a report on the progress of any actions.

The communications log shall be inspected and signed daily by a nominated senior representative of the Infraco and shall be counter signed by the Infraco's Representative at least once per week.

The Infraco's Representative shall write a report to **tie** and/or the Nominated City Officer of CEC (as notified by **tie** from time to time) at a frequency determined by **tie** (at least once per month) containing a list of any breaches of the requirements as defined within this section and also Schedule 3 (Code of Construction Practice and Code of Maintenance Contract) occurring within the previous month, setting out:

- the nature of the breach;
- the duration of the breach;
- the action taken by the Infraco to mitigate the breach; and
- the steps taken to minimise the likelihood of a subsequent occurrence of the breach.

Subject to the Infraco obtaining **tie**'s prior approval, a copy of each week's communication log shall be placed every Friday in the information centres, where it will remain until completion of the Infraco Works.

Any person, including representatives of **tie** and CEC's nominated representatives may freely inspect all deposited copies of the communications log during the normal opening hours of the information centres.

The version of communications log on public display should not breach any data protection legislation or other Law.

Copies of the communication log shall be forwarded to **tie**'s Representative and/or and CEC's Nominated City Officer once per week.

The master communication log shall be available for **tie**'s Representative and CEC's Nominated City Officer to inspect at any other time during normal working hours.

Level of Urgency	Category of Notification	Required Response Time
1	**High urgency** Involves an immediate threat to persons or property or the circumstances otherwise require immediate rectification.	Immediate action required. If response not completed by the Infraco within 4 hours, **tie** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Infraco.
2	**Medium urgency** No immediate threat to persons or property, but circumstances require rectification within 24 hours.	Remedial action requires to be completed within 24 hours. If the Infraco does not complete the required response within 24 hours, **tie** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Infraco.
3	**Issue requires rectification** but no immediate threat to persons or property and the circumstances do not otherwise require immediate rectification.	Timescales for rectification to be agreed between the Infraco and **tie**. In the event that the Infraco does not comply with the agreed timescales, **tie** may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Infraco.

Table 28 - Notification Hierarchy

13 Permits / Approvals

The Infraco shall obtain all necessary permits and approvals prior to undertaking investigations or works on Site, in accordance with paragraph 3 of the Code of Construction Practice.

13.1 Method Statements

The Infraco shall prepare method statements in respect of all investigation and work activities, as detailed in this Section and paragraph 3.2 of the Code of Construction Practice and submit these in accordance with paragraph 3.3 of the Code of Construction Practice.

The Infraco shall produce a method statement entitled "Procedures for dealing with Unidentified Apparatus or Unrecorded Artificial Obstructions", which shall be submitted by Infraco in accordance with paragraph 3.3 of the Code of Construction Practice. This method statement shall contain procedures which shall confirm the processes for dealing with unforeseeable events or circumstances, the discovery of unidentified apparatus (including live services) or unrecorded artificial obstructions. The final version of the method statement and procedures shall be agreed with the relevant key third parties, Approval Bodies, the Utilities and the emergency services The method statement shall be updated and a final version produced which shall be finalised by the Infraco in accordance with paragraph 3.3 of the Code of Construction Practice.

13.2 Existing Structures Which May Affect Progress and relationship with Third Parties

The Infraco shall undertake works to address the condition of existing structures where such condition may affect the progress of the Infraco Works. Where such work is completed the Infraco shall take appropriate photographs to fully demonstrate the quality of the reinstatement works.

The Infraco shall undertake survey inspections associated with buildings and structures which may be at risk of physical damage as a result of the Infraco Works.

For such structures and buildings the Infraco shall compile an appropriate schedule of such buildings / structures, and produce surveys / records similar to those described under paragraph 18.2.1 of Schedule 3 (Code of Construction and Code of Maintenance Practice).

Early warning must be given to **tie** where any third party is, or is likely to start, acting unreasonably. In these situations, **tie** will seek to resolve any issues with the third party to assist Infraco.

13.3 Network Rail

The Infraco shall ensure that the requirements of the Network Rail GRIP process are implemented on the works for which they are responsible whilst working in accordance with all relevant Network Rail Group Standards.

The contract requirements for Network Rail with regard to health and safety are included within the Network Rail document NR/SP/OHS/008. The project specific requirements are identified within the Safety Clause Menu against the requirements of Network Rail document NR/SP/OHS/008 and indicated with 'ticks' in the contractor column sections 51 to 59 inclusive of the safety clause menu and any other requirements that the Infraco is proposing by virtue of his method of undertaking the Infraco Works. The safety clause menu shall be signed off by the Infraco to confirm its proposals.

The Infraco Works shall be undertaken as Third Party Works as identified within the Network Rail document (RT/LS/P/043).

14 Human Factors

The Infraco shall provide systems and working practices that are:

- As easy to use as possible;
- Unlikely to cause annoyance or stress to users of the Edinburgh Tram Network, whether members of the public, operators, or maintainers; and
- Likely to promote safety to all.

The Infraco shall systematically and comprehensively:

- identify all the human factors issues associated with the engineering of the Edinburgh Tram Network, using task analysis;
- determine which of these human factors issues pose the most significant risk to the efficiency, productivity, safety and health of the Edinburgh Tram Network; and
- describe the organisational arrangements and processes the Infraco intends to put in place to manage these significant human factors issues as part of the engineering of the Edinburgh Tram Network

The Infraco shall produce and maintain in accordance with the submittals schedule a human factors management plan, covering the requirements summarised above, and where appropriate, shall undertake human factors studies to recommend solutions.

Areas of particular concern are:

- The human computer interfaces in the Control Centre;
- The layout of the driver's cabs;
- The facilities to enable maintenance of equipment:
  - In the workshop and Depot;
  - At trackside;

- In substations;
- At the Tramstops; and
- In the Control Centre.

The Infraco shall adopt all applicable best practice and guidelines for human factors. In designing the environment in the Control Centre, the Infraco shall comply with BS EN 50126 and ISO 11064 "Ergonomic Design of Control Centres.

15 Reliability, Availability and Maintainability

15.1 Reliability and Availability

The Edinburgh Tram Network is made up of many different subsystems, most of which may affect the reliability of operation of the ETN as a whole. In respect of achieving and maintaining reliability, the Infraco shall design, construct and maintain the Edinburgh Tram Network in accordance with Good Industry Practice, subject to the reasonable constraints of cost. Where necessary, the ETN should be made resilient to single point equipment and cable failure by employing suitable levels of equipment/cable redundancy and duplication.

On equipment or cable failure, subsystems shall be designed in a fail-safe manner, with graceful degradation. Limited back-up facilities shall be provided to maintain services under specified partial failure conditions.

Defined below are the requirements for availability of individual subsystems (each of which is given a definition), and also the availability of individual components of the subsystems.

In addition to the above, the overall availability of the Edinburgh Tram Network and its subsystems must support the tram punctuality requirement that is set out in these Employer's Requirements. Consequently it may be necessary to increase the minimum requirements that are set out below, especially as the consequences of the actions that third parties may take, including delays caused by other road users, need to be included in the punctuality analysis for the Edinburgh Tram Network.

For all components and subsystems, assume a Mean Time to Repair (MTTR) of 4 hours.

Any downtime required for planned maintenance can be discounted from the determination of availability, provided that such maintenance can be reasonably undertaken at a time when the maintenance has no impact on the operation of the ETN. This will often be during overnight shut downs.

15.2 Traction Power System

Component or Subsystem	Minimum Availability
AC circuit breaker, where its availability is defined as the probability that it either fails to conduct electricity when commended to be closed.	99.99%
Transformer / rectifier where its availability is defined as the probability that it either fails to provide the nominal 750VDC when energised.	99.99%
DC circuit breakers and busbars, where its availability is defined as the probability that traction power is not available from the DCCB when commanded to be closed, provided that 750 VDC is available at from the rectifier	99.99%
Transformer / rectifier where its availability is defined as the probability that it fails to provide the nominal 750VDC when energised by the HV input.	99.99%
Substation battery and charger, where its availability is defined as the probability that control voltage is not available from the battery at any time during its normal operation, regardless of the state of the incoming LV supply	99.99%
Substation, where its availability is defined as the probability that 750VDC voltage is not available for the OLE when the substation is commanded to provide 750VDC	99.75%

Table 29 - Substation Equipment

Component or Subsystem	Minimum Availability
OLE System, where its availability is defined as the probability that in any linear km of the OLE system, trams are not able to operate at the normal operational speed due to defects in the OLE. This is based on an 8 hour incident once every 3 years, 20hr/day operation and (20 route-km plus depot, about 50 track-km)	99.99925% for each km

Table 30 – Overhead Line Equipment

15.3 Supervisory and Communications Systems.

Component or Subsystem	Minimum Availability
ODN node	99.99%
Fibre Optic Cabling	99.99%
Patch Panels and Connectors	99.99%
ODN network, where its availability is defined as the probability that any message from a given input to a node reaches its intended destination node correctly and could be transmitted onwards by that node.	99.99%

Table 31 - Operational Data Network

Component or Subsystem	Minimum Availability
Transponder (if used)	99.9%
Loop Detector	99.9%
TPDS Trackside Controller	99.9%
TPDS subsystem, where its availability is defined as the probability that any given tram has its position detected and passed to the signal controller and to Control Centre operators correctly, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional	99.75%

Table 32 - Tram Position and Detection System

Component or Subsystem	Minimum Availability
Passenger Information Display	99.9%
Local Controller (if required)	99.9%
PID subsystem, where its availability is defined as the probability that the appropriate message is displayed correctly at a given PID, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional	99.75%

Table 33 – Passenger Information Display

Component or Subsystem	Minimum Availability
Telephone Handset	99.9%
PABX	99.99%
Telephone network, where its availability is defined as the probability that any 30 second conversation between a given telephone and another given telephone is heard clearly and completely by the caller and the intended recipient, assuming that the ODN is fully functional.	99.75%

Table 34 – Telephone Network

Component or Subsystem	Minimum Availability
PA speaker	99.9%
PA controller	99.9%
Microphone and speaker	99.9%
PA subsystem, where its availability is defined as the probability that an operator can make an intended announcement clearly at a given platform, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional.	99.75%

Table 35 - Public Address System

Component or Subsystem	Minimum Availability
Base Station	99.95%
Mobile Handset (Tram, Vehicle, or Hand Held)	99.7%
Central Switch	99.99%
Operational Radio subsystem, where its availability is defined as the probability that a 10 second call (voice) or short data message can be received clearly by the intended recipient, assuming that the ODN is fully functional and that the hardware component of the Control Centre workstations is fully functional	99.75%

Table 36 - Operational Radio System

Component or Subsystem	Minimum Availability
Help / Emergency Help Point	99.9%
Help Point subsystem, where its availability is defined as the probability that a member of the public can contact the Control Centre operator and can carry out a Help Point conversation lasting 20 seconds, clearly and without interruption, assuming that the ODN is fully functional and that the PABX is fully functional	99.75%

Table 37 - Passenger Help / Passenger Emergency Help System

Component or Subsystem	Minimum Availability
CCTV camera	99.95%
Digital Video Recorder	99.95%
CCTV Matrix	99.95%
CCTV subsystem, where its availability is defined as the probability that an image is displayed correctly and in the specified sequence at the Control Centre, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional	99.9%
Recording and replay subsystem, where its availability is defined as the probability that an image is displayed from any given time in the past (within the recorded period) can be retrieved and displayed correctly, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional	99.9%

Table 38 - CCTV System

Component or Subsystem	Minimum Availability
SCADA RTU (including I/O cards and interface cards)	99.95%
SCADA subsystem, where its availability is defined as the probability is the lesser of (a) that an indicator is read correctly at the RTU, transmitted to the SCADA Master Station in the Control Centre, and displayed correctly on any SCADA display that is in use within four seconds: and (b) that a control is effectively transmitted to an outstation within two seconds, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional	99.75%

Table 39 - SCADA System

Component or Subsystem	Minimum Availability
Servers (if necessary, by use of hardware and software redundancy)	99.99%
Workstations	99.9%
Printers	99.5%
CCTV Matrix Controller	99.9%
LAN Switches, Routers and Hubs	99.99%

Table 40 - Central Control Equipment

15.4 Maintainability

The ETN and its components shall be designed with maintainability in mind. To this end, the following shall be observed:

- Important equipment shall be in a redundant configuration, so that a component may be replaced while standby equipment takes over its duty;
- Equipment shall be replaceable, if possible, as field replaceable units, so that defective components can be replaced without the need to power down the overall piece of equipment; and
- Equipment, particularly at trackside and on Tramstops, shall be positioned so that where possible it is accessible for maintenance or replacement without the necessity to halt tramway traffic or to close the Tramstop and without the need to use access equipment such as steps.

15.5 Supportability

The equipment selected for use on the Edinburgh Tram Network shall be selected so that:

- It has a long design life, as specified in section 6 of these Employer's Requirements.
- It shall be based on standard Commercial Off-the Shelf (COTS) equipment as far as appropriate, so that replacement parts may be easily obtained and integrated into the ETN without the necessity of resorting to the original subsystem or equipment suppliers.

16 Electromagnetic Compatibility

16.1 EMC Directive

On 20th July 2007 a new EMC Directive came into force in the European Union. Statutory Instrument 2006 No.3418 implements the new EMC Directive 2004/108/EC in UK law. The rules for the new EMC Directive have changed significantly from the old Directive (89/336/EEC). After 19th July 2009 declarations made will require appropriate "Technical Documentation". This means that the Declaration of Conformity made using the old conformance mechanisms will have to be updated to use "Technical Documentation". The Infraco must be aware of the relevance of the 19th July 2009 date and insist that suppliers provide documentation accordingly.

16.2 Essential Protection Requirements

The purpose of the EMC Directive is to ensure that electrical/electronic equipment does not cause or be susceptible to electromagnetic disturbance. The protection requirements required of all electrical/electronic equipment/systems/installations are as follows:

- the electromagnetic disturbance generated shall not exceed the level above which radio and telecommunications equipment or other equipment cannot operate as intended; and

- they shall have a level of immunity to the electromagnetic disturbance to be expected in their intended use which allows them to operate without unacceptable degradation of that intended use.

The Infraco must produce an Edinburgh Tram Network specific EMC strategy document in accordance with the Submittal Programme that clearly defines its strategy for achieving compliance with these essential protection requirements and shall submit it to **tie** for its approval.

17 Health, Safety, Quality and Environment

17.1 Quality Management

The Infraco shall undertake the Infraco Works fully in compliance with quality management processes and procedures referenced in ISO 9001 and ISO 9004.

The Infraco shall develop a Quality Plan to meet the requirements of ISO 10005 - 1995, and which fully defines all quality aspects of the Infraco Works. The Quality Plan shall be submitted in accordance with the Review Procedure. The Quality Plan shall demonstrate an integrated quality management system relating to the design, construction, testing, commissioning and maintenance of the Edinburgh Tram Network and shall show how Infraco and its Sub-Contractors shall comply with the requirements of the Quality Plan.

The Infraco shall have all associated documentation readily available for internal review and review by **tie**. Regular internal audits shall be undertaken by the Infraco to ensure full compliance with ISO 9001 and ISO 9004 in accordance with paragraph 5.1 of the Code of Construction Practice. The Infraco shall prepare and submit in accordance with the Review Procedure a "Schedule of Internal Audits" for agreement with **tie**. This shall define the planned nature and timing of the internal audits. Furthermore **tie** reserves the right to undertake external audits in accordance with paragraph 5.2 of the Code of Construction Practice.

The Infraco shall ensure that its management system for the Infraco Works is developed to ensure that it aligns with the requirements of the Tram Project Quality Policy Statement (DEL.HSQE.103).

Quality control including materials and works on Site shall also be undertaken by the Infraco in accordance with the requirements of paragraph 3.2 of the Code of Construction Practice and the Project Safety and Quality Interface Document. The Infraco shall be required to comply with the requirements of this document including the completion of forms and other systems in order to assist **tie** in complying with **tie's** own safety and quality management systems.

17.2 Health & Safety

17.2.1 Safety Management Plan

The Infraco shall submit a safety management plan that is over-arching with regard to safety and defines the management procedures that shall be put in place to ensure health and safety for the design, construction, testing, commissioning and maintenance of the Edinburgh Tram Network. This document shall be stand alone and separate from other safety deliverables such as health and safety plan, system safety management plan, case for safety development etc. The Safety Management Plan shall address all issues relating to the safety of the Infraco Works, staff and third parties, however specific details relating to the items below are required and shall be submitted by the Infraco in accordance with the Submittal Programme:

- The plan shall detail the approach and all management procedures relating to health and safety for the Edinburgh Tram Network;
- The plan shall show how the Infraco will ensure that its Sub-Contractors apply all relevant health and safety policies and procedures to all Sub-Contractors;
- Details of all interfaces associated with safety and the procedures of how these shall be managed. Interfaces shall include Roads Authorities, Health and Safety Executive; any other relevant statutory authorities, HMRI; Competent Person (ROGS); Network Rail; Police; Fire and Rescue Services; Ambulance Service; and all applicable Law;
- Proposed Safety Initiatives;
- How the Infraco proposes that a safety culture shall be cascaded and enforced throughout the team including with Sub-Contractors;
- Infraco proposals for how safety shall be incentivised throughout the team, including with Sub-Contractors;
- The emergency procedures which the Infraco propose to implement;
- Details of how the Infraco shall implement accident and incident reporting and promotion of an open culture;
- The Infraco's safety inspection & safety tour regime;

- An outline of the Infraco's procedures relating to safety for compliance with **tie**'s Drugs & Alcohol Policy and procedures and details of the Infraco's own similar policy and procedures;
- Details of any particular safety issues the Infraco considers would be significant and initial mitigation measures the Infraco considers necessary;
- Commissioning of the Edinburgh Tram Network;
- Driver Training on the Edinburgh Tram Network;
- Maintenance of the Edinburgh Tram Network.

17.2.2 Occupational Health & Safety Management System

The Infraco shall adopt an occupational health & safety management system consisting of the implementation and use of those processes and procedures referenced in BS 8800, OHSAS 18001-2007 and/or HSG 65 (Successful H&S Management).

17.2.3 Project Health & Safety Plan and Health & Safety File

The Infraco shall develop a construction phase plan and supply all necessary information for the Project Health & Safety File in accordance with the Construction (Design and Management) Regulations 2007 and L144 Managing Health and Safety in Construction and as described in the pre-construction information. The construction phase plan shall require to be submitted in accordance with the Review Procedure.

17.2.4 Interface with tie's Safety Systems

The Infraco shall ensure that the management system for the Infraco Works is developed to ensure that it aligns with the requirements of the Tram Project Safety Policy Statement (DEL.HSQE.105). Section 32 of the Agreement contains the Project Safety (and Quality) Interface Document. The Infraco shall be required to comply with the requirements of this document including the completion of forms and other systems in order to assist **tie** in complying with **tie**'s own safety and quality management systems.

17.2.5 System Safety Management Plan (SSMP)

The Infraco shall be responsible for the development of the SSMP.

The SSMP shall define the engineering process that shall ensure, and provide a record of, assurance that the tramway has achieved an acceptable level of performance. This is achieved through a staged "case for safety" submission (refer below) process to signify that safety has been engineered into the design of the Edinburgh Tram Network. The SSMP shall define the process, activities and requirements for the preparation for a "case for safety" at the relevant design stage. The SSMP shall also define the system safety management organisation and the strategy to achieve the individual hazard system safety targets. The SSMP is concerned with only with those hazards that could give rise to an increased level of risk to passengers, staff and the general public from the operating system. (All health and safety hazards related to the risk to workers, staff and the general public from the construction activities should be covered under the safety management plan.)

17.2.6 The Railways and Other Guided Transport Systems (Safety) Regulations 2006

The Edinburgh Tram Network shall be delivered in accordance with The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS).

The Infraco shall design and execute the Infraco Works using safety management and procedures to demonstrate that the Edinburgh Tram Network is safe to introduce into service as defined by the Safety Management System under ROGS. This shall also include the development of the Case for Safety to the satisfaction of the Competent Person and the Project Safety Certification Committee. These aspects form an integral part of the design of the Edinburgh Tram Network and are detailed in this section of these Employer's Requirements.

The Infraco shall undertake all Infraco Works in accordance with the written safety verification scheme requirements prepared by **tie**. Safety verification will be undertaken by **tie**. The Competent Person shall assure the process and its outputs. The Infraco shall allow **tie** and the Competent Person access to undertake safety verification activities, such as system safety audits. The Infraco shall develop a safety management system for when the Edinburgh Tram Network is operational which complies with the requirements of ROGS and other relevant legislation to the satisfaction of the Competent Person and **tie/TEL**.

Whilst there is no requirement in ROGS for projects such as the ETN to be notified to or given prior consent or approval by HMRI, HMRI have been involved in the development of the Edinburgh Tram

Network scheme to date and it is **tie**'s intention to continue this involvement. The Infraco shall assist **tie** in any liaison with the HMRI when requested to do so.

17.2.7 Health and Safety Management

The health and safety responsibilities and CDM/ROGs application are defined in the matrix below for each phase of the project.

Table 41 – Matrix showing Contractual Responsibilities – Health & Safety Management

		Infraco					Revenue services	
RESPONSIBILITIES	**MUDFA**	**Pre Novation Design**	**Post Novation Design**	**Construction / Installation**	**Commissioning / Test running ***	**Shadow running**	**Operation**	**Maintenance.**
tie Ltd.	CDM Client.	CDM Client. **ROGS duty holder.**	CDM Client. **ROGS duty holder.**	CDM Client. **ROGS duty holder.**	CDM Client. **ROGS duty holder. ****	- **ROGS duty holder. ****	-	-
Transdev.		Adviser to **tie**.	Adviser to **tie**.	Adviser to **tie**.	Driver training. Inputting into hazard log.	Operator of tram system. Inputting into hazard log.	Operator of tram system.	-
SDS	Designer.	Designer. Managing hazard log.	Designer. Inputting into hazard log.	-	-	-	-	-
MUDFA contractor.	Principal contractor	-	-	-	-	-	-	-
Infraco.	-	-	Design manager. Managing hazard log.	Principal contractor. Managing hazard log.	Principal contractor. Managing hazard log.	-	-	Contractor/Principal contractor. Maintainer–infrastructure.
Tramco.	-	-	Designer. Inputting into hazard log.	Contractor. Inputting into hazard log.	Contractor. Inputting into hazard log.	-	-	Maintainer–vehicles.
TEL.	-	-	-	-	-	-	**ROGS duty holder.**	CDM Client.
CEC.	-	-	-	-	-	-	-	-Maintainer - roads
REGULATIONS								
CDM Regs	Yes – Construction Phase Plan, Residual Risk Register. Health & safety file initiated.	Yes – Pre-construction information, Residual Risk Register. Health & safety file progressed.	Yes – Pre-construction information, Residual Risk Register. Health & safety file progressed.	Yes – Construction Phase Plan. Health & safety file progressed.	Yes – Construction Phase Plan. Health & safety file completed & handed over to TEL.	No – no longer construction work.	No.	Yes – where maintenance works are "construction works". (Notifiable works last more than 30 days or 500 man days).
ROGS Regs	No.	Yes – Safety Verification Scheme. Appointment of Independent Competent	Yes – Safety Verification Scheme. NoNOs from ICP.	Yes – Safety Verification Scheme. NoNOs from ICP.	Yes – Safety Verification Scheme + Safety Management System. NoNOs from ICP.	Yes – Safety Verification Scheme + Safety Management System. Final NoNO from ICP.	Yes – Safety Management System.	Yes – Safety Management System.

		Person (ICP).						
SAFETY MANAGEMENT SYSTEMS								
Safety Management Systems	AMIS SMS – construction. SDS SMS – design.	**tie** SMS – safety verification. SDS SMS - design.	**tie** SMS – safety verification. Infraco SMS – design management. SDS SMS – design. Tramco SMS – design.	**tie** SMS – safety verification. Infraco SMS – construction/installation Tramco SMS – manufacture/installation.	**tie** SMS – safety verification. Infraco SMS – installation/operation. Tramco SMS – installation. Transdev SMS – operation.	**tie** SMS – safety verification. Infraco SMS - operation. Transdev SMS – operation.	TEL SMS. Transdev SMS - operation.	TEL SMS. Infraco SMS – maintenance. Tramco SMS – maintenance.

* The project moves into this stage in phases once key milestones have been achieved e.g. the energisation of the OLE within the depot.

** This is flexible. TEL may assume the role of **ROGS duty holder** during this phase.

KEY

Responsibilities under the CDM Regulations

Responsibilities under the ROGS Regulations

17.3 Environmental Management

17.3.1 Environmental Management System

The Infraco shall adopt an environmental management system consisting of the implementation and use of those processes and procedures referenced in ISO 14001.

Documentation developed to meet the requirements of the environmental management system shall be submitted in accordance with the Review Procedure.

The Infraco shall ensure that the management system for the Infraco Works is developed to ensure that it aligns with the requirements of the Tram Project Environmental & Sustainability Policy Statement (DEL.HSQE.101).

17.3.2 Environmental and Sustainability Action Plan

The Infraco shall submit and maintain an Environmental & Sustainability Action Plan (EAP). This shall be based on SDS Environmental Mangement Plan and shall cover environmental issues for the duration of the Infraco Works, including design and construction stages. It shall describe the management process, procedures and interface requirements associated with meeting the Infraco's environmental responsibilities.

It shall then develop in detail the potential impacts on environmental resource, mitigation measures and responsibilities associated with all stages of the Infraco Works.

The EAP shall be prepared using the following sources of information.

- the Environmental Statements;
- The Design Manual;
- The Noise and Vibration Policy as contained within the Code of Maintenance Practice;
- The Code of Construction Practice;
- The Landscape and Habitat Management Plan for the Roseburn Corridor;
- The Badger Mitigation Plan for the Roseburn Corridor;
- Agreements made with statutory bodies; and

- Parliamentary agreements.

The EAP shall be amended by the Infraco to reflect any changes to the tramway design or engineering solutions and the results of surveys..

17.3.3 Construction Environmental Management Plan (CEMP)

The Infraco shall prepare a construction environmental management plan (CEMP) including method statements, as necessary, to convey the required level of information during the construction stage of the Infraco Works.

Site specific EMPs shall be prepared for each geographical section and intermediate geographical section as appropriate. These plans shall be produced by the Infraco prior to any works commencing on Site and must be reviewed by **tie** before work starts. The site specific EMPs must separately address the following sites and/or issues:

- Site accommodation, compound and offices and storage areas;
- Site clearance;
- Geographical sections and intermediate geographical sections of the Tram route;
- The Depot;
- Structures, such as sub-stations not already included in the above; and
- Road, cycleway and footway works, including drainage, signage and lighting.
- A series of site specific and topic related EMPs shall also be produced by the Infraco that shall address all the environmental issues, landscape, ecology etc. These shall cover the general control and protection measures for each topic as it relates to each of the site specific sections in the plan area. The Infraco shall have responsibility for the production, content and implementation of the Site Specific EMPs.
- The Infraco shall submit to **tie** the site specific EMPs 8 weeks prior to the commencement of the relevant section of the Infraco Works.

- **tie** shall comment on the plan(s) submitted, in accordance with the Review Procedure and agree the final plans prior to the commencement of any work on the relevant section or activity.

17.3.4 Requirement of Site Specific EMPs

The Infraco shall develop the site specific EMPs to include the following details:

- **A description of the works to be undertaken**
- List of all separate work activities that fall within the scope of the works.
- **A detailed programme of the construction activities**
- Proposed dates and sequence of the works (showing how environmental impacts are affected by potential changes to the Programme);
- Details of proposed normal working hours and intended start up and close down times; and
- Outline of any works which may require construction activities outside of normal working hours.
- **Location of the works, including a site plan, showing construction site boundaries**
- This shall show the position of plant and position of any sensitive receptors e.g. watercourses, local residents, etc.
- **Personnel access routes/points**
- Location plan of each access route/point;
- List of activities for which each access point is to be used
- **Vehicular access routes/points**
- Location plan of each access route/point;
- List of activities for which each access point is to be used
- **Equipment and plant to be used (including type, make and expected number)**
- **Method of delivery/removal of materials and plant**

- **Details of proposed site accommodation**
- **Details of how public right of way and access to property will be retained and managed**
- A list of Consents/permissions obtained or to be obtained for the works
- **External Consultation**
- A list of those notified of the works and the date notified
- A list of proposed notifications and dates
- **Significant environmental impacts relating to each activity.**
- (This should draw upon the definitions of significant impacts used in the Environmental Statement).
- **Significant environmental risks relating to each activity.**
- **Receptors which are likely to be affected by the works.**
- **On-site mitigating measures for each impact and risk.**

These will be transferred onto site management statements which will briefly state the key risks and mitigating measures which have been agreed. The site management statement will be attached to the construction method statement for the works to ensure that it is brought to the attention of all site staff. The Site Management Statement will be briefed out to all site based staff as a toolbox talk.

- **Monitoring proposals that shall include:**
- The receptors for which monitoring will be undertaken;
- Frequency of monitoring;
- Factors against which the monitoring results will be analysed;
- Threshold levels;

- Timescales within which results will be analysed;
- List of organisations/individuals to whom results will be distributed; and
- Actions to be taken in the event that thresholds are breached.

17.3.5 Permits to Work

Prior to being granted access to commence construction works, the Infraco shall complete and submit to **tie** for its autorisation, the required Permits to Work.

Further details of the Permits to Work process are included within the Code of Construction Practice, the Project Safety & Quality Interface Document and Section 39 of the Employer's Requirements.

18 Cabling and Ducting

This Section sets out the requirements with the Infraco must comply with in relation to cabling and ducting.

18.1 Cabling

All cables must be mechanically protected such that they cannot be accessed by the public without using tools to remove separate mechanical protection.

Cables and associated supports must be rated such that neither the cables nor the supports degrade due to thermal or mechanical stress during their design life.

Cables must operate satisfactorily under all foreseeable fault, and loading conditions.

Cables must operate satisfactorily under all foreseeable environmental conditions. This must include the effects of sunlight, dampness, temperature, and exposure to water. Cables must be selected to recognise risk that they may be submerged in water.

Cables must be designed to last for the durations that are set out in Table 22 - Equipment Design Life.

Cable terminations must not impose any stress on the cables, and sufficient spare length must be provided in all cables to permit foreseeable maintenance and repair work.

Cables must be identified in accordance with requirements agreed with **tie**.

Where joints in cables are required, and cannot be reasonably avoided, they must be located in draw pits and identified on the as-built drawings. Joints in draw pits must be both suitably supported and accessible. This may require draw pits that are larger than normal size to be used to contain cable joints.

All cables in all draw pits will be identified with a suitable label.

18.2 Ducts

Spare ducts shall be provided on all duct routes as follows:

Number of ducts in cable route	Minimum number of spare (unused) ducts	Minimum size of spare duct
2	0	N/A
3 or more	20% of the number of ducts	Maximum size of used ducts

Table 42 – Ducts

All ducts, and all individual ducts in banks of ducts, must contain draw ropes of sufficient mechanical integrity to enable additional new or replacement cables to be pulled through the duct.

All ducts, including ducts that are installed but not used for cables, must be free from debris and free from obstructions.

All installed ducts, including ducts that are installed but not used for cables, must not be crushed. All internal dimensions of the duct as built must never less than 90% of duct's nominal dimensions.

Ducts must be provided with drainage that is integrated with the specification of the cables used such that there is no foreseeable risk of degradation from any water that may be in the ducting system.

Ducts must be of sufficient mechanical integrity to protect both themselves and the cables contained in the ducts from all foreseeable damage, degradation and vandalism.

The bending radii of ducts must be integrated with the requirements of the cables to be installed such that the cables can be installed, replaced and terminated without damage.

Ducts must be provided in sufficient number and size to ensure that there is no degradation in the cables due to thermal effects or chafing of cables. It shall be possible to remove and replace any individual cable in the ducting system without the need to remove or significantly disturb any other cables from the system.

Cable ducts shall be installed with appropriate warning arrangement to anyone who may be undertaking excavation work that may damage the ducts. This may be achieved by the installation of plastic warning tape in the ground above the ducts.

Where cables are installed in segregated parts of the tramway, they shall not be installed in cable troughs unless specifically agreed by **tie**. Any proposals for the use of cable troughs must include:

- Locked lids or equivalent to minimise the risk of vandalism and/or theft;
- Where cable troughs form part of the walkway along the tram route, a proven design of locked lids that will eliminate any rocking of the lids must be used; and
- Troughs must be secured against any lateral movement.

For the avoidance of doubt, where cable troughs form part of a structure, the above requirements still apply.

Where ducts are used on the off street tramway, these are preferred to be placed under the walkway with draw pit covers forming part of the walkway.

Any slipping and/or tripping hazards associated with draw pits that are located in a walkway must be eliminated.

Some cables terminate in equipment on ballasted track. These include:

- traction return bonding connected to the rails;
- connections to loops; and
- possibly some connections to some Point Position Indicators.

These cables are to be installed such that the risk of damage to the cables due the activities of track maintenance equipment, vandalism and people walking on the track is minimised.

18.3 Duct Chambers and Draw pits

Duct chambers must be structurally sound and built to the requirements of the cabling network as specified in this section 18.

The design of the location of draw pits must such that they can be safely accessed without stopping the operation of the tramway or requiring a road closure, unless specifically agreed by **tie**.

The integration of draw pit covers into the surfacing in the surrounding area shall be included in the design. This will include the orientation and the surfacing of the cover.

Draw pit covers will be of a family, such that the number of different keys needed to lift draw pit covers is minimised.

The Infraco shall provide sufficient draw pit keys and access equipment to adequately operate and maintain the system.

18.4 Cable separation

Sufficient separation between cables must be provided in order to:

- ensure that any risk of damage to the insulation of the cables that could cause potential risks of energising other circuits is minimised. All cables carrying +750V dc must not be in physical contact with any other cables unless the cables are permanently bonded together,
- ensure that electromagnetic compatibility between cables is provided, and
- permit access to cables and any essential cable joints for maintenance purposes

18.5 Other requirements

Where cables are installed inside conducting items that are not earthed, such as OLE poles, the insulation and the mechanical protection of the cables must be sufficient to mitigate any associated hazards.

As built drawings will accurately identify:

- the cables that are contained in each duct, to aid cable location and fault finding; and
- the location of all draw pits and all duct runs.

19 Cabinets

This Section 19 sets out the requirements which the Infraco must comply with in relation to cabinets and the environmental conditions as defined in Section 3.6.4.

Cabinets, cubicles and equipment housings will be required in the following instances as a minimum:

- To house communications equipments at the Tramstops;
- To house SCADA equipment within substations;
- To house radio equipment at base stations; and
- To house points control, points indicator control, points heaters and Tram control equipment at rail junctions.

All cabinets that are located externally shall meet the following requirements:

- They shall provide an ingress protection rating of 55 (BS EN 60529 Specification for Degrees of Protection Provided by Enclosures) as a minimum;
- They shall be coated with materials that inhibit graffiti and assist with its removal;
- Equipment housing, enclosures, cable routes etc. shall allow for an increase of temperature caused by the equipment, whereby the housing itself shall not cause any harm to the functionality of the equipment or the temperature reached at the surface of the enclosure
- All cabinets shall provide an entry for cabling, with no cables visible or accessible without opening the cabinet;
- All cabinets are provided with a robust lock, satisfying the **tie** lock suiting requirements set out in these Employer's Requirements;
- The cabinet doors shall be equipped with a multi point locking mechanism that complies with the Edinburgh Tram Network security locking policy;
- In the event of the equipment cabinets being opened, an alarm shall be transmitted to the Supervisory Control and Data Acquisition system so that staff in the Control Centre can be alerted;

- The equipment contained within the cabinets shall be of a modular construction that shall allow rapid replacement should that become necessary;

- When the cabinet doors are open, they do not obstruct tramway operation, road vehicles, passengers or other members of the public; and

- Work can be carried out safely on the contents without affecting tramway operations or requiring temporary traffic management.

In addition, those cabinets located at Tramstops shall be designed to integrate visually with the Tramstop furniture. The external colour and appearance of the cabinets, shall match and complement the architectural finishes and materials of the structures of the Tramstop where the cabinet is to be mounted.

20 NOT USED

21 Utilities / MUDFA

Where Infraco is instructed by a **tie** Change to carry out utilities diversions, relocation or protective works to deliver the Edinburgh Tram Network the following shall apply.

The philosophy adopted for the MUDFA Works is to clear the ground of utilities such that the track can be installed in ground that has no live utilities within it. The MUDFA Works considers utilities that lie below the area of land that is described by the tram's DKE. It is assumed that the width of ground needed for the construction of the track slab is no more than the width of the tram's DKE.

Where utilities lie below 1200mm from the surface, they are left in-situ.

Where utilities occupy ground that is within 600mm of the existing road surface, they are removed and replaced.

Where utilities lie between these two limits, they are considered on a case by case basis. Generally, utilities that cross the tramway are protected (sleeved for example) and left in position. Where utilities run along the tramway, they are diverted and placed outside the tram's DKE.

Special arrangements are made for major utilities such as the HV cables and the service tunnel along Leith Walk.

Schedule 46 details specific locations and utility types which shall be either left in situ or be diverted by Infraco as a **tie** Change. Where utilities' scope decisions and responsibilities fall outside this schedule Infraco and tie shall jointly agree the most appropriate party (either MUDFA or Infraco) to undertake the diversion works.

The generic allocation of responsibility for relocating utilities is set out in Section 21 of these Employers Requirements. Infraco will only be responsible for relocating such utilities after receiving a **tie** Notice of Change instructing such relocation.

Tie will obtain designs for all utility diversion works and issue them to Infraco.

Infraco shall deliver the utilities diversion works instructed in accordance with designs provided.

Infraco shall ensure that the Programme as amended in accordance with Clause 80 contains adequate allowance for these utility diversion works.

Infraco responsibilities in respect of utilities diversions instructed as a **tie Change** shall also include:

1. Where diversion works are to be delivered by Statutory Utilities (SUs) supporting tie in the development and agreement of utilities diversions works package agreements with the SUCs. Such support mean supporting tie and providing all necessary information to enable tie to negotiate contracts for diversion works with SUCs, assembling and checking work package agreements, defining detailed scope, providing constructability advice and agreeing programme of works with SUC's and co coordinating such so that impact on programme for delivery of the Infraco Works is minimised, agreeing construction and delivery methodologies with SUCs, finalising the scope of Utilities diversion works and the boundary of responsibility between work to be delivered by Infraco and that of SUCs.
2. Providing all enabling, traffic management requirements, ancillary building, civil engineering, electrical and mechanical works in connection and all attendances required to enable SUCs to carry out and complete their works.
3. Coordinate the works of SUCs with each other and with that of the Infraco.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
Water	Connections	Connections to new mains will be required before old main can be decommissioned. This is part of the advance diversion scope of MUDFA.	If any connections are missed by MUDFA and subsequently identified by Infraco, they must be carried out at the time of Infraco. However, this risk is small as missed connections would usually lead to immediate customer complaints when the old service was decommissioned.	Note that this is not intended to be the primary mitigation of this risk: site investigation and planning should ensure that connections are identified and dealt with by MUDFA.
	Diversion (other than 800mm at Depot)	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out by (or at the same time as) Infraco. Extensive site investigation has been carried out to reduce this risk, but it cannot practically be eliminated.	
	Diversion of 800mm at Gogar Depot.	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out by (or at the same time as) Infraco.	There is little, if any, risk of encountering any other water service in the Gogar Depot area that has not been dealt with by MUDFA.
	External Protection	Part of the advance diversion scope of MUDFA.		Long longitudinal protection would not be acceptable for water mains

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	Insurance Pipes	Part of the advance diversion scope of MUDFA.		

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
Waste water	Diversions and manhole construction	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, or where the designs of works have been unable to be sufficiently progressed prior to MUDFA vacating the Work Sections, the diversions must be carried out by (or at the same time as) Infraco. Extensive site investigation has been / will be carried out to reduce this risk, but it cannot practically be eliminated.	Sewer design and agreement with SUC (Scottish Water) regarding treatment required to existing sewers is not currently complete and the programmed completion of the telecoms cabling works is such that existing services cannot be abandoned to allow the manhole and sewer construction works to be undertaken for significant periods of time after all the ducts and other utility diversions are complete. This may result in sewer diversion works to be undertaken after all other MUDFA programmed works in Work Sections are complete. Works may be undertaken by either MUDFA or Infraco.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	Internal Refurbishment	Part of the advance diversion scope of MUDFA.		
	External protection	Where crossing or short longitudinal - part of the advance diversion scope of MUDFA.	Where long longitudinal: would be relatively easy to incorporate into Infraco - for a section, excavation would be deeper with (e.g.) concrete placed - this would avoid double excavation by MUDFA and Infraco.	
	Connections to new sewers	Connections to new mains will be required before old main can be decommissioned. This is part of the advance diversion scope of MUDFA.	If any connections are missed by MUDFA and subsequently identified by Infraco, they must be carried out at the time of Infraco. However, this risk is small as missed connections would usually lead to immediate customer complaints or evidence of flooding when the old service was decommissioned.	This is not intended to be the primary mitigation of this risk: site investigation and planning should ensure that connections are identified and dealt with by MUDFA.
	Existing connections	An existing connection to an existing (and left in place) sewer may have to be repositioned. This would be part of the advance diversion scope of MUDFA.	A connection may not be identified at the time of MUDFA, and uncovered by Infraco. The connection must be repositioned at the time of Infraco.	

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	Manhole access level change (eg raise height of access cover)	St Andrews Square and North & South St Davids Street will be undertaken by MUDFA as part of the road realignment and construction works required to accommodate the proposed Traffic Regulation Order (TRO).	Manhole access level changes must be adjusted at the time of Infraco. Manhole lids to be flush with the finished road surface.	It will also mean that new manholes installed by MUDFA may have to be modified by Infraco.
	New Gully connections	St Andrews Square and North & South St Davids Street will be undertaken by MUDFA as part of the road realignment and construction works required to accommodate the proposed Traffic Regulation Order (TRO).	Infraco shall install road gulleys. These will have to be installed at the same time as the road construction is carried out.	If a new road gully is required at a place where the road level is not to be changed, MUDFA could install it. However this situation is unlikely, and for consistency and avoidance of confusion Infraco should probably do all of this.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
Telecoms	Protect	Where crossing or short longitudinal - part of the advance diversion scope of MUDFA. Where long longitudinal: would be part of the advance diversion scope of MUDFA allowing Infraco a "clear run". However would necessitate double - excavation of a long length of the tram foundation area.		Where long longitudinal: would be relatively easy to incorporate into Infraco - for a section, excavation would be deeper with (e.g.) concrete placed - this would avoid double excavation by MUDFA and Infraco*.
	Slew/Lower	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out as Infraco Works. Extensive site investigation has been carried out to reduce this risk, but it cannot practically be eliminated.	

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	Divert (inc manhole construction)	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out as Infraco Works. Extensive site investigation has been carried out to reduce this risk, but it cannot practically be eliminated.	
	Insurance Ducts	Part of the advance diversion scope of MUDFA.		
	Manhole access level change (eg raise height of access cover)	St Andrews Square and North & South St Davids Street will be undertaken by MUDFA as part of the road realignment and construction works required to accommodate the proposed Traffic Regulation Order (TRO).	Manhole access level changes must be adjusted at the time of Infraco. Manhole lids to be flush with the finished road surface.	This will also mean that new manholes installed by MUDFA may have to be modified by Infraco.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
Gas	Divert	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out as Infraco Works. Extensive site investigation has been carried out to reduce this risk, but it cannot practically be eliminated.	
	Protect	Part of the advance diversion scope of MUDFA.		Long longitudinal protection would not be acceptable for gas mains
	Insurance Pipes	Part of the advance diversion scope of MUDFA.		
	Connections	Connections to new mains will be required before old main can be decommissioned. This is part of the primary scope of MUDFA.	If any connections are missed by MUDFA and subsequently identified by Infraco, they must be carried out as part of Infraco Works. However, this risk is small as missed connections would usually lead to immediate customer complaints when the old service was decommissioned.	This is not intended to be the primary mitigation of this risk: site investigation and planning should ensure that connections are identified and dealt with by MUDFA.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
Electricity	Divert	Part of the advance diversion scope of MUDFA.	If any apparatus is discovered by Infraco that was not identified at the time of the utility advance diversion works, the diversion must be carried out as part of Infraco Works. Extensive site investigation has been / will be carried out to reduce this risk, but it cannot practically be eliminated.	
	Protect	Where crossing or short longitudinal - part of the advance diversion scope of MUDFA.	Where long longitudinal: would be relatively easy to incorporate into Infraco - for a section, excavation would be deeper with (e.g.) concrete placed - this would avoid double excavation by MUDFA and Infraco.	Where long longitudinal: would be part of the advance diversion scope of MUDFA allowing Infraco a "clear run". However would necessitate double - excavation of a long length of the tram foundation area.
	Insurance ducts	Part of the advance diversion scope of MUDFA.		

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	Domestic + Business connections	Connections to new cables will be required before old cable can be decommissioned. This is part of the primary scope of MUDFA.	If any connections are missed by MUDFA and subsequently identified by Infraco, they must be carried out as part of Infraco Works. However, this risk is small as missed connections would usually lead to immediate customer complaints when the old service was decommissioned.	This is not intended to be the primary mitigation of this risk: site investigation and planning should ensure that connections are identified and dealt with by MUDFA.
Street Furniture (eg street lighting, traffic lights, lighted bollards, bus stops, etc)	Existing power & telecoms Divert	St Andrews Square and North & South St Davids Street will be undertaken by MUDFA as part of the road realignment and construction works required to accommodate the proposed Traffic Regulation Order (TRO).	All existing power and telecoms diversions required must be carried out by (or at the same time as) Infraco. Depth of cover and the final road infrastructure alignment and construction to be finalised by and carried out by Infraco.	Extensive site investigation has been / will be carried out to reduce this risk, but it cannot practically be eliminated.
	Protect	St Andrews Square and North & South St Davids Street will be undertaken by MUDFA as part of the road realignment and construction works required to accommodate the proposed Traffic Regulation Order (TRO).	All existing power and telecoms diversions required must be carried out by (or at the same time as) Infraco. Depth of cover and the final road infrastructure alignment and construction to be finalised by and carried out by Infraco.	.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	New connections	For future street furniture, appropriate ducting would be installed by MUDFA where (1) design details are available sufficiently in advance, (2) the road/tram alignment is formally finalised and (3) the future ground levels are such that new ducts can be buried beneath the existing ground level, without either excessively deep excavation or inadequate (or no) cover.	Where design is not available in time for MUDFA, or where future road levels do not facilitate advance installation, duct installation work must be carried out as part of Infraco Works.	
Other	SP transmission cables	If the design agreed with Scottish Power requires external protection beyond that provided by the track slab in that area, and if the design is available in good time, then MUDFA could undertake these works if required.	Infrastructure design will have to take account of the specific requirements to avoid diverting these cables. This will include special track slab construction (for Leith Walk) and careful bridge abutment/pier design (for 3 other areas). Should this design be impossible, the diversion work would be carried out by Scottish Power directly.	This would not be possible before 2008 (at the time of writing; lead time requires a notification before October in one year for work in the summer of the following year). Consultation between utilities and infrastructure design teams should facilitate this design.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	BT cables at A8 by Gogar		Infrastructure designs shall take account of the specific requirements to avoid diverting these cables.	This may include a deeper excavation for the tunnel under the A8 than had previously been envisaged, plus provision of temporary support for the cables during the construction of the tunnel. Should this design be impossible, the diversion work would be carried out under MUDFA terms and conditions. Consultation between utilities and infrastructure design teams should facilitate this design. Trial holes have been undertaken on behalf of BT to confirm the depth of the existing cables – the initial, informal, impression from BT is the cables are higher than anticipated which indicates the cables may not require diversion but incorporation into the infrastructure design.

Service	Description	MUDFA SCOPE	INFRACO SCOPE	NOTES
	BT cables at Roseburn street		Infrastructure design will have to take account of the specific requirements to accommodate these cables. Infraco shall consider the design solution for cabling installation as part of the Infraco Works.	This will include careful bridge abutment/pier design. The cabling element of this work is to be carried out by BT following diversion works, and may impact on the Infraco programme. Consultation between utilities and infrastructure design teams should facilitate this design. Note: a design solution for the cables as part of the Infraco works has been agreed with BT.
	Utility work dependent on prior structures work, eg cables in bridge decks		Will require structures work to be completed before utility work can be started. Infraco shall complete any and all utility diversions, utility protections works etc. including design (by SDS) following (or at the same time as) the Structures are completed.	

Table 42a – Table showing the responsibility for diversion/protection work on the utilities for the Edinburgh Tram project

22 Locks and Key Suiting

22.1 General

The Edinburgh Tram Network will have many locks installed to provide a suitable level of secure access to equipment and rooms. The locks and keys used shall be integrated into appropriate key suiting families. The philosophy is to strike an appropriate balance between the following two extremes:

- A single fully integrated key suiting arrangement for the whole of the Edinburgh Tram Network;
- No suiting, with every lock needing a different key;

The Infraco shall propose key suiting arrangements that are subject to approval by **tie**. In developing the proposals, Infraco shall consider:

- The need for staff to be able to undertake their duties without having to carry large numbers of keys with then to access the places that their duties require;
- Future expansion of the Edinburgh Tram Network;
- Changes to the key suiting that are likely to be needed as the system matures, and any key suiting must bear be sufficiently flexible to enable such changes to be made; and
- The ongoing costs of providing keys to staff during the life of the Edinburgh Tram Network;

22.2 Key Suiting System

A key suiting system that is based by the Infraco on the following is likely to be acceptable to **tie**.

A stand alone suite of keys, hierarchically structured to provide access to equipment such as:

The suiting documentation will list all locks to be installed on the Edinburgh Tram Network, including any locks that are not proposed to be included in the suites. There should be 4 completely separate suiting systems, as set out below:

22.2.1 Tram

- The Infraco shall procure all keys that are required for operating each tram. It is anticipated that each tram driver will need to carry no more than two keys for each Tram in order to undertake their duties. One key would permit access onto the tram, into the cab, and enable the Tram to be driven. The second key would open any panels that the driver may need to access and may also provide for such tasks as locking doors out of use;

- A different key would permit staff such as cleaners to access the inside of the Tram and the Tram cabs, but would not enable the Tram to be driven;

- Tram Maintenance staff may also need additional keys to access sensitive or potentially dangerous equipment.

22.2.2 Substations and Power

A stand alone suite of keys, hierarchically structured to provide access to equipment such as:

- Isolator cabinets, to check the position of isolators and to fit isolation padlocks;

- Substation LV areas;

- Substation HV areas in substations;

- Isolators, to permit hand operation;

- Equipment within the substations may also have a multitude of locks that may be suited, depending on the Infraco maintenance philosophy.

Separate individual locks with a single key will be used for securing isolations. There will be no suiting whatsoever for these.

22.2.3 Depot and buildings

A stand alone suite of keys, hierarchically structured to provide access at doors in the Depot building and other buildings in the Depot area such as the Depot plant building. A low level key in this structure could be used for any trackside gates that are required along the alignment.

22.2.4 Signalling and Communication Equipment

A stand alone suite of keys, hierarchically structured, to provide access to all trackside cabinets, including:

- Points control;
- Points heating;
- Signalling and;
- Tramstop.

Isolator cabinets are substations are excluded from this suite because they are included in the substations and power suite of keys.

23 Testing and Commissioning

23.1 Systems Acceptance

23.1.1 Scope

This section of the Employer's Requirements is to define the systems acceptance requirements applicable to the Edinburgh Tram Network (ETN) which the Infraco must comply with.

23.1.2 General Description and Principles

The process for acceptance of the Edinburgh Tram Network set out in this document is designed to ensure that the ETN is delivered in an acceptably safe, compliant, and efficient manner. The objectives of the process are to ensure that system performance, integrity, reliability, availability, and safety are rigorously tested and that throughout all stages of the delivery process the many sub-systems and the overall System are validated and verified against **tie**'s requirements and applicable standards. The detailed sequence and scope of infrastructure testing and commissioning prior to System Acceptance Testing shall be programmed out and proposed by the Infraco.

The acceptance process is heavily dependent on the delivery of the planned service timetables, the Operational Timetable (see 2.8 of these Employer's Requirements) and the Enhanced Timetable (see 2.8 of these Employer's Requirements). Details regarding the tram service frequency, number of trams and the phased opening of the Edinburgh Tram Network are contained in 2.8 of these Employer's Requirements.

Pre-system acceptance testing includes both Factory Acceptance Tests (FATs), Site Acceptance Tests (SATs), Sub-system Integration Tests (SITs) and System Commissioning Tests (SCTs).

Once a Section of the ETN is physically completed and the System Integration Tests are satisfactorily completed then the formal acceptance process requires the Infraco to carry out and pass a series of System Acceptance Tests (SATS) in order to achieve Sectional Completion. These tests are:

Table 43 - Description of the Acceptance Tests

Test	Test Name	Test Description	Programme
T1	Post Commissioning Test	The test shall demonstrate and prove that each Section of the ETN in sequence is able to perform in an acceptably safe manner and deliver the required run times. Please refer to relevant section below. This is the gateway test to driver training.	Post Commissioning Test will immediately follow the successful commissioning of the nominated section and is a requirement for progressing into the Driver Training.
T2	Performance Test 1	After Section D has passed Test T1 then this test shall demonstrate and prove that Phase 1a of the ETN is able to perform satisfactorily to move into the three-month Shadow Running period. Please refer to relevant section below. This is the gateway test to shadow running.	Performance Test 1 will immediately preceed the Shadow Running period and is a requirement for progressing to this phase of the programme.
T3	Pre-operations Test	The test shall cover a seven day period during the latter part of the Shadow Running phase of the programme. The Test is the operation of the initial entry into service timetable and includes infrastructure, trams, and operations systems – Please refer to relevant section below.	Pre-operations Test shall immediately precede the Service Commencement Date.
T4	Network Performance Test	The Test shall be carried out over a 28 day period in Passenger Service to establish that the ETN can reliably operate the Operational Timetable – please refer to Please refer to relevant section below.	To be completed within twelve months of the Service Commencement Date.
T5	Network Reliability Test	Reliability Testing of certain sub-systems in Passenger Service – please	To be completed within twelve months of the Service

		refer to Please refer to relevant section below.	Commencement Date.

The Post Commissioning Test (T1), Performance Test 1 (T2) and Pre-operations Test (T3) have to be passed before the Edinburgh Tram Network (or Sections thereof) can open for passenger carrying service and are therefore to be scheduled during the test running and driver training and shadow running phases.

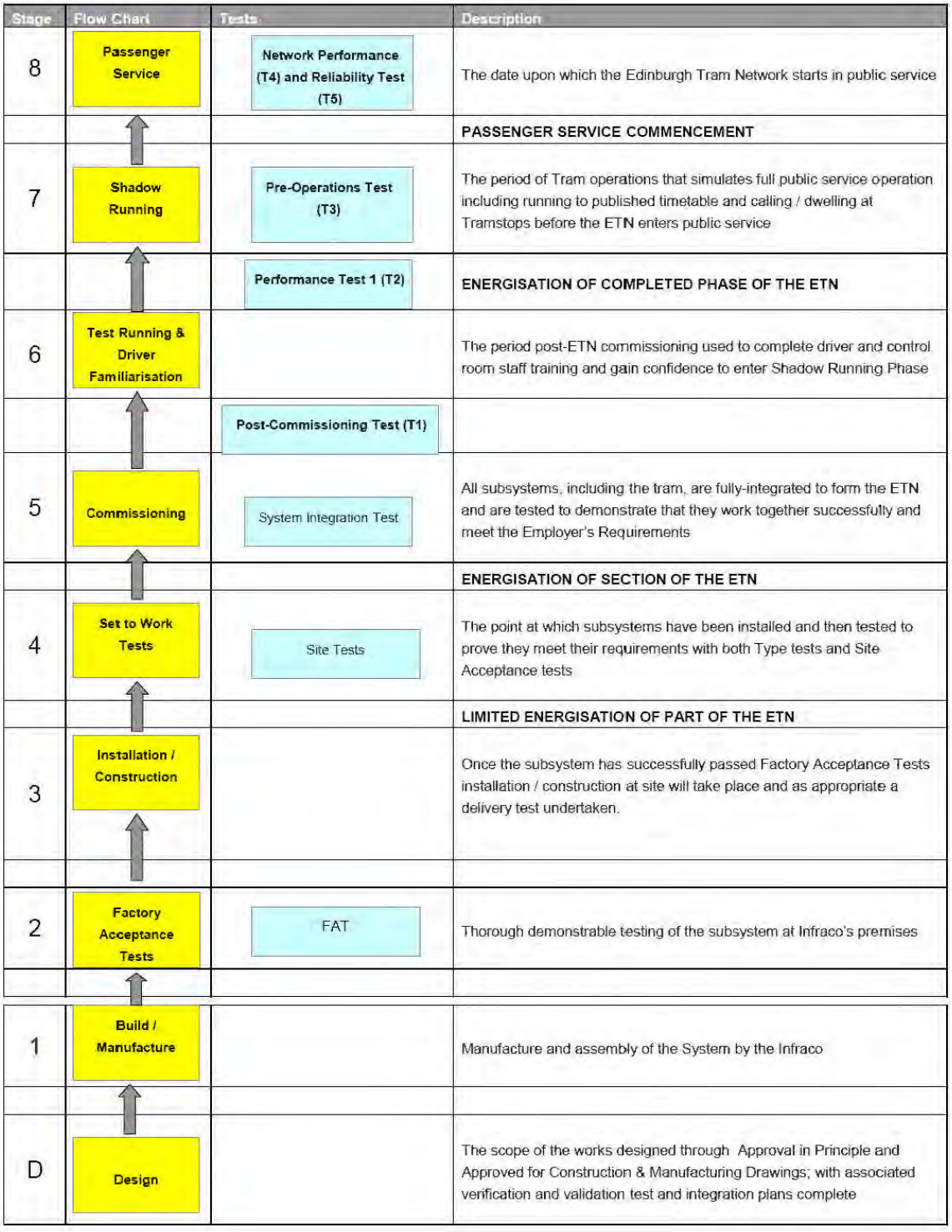
The Post Commissioning Tests (T1) can be undertaken in isolation for each Section.

Performance Test 1 (T2) and the Pre-operations Test (T3) can only be undertaken for that/those section(s) that are to be opened for passenger carrying service immediately thereafter.

The Network Performance (T4) and Network Reliability Test (T5) shall not be carried out until Passenger carrying Service has commenced on the whole Edinburgh Tram Network.

The figure on the next page shows the structure of the tests.

Figure 10 - Edinburgh Tram Network: Extract from System Life Cycle Model



Stage	Flow Chart	Tests	Description
8	Passenger Service	Network Performance (T4) and Reliability Test (T5)	The date upon which the Edinburgh Tram Network starts in public service
			PASSENGER SERVICE COMMENCEMENT
7	Shadow Running	Pre-Operations Test (T3)	The period of Tram operations that simulates full public service operation including running to published timetable and calling / dwelling at Tramstops before the ETN enters public service
		Performance Test 1 (T2)	ENERGISATION OF COMPLETED PHASE OF THE ETN
6	Test Running & Driver Familiarisation		The period post-ETN commissioning used to complete driver and control room staff training and gain confidence to enter Shadow Running Phase
		Post-Commissioning Test (T1)	
5	Commissioning	System Integration Test	All subsystems, including the tram, are fully-integrated to form the ETN and are tested to demonstrate that they work together successfully and meet the Employer's Requirements
			ENERGISATION OF SECTION OF THE ETN
4	Set to Work Tests	Site Tests	The point at which subsystems have been installed and then tested to prove they meet their requirements with both Type tests and Site Acceptance tests
			LIMITED ENERGISATION OF PART OF THE ETN
3	Installation / Construction		Once the subsystem has successfully passed Factory Acceptance Tests installation / construction at site will take place and as appropriate a delivery test undertaken.
2	Factory Acceptance Tests	FAT	Thorough demonstrable testing of the subsystem at Infraco's premises
1	Build / Manufacture		Manufacture and assembly of the System by the Infraco
D	Design		The scope of the works designed through Approval in Principle and Approved for Construction & Manufacturing Drawings; with associated verification and validation test and integration plans complete

23.2 Test Planning

The efficient programming of the tests is vital to the success of the system acceptance test process. Infraco shall, therefore, consider and incorporate, in a coordinated manner at each stage of the implementation of this process, the relevant documentation, the required tram availability and commissioning site availability and staff (from all concerned parties), into the overall Infraco test plan.

The Infraco shall prepare and present the Infraco test plan for review no later than six months after the Effective Date. The Infraco test plan shall describe how the Factory Acceptance Testing, Site Testing and Commissioning, Test Running and Driver Training and Shadow Running, as well as the Network Performance and Network Reliability tests are to be undertaken. The definition of these tests is shown in Figure 10. The programming of the tests shall be in accordance with the Programme as described in Section 39 of these Employer's Requirements. Infraco shall ensure that the PSCC and the Independent Competent Person (or the appropriate approval regime in force) are satisfied that the testing process is robust, comprehensive and satisfies all of the safety issues legislated and mandated for the system.

As the project evolves the Infraco Test Plan/Risk Register/Hazard Log shall be maintained by the Infraco. Infraco shall demonstrate that the issues raised in this log have been mitigated or that the tests have demonstrated the risk has been resolved. It is therefore important that the testing procedures and results are correlated with the Project Risk Register and Hazard Log.

23.3 Pre-Systems Acceptance Testing (before starting the systems acceptance process)

The following should be noted with regards to any tests to be undertaken:

- The individual test documentation / specifications shall be submitted to **tie** for acceptance in accordance with Schedule 14 (Review Procedure) and **tie**'s approval obtained before the test can take place;

- A notice period of at least seven working days shall be given to **tie** prior to any test in order that **tie**, and/or its representative(s), can arrange, at their option, to witness the test. The Operator's staff shall also be invited to witness all testing activities;

- Factory Acceptance Tests (FAT) and Site Acceptance Tests (SAT) test results shall be submitted to **tie** for review;

- **tie** reserves the right to be present during any of the tests to be undertaken; and
- Any such review will be undertaken in accordance with Schedule 14 (Review Procedure).

The following tests shall be carried out in advance of the systems acceptance testing sequence.

23.4 Factory Acceptance Tests (FAT)

23.4.1 Overview

Factory Acceptance Tests consist of a series of progressive activities all of which are undertaken at the sub-system manufacturer's premises.

Initial testing at the component manufacturer's premises of components to be used as part of a sub-system shall be undertaken to verify that the components behave as predicted in the design and satisfies the Employer's Requirements for that component.

Initial testing undertaken at the manufacturer's premises shall be undertaken to verify that the sub-system **or** component behaves as predicted in the design and meets the requirements of the design specification and provides correct functionality.

Once sub-systems or components have been successfully tested they shall be incrementally integrated and tested to verify that the sub-systems behave as predicted in the design and meet the requirements of the design specification and provide correct functionality.

Part of the FATs are first article inspections or type tests. These shall be undertaken on the first production item. This inspection shall verify that the Quality and functionality of the product is acceptable and that the manufacturers' quality control processes and procedures have been implemented.

The test specification(s) shall be produced by Infraco and shall be subject to acceptance in accordance with the Review Procedure. **tie** agreement to all proposed component, sub-system and Factory Acceptance Test specifications is required at least ten business days prior to the date of the component, sub-system and FAT tests identified above and any additional tests required by Infraco.

23.4.2 Pass Criteria

FAT testing shall demonstrate that the individual sub-systems or components and equipment fully meet the requirements and are suitable for the subsequent release from the factory environment, delivery to site and installation.

FATs demonstrate the integration of the modules and sub-systems under factory conditions and their reliable operation under cyclical testing.

As far as applicable the FAT will demonstrate that the sub-system or components has been successfully exercised through simulation, including a demonstration on how the alarm handling manages the worst case alarm flood. This test will be subject to **tie** approval.

23.5 Site Tests

23.5.1 Overview

The objective of site tests is to demonstrate that:

(a) Construction/installation activities have been completed correctly by demonstrating that the design specification and functionality of these Employer's Requirements have been achieved;

(b) The sub-systems, in isolation and before passengers are carried, function and behave at site as designed and tested in the FAT;

(c) The infrastructure sub-systems and the tram will then be integrated with each other insofar as is possible to prove that they collectively function and behave at Site as designed and tested in the FAT; and

(d) The ETN functions and behaves at Site as designed and tested in the FAT. This is defined as system commissioning tests and involves the integration of the infrastructure sub-systems and the tram.

The Independent Competent Person as defined under the ROGS Regulations, other regulatory bodies and the PSCC shall need to be satisfied that the ETN is safe to operate before commencement of system commissioning activities. In order to verify this it shall be necessary for the Infraco to address the issues raised by the Independent Competent Person, PSCC, HMRI (or the appropriate approval regime in force) and Approval Bodies. This may necessitate defining specific tests or incorporating additional Network Performance Test details into the suite of verification commissioning tests. Often the areas of interest to these bodies do not become clear until the majority of issues on the risk register and hazard log have been closed out. Typically these may include items such as:

- pedestrian collision, and the risk of a person being "run over " by a tram;
- gauging and possible entrapment of people in pedestrian areas;
- failed tram recovery;
- control room operational procedures; and
- Recovery from derailments, including rerailing a tram.

It is assumed that **tie** shall procure all electrical power and that a supply is available for the complete on site test procedures until commencement of passenger service.

23.6 Sub-system Integration Tests (SIT)

23.6.1 Overview

Sub-system Integration Tests cover items 23.5.1 of these Employer's Requirements. They shall be undertaken on Sections.

The Infraco shall produce the suite of SIT testing specifications for acceptance by **tie** no later than three months prior to the commencement of the tests through the Review Procedure.

23.6.2 Pass Criteria

The tests are passed when:

- Each sub-system, module or component of the system functions in isolation as designed and does not deviate from FAT results.

- All sub-systems for the given section of tramway are demonstrated to collectively perform in accordance with the operations and performance, and all of these Employer's Requirements.

23.7 System Commissioning and Integration Tests (SCT)

23.7.1 Overview

System Commissioning and Integration Tests shall be undertaken on Sections.

Such activities include the running of tram(s) over section(s) of the Edinburgh Tram Network for which Sub-system Integration Tests have been successfully completed. This will verify that the ETN behaves as predicted and as demonstrated as far as was practical in previous tests.

Infraco shall liaise with both **tie** and the Operator to ensure that sufficient competent operational personnel are available to conduct the required activities, including tram drivers and control room staff.

23.7.2 Pass Criteria

The tests are passed when:

- Each sub-system, module or component of the system functions collectively as designed and do not deviate from FAT results.

All sub-systems for the given section of tramway are demonstrated to collectively perform in accordance with the operations and performance, and all of the Employer's Requirements for a representative number of consecutive passes of a tram in each direction over the given section of the network.

- The integration testing shall include demonstrating that the control room systems and control centre equipment connected to a representative sample of the substation SCADA and other

equipment required for Tramstops can be effectively exercised under a robust simulation of trams progressing around the ETN.

23.8 System Acceptance Activities and System Acceptance Tests

The Infraco shall produce the suite of System Commissioning Test specifications for review by **tie** no later than three months before commencement of the tests. These will be reviewed in accordance with the Review Procedure

23.9 Operations and Maintenance Staff Training

The object of this series of activities is to complete driver, control room and maintenance staff training and provide said staff with greater system familiarisation, demonstrating competence to enter Shadow Running phase upon the passing both of the Post Commissioning and Performance Test 1 (T1 and T2). It therefore forms an integral part of the driver-route familiarisation and training programme.

Staff Training shall achieve the following objectives:

- Enables control room staff to gain experience running a tramway without passenger pressures;
- Allow operational staff to fulfil their duties; and
- Enables the drivers to gain route knowledge and familiarity with the trams and procedures without passenger pressures.

The activities undertaken during this phase are designed to demonstrate confidence in the system performance and system safety by means of passing the post commissioning test and performance test T1, and to gain approval of the Independent Competent Person, PSCC and HMRI. (or the appropriate approval regime in force) to progress to Shadow Running.

Infraco shall liaise with the Operator to undertake careful integration of the operational training programme and testing needs in order to avoid conflicts between operational requirements and the technical validation/verification. These comprise items 4, 5 and 6 of the system commissioning model in Figure 10 – Edinburgh Tram Network –Extract From System Lifecycle Model.

23.10 Shadow Running

The Shadow Running phase will last three months and shall:

- Build and validate the operating pattern up to the Service Commencement Date;
- Carry out any further emergency exercises;
- Demonstrate that the ETN can be safely operated in a routine manner and can recover from emergency situations and emerging perturbations;
- Resolve any issues in respect of operating practices;
- Demonstrate that reliability growth is being monitored and corrective action taken as necessary;
- Allow mileage accumulation to be carried out on the trams;
- Permit infrastructure and tram maintenance staff to familiarise themselves with the procedures, practices and operations regimes and to demonstrate competence development;
- Ensure experience is gained in the gathering and evaluation of the performance monitoring regime data in accordance with Schedule 7 of this Agreement; and
- Allow minor adjustments and tuning of systems.

This comprises item 7 of the system commissioning Model in Figure 10 – Edinburgh Tram Network – Extract From System Lifecycle Model.

The evaluation of Shadow Running is the pre-operations test (T3), the passing of which is the gateway to moving into operation, provided all necessary HMRI (or the appropriate approval regime in force) consents are obtained.

23.11 Final System Acceptance Tests in the Operations and Maintenance Phase

Within twelve months of opening the ETN to passenger service Infraco shall undertake and pass the Network Performance (T4) and Network Reliability Test (T5) (as described in Sections 23.16 and 23.17).

23.12 Emergency Exercises

The Infraco and the Operator shall prepare a plan for review by tie and the Competent Person and following approval of the plan, the Operator shall perform with support from the Infraco a series of exercises with the emergency services and other stakeholders such as Network Rail and BAA. The planning for these exercises will require close liaison by the Infraco and the Operator with the various emergency services. They will be planned to take place in the commissioning period, test running or in the shadow running phase. The nature of the exercises will require detailed planning with Fire, Police, and Ambulance services but are likely to include, as a minimum:

- A simulated road traffic accident at a major road junction;
- A major tram collision/derailment including emergency isolations; and
- A rescue of persons trapped underneath a tram.

23.13 Post Commissioning Test Specification – T1

This sub-section sets out the Performance Test assumptions applicable to all Performance Tests. Should the Infraco be able to prove to the reasonable satisfaction of **tie**'s Representative that any of the Performance Test pass criteria have been exceeded by reason of a Performance exclusion then the test results will be amended to discount the effects of such Performance Test exclusions.

The following exclusions shall apply:

- Operator staff in the Control Room causing or significantly contributing to delays in the operation of the System;
- Failure to provide the correct number of trained Tram Drivers as defined in the DPOFA save where the failure is as a result of the Infraco's own failure in respect of its own obligations in the Agreement;
- Failure of the Tram Drivers to consistently drive the Trams to good industry practice;
- Failure to procure all electrical power that is required for the operation of the System. Periods when the electrical supply is not available will be discounted from the Test and the test period shall be extended by an equivalent period;

- A failure by the Operator to comply with the relevant parts of the Operations and Maintenance Manuals; and

- Damage caused by the Operator.

However, in no event shall any allowances or relief or Network Performance Test exclusion be granted to the Infraco where any delays or failure to pass the Network Performance Test has been caused or contributed by:

(a) Any default, breach or omission by the Infraco or its subcontractors;

(b) Infraco Defects or Snagging;

(c) Equipment undergoing modification or rectification by the Infraco and;

(d) TRAMCO's failure pursuant to the Tram Maintenance Contract.

The burden of proof shall be on the Infraco to show that such failures of the Operator were caused by reasons for which the Infraco was not responsible and for which the Operator should be properly accountable for by reason of the Operator's default, omission, negligence or breach of statutory duty. The Infraco shall develop and agree audit procedures with **tie**, and the Operator in respect of the Network Performance Test exclusions set out in this paragraph.

Dwell times at Tramstops shall be regulated; as set out in the Employer's Requirements.

23.13.1 Overview of Post Commissioning Test

This section describes the requirements for the Post Commissioning Tests, their execution, monitoring and completion. Post Commissioning Tests form part of the requirements for the final system acceptance.

23.13.2 Test Objectives

This Post Commissioning Test seeks to achieve the following objectives:

Prove that the system is capable of controlling an 'off-street' section of Edinburgh Tram Network in an acceptably safe manner; and

Prove that the system is capable of controlling an 'on-street' section of Edinburgh Tram Network in an acceptably safe manner.

23.13.3 Network Performance Test Description

The Post Commissioning Test is a multi part test, with each part of the test required to be passed in sequence before the entirety of the Post Commissioning Test can be passed. It cannot be conducted until Phase 1a of the Edinburgh Tram Network has been successfully commissioned.

23.13.4 Features

The Infraco shall demonstrate that Gogar Depot and Phase 1a of the Edinburgh Tram Network can be monitored and controlled in accordance with the Case for Safety.

Tests shall provide for:

- Demonstration of the run times as defined below.
- Forty end-to-end tram movements on the nominated section of which twenty are in each direction; and
- Trams will dwell at each Tramstop, and will exercise opening and closing of the doors at each Tramstop, the minimum period of doors being fully opened at each Tramstop will be 13 seconds.

The undertaking of the test shall essentially be an operational function led by Infraco but in conjunction with the Operator. Infraco shall manage the preparation for the tests with technical and maintenance support and monitoring by Infraco (along with representatives from **tie)**.

For the demonstration of run time, the following conditions shall apply:

- Targets of the run time demonstrations shall be developed in accordance with Section 2.12 of the Employers Requirements and agreed between the parties from the agreed maximum journey times and associated assumptions detailed in Section 2.11 of the Employers Requirements during the design phase, as further details of tram performance and traffic lights are available;
- For avoiding of influences due to public traffic, run time demonstrations shall take place during night times only;
- tie will be responsible for the communication with local authorities like CEC, UTC or police;
- run time demonstration to be performed in both directions and shall include the following two demonstrations:
  - run allowing tram priority at each traffic junction along the route
  - run following the regulations and phasing of traffic lights under regular conditions
- Sufficient runs shall be carried out in both directions to provide a level of confidence that the target runtimes have been achieved as agreed in accordance with Section 2.12 of the Employers Requirements.
- Infraco shall undertake and pass the Post Commissioning Test (T1) before proceeding to the Performance Test 1 (T2).

tie shall be given thirty working days advance notice of the finalisation of the Post Commissioning Test plan and seven working days written notice of the Test commencement date.

23.13.5 Pass Criteria

Subject to the exclusions defined in23.13 above, the following shall define the pass criteria for the T1 test.

- All test results from previous tram and system and sub-system tests are to be available and signed off as accepted by **tie**, including all the closed out Snagging Rectification Certificates.

- The test shall have been successfully completed when:

  - At least 95% of the end-to-end tram movements are within the agreed target runtime; and

  - Acceptance of the Case for Safety and test results by the Independent Competent Person and where appropriate Her Majesty's Railway Inspectorate (or the appropriate approval regime in force) and approval or "No Objection to Proceed" respectively for full driver training has been obtained.

23.13.6 Monitoring and Reporting of Test Performance

Appropriate levels of observation by Infraco shall be conducted to satisfy **tie** that the auto-generation of reports from the systems is accurate.

23.14 Performance Test 1 Specification – T2

23.14.1 Overview

This section describes the requirements of Performance Test 1 and the proposals for its execution monitoring and completion. Performance Test 1 forms part of the requirements for the final System Acceptance.

23.14.2 Test Objectives

Performance Test 1 seeks to achieve the following objectives:

- Demonstrate that the Edinburgh Tram Network (or sections thereof) can be operated in an acceptably safe manner;

- Demonstrate that the completed Operator training programme has achieved an adequate competency to proceed in Shadow Running; and

- Demonstrate the mobilisation and competency of the maintenance teams provided by the Infraco.

23.14.3 Network Performance Test Description

Performance Test 1 builds upon Post Commissioning Test and cannot be undertaken until Post Commissioning Test has been passed.

23.14.4 Features

The Infraco shall demonstrate that the Edinburgh Tram Network can start Shadow Running and can be monitored and controlled in accordance with the Case for Safety.

Performance Test 1 shall provide for:

- Operation from 07:00 to 20:00 hrs on three consecutive days (none of which are Saturday, Sunday or Bank Holidays);
- The System will run to the Operational Timetable with headways extended by no more than 50%. For the avoidance of doubt, the trips scheduled for this test are the same as in the Operational Timetable as set out in Sections 2.11 and 2.12 of these Employer's Requirements; and
- Trams shall dwell at each Tramstop and shall exercise opening and closing of the doors at each Tramstop. The minimum period of doors being fully opened shall be 13 seconds at each Tramstop.
- The undertaking of the test shall be an operational function led by Infraco but in conjunction with the Operator. Infraco shall manage the preparation for the Tests with technical and maintenance support and monitoring by Infraco (along with representatives from **tie**).
- Infraco shall undertake and pass Test T2 before proceeding to the Shadow Running phase.
- **tie** shall be given twenty working days advance notice of the Performance Test 1 plan and seven working days written notice of the Test commencement date.

23.14.5 Pass Criteria

The following define the pass criteria for the T2 test.

All test results from previous tram and system and sub-system tests are to be available and signed off as accepted by **tie**. Any Defect Correction lists shall be available and agreed as being programmed to be remedied.

The test shall have been successfully completed when:

- At least 95% of the end-to-end tram movements meet the requirements of the Performance Regime in terms of Punctuality Service Element as defined in 2.16.

- Acceptance of the Case for Safety and test results by the PSCC , the Independent Competent Person and where appropriate Her Majesty's Railway Inspectorate (or relevant approval body) and their approval or 'Letter of No Objection to proceed" into Shadow Running.

23.14.6 Monitoring and Reporting of Test Performance

The primary data used to evaluate the test shall be automatically generated from the Supervisory Control & Communications performance monitoring sub system and validated independently.

23.15 Pre-Operations Test Specification – T3

23.15.1 Overview

This section describes the requirements of the Pre-Operations Test and the proposals for its execution monitoring and completion. The Pre-operations Test shall be conducted during the Shadow Running phase of the project and forms part of the requirements for the final System Acceptance.

23.15.2 Test Objectives

The Pre-operations Test seeks to prove that the Edinburgh Tram Network, or section thereof, in the event of sectional opening operates to a sustained level of performance determined by the Opening Timetable and the performance regime such that:

- The Operator can safely commence passenger carrying revenue earning service;
- The Infrastructure and Tram Maintainers can commence the Planned Maintenance proposed for passenger carrying revenue earning service; and
- The Edinburgh Tram Network passes the ride quality criteria in Tables 62 & 63 of the Employers Requirements.

23.15.3 Network Performance Test Description

Pre-operations Test is a four-part test upon successful completion of all parts of which the Edinburgh Tram Network or section(s) thereof can be opened to public service. The Pre-Operations test cannot be undertaken ahead of the successful completion and passing of the respective Performance Test 1.

23.15.4 Features

The Infraco shall demonstrate that the entire Edinburgh Tram Network or section(s) thereof can be operated to the defined levels of performance, reliability and availability and in accordance with the operational Case for Safety.

The Part 1 test shall comprise:

- Five consecutive days (none of which are Saturday, Sunday or Bank Holidays) of testing in accordance with the Operational Timetable. This test is to be undertaken no sooner than two weeks after commencement of the Shadow Running phase;

The Part 2 test shall comprise:

- Five consecutive days (none of which are Saturday, Sunday or Bank Holidays) of testing in accordance with the Enhanced Timetable, which cannot commence until two weeks from successful completion of the Part 1 test, and must be completed at least two weeks prior to the end of the Shadow Running phase, unless agreed otherwise by **tie**.

For both the Part 1 and Part 2 tests, trams shall dwell at each non-terminus Tramstop for a nominal 25 seconds and the doors shall normally remain closed.

The Part 3 test (which can be undertaken at any time during shadow running) shall comprise:

- One of the fleet of trams shall be selected by **tie** to be instrumented and monitored. The selected tram shall provide results for 100 journeys of the selected tram consecutively over all sections of the ETN;

- Measurement of lateral, longitudinal and vertical accelerations to be taken on the floor of the trailing cab of the tram.

- All tram journeys during the test period that provide data for this test shall be completed within a tolerance of plus or minus 10% of the journey times that are setout in the Operational Timetable;

- Analysis to be performed as follows:

    - For each journey between Tramstops a root mean square average of the combined lateral, longitudinal and vertical accelerations (RSS addition) is to be determined in accordance with ISO 2631.

The Part 4 test shall comprise:

- One tram from the fleet will be loaded to AW0
- Measurement of lateral, longitudinal and vertical accelerations to be taken on the floor of the trailing cab of the tram
- Entire Edinburgh Tram Network to be covered within 10% of the journey times that are setout in the Operational Timetable
- Load the tram to AW2 and repeat steps above; and
- Analysis to be performed as follows:
    - Select the greater of the results (AW0 or AW2) for each of the journeys to be used as a benchmark for each individual tram for any particular journey.

The undertaking of the test shall essentially be an operational function led by Infraco but in conjunction with the Operator. Infraco shall manage the preparation for the Tests with technical and maintenance support and monitoring by Infraco (along with representatives from **tie**).

Infraco shall undertake and pass Pre-operations Test before proceeding to the Service Commencement Date.

tie must be given thirty working days advance notice of the Performance Test 1 plan and seven working days written notice of the Test commencement date.

23.15.5 Pass Criteria

The following define the pass criteria for the T3 test.

All test results from previous tram and system and sub-system tests shall be available and signed off as accepted by **tie** including the clearance of all Defect Correction lists unless dispensation has been proposed by Infraco and agreed by tie acting reasonably.

23.15.6 Part 1 and 2 Pass Criteria

Each Pre-operations Test can only be successfully completed:

- As soon as 99% Punctuality Service Element as defined in chapter 2.16 has been achieved in accordance with the Infraco and Tram Maintainer performance regimes.

For the avoidance of doubt any delays caused by road traffic shall not be included in the delay measurement.

23.15.7 Part 3 and 4 Pass Criteria

Part 3 test can be deemed to be passed when none of the 100 journeys have an rms of the combined lateral, longitudinal and vertical accelerations exceeding 30mg.

Part 4 test can be deemed to have been passed when the instrumented tram from the fleet has attained a Ride Index equal to or less than as shown in the tables below in accordance with ISO 2631:

Speed	Wz Vertical	Wz Lateral
40 km/h	2,32	1,58
70 km/h	2,96	2,36

Table 44 - Ride Index in the Drivers Cab

Speed	Wz Vertical	Wz Lateral
40 km/h	2,24	1,64
70 km/h	2,82	2,28

Table 45 - Ride Index in the Passenger Compartment

23.15.8 Consents

This is in addition to passing the above tests.

All consents to achieve full passenger service must have been obtained and evidenced as part of Test T3.

23.15.9 Monitoring and Reporting of Test Performance

The primary data used to evaluate Parts 1 and 2 of this test shall be automatically generated from the Supervisory Control & Communications performance monitoring sub system and validated independently.

During the Pre-operations Test monitoring period Infraco will undertake audits, to the satisfaction of **tie**, of the collection and communication of fault and tram punctuality data against each of the performance indicators.

23.16 Network Performance Test Specification – T4

23.16.1 Overview

This section describes the requirements of Network Performance Test (T4) and the proposals for its execution monitoring and completion. Network Performance Test forms part of the requirements for the final System Acceptance.

The Test shall cover a 28 day consecutive period, which shall be undertaken after the Edinburgh Tram Network has entered Public Service until the Test is satisfactorily passed or, unless otherwise agreed by **tie**.

The Test is the operation of the complete ETN to the Operational Timetable each day for the duration of the test. The timetable used for the test shall be agreed with **tie**.

The undertaking of the test will be an operational function carried out by the Operator. Infraco shall manage the preparation for the Tests with technical and maintenance support and monitoring by Infraco (along with representatives from **tie**).

Infraco shall undertake and pass the Network Performance Test within twelve months after the Service Commencement Date of the whole Edinburgh Tram Network.

tie shall be given thirty working days advance notice of the Network Performance Test plan and seven working days written notice of the Pre-operations Test commencement date.

23.16.2 Pass Criteria

The test will measure the Punctuality Service Element over twenty-eight days.

The test shall be passed once the criteria stated in the Employer's Requirements Operational and Performance Section (Section 2) have been demonstrated to be met.

The Infraco may discount any one day from the calculation but shall not be a day on which a Special Demonstration shall be planned.

For the avoidance of doubt the exclusions in Section 23.13 shall apply.

23.16.3 Special Demonstrations

During the Network Performance Test a number of demonstrations will be performed, these are described in the following two sub-sections.

23.16.4 Substation and UPS Demonstrations

Infraco shall demonstrate that the system can operate with two of the traction supplies from a substation taken out of use, one at a time, for a period of two hours during the peak service. The substations concerned and the times for their disconnection will be selected by **tie**.

The disconnection of the substations and placing them into bypass will be undertaken in accordance with the Operator's normal procedures for such switching.

Operation of the Uninterruptible Power Supplies (UPS) at two tram stops for four hours shall also be demonstrated. During this period the electrical supply to the chosen tram stop UPS's shall be disconnected. The tram stop UPS's concerned and the time for their disconnection shall be chosen by **tie**.

The Infraco shall prepare a plan detailing the programme for the above events and include this in the test arrangements that will be submitted to **tie** in accordance with the review procedure.

23.16.5 Tram Change Over

The Infraco shall demonstrate, during peak hours, a Tram changeover by which a Tram in service shall be substituted with the "hot spare".

tie will give Infraco thirty minutes notice of this test.

23.16.6 Monitoring and Reporting of Test Performance

The Punctuality Service Element shall be obtained. The results for the previous day shall be ratified in accordance with the Performance Regime in Schedule 7 of this Agreement and the Operator Performance Regime under the DPOFA Agreement.

A meeting will take place daily where the performance up to that date is reviewed and any investigations concluded and data accepted. The meeting will be recorded and minutes distributed to each party by the meeting secretary within three working days.

During the Network Performance Test monitoring period **tie** may undertake audits of the collection and communication of fault data against each of the performance indicators.

23.16.7 Network Performance Test Timetable

The Enhanced Timetable delivering the ultimate capacity of the ETN as contracted shall be prepared by the Operator as that which shall be the ultimate timetable to be used in Passenger Service, proposed by the Infraco, and agreed by **tie**.

23.17 Network Reliability Test Specification – T5

23.17.1 Overview

This sub-section describes the requirements of Network Reliability Test and the proposals for execution, monitoring and achievement of System Acceptance.

Network Reliability Test is a set of sub-system reliability tests each measured over a twenty-eight day period. Each specified sub-system has its own specified target detailed within 23.17.2. The tests may start on the same date as T4 (on or after Service Commencement Date) and as each subsystem is individually demonstrated to meet its contractual target that subsystem reliability test is then considered completed. Network Reliability Test is only passed when all the sub-systems meet their targets.

The undertaking of the test will essentially be a maintenance function carried out by the Infraco. However, it requires Infraco management of the preparation for the Tests with technical support and monitoring by Infraco, (along with representatives from **tie** during the Test).

Infraco shall undertake and pass Network Reliability Test within twelve months after the Service Commencement Date of the whole Edinburgh Tram Network to pass Network Reliability Test.

If any part of the works or part of the ETN fails to pass Network Reliability Test then rectification, repair, modification or reinstatement of that part shall be undertaken. The defect correction period on that part of the system or any sub-system which fails the test shall be extended a further twelve months beyond the time of rectification, repair or modification. Infraco will propose and undertake the necessary remedial action and retest to achieve acceptance.

tie must be given 20 working days advance notice of the Network Reliability Test plan and fourteen working days written notice of the test commencement date.

23.17.2 Sub-Systems Subject to Network Reliability Test and Reliability targets

Table 46 - Network Reliability Test

TEST	TARGET VALUE
Tram Reliability	Please refer to Tram Supply Agreement.
Passenger Information Display System	As set out in the Employer's Requirements 99.75% availability over six consecutive Periods.
Passenger Help/Emergency Help Point System	As set out in the Employer's Requirements 99.75% availability over six consecutive Periods.
On Street Track & Formation	Achieves 99.995% availability over six consecutive Periods.
Off Street Track & Formation	Achieves 99.995% availability over six consecutive Periods.
Point Machines	Achieves 99.995% availability over two consecutive Periods.
Traction Switchgear	Achieves 99.99% availability over two consecutive Periods.
OLE Equipment	Achieves 99.999% availability over two consecutive Periods.
Earthing & Bonding	No reported stray current instances, or rail to earth voltages that exceed 60 volts as defined in the EN50122/1, for four consecutive Periods
Operational Radio	Achieves 99.75% availability over two consecutive Periods.
Operational Data Network	Achieves 99.99% availability over two consecutive Periods.
UTC Interface	Achieves 99.75% availability over four consecutive Periods.
Wheel/Rail Interface	No proven instances of Noise and Vibration exceedence have occurred in a six month periods
CCTV System	Achieves 99.9% availability over two consecutive Periods.
Tram Position Detection System	Achieves 99.9% availability over two consecutive Periods.
Traction SCADA System	Achieves 99.75% availability over two consecutive Periods.
Tramstop Lighting	Achieves 98.5% availability over two consecutive Periods.

23.17.3 NOT USED

23.17.4 Assumptions and Exclusions

General Exclusions and Assumptions

Should the Infraco be able to prove to the satisfaction of **tie** that any of the reliability tests would have been exceeded by means of one or more of the following exclusions then, in consultation with **tie**, the test results shall be amended to discount the effects of such proven Network Reliability Test exclusions.

The Network Reliability Test exclusions and Network Reliability Test assumptions set out in this section relate only to the Network Reliability Test and shall not be used or relied upon in any circumstances in any connection with any other test.

When the tests have commenced, neither **tie,** the Operator or Third Parties shall be entitled to interfere, interrupt or influence the tram operation or service or the tests in such a way that it disadvantages Infraco, or has an impact on the testing process, the results, or causes the non acceptance of the tests.

Operator Influences

Defects caused by the Operator's failure to:

Provide properly trained staff as defined in the DPOFA, exercising a reasonable duty of care to good industry practice.

Exclusions

The Infraco must demonstrate by reasoned argument that failures or loss of availability resulting from Operator actions were caused by reasons for which the Infraco was not responsible (eg Operating Manuals and supplier training). The Infraco shall develop and agree audit procedures with **tie** and the Operator in respect of the Network Reliability Test exclusions set out in this paragraph.

However, in no event shall any allowances or relief or Reliability Network Reliability Test exclusion be granted to the Infraco where any delays or failure to pass Network Reliability Test has been caused or contributed to by:

- Any default, breach or omission of the Infraco;
- Infraco defects; and
- Equipment undergoing repair, modification or rectification by the Infraco.

Realistic long term response times to repair defects shall be provided by Infraco during the period of the test.

It is assumed that **tie** shall procure all electrical power and that a supply is available for the tests.

Any failures resulting from inappropriate actions or omissions by the Operator or his contracted staff shall be discounted. as set out in the DPOFA .

For the avoidance of doubt, the impact of third party vandalism shall be excluded.

23.17.5 Monitoring & Reporting of Test Performance

The scoring of faults should be achieved by first reviewing the fault logs and performance reports using them as a filter to establish which faults need to go forward into the review. The review meeting will then be used to discuss and allocate the responsibility of faults under the performance regime.

The review meeting will take place daily where the performance of each system will be reviewed for the previous day. Representatives of Infraco, Tramco, **tie** and the Operator will attend this meeting. Each sub-system will be reviewed and agreement reached on all failures. The meeting will be recorded and the resulting daily report distributed to each party within 3 Business Days.

23.17.6 Audit Procedures

During the Network Reliability Test monitoring period, **tie** may undertake audits of the collection and communication of fault data against each of the sub-system tests and also audit the response times to rectification of notified faults.

23.17.7 Services in Connection with the Operator

The Operator shall be appointed separately by **tie** to provide various services in conjunction with the construction, commissioning and operation of the Edinburgh Tram Network. The Operator's Scope of Supply shall include the following:

Provision of representatives during the Construction, Commissioning and Operation stages to provide the Operator's Services, including liaison with the Infraco.

Observing and reporting on the acceptability of the proposed design and the quality of infrastructure, trams and equipment;

Supporting obtaining the necessary consents for commissioning and Public Operation;

Assisting Infraco in development of a Testing & Commissioning Plan (in conjunction with Infraco)

Appointment and training of staff in support of any commissioning process.

Notwithstanding the Operator's responsibilities described above, the Infraco responsibilities (associated with the interface with the Operator) shall include, but not be limited to, the following:

- providing support to obtain operational approvals and consents in respect of the Edinburgh Tram Network;
- providing technical support on systems integration
- providing technical support on the development of operational plans and management systems; and
- provide technical support with regard to operational interfaces with CEC traffic management systems. This shall include phasing sequence drawings of key junctions
- Preparing and submitting plans for driver training and the training of other operational staff. Undertaking training of the Operator's trainers (8-10 trainers) and control room staff (18-21 staff)
- Prepare and submit plans for maintenance and operations manuals
- Provide support required for System Acceptance, including the development of a Testing and Commissioning Plan;
- Work to mitigate any delays to the system construction and commissioning howsoever caused.

Comm. Model Ref	Infraco	Operator
	The following table represents a guide of the key responsibilities associated with the Infraco and the Operator during the various phases of the Life Cycle Model. Further details are provided within these Employer's Requirements and the DPOFA. The Infraco Contract (refer to the Code of Construction Practice) allows for the potential for Sectional Completion. Accordingly, where Sectional Completion was to apply, then it would follow that the (System Commissioning Model) stages for each Sectional Completion would apply at different times in the programme (e.g. possible to have "Shadow Running" ongoing for Section A, whilst "Commissioning" for Section B on-going). The listed responsibilities would equally apply to each Sectional stage. Items are listed under the most appropriate stage, but this does not exclude the associated activity from being required during other stages	
	GENERAL OBLIGATIONS	
	The general provision of all the technical and management services as defined within these Employer's Requirements. This shall include design, programming, installation, testing, system acceptance, training and maintenance. The Infraco shall be required to work closely with the Operator to successfully deliver the project.	Liaising and working closely (and timely) in partnership with the Infraco to meet the requirements of the Project associated with design, installation, system acceptance, delivery into service and maintenance, taking account of the Infraco's Scope of Supply. The Operator shall also be responsible for Operator Maintenance.

	Management and implementation of a liaison process, with the assistance of the Operator, to ensure that all parties are fully informed and resources arranged adequately.	Provision of staff resources during the Commissioning, Construction and Operation stages to provide the Operator's Services, including liaison with the Infraco. Provide and keep updated the training and recruitment plan describing the roles of each member of the Operations staff with specific instructions for the proper performance of their duties and training requirements.
		Ensuring that all relevant operational and maintenance subcontracts are in place and that appropriate subcontractor staff training programmes are implemented.
	Responsibility for adherence to the programme	Monitoring Progress
	Responsibility for complying with the functional and non-functional requirements as defined within these Employers Requirements.	Observing and commenting on the acceptability of the design and installation.
	Production of risk deliverables and register in accordance with these Employer's Requirements.	Provision of risk advice (from the Operator's viewpoint) to Infraco and commenting / liaising on risk documentation produced by Infraco.
	Under the CDM Regulations, the Infraco shall be responsible as Principal Contractor and shall comply with all associated CDM Responsibilities relating to the design and construction activities until Services Commencement Date (and beyond, where appropriate). Beyond the Services Commencement Date, the Infraco may be required to undertake certain elements of work (including maintenance) which fall within the remit of CDM Regulations. In such a scenario the Infraco would be responsible as Principal Contractor for the duration of such works.	As with any party working on a "CDM site", the Operator shall be responsible for complying with CDM Regulations and the Principal Contractors Safe Systems of working (e.g. permit to work system). Notwithstanding the Infraco's over-arching responsibility as Principal Contractor up to Services Commencement Date, once the network is energised (and trams begin to operate) the Operator shall have a key role in managing the "operational end" of systems (e.g. the Operator would be responsible for developing and managing a permit to isolate systems within the context of the over-arching Infraco's systems).

	There shall be a requirement for the Infraco to comply where appropriate with the Operators Systems and procedures associated with the Operator's responsibility to manage operational safety.	The Operator shall be responsible for Operational Safety. This shall include developing Operational Plans, timetables and Management Systems and Operating Procedures for the Operational Phase. Operational safety responsibilities shall, by definition, occur once any part of the system is energised (anticipated to be between Stages 4 and 5, "Set to Work Tests" and "Commissioning", respectively.
DD	**DETAILED DESIGN STAGE**	
	Completing the full design and meeting all the deliverables as defined within the SDS Providers Agreement with **tie**, which is being novated and which is included in Volume 7 of the Infraco ITN.	Observing and reporting on the acceptability of proposed designs against the Design Manual and the Employers Requirements and the ability of the proposals to meet operational objectives
	Obtaining all approvals and consents in respect of the Edinburgh Tram Network;	Supporting the obtaining of necessary consents for Commissioning and Public Operation (and any consents which are relevant to the Operator).
	Managing and undertaking all interfaces with CEC traffic management systems.	Assisting Infraco with the interfaces with CEC, which are relevant to the Operator.
	Developing and updating a Testing and Commissioning Plan (TCP) for each element of the System including programmes and procedures with controls and acceptance criteria.	Providing input to a Testing and Commissioning Plan (TCP) for each element of the System including programmes and procedures with controls and acceptance criteria.

	Assisting the Operator with the development of a process for the handover for Operational purposes of the infrastructure and equipment from Infraco.	Developing a process for the handover for Operational purposes of the infrastructure and equipment from Infraco.
	Scheduling, and coordinating with the Operator, driver training, and the training of other operational and maintenance staff. The scope of the training shall cover all aspects of maintenance (as defined within these Employer's Requirements) and all operations. The Infraco shall be responsible for developing coordinated Training Plans in accordance with section 40 (Maintenance) of these Employer's Requirements.	Assisting the Infraco in the development of coordinated Training Plans and the specification of training documentation requirements from Infraco and Sub-suppliers.
	Complying with, and undertaking internal audits, associated with the Code of Construction Practice	Reviewing Infraco's compliance with the Code of Construction Practice, associated with any operator related issues.
1	**BUILD / MANUFACTURE**	
	Managing and implementing the manufacture and assembly of the System in accordance with the general provision of all the technical and management services as defined within these Employer's Requirements	Observing and reporting on the quality and functionality of Infrastructure and Equipment provision / manufacture and its compliance with Specifications where it affects the operational objectives.
	Liaising with the Operator to address any associated issues, and where necessary rectifying any works.	
2	**FACTORY ACCEPTANCE TESTS**	
	Managing and implementing the Testing process in accordance with the TCP. FAT tests (initial tests and integrated testing) shall be undertaken to verify that the components / system behave as planned in the design, meet the requirements of the design specification and provides correct functionality.	Assisting and providing advice to Infraco to manage the Testing process in accordance with the TCP.
		Observation if necessary and appropriate of any factory acceptance tests on equipment to be provided.

3	INSTALLATION / CONSTRUCTION	
	Managing and implementing the installation and construction at the Site in accordance with the general provision of all the technical and management services as defined within these Employer's Requirements.	Observing and reporting on the quality and functionality of Infrastructure and Equipment provision and installation, and its compliance with Specifications where it affects the operational objectives
	Liaising with the Operator to address any associated issues, and where necessary rectifying any works.	
4	SET TO WORK TESTS	
	Managing and implementing the Testing process in accordance with the TCP. These site tests (System Integration Tests) in accordance with section 6 of Part 1c – Tram Testing and Commissioning of the Employer's Requirements shall be undertaken to demonstrate that the construction / installation has been undertaken satisfactorily and that the systems behave as intended in the design.	Assisting and providing advice to Infraco to manage the Testing process in accordance with the TCP
		In accordance with the TCP; witnessing and reporting on the implementation tests
		Attending Tests
		Managing the Operational Safety of the Testing and Commissioning process in support of Infraco once the system is energised and trams begin to operate. Develop a system of management of safety during testing and commissioning (including the training of staff and contingency provisions)
	Obtaining Consents and Approvals required to allow the system to be energised and trams to operate to the extent not the responsibility of **tie** under Clause 19.	Supporting the obtaining of Consents and Approvals for the system to be energised and trams to operate.
	Reviewing and commenting on the proposed Commissioning Phase Operating Procedures.	Developing Commissioning Phase Operating Procedures.

5	COMMISSIONING	
	Managing and implementing the Testing and Commissioning process in accordance with the TCP. This includes the site commissioning testing as defined within this Section at 23.20.1.	Assisting and providing advice to Infraco to manage the Testing and Commissioning process in accordance with the TCP
		In accordance with the TCP; witnessing and reporting on the implementation tests
		Attending Tests
		Managing the Operational Safety of the Testing and Commissioning process in support of Infraco once the system is energised. Develop a system of management of safety during testing and commissioning (including the training of staff and contingency provisions)
	Providing technical support on the development of operational plans, timetables and management systems and Operating Procedures; and	Developing Operational Plans, timetables and Management Systems and Operating Procedures for Operational Phase
	preparing and submitting plans, manuals & procedures for maintenance and operations in accordance with these Employer's Requirements, in time for System Energisation.	Reviewing and commenting on the acceptability of plans, manuals & procedures for maintenance and operations.
6	TEST RUNNING AND DRIVER FAMILIARISATION	
	Scheduling, and coordinating with the Operator, driver training and the training of other operational staff as part of the Commissioning activities prior to the start of Shadow Running. Implementing training plans including the undertaking of training of the Operator's trainers (8-10 trainers) and control room staff (18-21 staff).	Appointing and training of Operator staff and Operational rules and procedures training for Infraco. The Operator shall be responsible for training the drivers (utilising the training plans / information developed by Infraco and the Operator Trainers, who shall have been assessed as competent by Infraco on the operation of their systems and equipment).
	Demonstrating that the completed Operator training programme has produced a level of adequate	Assisting Infraco to demonstrate that the completed Operator training programme has

	competency to proceed to shadow running.	produced a level of adequate competency to proceed to shadow running.
T1	The implementation of the T1 Post Commissioning Test: follows successful commissioning of the nominated section, test to demonstrate and prove the system is able to perform in a safe manner and delivers the required end to end run times (these may be up to 5% greater than target runtimes).	Assisting and providing advice to Infraco to manage the Testing and Commissioning process in accordance with the TCP
T2	The implementation of the T2 Performance Test: precedes Shadow Running: test to demonstrate and prove the system is able to perform satisfactorily to move into the 3 month Shadow Running Period (The T2 Performance Test is performed over 3 days and 95% of runtimes must be within target runtime; whilst service headways may be increased by up to 50% of those of the operating timetable).	
		In accordance with the TCP; witnessing and reporting on the tests
		Attending Tests
		Managing the Operational Safety of the Testing and Commissioning process. Develop a system of management of safety during testing and commissioning (including the training of staff and contingency provisions)
	Infraco to review to prepare Go Live timetable to be tested during shadow running.	Operator to prepare the Opertional Timetable to be tested during shadow running.
	Obtaining Consents and Approvals required to allow the system to start shadow running to the extent not the responsibility of **tie** under Clause 19.	Supporting the obtaining of Consents and Approvals for the system to commence shadow running.

7	**SHADOW RUNNING**	
	Implementing the Shadow Running Phase to cover the requirements. Please refer to relevant section below.	
T3	Implementing the T3 Pre-Operations Test: precedes Service Commencement, the test is undertaken during the Shadow Running Period, the test is the operation of the initial entry into service timetable and includes infrastructure, trams and operations systems (T3 is over 2 x 5 days and 99% performance must be achieved).	In accordance with the TCP; witnessing and reporting on the tests
		Attending Tests
		Managing the Operational Safety of the Testing and Commissioning process
		Developing a system of management of safety during shadow running and public operation (including the training of staff and contingency provisions)
	Obtaining the necessary Consents and Approvals for Public Operation to the extent not the responsibility of **tie** under Clause 19.	Supporting the obtaining necessary consents for Public Operation
8	**SERVICE COMMENCEMENT DATE**	
	Infraco shall support the preparation for the T4 Network Performance Test with technical and maintenance support and monitoring. (T4 is over a 28 consecutive day period on a rolling basis in passenger service with the ultimate timetable in operation. 1 day in the period may be discounted. The test is to show that reliable operation is achieved.)	The Operator shall manage the preparation for the T4 Network Performance Test with technical and maintenance support and monitoring by the Infraco. The implementation of the T4 Network Performance Test.

	Demonstrations during the Network Performance Test e.g. sub-stations / UPS – demonstration of operation where a sub-station can be taken out of service for 2 hours during peak service.	
	Review, comment and provide support in preparation of the Test and Ultimate Timetables.	Preparation of an agreed Network Performance Test Operational Timetable and Enhanced Timetable as that which shall be the ultimate timetable to be used in Passenger Service.
	Infraco management for the preparation of the T5 Network Reliability Test with technical support and monitoring by Infraco.	The implementation of the T5 Network Reliability Test: the reliability testing of certain sub-systems in Passenger Service (within 12 months of opening).
	In accordance with the TCP; witness and report on the tests	Managing the Operational Safety of the Testing and Commissioning process. Develop a system of management of safety during testing and commissioning (including the training of staff and contingency provisions)

Table 47 - Table showing a guide of the key responsibilities associated with the Infraco and the Operator during the various phases of the Life Cycle Model

23.18 Tram Testing and Commissioning

23.18.1 Document Scope

The scope of this section of the document is to define the Tram Testing & Commissioning requirements that are applicable to all elements of the Edinburgh Tram Network (ETN).

23.18.2 General Requirements

This document defines the process for the testing and commissioning of the ETN that shall be carried out by the Tram Supplier together with the requirements of the Tram Tests that must be carried out to meet the Employer's Requirements and all relevant regulatory bodies as to the quality, performance and compliance of the Trams. It also identifies the tests to be carried out to meet the requirements for System Acceptance testing (involving Trams) of the completed Edinburgh Tram Network.

For certain of the type tests it may be acceptable to reference relevant tests previously undertaken on similar systems. The Tram Supplier will justify to the Tram Inspector all instances where this approach is applicable. This approach will only be possible in areas where there has not been anything other than very minor design changes. Where this approach is proposed, the final test reports and supporting data must be provided to allow the information to be assessed and accepted or rejected. It will be the Tram Supplier's responsibility to obtain any necessary permissions for the use of the test results and data concerned.

23.18.3 Test Plan

The Tram Supplier shall create and adhere to a Test Plan, which will comply with the requirements of EN50215 and encompass a logical build up of testing that leads to acceptance of the vehicles. The Test Plan shall include sufficient testing to demonstrate that all the Employer's Requirements have been met and to ensure that all relevant consents for passenger operation can be achieved from all relevant bodies. It must also be created in such a way as to maximise off-site testing.

The Tram Supplier shall carry out the Tram tests in accordance with this document, the Test Plan and the Tram commissioning and delivery programme. The Tram Supplier shall submit the Test Plan for agreement by the Infraco. Detailed Test Specifications for all tests shall also be submitted for agreement as part of the design scrutiny process and not less than eight weeks prior to the commencement of the tests.

The Test Plan shall be provided in Microsoft Project, together with any commentary, specifications and all results following completion of the Tram tests, in Microsoft Word/Excel format. The relevant supplied drawings shall be provided in electronic format and as hard copy. Test reports for each Tram Test shall be submitted, within two weeks following the completion of the Tram Test.

23.18.4 Tram Test Categories

The Tram Tests shall be divided into five discrete stages:

- Factory Acceptance Tests ("FAT")
- Delivery Acceptance Tests ("DAT")
- Site Commissioning Tests ("SCT")
- System Integration Tests ("SIT")
- System Acceptance Tests ("SAT")

With the exception of the Factory Acceptance Tests, which shall be carried out at the Tram Supplier's Factory, all other tests are to be carried out after the Trams are delivered to the Depot. All the tests are to be carried out by the Tram Supplier, except for the System Integration and System Acceptance Tests, which will be managed by Infraco.

Each category of Tram test can comprise two sub-categories:

- Type tests shall be performed to demonstrate that the vehicle design complies with the relevant section of these Employer's Requirements and all relevant Legislation and regulations;
- Routine tests shall be carried out on each vehicle prior to delivery/handover. The routine tests shall include the agreed measurements and checks to confirm the compliance of each Tram.

The Tram Supplier shall provide all necessary support to the Infraco during the testing and commissioning activities in Edinburgh, from the delivery of the first Tram and until the completion of the System Acceptance Tests. This will include input to the development of the necessary specifications and procedures. The support for the Tram tests to be undertaken in Edinburgh shall include, but be not be limited to, a testing manager and technicians (who will be based in Edinburgh throughout the delivery and testing of the trams), full logistics support for the despatch of urgent and routine spares during the testing process, documentation authors and administrative support for the production and control of test specifications, reports, and supporting documentation.

23.18.5 Test Certificates

Upon the successful completion of each of the Tram tests the Tram Inspector will issue the following test certification:

- Factory Acceptance Type Test Certificate;
- Factory Acceptance Routine Test Certificate;
- Certificate of Tram Delivery; and
- Site Commissioning Type Test Certificate.

Upon successful completion of all the tests for any individual Tram the Tram Inspector will issue the following test certification:

- Certificate of Tram Commissioning.

23.19 Factory Acceptance Tests (FAT)

Factory Acceptance Tests– This group of tests shall be undertaken at the Tram Supplier's Factory and upon successful completion the Tram Supplier will be issued with a Factory Acceptance Type Test Certificate and/or Factory Acceptance Routine Test Certificate by the Tram Inspector. The Factory Acceptance Tests shall be conducted in accordance with the Tram Manufacturing, Delivery Programme and the Test Plan. The FAT will be broken down into Factory Acceptance Type Tests and a series of Factory Acceptance Routine Tests and will comprise both static inspections and dynamic tests. The Factory Acceptance Type Tests shall be undertaken on a single Tram. This shall be the first Tram unless agreed otherwise in writing by the Tram Inspector.

Static inspections and tests shall be conducted at the Tram Supplier's Factory or at the sub-suppliers' premises during normal working hours during which the Tram Inspector will be entitled to inspect, examine and witness testing of all major systems, sections, apparatus, equipment, components, internal seating, fixtures and fittings and devices, including all structural, electrical, hydraulic and other major components and assemblies (except where the items concerned have been previously tested to the Tram Inspector's satisfaction and the appropriate test certificate issued).

Dynamic tests shall be conducted on the test track at the Tram Supplier's Factory or an alternative location subject to the Tram Inspectors agreement.

The Tram Inspector shall be given adequate prior notice of all tests. **tie** may, at its sole discretion, waive its right to attend or witness any test.

Whether or not the Tram Inspector is in attendance the Tram Supplier shall keep, and make available to the Tram Inspector on request, true and accurate records of the tests, the performance of the Tram during such tests, and any faults which developed or became apparent during the course of such tests.

The Tram Inspector may require evidence that the Tram has operated an agreed number of kilometres/hours in order to fulfil the requirements of the Test and Commissioning Plan under the agreed test track conditions without major faults or breakdown and has met the performance standards set out in this section throughout such period before issuing the Factory Acceptance Routine Test Certificate and/or Factory Acceptance Type Test Certificate. The distance travelled during the dynamic test on the test track will be limited and the main objective will be to check functions and performances not endurance, hence the distance travelled will relate to an agreed schedule to prove these functions.

The Factory Acceptance Routine Tests and the Factory Acceptance Type Tests referred to in the following tables shall include such examinations and tests as the Tram Inspector may reasonably require to satisfy himself that the Trams qualify or do not qualify for a Factory Acceptance Routine Test Certificate and/or and a Factory Acceptance Type Test Certificate. This will include but not be limited to; the checking of individual manufacturing and inspection records, module and sub-assembly tests including as-built dimensional checks where appropriate, for major items such as but not limited to bogie frames, wheel sets, traction and brake equipment.

The Tram Supplier shall make available to the Tram Inspector throughout the Factory Acceptance Routine Tests and/or Factory Acceptance Type Tests qualified staff and, where appropriate, its major sub-contractors to conduct, supervise and record the results of all such inspections, tests and examinations as are referred to in this document and to respond to all enquiries about the condition or performance of the Trams or its major sub-systems.

Table 48 - Factory Acceptance Tests: Static Type Tests

TEST	LOCATION	EN 50215 Reference	COMMENTS
Overall dimensional checks	Static test, at the Tram Supplier's Factory	8.1	To include external static envelope, internal dimensions, door widths and openings.
General examination and security check.	Static test, at the Tram Supplier's Factory		To establish accuracy and security of fixing of fixtures and fittings,
Coefficient of flexibility	Static test, at the Tram Supplier's Factory	8.2	Static test with a maximum cant of 100mm simulated. Horizontal and vertical flexibility.
Lifting ability	Static test, at the Tram Supplier's Factory	8.3	Body Lifting and major component removal. Bogie handling.
Tram weight	Static test, at the Tram Supplier's Factory	8.4	Tram and axle weights, including individual wheel and axle loading. Load testing of the complete vehicle and the checking of critical dimensions and clearances under a range of loading conditions. Suspension deflections and door entrance height measurement.
Sealing	Static test, at the Tram Supplier's Factory	8.5	Resistance of body structure to water ingress, humidity and snow.
Electrical insulation	Static test, at the Tram Supplier's Factory	8.6	High voltage insulation tests. Withstand and impedance of all cabling.
Bonding & return circuits	Static test, at the Tram Supplier's Factory	8.7	Continuity and integrity of all safety earth bonds and return current circuits.
Hydraulic system	Static test, at the Tram Supplier's Factory	8.9	Pumps and pipe-work. Pressure tests and leakage.
Braking System	Static test, at the Tram Supplier's Factory	8.10	Friction brake system

TEST	LOCATION	EN 50215 Reference	COMMENTS
Parking brake	Static test, at the Tram Supplier's Factory	8.11	Clamping force measurement
Auxiliary Power Supply	Static test, at the Tram Supplier's Factory	8.12	Power supplies and associated equipment.
Battery charging system	Static test, at the Tram Supplier's Factory	8.13.1	Batteries, battery chargers and associated equipment. Battery capacity for emergency working.
Auxiliary and control system	Static test, at the Tram Supplier's Factory	8.14	Vehicle control and management system. Software validation. Drivers' controls and instruments.
Doors	Static test, at the Tram Supplier's Factory	8.14.3	Passenger Doors, driver's doors. Emergency access and egress. Operation and timing.
Heating, ventilation & air-conditioning	Static test, at the Tram Supplier's Factory	8.14.4	System operation and effectiveness at the ambient conditions of the test location Thermostats, air flows. Hot/cold areas.
Lighting	Static test, at the Tram Supplier's Factory	8.14.5	Interior and exterior lighting.
Monitoring equipment	Static test, at the Tram Supplier's Factory	8.14.7	CCTV System, cameras and displays.
Event recorder	Static test, at the Tram Supplier's Factory	8.14.7	OTMR, (as far as practicable at the test location).
Communications and passenger information systems	Static test, at the Tram Supplier's Factory	8.14.7	Radios, PA, emergency communications (as far as practicable at the test location). Warning tones. Passenger information system. Passenger Emergency Help Points.
Configuration control	Static test, at the Tram Supplier's Factory	8.14.8	Determination of defined software and firmware status for all sub-systems. Modification status for all major and critical components and others as appropriate.

TEST	LOCATION	EN 50215 Reference	COMMENTS
Traction system	Static test, at the Tram Supplier's Factory	8.16	Motors, gearboxes, control equipment, power supplies and current collection.
Tram control system	Static test, at the Tram Supplier's Factory	8.16	Tram central control system and interfaces, fault monitoring and diagnostics.
Operability and maintainability	Static test, at the Tram Supplier's Factory	8.17	Verification of conformity with the proposed and agreed design. Operator and maintainer access to all appropriate areas.
Safety systems	Static test, at the Tram Supplier's Factory	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop. Emergency pushbutton, Track brakes. Horns/warning devices.
Windscreen washers, wipers and demisters	Static test, at the Tram Supplier's Factory	9.18	System operation and effectiveness, demisters.
Pantograph	Static test, at the Tram Supplier's Factory	9.12	Operation. Contact forces.
Sanding system	Static test, at the Tram Supplier's Factory		System operation. Sand delivery rate. Coherence between VTCU output and the correct sanding unit.
Flange lubrication system.	Static test, at the Tram Supplier's Factory	9.11	Set-up of equipment.
Visual examination of all client defined features	Static test, at the Tram Supplier's Factory	HMRI, RVAR	Interior layout, seating, livery and signage.
Emergency coupler	Static test, at the Tram Supplier's Factory		Check of mountings / space envelope. manual operation.

Table 49 - Factory Acceptance Tests: Dynamic Type Tests

TEST	LOCATION	EN50215 Reference	COMMENTS
Traction system performance	Dynamic test, at the Tram Supplier's Factory test track	9.1	Dynamic performance, acceleration and braking rates. Jerk rates. Current collection. Degraded modes. Speed attainment. Power consumption. Wheelslip correction and sanding. Simulated locked axle detection
Braking system	Dynamic test, at the Tram Supplier's Factory test track	9.3	Friction brake system, service and emergency deceleration rates and stopping distances. Dynamic brake operation and blending with friction brake, jerk rates. Wheelslide correction and sanding. Track brake operation.
Thermal capacity	Dynamic test, at the Tram Supplier's Factory test track	9.4	Temperature rise monitoring of traction, braking & auxiliary equipment during repeated duty cycles. Including degraded modes and emergency duty.
Motion resistance	Dynamic test, at the Tram Supplier's Factory test track	9.5	Demonstration/derivation of Tram resistance to motion.
Coupling test	Dynamic test, at the Tram Supplier's Factory test track	9.8	Coupled Tram operation with emergency couplers, as far as practical and subject to availability of two Trams.
Ride quality	Dynamic test, at the Tram Supplier's Factory test track	9.9	Assessment of Tram ride quality, (providing that the test is meaningful at this location).
Flange lubrication system.	Dynamic test, at the Tram Supplier's Factory test track	9.11	System operation.
Pantograph	Dynamic test, at the Tram Supplier's Factory test track	9.12	Operation, Functional check.

TEST	LOCATION	EN50215 Reference	COMMENTS
Electromagnetic compatibility	Dynamic test, at the Tram Supplier's Factory test track	9.14	Electromagnetic radiation and susceptibility of vehicle systems. See also EN 50121, within the constraints of the test track.
Voltage interruption and jump	Dynamic test, at the Tram Supplier's Factory test track	9.15	Reaction of traction/dynamic brake/auxiliary power systems to supply voltage interruptions jumps. Operation over the full-specified voltage range covered by the type test certificate of the traction and auxiliary equipment (as far as practicable at the test location).
Windscreen washers, wipers and demisters	Dynamic test, at the Tram Supplier's Factory test track	9.18	System operation and effectiveness, including demisters.
Tram control system	Dynamic test, at the Tram Supplier's Factory test track	9.19	Interfaces between traction, braking, auxiliary, control and safety systems. Tram management systems, displays and diagnostics.
Monitoring equipment	Dynamic test, at the Tram Supplier's Factory test track	9.19	CCTV System, cameras and displays.
Event recorder	Dynamic test, at the Tram Supplier's Factory test track	9.19	OTMR, (as far as practicable at the test location).
Communications & passenger information systems	Dynamic test, at the Tram Supplier's Factory test track	9.19	Radios, PA, emergency communications. Warning tones. Passenger information system as far as practicable at the test location.
Safety systems	Dynamic test, at the Tram Supplier's Factory test track	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop and speed inhibit. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer calibration.

TEST	LOCATION	EN50215 Reference	COMMENTS
Operability & maintainability	Dynamic test, at the Tram Supplier's Factory test track	8.17	Demonstration of degraded modes
Parking brake	Dynamic test, at the Tram Supplier's Factory test track	8.11	System operation and pull away test
Noise and vibration	Dynamic test, at the Tram Supplier's Factory test track	9.16	Noise and vibration measurements, as far as practicable at the test location.

Table 50 - Factory Acceptance Tests: Static Routine Tests

TEST	LOCATION	EN 50215 Reference	COMMENTS
Overall dimensional checks	Static test, at the Tram Supplier's Factory	8.1.2	Reduced overall dimension check.
General examination and security check.	Static test, at the Tram Supplier's Factory		To establish accuracy and security of fixing of fixtures and fittings.
Tram weight	Static test, at the Tram Supplier's Factory	8.4.3	Tram, and axle, weights.
Sealing	Static test, at the Tram Supplier's Factory	8.5.2	Resistance of body structure to water ingress
Electrical insulation	Static test, at the Tram Supplier's Factory	8.6	High voltage insulation tests. Withstand and impedance of all cabling.
Bonding and return circuits	Static test, at the Tram Supplier's Factory	8.7	Continuity & integrity of all safety earth bonds and return current circuits.
Hydraulic system	Static test, at the	8.9	Pumps and pipe-work. Pressure tests. Leakage.

TEST	LOCATION	EN 50215 Reference	COMMENTS
	Tram Supplier's Factory		
Braking System	Static test, at the Tram Supplier's Factory	8.10.2	Friction brake system functional test including parking brake
Auxiliary power supply	Static test, at the Tram Supplier's Factory	8.12.2	Power supplies and associated equipment.
Battery charging system	Static test, at the Tram Supplier's Factory	8.13.2	Batteries, battery chargers and associated equipment.
Auxiliary and control system	Static test at the Tram Supplier's Factory	8.14.1	Tram control and management system. Drivers' controls and instruments.
Doors	Static test, at the Tram Supplier's Factory	8.14.3	Passenger doors, driver's doors. Emergency access and egress. Operation & timing
Heating, ventilation and air-conditioning	Static test, at the Tram Supplier's Factory	8.14.4	System operation and effectiveness. Thermostats, air flows. Hot/cold areas. Duct sealing. Functional check
Lighting	Static test, at the Tram Supplier's Factory	8.14.5	Interior and exterior lighting. Functional check.
Monitoring equipment	Static test,at the Tram Supplier's Factory	8.14.7	CCTV System, cameras and displays.
Event recorder	Static test, at the Tram Supplier's Factory	8.14.7	OTMR, (as far as practicable at the test location).
Communications and passenger information systems	Static test, at the Tram Supplier's Factory	8.14.7	Radio, PA, emergency communications (as far as practicable). Warning tones. Passenger information system.
Configuration control	Static test, at the Tram Supplier's Factory	8.14.8	Verification of defined software and firmware status for all sub-systems. Modification status for all major and critical components and others as appropriate.

TEST	LOCATION	EN 50215 Reference	COMMENTS
Traction system	Static test, at the Tram Supplier's Factory	8.16	Motors, gearboxes, control equipment, power supplies and current collection.
Tram control system	Static test, at the Tram Supplier's Factory	8.16	Tram central control system and interfaces, fault monitoring and diagnostics.
Operability and maintainability	Static test, at the Tram Supplier's Factory	8.17	Fault handling, diagnostics and indications. Safety isolations.
Safety systems	Static test, at the Tram Supplier's Factory	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop. Emergency pushbutton, Track brakes. Horns/warning devices.
Windscreen washers, wipers and demisters	Static test, at the Tram Supplier's Factory	9.18	Functional check including demisters.
Pantograph	Static test, at the Tram Supplier's Factory	9.12	Operation. Contact forces
Sanding system	Static test, at the Tram Supplier's Factory		System operation. Sand delivery rate.
Flange lubrication system.	Static test, at the Tram Supplier's Factory	9.11	Set-up of equipment.
Visual examination of all client defined features	Static test, at the Tram Supplier's Factory		Interior layout, seating, livery and signage.

Table 51 - Factory Acceptance Tests: Dynamic Routine Tests

TEST	LOCATION	EN 50215 Reference	Comments
Traction system performance	Dynamic test, at the Tram Supplier's Factory test track	9.1.2	Dynamic performance, acceleration and braking rates. Current collection. Speed attainment. Wheelslip correction and sanding.
Braking system	Dynamic test, at the Tram Supplier's Factory test track	9.3.2	Friction brake system, service and emergency deceleration rates and stopping distances. Dynamic brake operation and blending with friction brake, Wheelslide correction and sanding. Track brake operation.
Flange lubrication system.	Dynamic test, at the Tram Supplier's Factory test track	9.11	System operation, as far as practicable.
Tram control system	Dynamic test, at the Tram Supplier's Factory test track	9.19	Interfaces between traction, braking, auxiliary, control and safety systems. Tram management systems, displays and diagnostics.
Monitoring equipment	Dynamic test, at the Tram Supplier's Factory test track	9.19	CCTV System, cameras and displays.
Event recorder	Dynamic test, at the Tram Supplier's Factory test track	9.19	OTMR, (as far as practicable at the test location).
Communications and passenger information systems	Dynamic test, at the Tram Supplier's Factory test track	9.19	PA, emergency communications. Warning tones. Passenger information system (as far as practicable at the test location).
Safety systems	Dynamic test, at the Tram Supplier's Factory test track	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop and speed inhibit. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer calibration.

23.20 Delivery Acceptance Tests (DAT)

These tests shall be carried out by the Tram Supplier upon the delivery of each Tram. They shall establish that the Tram has not been damaged or affected in any way by the delivery process and that it remains in the condition in which it was inspected prior to despatch from the Tram Supplier's factory. On satisfactory completion of the DAT the Tram Inspector will issue a Certificate of Tram Delivery.

TEST	LOCATION	EN 50215 Reference	Comments
Overall dimensional checks	Static test, at the Depot		Reduced to any parts or components which will been adjusted/removed during the transport.
General examination and security check.	Static test, at the Depot		To establish accuracy and security of fixing of all fixtures and fittings, transit damage. Visual inspection
Hydraulic system	Static test, at the Depot	8.9	Pumps and pipe-work. Visual inspection and checks for leakage.
Tram weight	Static test, at the Depot		Measurement of as-delivered tare weight, plus sand and fluids.

Table 52 – Table showing Delivery Acceptance Tests

23.20.1 Site Commissioning Tests

The Site Commissioning Type Tests shall be undertaken on the Tram(s) as appropriate, when they are delivered to the Depot and following the completion of the DAT. Upon successful completion the Tram Supplier will be issued with a Site Commissioning Type Test Certificate by the Tram Inspector. The tests shall comprises Static and Dynamic tests and will include, but not be limited to, the tests referred to in the tables on the following page.

For the avoidance of doubt the Tram Inspector shall not issue a Type Test Certificate even if by a lack or fault of the system infrastructure a test is failing or cannot be executed.

Table 53 – Site Commissioning Tests: Static Type Tests

TEST	LOCATION	EN 50215 Reference	Comments
Monitoring equipment	Static test, at the Depot	8.14.7	CCTV System, cameras and displays.
Tram location and detection system	Static test, at the Depot	8.14.7	Tram location and detection system.
Event recorder	Static test, at the Depot	8.14.7	OTMR
Communications and passenger information systems	Static test, at the Depot	8.14.7	Radios, PA, emergency communications. Warning tones. Passenger information system.
Noise.	Static test, at the Depot	8.18	Noise (outstanding from factory), internal & external. At same time as dynamic and performed on specified track section.
Safety systems	Static test, at the Depot	8.19	Brake control systems, emergency brake, passenger emergency. Driver's Deadman system, door safety loop. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer
Pantograph	Static test, at the Depot	9.12	Operation. Contact forces.
Electromagnetic compatibility	Static test, at the Depot	9.14	Electromagnetic radiation and susceptibility of Tram systems. Completion of the Tram FAT type test.

Table 54 – Site Commissioning Tests: Dynamic Type Tests

TEST	LOCATION	EN 50215 Reference	Comments
Traction system performance	Dynamic test, at designated test site	9.1.1	Dynamic performance, acceleration & braking rates. Jerk rates. Acceleration and control on gradients. Roll-back protection. Current collection. Speed attainment. Power consumption. Wheelslip correction and sanding. Emergency duty.
Braking system	Dynamic test, at designated test site	9.3.1	Friction brake system, service and emergency deceleration rates and stopping distances. Dynamic brake operation and blending with friction brake, jerk rates. Wheelslide correction and sanding. Track brake operation.
Thermal capacity	Dynamic test, at designated test site	9.4	Temperature rise monitoring of traction, braking and auxiliary equipment during repeated duty cycles. Including degraded modes and emergency duty.
Tram/track interaction	Dynamic test, at designated test site	9.8	Wheel rail interaction. Load testing of the complete vehicle and the checking of critical dimensions and clearances under a range of loading conditions. Suspension deflections and inter-vehicle clearances. Safety against derailment. Coupled Tram operation
Ride quality	Dynamic test, at designated test site	9.9	Assessment of Tram ride quality.
Kinematic gauging	Dynamic test, at designated test site	9.10	Dynamic performance, kinematics and gauging. Load testing of the complete vehicle and the checking of critical dimensions, swept path and clearances under load conditions. Suspension deflections. Pantograph sway,

TEST	LOCATION	EN 50215 Reference	Comments
Flange lubrication system.	Dynamic test, at designated test site	9.11	System operation.
Pantograph	Dynamic test, at designated test site	9.12	Included in Kinematic gauging
Electromagnetic compatibility	Dynamic test, at designated test site	9.14	Electromagnetic radiation and susceptibility of Tram systems.
Noise and vibration	Dynamic test, at designated test site	9.16	Noise and vibration tests performed on the specified section of track.
Safety Systems	Dynamic test, at designated test site	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop and speed inhibit. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer. Event Recorder (OTMR).
Tram location and detection system	Dynamic test, at designated test site	8.14.7	Tram location and detection system.
Operability and maintainability	Dynamic test, at designated test site	8.17	Coupling test and recovery.
Parking brake	Dynamic test, at steepest gradient	8.11	System operation, effectiveness on steepest available gradient.

The Site Commissioning Routine Tests shall be performed on each Tram and comprise static and dynamic tests. This shall comprise of a full functional test, both statically and dynamically, of the Tram, including inspection, examination or testing of all major systems, sections, apparatus, equipment, components, internal seating, fixtures and fittings and devices (including testing the same whilst in operation); with the further inclusion of electrical, hydraulic and other major components and assemblies, as far as practical, at the test location.

The Site Commissioning Routine Test will be designed to establish that each individual tram functions in accordance with the design. It is not intended that the routine test should be a full re-working of the either the type test or the factory tests merely confirmation through carefully targeted testing that the build was correct., It will confirm that it is in a suitable condition to operate safely on the system. Upon successful completion of the Routine Tests the Tram Supplier will be issued with a Certificate of Tram Commissioning by the Tram Inspector.

Whether or not the Tram Inspector is in attendance at a Site Commissioning Test, the Tram Supplier shall keep and make available to the Tram Inspector on request true and accurate records of the Site Commissioning Test conducted, the performance of the Tram during such tests and any faults which developed or became apparent during the course of such tests.

23.20.2 Re-Testing

The Tram Supplier shall, if requested by the Tram Inspector, undertake such further examinations and tests as the Tram Inspector may reasonably require to satisfy himself that a Tram and/or the Trams qualify for a Certificate of Tram Commissioning

23.20.3 Testing Support

The Operator shall make the following available where required by the Testing and Commissioning Plan, (and agreed by Infraco):

- Depot and workshop facilities at the Depot;
- Reasonable assistance from its drivers, maintenance and other staff; and
- Track, power supplies and other facilities, as agreed, to meet the needs of the Tram Testing and Commissioning Plan.

All parties involved and their respective representatives and staff shall:

- Observe such reasonable requirements as may be notified in writing by the Operator or to preserve health and safety, protect the Trams against damage and avoid unnecessary disruption to the Operator's operations.
- Use all reasonable endeavours to avoid risks to health and safety, damage to the Trams or unnecessary disruption to the Operator's operations.
- The Tram Supplier shall make available throughout the Tram Commissioning Tests qualified staff from the Tram Supplier's organisation and, where appropriate, its major sub-contractors to:
  - Conduct, supervise and record the results of all such inspections, tests and examinations as are referred to in this document; and
- Respond to all reasonable enquiries about the condition or performance of the Trams or the major systems, sections, apparatus, equipment, components, internal seating, fixtures and fittings and devices, including all structural, electrical, hydraulic and other major components and assemblies and to rectify any failures of the same.

Table 55 – Site Commissioning Tests: Static Routine Tests

TEST	LOCATION	EN 50215 Reference	Comments
Braking system	Static test, at the Depot	8.10.2	Friction brake system, including parking brake
Monitoring equipment	Static test, at the Depot	8.14.7	CCTV System, cameras and displays.
Event recorder	Static test, at the Depot	8.14.7	OTMR,
Tram location and detection system	Static test, at the Depot	8.14.7	Tram Location and Detection equipment.
Communications and passenger information	Static test, at the Depot	8.14.7	Radios, PA, emergency communications. Warning tones. Passenger information system.

TEST	LOCATION	EN 50215 Reference	Comments
systems			
Configuration control	Static test, at the Depot	8.14.8	Verification of defined software and firmware status for all sub-systems. Modification status for all major and critical components and others as appropriate.
Traction system	Static test, at the Depot	8.16	Motors, gearboxes, control equipment, power supplies and current collection.
Safety systems	Static test, at the Depot	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman system, door safety loop. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer.
Windscreen washers, wipers and demisters	Static test, at the Depot	9.18	System function
Pantograph	Static test at the Depot		Contact forces and operation.
Sanding system	Static test, at the Depot		System function.
Doors	Static test at the Depot		Cycle times.
Heating, ventilation and air-conditioning	Static test, at the Depot	8.14.4	Functional check

Table 56 – Site Commissioning Tests: Dynamic Routine Tests

TEST	LOCATION	EN 50215 Reference	Comments
Traction system performance	Dynamic test, at designated test site	9.1.2	Dynamic performance, acceleration & braking rates. Speed attainment. Operation through supply interruptions and at varying line voltages.
Braking system	Dynamic test, at designated test site	9.3.2	Friction brake system, service and emergency deceleration rates and stopping distances. Dynamic brake operation and blending with friction brake, sanding. Track brake operation.
Ride quality	Dynamic test, at designated test site	9.9.2	Subjective ride test to discern any obvious ride irregularity.
Flange lubrication system.	Dynamic test, at designated test site	9.11	System function.
Noise and vibration	Dynamic test, at designated test site	9.16.2	Subjective noise and vibration assessment to discern any obvious irregularity.
Tram control system	Dynamic test, at designated test site	9.19	Interfaces between traction, braking, auxiliary, control and safety systems. Tram management systems, displays and diagnostics.
Monitoring equipment	Dynamic test, at designated test site	9.19	CCTV System, cameras and displays.
Event recorder	Dynamic test, at designated test site	9.19	OTMR
Tram location and	Dynamic	9.19	Tram location equipment

TEST	LOCATION	EN 50215 Reference	Comments
detection system	test, at designated test site		
Communications and passenger information systems	Dynamic test, at designated test site	9.19	Radios, PA, emergency communications. Warning tones. Passenger information system (as appropriate).
Safety systems	Dynamic test, at designated test site	8.19	Brake control systems, emergency brake, passenger emergency. Driver's deadman's system, door safety loop and speed inhibit. Emergency pushbutton, Track brakes. Horns/warning devices. Speedometer calibration.
Parking brake	Dynamic test, at designated test site	8.11	System function Part of braking test

23.21 System Integration Tests (SIT)

The System Integration Tests consist of tests carried out to prove that the ETN as a whole can function as intended. All infrastructure, operation and control systems shall be exercised during these tests. The Tram Supplier will provide reasonable input to the development of the SAT specifications as well as participation in, and support to, the tests whenever reasonable technical support is needed in reference to the Trams.

The System Integration Tests will include, but will not be limited to, the following:

- Comprehensive gauging and dimensional checks under a range of loading conditions;
- Run time tests;
- Interface checks to all items of workshop plant and equipment including the wheel lathe, Tram washing machine, sanding plant, cranes and hoists;
- Access and handling checks for all major items of equipment, sub-assemblies and major capital spares items;
- Validation of the radio communication system; and
- Validation of the tram position detector system.

The System Integration Tests will involve carrying out gauging runs over all parts of the ETN in order to establish that the Trams (when operating individually or in conjunction with other Trams) accord with the Tram Section and the agreed detailed interface arrangements in terms of the alignment geometry, clearances, loads, pantograph dynamics, wheel rail interface, traction power system, communications and route setting equipment, compliance with operational procedures and Tram performance values. In particular it shall be demonstrated that there is sufficient clearance between passing Trams on the Network and between Trams and other Network equipment and installations to ensure that the Trams can be operated safely and without damage to themselves and to the other parts of the System.

There shall be static and dynamic tests to verify that the pantograph conforms to the requirements of the Employer's Requirements.

There shall be a series of tests to demonstrate the ability of one Tram to recover another failed Tram, including on the most severe gradient on the ETN and potentially in a degraded mode.

The testing of the systems, including but not limited to; power supplies, overhead line, Depot equipment, and EMC tests will require the use of a number of Trams running at the same time.

Table 57 – System Integration Tests: Static Type Tests

TEST	LOCATION	EN 50215 Reference	Comments
Lifting ability	Static test, at the Depot	8.3	Body Lifting and major component removal. Bogie handling.
Battery charging system	Static test, at the Depot	8.13	Battery access for maintenance and topping up. Operation and suitability of external battery chargers.
Monitoring equipment	Static test, at the Depot	8.14.7	CCTV System, Interface with the Depot systems.
Event recorder	Static test, at the Depot	8.14.7	OTMR, Interface with the Depot systems.
Tram location and detection system	Static test, at the Depot	8.14.7	Tram location equipment.
Communications and passenger information systems	Static test, at the Depot	8.14.7	Radios, PA, emergency communications. Warning tones. Passenger information system. Interface with the Depot systems.
Traction system	Static test, at the Depot	8.16	Power supply interaction.
Operability and maintainability	Static test, at the Depot	8.17	Review and demonstration of accessibility and removal of components. Fault handling, diagnostics and indications. Safety issues.
Noise and vibration.	Static test, at the Depot	8.18	Noise and vibration levels, internal and external.
Pantograph	Static test, at	9.12	Operation. Contact forces.

TEST	LOCATION	EN 50215 Reference	Comments
	the Depot		
Sanding system	Static test, at the Depot		Refilling system. Verification that the fill level can be observed from inside the tram.
Flange lubrication system.	Static test, at the Depot	9.11	Refilling.
Visual examination of all client defined features	Static test, at the Depot	HMRI, RVAR	Interior layout, seating, livery and signage
Electromagnetic compatibility	Static test, at the Depot	9.14	Electromagnetic radiation and susceptibility of vehicle systems.

Table 58 – System Integration Tests: Dynamic Tests

TEST	LOCATION	EN 50215 Reference	Comments
Tram/track interaction	Dynamic test, at designated test site	9.8	Wheel rail interaction. Load testing of the complete vehicle and the checking of critical dimensions and clearances under a range of loading conditions. Suspension deflections and inter-vehicle clearances.
Kinematic gauging	Dynamic test, at designated test site	9.10	Dynamic performance, kinematics and gauging. Load testing of the complete vehicle and the checking of critical dimensions, swept path and clearances under a range of loading conditions. Suspension deflections. RVAR and HMRI requirements.
Platform gauging	Dynamic test, at designated test site	9.10	Platform stepping distance and heights, tare and loaded conditions. RVAR requirements.
Flange lubrication system.	Dynamic test, at designated test site	9.11	Effectiveness.
Pantograph	Dynamic test, at designated test site	9.12	Operation, contact forces, sway. OLE deflection.
Electromagnetic compatibility	Dynamic test, at designated test site	9.14	Electromagnetic radiation and susceptibility of vehicle systems.
Voltage interruption and jump	Dynamic test, at designated test site	9.15	Reaction of traction/dynamic brake/auxiliary power systems to supply voltage interruptions, jumps and short circuits. Operation over full-specified voltage range.
Noise and vibration.	Dynamic test, at designated test site	9.16	Noise and vibration levels.
Monitoring equipment	Dynamic test, at designated	9.19	CCTV System, cameras and displays.

TEST	LOCATION	EN 50215 Reference	Comments
	test site		
Tram location and detection system	Dynamic test, at designated test site	9.19	Tram location equipment, throughout the available route. Road junction and point motor control.
Communications and passenger information systems	Dynamic test, at designated test site	9.19	Radios, PA, emergency communications. Reception and effective communication with the Depot throughout the available route. Warning tones. Passenger information system
Operability and maintainability	Dynamic test, at designated test site	8.17	Review of all systems as required. Demonstration of degraded modes and recovery practices. Coupling test
Traction supply	Dynamic test, at designated test site		Sub-station load tests, sub-station outages. Regeneration. Overload protection, touch voltage and stray current tests.
Section run times	Dynamic test, throughout the System		Proving of the System infrastructure in stages as it becomes available to operate.

23.21.1 System Acceptance Testing

Tram testing will be undertaken in support of the system acceptance testing set out in these Employer's Requirements.

24 Trams

24.1 Scope

This section defines the requirements for Trams that are applicable to the Edinburgh Tram Network and with which the Infraco must comply.

24.2 General Technical Specification

The Trams shall be of a high quality in design and construction and comply with the following general design criteria:

- High safety standards including, but not limited to:
  - Compliance with Railway Safety Publication 2 - Guidance on Tramways, issued by the Office of the Rail Regulator;
  - Compliance with Rail Vehicle Accessibility Regulations, 1998;
- High reliability, minimum maintenance requirement and ease of repair;
- Proven design and technology;
- Low floor access;
- Easy to clean;
- Modern and attractive appearance;
- Low weight;
- Low environmental impact;
- Meets access requirements for the disabled;
- Minimum use of energy;
- The Trams will be required to have a minimum operating capability of at least 100,000 km per year; and

The Trams shall be designed to have a minimum service life in accordance with Section 6 of these Employer's Requirements.

The Trams shall be articulated in order to negotiate the track alignment. They will be fully bi-directional and capable of being driven from either end and shall have passenger doors on both sides. They will be capable of being operated by one person.

Normal service Trams shall comprise one vehicle, but shall be capable of running coupled together for the purpose of one Tram recovering another failed Tram from any point on the system.

The Tram should be designed and constructed in accordance with a Quality Plan (as prescribed under ISO9001), which should also include a delivery plan and a Test Plan.

A full-scale Tram mock-up shall be provided to demonstrate areas critical to operation and access as part of the formal design process and for use in public consultation. The mock-up shall include the entire cab and a representative portion of one saloon, including a vestibule with at least one operational pair of bi-parting doors and space reserved for wheelchair use. The mock-up shall show the exterior form and livery. The mock-up shall be weatherproof and shall be delivered to a location in Edinburgh designated by **tie.**

24.3 Wheel / Rail Interface

The Trams shall have a wheel profile and suspension characteristic that is compatible with the rail profiles used throughout the System in terms of risk of derailment, noise, wear and vibration. The wheel profile shall allow for flange running at crossings. The Tram will be designed to operate in conjunction with a track gauge of 1,435mm and a flange back-to-back dimension consistent with the rail types to be used on the Edinburgh Tram Network.

24.4 Tramway Path

Trams shall be compatible with the System track alignment and the geometric constraints as outlined in Section 26 of these Employer's Requirements, which gives the alignment criteria and the assumed Tram characteristics. From this the developed kinematic envelope ("DKE") calculations and any other information, to show compatibility with the alignment, shall be provided by the Infraco. The Trams shall negotiate the minimum radius horizontal and vertical curves, and maintain acceptable wheel flange wear.

Minimum clearances to existing structures, Tramstops, overhead line equipment structures and all other road furniture shall be maintained in accordance with the agreed DKE and it shall always be possible for one Tram to pass another, at any point on the system. The Infraco shall ensure that the Tram Supplier shall provide supporting information to enable a reduced DKE to be developed for use in locations where restricted speeds are or may require to be applied.

24.5 Supervisory, Control & Communications Systems

The Trams shall be fitted with equipment to automatically indicate their position to, and communicate with, a central control centre.

Additionally, a bus tracker box will be fitted.

A voice radio system will be permanently available between the driver and the central control centre. This equipment will be supplied by Infraco and will be free-issue to the Tram Supplier, to be installed and tested as part of the Tram manufacturing process.

The supply and integration of the free-issue equipment will be controlled through a system interface register, to be developed from Schedule 22 of the TSA and managed by Infraco.

All on-board systems with real-time clocks shall be updated and synchronised from a common source, throughout the working life of the Tram.

24.6 Depot Facilities

The Trams shall be maintained at the Depot and a system interface register shall be used to ensure that the Trams and the equipment provided for their routine maintenance and operation are compatible.

The Trams shall be compatible with a mechanised sand filling system at the Depot (see Section 29 of these Employer's Requirements), enabling the sand system on the Trams to be replenished within five minutes and by one driver alone. The Infraco shall ensure that the Tram Supplier shall provide a specification for the sand, and contact details for a UK-based commercial supplier of this sand.

The Trams shall have a key suiting system that provides a logical hierarchy of access to cleaners, inspectors, drivers and maintenance staff. It shall not be part of the same suite as detailed in Section 22 of these Employer's Requirements.

The Trams shall be supplied with a nominal 24VDC shore supply, socket compatible with battery charging equipment in the depot.

24.7 Electro-Magnetic Compatibility

The Trams and their sub-systems shall not generate excessive, nor be susceptible to, electro-magnetic interference and shall comply with EN 55013, EN 50121 and EN 50122 as appropriate.the requirements of the specification as detailed in section 16 of these Employer's Requirements.

24.8 Climate and Environment

The Trams shall operate normally in all climatic and environmental conditions found in the Edinburgh area on the proposed route, including operation in a marine environment having a saline atmosphere and being subject to fine wind-blown sand. This shall also include conditions where ice forms on the overhead line and wind speeds of up to 120km/h.

The Trams shall function, without deterioration in performance and for their whole design working life, within the weather conditions anticipated within the Edinburgh area as described elsewhere in Section 3.6.4 of these Employer's Requirements - taking into account the previously quoted wind speed. All equipment housings/enclosures that contain electronic equipment shall be so equipped to avoid the occurrence of condensation. The Trams shall be capable of being started up normally under the range of weather conditions as outlined above after no less than 72 hours of being left in the open in a shutdown condition.

24.9 Interface Management

The Infraco shall procure that the Tram Supplier participates in the interface engineering process. The Tram interfaces are identified in the TSA. The management of the interfaces will be carried out by Infraco using the system interface register.

24.10 Systems Assurance

The Infraco shall ensure that the Tram Supplier shall implement a System Assurance engineering process in accordance with the requirements of the Edinburgh Tram Network. This process shall cover all aspects of design, manufacture, integration, testing and commissioning of the Tram, and all interfaces with the system, to demonstrate compliance with the reliability, availability, maintainability and safety requirements of **tie**.

The Infraco shall ensure that the Tram Supplier shall follow the approach of BS EN 50126:1999 "Railway Applications – The specification and demonstration of RAMS".

The Infraco shall ensure that the Tram Supplier shall implement a reliability, availability and maintainability management process and will detail it in a Reliability, Availability and Maintainability Plan (RAMP).

The Infraco shall ensure that the Tram Supplier shall implement a System Safety Management Plan (SSMP), which shall define the process, activities and requirements for the preparation of a 'Case for Safety' during the design and handover stages of the project. The plan shall also define the system safety management organisation and the strategy to achieve the individual hazard system safety targets.

All foreseeable system safety hazards are to be identified, evaluated and recorded in a Hazard Log that will be managed and maintained throughout the project lifecycle. The Infraco shall ensure that the Tram Supplier shall implement a hazard management process to identify hazards through hazard analysis and the means to mitigate these hazards.

24.11 Noise and Vibration

Trams shall at all times meet the requirements of the **tie** Noise and Vibration Policy (NVP/001/V1.01). Trams shall operate as quietly as is reasonably possible. The proposed design shall incorporate wheel damping, side skirts with sound-deadening linings and resilient mounting of electrical equipment likely to generate noise. The Infraco shall ensure that the Tram Supplier shall provide the anticipated noise levels of the proposed Tram. Noise tests shall be carried out in Edinburgh to determine the frequency peaks generated, in particular by the wheels. The results of these tests shall be used to determine the type and extent of any tuned vibration dampers that should be fitted to the wheels.

24.12 Specific Technical Requirements

The Tram body shall be a nominal width of 2.65m externally. Note that external door sills may be required in order to comply with Rail Vehicle Accessibility Regulations.

The total Tram length shall be a nominal value of up to 44m.

The following loading conditions shall apply in this document:

- AW0 = Tram tare weight (empty car)
- AW1 = AW0 + full load of seated passengers
- AW2 = AW1 + weight of standing passengers at 4 persons/m^2

- AW3 = AW1 + weight of standing passengers at 5 persons/m_2
- AW4 = AW1 + weight of standing passengers at 6 persons/m_2
- AW5 = AW1 + weight of standing passengers at 8 persons/m^2

Where the mean passenger weight is taken to be 70.5kg.

The passenger capacity of the tram shall be at least 230 persons, of which a minimum of 80 shall be seated, on fixed seats. There shall in addition be provision for wheelchairs in accordance with Rail Vehicle Accessibility Regulations. There shall also be provision for luggage racks.

At least 66% of the floor area available for standing must be low-floor, with a height above rail level of between 300mm and 400mm. High floor areas shall be minimised. All doorways shall allow level boarding access at a height between 300-350mm above the top of the rail. The slope of the floor at the entrance shall be in accordance with disabled access regulations. Suitable means of adjustment shall be provided to compensate for wheel wear in order to remain within these limits.

The Tram shall have a maximum operating speed of up to 70km/h. However, a speed of 80km/h must be achievable, though not sustainable for a prolonged period.

The Tram structure will incorporate a strong and stiff underframe capable of supporting a buffing load in compliance with EN 12663 category V without permanent deformation. The structure shall not deform, crack, fracture, corrode or suffer loosening of rivets or bonding during the normal service life of the vehicle. It shall be, and remain, watertight against rain, passing through standing water and passing through the washing plant throughout its working life.

The tram structure shall be designed and tested to accommodate a passenger loading of AW5 as defined earlier in this clause.

All cavities in the floor structure, body sides and ceiling will be well drained and constructed in such a way that water does not collect and corrosion does not occur. Insulation material will fill all void spaces to minimise noise, vibration and heat loss.

The articulated joints will provide a wide gangway and resistance to vehicle climbing in the event of a collision. The articulation will require minimum maintenance and be capable of being dismantled to separate the Tram bodies with a minimum of equipment.

Where different metals are in contact, due regard shall be given to preventing the effects of dissimilar metal corrosion. All metal surfaces shall be treated to resist corrosion. All body panels will be interchangeable between vehicles and all exterior panels will be lined with water resistant, sound absorbing and heat insulating materials to minimise the possibility of resonance.

Easily replaceable energy absorption devices shall be provided at both ends of the Tram such that frontal and rearward collisions, at speeds up to 5 km/hr shall be fully absorbed without causing permanent deformation of the body structure. The front skirts and lower body side panels shall be mechanically fastened so as to allow easy replacement and shall be interchangeable between Trams. Each panel must be able to be replaced by one person in ten minutes.

The Trams shall be designed to be resistant to fire in accordance with the standard BS6853 Category 2, or the equivalent European Standard.

The maximum axle load at AW4 loading, and including all consumables, shall be 11.5 tonnes.

The windscreen shall be compliant to the equivalent International Regulation ECE 43 (Uniform Provisions Concerning the Approval of Safety Glazing and Glazing Materials (Rev1 08.1990). The windscreen and cab side windows shall consist of laminated glass panes made of safety glass. There should be no diffraction effects or colour distortions in the cab windows. Any glass screens dividing the driver's cab from the saloon shall be treated to minimise reflections. All internal glazing shall be made from safety glass.

The side windows (including the door windows) will be made from heat reflecting safety glass. The glazed area shall be maximised within the limits set by structural integrity, solar gain and passenger modesty. Passengers must have a clear view to the exterior whether seated or standing. Tinted windows shall be used to minimise dazzling.

The windows shall allow permeability for radio waves with frequencies for Global System for Mobile telecommunications, and other public-domain transmissions.

All windows, (including the driver's windscreen) shall be easily replaceable using standard methods and tooling available in the Depot. All glass surfaces must be replaceable within two hours and should be secured so as to be watertight and draught-proof. Bonded glass is not preferred, unless it can be demonstrated that the bonded glazed units can be easily interchanged in less than two hours. Bonding to a mechanically-fixed window frame, or securing using a rubber section, is preferred.

If the windows used are bonded, they should have a black, printed ceramic silk screen print to cover the bonding zone and protect the bonding material from ultra violet transmission, on which the ultra violet -Transmission should be less than 0,1% at 400-600 nm.

Opening hopper windows will be fitted throughout the passenger compartment. All interior glass surfaces in the Tram passenger compartments shall be fitted with Ultra Violet light reducing and shatter resisting film on the inside surface, which shall be easily replaceable as a maintenance task when required yet give good visibility when in place. This film shall also provide effective protection against damage to the glass by 'etching'-type graffiti.

24.13 Driver's Cab

The driver's cab shall be arranged so that at least 95% of adult persons can comfortably access the cab desk and all the controls located within the cab, whilst retaining the appropriate field of view out of the cab. The design of the cab shall be undertaken to good human factors practice.

The driver's cabs shall be air-conditioned and the temperature shall be thermostatically controllable by the driver. Air conditioning in both cabs shall be switched on or off from either cab. Temperature selection shall be only available from the cab in use.

An effective windscreen demisting system shall be fitted, suitable for the climatic conditions encountered in Edinburgh. The demisting system shall be able to clear the windows of condensation within ninety seconds of a cab being made operational.

The cab may extend to the full width of the Tram, and be separated from the passenger area by a glazed partition providing good passenger visibility through the cab windscreen. A mirror providing the driver with a view into the saloon (when sat at the controls) shall be provided.

An internal cab to saloon door is required, which must be lockable from the saloon side and cab side but capable of being opened at any time from inside the cab. The door must latch automatically when closed.

An inward opening, hinged and lockable external cab door may be provided. It shall be capable of being locked and unlocked from both inside and outside the cab.

The cab lighting level shall be 250-300 LUX at 1.0m above floor level. The driver shall have the control of switching this lighting on or off.

A generally translucent mesh fabric sunblind shall be provided, with an opaque strip extending 150mm up from the bottom edge. The blind must be able to be deployed by the driver whilst in the driving position. It need only be retractable at stops.

Cab windscreens and cab windows shall maximise the degree of all round vision available to the driver. A clear unobstructed view of the road/track ahead shall be provided with clear and unrestricted sight lines, particularly low down in front of the cab.

The partition between the Cab and Saloon and other glazing surfaces shall minimise the incidence of reflections at all times and in all expected environmental conditions. Blinds or curtains shall be provided to screen the saloon lighting from the cab at night.

The following features that relate to instruction of Tram drivers shall be provided:

- A Tram driver can be under instruction when a Tram is in passenger service, consequently it must be possible for an instructor and a driver to be inside the cab with the cab/saloon door closed, and the instructor must be comfortably and safely located in the cab.
- The instructor must be able to apply the Tram security brakes quickly.
- The instructor must be seated and secure in the cab to the extent that he can apply the brakes even when the Tram is performing unpredictably.
- The instructor's seat may be a portable item,supplied with the Tram.

The driver's seat, unless purpose-designed for a Tram, shall be a seat specifically designed for bus applications rather than for other vehicles such as heavy rail or heavy goods vehicles, as it must be capable of being adjusted frequently without any damage. The seat must be of ergonomic design, easy to clean and easily removable from the cab. The seat cushions shall be easily removable for cleaning.

The driver's seat must be easily adjustable so that 95% of adult persons may be seated comfortably with effective reach to the drivers' controls, and maintain unrestricted lines of sight through the windscreen.

Both cabs on each Tram shall provide stowage for:

- A points handle, typically a steel bar about 1m long (supplied by others). This must be placed so the driver can easily take it with him when leaving the cab, and so it must be stowed and un-

stowed without risk of damage to the cab finishes or equipment. When not in use it must be secured so as to prevent becoming a hazard in the event of an emergency stop or a collision.

- A first-aid box (supplied by others)
- A fire extinguisher to be supplied with the Tram.
- A place to hang a driver's coat, where it will not interrupt the view in any direction.
- A place to hold two A5 ring binders of timetables, information and procedures.
- A place to clip an A5 sheet of paper, which can be conveniently referred to by the driver (whilst at a Tram stop), and which does not obscure any controls or gauges.
- A hand lamp (supplied by others)

Provision shall be made within each cab to allow two operational personnel to separately and securely store personal effects

There shall be provision in each cab for a secure cash box (supplied by others). The dimensions of this are to be provided by **tie**.

There shall be charging points in each cab for a portable radio and a hand-held ticket machine.

The tram shall be fitted with holders in each cab for a destination board, for the purpose of indicating additional destinations of public interest. This board is to be placed in position by the driver so as to be seen from in front of the tram. The dimensions of the board are to be provided by **tie**.

24.14 Tram Controls

The layout of controls, switches and instrumentation shall be agreed with **tie** on the mock-up, by use of design submittals and the use of the mock-up. The desk panels shall be made of material that is wear resistant and free from reflections.

It shall be possible to drive the Tram from each cab. Insertion of the driver's key and the operation of one switch in either cab shall switch on all of the equipment needed to enable the Tram to be driven from that cab. Essential sub-systems shall not be separately switched.

The Tram acceleration and braking shall be controlled from a combined controller handle, incorporating a dead man safety device. This shall normally be locked out of use until released by the driver's key, which shall remain captive in the controller until the controller is placed in the off

position. It shall not be possible to operate the Tram with more than one controller in use at any one time.

The controller shall include a slow speed mode, for driving through the Tram washing plant.

The following controls shall be conveniently placed for the driver's free hand when the Tram is in motion:

First priority

- Audible warnings (bell, horn);
- Track brake (in addition to the emergency brake on the driver's controller);
- Indicators;
- Pantograph emergency drop.

Second priority

- Manual sand (in addition to the automatic sanding system);
- Windscreen washer and wiper controls;
- Headlamp dip/main beam;
- Panic Alarm;
- Tram punctuality display against timetable or headway.

The following controls shall be conveniently placed for use when the Tram is at a Tram stop:

- Door controls;
- Rear-view normal mode push-button;
- Tram Ready To Start (junction calling when at a Tramstop close to the junction);
- Hazard and marker lights;

- Air-conditioning and temperature controls;
- Saloon heating control;
- Fault reset push-button;
- Public Address controls;
- Radio controls;
- Cab light switch;
- Saloon lighting;
- Pantograph control;
- Windscreen demister.

At least one cab shall display an odometer calibrated in km. Both cabs shall display a speedometer calibrated in km/h and mph.

Windscreen wiper control shall be by means of a multi-position switch having intermittent, continuous slow and continuous fast positions. Wipers shall be self-parking to a position close to and parallel with the edge of the windscreen.

There shall also be a separate push button, which operates wipers and windscreen washers for as long as it is held down, and provides one additional sweep of the wipers after it is released.

Each cab shall be equipped with an indicator to inform the driver whether the Tram is running early or late, and by how much.

24.15 Rear View Equipment

Rear-views shall be provided by close circuit television equipment which shall function as follows:

The 'normal' view, displayed whenever the Tram is in motion, shall have two screens in the cab integrated into the desk: one on the left side of the desk and one its right. The images in them shall be the same as would be seen in mirrors.

The 'Tram stop' view shall be displayed in the time between the doors being enabled at a stop and all doors being proved closed. In this view, the monitor on the platform side (the side on which the doors are enabled) shall show the same as in normal view. The other monitor shall display the image from the rear camera on the platform side, to enable the driver to view passengers disembarking and embarking and to ensure that doors are clear before they are closed.

Note that the images of views back from the cab will be laterally inverted and those forward from the rear of the Tram will not.

A separate push button conveniently located on the cab desk shall provide the driver with a changeover facility from 'Tram stop' to 'normal mode' for as long as it is held down, to allow a driver to check that nothing is overtaking the Tram at an on-street stop whilst the doors are closing.

Closed circuit television images must remain clear enough to see a cyclist overtaking the Tram before the Tram sets off from an in-street Tram stop, even whilst it is raining, dark, under street lighting and there are car headlamps shining towards the cameras. The tram supplier will be required to demonstrate that the CCTV coverage allows drivers to effectively see all passengers boarding and alighting, as well as being sufficient for the needs of driving the tram on street.

The images from the cameras shall be displayed in the cab to the driver on colour flat-screens with manually adjustable brightness. Images on these screens shall be viewable by the driver under all ambient lighting and weather conditions and at as wide an angle as possible. Care shall be taken to ensure that 'flaring' of the image from brightly lit, wet, road surfaces is avoided. Special consideration shall be given to the use of this equipment in wet weather and poor lighting conditions, when it may be necessary to remove rain droplets or prevent them from forming on the camera lens.

Rain affects closed circuit television both by creating additional reflections from wet road surfaces and by settling on the camera housings themselves. The system must cope adequately with both.

24.16 Interior

Care and attention shall be given to provide a safe passenger environment. Passenger movement within the Tram shall be made as safe as practicable, and able-bodied passengers shall be able to move along the entire length of the passenger saloon of the Tram.

The free and safe movement and loading of passengers shall be facilitated by the incorporation of handrails, grab-poles and an interior free of tripping hazards and sharp corners throughout the Tram. The gangway width between seats shall be not less than 650mm. Hand-holds will be provided to maximise the use of standing space, particularly in vestibules and articulations.

Steps may be included to permit the movement of passenger's to or from areas where there is a difference in the height of the floor of the Tram. Steps shall not exceed 200mm in height and the quantity should be as few as possible. There shall be a minimum of 16 seats accessible to passengers without using steps.

All seats shall be at least 450mm wide, ergonomically designed, resistant to damage and soiling and have easily replaceable covers. The seats shall as far as possible not be placed on pedestals, i.e. shall not require a step up for passengers when taking a seat. Wherever practicable seats should be cantilevered from the vehicle side so as to leave a clear floor area to facilitate cleaning. Seat rows shall be pitched no closer than 752mm.

The non-slip, easy clean floor covering shall also continue up the vehicle sides and seat pedestals so that there are no corners that can act as dirt traps. The floor covering shall be hardwearing with minimal openings and continuous welded or seamless glued joints. The edges of the floor covering shall be sealed to prevent water penetration to the structure of the Tram.

The floor covering shall be highly resistant to staining from any source.

The actual floor area available for standing passengers shall be clearly identified. From this the total standing capacity shall be calculated, respecting Rail Vehicle Accessibility Regulations and the limitations of standing room in areas such as articulations. Seating shall generally be arranged transversely with minimum longitudinal seating.

The tram shall be fitted with luggage racks, distributed evenly about the vehicle and situated as close as practicable to the vestibules. The luggage racks shall occupy a floor space of up to $10m^2$ and extend the full height of the interior and have two intermediate shelves. At floor level a horizontal bar shall extend across the opening into the saloon to prevent objects rolling out of the luggage space. Luggage shall be effectively prevented from excessive movement out of the racks, either under high rates of braking or lateral acceleration. The luggage racks should be easily replaced by seating (or standing areas if appropriate) should **tie** require to do so.

The tram is to be provided with information screens so as to be visible from within most parts of the saloon. The screen should be able to display video information for events and places of public interest, and should also be able to display selected views from the closed-circuit television system. All passenger areas of Trams shall be provided with windows in all sidewalls to maximise visibility for passengers. This requirement shall also apply to draught screens and separation walls to the driver's cabs.

The Tram shall provide data on the number of passengers boarding and disembarking at each Tramstop. This data shall be easily downloaded each day when the tram returns to the Depot. Software to allow analysis of the data shall be provided.

The passenger counting facility shall be incorporated on 6 of the trams in the fleet only. It shall be possible, with minimum disruption to wiring looms, body panels and major equipment, to retro-fit passenger counting equipment should this be required after the vehicles have been delivered.

Passenger stop request buttons shall be provided in the saloon area in accordance with Rail Vehicle Accessibility Regulations.

Interior saloon lighting shall provide glare free, uniformly distributed illumination in passenger areas, to a level of between 280-350 lux. The lighting diffusers shall be easily cleanable.

Emergency internal lights must function after disconnection from the overhead power supply (at all operating temperatures) in accordance with the battery back-up and load-shedding requirements below. Emergency internal lighting shall provide a minimum illumination of 30 lux at floor level and shall be evenly distributed in each passenger area of the Tram. The operation shall be independent from the overhead line power supply. Uniformity of illumination shall not be less than a factor of 0.4 Headroom throughout the seating areas shall be at least 2.1m to ceiling.

There shall be litter bins provided at each vestibule on both sides of the tram, each being able to be filled with typical soft drink cans. The litter bins shall be easily emptied.

All passenger areas of Trams shall be provided with a heating and ventilation system that maintains a constant acceptable ambient temperature during transit between Tram stops and during boarding and alighting at Tram stops when operating in all prevailing climatic and environmental conditions on the proposed route.

The arrangement of heating devices shall prevent excessive draughts caused by high airflow rates, due to the even warm air distribution inside the Tram. With the appropriate arrangement of the

vents, the air inside the Tram shall be heated and distributed over a large area through natural convection. Pockets of hot and cold air shall be avoided.

The interior of each Tram shall be fitted with reserved spaces for on-board advertising and passenger information notices. These spaces shall allow cardboard panels, 210mm deep, to fit snugly into retaining grooves. A clear smooth surface at least 160mm deep shall be available between the grooves to allow for the fixing of vinyls. There shall be a route map above the inside of every passenger doorway. The Infraco shall ensure that the Tram Supplier shall produce and fix all notices required by law or the Safety Management System, and fix free-issue logos, route maps and other notices, using appropriate materials and attachment methods, against a schedule which shall be agreed by **tie** on the mock-up.

Trams shall be fitted with racks close to the vestibule areas for holding information leaflets and newspapers. The arrangement and design of these racks is to be agreed by **tie** on the mock-up.

Two night partitions shall be provided which are fully retractable and can be securely stowed when not in use. These partitions shall be located adjacent to the articulations on either side of the wheelchair area towards the centre of the tram.

This night partition should be included in the mock-up.

The function of these partitions shall be to enable the rearmost portion of the tram to be securely locked out of use by the on-board inspector in order to enable him to more closely supervise the passengers in the forward portion of the tram whilst retaining the wheelchair facilities, as required by RVAR.

The partitions themselves shall be simple to operate by one person in the range of 5th percentile female to 95th percentile male. It shall be possible to lock the partitions in either the stowed or fully deployed position using a key which is carried by the on-board inspector as part of his normal duties. It shall be possible to deploy and stow the partition within 2 minutes. When deployed or stowed the partition shall be robust enough to withstand a person falling against it without sustaining damage.

A key operated control, located such that it may be conveniently operated by the on-board inspector with the partition deployed, from either side of the partition, shall cause the lights in the rearmost (isolated) portion of the tram to be reduced to emergency lighting levels, and disable the external door pushbuttons in order to prevent passengers accessing this portion of the tram. Under all circumstances the crew entry functionality at the single end doors shall remain operable and it shall be possible to operate the emergency door release throughout the tram. Additionally the Passenger

Emergency Communication Units shall remain active in all parts of the tram. The activation of the key operated control shall be indicated in the active driving cab but shall not cause a fault alarm.

In order to assist with the design the following information gives the anticipated normal method of operation.

At a terminus where the partition is to be put in place:

- The passenger doors will be opened in the normal way to allow passengers to exit and enter the tram (at this point they may board at any point in the tram);
- The driver will close and remove the enable command from all doors before closing down the cab and walk to the other cab;
- The on-board inspector will move any passengers in the area to be closed off to the portion of the tram forward of the partition;
- The inspector will then secure the partition in place and operate the key switch to deactivate the rearmost door controls and dim the lights;
- The driver will activate the forward cab and enable the doors for passenger boarding in the normal manner prior to departing.

Consideration should be given to providing an indication on the side passenger information displays to indicate to intending passengers that boarding is at the forward end of the tram only.

Tram loading will be uneven when the partition is deployed. The implications on load compensation in traction and braking control of the tram shall be considered and should continue to function appropriately when this condition is in force.

Interior ceiling and coving panels should be securely retained, so that they do not fall onto the maintainer when the catch is released. All interior panels should be small enough to be handled and lifted by one person unaided.

The interior livery shall be developed as part of the system identity and branding package and is to incorporate the features set out in the Design Guidelines. Typically this shall include the following factors:

- Paint finishes should use the same colours as for the exterior;
- GRP interior panels / door interiors / lower finisher trim for bonded glazing shall be Blue RAL 5005;
- Roof / coves / sides laminates shall be the same colour as Perstorp PP5650U Cezanne;
- Seats and wheelchair backrests shall be covered in Holdsworth Edinburgh Tartan – W218ET (including priority moquette);
- Driver's seat covering shall be Black hide material;
- Floor colours shall be as per Taraflex Luna NT Lewis (Taraflex Red BEF 53/01) and Taraflex Polaris NT Arran (Taraflex Blue BEF 33/01);
- Floor covering weld cord – Yellow;
- Seat backs shall be in Lothian Blue; and
- Hand rails and stanchions shall be in Red RAL 3020.

Passenger seats shall be of a similar style to the Grammar Pratico 2845 Low backrest, as currently deployed on Lothian Buses.

24.17 Bogies

The vehicle will have a minimum of 66% adhesive weight on motored axles.

The bogies shall be of proven design and have been used successfully in another Tram project.
The bogies will incorporate suspension systems to give a high-quality ride characteristic. The suspension system will be self-adjusting or adjustable for wheel wear so that ride heights can be closely maintained.

The ground clearance (from top of rail) fully laden with worn wheels shall not be less than 50mm to any part of the bogie structure except a track guard.

Each axle on the motor bogies will have a spring-applied friction brake. It shall be possible to release the spring-applied brake manually in the event of failure of the actuation system. Under normal operation the parking brake will release and apply automatically when the driver's controller is activated.

Each bogie shall have two electro-magnetic track-brakes, one suspended over each rail between the wheels.

The wheels shall incorporate resilience and damping in order to minimise noise and vibration. Tuned vibration absorbers will be fitted after carrying out tests to determine their most effective parameters.
Effective under-run protection arrangements shall be provided. The end bogies will carry adjustable track guards on their outer ends, to conform to Railway Safety Publication 2 – Guidance on Tramways, issued by the Office of the Rail Regulator requirements for under-run protection. The motor bogies will be interchangeable with each other.

Removal of components such as brake actuators, suspension units, etc. will be facilitated to allow on-site repair and replacement of major items such as motors or wheels to take place with the minimum of Tram down-time.

The ride comfort levels measured according to the ISO 2631 Standard on a ballasted straight and level track in good condition shall be no worse than:

Speed	Wz vertical	Wz lateral
40 km/h	2,32	1,58
70 km/h	2,96	2,36

Table 59 - Ride Comfort in the Driver's Cab

Speed	Wz vertical	Wz lateral
40 km/h	2,24	1,64
70 km/h	2,82	2,28

Table 60 - Ride Comfort in Passenger Compartment

At least two wheelsets of the Tram shall be equipped with flange lubrication equipment on all wheels. Both sides of the flange shall be lubricated. It shall be capable of being programmed to operate on the basis of either location, or of a time interval, or a combination of these.

24.18 Re-Railing

The Trams shall be capable of being returned to the running track in case of derailment with the minimum amount of equipment and in the shortest possible time. The Infraco ensure that the Tram Supplier shall indicate the best methods for re-railing and the equipment required, for all track forms used on the system.

If the Tram design includes suspended body sections, then articulation locks shall be procured by the Infraco from the Tram Supplier.

24.19 Propulsion Equipment

The Tram shall not export additional risk onto Network Rail infrastructure. In particular, the harmonic generation from the propulsion and control equipment shall not interfere with train-borne or trackside systems or other third party systems and infrastructure.

The traction equipment shall detect and automatically manage wheel slip and wheel slide, so as to maintain performance and stopping distances in all track conditions and without damage to the wheel treads. When slip or slide is detected sand will automatically be applied to the rails in front of the leading axle. Sanding must not take place due to spurious wheelslip/slide detected at flange running crossings, pointwork or sharply curved or transitional track. The traction equipment shall tolerate variations in wheel diameter.

The Trams will have the following performance when motoring, on straight and level track and with a nominal line voltage of 750V dc:

Speed (km/h)	Load	Performance	Notes
0 -> 30	Up to AW4	1.2 m/s^2	Instantaneous
0 -> 70	Up to AW4	0.8 m/s^2	Average

Table 61 - Tram Performance Levels

The effect of variation of the line voltage (within the prescribed system limits) on the Tram performance, shall be provided by the Tram Supplier on behalf of the Infraco. The maximum line current, and the conditions when it shall be demanded by the Tram, shall also be provided by the Tram Supplier on behalf of the Infraco.

The Trams shall provide safe operation on all gradients under degraded performance modes as imposed by the traction equipment. In particular, the Trams shall be able to complete any journey on the System with one complete traction drive unit isolated.

The traction and braking control system shall be optimised to provide smooth and low jerk values in starting from rest, acceleration, braking and stopping, on level track and on all gradients that are encountered, under all loading and environmental conditions, while protecting against unintended downhill movement.

The Tram may be fitted with a short-time rated emergency mode, with a higher tractive effort, to assist in recovering other Trams.

24.20 Braking Equipment

The Tram Braking Equipment shall be designed to comply with BS EN 13452 Part 1 except where stated below.

The service brake application shall be capable of retardation at an acceptable rate (as defined in Tables 3 and 4 of BS EN 13452 Part 1) at all specified laden conditions and the jerk rate shall be limited so as to not cause discomfort to standing passengers. The service brake shall normally consist of a regenerative electro-dynamic brake, (that as far as is practicable shall return the braking energy to the overhead line) and a friction brake. The electro-dynamic brake shall normally take precedence over the friction brake.

The regenerated voltage shall not exceed 900V. Should the overhead line become unreceptive, the braking energy shall be dissipated in naturally cooled resistors. Transition between regenerative and rheostatic modes shall be automatic, instantaneous and free from jerk. Braking distances and deceleration rates shall be unaffected by transitions during braking.

The brake resistors shall be protected from overheating. Malfunction of the dynamic brake system must be detected and recorded by the fault monitoring system.

Electro-dynamic and friction brakes shall be blended. In normal operation the friction brake will take over from the electric brake at a low speed. In addition, sand will be applied automatically during braking when triggered by the wheel slip/slide control system. Should the electro-dynamic brake be unavailable on any particular traction drive then the friction brake will be automatically applied to compensate, without jerk or loss of performance.

For emergency braking applications the jerk rate shall be limited without compromising emergency braking performance. The friction braking system should be capable of repeated full service or emergency brake applications.

The Tram parking brake shall be of sufficient performance for a Tram (whether laden or unladen) to hold without movement and for an indefinite period another unladen Tram without brakes on the steepest gradient on the Edinburgh Tram Network under all adhesion conditions.

The braking function and performance of the Tram shall be in accordance with Tables 3 and 4 of BS EN 13452 Part 1. The definitions of the braking modes given in these tables are as defined at Section 3.2 of the Standard.

When the Emergency brake is applied, the track brakes should be released immediately before the Tram comes to rest in order to minimise jerk to passengers.

All braking and jerk rates shall comply with the requirements defined in Standard EN 13452.

24.21 Run Time

The Trams will be capable of being operated continuously for twenty hours in each day.

A runtime simulation will be carried out by the Infraco to demonstrate the required end-to-end journey times. The Trams shall have sufficient performance and ratings to meet the requirements for these run times and end to end journey times. The inputs to the simulation shall be based on theoretical Tram performance validated by type test measurements with similar Trams in service elsewhere. The infrastructure and operational assumptions for the runtime shall include, but not be limited to:

- Alignment information, including speed restrictions due to geometry and sighting restrictions;
- Location of Tram stops and assumed dwell times;

- Speed restrictions due to the presence of pointwork;
- Service brake rates including agreed allowances for driver variation and technique, and varying adhesion conditions;
- Jerk rate and acceleration compliant with the requirements;
- Assumed delays due to operation in mixed traffic, which may be in the form of assumed speeds or time delays;
- Assumed delays due to the operation of the traffic-signal-controlled junctions, which may be in the form of assumed speeds or time delays;
- Tram loading;
- Wheel wear; and
- Traction system supply voltage.

24.22 High-Voltage Equipment

All Tram-borne high voltage equipment shall be adequately rated for operation at the line voltage. All high voltage equipment other than the pantograph will be securely enclosed in rigid, metal and earthed equipment cases.

The high-voltage sub-systems will be protected by high-speed circuit-breakers or fuses, which shall be enclosed so that their operation does not cause alarm or danger to persons standing near to the Tram. The length of electrically unprotected cabling between the pantograph and the protection devices shall be minimised.

Wherever feasible, there will be duplication of primary assemblies in order to minimise the potential for single-point failures. There will be a minimum of two self-contained traction groups, so that failure of a traction drive on one bogie does not immobilise the Tram.

24.23 Auxiliary Power Supply Systems

The auxiliary supply converter(s) shall start when fed from the overhead line, irrespective of the state of charge of the batteries.

The converter outputs for auxiliary supplies and battery charging derived from the overhead supply shall be isolated from the overhead supply to prevent any possibility of excessive voltages appearing on the low-voltage circuits.

The saloon heating units (if mounted in the saloon area) shall be provided with appropriate protection and insulation for the heating elements and their terminal connections.

The charging system for the batteries will be appropriate to the type and size of battery provided.

A suitable socket for connecting a 24V battery charging supply shall be provided.

The batteries shall be of a low maintenance type suitable for traction applications and enclosed in electrolyte-proof containers to contain environmental pollution in case of damage. There shall be absolutely no possibility of spillage from the batteries entering the passenger saloon or the cab. The battery enclosure shall be vented to prevent the build-up of gases.

In the event of loss of the 750V overhead supply, the batteries will allow all essential systems to operate for a minimum of thirty minutes. Certain critical functions will continue to operate for up to one hour from battery supply:

After ten minutes:

- The saloon lighting system shall revert to emergency lighting only.

For up to thirty minutes, the following systems shall remain in operation:

- Brake system;
- Public Address system ;
- Emergency lighting; and
- Door system.

For up to one hour the following systems shall remain operational:

- Pantograph;
- Minimum exterior lighting; and
- Radio communication system.

24.24 Faults and Diagnostic System

The Trams will have a condition and fault monitoring system integral with the vehicle control system, to give indication to the driver of the status of equipment and to allow control of degraded modes. Failures or events requiring maintenance intervention shall be recorded by an on-board system that shall retain all pertinent details after the Tram has been shut down, for downloading and analysis by maintenance staff. This system will have sufficient capacity to store such information at least for the interval between scheduled maintenance examinations, on a first-in, first-out basis. There shall be a visible indication that at least one day's worth of recording remains available.

The downloading of data shall be accomplished using a commonly available lap-top computer or related portable device. Any software or special equipment or licences required to download or analyse the data from the Trams shall be provided by the Tram Supplier.

The display for the driver shall also provide unambiguous information of the status of the Tram, and the severity of any faults present. In particular, the system shall continuously indicate one of the following fault states according to the condition of the Tram:

- Tram OK;
- Minor fault, report to control and continue;
- Major fault, report to control and continue in degraded mode;
- Major fault, Tram must be immediately taken out of service; and
- Major fault, Tram inoperative.

The Tram shall perform a self-check automatically whenever it is started up from a shut-down condition.

24.25 Sanding System

The Tram shall be equipped with a system, which deposits sand immediately ahead of the driven wheels in the direction of travel to rectify any poor adhesion conditions at the wheel/rail interface. The system shall be activated both automatically whenever wheelslip or wheelslide is detected, and manually when under control of the driver. Sand will also be automatically applied whenever the emergency or security brakes are used.

Sand shall be deposited on at least two locations on each rail per direction of travel. The rate of sand deposition shall be no more than that required to correct the poor adhesion. The automatic sanding system shall be inhibited when the Tram is stationary, unless activated manually. The sanding unit response time shall be effectively instantaneous.

The Tram-mounted sand boxes shall have sufficient capacity for a full day's service under all conditions of weather and loading.

The sand filler covers shall have seals to keep the sand content dry under all weather conditions, and when the vehicle is being washed.

A means of ascertaining the sand level in the sandboxes shall be provided, visible from within the Tram.

The Tram sandboxes shall be filled from outside of the Tram using a sand dispensing plant at the Depot. The sandbox arrangement will be compatible with the sand dispensing plant such that it is possible for the driver of the Tram to completely fill all the sandboxes in five minutes. In the event of failure of the plant, it shall also be possible to fill the sandboxes manually, and if any special equipment is required for this, the Infraco shall ensure that the Tram Supplier shall provide it.

24.26 Passenger Doors

The Tram will be equipped with at least four pairs of bi-parting sliding-plug doors, plus two single doors, on each side of the vehicle for the passenger saloon and one internal cab door per cab with a clear opening of not less than 610mm. The doors shall be equipped so that rainwater does not drip onto passengers when the doors are opened.

The passenger saloon doors shall be fitted on both sides of the vehicle in the low-floor area. The doors will be of the following characteristics:

- The double door clearance width shall not be less than: 1300 mm
- The double door clearance height shall not be less than: 2025 mm
- The closing force shall be: <200N
- The opening force shall be: <250N

The doors will be opened and closed by the driver or simply released by the driver so that the passengers will be able to open the doors themselves using door push buttons. The push buttons will be illuminated when they are activated. The doors shall stay open for a fixed time before closing automatically. A warning tone shall be sounded when the doors are released and a different tone shall sound to give warning of door closure.

Devices will be incorporated into the individual door control mechanisms, or in the leading edge of the door, to detect and protect against door obstruction. Slow or defective door mechanisms will be indicated to the driver by the vehicle fault management system. The driver shall be able to isolate any door by using the driver's key to operate an isolation switch local to each door. Such a door shall be secured from all forms of operation other than emergency release.

It shall be possible to open each door manually in case of emergency (including any door that has been isolated). An internal emergency handle will be provided at each door entrance. Operation of the handle shall cause an immediate application of the emergency brake and unlock the door such that it can then be moved open by hand after the vehicle is stationary. The emergency handle will only be able to be reset using the driver's key.

The door edges shall be fitted with weather-proof seals that are soft enough to allow a person's fingers to be withdrawn after the doors have closed. The seals shall be effective against all likely weather conditions and in the Tram washing plant and shall not offer a hand-hold to allow persons to ride on the outside of the Tram.

The Tram shall accept a door enable command from the driver when the Tram speed is below 10km/h, but the doors shall not become enabled until the Tram is at a standstill. If, having been enabled, the Tram speed then rises above 10km/h, the enable command shall automatically be cancelled.

The time from the Tram coming to rest to doors being fully open in response to a prompt passenger demand, plus the time from the driver pressing the door close button to the Tram moving off, shall be less than 12 seconds. This time shall include all necessary delays for RVAR-required tones. The doors themselves shall move from closed to fully open or vice versa in 3.5 seconds or less.

The door guidance mechanism shall not be a swing plug mechanism nor a folding door.

The following controls shall be fitted in each cab for driver control of the doors:

- Separate door-enable controls for the left and right sides. It must be possible to enable both sides simultaneously. The 'enable' buttons of the Tram should each be located on the appropriate side of the cab desk.

- One door 'open' button, which will open any doors previously enabled, but not opened by passengers, provided the Tram is at a stand still.

- One door 'close' button, which will close all doors that are open. This will be the normal mode of door closing at Tram stops other than termini.

- To prevent the doors being enabled on the wrong side, the door enable shall be interlocked and programmed with the correct side for the platform at each Tram stop along the route. This feature shall be capable of being over-ridden by the driver (for example, if the Tram uses an unusual platform at a terminus), but such over-ride shall require the driver to press at least one additional button, which shall not be located adjacent to the other door controls in the cab. It shall be possible to open all the doors when the Tram is in the Depot.

The door enabled indicator lights at the doors shall illuminate and the door enabled tone start, simultaneously with the door actually becoming available.

A door shall re-close automatically, with warning tone, if no obstacle is detected for twenty seconds (configurable). This will be the normal mode of door closing at termini.

When all doors are closed and traction is available, an audible signal, distinct from all other tones and quieter and less offensive than any alarm tone, shall sound in the cab in use. This is preferred to a lamp or other visual signal as the driver already has to view the platform and check ahead before moving off.

Unless a separate external cab door is provided, the door nearest each cab on each side (four doors in total) of the Tram shall be provided with local internal and external 'door open' and 'door close' switches operated by the driver's key. These shall be spring-loaded centre-off, turned one way to open and the other to close. Any door opened using a local switch shall be capable of being closed either using the appropriate local switch or the 'door close' button in any active cab. The purpose of these switches is to allow local control of the door by a driver who needs to leave and re-enter a passenger-carrying Tram, for example to operate points, at a place which is not a Tramstop. In addition, unless a separate cab door is provided, a separate control shall be provided in the cab to allow the Tram driver to open and close the nearside front passenger door separately from the cab. This is to allow the driver to open and close this door separately at the crew change halt at the Depot. An exterior emergency door release shall be incorporated to comply with the requirments of Railway Safety Publication 2,

The door-enabled tone required by Rail Vehicle Accessibility Regulations 1998 (as amended) shall be audible from both inside the Tram and on the platform. This may require an additional external sounder if, in order to be heard outside, the internal one is uncomfortably loud for passengers on the Tram.

24.27 Communication and Monitoring Systems (CCTV)

Spatial provision shall be made in the most appropriate part of the Tram for the operational radio system, driver control units and tram position and detection system equipment, including the associated cabling, support equipment, microphones, speakers, antennae and power supplies. The cabling shall be installed and tested by the Tram Supplier.

These sub-systems will be supplied by the Infraco as free-issue items to the Tram Supplier, and shall be installed and functionally tested during the Tram manufacturing process. The Infraco and Tram Supplier shall work with the suppliers of these sub-systems to define and agree the interface requirements.

The Tram shall be fitted with cab-to-cab intercom facilities. The intercom facility will also provide communication between all four cabs when two Trams are coupled during the recovery of a defective Tram. This facility shall be fully duplex and hands-free.

The Tram shall be fitted with internal cameras that record digital images covering:

- The whole of the saloon, (including the passenger help points) with sufficient clarity to enable individuals to be identified for evidential purposes; and

- The views ahead/back from the cabs.

The resolution of recorded images and recording speed of images shall be of a quality from which it would be capable of being reliably used as part of an accident investigation, and in respect of the saloon images shall be of a quality to enable a conviction in the event of illegal activity. Appropriate labelling in accordance with regulations governing the use of such equipment shall be put in place.
The cameras shall be of a hemispherical type without any detectable direction of the camera view. Additional information, i.e. time, date, camera number and the Tram number will be added to every image recorded.

The recorded Closed Circuit Television images will be capable of being retained on the Tram for not less than 72 hours at which point the system will restart recording and erase the retained image. Minimum frame rate shall be 16fps, per camera. Consideration should be given to providing a push-button in the cab to enable the driver to add an index-point to the recorded images.

Closed Circuit Television images shall be taken from the Tram for subsequent retention and analysis. This shall be done using a removable data storage medium rather than by data transfer. It shall be readily apparent to the Tram driver and to maintenance staff when the storage medium is not present on the Tram. The data storage medium shall be retained by a secure locking device, that is not released by a Tram system key. All data storage devices shall be interchangeable between trams.

All software required for off-Tram viewing, editing and analysis, shall be procured by the Infraco from the Tram Supplier. This shall include any non-standard supporting hardware and any associated licences.

24.28 Event Recorder

The Tram shall include a data recorder capable of providing time, speed and distance information at 1.0m resolution or better for the last day's operations, and at 10.0m resolution or better for the last seven days' operations. Additionally, the start and end of the following events shall be recorded:

- Horn;
- Bell;
- Traction;
- Brake;
- Hazard brake;
- Safety brake;
- Track brake;
- Driver's Safety Device;
- Door enable left present;
- Door enable right present;
- Manual sand command present;
- Tram Ready to Start;

- Hazard lights;
- Left indicator;
- Right Indicator; and
- Passenger Help Point.

Software enabling event recorder download data to be interrogated and displayed in both graphical and tabular format shall be provided. The software shall also enable all of the data to be exported into Microsoft Excel for further analysis.

The data shall be recorded onto a secure, removable data storage medium. The data recorded shall include the Tram number and date. The data shall be retained and be retrievable at least until 48 hours after the Tram has been shut down. The data storage medium shall be retained by a secure locking device,that is not released by a Tram system key. All data storage devices shall be interchangeable between trams.

The Infraco shall ensure that the Tram Supplier shall indicate how the distance base of the recorder shall be recalibrated in normal usage.

24.29 Public Address System

Automatic, audible announcements for destination and stops shall be made by means of a digital voice announcement system. The Tram Supplier shall supply a copy of any necessary equipment and software needed to upload new and amended announcements or to alter the times and places at which announcements are made. The system should allow for a sound quality of RASTI 0.7, or better.

Additionally, the Tram shall be fitted with both internal and external public address systems, selectable individually by the driver, to allow the driver to make direct announcements.

The following are additional to the requirements of the Rail Vehicle Accessibility Regulations 1998 (as amended):

- Rail Vehicle Accessibility Regulations permit audible announcements between stops to be omitted where the run time between stops is less than two minutes. This option is to be used wherever possible.

- Where stops are omitted the system shall automatically allow for this without intervention of the driver.

- At a stop, in addition to the Rail Vehicle Accessibility Regulations requirement of announcing the next stop and destination, the equipment must also be capable of announcing the current stop. The form of the announcement to be provided initially shall be:

  "This is <name of current stop>. This Tram is for <name of destination>. The next stop is <name of next stop>."

It shall be initiated by the door enable, and there shall be a short delay so that the door-enable tone is finished before the announcement starts.

24.30 Passenger Information System

The Tram shall be fitted with six external destination displays, one at each end above the cab and two on each side, one near each end. The side displays should not be obscured by open doors. These displays shall be capable of displaying as a minimum a service number and the ultimate destination of the Tram. The displays should be legible from an oblique viewing angle.

In addition to the text indicating the destination of a tram on both the side and cab exterior displays an area immediately preceding the text shall be reserved for a single symbol. This symbol shall be displayed in an array of LEDs of the same size and resolution as that of a text character. The symbol shall be in a single colour which is the same as that of the text display. It shall be possible to display a variety of characters including simple geometric shapes and representative symbols (e.g. an aeroplane to indicate AIRPORT as the destination). It shall be possible to select an appropriate symbol during the programming of the system which will then appear on the display when the driver selects his route.

The purpose of this feature is to assist passengers with reading difficulties to ensure that they board a tram on the correct route for their requirements.

Internal saloon displays shall be used to show information concerning the next stop and additionally a "Tram Stopping" sign. They shall also display the local time, and should also be able to display public service information. The number and location of these displays shall be such that the information shall be easily visible to passengers within any part of the Tram.

The internal visual displays shall display, successively:

- Screen 1: Tram to
- Screen 2: <Destination>
- Screen 3: Next Stop
- Screen 4: <Next Stop>

Stepping to the next stop name shall take place on arrival at a stop once the doors are enabled. Where stops are omitted, the displays shall take account of this automatically without the intervention of the driver.

The size of the Passenger Information Display font shall conform to the requirements of the Rail Vehicle Access Regulations 1998 (as amende). The brightness of the displays shall compensate for ambient light quality.

After leaving the stop before a terminus, the external destination indicators shall change to show the destination of the next trip, so that the Tram arrives at the terminus with the correct next destination already displayed.

24.31 Passenger and Inspector Alarm System

Passenger alarm devices shall be located in the saloon area, at every door area and at the disabled passengers area. These devices shall allow communication with the driver and the location of the active device shall be indicated on the driver's display. The communication system shall be fully duplex.

Request 'Stop' buttons shall be provided and shall be compliant with Rail Vehicle Accessibility Regulations 1998 (as amended) and shall:

- Become operable when doors are proved closed at a Tramstop;
- When the first one is pressed, sound a single audible warning in the cab, illuminate a warning light in the cab and illuminate the Tram stopping indicators (required by the Rail Vehicle Accessibility Regulations) 1998 (as amended) in the saloon;
- No further audible warning in the cab from subsequent button pushes; and

- Be positioned such that they can be easily activated by any passenger intending to disembark, but should not be positioned such that they can be inadvertently activated by standing passengers.

Request stop from the wheelchair spaces shall:

- Illuminate a different warning light in the cab.
- Create a door open request for the nearest door, so it opens as soon as enabled.
- Override the automatic close on that door for the next opening.

All request stop indications shall be cancelled by the next door enable command.

Devices shall be provided that enable the on-board inspector, working within the saloon or on an adjacent platform, to alert the tram driver to an incident.

The handheld, pocket sized device to be carried by the on-board inspector shall have 2 modes of operation. Mode 1 will provide an alarm to the driver to indicate that the inspector is experiencing difficulties or feels under threat. Mode 2 will alert the driver to an immediate emergency e.g. the inspector is under physical attack.

When the inspector initiates a Mode 1 alarm the handheld device will operate silently. If a Mode 2 alarm is initiated a loud 'panic alarm' sound will be emitted from the handheld device in order to deter the attacker.

The inspector's device shall be stored in a charger/holder in the Depot Duty Room for Drivers and Inspectors and picked up by the inspector as he begins his duty on the tram. The Inspector's device shall be equipped with a mounting device and sized such that it can be conveniently and comfortably be carried on the ticket issuing machine shoulder strap. Each cab of the tram shall be equipped with a receiver capable of responding to all alarm Modes transmitted within range.
It shall be possible to replace either the handset or the receiver with a spare in the event of failure or loss.

The handheld device and related system shall operate satisfactorily in the electromagnetic environment which will be encountered on the Edinburgh Tram Network.

24.32 Hauling or Propelling a Defective Tram

An emergency coupler will be provided at each end of each Tram. It will be used only for hauling or propelling a defective Tram. The couplers will normally be concealed behind a removable cover. Coupling must be possible at all locations on the Edinburgh Tram Network.

An empty Tram shall be capable of both hauling and propelling (but not both simultaneously) another empty Tram, which is incapable of movement under its own power, between any two points.

As well as mechanical coupling, the following control facilities shall be provided on a coupled pair of Trams:

- Track brake control of both Trams from the cab in use, assuming that each Tram's batteries have sufficient charge;
- Through intercom between all cabs; and
- Through control and power to hazard lights, brake lights and marker lights.
- The intercom, marker lights, brake lights and hazard lights shall be operational on both Trams even if the Tram being assisted has no battery power available.
- The Tram will have a true reverse direction capability from a leading cab, to allow the uncoupling of one Tram from another. This will be enabled with the use of a sealed switch.

24.33 Exterior Details and Livery

The exterior livery shall be as set out in Section 5 of these Employer's Requirements.

The paint shall typically be water based and should allow for the application and removal of advertising vinyl coverings without damage.

The Infraco shall ensure that the repair methods for the Tram shall be defined by the Tram Supplier and shall not import undue risk with regard to the processes and materials used.

The external lighting shall comply with Her Majesty's Railway Inspectorate Railway Safety Publication, Part 2, The Road Vehicles Lighting Regulations, 1989 and the amendment 1994.

The external lighting shall consist of Light Emitting Diode (LED) arrays wherever practicable, and shall be composed of:

Facing forward

- Two white dip-able symmetric headlights;
- Two white front position lights (integrated in the headlight cluster)(side lights);
- One fixed white centre headlight located centrally above the windscreen;
- Two amber direction indicators; and
- Two end outline marker light (white, at high level).

Facing rearward

- Two red rear position lights (tail lights);
- Two red brake lights;
- Two high intensity rear fog lights (red);
- Two amber direction indicators; and
- Two end outline marker lights (red) (at high level).

Side Markers. Four, or more, amber LED combination lights down both sides working as:

- Side marker lights;
- Direction indicators; and
- Side reflectors.

The Tram exterior shall be designed so as to prevent surfing by any individual.

The Tram exterior finish shall allow for easy repair to accidental damage and severe attacks of graffiti. The finish shall allow for the easy application and removal, if required in the future, of special finishes for advertising, such as self-adhesive vinyl.

24.34 Roof-Mounted Equipment

Much of the electrical traction and auxiliary equipment will be housed in equipment cases located on the roof of the Tram. The equipment cases will be robust, weatherproof and suitable for storage and operation in an exposed position. All enclosures will minimise the risk of condensation, and provide adequate and effective ventilation for cooling where required. The normal working of the roof-mounted equipment shall not be adversely affected by dust, wind, rain, snow or ice.

Access to the equipment within the equipment cases will be quick and straight-forward for suitably qualified and trained staff, working from high-level platforms. Standing areas shall have non-slip surfaces. Due regard will be given to the safety requirements considering the location at height and the working voltage. Specific measures will be required to mitigate the risk from charged capacitors and batteries, and equipment likely to be at high temperature. All metal enclosures shall be suitably earthed to the vehicle structure.

All the roof-mounted assemblies shall be easily removable with the minimum amount of disruption to the Tram, to allow repair by replacement. The use of plugs and sockets to allow quick connection and disconnection of assemblies is preferred. Cabling and piping shall be protected from accidental damage.

As far as is practicable, the equipment will be equally divided between the two end sections of the Tram to equalise weight distribution.

The location of the pantograph will be determined by the layout of the Tram and shall be mounted above a bogie and as near to the centre of the Tram as possible.

24.35 Pantograph

Infraco shall ensure that the pantograph for the tram fleet shall be supplied by Tramco.

The governing specifications for the pantograph shall be BS EN 50206-2, BS EN 50119 and Railway Safety Publication 2 - Guidance on Tramways, issued by the Office of the Rail Regulator.

The wire height requirements shall be confirmed, including the operational wire heights within the depot buildings, over-bridges and high load route areas.

A single roof mounted pantograph shall be provided compatible with the Edinburgh Tram Network OLE.

Failure of any porcelain insulators on the lightning protection or other equipment shall not allow flexible cables to fall onto the vehicle roof.

The pantograph mechanism shall raise and lower using an electric drive system. In the event of failure or emergency situation, it shall be possible to lower the pantograph using a hand-crank operated from inside the Tram.

In developing the OLE design, the following pantograph / OLE characteristics have been assumed.

- Maximum wire height 6.8 m
- Minimum wire height 4.3 m
- Profile to be developed
- Overall Collector Head width 1850mm assumed
- Carbon length 1000mm minimum
- Collector Head Depth 250mm
- Along track length to be developed
- Head mass (to be as low as reasonably achievable)
  - (a) Carbon 13.0 kg assumed
  - (b) Metallised Carbon 15.0 kg assumed
- Articulation (frame) dynamic mass 12.0 / 16.0 kg
- Head suspension 12000 N / m
- Frame damping raising 60 / 100 N sec / m
- Frame damping lowering 60 / 100 N sec / m
- Head suspension damping 8 / 12 N sec / m
- Quasi-static contact force 90 N / 180 N
- Friction frame hinge 8 N / 10 N

25 Tramstops

This Section of the Employer's Requirements defines the Tramstop requirements applicable to the Edinburgh Tram Network which the Infraco must comply with.

25.1 General

The Edinburgh Tram Network shall have Tramstops provided at the locations shown in Figure 1 – Edinburgh Tram Phases 1a and 1b Network Diagram of these Employer's Requirements.

All elements of the Edinburgh Tram Network infrastructure shall be designed, manufactured and installed to provide a layout and a suite of furnishings reflecting a fully integrated system and shall be of an economical design and construction that shall reflect economy of use, maintenance, overhaul and renewal.

Provision shall be made, in the form of space, agreed fixing details, local cable routes for data, power and lighting (where appropriate) for a local termination point (Tramstop equipment cabinet), to be provided at all Tramstops.

The Tramstop design aesthetic shall extend to the design of the associated street furniture cabinets, trackside isolator cabinets, point control, point heater cubicles, road junction control cabinets, detector loop cabinets, etc. which shall be visually compatible with the Tramstop furniture. Particular note shall be paid to the requirements laid down in the Tram Design Manual to ensure compliance.

The emphasis on this co-ordination shall ensure an integrated design approach within the urban environment.

25.2 Tramstop Definition

Tramstops shall provide passengers waiting for, entering or leaving the tram system with safe, comfortable, environmentally friendly, informative, high quality access and egress facilities.

Tramstops shall be of the following three types:

- Island platform stops;
- Side platform stops; and
- Combined side and island platform stops.

Platforms shall be long enough to cater for nominal tram vehicles with the extreme distance between the outer edges of the end passenger doors of the vehicle of up to 38.13 m.

Side platform stops shall provide passengers with an effective circulation area and shall be a minimum of 3.0 metres wide. Island platform stops shall be a minimum of 4.0 metres wide unless otherwise agreed with **tie**. A stopping tolerance of plus/minus 2.0m shall be allowed for in the platform length.

All platforms shall contain a minimum clear unobstructed envelope.

The platform height shall match the requirements of the tram to ensure level access in accordance with RVAR (Rail Vehicle Accessibility Regulations).

The layout of architectural elements on the platform shall be arranged to provide the user with ease of access and passage on / off the trams.

Access routes serving the platform shall be appropriate for the level of pedestrian activity and be, where practical, a direct route from key passenger generators.

Key views and vistas of the City of Edinburgh shall not be unnecessarily interrupted.

Platforms shall provide passengers with a clear view of approaching trams.

Tramstops shall maintain consistency of alignment with the track.

A Tramstop shall be defined as:

- That area bounded by the rear of any platform structure and the track crossing points at either end; (or for central stops the external track edge between the track crossing points at either end);
- Including any underground service ductwork and cabinet specifically associated with the stop, outside this zone in the immediate vicinity;
- Including all dedicated access routes to the nearest public road or key passenger generator; and
- Including all structures, systems (including cabinet), finishes etc required to deliver the functionality of the Tramstop.

25.3 Tramstop Requirements

25.3.1 General

Tramstop architecture shall reflect a coordinated design consistent with the overall design aspirations as outlined in the Tram Design Manual and in the CEC Code of Practice for Access and Mobility and shall be subject to the approval of **tie**.

All components used in the construction of the Tramstop shall comply fully with relevant British and European Standards.

Tramstops shall be compliant with amongst others:

- The requirements of the Tram Design Manual;
- Railway Safety Publication 2 – Guidance on Tramways, issued by the Office of the Rail Regulator;
- Disability Discrimination Act requirements;
- The outcome of consultation with the Mobility and Access Committee for Scotland (MACS);
- The Department for Transport Inclusive Mobility Guide to Best Practice on Access on Pedestrian and Transport Infrastructure; and
- The Building Regulations (Part M).

Reference should also be made to:

- Mobility-impaired access and egress to and from each platform, the minimum width of ramps provided on the Edinburgh Tram Network System shall be 2.0m between handrails;
- Ramps, if required, shall have a maximum gradient of 1 in 20;
- No ramp shall be longer than 10m without the incorporation of a landing;
- Landings shall be no shorter than the width of the ramp; and

- Mobility impaired tram access/egress points shall be clearly defined within the platform finish if required by the tram design and consistent with tram stopping tolerances.

Tramstops shall be of a design that ensures the mobility impaired are able to use them and all parts thereof without hindrance or confusion. All walking routes approaching or within the Tramstop area shall be clear of any form of obstruction.

Provision shall be made for those who require to use canes e.g. inclusion of tapping rails. Guardrails shall be provided with handrails.

Where appropriate, Tramstops shall be provided with handrails, balustrades, and general platform furniture, other than seating, of a design that inhibits their use as seating or as a climbing medium.

Tactile surfacing shall be provided as appropriate e.g. at platform edges, stairs or ramps (if applicable), and at dropped kerbs.

25.3.2 Platform Surface

The general platform surface shall be in accordance with the Tram Design Manual and will vary dependant upon location, but in all instances provision shall be made for tactile strips (400mm wide) to assist the visually impaired along the platform edge. The platform edge shall have a suitable 65mm wide delineation of the white or alternative inset line to the leading edge of the line-side coping, or other equivalent visual feature.

Disabled boarding points shall be indicated, if required, by use of tactile material indicating the position of the relevant tram doors.

Platform surfaces shall have a nominal cross fall away from the platform edge of 1:40 to a slot drainage system. Platform drainage will be dependant upon local topographical criteria.

The platform top surfaces shall be slip resistant and durable. Transition zones shall be provided, free of trip hazards, which can be clearly differentiated by those who are visually impaired.

25.3.3 Tramstop Furniture and Equipment

All Tramstop furniture and equipment on the platforms shall be constructed of materials and finishes that are resistant to scratching and ensure the easy removal of graffiti.

Emphasis shall be given to the reduction of 'clutter' and where possible elements shall be combined to provide a dual functionality.

The Tramstop furniture and equipment shall be designed to allow easy replacement of damaged components without affecting equipment, lighting and seating.

Tramstop furniture and equipment shall be designed to support the passenger service without maintenance intervention that results in any form of disruption to the service during service hours. The equipment provided at each location shall be appropriate to that location to limit any unnecessary clutter at Tramstops.

Tramstop furniture and equipment shall be of a modular design based around simple geometric shapes and of modular construction to enable their rapid replacement.

Components and materials shall be of a quality suitable for use in a densely populated and marine environment.

The design of the Tramstop furniture and equipment shall ensure that minor inspection, repairs and maintenance, including lamp replacement, can be carried out during the operational day with the minimum of disruption to passengers, and without disruption to passenger services.

25.4 Description of Tramstop and Street Furniture

25.4.1 General

Each Tramstop shall include the following components:

- Passenger Shelter / Canopied Waiting Area;
- Passenger Help Point;
- Passenger Emergency Call Point;
- Closed Circuit Television Cameras;
- Real Time Passenger Information Display Bus Tracker Reporting (where identified);
- Braille assistance;

- Public Address;
- Information Panel;
- System Logo and Stop Name;
- A perch rail/seat; and
- Advertising panel (6 sheet) - if permitted by Planning Authority;
- Ticket Vending Machines;
- Lighting;
- Litter bins.

Equipment placed on platforms shall not prohibit passengers from having a clear view of an arriving tram.

25.4.2 Shelters and Canopied Waiting Areas

Each platform shall contain facilities to provide passengers with weather protection (e.g., wind, snow and rain) in the form of a canopy or shelter designed and constructed to provide maximum visual transparency with minimum visual impact, consistent with offering the required protection.

Tramstop shelters shall be of a modular design based around simple geometric shapes, providing the necessary requirements for passenger use and comfort. A clear uninhibited view of arriving trams shall be available to passengers from within the shelter area.

Tramstop shelters shall permit future easy alteration to the capacity in terms of volume of passengers and equipment to meet emerging needs.

Lighting within the shelter shall provide a minimum of 50 Lux evenly distributed (controlled by sensor).

All shelters shall be provided with adequate drainage facilities to ensure all rainwater is carried away into the Tramstop drainage system.

Side infill panels together with back panels shall be of toughened transparent glass to provide a light visual appearance and with the Roof panel of complementary quality to provide passengers with protection from the weather. The design shall be such that it provides a safe environment for passengers in the event that glass panels are missing from the shelter as a result of breakage. The design of the shelter shall also take account of access requirements for maintenance and repair purposes.

Side panels shall provide sufficient depth to give weather protection but not obstruct the safe use of the Passenger Emergency Call and Help Points and shall meet the requirements of the visually impaired.

Shelter roofs shall be profiled to prevent build up of litter / debris on the top surface. The shelter structure, roof and wall panels shall, as far as is possible, be made from proprietary components in order to facilitate ease of replacement and repair.

25.4.3 Tramstop Lighting Columns

Platforms shall be provided with a minimum illumination level of 30 Lux.

Lighting shall be low energy, avoid glare to tram drivers and road users, have good colour rendition and be provided throughout the whole of the area occupied by the Tramstop.

The Tramstop lighting shall differ from the adjacent urban and or city lighting and shall emphasise the presence of the Tramstop to enable passengers to identify the Tramstop from a distance. Consideration should be given to the requirement to make use of local ambient lighting (which may need to be enhanced) to avoid additional clutter at the Tramstop.

Access routes to the stops shall, wherever practical, use existing street lighting as the sole or primary means of illumination. Where this is not possible then lighting of a similar level to the local road lighting shall be provided.

All platform shelter / canopy lighting shall enhance security in the waiting area.

Tramstop lighting shall not conflict with the requirements for Closed Circuit Television coverage and shall permit the attachment of other stop furniture or equipments as required.

Hinged columns, hinging parallel to the track, shall be provided for ease of maintenance.

Tramstop emergency lighting facilities shall be provided in all shelters where the adjacent road lighting would be inadequate in the event of a Tramstop power supply failure.

25.4.4 Tramstop Name Signs

Each Tramstop shall include an illuminated pole mounted Logo, or more than one if there are more than one access points from a public road, or a sign incorporating the Edinburgh Tram Network corporate identity visible from a distance of 50m.

Each Tramstop shall be provided with Tramstop name signage as part of the general furniture arrangement on each platform.

Tramstop name signs shall be legible to tram-borne passengers as early as possible on their approach to the platform.

An appropriate number of stand-alone Tramstop name signs shall be provided along the length of each platform. The construction and materials shall form part of the "family" of components forming the Tramstop furniture.

The Tramstop name sign support structures shall be incorporated within the line of any guardrails, should these be provided, and into the advertising / information display.

The Tramstop name signs and Logo shall be illuminated and shall be displayed on the tram arrival side of the shelter as well as along the platform.

25.4.5 Advertising / Information Signs and Displays

A Real Time Passenger Information Display (double sided) shall be provided at each platform.

This shall take the form of a dynamic multi line visual display which is legible in all weather conditions to passengers having normal vision and standing at a distance of 10.0m away.

The Real Time Passenger Information Display shall comply with the requirements described in the Employer's Requirements.

Passenger information regarding the tram service and safety notices shall be provided at all Tramstops in both writing and Braille.

All passenger-operated equipment shall be provided with clear unambiguous operating instructions in both writing and Braille.

A suitably enclosed weatherproof map (part of the Tramstop furniture) of the local area, bearing the words 'You are Here', shall be located in each platform shelter.

A suitably enclosed weatherproof information display or displays (indicating the locations of adjacent bus stops and bus related information, hospitals, local amenities and places of interest) shall also be located at each platform access/egress position.

At appropriate key interchange locations (refer to 35.4.1 - Overview to the Passenger Information Display System), provision shall be made within the Tramstop layout to provide a bus tracker information panel, which shall be provided and installed by others.

25.4.6 Litter Bins

Litter bins, where provided, shall be stainless steel (Minimum Grade 304 to BS 5135) to facilitate easy cleaning and shall have a lockable removable bin liner.

The location of bins shall not obstruct the main passenger circulation routes and shall ensure convenience of use.

A minimum of two litter bins per platform shall be provided each positioned mid-point between the shelter and the end of the platforms.

Lockable access covers shall be provided and the bins shall be designed to limit entry and retention of liquids.

The bin size shall be determined on the basis of a single collection per day.

25.4.7 Public Address

Speakers shall be provided at each lighting pole location and within the shelter to enable passengers to receive messages without volume settings being high and causing nuisance outside the area of the platform.

Induction loops shall be provided within the central area around the shelter position.

Further details of the public address system are contained in Section 35.13.2 – Workstation Capabilities.

25.4.8 Tramstop CCTV

Closed Circuit Television (pan, tilt and zoom) digital colour cameras shall be provided on each platform to enable colour pictures to be displayed at the Control Centre and other Closed Circuit Television monitoring authorities.

The canopies / shelters, stop lighting and publicity / information displays shall not inhibit the Closed Circuit Television coverage of the Tramstop or platform.

The total number of cameras on each Tramstop shall be dictated by the physical restraints associated with each individual Tramstop, however, a minimum of one per platform shall be provided.

25.4.9 Passenger Help Points and Passenger Emergency Help Points

Tramstops will be provided with one combined Passenger Help Point and one Passenger Emergency Help Point on each platform, providing two-way (duplex) audio communication between a person located on the platform and the operator located at the Control Centre.

The Passenger Help Points / Passenger Emergency Help Points detailed arrangements shall be in accordance with Section 35.13.2 – Workstation Capabilities.

25.4.10 Guardrails, Handrails and Cycle Racks

Platform guardrails shall be provided to the rear of any platform where there is a potentially dangerous interface with passing road vehicles, Network Rail or a significant change in level.

Splashguards shall be provided in vulnerable locations.

Where provided, guardrails shall be set at 1150mm above platform level and comply with the requirements for the mobility impaired.

Cycle parking frames will be provided at each Tramstop, where this is appropriate. These will be positioned within view of the Closed Circuit Television surveillance system.

25.4.11 Seating

Bench seats (with integral arm rests and perforated seating structure) shall be positioned on each platform and within each shelter a perch rail / seat shall be provided, designed to prevent the retention of liquids. In all instances the under seat space shall be open to meet security requirements.

25.4.12 Ticket Vending Machines (TVMs)

Ticket vending machines shall be located within or adjacent to the shelters. The TVMs shall be positioned in an appropriately shaded location to assist users in reading the machine's visual display. Ticket vending machines will be supplied to the Infraco, as free issue, by TEL.

Infraco shall make provision for the power and communication cable routes, cables and draw wires from the Tramstop equipment cabinet to the proposed ticket vending machine locations.

Sufficient spare ways within the power and equipment cabinet to accommodate ticket vending machines and a local ticket vending machine network connection will be provided. Further details regarding ticket vending machines can be obtained in 36.5 of these Employer's Requirements.

25.5 Electrical (LV) and Communication Facilities

All Tramstop electrical (LV) and communication equipment shall be accommodated within a Tramstop equipment cabinet. LV supplies shall be provided to the equipment cabinet from which local electrical supplies to Tramstop equipment will be fed.

A 230V, 13A or equivalent socket shall be provided within the Tramstop equipment cabinet.

A 110V supply shall be provided at a suitable location on each platform for cleaning purposes.

All power requirements for the Tramstop infrastructure and adjacent infrastructure equipment will be sourced from the local Distribution Network Organisation supply. All power supplies shall be adequately rated to support the requirements of the Tramstop equipment.

25.6 Layover Facilities

Layover facilities shall be provided in accordance with Section 2.15.

26 Track

This Section of the Employer's Requirements defines the Track requirements applicable to the Edinburgh Tram Network which the Infraco must comply with.

26.1 Track Layout

The Infraco shall ensure that the track layout shall be in accordance with ETN Diagram at Figures 2 & 3 – Edinburgh Tram Phases 1a and 1b Network Diagram

26.2 Components

Trackwork components to be provided shall include, but are not limited to, the following:

- Rails (relate to Wheel / Rail interface: N.B. inc. hardness related to welding repair);
- Sleepers and points and crossing bearers;
- Turnouts;
- Points and points motors;
- Points baseplates and slippers;
- Points rollers;
- Crossings;
- Check rails and check rail fastening systems;
- Guard rails and guard rail fastening systems;
- Transition rails;
- Rail joints (fishplated and welded);
- Insulated rail joints;
- Isolatable rail joints and provisions for access to associated rail/cable connections;

- Rail movement joints;
- Rail fastening systems;
- Rail pads;
- Baseplates;
- Resilient baseplate systems;
- Rail embedment for street running track;
- Paved trackbed and concrete trackbed systems;
- Grooved rail drainage systems (including boxes);
- Buffer stops and vehicle arrestor systems;
- Ballast;
- Granular filtering;
- Granular blanketing;
- Geotextile membranes;
- Plastics membranes;
- Geosynthetic reinforcement;
- Provision and installation of signs and markers; and
- Grasstrack.

26.3 General Requirements

Tracks shall be designed and constructed for left-hand running under line of sight operation.

The maximum design speed shall be 80 km/h.

Where the Edinburgh Tram Network runs within an urban environment on non-segregated sections of tramway, the speed limit shall be the same as that for motor vehicle traffic.

The trackforms shall be applied as indicated at the documents System wide trackform Surface Finishes Version 3 ULE90130-SW-DRG-00069.PDF, ULE90130-SW-DRG-00070.PDF and ULE90130-SW-DRG-00071.PDF

The track shall facilitate ease of construction and minimise disruption to other road users and the public during the construction phase on all roads and across all junctions between Haymarket and Ocean Terminal via Princes Street.

The track shall minimise the potential for stray current and be in accordance with the requirements and codes of practice for stray current and the **tie** Earthing and Bonding Policy document. As the valid standard the EN 50122 shall be in force.

Ensure simplicity of overall maintenance and ease of rail replacement and relaying, minimising the disruption to other road users.

The track shall comply with the operational noise and vibration requirements as stated in the **tie** Noise and Vibration Policy. Detailed technical solutions will be determined during the Detailed Design Phase for areas identified as sensitive to Noise and Vibration. The assessment of these solutions shall be in line with the characteristics of the vehicles, the existing sub-structure and the structures adjacent to the track-bed.

The track shall integrate fully with roads, such that differences in roads surfaces, specifically finished levels and skid resistance, are minimised as far as is reasonably practicable.

The track shall integrate fully with surrounding area functionality and appearance, to ensure that hazards to pedestrians, the mobility impaired and cycle users are minimised as far as is reasonably practicable, and such that track surface finishes are in accordance with all design requirements, guidance and aspirations.

Adequate track formation shall be provided to facilitate the secure foundation for track installation.

The in-street track formation shall be of shallow design such that it permits minimum amount of public utility diversions and aids the high speed construction of the tramway.

The surface at pedestrian crossing points shall be level with the top of the running rails and surfaced in non-slip materials. These materials shall be chosen to be reasonably consistent with the character of the locality whilst providing clear indication to all users (including the visually impaired) of the correct point to cross the track and the extent of the Edinburgh Tram Network environment.

Track shall be a standard tramway track with steel rails set to Standard Gauge (1.435m) and shall be compatible with the Edinburgh Tram Network trams.

On ballasted sections of the route, road/rail equipment will be used for maintenance tasks such as tamping. These machines shall be equipped with suitably profiled wheels.

26.4 DKE, Structure Gauge and Clearances

The DKE adopted shall be the "Assumed Tram for Design", as presently defined in the SDS design documents.

Structure gauge and clearance drawings shall include the standards for staff maintenance walkways and tram evacuation walkways.

Adequate walkways are required throughout the route off-street. Appropriate signing shall be included to indicate the walkway.

26.5 Trackforms

Various trackforms, as presently shown in the SDS design documents, are required to suit the different domains in which the track lies along the route and in the Depot and sidings. The different trackforms provided shall comprise, but not necessarily be limited to:

- Flush-finished track in road areas and at Tramstops, including mixed operation with traffic of various kinds, or not; and with a variety of surface finishes;
- Track with grass flush finish;
- Track with plain concrete flush finish (e.g. in the depot and for certain structures, e.g. the A8 Underpass);
- Direct fixation track on structures;
- Ballasted track; and

- Special trackforms in the depot or at Tramstops.

The trackforms shall be designed and installed to take full account of the requirements for future maintenance of components, e.g. life-extension of rails by welding in situ, and the adjustment of the levels of rails and the adjacent surfaces, and of sectional renewal.

26.6 Specific Technical Requirements

Retention of alignment on small radius curves in the case of ballasted track where rails are continuously welded shall be considered. A minimum radius shall be established for the application of ballasted track, with an appropriate alternative trackform applied elsewhere.

For in-street track construction, and in the absence of sleepers or similar, a means of retaining the lateral and rotational position, such as tie-bars of the rail together with the track gauge shall be provided.

A standard trackform shall be provided which shall comprise a slab that shall be suitable for any of the road, pavior / block / sett and grass surface finishes. In effect the surface finishes shall be interchangeable without having necessarily to redesign or reconstruct the whole slab.

A special track form shall be used at sensitive locations to mitigate against ground borne noise and vibration. These locations will be identified by the Infraco in agreement with **tie**.

At the end of all terminating tracks, provision shall be made for a device for arresting Trams. These devices may include sliding friction or fixed type buffer stops, sand drags, architectural features such as planters, wheels stops or other means. The choice of such device(s) shall be made through risk analysis of the location, taking into account the risk to passengers, pedestrians and staff and to the vehicles and surrounding environment.

Rail shall be continuously welded wherever possible. The use of fish-plated joints shall be avoided although fishplated track may be proposed in the Depot to avoid the requirement for rail movement joints at turnouts.

26.7 The Wheel / Rail Interface

A report has been produced by SDS (ref: ULE 90130-SW-REP-00130 v3) which shall form the basis of development of this critical interface. The key factors will be recorded here.

26.8 Drainage

Drainage from trackwork shall be interfaced with the road and civils drainage systems. Adequate drainage within the trackwork system shall be provided such that the integrity of the installations is secure.

The Edinburgh Tram Network shall have a drainage system that, as a minimum, achieves accepted EU or BS standards and Good Industry Practice.

The drainage of all new bridge structures shall be positive and, unless otherwise required by the relevant local authority, all surface water shall be piped to the local storm water sewer systems by a defined drainage path.

Particular attention shall be paid to ensure that surface water drainage systems in the vicinity of traction substations and cable ducts are routed to avoid any risk of flooding of electrical equipment areas, point machine chambers, and the ducts themselves.

For on-street track, the track drainage system shall incorporate an insulated break from the storm water system.

Drainage proposals including any new flows into existing drains and the method of connection shall be approved by Scottish Water, SEPA and the City of Edinburgh Council Roads Department as appropriate.

26.9 Technical Requirements for Points and Crossings

All turnouts, crossings and interruptions to the continuity of the rail head shall be equipped with flange running sections or other design which minimises joint noise.

The design shall minimise flange squeal through tight radii and through junctions.

Points shall be provided with two movable blades so mounted to allow the use of magnetic track brakes and their safe passage through the point and crossing.

All points shall be freely trailable without damage to the blades or mechanism.

Points and crossings shall be designed so that they are capable of through stressing as required.

All points on the main line, likely at some time or another to be taken in the facing direction (including trailing, emergency crossovers), shall be equipped with detection and indication. Indication of trailing points likely to be taken at high speed shall be considered.

All points, when operated by hand lever, shall be capable of being thrown fully, by one throw of the lever, by a male or female person of slight build, without undue effort or strain. To this end, the maximum required effort to change the points shall not normally exceed 230Nm.

Some form of indication shall be incorporated into the mechanism to indicate that the point has thrown fully. Lever mechanisms requiring repeated operation to throw the points are not acceptable.

Efforts should be made to reduce friction and the effort to throw the points. Flange relief of the point tongues is one such feature.

Point tongue profiles and movement on all points shall conform to the same dimensions and tolerances.

Design tolerances shall be maintained in service with a relatively low level of attention.

Designs with potential for high wear rates or other high maintenance features are not acceptable.

Designs with the potential for lengthy infrastructure replacement periods are not acceptable, particularly in on-street areas.

Adequate, functional drainage must be provided to ensure that rail grooves and point machine pits are kept clear of rainwater, sand and rubbish from the street etc.

Pointwork in the depot site area shall be installed in a flush-finished trackform for 9 turnouts and 1 crossing at the beginning of the depot area. This flush-finished trackform will be designed for re-railing purposes only.

26.10 Technical Requirements for Point Operation

26.10.1 Point Machines and Mechanisms in General

All point machines, whether powered or not, shall be from the same family of machines and provided by the same supplier.

Point machines shall allow the points to be 'freely' trailable without damage to the blades or mechanism.

In street running track, point machines shall be installed between the rails of the track.

On ballasted track, in order to facilitate maintenance, they shall be installed to the side of the track, on the outside of a typical two track layout.

Point machines shall be capable of manual operation in a single throw by tram drivers using a removable point bar to be carried in the Tram drivers cab. Only one form of point bar shall be utilised on the system.

It shall be possible for the points to be changed by a male or female person of slight build, without undue effort or strain when the points are not affected by snow or ice. To this end, the maximum required effort to change the points shall not normally exceed 230Nm.

When operated by hand using the standard points operating bar, it shall not be possible to inadvertently partially throw the points, which shall always throw sufficiently to make the respective detection circuits at each lie of the points with a single movement of the lever.

A total number of 70 point operating bars shall be supplied.

All combinations of points and point machines shall be validated to demonstrate that:

- The machines shall exert sufficient force under all foreseeable circumstances to move the points blade into the required position;
- The points shall close and lock reliably under all foreseeable operating conditions;
- Detection settings shall have adequate maintenance tolerances to ensure that points detection setting testing shall be required no more than monthly on all points;
- The wheel/rail interface at the toes of the points shall be such that there is no derailment risk under all combinations of wheel wear, rail wear, and detection settings;
- Any tram driver shall be able to operate all points safely and without risk of injury; and

The enclosing case of the Point Machine shall be to Class IP 67 and be drained.

Point Machines shall not be overstressed in performing its duty. Efforts should be made to minimise friction and the effort to throw the points. Flange relief of the point tongues is one such feature and there are others such as PTFE slides and supporting rollers.

The flangeway in advance of the point tips shall not be less than 41mm. It shall be consistent with the wheel/rail interface report.

The amount by which nominally 'closed' point tongues may be open at their tips whilst still providing detection, shall be agreed as a part of the wheel/rail interface criteria.

Each Point Machine shall be clearly identified and robustly labelled.

Point Machines of all types and their drive and detector rods shall be insulated from the running rails and from the surrounding earth. Separate earthing connections for the drive motor (where fitted) and the machine case shall be provided.

Point Machines of all types shall normally not require maintenance more frequently than at three-monthly intervals although inspection may be carried out more frequently.

All Point Mechanisms shall incorporate at least one volt-free change-over contact in both the 'Normal' and 'Reverse' positions, in addition to those required for detection purposes.

In the case of Point Machines incorporating an over-centre device, it shall not be possible for the machine to be set in the 'null' position during powered or sprung operation, as applicable.

26.10.2 Specific Requirements for Motorised Point Machines

The Point Machines will operate from a 230Vac supply.

The Point Machine shall be capable of operating the two point tongues for the full throw required to provide the standard 'blades open' gap, to clear the backs of the flanges of the wheels. However, the throw shall not be so great as to flex the tongues further than necessary, thereby introducing unnecessary stress in the track components and load on the operating machine mechanism. This dimension 50mm,+5/-0mm will be finalised after the wheelset profile has been determined and the Wheel-Rail Interface Report has been finalised in the Detailed Design Phase.

26.10.3 Specific Requirements for Sprung Point Mechanisms

The Spring Point Mechanism shall be capable of being biased to effect a route to either lie of the points. The mechanism shall normally set the points in their 'Normal' position but by adjustment, they shall be capable of being set in the 'Reverse' position.

In both cases, it shall be possible to change the lie of the points using the standard points operating bar with an effort not exceeding 230Nm.

Only the incursion of a foreign body in the space between the point tongue and the stock rail shall prevent a satisfactory change in the lie of the points.

The lie of the points shall be continuously maintained in the 'Normal' (or if adjusted, 'Reverse') position by adequate spring pressure.

After having been forced across by the passage of a tram, the mechanism shall positively return the points to the 'Normal' position and provide the standard 'blades open' gap, to clear the backs of the flanges of the wheels.

If possible, by the rearrangement of components, the Spring Point Mechanism shall be convertible into a Bistable Point Mechanism for the avoidance of spares duplication.

26.10.4 Specific Requirements for Bistable (flip-flop) Point Mechanisms

The Bistable Point Mechanism shall be capable of being biased to effect a trailing route through either lie of the points, by use of a standard points operating bar. The mechanism shall normally retain the points in the position last trailed. However, by operation using the approved points operating bar, they shall be capable of being set in the alternative position.

Only the incursion of a foreign body in the space between the point tongue and the stock rail shall prevent a satisfactory change in the lie of the points.

The lie of the points will be continuously maintained in the position last trailed by adequate spring pressure.

After having been forced across by the passage of a tram, the mechanism shall positively leave both blades of the points held firmly across with the 'closed' point against the stock rail and provide the required 'blades open' gap, to clear the backs of the flanges of the wheels on the other side.

The amount by which nominally 'closed' point tongues may be open at their tips shall be within the same tolerances specified for points operated by powered Point Machines.

If possible, by the rearrangement of components, the Bistable Point Mechanism shall be convertible into a Spring Point Mechanism for the avoidance of spares duplication.

26.10.5 Specific Requirements for Hand-Operated Point Mechanisms (Point Levers)

Points operated by Hand-Operated Point Mechanisms shall normally be traversed in the facing direction subject to a 10 km/h track speed limit.

One throw of the lever shall fully throw the points to either 'Normal or 'Reverse' positions. Levers which require one or more attempts to complete the operation are not acceptable.

It shall not be possible to inadvertently partially throw the points, which shall always throw sufficiently to allow the respective 'points thrown' indication at each lie of the points to be given with a single movement of the lever.

Only the incursion of a foreign body in the space between the point tongue and the stock rail shall prevent a satisfactory change in the lie of the points.

After having been thrown, the mechanism shall positively leave both blades of the points held firmly across with the 'closed' point against the stock rail and provide the required 'blades open' gap to clear the backs of the flanges of the wheels on the other side.

The amount, by which nominally 'closed' point tongues may be open at their tips, shall be within the same tolerances specified for points operated by powered Point Machines.

26.11 Technical Requirements for Point Control and Indication

26.11.1 Detection

Where detection and indication is required, the mechanism shall be fitted with detection equipment capable of differentiating between a 'safe' and 'unsafe' gap. When closed, the detectors must be capable of detecting a minimum gap of 1.5mm although the 'unsafe' gap detection including a safety margin will be slightly greater than this at 2.5mm, +0/-0.5mm between the closed point tongue and the corresponding stock rail at each lie of the points. To be confirmed with wheel/rail interface criteria.

Each point tongue shall be independently detected through a separate mechanical connection to the point tongues, independent of the drive rod connection and as close as practicable to the tip of the tongue. Totally enclosed proximity switches are preferred for this duty.

26.11.2 Control

The Point Controller shall receive information from the Tram Position and Detection System (TPDS) and set the Points and Point Indicators and shall be driven by the output from the point detection.

The Point Controller shall acknowledge the requests from TPDS and make all the necessary safety checks before commanding the point machine to move the points.

When the Point Controller causes the Point Machines to change the points, it shall monitor the detection contacts in the associated Point Machine(s) to determine whether the points have fully thrown.

Once the points have been satisfactorily operated (i.e. been fully thrown), the Point Indicator shall show a sloping row of lights (or LED clusters), corresponding to the lie of the point to approaching trams. If the points have not fully thrown, a horizontal row of lights (or LED clusters) shall be displayed.

If an appropriate command has been set by personnel in the Control Centre, the Point Controller shall block any associated points requested by the tram on-board computer from its route code.

The Point Controller shall report to the adjacent Tram Position and Detection System and or SCADA when any of the following conditions apply:

- Failure of the Point Machine supply;
- Failure of the Point Indicator supply;
- Receipt of an indication of faulty point detection; and
- Failure of the Point Heaters supply.

When the relevant track circuits or mass detectors detect the presence of a tram in a prescribed area, the Point Controller will lock the points against any further signals to change them until the tram has left the prescribed area.

The Point Controller shall also afford the facility to set and control the associated points locally.

26.11.3 Indication

The lie of the points shall be indicated to trams approaching the toe of the points in a facing direction. Indication of trailing points likely to be taken at high speed shall also be considered. The specific requirements at each location are defined on the track layout diagram.

The basic technology and design of the point indicator shall be same as the tram signals. The colour shall not be white, red or green.

Point indicators shall exhibit the following standard aspects to drivers:

- Points set to left hand route: diagonal row of lights sloping upwards towards the left;
- Points set to right hand route: diagonal row of lights sloping upwards towards the right; and
- Points not detected: horizontal bar

The indicator shall be placed for visibility to the tram driver in the same basis as tram signals.

The means of illumination shall be by LEDs.

A minimum of five clusters in each row shall be provided.

All Point Indicators shall be located in agreement with the Operator and shall be co-located where relevant with tramway signals.

Each Point Indicator shall be clearly identified and robustly labelled.

The aspect shall be clearly visible in all weather conditions.

The Point Indicators shall normally not require maintenance more frequently than at three-monthly intervals although inspection may be carried out more frequently.

26.11.4 Control Cabinet

Controls to set and control the associated points locally shall be provided in a cabinet. These shall be operable while the relevant points are in direct view of the person operating them.

The Point Controller cabinet shall contain the power supply for the operation of the associated points and to all associated Point Indicators.

The Point Controller cabinet shall contain and control with an input from the SCADA system, the power supply to the point heaters mounted on the associated points.

The Point Controller shall not require maintenance more frequently than at six-monthly intervals although inspection may be carried out more frequently.

26.12 Indication of Hand Operated Point Mechanisms (Point Levers)

The lie of the points shall be indicated to trams approaching the toe of the points in a facing direction.

Upon the operating lever being thrown, a simple mechanical device will detect that the closing point tongue has closed to within the permitted tolerances specified above.

Detection of the fully thrown condition shall cause a mechanical indicator to display a corresponding indication to the tram driver. The indicator shall present an indication equivalent to that shown on lit indicators and be visible from the normal tram driver's operating position in the cab, when the tram is 5 metres to the rear of the point tips, in daylight and illuminated by the tram's headlights after dark. Failure to close the tongue to within this tolerance shall not allow the indicator to show a 'points thrown' indication. Both point tongues shall be detected, either individually or as a coupled pair.

26.13 Technical Requirements for Points Heating

Points heating systems will allow the efficient operation of points in low temperatures and shall be such that the components will not intrude into the surrounding infrastructure.

Points heating shall be electrically powered and shall be controlled automatically by sensing when the predefined temperatures for activation and deactivation have been reached.

Point Heating devices shall provide health status information via the SCADA to the Control Centre.

Point Heaters shall be capable of being manually activated and/or deactivated locally and from the Control Centre.

The locations at which point heating shall be provided will be agreed and shown on the track layout diagram.

Where more than one heater is controlled from a Point Controller, it shall energise each of them in sequence in order to limit the inrush current demanded.

The Point Controller shall monitor the local ambient temperature and humidity and control the supply to the point heaters accordingly.

The settings at which the point heaters are energised shall be adjustable within the limits of 0°C to + 5°C.

26.14 Tolerances

The following definition of construction and maintenance tolerances shall be developed and agreed between Infraco and **tie**.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Speed	Shared running	Maximum	kph		**50**	**50**	**50**
Speed	Segregated running	Maximum	kph		**80**	**80**	**80**
Speed	Depot	Maximum	kph		**15**	**15**	**20**

Table 62 - Speed assumptions and normal limitations

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Geometric element	Minimum length		m		**15**	**12**	**6**

Table 63 - Geometric Elements - Element lengths are tied to the tram length, specifically distance between bogies

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Horizontal radius - Minimum	Running lines	Slab track	m		50	30	25
Horizontal radius - Minimum	Depot lines		m		50	40	20
Horizontal radius curves	Distance between opposite flexure	Radii dependant - no transition curves	m	Considered minima dependant upon tram data	15	10	6

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Horizontal radius curves	Distance between opposite flexure	With transitions on adjacent opposite flexure curves	m	Exceptional to be considered individually (also refer wheelbase)	10	8	6
Horizontal radius curves	Distance between curves of opposite flexure	Turnouts - theoretical tangent points at switch toe to next tangent pt (of opposite flexure)	m	Considered minimums dependant upon tram data (wheelbase)	10	8	6
Horizontal radius curves	Distance between curves of opposite flexure	Turnouts - theoretical tan.pt. at switch toe to tan.pt. (of similar flexure)	m	Considered minimums dependant upon tram data (bogie axle ctrs)	5	3	2
Horizontal radius curves	Tramstops		m	Absolute minimums	Infinity	2000	1000

Table 64 - Horizontal Curves: Minimum requirements for horizontal curves including distances between similar and opposite flexure. Similar requirements also for horizontal curvature up to turnouts and through Tramstops.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Cant	Platforms		mm		0	0	0
Cant	Tangent track	Facilitate drainage	mm		0	15	15
Cant	Fixed Obtuse crossings		mm		0	15	30
Cant	Curves		mm	Subject to Tram	75	75	100
Cant	Plain line track – depot		mm		0	0	15

Table 65 – Cant: Maximum cant values

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Negative cant	Plain line		mm		0	15	15
Negative cant	Turnouts	Turnouts - when turnout is facing downhill on a grade	mm		0	0	15
Negative cant	Turnouts	Turnouts and acute diamond crossings	mm		0	0	15
Negative cant	Turnouts	Obtuse crossings in diamonds	mm		0	0	0

Table 66 - Negative Cant: Maximum allowable values which are particularly important with regard to turnouts and obtuse crossings.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Cant excess			mm	Subject to Tram	0	25	50

Table 67 - Cant Excess - Normally applied where slow speed running may be encountered, but does have some bearing in this concept.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Cant deficiency	Plain line		mm	Maximum	40	60	75
Cant deficiency	Plain line - Depot		mm		40	75	100
Cant deficiency	Through route of turnout	On tangent or curved track	mm		0	40	60
Cant deficiency	Turnout route		mm		40	60	75
Cant deficiency	Based on theoretical radius at switch toe	Cant deficiency based on theoretical radius formed by shortest wheel-base placed centrally at switch toe	mm		40	40	50
Cant deficiency - jerk	At switch toes Consider shortest wheelbase	Maximum permitted jerk rate at switch toes using theoretical radius formed by shortest wheel-base	m/s3	jerk = 0.2 m/s3	0.3	0.4	0.5
Cant deficiency - jerk	Plain line Consider shortest wheelbase	Maximum permitted jerk rate as a result of the geometry change and shortest wheel-base	m/s3		0.25	0.35	0.45

Table 68 - Cant Deficiency: Deficiency at the switch toe will require careful consideration, effectively setting speed restrictions. Particular impact on the criteria will be to assess jerk with reference to the shortest wheelbase.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Transition curves	Virtual Transition	Length basis	m	Subject to Tram	No use	1.8	1.8
Transition curves	Clothoid	Minimum length	m	Subject to Tram	15	10	6

Table 69 - Transition Curves - Dimensional requirements with some relationship to the tram dimensions

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Cant gradient	Cant gradient - Maximum permitted	RoCC may be overwritten by other minimums		Consider RoCC	RoCC	600	300
Cant gradient	Cant gradient - Minimum permitted				1500	2000	3000
Cant gradient	Switch toes				0	0	0
Cant gradient	Crossings and diamonds				0	0	0

Table 70 - Cant Gradient: Permitted maximums which, in effect, define twist parameters (dealt with later). Note: All the following apply only in the cases of applied cant on track on zero grade. For track on a grade or a vertical curve, where a twist in the track will arise from a horizontal curve, the maximum gradient that arises from applied cant must be less than the following limits (i.e. one in (value greater than following limits)) because an element of effective cant gradient will result from the combinations of horizontal curve and grade / vertical curve. In the latter cases the gradients that arise from applied cant are governed by the overall twist limits which are specified in table 78 below.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Rates of change – cant		Rate of change of cant	mm/s	Subject to Tram	35	55	68
Rates of change - cant def		Rate of change of cant deficiency - plain line	mm/s	Subject to Tram	35	55	68
Rates of change - cant def		Rate of change of cant deficiency - S&C	mm/s	Subject to Tram	35	55	80

Table 71 - Rates of change of cant (RoCC) & Rates of change of cant deficiency (RoCCD) - Rate of change in lateral acceleration.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Vertical alignment	Sag	Vertical curve radius - minimum	m	Subject to Tram	1000	625	500
Vertical alignment	Hog	Vertical curve radius - minimum	m	Subject to Tram	1000	625	500
Vertical alignment	Vertical acceleration		% of g		2	2	4
Vertical alignment	Turnouts and diamonds	Vertical curve radius. Proximity of vertical curve tangent point to switch toe and crossing of turnouts and diamonds.	m		15	10	6
Vertical alignment	Advance sws - xng & sws	Vertical curve radius	m		0	0	0
Vertical alignment		Minimum curve element length	m		20	15	10

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Vertical alignment	Instantaeneous change in grade		%		None	0.1	0.2
Vertical alignment	Grade distance between adjacent curves (similar flexure)	Preferred situation	m		None	None	None
Vertical alignment	Grade distance between vertical curves of opposite flexure	With combined average radius ***less than*** 3125m	m		15	10	6
Vertical alignment	Grade distance between vertical curves of opposite flexure	With combined average radius ***greater than*** 3125m.	m		15	10	0

Table 72 - Vertical Alignment - Some elements require consideration from the tram supplier, others refer again to element lengths

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Vertical geometry	Tramstops	Radius through tramstops (without exceeding gradient criteria)	m		Infinity	2000	1000

Table 73 - Vertical Geometry: Tramstop requirements

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Gradients			%		5.0	6.7	8.0
Gradients	Tramstops		%		1.0	2.0	2.5

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Gradients	Stabling	Maximum – includes locations where tram driver is routinely required to leave driving position	%		0.0	0.1	0.2
Gradients	Turnouts and junctions	Dependant upon twist and negative cant	%		0.2	3.0	6.5

Table 74 – Gradients: Maximum gradients in various locations

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Twist (as part of the design)	Short wave (over bogies)		$^0/_{00}$	Subject to Tram	1.5	2.0	3.3
Twist (as part of the design)	Long wave over length of vehicle	Project Tram geometric capability 10m @ 3mm $^0/_{00}$ + 10mm -- i.e. 30+10 = 40 (or 4 $^0/_{00}$)	$^0/_{00}$	Subject to Tram	1.5	2.0	3.3

Table 75 - Twist

The above represents the limits on the overall twist in the track that is a summation of: any gradient arising from applied cant; effective combinations of horizontal curves and grades / vertical curves; and other twisting effects (e.g. resulting from induced crossfalls for road drainage).

Twist is introduced into the track whenever cant is applied and when track with zero cross-level has a combination of horizontal curvature and vertical curvature or gradient.

Such geometry creates a twist, which has to be negotiated by the tram vehicle. Clearly the tram has to be capable of handling such geometric situations. Certain manufacturers may define these criteria in their own way, an interpretation of which is indicated below.

Twist in the long wave is measured over the wheelbase (bogie centres); short wave being measured over the axle centres of the bogie. Short wave twist also leads to wheel un-loading, not, as yet, defined here.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Vert / Horiz alignment	Horizontal radius - 25	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	1600	1200	1000
Vert / Horiz alignment	Horizontal radius - 30	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	1333	1000	833
Vert / Horiz alignment	Horizontal radius - 40	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	1000	750	625
Vert / Horiz alignment	Horizontal radius - 50	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	800	600	500
Vert / Horiz alignment	Horizontal radius - 60	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	667	500	n/a
Vert / Horiz alignment	Horizontal radius - 80	Vertical curve radius - minimum (product rule)	m	40k,30k,25k	500	n/a	n/a

Table 76 - Vertical/horizontal alignment combinations

Taking the comments above regarding twist, it can be seen the certain combinations of vertical and horizontal alignment can cause undesirable geometric situations. The tables below define, using a simple product rule, the limitations.

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Track spacing	Plus allowance for DKE	Double track main line - track centres - side poles	mm	- 3100			
Track spacing	Plus allowance for DKE	Double track main line - track centres - centre poles	mm	- 3600			
Track spacing	Plus allowance for DKE	Depot tracks and sidings - track centres		TBA Subject to Tram			
Track spacing	Plus allowance for DKE	Depot tracks and sidings - track centres - working space		TBA Subject to Tram			

Table 77 - Track Spacing. Note: straight track on radii larger than 350 metres on fixed non-ballasted trackform

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Gauge	Track gauge				1435	1435	1435
Gauge	Track gauge widening				0	0	0
Gauge	Track gauge-flange-running			TBA Subject to Tram			
Gauge	Check flangeway			TBA Subject to Tram			

Table 78 – Gauge: Standard data that requires further review/approval

Element	Qualifier	Comment	Unit	Comment	Desirable Value	Limiting Value	Exceptional Limiting Value
Rail inclination		Inclination - Vertical street grooved rail		TBA			
Rail inclination		Inclination - Non grooved rail		TBA Subject to Tram			

Table 79 - Rail Inclination

27 Roads and Utilities

This Section of the Employer's Requirements defines the roads and utilities requirements applicable to the Edinburgh Tram Network with which the Infraco must comply.

27.1 General

The roads works and utilities shall consist of all the necessary road works and associated accommodation works required to fully integrate the Edinburgh Tram Network into the urban road environment, including those relevant areas that are not trafficked.

The road works, utilities and associated accommodation works shall be provided in accordance with the Design Manual for Roads and Bridges (DMRB), except as amended by the requirements of, or otherwise agreed with, the relevant authority including where such requirements are more onerous.

The roads and utility works shall include but not be limited to the following:

- Road and junctions (including all necessary off-alignment works);
- Site clearance;
- Safety barriers and fencing;
- Drainage works including track drainage;
- Earthworks;
- Surfacing;
- Road lighting;
- Traffic signage and road markings;
- Traffic signals and tram signals;
- Landscaping;
- Temporary and permanent traffic measures;
- All associated cable ducting required for the works;

- Depot access and utilities, including within the Depot;

- Utility diversion works where not carried out by MUDFA; and
- Removal of all redundant services and apparatus affecting the works.

The works shall take account of MUDFA.

27.2 System-Wide Requirements

The tram network shall be segregated from the road wherever feasible using a variety of means as appropriate to the features and constraints of the individual locations. These include the use of road markings and varying surface types for visual or textural delineation. The design of the segregation details shall optimise their effectiveness without significantly compromising safety and operational factors, including the operation of junctions and emergency and maintenance access.

27.3 General Requirements

All works shall be carried out in accordance with the provisions of the Tram Legislation. All works on adopted roads shall be to a standard to allow subsequent re- adoption by the Roads Authority.

Wide-area modelling of traffic impacts consequent to the design shall be provided as a pre-requisite to approval, and prior agreement with the City of Edinburgh Council on the Traffic Regulation Orders and Temporary Traffic Regulation Orders necessary to implement the design and complete the works.

In addition to roads that have been adopted by the Roads Authority, the route for the tramway also uses roads that are currently in private ownership. In all cases the owners of private roads shall be consulted and their input and approval sought during the design process. Road works within these areas shall be to the same standard as that used for the roads adopted by City of Edinburgh Council (similarly, new and extended roads shall follow the same process). Where third parties are affected by a new or extended road their inputs and approvals where necessary shall be sought during the consultation process.

27.4 Stray Current

Refer to Stray Current of these Employer's Requirements at section 32.

27.5 Roads

27.5.1 General

The general requirements for the design of the roadworks shall meet the relevant Standards set out in Section 3.6 of these Employer's Requirements with emphasis on the following:

- Design Manual for Roads and Bridges (DfT);
- City Development Transport – Development Quality Handbook – Movement and Development (CEC);
- Edinburgh Standards for Streets (CEC); and
- Tram Design Manual (CEC).

27.5.2 Roads Design

The roads and track alignment shall be integrated in a manner that best uses the available space and optimises the alignment of both systems. Horizontal clearances between kerb lines of roads and tram network structures shall be not less than those set out in the relevant Department for Transport technical memoranda and the Department for Transport publication "Roads and Traffic in Urban Areas" and shall meet the guidance in ORR RSP2.

The requirements for geographical sections of the design and construction shall be discussed and agreed with **tie** and the City of Edinburgh Council to determine the extent of the proposed re-modelling, roadworks and (temporary and/or permanent) traffic management.

All surfacing materials shall comply with the DMRB requirements and consider City of Edinburgh Council's preferences. The integration of the Edinburgh Tram Network alignment, road design and road markings shall minimise the risk of road vehicles skidding on the rails. The finished works shall meet the serviceability requirements, balanced with commercial, social and environmental considerations. In particular, the following factors shall be taken into account:

- Make the best use of existing infrastructure;
- The requirements of the promoter (**tie** and CEC);

- Minimise the disruption to traffic;
- Minimise the public perception of waste and unnecessary disruption;
- Minimise the construction cost;
- Maximise the maintainability;
- Minimise the construction time;
- Minimise the excavation, material usage and hence vehicle movements; and
- Meet the needs of properties fronting onto the route of the tramway.

The Roads Design shall include but not be limited to:

- Identification of constraints and provision of typical sections;
- Tram / road interface review in the light of outputs from the design process;
- Provision of integrated tram/road design model;
- Assessment of the impact of the track alignment on the road design and layout;
- Assessment of the impact of the OLE design on the road design and layout;
- Layout drawings including extent of the works;
- Drawings detailing discrete locations where the vertical track alignment deviates from existing ground levels, this will include cross-sections and contoured plans as required;
- Standard details;
- Drawings to show changes to existing car parking provisions along the route, for example at Rosebery House, Haymarket including new access;
- Access and general arrangement layout to the Depot at Gogar;

- Consultation with City of Edinburgh Council, Scottish Environment Protection Agency and Scottish Water during the initial drainage design process identifying potential outfall locations and surface water treatment requirements for both roads and tram;
- Location of existing surface water drainage networks and outline routing of surface water from track and road drainage over the entire route;
- Standard details of drainage connections, sand traps, manholes, etc.;
- Pedestrian guardrails and boundary fencing;
- Interpretation of outputs from the traffic modelling process;
- Identification of junctions where existing traffic signals may need modification. Identification of locations where new traffic signals may require to be installed;
- Preparation of information to support the Traffic Regulation Orders and Temporary Traffic Regulation Orders. This will be based on the roads design, or the latest road design available. Prior to submission for the Statutory Process the TROs will be reviewed against the latest design;
- Safety audits for all stages;
- Compliance with the approvals process;
- Layout drawings for tram / road interface at 1:500 scale;
- Final junction register;
- Integration of traffic and tram signalling systems determined by the traffic model and tram run-time simulation;
- Three-dimensional MX model for all roads design;
- Details including any special measures at specific locations;
- Detailed General Arrangement of new access to car park at Haymarket including any modifications to car park layout;

- General Arrangement and vertical alignment for new access road to the Depot at Gogar;
- 1:200 scale drawings for each junction;
- Detailed design of surface water drainage networks modelled using appropriate software;
- Detailed design of site clearance layout, boundary fencing, safety barrier and pedestrian guardrail, pavement, earthworks, signs and markings, kerbing, footways, traffic signal layouts and road lighting;
- Determination of the extent of modifications to existing traffic signals and new installation requirements. Preparation of a traffic signal equipment performance specification; and
- Links with the CEC UTC;
- Compliance with all side agreements entered into by CEC (whether final or in draft) with respect to the Parliamentary Tram Acts.

27.5.3 Road User Safety Audit

Road User Safety Audits shall be carried out as required by The City of Edinburgh Council and sufficient to demonstrate the integrity of the design process to HMRI (or the appropriate regime in force).

27.5.4 Cycleways

Where it is required that cycleways are provided as part of the Infraco Works these shall be designed and constructed in accordance with the relevant guidelines including:

- Design Manual for Roads and Bridges;
- City of Edinburgh Council "Roads Development Guidelines";
- Scottish Executive's "Cycle by Design"; and
- SUSTRANS "Cycle Friendly Infrastructure Guidelines for Planning and Design".

27.6 Drainage Including Track Drainage

All roads drainage shall be designed and constructed in accordance with The Design Manual for Roads and Bridges, Volume 4 and comply with The City of Edinburgh Council's requirements and the Scottish Environment Protection Agency standards. Where appropriate during the design process Scottish Water shall be consulted. The design parameters defined by these design codes and agreed by **tie** / CEC / SEPA / Scottish Water as being appropriate for the area and system shall be accommodated within the finished works.

At locations where the tramway drainage is connected to any other drainage system measures shall be taken to ensure that any by-products of the tram system are accounted for (e.g. provision of sand interceptors). Where necessary early involvement of the Scottish Environmental Protection Agency (SEPA) shall be sought to define and agree surface water outfall locations.

Provisions shall be included for the proper and effective drainage of grooved rails and point machine pits in road running track detailed in the relevant section of these Employer's Requirements.

Provision shall be made in trackwork for the interception of entrained debris in the system that drains surface water from grooved rails, to enable the easy collection and removal of detritus by means of planned maintenance.

Outlets from the grooved rail and point machine pit drains shall be connected directly to the roads drainage system. For on-street track, the track drainage system shall incorporate an insulated break from the storm water system.

Provision shall be made in trackwork for the effective drainage of the track structure on grass track, ballasted and other off-road running sections (except on bridges, viaducts and the like). Outlets from these drainage systems shall be connected to collector drains running alongside the track. Chambers for access to clean and maintain the collector drain pipes and for the interception and removal of entrained debris and detritus shall be incorporated in the collector system. Collector drain systems shall be connected to other systems or outfalls as appropriate for the local regime and existing drainage systems, and in accordance with the requirements of the relevant water utility, the Scottish Environmental Protection Agency, the roads authorities and all other authorities as appropriate.

The drainage of all new bridge structures shall be positive and, unless otherwise required by the relevant local authority, all surface water shall be piped to the local storm water sewer systems by a defined drainage path.

Particular attention shall be paid to ensure that surface water drainage systems in the vicinity of traction substations and cable ducts are routed to avoid any risk of flooding of electrical equipment areas, point machine chambers, and the ducts themselves.

27.7 Road Signs, Traffic Signals and Urban Traffic Control

Road signs shall comply with the Traffic Signs Regulations and General Directions 2002 and the Traffic Signs Manual. The works shall be consistent with the requirements stated in the Edinburgh Standards for Streets (CEC). The signage provided for the tramway and the mandatory road signs shall be considered holistically and measures shall be taken to avoid clutter that could lead to a confusing environment for road users.

The traffic and tram signalling systems shall support the run-time of the tramway whilst minimising the impact on other road users. It shall be fully integrated with the City of Edinburgh Council's urban traffic control system. A protocol will require to be developed with the City of Edinburgh Council regarding the installation and integration of the traffic and tram signals. The signalling system shall incorporate recent/current technological developments, as appropriate, to optimise the combined efficiency of the tram and traffic signals.

The traffic management system shall accommodate the direct and consequential impacts of the Tram system and will be subject to approval by **tie** and CEC Wide-area modelling of traffic impacts consequent to the design shall be provided as a pre-requisite to approval, and prior agreement with the City of Edinburgh Council to implement the design and complete the works.

27.8 Road Lighting and Road Furniture

The road lighting shall conform to the Council strategy on lighting applying current street lighting standards and the Tram Design Manual. The lighting columns and Overhead Line Equipment (OLE) poles shall be rationalised to minimise road clutter and ensure safety of all users. Similarly, the quantity and disposition of road furniture shall also be rationalised for visual and safety reasons. OLE is subject to prior approval of the CEC planning authority and is to be obtained through the design process.

Lighting and road furniture will require to conform with safety guidelines and pass all relevant stages of road safety audit which are to be undertaken within the road design for tram implementation.

27.9 Utilities

The Edinburgh Tram Network shall be designed and constructed such that there is a minimal requirement to divert existing public utilities.

The final alignment shall take cognisance of the need to avoid the diversion of utilities' system-critical apparatus such as high-voltage oil-filled cables, fibre-optic communication cables, and high-pressure gas mains, wherever possible. Any protection required to such utilities shall be instructed as a **tie** Change and follow the principles of Section 21.

Utility diversions that are not covered under the advance Multi Utilities Diversion Framework Agreement (MUDFA) including unknown apparatus that is found during the Infraco Works shall be instructed as a **tie** Change and follow the principles of Section 21.

27.10 OLE Poles

Location of Overhead Line Equipment poles will be designed so as to minimise the risk of traffic impact. Collision barriers shall be provided where there is a reasonably foreseeable risk of a collision between a road vehicle and an OLE pole. However, collision barriers are not the preferred solution and all reasonable mitigation efforts shall be made, and careful consideration given, in the location of poles to avoid the necessity for collision barriers. Should this not be achievable, the collision barriers shall be functional, practical and maintenance free with anti-climbing measures to prevent the public from climbing and standing on top of barriers. Details of such barriers shall be approved by the City of Edinburgh Council in their capacity as Roads Authority as well as for visual impact through the prior approvals process.

28 Structures

28.1 General

The Edinburgh Tram Network requires the construction, or modification to, a number of structures throughout its length. The work involved in the Edinburgh Tram Network will impact on bridges and retaining structures. This Section 28 sets out the requirements which the Infraco must comply with in relation to structures.

28.2 Structures List

The following is a list of the principal structures along the Edinburgh Tram Network.

Table 80 - Structures Schedule

Structure Ref.	Section	Structure Name	Description
S19	2A	Haymarket Station Viaduct	New underbridge
S18	1D	Leith Walk Railway Bridge	Existing underbridge over single railway line
S1	3A	Roseburn Terrace Bridge	Existing single span plate girder underbridge.
S2	3A	Coltbridge Viaduct	Existing three span masonry arch underbridge
S3	3A	St George's School Access Bridge	Existing single span masonry arch overbridge.
S4	3A	St George's School Footbridge	Single span steel truss footbridge
S5	3A	Ravelston Dykes Bridge	Existing single span masonry arch overbridge.
S6	3A	Craigleith Drive Bridge	Existing single span masonry arch underbridge.
S7	3A	Holiday Inn Access Bridge	Existing three span composite overbridge
S8	3A	Queensferry Road Bridge	Existing single span masonry arch overbridge.

Structure Ref.	Section	Structure Name	Description
S9	3A	Groathill Road South Bridge	Existing single span masonry arch underbridge.
S10	3A	Telford Road Bridge	Existing single span overbridge.
S12	3B	Crewe Road Gardens Bridge	Existing single span RC structure
S20	2A	Russell Road Bridge	New underbridge at Russell Road delta
W3	5A	Russell Road Retaining Wall One	New retaining wall required due to level difference.
W4	5A	Russell Road Retaining Wall Two	New retaining wall required due to level difference.
W18	5A	Murrayfield Tramstop Retaining Wall	
S21A	5A	Roseburn Street Bridge	New underbridge
S21B	5A	Murrayfield Stadium Retaining Wall	New retaining wall required due to level difference.
S21C	5A	Murrayfield Stadium Underpass	New underbridge
S21D	5A	Murrayfield Training Pitches Retaining Wall	New retaining wall required due to level difference.
S21E	5A	Water of Leith Bridge	New underbridge
S23	5B	Carrick Knowe Underbridge	New underbridge (Intersection Bridge)
S24	5B	Existing Saughton Road Bridge	Existing WEBS structure
S25	5B	Existing Broomhouse Road Bridge	Existing WEBS structure

Structure Ref.	Section	Structure Name	Description
S26	5B	South Gyle Access Road Bridge	New underbridge
W11	5B	Bankhead Drive Retaining Wall	New retaining wall required due to level difference.
S27	5C	Edinburgh Park Station Bridge	New underbridge (Intersection Bridge)
S28	5C	A8 Underpass	New underpass
W16	5C	A8 Retaining Wall	Now replaced by a slope.
W19	5C	Gyle Stop Retaining Wall	New retaining wall required due to level difference.
S32	6	Depot Access Bridge	New structure required to provide vehicular access from Gogar Burn roundabout to the new depot.
S29	7A	Gogar Burn Bridge	New underbridge
S33	7A	EARL Underbridge	No longer required.
W14	7A	Gogar Burn Retaining Wall One	New retaining wall required due to level difference.
W15	7A	Gogar Burn Retaining Wall Two	New retaining wall required due to level difference.
W100	3A	Roseburn Corridor Retaining Walls	
S17	1D	Tower Place Bridge	Existing underbridge at Leith Docks

Structure Ref.	Section	Structure Name	Description
S16	1D	Victoria Dock Entrance Bridge	Existing underbridge at Leith Docks
W1	1D	Lindsay Road Retaining Wall	Existing modular retaining wall adjacent to Lindsay Road.
S30	7A	Gogar Culvert One	New culvert
S31	7A	Gogar Culvert Two	New culvert
S34	7A	Gogar Culvert Three	New culvert
W8	5A	Baird Drive Retaining Wall	New retaining wall required due to level difference.
S22	5A	Balgreen Road Bridge	New underbridge
W9	5A	Balgreen Road Retaining Wall One	New retaining wall required due to level difference.

28.3 Proposed Structural Form

The approval for all structures and civil engineering works shall be in accordance with the Consents Programme and Schedule 14 (Design Management Plan). The proposals at all structures listed above shall be subject to review/acceptance by **tie** prior to application for consent being made to the City of Edinburgh Council, or Approval to Network Rail as appropriate.

28.4 Listed Structures

Due cognisance shall be taken by the Infraco of the historical status of any of the structures affected by the Infraco Works. Work on such structures will be subject to the relevant approval process, as described in the Consents Programme and Schedule 14 (Design Management Plan).

28.5 Vibration and Noise

Structures and civil engineering works shall be designed in accordance with **tie**'s Noise and Vibration Policy at 10.1.5.

28.6 Bearings and Movement Joints

The design shall minimise the need for bearings and movement joints within all the structures. Integral structures shall be adopted where feasible.

Where bearings are required, either elastomeric or pot type bearings shall be used to accommodate the longitudinal and transverse translations and rotations while minimising lateral loads on sub-structures.

All bearings shall be replaceable under full live loading.

The use of movement joints shall be minimised, but where proposed they shall be easily maintainable and replaceable.

28.7 Design Life

The design life of all structures is set out in Section 6 (Design Life) of these Employer's Requirements.

28.8 Design Standards

All structures shall be designed in accordance with the appropriate design standards – See Section 8 (Standards) of these Employer's Requirements. Adopted design standards should be listed by the Infraco in the Approval in Principle Form 'A', or equivalent, submitted to **tie** for individual structures.

28.9 Structure Loading

Structures supporting the ETN shall be designed to carry 0.5RL loading as defined in the Design Manual for Roads and Bridges (DMRB and BS5400 Part 2). The maximum allowable tram axle load is determined in 24.12 of these Employer's Requirements.

During the design of structures due cognisance shall be given to the loadings imposed by construction and maintenance vehicles. Any constraints upon the operation of construction and maintenance vehicles shall be identified and advised to **tie**.

28.10 Rail Break

All elements shall be designed and provided to cater for tensile breakage of one rail at any location at ultimate limit state only. The other unbroken rails and the supporting structure shall resist the unbalanced force from a broken rail. The force resisted by any element shall be the lesser of:

- The force resulting from the rail and concrete deck temperatures and shrinkage, or
- The sum of the clip resistances between the movement joints bounding the break.

The effect of rail break shall be considered in conjunction with rail tensile temperature effects and the tram dynamic weight, centrifugal, nosing and braking and/or traction effects. The partial load factor shall be taken as 1.0.

28.11 Clearances

As a minimum, clearances shall be to RSPG 2 Tramways requirements.

Structural designs shall take due cognisance of the potential developed kinematic envelope of Trams that may be operated on the ETN.

28.12 Finishes

Finishes to all concrete components of the Infraco Works shall comply with the following:

▪ All buried and permanently submerged surfaces	F1, U1
▪ Pier tops, bearing shelves and hidden surfaces	F2, U2
▪ Parapet Coping, Exposed surfaces	F3, U3
▪ Main bridge deck	U4
▪ Special finishes – where deemed appropriate these are to be agreed with **tie** and all relevant authorities (e.g. CEC structures department) taking cognisance of all cost and construction impacts.	Note

Table 81 - Finishes

28.13 Protection

Structural steelwork shall be protected by a paint system in accordance with the appropriate standard. Steel surface preparation and the application of high performance paint coatings shall provide a design life to the first maintenance intervention in excess of twenty years. This requirement takes precedent over other standards.

The top surface of the any bridge deck shall be protected with a proprietary sprayed waterproofing system in accordance with BD 47/99.

All buried concrete surfaces shall receive two coats of bitumen; and Pavix (or equivalent) is to be applied to all concrete surfaces exposed to salt spray. A risk based assessment is to be undertaken for approval by **tie** to identify the extent of anti-graffiti treatment to be applied to exposed concrete surfaces.

28.14 Infrastructure Maintainability

The infrastructure shall be designed to minimise maintenance requirements. In particular the design should allow access which will not adversely impact systems operation of the Edinburgh Tram Network for the completion of routine work.

Structures will be subject to regular general inspections and a principal inspection at a frequency of every six years. The principal inspection shall entail amongst others a close visual inspection of all

elements of a structure. Details of the inspection and maintenance regimes are to be developed by Infraco and approved by **tie**. Maintenance Requirements are detailed further in Table 92 – Structures at Section 40 of these Employer's Requirements.

28.15 Provision for Inspection and Maintenance

Access to the underside of decks for inspection and maintenance shall be via vehicular-mounted inspection platforms operating from ground level, where access is feasible within contracted design parameters. For maintenance of metal parapets, for example, access shall be from the walkways. For bridges across Network Rail infrastructure it will be necessary to undertake such inspections in accordance with Network Rail requirements.

28.16 Bearings

Mechanical bearings shall be replaceable by jacking up the structure's deck a nominal amount, which minimises disruption and physical works. Where this is required, track will be designed such that only the bridge track is displaced. The bearings shall not require replacement for at least 50 years. Where bearings are provided, suitable inspection and maintenance galleries shall be provided.

Unauthorised access to these galleries shall be prevented through the incorporation of suitable measures.

No specific provisions shall be made for inspection and maintenance of the bearings on piers. Access to these bearings will be via a hydraulic access platform.

28.17 Expansion Joints

Bridge expansion joints shall be of the sealed type and provision shall be made to carry any water seeping through the joint into the deck drainage system. Expansion joints shall be easily maintained and replaced.

28.18 Earthing and Bonding

Structures shall be designed to comply with the Earthing and Bonding Policy at Earthing and Bonding of these Employer's Requirements.

28.19 Protection against Stray Current

Where trackform is an integral part of the structures, it shall be designed to comply with Stray Current Section 32 of these Employer's Requirements.

28.20 Third Party Relationships

28.20.1 Road Closure and Traffic Management

All Infraco Works affecting road traffic will be subject to the granting of permissions from relevant parties and may involve road closures or traffic management measures approved by CEC or the owner of the affected road. All such approvals are to be in place in advance of of any traffic impacts and comply with the requirements of Project Management Processes

In particular, the following works are expected to have a significant effect on traffic movements and may require particular consideration:

- Groathill Road Bridge and Craigleith Drive Bridge may require road closures for the duration of the Infraco Works;
- Construction of the abutments and new deck for Roseburn Terrace Bridge will require temporary closure of the A8 and partial workings within the carriageway;
- The construction of a structure, passing under the A8 to the east of Gogar roundabout, shall require significant traffic management to minimise disruption to traffic during construction. Additionally consideration will be required for the traffic impacts to the construction of the Depot Access Bridge and A8 retaining wall structures;
- Ocean Drive Bridge widening may require road closure for the duration of the Infraco Works;
- Roseburn Corridor Structures will be impacted an may require temporary traffic constraints (Ravelston Dykes Bridge, Holiday Inn Access Bridge, Queensferry Road Bridge, Telford Road Bridge, Crew Road Gardens Bridge;
- Tram bridges to be constructed over live roads may require some traffic constraints including Haymarket Station viaduct, Russell Road Bridge, Roseburn Street Viaduct, Balgreen Road Bridge, South Gyle Access Bridge.

28.20.2 Other Interested Parties

All relevant third parties shall be consulted by Infraco as required during the course of. In particular, this will include in relation to structures:

- Network Rail – noting particularly the Carricknowe and Edinburgh Park Bridges;
- Forth Ports;
- Edinburgh Airport Limited;
- Edinburgh Park Management Limited / New Edinburgh Limited; and
- Scottish Rugby Union.

28.20.3 Landscaping and Boundary Treatment

The Design Manual sets out the parameters of the design elements of the environmental mitigation measures to be implemented. The design guidance and requirements contained within the Design Manual shall be considered by the Infraco taking into account the CEC's own Development Quality Guidelines. (They include: Quality of Landscaping in New Developments, Biodiversity, Tree protection and Urban Forestry.)

A Landscape and Habitat Management Plan (LHMP) shall also be identified and prepared for the approval of **tie** and subsequent presentation to the CEC. It should be noted that there is a requirement for the LHMP applicable to the Roseburn Corridor to be specifically approved by the CEC Planning Committee.

A Boundaries Treatment Management Plan shall be created and updated by the Infraco to reflect emerging issues regarding boundary interface design matters between the track and adjoining ownerships. In general, all landscaping and boundary measures shall be in keeping with the surrounding environment and shall be consistent with the local character of the relevant area.

Where it is determined that fencing is required either to physically segregate the tram track or to separate the tram from other parties (for example Network Rail) the fencing shall be of a type and standard that provides the necessary separation and satisfy the requirements of the other party. In the case of Network Rail it must conform to their Group and Company Standards. The design will take into account concerns with respect to an individual having safety space in a fenced route.

Boundary treatments shall take cognisance of the need for appropriate noise mitigation measures, as well as other appropriate ecological works (e.g. badger mitigation) ensuring all Infraco Works have achieved all relevant approvals. In particular it is required that such boundary treatment and noise mitigation measures meet with the requirement to provide an end result which is no worse than the environmental impact assessment and presented in the Environmental Statement which was presented as part of the parliamentary submission.

29 Depot

29.1 Scope

This Section of the Employer's Requirements defines the Depot requirements applicable to the Edinburgh Tram Network (ETN) which the Infraco must comply with.

29.2 Depot, Buildings and Associated External Works

The Depot shall be of an economical design which reflects economy of use and maintenance in providing all the functionality required by **tie**.

The Depot shall provide the facilities to operate, service, repair and maintain a reliable passenger service.

29.3 The Site

The Depot site in Gogar is located in the vicinity of Edinburgh International Airport and has constraints imposed upon its design by the Civil Aviation Authority due to the proximity of the emergency runway at the airport. Factors to be accommodated in the design and construction of the Depot include height restrictions that shall necessitate detailed discussions with the aviation authorities.

29.4 Staff Halt

At a location to be agreed by **tie**, shelters shall be provided for the sole use of tram crew and other staff working on the Edinburgh Tram Network so as they can board the Trams. The staff halt shall comprise of shelters not less than 2.5m x 2m which shall provide weather protection. The staff halt will be linked to the Depot by a designated walking route leading to a controlled gate in the Depot boundary fence. The shelters shall be monitored by CCTV cameras, if they are not visible from the Depot Control Centre. The shelters will be provided with telephones providing a dedicated link to the Depot Control Centre.

The staff halt shall not introduce any speed restriction to the passage of Trams.

29.5 Drainage

The general site area shall be lowered to ensure that all structures are below the flight path. As a result of this excavation, both foul and surface water drainage may need to be pumped from the permanent works to off-site outfalls.

29.6 Access

Road access from the A8 Gogar roundabout link road shall provide both entry and exit for normal Depot operations traffic and also for delivery and egress of Trams with the minimum of impact on other facilities. Height restrictions on vehicle loads shall be verified in relation to the Airport operations. The link road giving access to the Depot may be extended by others and will cross the Tram route to the Airport, and the Depot entry track.

29.7 Utilities

Existing utilities and sewers crossing the Depot Site site shall be protected or re-located as appropriate and shall be instructed as a **tie** Change and follow the principles of Section 21.

29.8 Depot Site Layout

The configuration of the Depot and the use of the equipment contained therein shall minimise disturbance to neighbours.

Allowance shall be made in the site layout adjacent to the Depot building to accommodate temporary office facilities that may be needed during the construction, testing and commissioning phases of the Infraco Works. This shall include the provision of temporary electricity and water services.

The Depot site shall accommodate a zone within which the required accommodation can be located.

The Depot shall be secure and be provided with security systems as appropriate.

- The Depot shall have a suitably robust security fence 2.4m high shall enclose the Depot site with controlled entry points for Trams, vehicles and pedestrians. The security entry points shall be unmanned with security control systems providing the means of operation. These shall be centred on the Depot reception during normal office hours with transfer to the Control Centre at other times.

- The Depot shall incorporate two separate access points to the running lines.

- The entire Depot external operating area within the perimeter fence shall be provided with a comprehensive CCTV surveillance system, the images from which shall be displayed in real-time in the Control Centre. The cameras shall form part of the network CCTV system (refer to Section 35 (Supervisory Control and Communications Systems) of these Employer's Requirements. In particular a CCTV system shall be provided to view the Depot vehicular and

pedestrian entrances. It shall be integrated with the entry systems and shall be centred on the Depot reception during normal office hours with transfer to the Control Centre at other times.

The current reference design sets the Depot site below existing ground level and retaining structures shall be constructed as necessary along the A8 site boundary. These structures shall also form the ramp for the through track of the tram system to the Airport.

- The stabling area and its configuration shall be established by the combination of track requirements and the Depot building footprint. The Depot layout shall accommodate a minimum of 36 berths. The stabling facility shall be built to accommodate an initial 27 x 44m Trams. Adequate provision shall be made to allow cleaning personnel to move around berthed Trams.

- Set between the stabling roads shall be access paths alternately at least 1.0m and 2.0m wide with service points to provide facilities for Tram cleaning and minor maintenance on the 2.0m width paths.

- The desirable longitudinal gradient of all tracks within the Depot shall be zero. The absolute maximum longitudinal gradient shall be 0.4%. Cross-level gradient (cant) of all tracks shall be zero (see Section 26 (Track) of these Employer's Requirements).

- At the ends of any tracks that terminate, a Tram-arresting device shall be provided.

- A track shall be provided to enable Trams to be loaded and off loaded onto/from road transportation.

- A servicing track shall be provided complete with a tram wash plant and hand windscreen cleaning points. Road access shall be provided for detergent deliveries to the wash plant.

- The wash plant shall be located inside a shelter (the shelter need not extend the full length of the Tram being washed) – see Table 83 - Depot Plant and Equipment to be Provided of these Employer's Requirements, where the operating temperature range is set out. The facility will be provided with suitable devices to remove excess moisture from the washed vehicles. High quality results, at least as good as those achieved by Lothian Buses on their fleet, shall be delivered by this facility.

- Sand filling points within an enclosed structure shall be installed on the servicing track. The bulk sand silo (capacity at least 30t) and associated feeder equipment shall be located close by, along with the provision of road access for sand deliveries.

- A suitably drained bogie wash point shall be provided in the apron at the front of a Tram entry point to the workshop which allows demounted bogies to be easily manoeuvred in and out of the workshop. Plant used for this operation shall be transportable and housed within the main workshop. Power and water shall be provided to allow the tram pressure washer to be utilised at this location. Treatment of wastewater, to meet appropriate standards prior to connecting to the site drainage system, shall be provided.

- Car parking shall be provided for one third of the personnel employed on the Depot site. Within this provision, visitor car parking shall be provided close to the Depot entrance for no less than six vehicles.

- Servicing areas for external stores and containment of waste shall be provided.

- A sub-station for both traction power (main line and depot feeds) and domestic Depot supplies shall be provided.

- Due to the proximity of the Airport runway, planting and landscaping within the Depot site shall be restricted and consistent with CAA guidance to prevent bird strikes. Native species of plants shall be used where possible and shall be compatible with Tram operations.

- The Depot site shall be appropriately lit.

29.9 Depot Building

The following identify the principal features of the Depot building:

- The main Tram workshop, other workshops, stores, management, administration, operations and maintenance offices, staff welfare facilities (support accommodation) and the Control Centre for the complete Edinburgh Tram Network, shall be contained within a steel framed building clad in an insulated panel cladding system. The roof of the building shall be insulated to a suitable standard with the minimum number of penetrations.

- The building workshop shall accommodate a minimum of two tram maintenance roads, a wheel lathe road and a further tram service road.

- The support accommodation shall be arranged on two floors set to one side of the main tram maintenance workshop. The Control Centre shall be located at first floor level with the equipment room set below. A view of the depot external stabling area and tram entry/exit point shall be provided to Control Centre staff from within the Control Centre.

- The Depot shall be provided with the appropriate electricity supplies including 400V for individual items of workshop equipment both inside and outside the building, 230V for internal domestic use and 110V for small tools.

- Natural light in offices shall be maximised and all rooms shall be placed within the building in locations appropriate to their function. This shall be supplemented by artificial lighting consistent with the tasks undertaken and the hours of operation of the facility.

- Additional service space shall be provided for the accommodation of domestic services as well as for the accommodation and systems directly linked to the Tram operations.

- Full heating and ventilation will be provided throughout the building with air conditioning to the cControl Centre, equipment room, training and meeting rooms.

- Fire alarms and fire extinguishing systems shall be provided throughout the Depot building. Fire suppression shall be provided in the technical equipment room(s).

- Suitable office furniture shall be provided for all areas within the Depot building.

The following schedule of accommodation shall form the basis of the design for the office and welfare facilities attached to the Depot.

29.10 Schedule of Staff Numbers

The Depot shall accommodate the number of staff identified in the "Establishment with Expansion" column set out below.

Note: The locker rooms should have sufficient capacity for approximately 5% spare capacity on these numbers to cope with staff turnover and associated training overlap.			**Max Number on duty in the Depot at one time**	
Anticipated Job Title	**Establishment for Phase 1a/1b**	**Establishment with Expansion**	**Phase 1a/1b**	**With Expansion ratioed up**
OPERATIONS				
CORPORATE MANAGEMENT				
General Manager	1	1	1	1
Operations Manager	1	1	1	1
Commercial Manager	1	1	1	1
OPERATIONS				
Duty Managers	11	12	4	4
Operations Supervisor	9	9	2	2
Operations Assistant	1	1	1	1
Drivers	112	126	11	12

Anticipated Job Title	Establishment for Phase 1a/1b	Establishment with Expansion	Phase 1a/1b	With Expansion ratioed up
OPERATIONS				
Engineering Manager	1	1	1	1
Vehicle Engineer	1	1	1	1
Infrastructure Engineer	3	3	3	3
Safety and Standards Manager	1	1	1	1
Performance Regime Manager	1	1	1	1
Clerk	1	1	1	1
FINANCE				
Finance Manager	1	1	1	1
Accounts Assistant	2	2	2	2
Administration				
Secretaries	1	1	1	1
Admin. Staff	2	2	2	2

Anticipated Job Title	Establishment for Phase 1a/1b	Establishment with Expansion	Phase 1a/1b	With Expansion ratioed up
REVENUE PROTECTION STAFF				
Inspectors	112	126	11	11
Cashiers	1	1	1	1
Revenue Protection Manager	1	1	1	1
INFRASTRUCTURE / VEHICLE CLEANING				
Cleaning Manager	1	1	1	1
Cleaners	20	23	10	11
SUB TOTAL	**285**	**318**	**59**	**67**
TRAM MAINTENANCE				
Office Staff	3	3	3	3
Storeman	1	1	1	1
Technicians	30	34	15	16

Anticipated Job Title	Establishment for Phase 1a/1b	Establishment with Expansion	Phase 1a/1b	With Expansion ratioed up
SUB TOTAL	**34**	**38**	**19**	**21**
INFRASTRUCTURE MAINTENANCE				
Office Staff	4	4	4	4
Storeman	1	1	1	1
Technicians	37	42	18	20
SUB TOTAL	**42**	**47**	**23**	**25**
SUMMARY				
Operations	285	318	59	67
Tram Maintenance	34	38	19	21
Infrastructure Maintenance	42	47	23	25

Table 82 – Schedule of Staff Numbers

29.11 Accommodation (First floor)

The first floor is to be occupied by the Operator. The accommodation set out below is required as a minimum and must be related in all respects to the numbers of staff to be employed and based at the Depot as set out in Table 82 – Schedule of Staff Numbers, where not otherwise specified. Appropriate account is also to be taken by the Infraco of the maximum numbers of staff indicated as being on the premises at any one time in sizing toilets, messing facilities etc.

- A Control Centre to include the equipment as defined in paragraph 35.13 and allow a good ergonomic layout for the functions carried out therein.

- A room adjacent to the Control Centre, with sufficient space for the incorporation of the necessary furniture and technical equipment used to store and manage the handheld radios and ticketing equipment and their batteries, together with one desk space.

- A cash office adjacent to the Control Centre, with adequate space for two staff members and the associated equipment for cash counting and sorting, as well as a safe of an appropriate size.

- A viewing area shall be provided for visitors to view the Control Centre without disrupting the activity within.

- Windows shall be provided to provide a view into the tram workshop from the first floor. Suggested locations are adjacent to the Control Centre (if not inside, then integrated with the viewing area referred to above), adjacent to the engineering office, and in the viewing area.

- Adequate toilets and showers (Male, Female, Disabled).

- Access from the ground floor with at least two staircases and one lift (for disabled access and, unless other arrangements are available, for the lifting of equipment and furniture required on the first floor).

- One set of stairs is to give direct access between an external door (itself adjacent to the visitor's parking spaces) and the first floor. A reception area is to be provided at the first floor landing including an allowance for a reception desk and a minimum of four waiting chairs. A second set of stairs is to be adjacent to the Control Centre and provide a direct link, to a route from the staff parking/external access gate and the locker rooms, and to the walking routes onwards into the stabling sidings and to the access gate in the Depot fence to the staff halt on the main line.

- Office for the General Manager, sized for one person with meeting table for six people.
- Office for the Operations Manager, sized for two people. To be situated close to the Control Centre.
- Office for the Safety and Performance Managers, sized for two people.
- Engineering office, sized for three people, with meeting area for four people.
- Office for the Duty Manager and Supervisors, sized for three people.
- Office for the Finance and Commercial Managers, sized for two people.
- General office, sized for eight people.
- Messing facility, including limited self-service kitchen facility.
- Cleaning office and store.
- Interview room, close to the office of the Operations Manager.
- Meeting room for 10 people, close to the Reception.
- Two training rooms, one sized for 30 people and one for 15 people. The larger should be able to be subdivided, broadly in half. Note that this may be required to be on a permanent basis once the complete system is open for service.
- Space to locate the PABX and a computer server for the Operator.
- Locker Rooms, male and female in suitable proportion for the total relevant staff numbers and with an allowance for flexibility in recruitment. The design shall allow for flexibility in the division to allow for long-term changes in the proportions. The locker rooms should be placed conveniently for the Control Centre and messing facility. The space allowance for lockers should be based on two-thirds height/interleaved lockers.
- A store for uniforms and other small operational equipment.
- A records store.

- A location for photocopying.

29.12 Workshop General Requirements

- In the main workshop, all roads shall have traction power. The wheel lathe shall be placed in a central position to enable the workshop doors to be closed whilst the lathe is in operation;
- Gantry structures, for access to the Tram roof area from both sides, shall be provided for a minimum of two berths;
- Under-track pits shall be provided on no fewer than four tram maintenance berths incorporating access and egress stairs. Pits shall have adequate lighting, drainage and power tool sockets;
- 'Built-in' jacking points (i.e. lifting under the Tram bogies) shall be provided to one of the roads, which shall be provided with traction power, the pits containing this equipment shall be adequately drained;
- Battery charging equipment shall be provided for Tram batteries, fork lift trucks and all other battery powered equipment with associated ventilation equipment, in a dedicated area off the main workshop;
- Hydraulic and electronic workshop facilities, including bespoke test benches, shall be provided appropriate to the Trams. Fixed equipment, for the servicing and testing of hydraulic and electronic equipment shall be provided. The areas shall be capable of being separated from the main workshop area by closure of an industrial door; and
- Both heavy and light stores areas shall be provided complete with the necessary racking systems to suit the storage requirements of the spare parts required for all systems, equipment and Trams being supplied. Forklift truck access to these areas shall be provided. Stores are to be segregated between those required for the Tram Maintainer and those for Infraco.

29.13 Accommodation on Ground Floor

29.13.1 General Facilities

The ground floor is to be principally occupied by the Infraco. The accommodation requirements set out below is required as a minimum.

The design of the accommodation must be related in all respects to the numbers of relevant staff to be employed and based at the Depot as set out in Table 82 – Schedule of Staff Numbers, where not

otherwise specified. Appropriate account is also to be taken by the Infraco of the maximum numbers of staff indicated as being on the premises at any one time in sizing toilets, messing facilities etc.

The different spaces should be arranged grouped logically together and with respect to accesses etc. The workshop areas must also accommodate all relevant equipment listed in the Plant and Equipment Schedule – see Table 83 - Depot Plant and Equipment to be Provided.

- The equipment room shall be underneath the Control Centre. Necessary domestic plant rooms.
- A store for tram and infrastructure cleaning equipment.
- First aid room (suitable for all staff at the depot, accessible from the first floor and to an external vehicle access).

29.13.2 Facilities

- Staff access shall be arranged preferably, adjacent to the locker rooms and convenient for external access and with appropriate security.
- Adequate toilets and showers shall be provided (Male, Female, Disabled) serving both contractors.
- A messing facility, including limited self-service kitchen facility.
- Locker rooms, male and female in suitable proportion for the total relevant staff numbers and with an allowance for flexibility in recruitment. The design shall allow for flexibility in the division to allow for long-term changes in the proportions. The space allowance for lockers should be based on a full-height lockers for each relevant person. There should be dry locker rooms, sufficient for all Infraco staff, based on full-height lockers, and a drying room to include additional full-height lockers for all of the Infrastructure and Tram Maintenance staff.
- machine tool area, open to the tram workshop. This might be linked to the dirty workshop.

29.13.3 Tram Maintainer Specific Facilities

- A small store for workshop cleaning equipment.
- A location for a computer server for the Tram Maintainer.
- Tram Maintenance Managers Office, sized for one person with meeting area for four persons.

- Tram Maintenance General Office, sized for five persons.
- Tram Stores including office, small items store and large items store with access for fork-lift truck. The size of these shall be agreed with the relevant contractor.
- Battery store and charging area
- Clean workshop(s) for electronics and hydraulics
- Dirty workshop for bogie, with cross access track from the main vehicle workshop underneath the travelling crane; area could be linked with machine tool area

29.13.4 Infrastructure Maintainer Specific Facilities

- A location for a computer server for the Infrastructure Maintainer.
- Infrastructure Maintenance Manager's office, sized for one person with meeting area for four persons.
- Infrastructure Maintenance general office, sized for five persons.
- Infrastructure stores including small office, small items store and large items store with access for fork-lift truck. The size of these shall be agreed with the relevant contractor.
- Clean workshop for electronics
- Dirty workshop which could be the machine tool area.

29.14 Provisional Schedule of the Plant and Equipment

The plant and equipment to be provided and installed shall include, but not be limited to, the following:

Table 83 - Depot Plant and Equipment to be Provided

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
1		Cleaning Equipment										
	1.1	Tram Cleaning Equipment	Equipment for cleaning of tram interiors	110V Industrial vacuum cleaning equipment, ≥ 2kW power Equipment to allow removal Floor polishing equipment	P	Generally used in stabling areas However can be used throughout the Depot	T	O	O	O	O	6

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.2	Tram pressure washer	Industrial washer for general tram cleaning within the Depot including bogie washing	Self powered Hot water/steam - self heating Pressure variable up to ≥200 bar Flow rate ≥12 l/min Lance and hose ≥10m Detergents compatible with Tram external finishes	M	Throughout Depot	T	T	T	T	T	1
	1.3	Infraco pressure washer	Removal Removal of fly posters General cleaning	Features as per Tram pressure washer Mobile towable bowser with capacity for up to one shift of cleaning Infraco to ensure	M	Across the ETN	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				interchangability with tram pressure washer Readily transportable on back of road-rail and other road vehicles								

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.4	Tram Washing Plant	Fixed plant for cleaning of Tram exterior	Unidirectional >15 tph continuously Minimised water consumption, maximised water recirculation controllable and monitored from Control Centre via SCADA system Self contained Pre-wet One pair application brushes Automatic end wash Two pair water wash brushes	F	Alongside main workshop	I	O	O	O	O	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Dryer Operates from -5°C ambient external temperature within shelter Final details TBD with tram supplier ≥70% water recycling Backflow prevention devices shall be installed. Treatment of wastewater to meet appropriate standards prior to connecting to site drainage system shall be provided.								

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.5	Rail Groove Cleaning Equipment	P-way cleaning	Vacuum equipment to remove detritus/debris from grooved track including drain boxes and points Able to clean drains and gullies employing water jets Transportable on road/rail vehicle, lifted with crane or fork lift truck Self powered for full shift Easy collection/disposal of detritus/debris	M	Across the ETN	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.6	Parts washer	Infrastructure/Tram component cleaning & degreasing in dirty workshop	Able to wash components ≤100kg, ≤750mm diameter	F	Within dirty workshop	I	I/T	I	I	User	1
	1.7	Floor scrubber	Depot floor cleaning	Industrial vacuum/brush scrubber equipment Compatible with floor finishes	M	Within Depot building	T	T	T	T	T	1
2		Mechanical Handling										
	2.1	Shunter	Manouveuring Trams within workshop	Battery powered Road/rail capability Capable of towing/propelling single Trams Speed up to 3 km/h	M	Throughout Depot tracks Road capability to move	T	O/T	I/T	O	User	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Local and remote control Charging facilities Coupler at each end		between tracks on hardstanding						
	2.2	Tram lifting system and stands	Lifting Trams to allow routine maintenance and removal of bogie(s)	Fixed underfloor system providing flush floor when not in use. Ability to lift fully functional, unladen tram. Synchronised lift from single control panel. Ability to stop and lock lift at any vertical positionInterlocking to	F	Main workshop	I	T	T	T	T	1 set

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				protect Tram in event of system/component failure. Manually positioned stands to be provided Interlocking with OLE if required.								
	2.3	Fixed high level access platforms	To allow access to all equipment mounted on Tram roof	Capable of providing access to all roof mounted equipment on tram Decking to prevent tools or small to components falling through Handrails and toeboards to prevent	F	Main workshop	I	T	I	T	T	2 sets

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				personnel/material falling Access/egress gates interlocked with OLE End protection								
	2.4	Overhead crane	Bridge type crane spanning 2 roads within the workshop to allow all material within main workshop to be transported up to and including size/weight of motor bogie	≥6.3 tonne capacity Vertical clearance <960 mm from hook (fully raised) to top of crane Traverses below OLE Interlocked with OLE Remote control using hand held device Multi-speed faciltiy - lift, traverse and travel	F	Main workshop	I	T/I	T	T	User	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Long and cross travel to cover all areas over the two roads								
	2.5	Mobile crane	Facilitate removal of miscellaneous equipment including bogie components within the dirty workshop	≥2t capacity Powered operation	M	Throughout workshops	T	T/I	T	T	User	1
	2.6	Bogie workstands	To allow dismounted bogies to be maintained	Allows bogie to be manoeuvred along the stub track in the dirty workshop Wheel locks Capable of supporting	M	Dirty workshop	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				both trailer and motor bogie								
	2.7	Other tram equipment stands	Various stands to allow items of equipment to be stored and readily maintained when dismounted from the Tram	Infraco to propose depending on tram design Expected to include stands for doors, windows, body panels etc…	M	Throughout Depot	T	T	T	T	T	
	2.8	Accommodation bogies	To allow Trams to be moved within workshop once bogies have been removed or the Tram has been split at any articulation	Allows Tram to be manoeuvred throughout the depot once any combination of bogies has been replaced Allows entire tram to	M	Throughout Depot	T	T	T	T	T	

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				be manoeuvred throughout the depot once any articulation has been split								
	2.9	Fork lift truck	Lifting and transporting miscellaneous equipment	Battery powered Charging facilities Road wheels >3 t lifting capacity Drum handling equipment Crane arm Capable of accessing all shelving and racking in stores-Infraco to demonstrate	M	Throughout the Depot but limited to hard standing areas when outside	T & I	T/I	T/I	T	User	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.10	Pallet truck	Lifting & Transporting equipment particularly in stores	Manually manoeuvred, hydraulic lifting the Infraco to propose requirements. Infraco to provide integrated solution	M	Throughout the Depot but limited to hard standing areas when outside	I	T/I	T/I	T	User	The Infraco to propose
	2.11	Hand trolleys	Transporting tools and spares	Unpowered the Infraco to propose requirements. Infraco to provide integrated solution	M	Throughout the Depot but limited to hard standing areas when outside	I	T/I	T/I	T	User	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.12	Infraco lifting slings	General slings for lifting infrastructure heavy components on system and in Depot building	Infraco to propose. Stand for storage	P	Use on system infrastructur e	I	I	I	I	I	The Infraco to propose
	2.13	Tram lifting slings	Specific lifting gear to allow all equipment to be removed and replaced.	Raised hook on overhead crane can be no more than 5390 mm ARL the Infraco to propose Stand for storage	M	Use in Depot building only	T	T	T	T	T	Tramco to propose
	2.14	Windscreen/window removal equipment	For use in replacing tram windscreens and side windows	Mobile stand capable to being used to access both windscreen and side windows Electrically powered vacuum beam with	M	Use in Depot building only	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				suckers adapted to windscreen design Audio/visual alarm in the event of suction loss								
	2.15	Re-railing equipment	For use in rerailing trams out on the System	Variety of jacks/beams/slides to be proposed by the Infraco Airbags Slew locking devices Capable of being readily transported on the road/rail vehicle	M	Used any where on system including Tramstops	T	T	T	T	T	1 set
	2.15	Stop boards	To indicate the presence of equipment/personnel/tram	The Infraco to propose requirements. Infraco	P	Throughout System	I	T/I	I	T/I	User	≥20

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
			s on the tracks	to develop integrated solution								
3		Workshop & Stores Furniture										
	3.1	Shelving and racking	Storage of spares and other material	Heavy duty The Infraco to propose requirements. The Infraco to develop integrated solution	F	Stores	I	T/I	I	T/I	User	The Infraco to propose
	3.2	Tram staging	for Tram inspections/repairs	The Infraco to propose any additional staging required	M	Used within Depot building	T	T	T	T	T	The Infraco to propose
	3.3	General staging	For infrastructure inspections/repairs	The Infraco to propose any additional staging	M	Across Edinburgh Tram	I	I	I	I	I	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				required		Network						
	3.4	Shelving	Storage of minor items/documents	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose
	3.5	Workbenches	Equipment maintenance	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose
	3.6	Cupboards	Storage of minor items/documents	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	3.7	COSHH cupboard	Storage of COSHH items	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Dirty workshop	I	T/I	I	T/I	use r	The Infraco to propose
	3.8	Workshop stools	Personnel comfort when working	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	Us er	The Infraco to propose
4		Fixed Plant										
	4.1	Air conditioning maintenance equipment	Specialist tools for filling/emptying refrigerant	The Infraco to propose	F	Anywhere in Depot building	T/I	T/I	T/I	T/I	T/I	The Infraco to propose
	4.2	Tyre replacement equipment	Specialist tools for tyre splitting/removal/balancing /bearing replacement	The Infraco to propose	F	Dirty workshop	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	4.3	Underfloor wheel lathe	In-situ reprofiling of Tram tyres	Capable of producing a range of wheel profiles. Tolerances to be agreed between the Infraco Swarf conveyed to skip for removal by means of forklift truck capable of turning all wheels on one Tram within eight hour shift	F	Within Depot building.	I	T	T	T	T	1
	4.4	Sand Plant	Refilling of Tram sanding equipment	Minimum silo capacity 30 tonnes Capable of receiving sand delivery directly from road vehicle Allows Tram driver to	F	Dedicated facility	T	O	O	O	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				fill an empty tram within 5 minutes Rate of fill to be sustainable for 30 minutes. In no circumstances shall the interval between the filling of two Trams exceed 10 minutes The physical condition of the sand shall not deteriorate when stored Sand deliveries to a Tram shall stop automatically when								

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				the tram sand box is full Sand filling nozzles to be compatible with the sand filling inlets on the trams Signal interlocking to inhibit the movement of a tram if the sand filling nozzles are not returned to their correct storage position.								
	4.5	Machine tools	General machine tools required for maintenance	The Infraco to propose requirements. The Infraco to develop	F	Dirty workshop	I	T/I	T/I	T/I	User	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				integrated solution								
	4.6	Paint booth	Respraying of removable Tram panels	For use with water based paints integrated compressor	F	Outside workshop	T	T/I	T/I	T	Us er	1
	4.7	Pantograph maintenance & load test jig	to calibrates and align tram pantograph off Tram roof	The Infraco to propose	F	Throughout workshops	T	T	T	T	T	1
	4.8	Suspension setting equipment	To allow suspension to be set/shimmed without using tram lift	The Infraco to propose	M	Throughout workshops	T	T	T	T	T	1
	4.9	Diesel generator	Back up power source	Capable of connection to the depot LV switchboard and other plant requiring an external	M	Across network	*	I	I	I		*To be rented by the Operator if and when required.

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				energy source. Capable of providing at least three day continuous operation.								
5		Hand & Mobile Tools										
	5.1	Infrastructure tools	Hand tools	The Infraco to propose	P	Across ETN	I	I	I	I	I	The Infraco to propose
	5.2	Tram tools	Hand tools	The Infraco to propose	P	Across ETN	T	T	T	T	T	Tramco to propose
6		Welding Shop Equipment										
	6.1	Ferrous welding equipment	General infrastructure repairs	The Infraco to propose requirements. Infraco to develop integrated solution	F	Dirty workshop	I	T/I	I	T/I	Us er	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	6.2	Aluminium welding equipment	Specialist Tram and Tram shelter repairs	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Dirty workshop	I	T/I	I	T/I	User	The Infraco to propose
7		Battery Shop Equipment										
	7.1	Tram battery charger	To recharge Tram Batteries	The Infraco to propose	P	Battery room	T	T	T	T	T	The Infraco to propose
	7.2	Infrastructure battery chargers	To recharge various batteries used in power supply, control and comms equipment	The Infraco to propose and develop solution compatible with tram battery charger	P	Battery room	I	T	T	T	T	The Infraco to propose
8		Instrumentation and Test Equipment										

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	8.1	Tram test equipment	To allow testing of measurement and testing of tram equipment	The Infraco to propose. Note any overlap with "Special Tools" to be highlighted. As a minimum, proposal to include; headlight tester, tools to allow event recorder to be downloaded and interrogated, tools to allow CCTV systems to be downloaded and interrogated, tools to allow PA and PID announcements to be re-configured.	M/P	The Infraco to propose	T	T	T	T	T	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	8.2	Infrastructure and Fixed systems test equipment	To allow measurement and testing of infrastructure and fixed systems	The Infraco to propose. Note any overlap with "Special Tools" to be highlighted as a minimum, proposal to include; OLE height and stagger gauge, stray current data loggers, noise measurement equipment, ride measurement equipment, point setting detection equipment, ≥3 sets of live line testing	M/P	The Infraco to propose	I	I	I	I	I	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				equipment								
9		Infrastructure Maintenance Equipment										
	9.1	Portable P&C grinders	To dress points and crossings	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.2	Track welding equipment	to build up profiles/replace sections of track	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.3	Portable tamping equipment	To build up track ballast to realign track	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.3	Portable lighting equipment	To illuminate work/collision sites	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.4	Portable generators	To power site tools/lights	The Infraco to	P	On Site	I	I	I	I	I	2

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				propose								
	9.5	Track measuring Equipment	To allow track line and levels to be measured	The Infraco to propose	P	On site	I	I	I	I	I	1 set
10		Road Vehicles										
	10.1	Road - rail vehicle	To move about the system carrying mobile equipment and personnel	Able to operate on UK roads Able to operate on all parts of the ETN To be equipped with demountable ≥2 man-basket to enable OLE inspection throughout the ETN Capable of towing a tram including ability to apply tram brakes from cab of road-rail	M	Mobile throughout ETN and road network	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				vehicle Capable of having snow plough attached in both road and rail mode Crane with capacity ≥6t and a reach (reduced capacity) of at least 4m. Able to transport other equipment items as set out elsewhere in this list Able to transport ≥3 personnel in cab Payload capability ≥10t							

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				This will make it a requirement that the driver has a LGV driving license. Powered winch with ≥8t pulling capacity								
	10.2	Other road vehicles	Miscellaneous vehicles to be proposed by Infraco	The Infraco to propose	M	Throughout road network	I	I	I	I	I	The Infraco to propose
	10.3	Road/rail trailer	Trailer with large man lift for OLE inspection/repairs	Capable of being towed to site by	M	Throughout road	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				road/rail vehicle or truck		network						

29.15 Overhead Line Equipment

The Depot tracks shall be equipped with overhead line equipment. This will be in compliance with the Employer's Requirements for Overhead Line Equipment in Section 31.

Electrical and safety interlocking with the craneage and other plant and equipment shall be provided.

29.16 Depot Substation Buildings and Associated External Works

The requirements for the Depot substation building and associated external works are as follows:

- The Depot sub-station requirements and facilities shall accommodate the needs of the traction power loads within the Depot and to service the adjacent sections of main line, the Depot domestic supplies and the requirements of the Distribution Network Operator.
- A separate 11kV/400V LV transformer and distribution switchgear shall be accommodated fed from the main 11kV supply located in the Depot substation.
- The depot LV switchboard shall be capable of being energised from an external / mobile generator via socket and plug with an interlocked isolator. This shall provide 400 V ac supplies to essential services within the Depot complex.
- Provision shall be made for the switchboard generator apron and clear access to the connection point.

29.17 Depot Systems

29.17.1 Electrical Supplies

The power supply to the traction sub-station is described in Section 30 (Traction Power) of these Employer's Requirements.

Scope

The requirements on the Infraco shall include but not be limited to:

- Main (11kV) power transformer and LV switchboard;
- Sub-mains distribution and main equipment;
- Small power distribution;
- Power supply to mechanical plant and controls;
- Back-up supplies (fixed standby generator);
- Uninterruptible power supplies;
- Data distribution and information technology systems supplies (including operations IT systems);
- Fire protection system supplies;
- Power supplies to CCTV, security and access control systems supplies;
- Power supplies to lighting – internal and external, emergency lighting supplies;
- Cable containment;
- Lightning protection and Depot equipment earthing; and
- Commissioning of systems and training.

Auxiliary Power Supplies

Auxiliary supplies shall be provided with a suitably sized uninterruptible power supply. The uninterruptible power supply room shall be provided with cooling in order to maintain battery life (along with ventilation to offset hydrogen build-up if required).

110 Volt Power Supplies

Appropriate networks of 110 V shall be provided:

- 110 V power shall be distributed within the stabling area;
- 230 V/110 V transformers shall provide 110 V supplies throughout the workshops, the main LV switchroom, the plantroom, the wash plant and the sand filling plant.

Control Centre

Electrical supplies shall be configured such that in the event of a single failure there shall be no loss of data and no requirement for excessive actions on the part of the Control Centre staff.

A dual supply changeover arrangement, with high integrity circuit breakers is preferred to a single large uninterrupted power supply. The power changeover function shall not in itself cause the failure of any system so powered, the loss of information or an interruption to the availability to any sub-system for more than 20 seconds.

- Two, suitably sized uninterrupted power supplies shall be connected in parallel and supplied from the Depot substation to provide supplies to critical loads, i.e. Control Centre and equipment room supplies;
- The equipment room electrical systems to provide heating, ventilation, air conditioning, lighting, power and other building services to provide effective habitation for the centralised terminals of all sub systems deployed upon the Edinburgh Tram Network and the human/computer interfaces thereof shall be provided; and
- Lighting to equipment room shall be provided in accordance to CIBSE Codes. Emergency lighting within equipment room shall be at least 50% of normal to allow operations to be carried out even during mains failure.

An appropriate means of facilitating uninterrupted data and voice communication between the equipment room and Control Centre shall be provided for those sub-systems that are present at the operator workplaces, mimic diagrams, display banks and any emergency override facilities. Dedicated containment (and riser, depending on the room's orientation) for cabling between the two rooms shall be provided.

29.17.2 Specific Sub-System Technical Requirements

Access Control

A complete access control system shall be provided to relevant standards with a clearly defined access control strategy.

Controlled entry for pedestrians, Trams and road vehicles shall be provided with appropriate access control for each. Access control shall be switchable between a reception area (for daytime use) and the Control Centre. The Depot road entrance shall have two separate vehicle gates for entry and exit, and additionally a pedestrian gate on the footway. The vehicle gate shall be capable of being opened, and the pedestrian gate released, from either the Control Centre or the Depot reception, or by a member of staff presenting a security card to a reader at the gate.

The vehicle gate shall re-close once a vehicle has passed through. The pedestrian gate shall close automatically and re-lock when it closes. The vehicle exit gate shall open automatically when a vehicle approaches it from within the Depot.

Tram entry / exit locations shall be provided with manual gates, which shall normally be left open. At these gateways, there shall be a microwave or equivalent detector, which shall sound a single brief distinct audible warning in the Control Centre whenever the beam is interrupted by a person or larger object.

Intercoms shall be provided from each of the two entry gates (pedestrian and vehicle) to reception and Control Centre. There shall be two intercom positions on the same pole, one at convenient height for car drivers and one for heavy goods vehicle drivers, who shall be able to use them whilst in the driving seats of their vehicles. here shall be one security card reader at the lower position and one with the intercom at the pedestrian gate. Any equipment in centre of the road shall be removable if required to allow tram movement by road if designed to be through the same access. An intercom system shall operate in line with the access control system.

IT Systems

IT Systems including network cabling containment throughout the Depot building for the independent supply of IT systems shall be provided in accordance with Good Industry Practice.

- Data cabling shall be provided to appropriate standards;
- All equipment finishes shall be appropriate to area and type of use within the Depot building and shall be in materials with a long life in an environment that is in continuous use;
- All accessories used shall be from approved suppliers/manufacturers. Lifespan of finishes / accessories shall be verified with relevant supplier. Correctly (IP) rated items shall be installed as appropriate to the environment; and
- All materials used shall comply with their appropriate standards. Where necessary, finishes / accessories to carry the appropriate 'test pass' mark.

Data collection facilities shall be provided for the management of information provided by all relevant equipment including the underfloor wheel lathe, SCADA, wash plant etc.

Adequate data points shall be provided to enable data collection facilities to be connected.

Lighting

Natural light in offices shall be maximised and all rooms shall be placed within the building in locations appropriate to their function.

Office lighting shall be to CIBSE document 'Lighting Guide 7: Office Lighting'. The document encourages the maximum use of daylight in offices. Use of lighting controls (i.e. daylight sensing, presence detection) shall also be provided, hence saving energy by utilising daylight wherever and whenever possible.

Lighting in main workshop and other areas shall be placed such that light is given where required for work to take place, including when Trams are present. Each lighting element shall also be safely accessible for maintenance during the continuous operating hours with the OLE over one Tram berth isolated.

- Lighting shall be provided so as to provide the required lighting levels (to CIBSE Guides) even when Trams are occupying the workshop. Task lighting shall be provided by luminaires placed close to the task, also supported by portable lamps connected to local supplies;

- Appropriate switching and control strategies shall be implemented; and

- Verification of lighting levels shall be supported by lighting calculations and also by taking post-installation light meter readings.

29.17.3 Workshop Doors

Workshop Tram access doors shall be bi-parting, bi-folding with clear panels for through visibility. The doors shall be power-operated with push-button controls both inside and outside. The open and close button shall be press and hold whilst the door moves, rather than press and walk away to ensure door does not open or close onto an obstruction or person.

- A top-hung door with a bottom track shall be provided and allowed for when sizing the electric motor;

- The actuating mechanism shall be such that it can be maintained without the need to isolate the overhead line equipment;

- In the event of power or door operating equipment failure, it shall be possible for one person to operate the doors manually from ground level;

- The doors shall be provided with a suitably located insulated aperture to accommodate the live overhead line;

- Overdoor heaters, if proposed, shall operate only when doors open via interlinks and integral thermostats.

Door leaves shall be bonded to earth so that should they inadvertently come into contact with the overhead line equipment, the fault resistance shall be sufficiently low to ensure immediate circuit breaker trip without damage to doors or equipment.

29.17.4 Hazardous Material Storage

Facilities for the storage of hazardous materials and road access for their delivery and off loading shall be provided.

29.18 Equipment Room

29.18.1 Fire Alarms / Fire Extinguishing System

The equipment room shall have a means of locally activating the fire alarm via a wall-mounted panel.

The equipment room shall be fitted with smoke and temperature alarms.

The equipment room shall also be fitted with an automatic and manually operated extinguishing system, which shall not damage the equipment when activated. The extinguishing system chosen shall be designed subject to a risk assessment based on criticality etc.

In the event of the loss of the primary power supply, the alarm system shall function for a minimum of six hours. This system shall be integrated with the durations and functionality of all other UPS systems.

29.18.2 Heating and Ventilation

The equipment room shall be environmentally controlled to minimise the effects of room heating due to equipment dissipation.

The heat exchanger vents shall not be positioned over the work area of the maintainers nor directly above equipment cubicles, and shall be placed in position to minimise localised chilling effects.

The room shall be positively ventilated to prevent dust ingress.

All equipment fitted with fans shall ensure that fan failure shall not compromise system functionality.

29.18.3 Lighting

Lighting within the equipment room shall be either incandescent or fluorescent type fittings.

In the event of power failure, emergency lighting shall be fitted which shall operate for four hours and maintain the level of illumination in the room.

The lighting shall be positioned to illuminate the front and rear of the equipment cubicles, but not directly above equipment cubicles.

29.18.4 Cable / Conduit Entry

Cable routing shall be primarily through floor-recessed conduit.

The main cable entry / exit shall be via an aperture located in the floor, which provides entry or access for cables external to the Depot.

Cable access shall be through the equipment room ceiling.

Particular care shall be taken to ensure that electro-magnetic compatibility is not degraded when cables are closely located.

Cables shall be continuously screened through the wall / floor / ceiling apertures.

Appropriate strain relief or clamping shall be provided.

All cables and conduits shall be clearly marked with cable identifiers or suitable permanent marking which shall last for the expected lifespan of the cable or conduit.

29.18.5 Architectural Requirements

Equipment shall be laid out in the equipment room to afford easy accessibility.

Cubicle doors, when opened shall not impinge on access.

Appropriate 'safe' walkways shall be clearly identified on the floor of the room.

Equipment shall be placed such that cabling runs are minimised.

Antenna, low signal or high frequency cable runs shall be minimised and the equipment positioning optimised to ensure a majority of these runs are compliant.

The equipment room floor shall be sealed to minimise dust ingress into the equipment and the surface shall ensure that no static build-up occurs.

29.18.6 Security Requirements

In the event of security and access control system failure, this shall be logged accordingly and displayed to the Control Centre staff.

29.18.7 Equipment Room Furniture

The equipment room shall be furnished with modern ergonomic furniture to assist the maintainers and reduce fatigue.

There shall be two maintainer's desk positions in the room.

The design of the equipment room furniture shall include provision for the effective management of cabling, and equipment and maintenance power supply distribution.

Each desk position shall have personal storage of a minimum of three lockable drawers.

Positioning of storage shall not inhibit the work-envelope of the maintainer.

Additional tool storage locations shall be located in appropriate areas of the equipment room

29.19 Mechanical and Public Health

29.19.1 General

The mechanical and public health services works to be provided shall include the main Depot, and comprise heating, fresh air ventilation, toilet accommodation extract ventilation, specialist extract ventilation, comfort cooling systems, control systems, incoming natural gas supplies and distribution, fire alarm systems, fire suppression system, incoming mains water supplies, domestic hot water generation, domestic hot and mains water distribution, rainwater collection, waste and soil pipework systems, and underground surface water and foul drainage immediately local to the main Depot (connecting into main services systems).

29.19.2 Water

Cold water shall be provided to each stabling road.

Mains water shall be supplied to areas such as the vehicle workshop (and other special purpose workshops), plant room and wash plant. Backflow prevention devices shall be employed.

Domestic hot water shall be centrally generated and stored. The calorifiers and circulation plant shall be housed in the appropriate plant room.

29.19.3 Air Conditioning

Air conditioning shall be provided in the Control Centre, and all administration areas.

A 'free-cooling' system shall be provided for the equipment room.

Duplicate cooling systems, each capable of 100% duty, shall be installed to serve the Control Centre and equipment room.

29.19.4 Ventilation

Dedicated extractor systems shall be provided to suit specific items of equipment (i.e., lathes, paint spraying booths. vehicle battery charging and uninterrupted power supply system).

29.19.5 Drainage Pad

A drainage pad shall be provided adjacent to the pressure washer with a water and power supply for a pressure washer.

Treatment of wastewater to meet appropriate standards prior to connecting to site drainage system shall be provided.

29.19.6 Mechanical Systems

The systems shall be configured such that in the event of a single failure there shall be no loss of data and no requirement for excessive actions on the part of the Control Centre staff.

All centralised mechanical services plant shall be located in the plant room with sufficient space allocation for maintenance and / or plant removal. The only exception to this may be the heat rejection plant necessary for the air conditioning/comfort cooling installations, which are likely to located externally. Should equipment be required to be located externally the impact on the overall visual appearance of the Depot shall be considered.

30 Traction Power

The scope of this Section of the Employer's Requirements is to define the traction power (substations) requirements applicable to the Edinburgh Tram Network which the Infraco must comply with.

30.1 General Requirements

The provision of traction power shall be derived from a number of suitably located traction substations distributed around the Edinburgh Tram Network.

Each Edinburgh tram traction power substation shall include:

- The traction substation enclosure;
- The associated Scottish Power HV (11 kV) three-phase power supplies with associated HV switchboard, metering and local emergency tripping facility;
- 230V LV services with associated metering and distribution equipment for substation services i.e. lighting, small power etc;
- Traction substation transformer-rectifier/s and equipment;
- Traction dc switchboards;
- Feeder and bypass isolators;
- Substation earthing;
- Negative busbars;
- Batteries / charger;
- SCADA interface marshalling panels or agreed equivalent;
- Associated internal power and control cabling; and
- Miscellaneous items to complete.

Substations shall be containerised at all locations where this is practicable.

Provision shall also be made for a 11 kV supply to the Depot services transformer.

30.2 Traction Substations

30.2.1 General

A sufficient number of traction substations (including a separate substation for the Depot) shall be provided, as described later in this Section 30.

The equipment to be provided for each of the eight traction substations for Phase 1a shall comprise:

- Appropriate HV supply arrangements from a Scottish Power circuit breaker (as part of their HV switchboard to be located in a separate section of the substation building);
- A single indoor transformer-rectifier unit;
- A 750 V dc switchboard with direct acting overload protection, impedance protection, earth fault protection and transfer tripping;
- A negative busbar cubicle;
- A tripping and closing battery and charger; and
- All associated internal power and control cabling, and earthing.

The layout and disposition of all equipment contained within all substations shall be identical where this is practical.

Separate personnel access shall be provided to the compartment housing LV control, protection and instrumentation equipment and associated multicore cabling terminations. This compartment shall be fully segregated from the HV / traction voltage compartments by means of a cage or similar. An access door shall be provided between the two compartments, with a locking system that is to be agreed with **tie**.

Two track feeder isolators with earthing function and a motorised bypass isolator shall be provided.

At all substations, control and indication information shall be provided to SCADA by suitable remote communication interface.

30.2.2 Russell Road Track Paralleling Hut (applicable to Phase 1b only)

Consideration shall be given to the provision of a Russell Road track paralleling hut, which shall be provided with similar equipment as all other substations, however an HV supply from Scottish Power will not be provided and the substation shall be used as a track paralleling hut in the first instance.

The design shall consider the future detailed provision for the installation of such an HV Supply, in configuration of the substation which shall be identical, as far as practicable, to all other substations to be provided within the Edinburgh Tram Network.

Cable ducts into the building shall be provided to enable the future installation of a HV Supply with the minimum of disturbance to the ongoing operation of the location.

30.2.3 Gogar Depot Substation

The equipment at the Depot traction and services substation shall comprise three HV supply cables from three Scottish Power circuit breakers, or ring main units feeding two indoor transformer-rectifier units for depot stabling traction and main line traction, and the other to the services transformer in the Depot building.

One four-panel 750V dc switchboard with direct acting overcurrent protection, relay overcurrent protection, thermal image, earth fault protection on three (two for the yard and one for the workshop) track feeder circuit breakers and direct acting reverse current protection on the rectifier circuit breaker. (Alternatively, a fused rectifier may be used, whereby no direct acting reverse current protection on the rectifier circuit breaker is needed at all. An isolator may be offered in place of a rectifier circuit breaker. If the fused rectifier option is chosen, then this will be fed from one rectifier transformer; a three panel 750V dc switchboard feeds the main line in the usual way as described above.

The whole of the Depot yard shall be earthed on the negative side including the workshop traction supplies.

The enclosure of the yard and workshop circuit breaker shall be solidly earthed, and also connected to the rectifier negative pole.

Two negative busbar cubicles (one for the yard rectifier and the other for the main line rectifier), a tripping and closing battery and charger, all associated internal power and control cabling, and earthing shall be provided.

In an annex segregated from the main enclosure for fire detection, two motorised track feeder isolators with motorised earthing function and a motorised load break bypass isolator with over-current detection and tripping relay shall be provided.

30.3 System Protection Settings

As well as complying with the **tie** requirements for as built documentation, all calculations used to determine protection settings shall be provided by the Infraco in a format allowing complete checking of methodology results without any additional sources of information.

30.4 Power System Design Principles

The 11 kV feeds to each traction substation shall be derived from and form part of the local Distribution Network Providers (Scottish Power) Network ring with a dedicated ring main unit or switchboard feeding the Edinburgh Tram Network the traction substation.

HV switchgear shall be provided to meet the requirements of the DNO (Scottish Power).

The 750 V dc traction power system shall provide a very high degree of reliability. Thus, small single-rectifier, substations shall be provided at close spacing, arranged to feed the 'in' and 'out' lines in permanent cross-connection between substations.

The OLE feeding shall be arranged so that the use of locally operated manual feeder isolators can facilitate the remote isolation and earthing of the overhead line; alternative solutions may also be offered.

Each traction substation shall also be configured so it can be isolated from the main line and bypassed without an impact on the Tram service.

The auxiliary switches of the bypass isolator shall, on the bypass isolator closing, re-configure the hard wire inter-tripping pilots to bypass the isolated substation. In the event of a fault, the over-current relay of the bypass isolator shall trip the feeding circuit breakers at both ends of the extended section, and give SCADA indication of the direction in which the fault current flow was detected. Other procedures for indication of fault location may also be offered.

Equipment located within the substations and the remote motorised isolators, including the earthing function, shall be controlled and monitored over the SCADA system.

11 kV supplies at the Depot and control centre will be taken from two 11 kV Scottish Power feeders, via a Scottish Power switchboard affording three 11 kV feeds to the Edinburgh Tram Network.

One feed shall supply the traction transformer-rectifier for the Depot yard, workshop and stabling area roads that have the track solidly earthed.

The second feed shall supply the traction transformer-rectifier for a normal main line feeding configuration.

The third feed shall supply the transformer, adequately-sized for the Depot and control centre LV ac services.

Maximum use of the standard traction transformer rectifier unit shall be achieved for the System by providing a high degree of reliability. This will be afforded by deriving traction supplies from two separate Scottish Power feeders at each substation.

In the particular case of the Depot, in the event of loss of the 400 V ac supply, essential equipment (principally the Control Centre) shall continue to function on UPS supplies and from a separate generator (see Section 29 (Depot) of these Employer's Requirements).

The 11 kV incoming supply to all traction substations shall be able to be individually tripped by the system controller located in the Control Centre via SCADA, and by staff locally by means of a dedicated 11kV trip push button to be located in each substation lobby.

The OLE shall also be able to be tripped in either direction by the system controller from the Control Centre via SCADA.

The OLE shall be able to be tripped in both directions simultaneously via a hard wire emergency mass trip button to be located in the Control Centre that shall trip all substations in the designed groups.

The OLE shall be able to be tripped locally in both directions simultaneously by means of an emergency push button located in each substation lobby.

The substations are named, referenced and located as shown below:

Table 84 - Substation Abbreviations

Substations	Nomenclature
Phase 1a	
Leith Sands Substation	LSE

Leith Walk Substation	LWE
Cathedral Substation	CAE
Haymarket Terrace Substation	HTE
Jenner's Depository Substation	JDE
Bankhead Drive Substation	BDE
Gogar Depot Substation	GDE
Ingliston Park and Ride Substation	IPE
Phase 1b	
Craigleith Substation	CGE
Granton Mains East Substation	GME
Granton Road Substation	GRE

The 750 V dc feeder circuit breakers at each substation shall be arranged to feed the OLE locally through manual feeder isolator / earth switches located in their own compartment of the traction substation. Motorised load break bypass isolators shall be provided in these compartments or at suitable location to link adjacent OLE sections in an emergency.

Intermediate sub-sectioning points shall be provided, comprising section isolators in trackside pillars (depot: pole mounted will be acceptable) to give operational flexibility during emergencies. With the exception of 'tail end' feeds, most sections of OLE shall be double end fed, and provided as second level protection with transfer tripping through private pilot cables.

30.5 Scottish Power Interface (DNO)

All Scottish Power 11 kV supplies connections, together with all associated protection, emergency tripping and tariff metering equipment shall be procured by the Infraco.

The provision of a separate Scottish Power LV supply connection for lighting and auxiliary services within the traction substation buildings, excluding the depot traction substation shall be procured by the Infraco.

The ratings and protection of the Scottish Power supplies shall be suitably co-ordinated with the characteristics of the power conversion equipment.

SCADA indications shall be made available and SCADA cable tails shall be provided for Scottish Power to wire into their equipment. A maximum number of up to 5 in-/output connections are to be considered as sufficient.

30.6 Multicore and Control Cabling

All necessary multicore and control cables within the substation, and LV ac supplies to the substation equipment, shall be provided.

Each substation LV ac supply shall be drawn from a suitably rated LV ac consumer unit.

The provision and installation of all the necessary intertripping pilot cables to and from the dc switchgear located within each substation shall be included.

Cables for all LV ac and LV dc protection, control, alarm and indications shall have copper conductor with XLPE or PVC insulation and an overall PVC oversheath and galvanized steel wire armour where cables are to be installed without armoured conduit or trunking or other adequate mechanical protection.

The conductors shall be plain annealed copper wire complying with BS EN 60447 – 2007 as applicable or equivalent and all cores shall be clearly identified by printed numbers at regular intervals.

The minimum conductor size shall be not less than seven strands of 0.67 mm diameter wire, or in the case of single wire conductors the minimum cross-sectional area shall be not normally be less than 2.5 mm^2. In special cases for light current installations single strand, annealed copper conductors with a cross-section of 1.5 mm^2 may be used but only with the specific written approval of **tie**.

All cable sheaths shall be free from defects and impervious to water.

Multicore and control cables shall be terminated in accordance with the manufacturer's recommendations and the cable cores shall be left long enough to be terminated without the addition of separate tails.

All detail diagrams shall be cross-referenced and shall show multicore cable schedule reference numbers to facilitate cable identification.

30.7 Transformer Rectifiers

30.7.1 General Arrangement

Each unit shall consist of a dry type, Class F AN cooled transformer to BS EN 60726. Each unit shall be suitable for environmental conditions E1 and ambient temperatures C1. The rectifier shall

comprise silicon diodes mounted on heat sinks, the whole to BS EN 60146, and cooled by natural circulation of air, enclosed in a cubicle with a rigidly constructed fabricated steel framework. The steel framework shall be completely clad in sheet steel to the extent as shall be consistent, by the provision of screened openings, with the requirements of natural cooling and ability to assess readily by direct vision from outside the cubicle any unhealthy condition of the major internally mounted components. Drip-proof top covers shall be fitted. The outer surfaces of the cubicles shall be Grey Shade 631 Semi Gloss to BS 381C 1996 or similar, e.g. RAL 7047. Adequate ventilation provision shall be made in the substation buildings without jeopardising the security of the building to ensure the equipment is able to perform correctly.

Alternatively, a separate close-coupled transformer cubicle may be offered. Substation floor area shall be considered at a premium, so an important consideration is compactness of layout without jeopardising operating and maintenance requirements.

All equipment shall comply with the requirements of BS EN 60076 and BS EN 60146, and the degree of enclosure shall be IP31 of BS EN 60529.

30.7.2 Rating

The rating of the transformer-rectifiers shall be declared as the 100 per cent continuous rated output at 750 V dc on all transformer tappings. Each combined unit shall have an overload rating according to the rating class of BS EN 60146 stated in the Schedules. The impulse voltage withstand rating shall be 75 kV for the nominal system voltage of 11 kV.

30.7.3 Voltage Regulation

The overall voltage regulation of each combined transformer - rectifier shall be 5 per cent with a tolerance of ±5 per cent of the regulation from 5 to 100 per cent rated load.

30.7.4 Voltage Ratio & Connections

The HV primary winding shall be delta connected, and two secondary windings, one star and one delta, arranged for series bridge rectifier operation in accordance with circuit diagram 12 of BS EN 60146 to produce 750 V dc at 100 per cent rated load and nominal tapping.

30.7.5 Voltage & Phase Tapping

Tappings shall be provided on the HV windings in order to make an off-circuit HV voltage selection, by means of bolted links.

30.7.6 Transformer Cores

The cores shall be built up of cold rolled grain oriented silicon steel sheets in accordance with the guaranteed maximum total loss stated in BS EN 10107. When a transformer is connected on the nominal tapping, and operating at rated voltage and frequency, the flux density at any point in the magnetic circuit shall not exceed 1.6 Tesla.

The magnetic circuit shall be insulated from all structural parts and be capable of withstanding a test voltage to the frame of 2 kV rms for one minute. A link shall be provided for earthing the magnetic circuit to the enclosure.

30.7.7 Performance Under External Short Circuit

The performance of the rectifier transformer under external short circuit conditions shall be in accordance with BS EN 60076 (BS 171 is withdrawn). In applying the values stated therein it is to be assumed that the voltage at the terminals of one side of the transformer is maintained at the full rated value for the duration of the short circuit when there is a short circuit between the phases or to earth on the other side of the transformer, or between poles on the rectifier output.

30.7.8 Losses

The no-load and load losses shall be as low as is consistent with reliability and economical use of materials.

30.7.9 HV Cable Terminations

A cable termination chamber for top or bottom entry shall be provided suitable for dry type terminations and the HV cable.

30.7.10 Diodes

The type of diode used shall have been proved in service and have an assessed reliability generally in accordance with valid and current European Standards ((actual BS 9300 seems not to standardise diodes for traction rectifiers)). A fuse-less design of diode bridge shall be provided. Alternatively fused diode bridges with monitored fuses in combination with fuse-less, but short circuit proof resistor/capacitor circuits may also be offered (refer to section30.7.11).

Each diode shall be capable of withstanding voltages having a peak value not less than 2.5 times the peak working reverse voltage rating.

Particular attention shall be paid to the method used for mounting the diodes, and it shall be possible to replace easily any individual diode without disturbing other components.

30.7.11 Surge Protection

Each rectifier shall be fitted with surge protection to ensure that the reverse voltage is shared equally across series connected diodes and bridges and that the voltage across individual diodes is limited to the peak transient reverse voltage rating of the diode.

In order to attenuate surge voltages caused by lightning strikes, pantograph arcing or similar effects, a surge protection circuit comprising two separately fused resistor/capacitor networks shall be provided. The design of the surge circuit shall be such that resonant effects with significant

harmonics present in the open circuit voltage are minimised. . Alternatively, a non-fused short-circuit proof resistor/capacitor circuit may also be offered.

Adequate protection against lightning and over-voltages, however caused shall be afforded to the substation equipment. The characteristics of all surge diverters to be used on the Edinburgh Tram Network shall be correctly co-ordinated with those of the rectifier surge circuits, so as to limit over-voltages to acceptable levels and minimise resonance effects.

30.7.12 Temperature Rise

The rectifier transformer temperature rise shall be limited to 800 K at rated output. The maximum operating temperature of any rectifier component, including busbars and connections, shall not exceed the limits permitted by BS EN 60146.

30.7.13 Protective Services

The following devices shall be provided:

- Diode heat sink and transformer winding over-temperature alarm and trip, with alarm contacts for SCADA indication and local alarm lamp indication (amber) or, alternatively, indicated on substation control & protection display;
- Surge circuit fuse failure alarm, operating for the failure of either or both circuits, with alarm contacts for SCADA indication and local alarm lamp indication (amber) or alternatively indicated on the substation control & protection display; if a non fused solution is provided (refer to Section 30.7.11 Surge Protection then no indication is required.
- A supply supervision device shall be provided to monitor the presence of the main supply to the transformer-rectifier and to give a supply failure alarm through the SCADA system; and
- An extreme inverse over-current/earth fault relay protection on the 11 kV incoming circuit for tripping the Scottish Power rectifier feeder circuit breaker, with alarm contacts for SCADA indication.

30.7.14 Instrumentation

Each rectifier shall be fitted with a shunt or dc current transducer with connection to an ammeter mounted on the front of the cubicle. Each rectifier shall be fitted with a fused voltage divider connected to a rectifier output voltmeter mounted alongside the ammeter.

The overall accuracy of the shunt / dc current transducer and ammeter, and of the voltage divider and voltmeter, shall be to Class Index 1.3.

Alternatively, this instrumentation may be located in the rectifier feeder cubicle of the DC switchgear or the values may be shown on substation control & protection displays.

All 750 V dc connections, relays and instruments and any stray current monitoring instruments shall be capable of withstanding the test voltage stipulated in BS EN 50124-1 2001.

30.7.15 Negative Isolation

The negative connection from each rectifier shall include a disconnection facility by means of an isolator, either as part of the rectifier or part of the negative busbar cubicle.

30.8 A.C. HV Switchgear

Provision is to be made for a 'Scottish Power' emergency trip facility (located in each substation lobby) to allow mobile tramway staff, who may not be authorised for access to the traction substations, to trip the Scottish Power in-feed to a substation in the event of a failure of the SCADA system.

30.9 D.C. Traction Supply Switchgear

30.9.1 General

The switchgear shall be of the high-speed air break type in accordance with BS EN 50123-2, suitable for use on a 750 V dc traction overhead line system, with floating track negative return circuit.

Circuit breakers shall be of the carriage-mounted 'withdrawable' type, within cubicles.

The switchboard shall comply with BS EN 50123 Part 6 and be capable of sustaining without damage, the electrical and mechanical stresses produced by fault conditions up to the prospective system short circuit rating.

The entire switchboard enclosure shall be insulated from earth and there shall be no inadvertent earthing of the switchboard other than via the main earth bar passing through the low impedance earth fault sensor.

Each cubicle shall be of rigid folded sheet steel construction suitable for all normal and fault conditions, and withstand repeatedly without distortion or failure, shocks caused by closing and opening impacts. Enclosures shall have a degree of protection to IP 31.

Removal of covers on any cubicle to permit access to components shall not cause exposure of live conductors in the adjacent cubicles.

The design of the cubicles shall ensure complete dispersion of ionised effluent from the circuit breaker to atmosphere without hazard to personnel or the possibility of establishing a conducting path to the switchboard frame.

The switchgear assembly shall be designed in compliance with, and have certified test reports to demonstrate compliance with clause 6.6.3 of BS EN 50123-6 1998. Front access doors to compartments with exposed metalwork connected to the primary circuit shall be insulated against arcing to the door (3 mm polycarbonate screen or equivalent) and have a fault rated flexible earth strap at the top of the door between door and cubicle frame. Hinges and door latches shall be substantial and keep engaging on door closure.

Outgoing cable boxes shall be suitably sized to accommodate the DC cables. Feeder cable boxes shall be furnished with a surge arrester coordinated with the OLE and rectifier surge protection ratings.

Other DC switchgear, proved and tested in similar applications providing same or similar functionality in compliance with relevant, current and valid European Standards may also be provided.

30.9.2 Busbars

The busbars shall be rigidly supported and fully insulated throughout their length, including tee-off connections and joints between adjacent chambers.

The busbars shall be completely enclosed in an earthed metal chamber, access to which shall be by means of bolted panels. Removal of these panels shall not give access to outgoing circuits. No small wiring or other equipment shall be mounted in busbar chambers.

Other solutions providing same or similar functionality and electrical safety may also be provided.

30.9.3 System Voltage and Fault Level

The normal system traction working voltage shall be taken as 750 V DC, with a tolerance in accordance with BS EN 50163.

The switchgear shall be capable of withstanding the electrical and mechanical stresses when clearing short circuit currents up to the maximum prospective level of the system, assuming that normal voltage will be maintained at the primary terminals of the rectifier transformer.

The switchgear shall be capable of interrupting the following currents:

- Terminal short circuits;
- Overhead line faults adjacent to a substation;
- Overhead line faults remote from substations, and including faults at the most distant point fed under the most onerous outage conditions tolerable;
- All values of traction load currents likely to be encountered in service, passing through the switchgear in either the forward or reverse direction; and
- Load currents of tramcar auxiliaries, under both starting and running conditions, passing through the switchgear in either the forward or reverse directions.

All electrical clearances in air and insulator creepage distances shall be adequate to withstand all specified steady state voltages and all transient voltages likely to arise in service.

30.9.4 Temperature Rise

Each current carrying component of the equipment supplied shall be capable of continuous operation at the specified ratings without exceeding the maximum temperature rises stated in the appropriate European Standard.

30.9.5 Circuit Breaker Isolation

Each complete circuit breaker together with its auxiliary switches and operating mechanism shall be arranged on a 'withdrawable' carriage to permit full accessibility for maintenance purposes and as a means of isolating the circuit.

Indication of circuit breaker `open/closed' status, and circuit breaker position, shall be visible through a window in the cubicle access door or by other suitable means (e.g. after opening the cubicle access door and, in addition, on substation protection and control display)..

The circuit breaker carriage shall remain within the confines of the cubicle when in the service or isolated positions.

A positive stop shall be provided to indicate when the circuit breaker has been fully moved into the service position.

Mechanical interlocks shall be provided so that it is neither possible to withdraw the circuit breaker without having first tripped the operating mechanism, nor to replace the circuit breaker if in the closed position. Means shall also be provided to enable the circuit breaker to be operated electrically or by hand when in the isolated position. A padlocking facility shall be provided on the isolating handle aperture. The main isolating contacts of the fixed portion shall be equipped with shutters arranged automatically to cover all live parts on both busbar and outgoing circuits. Provision shall be made for padlocking each individual shutter in the closed position.

Secondary isolating contacts shall be provided as necessary and arranged so that when in the isolated position all auxiliary supplies to the circuit breaker carriage are still connected.

Facilities shall also be provided so that the circuit breaker and its associated electrical auxiliary circuits can be operated electrically when the carriage is completely withdrawn from the cubicle enclosure.

The circuit breaker carriage shall be equipped with suitable wheels for movement on normal floor surfaces and also to act as guides in conjunction with suitable alignment rails, pins and sockets to ensure correct and accurate engagement of the plug and socket contacts.

Steel ramps and tracks of suitable section and robust construction shall be provided for the movement of the carriage into and out of the stationary portion of the cubicle. The arrangement shall positively and accurately align the main and secondary plugs of the carriage with the respective stationary portion plugging contacts and during all movements under service conditions maintain such alignment and earthing contact. The ramps shall be designed to permit easy movement of the carriage between cubicle and floor without shock or damage to the equipment or floor.

Plugging or scraping contacts with copper current paths shall be provided to ensure a satisfactory and positive connection of the metalwork of the circuit breaker carriage to the switchboard earth bar established in the isolated position before any 750 V connections are made.

30.9.6 Circuit Breakers

All circuit breakers shall have a continuous current rating in accordance with BS EN 50123 and BS EN 60439 where applicable, shall be identical in arrangement and fully interchangeable with each other, where appropriate. Rectifier and feeder circuit breakers shall not be interchangeable, in -case Rectifier circuit breakers are provided (in case of Fused Rectifier diodes, Rectifier disconnectors are sufficient and to be provided).

The closing circuit shall contain an anti-pumping feature which shall prevent automatic re-closure should the closing signal be retained indefinitely either by operator action or resulting from a failure on the supervisory control system. The circuit breaker shall not respond to a close signal when open and a trip signal is present.

Closing and tripping circuits shall be capable of satisfactory operation within the limits of 70 per cent (tripping of feeder circuit breaker trip coils) 80 per cent (closing) and 120 per cent, of the rated dc auxiliary supply voltage.

The 'trip' coils of the dc rectifier circuit breakers shall, if needed (see above), take the form of 'under voltage release' coils after Network Rail practice, so that loss of auxiliary voltage will cause the rectifier circuit breaker to drop out, leaving the feeder breakers closed up as a track paralleling hut (TPH).

The circuit breaker shall be capable of being closed and tripped manually in the service position while still retaining its full fault making and breaking capacity. Under such manual operation it shall be possible to disconnect the auxiliary dc supply without interfering with the operation of the breaker.

Provision shall also be made for the slow manual closing of circuit breakers when withdrawn for maintenance purposes and one device for this purpose shall be provided per switchboard. The slow closing device shall be such that the moving portion of the circuit breaker can be halted at any point in the travel, to enable checks to be made at all points of the closing stroke.

Mechanical indicators shall be provided to show whether the circuit breaker is open or closed. An operations counter shall be fitted.

Shunt tripping coils shall be wired in series with circuit breaker auxiliary contacts arranged so that the supply to these coils is automatically cut off on completion of a successful operation.

All contacts shall be easily and quickly replaceable.

The arc chutes shall be so arranged that any emission of flame, hot gases or metal particles during operation of the circuit breaker will be contained within the cubicle and not cause damage. Arc-chutes shall be designed for convenient handling and removal during inspection and maintenance.

The design of the arc control chutes shall be such that erosion caused by the arc and emission of ionised effluent during operation of the circuit breaker is minimal. The materials used in them shall be non-hygroscopic.

Each circuit breaker carriage shall be fitted with a label holder and an easily removable blank white sandwich plastic label.

The front and rear of each cubicle shall display a prominent label showing the circuit identification by name and approved reference number.

30.9.7 Interlocks

A system of mechanical or electronic interlocks (substation control and protection) shall be provided which automatically imposes a fixed sequence of events designed to prevent mal-operation of the circuit breaker unit as a whole.

30.9.8 Protection Devices

Each feeder circuit breaker shall be fitted with a uni-directional series instantaneous overload device, with a calibration range chosen to be a standard for the system. It shall also be fitted with a multi-functional device to afford instantaneous, programmable and thermal image protection. Rate of rise protection is disallowed (may be a standard part of the multi function relay, provided it can be disabled) but impedance protection will be considered.

Each feeder circuit breaker shall be fitted with a line proving device to prove the circuit onto which the circuit breaker has been instructed to close is not faulted. The maximum current that may flow due to the 'line proving', in the event of a short circuit shall not exceed 40 amps. The relay that measures the residual resistance in the circuit and blocks the circuit breaker against closing shall have a setting range of 2 to 50 ohms as a minimum. In addition to blocking the circuit breaker from closing a SCADA indication shall also be given that the closing has been blocked.

A combined intertripping and earth fault protection scheme shall be provided. Each switchboard shall be equipped with a low impedance earth fault detector, arranged to initiate a local mass trip of all dc circuit breakers and to intertrip corresponding feeder breakers at adjacent substations for all causes of feeder CB tripping. 'Intertrip receive' protection relays or related control equipment shall be fitted with a manual reset flag or similar (e.g. display), showing when the protection is operated. Intertrip by-pass facilities shall be provided, by means of auxiliary switches in the substation bypass isolators reconfiguring automatically when the isolator is closed. Inter-trip, in/out of service, switches shall be provided in order to inhibit the intertripping when OLE is sub-sectioned. Provision shall be made for SCADA 'opening' of the feeder circuit breakers without causing a mass trip or intertrip.

Contacts shall be provided to give individual trip alarms from main and back-up protections through the SCADA system.

The SCADA system will include a remote trip facility. In order to maximise reliability, the incoming SCADA control signal for this facility shall be arranged not only to trip the appropriate local feeder circuit breaker but also to trip the corresponding feeder circuit breaker at the remote end of the OLE section via the intertripping pilot wire system.

Each circuit breaker shall be fitted with a push button and lamp (white) to provide a local trip 'circuit healthy' indication on demand with the breaker closed. The current path for this feature shall include the actual circuit breaker trip or actuation coil.

Additionally, a voltage operated relay fitted with a self reset flag indicator shall be provided to supervise the tripping supplies to the switchboard. Contacts shall be provided to give an alarm through the SCADA system.

Each outgoing d.c. feeder cable box shall be equipped with a surge diverter.

30.9.9 Control and Instrumentation

All equipment shall comply with relevant and valid European Standards.

Auxiliary control supply shall be from a floating LV d.c. supply. Individual panels shall have both polarities of the supply fused, or protected by magnetic circuit breakers.

Current measuring devices shall be fed from either shunts or transducers. All 750 V connections and associated relays and instruments shall be capable of withstanding the test voltages according to relevant and valid European Standards.

Main items to be included on each panel shall include:

- Circuit breaker control switch (open/close);
- Circuit breaker control selector switch (local/supervisory); and
- Indication lamps (open/closed - green/red).

All control and control selector switches shall be suitable for locking by means of a padlock. Indication lamps shall be of the LED type to ensure long life.

Each feeder circuit breaker panel shall be provided with an ammeter, of overall accuracy including the shunt to Class Index 1.5.

Each rectifier panel shall be provided with a voltmeter fed from the rectifier side of the circuit breaker, or the rectifier voltage transducer.

Alternatively, listed control and indication elements may also be provided by means of the substation protection and control units (e.g. display). In this case, therefore, padlocking is not applicable.

30.9.10 Overhead Line Emergency Trip

A facility to ensure the fail-safe hard wire emergency mass trip of traction substation dc circuit breakers by the system controllers shall be provided within the Control Centre.

Separate emergency trip push buttons shall be provided for the following two groups:

- Haymarket to Newhaven
- The rest of the Edinburgh Tram Network including the Depot,

This facility shall take the form of a suitably located and identified wall mounted box containing all equipment and push buttons necessary to provide this function.

The equipment to be provided in each traction substation and TP hut for this feature shall comprise a hold-in relay energised from the tripping batteries of the traction substation and a remote normally-closed contact in the Control Centre or other substation. The system shall be provided with trimming resistances to keep the relay current within limits for varying distances to the remote contact. The system is envisaged to be stable at up to 15 km with 1.5 sq mm pilot cores. The mass

trip relay shall have sufficient circuits to trip all feeder circuit breakers and dc rectifier circuit breakers. It is not envisaged to use the rectifier circuit breaker trip and an open link shall be provided in this circuit. Two further normally-open and normally-closed contacts shall be provided for use in cascading the trip to other traction substations in a similar manner.

Provision shall be made for an overhead line emergency trip facility (located in each substation lobby) to allow mobile tramway staff, who may not be authorised for access to the traction substations, to trip the overhead lines in both directions from a substation in the event of a failure of the SCADA system. The logic of this trip facility will be integrated in the central station controller of each substation.

30.9.11 Circuit and Busbar Earthing

Means shall be provided at each panel for applying a safety earthing device to busbar or circuit connections in order to comply with safety legislation. A dedicated earthing truck or other suitable earthing equipment, as needed for the installed equipment, shall be provided at each substation for such purposes.

30.9.12 Isolator Motorised Operation

Where motorised isolators are provided, operation of the feeder isolator and earth switch functions shall be from the substation tripping battery.

Operational commands shall be via SCADA signals hard wired from the SCADA outstation within the substation to relays in the isolator panel.

Both OLE feeder terminals shall have 'live line' detection arranged to inhibit opening of the feeder isolator and this detection shall be brought back to the Control Centre via SCADA.

It shall not be possible to earth a feeder unless the bypass and feeder isolator are both open.

It shall not be possible to close a feeder isolator unless both the earth has been removed and the adjacent bypass isolator is open.

It shall not be possible to close the bypass isolator unless both adjacent feeder isolators are open. SCADA position indication shall be provided for all switching elements in all positions.

In the event of loss of rectified Scottish Power LV supply the operation shall auto change over to a battery supply.

For isolators located in the Depot, this section is not applicable, because of manual operation.

30.9.13 Bypass Isolator Over-current Feature

The bypass isolator when closed shall reconfigure the 'pilot wire' inter-tripping between adjacent substations to bypass the substation in which the bypass isolator is accommodated.

In case protection of contact line cannot be provided by adjacent substations when bypass-isolator is closed, the bypass isolator shall have a 'line current' trip feature where the current passing through the bypass isolator is measured and operates one of two relays depending on the direction of current flow through the isolator to trip both remote substations in the event of detecting a current in excess of setting.

The setting range to be approved by **tie**.

The relays shall be powered from a dedicated battery with a minimum of four hours standby time.

This battery shall be supplied from the substation tripping battery supply. There shall be SCADA indication of loss of battery voltage.

30.10 Batteries and Chargers

30.10.1 Scope and System Voltage

One 100 per cent duty battery, 100 per cent duty charger and dc distribution board unit shall be provided for each traction substation, for the purposes of providing tripping, closing and control supplies for the 750 V dc and ac switchgear. The battery charger will be supplied from the Scottish Power LV ac supplies in the substation. Neither polarity shall be deliberately earthed and the supply shall function unaffected with either pole inadvertently earthed.

It is to be noted that such supplies for the Scottish Power 11 kV switchgear will be derived from a battery and charger to be supplied and installed by Scottish Power themselves (Electricity Supply Regulations requirement).

The nominal battery voltage, suitable for the switchgear, shall be in accordance with BS 2618. The charger supply shall be 230 V, single phase, 50 Hz, and the complete equipment shall be a manufacturer's standard product.

30.10.2 Batteries

The batteries shall be of the high performance type, and shall be designed for a life expectancy of at least ten years under the conditions of service likely to be encountered. Battery cases shall be of high impact polystyrene translucent plastic. The batteries shall be such that maintenance shall be required at not less than twelve month intervals.

30.10.3 Battery Duties

The rating of each battery shall be sufficient to meet the requirements of the most arduous duty cycle at any one of the substations including:

- The continuous standing load; and
- On the assumption the battery is charged to 80 per cent of its rated capacity and the charger supply is then lost, the battery shall then be able to supply the standing load for twenty-four hours and then have sufficient capacity to carry out the closure and tripping of a 750 V circuit breaker twelve times in quick succession.

30.10.4 Battery Accommodation

Each battery together with its associated charger and dc distribution load shall be accommodated in a single, self-contained, ventilated, sheet steel cubicle of rigid construction.

The cells shall be so mounted that ready access is provided to the tops of all cells for maintenance purposes. The battery enclosure internal metalwork shall be treated with electrolyte-resisting paint.

30.10.5 Battery Chargers

Each battery charger shall be of the automatic constant voltage type and shall be suitable for supplying the constant load and at the same time maintaining the battery in a fully charged condition while floating across the load and charger.

Arrangements shall be made such that, in the event of the battery becoming discharged, the rate at which recharging commences is as high as possible consistent with maintaining the automatic charging constant voltage feature and with the connections remaining undisturbed, as for normal service.

Each charger shall also incorporate a boost charge feature, which shall, after having been started, provide an automatically controlled high charge rate sufficient to restore a fully discharged battery to the fully charged state within twelve hours without excessive gassing or any form of damage to the

battery. The boost charge shall be initiated manually but reset to float automatically, and shall not cause damage to any connected equipment. Each charger shall be capable of automatically and continuously supply the constant load with the battery disconnected. Under such conditions, the charger shall still maintain the nominal system voltage without any damage to itself, and the ripple of dc output shall not exceed ±15 per cent.

30.10.6 Alarm Devices

The following shall be provided:

- Undervoltage detection equipment to give local indication (amber lamp) and supervisory alarm when the system voltage falls to below 80 per cent nominal. A time delay shall be incorporated to prevent initiation during temporary voltage dips;

- Charge fail detection equipment to give local indication (amber lamp) and supervisory alarm if the voltage from the charger falls below the nominal floating charge voltage. Blocking diodes shall be provided to prevent the battery voltage being supplied to the equipment, so that only the charger voltage is effective in causing the alarm. The device shall not operate on switching surges or transient loss of ac supply; and

- Earth fault detection equipment to give local indication (amber lamp) and supervisory alarm of the occurrence of an earth fault, and to give local discrimination between positive and negative faults.

The above alarms shall be given separate SCADA alarm channels.

30.10.7 Instrumentation

The following shall be provided:

- Charger output/output voltmeter;

- Output dc load ammeter; and

- Centre zero battery ammeter.

30.10.8 Battery Distribution Board

The following shall be provided:

- Provision for isolating the battery (withdrawing the main fuses);

- Main and subsidiary fuses in both polarities; and
- Subsidiary fuses to dc switchboards (three in Depot traction substation, one in each of the other substations), ac switchgear transformer rectifier units, feeder and bypass isolators, two spare circuits.

30.11 Earthing, Bonding, Surge Protection & Ancillary Equipment

30.11.1 Earthing Systems

Each substation shall be equipped by Scottish Power with an earth system for their equipment which may be available for connection to the Edinburgh Tram Network substation earthing system and equipment, but only by agreement between the parties.

A earthing installation at each traction substation shall also be provided capable of specified performance alone, without recourse to connection to the Scottish Power earth system. Where Scottish Power allows interconnection, the Edinburgh Tram Network earth system shall connect to the Scottish Power earth terminal via a disconnectable link.

The Edinburgh Tram Network earthing systems shall be constructed employing copper conductors, including all necessary junctions, connectors and supports. The installation shall comply with relevant, current and valid European Standards.

The earth systems shall comprise a continuous main earth bar installation, located where possible in the cable trench, and around the inside walls of the substation, with branch connections to equipment and metalwork.

Each earthing conductor shall either be solid copper with a minimum cross-sectional area of 80 mm2 or stranded PVC sheathed copper with a minimum cross-sectional area of 70 mm^2.

All joints and bonds shall be made by proven methods to the current carrying ability of the earth conductor and full details shall be submitted for **tie**'s approval.

Attention is drawn to manufacturers' instructions on the earthing of traction dc switchgear via to low impedance earth fault protection equipment.

An Edinburgh Tram Network local earth rod system, of resistance to earth less than 2 ohm, shall be provided at each traction substation and connected to the substation earth system through a

disconnection link by means of stranded PVC sheathed copper cable with a minimum cross-sectional area of 70 mm^2 per cable. The earth rod system shall be in a minimum of two near equal sections (~4 Ohm) each connected back to the substation earth system as described. The resistance between any point of the earth system and a group of earth rods shall not exceed 0.1 ohm. This assumes earth interconnection with the Scottish Power system.

30.11.2 Traction Negative Busbar System

A negative busbar, insulated from earth and mounted within a sheet steel enclosure, shall be provided at each traction substation. The enclosure shall also incorporate an off-load isolator for the connection cables to the rectifier negative terminal. The negative busbar shall provide the connection point for the outgoing negative feeder cables to the tram track. The enclosure shall be able to accommodate four 1000 square millimetre section aluminium cables to the running rails. The enclosure shall be arranged to facilitate visual inspection of the connections inside. The enclosure shall be provided with robust insulated terminals adjacent to the negative busbar for terminating the stray current monitoring cables. Alternative stray current monitoring system can also be provided whereas no stray current monitoring cables may be necessary.

In order to minimise the flow of stray return currents in the earth and buried services, the negative pole of the traction supply, comprising rectifiers, negative busbars, feeder cables and tram track, shall not be deliberately earthed at any point.

The traction negative busbar of each traction substation shall be connected to the substation earth bar either via a minimum of one BB HVL and two Alstom 'Interval of discharge' (Soule 2 RAY's) in parallel, or via an equivalent circuit (e.g. Siemens Sitras® SCD), to control the touch voltage of the traction negative circuit and provide a fault return path. These shall be accommodated within the sheet steel negative busbar enclosure or in a separate cubicle.

The metalwork of the negative busbar enclosure shall be connected to the substation earth system.

30.11.3 Surge Diverters

Adequate protection against lightning and atmospheric overvoltages shall be afforded to the substation equipment. The characteristics of all surge diverters shall be correctly co-ordinate with those of the rectifier surge circuits, so as to limit overvoltages to acceptable levels and minimise resonance effects.

The equipment connected to the OLE shall be protected against surges by surge diverters.

Each feeder isolator shall be equipped with a non-linear resistor gapless surge diverter connected positive pole to earth at the cable terminations in the substation. The surge diverters shall be of the zinc oxide type, enclosed in the dc feeder circuit breaker cable box.

The surge diverters shall be so designed and constructed to combine a high discharge capacity and low residual voltage with mechanical robustness.

30.11.4 Substation Ancillary Equipment

The following ancillary equipment shall be provided in each substation:

- 2 No. suitable sized and rated fire extinguishers of approved type and size;
- 1 No. fully-stocked first aid cabinet of approved type;
- 2 No. `Electric Shock' wall-mounted framed safety instruction cards;
- 1 No. substation operation diagram printed on a plastic medium and framed;
- 6 No. double-sided rigid plastic notices 100 mm x 600 mm with cord loop attachment, "Danger-Live";
- 12 No. double-sided rigid plastic notices 100 mm x 60 mm with cord loop attachment, "Caution - do not interfere with this apparatus"; and
- 4 No. key safes, approximately 150 mm x 250 mm of approved type.

Sufficient padlocks for all switchgear shall be provided. The structured key security system shall be agreed with **tie**.

All substation door access keys shall be in accordance with the structured key security system set out in Section 22 of these Employer's Requirements.

30.12 Cables & Accessories

30.12.1 General

All cables shall comply with the current applicable specifications of the relevant European Standard and the supplementary requirements of these Employer's Requirements.

30.12.2 Types of Cables

Categories of cables shall be allocated series of reference numbers as follows:

- HV supply cables (1000 series)
- 750 V dc traction cables (positive) (2000 series)
- 750 V dc traction cables ((negative) (3000 series)
- Stray current monitoring cables (4000 series)
- LV supply cables (5000 series)
- Pilot cables (dc transfer trip) (6000 series)
- Telecoms multipair cables (7000 series)
- Fibre optic cables (8000 series)

30.12.3 11kV A.C. Cable

AC cables shall be provided for the interconnection of the Scottish Power HV switchgear, the a.c. circuit breaker, and the transformer rectifier units.

The cables shall be in compliance with Scottish Power standard and may be three phase or single phase with sheaths connected also in accordance with Scottish Power standards.

30.12.4 Traction Supply Cables

Single core 750 V DC copper cables shall be used for the connection of rectifier (positive) to dc switchgear, and rectifier (negative) to negative busbars.

Cables from rectifiers to DC switchgear positive and negative busbars shall be dimensioned taking into account the rating of the transformer/ rectifier unit, including their overload class.

Negative cables may have a reduced insulation level commensurate with the reduced voltage withstand required.

The cables shall be manufactured in accordance with appropriate European Standards.

Conductors shall be stranded tinned copper wires to BS EN 60228.

The insulation shall be butyl rubber (BR) or ethylene propylene rubber (EPR) to BS 6899 type GP2.

Alternatively XLPE may be considered by **tie** with adequate reference application and justification.

Cables shall be anchored at terminations by mechanical plastic glands, where gland plates must be traversed, and if necessary supported by non-hygroscopic resin-bonded laminated wood, hardwood or similar non-metallic approved clamps.

Conductor terminations shall be by means of indented or annular-compressed tinned copper lugs, with heat-shrinkable tube oversheath.

Cable conductors shall be jointed with indented or annular compressed ferrules with an approved compression tool, the joint made up by an approved jointing kit and sheathed by an approved heat-shrinkable tube.

Compression tools shall be certified as calibrated, and shall only be used when within the calibration period.

Cables to be utilised within the permanent works shall be drummed up and provided to site to ensure maximum cable lengths are installed throughout to minimise the necessity for through joints.

30.12.5 Low Voltage Supply and Multicore Control Cables

The cable construction shall comply with European standards.

Cables shall have copper conductor with XLPE insulation, PVC oversheath and, where not installed with mechanical protection, galvanized steel wire armour.

The conductors shall be plain annealed copper wire complying with BS EN 60447 circular or shaped conductors. All cores shall be identified by phase colours, or in case of control cables, by printed numbers.

All sheaths shall be free from defects and impervious to water.

LV supply cables shall be terminated in accordance with the manufacturer's recommendations and the cable cores shall be left long enough to be terminated without the addition of separate tails.

Cables to be utilised within the permanent works shall be drummed up and provided to site to ensure maximum cable lengths are installed throughout to minimise the necessity for through joints.

31 Overhead Line Equipment

31.1 Scope

This Section of the Employer's Requirements defines the overhead line equipment (OLE) requirements that are applicable to the Edinburgh Tram Network which the Infraco must comply with.

31.2 General Requirements

The information provided in this section supplements any information provided in the Tram Design Manual and other documentation provided by **tie**.

Unless otherwise stipulated, all requirements pertaining to overhead line equipment shall be compliant with BS EN 50119.

31.3 Equipment Overview

Appearance of the overhead line equipment is of paramount importance throughout the Edinburgh Tram Network. The appearance must be appropriate to the location, and visual intrusion shall be minimised.

The type of equipment provided (including, for example, auto-tensioned, fixed termination, catenary support; central mast with balanced bracket arms, side masts with cantilever arms, span wire construction etc.) over each section of the Edinburgh Tram Network shall be appropriate to the area and to the tramway operating speed requirement in that location. The use of building fixings shall be maximised.

31.4 Electrical Power Characteristics

The overhead line equipment shall be energised at a nominal 750V in accordance with BS EN 50163: 2005: Railway Applications - Supply Voltages of Traction Systems.

The overhead line equipment system shall comply with the following electrical and operational parameters:

- System voltage;
- Conductor of suitable cross sectional area;

- Traction buried reinforcing DC cables;
- The required operational speeds; and
- All in-service loading conditions.

31.5 Environmental Considerations

The overhead line equipment system shall fully comply with the environmental criteria as set out in these Employer's Requirements.

31.5.1 Ice Loading

The conventional ice loading of 10mm radial shall be used when assessing the ice-loading on overhead conductors.

31.5.2 Pollution

The creepage path and creepage distance of insulators shall accommodate the implications of atmospheric pollution in accordance with EN 50119:2001, pollution level "medium", and for areas close to the sea, "heavy"..

31.6 Material for Equipment

Standard materials shall be used with the exception of the route sections from Newhaven Road to Ocean Drive and Caroline Park to Granton Square Tramstops, where stainless steel or aluminium material (for tubes and fittings) shall be provided.

If 'parafil' or an equivalent material is to be considered, rigorous quality control fully documented and certified measures for the application, installation and long-term maintenance of the material shall be implemented. These measures are subject to specific approval by **tie**.

31.7 Pole and Cantilever Tube Deflection Criteria

The deflection of poles, cantilever tubes and other structural elements under normal and transient loading conditions shall be such as to not detract from the minimum safety functionality or appearance of the overhead line equipment system.

31.8 Mechanical and Electrical Clearances

Mechanical and electrical clearances shall, as a minimum, be in accordance with BS EN 50119 and the guidelines specified in ORR's publication "Guidance on Tramways", Railway Safety Publication 2 (**"RSP 2"**). In addition, a 'safe working zone', shall be incorporated.

31.9 Contact Wire Gradient and Geometry

Contact wire gradients adopted shall take account of the planned tram operating speed in the area and shall follow BS EN 50119 requirements. The contact wire gradient shall be such that at all times and under all environmental and operating conditions, contact with the pantograph is maintained.

The overhead line equipment horizontal geometry shall be arranged so that the contact wire is always in contact with the working width of the pantograph under all environmental and operational conditions.

31.9.1 Contact Wire Height

The governing requirement for the establishment of rules for contact wire heights shall be as clause 5.2.8 of BS EN 50119. For safety considerations, in areas where tram path is shared with the public traffic the contact wire height and the profiling of the wire shall take into account:

- ORR's RSP2 requirement for minimum wire heights where a support has failed;
- Minimise the risk of contact with wire from people and/or objects on open top double decker buses, over-height road vehicles, window cleaners carrying ladders and any third party work;
- Activities associated with the Edinburgh festival, Christmas fun-fair on Princes Street, and similar public events; and
- Provide the necessary clearance for designated high-load routes.

31.10 Structural Integrity

All proposed structures within the overhead line equipment system shall be designed to comply fully with the design parameters and codes of practice specified for the project.

31.11 Electromagnetic Compatibility

The overhead line equipment shall comply with Electromagnetic Compatibility Section of these Employer's Requirements.

31.12 Dynamic Performance

The dynamic performance of the overhead line equipment/pantograph interface shall be in accordance with the requirements of Clause 5.2.1 of BS EN 50119.

The performance of the overhead line equipment/pantograph interface shall be validated by a full dynamic simulation study undertaken during the design phase. The governing specification for all design activities is BS EN 50119.

The study method shall be validated in accordance with the requirements of BS EN 50317 and BS EN 50318.

31.13 Design Life

The design life of the overhead line equipment is set out in Design Life of these Employer's Requirements.

31.14 Auto-Tensioned Equipment Types

31.14.1 Form of Equipment

Low visual impact equipment is required throughout the Edinburgh Tram Network. Thus, anywhere along the route of the Edinburgh Tram Network, where line speed and/or pantograph interaction with the overhead line equipment demands, auto tensioned trolley wire equipment will generally be the appropriate solution.

31.14.2 Conductors and Tensioning Devices

The overhead line equipment shall utilise a single contact wire system, with additional parallel (buried) feeders or catenary system outside the city centre where the messenger wire replaces the parallel feeders..

The contact wire size shall be confirmed by electrical modelling studies and by pantograph/ overhead line equipment dynamic modelling.

Should mechanically tensioned balance weight system be proposed, the tensioning device shall comprise a counterweights and pulleys system of discrete and compact design. For example, the counterweight stack must be incorporated inside the pole structure. The system shall utilise a fail-safe mechanism with vandal proof features.

31.14.3 Tension Lengths

The maximum tension length between anchor locations shall be chosen so as to minimise the number of anchor points but without undue drag, localised hard spots and overloading of the equipment.

31.14.4 Span Length

The pole positioning, and hence span length along the track, shall be chosen:

- To maximise the structure spacing to achieve economy;
- To maintain the technical parameters referred to elsewhere in this document, e.g. geometry, clearance, dynamic performance, etc;
- For visual and aesthetic appearance issues, in accordance with the Tram Design Manual, and
- The achievement of all relevant consents and approvals.

31.14.5 Parallel Feeders

Aerial parallel feeders shall not be permitted. All parallel feeders shall be buried, located in suitable ducts running along the tracks and with cross feeding to the overhead line equipment conductors at suitable intervals. Outside Edinburgh city centre other options, like catenary system may also be offered by the Infraco for approval by **tie**.

31.15 Fixed Termination Equipment Types

31.15.1 Form of Equipment

Fixed termination trolley wire equipment shall be considered as an appropriate and cost effective solution for highly sensitive areas and/or where lower operational running speeds are required.

31.15.2 Reduced Conductor Tension System

At junctions and sharp corners, where the operational speeds are limited by the track geometry, a variant of the fixed termination unsupported wire shall be considered which utilises a reduced conductor tension system.

31.16 Depot Equipment Type

In the Depot area, a fixed termination single contact wire system (supported or unsupported) shall be provided which shall accommodate the wire height constraints.

31.16.1 Equipment Support and Registration

Cantilevers

For both auto-tensioned and fixed termination systems the cantilevers shall consist of a horizontal registration tube insulated and hinged at the face of the pole, and supported by a tie wire.

As an option, fully insulated tubes and steady arms (glass fibre plastic or equivalent) may be proposed and offered for review by **tie**.

Cross Span Wire Supports

In Edinburgh city centre areas, as an alternative to cantilever on pole equipment option, the simple cross span wire support assembly may be considered. These can be constructed between poles or attached to suitable buildings, along the route of the Edinburgh Tram Network. The choice of material and the method of construction of cross span wires shall be subjected to the approval of the planning authority.

All fittings, clamps and accessories shall be standard proprietary items, capable of being sourced freely from the market.

For minimising the visual impact of the equipment the use of non-corroding material (particularly stainless steel) shall be considered by the Infraco.

Jumpers and Feeders

All feeders and jumpers shall be electrically and mechanically compatible with the environmental and operational conditions. The visual impact due to connecting buried feeder cables to overhead conductors shall be considered when selecting appropriate feeder pole locations.

Insulation

All overhead line equipment support and registration assemblies shall be double insulated or equivalent. Failure of any single insulator shall not create an unsafe condition.

Section Insulators

Apart from the entrance to the Depot maintenance workshop, all section insulators shall be of the 'make before break' type.

31.17 Overhead Line Equipment Poles and Equipment Enhancement

Where poles are provided, the shape and colour shall be considered as part of the visual approach. The objective shall be to minimise their overall visual impact. It should be noted that the Tram Design Manual identifies a preference for circular poles.

Consideration shall be given to individual replacement of building fixings by poles in the future, should building alterations require their removal on a temporary or permanent basis.

The appearance around the base of support poles is of importance in certain areas. Consideration shall be given to minimise the impact to and ease of replacement of poles if damaged, e.g., by errant road vehicles.

The paint finish, if painting is required, shall be fully applied at the manufacturers works. However, following installation on site, the paint finish may have to be re-applied in some areas. The paint system to be used shall be offered for approval by **tie**.

Special attention shall be given to avoid damage to painted surfaces during delivery and installation. Specific approval shall be sought to make good any damage to paint work, following installation on site and **tie** reserves the right to reject equipment on the grounds of damaged paintwork alone.

31.17.1 Combined OLE / Lighting Poles

An integrated design of overhead line equipment poles and street lighting is required. This shall seek to optimise the spacing of support poles and minimise visual intrusion of the OLE and road lighting as a whole. An appropriate electrical feeding and earthing scheme shall be provided. This shall minimise the additional components required to be attached to support poles and shall take account of the maintenance approach to be adopted for the road lighting. The general requirements

for bonding and earthing of the system are contained in Earthing and Bonding of these Employer's Requirements.

Poles carrying overhead wiring along Princes Street shall not interrupt axial views down the streets connecting to Princes Street, shall be located between tram lines and shall be placed at regular intervals.

It should be noted that the Tram Design Manual prohibits fixings for wiring to buildings or structures on the north side of Princes Street.

31.17.2 Anchor Bolts, Foundations and Ties

Tie-back anchors shall be permitted in the off-street sections of the Edinburgh Tram Network with adequate anti-climbing protection, the design of which shall be subject to specific approval by **tie**.

Any anchor bolt connections and fasteners shall be fully secured and vandal proofed.

31.17.3 Foundations

For the ease of construction and where applicable the preferred type of foundations shall be of side bearing concrete, cast in-situ. These shall be either mechanically or hand dug, depending on the access and limited space availability for plant and equipment. This type of foundation shall be provided in Edinburgh city centre and populated areas, particularly where underground utilities are closely spaced or not easily detectable.

In certain areas within the Edinburgh Tram Network where the track alignment and construction of the track slab permits, the overhead line equipment foundations may be incorporated within the track slab design.

31.17.4 Fixing to Masonry and Concrete Structures

There are a significant number of buildings, particularly within the World Heritage Site categorised for their architectural or heritage values.

Fixings to buildings listed in schedule 10 of each of the Edinburgh Tram (Line One) Act 2006 and Edinburgh Tram (Line Two) Act 2006 require full listed building consent.

31.18 Safe Working On The System

The configuration of the overhead line equipment shall take into account the project requirements for a safe working zone of 2.0m (measured horizontally from the near rail and also vertically above

the ground). All electrical and mechanical clearances shall comply BS EN 50119 and with the recommendations and guidance provided by HMRI RSP2.

31.19 Switching and Sectioning Requirements

31.19.1 Sectioning

The overhead line shall be divided by means of OLE section insulators into separate electrical sections and subsections, the lengths of which are determined by the locations of the traction substations and operational requirements.

31.19.2 Isolation Facilities

At substation feeder points, off-load, positive polarity, SCADA controlled, motor operated isolator/earth switches (termed 'feeder isolators') shall be provided to isolate and earth each overhead line section from its respective feeder cable. Additionally, positive polarity, SCADA controlled, motor operated load brake isolators (termed 'bypass isolators') shall be provided to interconnect adjacent overhead line sections when the intervening substation is out of service. These shall be connected across the line side of the two feeder isolators, and will normally be open. At key overhead line sectioning points, positive polarity manually operated isolator/earth switches (termed "section isolators") shall be provided to isolate sub-sections from other sub divisions of the section and (in some cases) earth the isolated section.

At the section insulator and the insulated rail joint between Depot and main line, a mechanically coupled double pole section isolator is to be provided to bypass the section insulator and insulated rail joint. The isolator is intended to be used solely to power the Depot and stabling and fans from the main line in the event of failure of the depot traction power supply. It is not intended to be used to power the main line from the depot stabling traction power supply.

31.20 Isolator Enclosures

Feeder isolators and bypass isolators shall be provided.

Section isolators shall be provided. For on-street sections these 'section isolators' shall be totally enclosed in trackside cubicles, referred to as 'section pillars'.

Section pillars shall be of stainless steel construction to IP 65, free-standing with a base set on a concrete foundation. The pillars shall be factory-built assemblies, of rationalised widths to suit the range of isolator numbers required per unit.

The enclosure shall be bonded to the tram track via an insulated 'earth' cable from an internal stainless steel stud, and the arrangements of which shall comply with Earthing and Bonding of these Employer's Requirements.

The isolator/earth switch 'earth' bar shall be bonded to the section pillar and connected to the tram track via suitable cable(s) additional to the above.

The dimensions of the pillars shall be the minimum compatible with standard creepage and clearance distances because physical clearances on the tramway are restricted.

An A4 size document holder shall be provided on the inside of the enclosure door.

The doors shall be outward opening through 180 degrees, hinged internally and fitted with stays. The doors shall be fitted with heavy-duty stainless steel locks operated by dedicated keys, which shall be provided in accordance with the operation and maintenance requirements for the **tie** structured key security system described in Section 22 of these Employer's Requirements.

It shall be possible to view the status of the isolator and any locking without opening the doors.

31.20.1 Paint Finish

The paint finish, if painting is required, shall be fully applied at the manufacturers works. However, following installation on site, the paint finish may have to be re-applied in some areas. The paint system to be used shall be offered for approval by **tie**.

Special attention shall be given to avoid damage to painted surfaces during delivery and installation. Specific approval shall be sought from **tie** to make good any damage to paint work, following installation on site and **tie** reserves the right to reject equipment on the grounds of damaged paintwork alone.

31.20.2 Labelling

Front panel legends, fitted centrally to the door consisting of approved 'Danger 750 V' - labels (black letters on a yellow background), and 'pillar description - reference number labels' with black letters on a polished stainless background, shall be provided on each pillar door.

31.20.3 Isolators

Isolators within an enclosure shall be arranged in groups where possible. The physical position of each isolator within each group shall correspond with the actual direction of the overhead line connected to it, and a standard layout shall be adopted throughout the system.

The isolator blades shall be of copper, and the isolator assembly and its insulation shall be suitable for the required current carrying capacity within the environment of the enclosure.

Feeder and section isolators and operating mechanisms shall be suitable for off-load breaking and fault making in respect of both 'closing' and 'earthing' operations. The operating mechanism for manual operation shall have a firm distinct stop in the operation at each stage of operation. It shall not be possible to move from closed to earth positions, or the reverse, without the operator coming to a definite halt at the 'open' position before moving to the earth position by a separate operator movement.

Bypass isolators and their operating mechanisms shall be suitable for on-load breaking and fault making in respect of 'closing' operations.

The construction of the isolator shall be such that live parts are fully shrouded from the operator, by 8 mm of polycarbonate or equivalent arc resistant material, whilst allowing the position of the isolator contacts to be clearly visible with the enclosure door open.

The isolator mechanism shall be such that it can be locked by means of a padlock in the closed, open or earthed position.

Each isolator mechanism shall be clearly labelled with its unique identifier reference code in accordance with the electrical nomenclature scheme.

31.21 Power Feeder, Reinforcing and Bonding Cables

31.21.1 Feeder Cables

Single core 750 V dc cables shall be used for:

- The connection of substations (positive) to the OLE;
- OLE parallel reinforcing cables;
- Negative cables from substation negative busbars to the track; and
- Negative track parallel cables and rail and track cross bonding cables.

OLE parallel reinforcing cables shall be sized in accordance with the design of the overall traction system.

Feeder cables shall be sized to match the rating of the OLE / reinforcing cable combination of each section.

Feeder cables from the traction substation feeder isolators to the OLE parallel reinforcing cable junctions shall be buried cable ducts running track side. A maximum of two cables may be carried per 150 mm diameter duct.

Cables for different circuits shall not share a common duct. The choice of cable material shall also minimise the number of bi-metallic cable joints.

Positive and negative cables shall not share a common duct.

Reinforcing cables shall be installed in buried ducts along the track. They shall run from OLE feeder point to feeder point with connections to the OLE via single core suitably rated copper cables to 'inbound' and 'outbound' lines. These feeds shall be at traction substations and maximum intervals of 450 m. Cables shall be drummed and supplied at maximum lengths to avoid and/or minimize cable through joints. Where joints cannot be avoided they shall be located in suitable cable drawpits or in neat, small dimension pillars of minimum intrusion on the streetscape. Joints between drum lengths of reinforcing cable, where no OLE connection is involved, may be in pillars or drawpits at the discretion and agreement as to specific installation method statements by **tie**. The insulation system employed at connection points shall meet the requirements of EN 50124-1 2001 to level 0.9 kV and OV4.

At nominal mid points between the OLE feeds and a maximum 250m from an OLE feed point there shall be suitably rated copper cross connections between the 'inbound' and 'outbound' OLE contact wires via the shortest practicable visually acceptable cable route. There shall be no joints in these cables.

Positive reinforcing and feeder cables shall be terminated in compression cable lugs of proprietary appropriate size and material for the cable used. Proprietary crimping tools designated for the cable lug to be crimped shall be used. Such crimping tools shall be under quality assurance control and within their calibration period. The appropriate flat stainless washer shall be used between cable lug and fixing bolt head. At all bi-metallic connections a suitable bi-metal connector piece shall be employed such that dissimilar metals are not connected other than by molecular fusion.

Feeder cables to the OLE shall be copper cored flexible, where required, installed in the OLE support poles in a neat and unobtrusive manner. As installed the cables shall meet the requirements for double insulation such that two distinct insulation layers can be identified to the

satisfaction of HMRI (or the appropriate regime in force). There shall be no joints between connection to the contact wire and the connection to the reinforcing cable(s).

The bi-polar section isolator at the eastern Depot entrance shall have one side of the positive pole cabled to the main line OLE parallel reinforcing cable by duplicate suitably rated cables. The other side of the positive pole shall be cabled to the Depot east isolator panel by duplicate suitably rated cables. The negative pole shall have suitable cables to each side of the isolator, one to each rail either side of the insulated rail joints.

Negative cables may have a reduced insulation level commensurate with the reduced voltage withstand required.

31.21.2 Track to Traction Substation (TSS) Negative Return Cables

Each of the four running rails in the vicinity of the TSS shall have a cable brought back to the negative busbar of the TSS.

A nominal one metre from the position on the running rails of the connections mentioned in the above, the cess running rail of each track shall be connected to the six-foot rail of the other track by a single cable. These are also classed as 'return' cables.

31.21.3 Rail to Rail and Track to Track Traction Cross Bonds

The rails of each track shall be connected together with a single suitably rated cable at suitable intervals.

At every second connection in the above, the six-foot rails of each track shall be connected together with a single suitably rated cable.

31.21.4 Running Rail Continuity Cables

Where 'along track continuity bonding' is required for negative return traction current return, 'along track' bonding cables shall be installed. Places requiring such bonding are:- Insulated rail joints to be normally bonded out, fishplated rail joints, rail sliding expansion joints (breathers), points and crossings, or other designated places.

'Along track bonding' shall comprise duplicate copper or steel cables as a minimum for each running rail to be so bonded.

31.21.5 General Requirements for Cables

All cables shall be terminated in compression cable lugs of proprietary appropriate size and material for the cable used. Proprietary crimping tools designated for the cable lug to be crimped shall be used. Such crimping tools shall be under quality assurance control and within their calibration period. The appropriate flat stainless washer shall be used between cable lug and fixing bolt head. All return cables shall be connected to the running rails via proprietary connector plates to connect with the running rails using duplicate 'Cembre' or equivalent connectors, by milled holes in the rail web with connector thimbles expanded into the holes on a spacing not less than that allowed by the track designer. Bolt and connection sizes shall be coordinated with the rating of the cable size to be connected. Simpler single 'Cembre' type connections (or similar approved) may be used for cross bonding cables and duplicated continuity cables mentioned in the above.

The cables shall be manufactured to European standards, appropriate to their application.

Cables shall be anchored at terminations by mechanical plastic glands, where gland plates must be traversed, and if necessary supported by non-hygroscopic resin-bonded laminated wood, hardwood or similar non-metallic approved clamps. Conductor terminations shall be by means of indented or annular-compressed lugs to suit the cable, with heat-shrinkable tube over-sheath.

Cable conductors shall be jointed with indented or annular compressed ferrules with an approved compression tool, the joint made up by an approved jointing kit and sheathed by an approved heat-shrinkable tube. Compression tools shall be certified as calibrated, and within the calibration period.

31.21.6 Cable Ducts

Power cables shall be laid in suitably sized UPVC/polyethylene cable ducts. Parallel reinforcing cables for the OLE will require a minimum of 200 mm diameter ducts.

Draw pits shall be sized to suit the particular cables installed within the cable run and shall facilitate the installation of the cables without damage to the cable. Particular attention shall be made to ensure the cable loop can be installed without damage to the cable when installing at mid point.

Suitable draw wires shall be installed in each of the ducts when they are laid, and the draw wires shall remain in the ducts after the installation of the cables to aid any future modification or repair work.

31.21.7 Installation of Cables

The arrangement of cables and all methods of laying and installation, including any special methods that may be necessary, shall be submitted by the Infraco for approval by **tie**.

Unless it has been agreed that the construction of cables is such as to permit laying at sub-zero temperatures, cable laying shall take place only when the ambient temperature is above 0°C and has been at this temperature for at least 24 hours, and approved special precautions have been taken to maintain the cable above this temperature to avoid risk of damage during handling. The recommendations of the cable manufacturer must also be taken into account.

All cables shall be installed with a bending radius not less than that recommended by the cable manufacturer.

Cable installation shall take account of the physical properties of the cables and the manufacturer's recommendations shall be clearly detailed on all cable pulling schedules.

All joints and terminations shall be made by proven methods to the current carrying ability of the cable and full details shall be provided to **tie**.

31.21.8 Surge Diverters

Surge diverters shall be positioned at the junction of each feed point and the OLE at traction substations on the OLE side of the isolator, and at over-bridges.

Surge diverters shall be of the gapless, metal oxide type with a rated discharge current of at least 10kA. The earthing terminal of the arrester will be connected to buried rods to provide an earthing resistance of less than 5 ohms. Surge arrestors' design, material and performance shall conform to the requirements of power supply specified standards for the Edinburgh Tram Network.

31.21.9 Bonding

The earthing and bonding requirements shall comply with **tie**'s Earthing and Bonding Policy (see Section 34 of these Employer's Requirements).

32 Stray Current

The ETN shall be designed in accordance with BS EN 50122-2.

In order to keep the stray currents caused by the traction return current as low as possible, permanent conductive connections between the return circuit and earth, including drainage diodes, are disallowed. The rail insulation against earth shall be at least five times better than recommended in BS EN 50122-2 before commencement of the Testing and Commissioning Phase.

Voltage limiting devices between return circuit and earth shall be dimensioned such, that they do not short-circuit the return circuit and earth during normal operation of the ETN, but ensure that accessible voltages do not exceed 60 V limit stated in RSP2 clause 183.

Where track substructures are steel-reinforced in longitudinal direction, a sufficient amount of reinforcement bars, i.e. at least four per track, shall be longitudinally interconnected by welding. At both sides of expansion gaps in the substructure, these bars shall have welded cross-connections and shall be interconnected in longitudinal direction by means of a conductor with suitable mechanical flexibility. This interconnected system shall not be connected to the return circuit at any point.

The Infraco must produce an Edinburgh Tram Network specific Stray Current Mitigation Strategy document that clearly defines its strategy for achieving as low as reasonably practicable protection requirements for the stray current effects and must submit such strategy to **tie** for their approval. Additionally, as part of that Stray Current Mitigation Strategy, the Infraco must produce a "Code of Practice for Stray Current Corrosion Control" and submit it to **tie** for their approval.

33 Low Voltage Architecture

The LV supplies shall be arranged by the Infraco with the DNO, and this shall also include all necessary metering equipment or agreements for provision of unmetered supplies. The LV supplies shall include all those required for illuminated road signs, other road furniture, street lighting, traffic signal controllers, points actuation, tram signals, communications equipment, and Tramstop equipment.

The LV supplies shall provide the necessary security of supply to achieve the overall ETN reliability requirements, for individual elements and as a whole.

The LV supplies shall allow cabinet sizes in areas of visual concern to be minimised.

Provision shall be made by the Infraco for the attachment of local generators at critical points in the ETNin the case of local supply outages (e.g. at Tramstops).

The system architecture provided by the Infraco shall take account of the known statistical history of local power outages such that the overall ETN system and subsystems availability is achieved.

In establishing the capacity and duration of any UPSs provided, the time that the Infraco maintenance staff may need to mobilise and install a temporary generator shall be considered by the Infraco and advised to **tie**. This time shall be demonstrated by the Infraco to **tie** during the commissioning period. **tie** shall give at least two weeks notice that the test may be required. **tie** may then require the test to be undertaken by the Infraco immediately with no further prior notice at a time and location to be determined by **tie**. This time shall be appropriately included in the overall availability analysis for the ETN.

LV power design by the Infraco shall take account of local system requirements e.g. for additional lighting and for specific loads, such as the passenger lift at Murrayfield Tramstop and drainage pumps where installed.

The LV architecture shall reflect the fact that isolated supplies will be required trackside and remote from Tramstops or substations at such as pointwork and signals at tramway junctions, and isolated TPDS cabinets.

Particular attention must be given by the Infraco to suitable redundancy for critical equipment such as drainage pumps and the communications systems.

LV supplies to substations shall be provided as part of the Infraco's arrangements with the DNO unless these supplies are provided from elsewhere.

Where UPSs are to be provided by the Infraco, careful consideration of appropriate loads to be supplied should be given by the Infraco. Automatic load-shedding schemes shall be considered where appropriate to support the required overall System availability.

Proposals for remote metering of substations shall be provided by the Infraco for the approval of **tie**.

34 Earthing and Bonding

The requirements for earthing and bonding are set out in the latest version of the document "System Earthing Policy", reference ULE90130-SW-REP-00071 and the Infraco shall comply with such requirements in respect of carrying out the Infraco Works.

35 Supervisory Control and Communications Systems

35.1 Scope

The scope of this section of the document is to define the Supervisory Control & Communications requirements that are applicable to the Edinburgh Tram Network (ETN).

It is split into three parts:

- Specific technical requirements of the various telecommunication subsystems;
- Components of those subsystems located at the Control Centre;
- Common considerations applying to these subsystems.

35.2 Specific Technical Requirements

This describes the various subsystems of the Supervisory Control and Communications System:

- The Tram Position and Detection Subsystem;
- The Passenger Information Display System;
- The Telephone Network;
- Operational Radio System;
- Passenger Help / Passenger Emergency Help Points;
- Closed Circuit Television (CCTV) System;
- Supervisory Control and Data Acquisition;
- Operational Data Network.

1.3 sets out considerations that apply to all Communications Subsystems that are included in 1.2.

The detailed interfaces between Infraco and Tramco shall be developed. Consequently the statements made in the ERs concerning the scope split between Infraco and Tramco may be subject to change.

35.3 Tram Position and Detection System

35.3.1 Overview

The Tram Position and Detection System shall provide the information needed to monitor the efficient and effective movement and to implement the overall regulation of trams running on the Edinburgh Tram Network. The Tram Position and Detection System shall include both tram borne and trackside equipment.

Each tram driver shall be responsible for safe tram operation using 'Line Of Sight' principles, with the Tram Position and Detection System identifying and setting the correct route ahead of the tram and providing tram signals.

The Tram Position and Detection System shall provide monitoring facilities to the Control Centre staff.

The Tram Position and Detection System shall collect the following data from each tram as is passes over the loops for transmission to the Control Centre in real time:

- Tram number;
- Tram run number;
- Tram destination;
- Driver staff identity number;
- Driver duty number; and
- Whether the Tram is in service or out of service.

The Tram Position and Detection System shall provide a number of functions which shall include:

- Tram identification;
- Tram position on network (outside of depot);

- Tram progress monitoring;
- Route setting;
- Processing of manual 'Tram ready to start' and automatic advance signal demand requests from trams;
- Provide demands to the Points Controllers to permit trams to safely traverse points junctions;
- Provide demands to the local Traffic Signal Controller(s) to permit trams to safely traverse tram/road crossings; and
- Tram signals to provide controlled entry to and exit from the depot berthing and maintenance facilities;
- Store data concerning the times each tram arrives at and departs from all of the Tramstops. This will be passed to the Central Data Recorder to allow the daily performance of the system to be calculated by the Performance Monitoring System.

The Tram Position and Detection System shall convert relevant Tram Position and Detection System data into a format to update the Real Time Passenger Information Display system.

On the approach of a tram to each Tramstop and at the termini, the Tram Position and Detection System shall provide updates to the Passenger Information Display system such that the Tramstop Passenger Information Displays are updated and display information as stated in 35.4.1.

On each day, the TPDS shall enter the details of journeys for the particular tram for each entire operating day into the tram on-board computer at the commencement of service. The tram driver shall input his own driver code and the tram diagram number for the day. Alternatively, the TPDS may transmit this data to the tram. Any change to this data e.g. as the result of an incident affecting the service shall be initiated by the driver.

The Tram Position and Detection System will include the ability to:

- Display to the Driver how early or late he/she is at each stop;
- Allow the Driver to issue 'Tram Ready-to-Start' commands at selected Tramstops;
- Allow the Driver, when his/her tram is on the approach to a diverging junction, to manually demand that the points move left or right by operating controls in the cab.

35.3.2 Technical Requirements

Key locations where Tram Position, Route Setting and Detection Equipment shall be provided shall include:

- At the approach to, and exit from, tramway/ road junctions;
- Entry to, and exit from, the Depot;
- At the approach to, and at, all Tramstops;
- At the approach to, and exit from, points and crossings.

Trackside Equipment at each of these locations shall be connected to the Edinburgh Tram Operational Data Network.

In the event that this Operational Data Network fails, the Trackside Tram Position and Detection System Equipment at each of these locations shall continue to operate autonomously until network connections are restored, at which point normal operations shall resume without Control Centre staff intervention.

The TPDS shall pass the times at which each tram arrives and leaves each Tramstop to the Performance Monitoring System (PMS), so that the PMS can calculate the operational performance of the Tram System according to specified algorithms.

Tramway signal heads shall be positioned at all signal controlled Track and Road Junctions and Pedestrian Crossings to allow optimum sighting for the tram driver. Local environmental conditions and the requirements of all interested parties, including that of HMRI (or the appropriate regime in place), shall be taken into consideration when choosing the positions of these signals.

Tramway signal heads shall display different proceed aspects for different routes if they are signalled separately. In such cases the Tram Position and Detection System shall pass the appropriate direction request to the road traffic signal controller as well as the point controller.
Tramway signal heads shall indicate the acceptance of the signal demand by the system to the tram drivers.

The lie of all facing points shall be detected and displayed by point indicators. These are in the scope of the Points Control System, and are described in the section of this document dealing with the Track. However, although Signals and Points Indicators shall be clearly distinguishable, they should also be in similar style, and it will require some co-ordination with the Points Controller supplier to ensure compatibility.

Tramway signal heads shall utilise Light Emitting Diodes (LED's) and not incandescent lamps.

At all signal controlled tram and road junctions there shall be an interface installed between the Edinburgh Tram Network Tram Position and Detection System and the local traffic Signal Controllers. All tram signals at signalled controlled tram and road junctions shall be driven directly by the Traffic Signal Controller, through demands from the Tram Position, Route Setting and Detection System. The Tram Position and Detection System/Urban Traffic Control System interface shall implement an agreed Tram Priority at each signal controlled junction.

Each Tram Position and Detection System/Urban Traffic Control System interface shall incorporate the facility for the initiation of a "tram proceed" signal in the event of either tram detection failure or local Urban Traffic Control System interface failure. This facility shall be available at all times for use by the Control Centre Staff. Trackside facilities for tram drivers to make manual requests of the UTC are not required. A foreseeable single point failure shall not cause a tram to be presented with a tram stop signal on the street that causes the tram to stop for more than 5 minutes. A FMEA analysis shall be produces within 8 months of contract close that satisfactorily demonstrates that the proposed solution meets this requirement.

The failure of the Tram Position and Detection System equipment at any signal-controlled road crossing shall initiate the immediate operation of the junction into a predetermined (adjustable) priority cycle sequence. All such failures shall be monitored, reported and logged to the Tram Control Centre via SCADA and passed to the PMS System.

The implementation of the detection system at Tramstops and other trackside locations will be permitted to use the Tram Position and Detection System hardware in lieu of a Supervisory Control and Data Acquisition Remote Termination Unit for the passage of alarms and indications, should this prove a more efficient use of hardware resources.

35.3.3 Tram-Borne Equipment

The Tram Position and Detection System shall include equipment to be installed on the trams. This equipment shall include:

- A Driver's Panel and keypad, to be installed in each cab;
- Communications equipment, to provide transmission of messages between the tram and the trackside equipment;
- Vehicle fault / maintenance indications / alarms transmission interface.

This equipment shall utilise the on-tram power supply.

All operations data messages etc. to or from the tram-borne Tram Position and Detection System shall be monitored and recorded in the equipment room for future reference or fault investigation.

35.4 Passenger Information Display System (PIDS)

35.4.1 Overview

Each Tramstop platform shall be equipped with a real time passenger information display system that shall be connected to the Control Centre by the Operational Data Network.

PIDs shall allow a limited selection of messages and free-form text to be displayed, at selected individual, selected groups or at all Tramstops on command from the Control Centre.

Each platform shall be equipped with at least one double-sided display; the display shall be in the form of a dynamic three line display.

Each display shall conform to the requirements of "DfT Inclusive Mobility - Guide to best practice in access to transport infrastructure". They shall each have the following characteristics:

- It shall be double sided;
- It shall be based on LED technology;
- Each side shall have three dynamic information lines, the third of which shall also provide a time display;

- Each line shall have at least 32 characters;
- Each character shall be at least 50 mm high;
- Characters shall be bright yellow on a black background;
- The PID shall adjust to ambient light levels making it legible in all weather and lighting conditions.

Each Passenger Information Display shall be sited so that it is visible to anyone standing within the Tramstop shelter, and from as much of the platform area as possible.

Passenger Information Displays shall also be provided at the following locations:

- Ingliston Park and Ride facility;
- Edinburgh Airport passenger terminal;
- Ocean Terminal Shopping Centre; and
- Haymarket Railway Station.

Alternative types of display may be used at these locations subject to agreement with **tie**.

At termini, the Passenger Information Displays shall display a departure time, which shall be the later of the scheduled departure time and the arrival time plus one minute. At other Tramstops, the Passenger Information Displays shall show variable messages including the destination and time to arrival (in minutes) of the next three tram service arrivals, or arrivals within the next 30 minutes, which ever is the less at the particular platform.

Tramstop Passenger Information Displays shall be able to display Lothian Buses 'BUSTRACKER' information as an overall capability. Real-Time data shall be provided over an internet connection by the client in an agreed format.

The following Tramstops shall have Passenger Information Displays that display the arrivals of both buses and trams at the Tramstop:

- Ocean Terminal
- Foot of the Walk
- Picardy Place
- Saint Andrew Square
- Princes Street
- Haymarket
- Edinburgh Park Station
- Airport
- Crewe Toll
- Granton

Passenger Information Displays on Tramstops, including those with bus/tram interchange facilities, shall be capable of prefacing the destination of the tram service being displayed by a two or three digit 'trip number' and of any required bus service by a three digit route number.

Each Passenger Information Display shall incorporate a digital time display (synchronised to the Edinburgh Tram Network time server derived from the Rugby Radio Clock or its successor or similar) as part of the display.

The colour and contrast of the lettering that is displayed by the Passenger Information Display shall fully take into account the requirements of the visually impaired. In particular DfT guidelines e.g. 'Inclusive Mobility - relating to provision for the visually impaired' and the requirements of Mobility and Access Committee for Scotland (MACS) shall be considered.

The Passenger Information Display System shall incorporate the necessary degree of redundancy and duplication to enable the systems availability targets to be achieved without losing the ability to handle faults and accept necessary upgrades.

The equipment shall be consistent with the design of the structural elements of the Tramstop.

The Passenger Information Displays shall have 3 line LEDs and configured as lines, scrolling functionality should be possible.

35.5 Telephone Network

35.5.1 Overview

The Edinburgh Tram Network shall be provided with a Telephone Network that shall provide two-way voice communications between all staff at fixed locations throughout the Edinburgh Tram Network. The main Operator interface with the Telephone Network shall be provided by an integrated workstation at each Control Centre staff position.

The Operator's interface shall be designed to carry out control functions in an ergonomically efficient manner.

The Telephone Network shall comprise of the following sub-systems:

- A central Private Automatic Branch Exchange (PABX):
- Public Switched Telephone Network;
- Depot extensions (via the Depot structured cabling scheme);
- Passenger Help / Emergency Help Points (via the Operational Data Network);
- Public Address System (via the Operational Data Network);
- Substation extensions (via the Operational Data Network); and
- A Voice Recorder;
- Control Centre Human Computer Interface (HCI) for the telephony services; and
- Call logging and maintenance facilities.

To facilitate management and maintenance of the PABX, it shall be provided with a maintainer's workstation, located in close proximity to the equipment.

The PABX shall provide:

- Digital call recording;
- Digital call logging;
- Maintenance and subscriber management; and
- All recording of the Telephone Network is to be digital to the current best medium.

All recording as described above should be carried out to the data recorders.

The Telephone Network shall include all PABX equipment, all necessary interfaces, configuration of the system elements, the connecting cables and management and diagnostic facilities.

The Telephone Network shall provide voice communications to external agencies including the emergency services and the urban traffic controllers.

The Telephone Network shall provide maintenance and administrative staff within the depot and substations telephone communications facilities appropriate to their needs.

35.5.2 Technical Requirements

The Telephone Network shall provide voice communication with all internal Edinburgh Tram Network organisation members and external parties but not with trams.

The Telephone Network and all associated components shall be of sufficient capacity to meet the current and future needs of the Edinburgh Tram Network.

All elements of the Telephone Network shall be designed to operate in an integrated manner.

The Telephone Network shall use the Operational Data Network for call routing to remote locations, e.g. Tramstops and traction power substations.

Suitable operator equipment shall be provided for the depot receptionist.

Suitable telephone handset equipment shall be provided for depot operational, administrative and maintenance staff.

Suitable telephone handset equipment shall be provided for traction power substations.

Access to the Public Switched Telephone Network shall be configurable at all telephones, including those within the depot and substations, in order to change call barring and security measures.

PABX equipment shall be located in the Equipment Room. A multi-pair tie cable shall be provided to interconnect the PABX with the depot structured cabling patch panel.

The Telephone Network shall be equipped with a Maintainers' Workstation, also situated in the Equipment Room, for network management and diagnostics.

The Maintainers' Workstation shall allow the:

- Display of system status and alarms;
- Download of call and system logs to removable media;
- Configuration of the Telephone Network;
- Management of subscribers;
- Provision for updating system software; and
- Reporting of real time status and alarms to external equipment.

35.6 Public Address System

35.6.1 Overview

Loudspeakers and Audio Loops located at each Tramstop platform shall form part of the Edinburgh Tram Network Public Address System. The Operational Data Network, details of which are contained in Section 35.6.1 shall connect the associated amplifiers/controllers to the Control Centre.

35.6.2 Technical Requirements

Each Tramstop shall constitute a zone.

An appropriate number of low output speakers shall be provided at each platform to prevent the possibility of announcement intrusion into adjoining properties, yet clearly audible without distortion on all areas of the platform. The speakers and their mountings shall be visually unobtrusive.

The Control Centre shall have the ability to make direct announcements to any Tramstop or groups of Tramstops, or turn off individual Tramstops or groups of Tramstops.

There shall be automatic switching between the volume setting for day / night time for each day of the week at the appropriate time of day.

Each Tramstop platform shall also be equipped with an audio loop to provide Public Address facilities for those who use hearing aids. The messages conveyed by these audio loops shall be identical to those issued by the standard Public Address equipment.

Park and Ride facilities shall be considered as a single Tramstop for Public Address purposes.

A 'library' of pre-recorded Public Address announcements shall be available to the Control Centre. Facilities shall be provided in the Control Centre for suitably trained operational staff to record additional announcements.

The approach and passing of 'Out of Service' trams shall be capable of initiating an automatic announcement at the stop advising passengers of the approach of the 'Out of Service' tram as it passes through the network.

35.7 Operational Radio System (ORS)

35.7.1 Overview

The ORS shall meet the mobile communications requirements for operation and maintenance requirements of the trams, and the tram network, and have sufficient capacity to meet the known future needs as defined in these Employer's Requirements.

An ORS shall be provided to enable safe and effective two-way communication enabling voice and data exchanges between the Control Centre staff and:

- Drivers on board an individual Tram, groups of Trams and/or all trams;
- Drivers of road and other support vehicles for the Edinburgh Tram Network; and
- Individually, or in groups, other mobile Edinburgh Tram Network operations and/or maintenance staff using hand portable equipment along the Edinburgh Tram Network and in the Depot.

Reliable voice communications shall be available throughout the length of the route, and to all areas used by operations or maintenance staff in the course of their duty so that messages of normal, priority or emergency status can be conveyed with high reliability.

The main operator interface with the ORS shall be provided by workstations installed in the Control Centre (for Control Centre staff), and tram mounted mobiles (for tram crews), road vehicle mounted mobiles and hand portable equipment for other mobile staff. Infraco shall supply 130 sets of radios with two spare batteries each and carrying cases. These sets will be supported by suitable re-charge racking and storage facilities.

The ORS shall comprise:

- A trunking controller;
- Sufficient base-stations to provide acceptable and reliable coverage to the satisfaction of **tie**;
- Integrated Control Centre operators' equipment;
- Mobile equipments for tram, road vehicle or hand-portable operation; and
- All communications links and configuration of the system.

35.7.2 General Requirements

The ORS shall use trunking technology capable of group and broadcast calls with normal or emergency priority.

Base-station equipment in close proximity to the Edinburgh Tram Network shall connect to the trunking controller via the Operational Data Network.

The radio system or two-way communication shall not be affected by the failure of the Control Centre systems or supplies.

The ORS shall operate within allocated frequencies administered by OfCom. Operating licences and consents for the ORS shall be obtained from OfCom and any other relevant authorities, e.g. Civil Aviation Authority (CAA). The Operator shall be required to hold all such licences and permits obtained.

Communication shall be reliable, continuous and free from interference as set out in the RAMsS section of this document.

The Operational Radio System shall have all voice communications digitally recorded by the central voice recorder. Recording of the Operational Radio System voice communications shall be integrated with recording of the Telephone Network.

All recording of the Operational Radio System is to be digital to the current best medium.

35.7.3 Short Codes

The Operational Radio System shall be able to send 'short codes' to Trams. It shall be possible to send such short codes to individual trams, groups of trams or to all trams and shall be configurable by the Operator's administrator.

The short codes shall be:

Table 85 - Radio Short Codes

Status Message	Status Meaning	Control to Tram	Tram to Control
CHANGE	Change Active Unit		✓
ACK MESS	Status message acknowledge		✓
ACK CALL	Group Voice Call Acknowledge		✓
###-DEP	Departure from departure points, where ### is the three letter code for each departure Tramstop.		✓
DELAY	Delay to Report		✓
FAULT	Defect to Report		✓
NEWCREW	Crew Change Complete		✓
HELP	Police Required		✓ (see notes below)
EXIT	Depot Exit Request		✓
ENTRY	Depot Entry Request		✓
RELIEF	Crew Relief Request		✓
XO-DONE	Crossover / Turnback complete		✓
STABLED	Tram Stabled		✓
CREWGONE	Driver Leaving Tram – will report back		✓

ALL-STOP	Stop Immediately	✓	
STOPNEXT	Wait Next Stop	✓	
FIREMEN	Beware Fire Engines	✓	
FIREGONE	Fire Engines Clear	✓	

Notes

The 'HELP' code shall also be able to be sent from the hand portable and from the road vehicle radios; and

The emergency call functionality shall also require the use of short codes.

There shall be at least 30 codes.

The Operational Radio System including all mobiles radios and hand-portables shall be capable of being reconfigured by the Operator to operate with amended or additional status messages.

35.7.4 Physical Considerations

The Radio System Trunking Controller shall be installed in the Equipment Room. It shall communicate with either the maintainer's workstation or as a separate dedicated workstation, located in close proximity to the equipment.

All base station antennae shall be fitted with adequate surge protection measures.

Provision shall be made for charging racks sufficient for the for hand-portable radio equipment. Charging racks are to be located in the Control Centre.

All masts required to support base station equipment shall be capable of withstanding all foreseeable wind loading. They shall be fitted with anti-climb protection.

35.7.5 Radio Maintainers' Workstation

The Operational Radio System shall be equipped with a Radio Maintainers' Workstation for network management and diagnostics.

The Maintainers' Workstation shall allow the:

- Display of system status and alarms;
- Download of system logs to removable media;
- Configuration of the Operational Radio System;
- Subscriber management;
- Provision for updating system software;
- Reporting of real time status and alarms to external equipment; and

The Operational Radio System maintainers' workstation shall be situated in the Equipment Room.

Fault and downtime information shall be transmitted to the PMS system.

35.7.6 Road Vehicle Mobile Radio Equipment

The Operator and Maintainers will operate road vehicles requiring Operational Radio System mobile radio equipment. As a minimum all road vehicles shall be equipped with:

- Mobile transceiver;
- Cable harness, feeder and antenna;
- Display, keypad, speaker & microphone; and
- Necessary power supplies.

All road vehicle mobile equipment shall be equipped with a keypad and alphanumeric display unit and be capable of displaying and storing short data messages.

Road vehicle mobiles shall translate status codes into meaningful textural messages.

All vehicle mobiles shall be equipped with an emergency call facility.

35.7.7 Hand-Held Mobile Radio Equipment

Certain Operational and Maintenance staff will be mobile and require hand portable mobile radio equipment. As a minimum the equipment shall include one hundred and thirty sets of:

- Hand-held radios with battery;
- Carrying cases for the hand-held radios;
- Two spare batteries for each radio;
- All necessary operational accessories, such as lapel microphones; and
- Sufficient charging racks suitable for 230VAC 50Hz operation to ensure availability of fully charged radios.

As a minimum the handportable radio shall use batteries with a life of 10 hours when used with a 90%rx / 10%tx duty Cycle.

Battery chargers shall fully charge a battery in less than 4 hours.

All hand portable radios shall be weatherproof and suitable for continuous use on or about the person in the outdoor environment.

All hand portable mobile equipment shall be equipped with a keypad and alphanumeric display unit and be capable of displaying and storing short data messages.

Hand portable mobiles shall translate status codes into meaningful textural messages.

All hand portable mobiles shall be equipped with an emergency call facility. The hand portables shall operate effectively and clearly within the trams and along the route of the Edinburgh Tram Network.

35.7.8 Tram borne Radio Equipment

Radio equipment shall be fitted to each driver's cab to enable two-way voice communications between drivers and controllers at the depot.

The Operational Radio Network equipment fitted to the tram shall include, as a minimum:

- Mobile transceiver;
- Keypad and display compatible with MAP27 interface protocol;
- Radio antenna, to be mounted on the tram roof.

The above equipment shall be free issued to the Tram Supplier for installation.
This radio equipment will utilise equipment supplied by the Tram Supplier, including:

- Gooseneck microphone;
- Emergency call button or kick switch and interface to the ORS;
- All necessary interconnections between Operational Radio Equipment in both cabs provided; and
- All necessary interconnections to other on-tram systems including power supply.

All voice communications involving the tram driver shall be via a hands-free method incorporating the touch-screen console and the gooseneck microphone so as to minimise distraction of the driver from his/her driving responsibilities. The integration of these functions shall be undertaken by Infraco.

When the tram is required to change direction of travel; e.g. after arrival at a terminus, the tram driver shall not be required to make any input to the Operational Radio System as he/she takes up occupation of the 'now leading' cab and the 'Change' status message shall be automatically generated.

Tram radios shall translate status codes into meaningful textual messages and display these to the driver.

All radio calls received during on-board Public Address announcements shall be clearly indicated to the driver at the time of receipt.

All tram-borne radios shall be equipped with an emergency call facility.

35.7.9 Tram-Borne Interfaces

The interfaces for tram-borne Operational Radio Network equipment with other tram-borne systems shall include:

- Passenger Emergency Help Points;
- Public Address System; where the tram driver instigates an on-board Public Address, this shall take precedence over any incoming radio calls received during the duration of public address. The tram driver shall be alerted to the presence of an incoming radio call;
- Radio voice communications and an attack alarm shall be provided between the tram drivers and the inspectors on board each tram.

35.8 Passenger Help / Passenger Emergency Help Points

35.8.1 Overview

Each Tramstop platform shall be equipped with at least one Passenger Help / Passenger Emergency Help Point that shall be connected to the Control Centre by the Operational Data Network.

Each Passenger Help / Passenger Emergency Help Point shall be sited so that it is visible by the platform Closed Circuit Television camera.

Provision shall be provided for the connection of future additional Passenger Help/Passenger Emergency Help Points, as a minimum, at Ingliston Park and Ride facility.

All Passenger Help / Passenger Emergency Help Points System Equipment shall comply with the latest disability advice from the Department for Transport.

35.8.2 Technical Requirements

Each Passenger Help / Passenger Emergency Help Point shall be provided with a two-way speech connection between the user on the Tramstop platform and the Control Centre Staff.

Each Passenger Help / Passenger Emergency Help Point shall be clearly visible and signed, and mounted in a manner that restricts its vulnerability to vandalism.

Each Passenger Help / Passenger Emergency Help Point shall be capable of being activated in two modes, normal and emergency, and there shall be a clearly marked and separate activation button for each function. Initiation of a call at the Passenger Help / Passenger Emergency Help Point shall be by pushing the appropriate call button.

Initiation of a call shall initiate the immediate recording of the subsequent voice communication that shall be time and date related.

Initiation of a call at the Passenger Emergency Help Point shall also cause the relevant Closed Circuit Television camera to focus on the Passenger Help / Passenger Emergency Help Point, overriding any sequential scanning for that camera. The recording rate of the CCTV camera will be increased during the PEHP conversation to the rate specified at section 35.14.13 of these Employer's Requirements.

35.9 Closed Circuit Television

35.9.1 Overview

The Edinburgh Tram Network shall be provided with a digital colour Closed Circuit Television (CCTV) System.

The tram CCTV system shall interface to the City of Edinburgh Council citywide CCTV system as 35.9.2.

Each Tramstop platform shall be equipped with at least one Closed Circuit Television camera. Additional Closed Circuit Television cameras shall be provided if adequate coverage of the access and egress routes at Tramstops and park and ride facilities cannot be achieved using the platform Closed Circuit Television cameras. Additional Closed Circuit Television cameras shall be provided to give full coverage of Park and Ride facilities.

Images from the CCTV cameras shall be transmitted to a Digital Video Recorder where they shall be recorded and time-stamped.

The Closed Circuit Television System shall comply with the requirements outlined in the Home Office guidelines for digital CCTV and the related UK Police Guidance notes and shall provide clear images of 'evidential quality' under all weather and lighting conditions to be made available at the Control Centre for operational purposes and for the recording for evidential purposes.

The Edinburgh Tram Network Depot complex will be equipped with a digital CCTV System as part of the Depot Security System. This CCTV System shall be interfaced to the Passenger CCTV System detailed in this Section. The requirements for the Depot CCTV System are described in 29.8 - Depot Site Layout.

(Please note: As of 11/12/2007, the calculation of the number of CCTV cameras and the bandwidth required on the ODN – See 35.11 for a definition – is based on two cameras per Tramstop, plus ten cameras at the depot and none at Sub-stations. This gives a requirement for 54 new cameras. The ODN also needs to allow for 7 existing, plus two new, cameras at the Ingliston Park & Ride.

35.9.2 Technical Requirements

Cameras shall be of the dome type, vandal resistant and mounted on Tramstop infrastructure or special CCTV poles. The mounting arrangements for each camera shall ensure stability and limit any vibration to acceptable limits so as not to interfere with image quality.

CCTV cameras located at the Park and Ride facilities shall be positioned to cover all of the car park paths, locations identified for Ticket Vending Machines, shelters, buildings, any other structures and both pedestrian and vehicle access points.

The CCTV System at Park and Ride facilities shall provide a clear image of vehicles including the ability for operators to read their registration plates.

The CCTV viewing system shall normally cycle through a pre-defined list of camera images and carry this out over a pre-programmed time period.

All CCTV cameras shall be provided with pan, tilt and zoom facilities both automatically within preset limits and under manual control, and be programmed to zoom in on the Passenger Help / Passenger Emergency Help Point when they are used and to a Ticket Vending Machine location when a TVM alarm is initiated. The Control Centre Staff shall be able to override automatic operation and control the cameras.

The CCTV cameras shall incorporate configurable 'no-dwell' zones to ensure the privacy of adjacent buildings and shall be suitably adjusted at the time of camera installation.

The CCTV System shall be provided with appropriate electrical / electronic interfaces to facilitate the presentation of images to an Edinburgh Tram Network display located within the Lothian & Borders Police Centre, the Lothian Buses Control Centre (Annandale Street) and one located at the Edinburgh in View CCTV Centre. This interface will also enable the transmission of images from the CEC's CCTV system to the ETN such that an appropriate subset of the CEC's CCTV images can be viewed in the Control Centre.

These interfaces shall be physically located in the Equipment Room. They shall include the provision and installation of the necessary connections and extensions to the Tram communication system to provide the necessary interfaces to third parties, and shall remain under the control of the Edinburgh Tram Network.

The selection of individual images by any of the above mentioned third parties for their further interrogation on their local monitors shall only be provided following telephone authority being obtained by them from the Control Centre Operator and shall not inhibit the continued use or availability of images to the Control Centre Operator.

Facilities shall be provided to enable any images generated by cameras that are part of the other interconnected CCTV systems to be selected by the Control Centre Operator and displayed within the Control Centre. Facilities shall be provided to "screen print" images for expediency.

35.10 Supervisory Control and Data Acquisition

35.10.1 Overview

A Supervisory Control and Data Acquisition (SCADA) System shall be provided to monitor and control remote equipment.

The SCADA System shall comprise of a central host, which is used to scan the outlying equipment that is connected to Remote Terminal Units (RTUs) or "Intelligent Relays" shall regularly scan the attached equipment for status or to set/reset the associated controls and, in turn, will be scanned periodically by the central system. Alternatively, electronic subsystems like e.g. traction substation control & protection systems can be directly connected to overall SCADA by means of e.g. a databus or network connection.

The primary interface to the SCADA System shall be a diagram displayed to the Control Centre operators. The SCADA System shall transmit system data received, in real-time, from the RTUs to the mimic display.

The SCADA System will comprise four main functional elements as follows:

- Traction Power SCADA;
- Tramstop SCADA;
- Trackside SCADA; and
- Ticket Vending Machine alarm indications shall be transmitted via the SCADA system. Further details are contained in Employer's Requirements Integrated Fare Collection Section.

The current status of the Traction Power System as presented by the SCADA System shall be available as a display to the Control Centre Staff at all times.

35.10.2 General Requirements

The SCADA itself shall not be a safety critical system, however, it shall provide the facility for the Control Centre staff to make requests of remote equipment to execute actions on behalf of the Control Centre staff, and provide indications for sub-systems.

These sub-systems are:

- Safety related - the traction power control system and remote terminal at each substation;
- Security related - the Passenger Help / Passenger Emergency Help Points at each Tramstop together with the associated Closed Circuit Television camera; and
- Security related - The transmission of Intruder Alarms.

The SCADA system shall pass data relating to equipment failure to the Performance Monitoring System (PMS), to allow the PMS to calculate operational performance relating to equipment availability.

The implementation of the SCADA System at Tramstops and other trackside locations may use the Tram Position and Detection System hardware in lieu of a SCADA RTU for the passage of alarms and indications, should this prove to be more efficient option.

Each SCADA System RTU shall contain a minimum of 30% spare capacity for the future in addition to those specified in the sections below, for the addition of further controls and indications across the Edinburgh Tram Network.

At Tramstops the SCADA Remote Termination Units shall be housed in the Tramstop equipment cabinet with the other Tramstop Supervision, Control and Communication Equipment.

Within Substations the SCADA Control and Monitoring Modules shall be wall or cabinet mounted. SCADA Remote Termination Units shall also be installed within the Points Controller cabinet at all electrically heated points. Further details are contained in 26.11.2 of these Employer's Requirements.

It shall be assumed that the signals to be monitored and controlled by the SCADA system will be concentrated into an interface rack. Connection shall be made from the SCADA Modules to the interface rack.

Individual Tramstop systems control and communications equipments shall be designed to integrate with the Tramstop furniture wherever possible.

35.10.3 Traction Power SCADA

The Edinburgh Tram Network Traction Power Supply System has substations placed along the Edinburgh Tram Network as detailed in Employer's Requirements Traction Power (Substations) Section.

Each Traction Power Control Unit should provide as a minimum:

- 128 Digital Inputs;
- 16 Digital Outputs;
- 16 Analogue Inputs.

It shall be possible to put each substation into a bypass mode remotely by using SCADA, in order to guard against equipment and power failures or to allow maintenance.

The SCADA System shall contain a series of 'macros' that shall enable the Control Centre staff to isolate and earth all electrical sections between adjacent sub-stations or between a sub-station and the end of the Edinburgh Tram Network route by making no more than two mouse clicks, or equivalent, from the SCADA Human Computer Interface power diagram. This operation will initiate a sequence of switching operations, the progress and completion of which shall be indicated to the Control Centre staff via the SCADA Human Computer Interface power diagram. Should any operation in this sequence 'time out', or fail, a visual and audible alarm shall be generated to the Control Centre staff and the sequence be suspended by the system.

Facilities shall be provided to enable the switching sequences to be created, edited and deleted by a person with the appropriate rights of SCADA access to the system shall be provided.

The following SCADA System controls and indications provided for each substation shall include, but not be limited to:

- Fire Alarms;
- Equipment Over Temperature Alarms;
- Intruder Alarms;

- Low Voltage Power Supply Fault indication;
- DC power fault indication (e.g. output circuit failure, etc.);
- Over Voltage Trip Alarms;
- Under Voltage Trip Alarms (if Under Voltage Trips are generated);
- Line Live;
- Line Earthed;
- Stray current monitoring, if provided;
- Power data, volts and amps in real time;
- 'UPS status for communications equipment;
- Battery and Battery Charger Status;
- DNO indications;
- Status of all isolators; and
- Status of all circuit breakers and control of them.

The Edinburgh Tram Overhead Line Equipment shall be arranged such that it is possible to isolate all or parts of the overhead traction supply. Feeder and Bypass Isolators are located at the line side in electrical cabinets or within the nearest substation. Further details are available in Employer's Requirements Overhead Line and Pantograph Section.

The SCADA System controls and indications to and from these Isolators shall include:

- Control command for opening and closing of individual Bypass Feeders at each substation;
- Indication of all individual Feeder Isolator position (open / closed / earthed / indeterminate); and
- Indication and Control of all individual Bypass Isolators.

Where a Control Command is instigated by an Operator, the display shall ask him / her to confirm the action before proceeding. In any case, each Control Command shall be handled at the protocol level by a Request – Check – Confirm sequence to ensure that the possibility of the wrong control being performed is minimised. SW and HW interlocking may be realised in the traction power station by means of the substation control and protection system in each substation, which may also be required for local operation.

Information presented to the Operator shall be accurate under all feasible circumstances and shall include the status of all sub-section isolators. Manual input of the status of sub-section isolators may be proposed by Infraco with the appropriate risk analysis.

35.10.4 Tramstop SCADA

Tramstop Equipment shall be monitored by the Control Centre Operating staff via the SCADA System.

Such equipments shall include, but not be limited to:

- Operation of Passenger Help / Passenger Emergency Help Point and status;
- 'No-Break' Power Supply failure alarms;
- Communications Systems Status & Alarms;
- CCTV fault status;
- Public Address System volume level control, fault status and controls;
- Passenger Information Display fault status;
- Passenger Help/Passenger Emergency Help Point activation;
- Passenger Help/Passenger Emergency Help Point fault status;
- Tramstop equipment intruder alarms (including Fare Collection System Alarms – see below);
- Tramstop electrical supply status (including Tramstop lighting supplies).

Each Tramstop RTU should provide as a minimum:

- 64 Digital Inputs;
- 16 Digital Outputs;
- 4 Analogue Inputs.

35.10.5 Trackside SCADA

The SCADA System shall monitor trackside equipment as follows:

- Point Controls and Indications;
- Failure of Points to move within a given time of the request;
- Point Heater Controls and Indications (The Operator shall be able to command the heating of points in the event of the thermostatic control failing);
- Tram Wash equipment; and
- Sand replenishment equipment - inclusive of sand levels etc;
- Status of lift(s);
- Pumps.

It is possible that the Trackside SCADA system will share an RTU with the Tramstop SCADA system, and the trackside SCADA requirements will vary at different points along the alignment. The I/O counts are included within the Tramstop I/O count. However, note that an extra RTU will be necessary in the Depot for the specialised equipment there, for which the allowance below should be made:

- 64 Digital Inputs;
- 4 Analogue Inputs.

35.10.6 Fare Collection SCADA

Ticket Vending Machine Alarms shall be brought to the attention of the Control Centre Operating staff via the SCADA System.

The TVMs provided by **tie** shall contain normally closed relay contacts (contacts open on occurrence of fault) for the following alarms to the SCADA system, and shall include:

- TVM Vandal Alarm;
- TVM coin jam;
- TVM printer malfunction;
- TVM card unit malfunction;
- TVM tickets low;
- TVM Cash Vault(s) ¾ full;
- TVM doors open.

TVMs shall be procured by TEL and issued to Infraco for installation.

The I/O for the TVMs is already included in the count in the Tramstop SCADA.

35.11 Operational Data Network

35.11.1 Overview

An Operational Data Network (ODN) shall be provided to ensure two-way voice and data transmission to fixed locations along the entire Edinburgh Tram Network, with high reliability, availability and low latency.

The ODN shall provide the communications 'backbone' between Tramstops, substations, other remote equipment and the Depot, and shall convey data for a variety of applications including:

- Tram Positioning, Routing and Detection System;
- Passenger Information Displays;
- Telephone Network;
- Public Address;
- Operational Radio Network (optional);
- Passenger Help / Passenger Emergency Help Points;
- Closed Circuit Television;
- Point Control and Indication;
- Point Heating Control and Indication;
- Supervisory Control And Data Acquisition; and
- Ticket Vending Machines (separation of data shall be provided, one secure encoded stream for revenue, ticketing and fare collection data and the other for Ticket Vending Machine alarms, administration and management).

The ODN shall use a fibre optic transmission system. A multi-core fibre shall connect all ODN nodes.

The ODN shall include all master and outstation node equipment, interface cards, configuration of the system elements, the connecting cables and management and diagnostic facilities. Fibre optic repeaters between nodes shall not be employed.

The ODN Control Centre Node shall be equipped with sufficient communications capacity to allow the interconnection of all traction power substation nodes, Tramstop nodes point control nodes and Depot equipment.

Where appropriate, Depot subsystems shall be connected to the ODN via the secure Local Area Network.

The ODN shall support the emergency relocation of Control Centre staff to alternative location(s) served by the ODN following a Control Centre evacuation, where they will be able to continue operation of the Edinburgh Tram Network albeit in a degraded mode.

The ODN shall not be a safety critical system. However it shall convey safety or security related messages to and from the following sub-systems:

- Safety related - Traction Power Supervisory Control And Data Acquisition; and
- Security related - Passenger Help / Passenger Emergency Help Points and the associated Closed Circuit Television images;
- Security related - The transmission of Intruder Alarms.

The ODN shall provide a bandwidth sufficient for the satisfactory transfer of all data, telephone and other signals required for controlling, monitoring and communicating with equipment distributed throughout the Edinburgh Tram Network.

In addition, the associated ODN communications paths and power supplies shall themselves incorporate similar levels of redundancy / diversity.

The ODN shall be configured such that in the event of single failure there shall be no loss of data and no requirement for any immediate actions on the part of the Control Centre staff. It shall be configured so as to provide automatic re-routing in the event of failures such that any loss of facility is confined to that given locality and does not affect the operation of the transmission system and facilities at any other location.

The ODN shall incorporate the necessary degree of redundancy and duplication to enable the commitment to be achieved without losing the ability to handle faults and accept necessary upgrades.

Where there are connections or any exchange of data between subsystems, each system shall be such that any failure in another system shall not cause a failure of the system, (except in the functionality between the two systems concerned).

There shall be commonality of design between all types of ODN nodes.

The transmission latency of the ODN shall be such that it does not contribute any appreciable delay to any voice or data applications.

The ODN shall provide an expansion capability of 200% to allow for system growth or to enable further interfaces to be added or an increase in the bandwidth requirements of existing applications or known future enhancements of the Edinburgh Tram Network.

35.11.2 Location of Nodes

Remote ODN Nodes shall be located so that together they serve all locations along the alignment which require communications with the Control Centre, including Tramstops, substations, and points control and points heating cabinets. ODN nodes shall be provided at all Tramstops. Nodes shall also be provided at other locations if it not within the immediate vicinity of a Tramstop node.

Tramstop Nodes

Each Tramstop Node shall be equipped with communications interfaces to allow the interconnection of the following two-way voice or data services throughout the Edinburgh Tram Network:

- Digital Closed Circuit Television cameras and associated controls;
- Passenger Help / Passenger Emergency Help Points;
- Public Address;
- Ticket Vending Machines;
- Passenger Information Displays;
- Supervisory Control And Data Acquisition Remote Telemetry Units;
- Tram Position and Detection System Equipment; and
- Edinburgh Tram Network timeserver.

Where appropriate, a Tramstop Node shall be equipped with additional communications interfaces to allow the interconnection of the following two-way voice or data services throughout the Edinburgh Tram Network:

- Radio base station equipment or
- Other Control Centres e.g. Police. Fire, Ambulance and other Emergency Services, Traffic Control Centre.

Traction Power Substation Node

If required separately, a Substation Node shall be equipped with communications interfaces to allow the interconnection of the following two-way voice and data services throughout the Edinburgh Tram Network:

- Supervisory Control And Data Acquisition Remote Telemetry Units;
- Private Automatic Branch Exchanges extensions; and
- Edinburgh Tram Network timeserver.

Where appropriate, an ODN Substation Node shall be equipped with additional communications interfaces to allow the interconnection of the following two-way voice or data services throughout the Edinburgh Tram Network

- Digital Closed Circuit TV cameras and associated controls;
- Tram Position and Detection System equipment;
- Radio base station equipment or
- Other Control Centres e.g. Police.

Points Control Node

If required separately, a Points Cabinet Node shall be equipped with communications interfaces to allow the interconnection of the following two-way voice or data services throughout the Edinburgh Tram Network:

- Supervisory Control And Data Acquisition Remote Telemetry Units; and

- Tram Position and Detection System equipment.

Where appropriate, a Points Cabinet Node shall be equipped with additional communications interfaces to allow the interconnection of the following two-way voice or data services throughout the Edinburgh Tram Network:

- Radio base station equipment or
- Other Control Centres e.g. Police.

35.11.3 General Requirements

For all ODN nodes, the multi-core fibre shall be terminated at a fibre patch panel situated adjacent to the node.

Tramstop node equipment shall be mounted in the Tramstop Equipment Cabinet. Traction Power Substation node equipment shall be either rack or wall mounted dependent upon its location. Control Centre Node equipment shall be fitted within an equipment rack located in the Equipment Room.

The ODN shall be equipped with a Maintainers' Workstation (which may be shared with other subsystems) running a Network Management System for network management and diagnostics.

The Maintainers' Workstation shall allow the:

- Display of system status and alarms;
- Download of system logs to removable media;
- Configuration of the Operational Data Network;
- Provision for updating system software; and
- Reporting of real time status and alarms to external equipment.

The ODN maintainers' workstation shall be situated in the Equipment Room at the Control Centre.

35.12 Considerations applying to all Communications Subsystems

This sub-section details those considerations which apply to all the subsystems these are:

- Electrical Connections;
- Cabinets;
- Alarming of Faults.

35.12.1 Electrical Connections

All powered equipment described above, with the exception of the Passenger Information Display System and Ticket Vending Machine, shall be provided with a 'No-Break' power supply, via a UPS system, located in the nearest Tramstop Cabinet or Substation, as appropriate. LV Supplies will be in accordance with 33 these Employer's Requirements.

All electrical connections shall be made in such a way that the public shall not have access to any cabling. All cabling and wiring must comply with the Cabling and Ducting section of these Employer's Requirements.

The cable routes shall avoid close contact with, or interference from, high voltage electrical supplies and for this reason a 3.0 metre separation shall be achieved in any plane between any communication cable routes and high voltage electrical supplies.

Wherever practicable, communication between two or more items of trackside equipment and from trackside equipment to the Control Centre shall be by such means that permits minimal trackside cabling and an acceptable level of system integrity.

All powered equipment described in this section shall be provided with a connection to an earth. The earthing and bonding requirements are described in **tie**'s Earthing and Bonding Policy Document.

35.12.2 Cabinets

All Tramstop control equipment, forming part of the subsystems, as described above, shall be mounted in cabinets located on or adjacent to the Tramstop platforms. Within substations, cabinets may be wall or floor-mounted as appropriate. The requirements on cabinets in general are detailed in 19 of these Employer's Requirements.

35.12.3 Alarming of Faults

It is essential that malfunctioning of equipment is brought to the attention of the operators, in a unified manner, as quickly as possible. This shall be achieved through the medium of the SCADA System.

Where possible, this may be achieved through network monitoring of the subsystems, and a connection between the network monitoring system and the SCADA system. Where this is not possible, it shall be achieved through a contact connected into an RTU connected in turn to the appropriate SCADA system.

35.13 Control Centre

This describes the components of the various subsystems described above are located in the Control centre. It divides those systems into:

- Those components within the Control Centre;
- Those components within the Equipment Room.

35.13.1 Control Centre - Overview

The Control Centre shall be the focal point for the control and operation of the Edinburgh Tram Network. Its purpose shall be to provide a working place for the operational employees to manage and coordinate day-to-day activities associated with system operations. The Control Centre shall be located on the first floor of the Depot building.

The Control Centre comprises of a number of workstations, at which Control Centre staff sit and use equipment to remotely control or retrieve data from the system. The operator interface shall be designed to carry out control functions in an ergonomically efficient manner.

These workstations are:

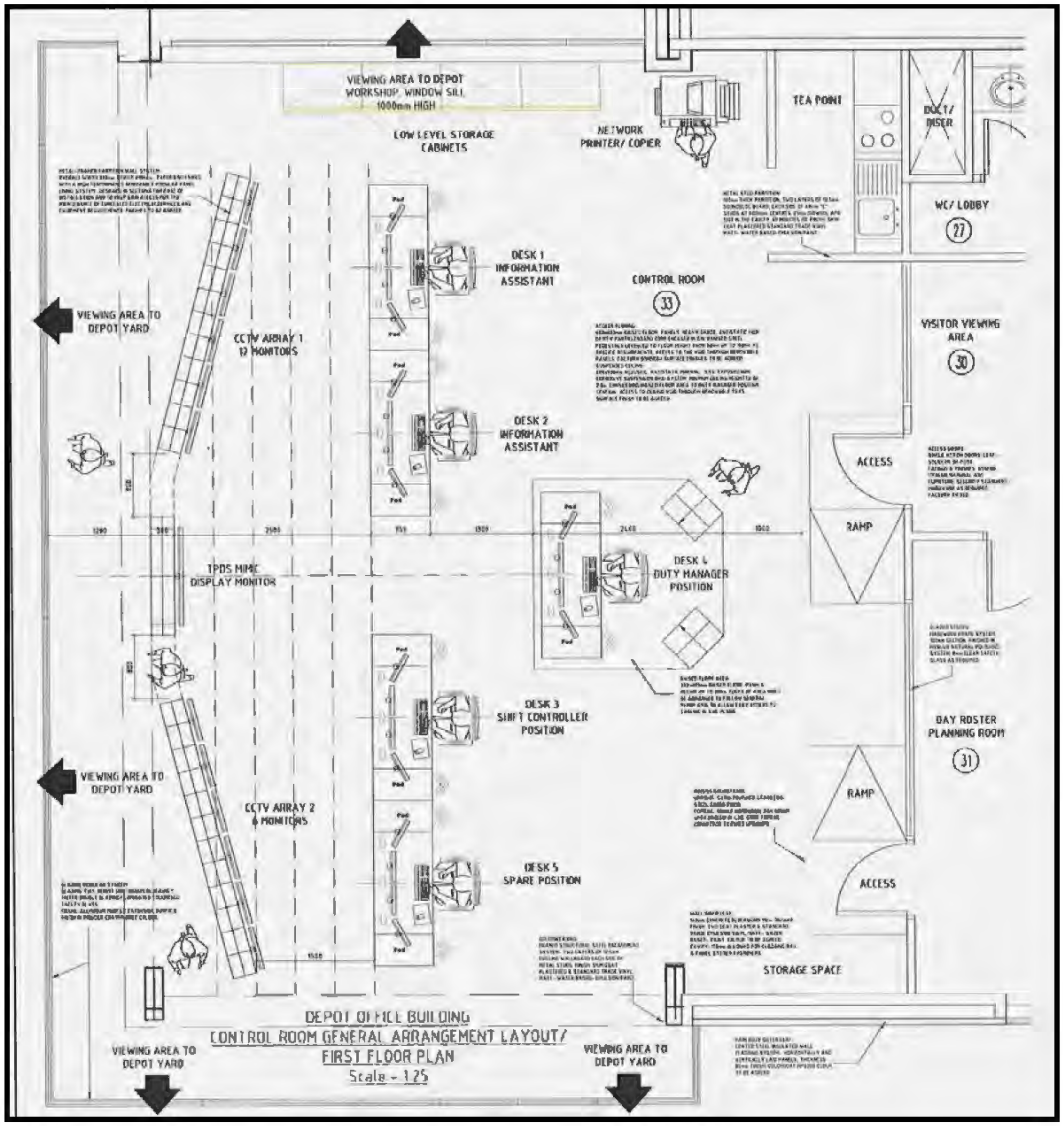
- The Duty Manager;
- The Shift Controller;
- The Information and Security Supervisor;

- There are also two workstations that have been identified for future expansion of the system.

A Monitor Matrix shall be provided, to be positioned either on the front wall or in close vicinity to the Control Centre desks. The matrix shall be of sufficient size to be viewed by all Control Centre staff.

A typical Control Centre Layout is shown in the diagram below. This shows the Control Centre with the addition of the two workstations that have been identified for future expansion.

Figure 11 - Typical Control Centre Layout



35.13.2 Workstation Capabilities

Each Control Centre Workstation shall have the capability to provide indication and control of all subsystems and services: however, it will normally be restricted by logon status to the duties normally associated with the position. The various control and monitoring capabilities are described by subsystem:

- Tram Position and Detection Subsystem;
- SCADA System;
- Operational Radio System;
- Passenger Information Displays;
- Public Address;
- Closed Circuit Television;
- Passenger Help / Passenger Emergency Help Point System;
- Telephone System.

There shall be at least three screens attached to each workstation. The three screens shall be able to form a continuous display. The status of the dynamic data shall be regularly updated, at a frequency of not less than once every five seconds.

Through the top-level diagram it shall be possible to access additional nested menus or screens to gain additional information from the subsystems and facilities.

The presentation of the menus and 'human computer interface', to the Control Centre operators, shall be subject to the approval of **tie**.

Each workstation shall be equipped with at least one keyboard, and some or all of a mouse, joystick, or touch screen capability to navigate around the screens. The keyboard (s) shall be retractable when not in use.

Differential alarm tones shall be provided for each of:

- Operational Radio Network normal calls;
- Operational Radio Network emergency calls;
- Passenger Help Point activation;
- Passenger Emergency Help Point activation;
- Internal and external telephones; and
- Emergency Telephone lines

Tram Position and Detection Subsystem

The Workstation shall present a diagrammatic representation of the entire Edinburgh Tram Network both as an overview display and a series of overlapping sectional displays

Each display shall provide the following as a minimum:

- Last known position of each tram;
- Run / Route number of each tram;
- Number of each tram;
- Punctuality of each tram;
- Driver staff identity for each tram;
- Tram in service / out of service;
- Tram destination; and
- Status of each tramway signal;
- Lie of points;
- Input a tram signal demand via the UTC system;

The Control Centre Workstation(s) controls are only intended for use when the system is disrupted, in emergencies, engineering works, equipment failure conditions, or at the run out and run in of trams to/form the depot. Under normal operating conditions the Tram Position and Detection System will automatically control signals, points and routing of the trams and without the intervention of Control Centre staff. They shall be designed in such a way as to not compromise the safe running of the tram system at any time.

SCADA System

The Workstation shall present a diagrammatic representation of the entire Edinburgh Tram Network both as an overview display and a series of overlapping sectional displays, upon which shall be displayed the control, monitoring and alarm functions associated with the following:

- Electrical Power Substation Equipment for each Electrical Supply Point, the actual position and status of circuit breakers and motorised section isolators;
- Tramstop Equipment;
- Trackside Equipment; and
- Vending Machine Alarms. Details available in Employer's Requirements, Integrated Fare Collection.

The controls and indications shall be displayed in real time and synchronised with the Edinburgh Tram Network Time system.

SCADA Alarms

All alarm events shall generate an alarm message, which shall be electronically logged and displayed to the targeted Control Centre operator.

Each alarm message shall identify the system that has generated it.

Each alarm message shall be assigned a priority level.

High priority alarms shall generate an audible tone.

Alarms shall be presented in a hierarchical manner, with sufficient gradation to ease handover between Control Centre staff.

The Control Centre staff shall have the facility to accept alarms individually or as a 'page' of alarms.

The alarm list shall have the facility to display alarms in chronological order, with the latest alarm first.

Each alarm entry shall include the date and time of occurrence, location and plant identity.

The silencing of alarms shall not inhibit the annunciation of further alarms nor constitute an acknowledgement of the alarm.

Alarm Sequence

Onset of Alarm

This shall be indicated by a flashing alarm message and sounding an audible alarm at the Workstation. There is also a simultaneous logging in the fault log and printing of the alarm on a printer situated in the equipment room.

Acknowledgement of the Alarm by the Control Centre Staff

The alarm message shall be steady, the audible alarms shall revert to a low level, and the acknowledgement shall be logged in the fault log and printed on a printer situated in the equipment room.

Acknowledgement of Reset of the Alarm by the Control Centre Staff

The reset alarm message shall be steady, the low level audible alarms shall cease, and the acknowledgement shall be logged in the fault log and printed on the Supervisory Control and Data Acquisition System printer situated in the Equipment Room.

Operational Radio System

The Workstation shall permit (preferably via a touch screen interface):

- Initiation / receipt of radio calls to any/all tram(s) and other vehicles fitted with the Operational Radio System;
- Initiation / receipt of radio calls to any/all portable radio handsets;

- Provides audible and visual alarms for emergency radio calls received. Such alarms shall be displayed so as to clearly differentiate between normal events and emergency events; and

- Use of 'short radio codes'.

Primary means of initiating radio calls to individual trams from the Control Centre staff shall be achieved by mouse click(s) on the relevant tram represented on the Tram Position Detection System display.

The attention of Control Centre staff to a tram making a radio call to the Control Centre shall be achieved by appropriate graphics symbols on both the Tram Position Detection System and Operational Radio System Human Computer Interfaces accompanied by an audible signal.

All Operational Radio System communications shall be via the Control Centre: direct calling between outstation radios is not required and shall not be available.

When an outstation user wishes to call the Control Centre, they shall insert a call request message. The Control Centre staff will then call them back.

When Control Centre staff call an outstation, the outstation radio shall 'ring' and the outstation operator shall answer the call and speak first.

All radio calls shall also be capable of being made and received via the Control Centre Workstations.
When an emergency call is received at the Control Centre, a distinct audible and visual alarm shall appear on the Workstation. It shall not be possible for a Control Centre member of staff to cancel an emergency call without answering it.

Nomenclature for tram radio call signs shall be the same as the tram number.

When Control Centre staff send a single voice message to all trams and request the tram drivers to acknowledge receipt, the radio system shall present a list of all trams and their status to the Control Centre staff via the Operational Radio System Human Computer Interface.

The status shall be coloured to identify:

- Trams that have acknowledged the message, in green;

- Trams that do not have active radios, in amber;

- Trams that have not acknowledged the message in red.

This will enable the Control Centre staff to identify any trams that have not acknowledged the call. A similar arrangement shall apply to status codes sent to trams.

The Operational Radio System shall support the emergency relocation of Control Centre staff to alternative location(s) served by the Operational Data Network following a Control Centre evacuation, where they will be able to continue operation of the Edinburgh Tram Network albeit in a degraded mode.

The system shall digitally record all outgoing and incoming radio messages.

Passenger Information Displays

The Passenger Information Display System shall be accessible to the Control Centre staff via the Control Centre Workstations.

Normally, the Platform Information Display System shall be automatically updated from the Tram Position Detection System. However, the Control Centre staff shall have the ability to display a selection of pre-recorded messages and free form text on individual Platform Information Displays or groups of displays.

Details and times of the application of pre-recorded messages and free form text shall be logged by the Central Data Recording System.

Public Address

The Control Centre staff shall have the ability to initiate and transmit direct announcements to individual Public Address System Platforms, zones or groups of zones via the Control Centre telecommunications console.

The Control Centre staff shall be able to alter the volume setting of individual Public Address System zones or groups of zones.

Details of all Control Centre staff interventions and direct announcements shall be logged by the Central Data Recording System.

Closed Circuit Television

Colour pictures shall be transmitted to the Control Centre from the Tramstops, substations, park & ride facility and surrounding areas.

The system shall normally display a continuous cycle of Closed Circuit Television. The system shall interrupt this cycle to automatically display the image of the location where a Passenger Help Point / Passenger Emergency Help Point is activated: this shall cause the relevant camera image to be transferred to the Control Centre Staff's local Closed Circuit Television display. This should be able to be overridden by the Control Centre staff. After termination of a Passenger Help / Passenger Emergency Help Point call, the associated Close Circuit Television Camera shall revert to the normal scanning sequence.

The Operator shall be able to select those images that are required to be displayed in predetermined viewing patterns on the Monitor Matrix at the front on the Control Centre near that of the support workplace. Priority of selection shall be adjustable, to be governed by the current Edinburgh Tram Network operating procedures. This shall be adjustable and the system shall allow new viewing patterns to be created, amended and deleted as required by the Control Centre staff to suit individual operational circumstances.

Operation of a Ticket Vending Machine alarm shall similarly cause the local Closed Circuit Television image to be automatically displayed on a pre-selected monitor in the Control Centre.

The selection of the camera for control shall cause the image to be transferred to the Control Centre Staff's local Closed Circuit Television display.

The Control Centre Staff shall have a joystick that shall allow control of the pan, tilt, zoom and focus camera attributes.

The Closed Circuit Television Graphical User Interface shall allow the Control Centre operator to switch any camera image to be recorded at high rate to the central data recorder, to be viewed on any monitor or his own workstation.

The control of the video switching shall be completely transparent to the user.

Location, time and date stamped recording facilities shall be activated if the emergency button is activated on a Passenger Help / Passenger Emergency Help Point, the image from the relevant camera shall be automatically routed to a designated screen in the Control Centre.

Video and textual information shall be displayed on the local display when swapped from the monitor matrix display and shall maintain camera identity, status and location.

All characters overlaid on a Closed Circuit Television image shall provide clearly legible letters and characters on a dark background. Character generation shall be separate from the video image such that the location of a camera failure can be clearly identified.

The Control Centre shall provide facilities to capture a video image displayed on the Control Centre operator's display and print the image via a high quality video printer.

Passenger Help / Passenger Emergency Help Point System

The Passenger Help / Passenger Emergency Help Points System shall be accessible to the Control Centre staff via the Control Centre Workstations for alarm presentation, and via the Control Centre telecommunications console for communication with the person initiating the alarm or help request. Activation of a Passenger Help / Passenger Emergency Help Point shall give an immediate flashing indication and associated audible alarm on all Control Centre staff workstations and the Control Centre Overview Display. If this is an Emergency Help point activation, the image of the associated CCTV camera shall be automatically called to the Monitor Matrix.

The alarm message shall be steady and the audible alarm shall be silenced upon acknowledgement by the Control Centre staff.

Upon termination by the Control Centre staff of a Passenger Help / Passenger Emergency Help Point call, the reset alarm message shall be steady.

Telephone System

There shall be a touch screen interface to the Telephone, (and Public Address and Passenger Help Point / Passenger Emergency Help Point sub-systems if not provided for otherwise) that provides for:

- Initiation / receipt of telephone calls to any / all users on the exchange provided;
- Priority and high integrity initiation / receipt of telephone calls to / from emergency services;
- Audible and visual alarms for Passenger Help Point / Passenger Emergency Help Point calls received; and
- Making of public address announcements at individual, grouped or all Tramstops and / or park & ride sites.

All Control Centre staff positions shall be identical, with functionality determined by user 'log-in'.
All voice communications to and from the Control Centre shall be recorded and be capable of being played back.

Recorded voice communications shall be stored as detailed in 35.14.14.

Emergency telephone lines shall be provided to allow contact with and from the organisations detailed in 35.13.4, regardless of any failure of the main Private Automatic Branch Exchange.

Such facilities need not necessitate individual handsets but may consider a single handset (on the relevant operator workplaces) with priority displays and call buttons.

The Workstation shall incorporate:

- Information displays: (Supervision of extensions and exchange lines);
- Call processing and routing: Traffic and console status; and
- Ability to provide user input via keyboard entry.

The Workstation shall provide:

- Interactive voice greetings and messaging;
- Advanced call monitoring;
- Line engaged signal;
- Waiting time or queuing status;
- Called / calling parties identity;
- Pre-programmed numbers;
- Hands-free / wireless operation;
- Time display, synchronised by the Time Server;
- Conference calling;
- Audio control;
- Programmable functions;
- A local loudspeaker;

- An adjustable ring tone;
- Public Address System Interface; and
- Number ID

35.13.3 Control Centre Philosophy

The Control Centre shall provide Control Centre staff, and especially the shift controller and duty manager, with clear visibility of the entrance and exit tracks and associated infrastructure of the Depot complex with the main tramway and at least one end of Depot shed tracks and stabling apron tracks.

All Workstations shall be of similar design to maintain the aesthetics of the Control Centre.

Each Control Centre Staff position shall be able to control the local lighting, so that screen light reflections shall be reduced.

The Control Centre shall provide positions for the following operations personnel:

Operations Duty Manager

The Duty Manager will be responsible for overall control of the Edinburgh Tram Network and the safety of its operation.

The Operations Duty Manager is required to 'book' Tramcrew on / off duty and needs to see crew before they take their turn of duty in order to be convinced that they are in an appropriate condition to commence duty. The Control Centre shall provide for this without the need for Tramcrew to enter the Control Centre.

The Duty Manager's workstation will be identical to all other workstations.

Operations Shift Controller

The shift controller is responsible for the minute by minute operation of the Edinburgh Tram Network ensuring service perturbation risks are minimised and Tramcrew are aware of the current state of the Edinburgh Tram Network.

Operations Information & Security Supervisor

The information & security supervisor provides support to the duty manager and shift controller by monitoring the positions of trams, monitoring and editing of Passenger Information Displays, monitoring of Closed Circuit Television and Passenger Help / Passenger Emergency Help Points. This post will also take the primary role in ensuring passenger information and security.

Duty Manager

The duty manager's work place shall be located such that he can clearly see and interact with all the operations of the Control Centre.

The duty manager's workplace shall provide facilities to monitor and control the following subsystems:

- Tram Position and Detection;
- Supervisory Control and Data Acquisition;
- Operational Radio System;
- Closed Circuit Television;
- Telephones.

Shift Controller

The operator workplace provided for the shift controller shall be a complete replica of that provided for the duty manager.

In addition, the shift controller shall be given clear visibility of the mimic display and the bank of CCTV displays located at the front of the Control Centre.

Information & Security Supervisor

The information and security supervisor workplace shall be identical to the other workstations.

Monitor Matrix

A monitor matrix shall be mounted either on the front wall or in close vicinity to the Control Centre desks. The matrix shall be of sufficient size to be viewed by all Control Centre staff.

It shall display CCTV images. Textual information shall be displayed on the displays to provide camera identity, status and location. Characters shall provide clearly legible letters and characters on a dark background. Character generation shall be separate from the video image such that the location of a camera failure can be clearly identified, and shall not be generated by the camera itself.

The Monitor Matrix shall cycle through a user-definable set of images over a period of time.

Positioning of the images or sequencing in the matrix shall reflect the geographical layout of the Edinburgh Tram Network. The sequencing and display time of these images shall be user configurable.

The Information and Security Operator shall be able to select those images that are required to be displayed in specified viewing patterns on Monitor Matrix. Priority of selection shall be adjustable, to be governed by the current Edinburgh Tram Network operating procedures. This shall be adjustable and the system shall allow new viewing patters to be created, amended and deleted as required by the Control Centre staff to suit individual operational circumstances.

When activated by the Passenger Help / Passenger Emergency Help Points System interface, the Monitor Matrix shall display the associated CCTV image for that Passenger Help/Passenger Emergency Help Point.

35.13.4 Emergency Telephone Lines

The Control Centre shall have dedicated 'direct' lines between itself and the following locations as a minimum:

- Fire Brigade Control Centre;
- Lothian & Borders Police Control Centre;
- Lothian Buses Control Centre (Annandale Street);
- Edinburgh in View CCTV Centre;

- Ambulance Control Centre;
- Airport Control Centre;
- Network Rail Edinburgh Waverley Power Signal Box;
- Network Rail Electrical Control Centre at Cathcart; and
- City of Edinburgh Urban Traffic Control.

The primary telephone interface providing these facilities shall be through the single integrated audio telecommunications device at each desk, with a secondary hand-held unit for back up. Multi facilities will not be acceptable.

Any incoming calls from emergency services shall be brought to the attention of the Control Centre staff, via messages on the display, audible alarms and / or indicators on the handsets.

All voice communications and messages critical to safe operation shall be recorded on the central data recording system.

All Control Centre communications between control-room staff shall also be recorded and stored for at least thirty-one days.

35.13.5 Local Area Network

All of the Workstations situated within the Control Centre shall be connected to a dual redundant Local Area Network, which shall in turn be connected to the Servers and Systems in the Equipment Room and thence to the Operational Data Network.

The Local Area Network cabling standard shall be category 5/5e or higher.

Each Control Centre staff position shall have two Local Area Network connections per Local Area Network and these shall be accessible through the floor mounted recessed sockets.

The Local Area Network shall accommodate the connection of further terminals for the requirements of future expansion of the Edinburgh Tram Network.

35.13.6 Control Centre Time Display

The Control Centre shall have one or more wall-mounted digital display clocks, mounted so that all Control Centre operators have full view of the displayed time.

These clocks shall show the day, date, hours, minutes and seconds.

The clocks shall be synchronised with the Rugby time signal or its successor or similar.

35.13.7 Safety Requirements

The Control Centre will not house safety critical systems, however, it will provide controls and indications for sub-systems that can be considered to be safety or security related.

These sub-systems are:

- Safety related - the Traction Power Control System and Supervisory Control and Data Acquisition at each substation;
- Security related - the Passenger Help / Passenger Emergency Help Point communications to each Tramstop; together with the associated Closed Circuit Television equipment; and
- Safety related - the Tram Position, Route Setting and Detection System.

35.13.8 Electrical Requirements

The equipment located in the Control Centre shall run from 230/240VAC 50Hz electrical supplies.

Appropriate switched mains sockets shall be located on the walls and in the floor area close to each Control Desk locations for miscellaneous mains powered equipment.

There shall be no 110VAC or 415VAC 50 Hz available in this room. Power tools which require 110VAC 50Hz shall utilise a step-down / isolation transformer to achieve this.

Each mains socket shall be rated for a current of 13A.

The Control Centre equipment shall be supported by the provision of Uninterruptible Power Supply / diverse electrical supplies, further details are available in the Employer's Requirements Depot Section. An Uninterruptible Power Supply mains distribution panel shall be available in the Control Centre to provide a fault tolerant supply for all the equipment in the room. The connection of the

equipment to the Uninterruptible Power Supply distribution panel shall be through a system which has the same standard three-pin plug and sockets as normal 240v supplies, but is differentiated from the normal supply by means of appropriate labels and/of colour.

The design shall include full details of the future capacity that shall be provided for Edinburgh Tram Network expansion, and the method proposed for the work necessary to incorporate, install and commission future extensions.

All Control Centre cables and equipment shall be identified by permanent labelling in an approved format as detailed in the overall system-wide requirements.

The system wiring shall be sized to permit a minimum of 35% increase in power consumption for any additional equipment added as part of future Edinburgh Tram Network enhancements.

The main cable entry shall be via an aperture located in the floor, which provides entry or access for cables into the equipment room.

Particular care shall be taken to ensure that Electro-Magnetic Compatibility is not degraded when cables are closely located.

Cables shall be continuously screened through the aperture in the floor.

Appropriate strain relief or clamping shall be provided.

All cables and conduits shall be clearly marked with cable identifiers or suitable permanent marking which shall last for the expected system lifespan.

Local cabling between the Control Centre and the Equipment Room ducts shall be such that new cabling shall be capable of being installed without disruption to the operations including impact on the connections to the workstations.

35.13.9 Logging

In addition to voice image and message recording, there are two additional log facilities:

- Fault log; and
- Day log.

Fault Log

An electronic fault log shall be created which shall log status messages from Supervisory Control and Data Acquisition and communications systems.

The fault log records all system faults for further investigation.

Data storage shall be provided which shall record data on a 'first in-first out' basis.

Data shall be backed up on a removable storage medium and the system shall automatically do this or notify the Control Centre operator that backup is required before overwriting.

Data shall be backed up on a removable storage medium and the system shall automatically do this or notify the Control Centre operator that backup is required before overwriting.

Fault reports shall be automatically generated.

Day Log

An electronic log of day-to-day operations shall be implemented, from which a hard copy can be generated.

35.13.10 Central Data Recording

The Control Centre shall have a means of digitally recording/replaying the following information:

- All Operational Radio System voice communications;
- All Telephone Network calls to or from the Control Centre;
- All calls via the emergency telephone lines;
- Public Address announcements;
- Closed Circuit Television images, (at variable speed controlled by the viewer);
- Textual changes to Passenger Information Display; and
- The data shall be stored on non-volatile memory storage for the purposes of review or incident investigation.

The Control Centre staff shall be able to replay the data recorder from each desk position.

Information shall be recorded in a tamper-proof manner to evidential standards and be retained for a minimum period of one month.

35.13.11 Printers

The Control Centre shall house local printers for the printing of logs of maintenance or diagnostic data or colour prints of Closed Circuit Television frames.

35.13.12 Control Centre Furniture

The Control Centre shall be furnished with modern ergonomic furniture to assist the Control Centre staff and reduce fatigue.

Each desk position shall have personal storage of a minimum of three lockable drawers. Positioning of storage shall not inhibit the work-envelopes of the Control Centre Staff.

Additional storage equipment shall be located to the sides of the Control Centre.

The design of the Control Centre furniture shall include provision for the effective management of cabling, and equipment and maintenance power supply distribution.

Each of the Control Centre staff shall have the following functionality:

- Computer / workstation with dual flat screen displays, plus retractable keyboard;
- Integrated audio communications device comprising of handset and headset for (Public Address, Operational Radio, Telephones and Passenger Help / Passenger Emergency Help Points). The Telephone System (PABX) and the Operational Radio System shall be provided separately;
- Emergency telephones;
- Local light dimming control;
- Joystick control, (movement zoom and focus of Closed Circuit Television Cameras;
- Pointing device such as a mouse or tracker ball and keyboard; and
- Passenger Help / Passenger Emergency Help Point identification display.

The integrity of Controls and Indications shall be commensurate with the extent to which safety depends upon their correct operation, in both normal and degraded modes.

35.13.13 Spare Capacity / System Expansion

Following installation of the initial Edinburgh Tram Network Control Centre System:

- All conduits, troughing, trunking, and apertures shall be only 50% full of cables;
- All multi-pin connectors shall have a minimum of 10% capacity available for expansion; and
- All multi-way termination blocks shall provide a minimum of 20% capacity for expansion.

35.14 Equipment Room

35.14.1 Overview

The Equipment Room shall be situated either directly adjacent to, or directly below the Control Centre. The primary purpose of the Equipment Room is to provide a location to house the bulk of equipment, which supports the operational monitoring, management and operation of the Edinburgh Tram Network.

The equipment shall primarily be contained in freestanding cabinets located in the Equipment Room. Cabling from the equipment exits from the cabinets and shall be routed to sub-systems located outside the Depot or routed through an aperture into the Control Centre.

Within the Equipment Room will be maintainer desks, which shall be used for maintaining equipment associated with the running of the system.

It is proposed that the Equipment Room shall house the servers which host the following systems (subject to the required performance, reliability, safety and maintainability characteristics):

- Tram Position and Detection subsystem;
- Passenger Information Display subsystem;
- Telephone Network Private Automatic Branch Exchange;
- Public Address subsystem;
- Operation Radio Network Trunking Controller and base station (if required);

- Passenger Help / Passenger Emergency Help Point subsystem;
- Closed Circuit Television subsystem;
- Matrix controller;
- Supervisory Control and Data Acquisition subsystem;
- Operational Data Network Control Central Node;
- Performance Monitoring System;
- Central Data Recording and Storage;
- Radio Clock;
- Security and Access Controller;
- Fire alarm system;
- Voice recording and playback;
- Printers (if required).

35.14.2 Maintainer's Positions

Where appropriate, a Maintainer's Workstation shall be provided for a subsystem, along with any printer. The maintainer's position shall be supplied with any additional diagnostic equipment that cannot be integrated into the maintainer's workstation as part of the suite of software. Any additional special adapters or cables and connectors shall also be provided.

35.14.3 Security and Access Control

The security and access control system shall be housed in the Equipment Room.

The security and access control system shall also monitor the entry and exit to the Equipment Room.

Abnormal or illegal entry messages shall be sent to the Control Centre. These actions shall also be logged in the central data recorder.

35.14.4 Layout

The layout of the Equipment Room shall not be detrimental to maintenance and movement of equipment.

The positioning of cabinets and equipment shall take into consideration the cable and conduit entries and exits into the room.

The maintainer's workstations shall be situated with a full view of the equipment.

35.14.5 Equipment Housings and Mounting

Where possible, the equipment shall be placed in sealed, lockable cabinets, which provide a minimum of IP34 sealing.

Where indicators or diagnostic light emitting diodes/displays are used on equipment the cabinets shall have a glass door to assist in easy viewing from the maintainer's workstation.

Wherever possible, equipment shall be rack mounted or modular to aid replacement and maintenance.

To assist with installation all cabinets and equipment shall be fitted with suitable craneage or lifting points.

35.14.6 Diagnostic, Maintenance or Offline Mode Indications

If the equipment in the Equipment Room is placed into a diagnostic, maintenance or offline mode, this shall be communicated to the Control Centre staff and shall not compromise system safety or the performance of other systems.

35.14.7 Equipment Power Supplies

All powered equipment shall be connected to an Uninterruptible Power Supply in an adjacent room. This shall deliver 230V a.c. 50 Hz or 400 V a.c. 50 Hz.

Switched mains sockets shall be located on the walls and in the floor area close to the equipment locations. Further details are available in the Employer's Requirements - Depot. There shall be provision for 110V a.c. 50Hz in this room to enable the connection of power tools and the sockets shall be clearly marked accordingly.

Each 230V ac 50Hz mains socket shall be rated for a current of 13A.

A Supply distribution panel shall be mounted to the wall to enable disconnection of supplies in the event of an emergency.

The system wiring shall be sized to permit a minimum of 25% increase in power consumption to accommodate additional equipment required for Edinburgh Tram Network expansion.

The power loading and performance characteristics of equipment shall be stated at the extremes of temperature, normal running and transient conditions.

35.14.8 Storage

The Equipment Room shall provide storage for both personal and vocational items. This shall be in the form of lockable cupboards and units.

All main data storage shall be carried out on servers or equipment located in the equipment room where access is restricted. All system or program data must be shown to be retrievable in the instance of a system re-build.

Adequate shelving and filing cabinets etc shall be provided to locate equipment, handbooks, files and storage of electronic data.

Printers and miscellaneous equipment shall be sited in the locale of the maintainers in order to afford easy access.

35.14.9 Spare Capacity / System Expansion

All conduits, troughing, trunking, or apertures shall be only 50% full of cables. All multi-way termination blocks shall provide a minimum of 20% capacity for expansion. All multi-pin connectors shall have a minimum of 10% capacity available for expansion.

Each cabinet shall only be populated up to 75% to provide additional space for system enhancements.

Cabinets containing equipment which may be affected by the future Edinburgh Tram Network enhancements shall have enough spare capacity to accommodate those changes or demonstrate that the expansion or upgrade can be achieved with the minimum amount of changes or use of personnel.

All patch panels and terminals shall have the capacity for equipment used by the future Edinburgh Tram Network enhancements.

35.14.10 Master Clock and System Clocks

Within the Equipment Room, a Master Clock System shall be installed.

The Master Clock shall source a time signal from the standard Rugby clock signal (or its successor) or similar and broadcast the time signal to all systems that require accurate time synchronisation.

The Master Clock shall broadcast the time signal over the Local Area Network or directly via wired connections to the appropriate equipment.

In the event of Rugby time signal failure the system shall continue to generate time signals based on an accurate battery-backed clock. In the event of Master Clock failure, each of the systems that require the Rugby time signal shall continue operating using their own local clock signal. The failure of the Master Clock shall be logged accordingly and displayed to the Control Centre staff.

The time shall be sent to each of the systems to allow logging to resolution of 10ms or better.

A digital display clock shall be situated in a position, which can be easily seen by the maintainers at their workstation position. The clock shall source its time from the master clock. It shall show the day, date, hours, minutes and seconds.

35.14.11 Performance Monitoring System

The Performance Monitoring System shall be connected to the equipment room Local Area Network and be accessible by all designated users with appropriate user group login and password protection.

It shall receive data from the Tram Position and Detection Subsystems and the SCADA systems, which will allow it automatically to calculate those measures of performance of the Tram Network that can be calculated automatically. The relevant Performance Measures are all of those measures that form Performance Measurement System, as set out in Schedule 6 to the Infraco Agreement. This system shall produce appropriate daily and other periodical reports in both paper and software format. The reports shall to provide a suitable audit trail for the calculation of the PMS. The detailed specification for this system shall be subject to further development with **tie** and subject to **tie**'s approval.

The Performance Monitoring System shall also be accessible remotely through a Local Area Network firewall, via the Internet.

35.14.12 Monitor Matrix Display Driver

The Monitor Matrix Controller shall receive data from the Closed Circuit Television System cameras and display the images onto the Matrix of displays in the Control Centre.

It shall be connected to the dual redundant Local Area Network and / or Closed Circuit Television System.

It shall have the capability of being expanded to accommodate the expansion of the Edinburgh Tram Network closed circuit television system.

35.14.13 Central Data Recording

The Central Data Recorder shall be housed in a cabinet separate to all other equipment. The cabinet shall be sealed and locked and have suitable tamperproof fittings. The door shall be fitted with an alarm to indicate when it has been opened, which shall be logged, printed, and displayed to the Control Centre staff.

The data shall be stored in secure manner such that no tampering can be achieved. The maintainers shall have easy access to the system in order to backup/archive data. The system shall have the capability of supporting connections to a Local Area Network based digital recording system held in the Equipment Room.

The system shall provide playback facilities within both the Control Centre and one of the administration offices.

All recorded Control Centre communications shall be time stamped to the nearest second, updated from the Edinburgh Tram Network Time Server in the Equipment Room. Recordings shall be archived to transportable media.

The archiving process shall not interrupt the recording process. The viewing of recorded Closed Circuit Television images shall not interrupt the recording of further Closed Circuit Television images.

The quality of data stored shall be suitable for legal interpretation and proceedings.

The data shall be stored on a system, which shall have the capacity to store at least thirty-one days worth of system communications, Closed Circuit Television images and text information.

Each camera shall be recorded at a minimum rate of 16 frames per second (fps): however, the images shall be recorded at a higher frame rate of 25 fps when:

- An Emergency Help point has been activated;
- A TVM alarm is detected;
- A designated zone has been entered;
- The Control Centre staff manually command the Closed Circuit Television image to be recorded.

The data shall be recorded in a circular buffer where the oldest data is overwritten by the latest data ('first in-first out') and is subject to the storage capacity of 31 days referred to above.

The data shall be stored in secure manner such that no tampering can occur.

The images shall be overlaid by security coding of time/date and location.

Freeze frame facilities shall be provided.

In the above cases, the system will interrogate the Operator at the end of every three minutes to determine whether or not the high recording rate should be continued.

The central data recorder shall provide conversion facilities to adjust the optimisation of the images but not the pictorial content.

The storage device shall provide an audible warning that the storage capacity is within 5% of capacity and that the Control Centre staff are required to archive data to a non-volatile medium.

The status of the data recorder shall be conveyed to Control Centre staff.

Each DVR shall be connected to the Operational Data Network, to allow images to be transferred between locations to allow remote viewing.

35.14.14 Voice Recording

The Equipment Room shall house a Local Area Network based digital recording system that shall record all voice communications both into and out of the Control Centre.

The Central Voice Recorder shall be housed in a cabinet separate to all other equipment.

The cabinet shall be sealed and locked and have suitable tamperproof fittings.

The door shall be fitted with an alarm to indicate when it has been opened, which shall be logged, printed, and displayed to the Control Centre staff.

The voice recordings shall be stored in a secure manner such that no tampering can be achieved. The maintainers shall have easy access to the system in order to backup / archive data.

The system shall provide playback facilities within both the Control Centre and in one of the administration offices.

All recorded Control Centre communications shall be time stamped to the nearest second, updated from the Time Server in the Equipment Room.

Recordings shall be archived to removable media.

The archiving process shall not interrupt the recording process.

The quality of data stored shall be suitable for legal interpretation and proceedings.

The voice recordings shall be stored on a system, which shall have the capacity to store at least thirty-one days worth of voice communications.

The data shall be recorded in a circular buffer where the oldest data is overwritten by the latest data ('first in-first out').

The data shall be stored in secure manner such that no tampering can be achieved.

The storage device shall provide an audible warning that the storage capacity is within 5% of capacity and that the Control Centre staff are required to archive data to a non-volatile medium.

The status of the voice recorder shall be conveyed to Control Centre staff.

35.14.15 Equipment Room Maintainer Desks

Two workstations shall be provided for the maintainers, which comprise a local display, 'man-machine interface' and keyboard to enable the interrogation of the server or other related equipment for diagnostic or maintenance purposes.

The Workstations in the Equipment Room shall be of similar design to their equivalents in the Control Centre but their users shall require a greater level of more detailed access. Such access shall be governed by password and user group membership.

The Equipment Room workstations shall comprise:

- Display, mouse and keyboard for interaction with the Tram Position and Detection System and Passenger Information Display sub-system, the Operational Radio System and the UTC sub-system, the latter via the Tram Position, Route Setting and Detection System;
- Touch screen interface to the Telephone Network, Public Address system, and Passenger Help/Passenger Emergency Help Point systems;
- Touch screen interface to the Operational Radio System;
- Displays and console for the selection and monitoring of Closed Circuit Television images from remotely located cameras;
- Display, mouse and keyboard for interaction with the Supervisory Control and Data Acquisition System; and
- Human computer interfaces for the purpose of archiving and retrieving logged data.

Each maintainer's position shall have two-off Local Area Network connections per Local Area Network and these shall be accessible through recessed sockets.

Each maintainer's position shall have a Telephone Network handset.

35.14.16 Equipment Room Local Area Network Requirements

Each of the maintainer's workstation computers situated within the Equipment Room shall be connected to a Local Area Network.

The Local Area Network cabling standard shall be category 5/5e or higher.

Each Equipment Room maintainer's positions shall have two Local Area Network connections that shall be accessible through recessed sockets.

The Equipment Room Local Area Network shall accommodate the connection of further terminals for the requirements of future Edinburgh tram Network expansion.

35.14.17 Other Systems

A repeat of the 'System Overview' display that is located in the Control Centre staff shall be made available on the Operator's Local area network, updated at least every 5 seconds. This is to enable **tie** to use this image for purposes such as for onward transmission to the TEL /Lothian Bus information centres and in the depot mess room to assist staff with timing crew changes.

36 Integrated Fare Collection

36.1 Scope

The scope of this Section of these Employer's Requirements is to define the integrated fare collection requirements that are applicable to the Edinburgh Tram Network.

36.2 Procurement

Ticket Vending Machines (TVMs) and Ticket Validators for installation at Tramstops will be 'free issued' by **tie** to the Infraco at the Depot. The Infraco shall be required to provide the necessary foundations, ducting, power supply and communications linkage to the TVM and Ticket Validator locations at the Tramstops. The Infraco shall be responsible for the installation of agreed quantities of TVMs and Ticket Validators at the agreed locations.

36.3 General Technical Specification

The hand held TVM docking stations shall be 'free issued' by **tie** to the Infraco at the Depot and the Infraco shall provide appropriate power and comms interface connections, together with appropriate racking to store and charge.

36.4 Integrated Fare Collection

tie/TEL shall be responsible for the Edinburgh Tram integrated fare collection system which shall provide passengers with tickets and ticket validation on and/or off Trams for multi modal seamless bus and Tram journeys within the confines of the Lothian Bus operational area for ticket sales and throughout the SESTRAN area for validation.

Static Ticket Vending Machines will be provided at Tramstops, and hand held ticket vending machines that can also validate tickets will be carried by an Inspector on board each Tram. The fare collection system shall consist of a number of items of equipment each providing elements of the overall System functionality.

These shall include:

- Ticket Vending Machines providing ticket purchasing facilities – these are to be provided separately to the Infraco by **tie** and 'free issued' for installation by the Infraco;
- Tramstop ticket Validators – these are to be provided separately to the Infraco by **tie** and 'free issued' for installation by the Infraco;

- Docking stations for hand-held ticket issuing and smart-card validation machines and associated support apparatus (including docking stations) – these are to be provided separately to the Infraco by **tie** and 'free issued' to the Infraco. The Infraco shall provide power and communications interface connections to the Depot local area network, together with appropriate racking to store and charge the hand held ticket machines.

The elements of the IFC system shall use the system wide communications backbone that shall be provided by Infraco to provide the wide area connections for data transfer and equipment control.

The Infraco shall provide connections for the Ticket Vending Machines and Ticket Validators to be connected locally to the communications network at Tramstops.

The Infraco shall provide a connection for the ticketing central management system to be connected to the communications network and local area operational network at the depot / operational control centre.

The Infraco shall provide for the ticketing central management system to be connected to the outside world by means of a secure IP address.

36.5 Ticket Vending Machines and Validators

36.5.1 General

There shall be a minimum of two TVMs per Tramstop. Exact numbers of TVMs and Ticket Validators are to be agreed for each Tramstop.

The Infraco shall include in the design of the Tramstops suitable foundations for the TVMs and the Ticket Validators and provide 230 volt ac power and communications links to the units as appropriate.

36.5.2 Docking Stations for Hand-Held Ticket Machines

Docking stations and chargers shall be 'free issued' by **tie** to the Infraco. The Infraco shall provide power and communications interface connections to the depot local area network, together with appropriate racking to store and charge the hand held ticket machines. These will be connected to the Central Management System.

Table 86 - Hand Held Ticket Machine Quantities

Equipment	Quantity	Comments
Docking Stations	*35*	As determined in the design and implementation phases

36.5.3 Equipment Interfaces

The following equipment interfaces are required to be provided by the Infraco:

Table 87 - System Interfaces

Interface	Interface with Discipline	Interface Definition	Interface Management
Central Management System	System wide	Integrated Fare Collection	Individual sub systems
Ticket Vending Machine	Tramstop / Buildings	Integration Fare Collection	Buildings
Ticket Vending Machine	Supervisory, Control and Communications System	Integrated Fare Collection	Supervisory, Control and Communications System
Smart Card Validators	Tramstop / Buildings	Integration Fare Collection	Buildings
Smart Card Validators	Supervisory, Control and Communications System	Integrated Fare Collection	Supervisory, Control and Communications System
Hand Held Ticket Machines	Central Internal Financial Control system and SC&C	Integrated Fare Collection	Integrated Fare Collection

The interfaces identified above will be further developed by the Infraco to include details of programme requirements for interface resolution. The detailed interfaces and management thereof will be carried out according to the system integration process for the Edinburgh Tram Network.

37 System Integration

37.1 Introduction

A tramway has many constituent parts and therefore integration is a crucial factor when designing, implementing and operating a successful tramway.

tie shall be provided by the Infraco with a totally integrated Edinburgh Tram Network with all systems, subsystems and interfaces working efficiently and harmoniously together as one and able to be operated and maintained in full compliance with the requirements of the Edinburgh Tram Network and appropriate Consents. To achieve this, the Infraco shall be responsible for successfully undertaking comprehensive co-ordination and system integration roles within the Infraco Works. The system integration responsibility shall exist throughout all phases of the Infraco Works.

This Section of the Employer's Requirements outlines these responsibilities and provides details of the extent of co-ordination and system integration.

37.2 Definitions

System Integration shall include the collation, identification, recording and management of all elements of the Infraco Works, including but not limited to, the project management, design, procurement, manufacturing, factory testing, delivery, offloading, erection, construction, equipping, testing, commissioning, system acceptance testing, shadow running, operation and maintenance of the ETN.

Such integration shall include both the 'hard' integration elements in terms of system and sub-system functionality etc and 'soft' integration elements associated with approvals and Consents, people interfaces, plans, processes and procedures, and land/property agreements.

Also included shall be the production and delivery of all associated documentation (training and maintenance manuals and "As Built" documentation), all spare parts and special tools etc to allow the safe and efficient fulfilment of all operation and maintenance obligations, including dependability criteria, for the projected life time of the Edinburgh Tram Network.

System interfaces shall mean where two or more main elements or subsystems meet or interact or are intended to meet or interact in a manner which is necessary for the expedient and necessary progress of the Infraco Works and the safe and efficient operation and maintenance of the Edinburgh Tram Network.

37.3 Principle

System Integration is a fundamental project requirement and shall include the efficient and effective leadership of the system engineering and associated processes, coordination of the processes for the design, implementation and bringing the Edinburgh Tram Network into public service, complete technical direction and configuration management of the existing system design and system and subsystem interfaces to facilitate the Infraco Works.

37.4 Inter-contract Integration, Integration of third party and free issue equipment

The Infraco shall be responsible for managing all activities required to ensure that the Edinburgh Tram Network is successfully integrated with the equipment and subsystems being provided by the Infraco Parties and others. This over-arching integration role shall include as a minimum the following activities:

- undertaking a design co-ordination system and subsystem development function between contracts;
- lead in the system integration of the ticketing machines, ticket validators and bus passenger information displays;
- lead in the system integration of the subsystems and equipment being provided under the ETN project together with, systems and equipment, such as the "free issue components" or as indicated by **tie**;
- provision of an integrated testing and commissioning plan; and
- implementation of an integrated testing and commissioning programme.

37.5 Formal Roles to be undertaken by the Infraco

37.5.1 System Design Authority

The Infraco shall be responsible for the management of the design and interface processes in respect of systems and equipment being provided under or supplied pursuant to this Agreement. The system design authority role shall be deemed to include leadership of the System engineering process, co-ordination of the design process, configuration management of the System design, System and subsystem interfaces and all associated documentation including general technical direction.

37.5.2 System Integrator

The Infraco shall perform the system integrator role with the aim of meeting the objectives of system integration as set out in this Section. This responsibility shall exist in all phases of the contract from initial requirements analysis, final sign-off of the ETN for operational use and during maintenance.

The Infraco shall be responsible for the practicalities of how the role of system integrator shall be executed, however as a minimum the role is deemed to include the management of the following activities:

- Systems assurance;
- Electromagnetic compatibility including stray current;
- Electromagnetic interference and any associated immunisation of Network Rail signalling systems or assets;
- Environmental issues – noise and vibration;
- System acceptance inclusive of testing and commissioning and training;
- Inter-contract integration;
- Third party issues and consents;
- System safety; and
- Verification and validation.

The Infraco shall:

- Produce a comprehensive system integration management plan, to be implemented and regularly updated by the Infraco throughout the duration of the Infraco Works. Such a plan shall form a fundamental part of the Infraco's overall operational & maintenance plan and design & implementation plan.
- Establish and document appropriate arrangements for the identification, management and monitoring of system integration at the scheme, system, and sub-system levels;

- Provide demonstrable assurance throughout the technical development, procurement and implementation of the ETN that the system and sub-systems form an integrated whole (both in terms of physical, functional and organisational fit, and the operation performance and dependability)

- Identify and integrate the System and all systems as defined in these Employer's Requirements. and equipment being provided under for the ETN project together with, subsystems and equipment provided by others as detailed in 37.4.

- Maintain the integrity of the scheme configuration; and

- Provide and demonstrate compliance and traceability between the scheme requirements and the design and implemented solution and evidence to support the phased and final cases for safety.

All Deliverables shall be:

- submitted in soft copy as required by **tie**;

- Produced in accordance with the ISO 9000 series and in a format approved by **tie**;

- Clearly written, without jargon, with terminology defined; figures, data, calculations and information used shall be clearly traceable and justified; all assumptions shall be stated and justified; and

- Be updated as necessary throughout the Term or as requested by **tie**.

38 Location Specific Requirements

The requirements set out in this section of the Employer's Requirements are mostly applied either system wide or common to particular elements throughout the ETN. The principal exceptions are in relation to the Depot, the Specific Agreements made during the Parliamentary process and the Third Party Agreements as detailed in Schedule 13 (Third Party Agreements). Specific requirements have been identified through the design process. These have been developed by the SDS Provider through the design process over the past years, in particular the following processes:

- The SDS design process, preliminary and detailed (still ongoing) including (in no specific order and not limited to;
- Initial briefing from **tie** and their designers from the Parliamentary stage on issues within the STAG drawings and that had arisen subsequently, either during or in parallel with the Parliamentary process;
- Consultation with CEC as Promoter/Undertaker, as Planning Authority and with their Transport function, including as Roads Authority;
- Consultation with Stakeholders, including major bodies such as BAA, RBS, New Edinburgh Limited, Network Rail and First Scotrail, Historic Scotland, the World Heritage Trust, Forth Ports, and the emergency services. Note that some of these have Agreements as referred to above, but that further consultation and the passage of time has identified additional, changed and/or more detailed requirements to those set out in the Agreements;
- Consultation with other affected landowners, who may not have specific design requirements built into Agreements, as referred to above;
- Consultation with the Operator and with TEL (including Lothian Buses);
- Consultation with HMRI;
- Consultation with other affected bodies such as SEPA, Scottish Power, and the other Utilities;
- Specific consultation with frontagers;
- Specific consultation with general interest groups, relating to e.g. environmental matters, disability issues and cycling;
- Consultations with those submitting planning applications along the tram route;

- Public consultation.

39 Project Programme

39.1 Introduction

This Section of the Employer's Requirements provides an account of the programme restrictions that will impact on the Programme. The Section also contains details of the format in which programmes should be submitted and how costs should be broken down in the Work Breakdown Sheet.

39.2 Key Dates

- Key dates in respect of the Edinburgh Tram Network and the provision of the works, services and supplies by the Infraco are set out below. The tram depot at Gogar shall be complete and commissioned ready to accept first tram delivery by the end of November 2009.

Delivery into service for Phase 1a and Phase 1b shall bein accordance with the Programme.

In addition to the Programme dates included above, there are further Programme restrictions within which Infraco must work. These are constraint dates which shall not necessarily affect the whole Works but may do so. Infraco shall take due cognisance of these and the Programme dates outlined above. The constraint dates are as listed below:

- Table of overall Programme Constraints;

Constraint	Dates
Embargos	August Embargo – from the first Sunday in August until the first Sunday in September Christmas Embargo – from the Thursday preceding the first Sunday in December until the first working day of the New Year annually
MUDFA	Latest revision of programme as agreed with **tie** through formal progress meetings.
Design	Latest revision of programme as agreed with **tie** through formal progress meetings.
Others	All other Constraints as shown in Schedule 13 – Third Party Agreements, Code of Construction Practice and Network Rail Possessions

Table 88 – Table of overall Programme Constraints

- Further working time restrictions are imposed on the Infraco by the Construction Code of Practice;

- Network Rail potential possession dates..

39.3 Basis for Programme

- Infraco shall base its programme on the project management requirements at 12 of these Employer's Requirements;

- The Work Breakdown Structure (WBS) for building and coding the programme that is to be used to develop the Infraco programme is that used in **tie**'s master programme;

- The P3e Activity Code Dictionary (Mandatory Codes as below); and

39.4 Third Party Agreements

Infraco shall include these constraints and obligations resulting from Schedule 13 – Third Party Agreements. Infraco shall demonstrate to **tie** that these constraints and obligations have been considered and resolved in the programme.

tie acknowledge their supporting role in the delivery of the obligations contained within these Third Party Agreements.

39.5 P3e Activity Code Dictionary (Mandatory Codes)

The following codes shall be used by the Infraco in the preparation and development of their programme. These codes can only be modified with the express permission of **tie**.

Activity Code		Description
Geographical Sections		
01	Section 01	Newhaven Road to Haymarket
02	Section 02	Haymarket Corridor
03	Section 03	Haymarket to Granton Square
04	Section 04	Granton Square to Newhaven Road – (Future Development)
05	Section 05	Roseburn Junction to Gogar
06	Section 06	Gogar Depot
07	Section 07	Gogar to Edinburgh Airport
08	Section 08	Ingliston Park & Ride to Newbridge – (Future Development)
Intermediate Geographical Sections		
01A		Newhaven Road (inclusive) to Foot of the Walk (exclusive)
01B		Foot of the Walk (inclusive) to McDonald Road (exclusive)
01C		McDonald Road (inclusive) to Princes Street West (exclusive)
01D		Princes Street West (inclusive) to Haymarket (exclusive)
02A		Haymarket (inclusive) - Roseburn Junction (inclusive)
03A		Roseburn Junction (exclusive) to Crewe Toll (inclusive)
03B		Crewe Toll (exclusive) to Caroline Park (inclusive)
03C		Caroline Park (exclusive) to Granton (inclusive)
04A		Granton (exclusive) to Lower Granton Road (inclusive) - Future Development
04B		Lower Granton Road (exclusive) to Newhaven Road (exclusive) - Future Development
05A		Roseburn Junction (exclusive) to Balgreen Road (inclusive)
05B		Balgreen Road (exclusive) to Edinburgh Park (inclusive)
05C		Edinburgh Park (exclusive) to Gogarburn (inclusive)
06A		Gogar Depot
07A		Gogarburn (exclusive) to Edinburgh Airport (inclusive)
08A		Ingliston Park & Ride to Newbridge North - Future Development

Sub-Section (Tram Stop)

00	Intermediate Section Wide
01	Depot
02	Depot Stop (exclusive) - Gogarburn (inclusive)
03	Gyle (exclusive) - Depot Stop (inclusive)
04	Gogarburn (exclusive) to Ingliston Park & Ride (inclusive)
05	Ingliston Park & Ride (exclusive) to Edinburgh Airport (inclusive)
06	Edinburgh Park Central (exclusive) - Gyle (inclusive)
07	Edinburgh Park Station (exclusive) - Edinburgh Park Central (inclusive)
08	Bankhead (exclusive) - Edinburgh Park Station (inclusive)
09	Saughton Road North (exclusive) - Bankhead (inclusive)
10	Balgreen Road (exclusive) - Saughton Road North (inclusive)
11	Murrayfield Stadium (exclusive) - Balgreen Road (inclusive)
12	Roseburn Junction (exclusive) to Murrayfield Stadium (inclusive)
13	Haymarket (inclusive) - Roseburn Junction (inclusive)
14	Shandwick Place (inclusive) - Haymarket (exclusive)
15	Princes Street West (inclusive) - Shandwick Place (exclusive)
16	St. Andrew's Square (exclusive) - Princes Street West (exclusive)
17	Picardy Place (inclusive) - St. Andrew's Square (exclusive)
18	McDonald Road (inclusive) - Picardy Place (exclusive)
19	Balfour Street (inclusive) - McDonald Road (exclusive)
20	Foot of the Walk (inclusive) - Balfour Street (exclusive)
21	Bernard Street (inclusive) - Foot of the Walk (exclusive)
22	Port of Leith (inclusive) - Bernard Street (exclusive)
23	Ocean Terminal (inclusive) – Port of Leith (exclusive)
24	Newhaven Road (inclusive) - Ocean Terminal (exclusive)
25	Roseburn Junction (exclusive) to Roseburn (inclusive)
26	Roseburn (exclusive) - Ravelston Dykes (inclusive)
27	Ravelston Dykes (exclusive) - Craigleith (inclusive)
28	Craigleith (exclusive) - Telford Road (inclusive)
29	Telford Road (exclusive) - Crewe Toll (inclusive)
30	Crewe Toll (exclusive) - West Pilton (inclusive)
31	West Pilton (exclusive) - Caroline Park (inclusive)
32	Caroline Park (exclusive) - Saltire Square (inclusive)
33	Saltire Square (exclusive) - Granton Square (inclusive)
34	St. Andrew's Square

Discipline Codes

ACCB	Accommodation and Boundary Works
APPR	Approvals
APPP	Prior Approvals – Detail Design
APPT	Technical Approvals – Detail Design
ARCH	Architecture
AUXI	Auxilliary Power
BLDS	Buildings
BRDG	Bridges
CECS	CEC Services
CHAR	Charette Changes
COMM	Commissioning
DASB	Design – As Builts
DEMO	Demolition
DEPO	Depot
DRAN	Drainage
EART	Earthworks / Embankments
ELEC	Electricity
ENVI	Environmental
GASS	Gas
GEOT	Geotechnical
HIGH	Highways
HMRI	Railway Inspectorate
JNCS	Junctions
LAND	Landscaping
LIGH	Lighting
MANA	Management
MECH	Mechanical
MILE	Milestones
MISC	Miscellaneous
MODL	Modelling
MULT	Multi-Discipline
NETR	Network Rail
OHLE	OHLE
OTHW	Other Works
PLAT	Platforms
POWR	Power (Traction)
ROAD	Roads / Paths / External Works

SEWR	Sewerage
SIGN	Signalling
STAK	Stakeholder
STRL	Street Lighting
STRU	Structures / Retaining Structures
SUBM	Submissions
SUBS	Sub-Stations
SURV	Surveys
SYSC	Systems Communications
SYSE	Systems Engineering
TELC	Telecoms (Including Data)
TRAM	Tram Vehicles
TRCK	Track
TRMS	Tram Stops
TROS	Traffic Order
TTRO	Temporary Traffic Order
TUNN	Underpasses / Tunnels
UTIL	Utilities
WATR	Water Supply

Phase Codes

D	DEVELOPMENT (Management)
L	LAND & PROPERTY (Management)
J	JRC (Management)
S	SDS DESIGN
ID	INFRACO DESIGN
M	MUDFA (Utilities - Construction)
A	ADVANCED WORKS (Construction)
I	INFRACO (Construction)
T	TRAMCO (Construction)
W	SYSTEM WIDE As Built Design
P	PROJECT WIDE

Scope Type Codes

O	Original Scope
A	Approved Change to Original Scope
U	Unapproved Change to Original Scope

Line Codes

00	Common
1a	Phase 1a - Airport to Newhaven Road
1b	Phase 1b - Roseburn Junction to Granton Square
02	Phase 02 - Granton Square to Newhaven Road
03	Phase 03 - Ingliston Park & Ride to Newbridge North - Future Development

40 Maintenance

40.1 Scope

The scope of this section is to define the maintenance requirements with which the Infraco must comply.

It is anticipated that the Edinburgh Tram Network will have been delivered, tested and commissioned and taken into operation in accordance with the other parts of these Employers Requirements.

The maintenance scope is to maintain the delivered Edinburgh Tram Network functionality for the Term according to this Section of the Employer's Requirements and the Agreement.

40.1.1 General

The Infraco maintenance responsibilities during the Term are detailed here and apply to both the Edinburgh Tram Network infrastructure and Trams. This section also details the Infraco's obligation to develop a maintenance strategy and plan for the Edinburgh Tram Network as a whole, for delivering a maintenance service. The strategy and plan shall include planned inspections and interventions, lifecycle replacement and response to unplanned equipment failures and damage for whatever reason. For the avoidance of doubt, in accordance with the Infraco Agreement, repair of damage due to accidents, vandalism, graffiti, theft, derailments, external influences, force majeure, and repair of damages due to improper handling or operation of the system, where this is not the responsibility of Infraco, entitles Infraco to payment for additional labour and material required in accordance with the Schedule of Agreed Prices.

In response to these requirements the Infraco shall develop a maintenance strategy to support and enable the Edinburgh Tram Network to maintain the performance standards, and a Maintenance Plan for all Infrastructure and Tram systems and elements under their responsibility, that make up the Edinburgh Tram Network. The Maintenance Plan shall be submitted to **tie** and reviewed and agreed in accordance with the Review Procedure.

The Infraco's performance in delivering effective maintenance will be measured, monitored and managed through a combination of the key performance indicators and availability criteria, and assessed by **tie** through a series of qualitative tests in accordance with the Agreement.

40.1.2 Overall Objectives

The main objective of the Edinburgh Tram Network is to provide a safe, reliable, punctual, clean, easily accessible, comfortable and environmentally friendly transport service.

The Maintenance Plan shall form part of the Infraco integrated management system. This shall also include the following objectives, procedures and processes:

- The Parties shall co-operate to achieve the aims under the Agreement;
- The Infraco shall demonstrate how it will meet the Employer's specific requirements under the Infraco Agreement, particularly the requirements for the availability of the ETN and defined sub-systems;
- The Infraco shall manage all their Infraco Parties to ensure they fulfil the requirements of their contracts;
- The Infraco shall ensure that the activities of all Infraco Parties do not compromise the operations, safety and life expectancy of the ETN;
- The Infraco shall set up and adhere to schedules and programmes for all planned work, including adherence to the relevant Operations & Maintenance Specifications and Manuals provided by Infraco;
- The Infraco shall in discharging its obligations minimise any downtime on the system for the Operator;
- The Infraco shall co-operate with **tie** and interfacing parties including the Operator, CEC, Network Rail shall co-operate and, in particular, shall support any obligations they respectively have under their safety management system;
- The Infraco shall be aware of, and be compliant with Law and standards governing operation and maintenance of tram network infrastructure, systems, equipment, and any changes thereto; and
- The Infraco shall establish and maintain lines of communication with all interfacing and affected parties by means of scheduled meetings, consultation, notices, and when required by tie publicity, in regard to maintenance works.

Each year the Infraco shall plan and undertake programmes to review and improve the levels of system availability, safety, performance, and delivery of the infrastructure and trams. The Infraco shall develop a performance improvement plan which shall be developed in conjunction with the Operator and shall be included in future issues of the infrastructure maintenance plan. Infraco shall update the Maintenance Plan in the light of operational experience and resubmit for approval in accordance with the Review Procedure in Schedule 14 of the Agreement.

The Infraco performance payment regime set out in Schedule 7 of the Agreement shall provide a financial incentive for Infraco to provide reliable systems and assets for operation and to undertake effective maintenance of the Edinburgh Tram Network.

40.2 Infrastructure Maintenance Requirements

40.2.1 Purpose

This Infrastructure Maintenance Requirements section identifies the output specification that the Infraco shall meet. This includes delivering planned preventative (cyclical), life cycle and corrective maintenance to the infrastructure of the Edinburgh Tram Network and all relevant plant and equipment for which Infraco is responsible. The Infrastructure Maintenance Plan, which shall be developed by Infraco in response to these Requirements, shall specify objective plans and specifications for maintenance from the pre-operational period and over the Term and shall contain a strategy complying with 40.2.4 of this Section. These Employer's Requirements may be reviewed as necessary during the operational period by agreement with **tie**. The Infrastructure Maintenance Requirements shall be read in conjunction with the other sections of these Employer's Requirements and with such 'as-built' technical documentation, design standards and Operation & Maintenance standards and manuals as are developed by the Infraco.

The Infrastructure Maintenance Plan shall be a fully controlled issue document. Updates shall be shown as a draft version until these are agreed by **tie**. It shall take into account all statutory, regulatory and contractual requirements in force at the time of issue.

40.2.2 Scope

The Infrastructure Maintenance Plan shall cover all maintenance activities, including but not exclusively, the response to unplanned equipment failures and damage for whatever reason, to the infrastructure, plant and equipment that make up the Edinburgh Tram Network. The following responsibilities matrix identifies the general scope for which the Infraco is responsible. The Infraco responsibility for Depot Plant and Equipment maintenance is identified in Table 83 - Depot Plant and Equipment to be Provided.

The Infraco detailed responsibilities in respect of road related obligations are contained in table 90 – Roads, structures in table 92 – Structures (as carried out by the Infraco or others) and landscaping (trees and vegetation).

Table 89 – Infrastructure and Equipment Responsibilities Allocation Matrix

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Tram Stop Structure																
Platform surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Platform Inclined Approach		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Canopy		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Inside surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Internal Roof surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External Roof surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Integral Lighting		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Internal seating		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Tram Stop Furnishings																
Stop Name Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Static Information Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Guard Rails/Barriers (as applicable)		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Lighting Columns		N/A	N/A	N/A	✗	✗	✗	✓	✗	✗	✓	✗	✗	✗	✗	✓
Lighting Lanterns		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Litter Bins		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External seating		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Platform Edge White Line		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Advertising Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Stop Equipment																
CCTV Cameras		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Public Address Loudspeakers		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Hearing Loops		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Passenger Information Displays		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Passenger Alarm/Help points		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Ticket Vending Machines (maintained & serviced by TEL)		N/A	N/A	N/A	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓
Drainage (Interface defined in Table 93)		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Trackside Equipments																
Stop Equipment Cabinets		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Stop Equipment Cabinet Equipment		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Traction Isolator Cabinets		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Traction Isolator Cabinet Equipment		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Point Control Cabinets		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Point Control Cabinet Equipment		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Point Heater Cabinets, Point Heaters & Controls		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Road Junction Cabinets		N/A	N/A	N/A	✘	✘	✔	✘	✘	✘	✘	✘	✘	✘	✔	✘
Road Junction Cabinet Equipment		N/A	N/A	N/A	✘	✘	✔	✘	✘	✘	✘	✘	✘	✘	✔	✘
Point Machines (including Manual Control)		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
OLE Contact Wire & Supports		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
OLE Poles		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
OLE Pole mounted Equipments		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
OLE Wall Fixings		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
OLE Wall fixed Equipment		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Tram Signal Heads (Roadside)		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✓
Tram Signal Posts (Trackside)		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Signals Posts		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Detector Loops		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Lighting on OLE Masts		N/A	N/A	N/A	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trackside cable ducts		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trackside cables		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Cable drawpits		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Structures (Bridges, Retaining Walls etc)																
Over Bridges See Table 95 for split		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Under bridges See Table 95 for split		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Retaining walls		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Misc Structures		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Swept Path		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Swept Path Markings		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Track																
Trackwork		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Points & Crossings		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Track Drainage		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Field' Stray Current Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Sub Stations																
Sub Station Buildings		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Sub Station Equipments		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Sub Station Compounds		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Sub Station Parking Facilities		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Stray Current Monitoring Points		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Stray Current Equipments		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Earthing Equipments		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Trams																
Free issue' tram mounted equipments		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Trams		N/A	N/A	N/A	✘	✘	✘	✔	✘	✔	✘	✘	✘	✘	✘	✔
Tram saloon & Drivers cabs		N/A	N/A	N/A	✘	✘	✘	✔	✘	✔	✘	✘	✘	✘	✘	✔
Radio																
Portable radios		N/A	N/A	N/A	✘	✘	✘	✔	✔	✘	✘	✘	✘	✘	✘	✔
Radio Base stations		N/A	N/A	N/A	✔	✘	✘	✘	✔	✘	✘	✘	✘	✘	✘	✔
Landscaping																
Soft landscaping		N/A	N/A	N/A	✘	✘	✘	✔	✔	✘	✘	✘	✘	✘	✘	✔
Hard Landscaping		N/A	N/A	N/A	✘	✘	✘	✔	✔	✘	✘	✘	✘	✘	✘	✔

Floor	Room No.	Description	User Competence Assessor	Used by			Cleaned by			Maintained by			Access Controlled by		
				Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	Transdev
Stores, Workshops and Maintenance Area															
Ground Floor Level		Stores Office Centrally located	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✓	✗
		Heavy Store (Infraco)		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Heavy store (Tramco)		✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Visitors Entrance Hall	n.a	✓	✓	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓
		Workshop Cleaners Room	n.a	✓	✓	✗	✗	✓	✗	✓	✗	✗	✓	✓	✗
		Light Store (Infraco)		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Light Store (Tramco)		✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Infrastructure Workshop		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Dirty Workshop / Machine Shop		✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Clean Workshop (Infraco)		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Clean workshop (Tramco)		✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Lobby	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Male Toilets	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Male Showers	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Female Toilets	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Female Showers	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Staff Corridor	n.a	✓	✓	✓	✗	✗	✓	✓	✗	✗	✗	✗	✗
		Infrastructure Admin	n.a	✓	✗	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Maintenance (Tramco) Admin	n.a	✗	✓	✗	✗	✗	✓	✓	✗	✗	✗	✓	✗
		First Aid	n.a	✓	✓	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓
		Switchroom		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Infrastructure Manager	n.a	✓	✗	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗
		Maintenance (Tramco) Manager	n.a	✗	✓	✗	✗	✗	✓	✓	✗	✗	✗	✓	✗
		Store Room (Cleaners?)	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗
		Staff Entrance Hall	n.a	✓	✓	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓
		Drying Room	n.a	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✓	✗
		Tram Batteries		✗	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Equipment Room		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		UPS Room		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Compressor Room - Air tools		✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
		Tram Maintenance Area		✗	✓	✓	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Maintenance Area Transit Zone		✓	✓	✓	✗	✓	✗	✓	✗	✗	✗	✓	✗
		Inspection Pits		✗	✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗
First Floor office accommodation			n.a	✗	✗	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓
Furnishings - Used, Cleaned, Maintained and Controlled as appropriate															
Chairs, Desks, Tables, Filing cabinets etc			As Appropriate	✗	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
Kitchen and Catering Equipment				✗	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
Reception Desk & Furnishings				✗	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
Control Room Furnishings				✗	✗	✓	✗	✗	✓	✓	✗	✓	✗	✗	✓
Lockers, Coat Rails etc				✗	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
Training Room furnishings (Projector, Screen etc)				✗	✗	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓
External															
Depot Yard				✗	✗	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓
Depot Stabling Area				✗	✗	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓
Electrical Sub Station				✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
Power Energy Building (Electric, Gas etc)				✓	✗	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗
Depot Car Park				✗	✗	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Miscellaneous																
Communication & Control links		N/A	N/A	N/A	✗	✗	✗	✗	✔	✗	✗	✗	✗	✗	✗	✔

LEGEND	
	Provided by Tram Maintainer
	Provided by the Infraco
✔	Responsible
✗	Not Responsible

Table 90 – Roads

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
Defects reporting CLARENCE, walking surveys, etc	Rail and rail containment	Infraco			Sharing of information between CEC & Infraco call centres. All part of the routine 28 day inspection, work arising dealt with below
	Tram Stops	Infraco			
	Overhead Line Equipment	Infraco			
	Tram duct access chambers	Infraco			
	Tram vehicle detection loops	Infraco	-	-	
	Non-tram vehicle detection loops	CEC	1 working hour		
	Temporary tram signs	CEC	28 days	-	
	Coloured/textured surfacing for tram	CEC	28 days	-	
	All other road related defects	CEC	28 days	-	
Defect repairs	Rail and rail containment	Infraco			
	Tram Stops	Infraco			
	Overhead Line Equipment	Infraco			
	Tram duct access chambers	Infraco			
	Tram vehicle detection loops	Infraco			
	Temporary tram signs	Infraco			
	Coloured/textured surfacing for tram	CEC		3 months	Resurfacing only to be undertaken when it is agreed that it is required.
	All other road related defects	CEC	-	Emergency* (7 days) Non Emergency (3 months)	* Likely to result in injury (CEC liability, conscious decision by CEC on timescale)
Signals	Tram detection loops and cable to the UTC controller	Infraco		1hr	
	Traffic and tram signal equipment	CEC		4hrs	24 hr response already contracted by CEC.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	Traffic detection	CEC		4hrs	
	CEC Traffic Control Centre	CEC		5mins	Telephone contact with CEC Control Centre except when this is unmanned when Tram control will be able to make a junction call themselves.
Lighting	On OLE poles	Infraco		* 2hr	Response required when 6 or more adjacent lights fail.
	Platforms	Infraco		* 1hr	Response required when 2 or more adjacent lights fail.
	Street Lighting	CEC		* 2hr	Response required when 6 or more adjacent lights fail.
	All other illuminated road signs and bollards	CEC		28 days	
Winter Maintenance	Roads	CEC		* 2hrs	
	Cycleways/footways	CEC		* 2hrs	
	Platforms on-street	CEC		* 2hrs	
	Platforms off-street	Infraco		* 2hrs	
Removal of obstructions	On road/footway including non-segregated tramway path, platforms and platform ramps	CEC		* 1hr	May involve Lothian and Borders Police
	On tramway (segregated sections)	CEC		*1hr	
	On platform (segregated sections)	CEC		*1hr	
CCTV	For roads	CEC		28 days	
	For tram	Infraco		2 days	

Table 91 – Roseburn Corridor

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
Defects reporting CLARENCE, walking surveys, etc	Cycleway/footway	CEC	28 days		
	Retaining walls	CEC	28 days		
	Lighting	CEC	28 days		
	Embankment/cutting and its vegetation	CEC	28 days		
	Kick-rail	Infraco			Demarcation between areas
	Fencing – between cycleway/footway and	Infraco			
	tramway - all other fencing	CEC			
	Noise Barriers	Infraco			If required and do not form a part of the perimeter fencing.
	Grass track	Infraco			
	Drainage	Infraco			
	Tram Stops	Infraco			
	Overhead Line Equipment	Infraco			
	Tram duct access chambers	Infraco			
	Tram vehicle detection loops	Infraco			
	Temporary tram signs	Infraco			
	Coloured/textured surfacing for tram	Infraco			
Defect repairs	Cycleway/footway	CEC		Emergency* (7 days) Non Emergency (3 months)	
	Retaining walls	CEC			
	Lighting	CEC			

	Embankment/cutting and its vegetation	CEC			
	Kick-rail	Infraco			
	Fencing	Infraco			
	Noise Barriers	Infraco			
	Grass track	Infraco			
	Drainage	Infraco			
	Tram Stops	Infraco			
	Overhead Line Equipment	Infraco			
	Tram duct access chambers	Infraco			
	Tram vehicle detection loops	Infraco			
	Temporary tram signs	Infraco			
	Coloured/textured surfacing for tram	Infraco			
Winter Maintenance	Cycleways/footways	CEC		* 2hrs	
	Platforms	Infraco		* 2hrs	
Removal of obstructions	On cycleway/footway	CEC		* 1hr	May involve Lothian and Borders Police
	On tramway and platform	Infraco		* 1hr	
CCTV	At Tramstops	Infraco		2 days	

Table 92 – Structures

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
Structures	S01 Roseburn Terrace Bridge Existing structure to carry trams and cycles	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance (see Definitions below). Existing deck to be removed by the Infraco and fascia to be incorporated within new structure. The existing abutments will be retained to support the embankments but will not support the new bridge deck. Inspection report available. No major defects noted that would present a future maintenance liability.
	S02 Coltbridge Viaduct Existing structure to carry trams and cycleway	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) and assessed. The existing structure will carry the proposed tramway with a new steel walkway attached to the western elevation. Any defects noted during the inspection will be rectified by the Infraco during the construction of the walkway and new deck slab.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S03 St George School Access Bridge Existing road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance (if CEC own it). Infraco will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides vehicular access over the proposed tramway.
	S04 St George School footbridge Existing footbridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance (if CEC own it). CEC to be responsible for polycarbonate sheets. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides pedestrian access over the proposed tramway.
	S05 Ravelston Dykes Bridge Existing bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. TEL will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides vehicular access over the proposed tramway.
	S06 Craigleith Drive Bridge Existing bridge to carry trams and cycles	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. The structure have been inspected (report is available) and assessed. The structure has capacity to carry the proposed tramway. No major defects were noted.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S07 Holiday Inn Access Bridge Existing road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides vehicular access over the proposed tramway.
	S08 Queensferry Road Bridge Existing road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides vehicular access over the proposed tramway.
	S09 Groathill road South Bridge Existing bridge to carry trams	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. The structure have been inspected (report is available) and assessed. The structure has capacity to carry the proposed tramway. No major defects were noted.
	S10 Telford Road Bridge Existing road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. Existing structure has been inspected (inspection report available) but no assessment has been undertaken as the structure provides vehicular access over the proposed tramway.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S11 Drylaw Drive Bridge Existing bridge to be demolished				Structure to be demolished by the Infraco.
	S12 Crewe Road Gardens Bridge Existing road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. Structure to be extended by the Infraco over the proposed tramway. No inspection or assessment has been undertaken. A full set of construction drawings for the structure were provided.
	S16 Victoria dock Entrance Bridge Existing bridge carrying to carry trams and general traffic	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. An inspection of the structure was undertaken (inspection report is available), however, no assessment has been undertaken to date.
	S17 Tower Place Bridge Existing bridge carrying to carry trams and general traffic	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance. An inspection of the structure was undertaken (inspection report is available), however, no assessment has been undertaken to date.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S18 Leith Walkway Railway Bridge Existing	Network Rail			The structure has been inspected and assessed (reports are available). The structure has capacity to carry the proposed tramway. The major defected noted during the inspection, leaking water main, has now been rectified. However, the next routine inspection should confirm that no adverse affects have occurred to the substructures.
	S19 Haymarket Station Viaduct New	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.
	S20 Russell Road Bridge New	Infraco			Infraco to be responsible for all maintenance.
	S21A Roseburn Street Bridge New	Infraco			Infraco to be responsible for all maintenance.
	S21B Murrayfield Stadium Retaining Wall New	Infraco			Infraco to be responsible for all maintenance.
	S21C Murrayfield Stadium Underpass New	Infraco			Infraco to be responsible for all maintenance.
	S21D Murrayfield Training Pitches R/W New	Infraco			Infraco to be responsible for all maintenance.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S21E Water of Leith Bridge New	Infraco			Infraco to be responsible for all maintenance.
	S22 Balgreen Road Bridge New	Infraco			Infraco to be responsible for all maintenance.
	S23 Carrick Knowe U/B New bridge carrying trams and cycles	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.
	S24 Saughton Road Bridge Existing WEBS bridge	Infraco			Infraco to be responsible for all maintenance. This structure was constructed as part of the WEBS project. Full construction drawings were supplied to ensure that the structure is integrated into the tram system without any modification. An assessment report confirming this is available.
	S25 Broomhouse Road Bridge Existing WEBS bridge	Infraco			Infraco to be responsible for all maintenance. This structure was constructed as part of the WEBS project. Full construction drawings were supplied to ensure that the structure is integrated into the tram system without any modification. An assessment report confirming this is available.
	S26 South Gyle Access Bridge New tram only bridge	Infraco			Infraco to be responsible for all maintenance.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	S27 Edinburgh Park Station Bridge New tram only bridge	Infraco			Infraco to be responsible for all maintenance.
	S28 A8 Underpass New	Infraco			Infraco to be responsible for all maintenance.
	S29 Gogar Burn Bridge New	Infraco			Infraco to be responsible for all maintenance.
	S30-31-34 Gogar Culverts New	Infraco			Infraco to be responsible for all maintenance.
	S32 Depot Access Bridge New road bridge over tram	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.
	S33 No longer required				
	W01 Lindsay Road Retaining Wall New	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.
	W02 Ferry Road Retaining Wall New	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.
	W03-04 Russell Road Retaining walls 1&2 New	Infraco			Infraco to be responsible for all maintenance.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	W08 Baird Drive Retaining wall New	Infraco			Infraco to be responsible for all maintenance.
	W09 Balgreen Road Retaining wall 1 New	Infraco			Infraco to be responsible for all maintenance.
	W11 Bankhead Drive Retaining. Wall New	Infraco			Infraco to be responsible for all maintenance.
	W14 & W15 Gogar Burn Retaining Walls New	Infraco			Infraco to be responsible for all maintenance.
	W16 A8 Retaining Wall New	Infraco			Infraco to be responsible for all maintenance.
	W17 Depot Internal Retaining Walls New	Infraco			Infraco to be responsible for all maintenance.
	W18 Murrayfield Tramstop Retaining Wall New	Infraco			Infraco to be responsible for all maintenance.
	W19 Gyle Stop Retaining Wall New	Infraco			Infraco to be responsible for all maintenance.

Task or Activity	Sub-heading	Maintenance Works to be undertaken by:	Frequency	Minimum Response Time	Comments
	W100 Roseburn Corridor Retaining. Structures New	CEC			CEC to be responsible for the ongoing structural maintenance. Infraco will be responsible for day-to-day maintenance.

Clarification of terms used in Tables 89 to 92 inclusive of the Employers Requirements.

Tram Stop:
Shall comprise: shelters, lighting, passenger information, platform and ramps including the paving, kerbing/cope and soft landscaping, drainage, cleansing and waste removal, seats, cycle racks (where these are directly associated with the tramstop, ticket machines and waste bins).

Rail and Rail Containment

Shall comprise: the rail and rail drainage (up to the point where this ties in to existing road drainage), and the structural elements that contain its permanent placement, and any associated road repairs where these are a consequence of the tramway maintenance. In the case of Roseburn Corridor it shall also include the grass track, up to and including the kick-rail and fencing separating the tramway from the cycleway/footpath.

Overhead Line Equipment

Shall comprise: the pole, the overhead power line and any necessary equipment to allow the permanent placement of the overhead power line.

Tram duct access chambers

Shall comprise: chamber/manholes and permanent covers to access points to the tram related duct access points along the route.

Temporary tram signs

Shall comprise: traffic signs, including temporary speed restriction signs, which are erected from time to time for limited periods over and above permanent tram signs.

Coloured/textured surfacing for tram

Shall comprise: specialist coloured and textured surfacing, including skid-resistant and edge demarcation surfacing, which is laid specifically for hazards directly associated with the tram track over and above that required for general traffic.

Grass Track

Shall comprise: the rail and rail drainage and the structural elements that contain its permanent placement, and any associated repairs, all within the boundaries defined by kick-rails and/or fence/retaining walls.

Structures

"Day-to-day" maintenance of structures will comprise cosmetic treatments including cleaning, the removal of graffiti and localised repairs of paintwork where this is required as a result of graffiti removal.

"Structural maintenance" of any structures will comprise renewal of waterproofing and associated road surfacings; repairs to brickwork, masonry, concrete or steel; repairs to facings and cladding; repair and/or replacement of bearings; repairing 3rd party damage; and any other maintenance activity not mentioned in the "day-to-day" activities above. Where this will require the removal of the rails or its containment is required prior to the structural maintenance then this will be undertaken in all instances by Infraco and reinstated upon completion of the works.

Where activities are the obligation of the Infraco or the Infraco's Sub-contractors, or the Infraco is supporting other parties' roads, structures and Roseburn Corridor obligations, Infraco shall ensure that such obligations are fulfilled, to ensure the safety of the Edinburgh Tram Network is not degraded and that the ability of Infraco, Tram Maintainer, **tie** and the Operator to achieve their objectives is not frustrated.

40.2.3 Maintenance Approach

The approach to maintenance of the Edinburgh Tram Network (**"ETN"**) shall be as follows:

- All day to day maintenance and inspection activities and planned life cycle renewals and refurbishments shall be planned, organised, undertaken and safely handed back to the Operator in an operational condition as required by the Infrastructure Maintenance Plan and the specifications (against which the ETN is built) and procedures;

- All activities carried out under the scope of the Infrastructure Maintenance Plan shall be the responsibility of the Infraco manager responsible for the maintenance obligations;

- All day to day maintenance, inspection activities and life-cycle replacement works shall be carried out in accordance with agreed procedures and method statements, in the knowledge of, and in liaison with, the Operator;

- Infraco will maintain system interfaces (e.g. Wheel / Rail or Pantograph / OLE), to the best effect for the ETN as a whole.

- Maintenance and life-cycle replacement works shall be classified as planned or unplanned activities arising from condition assessment which has been determined by planned inspection and testing;

- Unplanned maintenance activities shall include rapid response to unplanned equipment failure and damage from whatever cause, and shall be monitored in accordance with the fault rectification times. The approach to each of these categories will be different but there shall be two managers (the Tram Maintainer and the Infraco, with one to be designated as the lead manager) liaising with the Operator's engineering manager, who are responsible for undertaking works in their area of responsibility. These managers shall be able to call upon the services of contractors to carry out all or part of these works.

40.2.4 Maintenance Strategy

Preventative Maintenance

The Infraco shall schedule interventions such that all components that make up the infrastructure shall be subject to checks, repairs and conditioning treatments in order to maximise the asset and component lives, and in advance of critical tolerances being reached which would have affected operation, or have reduced their performance in the service for which they were designed.

Two types of preventative maintenance shall be undertaken:

- Systematic preventative maintenance that follows a predetermined schedule based upon time, usage and data gained through operational and maintenance experience such as:

  - Condition inspection and safety checks; for example, grooves for excessive wear, damage, or debris;

  - Cleaning of equipment and drains;

  - Functional tests to reveal faults; and

  - Adjustments to enable optimum operation.

- Conditional preventive maintenance including carrying out planned inspections to establish if the performance or operation of infrastructure sub systems are within pre-determined measurable parameters such as:

  - Vibration and noise levels ;

- Temperature thresholds in substation transformers etc.;
- Wear limits on rail, and wire height and stagger, etc.;
- Including non-destructive testing as appropriate; and
- Points operation times and geometric limits.

The Infraco shall take the necessary corrective maintenance action arising as a consequence of the conditions where these are out of tolerance.

Reactive and Fault Correction Maintenance

The Infraco shall repair or change damaged or faulty equipment, following the observation of any failures and/or the occurence of incidents. This involves two kinds of intervention:

- Breakdown in service requiring specific intervention shall be limited to re-establishing safe, robust and sound operating conditions. This shall require a specific intervention, to be carried out by Infraco staff within the limits of the equipment and operating rules and procedures agreed with the Operator and **tie**.
- Repairs: this covers interventions that shall be undertaken following incidents or failures that occur in operation, potentially involving a longer stoppage of equipment including overhauls of parts of a sub-system or section of the line. This is an intervention of lasting character, carried out by maintenance staff or contractors. After repair, if equipment has been replaced, then it shall conform to its original specifications or such alternative standards as agreed with **tie**; or in the event that the equipment is reconditioned then it shall conform with allowable tolerances.

Response times for reactive and fault correcting maintenance will be based on the potential impact of the incident or failure. A response to an incident is to be initiated within the time limits specified in Clause 52 of the Agreement. Fault Correction times are detailed in the table on the following page.

Table 93 - Fault Correction Requirements

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description
1	1 hour to attend and make safe and functional. 2 hours to Breakdown Intervention	2 hours to attend and make safe and functional. Rectified by 07:30	Critical issue such as Health & Safety risk, or failure halting the operation of the tram network in whole or part thereof, failure of major system
2	2 hours	3 hours	Failure impacting the punctuality of the tram network, or having potential to impact.
3	8 hours	9 hours	Failure or incident not having immediate impact on network operation, but impacting the quality of the Transport Services as monitored by the Edqual Service elements in Schedule 7 of this Agreement
4	1 week	1 week	Failure or incident not impacting network operation, nor quality of the Transport Services as monitored by the Edqual Service elements in Schedule 7 of this Agreement
Tramstop lighting Fault	2 days	2 days	
Tramstop telephone Fault	3 days	3 days	
Fault causing the lift at Murrayfield Tramstop or depot to be out of operation	6 hours	6 hours	

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description
Tramstop electronic passenger information display Fault	2 days	2 days	
Tramstop PA system Fault	24 hours	24 hours	
Tramstop CCTV Fault	2 days	2 days	
Defect, fault or other disrepair that restricts access to all or part of a Tramstop or otherwise interferes with its use	1 day	1 day	
Defect, fault or disrepair causing a trip hazard at an Tramstop (including unintended changes of floor levels or protrusions from the floor of more than 25mm)	24 hours	24 hours	
Defect degrading system access to	6 days	6 days	

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description
below DDA requirements			
Broken glass at a Tramstop or the depot	2 hours	2 hours to attend, make safe and functional. Rectified by 07:30	
Overflowing / damaged gutter at a Tramstop or the depot	24 hours	24 hours	
Structural defect, fault or other disrepair at a Tramstop or the depot	28 days	28 days	
Any other defect, fault or other disrepair at a Tramstop or the depot (including in relation to shelters, seats, canopies, signage, cycle parking, litter bins and poster cases) but excluding blocked	5 days	5 days	

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description
drains, overgrown vegetation and fencing faults.			
Blocked drain other than on a street running section of the Edinburgh Tram Network System	24 hours	24 hours	
Blocked drain on a street running section of the Edinburgh Tram Network System	2 hours	By 07:30 if notified between 22:01 and 05:30	
Overgrown vegetation	3 days	3 days	
Defect, fault or disrepair fencing such that access to the track or buildings and equipment is not prevented	6 hours	6 hours	
Defect, fault or disrepair in respect of a Monitoring Point or any other	24 hours	24 hours	

Fault category	Correction Time Limit Between 06:01-22:00	Correction Time Limit Between 22:01-06:00	Description
electronic monitoring equipment			
Structural defect, fault or disrepair other than at a Tramstop or the depot	28 days	28 days	
Any other defect, fault or disrepair other than at a Tramstop or the depot	2 days	2 days	

Note:

The foregoing table concentrates on elements not covered by the punctuality and qualitative criteria of the Performance Monitoring Regime set out in Schedule 6 to the Agreement.

The Infraco shall develop an electronic system for the management of reactive and faulting maintenance. The system shall be based upon the electronic Event Logger which will be situated in the Control Centre and shall enable the accurate analysis, reporting and logging of faults and other reactive maintenance requirements (including cleaning) including the time and date when they were reported and the time and date when they were cleared. Infraco shall manage all faults through to a satisfactory resolution and will provide a full record and audit trail including details of how the resolution was achieved and the time taken to achieve it. The full details of the system to be agreed with **tie** and shall form part of the asset management system as referred to in these Employer's Requirements.

Life Cycle Maintenance

The Infraco shall refurbish and replace elements of infrastructure before its performance deteriorates below the design, stated tolerances or equipment has become obsolete and/or is incurring disproportionately high maintenance costs as assessed by the Infraco and proposed to **tie**.

The initial lifecycle replacement plan will be based upon the manufacturer's stated design life, Infraco's previous experience, and assumptions on the impact of designed use.

Subsequent annual updates will take into account condition and reliability data gathered during the inspection, maintenance and operational use.

Further Maintenance Activities

In respect of the ETN, the Infraco shall in addition to preventive, life cycle and reactive maintenance undertake the:

- Removal of graffiti;
- Repair vandalism and accident damage; and
- Cleaning.

Repair of vandalism and accident damage and removal of graffiti will be undertaken by the Infraco and, where this is not caused by the Infraco or any of the Infraco Parties, the Infraco shall be entitled to payment for additional labour and material required in accordance with the Schedule of Agreed Prices.

40.2.5 Organisation, Training and Competency

Staffing Plan, Recruitment and Training Plan

The description of the Infraco organisation for all aspects of maintenance and all management and administrative support shall be set out in Infraco human resources plans (staffing plan and recruitment and training plan). These documents shall contain all details of:

- Organisational structure;
- Job descriptions and required competencies;
- Standard training courses;
- Compliance with all appropriate Law and regulations;
- and the procedures required to:
  - Recruit staff to fulfil the various employee roles and maintain the required establishment;
  - List the scope of items to be sub-contracted by the Infraco;
  - Monitor the performance and competency of maintenance staff whether direct labour or contractors; and
  - Secure and review the required competencies and associated training courses.

The maintenance documents submitted in draft form with the Infraco Proposals shall subsequently be developed and agreed with **tie** and Operator as part of the Infraco Works. This will include the identification of key staff. These documents shall be reviewed and updated when necessary, and at least annually.

It is to be expected that there will be an element of staff turn-over during the contract period. The Infraco shall include in the plan their process of ensuring quality is maintained and knowledge is managed and maintained. The proposed replacement of any key staff member of Infraco shall be notified to **tie** and to the Operator.

40.2.6 Quality, Health, Safety and Environmental

Health and Safety

For all matters relating to Health and Safety, Infraco shall produce and maintain a Safety Management Plan, which shall comply with the requirements of ISO18001 and be certified by an ISO approved body. The Safety Management Plan shall be reviewed and updated when necessary, and at least annually.

Environmental and Sustainability Management

For all matters relating to environmental and sustainability management Infraco shall produce an Environmental Management Plan. This shall set out the various environmental legal and regulatory requirements that Infraco shall comply with and the Infraco standards, processes and procedures that will enable compliance with such environmental, legal and regulatory requirements, to also meet its obligations under the various agreements to which it is a party, the **tie** Environmental and Sustainability policy and shall in all respects comply to the requirements of ISO 14001 and be certified by an ISO approved body.

The Environmental Management Plan shall be submitted to **tie** prior to completion of Section A on Site, and shall be reviewed and updated when necessary, and at least annually.

Quality

The Infraco HSQE Manager shall be responsible for providing a Quality Management Plan within the Quality Management System which shall comply with the requirements of ISO 9001 and be certified by an ISO approved body. The Quality Management Plan shall be available at least three months in advance of any maintenance activities commencing. The Infraco HSQE Manager shall be responsible for auditing and inspecting the requirements of all Infraco plans, processes and procedures.

The Quality Management Plan shall be submitted to **tie**, and shall be reviewed and updated when necessary, and at least annually.

Safety

The Infraco shall develop, to the satisfaction of **tie**, the Independent Competent Person as defined under the ROGs regulations, HMRI and other Approval Bodies, a generic safety management system for the commissioning and operation of the ETN that complies with the ROGs regulations.

The generic safety management system shall be capable of development to a full and final version prior to commencement of commissioning of the ETN.

The preliminary work on the safety management system will include the production of a safety justification framework document that will indicate the likely format and some of the detail of the eventual Case for Safety that the Operator, Infraco and Tram Maintainer will be required to present to, and gain approval from, the Competent Person as defined under the ROGs Regulations.

The framework document will be drafted in conjunction with the Operator and **tie** and in consultation with the Competent Person, as defined under the ROGs Regulations and other relevant Approval Bodies describing how system safety is achieved through system design supported by system maintenance and system operation. It shall embrace the following subject areas:

- Description of system design, maintenance and operation: Introductory section giving general description of the ETN, identification of safety responsibilities and reporting mechanisms;
- Arrangements during construction and initial access to the lines: organisation and management of working staff, safety, emergency arrangements, identification of staff, insurance, safety audit, arrangements for keeping and distributing records;
- Arrangements for testing and staff training: organisation and management of staff, safety arrangements including staff working on the tramway, emergency arrangements, identification of staff, insurance, fault analysis, safety audit, arrangements for keeping and distributing records;
- Infrastructure management: track, speed limits, public crossings (surface and bridges), fencing, Tramstop infrastructure, monitoring and reporting systems;
- Tram operation arrangements: operating arrangements including fitness and training of staff, certification of staff, tram preparation, defect repair and breakdown procedures and communications;
- Tramstop arrangements: access for contractors, control of access and vandalism and security;
- Tram maintenance arrangements: engineering and operational acceptance of tram vehicles, competence of staff engaged on maintenance, quality assurance, technical audit, monitoring, reporting of defects, procedure for imposing operating restrictions, acceptance of trams for the transport services;
- Infrastructure maintenance: inspection procedures, accreditation, control and monitoring, reporting procedures, emergency arrangements, communications, signage and warnings in the operating environment;
- Interfaces with other organisations: liaison with emergency services, HMRI and Roads authorities;

- Risk assessment: assessment of the risks associated with all aspects of the project operations including groups of people most at risk, severity of failure event and likelihood of event occurring;

- Health and safety policy: policy statement, monitoring arrangements, alcohol and drug policy including testing and disciplinary action; and

- Code of practice for working on or near the line;

- Control of safety critical work.

40.2.7 Liaison with tie and Other Parties on Maintenance Related Issues

Infraco Communications Plan

The Infraco shall create a Communications Plan (which shall be agreed with **tie** as part of the finalisation of the Infrastructure Maintenance Agreement) for all matters related to communications between the Infraco, the Operator, Tram Maintainer, **tie**, TEL, CEC and if required by **tie** other third parties.

A Communications Plan shall be submitted to **tie** prior to commencement on Site, and shall be reviewed and updated when necessary and at least annually.

The Infraco shall establish effective lines of communication with the Operator and **tie**, through the control centre and planning staff in order to plan maintenance activities around tram service requirements. The Infraco shall pay particular attention to communication in respect of the planning and undertaking of works having a direct impact on the operation of the ETN, the return to full service following completion of the maintenance and unplanned maintenance activities or repairs covering day to day operations and tie/third party long-term contractual matters.

The Infraco shall provide details of how effective lines of communication with the Operator and **tie** will be set up and maintained throughout the Term. This will include details of how key staff and expertise will be provided "on call" at all times to the Operator in the event of unforeseen breakdowns etc. Infraco shall after liasing with the Operator propose a process for system / equipment handover after the completion of maintenance activity to be agreed with **tie** and a programme of daily meetings to discuss punctuality performance (and associated deductions) and infrastructure availability.

The Communications Plan shall be aligned with that of the Operator and Tram Maintainer to ensure communication in critical areas, such as health and safety management, access arrangements for maintenance and response, and permits to work, are coordinated.

40.2.8 Reporting

Annual Review

Infraco shall prepare an annual review report, "The Annual Review Report". The content of the Annual Review Report shall be agreed with **tie** and address the following, as a minimum:

- Health and safety, environmental and quality annual performance reports and proposals for improvement;
- Annual report on planned, reactive and lifecycle maintenance activities carried out against programme, together with impact of shortfalls and proposals for recovery;
- Overall system performance, trends in condition or failures and recommendations based on learning though the process of delivering maintenance; and
- Summary and classification of complaints and significant events, together with actions taken / recommended.
- Recommendations based on learning though the process of delivering maintenance.

Infraco shall be responsible for arranging each year's Annual Review Meeting, to take place, as nearly as possible, twelve months after the previous year's Annual Review Meeting.

Infraco shall issue the meeting agenda and all required management reports and papers, as agreed with **tie**, no later than five working days in advance of each meeting.

Reporting period review

The reporting period review report shall include comprehensive details to cover as a minimum the following information for the relevant Reporting Period:

- Output from performance measurement system with associated performance deduction calculations as Schedule 7;
- Details of all events after associated with failures to provide Available Infrastructure and Available Trams;
- Health and safety, environmental and quality reports;

- Maintenance report showing progress against Annual Maintenance Plan and detailing the programme for the upcoming eight weeks, including;
    - A statement on planned maintenance, including cleaning, performance during the Reporting Period and any backlog;
    - Report on reactive and fault correcting maintenance, including cleaning, required during the Reporting Period, impact on Tram service, and any wider implications to the service and the Maintenance;
    - Any planned future works to be carried out within the eight week period, howsoever arising, which have the potential to disrupt the operation of the Edinburgh Tram Network service; and
    - Infrastructure condition, failures in the Period and mitigation undertaken in Period and with recommendations and actions to be taken, complaints and any significant events.

Infraco shall schedule the Four weekly Review Meetings no less than one month in advance of each meeting.

Infraco shall issue the meeting agenda and all required management reports and papers, as agreed with **tie**, later than five working days in advance of each meeting.

Records

Infraco shall maintain all records necessary for the effective delivery of the maintenance services. All records shall to be up to date within ten Business Days of the end of the relevant Reporting Period relating to the specific record. Records are to be the property of **tie**, access to the records will be afforded to **tie** within five days of a request being made. Records will be kept for the longer of the Term or 6 years from the day the maintenance service was performed.

The record details, including format, storage medium, recovery procedure, administration and access, are to be proposed within the draft Communication Plan, and discussed and agreed with **tie** in conjunction with the final Communications Plan.

The agreed method of communicating a request will be included within the Communications Plan.

40.2.9 Infrastructure Maintenance Plan - Overview

Infraco shall develop and deliver a Maintenance Plan that ensures that all the Infrastructure assets and equipment safely continue to meet their designed operational performance or specification, meet the availability targets identified within the Contract, and support the achievement of the performance regime.

40.2.10 Development of the Plan

An Infrastructure Maintenance Plan shall be developed by Infraco and submitted to **tie** prior to commencement of maintenance activities. This shall detail how maintenance will be delivered in response to the infrastructure maintenance requirements; where it is not possible to include elements of detail at the time, a development plan will be included, identifying exactly what information is outstanding, and when it will be provided.

The completed Infrastructure Maintenance Plan will be submitted by the date identified in the development plan and agreed with **tie**.

During the operational phase Infraco shall submit to **tie** an annual infrastructure maintenance plan for review and approval three months before the anniversary of the Service Commencement Date of the Edinburgh Tram Network or part thereof. The new plan will detail the planned and life cycle maintenance for the following year in order to provisionally approve planned works. The process of approval is to be agreed with **tie** during the tender stage.

Life Cycle Requirements

A Lifecycle Replacement Plan shall be included within the Infrastructure Maintenance Plan. This will detail all planned lifecycle replacement works over the Term.

The annual updates to the Infrastructure Maintenance Plan will include an updated Lifecycle Maintenance Plan detailing life cycle replacement works until the end of the maintenance period.

The planned maintenance strategy (including cyclical and life-cycle maintenance) should be such that the performance of the Edinburgh Tram Network should never fall below that of the designed operational performance or specification, within the Term.

Reactive Maintenance Requirements

The Infraco Maintenance Plan shall detail Infraco's assumptions on the volume and type of reactive maintenance likely to be experienced in the relevant period, and should detail how their resource planning has been prepared to respond to it.

Frequencies

The Infraco Maintenance Plan shall indicate the frequency and sequence to which maintenance will be undertaken; based upon statutory obligations, manufacturer's and best practice recommendations, Contractor's experience and operational performance and availability requirements.

Maintenance Codes

A standard Work Breakdown Structure, consistent with that defined for the construction phase, shall be established to identify maintenance tasks to various infrastructure sub-systems.

40.2.11 Tools

The Infraco shall maintain and replace as appropriate, a full set of tools sufficient for the maintenance of the ETN in good condition and calibrated where necessary.

40.2.12 Availability and Warranty

The availability requirement for the Edinburgh Tram Network is contained within the performance regime.

Lack of availability of key systems or the late running of trams due to failures which are the Infraco responsibility will give rise to the imposition of performance deductions from the fee payable under Schedule 6. Details of the performance regime are set out in the Schedule 6.

During any warranty period or extended warranty period associated with any part and during the Term (as set out in the Agreement), a robust process shall be in place to manage the return and replacement of parts thus contributing to optimal operational service, whilst optimising the management of warranty claims under the Agreement.

40.2.13 Asset Management System

An integrated asset maintenance management and recording system shall be provided and utilised by Infraco in order for data obtained from the tram and infrastructure sub-systems or other sources to be collated and analysed. This will enable the Infraco to assess safety and performance issues and to facilitate modifications and changes, where necessary, to the maintenance plan and working practices including the asset management system itself.

A computerised asset management system shall be established, in a form to be agreed with **tie**, to facilitate maintenance of the assets and allow data obtained from the infrastructure sub-systems, trams or other sources to be collated and analysed. This will include development of an asset register.. This will enable technical staff to assess safety and performance issues and to facilitate modifications and changes, where necessary, to the maintenance plan and working practices.

In addition to recording all the assets as they arrive on site, the asset management system shall record against each discrete item provided with a serial number:

- Its date of registration;
- Its location(s), including transfers from one site or equipment to another;
- Its maintenance history, with references etc.;
- Its fault history;
- Its maintenance prognosis (when maintenance is next due etc.); and
- Overdue inspection / maintenance.

The functional details of the asset management system will be integrated with the hard copies of the suite of operation and maintenance manuals and comply with the requirements specification for an asset management system.

40.2.14 Work Instructions

Infraco shall verify that they and all sub-contractors have carried out the necessary planning to undertake all proposed maintenance activities in accordance with the Infrastructure Maintenance Plan and all necessary risk assessments, method statements and work instructions.

For each maintenance activity type, detailed work instructions will be broken down against equipment type and artisan skill set to facilitate planning of the work. Each work instruction will provide a step by step breakdown of the work involved including information about how any equipment to be worked on should be accessed and / or made safe.

40.2.15 Minimum Spare Parts Holdings

In order to cover all planned infrastructure maintenance and arising corrective maintenance, sufficient spares shall be held by the Infrastructure Maintainer throughout the duration of the Infrastructure Maintenance Agreement to ensure that delays in completing planned or corrective maintenance are not experienced due to parts unavailability.

Infraco will provide details of its planned spares holding within the Infrastructure Maintenance Plan.

The Infrastructure Maintainer shall be required to maintain, at all times, a minimum holding of certain spare parts. The schedule of minimum spare parts holding will be developed by **tie** and Infraco as part of the finalisation of the Infrastructure Maintenance Agreement. The level of minimum spare parts holding will also be reviewed every year to ensure that it is appropriate on the basis of operational experience and Infraco's ongoing requirements.

For the avoidance of doubt, the initial stock / holding of spares shall be provided as part of the initial capital expenditure by Infraco. The Infraco maintainer shall be responsible for the replacement of any spare part used and the stock / holding shall be maintained at the same level, subject to adjustments approved by **tie**, based upon experience, once the ETN is operational. Where repair is to be undertaken in-situ, information shall be provided of any special facilities or equipment required. Where equipment is to be returned to the original equipment manufacturer (or any other organisation) for repair, it shall be demonstrated that the holding is sufficient to allow for predicted turnaround times.

Wherever reasonably practicable and where cost efficient the Infrastructure Maintainer shall source as many consumable spare parts and as much repair work from approved local suppliers in the interests of cost efficiency and minimisation of lead times.

40.2.16 Maintenance Records

All maintenance work performed shall be logged for record, monitoring and audit purposes. This shall be recorded in a log book and in the asset management system.

40.2.17 Indicative Scope

Infraco shall develop their Infrastructure Maintenance Plan to include all fixed Infrastructure and mobile equipment under their responsibility; this includes, but is not limited to those identified in table below.

The maintenance of Infrastructure shall generally be based on the recommendations of the manufacturer or designer, and as set out in the operating and maintenance manual. Specific additional requirements are listed in the second column.

Table 94 - Infrastructure Maintenance Plan Scope

System, Element or Service	tie Specific Requirements
Overhead Line Electrification	
Control and Communications Systems	The common failure reporting of the SCADA system, the log files of computers and the recording devices shall be used for the detection of failures in addition to fault reports provided by the Operator. As the Closed Circuit Television (CCTV) and the Public Address System (PA) at the Tramstops and in the depot area are crucial for the security of the site, their proper functioning shall be monitored. CCTV cameras need to be cleaned regularly and recording media made available. Quick repair of any faulty or damaged CCTV equipment shall be conducted to maintain Tramstop security. It is equally essential that the information given over the PA system be clear and audible, taking into account ambient noise level at Tramstops.
Power Supplies and Sub-Stations	
Tramstops	Regular maintenance is essential to ensure that features, which were designed to prevent crime and improve the environment, do not deteriorate and present opportunities for crime and raise fears for personal security. It is also crucial to ensure that Help Points are clearly signed and well lit so that their location is clear to passengers on the Tramstop. Therefore, the quick repair of faulty or damaged equipment is essential.
Pest Control	Special planned maintenance shall be considered for vermin

System, Element or Service	tie Specific Requirements
	control, pigeon shoots and the removal/ cleaning of birds' droppings and nests. These activities shall be scheduled as required and every six months intervals maximum throughout the ETN.
Depot Building and Yard	Special planned maintenance shall be considered for vermin control, Pigeon shoots and the removal/cleaning of birds' droppings and nests. These activities shall be scheduled as necessary and every six months intervals maximum. Infraco will ensure that safe, secure, access and use of the facilities is not impeded by adverse weather conditions such as snow and ice.
Lighting for Depot Building, Depot Yard, Tramstops, P&R Site, Control Centre and Offices	
Track Work and Roads	
Landscaping	A landscape and vegetation plan shall be developed and adhered to by Infraco to summarise the responsibilities and frequency and scope of the management of trees on, or closely adjacent to, the System (see Third Party Agreements (Schedule 13) and the Code of Maintenance Practice).
Structures	Regular drain clearing
Internal Workshop Equipment	This equipment should be supplied to Infraco with the corresponding operating instructions, which also contain instructions for proper maintenance.
External Workshop Equipment	
Infraco Road Vehicles	Maintenance of vehicles shall be in line with best practice and legislative requirements

40.2.18 Cleaning Maintenance Plan

Within the Infrastructure Maintenance Plan Infraco shall include a cleaning plan which shall detail the cleaning schedule for all infrastructures and equipment for which Infraco have responsibility. In addition to scheduled cleaning, if required by **tie,** Infraco shall provide a reactive cleaning service to respond to specific incidents causing litter or hazards. Where this requires additional material or labour, the scope and costs shall be agreed in advance in writing in accordance with the Agreement.

40.2.19 Track and Infrastructure Cleaning

The Infraco shall ensure that all locations for which Infraco has responsibility are kept free of rubbish and litter. The locations shall be cleaned in accordance with the location categories defined in any Regulations made under the Environmental Protection Act 1990. These categories are:

- Category 1 Walkways linking to public rights of way or road;
- Category 9 Railway embankments in urban areas.

The complete ETN shall be litter picked once every six months on average with the area within the Tramstop being litter picked every month.

Infraco cleaning of Tramstops shall be limited to the following:

- CCTV cameras;
- Passenger Information Displays; and
- Public Address speakers.

40.2.20 Depot Building and Yard, Offices and Car Park

Infraco shall ensure that all locations for which Infraco has responsibility are kept free of rubbish and litter. The areas within the Depot shall be cleaned in accordance with the frequencies stipulated in the Infrastructure Maintenance Plan, but no less than the following:

- Toilets – once a day;
- Canteen areas – once a day;
- Offices – once a day;
- Corridors and communal areas – once a day;
- Workshop area – once a day; and
- Car Park and Depot Yard – once a week.

40.2.21 Cleaning Records

All cleaning work performed shall be logged for record, monitoring and audit purposes. This shall be recorded in a log book and in the CMS.

40.3 Tram Maintenance Strategy

40.3.1 Purpose

The purpose of this tram maintenance section is to describe how Infraco shall procure that Tram Maintainer shall meet its obligations under the Tram Maintenance Agreement and its obligations under the Operators safety justification document in respect of maintenance and all references to Tram Maintainer responsibilities in this section shall be read as Infraco responsibilities and the Infraco shall have overall responsibility for the compliance. This includes the fleet of trams supplied under the Tram Supply Agreement and any relevant plant and equipment for which the Tram Maintainer is responsible. The final version of the Tram Maintenance Plan, to be developed by Tram Maintainer in response to these Employer's Requirements, will set out the specific objectives for the pre-operational period and the first twelve years of operation, following which this document may be reviewed. This Tram Maintenance section should be read in conjunction with the Tram Maintenance Agreement, and with such 'as-built' technical documentation and operation and maintenance manuals as shall be provided by the Tram Supplier.

The Tram Maintenance Plan shall be a fully controlled document. The Infraco shall procure that Tram Maintainer will take into account all mandatory requirements in force at the time of issue. It shall be updated annually allowing a three month review period to take cognisance of operational experience.

40.3.2 Scope

This Tram Maintenance section covers the maintenance activities for the following:

- Tram servicing & maintenance (planned activities);
- Tram repairs (unplanned activities); and
- Cleaning of the trams (primarily the responsibility of the Operator).

Where certain activities are the obligation of parties other than Tram Maintainer, the Tram Maintenance section will describe how the Tram Maintainer shall ensure that such maintenance obligations are fulfilled, so as to ensure the safety of the ETN, is not degraded and that the ability of the Operator to achieve its objectives is not frustrated.

Table 89 – Infrastructure and Equipment Responsibilities Allocation Matrix and Table 83 - Depot Plant and Equipment to be Provided identifies the scope for which the Tram Maintainer is responsible.

Overall Objectives

The overriding objective is to operate a safe, reliable, punctual, clean, easily accessible, comfortable, and environmentally friendly transport service which meets **tie**'s expectations.

The Tram Maintenance Plan will be developed to deliver this objective by:

- Co-operation with Infraco to achieve the aims of the Tram Maintenance Agreement;
- Meeting the specific requirements under the Tram Maintenance Agreement, particularly the defined performance standards in respect of tram availability and reliability;
- Diligent management of subcontractors to ensure they fulfil the requirements of their subcontracts;
- Adherence to the relevant Operations and Maintenance Manuals;
- Setting up and adherence to schedules and programmes for all planned work;
- Co-operation with interfacing parties and in particular the support of any obligations they have under a 'Safety Case', 'Safety Management System' or Legislation;
- Awareness of, and compliance with, legislation, statutes, regulations, and standards governing the operation of the Tramway and any changes thereto. (This will include reviews to identify any necessary changes to any established operating procedures for Phases 1a and 1b); and
- Establishing and maintaining lines of communication with all interfacing and affected parties by means of scheduled meetings, public meetings and consultation. Each year the Tram Maintainer shall undertake programmes to improve the safety, performance, and delivery of the Tram service. These programmes shall be developed in the form of a performance improvement plan which shall be included in future issues of the Operations and/or Tram Maintenance Plan.

Maintenance Approach

The approach to maintenance of the Trams shall be as follows:

- All day to day maintenance and inspection activities and any "special works" are to be planned, organised, carried out and safely handed back to an operational status under the requirements of this Tram Maintenance section and Infraco and/or Operator procedures and regulations;

- All activities carried out under the control of the Tram maintenance plan are the responsibility of a named Tram Maintainer manager (or his named deputy) responsible for the maintenance obligation;

- Maintenance activities are classified as planned, or unplanned arising from condition determined from planned inspection and testing;

- The approach to each of these classifications will be different but essentially there will be two managers (Tram Maintainer and Infraco) liaising with the Operator's Engineering Manager, for carrying out the works in their area of responsibility with Infraco having overall responsibility. Subject to prior approval, these managers may call upon the services of approved sub-contractors to carry out some of these works; and

- Tram maintenance staff will have been trained to drive the Trams within the Depot and will do so when Operator drivers are unavailable to do so.

- The Tram Maintainer shall minimise the operational downtime of the tram vehicles or any other equipment under its control for maintenance.

Table 95 - Maintenance Plan

Maintenance Activity	Planned Frequency	Responsible Manager	Contracted out to External Supplier – Tenderer to complete
Inspection of Trams	Yes See Appendix 1	Tram Maintainer Manager	
Servicing of Trams	Yes See Appendix 1	Tram Maintainer Manager	
Maintenance & overhaul of Trams	Yes See Appendix 1	Tram Maintainer Manager	
Cleaning of trams Sanding, consumable replenishment	Yes See Appendix 1	Operator	N/A
Repairs as required to trams to deliver the timetable (including	Unplanned	Tram Maintainer Manager	

accident damage and vandalism repairs)			

40.3.3 Organisation, Training, and Competency

Staffing Plan, Recruitment & Training Plan

The description of the Tram Maintainer organisation for all aspects of the operation, maintenance, and all management and administrative support of Phases 1a and 1b shall be set out in the Tram Maintainer human resources plans, staffing plan and recruitment and training plan. These documents will contain details of:

- Job descriptions and required competencies; and
- Standard training courses;
- and the procedures required to:
  - effectively recruit staff to fulfil the various employee roles;
  - monitor their performance; and
  - secure and review the required competencies and associated training courses.

These documents shall be agreed with **tie** as part of the finalisation of the Tram Maintenance Agreement.

40.3.4 Quality, Health, Safety, & Environment

Health and Safety

For all matters relating to health and safety the Tram Maintainer shall produce a Safety Management Plan which shall be agreed with **tie** as part of the finalisation of the Tram Maintenance Agreement. This Plan shall set out all relevant or appropriate regulatory requirements that the Tram Maintainer has to comply with, and the Tram Maintainer standards and procedures that it will have to develop to comply with legislation. The Plan will also meet the obligations under the Tram Maintenance Agreement. The Safety Management Plan must not prejudice the Operator safety case. The Tram Maintainer shall operate complaint to ISO 18001.

Environment

For all matters relating to environmental management, the Tram Maintainer shall produce an Environmental Management Plan which shall be agreed with **tie** as part of the finalisation of the Tram Maintenance Agreement. This Plan shall set out all relevant and appropriate regulatory requirements that the Tram Maintainer shall comply with, and the Tram Maintainer Standards and Procedures that it will have to develop to comply with legislation. The Plan will also meet the obligations under the various Agreements. The Tram Maintainer shall operate in compliance within EN14001.

Quality

The Tram Maintainer shall be responsible for quality in so far as implementing the requirements of the above two plans in respect of auditing and inspecting the requirement of all Tram Maintainer plans and procedures. The Tram Maintainer shall operate to and achieve accreditation to ISO 9002.

40.3.5 Liaison with Promoter & Other Parties on Maintenance Related Issues

Communications Plan

The Tram Maintainer shall create a Communications Plan (which shall be agreed with **tie** as part of the finalisation of the Tram Maintenance Agreement) for all matters related to communications within Infraco, the Operator, and all relevant third parties and stakeholders.

It is critical that the Tram Maintainer establishes effective lines of communication with the Operator, through their Control Centre, in order to plan the maintenance activities around service requirements. This specifically relates to the withdrawal of Trams for planned preventative maintenance and returning of Trams for service following completion of these activities and unplanned maintenance activities or repairs.

The Tram maintainer will provide details of how effective lines of communication with the Tram Operator will be set up and maintained throughout the period of the Tram Maintenance Agreement. This will include details of how key staff and expertise will be provided 'on-call' at all times to the Operator in the event of unforeseen tram breakdowns etc. It will also include a system for Tram handover after the completion of Tram Maintenance activity and a programme of daily meetings to discuss punctuality performance (and associated deductions), tram defect status and future Tram utilisation.

40.3.6 Tram Servicing and Maintenance Plan

Fleet Overview

The Tram fleet for Phases 1a and 1b will consist initially of 27 Trams, each capable of carrying about 250 passengers.

The Trams will be maintained at a new purpose-built depot.

40.3.7 Maintenance Plan Overview

All planned and preventative inspection and maintenance shall be carried out using a programme that shall be agreed annually between **tie** and Infraco. A balanced programme is required for this type of rolling stock, enabling the most efficient use of Tram downtime.

Maintenance schedules and examination job titles in this document have been drawn from general experience of similar vehicle types, and do not relate to any particular vehicle. It should be noted that all exams, sequences and frequencies mentioned are indicative at this stage, and will be reviewed once further fleet and maintenance contractor details are known.

Unplanned repair activities are not included in this Tram Maintenance section but shall be provided by the Tram Maintainer in terms specified in the Tram Maintenance Agreement.

40.3.8 Maintenance Strategy

Tram Planned Preventative Maintenance

There are two types of preventative maintenance which are to be carried out:

- Systematic preventative maintenance which follows a predetermined schedule such as:
  - Condition inspection and safety checks;
  - Cleaning of equipment;
  - Functional tests to reveal faults; and
  - Adjustments to enable optimum operation.

- Conditional preventative maintenance consists of carrying out regular inspections to determine that the performance, or operation of, Tram sub-systems remain within pre-determined measurable parameters, such as:
  - Vibration and noise levels;
  - Temperature threshold; motors and cooling circuits, etc.;
  - Wear threshold; wheel diameter, suspension heights/clearances, and pantograph height, etc.; and
  - Door operation times.

Tram Corrective Maintenance

This type of maintenance entails repairing or changing faulty equipment, through observation of failures. It involves three kinds of intervention:

- Breakdown in service requiring specific intervention. Immediate repairs are to be carried out rapidly to clear the line as quickly as possible. This activity is limited to re-establishing sound operating conditions and assisting the Operator to re-establish operational headways. Unless a repair can be rapidly undertaken to ensure safe, normal operation of the affected Tram for the remainder of the day, the affected Tram should be withdrawn from service and returned to the Depot where a more permanent repair, under controlled conditions, may be carried out.

- Repairs. This covers interventions carried out following incidents or failures that occur in operation, or identified from routine maintenance activity, generally involving a longer stoppage of equipment including overhauls of an entire Tram or major Tram component or operating system. This is an intervention of lasting character, carried out by maintenance staff (or approved sub-contractors). After repair, the Tram must conform to its original specifications.

- Whilst not strictly a breakdown, the Tram Maintainer shall also be required to assist with the recovery of any Tram derailment occurring on the line and carry out the appropriate re-railing technique, irrespective of the cause of the derailment. The Tram Maintainer will advise the Operator of the safe condition, or otherwise, when re-railing of the Tram has been completed.

Further Maintenance Operations

Preventive maintenance and corrective maintenance must be complemented by:

- Operations that contribute to the good image of public transport (appearance and comfort) such as removal of graffiti and re-applying freshening up paintwork, that cannot be achieved by the Operator through routine cleaning methods; and

- Checks on wheel condition (profile and flats).

The final version of the Tram Maintenance Plan shall include the proposed programme for all Tram preventative maintenance and further maintenance operations.

The periodicity/interval and duration or all planned preventative maintenance activities shall be specified in the final version of the Tram maintenance plan. It is anticipated that most intervals will be fixed-time intervals based upon calculated scheduled service distances, to be specified by the Tram Supplier. If any activities are specifically based upon a kilometreage based interval, which cannot readily be related to elapsed time, this should be made clear in the proposal.

The various examination types, based on their interval shall be categorised by code letter and the activities to be undertaken shall be fully detailed. The information should be summarised in the form of a matrix or star/dot chart where the breakdown of exam type is shown labelled on one axis and equipment or sub-system to be worked on is labelled on the other axis.

The Tram Maintainer will also create a list of standard repair times for items that are susceptible to damage or failure in service, such as replacement of glazing, lower front skirts, pantograph etc. Where possible, standard durations for repair and fixed prices for these repairs shall be established.

Maintenance Codes

A standard set of maintenance codes should be established to identify maintenance tasks to various Tram sub-systems:

The following standard set of codes is proposed (and are used in the Star Charts) and should be developed further as the details of the Tram design and recommended maintenance approach are understood:

Table 96 - Star Charts

Code	Area
A	Sanding System
B	Brakes
C	Bodywork
E	Battery and Control Systems
F	Radio and communications systems
G	Pantograph
H	Heating and Ventilation
I	Interior Trim and Fittings
M	Electrical Machines
O	Doors
P	Electrical Traction Power Equipment
T	Mechanical Transmission
U	Underframe and Bogies
Z	Emergency Equipment

Maintenance star charts setting out the indicative periodicities for maintenance activities shall be developed as part of the Maintenance Plan.

These star charts are to be developed in line with the finalisation of the Tram Maintenance Agreement and Tram Supplier's recommendations.

40.3.9 Availability and Warranty

The availability requirement for phases 1a and 1b of the ETN will be established in detail during the tendering process. Where possible, at peak periods and for special events, all trams should be made available.

Any lack of availability will give rise to the imposition of availability deductions from the fee payable under the Tram Maintenance Agreement. Details of the availability performance regime are set out in the Tram Maintenance Agreement. This also sets out the requirement for a 'hot spare' Tram and for Trams to be available for training purposes outside of peak hours.

During the Warranty and Extended Warranty period (as set out in the Tram Supply Agreement) a robust process must be in place to manage the return and replacement of parts thus ensuring optimal operational service, whilst optimising the management of warranty claims under the Tram Supply Agreement.

40.3.10 Technical Management

An integrated, computer-based maintenance management and recording system (CMS) should be utilised in order for data obtained from the maintenance of the Trams or other sources to be collated and analysed. This will enable the technical team to assess safety and performance issues and to facilitate modifications and changes, where necessary, to the Tram Maintenance Plan and working practices.

The CMS shall also provide a real-time configuration management control system of the Trams by recording serial numbers of all components on the Trams. This record shall also be updated whenever components are exchanged or replaced during maintenance or repair of the Trams.

The CMS will need to be capable of interfacing with Infraco and/or **tie**'s systems to facilitate remote access to maintenance management data.

40.3.11 Work Instructions

In order for Infraco to be able to verify that the Tram Maintainer has carried out the necessary planning to undertake all proposed preventative maintenance activities in accordance with the Tram Maintenance Plan, details of the work activities shall be submitted for information only.

For each exam type detailed work instructions will be broken down against equipment type and artisan skill-set to facilitate planning of the work. Each work instruction will provide a step-by-step breakdown of the work involved including information about how any equipment to be worked on should be accessed and/or removed from the Tram.

Each work instruction should, as a minimum, include details of:

- Health and safety precautions;
- Key skills and competencies required to undertake the work;
- Consumable components to be replaced;
- Special tooling (if any);

- Particular Depot facilities required; and
- Agreed time to complete the task.

40.3.12 Minimum Spare Parts Holdings

In order to cover all planned Tram Preventative Maintenance and arising Corrective Maintenance, sufficient spares shall be held by the Tram maintainer throughout the duration of the Tram Maintenance Agreement to ensure that a Tram is seldom unavailable for service due to parts unavailability.

Spares fall into the following categories:

- Consumables (brake pads, filters, bulbs etc.);
- Line Replaceable Units (repair on site);
- Line Replaceable Units (return to OEM for repair); and
- All other equipment.

The Tram Maintainer shall provide details of its planned spares holding and into which of each of the above categories each item falls.

In order to facilitate a seamless transition of Tram Maintenance services from one Tram Maintainer to another on the expiry or earlier termination of the Tram Maintenance Agreement, the Tram Maintainer shall be required to maintain, at all times, a minimum holding of certain spare parts. The schedule of minimum spare parts holding will be developed by **tie** and the Tram Maintainer as part of the finalisation of the Tram Maintenance Agreement. The level of minimum spare parts holding will also be reviewed after three years to ensure that it is appropriate on the basis of operational experience and Infraco's ongoing requirements.
Failure to maintain the minimum spare parts holding will give rise to an availability deduction being made in respect of the maintenance fee.

Where repair is to be undertaken on site, information shall be provided of any special facilities or equipment required. Where equipment is to be returned to the original equipment manufacturer (or any other organisation) for repair, it shall be demonstrated that the holding is sufficient to allow for predicted turnaround times. Estimated lead times for all other spares shall also be provided.

Where line replaceable units (LRUs) are exchanged as part of normal Tram preventative maintenance (to be brought up to optimum condition off the vehicle), the appropriate work

instruction should be explicit regarding this fact and should also state the approved time for exchange of such components. The spares holding of LRUs should be sufficient to cater for this method of working.

Wherever possible the Tram maintainer shall source as many consumable spare parts and as much repair work from approved local suppliers in the interests of cost efficiency and minimisation of lead times.

40.3.13 Cleaning Maintenance Plan

Tram Cleaning

Internal and external cleaning of Trams is the responsibility of the Operator. This will also include the removal of graffiti, except where this cannot be removed by normal cleaning methods or requires replacement of the panel(s) concerned. In such cases the panels will be replaced or made good by the Tram Maintainer. This shall also include the replacement of window glazing due to damage by etching.

The Tram Maintainer must ensure that adequate quantities of interior and exterior body panels, glazing and window sealing materials are kept in stock to meet this obligation.

40.4 Maintainability, Maintenance and Spares

40.4.1 General

An asset register shall be produced by the Infraco and the Tram Maintainer and populated by them with equipment data, serial numbers etc. The asset register shall be available prior to the commencement of delivery of equipment and materials. All spares, tools and test equipment which are delivered as part of the Works, shall be entered in the asset register.

Performance, reliability, fault / failure data shall be available that enables analysis of the Edinburgh Tram Network for product improvement.

Data shall be presented to maintenance staff such that potential causes of faults / failures are clearly identified.

Hardware components shall be easily accessible and not require specialist equipment for their removal or replacement.

Connectors shall be used which permit fast and easy disconnection and replacement of faulty / failed components and prevent dirt and moisture ingress and are suitably supported and specified for the operating environment in which they are used.

Maintenance regimes, component replacement programmes and spares holding levels shall be determined through fault tree, cause-consequence and Markov analysis, as appropriate, and ratified through the verification and validation process.

Spares that have potential long lead times, or minimum order quantities, shall be identified and adequate quantities held on site in order to achieve the performance requirements of the system including repair times.

The Edinburgh Tram Network shall be designed to facilitate inspection, repair, maintenance and fault finding without interruption to the ETN operations and performance.

Spares provided shall be sufficient to ensure the continuous operation of the system from the date of the Edinburgh Tram Network handover to **tie**. These spares shall include provision for damage and vandalism. The Edinburgh Tram Network design shall be underwritten such that all equipment / system suppliers shall warrant that all equipment in the design shall be available for the design lives specified and that they shall give **tie** a minimum of twelve months notice where after that period they intend to cease supply of that component.

Equipment housings / enclosures and their contents, e.g. racks etc. shall not exceed 2.0m in height unless specifically agreed by with **tie**.

The lowest mounting point, plug-in group or terminal block shall not be less than 0.4m above floor level unless specifically agreed by with **tie**.

Cables shall be clearly identified at each end of the cable connections by clearly visible and indelible labels. Related drawings shall describe the labelling conventions.

The maximum use shall be made of readily available and fully proven 'industry standard' materials and components. These shall remain readily available for the projected life of the Edinburgh Tram Network and which shall be supported in the market place on an ongoing basis.

Provision for handling the possible obsolescence of any of the components during the projected life of the ETN without degrading the ongoing performance of the Edinburgh Tram Network shall be individually addressed prior to supply/construction.

The detailed arrangements for the delivery, storage, management, and control of spare parts shall be agreed between the Infraco, the Tram Maintainer and the Operator as part of the arrangements for the ongoing operation and maintenance of the ETN.

In addition, Infraco shall procure that an adequate supply of consumables and spares shall be available to support the testing, commissioning and shadow running.

The Infraco / Tram Maintainer shall establish and maintain a log of all such consumables and spares used during this process and an updated copy shall be presented with each monthly progress report.
Where cables are to be provided, they shall contain sufficient slack to permit reasonable disturbance during maintenance.

40.4.2 Structures and Civil Engineering

As the bulk of these features will be static, the quantity of spares shall include those items that may suffer attrition as a result of accidents and vandalism such as signage, bollards, etc., and any special features bespoke to the ETN.

If not readily available, small quantities of special surfaces, e.g. tactile paving, etc., shall be stocked but it is anticipated that common wearing surfaces will be repaired using materials commonly available to the trade.

40.4.3 Track

In respect of track and ancillaries, the levels and numbers of spare holdings of major replacement elements, such as rails, sleepers, switch half-sets and full-sets, and crossings – 'standard' supply and more importantly of bespoke design – are considered to be of critical importance. At least one point machine, point indicator and hand operated mechanism shall be provided. Additionally, quantities of small parts and day-to-day maintenance items, together with special equipment such as buffer stops, are to be provided, based on instructions contained in the maintenance manual and on forecast component lives. In proposing the numbers of all spares holdings, the objective will be to ensure, as far as will be reasonably practicable, uninterrupted operation of the tram services.

40.4.4 Training

An indicative training plan for all parties involved in the maintenance and operation of the Edinburgh Tram Network System shall be produced and submitted to **tie** within six months of the Commencement Date. This shall be updated as required thereafter and as a minimum, be submitted to **tie** every eight months.

40.4.5 Infrastructure and Trams

Training and Competency

Staff training and competency assessments shall be carried out in accordance with best practice. The requirements of the ROGs regulations for safety critical work shall be observed.

Training Plan

An indicative training plan for all staff of the Edinburgh Tram Network System shall be produced within six months of the Commencement Date.

Both operating and maintenance training courses shall be provided for all of the items of supply associated with the Edinburgh Tram Network, including the operation and maintenance of all specialist plant and tools provided or required. All training materials and classes shall be in the English language.

The training may take place either at an individual contractor's premises or, locally on the tramway system or at other facilities to be agreed with the Operator/Maintainer and made available by the training supplier. All these arrangements shall be with the prior agreement of the Operator/Maintainer. "Maintainer" in this Section regarding Training in maintenance and operation means both Infraco and Tram Maintainer.

A training plan shall be provided for each group of trainees (i.e. Operator and Maintainer) covering all the items of supply. The plan will set out in a logical manner the order, duration, location and the content of the training to be given, the type (i.e. classroom, practical hands on) and the scope (i.e. operation, routine maintenance, first line repair, second line repair etc).

The Training Plan shall take due account of the Operator's proposed operational plan and the maintainer's proposed maintenance plan and any manufacturer's or otherwise recommended maintenance intervals for the scope of equipment supplied as well as all manufacturer's maintenance intervals for the equipment provided.

The Training Plans will clearly set out the course objectives. These will ensure that:

- All appropriate grades of operational and maintenance staff are able to perform, in a proper, effective and safe manner all necessary scheduled and reasonably foreseeable unscheduled tasks in order to functionally operate, maintain, fault find and safely restore in the shortest time in the event of any failure, the full functionality of the systems and equipment forming the Edinburgh Tram Network.

- All appropriate operational and maintenance staff are able to comprehend environmental and operational conditions, safety concepts and the health and safety requirements when carrying out their duties.

- All appropriate operational and maintenance staff are able to correctly interpret and make proper correct safe and effective use of all operational electronic data, displays and printed/written documentation presented to them in the course of their duties.

- The competence of all of the trainees shall be certified in a format that is compliant with all of the obligations placed on the employers of the trainees.

- The Training Plans shall clearly set out the level of testing of trainees, and how the certification of trainees will be achieved and documented. It shall also set out the method of participant feedback to be used following the completion of the training. Where appropriate, the testing and certification process will be split where appropriate to ensure competency on particular items of equipment, systems and methods.

- The training plans shall be agreed with **tie** and the operator prior to the commencement of the training.

Training Material

Infraco will provide, inter alia, the following training materials appropriate to the individual training session.

- Twelve sets of all training material and two sets of the Training plans and trainer's course material and notes, together with copy discs, drawings and artwork shall be provided to enable the Operator/ Maintainer to provide future training courses for himself when necessary.

- All training material, including master discs, drawings and artwork, will be updated within four months of the completion of the training on the basis of the formal feedback from attendees and the Operator/ Maintainer of 'lessons learnt' and from its practical application on the tramway on a routine basis and shall reflect all changes made to the system such that the system and training are fully aligned.

- In the event of any of the systems or equipment supplied and installed having to be modified or amended or the maintenance requirements for the same being revised within the Warranty period, the training material shall be revised and updated to reflect the changes to equipment, components or procedures that have become necessary.

Training Costs

All relevant costs, including travel and accommodation, associated with the effective training of the Operator/Maintainer's staff, on site or remote, shall be at the expense of the training provider, including materials, classrooms and instructors, but excluding the time cost for the trainees.

40.4.6 Maintenance Training

All relevant costs associated with the effective training of the Operator/Maintainer's staff, on site or remote, shall be at the expense of the training provider, including materials, classrooms and instructors, but excluding the time cost for the trainees.

Training courses and materials shall be provided in line with the Training Plans. These shall cover all operations necessary for the maintenance, repair and renewal of all the infrastructure and equipment forming the ETN systems throughout its life including items such as fault diagnosis, replacement and repair of equipment, software maintenance, system structure, integration and interfaces and hardware and software set-up.

The training shall include training on all the specialist tools and test equipment and software required to maintain and operate the system.

The training shall be structured as set out in the training plan to cover the basic theory, system operation overview, routine maintenance, first line fault rectification, second line fault rectification, renewals and software maintenance.

The training documentation shall include reference to manufacturer's documentation and also include all documentation, drawings, and technical data required to provide a single reference for the items covered by the training. The documentation will include fault identification and rectification process flow charts to assist maintenance personnel in identifying and rectifying faults. The initially recommended periodicity of inspections, tests and routine maintenance or rectification processes shall include 'pass' or 'fail' criteria. In the case of a 'failed' test, the appropriate course of action, with remedies for such inspections, tests and maintenance shall be detailed. Course documents, course content and notes shall be submitted for approval by **tie**.

Risk assessments shall be carried out on all of the proposed maintenance methods and where found to be appropriate safe systems of work shall be included within the training material and training. COSHH assessments will be carried out on all substances to be used in the training and proposed for the maintenance of the equipments. All such documentation shall be submitted to **tie** for approval.

Personal Protective Equipment for course attendees shall be provided, as appropriate, by Infraco.

Testing and certification of the attendees shall be carried out. Upon completion of the training on each section of the equipments and systems, all attendees shall be required to pass a written and practical test for evaluation and certification purposes by the trainer to confirm that personnel are competent to carry out all necessary tasks. The certification process and documentation shall be submitted to **tie**. The individual results and certification shall be fully documented and presented to **tie** and the Operator / Maintainer for their records.

40.4.7 Operational Training

Sufficient Operational Training Courses shall be provided in line with the Training Plan for all the various grades of the Operator/Maintainer's staff, to ensure that safe and proper operation of the system can be achieved throughout its life, commencing with the formal take-over of the ETN.

The training shall be structured as set out in the training plan to cover the operation of the ETN under all operating conditions, including normal running and working in the many degraded modes, and in the recovery from degraded modes.

The training shall include operator familiarisation and functional training in conjunction with the Factory and Site Acceptance Tests of the integrated system and Control Centre systems.

The training shall provide comprehensive hands-on training on the equipment and systems for all operational equipment including trams.

This shall include the simulation of a service and all associated equipments and failures.

The training shall include full details of the functionality of the tramway and control systems.

The training documentation shall include reference to manufacturers' documentation and also include all documentation, drawings, and technical data required to provide a single reference for the items covered by the training. The documentation shall include fault identification process flow charts to assist the Operator / Maintainer in identifying faults and to assist in the deployment of the correct maintenance personnel.

40.5 Information Procedures, Records and Manuals

40.5.1 General

All designers, suppliers, installers and maintainers of the Edinburgh Tram Network shall provide comprehensive documentation in support of their works. Such documentation shall be prepared in

accordance with the contractual requirements, Employer's Requirements and any other relevant documentation.

This information will be included in the form of the Project Health and Safety File. The file will be divided into Sections and Volumes in a manner to be agreed with **tie**. Each Section will be numbered in sequence and may comprise more than one volume. The volumes shall be identified by an integrated sequential numbering system.

40.5.2 Information

Information to be provided shall include, but shall not necessarily be limited to:

- Product literature;
- Design parameters, specifications, data and drawings;
- Product specifications;
- Illustrated parts lists;
- Product usage and examples of use service;
- Whole life cycle evidence and documentation;
- Maintenance and fault finding;
- Spares management, product storage and handling; and
- Health and Safety considerations and documentation.

40.5.3 Operation and Maintenance Manuals Information

Infraco shall produce for the Edinburgh Tram Network operating instructions for the system as a whole and for all individual sub-systems consolidated into an overall suite of bespoke Operations and Maintenance Manuals. This data shall be produced in hard copy form and shall also be available as an on-line database to operations and maintenance personnel.

The Edinburgh Tram Network shall have maintenance instructions for the system as a whole and for all individual sub-systems consolidated into an overall suite of Operations and Maintenance Manuals.

This data shall be produced in hard copy form and available as an on-line database available to maintenance personnel. The technical documents and manuals shall be compiled electronically in a universal format such as XTML.

Maintenance instructions shall be available in hard copy form and for download to remote/portable diagnostics terminals.

The Operations Manuals and Maintenance Manuals shall be comprehensively indexed and cross-referenced. They shall meet all requirements of an ISO 9000 Quality Plan, ISO 14000 Environmental Plan and ISO 18000 Health and Safety Plan. They shall take into account the relevant legal requirements and customary practices existing in Scotland. They shall be of a quality at least as good as that outlined in the SDS Maintenance Documentation Specification (reference number ULE90130-SW-SPN-00064).

They shall be prepared in accordance with a uniform approach, combining together the contributions from different contributors. They shall be consistent in terms of the page layout, indexing, language, tense, person and methodology of maintenance of each item of equipment on the system in a clear and concise manner.

The Maintenance Manuals shall include initial planned maintenance schedules and all inspection and maintenance frequencies. These frequencies shall include, but not necessarily be limited to, post commissioning, daily, weekly, specific and periodic inspection and procedural activities. All such activities shall be fully co-ordinated and integrated to minimise the frequency of visits and thus the possible disruption of the tram service.

The contributors shall update the manuals' information at periods considered appropriate to their equipment and/or installation supply throughout during the contracted period of maintenance and/or warranty agreement. Notwithstanding such interim updates, a full review and update will be undertaken at the end of such maintenance and/or warranty agreement. Such updating material shall be carried out and provided by the appropriate maintainer.

The master copy of the Manuals shall be held electronically and be accessible via the Internet using an appropriate access permission regime. The access arrangements shall record who accesses individual sections and when.

The information to be included in the manuals from the relevant subcontractors through the Infraco and Tram Maintainer shall include, but not be limited to the following:

- System Overview (including explanation of manuals content)

Landscaping Manuals, comprising:

- Area Descriptions;
- Inspection and Maintenance Manual; and
- Planting Stock Lists.

Structures Manuals, comprising:

- Structures descriptions, etc.;
- Inspection and maintenance manual; and
- Illustrated parts list.

Power supply Mmanuals, comprising:

- Equipment Description and Operation Manual (how the equipment works);
- Maintenance Manual (including inspection and day-to-day maintenance procedures);
- Overhaul Manual; and
- Illustrated Parts List.

Overhead Line, Manuals, comprising:

- Equipment Description and Operation Manual (how the equipment works);
- Inspection and Maintenance Manual (including erection procedures, etc.);
- Overhaul Manual; and
- Illustrated Parts List.

Permanent Way Manuals, comprising:

- Equipment Description and Operation Manual (how the equipment works);

- Inspection and Maintenance Manual;
- Overhaul Manual; and
- Illustrated Parts List.

Tramstops Manuals, comprising:

- Tramstop descriptions, Lighting, Seating, Signs, etc.;
- Inspection and Maintenance Manual; and
- Illustrated Parts List;
- Supervisory Control and Communications Systems Manuals, comprising:
- Equipment Description and Operation Manual;
- Inspection and Maintenance Manual; and
- Illustrated Parts List.

Tram Manuals, comprising:

- Information to be included in a Drivers Handbook;
- Equipment Description and Operation Manual;
- Maintenance Manual (including inspection and day-to-day maintenance procedures);
- Overhaul Manual (larger overhauls are unlikely to be carried out by **tie** and this will be required by their eventual overhaul contractor); and
- Illustrated Parts List.
- A full suite of vehicle design drawings.

Gogar Maintenance Depot Manuals, comprising:

- Description of Depot and its Equipment (including road and on-track maintenance vehicles);
- Maintenance Manual (covering all equipment including integrated equipment maintenance schedule) under the following headings:
  - Fixed equipment;
  - Mobile equipment;
  - Portable equipment; and
  - Hand tools.
- Illustrated Parts Lists for each of the above.

Central Control Centre Manuals, comprising:

- Operational Procedures (these may be included in System Operation manuals);
- Equipment Description and Operation Manual; and
- Illustrated Parts List.

Signalling, including:

- Equipment Description and Operation;
- Inspection and Maintenance Manual; and
- Illustrated Parts List.

40.5.4 Asset Register

The Operations and Maintenance Manual shall be linked to an Asset Register within the computerised Asset Management System that shall be provided by the Infraco . This shall be populated with actual equipment data, serial numbers etc. This asset register shall be capable of being linked to a graphical information system (GIS) and include as-built, maintenance and other drawings and records.

Performance, reliability, fault/failure data shall be included, presented and made available to enable analysis for product improvement.

40.5.5 Provisional List of Operating Procedures and Standards

A – Operating Procedures (To be developed in conjunction with the Operator)

1. Permit to work;
2. Power switching and isolation;
3. Switching and Safety Interlocking with Inspection Platforms in Depot;
4. Track Safety;
5. Issue and use of Personal Protection Equipment;
6. First Aid;
7. Communication with OCC (Trackside);
8. Communication with OCC (Tram);
9. Depot & Yard Tram Movements & Parking;
10. Use of Wheel Lathe;
11. Lifting & Safe Handling;
12. Recording of Maintenance & Repair in Infraco Records System;
13. Risk Assessments (Safety, and Environment);
14. COSHH Risk Assessments;
15. Preparation and Approval of Method statements;
16. Materials Procurement & Control;
17. Waste Disposal;
18. Evacuation of Depot;

19. Detailed maintenance procedures (as supplied by the Tram Maintainer & Infraco);

20. Monitoring the medical condition of employees;

B – Infraco Standards (to be developed by Infraco prior to Section A completion)

1. Tram (pantograph parameters, door parameters, wheel profile, suspension/coupler heights & clearances, brake parameters and wear limits);

2. Tram Driver routine preparation;

3. Tram Cleaning;

4. Tram related Noise and Vibration (To be developed in conjunction with the Tram Maintainer);

5. Tram clearances with Tramstops (To be developed in conjunction with the Tram Maintainer).

Part 2: Tram Maintenance Programme

These are comments from tie on the Maintenance Plan (TMA Schedule 2 Part 2) submitted on 9th November 2007:-

Introduction

It is not tie's intention to instruct CAF over the content of their Maintenance Plan, but once the contract is operating, CAF will need to seek approval from tie for their intended Plan for each coming year. The comments below are therefore purely suggestions and are based on common UK tram maintenance practice.

Maintenance Plan Comments

1. The proposed content for the daily tram Preparation inspection should be incorporated into the overall Maintenance Plan document
2. Within the tram preparation inspection – please explain what is the "Cab Terminal & Lamp Box"?
3. Tram Preparation inspection – suggest adding a passenger door function check (usually one door is checked at random each night)
4. Tram Preparation inspection – suggest the addition of an exterior condition check including a c check that all opening panels are securely closed
5. There is no Auto-Coupler fitted to the Edinburgh tram (therefore the first section of the Plan needs revision).
6. We suggest that the base IS exam periodicity is too short. 2 months between IS inspections would be normal once the trams have got over any bedding-in period
7. When the trams are new (perhaps first 3 months of operation, we suggest there is a more frequent visual inspection – perhaps every 5 to 7 days) to make sure all the new equipment is functioning properly frequency
8. Section 2.9.1 – tyre gauging not listed – suggest a 2-monthly periodicity
9. If the flange lubrication system is curve-sensing a check on its function is needed, perhaps every 3 months
10. UK practice is to ultrasonically test axles – suggest at 2/3 yearly periodicity. This is usually a bought-in service.
11. Suggest that a test of the emergency lighting operation is missing (linked to item 9.2 battery capacity test). Suggest emergency light left on to prove 1 hour capacity – test should be done every year
12. Suggest that a dynamic brake test is missing. The trams should have their actual braking performance tested on the move every year. (They should also each be tested from new though this may form part of the commissioning tests).

Maintenance Management System

There is certain functionality within the Maintenance Management System that we will require, namely:-

- automatic reminder to rolling stock team leader of any outstanding defects on a particular tram
- easy ability to show up repeating faults
- controls discouraging the use of non-accredited staff from carrying out safety critical work
- serial number tracking of key components including the setting up of parent-and-child component hierarchies (e.g. a wheel is part of a wheel-set assembly and that wheel-

set is part of a bogie – so that if the bogie is exchanged, all of the “child” components are changed with it).

- a defect audit trail which directly links an in-service failure with work done in the workshop and any material used, so that conclusive evidence exists to explain the cause(s) of the original fault.

TRAM MAINTENANCE SERVICES

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APPENDIX 1 – PROPOSED MAINTENANCE PLAN 26

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1. MAINTENANCE DOCUMENTATION

1.1. MAINTENANCE PLAN DEFINITION

The Maintenance Plan drawn up for the Edinburgh LRV Units is based both upon CAF's large experience as builder and maintainer of rolling stock and upon the latest technology applied in the design and production of the stock. This calls for stock maintenance and service requirements lower than those proposed for earlier generation vehicles for similar accomplished reliability rates. In addition, the mean life between failures of the equipment incorporated into the vehicles is improved.

The most important criteria observed for the choice of equipment making up these Units, in addition to those related to operation and functionality, have been as follows:

- Simplification of the maintenance tasks.
- Accessibility.
- Interchange ability.
- Reduced and less frequent tasks.
- Safety.
- Minimum environmental damage.

Therefore, as opposed to units belonging to earlier generations, the intervals between preventive maintenance events are lengthened in as much as possible and the amount of tasks is also reduced, all this being possible based on the experience gathered to date. Also, the overhaul and significant repair events shall not only be spaced out in time but thanks to the durability and low maintenance requirements of the equipment the work loads are reduced for the same availabilities. Also the LRU philosophy is adopted, this means that equipment modularisation is used as much as is possible to make their maintenance events independent from the rest of the unit and to make interchange ability simpler and more operative.

Therefore, the Maintenance Plan designed for the units is highly based on three types of operations:

- Regular checks, based on visual examinations, inspections, measurements, technical cleaning, checks and top-up of several levels of fluids, analysis of *software* installed on the train and the execution, if necessary, of operation tests on the equipment.
- Other checks more relevant than the above, are those where preventive maintenance criteria are applied to the most critical modules of the train. Each of these shall have the periodicity suggested by the manufacturer and

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the experience gathered. In general terms, this shall imply checking, verification, replacement of worn items, torquing, more comprehensive checks, bench tests and small dismantling and assembly work. These operations are comprised within the maintenance work described in the preceding item together with the modification and predictive maintenance events from the software installed. As the work involved in this type of maintenance depends directly on the operation of the train, the periodicity of the operations is a function of the mileage travelled and operating conditions.

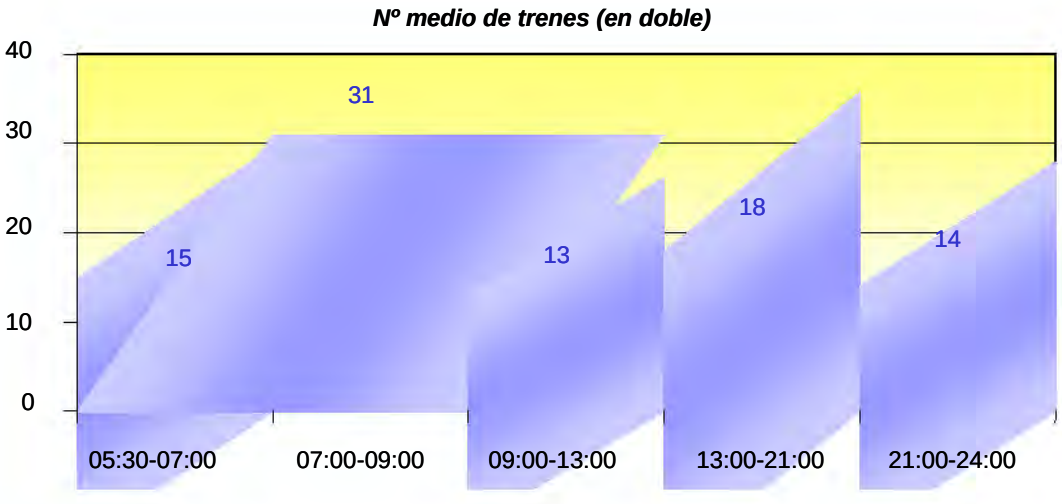
- Finally, the maintenance cycle is completed with the revision, dismantling, reconditioning and general assembly, which is determined by the wear and tear resulting of the prolonged use of the equipment. This type of operations include not only short cycle inspections such as those mentioned above but also repairs which entail the replacement of important units. These operations, by means of the technique of depot parts or modules turnover, optimise the down time periods of the trains and allow the trains to resume revenue service almost under the same initial conditions.

The several types of maintenance used by CAF shall be explained below. Maintenance Plan operations are classified according to the several maintenance types.

An example of Maintenance Planning – Local Train Network – RENFE (Madrid)

This planning model ensures that no maintenance operations are performed on Units during peak hours. The model has already being adopted by CAF for its maintenance operations and it forms an important part of CAF's operational strategy, generating some high availability rates.

An example of this method is shown below, indicating the real situation achieved by CAF for the maintenance of a fleet of trains pertaining to the local train network service. The operating diagram for the service in question is shown below (indicating the number of 6-car trains for each time slot)



Average Nº of trains (double)

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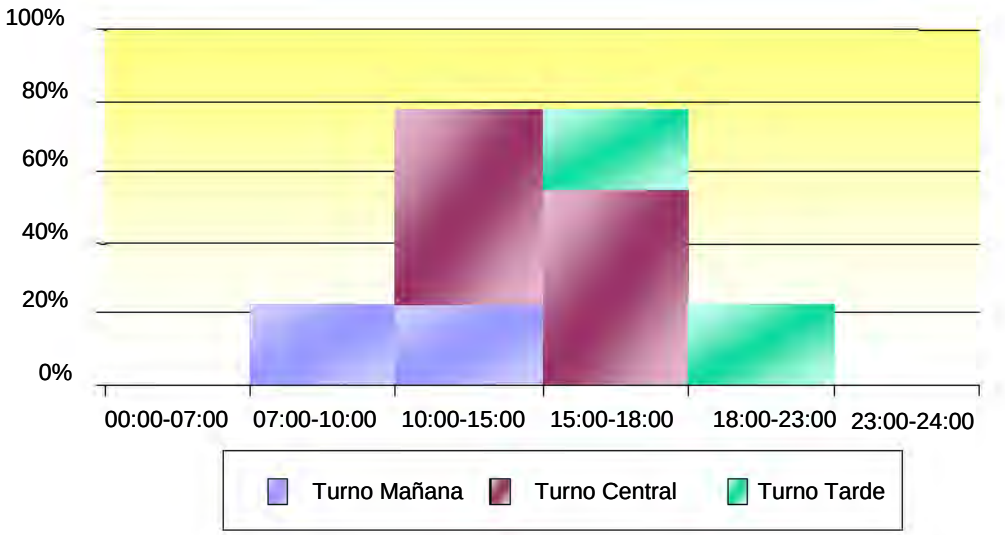
CAF has adapted its working hours in order to perform maintenance tasks during off-peak hours. In this way, the whole of the Customer's fleet is available for service during peak hours (100% availability). The medium and long cycle inspections are the only exceptions to this and these operations need to be co-ordinated with the customer beforehand as the out-of-service time is greater than the off-peak time interval. The following chart shows the direct personnel assigned to maintenance operations:



Morning shift *Central shift* *Afternoon shift*

There is also a small night guard duty shift (not shown on the graph).

Over the last few years, the availability figures achieved during peak morning hours, taking into account the fact that overhauls (major repairs performed at 1.200.000 kilometres and carried out by the Customer himself at his own workshops) are not included in this calculation, are as follows:

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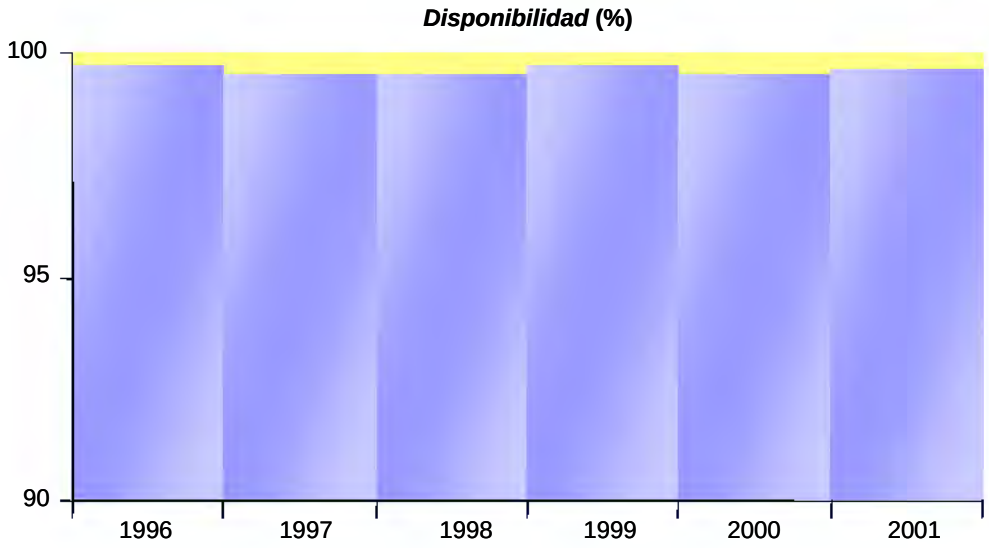
Availability %



1.2. PREVENTIVE MAINTENANCE

This type of maintenance aims at reducing the probability of failure in a system or equipment.

These maintenance operations shall be aimed at the reduction of the probability of failures in the vehicles. The following items shall be included:

1.2.1. Ordinary Maintenance (IS Visit)

This type of maintenance that was called "visit" by some railway operators, and it basically comprises one regular inspection in order to very that all items are in good condition. This is an ocular inspection in which, among others, the following checks are made:

- Check for broken, loose or deformed items.
- Check for faulty lighting
- General visual inspection of the vehicle.

Although this maintenance method main seem to be an easy procedure, it is paramount for safety, corporate image and comfort purposes.

In addition, this set of operations includes the functional checking of several equipment such as:

- Check of windscreen wipers and washer.
- Topping up of sanders if necessary. Verification of hoses and nozzle position.

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- Check of flange lubrication operation.
- Check of brake functionality.
- Exterior washing.

The optimum cycle of this type of maintenance differs from train to train, but they can be within one week and one month.

1.2.2. Systematic Preventive Maintenance (Revisions PV-P4)

It consists on the visits made according to an established mileage based schedule. The schedule includes all standard control, cleaning, adjusting and replacement maintenance events. Performing these operations does not depend on the component condition, but on mileage or time interval identified for the event in question.

1.2.3. Preventive Maintenance on Condition (Revisions PV-P4)

This is the maintenance according to the condition or status of items. It consists on performing the appropriate maintenance events based on the equipment condition once the pre-established revision schedules have been exceeded. The purpose of the method is to change an item before it fails, but not before it is actually necessary. It is not based upon "predictions" or suppositions based upon historical data. What it does is to analyse how each item performs at each moment, i.e. it is individualized for each item.

Under the name "Maintenance Based on Condition" there are different methods of applying the final philosophy of the method. The following provides a brief description of each method:

- Predictive maintenance:

  Via the monitoring of different parameters the performance of the parts is controlled. This allows the fault to be detected before it occurs allowing the full service life of the parts to be reached. This is very useful when the life of the parts cannot be effectively determined and/or when the costs of the fault and/or the recovery of the part are very high. This method tends to minimise the downtime necessary for maintenance. Typical examples of the application of this method are the analysis of vibrations in axle end bearings, analysis of oils in engines and/or gear-units, the thermal control of bearings, etc.

1.2.4. Predictive Preventive Maintenance (Revisions PV-P4)

It consists on performing the appropriate maintenance events based on the equipment condition following the analysis of the evolution of significant parameters such as:

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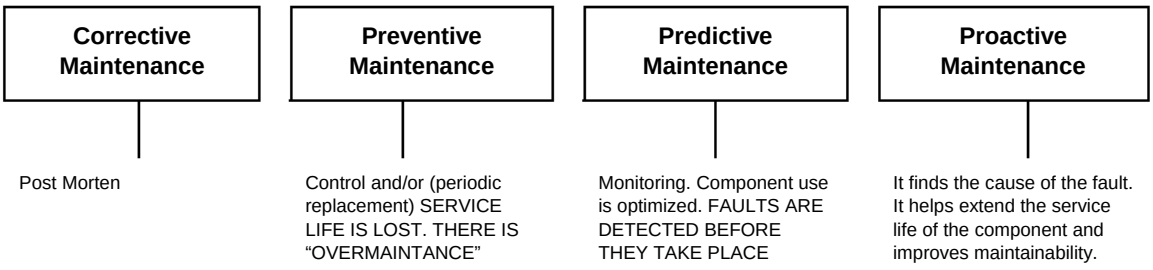
- Sampling analyses
- Individual measurements
- Visual controls (colour, thickness, etc.)

One of the preventive maintenance techniques which is currently used is the following:

- Proactive Maintenance:

  This is the next step to preventative maintenance. Analysis of the parameters must go beyond the early detection of faults: It searches for the cause of these faults and tries to correct them as well as finding ways of extending the service life of the parts and optimising their maintainability. This is an excellent tool which contributes to appropriate redesign and, the most important maintenance, pre-maintenance or design maintenance.



1.3. CORRECTIVE MAINTENANCE

This is based on component replacement following failure. 100% of the component service life is used but the failure occurs at any given moment and no prediction exists as to the failure moment. This is totally ruled out for safety items and other items where failure consequences are much higher in cost than the value of the component as such, as is the case of lubricants, where a failure can give rise to seizures due to lack of lubrication, damaged slip rings in motors due to lack of brush replacement, etc. Another very important factor is the loss of productivity or loss of revenue service until the component is repaired / replaced.

Current railway operation focuses on passenger safety and lack of train availability, or what is even worse, train service disruption, as the top priority factors to be considered. Another essential factor to be considered is assurance of maximum riding comfort.

Corrective maintenance comprises the following:

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1.3.1. Palliative Corrective Maintenance or Failure Repairs

This is a provisional maintenance event performed by the driving operator or by the person responsible for maintenance using the onboard resources and according to the railway operation rules. This maintenance mode allows for failure tracing on the line, with the sole purpose of preventing track obstruction for all other vehicles.

Following the service action, the vehicle can resume the journey in a degraded mode commensurate with the failure and with or without passengers.

1.3.2. Curative or Repair Maintenance

This is a conclusive service action which is performed by a person in charge of maintenance for the failed equipment or device. Following the repair, the vehicle must recover all its original characteristics.

1.4. SMALL VANDALISM

Injuries caused by vandalism in vehicle interiorism, windows and cleaning of interior paintings will have an exemption of 1.345 ₤ per unit per year, when this exemption is exceeded, Infraco/tie will carry with this costs.

In this cases, the maintainer will support the reparations with the resources needed.

1.5. ACCIDENT AND GREAT VANDALISM

They will be excluded, break of windscreens of the cabin, external paintings and circulation accidents.

In case Infraco/tie requires it, the maintainer will present an offer for the realization of the excluded works, indicated in the previous paragraph.

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2. FREQUENCY OF PREVENTIVE MAINTENANCE EVENTS

The time interval between two consecutive preventive maintenance events is variable and depend on the nature of the equipment to be maintained, and the number and the scope of the events are different in each revision.

The operations to be performed for preventive maintenance can be allocated to several days with different activities, and each one can be completed independently from the others. Thus, the customer has the equipment for operation during peak hours, and maintenance events take place only in off-peak hours, at night, on bank holidays etc. Operations that require more than one working day are divided such that one day bogies are checked, the following day the brakes etc. The unit is available at service peak hours and is checked at off-peak hours.

The Official Maintenance Plan shall include each maintenance specification from the manufacturers of the equipment or items incorporated in the vehicle. Based on said specifications, the scopes of the maintenance events and the appropriate applicable cycles shall be identified.

As a prelyminar edition, the following maintenance cycle is proposed:

REVISIONS							
REVISION	**IS**	**PV**	**P0**	**P1**	**P2**	**P3**	**P4**
Minimum	13 days	8.000 km	15.000 km	70.000 km	305.000 km	610.000 km	1.220.000 km
Medium	18 days	10.000 km	20.000 km	80.000 km	320.000 km	640.000 km	1.280.000 km
Maximum	23 days	12.000 km	25.000 km	90.000 km	335.000 km	670.000 km	1.340.000 km

Table 1: "Revision frequency"

The schedule assumes the yearly mileage of approximately 100.000 km/year/unit. If the yearly mileage differ greatly from the above figure, it shall be necessary to revise the frequencies of preventive events.

The complete maintenance plan proposed is presented in Appendix 1 – Maintenance Plan.

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3. MAINTENANCE PLAN IMPROVEMENT

After a previous test period, CAF is used to change the Initial Maintenance Plan in most of maintenance activities managed. The earlier months of work are used to study the possible failures and the necessities of the previous Plan, and then it's improved progressively by means of a logic evolution, for the aim of minimising the total maintenance cost and optimising the trains availability.

This improved Plan has to be agreed with the Customer and the main suppliers (engine, HVAC, etc.), and the necessary information and criteria will be given to the Customer, for being able to judge CAF proposal for optimising the Maintenance Plan.

Following paragraphs are to explain briefly the way CAF is used to manage maintenance works, and the way the Maintenance Plan is improved.

The improved maintenance plan will be based on CAF's vast experience as constructor and maintainer of rolling stock and on the modern technology set up for designing and building rolling stock.

Thus, in comparison to old maintenance philosophies, preventive maintenance work is spaced out as much as possible while being improved in quality. Moreover the old operations of protracted downtime disappear. The so-called overhauls and major repairs are replaced by lighter work, which is not only more spaced-out in time but less workload demanding.

The philosophy of LRUs (Line Replaceable Units) is also adopted as much as possible, i.e., the use of modules for as much assets as possible to make its training and repairing operations independent of the rest of the unit.

Some real examples of maintenance improvement got by CAF are available for Customer. Here it's shown an example of maintenance cycle extension, from the Móstoles Maintenance Workshop, in Spain, where RENFE (Spanish Railways) Commuter EMUs are being maintained by CAF, getting very profitable results. At the beginning of the undertaking of this maintenance, executed operations number was twice the nowadays number, so half of costs are being saved.

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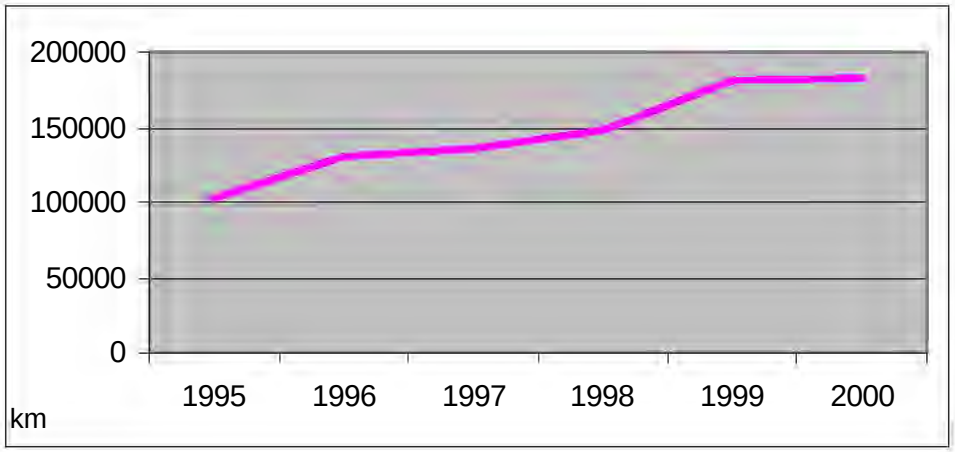
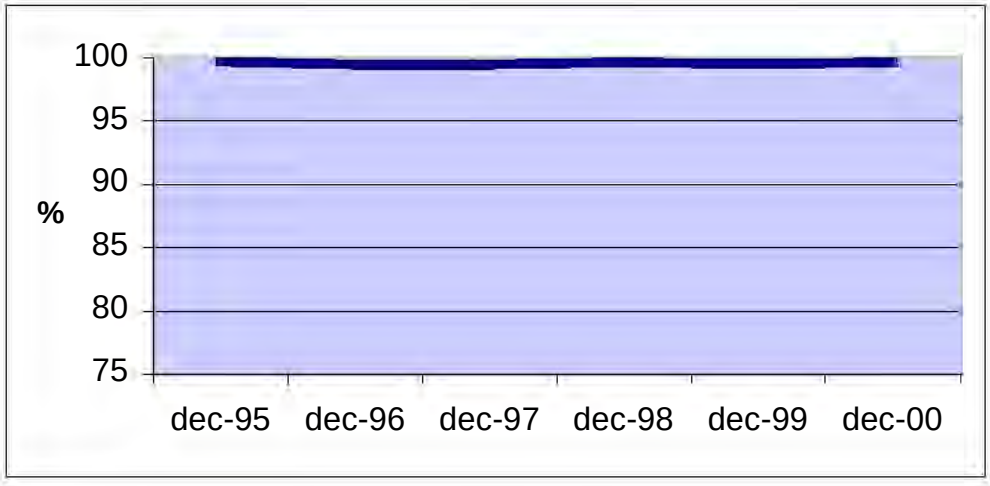
Reliability
(Mean Kilometres Between Failures, MKBF)



MKBF (year 2000) = 182 226 km.
Reliability improvement (years 1995 to 2000) = 78%
(*) Incidence: 5 or more minutes delay

Kilometres Between Incidences (5 minutes), years 1995 to 2000					
1995	1996	1997	1998	1999	2000
102 613	130 513	135 450	147 809	181 999	182 226

Peak Hour Availability



Availability (Dec. 2000, peak hour) = 99.66 %
Contract Requirements= 96.00 %

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Peak hour Avilability (overhauls not included)					
1995	1996	1997	1998	1999	2000
99.75%	99.49%	99.50%	99.70%	99.53%	99.66%

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4. COMPUTERIZATION OF MAINTENANCE

This involves the application of a tried and tested data processing system adopted by CAF (Computer Aided Maintenance) which allows the complete automated management of the Maintenance activity. On the one hand, it will ensure the mechanisation of the repetitive tasks and, on the other, easy handling of large amounts of data and their reduction to a suitable size that makes it possible for them to considered, discussed and analysed. In particular, it will fulfil four basic objectives:

- Saving of resources.
- Facilitating the work.
- Handling of large amounts of information.
- Adequate processing of this information.

In fact, the application of the Computer Aided Maintenance system will ensure:

- Improvement in the availability of the trains, by means of:
  - Rapid processing of the work orders.
  - Simulation-based planning aid.
  - Detection of recurring breakdowns.
  - Improvements in the co-operation of the disposition of stocks and personnel.
- Reduction of maintenance costs, by means of:
  - Reduction in the consumption of spare parts.
  - Identification of obsolescence of materials.
  - Optimisation of the replenishment and rationalisation of stores.
  - Optimisation of the capacities of the service, increase in efficiency.
  - Reduction of indirect workforce.
  - Analysis of profitability.
- Control of the results:
  - Analysis of the effectiveness of maintenance policies.

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  - Structured technical and financial record.
  - Reliability.
- Improvement of the service:
  - Flexible adaptation to the production demands.
  - Coordination of efforts.
  - Reduction of administrative tasks.
- Systematisation of the work:
  - Simplification of the handling of information.
  - Simplification of the analysis.
  - Reliable and accessible information.

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4.1. TECHNICAL MONITORING OF VEHICLES

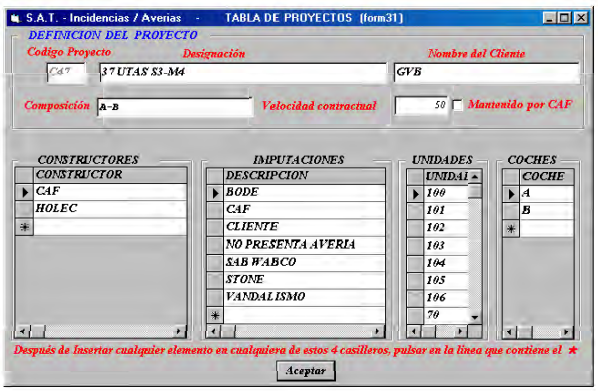
A computer system is available for the technical analysis of the functioning of the vehicles. Among other modules, it contains:

- Information about the current condition of the vehicles.
- Historical record of activities and costs.
- Modifications implemented.
- Consumption.
- Evolution of breakdowns.
- Evolution of quality parameters.

With the aim of achieving, by means of analysis:

- Reduction of breakdowns.
- Reduction of costs.
- Better planning of the workloads.
- Definition of preventative tasks.

The management of the information obtained through this system greatly facilitates the detection of areas in need of improvement, the balancing of tasks and the definition of the maintenance policy. Some examples of applications are shown below:





Project definition screen ***Breakdown recording screen***

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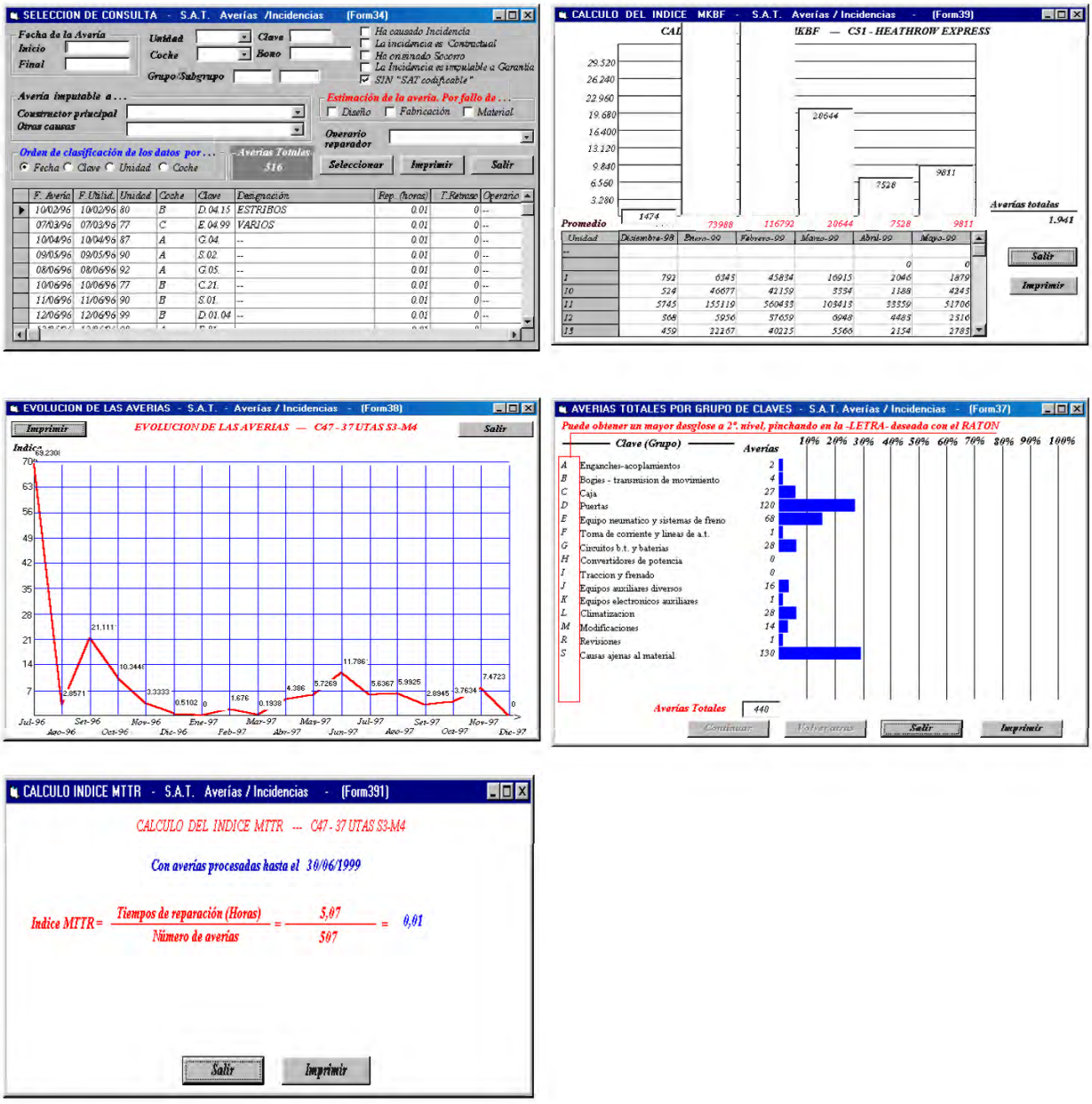

Consultation Selection Screens, MKBF (Mean Kilometres Between Failures), breakdown trends, ABC of breakdowns by functional groups and general calculation of MTTR (Mean Time To Recovery)

The software chosen by CAF for all its projects is the Prisma II ® system, a Windows-based system with a tried and tested track record of 10 years on various types of railway maintenance. This not only generates the information on site, including, personnel and material management and administration but also analyses breakdowns and provides maintenance parameters; it also draws up documents that are periodically handed over to the customer.

The operator will also have access to computer files and databases, including those files involving on-line safety criteria such as wheel profile measurements, etc.

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The Prisma II system is custom made for maintenance targets, centring on the reliability of the equipment, reduction of maintenance costs and ongoing improvement, all combined with a minimisation of indirect resources.

The functional aspects of the Prisma II system are those corresponding to each module making it up, which manage preventive, corrective and predictive maintenance. In particular these modules are:

Personnel module:

This includes all the necessary functions for controlling, identifying, deploying and evaluating both in-house and subcontracted human resources involved in maintenance work.

Workers are grouped by trade, category and team in the interest of improved monitoring. Types of working hours are defined, work is valued, organisation charts are obtained and availability determined for executing and timetabling of the work.

Material resources module:

This describes and groups the various non-human resources necessary for executing the maintenance tasks.

Contract module:

This serves for managing maintenance work contracted out, cross referenced with the equipment pool, while also controlling prices and tying in with orders and invoices, etc.

Assets module:

This describes and identifies with precision the fleet to be maintained, giving a description of its technology. It is tied in with the other modules, such as historical record, planning, structures, document management, production and timetabling.

Structures module:

Exploded and imploded drawings of structures with zoom, integrated with document management systems and connected to other modules.

Document management module:

This organises the whole list of plans and graphic diagrams for carrying out advanced maintenance.

Work order module:

This module serves for the creation of any necessary work orders, either manually or automatically. A study can be made of the whole historical record and plans referring to the element concerned. It is closely linked to the modules managing

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notices, fault diagnoses, stores, preventive maintenance, predictive maintenance and historical records.

Preventive maintenance module:

This module allows the user to see the current state of maintenance of all vehicles whether there are any outstanding defects and what is being planned to bring the unit to its correct maintenance state.

Advanced planning module:

This combines advanced planning aid programmes for the user with a simple procedure by means of graphics, on-line simulation of necessary resources, isolation of charges and setting of priorities in terms of maintenance functions to allow planning of resources to take place.

Store and spares module:

This has all the services necessary for managing a medium-sized store, with control of location and inventories, historical records by material, incoming and outgoing movements, stock taking, purchasing needs.

Purchasing module:

Custom made for maintenance tasks, with facilities for managing suppliers and their historical record, suggestions of orders and suppliers (in connection with work orders and stores), it carries out open orders, manages associated documents, monitors orders, suppliers and invoices, etc.

Historical record module:

The historical record is automatically generated and facilitates all types of enquiries and reports on the analysis of costs and their distribution, graphs showing trends in working times, downtimes, etc., by multiple criteria, analysis of maintenance response, historical records unit by unit, analysis of efficiency and performance of human resources, analysis of defects, etc.

Predictive maintenance module:

With manual data input or specific connection, it defines control and alarm points, monitors the trend of variables and analyses trends affecting the historical record, interacting with the modules of preventive maintenance and breakdown diagnosis, automatically adjusting scales and procedures to dates or proposing actions of another type.

Breakdown diagnosis module:

This module is directed towards analysis of breakdowns and their root cause and analysis of epidemic failures to allow the maintenance procedure to be rapidly

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changed to either in the short term compensate for the failures and in the long term to see if changed procedures can be made to eliminate the problem.

Ongoing improvement module:

This is geared towards the setting up of continual improvement systems by means of suggestions, and guarantees a simplified and detailed control of the trend of such systems, participation of personnel, etc., interrelated to work orders and maintenance tasks.

The computerised management of the maintenance tasks, as mentioned above, will allow the following:

- Improvement of availability, by means of:
  - Planning aid by simulation.
  - Detection of repetitive breakdowns.
  - Improved co-ordination in the disposition of stocks and personnel.
- Reduction of maintenance costs by means of:
  - Reduced consumption of spare parts.
  - Identification of material obsolescence.
  - Optimisation of replenishment and rationalisation of stores.
  - Optimisation of service capacities, increase in efficiency.
  - Reduction of indirect labour.
  - Analysis of profitability.
- Records:
  - Analysis of the efficiency of maintenance policies.
  - Structured technical and economic historical record.
  - Reliability.
- Service improvement:
  - Flexible adaptation to production needs.
  - Coordination of efforts.
- Reduction of administrative tasks:

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- Planning of work.
- Simplification of information handling.
- Simplification of analysis.
- Reliable, accessible information.

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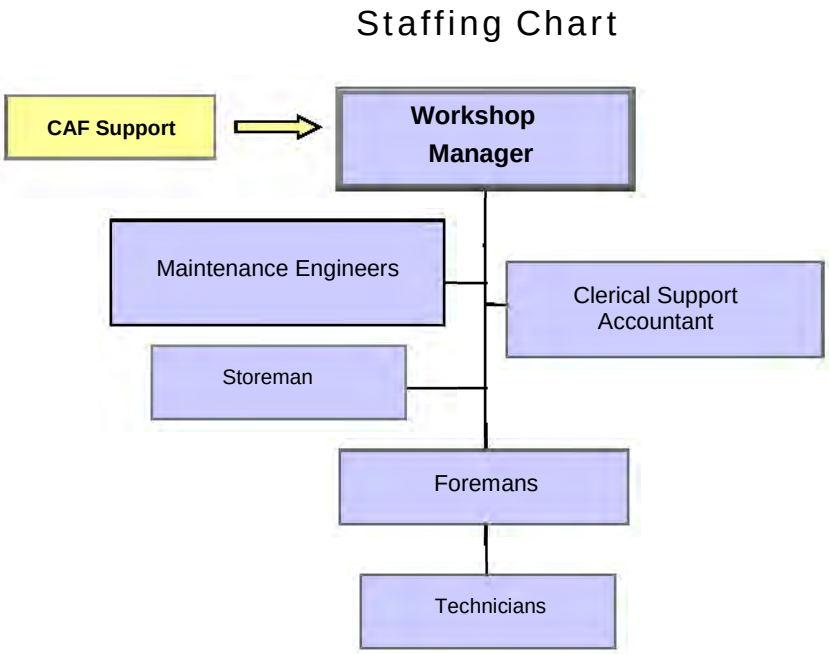
5. MAINTENANCE SUPPORT REQUIREMENTS

5.1. PERSONNEL

The following personnel structure has been envisaged, considering a single maintenance centre for maintenance operations:



This Chart includes the whole staff necessary to arrange the entire maintenance program.

5.2. PERSONNEL FUNCTIONS AND QUALIFICATION REQUIREMENTS

A short description of the maintenance personnel is made in this Section.

5.2.1. Workshop Manager.

Functions:

- Deciding and control the targets, let them to be reached.
- Assuring the rolling stock availability.
- Calculating the Workshop general budget.

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- Letting the service requirements to be reached.
- Managing the materials, economic and human resources in the workshop.
- Managing the investments for maintenance.
- Deciding training programs, and rewards and punishments for workers.
- Assuring the implantation of Quality and Environment Programs.
- Supervising the management of spares.

Professional skills:

- Engineer or economist.
- Rolling stock maintenance knowledge, and relationship skills.
- Rolling stock maintenance experience.

5.2.2. Maintenance Engineer

Functions:

- Guarantying equipment availability
- Establishing Maintenance and Cleaning Plans, reviewing them and suggesting improvements.
- Suggesting solutions for technical or human necessities.
- Programming the maintenance operations schedule.
- Implanting the computer systems for maintenance, and supervising their utilization.
- Asking for updating of trains technical documentation.
- Asking for updating of workshop technical documentation.
- Facing the structural staff of maintenance.
- Supervising spares managing.
- Supervising fault analysis.
- Supervising components and dismounted equipment reparation.
- Writing and updating reliability, availability, maintainability and safety reports, and other reports asked for the Operator.

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- Supervising of units faults, inspections and operations.
- Supervising and helping to implant the Quality Assurance Plan procedures.
- Supervising and helping to implant the Environmental Protection Plan procedures.
- Deciding and supervising receiving, storing and packaging criteria.
- Suggesting personnel changes, awards, punishments and training.
- Supervising cleaning works.

Professional skills:

- Electrical, electronic and/or mechanical engineer.
- Technical knowledge on railways, maintenance and computers.
- Experience in rolling stock maintenance.

5.2.3. Clerical Support Staff.

Functions:

- Personnel managing.
- Logistics responsible.
- Facing suppliers.
- Controlling of investments.
- Responsible of factoring and financial or administrative matters.
- Supervising the computer system.

Professional skills:

- Clerks.
- Experience with maintenance work control.

5.2.4. Chiefs - Foreman

Functions

- Supervision, management and control of the work performed by the different technical teams carrying out the Preventive Maintenance operations, making particularly sure that the Inspection Programmes envisaged are in fact carried

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out, planning and resolving with sufficient time any reduction in the resources assigned to these tasks.

- Mediation between the technicians and the Head of the Maintenance Service.
- Ensure compliance with the Health and Safety Regulations and Occupational Risk Prevention Regulations.

Professional profile

- Vocational Training FP-II or higher
- Technical knowledge of railways.
-

5.2.5. Technicians.

Functions:

- Carrying out the scheduled inspections and operations.
- Keeping the safety rules.
- Informing the results of the inspections and operations.
- Collaborating with quality requirements.
- Suggesting training necessities.
- Polyvalence with pneumatic and mechanical knowledge.

Professional skills:

- Skilled technician.
- Railway technician knowledge.

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APPENDIX 1 – PROPOSED MAINTENANCE PLAN

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PRELIMINARY DAILY TRAM PREPARATION	
PARTS TO BE VISITED	**OPERATIONS TO BE PERFORMED**
Cab terminal	
	Check lamp box and terminal incidents
Cab controls	
	Check the correct operation of the cab controls, buttons.
Cab	
	Check the correct operation of the windscreen wipers.
	Check cab lighting, themal magnetic switch panel and console.
	Create communication with the public via the PIS.
	Check the correct condition and adjustment of the driver seat.
	Check the correct operation of the Dead Man Device, handle movement.
Automatic start up	
	Execute automatic start up (autotest) for doors, brake, video surveillance, traction.
Saloon	
	Check the saloon lighting turns on.
	Check the correct condition of the saloon seats, panels and hatchdoors..
Pneumatic Compressor	
	Check the water tightness of the pneumatic system, ensuring that the compressor turns off in less than Xmin.
Exterior lighting	
	Turn on the saloon, exterior, position, cross, long beam, intermittent, brake, beacon, gauge lights.
Cab air conditioning	
	Activate the cab HVAC and check its operation.
Traction	
	Connect a circuit breaker and apply traction for a few metres to check that the unit brake is released and that the traction equipment is OK.

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
1	**COUPLER**							
1,1	**Automatic Coupler**							
	Verify that the automatic coupler height is correct relative to rail top.				x	x	x	x
	Verify the maximum shifting of the automatic coupler.				x	x	x	x
	Verify correct coupling/ uncoupling						x	x
	Lubricate automatic coupler.						x	x
	Paint automatic coupler.						x	x
	Complete disassembly of the coupler - Change internal dampers - Change silentblocks							x
	Complete assembly with operation test							x
1.1.1	Coupler head							
	Verify visually the correct condition of the coupler head and the main axis as well as its fixings.				x	x	x	x
	Verify the position and correct condition of the uncoupling handle				x	x	x	x
1.1.2	Intermediate eyelet tube							
	Check condition of the intermediate tube, the cylindrical shat and the complete eyelet.				x	x	x	x
	Verify that both caps and the set washer are in place.				x	x	x	x
	Verify the correct tightening of the intermediate tube and coupler head fixing screw.				x	x	x	x
1.1.3	Stowable support trestle assembly.							
	Verify the joint between the intermediate tube and the traction bar.				x	x	x	x
	Verify the correct condition of the drive arm, the support trestle and the stowing handle, as well as their fixing hardware.				x	x	x	x
	Verify correct condition and fixing of top and bottom half-flanges.				x	x	x	x
	Verify that the coupler stows correctly as well as stowing angles by using he stowing handle.				x	x	x	x
1.1.4	Latching device							
	Verify that all items are in optimum condition.				x	x	x	x
	Verify that all items are correctly tightened and that threats are sealed with LOCTITE.				x	x	x	x
	Verify the correct operation of the latch device pulling the roped handle.				x	x	x	x
	Verify correct condition and fixing of the P.A.t. cables.				x	x	x	x
1,2	**Mechanical coupling between vehicles**							
	Complete disassembly of the coupling - Change internal dampers - Change silentblocks							x
	Complete assembly with operation test							x
1.2.1	Top joint							
	Verify the correct tightening of the fixing screw on the motor and trailer vehicle.			x	x	x	x	x
	Verify correct condition of lubricators and that they are in position			x	x	x	x	x
	Verify that the top joint is correctly lubricated.			x	x	x	x	x
	Inspect for the correct condition of the safety ring. Otherwise, replace it.			x	x	x	x	x
	Lubricate top joint.						x	x
1.2.2	Turning crown							
	Verify the correct tightening of the fixing screw on the trailer vehicle.			x	x	x	x	x
	Verify the correct tightening of the fixing screw of the joint pieces on the exterior crown.			x	x	x	x	x
	Inspect for the correct condition of gaskets. Otherwise, replace or lubricate.			x	x	x	x	x
	Lubricate the turning crown.						x	x
	Verify that the balls are in optimum condition. Otherwise, completely top up the balls filling.						x	x
	Clean the ball rolling tracks, the greasing holes and the gasket surfaces.						x	x

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
	Replace the gaskets.						x	x
2	**BOGIE**							
2,1	**Motor bogie frame**							
	Visually check for cracks, fine cracks or deformation on structural items and welding beads. If necessary check by dye-penetrants.			x	x	x	x	x
	Verify by ultrasounds or magnetic particle inspection the condition of welding beads and spots CLASS B.						x	x
	Repair cracks of structural items and welding beads.						x	x
	Clean the motor bogie frame with pressurized steam and dry out with compressed air.					x	x	x
	Perform dimensional verification. Correct out of range dimensions by cool straightening or machining						x	x
	Paint the motor bogie frame.						x	x
2,2	**Carrying bogie frame**							
	Visually check for cracks, fine cracks or deformation on structural items and welding beads. If necessary check by dye-penetrants.			x	x	x	x	x
	Clean the carrying bogie frame with pressurized steam and dry out with compressed air.					x	x	x
	Repair cracks of structural items and welding beads.						x	x
	Verify by ultrasounds or electromagnetic particle inspection the condition of welding beads and spots CLASS B.						x	x
	Perform dimensional verification. Correct out of range dimensions by cool straightening or machining						x	x
	Paint the carrying bogie frame.						x	x
2,3	**Motor bogie**							
	Check the presence and correct condition of all fixing items for the headstocks.			x	x	x	x	x
	Visually check welds for cracks or deformation on headstock supports.				x	x	x	x
	Verify the fixing hardware tightening torque of headstock framing on brackets.				x	x	x	x
	Paint the headstock surface.						x	x
	Load the motor bogie on a press and verify heights.						x	x
	Verify the fixing hardware tightening torque of both headstock brackets on the motor bogie frame.				x	x	x	x
2.3.1	Bogie bolster							
	Verify by ultrasounds or magnetic particle inspection the condition of bogie bolster welding beads.						x	x
	Perform the dimensional verification of the bogie bolster.						x	x
	Paint the bogie bolster.						x	x
2.3.2	Guard-iron							
	Check for failures, cracks and deformation. Repair as necessary.			x	x	x	x	x
	Verify the tightening torque of the fixings of the motor bogie support on the axle-box. Tighten as necessary.				x	x	x	x
	Verify the tightening torque of each guard-iron mounts on the motor bogie supports. Tighten as necessary.				x	x	x	x
	Adjust the guard-iron and sand ejector pipes height.				x	x	x	x
	Paint the guard-irons.						x	x
2.3.3	Bogie electric installation							
	Verify that supports, clamps, fittings, hoses and fixing hardware are in place and in good condition.			x	x	x	x	x
2.3.4	Brake system hydraulic installation							
	Visually verify that flanges, clamps, joints, fittings, elbows, pipes, pressure taps and fixing hardware are in place and in good condition.			x	x	x	x	x
	Verify that joint fittings are secured correctly.			x	x	x	x	x
	Verify the brake system hydraulic circuit by applying 100 bar for 15 min. The head loss must be over or equal to 0.1 kg/cm2.			x	x	x	x	x
2.3.5	Installation of the flange lubrication system							
	Visually verify that all supports, clamps, joints, fittings, elbows, pipes and fixing hardware are in place and in good condition.			x	x	x	x	x
	Verify that joint fittings are secured correctly.			x	x	x	x	x

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
2,4	**Carrying bogie**							
	Load the carrying bogie on a press and verify heights.						x	x
2.4.1	Electric Installation							
	Verify that supports, clamps, fittings, hoses and fixing hardware are in place and in good condition.			x	x	x	x	x
2.4.2	Brake system hydraulic installation							
	Visually verify that flanges, clamps, joints, fittings, elbows, pipes, pressure taps and fixing hardware are in place and in good condition.			x	x	x	x	x
	Verify that joint fittings are secured correctly.			x	x	x	x	x
	Verify the brake system hydraulic circuit by applying 100 bar for 15 min. The head loss must be over or equal to 0.1 kg/cm2.			x	x	x	x	x
2,5	**Sanders and sand ejectors**							
	Check the sand level within the reservoirs. Top up as necessary.	x	x	x	x	x	x	x
	Visually check for indents or cracks or on sanders and sand ejectors.			x	x	x	x	x
	Verify that threats and automatic fittings do not leak. Replace as necessary.			x	x	x	x	x
	Clean all sand ejector parts.					x	x	x
	Verify that sealing, sliding and guiding surfaces show no wear. Otherwise, make good by grinding.					x	x	x
	Verify diameter sizes of all piping outlets.					x	x	x
	Verify diameter size of the calibrated flow diameter.					x	x	x
	Verify correct air spray through nozzles.					x	x	x
	Paint sanders and sand ejectors.					x	x	x
	Change hoses							x
2,6	**Axle-boxes**							
	Verify visually the correct condition of axle-box caps, fixing and check for grease leaks.			x	x	x	x	x
	Verify the distance between the slide protection sensor head and the phonic wheel (on axle-boxes fitted with sensor).				x	x	x	x
	Check cap fixing hardware tightening torque, brake disks, adaptors, resilient wheels, fixing bowls and cables.				x	x	x	x
	Clean axle-boxes.				x	x	x	x
	Check bearing temperature. Apply grease.					x	x	x
	Change bearings							x
	Verify that labyrinths are not damaged and check for grease built-up.				x	x	x	x
	Check the condition of the contact disk (on axle-boxes with earthing device). Clean contact surface.						x	x
	Change contact disk							x
	Check, and replace as necessary, the earthing brushes (on axle-boxes with earthing device).					x	x	x
	Change earthing brushes							x
	Clean particles and waste oil.					x	x	x
	Check for wear or deformation on the contact surfaces.					x	x	x
	Verify colour.					x	x	x
	Check wear height.					x	x	x
	Paint axle-boxes.						x	x
2,7	**Primary suspension**							
	Visually verify the correct condition of primary springs. Replace as necessary.			x	x	x	x	x
	Verify the fixing hardware tightening torque of primary springs on the bogie frame, for motor cars A and B.				x	x	x	x
	Verify the tightening torque of fixing hardware of primary springs on their support plate and of support plates on the bogie frame, for trailer cars C.				x	x	x	x
	Verification of heights and adjustment.						x	x
	Static horizontal loading test.						x	x
	Vertical loading test.						x	x
2,8	**Secondary suspension**							

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
	Degrease and clean by pressurized steam the secondary suspension assembly. Dry out with compressed air.			x	x	x	x	x
	Measure the vertical distance from the rail to the highest point of the bogie bolster for the motor bogie, and to the underframe for the carrying bogie. Adjust as necessary.				x	x	x	x
2.8.1	Stop nut assembly							
	Verify the correct condition of the stop nut assembly items, particularly check for failures and deformation.			x	x	x	x	x
	Measure the vertical stroke under tare of the top face of the stop nut and the bogie frame support. Adjust as necessary.				x	x	x	x
	Verify the tightening torque and tighten as necessary.					x	x	x
2.8.2	Lateral stops							
	Verify the correct condition of the fixing hardware and the resilient body of the lateral stops on the motor and carrying bogie. Check for spalling and wear.			x	x	x	x	x
	Measure the lateral stroke of the lateral stops relative to the bogie bolster support for the motor bogie or to the underframe for the carrying bogie. Adjust as necessary.				x	x	x	x
	Verify the tightening torque of auto-locking nuts and tighten as necessary.						x	x
	Verify the resiliency characteristics of the lateral stops.						x	x
	Change lateral stops							x
2.8.3	Springs							
	Verify the correct condition of all items, and specifically check for cracks or deformation.			x	x	x	x	x
	Verify the correct condition of elastic pads and specifically check for spalling and wear.			x	x	x	x	x
	Verify the correct condition of the vertical stop and fastening on the top support..			x	x	x	x	x
	Measure the vertical distance between the vertical stops and lower supports. Adjust as necessary.				x	x	x	x
	Paint the springs.						x	x
2.8.4	Transversal and vertical dampers							
	Verify the correct condition fixing hardware and resilient items.			x	x	x	x	x
	Check for damper deformation.			x	x	x	x	x
	Check for oil leaks.			x	x	x	x	x
	Verify the tightening torque of auto-locking nuts and tighten as necessary.				x	x	x	x
	Change dampers							x
2.8.5	Drag links							
	Verify the correct condition of all fixing hardware and specially the elastic joints.			x	x	x	x	x
	Verify the fixing hardware tightening torque on the motor bogie, on the carrying bogie and on the underframe.						x	x
	Paint drag links and protect against corrosion the surfaces of holes.						x	x
	Change elastic joints							x
2,9	**Bogie rolling bridge-sets**							
	Verify the dimensions of the rolling bridge-set.					x	x	x
	Clean and degrease the rolling bridge-set of the trailing bogie with pressurized steam.					x	x	x
	Verify by magnetoscopy or ultrasounds the welds of the axle-box frames. Perform their dimensional verification.						x	x
	Paint the carrying bogie rolling bridge-set.						x	x
2.9.1	Wheel							
	Clean with steam and note surface flaws. If necessary, turn or change the wheels.			x	x	x	x	x
	Verify the clearance between the internal faces of the wheels. Disassemble and press fit them as necessary.					x	x	x
	Perform the geometric verification of wheels. If necessary, relathe them.					x	x	x
2,10	**Cow-catcher**							

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
	Check for indents, deformation etc. on the cow-catcher. Check paint condition.			x	x	x	x	x
	Verify correct tightening of the cow-catcher fastening on the carbody.			x	x	x	x	x
	Verify the correct condition of welds on the cow-catcher assembly.				x	x	x	x
	Verify and adjust the height of the cow-catcher at 115 mm over the rail.			x	x	x	x	x
2,11	**Flange lubrication**							
	Verify the operation of the lubrication system.		x	x	x	x	x	x
	Check for leaks on the compressed air circuit and on the lubricant circuit.		x	x	x	x	x	x
	Verification and adjustment of the position of the spray delivery piping.				x	x	x	x
	Verify the tightening torque of all fixing items.				x	x	x	x
	Verify the grease reservoir level and top up.		x	x	x	x	x	x
	Clean the conical tangent nozzles.				x	x	x	x
	Check grease level within the reservoirs. Top up as necessary and verify the correct lubrication operation.	x	x	x	x	x	x	x
	Change hoses and ejectors							x
2,12	**Motor bogie brake calliper**							
	Check for wear on the brake linings of the motor bogie brake callipers and verify the groove depth.		x	x	x	x	x	x
	Replace motor bogie brake calliper linings.		x	x	x	x	x	x
	Verify the mechanical system for release of the motor bogie brake calliper.		x	x	x	x	x	x
	Verify brake system cab indicators.		x	x	x	x	x	x
	Verify correct condition and tightening of the motor bogie brake calliper fixing items.			x	x	x	x	x
	Verify the loosening aid system.				x	x	x	x
	Drain the service brake enclosure and the brake/loosening aid enclosure of the motor bogie brake calliper.				x	x	x	x
	Replace motor bogie brake calliper oil.					x	x	x
	Verify the pressure in the motor bogie brake calliper.				x	x	x	x
	Dismount the motor bogie brake calliper, inspect its components and replace those needing replacement.						x	x
	Change joints and wear and tear parts							x
2,13	**Carrying bogie brake calliper**							
	Check for wear on the brake linings of the carrying bogie brake callipers and verify the groove depth.		x	x	x	x	x	x
	Replace carrying bogie brake calliper linings.		x	x	x	x	x	x
	Verify the mechanical system for release of the carrying bogie brake calliper.		x	x	x	x	x	x
	Verify brake system cab indicators.		x	x	x	x	x	x
	Verify correct condition and tightening of the carrying bogie brake calliper fixing items.			x	x	x	x	x
	Verify the loosening aid system.				x	x	x	x
	Drain the service brake enclosure and the brake/loosening aid enclosure of the carrying bogie brake calliper.				x	x	x	x
	Replace carrying bogie brake calliper oil.					x	x	x
	Verify the pressure in the carrying bogie brake calliper.				x	x	x	x
	Dismount the carrying bogie brake calliper, inspect its components and replace those needing replacement.						x	x
	Change joints and wear and tear parts							x
2,14	**Brake disk**							
	Verify that brake linings are positioned correctly, that they are not worn down to the limit and that they do not score the friction surface of the brake disks.			x	x	x	x	x
	Verify correct condition and tightening of the motor car friction disk fixing items.			x	x	x	x	x
	Inspect the correct condition and tightening of the protection plug on the brake disk hub oil injection hole for motor cars.			x	x	x	x	x

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
	Verify correct condition and tightening of the trailer car friction disk fixing items.			x	x	x	x	x
	Verify wear limits of brake disks for motor and trailer cars.			x	x	x	x	x
	Change friction disk							x
2,15	**Gear unit**							
	Verify that the gear-unit casing is in optimum condition.			x	x	x	x	x
	Check for leaks on the input and output sides of the gear unit.			x	x	x	x	x
	Check oil level on the oil filler cap.			x	x	x	x	x
	Oil change.					x	x	x
	Verify optimum condition and specially check for cracks on of V-seal rings, O rings, mating faces and rubber-metal items.				x	x	x	x
	Inspect and evaluate the quantity of abrasion particles on the magnet of the drain plug and filler cap. Clean as necessary.					x	x	x
	Clean the gear unit box.				x	x	x	x
	Inspect the ageing protection metal-rubber layer.				x	x	x	x
	Check for clogging of the inspection hole and clean if necessary. Verify correct condition of filtres and replace as necessary.				x	x	x	x
	Verify the fixings of the gear-unit on the motor bogie frame.					x	x	x
	Verify the correct position of screws on the casing, bearings and cap.						x	x
	Replace the resilient mounts of the gear unit on the motor bogie frame.						x	x
	Verify that the contact face of gear teeth is clean and crack free.						x	x
	Change gear box bearings							x
2,16	**Gear-unit - wheel-set coupling**							
	Verify correct condition and tightening of the joint screws on the gear-unit side with the gear-unit hollow shaft.				x	x	x	x
	Check for wear and damage of ball bearings.				x	x	x	x
	Check for wear and damage of coupling parts.				x	x	x	x
	Replace ball bearings.							x
	Clean the coupling.						x	x
3	**DOORS**							
3,1	**Cab door**							
	Verify the correct condition of the glazing of the cab door.	x	x	x	x	x	x	x
	Verify correct condition and operation of the lock.	x	x	x	x	x	x	x
3,2	**Passenger access doors**							
	Inspect for the correct condition of the following stops, and replace those defective:			x	x	x	x	x
	- Interlocking stop.			x	x	x	x	x
	- Telescope stop.			x	x	x	x	x
	- Door opening stop.			x	x	x	x	x
	- Synchronization bar stop.			x	x	x	x	x
	- Stroke limit stop.			x	x	x	x	x
	Check door reopening when obstacles are detected.	x	x	x	x	x	x	x
	Check door emergency opening operation.	x	x	x	x	x	x	x
	Check the equipment fixed on the tramway carbody:				x	x	x	x
	- Tightening torques of the interior and exterior emergency handles.				x	x	x	x
	- Fixing of electric cables.				x	x	x	x
	- Cable tension.				x	x	x	x
	- Locking verification.				x	x	x	x
	Check door automatic mode operation.	x	x	x	x	x	x	x
	Check door manual mode operation.			x	x	x	x	x
	Clean and replace the following items as necessary:							
	- Interlocking spring.						x	x
	- Top and lower arm of the synchronization bars.						x	x
	- Top and lower pulleys of the the synchronization bars.						x	x
	- Door opening, interlocking, telescope and stroke limit stops.						x	x
	Replace the following items as necessary:							
	- Door control operator electronic plate.						x	x

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
	- Interior emergency actuation handles.						x	x
	- Berne square key for unlocking the exterior emergency handle.						x	x
	- Electric cabling.						x	x
	- Unlocking mechanical cabling.						x	x
	Verify the closing of the traction loop.	x	x	x	x	x	x	x
	Verify the RS485 line cabling.				x	x	x	x
3.2.1	Door operator assembly							
	Verify the tightening torque of fixing items on bearing housings.				x	x	x	x
	Inspect for the correct condition stops, bearing housings and studs.				x	x	x	x
	Verify that linkage movements take place without abnormal impacts or noises.				x	x	x	x
	Check the condition and tension of the belt.			x	x	x	x	x
	Lubricate the bearing housings.				x	x	x	x
	Lubricate the telescope.				x	x	x	x
	Clean the guiding rail.						x	x
	Clean the telescope thoroughly.						x	x
	Replace the synchronization rod, interlocking rod, return rod joint, return pulley, belt, tension pulleys, telescope support, motor support bearings, gear motor, bearing housing and interlocking control contact.						x	x
3.2.2	Complete door leaves							
	Check that there area no cuts on the seals. Otherwise, replace them.			x	x	x	x	x
	Verify good contact of peripheral joints and central joints.			x	x	x	x	x
	Verify that the electric cabling does not interfere with mechanical movements.			x	x	x	x	x
	Slowly operate the door operator and verify that the guide items move by rolling and not by sliding.			x	x	x	x	x
	Verify correct lubrication of bearing housings and guides. Otherwise, lubricate them.				x	x	x	x
	Replacement of gaskets.						x	x
	Change bearings							x
4	**CAB**							
4,1	**Master controller**							
	Verify the interlocking of the traction/braking handle.	x	x	x	x	x	x	x
	Visually verify the correct condition of the toothed belt, toothed wheels and ball bearings.			x	x	x	x	x
	Visually inspect electric wiring and specially the safety terminals and the coil cable.			x	x	x	x	x
	Lubricate the master controller.			x	x	x	x	x
4,2	**Cab lining**							
	Visually verify the correct condition of traps and ceiling panels. Repair as necessary.		x	x	x	x	x	x
	Visually verify the correct condition of side panels. Repair as necessary.		x	x	x	x	x	x
	Verify the correct opening of trap doors and the condition of hinges and supports.					x	x	x
	General revision. Repair all panels, gaps, hinges and supports as necessary.						x	x
4,3	**Driver desk**							
	Visually verify the correct condition of all control items.	x	x	x	x	x	x	x
	Verify the correct operation of the control items.	x	x	x	x	x	x	x
	Externally clean the control console panels and the glazing of the circuit breaker cabinet.			x	x	x	x	x
4,4	**Windshield wipers**							
	Verify the level of liquid of the wipers of the fluid tank. Top up if necessary.		x	x	x	x	x	x
	Review the condition of the blade and verify its cleaning performance. Replace as necessary.		x	x	x	x	x	x
	Verify cleanliness of the fluid tank. Clean as necessary.				x	x	x	x
	Revise the electric connections of the motor and the pump.				x	x	x	x

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
	Verify the correct operation of the windshield wiper.	x	x	x	x	x	x	x
	Verify the correct condition and tightening of the fixing items of all pieces.				x	x	x	x
	Verify the tightness of the whole circuit.				x	x	x	x
	Lubricate the hinges and mobile parts.				x	x	x	x
4,5	**Driver seat**							
	Verify the correct operation of all movements.		x	x	x	x	x	x
	Verify that padded areas are not sagged. Otherwise, replace defective items.		x	x	x	x	x	x
	Verify the tightening torque of all fixing items.			x	x	x	x	x
	Fit in the control disk.				x	x	x	x
	Replace upholstery.						x	x
5	**CARBODY**							
5,1	**Interior lighting**							
5.1.1	Saloon lighting							
	Verify the operation of the saloon lamps. Replace as necessary.	x	x	x	x	x	x	x
	General revision of press buttons, lamps and cabling. Verify fixings. Replace damaged items.				x	x	x	x
5.1.2	Cab lighting							
	Verify the operation of the cab lamps. Replace as necessary.	x	x	x	x	x	x	x
	General revision of press buttons, lamps and cabling. Verify fixings. Replace damaged items.				x	x	x	x
5.1.3	Control console and cabinet lighting							
	Verify the operation of the saloon lamps. Replace as necessary.	x	x	x	x	x	x	x
	General revision of press buttons, lamps and cabling. Verify fixings. Replace damaged items.				x	x	x	x
5.1.4	Emergency lighting							
	Verify the operation of the saloon lamps. Replace as necessary.	x	x	x	x	x	x	x
	General revision of press buttons, lamps and cabling. Verify fixings. Replace damaged items.				x	x	x	x
5,2	**Glazing**							
	Visually verify the correct condition of all glazing. Replace defective glazing.	x	x	x	x	x	x	x
	Inspect the condition of the demister bands of the cab lower front glaze panel as well as electric wiring.				x	x	x	x
5,3	**Interior accessories**							
5.3.1	Fire extinguishers							
	Visually inspect fire extinguisher condition.	x	x	x	x	x	x	x
	Verify the identification label and the seal. NOTE: Replace the fire extinguishers according to the legislation in effect.	x	x	x	x	x	x	x
5.3.2	Sun visor							
	Verify correct condition and operation.	x	x	x	x	x	x	x
	Disassemble, clean, replace and verify.						x	x
5.3.3	Poignées							
	Verify the fixings and replace damaged items.			x	x	x	x	x
	Clean and local repairs.					x	x	x
	Disassembly and general repair with surface treatment on condition.						x	x
5.3.4	Half-partitions							
	Verify correct condition and cleanliness. Replace as necessary.	x	x	x	x	x	x	x
5,4	**Floor lining**							
	Visual inspection. Perform local repairs as necessary.			x	x	x	x	x
	Replace flooring lining as necessary.						x	x
5,5	**Exterior paint and inscriptions**							
	Verify the condition of exterior inscriptions.	x	x	x	x	x	x	x
	Verify the correct condition of the carbody exterior paint coat, specially check for graffitis and forbidden inscriptions. Otherwise wash the tramway, remove the graffitis and inscriptions and/or paint.						x	x
5,6	**Saloon lining**							

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
	Visually verify the correct condition of door traps and side panels. Repair as necessary.		x	x	x	x	x	x
	Visually verify the correct condition of ceiling panels. Repair as necessary.		x	x	x	x	x	x
	Visually verify the correct condition of side panels and trims. Repair as necessary.		x	x	x	x	x	x
	Visually verify the correct condition of the interior indicator lining. Repair as necessary.		x	x	x	x	x	x
	Verify the correct opening of trap doors and the condition of hinges and supports.					x	x	x
	General revision. Repair all panels, gaps, hinges and supports as necessary.						x	x
5,7	**Exterior signalling**							
5.7.1	Crossing and running lights							
	Visual inspection and operation verification.	x	x	x	x	x	x	x
	Verify drain space and water-tightness of headlights.				x	x	x	x
5.7.2	Marker lights							
	Verify the drain space and the water tightness of the marker lights for motor and trailer cars.				x	x	x	x
	Clean the exterior and interior of the light screens.				x	x	x	x
	Visual inspection and operation verification.	x	x	x	x	x	x	x
5.7.3	Flasher lights							
	Visual inspection and operation verification.	x	x	x	x	x	x	x
	Verify drain space and water-tightness of lateral and front flasher lights.				x	x	x	x
5.7.4	Gauge lights							
	Visual inspection and operation verification.	x	x	x	x	x	x	x
	Verify the drain space and the water tightness of the front gauge lights for motor and lateral gauge lights for motor and trailer cars.				x	x	x	x
	Visual inspection and operation verification.	x	x	x	x	x	x	x
	Verify drain space and water-tightness of brake lights.				x	x	x	x
5,8	**Fixed and tip-up seats**							
	Verify the condition of the shrouds, linings and trims. Repair breakage or cracks on the shrouds. Replace the defective item as necessary.	x	x	x	x	x	x	x
	Verify that the screws and and nuts are optimally tightened. Tighten as necessary.			x	x	x	x	x
	General revision of all seats, replace and/or repair defective items.						x	x
5,9	**Roof**							
	Clean water drain holes of the T.U. roof.	x	x	x	x	x	x	x
5,10	**Emergency materials**							
	Revision of the seal presence. Otherwise, verify any missing items.	x	x	x	x	x	x	x
5,11	**Bodyends**							
5.11.1	Motor car front bodyend							
	Visually verify correct condition of the front bodyend.	x	x	x	x	x	x	x
5.11.2	Motor car rear bodyend							
	Visually verify the correct condition of cabinets and panels.		x	x	x	x	x	x
	Verify the correct opening of trap doors and the condition of hinges and supports.			x	x	x	x	x
5.11.3	Trailer car bodyends							
	Visually verify the correct condition of panels.		x	x	x	x	x	x
5,12	**Cabling and Trap Doors**							
	Check the condition of cables, fittings and fixing hardware.		x	x	x	x	x	x
	Verify the condition of traps, fixing hardware, locks, supports, tie rods and hinges. Replace supports, tie rods and hinges as necessary.			x	x	x	x	x
	Verify the correct condition of the items that make up the lever assembly of the front trap door of A and B motor bogies.				x	x	x	x
	Paint the cables and trap doors on condition.						x	x
6	**HVAC EQUIPMENT**							
6,1	**CAB HVAC equipment**							

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
	Check for cracks and water drops on the tray of the evaporation zone. Clean the tray drain hole.			x	x	x	x	x
	Verify the fittings and condition of outlet pipes.			x	x	x	x	x
	Clean the electric connections of the HVAC unit components.			x	x	x	x	x
	Verify the tightening torque of fixing items of the HVAC unit on the ceiling.				x	x	x	x
	Verify the tightening torque of fixing items of interior components of the HVAC unit.				x	x	x	x
	Verify that all the HVAC equipment components are correctly connected.				x	x	x	x
	Verify the condition of HVAC unit structure, paint, gaps and specially mounts. Clean, paint and repair damages.				x	x	x	x
	Verify the operation of the HVAC equipment of the two cabs and the foot warmers.	x	x	x	x	x	x	x
6.1.1	Cooling circuit							
	Verify, while in operation, the flow of coolant on the sight-glass. Clean o replace the sight glass. Perform the partial charge of coolant as necessary.			x	x	x	x	x
	Verify the water-tightness of the cooling circuit after draining the coolant. Perform the total charge of coolant.					x	x	x
	Inspect fittings and welds of the piping and valve system. Partially top up as necessary.				x	x	x	x
	Check condition of tubes of the piping system.				x	x	x	x
6.1.2	Electronics							
	Use a PC to verify the operation of control electronics.			x	x	x	x	x
6.1.3	Condensation and evaporation coils							
	Clean the condensation coil with compressed air.				x	x	x	x
	Clean the evaporation coil with compressed air.					x	x	x
	Clean the condensation coil with pressurized water.				x	x	x	x
	Thoroughly clean the evaporation coil with pressurized water.					x	x	x
	Verify the tightness of the evaporation coil.				x	x	x	x
6.1.4	Discharge and condensation fans							
	Check the operation of the discharge and condensation fans. Verify that the connectors of the discharge and condensation fans on the electric panel operate correctly.			x	x	x	x	x
	Check the correct rotation direction of the discharge and condensation fans.			x	x	x	x	x
	Visually inspect electric wiring of discharge and condensation fans.			x	x	x	x	x
	Check the current rate drawn in the discharge and condensation fans.					x	x	x
	Check the bearings and drive blades of discharge and condensation fan motors. Replace if damaged.				x	x	x	x
6.1.5	Thermostatic check valves							
	Verify tightness of the thermostatic check valve.			x	x	x	x	x
	Verify tightness of the by-pass control valve.			x	x	x	x	x
6.1.6	Pressure switches							
	Verify operation and calibration of pressure switches.					x	x	x
6.1.7	Heating elements							
	Verify operation of heating elements.			x	x	x	x	x
	Verify wiring of heating elements.				x	x	x	x
6.1.8	Temperature probes							
	Verify the values picked up by temperature probes.			x	x	x	x	x
	Verify the electric wiring of temperature probes.				x	x	x	x
6.1.9	Electric boards							
	Visually verify the switches, contactors, relays, PCBs and other electric accessories on electric boards. Verify that switches and relays can be correctly connected and reset.			x	x	x	x	x
	Check the electric wiring of electric board items.			x	x	x	x	x
	Clean the electric wiring of electric boards.			x	x	x	x	x
	Verify electric connectors.				x	x	x	x
6.1.10	Temperature selector switch							

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
	Verify operation of the temperature selector switch.			x	x	x	x	x
6.1.11	Trap doors and filters							
	Clean with compressed air the filtering cap of exterior and return air filters.			x	x	x	x	x
	Replace exterior and return air filters as necessary.		x	x	x	x	x	x
	Replace the dryer filter as necessary.				x	x	x	x
6.1.12	Discharge air conduits.							
	Clean air discharge conduits with compressed air.					x	x	x
6,2	**Cab HVAC unit compressors**							
	Verify oil level. Top up if necessary.				x	x	x	x
	Verify maximum and minimum operating pressures.				x	x	x	x
	Measure current drawn in by the compressor.				x	x	x	x
	Verify the correct condition of silent blocks and fixing hardware of these items.				x	x	x	x
	Clean electric terminals with compressed air.				x	x	x	x
	General revision of the compressor, disassembly, replace and/or inspection of all parts of the compressor and assembly.						x	x
6,3	**Saloon Ventilation Equipment**							
	Verify operation	x	x	x	x	x	x	x
	Tighten fan and motor fixing screws				x	x	x	x
	Verify and tighten connections on terminal bars. Test drawn in current.				x	x	x	x
	Verify bearing noise, replace as necessary.				x	x	x	x
	General revision, replacement of bearings, cleaning, verification and adjustments						x	x
7	**GANGWAYS**							
7,1	**Gangway corridor**							
	Check for wear gaps between the bolt-on frame items.		x	x	x	x	x	x
7.1.1	Bolt-on frames							
	Verify the water-tightness between bolt-on frames and bodyends.			x	x	x	x	x
7.1.2	Corrugated bellow							
	Verify that the steel cable is correctly tensioned pulling on the joint fabric.		x	x	x	x	x	x
	Inspect the correct position of the joint fabric of the corrugated bellow around the bolt-on frame or the rubber sections.		x	x	x	x	x	x
	Verify that the fabric does not have holes or cracks and that it is correctly positioned on the aluminium sections. Otherwise, repair the fabric.		x	x	x	x	x	x
	Check for failures of aluminium sections. Repair any damaged section.			x	x	x	x	x
	Clean the bottom of the bellow.				x	x	x	x
	Verify that water drain holes are not clogged.				x	x	x	x
7.1.3	Rubber sections							
	Verify that rubber sections do not have wear or failures. Otherwise, replace them.		x	x	x	x	x	x
7.1.4	Tensioning bands							
	Verify that tensioning bands do not have wear or failures. Otherwise, replace them.		x	x	x	x	x	x
	Verify that protections are fastened onto tensioning bands.		x	x	x	x	x	x
7.1.5	Fixing bolts and safety pins							
	Verify that fixing bolts and safety pins are not worn down. Otherwise, replace them.			x	x	x	x	x
	Verify that fixing bolts and safety pins are covered with protections.		x	x	x	x	x	x
7.1.6	Ceiling lining, false ceiling and lining skirts.							
	Verify that fixing strips on ceiling lining and on flooring skirts are correctly screwed-on.				x	x	x	x
8	**HIGH VOLTAGE ELECTRIC SYSTEM**							
8,1	**Pantograph**							
	Clean the pantograph.					x	x	x
	Apply a new paint base coat and a finish coat on the pantograph.						x	x

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
	Verify condition and tightening of the fixing items of all pantograph items.						x	x
	Visually verify the correct condition of the pantograph and pantograph components.	x	x	x	x	x	x	x
8.1.1	Frame							
	Visually check for cracks and deformation on the frame.				x	x	x	x
8.1.2	Pick-up shoes							
	Check for wear on carbon shoes. File down marks equal or above 5 mm.			x	x	x	x	x
8.1.3	Flexible couplings							
	Visually inspect flexible couplings.			x	x	x	x	x
	Check lubrication of flexible couplings. Lubricate as necessary.			x	x	x	x	x
	Verify the tightening torque of flexible couplings. Tighten as necessary.				x	x	x	x
	Replace flexible couplings as necessary.					x	x	x
8.1.4	Support springs							
	Verify contact pressure of support springs. Verify condition and tightening torque of springs. If necessary, adjust the contact pressure.			x	x	x	x	x
8.1.5	Top and lower arm							
	Visually check the condition of top and lower arms. Replace as necessary.				x	x	x	x
8.1.6	Top and lower tie bars							
	Visually check the condition of top and lower tie bars.				x	x	x	x
	Adjust top and lower tie bars.						x	x
8.1.7	Drive device							
	Inspect electric cables, connections, switches, supports, handles and emergency mechanism of the drive device.				x	x	x	x
	Check operation of the drive device and the emergency system.				x	x	x	x
8.1.8	Damper							
	Replace the stop of the swing lever.				x	x	x	x
	Check for damper deformation or cracks on the vibration damper. Replace damper pars or install a new damper as necessary.				x	x	x	x
	Replace the damper.						x	x
8.1.9	Coupler							
	Visually inspect coupler parts condition. Replace coupler pars or install a new coupler as necessary.				x	x	x	x
	Verify operation of the coupler.				x	x	x	x
8.1.10	Isolators							
	Replace the threaded element of the coupler.						x	x
	Check for cracks on the isolators. Replace as necessary.				x	x	x	x
8.1.11	Joints							
	Clean the isolators.				x	x	x	x
	Lubricate all pantograph joints.				x	x	x	x
	Change joints							x
8.1.12	Pan head and plate springs.							
	Inspect bearings and joints.						x	x
	Verify that plate springs bend without effort.				x	x	x	x
	Check for damages and corrosion on plate springs, springs support and mastic. Replace as necessary.				x	x	x	x
	Otherwise straps.				x	x	x	x
	Change bearings and joints							x
8.1.13	Bolt-on frames							
	Replace the lead horns.						x	x
8,2	**Circuit breaker**							
	Measure wear due to arcing. If necessary, replace the mobile contact, the top connection and connections on the left and right.				x	x	x	x
	Measure the distance between deflectors of the arc chute. Replace deflectors as necessary.				x	x	x	x
	Verify play between fork and pulley. If incorrect, replace the damper and add/remove shim washers.					x	x	x

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
	Check the connections of the arc chute and the tightening torque of the fixing items.				x	x	x	x
	Clean the arc chute.				x	x	x	x
	Replace main contacts.						x	x
	Replace arc chute components.						x	x
	Replace the guiding assembly, the damper assembly, the damping block and the fork.						x	x
	Replace the I-max trip unit.				x	x	x	x
	Replace auxiliary switches.						x	x
	General inspection of the circuit breaker and the arc chute.						x	x
	Verify that the elastic rings are in correct position when the circuit breaker is brought to close position.				x	x	x	x
	Verify the condition of the washer (5, Figure C-3).				x	x	x	x
	Replace PUR washer and MVQ ring of the closing device.				x	x	x	x
	Replace the items of the closing device.						x	x
8,3	**Lighting Arrestor**							
	Verify correct condition of the lighting arrestor. Check for electric arcing signs.				x	x	x	x
	Verify the correct fixing of the lighting arrestor on the roof.				x	x	x	x
	Inspect the cable connecting the lighting arrestor to the pantograph and its fixing.				x	x	x	x
	Change cable connecting							x
	Clean the casing and the support flange of the lighting arrestor				x	x	x	x
8,4	**Brake Resistors**							
	Visually check the exterior of the brake resistors and their connection cables.				x	x	x	x
	Verify the correct fixing of brake resistors on the roof of the tramway.				x	x	x	x
	Clean brake resistors exterior with compressed air.				x	x	x	x
	Verify the ohmic value of brake resistors.				x	x	x	x
8,5	**Traction Inverter**							
	Verify the exterior condition of the box, specially the plate support bolts and exterior edges.				x	x	x	x
	Clean box ventilation grills.				x	x	x	x
	Verify the correct condition of cover hinges.				x	x	x	x
	Verify the correct tightening of control connectors and power conductor cable glands.				x	x	x	x
	Verify the correct fixing of the box on the tramway.				x	x	x	x
	Verify the correct condition of the earthing cable and fixing hardware.				x	x	x	x
	Inspect the interior:							
	Verify the box inlet and outlet conduit connections.					x	x	x
	Inspect the exterior aspect of the filter inductance.					x	x	x
	Inspect the exterior aspect of the filter capacitors.					x	x	x
	Verify the value of the precharge resistor and the discharge resistor.					x	x	x
	Verify that the control PCB is correctly installed in the rack.					x	x	x
	Verify the correct condition of the cabling.					x	x	x
	Verify the tightening torque of fixing items of interior equipment in the inverter box.					x	x	x
	Replace damaged or defective inverter box interior equipment.					x	x	x
	Replace fans:					x	x	x
	Main fans.					x	x	x
	Control PCB fan.					x	x	x
	Air recirculation fans.					x	x	x
	Replacement of rubber gaskets:					x	x	x
	For main fans.					x	x	x
	For the inverter top covers.					x	x	x
	For the lining of profiles subject to contact hazard.					x	x	x
	For all cable holding bars.					x	x	x
	Rehabilitate the inverter box by repairing and painting.						x	x

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
	Rehabilitate the inverter box.						x	x
9	**LOW VOLTAGE ELECTRIC SYSTEM**							
9,1	**Static converter**							
	Visually check the condition of the static converter components.					x	x	x
	Inspect the fixings of all the static converter components.					x	x	x
9.1.1	Static converter box							
	Inspect the paint and the plate condition.				x	x	x	x
	Clean the top back cover located on the forced ventilation area.				x	x	x	x
	Replace the rubber gaskets on the converter cover.						x	x
	Clean the static converter box with sand blasting, prime it and paint it.						x	x
9.1.2	Branching							
	Check for warming, burns or failures on the connection tubing and PG fittings.					x	x	x
	Check the correct branching of the control and signalling connector.				x	x	x	x
	Inspect the HV input and 380 Vac output electric connections and interconnection connectors					x	x	x
	Inspect the fixings of the electric connections of all components of the static converter.					x	x	x
9.1.3	Fans and ventilation heat sink							
	Clean the ventilation heat sink with compressed air or with soapy water if necessary.					x	x	x
	Check for friction or abnormal noise by manually turning the fans					x	x	x
	Replace the fan of the ventilation heat sink.						x	x
	Replace the fans of the fan plate.						x	x
	Verify the operation of the fans by connecting them to a power source. No friction or abnormal noise should occur.						x	x
9.1.4	Resistors							
	Check for leaks and failures on the HV filter resistors.					x	x	x
	Check for oil leaks on the AC filter capacitors.					x	x	x
	Measure the capacity of the electrolytic capacitors.					x	x	x
9.1.5	Electronics							
	Verify the correct position of the PCBs on the control rack.					x	x	x
	Verify the condition of the inverter IGBT transistors.					x	x	x
	Test the electronic PCBs.						x	x
9.1.6	Coils							
	Verify the condition of the DC output filter coils and the HV input coil.					x	x	x
9.1.7	Transformers							
	Verify the condition of the output transformers and the voltage reference transformer.					x	x	x
9,2	**Battery**							
	Verify the polarity and the tightening of the connections between SRX-155 FR items.					x	x	x
	Verify the polarity and the tightening of the connections between exterior terminals.					x	x	x
	Verify electrolyte level. Check the battery charge voltage.				x	x	x	x
	Apply a new coat of Vaseline on the battery terminals.					x	x	x
	Verify the general condition of battery voltage.					x	x	x
	Clean the battery exterior with plain water.					x	x	x
	Verify the voltage and current of the charge system.					x	x	x
	Top up the battery with distilled or deionised water.				x	x	x	x
	Verify electric continuity.					x	x	x
	Perform a charge and discharge cycle. Check the battery capacity.					x	x	x
	Paint the battery box.						x	x
	Change battery							x
10	**TRACTION MOTOR**							
10,1	**Traction motor**							
	Verify the general condition of the motor, the fixings of the fan guard, and chic for indents and failures.				x	x	x	x

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
	Verify paint condition and repair damaged areas.				x	x	x	x
	Verify the tightening torques of component fixing screws.				x	x	x	x
	Verify the correct condition of the cabling and connections.				x	x	x	x
	Clean the traction motor exterior and the cooling tubes of the stator which can be accessed by removing the air inlet grill.				x	x	x	x
	Verify the stator insulation. If necessary, repair it with silicone resin.				x	x	x	x
	Lubricate the bearing on the non drive end.				x	x	x	x
	Verify the condition of the traction motor fixings onto the bogie frame and onto the gear unit.					x	x	x
	Inspect the rotor: seat of the motor side of the gear-unit-motor coupling, condition of the weld of the short-circuit bars-rings, seat of fans, tightening of balancing blocks.						x	x
	Verify the continuity of the resistors thermometers and the correct condition of the speed sensor.						x	x
	Replace the bearing.						x	x
	Clean the stator, the rotor and the cooling tubes of both. Dry out with air.						x	x
	Perform tests for dielectric strength, winding resistance, insulation resistance and ohmic resistance for the temperature probe.						x	x
10,2	**Traction Electronics**							
	Verification of the start of the treatment module and the study of abnormal situations.			x	x	x	x	x
11	**HYDRAULIC SET**							
11,1	**Motor Bogie Hydraulic Set**							
	Verify oil level on the motor bogie hydraulic set.		x	x	x	x	x	x
	Top up the motor bogie hydraulic set with oil.		x	x	x	x	x	x
	Verify the tightness of hydraulic connections.		x	x	x	x	x	x
	Verify the pressure built-up time of the motor bogie hydraulic set.		x	x	x	x	x	x
	Verify the time interval between two recouplings.		x	x	x	x	x	x
	Verify the correct condition and tightening of the fixing items of the motor bogie hydraulic set.			x	x	x	x	x
	Verification of the emergency brake application.				x	x	x	x
	Verification of the service brake application.				x	x	x	x
	Verification of the urgency brake application.				x	x	x	x
	Verification of the parking brake application.				x	x	x	x
	Verify the motor bogie hydraulic set pressurization when the motor is stopped and when the motor restarts.				x	x	x	x
	Verify the accumulation pressure on accumulators.				x	x	x	x
	Purge the motor bogie hydraulic set.					x	x	x
	Purge the hydraulic circuit.					x	x	x
	Change the motor bogie hydraulic set oil.					x	x	x
	Disassembly and cleaning of the motor bogie hydraulic set motor.				x	x	x	x
	Check the fouling of the motor bogie hydraulic set oil.				x	x	x	x
	Replace the air filter of the suction valve on the motor bogie hydraulic set.					x	x	x
	Replace the original filter.					x	x	x
	Replace the safety filter.					x	x	x
	Dismount the motor bogie hydraulic set, inspect its components and replace those needing replacement.						x	x
11,2	**Carrying Bogie Hydraulic Set**							
	Verify the oil level on the carrying bogie hydraulic set.		x	x	x	x	x	x
	Top up the oil of the carrying bogie hydraulic set with oil.		x	x	x	x	x	x
	Verify the tightness of hydraulic connections.		x	x	x	x	x	x
	Verify the pressure built-up time of the carrying bogie hydraulic set.		x	x	x	x	x	x
	Verify the time interval between two recouplings.		x	x	x	x	x	x
	Verify the correct condition and tightening of the fixing items of the carrying bogie hydraulic set.			x	x	x	x	x
	Verification of the emergency brake application.				x	x	x	x
	Verification of the service brake application.				x	x	x	x
	Verification of the urgency brake application.				x	x	x	x

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
	Verification of the parking brake application.				x	x	x	x
	Verify the carrying bogie hydraulic set pressurization when the motor is stopped and when the motor restarts.				x	x	x	x
	Verify the accumulation pressure on accumulators.				x	x	x	x
	Purge the carrying bogie hydraulic set.					x	x	x
	Purge the hydraulic circuit.					x	x	x
	Replace the carrying bogie hydraulic set oil.					x	x	x
	Disassembly and cleaning of the carrying bogie hydraulic set motor.				x	x	x	x
	Check the fouling of the carrying bogie hydraulic set oil.				x	x	x	x
	Replace the air filter of the suction valve on the carrying bogie hydraulic set.					x	x	x
	Replace the original filter.					x	x	x
	Replace the safety filter.					x	x	x
	Dismount the carrying bogie hydraulic set, inspect its components and replace those needing replacement.						x	x
12	**PNEUMATIC SYSTEM**							
12,1	**Pneumatic System Separator Filter**							
	Purge the pneumatic system separator filter.	x	x	x	x	x	x	x
	Change filter							x
12,2	**Reservoir of accumulators**							
	Verify the accumulation pressure. ATTENTION: Perform this verification on the first operation week. If no nitrogen leak is detected repeat 4 month later.				x	x	x	x
	Verify the correct condition and tightening of the fixing items of accumulator reservoirs.			x	x	x	x	x
	Verify the nitrogen pressure on the accumulator reservoir.				x	x	x	x
	Inflate the accumulator reservoir.				x	x	x	x
	Replace the accumulator reservoir.							x
	Verify the correct condition of the accumulator reservoir joint fittings.				x	x	x	x
12,3	**Auxiliary Compressor**							
	Verify the correct condition of the auxiliary compressor, specially the noise level and lack of dirt.			x	x	x	x	x
	Verify the correct fixing of the auxiliary compressor silent blocks on the base and check fro cracks and deformation. Replace as necessary.				x	x	x	x
	Replace the suction filter of the auxiliary compressor.				x	x	x	x
	Replace the electric motor brushes.				x	x	x	x
	General revision.						x	x
12,4	**KM Type Pressure Switch**							
	Verify the opening and closing pressure of the pressure switch on the auxiliary compressor stop and restart cycles.				x	x	x	x
	Verify the tightness of the KM type pressure switch.				x	x	x	x
	KM type pressure switch replacement.						x	x
12,5	**Sanding control panel**							
	Verify tightness of the sanding control panel.		x	x	x	x	x	x
	Verify the operation of the sanding control panel. Replace the panel defective items as necessary.			x	x	x	x	x
	Clean the sanding control panel conduits.					x	x	x
	Thoroughly check the various items of the panel and specially their operation.					x	x	x
12,6	**Sanding Pressure Regulator**							
	Verify the tightness of pressure regulator. Replace as necessary.		x	x	x	x	x	x
	Verify the pressure regulator operation. Adjust or replace as necessary.			x	x	x	x	x
	Verify wear limits of valves, guide, piston and spring. Replace defective items.					x	x	x
13	**VIDEOMONITORING SYSTEM**							
	Clean the exterior and interior camera lenses.				x	x	x	x
	Clean the viewfinder of exterior and interior camera.			x	x	x	x	x
	Clean the screens indicator monitors.	x	x	x	x	x	x	x

Ref Operation	MAINTENANCE TASKS	Intervals						
		IS (15 days)	PV (10,000)	P0 (20,000)	P1 (80,000)	P2 (320,000)	P3 (640,000)	P4 (1,280,000)
	Focusing of exterior and interior camera lenses.			x	x	x	x	x
	Revision of exterior and interior camera fixings.			x	x	x	x	x
	Verification of the videomonitoring central unit control operation				x	x	x	x
	Opening and display of files.				x	x	x	x
	Verify the operation of acknowledged alarms and of the general system.	x	x	x	x	x	x	x
14	**EVENT RECORDING EQUIPMENT**							
	, Verify the insertion of connectors and connections.					x	x	x
	Change of batteries on the control unit board of the recording central unit.					x	x	x
	Data download.			x	x	x	x	x
15	**PASSENGER INFORMATION SYSTEM**							
	Verify the insertion of connectors and connections.					x	x	x
	Replace the information central unit control board battery.					x	x	x
	Verification of the bell operation.	x	x	x	x	x	x	x
	Verification of the operation of interior and exterior indicators and public address system.	x	x	x	x	x	x	x
16	**ON BOARD COMPUTER SYSTEM (OCBS)**							
	Verify the insertion of connectors and connections.					x	x	x
	Change of control board batteries on the the monitoring/control central units.					x	x	x

Part 3: Deliverables Programme

Milestone nunber	REF.	DELIVERABLE	DATE	REMARKS
M1 of TMA		Demonstration to tie of completion of review of Tram Supplier Tram design and Infraco Depot design to	**18/07/2008**	
		1- Maintainability in accordance with Tram Maintenance Specification and Depot plans	**18/07/2008**	
		2- Identification of all required spares and stock levels	**18/07/2008**	
		3- Identification of all special tools and test equipment	**18/07/2008**	
		4- Identification of all training needs	**18/07/2008**	
M2 of TMA		1- Finalisation of any changes agreed by tie to the Tram Maintenance Specification and maintenance plans in response to final Tram and Depot design	**28/11/2008**	
		2- Acceptance by tie of Tram Maintainer's safety management system	**28/11/2008**	
		3- Approval by the tie of Tram Maintainer's maintenance procedures and management procedures	**28/11/2008**	
M3 of TMA		Finalisation of maintenance team training and recruitment plan including competence assessment	**See below**	
M4 of TMA		Completion of mobilisation of maintenance team management and administrative staff to Depot	**See below**	
M5 of TMA		Delivery to the Depot of all Tram Maintainer procured spares, special tools, equipment, and all computer	**See below**	
M6 of TMA		Complete mobilisation of maintenance team technicians to Depot	**17/07/2010**	
M7 of TMA		1- Completion of maintenance team training in accordance with training and recruitment plan and all required competencies certified		
		2- Demonstration of no non-conformance to a Client audit to demonstrate readiness for the delivery of the Tram Maintenance Services		
	1	Recruit Fleet/Contract local manager	**24/07/2008**	
	2	Occupy depot offices	**11/12/2009**	
	3	Supply office equipment (desks/pcs/etc.)	**18/12/2009**	
	4	Supply road vehicle(s)	**18/12/2008**	
	5	Provide Maintenaance Manuals (TSA)	**28/08/2009**	
	6	Take over management of workshop area	**11/12/2009**	
	7	Provide tram Illustrated Parts List (TSA)	**29/01/2010**	
	8	First access to depot stores	**11/12/2009**	
	9	Equip stores with warranty spares	**18/12/2009**	
	10	Equip stores with normal tools	**18/12/2009**	
	11	Equip stores with consumable parts	**18/12/2009**	
	12	Recruit Technicians (first batch)	**02/10/2009**	
	13	Train Technicians (first batch)	**18/12/2010**	
	14	Equip stores with capital spares	**29/01/2010**	
	15	Accredit Technicians (first batch)	**29/01/2010**	
	16	MMS system configured, populated and running	**29/01/2010**	
	17	First tram passes commissioning tests	**29/01/2010**	
	18	Equip stores with Special Tools (TSA)	**30/07/2010**	
	19	Provide 5x trams for testing/training purposes	**29/01/2010**	
	20	Provide first monthly TramCo performance report to InfraCo	**26/03/2010**	
	21	Provide 10x trams for Phase 1a operation	**10/09/2010**	
	22	Last tram passess commissioning tests	**24/09/2010**	
	23	Provide 25x trams for full service operation	**23/12/2010**	
	24	Accreditation to EN 14001 (Environmental stds.)	**Depot commissioning + 1 year**	
	25	Accreditation to ISO9002 (Quality Stds.)	**Depot commissioning + 1 year**	

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

SCHEDULE 3

PAYMENT

PART 1: PERFORMANCE PAYMENT

1. SERVICES PAYMENT

1.1 Subject to the provisions of paragraph 3 of this Schedule 3 (*Payment*), the Services Payment due from the Client to the Tram Maintainer for each Reporting Period shall be established as follows:

$$SP = ((MaxPP - MinPP) \times OPP) + MinPP$$

In any event SP shall not be less that the Minimum Periodic Payment

where:

SP is the Services Payment;

MaxPP is the Maximum Performance Payment for the Reporting Period as calculated in accordance with paragraph 1.3;

MinPP is the Minimum Performance Payment for the Reporting Period;

OPP is the Overall Payment Performance as calculated in accordance with paragraph 1.2;

1.2 The Overall Payment Performance shall be calculated on the following basis:

$$OPP = \frac{TPP - MinOPP}{100\% - MinOPP}$$

save where OPP is a negative figure, in which case OPP shall be 0 (zero)

and where:

TPP is the Tram Punctuality Performance calculated in accordance with paragraph 2; and

MinOPP is the Minimum Overall Payment Performance.

1.3 The Maximum Performance Payment shall be adjusted in accordance with this paragraph 1.3 during the last Reporting Period and agreed before the thirteenth Reporting Period End Date of each year:

Maximum Performance Payment is based upon the planned total Tram kilometrage per year as set out in part 3 of this Schedule 3 (*Payment*) for the first three years and, thereafter, as advised by the Client ("**Planned Kilometrage**"). The Tram Maintainer will measure the total kilometrage travelled by the Tram fleet in each Reporting Period ("**Actual Kilometrage**").

1.4 Not Used

1.5 The Tram Maintainer shall evaluate the Tram Punctuality Performance in accordance with this Schedule 3 (*Payment*).

1.6 The Tram Maintainer's Representative shall meet with representatives of the Operator, the Client and **tie** every Operating Day at 09:00 (or such other time as all parties shall reasonably agree) to determine the responsibility for any Late Trams or other non Availability or poor performance of Trams. Where the parties cannot, acting reasonably, determine responsibility for any Late Tram or other non Availability or poor performance then **tie** shall, in its absolute discretion, determine responsibility, subject only to referral of such resolution to the Dispute Resolution Procedure.

1.7 If the Tram Punctuality Performance is less than 95% then the Tram Maintainer shall, within 10 Business Days prepare a rectification plan ("**Rectification Plan**") (to be agreed with the Client, acting reasonably) setting out a comprehensive analysis of the reasons why the Tram Punctuality Performance is less than 95% and setting out a detailed plan to improve performance to achieve a Tram Punctuality Performance of at least 98%.

1.8 The Tram Maintainer shall report the results of the evaluation for each Reporting Period to the Client on or before the 10th Business Day of the Reporting Period following the Reporting Period in which the evaluation was performed.

2. TRAM PUNCTUALITY PERFORMANCE

2.1 Tram Punctuality Performance shall be calculated on the following basis:

$$TPP = 1 - \left(\frac{LT + UHS + \left(\frac{DT}{4} \right) + (5 \times LLT)}{TMT + TMS} \right)$$

where:

TPP is the Tram Punctuality Performance;

LT is the total number of Tram Maintainer Late Trams in the Reporting Period;

UHS is the total number of Timetabled Hot Spares which were not made Available in accordance with Clause 9.2.1.1 in the Reporting Period;

DT is the total number of Defective Trams in the Reporting Period;

LLT is the total number of Late Last Trams in the Reporting Period;

TMT is the total number of Timetabled Monitored Trams in the Reporting Period; and

TMS is the total number of Timetabled Hot Spares in the Reporting Period.

2.2 Excusing Causes

In determining the number of Late Trams and Late Last Trams in any Reporting Period for the purposes of paragraph 2.1 above, the Tram Maintainer shall not include any Late Tram or Late Last Tram arising from an Excusing Cause that existed at the time the Tram arrived at (or departed) the relevant Monitoring Point. A report shall be submitted in accordance with paragraph 5.

3. SERVICES PAYMENT PENDING TRAM RELIABILITY

3.1 Until the earlier of:

3.1.1 the date when the final Tram is delivered and Reliability established (within the meaning given in clause 44 of the Tram Supply Agreement); and

3.1.2 the expiry of 13 full Reporting Periods from the commencement of Passenger Services,

the Services Payment due from the Client to the Tram Maintainer shall be established as follows:

SP = MaxPP x 0.9

where SP and MaxPP have the meaning given to those expressions in paragraph 1.1 of this Schedule 3 (*Payment*).

3.2 That element of the Maximum Performance Payment for each Reporting Period which is not payable pursuant to paragraph 3.1 above ("**Service Payment Retention**") shall be applied as follows:

3.2.1 The Service Payment Retention shall be paid to the Tram Maintainer in accordance with the provisions of Clause 42.2 (*Application for Services Payments*), which shall be construed mutatis mutandis, as if references therein to the date of the Interim Certificate was a reference to the date when the final Tram is declared Reliable provided that all Trams shall have been delivered Reliable not later than the expiry of 13 full Reporting Periods form the commencement of Passenger Services; or

3.2.2 If all Trams have not been declared Reliable by the expiry of 13 full Reporting Periods from the commencement of Passenger Services, the Service Payment Retention shall be retained by the Client and the Tram Maintainer shall have no further entitlement to it.

3.3 Upon the earlier of:

3.3.1 the payment of the Service Payment Retention to the Tram Maintainer pursuant to paragraph 3.2.1; or

3.3.2 the expiry of 13 full Reporting Periods from the commencement of Passenger Services,

the Services Payment provisions set out in paragraph 1.1 of this Schedule 3 (*Payment*) shall apply with full force and effect, and the provisions of this paragraph 3 shall cease to have effect (save in respect of the payment obligation or retention right set out in paragraph 3.2 above).

4. REVIEW OF PERFORMANCE BENCHMARKS

4.1 On or prior to the expiry of 13 full Reporting Periods after the commencement of Passenger Services and thereafter on or prior to each subsequent Performance Review Date, the Client shall review and determine the Minimum Overall Payment Performance benchmark and the Tram Punctuality Performance benchmark

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("**Performance Benchmarks**") to apply for each Reporting Period from each such date to the next Performance Review Date.

4.2 In determining what Performance Benchmarks are to apply up to the next Performance Review Date under paragraph 4.1 above, the Client will have regard to the following:

4.2.1 the level of performance achieved by the Tram Maintainer in the preceding periods in relation to the then current level of Performance Benchmarks and the extent to which that level of performance is or is likely to be sustainable or to be improved upon by an efficient maintenance of the Trams using all reasonable endeavours to optimise the availability of those Trams;

4.2.2 the improvement in performance which the Tram Maintainer might reasonably be expected to achieve up to the next Performance Review Date; and

4.2.3 the effect (or likely effect) of any investments or improvements made, or due to be made which can reasonably be expected to affect the performance of the Tram Maintainer under this Agreement.

4.3 If the Tram Maintainer disagrees that any or all of the Performance Benchmarks determined by the Client under paragraphs 4.1 and 4.2 above are reasonable for the Client to determine then either of the parties may refer that issue for determination in accordance with the Dispute Resolution Procedure but until such revisions are agreed or otherwise determined in accordance with such Dispute Resolution Procedure, the Performance Benchmarks are assessed by the Client under paragraphs 4.1 and 4.2 above shall apply.

5. EXCUSING CAUSES AND PERFORMANCE REBATES

5.1 To the extent that:

5.1.1 a single Minor Defect or Major Defect on a Tram in passenger service has led to Tram Maintainer Late Trams continuing to be allocated in excess of one hour after the removal of the defective Tram back to the Depot where the Tram Maintainer has made a Hot Spare available to the Operator; or

5.1.2 one or more Excusing Causes have resulted in Tram Maintainer Late Trams being allocated which are due to an adverse impact on the performance of the Services by the Tram Maintainer under this Agreement of an Excusing

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Cause or on the monitoring of such performance under part 1 of this Schedule 3 (*Payment*);

results in the Services Payment payable by the Client under part 1 of this Schedule 3 (*Payment*) in relation to a Reporting Period being less than it would otherwise have been by an amount equal to or greater than the Relief Threshold then, in order to claim a Performance Rebate from the Client in consequence thereof, then the Tram Maintainer shall:

(a) within 10 Business Days after the end of the relevant Reporting Period submit to the Client written notice:

(i) describing the effect that each such single defect or single defect or Excusing Cause has had on the performance of the Services or on the monitoring of such performance during that Reporting Period including full details of the nature of the single defect or Excusing Cause, the date of occurrence and its duration (or likely duration in the case of a single defect or Excusing Cause that is affecting Services at the date of the notice);

(ii) describing the effect of each such single defect or Excusing Cause or external factor on the allocation of Tram Maintainer Late Trams and Tram Maintainer Late Last Trams;

(iii) stating the Services Payment that would have been due from the Client in respect of that Reporting Period had the Excusing Cause(s) or external factor not occurred; and

(iv) stating the proposed Performance Rebate due from the Client assuming that the Actual Performance Level for Tram Punctuality Performance during any period affected by an Excusing Cause or external factor would have been no higher than the Actual Performance Level applying to those parts of the Reporting Period not affected by an Excusing Cause or external factor (or where the proposed Performance Rebate applies to a full Reporting Period, the previous Reporting Period not affected by an Excusing Cause or external factor);

(b) demonstrate to the reasonable satisfaction of the Client that:

(i) the Tram Maintainer could not have avoided the occurrence of the Excusing Cause(s) or the external factor or the consequences thereof by steps which it might reasonably be expected to have taken, without incurring material additional expenditure;

(ii) the Excusing Cause(s) or external factor caused the claimed effect on the allocation of Tram Maintainer Late Trams and Tram Maintainer Late Last Trams; and

(iii) the reduction in the Services Payment caused by the Excusing Cause(s) or external factor could not reasonably be expected to have been avoided or reduced by the Tram Maintainer taking all those steps which a reasonably experienced, efficient and competent maintenance contractor engaged in the same type of undertaking (comparable in size, scope and complexity to its activities in relation to this Agreement) would properly be expected to take if seeking in good faith and in accordance with Good Industry Practice to mitigate or recover the effect of the Excusing Cause(s), in particular by implementing any relevant contingency plans that the Tram Maintainer is required to put in place under this Agreement.

5.2 In the event that the Tram Maintainer has submitted a notice under paragraph 5.1(a) and complied with its obligations under paragraph 5.1(b) then:

(a) the Tram Maintainer and the Client shall endeavour to agree as soon as practicable the amount of the Performance Rebate (if any);

(b) the Tram Maintainer shall provide, as soon as reasonably practicable after any request by the Client, such further information and explanations as the Client may reasonably request;

(c) to the extent that the Client agrees to pay the proposed Performance Rebate, the Client shall pay to the Tram Maintainer the Performance Rebate or such part as it agrees to be payable, within 14 days of the later of the receipt by the Client of the notice to the Client under paragraph 5.1(a) and the receipt of all information and explanations requested under paragraph 5.1(b) that are reasonably required by the Client to verify its liability to make such payment;

(d) if the Client wishes to dispute all or part of the proposed Performance Rebate, it shall, within 28 days of receipt of the notice under paragraph 5.1(a) of part 1 of this Schedule 3 (*Payment*) (or if later within 28 days after receipt of any further information reasonably requested under paragraph 5.2 (b) of part 1 of this Schedule 3 (*Payment*)), submit written notice to the Tram Maintainer setting out the reasons why it disagrees with the notice submitted under paragraph 5.1 (a) of part 1 of this Schedule 3 (*Payment*) or considers that the Tram Maintainer has not complied with its obligations under paragraph 5.1(b) of part 1 of this Schedule 3 (*Payment*);

(e) to the extent that the Tram Maintainer and the Client are unable to agree the amount of the Performance Rebate (if any) within 28 days of days of receipt of the notice referred to in paragraph 5.2 (d) of part 1 of this Schedule 3 (*Payment*), then the determination of the applicable Performance Rebate may at the instance of either Party be referred for determination in accordance with the Dispute Resolution Procedure; and

(f) the Client shall pay any unpaid amount of the Performance Rebate subsequently agreed or determined to be payable within 14 days of the quantum of the Performance Rebate being agreed or within 14 days of receipt by **tie** of the determination thereof, together with interest in accordance with the rate set out in Clause 42.5 of this Agreement from the due date for payment of the Services Payment for the Reporting Period in relation to which the Performance Rebate is payable up to the date of payment.

5.3 The Client shall be entitled to deduct from any Performance Rebates payable by it under this paragraph 5 of part 1 of this Schedule 3 (*Payment*) any variable cost savings realised by the Tram Maintainer as a result of non-performance of the Services, particularly in the case of Excusing Causes having an extended duration.

PART 2: MOBILISATION MILESTONES

PAYMENT MILESTONES SCHEDULE CAPITAL

PAYMENT MILESTONES SCHEDULE CAPITAL MAINTENANCE

PAYMENT MILESTONES SCHEDULE- Mobilisation TMA							Payment Period					
No.	Milestone Description	Revised forecast date based on signature on 26th March 2008	Milestone Payment Proposed	£ of Total Milestone Payments	revised previous plus 30 days	revised forecast reporting period	Period End Date	Application for payment	Clause 38.6 Issue of Interim Certificate	Clause 38.8 VAT Certificate to client	Clause 38 payment of Interim Certificate	Amount to be paid
	Mobilisation TMA		£2,275,806.32					within 3 business days	10 Business days from application date	7 days from issue of Interim certificate	20 business days from issue of VAT certificate	
	Contract Award	26/03/2008		£0.00	12/05/2008	Q2/2008-2009	24/05/2008	26/05/2008	11/06/2008	16/06/2008	16/07/2008	£0.00
M1	Demonstration to tie of completion of review of Tram Supplier Tram design and Infraco Depot design to ensure	26/09/2008	13.95%	£317,474.98	06/11/2008	Q3/2008-2009	09/11/2008	12/11/2008	26/11/2008	03/12/2008	31/12/2008	£317,474.98
M2	Finalisation of any changes agree by tie to the Tram Maintenance Specification and maintenance Specification and maintenance plans in response	26/01/2009	18.60%	£423,299.97	06/03/2009	Q3/2008-2009	31/03/2009	04/04/2009	13/04/2009	28/04/2009	28/05/2009	£423,299.97
M3	Finalisation of maintenance team training and recruitment plan including competence assessment	26/09/2009	18.60%	£423,299.97	06/11/2009	Q3/2009-2010	14/11/2009	18/11/2009	02/12/2009	09/12/2009	08/01/2010	£423,299.97
M4	Completion of mobilisation of maintenance team management and administrative staff to depot	26/12/2009	18.60%	£423,299.97	06/02/2010	Q3/2009-2010	05/02/2010	10/02/2010	24/02/2010	03/03/2010	31/03/2010	£423,299.97
M5	Delivery to the depot of all Tram maintainer procured spares, special tools,equipment and all computer	26/02/2010	13.95%	£317,474.98	06/04/2010	Q1/2010-2011	01/05/2010	26/05/2010	10/06/2010	28/05/2010	23/06/2010	£317,474.98
M6	Complete mobilisation of maintenance team techn can to Depot	26/09/2010	9.30%	£211,649.98	06/11/2010	Q3/2010-2011	13/11/2010	17/11/2010	01/12/2010	08/12/2010	05/01/2011	£211,649.98
M7	Completion of maintenance team training in accordance with training and recruitment plan and all required competences certified	05/12/2010	4.65%	£105,824.99	15/01/2011	Q1/2010-2011	05/02/2011	09/02/2011	23/02/2011	02/03/2011	32/03/2011	£105,824.99
M7	Demonstrasion of non conformance to advent audit to demonstrate readiness for the delivery of the tram maintenance services	30/11/2010	2.33%	£53,481.45	06/01/2011	Q3/2010-2011	03/01/2011	10/01/2011	26/01/2011	02/02/2011	02/03/2011	£53,481.45
CROSS CHECKS			100.00%	£2,275,806.32								£2,275,806.32

PART 3: MAXIMUM PERFORMANCE PAYMENT

PAYMENT MILESTONES MAINTENANCE SCHEDULE- 1 TO 27 Trams		CAF					Payment Period				
No.	**Milestone Description**	**Comments**	**Previous Forecast Date**	Revised forecast date based on signature on 12th May 2008	**Previous forecast reporting period**	revised forecast reporting period period	**Period End Date**	**Application for payment**	**Clause 38.6 Issue of Interim Certificate**	**Clause 38.6 VAT Certificate to client**	**Clause 38 payment of Interim Certificate**
	Maintence payment will start on commencement of shadow running and will apply to all 27 Trams.							within 15 business days	10 Business days from application date	10 Busines days from issue of interim certificate	20 days from issued of interim certificate
1	Commencement of Shadow Running	Employers Requirements Clause 23.10 Shadow Running. The evaluation of the shadow running is the pre operations test. Tram Inspector will confirm passing of test so payment can be made	30/09/2010	18/04/2011	07/2010-2011	01 - 11/12					
2	Maintenance payment number 01 year 1	Payment number 1 is due at the start of shadow running	30/09/2010	18/04/2011	07/2010-2011	01 - 11/12	30/04/2011	20/05/2011	03/06/2011	17/06/2011	23/06/2011
3	Maintenance payment number 02 year 1	Payment number 2 is due at end of first period after maintenance payment 1 was applied for		16/05/2011		02 - 11/12	28/05/2011	17/06/2011	01/07/2011	15/07/2011	21/07/2011

PAYMENT MILESTONES MAINTENANCE SCHEDULE- 1 TO 27 Trams		CAF					Payment Period				
No.	Milestone Description	Comments	Previous Forecast Date	Revised forecast date based on signature on 12th May 2008	Previous forecast reporting period	revised forecast reporting period period	Period End Date	Application for payment	Clause 38.6 Issue of Interim Certificate	Clause 38.6 VAT Certificate to client	Clause 38 payment of Interim Certificate
4	Maintenance payment number 03 year **1**	Payment number 3 is due at end of first period after maintenance payment 2 was applied for		13/06/2011		03 - 11/12	25/06/2011	15/07/2011	29/07/2011	12/08/2011	18/08/2011
5	Maintenance payment number 04 year 1	Payment number 4 is due at end of first period after maintenance payment 3 was applied for		11/07/2011		04 - 11/12	23/07/2011	12/08/2011	26/08/2011	09/09/2011	15/09/2011
6	Maintenance payment number 05 year 1	Payment number 5 is due at end of first period after maintenance payment 4 was applied for		08/08/2011		05 - 11/12	20/08/2011	09/09/2011	23/09/2011	07/10/2011	13/10/2011
7	Maintenance payment number 06 year 1	Payment number 6 is due at end of first period after maintenance payment 5 was applied for		05/09/2011		06 - 11/12	17/09/2011	07/10/2011	21/10/2011	04/11/2011	10/11/2011
8	Maintenance payment number 07 year 1	Payment number 7 is due at end of first period after maintenance payment 6 was applied for		03/10/2011		07 - 11/12	15/10/2011	04/11/2011	18/11/2011	02/12/2011	08/12/2011
9	Maintenance payment number 08 year 1	Payment number 8 is due at end of first period after maintenance payment **7** was applied for		31/10/2011		08 - 11/12	12/11/2011	02/12/2011	16/12/2011	30/12/2011	05/01/2012

PAYMENT MILESTONES MAINTENANCE SCHEDULE- 1 TO 27 Trams		CAF					Payment Period				
No.	Milestone Description	Comments	Previous Forecast Date	Revised forecast date based on signature on 12th May 2008	Previous forecast reporting period	revised forecast reporting period period	Period End Date	Application for payment	Clause 38.6 Issue of Interim Certificate	Clause 38.6 VAT Certificate to client	Clause 38 payment of Interim Certificate
10	Maintenance payment number 09 year 1	Payment number 9 is due at end of first period after maintenance payment 8 was applied for		28/11/2011		09 - 11/12	10/12/2011	30/12/2011	13/01/2012	27/01/2012	02/02/2012
11	Maintenance payment number 10 year 1	Payment number 10 is due at end of first period after maintenance payment 9 was applied for		26/12/2011		10 - 11/12	07/01/2012	27/01/2012	10/02/2012	24/02/2012	01/03/2012
12	Maintenance payment number 11 year 1	Payment number 11 is due at end of first period after maintenance payment 10 was applied for		23/01/2012		11 - 11/12	04/02/2012	24/02/2012	09/03/2012	23/03/2012	29/03/2012
13	Maintenance payment number 12 year 1	Payment number 12 is due at end of first period after maintenance payment 11 was applied for		20/02/2012		12 - 11/12	03/03/2012	23/03/2012	06/04/2012	20/04/2012	26/04/2012
14	Maintenance payment number 13 year 1	Payment number 13 is due at end of first period after maintenance payment 12 was applied for		19/03/2012		13 - 11/12	31/03/2012	20/04/2012	04/05/2012	18/05/2012	24/05/2012
15	Maintenance payment number 01 year 2	Payment number 1 year 2 is due at the end of the first period after maintenance payment 13 was applied for		16/04/2012		01 - 12/13	28/04/2012	18/05/2012	01/06/2012	15/06/2012	21/06/2012
16	Maintenance payment number 02 year 2	Payment number 2 year 2 is due at end of first period after maintenance payment 1 was applied for		14/05/2012		02 - 12/13	26/05/2012	15/06/2012	29/06/2012	13/07/2012	19/07/2012

PAYMENT MILESTONES MAINTENANCE SCHEDULE- 1 TO 27 Trams		CAF					Payment Period				
No.	Milestone Description	Comments	Previous Forecast Date	Revised forecast date based on signature on 12th May 2008	Previous forecast reporting period	revised forecast reporting period period	Period End Date	Application for payment	Clause 38.6 issue of Interim Certificate	Clause 38.6 VAT Certificate to client	Clause 38 payment of Interim Certificate
17	Maintenance payment number 03 year 2	Payment number 3 year 2 is due at end of first period after maintenance payment 2 was applied for		11/06/2012		03 - 12/13	23/06/2012	13/07/2012	27/07/2012	10/08/2012	16/08/2012
18	Maintenance payment number 04 year 2	Payment number 4 year 2 is due at end of first period after maintenance payment 3 was applied for		09/07/2012		04 - 12/13	21/07/2012	10/08/2012	24/08/2012	07/09/2012	13/09/2012
19	Maintenance payment number 05 year 2	Payment number 5 year 2 is due at end of first period after maintenance payment 4 was applied for		06/08/2012		05 - 12/13	18/08/2012	07/09/2012	21/09/2012	05/10/2012	11/10/2012
20	Maintenance payment number 06 year 2	Payment number 6 year 2 is due at end of first period after maintenance payment 5 was applied for		03/09/2012		06 - 12/13	15/09/2012	05/10/2012	19/10/2012	02/11/2012	08/11/2012
21	Maintenance payment number 07 year 2	Payment number 7 year 2 is due at end of first period after maintenance payment 6 was applied for		01/10/2012		07 - 12/13	13/10/2012	02/11/2012	16/11/2012	30/11/2012	06/12/2012
22	Maintenance payment number 08 year 2	Payment number 8 year 2 is due at end of first period after maintenance payment 7 was applied for		29/10/2012		08 - 12/13	10/11/2012	30/11/2012	14/12/2012	28/12/2012	03/01/2013
23	Maintenance payment number 09 year 2	Payment number 9 year 2 is due at end of first period after maintenance payment 8 was applied for		26/11/2012		09 - 12/13	08/12/2012	28/12/2012	11/01/2013	25/01/2013	31/01/2013

PAYMENT MILESTONES MAINTENANCE SCHEDULE- 1 TO 27 Trams		CAF					Payment Period				
No.	Milestone Description	Comments	Previous Forecast Date	Revised forecast date based on signature on 12th May 2008	Previous forecast reporting period	revised forecast reporting period period	Period End Date	Application for payment	Clause 38.6 Issue of Interim Certificate	Clause 38.6 VAT Certificate to client	Clause 38 payment of Interim Certificate
24	Maintenance payment number 10 year 2	Payment number 10 year 2 is due at end of first period after maintenance payment 9 was applied for		24/12/2012		10 - 12/13	05/01/2013	25/01/2013	08/02/2013	22/02/2013	28/02/2013
25	Maintenance payment number 11 year 2	Payment number 11 year 2 is due at end of first period after maintenance payment 10 was applied for		21/01/2013		11 - 12/13	02/02/2013	22/02/2013	08/03/2013	22/03/2013	28/03/2013
26	Maintenance payment number 12 year 2	Payment number 12 year 2 is due at end of first period after maintenance payment 11 was applied for		18/02/2013		12 - 12/13	02/03/2013	22/03/2013	05/04/2013	19/04/2013	25/04/2013
27	Maintenance payment number 13 year 2	Payment number 13 year 2 is due at end of first period after maintenance payment 12 was applied for		18/03/2013		13 - 12/13	31/03/2013	20/04/2013	04/05/2013	18/05/2013	24/05/2013
28	Maintenance payment number 01 year 3	Payment number 1 year 3 is due at the end of the first period after maintenance payment 13 was applied for		15/04/2013		01 - 13/14	27/04/2013	17/05/2013	31/05/2013	14/06/2013	20/06/2013
29	Maintenance payment number 02 year 3	Payment number 2 year 3 is due at end of first period after maintenance payment 1 was applied for		13/05/2013		02 - 13/14	25/05/2013	14/06/2013	28/06/2013	12/07/2013	18/07/2013
30	Maintenance payment number 03 year 3	Payment number 3 year 3 is due at end of first period after maintenance payment 2 was applied for		10/06/2013		03 - 13/14	22/06/2013	12/07/2013	26/07/2013	09/08/2013	15/08/2013
31	Maintenance payment number 04 year 3	Payment number 4 year 3 is due at end of first period after maintenance payment 3 was applied for		08/07/2013		04 - 13/14	20/07/2013	09/08/2013	23/08/2013	06/09/2013	12/09/2013

PAYMENT MILESTONES MAINTENANCE SCHEDULE- 1 TO 27 Trams		CAF					Payment Period				
No.	Milestone Description	Comments	Previous Forecast Date	Revised forecast date based on signature on 12th May 2008	Previous forecast reporting period	revised forecast reporting period period	Period End Date	Application for payment	Clause 38.6 Issue of Interim Certificate	Clause 38.6 VAT Certificate to client	Clause 38 payment of Interim Certificate
32	Maintenance payment number 05 year 3	Payment number 5 year 3 is due at end of first period after maintenance payment 4 was applied for		05/08/2013		05 - 13/14	17/08/2013	06/09/2013	20/09/2013	04/10/2013	10/10/2013
33	Maintenance payment number 06 year 3	Payment number 6 year 3 is due at end of first period after maintenance payment 5 was applied for		02/09/2013		06 - 13/14	14/09/2013	04/10/2013	18/10/2013	01/11/2013	07/11/2013
34	Maintenance payment number 07 year 3	Payment number 7 year 3 is due at end of first period after maintenance payment 6 was applied for		30/09/2013		07 - 13/14	12/10/2013	01/11/2013	15/11/2013	29/11/2013	05/12/2013
35	Maintenance payment number 08 year 3	Payment number 8 year 3 is due at end of first period after maintenance payment 7 was applied for		28/10/2013		08 - 13/14	09/11/2013	29/11/2013	13/12/2013	27/12/2013	02/01/2014
36	Maintenance payment number 09 year 3	Payment number 9 year 3 is due at end of first period after maintenance payment 8 was applied for		25/11/2013		09 - 13/14	07/12/2013	27/12/2013	10/01/2014	24/01/2014	30/01/2014
37	Maintenance payment number 10 year 3	Payment number 10 year 3 is due at end of first period after maintenance payment 9 was applied for		23/12/2013		10 - 13/14	04/01/2014	24/01/2014	07/02/2014	21/02/2014	27/02/2014
38	Maintenance payment number 11 year 3	Payment number 11 year 3 is due at end of first period after maintenance payment 10 was applied for		20/01/2014		11 - 13/14	01/02/2014	21/02/2014	07/03/2014	21/03/2014	27/03/2014
39	Maintenance payment number 12 year 3	Payment number 12 year 3 is due at end of first period after maintenance payment 11 was applied for		17/02/2014		12 - 13/14	01/03/2014	21/03/2014	04/04/2014	18/04/2014	24/04/2014

PAYMENT MILESTONES MAINTENANCE SCHEDULE- 1 TO 27 Trams		CAF					Payment Period				
No.	Milestone Description	Comments	Previous Forecast Date	Revised forecast date based on signature on 12th May 2008	Previous forecast reporting period	revised forecast reporting period period	Period End Date	Application for payment	Clause 38.6 Issue of Interim Certificate	Clause 38.6 VAT Certificate to client	Clause 38 payment of interim Certificate
40	Maintenance payment number 13 year 3	Payment number 13 year 3 is due at end of first period after maintenance payment 12 was applied for		17/03/2014		13 - 13/14	31/03/2014	20/04/2014	04/05/2014	18/05/2014	24/05/2014

TRAM KM FORECAST

Year	2008	2009	2010	Year 1 2011	Year 2 2012	Year 3 2013
Mileage (km)	Nil	Nil	Nil	57037	70000	85000
Trams				27	27	27
Total				1540000	1890000	2295000

EDINBURGH TENDER

Tender Data	1.08	€/ km & Trams	100.000	km

KM Proposed			
1st year:	km & Trams (27 units)	57.037	km/Tram
2nd year:	km & Trams (27 units)	70.000	km/Tram
3rd year:	km & Trams (27 units)	85.000	km/Tram

	Year 2007	year 2008	Year 2009	Year 2010	year 2011	Year 2012	Year 2013
		CPI forcast estimate	CPI forcast estimate	CPI forcast estimate	CPI forcast estimate	CPI forcast estimate	CPI forcast estimate
KM	**Price € / km**	**3%**	**3%**	**3%**	**3%**	**3%**	**3%**
55001 - 60000	**1,3756**	1,4168	1,4593	1,5031	1,5482	1,5947	1,6425
60001 - 65000	**1,3187**	1,3583	1,3990	1,4410	1,4842	1,5288	1,5746
65001 - 70000	**1,2700**	1,3081	1,3473	1,3878	1,4294	1,4723	1,5164
70001 - 75000	**1,2278**	1,2646	1,3026	1,3416	1,3819	1,4233	1,4660
75001 - 80000	**1,1908**	1,2266	1,2634	1,3013	1,3403	1,3805	1,4219
80001 - 85000	**1,1582**	1,1930	1,2288	1,2656	1,3036	1,3427	1,3830

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85001 - 90000	**1,1293**	1,1631	1,1980	1,2340	1,2710	1,3091	1,3484
90001 - 95000	**1,1033**	1,1364	1,1705	1,2056	1,2418	1,2791	1,3174
95001 - 100000	**1,08**	1,1124	1,1458	1,1801	1,2155	1,2520	1,2896

NOTE 1: If each tram or any tram does not exceed 55.000 km per year or is above 100.000 km per year, the parties shall meet and reach an agreement with respect to payment for that tram or trams.
NOTE 2: Unless the parties agree otherwise, the parties shall agree at the beginning of the year the payment forecast and the payments for periods 1 to 12 shall be made based on that forecast with a balancing payment to adjust for the actual at the end of period 13.
NOTE 3: For years 1 to 3 then the proportion of the €/km figure that is based upon costs incurred in £ sterling is 40%. Therefore 40% is not subject to currency fluctuation and shall be converted into £/km using the rate of 0.693 € per £1 sterling. The other 60% of the €/km figure shall be converted into £/km based on the prevailing exchange rate on the date of payment application unless the Parties agree to hedge the maintenance payments.
NOTE 4: For years 4 to 30 then the proportion of the €/km figure that is based upon costs incurred in £ sterling is 60%. Therefore 60% is not subject to currency fluctuation and shall be converted into £/km using the rate of 0.693 € per £1 sterling. The other 40% of the €/km figure shall be converted into £/km based at the prevailing exchange rate on the date of payment application unless the Parties agree to hedge the maintenance payments.

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

SCHEDULE 4

REQUIRED INSURANCES

Part 1

Required Insurances

1. PROPERTY DAMAGE AND BUSINESS INTERRUPTION INSURANCE

Insured Parties:	The Tram Maintainer Any Tram Maintainer Party each for its respective rights and interests
Coverage:	All risks of physical loss, destruction or damage to the Insured Property from any causes not otherwise excluded. <u>Insured Property</u> All real and personal property used by the Insured Parties in connection with the activities forming the subject of this Agreement including but not limited to – Buildings Contents including improvements and alterations Machinery, plant, tools and equipment Stock including raw materials, work in progress and finished goods <u>Business Interruption</u> Loss of gross profit or revenue and increased costs of working following loss or destruction of or damage to property used by the Insured Parties in connection with the activities forming the subject of this Agreement
Limit of Indemnity:	The full replacement value of the Insured Property at the time of reinstatement The amount of gross profit or revenue for the maximum indemnity period First loss basis will be considered
Period of Insurance:	From the earlier or the Effective Date or the commencement of the activities forming the subject of this Agreement until completion of the works specified in the Agreement including the period of any defect period or extended warranty period or the expiry of the

	maximum indemnity period if later.
Territorial Limits:	Anywhere within Europe including whilst in transit by road or rail.
Exclusions:	loss of any of the Insured Property by theft or disappearance when the loss is revealed only in the course of an inventory undertaking the cost of making good wear and tear, gradual deterioration, etc. but not resulting damage war, invasion, acts of foreign enemies, hostilities, civil war, rebellion, revolution, insurrection or military or usurped power nuclear risks sonic bangs
Extensions:[1]	The insurance must include the following minimum extensions: professional fees including surveyors', consulting engineers' and legal fees removal of debris temporary repairs automatic reinstatement of sum insured local authority Clause including European Union, railway inspectorate or Health and Safety Executive full value terrorism cover off-site storage property at maintainer's premises waiver of subrogation between insured parties non-invalidation utilities/suppliers/customers/property stored extensions denial of access extension subsidence, ground heave and landslip
Maximum Permitted Deductible:	GBP 40,000 each and every occurrence or all occurrences attributable to one source or original cause

[1] To be agreed no later than 12 months before the commencement of maintenance services

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2. PUBLIC AND PRODUCTS LIABILITY INSURANCE

To be retained to cover liability risks not insured by the OCIP at the Tram Maintainer's own premises

Insured Parties:	**tie** Any **tie** Party The Tram Maintainer Any Tram Maintainer Party Any party forming the Client (should the Client not be **tie** or the Infraco) Any Client Party The Infraco each for its respective rights and interests.
Coverage:	To indemnify the insured parties against legal liability for damages or compensation arising out of bodily injury including death, illness, disease and psychiatric damage and direct loss of or damage to physical property including obstruction, interference, loss of amenities, nuisance, trespass, stoppage of traffic, infringement of light, easement or quasi easement, or any like cause happening during the Period of Insurance and arising out of or in connection with the activities of the parties in respect of the services forming the subject of the Agreement.
Limit of Indemnity:	£80,000,000 any one occurrence/unlimited in the aggregate (other than in respect of sudden and accidental pollution which shall be in the aggregate)
Period of Insurance:	From the earlier or the Effective Date or the commencement of the activities forming the subject of this Agreement until completion of the activities specified in the Agreement including the period of any defect period or extended warranty period.
Territorial Limits and Jurisdiction:	Worldwide
Exclusions:	fines, penalties, punitive or exemplary damages. war, invasion, acts of foreign enemies, hostilities (whether declared or not), civil war, rebellion, revolution, insurrection of military or usurped power. nuclear risks seepage, pollution or contamination unless caused by a sudden, unintended and unexpected happening. professional indemnity, but not excluding property damage or bodily

	injury. Professional indemnity exclusion is not to apply to activities in connection with the sale or supply of goods or products or the maintenance of Trams Exclusion of property in the Insured Party's care, custody or control is not to apply to Trams in their custody for the purposes of maintenance or overhaul or other activities forming the subject of this Agreement
Extensions:	cross liabilities Clause claimants' and defence costs and expenses in addition to limits of indemnity waiver of subrogation between insured parties Health and Safety at Work Act Clause the Insured includes the respective officers, directors, agents, servants and employees of an insured party contractual liability Clause non invalidation-non-vitiation Clause cover is to be primary with no contribution with any other policies effected by or on behalf of the insured parties Defective Premises Act liability Data Protection Act liability
Maximum Permitted Deductible:	GBP 25,000 each and every occurrence or all occurrences attributable to one source or original cause in respect of property damage (personal injury claims will be paid in full)

3. EMPLOYERS' LIABILITY INSURANCE

Insured Party:	The Tram Maintainer and any Tram Maintainer Party
Coverage:	To indemnify the Insured Party against legal liability for damages or compensation arising out of bodily injury including death, illness, disease and psychiatric damage sustained by any employee arising out of and in the course of the employee's employment caused during the Period of Insurance.
Limit of Liability:	Minimum limit of indemnity of GBP 10,000,000 any one occurrence or series of occurrences arising from one original cause or event, unlimited during the Period of Insurance.
Period of Insurance:	From the Effective Date for twelve months and thereafter each further twelve month period until the earlier of the end of the activities forming the subject of this Agreement or the date of termination of this Agreement.

Minimum Extensions:	The insurance must include the following minimum extensions: Contractual liability Claimant's and defence costs and expenses Indemnity to principals Cross liabilities Inclusion of directors, officers, partners and employees as Insured Parties Health and Safety legislation prosecution costs including costs of an appeal Unsatisfied court judgements Compensation for court attendance Definition of employee to include as a minimum persons under a contract of service or apprenticeship, labour only subcontractors, self-employed persons, labour masters or persons supplied by them, operators and drivers of hired in plant
Maximum Permitted Deductible:	NIL

4. COMPREHENSIVE MOTOR INSURANCE

Insured Party:	The Tram Maintainer **tie** or the Client (id not **tie**)
Coverage:	Comprehensive in respect of loss or damage to Own Vehicles. Legal Liability for death, injury, illness or disease or loss of or damage to Third Party Property.
Limit of Liability:	Own Damage - Market Value/Cost of Repairs Third Party: Bodily Injury - Unlimited. Property Damage by Cars £20,000,000 any one occurrence Property Damage by Commercial Vehicles £5,000,000 any one occurrence unlimited during the Period of Insurance
Period of Insurance:	From the Effective Date for twelve months and thereafter each further twelve month period until the date of expiry or earlier termination of the Agreement.
Minimum Extensions:	The insurance must include the following minimum extensions: Contingent motor liability Passenger indemnity and negligence of passengers Occasional business use by employees Unauthorised movement Indemnity to principals

Unauthorised use by employees

Maximum Permitted Deductible:	GBP 25,000 in respect of own damage GBP NIL in respect of third party liability

5. DIRECTORS' & OFFICERS' LIABILITY

Insured Party:	The Tram Maintainer (Insured Organisation) The Directors and Officers of the Tram Maintainer (insured Persons)
Coverage:	A – Directors' & Officers' Liability To pay on behalf of each Insured Person the direct loss to the extent they are not indemnified by the Insured Organisation B – Corporate Reimbursement To pay on behalf of the Insured Organisation the direct loss to the extent the Insured Organisation has indemnified the Insured Person
Limit of Liability:	GBP 10,000,000 any one occurrence and in the aggregate during any twelve month Period of Insurance
Period of Insurance:	From the Effective Date for twelve months and thereafter each further twelve month period until the expiry or earlier termination of the Agreement.
Minimum Extensions:	The insurance must include the following minimum extensions: Defence costs in respect of pollution and contamination Outside directorships Provision for run-off cover and extended claim reporting period on expiry Bilateral discovery period
Exclusions:	No insured versus insured exclusion in respect of claims outside the United States of America Bodily injury and property damage – "for" language to be used
Maximum Permitted Deductible:	A - GBP NIL in respect of Directors' & Officers' liability B - GBP 25,000 in respect of Corporate Reimbursement

Part 2

Broker's Letter of Undertaking

To: [THE EMPLOYER]

Dear Sirs

We confirm in our capacity as insurance brokers that the Required Insurances specified in Clause 29 (*Insurance*) and Schedule 4 *(Required Insurances)* of the Tram Maintenance Agreement dated ◆ between ◆ (the "**Tram Maintainer**") and Client as defined therein (the "**Agreement**") are, as at the date hereof, in effect in respect of the risks set out in the attached cover notes.

We have arranged the Required Insurances on the basis of the information and instructions given by the Tram Maintainer. We have not made any particular or special enquiries regarding the Required Insurances beyond those that we would normally make in the ordinary course of arranging the insurances on behalf of our insurance broking clients.

The confirmations set out in this letter are given by reference to our state of knowledge at the date hereof.

Pursuant to instructions received from the Tram Maintainer, we hereby undertake in respect of the interests of the Tram Maintainer and the Client in the Required Insurances referred to in the attached cover notes:

1. to use reasonable endeavours to have endorsed on each and every policy evidencing the Required Insurances when the same is issued, endorsements substantially in the form set out in Schedule 4 (*Required Insurances*) of the Agreement;

2. to advise the Client:

   2.1 promptly after receiving notice of any insurer's cancellation or suspension of any of the Required Insurances or receiving notice of the intended cancellation or suspension of any of the Required Insurances;

   2.2 promptly upon our receipt from the Tram Maintainer of any notice of any changes proposed to be made to the Required Insurances which, if effected, would result in a material reduction in limits or coverage (including in respect of extensions of cover) or in an increase in deductibles, exclusions or exceptions;

   2.3 of any default in the payment of any premium for any of the Required Insurances;

   2.4 at least twenty days prior to the expiry of any of the Required Insurances if we have not received written renewal instructions from the Tram Maintainer or if we receive written instructions to renew, to advise the Client of the details thereof; and

   2.5 on receipt of notice of any act or omission of the Tram Maintainer or any Sub-Contractor which will invalidate or render unenforceable in whole or in part, any of the Required Insurances;

3. no later than 10 days (in respect of certificates) and as soon as reasonably practicable in respect of policies and other documents, to supply you and/or your insurance advisors (or your or their authorised representative) copies of all placing slips, certificates, cover notes, renewal receipts and confirmations of renewal and payment of premiums and all policy documents (or

confirmation of the terms of such policy documents where such policy documents cannot be made available) in respect of the Required Insurances, or upon request, to make available to you the originals of any or all such documents held by us;

4. to disclose to the insurers any fact, change of circumstance or occurrence is material to the risks insured against under the Required Insurances;

5. to treat as confidential all information in relation to the Required Insurances supplied to us by the Tram Maintainer or any Sub-Contractor or the Client and not to disclose, without the written consent of the Client, such information to any third party other than the insurers under the Required Insurances, unless required to do so by law or any regulatory authority; and

6. to notify the Client as soon as reasonably practicable prior to our ceasing to act as brokers to the Tram Maintainer, unless impracticable because of circumstances beyond our control, in which case we shall notify the Client as soon as reasonably practicable upon becoming aware that we shall cease, or have ceased, so to act.

Where insurers wish any of the Required Insurances to be cancelled for reasons of non-payment of premium, we will request those insurers to give you a reasonable opportunity of paying such amounts outstanding before issuing notice of cancellation on behalf of such insurers.

The above undertakings are given subject to our continuing appointment for the time being as insurance brokers to the Tram Maintainer in relation to the Required Insurances concerned and the monitoring and handling of claims in relation to the Tram Maintainer, and our obligations set out in this letter shall automatically cease upon termination of our appointment.

For the avoidance of doubt all undertakings and other confirmations given in this letter relate solely to the Required Insurances. They do not apply to any other insurances and nothing in this letter should be taken as providing any undertakings or confirmations in relation to any other such insurance that ought to have been placed or may at some future date be placed by other brokers.

This letter is given by us on the instructions of the Tram Maintainer and with the Tram Maintainer's full knowledge and consent as to its terms as evidenced by the Tram Maintainer's signature below.

This letter shall be governed by and shall be construed in accordance with Scots Law and any dispute as to its terms shall be submitted to the exclusive jurisdiction of the courts of Scotland.

Yours faithfully

.....
For and on behalf of (Insurance Broker)

.....
For and on behalf of (The Tram Maintainer)

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Part 3

Insurance Questionnaire

ALL CLASSES OF REQUIRED INSURANCES	
Do your current insurance policies comply with the full scope of cover required for each class of Required Insurance as detailed in the Schedules? **If NO, please identify the class of Required Insurance and provide full details**	NO Under the Liability - The limit is less than the limit required - Clauses not known like: - Health and safety at work at clause - Non vitiation non invalidation clause - Defective premises act liability - Policy is not primary - Data protection act liability
Where your current insurance policies do not comply with the full scope of the Required Insurances	
(a) can your policies be amended or extended and if so please provide cost implications, or	**Limit could be increase but we shoul need to quote to know the cost implication.** **Data protection could not be included.This is not possible under the Spanish liability wordings**
(b) please provide reasons why the full scope of insurance as detailed in the Schedules will not be carried	As explained before

1.0	PROPERTY DAMAGE AND BUSINESS INTERRUPTION – PREMISES RISKS	
1.1	**Name and Address of Insurers**	**ZURICH**
1.2	**Policy Number(s)**	**91831347910**
1.3	**Renewal Date**	**JANUARY 1st**
1.4	**Limit of Indemnity**	£ 103.217.472
1.5	**Does the policy include the full range of extensions specified in the schedule of required insurances? If not, please advise which are not covered.**	YES
1.6	**What excesses apply?**	£ 10.119,39 - PROPERTY DAMAGE

	48h. BUSINESS INTERRPTION
2.0 PUBLIC AND PRODUCTS LIABILITY	
2.1 Name and Address of Insurers	**ZURICH**
2.2 Policy Number(s)	**458323**
2.3 Renewal Date	**JANUARY 1st**
2.4 Limit of Indemnity in respect of (please state whether any one occurrence or in the aggregate)	
a. Public Liability	£ 80.954.880 PER CLAIM
b. Products Liability	£ 80.954.880 PER CLAIM AND AGGREGATE
c. Subsidence, collapse, vibration or removal or weakening of support	CLAUSE NOT KNOWN
d. Fire and explosion	£ 80.954.880 PER CLAIM
e. Pollution	£ 80.954.880 PER CLAIM
f. Any other "inner" limit	£ 8.095.488 PER CLAIM – TENANT´S LIABILITY
2.5 Is the policy subject to a heat warranty or condition of any sort and/or any height or depth restrictions? If so attach copies.	NO
2.6 Is Contractual Liability included?	YES
2.7 Does the policy include liability in respect of damage to premises temporarily occupied for the performance of works therein or thereon?	YES
2.8 Does the policy include a cross liability provision and a General Indemnity to Principals/Main Contractors Clause?	YES
2.9 What limitations apply in respect of cover for loss or damage due to defective design, workmanship or materials?	NONE
2.10 What excesses are applicable?	£ 10.119,36
2.11 Is the policy extended to include financial loss?	YES (If yes state limit £ 1.349.248)
2.12 Does the policy include liabil ty for the acts of subcontractors?	YES

2.13	Does the policy respond to judgements made outside UK?	YES
2.14	Is the cover subject to any material exclusions or limitations? (If YES please supply copies thereof?	NO
2.15	Have you ever undertaken or are you currently undertaking work on behalf of Network Rail or British Airports Authority? (If YES please state which or both?	
2.16	Does your policy extend to include the minimum insurance requirements of either Network Rail or British Airports Authority? (If YES please state which or both)	
2.17	Does the policy include the Trams whilst in your care, custody and control for maintenance activities?	YES
3.0	EMPLOYERS' LIABILITY – NOT APPLICABLE IN SPAIN (SOCIAL SECURITY).When CAF has to hire employees locally,then an Employers´Liability policy will be issue locally according with your legislation.	
3.1	Name and Address of Insurers	
3.2	Policy Number(s)	
3.3	Renewal Date	
3.4	Limit of Indemnity	£
3.5	Is the policy subject to a heat warranty or condition of any sort and/or any height or depth restrictions? If so attach copies.	
3.6	Is Contractual Liability included?	
3.7	What is the definition of "employee"?	
3.8	Does the policy include a cross liability provision and a General Indemnity to Principals/Main Contractors Clause?	
3.9	Does the policy respond to judgements made outside UK?	
4.0	COMPREHENSIVE MOTOR INSURANCE – NOT APPLICABLE	
4.1	Name and Address of Insurers	

4.2	Policy Number(s)	
4.3	Renewal Date	
4.4	Limits of Indemnity in respect of (Please state whether any one occurrence or in the aggregate)	
	a. Third Party Property Damage	£
	b. Third Party Bodily Injury (if any)	£
4.5	Is the policy subject to a Deductible or excess? If so please provide details.	
4.6	Are there any restrictions on usage or types of drivers? If so please provide details.	
5.0	DIRECTORS' and OFFICERS' LIABILITY INSURANCE	
5.1	Name and Address of Insurers	CHUBB
5.2	Policy Number(s)	82001331
5.3	Renewal Date	APRIL 10TH
5.4	Limits of Indemnity (Please state whether any one occurrence or in the aggregate)	£ 10.792.000 PER CLAIM
5.5	Is the policy subject to a Deductible or excess? If so please provide details.	53.960 £ IN U.S.A.
5.6	Is cover subject to any material exclusions or limitations? If YES so please provide details.	
5.7	Please confirm what the provisions of your policy are in respect of – Extended reporting period Bodily injury and property damage exclusion Insured versus insured claims	

6.0	SELF –INSURANCE ARRANGEMENTS	
6.1	Please advise if any of the abcve classes of business are completely self-insured and provide details of the arrangements (self-insurance funds, captive insurers etc)	
6.2	Please advise if significant elements or levels of the covers required are self-insured and provide details of the arrangements	

DECLARATION:

We confirm that the foregoing details are accurate and that the above policies are subject to no special terms, conditions and exceptions other than those referred to above. We also confirm that all premiums due to date have been paid.

Signed.....

Position INSURANCE BROKER - CAF

Name IVAN MATARUSA

Date 2006/9/26

For and on behalf of

AON GUL 7 CARVAJAL

.....

.....

This form should be completed by your Insurers or your Registered Insurance Brokers ONLY.

The above information is agreed on behalf of the Candidate by the Candidate's Authorised Representative:

Name.....

Signed.....

For and on behalf of.....

Date 27/ Sept. /2006

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PROPOSED OPERATIONAL PHASE COVER SPECIFICATION PREPARED 10TH JANUARY 2008

This is a proposed cover specification only. Cover has not been effected and the details in this proposed cover specification are subject to change based on insurers' willingness to provide the full scope of cover proposed.

INSURED:

i. **tie** Limited

ii. The INFRACO Maintainer and TRAMCO Maintainer

iii. The Co-contractors and/or Sub-Contractors of any tier including the maintenance contractors

iv. Transdev Edinburgh Tram Limited as operator

v. Local authorities and utility providers as required

vi. Transport Edinburgh Limited (TEL)

vii. Any other party having an insurable interest (and not mentioned above) to the extent that the Insured (i) is required by contract or agreement to provide insurance to such parties

viii. The Scottish Ministers/Scottish Executive, Transport Scotland and City of Edinburgh Council

ix. Network Rail

x. Alfred McAlpine Infrastructure Services Ltd

each for their respective rights and interests.

Business Interruption cover –
Insured (i), (iv) and (vi) only

PERIOD:

From the commencement of passenger operations and annually renewable thereafter.

INTEREST:

The operation and maintenance of the Edinburgh Tram Network including all ancillary and associated works and activities related therewith of whatsoever nature.

Section 1 – Material Damage & Business Interruption

All risks of loss or destruction of or damage to the Insured Property by any cause not excluded including resulting Business Interruption

Section 2 – Third Party Liability

To indemnify the Insured against all sums (including claimants' costs and expenses) arising out of:

(a) death or bodily injury to or illness or disease or psychiatric damage suffered by any person;
(b) loss or damage to property;
(c) obstruction, interference, loss of amenities, negligence, nuisance, trespass, stoppage of traffic, infringement of any easement or right of air, light, water or way or any like cause

happening or consequent upon a cause occurring during the Period of Insurance and arising out of or in connection with the Project

SUMS INSURED/LIMITS OF INDEMNITY:

Section 1 – Material Damage/Business Interruption

Material Damage

Reinstatement value of the Property Insured

Business Interruption

The intention is to arrange Business Interruption cover to pay for the shortfall in revenue due to Insured Damage which all the Insured Parties would expect to obtain from the Edinburgh Tram Network Project. This cover would be expected to indemnify the Insured Parties irrespective of any contractual set-offs or restrictions as between the Insured Parties.

Cover would include increased costs of working plus additional increased costs of working if available from the insurance market

Maximum indemnity period - 12 months

Section 2 – Third Party Liability

£100,000,000 any one occurrence
£100,000,000 any one occurrence and in the aggregate in respect of products liability
£100,000,000 any one occurrence and in the aggregate in respect of pollution or contamination
Unlimited liability for bodily injury as required under the Road Traffic Acts

EXCESS:

Section 1 Material Damage & Business Interruption

Material Damage

£50,000 each and every occurrence and/or series of occurrences increasing to
£250,000 each and every occurrence in respect of overhead power cables and associated supporting structures
£500,000 each and every occurrence in respect of tram breakdown and track subsidence cover

Business Interruption

14 days or £50,000 each and every occurrence whichever is the greater

Section 2 Third Party Liability

£10,000 each and every occurrence and/or series of occurrences in respect of

property damage

TERRITORIAL LIMITS: Anywhere in the United Kingdom (including inland transits and off-site storage) but worldwide in respect of Section 2

CONDITIONS:

Section 1 Material Damage/Business Interruption

- professional fees including surveyors', consulting engineers' and legal fees
- removal of debris
- temporary repairs and expediting expenses
- automatic reinstatement of sum insured

- local authority clause including European Union, railway inspectorate or Health and Safety Executive
- off-site storage
- property at supplier's premises
- waiver of subrogation between insured parties
- non-invalidation and non-vitiation
- severability of interest
- tram breakdown and track subsidence – limit £2M in the aggregate during the Period of Insurance
- track subsidence
- driver/operator error
- 72 hour clause
- reinstatement basis of settlement
- suppliers extension
- utilities extension
- denial of access
- notifiable diseases, food and drink poisoning, defective sanitation
- property hired in
- temporary loan
- capital additions

- trace and access
- metered water and fire extinguishing media
- replacement locks
- machinery breakdown
- damage to landscaped area by emergency services
- clearance of drains
- temporary removal
- plans and documents
- minimisation of loss
- escalation
- buildings for demolition
- computer data
- reinstatement basis of settlement
- Damage to utility suppliers' property
- alternative accommodation

Section 2 Third Party Liability

- Consumer Protection Act or Health and Safety at Work Act Prosecution Defence Costs

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- Food Safety Act
- Defective Premises Act
- Data Protection Act
- Motor Contingent Liability
- Movement of Obstructing Vehicles
- Compensation for Court Attendance
- Employees' and Visitors' Effects
- Indemnity to Principal

- Professional Visits Worldwide
- Leased and Rented Premises
- Servicing of Vehicles
- Libel and Slander

- waiver of subrogation between insured parties
- contractual liability clause

- non invalidation-non-vitiation clause
- severability of interests clause
- munitions of war

PRINCIPAL EXCLUSIONS:

Section 1 – Material Damage & Business Interruption

- Fines or penalties
- Motor vehicles (other than trams), water craft
- Wear and tear and corrosion but not resulting damage
- Inventory losses
- Deductible
- Change in water table, temperature
- Collapse or cracking of buildings
- Date recognition
- Fraud or theft by employees
- Normal bedding down of structures
- Machinery and computer breakdown
- Track subsidence, heave, sinkage or misalignment unless caused by fire, lightning, earthquake, storm, tempest, explosion and water damage
- Damage to excavations
- War, invasion, acts of foreign enemies, hostilities (whether declared or not), civil war, rebellion, revolution, insurrection of military or usurped power.
- Nuclear risks
- Seepage, pollution or contamination unless caused by defined perils.
- Sonic boom

Section 2 – Third Party Liability

- Employers' Liability
- Liability arising out of the use of, ownership or possession of any motor vehicle other than trams or plant as a tool of trade
- Liability arising out of the use of, ownership or possession of any aircraft or waterborne craft
- Asbestos exclusion
- Liquidated damages

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- Fines, penalties, punitive or exemplary damages
- War, invasion, acts of foreign enemies, hostilities (whether declared or not), civil war, rebellion, revolution, insurrection of military or usurped power.
- Nuclear risks
- Seepage, pollution or contamination unless caused by sudden, unintended and unexpected happening.
- Professional indemnity
- The cost of making good loss of or damage to property belonging to the Insured or in the Insured's care, custody or control
- Medical malpractice

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 5 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 5

SPARES POOL AND SPECIAL TOOLS

Part 1: Spares Pool

1. COMPLETED SPARE PARTS PROFORMAS

The aim of this document is to present the list of spare parts needed for the maintenance of the 27+4 Trams. Following considerations have been made:

- Spare parts are understood, as big spares for overhaul and accident / vandalism operations.
- Supplier and lead times for the spare parts are NOT DEFINED YET. In further stage, CAF will present this information.
- Exchange time, weight and Volume of the spare parts will BE DEFINED IN FURTHER STAGE.

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Item	Description	Assumed no. (per Tram)	Minimun Spares Holding	Price (per unit)	Total price (Minimum Spares Holding x Price per Unit)	Total price (Minimum Spares Holding x Price per Unit)
1	Motor bogie (complete)	3	4	182.118 €	728.473 €	£539.216
2	Trailer bogie (complete)	1	2	135.760 €	271.521 €	£200.980
3	Traction set including :	3	1	466.192 €	466.192 €	£345.075
	IGBT Traction inverter					
	Traction control unit ECON					
	Traction motors					
	Braking resistor					
	High speed circuit breaker					
	Mater controllers			Included above		
4	Gearbox	12	6	24.548 €	147.290 €	£109.024
5	Brake actuator (for motor bogie)	12	6	6.167 €	37.004 €	£27.391
6	Brake actuator (for trailer bogie)	4	2	6.374 €	12.747 €	£9.436
7	Wheel sets (complete, for one motor bogie)	6	6	24.548 €	147.290 €	£109.024
8	Wheel sets (complete, for one trailer bogie)	2	2	32.055 €	64.110 €	£47.454
9	Wheel rims (1 set)	1 set	2	7.912 €	15.824 €	£11.713
10	Emergency coupler	2	2	9.009 €	18.017 €	£13.336
11	Pantograph	1	2	13.232 €	26.465 €	£19.589
12	Battery charger	1	1	19.799 €	19.799 €	£14.656
13	Battery	1	1	6.990 €	6.990 €	£5.174
14	High Voltage control box	3			Included in traction	Included in traction
15	Cab air conditioning unit	2	3	18.110 €	54.329 €	£40.214
16	Saloon heating and ventilation unit	3	2	27.330 €	54.661 €	£40.460
17	Tram control computer	1	1	62.076 €	62.076 €	£45.949
18	Brake pump / Central hidraúlica	4	4	12.278 €	49.114 €	£36.354

Item	Description	Assumed no. (per Tram)	Minimun Spares Holding	Price (per unit)	Total price (Minimum Spares Holding x Price per Unit)	Total price (Minimum Spares Holding x Price per Unit)
19	Brake discs	16	16	2.059 €	32.947 €	£24.387
20	EVENT RECORDER	2	2	19.179 €	38.358 €	£28.392
21	Cab desk panel (without equipment) set	2	2	11.773 €	23.547 €	£17.429
22	Drivers seat	2	2	1.632 €	3.264 €	£2.416
23	Windscreen	2	8	4.186 €	33.489 €	£24.789
24	Door mechanism and leaf (double door)	10	5	10.175 €	50.873 €	£37.656
25	Door mechanism and leaf (single door)	4	2	8.593 €	17.186 €	£12.721
26	Saloon side window 1 set per tram	1 set	2	14.872 €	29.743 €	£22.016
27	Body front skirt (2 sets)	2 sets	6	3.257 €	19.541 €	£14.464
28	Body side skirts (2 sets)	2 sets	6	18.030 €	108.182 €	£80.076
29	Passenger seat unit (1 set per tram)	1 set	0	62.165 €	15.541 €	£11.504
30	Passenger seat squab (1 set per tram)	1 set	1	28.648 €	28.648 €	£21.205
31	Handrails (1 set)	1 set	1	13.752 €	6.876 €	£5.090
32	Cameras (1 set)	1 set	1	39.808 €	39.808 €	£29.466
33	Passenger Display unit (interior) (1 set)	1 set	2	25.700 €	51.400 €	£38.046
34	Passenger Display unit (exterior) (1 set)	1 set	2	6.853 €	13.706 €	£10.145
35	Complete Articulation assembly	5	3	22.349 €	67.048 €	£49.629
36	Sanding units (1 set)	1 set	1	10.361 €	10.361 €	£7.669
37	Suspension items (1 set)	1 set	1	27.013 €	27.013 €	£19.995
38	Energy absorption device (2 sets)	2 sets	2	18.394 €	36.788 €	£27.230
39	Flange Lubrication System	1 set	1	1.214 €	1.214 €	£898
40	Cab Front Shell Moulding	2	2	14.468 €	28.935 €	£21.418
41	Under-run Guard	2	2	6.785 €	13.570 €	£10.045
42	Exterior Ligthing Units		2	6.185 €	12.369 €	£9.156

Item	Description	Assumed no. (per Tram)	Minimun Spares Holding	Price (per unit)	Total price (Minimum Spares Holding x Price per Unit)	Total price (Minimum Spares Holding x Price per Unit)
43	Axle End Earthing Brush Units complete		4	3.394 €	13.576 €	£10.049
44	Speed Probes		1	1.885 €	1.885 €	£1.395
45	Roof Equipment Set of cases complete with fittings		0	To be defined	To be defined	To be defined
46	Cab Sun Blind	2	2	128 €	257 €	£190
47	Swan-neck cab microphone		4	342 €	1.368 €	£1.013
48	Electro-magnetic track brake unit complete		4	9.423 €	37.691 €	£27.899
49	Cab door complete with fittings		2	613 €	1.227 €	£908
50	Interior ligthingd cover(s)		1	7.387 €	7.387 €	£5.468
51	Pantograph head assembly		6	1.713 €	10.277 €	£7.607
52	Windscreen wiper arms complete		6	429 €	2.571 €	£1.903
53	Cab rear view camera		2	2.833 €	5.665 €	£4.193
	TOTAL				2.974.212 €	£2.201.512

NOTE: Currency hedged as per 29 April 2008 (0,7402 euro/GBP)

Part 2: Special Tools

Item No.	Description	Assumed No.
1	HVAC Diagnostic Software	1
2	Traction Equipment Diagnostic Software	1
3	Brake Equipment Diagnostic Software	1
4	Door Equipment Diagnostic Software	1

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

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This is Schedule 6 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 6

SUB-CONTRACTOR DIRECT AGREEMENT

(1) [SUB-CONTRACTOR]

- and -

(2) [tie LIMITED] or [*OTHER THIRD PARTY BENEFICIARY*]

- and -

(3) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

DIRECT AGREEMENT IN FAVOUR OF [tie LIMITED] or [OTHER THIRD PARTY BENEFICIARY] FROM [SUB-CONTRACTOR] relating to THE TRAM MAINTENANCE AGREEMENT

AGREEMENT

BETWEEN

(1) **[*SUB-CONTRACTOR*]** [(company number [◆]) whose registered office is at [◆]] *OR* [carrying on business together in partnership under the name of [◆] at [◆]] ("**Sub-Contractor**")];

(2) **[[tie LIMITED** (Company Number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ] OR **[[Other third party beneficiary]** [(company number [◆]) whose registered office is at [◆]] ***OR*** [carrying on business together in partnership under the name of [◆] at [◆]]] [("**Beneficiary**") which expression shall include its successors and permitted assignees.; and

(3) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa) – Spain (**"Tram Maintainer"**).

BACKGROUND

A By an agreement in writing dated ◆ 2008 (the "**Tram Maintenance Agreement**"), **tie** appointed the Tram Maintainer to maintain the Trams and supply documentation and associated equipment in connection with the Edinburgh Tram Network.

B It is a term of the Tram Agreement that the Tram Maintainer shall procure that the Sub-Contractor enter into this Agreement with the Beneficiary.

C The Sub-Contractor has been appointed by the Tram Maintainer as [◆] in terms of the Sub-Contract (as hereinafter defined).

D It is a term of the Sub-Contract or has otherwise been agreed that the Sub-Contractor enters into this Agreement with the Beneficiary in relation to the Sub-Contract Works.

IT IS AGREED as follows:

1. **DEFINITIONS AND INTERPRETATION**

In this Agreement:

1.1 the following words and expressions have the following meanings, unless the context requires otherwise:

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"**Agreement**" means this document (as amended from time to time pursuant to clause 13);

"**Edinburgh Tram Network**" means the tramway which is to be designed, constructed and maintained in Edinburgh in Phase 1a (forming part of Line One and Line Two as described in the tram Legislation) and Phase 1b, or either of them (as may be amended from time to time together with any modification, line extension, spur, interconnection and any additional line which may be instructed), to be constructed in accordance with the Tram Legislation together with all associated works and facilities including all civil engineering and track works, Trams, infrastructure, plant, machinery and equipment installed or used for such tramway;

"**Good Industry Practice**" means using standards, practices, methods and procedures conforming to Law and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably be expected from a large, reputable, professionally qualified, competent and skilled organisation experienced in carrying out activities of a similar nature, scope and complexity to those comprised in the Sub-Contract Works, and seeking in good faith to comply with its contractual obligations and all duties owed by it;

"**Insurance Period**" means the period of 12 years from the date of issue of the last certificate of substantial completion in respect of the Sub-Contract Works, as established pursuant to and for the purposes of the Sub-Contract (or, if sooner, 12 years after termination of the employment of the Sub-Contractor under the Sub-Contract);

"**Intellectual Property Rights**" means any rights in or to any patent, design right, utility model, trade mark, brand name, service mark, trade name, business name, logo, invention (whether registered or unregistered), domain name, semi-conductor right, topography right, software designs and/or other materials, source code, copyright, moral right, know-how, or rights in databases and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or for an extension, revival or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the law of Scotland or of any other jurisdiction;

"**Law**" means:

(a) any Act or instruments of the Scottish Parliament or the United Kingdom Parliament or subordinate legislation within the meaning of section 21(1) of the Interpretation Act 1978, any exercise of the Royal Prerogative, and any enforceable community right within the meaning of section 2 of the European Communities Act 1972;

(b) any applicable guidance, direction or determination issued by any regulatory body with which **tie**, CEC, the Tram Maintainer and/or the Sub-Contractor is bound to comply; and

(c) any applicable judgment of a relevant court of law which is a binding precedent,

in force, or applicable in Scotland;

"**Line One**" means the tramway works as authorised by the Edinburgh Tram (Line One) Act 2006;

"**Line Two**" means the tramway works as authorised by the Edinburgh Tram (Line Two) Act 2006;

"**Party**" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

"**Sub-Contract**" means the sub-contract dated [□] made between the Tram Maintainer and the Sub-Contractor;

"**Sub-Contract Works**" means the works and services to be undertaken by the Sub-Contractor under the Sub-Contract;

"**Sub-Contractor Deliverables**" means all documents, information, reports, diagrams, records, method statements, risk assessments, manuals, schedules, databases, photographs, formulae, plans, designs, specifications, drawings, details, calculations, models and simulations, the outputs and reports based on any models, programmes and all other material created and/or provided by the Sub-Contractor (or any other third party) in the performance of the Sub-Contract Works and the Sub-Contractor's obligations under the Sub-Contract;

"**TEL**" means Transport Edinburgh Limited a company incorporated under the Companies Act with registered number SC269639 and having its registered office at

55 Annandale Street, Edinburgh, Midlothian, EH7 4AZ which shall include its successors in title and permitted assignees;

"**Trams**" means the tram vehicles to be provided for operation on the Edinburgh Tram Network;

"**Tram Legislation**" means the Edinburgh Tram (Line One) Bill and the Edinburgh Tram (Line Two) Bill, and after such Bills are enacted means the Edinburgh Tram (Line One) Act, the Edinburgh Tram (Line Two) Act and such other legislation relative to the Edinburgh Tram Network as may be enacted from time to time; and

1.2 unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender include all other genders.

1.2.2 a reference to:

1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a clause is a reference to a clause in this Agreement.

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation.

1.4 Where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

2. STANDARD OF CARE

2.1 The Sub-Contractor warrants and undertakes to the Beneficiary that it has carried out and shall carry out the Sub-Contract Works and its other duties and obligations under the Sub-Contract subject to and in accordance with the terms thereof.

2.2 In addition to and without derogation from clause 2.1, the Sub-Contactor warrants to the Beneficiary that:

2.2.1 in the performance of the Sub-Contract Works and its other obligations under the Sub-Contract it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent contractor experienced in carrying out works and services similar to the Sub-Contract Works in connection with projects of a similar type, nature and complexity;

2.2.2 any design produced by the Sub-Contractor will satisfy in every respect any relevant performance specification or any requirement included or referred to in the Sub-Contract and will be suitable in every respect for the purposes included in or reasonably to be inferred from the Sub-Contract; and

2.2.3 any design produced by the Sub-Contractor will fully comply with Law.

2.3 The Sub-Contractor shall owe a duty of care to the Beneficiary in carrying out its duties and obligations under the Sub-Contract.

3. MATERIALS

3.1 The Sub-Contractor warrants to the Beneficiary that it has not and shall not use any materials which at the time of use:

3.1.1 are known to be deleterious in the particular circumstances in which they are used (either to health and safety or to the durability of any works on which the Sub-Contractor is employed by the Tram Maintainer); or

3.1.2 contravene any relevant standard or code of practice issued from time to time by the BSI Group or under a European directive relating to standards; or

3.1.3 do not accord with the guidelines contained in the edition of the publication "Good Practice in Selection of Construction Materials" (Ove Arup & Partners) current at the date of specification of use; or

3.1.4 contravene Good Industry Practice.

4. COPYRIGHT LICENCE

4.1 The Sub-Contractor hereby grants to the Beneficiary an royalty-free and exclusive licence to use such Intellectual Property Rights for operation and maintenance of the trams but in any case for manufacturing purposes in the Sub-Contractor Deliverables as may be necessary for the Beneficiary to use in relation to the [[Edinburgh Tram Network] ***OR*** [*Where beneficiary is not* ***tie*** *an appropriate use should be included*]]. This licence shall carry the right to grant sub-licences, and be transferable to third parties, prior written agreement of the Sub-Contractor.

4.2 In so far as ownership of the copyright and any other Intellectual Property Rights in any Sub-Contractor Deliverable prepared or provided by the Sub-Contractor in connection with the Edinburgh Tram Network is vested in any person other than the Sub-Contractor, the Sub-Contractor shall procure for the Beneficiary the benefit of such a licence as is referred to in clause 4.1 for the purposes referred to therein.

4.3 The Sub-Contractor shall, if so requested at any time, execute such documents and perform such acts as may be required fully and effectively to assure to the Beneficiary or any third party the rights referred to in this clause 4.

4.4 The Sub-Contractor shall provide to the Beneficiary a copy of any of the Sub-Contractor Deliverables as soon as reasonably practicable after receipt by the Sub-Contractor of a written request from the Beneficiary to do so.

4.5 The Sub-Contractor undertakes to the Beneficiary that the use by the Beneficiary of any of the Sub-Contractor Deliverables for any purpose provided for in this clause 4 shall not infringe the rights of any third party in relation to the Sub-Contractor Deliverables.

5. REQUIRED INSURANCES

5.1 The Sub-Contractor undertakes that:

5.1.1 it has maintained and shall maintain during the performance of its obligations under the Sub-Contract and the Insurance Period each of the insurances as follows:

5.1.1.1 professional indemnity insurance with an insurer authorised to carry out insurance business in the United Kingdom for an amount not less than £[□] on an each and every claim basis and £[□] on an aggregate basis in respect of pollution and contamination claims and date recognition claims, in respect of the legal liability of the Sub-Contractor as a result of any negligent act, error or omission in the performance of the professional activities and duties in connection with the Sub-Contract Works and in the performance of its obligations under the Sub-Contract; and

5.1.1.2 [◆] [*Detail any further insurances held by the Sub-Contractor*]

5.1.2 cover under the professional indemnity insurance is extended to include the Sub-Contractor's liabilities under this Agreement;

5.1.3 this Agreement has been disclosed to the Sub-Contractor's current professional indemnity insurers or brokers (as the case may be) and shall be disclosed to any future professional indemnity insurers or brokers providing the insurance required by this Agreement; and

5.1.4 the Sub-Contractor shall abide by the terms and conditions of insurance and shall not do or omit to do anything that might prejudice the cover or its right to make a claim.

5.2 As and when reasonably required by the Beneficiary, the Sub-Contractor shall produce for inspection documentary evidence that such insurance is being properly maintained.

5.3 If the insurer makes or attempts to make any material alteration or purports to withdraw the Sub-Contractor's professional indemnity cover, or if the Sub-Contractor is unable to obtain professional indemnity insurance, the Sub-Contractor shall promptly give notice of this to the Beneficiary.

6. STEP-IN

6.1 The Sub-Contractor shall not exercise nor seek to exercise any right of determination of its employment under the Sub-Contract or to rescind the Sub-Contract or to discontinue the performance of any of the Sub-Contractor's obligations in relation to the Sub-Contract by reason of breach on the part of the Tram Maintainer (or otherwise) without giving to the Beneficiary not less than twenty one days' written

notice of its intention to do so and specifying in such notice the grounds for the proposed determination. The Sub-Contractor will for the period of any such notice diligently and properly continue to perform the Sub-Contractor's obligations under the Sub-Contract.

6.2 Any period stipulated in the Sub-Contract for the exercise by the Sub-Contractor of a right of determination will nevertheless be extended as may be necessary to take account of the period of notice required under clause 6.4.

6.3 Compliance by the Sub-Contractor with the provisions of clause 6.1 will not be treated as a waiver of any breach on the part of the Tram Maintainer giving rise to the right of determination nor otherwise prevent the Sub-Contractor from exercising its rights after the expiration of the notice unless the right of determination has ceased under the provisions of clause 6.4.

6.4 The right of the Sub-Contractor to determine its employment under the Sub-Contract or to rescind the Sub-Contract or to discontinue the performance of any of its obligations in relation to the Sub-Contract shall cease if within the period of twenty one days referred to in clause 6.1 the Beneficiary gives written notice to the Sub-Contractor:

6.4.1 requiring the Sub-Contractor to continue with the performance of all its obligations under the Sub-Contract;

6.4.2 acknowledging that the Beneficiary is assuming all the obligations of the Tram Maintainer under the Sub-Contract; and

6.4.3 undertaking to the Sub-Contractor to discharge all amounts payable to the Sub-Contractor under the terms of the Sub-Contract.

6.5 Upon compliance by the Beneficiary with the requirements of clause 6.4 the Sub-Contract will continue in full force and effect as if the right of determination on the part of the Sub-Contractor had not arisen and in all respects as if the Sub-Contract had been made between the Beneficiary and the Sub-Contractor to the exclusion of the Tram Maintainer.

6.6 Notwithstanding that as between the Tram Maintainer and the Sub-Contractor the Sub-Contractor's right of determination of its engagement under the Sub-Contract may not have arisen the provisions of clause 6.5 shall nevertheless apply if the Beneficiary

gives written notice to the Sub-Contractor and the Tram Maintainer to that effect and the Beneficiary complies with the requirements on its part under clause 6.4.

6.7 The Sub-Contractor does not need to be concerned or required to enquire whether, and will be bound to assume that, as between the Tram Maintainer and the Beneficiary, the circumstances have occurred permitting the Beneficiary to give notice under clause 6.6.

6.8 By acting in accordance with the provisions of this clause 6, the Sub-Contractor will not incur any liability to the Tram Maintainer.

6.9 Unless and until the Beneficiary has given notice under this clause 6:

6.9.1 the Beneficiary has no liability whatsoever to the Sub-Contractor in respect of amounts payable to the Sub-Contractor under the Sub-Contract; and

6.9.2 the Beneficiary has no authority to issue any direction or instruction to the Sub-Contractor in relation to the performance of the Sub-Contractor's duties under the Sub-Contract.

6.10 Without prejudice to the provisions of clauses 6.1 to 6.9 inclusive, if prior to the service of any notice under clause 6.4 the employment of the Sub-Contractor under the Sub-Contract is determined for any reason whatsoever the Sub-Contractor shall, if requested in writing so to do by the Beneficiary no later than 12 weeks after the date of such determination, forthwith enter into a new agreement with the Beneficiary in relation to the carrying out of the Sub-Contract Works on the same terms as the Sub-Contract, but with such revisions as the Beneficiary and the Sub-Contractor may reasonably require to reflect altered circumstances and the fact that it is the Beneficiary and not the Tram Maintainer employing the Sub-Contractor.

7. ASSIGNATION

7.1 The Sub-Contractor shall not assign, novate or otherwise transfer the whole or any part of the Agreement without the prior written agreement of the Beneficiary.

7.2 The Beneficiary shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

[[*Include where the Beneficiary is* ***tie***]

[7.2.1 to the Scottish Ministers, TEL, the City of Edinburgh Council or any local authority; or

7.2.2 other body with no worse financial standing than that of the Beneficiary who takes over all or substantially all the functions of the Beneficiary; or

7.2.3 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form acceptable to the Sub-Contractor acting reasonably) by the Beneficiary or a person falling within clause 7.2.1; or

7.2.4 with the prior written consent of the Tram Maintainer (such consent not to be unreasonably withheld or delayed) to any person not covered by clauses 7.2.1 or 7.2.2.]

Or

[[*Include where the Beneficiary is an other third party*]

7.2.1 without the consent of the Sub-Contractor to any person provided that no more than two such assignations will be permitted. Any assignations by the Beneficiary to a subsidiary or associated company of the Beneficiary or a member of the same group of companies will not count as an assignation;

7.2.2 with the prior written consent of the Sub-Contractor (such consent not to be unreasonably withheld or delayed).]

7.3 The Sub-Contractor undertakes to the Beneficiary not to contend in any court proceedings under this Agreement that any person to whom the Beneficiary assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this clause is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that the Beneficiary is named under this Agreement or any intermediate assignee of the Beneficiary escaped loss resulting from such breach by reason of the disposal of its interest in the same.

8. LIABILITY OF THE SUB-CONTRACTOR

8.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by the law of contract, delict or otherwise.

8.2 The responsibility of the Sub-Contractor under this Agreement is not to be reduced or in any way released or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by the Beneficiary against a third party.

8.3 The rights and benefits conferred upon the Beneficiary by this Agreement are in addition to any other rights and remedies that the Beneficiary may have against the Sub-Contractor including (without prejudice to the generality of the foregoing) any remedies in delict.

8.4 Subject to the other provisions of this Agreement, the liability of the Sub-Contractor to the Beneficiary is to be determined in all respects in accordance with the terms of the Sub-Contract and, in the event of any claim by the Beneficiary under this Agreement, the Sub-Contractor shall be entitled to rely upon any defence, right, limitation or exclusion under the Sub-Contract as though the Beneficiary were named as the Tram Maintainer under it, except that:

8.4.1 the Beneficiary shall not be affected by any subsequent variation of the Sub-Contract which would adversely affect the obligations owed by the Sub-Contractor or the waiver, compromise or withdrawal of any claim made by the Tram Maintainer; and

8.4.2 the Sub-Contractor shall not be entitled to exercise any right of set-off, retention or withholding against the beneficiary to which the Sub-Contractor may be entitled against the Tram Maintainer.

8.4.3 In no event, the Sub-Contractor shall be responsible for indirect or consequential damages

9. CONSENT OF TRAM MAINTAINER

9.1 The Tram Maintainer consents to the terms of this Agreement.

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10. **NOTICES**

10.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

10.2 Any notice given pursuant to this clause, if sent by special or recorded delivery, is deemed to have been received on proof of delivery.

11. **RIGHTS OF THIRD PARTIES**

11.1 A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

12. **INVALID TERMS**

12.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

12.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

12.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

13. **VARIATIONS AND WAIVERS TO BE IN WRITING**

13.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

14. **WAIVER**

14.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

14.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

15. JURISDICTION AND LAW

15.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

[*[Include where the Beneficiary is **tie**]*

15.2 The Parties agree that any dispute in relation to this Agreement shall be conducted in accordance with Clause 52 (*Dispute Resolution*) of the Tram Maintenance Agreement and the provisions of the said Clause 52 (*Dispute Resolution*) and Schedule 9 (*Dispute Resolution Procedure*) and Schedule 10 (*Panels*) of the Tram Maintenance Agreement are deemed to be incorporated mutatis mutandis in respect of this Agreement provided that any reference to "Parties" in the Tram Maintenance Agreement shall be deemed to refer to the Beneficiary and the Sub-Contractor and the reference in the Tram Maintenance Agreement to "Clause 56 (*Notices*)" shall mean clause 10 of this Agreement.

IN WITNESS WHEREOF these presents on this and the preceding [◆] pages are executed as follows:

EXECUTED for and on behalf of **[SUB-CONTRACTOR]** at

on 200[◆] by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

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EXECUTED for and on behalf of **[[tie LIMITED]**
***OR* [*other third party beneficiary*]** at

on 200[◆] by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

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EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at

on 200[◆] by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

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SCHEDULE 7

TUPE INFORMATION

1. The number of staff who are TUPE Employees.

2. In relation to each employee who falls within the scope of paragraph 1 above:

   2.1 the employee's age and gender (so that pension entitlements can be calculated and provided for) and whether such employee is within or outside any group pension scheme; and

   2.2 the employee's salary, length of service, contractual period of notice, any pay settlement covering future dates which has already been agreed by the Tram Maintainer and any redundancy entitlement.

3. Information relating to or connected with the other terms and conditions of the contracts of employment with employees falling within the scope of paragraph 1 above including details of:

   3.1 terms incorporated from any collective agreement;

   3.2 so far as the Tram Maintainer should reasonably be aware any outstanding liability for past breaches of such contracts;

   3.3 so far as the Tram Maintainer should reasonably be aware any outstanding statutory liability (for example, any claim under non-discrimination legislation); and

   3.4 so far as the Tram Maintainer should reasonably be aware any other outstanding liability required to be met by any successor tram maintenance contractor if its tender is accepted.

4. Such other information as the Client may reasonably require in relation to TUPE Employees

[redacted]

Director/Authorised Signatory
tie LIMITED

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 8 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 8

NOT USED

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This is Schedule 9 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 9

DISPUTE RESOLUTION PROCEDURE

1. The Parties agree that this Schedule 9 (*Dispute Resolution Procedure*) shall have effect for the resolution of any Dispute.

2. Any Dispute shall, in the first instance, be referred to the Internal Resolution Procedure in accordance with paragraph 10.

3. Neither Party shall commence any court proceedings until the procedures in paragraphs 10 to 57.3 have been completed, under exception that the provisions of this Schedule 9 (*Dispute Resolution Procedure*) shall not apply so as to prevent either Party seeking an interim order, or interim relief, in the Scottish courts.

4. In the event that any court proceedings whatsoever are initiated by either Party against the other, the Parties agree that the Court of Session, Scotland, shall have exclusive jurisdiction.

5. Neither Party shall be entitled to suspend the performance of its undisputed obligations under this Agreement merely by reason of the reference of any Dispute to the Dispute Resolution Procedure contained in this Schedule 9 (*Dispute Resolution Procedure*).

6. Subject to the Tram Supplier's and the Client's discretionary rights set out in paragraphs 55 to paragraph 57.2 to require that a Dispute and a Related Dispute (as defined in paragraph 55) be dealt with together at an appropriate stage of the Dispute Resolution Procedure, the provisions of this Schedule 9 (*Dispute Resolution Procedure*) are mandatory and binding upon the Parties. For the avoidance of doubt, nothing in this Schedule Part 9 shall be intended to disapply section 80(2) and 79(2) of the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006 (together the "**Tram Acts**") respectively.

7. Except in relation to the matters provided for in paragraphs 14 to 54 and subject to the provisions of paragraph 9, in the event that either Party following the timeous referral of any Dispute then pursues such Dispute under the Dispute Resolution Procedure, and in the event that such Party fails to observe any time limit or timescale provided for in this Schedule 9 (*Dispute Resolution Procedure*) in relation to the pursuit or progression of such Dispute, such Party shall, upon such failure occurring and upon the expiry of 90 days following written notification from the other Party requiring the first Party to pursue the Dispute Resolution Procedure, be deemed to have irrevocably waived any right to pursue or progress such Dispute any further. In that event, such Party shall be deemed to have elected not to have referred

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such Dispute or to have withdrawn such Dispute from the Dispute Resolution Procedure and shall be deemed to have irrevocably waived any right to refer any Dispute arising from the same or substantially the same Dispute or similar circumstances to the Dispute Resolution Procedure and shall be liable for payment of the whole fees incurred by any mediator or adjudicator who has acted in respect of such Dispute. This paragraph 8 is without prejudice to the rights of either Party to raise in defence to any Dispute any defence (including, without prejudice to the foregoing generality, any defence of retention, compensation or set-off) which would otherwise be available to it.

8. Notwithstanding the provisions of paragraph 8, in the event that a Party who pursues any Dispute under the Dispute Resolution Procedure fails to observe any time limit or timescale provided for in this Schedule 9 (*Dispute Resolution Procedure*) in relation to the pursuit or progression of the Dispute or fails to take action following a notification from the other Party pursuant to paragraph 7 above, the other Party may elect to waive such failure, in which event the time limit or timescale to which such failure relates shall be extended at the discretion of such other Party and the Dispute shall progress in accordance with the Dispute Resolution Procedure, subject that all other time limits and timescales provided for in this Schedule 9 (*Dispute Resolution Procedure*) which are affected by such extension shall be deemed to have been extended to give effect to such extension of the time limit or timescale to which such failure relates.

Internal Resolution Procedure

9. The following procedure is the Internal Resolution Procedure referred to in paragraph 2:

9.1 In the event of any Dispute arising, the Tram Maintainer's Representative and the Client's Representative shall seek to resolve the Dispute at a meeting to be convened within three Business Days of written notification by either Party to the other that it wishes to initiate the Internal Resolution Procedure in respect of that Dispute ("Notification"). Such Notification shall be given in accordance with the provisions of Clause 56 (*Notices*) of this Agreement.

9.2 If following the meeting referred to in paragraph 9.1, the Dispute is not resolved or in the event that a meeting has not been convened 3 Business Days pursuant to paragraph 9.1, each Party shall, before the expiry of the period of seven Business Days from Notification, serve, in accordance with the provisions of Clause 56 (*Notices*) of this Agreement, a written position paper ("**Position Paper**") upon the other Party. Each Party's Position Paper shall state in reasonable detail that Party's

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position and required objectives in relation to the Dispute; any required redress, and, where possible, any comments on the other Party's position.

9.3 Upon such service of a Position Paper by the Party initiating or pursuing the Dispute, the Chief Executive (or equivalent) of the Tram Maintainer and the Chief Executive (or equivalent) of the Client (or their respective deputies in the event of their unavailability) shall seek to resolve the Dispute by meeting in good faith to discuss and negotiate upon the Dispute without recourse to legal or other proceedings.

9.4 In the event that resolution of the Dispute is achieved by the Chief Executive (or equivalent) of the Tram Maintainer and the Chief Executive (or equivalent) of the Client, the resolution shall be reduced to writing and, once it is signed by the duly authorised representatives of both Parties, shall be binding on the Parties.

9.5 Unless concluded by a written legally binding agreement, all discussions and negotiations connected with the Dispute shall be conducted in confidence and without prejudice to the rights of the Parties in any future legal or other proceedings. Nor may such matters be produced or relied upon in evidence in any such proceedings.

10. In the event that any Dispute is not resolved by the Internal Resolution Procedure within a period of twenty Business Days from Notification (or longer if so agreed by the Parties) then the following provisions of this paragraph 11 shall apply;

10.1 The Chief Executive (or equivalent) of the Tram Maintainer and the Chief Executive (or equivalent) of the Client (or their respective deputies in the event of their unavailability) shall, within a further period of five Business Days, seek to agree that the Dispute shall be resolved by any one of the following procedures:

10.1.1 mediation in accordance with paragraphs 11 to 13; or

10.1.2 adjudication in accordance with paragraphs 14 to 54; or

10.1.3 litigation before the Court of Session, Scotland, in which event the Summons or Petition in any such litigation shall be signed and served within ten Business Days of the date of expiry of the period of sixty Business Days following the conclusion of the internal resolution procedure under paragraphs 9 and 10.

In the event that the Chief Executive (or equivalent) of the Tram Maintainer and the Chief Executive (or equivalent) of the Client (or their respective deputies in the event

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of their unavailability) are unable to agree that the Dispute be resolved by the procedures described in paragraphs 10.1.1, 10.1.2 or 10.1.3, the Party initiating or pursuing the Dispute shall refer the Dispute to mediation (and thereafter adjudication, if necessary) in accordance with paragraphs 11 to 13 or in the case of a Related Dispute conjoined by either Party pursuant to paragraph 55 or where a Related Dispute has already been referred to the decision of an adjudicator to adjudication in accordance with Paragraphs 14 to 54 (without the need to first refer the Dispute to adjudication).

Mediation

11. The Parties shall attempt in good faith to resolve the Dispute by a procedure of mediation in accordance with the Centre for Effective Dispute Resolution mediation rules or Model Mediation Procedure in force at the commencement of the mediation, (or in the event that the Centre for Effective Dispute Resolution has ceased to exist as at the time of the commencement of the mediation, mediation rules or a model mediation procedure offered by any other body offering commercial mediation services which shall be selected by agreement between the Parties (failing such agreement by the Party referring the Dispute to mediation. In the event that any provision of such mediation rules or model mediation procedure conflicts with any provision of this Schedule 9 (*Dispute Resolution Procedure*), the provisions of this Schedule 9 (*Dispute Resolution Procedure*) shall take precedence. In the event that any timescales contained in such mediation rules or model mediation procedure conflicts with the timescales referred to in this Schedule 9 (*Dispute Resolution Procedure*), the timescales contained in such mediation rules or model mediation procedure shall be amended accordingly such that the timescales referred to in this Schedule 9 (*Dispute Resolution Procedure*) shall be adhered to.

12. In the event that resolution of the Dispute is achieved in consequence of such mediation procedure, such agreed resolution shall be recorded in writing and, once it is signed by the duly authorised representatives of both Parties, shall be binding on the Parties. Unless concluded by a written legally binding agreement, all discussions and negotiations (including written submissions made and documents produced in relation thereto) connected with the mediation procedure referred to in paragraph 11 shall be conducted in confidence and without prejudice to the rights of the Parties in any future legal or other proceedings. Nor may such matters be produced or relied upon in evidence in any such proceedings.

13. If any Dispute to which this Schedule 9 (*Dispute Resolution Procedure*) relates is not resolved by the mediation procedure referred to in paragraphs 11 and 12 within a period of 30 Business

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Days from the referral of the Dispute to mediation (or longer if so agreed by the Parties), the mediation procedure shall be terminated and, unless the Party initiating or pursuing the Dispute withdraws the Dispute, the Dispute shall within a further sixty days of the termination of the mediation procedure, be referred to adjudication in accordance with paragraphs 14 to 52.

Adjudication

14. In the event that either Party refers a Dispute to adjudication in terms of paragraph 10.1.2 or 13, or exercises a statutory right available to it under the Housing Grants Construction and Regeneration Act 1996 to raise adjudication proceedings in relation to "construction operations" (within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996) which are not Authorised Works as defined in the Tram Acts, such adjudication shall be conducted in accordance with paragraphs 14 to 52, wherein any reference to "days" is a reference to calendar days.

15. Where a Related Dispute (as defined in paragraph 55) relates or is claimed by the other party to a Related Contract to relate to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 and where such other party to a Related Contract claims to exercise a statutory right available to it under the Housing Grant, Construction and Regeneration Act 1996, then reference of the Dispute arising under this Agreement to mediation shall not be a precondition to the commencement of adjudication proceedings. In the foregoing circumstances, the Tram Supplier or the Client shall be entitled to refer a Dispute at any time to adjudication in terms of paragraphs 14 to 54 hereof.

Notice of intention to seek adjudication

16. Either Party may give written notice (the "**Notice of Adjudication**") of its intention to refer the Dispute to adjudication and the Party giving such notice shall be the "**Referring Party**".

17. The Notice of Adjudication shall be given to the other Party and the Party receiving the Notice of Adjudication shall be the "**Responding Party**".

18. The Notice of Adjudication shall set out briefly:

    18.1 the nature and a brief description of the Dispute and of the parties involved;

    18.2 details of where and when the Dispute has arisen;

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18.3 the nature of the redress which is sought; and

18.4 the names and addresses of the Parties (including the addresses which the Parties have specified for the giving of notices).

19. The adjudicator selected to consider the Dispute shall be selected from one of the panels ("**Panels**") appointed by the Parties in accordance with the following:

19.1 there shall be three Panels, one in respect of legal matters, ("**Legal Panel**"), one in respect of construction/operational matters and construction/operational interface matters ("**Construction/Operational Panel**") and one in respect of financial matters ("**Financial Panel**").

19.2 each Panel shall be comprised of at least four members, who are listed in Schedule 10 (*Panels for the Dispute Resolution Procedure*) to the Agreement.

19.3 if any member of a Panel resigns or dies or becomes incapax or ill to the extent of being unable to reasonably discharge his duties as a member of the Panel, a replacement shall be appointed by the Parties as soon as practicable. Any such replacement shall be wholly independent of **tie**, any **tie** Party, TEL, Transport Scotland, the Client, any Client Party, the Tram Maintainer, any Tram Maintainer Party, CEC or any Relevant Authority, any Approvals Body, the Tram Supplier, any Tram Supplier Party, the Infraco, any Infraco Party, the Operator or any equipment supplier or any party associated with the Edinburgh Tram Network, and any successor to or subsidiary or parent of any of the aforementioned parties. If the Parties are unable to agree on the identity of such replacement(s), the President or Vice President for the time being of The Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland shall appoint such replacement(s) within thirty days of any application for such appointment by either Party.

20. The Referring Party shall at the same time as giving the Notice of Adjudication to the Responding Party, send to each of the members of the relevant Panel a copy of the Notice of Adjudication and a request that each member of the relevant Panel advises both Parties within three days of the date of the Notice of Adjudication as to whether or not he is able and willing to act. The Referring Party shall (acting reasonably) be entitled to select which of the Panels is the relevant Panel in light of the subject matter of the Dispute. The Parties shall attempt to agree within two further days as to which one of the members of the relevant Panel who responded indicating that they are able and willing to act shall be requested to act as

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adjudicator. In the event that such agreement is reached, the Referring Party shall, within a further period of one day, request the member of the relevant Panel upon whom agreement has been reached to act as adjudicator. In the event that such agreement is not reached, the Responding Party shall, within a further period of two days, select one of the members of the relevant Panel who responded indicating that they are able and willing to act and the Referring Party shall request that member to act as adjudicator.

21. If no member of the relevant Panel indicates that he is able and willing to act within three days of receiving a request to act as adjudicator, the Referring Party shall request the President or the Vice President for the time being of The Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland to select a person to act as adjudicator.

22. Any person appointed, requested or selected to act as adjudicator in accordance with paragraphs 19, 20, 21, 24 and 25 shall be a natural person acting in his personal capacity. A person appointed, requested or selected to act as an adjudicator shall be wholly independent of **tie**, any **tie** Party, TEL, Transport Scotland, the Client, any Client Party, the Tram Maintainer, any Tram Maintainer Party, CEC or any Relevant Authority, any Approvals Body, the SDS Provider, the Tram Supplier, any Tram Supplier Party, the Infraco, any Infraco Party, the Operator or any equipment supplier or any party associated with the Edinburgh Tram Network, and the Tram Maintainer Parties and any successor to or subsidiary or parent of any of the aforementioned parties.

23. The requests referred to in paragraphs 20 and 21 shall be accompanied by a copy of the Notice of Adjudication.

24. The Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland must communicate the selection of an adjudicator to the Referring Party within three days of receiving a request to do so.

25. If the Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland fails to comply with paragraph 24, the Referring Party may:

    25.1 agree with the other Party to the Dispute to request a specified person to act as adjudicator; or

    25.2 request any other adjudicator nominating body to select a person to act as adjudicator. An "adjudicator nominating body" shall mean a body (not being a natural person and

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not being a Party to the Dispute) which holds itself out publicly as a body which will select an adjudicator when requested to do by a Referring Party.

26. The person requested to act as adjudicator in accordance with the provisions of paragraph 20 or 21 shall indicate whether or not he is willing to act within two days of receiving the request.

27. Where an adjudicator has been selected and appointed in accordance with paragraph 20 or 21 within seven days of the date of the Notice of Adjudication, then the Referring Party shall refer the Dispute in writing (the "**Referral**") to the adjudicator within that seven day period. Where an adjudicator has not been selected within and appointed within seven days of the Notice of Adjudication, then the Referral shall be made immediately upon such selection and appointment. Any failure on the part of the Referring Party to make the Referral within seven days of the date of the Notice of Adjudication shall not invalidate the decision of the adjudicator.

28. The Referral shall be accompanied by copies of, or relevant extracts from the Agreement and such other documents as the Referring Party intends to rely upon.

29. The Referring Party shall, at the same time as he sends to the adjudicator the documents referred to in paragraphs 27 and 28, send copies of those documents to the Responding Party.

30. The adjudicator may, with the consent of the parties to those Disputes, adjudicate at the same time on more than one Dispute under the Agreement.

31. The Parties may agree to extend the period within which the adjudicator may reach a decision in relation to all or any of these Disputes.

32. An adjudicator may resign at any time on giving notice in writing to the Parties.

33. An adjudicator must resign where the Dispute is the same or substantially the same as one which has previously been referred to adjudication, and a decision has been taken in that adjudication.

34. Where an adjudicator ceases to act under paragraph 32 or 33, or dies or becomes incapax or ill to the extent of being unable to reasonably discharge his duties:

34.1 the Referring Party may serve a fresh notice in accordance with paragraphs 16 to 18 and shall in accordance with paragraphs 19 to 29 request an adjudicator to act; and

34.2 if requested by the new adjudicator, the Parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

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35. The Parties to a Dispute may at any time agree to revoke the appointment of the adjudicator and in such circumstances the fees and expenses of that adjudicator shall, subject to paragraph 36, be determined and payable in accordance with paragraphs 52 and 53.

36. Where the revocation of the appointment of the adjudicator is due to the default or misconduct of the adjudicator, the Parties shall not be liable to pay the adjudicator's fees and expenses.

Powers of the Adjudicator

37. The adjudicator shall:

37.1 act impartially in carrying out his duties and shall do so in accordance with any relevant terms of the Agreement and shall reach his decision in accordance with Scots law; and

37.2 avoid incurring unnecessary expense.

38. The adjudicator may take the initiative in ascertaining the facts and the law necessary to determine the Dispute, and shall decide on the procedure to be followed in the adjudication. In particular, he may:

38.1 request either Party to supply him with such documents as he may reasonably require including, if he so directs, any written statement from either Party supporting or supplementing the Referral and any other documents given under paragraphs 28 and 29;

38.2 conduct the adjudication in the English language and decide whether a translation of any document is to be provided and, if so, by whom, by when, and at whose cost;

38.3 meet and question either Party and their representatives;

38.4 subject to obtaining any necessary consent from a third party or the Parties, make such site visits and inspections as he considers appropriate, whether accompanied by the Parties or not;

38.5 subject to obtaining any necessary consent from a third party or the Parties, procure the carrying out of any tests or experiments, and make directions as to the conditions for and responsibility for the cost of the same;

38.6 obtain and consider such representations and submissions as he requires, and, provided he has notified the Parties of his intention, appoint experts, assessors or legal advisers;

38.7 give directions as to the timetable for the adjudication, any deadlines, or limits as to the length of written documents or oral representations to be complied with; and

38.8 issue other directions relating to the conduct of the adjudication.

39. The Parties shall comply with any request or direction of the adjudicator in relation to the adjudication.

40. If, without showing sufficient cause, a Party fails to comply with any request, direction or timetable of the adjudicator made in accordance with his powers, fails to produce any document or written statement requested by the adjudicator, or in any other way fails to comply with a requirement under these provisions relating to the adjudication, the adjudicator may:

40.1 continue the adjudication in the absence of that Party or of the document or written statement requested;

40.2 draw such inferences from that failure to comply as may, in the adjudicator's opinion, be justified in the circumstances;

40.3 make a decision on the basis of the information before him, attaching such weight as he thinks fit to any evidence submitted to him outside any period he may have requested or directed;

40.4 disqualify any part or parts of that Party's submissions affected by the failure to comply; and

40.5 grant the other Party proper opportunity to consider and respond to any evidence or representation made late.

41. Subject to any agreement between the Parties to the contrary, either Party may be assisted by, or represented by, such advisers or representatives (whether legally qualified or not) as he considers appropriate.

42. The adjudicator shall consider any relevant information submitted to him by either Party and shall make available to them any information to be taken into account in reaching his decision.

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43. The adjudicator and the Parties shall not disclose to any other person any information or document provided in connection with the adjudication which the Party supplying it has indicated is to be treated as confidential, except to the extent that disclosure is required by law or is necessary for the purposes of, or in connection with, the adjudication, or the information is already in the public domain.

Adjudicator's Decision

44. Unless otherwise agreed in accordance with paragraph 56.1 or 57.1 the adjudicator shall reach his decision not later than:

44.1 twenty eight days after the date of the Referral as defined in paragraph 27;

44.2 forty two days after the date of the Referral if the Referring Party so consents; or

44.3 such period exceeding twenty eight days after the Referral as the Parties may, after the giving of that notice, agree.

45. Where the adjudicator fails, for any reason, to reach his decision in accordance with paragraph 44;

45.1 either of the Parties to the Dispute may serve a fresh notice in accordance with paragraphs 16 to 18 and shall request an adjudicator to act in accordance with paragraphs 19 to 29; and

45.2 if requested by the new adjudicator the Parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

46. As soon as possible after he has reached a decision, the adjudicator shall deliver a copy of that decision to each of the Parties.

47. The adjudicator shall decide the matters in Dispute and may make a decision on different aspects of the Dispute at different times.

48. The adjudicator may take into account any other matters which the Parties agree should be within the scope of the adjudication or which are matters under the Agreement which he considers are necessarily connected with the Dispute and, in particular, he may:

48.1 open up, review and revise any decision taken or any notice certifying payment given by any person referred to in the Agreement, unless the Agreement states that the decision or notice certifying payment is final and conclusive; and/or

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48.2 decide that any of the Parties to the Dispute is liable to make a payment under the Agreement (whether in sterling or some other currency) and, subject to the terms of the Agreement, when that payment is due and the final date for payment.

49. The adjudicator shall provide written reasons for his decision.

Effect of the Decision

50. In his decision, the adjudicator may, if he thinks fit, order either or both of the Parties to comply (forthwith) with his decision or any part of it. In the absence of any directions by the adjudicator relating to the time for performance of his decision, the Parties shall be required to comply with any decision of the adjudicator immediately on delivery of the decision to the Parties in accordance with paragraph 46.

51. The decision of the adjudicator shall be binding on the Parties, and they shall comply with it, until the Dispute is finally determined by legal proceedings or by agreement between the Parties.

52. The adjudicator shall be entitled to the payment of such reasonable amount as he may determine by way of fees and expenses incurred by him and the Parties shall be jointly and severally liable to pay that amount to the adjudicator.

53. Without prejudice to the right of the adjudicator to effect recovery from either Party in accordance with paragraph 52, the adjudicator may by direction determine the apportionment between the parties of liability for his fees and expenses, or otherwise the Parties shall each be liable to pay one-half share of the adjudicator's fees and expenses.

54. The adjudicator shall not be liable for anything done or omitted in the discharge or purported discharge of his functions as adjudicator unless the act or omission is in bad faith, and any employee or agent of the adjudicator shall be similarly protected from liability.

Related Disputes

55. Notwithstanding the terms of paragraphs 2, 3 and 6 to 9 above, in the event that a dispute or potential dispute under, or in connection with any contract associated with the Edinburgh Tram Network (referred to in this Schedule 9 (*Dispute Resolution Procedure)* as "**Related Contracts**")), has arisen or arises out of substantially the same issues of fact and/or law (as the case may be) as a Dispute under the Agreement (a "**Related Dispute**"), then providing that the Related Contract contains dispute resolution provisions in terms substantially the same as set out in this Schedule 9 (*Dispute Resolution Procedure*) (save for necessary changes), either

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Party may require and direct that the Dispute and the Related Dispute be dealt with together at an appropriate stage of the Dispute Resolution Procedure.

56. In the event that a Related Dispute has already been referred to the decision of an adjudicator in accordance with the provisions of the Related Contract, and the Client is of the opinion that a Dispute is to be (but has not yet been) referred to adjudication under this Schedule 9 (*Dispute Resolution Procedure*), the Client or the Tram Supplier may refer the Dispute, or may by notice in writing to the Tram Maintainer require that the Dispute be referred (as the case may be) to the adjudicator appointed under the Related Contract to decide upon the Related Dispute, with the intention that such adjudicator shall, insofar as is relevant, practicable and appropriate, come to the same conclusion as to the facts and apply the same reasoning and analysis in reaching a decision on the Dispute as the adjudicator's conclusions, reasoning and analysis applied by him as the adjudicator in the Related Dispute and:

56.1 the adjudicator shall, if practicable, hear the Dispute at the same time as the Related Dispute and shall request such extension of time for producing his decision or award as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The Parties shall agree to such request for an extension of time, except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the adjudicator);

56.2 except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the adjudicator), the adjudicator shall have power (if so requested by the Client) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the Parties to the Dispute and the Related Dispute, and to the adjudicator; and

56.3 the Client shall procure that, as soon as practicable, the other party or parties to the Related Dispute shall give the Tram Maintainer copies of the Related Contract, the Referral Notice in the Related Dispute and any other documentation provided to the adjudicator by any party to the Related Dispute.

57. In the event that a Dispute has already been referred to the decision of an adjudicator, and the Client is of the opinion that a Related Dispute is to be (but has not yet been) referred to adjudication, the Client may refer the Related Dispute to the adjudicator appointed under this Schedule 9 (*Dispute Resolution Procedure*) to decide upon the Dispute, and:

57.1 the adjudicator shall, if practicable, hear the Related Dispute at the same time as the Dispute and shall request such extension of time for producing his decision or award as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The Parties shall agree to such request for an extension of time, except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator).

57.2 except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the adjudicator), the adjudicator shall have power (if so requested by the Client) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the Parties to the Dispute and the Related Dispute, and to the adjudicator;

57.3 as soon as practicable, the Client shall give to the Tram Maintainer copies of the Related Contract, the Referral Notice in the Related Dispute and any other documentation provided to the adjudicator by any party to the Related Dispute.

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57. In the event that a Dispute has already been referred to the decision of an adjudicator, and the Client is of the opinion that a Related Dispute is to be (but has not yet been) referred to adjudication, the Client may refer the Related Dispute to the adjudicator appointed under this Schedule 9 (*Dispute Resolution Procedure*) to decide upon the Dispute, and:

57.1 the adjudicator shall, if practicable, hear the Related Dispute at the same time as the Dispute and shall request such extension of time for producing his decision or award as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The Parties shall agree to such request for an extension of time, except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator).

57.2 except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the adjudicator), the adjudicator shall have power (if so requested by the Client) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the Parties to the Dispute and the Related Dispute, and to the adjudicator;

57.3 as soon as practicable, the Client shall give to the Tram Maintainer copies of the Related Contract, the Referral Notice in the Related Dispute and any other documentation provided to the adjudicator by any party to the Related Dispute.

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 10 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 10

PANELS FOR DISPUTE RESOLUTION PROCEDURE

CONSTRUCTION/OPERATIONAL

Alan Wilson
[redacted]
Chesterfield
DERBYSHIRE
[redacted]

Tony Canham
[redacted]
NORWICH
[redacted]

Peter Chapman
[redacted]
OXSHOTT
SURREY
[redacted]

Guy Cottam
[redacted]
BATH
[redacted]

FINANCIAL

Nigel Lowe
Nigel Lowe Consulting Limited
[redacted]
LONDON
[redacted]

Bryan Porter
[redacted]
GLASGOW
[redacted]

John Hunter
Hunter Consulting
[redacted]
STIRLING
[redacted]

Eric Mouzer
[redacted]
BIRMINGHAM
[redacted]

LEGAL

Lord Dervaird (Prof. John Murray QC)
[redacted]
EDINBURGH
[redacted]

Gordon Coutts, QC
[redacted]
EDINBURGH
[redacted]

[redacted], QC
[redacted]
EDINBURGH
[redacted]

Nick Ellis
Advocates Library
Parliament House
EDINBURGH
[redacted]

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 11 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 11

AGREED REPAIRS

Schedule 11 - Tram Agreed Repairs-V5.xls

	STERLING GBP £ (Fixed exchange rate)				
REF.	REPAIR/DEFECT	MAN-HRS	MATERIALS	TOTAL	
			Pounds		
1	Replace bodyside window (glazing) - 1x unit (Opening Window, two glaces)	£104	£378	£482	
1A	Replace bodyside window (glazing) - 1x unit (Fixed Window)	£104	£202	£306	
2	Replace bodyside window (glazing) - subsequent unit (OW)	£78	£378	£456	
2A	Replace bodyside window (glazing) - subsequent unit (FW)	£78	£202	£280	
3	Replace bodyside window unit complete (incl. Frame, Opening Window)	£156	£676	£832	
4	Replace windscreen (glazing)	£260	£3.797	£4.057	
5	Replace cab side window (glazing)	£78	£467	£545	
6	Replace door leaf window (glazing)	£52	£435	£487	
7	Replace interior glass draught screen	£78	£140	£218	
8	Replace front GRP panel	£52	£4.351	£4.403	
9	Exchange pantograph complete	£208	£0	£208	
10	Replace pantograph carbon	£52	£567	£619	
11	Replace wheel - 1x	£416	£1.880	£2.296	
12	Replace 2nd or subsequent wheel	£156	£1.880	£2.036	
13	Replace tyre 1x	£312	£932	£1.244	
14	Replace tyre 2nd or subsequent	£52	£932	£984	
15	Exchange traction motor/gearbox unit	£156	£0	£156	
16	Replace friction brake disk	£104	£1.868	£1.972	
17	Exchange driver seat	£52	£1.479	£1.531	
18	Replace cab microphone	£52	£310	£362	
19	Exchange power bogie	£234	£0	£234	
20	Exchange trailer bogie	£208	£0	£208	
21	Exchange cab door	£156	£181	£337	
22	Exchange passenger door leaf	£52	£3.049	£3.101	
23	Exchange under-guard	£78	£0	£78	
24	Tyre turn 1x bogie	£156	£0	£156	
25	Tyre turn 2nd or subsequent bogies	£104	£0	£104	
26	Exchange Albert (emergency) coupler	£52	£8.171	£8.223	
27	Replace saloon seat cushion (base)	£26	£125	£151	
28	Replace saloon seat cushion (back)	£26	£125	£151	
29	Exchange cab radio module	£52	£0	£52	
30	Exchange TPDS transponder	£26	£0	£26	
31	Replace door-open pushbutton	£52	£467	£519	
32	Replace passenger Call-for-Help unit	£52	£932	£984	
33	Carry out OTMR download	£26	£0	£26	
34	Carry out static brake test	£26	£0	£26	
35	Carry out dynamic brake test	- - -	- - -	- - -	
36	Carry out post-third party repairs pre-service inspection	£52	£0	£52	
	NOTE: The prices above are based on year 2007and will be Indexed annually. It is also assumed each item is bought on one to one basis. A price revision could be made on the contract effective commencement date to take into account if it is possible to buy in batches and, also, to find local suppliers in order to reduce some of the costs.				

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

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This is Schedule 12 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 12

RETURN CONDITION

Part 1 - Procedure

1. Final Inspection

During the period of six months prior to the scheduled Expiry Date the Client and/or any person designated by the Client will be entitled to inspect the Trams and the Spare Parts Pool on one or more occasions (as notified by the Client to the Tram Maintainer), and including, for the avoidance of doubt, its Technical Records in order to verify that their condition meets the Return Condition provided that such inspections shall not unreasonably disrupt the Services. Each such inspection will be long enough to permit the Client and/or any person designated by the Client to inspect the relevant Trams (including, for the avoidance of doubt, all relevant Technical Records) and/or the Spare Parts Pool. For the avoidance of doubt, the Client shall be entitled to inspect the Trams and the Spare Parts Pool both during the said period of six months and on the required Return Date.

2. Non-Compliance

If at the time of any inspection referred to in paragraph 1 or upon the required Return Date the condition of such Trams does not meet the requirements referred to in the Return Condition in any material respect or the Spare Parts Pool does not meet the requirements of the Return Condition, the Client will provide to the Tram Maintainer details of such non-compliance and the Tram Maintainer will, unless otherwise expressly agreed in writing, indemnify the Client on terms satisfactory to the Client in its reasonable discretion against the reasonable cost of putting such Trams into the Return Condition.

3. Intermediate Inspections

3.1 Without prejudice to the Client's rights under paragraph 1, at any time during the Term, the Client and/or any person designated by the Client will be entitled, upon giving the Tram Maintainer reasonable notice of its intention to do so, to inspect (or re-inspect) the Trams including, for the avoidance of doubt, its Technical Records in order to verify that their condition as at the date of such inspection complies with the Return Condition provided that such inspections shall not unreasonably disrupt the Services and the Tram Maintainer shall use all reasonable endeavours to facilitate the Client's exercise of its rights under this paragraph 3.

3.2 The Tram Maintainer will pay to the Client on demand all reasonable out of pocket expenses incurred by the Client in connection with any inspection carried out pursuant to paragraph 3.1 if (i) the Tram Maintainer has provided security pursuant to paragraph 4 which is still in existence; or (ii) such inspection identifies instances where any Tram, Technical Record, Spare Part or Special Tool does not comply with the Return Condition where the total cost of the remedial work as may be necessary to put all Trams, Technical Records, Spare Parts and/or Special Tools back in the Return Condition shall, in the Client's absolute discretion (acting reasonably), exceed £50,000 in aggregate value.

3.3 The Tram Maintainer may in its absolute discretion request the Client carry out a re-inspection pursuant to paragraph 3.1 whereupon the Client will endeavour to carry out such re-inspection at the earliest practicable opportunity. The Tram Maintainer will pay to the Client on demand all reasonable out of pocket expenses incurred by the Client in connection with any re-inspection carried out pursuant to paragraph 3.1 where in the Client's reasonable opinion such inspection is desirable as a prudent measure because a previous inspection has shown that the relevant Trams were not in accordance with the requirements stipulated in paragraph 3.1 or where such re-inspection is requested by the Tram Maintainer for the purpose of the Client verifying that any remedial action that had been identified by the Client on a previous inspection has been completed to the Client's satisfaction.

3.4 The Client shall have no duty or liability to carry out such inspections as are referred to in paragraph 3.1 and the provisions of paragraphs 1, 2 and 4 shall continue to apply to the Trams and the Spare Parts Pool whether or not the Client shall exercise its rights under this paragraph 3. Furthermore, the Client shall have no liability arising out of any such inspection other than for material damage or personal injury caused by its employees or designated persons during the course of conducting such inspection and the discharge of their duties.

3.5 In relation to re-inspection (other than those carried out at the Tram Maintainer's invitation) the Client will act reasonably having regard to all relevant circumstances when determining the period of time after the previous inspection when any re-inspection shall be carried out.

4. Provision of Security in respect of Return Condition

If at the time of any inspection pursuant to paragraph 3.1 the condition of the Trams, Spare Parts Pool or the Technical Records does not comply with the Return Condition, the Client

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will provide to the Tram Maintainer details of such non-compliance and/or non-performance together with details of the Client's reasonable estimate of the quantum of such non-compliance or non-performance in terms of the cost of rectifying or repairing or otherwise making good those items which are not in compliance or accordance with the requirements of the Return Condition (**"Quantum"**). If the Quantum (as determined by the Client in its absolute discretion, acting reasonably) from time to time exceeds £50,000 in aggregate amount the Tram Maintainer will within ten (10) Business Days of the Client providing details of the Quantum to the Tram Maintainer provide security in a sum not less than the aggregate Quantum from time to time, such security to be in the form of (at the Tram Maintainer's discretion):

4.1 a deposit of cash Sterling into the Account; or

4.2 a bond in substantially the form of the Performance Bond (**"Return Condition Bond"**).

but in the absence of the Client and the Tram Maintainer being able to agree any of the details referred to in sub-paragraph 4.2 within such period of ten (10) Business Days, the security shall take the form of a cash deposit in accordance with sub-paragraph 4.1.

5. Non-Compliance revealed by a Final Inspection

If, at the time of any final inspection pursuant to paragraph 1 or on the required Return Date for the Trams, the condition of the Trams does not comply with the requirements of this Agreement, and where the Quantum of such non-compliance and/or non-performance is greater than £50,000 in aggregate amount then, without prejudice to the provisions of paragraph 2, the Tram Maintainer will within five (5) Business Days of the Client providing such details to the Tram Maintainer pursuant to paragraph 2 provide the Client with security as provided for in paragraph 4 as if the provisions of that paragraph were repeated in full in this paragraph, mutatis mutandis.

6. Realisation of Security

6.1 On the Return Date for any Tram or the Spare Parts Pool the Client shall be entitled to withdraw any and all funds standing to the credit of the Account and/or draw down all or any part of the amount of the Return Condition Bond in the following circumstances:

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6.1.1 to the extent necessary to remedy any non-compliance by the Tram Maintainer with its obligations under this Agreement to comply with the Return Condition; and/or

6.1.2 if and to the extent that the Tram Maintainer fails to indemnify the Client in full in the circumstances specified in, and in accordance with, paragraph 2.

6.2 If the Tram Maintainer has provided security under paragraph 4 but the amount of such security exceeds the aggregate Quantum from time to time, the Tram Maintainer shall be entitled to reduce the level of such security by an amount equal to such excess.

6.3 If the Tram Maintainer is entitled to reduce the level of security from time to time pursuant to paragraph 6.2 the Client will co-operate with the Tram Maintainer and (at the Tram Maintainer's expense) do such acts or things as may be reasonably necessary to facilitate any permitted reduction in the level of security provided by the Tram Maintainer for the time being including giving any necessary instruction to make payment out of the Account.

6.4 On the Return Date of the last Tram to be redelivered under this Agreement or on any date thereafter in circumstances where the Client is not entitled to withdraw funds from the account or draw down on the Return Condition Bond pursuant to paragraph 6.1 the Parties agree that sums standing to the credit of the Account shall be returned to the Tram Maintainer and/or the Tram Maintainer may cancel any extant Return Condition Bond.

7. Audit Sampling

For the purpose of determining the level of any non-compliance and/or non-performance with the requirements of this Agreement, the Tram Maintainer acknowledges that the Client shall be entitled to inspect a sample of Trams to be determined by the Client in its absolute discretion and that, so long as any such sample is reasonably representative having regard to the nature or circumstances of any particular instance of non-compliance or non-performance, the Client shall be entitled to rely on such samples (acting reasonably) for the purpose of evaluating the likely extent of any non-compliance or non-performance across all Trams (or part thereof) and for determining the Quantum.

Part 2 - Condition

Unless otherwise agreed with the Client and save as modified by the Client in accordance with Clause 16 (*Changes*), each Tram, Spare Part and Special Tool must be returned in a condition consistent with:

1. its position within the Tram Maintenance Programme and the requirements of the Tram Maintenance Specification as appropriate; and

2. the Tram Requirements Specification as appropriate,

and, subject to normal wear and tear, the Tram will be returned in fully operational condition and with all its Parts fitted and operational, with the cabs of each Tram containing driver's log books and/or fault record books as appropriate and the Spare Parts Pool will contain all the Spare Parts required for the Minimum Spare Parts Pool.

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CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 13 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 13

DEPOT SUB-LICENCE

1. In accordance with Clause 10 (*Use of the Depot*) of this Agreement the Client grants to the Tram Maintainer a sub-licence to occupy and use the Depot on a non-exclusive basis on the terms set out below:

   1.1 subject to the Tram Maintainer complying with the undertakings set out in paragraph 2 below, the Tram Maintainer shall have the right during the Term to enter into, remain in and occupy those parts of the Depot within the area shaded yellow on the Depot Plan for the purposes of carrying out and performing the Services and other obligations assumed by the Tram Maintainer in accordance with this Agreement including those offices and facilities shaded yellow on the Depot Plan in connection with the performance of such Services and other obligations.

   1.2 The Client and the Tram Maintainer agree that:

      1.2.1 the right to occupy granted pursuant to paragraph 1.1 above shall terminate on the earlier of the Termination Date or the Expiry Date;

      1.2.2 the Tram Maintainer's occupation of the Depot will be as a sub-licensee only and shall confer on the Tram Maintainer no greater interest than that of sub-licensee and in particular the sub-licence granted by paragraph 1.1 above shall not create a relationship of landlord and tenant;

      1.2.3 the benefit of the sub-licence granted by paragraph 1.1 above is personal to the Tram Maintainer, its contractors and sub-contractors and its and/or their work persons, servants and agents and is not assignable and the rights given in paragraph 1.1 above may only be exercised by the Tram Maintainer, its contractors and sub-contractors of any tier and its and/or their work persons, servants and agents.

2. The Tram Supplier agrees and undertakes to the Client that it shall (and shall procure that its sub-contractors shall):

   2.1 carry out the Services with the minimum disruption to neighbouring properties to the Depot;

2.2 use the Depot only for, and to the extent necessary for, the purposes of carrying out and performing the Services and other obligations assumed by the Tram Maintainer under and in accordance with this Agreement;

2.3 keep the Depot as clean and tidy as practicable and not make any physical alterations thereto;

2.4 provide cleaning, maintenance and access control services as required under Appendix 2 of this Schedule 13 (*Depot Sub-Licence*);

2.5 not to display any signs or notices at the Depot without the prior written consent of the Client, (such consent to be at the Client's absolute discretion);

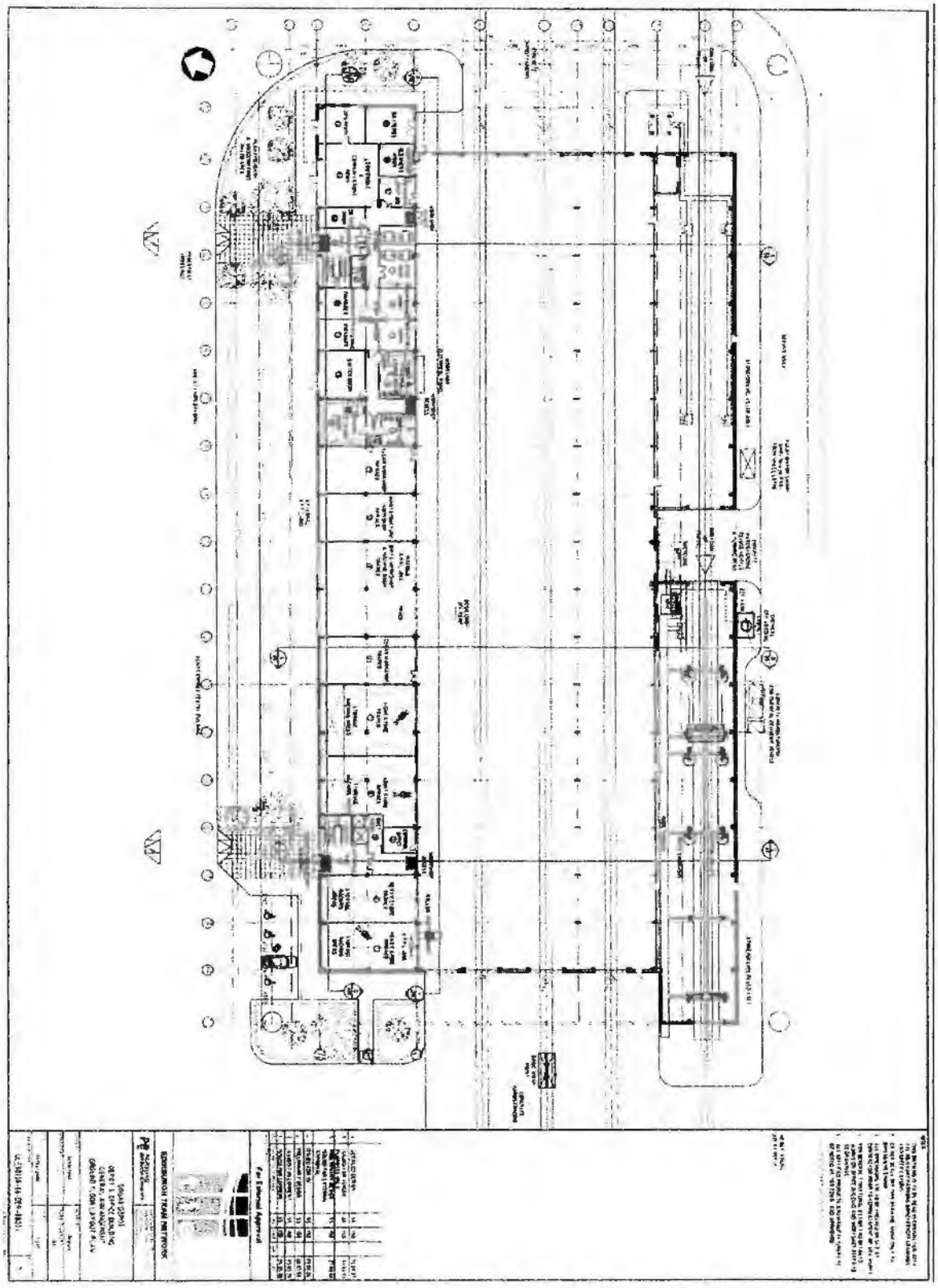
2.6 Upon termination of the licence make good any damage which the Tram Maintainer has caused to the Depot and remove all equipment and apparatus which it has brought into the Depot; and

2.7 not cause unreasonable interference to the other users of the Depot.

3. The Tram Maintainer acknowledges that the Operator shall have the responsibility for the co-ordination of health and safety issues at the Depot and Tram Maintainer hereby agrees to comply with any instructions of the Operator in relation to health and safety issues at the Depot.

APPENDIX 1

Depot Plan



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APPENDIX 2

DEPOT RESPONSIBILITIES ALLOCATION MATRIX

See Schedule 2 Employer's Requirements Section 40 Table 83 and Table 89

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CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 14 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 14

KEY PERSONNEL

Name	Iñigo Urretabizkaia		
Current Employer	CAF		
Professional Qualifications	BACHELOR SCIENCE IN INDUSTRIAL ENGINEERING		
Availability	YES		
Relevant Experience to the [Tram Supply Agreement]/[Tram Maintenance Agreement]			
Project	**Role and Responsibility (including identity of employer)**	**From**	**To**
LRV PITTSBURGH BRUSSELS METRO	QUALITY PROJECT MANAGER	2002	2006
INTERNATIONAL PROJECTS CAF	MAINTENANCE AND WARRANTY SERVICE DEPUTY MANAGER, CAF	2006	2007
INTERNATIONAL PROJECTS CAF	MAINTENANCE AND WARRANTY SERVICE MANAGER, CAF	2007	-

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Name	David Anthony Lowe
Current Employer	Construcciones y Auxiliar de Ferrocarriles
Professional Qualifications	BSc Mechanical Engineering
Availability	

Relevant Experience to the [Tram Supply Agreement]/[Tram Maintenance Agreement]

Project	Role and Responsibility (including identity of employer)	From	To
Existing LUL rolling stock	London Underground Ltd Mechanical engineer in the technical office. Review and improve design of existing rolling stock to improve reliability and support maintenance activities	1989	1994
Hong Kong Metro	CAF Systems engineer in support of Safety, Reliability and Maintenance studies for new rolling stock. Modifications manager for fleet as continuation	1994	1999
WMATA	CAF Systems design and integration engineer for propulsion, brakes and ATO systems. Onsite testing, Modifcation and engineering support manager during the warranty period.	1999	2003
Sacramento LRV	CAF Systems design and integration engineer for brakes system and EMC studies and testing.	2001	2003
Pittsburg LRV	CAF Systems design and integration engineer for propulsion and brakes systems.	2002	2003
Irish Rail DMUs	CAF Modifcation and engineering support manager during the warranty period.	2003	2004
NIR DMUs	CAF Warranty manager	2004	2005
Irish Rail Intercities	CAF Warranty manager	2005	2007

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CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 15 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 15

RISK MANAGEMENT

Required Action from the Tram Maintainer	Timing/Frequency applicable to the Tram Maintainer
The Tram Maintainer shall support the Client in the development of the **Project Risk Management Plan** ("**PRMP**"). The PRMP will detail the management of commercial, environmental, safety and security risk aspects of the Edinburgh Tram Network. The PRMP shall be focused on the risk factors related to the implementation of the Edinburgh Tram Network and shall outline the management arrangements to facilitate the inclusion of input from third parties. The risk management process will be applied and co-ordinated throughout the Term. The PRMP shall indicate the critical success factors, key areas of focus and individuals involved.	Input from the Tram Maintainer as required by the Client to facilitate the delivery of the PRMP within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Maintainer on an ongoing basis during the Term to allow periodic updates of the PRMP to be issued.
The Tram Maintainer shall support the Client with contribution to the **Project Assumptions Register** ("**PAR**") which shall record and report all capex, opex, lifecycle, revenue, programme, quality, functionality and approvability assumptions and consequent risks in relation to the Edinburgh Tram Network throughout the Term. The PAR shall be one central register with input from a number of parties, which the Client will co-ordinate. The Tram Maintainer shall document all relevant assumptions made in relation to the performance of the Services.	Input from the Tram Maintainer as required by the Client to facilitate the delivery of the PAR within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Maintainer on an ongoing basis during the Term to allow periodic updates of the PAR to be issued.
The Tram Maintainer shall support the Client with contribution to the **Project Risk Register** ("**PRR**") to be developed by the Client. The PRR should summarise all capex, opex, lifecycle, revenue, programme, quality, functionality and approvability risks to the Edinburgh Tram Network. The PRR will also detail the proposed and completed mitigation of such risks. The PRR shall include analysis of each risk in terms of 'likelihood' and 'impact' prior to and following mitigation to allow effectiveness of mitigation to be assessed, responsible owner of each risk and graphical summaries of risk profile.	Input from the Tram Maintainer as required by the Client to facilitate the delivery of the PRR within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Maintainer on an ongoing basis during the Term to allow periodic updates of the PRR to be issued.

Required Action from the Tram Maintainer	Timing/Frequency applicable to the Tram Maintainer
The risks to be addressed should include strategic, commercial, economic, legal and regulatory, organisational, environmental, technical, operational and infrastructure risks. The Client will continue to use "Active Risk Manager", and the Client shall bear all the costs for license agreements and access costs for its use by the Client and any other party with the consent of the Client.	(continued)
The Tram Maintainer shall prepare and submit a **Progress Report** on risk to the Client on the status of risk management and mitigation in relation to the Services giving a summary of new risks identified, new assumptions, key matters to be resolved and achievements, including risks that have been closed out. The Progress Report must demonstrate how identified risks are being actively managed by the Tram Maintainer. The Progress Report should indicate "**Red-Amber-Green**" (**RAG**) status on key components including specification compliance, incomplete design and programme for outstanding work.	Delivery by the Tram Maintainer to the Client within 1 month of the Effective Date. The Tram Maintainer shall provide an updated Progress Report on a monthly basis throughout the Term.
The Tram Maintainer shall support the Client in the preparation and maintenance of a **Cost and Programme Contingency Report** ("**CPCR**") for the construction phase of the Edinburgh Tram Network. The CPCR shall indicate the recommended capital cost and programme contingency allowances to be considered. The CPCR to be provided by the Client will also include a detailed quantitative risk analysis using the Monte Carlo simulation (*@RISK*4.5 and *Pertmaster Project Risk* or equivalents) for both cost and programme components. The CPCR shall also summarise the recommended mitigation for the construction phase and also include the commissioning and defects phases of the project.	Input from the Tram Maintainer to facilitate delivery of the CPCR within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Maintainer on an ongoing basis during the Term to allow periodic updates of the CPCR to be issued.

Required Action from the Tram Maintainer	Timing/Frequency applicable to the Tram Maintainer
The Tram Maintainer shall engage in liaison with the Client and any other party requested by the Client regarding risk matters to ensure effective management of risk. Liaison to include participation in risk management meetings and workshops and assistance with development of the risk identification procedures relevant to the implementation of the Edinburgh Tram Network.	The Tram Maintainer shall be available for monthly meetings with the Client and any other party requested by the Client. The Tram Maintainer shall also engage in ongoing liaison (including participation in risk workshops) with such parties as required by the Client throughout the Term.
The Tram Maintainer shall support the Client in the preparation of a **Construction Risk Control Report** ("**CRCR**") which shall indicate the risks identified by the Client during the construction phase of the Edinburgh Tram Network, including, but not limited to, construction sequence, construction methodologies, access, quality, approvals, security, safety and compliance. The Tram Maintainer shall assist in demonstrating how risks are to be managed and co-ordinated with other relevant parties, including the use of 'informed' registers, co-ordinating plans and summarising plans.	Input from the Tram Maintainer to facilitate delivery of the CRCR within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Maintainer on an ongoing basis during the Term to allow periodic updates of the CRCR to be issued.
The Tram Maintainer shall support the Client in the preparation of a **Commissioning Risk Control Report** which shall detail the plans for mitigating the risks associated with the commissioning of the Edinburgh Tram Network. The Commissioning Risk Control Report shall identify the areas where the largest commissioning risks may appear. This should cover operational and design risks that could be associated with the whole project including, but not limited to, the trams, the tracks, the power supply and the tram depot. The Commissioning Risk Control Report shall concentrate on the commissioning process, but shall also refer to ongoing issues which also affect the construction and/or operation of the Edinburgh Tram Network.	Input from the Tram Maintainer to facilitate delivery of the Commissioning Risk Control Report within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Maintainer on an ongoing basis during the Term to allow periodic updates of the Commissioning Risk Control Report to be issued
The Tram Maintainer shall support the Client in the preparation a **Residual Risk Control Report** ("**RRCR**") that will detail the plans for mitigating the risks arising from the construction and commissioning of the Edinburgh Tram Network which are still of ongoing importance. The RRCR should clearly detail the areas of importance that could affect the project	Input from the Tram Maintainer to facilitate delivery of the RRCR within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Maintainer on an ongoing basis during the Term to allow periodic updates of the RRCR to be issued

Required Action from the Tram Maintainer	Timing/Frequency applicable to the Tram Maintainer
that will require to be addressed at the start of the project. These areas could be associated with design, operational and defects factors. Risks to be noted in the RRCR may include, but shall not be limited to, snagging, claims, specification defects and commercial concerns.	
The Tram Maintainer shall support the Client in the preparation and maintenance of an **Operational and Maintenance Report** ("**OMR**") that will detail the identified risks associated with the provision of maintenance services in relation to the Edinburgh Tram Network.	Input from the Tram Maintainer to facilitate delivery of the OMR within the timescales agreed pursuant to the Infraco Contract. Input will be required from the Tram Maintainer on an ongoing basis during the Term to allow periodic updates of the OMR to be issued.

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CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 16 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 16

DEFECTS LIST

This is Schedule 16 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

PART 1 - MINOR DEFECTS

Ref.	Fault	Qualification	Likely Responsibility	Remarks	Acceptable as off-depot state
CATEGORY C	**Minor Defect**				
	Fault needs to be advised to driver/operator but does not affect the operation of the tram in traffic. No immediate technical support required.				
C.1.	Loss of Cyclops light		TramCo	Believed to be not essential under the RTA	C
C.2.	Unusual wheel squeal		Indeterminate until investigated	Could be tram or track specific	C
C.3.	One doorway isolated	Dependent upon Operator discretion	TramCo	Check RVAR implications of particular door out of use.	N
C.4.	Loss of one marker light		TramCo	What degree of redundancy exists on tram (e.g. LEDs)?	N
C.5.	Screen wash level low	Could be filled up in service?	TramCo	Cab indication?	N
C.6.	Non-obscene or non-racist graffiti	Depends upon size/severity - could be Cat B	Opco		N
C.7.	Damaged or missing seat(s)	Replacement cushions can be fitted in service normally.	Opco		C
C.8.	Defective night screen partition		TramCo	Needs more thought as to implications.	C
C.9.	Loss of any CCTV image		TramCo		C
C.10.	Loss of TFT info screen		TramCo		C

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Ref.	Fault	Qualification	Likely Responsibility	Remarks	Acceptable as off-depot state
C.11.	Conductor-driver communtication lost		TramCo		N
C.12.	Emergency coupler damaged		Opco		N
C.13.	Minor windscreen damage	No driver vision impairment or risk of lose glass	Opco		C
C.14.	Loose handrail		TramCo		C
C.15.	Any equipment isolated from cab		Opco	Could be Cat A or B dependant upon equipment but fault annuciator will advise accordingly.	C
C.16.	Use of reverse		Opco	Usually frowned upon without good cause.	Y
C.17.	Loose floor covering	If severe would be Cat B	Opco	Tripping hazard	N
C.18.	Loss of wipers when not raining and non-leading cab.		TramCo		N
C.19.	Loss of sun-blind	Cat A if under severely low sun conditions	TramCo/unless abused by Operator		N
C.20.	Partial loss of auxilliary power	Assuming no operational consequence for remainder of service	TramCo	Split unit with load shedding allows one half of aux. converter to operate tram safely, but should not stay out in service in this condition.	N
C.21.	Loss of screen washer		TramCo	Will tram have low-level warning?	N
C.22.	Loss of internal destination indicator	Conductors or driver to compensate by additional use of p.a.	TramCo		C
C.23.	Loss of p.a.	Cat B if combined with internal destination indicator fault as well	TramCo		N
C.24.	Loss of any PEC	Onboard staff to be	TramCo	Passenger Emergency Call	N

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Ref.	Fault	Qualification	Likely Responsibility	Remarks	Acceptable as off-depot state
		visible and available		Point	
CATEGORY D	**Other Defect**				
	Fault is treated according to operational discretion and the list is adjusted for these in the light of experience gained.				
	Any fault not listed above				Y

PART 2 - MATERIAL DEFECTS

Ref.	Fault	Qualification	Likely Responsibility	Remarks	Acceptable as off-depot state
CATEGORY A	Material Defect				
	Tram must be returned to depot immediately by de-tramming passengers at next stop (or sooner if necessary). Tram may need to return at reduced speed or by being assisted by another tram. Technical support immediate. Vehicle not allowed back off depot until fault cleared other than for test run purposes.				N = Not; Y = Yes; C = if Operator agrees concession.
A.1.	Derailment, collision or impact with person or large obstacle.		OpCo	Driver will need to make quick initial assessment if he/she is able to. Technical assistance likely to be needed.	N
A.2.	Severely damaged windscreen (damage area larger than 40 mm within Zone A which is an area 290 mm wide centred on the steering wheel !. For steering wheel read centreline of driver's seat?	Where driver vision impaired or risk of glass fall out. If at rear end, could be treated as Cat. B	OpCo	Driver will need to make quick initial assessment if he/she is able to.	N
A.3.	Broken axle	Tram not to be moved at all until inspected by Technician.	TramCo	Will need to be skated home. Difficult to see how a driver could diagnose this failure.	N
A.4.	Police investigation.	If absolutely necessary.	OpCo		N
A.5.	Loss of 750 volt feed.		Indeterminate until investigated	Driver will need to make quick initial assessment if he/she is able to. Could be infrastructure or tram problem.	N

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Ref.	Fault	Qualification	Likely Responsibility	Remarks	Acceptable as off-depot state
A.6.	Visible Pantograph damage		Indeterminate until investigated	750 volt may or may not be lost. Driver will need to make quick initial assessment and may need technical support before tram can move at all. Formal investigation required.	N
A.7.	Door opens in traffic (i.e. door irregularity leading to a potential unsafe situation)		TramCo	Formal investigation required.	N
A.8.	Door will not close and lock (whether isolated or not) or opens on the move.	If can be successfully isolated & locked, then Cat C.	Indeterminate until investigated	Formal investigation required.	N
A.9.	Passenger injured when caught in door.		Indeterminate until investigated	Formal investigation required.	N
A.10.	Not used				
A.11.	Not used				
A.12.	Broken internal glazing or glass lighting	If in small area conductor may be able to mitigate to a Cat B	OpCo		C
A.13.	Broken external bodyside window	If glass held in place, then Cat B	OpCo	Driver will need to make quick initial assessment.	N
A.14.	Loss of all exterior lighting during darkness or low light.		TramCo	Operator may need to use Bardic lamps as markers, or arrange for escort vehicle.	N
A.15.	Not used				
A.16.	Notably reduced or disconcerting brake performance.		TramCo	Hold vehicle at a terminus or siding until technical help arrives	N
A.17.	Not used				
A.18.	Primary cab control defective.		TramCo	E.g. traction controller, plus list of items to be worked up.	N

Ref.	Fault	Qualification	Likely Responsibility	Remarks	Acceptable as off-depot state
A.19.	Loss of wipers at leading end during rain	If no rain, then Cat B	TramCo/external causes	Wipers required even if no rain in case of dust or substances thrown at or sprayed at windscreen.	N
A.20.	Unable to release brakes.		TramCo		N
A.21.	Fire, smoke or severe smell from tram equipment	Where confirmed by member of on-board staff	TramCo	Move after de-tramming to location where technical help can be administered. Will need a formal post-incident investigation.	N
A.22.	Driver seat badly defective		OpCo		N
A.23.	Significantly impaired vision through leading cab windows.		TramCo or external causes		N
A.24.	Horn & bell both defective	If only horn defective then Cat B, or if only bell defective then Cat C.	TramCo		N
A.25.	Excessive wheel slip or slide	Could proceed at caution and be Cat B depending on tram's route.	TramCo	Implies a WSP or sanders fault	N
A.26.	Spillage of hazardous or bio-hazard material.	Could be treated as Cat B if tramcrew can limit exposure.	OpCo		N
A.27.	Tram unable to activate road junction controller (TPDS)	Could be Cat B depending on tram working	Infraco.	This is rarely if ever a tram defect.	N
A.28.	Loss of sunblind during bright low-sun conditions		TramCo/unless abused by Operator		N
A.29.	Loss of both headlamps		TramCo		N

Ref.	Fault	Qualification	Likely Responsibility	Remarks	Acceptable as off-depot state
A.30.	Loss of all auxilliary power.	Cat B if no operational consequences for at least 1.5 hrs.	TramCo	Aux. converter has redundancy built in that should prevent this from happening. Batteries will become depleted over time. Traction inverter cooling will be lost.	N
A.31.	Loss of use of rear-view camera or mirror.	Conductor may be able to mitigate risk.	Indeterminate until investigated		N
A.32.	Suspicious package on board		OpCo	Will need a specific procedure	N
A.33.	Loss of all rear reflectors at the rear end.	If one reflector only then Cat C	TramCo	Minimum of one rear reflector required by law. One reflector meets the law.	N
A.34.	Loss of both rear red brake lights at rear end.	If one light only, then cat. B	TramCo	Minimum of one brake light required by law. Good redundancy could mitigate effects of a failure.	N
A.35.	Loss of trafficators either side or end.	Operational discretion to be exercised depending upon which light.	TramCo		N
A.36.	Not used				
A.37.	Parking brake failure		TramCo	Formal investigation required.	N
A.38.	Failure of roll-back detection/braking		TramCo		N
A.39.	Injury to passenger where tram implicated		Indeterminate until investigated	Formal investigation required.	N

Ref.	Fault	Qualification	Likely Responsibility	Remarks	Acceptable as off-depot state
CATEGORY B	**Material Defect**				
	Tram shall be returned to depot at the next sensible opportunity (Control Room initiative) by de-tramming passengers at the next terminus or suitable location. Tram may need to return at reduced speed. Technical support immediate. Vehicle not allowed back off depot until fault cleared other than for test run purposes.				
B.1.	Not used				
B.2.	Loss of one braking module		TramCo	High redundancy within hydraulic brake system (5x modules ?).	N
B.3.	Loss of one traction package		TramCo	Electric braking likely to be affected	N
B.4.	Loss of electric brake			Tram will still brake successfully but handling will be affected. Is not unsafe but will put an unusual strain on the friction brake system.	N
B.5.	Rough Riding	Speed may be limited dependant upon severity.	Indeterminate until investigated.	Could have many causes but driver unlikely to be able to diagnose in service.	N
B.6.	Wheel flat or flats	Speed may be limited dependant upon severity.	Indeterminate until investigated.	Likely to be tram but could be driver mishandling.	C
B.7.	Severely unusual noise	Speed may be limited dependant upon severity.	Indeterminate until investigated.	Driver may or may not be able to diagnose. Technical support likely to be needed.	N

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B.8.	Minor windscreen damage (driver view not impaired and no risk from glass pieces). Outside of criteria in fault A.2. above.	If damage less than 10mm or outside of wipers' swept path, then Cat. C.	OpCo		C
B.9.	Loss of radio (either end)	If a system wide failure, then Control will need to use initiative.	Infraco		N
B.10.	Loss of one headlamp during darkness, fog or low light		TramCo	What will policy be - usually UK trams run with headlights on day and night, but RTA does not require working headlights on road vehicles during daylight?	N
B.11.	Loss of one marker light, either side or end; yellow, red or white.		TramCo	Level of redundancy on tram?	N
B.12.	Loss of both rear fog lights during fog, mist or driving rain.		TramCo	One rear fog light meets the law.	N
B.13.	Loss of wipers when not raining.		TramCo/unless external causes	Wipers required even if no rain in case of dust or substances thrown at or sprayed at windscreen.	N
B.14.	Not used				
B.15.	Not used				
B.16.	Loss of saloon heating in very cold weather.	Inspector could make a judgement on the day. Tram will be at its coldest off depot.	TramCo	Minimum temp. to be agreed below which the tram should not operate.	C
B.17.	Loss of cab climate control in either very cold or very hot weather.			Minimum & maximum temps.to be agreed beyond which the tram should not operate.	C
B.18.	Under-guard (or other part of vehicle) dragging on ground		OpCo	Could be as a result of an impact or snow build up.	N

B.19.	Loss of OTMR		TramCo	Must show indication to driver "by law"	N
B.20.	More than one adjacent door locked out of use.		TramCo	Check RVAR restrictions on door availability	N
B.21.	Not used				
B.22.	Blatently obscene or racist graffiti	Conductor or mobile cleaner may be able to deal with it.	OpCo		N
B.23.	Loss of two or more internal CCTV images		TramCo		C
B.24.	Cash vault full		OpCo	Tram could be met and the cash box exchanged?	N
B.25.	Not used				
B.26.	Insecure internal or external panel		OpCo		N
B.27.	Loss of external destination indicator	Cat C if temporary blinds are deployed.	TramCo		C
B.28.	Not used				
B.29.	Not used				
B.30.	Loss of on-board emergency equipment.		OpCo	Could be replenished whilst in traffic. Cupboard should be sealed and checked on Prep. Exam.	N
B.31.	Mis-aligned headlamp where dazzling of other drivers likely		Indeterminate until investigated.		N
B.32.	Not used				
B.33	Severe arcing from pantograph or wheels other then in freezing weather	Technical support required.	Indeterminate until investigated.	Ice on OHLE or rails can cause this but could also be indicative of fault with pantograph or tyre earth bonds.	N

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B.34	Unable to close & lock cab door		TramCo		N
B.35	Unable to open cab door		TramCo		N
B.36	Loss of all interior lighting in one section of tram during darkness.		TramCo		N
B.37	Notably reduced or disconcerting traction performance.		TramCo	Hold vehicle at a terminus or siding until technical help arrives	N
B.38	Loss of all marker lights at one corner of tram (red or white) or all along one side (yellow)	Internal partition to not be used and saloon lights to be all on.	TramCo	Good redundancy could mitigate effects of a failure.	N

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 17 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 17

COMMERCIALLY SENSITIVE INFORMATION

CAF considers as Commercially Sensitive Information any information delivered at any moment, to **tie** or the Client any of the parties working, collaborating with **tie** or the Client, related with:

- Prices, including, but not limited to, overall amounts, partial amounts, options prices and payments milestones;
- Detailed technical drawings; and/or
- Detailed technical calculations.

[redacted]

Director/Authorised Signatory
tie LIMITED

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Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

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This is Schedule 18 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 18

CODE OF CONSTRUCTION PRACTICE AND CODE OF MAINTENANCE PRACTICE

Part 1 - CODE OF CONSTRUCTION PRACTICE

1. MANAGEMENT SYSTEMS

1.1 The Tram Maintainer shall implement and comply with the following management systems:

1.1.1 a "quality management system" in accordance with ISO 9001;

1.1.2 a "safety management system" in accordance with OHSAS 18001 or HSG65; and

1.1.3 an "environmental management system" in accordance with ISO 14001.

2. INSTRUCTION AND TRAINING

2.1 The Tram Maintainer shall ensure that its employees, Sub-Contractors, agents and others on Site (as defined in the Infraco Contract) undertake a number of inductions. These shall comprise:

2.1.1 project-specific induction for the Services (provided by the Tram Maintainer); and

2.1.2 worksite and task-specific-induction including a method statement briefing and toolbox talk, (provided by the Tram Maintainer).

2.2 Any persons who have not received the induction, for example visitors, shall be escorted on Site (as defined in the Infraco Contract) by a competent inducted person.

2.3 The Tram Maintainer shall maintain induction and training records in order that the Client can inspect them. These records shall identify the scope of the induction and training and the persons who received them.

3. SAFE SYSTEMS

3.1 **Risk Assessments**

3.1.1 The Tram Maintainer shall prepare risk assessments for all work activities being undertaken.

3.1.2 Each risk assessment shall include as a minimum the following details:

3.1.2.1 Document control

3.1.2.1.1 document title and number;

3.1.2.1.2 revision status;

3.1.2.1.3 authorisation for use; and

3.1.2.1.4 reference to supplementary documentation.

3.1.2.2 identification of any hazards;

3.1.2.3 identification of those who might be harmed, and how; and

3.1.2.4 an evaluation of the risks and, in relation to each risk, the control measures required to reduce the risk to an appropriate level.

3.2 **Method Statements**

3.2.1 The Tram Maintainer shall prepare method statements for all work activities which fall within the definition of "construction work" under the Construction (Design & Management) Regulations 2007. Each method statement shall relate to the relevant work location.

3.2.2 Categorisation of Method Statements

Method statements shall be categorised as detailed below:

CATEGORY	RISK	APPROVAL PROCESS
A1	**Low risk.** Minimum implications on Human life or the Project	**Prepared** by Contractor / Sub Contractor **Approved** by Contractor / Sub Contractor
A2	**Medium risk.** Possibly implications on Human life or the Project	**Prepared** by Contractor / Sub Contractor **Approved** by Contractor / Sub Contractor **For Information** the Client Ltd Project Manager
A3	**High risk.** Major implications on Human life or the Project.	**Prepared & Approved** by Contractor/ Sub Contractor **Accepted** by the Client Ltd HSQE Advisor **Accepted** by the Client Ltd Project Manager

3.2.3 Each method statement shall include as a minimum the following details:

3.2.3.1 Document control

3.2.3.1.1 document title and number;

3.2.3.1.2 revision status;

3.2.3.1.3 contractor prepared and approved; and

3.2.3.1.4 the Client acceptance for use (as defined below).

3.2.3.2 Scope of work

3.2.3.3 Hazards identified

3.2.3.4 Public interface arrangements

3.2.3.5 Protection of existing infrastructure

3.2.3.6 Environmental protection arrangements

3.2.3.7 Plant, equipment and materials

3.2.3.8 Emergency procedures

3.2.4 The documentation referred to in paragraph 3.2.3 above shall be developed so that it is specific to the Services. The Tram Maintainer shall ensure that revisions and updates can be identified.

3.2.5 The Tram Maintainer shall issue a copy of its procedure for the production of method statements and risk assessments to the Client for approval in accordance with the Review Procedure.

3.3 Submission of Risk Assessments & Method Statements

3.3.1 A 4-week "look ahead" schedule identifying the required scope of the Services shall be issued to the Client by the Tram Maintainer. This schedule shall identify the relevant risk assessments and method statements which are required in respect of each such scope. The Client shall identify which risk assessments and method statements require to be provided by the Tram Maintainer to the Client based upon the categorisation of method statements in accordance with paragraph 3.3.2 above.

3.3.2 The Tram Maintainer shall issue risk assessments and method statements to the Client a minimum of 20 Business Days prior to the commencement of the Services which are the subject of the method statements and risk assessments.

3.3.3 The Tram Maintainer shall not undertake any Services for which a risk assessment or method statement has been requested without the agreement of the Client.

3.3.4 The Client shall supply a letter of acceptance with all requested and returned Method Statements and Risk Assessments, which are found to be acceptable for site use. No requested Method Statement work activities shall commence on site without this letter of acceptance.

3.3.5 Irrespective of whether or not the Client has reviewed a risk assessment and method statement produced by the Tram Maintainer, the Tram Maintainer shall issue one copy of the risk assessment and method statement to the Client for information purposes before any work shall commence.

3.4 Permit to Commence Works

3.4.1 The Tram Maintainer shall comply with the Client's system for controlling access to undertake work activities, which shall require the Tram Maintainer to obtain an approved permit to commence works from the Client (**"Permit to Commence Works"**) for each Work Site and agreed scope of construction works.

3.4.2 In so far as not otherwise submitted pursuant to this Agreement, the Tram Maintainer shall submit a form for each required Permit to Commence Works (**"Permit to Commence Works Form"**) which is required, to the Client a minimum of 5 Business Days in advance of the access being required.

3.4.3 The Tram Maintainer shall advise the Client of the persons within its organisation who are competent to authorise the Permit to Commence Works Forms.

3.4.4 Each Permit to Commence Work Form shall identify the necessary licences, third party approvals and notifications that have been obtained / granted to enable the works to be undertaken, together with the specific control measures that require to be implemented under the Tram Maintainer's safety management system.

3.4.5 The Tram Maintainer's personnel who will implement the Permit to Commence Works procedure shall be required to undergo training by the Client.

3.5 **Permits to Work**

3.5.1 The Tram Maintainer shall implement a "permit to work" system for the following activities as a minimum:

3.5.1.1 hot works;

3.5.1.2 entry into confined spaces;

3.5.1.3 work affecting services;

3.5.1.4 access to live facilities; and.

3.5.1.5 works on private land controlled by third parties.

The Tram Maintainer shall implement a procedure for managing third party permits to work

3.5.2 The Tram Maintainer shall issue a copy of its permit to work procedures to the Client for approval in accordance with the Review Procedure.

3.5.3 The Tram Maintainer shall advise the Client of the competent persons within its organisation who shall be competent to authorise permits to work.

3.6 Personal Protective Equipment

3.6.1 The Tram Maintainer shall provide all necessary personal protective equipment (**"PPE"**) for its employees and provide them with all necessary information, instruction and training on its use.

3.6.2 The Tram Maintainer shall ensure that all persons on any Work Site (including any Tram Maintainer Parties and visitors) wear the necessary PPE.

3.6.3 The Client's specific requirements for PPE with regard to particular tasks are as follows:

3.6.3.1 head protection conforming to BS 5240 or BS EN 397;

3.6.3.2 protective footwear complying with BS EN 345 (safety boots which provide ankle support and contain steel midsoles shall be required for works which are carried out on railway land);

3.6.3.3 yellow high visibility clothing to comply with BS EN 471:1994, Table 1, Class 2 or 3, which shall be worn at all times; the clothing shall comply with the requirements of Clause 4.2.3(b) in all cases; jackets with sleeves in accordance with Clause 4.2.4 and to Class 3 shall be worn on dual carriageway roads with a speed limit of 50 mph or above, unless operatives stay within the working space at all times; and

3.6.3.4 orange high visibility clothing complying with GO/RT 3279 shall be worn where any works are carried out on railway land.

3.7 Work Site Completion Certificates

3.7.1 The Tram Maintainer shall comply with the Client's system for certifying the completion of the relevant work activities within each Work Site, which shall require the Tram Maintainer to complete a completion certificate (**"Work Site Completion Certificate"**) for each Work Site in relation to which the relevant Services have been completed.

3.7.2 The Work Site Completion Certificate shall be completed by the Tram Maintainer to identify and cross reference the quality control records, testing and commissioning records and any other relevant records identified within Schedule 2 (*Employer's Requirements*) and this Schedule 18 (*Code of Construction Practice*), together with details of any outstanding works which are required and the timescales for undertaking them.

4. REPORTING

4.1 The Tram Maintainer shall report the following information to the Client within the same working day or 24 hours of the event occurring:

4.1.1 details of any accident or incident;

4.1.2 details of any environmental event; and

4.1.3 details of any visit by either the Health & Safety Executive or SEPA, together with details of any report issued or enforcement action that resulted.

4.2 The Tram Maintainer shall include the following information within its four weekly progress report which is to be provided to the Client as part of the Services:

4.2.1 an update on any events referred to in paragraphs 4.1.1 to 4.1.3;

4.2.2 details of any near misses;

4.2.3 details of any accident investigation reports raised by the Tram Maintainer including details of corrective and preventative actions which have been taken;

4.2.4 the accident incident rate (**"AIR"**) and accident frequency rate (**"AFR"**) for the Services (including details of total hours worked and number of persons employed);

4.2.5 a summary of the monitoring and internal auditing activities undertaken by the Tram Maintainer in the period, including details of any corrective or preventative actions raised or closed out; and

4.2.6 details of the programme of monitoring and auditing planned for the subsequent four-weekly period.

5. AUDITING AND MONITORING

5.1 The Tram Maintainer shall be responsible for carrying out, auditing and monitoring of its site establishment and work activities.

5.2 The Client shall undertake regular auditing and monitoring of the Tram Maintainer's activities and site establishment and documentation records, and the Tram Maintainer shall action any findings which are raised by the Client.

6. NON-CONFORMANCE, COMPLAINTS AND DISCIPLINARY MATTERS

6.1 The Client shall implement a process for recording and processing breaches by the Tram Supplier of the requirements of this Schedule 18 (*Code of Construction Practice*) and complaints.

6.2 The Tram Maintainer shall take such steps as are required by the Client to remedy any such infringement or address any such complaint and the following priority levels for action shall apply:

Level of Urgency	Category of Notification	Required Response Time
1	High urgency. Involves an immediate threat to persons or property or the circumstances otherwise require immediate rectification.	Immediate action required. If response not completed by the Tram Maintainer within 4 hours, the Client may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Tram Maintainer.
2	Medium urgency. No immediate threat to persons or property, but circumstances require rectification within 24 hours.	Remedial action requires to be completed within 24 hours. If the Tram Maintainer does not complete the required response within 24 hours, the Client may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Tram Maintainer.
3	Issue requires rectification, but no immediate threat to persons or property and the circumstances do not otherwise require immediate rectification.	Timescales for rectification to be agreed between the Tram Maintainer and the Client. In the event that the Tram Maintainer does not comply with the agreed timescales, the Client may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Tram Maintainer.

If the Tram Maintainer fails to take any remedial action required by the Client pursuant to the table above, the Client shall be entitled to employ and pay other persons to carry out the same and all costs incurred by the Client shall be recoverable

from the Tram Maintainer by the Client and may be deducted by the Client from any monies due or to become due to the Tram Maintainer or, alternatively, recoverable from the Tram Maintainer as a debt.

6.3 The Client shall implement a process for initiating disciplinary actions which could arise from complaints received in respect of Tram Maintainer staff or breach by any member of the Tram Maintainer's staff in respect of the requirements of Schedule 2 (*Employer's Requirements*) or this Schedule 3 (*Code of Construction Practice*). These comprise:

6.3.1 Black Card: issued for gross misconduct, or the aggregation of two Red Cards or three Yellow Cards - results in employment on the Edinburgh Tram project being terminated for the individuals involved.

6.3.2 Red Card: issued for serious misconduct, or the aggregation of two Yellow Cards.

6.3.3 Yellow Card: issued for misconduct.

7. IDENTIFICATION

7.1 The Tram Maintainer shall ensure that all site construction staff are easily identifiable to the public by use of photo identity cards.

7.2 The Tram Maintainer shall ensure that all site construction staff identify their employer by means of their company logo on their high visibility waistcoat / jacket and safety helmet.

8. HOURS OF WORKING

8.1 Normal maximum hours of permissible working for the Services shall be:

Monday – Friday **0700 – 1900 hours**

Saturday **0800 - 1300 hours**

8.2 These hours of work shall not apply to equipment which is required to operate continuously (e.g. for safety or environmental reasons) or to work undertaken within fully enclosed areas such as buildings.

8.3 **Work Outside Normal Hours**

8.3.1 In certain circumstances work outwith these hours may be undertaken with the prior approval of the Client and CEC. These circumstances may include:-

8.3.1.1 Sunday and evening/night working on public roads and in the vicinity of the railway network, where such working is required to minimise disruption to other traffic; or

8.3.1.2 where, through consultation with local residents and businesses adjacent to the proposed Services to be undertaken outwith the normal hours of working, it is deemed by the Tram Maintainer acting reasonably and having due and proper regard to the said consultation to be less disruptive to those businesses and residents by having the Tram Maintainer working extended hours outwith the normal hours of working, or

8.3.1.3 where Services are taking place in areas where there are no residents adjacent to the proposed Services.

8.3.2 Application for prior approval must be made by the Tram Maintainer at least two weeks in advance.

8.4 Where Sunday or evening and night working has the potential to disturb nearby land users and occupiers, the Tram Maintainer shall notify such users and occupiers seven days in advance with a description of the work to be carried out, measures which will be taken to control noise or other disturbance, and proposed hours of working.

8.5 No works shall be undertaken between Haymarket at Magdala Crescent to Leith Walk Junction of London Road from and including the following dates:

Festival 03rd August 2008 until 07th September 2008;

Festival 02nd August 2009 until 06th September 2009;

Festival 01st August 2010 until 05th September 2010;

Christmas 07th December 2008 until 02nd January 2009;

Christmas 06th December 2009 until 04th January 2010; and

Christmas 05th December 2010 until 04th January 2011.

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9. SITE ARRANGEMENTS

9.1 Site Housekeeping

9.1.1 A 'good housekeeping' policy shall be applied by the Tram Maintainer at all times; this shall include, but not necessarily be limited to, the following requirements:

9.1.1.1 all working areas, including offices, shall be kept in a clean and tidy condition;

9.1.1.2 all working areas shall be a no-smoking area; specific areas within the Site shall be designated as smoking areas and shall be equipped with containers for smoking waste; these shall not be located at the boundary of the Site and adjacent to neighbouring land;

9.1.1.3 open fires shall be prohibited at all times;

9.1.1.4 all necessary measures shall be taken to minimise the risk of fire and the Tram Maintainer shall comply with the requirements of the local fire authority;

9.1.1.5 radios (other than two-way radios used for the purposes of communication related to the Services) and other forms of audio equipment shall not be operated on the Site;

9.1.1.6 any waste susceptible to spreading by wind or liable to cause litter shall be stored in enclosed containers;

9.1.1.7 rubbish shall be removed at frequent intervals and the Site kept clean and tidy;

9.1.1.8 hoardings shall be frequently inspected, repaired and re-painted as necessary;

9.1.1.9 eating and drinking shall only permitted within the Tram Maintainer's designated welfare area;

9.1.1.10 adequate toilet facilities shall be provided for all Site staff;

9.1.1.11 food waste shall be removed frequently;

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9.1.1.12 the Tram Maintainer's personnel (including any Sub-Contractors) shall be required to conform to a reasonable dress code;

9.1.1.13 any behaviour that is lewd or likely to cause offence shall not be permitted; and

9.1.1.14 wheel washing areas shall be brushed clean frequently.

9.1.2 The Tram Maintainer shall inspect all working areas at least weekly and shall provide a four weekly written report on compliance with paragraph 9.1.1 above. the Client, the Client's Representative or any other party authority by either of them may carry out inspections of the Site at any time without prior notice of time and place of the inspections. Access to all areas of the Services shall be given to visiting inspectors and the Tram Maintainer shall give inspectors all reasonable assistance during their Site inspection.

9.1.3 The Tram Maintainer shall register the project with the Considerate Constructors Scheme.

9.2 **Welfare**

9.2.1 The Tram Maintainer shall be responsible for ensuring that adequate welfare facilities are provided; adequate facilities shall comprise:

9.2.1.1 sufficient toilet facilities for all staff at readily accessible locations, including adequate supplies of toilet paper;

9.2.1.2 facilities for changing, storing and drying clothes, for heating water and for washing and drinking (the latter must have seating for each person and wipe-clean mess table tops);

9.2.1.3 washing facilities near every toilet facility and changing room; the washing facilities shall include a supply of hot and cold or warm water, soap or cleaning agent and towels or hot air drier;

9.2.1.4 clean, wholesome drinking water, clearly marked as such;

9.2.1.5 a means of heating food; and

9.2.1.6 rest facilities.

9.2.2 The Tram Maintainer shall keep all welfare facilities clean and shall not use them for the storage of materials, plant and other working equipment.

9.2.3 The Tram Maintainer shall provide suitable and sufficient fire fighting equipment for all on-site accommodation.

9.2.4 Where there is the possibility of female employees or visitors being present on the Site, the Tram Maintainer shall provide separate toilet, washing and changing facilities.

9.3 Fencing and Hoardings

9.3.1 The Tram Maintainer shall ensure that all working areas are sufficiently and adequately fenced to prevent the public and animals from straying on to the working area; hoardings shall be provided to suit the individual location by carrying out an appropriate risk assessment, but may be:

9.3.1.1 adjacent to a pedestrian route;

9.3.1.2 a modular wire mesh fence, a minimum of 1.8 metres in height, where appropriate for minimum security needs; or

9.3.1.3 a 2.4 m minimum height, plywood faced, timber framed boundary hoarding, of a surface density of not less than 7kg/m² or other hoarding providing equivalent security and noise attenuation, in the vicinity of noise sensitive neighbours;

9.3.1.4 in locations identified by the Client a proprietary steel panelled hoarding system a minimum of 2.4m in height;

9.3.1.5 a 2.4m minimum height, plywood faced, timber framed boundary hoarding, of a surface density of not less than 7kg/m² together with a covered walkway over a pedestrian route;

9.3.1.6 adjacent to a live road carriageway;

9.3.1.7 as for a pedestrian route, but in conjunction with a vehicle restraint system which complies with containment level T1 and T2 of BS EN 1317 - 2:1998, where determined by the risk assessment;

9.3.1.8 in areas not adjacent to a live carriageway or pedestrian route;

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9.3.1.9 as for a pedestrian route;

9.3.1.10 a post and wire fence 1.2m in height erected on the line of the Permanent Land;

9.3.1.11 other designs, where a particular level of risk mitigation appearance or acoustic rating is considered to be required and is agreed with the Client and CEC; and

9.3.1.12 where the Services to be undertaken are of a minor nature, and subject to the approval of the Client, barriers comprising post and planks or similar proprietary systems can be used.

All fencing and hoardings shall comply with Chapter 8 of the Traffic Sign Manual.

All access and egress to worksites shall be via designated positions within the fencing and hoardings, which shall remain closed and secured when not in use.

9.3.2 All fencing and hoardings that create poorly lit pedestrian routes shall have appropriate lighting fitted by the Tram Maintainer, and these shall be illuminated at all times when the adjacent street lighting is lit.

9.3.3 The Tram Maintainer shall ensure that the location and design of Site boundaries, hoarding and temporary structures on the public road shall permit adequate visibility at junctions and proper forward visibility along the roads in accordance with the National Roads Directorate advice notes and the requirements of CEC.

9.3.4 The Tram Maintainer shall ensure that where hoardings are provided, they are painted on the side facing away from the working area in a colour and style to be approved by the Client and CEC, and that the public side of the hoarding carries signs which identify the project and give appropriate contact information for the Tram Maintainer.

The Tram Maintainer shall ensure that where fencing is provided the fence panels are covered by material that complies with the requirements of Loss Prevention Standard LPS 1215 *Flammability Requirements and Tests for LPCB Approval of Scaffolding Materials.* The material shall be printed in a

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colour and style to be approved by the Client and CEC, and carries signs which identify the project.

9.3.5 All hoardings shall be maintained by the Tram Maintainer in a neat and tidy condition at all times, 24 hours, 7 days a week.

9.3.6 The Tram Maintainer shall be expressly prohibited from displaying or allowing to be displayed any advertisement or notice including illicit bill or fly posting on the hoardings. The Tram Maintainer shall ensure that all graffiti, fly posting or defacement to the hoardings is removed and made good or obscured within 24 hours.

9.3.7 An information board shall be provided by the Tram Maintainer at each working area detailing information on the work programme and estimated duration of the Tram Maintainer at that working area, together with the location of the information centre, the web address and a 24-hour telephone number for use by members of the public who wish to lodge complaints or comments or additional information.

9.3.8 All fencing and hoarding shall be removed as soon as reasonably practicable after the completion of any part of the Tram Maintainer.

9.4 **Lighting and Visual Intrusion**

9.4.1 The Tram Maintainer shall site construction buildings, equipment and lighting so as to minimise visual intrusion and light spillage at nearby residential properties, in so far as is consistent with the safe and efficient operation of each Work Site. Lighting shall be removed as soon as is consistent with the safe and efficient operation of each Work Site.

9.4.2 Site lighting shall be positioned and directed by the Tram Maintainer so as to minimise nuisance to residents and to minimise distractions or confusion to passing drivers on adjoining public roads. This provision shall apply particularly to working areas where work after dark will be carried out and the Tram Maintainer shall provide appropriate lighting for these sites.

9.4.3 So far as is practicable, all power to temporary traffic signals, lighting and the like shall be taken by the Tram Maintainer from mains supplies rather than from portable generators. Where portable generators are used, industry best

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practice shall be followed to minimise noise and pollution from such generators.

9.4.4 The Tram Maintainer shall comply with the Institute of Lighting Engineers' document *Guidance Notes on Reduction of Light Pollution 2000* in so far as is reasonably practicable and applicable to the Tram Maintainer.

9.5 **Access and Loading**

9.5.1 The Tram Maintainer shall ensure that lorries shall enter and exit the Site in a forward direction at designated locations, except where space restriction does not permit this. If the reversing of vehicles into public spaces is required, then a responsible person observing the rear of the vehicle shall properly control the movement. The sounding of audible reversing alarms shall not be permitted outside normal working hours, except where this has been approved by the Client and CEC in connection with Tram Maintainer Works permitted under paragraph 8.3 above). Entry and exit conditions shall be subject to prior approval by the Client, CEC and the Lothian and Borders Police before implementation.

9.5.2 Access to and egress from the Site shall be carried out by initiating a left turn wherever reasonably practicable.

9.5.3 All loading and unloading of vehicles shall take place off the public road as far as is reasonably practicable.

9.6 **Security**

9.6.1 Adequate security shall be exercised by the Tram Maintainer to protect the public and prevent unauthorised entry to or exit from the Site. Site gates, where used, shall be closed and locked when there is no Site activity and Site security measures shall be implemented.

9.6.2 Site security cameras, where used, shall be placed in locations which will not unduly infringe upon the privacy of local residents.

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9.7 **Living Accommodation**

9.7.1 No living accommodation shall be provided by the Tram Maintainer within any construction working area. Mess rooms, locker rooms, toilets and showers shall be permitted at Work Sites.

9.8 **Clearance of Site on Completion**

9.8.1 The Tram Maintainer shall clear and clean all utilities apparatus (where relevant to the Tram Maintainer Works), working areas and accesses as work proceeds and when no longer required for the carrying out of the Services.

9.8.2 All surplus soil and materials, rubbish, Temporary Works (including temporary roads and hardstandings), Tram Supplier's Equipment, sheds, offices and temporary fencing shall be removed, post holes filled and the surface of the ground restored as near as practicable to its original condition, or to such condition as has previously been agreed with the Client and CEC in accordance with this Agreement and/or the Specification (as appropriate).

9.9 **Pest Control**

9.9.1 The Tram Maintainer shall ensure that the risk of infestation by pests or vermin is minimised by adequate arrangements for the disposal of food waste or other material attractive to pests. If infestation occurs, the Tram Maintainer shall take such action to deal with it as required by the Client and CEC.

10. REQUIREMENTS RELATING TO WORKS AFFECTING EDINBURGH AIRPORT

10.1 The Tram Maintainer shall comply with the requirements of Edinburgh Airport Limited in relation to aerodrome safeguarding, including those requirements included within the Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas) (Scotland) Direction 2003 (SEDD Circular 2/2003).

10.2 The Tram Maintainer shall have regard to, and comply (where relevant) with all BAA and CAA guidelines, including, (but not necessarily limited to):

10.2.1 CAP 168 Licensing of Aerodromes.

10.2.2 CAP 680 Aerodrome Bird Control.

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10.2.3 CAA Safeguarding of Aerodromes Advice Note 1 (Safeguarding – An Overview).

10.2.4 CAA Safeguarding of Aerodromes Advice Note 2 (Lighting near Aerodromes).

10.2.5 CAA Safeguarding of Aerodromes Advice Note 4 (Cranes and Other Construction Issues).

10.2.6 BAA Standard Conditions for Aerodrome Safeguarding.

10.3 The Tram Maintainer shall prepare for approval by the Client and Edinburgh Airport Limited a "Construction Management Strategy" as defined within CAA Safeguarding of Aerodromes Advice Note 4 (Cranes and Other Construction Issues). The Construction Management Strategy shall address as a minimum the following issues:

10.3.1 use of cranes or other tall construction equipment;

10.3.2 control of activities likely to produce dust or smoke clouds

10.3.3 the design of temporary lighting to avoid distracting pilots (see Advice Note 2);

10.3.4 storage of materials, particularly compliance with height limits;

10.3.5 control and disposal of waste, to prevent attraction of birds; and

10.3.6 site restoration, to prevent attraction of birds.

11. REQUIREMENTS RELATING TO WORKS AFFECTING THE RAILWAY

11.1 The Tram Maintainer shall comply with the requirements of Network Rail in relation to railway safeguarding.

11.2 The Tram Maintainer shall comply with all Network Rail standards and guidelines, including but not limited to "*Contract Requirements (NR/SP/OHS/008)*" including the Safety Clause Menu and "*Health and Safety Management of Third Party Works (RT/LS/P/043)*".

12. HEALTH & SAFETY REQUIREMENTS

12.1 **Safety Signage**

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The Tram Maintainer shall be responsible for the provision of all safety signage required for the work activities being undertaken. Safety signage shall comply with the Health and Safety (Safety Signs and Signals) Regulations 1996.

12.2 **Hazardous Substances**

12.2.1 The Tram Maintainer shall maintain a register of safety data sheets for all materials and substances used.

12.2.2 The Tram Maintainer shall be responsible for undertaking "COSHH" assessments for materials and substances used or with which contact will be made on the Site.

12.2.3 The Tram Maintainer shall liaise with the Client regarding proposals for storage of hazardous substances in open air, in buildings, within the workplace and the decanting, disposal of empty containers, tanks and cylinders.

12.3 **Electricity**

12.3.1 The Tram Maintainer shall use electrical tools and equipment which operate at a voltage no greater than 110V. Where there is a requirement to operate tools and equipment using a voltage greater than 110V, the approval of the Client shall be obtained in writing.

12.3.2 Electrical tools shall be double insulated and used in conjunction with a RCD.

12.3.3 Tools shall be connected to a 240V supply via a portable 110V centre tapped transformer.

12.3.4 The lead between the 240V supply and the transformer shall be as short as is reasonably possible.

12.3.5 All temporary electrical systems shall possess a current inspection certificate.

12.3.6 All tools shall have passed an electrical safety test and shall be identified with a label which states the unique identification, the test date, the next test date and the organisation which carried out the electrical safety test.

12.4 **Provision and Use of Work Equipment**

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12.4.1 The Tram Maintainer shall be responsible for ensuring the inspection of all work equipment. Records of inspections shall be retained at the Site.

12.4.2 Work equipment shall only be used by authorised personnel, who have received appropriate training and certification.

12.5 **Lifting Operations and Lifting Equipment**

12.5.1 The Tram Maintainer shall be responsible for ensuring that all lifting equipment is accompanied by current test and examination certificates.

12.5.2 Safe working loads shall be shown on all lifting equipment.

12.5.3 Lifting equipment and lifting operations shall only be used by authorised personnel, who have received appropriate training and certification.

12.6 **Height Gauges for Low Structures**

A height gauge in the form of a rigid "goal post" type structure shall be erected at:

12.6.1 all egress points from the worksites. The height that the cross bar is set to shall be dependent upon the minimum height of any obstruction that a vehicle will encounter on public or third party land; and

12.6.2 all access points to the worksites or in the proximity of an on site obstruction. The height to which the crossbar requires to be set shall be subject to review during the course of the Services to ensure that it takes cognisance of the ongoing Services.

The height gauge shall comprise a form that shall alert the driver of contact with the crossbar and shall be located in a position that shall enable the driver to take avoiding action prior to contacting any obstruction.

12.7 **Overhead Power Lines**

Where plant and equipment is working in the vicinity of an overhead power line, the distance between the plant and equipment and the overhead line should be at least:

12.7.1 15m (plus the length of the jib) if the lines are suspended from steel towers; or

12.7.2 9m (plus the length of the jib) if the lines are supported on wooden poles.

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In cases where approach is likely, stout, distinctive barriers should be erected at ground level to prevent access. Where work is to take place close to overhead lines, detailed precautions should be discussed with the owner of the overhead lines. However, the responsibility for ensuring that precautions are adequate remains with the Tram Maintainer, not with the owner of the power lines.

In addition to the specific precautions required when working in the vicinity of overhead power lines, the following shall be undertaken:

12.7.3 barriers shall be erected at least 6m away, to prevent inadvertent approach by other site vehicles; and

12.7.4 crossing points shall be clearly marked beneath the lines by means of a rigid "goal post" structure at a height specified by the electrical supplier.

Storage of materials shall be prohibited in the area between the overhead lines and the ground-level barriers.

13. FIRE PREVENTION

13.1 The requirements of the document "*Fire Prevention on Construction Sites: The Joint Code of Practice on the Protection from Fire of Construction Sites and Buildings Undergoing Renovation* (published by the Construction Confederation and the Fire Protection Association) shall apply to the Services.

13.2 All temporary protective coverings shall comply with the requirements of the Loss Prevention Standard LPS 1207 'Fire Requirements for Protective Covering Materials'.

13.3 All scaffold cladding materials shall comply with the requirements of the Loss Prevention Standard LPS 1215 'Flammability Requirements for Scaffold Cladding Materials'.

13.4 The Tram Maintainer shall, as appropriate to the work activities, appoint "a fire marshall" who shall be responsible for day to day fire safety.

13.5 A permit to work shall be implemented for all "hot works".

13.6 The use of halogen lighting shall be prohibited.

14. FIRST AID

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14.1 the Tram Maintainer shall be responsible for providing first aid provision for its personnel (including any Sub-Contractors) in accordance with the Health and Safety (First Aid) Regulations ("Regulations") 1981. This shall include the provision of:

14.1.1 a first aid box, the size of which shall be commensurate with the number of workers on Site; and

14.1.2 the required number of first aiders or appointed persons required by the Regulations.

15. INSPECTIONS

15.1 The Tram Maintainer shall be responsible for undertaking the statutory inspections required in terms of the Construction (Health, Safety and Welfare) Regulations 1996 that relate to the Services being carried out. The records of the inspections shall be retained on the Site.

16. ROADS AND FOOTPATHS, CYCLEWAYS AND BRIDLEWAYS

16.1 General

16.1.1 The Tram Maintainer shall submit to the Client a statement setting out the proposed measures (including specified traffic routes) to be taken with respect to traffic and road safety for the duration of the Services, to enable the development including all relevant information in relation to the Tram Maintainer obtaining Temporary Traffic Regulation Orders (**"TTROs"**) and the equivalent of such orders as are applicable to third parties (for example Edinburgh Airport Limited), for approval before the Services commence. The Tram Maintainer shall circulate the approved statement to all bodies identified by the Client and CEC and any other bodies reasonably requested by the Client.

16.1.2 The measures to be taken with respect to traffic and road safety shall include, but not necessarily be limited to:

16.1.2.1 use of TTROs; the Tram Maintainer shall consult with the Client, CEC and other third parties on the arrangements for agreeing and implementing TTROs to facilitate road closures and the like; the use of TTROs shall take into account the requirement for, and availability of, suitable alternative routes;

16.1.2.2use of temporary signing and lining where required by the Client and CEC to identify places where construction is taking place;

16.1.2.3use of temporary signing to restrict vehicle types and sizes and define routes for construction traffic;

16.1.2.4use of appropriate temporary signing and lighting wherever the Services are in progress to ensure the safety of all road users; and

16.1.2.5preparation and implementation of a programme agreed by Tram Maintainer with the Client and CEC for road closures and temporary traffic signal arrangements.

16.2 **Temporary Road Closures And Diversions**

16.2.1 The Tram Maintainer shall finalise the arrangements for required closures and diversions of specified highways, footpaths and cycle ways with the Client and CEC, BAA or any private landowner, to suit its Programme.

16.2.2 Before breaking up, closing or otherwise interfering with any street or footpath to which the public has access, the Tram Maintainer shall make such arrangements with the Client and CEC as may be reasonably necessary to cause as little interference with the traffic in that street or footpath during the Services as shall be reasonably practicable.

16.2.3 Temporary road closures which result in the diversion of bus routes shall be agreed by the Tram Maintainer with the relevant bus operators who will in turn notify the Traffic Commissioner.

16.2.4 Pedestrian access to properties shall be maintained at all times where practicable, unless otherwise agreed with the Client and CEC and the owners and tenants of affected properties. Access to and from public facilities shall be maintained at all times unless otherwise agreed with the relevant administrating bodies.

16.2.5 Wherever the Services interfere with the existing public or private roads or other ways over which there is a public or private right of way for any traffic, the Tram Maintainer shall construct diversion ways as necessary. The standard of construction and lighting shall be suitable in all respects for the class or classes of traffic using the existing ways and the widths of the

diversions shall not be less than that of the existing way unless otherwise agreed with the Client and CEC or the owner of the private road.

16.2.6 Diversion routes shall be constructed in advance of any interference with the existing ways, shall be kept as short as reasonably practicable and shall be maintained by the Tram Maintainer to provide adequately for the traffic flows. All diversion routes shall be removed and the road returned to the Client and CEC as soon as is reasonably practical after completion of the Services. Liaison shall be undertaken with the Client and CEC regarding any special events such as the Edinburgh Festival, Christmas, New Year, sporting events and filming which might interact with the diversions.

16.2.7 Adequate horizontal clearance of 0.6 metres minimum shall be provided from the kerb line, to avoid fouling by vehicles. The minimum headroom beneath any projection over the road shall be 5.3 metres.

16.3 **Parking Provision for Construction Traffic**

16.3.1 Areas and locations of parking provision for site and construction traffic shall be agreed by the Tram Maintainer with the Client and CEC prior to the commencement of Services.

16.3.2 No daytime or overnight parking of site or construction vehicles outside any construction compounds or work sites shall be allowed except where the delivery or removal of materials is taking place at that location and with prior agreement with the Client and CEC, as required under paragraph 8.3 above.

16.4 **Pedestrian Routes, Cycle Routes and Bridleways**

16.4.1 The Tram Maintainer shall ensure that all existing pedestrian routes, cycle routes and bridleways are maintained throughout the Services unless otherwise agreed with the Client and CEC. Any temporary replacement footway or cycleway shall meet the following requirements:

16.4.1.1 all temporary and diverted footways, which replace footways which are currently accessible to wheelchairs and pushchairs, shall continue to be usable by such users where reasonably practicable and take into account DDA access requirements;

16.4.1.2tactile paving shall be used where present on existing pedestrian facilities unless otherwise agreed with the Client and CEC;

16.4.1.3any temporary footways and cycle ways shall have uniform surfaces; there shall be no steps and any longitudinal gradients shall be suitable for the prevailing conditions, preferably 1 in 20 and no greater than 1 in 12; cross-falls shall be suitable for disposal of surface water run off, but ideally shall not exceed 1 in 30;

16.4.1.4ramps shall be provided at all junctions of footways and cycle ways with carriageways; gradients shall be appropriate to the circumstances, not exceed 1 in 12, and the base of the ramps shall be flush with the carriageway; all temporary footways and cycle way ramps shall be surfaced in non-slip material and kept free from mud and debris; the Tram Maintainer shall ensure that there is no ponding at any junction;

16.4.1.5existing footway and cycle way widths shall be maintained where practicable; footway and cycle way widths shall not be reduced without the prior agreement and approval of CEC;

16.4.1.6clear signing and protection measures shall be provided at all times for each pedestrian and cycle route or bridleway affected by the Services, in accordance with Chapter 8 of the Traffic Signs Regulations and General Directions 1981 and relevant safety legislation; the Tram Maintainer shall liaise and agree the signing requirements of all pedestrian and cycle routes affected by the Services with the Client and CEC, and shall provide any additional signage and/or protection measures required and agreed with the Client and CEC; and

16.4.1.7headroom clearance over footways and cycle ways shall be appropriate for the circumstances and a minimum of 2.3 metres; a horizontal clearance of 0.6 metres shall be provided from the kerb line, where practicable, for any hoarding to avoid fouling by vehicles; the minimum headroom beneath any projection over the highway shall be 5.3 metres, but will be higher for abnormal load routes; where a path is a designated bridleway, headway clearance shall be appropriate for the circumstances and a minimum of 3.6

metres; all pedestrian routes diverted onto the carriageway shall be clearly defined by continuous barriers, constructed to the reasonable requirements of the Client and CEC.

16.5 **Maintenance and Repair of the Road**

16.5.1 The Tram Maintainer shall carry out a pre-construction inspection and take photographs of the public roads, footpaths and cycle ways in the vicinity of the Site in conjunction with the Client and CEC. The Tram Maintainer shall produce a report of the results of the joint inspection. The report shall establish the general road conditions within and in the vicinity of the Site, the residual life of the road and the level of reinstatement likely to be required in order to comply with the requirements of this Agreement, including the Specification. The report shall be agreed and signed by both the Tram Maintainer, the Client and CEC as appropriate.

16.5.2 The Tram Maintainer shall take every reasonable precaution to prevent its operations from unnecessarily damaging the roads and footpaths within the Site and in the vicinity of the Tram Maintainer Works.

16.5.3 The Tram Maintainer shall carry out all maintenance works as are necessary to maintain the roads and footpaths affected by the Services in a safe and serviceable condition to the reasonable satisfaction of CEC and the Client.

16.5.4 Reinstatements of the road shall be carried out in accordance with the RAUC(S) "*Specification for the Reinstatement for Openings of Roads*", October 2003.

16.6 **Existing Street Furniture**

16.6.1 No street furniture or other features within the vicinity of the Site and the Services, but outwith the area covered by the Tram Legislation shall be unnecessarily disturbed or altered by the Services, except as expressly required by the Client in accordance with this Agreement. Any damage to street furniture consequent upon construction activities connected with the Services shall be reported to the Client and the appropriate owner or authority (unless the appropriate owner cannot be identified) immediately on discovery of the damage. Any damage shall be replaced or made good as soon as practicably possible and to the reasonable satisfaction of the owner of the street furniture or other feature.

16.6.2 Any street furniture or other obstructions outside the area to be occupied by the Tram Maintainer but which are required to be moved in order to gain

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access to the Site shall, subject to the prior consent of the owner thereof, be removed and reinstated or replaced as appropriate, on completion of the Services. Any costs associated therewith shall be borne by the Tram Maintainer, including the costs of reinstatement or replacement.

16.7 **Vehicle Movements and Access to the Site**

16.7.1 The Tram Maintainer and its Sub-Contractors and suppliers moving loads, construction plant, materials and spoil (including vehicles used for carrying such when empty) shall limit the use of the public roads for such purposes as far as reasonably practicable.

16.7.2 All access routes shall be agreed with the Client and CEC prior to the commencement of the relevant part of the Services.

16.7.3 Vehicles arriving or leaving the Site shall do so during the normal working hours as specified in paragraph 8.1 above, unless otherwise agreed with the Client and CEC. Access (which is deemed to include both the route and entrance to any Work Site) by lorries shall be as agreed with the Client, CEC and the Lothian and Borders Police. Access to and egress from the Site shall be carried out by initiating a left turn wherever reasonably practicable.

16.7.4 All vehicles operating on the Site shall be fitted with roof mounted yellow flashing beacons and reversing alarms.

16.7.5 The Tram Maintainer shall take all reasonable measures to ensure that delivery vehicles do not remain stationary on the road unnecessarily prior to entering the Site. In exceptional circumstances, for example where the Site is very constrained, it may be necessary to have the potential for a limited number of vehicles to stand on the road. The location of such standing areas their size and the duration of any standing periods shall be subject to prior agreement with the Client, CEC and the Lothian and Borders Police.

16.7.6 The Tram Maintainer shall ascertain and comply with any restrictions in respect of abnormal load routes as they may affect access to the Site.

16.8 **Mud on Roads**

16.8.1 The Tram Maintainer shall take strict measures to minimise the spillage of mud and loose materials on roads arising from the Services and ensure that

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the roads are safe at all times. These shall include, but not necessarily be limited to:

16.8.1.1 the provision of easily cleaned hard standings for vehicles entering, parking and leaving the Site or construction compound;

16.8.1.2 the provision of wheel washing facilities at construction compounds and construction sites, including, where practicable, mechanical wheel spinners, adequate provision for drainage via settlement tanks and regular maintenance of settlement tanks;

16.8.1.3 where mechanical wheel wash facilities are not practicable at construction sites, the use of manual techniques to ensure that the wheels of vehicles are clean prior to them leaving the construction site;

16.8.1.4 the use of mechanical road sweepers and surface flushing apparatus to clean the hard standing and to remove any mud or debris deposited by site vehicles on roads, footpaths, and in gullies or drains in the vicinity of the Site; the road sweepers or other equipment shall be readily available whenever the need for cleaning arises;

16.8.1.5 the loading and sheeting of vehicles are in such a manner as to prevent material falling off during their journey;

16.8.1.6 compliance with the requirements regarding the control of dust outlined in paragraph 19 below; and

16.8.1.7 compliance with the requirements regarding the control of waste water, mud, debris from wheel washing outlined in paragraph 21 below.

16.9 **Provision, Erection and Maintenance of Traffic Safety and Control (Traffic Safety Measures)**

16.9.1 The Tram Maintainer shall provide, erect and maintain such traffic signs, road markings, lamps, barriers and traffic control signals and such other measures as may be necessitated by the construction of the Services in accordance with the requirements of the Agreement and to the approval of the Client and CEC. The Tram Maintainer shall not commence any work which affects the

public road until all traffic safety measures necessitated by the work are fully operational.

16.9.2 The Tram Maintainer shall keep clean and legible at all times all traffic signs, road markings, lamps, barriers and traffic control signals and shall position, replace, reposition, cover or remove them as required by the progress of the Services and to the reasonable requirements of the Client and CEC.

16.9.3 The Tram Maintainer shall ensure that all barriers, footpath space and temporary footpaths (including the requirement for kerb ramps where use has to be made of the carriageway) shall comply with the requirements of the document *Inclusive Mobility A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure* issued by the Mobility and Inclusion Unit of the Department for Transport.

16.9.4 So far as practicable, all power to temporary traffic signals and lighting shall be taken by the Tram Maintainer from mains supplies rather than from portable generators. Where portable generators are used all reasonable measures will be taken to minimise noise and pollution from such generators.

16.10 **Implementation of the Closure of Roads and Access to Frontages**

16.10.1 The Tram Maintainer shall not close any roads or private accesses until immediately before the area is required for construction in accordance with this Agreement and the Programme. The construction of the Services shall follow in the area of a temporary closure expeditiously and shall be carried out efficiently and in a continuous manner to ensure that all temporary closures are re-opened as quickly as possible.

16.10.2 The Tram Maintainer shall, in carrying out the Services, take all reasonable precautions to prevent or reduce any disturbance or inconvenience to the owners, tenants or occupiers of adjacent properties, and to the public generally. The owners, tenants or occupiers of affected properties shall be informed of the Services to be undertaken, their planned duration, road and access closures and alternative access routes (where required) in writing and by locally posted public notices at least one calendar month prior to work starting.

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16.10.3 The Tram Maintainer shall render all necessary assistance to occupiers of premises affected by the Services so as to enable them to accept and send out deliveries to and from their premises during their normal working hours.

16.11 Access for Emergency Vehicles

16.11.1 The routes proposed by the Tram Maintainer for emergency service vehicles and personnel to gain access to the Site, the construction corridor and neighbouring sites along the route shall be agreed by the Tram Maintainer with the emergency services and the Client and CEC prior to the start of construction.

17. NOISE

17.1 Noise Control

17.1.1 The Tram Maintainer shall take all practicable measures to minimise nuisance from noise. The noise limits specified in this paragraph 17.1 or which may be otherwise agreed with CEC shall not be regarded as a licence to make noise up to the stated limit.

17.1.2 Subject to the specific requirements of CEC and other affected third parties the following minimum requirements shall be met:

17.1.2.1during normal working hours, as defined in paragraph 8.1 above the maximum noise levels measured 1 metre from any occupied dwelling or other building used for residential purposes, generated by construction plant and equipment shall not exceed the following limit:

Monday to Friday (inc.) 0700-1900 hours $L_{Aeq\ 12\ hour}$ 75 dB

Saturday 0800 - 1300 hours $L_{Aeq\ 5\ hour}$ 75 dB

17.1.2.2outside normal working hours, the following limits shall apply:

Period	Hours	Limit
Monday to Friday (inc.)	1900-2200	$L_{Aeq\ 3\ hours}$ 65 dB
Saturday	1300-2200	$L_{Aeq\ 9\ hour}$ 65 dB

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Sunday & Bank Holidays	0800-2000	$L_{Aeq\ 12\ hours}$ 65 dB

17.1.2.3 the default noise limit for any night time (2200 hours (or 2000 hours on Sundays and Bank Holidays) to 0700 (or 0800 on Saturdays, Sundays and Bank Holidays)) construction work shall be $L_{Aeq\ 1\ hour}$ 55dB at residential buildings; higher noise levels may be permitted where ambient noise levels are higher.

17.1.2.4 the maximum noise levels measured 1 metre from any school, college or other teaching facility resulting from construction work shall not exceed the following limits:

At any time when occupied $L_{Aeq\ 1\ hour}$ 65 dB

17.1.2.5 the maximum noise level measured 1 metre from any office building or other building used for office purposes during normal working hours shall be as defined in paragraph 17.1.2.1 above.

17.1.3 In order to ensure that the best practicable means are used to meet the levels set out above, a programme of on-site monitoring by a suitably qualified practitioner shall be agreed between the Tram Maintainer, the Client and CEC. This monitoring programme shall include the location and frequency of readings, and shall define to whom the results shall be made available. Monitoring shall be undertaken by the Tram Maintainer at locations identified in the Environmental Statements as those where mitigation measures may be necessary to avoid significant noise disturbance.

17.1.4 In exceptionally difficult circumstances, essential work causing noise above these limits may be permitted with the prior approval of the Client and CEC. Where not otherwise required in accordance with this Agreement, application for prior approval must be made at least two weeks in advance of the relevant Services commencing, and shall be fully justified and kept to the minimum necessary. Conditions may be attached to any permission for such Services.

17.1.5 In the event that measurements indicate noise has exceeded the limits in paragraph 17.1.2 above of this clause, the Tram Maintainer shall stop the operation in a safe manner and take all practicable measures to prevent

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recurrence. If this does not enable the limits to be met, exceptional permission must be applied for under the terms of paragraph 17.1.4 above.

17.1.6 Without prejudice to the other requirements of this paragraph 17, the Tram Maintainer shall comply with the recommendations set out in BS 5228, '*Noise Control on Construction and Open Sites*'; insofar as these are reasonably practicable and applicable to the Services, and in particular with the following requirements:

17.1.6.1 all vehicles and mechanical plant used for the purpose of the work shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order;

17.1.6.2 all compressors and generators shall be 'sound reduced' models fitted with properly lined and sealed acoustic covers, which shall be kept closed whenever the machines are in use, and all pneumatic percussive tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers;

17.1.6.3 all machines in intermittent use shall be shut down in the intervening periods between work or throttled down to a minimum; noise emitting equipment which is required to run continuously shall be housed in a suitable acoustic enclosure (see BS5228 Part 1:1997, Figures B.1, B.2 and B.3 (or later issue));

17.1.6.4 stationary equipment with significant noise output shall be sited away from sensitive site boundaries as far as is practicable;

17.1.6.5 temporary noise barriers shall be used to reduce noise levels where appropriate and practicable; barriers shall be located as close to the plant as possible, and shall have a mass per unit area of at least $7kg/m^2$;

17.1.6.6 no deliveries shall arrive at the Site before 0700 hours;

17.1.6.7 the engines of all parked vehicles or vehicles waiting to enter any work area shall be switched off within two minutes of arrival; and

17.1.6.8 work compounds shall be laid out so that accesses and loading areas are located as far away from sensitive neighbours as practicably

possible and so that temporary structures screen noisy areas where practicable.

17.1.7 Without prejudice to the requirements of this paragraph 17 set out above, the Tram Maintainer shall comply with the City of Edinburgh Department of Environmental and Consumer Service's document *Construction Site Noise: A Guide for Contractors*, August 2000 (or current issue, if subsequent amendments have been issued), and shall liaise with that department in accordance with the requirements therein.

17.2 **Communications Regarding Noise**

17.2.1 The Tram Maintainer shall give 7 days notice to local residents who may be adversely affected by noise from the proposed programme of Services, providing a description of the work to be carried out, measures that will be taken to control noise or other disturbance, and the proposed hours of working.

17.2.2 The Tram Maintainer shall provide the Client and any other party requested by the Client with a list of contacts who will be responsible for investigating and resolving noise issues in respect of the carrying out of the Services.

18. VIBRATION

18.1 **Vibration Control**

18.1.1 Subject to the specific requirements of the Client and CEC, the following minimum requirements shall be met:

18.1.1.1 to protect residents and users of buildings from nuisance and harm the Tram Maintainer shall, as far as practicable, not exceed the Vibration Dose Values specified in BS6472:1992 as resulting in a 'low probability of adverse comment'; and

18.1.1.2 to protect buildings and other structures from physical damage, peak particle velocity levels shall not exceed 5mm/sec except for particularly sensitive buildings or structures where the level shall not exceed 3mm/sec.

18.1.2 If vibration levels are predicted to exceed the criteria specified in paragraph 18.1.1 above, then the Tram Maintainer shall procure that a suitably qualified practitioner undertakes monitoring during the activity and the Tram Maintainer shall adopt alternative methods of working to reduce vibration levels to those prescribed in above. The monitoring programme shall be agreed between the Tram Maintainer, the Client and CEC. This programme shall include the location and frequency of readings and will identify to whom the results should be made available.

18.1.3 In order to ensure that these levels are not exceeded, a programme of on-site monitoring by a suitably qualified practitioner shall be agreed between the Tram Maintainer, the Client and CEC. This programme shall include the location and frequency of readings, and to whom the results should be made available and, as a minimum, shall cover all locations identified as 'significantly affected' in the Environmental Statement.

18.2 **Inspection of Buildings and Other Structures**

18.2.1 The Tram Maintainer shall be responsible for the compilation of a schedule of all buildings or other structures, including scheduled monuments and listed buildings that are located within the Site, or which are located directly adjacent to such Work Sites, which may be at risk of physical damage or damage caused by vibration generated during the Services. The said schedule is to be subject to agreement with CEC, CEC having the power to add, or subtract, buildings from the schedule as they deem fit. The agreed schedule is to be published in accordance with the requirements of Schedule 2 (*Employer's Requirements*). A notice of inclusion within the schedule is to be delivered to each scheduled building, attachment of a notice to the building shall be sufficient evidence that notice has been served. Subject to the granting to the Tram Maintainer of free and unhindered access to the building or structure, a record of the condition and survey of any defects in the building or structure shall be prepared prior to the commencement of any Services. Certified copies of the building record and condition survey shall be made available free of charge by the Tram Maintainer to the owners of the examined buildings or structures, on their presentation of proof of title to the building. The best practicable means shall be undertaken by the Tram Maintainer to avoid damage, or to minimise damage where it is unavoidable. The condition of the buildings and other structures listed in the schedule shall

be monitored at reasonable intervals during the Services and for a period of one year after the completion of the said Services. The results of the aforesaid monitoring shall be made available free of charge by the Tram Maintainer to the owners of the examined buildings, on their presentation of proof of title to the building.

18.2.2 The results of this record of the conditions and survey of any defects shall be provided to the Client and CEC, the property owner and occupier and, in the case of scheduled or listed features, to CEC and Historic Scotland by the Tram Maintainer.

18.2.3 Where an element of the Services have been completed and at any time up to two years after their completion, the owners of properties identified under paragraph 18.2.1 above may, upon providing reasonable evidence of damage, request that a second defects survey is undertaken. Any damage which is identified as being caused by the Services shall be repaired by the Tram Maintainer within a reasonable time of identification at the expense of the Tram Maintainer to the reasonable satisfaction of the property owner and so that the property is returned no worse than the standard of repair and stability existing before the Services commenced.

19. DUST AND AIR POLLUTION

19.1 Dust and Other Air Pollution

19.1.1 The Tram Maintainer shall take all necessary measures to avoid creating a dust nuisance during the Services.

19.1.2 Particular consideration shall be given by the Tram Maintainer to Services affecting the operations of Edinburgh Airport Limited. Details of the specific mitigation measures shall be included within the Construction Management Strategy identified under paragraph 10.3 above.

19.1.3 Measures to prevent dust shall include the following:

19.1.3.1 the provision of easily cleaned hardstandings for vehicles;

19.1.3.2 the enclosure of material stockpiles at all times and damping down of dusty materials, using water sprays during dry weather;

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19.1.3.3the hard surfacing of heavily used areas which will be kept clean by regular brushing and water spraying;

19.1.3.4control of dust released from cutting or grinding of materials on the Site; any mobile crushing plant which is used during the Services shall be appropriately licensed and sited so as to minimise dust annoyance to any persons who may be liable to be affected by emissions; the Tram Maintainer shall notify SEPA in advance of any mobile crushing plant being brought onto the Site;

19.1.3.5the complete sheeting of all vehicles carrying spoil and other dusty materials;

19.1.3.6watering of unpaved surfaces and roads; and

19.1.3.7a limit on vehicle speeds on unpaved surfaces of 20 kph.

19.1.4 Where dust generating Services (such as excavation and demolition) are undertaken close to buildings so that there is a potential for soiling of windows and ledges with dust, the Tram Maintainer shall clean such windows and ledges as frequently as is necessary (and as a minimum, at least once per week) during periods of dust generating work and on completion of the Services at that Work Site. The Tram Maintainer shall take precautions to prevent damage occurring as a consequence of cleaning works.

19.1.5 The Tram Maintainer shall take precautions to prevent the emission of smoke or fumes from construction vehicles, site plant and stored materials including volatile substances. Vehicles and plant shall be well maintained and measures shall be taken by the Tram Maintainer to ensure that engines and motors are not left running for long periods when not directly in use.

19.1.6 The engines of all parked vehicles or vehicles waiting to enter any work area shall be switched off within two minutes of arrival.

19.1.7 Work compounds shall be laid out by the Tram Maintainer so that accesses and loading areas are located as far away from sensitive neighbours as is practicably possible, and so that temporary structures screen noisy areas where practicable.

19.1.8 There shall be no burning of waste on the Site.

20. DISPOSAL OF WASTE AND CONTAMINATED MATERIALS

20.1 Waste

20.1.1 A waste management plan (**"WMP"**) shall be developed in accordance with *"Site Waste Management Plans: Guidance for Contractors and Clients"* (DTI 2004). The Tram Maintainer shall be responsible for the preparation of the WMP to address all of the approvals and consents which require to be obtained and thereafter, the Tram Maintainer shall be responsible for the development of the WMP to document the control measures and mitigation measures that shall be implemented. The plan shall in particular identify:

20.1.1.1 responsibilities for waste management;

20.1.1.2 the types and quantities of waste materials likely to be generated;

20.1.1.3 measures to be taken to minimise generation of waste;

20.1.1.4 proposals for recycling and/or re-use;

20.1.1.5 measures to be adopted for management of waste on the Site including enclosure, segregation, secure storage, sorting for recovery, and other on-site handling;

20.1.1.6 proposed treatment and disposal routes; and

20.1.1.7 licensing arrangements.

20.1.2 The Tram Maintainer shall implement and comply with the WMP.

20.1.3 The Tram Maintainer shall undertake monthly audits to demonstrate compliance with Statutory Requirements and the WMP. The Tram Maintainer shall set out its audit programme in the WMP and shall provide copies of the audit report to the Client.

20.1.4 Spoil or other waste materials arising from the Services shall be used, wherever reasonably practicable, in the Services.

20.1.5 The disposal of waste, including any surplus spoil, shall be managed by the Tram Maintainer, so far as is reasonably practicable, to maximise the environmental and development benefits from the use of surplus material to

minimise the removal of surplus spoil from the Site and to reduce any adverse environmental effects of disposal.

20.2 **Contaminated Land and Materials**

20.2.1 The Tram Maintainer shall identify all areas within the Site where contaminated land, including land contaminated by invasive alien species listed in Part 2 of Schedule 9, of the Wildlife and Countryside Act 1981 (as amended), may be encountered. In each of these areas, the Tram Maintainer shall:

20.2.1.1 carry out appropriate additional site investigations as instructed by the Client to the satisfaction of the Client and CEC to determine the extent and type of contaminants present on the Site;

20.2.1.2 identify potential sources, pathways and receptors and assess the risk of harm to receptors;

20.2.1.3 liaise with the Client, CEC and SEPA to address their reasonable requirements and to agree control or protection measures necessary for dealing with identified risks;

20.2.1.4 obtain any necessary licences for the storage, treatment and disposal of contaminated material (including dewatering discharge); and

20.2.1.5 ensure that removal and disposal of contaminated materials complies with a strict consignment note system and that delivery is to appropriately licensed disposal facilities.

20.2.2 The Tram Maintainer shall develop management procedures to be followed in the event that contaminated or hazardous materials are discovered on the Site during construction.

20.2.3 If the Tram Maintainer identifies contamination on the Site which has not been previously identified , no further development shall take place (except to the extent that would not disturb that contamination) until a site investigation has been carried out in accordance with paragraph 20.2.1 above.

20.2.4 The Tram Maintainer shall comply with the guidance in the Health & Safety Executive document "*Protection of Workers and the General Public during*

the Development of Contaminated Land" (1991) and to the DEFRA document "*Helping to Prevent the Spread of Invasive Non-native Species, Horticultural Code of Practice*" (March 2005), in so far as this is reasonably practicable and applicable to the Services. Invasive alien species listed on Schedule 9, Part II of the Wildlife and Countryside Act 1981 as amended by the Nature Conservation (Scotland Act) 2004, will be treated in accordance with the Environmental Protection Act 1990. Japanese knotweed and giant hogweed and soils containing particles of these plants are regarded as controlled waste.

20.2.5 Appropriate precautions shall be taken if materials containing asbestos are encountered. The Tram Maintainer shall observe the exposure limits and measurement methods for asbestos, set out in the Health & Safety Executive Guidance Note EH 10 (2001), and shall also comply with Health & Safety Executive "*Guideline Note MS13 - Asbestos*" (2005), the Health & Safety Commission document "*Approved Code of Practice and Guidance Note Work with Asbestos Insulation, Asbestos Coating and Asbestos Insulating Board*" (2002), in so far as these are applicable to the Services.

21. PROTECTION OF THE WATER ENVIRONMENT

21.1 Waste Water and Run-off

21.1.1 A construction site drainage plan (**"CSDP"**) shall be prepared, in consultation with SEPA. The Tram Maintainer shall be responsible for the preparation of the CSDP to address all of the approvals and consents which require to be obtained. Thereafter, the Tram Maintainer shall be responsible for the development of the CSDP to document the control measures and mitigation measures that shall be implemented. The CSDP shall include measures to ensure that surface water runoff is contained and managed appropriately and that appropriate measures are taken to prevent inundation of the Site. "Sustainable Urban Drainage System" (**"SUDS"**) measures shall be included within the Services where reasonably practicable and applicable, in accordance with Law and the guidance in:

21.1.1.1 "*Interim Code of Practice for SUDS*" (CIRIA 2004);

21.1.1.2 "*Sustainable Urban Drainage System – Design Manual for Scotland and Northern Ireland*" (CIRIA C521); and

21.1.1.3"*Sustainable Urban Drainage Systems – Best Practice Manual*" (CIRIA C523).

21.1.2 The Tram Maintainer shall implement and comply with the CSDP.

21.1.3 The Tram Maintainer shall ensure that there shall be no washout from temporary construction laydown and storage areas into watercourses.

21.1.4 No water shall be discharged into watercourses, but shall be stored in settlement lagoons or tanks, or filtered prior to discharge, or discharged onto a grassy area to soak away.

21.1.5 Waste water and site discharges to surface water or sewer shall only be permitted where the effluent quality and discharge location is acceptable to SEPA or Scottish Water (as appropriate). Water Environment (Controlled Activities) (Scotland) Regulations 2005 ("**CAR**") discharge authorisation shall be obtained by the Tram Maintainer if required prior to discharge.

21.1.6 The Tram Maintainer shall ensure that all treatment facilities are regularly inspected and maintained and that a full record is kept of inspection, maintenance and other measures to maintain equipment performance.

21.1.7 Approval from SEPA shall be obtained by the Tram Maintainer prior to any excavation below the water table, including any site de-watering and discharge. Contact should be made with SEPA at least one month prior to the relevant operation to establish the level of CAR authorisation required. Cut-off ditches may be used to prevent water from entering excavations.

21.1.8 The Tram Maintainer shall comply with BS 6031: 1981 "*Code of Practice for Earthworks*", regarding the general control of site drainage is so far as this is applicable to the Services.

21.1.9 The Tram Maintainer shall ensure that areas of exposed ground and stockpiles are minimised to reduce silty runoff. Geotextiles or other equivalent measures shall be used by the Tram Maintainer where necessary to prevent silty run-off from soil mounds close to watercourses.

21.1.10 The Tram Maintainer shall ensure that any water that has come into contact with contaminated materials is disposed of in accordance with the requirements of SEPA or Scottish Water (as appropriate).

21.1.11 The Tram Maintainer shall take suitable precautions to prevent the entry of pollutants into any bodies of water, and report any incidents to SEPA and Scottish Water.

21.1.12 Procedures for responding to potentially polluting incidents or inundation of the site by floodwaters shall be implemented in accordance with SEPA guidance (with reference to paragraph 21.6 below).

21.1.13 Cementicious mixtures are highly alkaline and corrosive and shall be prevented from entering watercourses and drains. The Tram Maintainer shall make suitable provision for washing out ready mix concrete lorries, skips, concrete pumps and the like.

21.2 **Storage of Polluting Materials**

21.2.1 The Tram Maintainer shall make provision to ensure that oil drums and containers or other potential contaminants stored on the Site are properly isolated and bunded and that no oil or other contaminants are allowed to reach watercourses or groundwater, including aquifers. Oil storage containers (both fixed and mobile) with a 200 litre capacity or greater shall be stored in compliance with the Water Environment (Oil Storage) (Scotland) Regulations 2006, where applicable. Drip trays and other secondary containment measures shall be used by the Tram Maintainer where necessary to prevent spills during refuelling and operation of small static and mobile equipment. Storage locations for such materials shall be positioned away from watercourses. All surface water or other contaminated water which accumulates in bunds shall be removed by the Tram Maintainer by manually controlled positive lift pumps, and not by means of a gravity drain.

21.2.2 Refuelling shall be carried out by the Tram Maintainer in a designated area which is away from watercourses and drains.

21.2.3 Spill response kits containing equipment appropriate to the quantity and types of materials present on site shall be available for use by the Tram Maintainer in the event of a fuel spillage. Personnel shall be trained in their use.

21.3 **Protection of Aquifers**

21.3.1 The Tram Maintainer shall have due regard for protection of underlying aquifers and adhere to the SEPA "*Groundwater Protection Policy for*

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Scotland". In all instances, measures to ensure appropriate protection of aquifers shall be undertaken, subject to prior approval of SEPA. Prior approval shall be sought by the Tram Maintainer in writing, prior to commencement of the relevant Services.

21.4 **Control and Management of Foul Drainage**

21.4.1 Where permanent facilities are not accessible foul water and sewage effluents produced by the construction workforce shall be contained by temporary foul drainage facilities. A licensed contractor engaged by the Tram Maintainer shall dispose of all foul water collected off-site.

21.5 **Services in the Vicinity of Water**

21.5.1 The Tram Maintainer shall take suitable precautions to prevent the entry of pollutants, including sediments and dusts, into any bodies of water, and report any incidents to SEPA.

21.5.2 Crossings of watercourses shall be constructed by the Tram Maintainer so as not to impede the flow, obstruct the movement of floodwater or exacerbate erosion of the channel and banks and shall require CAR authorisation from SEPA.

21.5.3 In watercourses which support migratory fish, Services shall be avoided during upstream and downstream fish migration, spawning, incubation and hatching periods.

21.5.4 Where bankside habitat is temporarily affected, it shall be reinstated by the Tram Maintainer to its original form on completion of the Services at that Work Site.

21.5.5 Areas of bankside adjacent to working areas shall be fenced off during construction to prevent damage to the banksides.

21.5.6 Stripping of surface vegetation near water by the Tram Maintainer shall be kept to a minimum. Exposed surfaces shall be seeded or reinstated by the Tram Maintainer with vegetation, as soon as is practical after construction in that working area is complete.

21.5.7 Where culverting is required as Temporary Works, such culverting shall be subject to CAR authorisation from SEPA. Culverting that is so authorised shall be designed by the Tram Maintainer and constructed to permit the passage of fish and other aquatic fauna under normal flow conditions.

21.6 Guidance

21.6.1 The Tram Maintainer shall comply with all relevant SEPA "pollution prevention" guidelines, including, but not necessarily limited to:

21.6.1.1 PPG1	General guide to the prevention of water pollution.
21.6.1.2 PPG2	Above ground oil storage tanks.
21.6.1.3 PPG3	The use and design of oil separators.
21.6.1.4 PPG4	Disposal of sewage where no mains drainage is available.
21.6.1.5 PPG5	Works in, near or liable to affect watercourses.
21.6.1.6 PPG6	Working at construction and demolition sites.
21.6.1.7 PPG7	Refuelling facilities
21.6.1.8 PPG8	Storage and disposal of used oils.
21.6.1.9 PPG13	High pressure water and steam cleaners.
21.6.1.10 PPG18	Control of spillages and fire fighting runoff.
21.6.1.11 PPG19	Garages and vehicle service centres.
21.6.1.12 PPG21	Pollution incident response planning.
21.6.1.13 PPG22	Dealing with spillages on roads.
21.6.1.14 PPG23	Maintenance of structures over water.
21.6.1.15 PPG26	Pollution prevention storage and handling of drums and intermediate bulk containers.

21.7 Water Environment (Controlled Activity) (Scotland) Regulations 2005

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Without prejudice to the foregoing terms of this paragraph 21, the Tram Maintainer shall comply with the terms of CAR where relevant to the Services.

22. ECOLOGY

22.1 Encroachment into Wildlife Areas

22.1.1 The Tram Maintainer shall take all reasonably practicable measures to minimise harm to and disturbance of wildlife caused by noise and vibration, dust and other air pollution, including:

22.1.1.1 minimising habitat loss by keeping the working corridor and extent of working areas to the minimum necessary for the Services; removal of habitats and new planting shall be undertaken in consultation with Scottish Natural Heritage (**"SNH"**), the Client and CEC;

22.1.1.2 fencing off adjacent habitat to prevent unnecessary incursion or damage; staff shall be made aware of the need to avoid damage to adjacent retained areas;

22.1.1.3 the reinstatement or replacement of areas of habitat disturbed during construction in areas not required for the Services on completion of the Services in accordance with the Landscape and Habitat Management Plan (**"LHMP"**). The Tram Maintainer shall be responsible for the preparation of the LHMP to address all of the approvals and consents which require to be obtained and thereafter, the Tram Maintainer shall be responsible for the development of the LHMP to document the control measures and mitigation measures that shall be implemented ; and

22.1.1.4 compliance with the guidelines set out in British Standard (BSI *Code of Practice for Earthworks* (BS6031) in relation to soil stripping, storage and placing.

22.1.2 Approval shall be obtained by the Tram Maintainer from the Client, SNH, SEPA, Scottish Executive Environment Group Wildlife Habitats Division (**"SEEG WHD"**) and CEC, for detailed method statements for any Services proposed in designated sites, including Special Protection Areas (SPA)/Ramsar sites, Sites of Special Scientific Interest (SSSI), Sites of Interest for Nature Conservation (SINC) and Wildlife Sites.

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22.1.3 Applications for approval shall be made by the Tram Maintainer at least one calendar month prior to relevant Services commencing.

22.2 **Protected Species**

22.2.1 In advance of any Services, the Tram Maintainer shall employ suitably qualified professionals to check all working areas and any land within 30 metres of the boundary of the working area (unless there is a boundary with a private third party within the 30 metres, in which case no checks shall be taken within the private land), or 100m from any piling operations or use of explosives for the presence of species protected by statute. Where protected species are identified, appropriate mitigation measures shall be agreed in advance with the relevant authorities and any appropriate licences obtained in accordance with any requirements for licensing. The Tram Maintainer shall implement any mitigation measures agreed in accordance with this paragraph 22.2.1.

22.2.2 Where any habitat has to be cleared in the breeding bird season, typically March to June or July for most species, the habitat must be checked prior to removal for the presence of nesting wild birds, their nests and eggs and young. If found, no habitat shall be removed until nesting is complete, or unless other suitable mitigation is agreed in advance between the Tram Maintainer and SNH.

22.2.3 The Tram Maintainer shall be responsible for obtaining a licence from SNH for any work that may cause disturbance to a badger or involves the damage or destruction of a sett. Licence applications shall be made for any Services within 10m, heavy machinery operating within 30m, and for piling or use of explosives within 100m, and no Services shall proceed until the required licences are obtained. Alternative setts shall be provided in the event of and in advance of any loss.

22.2.4 The Tram Maintainer shall be responsible for obtaining a licence from SEEG WHD for any work which may cause disturbance to otters or involve damage or destruction to an otter holt or lying up site or if any Services are proposed within 30m of an otter holt or lying up site. Alternative holts or lying up sites shall be provided in the event of and in advance of any loss.

22.2.5 The Tram Maintainer shall be responsible for ensuring that all bridges and other built structures and mature and dead trees within the working area shall be checked by a licensed bat handler for their use by roosting or hibernating bats prior to felling or other potentially damaging operations. If found, mitigation measures shall be agreed between the Tram Maintainer and SNH and SEEGWHD and implemented, including review of the design to seek ways of avoiding loss of the roost. If avoidance is not possible, a licence shall be applied for by the Tram Maintainer from SEEG WHD for disturbance to a European Protected Species and / or destruction or damage to a breeding site or resting place. Alternative roost sites shall be provided in advance of any loss. Any loss of feeding habitat shall be compensated for by new habitat creation as detailed in the LHMP. All mitigation measures for protected species shall be installed by the Tram Maintainer as early as possible during the construction process so that use can be established at an early stage.

22.2.6 Where appropriate use of mitigation measures by target species will be positively encouraged using a variety of techniques e.g. feeding.

22.2.7 Permanent mitigation structures for protected species including mammal fencing and tunnels and artificial badger setts shall be checked during construction and approved on completion by a suitably qualified ecologist and reported to SNH. Should these structures not be to the required standard specified, remedial measures shall be taken by the Tram Maintainer .

22.2.8 Mitigation shall aim to compensate for loss of foraging specifically for badgers through creation of appropriate grassland and scrub habitat wherever possible within the Limits of Deviation in the Tram Legislation in line with the Civil Aviation Authority Advice Note 3 – "*Potential Bird Hazards from Amenity Landscaping and Building Design*".

22.2.9 The Tram Maintainer's personnel and personnel engaged by any Sub-Contractors shall be briefed by a suitably qualified professional on measures for protected species as part of site induction.

22.3 Protection of Mature Trees

22.3.1 For the purposes of this paragraph, "trees" are defined as trees with a diameter of over 10cm girth at a height of 1.5 m above ground level.

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22.3.2 Loss of trees shall be avoided as far as reasonably practicable. The Tram Maintainer shall comply with the guidelines set out in British Standard (BS) 5837:1991 "Trees in Relation to Construction" insofar as these are reasonably practicable and applicable to the Services.

22.3.3 All tree surgery operations shall comply with the British Standard (BS) 3998 "*Recommendations for Tree Work*" and a method statement addressing safety of workers and the public shall be prepared and implemented.

22.3.4 Felling shall be carried out in accordance with the Forestry Commission document "*Forest and Water Guidelines 2004*", which relates to the influence that woodland and trees can have on the freshwater environment, insofar as this is reasonably practicable and to the extent that they are applicable to the Services.

22.3.5 Prior to felling, the Tram Maintainer shall procure that trees suitable as bat roosts are checked by a licensed bat handler for roosting and hibernating bats, and should any be identified, mitigation measures shall be agreed by the Tram Maintainer with SNH and SEEG WHD and the Tram Maintainer shall obtain any relevant licences.

22.3.6 Woody material generated shall be retained on the Site as far as is reasonably possible and used as part of habitat creation measures.

22.3.7 Adverse effects on all trees within or in the vicinity of the Site shall be minimised by the adoption of suitable mitigation measures. These may include, but shall not be limited to, the following:

22.3.7.1 selective removal of lower branches in an approved manner, to reduce mechanical damage by construction plant;

22.3.7.2 control of construction activities to minimise compaction of the ground beneath the entire canopy of the tree; no heavy materials or plant shall be stored, and construction traffic movements shall be controlled, by fencing or other means, so as to minimise vehicle movement within the canopy;

22.3.7.3 the use of matting around the root zone to minimise soil compaction; and

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22.3.7.4the use of chestnut paling around the trunk to prevent damage.

22.4 Tree Replacement

Where trees are removed, damaged or die as a consequence of the Services, they shall be replaced by the Tram Maintainer by at least 2 trees for every one removed, which replacement trees shall be of similar or approved size and in a location as close as possible to the original position. All tree planting shall be agreed with the Client and CEC, and shall be in accordance with the LHMP. The supply, storage, handling, planting and maintenance of new planting shall be undertaken in accordance with the appropriate British Standards, including, but not necessarily limited to;

22.4.1 (BS5837) "Trees in Relation to Construction";

22.4.2 (BS3998) "Recommendations for Tree Works"; and

22.4.3 (BS4428) "Code of Practice for General Landscape Operations (excluding hard surfaces)".

22.5 Control of Invasive and Alien Species

22.5.1 If any invasive alien species listed in Schedule 9, Part II of the Wildlife and Countryside Act 1981 (as amended), are identified along the route, including Japanese Knotweed (*Fallopia japonica*), Giant Hogweed (*Heracleum mantegazzianum*) or Himalayan Balsam (*Impatiens glandulifera*), a strategy shall be developed and implemented by the Tram Maintainer prior to the commencement of the Services to manage their presence. The strategy will ensure appropriate treatment of invasive alien species in advance of construction in accordance with approved methodology and will prevent the spread of the species within and outside the development area. The soil containing these species or plants thereof shall be dealt with as contaminated material and disposed of in accordance with paragraph 20.2 above;

22.5.2 The Tram Maintainer shall comply with the strategy for the control of invasive and alien species.

23. ARCHAEOLOGY AND CULTURAL HERITAGE

23.1 Archaeological and Heritage Mitigation Plan

23.1.1 In advance of the commencement of the Services, an "Archaeological and Heritage Mitigation Plan" (**"AHMP"**) shall be prepared. The Tram Maintainer shall be responsible for the preparation of the AHMP to address all of the approvals and consents which require to be obtained and thereafter, the Tram Maintainer shall be responsible for the development of the AHMP to document the control measures and mitigation measures that shall be implemented. The AHMP will identify the level of mitigation proposed at each site of archaeological or historic significance (as defined by statute and/or Historic Scotland), taking into account the measures outlined in the Environmental Statements. These may include:

23.1.1.1prior archaeological evaluation by trial excavations;

23.1.1.2a detailed photographic record prior to construction;

23.1.1.3a watching brief during construction;

23.1.1.4a detailed standing building survey and salvage;

23.1.1.5archaeological excavation;

23.1.1.6preservation in situ;

23.1.1.7further documentary research and archiving; or

23.1.1.8other such measures as may be approved.

23.1.2 The Tram Maintainer shall implement and comply with the AHMP.

23.1.3 No development within or immediately adjacent to an area which is, in the opinion of the Client and CEC, of known or suspected archaeological importance, shall commence until a scheme to deal with any archaeological remains on the Site has been submitted to and approved by the Client and CEC and implemented. The Tram Maintainer shall apply for prior approval at least two calendar months in advance of the relevant Services commencing.

23.1.4 No development within or adjacent to an area which is designated as a Scheduled Ancient Monument shall commence without the Tram Maintainer confirming whether Scheduled Monument Consent is required from Historic Scotland, and where necessary obtaining such consent. The AHMP shall identify the Scheduled Ancient Monuments and Listed Buildings which shall

be affected, and shall outline the Services that can take place in proximity to them and will detail the necessary mitigation.

23.1.5 All records obtained through the mitigation shall be lodged with the National Monuments Record of Scotland (**"NMRS"**).

23.1.6 The AHMP shall outline the appropriate procedures that shall be followed should any significant archaeological remains be found during the pre-construction excavations.

23.1.7 Any archaeological works carried out on the Site by the Tram Maintainer shall be undertaken by a suitably qualified investigating body acceptable to the Client and CEC. The results shall be provided to the property owner and occupier and, in the case of scheduled or listed features, to the Client, CEC and Historic Scotland.

23.1.8 The Tram Maintainer shall take all reasonable precautions to prevent employees, any Sub-Contractors, their employees, or any other persons from removing or damaging any fossils, coins, articles of value or antiquity, structures or other remains or any other thing of archaeological or historical interest during investigations and during all the Services. The AHMP shall outline the legal obligations placed on those who discover portable antiquities or disturb human remains.

23.1.9 The Tram Maintainer shall appoint a suitably qualified professional person to record the condition of all scheduled and listed buildings and structures or parts thereof, within or adjacent to the construction working areas which are identified as at risk from physical damage or vibration. This will have been carried out in accordance with the Institute of Field Archaeologists Standards and Guidance. The results shall be provided to the property owner and occupier and in the case of scheduled or listed features, to CEC and Historic Scotland.

23.1.10 At least one month prior to commencement of the relevant excavation works, a copy of each survey undertaken under paragraph 23.1.9 above shall be provided by the Tram Maintainer to the Client, the property owner and occupier and, in the case of scheduled or listed features, to the Client, CEC and Historic Scotland.

23.1.11 After the Services have been completed and at any time up to two years after the opening of the tram, the above parties may, upon providing the Client or the Tram Maintainer with reasonable evidence of damage, request that a second defects survey is undertaken. Any damage which is identified as being caused by the Services shall be repaired within a reasonable time of identification at the expense of the Tram Maintainer to the reasonable satisfaction of the property owner and such that the property is returned to the standard of repair and stability existing before the Services commenced.

23.2 **Guidance**

23.2.1 All archaeological investigations, watching briefs or other activities shall be carried out in accordance with the following guidance from the Institute of Field Archaeologists, particularly – but not necessarily limited to standards and guidance for:

23.2.2 field evaluation;

23.2.3 excavation;

23.2.4 archaeological watching brief;

23.2.5 archaeological investigation and recording of standing buildings or structures;

23.2.6 collection, documentation conservation and research of archaeological materials;

23.2.7 the IFA policy statement on Environmental Protection;

23.2.8 the IFA Code of Conduct; and

23.2.9 the British Archaeologists and Developers Liaison Group Code of Practice.

Part 2

PART B - CODE OF MAINTENANCE PRACTICE

1. MANAGEMENT SYSTEMS

1.1 The Tram Maintainer shall implement and comply with the following management systems:

1.1.1 a "quality management system" in accordance with ISO 9001;

1.1.2 a "safety management system" in accordance with ISO 18001 or HSG65; and

1.1.3 an "environmental management system" in accordance with ISO 14001.

2. INSTRUCTION AND TRAINING

2.1 The Tram Maintainer shall ensure that its employees, Sub-Contractors, agents and others on the Edinburgh Tram Network for whom the Tram Maintainer has responsibility undertake a number of inductions. These shall comprise:

2.1.1 specific induction for the Maintenance Services (provided by the Tram Maintainer);

2.1.2 worksite and task-specific-induction including a method statement briefing and toolbox talk, (provided by the Tram Maintainer).

2.2 Any persons who have not received the induction, for example visitors, shall be escorted on Edinburgh Tram Network non-public areas at all times by a competent inducted person and receive a site briefing.

2.3 The Tram Maintainer shall maintain induction and training records in order that the Operator and the Client can inspect them. These records shall identify the scope of the induction and training and the persons who received them.

3. SAFE SYSTEMS

3.1 Risk Assessments

3.1.1 The Tram Maintainer shall prepare risk assessments for all work activities being undertaken.

3.1.2 Each risk assessment shall include as a minimum the following details:

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3.1.2.1 Document control

(a) document title and number;

(b) revision status;

(c) authorisation for use; and

(d) reference to supplementary documentation.

3.1.2.2 identification of any hazards (as a minimum they should address the following – access to the work site, security of the work site, interface with the public, potential for vandalism, interface with the tram system and interface with traffic);

3.1.2.3 identification of those who might be harmed, and how; and

3.1.2.4 an evaluation of the risks and, in relation to each risk, the control measures required to reduce the risk to an appropriate level.

3.2 Method Statements

3.2.1 Where the risk assessments identify that additional control measures are required, the Tram Maintainer shall prepare method statements.

3.2.2 Each method statement shall include as a minimum the following details:

3.2.3 Document control

(a) document title and number;

(b) revision status;

(c) authorisation for use; and

(d) reference to supplementary documentation.

3.2.3.1 General information

(a) description and scope of work;

(b) location and boundaries (including sketch or site plan if appropriate); and

(c) access routes for personnel and materials and equipment.

3.2.3.2 Resources

(a) number of personnel (including function and role);

(b) contacts; and

(c) lines of communication.

3.2.3.3 Details of work activities

(a) detailed work sequence;

(b) plant, equipment and tools to be used;

(c) personal protective equipment required;

(d) delivery requirements;

(e) wastes produced, and means of disposal; and

(f) inspection and testing requirements, including details of:

(i) acceptance criteria;

(ii) quality control checklists and record forms to be used;

(iii) frequencies of inspections and testing; and

(iv) documentation which is required prior to the issue of a handover checklist in accordance with Clause 60.2 of the Agreement.

3.2.3.4 Specific control measures

(a) permits and authorisations required; and

(b) temporary amended systems.

3.2.3.5 Emergency procedures

(a) Evacuation and rescue.

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(b) Interface with the Operator / Control Centre and Emergency Services.

3.2.3.6 Supplementary documentation

(a) risk assessments; and

(b) COSHH assessments.

3.2.4 The documentation referred to in paragraph 3.2.2 above shall be developed so that it is specific to the Maintenance Services. The Tram Maintainer shall ensure that revisions and updates can be identified .

3.2.5 The Tram Maintainer shall issue a copy of its procedure for the production of method statements and risk assessments to the Client for approval.

3.3 Access Permit

3.3.1 The Tram Maintainer shall comply with the Operator's system for controlling access to undertake work activities as notified to the Tram Maintainer by the Client, which shall require the Tram Maintainer to obtain an approved access permit (**"Access Permit"**) from the Client for works that will require a disruptive possession.

3.3.2 In so far as not otherwise submitted pursuant to this Agreement, the Tram Maintainer shall submit a form for each required Access Permit (**"Access Permit Form"**) which is required, to the Client at least 10 Business Days in advance of access being required. In the event of emergency works or essential unplanned Maintenance Services a reduced period of notice can be applied in accordance with Clause 20.13 of the Agreement.

3.3.3 The Tram Maintainer shall advise the Client of the persons within its organisation who are competent to authorise the Access Permit Forms.

3.3.4 Each Access Permit Form shall identify the risk assessments, method statements and permits to work which have been raised under the Tram Maintainer 's safety management system.

3.3.5 Each Access Permit Form shall identify any requirements for system interruption or isolation.

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3.3.6 The Tram Maintainer shall agree with the Client the "start work date and time" and "stop work date and time" for each work activity or group of work activities to be included in each Access Permit.

3.3.7 The Tram Maintainer shall identify within each Access Permit Form any special control measures which require to be implemented including:

3.3.7.1 requirement for a temporary speed restriction;

3.3.7.2 requirement for disablement of traffic signals;

3.3.7.3 traffic management requirements under Chapter 8 of the traffic signs manual for segregating the work sites from the operational Edinburgh Tram Network or road traffic; and

3.3.7.4 requirement to undertake works outwith the conditions included within the noise and vibration policy referred to in the Tram Legislation.

3.3.8 On completion of the work activity or group of work activities, or the "stop work time" (which ever is sooner) the Tram Maintainer shall return the relevant Access Permit to the Client for cancellation.

3.3.9 The Tram Maintainer's authorised persons shall be required to undergo training by the Client (with the input of the Operator) in the operation of the Access Permit system.

3.4 Permits to Work

3.4.1 The Tram Maintainer shall implement a "permit to work" system for the following activities as a minimum:

3.4.1.1 breaking the ground;

3.4.1.2 hot works;

3.4.1.3 entry into confined spaces;

3.4.1.4 work affecting services;

3.4.1.5 access to live facilities; and

3.4.1.6 works on private land controlled by third parties.

3.4.2 The Tram Maintainer shall implement a procedure for managing third party permits to work.

3.4.3 The Tram Maintainer shall issue a copy of its permit to work procedures to the Client for approval.

3.4.4 The Tram Maintainer shall advise the Operator and the Client of the competent persons within its organisation who shall be competent to authorise permits to work.

3.5 Personal Protective Equipment

3.5.1 The Tram Maintainer shall provide all necessary personal protective equipment (**"PPE"**) for its employees and provide them with all necessary information, instruction and training on its use.

3.5.2 The Tram Maintainer shall ensure that all persons on any Work Site (including any representatives of the Operator, the Client and visitors) wear the necessary PPE.

3.5.3 the Client's specific requirements for PPE with regard to particular tasks are as follows:

3.5.3.1 yellow high visibility clothing to comply with BS EN 471:1994, which shall be worn at all times when working on the Edinburgh Tram Network or roads.

3.5.3.2 orange high visibility clothing complying with GO/RT 3279 shall be worn where any works are carried out on railway land.

4. REPORTING

4.1 The Tram Maintainer shall report the following information to the Operator and the Client within 24 hours of the event occurring:

4.1.1 details of any accident or incident which requires notification to the Health & Safety Executive (the Tram Maintainer shall copy Form 2508 to the Operator and to the Client);

4.1.2 details of any environmental event which requires notification to the Scottish Environmental Protection Agency (**"SEPA"**); and

4.1.3 details of any visit by either the Health & Safety Executive or SEPA, together with details of any report issued or enforcement action that resulted.

4.2 The Tram Maintainer shall report the following information to the Client and, if requested by the Client, to any other relevant third party on a four weekly reporting cycle:

4.2.1 details of any near misses;

4.2.2 details of any accident investigation reports raised by the Client including details of corrective and preventative actions which have been taken;

4.2.3 the accident frequency rate (**"AFR"**) for the Maintenance Services (including details of total hours worked and number of persons employed);

4.2.4 a summary of the monitoring and internal auditing activities undertaken by the Tram Maintainer in the period, including details of any corrective or preventative actions raised or closed out; and

4.2.5 details of the programme of monitoring and auditing planned for the subsequent four-weekly period.

5. AUDITING AND MONITORING

5.1 The Tram Maintainer shall be responsible for carrying out and recording, auditing and monitoring of its maintenance work activities.

5.2 The Client any other party reasonably requested by the Client may undertake regular auditing and monitoring of the Tram Maintainer's maintenance work activities, and the Tram Maintainer shall action any findings which are raised the Client or the relevant other party.

6. NON-CONFORMANCE, COMPLAINTS AND DISCIPLINARY MATTERS

6.1 The Client shall implement a process for recording and processing breaches by the Tram Maintainer of the requirements of this Part B of Schedule 3 (*Code of Construction Practice and Code of Maintenance Practice*) and complaints.

6.2 The Tram Maintainer shall take such steps as are required by the Client to remedy any such infringement or address any such complaint and the following priority levels for action shall apply:

Level of Urgency	Category of Notification	Required Response Time
1	High urgency. Involves an immediate threat to persons or property or the circumstances otherwise require immediate rectification.	Immediate action required. If response not completed by the Tram Maintainer within 4 hours, the Client may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Tram Maintainer.
2	Medium urgency. No immediate threat to persons or property, but circumstances require rectification within 24 hours.	Remedial action requires to be completed within 24 hours. If the Tram Maintainer does not complete the required response within 24 hours, the Client may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Tram Maintainer.
3	Issue requires rectification, but no immediate threat to persons or property and the circumstances do not otherwise require immediate rectification.	Timescales for rectification to be agreed between the Client and the Tram Maintainer . In the event that the Tram Maintainer does not comply with the agreed timescales, the Client may procure that the relevant work is carried out and the costs of so doing shall be recovered from the Tram Maintainer .

If the Tram Maintainer fails to take any remedial action required by the Client pursuant to the table above, the Client shall be entitled to employ and pay other persons to carry out the same and all costs incurred by the Client shall be recoverable from the Tram Maintainer by the Client and may be deducted by the Client from any monies due or to become due to the Tram Maintainer or, alternatively, recoverable from the Tram Maintainer as a debt.

7. IDENTIFICATION

7.1 The Tram Maintainer shall ensure that all staff undertaking Maintenance Services are easily identifiable to the public by use of photo identity cards.

7.2 The Tram Maintainer shall ensure that all personnel undertaking maintenance activities identify their employer by means of their company logo on their safety helmet.

8. SITE ARRANGEMENTS

8.1 Site Housekeeping

8.1.1 A 'good housekeeping' policy shall be applied by the Tram Maintainer at all times; this shall include, but not necessarily be limited to, the following requirements:

8.1.1.1 all working areas, including offices, shall be kept in a clean and tidy condition;

8.1.1.2 all working areas shall be a no-smoking area; specific areas within the Site shall be designated as smoking areas and shall be equipped with containers for smoking waste; these shall not be located at the boundary of the Site and adjacent to neighbouring land;

8.1.1.3 open fires shall be prohibited at all times;

8.1.1.4 all necessary measures shall be taken to minimise the risk of fire and the Tram Maintainer shall comply with the requirements of the local fire authority;

8.1.1.5 radios (other than two-way radios used for the purposes of communication related to the Maintenance Services) and other forms of audio equipment shall not be operated on the Site;

8.1.1.6 any waste susceptible to spreading by wind or liable to cause litter shall be stored in enclosed containers;

8.1.1.7 rubbish shall be removed at frequent intervals and the Site kept clean and tidy;

8.1.1.8 eating and drinking shall only be permitted within the Tram Maintainer's designated welfare area;

8.1.1.9 adequate toilet facilities shall be provided for all maintenance staff;

8.1.1.10 food waste shall be removed frequently;

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8.1.1.11 the Tram Maintainer's personnel (including any Sub-Contractors) shall be required to conform to a reasonable dress code;

8.1.1.12 any behaviour that is lewd or likely to cause offence shall not be permitted; and

8.1.2 The Tram Maintainer shall inspect all working areas at least weekly and shall provide a four weekly written report on compliance with paragraph 8.1.1 above. The Tram Maintainer or any other party authorised by it may carry out inspections of the Site at any time without prior notice of time and place of the inspections. Access to all areas of the Maintenance Services shall be given to visiting inspectors and the Tram Maintainer shall give inspectors all reasonable assistance during their Site inspection.

8.2 Temporary Fencing

8.2.1 The Tram Maintainer shall ensure that all working areas are sufficiently and adequately protected to prevent the public and animals from straying on to the working area; temporary fencing shall be provided to suit the individual location by carrying out an appropriate risk assessment.

8.2.2 All temporary fencing shall comply with Chapter 8 of the [Traffic Sign Manual].

All access and egress to worksites shall be via designated positions within the temporary fencing, which shall remain closed and secured when not in use.

8.2.3 All temporary fencing that creates poorly lit pedestrian routes shall have appropriate lighting fitted by the Tram Maintainer, and these shall be illuminated at all times when the adjacent street lighting is lit.

8.2.4 The Tram Maintainer shall ensure that the location and design of temporary fencing and temporary structures on the public road shall permit adequate visibility at junctions and proper forward visibility along the roads in accordance with the National Roads Directorate advice notes and the requirements of CEC.

8.2.5 All temporary fencing shall be maintained by the Tram Maintainer in a neat and tidy condition at all times, 24 hours, 7 days a week.

8.2.6 The Tram Maintainer shall be expressly prohibited from displaying or allowing to be displayed any advertisement or notice including illicit bill or fly posting on the temporary fencing. The Tram Maintainer shall ensure that all graffiti, fly posting or defacement to the temporary fencing is removed and made good or obscured within 24 hours.

8.2.7 All temporary fencing shall be removed as soon as reasonably practicable after the completion of any part of the Maintenance Services.

8.3 Lighting and Visual Intrusion

8.3.1 Site lighting shall be positioned and directed by the Tram Maintainer so as to minimise nuisance to residents and to minimise distractions or confusion to passing drivers on adjoining public roads. This provision shall apply particularly to working areas where work after dark will be carried out and the Tram Maintainer shall provide appropriate lighting for these sites. Lighting shall be removed as soon as is consistent with the safe and efficient operation of each Work Site.

8.3.2 So far as is practicable, all power to temporary traffic signals, lighting and the like shall be taken from mains supplies rather than portable generators. Where portable generators are used to provide power to temporary traffic signals, lighting and the like the Tram Maintainer shall ensure industry best practice be followed to minimise noise and pollution from such generators.

8.3.3 The Tram Maintainer shall comply with the Institute of Lighting Engineers' document *Guidance Notes on Reduction of Light Pollution 2000* in so far as is reasonably practicable and applicable to the Tram Maintainer.

8.4 Access and Loading

8.4.1 The Tram Maintainer shall ensure that lorries shall enter and exit the Site in a forward direction at designated locations, except where space restriction does not permit this. If the reversing of vehicles into public spaces is required, then a responsible person observing the rear of the vehicle shall properly control the movement. The sounding of audible reversing alarms shall not be permitted outside normal working hours, except where this has been approved by the Client and CEC in connection with the Maintenance Services. Entry

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and exit conditions shall be subject to prior approval by the Client, CEC and the Lothian and Borders Police before implementation.

8.4.2 Access to and egress from the Site shall be carried out by initiating a left turn wherever reasonably practicable.

8.4.3 All loading and unloading of vehicles shall take place off the public road as far as is reasonably practicable.

8.5 **Living Accommodation**

8.5.1 No living accommodation shall be provided by the Tram Maintainer within any maintenance working area. Mess rooms, locker rooms, toilets and showers shall be permitted at designated positions agreed with the Client.

8.6 Clearance of Maintenance Work Site on Completion

8.6.1 The Tram Maintainer shall clear and clean all working areas and accesses as work proceeds and when no longer required for the carrying out of the Maintenance Services.

8.6.2 All surplus materials, rubbish, Temporary Works, Tram Maintainer's Equipment, and temporary fencing shall be removed, and the surface of the ground restored as near as practicable to its original condition, or to such condition as has previously been agreed with the Client in accordance with this Agreement and/or the Employer's Requirements (as appropriate).

8.7 Pest Control

8.7.1 The Tram Maintainer shall ensure that the risk of infestation by pests or vermin is minimised by adequate arrangements for the disposal of food waste or other material attractive to pests. If infestation occurs, the Tram Maintainer shall take such action to deal with it as required by the Client.

9. REQUIREMENTS RELATING TO WORKS AFFECTING EDINBURGH AIRPORT

9.1 The Tram Maintainer shall have regard to, and comply (where relevant) with all BAA and CAA guidelines when working on or adjacent to [Edinburgh Airport].

9.2 For Maintenance Services to be carried at Edinburgh airport, the Tram Maintainer shall prepare for approval by the Client and any other party reasonably requested by

the Client a "Construction Management Strategy" as defined within CAA Safeguarding of Aerodromes Advice Note 4 (Cranes and Other Construction Issues). The Construction Management Strategy shall address as a minimum the following issues:

9.2.1 use of cranes or other tall construction equipment;

9.2.2 control of activities likely to produce dust or smoke clouds

9.2.3 the design of temporary lighting to avoid distracting pilots (see CAA Safeguarding of Aerodromes Advice Note 2 Lighting near Aerodromes);

9.2.4 storage of materials, particularly compliance with height limits;

9.2.5 control and disposal of waste, to prevent attraction of birds; and

9.2.6 site restoration, to prevent attraction of birds.

10. REQUIREMENTS RELATING TO WORKS AFFECTING THE RAILWAY

10.1 The Tram Maintainer shall comply with the requirements of Network Rail in relation to railway safeguarding and at all times keep the Client informed of any and all dealings with Network Rail.

11. REQUIREMENTS RELATING TO WORKS AFFECTING OTHER THIRD PARTIES

11.1 The Tram Maintainer shall comply with the requirements of other affected third parties in relation to procedural requirements e.g. notifications, implementation of Permit to Work systems as defined within Third Party Agreements or as may be reasonably required by the Client.

12. ROADS AND FOOTPATHS, CYCLEWAYS AND BRIDLEWAYS

12.1 General

12.1.1 The measures to be taken with respect to traffic and road safety shall include, but not necessarily be limited to:

12.1.1.1 use of TTROs; the Tram Maintainer shall consult with the Client and other third parties notified by the Client on the arrangements for agreeing and implementing TTROs to facilitate road closures and the

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like; the use of TTROs shall take into account the requirement for, and availability of, suitable alternative routes;

12.1.1.2 use of appropriate temporary signing and lighting wherever the Maintenance Services are in progress to ensure the safety of all road users;

12.1.1.3 use of temporary signing to restrict vehicle types and sizes and define routes for construction traffic;

12.1.1.4 use of appropriate temporary signing and lighting wherever the Maintenance Services are in progress to ensure the safety of all road users; and

12.1.1.5 preparation and implementation of a programme agreed by the Tram Maintainer with the Client and CEC for road closures and temporary traffic signal arrangements.

12.2 Temporary Road Closures And Diversions

12.2.1 The Tram Maintainer shall finalise the arrangements for required closures and diversions of specified roads, footpaths and cycle ways with the Client, the Operator, CEC, BAA, any private landowner or relevant bus operator.

12.2.2 Before closing or otherwise interfering with any street or footpath to which the public has access, the Tram Maintainer shall make such arrangements with the Client, and if requested by the Client, with the Operator and CEC as may be reasonably necessary to cause as little interference with the traffic in that street or footpath during the Maintenance Services as shall be reasonably practicable.

12.2.3 Pedestrian access to properties shall be maintained at all times where practicable, unless otherwise agreed with the Client, and if requested by the Client, with the Operator and CEC and the owners and tenants of affected properties. Access to and from public facilities shall be maintained at all times unless otherwise agreed with the relevant administrating bodies.

12.2.4 Wherever the Maintenance Services interfere with the existing public or private roads or other ways over which there is a public or private right of way for any traffic, the Tram Maintainer shall construct diversion ways as

necessary. The standard of construction and lighting shall be suitable in all respects for the class or classes of traffic using the existing ways and the widths of the diversions shall not be less than that of the existing way unless otherwise agreed with the Tram Maintainer, and, if requested by the Client, with the Operator and CEC or the owner of the private road.

12.2.5 Diversion routes shall be constructed in advance of any interference with the existing ways, shall be kept as short as reasonably practicable and shall be maintained by the Tram Maintainer to provide adequately for the traffic flows. All diversion routes shall be removed and the road returned to the Client and CEC as soon as is reasonably practical after completion of the Maintenance Services. Liaison shall be undertaken with the Client and CEC regarding any special events such as the Edinburgh Festival, Christmas, New Year, sporting events and filming which might interact with the diversions.

12.2.6 Adequate horizontal clearance of 0.6 metres minimum shall be provided from the kerb line, to avoid fouling by vehicles. The minimum headroom beneath any projection over the road shall be 5.3 metres.

12.3 Parking Provision for Construction Traffic

12.3.1 Areas and locations of parking provision for site and construction traffic shall be agreed by the Tram Maintainer with the Client and CEC prior to the commencement of the Maintenance Services.

12.4 Maintenance and Repair of the Road

12.4.1 The Tram Maintainer shall take every reasonable precaution to prevent its operations from unnecessarily damaging the roads and footpaths within the Site and in the vicinity of the Maintenance Services.

12.4.2 The Tram Maintainer shall carry out all Maintenance Services as are necessary to maintain the roads and footpaths affected by the Maintenance Services in a safe and serviceable condition to the reasonable satisfaction of the Client, the Operator and CEC.

12.4.3 Reinstatements of the road shall be carried out in accordance with the RAUC(S) "*Specification for the Reinstatement for Openings of Roads*", October 2003.

12.5 Existing Street Furniture

12.5.1 No street furniture or other features within the vicinity of the Site and the Maintenance Services, but outwith the area covered by the Tram Legislation shall be unnecessarily disturbed or altered by the Maintenance Services. Any damage to street furniture consequent upon construction activities connected with the Maintenance Services shall be reported to the Client and the appropriate owner or authority (unless the appropriate owner cannot be identified) immediately on discovery of the damage. Any damage shall be replaced or made good as soon as practicably possible and to the reasonable satisfaction of the owner of the street furniture or other feature.

12.5.2 Any street furniture or other obstructions outside the area to be occupied by the Tram Maintainer but which are required to be moved in order to gain access to the Maintenance Services shall, subject to the prior consent of the owner thereof, be removed and reinstated or replaced as appropriate, on completion of the Maintenance Services. Any costs associated therewith shall be borne by the Tram Maintainer, including the costs of reinstatement or replacement.

12.6 Vehicle Movements and Access to the Site

12.6.1 The Tram Maintainer and its Sub-Contractors and suppliers moving loads, construction plant, materials and spoil (including vehicles used for carrying such when empty) shall limit the use of the public roads for such purposes as far as reasonably practicable.

12.6.2 All access routes shall be agreed with the Client and CEC prior to the commencement of the relevant part of the Tram Maintainer Works.

12.6.3 Access (which is deemed to include both the route and entrance to any Work Site) by lorries shall be as agreed with the Client, CEC and the Lothian and Borders Police. Access to and egress from the Site shall be carried out by initiating a left turn wherever reasonably practicable.

12.6.4 All vehicles operating on the Site shall be fitted with roof mounted yellow flashing beacons and reversing alarms.

12.6.5 The Tram Maintainer shall take all reasonable measures to ensure that delivery vehicles do not remain stationary on the road unnecessarily prior to

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entering the Site. In exceptional circumstances, for example where the Site is very constrained, it may be necessary to have the potential for a limited number of vehicles to stand on the road. The location of such standing areas their size and the duration of any standing periods shall be subject to prior agreement with the Client, CEC and the Lothian and Borders Police.

12.6.6 The Tram Maintainer shall ascertain and comply with any restrictions in respect of abnormal load routes as they may affect access to the Site.

12.7 Provision, Erection and Maintenance of Traffic Safety and Control (Traffic Safety Measures)

12.7.1 The Tram Maintainer shall provide, erect and maintain such traffic signs, road markings, lamps, barriers and traffic control signals and such other measures as may be necessitated by Maintenance Services in accordance with the requirements of the Agreement and to the approval of the Client, the Operator and CEC. The Tram Maintainer shall not commence any work which affects the public road until all traffic safety measures necessitated by the work are fully operational.

12.7.2 The Tram Maintainer shall keep clean and legible at all times all traffic signs, road markings, lamps, barriers and traffic control signals and shall position, replace, reposition, cover or remove them as required by the progress of the Maintenance Services and to the reasonable requirements of the Client, the Operator and CEC.

12.7.3 The Tram Maintainer shall ensure that all barriers, footpath space and temporary footpaths (including the requirement for kerb ramps where use has to be made of the carriageway) shall comply with the requirements of the document *Inclusive Mobility A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure* issued by the Mobility and Inclusion Unit of the Department for Transport.

12.7.4 Where portable generators are used to provide power to temporary traffic signals, lighting and the like the Tram Maintainer shall ensure industry best practice be followed to minimise noise and pollution from such generators.

12.8 Implementation of the Closure of Roads and Access to Frontages

12.8.1 The Tram Maintainer shall not close any roads or private accesses until immediately before the area is required for undertaking the Maintenance Services in accordance with this Agreement and the Maintenance Programme. The Maintenance Services shall follow in the area of a temporary closure expeditiously and shall be carried out efficiently and in a continuous manner to ensure that all temporary closures are re-opened as quickly as possible.

12.8.2 The Tram Maintainer shall, in carrying out the Maintenance Services, take all reasonable precautions to prevent or reduce any disturbance or inconvenience to the owners, tenants or occupiers of adjacent properties, and to the public generally. The owners, tenants or occupiers of affected properties shall be informed of the Maintenance Services to be undertaken, their planned duration, road and access closures and alternative access routes (where required) in writing and by locally posted public notices at least one calendar month prior to work starting.

12.8.3 The Tram Maintainer shall render all necessary assistance to occupiers of premises affected by the Maintenance Services so as to enable them to accept and send out deliveries to and from their premises during their normal working hours.

12.9 Access for Emergency Vehicles

12.9.1 During Maintenance Services involving any likely disruption to roads and access routes the Tram Maintainer shall propose suitable access routes for emergency service vehicles and personnel to gain access to the Edinburgh Tram Network. These shall be agreed by the Tram Maintainer with the Client, Emergency Services, the Operator and CEC prior to the start of the Maintenance Services.

13. NOISE

13.1 Noise Control

13.1.1 The Tram Maintainer shall take all practicable measures to minimise nuisance from noise.

13.2 Communications Regarding Noise

13.2.1 The Tram Maintainer shall give seven days notice to local residents who may be adversely affected by noise from the proposed programme of Maintenance Services, providing a description of the work to be carried out, measures that will be taken to control noise or other disturbance, and the proposed hours of working.

14. VIBRATION

14.1 Vibration Control

14.1.1 The Tram Maintainer shall take all practicable measures to minimise damage caused due to vibration.

15. DUST AND AIR POLLUTION

15.1 Dust and Other Air Pollution

15.1.1 The Tram Maintainer shall take all necessary measures to avoid creating a dust nuisance during the Maintenance Services.

15.1.2 Particular consideration shall be given by the Tram Maintainer to works affecting the operations of Edinburgh Airport Limited. Details of the specific mitigation measures shall be included within the Construction Management Strategy identified under paragraph 9.2 above.

15.1.3 Measures to prevent dust shall include the following:

15.1.3.1 the hard surfacing of heavily used areas which will be kept clean by regular brushing and water spraying;

15.1.3.2 control of dust released from cutting or grinding of materials on the Maintenance Services;

15.1.3.3 the complete sheeting of all vehicles carrying dusty materials;

15.1.4 Where dust generating works are undertaken close to buildings so that there is a potential for soiling of windows and ledges with dust, the Tram Maintainer shall clean such windows and ledges as frequently as is necessary (and as a minimum, at least once per week) during periods of dust generating work and on completion of the Maintenance Services at that location. The Tram

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Maintainer shall take precautions to prevent damage occurring as a consequence of cleaning works.

15.1.5 The Tram Maintainer shall take precautions to prevent the emission of smoke or fumes from vehicles and plant. Vehicles and plant shall be well maintained and measures shall be taken by the Tram Maintainer to ensure that engines and motors are not left running for long periods when not directly in use.

16. DISPOSAL OF WASTE AND CONTAMINATED MATERIALS

16.1 Waste

16.1.1 A waste management plan (**"WMP"**) shall be developed in accordance with "*Site Waste Management Plans: Guidance for Contractors and Clients*" (DTI 2004). The Tram Maintainer shall be responsible for the preparation of the WMP to address all of the approvals and consents which require to be obtained and the control measures and mitigation measures that shall be implemented. The WMP shall be subject to the approval of the Operator and the Client. The WMP shall in particular identify:

16.1.1.1 responsibilities for waste management;

16.1.1.2 the types and quantities of waste materials likely to be generated;

16.1.1.3 measures to be taken to minimise generation of waste;

16.1.1.4 proposals for recycling and/or re-use;

16.1.1.5 measures to be adopted for management of waste on the Site including enclosure, segregation, secure storage, sorting for recovery, and other on-site handling;

16.1.1.6 proposed treatment and disposal routes; and

16.1.1.7 licensing arrangements.

16.1.2 The Tram Maintainer shall implement and comply with the WMP.

16.1.3 The Tram Maintainer shall undertake monthly audits to demonstrate compliance with Statutory Requirements and the WMP. The Tram Maintainer shall set out its audit programme in the WMP and shall provide copies of the audit report to the Operator and Tram Maintainer.

17. PROTECTION OF THE WATER ENVIRONMENT

17.1 Waste Water and Run-off

17.1.1 The Tram Maintainer shall ensure that there shall be no washout from the Maintenance Services into watercourses.

17.1.2 No water shall be discharged into watercourses, but shall be filtered prior to discharge, or discharged onto a grassy area to soak away.

17.1.3 Waste water and site discharges to surface water or sewer shall only be permitted where the effluent quality and discharge location is acceptable to SEPA or Scottish Water (as appropriate). Water Environment (Controlled Activities) (Scotland) Regulations 2005 ("CAR") discharge authorisation shall be obtained by the Tram Maintainer if required prior to discharge.

17.1.4 The Tram Maintainer shall take suitable precautions to prevent the entry of pollutants into any bodies of water, and report any incidents to SEPA and Scottish Water.

17.1.5 Procedures for responding to potentially polluting shall be implemented in accordance with SEPA guidance.

17.2 Storage of Polluting Materials

17.2.1 The Tram Maintainer shall make provision to ensure that oil drums and containers or other potential contaminants are properly isolated and bunded and that no oil or other contaminants are allowed to reach watercourses or groundwater, including aquifers. Oil storage containers (both fixed and mobile) with a 200 litre capacity or greater shall be stored in compliance with the Water Environment (Oil Storage) (Scotland) Regulations 2006 (where applicable). Drip trays and other secondary containment measures shall be used by the Tram Maintainer where necessary to prevent spills during refuelling and operation of small static and mobile equipment. Storage locations for such materials shall be positioned away from watercourses. All surface water or other contaminated water which accumulates in bunds shall be removed by the Tram Maintainer by manually controlled positive lift pumps, and not by means of a gravity drain.

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17.2.2 Refuelling shall be carried out by the Tram Maintainer in a designated area which is away from watercourses and drains.

17.2.3 Spill response kits containing equipment appropriate to the quantity and types of materials present on site shall be available for use by the Tram Maintainer in the event of a fuel spillage. Personnel shall be trained in their use.

17.3 Works in the Vicinity of Water

17.3.1 The Tram Maintainer shall take suitable precautions to prevent the entry of pollutants, including sediments and dusts, into any bodies of water, and report any incidents to SEPA.

17.4 Water Environment (Controlled Activity) (Scotland) Regulations 2005

Without prejudice to the foregoing terms of this paragraph 15, the Tram Maintainer shall comply with the terms of CAR where relevant to the Tram Maintainer.

18. ECOLOGY

18.1 Encroachment into Wildlife Areas

18.1.1 The Tram Maintainer shall take all reasonably practicable measures to minimise harm to and disturbance of wildlife caused by noise and vibration, dust and other air pollution.

18.1.2 Approval shall be obtained by the Tram Maintainer from Scottish Natural Heritage, SEPA, Scottish Executive Environment Group Wildlife Habitats Division ("**SEEG WHD**") and CEC, for detailed method statements for any Maintenance Services proposed at designated sites, including Special Protection Areas ("**SPA**")/'Ramsar' sites, Sites of Special Scientific Interest ("**SSSI**"), Sites of Interest for Nature Conservation ("**SINC**") and wildlife sites.

18.1.3 Applications for approval shall be made by the Tram Maintainer at least one calendar month prior to relevant Maintenance Services commencing.

18.2 Protected Species

18.2.1 In advance of any works, the Tram Maintainer shall employ suitably qualified professionals to check all working areas and any land within 30 metres of the

boundary of the working area (unless there is a boundary with a private third party within the 30 metres, in which case no checks shall be taken within the private land) for the presence of species protected by statute. Where protected species are identified, appropriate mitigation measures shall be agreed between the Tram Maintainer and the relevant authorities.

18.2.2 Where any habitat has to be cleared in the breeding bird season, typically March to June or July for most species, the habitat must be checked by the Tram Maintainer prior to removal for the presence of nesting wild birds, their nests and eggs and young. If found, no habitat shall be removed until nesting is complete, or unless other suitable mitigation is agreed in advance between the Tram Maintainer and Scottish Natural Heritage.

18.2.3 The Tram Maintainer shall be responsible for obtaining a licence from Scottish Natural Heritage for any work that may cause disturbance to a badger or involves the damage or destruction of a sett. Licence applications shall be made by the Tram Maintainer for any works within 10m, heavy machinery operating within 30m, and no works shall proceed until the required licences are obtained.

18.2.4 The Tram Maintainer shall be responsible for obtaining a licence from SEEG WHD for any work which may cause disturbance to otters or involve damage or destruction to an otter holt or lying up site or if any Maintenance Services are proposed within 30m of an otter holt or lying up site.

18.2.5 The Tram Maintainer shall be responsible for ensuring that all bridges and other built structures and mature and dead trees within the working area shall be checked by a licensed bat handler for their use by roosting or hibernating bats prior to felling or other potentially damaging operations. If found, mitigation measures shall be agreed between the Tram Maintainer, Scottish Natural Heritage and SEEG WHD and implemented, including review of the design to seek ways of avoiding loss of the roost. If avoidance is not possible, a licence shall be applied for by the Tram Maintainer from SEEG WHD for disturbance to a European Protected Species and / or destruction or damage to a breeding site or resting place. Alternative roost sites shall be provided in advance of any loss. Any loss of feeding habitat shall be compensated for by new habitat creation as detailed in the landscape and habitat management plan prepared and issued to the Tram Maintainer by the Client. All mitigation

measures for protected species shall be installed by the Tram Maintainer as early as possible so that use can be established at an early stage.

18.2.6 Where appropriate use of mitigation measures by target species will be positively encouraged using a variety of techniques e.g. feeding.

18.2.7 The Tram Maintainer's personnel and personnel engaged by any Sub-Contractors shall be briefed by a suitably qualified professional on measures for protected species as part of site induction.

18.3 Protection of Mature Trees

18.3.1 For the purposes of this paragraph, "trees" are defined as trees with a diameter of over 10cm girth at a height of 1.5 m above ground level.

18.3.2 All tree surgery operations shall comply with the British Standard (BS) 3998 "*Recommendations for Tree Work*" and a method statement addressing safety of workers and the public shall be prepared by the Tram Maintainer and implemented.

18.3.3 Felling shall be carried out in accordance with the Forestry Commission document "*Forest and Water Guidelines 2004*", which relates to the influence that woodland and trees can have on the freshwater environment, insofar as this is reasonably practicable and to the extent that they are applicable to the Maintenance Services.

18.3.4 Prior to felling, the Tram Maintainer shall procure that trees suitable as bat roosts shall be checked by a licensed bat handler for roosting and hibernating bats, and should any be identified, mitigation measures shall be agreed by the Tram Maintainer with Scottish Natural Heritage and SEEG WHD and the Tram Maintainer shall obtain any relevant licences.

18.3.5 Woody material generated shall be retained on the site as far as is reasonably possible and used as part of habitat creation measures.

18.4 Control of Invasive and Alien Species

18.4.1 If any invasive alien species listed in Schedule 9, Part II of the Wildlife and Countryside Act 1981 (as amended), are identified along the route, including Japanese Knotweed (*Fallopia japonica*), Giant Hogweed (*Heracleum*

mantegazzianum) or Himalayan Balsam (*Impatiens glandulifera*), the Tram Maintainer shall develop a strategy to manage their presence. The strategy will ensure appropriate treatment of invasive alien species in accordance with approved methodology and will prevent the spread of the species within and outside the Edinburgh Tram Network

18.4.2 The Infraco shall comply with the DEFRA document "*Helping to Prevent the Spread of Invasive Non-native Species, Horticultural Code of Practice*" (March 2005), in so far as this is reasonably practicable and applicable to the Maintenance Services. Invasive alien species listed on Schedule 9, Part II of the Wildlife and Countryside Act 1981 as amended by the Nature Conservation (Scotland Act) 2004, will be treated in accordance with the Environmental Protection Act 1990. Japanese knotweed and giant hogweed and soils containing particles of these plants are regarded as controlled waste.

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 19 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 19

TIE AND CEC POLICIES

Tram Project Environmental & Sustainability Policy Statement

The Edinburgh Tram project will deliver a new tram network for the City of Edinburgh.

tie recognises that the achievement of excellence in the delivery of such projects is underpinned by a systematic approach where concern for environmental and sustainability matters is fundamental and forms an integral part of its operations.

tie will adopt an environmental management system which conforms to the principles and requirements of BS EN ISO 14001 2004 Environmental Management Systems.

The management team:

- Is committed to good environmental management practice including building sustainability into the project and the prevention of pollution.
- Shall promote a positive culture on environmental and sustainability issues through leadership and communication.
- Use effective communication within the team as a primary enabler of environmental good practice.
- Shall put in place suitable management arrangements for ensuring environmental matters are integral to the execution of the Tram project.
- Is committed to continual improvement of its environmental management arrangements.
- Will set environmental and sustainability objectives which shall be monitored and reviewed for effectiveness and suitability.
- Shall work with the relevant statutory bodies to comply with or exceed applicable legislation, regulations and contractual obligations.

It is recognised that everyone involved with **tie** has responsibilities for reducing our impact on the environment, good environmental practice must be considered a core value that is to be taken into account by all tie personnel and tie suppliers in all those activities they undertake for tie.

This policy will be communicated to **tie** personnel and **tie** suppliers so ensuring that they are aware of their own responsibilities within it. Additionally it will be made available to other interested third parties who may require it.

This policy shall be reviewed annually for continuing suitability.

Signed

Matthew Crosse
Project Director
27th February 2007

DOC NO	VERSION	STATUS	DATE	PROJECT	SHEET
DEL HSQE 101	2.0	Approved	27 Feb 07	Edinburgh Tram Network	1 of 1

Tram Project Safety Policy Statement

The Edinburgh Tram project will deliver a new tram network for the City of Edinburgh

The project will adopt a safety management system which conforms to the principles and requirements of OHSAS **18001** 1999 Occupational health and safety management systems - Specification or **HSG65: 2000** Successful Health & Safety Management

tie recognises that the control of health and safety aspects arising from the Edinburgh Tram project is an essential feature of our efficient operation

tie also recognises and accepts the responsibility of the Health and Safety at Work etc Act 1974 and associated legislation to provide and maintain safe working conditions and a healthy environment for all persons who may be affected by the Edinburgh Tram project The management team

- shall provide plant and systems of work that are safe and free from risks to health
- shall provide such information, instruction, training and supervision as is necessary to ensure the health and safety at work of all employees and those who may be affected by our work,
- shall maintain in a condition that is safe and free from risk to health any place of work under **tie**'s control and provide adequate facilities and arrangements for the welfare of employees at work
- shall safeguard visitors to all areas within **tie**'s control and any member of the public who may be affected by **tie**'s activities
- shall ensure that all information concerning health and safety pertaining to the Edinburgh Tram project is provided, where appropriate, to external sources
- shall encourage and promote a safety culture which will show best practises on the Edinburgh Tram project by showing leadership and commitment to health and safety issues
- set health and safety objectives which shall be monitored and reviewed for effectiveness and suitability

It is recognised that everyone involved with the Edinburgh Tram project is responsible for health and safety Health and safety must be considered as a core value that is to taken into account by Edinburgh Tram project staff and suppliers in all their project related activities

This policy shall be communicated to Edinburgh Tram project staff and suppliers

This policy shall be reviewed annually for continuing suitability

Signed

Matthew Crosse
Project Director
26th July 2007

DOC NO	VERSION	STATUS	DATE	PROJECT	SHEET
DEL HSQE 105	3 0	Approved	26 Jul 07	Edinburgh Tram Network	1 of 1

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Cover Approval Sheet

Company Policy

Doc Ref.	PS 625
Rev	0.0
Status	Approved
Owner	HR Department

DRUGS & ALCOHOL POLICY

Document Approval

	Signature	Title	Date
Prepared By:	[redacted]	tie HSQE Manager	02/08/07
Approved By:		Engineering & Procurement Director	02/08/07
Authorised By:		HR & Corporate Affairs Director	02/08/07

Confidential and Proprietary Information of tie Limited

tie has a responsibility to provide a safe and healthy working environment and recognises that this may be jeopardised by those who misuse alcohol and/or drugs within the working environment, or in a way that may affect themselves or others

The tie policy reflects the requirements of the Transport and Works Act 1992

tie will take all reasonable steps to ensure that employees, consultants and contractors are made aware of the content of this statement, legislation, standards and client requirements and the implications therein

Specific arrangements are detailed in the tie Drugs and Alcohol procedure

It is a requirement of tie that no employee, consultant or contractor shall

- Report or endeavour to report for duty in an unfit state due to alcohol or illegal drugs abuse;
- Be in possession of alcohol or illegal drugs in the workplace
- Consume alcohol or illegal drugs whilst on duty

When medication is prescribed or advised to an employee, they must advise the medical practitioner or pharmacist of the nature of their work so that appropriate information on the possible affects and the potential effect on workplace safety can be given. The employee must inform their manager and provide relevant and accurate details of the medication involved in order that they may obtain advice on what, if any, restrictions apply. The employee must comply with any restrictions imposed by their manager

tie policy permits assistance with the rehabilitation of employees that voluntarily seek help for alcohol or drug dependency or misuse problems. Staff must, however, seek assistance at the earliest opportunity. Subsequent discovery or disclosure prompted by an impending screening will not be acceptable

A programme of screening is in place within tie to

- Detect the use of drugs and/or alcohol by potential employees via employment medical screening
- Detect the use of drugs and/or alcohol by any person(s) via "random testing"
- Detect the use of drugs and/or alcohol by any person(s) involved in a safety critical incident via "for cause" testing where there are grounds to suspect that the actions of the person(s) led to the incident; and
- Detect the use of drugs and/or alcohol via "for cause" testing where abnormalities of behaviour prompt managerial intervention

tie require full compliance with this policy and shall take the appropriate disciplinary action in the event of any infringement

[redacted]

Willie Gallagher
Executive Chairman
02 August 2007

1.0 DOCUMENT CHANGE CONTROL HISTORY

Revision	Date	CR No	Reason for Change	Authorisation
A	16/11/2006		1st Issue of new document	
0.0	02/08/2007	0015	Re-draft in company template	02/08/2007

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Tram Project Quality Policy Statement

The Edinburgh Tram project will deliver a new tram network for the City of Edinburgh.

The project will adopt a quality management system which conforms to the principles and requirements of BS EN ISO 9001:2000 Quality Management Systems.

tie recognises that the achievement of the objectives set for the Edinburgh Tram project requires that the project is underpinned by a systematic approach with a 'right first time' attitude. The management team:

- shall promote a positive culture through leadership and communication;
- use effective communication within the team as a primary enabler of quality;
- shall put in place suitable management arrangements for the effective execution of the Edinburgh Tram project;
- is committed to continual improvement of its management arrangements throughout the project life cycle;
- set quality objectives which shall be monitored and reviewed for effectiveness and suitability;
- will deliver a tram network that is fit for purpose, meeting the technical requirements of the project's stakeholders and being delivered to time and cost.

It is recognised that everyone involved with the Edinburgh Tram project is responsible for the quality of the delivery. Quality must be considered as a core value that is to taken into account by Edinburgh Tram project staff and suppliers in all their project related activities.

This policy shall be communicated to Edinburgh Tram project staff and suppliers.

This policy shall be reviewed annually for continuing suitability.

Signed

Matthew Crosse
Project Director
27th February 2007

DOC NO	VERSION	STATUS	DATE	PROJECT	SHEET
DEL HSQE 103	2.0	Approved	27 Feb 07	Edinburgh Tram Network	1 of 1

EDINBURGH TRAM LINES ONE AND TWO

NOISE AND VIBRATION POLICY

DECEMBER 2005

1 INTRODUCTION

This policy statement sets out the approach the promoter proposes to adopt to mitigate noise from the operation of Edinburgh Tram Lines One and Two. Impacts during construction will be covered by the Edinburgh Tram Lines One and Two Code of Construction Practice.

This policy has been developed in the absence of any statutory requirements for noise mitigation from rail systems in Scotland. Unlike the situation for new roads throughout the UK, and for new railways in England and Wales, there are no noise insulation regulations or other statutory requirements to control noise from railways in Scotland. The promoter therefore proposes to implement a noise scheme based upon non-statutory standards set out in this policy statement. These are set at significantly lower noise levels than apply for statutory noise insulation elsewhere and mitigation will be provided wherever it is reasonably practicable to do so. It is important to recognise that this is a non-statutory arrangement and there will be cases where there are practical limitations as to what can be achieved. This Policy clarifies how these circumstances will be addressed.

2 APPROACH

The promoter will undertake measures to mitigate significant noise impacts for residents and other noise sensitive receivers in the vicinity of the routes, following a tiered approach. In this, different options for mitigation will be considered in turn, taking into account what is reasonably practicable and acceptable to affected parties in the circumstances of each location potentially affected by noise. This policy will be applied in accordance with the principle of best practicable means [1].

[1] Best Practicable Means are defined in section 72 of the Control of Pollution Act 1974 as those measures which, [illegible]

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- Firstly, the promoter will define and apply strict noise emission standards when procuring all tram vehicles.

- Secondly, the promoter will use all reasonably practicable measures to avoid significant noise impacts through design of the track and trackbed.

- Thirdly, where these measures are not sufficient to mitigate significant impacts, the promoter will provide noise barriers to attenuate noise between the track and sensitive receivers.

- Fourthly, the promoter will offer noise insulation within residential properties where, after all reasonably practicable and acceptable attenuation at source is provided, residual noise levels would exceed given thresholds.

Noise sensitive receivers are defined to include all types of dwellings, schools, libraries, hospitals, theatres and concert halls, and places of worship currently bordering the route.

In defining what is reasonably practicable (or what constitutes best practicable means), the promoter will take into account engineering feasibility, maintenance of driver sight lines, safe operation of the tram, safe interaction with road traffic, the safety of pedestrians and cyclists, and security and crime considerations. It will also take into account the cost of any proposed mitigation measure and the level of benefit achieved in terms of number of properties affected, the degree of noise reduction and the resulting noise levels, such that costs are not disproportionate to the benefits achieved. In defining what is acceptable, the promoter will consult affected residents and take into account impacts on their amenity and that of other parties such as recreational user of facilities, and any other environmental concerns.

The application of these principles is further described below. A key aspect of their application is the definition of what constitutes a significant impact and this is set out in the next section before describing how this applies to the selection of appropriate noise mitigation measures at the four levels in the mitigation hierarchy.

3 *DEFINITION OF SIGNIFICANT NOISE IMPACT*

As noted above there are no statutory requirements for mitigating tram noise in Scotland. It is therefore necessary to define criteria to establish when noise mitigation should be considered. These have been based on the approach used in the Environmental Impact Assessments for Edinburgh Tram Lines

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One and Two. The likelihood of exceeding these criteria will be determined in advance of construction by noise modelling [1].

Options for noise mitigation will start to be considered if the free-field noise level outside the window of any sensitive receiver exceeds either of the following noise target levels:

- for daytime noise, $L_{Aeq\ 0700\text{-}2300\ hours}$ 55 dB;

or

- for night time noise, $L_{Aeq\ 2300\text{-}0700\ hours}$ 45 dB

Where tram noise is predicted to be more than 3dB [2] above either of these thresholds, mitigation measures to reduce the adverse impact of noise will be considered according to the extent to which the pre-existing ambient ($L_{Aeq\ 1\ hour}$) noise level is increased, as follows

- Increase of 3-5 dB - mitigation considered on a case by case basis, and implemented if reasonably practicable and acceptable to affected parties.

- Increase of greater than 5 dB – mitigation implemented if reasonably practicable and acceptable to affected parties.

4 THE MITIGATION HIERARCHY

4.1 TRAM VEHICLE PROCUREMENT

The promoter will define and apply strict noise emission standards in the procurement of all tram vehicles. These will be decided following a review of achievable performance standards at the time of procurement of the tram vehicles and will be designed to reflect prevailing good standards at the time. The tram vehicle and the tram rails will be designed in a coordinated manner, so as to achieve the required performance standard in the circumstances to be encountered on the Edinburgh Tram system.

4.2 TRACK DESIGN

The promoter will adopt all reasonably practicable and acceptable measures to reduce noise at source by design of the track to attenuate noise. A variety of

(1) Predictions will be made at the final design stages by modelling and will take into account details of the track alignment and surrounding ground form between the track and the nearest building facade, the presence of natural barriers, the selected tram vehicle and the operating schedule.
(2) Exceedances of up to 3 dB are considered to be of marginal significance. In line with current guidance, 3 dB is taken as the limit of perception of change in environmental noise

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measures may be available to contribute to noise reduction at source and the promoters will consider all current developments in the field in developing the final design for the scheme. These will include the use of grass track which is already planned along some sections of the route and installation of acoustic plenum structures alongside the tram rails if this is acceptable to HM Railways Inspectorate.

4.3 *Noise Barriers*

Where significant noise impacts are still predicted to occur, the promoter will consider the provision of noise screening structures within the tram corridor. The dimensions (length and height) and form of each structure will be determined by modelling and in consultation with affected properties. Where an attenuating structure proves not to be reasonably practicable or acceptable, or is only possible with reduced dimensions, the promoter will consider whether there are additional special measures that can be taken to mitigate noise that are proportionate in the circumstances of the case.

4.4 *Noise Insulation*

If approved the provisions of the Edinburgh Tram Line One and Two Bills will empower the promoter to set up a noise insulation scheme. This scheme will be as defined in the Noise Insulation (Railways and Other Guided Systems) Regulations 1996, which apply in England and Wales. Under this scheme noise insulation will be provided for residential properties, if tram noise reaches the qualifying façade levels:

- 68 dB $L_{Aeq\ 0600-0000\ hours}$ during the day and evening; and
- 63 dB $L_{Aeq\ 0000-0600\ hours}$ at night

Further details of the qualifying criteria and of the noise insulation package that will be offered are as set out in the Regulations.

Also, although it is intended that wheel squeal [1] on bends will be minimised through good design and operational practices, to address the possibility that this characteristic form of noise could, if it were to occur, cause sleep disturbance at night in residential properties, the promoter will also have discretionary powers to offer noise insulation (as otherwise prescribed under the Regulations) to affected residential properties taking account of the frequency and level of wheel squeal.

In addition, to address the possibility that for a particular reason a high peak noise level from the tram cannot be mitigated in an area where existing peak noise is currently low, noise insulation will be offered irrespective of tram L_{Aeq}

(1) Wheel Squeal is the distinctive tonal noise sometimes generated on very tight bends where tram wheel/track geometry and conditions are poor.

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levels as follows. Where the tram free-field level exceeds $L_{Amax\ slow}$ 82 dB more than twice an hour at night (2300-0700 hours) insulation will be offered provided the tram $L_{Amax\ slow}$ is above the pre-existing ambient $L_{Amax\ slow}$ by at least 3dB (or 5dB at the discretion of the promoter, depending on frequency and local circumstances). The ambient $L_{Amax\ slow}$ will be the night-time $L_{Amax\ slow}$ from all other noise sources that is routinely exceeded at least twice an hour in the hours when the tram operates. This noise insulation offer would be over and above any others that may be offered under this policy.

5 *VIBRATION*

Trackforms will be designed adjacent to sensitive receptor buildings using Best Practicable Means to keep within the guideline levels of Vibration Dose Value (VDV) given in BS6472: 1992 below which the probability of adverse comments is low:

- Day (0700-2300 hours): 0.2 $m/s^{1.75}$; and
- Night (2300-0700 hours): 0.13 $m/s^{1.75}$.

In addition, the specification for the design of the tramway will include a Peak Particle Velocity (PPV) level no higher than 2mm/s at 2m from the rails.

6 *MAINTENANCE AND MONITORING*

The promoter is committed to maintaining the tram system, and in particular the wheel and rail surfaces, so as to minimise noise at sensitive receivers. For each section of the route a noise and vibration monitoring scheme will be established and results will be regularly reported. The noise and vibration monitoring scheme will be agreed with the City of Edinburgh Council's Environmental and Consumer Services department. Appendix 1 gives details of the proposed noise monitoring system and how it will avoid unnecessary increase in noise levels.

The Promoter will give due notice to the City of Edinburgh Council's Environmental and Consumer Services department and potentially affected residents of plans to carry out any potentially noisy maintenance activities at night such as rail grinding.

The operator will establish a policy on the appropriate use of vehicle audible warning devices in accordance with safe working practices, which will be

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reviewed from time to time, for example if repeated complaints are received in certain areas.

The operator will co-operate with the City of Edinburgh Council's Environmental and Consumer Services Department in establishing appropriate sound levels for tram stop Public Address systems if complaints are received from occupiers of noise sensitive premises

APPENDIX 1

NOISE MONITORING PROCEDURES

A list of representative noise monitoring locations will be agreed with the City of Edinburgh Council's Environmental and Consumer Services department in consultation with local residents groups. The list will be reviewed from time to time.

Tram noise measurements will be carried out as prescribed below in the following circumstances.

- During commissioning of the scheme
- 3-6 months after commencement of passenger service.
- At intervals not exceeding 1 year thereafter.
- Upon reasonable request by the City of Edinburgh Council's Environmental and Consumer Services department.

At the agreed monitoring locations, measurements will be taken of the $L_{Amax,\ Slow}$ and SEL noise levels of a pass-by of each of the vehicles on each track, under normal operation. In the case of new works, the rails will be free from visible defects. The results of the noise monitoring will be published on the internet.

At any location, if the mean of the noise levels of all the vehicles measured on any one track is found to be 3 dB(A) or more greater than the mean measured on any previous occasion for an equivalent set of vehicles, then the track will be reground, or other appropriate work will be undertaken, as soon as reasonably practicable, assuming noise from particular vehicles has not skewed either average.

Monitoring will also be used to prevent any particular vehicle becoming excessively noisy, as follows. In the event that the maximum noise level of any vehicle is found to be 5 dB(A) or more greater than the mean then the wheels of that vehicle will be scheduled for re-turning as soon as reasonably practicable.

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 20 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 20

REPORTING PERIOD END DATES

PERIOD END DATES (all Saturdays except 31st March)

CONSTRUCTION PERIOD					
	2007 / 08	**2008 / 09**	**2009 / 10**	**2010 / 11**	**2011 / 12**
1	28/04/2007	26/04/2008	02/05/2009	01/05/2010	30/04/2011
2	26/05/2007	24/05/2008	30/05/2009	29/05/2010	28/05/2011
3	23/06/2007	21/06/2008	27/06/2009	26/06/2010	25/06/2011
4	21/07/2007	19/07/2008	25/07/2009	24/07/2010	23/07/2011
5	18/08/2007	16/08/2008	22/08/2009	21/08/2010	20/08/2011
6	15/09/2007	13/09/2008	19/09/2009	18/09/2010	17/09/2011
7	13/10/2007	11/10/2008	17/10/2009	16/10/2010	15/10/2011
8	10/11/2007	08/11/2008	14/11/2009	13/11/2010	12/11/2011
9	08/12/2007	06/12/2008	12/12/2009	11/12/2010	10/12/2011
10	05/01/2008	03/01/2009	09/01/2010	08/01/2011	07/01/2012
11	02/02/2008	31/01/2009	06/02/2010	05/02/2011	04/02/2012
12	01/03/2008	28/02/2009	02/03/2010	05/03/2011	03/03/2012
13	31/03/2008	31/03/2009	31/03/2010	31/03/2011	31/03/2012

SERVICE PERIOD					
	2012 /13	**2013 / 14**	**2014 / 15**	**2015 / 16**	**2016 / 17**
1	28/04/2012	27/04/2013	26/04/2014	02/05/2015	30/04/2016
2	26/05/2012	25/05/2013	24/05/2014	30/05/2015	28/05/2016
3	23/06/2012	22/06/2013	21/06/2014	27/06/2015	25/06/2016
4	21/07/2012	20/07/2013	19/07/2014	25/07/2015	23/07/2016
5	18/08/2012	17/08/2013	16/08/2014	22/08/2015	20/08/2016
6	15/09/2012	14/09/2013	13/09/2014	19/09/2015	17/09/2016
7	13/10/2012	12/10/2013	11/10/2014	17/10/2015	15/10/2016
8	10/11/2012	09/11/2013	08/11/2014	14/11/2015	12/11/2016
9	08/12/2012	07/12/2013	06/12/2014	12/12/2015	10/12/2016
10	05/01/2013	04/01/2014	03/01/2015	09/01/2016	07/01/2017

11	02/02/2013	01/02/2014	31/01/2015	06/02/2016	04/02/2017
12	02/03/2013	01/03/2014	28/02/2015	05/03/2016	04/03/2017
13	31/03/2013	29/03/2014	31/03/2015	31/03/2016	31/03/2017
	2017 / 18	**2018 / 19**	**2019 / 20**	**2020 / 21**	**2021 / 22**
1	29/04/2017	28/04/2018	27/04/2019	02/05/2020	01/05/20
2	27/05/2017	26/05/2018	25/06/2019	30/05/2020	29/05/2021
3	24/06/2017	23/06/2018	22/06/2019	27/06/2020	26/06/2021
4	22/07/2017	21/07/2018	20/07/2019	25/07/2020	24/07/2021
5	19/08/2017	18/08/2018	17/08/2019	22/08/2020	21/08/2021
6	16/09/2017	15/09/2018	14/09/2019	19/09/2020	18/09/2021
7	14/10/2017	13/10/2018	12/10/2019	17/10/2020	16/10/2021
8	11/11/2017	10/11/2018	09/11/2019	14/11/2020	13/11/2021
9	09/12/2017	08/12/2018	07/12/2019	12/12/2020	11/12/2021
10	06/01/2018	05/01/2019	04/01/2020	09/01/2021	08/01/2022
11	03/02/2018	02/02/2019	01/02/2020	06/02/2021	05/02/2022
12	03/03/2018	02/03/2019	29/02/2020	06/03/2021	05/03/2022
13	31/03/2018	31/03/2019	31/03/2020	31/03/2021	31/03/2022
	2022 / 23	**2023 / 24**	**2024 / 25**	**2025 / 26**	**2026 / 27**
1	30/04/2022	29/02/2023	27/04/2024	26/04/2025	02/05/2026
2	28/05/2022	27/05/2023	25/05/2024	24/05/2025	30/05/2026
3	25/06/2022	24/06/2023	22/06/2024	21/06/2025	27/06/2026
4	23/07/2022	22/07/2023	20/07/2024	19/07/2025	25/07/2026
5	20/08/2022	19/08/2023	17/08/2024	16/08/2025	22/08/2026
6	17/09/2022	16/09/2023	14/09/2024	13/09/2025	19/09/2026
7	15/10/2022	14/10/2023	12/10/2024	11/10/2025	17/10/2026
8	12/11/2022	11/11/2023	09/11/2024	08/11/2025	14/11/2026
9	10/12/2022	09/12/2023	07/12/2024	06/12/2025	12/12/2026
10	07/01/2023	06/01/2024	04/01/2025	03/01/2025	09/01/2027
11	04/02/2023	03/02/2024	01/02/2025	31/01/2026	06/02/2027
12	04/03/2022	02/03/2024	01/03/2025	28/02/2026	06/03/2027
13	31/03/2022	31/03/2024	31/03/2025	31/03/2026	31/03/2027

Notes

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- The Reporting Periods run each year from 1st April to 31st March.
- Period One (P1) starts the first of April and generally finishes on the 4th Saturday following that date.
- Period Two (P2) starts on the next day (generally the 4th Sunday) and finishes on the 4th Saturday from that date.
- Periods Three through to Twelve follow at four weekly intervals.
- Period Thirteen starts the Sunday after the end Saturday of P12 and finishes on 31st March.

[redacted]

[redacted]

Director/Authorised Signatory
tie LIMITED

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 20 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 20

REPORTING PERIOD END DATES

PERIOD END DATES (all Saturdays except 31st March)

CONSTRUCTION PERIOD					
	2007 / 08	**2008 / 09**	**2009 / 10**	**2010 / 11**	**2011 / 12**
1	28/04/2007	26/04/2008	02/05/2009	01/05/2010	30/04/2011
2	26/05/2007	24/05/2008	30/05/2009	29/05/2010	28/05/2011
3	23/06/2007	21/06/2008	27/06/2009	26/06/2010	25/06/2011
4	21/07/2007	19/07/2008	25/07/2009	24/07/2010	23/07/2011
5	18/08/2007	16/08/2008	22/08/2009	21/08/2010	20/08/2011
6	15/09/2007	13/09/2008	19/09/2009	18/09/2010	17/09/2011
7	13/10/2007	11/10/2008	17/10/2009	16/10/2010	15/10/2011
8	10/11/2007	08/11/2008	14/11/2009	13/11/2010	12/11/2011
9	08/12/2007	06/12/2008	12/12/2009	11/12/2010	10/12/2011
10	05/01/2008	03/01/2009	09/01/2010	08/01/2011	07/01/2012
11	02/02/2008	31/01/2009	06/02/2010	05/02/2011	04/02/2012
12	01/03/2008	28/02/2009	02/03/2010	05/03/2011	03/03/2012
13	31/03/2008	31/03/2009	31/03/2010	31/03/2011	31/03/2012

SERVICE PERIOD					
	2012 /13	**2013 / 14**	**2014 / 15**	**2015 / 16**	**2016 / 17**
1	28/04/2012	27/04/2013	26/04/2014	02/05/2015	30/04/2016
2	26/05/2012	25/05/2013	24/05/2014	30/05/2015	28/05/2016
3	23/06/2012	22/06/2013	21/06/2014	27/06/2015	25/06/2016
4	21/07/2012	20/07/2013	19/07/2014	25/07/2015	23/07/2016
5	18/08/2012	17/08/2013	16/08/2014	22/08/2015	20/08/2016
6	15/09/2012	14/09/2013	13/09/2014	19/09/2015	17/09/2016
7	13/10/2012	12/10/2013	11/10/2014	17/10/2015	15/10/2016
8	10/11/2012	09/11/2013	08/11/2014	14/11/2015	12/11/2016
9	08/12/2012	07/12/2013	06/12/2014	12/12/2015	10/12/2016
10	05/01/2013	04/01/2014	03/01/2015	09/01/2016	07/01/2017

11	02/02/2013	01/02/2014	31/01/2015	06/02/2016	04/02/2017
12	02/03/2013	01/03/2014	28/02/2015	05/03/2016	04/03/2017
13	31/03/2013	29/03/2014	31/03/2015	31/03/2016	31/03/2017
	2017 / 18	**2018 / 19**	**2019 / 20**	**2020 / 21**	**2021 / 22**
1	29/04/2017	28/04/2018	27/04/2019	02/05/2020	01/05/20
2	27/05/2017	26/05/2018	25/06/2019	30/05/2020	29/05/2021
3	24/06/2017	23/06/2018	22/06/2019	27/06/2020	26/06/2021
4	22/07/2017	21/07/2018	20/07/2019	25/07/2020	24/07/2021
5	19/08/2017	18/08/2018	17/08/2019	22/08/2020	21/08/2021
6	16/09/2017	15/09/2018	14/09/2019	19/09/2020	18/09/2021
7	14/10/2017	13/10/2018	12/10/2019	17/10/2020	16/10/2021
8	11/11/2017	10/11/2018	09/11/2019	14/11/2020	13/11/2021
9	09/12/2017	08/12/2018	07/12/2019	12/12/2020	11/12/2021
10	06/01/2018	05/01/2019	04/01/2020	09/01/2021	08/01/2022
11	03/02/2018	02/02/2019	01/02/2020	06/02/2021	05/02/2022
12	03/03/2018	02/03/2019	29/02/2020	06/03/2021	05/03/2022
13	31/03/2018	31/03/2019	31/03/2020	31/03/2021	31/03/2022
	2022 / 23	**2023 / 24**	**2024 / 25**	**2025 / 26**	**2026 / 27**
1	30/04/2022	29/02/2023	27/04/2024	26/04/2025	02/05/2026
2	28/05/2022	27/05/2023	25/05/2024	24/05/2025	30/05/2026
3	25/06/2022	24/06/2023	22/06/2024	21/06/2025	27/06/2026
4	23/07/2022	22/07/2023	20/07/2024	19/07/2025	25/07/2026
5	20/08/2022	19/08/2023	17/08/2024	16/08/2025	22/08/2026
6	17/09/2022	16/09/2023	14/09/2024	13/09/2025	19/09/2026
7	15/10/2022	14/10/2023	12/10/2024	11/10/2025	17/10/2026
8	12/11/2022	11/11/2023	09/11/2024	08/11/2025	14/11/2026
9	10/12/2022	09/12/2023	07/12/2024	06/12/2025	12/12/2026
10	07/01/2023	06/01/2024	04/01/2025	03/01/2025	09/01/2027
11	04/02/2023	03/02/2024	01/02/2025	31/01/2026	06/02/2027
12	04/03/2022	02/03/2024	01/03/2025	28/02/2026	06/03/2027
13	31/03/2022	31/03/2024	31/03/2025	31/03/2026	31/03/2027

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[redacted]

[redacted]

Director/Authorised Signatory
tie LIMITED

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 21 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 21

RESPONSE

NOT USED (see Schedule 2 Parts 1, 2, 3)

TIE00899940_1206

This is Schedule 22 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 22

NOT USED

This is Schedule 23 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 23

BOND AND COLLATERAL WARRANTY

Part 1 - Performance Bond

(1) [◆] [SURETY]

- in favour of -

(2) [◆]

PERFORMANCE BOND

TIE00899940_1208

PERFORMANCE BOND

BETWEEN

(1) [◆], a company incorporated in [◆] under company number [◆] whose registered office is at [◆] ("**the Surety**"); and

(2) [◆], a company incorporated in [◆] under number [◆] and having its registered office at [◆] ("**Beneficiary**")

WHEREAS

A. **tie** entered into an agreement for the appointment of a contractor (hereinafter referred to as the "**Tram Maintenance Agreement**") dated [◆] with Construcciones y Auxiliar de Ferrocarriles S.A. (CAF) (the "**Tram Maintainer**") to maintain the tram vehicles on a light rapid transit system in Edinburgh known as the Edinburgh Tram Network.

B. Clause 46 (*Performance Bond and Collateral Warranties*) of the Tram Maintenance Agreement obliges the Tram Maintainer to deliver to the Beneficiary an unconditional irrevocable Performance Bond on the conditions and in the form set out in Schedule 23 Part 1 (*Performance Bond*) to the Tram Maintenance Agreement, issued by a surety acceptable to the Beneficiary and callable subject only to written notification by the Beneficiary.

C. In consideration of the Beneficiary accepting the Surety's obligations set out below in discharge of the Tram Maintainer's undertaking to provide a performance bond under Clause 46 (*Performance Bond and Collateral Warranties*) of the Tram Maintenance Agreement, the Surety hereby irrevocably and unconditionally agrees and undertakes to pay to the Beneficiary a sum not exceeding £1,000,000 (one million pounds) (the "**Bonded Amount**") and the Surety accordingly covenants with the Beneficiary and agrees as follows:

1. The Surety hereby covenants with the Beneficiary that following receipt by the Surety of a notice in writing from the Beneficiary in the form set out in Appendix 1 ("**Demand Notice**") that the Tram Maintainer has persistently and/or maliciously failed to perform or observe any of its duties and/or obligations arising under or in connection with the Tram Maintenance Agreement and/or has committed a persistent breach of any provision and/or has failed to fulfil any warranty or indemnity set out in the Tram Maintenance Agreement and/or has persistently failed to satisfy any of its liabilities under or in connection with the Tram Maintenance Agreement has occurred, the Surety shall forthwith (and in any event no later than five Business Days) pay to the Beneficiary in full and without any deductions whatsoever or any right of set-off, abatement or counterclaim, the sum due from the Tram Maintainer

under the Tram Maintenance Agreement as stated in the Demand Notice in immediately available funds by electronic transfer to the account nominated in the Demand Notice, not exceeding in aggregate the Bonded Amount.

2. The Beneficiary shall only be entitled to issue a Demand Notice to make a claim under this Performance Bond if it has:

2.1 provided the Surety with a written statement in the form set out in Appendix 2 (the "**Prior Written Notice**") which identifies the Tram Maintainer's default; and

2.2 given the Tram Maintainer fourteen Business Days' (following receipt of the Prior Written Notice) to rectify its performance; and

2.3 the Tram Maintainer has failed to rectify its performance.

3. Any Demand Notice must be made in writing signed by an authorised representative of the Beneficiary and a copy of the written statement identifying the default must accompany the Demand Notice.

4. Subject to Clause 2 above, upon receipt by the Surety of a Demand Notice from the Beneficiary, the Surety shall not be entitled or obliged to make any enquiry or proof or contestation or impose any further conditions on the Beneficiary (or the Tram Maintainer) and the Beneficiary shall not need to take any legal action against or to obtain the consent of the Tram Maintainer. The Beneficiary may make as many separate demands hereunder as the Beneficiary thinks fit. The Beneficiary shall not be obliged to exercise any other right or remedy the Beneficiary may have before making a demand under this Performance Bond.

5. A Demand Notice received from the Beneficiary in accordance with Clause 1, 2 and 3 above shall be conclusive evidence of the Surety's liability to pay to the Beneficiary and of the amount of the sum or sums which the Surety is liable to pay. The Surety's obligation to make payment under this Performance Bond shall be a primary, independent and absolute obligation and the Surety shall not be entitled to delay or withhold payment for any reason. The Surety's obligation hereunder shall not be affected by any act, omission, matter or thing which, but for this provision, might operate to release or otherwise exonerate the Surety from the obligations hereunder in whole or in part, including without limitation and whether or not known to the Surety or to the Beneficiary:

5.1 any time or waiver granted to the Beneficiary or to the Tram Maintainer;

5.2 the taking, variation, compromise, renewal or release of or the refusal or neglect to perfect or to enforce any rights, remedies or securities against the Beneficiary or the Tram Maintainer;

5.3 any legal limitation, disability or incapacity relating to the Beneficiary or the Tram Maintainer;

5.4 any variation of or amendment to the Tram Maintenance Agreement (or related documentation) or the works or services to be performed thereunder or any other document or security so that references to the Tram Maintenance Agreement in this Performance Bond shall include each such variation and amendment;

5.5 any unenforceability, invalidity or frustration of any rights or obligations of the Beneficiary or the Tram Maintainer under the Tram Maintenance Agreement or any other document or security; and

5.6 any other fact, circumstance, provision of statute or rule of law which might, were the Surety's liability to be secondary rather than primary, entitle the Surety to be released or discharged in whole or in part from the Surety's undertaking.

6. NOT USED.

7. NOT USED.

8. NOT USED.

9. The Surety's liability under this Performance Bond shall not be affected or reduced by the insolvency of the Tram Maintainer or its liquidation, receivership or other like temporary or permanent status.

10. The Beneficiary shall be at liberty to compromise, release, waive or neglect any security as it sees fit, without impairment of their rights under this Performance Bond.

11. Provided that any rectification work and/or maintenance work has been carried out to the Beneficiary's satisfaction in accordance with clauses 39 (*Effect on Termination or Expiry*) and 44 (*TUPE and Handover*), this Performance Bond shall cease to have effect on the earlier of: ninety days after the earlier of the Expiry Date or the date of termination of the Tram Maintenance Agreement; save in connection with any Demand Notice issued to the Surety in writing prior to the expiry of the said period of ninety days.

12. The Beneficiary shall be entitled to assign this Performance Bond without the consent of the Surety,

13. Any Prior Written Notice and any Demand Notice to be served by the Beneficiary pursuant to this Performance Bond shall be sent by the Beneficiary to the Surety, to the Surety's address at ***[Insert Address]*** (and if sent by special or recorded delivery shall be taken as having been received by the Surety on the date of receipt by the Surety as evidenced by the relevant certificate of delivery) or shall be delivered personally to the Surety at the address set out in this Clause (and shall be deemed to have been received at the time of delivery).

14. This Performance Bond shall be governed by and construed in accordance with the Laws of Scotland and the Parties hereby agree to submit to the exclusive jurisdiction of the Court of Session over any claim arising out of this Performance Bond.

15. A person who is not a party to this Performance Bond shall have no right to enforce any of the terms of this Performance Bond.

16. In this Performance Bond:

16.1 the words and expressions have the same meanings as in the Tram Maintenance Agreement and we shall be deemed to have full knowledge of the terms and conditions of the Tram Maintenance Agreement;

16.2 "person" includes any firm and any entity having legal capacity; and

16.3 the definitions given in the recitals apply to the rest of this Performance Bond.

IN WITNESS WHEREOF

EXECUTED for and on behalf of **[THE SURETY]**
at

on 200◆ by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

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EXECUTED for and on behalf of [THE BENEFICIARY **LIMITED**] at

on 200◆ by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

TIE00899940_1213

APPENDIX 1

DEMAND NOTICE

[date]

SURETY
[Address]
Attention: [Responsible Officer]

Dear Sirs

Performance Bond [◆] [Ref: ◆]
Edinburgh Tram Network - Construcciones y Auxiliar de Ferrocarriles S.A.

This is our formal demand for payment pursuant to Clause 1 of the above instrument issued by you in our favour for the amount of £[◆]. Please pay the sum of £[□] forthwith by electronic transfer to [◆ ***bank account details***].

We hereby certify that Construcciones y Auxiliar de Ferrocarriles S.A.(CAF) has failed to [◆ ***describe default***] [and has failed to rectify that default as at the date of this Demand]. In accordance with Clause 2 of the Performance Bond, we attach a certified copy of the relevant default notice.

Yours faithfully,

_____

_____
Director and authorised signatory
for and on behalf of [Beneficiary]

TIE00899940_1214

APPENDIX 2

PRIOR WRITTEN NOTICE

[date]

Construcciones y Auxiliar de Ferrocarriles S.A.
J.M. Iturrioz 26
20200
Beasain
(Guipuzcoa)
Attention: [Responsible Officer]

Dear Sirs

Performance Bond [◆] [Ref: ◆]

Edinburgh Tram Network - Construcciones y Auxiliar de Ferrocarriles S.A.

This is our formal notice that Construcciones y Auxiliar de Ferrocarriles S.A.(CAF) has failed to [◆ ***describe default***] [and has failed to rectify that default as at the date of this Notice]. In accordance with Clause 2 of the Performance Bond, Construcciones y Auxiliar de Ferrocarriles S.A. is hereby on written notice that if the default described above is not rectified within fourteen Business Days then [Beneficiary] may issue a Demand Notice.

Yours faithfully,

_____

_____
Director and authorised signatory
for and on behalf of [Beneficiary]

TIE00899940_1215

Part 2 - Collateral Warranty

(1) [*OTHER THIRD PARTY BENEFICIARY*]

- and -

(2) [CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)]

COLLATERAL WARRANTY IN FAVOUR OF *THIRD PARTY BENEFICIARY*] FROM [CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)]

relating to

THE TRAM MAINTENANCE AGREEMENT

AGREEMENT

BETWEEN

(1) **[[THIRD PARTY BENEFICIARY]** [(company number [◆]) whose registered office is at [□]] ***OR*** [carrying on business together in partnership under the name of [◆] at [◆]] ("**Beneficiary**") which expression shall include its successors and permitted assignees.; and

(2) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa) – Spain ("**Tram Maintainer**")

BACKGROUND

A By an agreement in writing dated **[◆]** (the "**Tram Maintenance Agreement**"), **tie** appointed the Tram Maintainer to design, manufacture and supply Trams and supply documentation and associated equipment in connection with the Edinburgh Tram Network.

B It is a term of the Tram Maintenance Agreement that the Tram Maintainer shall enter into this Agreement with the Beneficiary.

IT IS AGREED as follows:

1. **DEFINITIONS AND INTERPRETATION**

In this Agreement:

1.1 the following words and expressions have the following meanings, unless the context requires otherwise:

"**Agreement**" means this document (as amended from time to time pursuant to clause 13);

"**Deliverables**" means all documents, information, reports, diagrams, records, method statements, risk assessments, manuals, schedules, databases, photographs, formulae, plans, specifications, drawings, details, calculations, models and simulations, the outputs and reports based on any models, programmes and all other material created and/or provided by the Tram Maintainer (or any other third party) in the performance of the Services and the Tram Maintainer's obligations under the Tram Maintenance Agreement;

"**Edinburgh Tram Network**" means the tramway which is to be designed, constructed and maintained in Edinburgh pursuant to the Infraco Contract and any network expansion, modification, line extension, spur, interconnection and any additional line which may be instructed), to be constructed in accordance with the Tram Legislation together with all associated works and facilities including all civil engineering and track works, Trams, infrastructure, plant, machinery and equipment installed or used for such tramway;

"**Good Industry Practice**" means using standards, practices, methods and procedures conforming to Law and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably be expected from a large, reputable, professionally qualified, competent and skilled organisation experienced in carrying out activities of a similar nature, scope and complexity to those comprised in the Services, and seeking in good faith to comply with its contractual obligations and all duties owed by it;

"**Insurance Period**" means the period of insurance set out in part 1 of Schedule 4 (*Required Insurances*) of the Tram Maintenance Agreement;

"**Intellectual Property Rights**" means any rights in or to any patent, design right, utility model, trade mark, brand name, service mark, trade name, business name, logo, invention (whether registered or unregistered), domain name, semi-conductor right, topography right, software designs and/or other materials, source code, copyright, moral right, know-how, or rights in databases and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or for an extension, revival or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the law of Scotland or of any other jurisdiction;

"**Law**" means:

(a) any Act or instruments of the Scottish Parliament or the United Kingdom Parliament or subordinate legislation within the meaning of section 21(1) of the Interpretation Act 1978, any exercise of the Royal Prerogative, and any enforceable community right within the meaning of section 2 of the European Communities Act 1972, and any bye-laws of CEC;

(b) any applicable guidance, policy, direction or determination issued by any regulatory body with which **tie**, CEC, the Client and/or the Tram Maintainer

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is bound to comply (to include, for the avoidance of doubt, the **tie** and CEC policies) and to the extent not published or otherwise publicly available, is made available to the Tram Maintainer; and

(c) any applicable judgment of a relevant court of law which is a binding precedent,

in each case in force, or applicable, in Scotland;

"**Line One**" means the tramway works as authorised by the Edinburgh Tram (Line One) Act 2006;

"**Line Two**" means the tramway works as authorised by the Edinburgh Train (Line Two) Act 2006;

"**Party**" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

"**Services**" means the works and services to be undertaken by the Tram Maintainer under the Tram Maintenance Agreement;

"**Tram Maintenance Agreement**" means the contract dated [□] made between the Client and the Tram Maintainer;

"**TEL**" means Transport Edinburgh Limited a company incorporated under the Companies Act with registered number SC269639 and having its registered office at 55 Annandale Street, Edinburgh, Midlothian, EH7 4AZ which shall include its successors in title and permitted assignees;

"**Trams**" means the tram vehicles to be provided for operation on the Edinburgh Tram Network; and

"**Tram Legislation**" means the Edinburgh Tram (Line One) Act, the Edinburgh Tram (Line Two) Act and such other legislation relative to the Edinburgh Tram Network as may be enacted from time to time;

1.2 unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender include all other genders.

1.2.2 a reference to:

1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a clause is a reference to a clause in this Agreement;

1.3 the list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation; and

1.4 where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

2. STANDARD OF CARE

2.1 The Tram Maintainer warrants and undertakes to the Beneficiary that it has carried out and shall carry out the Services and its other duties and obligations under the Tram Maintenance Agreement subject to and in accordance with the terms thereof.

2.2 In addition to and without derogation from clause 2.1, the Tram Maintainer warrants to the Beneficiary that:

2.2.1 in the performance of the Services and its other obligations under the Tram Maintenance Agreement it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent contractor experienced in carrying out works and services similar to the Services in connection with projects of a similar type, nature and complexity;

2.2.2 any design produced by the Tram Maintainer will satisfy in every respect any relevant performance specification or any requirement included or referred to in the Tram Maintenance Agreement and will be suitable in every respect for the purposes included in or reasonably to be inferred from the Tram Maintenance Agreement; and

2.2.3 any design produced by the Tram Maintainer will fully comply with Law.

2.3 The Tram Maintainer shall owe a duty of care to the Beneficiary in carrying out its duties and obligations under the Tram Maintenance Agreement.

3. MATERIALS

3.1 The Tram Maintainer warrants to the Beneficiary that it has not and shall not use any materials which at the time of use:

3.1.1 are known to be deleterious in the particular circumstances in which they are used (either to health and safety or to the durability of any works on which the Tram Maintainer is employed by the Client); or

3.1.2 contravene any relevant standard or code of practice issued from time to time by the BSI Group or under a European directive relating to standards; or

3.1.3 do not accord with the guidelines contained in the edition of the publication "Good Practice in Selection of Construction Materials" (Ove Arup & Partners) current at the date of specification of use; or

3.1.4 contravene Good Industry Practice.

4. COPYRIGHT LICENCE

4.1 The Tram Maintainer hereby grants to the Beneficiary an, royalty-free and exclusive licence to use such Intellectual Property Rights in the Deliverables as may be necessary, for operation and maintenance of the trams but, in any case, for manufacturing purposes, for the Beneficiary to use in relation to the [[Trams] ***OR*** [*other appropriate use*]]. This licence shall carry the right to grant sub-licences, and be transferable to third parties, prior written agreement of the Tram Supplier.

4.2 In so far as ownership of the copyright and any other Intellectual Property Rights in any Deliverable prepared or provided by the Tram Maintainer in connection with the Edinburgh Tram Network is vested in any person other than the Tram Maintainer, the Tram Maintainer shall procure for the Beneficiary the benefit of such a licence as is referred to in clause 4.1 for the purposes referred to therein.

4.3 The Tram Maintainer shall, if so requested at any time, execute such documents and perform such acts as may be required fully and effectively to assure to the Beneficiary or any third party the rights referred to in this clause 4.

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4.4 The Tram Maintainer shall provide to the Beneficiary a copy of any of the Deliverables as soon as reasonably practicable after receipt by the Tram Maintainer of a written request from the Beneficiary to do so, unless already delivered to the Beneficiary.

4.5 The Tram Maintainer undertakes to the Beneficiary that the use by the Beneficiary of any of the Deliverables for any purpose provided for in this clause 4 shall not infringe the rights of any third party in relation to the Deliverables.

5. REQUIRED INSURANCES

5.1 The Tram Maintainer undertakes that:

5.1.1 it has maintained and shall maintain during the performance of its obligations under the Tram Maintenance Agreement and the Insurance Period each of the insurances as follows:

5.1.1.1 not used;

5.1.1.2 Property Damage and Business Interruption Insurance on the terms described in Schedule 4 Part 1 to the Tram Maintenance Agreement;

5.1.1.3 Public and Products Liability Insurance on the terms described in Schedule 4 Part 1 of the Tram Maintenance Agreement;

5.1.1.4 Employer's Liability Insurance on the terms described in Schedule 4 Part 1 of the Tram Maintenance Agreement;

5.1.1.5 Comprehensive Motor Insurance on the terms described in Schedule 4 Part 1 of the Tram Maintenance Agreement; and

5.1.1.6 Directors' and Officers' Liability Insurance on the terms described in Schedule 4 Part 1 of the Tram Maintenance Agreement.

5.1.2 cover under the insurances is extended to include the Tram Maintainer's liabilities under this Agreement;

5.1.3 this Agreement has been disclosed to the Tram Maintainer's current insurers or brokers (as the case may be) and shall be disclosed to any future professional indemnity insurers or brokers providing the insurance required by this Agreement; and

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5.1.4 the Tram Maintainer shall abide by the terms and conditions of insurance and shall not do or omit to do anything that might prejudice the cover or its right to make a claim.

5.2 As and when reasonably required by the Beneficiary, the Tram Maintainer shall produce for inspection documentary evidence that such insurance is being properly maintained.

5.3 If the insurer makes or attempts to make any material alteration or purports to withdraw the Tram Maintainer 's cover, or if the Tram Maintainer is unable to obtain insurance, the Tram Maintainer shall promptly give notice of this to the Beneficiary.

6. ASSIGNATION

6.1 The Tram Maintainer shall not assign, novate or otherwise transfer the whole or any part of the Agreement without the prior written agreement of the Beneficiary.

6.2 The Beneficiary shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

6.2.1 to the Scottish Ministers, TEL, the City of Edinburgh Council or any local authority; or

6.2.2 other body with no worse financial standing than that of the Beneficiary who takes over all or substantially all the functions of the Beneficiary; or

6.2.3 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form acceptable to the Sub-Contractor acting reasonably) by the Beneficiary or a person falling within clause 6.2.1; or

6.2.4 with the prior written consent of the Tram Maintainer (such consent not to be unreasonably withheld or delayed) to any person not covered by clauses 6.2.1 or 6.2.2.]

6.2.5 without the consent of the Tram Maintainer to any person provided that no more than two such assignations will be permitted. Any assignations by the Beneficiary to a subsidiary or associated company of the Beneficiary or a member of the same group of companies will not count as an assignation;

6.2.2 with the prior written consent of the Tram Maintainer (such consent not to be unreasonably withheld or delayed).

6.3 The Tram Maintainer undertakes to the Beneficiary not to contend in any court proceedings under this Agreement that any person to whom the Beneficiary assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this clause is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that the Beneficiary is named under this Agreement or any intermediate assignee of the Beneficiary escaped loss resulting from such breach by reason of the disposal of its interest in the same.

7. LIABILITY OF THE TRAM MAINTAINER

7.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by the law of contract, delict or otherwise.

7.2 The responsibility of the Tram Maintainer under this Agreement is not to be reduced or in any way released or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by the Beneficiary against a third party.

7.3 The rights and benefits conferred upon the Beneficiary by this Agreement are in addition to any other rights and remedies that the Beneficiary may have against the Tram Maintainer including (without prejudice to the generality of the foregoing) any remedies in delict.

7.4 Subject to the other provisions of this Agreement, the liability of the Tram Maintainer to the Beneficiary is to be determined in all respects in accordance with the terms of the Tram Maintenance Agreement and, in the event of any claim by the Beneficiary under this Agreement, the Tram Maintainer shall be entitled to rely upon any defence, right, limitation or exclusion under the Tram Maintenance Agreement as though the Beneficiary were named as the Client under it, except that:

7.4.1 the Beneficiary shall not be affected by any subsequent variation of the Tram Maintenance Agreement which would adversely affect the obligations owed by the Tram Maintainer or the waiver, compromise or withdrawal of any claim made by the Client; and

7.4.2 the Tram Maintainer shall not be entitled to exercise any right of set-off, retention or withholding against the Beneficiary to which the Tram Maintainer may be entitled against the Client.

7.4.3 In no event, the Tram Maintainer shall be responsible for indirect or consequential damages

8. NOTICES

8.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

8.2 Any notice given pursuant to this clause, if sent by special or recorded delivery, is deemed to have been received on proof of delivery.

9. RIGHTS OF THIRD PARTIES

9.1 A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

10. INVALID TERMS

10.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

10.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

10.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

11. VARIATIONS AND WAIVERS TO BE IN WRITING

11.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

12. WAIVER

12.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

12.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

13. JURISDICTION AND LAW

13.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

IN WITNESS WHEREOF these presents on this and the preceding **[◆]** pages are executed as follows:

EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)
at
on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of ***[third party beneficiary]*** at

on 200[◆] by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

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[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

This is Schedule 24 referred to in the foregoing Tram Maintenance Agreement between tie Limited and Construcciones Y Auxiliar de Ferrocarriles S.A. (CAF)

SCHEDULE 24

REVIEW PROCEDURE

1.0 INTRODUCTION

1.1 Except where otherwise agreed in writing, the provisions of this Schedule 24 (*Review Procedure*) shall apply whenever any course of action is required to be reviewed, approved, agreed, consented to or otherwise processed in accordance with the Agreement.

1.2 Each submission by the Tram Maintainer to the Client's Representative under the Review Procedure shall be accompanied by three hard copies and a soft copy (in agreed appropriate format) of the Train Maintainer's proposals) to be reviewed or a statement of the proposed course of action (the entire contents of a submission being referred to as a "Submitted Item"). In relation to each Submitted Item, the provisions of this Schedule 24 (*Review Procedure*) shall apply.

1.3 Within 20 Business Days of the date of receipt of a submission (or re-submission, as the case may be) of the Submitted Item to the Client's Representative (or such other period as the Parties may agree), the Client's Representative shall return one copy of the relevant Submitted Item to the Tram Maintainer endorsed (subject to and in accordance with paragraph 3 (*Grounds of Objection*)) "Level A - no objection", "Level B - proceed subject to comments" or "Level C - resubmit".

1.4 If the Client's Representative fails to return a copy of any Submitted Item within 20 Business Days (or within such other period as the Parties may agree in writing) of the date of its submission to the Client's Representative, then the Tram Maintainer shall re-submit the submitted items stating that it is a resubmitted item If the Client's Representative fails to return a copy of any Submitted Item within 5 Business Days of any re-submission, then the Client's Representative shall be deemed to have returned the Submitted Item to the Tram Maintainer endorsed "Level A - no objection".

1.5 If the Client's Representative makes an objection to any Submitted Item in accordance with paragraph 3 (*Grounds of Objection*), the Client's Representative shall state the ground upon which such objection is based and the evidence or other information necessary to substantiate that ground.

1.6 For the avoidance of doubt, the Client's Representative shall be entitled to make such comments on any Submitted Item on any grounds as he sees fit but, to the extent that the Client's Representative comments on a Submitted Item other than on the grounds specified in

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paragraph 3 (*Grounds of Objection*), or fails to comply with the provisions of this paragraph 1, the Tram Maintainer may, at its discretion request written clarification of the basis for such comments and, if clarification is not received within 10 Business Days of such request by the Tram Maintainer refer the matter for determination in accordance with the Dispute Resolution Procedure.

1.7 Where any information that has been provided is updated, the new issues shall be provided promptly to the Client as soon as reasonably possible.

1.8 The Client's Representative shall be entitled to instruct the Tram Maintainer that a defined class of Deliverable or course of action may be submitted "for information" and not for review in accordance with this Schedule 24 (*Review Procedure*).

1.9 The Tram Maintainer shall ensure that each Submitted Item shall contain sufficient detail and shall be accompanied by sufficient information to enable the Client's Representative to assess the Submitted Item in accordance with Schedule 24 *(Review Procedure).*

1.10 Where a revised Submitted Item is submitted, the Tram Maintainer shall also ensure that such revision clearly identifies what revision to the proposal was made.

2. FURTHER INFORMATION

2.1 The Tram Maintainer shall submit any further or other information, drawings, data and documents (including details of calculations) that the Client's Representative reasonably requires to act in accordance with this Schedule 24 (*Review Procedure*). If the Tram Maintainer does not submit any such information, data and documents, the Client's Representative shall be entitled to object to the Submitted Item:

2.1.1 on the basis of the information, data and documents which have been provided; or

2.1.2 on the grounds that insufficient information, data and documents have been provided to enable the Client's Representative to act in accordance with this Schedule 24 (*Review Procedure*).

3. GROUNDS OF OBJECTION

3.1 The Client's Representative may object to any Submitted Item on the grounds set out in paragraph 2 (*Further Information*) above but otherwise may make objections in relation to a Submitted Item if, on the balance of probabilities, implementation of that Submitted Item:

3.1.1 would not be in accordance with this Agreement; and/or

3.1.2 would result in an increase to the Client's liabilities or potential or contingent liabilities under this Agreement; and/or

3.1.3 would be inefficient as to expenditure of resource/costs; and/or

3.1.4 would lead to a health and safety risk to any person or property; and/or

3.1.5 would lead to a breach of any Law or the terms of any Consent; and/or

3.1.6 would necessitate the obtaining of a new Law or the obtaining of a variation to an existing Law; and/or

3.1.7 would not be in accordance with any relevant environmental requirements; and/or

3.1.8 would not be in accordance with the Employer's Requirements; and/or

3.1.9 would adversely impact on the flexibility or ease of operation, run time, reliability, operating maintenance costs or revenues of the Edinburgh Tram Network; and/or

3.1.10 would materially adversely affect the Tram Maintainer's ability to perform its obligations under this Agreement; and/or

3.1.11 would materially adversely affect the Client's ability to perform its obligations or enforce its rights under this Agreement; and/or

3.1.12 would not be in accordance with Good Industry Practice; and/or

3.1.13 would prevent efficient procurement, construction, completion and/or commissioning of or under the Infraco Contract.

4. EFFECT OF REVIEW

4.1 Any Submitted Item which is returned or deemed pursuant to paragraph 1.4 to have been returned by the Client's Representative endorsed "Level A - no objection" shall be complied with and implemented by the Tram Maintainer.

4.2 If the Client's Representative returns the Submitted Item endorsed other than "Level A - no objection", the Tram Maintainer shall:

4.2.1 where the Client's Representative has endorsed the Submitted Item "Level B - proceed subject to comments", proceed with the performance of the Services in

accordance with the Tram Maintenance Programme but acknowledge and take into account the Client's Representative's comments; or

4.2.2 where the Client's Representative has endorsed the Submitted Item "Level C - resubmit", not act upon the Submitted Item, amend the Submitted Item to respond to the Client's Representative's objections and requirements, and re-submit the same to the Client's Representative in accordance with paragraph 4.3 unless the Tram Maintainer disputes that any such objection or proposed requirement is on grounds permitted by this Agreement, in which case the Tram Maintainer or the Client's Representative may refer the matter for determination in accordance with the Dispute Resolution Procedure and the Tram Maintainer shall not act on the Submitted Item until such matter is so determined or otherwise agreed provided that any referral to the Dispute Resolution Procedure is at the risk of the Tram Maintainer.

4.3 Where the Submitted Item has been endorsed *Level C*, the Tram Maintainer shall within 10 Business Days of receiving the returned Submitted Item, resubmit the Submitted Item as amended to the Client's Representative and the provisions of paragraphs 1.2 to 4 of this Schedule 24 *(Review Procedure)* shall apply (mutatis mutandis) to such re-submission.

4.4 The return or deemed return of any Submitted Item endorsed "Level A - no objection" or otherwise endorsed in accordance with paragraph 4.2.1 (*Level B* - proceed subject to comments) shall mean that the relevant Submitted Item may be used or implemented (subject to any comments made in accordance with paragraph 4.2.1) for the purposes for which it is intended. However, the return or deemed return of any Submitted Item howsoever endorsed shall not:

4.4.1 relieve the Tram Maintainer of its obligations under this Agreement; nor

4.4.2 constitute an acknowledgement, admission or acceptance by Client that the Tram Maintainer has complied with such obligations.

5. DISCLAIMER

5.1 No review, objection, comment or silence by the Client shall operate to:

5.1.1 exclude or limit the Tram Maintainer's obligations or liabilities under this Agreement (or the Client's rights under this Agreement); or

5.1.2 fix the Client with any express or implied obligations, duties or liabilities with respect to the Submitted Item.

5.2 For the avoidance of doubt, this information is supplementary to information required to be produced by the Tram Maintainer in order to satisfy the approval requirements of and Consents from other third parties and Relevant Authorities.

5.3 The Tram Maintainer shall promptly provide copies of all such submissions to the Client together with the responses to them as a matter of routine.

6. DOCUMENTATION FORMAT AND MANAGEMENT

6.1 The Tram Maintainer shall issue three hard copies and a soft copy (in appropriate agreed format) of all Submitted Items to the Client and compile and maintain a register of the date and contents of the submission for each Submitted Items.

6.2 The Tram Maintainer shall compile and maintain a register of the date of receipt and content of all Submitted Items that are returned or deemed to be returned by the Client's Representative.

6.3 All drawings shall be presented as A3 sized paper copies and drawings shall be prepared at their original size in a manner that allows them to be readily legible when reduced to A3 size. Original drawings shall not be greater than A0 in size.

7. VARIATIONS

7.1 No review, objection or comment or any failure to make objection or comment under this Schedule 24 (*Review Procedure*) by the Client shall constitute a Client Change

7.2 If, having received comments from the Client's Representative, the Tram Maintainer considers that compliance with those comments would amount to a Client Change, the Tram Maintainer shall within 10 Business Days of any comments being received, before complying with the comments, notify the Client of the same and, if it is agreed by the parties or determined pursuant to the Dispute Resolution Procedure that a Client Change would arise if the comments were complied with, the Client may proceed with the matter in accordance with Clause 16 (*Changes*).

7.3 Any failure by the Tram Maintainer to notify the Client within 10 Business Days of comments being received that it considers compliance with such comments of the Client's Representative would amount to a Client Change shall constitute an irrevocable acceptance by the Tram Maintainer that any compliance with the Client's comments shall be without cost to the Client and without any entitlement to any extension of time or other relief.

7.4 No alteration or modification to the scope, quality, quantity or nature of the Services arising from the development of the detailed design or from the co-ordination or integration of the design shall be construed or regarded as a Client Change.

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

THIS IS SCHEDULE PART 20 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 20



(1) TIE LIMITED

- and -

(2) BILFINGER BERGER UK LIMITED

- and -

(3) SIEMENS PLC

- and -

(4) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A

NOVATION OF A TRAM MAINTENANCE AGREEMENT

in respect of

EDINBURGH TRAM NETWORK

AGREEMENT

AMONG

(1) **tie LIMITED** a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh EH1 1YJ ("**tie**") which expression shall include its successors, permitted assignees and transferees; and

(2) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London EC1A 4EJ which expression shall include its successors, permitted assignees and transferees; and

(3) **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens Square, Frimley, Camberley, Surrey GU16 8QD which expression shall include its successors, permitted assignees and transferees,

(Bilfinger Berger UK Limited and Siemens plc together the "**Infraco**" and each separately an "**Infraco Member**"); and

(4) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF),** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa) Spain ("**Tramco**") which expression shall include its successors, permitted assignees and transferees.

BACKGROUND

A By an agreement in writing dated ◆ 200◆ ("**Tram Maintenance Agreement**") **tie** appointed Tramco to provide services for the ongoing maintenance of Trams and for the supply of consumables and spares for the Trams in connection with the Edinburgh Tram Network. A copy of the Tram Maintenance Agreement is attached to this Agreement and initialled by the parties for the purpose of identification. This Agreement is supplemental to the Tram Maintenance Agreement.

B **tie** and Infraco have entered into a contract ("**Infraco Contract**") under which Infraco has been appointed to carry out and/or manage the design, construction, installation, commissioning, tram procurement, system integration, infrastructure maintenance, tram maintenance and supply of related equipment and materials, trams and related infrastructure in respect of the Edinburgh Tram Network.

C **tie** and Infraco have agreed, with the consent of Tramco, that Infraco shall take over the rights and liabilities of the "**Client**" (as defined in the Tram Maintenance Agreement) under the Tram Maintenance Agreement and that Tramco shall owe all of the duties and obligations arising thereunder to Infraco by novating the Tram Maintenance Agreement from **tie** to Infraco upon and subject to the terms of this Agreement.

D **tie** wishes to be released from the Tram Maintenance Agreement and Tramco has agreed to release **tie**.

1. DEFINITIONS AND INTERPRETATION

1.1 The definitions given in the recitals to this Agreement apply to this Agreement.

1.2 In this Agreement the following additional words and expressions shall have the meanings set out opposite to them:

"**Effective Date**" means the last date of execution of this Agreement.

1.3 Clause headings in this Agreement are for the convenience of the parties only and do not affect its interpretation.

1.4 Unless otherwise defined hereunder, where the Tram Maintenance Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement.

2. RELEASE BY TRAMCO OF tie

2.1 Tramco releases and discharges **tie** from any and all duties, obligations and liabilities owed to Tramco under the Tram Maintenance Agreement and accepts the liability of Infraco under the Tram Maintenance Agreement in lieu of **tie**.

3. RELEASE BY tie OF TRAMCO

3.1 **tie** releases and discharges Tramco from the further performance of Tramco's duties and obligations under the Tram Maintenance Agreement.

4. ACCEPTANCE OF LIABILITY BY TRAMCO TO THE INFRACO

4.1 Tramco undertakes to Infraco to continue to perform all the duties and to discharge all the obligations of Tramco under the Tram Maintenance Agreement and to be bound by its terms and conditions in every way as if Infraco was and always had been a party to the Tram Maintenance Agreement in place of **tie**.

4.2 Tramco warrants to Infraco that, in respect of the duties and obligations which it has already performed under the Tram Maintenance Agreement, it has performed those duties and obligations in accordance with the standards of skill and care set out in the Tram Maintenance Agreement and otherwise in compliance with all of the terms and conditions thereof. Tramco warrants to Infraco that it shall be liable for any loss or damage suffered or incurred by Infraco arising out of any negligent act, default or breach by Tramco in the performance of its obligations under the Tram Maintenance Agreement prior to the Effective Date. Tramco shall be liable for such loss or damage notwithstanding that such loss or damage would not have been suffered or incurred by **tie** (or suffered or incurred to the same extent by **tie**).

4.3 Without prejudice to Clauses 4.2 or 4.4, Tramco shall not contend under this Agreement that its liability to Infraco is affected or diminished by reason of **tie** having suffered no loss and/or any loss claimed to have been suffered by Infraco being different in character from that suffered by **tie**.

4.4 Tramco confirms it was aware at the time of entering into the Tram Maintenance Agreement that Infraco could suffer losses, damages, costs, expenses, claims, demands and proceedings as a result of Tramco's breach of the Tram Maintenance Agreement.

4.5 Without prejudice to the generality of this Novation, Tramco warrants and undertakes to Infraco that its duties and obligations under, the Tram Maintenance Agreement, whether required to be performed prior to the date hereof, have been and will be performed in accordance with the Tram Maintenance Agreement.

4.6 Tramco acknowledges that any breach of the warranties in this Agreement may cause Infraco to be in breach of the Infraco Contract and/or cause Infraco to suffer loss and/or damage.

4.7 The liability of Tramco to Infraco pursuant to the Tram Maintenance Agreement as novated by this Agreement (both in respect of the period prior to the Effective Date and after the Effective Date) shall not be affected by Infraco's assumption of liability to **tie** for Tram Maintenance Agreement in respect of the Edinburgh Tram Network pursuant to the Infraco Contract.

4.8 Tramco acknowledges that Infraco has and shall continue to rely upon all Services Carried out by Tramco under the Tram Maintenance agreement as novated by this Agreement.

4.9 For the avoidance of doubt, in accordance with Clause 45.5 of the Tram Maintenance Agreement save where expressly provided for in the Tram Maintenance Agreement, nothing in this Agreement shall expose either Party to the application of Indirect Loss.

5. VESTING OF REMEDIES AGAINST TRAMCO

All rights of action and remedies against Tramco under and pursuant to the Tram Maintenance Agreement vested in **tie** (including their accrued rights of action and remedies) shall automatically and without the need for any further action on the part of Infraco, vest in Infraco with effect from the Effective Date.

6. ACCEPTANCE OF LIABILITY BY INFRACO

With effect from the Effective Date Infraco undertakes to perform all the duties and to discharge all the obligations of **tie** under the Tram Maintenance Agreement as novated by this Agreement and to be bound by its terms and conditions in every way as if Infraco was and always had been a party to the Tram Maintenance Agreement in place of **tie** and as if all acts and omissions of **tie** under or pursuant to the Tram Maintenance Agreement prior to the Effective Date were the acts and omissions of Infraco.

7. VESTING OF REMEDIES AGAINST tie

As from the Effective Date, all rights of action and remedies under or pursuant to the Tram Maintenance Agreement vested in Tramco shall lie against Infraco and not **tie** whether or not such rights of action or remedies may have arisen prior to, on or after the Effective Date.

8. ACKNOWLEDGEMENT OF PAYMENT

Tramco acknowledges that all payments properly due to Tramco under the Tram Maintenance Agreement up to the Effective Date have been paid by **tie** (subject to confirmation of pending payments and the assurance that the Tramco will not suffer payment delays due to the novation process).

9. AMENDMENT OF TRAM MAINTENANCE AGREEMENT

tie, Tramco and Infraco agree that the terms of the Tram Maintenance Agreement shall be and are varied in the manner set out in Appendix 1 to this Agreement.

10. AFFIRMATION OF TRAM MAINTENANCE AGREEMENT

The terms and conditions of this Agreement represent the entire agreement between the parties relating to the novation of the Tram Maintenance Agreement and, except as specifically

amended by Appendix 1 of this Agreement, all the terms and conditions of the Tram Maintenance Agreement remain in full force and effect. **tie** hereby confirms that it has not exercised any rights and discretions in regard to the Tram Maintenance Agreement prior to the point of novation.

11. EQUIVALENT PROJECT RELIEF

tie acknowledges that in relation to any Dispute under the Infraco Contract where the Client's sole involvement in any Client Claim is in performing administrative functions in relation to the Client Claim, and not as an interested or affected party, then Infraco shall be entitled to recover its costs incurred in relation to such dispute pursuant to Clause 9A (Tramco Equivalent Project Relief) of the Tram Maintenance Agreement from **tie**. **tie** agrees to pay to the Infraco such reasonable costs unless the dispute proceeds to adjudication where such costs shall be paid as allocated between **tie** and the Tram Maintainer by the adjudicator following the Adjudication procedure.

The Infraco agrees that it shall minimise as far as reasonably practicable its administrative costs in relation to Equivalent Project Relief.

The Tram Maintainer agrees not to vexatiously claim under the Tram Maintenance Agreement or vexatiously use the Disputes Resolution Procedure.

12. The parties acknowledge that it is the intention for CAF S.A., subsequent to the Novation, to assign the Tram Maintenance Agreement to its wholly owned subsidiary CAF RAIL UK Limited and, upon provision of a duly completed Parent Company Guarantee, Client agreement shall not be unreasonably withheld.

13. RIGHTS OF THIRD PARTIES

A person who is not party to this Agreement shall have no right to enforce any term of this Agreement. This clause does not affect any right or remedy of any person which exists or is otherwise available.

14. LAW AND JURISDICTION

This Agreement shall be governed by and construed in accordance with Scots law and the Scottish Courts shall have jurisdiction with regard to all matters arising under it.

IN WITNESS WHEREOF these presents on this and the preceding [◆] pages together with Appendix 1 which is annexed and subscribed as relative hereto and the copy of the Tram Maintenance Agreement which is attached and subscribed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at

on 2008 by:

Director _____

Full Name _____

Director _____

Full Name _____

EXECUTED for and on behalf of **SIEMENS PLC**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Authorised Signatory _____

Full Name _____

EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

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APPENDIX 1

Schedule of Amendments to the Tram Maintenance Agreement

Clause 9 - Terms Governing the Services

Insert the following new Clause 9.19:

9.19 In addition to the other requirements of this Clause 9, the Tram Maintainer shall support the Client as required in relation to the maintenance and provision of any records, drawings, registers, manuals and/or reports as may be required under the Infraco Contract in respect of the Services. Nevertheless, the level of information to be supplied will be agreed during the contract negotiation process in order to protect the Tram Maintainer's know-how from an Infraco that could be a competitor.

Insert at end of Clause 9.29 the following:

9.29 The Tram Maintainer acknowledges that it has a copy of the Infraco Contract and is deemed to be aware of the obligations, risks and liabilities assumed by the Infraco thereunder. Without prejudice to the foregoing, the Tram Maintainer shall be deemed to be fully aware of the adverse financial and other consequences for the Client which could arise under the Infraco Contract in consequence, in whole or in part, of a breach on the part of the Tram Maintainer of its obligations under this Agreement.

Clause 37 - Termination for Corrupt Gifts and Fraud

Delete Clause 37 (*Termination for Corrupt Gifts and Fraud*), in its entirety substitute therefore:

37.1 The Tram Maintainer or anyone employed by it or acting on its behalf (including any Tram Maintainer Party) shall not commit any Prohibited Act.

37.2 If the Tram Maintainer or anyone employed by it or acting on its behalf (including any Tram Maintainer Party) commits any Prohibited Act, then the Client shall be entitled to act in accordance with Clauses 37.3 to 37.8.

37.3 If a Prohibited Act is committed by the Tram Maintainer or by an employee of the Tram Maintainer not acting independently of the Tram Maintainer, then the Client may terminate this Agreement by giving notice to the Tram Maintainer.

37.4 If a Prohibited Act is committed by an employee of the Tram Maintainer acting independently of the Tram Maintainer, then the Client may give notice to the Tram Maintainer of termination and this Agreement will terminate, unless within 30 days of receipt of such notice

the Tram Maintainer terminates that employee's employment and (if necessary) procures the performance of the relevant obligations by another person.

37.5 If a Prohibited Act is committed by anyone acting on behalf of the Tram Maintainer (excluding employees of the Tram Maintainer but including any Tram Maintainer Party, and their employees) and not acting independently of the Tram Maintainer, then the Client may give notice to the Tram Maintainer of termination and this Agreement shall terminate.

37.6 If a Prohibited Act is committed by anyone acting on behalf of the Tram Maintainer (excluding employees of the Tram Maintainer but including any Tram Maintainer Party, and their employees) and acting independently of the Tram Maintainer, then the Client may give notice to the Tram Maintainer of termination and this Agreement will terminate (but only if the said notice given under this Clause 36.6 is countersigned by **tie**) unless, within 30 days of receipt of such notice, the Tram Maintainer procures the termination of such party's employment and procures the performance of the relevant part of the Services by another person.

37.7 Any notice of termination under this Clause 37 (*Termination for Corrupt Gifts and Fraud*) shall specify:

37.7.1 the nature of the Prohibited Act;

37.7.2 the identity of the person whom the Client believes has committed the Prohibited Act; and

37.7.3 the date on which this Agreement will terminate, in accordance with the applicable provision of this Clause 37 (*Termination for Corrupt Gifts and Fraud*).

37.8 If this Agreement is terminated pursuant to this Clause 37 (*Termination for Corrupt Gifts and Fraud*) the provisions of Clause 38 (*Payment on Termination*) and Clause 39 (*Effect of Termination or Expiry*) shall apply.

Clause 56 - Assignation, Changes in Legal Status and Changes in Control and Subcontracting

Delete Clause 56.2 and substitute therefore:

56.2 The Client shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

56.2.1 to the Scottish Ministers, TEL, CEC Transport Scotland or any local authority; or

56.2.2 to any body with no worse financial standing than that of **tie** who takes over all or substantially all of the functions of **tie**; or

56.2.3 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to the Tram Maintainer acting reasonably) by **tie** or a person falling within Clause [56.2.1]; or

56.2.4 to the Operator; or

56.2.5 with the prior written consent of the Tram Maintainer (such consent not to be unreasonably withheld or delayed) to any person not covered by Clauses 56.2.1, 56.2.2, 56.2.3 or 56.2.4 whose ongoing financial standing is no worse than **tie**.

……
Director/Authorised Signatory
tie LIMITED

……..
Director/Authorised Signatory
BILFINGER BERGER UK LIMITED

……..
Director/Authorised Signatory
SIEMENS PLC

……..
Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)



(1) TIE LIMITED

- and -

(2) BILFINGER BERGER (UK) LIMITED

- and -

(3) SIEMENS plc

-and-

(4) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

NOVATION OF A TRAM MAINTENANCE AGREEMENT

in respect of

EDINBURGH TRAM NETWORK

AGREEMENT

AMONG

(1) **tie LIMITED** a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh EH1 1YJ ("**tie**") which expression shall include its successors, permitted assignees and transferees; and

(2) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London EC1A 4EJ which expression shall include its successors, permitted assignees and transferees; and

(3) **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens Square, Frimley, Camberley, Surrey GU16 8QD which expression shall include its successors, permitted assignees and transferees,

(Bilfinger Berger UK Limited and Siemens plc together the "**Infraco**" and each separately an "**Infraco Member**"); and

(4) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF),** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa) Spain ("**Tramco**") which expression shall include its successors, permitted assignees and transferees.

BACKGROUND

A By an agreement in writing dated 13 May 2008 ("**Tram Maintenance Agreement**") **tie** appointed Tramco to provide services for the ongoing maintenance of Trams and for the supply of consumables and spares for the Trams in connection with the Edinburgh Tram Network. A copy of the Tram Maintenance Agreement is attached to this Agreement and initialled by the parties for the purpose of identification. This Agreement is supplemental to the Tram Maintenance Agreement.

B **tie** and Infraco have entered into a contract ("**Infraco Contract**") under which Infraco has been appointed to carry out and/or manage the design, construction, installation, commissioning, tram procurement, system integration, infrastructure maintenance, tram

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maintenance and supply of related equipment and materials, trams and related infrastructure in respect of the Edinburgh Tram Network.

C **tie** and Infraco have agreed, with the consent of Tramco, that Infraco shall take over the rights and liabilities of the "**Client**" (as defined in the Tram Maintenance Agreement) under the Tram Maintenance Agreement and that Tramco shall owe all of the duties and obligations arising thereunder to Infraco by novating the Tram Maintenance Agreement from **tie** to Infraco upon and subject to the terms of this Agreement.

D **tie** wishes to be released from the Tram Maintenance Agreement and Tramco has agreed to release **tie**.

1. DEFINITIONS AND INTERPRETATION

1.1 The definitions given in the recitals to this Agreement apply to this Agreement.

1.2 In this Agreement the following additional words and expressions shall have the meanings set out opposite to them:

"**Effective Date**" means the last date of execution of this Agreement.

1.3 Clause headings in this Agreement are for the convenience of the parties only and do not affect its interpretation.

1.4 Unless otherwise defined hereunder, where the Tram Maintenance Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement.

2. RELEASE BY TRAMCO OF tie

2.1 Tramco releases and discharges **tie** from any and all duties, obligations and liabilities owed to Tramco under the Tram Maintenance Agreement and accepts the liability of Infraco under the Tram Maintenance Agreement in lieu of **tie**.

3. RELEASE BY tie OF TRAMCO

3.1 **tie** releases and discharges Tramco from the further performance of Tramco's duties and obligations under the Tram Maintenance Agreement.

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4. ACCEPTANCE OF LIABILITY BY TRAMCO TO THE INFRACO

4.1 Tramco undertakes to Infraco to continue to perform all the duties and to discharge all the obligations of Tramco under the Tram Maintenance Agreement and to be bound by its terms and conditions in every way as if Infraco was and always had been a party to the Tram Maintenance Agreement in place of **tie**.

4.2 Tramco warrants to Infraco that, in respect of the duties and obligations which it has already performed under the Tram Maintenance Agreement, it has performed those duties and obligations in accordance with the standards of skill and care set out in the Tram Maintenance Agreement and otherwise in compliance with all of the terms and conditions thereof. Tramco warrants to Infraco that it shall be liable for any loss or damage suffered or incurred by Infraco arising out of any negligent act, default or breach by Tramco in the performance of its obligations under the Tram Maintenance Agreement prior to the Effective Date. Tramco shall be liable for such loss or damage notwithstanding that such loss or damage would not have been suffered or incurred by **tie** (or suffered or incurred to the same extent by **tie**).

4.3 Without prejudice to Clauses 4.2 or 4.4, Tramco shall not contend under this Agreement that its liability to Infraco is affected or diminished by reason of **tie** having suffered no loss and/or any loss claimed to have been suffered by Infraco being different in character from that suffered by **tie**.

4.4 Tramco confirms it was aware at the time of entering into the Tram Maintenance Agreement that Infraco could suffer losses, damages, costs, expenses, claims, demands and proceedings as a result of Tramco's breach of the Tram Maintenance Agreement.

4.5 Without prejudice to the generality of this Novation, Tramco warrants and undertakes to Infraco that its duties and obligations under, the Tram Maintenance Agreement, whether required to be performed prior to the date hereof, have been and will be performed in accordance with the Tram Maintenance Agreement.

4.6 Tramco acknowledges that any breach of the warranties in this Agreement may cause Infraco to be in breach of the Infraco Contract and/or cause Infraco to suffer loss and/or damage.

4.7 The liability of Tramco to Infraco pursuant to the Tram Maintenance Agreement as novated by this Agreement (both in respect of the period prior to the Effective Date and after the Effective Date) shall not be affected by Infraco's assumption of liability to **tie** for Tram Maintenance Agreement in respect of the Edinburgh Tram Network pursuant to the Infraco Contract.

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4.8 Tramco acknowledges that Infraco has and shall continue to rely upon all Services Carried out by Tramco under the Tram Maintenance agreement as novated by this Agreement.

4.9 For the avoidance of doubt, in accordance with Clause 45.5 of the Tram Maintenance Agreement save where expressly provided for in the Tram Maintenance Agreement, nothing in this Agreement shall expose either Party to the application of Indirect Loss.

5. VESTING OF REMEDIES AGAINST TRAMCO

All rights of action and remedies against Tramco under and pursuant to the Tram Maintenance Agreement vested in **tie** (including their accrued rights of action and remedies) shall automatically and without the need for any further action on the part of Infraco, vest in Infraco with effect from the Effective Date.

6. ACCEPTANCE OF LIABILITY BY INFRACO

With effect from the Effective Date Infraco undertakes to perform all the duties and to discharge all the obligations of **tie** under the Tram Maintenance Agreement as novated by this Agreement and to be bound by its terms and conditions in every way as if Infraco was and always had been a party to the Tram Maintenance Agreement in place of **tie** and as if all acts and omissions of **tie** under or pursuant to the Tram Maintenance Agreement prior to the Effective Date were the acts and omissions of Infraco.

7. VESTING OF REMEDIES AGAINST tie

As from the Effective Date, all rights of action and remedies under or pursuant to the Tram Maintenance Agreement vested in Tramco shall lie against Infraco and not **tie** whether or not such rights of action or remedies may have arisen prior to, on or after the Effective Date.

8. ACKNOWLEDGEMENT OF PAYMENT

Tramco acknowledges that all payments properly due to Tramco under the Tram Maintenance Agreement up to the Effective Date have been paid by **tie** (subject to confirmation of pending payments and the assurance that the Tramco will not suffer payment delays due to the novation process).

9. AMENDMENT OF TRAM MAINTENANCE AGREEMENT

tie, Tramco and Infraco agree that the terms of the Tram Maintenance Agreement shall be and are varied in the manner set out in Appendix 1 to this Agreement.

10. AFFIRMATION OF TRAM MAINTENANCE AGREEMENT

The terms and conditions of this Agreement represent the entire agreement between the parties relating to the novation of the Tram Maintenance Agreement and, except as specifically amended by Appendix 1 of this Agreement, all the terms and conditions of the Tram Maintenance Agreement remain in full force and effect. **tie** hereby confirms that it has not exercised any rights and discretions in regard to the Tram Maintenance Agreement prior to the point of novation.

11. EQUIVALENT PROJECT RELIEF

tie acknowledges that in relation to any Dispute under the Infraco Contract where the Client's sole involvement in any Client Claim is in performing administrative functions in relation to the Client Claim, and not as an interested or affected party, then Infraco shall be entitled to recover its costs incurred in relation to such dispute pursuant to Clause 9A (Tramco Equivalent Project Relief) of the Tram Maintenance Agreement from **tie**. **tie** agrees to pay to the Infraco such reasonable costs unless the dispute proceeds to adjudication where such costs shall be paid as allocated between **tie** and the Tram Maintainer by the adjudicator following the Adjudication procedure.

The Infraco agrees that it shall minimise as far as reasonably practicable its administrative costs in relation to Equivalent Project Relief.

The Tram Maintainer agrees not to vexatiously claim under the Tram Maintenance Agreement or vexatiously use the Disputes Resolution Procedure.

12. The parties acknowledge that it is the intention for CAF S.A., subsequent to the Novation, to assign the Tram Maintenance Agreement to its wholly owned subsidiary CAF RAIL UK Limited and, upon provision of a duly completed Parent Company Guarantee, Client agreement shall not be unreasonably withheld.

13. RIGHTS OF THIRD PARTIES

A person who is not party to this Agreement shall have no right to enforce any term of this Agreement. This clause does not affect any right or remedy of any person which exists or is otherwise available.

14. LAW AND JURISDICTION

This Agreement shall be governed by and construed in accordance with Scots law and the Scottish Courts shall have jurisdiction with regard to all matters arising under it.

IN WITNESS WHEREOF these presents on this and the preceding 5 pages together with Appendix 1 which is annexed and subscribed as relative hereto and the copy of the Tram Maintenance Agreement which is attached and subscribed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**
at EDINBURGH

on 14th MAY 2008 by:

Authorised Signatory [redacted]

Full Name WILLIAM GALLAGHER

Witness Signature [redacted]

Full Name ANDREW SUTHERLAND FITCHIE

Address DLA PIPER, RUTLAND SQUARE
EDINBURGH, EH1 2AA

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at EDINBURGH

on 14th MAY 2008 by:

Director [redacted]

Full Name V RICHMOND John Watson

Director [redacted]

Full Name GARY PETER DALTON

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EXECUTED for and on behalf of **SIEMENS PLC**
at EDINBURGH

on 14 MAY 2008 by:

[redacted]

Authorised Signatory

C. ROTH

Full Name

[redacted]

Authorised Signatory

M. FLYNN

Full Name

EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at EDINBURGH

on 13 MAY 2008 by:

[redacted]

Authorised Signatory

JESUS ARANAOLA

Full Name

[redacted]

Witness Signature

ANTONIO CAMPOS

Full Name

[redacted]

Address

REASAIN

APPENDIX 1

Schedule of Amendments to the Tram Maintenance Agreement

Clause 9 - Terms Governing the Services

Insert the following new Clause 9.19:

9.19 In addition to the other requirements of this Clause 9, the Tram Maintainer shall support the Client as required in relation to the maintenance and provision of any records, drawings, registers, manuals and/or reports as may be required under the Infraco Contract in respect of the Services. Nevertheless, the level of information to be supplied will be agreed during the contract negotiation process in order to protect the Tram Maintainer's know-how from an Infraco that could be a competitor.

Insert at end of Clause 9.29 the following:

9.29 The Tram Maintainer acknowledges that it has a copy of the Infraco Contract and is deemed to be aware of the obligations, risks and liabilities assumed by the Infraco thereunder. Without prejudice to the foregoing, the Tram Maintainer shall be deemed to be fully aware of the adverse financial and other consequences for the Client which could arise under the Infraco Contract in consequence, in whole or in part, of a breach on the part of the Tram Maintainer of its obligations under this Agreement.

Clause 37 - Termination for Corrupt Gifts and Fraud

Delete Clause 37 (*Termination for Corrupt Gifts and Fraud*), in its entirety substitute therefore:

37.1 The Tram Maintainer or anyone employed by it or acting on its behalf (including any Tram Maintainer Party) shall not commit any Prohibited Act.

37.2 If the Tram Maintainer or anyone employed by it or acting on its behalf (including any Tram Maintainer Party) commits any Prohibited Act, then the Client shall be entitled to act in accordance with Clauses 37.3 to 37.8.

37.3 If a Prohibited Act is committed by the Tram Maintainer or by an employee of the Tram Maintainer not acting independently of the Tram Maintainer, then the Client may terminate this Agreement by giving notice to the Tram Maintainer.

37.4 If a Prohibited Act is committed by an employee of the Tram Maintainer acting independently of the Tram Maintainer, then the Client may give notice to the Tram Maintainer of

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termination and this Agreement will terminate, unless within 30 days of receipt of such notice the Tram Maintainer terminates that employee's employment and (if necessary) procures the performance of the relevant obligations by another person.

37.5 If a Prohibited Act is committed by anyone acting on behalf of the Tram Maintainer (excluding employees of the Tram Maintainer but including any Tram Maintainer Party, and their employees) and not acting independently of the Tram Maintainer, then the Client may give notice to the Tram Maintainer of termination and this Agreement shall terminate.

37.6 If a Prohibited Act is committed by anyone acting on behalf of the Tram Maintainer (excluding employees of the Tram Maintainer but including any Tram Maintainer Party, and their employees) and acting independently of the Tram Maintainer, then the Client may give notice to the Tram Maintainer of termination and this Agreement will terminate (but only if the said notice given under this Clause 36.6 is countersigned by **tie**) unless, within 30 days of receipt of such notice, the Tram Maintainer procures the termination of such party's employment and procures the performance of the relevant part of the Services by another person.

37.7 Any notice of termination under this Clause 37 (*Termination for Corrupt Gifts and Fraud*) shall specify:

37.7.1 the nature of the Prohibited Act;

37.7.2 the identity of the person whom the Client believes has committed the Prohibited Act; and

37.7.3 the date on which this Agreement will terminate, in accordance with the applicable provision of this Clause 37 (*Termination for Corrupt Gifts and Fraud*).

37.8 If this Agreement is terminated pursuant to this Clause 37 (*Termination for Corrupt Gifts and Fraud*) the provisions of Clause 38 (*Payment on Termination*) and Clause 39 (*Effect of Termination or Expiry*) shall apply.

Clause 56 - Assignation, Changes in Legal Status and Changes in Control and Subcontracting

Delete Clause 56.2 and substitute therefore:

56.2 The Client shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

56.2.1 to the Scottish Ministers, TEL, CEC Transport Scotland or any local authority; or

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56.2.2 to any body with no worse financial standing than that of **tie** who takes over all or substantially all of the functions of **tie**; or

56.2.3 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to the Tram Maintainer acting reasonably) by **tie** or a person falling within Clause 56.2.1; or

56.2.4 to the Operator; or

56.2.5 with the prior written consent of the Tram Maintainer (such consent not to be unreasonably withheld or delayed) to any person not covered by Clauses 56.2.1, 56.2.2, 56.2.3 or 56.2.4 whose ongoing financial standing is no worse than **tie**.

[redacted]
Director/Authorised Signatory
tie LIMITED

[redacted]
Director
BILFINGER BERGER UK LIMITED

[redacted] .....
Authorised Signatory
SIEMENS PLC

[redacted] ...
Director/Authorised Signatory
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

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THIS IS SCHEDULE PART 21 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 21



(1) TIE LIMITED

- and -

(2) BILFINGER BERGER (UK) LIMITED

- and -

(3) SIEMENS plc

-and-

(4) CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

COLLATERAL WARRANTY IN RESPECT OF A TRAM MAINTENANCE AGREEMENT IN FAVOUR OF tie FROM TRAMCO

relating to

THE EDINBURGH TRAM NETWORK

AGREEMENT

BETWEEN

(1) **tie LIMITED** (company number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ ("**tie**");

(2) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London EC1A 4EJ which expression shall include its successors, permitted assignees and transferees; and

(3) **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens Square, Frimley, Camberley, Surrey GU16 8QD which expression shall include its successors, permitted assignees and transferees,

(Bilfinger Berger UK Limited and Siemens plc together referred to as the "**Infraco**", which term shall include its successors and permitted assignees); and

(4) **CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF),** a company registered in Spain in the Corporate Register of Guipuzcoa: volume 983, sheet 144, page number SS-329, entry 239 and having its registered office at J.M. Iturrioz 26, 20200 Beasain (Guipuzcoa), Spain ("**Tramco**");

BACKGROUND

A By an agreement in writing dated ◆ 200◆ (the "**Tram Maintenance Agreement**"), **tie** appointed Tramco to provide services for the ongoing maintenance of Trams and further supply of consumables and spares for the Trams in connection with the Edinburgh Tram Network.

B **tie** and Infraco have entered into a contract under which Infraco has been appointed to carry out and/or manage the design, construction, installation, commissioning, tram procurement, system integration, infrastructure maintenance, tram maintenance and supply of related equipment and materials, trams and related infrastructure in respect of the Edinburgh Tram Network.

C **tie** and Infraco have agreed, with the consent of Tramco, that Infraco shall take over the rights and liabilities of the Client under the Tram Maintenance Agreement by novating the Tram

Maintenance Agreement from **tie** to Infraco upon and subject to the terms of the Novation Agreement (as hereinafter defined).

D It is a term of the Tram Maintenance Agreement that Tramco shall enter into this Agreement with **tie,** if requested by **tie**, following the execution of the Novation Agreement.

IT IS AGREED as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement the following words and expressions have the following meanings, unless the context requires otherwise:

"**Agreement**" means this document (as amended from time to time pursuant to Clause 13);

"**Deliverables**" means all Technical Records, Tram Maintainer's Materials Project IPR, Software and including but not limited to , information, reports, records, diagrams, manuals, schedules, databases, photographs, formulae, consultation materials, drawings (including as-built drawings), plans, designs, specifications, details, calculations, models and simulations and outputs and reports based on any models or simulations, programmes and all other material created and/or produced by Tramco (or any Tram Maintainer Party or any other third party) and all other all written or documentary outputs to be prepared and delivered by Tramco in the performance of the Services and Tramco's other obligations under the Tram Maintenance Agreement;

"**Infraco Contract**" means the contract to be entered into or entered into by **tie** with Infraco as described in Recital B above;

"**Novation Agreement**" means the novation agreement entered into among **tie**, Tramco and Infraco relating to the novation of the Tram Maintenance Agreement;

"**Party**" means each and any of the parties to this Agreement and **Parties** shall be construed accordingly;

"**Tram Maintenance Agreement**" means the agreement dated [◆] and originally entered into by **tie** and Tramco, which has been novated to Infraco and Tramco pursuant to the Novation Agreement.

1.2 Unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender include all other genders.

1.2.2 a reference to:

1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a recital, clause or schedule is a reference to a recital, clause or schedule of or to this Agreement.

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation.

1.4 Where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

1.5 Unless otherwise defined hereunder, where the Tram Maintenance Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement.

1.6 In the case of any unintended conflict between the definition or interpretation of words or expressions in this Agreement and in the Tram Maintenance Agreement, the Tram Maintenance Agreement shall prevail save where by express words or where it is apparent from the context that the contrary is intended in this Agreement.

2. STANDARD OF CARE

Tramco warrants and undertakes to **tie** that:

2.1 it has carried out and shall carry out and discharge the Services and all its other duties and obligations under the Tram Maintenance Agreement subject to and in accordance with the terms thereof; and

2.2 in addition to and without derogation from clause 2.1:

2.2.1 Tramco warrants to **tie** that, in the performance of the Services and all its other duties and obligations under the Tram Maintenance Agreement it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent Tram maintainer experienced in performing services similar to the Services to be performed under the Tram Maintenance Agreement;

2.2.2 it owes a duty of care to **tie** in carrying out its duties and obligations under the Tram Maintenance Agreement; and

2.3 all obligations and duties on the part of Tramco set out in the Tram Maintenance Agreement which are expressed to be made in favour or given to **tie** shall be directly enforceable by **tie** pursuant to this Agreement following novation of the Tram Maintenance Agreement pursuant to the Novation Agreement.

3. COPYRIGHT LICENCE

3.1 Tramco hereby grants to **tie** a, royalty-free and exclusive licence to use such Project IPR and Tram Maintainer IPR as may be necessary for operation and maintanance of the trams but in any case for manufacturing purposes,for **tie** to use in relation to any projects associated with the Services and/or the operation and/or maintenance of the Edinburgh Tram Network, including the Trams. This licence shall carry the right to grant sub-licences, and be transferable to third parties, prior written approval from the Tram Maintainer. Tramco shall be liable for the Project IPR and the Tram Maintainer IPR only to the extent that it is used for the purposes for which it was intended.

3.2 In so far as ownership of the copyright and any other Intellectual Property Rights in any Deliverable in connection with the provision of the Services under the Tram Maintenance Agreement is vested in any person other than Tramco including any Tram Maintainer Party, Tramco shall procure for **tie** the benefit of such a licence as is referred to in clause 3.1 for the purposes referred to therein.

3.3 Tramco shall, if so requested at any time, execute such documents and perform such acts (including the grant to **tie** of a licence to use any Software related with operation

and maintenance) as may be required fully and effectively to assure to **tie** or any third party the rights referred to in this clause 3.

3.4 Tramco shall provide to **tie** a copy of any of the Deliverables which are to be provided to Infraco under the Tram Maintenance Agreement as soon as reasonably practicable after receipt by Tramco of a written request from **tie** to do so, unless already delivered to **tie**.

3.5 Tramco undertakes to **tie** that the use by **tie** of any of the Deliverables for any purpose provided for in this clause 3 shall not infringe the rights of any third party in relation to the Deliverables.

4. REQUIRED INSURANCES AND OCIP INSURANCES

4.1 Tramco undertakes to **tie** that:

4.1.1 it has maintained and shall maintain during the performance of its obligations under the Tram Maintenance Agreement each of the Required Insurances in accordance with the requirements of Clause 17 (*Required Insurances*) and Schedule 4 (*Required Insurances*) of the Tram Maintenance Agreement;

4.1.2 cover under the professional indemnity insurance is extended to include Tramco's liabilities under this Agreement;

4.1.3 this Agreement has been disclosed to Tramco's current professional indemnity insurers or brokers (as the case may be) and shall be disclosed to any future professional indemnity insurers or brokers providing the insurance required by this Agreement;

4.1.4 Tramco shall abide by the terms and conditions of insurance and not do or omit to do anything that might prejudice the cover or its right to make a claim; and

4.1.5 it has had disclosed to it details of the OCIP Insurances and that it shall abide by the terms and conditions of the insurances contained therein and shall not do or omit to do anything that might prejudice the cover or **tie**'s right to make a claim under the OCIP Insurances.

4.2 As and when required by **tie**, Tramco shall produce for inspection documentary evidence that the Required Insurances are being properly maintained.

4.3 Tramco shall not make any material alteration to the terms of the Required Insurances without **tie**'s prior approval which approval shall not be unreasonably withheld. If the insurer makes or attempts to make any material alteration or purports to withdraw cover, or if Tramco is unable to obtain professional indemnity insurance, Tramco shall promptly give written notice of this to **tie**.

5. tie STEP-IN

5.1 Tramco shall not exercise nor seek to exercise any right of determination of the Tram Maintenance Agreement or to rescind the Tram Maintenance Agreement by reason of a Client Default or to otherwise discontinue the performance of any of Tramco's obligations in relation to the Tram Maintenance Agreement by reason of breach on the part of Infraco (or otherwise) without giving to **tie** not less than 21 days' written notice of its intention to do so and specifying in such notice the grounds for the proposed determination. Tramco shall for the period of any such notice diligently and properly continue to perform Tramco's obligations under the Tram Maintenance Agreement.

5.2 Any period stipulated in the Tram Maintenance Agreement for the exercise by Tramco of a right of determination shall nevertheless be extended as may be necessary to take account of the period of notice required under clause 5.1.

5.3 Compliance by Tramco with the provisions of clause 5.1 shall not be treated as a waiver of any breach on the part of Infraco giving rise to the right of determination nor otherwise prevent Tramco from exercising its rights after the expiration of the notice unless the right of determination shall have ceased under the provisions of clause 5.4.

5.4 The right of Tramco to determine the Tram Maintenance Agreement or to rescind the Tram Maintenance Agreement or to discontinue the performance of any of its obligations in relation to the Tram Maintenance Agreement shall cease if within the period of 21 days referred to in clause 5.1, **tie** gives written notice to Tramco:

5.4.1 requiring Tramco to continue with the performance of all its obligations under the Tram Maintenance Agreement;

5.4.2 acknowledging that **tie** is assuming all the obligations of Infraco (as "Client") under the Tram Maintenance Agreement; and

5.4.3 undertaking to Tramco to discharge all amounts payable to Tramco under the terms of the Tram Maintenance Agreement from the date on which such notice under this clause 5.4 is given to Tramco.

5.5 Upon compliance by **tie** with the requirements of clause 5.4, the Tram Maintenance Agreement shall continue in full force and effect as if the right of determination on the part of Tramco had not arisen and in all respects as if the Tram Maintenance Agreement had been made between **tie** and Tramco to the exclusion of Infraco.

5.6 Notwithstanding that as between Infraco and Tramco, Tramco's right of determination of its engagement under the Tram Maintenance Agreement may not have arisen the provisions of clause 5.5 shall nevertheless apply if **tie** gives written notice to Tramco and Infraco to that effect and **tie** complies with the requirements on its part under clause 5.4.

5.7 Tramco does not need to be concerned or required to enquire whether, and shall be entitled to assume that, as between Infraco and **tie**, the circumstances have occurred permitting **tie** to give notice under clause 5.6.

5.8 Tramco acting in accordance with the provisions of this clause 5 shall not incur any liability to Infraco arising out of the exercise by **tie** of its rights under this clause 5.

5.9 Save as otherwise set out in this Agreement, unless and until **tie** has given notice under this clause 5:

5.9.1 **tie** has no liability whatsoever to Tramco in respect of amounts payable to Tramco under the Tram Maintenance Agreement; and

5.9.2 **tie** has no authority to issue any direction or instruction to Tramco in relation to the performance of Tramco's obligations under the Tram Maintenance Agreement.

5.10 Without prejudice to the provisions of clauses 5.1 to 5.9 inclusive, if prior to the service of any notice under clause 5.4 Tramco is determined under the Tram Maintenance Agreement for any reason whatsoever Tramco shall, if required in writing so to do by **tie**, no later than 12 weeks after the date of such determination forthwith enter into a new agreement with **tie** on the same terms as the Tram Maintenance Agreement, but with such revisions as **tie** and Tramco may reasonably require to reflect altered circumstances and the fact that it is **tie** and not Infraco employing Tramco.

6. ASSIGNATION

6.1 Tramco shall not assign, novate or otherwise transfer the whole or any part of this Agreement without the prior written agreement of **tie**.

6.2 **tie** shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

6.2.1 to the Scottish Ministers or any local authority or other body with no worse financial standing than that of **tie**; or

6.2.2 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to Tramco) by **tie** or a person falling within clause 6.2.1; or

6.2.3 to City of Edinburgh Council or Transport Edinburgh Limited; or

6.2.4 to any other person with the prior written consent of Tramco (such consent not to be unreasonably withheld or delayed).

7. LIABILITY OF TRAMCO

7.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by law of contract, delict or otherwise.

7.2 The responsibility of Tramco under this Agreement is not to be reduced or in any way released or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by **tie** against a third party.

7.3 The rights and remedies conferred upon **tie** by this Agreement are in addition to any other rights and remedies that **tie** may have against Tramco including (without prejudice to the generality of the foregoing) any remedies in delict.

7.4 Subject to the other provisions of this Agreement, the liability of Tramco to **tie** is to be determined in all respects in accordance with the terms of the Tram Maintenance Agreement and this Agreement and, in the event of any claim by **tie** under or through this Agreement, Tramco shall be entitled to rely upon any defence, right, limitation or exclusion under the Tram Maintenance Agreement as though **tie** were named as Client under it, except that:

7.4.1 **tie** shall not be affected by any subsequent variation of the Tram Maintenance Agreement which would adversely affect the obligations owed by Tramco or the waiver, compromise or withdrawal of any claim made by Infraco; and

7.4.2 Tramco shall not be entitled to exercise any right of set-off, retention or withholding against **tie** to which Tramco may be entitled as against Infraco.

7.5 The liability of Tramco under this Agreement shall be no greater in extent than the liability of Tramco under the Tram Maintenance Agreement.

7.6 In no event, the Tram Maintainer shall be responsible for indirect or consequential damages

8. DELIVERY, TITLE TO PARTS AND OTHER PROPERTY

Notwithstanding any provision of the Tram Maintenance Agreement to the contrary, in respect of Tramco's performance of its obligations under the Tram Maintenance Agreement:

8.1 Tramco shall transfer to **tie** or such other party as shall be notified by **tie** to Tramco in writing, each Spare Part or Special Tool upon delivery of such item to the Depot.

8.2 Title to all Parts (including Spare Parts and Special Tools) supplied or provided by Tramco pursuant to the Tram Maintenance Agreement which are not already owned by **tie** and which are installed on the Trams in the course of or as the result of the performance of the Services shall vest in **tie** free and clear of other all Security Interests. Tramco shall at its own expense take all such steps and execute, and procure the execution of, all such instruments as **tie** may reasonably require to ensure that title so passes to **tie** according to applicable Law. Tramco shall transfer title in the Deliverables to **tie** or such other party as **tie** shall notify to Tramco in writing, on the Tram Maintenance Commencement Date.

8.3 Any Part at any time removed from a Tram shall remain the property of **tie** and Tramco undertakes (and shall procure that its sub-contractors so undertake) to clearly identify such Parts as belonging to **tie** and to keep all such Parts stored separately from any third party's property.

8.4 Tramco shall not have or acquire title to any Tram, **tie** Supplied Goods or Technical Records by reason of the performance of its obligations under the Tram Maintenance Agreement. Tramco hereby waives (in favour of **tie**) and undertakes to **tie** that it shall not exercise any lien it may have or acquire over any Tram, **tie** Supplied Goods,

Technical Records or Deliverables. The Tram maintainer will have the right to access the Technical Records, and to store copies of such for the performance of Services under this agreement, or for the purpose of interpretation of this agreement

8.5 Tramco shall at its own expense label or otherwise clearly identify at all times as being the property of **tie** any Parts and/or raw materials and/or spares for the Trams in Tramco's or its agent's or sub-contractor's possession or control in relation to which title has vested in **tie** pursuant to this Agreement or the Tram Maintenance Agreement and Tramco shall ensure that such items shall at all times in Tramco's (its agent's or sub-contractor's) possession or control be kept separate from Tramco's or any third party's goods.

8.6 On termination of the Tram Maintenance Agreement Tramco shall promptly deliver to **tie** or such other party as shall be notified by **tie** to Tramco in writing any Parts, Spares, Tram Maintainer's Materials, Deliverables or other materials the property of which is vested in **tie** by virtue of this Agreement or the Tram Maintenance Agreement or as **tie** shall direct and if it shall fail to do so, **tie** or its agents may enter any premises of Tramco or of any sub-contractor, remove such Parts, Spares, Tram Maintainer's Materials, Deliverables and other materials and recover the cost of doing so from Tramco.

8.7 Tramco shall incorporate provisions equivalent to those provided in clauses 8.4 to this 8.7 (mutatis mutandis) in every sub-contract.

9. CONSENT OF INFRACO

9.1 Infraco consents to the terms of this Agreement.

10. NOTICES

10.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

10.2 Any notice given pursuant to this clause, if sent by registered or recorded delivery post, is deemed to have been received 48 hours after being posted.

11. RIGHTS OF THIRD PARTIES

11.1 A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

12. INVALID TERMS

12.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

12.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

12.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

13. VARIATIONS AND WAIVERS TO BE IN WRITING

13.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

14. WAIVER

14.1 Save where expressly stated, no failure or delay by any Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver or any subsequent breach.

14.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

15. JURISDICTION AND LAW

15.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

15.2 The Parties agree that any dispute in relation to this Agreement shall be conducted in accordance with Clause 52.1 (*Dispute Resolution*) of the Tram Maintenance

Agreement and the provisions of the said Clause 52.1 (*Dispute Resolution*) and Schedule 9 (*Dispute Resolution Procedure*) and Schedule 10 (*Panels*) are deemed to be incorporated mutatis mutandis in respect of this Agreement provided that any reference to "**Parties**" shall be deemed to refer to **tie** and Tramco, any reference to "**Client**" shall be deemed to refer to **tie**, and notices to be given in connection therewith shall be given in accordance with Clause 10 of this Agreement.

IN WITNESS WHEREOF these presents on this and the preceding [◆] pages are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at

on 2008 by:

Director _____

Full Name _____

Director _____

Full Name _____

EXECUTED for and on behalf of **SIEMENS PLC**
at

on 2008 by:

Authorised Signatory _____

Full Name _____

Authorised Signatory _____

Full Name _____

EXECUTED for and on behalf of
CONSTRUCCIONES Y AUXILIAR DE FERROCARRILES S.A. (CAF)

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

THIS IS SCHEDULE PART 22 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

TIE00899941_0001



(1) TIE LIMITED

- and -

(2) PARSONS BRINCKERHOFF LIMITED

PROVISION OF SYSTEM DESIGN SERVICES

relating to

THE EDINBURGH TRAM NETWORK

tie
Verity House
19 Haymarket Yards
Edinburgh
EH12 5BH

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AGREEMENT BETWEEN THE SDS PROVIDER AND THE JOINT REVENUE COMMITTEE 363

AGREEMENT

BETWEEN

(1) **TIE LIMITED** a company incorporated under the Companies Act with registration number SC230949 and having its registered office at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ (the "Client") which expression shall include its successors in title and permitted assignees; and

(2) **PARSONS BRINCKERHOFF LIMITED** a company incorporated under the Companies Act with registration number 2554514 and having its registered office at Amber Court, William Armstrong Drive, Newcastle Business Park, Newcastle Upon Tyne, NE4 7YQ (the "SDS Provider") which expression shall include its permitted assignees.

WHEREAS

A. **tie** requires a consultant to perform the Services (as hereinafter defined) in respect of the Edinburgh Tram Network (as hereinafter defined).

B. Pursuant to a notice published in the Official Journal of the European Union on 28 December 2004 with reference 2004/S252-217951, **tie** invited expressions of interest from appropriately qualified parties for the performance of the Services.

C. By competitive procurement process, conducted in accordance with Law, **tie** has selected the SDS Provider to perform the Services in accordance with this Agreement.

D. **tie** has issued a Letter of Appointment (as hereinafter defined) in response to the SDS Provider's Formal Offer (as hereinafter defined).

E. **tie** intends to appoint an infrastructure provider (the "**Infraco**") to complete the design, and carry out the construction, installation, commissioning and maintenance planning in respect of the Edinburgh Tram Network. It is further intended that the contract which the infrastructure provider will enter into with **tie** will require the infrastructure provider to accept responsibility for design and other work carried out by the SDS Provider for **tie** under the terms of this Agreement.

F. If required by **tie**, **tie** and the SDS Provider have agreed to the novation of this Agreement upon and subject to the terms of this Agreement to the infrastructure provider to be appointed by **tie**.

NOW IT IS HEREBY AGREED AS FOLLOWS:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement (including the recitals and the Schedules), save as otherwise expressly stated or as the context otherwise requires, the following words and expressions shall have the meanings hereby ascribed to them:

"**Abortive Work**" means any work which cannot be used in relation to the Edinburgh Tram Network (but not including work occurring as part of the iterative process of design);

"**AFC**" means automatic fare collection;

"**Affected Party**" means a Party that is unable to comply with all or a material part of its obligations under this Agreement as a direct result of a Force Majeure Event;

"**Agreement**" means the main body of this document (as may be amended from time to time in accordance with this Agreement) together with the Schedules, and the Formal Offer, and the Letter of Appointment;

"**ALARP**" means as low as reasonably practicable;

"**Approval Bodies**" means any Relevant Authorities, planning authorities, roads authorities, HMRI, Network Rail and any other parties who are to issue Consents which may be required for the construction, installation, commissioning, completion and opening of the Edinburgh Tram Network;

"**BAA**" means BAA plc, a company incorporated under the Companies Act with registration number 1970855 and having its registered office at 130 Wilton Road, London, SW1V 1LQ which expression shall include its successors in title and assignees;

"**Background Information**" means all and any materials, documents, drawings, plans or other information in paper, electronic or any other form, relating in any way to this Agreement and the Tram Legislation (and the parliamentary process) and made available to the SDS Provider by **tie**, CEC and/or any of their respective members, officers, agents and/or advisers during the procurement competition relative to this Agreement or thereafter;

"**Business Day**" means any day other than a Saturday, Sunday or a public holiday recognised by CEC;

"**CCTV**" means closed circuit television;

"**CDM Regulations**" means the Construction (Design and Management) Regulations 1994 (S.I. 1994/3140) or any Regulations superceding these;

"**CEC**" means the City of Edinburgh Council and its successors and assignees whomsoever;

"**Cess**" means safe area at the side of the tram track;

"**Change in Control**" means any sale or disposal of any legal, beneficial or equitable interest in any or all of the share capital of a corporation or the control over the exercise of voting rights in a corporation or the control over the right to appoint or remove directors of a corporation;

"**Change in Law**" means the coming into effect after the last date of execution of this Agreement of:

(a) Legislation, other than any Legislation which on the date of this Agreement has been published:

(i) in a draft Bill as part of a Scottish Executive/Scottish Parliament or United Kingdom Government consultation paper;

(ii) in a Bill (including the Tram Bills);

(iii) in draft subordinate Legislation within the meaning of section 21(1) of the Interpretation Act 1978; or

(iv) as a proposal in the Official Journal of the European Communities;

(b) any Guidance (other than Guidance which on the date of this Agreement has been published (in draft or otherwise) in any Scottish Executive, Scottish Parliament or United Kingdom Government consultation paper (and/or on any Scottish Executive, Scottish Parliament or United Kingdom Government internet site)); or

(c) any applicable judgement of a relevant court of law which changes a binding precedent;

"Client Change" means any addition, modification, reduction or omission in respect of the Services or any other term of this Agreement instructed in accordance with Clause 7.2, Clause 15 (*Changes*) or Clause 29 (*Novation*);

"Client Change Order" means the written confirmation issued by the Client to proceed with a Client Change on the basis of an Estimate (as modified, if required);

"Client Default" means one of the following events:

(a) a failure by the Client to make payment of any amount of money that is certified in an Interim Certificate as due and payable by the Client to the SDS Provider under this Agreement exceeding 5% of the value of the Services to be performed under this Agreement (as such value is determined in accordance with this Agreement); or

(b) a breach by the Client of any of its material obligations under this Agreement which substantially frustrates or renders it impossible for the SDS Provider to perform its obligations under this Agreement for a continuous period of 30 days;

"Client Notice of Change" means a notice served by the Client pursuant to Clause 15.1, setting out the matters specified in Clause 15.2;

"Client Party" means any advisers appointed by the Client or any of the Client's employees, agents, contractors and sub-contractors of any tier and its or their directors, officers and employees (excluding the SDS Provider or any SDS Provider Party);

"Client's Representative" means the person or persons appointed by the Client from time to time and notified to the SDS Provider;

"Code" means the Scottish Ministers' Code of Practice on the Discharge of Functions by Public Authorities under the Freedom of Information (Scotland) Act 2002 as the same may be amended, varied or replaced from time to time;

"Code of Construction Practice" means the code which has been developed in conjunction with all relevant parties with regard to construction practices, environmental issues, safety issues and other aspects relative to the construction, installation and commissioning of the Edinburgh Tram Network;

"Commercially Sensitive Information" means the subset of Confidential Information listed in Schedule 5 (*Commercially Sensitive Information*) comprised of information:

(a) which is provided by the SDS Provider to the Client in confidence for the period set out in that schedule; and/or

(b) that constitutes a trade secret;

"**Confidential Information**" means any information which has been designated as confidential by either Party in writing or that ought to be considered as confidential (however it is conveyed or on whatever media it is stored) including information which relates to the business, affairs, properties, assets, trading practices, goods, services, developments, trade secrets, Intellectual Property Rights, know-how, personnel of either Party, all personal data and sensitive personal data within the meaning of the Data Protection Act 1998, and the Commercially Sensitive Information;

"**Consents**" means without limitation all permissions, consents, approvals, non-objections, certificates, permits, licences, agreements, statutory agreements and authorisations, Planning Permissions, traffic regulation orders, building fixing agreements, building control approvals, building warrants, and all other necessary consents and agreements from the Approval Bodies, or any Relevant Authority, any other relevant third parties whether required by Law or the Tram Legislation or under contract;

"**Construction Panel**" has the meaning given to it in Clause 28.19.1;

"**Construction Proposals**" means the proposals for the construction, installation and commissioning of the Edinburgh Tram Network to be developed by the Infraco;

"**Control Room**" means a centralised control room within the Depot which will facilitate tram servicing and maintenance;

"**Data Radio**" means a system that allows two way data communication for monitoring, control and recording between the Control Room and remote equipment eg trams, TPDS, PCC, PHC, sub-station equipment, TVM, PID, UTX and signals;

"**DCCB**" means direct current circuit breaker;

"**DDA**" means the Disability Discrimination Act 1995;

"**Deliverables**" means the Functional Requirements Specifications, the Technical Specifications and the items listed in Appendix 3 to Schedule 1 *(Scope of Services)*, and all other documents, information, reports, diagrams, bills of quantities, records, manuals, schedules, databases, reinforcement details, photographs, formulae, consultation materials, plans, designs, specifications, drawings (including as-built drawings), details, calculations, transport and other models and simulations, the outputs and reports based on any models, programmes and all other material created and/or provided by the SDS Provider (and/or any SDS Provider Party or any other third party) in the performance of the Services and the SDS Provider's other obligations under this Agreement;

"**Depot**" has the meaning given in paragraph 1.1.4 of Schedule 11 (*Requirements Specification for Overall System Operational and Performance Requirements*);

"**Design Manual**" means the design manual issued by CEC as may be amended from time to time;

"**Design and Technical Gateway Process**" means the process set out in Clause 7.3 of this Agreement;

"**Design and Technical Services**" means those services described in paragraph 2 of Schedule 1 (*Scope of Services*) as may be amended from time to time in accordance with this Agreement;

"Detailed Design Phase" means the phase described in paragraph 2.6 of Schedule 1 *(Scope of Services);*

"Detailed Design Phase Milestone Payment" means the sum of money identified in respect of the milestone payment for Detailed Design Phase in Schedule 3 *(Pricing Schedule)* as may be adjusted from time to time in accordance with this Agreement;

"Detailed Design Phase Sub-Milestones" means the sub-milestones identified as occurring during the Detailed Design Phase in Schedule 3 *(Pricing Schedule)* as may be adjusted from time to time in accordance with this Agreement;

"Detailed Design Phase Sub-Milestone Payments" means the sum of money identified in respect of each Detailed Design Phase Sub-Milestone in Schedule 3 *(Pricing Schedule)* as may be adjusted from time to time in accordance with this Agreement;

"Discriminatory Change in Law" means a Change in Law, the terms of which apply expressly to:

(a) the Edinburgh Tram Network; and/or

(b) the SDS Provider and not to other persons;

"Dispute" means any dispute, difference or unresolved claim between the Parties in connection with or arising from this Agreement;

"Dispute Resolution Procedure" means the procedure set out in Clause 28 (*Dispute Resolution Procedure*);

"DKE" means developed kinematic envelope;

"DNO" means district network operator;

"DPOFA" means the development partnering and operating franchise agreement between **tie** and the Operator dated 14 May 2004;

"Edinburgh Tram Network" means Line One and Line Two or either of them, as may be amended from time to time, together with any modification, line extension, spur, interconnection and any additional line which may be instructed by **tie;**

"Effective Date" shall have the meaning given in Clause 2.1;

"E&M" means electrical and mechanical;

"EMC" means electro magnetic current;

"Environmental Statement" means the environmental statements supporting each of the Tram Bills;

"Environmental Information Regulations" means the Environmental Information (Scotland) Regulations 2004, Scottish SI 2004/520;

"E & P" means electrification and power;

"Estimate" means the estimate to be provided by the SDS Provider pursuant to Clause 15.3;

"Final Persistent Breach Notice" has the meaning given in Clause 24.2;

"Financial Panel" has the meaning given to it in Clause 28.19.1;

"FOISA" means the Freedom of Information (Scotland) Act 2002 and any subordinate legislation made under this Act from time to time together with any guidance and/or codes of practice issued by the Scottish Information Commissioner in relation to such legislation;

"Force Majeure Event" means the occurrence after the Effective Date of:

(a) war, civil war, armed conflict or terrorism; or

(b) nuclear, chemical or biological contamination unless the source of the contamination is the result of actions by the SDS Provider or any SDS Provider Party; or

(c) pressure waves caused by devices travelling at supersonic speeds;or

(d) a natural disaster.

"Formal Offer" shall mean the tender for the Services issued by the SDS Provider and dated 13th May 2005 as the same has been amended and/or supplemented by letters and attachments from Mike Jenkins to Ian Kendall dated 8 June 2005 and 29 June 2005 and letters from David Hutchison to Ian Kendall dated 10 August 2005 and 2 September 2005;

"4ft" means the distance between inner sides of the two running rails of the track;

"Functional Requirements Specifications" means the Requirements Specification for Civil Engineering Works, the Requirements Specification for Overall System Operational and Performance Requirements, the Requirements Specification for Supervision, Command and Control Suite of Systems, the Requirements Specification for Electrification and Power, the Requirements Specification for Tram Vehicle, and the System-Wide Non-Functional Requirements as may be amended and developed from time to time;

"Funder's Direct Agreement" means the direct agreement to be entered into between any funder and the SDS Provider in relation to the Infraco Contract;

"General Change in Law" means a Change in Law which is not a Discriminatory Change in Law or a Specific Change in Law;

"Good Industry Practice" means using standards, practices, methods and procedures conforming to Law and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably be expected from a large, reputable, professionally qualified, competent and skilled organisation experienced in carrying out activities of a similar nature, scope and complexity to those comprised in the Services, and seeking in good faith to comply with its contractual obligations and all duties owed by it;

"GSN" means global structured notation for safety cases;

"Guarantee Agreement" means the agreement guaranteeing the due, proper and complete performance of obligations of the SDS Provider and entered into among PB International Inc., PBC International Inc., the SDS Provider and **tie** dated on or around the date hereof;

"**Guidance**" means the any applicable guidance, direction or determination issued by any regulatory body with which the Client and/or the SDS Provider is bound to comply;

"**HCI**" means human computer interface;

"**HF**" means human factors;

"**HMRI**" means Her Majesty's Railway Inspectorate;

"**HSE**" means Health & Safety Executive;

"**HVAC**" means heating, ventilation and air conditioning;

"**IEC**" means International Electrotechnical Commission;

"**Indemnified Liabilities**" means actions, claims (including third party claims), demands, proceedings, losses, damages, liabilities, costs and expenses (including reasonable legal fees and expert witness fees);

"**Indemnified Parties**" has the meaning given in Clause 27.1;

"**Indirect Loss**" means any business interruption, loss of profits, loss of business, loss of business opportunity, loss of or damage to or corruption of data or loss of management time or time of other employees;

"**Information**" has the meaning given under section 73 of FOISA;

"**Infraco**" means the infrastructure provider to be appointed or appointed by **tie** in relation to the Edinburgh Tram Network;

"**Infraco Contract**" means the contract to be entered into or entered into by **tie** with the Infraco in relation to the completion of the design, and carrying out the construction, commissioning and maintenance planning of the Edinburgh Tram Network;

"**Insolvency Event**" means any of the following events:

(a) the SDS Provider is unable to pay its debts as they fall due or is insolvent or admits in writing inability to pay its debts as they fall due;

(b) the SDS Provider suspends for a period of two months making payments on all or any class of its debts or a moratorium is declared by the SDS Provider in respect of its indebtedness;

(c) the SDS Provider ceases business or announces an intention to do so;

(d) the SDS Provider (being an individual), such expression to include single members of a partnership (whether limited or not) becomes bankrupt or makes composition or arrangement with its creditors, or is the subject of an application to the Court for an interim order under the Insolvency Act 1986,

(e) the following are entered into:

(i) a voluntary arrangement (other than a solvent one) for a composition of debts of the SDS Provider;

(ii) a scheme of arrangement in respect of the SDS Provider pursuant to the Insolvency Act 1986 or the Companies Act 1985; or

(iii) a material composition or arrangement other than a solvent one with the SDS Provider's creditors;

(f) either of the following:

(i) the winding-up of the SDS Provider (including passing a shareholders' resolution or the presentation of a petition by the SDS Provider for the purpose of winding up the SDS Provider); or

(ii) its administration (including where an application is made by the SDS Provider, or petition is presented by the SDS Provider for or any meeting of its directors or members resolves to make an application for an administration order);

(g) an order for the winding-up or administration of the SDS Provider is made;

(h) any liquidator, judicial custodian, receiver, administrative receiver, administrator or the like is appointed in respect of the SDS Provider or any material part of the SDS Provider's assets;

(i) possession is taken of, or any execution or other process (other than on the dependence or inhibition) is levied or enforced upon, any material part of the property (whether real or personal) of the SDS Provider by or on behalf of any creditor or encumbrancer of the SDS Provider;

(j) anything analogous to any of the events mentioned in paragraphs (a) to (h) above occurs in relation to the SDS Provider under the law of any relevant jurisdiction; or

(k) in the event that **tie** has made a demand pursuant to the Guarantee Agreement for due, proper and complete performance of any of the SDS Provider's obligations, including indemnification against liabilities incurred by **tie** by reason of the SDS Provider's default under this Agreement and, in the opinion of **tie** (acting reasonably), no substantive action in response to such demand has been taken within a period of 14 days of the date of such demand. For the avoidance of doubt, this provision creates no requirement on **tie** to make such demand prior to any decision by **tie** on the operation of Clause 19 (*Termination on SDS Provider Default*);

"**Intellectual Property Rights**" means any rights in or to any patent, design right, utility model, trade mark, brand name, service mark, trade name, business name, logo, invention (whether registered or unregistered), domain name, semi-conductor right, topography right, software designs and/or other materials, source code, copyright, moral right, or rights in databases and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or for an extension, revival or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the law of Scotland or of any other jurisdiction;

"**Interim Certificate**" means any notice to be issued by the Client in accordance with Clause 12.3;

"Internal Resolution Procedure" means the procedure described in Clause 28.10;

"Joint Revenue Committee" means the consultant or consultants appointed by **tie** to perform transport modelling functions in relation to the Edinburgh Tram Network;

"Key Personnel" means those staff specified as such in Schedule 2 (*Key Personnel*);

"Law" means:

(a) any applicable Legislation;

(b) any applicable Guidance; and

(c) any applicable judgment of a relevant court of law which is a binding precedent,

in each case in force in Scotland;

"Legal Panel" has the meaning given to it in Clause 28.19.1;

"Legislation" means any Act or instruments of the Scottish Parliament or the United Kingdom Parliament or subordinate legislation within the meaning of section 21(1) of the Interpretation Act 1978, any exercise of the Royal Prerogative, and any enforceable community right within the meaning of section 2 of the European Communities Act 1972;

"Letter of Appointment" means the letter from the Client to the SDS Provider dated 6th September 2005 accepting the SDS Provider's Formal Offer;

"Line One" means Sectors DHY6 (excluding the tramstop at Murrayfield and the alignment between that tramstop and the junction at Roseburn), HOT1, HOT2, HOT3, HOT4, HOT5, HOT6, HCT1, CTO1 and CTO2 as may be amended from time to time;

"Line Two" means Sectors ARP1, DHY1, DHY2, DHY3, DHY4, DHY5, DHY6 (excluding the tramstop at Haymarket and the alignment between that tramstop and the junction at Roseburn), and GNB1 as may be amended from time to time;

"Line One and Line Two" means Sectors ARP1, DHY1, DHY2, DHY3, DHY4, DHY5, DHY6, HOT1, HOT2, HOT3, HOT4, HOT5, HOT6, HCT1, CTO1, CTO2 and GNB1 as may be amended from time to time;

"Management Fees" means the sum of money identified in respect of management fees in Schedule 3 *(Pricing Schedule)* as may be adjusted from time to time in accordance with this Agreement;

"Master Project Programme" means the project programme to be prepared, maintained, updated and amended from time to time by **tie** and notified to the SDS Provider and as may be extended in accordance with Clause 7.5 of this Agreement;

"M & E" means mechanical and electrical;

"Milestone Completion Certificate" means the certificate to be issued by the Client in accordance with Clause 7.3 in relation to the completion of the Requirements Definition Phase, the System-Wide Preliminary Design Requirements, the Preliminary Design Phase and the Detailed Design Phase;

"Network Diagram" means the diagram identified in the Requirements Specification for Overall System Operational and Performance Requirements;

"Network Rail" means Network Rail Infrastructure Limited, a company incorporated under the Companies Act with registered number 2904587 and having its registered office at 40 Melton Street, London, NW1 2EE which shall include its successors in title and assignees;

"Notice of Adjudication" has the meaning given in Clause 28.16;

"Notification" has the meaning given in Clause 28.10.1;

"Novation Agreement" means the novation agreement to be entered into among **tie**, the SDS Provider and the Infraco in the form set out in Schedule 8 (*Novation Agreement*);

"OLE" means overhead line equipment;

"Open Book Basis" means the availability and disclosure (consistent with operation of Clause 14 (*Audit*)) of all underlying data and calculations used by the SDS Provider to create and justify costings and financial analysis presented to the Client;

"Operations Panel" has the meaning given to it in Clause 28.19.1;

"Operator" means Transdev Edinburgh Tram Limited, a company incorporated in Scotland under registered number SC267598 and having its registered office at Level 2, Saltire Court, 20 Castle Terrace, Edinburgh EH1 2ET, appointed by **tie** as operator under the DPOFA;

"ORS" means operational radio system;

"PA" means public address;

"Panels" has the meaning given to it in Clause 28.19;

"Parliamentary Undertakings" means any undertaking given to a Parliamentary Committee during the passage of the Tram Bills through the Scottish Parliament, and any undertaking or agreement given to any person in consideration of his refraining from opposition to the Tram Bills through the Scottish Parliament;

"Party" means each and any of the parties to this Agreement and "Parties" shall be construed accordingly;

"P3e" means Primavera 3e;

"PCC" means point control cabinet;

"Permitted Variation" means a Client Change, a change proposed by the SDS Provider or a Qualifying Change in Law, as agreed or determined to proceed in accordance with this Agreement;

"Persistent Breach Notice" has the meaning given in Clause 24.1;

"PHC" means point heating cabinet;

"PHP" means passenger help point;

"PID" means passenger information display;

"Planned Service Commencement Date" means the programmed date of service commencement of 31 December 2009 as may be amended from time to time by **tie** and notified to the SDS Provider;

"Planning Permission" means any planning permission, planning approval, approval of reserved matters. listed building consent, conservation areas consent and/or other consent or approval;

"Position Paper" has the meaning given in Clause 28.10.2;

"Preliminary Design Phase" means the phase described in paragraph 2.4 of Schedule 1 *(Scope of Services);*

"Preliminary Design Phase Milestone Payment" means the sum of money identified in respect of the milestone payment for Preliminary Design Phase in Schedule 3 *(Pricing Schedule)* as may be adjusted from time to time in accordance with this Agreement;

"Preliminary Design Phase Sub-Milestones" means the sub-milestones identified as occurring during the Preliminary Design Phase in Schedule 3 *(Pricing Schedule)* as may be adjusted from time to time in accordance with this Agreement;

"Preliminary Design Phase Sub-Milestone Payments" means the sum of money identified in respect of each Preliminary Design Phase Sub-Milestone in Schedule 3 *(Pricing Schedule)* as may be adjusted from time to time in accordance with this Agreement;

"Programme" means the programme set out in Schedule 4 (*Programme*) (as maintained, updated and amended from time to time by the SDS Provider in accordance with this Agreement) as may be extended in accordance with Clause 7.5 of this Agreement which shall include the Programme Phasing Structure;

"Programme Phasing Structure" means the programme set out in Appendix 2 of Schedule 1 *(Scope of Services)* as may be amended by **tie** from time to time and notified to the SDS Provider;

"Prohibited Act" means:

(a) offering, giving or agreeing to give to **tie**, the Scottish Executive, CEC, or any **tie** Party or any other public body or any person owned or employed by any of them any gift or consideration of any kind as an inducement or reward:

(i) for doing or not doing (or for having done or not having done) any act in relation to the obtaining or performance of this Agreement; or

(ii) for showing or not showing favour or disfavour to any person in relation to this Agreement;

(b) paying commission or agreeing to pay commission to any person in connection with the award of this Agreement;

(c) committing any offence:

(i) under the Prevention of Corruption Acts 1889-1916 or section 68(2) of the Local Government (Scotland) Act 1973;

(ii) under any Law creating offences in respect of fraudulent acts; or

(iii) at common law in respect of fraudulent acts in relation to this Agreement or any other relevant agreement with **tie**, the Scottish Executive, CEC or any other public body; or

(d) defrauding or attempting to defraud or conspiring to defraud **tie**, CEC, the Scottish Executive or any other public body;

Any references within this Agreement to any "Prohibited Act" shall include acts outwith the United Kingdom and the references within the definition "Prohibited Act" to UK legislation shall be deemed to be amended to refer to legislation in other jurisdictions outside of the United Kingdom.

"Project IPR" means all Intellectual Property Rights in the Deliverables and the Specially Written Software and any other Intellectual Property Rights created in the performance of the Services which are specific in nature to the performance of the Services;

"Qualifying Change in Law" means:

(a) a Discriminatory Change in Law; and/or

(b) a Specific Change in Law;

"Referral Notice" has the meaning given in Clause 28.27;

"Referring Party" has the meaning given in Clause 28.16;

"Related Contract" has the meaning given in Clause 28.55;

"Related Dispute" has the meaning given in Clause 28.55;

"Relevant Authority" means any court with the relevant jurisdiction and any local authority, national authority or supra national agency, inspectorate, minister, Scottish Executive, body, official or public or statutory person of the government of the United Kingdom or of the European Union and "Relevant Authorities" shall be construed accordingly;

"Requests for Information" shall have the meaning set out in FOISA or any apparent request for information under FOISA, the Environmental Information Regulations or the Code;

"Required Insurances" means the insurances set out in Part 1 of Schedule 6 (*Required Insurances*) as may be amended from time to time in accordance with this Agreement;

"Requirements Definition Phase" means the phase described in paragraph 2.3 of Schedule 1 *(Scope of Services)*;

"Requirements Definition Phase Milestone Payment" means the sum of money identified in respect of the milestone payment for the Requirements Definition Phase in Schedule 3 *(Pricing Schedule)* as may be adjusted from time to time in accordance with this Agreement;

"**Requirements Definition Phase Sub-Milestones**" means the sub-milestones identified as occurring during the Requirements Definition Phase in Schedule 3 *(Pricing Schedule)* as may be adjusted from time to time in accordance with this Agreement;

"**Requirements Definition Phase Sub-Milestone Payments**" means the sum of money identified in respect of each Requirements Definition Phase Sub-Milestone in Schedule 3 *(Pricing Schedule)* as may be adjusted from time to time in accordance with this Agreement;

"**Requirements Specification for Civil Engineering Works**" means the specification set out in Schedule 12 (*Requirements Specification for Civil Engineering Works*) as may be amended and developed from time to time in accordance with this Agreement;

"**Requirements Specification for Electrification and Power**" means the specification set out in Schedule 14 (*Requirements Specification for Electrification and Power*) as may be amended from time to time in accordance with this Agreement;

"**Requirements Specification for Overall System Operational and Performance Requirements**" means the specification set out in Schedule 11 (*Requirements Specification for Overall System and Operational Performance Requirements*) as may be amended and developed from time to time in accordance with this Agreement;

"**Requirements Specification for Supervision, Command and Control Suite of Systems**" means the specification set out in Schedule 13 (*Requirements Specification for Supervision, Command and Control Suite of Systems*) as may be amended and developed from time to time in accordance with this Agreement;

"**Requirements Specification for Tram Vehicle**" means the specification set out in Schedule 15 (*Requirements Specification for Tram Vehicle*) as may be amended and developed from time to time in accordance with this Agreement;

"**Responding Party**" has the meaning given in Clause 28.17;

"**Retention**" has the meaning given in Clause 12.7.1;

"**Review Procedure**" means the review procedure set out in Schedule 9 *(Review Procedure)*;

"**RSPG**" means Railway Safety Principles and Guidance, issued by HMRI under HSE;

"**RVAR**" means Rail Vehicle Accessibility Regulations;

"**SCADA**" means supervisory control and data acquisition system;

"**Schedules**" means Schedule 1 (*Scope of Services*), Schedule 2 (*Key Personnel*), Schedule 3 (*Pricing Schedule*), Schedule 4 (*Programme*), Schedule 5 (*Commercially Sensitive Information*), Schedule 6 (*Required Insurances*), Schedule 7 (*Draft Collateral Warranties*), Schedule 8 (*Novation Agreement*), Schedule 9 (*Review Procedure*), Schedule 10 *(Panels for the Dispute Resolution Procedure*), Schedule 11 (*Requirements Specification for Overall System Operational and Performance Requirements*), Schedule 12 (*Requirements Specifications for Civil Engineering Works*), Schedule 13 (*Requirements Specification for Supervision, Command and Control Suite of Systems*), Schedule 14 (*Requirements Specification for Electrification and Power*), Schedule 15 (*Requirements Specification for Tram Vehicle*), Schedule

16 (*System-Wide Non-Functional Requirements*), and Schedule 17 (*Agreement between the SDS Provider and the Joint Revenue Committee*), as the same may be amended from time to time in accordance with the terms of this Agreement;

"SDS Provider Default" means the events set out in Clause 19.1;

"SDS Provider IPR" means:

(a) all Intellectual Property Rights (including Intellectual Property Rights in relation to the SDS Provider Software) in respect of or derived from work product created or services performed by the SDS Provider in relation to the transportation sector (in particular the railway and light rail sectors) which the SDS Provider can demonstrate by documentary evidence were already existing and owned by or licensed to the SDS Provider prior to the Effective Date; and

(b) any modifications or developments of any of the rights listed in paragraph (a) above which are generic in nature and not specific to the performance of the Services;

"SDS Provider Party" means any sub-consultant, supplier, sub-contractor, specialist and/or any other party appointed by the SDS Provider in accordance with Clause 9 (*Sub-Letting and the Appointment of SDS Provider Parties*) to perform any part of the Services (and "SDS Provider Parties" will be construed accordingly);

"SDS Provider Software" means programs, the Intellectual Property Rights in which are (a) owned by the SDS Provider; and (b) used by the SDS Provider to carry out its obligations under this Agreement;

"SDS Provider's Representative" shall have the meaning given to it in Clause 10.8;

"SDS-JRC Modelling Suite" has the meaning given in paragraph 3.5.1 of Schedule 1 (*Scope of Services*);

"Sector" means each sector identified in the Programme Phasing Structure;

"Services" shall mean those services to be performed by the SDS Provider which are set out in Schedule 1 (*Scope of Services*) and for the avoidance of any doubt, shall include any variations pursuant to the provisions of this Agreement, and shall also include the other obligations which the SDS Provider is required to carry out as expressed under this Agreement;

"Service Commencement Date" means the date the Edinburgh Tram Network goes into passenger carrying service;

"Specially Written Software" means programs which are written by or on behalf of the SDS Provider specifically to enable the SDS Provider to carry out its obligations under this Agreement;

"Specific Change in Law" means any Change in Law which specifically applies to the provision of a service the same as or similar to the Services (but not to the provision of other services) but excluding the making, amendment or revocation of any traffic regulation order;

"Stage Build" means part of the Edinburgh Tram Network that once commissioned can be opened for Trial Operation;

"Sub-Milestones" means those sub-milestones identified in Schedule 3 (*Pricing Schedule*) as may be adjusted from time to time in accordance with this Agreement;

"Submitted Item" has the meaning given in paragraph 1.2 of Schedule 9 (*Review Procedure*);

"Sub-Sector" means each sub-sector identified in the Programme Phasing Structure;

"System-Wide Preliminary Design Requirements" means those high level requirements for the whole of the Edinburgh Tram Network described in paragraph 2.4 of Schedule 1 (*Scope of Services*);

"System-Wide Non-Functional Requirements" means the requirements set out in Schedule 16 (*System-Wide Non-Functional Requirements*) as may be amended and developed from time to time in accordance with this Agreement;

"TBC" means traction/brake controller;

"Technical Specifications" are the specifications to be prepared by the SDS Provider to describe the technical aspects of each part of the Edinburgh Tram Network which shall meet the Functional Requirements Specifications and shall allow all aspects of the Edinburgh Tram Network to be procured, constructed, installed, commissioned and maintained;

"Termination Date" means the date of termination expressed in a notice served in accordance with Clauses 19 (*Termination for SDS Provider Default)*, 20 (*Termination, Abandonment or Suspension of the Services by the Client*), 21 (*Termination for* the *Client Default*), 22 (*Termination for Corrupt Gifts and Payments*), 23 (*Termination by Reason of Force Majeure*) or 24 (*Persistent Breach*) (as appropriate);

"Third Party Software" means programs, the Intellectual Property Rights in which are (a) owned by a third party and (b) used by SDS Provider to carry out its obligations under this Agreement;

"tie" means a company incorporated under the Companies Act with registered number SC230949 and having its registered office at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ which shall include its successors in title and permitted assignees;

"tie Party" means any advisers appointed by **tie** or any of **tie's** agents, employees, contractors and sub-contractors of any tier and its or their directors, officers and employees (but excluding the SDS Provider, any SDS Provider Party) and statutory undertakers and utilities;

"TLA" means three letter acronym;

"Topics Register" means the central project register of all known issues relating to the design, construction, testing, commissioning, operation and maintenance of the Edinburgh Tram Network;

"TPDS" means tram position and detection system;

"Tram Bills" means the Edinburgh Tram (Line One) Bill and the Edinburgh Tram (Line Two) Bill,

"Tram Legislation" means the Edinburgh Tram (Line One) Bill and the Edinburgh Tram (Line Two) Bill, and after such Bills are enacted means the Edinburgh Tram

(Line One) Act, the Edinburgh Tram (Line Two) Act and such other legislation relative to the Edinburgh Tram Network as may be enacted from time to time;

"Tram Supplier" means the tram supplier to be procured by **tie** in relation to the supply of trams for the Edinburgh Tram Network;

"Tram Supply Contract" means the contract to be entered into by **tie** or other party with the Tram Supplier in relation to the supply of trams for the Edinburgh Tram Network;

"Transport Edinburgh Limited" means Transport Edinburgh Limited, (registered number SC269639) and having its registered office at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ which shall include its successors in title and permitted assignees;

"Trial Operation" means the timetabled operation by the Operator of the Edinburgh Tram Network prior to the Service Commencement Date;

"TRTS" means tram ready to start;

"TSS Provider" means the technical support services provider to be appointed by **tie**;

"TVM" means automatic ticket vending machine;

"UPS" means uninterruptible power supply;

"UTC" means urban traffic control;

"UTX" means urban traffic controller device;

"VDV" means vibration dose value;

"WBS" means work breakdown structure;

1.2 Unless the context requires otherwise:

1.2.1 words importing gender include masculine, feminine and neuter;

1.2.2 the singular includes the plural and vice versa;

1.2.3 a reference to any part, Clause, sub-clause or Schedule is, except where it is expressly stated to the contrary, a reference to such part, Clause or sub-clause of or Schedule to this Agreement;

1.2.4 a reference in any Schedule to any part, paragraph or sub-paragraph is, except where it is expressly stated to the contrary, a reference to such part, paragraph or sub-paragraph of that Schedule (as the case may be);

1.2.5 any reference to this Agreement or to any other document shall include any variation, amendment, or supplement to this Agreement or such document as expressly permitted under the terms of this Agreement;

1.2.6 any reference to any enactment, order, regulation or other similar instrument (including any EU instrument) (whether specifically named or not) shall be construed as a reference to the enactment, order, regulation or instrument as amended, replaced, consolidated or re-enacted and shall include any orders, consents, regulations, legally binding codes of practice or subordinate legislation (within the meaning of section 21(1) of the Interpretation Act 1978) made thereunder;

1.2.7 a reference to a person includes individuals, firms, partnerships, bodies corporate, joint ventures, government departments and any organisation capable of suing or being sued and references to any of the same include the others and their successors and assignees and transferees to the extent that such assignation and transfer are expressly permitted under the terms of this Agreement;

1.2.8 headings and the contents list are for convenience of reference only and do not affect the interpretation of this Agreement;

1.2.9 the ejusdem generis rule does not apply and the meaning of general words is not to be restricted by any particular examples preceding or following those general words;

1.2.10 a reference to a time of day is a reference to the time in Scotland;

1.2.11 subject to the restrictions imposed by this Agreement on subcontracting, an obligation to do something includes an obligation to procure it to be done;

1.2.12 an obligation not to do something includes an obligation not to wilfully allow it to be done;

1.2.13 the word "including" means "including without limitation";

1.2.14 a reference to "consent" shall mean consent in writing;

1.2.15 any reference to any Deliverable or course of action being reviewed, approved, agreed, consented to or otherwise processed in accordance with this Agreement means that the provisions of Schedule 9 (*Review Procedure*) shall apply except where otherwise agreed in writing by the Client.

1.3 This Agreement shall be interpreted and construed as a whole provided that in the event of any inconsistency or conflict between:

1.3.1 the main body of this Agreement and the Schedules, the main body of this Agreement shall prevail to the extent of any such inconsistency or conflict over the Schedules

1.3.2 the main body of this Agreement and the Schedules and the Formal Offer and/or the Letter of Appointment, the main body of the Agreement and the Schedules shall prevail to the extent of any such inconsistency or conflict over the Formal Offer and/or the Letter of Appointment

unless expressly stated otherwise by the Client.

1.4 In the case of any inconsistency or conflict between or in any of the documents forming the Agreement, or any inconsistency or conflict between the Agreement and any instructions from the Client or the Client's Representative, the SDS Provider shall notify the Client within 3 Business Days and the Client, subject to Clause 1.3, shall

issue in writing such further instructions as the Client considers appropriate in its absolute discretion to resolve the inconsistency or conflict.

1.5 Where a Party comprises two or more persons:

1.5.1 any obligations on the part of that Party contained or implied in this Agreement are deemed to be joint and several obligations on the part of those persons; and

1.5.2 references to that party include references to each and any of those persons.

2. TERM OF THIS AGREEMENT

2.1 This Agreement shall come into effect on the last date of execution of this Agreement and shall continue in effect until the date on which the SDS Provider is notified by the Client that the defects liability period for the Infraco Contract has ended in accordance with the terms of the Infraco Contract provided always that the Parties may agree to extend the term of this Agreement.

3. DUTY OF CARE, STANDARDS AND THE SERVICES TO BE PROVIDED

General

3.1 The Client hereby appoints the SDS Provider in accordance with the terms of this Agreement and the SDS Provider hereby accepts full responsibility and agrees to perform the Services and its other obligations under this Agreement fully and faithfully in the best interests of the Client.

3.2 The SDS Provider warrants to the Client that, in the performance of the Services and its other obligations under this Agreement it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent system design services provider experienced in performing services similar to the Services in connection with projects of a similar size, scope and complexity.

3.3 The SDS Provider shall (each as distinct and separate obligations) perform the Services and its other obligations under this Agreement (exercising the level of skill, care and diligence set out in Clause 3.2):

3.3.1 so as to comply in all respects with this Agreement;

3.3.2 so as to enable the Edinburgh Tram Network to be procured, constructed, installed, tested and commissioned, and thereafter operated and maintained;

3.3.3 in accordance with the SDS Provider's quality management system and plans;

3.3.4 so as to ensure compliance with the Functional Requirements Specifications and the Technical Specifications (as applicable);

3.3.5 in accordance with the Design Manual;

3.3.6 so as to ensure compliance with the Tram Legislation;

3.3.7 so as to ensure compliance with all applicable Law and Consents;

3.3.8 in accordance with the Parliamentary Undertakings;

3.3.9 in compliance with the Environmental Statements, and all other applicable environmental regulations and requirements;

3.3.10 so as to permit compliance with the Code of Construction Practice and with the Construction Proposals;

3.3.11 in accordance with Good Industry Practice;

3.3.12 to ensure that the design of the Edinburgh Tram Network is buildable;

3.3.13 to assist **tie** in ensuring that best value (pursuant to the Local Government (Scotland) Act 1973 as amended by the Local Government in Scotland Act 2003) has been secured in the performance of the Services;

3.3.14 in such manner so as not wilfully to detract from the image and reputation of **tie**, Transport Edinburgh Limited, CEC, the Scottish Executive or any project related to the performance of the Services;

3.3.15 in a manner that is not likely to be injurious to persons or property; and

3.3.16 using the Key Personnel and such other staff as may be approved by the Client for that type of work.

3.4 The SDS Provider shall to the extent necessary for the performance of its Services and its other obligations under this Agreement take due and proper account of the risks associated with the Edinburgh Tram Network arising from:

3.4.1 ground conditions (including climatic, geotechnical, ecological, environmental, hydrological and sub-surface conditions, any contamination and any archaeological finds);

3.4.2 use by third parties of any of the land which will form part of or be associated with or will be adjacent to the Edinburgh Tram Network;

3.4.3 the quality of any existing structures;

3.4.4 the obligations assumed or the undertakings given in any Parliamentary Undertakings relative to this Agreement; and

3.4.5 safety requirements and environmental matters.

3.5 The SDS Provider shall use best endeavours to ensure that the design of the Edinburgh Tram Network:

3.5.1 maximises construction productivity by reference to international best practice;

3.5.2 minimises disruption to the city of Edinburgh;

3.5.3 safeguards efficiency in the obtaining of Consents; and

3.5.4 optimises the Infraco's compliance with the Code of Construction Practice

3.6 The SDS Provider shall at all times keep itself fully informed about current professional standards and about all matters relating to, or which might have a bearing on, the performance of the Services and its other obligations under this Agreement.

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3.7 The SDS Provider's duties and obligations under or pursuant to this Agreement will not be released, diminished or in any other way affected by any independent inquiry into any matter which may be made or carried out by the Client or by any firm, company or party on the Client's behalf nor by any action or omission of any such firm, company or party whether or not such action or omission might give rise to any independent liability of such firm, company or party to the Client.

3.8 The SDS Provider is deemed to have satisfied itself that it fully understands the scope and extent of the Services and its other obligations under this Agreement, and that it has sufficient information or will at the relevant time have sufficient information, to enable it to perform the Services and its other obligations under this Agreement.

3.9 The SDS Provider acknowledges that the Client will rely upon the skill and judgement of the SDS Provider in connection with all matters for which the SDS Provider is responsible under this Agreement.

Background Information

3.10 The SDS Provider acknowledges that certain Background Information has been made available to it in relation to this Agreement. The SDS Provider further acknowledges that **tie** does not give any warranty or undertaking as to the completeness, currency, accuracy or fitness for any purpose of any of the Background Information and, subject to the express provisions of this Agreement, neither **tie**, any **tie** Parties, nor any of its or their employees shall be liable to the SDS Provider in contract, delict (including breach of statutory duty), or otherwise as a result of:

3.10.1 any inaccuracy, error, defect, omission, unfitness for any purpose or inadequacy of any kind whatsoever in the Background Information; nor

3.10.2 any failure to make available to the SDS Provider any materials, documents, drawings, plans or other information relating to this Agreement;

provided that nothing in this Clause 3.10 shall exclude any liability in respect of any statements made or information provided fraudulently.

3.11 The SDS Provider acknowledges and confirms that as part of the Services it has conducted its own analysis and review of the Background Information and has before the execution of this Agreement, or upon receipt if received thereafter, satisfied itself as to the veracity, accuracy, reasonableness, scope, materiality, currency (where applicable) and completeness of all such Background Information upon which it places reliance.

Liasion and Compliance with Master Project Programme and Budget

3.12 The SDS Provider shall liaise with the Client, any Client Party, **tie**, any **tie** Party, the Tram Supplier, and any other parties as may be required by the Client or **tie** to facilitate the production, by such persons, of any information required from them, in order that the Services and its other obligations under this Agreement can be progressed according to the Master Project Programme and the Programme. The SDS Provider shall liaise with the Client, any Client Party, **tie**, any **tie** Party, the Tram Supplier, and any other parties as may be required by the Client or **tie** as often as is necessary in order to ensure that the Services and its other obligations under this Agreement are performed properly and in accordance with the terms of this Agreement.

3.13 The SDS Provider shall collaborate and liaise with the Client throughout the performance of the Services, inter alia, to ensure due consideration is given to the

type of materials and optimum and cost effective construction methods, construction programme and temporary works, as appropriate.

3.14 Where the Client, or other bodies or persons involved in related works or services appoint other consultants or use their own staff for purposes related to the Services or the SDS Provider's other obligations under this Agreement, the SDS Provider shall use all reasonable endeavours (including the use of liaison with such other bodies or persons) to ensure that the Services, the SDS Provider's other obligations under this Agreement and these related works are carried out together with the greatest economy and in accordance with the Master Project Programme and the Programme.

3.15 In performing the Services and its other obligations under this Agreement, the SDS Provider will have regard to the constraints imposed by the Master Project Programme and the Programme and to the objective of keeping the overall costs of the Services and its other obligations under this Agreement within any budgetary constraints agreed with the Client. If the SDS Provider considers that there may be a conflict between its obligations under this Clause 3.15 and the performance of the Services and/or the performance of any of the SDS Provider's obligations under this Agreement, it will within 3 Business Days give written notice of the same to the Client.

Provision of all labour, goods, materials and services

3.16 The SDS Provider shall provide all labour, goods, materials and services whether of a temporary or permanent nature required in and for the execution of the Services and its other obligations under this Agreement so far as the necessity for providing the same is specified in this Agreement or could reasonably be foreseen therefrom by a system design services provider experienced in work of similar nature and scope as the Services.

Prohibited Materials

3.17 The SDS Provider warrants to the Client that it has not specified for use and shall use the standard of skill and care provided for in Clause 3.2 not to specify for use and shall use such skill and care consistent with any supervisory and inspection responsibilities to be undertaken as part of the Services to see that there shall not be used, any materials which at the time of specification or use (as the case may be):

3.17.1 are known to be deleterious in the particular circumstances in which they are specified to be used (either to health and safety or to the durability of any works on which the SDS Provider is employed by the Client); or

3.17.2 contravene any relevant standard or code of practice issued from time to time by the BSI Group or under a European directive relating to standards; or

3.17.3 do not accord with the guidelines contained in the edition of the publication "Good Practice in Selection of Construction Materials" (Ove Arup & Partners) current at the date of specification of use; or

3.17.4 contravene Good Industry Practice.

CDM Regulations

3.18 The SDS Provider warrants to the Client that it shall carry out and fulfil the responsibilities of a "Designer" imposed by the CDM Regulations and shall co-operate with and supply any required information to any planning supervisor appointed by **tie** or the Infraco (as appropriate) in the performance by the planning supervisor of its obligations under the CDM Regulations. The SDS Provider shall notify the Client as soon as it becomes aware, or reasonably anticipates that it shall

have insufficient resources or the necessary competence to comply with its obligations under the CDM Regulations.

Mitigation and Open Book Accounting

3.19 The SDS Provider undertakes to co-operate with the Client in order to facilitate the performance of this Agreement and in particular will:

3.19.1 approach all pricing, estimating and budgeting functions on a collaborative and Open Book Basis;

3.19.2 use reasonable endeavours to avoid unnecessary complaints, disputes and claims against or with the Client;

3.19.3 not interfere with the rights of the Client in performing its obligations under this Agreement, nor in any other way hinder or prevent the Client from performing those obligations or from enjoying the benefits of its rights;

3.19.4 take reasonable steps to mitigate any costs, unnecessary acts, foreseeable losses and liabilities of the Client; and

3.19.5 take all reasonable steps to manage, minimise and mitigate all costs.

Investigations and Surveys

3.20 The SDS Provider shall notify the Client of any ground, physical, geophysical investigations or archaeological or ecological surveys or any other investigations or surveys which it intends to carry out.

Procurement Support

3.21 The SDS Provider shall make suitable facilities and resources available upon reasonable notice from the bidders for the Infraco Contract and the Tram Supply Contract to permit and facilitate the ability of these bidders to thoroughly examine, check and satisfy themselves as to the adequacy, correctness and suitability of the Deliverables which have been created by the SDS Provider and which the Infraco and the Tram Supplier will be adopting and making use of respectively in the Infraco Contract and the Tram Supply Contract. No additional costs shall be paid to the SDS Provider in respect of the provision of such suitable facilities and resources or the supply to bidders of any Deliverables as part of the procurement process.

3.22 The SDS Provider shall permit the bidders for the Infraco Contract and the Tram Supply Contract to carry out a due diligence exercise on this Agreement (including any commercial terms) prior to the award of the Infraco Contract and the Tram Supply Contract provided that **tie** shall procure that such bidders are required to enter into a confidentiality agreement or other agreement incorporating provisions on confidentiality.

3.23 The SDS Provider agrees to adhere to the bidding protocols be developed and issued by **tie** relative to the procurement of the Infraco Contract and the Tram Supply Contract which shall cover issues including interaction with the bidders, limits of assistance to be given to the bidders, confidentiality, collusion, development of the design and continuing performance of the Services.

type of materials and optimum and cost effective construction methods, construction programme and temporary works, as appropriate.

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3.17.3 do not accord with the guidelines contained in the edition of the publication "Good Practice in Selection of Construction Materials" (Ove Arup & Partners) current at the date of specification of use; or

3.17.4 contravene Good Industry Practice.

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3.19.3 not interfere with the rights of the Client in performing its obligations under this Agreement, nor in any other way hinder or prevent the Client from performing those obligations or from enjoying the benefits of its rights;

3.19.4 take reasonable steps to mitigate any costs, unnecessary acts, foreseeable losses and liabilities of the Client; and

3.19.5 take all reasonable steps to manage, minimise and mitigate all costs.

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3.20 The SDS Provider shall notify the Client of any ground, physical, geophysical investigations or archaeological or ecological surveys or any other investigations or surveys which it intends to carry out.

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3.21 The SDS Provider shall make suitable facilities and resources available upon reasonable notice from the bidders for the Infraco Contract and the Tram Supply Contract to permit and facilitate the ability of these bidders to thoroughly examine, check and satisfy themselves as to the adequacy, correctness and suitability of the Deliverables which have been created by the SDS Provider and which the Infraco and the Tram Supplier will be adopting and making use of respectively in the Infraco Contract and the Tram Supply Contract. No additional costs shall be paid to the SDS Provider in respect of the provision of such suitable facilities and resources or the supply to bidders of any Deliverables as part of the procurement process.

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3.23 The SDS Provider agrees to adhere to the bidding protocols be developed and issued by tie relative to the procurement of the Infraco Contract and the Tram Supply Contract which shall cover issues including interaction with the bidders, limits of assistance to be given to the bidders, confidentiality, collusion, development of the design and continuing performance of the Services.

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Defects Rectification

3.24 The SDS Provider shall assist the Infraco as appropriate in the design and execution of any defects rectification relative to the Edinburgh Tram Network, and in obtaining a defects rectification certificate from **tie.**

System Integration

3.25 The SDS Provider shall liaise with the Operator as instructed by the Client in relation to:

3.25.1 system operation and related design issues;

3.25.2 commissioning and Trial Operation; and

3.25.3 operational defects.

3.26 The SDS Provider shall be responsible for ensuring that all elements of the design relative to the Edinburgh Tram Network **are compatible with system integration and** the SDS Provider shall make qualified personnel available to support the the Client in the discharge of its responsibilities to ensure system integration.

Traffic Management Protocol

3.27 The SDS Provider shall undertake the development of a traffic management protocol (with a view to this document becoming part of the Infraco Contract), and shall attend all meetings with the Client, **tie,** CEC, any other Relevant Authorities and the Operator to discuss traffic management issues.

4. DEVELOPMENT, REVIEW, FINALISATION AND DELIVERY OF THE DELIVERABLES

4.1 The SDS Provider shall develop and finalise the Deliverables in accordance with this Agreement, and the Client shall be entitled to review the Deliverables in accordance with Schedule 9 (*Review Procedure).*

4.2 The SDS Provider shall submit the design of any changes and any other Deliverables associated with any changes developed pursuant to Clause 15 (*Changes*) to the Client's Representative for review pursuant to Schedule 9 (*Review Procedure*).

4.3 The SDS Provider shall allow the Client's Representative, at any time, a reasonable opportunity to view any Deliverable at any stage of development, and this opportunity shall be made available to the Client's Representative as soon as reasonably practicable following receipt of any written request from the Client's Representative.

4.4 The SDS Provider shall establish and maintain a computerised database/repository which the Client, the Client's Representative, **tie**, any **tie** Parties and any other party reasonably required by **tie** may access remotely by computer (through an appropriate login/security regime) to view drawings comprised within the Deliverables and electronically store and/or print copies of such Deliverables.

4.5 The SDS Provider shall, as soon as reasonably practicable after the Effective Date, submit to the Client's Representative a submittal programme setting out the order in which each Deliverable is to be submitted. The SDS Provider may, as necessary, update such programme and shall submit the same from time to time to the Client's Representative so that the Client has at least 14 days' notice of any revision to the periods shown in the previous submittal programme and the SDS Provider shall submit to the Client's Representative five copies of each Deliverable no later than the end of the period shown in the submittal programme for that Deliverable.

4.6 Where the Client's Representative does not consider that the Client will be able to comply with the periods specified in Schedule 9 (*Review Procedure*) for indicating 'no objection' status or the making of objections in relation to any Deliverable because of the volume of documents to be received in accordance with the submittal programme, the Client's Representative may introduce an alternative timetable and the SDS Provider shall comply with such alternative timetable. Provided that, where the Client is unable to comply with the time periods set out in Schedule 9 (*Review Procedure*) and such inability is not due to any breach of this Agreement, omission or fault on the part of the SDS Provider, the introduction of an alternative timetable shall be treated as a Client Change and the terms of Clause 15 (*Changes*) shall apply.

4.7 During the preparation of the Deliverables, the Client and/or the Client's Representative shall at its discretion be entitled to call for a meeting to discuss the development of any Deliverable, and the SDS Provider shall give due consideration to any comments made by the Client or the Client's Representative at any such meetings. As soon as reasonably practicable following any such meeting, the SDS Provider will prepare and circulate to those attending the meeting a report listing the Deliverables discussed and any comments made at such meeting.

4.8 If it should be found that the Deliverables do not fulfil the requirements of this Agreement or the needs of any Approval Bodies, the SDS Provider shall at its own expense amend the Deliverable. Such amendment shall be made in accordance with Schedule 9 (*Review Procedure*) and such amendment and rectification shall ensure that the Deliverable shall satisfy the requirements of this Agreement and any Approval Bodies.

4.9 The SDS Provider shall provide the Client with all Deliverables in accordance with the terms of this Agreement and where no timescale for provision of such Deliverables is specified, such Deliverables shall be provided to the Client as soon as reasonably practicable. The SDS Provider shall provide to the Client, at no cost to the Client, five copies of the Deliverables in hard copy form and one copy in an agreed soft copy form (as appropriate to the format of the Deliverables). In respect of any further copies of a particular Deliverable, the Client may require or which tie may require, the SDS Provider agrees to absorb the reasonable copying charges or other reasonable charges for provision of the same to the Client as the Client requires and for the purposes of achieving all Consents.

4.10 In addition to the requirements of Clause 4.9, the SDS Provider shall provide to the Client, at no cost to the Client, five copies in hard copy form and one copy in an agreed soft copy form of the as-built drawings and any manuals prepared.

4.11 The SDS Provider accepts all risks arising from any conflicts, ambiguities, discrepancies, errors or omissions that subsequently appear within or between any of the Functional Requirements Specifications, the Technical Specifications and any of the other Deliverables, and the SDS Provider shall not be entitled to make any claim against the Client for an extension of time, payment or otherwise in respect of any such conflicts, ambiguities, discrepancies, errors or omissions.

4.12 The SDS Provider shall within 3 Business Days notify the Client upon becoming aware of any conflicts, ambiguities, discrepancies, errors or omissions within or between any of the Functional Requirements Specifications, the Technical Specifications, and any of the other Deliverables. Where there are any conflicts, ambiguities, discrepancies, errors or omissions, the SDS Provider shall provide with any notification its proposals for resolving such conflicts, ambiguities, discrepancies, errors or omissions in compliance with this Agreement. Such proposals could include the suggestion that no action is required. The SDS Provider shall proceed with its proposals to resolve any such conflicts, ambiguities, discrepancies, errors or omissions as soon as reasonably practicable. If the proposal from the SDS Provider

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is that no action is required or the Client does not agree with the action proposed by the SDS Provider, the Client may notify the SDS Provider, within 10 Business Days of the SDS Provider's notice, to resolve any conflicts, ambiguities, discrepancies, errors or omissions in a different manner (which notification shall be binding on the SDS Provider).

4.13 The SDS Provider shall develop the Functional Requirements Specifications and the Technical Specifications using innovative solutions which are in accordance with Good Industry Practice.

5. CONSENTS

5.1 The SDS Provider shall (at its own cost and expense):

5.1.1 obtain and maintain in effect all Consents which may be required for the construction, installation, commissioning, completion and opening of the Edinburgh Tram Network as is consistent with, required by or contained within the Services; and

5.1.2 implement each Consent within the period of its validity and in accordance with its terms.

5.2 The SDS Provider shall provide copies of such Consents to the Client's Representative. At the request of the SDS Provider, the Client may at its discretion render appropriate assistance, without any obligation, in relation to obtaining any Consent.

5.3 Acknowledgement by the Client of the copies of Consents provided to them pursuant to Clause 5.2 shall not in any way affect the SDS Provider's obligations or relieve the SDS Provider from its obligations pursuant to this Clause 5 (*Consents*) or otherwise.

5.4 The SDS Provider shall provide the Client with a programme of Consents to be obtained within 30 days of the Effective Date and shall update the programme on a monthly basis showing progress and any new Consents to be obtained. The Client shall be entitled to request information in relation to the progress of the application for any such Consent and the Consent itself and the SDS Provider shall provide the same at no cost to the Client.

6. QUALITY ASSURANCE

6.1 The SDS Provider shall operate a quality management system, and comply with such system. Such quality management system shall be reflected in appropriate quality management plans, the standard of which shall comply with BS EN 150 9001:2000. Such plans shall be developed in accordance with the Review Procedure.

6.2 If in the opinion of the Client, any Deliverable is not prepared in accordance with the SDS Provider's quality management system or with any other provision of the Agreement, the Client shall so inform the SDS Provider in writing giving reasons. Such non-compliance shall be treated as an error or omission in the performance of the Services and the provisions of Clause 18 (*Errors and/or Omissions in the* Services) shall apply.

6.3 Compliance with any such approved quality management system shall not relieve the SDS Provider from any of its other duties, obligations or liabilities under this Agreement.

7. PROGRESS

7.1 Master Project Programme, Programme Phasing Structure and Programme

7.1.1 The SDS Provider shall progress the Services with due expedition and in a timely and efficient manner without delay, to achieve timeous completion of the Services (or any part thereof) and its other obligations under this Agreement in accordance with the Master Project Programme and unless otherwise agreed with the Client, the SDS Provider shall adhere to that Master Project Programme with due diligence.

7.1.2 Within 30 days of the Effective Date, the SDS Provider shall update the Programme with detailed programme information and shall thereafter maintain update and amend the Programme in accordance with the requirements set out in paragraph 4 of Schedule 1 *(Scope of Services)* and/or at additional or other intervals as may be reasonably required by the Client. Any updates or amendments to the Programme shall be approved by the Client in accordance with the Review Procedure or as may be otherwise agreed in writing by the Client.

7.2 The SDS Provider shall carry out the Services required in respect of the Requirements Definition Phase, the System-Wide Preliminary Design Requirements, the Preliminary Design Phase, and the Detailed Design Phase in the order of "criticality" (with "A" being the most critical), sequence and dates shown in the Programme Phasing Structure PROVIDED ALWAYS that the Client may at any time require the SDS Provider to stop, amend and/or accelerate such order of performance in respect of the whole or any part of the Requirements Definition Phase, the System-Wide Preliminary Design Requirements, the Preliminary Design Phase and/or the Detailed Design Phase. Any such stop, amendment or acceleration shall be complied with as soon as reasonably practicably by the SDS Provider subject to the following procedure (unless otherwise agreed by the Parties):

7.2.1 the SDS Provider shall provide an Estimate to the Client for any required stop, amendment or acceleration within 5 Business Days of any request from the Client;

7.2.2 any Estimate provided by the SDS Provider shall include the opinion of the SDS Provider (acting reasonably) on the following matters:

7.2.2.1 whether relief from compliance with any of its obligations under this Agreement is required as a result of the required stop, amendment or acceleration;

7.2.2.2 any impact on the performance of the Services;

7.2.2.3 any impact on the Master Project Programme and the Programme, and any requirement for an extension of time;

7.2.2.4 any amendment required to the Agreement as a result of the required stop, amendment or acceleration,

7.2.2.5 the proposed method of delivery of the required stop, amendment or acceleration;

7.2.2.6 proposals to mitigate the impact of the required stop, amendment or acceleration; and

7.2.2.7 any increase or decrease in any sums due to be paid to the SDS Provider (including any milestone payments and lump sum payments) as a result of the required stop, amendment or acceleration.

7.2.3 the valuation of any required stop, amendment or acceleration shall be added to or deducted from the sums due to be paid to the SDS Provider as the case may be and shall be ascertained, by the Client as follows:

7.2.3.1 by measurement and valuation at the rates and prices for similar work in Schedule 3 *(Pricing Schedule)* insofar as such rates and prices apply;

7.2.3.2 if such rates and prices do not apply by measurement and valuation at rates and prices deduced therefrom insofar as it is practical to do so;

7.2.3.3 if such rates and prices do not apply and it is not practicable to deduce rates and prices therefrom by measurement and/or valuation at fair rates and prices; or

7.2.3.4 if the value of the required stop, amendment or acceleration cannot properly be ascertained by measurement and/or valuation, the value of the resources and labour employed thereon, as appropriate, in accordance with the basis of rates for provisional work set out in Schedule 3 (*Pricing Schedule*);

provided that where any required stop, amendment or acceleration would otherwise fall to be valued under Clauses 7.2.3.1 and 7.2.3.2 above, but the Client's Representative is of the opinion that the instruction therefor was issued at such a time or was of such content as to make it unreasonable for the alteration or addition to be so valued, the value of the required stop, amendment or acceleration shall be ascertained by measurement and/or valuation at fair rates and prices.

7.2.4 The SDS Provider shall include in the Estimate evidence demonstrating that:

7.2.4.1 the SDS Provider has used all reasonable endeavours to minimise (including by the use of competitive quotes) any increase in costs and to maximise any reduction of costs;

7.2.4.2 the SDS Provider has, where required by the Client, sought competitive quotes from persons other than the SDS Provider Parties in pursuance of its obligation under Clause 7.2.4.1 above;

7.2.4.3 the SDS Provider has investigated how to mitigate the impact of the required stop, amendment or acceleration; and

7.2.4.4 the required stop, amendment or acceleration will, where relevant, be implemented in the most cost-effective manner.

7.2.5 As soon as reasonably practicable after the Client receives the Estimate, the Parties shall discuss and agree the issues set out in the Estimate. From such discussions the Client may modify its original instruction in relation to the required stop, amendment or acceleration, and the Client may require the SDS Provider to seek and evaluate competitive tenders. In each case, the SDS Provider shall, as soon as practicable, and in any event not more than

14 days after receipt of such instruction, notify the Client of any consequential changes to the Estimate.

7.2.6 If the Parties cannot agree on the contents of the Estimate, then either Party may refer the Estimate for determination in accordance with the Dispute Resolution Procedure

7.2.7 As soon as reasonably practicable after the contents of the Estimate have been agreed or determined pursuant to the Dispute Resolution Procedure the Client shall:

7.2.7.1 confirm its instruction in relation to the required stop, amendment or acceleration; or

7.2.7.2 withdraw its instruction in relation to the required stop, amendment or acceleration.

7.2.8 If the Client does not confirm its instruction in relation to the required stop, amendment or acceleration within 30 days of the contents of the Estimate having been agreed or determined pursuant to Clause 7.2.7, then the instruction in relation to the required stop, amendment or acceleration shall be deemed to have been withdrawn.

7.3 Design and Technical Gateway Process

Gateway from the Requirements Definition Phase to the preparation of the System-Wide Preliminary Design Requirements

7.3.1 The SDS Provider shall, within 3 Business Days, notify the Client when the SDS Provider considers that it has completed each of the Services to be carried out pursuant to the Requirements Definition Phase and that all matters to be agreed during the Requirements Definition Phase have been agreed between the SDS Provider and the Client. Without limitation, the SDS Provider shall not serve such notice until the Services described in paragraph 2.3 of Schedule 1 (*Scope of Services*) have been completed.

7.3.2 If the Client agrees that all of such Services have been completed and/or the relevant matters agreed, the Client shall issue a Milestone Completion Certificate and notify the SDS Provider in writing within 10 Business Days that the preparation of the System-Wide Preliminary Design Requirements can commence. Subject to Clause 7.2 and notwithstanding that a Milestone Completion Certificate may have been issued by the Client, the SDS Provider shall not commence the Detailed Design Phase in respect of such Sub-Sector or Sector (as appropriate) until the Client shall have confirmed such commencement by notice in writing to the SDS Provider.

7.3.3 To the extent that the Client considers that any Services have not been completed by the SDS Provider and/or the relevant matters agreed, the Client shall within 10 Business Days notify the SDS Provider in writing accordingly, including details of the further activities to be carried out by the SDS Provider in order to complete such Services.

7.3.4 After receiving any notification from the Client under Clause 7.3.3, the SDS Provider shall within 3 Business Days re-notify the Client when the SDS Provider considers that it has completed each of the Services to be carried out pursuant to the Requirements Definition Phase and that all matters to be agreed during the Requirements Definition Phase have been agreed between the SDS Provider and the Client, and the provisions of Clauses 7.3.1 to 7.3.3 shall apply mutatis mutandis to such re-notification.

7.3.5 To the extent that some but not all of the Services in respect of the Requirements Definition Phase have been completed and/or relevant matters agreed, the Client may, in its sole discretion, notify the SDS Provider in writing that the preparation of the System-Wide Preliminary Design Requirements shall commence and in such circumstances:

7.3.5.1 the Client may direct that some or all of the preparation of the System-Wide Preliminary Design Requirements shall be commenced; and

7.3.5.2 the SDS Provider shall continue to provide the Services in respect of the Requirements Definition Phase until (i) the relevant Services have been completed, and (ii) all matters to be agreed during Requirements Definition Phase have been agreed between the SDS Provider and the Client, or until the Client otherwise directs;

PROVIDED ALWAYS that the Client shall not issue a Milestone Completion Certificate in respect of the Requirements Definition Phase until all of the Services have been completed and/or the relevant matters agreed.

Gateway from the preparation of the System-Wide Preliminary Design Requirements to the Preliminary Design Phase in respect of each Sub-Sector

7.3.6 The SDS Provider shall within 3 Business Days notify the Client when the SDS Provider considers that it has completed each of the Services to be carried out pursuant to the preparation of the System-Wide Preliminary Design Requirements and that all matters to be agreed in respect of the preparation of the System-Wide Preliminary Design Requirements have been agreed between the SDS Provider and the Client. Without limitation, the SDS Provider shall not serve such notice until the relevant Services described in paragraph 2.4 of Schedule 1 (*Scope of Services*) have been completed to a high level for the whole System.

7.3.7 If the Client agrees that all of such Services have been completed and/or the relevant matters agreed, the Client shall issue a Milestone Completion Certificate and notify the SDS Provider in writing within 10 Business Days that the Preliminary Design Phase in respect of each Sub-Sector can commence. Subject to Clause 7.2 and notwithstanding that a Milestone Completion Certificate may have been issued by the Client, the SDS Provider shall not commence the Detailed Design Phase in respect of such Sub-Sector or Sector (as appropriate) until the Client shall have confirmed such commencement by notice in writing to the SDS Provider.

7.3.8 To the extent that the Client considers that any Services have not been completed by the SDS Provider and/or the relevant matters agreed, the Client shall within 10 Business Days notify the SDS Provider in writing accordingly, including details of the further activities to be carried out by the SDS Provider in order to complete such Services.

7.3.9 After receiving any notification from the Client under Clause 7.3.8, the SDS Provider shall within 3 Business Days re-notify the Client when the SDS Provider considers that it has completed each of the Services to be carried out pursuant to the System-Wide Preliminary Design Requirements and that all matters to be agreed during the System-Wide Preliminary Design Requirements have been agreed between the SDS Provider and the Client, and the provisions of Clauses 7.3.6 to 7.3.9 shall apply mutatis mutandis to such re-notification.

7.3.10 To the extent that some but not all of the Services in respect of the preparation of the System-Wide Preliminary Design Requirements have been completed and/or the relevant matters agreed, the Client may, in its sole discretion, notify the SDS Provider in writing that the Preliminary Design Phase in respect of each Sub-Sector or Sector (as appropriate) shall commence and in such circumstances:

7.3.10.1 the Client may direct that some or all of the Services in respect of the Preliminary Design Phase shall be commenced; and

7.3.10.2 the SDS Provider shall continue to provide the Services in respect of the preparation of the System-Wide Preliminary Design Requirements until (i) the relevant Services have been completed, and (ii) all matters to be agreed in respect of the preparation of the System-Wide Preliminary Design Requirements have been agreed between the SDS Provider and the Client, or until the Client otherwise directs.

PROVIDED ALWAYS that the Client shall not issue a Milestone Completion Certificate in respect of the preparation of the System-Wide Preliminary Design Requirements until all of the Services have been completed and/or the relevant matters agreed.

Gateway from the Preliminary Design Phase in respect of each Sub-Sector or Sector (as appropriate) to the Detailed Design Phase in respect of each Sub-Sector or Sector (as appropriate)

7.3.11 In respect of each Sub-Sector or Sector (as appropriate), the SDS Provider shall within 3 Business Days notify the Client when the SDS Provider considers that it has completed each of the Services to be carried out pursuant to the Preliminary Design Phase in respect of each Sub-Sector or Sector (as appropriate) and that all matters to be agreed in respect of the Preliminary Design Phase in respect of each Sub-Sector or Sector (as appropriate) have been agreed between the SDS Provider and the Client. Without limitation, the SDS Provider shall not serve such notice until the Services described in paragraph 2.4 of Schedule 1 (*Scope of Services*) have been completed.

7.3.12 If the Client agrees that all of such Services have been completed and/or the relevant matters agreed in respect of a Sub-Sector or Sector (as appropriate), the Client shall issue a Milestone Completion Certificate within 10 Business Days. Subject to Clause 7.2 and notwithstanding that a Milestone Completion Certificate may have been issued by the Client, the SDS Provider shall not commence the Detailed Design Phase in respect of such Sub-Sector or Sector (as appropriate) until the Client shall have confirmed such commencement by notice in writing to the SDS Provider.

7.3.13 To the extent that the Client considers that any Services have not been completed by the SDS Provider and/or the relevant matters agreed, the Client shall within 10 Business Days notify the SDS Provider in writing accordingly, including details of the further activities to be carried out by the SDS Provider in order to complete such Services.

7.3.14 After receiving any notification from the Client under Clause 7.3.13, the SDS Provider shall within 3 Business Days re-notify the Client when the SDS Provider considers that it has completed each of the Services to be carried out pursuant to the Preliminary Design Phase in respect of such Sub-Sector or Sector (as appropriate) and that all matters to be agreed during the

Preliminary Design Phase in respect of such Sub-Sector or Sector (as appropriate) have been agreed between the SDS Provider and the Client, and the provisions of Clauses 7.3.11 to 7.3.13 shall apply mutatis mutandis to such re-notification.

7.3.15 To the extent that some but not all of the Services to be carried out pursuant to the Preliminary Design Phase in respect of a Sub-Sector or Sector (as appropriate) have been completed and/or the relevant matters agreed, the Client may, in its sole discretion, notify the SDS Provider in writing that the Detailed Design Phase in respect of such Sub-Sector or Sector (as appropriate) shall commence and in such circumstances:

7.3.15.1 the Client may direct that some or all of the Services to be performed pursuant to the Detailed Design Phase in respect of such Sub-Sector or Sector (as appropriate) shall be commenced; and

7.3.15.2 the SDS Provider shall continue to provide the Services to be carried out pursuant to Preliminary Design Phase in respect of such Sub-Sector or Sector (as appropriate) until (i) the relevant Services have been completed, and (ii) all matters to be agreed in respect of the Preliminary Design Phase in respect of such Sub-Sector or Sector (as appropriate) have been agreed between the SDS Provider and the Client, or until the Client otherwise directs.

PROVIDED ALWAYS that the Client shall not issue a Milestone Completion Certificate in respect of the Detailed Design Phase for such Sub-Sector or Sector (as appropriate) until all of the Services have been completed and/or the relevant matters agreed.

Completion of the Detailed Design Phase in respect of each Sub-Sector or Sector (as appropriate)

7.3.16 In respect of each Sub-Sector or Sector (as appropriate), the SDS Provider shall within 3 Business Days notify the Client when the SDS Provider considers that it has completed each of the Services to be carried out pursuant to the Detailed Design Phase in respect of each Sub-Sector or Sector (as appropriate) and that all matters to be agreed in respect of the Detailed Design Phase in respect of each Sub-Sector or Sector (as appropriate) have been agreed between the SDS Provider and the Client. Without limitation, the SDS Provider shall not serve such notice until the Services described in paragraph 2.6 of Schedule 1 (*Scope of Services*) have been completed.

7.3.17 If the Client agrees that all of such Services have been completed and/or the relevant matters agreed in respect of a Sub-Sector or Sector (as appropriate), the Client shall issue a Milestone Completion Certificate within 10 Business Days.

7.3.18 To the extent that the Client considers that any Services have not been completed by the SDS Provider and/or the relevant matters agreed, the Client shall within 10 Business Days notify the SDS Provider in writing accordingly, including details of the further activities to be carried out by the SDS Provider in order to complete such Services.

7.3.19 After receiving any notification from the Client under Clause 7.3.18, the SDS Provider shall within 3 Business Days re-notify the Client when the SDS

Provider considers that it has completed each of the Services to be carried out pursuant to the Detailed Design Phase in respect of such Sub-Sector or Sector (as appropriate) and that all matters to be agreed during the Detailed Design Phase in respect of such Sub-Sector or Sector (as appropriate) have been agreed between the SDS Provider and the Client, and the provisions of Clauses 7.3.16 to 7.3.18 shall apply mutatis mutandis to such re-notification.

7.4 Delays

7.4.1 Within 3 Business Days of the SDS Provider becoming aware of the likelihood of delay to the performance of any element of the Services such that the Master Project Programme and the Programme are unlikely to be met, the SDS Provider shall notify the Client, informing the Client of the reasons, the likely delay and any measures, with estimated costs, which may mitigate the delay.

7.4.2 Following such notification, the SDS Provider shall promptly provide the Client with all necessary information to enable the Client to approve any amendments to the Master Project Programme and the Programme which the SDS Provider wishes to make in accordance with Clause 7.4.1.

7.4.3 If the Client instructs the SDS Provider to mitigate the delay, any such mitigation shall be at the SDS Provider's expense if the delay was the fault of the SDS Provider, otherwise any costs associated with such instruction will be dealt with as a variation in accordance with Clause 15 (*Changes*).

7.5 Extensions of Time

7.5.1 If for any other reason outwith the control of the SDS Provider and not arising out of the SDS Provider's breach of this Agreement or the SDS Provider's negligent or wilful act or omission, the SDS Provider considers that the SDS Provider is entitled to an extension of time for completion of the Services, the SDS Provider shall within 10 Business Days of becoming aware of such possible entitlement to an extension of time, request an extension of time from the Client stating the reason for the request and clearly indicating the length and basis of calculation of the extension of time requested.

7.5.2 Subject to Clause 7.5.3, within 10 Business Days of receipt of such notice the Client shall respond, either:

(i) agreeing to the extension of time and consequent amendment of the Programme or the Master Project Programme; or

(ii) granting an amended extension of time and consequent amendment of the Programme or the Master Project Programme; or

(iii) clearly stating the further information required before reaching a decision; or

(iv) rejecting the request, clearly stating the Client's reason for doing so.

7.5.3 The SDS Provider shall not be entitled to any extension of time if and to the extent that the SDS Provider could (where such action is within the power of the SDS Provider and the SDS Provider could be reasonably expected to take such action, having regard to the scope and nature of the Services), by the exercise of the standard of skill, care and diligence provided for in Clause 3.2, have prevented or reduced the requirement for such extension of time.

7.6 Client Decisions & Information

7.6.1 Within 3 Business Days of the SDS Provider finding that a Client decision or information essential to the continuity of the Services or to achieving the Master Project Programme and the Programme is likely to be required, the SDS Provider shall give notice of that requirement to the Client with full supporting information including the date by which such decision or information is required to ensure that there is no delay to the continuity of the Services.

7.6.2 The Client shall within 7 days, in liaison with the SDS Provider, determine and notify the SDS Provider in writing of the date by which the decision is to be made or the information is to be provided.

7.6.3 In the event that the Client's notified date or the Client's actual decision or provision of information results in delay to the continuity of Services the matter shall be treated as an extension of time in accordance with Clause 7.5.

7.6.4 Where the SDS Provider makes any recommendation to the Client requiring the decision and agreement of the Client to proceed, any reasonably foreseeable effect of the application of that recommendation not fully described and evaluated by the SDS Provider using the standard of skill, care and diligence provided for in Clause 3.2 to the Client at the time of the recommendation or earlier shall be the full responsibility of the SDS Provider.

7.7 Abortive Work

7.7.1 Immediately that the SDS Provider becomes aware that any element of Services is likely to be Abortive Work for any reason, the SDS Provider shall notify the Client of:

(i) the probable nature of the Abortive Work;

(ii) the cause of the Abortive Work being abortive;

(iii) the estimated effect of the Abortive Work in terms of cost, of time in completion of the Services and of any other matters in relation to the Agreement; and

(iv) any measures to be taken which may mitigate that effect.

7.7.2 The SDS Provider and the Client shall jointly investigate, and the Client shall determine the actual extent of any Abortive Work.

7.7.3 Payment by the Client to the SDS Provider in respect of any Abortive Work which has been carried out by the SDS Provider shall be determined as a variation in accordance with Clause 15 (*Changes*) of this Agreement provided always that no payment shall be due for Abortive Work which has resulted from any fault of the SDS Provider and/or any breach by the SDS Provider of its obligations under this Agreement.

8. KEY PERSONNEL, STAFF AND PROVISION OF ACCOMMODATION FOR THE CLIENT IN EDINBURGH

8.1 The SDS Provider shall ensure that:

8.1.1 the Key Personnel shall have day-to-day responsibility for and be involved in the performance of the Services; and

8.1.2 in addition to the Key Personnel, there shall at all times be a sufficient number of staff (including all relevant grades of supervisory staff) available for the provision of the Services in accordance with this Agreement. This obligation shall include ensuring that there are sufficient staff to cover periods of holiday, sickness and other absences and anticipated and actual peaks in servicing the Client's requirements for the Services.

8.2 The SDS Provider shall locate staff at such locations as the SDS Provider considers convenient for the Project, provided that:

8.2.1 the SDS Provider acknowledges that it will not be entitled to any reimbursement from the Client in relation to the travel of any person to or from Edinburgh, or for the accommodation or subsistence of any person visiting Edinburgh; and

8.2.2 the Client will require the SDS Provider to make the Key Personnel available for meetings in Edinburgh at such times as the Client may, in its sole discretion, direct; and

8.2.3 the SDS Provider's Representative and other members of the SDS Provider's staff (as the Client may reasonably require) shall be required to be located in Edinburgh or such other location as may be reasonably required by the Client.

8.3 The SDS Provider shall ensure that there are no changes to the Key Personnel without the Client's prior written consent (such consent not to be unreasonably withheld or delayed in the case of a change necessitated by sickness or reasonable annual, maternity, paternity or compassionate leave or where one of the Key Personnel's employment ceases) and that any replacement persons shall be of at least equivalent status and ability to the person whom they replace.

8.4 The SDS Provider shall use all reasonable endeavours to ensure the continuity of the personnel assigned to perform the Services and shall select Key Personnel having careful regard to those persons' existing work load and other planned commitments.

8.5 The SDS Provider shall ensure that its Key Personnel and staff shall:

8.5.1 have the level of skill, experience and authority appropriate (i) to the Services to which such staff are allocated and (ii) the standards to be achieved pursuant to this Agreement; and

8.5.2 receive such training and supervision as is necessary to ensure the proper performance of this Agreement and compliance with all regulatory requirements appropriate to and required for the performance of the Services in accordance with this Agreement.

8.6 All Key Personnel should have a nominated deputy who shall be capable of fulfilling the duties of the person to whom they are deputising in the event of their absence and who shall be kept fully informed of project status in the relevant area.

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8.7 The SDS Provider shall not, during the period of this Agreement, contract or retain as an adviser or consultant, any person currently or previously employed or engaged as appropriate in the previous 3 months by the Client unless the prior written approval of the Client has been obtained.

8.8 The Client shall be at liberty to object to and require the SDS Provider to remove from the performance of the Services any person employed by the SDS Provider (including any person from any permitted SDS Provider Party) who in the reasonable opinion of the Client misconducts itself or is incompetent or negligent in the performance of its duties or persists in any conduct which is prejudicial to safety or health, and such persons shall not be again employed upon the Services without the permission of the Client. No compensation shall be payable by the Client in respect of such objection and removal.

8.9 If the Client gives the SDS Provider notice that any member of staff should be removed from involvement in the Services, the SDS Provider shall immediately comply with such notice.

8.10 The SDS Provider shall (and shall procure that the Key Personnel, its staff employed in the performance of the Services and the SDS Provider Parties) comply with all regulatory requirements appropriate to and required for the performance of the Services and any rules, regulations and instructions from the Client's Representative.

8.11 Unless co-located with **tie**, the SDS Provider shall provide a dedicated office space at the offices of the SDS Provider for four **tie** personnel with a meeting table for six, desks, chairs, storage, phones, use of printers, photocopiers, fax, an independent IT connection with a dedicated separate line and the usual welfare facilities.

9. SUB-LETTING AND THE APPOINTMENT OF SDS PROVIDER PARTIES

9.1 The SDS Provider shall not sub-let the whole of the Services.

9.2 Subject to Clause 9.3, the SDS Provider may sub-let part of the Services with the prior written approval of the Client to a sub-consultant, supplier, sub-contractor, specialist and/or other party for performance of that specific part of the Services.

9.3 The SDS Provider shall supply all relevant information (including curriculum vitae, financial and legal information, information on relevant experience and technical capacity, insurance details and the methodology for provision of the sub-let services) required by the Client to enable a decision to be made by the Client on the suitability of the proposed sub-consultant, supplier, sub-contractor, specialist and/or other party to perform the relevant part of the Services. The Client's decision on the use of any sub-consultant, supplier, sub-contractor, specialist and/or other party shall be final.

9.4 The SDS Provider shall be wholly responsible for the performance of the Services including any part of the Services carried out by any SDS Provider Party appointed by the SDS Provider.

9.5 Within 14 days of any written request from the Client, the SDS Provider shall procure collateral warranties from Corderoy, Halcrow and Ian White Associates, and shall use reasonable endeavours to procure the execution of a collateral warranty by any other SDS Provider Party in the Client's or **tie's** favour or in favour of such other party as may be reasonably required by the Client, and in a form acceptable to the Client (acting reasonably).

10. MANAGEMENT OF THE SERVICES

10.1 The Client's Representative shall:

10.1.1 be responsible for the day to day supervision of the Services to be performed by the SDS Provider;

10.1.2 exercise the functions and powers of the Client in relation to the Project which are identified in this Agreement;

10.1.3 exercise such other functions and powers of the Client under this Agreement as the Client may notify to the SDS Provider from time to time; and

10.1.4 be the primary point of contact for the SDS Provider with the Client;

and the SDS Provider shall observe, and shall procure that any SDS Provider Parties observe, all reasonable instructions of the Client and the Client's Representative in relation to this Agreement. The SDS Provider shall not and shall procure that any SDS Provider Parties shall not act upon any instruction from any other party unless confirmed by the Client or the Client's Representative in writing. If the SDS Provider or any SDS Provider Parties shall receive any such instructions, the SDS Provider shall notify the Client or the Client's Representative immediately.

10.2 The Client's Representative shall be entitled at any time, by notice in writing to the SDS Provider, to authorise any other persons to exercise the functions and powers of the Client delegated to him, either generally or specifically. Until further notice from the Client, any act of any such person shall, for the purposes of this Agreement, constitute an act of the Client's Representative and all references to "the Client's Representative" in this Agreement (apart from this Clause 10 (*Management of the Services*)) shall be taken as references to such person so far as they concern matters within the scope of such person's authority.

10.3 The Client may by notice in writing to the SDS Provider change the identity of the Client's Representative. The Client shall consult with the SDS Provider prior to the appointment of any replacement for the Client's Representative, taking account of the need for liaison and continuity in respect of this Agreement. Such change shall have effect on the date specified in the written notice.

10.4 During any period when a Client's Representative has not been appointed (or when the Client's Representative is unable through illness, incapacity or any other reason whatsoever to carry out or exercise his functions under this Agreement), the Client shall carry out the functions which would otherwise be performed by the Client's Representative.

10.5 No decision, act or omission of the Client, or the Client's Representative shall, except as otherwise expressly provided in this Agreement:

10.5.1 in any way relieve or absolve the SDS Provider from, modify, or act as a waiver or personal bar of, any liability, responsibility, obligation or duty under this Agreement;

10.5.2 in the absence of an express written instruction or authorisation issued by the Client under Clause 15 (*Changes*), constitute or authorise a variation; or

10.5.3 be construed as restricting or binding the Client in any way save with regard to the specific project matters to which it relates.

10.6 The SDS Provider shall be entitled to treat all instructions and directions of the Client's Representative as those of the Client provided always that such instructions or directions of the Client's Representative are in writing, are not in conflict with or are inconsistent with this Agreement or any other express instructions or directions of the Client, and the SDS Provider shall not be required to determine whether an express

authority has in fact been given. The SDS Provider shall, as soon as reasonably practicable, bring to the attention of the Client any instructions or directions that are given to the SDS Provider that are ambiguous or in conflict or are inconsistent, and the Client will verify such instructions in writing.

10.7 If for any reason the Client's Representative considers it necessary to give any instructions or directions orally, then, provided that the Client confirms such instruction or direction within five Business Days, such oral instruction or direction shall be deemed to be an express instruction or direction of the Client.

10.8 The SDS Provider shall appoint a representative ("SDS Provider's Representative") who shall:

10.8.1 act as the principal point of contact for the Client, and the Client's Representative in relation to all matters related to this Agreement;

10.8.2 have full authority to act on behalf of the SDS Provider for all purposes of this Agreement, and the Client and the Client's Representative shall be entitled to treat all instructions and directions of the SDS Provider's Representative as those of the SDS Provider;

10.8.3 manage and co-ordinate the provision of the Services by the SDS Provider (and any SDS Provider Party) and the integration of provision of the Services with the tasks being performed by the Client's internal team and the other advisers appointed by the Client; and

10.8.4 liaise with the Client's Representative in relation to various matters including the scope of the Services to be carried out from time to time.

10.9 The SDS Provider may by written notice to the Client change the identity of the SDS Provider's Representative. Where the SDS Provider wishes to do so, it shall by written notice to the Client propose a substitute for approval, taking account of the need for liaison and continuity in respect of the provision of the Services and the Master Project Programme and the Programme when the change is proposed. Such appointment shall be subject to the prior written approval of the Client (not to be unreasonably withheld or delayed).

10.10 The SDS Provider shall also nominate a deputy to the SDS Provider's Representative. During any period when the SDS Provider's Representative is unable through illness, incapacity, annual leave or any other reason whatsoever to carry out or exercise his functions under this Agreement, such deputy shall carry out the functions which would otherwise be performed by the SDS Provider's Representative.

11. METHODS OF PAYMENT

11.1 The fees for the performance of the Services shall be a combination of:

11.1.1 milestone payments incorporating sub-milestone payments, as set out in Schedule 3 *(Pricing Schedule)*, or as may be otherwise agreed by the Client in accordance with this Agreement;

11.1.2 a fixed lump sum or sums as set out in Schedule 3 *(Pricing Schedule)*, or as may be otherwise agreed by the Client in accordance with this Agreement; and/or

11.1.3 a time based fee as may be agreed by the Client in accordance with this Agreement and in accordance with the relevant rates set out in Schedule 3 (*Pricing Schedule*) to this Agreement.

11.2 Any applications for payments for sums due under this Agreement shall be made in accordance with the procedure set out in Clause 12 (*Arrangements for Invoicing and Payment*) and any payment which is due to the SDS Provider shall be paid by the Client in accordance with the procedure set out in Clause 12 (*Arrangements for Invoicing and Payment*).

11.3 During the Requirements Definition Phase, the SDS Provider shall make applications for Requirements Definition Phase Sub-Milestone Payments in accordance with Clause 12 (*Arrangements for Invoicing and Payment*) for completed Requirements Definition Phase Sub-Milestones up to a cumulative value of fifty per cent (50%) of the total value of the Requirements Definition Phase Milestone Payment. The SDS Provider shall not make application for payment for any incomplete Requirements Definition Phase Sub-Milestones and the Client's decision as to whether any Requirements Definition Phase Sub-Milestone is complete shall be final. The SDS Provider shall make an application for payment of the remaining fifty per cent (50%) of the total value of the Requirements Definition Phase Milestone Payment following the issue of the Milestone Completion Certificate by the Client in respect of the Requirements Definition Phase.

11.4 The SDS Provider shall make an application for payment in respect of the System-Wide Preliminary Design Requirements in accordance with Clause 12 (*Arrangements for Invoicing and Payment*) following the issue of the Milestone Completion Certificate by the Client for the System-Wide Preliminary Design Requirements.

11.5 During the Preliminary Design Phase, the SDS Provider shall make applications for Preliminary Design Phase Sub-Milestone Payments in accordance with Clause 12 (*Arrangements for Invoicing and Payment*) for completed Preliminary Design Phase Sub-Milestones in respect of each Sub-Sector or Sector (as appropriate) up to a cumulative value of eighty per cent (80%) of the total value of the Preliminary Design Phase Milestone Payment for the relevant Sub-Sector or Sector (as appropriate). The SDS Provider shall not make application for payment for any incomplete Preliminary Design Phase Sub-Milestones and the Client's decision as to whether any Preliminary Design Phase Sub-Milestone is complete shall be final. The SDS Provider shall make an application for payment in respect of the remaining twenty per cent (20%) of the total value of the Preliminary Design Phase Milestone Payment for the relevant Sub-Sector or Sector (as appropriate) following the issue of the Milestone Completion Certificate by the Client in respect of the Preliminary Design Phase for the relevant Sub-Sector or Sector (as appropriate).

11.6 During the Detailed Design Phase, the SDS Provider shall make applications for Detailed Design Phase Sub-Milestone Payments in accordance with Clause 12 (*Arrangements for Invoicing and Payment*) for completed Detailed Design Phase Sub-Milestones in respect of each Sub-Sector or Sector (as appropriate) up to a cumulative value of eighty per cent (80%) of the total value of the Detailed Design Phase Milestone Payment for the relevant Sub-Sector or Sector (as appropriate). The SDS Provider shall not make application for payment for any incomplete Detailed Design Phase Sub-Milestones and the Client's decision as to whether any Detailed Design Phase Sub-Milestone is complete shall be final. The SDS Provider shall make an application for payment in respect of the remaining twenty per cent (20%) of the total value of the Detailed Design Phase Milestone Payment for the relevant Sub-Sector or Sector (as appropriate) following the issue of the Milestone Completion Certificate by the Client in respect of the Detailed Design Phase for the relevant Sub-Sector or Sector (as appropriate).

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11.7 The SDS Provider shall make applications for payment in respect of any fixed lump sum or sums in accordance with Clause 12 (*Arrangements for Invoicing and Payment*) up to the agreed value of the fixed lump sum or sums and the Client shall not be liable to pay the SDS Provider any additional sum of money in relation to the Services to which the fixed lump sum or sums relates, unless agreed expressly in writing by the Client in accordance with this Agreement.

12. ARRANGEMENTS FOR INVOICING AND PAYMENT

12.1 Subject to Clause 11 (*Methods of Payment*), the SDS Provider shall submit each application for payment in respect of any sub-milestones, milestones, fixed lump sum or sums and any other fees, costs and/or expenses agreed in accordance with this Agreement, which are being claimed by the SDS Provider for the previous calendar month, to the Client's Representative within three Business Days following the final date of each calendar month

12.2 Each application for payment shall:

12.2.1 set out the sub-milestone payments claimed;

12.2.2 set out the milestone payments claimed;

12.2.3 include any Milestone Completion Certificates;

12.2.4 set out the proportion of any fixed lump sum or sums claimed in an updated cost loaded programme in electronic form (P3e) together with two hard copies of all supporting documentation

12.2.5 set out the proportion of Management Fees claimed in an updated cost loaded programme in electronic form (P3e) together with two hard copies of all supporting documentation;

12.2.6 set out any other fees claimed in an updated cost loaded programme in electronic form (P3e) together with two hard copies of all supporting documentation;

12.2.7 set out any other costs and/or expenses where it has been agreed in writing that such costs and/or expenses shall be charged to the Client;

12.2.8 a forecast of the fees and any associated costs and/or expenses which the SDS Provider estimates could be claimed for the next two months following the month which is the subject of the application for payment, together with a breakdown of the tasks and workstreams which relate to such forecast.

12.3 The Client shall procure that the Client's Representative shall, subject to any clarifications as are in the Client's opinion (acting properly and reasonably) necessary, certify by notice in writing (an "Interim Certificate") to the SDS Provider that part of the sum claimed in the application for payment which is approved by the Client and give reasons why any part of the sum claimed has not been certified and the value of the sums involved no later than 10 Business Days after the date on which application for payment was received by the Client.

12.4 Subject to Clause 12.7, the SDS Provider shall submit a VAT invoice to the Client within seven days of the date of the Interim Certificate and to the value of the said Interim Certificate. Payment will become due to the SDS Provider on the date of issue of said Interim Certificate by the Client and subject to Clause 12.5 the final date for payment by the Client of such valid VAT invoice shall be 30 days from the date of issue of the Interim Certificate by the Client.

12.5 If the SDS Provider is late in submitting its application for payment to the Client by more than three Business Days after the required timescales in Clause 12.1, payment in respect of any amount certified in an Interim Certificate, shall become due to the SDS Provider on the date of receipt of the relevant valid VAT invoice by the Client in respect of the late application for payment, and the final date for payment of such valid VAT invoice shall be made by the Client to the SDS Provider within 30 days of the first date of the calendar month following receipt of the valid VAT invoice.

12.6 If the SDS Provider is late in submitting a valid VAT invoice to the Client by more than three Business Days after the required timescales in Clause 12.4, payment in respect of any amount certified in an Interim Certificate, shall become due to the SDS Provider on the date of late receipt of the relevant valid VAT invoice by the Client and the final date for payment of such late valid VAT invoice shall be made by the Client to the SDS Provider within 30 days of the first date of the calendar month following receipt of the late valid VAT invoice.

12.7 **Retention**

12.7.1 Prior to the date of execution of the Novation Agreement by the SDS Provider and the date of execution of the Funder's Direct Agreement by the SDS Provider, the SDS Provider shall submit a VAT invoice to **tie** for ninety seven per cent (97%) of the sum certified in each relevant Interim Certificate. **tie** shall retain three per cent (3%) of such sums certified in each relevant Interim Certificate (the **"Retention"**). Payment will become due to the SDS Provider on the date of issue of such Interim Certificate by **tie** and subject to Clauses 12.5 and 12.6, the final date for payment of such valid VAT invoice shall be 30 days from the date of issue of the Interim Certificate.

12.7.2 Within 30 Business Days of the date of execution of the Novation Agreement by the SDS Provider and the date of execution of the Funder's Direct Agreement by the SDS Provider or the SDS Provider being notified in writing by **tie** that the Novation Agreement is not to be executed by the SDS Provider and/or that that the Funder's Direct Agreement is not to be executed by the SDS Provider, the SDS Provider shall issue a valid VAT invoice to **tie** for one hundred per cent (100%) of the total of all Retentions retained in accordance with Clause 12.7.1.

12.7.3 Payment will become due to the SDS Provider on the date of receipt of the valid VAT invoice by **tie** and the final date for payment of such valid VAT invoice by **tie** shall be 30 days from the date of receipt of such valid VAT invoice.

12.7.4 The SDS Provider shall be entitled to offer, and **tie** may at its sole discretion accept, a retention bond, in lieu of the operation of Clauses 12.7.1 to 12.7.3 above:

12.7.4.1 the SDS Provider shall ensure that the retention bond is available and in full force and effect as from the last date of execution of this Agreement until

(a) the date of execution of the Novation Agreement by the SDS Provider and the date of execution of the Funder's Direct Agreement by the SDS Provider; or

(b) the SDS Provider being notified in writing by **tie** that the Novation Agreement is not to be executed by the SDS Provider and/or that the Funder's Direct Agreement is not to be executed by the SDS Provider;

12.7.4.2 the retention bond shall be issued in a form and by a surety acceptable to **tie** and shall be expressed as irrevocable and unconditionally payable forthwith on demand to **tie** in an amount of £500,000 by electronic transfer of funds to an account nominated by **tie**, upon written notification from **tie** to the surety that the SDS Provider has failed to execute the Novation Agreement and the Funder's Direct Agreement, when requested by **tie** pursuant to Clauses 29.1 and 29.7 of this Agreement. Demand for payment under the retention bond shall not be subject to any further action or recourse being taken by **tie**;

12.7.4.3 **tie** shall release the original retention bond to the surety on its satisfaction as to due execution of the Novation Agreement and the Funder's Direct Agreement or following the SDS Provider being notified in writing by **tie** that the Novation Agreement is not to be executed by the SDS Provider and/or that the Funder's Direct Agreement is not to be executed by the SDS Provider. In the event that the credit rating of the surety is at any time downgraded, **tie** shall be entitled to require the SDS Provider to arrange for the issue of a replacement retention bond issued at no cost to **tie** by a different surety acceptable to **tie**;

12.7.4.4 subject to Clause 12.7.4.5 below, the issue and continued validity of a retention bond shall be a condition precedent to payment by **tie** to the SDS Provider under this Agreement;

12.7.4.5 failure by the SDS Provider to provide and maintain an acceptable retention bond (or a replacement therefor) shall constitute a breach and Clauses 12.7.1 to 12.7.3 above shall operate forthwith without further notice from **tie**. Acceptance of a retention bond following failure to provide or maintain shall be at **tie**'s discretion.

12.8 **Adjustments to the Milestone Payments, Lump Sums and Rates**

12.8.1 Without prejudice to Clause 12.3, any milestone payments, and/or lump sum or sums payments, or other sums set out in Schedule 3 (*Pricing Schedule*) to this Agreement or agreed in accordance with this Agreement will not be adjusted except by the express written agreement of the Client where there has been a variation of the Services in accordance with Clause 15 (*Changes*);

12.8.2 The rates set out in Schedule 3 (*Pricing Schedule*) to this Agreement shall not be adjusted;

12.9 **Payments to SDS Provider Parties**

12.9.1 Where, with the agreement of the Client, the SDS Provider has appointed any SDS Provider Parties, no additional payments shall be made over and above any fixed lump sum or sums, and/or any milestone payments and/or sub-milestone payments, or the rates set out in Schedule 3 (*Payment Schedule*) to this Agreement, unless expressly agreed by the Client in writing.

12.9.2 Where the Client has expressly agreed in writing that payment shall be made by the Client for the services of SDS Provider Parties, the SDS Provider shall apply for such payment in accordance with Clause 12.1.

12.10 **Interest on Late Payments**

12.10.1 In the event of failure of the Client to make payment in accordance with this Clause 12 (*Arrangements for Invoicing and Payment*), the Client shall pay to the SDS Provider interest upon any payment not paid by the final date for payment at a rate per annum equivalent to 2 per cent above the Base Rate of the Royal Bank of Scotland current on the date upon which such payment first becomes overdue adjusted to reflect any changes to the rate during the period over which the payment remains overdue.

12.11 **SDS Provider to remain responsible:**

12.11.1 The final payment for any Services shall not be interpreted as being the satisfaction of the Client that the Services have been performed in accordance with the Agreement.

12.11.2 The responsibility of the SDS Provider for the Services shall not come to an end solely by reason of the making of any payment therefor.

13. SET-OFF

13.1 Subject to Clause 13.2 and Clause 27.4, the Client may deduct any amount payable by the SDS Provider to the Client whether by way of damages or in respect of any loss or expense sustained by the Client by reason of the SDS Provider's breach of this Agreement from any other payment or payments due to be made to the SDS Provider by the Client under this Agreement.

13.2 Any notice of intention to withhold payment shall be served by the Client at least three days prior to the final date for payment calculated in accordance with Clause 12 *(Arrangements for Invoicing and Payment)* and such notice shall state the sums being withheld and the detailed reason or detailed reasons for such withholding. Where an effective notice of intention to withhold payment is given, but on the matter being referred to the Dispute Resolution Procedure, it is decided that the whole or part of the amount should be paid, the decision shall be construed as requiring payment not later than:

13.2.1 7 days from the date of the decision, or

13.2.2 the date which, apart from the notice, would have been the final date for payment,

whichever is the later.

13.3 The SDS Provider shall be entitled to payment of interest as provided in Clause 12.10.1 in respect of the relevant part of any payments which have been withheld in accordance with Clause 13.2 but are subsequently determined as being payable by the Client to the SDS Provider either by agreement between the Parties or a decision following a referral to the Dispute Resolution Procedure. The interest shall be calculated for the period between the date when the relevant part of the payment should have been paid but for the notice of intention to withhold payment and the date on which payment is made by the Client in accordance with Clause 13.2.

14. AUDIT

14.1 The SDS Provider shall produce to the Client any documents or provide any information relevant to the performance of the Services or any part thereof as the Client's auditors may require and shall provide any documents or information reasonably required by the Client in respect of any SDS Provider Parties.

14.2 Proper books, vouchers, accounts and records relating to the Services and any services being performed by SDS Provider Parties shall be maintained by the SDS Provider at its place of business and shall be available for inspection by the Client or any officer authorised by the Client at all reasonable times during the duration of the Agreement and for six years after the termination or expiry of this Agreement.

15. CHANGES

Client Changes

15.1 Unless expressly stated in this Agreement or as may otherwise be agreed by the Parties, Client Changes shall be dealt with in accordance with this Clause 15 (*Changes*). If the Client requires a Client Change, it must serve a Client Notice of Change on the SDS Provider.

15.2 A Client Notice of Change shall:

15.2.1 set out the proposed Client Change in sufficient detail to enable the SDS Provider to calculate and provide the Estimate in accordance with Clause 15.3 below;

15.2.2 require the SDS Provider to provide the Client within 18 days of receipt of the Client Notice of Change with an Estimate, and specify whether any competitive quotes are required; and

15.2.3 set out how the Client wishes to pay (where relevant) for any proposed Client Change.

15.3 As soon as is reasonably practicable, and in any event within 18 days after having received a Client Notice of Change, the SDS Provider shall deliver to the Client the Estimate. The Estimate shall include the opinion of the SDS Provider (acting reasonably) on:

15.3.1 whether relief from compliance with any of its obligations under this Agreement is required during or as a result of the implementation of the proposed Client Change;

15.3.2 any impact on the performance of the Services;

15.3.3 any impact on the Master Project Programme and the Programme, and any requirement for an extension of time;

15.3.4 any amendment required to the Agreement as a result of the implementation of the proposed Client Change,

15.3.5 the proposed method of delivery of the proposed Client Change;

15.3.6 proposals to mitigate the impact of the proposed Client Change; and

15.3.7 any increase or decrease in any sums due to be paid to the SDS Provider (including any milestone payments and lump sum payments) as a result of the implementation of the proposed Client Change.

15.4 The valuation of any Client Changes made in compliance with this Clause 15 (*Changes*) shall be added to or deducted from the sums due to be paid to the SDS Provider as the case may be, and shall be ascertained by the Client as follows:

15.4.1 by measurement and valuation at the rates and prices for similar work in Schedule 3 *(Pricing Schedule)* insofar as such rates and prices apply;

15.4.2 if such rates and prices do not apply by measurement and valuation at rates and prices deduced therefrom insofar as it is practical to do so;

15.4.3 if such rates and prices do not apply and it is not practicable to deduce rates and prices therefrom by measurement and/or valuation at fair rates and prices; or

15.4.4 if the value of the Client Change cannot properly be ascertained by measurement and/or valuation, the value of the resources and labour employed thereon, as appropriate, in accordance with the basis of rates for provisional work set out in Schedule 3 (*Pricing Schedule*);

provided that where any Client Change would otherwise fall to be valued under Clauses 15.4.1 and 15.4.2 above, but the Client's representative is of the opinion that the instruction therefor was issued at such a time or was of such content as to make it unreasonable for the alteration or addition to be so valued, the value of the Client Change shall be ascertained by measurement and/or valuation at fair rates and prices.

15.5 The SDS Provider shall include in the Estimate evidence demonstrating that:

15.5.1 the SDS Provider has used all reasonable endeavours to minimise (including by the use of competitive quotes) any increase in costs and to maximise any reduction of costs;

15.5.2 the SDS Provider has, where required by the Client, sought competitive quotes from persons other than the SDS Provider Parties in pursuance of its obligation under Clause 15.5.1 above;

15.5.3 the SDS Provider has investigated how to mitigate the impact of the Client Change; and

15.5.4 the proposed Client Change will, where relevant, be implemented in the most cost-effective manner, including showing that when such expenditure is incurred Changes in Law that are foreseeable at that time have been taken into account by the SDS Provider.

15.6 If the SDS Provider does not intend to use its own resources to implement any proposed Client Change, it shall:

15.6.1 demonstrate that it is appropriate to subcontract the implementation of such Client Change; and

15.6.2 comply with Good Industry Practice with the objective of ensuring that it obtains best value for money when procuring any SDS Provider Party or Deliverable required in relation to the proposed Client Change.

15.7 As soon as reasonably practicable after the Client receives the Estimate, the Parties shall discuss and agree the issues set out in the Estimate. From such discussions the Client may modify the Client Notice of Change, and the Client may require the SDS Provider to seek and evaluate competitive tenders. In each case the SDS Provider shall, as soon as practicable, and in any event not more than 14 days after receipt of such modification, notify the Client of any consequential changes to the Estimate.

15.8 If the Parties cannot agree on the contents of the Estimate, then either Party may refer the Estimate for determination in accordance with the Dispute Resolution Procedure provided that the SDS Provider shall not be obliged to implement any proposed Client Change where:

15.8.1 the Client does not have the legal power or capacity to require the implementation of such proposed Client Change; or

15.8.2 implementation of such proposed the Client Change would

15.8.2.1 be contrary to Law;

15.8.2.2 not be technically feasible;

15.8.2.3 substantially and materially increases the probability of a substantial non-compliance with this Agreement by the SDS Provider; or

15.8.2.4 be outwith the specific competence of the SDS Provider either in performing the activity required by the Client Change or in supervising a SDS Provider Party to carry out the activity required by the Client Change.

15.9 As soon as reasonably practicable after the contents of the Estimate have been agreed or determined pursuant to the Dispute Resolution Procedure the Client shall:

15.9.1 issue a Client Change Order ; or

15.9.2 withdraw the Client Notice of Change.

For the avoidance of doubt, the SDS Provider shall not commence work until instructed through receipt of a Client Change Order.

15.10 If the Client does not issue a Client Change Order within 30 days of the contents of the Estimate having been agreed or determined pursuant to Clause 15.9, then the Client Notice of Change shall be deemed to have been withdrawn.

Restrictions on Entitlements to Relief for a Client Change

15.11 The SDS Provider shall not be entitled to any extension of time, payment or relief in respect of any Client Change if and to the extent that the SDS Provider could (where such action is within the power of the SDS Provider and the SDS Provider could be reasonably expected to take such action, having regard to the scope and nature of the Services), by the exercise of reasonable foresight and diligence, have prevented or materially reduced the requirement for such Client Change.

15.12 If, having received instructions from the Client or the Client's Representative, the SDS Provider considers that compliance with those instructions would amount to a Client Change, the SDS Provider shall within 10 Business Days of any instructions being received, notify the Client of the same and, if it is agreed by the parties or determined pursuant to the Dispute Resolution Procedure that a Client Change would arise if the

instructions were complied with, the Client may proceed with the instruction in accordance with this Clause 15 (*Changes*).

15.13 Any failure by the SDS Provider to notify the Client within 10 Business Days of instructions being received that it considers compliance with such instructions from the Client or the Client's Representative would amount to a Client Change shall constitute an irrevocable acceptance by the SDS Provider that any compliance with the Client's or the Client Representative's comments shall be without cost to the Client and without any entitlement to any extension of time or other relief.

15.14 Any failure by the SDS Provider to notify the Client within 10 Business Days of becoming aware of any other matter or occurrence which could amount to a Client Change shall constitute an irrevocable acceptance by the SDS Provider that in being instructed to deal with such matter or occurrence as a Client Change, the SDS Provider shall not be entitled to any costs, extension of time or other relief. in respect of such Client Change.

Changes proposed by the SDS Provider

15.15 Within 10 Business Days of the SDS Provider becoming aware of the need or desirability for a variation to the Services, the SDS Provider shall notify the Client of the reasons, consequential effects including any increase or reduction in costs, and options available to mitigate these effects with a recommendation for action by the Client.

15.16 If the Client wishes to proceed with a variation proposed by the SDS Provider, the Client shall serve a Client Notice of Change on the SDS Provider and Clauses 15.2 to 15.11 shall be adhered to by the Client and the SDS Provider.

Change Control Register

15.17 The SDS Provider shall maintain a change control register which shall detail the status and gives summary information on all withdrawn, potential and confirmed variations under this Agreement.

16. QUALIFYING CHANGE IN LAW

16.1 If a Qualifying Change in Law occurs or is to occur, then either Party may write to the other to express an opinion on its likely effects, giving details of its opinion of:

16.1.1 any necessary change in the Services;

16.1.2 whether any changes are required to the terms of this Agreement to deal with the Qualifying Change in Law; or

16.1.3 whether relief from compliance with any obligations under this Agreement is required as a result of the Qualifying Change in Law;

in each case giving in full detail the procedure for implementing the Qualifying Change in Law. Responsibility for any costs of such implementation (and any resulting variation to payments due under this Agreement or other payment method at the Client's discretion) shall be dealt with in accordance with Clauses 16.2 and 16.3 below.

16.2 As soon as reasonably practicable after receipt of any notice from either Party under Clause 16.1 above, the Parties shall discuss and agree the issues referred to in Clause 16.1 above and any ways in which the SDS Provider can mitigate the effect of the Qualifying Change in Law and the SDS Provider shall:

16.2.1 provide evidence to the Client that the SDS Provider has used and will continue to use all reasonable endeavours (including where appropriate and practicable the use of competitive quotes) to minimise any increase in costs and maximise any reduction in costs;

16.2.2 demonstrate how the effects of the Qualifying Change in Law will be mitigated;

16.2.3 demonstrate that the relevant changes will be implemented in the most cost-effective manner, including showing that when expenditure is incurred or has been incurred, foreseeable Changes in Law at that time have been taken into account by the SDS Provider; and

16.2.4 give evidence as to how the Qualifying Change in Law has affected the fees and/or costs of similar consultants.

16.3 As soon as reasonably practicable after the issues referred to in Clause 16.2 have been agreed between the Parties or determined pursuant to the Dispute Resolution Procedure, the Client shall give a Client Notice of Change and the provisions of Clause 15 (*Changes*) shall apply except that the SDS Provider shall be obliged to implement the change in all circumstances (except to the extent that such change is not necessary to implement the Qualifying Change in Law). The Client shall issue a Client Change Order once it has been agreed or determined pursuant to the Dispute Resolution Procedure. In assessing the value of the change, the Client shall pay the agreed amount less the agreed threshold of £15,000 for each and every event. The Client will, at its sole discretion, determine the scope of each and every event.

16.4 Except as otherwise expressly provided in this Agreement, the SDS Provider shall be responsible for any increase in its costs and shall not be entitled to any relief from its obligations under this Agreement to the extent that the same is caused as a result of a General Change in Law.

17. REQUIRED INSURANCES

17.1 The SDS Provider shall, at its own cost, procure that each of the Required Insurances is taken out, comes into effect and is maintained with reputable insurers authorised to carry out insurance business in the United Kingdom and otherwise in accordance with the requirements of Schedule 6 (*Required Insurances*).

17.2 The Required Insurances referred to in this Clause 17 (*Required Insurances*) shall be effected with insurers approved by the Authority, such approval not to be unreasonably withheld or delayed. The SDS Provider shall not make any material alteration to the terms of the Required Insurances without the Client's prior approval (which approval shall not be unreasonably withheld). If any such material alteration to the Required Insurances is made, the SDS Provider shall complete the questionnaire set out in Part 3 of Schedule 6 (*Required Insurances*) duly endorsed by its insurance broker. If the insurer makes or attempts to make any material alteration or purports to withdraw cover, or if the SDS Provider is unable to obtain professional indemnity insurance, the SDS Provider shall promptly give notice of this to the Client.

17.3 The SDS Provider shall ensure that its insurance broker gives the Client as soon as reasonably practicable after any of the Required Insurances is taken out, replaced or renewed, a letter of undertaking in the form set out in Part 2 of Schedule 6 (*Required Insurances*).

17.4 The SDS Provider shall provide satisfactory evidence to the Client that the Required Insurances have been effected and are being maintained. The SDS Provider shall

upon request produce to the Client confirmation of the payment of current insurance premiums.

17.5 The SDS Provider shall confirm to the Client in writing on or around the date of the first and each subsequent anniversary of the Effective Date that the Required Insurances continue to be maintained. The SDS Provider shall, when required by the Client, make available for inspection by the Client, documentary evidence that such Required Insurances are being properly maintained. For the avoidance of doubt, the Client acknowledges that there may be a delay between the renewal date and issue of such evidence and such delay will not be deemed to be a failure of the SDS Provider to provide evidence of cover.

17.6 If the SDS Provider shall fail upon request to produce to the Client satisfactory evidence that there is in force the Required Insurances referred to in this Clause 17 (*Required Insurances*) or is otherwise in breach of this Clause 17 (*Required Insurances*), the Client may, on behalf of the SDS Provider, effect and keep in force any such insurance and pay such premium or premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the Client as aforesaid from any monies due or which may become due to the SDS Provider.

17.7 The SDS Provider shall increase the limit of indemnity and amend the terms of the third party liability insurance set out in Schedule 6 (*Required Insurances*) if required by the Client in order to meet the requirements of any third party including Network Rail and BAA with regard to any of the Services to be performed by the SDS Provider in accordance with this Agreement. Any costs associated with such increase and/or amendment shall be paid by the SDS Provider.

17.8 The SDS Provider shall not take any action or fail to take any reasonable action or (insofar as it is reasonably within its power) permit or allow others to take or fail to take any action (including failure to disclose any fact) as a result of which any of the Required Insurances may be rendered void, voidable, unenforceable or suspended or impaired in whole or in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

17.9 The supply to the Client of any insurance policy or insurance certificate or renewal certificate or other evidence of compliance with this Clause 17 (*Required Insurances*) shall not imply, or be taken as, acceptance by the Client that:

17.9.1 the extent of insurance cover is sufficient and its terms are satisfactory; or

17.9.2 in respect of any risks not insured against, insurable interests or parties not insured, an acceptance by the Client that the same were uninsurable.

18. ERRORS AND/OR OMISSIONS IN THE SERVICES

18.1 If during the performance of the Services and/or where the SDS Provider has completed the Services, the Client becomes aware of any error or omission in the performance of the Services or of any other breach of this Agreement, the Client shall notify the SDS Provider, who shall, at its own expense and in liaison with the Client and/or any other party or parties nominated by the Client, rectify any error or omission or breach, or where this is agreed by the Client to be impracticable or undesirable, take such other agreed steps to address the error or omission.

18.2 Any direct costs to the Client of remedying any such errors or omissions or breaches shall be paid by the SDS Provider to the Client.

18.3 These arrangements shall in no respect diminish the Client's ability to recover damages from the SDS Provider for losses incurred by the Client consequent upon the error or omission or breach in question.

19. TERMINATION FOR SDS PROVIDER DEFAULT

19.1 The Client may terminate this Agreement upon giving written notice to the SDS Provider, and this Agreement shall terminate on the date falling 30 days after the service of such notice if:

19.1.1 the SDS Provider breaches any material provision or requirement of the Agreement; or

19.1.2 the circumstances envisaged by Clause 33.7 apply;

19.1.3 following a written warning and the removal of any member of the Key Personnel, any replacement member of the Key Personnel is, in the opinion of the Client, incompetent to perform any of his duties;

19.1.4 the SDS Provider conducts itself in a manner which the Client considers to be incompatible with the performance of the Services, and/or in such manner so as to wilfully detract from the image and reputation of the Client, **tie**, CEC, Transport Edinburgh Limited, the Scottish Executive or any project related to the performance of the Services, or

19.1.5 any partner or director of the SDS Provider directly involved with this Agreement is expelled from or sanctioned by his relevant professional Institute or Institution, thus compromising the performance of the Services; or

19.1.6 an Insolvency Event occurs; or

19.1.7 the SDS Provider fails to resolve a conflict of interest in accordance with Clause 31 (*Conflict of Interest)* to the reasonable satisfaction of the Client; or

19.1.8 there is a change in legal status of the SDS Provider or a Change in Control of the SDS Provider which is materially prejudicial to the performance of the Services.

19.2 The SDS Provider shall immediately notify the Client of

19.2.1 any resolution or decision by the SDS Provider or the board of directors of the SDS Provider or a decision by any director of the SDS Provider to seek legal or financial advice pertaining to the solvency of the SDS Provider; and/or

19.2.2 any presentation of any petition for the purpose of winding up the SDS Provider or any petition for an administration order.

20. TERMINATION, ABANDONMENT OR SUSPENSION OF THE SERVICES BY THE CLIENT

20.1 The Client may terminate this Agreement at any time and for whatever reason upon giving written notice to the SDS Provider, and this Agreement shall terminate on the date falling 60 days after the date of service of such written notice.

20.2 At any time the Client may decide to postpone or abandon any part of the Services and, if the Client decides to postpone or abandon any part of the Services, the Client may by notice in writing to the SDS Provider seek to vary the Services either by excluding the Services (or any part thereof) to be performed by the SDS Provider, or

by suspending performance of the same, and in such notice the Client shall specify the Services affected.

20.3 Unless otherwise notified in writing by the Client, if the Client shall not have required the SDS Provider to resume the performance of Services in respect of the whole or any part of the Services suspended under Clause 20.2 within a period of 12 months from the date of the notice, the Agreement shall forthwith automatically terminate in whole if the whole of the Services has been terminated or in part, if part of the Services has been terminated.

20.4 The SDS Provider shall, upon receipt of any notice in accordance with this Clause 20 (*Termination, Abandonment or Suspension of the Services by the Client)* terminating, suspending or abandoning the whole or any part of the Services, proceed in an orderly manner but with all reasonable speed and economy to take such steps as are necessary to bring to an end or suspend (as appropriate) the Services and its other obligations under this Agreement. The Client and the SDS Provider shall meet within 7 days of the said receipt of such notice to assess the costs arising.

21. TERMINATION OR SUSPENSION FOR CLIENT DEFAULT

21.1 If a Client Default has occurred and the SDS Provider wishes to terminate this Agreement, the SDS Provider must serve a termination notice on the Client within 30 days of becoming aware of the Client Default. Failure to do so shall be a waiver of the right to terminate.

21.2 The SDS Provider shall specify in the termination notice the type of the Client Default which has occurred entitling the SDS Provider to terminate.

21.3 Provided the SDS Provider has complied with Clauses 21.1 and 21.2, this Agreement shall terminate on the day falling 60 days after the date on which the Client receives the termination notice, unless the Client rectifies the Client Default within 60 days of receipt of the termination notice.

21.4 The SDS Provider shall not be entitled to, and shall not purport to, terminate this Agreement or accept any repudiation of this Agreement, except as expressly provided in this Clause 21 (*Termination for Client Default*) or Clause 23 (*Termination by Reason of Force Majeure*).

21.5 If the Client shall fail to pay the SDS Provider in full any amount properly due and payable under this Agreement by the final date for payment in accordance with the requirements of Clause 12 (*Arrangements for Invoicing and Payment*) and no effective notice to withhold payment has been given by the Client to the SDS Provider, the SDS Provider may, after giving the Client 60 days' notice in writing of the same, stating the ground or grounds on which it is intended to suspend performance, suspend the performance of the Services until payment in full is made by the Client.

22. TERMINATION FOR CORRUPT GIFTS AND PAYMENTS

22.1 The SDS Provider or anyone employed by it or acting on its behalf (including any SDS Provider Party) shall not commit any Prohibited Act.

22.2 If the SDS Provider, or anyone employed by it or acting on its behalf (including any SDS Provider Party), commits any Prohibited Act, then the Client shall be entitled to act in accordance with Clauses 22.3 to 22.7.

22.3 If a Prohibited Act is committed by the SDS Provider or by an employee of the SDS Provider not acting independently of the SDS Provider, then the Client may terminate this Agreement by giving notice to the SDS Provider.

22.4 If a Prohibited Act is committed by an employee of the SDS Provider acting independently of the SDS Provider, then the Client may give notice to the SDS Provider of termination and this Agreement will terminate, unless within 30 days of receipt of such notice the SDS Provider terminates the employee's employment and (if necessary) procures the performance of the relevant part of the Services by another person.

22.5 If a Prohibited Act is committed by anyone acting on behalf of the SDS Provider (excluding employees of the SDS Provider but including any SDS Provider Party, and their employees) and not acting independently of the SDS Provider, then the Client may give notice to the SDS Provider of termination and this Agreement will terminate.

22.6 If a Prohibited Act is committed by anyone acting on behalf of the SDS Provider (excluding employees of the SDS Provider but including any SDS Provider Party, and their employees) and acting independently of the SDS Provider, then the Client may give notice to the SDS Provider of termination and this Agreement will terminate, unless within 30 days of receipt of such notice the SDS Provider terminates that party's employment and procures the performance of the relevant part of the Services by another person.

22.7 Any notice of termination under this Clause 22 (*Termination for Corrupt Gifts and Payments*) shall specify:

22.7.1 the nature of the Prohibited Act;

22.7.2 the identity of the person whom the Client believes has committed the Prohibited Act; and

22.7.3 the date on which this Agreement will terminate, in accordance with the applicable provision of this Clause 22 (*Termination for Corrupt Gifts and Payments*).

23. TERMINATION BY REASON OF FORCE MAJEURE

23.1 Neither Party shall be entitled to bring a claim for a breach of obligations under this Agreement by the other Party or incur any liability to the other Party for any losses or damages incurred by that other Party to the extent that a Force Majeure Event occurs and such party is directly prevented from carrying out such obligations by that Force Majeure Event provided that such prohibition on bringing a claim and exclusion of liability shall not operate if and to the extent that:

23.1.1 the Affected Party could, by the exercise of reasonable foresight and diligence, have prevented or reduced the effect of the Force Majeure Event; and

23.1.2 the Affected Party could, whether before or after the occurrence of the Force Majeure Event, have reduced or eliminated the resulting breach of its obligations under this Agreement by taking reasonable steps.

23.2 On the occurrence of a Force Majeure Event, the Affected Party shall notify the other Party as soon as reasonably practicable, specifying details of the Force Majeure Event and providing evidence of its effect on the obligations of the Affected Party and any action proposed to remove or mitigate its effect.

23.3 The Parties shall enter into bona fide discussions with a view to alleviating the effects of such Force Majeure Event, and if the terms or measures to remove the effect of the Force Majeure Event cannot be agreed on or before the date falling 12 months after the date of the commencement of the Force Majeure Event or by the end of such longer period as the Parties may have agreed, or such Force Majeure Event is continuing or its consequence remains such that the Affected Party is unable to comply with all or a material part of its obligations under this Agreement for a period of more than 12 months after the date of the commencement of the Force Majeure Event or by the end of such longer period as the Parties may have agreed, either Party shall have the option to terminate this Agreement by written notice to the other.

23.4 The Parties shall at all times following the occurrence of a Force Majeure Event use all reasonable endeavours to prevent and mitigate the effects of any delay to the performance of the Services and the SDS Provider shall at all times during which a Force Majeure Event is subsisting take all steps in accordance with Good Industry Practice to overcome or minimise the consequences of the Force Majeure Event.

23.5 The Affected Party shall notify the other party as soon as reasonably practicable after the Force Majeure Event ceases or no longer causes the Affected Party to be unable to comply with its obligations under this Agreement. Following such notification, this Agreement shall continue to be performed on the terms existing immediately prior to the occurrence of the Force Majeure Event.

24. PERSISTENT BREACH

24.1 If a breach by the SDS Provider of any of its obligations under this Agreement has occurred more than once then the Client may serve a notice ("Persistent Breach Notice") on the SDS Provider:

24.1.1 specifying that it is a Persistent Breach Notice;

24.1.2 giving reasonable details of the breach; and

24.1.3 stating that such breach is a breach which, if it occurs frequently or continues, may result in a termination of this Agreement.

24.2 If, following service of such a Persistent Breach Notice, the breach specified has continued or occurred once again after the date falling 30 days after the date of service of the Persistent Breach Notice and before the date falling 365 days after the date of service of such notice, then the Client may serve another notice ("Final Persistent Breach Notice") on the SDS Provider:

24.2.1 specifying that it is a Final Persistent Breach Notice;

24.2.2 stating that the breach specified has been the subject of a prior Persistent Breach Notice within the period of 365 days prior to the date of service of the Final Persistent Breach Notice; and

24.2.3 stating that if such failure is not remedied within 7 days or is remedied and occurs once or more within the 180 day period after the date of service of the Final Persistent Breach Notice, this Agreement may be terminated with immediate effect.

25. PAYMENT FOLLOWING TERMINATION OR SUSPENSION

25.1 No compensation shall be payable by the Client to the SDS Provider for termination of this Agreement whether under contract, delict (including negligence), breach of (or

compliance with) statutory duty, restitution or otherwise but without prejudice to payments due under Clause 25.3.

25.2 Within 30 days of termination of this Agreement and following receipt of a valid VAT invoice, the Client shall pay to the SDS Provider:

25.2.1 any undisputed sums due from the Client to the SDS Provider pursuant to Clauses 11 (*Methods of Payment*) and 12 (*Arrangements for Invoicing and Payment*);

25.2.2 any entitlement to demobilisation costs pursuant to Clause 25.3; and

25.2.3 any sums due to the SDS Provider in respect of any work in progress which have not been certified in accordance with Clause 12 (*Arrangements for Invoicing and Payment*) provided that the calculation of such sums have been certified as follows:

25.2.3.1 the SDS Provider shall have provided the Client with a valuation of all work in progress in relation to the Services in accordance with the provisions of Clause 15.4 and subject to Clause 11 (*Methods of Payment*) and, for the avoidance of doubt, subject to any agreed milestone or lump sum payments set out in Schedule 3 (*Pricing Schedule*) or as agreed otherwise in accordance with this Agreement;

25.2.3.2 **tie** shall, subject to any clarifications as are in **tie's** opinion (acting properly and reasonably) necessary certify by notice in writing to the SDS Provider that part of the work in progress which is approved by **tie** and give reasons why any part of the work in progress has not been certified and the value of the sums involved no later than 10 Business Days after the date on which such valuation was received. **tie's** valuation of such work in progress shall be final and binding.

25.3 The Client shall make payment to the SDS Provider of any demobilisation costs which have been demonstrably and reasonably incurred by the SDS Provider in respect of:

25.3.1 termination for Client Default pursuant to Clause 21 *(Termination or Suspension for Client Default);* or

25.3.2 termination or abandonment pursuant to Clause 20 *(Termination, Abandonment or Suspension of the Services by the Client*); or

25.3.3 suspension pursuant to Clause 20 *(Termination, Abandonment or Suspension of the Services by the Client*).

25.4 The SDS Provider shall use all reasonable endeavours to minimise and mitigate any such demobilisation costs and the Client shall not be liable to pay the SDS Provider for such demobilisation costs to the extent that the SDS Provider has failed to minimise or mitigate such demobilisation costs or to the extent that such demobilisation costs have arisen out of the SDS Provider's breach of this Agreement or any negligent or wilful act or omission by the SDS Provider.

25.5 Within 30 days of termination of this Agreement, the SDS Provider shall pay to the Client any sums due from the SDS Provider to the Client pursuant to this Agreement.

25.6 This Agreement shall terminate automatically on the expiry of this Agreement unless it shall have been terminated earlier in accordance with the provisions of this Agreement. The SDS Provider shall not be entitled to any compensation on expiry of the Agreement.

25.7 Within 30 days of expiry of this Agreement, the Client shall pay to the SDS Provider any undisputed sums due from the Client to the SDS Provider in accordance with Clauses 11 (*Methods of Payment*) and 12 (*Arrangements for Invoicing and Payment*).

25.8 Within 30 days of expiry of this Agreement, the SDS Provider shall pay to the Client any sums due from the SDS Provider to the Client pursuant to this Agreement.

25.9 Either Party may refer any Dispute about disputed sums to the Dispute Resolution Procedure. If it is determined pursuant to the Dispute Resolution Procedure that the whole or part of any disputed amount is due to either the Client or the SDS Provider, the Client or the SDS Provider (as appropriate) shall raise an invoice within 30 days in respect of such determined amount and payment shall be made by the relevant Party within 60 days of the receipt of such invoice.

25.10 In the event of the Agreement being terminated under Clause 19 *(Termination for SDS Provider Default)* or Clause 22 (*Termination for Corrupt Gifts and Payments*) or Clause 24 (*Persistent Breach*), the Client shall be entitled to recover from the SDS Provider all losses, liabilities damages, penalties, fines, forfeitures, and the costs and expenses incident thereto (including without limitation legal costs of defence) sustained by the Client by such termination, and, without prejudice to the generality of this provision, the Client may forthwith employ and pay persons to carry out, manage and complete the Services and recover the costs of so doing from the SDS Provider.

25.11 In any case in which the Client has required the SDS Provider to suspend the carrying out of the Services, the Client may at any time within the period of 12 months from the date of the Client's notice served in accordance with Clause 20.2 (or such longer period as may be notified in writing by the Client) require the SDS Provider in writing to resume the performance of such Services. In such event, if the SDS Provider needs to perform any additional services in connection with the resumption of the Services, the Client shall pay the SDS Provider fair and reasonable costs in respect of the performance of such additional services which shall be treated as a Client Change and agreed in accordance with Clause 15 (*Changes*).

26. EFFECTS OF TERMINATION OR EXPIRY

26.1 Subject to Clause 25.2, the SDS Provider shall not have any other right or remedy against the Client on termination of this Agreement.

26.2 Subject to any exercise by the Client of its rights to perform, or to procure a third party to perform, the obligations of the SDS Provider, the Parties shall continue to perform their obligations under this Agreement, notwithstanding the giving of any notice of default or breach or termination notice, until the termination of this Agreement becomes effective.

26.3 Any termination or expiry of this Agreement shall not prejudice or affect the accrued rights or claims of either Party.

26.4 On expiry of this Agreement or any earlier termination of this Agreement for whatever reason, all Deliverables shall be handed to the Client, provided that the SDS Provider may retain one copy of any Deliverable where such copy is required for the purposes of Law or any recognised regulatory requirement or for record purposes (where the Client acting reasonably agrees). The provisions of Clause 33 (*Confidential*

Information) will continue to apply to these Deliverables beyond expiry of this Agreement or any earlier termination for whatever reason.

26.5 In order to aid the progress of the performance of the Services, the Client may make available to the SDS Provider various information, materials and documents. On expiry of this Agreement or any earlier termination of this Agreement for whatever reason, all such information, materials and documents shall be returned to the Client provided that the SDS Provider may retain one copy of any information, materials and documents where such copy is required for the purposes of Law or any recognised regulatory requirement. The provisions of Clause 33 (*Confidential Information*) will continue to apply to such information, materials and documents beyond expiry of this Agreement or any earlier termination for whatever reason.

26.6 Completion or termination of the Services shall not affect the SDS Provider's obligations under Clauses 3 *(Duty of Care, Standards and the Services to be provided)*, 11 (*Methods of Payment*), 12 *(Arrangements for Invoicing and Payment)*, 13 *(Set-Off)*, 14 *(Audit)*, 17 (*Required Insurances*), 18 *(Errors and/or Omissions in the Services)*, 25 (*Payment Following Termination or Suspension*), 26 (*Effects of Termination or Expiry*), 27 (*Indemnity by SDS Provider*), 28 (*Dispute Resolution Procedure*), 32 (*Copyright and Intellectual Property*) and 33 (*Confidential Information*). Those obligations shall continue in full force and effect.

27. INDEMNITY BY SDS PROVIDER, LIABILITY AND SOLE REMEDY

27.1 The SDS Provider shall indemnify the Client and its officers, agents and employees ("Indemnified Parties") from and against any and all claims, suits, losses, liabilities damages, penalties, fines, forfeitures, and the costs and expenses incident thereto (including without limitation any legal costs of defence) which any of the Indemnified Parties may hereafter incur, become responsible for, or pay out as a result of or in connection with:

27.1.1 any of the SDS Provider's, or its employees' or any SDS Provider Party's negligent or wilful acts or wilful omissions in the performance of the Services; or

27.1.2 breach of any term or provision of this Agreement ; or

27.1.3 breach of any Law; or

27.1.4 any non-performance or delay in performance of the SDS Provider's obligations under this Agreement.

27.2 The Parties acknowledge and agree that the only rights available to them to terminate this Agreement are those expressly set out in this Agreement and that neither Party shall be entitled to exercise a right to terminate or rescind or accept the repudiation of this Agreement under any other right whether arising in common law or statute or otherwise howsoever (other than for fraud or a fraudulent misrepresentation).

27.3 Nothing in this Agreement shall exclude or limit the liability of either Party for:

27.3.1 death or personal injury caused by that Party's negligence or the negligence of anyone for whom that Party is vicariously liable;

27.3.2 fraud or fraudulent misrepresentation; or

27.3.3 any breach of warranty given as to valid and marketable title, freedom from unduly onerous burdens and conditions or entitlement to possession by action of prescription; or

27.3.4 of the SDS Provider, for any breach of this Agreement or any delict (including negligence) or other liability arising prior to termination of this Agreement;

provided that nothing in this Clause 27.3 shall confer on either Party rights or remedies that they would not otherwise have.

27.4 Subject to Clause 27.3, neither party shall be entitled to claim damages for breach of this Agreement, in delict (including negligence), breach of statutory duty or on any other basis whatsoever to the extent that such damages claimed by that Party are for Indirect Losses suffered by that Party provided that for the avoidance of doubt, nothing in this 27.4 shall affect either Party's liability to the other Party, in respect of any claim, action, proceedings or demand against such other Party by a third party in connection with Indirect Loss suffered.

27.5 The SDS Provider shall not be relieved or excused of any responsibility, liability or obligation under this Agreement by the appointment of any SDS Provider Party. The SDS Provider shall, as between itself and the Client, be responsible for the selection, pricing, performance, acts, defaults, omissions, breaches, delict and offences of any SDS Provider Party. All references in this Agreement to any act, default, omission, breach, delict or offence of the SDS Provider shall be construed to include any such act, default, omission, breach or delict of any SDS Provider Party.

27.6 Notwithstanding any other term of this Agreement, except as detailed in Clauses 27.3.1, 27.3.2 and 27.3.3, the SDS Provider's total liability hereunder whether in contract, delict or howsoever arising shall not exceed the sum of £10,000,000 in respect of each and every claim other than in respect of claims arising from pollution or contamination where the limit of indemnity of £10,000,000 applies to any one claim and in aggregate during the policy period.

28. DISPUTE RESOLUTION PROCEDURE

28.1 The Parties agree that this Clause 28 (*Dispute Resolution Procedure*) shall have effect for the resolution of any Dispute.

28.2 Any Dispute shall, in the first instance, be referred to the Internal Resolution Procedure in accordance with Clause 28.10.

28.3 Neither Party shall commence any court proceedings until the procedures in Clauses 28.10 to 28.57.3 have been completed, under exception that Clause 28 (*Dispute Resolution Procedure*) shall not apply so as to prevent either Party seeking an interim order, or interim relief, in the Scottish courts.

28.4 In the event that any court proceedings whatsoever are initiated by either Party against the other, the Parties agree that the Court of Session, Scotland, shall have exclusive jurisdiction.

28.5 Neither Party shall be entitled to suspend the performance of its undisputed obligations under this Agreement merely by reason of the reference of any Dispute to the Dispute Resolution Procedure contained in this Clause 28 (*Dispute Resolution Procedure*).

28.6 Subject to the Client's discretionary rights set out in Clause 28.55 to Clause 28.57.3 to require that a Dispute and a Related Dispute (as defined in Clause 28.55) be dealt with together at an appropriate stage of the Dispute Resolution Procedure, the provisions of this Clause 28 (*Dispute Resolution Procedure*) are mandatory and binding upon the Parties.

28.7 Unless a Party refers a Dispute to the Dispute Resolution Procedure contained in this Clause 28 (*Dispute Resolution Procedure*) within three months of the date on which the event, matter or situation giving rise to the Dispute first occurred, such Party shall be deemed to have irrevocably waived any right to refer such Dispute to the Dispute Resolution Procedure, under exception that if such Party was not aware, and could not with reasonable diligence have been aware, that such event, matter or situation had occurred, this Clause 28.7 shall have effect as if for the reference herein to the date on which such event, matter or situation occurred, there was substituted a reference to the date when such Party first became, or could with reasonable diligence have become, aware that such event, matter or situation had occurred. This Clause 28.7 is without prejudice to the right of either Party to raise in defence to any Dispute any defence (including, without prejudice to the foregoing generality, any defence of retention, compensation or set-off) which would otherwise be available to it.

28.8 Except in relation to the matters provided for in Clauses 28.15 to Clause 28.54 and subject to the provisions of Clause 28.9, in the event that either Party pursues any Dispute under the Dispute Resolution Procedure, and in the event that such Party fails to observe any time limit or timescale provided for in this Clause 28 (*Dispute Resolution Procedure*) in relation to the pursuit or progression of such Dispute, such Party shall, immediately upon such failure occurring, be deemed to have irrevocably waived any right to pursue or progress such Dispute any further. In that event, such Party shall be deemed to have elected not to have referred such Dispute or to have withdrawn such Dispute from the Dispute Resolution Procedure and shall be deemed to have irrevocably waived any right to refer any Dispute arising from the same or substantially the same Dispute or similar circumstances to the Dispute Resolution Procedure and shall be liable for payment of the whole fees incurred by any mediator or adjudicator who has acted in respect of such Dispute. This Clause 28.8 is without prejudice to the rights of either Party to raise in defence to any Dispute any defence (including, without prejudice to the foregoing generality, any defence of retention, compensation or set-off) which would otherwise be available to it.

28.9 Notwithstanding the provisions of Clause 28.8, in the event that a Party who pursues any Dispute under the Dispute Resolution Procedure fails to observe any time limit or timescale provided for in this Clause 28 (*Dispute Resolution Procedure*) in relation to the pursuit or progression of the Dispute, the other Party may elect to waive such failure, in which event the time limit or timescale to which such failure relates shall be extended at the discretion of such other Party and the Dispute shall progress in accordance with the Dispute Resolution Procedure, subject that all other time limits and timescales provided for in this Clause 28 (*Dispute Resolution Procedure*) which are affected by such extension shall be deemed to have been extended to give effect to such extension of the time limit or timescale to which such failure relates.

Internal Resolution Procedure

28.10 The following procedure is the Internal Resolution Procedure referred to in Clause 28.2:

28.10.1 In the event of any Dispute arising, the SDS Provider's Representative andthe Client's Representative shall seek to resolve the Dispute at a meeting to be convened within three Business Days of written notification by either Party to the other that it wishes to initiate the Internal Resolution Procedure in respect of that Dispute ("Notification"). Such Notification shall be given in accordance with the provisions of Clause 36 (*Notices*) of this Agreement.

28.10.2 Further meetings may follow the meeting referred to in Clause 28.10.1, but in any event, if the Dispute is not resolved within seven Business Days of Notification, each Party shall, before the expiry of the period of ten Business

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Days from Notification, serve, in accordance with the provisions of Clause 36 (*Notices*) of this Agreement, a written position paper ("Position Paper") upon the other Party. Each Party's Position Paper shall state in reasonable detail that Party's position and required objectives in relation to the Dispute, any required redress, and, where possible, any comments on the other Party's position.

28.10.3 Upon such service of a Position Paper by the Party initiating or pursuing the Dispute, the Chief Executive (or equivalent) of the SDS Provider and the Chief Executive (or equivalent) of the Client (or their respective deputies in the event of their unavailability) shall seek to resolve the Dispute by meeting in good faith to discuss and negotiate upon the Dispute without recourse to legal or other proceedings.

28.10.4 In the event that resolution of the Dispute is achieved by the Chief Executive (or equivalent) of the SDS Provider and the Chief Executive (or equivalent) of the Client, the resolution shall be reduced to writing and, once it is signed by the duly authorised representatives of both Parties, shall be binding on the Parties.

28.10.5 Unless concluded by a written legally binding agreement, all discussions and negotiations connected with the Dispute shall be conducted in confidence and without prejudice to the rights of the Parties in any future legal or other proceedings. Nor may such matters be produced or relied upon in evidence in any such proceedings.

28.11 In the event that any Dispute is not resolved by the Internal Resolution Procedure within a period of thirty Business Days from Notification (or longer if so agreed by the Parties) then the following provisions of this Clause 28.11 shall apply;

28.11.1 The Chief Executive (or equivalent) of the SDS Provider and the Chief Executive (or equivalent) of the Client or their respective deputies in the event of their unavailability) shall, within a further period of five Business Days, seek to agree that the Dispute shall be resolved by any one of the following procedures:

28.11.1.1 mediation in accordance with Clauses 28.12 to 28.14; or

28.11.1.2 adjudication in accordance with Clause 28.15 to 28.54 in which event the Referring Party must give its Notice of Adjudication to the other Party within five Business Days of the date of expiry of the period of thirty five Business Days from Notification (or longer if so agreed by the Parties); or

28.11.1.3 litigation before the Court of Session, Scotland, in which event the Summons or Petition in any such litigation shall be signetted and served within ten Business Days of the date of expiry of the period of thirty-five Business Days from Notification (or longer if so agreed by the Parties).

28.11.2 In the event that the Chief Executive (or equivalent) of the SDS Provider and the Chief Executive (or equivalent) of the Client (or their respective deputies in the event of their unavailability) are unable to agree that the Dispute be resolved by the procedures described in Clauses 28.11.1.1 to 28.11.1.3, the Party initiating or pursuing the Dispute shall refer the Dispute to mediation (and thereafter adjudication if necessary) in accordance with Clauses 28.12 to 28.14.

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Mediation

28.12 The Parties shall attempt in good faith to resolve the Dispute by a procedure of mediation in accordance with the Centre for Effective Dispute Resolution mediation rules or Model Mediation Procedure in force at the commencement of the mediation, (or in the event that the Centre for Effective Dispute Resolution has ceased to exist as at the time of the commencement of the mediation, mediation rules or a model mediation procedure offered by any other body offering commercial mediation services which shall be selected by the Client), which procedure shall be commenced within five Business Days of the date of expiry of the period of thirty-five Business Days from Notification (or longer if so agreed by the Parties). In the event that any provision of such mediation rules or model mediation procedure conflicts with any provision of this Clause 28 (*Dispute Resolution Procedure*), the provisions of this Clause 28 (*Dispute Resolution Procedure*) shall take precedence. In the event that any timescales contained in such mediation rules or model mediation procedure conflicts with the timescales referred to in this Clause 28 (*Dispute Resolution Procedure*), the timescales contained in such mediation rules or model mediation procedure shall be amended accordingly such that the timescales referred to in this Clause 28 (*Dispute Resolution Procedure*) shall be adhered to.

28.13 In the event that resolution of the Dispute is achieved in consequence of such mediation procedure, such resolution shall be reduced to writing and, once it is signed by the duly authorised representatives of both Parties, shall be binding on the Parties. Unless concluded by a written legally binding agreement, all discussions and negotiations connected with the mediation procedure referred to in Clause 28.12 shall be conducted in confidence and without prejudice to the rights of the Parties in any future legal or other proceedings. Nor may such matters be produced or relied upon in evidence in any such proceedings.

28.14 If any Dispute to which this Clause 28 (*Dispute Resolution Procedure*) relates is not resolved by the mediation procedure referred to in Clauses 28.12 and 28.13 within a period of 55 Business Days from Notification (or longer if so agreed by the Parties), the mediation procedure shall be terminated and, unless the Party initiating or pursuing the Dispute withdraws the Dispute, the Dispute shall within a further 5 Business Days, be referred to adjudication in accordance with Clauses 28.15 to 28.54.

Adjudication

28.15 In the event that either Party refers a Dispute to adjudication in terms of Clause 28.11.1 or 28.14, or exercises a statutory right available to it (if any) under the Housing Grants Construction and Regeneration Act 1996 to raise adjudication proceedings, such adjudication shall be conducted in accordance with Clauses 28.15 to 28.54 wherein any reference to "days" is a reference to calendar days.

Notice of intention to seek adjudication

28.16 Either Party may give written notice (the "Notice of Adjudication") of its intention to refer the Dispute to adjudication and the Party giving such notice shall be the "Referring Party".

28.17 The Notice of Adjudication shall be given to the other Party and the Party receiving the Notice of Adjudication shall be the "Responding Party".

28.18 The notice of adjudication shall set out briefly:

28.18.1 the nature and a brief description of the Dispute and of the parties involved;

28.18.2 details of where and when the Dispute has arisen;

28.18.3 the nature of the redress which is sought; and

28.18.4 the names and addresses of the Parties (including the addresses which the Parties have specified for the giving of notices).

28.19 The adjudicator selected to consider the Dispute shall be selected from one of the panels ("Panels") appointed by the Parties in accordance with the following:

28.19.1 There shall be four Panels, one in respect of legal matters, ("Legal Panel") one in respect of construction matters and construction/operation interface matters ("Construction Panel"), one in respect of operational and maintenance matters ("Operations Panel") and one in respect of financial matters ("Financial Panel").

28.19.2 Each Panel shall be comprised of four members, who are listed in Schedule 10 *(Panels for the Dispute Resolution Procedure)* to this Agreement.

28.19.3 If any member of a Panel resigns or dies or becomes incapax or ill to the extent of being unable to reasonably discharge his duties as a member of the Panel, a replacement shall be appointed by the Parties as soon as practicable. Any such replacement shall be wholly independent of the Client, any Client Party, the SDS Provider, any SDS Provider Party, **tie**, any **tie** Party, City of Edinburgh Council or any Relevant Authority, any Approvals Body, the Tram Supplier or any equipment supplier or any party associated with the Edinburgh Tram Network, and any successor to or subsidiary or parent of any of the aforementioned parties. If the Parties are unable to agree on the identity of such replacement(s), the President or Vice President for the time being of The Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers shall appoint such replacement(s) within thirty days of any application for such appointment by either Party.

28.20 The Referring Party shall at the same time as giving the Notice of Adjudication to the Responding Party, send to each of the members of the relevant Panel a copy of the Adjudication Notice and a request that each member of the relevant Panel advises both Parties within three days as to whether or not he is able and willing to act. The Parties shall attempt to agree within two further days as to which one of the members of the relevant Panel who responded indicating that they are able and willing to act shall be requested to act as adjudicator. In the event that such agreement is reached, the Referring Party shall, within a further period of one day, request the member of the relevant Panel upon whom agreement has been reached to act as adjudicator. In the event that such agreement is not reached, the Responding Party shall, within a further period of two days, select one of the members of the relevant Panel who responded indicating that they are able and willing to act and the Referring Party shall request that member to act as adjudicator;

28.21 If no member of the relevant Panel indicates that he is able and willing to act within three days of receiving a request to act as adjudicator, the Referring Party shall request the Chairman or the Vice-Chairman for the time being of The Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers to select a person to act as adjudicator.

28.22 Any person appointed, requested or selected to act as adjudicator in accordance with Clause 28.20, 28.21 and 28.24 shall be a natural person acting in his personal capacity. A person appointed, requested or selected to act as an adjudicator shall be wholly independent of the Client, any Client Party, the SDS Provider, any SDS Provider Party, **tie**, any **tie** Party, City of Edinburgh Council or any Relevant

Authority, any Approvals Body, the Tram Supplier or any equipment supplier or any party associated with the Edinburgh Tram Network, and any successor to or subsidiary or parent of any of the aforementioned parties.

28.23 The request referred to in Clause 28.20 shall be accompanied by a copy of the Notice of Adjudication.

28.24 The Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers must communicate the selection of an adjudicator to the Referring Party within three days of receiving a request to do so.

28.25 Where The Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers fails to comply with Clause 28.24, the Referring Party may:

28.25.1 agree with the other Party to the Dispute to request a specified person to act as adjudicator; or

28.25.2 request any other adjudicator nominating body to select a person to act as adjudicator. An "adjudicator nominating body" shall mean a body (not being a natural person and not being a Party to the Dispute) which holds itself out publicly as a body which will select an adjudicator when requested to do by a Referring Party.

28.26 The person requested to act as adjudicator in accordance with the provisions of Clause 28.20 or 28.21 shall indicate whether or not he is willing to act within two days of receiving the request.

28.27 Where an adjudicator has been selected in accordance with Clause 28.20, 28.21 or 28.24, the Referring Party shall, not later than seven days from the date of the Notice of Adjudication, refer the Dispute in writing (the "Referral Notice") to the adjudicator.

28.28 A Referral Notice shall be accompanied by copies of, or relevant extracts from the Agreement and such other documents as the Referring Party intends to rely upon.

28.29 The Referring Party shall, at the same time as he sends to the adjudicator the documents referred to in Clauses 28.27 and 28.28, send copies of those documents to the Responding Party.

28.30 The adjudicator may, with the consent of the Parties to those disputes, adjudicate at the same time on more than one Dispute under the Agreement.

28.31 The Parties may agree to extend the period within which the adjudicator may reach a decision in relation to all or any of these Disputes.

28.32 An adjudicator may resign at any time on giving notice in writing to the Parties.

28.33 An adjudicator must resign where the Dispute is the same or substantially the same as one which has previously been referred to adjudication, and a decision has been taken in that adjudication.

28.34 Where an adjudicator ceases to act under Clauses 28.32 or 28.33, or dies or becomes incapax or ill to the extent of being unable to reasonably discharge his duties;

28.34.1 the Referring Party may serve a fresh notice in accordance with Clauses 28.16 to 28.19 and shall in accordance with Clauses 28.20 to 28.29 request an adjudicator to act; and

28.34.2 if requested by the new adjudicator, the Parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

28.35 The Parties to a Dispute may at any time agree to revoke the appointment of the adjudicator and in such circumstances the fees and expenses of that adjudicator shall, subject to Clause 28.36, be determined and payable in accordance with Clauses 28.52 to 28.53.

28.36 Where the revocation of the appointment of the adjudicator is due to the default or misconduct of the adjudicator, the Parties shall not be liable to pay the adjudicator's fees and expenses.

Powers of the Adjudicator

28.37 The adjudicator shall:

28.37.1 act impartially in carrying out his duties and shall do so in accordance with any relevant terms of the Agreement and shall reach his decision in accordance with Scots law; and

28.37.2 avoid incurring unnecessary expense.

28.38 The adjudicator may take the initiative in ascertaining the facts and the law necessary to determine the Dispute, and shall decide on the procedure to be followed in the adjudication. In particular, he may:

28.38.1 request either Party to supply him with such documents as he may reasonably require including, if he so directs, any written statement from either Party supporting or supplementing the Referral Notice and any other documents given under Clauses 28.27 to 28.28;

28.38.2 conduct the adjudication in the English language and decide whether a translation of any document is to be provided and, if so, by whom, by when, and at whose cost;

28.38.3 meet and question either Party and their representatives;

28.38.4 subject to obtaining any necessary consent from a third party or the Parties, make such site visits and inspections as he considers appropriate, whether accompanied by the Parties or not;

28.38.5 subject to obtaining any necessary consent from a third party or the Parties, procure the carrying out of any tests or experiments, and make directions as to the conditions for and responsibility for the cost of the same;

28.38.6 obtain and consider such representations and submissions as he requires, and, provided he has notified the Parties of his intention, appoint experts, assessors or legal advisers;

28.38.7 give directions as to the timetable for the adjudication, any deadlines, or limits as to the length of written documents or oral representations to be complied with; and

28.38.8 issue other directions relating to the conduct of the adjudication.

28.39 The Parties shall comply with any request or direction of the adjudicator in relation to the adjudication.

28.40 If, without showing sufficient cause, a Party fails to comply with any request, direction or timetable of the adjudicator made in accordance with his powers, fails to produce any document or written statement requested by the adjudicator, or in any other way fails to comply with a requirement under these provisions relating to the adjudication, the adjudicator may:

28.40.1 continue the adjudication in the absence of that Party or of the document or written statement requested;

28.40.2 draw such inferences from that failure to comply as may, in the adjudicator's opinion, be justified in the circumstances;

28.40.3 make a decision on the basis of the information before him, attaching such weight as he thinks fit to any evidence submitted to him outside any period he may have requested or directed;

28.40.4 disqualify any part or parts of that Party's submissions affected by the failure to comply; and

28.40.5 grant the other Party proper opportunity to consider and respond to any evidence or representation made late.

28.41 Subject to any agreement between the Parties to the contrary, either Party may be assisted by, or represented by, such advisers or representatives (whether legally qualified or not) as he considers appropriate.

28.42 The adjudicator shall consider any relevant information submitted to him by either Party and shall make available to them any information to be taken into account in reaching his decision.

28.43 The adjudicator and the Parties shall not disclose to any other person any information or document provided in connection with the adjudication which the Party supplying it has indicated is to be treated as confidential, except to the extent that disclosure is required by law or is necessary for the purposes of, or in connection with, the adjudication, or the information is already in the public domain.

Adjudicator's Decision

28.44 Unless otherwise agreed in accordance with Clause 28.56.1 or 28.57.1, the adjudicator shall reach his decision not later than:

28.44.1 twenty eight days after the date of the Referral Notice mentioned in Clause 28.25;

28.44.2 forty two days after the date of the Referral Notice if the Referring Party so consents; or

28.44.3 such period exceeding twenty eight days after the Referral Notice as the Parties may, after the giving of that notice, agree.

28.45 Where the adjudicator fails, for any reason, to reach his decision in accordance with Clause 28.44:

28.45.1 either of the Parties to the Dispute may serve a fresh notice in accordance with Clause 28.16 to 28.19 and shall request an adjudicator to act in accordance with Clauses 28.20 to 28.29; and

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28.45.2 if requested by the new adjudicator the Parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

28.46 As soon as possible after he has reached a decision, the adjudicator shall deliver a copy of that decision to each of the Parties.

28.47 The adjudicator shall decide the matters in Dispute and may make a decision on different aspects of the Dispute at different times.

28.48 The adjudicator may take into account any other matters which the Parties agree should be within the scope of the adjudication or which are matters under the Agreement which he considers are necessarily connected with the Dispute and, in particular, he may:

28.48.1 open up, review and revise any decision taken or any notice certifying payment given by any person referred to in the Agreement, unless the Agreement states that the decision or notice certifying payment is final and conclusive;

28.48.2 decide that any of the Parties to the Dispute is liable to make a payment under the Agreement (whether in sterling or some other currency) and, subject to the terms of the Agreement, when that payment is due and the final date for payment.

28.49 The adjudicator shall provide written reasons for his decision.

Effect of the Decision

28.50 In his decision, the adjudicator may, if he thinks fit, order either or both of the Parties to comply peremptorily with his decision or any part of it. In the absence of any directions by the adjudicator relating to the time for performance of his decision, the Parties shall be required to comply with any decision of the adjudicator immediately on delivery of the decision to the Parties in accordance with Clause 28.46.

28.51 The decision of the adjudicator shall be binding on the Parties, and they shall comply with it, until the Dispute is finally determined by legal proceedings or by agreement between the Parties.

28.52 The adjudicator shall be entitled to the payment of such reasonable amount as he may determine by way of fees and expenses incurred by him and the Parties shall be jointly and severally liable to pay that amount to the adjudicator.

28.53 Without prejudice to the right of the adjudicator to effect recovery from either Party in accordance with Clause 28.52, the Parties shall each be liable to pay one-half share of the adjudicator's fees and expenses.

28.54 The adjudicator shall not be liable for anything done or omitted in the discharge or purported discharge of his functions as adjudicator unless the act or omission is in bad faith, and any employee or agent of the adjudicator shall be similarly protected from liability.

Related Disputes

28.55 Notwithstanding the terms of Clauses 28.2, 28.3, 28.6, 28.7, 28.8 and 28.9, in the event that a dispute or potential dispute under, or in connection with any contract associated with the Edinburgh Tram Network (referred to in this Clause 28 *(Dispute Resolution Procedure)* as "Related Contracts"), has arisen or arises out of substantially the same issues of fact and/or law (as the case may be) as a Dispute

under this Agreement (a "Related Dispute"), then providing that the Related Contract contains dispute resolution provisions in terms substantially the same as set out in this Clause 28 *(Dispute Resolution Procedure)* (save for necessary changes), the Client may require and direct that the Dispute and the Related Dispute be dealt with together at an appropriate stage of the Dispute Resolution Procedure.

28.56 In the event that a Related Dispute has already been referred to the decision of an adjudicator in accordance with the provisions of the Related Contract, and the Client is of the opinion that a Dispute is to be (but has not yet been) referred to adjudication under this Clause 28 *(Dispute Resolution Procedure)*, the Client may refer the Dispute, or may by notice in writing to the SDS Provider require that the Dispute be referred (as the case may be) to the adjudicator appointed under the Related Contract to decide upon the Related Dispute, and:

28.56.1 the adjudicator shall, if practicable, hear the Dispute at the same time as the Related Dispute and shall request such extension of time for producing his decision or award as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The Parties shall agree to such request for an extension of time, except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator);

28.56.2 except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator), the adjudicator shall have power (if so requested bythe Client) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the Parties to the Dispute and the Related Dispute, and to the adjudicator; and

28.56.3 the Client shall procure that, as soon as practicable, the other party or parties to the Related Dispute shall give the SDS Provider copies of the Related Contract, the referral notice in the Related Dispute and any other documentation provided to the adjudicator by any party to the Related Dispute.

28.57 In the event that a Dispute has already been referred to the decision of an adjudicator, and the Client is of the opinion that a Related Dispute is to be (but has not yet been) referred to adjudication, the Client may refer the Related Dispute to the adjudicator appointed under this Clause 28 (*Dispute Resolution Procedure*) to decide upon the Dispute, and:

28.57.1 the Adjudicator shall, if practicable, hear the Related Dispute at the same time as the Dispute and shall request such extension of time for producing his decision or award as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The Parties shall agree to such request for an extension of time, except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator);

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28.57.2 except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator), the adjudicator shall have power (if so requested by the Client) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the Parties to the Dispute and the Related Dispute, and to the adjudicator;

28.57.3 as soon as practicable, the Client shall give to the SDS Provider copies of the Related Contract, the referral notice in the Related Dispute and any other documentation provided to the adjudicator by any party to the Related Dispute.

29. NOVATION, COLLATERAL WARRANTY IN FAVOUR OF TIE, FUNDER'S DIRECT AGREEMENT AND AGREEMENT BETWEEN THE JOINT REVENUE COMMITTEE AND THE SDS PROVIDER

Novation

29.1 **tie** intends to enter into an infrastructure supply contract with the Infraco. It is a material condition of this Agreement that the SDS Provider shall, if and at the time requested by **tie,** enter into and execute a Novation Agreement with **tie** and the Infraco in the form set out in Schedule 8 (*Novation Agreement*).

29.2 Notwithstanding the provisions of Clause 15 *(Changes),* **tie** may in its absolute discretion require the reduction of the scope of the Services prior to the execution of the Novation Agreement by the SDS Provider. If required, the SDS Provider shall within 5 Business Days of any request from **tie,** carry out a valuation of all work in progress in relation to the Services in accordance with the provisions of Clause 15.4, and subject to Clause 11 (*Methods of Payment*) and, for the avoidance of doubt, subject to any agreed milestone or lump sum payments set out in Schedule 3 (*Pricing Schedule*) or as agreed otherwise in accordance with this Agreement. **tie** shall, subject to any clarifications as are in tie's opinion (acting properly and reasonably) necessary, certify by notice in writing to the SDS Provider that part of the work in progress which is approved by **tie** and give reasons why any part of the work in progress has not been certified and the value of the sums involved no later than 10 Business Days after the date on which such valuation was received. **tie's** valuation of such work in progress shall be final and binding.

29.3 If the scope of the Services is reduced by **tie**, then within 30 Business Days of the date of execution of the Novation Agreement by the SDS Provider, the SDS Provider shall submit a valid VAT invoice to **tie** for the work in progress certified by **tie** in respect of the services which have been removed from the Services to be performed by the SDS Provider.

29.4 Payment will become due to the SDS Provider on the date of receipt of the valid VAT invoice by **tie** and the final date for payment by **tie** of such valid VAT invoice shall be 30 days from the date of receipt of such valid VAT invoice.

29.5 Within 10 days of any request from **tie,** the SDS Provider shall provide an Estimate of any changes proposed by the bidders for the Infraco Contract to the scope of the Services or the Deliverables, which have been notified by **tie** to the SDS Provider.

Collateral Warranty in favour of tie

29.6 On the date of execution of the Novation Agreement referred to in Clause 29.1, the SDS Provider shall execute a collateral warranty agreement in favour of **tie** in the form contained in Schedule 7 (*Collateral Warranty Agreement*) and provide the same as executed to **tie** on that date.

Funder's Direct Agreement

29.7 On the date of execution of the Novation Agreement, the SDS Provider shall, if required by **tie,** execute a Funder's Direct Agreement and provide the same as executed to the Infraco on that date.

Agreement between the Joint Revenue Committee and the SDS Provider

29.8 It is a material condition of this Agreement that the SDS Provider shall enter into and execute an agreement with the Joint Revenue Committee substantially in the form set out in Schedule 17 *(Agreement between the SDS Provider and the Joint Revenue Committee*), within 10 Business Days of the appointment of the Joint Revenue Committee by **tie.** Failure to enter into such agreement shall constitute a breach of this Agreement but shall not relieve the SDS Provider of any of its obligations in relation to the SDS-JRC Modelling Suite or otherwise under this Agreement. The SDS Provider shall provide **tie** with a duly certified executed copy of the agreement with Joint Revenue Committee entered into pursuant to this Clause 29.8 within 5 Business Days of its execution.

29.9 The SDS Provider shall be responsible for the development, testing, validation, commissioning and deployment of a transport modelling suite (the SDS-JRC Modelling Suite) as stipulated in Section 3.5 of Schedule 1 *(Scope of Services)*, such Deliverable to be approved by **tie** by 31 March 2006.

30. ASSIGNATION, CHANGES IN LEGAL STATUS AND CHANGES IN CONTROL

30.1 Without prejudice to Clause 9 *(Sub-Letting and the Appointment of SDS Provider Parties)*, the SDS Provider shall not assign, novate or otherwise transfer the whole or any part of the Agreement without the prior written agreement of the Client.

30.2 In addition to and without prejudice to the provisions of Clause 29.1 and the Novation Agreement to be entered into in accordance with Clause 29.1, the Client shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

30.2.1 to the Scottish Ministers or any local authority or other body with no worse financial standing than that of **tie** who, as a result of any Change in Law, takes over all or substantially all the functions of **tie**; or

30.2.2 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to the SDS Provider) by tie or a person falling within Clause 30.2.1; or

30.2.3 to CEC or Transport Edinburgh Limited; or

30.2.4 with the prior written consent of the SDS Provider (such consent not to be unreasonably withheld or delayed).

30.3 If the legal status of the SDS Provider shall change in any way, the Client shall be informed by the SDS Provider in writing, immediately.

30.4 If there is a Change of Control in the SDS Provider, the Client shall be informed immediately by the SDS Provider in writing.

31. CONFLICT OF INTEREST

31.1 The SDS Provider shall:

31.1.1 be responsible for ensuring that no conflict of interest arises in respect of its duties under the Agreement;

31.1.2 make all possible enquiries to ensure that there is no conflict of interest prior to its assuming the duties required of it under the terms of the Agreement; and

31.1.3 consult and advise the Client if the SDS Provider considers that a conflict of interest arises or if he considers that a conflict of interest may exist or may arise or may be foreseeable and shall furnish the Client with such information as shall enable the Client to determine whether or not a conflict of interest has arisen.

32. COPYRIGHT AND INTELLECTUAL PROPERTY

32.1 All SDS Provider IPR shall continue to be owned by the SDS Provider.

32.2 The SDS Provider hereby:

32.2.1 assigns by way of future assignation to the Client with full title guarantee the Project IPR which is created by it and shall procure that Project IPR created by any SDS Provider Party is also so assigned, for all of the residue of the term of such rights and all renewals or extensions thereof and together with all accrued causes of action in respect thereof;

32.2.2 grants to the Client a non-exclusive perpetual irrevocable royalty free licence to use such SDS Provider IPR as may be necessary for the Client to use in relation to any projects associated with the Services;

32.2.3 grants to the Client the right to grant non-exclusive non-assignable sub-licences to third parties for such lengths of time as the Client may reasonably require and otherwise on the same terms as the licence granted to the Client pursuant to Clause 32.2.2 above, to use the SDS Provider IPR referred to in that Clause (other than in relation to Third Party Software which is subject to the provision of Clause 32.9) in so far as is necessary or desirable for such third party to use such SDS Provider IPR in relation to any projects associated with the Services;

32.3 For the avoidance of doubt, the persons to whom the Client may grant sub-licences pursuant to Clause 32.2.3 above shall include:

32.3.1 any Client Party;

32.3.2 the Operator and any party other than the Operator providing support to **tie** in relation to the Edinburgh Tram Network;

32.3.3 **tie** and any **tie** Party;

32.3.4 bidders for the Infraco Contract and the Tram Supply Contract;

32.3.5 the Tram Supplier;

32.3.6 any party providing maintenance in relation to the Edinburgh Tram Network;

32.3.7 the Joint Revenue Committee;

32.3.8 any party appointed by **tie** to carry out utilities diversions; and

32.3.9 any assignee or transferee under this Agreement.

32.4 The Client hereby grants to the SDS Provider a non-exclusive revocable royalty free licence for the duration of this Agreement to use such Project IPR as is owned by it as may be necessary for the SDS Provider to use solely and exclusively for the purpose of performing the Services.

32.5 The copyright of this Agreement and any data or software supplied to the SDS Provider by the Client, shall remain solely with the Client.

32.6 The SDS Provider shall at any time and from time to time hereafter at the request of the Client execute all such documents and do all such further acts as may be required in order to vest the rights referred to in Clause 32.2.1 in the Client.

32.7 The SDS Provider waives any and all moral rights held or to be held by the SDS Provider in the Deliverables and the Project IPR and shall procure that all of the SDS Provider Parties who are authors of the whole or any part of the Deliverables or the Project IPR waive and abandon in writing all moral rights.

32.8 The SDS Provider agrees that all rights in the Project IPR shall remain the property of the Client and the SDS Provider shall retain no rights in the Project IPR beyond the licence granted in Clause 32.4 above. The SDS Provider shall be entitled to use such Project IPR only on the terms set out herein and solely for the purpose of the performance of the Services. In particular, otherwise as permitted in this Agreement herein, the SDS Provider shall not disclose, assign, sub-licence, lease, rent or otherwise dispose of the Project IPR.

32.9 To the extent that any of the Deliverables are generated by or maintained on a computer or similar system, the SDS Provider shall use all reasonable endeavours to procure for the benefit of the Client, at no charge or at the lowest reasonable fee, the grant of a licence or sub-licence for any relevant Third Party Software on the same terms as the SDS Provider Software is licensed to the Client, to enable the Client or its nominee to access and otherwise use (subject to the payment by the Client of the relevant fee, if any) such Deliverables in connection with this Agreement. As an alternative, the SDS Provider may provide such Deliverables in a format which may be read by software generally available at reasonable prices in the market at the relevant time or in hard copy format.

32.10 The SDS Provider shall ensure the back-up and storage in safe custody of the Deliverables in accordance with Good Industry Practice. Without prejudice to this obligation, the SDS Provider shall submit to the Client's Representative for approval its proposals for the back-up and storage in safe custody of the Deliverables and the Client shall be entitled to object if the same is not in accordance with Good Industry Practice. The SDS Provider shall comply, and shall cause all the SDS Provider Parties to comply, with all such proposals to which the Client Representative has given his or her approval. The SDS Provider may vary its procedures for such back-up and storage subject to submitting its proposals for change to the Client Representative, who shall be entitled to object on the basis set out above.

32.11 Where a claim or proceeding is made or brought against the Client or its permitted licensees which arises out of the infringement of any Intellectual Property Rights in any Deliverables or other materials provided by the SDS Provider or any SDS

Provider Party to the Client then the SDS Provider shall indemnify and keep the Client indemnified on demand at all times from and against all Indemnified Liabilities arising in connection with such claim or proceedings.

32.12 For the purposes of this Clause 32 (*Copyright and Intellectual Property*), "use" shall include the acts of copying, modifying, adapting and translating the material in question and/or incorporating them with other materials and the term "the right to use" shall be construed accordingly.

32.13 The provisions of this Clause 32 (*Copyright and Intellectual Property*) shall apply during the continuance of this Agreement and after its termination howsoever arising, and immediately following termination howsoever arising, the SDS Provider shall provide the Client with:

32.13.1 a copy of the object code for the Third Party Software and the SDS Provider Software on media that is reasonably acceptable to the Client;

32.13.2 a copy of the source code for the Specially Written Software on media that is reasonably acceptable to the Client; and

32.13.3 a copy of all documentation, manuals and other technical information relating to the Third Party Software, the Specially Written Software and the SDS Provider Software that is reasonably required by the Client to operate, manage and support the Third Party Software, the Specially Written Software and the SDS Provider Software.

32.14 The SDS Provider shall not reproduce or publish any document or matter relating to the Services or this Agreement, either alone or in association with any other body or person, without the prior written consent of the Client.

33. CONFIDENTIAL INFORMATION

33.1 Each Party:

33.1.1 shall treat all Confidential Information belonging to the other Party as confidential and safeguard it accordingly; and

33.1.2 shall not disclose any Confidential Information belonging to the other Party to any other person without the prior written consent of the other Party, except to such persons and to such extent as may be necessary for the performance of the Agreement or except where disclosure is otherwise expressly permitted by the provisions of this Agreement.

33.2 The SDS Provider shall take all necessary precautions to ensure that all Confidential Information obtained from the Client under or in connection with the Agreement:

33.2.1 is given only to such of the staff and professional advisors or SDS Provider Parties engaged to advise it in connection with the Agreement as is strictly necessary for the performance by the SDS Provider of the Services and its other obligations under this Agreement and only to the extent necessary for the performance by the SDS Provider of the Services and its other obligations under this Agreement;

33.2.2 is treated as confidential and not disclosed (without prior approval) or used by any staff or such professional advisors or SDS Provider Parties otherwise than for the purposes of the Agreement.

33.3 Where it is considered necessary in the opinion of the Client, the SDS Provider shall ensure that staff or such professional advisors or SDS Provider Parties sign a confidentiality undertaking before commencing work in connection with the Agreement.

33.4 The SDS Provider shall not use any Confidential Information it receives from the Client otherwise than for the purposes of the Agreement.

33.5 The provisions of Clauses 33.1 to 33.4 shall not apply to:

33.5.1 any information which is or becomes public knowledge (otherwise than by breach of this Clause 33);

33.5.2 any information which was in the possession of the receiving Party, without restriction as to its disclosure, before receiving it from the disclosing Party;

33.5.3 any information which is received from a third party who lawfully acquired it and who is under no obligation restricting its disclosure;

33.5.4 any information which is independently developed without access to the Confidential Information;

33.5.5 any disclosure pursuant to a statutory, legal or parliamentary obligation placed upon the Party making the disclosure, including any requirements for disclosure under FOISA, the Code, or the Environmental Information Regulations pursuant to Clauses 33.7 to 33.11(inclusive);

33.5.6 any disclosure by **tie** of this Agreement including the SDS Provider's fees and commercial terms, any information relating to the design of any aspect of the Edinburgh Tram Network and such other information as may be reasonably required for the purpose of conducting a due diligence exercise with any bidders for the Infraco Contract and the Tram Supply Contract and their advisers;

33.5.7 any disclosure by **tie** or the Client of this Agreement and any related information to the TSS Provider;

33.5.8 any information which is required to be disclosed to that Party's insurers and/or legal advisers subject to Clauses 33.2 and 33.3;

33.5.9 any registration of information in respect of the Consents and any property registration required;

33.5.10 any disclosure of information by the Client or **tie** to Transport Edinburgh Limited, CEC, Partnerships UK Limited, any department, office or agency of the Scottish Executive or the UK government;

33.5.11 any disclosure for the purpose of:

33.5.11.1 the examination and certification of **tie**'s, the Client's or the SDS Provider's accounts; or

33.5.11.2 any examination (pursuant to applicable Law) of the economy, efficiency and effectiveness with which **tie** has used their resources or funding made available to them including any examination pursuant to the Local Government (Scotland) Act 1973 as amended by the Local Government in Scotland Act

2003 of whether the Client has secured best value in the performance of its functions

33.5.12 any disclosure of Confidential Information obtained from the SDS Provider:

33.5.12.1 to any government department or any other local government authority or public authority equivalent in status to **tie.** All government departments or any other local government authority or public authority equivalent in status to **tie** receiving such Confidential Information shall be entitled to further disclose the Confidential Information to other government departments or any other local government authority or public authority equivalent in status to **tie** on the basis that the information is confidential and is not to be disclosed to a third party which is not part of any government department or any other local government authority or public authority equivalent in status to **tie**; or

33.5.12.2 to any person engaged in providing any services to the Client for any purpose relating to or ancillary to the Agreement;

provided that in disclosing information under this Clause 33 (*Confidential Information*) the Client discloses only the information which is necessary for the purpose concerned and requires that the information is treated in confidence and that a confidentiality undertaking is given where appropriate.

33.6 Nothing in this Clause shall prevent either Party from using any techniques, ideas or know-how gained during the performance of the Agreement in the course of its normal business, to the extent that this does not result in a disclosure of Confidential Information or an infringement of Intellectual Property Rights.

33.7 In the event that the SDS Provider fails to comply with this Clause 33 (*Confidential Information*), the Client reserves the right to terminate the Agreement by notice in writing in accordance with Clause 19.1.

33.8 The SDS Provider acknowledges that **tie** is subject to the requirements of FOISA and the Environmental Information Regulations and shall assist and cooperate with **tie** (at the SDS Provider's expense) to enable **tie** to comply with these Information disclosure requirements. **tie** agrees that it shall comply with the terms of the Code in respect of the discharge of its obligations under FOISA.

33.9 The SDS Provider shall and shall procure that the SDS Provider Parties shall:

33.9.1 transfer the Request for Information to **tie** as soon as practicable after receipt and in any event within two Business Days of receiving a Request for Information;

33.9.2 provide **tie** with a copy of all Information in its possession or power in the form that **tie** requires within five Business Days (or such other period as **tie** may specify) of **tie** requesting that Information; and

33.9.3 provide all necessary assistance as reasonably requested by **tie** to enable **tie** to respond to a Request for Information within the time for compliance set out in section 10 of FOISA or regulation 5 of the Environmental Information Regulations.

33.10 **tie** shall be responsible for determining at its absolute discretion whether the Confidential Information and/or any other Information:

33.10.1 is exempt from disclosure in accordance with the provisions of the Code, FOISA or the Environmental Information Regulations;

33.10.2 is to be disclosed in response to a Request for Information, and

33.11 in no event shall the SDS Provider respond directly to a Request for Information unless expressly authorised to do so by **tie**.

33.12 The SDS Provider acknowledges that **tie** may be obliged, pursuant to the Code, FOISA, or the Environmental Information Regulations to disclose Information:

33.12.1 without consulting with the SDS Provider, or

33.12.2 following consultation with the SDS Provider and having taken its views into account.

33.13 The SDS Provider shall ensure that all information and Deliverables produced in the course of the Agreement or relating to the Agreement is retained for disclosure and shall permit the Client and **tie** to inspect such records as requested from time to time.

33.14 The SDS Provider acknowledges that any lists or schedules provided by it outlining Confidential Information are of indicative value only and that **tie** may nevertheless be obliged to disclose Confidential Information in accordance with Clause 33.9.

33.15 Any public relations material, press releases, public presentations or conference engagements in relation to this Agreement planned by the SDS Provider requires the Client's and **tie**'s prior written approval.

34. WAIVER

34.1 Save where expressly stated, no failure or delay by the Client to exercise any right or remedy in connection with this Agreement will operate as a waiver of it or of any other right or remedy nor will any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

34.2 The SDS Provider agrees that no waiver shall occur or be deemed to have occurred unless or until a clear and unequivocal express waiver of a clearly identified default is contained in a written notice by the Client to the SDS Provider expressly for the purpose of effecting such waiver.

34.3 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

35. ENTIRE AGREEMENT

35.1 Except where expressly provided otherwise in this Agreement, this Agreement constitutes the entire agreement between the Parties in connection with its subject matter and supersedes all prior representations, communications, negotiations and understandings concerning the subject matter of this Agreement.

35.2 Each of the Parties confirms to the other that it has neither been induced to enter into this Agreement in reliance on, nor has it made, any representation or warranty except those contained or referred to in this Agreement.

35.3 Any representations or warranties other than those contained or referred to in this Agreement are superseded and extinguished by this Agreement.

35.4 Each Party irrevocably and unconditionally waives all rights and remedies which it might otherwise have had in relation to any representations or warranties other than those contained or referred to in this Agreement.

36. NOTICES

36.1 Any notice or notification required or authorised to be given under this Agreement by one Party to the other shall be:

36.1.1 in writing;

36.1.2 sent by one of the following methods:

(i) pre-paid registered or recorded delivery post or facsimile transmission addressed to the Party to which it is given at:

(a) in the case of notices given to the Client: **tie**, Verity House, 19 Haymarket Yards, Edinburgh EH12 5BH, fax number 0131 622 8301, attention: Projects Director, or such other address or fax number in the United Kingdom as the Client may notify the SDS Provider from time to time for that purpose; or

(b) in the case of notices given to the SDS Provider, Parsons Brinckerhoff Limited, 2nd Floor, 100 Queen Street, Glasgow, G1 3DF, fax number 0141 222 6901 ,attention: David Hutchison or such other address or fax number in the United Kingdom as the SDS Provider may notify the Client from time to time for that purpose; or

(ii) facsimile transmission addressed to the Client's Representative or the SDS Provider's Representative (as appropriate) at a facsimile number notified to the giving Party by the receiving Party for the service of notices under this Agreement from time to time; or

(iii) personal delivery into the hands of:

(a) in the case of notices given to the Client, the Client's Representative; or

(b) in the case of notices given to the SDS Provider, the SDS Provider's Representative.

(iv) e-mail to:

(a) in the case of notices given to the Client, the Client's Representative; or

(b) in the case of notices given to the SDS Provider, the SDS Provider's Representative.

36.1.3 be deemed duly served:

(i) if sent by pre-paid registered or recorded delivery post, 2 clear Business Days after posting; or

(ii) if sent via facsimile transmission or personal delivery, on the day of issue of the relevant fax confirmation receipt or such personal delivery (as appropriate), unless that day is not a Business Day in which case it shall be deemed duly served on the next Business Day thereafter; or

(iii) if sent via e-mail, the date of written acknowledgement by the Party to whom the notice was served.

37. CONSENT AND APPROVAL

37.1 The giving of any consent or approval by or on behalf of the Client shall not in any way relieve the SDS Provider of any of its obligations under the Agreement or of its duty to ensure the correctness, accuracy or suitability of the matter or thing which is the subject of the consent or approval.

37.2 Failure by the Client to disapprove or object to any matter or thing shall not prejudice its power subsequently to take action under the Agreement in connection therewith.

38. DISCRIMINATION

38.1 The SDS Provider shall not (and the SDS Provider shall insert a clause to this effect in each contract with any SDS Provider Party) unlawfully discriminate within the meaning and scope of the provisions of the Equal Pay Act 1970, the Sex Discrimination Act 1975, the Race Relations Act 1976, the Disability Discrimination Act 1995, the Employment Equality (Sexual Orientation) Regulations 2003 and the Employment Equality (Religion or Belief) Regulations 2003.

39. FURTHER ASSURANCE

39.1 Each Party shall at the reasonable request and cost of the other (save where it is expressly provided that the cost of such act or execution shall be for that party's account) do any act or execute any document that may be necessary to give full effect to this Agreement.

40. APPLICABLE LAW

40.1 This Agreement, any document completed or to be completed in accordance with its provisions and any matter arising from it or any such document shall be governed by and construed in accordance with Scots law.

40.2 Subject to Clause 28 (*Dispute Resolution Procedure*), the Parties hereby irrevocably submit to the exclusive jurisdiction of the Court of Session in relation to this Agreement, any such document and any such matter.

41. VARIATIONS TO BE IN WRITING

No variation, or alteration of any of the provisions of this Agreement shall be effective unless it is in writing and signed by both Parties.

42. NO PARTNERSHIP OR AGENCY

42.1 Nothing in this Agreement shall be construed as creating a partnership between the Client and the SDS Provider.

42.2 The SDS Provider shall not (and shall procure that the SDS Provider Parties shall not) act or purport to act as agent for the Client in relation to any matter unless specifically authorised in writing under this Agreement by the Client. The SDS

Provider shall not be entitled to bind the Client in any way or to create any liability or cause of action against the Client and shall not hold itself out (and shall procure that no SDS Provider Party shall hold itself out) as having any such authority or power

43. INVALID TERMS

If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

43.1 that term shall to that extent be deemed not to form part of this Agreement; and

43.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

44. THIRD PARTY RIGHTS

Subject to any other express provision of this Agreement, a person who is not party to this Agreement shall have no right to enforce any term of this Agreement.

IN WITNESS WHEREOF these presents on this and the preceding 75 pages together with Schedules One to Seventeen (inclusive) which are annexed and signed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED** at EDINBURGH

on 19TH SEPTEMBER 2005 by:

[redacted]

Authorised Signatory

MICHAEL WILLIAM DAVIS HOWELL

Full Name

[redacted]

Witness Signature

ALAN McLEOD CASSELS

Full Name

RUTLAND BUILDING

Address

RUTLAND SQUARE

EDINBURGH

EXECUTED for and on behalf of **PARSONS BRINCKERHOFF LIMITED** at EDINBURGH

on 19TH SEPTEMBER 2005 by:

[redacted]

Attorney

MICHAEL MAHN JENKINS

Full Name

[redacted]

Witness Signature

ALAN McLEOD CASSELS

Full Name

RUTLAND BUILDING

Address

RUTLAND SQUARE

EDINBURGH

This is Schedule One referred to in the foregoing Agreement between the Client and the SDS Provider

SCHEDULE ONE

SCOPE OF SERVICES

1. General

1.1 The SDS Provider shall:

1.1.1 perform all Design and Technical Services;

1.1.2 give all general technical support described in this Schedule One;

1.1.3 perform all management services described in this Schedule One; and

1.1.4 assist the Client as may be required in accordance with this Agreement.

2. Design and Technical Services

2.1 General

2.1.1 The SDS Provider shall undertake all design and produce the Deliverables necessary to enable the Edinburgh Tram Network to be procured, constructed, tested and commissioned (taking account of the need to fully co-ordinate these activities, including with other physically-related projects, so as to minimise overall disruption) to meet the requirements of the Master Project Programme, and then operated and maintained.

2.1.2 The SDS Provider shall produce a design which shall deliver overall system functionality, capability and achieve the performance requirements of the Edinburgh Tram Network.

2.1.3 The SDS Provider shall produce a tram service simulation that will demonstrate the achievement of the required run times and service performance as the design progresses.

2.1.4 The SDS Provider shall ensure that the design covers all aspects of the Edinburgh Tram Network and the associated works adjacent to the proposed alignment.

2.1.5 The SDS Provider shall undertake all necessary research, surveys and investigations necessary to support the provision of a cost effective design.

2.1.6 The SDS Provider is responsible for ensuring that there are no gaps and omissions in the specification and design of the Edinburgh Tram Network.

2.1.7 The SDS Provider shall demonstrate that the detailed design has properly considered and adopted the most advantageous whole life cost solutions.

2.1.8 The SDS Provider shall deliver designs and/or Technical Specifications which shall include:

2.1.8.1 detailed alignment and associated civil and structural works;

2.1.8.2 specifications of sub system functionality and technical requirements for the following E & M system components:

- trams;
- tram track;
- OLE;
- traction and auxiliary power supply network (including network reinforcement if required);
- signals and control system (for both tram and highway traffic control);
- communication systems;
- integrated fare collection equipment;
- security systems; and
- depot systems and associated maintenance plant and equipment.

2.1.8.3 the infrastructure required to support the above E&M system components, which includes:

- civil and structural engineering works (formation, structures, retaining walls and the like);
- track formation;
- road works;
- traffic management systems;
- tram stops;
- depot, buildings and associated external works;
- substation buildings and associated external works;
- foul and surface water drainage systems;
- building services (M&E) infrastructure;
- building works associated with the Edinburgh Tram Network's E&M systems;
- environmental mitigation measures;
- hard and soft landscaping; and
- stray current and EMC control systems.

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2.2 Design Approach

The SDS Provider shall approach the Design and Technical Services in a structured manner using a recognised 'V' life cycle model with regard to the integration of design engineering, systems engineering and safety engineering activities. The SDS Provider shall carry out the Design and Technical Services over three phases:

- Requirements Definition Phase;
- Preliminary Design Phase; and
- Detailed Design Phase.

2.3 Requirements Definition Phase

2.3.1 By the end of the Requirements Definition Phase, the SDS Provider shall have produced a set of Functional Requirements Specifications and the means by which they will be tested that have been agreed with the Client in accordance with the Review Procedure, such that the Preliminary Design Phase can commence.

2.3.2 During the Requirements Definition Phase, the SDS Provider shall:

2.3.2.1 develop the Functional Requirements Specification into full system requirement specifications that broadly align with the WBS;

2.3.2.2 identify and produce a series of management plans including; safety management/engineering, project management, environmental management, configuration management, verification and validation which will inform and direct the preliminary and detailed design processes;

2.3.2.3 undertake technology reviews such that the SDS Provider considers that the selected technologies will meet the requirements developed in this Requirements Definition Phase;

2.3.2.4 produce the initial safety case strategy, using GSN, and define the proposed arguments and the required supporting evidence to be provided;

2.3.2.5 record agreed requirements by a suitable means, such as a requirements database;

2.3.2.6 carry out and conclude early safety engineering activities such that 'safety' requirements are identified, assessed for risk and a hazard log initiated;

2.3.2.7 undertake any surveys required and incorporate relevant findings into the Functional Requirements Specifications and the Technical Specifications to be prepared by the SDS Provider;

2.3.2.8 deliver all Deliverables for the Requirements Definition Phase as are identified in Appendix 3 of this Schedule 1 (*Scope of Services*) ; and

2.3.2.9 define in detail the format for the drawings and documents to be produced as part of the Services, ensuring that all requirements for manufacture, construction, commissioning, operation, maintenance, land and property agreements, utilities diversions, access,

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wayleaves, servitudes and other third party agreements relative to the Edinburgh Tram Network, may be readily provided in appropriate formats from the same source computer files. If required bythe Client, the SDS Provider shall also detail the format for drawings and documents which are to be produced outwith the scope of the Services

2.3.3 The SDS Provider shall be responsible for undertaking and reporting on (inclusive of interpretative analysis) the following surveys along with any other surveys necessary to inform the design of the Edinburgh Tram Network including:

- ground penetrating radar;
- ground investigation and geotechnical surveys;
- contamination, pollution, air and water quality surveys;
- photographic surveys;
- topographical surveys;
- hydrographic surveys;
- archaeological surveys;
- structural, building & cellar surveys;
- condition of structure surveys;
- undertake Network Rail asset investigation study and prepare accurate engineering drawings for input into the detailed design process and Network Rail agreements;
- environmental and ecological surveys;
- noise and vibration baseline surveys;
- pre and post construction noise and vibration surveys;
- pre-condition dilapidation surveys of vulnerable third party structures;
- frontager surveys;
- radio surveys;
- traffic & public transport surveys;
- computer traffic/transport modelling; and
- 3-D representational modelling

The resultant analysis and reports from those surveys are to be used to develop the Functional Requirements Specifications and the Technical Specifications and to set base lines against which the impact of the Edinburgh Tram Network can be measured when built.

2.4 Preliminary Design Phase

2.4.1 By the end of the Preliminary Design Phase, the SDS Provider shall have produced a preliminary design for each Sector or Sub-Sector (as appropriate) to such a level that the SDS Provider, the Client and the relevant Approval Bodies are satisfied that when progressed, the detailed design in respect of each Sector or Sub-Sector (as appropriate) will deliver the agreed and specified system functionality, be acceptably safe, constructable, will comply with the Design Manual and deliver the Functional Requirements Specification agreed at the end of the Requirements Definition Phase.

2.4.2 The SDS Provider shall, initially at a high level for the whole of the Edinburgh Tram Network, and thereafter at a detailed level for each Sector or Sub-Sector (as appropriate) in the order referred to in the Programme Phasing Structure and Clauses 7.2 and 7.3 of the Agreement:

2.4.2.1 develop the track alignments and the associated track layout arrangements for the Edinburgh Tram Network;

2.4.2.2 define tramstop and substation locations;

2.4.2.3 propose appropriate technologies and agree the adoption of these for Edinburgh Tram Network with the Client;

2.4.2.4 prepare generic details for each type(s) of tramstop layouts/arrangements, including equipment, lighting, building services and signage;

2.4.2.5 carry out the preliminary design of the depot(s) layout and arrangement including trackwork, maintenance equipment control centre and staff facilities;

2.4.2.6 develop system architectures for supervisory control and communications and electrification and power elements;

2.4.2.7 demonstrate that all elements of the preliminary design meet the Functional Requirements Specifications, especially those related to run-time, performance/reliability, integrated ticketing and safety;

2.4.2.8 undertake such safety analysis that will allow further development of the safety case concurrent with the design to prove that the Edinburgh Tram Network is acceptably safe;

2.4.2.9 further develop the Functional Requirements Specifications for the infrastructure, systems and the trams such that it is ensured that the preliminary design of the infrastructure, systems and the trams are compatible and meet the Requirements Specification for Overall System Operational and Performance Requirements;

2.4.2.10 prior to the review of the whole preliminary design for the Edinburgh Tram Network (or part thereof), the SDS Provider shall produce for review the foreseen costs of taking that design forward to construction and commissioning;

2.4.2.11 produce a migration plan that shows constructability and commissioning of the design as well as user training and

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compliance with programmed dates for entering operational service; and

2.4.2.12 deliver all Deliverables for Preliminary Design Phase as are identified in Appendix 3 of this Schedule 1 (*Scope of Services*).

2.5 Technology Reviews

The SDS Provider shall undertake comparative technology reviews so as to identify the most appropriate ways of delivering the functionality required of the Edinburgh Tram Network and its component parts. This shall include:

- establishing the latest dates for any modification of elements of design where the opportunity exists to change the specification as a result of advances in proven technology;
- investigating the feasibility of proven wireless telecommunication systems such as:
  - monitoring, control and recording of voice radio communications between the control centre and the trams, passenger help points and public address systems;
  - monitoring, control and recording of remote equipment data via radio;
  - monitoring, control and recording of real-time CCTV video images via wireless means; and
  - updating and control of passenger information displays by Data Radio means;
- ensuring the Edinburgh Tram Network has the most relevant ticketing, management and information systems; and
- illustrating the advantages and disadvantages relevant to moving from an Edinburgh Tram Network designed to deliver the operational and performance requirements (stated in the Requirements Specification for Overall System Operational and Performance Requirements) with a 40 metre long 100% low floor tram to a 30 (+) metre long 70% (partial) low floor tram.

The SDS Provider shall conclude the comparative technology reviews during the early part of the Preliminary Design Phase and this shall include:

- a scoping study outlining the areas to be investigated;
- a programme outlining the latest date for modification of any specifications within the overall programme together with interaction of activities; and
- reports and presentations analysing and assessing the options and justifying the final selections of technologies in terms of time, cost, quality, safety, risk and maintainability.

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2.6 Detailed Design

2.6.1 By the end of the Detailed Design Phase for each Sector or Sub-Sector (as appropriate) the SDS Provider shall have:

2.6.1.1 produced and delivered to the Client, the detailed design and specification of all the works, associated sub-systems and components and their associated installation drawings/schedules, test specifications, manuals and records (all of which shall have been approved in accordance with the Review Procedure); and

2.6.1.2 produced the detailed design of the Edinburgh Tram Network for each Sector or Sub-Sector (as appropriate), in the order referred to in the Programme Phasing Structure and Clauses 7.2 and 7.3 of the Agreement, such that the detailed design has full approval of the Client and the relevant Approval Bodies and such that the Edinburgh Tram Network as designed can be constructed, installed, tested and commissioned by Infraco and then operated and maintained.

2.6.2 The SDS Provider shall:

2.6.2.1 build upon the work done in the Preliminary Design Phase and produce detailed Deliverables for all elements of the infrastructure and associated systems for the Edinburgh Tram Network from which construction, installation, testing and commissioning activities can commence and be satisfactorily concluded;

2.6.2.2 produce procurement specifications and associated schedules for all E&M systems and sub-systems for the Edinburgh Tram Network;

2.6.2.3 produce a costed programme of the design and its construction;

2.6.2.4 gain all relevant planning and other approvals and consents including traffic regulation orders (during construction and post-opening) to enable construction works to proceed in accordance with the requirements of the Master Project Programme;

2.6.2.5 produce the plan for the installation/testing/commissioning of the Edinburgh Tram Network and associated sub-systems;

2.6.2.6 ensure that E&M system suppliers produce appropriate training plans for operations and maintenance staff (including manuals) and trial running plans;

2.6.2.7 demonstrate that all elements of the detailed design meet the requirements agreed, especially those related to run-time, performance/reliability and safety;

2.6.2.8 undertake such safety analysis that will allow development of the safety case concurrent with the detailed design to prove that the system once constructed and operational will be acceptably safe;

2.6.2.9 finalise the Technical Specifications such that it is ensured that the design of the infrastructure systems and the trams are compatible;

2.6.2.10 at the review of the detailed design for each Sector or Sub-Sector (as appropriate) and prior to the review of the detailed design for the whole of the Edinburgh Tram Network (or part thereof), the SDS

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Provider shall produce for review the foreseen cost of taking that detailed design forward to construction and commissioning; and

2.6.2.11 deliver all Deliverables for the Detailed Design Phase as are identified in Appendix 3 of this Schedule 1 (*Scope of Services*).

2.7 Key Design Elements

2.7.1 The SDS Provider shall design:

2.7.1.1 the route from Haymarket to Ocean Terminal via Princes Street so as to:

- provide a look and feel that is at one with its surroundings whilst not detracting from the design elsewhere on the Edinburgh Tram Network;
- provide an efficient and effective means of constructing the tramline(s) with and without centre OLE poles that minimises disruption to Princes Street and Leith Walk and their users;
- provide a satisfactory interaction of trams, buses, pedestrians and other road users; and
- ensure a run time and performance that sustains economic success for the operation of the Edinburgh Tram Network by fully meeting the Functional Requirements Specifications.

2.7.1.2 The SDS Provider shall review the advantages and disadvantages of providing a chord at the south end of St. Andrew Square for use in perturbed circumstances and special events so that tram services from Picardy Place can traverse the chord and return towards Picardy Place on the clockwise track. Such review should contemplate the provision of removable OLE poles and wires and provide outline sketches and costs for providing this facility at St. Andrew Square.

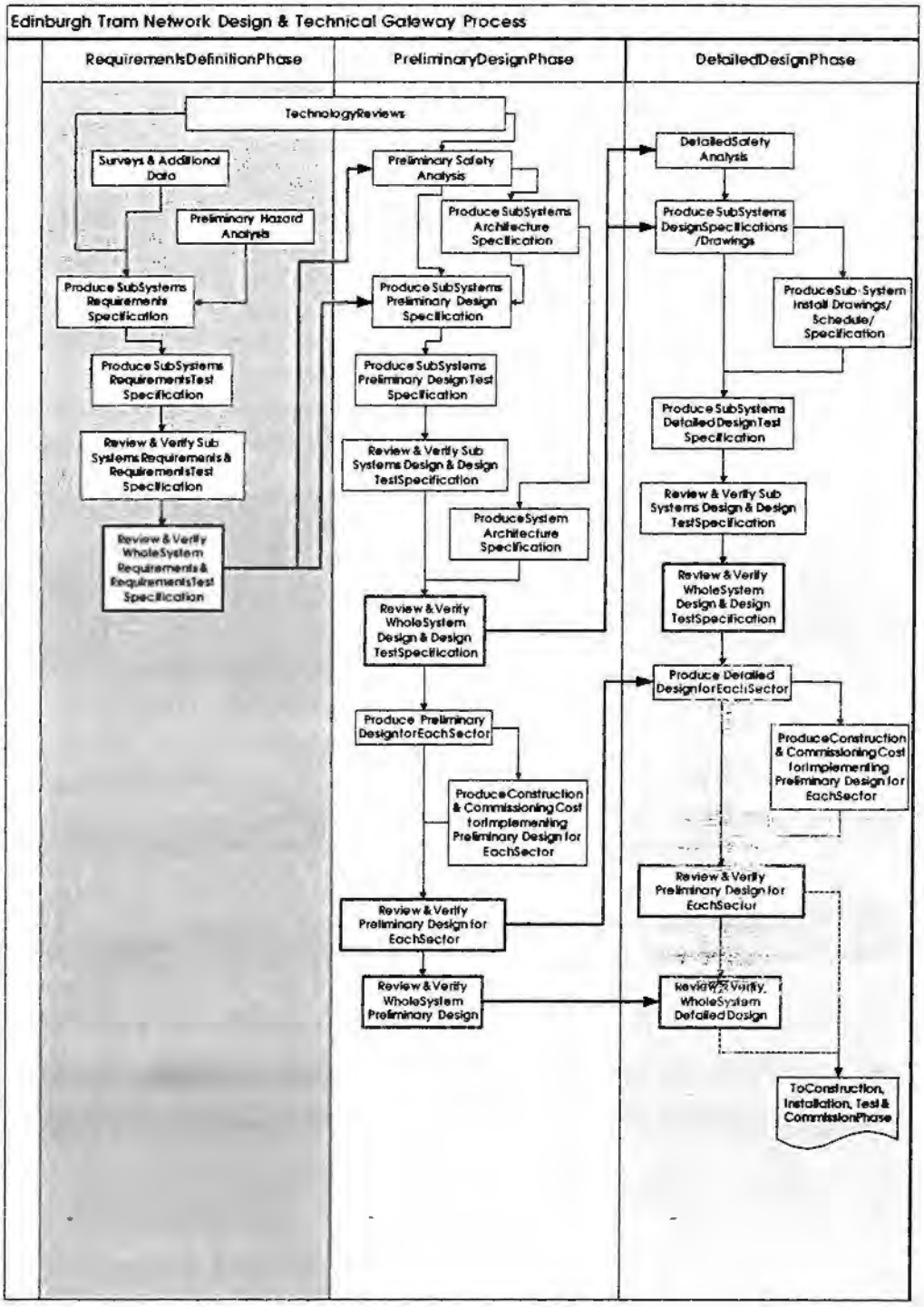
2.7.1.3 The SDS Provider shall establish early in the Preliminary Design Phase the effective use of proven radio communications for voice and data transmission as an early priority as this will influence the design and constructability of the Edinburgh Tram Network.

2.7.1.4 The SDS Provider shall establish early in the Preliminary Design Phase the parameters by which effective harmony of the infrastructure with the tram is achieved and therefore allow the Client to market test the tram manufacturers. Such design harmonisation shall ensure that tram types which meet the requirements are in current production and are likely to remain so at the time of likely procurement.

2.8 Design Review Process

2.8.1 The SDS Provider shall submit his Deliverables for review in accordance with the Review Procedure.

2.8.2 The SDS Provider shall comply with the Design and Technical Gateway Process. An example of how this Design and Technical Gateway Process will operate is set out below:



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3. General Technical Support

3.1 Procurement and Construction Support

3.1.1 The SDS Provider shall produce all technical documentation required for the procurement of the Infraco Contract and thereafter technical documentation to facilitate the construction and the commissioning of the Edinburgh Tram Network. This documentation shall be structured to provide the most detailed information for each part of the Edinburgh Tram Network, either as applicable to the technical element, or as is available reflecting the then current status of the design detail of the Sector or Sub-Sector. This documentation shall include drawings, Technical Specifications, bills of quantities, schedules of materials, a maintenance plan (including lifecycle) and schedules, and other items of documentation as may be required for procurement, construction, and pricing purposes.

3.1.2 In relation to the procurement of the Infraco Contract, the SDS Provider shall:

- answer queries/clarifications;
- attend meetings;
- confirm design details and rework any of the SDS Provider's design as necessary;
- assist in the technical review of tenders;
- review programmes and provide variance reports; and
- review cost plans and provide variance reports.

3.1.3 There will be in addition, a period when the SDS Provider, whilst continuing to work for the Client, will need to assist the bidders for the Infraco Contract in the development of their tenders.

3.1.4 The SDS Provider shall produce all technical documentation required for the procurement of the Tram Supply Contract. This documentation shall include drawings, Technical Specifications and other items of documentation as may be required for procurement, construction, maintenance and pricing purposes.

3.1.5 In relation to the procurement of the Tram Supply Contract, the SDS Provider shall:

- answer queries/clarifications;
- attend meetings;
- confirm design details and rework any of the SDS Provider's design as necessary;
- assist in the technical review of tenders;
- review programmes and provide variance reports; and
- review cost plans and provide variance reports.

3.1.6 The SDS Provider shall provide **tie** with expert advice and documentation in relation to other procurement activities for the Edinburgh Tram Network as required, including:

- preparation of tender documentation including bills of quantities and other documentation required for procurement purposes;
- answering queries/clarifications;
- attending meetings;
- confirming design details and reworking any of the SDS Provider's design as necessary;
- assisting in the technical review of tenders;
- maintenance plans (including lifecycle);
- review programmes and provide variance reports; and
- review cost plans and provide variance reports.

3.1.7 For the avoidance of doubt, the SDS Provider shall only be required to provide technical design support for the management and the making good of defects until the date falling one year after the Service Commencement Date.

3.2 Utilities

3.2.1 The SDS Provider shall provide assistance to **tie** with the management of an advanced utilities diversion programme. This shall include:

- assessing the need for and acquiring relevant data relating to the presence and location of all buried and above ground utility services;
- agreeing the need for and extent of diversions;
- undertaking critical design and developing a strategy for all utilities diversions to minimise diversion requirements and out-turn costs;
- ensuring appropriate servitudes for access and possessions management;
- preparing C4 cost schedules;
- preparation of documentation (excluding the contract terms) associated with the proposal to appoint a single service agreement with a specialist contractor to carry out advanced utility diversions;
- activities required to support the utilities diversion process including, but not limited to, traffic management plans/traffic regulation orders, site meetings and all necessary re-designs;
- management of unidentified diversions and design re-work/modifications on an as required basis;
- on-site attendance on an as-required basis; and

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- attendance at all meetings on an as-required basis.

3.2.2 The SDS Provider shall be responsible for the determination and design of all other utility diversions which are to be undertaken by Infraco.

3.3 Stakeholder Management

3.3.1 The SDS Provider shall assist the Client to minimise the adverse impact of the implementation of the Edinburgh Tram Network on stakeholders (both statutory and non statutory) and the general public. This shall include:

- securing, implementing and incorporating into the design all necessary Network Rail, BAA and other third party agreements;
- assisting by providing all technical details relevant to the compulsory purchase order process and land acquisition process (including wayleaves and servitudes);
- liasing with CEC, Scottish Executive, Historic Scotland, World Heritage Trust, Scottish Natural Heritage and others as required by the Client in relation to the performance of the Services;
- participating as appropriate in community liaison groups;
- providing input to information initiatives (media releases, newsletters, web site etc);
- assisting with the development and maintaining of a communications protocol for dealing with all stakeholders affected by the design & future construction of the Edinburgh Tram Network;
- assisting with the discharge of all Parliamentary Undertakings in relation to objectors and recording all actions taken in relation to stakeholder management; and
- management of the technical interface with Network Rail, BAA and other third parties.

3.4 Operations Development Support

3.4.1 The SDS Provider shall facilitate unity of the design of the Edinburgh Tram Network with the development of the Infraco Contract which shall include:

- liasing closely with the Operator to ensure consistency with operational aspirations and design constraints;
- providing support to obtain operational approvals and consents in respect of the Edinburgh Tram Network;
- providing technical support on public transport integration;
- providing technical support on systems integration; and
- providing technical support on the development of operational plans and management systems; and

- provide technical support with regard to operational interfaces with CEC traffic management systems.

3.5 Transport Modelling

3.5.1 Following the appointment by **tie** of the Joint Revenue Committee ("JRC") provided for pursuant to the DPOFA, the SDS Provider shall engage with the JRC to develop, test and commission a comprehensive and interdependent hierarchical transport modelling suite (the "SDS-JRC Modelling Suite") with the capability to model both wide area and localised impacts of the tram and of the different public transport service integration patterns on patronage.

3.5.2 The SDS Provider shall be jointly and severally responsible with the JRC for the planning, production and fitness for purpose of the SDS-JRC Modelling Suite which should demonstrate in simulation (as required under Section 3.5.9 below) that it meets all SDS Provider's individual requirements (both pre and post novation of the SDS Provider's contract) alongside the modelling needs and objectives of the JRC.

3.5.3 The SDS-JRC Modelling Suite shall be developed by a dedicated joint team combining equal contribution from both parties' relevant resources and skills and whose first task will be to prepare a composite model specification, work programme and resource submission for **tie's** approval. The joint team shall be located in the same office during the development, calibration and validation works on the SDS-JRC Modelling Suite which shall be capable of withstanding an independent audit at any stage of its life cycle.

3.5.4 Before approving the SDS-JRC Modelling Suite, **tie** may notify adjustment or further verification and calibration work following the initial demonstration and the SDS Provider shall make provision for this to be carried out before the SDS-JRC Modelling Suite is deployed.

3.5.5 The SDS-JRC Modelling Suite must be fully commissioned and approved by **tie** on or before 31 March 2006. The SDS Provider shall be jointly and severally responsible with the JRC for applying the SDS-JRC Modelling Suite to produce a model forecast scenario approved by **tie** for the first year after entry into public service of the Edinburgh Tram Network.

3.5.6 The SDS-JRC Modelling Suite shall be developed in order to produce all required outputs by the simplest functional principles. It shall satisfy the Scottish Executive STAG requirements and conform in all material aspects to the Department for Transport "Transport Analysis Guidance" as set out in the website WebTAG.

3.5.7 The outputs from the SDS-JRC Modelling Suite shall be robust and comprehensible and in a form which can subsequently be easily interrogated, using intuition and engineering judgement.

3.5.8 Throughout the life of the commission, the SDS Provider shall ensure the SDS-JRC Modelling Suite is regularly calibrated, updated and maintained (including upgrades) to resolve any issues that become apparent during use and to prevent it becoming obsolete.

3.5.9 The SDS-JRC Modelling Suite shall be capable of local modelling within the city centre and at key junctions in order to simulate with requisite precision the interaction of capacity, congestion and Edinburgh Tram Network design and operation. The SDS Provider and the JRC should ensure that the

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modelling suite is technologically current and that any novel features have been adequately tested. The SDS-JRC Modelling Suite shall function to:

- at a lower level, model the highly complex interaction between competing public transport, traffic movements and Level 1 tram priority in the city centre at multiple junctions and key interchanges;
- at the higher level, model congestion at key junctions in the wider network area and overall travel demands in the surrounding areas;
- iterate until a state of equilibrium is reached between supply and demand.

3.5.10 The SDS Provider and the JRC shall be jointly and severally responsible for ensuring that the SDS-JRC Modelling Suite is capable of supporting the performance of the SDS Provider and of the JRC under their respective mandates with **tie**. The SDS-JRC Modelling Suite shall be configured to include the following applications, in addition to any application the SDS Provider considers necessary to answer its own or **tie's** requirements:

- public transport demand and patronage/revenue forecasting capable of modal disaggregation;
- detailed traffic junction design recognition and evaluation and wider area effect assessment;
- temporary traffic diversion and traffic regulation order impact analysis.

3.5.11 The SDS-JRC Modelling Suite shall be competent and responsive in relation to requested specific inputs for project evaluation tools, financial and economic case analysis (including funding options analysis) and risk assessment. The SDS-JRC Modelling Suite shall be sensitive to the interaction of the SDS Provider's detailed tram line design with vehicular traffic, pedestrians and other urban infrastructure users and capable of generating responses relevant for designing countermeasures to alleviate adverse knock-on affects in the wider area transport network.

3.5.12 The correction of any fault or incapacity in the SDS-JRC Modelling Suite shall be the joint and several responsibility of the SDS Provider and the JRC.

3.5.13 Copyright and all intellectual property rights in (and all related work in progress) the SDS-JRC Modelling Suite shall vest in **tie.** Use of the models by SDS Provider shall be by licence from **tie**.

3.6 Topics Register

3.6.1 The SDS Provider shall participate in the management of the Topics Register.

3.6.2 The Topics Register is used to record all issues as they arise that require to be specifically addressed. The record is then amended as appropriate to track the manner in which issues have been resolved to the satisfaction of project. The SDS Provider is required to add to, or respond to issues as appropriate and attend regular review meetings at which the Topics Register will be updated and actions assigned.

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4. Management Services

4.1 Project Management and Programme Requirements

4.1.1 The SDS Provider shall ensure all that Services and any advance works are organised and programmed to meet the overall requirements of the Master Project Programme. This shall include:

- updating the construction strategy for the Edinburgh Tram Network;
- integration with new projects e.g. Capital Streets and CETM;
- identifying long lead time works;
- defining the extent of advance works;
- establishing diversionary works agreements;
- maintaining, managing & updating relevant sub-programmes including all approvals and traffic regulation orders;
- maintaining, managing and updating relevant risk and issue registers; and
- managing all cost reporting including the impact of changes.

4.1.2 The SDS Provider shall prepare, update, maintain and amend (as required) the Programme which will be coincident to and aligned with that of the Client and the Master Project Programme. All programme updates and reports shall be electronically transmitted to the Client's Representative to enable progress monitoring at intervals, which will be agreed, but are likely to be weekly and monthly. This shall include as a minimum:

- initial outline of the Programme in Primavera P3e for detailed implementation;
- Programme to follow the detailed WBS and Programme Phasing Structure as outlined in Appendices 1 and 2 to this Schedule 1 (*Scope of Services*);
- Programme to be cost and resource (named) loaded down to activities;
- all resource reporting / time sheet and cost allocation to be coded to suit the WBS activities. The coding of activities and resources to be agreed with **tie**;
- time sheets to be completed weekly against planned works as generated by Primavera P3e, any deviations to be reported in a weekly slippage report and notification of remedial actions to be authorised by the Client's Representative;
- weekly time sheets are to be submitted by 09:00hrs on the Tuesday following the relevant week;

- Programme to be updated and submitted weekly with all cost and resources;
- monthly progress reporting to include as a minimum and to be issued 3 working days before the progress meeting:
    - planned versus actual cost and resource summary;
    - progress against milestones;
    - earned value report;
    - 4 week forecast;
    - 8 week critical impact notice (any internal or external factor which may affect programme delivery); and
    - labour histograms detailing planned, actual and forecast across all disciplines;
- programming input as required by the Client; and
- attendance at meetings as required by the Client.

4.1.3 Work Breakdown Structure (WBS)

4.1.3.1 The SDS Provider shall structure the project using a suitable WBS in the form as outlined in Appendix 1 to this Schedule 1 (*Scope of Services*) and as is agreed by **tie**. Sufficient detail shall be included in the WBS to show adequate control of both internal and external resource. Deliverables must be clearly defined and denoted by a milestone which accords with the requirements of the Master Project Programme.

4.1.3.2 The WBS for this project should be designed to run from commencement of the Requirements Definition Phase through to the opening of the Edinburgh Tram Network to public service. The WBS should be segregated into both work type within discipline (in order to assist the SDS Provider and the Infraco to monitor, control and report on their specific roles) and is further divided into Stage Builds, Sectors and Sub-Sectors (as appropriate) to assist in the monitoring of progress along the Edinburgh Tram Network to aid integration of design, construction and commissioning.

4.1.3.3 The following WBS commitments are required from SDS Provider:

- **Requirements Definition Phase:** all documentation, programme costings etc. to be at WBS level;
- **Preliminary Design Phase:** all documentation, programme costings etc. to be at WBS level within each Stage Build, Sector or Sub-Sector (as appropriate);
- **Detailed Design Phase:** all documentation, programme costings etc. to be at WBS level within each Stage Build, Sector or Sub-Sector (as appropriate).

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4.1.4 Cost/Spend Curves

The SDS Provider shall submit cost/spend tables and cumulative curves to match the achievement of major deliverables and activities within the WBS.

4.1.5 Critical Path

The SDS Provider shall ensure that tasks within the plans must be logically linked to ensure a critical path is derived, and show clearly any internal and external dependencies, constraints, hold and checkpoints that the SDS Provider believes are required for the successful completion of the project. Actual progress shall detail the named resource/s used.

4.1.6 Resource Assignment

The SDS Provider shall ensure that all tasks on the plan are resourced and coded to an agreed coding structure to show the manpower required to complete the project on time. The manpower is required to be named personnel. However, if this is not possible in all cases, then generic skills and professions that are required for each task shall be clearly stated.

4.2 Risk Management

4.2.1 The SDS Provider shall adopt a process of risk management which shall include providing input to the risk allocation matrices to demonstrate the risk retention, sharing and transfer.

4.2.2 The SDS Provider shall:

Prepare and maintain a project risk management plan which shall confirm the objectives of the plan, the roles and responsibilities of the SDS Provider, the definitions of risk categorisation and impact, the risk management process and how the plan will be applied throughout the scheme development, design, procurement and construction phases of the Edinburgh Tram Network. This plan should indicate the critical success factors, key areas of focus and individuals involved.	To be delivered by the SDS Provider to the Client within 1-month of the Effective Date and shall be maintained by the SDS Provider throughout the term of the Agreement

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Prepare and maintain an assumptions register to record all capex, opex, lifecycle, revenue, programme, quality, functionality and approvability assumptions and consequent risks to the Edinburgh Tram Network throughout scheme development, design, procurement and construction phases. The SDS Provider shall ensure that the assumptions register contributes to the project risk register referred to below.	Agree format with the Client's designated risk manager (as notified to the SDS Provider from time to time) within 1-month of the Effective Date. The register shall be maintained by the SDS Provider throughout the term of the Agreement
Maintain close liaison with the **tie** project team, the Operator, stakeholders, the Tram Supplier and **tie**'s technical, legal, financial and other advisors, regarding risk matters. The SDS Provider shall facilitate risk management meetings to support the scheme development, design, procurement and construction phases of the Edinburgh Tram Network. Liaison to include assistance with the risk identification procedure which is being carried out by the Client and attendance at management workshops which shall be facilitated by the SDS Provider to allow a sharing of previous experience.	Monthly meeting with the Client and **tie**'s project team (as notified to the SDS Provider from time to time) and ongoing liaison with **tie**'s project team, the Operator, stakeholders, the Tram Supplier and the **tie**'s technical, legal, financial and other advisers throughout the term of the Agreement
Prepare and maintain a project risk register to summarise all capex, opex, lifecycle, revenue, programme, quality, functionality and approvability risks to the Edinburgh Tram Network and their proposed mitigation. The project risk register should include analysis of each risk in terms of 'likelihood' and 'impact' prior to and following mitigation, responsible owner of each risk and graphical summaries of risk profile. The risks to be addressed should include strategic, commercial, economic, legal and regulatory, organisational, environmental, technical, operational and infrastructure risks.	Agree format of the project risk register with the Client's designated risk manager (as notified to the SDS Provider from time to time within 1-month of the Effective Date. The SDS Provider shall maintain, update and circulate the project risk register to parties designated by the Client from time to time on a bi-monthly basis throughout the term of the Agreement
Prepare and submit a risk progress report to the Client on the status of risk management and mitigation giving a summary of new risks identified, new assumptions, key matters to be resolved and achievements. This report should indicate "Red-Amber-Green" (RAG) status on key components including planning permissions, specification compliance, incomplete design, programme for outstanding work, adequacy of investigations	Agree format with the Client's designated risk manager (as notified to the SDS Provider from time to time) within 1-month of the Effective Date and submit monthly report to the Client's said risk manager throughout the term of the Agreement

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Required Action from the SDS Provider	Timing/Frequency
and surveys, constructability, compliance with CDM Regulations, Design Manual compliance, optimisation of run-time, interface design, Parliamentary objector concession, approvals which require to be obtained from the Client or the Client's Representative (for example approvals required in accordance with the Review Procedure), Consents and certification	
Prepare and maintain a cost and programme contingency report indicating the recommended capital cost and programme contingency allowances to be considered. Report should also summarise the recommended mitigation for the construction and installation phase, the commissioning and defects resolution phase under the Infraco Contract (as such terms are defined in the Infraco Contract) and operational phase, including details of any residual development risks. Report should include a detailed quantitative risk analysis using the Monte Carlo simulation (*@RISK4.5 and Pertmaster Project Risk or equivalents*) for both cost and programme components.	Submit final report to the Client within 1-month prior to publication of OJEU Notice (as notified by the Client to the SDS Provider) for the Infraco Contract. Report to be updated on quarterly basis thereafter throughout the term of the Agreement and submitted to the Client's designated risk manager (as notified to the SDS Provider from time to time)
Prepare and maintain a design construction risk report, indicating the risks to be considered by Infraco during remaining scheme development and construction including construction sequence, construction methodologies, access, quality, approvals, security, safety, public relations and compliance with Parliamentary Bill and objector requirements.	Submit final reportto the Client's designated risk manager (as notified to the SDS Provider from time to time) within 1-month prior to the appointment of Infraco.
Prepare and maintain a design operation risk report indicating the risks to be considered by the Operator during remaining scheme development, the construction and installation phase under the Infraco Contract, the commissioning and defects resolution phase under the Infraco Contract and operational phase including maintenance, lifecycle replacement, quality, approvals including HMRI, security, safety, public relations and compliance with Parliamentary Bill and objector requirements.	Submit final report to the Client's designated risk manager (as notified to the SDS Provider from time to time) within 3-months prior to start of commissioning and defects resolution phase under the Infraco Contract.

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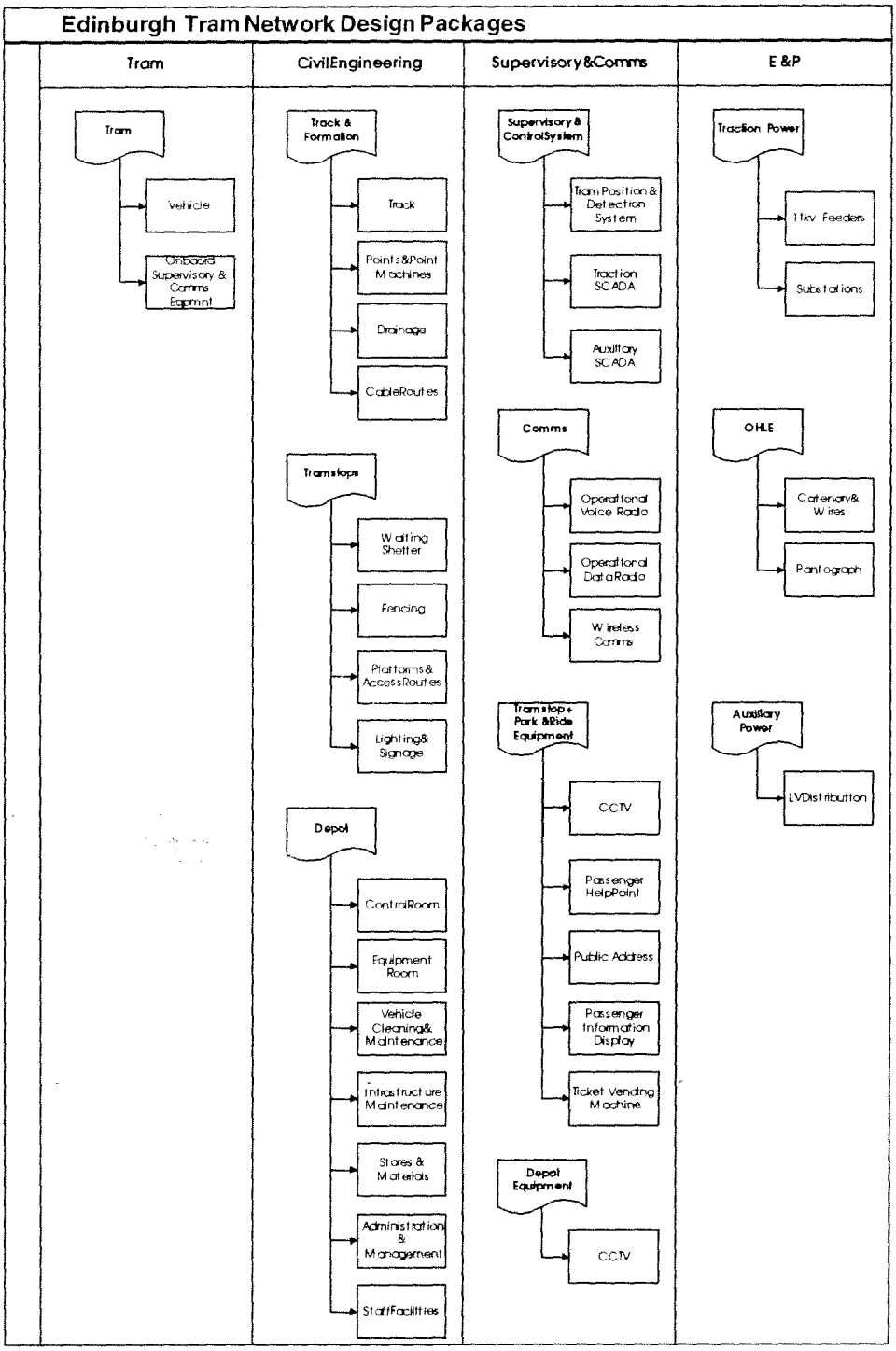
Report to include HAZOP risk assessment for the scheme and detail contingency plans.	

4.3 Financial Modelling

4.3.1 The SDS Provider shall provide inputs to the financial modelling process for the Edinburgh Tram Network which shall include capex and opex (including routine maintenance and lifecycle costs) estimates.

APPENDIX 1

WORK BREAKDOWN STRUCTURE



APPENDIX 1

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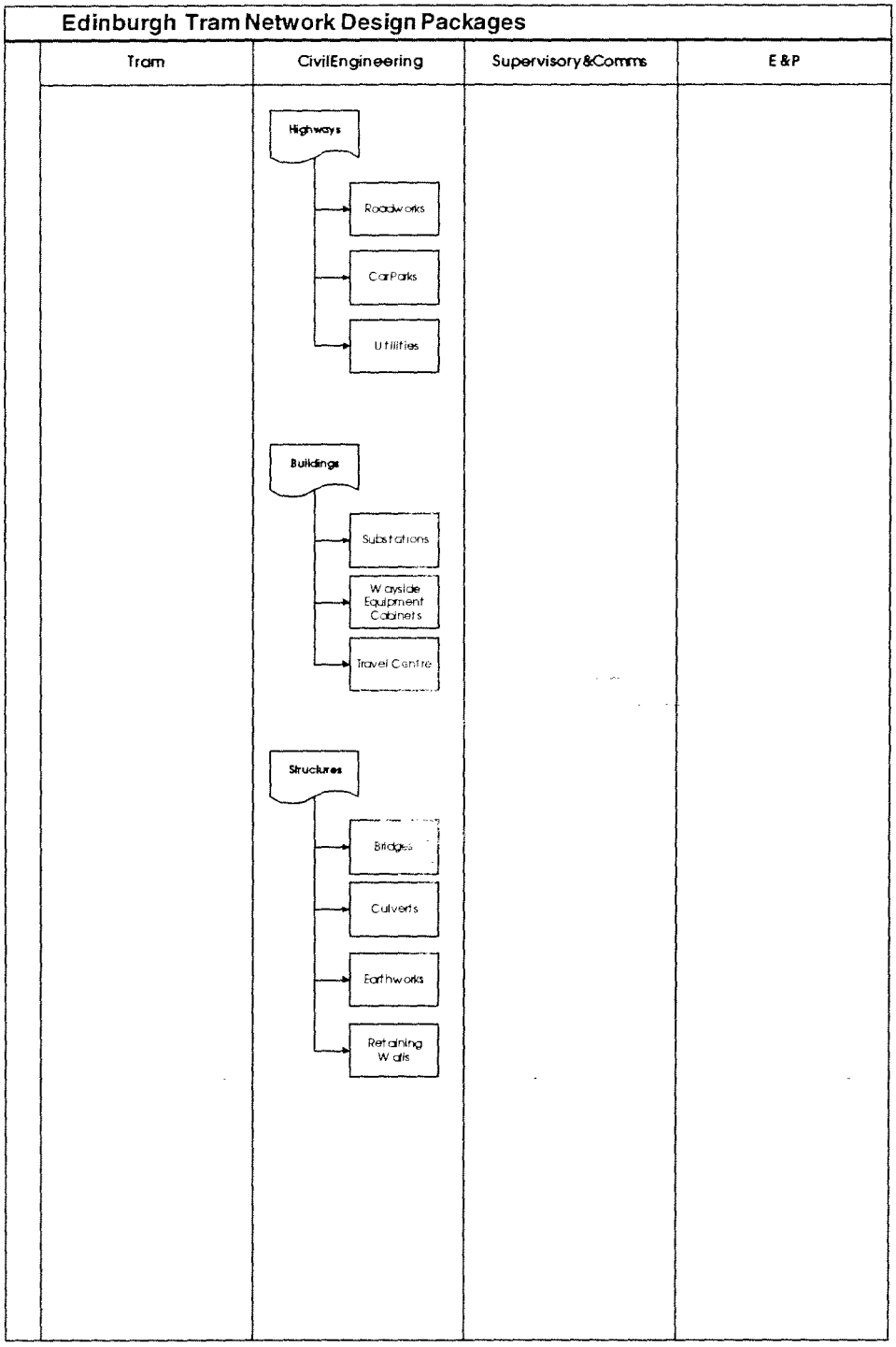

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APPENDIX 2

Programme Phasing Structure

APPENDIX 2

Programme Phasing Structure

Stage Build	Description	Sector		Sub-sector		Criticality	Commissioning Sequence for Trial Running(Line 1&2 and Line 2only)	Commissioning Sequence for Trial Running(Line 1only)	Preliminary Design Approved By	Detailed Design Approved By
ARP	Airport - Gogarburn	ARP1	Airport - Gogarburn (inc)			C	3		28-Feb-06	30-Sep-06
DHY	Depot - Haymarket	DHY1	Gogaburn (exc) - Gyle & Depot (inc)			A1	1		30-Nov-05	30-Mar-06
		DHY2	Gyle (exc) - Edinburgh Park (inc)			C			28-Feb-06	30-Sep-06
		DHY3	Edinburgh Park (exc) - South Gyle Acess (inc)			C	2		28-Feb-06	30-Sep-06
		DHY4	South Gyle Acess (exc) - Soughton Road North (inc)			C			28-Feb-06	30-Sep-06
		DHY5	Soughton Road North (exc) - Murrayfield (exc)	DHY5a	Soughton Road(exc)-Balgreen Road(inc)	B			30-Jan-06	30-May-06
				DHY5b	Balgreen Road(exc)-Murrayfield(exc)				30-Jan-06	30-May-06
		DHY6	Murrayfield (inc) - Haymarket (inc)			A(2)	3		30-Nov-05	30-Mar-06
HOT	Haymarket - Ocean Terminal	HOT1	Haymarket (exc) - St.Andrew Square (inc)	HOT1a	Haymarket(exc)-Shandwick Place(inc)	A(1)	4	3 (section now includes Haymarket Tramstop)	30-Nov-05	30-Mar-06
				HOT1b	Shandwick Place(exc)-Princes St West(inc)					
				HOT1c	Princes St West(exc)-Waverley Bridge(inc)					
				HOT1d	Waverley Bridge(exc)-St.Andrew SQ.(inc)					
		HOT2	St.Andrew SQ.(exc)-Picardy Place(inc)			A(2)	4	3	30-Nov-05	30-Mar-06
		HOT3	Picardy Place (exc) - Foot of the Walk (inc)	HOT3a	Picardy Place(exc)-MacDonald Rd(inc)	A(2)	5	2	30-Nov-05	30-Mar-06
				HOT3b	MacDonald Rd(exc)-Balfour St(inc)					
				HOT3c	Balfour St(exc)-Foot of the Walk(inc)					

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		HOT4	Foot of the Walk (exc) - Ocean Drive (inc)	HOT4a	Foot of the Walk(exc)-Constitution St(inc)	A(3)	6	1	30-Nov-05	30-May-06
				HOT4b	Constitution St(exc)-Ocean Drive(inc)					
		HOT5	Ocean Drive (exc) - Ocean Terminal (inc)			A(3)	6	1	30-Nov-05	30-May-06
		HOT6	Leith Depot & Connections			D	5	1	30-Mar-06	30-Nov-06
HCT	Haymarket - Crewe Toll	HCT1	Haymarket (exc) - Crewe Toll (inc)	HCT1a	Roseburn Jct(exc)-Roseburn(inc)	D	4	4	30-Mar-06	30-Nov-06
				HCT1b	Roseburn(exc)-Ravelston Dykes(inc)				30-Mar-06	
				HCT1c	Ravelston Dykes(exc)-Craigleith(inc)				30-Mar-06	
				HCT1d	Craigleith(exc)-W.General Hosp-Crewe Toll(inc)				30-Mar-06	
CTO	Crewe Toll - Ocean Terminal	CTO1	Crewe Toll (exc) - Granton Square (inc)	CTO1a	Crewe Toll(exc)-W. Granton(inc)	D	5	5	30-Mar-06	30-Nov-06
				CTO1b	W. Granton(exc)-Caroline Pk(inc)				30-Mar-06	
				CTO1c	Caroline Pk(exc)-Granton Waterfront(inc)				30-Mar-06	
				CTO1d	Granton Waterfront(exc)-Granton Sq.(inc)				30-Mar-06	
		CTO2	Granton Square (exc) - Ocean Terminal (inc)	CTO2a	Sea Wall Survey	A1	6	6	30-Nov-05	28-Feb-07
				CTO2b	Granton Sq.(exc)-Lower Granton Rd	E	6	6	30-Mar-06	
				CTO2c	Lower Granton Rd-Newhaven Rd					
				CTO2d	Newhaven Rd-Ocean Terminal(exc)					
GNB	Gogarburn - New bridge	GNB1	Gogaburn (exc) - Newbridge (inc)			F	7		30-Mar-06	28-Feb-07

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APPENDIX 3

Deliverables

TIE00899941_0108

Indicative Document Deliverables Listing for SDS Scope of Supply

Function	Requirements Definition												
	Requirements Spec	Preliminary HIRA	Project Management Plan	Operational & Performance Spec	Quality Management Plan	Safety Management Plan	Configuration Management Plan	Verification & Validation Plan	Preliminary Safety Case Arguments (GSN	List of Applicable Standards	Requirements Test Spec	Requirements Database Populated	Hazard Log &/Risk Register
Systemwide	√	√	√	√	√	√	√	√	√	√	√	√	√
Tram & Vehicles	√	√							√	√	√	√	√
Civil Engineering													
Track & Formation													
Track	√	√							√	√	√	√	√
Points & Point Machines/Actuators	√	√							√	√	√	√	√
Drainage	√	√							√	√	√	√	√
Cable Routes	√	√							√	√	√	√	√
Fencing	√	√							√	√	√	√	√
Highways													
Roadworks	√	√							√	√	√	√	√
Pedestrians Areas & Crossings	√	√							√	√	√	√	√
Car Parks	√	√							√	√	√	√	√
Road Traffic Management	√	√							√	√	√	√	√
Utilities	√	√							√	√	√	√	√
Buildings													
Substations	√	√							√	√	√	√	√
Travel Centre	√	√							√	√	√	√	√
General	√	√							√	√	√	√	√
Structures													
Bridges & Subways	√	√							√	√	√	√	√
Culverts	√	√							√	√	√	√	√
Earthworks	√	√							√	√	√	√	√
Retaining Walls	√	√							√	√	√	√	√
Tramstops													
Waiting Shelter	√	√							√	√	√	√	√
Cable Routes	√	√							√	√	√	√	√
Platforms & Access	√	√							√	√	√	√	√
Lighting & Signage	√	√							√	√	√	√	√
Fencing	√	√							√	√	√	√	√
Depot													
Control Room	√	√							√	√	√	√	√
Equipment Rooms	√	√							√	√	√	√	√
Vehicle Cleaning & Maintenance	√	√							√	√	√	√	√
Infrastructure Maintenance	√	√							√	√	√	√	√
Stores & Materials	√	√							√	√	√	√	√
Administration & Management	√	√							√	√	√	√	√
Staff Facilities	√	√							√	√	√	√	√
External Works	√	√							√	√	√	√	√
Supervisory/Control & Communications													
Supervisory & Control System													
Tram Position & Detection System	√	√							√	√	√	√	√
Traction SCADA	√	√							√	√	√	√	√
Auxiliary SCADA	√	√							√	√	√	√	√
Telecommunications													
Operational Voice Radio	√	√							√	√	√	√	√
Operational Data Radio	√	√							√	√	√	√	√
Wireless Communications	√	√							√	√	√	√	√
Tramstop Equipment													
CCTV	√	√							√	√	√	√	√
Passenger Help Points	√	√							√	√	√	√	√
Public Address Systems	√	√							√	√	√	√	√
Passenger Information Displays	√	√							√	√	√	√	√
Ticket Vending Machines	√	√							√	√	√	√	√
Depot Equipment													
CCTV	√	√							√	√	√	√	√
Control Room	√	√							√	√	√	√	√
Equipment Rooms	√	√							√	√	√	√	√
Electrification & Power													
Traction Power													
[illegible]	√	√							√	√	√	√	√
[illegible]	√	√							√	√	√	√	√
OHLE													
[illegible]	√	√							√	√	√	√	√
[illegible]	√	√							√	√	√	√	√
Auxiliary Power													
[illegible]	√	√							√	√	√	√	√

Edinburgh Tramway

Indicative Document Deliverables Listing for SDS Scope of Supply

		Function
	Requirements Definition	Requirements Spec
		Preliminary HIRA
		Project Management Plan
		Operational & Performance Spec
		Quality Management Plan
		Safety Management Plan
		Configuration Management Plan
		Verification & Validation Plan
		Preliminary Safety Case Arguments (GSN
		List of Applicable Standards
		Requirements Test Spec
		Requirements Database Populated
		Hazard Log & Risk Register

Indicative Document Deliverables Listing for SDS Scope of Supply

TIE00899941_0111

Function	Preliminary Design																															
	Project Management Plan	Quality Management Plan	Safety Management Plan	Configuration Management Plan	Verification & Validation Plan	List of Applicable Standards	System Architecture Spec	System Preliminary Design Spec	System Preliminary Design Test Spec	Functional Hazard Analysis	Preliminary Cause Consequence Analysis	Hazard Log & Risk Register	Requirements Spec/Database	Scheme Plan	Power Distribution Schematic	Safety Case (SSN)	Environmental Management Plan	System Integration Plan	Interface Specification	Planning Approvals	Signage Specification	Run Time Simulation	Tramway Alignment Drawings (1:500)- Topology/plan/horizontal/vertical/track/form	Architectural Drawings 1:50 - GA/Elevations	Architectural Drawings 1:100 - Generic Tramstop : Plans/Elevations/Sections/Equipment/Signs	Architectural Drawings 1:100 - St Andrew Square Tramstop : Plans/Elevations/Sections/Equipment/Signs	Architectural Drawings 1:100 - Princes St/Leith Walk Style Tramstop : Plans/Elevations/Sections/Equipment/Signs	Landscape Drawings (1:500) - Generic/Special Tramstops & Depot	Architectural Drawings 1:100 - Depot : GA/Elevations/Sections/Equipment/Signs
Systemwide	Update	Update	Update	Update	Update	Update	√	√	√	√	√	Update	Update			√	√	√	√	√	√	√										
Tram & Vehicles							n/a	n/a	n/a	√	√	Update	Update			√			√	√	√	√										
Civil Engineering																																
Track & Formation																																
Track							√	√	√	√	√	Update	Update			√			√	√	√	√	√									
Points & Point Machines/Heaters							√	√	√	√	√	Update	Update	√	√	√			√	√	√	√	√									
Drainage							√	√	√	√	√	Update	Update			√			√	√	√	√	√									
Cable Routes							√	√	√	√	√	Update	Update	√		√			√	√	√	√	√									
Fencing							√	√	√	√	√	Update	Update			√			√	√	√	√	√									
Highways																																
Roadworks							√	√	√	√	√	Update	Update			√			√	√	√	√	√									
Pedestrians Areas & Crossings							√	√	√	√	√	Update	Update	√		√			√	√	√	√										
Car Parks							√	√	√	√	√	Update	Update			√			√	√	√	√										
Road Traffic Management							√	√	√	√	√	Update	Update			√			√	√	√	√	√									
Utilities							√	√	√	√	√	Update	Update			√			√	√	√	√	√									
Buildings																																
Substations							√	√	√	√	√	Update	Update		√	√			√	√	√	√	√									
Travel Centre							√	√	√	√	√	Update	Update		√	√			√	√	√	√		√								
General							√	√	√	√	√	Update	Update		√	√			√	√	√	√		√								
Structures																																
Bridges & Subways							√	√	√	√	√	Update	Update			√			√	√	√	√	√									
Culverts							√	√	√	√	√	Update	Update			√			√	√	√	√	√									
Earthworks							√	√	√	√	√	Update	Update			√			√	√	√	√	√									
Retaining Walls							√	√	√	√	√	Update	Update			√			√	√	√	√	√									
Tramstops																																
Waiting Shelter							√	√	√	√	√	Update	Update		√	√			√	√	√	√			√	√	√		√			
Cable Routes							√	√	√	√	√	Update	Update	√		√			√	√					√	√	√		√			
Platforms & Access							√	√	√	√	√	Update	Update			√			√	√	√	√	√		√	√	√	√	√			
Lighting & Signage							√	√	√	√	√	Update	Update		√	√			√	√	√	√			√	√	√	√	√			
Fencing							√	√	√	√	√	Update	Update			√			√	√	√	√	√		√	√	√	√	√			
Depot																																
Control Room							√	√	√	√	√	Update	Update		√	√			√	√	√	√		√							√	
Equipment Rooms							√	√	√	√	√	Update	Update		√	√			√	√	√	√		√							√	
Vehicle Cleaning & Maintenance							√	√	√	√	√	Update	Update		√	√			√	√	√	√		√							√	
Infrastructure Maintenance							√	√	√	√	√	Update	Update		√	√			√	√	√	√		√							√	
Stores & Materials							√	√	√	√	√	Update	Update		√	√			√	√	√	√		√							√	
Administration & Management							√	√	√	√	√	Update	Update		√	√			√	√	√	√		√							√	
Staff Facilities							√	√	√	√	√	Update	Update		√	√			√	√	√	√		√							√	
External Works							√	√	√	√	√	Update	Update		√	√			√	√	√	√		√					√		√	
Supervisory/Control & Communications																																
Supervisory & Control System																																
Tram Position & Detection System							√	√	√	√	√	Update	Update	√	√	√			√	√	√	√										
Traction SCADA							√	√	√	√	√	Update	Update		√	√			√	√	√	√										
Auxiliary SCADA							√	√	√	√	√	Update	Update		√	√			√	√	√	√										
Telecommunications																																
Operational Voice Radio							√	√	√	√	√	Update	Update	√	√	√			√	√	√	√										
Operational Data Radio							√	√	√	√	√	Update	Update	√	√	√			√	√	√	√										
Wireless Communications							√	√	√	√	√	Update	Update	√	√	√			√	√	√	√										
Tramstop Equipment																																
CCTV							√	√	√	√	√	Update	Update		√	√			√	√	√	√			√	√	√		√			
Passenger Help Points							√	√	√	√	√	Update	Update		√	√			√	√	√	√			√	√	√		√			
Public Address Systems							√	√	√	√	√	Update	Update		√	√			√	√	√	√			√	√	√		√			
Passenger Information Displays							√	√	√	√	√	Update	Update		√	√			√	√	√	√			√	√	√		√			
Ticket Vending Machines							√	√	√	√	√	Update	Update		√	√			√	√	√	√			√	√	√		√			
Depot Equipment																																
CCTV							√	√	√	√	√	Update	Update		√	√			√	√	√	√		√								
Control Room							√	√	√	√	√	Update	Update		√	√			√	√	√	√		√								
Equipment Room							√	√	√	√	√	Update	Update		√	√			√	√	√	√		√								
Electrification & Power																																
Traction Power																																
Line Feeders							√	√	√	√	√	Update	Update	√	√	√			√	√	√	√										
Substations							√	√	√	√	√	Update	Update	√	√	√			√	√	√	√										
OHLE																																
Catenary & Wires							√	√	√	√	√	Update	Update	√	√	√			√	√	√	√										
Rail Equip							√	√	√	√	√	Update	Update			√			√	√	√	√										
Auxiliary Power																																
LV Distribution							√	√	√	√	√	Update	Update	√	√	√			√	√	√	√										

Edinburgh Tramway

Indicative Document Deliverables Listing for SDS Scope of Supply

Function
Project Management Plan
Quality Management Plan
Safety Management Plan
Configuration Management Plan
Verification & Validation Plan
List of Applicable Standards
System Architecture Spec
System Preliminary Design Spec
System Preliminary Design Test Spec
Functional Hazard Analysis
Preliminary Cause Consequence Analysis
Hazard Log & Risk Register
Requirements Spec/Database
Scheme Plan
Power Distribution Schematic
Safety Case (GSN)
Environmental Management Plan
System Integration Plan
Interface Specification
Planning Approvals
Signage Specification
Run Time Simulation
Tramway Alignment Drawings (1:500)- topology/plan/horizontal/vertical/trackform
Architectural Drawings t:50 - GA/Elevations
Architectural Drawings t:100 - Generic Tramstop : Plans/Elevations/Sections/Equipment/Signs
Architectural Drawings t:100 - St Andrew Square Tramstop : Plans/Elevations/Sections/Equipment/Signs
Architectural Drawings t:100 - Princes St/Leith Walk Style Tramstop : Plans/Elevations/Sections/Equipment/Signs
Landscape Drawings (1:500) - Generic/Special Tramstops & Depot
Architectural Drawings 1:100 - Depot : GA/Elevations/Sections/Equipment/Signs

Documents to be structured by Section within Scope Book

Preliminary Design

Indicative Document Deliverables Listing for SDS Scope of Supply

Function	Project Management Plan	Quality Management Plan	Safety Management Plan	Configuration Management Plan	Verification & Validation Plan	List of Applicable Standards	System Architecture Spec	System Design Spec	System Design Test Spec	Functional Hazard Analysis	Detailed Cause Consequence Analysis	Hazard Log & Risk Register	Requirements Spec/Database	Scheme Plan	Power Distribution Schematic	Detailed Layout Drawings/Location Plans	Wiring Schedules & Diagrams	Safety Case (GSN)	Cable Route & Duct Layout	Installation Drawings	Procurements Specifications	Installation, Test & Commissioning Plans and Records/Certificates	Detailed Design	Training Plans	Bill of Quantities	Layout Drawings	Interface Schedules	Planning Approvals	Bonding Plan
Systemwide	Update	Update	Update	Update	Update	Update	Update	Update	Update	Update	√	Update	Update					Update						√			√		
Tram & Vehicles							n/a	n/a	n/a	√	√	Update	Update					Update			√				√				
Civil Engineering																													
Track & Formation																		Update											√
Track							√	√	√	√	√	Update	Update			√		Update		√	√	√		√	√		√		
Points & Point Machines/Heaters							√	√	√	√	√	Update	Update	Update	Update	√	√	Update	√	√	√	√		√	√		√		
Drainage							√	√	√	√	√	Update	Update			√		Update		√	√	√		√	√		√		
Cable Routes							√	√	√	√	√	Update	Update	Update		√	√	Update	√	√	√	√		√	√		√		
Fencing							√	√	√	√	√	Update	Update			√		Update		√	√	√		√	√		√		
Highways																													
Roadworks							√	√	√	√	√	Update	Update			√		Update		√	√	√		√	√		√		
Pedestrians Areas & Crossings							√	√	√	√	√	Update	Update	Update		√	√	Update	√	√	√	√		√	√		√		
Car Parks							√	√	√	√	√	Update	Update			√	√	Update	√	√	√	√		√	√		√		
Road Traffic Management							√	√	√	√	√	Update	Update			√	√	Update		√	√	√		√	√		√		
Utilities							√	√	√	√	√	Update	Update			√	√	Update		√	√	√		√	√		√		
Buildings																													
Substations							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√	√	
Travel Centre							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
General							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Structures																													
Bridges & Subways							√	√	√	√	√	Update	Update			√		Update	√	√	√	√		√	√		√		
Culverts							√	√	√	√	√	Update	Update			√		Update	√	√	√	√		√	√		√		
Earthworks							√	√	√	√	√	Update	Update			√		Update	√	√	√	√		√	√		√		
Retaining Walls							√	√	√	√	√	Update	Update			√		Update	√	√	√	√		√	√		√		
Tramstops																													
Waiting Shelter							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√	√	
Cable Routes							√	√	√	√	√	Update	Update	Update		√	√	Update	√	√	√	√		√	√		√		
Platforms & Access							√	√	√	√	√	Update	Update			√	√	Update	√	√	√	√		√	√		√		
Lighting & Signage							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√	√	
Fencing							√	√	√	√	√	Update	Update			√		Update		√	√	√		√	√		√		
Depot																													
Control Room							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Equipment Rooms							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Vehicle Cleaning & Maintenance							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Infrastructure Maintenance							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Stores & Materials							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Administration & Management							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Staff Facilities							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
External Works							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Supervisory/Control & Communications																													
Supervisory & Control System																													
Tram Position & Detection System							√	√	√	√	√	Update	Update	Update	Update	√	√	Update	√	√	√	√		√	√		√		
Traction SCADA							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Auxiliary SCADA							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Telecommunications																													
Operational Voice Radio							√	√	√	√	√	Update	Update	Update	Update	√	√	Update	√	√	√	√		√	√		√		
Operational Data Radio							√	√	√	√	√	Update	Update	Update	Update	√	√	Update	√	√	√	√		√	√		√		
Wireless Communications							√	√	√	√	√	Update	Update	Update	Update	√	√	Update	√	√	√	√		√	√		√		
Tramstop Equipment																													
CCTV							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√	√	
Passenger Help Points							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Public Address Systems							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Passenger Information Displays							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Ticket Vending Machines							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Depot Equipment																													
CCTV							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Control Room							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Equipment Rooms							√	√	√	√	√	Update	Update		Update	√	√	Update	√	√	√	√		√	√		√		
Electrification & Power																													
Traction Power																													
1.1kv Feeders							√	√	√	√	√	Update	Update	Update	Update	√	√	Update	√	√	√	√		√	√		√	√	
Substations							√	√	√	√	√	Update	Update	Update	Update	√	√	Update	√	√	√	√		√	√		√	√	
OHLE																													
Catenary & Wires							√	√	√	√	√	Update	Update	Update	Update	√	√	Update	√	√	√	√		√	√		√	√	
Pantograph							√	√	√	√	√	Update	Update			√	√	Update		√	√	√		√	√		√		
Auxiliary Power																													
Lv Distribution							√	√	√	√	√	Update	Update	Update	Update	√	√	Update	√	√	√	√		√	√		√	√	

Edinburgh Tramway

Indicative Document Deliverables Listing for SDS Scope of Supply

Function	Project Management Plan	Quality Management Plan	Safety Management Plan	Configuration Management Plan	Verification & Validation Plan	List of Applicable Standards	System Architecture Spec	System Design Spec	System Design Test Spec	Functional Hazard Analysis	Detailed Cause Consequence Analysis	Hazard Log & Risk Register	Requirements Spec/Database	Scheme Plan	Power Distribution Schematic	Detailed Layout Drawings/Location Plans	Wiring Schedules & Diagrams	Safety Case (GSN)	Cable Route & Duct Layout	Installation Drawings	Procurements Specifications	Installation, Test & Commissioning Plans and Records/Certificates	Training Plans	Bill of Qualities	Layout Drawings	Interface Schedules	Planning Approvals	Bonding Plan
	Detailed Design																											
	Documents to be structured by Sector within Stage Build																											

Indicative Document Deliverables Listing for SDS Scope of Supply

Function	Tramway Alignment Drawings (1:500) - Topology/plan/horizontal/vertical/track/form	Tramway Alignment Drawings - Haymarket - St.Andrew Square - Ocean Terminal (1:200) - Topology/plan/horizontal/vertical/track/form	Tramway Alignment Drawings Cross Sections	Table of Horizontal & Vertical Alignments with Chainage	General Arrangement Drawings (1:500) - Surface/underground/detail/buildings clearance etc.	General Arrangement Drawings - Haymarket - St.Andrew Square - Ocean Terminal (1:200) - Surface/underground/detail/buildings clearance etc.	Route & Accommodation Drawings (1:500)	Route & Accommodation Drawings - Haymarket - St.Andrew Square - Ocean Terminal (1:200)	Structure Drawings (1:100)	General Arrangement Drawings (1:50) - Existing Structures/remedial/works & mods.	Foundation Drawings	Structural Arrangement Drawings (1:200)	Architectural Drawings 1:50 - GA/Elevations/Sections	Architectural Drawings 1:10 - Doors/Frames/Grilles	Architectural Drawings 1:100 - Tramstop - Plans/Elevations/Sections/Equipment/Signs	Architectural Drawings 1:10 - Tramstop - Equipment/Handrails/Signs	Landscape Drawings (1:500 & 1:100) - Tramstops	Architectural Drawings 1:100 - Depot - GA/Elevations/Sections/ext ork/Horiz/drainage/cabling/fast ning out	Architectural Drawings 1:10 - Depot - ittings/handrails/plaiciadgin g/doors/frames etc.
Systemwide																			
Tram & Vehicles																			
Civil Engineering																			
Track & Formation																			
Track	√	√	√	√	√	√	√	√											
Points & Point Machines/Heaters	√	√	√		√	√	√	√											
Drainage	√	√	√		√	√	√	√											
Cable Routes	√	√	√		√	√	√	√											
Fencing	√	√	√		√	√	√	√											
Highways																			
Roadworks	√	√	√	√	√	√	√	√											
Pedestrian Areas & Crossings	√	√	√	√	√	√	√	√											
Car Parks					√	√	√												
Road Traffic Management	√	√	√		√	√	√	√											
Utilities	√	√	√		√	√	√	√											
Buildings																			
Substations					√	√					1:100 & 1:20	√	√	√					
Travel Centre					√	√					1:100 & 1:2	√	√	√					
Tramstop					√	√					1:100 & 1:20	√	√	√					
Structures																			
Bridges & Subways	√	√	√		√	√	√	√	√	√									
Culverts	√	√	√		√	√	√	√	√	√									
Earthworks	√	√	√		√	√	√	√	√	√									
Retaining Walls	√	√	√		√	√	√	√	√	√									
Tramstops																			
Waiting Shelter					√	√	√	√							√	√			
Cable Routes					√	√	√	√							√	√			
Platforms & Access	√	√	√		√	√	√	√							√	√	√		
Lighting & Signage					√	√	√	√							√	√	√		
Fencing	√	√	√		√	√	√	√							√	√	√		
Depot																			
Control Room					√	√					1:100 & 1:2	√	√	√					
Equipment Rooms					√	√					1:100 & 1:2	√	√	√					
Vehicle Cleaning & Maintenance					√	√					1:100 & 1:2	√	√	√					
Infrastructure Maintenance					√	√					1:100 & 1:20	√	√	√					
Stores & Materials					√	√					1:100 & 1:20	√	√	√					
Administration & Management					√	√					1:100 & 1:20	√	√	√					
Staff Facilities					√	√					1:100 & 1:20	√	√	√					
External Works					√	√					1:100 & 1:2	√	√	√			√		
Supervisory/Control & Communications																			
Supervisory & Control System																			
Tram Position & Detection System																			
Traction SCADA																			
Ancillary SCADA																			
Telecommunications																			
Operational Voice Radio																			
Operational Data Radio																			
Wireless Communications																			
Tramstop Equipment																			
CCTV							√	√							√	√			
Passenger Help Point							√	√							√	√			
Public Address Systems							√	√							√	√			
Passenger Information Displays							√	√							√	√			
Ticket Vending Machines							√	√							√	√			
Depot Equipment																			
CCTV													√	√					
Control Room													√	√					
Equipment Rooms													√	√					
Electrification & Power																			
Traction Power																			
Track Feedings							√	√											
Substations							√	√											
OHLE																			
Catenary & Wires					√	√	√	√											
Portal/Cantilever																			
Auxiliary Power																			
Distribution							√	√											

TIE00899941_0115

Indicative Document Deliverables Listing for SDS Scope of Supply

Function	Tramway Alignment Drawings (1:500) - topology/plan/horizontal/vertical/trackform	Tramway Alignment Drawings Haymarket - St. Andrew Square - Ocean Terminal (1:200) - topology/plan/horizontal/vertical/trackform	Tramway Alignment Drawings Cross Sections	Table of Horizontal & Vertical Alignments with Chainage	General Arrangement Drawings (1:500) – surface/underground/site limits/site clearance etc.	General Arrangement Drawings - Haymarket-St.Andrew Square-Ocean Terminal(1:200) - surface/underground/site limits/site clearance etc.	Route & Accommodation Drawings (1:500)	Route & Accommodation Drawings – Haymarket-St.Andrew Square-Ocean Terminal(1:200)	Structure Drawings (1:100)	General Arrangement Drawings (1:50) - Existing Structures/remedial/works & mods.	Foundation Drawings	Structural Arrangement Drawings (1:200)	Architectural Drawings 1:50 - GA/Elevations/Sections	Architectural Drawings 1:10 – Doors/Frames/Grilles	Architectural Drawings 1:100 - Tramstop : Plans/Elevations/Sections/Equipment/Signs	Architectural Drawings 1:10 - Tramstop : Equipment/Handrails/Signs	Landscape Drawings (1:500 & 1:100) - Tramstops	Architectural Drawings 1:100 - Depot : GA/Elevations/Sections/ext brickwork/drainage/ceiling/setting out	Architectural Drawings 1:10 - Depot : fittings/handrails/pits/cladding/doors/frames etc.
	← *Documents to be structured by* Sector within Stage Build →																	

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[redacted]

Director / Authorised Signatory
tie Limited

[redacted]

Director / Authorised Signatory
Parsons Brinckerhoff Limited

This is Schedule Two referred to in the foregoing Agreement between the Client and the SDS Provider

SCHEDULE TWO

KEY PERSONNEL

David Calver	Project Manager
David Simmons	Deputy Project Manager
Andy Dixon	Chief Engineer
Chris Mason	Deputy Chief Engineer
Rick Finc	Approvals Manager
Colin MacDonald	Construction Manager
Bob Clark	Stakeholder Manager
Billy Johnston	Safety; Quality, Systems Assurance Manager

[redacted]

Director/Authorised Signatory

TIE LIMITED

[redacted]

Director/Authorised Signatory

PARSONS BRINCKERHOFF LIMITED

This is Schedule Three referred to in the foregoing Agreement between the Client and the SDS Provider

SCHEDULE THREE

PRICING SCHEDULE

SDS CONTRACT: PRICING SCHEDULE - OVERALL SUMMARY

SDS Contract Value

Tender amount				£25,472,581
Provisional additional work				£1,702,000 dt
				£23,770,581
Deduct				
Modelling		£1,215,000		
SDG	£116,400			
	£35,000	£151,400 dt		
		£1,063,600 + 7%	£1,138,052	
Modelling risk			£550,000	
Funding			£100,000	
Mobilisation			£100,000	£1,888,052 dt
				£21,882,529
Add				
Provisional Additional Work				£1,664,550
			Contract Value	**£23,547,079**
				=========

EDINBURGH TRAM NETWORK: PRICING SCHEDULE

The following Schedule is subject to the foregoing Overall Summary

TENDER SUMMARY, LINES 1 and 2 Combined

SDS Management	**£6,041,339.00**
Design	**£13,914,242.00**
Further Scope	**£2,600,000.00**
Provisional Additional Work	**£1,702,000.00**
Transport Modelling	**£1,215,000.00**
Tender Summary Carried to Formal Offer, Lines 1 and 2 Combined	**£25,472,581.00**

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

TENDER SUMMARY, LINE 1

SDS Management	£4,544,175.00
Design	£10,896,399.00
Further Scope	£1,700,000.00
Provisional Additional Work	£1,702,000.00
Transport Modelling	£972,000.00
Tender Summary Carried to Formal Offer, Line 1	£19,814,574.00

TENDER SUMMARY, LINE 2

SDS Management	£2,910,167.00
Design	£7,164,992.00
Further Scope	£1,700,000.00
Provisional Additional Work	£1,702,000.00
Transport Modelling	£972,000.00
Tender Summary Carried to Formal Offer, Line 2	£14,449,159.00

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EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

SDS MANAGEMENT, LINE 1

	SDS Management	Time/Lump Sum	£
	Tenderers shall price here for all non-quantity related elements of the work. Examples of this would be head office overheads, management required throughout the project, mobilisation, demobilisation, insurance etc., Tenderers shall detail and price each item individually and confirm if the items are time related or lump sum prices. In addition to the above Tenderers shall price separately the following items:		
a	Professional indemnity insurance		£inc
b	All other insurances		£inc
c	Co location of core team in offices provided by tie. Number of staff in core team to be confirmed. (14 no.). Potential fee saving £140,000k, subject to space confirmation.		£nil c/f
d	Infraco Procurement Services		£inc
e	Allowance for price inflation over the duration of the SDS contract. This item does not remove the liability of the Tenderer to provide a fixed price Tender		£inc
	Price inflation covered to end 2009		
f	Commissioning support		£inc
g	SDS support for management of defects		£exc
	To be paid as Additional Provisional Work		
	Other SDS Management		
	Mobilisation fee	Lump Sum	£300,000.00
	SDS Project and Technical Management	Time	£4,244,175.00
	SDS Management Carried to Tender Summary, Line 1		£4,244,175.00

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EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

SDS MANAGEMENT, LINE 2

	SDS Management	Time/Lump Sum	£
	Tenderers shall price here for all non-quantity related elements of the work. Examples of this would be head office overheads, management required throughout the project, mobilisation, demobilisation, insurance etc.,		
	Tenderers shall detail and price each item individually and confirm if the items are time related or lump sum prices.		
	In addition to the above Tenderers shall price separately the following items:		
a	Professional indemnity insurance	£	inc
b	All other insurances	£	inc
c	Co location of core team in offices provided by tie. Number of staff in core team to be confirmed. (14 no.). Potential fee saving £140,000k, subject to space confirmation.	£	nil c/f
d	Infraco Procurement Services	£	inc
e	Allowance for price inflation over the duration of the SDS contract. This item does not remove the liability of the Tenderer to provide a fixed price Tender	£	inc
	Price inflation covered to end 2009		
f	Commissioning support	£	inc
g	SDS support for management of defects	£	exc
	To be paid as Additional Provisional Work		
	Other SDS Management		
	Mobilisation fee	Lump Sum	£300,000.00
	SDS Project and Technical Management, including expenses	Time	£2,610,167.00
	SDS Management Carried to Tender Summary, Line 2		£2,610,167.00

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EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

SDS MANAGEMENT, LINES 1 and 2, Combined

	SDS Management	Time/Lump Sum	£
	Tenderers shall price here for all non-quantity related elements of the work. Examples of this would be head office overheads, management required throughout the project, mobilisation, demobilisation, insurance etc		
	Tenderers shall detail and price each item individually and confirm if the items are time related or lump sum prices.		
	In addition to the above Tenderers shall price separately the following items:		
a	Professional indemnity insurance	£	inc
b	All other insurances	£	inc
c	Co location of core team in offices provided by tie. Number of staff in core team to be confirmed. (20 no.). Potential fee saving £200,000k, subject to space confirmation	£	nil c/f
d	Infraco Procurement Services	£	inc
e	Allowance for price inflation over the duration of the SDS contract. This item does not remove the liability of the Tenderer to provide a fixed price Tender	£	
	Price inflation covered to end 2009		
f	Commissioning support	£	inc
g	SDS support for management of defects	£	exc
	To be paid as Additional Provisional Work		
	Other SDS Management		
	Mobilisation fee	Lump Sum	£500,000.00
	SDS Project and Technical Management	Time	£5,541,339.00
	SDS Management Carried to Tender Summary, Lines 1 and 2 Combined		£0.00

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EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN MASTER SUMMARY, LINE 1

Requirements Definition	**£1,074,157.00**
Preliminary Design	**£4,268,697.00**
Detail Design	**£5,553,545.00**
Design Carried to Tender Summary, Line 1	**£10,896,399.00**

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN MASTER SUMMARY, LINE 2

Requirements Definition	£1,074,157.00
Preliminary Design	£2,651,483.00
Detail Design	£3,439,352.00
Design Carried to Tender Summary, Line 2	£7,164,992.00

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EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN MASTER SUMMARY, LINES 1 and 2 COMBINED

Requirements Definition	£1,074,157.00
Preliminary Design	£5,565,699.00
Detail Design	£7,274,386.00
Design Carried to Tender Summary, Lines 1 and 2 Combined	£13,914,242.00

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EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: REQUIREMENTS DEFINITION

Sub milestone	PAYMENT MILESTONES (PM)	PM 1
	Indicative Document Deliverable List	REQUIREMENTS DEFINITION £
a	**Systemwide**	**£32,647.00**
b	**Tram & Vehicles**	**£21,765.00**
	Civil Engineering	
c	**Track & Formation**	**£76,177.00**
	Track	
	Points & Point Machines/Heaters	
	Drainage	
	Cable Routes	
	Fencing	
d	**Highways**	**£315,592.00**
	Roadworks	
	Pedestrians Areas & Crossings	
	Car Parks	
	Road Traffic Management	
	Utilities	
e	**Buildings**	**£51,206.00**
	Substations	
	Travel Centre	
	General	
f	**Structures**	**£370,004.00**
	Bridges & Subways	
	Culverts	

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	Earthworks	
	Retaining Walls	
g	**Tramstops**	**£32,647.00**
	Waiting Shelter	
	Cable Routes	
	Platforms & Access	
	Lighting & Signage	
	Fencing	
	Page Totals £ Carried Forward	**£900,038.00**

DESIGN WORK: REQUIREMENTS DEFINITION (Continued)

	PAYMENT MILESTONES (PM)	**PM 1**
Sub Milestone	**Indicative Document Deliverable List**	**REQUIREMENTS DEFINITION**
	Page Totals £ Brought Forward	**£900,038.00**
	Supervisory/Control & Communications	**£97,942.00**
h	**Supervisory & Control System**	
	Tram Position & Detection System	
	Traction SCADA	
	Auxillary SCADA	
i	**Telecommunications**	
	Operational Voice Radio	
	Operational Data Radio	
	Wireless Communications	
j	**Tramstop Equipment**	
	CCTV	
	Passenger Help Points	

	Public Address Systems	
	Passenger Information Displays	
	Ticket Vending Machines	
	Electrification & Power	**£76,177.00**
k	**Traction Power**	
	11kv Feeders	
	Substations	
l	**OHLE**	
	Catenary & Wires	
	Pantograph	
m	**Auxillary Power**	
	LV Distribution	
n	**Depot**	
	Control Room	
	Equipment Rooms	
	Vehicle Cleaning & Maintenance	
	Infrastructure Maintenance	
	Stores & Materials	
	Administration & Management	
	Staff Facilities	
	External Works	
o	**Depot Equipment**	**£**
	CCTV	
	Control Room	
	Equipment Rooms	
	Total Requirements Definition Cost £ Carried to Design Master Summaries for Line 1, Line 2, and Lines 1 and 2 Combined	**£1,074,157.00**

TIE00899941_0130

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN SUMMARY, LINE 1

Sector	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
	All Costs Carried from Tramstop Build Up	£	£
DHY6	Murrayfield/Haymarket	£153,783.00	£200,995.00
HOT1	Haymarket/Shandwick Place	£153,783.00	£200,995.00
HOT1	Shandwick Place/Prince Street West	£153,783.00	£200,995.00
HOT1	Prince Street West/Waverley Bridge	£153,783.00	£200,995.00
HOT1	Waverley Bridge/St Andrews Square	£153,783.00	£200,995.00
HOT1	St Andrews Square/Picardy Place	£153,783.00	£200,995.00
HOT2	Picardy Place/Macdonald Road	£153,783.00	£200,995.00
HOT2	Macdonald Road/Balfour Street	£153,783.00	£200,995.00
HOT2	Balfour Street/Foot of Walk	£153,783.00	£200,995.00
HOT3	Foot of Walk/Constitution Street	£153,783.00	£200,995.00
HOT3	Constitution Street/Ocean Drive	£153,783.00	£200,995.00
HOT4	Ocean Drive/Ocean Terminal	£153,783.00	£200,995.00
HOT 5	Leith Depot and Connections	£153,783.00	£200,995.00
	Page Totals £ Carried Forward	£1,999,179.00	£2,612,935.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

	PAYMENT MILESTONES (PM)	PM 2	PM 3
Sector	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
	Page Totals £ Brought Forward	£1,999,179.00	£2,612,935.00

HCT	Roseburn Junction/Roseburn (Part Tram Stop)	£153,783.00	£200,995.00
HCT	Roseburn/Ravelston Dykes	£153,783.00	£200,995.00
HCT1	Ravelston Dykes/Craigleith	£153,783.00	£200,995.00
HCT1	Craigleith/Western General Hospital	£153,783.00	£200,995.00
HCT1	Western General Hospital/Crewe Toll	£153,783.00	£200,995.00
CTO1	Crewe Toll/West Granton	£153,783.00	£200,995.00
CTO1	West Granton/Caroline Park	£153,783.00	£200,995.00
CTO1	Caroline Park/Granton Waterfront	£153,783.00	£200,995.00
CTO1	Granton Waterfront/Granton Square	£153,783.00	£200,995.00
CTO2	Granton Square/Lower Granton Road	£153,783.00	£200,995.00
CTO2	Lower Granton Road/Newhaven Road	£153,783.00	£200,995.00
CTO2	Newhaven Road/Ocean Terminal	£153,783.00	£200,995.00
	Leith Depot (1 Nr)	£212,060.00	£264,335.00
	Systemwide	£127,237.00	£158,601.00
	Trams	£84,825.00	£105,734.00
	Total Preliminary Design Costs £ Carried to Design Master Summary, Line 1	£4,268,697.00	
	Total Detailed Design Costs £ Carried to Design Master Summary, Line 1		£5,553,545.00

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN SUMMARY, LINE 2

Sector	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
	All Costs Carried from Tramstop Build Up	£	£
ARP1	Airport/Ingliston Park and Ride	£153,783.00	£200,995.00
ARP1	Ingliston Park and Ride/Gogarburn Depot Halt	£153,783.00	£200,995.00
DHY1	Gogarburn Depot Halt/Gyle/Depot/Connections	£153,783.00	£200,995.00
DHY2	Gyle/Depot/Connections/Edinburgh Park	£153,783.00	£200,995.00
DHY3	Edinburgh Park/South Gyle	£153,783.00	£200,995.00
DHY4	South Gyle/Saughton Road	£153,783.00	£200,995.00
DHY5	Saughton Road/Balgreen Road	£153,783.00	£200,995.00
DHY5	Balgreen Road/Murrayfield	£153,783.00	£200,995.00
DHY6	Murrayfield/Haymarket	£153,783.00	£200,995.00
HOT1	Haymarket/Shandwick Place	£153,783.00	£200,995.00
HOT1	Shandwick Place/Prince Street West	£153,783.00	£200,995.00
HOT1	Prince Street West/Waverley Bridge	£153,783.00	£200,995.00
HOT1	Waverley Bridge/St Andrews Square	£153,783.00	£200,995.00
HOT1	St Andrews Square/Picardy Place	£153,783.00	£200,995.00
GNB2	Ingliston West/Newbridge	£153,783.00	£200,995.00
	Gogarburn Depot (1 Nr)	£208,930.00	£273,069.00
	Systemwide	£81,485.00	£90,815.00
	Trams	£54,323.00	£60,543.00
	Total Preliminary Design Costs £ Carried to Design Master Summary, Line 2	£2,651,483.00	
	Total Detailed Design Costs £ Carried to Design Master Summary, Line 2		£3,439,352.00

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE
DESIGN SUMMARY. LINES 1 and 2 Combined

Sector	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
	All Costs Carried from Tramstop Build Up	£	£
ARP1	Airport/Ingliston Park and Ride	£153,783.00	£200,995.00
ARP1	Ingliston Park and Ride/Gogarburn Depot Halt	£153,783.00	£200,995.00
DHY1	Gogarburn Depot Halt/Gyle/Depot/Connections	£153,783.00	£200,995.00
DHY2	Gyle/Depot/Connections/Edinburgh Park	£153,783.00	£200,995.00
DHY3	Edinburgh Park/South Gyle	£153,783.00	£200,995.00
DHY4	South Gyle/Saughton Road	£153,783.00	£200,995.00
DHY5	Saughton Road/Balgreen Road	£153,783.00	£200,995.00
DHY5	Balgreen Road/Murrayfield	£153,783.00	£200,995.00
DHY6	Murrayfield/Haymarket	£153,783.00	£200,995.00
HOT1	Haymarket/Shandwick Place	£153,783.00	£200,995.00
HOT1	Shandwick Place/Prince Street West	£153,783.00	£200,995.00
HOT1	Prince Street West/Waverley Bridge	£153,783.00	£200,995.00
HOT1	Waverley Bridge/St Andrews Square	£153,783.00	£200,995.00
HOT1	St Andrews Square/Picardy Place	£153,783.00	£200,995.00
HOT2	Picardy Place/Macdonald Road	£153,783.00	£200,995.00
HOT2	Macdonald Road/Balfour Street	£153,783.00	£200,995.00
	Page Totals £ Carried Forward	£2,460,528.00	£3,215,920.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

	PAYMENT MILESTONES (PM)	PM 2	PM 3
Sector	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN

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	Page Totals £ Brought Forward	£2,460,528.00	£3,215,920.00
HOT2	Balfour Street/Foot of Walk	£153,783.00	£200,995.00
HOT3	Foot of Walk/Constitution Street	£153,783.00	£200,995.00
HOT3	Constitution Street/Ocean Drive	£153,783.00	£200,995.00
HOT4	Ocean Drive/Ocean Terminal	£153,783.00	£200,995.00
HCT	Roseburn Junction/Roseburn (Part Tram Stop)	£153,783.00	£200,995.00
HCT	Roseburn/Ravelston Dykes	£153,783.00	£200,995.00
HCT1	Ravelston Dykes/Craigleith	£153,783.00	£200,995.00
HCT1	Craigleith/Western General Hospital	£153,783.00	£200,995.00
HCT1	Western General Hospital/Crewe Toll	£153,783.00	£200,995.00
CTO1	Crewe Toll/West Granton	£153,783.00	£200,995.00
CTO1	West Granton/Caroline Park	£153,783.00	£200,995.00
CTO1	Caroline Park/Granton Waterfront	£153,783.00	£200,995.00
CTO1	Granton Waterfront/Granton Square	£153,783.00	£200,995.00
CTO2	Granton Square/Lower Granton Road	£153,783.00	£200,995.00
CTO2	Lower Granton Road/Newhaven Road	£153,783.00	£200,995.00
CTO2	Newhaven Road/Ocean Terminal	£153,783.00	£200,995.00
GNB2	Ingliston West/Newbridge	£153,783.00	£200,995.00
	Gogarburn Depot (1 Nr)	£208,930.00	£273,069.00
	Systemwide	£169,158.00	£221,089.00
	Trams	£112,772.00	£147,393.00
	Total Preliminary Design Costs £ Carried to Design Master Summary, Lines 1 and 2 Combined	£5,565,699.00	

Total Detailed Design Costs £ Carried to Design Master Summary, Lines 1 and 2 Combined		£7,274,386.00

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAM LINE 1, Systemwide

	PAYMENT MILESTONES (PM)	PM 2	PM 3
Sub milestone	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
a	Systemwide	£127,237.00	£158,601.00
	Total Systemwide Preliminary and Detailed Design, Line 1, £ Carried to Design Summary, Line 1	£127,237.00	£158,601.00

TRAM LINE 1, Systemwide

TRAM LINE 1, Trams

PAYMENT MILESTONES (PM)	PM 2	PM 3
Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
	£	£
Trams	£84,825.00	£105,734.00
Total Trams Preliminary and Detailed Design, Line 1, £ Carried to Design Summary, Line 1	£84,825.00	£105,734.00

TRAM LINE 1, Trams

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EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAM LINE 2, Systemwide

SUB MILESTONE	PAYMENT MILESTONES (PM) / Indicative Document Deliverable List	PM 2 PRELIMINARY DESIGN £	PM 3 DETAILED DESIGN £
a	Systemwide	£81,485.00	£90,815.00
	Total Systemwide Preliminary and Detailed Design, Line 2, £ Carried to Design Summary, Line 2	£81,485.00	£90,815.00

TRAM LINE 2, Systemwide

TRAM LINE 2, Trams

	PAYMENT MILESTONES (PM) / Indicative Document Deliverable List	PM 2 PRELIMINARY DESIGN £	PM 3 DETAILED DESIGN £
b	Trams	£54,323.00	£60,543.00
	Total Trams Preliminary and Detailed Design, Line 2, £ Carried to Design Summary, Line 2	£54,323.00	£60,543.00

TRAM LINE 2, Trams

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EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAM LINES 1 and 2 Combined, Systemwide

SUB MILESTONE	PAYMENT MILESTONES (PM) / Indicative Document Deliverable List	PM 2 PRELIMINARY DESIGN £	PM 3 DETAILED DESIGN £
a	Systemwide	£169,158.00	£221,089.00
	Total Systemwide Preliminary and Detailed Design, Lines 1 and 2, £ Carried to Design Summary, Lines 1 and 2, Combined	£169,158.00	£221,089.00

TRAM LINES 1 and 2 Combined, Systemwide

TRAM LINES 1 and 2 Combined, Trams

	PAYMENT MILESTONES (PM) / Indicative Document Deliverable List	PM 2 PRELIMINARY DESIGN £	PM 3 DETAILED DESIGN £
b	Trams	£112,772.00	£147,393.00
	Total Trams Preliminary and Detailed Design, Lines 1 and 2, £ Carried to Design Summary, Lines 1 and 2, Combined	£112,772.00	£147,393.00

TRAM LINES 1 and 2 Combined, Trams

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EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Airport / Ingliston Park and Ride

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Waiting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

	PAYMENT MILESTONES (PM)	**PM 2**	**PM 3**
SUB MILESTONE	**Indicative Document Deliverable List**	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00
h	**Tramstop Equipment**		

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h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrification & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Airport / Ingliston Park and Ride

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EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Ingliston Park and Ride to Gogarburn Depot Halt

Sub milestone	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

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d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Waiting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrification & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Gogarburn Depot Halt to Gyle and Depot Plus Connections

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

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d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Waiting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrification & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
		£153,783.00	£200,995.00

TRAMSTOPS: Gogarburn Depot Halt to Gyle and Depot Plus Connections

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Gyle and Depot Plus Connections to Edinburgh Park

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

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d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

	PAYMENT MILESTONES (PM)	**PM 2**	**PM 3**
SUB MILESTONE	**Indicative Document Deliverable List**	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	**£1,538.00**	**£2,010.00**
h2	Passenger Help Points	**£308.00**	**£402.00**
h3	Public Address Systems	**£308.00**	**£402.00**
h4	Passenger Information Displays	**£923.00**	**£1,206.00**
h5	Ticket Vending Machines	**£1,538.00**	**£2,010.00**
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	**£1,794.00**	**£2,345.00**
j2	Substations	**£2,392.00**	**£3,127.00**
k	**OHLE**		
k1	Catenary & Wires	**£4,784.00**	**£6,253.00**
k2	Pantograph	**£598.00**	**£782.00**
l	**Auxillary Power**		
l1	LV Distribution	**£2,392.00**	**£3,127.00**
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	**£153,783.00**	**£200,995.00**

TRAMSTOPS: Gyle and Depot Plus Connections to Edinburgh Park

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EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Edinburgh Park to South Gyle

SUB MILESTONE	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00
d2	Culverts	£5,809.00	£7,593.00

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d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

	PAYMENT MILESTONES (PM)	**PM 2**	**PM 3**
SUB MILESTONE	**Indicative Document Deliverable List**	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00
h	**Tramstop Equipment**		

h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: South Gyle

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

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d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: South Gyle

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EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Soughton Road to Balgreen Road

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

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d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Soughton Road to Balgreen Road

TIE00899941_0160

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Balgreen Road to Murrayfield

SUB MILESTONE	PAYMENT MILESTONES (PM) / Indicative Document Deliverable List	PM 2 PRELIMINARY DESIGN £	PM 3 DETAILED DESIGN £
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00
d2	Culverts	£5,809.00	£7,593.00

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d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00
h	**Tramstop Equipment**		

TIE00899941_0162

h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Balgreen Road to Murrayfield

TIE00899941_0163

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Murrayfield to Haymarket

SUB MILESTONE	PAYMENT MILESTONES (PM) / Indicative Document Deliverable List	PM 2 PRELIMINARY DESIGN £	PM 3 DETAILED DESIGN £
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

TIE00899941_0164

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Murrayfield to Haymarket

TIE00899941_0166

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Haymarket to Shandwick Place

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

TIE00899941_0167

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Haymarket to Shandwick Place

TIE00899941_0169

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Shandwick Place to Princes Street West

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00
d2	Culverts	£5,809.00	£7,593.00

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d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

	PAYMENT MILESTONES (PM)	**PM 2**	**PM 3**
SUB MILESTONE	**Indicative Document Deliverable List**	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00
h	**Tramstop Equipment**		

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Princes Street West to Waverley Bridge

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxiliary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Princes Street West to Waverley Bridge

TIE00899941_0174

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Waverley Bridge to St. Andrews Square

SUB MILESTONE	PAYMENT MILESTONES (PM) / Indicative Document Deliverable List	PM 2 PRELIMINARY DESIGN £	PM 3 DETAILED DESIGN £
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

	PAYMENT MILESTONES (PM)	**PM 2**	**PM 3**
SUB MILESTONE	**Indicative Document Deliverable List**	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Waverley Bridge to St. Andrews Square

TIE00899941_0177

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: St. Andrews Square to Picardy Place

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

TIE00899941_0178

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: St. Andrews Square to Picardy Place

TIE00899941_0179

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Picardy Place to MacDonald Road

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

	PAYMENT MILESTONES (PM)	**PM 2**	**PM 3**
SUB MILESTONE	**Indicative Document Deliverable List**	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	**£1,538.00**	**£2,010.00**
h2	Passenger Help Points	**£308.00**	**£402.00**
h3	Public Address Systems	**£308.00**	**£402.00**
h4	Passenger Information Displays	**£923.00**	**£1,206.00**
h5	Ticket Vending Machines	**£1,538.00**	**£2,010.00**
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	**£1,794.00**	**£2,345.00**
j2	Substations	**£2,392.00**	**£3,127.00**
k	**OHLE**		
k1	Catenary & Wires	**£4,784.00**	**£6,253.00**
k2	Pantograph	**£598.00**	**£782.00**
l	**Auxillary Power**		
l1	LV Distribution	**£2,392.00**	**£3,127.00**
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	**£153,783.00**	**£200,995.00**

TRAMSTOPS: Picardy Place to MacDonald Road

TIE00899941_0182

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: MacDonald Road to Balfour Street

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

TIE00899941_0183

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

TIE00899941_0184

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: MacDonald Road to Balfour Street

TIE00899941_0185

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Balfour Street to Foot of Walk

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

TIE00899941_0186

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Balfour Street to Foot of Walk

TIE00899941_0188

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Foot of Walk to Constitution Street

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

TIE00899941_0189

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM) / Indicative Document Deliverable List	PM 2 PRELIMINARY DESIGN	PM 3 DETAILED DESIGN
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Foot of Walk to Constitution Street

TIE00899941_0191

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Constitution Street to Ocean Drive

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	**£1,538.00**	**£2,010.00**
h2	Passenger Help Points	**£308.00**	**£402.00**
h3	Public Address Systems	**£308.00**	**£402.00**
h4	Passenger Information Displays	**£923.00**	**£1,206.00**
h5	Ticket Vending Machines	**£1,538.00**	**£2,010.00**
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	**£1,794.00**	**£2,345.00**
j2	Substations	**£2,392.00**	**£3,127.00**
k	**OHLE**		
k1	Catenary & Wires	**£4,784.00**	**£6,253.00**
k2	Pantograph	**£598.00**	**£782.00**
l	**Auxillary Power**		
l1	LV Distribution	**£2,392.00**	**£3,127.00**
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	**£153,783.00**	**£200,995.00**

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Ocean Drive to Ocean Terminal

SUB MILESTONE	PAYMENT MILESTONES (PM) / Indicative Document Deliverable List	PM 2 PRELIMINARY DESIGN £	PM 3 DETAILED DESIGN £
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

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h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Ocean Drive to Ocean Terminal

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EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Leith Depot and Connections

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

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d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Leith Depot and Connections

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Roseburn Jumction to Roseburn

SUB MILESTONE	PAYMENT MILESTONES (PM) / Indicative Document Deliverable List	PM 2 PRELIMINARY DESIGN £	PM 3 DETAILED DESIGN £
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

	PAYMENT MILESTONES (PM)	**PM 2**	**PM 3**
SUB MILESTONE	**Indicative Document Deliverable List**	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Roseburn Jumction to Roseburn

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Roseburn to Ravelston Dykes

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

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d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	**£1,538.00**	**£2,010.00**
h2	Passenger Help Points	**£308.00**	**£402.00**
h3	Public Address Systems	**£308.00**	**£402.00**
h4	Passenger Information Displays	**£923.00**	**£1,206.00**
h5	Ticket Vending Machines	**£1,538.00**	**£2,010.00**
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	**£1,794.00**	**£2,345.00**
j2	Substations	**£2,392.00**	**£3,127.00**
k	**OHLE**		
k1	Catenary & Wires	**£4,784.00**	**£6,253.00**
k2	Pantograph	**£598.00**	**£782.00**
l	**Auxillary Power**		
l1	LV Distribution	**£2,392.00**	**£3,127.00**
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	**£153,783.00**	**£200,995.00**

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Ravelston Dykes to Craigleith

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

	PAYMENT MILESTONES (PM)	**PM 2**	**PM 3**
SUB MILESTONE	**Indicative Document Deliverable List**	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Ravelston Dykes to Craigleith

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EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Craigleith to Western General Hospital

SUB MILESTONE	PAYMENT MILESTONES (PM) / Indicative Document Deliverable List	PM 2 PRELIMINARY DESIGN £	PM 3 DETAILED DESIGN £
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Craigleith to Western General Hospital

TIE00899941_0212

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Western General Hospital to Crewe Toll

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

TIE00899941_0213

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Western General Hospital to Crewe Toll

TIE00899941_0215

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Crewe Toll to West Granton

SUB MILESTONE	PAYMENT MILESTONES (PM) / Indicative Document Deliverable List	PM 2 PRELIMINARY DESIGN £	PM 3 DETAILED DESIGN £
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Crewe Toll to West Granton

TIE00899941_0218

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: West Granton to Caroline Park

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

TIE00899941_0219

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	**£1,538.00**	**£2,010.00**
h2	Passenger Help Points	**£308.00**	**£402.00**
h3	Public Address Systems	**£308.00**	**£402.00**
h4	Passenger Information Displays	**£923.00**	**£1,206.00**
h5	Ticket Vending Machines	**£1,538.00**	**£2,010.00**
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	**£1,794.00**	**£2,345.00**
j2	Substations	**£2,392.00**	**£3,127.00**
k	**OHLE**		
k1	Catenary & Wires	**£4,784.00**	**£6,253.00**
k2	Pantograph	**£598.00**	**£782.00**
l	**Auxillary Power**		
l1	LV Distribution	**£2,392.00**	**£3,127.00**
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	**£153,783.00**	**£200,995.00**

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Caroline Park to Granton Waterfront

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

TIE00899941_0222

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

	PAYMENT MILESTONES (PM)	**PM 2**	**PM 3**
SUB MILESTONE	**Indicative Document Deliverable List**	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Caroline Park to Granton Waterfront

TIE00899941_0224

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Granton Waterfront to Granton Square

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	**£1,538.00**	**£2,010.00**
h2	Passenger Help Points	**£308.00**	**£402.00**
h3	Public Address Systems	**£308.00**	**£402.00**
h4	Passenger Information Displays	**£923.00**	**£1,206.00**
h5	Ticket Vending Machines	**£1,538.00**	**£2,010.00**
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	**£1,794.00**	**£2,345.00**
j2	Substations	**£2,392.00**	**£3,127.00**
k	**OHLE**		
k1	Catenary & Wires	**£4,784.00**	**£6,253.00**
k2	Pantograph	**£598.00**	**£782.00**
l	**Auxillary Power**		
l1	LV Distribution	**£2,392.00**	**£3,127.00**
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	**£153,783.00**	**£200,995.00**

TRAMSTOPS: Granton Waterfront to Granton Square

TIE00899941_0227

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Granton Square to Lower Granton Road

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Granton Square to Lower Granton Road

TIE00899941_0230

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Lower Granton Road to Newhaven Road

SUB MILESTONE	PAYMENT MILESTONES (PM) / Indicative Document Deliverable List	PM 2 PRELIMINARY DESIGN £	PM 3 DETAILED DESIGN £
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Lower Granton Road to Newhaven Road

TIE00899941_0233

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Newhaven Road to Ocean Terminal

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

TIE00899941_0234

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Newhaven Road to Ocean Terminal

TIE00899941_0236

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN

TRAMSTOPS: Ingliston West to Newbridge

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
	Civil Engineering		
a	**Track & Formation**		
a1	Track	£8,372.00	£10,943.00
a2	Points & Point Machines/Heaters	£598.00	£782.00
a3	Drainage	£1,196.00	£1,563.00
a4	Cable Routes	£1,196.00	£1,563.00
a5	Fencing	£598.00	£782.00
b	**Highways**		
b1	Roadworks	£24,776.00	£32,382.00
b2	Pedestrians Areas & Crossings	£2,478.00	£3,238.00
b3	Car Parks	£2,478.00	£3,238.00
b4	Road Traffic Management	£7,433.00	£9,715.00
b5	Utilities	£12,388.00	£16,191.00
c	**Buildings**		
c1	Substations	£1,025.00	£1,340.00
c2	Travel Centre	£342.00	£447.00
c3	General	£342.00	£447.00
d	**Structures**		
d1	Bridges & Subways	£29,047.00	£37,965.00

TIE00899941_0237

d2	Culverts	£5,809.00	£7,593.00
d3	Earthworks	£11,619.00	£15,186.00
d4	Retaining Walls	£11,619.00	£15,186.00
e	**Tramstops**		
e1	Wailting Shelter	£1,538.00	£2,010.00
e2	Cable Routes	£1,281.00	£1,675.00
e3	Platforms & Access	£1,538.00	£2,010.00
e5	Lighting & Signage	£513.00	£670.00
e5	Fencing	£256.00	£335.00
	Page Totals £ Carried Forward	£126,442.00	£165,261.00

DESIGN WORK: PRELIMINARY AND DETAILED DESIGN (Continued)

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	**PRELIMINARY DESIGN**	**DETAILED DESIGN**
	Page Totals £ Brought Forward	£126,442.00	£165,261.00
	Supervisory/Control & Communications		
f	**Supervisory & Control System**		
f1	Tram Position & Detection System	£3,076.00	£4,020.00
f2	Traction SCADA	£1,538.00	£2,010.00
f3	Auxillary SCADA	£1,538.00	£2,010.00
g	**Telecommunications**		
g1	Operational Voice Radio	£1,538.00	£2,010.00
g2	Operational Data Radio	£1,538.00	£2,010.00
g3	Wireless Communications	£1,538.00	£2,010.00

h	**Tramstop Equipment**		
h1	CCTV	£1,538.00	£2,010.00
h2	Passenger Help Points	£308.00	£402.00
h3	Public Address Systems	£308.00	£402.00
h4	Passenger Information Displays	£923.00	£1,206.00
h5	Ticket Vending Machines	£1,538.00	£2,010.00
	Electrifcation & Power		
j	**Traction Power**		
j1	11kv Feeders	£1,794.00	£2,345.00
j2	Substations	£2,392.00	£3,127.00
k	**OHLE**		
k1	Catenary & Wires	£4,784.00	£6,253.00
k2	Pantograph	£598.00	£782.00
l	**Auxillary Power**		
l1	LV Distribution	£2,392.00	£3,127.00
	Total Preliminary and Detailed Design Costs £ Carried to Design Summary	£153,783.00	£200,995.00

TRAMSTOPS: Ingliston West to Newbridge

TIE00899941_0239

DESIGN PRICING SCHEDULE: Leith Depot (1Nr) Preliminary and Detailed Design.

SUB MILESTONE	PAYMENT MILESTONES (PM)	PM 2	PM 3
	Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
		£	£
D/1	**Depot**		
D/1a	Control Room	£10,603.00	£13,217.00
D/1b	Equipment Rooms	£10,603.00	£13,217.00
D/1c	Vehicle Cleaning & Maintenance	£31,809.00	£39,650.00
D/1d	Infrastructure Maintenance	£31,809.00	£39,650.00
D/1e	Stores & Materials	£10,603.00	£13,217.00
D/1f	Administration & Management	£21,206.00	£26,433.00
D/1g	Staff Facilities	£21,206.00	£26,433.00
D/1h	External Works	£21,206.00	£26,433.00
D/2	**Depot Equipment**		
D/2/a	CCTV	£10,603.00	£13,217.00
D/2/b	Control Room	£21,206.00	£26,434.00
D/2/c	Equipment Rooms	£21,206.00	£26,434.00
	Total Preliminary Design Costs £ Carried to Design Summary, Line 1	£212,060.00	
	Total Detailed Design Costs £ Carried to Design Summary, Line 1		£264,335.00

TIE00899941_0240

DESIGN PRICING SCHEDULE: Gogarburn Depot (1Nr) Preliminary and Detailed Design.

PAYMENT MILESTONES (PM)	PM 2	PM 3
Indicative Document Deliverable List	PRELIMINARY DESIGN	DETAILED DESIGN
	£	£
Depot		
Control Room	£10,446.00	£13,653.00
Equipment Rooms	£10,446.00	£13,653.00
Vehicle Cleaning & Maintenance	£31,340.00	£40,961.00
Infrastructure Maintenance	£31,340.00	£40,961.00
Stores & Materials	£10,447.00	£13,653.00
Administration & Management	£20,893.00	£27,307.00
Staff Facilities	£20,893.00	£27,307.00
External Works	£20,893.00	£27,307.00
Depot Equipment		
CCTV	£10,446.00	£13,653.00
Control Room	£20,893.00	£27,307.00
Equipment Rooms	£20,893.00	£27,307.00
Total Preliminary Design Costs £ Carried to Design Summaries, Line 2 and Lines 1 and 2 Combined	£208,930.00	
Total Detailed Design Costs £ Carried to Design Summaries, Line 2 and Lines 1 and 2 Combined		£273,069.00

TIE00899941_0241

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

FURTHER SCOPE, LINE 1

Further Scope	£
The items specifically detailed within the design pricing schedules are indicative and Tenderers are to detail here any further scope of work required to fulfill their full obligations under the SDS contract as detailed within these Tender Documents.	
Tenderers shall detail below additional specific items, with values, required to complete the SDS scope and not detailed elsewhere within the design pricing schedule.	
Payment of fees to statutory and other bodies	£200,000.00
Surveys	£1,500,000.00
Further Scope Carried to Tender Summary, Line 1	£1,700,000.00

TIE00899941_0242

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

FURTHER SCOPE, LINE 2

Further Scope	£
The items specifically detailed within the design pricing schedules are indicative and Tenderers are to detail here any further scope of work required to fulfill their full obligations under the SDS contract as detailed within these Tender Documents. Tenderers shall detail below additional specific items, with values, required to complete the SDS scope and not detailed elsewhere within the design pricing schedule.	
Payment of fees to statutory and other bodies	£200,000.00
Surveys	£1,500,000.00
Further Scope Carried to Tender Summary, Line 2	£1,700,000.00

TIE00899941_0243

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

FURTHER SCOPE, LINES 1 and 2 COMBINED

Further Scope	£
The items specifically detailed within the design pricing schedules are indicative and Tenderers are to detail here any further scope of work required to fulfill their full obligations under the SDS contract as detailed within these Tender Documents.	
Tenderers shall detail below additional specific items, with values, required to complete the SDS scope and not detailed elsewhere within the design pricing schedule.	
Payment of fees to statutory and other bodies	£300,000.00
Surveys	£2,300,000.00
Further Scope Carried to Tender Summary, Lines 1 and 2 Combined	£2,600,000.00

TIE00899941_0244

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

Provisional Additional Work

	Provisional Additional Work	Hours	Rate	Amount £
	Provisional Additional Work shall only have authority for payment and execution when instructed by tie, or authorised tie Representative prior to the work being carried out. The values contained in this section shall be deducted if not instructed by tie.The rates stated shall include all overheads, profit, non-productive overhead and time, holiday allowance, travelling, administration etc., and shall be the all-in rate for the respective grade of personnel. The rates shall apply for both the Lead and Sub Consultants.			
a	Senior Designer	4,500.00	£68.00	£306,000.00
b	Principle Designer	6,000.00	£85.00	£510,000.00
c	Graduate Designer	6,000.00	£55.00	£330,000.00
d	Senior CAD Technician	3,000.00	£49.00	£147,000.00
e	CAD Technician	5,000.00	£38.00	£190,000.00
f	Technical Support Rates valid to end 2009, exclude travel and subsistence	3,000.00	£38.00	£114,000.00
g	Additional payment of fees to statutory and other bodies			£5,000.00
h	Management, Uplift, oncost and profit		%	incl
I	Travel, subsistence	Provisional Sum		£100,000.00

Provisional Additional Work Carried to Tender Summaries for Line 1, Line 2, and Line 1 and 2 Combined		**£1,702,000.00**

TIE00899941_0246

EDINBURGH TRAM NETWORK: SDS PRICING SCHEDULE

TRANSPORT MODELLING

		£
a	Line 1 Transport Modelling Allow for all works required to complete the traffic modelling within the SDS scope of works as per Clause 3.5 of the Scope of Services	£972,000.00
	Transport Modelling Carried to Tender Summary, Line 1	£972,000.00

		£
b	Line 2 Transport Modelling Allow for all works required to complete the traffic modelling within the SDS scope of works as per Clause 3.5 of the Scope of Services	£972,000.00
	Transport Modelling Carried to Tender Summary, Line 2	£972,000.00

		£
c	Lines 1 and 2 Combined, Transport Modelling Allow for all works required to complete the traffic modelling within the SDS scope of works as per Clause 3.5 of the Scope of Services	£1,215,000.00
	Transport Modelling Carried to Tender Summary, Lines 1 and 2 Combined	£1,215,000.00

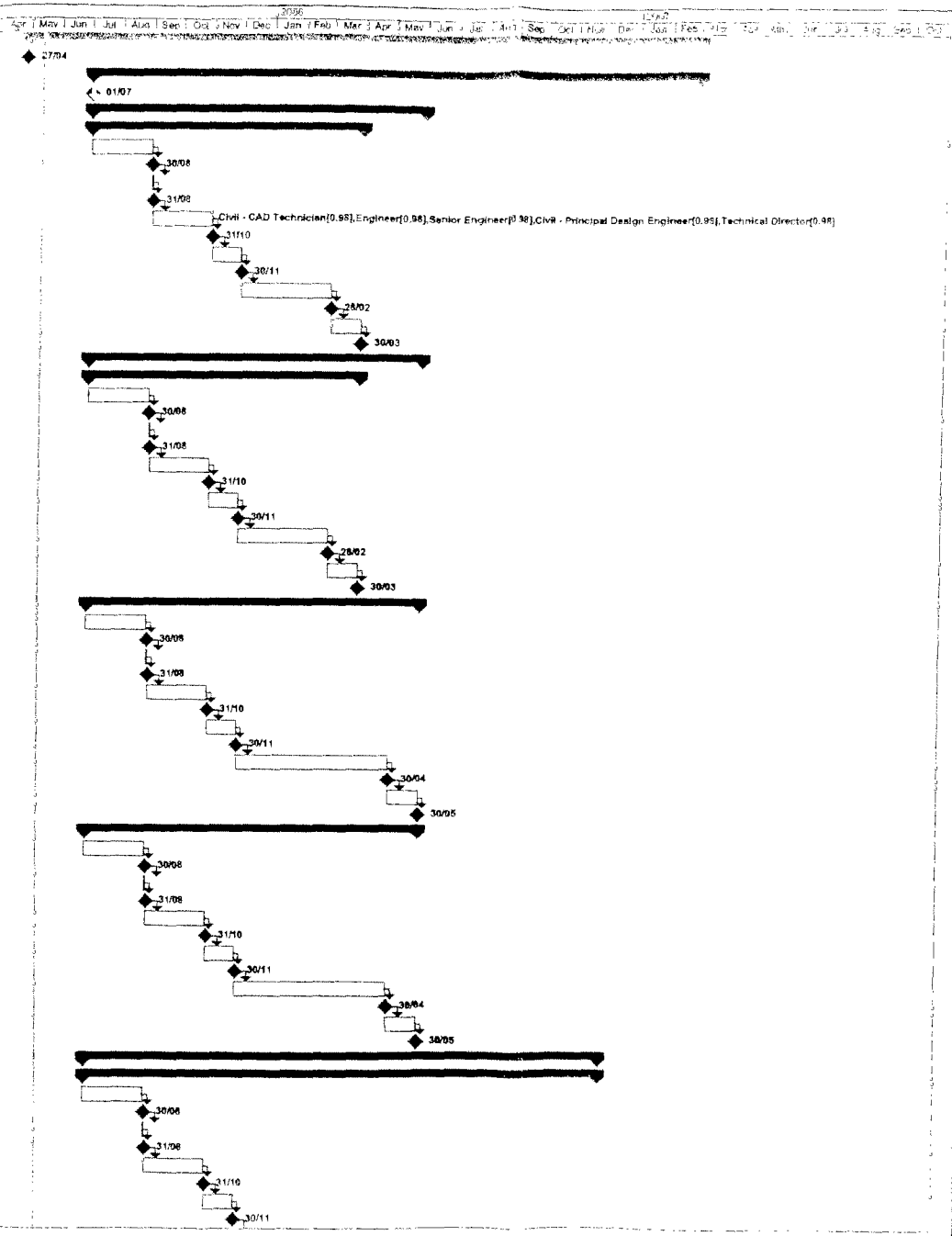
[redacted] [redacted]

Director/Authorised Signatory
TIE LIMITED

Director/Authorised Signatory
PARSONS BRINCKERHOFF LIMITED

Edinburgh Tram Network - Line One - System Design Services - Outline Design Programme

ID	Task Name	WBS	Duration	Start	Finish	Work
0	Edinburgh Tram Network - Line One - System Design Services - Outline Desig	0	477 days	Wed 27/04/05	Wed 28/02/07	204,375 hrs
1	1 Project Management	100	0 days	Wed 27/04/05	Wed 27/04/05	0 hrs
4	2 EDINBURGH TRAM SDS PROVIDER	200	432 days	Fri 01/07/05	Wed 28/02/07	204,375 hrs
5	2.1 CONTRACT AWARD - START DATE	200.1	0 days	Fri 01/07/05	Fri 01/07/05	0 hrs
6	2.2 St Andrews Sq - Foot of the Walk	200.4	236 days	Fri 01/07/05	Tue 30/05/06	32,700 hrs
7	2.2.1 St. Andrew Square (exc) - Picardy Place (inc)	200.4.2	193 days	Fri 01/07/05	Thu 30/03/06	8,175 hrs
8	2.2.1.1 Requirements Definition	200.4.2	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
9	2.2.1.2 Submit RD Deliverables for Approval	200.4.2	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
10	2.2.1.3 RD Approvals Period	200.4.2	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
11	2.2.1.4 Receive Requirements Definition Approval	200.4.2	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
12	2.2.1.5 Preliminary Design	200.4.2	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
13	2.2.1.6 Submit PD Deliverables for Approval	200.4.2	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
14	2.2.1.7 PD Approvals Period	200.4.2	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
15	2.2.1.8 Receive Preliminary Design Approval	200.4.2	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
16	2.2.1.9 Detailed Design	200.4.2	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
17	2.2.1.10 Submit DD Deliverables for Approval	200.4.2	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
18	2.2.1.11 DD Approvals Period	200.4.2	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
19	2.2.1.12 Receive Detailed Design Approval	200.4.2	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
20	**2.2.2 Picardy Place (exc) - Foot of the Walk (inc)**	**200.4.3**	**236 days**	**Fri 01/07/05**	**Tue 30/05/06**	**24,525 hrs**
21	**2.2.2.1 Picardy Place (exc) - Macdonald Road (inc)**	**200.4.3.**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**8,175 hrs**
22	2.2.2.1.1 Requirements Definition	200.4.3	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
23	2.2.2.1.2 Submit RD Deliverables for Approval	200.4.3	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
24	2.2.2.1.3 RD Approvals Period	200.4.3	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
25	2.2.2.1.4 Receive Requirements Definition Approval	200.4.3.	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
26	2.2.2.1.5 Preliminary Design	200.4.3	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
27	2.2.2.1.6 Submit PD Deliverables for Approval	200.4.3.	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
28	2.2.2.1.7 PD Approvals Period	200.4.3.	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
29	2.2.2.1.8 Receive Preliminary Design Approval	200.4.3	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
30	2.2.2.1.9 Detailed Design	200.4.3	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
31	2.2.2.1.10 Submit DD Deliverables for Approval	200.4.3	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
32	2.2.2.1.11 DD Approvals Period	200.4.3.	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
33	2.2.2.1.12 Receive Detailed Design Approval	200.4.3.	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
34	**2.2.2.2 Macdonald Road (exc) - Balfour Station (inc)**	**200.4.3.**	**236 days**	**Fri 01/07/05**	**Tue 30/05/06**	**8,175 hrs**
35	2.2.2.2.1 Requirements Definition	200.4.3	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
36	2.2.2.2.2 Submit RD Deliverables for Approval	200.4.3	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
37	2.2.2.2.3 RD Approvals Period	200.4.3.	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
38	2.2.2.2.4 Receive Requirements Definition Approval	200.4.3	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
39	2.2.2.2.5 Preliminary Design	200.4.3	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
40	2.2.2.2.6 Submit PD Deliverables for Approval	200.4.3.	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
41	2.2.2.2.7 PD Approvals Period	200.4.3	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
42	2.2.2.2.8 Receive Preliminary Design Approval	200.4.3.	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
43	2.2.2.2.9 Detailed Design	200.4.3	106 days	Thu 01/12/05	Sun 30/04/06	4,987.5 hrs
44	2.2.2.2.10 Submit DD Deliverables for Approval	200.4.3.	0 days	Sun 30/04/06	Sun 30/04/06	0 hrs
45	2.2.2.2.11 DD Approvals Period	200.4.3	22 days	Mon 01/05/06	Tue 30/05/06	0 hrs
46	2.2.2.2.12 Receive Detailed Design Approval	200.4.3.	0 days	Tue 30/05/06	Tue 30/05/06	0 hrs
47	**2.2.2.3 Balfour Station (exc) - Foot of the Walk (inc)**	**200.4.3.**	**236 days**	**Fri 01/07/05**	**Tue 30/05/06**	**8,175 hrs**
48	2.2.2.3.1 Requirements Definition	200.4.3.	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
49	2.2.2.3.2 Submit RD Deliverables for Approval	200.4.3.	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
50	2.2.2.3.3 RD Approvals Period	200.4.3	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
51	2.2.2.3.4 Receive Requirements Definition Approval	200.4.3	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
52	2.2.2.3.5 Preliminary Design	200.4.3	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
53	2.2.2.3.6 Submit PD Deliverables for Approval	200.4.3.	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
54	2.2.2.3.7 PD Approvals Period	200.4.3.	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
55	2.2.2.3.8 Receive Preliminary Design Approval	200.4.3	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
56	2.2.2.3.9 Detailed Design	200.4.3.	106 days	Thu 01/12/05	Sun 30/04/06	4,987.5 hrs
57	2.2.2.3.10 Submit DD Deliverables for Approval	200.4.3	0 days	Sun 30/04/06	Sun 30/04/06	0 hrs
58	2.2.2.3.11 DD Approvals Period	200.4.3	22 days	Mon 01/05/06	Tue 30/05/06	0 hrs
59	2.2.2.3.12 Receive Detailed Design Approval	200.4.3	0 days	Tue 30/05/06	Tue 30/05/06	0 hrs
60	**2.3 Foot of the Walk (exc) - Ocean Drive (inc)**	**200.4.4**	**368 days**	**Fri 01/07/05**	**Thu 30/11/06**	**32,700 hrs**
61	**2.3.1 Foot of the Walk (exc) - Constitution Street (inc)**	**200.4.4.**	**368 days**	**Fri 01/07/05**	**Thu 30/11/06**	**8,175 hrs**
62	2.3.1.1 Requirements Definition	200.4.4	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
63	2.3.1.2 Submit RD Deliverables for Approval	200.4.4	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
64	2.3.1.3 RD Approvals Period	200.4.4	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
65	2.3.1.4 Receive Requirements Definition Approval	200.4.4	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
66	2.3.1.5 Preliminary Design	200.4.4	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
67	2.3.1.6 Submit PD Deliverables for Approval	200.4.4	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
68	2.3.1.7 PD Approvals Period	200.4.4	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
69	2.3.1.8 Receive Preliminary Design Approval	200.4.4	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs



Task | Progress | Summary | External Tasks | External Milestone
Split | Milestone | Project Summary | External Milestone | Deadline

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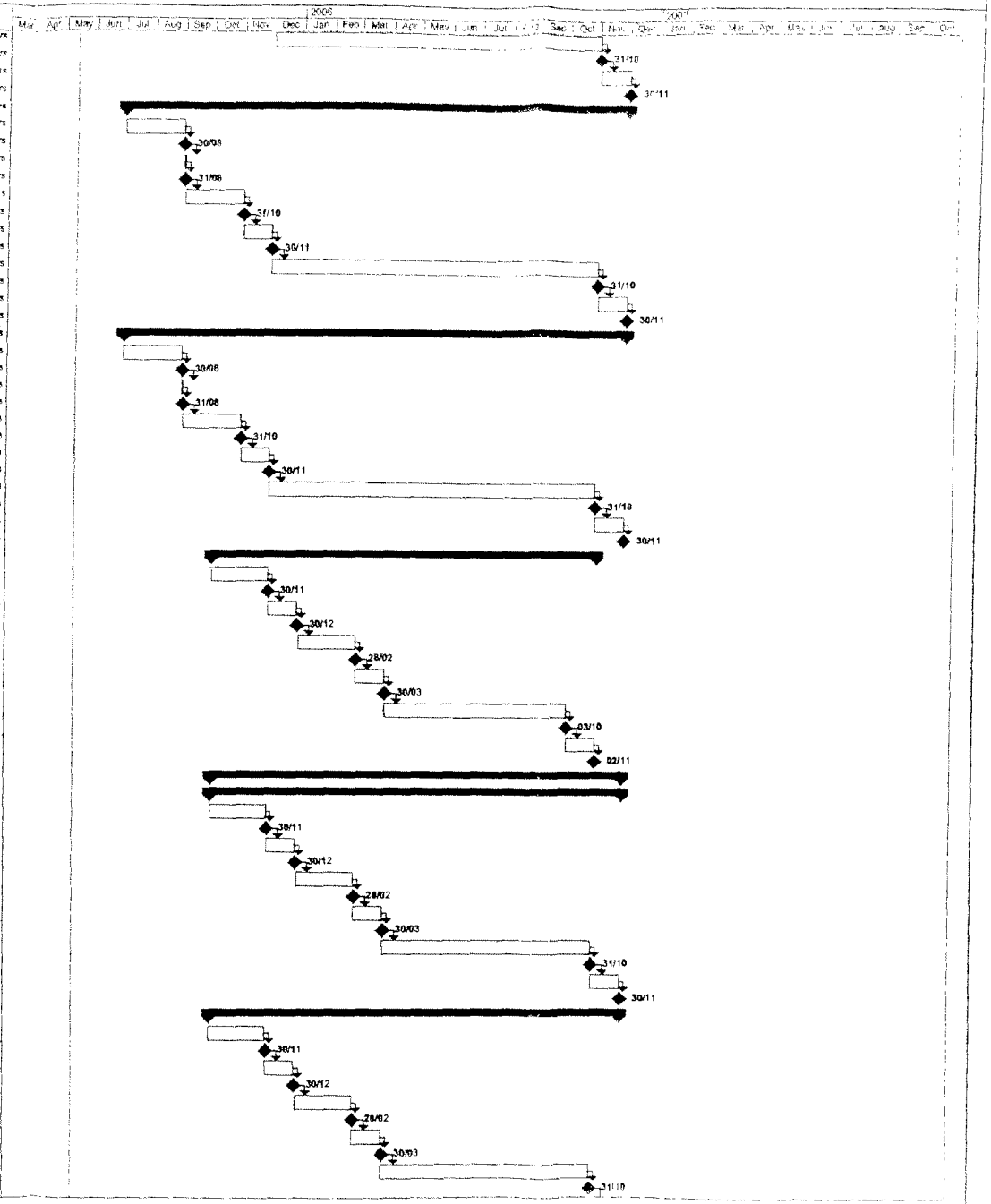
Edinburgh Tram Network - Line One - System Design Services - Outline Design Programme

ID	Task Name	WBS	Duration	Start	Finish	Work
70	2.3.1.9 Detailed Design	200.4.4	238 days	Thu 01/12/05	Tue 31/10/06	4,987.5 hrs
71	2.3.1.10 Submit DD Deliverables for Approval	200.4.4	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
72	2.3.1.11 DD Approvals Period	200.4.4	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
73	2.3.1.12 Receive Detailed Design Approval	200.4.4	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
74	**2.3.2 Constitution Street (excl - Ocean Drive (inc)**	**200.4.4.**	**368 days**	**Fri 01/07/05**	**Thu 30/11/06**	**8,175 hrs**
75	2.3.2.1 Requirements Definition	200.4.4	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
76	2.3.2.2 Submit RD Deliverables for Approval	200.4.4	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
77	2.3.2.3 RD Approvals Period	200.4.4	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
78	2.3.2.4 Receive Requirements Definition Approval	200.4.4	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
79	2.3.2.5 Preliminary Design	200.4.4	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
80	2.3.2.6 Submit PD Deliverables for Approval	200.4.4	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
81	2.3.2.7 PD Approvals Period	200.4.4	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
82	2.3.2.8 Receive Preliminary Design Approval	200.4.4	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
83	2.3.2.9 Detailed Design	200.4.4	238 days	Thu 01/12/05	Tue 31/10/06	4,987.5 hrs
84	2.3.2.10 Submit DD Deliverables for Approval	200.4.4.	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
85	2.3.2.11 DD Approvals Period	200.4.4	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
86	2.3.2.12 Receive Detailed Design Approval	200.4.4	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
87	**2.3.3 Ocean Drive (exc) - Ocean Terminal (inc)**	**200.4.5**	**368 days**	**Fri 01/07/05**	**Thu 30/11/06**	**8,175 hrs**
88	2.3.3.1 Requirements Definition	200.4.5.	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
89	2.3.3.2 Submit RD Deliverables for Approval	200.4.5.	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
90	2.3.3.3 RD Approvals Period	200.4.5	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
91	2.3.3.4 Receive Requirements Definition Approval	200.4.5	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
92	2.3.3.5 Preliminary Design	200.4.5	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
93	2.3.3.6 Submit PD Deliverables for Approval	200.4.5	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
94	2.3.3.7 PD Approvals Period	200.4.5.	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
95	2.3.3.8 Receive Preliminary Design Approval	200.4.5.	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
96	2.3.3.9 Detailed Design	200.4.5.	238 days	Thu 01/12/05	Tue 31/10/06	4,987.5 hrs
97	2.3.3.10 Submit DD Deliverables for Approval	200.4.5.	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
98	2.3.3.11 DD Approvals Period	200.4.5.	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
99	2.3.3.12 Receive Detailed Design Approval	200.4.5.	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
100	**2.3.4 Leith Depot & Connections**	**200.4.6**	**283 days**	**Mon 03/10/05**	**Thu 02/11/06**	**8,175 hrs**
101	2.3.4.1 Requirements Definition	200.4.6	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
102	2.3.4.2 Submit RD Deliverables for Approval	200.4.6.	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
103	2.3.4.3 RD Approvals Period	200.4.6	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
104	2.3.4.4 Receive Requirements Definition Approval	200.4.6.	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
105	2.3.4.5 Preliminary Design	200.4.6	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
106	2.3.4.6 Submit PD Deliverables for Approval	200.4.6	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
107	2.3.4.7 PD Approvals Period	200.4.6	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
108	2.3.4.8 Receive Preliminary Design Approval	200.4.6.	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
109	2.3.4.8 Detailed Design	200.4.6.	133 days	Fri 31/03/06	Tue 03/10/06	4,987.5 hrs
110	2.3.4.10 Submit DD Deliverables for Approval	200.4.6	0 days	Tue 03/10/06	Tue 03/10/06	0 hrs
111	2.3.4.11 DD Approvals Period	200.4.6	22 days	Wed 04/10/06	Thu 02/11/06	0 hrs
112	2.3.4.12 Receive Detailed Design Approval	200.4.6	0 days	Thu 02/11/06	Thu 02/11/06	0 hrs
113	**2.4 HAYMARKET CREWE TOLL**	**200.5**	**303 days**	**Mon 03/10/05**	**Thu 30/11/06**	**32,700 hrs**
114	**2.4.1 Roseburn Junction (exc) - Roseburn (inc)**	**200.5.1**	**303 days**	**Mon 03/10/05**	**Thu 30/11/06**	**8,175 hrs**
115	2.4.1.1 Requirements Definition	200.5.1	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
116	2.4.1.2 Submit RD Deliverables for Approval	200.5.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
117	2.4.1.3 RD Approvals Period	200.5.1.	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
118	2.4.1.4 Receive Requirements Definition Approval	200.5.1	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
119	2.4.1.5 Preliminary Design	200.5.1.	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
120	2.4.1.6 Submit PD Deliverables for Approval	200.5.1.	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
121	2.4.1.7 PD Approvals Period	200.5.1.	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
122	2.4.1.8 Receive Preliminary Design Approval	200.5.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
123	2.4.1.9 Detailed Design	200.5.1	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
124	2.4.1.10 Submit DD Deliverables for Approval	200.5.1	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
125	2.4.1.11 DD Approvals Period	200.5.1	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
126	2.4.1.12 Receive Detailed Design Approval	200.5.1.	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
127	**2.4.2 Roseburn (exc) - Ravelston Dykes (inc)**	**200.5.2**	**303 days**	**Mon 03/10/05**	**Thu 30/11/06**	**8,175 hrs**
128	2.4.2.1 Requirements Definition	200.5.2	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
129	2.4.2.2 Submit RD Deliverables for Approval	200.5.2	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
130	2.4.2.3 RD Approvals Period	200.5.2	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
131	2.4.2.4 Receive Requirements Definition Approval	200.5.2.	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
132	2.4.2.5 Preliminary Design	200.5.2	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
133	2.4.2.6 Submit PD Deliverables for Approval	200.5.2	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
134	2.4.2.7 PD Approvals Period	200.5.2	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
135	2.4.2.8 Receive Preliminary Design Approval	200.5.2	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
136	2.4.2.9 Detailed Design	200.5.2	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
137	2.4.2.10 Submit DD Deliverables for Approval	200.5.2	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs



Task | Progress | Summary | External Tasks | External Milestone
Split | Milestone | Project Summary | External Milestone | Deadline

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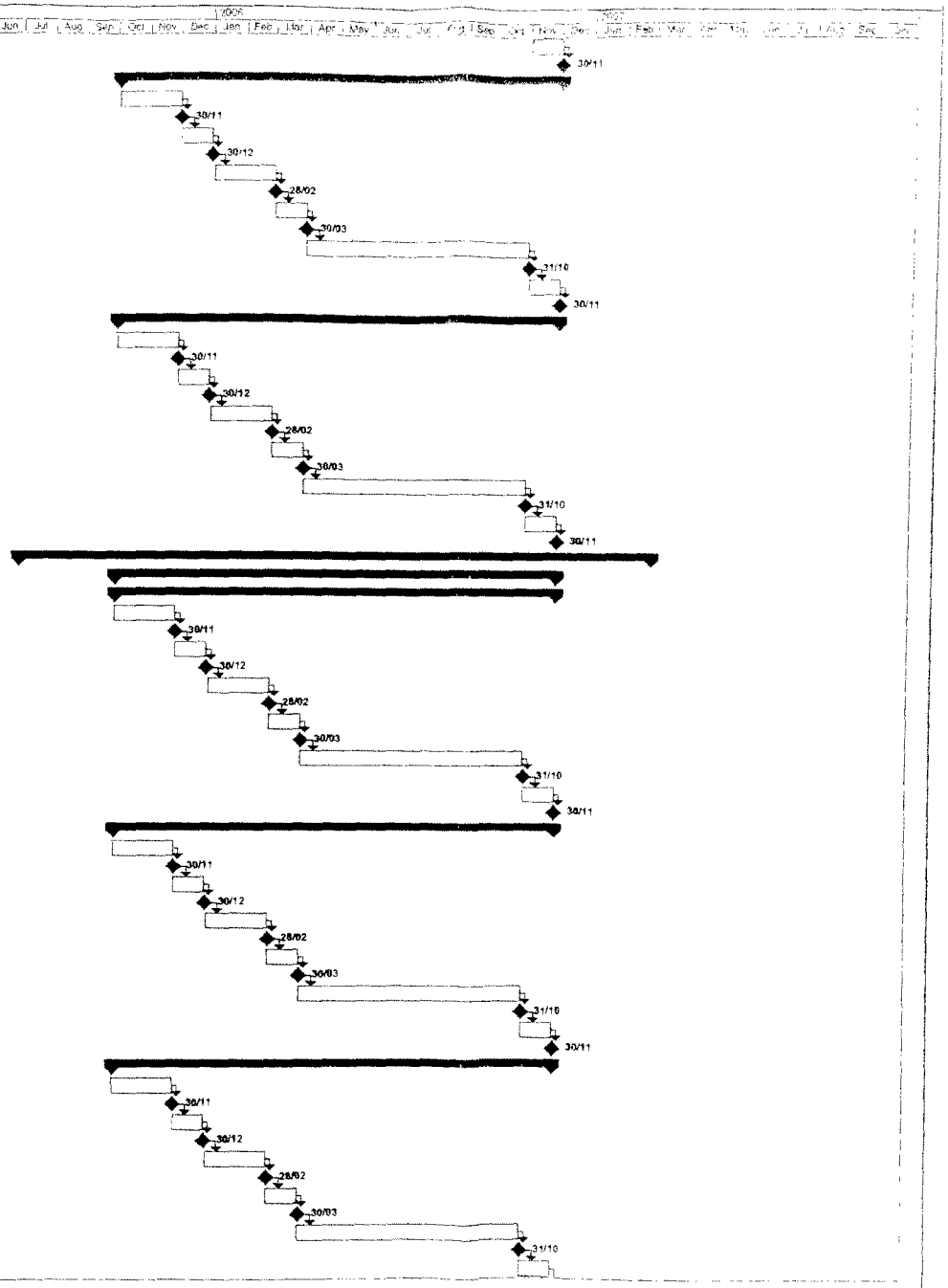
Edinburgh Tram Network - Line One - System Design Services - Outline Design Programme

ID	Task Name	WBS	Duration	Start	Finish	Work
138	2.4.2.11 DD Approvals Period	200.5.2	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
139	2.4.2.12 Receive Detailed Design Approval	200.5.2	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
140	**2.4.3 Ravelston Dykes (exc) - Craigleith (inc)**	**200.5.3**	**303 days**	**Mon 03/10/05**	**Thu 30/11/06**	**8,175 hrs**
141	2.4.3.1 Requirements Definition	200.5.3	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
142	2.4.3.2 Submit RD Deliverables for Approval	200.5.3	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
143	2.4.3.3 RD Approvals Period	200.5.3	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
144	2.4.3.4 Receive Requirements Definition Approval	200.5.3	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
145	2.4.3.5 Preliminary Design	200.5.3	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
146	2.4.3.6 Submit PD Deliverables for Approval	200.5.3	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
147	2.4.3.7 PD Approvals Period	200.5.3	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
148	2.4.3.8 Receive Preliminary Design Approval	200.5.3	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
149	2.4.3.9 Detailed Design	200.5.3	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
150	2.4.3.10 Submit DD Deliverables for Approval	200.5.3	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
151	2.4.3.11 DD Approvals Period	200.5.3	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
152	2.4.3.12 Receive Detailed Design Approval	200.5.3	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
153	**2.4.4 Craigleith (exc) - W. General Hospital - Crewe Toll (inc)**	**200.5.4**	**303 days**	**Mon 03/10/05**	**Thu 30/11/06**	**8,175 hrs**
154	2.4.4.1 Requirements Definition	200.5.4	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
155	2.4.4.2 Submit RD Deliverables for Approval	200.5.4	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
156	2.4.4.3 RD Approvals Period	200.5.4	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
157	2.4.4.4 Receive Requirements Definition Approval	200.5.4	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
158	2.4.4.5 Preliminary Design	200.5.4	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
159	2.4.4.6 Submit PD Deliverables for Approval	200.5.4	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
160	2.4.4.7 PD Approvals Period	200.5.4	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
161	2.4.4.8 Receive Preliminary Design Approval	200.5.4	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
162	2.4.4.9 Detailed Design	200.5.4	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
163	2.4.4.10 Submit DD Deliverables for Approval	200.5.4	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
164	2.4.4.11 DD Approvals Period	200.5.4	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
165	2.4.4.12 Receive Detailed Design Approval	200.5.4	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
166	**2.5 CREWE TOLL OCEAN TERMINAL**	**200.6**	**432 days**	**Fri 01/07/05**	**Wed 28/02/07**	**65,400 hrs**
167	**2.5.1 Crewe Toll (exc) - Granton Square (inc)**	**200.6.1**	**303 days**	**Mon 03/10/05**	**Thu 30/11/06**	**32,700 hrs**
168	**2.5.1.1 Crewe Toll (exc) - W. Granton (inc)**	**200.6.1**	**303 days**	**Mon 03/10/05**	**Thu 30/11/06**	**8,175 hrs**
169	2.5.1.1.1 Requirements Definition	200.6.1	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
170	2.5.1.1.2 Submit RD Deliverables for Approval	200.6.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
171	2.5.1.1.3 RD Approvals Period	200.6.1	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
172	2.5.1.1.4 Receive Requirements Definition Approval	200.6.1	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
173	2.5.1.1.5 Preliminary Design	200.6.1	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
174	2.5.1.1.6 Submit PD Deliverables for Approval	200.6.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
175	2.5.1.1.7 PD Approvals Period	200.6.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
176	2.5.1.1.8 Receive Preliminary Design Approval	200.6.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
177	2.5.1.1.9 Detailed Design	200.6.1	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
178	2.5.1.1.10 Submit DD Deliverables for Approval	200.6.1	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
179	2.5.1.1.11 DD Approvals Period	200.6.1	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
180	2.5.1.1.12 Receive Detailed Design Approval	200.6.1	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
181	**2.5.1.2 W. Granton (exc) - Caroline Park (inc)**	**200.6.1**	**303 days**	**Mon 03/10/05**	**Thu 30/11/06**	**8,175 hrs**
182	2.5.1.2.1 Requirements Definition	200.6.1	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
183	2.5.1.2.2 Submit RD Deliverables for Approval	200.6.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
184	2.5.1.2.3 RD Approvals Period	200.6.1	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
185	2.5.1.2.4 Receive Requirements Definition Approval	200.6.1	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
186	2.5.1.2.5 Preliminary Design	200.6.1	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
187	2.5.1.2.6 Submit PD Deliverables for Approval	200.6.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
188	2.5.1.2.7 PD Approvals Period	200.6.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
189	2.5.1.2.8 Receive Preliminary Design Approval	200.6.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
190	2.5.1.2.9 Detailed Design	200.6.1	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
191	2.5.1.2.10 Submit DD Deliverables for Approval	200.6.1	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
192	2.5.1.2.11 DD Approvals Period	200.6.1	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
193	2.5.1.2.12 Receive Detailed Design Approval	200.6.1	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
194	**2.5.1.3 Caroline Park (exc) - Granton Waterfront (inc)**	**200.6.1**	**303 days**	**Mon 03/10/05**	**Thu 30/11/06**	**8,175 hrs**
195	2.5.1.3.1 Requirements Definition	200.6.1	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
196	2.5.1.3.2 Submit RD Deliverables for Approval	200.6.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
197	2.5.1.3.3 RD Approvals Period	200.6.1	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
198	2.5.1.3.4 Receive Requirements Definition Approval	200.6.1	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
199	2.5.1.3.5 Preliminary Design	200.6.1	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
200	2.5.1.3.6 Submit PD Deliverables for Approval	200.6.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
201	2.5.1.3.7 PD Approvals Period	200.6.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
202	2.5.1.3.8 Receive Preliminary Design Approval	200.6.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
203	2.5.1.3.9 Detailed Design	200.6.1	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
204	2.5.1.3.10 Submit DD Deliverables for Approval	200.6.1	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
205	2.5.1.3.11 DD Approvals Period	200.6.1	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs

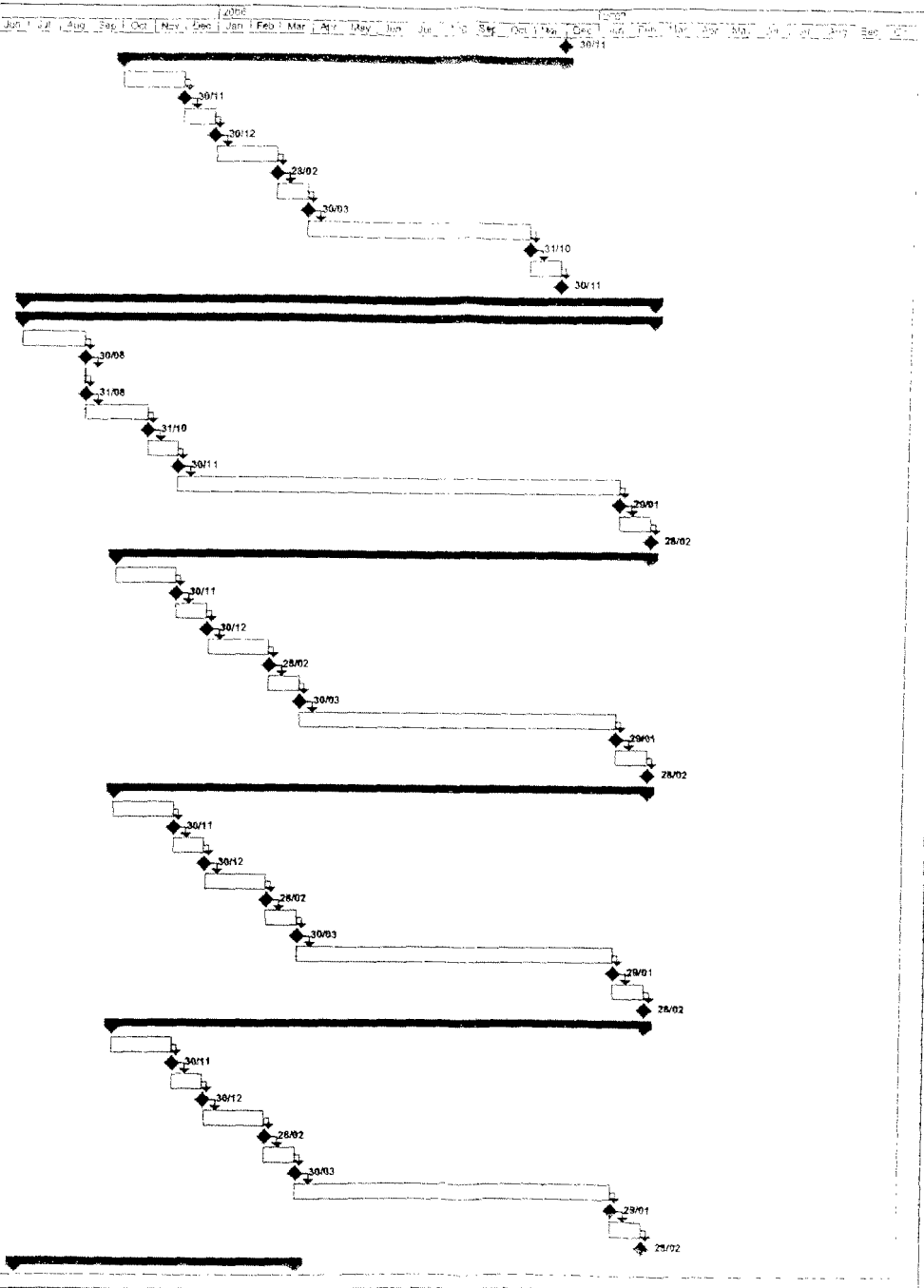


Task | Progress | Summary | External Tasks | External Milestone
Split | Milestone | Project Summary | External Milestone | Deadline

TIE00899941_0250

Edinburgh Tram Network - Line One - System Design Services - Outline Design Programme

ID	Task Name	WBS	Duration	Start	Finish	Work
206	2.5.1.1.12 Receive Detailed Design Approval	200.6.1	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
207	2.5.1.4 Granton Waterfront (exc) - Granton Square (Incl	200.6.1	363 days	Mon 03/10/05	Thu 30/11/06	8,175 hrs
208	2.5.1.4.1 Requirements Definition	200.6.1	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
209	2.5.1.4.2 Submit RD Deliverables for Approval	200.6.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
210	2.5.1.4.3 RD Approvals Period	200.6.1	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
211	2.5.1.4.4 Receive Requirements Definition Approval	200.6.1	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
212	2.5.1.4.5 Preliminary Design	200.6.1	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
213	2.5.1.4.6 Submit PD Deliverables for Approval	200.6.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
214	2.5.1.4.7 PD Approvals Period	200.6.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
215	2.5.1.4.8 Receive Preliminary Design Approval	200.6.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
216	2.5.1.4.9 Detailed Design	200.6.1	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
217	2.5.1.4.10 Submit DD Deliverables for Approval	200.6.1	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
218	2.5.1.4.11 DD Approvals Period	200.6.1	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
219	2.5.1.4.12 Receive Detailed Design Approval	200.6.1	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
220	**2.5.2 Granton Square (exc) - Ocean Terminal (Inc)**	**200.6.2**	**432 days**	**Fri 01/07/05**	**Wed 28/02/07**	**32,700 hrs**
221	**2.5.2.1 Sea Wall Survey**	**200.6.2**	**432 days**	**Fri 01/07/05**	**Wed 28/02/07**	**8,175 hrs**
222	2.5.2.1.1 Requirements Definition	200.6.2	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
223	2.5.2.1.2 Submit RD Deliverables for Approval	200.6.2	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
224	2.5.2.1.3 RD Approvals Period	200.6.2	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
225	2.5.2.1.4 Receive Requirements Definition Approval	200.6.2	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
226	2.5.2.1.5 Preliminary Design	200.6.2	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
227	2.5.2.1.6 Submit PD Deliverables for Approval	200.6.2	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
228	2.5.2.1.7 PD Approvals Period	200.6.2	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
229	2.5.2.1.8 Receive Preliminary Design Approval	200.6.2	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
230	2.5.2.1.9 Detailed Design	200.6.2	302 days	Thu 01/12/05	Mon 29/01/07	4,987.5 hrs
231	2.5.2.1.10 Submit DD Deliverables for Approval	200.6.2	0 days	Mon 29/01/07	Mon 29/01/07	0 hrs
232	2.5.2.1.11 DD Approvals Period	200.6.2	22 days	Tue 30/01/07	Wed 28/02/07	0 hrs
233	2.5.2.1.12 Receive Detailed Design Approval	200.6.2	0 days	Wed 28/02/07	Wed 28/02/07	0 hrs
234	**2.5.2.2 Granton Square (exc) - Lower Granton Road (Inc)**	**200.6.2**	**367 days**	**Mon 03/10/05**	**Wed 28/02/07**	**8,175 hrs**
235	2.5.2.2.1 Requirement Definition	200.6.2	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
236	2.5.2.2.2 Submit RD Deliverables for Approval	200.6.2	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
237	2.5.2.2.3 RD Approvals Period	200.6.2	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
238	2.5.2.2.4 Receive Requirements Definition Approval	200.6.2	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
239	2.5.2.2.5 Preliminary Design	200.6.2	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
240	2.5.2.2.6 Submit PD Deliverables for Approval	200.6.2	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
241	2.5.2.2.7 PD Approvals Period	200.6.2	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
242	2.5.2.2.8 Receive Preliminary Design Approval	200.6.2	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
243	2.5.2.2.9 Detailed Design	200.6.2	217 days	Fri 31/03/06	Mon 29/01/07	4,987.5 hrs
244	2.5.2.2.10 Submit DD Deliverables for Approval	200.6.2	0 days	Mon 29/01/07	Mon 29/01/07	0 hrs
245	2.5.2.2.11 DD Approvals Period	200.6.2	22 days	Tue 30/01/07	Wed 28/02/07	0 hrs
246	2.5.2.2.12 Receive Detailed Design Approval	200.6.2	0 days	Wed 28/02/07	Wed 28/02/07	0 hrs
247	**2.5.2.3 Lower Granton Road (exc) - Newhaven Road (Inc)**	**200.6.2**	**367 days**	**Mon 03/10/05**	**Wed 28/02/07**	**8,175 hrs**
248	2.5.2.3.1 Requirements Definition	200.6.2	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
249	2.5.2.3.2 Submit RD Deliverables for Approval	200.6.2	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
250	2.5.2.3.3 RD Approvals Period	200.6.2	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
251	2.5.2.3.4 Receive Requirements Definition Approval	200.6.2	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
252	2.5.2.3.5 Preliminary Design	200.6.2	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
253	2.5.2.3.6 Submit PD Deliverables for Approval	200.6.2	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
254	2.5.2.3.7 PD Approvals Period	200.6.2	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
255	2.5.2.3.8 Receive Preliminary Design Approval	200.6.2	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
256	2.5.2.3.9 Detailed Design	200.6.2	217 days	Fri 31/03/06	Mon 29/01/07	4,987.5 hrs
257	2.5.2.3.10 Submit DD Deliverables for Approval	200.6.2	0 days	Mon 29/01/07	Mon 29/01/07	0 hrs
258	2.5.2.3.11 DD Approvals Period	200.6.2	22 days	Tue 30/01/07	Wed 28/02/07	0 hrs
259	2.5.2.3.12 Receive Detailed Design Approval	200.6.2	0 days	Wed 28/02/07	Wed 28/02/07	0 hrs
260	**2.5.2.4 Newhaven Road (exc) - Ocean Terminal (exc)**	**200.6.2**	**367 days**	**Mon 03/10/05**	**Wed 28/02/07**	**8,175 hrs**
261	2.5.2.4.1 Requirements Definition	200.6.2	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
262	2.5.2.4.2 Submit RD Deliverables for Approval	200.6.2	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
263	2.5.2.4.3 RD Approvals Period	200.6.2	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
264	2.5.2.4.4 Receive Requirements Definition Approval	200.6.2	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
265	2.5.2.4.5 Preliminary Design	200.6.2	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
266	2.5.2.4.6 Submit PD Deliverables for Approval	200.6.2	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
267	2.5.2.4.7 PD Approvals Period	200.6.2	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
268	2.5.2.4.8 Receive Preliminary Design Approval	200.6.2	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
269	2.5.2.4.9 Detailed Design	200.6.2	217 days	Fri 31/03/06	Mon 29/01/07	4,987.5 hrs
270	2.5.2.4.10 Submit DD Deliverables for Approval	200.6.2	0 days	Mon 29/01/07	Mon 29/01/07	0 hrs
271	2.5.2.4.11 DD Approvals Period	200.6.2	22 days	Tue 30/01/07	Wed 28/02/07	0 hrs
272	2.5.2.4.12 Receive Detailed Design Approval	200.6.2	0 days	Wed 28/02/07	Wed 28/02/07	0 hrs
273	**2.6 EDINBURGH TRAM SDS PROVIDER**	**200**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**40,875 hrs**

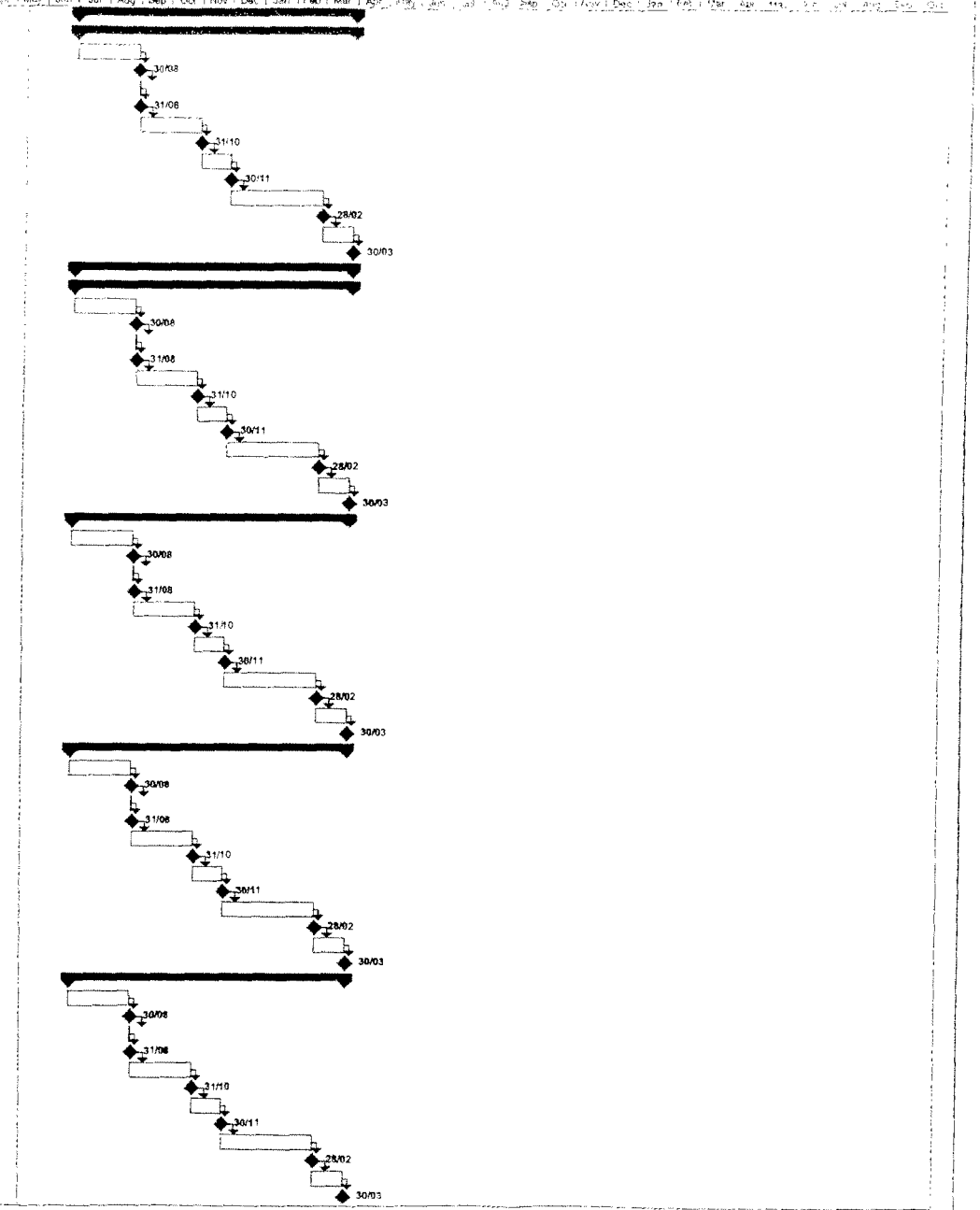


Task · Progress · Summary · External Tasks · External Milestone
Split · Milestone · Project Summary · External Milestone · Deadline

TIE00899941_0251

Edinburgh Tram Network - Line One - System Design Services - Outline Design Programme

ID	Task Name	WBS	Duration	Start	Finish	Work
274	**2.6.1 DEPOT HAYMARKET**	**200.3**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**6,175 hrs**
275	**2.6.1.1 Murrayfield (inc) - Haymarket (inc)**	**200.3.6**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**6,175 hrs**
276	2.6.1.1.1 Requirements Definition	200.3.6	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
277	2.6.1.1.2 Submit RD Deliverables for Approval	200.3.6	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
278	2.6.1.1.3 RD Approvals Period	200.3.6	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
279	2.6.1.1.4 Receive Requirements Definition Approval	200.3.6	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
280	2.6.1.1.5 Preliminary Design	200.3.6	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
281	2.6.1.1.6 Submit PD Deliverables for Approval	200.3.6	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
282	2.6.1.1.7 PD Approvals Period	200.3.6	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
283	2.6.1.1.8 Receive Preliminary Design Approval	200.3.6	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
284	2.6.1.1.9 Detailed Design	200.3.6	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
285	2.6.1.1.10 Submit DD Deliverables for Approval	200.3.6	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
286	2.6.1.1.11 DD Approvals Period	200.3.6	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
287	2.6.1.1.12 Receive Detailed Design Approval	200.3.6	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
288	**2.6.2 HAYMARKET St Andrews Square**	**200.4**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**32,700 hrs**
289	**2.6.2.1 Haymarket (exc) - Shandwick Place (inc)**	**200.4.1**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**6,175 hrs**
290	2.6.2.1.1 Requirements Definition	200.3.6	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
291	2.6.2.1.2 Submit RD Deliverables for Approval	200.3.6	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
292	2.6.2.1.3 RD Approvals Period	200.3.6	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
293	2.6.2.1.4 Receive Requirements Definition Approval	200.3.6	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
294	2.6.2.1.5 Preliminary Design	200.3.6	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
295	2.6.2.1.6 Submit PD Deliverables for Approval	200.3.6	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
296	2.6.2.1.7 PD Approvals Period	200.3.6	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
297	2.6.2.1.8 Receive Preliminary Design Approval	200.3.6	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
298	2.6.2.1.9 Detailed Design	200.3.6	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
299	2.6.2.1.10 Submit DD Deliverables for Approval	200.3.6	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
300	2.6.2.1.11 DD Approvals Period	200.3.6	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
301	2.6.2.1.12 Receive Detailed Design Approval	200.3.6	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
302	**2.6.2.2 Shandwick Place (exc) - Princes Street West (inc)**	**200.4.1**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**6,175 hrs**
303	2.6.2.2.1 Requirements Definition	200.4.1	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
304	2.6.2.2.2 Submit RD Deliverables for Approval	200.4.1	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
305	2.6.2.2.3 RD Approvals Period	200.4.1	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
306	2.6.2.2.4 Receive Requirements Definition Approval	200.4.1	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
307	2.6.2.2.5 Preliminary Design	200.4.1	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
308	2.6.2.2.6 Submit PD Deliverables for Approval	200.4.1	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
309	2.6.2.2.7 PD Approvals Period	200.4.1	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
310	2.6.2.2.8 Receive Preliminary Design Approval	200.4.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
311	2.6.2.2.9 Detailed Design	200.4.1	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
312	2.6.2.2.10 Submit DD Deliverables for Approval	200.4.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
313	2.6.2.2.11 DD Approvals Period	200.4.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
314	2.6.2.2.12 Receive Detailed Design Approval	200.4.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
315	**2.6.2.3 Princes Street West (exc) - Waverley Bridge (inc)**	**200.4.1**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**6,175 hrs**
316	2.6.2.3.1 Requirements Definition	200.4.1	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
317	2.6.2.3.2 Submit RD Deliverables for Approval	200.4.1	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
318	2.6.2.3.3 RD Approvals Period	200.4.1	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
319	2.6.2.3.4 Receive Requirements Definition Approval	200.4.1	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
320	2.6.2.3.5 Preliminary Design	200.4.1	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
321	2.6.2.3.6 Submit PD Deliverables for Approval	200.4.1	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
322	2.6.2.3.7 PD Approvals Period	200.4.1	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
323	2.6.2.3.8 Receive Preliminary Design Approval	200.4.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
324	2.6.2.3.9 Detailed Design	200.4.1	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
325	2.6.2.3.10 Submit DD Deliverables for Approval	200.4.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
326	2.6.2.3.11 DD Approvals Period	200.4.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
327	2.6.2.3.12 Receive Detailed Design Approval	200.4.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
328	**2.6.2.4 Waverley Bridge (exc) - St. Andrew Square (inc)**	**200.4.1**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**6,175 hrs**
329	2.6.2.4.1 Requirements Definition	200.4.1	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
330	2.6.2.4.2 Submit RD Deliverables for Approval	200.4.1	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
331	2.6.2.4.3 RD Approvals Period	200.4.1	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
332	2.6.2.4.4 Receive Requirements Definition Approval	200.4.1	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
333	2.6.2.4.5 Preliminary Design	200.4.1	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
334	2.6.2.4.6 Submit PD Deliverables for Approval	200.4.1	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
335	2.6.2.4.7 PD Approvals Period	200.4.1	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
336	2.6.2.4.8 Receive Preliminary Design Approval	200.4.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
337	2.6.2.4.9 Detailed Design	200.4.1	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
338	2.6.2.4.10 Submit DD Deliverables for Approval	200.4.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
339	2.6.2.4.11 DD Approvals Period	200.4.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
340	2.6.2.4.12 Receive Detailed Design Approval	200.4.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs



Task | Progress | Summary | External Tasks | External Milestone
Split | Milestone | Project Summary | External Milestone | Deadline

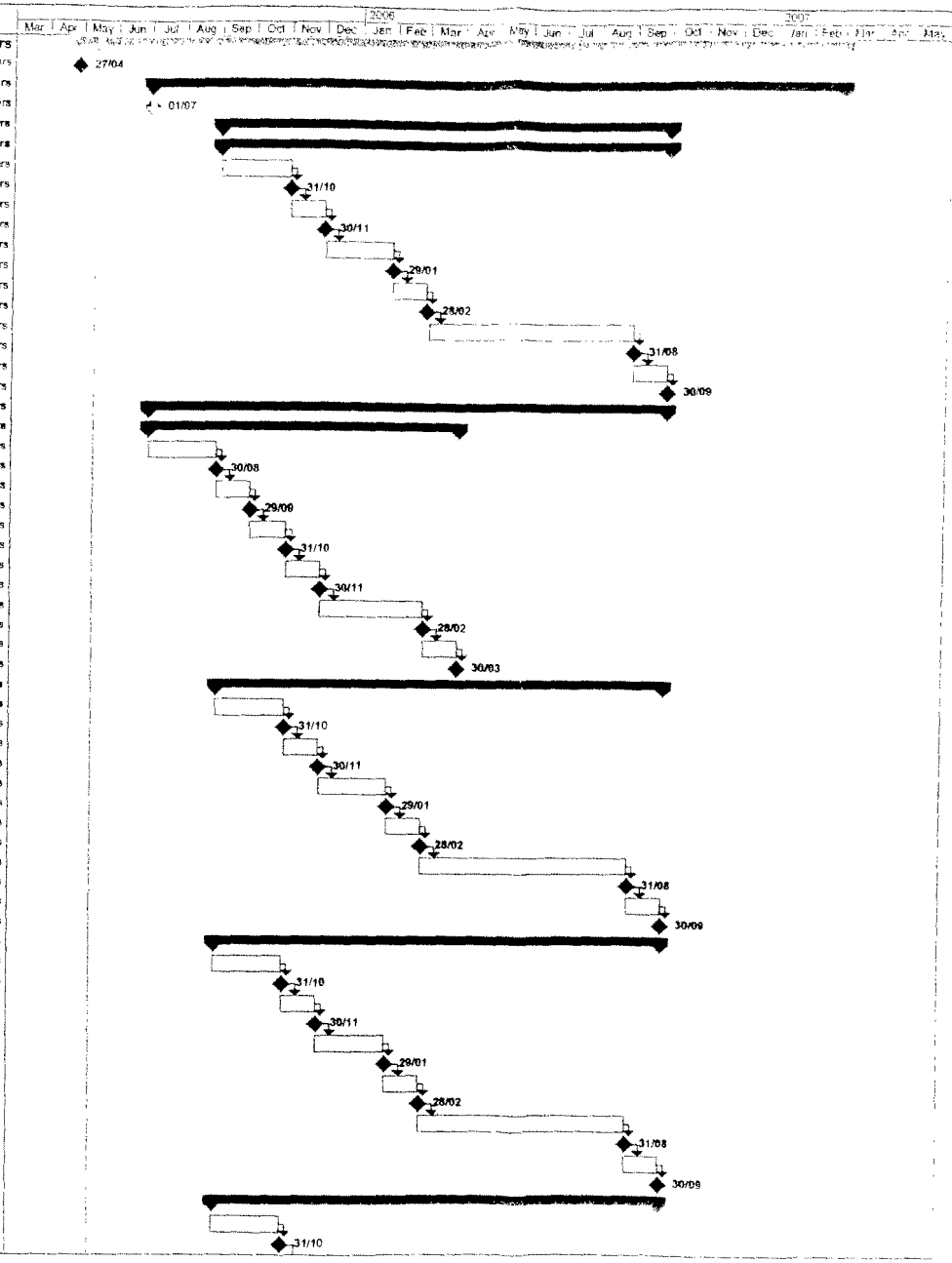
Thu 12/05/05 10:00

Tram 1.1 Common.mpp

TIE00899941_0252

Edinburgh Tram Network - Line Two - System Design Services - Outline Design Programme

ID	Task Name	WBS	Duration	Start	Finish	Work
0	**Edinburgh Tram Network - Line Two - System Design Services - Outline Desig**	**0**	**477 days**	**Wed 27/04/05**	**Wed 28/02/07**	**106,275 hrs**
1	1 Project Management	100	0 days	Wed 27/04/05	Wed 27/04/05	0 hrs
4	**2 EDINBURGH TRAM SDS PROVIDER**	**200**	**432 days**	**Fri 01/07/05**	**Wed 28/02/07**	**85,400 hrs**
5	2.1 CONTRACT AWARD / START DATE	200.1	0 days	Fri 01/07/05	Fri 01/07/05	0 hrs
6	**2.2 AIRPORT GOGARBURN**	**200.2**	**281 days**	**Thu 01/09/05**	**Sat 30/09/06**	**5,175 hrs**
7	**2.2.1 Airport - Gogarburn (Inc)**	**200.2.1**	**281 days**	**Thu 01/09/05**	**Sat 30/09/06**	**5,175 hrs**
8	2.2.1.1 Requirements Definition	200.2.1	43 days	Thu 01/09/05	Mon 31/10/05	1,612.5 hrs
9	2.2.1.2 Submit RD Deliverables for Approval	200.2.1	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
10	2.2.1.3 RD Approvals Period	200.2.1	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
11	2.2.1.4 Receive Requirements Definition Approval	200.2.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
12	2.2.1.5 Preliminary Design	200.2.1	40 days	Fri 02/12/05	Sun 29/01/06	1,575 hrs
13	2.2.1.6 Submit PD Deliverables for Approval	200.2.1	0 days	Sun 29/01/06	Sun 29/01/06	0 hrs
14	2.2.1.7 PD Approvals Period	200.2.1	22 days	Mon 30/01/06	Tue 28/02/06	0 hrs
15	2.2.1.8 Receive Preliminary Design Approval	200.2.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
16	2.2.1.9 Detailed Design	200.2.1	130 days	Fri 03/03/06	Thu 31/08/06	4,987.5 hrs
17	2.2.1.10 Submit DD Deliverables for Approval	200.2.1	0 days	Thu 31/08/06	Thu 31/08/06	0 hrs
18	2.2.1.11 DD Approvals Period	200.2.1	21 days	Fri 01/09/06	Sat 30/09/06	0 hrs
19	2.2.1.12 Receive Detailed Design Approval	200.2.1	0 days	Sat 30/09/06	Sat 30/09/06	0 hrs
20	**2.3 DEPOT HAYMARKET**	**200.3**	**324 days**	**Fri 01/07/05**	**Sat 30/09/06**	**32,700 hrs**
21	**2.3.1 Gogarburn (exc) - Gyle & Depot (Inc)**	**200.3.1**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**8,175 hrs**
22	2.3.1.1 Requirements Definition	200.3.1	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
23	2.3.1.2 Submit RD Deliverables for Approval	200.3.1	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
24	2.3.1.3 RD Approvals Period	200.3.1	22 days	Wed 31/08/05	Thu 29/09/05	0 hrs
25	2.3.1.4 Receive Requirements Definition Approval	200.3.1	0 days	Thu 29/09/05	Thu 29/09/05	0 hrs
26	2.3.1.5 Preliminary Design	200.3.1	22 days	Fri 30/09/05	Mon 31/10/05	1,575 hrs
27	2.3.1.6 Submit PD Deliverables for Approval	200.3.1	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
28	2.3.1.7 PD Approvals Period	200.3.1	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
29	2.3.1.8 Receive Preliminary Design Approval	200.3.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
30	2.3.1.9 Detailed Design	200.3.1	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
31	2.3.1.10 Submit DD Deliverables for Approval	200.3.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
32	2.3.1.11 DD Approvals Period	200.3.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
33	2.3.1.12 Receive Detailed Design Approval	200.3.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
34	**2.3.2 Gyle (exc) - Edinburgh Park (inc)**	**200.3.2**	**281 days**	**Thu 01/09/05**	**Sat 30/09/06**	**8,175 hrs**
35	2.3.2.1 Requirements Definition	200.3.2	43 days	Thu 01/09/05	Mon 31/10/05	1,612.5 hrs
36	2.3.2.2 Submit RD Deliverables for Approval	200.3.2	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
37	2.3.2.3 RD Approvals Period	200.3.2	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
38	2.3.2.4 Receive Requirements Definition Approval	200.3.2	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
39	2.3.2.5 Preliminary Design	200.3.2	40 days	Fri 02/12/05	Sun 29/01/06	1,575 hrs
40	2.3.2.6 Submit PD Deliverables for Approval	200.3.2	0 days	Sun 29/01/06	Sun 29/01/06	0 hrs
41	2.3.2.7 PD Approvals Period	200.3.2	22 days	Mon 30/01/06	Tue 28/02/06	0 hrs
42	2.3.2.8 Receive Preliminary Design Approval	200.3.2	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
43	2.3.2.9 Detailed Design	200.3.2	132 days	Wed 01/03/06	Thu 31/08/06	4,987.5 hrs
44	2.3.2.10 Submit DD Deliverables for Approval	200.3.2	0 days	Thu 31/08/06	Thu 31/08/06	0 hrs
45	2.3.2.11 DD Approvals Period	200.3.2	21 days	Fri 01/09/06	Sat 30/09/06	0 hrs
46	2.3.2.12 Receive Detailed Design Approval	200.3.2	0 days	Sat 30/09/06	Sat 30/09/06	0 hrs
47	**2.3.3 Edinburgh Park (exc) - South Gyle Acess (Inc)**	**200.3.3**	**281 days**	**Thu 01/09/05**	**Sat 30/09/06**	**8,175 hrs**
48	2.3.3.1 Requirements Definition	200.3.3	43 days	Thu 01/09/05	Mon 31/10/05	1,612.5 hrs
49	2.3.3.2 Submit RD Deliverables for Approval	200.3.3	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
50	2.3.3.3 RD Approvals Period	200.3.3	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
51	2.3.3.4 Receive Requirements Definition Approval	200.3.3	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
52	2.3.3.5 Preliminary Design	200.3.3	41 days	Thu 01/12/05	Sun 29/01/06	1,575 hrs
53	2.3.3.6 Submit PD Deliverables for Approval	200.3.3	0 days	Sun 29/01/06	Sun 29/01/06	0 hrs
54	2.3.3.7 PD Approvals Period	200.3.3	22 days	Mon 30/01/06	Tue 28/02/06	0 hrs
55	2.3.3.8 Receive Preliminary Design Approval	200.3.3	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
56	2.3.3.9 Detailed Design	200.3.3	132 days	Wed 01/03/06	Thu 31/08/06	4,987.5 hrs
57	2.3.3.10 Submit DD Deliverables for Approval	200.3.3	0 days	Thu 31/08/06	Thu 31/08/06	0 hrs
58	2.3.3.11 DD Approvals Period	200.3.3	21 days	Fri 01/09/06	Sat 30/09/06	0 hrs
59	2.3.3.12 Receive Detailed Design Approval	200.3.3	0 days	Sat 30/09/06	Sat 30/09/06	0 hrs
60	**2.3.4 South Gyle Access (exc) - Saughton Road North (Inc)**	**200.3.4**	**281 days**	**Thu 01/09/05**	**Sat 30/09/06**	**8,175 hrs**
61	2.3.4.1 Requirements Definition	200.3.4	43 days	Thu 01/09/05	Mon 31/10/05	1,612.5 hrs
62	2.3.4.2 Submit RD Deliverables for Approval	200.3.4	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs

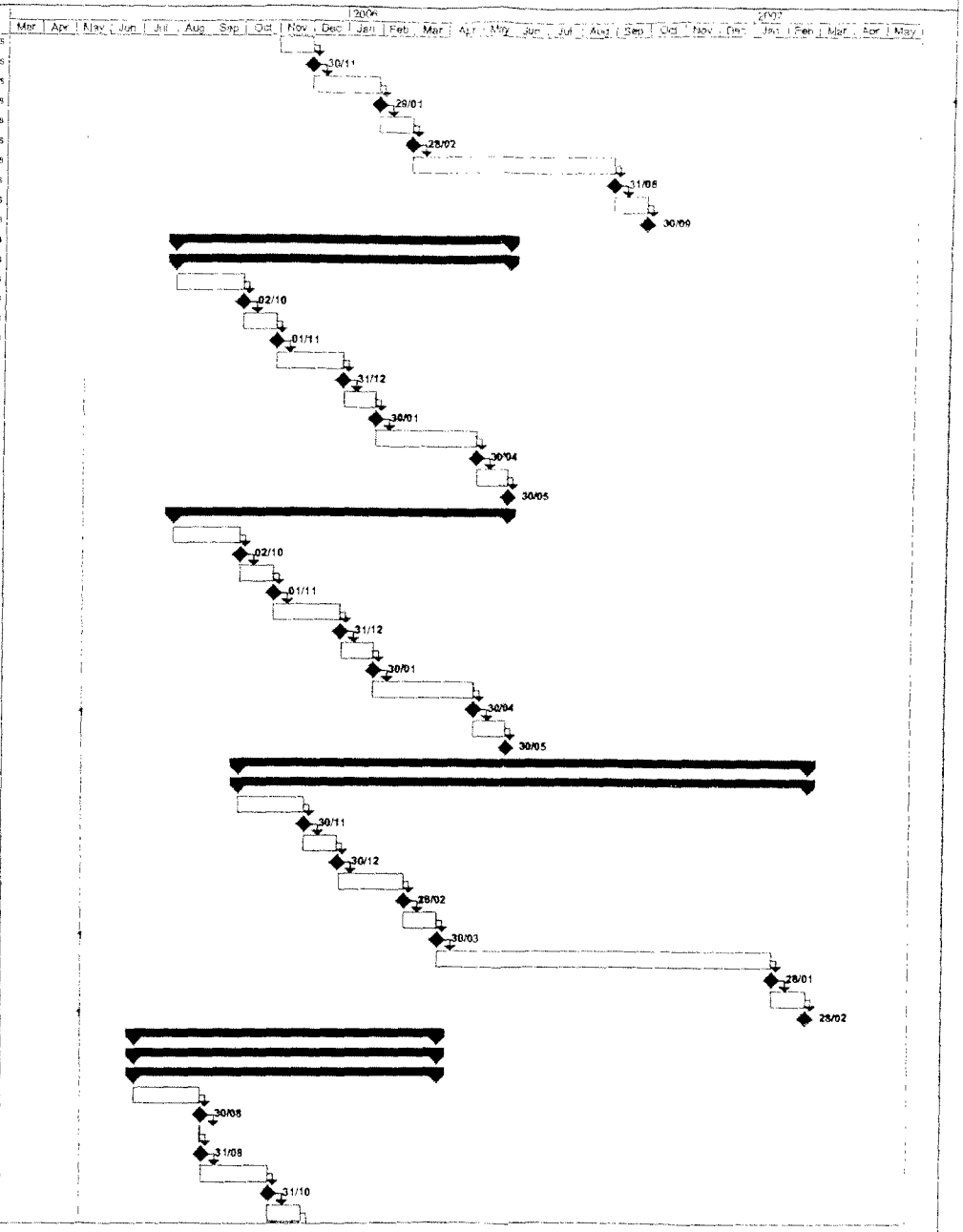


Task | Progress | Summary | External Tasks | External Milestone
Split | Milestone | Project Summary | External Milestone | Deadline

TIE00899941_0253

Edinburgh Tram Network - Line Two - System Design Services - Outline Design Programme

ID	Task Name	WBS	Duration	Start	Finish	Work
63	2.3.4.3 RD Approvals Period	200.3.4	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
64	2.3.4.4 Receive Requirements Definition Approval	200.3.4	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
65	2.3.4.5 Preliminary Design	200.3.4	41 days	Thu 01/12/05	Sun 29/01/06	1,575 hrs
66	2.3.4.6 Submit PD Deliverables for Approval	200.3.4	0 days	Sun 29/01/06	Sun 29/01/06	0 hrs
67	2.3.4.7 PD Approvals Period	200.3.4	22 days	Mon 30/01/06	Tue 28/02/06	0 hrs
68	2.3.4.8 Receive Preliminary Design Approval	200.3.4	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
69	2.3.4.9 Detailed Design	200.3.4	132 days	Wed 01/03/06	Thu 31/08/06	4,987.5 hrs
70	2.3.4.10 Submit DD Deliverables for Approval	200.3.4	0 days	Thu 31/08/06	Thu 31/08/06	0 hrs
71	2.3.4.11 DD Approvals Period	200.3.4	21 days	Fri 01/09/06	Sat 30/09/06	0 hrs
72	2.3.4.12 Receive Detailed Design Approval	200.3.4	0 days	Sat 30/09/06	Sat 30/09/06	0 hrs
73	**2.4 Saughton Road North (exc) - Murrayfield (exc)**	**200.3.5**	**213 days**	**Wed 03/08/05**	**Tue 30/05/06**	**16,350 hrs**
74	**2.4.1 Saughton Road North (exc) - Balgreen Road (inc)**	**200.3.5**	**213 days**	**Wed 03/08/05**	**Tue 30/05/06**	**8,175 hrs**
75	2.4.1.1 Requirements Definition	200.3.5	42 days	Wed 03/08/05	Sun 02/10/05	1,612.5 hrs
76	2.4.1.2 Submit RD Deliverables for Approval	200.3.5	0 days	Sun 02/10/05	Sun 02/10/05	0 hrs
77	2.4.1.3 RD Approvals Period	200.3.5	22 days	Mon 03/10/05	Tue 01/11/05	0 hrs
78	2.4.1.4 Receive Requirements Definition Approval	200.3.5	0 days	Tue 01/11/05	Tue 01/11/05	0 hrs
79	2.4.1.5 Preliminary Design	200.3.5	42 days	Wed 02/11/05	Sat 31/12/05	1,575 hrs
80	2.4.1.6 Submit PD Deliverables for Approval	200.3.5	0 days	Sat 31/12/05	Sat 31/12/05	0 hrs
81	2.4.1.7 PD Approvals Period	200.3.5	21 days	Mon 02/01/06	Mon 30/01/06	0 hrs
82	2.4.1.8 Receive Preliminary Design Approval	200.3.5	0 days	Mon 30/01/06	Mon 30/01/06	0 hrs
83	2.4.1.9 Detailed Design	200.3.5	64 days	Tue 31/01/06	Sun 30/04/06	4,987.5 hrs
84	2.4.1.10 Submit DD Deliverables for Approval	200.3.5	0 days	Sun 30/04/06	Sun 30/04/06	0 hrs
85	2.4.1.11 DD Approvals Period	200.3.5	22 days	Mon 01/05/06	Tue 30/05/06	0 hrs
86	2.4.1.12 Receive Detailed Design Approval	200.3.5	0 days	Tue 30/05/06	Tue 30/05/06	0 hrs
87	**2.4.2 Balgreen Road (exc) - Murrayfield (exc)**	**200.3.5**	**213 days**	**Wed 03/08/05**	**Tue 30/05/06**	**8,175 hrs**
88	2.4.2.1 Requirements Definition	200.3.5	42 days	Wed 03/08/05	Sun 02/10/05	1,612.5 hrs
89	2.4.2.2 Submit RD Deliverables for Approval	200.3.5	0 days	Sun 02/10/05	Sun 02/10/05	0 hrs
90	2.4.2.3 RD Approvals Period	200.3.5	22 days	Mon 03/10/05	Tue 01/11/05	0 hrs
91	2.4.2.4 Receive Requirements Definition Approval	200.3.5	0 days	Tue 01/11/05	Tue 01/11/05	0 hrs
92	2.4.2.5 Preliminary Design	200.3.5	42 days	Wed 02/11/05	Sat 31/12/05	1,575 hrs
93	2.4.2.6 Submit PD Deliverables for Approval	200.3.5	0 days	Sat 31/12/05	Sat 31/12/05	0 hrs
94	2.4.2.7 PD Approvals Period	200.3.5	21 days	Mon 02/01/06	Mon 30/01/06	0 hrs
95	2.4.2.8 Receive Preliminary Design Approval	200.3.5	0 days	Mon 30/01/06	Mon 30/01/06	0 hrs
96	2.4.2.9 Detailed Design	200.3.5	64 days	Tue 31/01/06	Sun 30/04/06	4,987.5 hrs
97	2.4.2.10 Submit DD Deliverables for Approval	200.3.5	0 days	Sun 30/04/06	Sun 30/04/06	0 hrs
98	2.4.2.11 DD Approvals Period	200.3.5	22 days	Mon 01/05/06	Tue 30/05/06	0 hrs
99	2.4.2.12 Receive Detailed Design Approval	200.3.5	0 days	Tue 30/05/06	Tue 30/05/06	0 hrs
100	**2.5 GOGARBURN - NEWBRIDGE**	**200.7**	**367 days**	**Mon 03/10/05**	**Wed 28/02/07**	**8,175 hrs**
101	**2.5.1 Gogarburn (exc) - Newbridge (inc)**	**200.7.1**	**367 days**	**Mon 03/10/05**	**Wed 28/02/07**	**8,175 hrs**
102	2.5.1.1 Requirements Definition	200.7.1	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
103	2.5.1.2 Submit RD Deliverables for Approval	200.7.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
104	2.5.1.3 RD Approvals Period	200.7.1	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
105	2.5.1.4 Receive Requirements Definition Approval	200.7.1	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
106	2.5.1.5 Preliminary Design	200.7.1	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
107	2.5.1.6 Submit PD Deliverables for Approval	200.7.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
108	2.5.1.7 PD Approvals Period	200.7.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
109	2.5.1.8 Receive Preliminary Design Approval	200.7.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
110	2.5.1.9 Detailed Design	200.7.1	218 days	Fri 31/03/06	Sun 28/01/07	4,987.5 hrs
111	2.5.1.10 Submit DD Deliverables for Approval	200.7.1	0 days	Sun 28/01/07	Sun 28/01/07	0 hrs
112	2.5.1.11 DD Approvals Period	200.7.1	23 days	Mon 29/01/07	Wed 28/02/07	0 hrs
113	2.5.1.12 Receive Detailed Design Approval	200.7.1	0 days	Wed 28/02/07	Wed 28/02/07	0 hrs
114	**3 EDINBURGH TRAM SDS PROVIDER**	**200**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**40,875 hrs**
115	**3.1 DEPOT HAYMARKET**	**200.3**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**8,175 hrs**
116	**3.1.1 Murrayfield (inc) - Haymarket (inc)**	**200.3.6**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**8,175 hrs**
117	3.1.1.1 Requirements Definition	200.3.6	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
118	3.1.1.2 Submit RD Deliverables for Approval	200.3.6	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
119	3.1.1.3 RD Approvals Period	200.3.6	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
120	3.1.1.4 Receive Requirements Definition Approval	200.3.6	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
121	3.1.1.5 Preliminary Design	200.3.6	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
122	3.1.1.6 Submit PD Deliverables for Approval	200.3.6	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
123	3.1.1.7 PD Approvals Period	200.3.6	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs

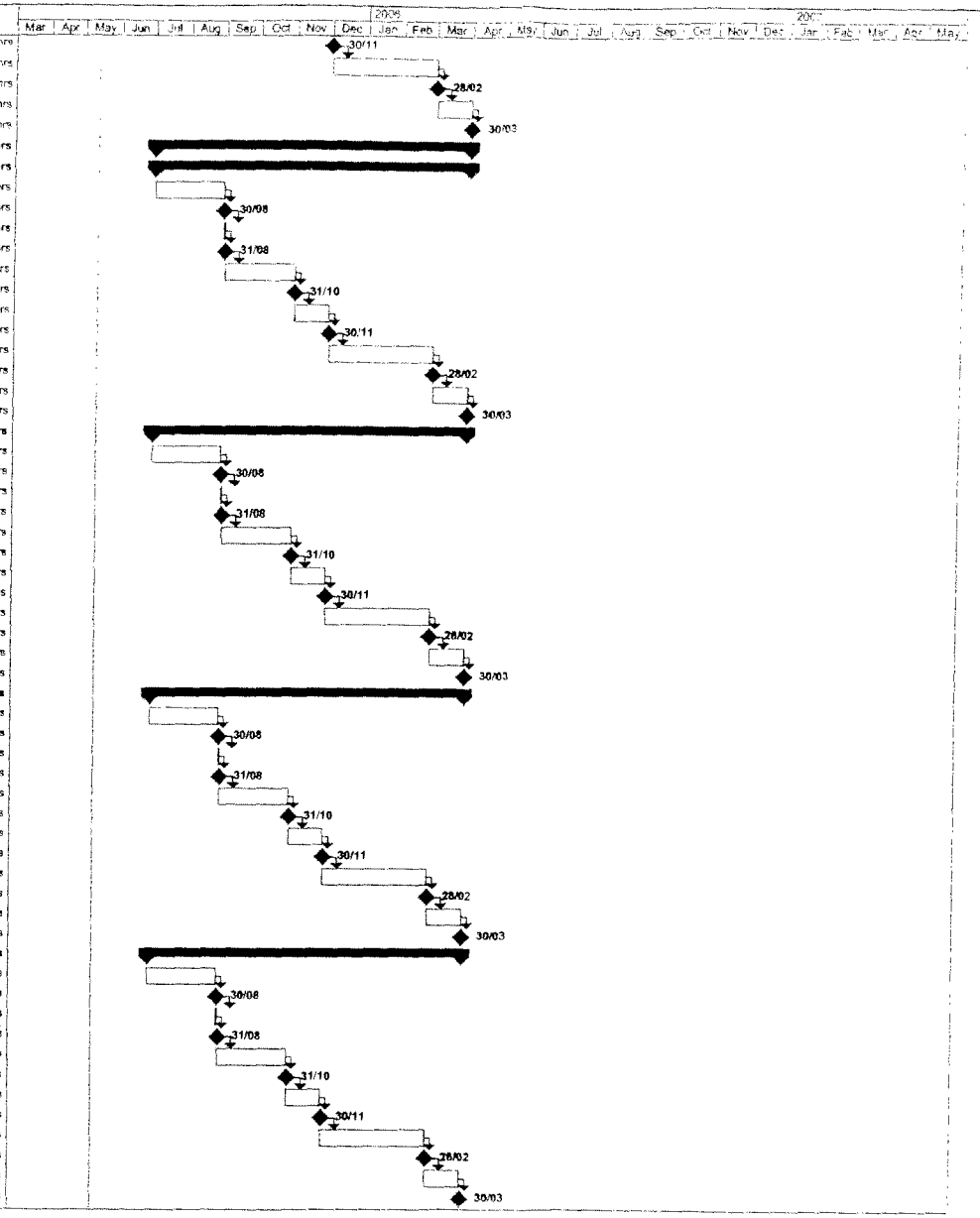


Task | Progress | Summary | External Tasks | External Milestone
Split | Milestone | Project Summary | External Milestone | Deadline

TIE00899941_0254

Edinburgh Tram Network - Line Two - System Design Services - Outline Design Programme

ID	Task Name	WBS	Duration	Start	Finish	Work
124	3.1.1.8 Receive Preliminary Design Approval	200.3.6	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
125	3.1.1.9 Detailed Design	200.3.6	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
126	3.1.1.10 Submit DD Deliverables for Approval	200.3.6	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
127	3.1.1.11 DD Approvals Period	200.3.6	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
128	3.1.1.12 Receive Detailed Design Approval	200.3.6	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
129	**3.2 HAYMARKET St Andrews Square**	**200.4**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**32,700 hrs**
130	**3.2.1 Haymarket (exc) - Shandwick Place (inc)**	**200.4.1**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**8,175 hrs**
131	3.2.1.1 Requirements Definition	200.3.6	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
132	3.2.1.2 Submit RD Deliverables for Approval	200.3.6	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
133	3.2.1.3 RD Approvals Period	200.3.6	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
134	3.2.1.4 Receive Requirements Definition Approval	200.3.6	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
135	3.2.1.5 Preliminary Design	200.3.6	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
136	3.2.1.6 Submit PD Deliverables for Approval	200.3.6	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
137	3.2.1.7 PD Approvals Period	200.3.6	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
138	3.2.1.8 Receive Preliminary Design Approval	200.3.6	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
139	3.2.1.9 Detailed Design	200.3.6	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
140	3.2.1.10 Submit DD Deliverables for Approval	200.3.6	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
141	3.2.1.11 DD Approvals Period	200.3.6	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
142	3.2.1.12 Receive Detailed Design Approval	200.3.6	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
143	**3.2.2 Shandwick Place (exc) - Princes Street West (inc)**	**200.4.1**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**8,175 hrs**
144	3.2.2.1 Requirements Definition	200.4.1	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
145	3.2.2.2 Submit RD Deliverables for Approval	200.4.1	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
146	3.2.2.3 RD Approvals Period	200.4.1	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
147	3.2.2.4 Receive Requirements Definition Approval	200.4.1	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
148	3.2.2.5 Preliminary Design	200.4.1	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
149	3.2.2.6 Submit PD Deliverables for Approval	200.4.1	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
150	3.2.2.7 PD Approvals Period	200.4.1	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
151	3.2.2.8 Receive Preliminary Design Approval	200.4.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
152	3.2.2.9 Detailed Design	200.4.1	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
153	3.2.2.10 Submit DD Deliverables for Approval	200.4.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
154	3.2.2.11 DD Approvals Period	200.4.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
155	3.2.2.12 Receive Detailed Design Approval	200.4.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
156	**3.2.3 Princes Street West (exc) - Waverley Bridge (inc)**	**200.4.1**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**8,175 hrs**
157	3.2.3.1 Requirements Definition	200.4.1	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
158	3.2.3.2 Submit RD Deliverables for Approval	200.4.1	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
159	3.2.3.3 RD Approvals Period	200.4.1	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
160	3.2.3.4 Receive Requirements Definition Approval	200.4.1	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
161	3.2.3.5 Preliminary Design	200.4.1	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
162	3.2.3.6 Submit PD Deliverables for Approval	200.4.1	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
163	3.2.3.7 PD Approvals Period	200.4.1	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
164	3.2.3.8 Receive Preliminary Design Approval	200.4.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
165	3.2.3.9 Detailed Design	200.4.1	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
166	3.2.3.10 Submit DD Deliverables for Approval	200.4.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
167	3.2.3.11 DD Approvals Period	200.4.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
168	3.2.3.12 Receive Detailed Design Approval	200.4.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
169	**3.2.4 Waverley Bridge (exc) - St. Andrew Square (inc)**	**200.4.1**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**8,175 hrs**
170	3.2.4.1 Requirements Definition	200.4.1	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
171	3.2.4.2 Submit RD Deliverables for Approval	200.4.1	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
172	3.2.4.3 RD Approvals Period	200.4.1	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
173	3.2.4.4 Receive Requirements Definition Approval	200.4.1	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
174	3.2.4.5 Preliminary Design	200.4.1	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
175	3.2.4.6 Submit PD Deliverables for Approval	200.4.1	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
176	3.2.4.7 PD Approvals Period	200.4.1	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
177	3.2.4.8 Receive Preliminary Design Approval	200.4.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
178	3.2.4.9 Detailed Design	200.4.1	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
179	3.2.4.10 Submit DD Deliverables for Approval	200.4.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
180	3.2.4.11 DD Approvals Period	200.4.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
181	3.2.4.12 Receive Detailed Design Approval	200.4.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs

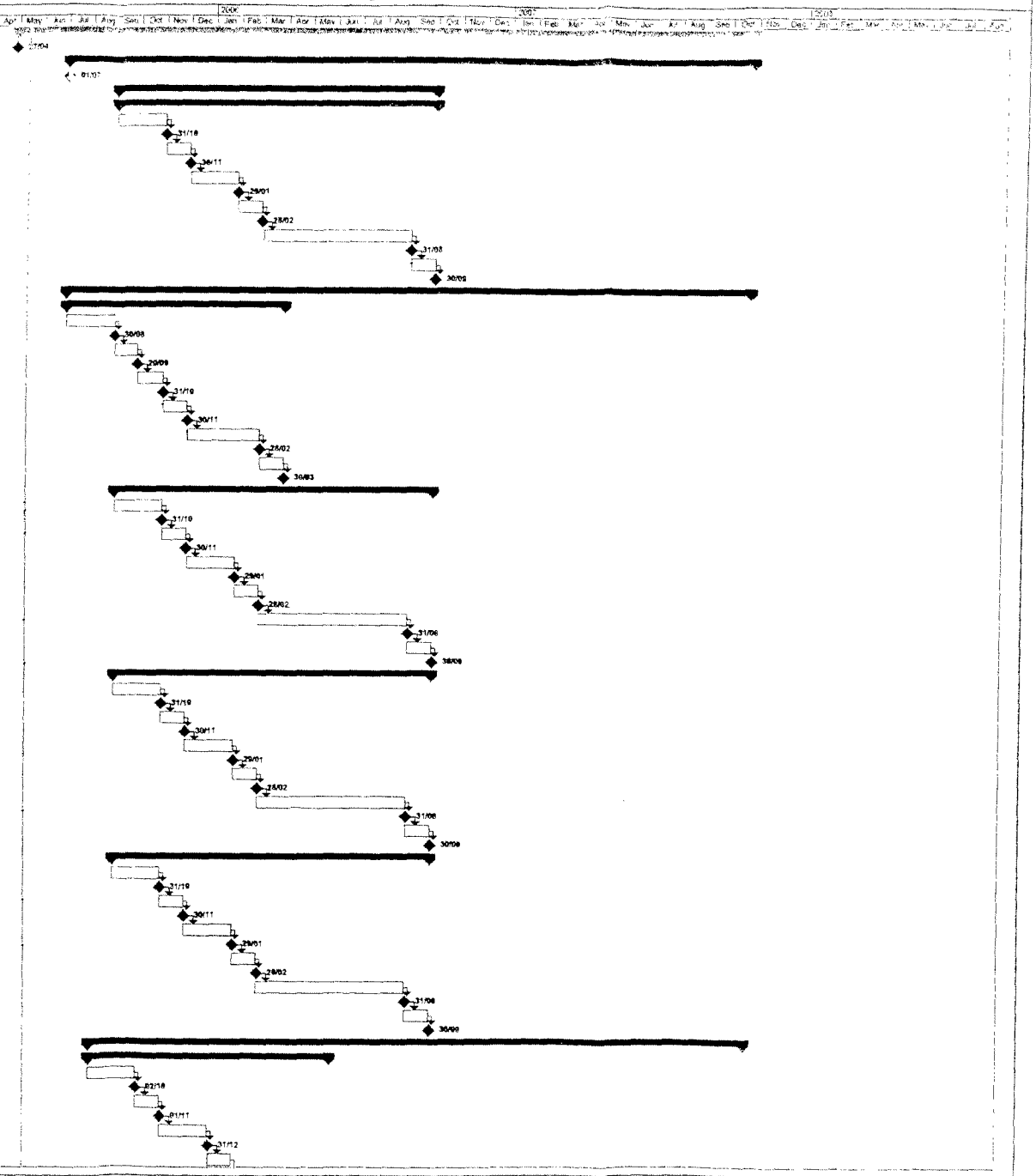


Task | Progress | Summary | External Tasks | External Milestone
Split | Milestone | Project Summary | External Milestone | Deadline

TIE00899941_0255

Edinburgh Tram Network - Lines One & Two - System Design Services - Outline Design Programme

ID	Task Name	WBS	Duration	Start	Finish	Work
0	Edinburgh Tram Network - Lines One & Two - System Design Services - Out	0	848 days	Wed 27/04/05	Thu 25/10/07	269,775 hrs
1	Project Management	100	0 days	Wed 27/04/05	Wed 27/04/05	0 hrs
4	2 EDINBURGH TRAM SDS PROVIDER	200	603 days	Fri 01/07/05	Thu 25/10/07	269,775 hrs
5	2.1 CONTRACT AWARD / START DATE	200.1	0 days	Fri 01/07/05	Fri 01/07/05	0 hrs
6	2.2 AIRPORT GOGARBURN	200.2	281 days	Thu 01/09/05	Sat 30/09/06	8,175 hrs
7	2.2.1 Airport - Gogarburn (inc)	200.2.1	281 days	Thu 01/09/05	Sat 30/09/06	8,175 hrs
8	2.2.1.1 Requirements Definition	200.2.1	43 days	Thu 01/09/05	Mon 31/10/05	1,612.5 hrs
9	2.2.1.2 Submit RD Deliverables for Approval	200.2.1	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
10	2.2.1.3 RD Approvals Period	200.2.1	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
11	2.2.1.4 Receive Requirements Definition Approval	200.2.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
12	2.2.1.5 Preliminary Design	200.2.1	40 days	Fri 02/12/05	Sun 29/01/06	1,575 hrs
13	2.2.1.6 Submit PD Deliverables for Approval	200.2.1	0 days	Sun 29/01/06	Sun 29/01/06	0 hrs
14	2.2.1.7 PD Approvals Period	200.2.1	22 days	Mon 30/01/06	Tue 28/02/06	0 hrs
15	2.2.1.8 Receive Preliminary Design Approval	200.2.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
16	2.2.1.9 Detailed Design	200.2.1	130 days	Fri 03/03/06	Thu 31/08/06	4,987.5 hrs
17	2.2.1.10 Submit DD Deliverables for Approval	200.2.1	0 days	Thu 31/08/06	Thu 31/08/06	0 hrs
18	2.2.1.11 DD Approvals Period	200.2.1	21 days	Fri 01/09/06	Sat 30/09/06	0 hrs
19	2.2.1.12 Receive Detailed Design Approval	200.2.1	0 days	Sat 30/09/06	Sat 30/09/06	0 hrs
20	2.3 DEPOT HAYMARKET	200.3	603 days	Fri 01/07/05	Thu 25/10/07	63,600 hrs
21	2.3.1 Gogarburn (exc) - Gyle & Depot (inc)	200.3.1	183 days	Fri 01/07/05	Thu 30/03/06	8,175 hrs
22	2.3.1.1 Requirements Definition	200.3.1	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
23	2.3.1.2 Submit RD Deliverables for Approval	200.3.1	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
24	2.3.1.3 RD Approvals Period	200.3.1	22 days	Wed 31/08/05	Thu 29/09/05	0 hrs
25	2.3.1.4 Receive Requirements Definition Approval	200.3.1	0 days	Thu 29/09/05	Thu 29/09/05	0 hrs
26	2.3.1.5 Preliminary Design	200.3.1	22 days	Fri 30/09/05	Mon 31/10/05	1,575 hrs
27	2.3.1.6 Submit PD Deliverables for Approval	200.3.1	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
28	2.3.1.7 PD Approvals Period	200.3.1	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
29	2.3.1.8 Receive Preliminary Design Approval	200.3.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
30	2.3.1.9 Detailed Design	200.3.1	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
31	2.3.1.10 Submit DD Deliverables for Approval	200.3.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
32	2.3.1.11 DD Approvals Period	200.3.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
33	2.3.1.12 Receive Detailed Design Approval	200.3.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
34	2.3.2 Gyle (exc) - Edinburgh Park (inc)	200.3.2	281 days	Thu 01/09/05	Sat 30/09/06	8,175 hrs
35	2.3.2.1 Requirements Definition	200.3.2	43 days	Thu 01/09/05	Mon 31/10/05	1,612.5 hrs
36	2.3.2.2 Submit RD Deliverables for Approval	200.3.2	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
37	2.3.2.3 RD Approvals Period	200.3.2	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
38	2.3.2.4 Receive Requirements Definition Approval	200.3.2	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
39	2.3.2.5 Preliminary Design	200.3.2	40 days	Fri 02/12/05	Sun 29/01/06	1,575 hrs
40	2.3.2.6 Submit PD Deliverables for Approval	200.3.2	0 days	Sun 29/01/06	Sun 29/01/06	0 hrs
41	2.3.2.7 PD Approvals Period	200.3.2	22 days	Mon 30/01/06	Tue 28/02/06	0 hrs
42	2.3.2.8 Receive Preliminary Design Approval	200.3.2	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
43	2.3.2.9 Detailed Design	200.3.2	132 days	Wed 01/03/06	Thu 31/08/06	4,987.5 hrs
44	2.3.2.10 Submit DD Deliverables for Approval	200.3.2	0 days	Thu 31/08/06	Thu 31/08/06	0 hrs
45	2.3.2.11 DD Approvals Period	200.3.2	21 days	Fri 01/09/06	Sat 30/09/06	0 hrs
46	2.3.2.12 Receive Detailed Design Approval	200.3.2	0 days	Sat 30/09/06	Sat 30/09/06	0 hrs
47	2.3.3 Edinburgh Park (exc) - Boath Gyle Access (inc)	200.3.3	281 days	Thu 01/09/05	Sat 30/09/06	8,175 hrs
48	2.3.3.1 Requirements Definition	200.3.3	43 days	Thu 01/09/05	Mon 31/10/05	1,612.5 hrs
49	2.3.3.2 Submit RD Deliverables for Approval	200.3.3	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
50	2.3.3.3 RD Approvals Period	200.3.3	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
51	2.3.3.4 Receive Requirements Definition Approval	200.3.3	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
52	2.3.3.5 Preliminary Design	200.3.3	41 days	Thu 01/12/05	Sun 29/01/06	1,575 hrs
53	2.3.3.6 Submit PD Deliverables for Approval	200.3.3	0 days	Sun 29/01/06	Sun 29/01/06	0 hrs
54	2.3.3.7 PD Approvals Period	200.3.3	22 days	Mon 30/01/06	Tue 28/02/06	0 hrs
55	2.3.3.8 Receive Preliminary Design Approval	200.3.3	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
56	2.3.3.9 Detailed Design	200.3.3	132 days	Wed 01/03/06	Thu 31/08/06	4,987.5 hrs
57	2.3.3.10 Submit DD Deliverables for Approval	200.3.3	0 days	Thu 31/08/06	Thu 31/08/06	0 hrs
58	2.3.3.11 DD Approvals Period	200.3.3	21 days	Fri 01/09/06	Sat 30/09/06	0 hrs
59	2.3.3.12 Receive Detailed Design Approval	200.3.3	0 days	Sat 30/09/06	Sat 30/09/06	0 hrs
60	2.3.4 Boath Gyle Access (exc) - Baughton Road North (inc)	200.3.4	281 days	Thu 01/09/05	Sat 30/09/06	8,175 hrs
61	2.3.4.1 Requirements Definition	200.3.4	43 days	Thu 01/09/05	Mon 31/10/05	1,612.5 hrs
62	2.3.4.2 Submit RD Deliverables for Approval	200.3.4	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
63	2.3.4.3 RD Approvals Period	200.3.4	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
64	2.3.4.4 Receive Requirements Definition Approval	200.3.4	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
65	2.3.4.5 Preliminary Design	200.3.4	41 days	Thu 01/12/05	Sun 29/01/06	1,575 hrs
66	2.3.4.6 Submit PD Deliverables for Approval	200.3.4	0 days	Sun 29/01/06	Sun 29/01/06	0 hrs
67	2.3.4.7 PD Approvals Period	200.3.4	22 days	Mon 30/01/06	Tue 28/02/06	0 hrs
68	2.3.4.8 Receive Preliminary Design Approval	200.3.4	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
69	2.3.4.9 Detailed Design	200.3.4	132 days	Wed 01/03/06	Thu 31/08/06	4,987.5 hrs
70	2.3.4.10 Submit DD Deliverables for Approval	200.3.4	0 days	Thu 31/08/06	Thu 31/08/06	0 hrs
71	2.3.4.11 DD Approvals Period	200.3.4	21 days	Fri 01/09/06	Sat 30/09/06	0 hrs
72	2.3.4.12 Receive Detailed Design Approval	200.3.4	0 days	Sat 30/09/06	Sat 30/09/06	0 hrs
73	2.3.5 Baughton Road North (exc) - Murrayfield (exc)	200.3.5	580 days	Wed 03/08/05	Thu 25/10/07	24,525 hrs
74	2.3.5.1 Baughton Road North (exc) - Saltgreen Road (inc)	200.3.5	213 days	Wed 03/08/05	Tue 30/05/06	8,175 hrs
75	2.3.5.1.1 Requirements Definition	200.3.5	42 days	Wed 03/08/05	Sun 02/10/05	1,612.5 hrs
76	2.3.5.1.2 Submit RD Deliverables for Approval	200.3.5	0 days	Sun 02/10/05	Sun 02/10/05	0 hrs
77	2.3.5.1.3 RD Approvals Period	200.3.5	22 days	Mon 03/10/05	Tue 01/11/05	0 hrs
78	2.3.5.1.4 Receive Requirements Definition Approval	200.3.5	0 days	Tue 01/11/05	Tue 01/11/05	0 hrs
79	2.3.5.1.5 Preliminary Design	200.3.5	42 days	Wed 02/11/05	Sat 31/12/05	1,575 hrs
80	2.3.5.1.6 Submit PD Deliverables for Approval	200.3.5	0 days	Sat 31/12/05	Sat 31/12/05	0 hrs
81	2.3.5.1.7 PD Approvals Period	200.3.5	21 days	Mon 02/01/06	Mon 30/01/06	0 hrs



Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | External Milestone | Deadline

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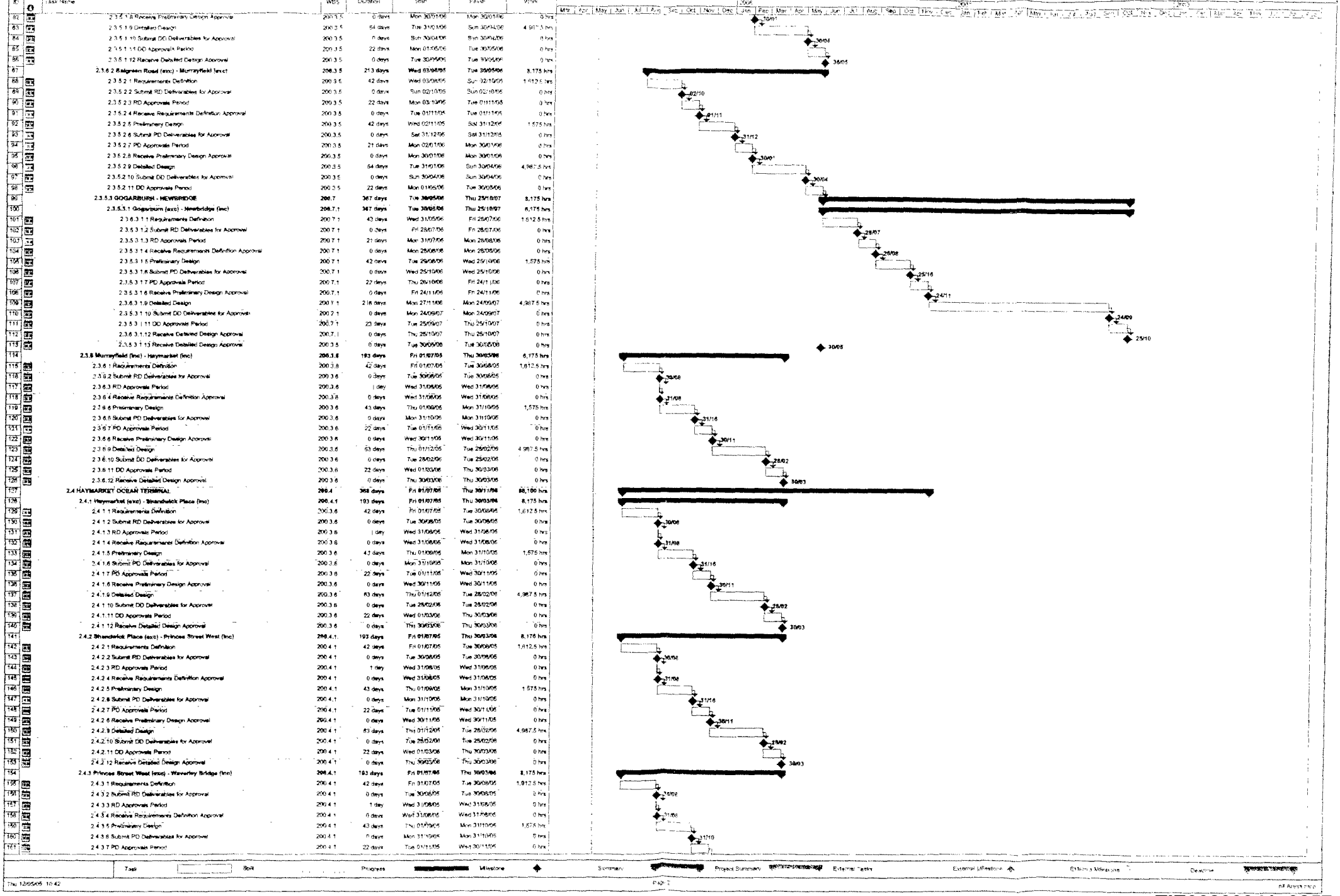
Edinburgh Tram Network - Lines One & Two - System Design Services - Outline Design Programme



ID	Task Name	WBS	Duration	Start	Finish	Work
62	2.3.5.1.8 Receive Preliminary Design Approval	200.3.5	0 days	Mon 30/01/06	Mon 30/01/06	0 hrs
63	2.3.5.1.9 Detailed Design	200.3.5	64 days	Tue 31/01/06	Sun 30/04/06	4,987.5 hrs
64	2.3.5.1.10 Submit DD Deliverables for Approval	200.3.5	0 days	Sun 30/04/06	Sun 30/04/06	0 hrs
65	2.3.5.1.11 DD Approvals Period	200.3.5	22 days	Mon 01/05/06	Tue 30/05/06	0 hrs
66	2.3.5.1.12 Receive Detailed Design Approval	200.3.5	0 days	Tue 30/05/06	Tue 30/05/06	0 hrs
67	**2.3.5.2 Balgreen Road (exc) - Murrayfield (exc)**	**200.3.5**	**213 days**	**Wed 03/05/06**	**Tue 30/05/06**	**8,175 hrs**
68	2.3.5.2.1 Requirements Definition	200.3.5	42 days	Wed 03/05/06	Sun 02/10/05	1,612.5 hrs
69	2.3.5.2.2 Submit RD Deliverables for Approval	200.3.5	0 days	Sun 02/10/05	Sun 02/10/05	0 hrs
70	2.3.5.2.3 RD Approvals Period	200.3.5	22 days	Mon 03/10/05	Tue 01/11/05	0 hrs
71	2.3.5.2.4 Receive Requirements Definition Approval	200.3.5	0 days	Tue 01/11/05	Tue 01/11/05	0 hrs
72	2.3.5.2.5 Preliminary Design	200.3.5	42 days	Wed 02/11/05	Sat 31/12/05	1,575 hrs
73	2.3.5.2.6 Submit PD Deliverables for Approval	200.3.5	0 days	Sat 31/12/05	Sat 31/12/05	0 hrs
74	2.3.5.2.7 PD Approvals Period	200.3.5	21 days	Mon 02/01/06	Mon 30/01/06	0 hrs
75	2.3.5.2.8 Receive Preliminary Design Approval	200.3.5	0 days	Mon 30/01/06	Mon 30/01/06	0 hrs
76	2.3.5.2.9 Detailed Design	200.3.5	64 days	Tue 31/01/06	Sun 30/04/06	4,987.5 hrs
77	2.3.5.2.10 Submit DD Deliverables for Approval	200.3.5	0 days	Sun 30/04/06	Sun 30/04/06	0 hrs
78	2.3.5.2.11 DD Approvals Period	200.3.5	22 days	Mon 01/05/06	Tue 30/05/06	0 hrs
79	**2.3.5.3 GOGARBURN - NEWBRIDGE**	**200.7**	**367 days**	**Tue 30/05/06**	**Thu 25/10/07**	**8,175 hrs**
80	**2.3.5.3.1 Gogarburn (exc) - Newbridge (inc)**	**200.7.1**	**367 days**	**Tue 30/05/06**	**Thu 25/10/07**	**8,175 hrs**
81	2.3.6.3.1.1 Requirements Definition	200.7.1	43 days	Wed 31/05/06	Fri 28/07/06	1,612.5 hrs
82	2.3.5.3.1.2 Submit RD Deliverables for Approval	200.7.1	0 days	Fri 28/07/06	Fri 28/07/06	0 hrs
83	2.3.5.3.1.3 RD Approvals Period	200.7.1	21 days	Mon 31/07/06	Mon 28/08/06	0 hrs
84	2.3.5.3.1.4 Receive Requirements Definition Approval	200.7.1	0 days	Mon 28/08/06	Mon 28/08/06	0 hrs
85	2.3.5.3.1.5 Preliminary Design	200.7.1	42 days	Tue 29/08/06	Wed 25/10/06	1,575 hrs
86	2.3.5.3.1.6 Submit PD Deliverables for Approval	200.7.1	0 days	Wed 25/10/06	Wed 25/10/06	0 hrs
87	2.3.5.3.1.7 PD Approvals Period	200.7.1	22 days	Thu 26/10/06	Fri 24/11/06	0 hrs
88	2.3.5.3.1.8 Receive Preliminary Design Approval	200.7.1	0 days	Fri 24/11/06	Fri 24/11/06	0 hrs
89	2.3.6.3.1.9 Detailed Design	200.7.1	216 days	Mon 27/11/06	Mon 24/09/07	4,987.5 hrs
90	2.3.5.3.1.10 Submit DD Deliverables for Approval	200.7.1	0 days	Mon 24/09/07	Mon 24/09/07	0 hrs
91	2.3.5.3.1.11 DD Approvals Period	200.7.1	23 days	Tue 25/09/07	Thu 25/10/07	0 hrs
92	2.3.6.3.1.12 Receive Detailed Design Approval	200.7.1	0 days	Thu 25/10/07	Thu 25/10/07	0 hrs
93	2.3.5.3.1.13 Receive Detailed Design Approval	200.3.5	0 days	Tue 30/05/06	Tue 30/05/06	0 hrs
94	**2.3.6 Murrayfield (inc) - Haymarket (inc)**	**200.3.6**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**8,175 hrs**
95	2.3.6.1 Requirements Definition	200.3.6	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
96	2.3.6.2 Submit RD Deliverables for Approval	200.3.6	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
97	2.3.6.3 RD Approvals Period	200.3.6	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
98	2.3.6.4 Receive Requirements Definition Approval	200.3.6	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
99	2.3.6.5 Preliminary Design	200.3.6	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
100	2.3.6.6 Submit PD Deliverables for Approval	200.3.6	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
101	2.3.6.7 PD Approvals Period	200.3.6	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
102	2.3.6.8 Receive Preliminary Design Approval	200.3.6	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
103	2.3.6.9 Detailed Design	200.3.6	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
104	2.3.6.10 Submit DD Deliverables for Approval	200.3.6	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
105	2.3.6.11 DD Approvals Period	200.3.6	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
106	2.3.6.12 Receive Detailed Design Approval	200.3.6	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
107	**2.4 HAYMARKET OCEAN TERMINAL**	**200.4**	**368 days**	**Fri 01/07/05**	**Thu 30/11/06**	**88,100 hrs**
108	**2.4.1 Haymarket (exc) - Shandwick Place (inc)**	**200.4.1**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**8,175 hrs**
109	2.4.1.1 Requirements Definition	200.3.6	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
110	2.4.1.2 Submit RD Deliverables for Approval	200.3.6	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
111	2.4.1.3 RD Approvals Period	200.3.6	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
112	2.4.1.4 Receive Requirements Definition Approval	200.3.6	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
113	2.4.1.5 Preliminary Design	200.3.6	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
114	2.4.1.6 Submit PD Deliverables for Approval	200.3.6	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
115	2.4.1.7 PD Approvals Period	200.3.6	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
116	2.4.1.8 Receive Preliminary Design Approval	200.3.6	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
117	2.4.1.9 Detailed Design	200.3.6	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
118	2.4.1.10 Submit DD Deliverables for Approval	200.3.6	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
119	2.4.1.11 DD Approvals Period	200.3.6	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
120	2.4.1.12 Receive Detailed Design Approval	200.3.6	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
121	**2.4.2 Shandwick Place (exc) - Princes Street West (inc)**	**200.4.1**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**8,175 hrs**
122	2.4.2.1 Requirements Definition	200.4.1	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
123	2.4.2.2 Submit RD Deliverables for Approval	200.4.1	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
124	2.4.2.3 RD Approvals Period	200.4.1	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
125	2.4.2.4 Receive Requirements Definition Approval	200.4.1	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
126	2.4.2.5 Preliminary Design	200.4.1	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
127	2.4.2.6 Submit PD Deliverables for Approval	200.4.1	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
128	2.4.2.7 PD Approvals Period	200.4.1	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
129	2.4.2.8 Receive Preliminary Design Approval	200.4.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
130	2.4.2.9 Detailed Design	200.4.1	63 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
131	2.4.2.10 Submit DD Deliverables for Approval	200.4.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
132	2.4.2.11 DD Approvals Period	200.4.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
133	2.4.2.12 Receive Detailed Design Approval	200.4.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
134	**2.4.3 Princes Street West (exc) - Waverley Bridge (inc)**	**200.4.1**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**8,175 hrs**
135	2.4.3.1 Requirements Definition	200.4.1	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
136	2.4.3.2 Submit RD Deliverables for Approval	200.4.1	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
137	2.4.3.3 RD Approvals Period	200.4.1	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
138	2.4.3.4 Receive Requirements Definition Approval	200.4.1	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
139	2.4.3.5 Preliminary Design	200.4.1	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
140	2.4.3.6 Submit PD Deliverables for Approval	200.4.1	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
141	2.4.3.7 PD Approvals Period	200.4.1	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

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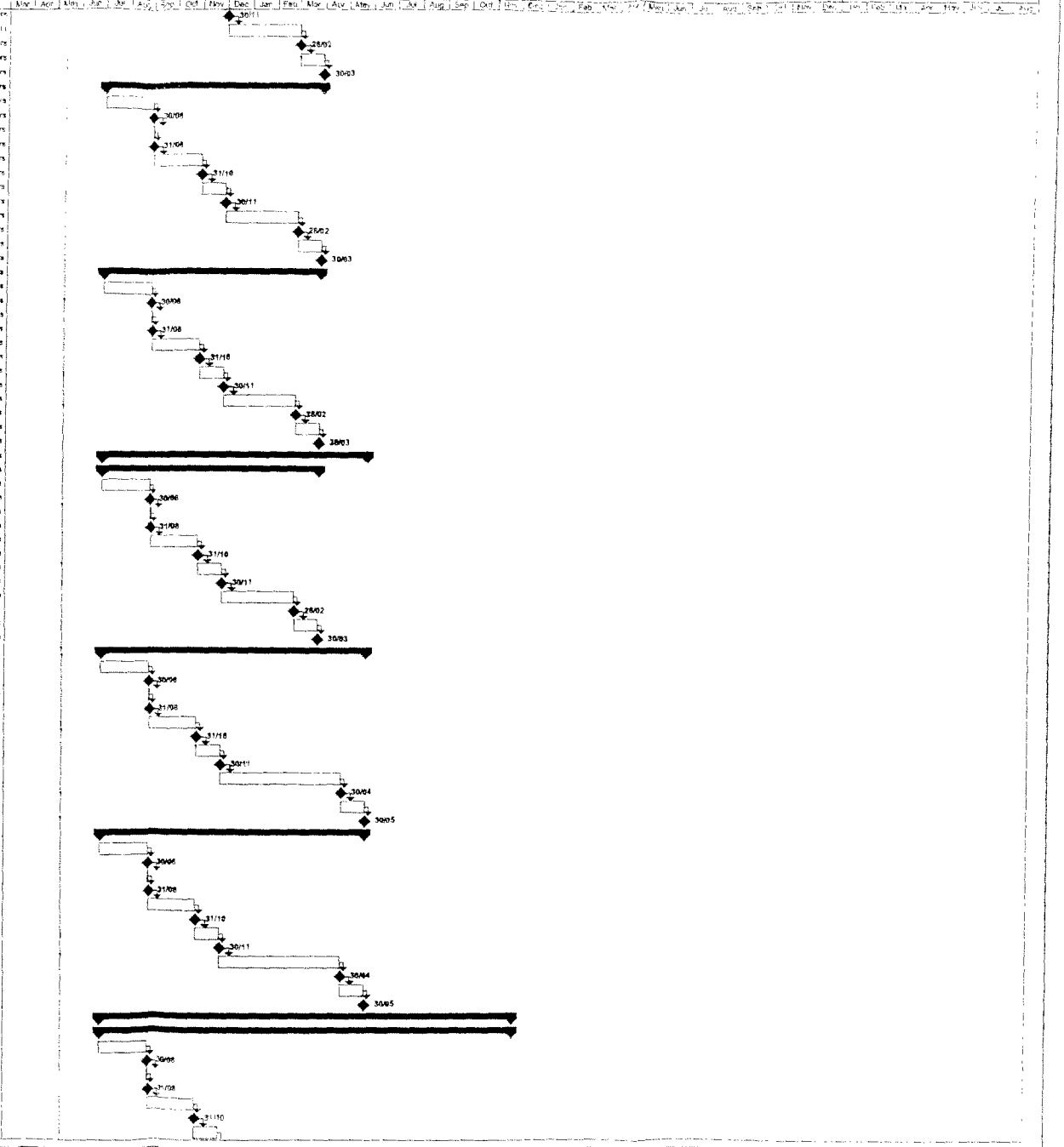
Edinburgh Tram Network - Lines One & Two - System Design Services - Outline Design Programme

ID	Task Name	WBS	Duration	Start	Finish	Work
162	2.4.3.8 Receive Preliminary Design Approval	200.4.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
163	2.4.3.9 Detailed Design	200.4.1	83 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
164	2.4.3.10 Submit DD Deliverables for Approval	200.4.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
165	2.4.3.11 DD Approvals Period	200.4.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
166	2.4.3.12 Receive Detailed Design Approval	200.4.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
167	**2.4.4 Waverley Bridge (exc) - St. Andrew Square (inc)**	**200.4.1**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**8,175 hrs**
168	2.4.4.1 Requirements Definition	200.4.1	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
169	2.4.4.2 Submit RD Deliverables for Approval	200.4.1	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
170	2.4.4.3 RD Approvals Period	200.4.1	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
171	2.4.4.4 Receive Requirements Definition Approval	200.4.1	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
172	2.4.4.5 Preliminary Design	200.4.1	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
173	2.4.4.6 Submit PD Deliverables for Approval	200.4.1	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
174	2.4.4.7 PD Approvals Period	200.4.1	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
175	2.4.4.8 Receive Preliminary Design Approval	200.4.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
176	2.4.4.9 Detailed Design	200.4.1	83 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
177	2.4.4.10 Submit DD Deliverables for Approval	200.4.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
178	2.4.4.11 DD Approvals Period	200.4.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
179	2.4.4.12 Receive Detailed Design Approval	200.4.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
180	**2.4.5 St. Andrew Square (exc) - Picardy Place (inc)**	**200.4.2**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**8,175 hrs**
181	2.4.5.1 Requirements Definition	200.4.2	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
182	2.4.5.2 Submit RD Deliverables for Approval	200.4.2	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
183	2.4.5.3 RD Approvals Period	200.4.2	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
184	2.4.5.4 Receive Requirements Definition Approval	200.4.2	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
185	2.4.5.5 Preliminary Design	200.4.2	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
186	2.4.5.6 Submit PD Deliverables for Approval	200.4.2	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
187	2.4.5.7 PD Approvals Period	200.4.2	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
188	2.4.5.8 Receive Preliminary Design Approval	200.4.2	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
189	2.4.5.9 Detailed Design	200.4.2	83 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
190	2.4.5.10 Submit DD Deliverables for Approval	200.4.2	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
191	2.4.5.11 DD Approvals Period	200.4.2	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
192	2.4.5.12 Receive Detailed Design Approval	200.4.2	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
193	**2.4.6 Picardy Place (exc) - Foot of the Walk (inc)**	**200.4.3**	**238 days**	**Fri 01/07/05**	**Tue 30/05/06**	**24,525 hrs**
194	**2.4.6.1 Picardy Place (exc) - Macdonald Road (inc)**	**200.4.3**	**193 days**	**Fri 01/07/05**	**Thu 30/03/06**	**8,175 hrs**
195	2.4.6.1.1 Requirements Definition	200.4.3	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
196	2.4.6.1.2 Submit RD Deliverables for Approval	200.4.3	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
197	2.4.6.1.3 RD Approvals Period	200.4.3	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
198	2.4.6.1.4 Receive Requirements Definition Approval	200.4.3	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
199	2.4.6.1.5 Preliminary Design	200.4.3	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
200	2.4.6.1.6 Submit PD Deliverables for Approval	200.4.3	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
201	2.4.6.1.7 PD Approvals Period	200.4.3	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
202	2.4.6.1.8 Receive Preliminary Design Approval	200.4.3	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
203	2.4.6.1.9 Detailed Design	200.4.3	83 days	Thu 01/12/05	Tue 28/02/06	4,987.5 hrs
204	2.4.6.1.10 Submit DD Deliverables for Approval	200.4.3	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
205	2.4.6.1.11 DD Approvals Period	200.4.3	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
206	2.4.6.1.12 Receive Detailed Design Approval	200.4.3	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
207	**2.4.6.2 Macdonald Road (exc) - Balfour Station (inc)**	**200.4.3**	**236 days**	**Fri 01/07/05**	**Tue 30/05/06**	**8,175 hrs**
208	2.4.6.2.1 Requirements Definition	200.4.3	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
209	2.4.6.2.2 Submit RD Deliverables for Approval	200.4.3	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
210	2.4.6.2.3 RD Approvals Period	200.4.3	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
211	2.4.6.2.4 Receive Requirements Definition Approval	200.4.3	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
212	2.4.6.2.5 Preliminary Design	200.4.3	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
213	2.4.6.2.6 Submit PD Deliverables for Approval	200.4.3	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
214	2.4.6.2.7 PD Approvals Period	200.4.3	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
215	2.4.6.2.8 Receive Preliminary Design Approval	200.4.3	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
216	2.4.6.2.9 Detailed Design	200.4.3	106 days	Thu 01/12/05	Sun 30/04/06	4,987.5 hrs
217	2.4.6.2.10 Submit DD Deliverables for Approval	200.4.3	0 days	Sun 30/04/06	Sun 30/04/06	0 hrs
218	2.4.6.2.11 DD Approvals Period	200.4.3	22 days	Mon 01/05/06	Tue 30/05/06	0 hrs
219	2.4.6.2.12 Receive Detailed Design Approval	200.4.3	0 days	Tue 30/05/06	Tue 30/05/06	0 hrs
220	**2.4.6.3 Balfour Station (exc) - Foot of the Walk (inc)**	**200.4.3**	**236 days**	**Fri 01/07/05**	**Tue 30/05/06**	**8,175 hrs**
221	2.4.6.3.1 Requirements Definition	200.4.3	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
222	2.4.6.3.2 Submit RD Deliverables for Approval	200.4.3	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
223	2.4.6.3.3 RD Approvals Period	200.4.3	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
224	2.4.6.3.4 Receive Requirements Definition Approval	200.4.3	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
225	2.4.6.3.5 Preliminary Design	200.4.3	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
226	2.4.6.3.6 Submit PD Deliverables for Approval	200.4.3	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
227	2.4.6.3.7 PD Approvals Period	200.4.3	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
228	2.4.6.3.8 Receive Preliminary Design Approval	200.4.3	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
229	2.4.6.3.9 Detailed Design	200.4.3	106 days	Thu 01/12/05	Sun 30/04/06	4,987.5 hrs
230	2.4.6.3.10 Submit DD Deliverables for Approval	200.4.3	0 days	Sun 30/04/06	Sun 30/04/06	0 hrs
231	2.4.6.3.11 DD Approvals Period	200.4.3	22 days	Mon 01/05/06	Tue 30/05/06	0 hrs
232	2.4.6.3.12 Receive Detailed Design Approval	200.4.3	0 days	Tue 30/05/06	Tue 30/05/06	0 hrs
233	**2.4.7 Foot of the Walk (exc) - Ocean Drive (inc)**	**200.4.4**	**366 days**	**Fri 01/07/05**	**Thu 30/11/06**	**16,350 hrs**
234	**2.4.7.1 Foot of the Walk (exc) - Constitution Street (inc)**	**200.4.4**	**366 days**	**Fri 01/07/05**	**Thu 30/11/06**	**8,175 hrs**
235	2.4.7.1.1 Requirements Definition	200.4.4	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
236	2.4.7.1.2 Submit RD Deliverables for Approval	200.4.4	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
237	2.4.7.1.3 RD Approvals Period	200.4.4	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
238	2.4.7.1.4 Receive Requirements Definition Approval	200.4.4	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
239	2.4.7.1.5 Preliminary Design	200.4.4	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
240	2.4.7.1.6 Submit PD Deliverables for Approval	200.4.4	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
241	2.4.7.1.7 PD Approvals Period	200.4.4	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs



Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

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Edinburgh Tram Network - Lines One & Two - System Design Services - Outline Design Programme

ID	Task Name	WBS	Duration	Start	Finish	Work
242	2.4.7.1.8 Receive Preliminary Design Approval	200.4.4	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
243	2.4.7.1.9 Detailed Design	200.4.4	238 days	Thu 01/12/05	Tue 31/10/06	4,987.5 hrs
244	2.4.7.1.10 Submit DD Deliverables for Approval	200.4.4	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
245	2.4.7.1.11 DD Approvals Period	200.4.4	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
246	2.4.7.1.12 Receive Detailed Design Approval	200.4.4	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
247	2.4.7.2 Constitution Street (exc) - Ocean Drive (inc)	200.4.4	368 days	Fri 01/07/05	Thu 30/11/06	8,175 hrs
248	2.4.7.2.1 Requirements Definition	200.4.4	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
249	2.4.7.2.2 Submit RD Deliverables for Approval	200.4.4	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
250	2.4.7.2.3 RD Approvals Period	200.4.4	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
251	2.4.7.2.4 Receive Requirements Definition Approval	200.4.4	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
252	2.4.7.2.5 Preliminary Design	200.4.4	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
253	2.4.7.2.6 Submit PD Deliverables for Approval	200.4.4	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
254	2.4.7.2.7 PD Approvals Period	200.4.4	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
255	2.4.7.2.8 Receive Preliminary Design Approval	200.4.4	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
256	2.4.7.2.9 Detailed Design	200.4.4	238 days	Thu 01/12/05	Tue 31/10/06	4,987.5 hrs
257	2.4.7.2.10 Submit DD Deliverables for Approval	200.4.4	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
258	2.4.7.2.11 DD Approvals Period	200.4.4	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
259	2.4.7.2.12 Receive Detailed Design Approval	200.4.4	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
260	2.4.8 Ocean Drive (exc) - Ocean Terminal (inc)	200.4.5	368 days	Fri 01/07/05	Thu 30/11/06	8,175 hrs
261	2.4.8.1 Requirements Definition	200.4.5	42 days	Fri 01/07/05	Tue 30/08/05	1,612.5 hrs
262	2.4.8.2 Submit RD Deliverables for Approval	200.4.5	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
263	2.4.8.3 RD Approvals Period	200.4.5	1 day	Wed 31/08/05	Wed 31/08/05	0 hrs
264	2.4.8.4 Receive Requirements Definition Approval	200.4.5	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
265	2.4.8.5 Preliminary Design	200.4.5	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
266	2.4.8.6 Submit PD Deliverables for Approval	200.4.5	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
267	2.4.8.7 PD Approvals Period	200.4.5	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs
268	2.4.8.8 Receive Preliminary Design Approval	200.4.5	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
269	2.4.8.9 Detailed Design	200.4.5	238 days	Thu 01/12/05	Tue 31/10/06	4,987.5 hrs
270	2.4.8.10 Submit DD Deliverables for Approval	200.4.5	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
271	2.4.8.11 DD Approvals Period	200.4.5	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
272	2.4.8.12 Receive Detailed Design Approval	200.4.5	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
273	2.4.9 Leith Depot & Connections	200.4.6	383 days	Mon 03/10/05	Thu 02/11/06	8,175 hrs
274	2.4.9.1 Requirements Definition	200.4.6	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
275	2.4.9.2 Submit RD Deliverables for Approval	200.4.6	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
276	2.4.9.3 RD Approvals Period	200.4.6	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
277	2.4.9.4 Receive Requirements Definition Approval	200.4.6	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
278	2.4.9.5 Preliminary Design	200.4.6	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
279	2.4.9.6 Submit PD Deliverables for Approval	200.4.6	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
280	2.4.9.7 PD Approvals Period	200.4.6	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
281	2.4.9.8 Receive Preliminary Design Approval	200.4.6	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
282	2.4.9.9 Detailed Design	200.4.6	133 days	Fri 31/03/06	Tue 03/10/06	4,987.5 hrs
283	2.4.9.10 Submit DD Deliverables for Approval	200.4.6	0 days	Tue 03/10/06	Tue 03/10/06	0 hrs
284	2.4.9.11 DD Approvals Period	200.4.6	22 days	Wed 04/10/06	Thu 02/11/06	0 hrs
285	2.4.9.12 Receive Detailed Design Approval	200.4.6	0 days	Thu 02/11/06	Thu 02/11/06	0 hrs
286	2.5 HAYMARKET CREWE TOLL	200.5	383 days	Mon 03/10/05	Thu 30/11/06	32,700 hrs
287	2.5.1 Roseburn Junction (exc) - Roseburn (inc)	200.5.1	383 days	Mon 03/10/05	Thu 30/11/06	8,175 hrs
288	2.5.1.1 Requirements Definition	200.5.1	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
289	2.5.1.2 Submit RD Deliverables for Approval	200.5.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
290	2.5.1.3 RD Approvals Period	200.5.1	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
291	2.5.1.4 Receive Requirements Definition Approval	200.5.1	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
292	2.5.1.5 Preliminary Design	200.5.1	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
293	2.5.1.6 Submit PD Deliverables for Approval	200.5.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
294	2.5.1.7 PD Approvals Period	200.5.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
295	2.5.1.8 Receive Preliminary Design Approval	200.5.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
296	2.5.1.9 Detailed Design	200.5.1	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
297	2.5.1.10 Submit DD Deliverables for Approval	200.5.1	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
298	2.5.1.11 DD Approvals Period	200.5.1	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
299	2.5.1.12 Receive Detailed Design Approval	200.5.1	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
300	2.5.2 Roseburn (exc) - Ravelston Dykes (inc)	200.5.2	383 days	Mon 03/10/05	Thu 30/11/06	8,175 hrs
301	2.5.2.1 Requirements Definition	200.5.2	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
302	2.5.2.2 Submit RD Deliverables for Approval	200.5.2	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
303	2.5.2.3 RD Approvals Period	200.5.2	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
304	2.5.2.4 Receive Requirements Definition Approval	200.5.2	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
305	2.5.2.5 Preliminary Design	200.5.2	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
306	2.5.2.6 Submit PD Deliverables for Approval	200.5.2	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
307	2.5.2.7 PD Approvals Period	200.5.2	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
308	2.5.2.8 Receive Preliminary Design Approval	200.5.2	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
309	2.5.2.9 Detailed Design	200.5.2	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
310	2.5.2.10 Submit DD Deliverables for Approval	200.5.2	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
311	2.5.2.11 DD Approvals Period	200.5.2	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
312	2.5.2.12 Receive Detailed Design Approval	200.5.2	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
313	2.5.3 Ravelston Dykes (exc) - Craigleith (inc)	200.5.3	383 days	Mon 03/10/05	Thu 30/11/06	8,175 hrs
314	2.5.3.1 Requirements Definition	200.5.3	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
315	2.5.3.2 Submit RD Deliverables for Approval	200.5.3	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
316	2.5.3.3 RD Approvals Period	200.5.3	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
317	2.5.3.4 Receive Requirements Definition Approval	200.5.3	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
318	2.5.3.5 Preliminary Design	200.5.3	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
319	2.5.3.6 Submit PD Deliverables for Approval	200.5.3	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
320	2.5.3.7 PD Approvals Period	200.5.3	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
321	2.5.3.8 Receive Preliminary Design Approval	200.5.3	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

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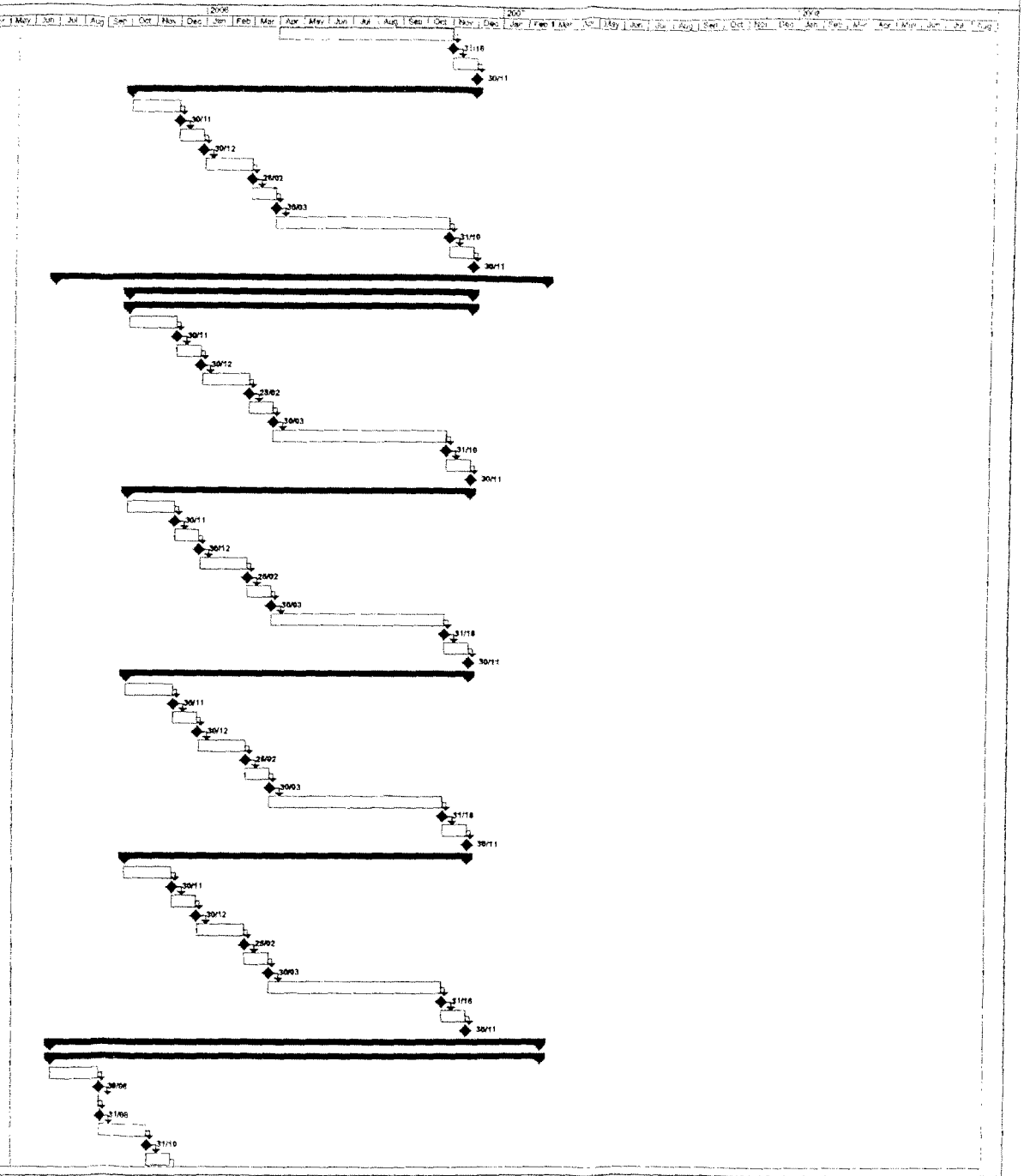
Edinburgh Tram Network - Lines One & Two - System Design Services - Outline Design Programme

ID	Task Name	WBS	Duration	Start	Finish	Work
322	2.5.3.9 Detailed Design	200.5.3	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
323	2.5.3.10 Submit DD Deliverables for Approval	200.5.3	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
324	2.5.3.11 DD Approvals Period	200.5.3	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
325	2.5.3.12 Receive Detailed Design Approval	200.5.3	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
326	**2.5.4 Craigleith (exc) - W. General Hospital - Crewe Toll (inc)**	**200.5.4**	**383 days**	**Mon 03/10/05**	**Thu 30/11/06**	**8,175 hrs**
327	2.5.4.1 Requirements Definition	200.5.4	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
328	2.5.4.2 Submit RD Deliverables for Approval	200.5.4	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
329	2.5.4.3 RD Approvals Period	200.5.4	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
330	2.5.4.4 Receive Requirements Definition Approval	200.5.4	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
331	2.5.4.5 Preliminary Design	200.5.4	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
332	2.5.4.6 Submit PD Deliverables for Approval	200.5.4	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
333	2.5.4.7 PD Approvals Period	200.5.4	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
334	2.5.4.8 Receive Preliminary Design Approval	200.5.4	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
335	2.5.4.9 Detailed Design	200.5.4	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
336	2.5.4.10 Submit DD Deliverables for Approval	200.5.4	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
337	2.5.4.11 DD Approvals Period	200.5.4	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
338	2.5.4.12 Receive Detailed Design Approval	200.5.4	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
339	**2.6 CREWE TOLL OCEAN TERMINAL**	**200.6**	**432 days**	**Fri 01/07/05**	**Wed 28/02/07**	**65,400 hrs**
340	**2.6.1 Crewe Toll (exc) - Granton Square (inc)**	**200.6.1**	**383 days**	**Mon 03/10/05**	**Thu 30/11/06**	**32,700 hrs**
341	**2.6.1.1 Crewe Toll (exc) - W. Granton (inc)**	**200.6.1**	**383 days**	**Mon 03/10/05**	**Thu 30/11/06**	**8,175 hrs**
342	2.6.1.1.1 Requirements Definition	200.6.1	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
343	2.6.1.1.2 Submit RD Deliverables for Approval	200.6.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
344	2.6.1.1.3 RD Approvals Period	200.6.1	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
345	2.6.1.1.4 Receive Requirements Definition Approval	200.6.1	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
346	2.6.1.1.5 Preliminary Design	200.6.1	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
347	2.6.1.1.6 Submit PD Deliverables for Approval	200.6.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
348	2.6.1.1.7 PD Approvals Period	200.6.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
349	2.6.1.1.8 Receive Preliminary Design Approval	200.6.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
350	2.6.1.1.9 Detailed Design	200.6.1	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
351	2.6.1.1.10 Submit DD Deliverables for Approval	200.6.1	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
352	2.6.1.1.11 DD Approvals Period	200.6.1	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
353	2.6.1.1.12 Receive Detailed Design Approval	200.6.1	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
354	**2.6.1.2 W. Granton (exc) - Carolina Park (inc)**	**200.6.1**	**383 days**	**Mon 03/10/05**	**Thu 30/11/06**	**8,175 hrs**
355	2.6.1.2.1 Requirements Definition	200.6.1	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
356	2.6.1.2.2 Submit RD Deliverables for Approval	200.6.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
357	2.6.1.2.3 RD Approvals Period	200.6.1	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
358	2.6.1.2.4 Receive Requirements Definition Approval	200.6.1	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
359	2.6.1.2.5 Preliminary Design	200.6.1	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
360	2.6.1.2.6 Submit PD Deliverables for Approval	200.6.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
361	2.6.1.2.7 PD Approvals Period	200.6.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
362	2.6.1.2.8 Receive Preliminary Design Approval	200.6.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
363	2.6.1.2.9 Detailed Design	200.6.1	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
364	2.6.1.2.10 Submit DD Deliverables for Approval	200.6.1	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
365	2.6.1.2.11 DD Approvals Period	200.6.1	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
366	2.6.1.2.12 Receive Detailed Design Approval	200.6.1	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
367	**2.6.1.3 Carolina Park (exc) - Granton Waterfront (inc)**	**200.6.1**	**383 days**	**Mon 03/10/05**	**Thu 30/11/06**	**8,175 hrs**
368	2.6.1.3.1 Requirements Definition	200.6.1	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
369	2.6.1.3.2 Submit RD Deliverables for Approval	200.6.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
370	2.6.1.3.3 RD Approvals Period	200.6.1	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
371	2.6.1.3.4 Receive Requirements Definition Approval	200.6.1	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
372	2.6.1.3.5 Preliminary Design	200.6.1	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
373	2.6.1.3.6 Submit PD Deliverables for Approval	200.6.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
374	2.6.1.3.7 PD Approvals Period	200.6.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
375	2.6.1.3.8 Receive Preliminary Design Approval	200.6.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
376	2.6.1.3.9 Detailed Design	200.6.1	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
377	2.6.1.3.10 Submit DD Deliverables for Approval	200.6.1	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
378	2.6.1.3.11 DD Approvals Period	200.6.1	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
379	2.6.1.3.12 Receive Detailed Design Approval	200.6.1	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
380	**2.6.1.4 Granton Waterfront (exc) - Granton Square (inc)**	**200.6.1**	**383 days**	**Mon 03/10/05**	**Thu 30/11/06**	**8,175 hrs**
381	2.6.1.4.1 Requirements Definition	200.6.1	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
382	2.6.1.4.2 Submit RD Deliverables for Approval	200.6.1	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
383	2.6.1.4.3 RD Approvals Period	200.6.1	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
384	2.6.1.4.4 Receive Requirements Definition Approval	200.6.1	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
385	2.6.1.4.5 Preliminary Design	200.6.1	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
386	2.6.1.4.6 Submit PD Deliverables for Approval	200.6.1	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
387	2.6.1.4.7 PD Approvals Period	200.6.1	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
388	2.6.1.4.8 Receive Preliminary Design Approval	200.6.1	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
389	2.6.1.4.8 Detailed Design	200.6.1	153 days	Fri 31/03/06	Tue 31/10/06	4,987.5 hrs
390	2.6.1.4.10 Submit DD Deliverables for Approval	200.6.1	0 days	Tue 31/10/06	Tue 31/10/06	0 hrs
391	2.6.1.4.11 DD Approvals Period	200.6.1	22 days	Wed 01/11/06	Thu 30/11/06	0 hrs
392	2.6.1.4.12 Receive Detailed Design Approval	200.6.1	0 days	Thu 30/11/06	Thu 30/11/06	0 hrs
393	**2.6.2 Granton Square (exc) - Ocean Terminal (inc)**	**200.6.2**	**432 days**	**Fri 01/07/05**	**Wed 28/02/07**	**32,700 hrs**
394	**2.6.2.1 Sea Wall Survey**	**200.6.2**	**432 days**	**Fri 01/07/05**	**Wed 28/02/07**	**8,175 hrs**
395	2.6.2.1.1 Requirements Definition	200.6.2	42 days	Fri 01/07/05	Thu 30/08/05	1,612.5 hrs
396	2.6.2.1.2 Submit RD Deliverables for Approval	200.6.2	0 days	Tue 30/08/05	Tue 30/08/05	0 hrs
397	2.6.2.1.3 RD Approvals Period	200.6.2	1 day	Wed 31/08/05	Wed 31/08/05	8 hrs
398	2.6.2.1.4 Receive Requirements Definition Approval	200.6.2	0 days	Wed 31/08/05	Wed 31/08/05	0 hrs
399	2.6.2.1.5 Preliminary Design	200.6.2	43 days	Thu 01/09/05	Mon 31/10/05	1,575 hrs
400	2.6.2.1.6 Submit PD Deliverables for Approval	200.6.2	0 days	Mon 31/10/05	Mon 31/10/05	0 hrs
401	2.6.2.1.7 PD Approvals Period	200.6.2	22 days	Tue 01/11/05	Wed 30/11/05	0 hrs 1



Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

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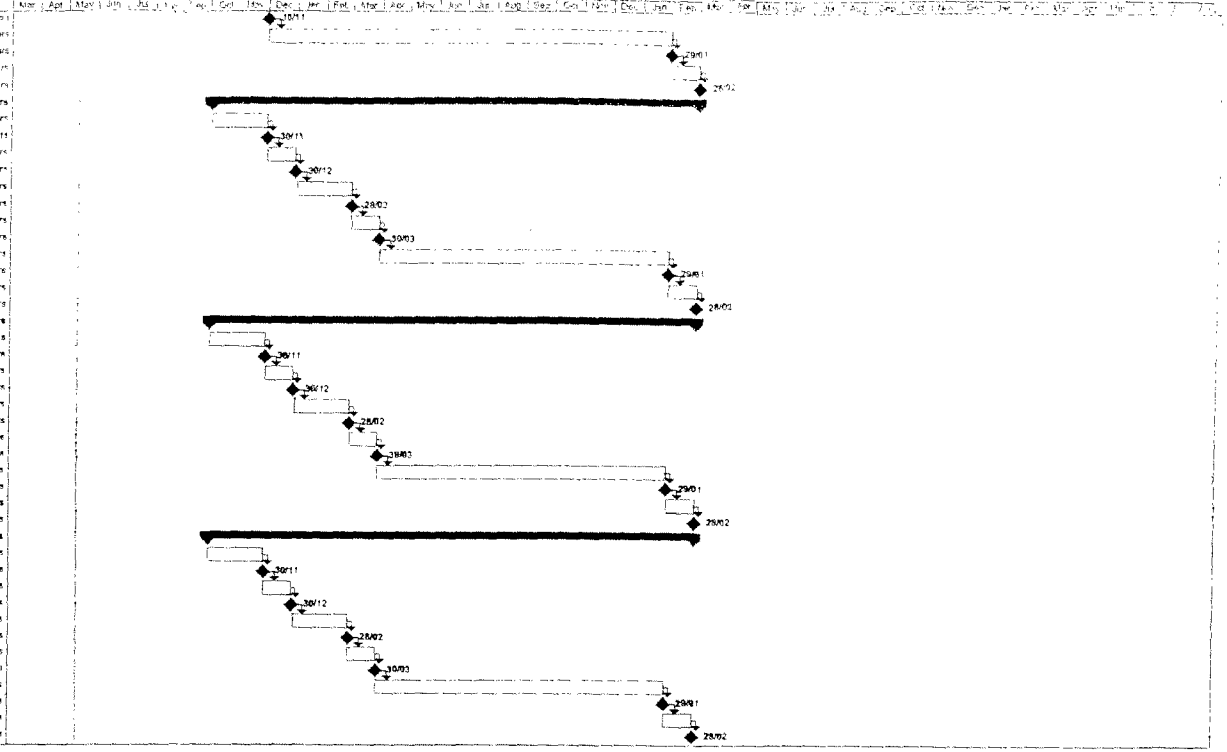
Edinburgh Tram Network - Lines One & Two - System Design Services - Outline Design Programme

ID	Task Name	WBS	Duration	Start	Finish	Work
402	2.6.2.1.8 Receive Preliminary Design Approval	200.6.2	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
403	2.6.2.1.9 Detailed Design	200.6.2	162 days	Thu 01/12/05	Mon 29/01/07	4,987.5 hrs
404	2.6.2.1.10 Submit DD Deliverables for Approval	200.6.2	0 days	Mon 29/01/07	Mon 29/01/07	0 hrs
405	2.6.2.1.11 DD Approvals Period	200.6.2	22 days	Tue 30/01/07	Wed 28/02/07	0 hrs
406	2.6.2.1.12 Receive Detailed Design Approval	200.6.2	0 days	Wed 28/02/07	Wed 28/02/07	0 hrs
407	**2.6.2.2 Granton Square (exc) - Lower Granton Road (inc)**	**200.6.2**	**367 days**	**Mon 03/10/05**	**Wed 28/02/07**	**8,175 hrs**
408	2.6.2.2.1 Requirements Definition	200.6.2	42 days	Mon 03/10/05	Wed 30/11/05	1,575 hrs
409	2.6.2.2.2 Submit RD Deliverables for Approval	200.6.2	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
410	2.6.2.2.3 RD Approvals Period	200.6.2	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
411	2.6.2.2.4 Receive Requirements Definition Approval	200.6.2	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
412	2.6.2.2.5 Preliminary Design	200.6.2	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
413	2.6.2.2.6 Submit PD Deliverables for Approval	200.6.2	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
414	2.6.2.2.7 PD Approvals Period	200.6.2	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
415	2.6.2.2.8 Receive Preliminary Design Approval	200.6.2	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
416	2.6.2.2.9 Detailed Design	200.6.2	217 days	Fri 31/03/06	Mon 29/01/07	4,987.5 hrs
417	2.6.2.2.10 Submit DD Deliverables for Approval	200.6.2	0 days	Mon 29/01/07	Mon 29/01/07	0 hrs
418	2.6.2.2.11 DD Approvals Period	200.6.2	22 days	Tue 30/01/07	Wed 28/02/07	0 hrs
419	2.6.2.2.12 Receive Detailed Design Approval	200.6.2	0 days	Wed 28/02/07	Wed 28/02/07	0 hrs
420	**2.6.2.3 Lower Granton Road (exc) - Newhaven Road (inc)**	**200.6.2**	**367 days**	**Mon 03/10/05**	**Wed 28/02/07**	**8,175 hrs**
421	2.6.2.3.1 Requirements Definition	200.6.2	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
422	2.6.2.3.2 Submit RD Deliverables for Approval	200.6.2	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
423	2.6.2.3.3 RD Approvals Period	200.6.2	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
424	2.6.2.3.4 Receive Requirements Definition Approval	200.6.2	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
425	2.6.2.3.5 Preliminary Design	200.6.2	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
426	2.6.2.3.6 Submit PD Deliverables for Approval	200.6.2	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
427	2.6.2.3.7 PD Approvals Period	200.6.2	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
428	2.6.2.3.8 Receive Preliminary Design Approval	200.6.2	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
429	2.6.2.3.9 Detailed Design	200.6.2	217 days	Fri 31/03/06	Mon 29/01/07	4,987.5 hrs
430	2.6.2.3.10 Submit DD Deliverables for Approval	200.6.2	0 days	Mon 29/01/07	Mon 29/01/07	0 hrs
431	2.6.2.3.11 DD Approvals Period	200.6.2	22 days	Tue 30/01/07	Wed 28/02/07	0 hrs
432	2.6.2.3.12 Receive Detailed Design Approval	200.6.2	0 days	Wed 28/02/07	Wed 28/02/07	0 hrs
433	**2.6.2.4 Newhaven Road (exc) - Ocean Terminal (exc)**	**200.6.2**	**367 days**	**Mon 03/10/05**	**Wed 28/02/07**	**8,175 hrs**
434	2.6.2.4.1 Requirements Definition	200.6.2	43 days	Mon 03/10/05	Wed 30/11/05	1,612.5 hrs
435	2.6.2.4.2 Submit RD Deliverables for Approval	200.6.2	0 days	Wed 30/11/05	Wed 30/11/05	0 hrs
436	2.6.2.4.3 RD Approvals Period	200.6.2	21 days	Thu 01/12/05	Fri 30/12/05	0 hrs
437	2.6.2.4.4 Receive Requirements Definition Approval	200.6.2	0 days	Fri 30/12/05	Fri 30/12/05	0 hrs
438	2.6.2.4.5 Preliminary Design	200.6.2	42 days	Mon 02/01/06	Tue 28/02/06	1,575 hrs
439	2.6.2.4.6 Submit PD Deliverables for Approval	200.6.2	0 days	Tue 28/02/06	Tue 28/02/06	0 hrs
440	2.6.2.4.7 PD Approvals Period	200.6.2	22 days	Wed 01/03/06	Thu 30/03/06	0 hrs
441	2.6.2.4.8 Receive Preliminary Design Approval	200.6.2	0 days	Thu 30/03/06	Thu 30/03/06	0 hrs
442	2.6.2.4.9 Detailed Design	200.6.2	217 days	Fri 31/03/06	Mon 29/01/07	4,987.5 hrs
443	2.6.2.4.10 Submit DD Deliverables for Approval	200.6.2	0 days	Mon 29/01/07	Mon 29/01/07	0 hrs
444	2.6.2.4.11 DD Approvals Period	200.6.2	22 days	Tue 30/01/07	Wed 28/02/07	0 hrs
445	2.6.2.4.12 Receive Detailed Design Approval	200.6.2	0 days	Wed 28/02/07	Wed 28/02/07	0 hrs



Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | External Milestone | Deadline

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This is Schedule Five referred to in the foregoing Agreement between the Client and the SDS Provider

SCHEDULE FIVE

COMMERCIALLY SENSITIVE INFORMATION

The SDS Provider's bid in relation to the provision of the Services, sent under cover of the SDS Provider's formal offer dated 13th May 2005, together with the subsequent correspondence detailed within the definition of "Formal Offer" in this Agreement shall be considered as Commercially Sensitive Information for the purposes of this Agreement.

[redacted]

Director/Authorised Signatory

TIE LIMITED

[redacted]

Director/Authorised Signatory

PARSONS BRINCKERHOFF LIMITED

This is Schedule Six referred to in the foregoing Agreement between the Client and the SDS Provider

SCHEDULE SIX

REQUIRED INSURANCES

Part 1

Required insurances

1. PROFESSIONAL INDEMNITY INSURANCE

Insured Party:	The SDS Provider
Coverage:	The legal liability of the SDS Provider as a result of any negligent act, error, or omission in the performance of its professional activities and duties in connection with the Services.
Limit of Indemnity:	Minimum £10,000,000 on an each and every claim basis and on an aggregate basis in respect of pollution and contamination claims and date recognition claims. There is no requirement to maintain cover in respect of asbestos or terrorism related claims.
Period of Insurance:	From the Effective Date for 12 months and thereafter each further 12 month period until the earlier of 12 years from the completion by the SDS Provider of the Services and its obligations under this Agreement or 12 years from the Termination Date.
Extensions:	The insurance must include the following minimum extensions: General Indemnity to Principals/Main Contractors Vicarious Liability for Sub-Consultants Worldwide Jurisdiction
Maximum Permitted Deductible:	GBP 25,000 each and every claim.

2. THIRD PARTY LIABILITY INSURANCE

Insured Party:	The SDS Provider
Coverage:	The legal liability of the SDS Provider for death, injury, illness, disease contracted by third party persons or loss of or damage to property arising out of or in connection with the Services.
Limit of Indemnity:	Unlimited as to the number of occurrences in each 12 month period in respect of death or injury to persons. For all other occurrences, a minimum of £5,000,000 any one occurrence (unlimited as to number of occurrences in the Period of Insurance stated below) in respect of third party liability and £5,000,000 any one occurrence and in the aggregate in any one 12 month period of insurance in respect of products liability and in annual aggregate in respect of pollution and contamination claims.

Period of Insurance:	From the Effective Date for 12 months and thereafter each further 12 month period until the earlier of Termination Date or the completion by the SDS Provider of the Services and its obligations under this Agreement.
Minimum Extensions	The insurance must include the following minimum extensions: Contractual Liability Liability for loss or damage to buildings temporarily occupied Cross Liabilities Clause Includes Liability for Sub-Contractors Worldwide Jurisdiction Includes Minimum Network Rail and/or BAA Insurance Requirements
Maximum Permitted Deductible:	GBP 500 each and every loss in respect of property damage claims, nil excess for bodily injury claims.

3. EMPLOYERS LIABILITY INSURANCE

Insured Party:	The SDS Provider
Coverage:	The legal liability of the SDS Provider for death, injury, illness, disease contracted by employees of the SDS Provider caused by or arising out of or in connection with the Services.
Limit of Liability	Minimum limit of indemnity of £10,000,000 any one occurrence or series of occurrences arising from one original cause or event.
Period of Insurance:	From the Effective Date for 12 months and thereafter each further twelve month period until the earlier of the completion by the SDS Provider of the Services and its obligations under this Agreement or the Termination Date.
Extensions	The insurance must include the following minimum extensions: Contractual Liability Cross Liabilities Clause General Indemnity to Principals/Main Contractors Worldwide Jurisdiction
Maximum Permitted Deductible:	GBP 500 any one claim/occurrence

Part 2

Form of Brokers Letter of Undertaking

To: [THE CLIENT]

Dear Sirs

We confirm in our capacity as insurance brokers that the Required Insurances specified in Clause 17 (*Required Insurances*) and Schedule 6 *(Required Insurances)* of the Agreement dated ◆ between Parsons Brinckerhoff Limited (the "SDS Provider") and the Client as defined therein are, as at the date hereof, in effect in respect of the risks set out in the attached completed insurance questionnaire ref SLF/LED/310299/1/4515105 dated 7 and 11 April 2005 and clarified on 8 June 2005.

We have arranged the Required Insurances on the basis of the information and instructions given by the SDS Provider. We have not made any particular or special enquiries regarding the Required Insurances beyond those that we would normally make in the ordinary course of arranging the insurances on behalf of our insurance broking clients.

The confirmations set out in this letter are given by reference to our state of knowledge at the date hereof.

Pursuant to instructions received from the SDS Provider, we hereby undertake in respect of the interests of the SDS Provider and the Client in the Required Insurances referred to in the attached completed quetionnaires:

1. to use reasonable endeavours in order that the policy provides full coverage for the Required Insurances when the same is issued, substantially in the form set out in Schedule 6 (*Required Insurances*) of the Agreement;

2. to advise the Client :

   2.1 promptly after receiving notice of any insurer's cancellation or suspension of any of the Required Insurances or receiving notice of the intended cancellation or suspension of any of the Required Insurances;

   2.2 promptly upon our receipt from the SDS Provider of any notice of any changes proposed to be made to the Required Insurances which, if effected, would result in a material reduction in limits or coverage (including in respect of extensions of cover) or in an increase in deductibles, exclusions or exceptions;

   2.3 of any default in the payment of any premium for any of the Required Insurances;

   2.4 at least 14 days prior to the expiry of any of the Required Insurances if we have not received written renewal instructions from the SDS Provider or if we receive written instructions to renew, to advise the Client of the details thereof; and

   2.5 on receipt of notice of any act or omission of the SDS Provider or any SDS Provider Party which will invalidate or render unenforceable in whole or in part, any of the Required Insurances;

3. no later than 14 days (in respect of certificates) and as soon as reasonably practicable in respect of policies, to supply you copies of certificates and confirmations of renewal and all policy documents (or confirmation of the terms of such policy documents where such policy documents cannot be made available) in respect of the Required Insurances;

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4. to disclose to the Client any fact, change of circumstance or occurrence is material to the risks insured against under the Required Insurances;

5. to treat as confidential all information in relation to the Required Insurances supplied to us by the SDS Provider or any SDS Provider Party or the Client and not to disclose, without the written consent of the Client, such information to any third party other than the insurers under the Required Insurances, unless required to do so by law or any regulatory authority; and

6. to notify the Client as soon as reasonably practicable prior to our ceasing to act as brokers to the SDS Provider, unless impracticable because of circumstances beyond our control, in which case we shall notify the Client as soon as reasonably practicable upon becoming aware that we shall cease, or have ceased, so to act.

Where insurers wish any of the Required Insurances to be cancelled for reasons of non-payment of premium, we will request those insurers to give you a reasonable opportunity of paying such amounts outstanding before issuing notice of cancellation on behalf of such insurers.

The above undertakings are given subject to our continuing appointment for the time being as insurance brokers to the SDS Provider in relation to the Required Insurances concerned and the monitoring and handling of claims in relation to the SDS Provider, and our obligations set out in this letter shall automatically cease upon termination of our appointment.

For the avoidance of doubt all undertakings and other confirmations given in this letter relate solely to the Required Insurances. They do not apply to any other insurances and nothing in this letter should be taken as providing any undertakings or confirmations in relation to any other such insurance that ought to have been placed or may at some future date be placed by other brokers.

This letter is given by us on the instructions of the SDS Provider and with the SDS Provider's full knowledge and consent as to its terms as evidenced by the SDS Provider's signature below for each and every correspondence that may be necessary.

This letter shall be governed by and shall be construed in accordance with Scots Law and any dispute as to its terms shall be submitted to the exclusive jurisdiction of the courts of Scotland.

Yours faithfully

.....

For and on behalf of (Insurance Broker)

.....

For and on behalf of (The SDS Provider)

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Part 3

Insurance Questionnaire

1.0	PUBLIC & PRODUCTS LIABILITY	
1.1	Name & Address of Insurers	
1.2	Policy Number(s)	
1.3	Renewal Date	
1.4	Limits of Indemnity in respect of (Please state whether any one occurrence or in the aggregate)	
	a. Public Liability	£
	b. Products Liability	£
	c. Subsidence, Collapse, Vibration or Removal or Weakening of Support	£
	d. Fire & Explosion	£
	e. Pollution	£
	f. Any other "inner" limit	£
1.5	Is the policy subject to a heat warranty or condition of any sort and/or any height or depth restrictions. If so attach copies?	YES/NO
1.6	Is Contractual Liability included?	YES/NO
1.7	Does the policy include liability for damage to premises temporarily occupied for the performance of works therein or thereon?	YES/NO
1.8	Does the policy include a cross liability provision and a General Indemnity to Principals/Main Contractors Clause?	YES/NO
1.9	What limitations apply in respect of cover for loss or damage due to defective design, workmanship or materials?	
1.10	What excess(es) are applicable?	
1.11	Is the policy extended to include financial loss?	YES/NO (If YES state limit £)
1.12	Does the policy:	
	a) include liability for acts of sub-contractors	YES/NO
	b) Respond to judgements made outside the UK	YES/NO
1.13	Is cover subject to any material exclusions or limitations?	YES/NO

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	(If YES please supply copies thereof)	
1.14	**Have you ever undertaken or are you currently undertaking work on behalf of Network Rail or British Airports Authority ?** **(if yes please state which or both)**	YES/NO
1.15	**Does your policy extend to include the minimum insurance requirements of either Network Rail or British Airports Authority?** **(if yes please state which or both)**	YES/NO
2.0	**EMPLOYERS LIABILITY**	
2.1	**Name & Address of Insurers**	
2.2	**Policy Number(s)**	
2.3	**Renewal Date**	
2.4	**Limit of Indemnity**	£
2.5	**Is the policy subject to a heat warranty or condition of any sort and/or any height or depth restrictions? If so attach copies.**	YES/NO
2.6	**Is Contractual Liability included?**	YES/NO
2.7	**What is the definition of "employee"?**	
2.8	**Does the policy include a cross liability provision and a General Indemnity to Principals/Main Contractors Clause?**	YES/NO
2.9	**Does the policy respond to judgements made outside UK?**	YES/NO
3.0	**PROFESSIONAL INDEMNITY**	
3.1	**Name & Address of Insurers**	
3.2	**Policy Number(s)**	
3.3	**Renewal Date**	
3.4	**Limit of Indemnity**	i. any one event £ ii. in the aggregate £
3.5	**Scope of professional duties insured as stated in the policy.**	
3.6	**What excess(es) are applicable?**	
3.7	**Is cover included for sub-consultants?**	YES/NO
3.8	**Is cover included for the costs of mitigation of loss**	YES/NO
3.9	**Does the policy include a General Indemnity to Principals/Main Contractors Clause?**	YES/NO
3.10	**Is cover subject to any material**	YES/NO

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exclusions or limitations? **(If YES please supply copies thereof)**	
3.11 Does the policy respond to judgements made outside UK	YES/NO

DECLARATION:

We confirm that the foregoing details are accurate and that the above policies are subject to no special terms, conditions and exceptions other than those referred to above. We also confirm that all premiums due to date have been paid.

Signed .....

Position .....

Name .....

Date .....

For and on behalf of

.....

.....

.....

This form should be completed by your Insurers or your Registered Insurance Brokers ONLY.

The above information is agreed on behalf of the Tenderer by the Tenderer's Authorised Representative:

Name .....

Signed .....

For and on behalf of .....

Date .....

[redacted] [redacted]

Director/Authorised Signatory

TIE LIMITED

Director/Authorised Signatory

PARSONS BRINCKERHOFF LIMITED

This is Schedule Seven referred to in the foregoing Agreement between the Client and the SDS Provider

SCHEDULE SEVEN

COLLATERAL WARRANTY IN FAVOUR OF TIE



(1) PARSONS BRINCKERHOFF LIMITED

- and -

(2) TIE LIMITED

- and -

(3) [*INFRACO*]

COLLATERAL WARRANTY IN FAVOUR OF TIE FROM THE SDS PROVIDER

relating to

THE PROVISION OF SYSTEM DESIGN SERVICES FOR THE EDINBURGH TRAM NETWORK

AGREEMENT

BETWEEN

(1) **PARSONS BRINCKERHOFF LIMITED** (Company Number 2554514) whose registered office is at Amber Court, William Armstrong Drive, Newcastle Business Park, Newcastle Upon Tyne, NE4 7YQ (**"SDS Provider"**);

(2) **TIE LIMITED** (Company Number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ (**"tie"**) which term shall include its successors and permitted assignees); and

(3) **[INFRACO]** (Company Number ◆) whose registered office is at ◆ (**"Infraco"**).

BACKGROUND

A By an agreement in writing dated [◆] 2005 (the **"SDS Agreement"**), **tie** appointed the SDS Provider to provide system design services in connection with the Edinburgh Tram Network.

B **tie** and Infraco have entered into a contract under which Infraco has been appointed to complete the design and carry out the construction, installation, commissioning and maintenance planning in respect of the Edinburgh Tram Network.

C **tie** and Infraco have agreed, with the consent of the SDS Provider, that the Infraco shall take over the rights and liabilities of the "Client" under the SDS Agreement by novating the SDS Agreement from **tie** to Infraco upon and subject to the terms of the Novation Agreement (as hereinafter defined).

E It is a term of the SDS Agreement that the SDS Provider shall enter into this Agreement with **tie** following the execution of the Novation Agreement.

IT IS AGREED as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement the following words and expressions have the following meanings, unless the context requires otherwise:

"Agreement" means this document (as amended from time to time pursuant to Clause 14);

"Deliverables" means the Functional Requirements Specifications, the Technical Specifications and the items listed in Appendix 3 to Schedule 1 *(Scope of Services)* of the SDS Agreement, and all other documents, information, reports, records, diagrams, bills of quantities, manuals, schedules, databases, reinforcement details, photographs, formulae, consultation materials, plans, designs, specifications, drawings (including as-built drawings), details, calculations, transport and other models and simulations, the outputs and reports based on any models, programmes and all other material created and/or provided by the SDS Provider (and/or any SDS Provider Party or any other third party) in the performance of the Services and the SDS Provider's other obligations under the SDS Agreement;

"Infraco Contract" means the contract to be entered into or entered into by **tie** with the Infraco in relation to the completion of the design, and carrying out the construction, commissioning and maintenance planning in respect of the Edinburgh Tram Network;

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"Novation Agreement" means the novation agreement entered into among **tie**, the SDS Provider and the Infraco;

"Party" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

"SDS Agreement" means the agreement dated [◆] originally entered into by the SDS Provider and **tie**, which has been novated to the Infraco and the SDS Provider.

1.2 Unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender include all other genders.

1.2.2 a reference to:

1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a recital, clause or schedule is a reference to a recital, clause or schedule of or to this Agreement;

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation; and

1.4 Where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

1.5 Unless otherwise defined hereunder, where the SDS Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement;

1.6 In the case of any unintended conflict between the definition or interpretation of words or expressions in this Agreement and the SDS Agreement, the SDS Agreement shall prevail save where by express words or where it is apparent from the context that the contrary is intended in this Agreement.

2. STANDARD OF CARE

The SDS Provider warrants and undertakes to **tie** that:

2.1 it has carried out and shall carry out its Services and other duties and obligations under the SDS Agreement subject to and in accordance with the terms thereof; and

2.2 in addition to and without derogation from clause 2.1;

2.2.1 the SDS Provider warrants to **tie** that, in the performance of the Services and its other obligations under the SDS Agreement it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly

qualified and competent system design services provider experienced in performing services similar to the Services in connection with projects of a similar size, scope and complexity; and

2.2.2 it owes a duty of care to **tie** in carrying out its duties and obligations under the SDS Agreement.

3. COPYRIGHT LICENCE

3.1 The SDS Provider hereby grants to **tie** an irrevocable, perpetual, royalty-free and non-exclusive licence to use such Project IPR and SDS Provider IPR as may be necessary for **tie** to use in relation to any projects associated with the Services. This licence shall carry the right to grant sub-licences, and be freely transferable to third parties. The SDS Provider shall be liable for the Project IPR and the SDS Provider IPR only to the extent that it is used for the purposes for which it was intended.

3.2 In so far as ownership of the copyright and any other Intellectual Property Rights in any Deliverable prepared or provided by the SDS Provider in connection with the Edinburgh Tram Network is vested in any person other than the SDS Provider including, without limitation, any SDS Provider Party, the SDS Provider shall procure for **tie** the benefit of such a licence as is referred to in clause 3.1 for the purposes referred to therein.

3.3 The SDS Provider shall, if so requested at any time, execute such documents and perform such acts (including the grant to **tie** of a licence to use any SDS Provider Software and/or any Third Party Software and/or any Specially Written Software) as may be required fully and effectively to assure to **tie** or any third party the rights referred to in this clause 3.

3.4 The SDS Provider shall provide to **tie** a copy of any of the Deliverables as soon as reasonably practicable after receipt by the SDS Provider of a written request from **tie** to do so.

3.5 The SDS Provider undertakes to **tie** that the use by **tie** of any of the Deliverables for any purpose provided for in this clause 3 shall not infringe the rights of any third party in relation to the Deliverables.

4. REQUIRED INSURANCES

4.1 The SDS Provider undertakes that:

4.1.1 it has maintained and shall maintain during the performance of its obligations under the SDS Agreement each of the Required Insurances in accordance with the requirements of Clause 17 (*Required Insurances*) and Schedule 6 (*Required Insurances*) of the SDS Agreement;

4.1.2 cover under the professional indemnity insurance is extended to include the SDS Provider's liabilities under this Agreement;

4.1.3 this Agreement has been disclosed to the SDS Provider's current professional indemnity insurers or brokers (as the case may be) and shall be disclosed to any future professional indemnity insurers or brokers providing the insurance required by this Agreement; and

4.1.4 the SDS Provider shall abide by the terms and conditions of insurance and not do or omit to do anything that might prejudice the cover or its right to make a claim.

4.2 As and when required by **tie**, the SDS Provider shall produce for inspection documentary evidence that such insurance is being properly maintained.

4.3 The SDS Provider shall not make any material alteration to the terms of the Required Insurances without **tie's** prior approval which approval shall not be unreasonably withheld. If the insurer makes or attempts to make any material alteration or purports to withdraw cover, or if the SDS Provider is unable to obtain professional indemnity insurance, the SDS Provider shall promptly give notice of this to **tie**.

5. TIE STEP-IN

5.1 The SDS Provider shall not exercise nor seek to exercise any right of determination of the SDS Agreement or to rescind the SDS Agreement by reason of a Client Default or to otherwise discontinue the performance of any of the SDS Provider's obligations in relation to the SDS Agreement by reason of breach on the part of the Infraco (or otherwise) without giving to **tie** not less than 21 days' written notice of its intention to do so and specifying in such notice the grounds for the proposed determination. The SDS Provider shall for the period of any such notice diligently and properly continue to perform the SDS Provider's obligations under the SDS Agreement.

5.2 Any period stipulated in the SDS Agreement for the exercise by the SDS Provider of a right of determination shall nevertheless be extended as may be necessary to take account of the period of notice required under clause 5.1.

5.3 Compliance by the SDS Provider with the provisions of clause 5.1 shall not be treated as a waiver of any breach on the part of the Infraco giving rise to the right of determination nor otherwise prevent the SDS Provider from exercising its rights after the expiration of the notice unless the right of determination shall have ceased under the provisions of clause 5.4.

5.4 The right of the SDS Provider to determine the SDS Agreement or to rescind the SDS Agreement or to discontinue the performance of any of its obligations in relation to the SDS Agreement shall cease if within the period of 21 days referred to in clause 5.1, **tie** gives written notice to the SDS Provider:

5.4.1 requiring the SDS Provider to continue with the performance of all its obligations under the SDS Agreement;

5.4.2 acknowledging that **tie** is assuming all the obligations of the Infraco (as "Client") under the SDS Agreement; and

5.4.3 undertaking to the SDS Provider to discharge all amounts payable to the SDS Provider under the terms of the SDS Agreement.

5.5 Upon compliance by **tie** with the requirements of clause 5.4, the SDS Agreement shall continue in full force and effect as if the right of determination on the part of the SDS Provider had not arisen and in all respects as if the SDS Agreement had been made between **tie** and the SDS Provider to the exclusion of the Infraco.

5.6 Notwithstanding that as between the Infraco and the SDS Provider, the SDS Provider's right of determination of its engagement under the SDS Agreement may not have arisen the provisions of clause 5.5 shall nevertheless apply if **tie** gives written notice to the SDS Provider and the Infraco to that effect and **tie** complies with the requirements on its part under clause 5.4.

5.7 The SDS Provider does not need to be concerned or required to enquire whether, and shall be entitled to assume that, as between the Infraco and **tie**, the circumstances have occurred permitting **tie** to give notice under clause 5.6.

5.8 The SDS Provider acting in accordance with the provisions of this clause 5 shall not incur any liability to the Infraco.

5.9 Unless and until **tie** has given notice under this clause 5:

5.9.1 **tie** has no liability whatsoever to the SDS Provider in respect of amounts payable to the SDS Provider under the SDS Agreement (except in relation to the sums referred to in Clause 8 of this Agreement); and

5.9.2 **tie** has no authority to issue any direction or instruction to the SDS Provider in relation to the performance of the SDS Provider's obligations under the SDS Agreement.

5.10 Without prejudice to the provisions of clauses 5.1 to 5.9 inclusive, if prior to the service of any notice under clause 5.4 the SDS Provider is determined under the SDS Agreement for any reason whatsoever the SDS Provider shall if required in writing so do to by **tie** no later than 12 weeks after the date of such determination forthwith enter into a new agreement with **tie** on the same terms as the SDS Agreement, but with such revisions as **tie** and the SDS Provider may reasonably require to reflect altered circumstances and the fact that it is **tie** and not the Infraco employing the SDS Provider.

6. ASSIGNATION

6.1 The SDS Provider shall not assign, novate or otherwise transfer the whole or any part of the Agreement without the prior written agreement of **tie**.

6.2 **tie** shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

6.2.1 to the Scottish Ministers or any local authority or other body with no worse financial standing than that of **tie** who, as a result of any Change in Law, takes over all or substantially all the functions of **tie**; or

6.2.2 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to the SDS Provider) by **tie** or a person falling within clause 6.2.1; or

6.2.3 to CEC or Transport Edinburgh Limited; or

6.2.4 with the prior written consent of the SDS Provider (such consent not to be unreasonably withheld or delayed).

6.3 The SDS Provider undertakes to **tie** not to contend in any court proceedings under this Agreement that any person to whom **tie** assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this clause is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that **tie** is named under this Agreement or any intermediate assignee of **tie** escaped loss resulting from such breach by reason of the disposal of its interest in the same.

7. LIABILITY OF THE SDS PROVIDER

7.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by law of contract, delict or otherwise.

7.2 The responsibility of the SDS Provider under this Agreement is not to be reduced or in any way released or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by **tie** against a third party.

7.3 The rights and benefits conferred upon **tie** by this Agreement are in addition to any other rights and remedies that **tie** may have against the SDS Provider including (without prejudice to the generality of the foregoing) any remedies in delict.

7.4 Subject to the other provisions of this Agreement, the liability of the SDS Provider to **tie** is to be determined in all respects in accordance with the terms of the SDS Agreement and, in the event of any claim by **tie** under this Agreement, the SDS Provider shall be entitled to rely upon any defence, right, limitation or exclusion under the SDS Agreement as though **tie** were named as Client under it, except that:

7.4.1 **tie** shall not be affected by any subsequent variation of the SDS Agreement which would adversely affect the obligations owed by SDS Provider or the waiver, compromise or withdrawal of any claim made by the Infraco; and

7.4.2 the SDS Provider shall not be entitled to exercise any right of set-off, retention or withholding against **tie** to which the SDS Provider may be entitled as against the Infraco.

7.5 The liability of the SDS Provider under this Agreement shall be no greater in extent than the liability of the SDS Provider under the SDS Agreement.

8. PAYMENT TO THE SDS PROVIDER IN RESPECT OF RETENTIONS AND REDUCTIONS IN THE SCOPE OF SERVICES

8.1 **tie** shall make payment of any sums which have been agreed to be due to the SDS Provider in accordance with Clause 12.7.3 and/or Clause 29.4 of the SDS Agreement, in the amounts and the timescales set out within these said Clauses.

9. CONSENT OF INFRACO

9.1 The Infraco consents to the terms of this Agreement.

10. NOTICES

10.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

10.2 Any notice given pursuant to this clause, if sent by registered or recorded delivery, is deemed to have been received 48 hours after being posted.

11. RIGHTS OF THIRD PARTIES

11.1 A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

12. INVALID TERMS

12.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable

12.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

12.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

13. VARIATIONS AND WAIVERS TO BE IN WRITING

13.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

14. WAIVER

14.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

14.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

15. JURISDICTION AND LAW

15.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

15.2 The Parties agree that any dispute in relation to this Agreement shall be conducted in accordance with Clause 28 (*Dispute Resolution Procedure*) of the SDS Agreement and the provisions of the said Clause 28 and Schedule 10 (*Panels to the Dispute Resolution Procedure*) are deemed to be incorporated mutatis mutandis in respect of this Agreement provided that any reference to "Parties" shall be deemed to refer to **tie** and the SDS Provider, any reference to "Client" shall be deemed to refer to **tie**, the reference to "Clause 36" shall mean Clause 10 of this Agreement.

IN WITNESS WHEREOF these presents on this and the preceding ◆ pages are executed as follows:

EXECUTED for and on behalf of **PARSONS BRINCKERHOFF LIMITED** at

on 2005 by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

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EXECUTED for and on behalf of **TIE LIMITED**
at

on 2005 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **[INFRACO]** at

on 2005 by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

[redacted] [redacted]

Director/Authorised Signatory Director/Authorised Signatory

TIE LIMITED **PARSONS BRINCKERHOFF LIMITED**

This is Schedule Eight referred to in the foregoing Agreement between the Client and the SDS Provider

SCHEDULE EIGHT

NOVATION AGREEMENT



(1) tie

- and -

(2) INFRACO

- and -

(3) PARSONS BRINCKERHOFF LIMITED

NOVATION OF SYSTEM DESIGN SERVICES AGREEMENT

in respect of

EDINBURGH TRAM NETWORK

TIE00899941_0281

AGREEMENT

AMONG

(1) **TIE LIMITED** (Company number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ (**"tie"**);

(2) **[INFRACO]** (company number ◆) whose registered office is at ◆ (**"Infraco"**);

(3) **PARSONS BRINCKERHOFF LIMITED** (company number 2554514) whose registered office is at Amber Court, William Armstrong Drive, Newcastle Business Park, Newcastle Upon Tyne, NE4 7YQ (**"SDS Provider"**).

BACKGROUND

A By an agreement in writing dated [◆] 2005 (**"SDS Agreement"**) **tie** appointed the SDS Provider to provide system design services in connection with the Edinburgh Tram Network.

B **tie** and Infraco have entered into a contract under which Infraco has been appointed to complete the design and carry out the construction, installation, commissioning and maintenance planning in respect of the Edinburgh Tram Network.

C **tie** and Infraco have agreed, with the consent of the SDS Provider, that the Infraco shall take over the rights and liabilities of the "Client" under the SDS Agreement by novating the SDS Agreement from **tie** to Infraco upon and subject to the terms of this Agreement.

1. DEFINITIONS AND INTERPRETATION

1.1 The definitions given in the recitals to this Agreement apply to this Agreement.

1.2 Clause headings in this Agreement are for the convenience of the parties only and do not affect its interpretation.

1.3 Unless otherwise defined hereunder, where the SDS Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement;

2. RELEASE BY THE SDS PROVIDER OF TIE

2.1 The SDS Provider releases and discharges **tie** from any and all duties, obligations and liabilities owed to the SDS Provider under the SDS Agreement and accepts the liability of the Infraco under the SDS Agreement in lieu of **tie**.

3. RELEASE BY TIE OF THE SDS PROVIDER

3.1 **tie** releases and discharges the SDS Provider from the further performance of the SDS Provider's duties and obligations under the SDS Agreement.

4. ACCEPTANCE OF LIABILITY BY THE SDS PROVIDER TO THE INFRACO

4.1 The SDS Provider undertakes to continue to perform all the duties and to discharge all the obligations of the SDS Provider under the SDS Agreement and to be bound by its terms and conditions in every way as if the Infraco was and always had been a party to the SDS Agreement in place of **tie**.

4.2 The SDS Provider warrants to the Infraco that, in respect of the duties and obligations which it has already performed under the SDS Agreement, it has performed those duties and obligations in accordance with the standards of skill and care set out in the

SDS Agreement. The SDS Provider warrants to the Infraco that it shall be liable for any loss or damage suffered or incurred by the Infraco arising out of any negligent act, default or breach by the SDS Provider in the performance of its obligations under the SDS Agreement prior to the date of this Agreement. The SDS Provider shall be liable for such loss or damage notwithstanding that such loss or damage would not have been suffered or incurred by **tie** (or suffered or incurred to the same extent by **tie**).

4.3 The liability of the SDS Provider to the Infraco pursuant to the SDS Agreement shall not be affected by the Infraco's assumption of liability for design to **tie** pursuant to the Infraco Contract.

4.4 The SDS Provider acknowledges that the Infraco has and shall continue to rely upon all Services carried out by the SDS Provider.

5. VESTING OF REMEDIES AGAINST SDS PROVIDER

All rights of action and remedies against the SDS Provider under and pursuant to the SDS Agreement vested in **tie** shall from the date of this Agreement vest in the Infraco.

6. ACCEPTANCE OF LIABILITY BY THE INFRACO

The Infraco undertakes to perform all the duties and to discharge all the obligations of **tie** under the SDS Agreement and to be bound by its terms and conditions in every way as if the Infraco was and always had been a party to the SDS Agreement in place of **tie** and as if all acts and omissions of **tie** under or pursuant to the SDS Agreement prior to the date of this Agreement were the acts and omissions of the Infraco.

7. VESTING OF REMEDIES AGAINST TIE

All rights of action and remedies under or pursuant to the SDS Agreement vested in the SDS Provider shall from the date of this Agreement lie against the Infraco and not **tie**.

8. ACKNOWLEDGEMENT OF PAYMENT

The SDS Provider acknowledges that all fees and expenses properly due to the SDS Provider under the SDS Agreement up to the date of this Agreement have been paid by **tie** except sums which have been agreed to be due to the SDS Provider in accordance with Clause 12.7.3 and/or Clause 29.4 of the SDS Agreement and which have not been paid by **tie**.

9. AMENDMENT OF SDS AGREEMENT

tie, the SDS Provider and the Infraco agree that the terms of the SDS Agreement shall be and are varied in the manner set out in Appendix 1 to this Agreement.

10. AFFIRMATION OF SDS AGREEMENT

The terms and conditions of this Agreement represent the entire agreement between the parties relating to the novation of the SDS Agreement and, except as specifically amended by Appendix 1 of this Agreement, all the terms and conditions of the SDS Agreement remain in full force and effect.

11. RIGHTS OF THIRD PARTIES

A person who is not party to this Agreement shall have no right to enforce any term of this Agreement. This Clause does not affect any right or remedy of any person which exists or is otherwise available.

12. LAW AND JURISDICTION

This Agreement shall be governed by and construed in accordance with Scots law and the Scottish Courts shall have jurisdiction with regard to all matters arising under it.

IN WITNESS WHEREOF these presents on this and the preceding [◆] pages together with Appendix 1 which is annexed and subscribed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED** at

on 2005 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **[INFRACO]** at

on 2005 by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

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EXECUTED for and on behalf of **PARSONS BRINCKERHOFF LIMITED** at

on 2005 by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

7.5.1.2 by the issuing of a Client Change Order in respect of the Services to which Clause 7.5.1.1 does not apply; or

7.5.1.3 by reason of any other breach by the Client of this Agreement; or

7.5.1.4 by reason of any breach by the Infraco of the Infraco Contract.

then in any such event the SDS Provider shall forthwith notify the Client of:-

(a) the cause of the delay;

(b) the SDS Provider's estimate of the likely effect of such delay upon the Programme and the Master Project Programme;

(c) the estimated additional cost that shall be incurred; and

(d) any acceleration measures which the SDS Provider could take to mitigate the effects of such delay and an estimate of the costs thereof.

7.5.2 The SDS Provider shall, subject to any instruction to accelerate the Services pursuant to Clause 7.5.3, be entitled to such adjustment to the Programme as may in all circumstances be fair and reasonable, provided always that the SDS Provider's entitlement to an extension of time for any event listed in Clauses 7.5.1.1 and 7.5.1.2 above shall in no circumstances exceed (in respect of such event) the extension of time (if any) to which the Client is entitled for the identical event under the Infraco Contract. An extension of time shall not be granted where the cause of the Services having been delayed, affected or suspended is due to any act, omission, default or breach of the Agreement by the SDS Provider or its employees, agents or servants or any SDS Provider Party.

7.5.3 The Client shall issue a Client Change Order to authorise any agreed acceleration of the Programme and/or increased costs as a result of delays notified under Clause 7.5.1.

7.5.4 If the Services are delayed in circumstances other than those entitling the SDS Provider to an extension of time as set out in Clause 7.5.1 or as a result of a Force Majeure Event, the SDS Provider shall inform the Client at the earliest opportunity and shall give an estimate of the likely effect upon the Programme. The SDS Provider at his own expense shall take such acceleration measures as are necessary to achieve the requirements of the Programme.

7.5.5 The SDS Provider shall not be entitled to and shall be deemed to have irrevocably waived any entitlement to any extension of time unless the SDS Provider has:

7.5.5.1 within 10 Business Days of becoming aware of the circumstances or occurrences which have caused or are likely to cause delay to the SDS Provider in the performance of the Services notified the Client in writing; and

7.5.5.2 within 10 Business Days after such notification submitted by further written notice to the Client detailed particulars of any extension of time to which it may consider itself entitled in order that such submission may be investigated at the time; and

7.5.5.3 wherever applicable, complied with the requirements of any Clause under this Agreement requiring timely notice to be given.

7.5.6 Any notice under 7.5.5.1 or 7.5.5.2 above shall give full particulars to the extent then possible of the cause of the delay and of its probable duration and where appropriate reasonable estimate of any direct and indirect costs likely to result therefrom together with any other relevant details.

Clause 15 - Changes

Insert the following new Clause 15.15

15.15 Except in relation to a breach of this Agreement or the Infraco Contract by the Client or unless otherwise agreed by the Client in writing, the SDS Provider's entitlement to additional payment or an extension of time for a Permitted Variation shall in no circumstances exceed (in respect of such Permitted Variation) the extension of time (if any) and/or additional payment (if any) to which the Infraco is entitled under the Infraco Contract for the identical Permitted Variation. The SDS Provider's entitlement to such extension of time or additional payment under this Agreement shall in no circumstances exceed that proportion of the Infraco's entitlement to an extension of time or additional payment under the Infraco Contract to which the Infraco becomes entitled in respect of the entitlement claimed by the SDS Provider. An extension of time and/or additional payment shall not be granted where the cause of the Permitted Variation is due to any act, omission, default or breach of the Agreement by the SDS Provider, its employees, agents or servants or any SDS Provider Party.

Clause 19 - Termination for SDS Provider Default

Delete Clause 19.1.3 and substitute therefore "Clause not used".

Clause 20 - Termination, Abandonment or Suspension of the Services by the Client

Delete Clause 20.1 and substitute therefor:

20.1 In the event that the Infraco Contract is terminated, this Agreement shall terminate unless the SDS Provider is notified that **tie** (or another nominated party) requires to step into this Agreement.

Clause 22 - Termination for Corrupt Gifts and Payments

Delete Clause 22 (Termination for Corrupt Gifts and Payments in its entirety) substitute therefor:

22.1 The SDS Provider or anyone employed by it or acting on its behalf (including any SDS Provider Party) shall not commit any Prohibited Act.

22.2 If the SDS Provider or anyone employed by it or acting on its behalf (including any SDS Provider Party) commits any Prohibited Act, then the Client may terminate this Agreement with immediate effect by giving notice to the SDS Provider.

Clause 30 - Assignation, Changes In Legal Status And Changes In Control

Delete Clause 30.2 and substitute therefor:

30.2 The Client shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

30.2.1 to an assignee permitted in accordance with the terms of the Infraco Contract; or

30.2.2 with the prior written consent of the SDS Provider (such consent not to be unreasonably withheld or delayed).

[redacted]

Director/Authorised Signatory

TIE LIMITED

[redacted]

Director/Authorised Signatory

PARSONS BRINCKERHOFF LIMITED

This is Schedule Nine referred to in the foregoing Agreement between the Client and the SDS Provider

SCHEDULE NINE

REVIEW PROCEDURE

1. Introduction

1.1 Except where otherwise agreed in writing, the provisions of this Schedule 9 (*Review Procedure*) shall apply whenever any Deliverable or course of action is required to be reviewed, approved, agreed, consented to or otherwise processed in accordance with the Agreement.

1.2 Each submission by the SDS Provider to the Client's Representative under the Review Procedure shall be accompanied by five copies of the proposed Deliverable (in appropriate agreed format) to be reviewed or a statement of the proposed course of action (the entire contents of a submission being referred to as a "Submitted Item"). In relation to each Submitted Item, the provisions of this Schedule 9 (*Review Procedure*) shall apply.

1.3 Within 20 Business Days of the date of receipt of a submission (or re-submission, as the case may be) of the Submitted Item to the Client's Representative (or such other period as the Parties may agree), the Client's Representative shall return one copy of the relevant Submitted Item to the SDS Provider endorsed (subject to and in accordance with paragraph 3 (*Grounds of Objection*)) "Level A - no objection", "Level B - proceed subject to comments" or "Level C - resubmit".

1.4 If the Client's Representative fails to return a copy of any Submitted Item within 20 Business Days (or within such other period as the Parties may agree in writing) of the date of its submission to the Client's Representative, then the SDS Provider shall re-submit the submitted item. If the Client's Representative fails to return a copy of any Submitted Item within seven days of any re-submission, then the Client's Representative shall be deemed to have returned the Submitted Item to the SDS Provider endorsed "Level A - no objection".

1.5 If the Client's Representative makes an objection to any Submitted Item in accordance with paragraph 3 (*Grounds of Objection*), the Client's Representative shall state the ground upon which such objection is based and the evidence or other information necessary to substantiate that ground.

1.6 For the avoidance of doubt, the Client's Representative shall be entitled to make such comments on any Submitted Item on any grounds as he sees fit but, to the extent that the Client's Representative comments on a Submitted Item other than on the grounds specified in paragraph 3 (*Grounds of Objection*), or fails to comply with the provisions of this paragraph 1, the SDS Provider may, at its discretion request written clarification of the basis for such comments and, if clarification is not received within 10 Business Days of such request by the SDS Provider refer the matter for determination in accordance with the Dispute Resolution Procedure.

1.7 Where any information that has been provided is updated, the new issues shall be provided promptly to the Client as soon as reasonably possible.

1.8 The Client's Representative shall be entitled to instruct the SDS Provider that a defined class of Deliverable or course of action may be submitted "for information" and not for review in accordance with this Schedule 9 (*Review Procedure*).

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1.9 The SDS Provider shall ensure that each Submitted Item shall contain sufficient detail and shall be accompanied by sufficient information to enable the Client's Representative to assess the Submitted Item in accordance with Schedule 9 *(Review Procedure).*

1.10 Where a revised Submitted Item is submitted, the SDS Provider shall also ensure that such revision clearly identifies what revision to the Deliverable was made.

2. Further Information

2.1 The SDS Provider shall submit any further or other information, data and documents that the Client's Representative reasonably requires to act in accordance with this Schedule 9 (*Review Procedure*). If the SDS Provider does not submit any such information, data and documents, the Client's Representative shall be entitled to object to the Submitted Item:

2.1.1 on the basis of the information, data and documents which have been provided; or

2.1.2 on the grounds that insufficient information, data and documents have been provided to enable the Client's Representative to act in accordance with this Schedule 9 (*Review Procedure*).

3. Grounds of Objection

3.1 The Client's Representative may object to any Submitted Item on the grounds set out in paragraph 2 (*Further Information*) above but otherwise may make objections in relation to a Submitted Item if, on the balance of probabilities, implementation of that Submitted Item:

3.1.1 would not be in accordance with this Agreement; and/or

3.1.2 would result in an increase to the Client's liabilities or potential or contingent liabilities under this Agreement; and/or

3.1.3 would be inefficient as to expenditure of resource/costs; and/or

3.1.4 would lead to a health and safety risk to any person or property; and/or

3.1.5 would lead to a breach of any Law or the terms of any Consent; and/or

3.1.6 would necessitate the obtaining of a new Law or the obtaining of a variation to an existing Law; and/or

3.1.7 would not be in accordance with any relevant environmental requirements; and/or

3.1.8 would not be in accordance with the Functional Requirements Specifications or the Technical Specifications; and/or

3.1.9 would adversely impact on the flexibility or ease of operation, run time, reliability, operating maintenance costs or revenues of the Edinburgh Tram Network; and/or

3.1.10 would materially adversely affect the SDS Provider's ability to perform its obligations under this Agreement; and/or

3.1.11 would materially adversely affect the Client's ability to perform its obligations or enforce its rights under this Agreement; and/or

3.1.12 is not in accordance with the SDS Provider's quality plans; and/or

3.1.13 would not be in accordance with Good Industry Practice; and/or

3.1.14 would prevent efficient procurement, construction, completion and/or commissioning of or under the Infraco Contract; and/or

3.1.15 prevent Service Commencement being achieved by the Planned Service Commencement Date.

4. Effect of Review

4.1 Any Submitted Item which is returned or deemed pursuant to paragraph 1.4 to have been returned by the Client's Representative endorsed "Level A - no objection" shall be complied with and implemented by the SDS Provider subject to Clauses 7.2 and 7.3 of the Agreement.

4.2 If the Client's Representative returns the Submitted Item endorsed other than "Level A - no objection", the SDS Provider shall:

4.2.1 where the Client's Representative has endorsed the Submitted Item "Level B - proceed subject to comments", proceed with the performance of the Services (subject to Clauses 7.2 and 7.3 of the Agreement) but acknowledge and take into account the Client's Representative's comments;

4.2.2 where the Client's Representative has endorsed the Submitted Item "Level C - resubmit", not act upon the Submitted Item, amend the Submitted Item to respond to the Client's Representative's objections and requirements, and re-submit the same to the Client's Representative in accordance with paragraph 4.3 unless the SDS Provider disputes that any such objection or proposed requirement is on grounds permitted by this Agreement, in which case the SDS Provider or the Client's Representative may refer the matter for determination in accordance with the Dispute Resolution Procedure and the SDS Provider shall not act on the Submitted Item until such matter is so determined or otherwise agreed provided that any referral to the Dispute Resolution Procedure is at the risk of the SDS Provider.

4.3 Where the Submitted Item has been endorsed *Level C*, the SDS Provider shall within 10 Business Days of receiving the returned Submitted Item, resubmit the Submitted Item as amended to the Client's Representative and the provisions of paragraphs 1.2 to 4 of this Schedule 9 *(Review Procedure)* shall apply (mutatis mutandis) to such re-submission.

4.4 The return or deemed return of any Submitted Item endorsed "Level A - no objection" or otherwise endorsed in accordance with paragraph 4.2.1 (*Level B* - proceed subject to comments) shall mean that the relevant Submitted Item may be used or implemented (subject to any comments made in accordance with paragraph 4.2.1) for the purposes for which it is intended. However, the return or deemed return of any Submitted Item howsoever endorsed shall not:

4.4.1 relieve the SDS Provider of its obligations under this Agreement; nor

4.4.2 constitute an acknowledgement, admission or acceptance by Client that the SDS Provider has complied with such obligations.

5. Disclaimer

5.1 No review, objection, comment or silence by the Client shall operate to (i) exclude or limit the SDS Provider's obligations or liabilities under this Agreement (or the Client's rights under this Agreement) or (ii) fix the Client with any express or implied obligations, duties or liabilities with respect to the Submitted Item.

5.2 For the avoidance of doubt, this information is supplementary to information required to be produced by the SDS Provider in order to satisfy the approval requirements of and Consents from other third parties and Approval Bodies. These include those required for:

5.2.1 local planning authorities;

5.2.2 local roads authorities;

5.2.3 HMRI;

5.2.4 Network Rail;

5.2.5 statutory undertakers; and

5.2.6 the Scottish Executive.

5.3 The SDS Provider shall promptly provide copies of all such submissions to the Client together with the responses to them as a matter of routine.

6. Documentation Format and Management

6.1 The SDS Provider shall issue five copies (in appropriate agreed format) of all Submitted Items to the Client and compile and maintain a register of the date and contents of the submission for each Submitted Items.

6.2 The SDS Provider shall compile and maintain a register of the date of receipt and content of all Submitted Items that are returned or deemed to be returned by the Client's Representative.

6.3 All drawings shall be presented as A3 sized paper copies and drawings shall be prepared at their original size in a manner that allows them to be readily legible when reduced to A3 size. Original drawings shall not be greater than A0 in size.

7. Variations

7.1 No review, objection or comment or any failure to make objection or comment under this Schedule 9 (*Review Procedure*) by the Client shall constitute a Client Change

7.2 If, having received comments from the Client's Representative, the SDS Provider considers that compliance with those comments would amount to a Client Change, the SDS Provider shall within seven days of any comments being received, before complying with the comments, notify the Client of the same and, if it is agreed by the parties or determined pursuant to the Dispute Resolution Procedure that a Client Change would arise if the comments were complied with, the Client may proceed with the matter in accordance with Clause 15 (*Changes*).

7.3 Any failure by the SDS Provider to notify the Client within seven days of comments being received that it considers compliance with such comments of the Client's Representative would amount to a Client Change shall constitute an irrevocable acceptance by the SDS Provider that any compliance with the Client's comments

shall be without cost to the Client and without any entitlement to any extension of time or other relief.

7.4 No alteration or modification to the scope, quality, quantity or nature of the Services arising from the development of the detailed Design or from the co-ordination or integration of the Design shall be construed or regarded as a Client Change.

[redacted]

[redacted]

Director/Authorised Signatory

TIE LIMITED

Director/Authorised Signatory

PARSONS BRINCKERHOFF LIMITED

This is Schedule Ten referred to in the foregoing Agreement between the Client and the SDS Provider

SCHEDULE TEN

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PARSONS BRINCKERHOFF LIMITED



This is the Schedule 11 referred to in the foregoing Agreement between the Client and the SDS Provider

Requirements Specification for

Overall System Operational & Performance Requirements

TIE00899941_0296

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1 OVERALL SYSTEM OPERATIONAL & PERFORMANCE REQUIREMENTS

1.1 Routes

The routes for the proposed Edinburgh Tram Network are as set out in the Edinburgh Tram (Line One) Bill and the Edinburgh Tram (Line Two) Bill

1.1.1 Line 1

A north Edinburgh loop connecting the city centre with Leith, Newhaven and Granton and passing through the Waterfront Development Area. The route, which comprises approximately 16km of double track and 23 tramstops, runs from Haymarket along the former Roseburn railway corridor, along the shore front to Ocean Terminal Shopping Centre and onwards to Leith returning to the city centre via Leith Walk. The route through the city centre to Haymarket, will be via Princes Street.

Line 1 comprises Stage Builds; HOT, HCT and CTO, as referred to in the Programme Phasing Structure.

1.1.2 Line 2

A western corridor from the city centre to the Gyle, Edinburgh Park, the Airport and Newbridge, with extensions possible in the future to Livingston or South Queensferry. The route comprises approximately 15 km of double track, the majority of which is fully segregated from other traffic, and 14 tramstops. The preferred corridor approximately follows the main Edinburgh-Glasgow railway line between Haymarket and the new station at Edinburgh Park, then heading north west to the Gyle, Gogarburn, Edinburgh International Airport and Newbridge.

Line 2 comprises Stage Builds; ARP, DHY and GNB, as referred to in the Programme Phasing Structure.

1.1.3 Line 3

At this stage it is envisaged that a potentially expanded tramway may include a southern corridor which will be about 9 km long from the city centre to the south east of the city. The preliminary alignment may follow approximately the Nicholson Street - Minto Street corridor from the city to Cameron Toll and continues past the new Edinburgh Royal Infirmary before swinging to the east to Craigmillar, Fort Kinnaird and terminating at the New Craighall park & ride.

All three lines are represented in the diagram below:



Further possible expansion, potentially including Line 3 may be added to the core network. This expansion could potentially take the form of interconnections, spurs and/or line extensions on Line Two possibly towards Dalmeny/South Queensferry and Livingston and Line Three towards Musselburgh. Any expansion will probably require additional approvals, infrastructure and increased tram fleet and do not form part of the requirements for the initial phase of the project which is the subject of this suite of Functional Requirements Specifications.

1.1.4 Depot

It is envisaged that the Edinburgh Tram Network will ultimately have one depot facility located at Gogar , connected to the running tramway of line 2. However, the parliamentary process currently allows for both a depot at Leith and one at Gogar. Two depot preliminary designs shall be required to be produced. The depot or depots to be installed as part of the Edinburgh Tram Network are referred to herein as the "Depot".

This installation will facilitate all tram servicing and maintenance and be the location of a centralized Control Room .

1.2 Service Patterns and Frequency

The Edinburgh Tram Network shall be available for operation 365 days per year.

1.2.1 Normal Service Weekdays

1.2.1.1 Granton - Haymarket - St. Andrew Square - Ocean Terminal - Granton

This part of the Edinburgh Tram Network will operate as a circular service operating in both clockwise and anti-clockwise directions.

For the section route from Roseburn Jct – Granton Square - Ocean Terminal, the overall system shall be capable of supporting a minimum service requirement of 6 trams/hour indefinitely, but subject to further business case and revenue development by **tie** shall be designed for a service equivalent to 8 trams/hour indefinitely from the outset of tram operation. Future revenue predictions show that future proofing to support a service equivalent to 12 trams/hour shall be required in this design.

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1.2.1.2 Airport - Haymarket – St. Andrew Square - Ocean Terminal

This part of the tramway will operate on an end to end basis in each direction.

For the section of route from Edinburgh International Airport to Roseburn Jct, the overall system shall be capable of supporting a service equivalent to 8 trams/hour indefinitely from the outset of tram operation. Future revenue predictions show that future proofing to support a service equivalent to 12 trams/hour shall be required in this design.

1.2.1.3 Common Corridor (Roseburn Junction - Princes Street - Ocean Terminal)

The common corridor shall facilitate the sum of service levels required for the non-common sections referred to in paragraph 1.2.1.1 and 1.2.1.2. This equates to peak hour services operating to a timetable based on a minimum service requirement of 14 trams/hour indefinitely, but subject to further business case and revenue development by **tie** shall be designed for a service equivalent to16 trams/hour indefinitely from the outset of tram operation. Future revenue predictions show that future proofing to support a service equivalent to 24 trams/hour shall be required in this design.

1.2.1.4 Gogarburn – Newbridge

From the Line 2 alignment at Gogarburn, a branch to Newbridge shall be designed which shall be capable of supporting a service equivalent to 8 trams/hour indefinitely from the outset of tram operation.

1.2.2 Operating Hours

The tramway shall have operating hours that will facilitate the following first and last tram services:

	Weekdays		Saturday		Sunday	
	First Departure	Last Departure	First Departure	Last Departure	First Departure	Last Departure
From Airport to City Centre	05:10	23:40	05:10	23:40	05:10	23:50
From Ocean Terminal to City Centre via Leith Walk	05:00	24:00	05:00	24:00	07:00	24:00
From Ocean Terminal to City Centre via Granton	05:00	24:00	05:00	24:00	07:00	24:00
From City Centre to Airport	04:30	24:00	04:30	01:00	04:30	00:30
From City Centre to Ocean Terminal via Leith Walk	05:00	24:00	05:00	24:00	07:00	24:00
From City Centre to Ocean Terminal via Granton	05:00	24:00	05:00	24:00	07:00	24:00

1.3 Special Workings

At certain times in the year, festivals, Hogmanay and other special events will generate the need to close Princes Street and/or Saint Andrew Square to all traffic. Under such circumstances the Edinburgh Tram Network will operate as follows:

Restriction	Tram Service	Revised Origin - Destination
Princes Street Closed/St. Andrew Square Open	Line 1	Operates between Shandwick Place and St Andrew Square via Ocean Terminal and visa versa
	Line 2	Operates between Edinburgh International Airport and Shandwick Place and visa versa
	Line 3	Potentially operates between New Craighall and St Andrew Square and visa versa
Princes Street and St. Andrew Square Closed	Line 1	Operates between Shandwick Place and Picardy Place via Ocean Terminal and visa versa. (Trams will use York Place Crossover to turnback)
	Line 2	Operate between Edinburgh International Airport and Shandwick Place and visa versa
	Line 3	Operates between New Craighall and North Bridge and visa versa

1.4 Journey times

Edinburgh Tram Network operations shall support the following key journey times:

1. Line 1 - Ocean Terminal to Ocean Terminal Clockwise shall have an end to end journey including layover of 45mins.
2. Line 1 - Ocean Terminal to Ocean Terminal Anti-clockwise shall have an end to end journey including layover of 45mins.
3. Line 2 - Airport to Ocean Terminal; each direction shall have an end to end journey time including layover currently envisaged at 35mins. All run time assumptions shall be agreed by **tie**.
4. Common corridor - The section between Haymarket and St Andrew Square tramstops shall have end to end journey times in each direction of 8 mins
5. Common corridor - The section between St Andrew Square and Ocean Terminal shall have their end to end journey times in each direction proven and agreed by **tie**.

1.5 Performance/Reliability

The system shall be designed and constructed to operate without unreasonable duress on Operations personnel in Normal, Degraded and Abnormal Modes as defined below.

- ***Normal Mode*** means the number of tram services as prescribed in the headway/timetable requirements.
- ***Degraded Mode*** means restricted operations resultant from failure of one or more components of the Edinburgh Tram Network.
- ***Abnormal Mode*** means the occurrence of extreme loading on a part of the Edinburgh Tram Network resultant from causes such as major disruption, whether caused through tramway elements or third party interference.

The Edinburgh Tram Network shall be designed such that during peak-hours service it achieves at least 80% of all tram journeys between the places listed below and shall be completed no more than 2 minutes late:

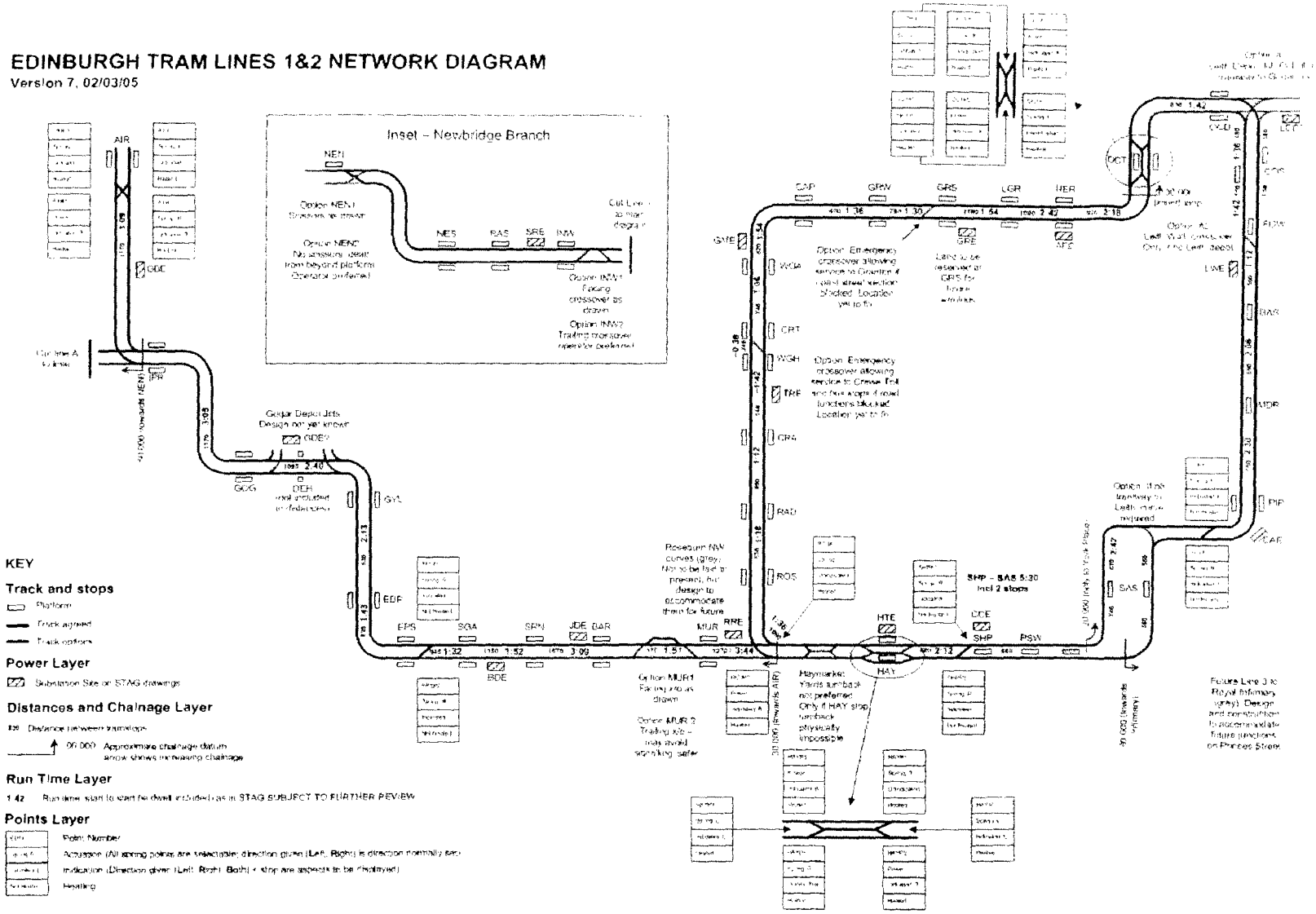
Airport - Haymarket and visa versa

Haymarket - St. Andrew Square - Ocean Terminal and visa versa

Haymarket - Granton Square - Ocean Terminal and visa versa

1.6 Tram Network Schematic applicable to this commission

The permanent way alignment and tramstop locations are depicted below:



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TIE00899941_0303



This is the Schedule 12 referred to in the foregoing Agreement between the Client and the SDS Provider

Requirements Specification for

Civil Engineering Works

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2 REQUIREMENTS SPECIFICATION FOR CIVIL ENGINEERING WORKS

2.1 General

This Requirements Specification for Civil Engineering Works sets out the functional requirements that **tie** requires to be met.

2.2 Track & Formation

2.2.1 Trackform and gauge

A standard railway track form with steel rails set to standard gauge and a standard tram track comprising grooved rail set to the same gauge shall be provided that is compatible with the Edinburgh Tram Network's tram fleet. Rail shall be continuously welded wherever possible. The use of fish-plated joints shall be avoided.

Track form and its alignment shall be designed as an integral component of the Edinburgh Tram Network taking account of the interaction with the tram and its running gear (wheel/rail interface), the need to meet the overall specified ride quality and journey time parameters and Edinburgh Tram Network whole life cost assessment.

2.2.2 Rail types

The rails used shall be selected from a family of rails that shall present the same profile to the wheel throughout the Edinburgh Tram Network. All rails used shall be readily available and used in significant quantities in Europe. S49 rail and its related grooved rail sections is one such option.

The selected wheel profile shall be demonstrated to be compatible with the rail profile in terms of the risk of derailment, noise, wear and vibration.

The safety of the selected wheel and rail combination shall also be proven and demonstrated at points and crossings.

On ballasted sections of the route, road/rail equipment will be used for maintenance tasks such as tamping. These machines are likely to present heavy rail wheel profiles to the track. It shall be possible to pass wheels that are of standard heavy profile through points. For this purpose, this may be achieved by having check rails that are bolted into position and consequently can be removed for this purpose. The passage of these wheels through the crossings can be achieved by inserting suitable packing into the crossing itself to lift the wheels.

2.2.3 Miscellaneous

An integrated approach shall be taken to the lubrication of the wheel/rail interface, preferably with no trackside rail lubricators and all track lubrication being carried out by the tram.

Any trackside cables shall be in ducts. Cable troughs shall not be used.

Any cables crossing the track on ballasted sections that terminate on the track shall be in orange plastic ducts as used by Network Rail.

On street, the track shall include regular spare cross track ducts to facilitate future utilities diversions or new services. The size and frequency of these ducts is to be agreed with **tie**.

Special track forms shall be used at sensitive locations to ensure sufficient noise and vibration control. These locations will be identified by the SDS Provider in agreement with **tie.**

2.2.4 Alignment and geometry

Details are included in the System Wide Non- Functional Requirements.

2.2.5 Trackform Construction Operation and Maintenance

A form of track construction shall be provided that will

- facilitate ease of construction and minimise disruption during the construction phase within the City of Edinburgh (Haymarket - Princes St - Ocean Terminal)
- comply with the Code of Construction Practice
- minimise the potential for stray current, bonding and corrosion issues
- be designed for simplicity of overall maintenance and ease of track replacement and relaying, especially on-street sections;
- comply with the operational noise and vibration requirements as stated in System-Wide Non-Functional Requirements.
- reduce, as far as is practicable, the disruption to other highway users caused by the repair or replacement of such trackwork.

2.2.6 Points & Point Machines

All turn-outs, crossings and interruptions to the continuity of the rail head shall be equipped with flange running sections or other design which minimises joint noise.

The design shall minimise flange squeal through tight radii and through junctions.

Points shall be provided with two movable blades so mounted to allow the use of magnetic track brakes and their safe passage through the point and crossing.

All points shall be freely trailable.

The moving parts of turn-outs shall not be located on pedestrian crossings or in areas of heavy crossing and turning movements by road vehicles.

The location of turn-outs and crossovers shall be positioned to minimise operational noise and vibration and visual intrusion caused by associated OLE.

Switches and crossings shall be designed so that they are capable of through stressing as required.

Point machines outside the Depot shall all be capable of manual operation by tram drivers using a red point bar that is carried in each cab of all trams. There shall only be one type of point bar.

All point machines shall be from the same family of machines and provided by the same supplier.

On the highway, point machines shall be installed in the "4ft", and on segregated track they shall be installed in the "cess" to facilitate maintenance.

All combinations of points and point machines shall be validated to demonstrate to tie that:

- the machines can exert sufficient force under all foreseeable circumstances to move the point blade into the required position

- in the Depot, any tram driver can safely operate all points without risk of injury and the points shall close reliably under all foreseeable operational conditions
- the wheel/rail interface at the toes of the points is such that there is no derailment risk under all combinations of wheel wear, rail wear, and detection settings
- detection settings have adequate maintenance tolerances to ensure that point detection setting testing is required no more than monthly on all points.
- the points will lock reliably under all foreseeable operating conditions.

The documentation that validates of these specific items shall be submitted to **tie** for approval in accordance with the Review Procedure.

2.2.7 Drainage

The Edinburgh Tram Network shall have a drainage system which at least achieves accepted EU or BS standards and Good Industry Practice.

The drainage of all new bridge structures shall be positive and, unless otherwise required by the relevant local authority, all surface water shall be piped to the local storm water sewer systems by a defined drainage path.

Particular attention shall be paid to ensure that surface water drainage systems in the vicinity of traction sub-stations and cable ducts are routed to avoid any risk of flooding of electrical equipment areas.

In street track, the track drainage system shall incorporate an insulated break from the storm water system.

Drainage proposals shall be approved by the relevant Water Utility, Environment Agency, and the Highway Authority.

Any new flows into existing drains and the methods of connection shall be authorised by Scottish Water, SEPA and Roads Authority.

2.2.8 Formation

The trackbed/roadbed shall be designed and specified for construction so as to avoid the need for excessive or frequent maintenance or repair.

2.2.9 Cable Routes

The trackform shall include all associated equipment including, where necessary, but without limitation to, drainage, ducts for power supply, signalling and telecommunications cables, traction earth and stray current systems. The location of the necessary associated equipment shall be clearly indicated on the agreed trackform drawings.

2.2.10 Pedestrian crossing points of track on off-carriageway sections

The surface at crossing points shall be level with the top of the running rails and surfaced in non-slip materials. These materials shall be in harmony with the character of the locality whilst providing clear indication to all users (including the visually impaired) of the correct point to cross the track and the extent of the Edinburgh Tram Network environment outside of the highway.

Crossings and approach ramps to them shall be accessible to those with disabilities, including users of wheelchairs.

Crossings shall be illuminated, to the same intensity as platforms, or pedestrian routes they serve, whichever is the higher, or otherwise as required by HMRI.

2.2.11 Roadworks

Horizontal clearances between kerb lines of roads and tram network structures shall be not less than those set out in the relevant Department of Transport technical memoranda and the Department of Transport publication, "Roads and Traffic in Urban Areas" (or Scottish equivalent) and shall meet the requirements of the HMRI.

2.2.12 Road Surface Design

The integration of the Edinburgh Tram Network alignment, highway design and highway markings must minimise the risk of road vehicles skidding on the rails.

2.3 Travel Centre

An Edinburgh Tram Network information and ticket sales facility shall be provided at Edinburgh International Airport interchange.

2.4 Tramstops

The main functions of a tramstop are to:

- provide a secure and comfortable environment for passengers on the Edinburgh Tram Network to wait for their intended tram service.
- provide a location at which intending tramway passengers can purchase a valid ticket.
- provide the means by which passengers can board and/or disembark trams.
- provide a point at which intending passengers are made aware of tram service timetables, their current punctuality and imminent tram arrival/departures.

2.4.1 Location

The Edinburgh Tram Network shall have tramstops provided at the locations shown in the Network Diagram contained in the Requirements Specification for Overall System Operational & Performance Requirements.

Tramstops and their surroundings shall be designed to provide safe and effective pedestrian circulation.

Key views and vistas of the City of Edinburgh shall not be unnecessarily interrupted.

2.4.2 Engineering Principles

The design of each tramstop shall compliment the public realm taking into account architectural form, colours and corporate branding such that they become commonly recognisable.

Tramstops shall provide the necessary functionality described herein and in doing so shall avoid unnecessary clutter.

The overall design of the tramstop shall ensure functionality is achieved as a whole. The tramstop shelter shall provide a clean, dry and safe area for passengers to wait but must not conflict with the CCTV surveillance system's aims to enhance security of passengers and react to any activation of the emergency PHP.

Tramstop design shall not leave any unlit areas on the tramstop platform and access routes thereto/therefrom.

Materials used shall be scratch resistant and easy to clean and repair/replace.

All access routes and platforms top surfaces shall be slip resistant and durable.

Transition zones shall be designed so as to be clearly differentiated by those who are visually impaired.

Unless required for proven safety requirements, handrails shall not be provided.

2.4.3 Access

Each tramstop shall provide access to all areas that conforms to the prevailing Disability Discrimination Act.

Access to tramstops shall as near as practicable to a direct route from key passenger generators that the tramstop serves.

Wherever practicable pedestrian access routes shall be designed to use street lighting as the sole or primary means of illumination.

Access route dimensions shall be appropriate for the prescribed level of pedestrian activity.

2.4.4 Platforms

Tramstop platforms and ancillary works shall maintain consistency of alignment with the Edinburgh Tram Network's permanent way.

Platforms shall provide passengers with a clear view of an arriving tram.

Platforms shall facilitate level access for boarding and disembarking from trams.

Tripping hazards shall be avoided.

The length of platform available for boarding/disembarking from trams shall be at least 4m greater than the distance between the outside front edge of the front most passenger door opening and the rear outside edge of the rear most passenger door opening of the tram.

Each platform shall be of sufficient area to accommodate the projected passenger flow for each location and shall have as a recommended minimum of 2m clear circulation width, but widths shall be designed to be commensurate with anticipated passenger and pedestrian demand.

Safety ramps shall be provided at each end of all platforms and shall conform to the HSE and Department of Transport's Requirements (produced by HMRI) and the Railways and Other Transport Systems (Approval of Works, Plant and Equipment) Regulations 1994.

2.4.5 Waiting Shelter

Waiting shelters on platforms shall not prohibit passengers within the shelter from having a clear view of an arriving tram.

Waiting shelters shall provide the means to distribute power and communications to/from equipment located at the tramstop.

The waiting shelter shall provide for seating (with backrests), signage, lighting, PIDs, PHPs, public address equipment, advertising and where practicable, ticket vending machine to be located within it.

Two litterbins shall be provided on each platform located at mid-points between the waiting shelter and each end of the platform.

Litterbins shall be designed to deter and eliminate opportunity for vandalism and/or terrorism.

Litterbins shall be provided such that each tramstop will require only one litter collection per operating day.

Waiting shelters shall permit future alteration to the capacity in terms of volume of passengers and equipment to meet emerging needs.

Tramstop waiting shelters shall be of elegant but functional design and provide protection to passengers from sun, wind and driven rain/snow.

Waiting shelters shall not permit climbing and/or its use by person(s)/object(s) coming into contact with the OLE.

Waiting shelters canopies shall be designed so as not to form a receptacle for litter/debris.

The shelter structure, roof and wall panels shall be available, as far as possible, 'off the shelf' in order to facilitate effective repair and maintenance.

2.4.6 Equipment

All equipment sited at tramstops shall have power provided in accordance with the Requirements Specification for Electrification and Power.

Equipment placed on platforms shall not prohibited passengers from having a clear view of an arriving tram.

The following minimum equipment level as referred to in the Requirements Specification for Supervision, Command and Control Suite of Systems shall be provided on each tramstop platform:

The minimum equipment level for any tramstop will be:

- 1 x CCTV camera per platform
- 1 x PA per platform
- 1 x Double-sided PID per platform
- 1 x PHP per platform
- 1 x Automated TVM per platform

Additional CCTV and PHP shall be provided where adequate security cannot be provided by the minimum equipment level.

All tramstop equipment, including where practicable, the automated ticket vending machine shall be located and/or integrated within the tramstop waiting shelter.

2.4.7 Signage

Each tramstop shall contain signage that displays the corporate branding.

The tramstop name shall be displayed prominently in several locations at that tramstop.

Signage of the tramstop name shall be displayed such that it is visible from arriving trams at the earliest possible opportunity.

Signage shall be clearly visible under all lighting conditions and in all weathers.

Directional signage showing entrance/exit routes to/from the tramstop platform and signage directing passenger to the relevant platform for their service shall be provided at all tramstops and park & ride sites.

2.4.8 Lighting

Lighting shall be provided to engender a safe and attractive environment in which intending passenger can wait.

All signage shall be illuminated.

Lighting design shall be the same or complimentary to adjacent highway lighting.

Lamps shall be able to be replaced during normal Edinburgh Tram Network operating hours without disruption to service.

Wherever practicable, lighting columns at tramstops should provided for the mounting and operation of CCTV cameras and radio/wireless communication antennae where used.

2.5 Depot

2.5.1 Site

The Depot site in sector DHY1 (Gogar) would be located in the vicinity of Edinburgh International Airport and may have constraints imposed on its design by aviation authorities. The potential Depot site at Leith would not have these constraints.

The Depot track layout shall be based on nominal 40m cars, noting requirement for shunting moves by two coupled cars. The SDS Provider is required to evaluate this against a move to 30+m cars.

Stabling shall be provided for the total number of cars in the fleet as derived from the technology review and service pattern/run time requirements.

Delivery of trams by road shall be afforded with minimum impact on other facilities.

Segregation of all rail and road vehicle movements shall be provided wherever practicable.

The Depot track and stabling layout shall be robust in operation with single failures of vehicles or pointwork causing a blockage of other tram movements. Single-ended stabling roads shall be avoided.

Point levers shall lay flat.

Logical walking routes and access in stabling shall be provided.

Water and 110V power shall be provided to each stabling berth.

Overall layout shall be operationally logical in the flow of vehicles, particularly when vehicles are entering or leaving service. A bypass road shall be provided past the washer.

Sanding and washing facilities shall be provided in a sheltered environment adjacent to but not part of the vehicle workshop space.

Depot layout shall allow the building(s) to be expanded with minimal disruption to normal operations.

Depot layout shall minimise disturbance to neighbours from sources such as artificial lighting and noise.

The orientation of the building within the Depot layout shall take into consideration aspects of solar gain and the view from the Control Room.

Car parking for XX vehicles, with provision for future expansion to XY vehicles; also cycle/motorcycle parking; locations for service vehicles and appropriate locations for visitors shall be provided. The values of XX and XY shall be agreed with **tie**.

Allowance shall be made in the layout adjacent to the Depot building for additional temporary office facilities for e.g. commissioning staff, including electricity and water services.

2.5.2 Security

The Depot site shall be secure and fitted with CCTV surveillance and any other necessary security systems as appropriate.

Controlled entry for pedestrians (staff to nearest tramstop and visitors), trams and road vehicles shall be allowed with appropriate access control for each. Access control shall be switchable between a reception area (for daytime use) and the Control Room.

The Depot perimeter fence shall be at least 2.4m high and shall have a continuous concrete strip foundation. It shall be a weldmesh or paling fence - interlaced wire is not acceptable. It shall be plastic coated or galvanised.

The Depot road entrance shall have two separate vehicle gates for entry and exit, and additionally a pedestrian gate on the footway. The vehicle entry gate shall be capable of being opened, and the pedestrian gate released, from either the Control Room or the Depot reception, or by a member of staff presenting a security card to a reader at the gate. The vehicle gate shall re-close once a vehicle has passed through. The pedestrian gate shall close automatically and re-lock when it closes.

Intercoms shall be provided from each of the two entry gates (pedestrian and vehicle) to reception and to the Control Room. There shall be two vehicle entry intercom positions on the same pole, one at a convenient height for car drivers and one for HGV drivers, who shall be able to use them whilst in the driving seats of their vehicles. There shall be one security card reader at the lower position and one with the intercom at the pedestrian gate.

Any equipment in the centre of the road (gateposts, islands, intercom/card reader pole) shall be removable if required to allow tram movement by road if this is designed to do be done through the same access.

The vehicle exit gate shall open automatically when a vehicle approaches it from the within the Depot.

The tram entry/exit locations shall be provided with manual gates which shall be normally left open. At these gateways, there shall be a microwave detector which shall sound a single brief distinct audible warning in the Control Room whenever the beam is interrupted by a person or larger object.

2.5.2.1 Depot CCTV

The entire Depot perimeter and together with the tram entrance junctions shall be under CCTV surveillance, the images from which shall be displayed real-time in the Control Room. The cameras shall form part of the network CCTV system.

A dedicated camera shall be provided to view the Depot entrance. The image from this camera shall be available on a monitor in the Depot reception area when access is being controlled from there.

2.5.3 Buildings & Services

The main Depot building shall accommodate the following requirements:

Auxiliary supplies shall be supplied from the traction substation; a UPS is to be installed for defined functions to be agreed.

The traction supply shall include an appropriate earthing scheme and interlocking with relevant workshop equipment and appropriate indication to maintenance staff and tram drivers.

The Depot maintenance building shall be designed and constructed for 40m nominal length trams. and for maintenance of an initial fleet of XX cars, including the staff to

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operate and maintain a system of respective size. Expansion to support a larger fleet size and system of 1.33 times the value XX shall be possible without disruption to the existing operations. The SDS Provider is required to evaluate this against a move to 30+m cars.

Provision of appropriate network cabling throughout the building for the independent supply of IT systems shall be made.

All appropriate furnishings shall be supplied.

All finishes shall be appropriate to area and type of use within the building and in materials with a long life in a largely 24/7 environment.

The office and welfare facilities shall support the staff numbers required for the initial and expanded system (numbers to be defined with **tie**).

The building shall also house training and meeting rooms, a secure room for cash, storage areas, maintenance workshops, supervisory offices and a stores area for both small items and large/heavy items.

The Control Room shall have an adjacent lobby area and preferably a viewing area from an adjacent corridor.

Natural light in offices shall be maximised and all rooms are to be placed within the building in locations appropriate to their function.

The layout of an agreed part of the office/training areas shall be able to be simply changed in layout for changing requirements. A specific example of this is the initial need for a large training room (XX people), with smaller areas preferred thereafter.

The building design shall avoid noise being transmitted through the roof space between the workshop, upper floor offices, training areas if at all possible, while retaining flexibility for future changes to layout.

An adequate open area shall be provided in the vehicle workshop, alongside the workshops, for flexible future use.

Space shall be provided throughout the relevant parts of the building to drive a loaded fork lift truck.

Appropriate networks of 110V and compressed air shall be provided.

Air conditioning shall be provided in the Control Room and consideration shall be given as to whether it would be cost effective for the office areas also to be so fitted.

There shall be sufficient maintenance pit space provided. The layout, cross-sections of such pit space shall facilitate the optimisation of those aspects of tram maintenance for which inspection pits are required.

Lighting in the main workshop and other areas shall be placed so that light is given where required for work to take place, including when trams are present. The lighting shall also be readily accessible for maintenance (lamp change).

2.5.4 Maintenance

2.5.4.1 Maintenance Shed Doors

The Depot doors shall be bi-parting, i-folding with clear panels for through visibility. They shall be power-operated with push-button controls both inside and outside. The open and close buttons shall be press and hold whilst the door moves, rather then press and walk away, to ensure that the door does not open or close onto an obstruction or person.

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In the event of power failure or door operating equipment failure, it shall be possible for one person to operate the doors manually. It shall be possible to change doors to manual mode from ground level.

A design of door without a bottom track is strongly preferred.

A design of door which does not have the actuation equipment at the top, near the OLE, is strongly preferred.

The doors must include an appropriate hole or insulated edge to accommodate the (live) OLE when they are closed.

Door leaves shall be bonded and earthed so that should they inadvertently come into contact with the OLE, the fault resistance will be sufficiently low to ensure an immediate circuit breaker trip without damage to the doors or equipment.

2.5.4.2 Workshop & Mobile Equipment

The following requirements shall be provided:

- A comprehensive provision of all workshop fixed tools, staging, storage racking, cupboards, benches, lockers, mobile tools and equipment and hand tools shall be specified.
- The scope shall include all staging and high-level access platforms required for the tram maintenance.
- An under floor wheel lathe appropriate to the type of tram and running gear. A key requirement being the ability to reprofile a complete tram in a single shift, with an appropriate definition of cut. Data collection facilities shall be provided.
- This shall include equipment for tram interior cleaning and infrastructure cleaning, although the requirement for the supply of these items has yet to be confirmed.
- Specialist tools, jigs and test equipment that are properly included in the scope of the "Tram Vehicle Supply Contract" and other supply subcontracts need not be specified. However, the scopes of supply shall be reviewed to ensure that there are no gaps in the supply arrangements.
- Appropriate battery charging equipment for trams and fork lift truck and associated ventilation equipment for this and other relevant activities shall be provided.
- A battery-powered fork lift truck of appropriate capacity and terrain capability shall be provided.
- Special workshop facilities, including test benches shall be provided, appropriate to the trams and other fixed equipment to be supplied, for hydraulic equipment and electronic equipment.

2.5.4.3 Sand Plant

A sand dispensing plant shall be provided at the Depot located as appropriate to facilitate effective maintenance, turnround of trams back into service. The sand silo need not be located in a building.

The sand silo must have a capacity of at least 30 tons, so that it will accept a full lorry-load.

Tram drivers will be expected to fill their own trams without assistance. One driver must be able to fill a tram from empty within five minutes (measured from one tram leaving the sand station to the next leaving the sand station). This rate of filling must

be sustainable for thirty minutes. In no circumstances may the interval between two successive trams exceed ten minutes.

The physical condition of the sand must remain in accordance with the procurement specification when the sand is delivered to the tram sandboxes.

Delivery must cease automatically when a box is full.

The sand plant delivery nozzles shall be compatible with the sand filling inlets on the tram.

Interlocking and indication (preferably standard tram signals) must be provided so that the indicators do not change to proceed unless all nozzles are stowed and clear of the tram.

2.5.4.4 Wash Plant

The wash plant shall be located inside a shelter (though the shelter need not extend the full length of the tram being washed). It shall be designed such that it will operate effectively at all temperatures of 0°c and above and it must be effective in washing trams at the ambient temperature.

In front of the wash plant and a tram length apart shall be the end wash pads, with lances / rotary brushes supplying detergent solution from the wash, and drainage.

2.5.4.5 Road – Rail Vehicle

A road-rail vehicle appropriate to the alignment and nature of the system shall be provided. Basic requirements include a Hiab-type crane of a capacity to be agreed, and exchangeable body pallets. A man basket shall be supplied.

Particular attention shall be applied to the suitability of the vehicle and its equipment for working on the OLE. This shall include a large working platform which does not need outriggers down so it can be moved quickly between structures, and moved along the track and highway slowly with people on the platform inspecting the OLE.

Options for tram towing capacity (and technical provisions) shall be considered as part of the development of this Requirements Specification for Civil Engineering Works.

A range of optional equipment for attachment to the vehicle shall be supplied. The possible options shall be investigated and agreed with **tie**.

A facility for groove cleaning is required. This may take the form of an exchangeable module to fit on the road-rail vehicle.

2.5.4.6 Shunter

The wheel lathe road should be unwired and a battery shunter provided to move trams over the wheel lathe.

2.5.4.7 Lifting Equipment

It shall be possible to:

- Unload a bogie from a lorry (and load it).
- Move a bogie from where it will be taken out from under the tram to anywhere it may be worked on.
- Take any roof box off the roof of the tram. Any removal of roof boxes shall be accomplished sideways over the overhead access platform and guard rails.

An appropriate set of lifting equipment, suited to the layout of the vehicle workshop, including an overhead traversing crane and options for semi-portal and/or travelling mono-hoists shall be provided.

A drained pad is required with a water and power supply for a pressure washer, accessible to bogies by rail (so they can be cleaned off after being extracted and can have salt washed off after winter) and to road vehicles (again, for washing underneath). The ideal location is outside but on the lifting road.

2.5.4.7.1 Lifting equipment – Trams

Equipment to lift a complete tram and/or parts of a complete vehicle shall be supplied. There is a strong preference for built-in equipment to leave an uninterrupted floor space when not in use, as well as avoiding handling jacks, trailing cables and minimising set-up time. There is a further preference for lifting under bogies than under sections of track. It must be possible to lift/drop any bogie or combination. Therefore, stands to support the vehicle with any combination of bogies removed are also required.

2.5.4.8 Accommodation bogies

An accommodation bogie to replace any of the tram bogies and which allows the vehicle to be moved around the Depot shall be provided.

An additional requirement is for a "bogie" or equivalent to support the disconnected end of a split tram. This must also be moveable at low speed. This might be based on the above or be a separate item (There is no requirement for both facilities to be available simultaneously).

2.5.4.9 Paint Booth

An appropriate paint system shall be provided (not involving isocyanates or other hazardous materials) for panel and patch repairs. An appropriate spray booth is to be provided (not whole vehicle).

2.5.5 Re-railing Equipment

An appropriate package is required. This needs to match the vehicle type and the special characteristics of the alignment. The equipment shall be packed together either as a module to fit the road-rail vehicle or to fit in a separate road vehicle. Options shall be discussed with **tie**.

The equipment will depend on the vehicle fittings e.g. if it has external jacking pockets or internal jacking holes in the floor. There may be a requirement for more than one set of traversing gear.

2.5.6 Stores

External storage facilities shall be provided for large items and for a limited amount of hazardous materials.

Layout to allow ease of road vehicle deliveries, inc. loading sand delivery into the silo, taking into account the likely types of pressure discharge, and of large deliveries to the inside stores.

The lorry delivery point shall be so located that the lorry does not need to pass under any OLE, and such that whilst connected to the delivery point, the tipping body cannot come within 3m of any live OLE, and such that it does not prevent road vehicle movements in the Depot.

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2.6 Utilities

Wherever possible, the Edinburgh Tram Network shall be designed such that there is no requirement to divert existing public utilities. Where this is not achievable, then diversionary works shall as far as possible be undertaken as part of an 'advanced works' programme with the relevant public utility organisation.

[redacted]

Director/Authorised Signatory
TIE LIMITED

[redacted]

Director/Authorised Signatory
PARSONS BRINCKERHOFF LIMITED



This **is the Schedule 13 referred to in the foregoing Agreement between the Client and the SDS Provider**

Requirements Specification for

Supervision, Command & Control Suite of Systems

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3 SUPERVISION, CONTROL & COMMUNICATIONS

3.1 General

Supervision, control and communications for the Edinburgh Tram Network will be centralised in a Control Room and supporting equipment room located at the Depot.

The Edinburgh Tram Network's tram position and detection sub-system ("TPDS") shall provide for the safe movement and overall regulation of trams running on the Edinburgh Tram Network. Such sub-system shall be primarily carried on-board the tram.

Although the tram driver shall be responsible for safe tram operation driving on 'line of sight', the command, signalling, control and communications system shall provide the personnel in the Control Room with the tram regulation and performance monitoring facilities needed to achieve the target headway for the core period and the timetable.

The Edinburgh Tram Network and all system components shall be configurable to ensure the ability to maintain tram services under all reasonably foreseeable conditions, albeit that some peripheral functions may be operating in degraded mode.

The Edinburgh Tram Network shall be configured such that in the event of single failure there shall be no loss of data and no requirement for excessive actions on the part of the Control Room staff.

Where there are connections or any exchange of data between subsystems, each system shall be such that any failure in another system shall not cause a failure of the system, (except in the functionality between the two systems concerned).

3.2 Operational Requirements

The supervisory, control and communication system shall enable compliance with the Requirements Specification for Overall System Operational and Performance Requirements and the System Wide Non Functional Requirements.

3.3 Sub-Systems

The supervisory, control and communication system shall comprise a number of sub-systems.

3.3.1 Tram Position and Detections System (TPDS)

The TPDS sub-system shall detect the location and position of trams anywhere on the Edinburgh Tram Network.

The TPDS sub-system shall be capable of accepting and processing the following information from each tram:

- Tram number
- Run number
- Destination
- Driver staff number
- Driver duty number
- Whether the tram is in service or not

This information shall be transmitted in real time to the Control Room from each tram. The tram driver shall input this information at the start of turn of duty and the system will then automatically update at the start of each trip.

TPDS shall provide data of tram positions such that the PID sub-system can be updated automatically in real-time. The PIDs shall display accurate information for both timetabled and untimetabled trams for which destination information is available, so that PIDs will display correctly even during periods of disruption.

On approach to a tram's destination, TPDS shall be capable of providing updates to the PIDS sub-system such that the tramstop PID can display the tram's next destination.

TPDS shall be able to automatically call for the setting of power points at junctions for the required route in advance of the tram approaching the junction. Once the points have been confirmed as being correctly 'set', an indication of such shall be given to the tram driver and Control Room operators. This functionality shall be based with the local point controller, being suitably protected from abuse, and not rely on communication between the remote location and the Control Room.

Where there is a tramstop on the approach to a signalled installation, then it shall detect a 'Ready-to-Start' signal operated by the driver of the tram from a cab control.

TPDS shall be interfaced with the urban traffic control system and provide information as to the approach of trams. This information shall be used by the local traffic signal controller to provide the agreed Tram junction priority. Tram priority at junctions shall be level 1. Where this priority level cannot be achieved level 2 shall be attained.

TPDS interfaces shall be compatible with the highway traffic-light system and shall enable the provision of visual indication to the drivers of trams of the ability to proceed or the need to stop.

At signalled road junctions where there is a divergent tramway junction ahead, TPDS shall detect which route the tram will take and may be required to provide such indication to the tram driver via an appropriate tram signal.

There shall be sufficient redundancy provided in the interface between TPDS and the UTC controller such that failure of one input and/or one output will not cause the interface to fail. As a guideline this should be of the order of 3 x tram approach inputs and 1 x departure input.

Additional signalling features in accordance with Good Industry Practice for safety enhancement and to achieve operational flexibility shall be provided where appropriate. Such features shall comply with the relevant signalling and signage standards.

At road junctions, provision shall be made so that in the event of failure of tram detection, the signal sequence may be initiated by a command from the Control Room through UTC to the local UTC interface.

3.3.2 Passenger Information Display System (PIDS)

Double-sided PIDs shall be provided on each tramstop platform. Such PIDs shall be mounted in such a way and position that restricts their vulnerability to vandalism and persons attempting to climb them.

Double-sided PIDs shall be provided at each park & ride site. Such PIDs shall be mounted in such a way and position that restricts their vulnerability to vandalism.

For each tramstop, 1 x PID shall be provided per platform face and shall be mounted in a suitable position such that it can be seen from within the shelter and from as much of the platform area as possible.

Additional PID's and signage shall be provided as appropriate at Edinburgh International Airport, Ocean Terminal and Haymarket.

Under normal and degraded modes of operation ('normal' and 'degraded' being defined in paragraph 1.5 of the Requirements Specification for Overall System Operational & Performance Requirements) the displays shall be updated automatically via data transmitted from the tram. Dependent upon system architecture the routing of such data communication may be from the tram via the Control Room equipment (for TPDS and PIDS) and then to the relevant tramstop PIDs rather than communicated directly from the tram to the relevant PIDs.

Provided that the next three tram service arrivals at a tramstop platform are expected within the ensuing 30 minute period, the PID for that platform shall display the destinations of these services and the expected number of minutes before their arrival.

PIDs shall be of a type and be sited so as to be legible to passengers in all reasonable prevailing lighting conditions.

PIDs shall be capable of allowing a limited selection of messages and free-form text to be displayed, at selected individual, selected groups or at all tramstops on command from the Control Room.

All PIDs shall display the current time using time source and format stated in the System-Wide Non-Functional Requirements.

3.3.3 Telephony

A telecommunications system shall be provided that allows communication with all internal Edinburgh Tram Network organisation members and external parties but not with trams.

All voice communications to and from the Control Room shall be recorded and played back.

Emergency telephone lines must be provided to allow contact with and from the following organisations regardless of any failure of the main PABX. Such facilities need not necessitate individual handsets but may consider a single handset (on the relevant operator workplaces) with priority displays and call buttons:

1. Fire Control Room
2. Police Control Room
3. Ambulance Control Room
4. Airport Control Room
5. Network Rail Edinburgh Waverley PSB
6. City of Edinburgh Urban Traffic Control
7. One other phone, the number to be used only by staff and others working near the Edinburgh Tram Network to report emergencies at worksites.

3.3.4 Public Address (PA)

A public address system shall be provided at each tramstop. Such equipment shall be mounted in such a way and position that restricts their vulnerability to vandalism.

The PA system shall enable the Control Room to provide audible information to passengers at selected individual, selected groups or at all tramstops. This facility shall be provided by:

1. the Operator selecting a pre-recorded announcement(s) from a library of such announcements.
2. the Operator directly making a voice announcement from the Control Room.

The PA system shall avoid noise carry and nuisance to any neighbouring properties whilst remaining audible on the platform concerned.

There shall be two volume settings for the PA system, one setting for daytime operation and one for night time operation. Such settings shall be pre-determined by time of day will automatically switch when those preset times are reached. These preset times shall be capable of amendment by the Operator and will be different for weekdays, Saturday and Sunday.

Volume settings shall be capable of being manually switched from the Control Room.

3.3.5 Operational Radio System (ORS)

A radio system shall provide a two-way communication enabling voice and data exchanges between the Control Room and

1. drivers on board individual or all trams
2. drivers of road and other support vehicles for the Edinburgh Tram Network. There may be up to 5 of these vehicles.
3. Individually or in groups with other mobile Edinburgh Tram Network operations staff using hand portable equipment along the Edinburgh Tram Network and in the Depot.

Communication shall be reliable, continuous and free from interference over the entire Edinburgh Tram Network.

Primary means of initiating radio calls to individual trams from the Control Room shall be achieved by mouse click(s) on the relevant tram represented on the TPDS display.

The attention of Control Room staff to a tram making a radio call to the Control Room shall be achieved by appropriate graphical and audible representations on both the TPDS and ORS HCI's.

All radio calls shall also be capable of being made and received via the ORS HCI.

All communications shall be via the Control Room. Direct calling between outstation radios is not required and shall not be available.

When an outstation wishes to call the Control Room, they shall insert a call request message. The Control Room will then call them back.

When the Control Room calls an outstation, the outstation radio shall "ring" and the outstation operator shall answer the call and speak first.

All outstation radios shall be equipped with an emergency call facility. When an emergency call is received at the Control Room, a distinct audible and visual alarm shall appear on the Control Room ORS HCI. It shall not be possible for a Control Room operator to cancel an emergency call without answering it.

The ORS shall be able to send 'short codes'. Such short codes can be sent to individual trams, groups of trams or to all trams and be configurable by the user's administrator. They shall consist of the following:

Status Message	Status Meaning	Control to Tram	Tram to Control
CHANGE	Change Active Unit ?		✓
ACK MESS	Status message acknowledge		✓
ACK CALL	Group Voice Call Acknowledge		✓
###-DEP	Departure from departure points, where ### is the three letter code for each departure tramstop. This feature may not be implemented.		✓
DELAY	Delay to Report		✓
FAULT	Defect to Report		✓
NEWCREW	Crew Change Complete		✓
HELP	Police Required		✓ (see note below)
EXIT	Depot Exit Request		✓
ENTRY	Depot Entry Request		✓
RELIEF	Crew Relief Request		✓
XO-DONE	Crossover / Turnback complete		✓
STABLED	Tram Stabled		✓
CREWGONE	Driver Leaving Tram – will report back		✓
ALL-STOP	Stop Immediately	✓	
STOPNEXT	Wait Next Stop	✓	
FIREMEN	Beware Fire Engines	✓	
FIREGONE	Fire Engines Clear	✓	

Notes:

1. the "HELP" code can also be sent from the hand portable and from the road vehicle radios.
2. The emergency call functionality may also require the use of short codes

There shall be at least 50% spare capacity for additional codes.

When the Control Room sends a single voice message to all trams and requests the tram drivers to acknowledge receipt, the radio system shall present a list of all trams and their status to the Control Room operator via the ORS HCI. The status shall be coloured to identify:

1. trams that have acknowledged the message, in green
2. trams that do not have active radios, in amber
3. trams that have not acknowledged the message in red.

This will enable the Control Room staff to identify any trams that have not acknowledged the call.

A similar arrangement shall apply to codes sent to trams.

The ORS shall record all voice communications and store such recordings at the Control Room in accordance with the System Wide Non Functional Requirements for data recording.

3.3.6 Passenger Help Points (PHP)

Clearly visible and signed PHPs shall be provided at each tramstop. Such equipment shall be mounted in such a way and position that restricts their vulnerability to vandalism.

Clearly visible and signed PHPs shall be provided at each park & ride site. Such equipment shall be mounted in such a way and position that restricts their vulnerability to vandalism.

PHPs shall be capable of being activated in two modes; normal and emergency. There shall be two buttons provided, one for each mode, and each clearly signed for their intended use.

Operation of a PHP by the 'emergency button' shall give an immediate indication and audible alarm presented to all Operator workplaces and the overview display at the Control Room. In addition it shall cause the relevant platform CCTV camera to focus on the PHP, overriding any sequential scanning for that camera.

The help point and operation of it shall be compliant with the prevailing Disability Discrimination Act.

The video image received during the period the camera is in the pre-set shot mode shall be continuously recorded together with time, date and location data.

The unit shall provide two-way speech facilities between the unit and the Control Room. Such voice communication shall be recorded by the CCTV sub-system and data stored in accordance with the System Wide Non Functional Requirements for data recording.

The Control Room operator shall be able to terminate the call, reset the alarm unit and override the camera controls. Once a PHP call has been cleared by the Operator, the CCTV camera shall return to its original position/sequence of scans unless the Operator has taken manual control of the camera.

3.3.7 Closed Circuit Television (CCTV)

CCTV camera(s) shall be provided at each tramstop platform and be able to pan and zoom both automatically within preset limits and under manual control. Such equipment shall be mounted in such a way and position that restricts their vulnerability to vandalism.

The CCTV surveillance system shall be of digital design.

All CCTV cameras shall be enclosed in domes to camouflage their position.

The CCTV system shall provide surveillance for ticket machines, shelters, buildings and other structures, the platform and their walking and access routes.

The CCTV system shall be provided at all park and ride sites and cover the cark park, paths to and from it, ticket vending machines, PHPs, shelters, buildings and other structures. It shall provide such CCTV to the same standard as that specified above in relation to tramstops.

At park & ride sites, a CCTV camera shall be positioned at the vehicular entrance/exit point such that clear images of vehicles and their registration plates can be displayed and recorded.

The CCTV surveillance system shall comprise colour cameras and all associated equipment to permit the remote viewing and recording of video images in real time 24 hours/day, 365 days/year.

CCTV recorded images and printed images shall comply with Home Office guidelines (or Scottish equivalent) and provides clear undistorted colour video images over the

entire operating range under all lighting and weather conditions, with image quality sufficient for unambiguous identification of persons for prosecution purposes.

The CCTV system shall support the facility to review recorded images, freeze frame, Rugby date and time stamp, any view and provide printed images of incidents without interruption to continuous CCTV surveillance operation.

The CCTV system shall provide for no-dwell zones to inhibit panning into neighbouring properties.

Stored viewing patterns shall be provided for each of the two banks of CCTV displays provided in the Control Room. Viewing patterns shall be capable of creation, amendment or deletion by the Edinburgh Tram Network operator/maintainer.

The CCTV system shall automatically position and zoom-in if the PHP is activated. Upon such activation the CCTV system shall record both CCTV images and the voice communication of the PHP unit.

The CCTV system shall be compatible with and allow image transfer to/from the UTC room and the local Police system.

3.3.8 Supervisory Collection and Data Acquisition System (SCADA)

A SCADA system shall be provided that will provide the HCI to monitor and control the Edinburgh Tram Network's traction power system and monitor and log data relating to Edinburgh Tram Network equipment.

The SCADA system shall be located in the equipment room of the Depot and be connected to remote equipment by a suitable communications medium.

3.3.8.1 Traction Power

The SCADA sub-system shall permit the controller to isolate and/or earth any section of the traction power system by making a minimal number of mouse clicks, or equivalent, from the SCADA HCI power diagram.

The SCADA sub-system shall monitor the status of the traction power system.

If abnormal conditions/events occur they shall be detected by the SCADA sub-system and transmitted to the Control Room in the form of an alert.

Alerts received at the Control Room shall be filtered, grouped and prioritised with only those that require Control Room staff action being indicated on the SCADA HCI in the Control Room.

All alerts shall be targeted to a particular user/group of users and have a nomenclature that is unambiguous and easy to comprehend by that user.

The SCADA sub-system shall permit the controller to remotely control motorised isolators from the SCADA HCI power diagram.

The SCADA sub-system shall permit the controller to open individual circuit breakers by making no more than one or two mouse clicks, or equivalent, from the SCADA HCI power diagram.

Closing of an individual circuit breaker or isolator to render the equipment 'live' shall require at least three mouse clicks in different places on the SCADA HCI power diagram.

The Operator shall be able to isolate and earth all electrical sections between adjacent sub-stations or between a sub-station and the end of the Edinburgh Tram Network route by making no more than two mouse clicks, or equivalent, from the SCADA HCI power diagram. This operation will initiate a sequence of switching operations, the progress and completion of which shall be indicated to the Operator

via the SCADA HCI power diagram. Should any operation in this sequence 'time out' or fail an visual and audible alarm shall be generated to the Operator and the sequence be suspended by the system.

Switching sequences shall be able to be created, edited and deleted by the system administrator.

The current status of the traction power system shall be displayed to the controller at all times.

All events within the traction power system shall be logged and be able to be retrieved for analysis.

3.3.8.2 Tramway Equipment

The SCADA sub-system shall monitor and log the events of all Edinburgh Tram Network equipment connected via the chosen communications medium. Equipment to be monitored and logged shall include:

- Tram position & detection devices
- ORS
- PHPs
- TEL
- Voice recording devices
- Point control equipment
- Point heating equipment
- Tram signals
- Point indicators
- Trackside cabinets/housings
- TRTS
- Point detection
- UPS (if supplied)
- All communications bearer systems
- PIDs
- CCTV cameras
- CCTV recording devices
- Public address system
- Equipment room HVAC devices
- Depot sand hopper levels
- Automated TV Ms
- UTC interface
- Tramstop cabinets/housings
- Tramstop lighting
- Power sub-stations

The SCADA sub-system shall provide spare capacity for at least 10% of additional alarms to be connected to the system. Configuration of such alarms shall be undertaken by the Edinburgh Tram Network's operations/maintenance personnel.

Alerts received at the Control Room shall be filtered, grouped and prioritised with only those that require Control Room staff action being indicated on the SCADA HCI in the Control Room.

All alerts shall be targeted to a particular user/group of users and have a nomenclature that is unambiguous and easy to comprehend by that user.

3.3.9 Fare Collection System

Fare collection and ticket issuing for the Edinburgh Tramway shall be effected through the provision of automatic TVMs

The system shall be configured such that in the event of single failure there shall be no loss of data and no requirement for excessive actions on the part of the Control Room staff.

Where there are connections or any exchange of data between subsystems, each system shall be such that any failure in another system shall not cause a failure of the system.

3.3.9.1 Automated Ticket Vending Machine (TVM)

TVMs shall have a proven record of successful use (defined as greater than 99% operational availability) in a similar environment and be capable of interfacing to the SCADA system used on the Edinburgh Tram Network.

One automated TVM shall be provided on each tramstop platform and wherever practicable shall be integrated into the tramstop shelter.

TVMs shall permit the user to select the type of ticket required and tender the relevant fare in as simple as possible manner. To achieve this they shall have an easily understood sequence of events to obtain a ticket and tender fare that is clearly displayed to the user.

Automated TVMs shall:

- accept UK coins of no less value than 5 pence and all UK bank notes, including all Scottish bank notes.
- accept all major credit/debit cards.
- be capable of easy conversion to Euro currency
- give correct change in the fewest number of coins/notes permissible
- have sufficient ticket, cash box and change capacity to carry out all normal transactions daily
- Once fare has been tendered successfully the TVM shall print the ticket and make it available to the user via an appropriate output means.

TVMs shall communicate reliably and effectively with the Edinburgh Tram Network's SCADA system. It is an objective that cabling for power and telecommunications is kept to a minimum. To achieve this alternative means of transmitting data from the TVM's to the SCADA system shall be considered. These may include internet or wireless technologies.

TVMs shall be weatherproof and vandal resistant, in particular with respect to maintaining clarity of display of the human-computer interface, under all reasonable lighting conditions.

TVMs shall conform to the power design of the Edinburgh Tram Network, in terms of EMC, standards, consumption and earthing.

3.4 Control Room

The Control Room shall be located at the Depot. It shall have access to/from the main administration and support offices located at the Depot.

The Control Room shall provide Control Room staff and especially the shift controller and duty manager with clear visibility of the entrance and exit tracks and associated

infrastructure of the Depot complex with the main tramway and at least one end of Depot shed tracks and stabling apron tracks.

3.4.1 Staffing Levels

The Control Room shall be designed to provide sufficient and effective area for the following operations personnel.

3.4.1.1 Duty Manager

The duty manager is responsible for overall control of the Edinburgh Tram Network and the safety of its operation.

The duty manager is also required to be present to 'book' tram-crew on and off duty.

3.4.1.2 Shift Controller

The shift controller is responsible for the minute by minute operation of the Edinburgh Tram Network ensuring service perturbations risks are minimised and tram-crew are aware of the current state of the Edinburgh Tram Network.

3.4.1.3 Information & Security Supervisor

The information & security supervisor provides support to the duty manager and shift controller by monitoring the positions of trams, monitoring and editing of PIDs, monitoring of CCTV and PHPs. This post will also take the primary role in ensuring passenger information and security.

3.4.1.4 Support

The Control Room will also need to allow for the provision of a support post to the information & security supervisor under certain perturbed situations.

3.4.2 Facilities

The duty manager is required to 'book' tram-crew on/off duty and needs to physically see crew before they take their turn of duty in order to be convinced that they are in an appropriate condition to commence duty. The Control Room shall provide for this without the need for tram-crew to enter the Control Room.

A diagrammatic representation of the Edinburgh Tram Network shall be provided in the Control Room that is clearly visible to all Control Room personnel. Such representation, which may take the form of a plasma type display, shall be capable of displaying the same views as stated in paragraph 3.4.5.1.1 herein.

A means of displaying replays of recorded CCTV surveillance images and voice recordings from the ORS and/or TEL sub-systems shall be provided in the Control Room and one of the Depot meeting rooms.

Sufficient printing and facsimile services shall be provided to maintain effective operations.

3.4.3 Systems

HCIs to the following sub-systems and grouping shall be provided in the Control Room:

Group	Sub-system within the Group
1	TPDS - Tram Position and Detection System
	PCC - Point Control System
	PHC – Point Heating System Alarms/Alerts
	PIDS - Passenger Information Display System (at Tramstops/Park & Ride Sites)
	UTC - Urban Traffic Control (interface to Highways Traffic Signals and Control)
	+ link to ORS to initiate radio call to tram from TPDS display
2	TEL - Telephony System
	PA - Public Address System (at Tramstops/Park & Ride Sites)
	PHP - Passenger Help Points (at Tramstops/Park & Ride Sites)
	+ link to CCTV when CCTV sub-system detects PHP activated
3	ORS - Operational Voice Radio Communications (Control to/from Tram and portable handsets)
4	CCTV - Closed Circuit Television Surveillance
	+ link to PHP sub-system when PHP is detected as being activated
5	SCADA – both traction power and auxillary SCADA high priority alarms/indications

Complete integration of all sub-systems is not required. Moreover, grouping of sub-systems or part thereof shall be provided and displayed via an appropriate HCI to the relevant operator position as defined in paragraph 3.4.5.

Operator access and security to relevant systems and parts thereof shall be governed by passwords/logons.

3.4.4 Example Configuration

An example configuration of the Control Room layout showing staffing and system HCIs is included below:

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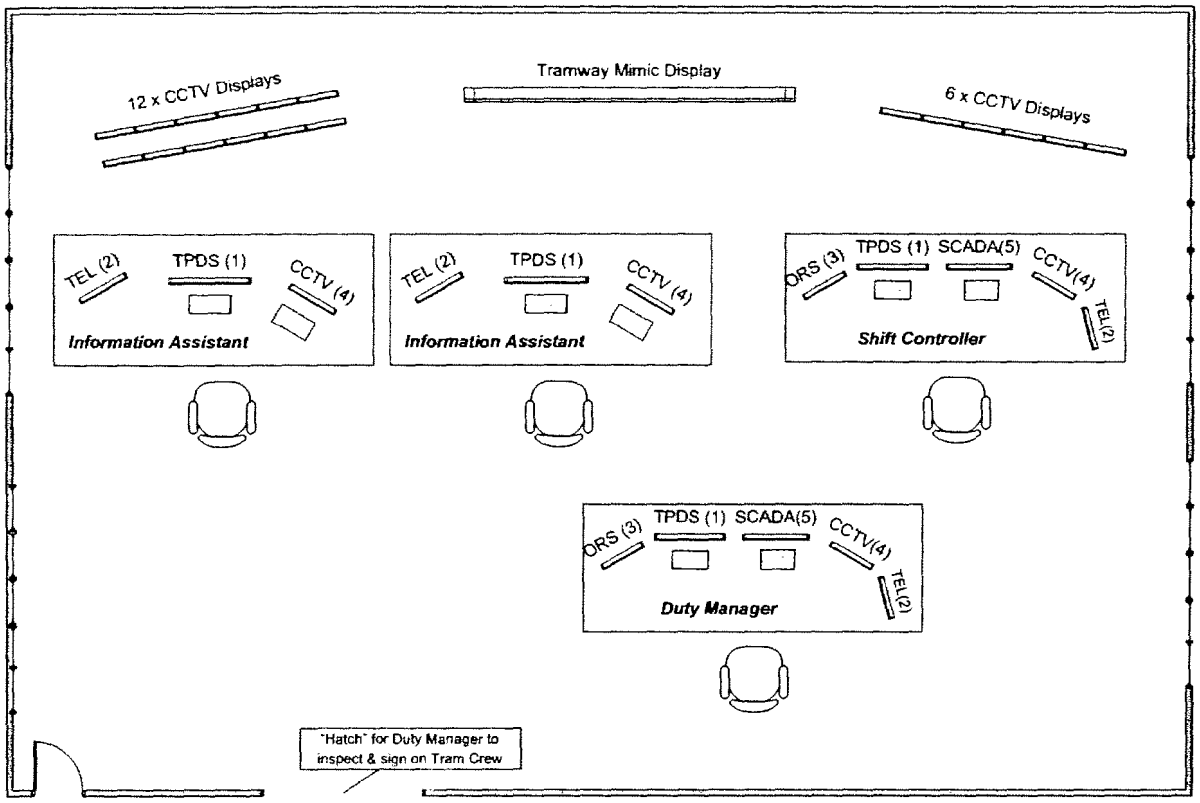

Figure 1 - Numbers in bracket represent HCI Groupings stated in section 1.3.3

3.4.5 Operator Workplaces

All operator workplaces shall be of similar design to maintain the aesthetics of the Control Room.

3.4.5.1 Duty Manager

The duty manager's work place shall be located such that he can clearly see and interact with all the operations of the Control Room.

The duty manager's workplace shall provide:

3.4.5.1.1 TPDS

There shall be a display, mouse and keyboard for interaction with TPDS to:

1. View the current state of the infrastructure
2. View the current position of trams
3. View the punctuality of trams on the Edinburgh Tram Network
4. View and acknowledge all alerts and alarms
5. Input a tram signal demand via the UTC system
6. Allow the updating of the PIDS sub-system with adhoc or pre-programmed suite of text messages.
7. Initiate a radio call to a tram via the ORS by mouse click on the appropriate tram represented on the display.

The keyboard shall be retractable when not in use.

3.4.5.1.2 SCADA

There shall be a display, mouse and keyboard for interaction with the SCADA sub-system to:

1. Provide full access to command and monitor the traction power sub-system.
2. Command the heating of points in the event of the thermostatic control failing
3. Provide indication of restricted alarms sets from remotely located infrastructure and ticketing equipment.

The keyboard shall be retractable when not in use.

3.4.5.1.3 ORS

There shall be touch screen interface to the ORS that permits:

1. Initiation/receipt of radio calls to any/all tram(s) and other vehicles fitted with ORS.
2. Initiation/receipt of radio calls to any/all portable radio handsets.
3. Initiation/receipt of radio calls to any/all PA and PHP devices.
4. Provides audible and visual alarms for emergency radio calls received. Such alarms shall be displayed so as to clearly differentiate between normal events and emergency events.
5. Use of 'short radio codes'.

3.4.5.1.4 CCTV

There shall be a display and console for the selection and monitoring of CCTV images from remotely located cameras.

This display and console shall automatically display the image of the location where a PHP is detected to have been activated.

This console shall be able to select those images that are required to be displayed on any CCTV display in the Control Room. Priority of selection shall be governed by the Edinburgh Tram Network operating procedures.

3.4.5.1.5 TEL

There shall be a touch screen interface to the TEL, (and PA and PHP sub-systems if not provided for by ORS voice radio) that provides for:

1. Initiation/receipt of telephone calls to any/all users on the exchange provided.
2. Priority and high integrity Initiation/receipt of telephone calls to/from emergency services.
3. Audible and visual alarms for PHP calls received.
4. Making of public address announcements at individual, grouped or all tramstops and/or park & ride sites.

3.4.5.2 Shift Controller

The operator workplace provided for the shift controller shall be a complete replica of that provided for the duty manager.

In addition the shift controller shall be given clear visibility of the mimic display and the bank of 6 CCTV displays located at the front of the Control Room.

3.4.5.3 Information & Security Supervisor

The information & security supervisor workplace shall provide HCI for:

3.4.5.3.1 TPDS

There shall be a display, mouse and keyboard for monitoring of:

1. View the current state of the infrastructure
2. View the current position of trams
3. View the punctuality of trams on the Edinburgh Tram Network
4. Allow the updating of the PIDS with adhoc or pre-programmed suite of text messages.
5. Initiate a radio call to a tram via the ORS by mouse click on the appropriate tram represented on the display.

The keyboard shall be retractable when not in use.

3.4.5.3.2 CCTV

There shall be a display and console for the selection and monitoring of CCTV images from remotely located cameras.

This display and console shall automatically display the image of the location where a PHP is detected to have been activated.

This console shall be able to select those images that are required to be displayed on a predetermined 10 display of the bank of 12 displays at the front on the Control Room near this workplace and that of the support workplace.

3.4.5.3.3 TEL

There shall be a touch screen interface to the TEL, (and PA and PHP sub-systems if not provided for by ORS voice radio) that provides for:

1. Initiation/receipt of telephone calls to any/all users on the exchange provided.
2. Initiation/receipt of priority telephone calls to/from emergency services.
3. Audible and visual alarms for PHP calls received.
4. Making of PA announcements at individual, grouped or all tramstops and/or park & ride sites.

3.4.5.4 Support

The operator workplace provided for the support post shall be a complete replica of that provided for the information & security supervisor.

The support post shall have clear visibility to the bank of 12 CCTV displays provided for the information & security supervisor. The support post shall via desktop console be able to select at will 3 CCTV images to be displayed on these displays.

3.5 Equipment Room

3.5.1 Facilities

The equipment room shall be located as close to the Control Room as reasonable practicable.

The equipment room shall provide HVAC, lighting, power and other buildings services to provide effective habitation for the centralised terminals of all subsystems deployed upon the Edinburgh Tram Network and the HCIs thereof.

The equipment room shall provide HVAC, lighting and other buildings services to provide effective habitation for those people required to access the HCIs of the Edinburgh Tram Network sub-systems located in the equipment room.

Appropriate facilities shall be provided to mitigate, detect and extinguish risks associated with the outbreak of fire.

An appropriate means of facilitating uninterrupted data and voice communication between the equipment room and Control Room shall be provided for those sub-systems that are present at the operator workplaces, mimic diagrams, display banks and any emergency override facilities.

3.5.2 Systems

'Head end' components of the following sub-systems shall be present in the equipment room:

- TPDS
- ORS
- PHPs
- TEL
- Voice recording devices
- Point control equipment
- Point heating equipment
- SCADA
- All communications bearer systems
- PID
- CCTV surveillance
- CCTV recording devices
- Public address system
- Automated ticket vending
- UTC interface

3.5.3 Workplaces

Workplaces in the equipment room shall be of similar design to their equivalents in the Control Room but their users shall require a greater level of more detailed access. Such access shall be governed by password and user groups membership.

The following workplaces shall be present in the equipment room:

1. Display, mouse and keyboard for interaction with TPDS and PIDS sub-systems, the ORS sub-system and the UTC sub-system.
2. Touch screen interface to the TEL, PA, and PHP sub-systems
3. Touch screen interface to the ORS sub-system

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4. Displays and console for the selection and monitoring of CCTV images from remotely located cameras.
5. Display, mouse and keyboard for interaction with the SCADA sub-system.
6. HCI(s) for the purpose of archiving and retrieving logged data

3.6 Tramstop Equipment

The architecture of the system shall ensure that, in general, all equipment associated with vehicle detection, relays, interlocking, point heating and point control, shall be situated in apparatus cabinets at the appropriate tramstops or point locations.

The minimum equipment level for any tramstop will be:

- 1 x CCTV camera per platform
- 1 x PA per platform
- 1 x PID per platform
- 1 x PHP per platform
- 1 x automated TVM per platform

Additional CCTV and PHP shall be provided where adequate security cannot be provided by the minimum equipment level.

Wherever practicable, equipment associated with the operation and control of PA, PID, PHPs and automated TVM shall be integrated into the design of the tramstop's passenger waiting shelter. Associated tail cables/other connections shall be sourced from sub-surface, prefabricated housings of materials such 'aqueduct'.

3.7 Trackside Equipment

The minimum amount of equipment shall be mounted at the trackside.

3.7.1 Equipment Cabinets & Housings

Separate cabinets/housings shall be provided for point control and/or point heating equipment. Such cabinets/housings shall be discretely located as close to the associated points as practicable.

Sub-surface, prefabricated housings of materials such 'aqueduct' shall be considered for use in housing trackside equipment such as point controllers and point heating controllers.

Trackside cabinets/housings shall provide the appropriate HVAC conditions that will ensure continuous operation of those sub-systems therein.

3.7.2 Communications Transmission

An integrated communications infrastructure shall be provided that is suitable for the satisfactory transfer of all data, telephone and other signals required for controlling, monitoring and communicating with equipment distributed throughout the Edinburgh Tram Network.

Wherever practicable, communication between two or more items of trackside equipment and from trackside equipment to the Control Room shall be by such means that permits minimal trackside cabling and an acceptable level of system integrity.

The schematic below provides an indication of the communication channels required:

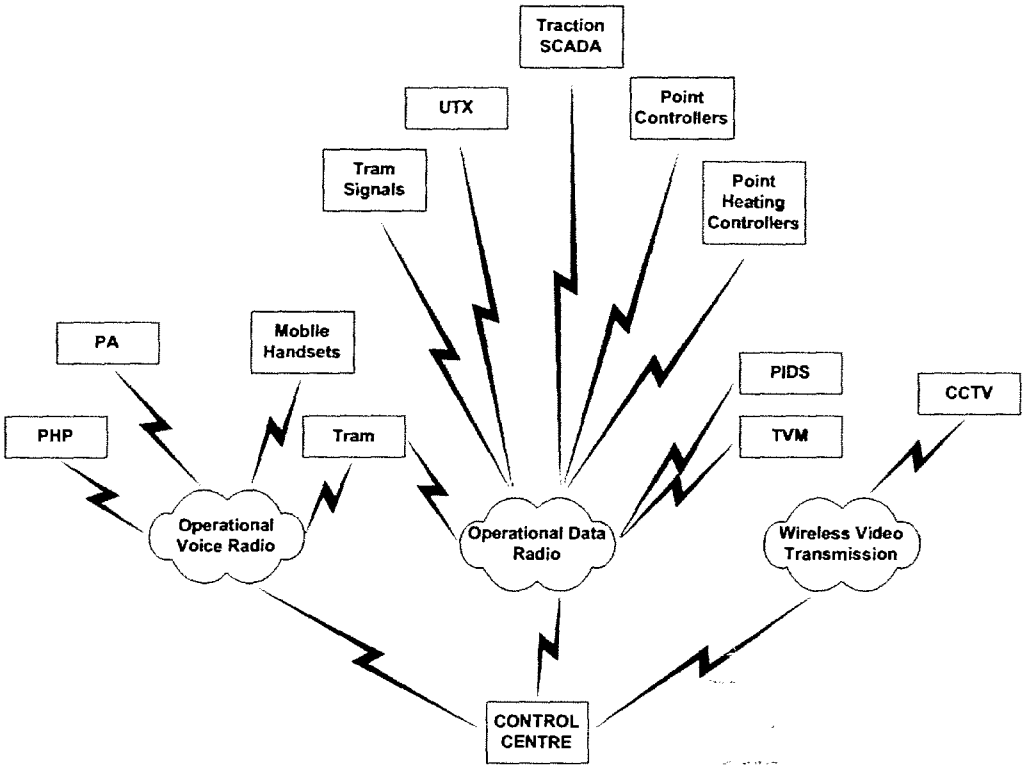

Figure 2 : Example Telecommunications Configuration

The communications bearer and associated electronic equipment shall be configured so as to provide automatic re-routing in the event of failures such that any loss of facility is confined to that given locality and does not affect the operation of the transmission system and facilities at any other location.

3.7.3 Points & Crossovers

3.7.3.1 Route Setting

Point controllers shall command powered point machines to be activated when valid data is received from an approaching tram.

There shall be a fallback mode for all junctions. The parameters of this will be agreed with **tie.**

Powered points shall not be able be activated whilst a tram is occupying the switching zone or by a following tram until the rear bogie of a preceding tram is clear of the moveable point blades.

Points situated within the highway shall not move until the approaching tram is in sufficiently close proximity to the switch blades so as to deter pedestrians from being on the switches.

All powered points shall be detected and have point indicators fitted at a suitable position at the trackside.

All point indicators shall be of Yellow Bar LED design.

The tram driver shall be able to clearly observe point indicators, where provided, and be able to stop before the points if they fail to respond to a command. Location of point indicators will require agreement with the Edinburgh Tram Network operator and HMRI.

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Composite alarm circuits to detect any faulty operation or failure of the separate components of point control packages shall be provided and initiate an alarm to the Control Room.

3.7.3.2 Point Heating

All powered points and emergency crossovers shown on the Edinburgh Tram Network diagram (as defined in the Requirements Specification for Overall System Operational & Performance Requirements) shall have heating mechanisms to prevent failure to operate during cold, snowy and icy weather conditions.

Points heating mechanisms shall activate automatically by sensing that a predetermined temperature has been reached.

Point heating control mechanisms shall have the facility to be activated upon command from the Control Room.

3.7.4 Signals

All tramway signals shall be of LED design.

Position of tramway signals shall be agreed with **tie**.

3.7.5 Power Supplies

A suitable power supply shall be provided in the equipment room at the Control Room that ensures that all equipment necessary to the continuing smooth operation of the Control Room can operate uninterrupted.

A dual supply changeover arrangement, with high integrity circuit breakers is preferred to a single large UPS. The power changeover function shall not itself cause the failure of any systems so powered, the loss of information or an interruption to the availability to any sub-system for more than 20 seconds.

Equipment connected directly to the running rails (e.g. point mechanisms) shall have insulation between rail and that equipment to prevent the flow of traction return current.

3.7.6 Cables

Trackside cabling shall be kept to minimal levels and alternative means of data transmission and power distribution considered. This could include radio communication for operational equipment with retail equipment such as TVMs communicating via internet or mobile phone links.

In all cases of installation, cables shall be protected from damage and view throughout their entire length by the use of appropriate ducting.

3.8 Tram Borne Supervisory, Control & Communication Equipment

3.8.1 Tram Position & Detection System (TPDS)

The tram shall carry such equipment that permits the following data to be input, gathered and transmitted between the vehicle and the Control Room:

- Tram position and which cab is in use
- Tram number
- Run number (unit diagram number)
- Service destination

- Driver number
- Driver duty number
- Whether tram is in/out of service

The tram shall initiate such message(s) that inform the Control Room and enable the updating of the PID sub-system of its destination.

3.8.2 Operational Radio System (ORS)

Nomenclature for tram radio call signs shall be the same as the vehicle number.

All voice communications involving the tram driver shall be via a handsfree method so as to minimise distraction of the driver from his driving responsibilities.

In the event that an on-board PHP is activated and the tram driver is involved in a radio call, the radio call shall not be interrupted. An alert of the help point activation shall be indicated to the tram driver.

The tram shall carry a mobile radio handset which includes both a microphone and an earpiece. This can be used in the event that the normal handsfree method of communication becomes unavailable or impractical – for example when the radio call is of a sensitive nature to those who may overhear it.

Where the tram driver instigates an on-board public address, this shall take precedence over any incoming radio calls received during the duration of public address. All radio calls received during this time shall be clearly indicated to the driver at the time of receipt.

When the tram is required to change direction of travel; e.g. after arrival at a terminus, the tram driver shall not be required to make any input to the ORS sub-system as he takes up occupation of the 'now leading' cab.

[redacted]

Director/Authorised Signatory
TIE LIMITED

[redacted]

Director/Authorised Signatory
PARSONS BRINCKERHOFF LIMITED



This is the Schedule 14 referred to in the foregoing Agreement between the Client and the SDS Provider

Requirements Specification for

Electrification & Power

TIE00899941_0342

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4 ELECTRIFICATION & POWER REQUIREMENTS

4.1 General

The traction power supply system shall be a 750V or 1500V nominal DC system, fed through overhead contact wire and with traction return through the running rails.

The appearance of the finished overhead contact wire system (OLE) is of paramount importance and will receive detailed consideration through the planning approval process.

4.2 Traction Power Supply System

4.2.1 Modelling and Capacity

The full input parameters for the traction system modelling shall be agreed by **tie** in advance. Parameters should be chosen conservatively, but not so that in combination an unrealistically severe combination of parameters arises. The system shall be designed to support:

1. the peak service pattern,
2. the assumed rail, track construction, bonding, OLE and any parallel feeding arrangements,
3. trams of 40m nominal length,
4. all trams at AW2 loading, and with full auxiliary electrical loading,
5. service disruption, simulated by an appropriate means e.g. by an additional load drawn by each tram,
6. capacity for system expansion (see paragraph 4.2.3)
7. no spurious circuit breaker trips, and
8. any one substation in bypass for an indefinite period.

Only substation locations identified by tie may be used for the simulation and design.

As part of the traction power system design, an integrated holistic approach shall be taken with other subsystems including the OLE and the track and bonding details.

4.2.2 Electrical System Design

The electrical system design shall include the preparation of the protection scheme and the calculation of settings for the protection arrangements at each substation while supporting the traction supply to the requirements included in Section 4.2.1.

The normal OLE feeding arrangement shall be double end feeding to each section between substations. Inter-tripping arrangements are therefore required. Cascade tripping resulting from a single fault shall be avoided.

Accessible voltages shall be demonstrated to achieve the relevant EN and HMRI requirements under fault conditions and/or conditions of service disruption.

4.2.3 Capacity for System Expansion

The traction power supply network design shall support any potential Line 3 service over the common section of route. If certain equipment can be omitted from the initial scheme, being only required for the enhanced services to be operated over the common section, then this may be omitted for the initial supply, but the buildings shall

accommodate its future introduction and it shall be able to be installed and commissioned without disruption to normal service.

In addition the E & P design shall accommodate increase in service to 12 services per peak hour per route as described in the Requirements Specification for Overall System Operational & Performance Requirements.

4.2.4 Depot Traction Supply

The Depot site tracks, including those in the vehicle workshop, shall be electrically insulated from the main line, and tied to a common earthing system for the whole Depot site. The location of the IBJs is to be selected taking into account the operational, track layout and OLE requirements.

The Depot traction supply shall be drawn from the main line when the Depot traction substation is not available. This reconfiguration shall be able to be implemented via SCADA.

A foreseeable single failure in the High Voltage supply to the Depot substation shall not result in an interruption to either the Depot traction or to any of the Depot ancillary supply of more than 5 minutes, with no requirement for manual switching.

4.3 Substations

4.3.1 Substations Requirements and Facilities

Detailed interface requirements for the sub-station shall be provided such that a finished building suitable for immediate installation of the electrical equipment and cabling is achieved. This shall include surface finishing and level tolerances in particular. The substation floor and walls shall be sealed to control dust generation.

Underground substations shall not be provided unless proven absolutely necessary. However, where substations are underground, all necessary ventilation, drainage, access and egress requirements shall be provided.

Ventilation shall be provided to ensure both the system performance in hot weather and that the equipment does not suffer from dampness, dust and condensation in cold weather. Forced ventilation can be provided, and thermostatically controlled background heating is required.

The layout of and access arrangements to all substations, particularly the Depot substation, must be accepted by **tie**. This shall facilitate effective training and certification of maintenance staff being implemented. Sufficient access shall be provided to all substations such that the largest component can be replaced without dismantling any of the substation structure.

An appropriate locking system for access doors shall be provided. An intruder system shall be provided that is activated by door contacts and when so activated shall provide an alert to the Control Room via SCADA.

Internal emergency lighting shall be provided and adequate external lighting for access and egress.

All substations shall have the ability to connect an external generator via socket and plug and an interlocked isolator. This shall provide all 400V AC services inside the substation to facilitate maintenance and fault investigation.

The substation building layout should include space for the inclusion of an energy storage device (see also paragraph 4.3.4 below).

All substation equipment shall be of low flammability in order to ensure that fire suppression is not required. Fire detection shall be provided and indicated in the Control Room by SCADA.

4.3.2 Incoming DNO Supplies

The integrity of the incoming DNO supplies to the substations shall be considered at part of their siting. It is important that adjacent substations are not fed from the same ring mains.

4.3.3 Flywheel energy storage

An option for the inclusion of flywheel energy storage at substations shall be considered. This should be addressed as a marginal cost on the scope of supply and a prediction of the energy saved from a separate power supply model.

4.4 Overhead Line Equipment (OLE)

4.4.1 General Requirements

Appearance of the OLE is of paramount importance throughout the Edinburgh Tram Network. The appearance must be appropriate to the location and visual intrusion shall be minimised. The visual appearance may need to include the contact wire stagger in certain areas.

The type of equipment selected (including e.g. auto-tensioned; fixed termination; catenary support; central mast with balanced bracket arms; side masts with cantilever arms; span wire construction etc.) over each section of the route must be appropriate to the area and to the tramway operating speed requirement in that location. The use of building fixings shall be maximised.

Where poles supports are provided, the shape and colour shall be considered as part of the visual approach. It is not necessary to minimise the total number of poles but rather to minimise their overall visual impact.

Consideration shall be given to individual replacement by poles in future, should building alterations require their removal on a temporary or permanent basis.

4.4.2 OLE Components

The use of twin contact wires is not permitted. Where necessary, buried parallel feeders may be considered as part of the traction power system network design. On certain sections of the route, aerial parallel insulated feeders may be considered.

Care shall be taken in specifying the standard components from which the overall OLE system will be assembled.

The part of the OLE that must be considered as 'live' should be minimised, with particular reference to minimising the impact on third-party maintenance alongside the route. The area considered as 'live' should preferably not exceed the width of the DKE of the pantograph head.

If 'parafil' or an equivalent material is to be used as part of the standard components, rigorous quality control measures for its installations shall be ensured.

Particular care shall be taken with the design for minimum visual impact of the parallel bonding between the contact wires, and of the feeder cabling from trackside isolators and at substations. Similarly, particular care must be taken with the overall visual impact and vandal-resistance of balance weight installations, where these are used.

The appearance around the base of support poles will also be of importance in certain areas. Consideration also needs to be given to the ease of replacement of poles if damaged by e.g. errant road vehicles.

4.4.3 Electrical Sectioning and DC Feeding Arrangements

The E & P system shall have both adjacent overhead lines in the same electrical section such that any outage will sever the system. Consequently most substations will only require two DCCBs and a bypass isolator. Line proving shall be a standard feature on all DCCBs.

Electrical sectioning of the overhead line shall be designed taking full account of the following criteria.

- It shall permit sectional energisation refer to the System Wide Non-Functional Requirements while allowing subsequent adjacent sections to be erected with minimum disruption to the energised sections.
- Electrical sections shall be such that crossovers and turnbacks can be used to turn trams with the overhead line isolated on the side of the crossover that is furthest from the city centre.
- Where trams are to be reversed, for instance at a crossover, the section insulators shall be placed to allow two coupled 40m nominal length cars to be reversed (e.g. in a recovery situation).
- Where there are centre platforms, the OLE should be able to be isolated and earthed in the centre platform, with trams able to run through the tramstop on the outer two lines. Also, when the OLE is isolated on one side of the tramstop, trams should be able to operate from the opposite side of the tramstop and turn back in the centre platform. This could be achieved with a changeover switch.
- At a terminus, either platform should be able to be isolated and earthed by the operation of manual isolators.

4.4.4 Section Insulators

Section insulators shall in general be non-gapping (make before break) and shall not require trams to coast through them. They should be positioned on straight track where possible and at a point where current flowing to or from the tram is normally low.

However, section insulators which isolate the overhead line in workshop tracks shall be gapping, so that even if a tram enters a dead section, the dead section is not rendered live by the passage of the pantograph.

4.4.5 Wire Height and Gradient

Generally, the wire shall be as high as practicable to:

- Mitigate HMRI's requirement for minimum wire heights where a support has failed.
- Reduce the risk of contact with wires from over height road vehicles, window cleaners carrying ladders and any third party work.

Contact wire gradients adopted must take account of the expected tram operating speed in the area and an appropriate standard for the installation.

4.4.6 Pantograph

The tram pantograph sub-system shall be supplied as part of the OLE scope of supply for free-issue to the tram manufacturer.

The pantograph must be able to be raised manually when the tram battery is discharged. It is expected that the pantograph will in principle be of the 'power up/ spring down' type.

4.4.7 Integration with Street Lighting

It is expected that on certain sections of route, an integrated design of OLE poles and streetlighting will be required. This should seek to optimise the spacing of support poles and minimise visual intrusion. An appropriate electrical feeding and earthing scheme must be developed and approved by HMRI. This should minimise the additional components required to be attached to support poles and take account of the maintenance approach to be adopted for the street lighting.

4.4.8 Depot

OLE sectioning shall allow maintenance tasks e.g. on washer without disruption to other operations.

Adequate traction power supply for whole fleet stabled overnight and individual tram movements shall be provided.

4.4.8.1 OLE in Maintenance Workshop

Each maintenance berth shall be capable of being isolated separately.

Live line status indication shall be provided for:

1. For tram drivers, standard LRT signals outside doors to each wired part of vehicle workshop, showing STOP when line dead and PROCEED when line live.
2. For staff in the shed, Red (live or dead but not earthed) / Green (earthed) indicators at each berth. Should be visible from as much of the shed as possible, from the rolling stock office and (preferably) from the window from the Control Room into the vehicle workshop.

Vehicle workshop OLE shall be high (partly for safety, partly because it facilitates pantograph set-up).

4.4.8.2 Safety Interlocking system

A safety interlocking system shall be provided that is essentially mechanical key system that shall prevent:

1. Access to a tram roof when the OLE above it is not earthed, either by preventing access to the gantry or by preventing access from gantry to tram.
2. Use of overhead crane where there is a conflict with live OLE;
3. Use of overhead crane where it would run into a tram on jacks.

If there is tram roof equipment near the ends, such that a person working on it is at risk of falling off the end, end gates to high level shall be provided and interlocked such that OLE cannot be live whilst a gate is across.

4.5 Control and Monitoring

4.5.1 SCADA

All circuit breakers shall normally be remotely controlled by the SCADA system, but may also be locally controlled at the substations.

All isolators outside the Depot shall be operated remotely by SCADA and shall provide indications to the Control Room through SCADA.

4.5.2 High integrity emergency isolation system

This system is separate from the SCADA system and shall have no common failure modes with the SCADA system. The Control room shall have the facility to initiate an isolation (not earthing) of all of the overhead line sections by opening the associated DCCBs for:

1. The Depot only, and
2. All other overhead line sections.

4.5.3 Traction Power Supply Isolators

All isolators outside the Depot shall be motorised. Isolators shall generally have three positions, with the common pole connected to the overhead line. The positions are:

1. **Normal** - connecting overhead line to feeder
2. **Earth** - connecting overhead line to rail
3. **Bypass** - connecting overhead line to bypass position on the adjacent isolator at the substation concerned.

The position shall be indicated locally (physically) at the isolator, as well as remotely in the Control Room via SCADA.

Isolators shall be easily locked in the earth position to provide safe isolation of the OLE.

Isolators shall be able to be hand wound whilst maintaining interlocking with DC supply.

In trackside cabinets, the relative positions of the individual isolators are to be geographically consistent with the electrical sections being switched.

All isolators in the Depot shall be manually operated, with two positions, closed to feeder and closed to earth.

4.6 Auxiliary Supplies

4.6.1 Tramstops

A standard approach to the supply of auxiliary power to tramstop locations shall be adopted. This approach shall meet the following criteria:

- The integrity of the supply shall be appropriate to the equipment being powered, and to the overall architecture of the network systems including communications, tramstop equipment, and tram signalling and point control equipment.
- The standard scheme needs to take account of the standard equipment to be provided at every tramstop, and the specific additional needs at certain individual tramstops, including those with three platforms rather than two.
- An element of additional supply shall be provided at each tramstop for future additional provisions.
- Provision for a socket for cleaning equipment shall be included.
- Provision shall be made to feed the auxiliary supply locally by an external supply (e.g. a generator) via plug/socket and isolator).
- Take consideration of the cost of supplying power to tramstops overall.
- Size and shape of the equipment cabinet at the tramstop, including the other equipment required as well as the power supply.

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- The integration of the equipment enclosure into the overall tramstop design, which may be by integration into a standard shelter 'kit of parts' or could be placed under the surface of the platform.
- Avoidance of bulky enclosures is required and an overall scheme without a UPS at each tramstop is essential.
- If higher integrity supplies are required, then consideration should be given to feeding from the nearest substations; possibly from the substation in each direction with an automatic changeover switch in case of failure of one or other supply.

Also refer to Requirements Specification for Civil Engineering Works, Requirements Specification for Supervision, Command and Control Suite of Systems and System Wide Non Functional Requirements.

4.6.2 Along the line

All auxiliary supplies to equipment alongside the track shall be specified, with appropriate supplies to the nature of equipment. This may be expected to include 400V AC supplies if necessary to supply any lifts and point heating equipment.

4.6.3 Street lighting/furniture & signs

All auxiliary supplies to street furniture, bollards, signs etc are to be specified.

All auxiliary supplies to streetlighting are to be specified. It is expected that some streetlighting may be attached to buildings and some may be integrated with OLE poles. The feeding arrangements shall be arranged logically with the intended future division of responsibility for the lighting, particularly in respect of footpaths and access to tramstops.

[redacted]

Director/Authorised Signatory
TIE LIMITED

[redacted]

Director/Authorised Signatory
PARSONS BRINCKERHOFF LIMITED



This is the Schedule 15 referred to in the foregoing Agreement between the Client and the SDS Provider

Requirements Specification for

Tram Vehicle

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5 TRAM VEHICLE

5.1 Design principles

The tram provided for the Edinburgh Tram Network shall comply with the following general design criteria:

- high safety standards
- high reliability, minimum maintenance requirement and ease of repair
- proven design and technology
- low floor access
- ease of cleaning
- modern and attractive appearance
- low weight
- low environmental impact
- meet access requirements for the disabled
- prevent the possibility of persons climbing on the sides or roof of the tram and from being able to 'surf' on it.

5.2 Minimum safety standards

Not withstanding the general safety requirements mandated in current relevant standards, the following minimum standards shall apply for the tram design:

(i) internal cubicles, access panels, etc. shall be lockable in order to prevent access by passengers but shall be easily accessible by operating staff;
(ii) care shall be taken to prevent injury by or in movable parts in the trams;
(iii) external and internal projections and finger traps shall be avoided as far as practicable;
(iv) internal fixtures shall be safely secured.

5.3 Physical Requirements

The tram design shall meet the following requirements:

(i) Trams shall be capable of running together for emergency operation only, i.e., one tram recovering a failed tram. Normal service trams shall comprise one tram;
(ii) trams in normal or emergency operation as defined in (i) shall be capable of negotiating the minimum radius horizontal and vertical curves specified in the System Wide Non Functional Requirements and maintain acceptable wheel flange wear and noise;
(iii) The tram shall be designed to have a minimum service life as specified in the System Wide Non Functional Requirements.

5.4 System Elements

5.4.1 Climatic and environmental conditions

The tram shall be capable of normal operation in all climatic and environmental conditions found on the proposed route as described in the System Wide Non Functional Requirements.

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5.4.2 Alignment and gauge details

The tram shall be capable of traversing track and gauge as specified in the System Wide Non Functional Requirements.

5.4.3 Network Rail infrastructure compatibility

The tram shall not import additional risk onto Network Rail infrastructure.

5.4.4 Traction Power supply

The traction power shall be collected from an OLE.

5.5 Overall design and performance

5.5.1 Overall configuration and layout

The tram body shall be approximately 2.65m wide externally. If a tenderer wishes to propose a tram with external projections (such as mirrors, camera pods, or footsteps) which will render the tram wider than this in plan view, details must be provided at the time of tender. Note that footsteps are likely to be required in order to comply with RVAR.

5.5.2 Crash worthiness

Easily replaceable energy absorption devices shall be provided at both ends of the tram such that frontal and rearward collisions, at speeds up to 5 km/hr, shall be fully absorbed without causing permanent deformation of the car body structure;

5.5.3 Materials

The tram shall be designed to be resistant to fire in accordance with the relevant UK or European standard. The onus to demonstrate equivalence of standards rests with the supplier.

5.5.4 Interior design

All passenger areas of trams shall be provided with a heating and ventilation system that maintains a constant acceptable ambient temperature during transit between tramstops and during boarding and alighting at tramstops when operating in all prevailing climatic and environmental conditions on the proposed route.

Able-bodied passengers shall be able to move along the entire length of the passenger accommodation of the tram.

Movement within the tram shall be made as safe as practicable. Care and attention shall be given to provide a safe passenger environment.

The free and safe movement of passengers shall be facilitated by the incorporation of handrails, grabpoles and an interior free of tripping hazards and sharp corners throughout the tram.

For the avoidance of doubt in this context, steps may be included to permit the movement of passengers to/from areas where there is a difference in the height of the floor of the tram.

All passenger areas of trams shall be provided with windows in all side walls to maximise visibility for passengers. This requirement shall also apply to draught screens and separation walls to the driver's cabs.

All seats shall be at least 450mm wide.

5.5.5 Saloon Lighting

Interior lighting shall provide glare free, uniformly distributed illumination in passenger areas, to a level of between 280-350 lux;

Emergency internal lights, hazard lights and radio must all function for at least 30 mins after disconnection from the overhead power supply. Emergency internal lighting shall provide a minimum illumination of 30 lux at floor level shall be evenly distributed in each passenger area of the tram; their operation shall be independent from the overhead line power supply. Uniformity of illuminance shall not be less than a factor of 0.4

5.5.6 Floor height and headroom

Headroom throughout the seating areas shall be 2.3m to ceiling in the low floor areas and where uneven floor height is proposed then 2.1m to ceiling in the high floor areas.

High floor areas shall be minimised and shall be no more that one third of the overall salon floor area.

5.5.7 Driver's cab

The driver's cabs shall be air-conditioned and the temperature shall be controllable by the driver. Air conditioning in both cabs shall be switched on or off from either cab but temperature selection shall be only available from the cab in use.

An internal cab to saloon door is required.

When changing ends, insertion of the driver's key and the operation of one switch shall switch on all of the equipment needed to enable the tram to be driven from that cab. Subsystems which are always needed shall not be separately switched.

The layout of controls and switches shall be agreed with **tie**.

A separate track brake button shall be provided, as well as the hazard brake on the driver's controller required by HMRI Guidance.

Driver control of sanding shall be provided as well as automatic control under conditions of wheel slip or wheel slide.

At least one cab shall display an odometer calibrated in km.

Windscreen wiper control shall be by means of a multi-position switch having intermittent, continuous slow and continuous fast positions.

There shall be a separate push button which operates wipers and windscreen washers for as long as it is held down, and provides one additional sweep of the wipers after it is released.

A mirror giving a view into the saloon is required.

A generally translucent mesh fabric sun blind is required, with an opaque strip extending 150mm up from the bottom edge. The blind must be capable to be deployed whilst driving. It need be retractable only at stops.

The configuration of the cab partition and the windscreen shall be such as to avoid confusing internal reflections in the windscreen at night. If this cannot be achieved, then blinds or curtains shall be provided to screen saloon lighting from the cab at night.

The following features that relate to instruction of tram drivers shall be provided:

- A tram driver can be under instruction when a tram is in passenger service. Consequently it must be possible for an instructor and a driver to be inside the

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cab with the cab/saloon door closed, and the instructor must be comfortably and safely located in the cab.

- The instructor must be able to apply the tram hazard or safety brakes quickly.
- The instructor must be seated and secure in the cab to the extent that he/she can apply the brakes even when the tram is performing unpredictably.

It shall be possible to drive the tram from each end of the tram.

The driver's cab shall be separated from the passenger area by a glazed partition providing good passenger visibility through the cab windscreen.

The drivers cab may extend to the full width of the tram.

The design of the driver's cab shall be undertaken to sound human factors practice.

Windscreens and cab windows shall be designed to maximise the degree of all round vision. A clear unobstructed view of the road/track ahead shall be provided.

Cab and glazing surfaces shall be designed to minimise the incidence of reflections during all hours of tram operation and all expected environmental conditions.

The following controls should be conveniently placed for the driver's free hand when the tram is in motion:

First priority:

- Audible warnings (bell, horn)
- Track brake
- Indicators

Second priority:

- Manual sand
- Windscreen washer and wiper controls
- Headlamp dip / main beam

The following controls shall be conveniently placed close together for use when the tram is at a tramstop:

- Door controls
- Rear-view normal mode push button
- Tram Ready To Start (junction calling when at a stop close to the junction)
- Tram punctuality display against timetable or headway

5.5.7.1 Driver's seat

Unless the seat is purpose-designed for the tram, it shall be a seat specifically designed for bus applications rather than for other vehicles such as heavy goods vehicles, as it must be capable of being adjusted many times per day without any damage.

5.5.7.2 Storage

Both cabs on each tram shall provide storage for:

- A points handle, typically a red steel bar about 1m long. This must be placed so the driver can easily take it with them when leaving the cab, and so it can be stowed and unstowed without risk of damage to the cab finishes or equipment
- A first-aid box
- A fire extinguisher

- A place to hang a driver's coat, where it will not interrupt his view in any direction.
- A place to hold two A5 ring binders of timetables, information and procedures.
- A place to clip an A5 sheet of paper, which can be conveniently referred to by the driver (whilst at a tramstop), and which does not obscure any controls or gauges.
- A handlamp

5.5.7.3 Rear View Equipment

Whilst mirrors may be acceptable, CCTV is the preferred rear-view equipment. If fitted, it must function as follows:

The "normal" view, displayed whenever the tram is in motion, shall have two screens in the cab, one on the left and one on the right side of the desk, and the images in them shall be the same as would be seen in mirrors.

The "tramstop" view shall be displayed between the doors being enabled at a stop and all doors being proved closed. In this view, the monitor on the platform side (the side on which the doors are enabled) shall show the same as in normal view. The other monitor shall display the image from the rear camera on the platform side.

A push button on the cab desk shall provide changeover from tramstop to normal mode for as long as it is held down, to allow a driver to check that nothing is overtaking the tram at an on-street stop whilst the doors are closing.

CCTV images must remain clear enough to see a cyclist overtaking the tram before it sets off from an in-street tramstop, even when it is raining, dark, under street lighting and there are car headlamps shining towards the cameras. In practice, the only application of CCTV on a UK street-running tramway so far had to use cameras which were colour by day and monochrome by night, with automatic changeover in low light.

Rain affects CCTV both by creating additional reflections and on the camera housings themselves; the system must cope adequately with both.

If mirrors are to be offered, they must be adjustable from the cab and heated. If only the mirrors in the active cab are heated, then the mirror must be clear of frost or condensation within one minute of the cab being made active, in an ambient temperature of -10°c.

If mirrors are provided, they must remain available at all times on street-running sections and must be included within the DKE. On off-street sections, if the mirrors are not to be included within the DKE, they must fold in, but must deploy automatically at a standstill.

The tram shall be fitted with cab-to-cab intercom facilities. The intercom facility will also provide communication between all four cabs when two trams are coupled during the recovery of a defective tram.

5.6 Communications systems – functionality and priorities

Spatial provision shall be made in the most appropriate part of the tram for ORS and TPDS sub-system equipment and the associated cabling, support equipment, microphones, speakers, antennae and power supplies.

5.7 Bogies

5.7.1 Bogie Systems

5.7.1.1 Sanding System

The tram shall be equipped with a system which deposits sand ahead of the driven wheels in the direction of travel both automatically, when wheelslip or wheelslide is detected, and manually under control of the driver. Sand shall be deposited on at least two locations on each rail.

The tram sand boxes shall have sufficient capacity for a full day's service under all conditions of weather and loading.

A means of ascertaining the sand level in the sandboxes shall be provided, visible from within the tram.

The tram sandboxes shall be filled from the outside the tram using a sand dispensing plant. In the event of failure of the plant, it shall also be possible to fill the tram manually, and if any special equipment is required for this, the tram manufacturer shall provide it.

The tram manufacturer shall provide a specification for the sand to be used. This shall be provided within 30 days of contract award, for use by the sand plant manufacturer. The tram manufacturer shall also provide the contact details of at least one UK supplier of compliant sand. This information shall be provided at least three months before the date on which the first tram is programmed to operate outside the Depot.

5.7.1.2 Flange Lubrication Equipment

At least one bogie of the tram shall be equipped with flange lubrication equipment on all wheels. Both sides of the flange shall be lubricated. It shall be capable of being programmed to operate on the basis of either location, or of a time interval, or a combination.

5.8 Propulsion and braking equipment

5.8.1 Performance

The tram power equipment shall be designed to conform to the nominal voltage. It is envisaged that nominal voltage will be either 750 volt dc or 1,500 volt dc.

The harmonic generation from the propulsion and control equipment shall not interfere with trainborne or trackside systems or third party infrastructure.

The traction equipment shall be capable of detecting and automatically managing wheel slip and wheel slide.

5.8.2 Braking equipment

The service brake application shall be capable of retardation at an acceptable rate at all specified tare and laden conditions and the jerk rate shall be limited so as to not cause discomfort to standing passengers.

For emergency braking applications the jerk rate shall be limited as far as practicable without compromising emergency braking performance.

5.9 PASSENGER DOORS

The tram shall be capable of providing data of the number of passengers boarding and disembarking at each tramstop.

Provision for passengers to validate their travel tickets on boarding the tram and on disembarking shall be made at a suitable point(s).

5.9.1 Door system performance

The tram shall accept a door enable command from the driver when the tram speed is below 10km/h, but the doors shall not become enabled until the tram is at a standstill. If, having been enabled, the tram speed then rises above 10km/h, the enable command shall be cancelled.

To prevent the doors being enabled on the wrong side, the door enable shall be interlocked and programmed with the correct side for the platform at each tramstop along the route. This feature must be capable of being over-ridden by the driver (for example, if the tram uses an unusual platform at a terminus), but such over-ride must require the driver to press at least one additional button which shall not be located adjacent to the other door controls in the cab.

The time from the tram coming to rest to doors being fully open in response to a prompt passenger demand, plus the time from the driver pressing the door close button to the tram moving off, shall be less than 12 seconds. The doors themselves shall move from closed to fully open or vice versa in less than 3 seconds.

5.9.2 Sealing

The door sealing arrangement will be designed to exclude the ingress of water in all weather conditions found on the proposed route and when passing through the Depot washing plant.

5.9.3 Door guidance system

The guidance mechanism shall not be a swing plug mechanism.

5.9.4 Passenger door operation

The following controls shall be fitted in each cab for driver control of the doors:

- Door enable controls for the left and right sides separately. It must be possible to enable both sides simultaneously. The enable buttons should each be located on the appropriate side of the cab desk.
- One door open button, which will open any doors not previously enabled, provided the tram is at a stand.
- One door close button, which will close all doors which are open. This will be the normal mode of door closing at tramstops other than termini.

The door enabled indicator lights at the doors shall illuminate, and the door enabled tone start, simultaneously with the door actually becoming available.

A door shall re-close automatically, with warning tone, if no obstacle is detected for twenty seconds (configurable). This will be the normal mode of door closing at termini.

When all doors are closed and traction is available, an audible signal, distinct from all other tones and quieter and less offensive than any alarm tone, shall sound in the cab in use. This is preferred to a lamp or other visual signal as the driver already has to view the platform and check ahead before moving off.

Unless a separate external cab door is provided, the door nearest each cab on each side (four doors in total) shall be provided with local internal and external door open and close switches operated by driver's key. These shall be spring-loaded centre-off, turned one way to open and the other to close. Any door opened using a local switch shall be capable of being closed either using the appropriate local switch or the "door close" button in an active cab. The purpose of these switches is to allow local control of the door by a driver who needs to leave and re-enter a passenger-carrying tram, for example to operate points, at a place which is not a tramstop.

In addition, unless a separate cab door is provided, a separate control shall be provided in the cab to allow the tram driver to open and close the nearside front passenger door separately. This is to allow the driver to open and close this door separately at the crew change halt at the Depot.

The door enabled tone required by RVAR shall be audible from both inside the tram and on the platform. This may require an additional external sounder if, in order to be heard outside, the internal one is uncomfortably loud for passengers on the tram.

5.10 Communication systems

5.10.1 Close circuit television

The tram shall be fitted with internal CCTV which shall record digital images covering:

- The whole of the saloon, with sufficient clarity to enable individuals to be identified for evidential purposes;
- The views ahead/back from the cabs.

The resolution of recorded images and recording speed of images shall be of a quality from which it would be capable of being reliably used as part of an accident investigation and in respect of the saloon images be of a quality to gain a conviction in the event of illegal activity.

The recorded CCTV images will be capable of being retained on the tram for 72 hours at which point the system will restart recording and erase the retained image.

CCTV images must be capable of being taken from the tram for subsequent retention and analysis. This must be done using a removable data storage medium rather than by data transfer.

All software required for off tram viewing, editing and analysis must be provided by the manufacturer.

5.10.2 Event Recorder

The tram shall include a data recorder capable of providing time, speed and distance information at 1m resolution or better for the last day's operations, and at 10m resolution or better for the last 7 days' operations. Additionally the start and end of the following events shall be recorded:

- Horn
- Bell
- Traction
- Brake
- Hazard brake
- Safety brake
- Track brake

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- Door enable left present
- Door enable right present
- Manual sand command present
- Tram Ready to Start (TRTS)
- Hazard lights
- Left indicator
- Right Indicator

Software enabling event recorder download data to be interrogated and displayed in both graphical and tabular format shall be provided. The software shall also enable all of the data to be exported into Excel for further analysis.

The data shall be recorded onto a removable data storage medium. The data recorded shall include the tram number.

5.10.3 Public address system

Audible announcements for destination and stops shall be made by means of a digital voice announcement system. The supplier shall supply a copy of any necessary equipment and software needed to upload new and amended announcements or to alter the times and places at which announcements are made.

Additionally, the tram shall be fitted with both internal and external public address systems, selectable individually by the driver.

The following are additional to the requirements of the RVAR:

- RVAR permit audible announcements between stops to be omitted where the run time between stops is less than two minutes. This option is to be used wherever possible.

- At a stop, in addition to the RVAR requirement of announcing the next stop and destination, the equipment must also be capable of announcing the current stop. The form of the announcement to be provided initially shall be:

    - "This is <name of current stop>. This tram is for <name of destination>. The next stop is <name of next stop>." It shall be initiated by the door enable, and there shall be a short delay so that the door enable tone is finished before the announcement starts.

5.10.4 Passenger Information Systems

The tram shall be fitted with six external destination displays, one at each end above the cab and two on each side, one near each end. The side displays should not be obscured by open doors.

- The visual displays shall display, successively:

    - Screen 1: Tram to
    - Screen 2: <Destination> (see separate proposal for Line1)
    - Screen 3: Next Stop
    - Screen 4: <Next Stop>

Stepping to the next stop name shall take place on arrival at a stop

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- After leaving the stop before a terminus, the external destination indicators shall change to show the destination of the next trip, so that the tram arrives at the terminus with the correct next destination already displayed.

5.10.5 Passenger Alarm Systems

Passenger alarm devices shall be located in the saloon area.

Request "Stopping Buttons" are to be provided and compliant with RVAR and should:

- become operable when doors are proved closed at a tramstop.
- when the first one is pressed, sound a single audible warning in the cab, illuminate a warning light in the cab and illuminate the tram stopping indicators required by the RVAR in the saloon.
- no further audible warning in the cab from subsequent button pushes.
- positioned such that they can easily activated by any passenger intending to disembark, but should not be positioned such that they can be inadvertently activated by standing passengers.

Request stop from the wheelchair spaces should:

- illuminate a different warning light in the cab.
- create a door open request for the nearest door, so it opens as soon as enabled.
- override the automatic close on that door for the next opening.

All request stop indications should be cancelled by the next door enable command

5.11 Towing or Propelling a dead tram

An empty tram shall be capable of both hauling and propelling (but not both simultaneously) another empty tram, which is incapable of movement under its own power, between any two points on the system under the climate conditions described in the System Wide Non-Functional Requirements.

As well as mechanical coupling, the following control facilities shall be provided on a coupled pair of trams:

- Track brake control of both trams from the cab in use
- Through intercom between all cabs
- Through control and power to hazard lights and marker lights

The intercom, marker lights and hazard lights shall be operational on both trams even if the tram being assisted has no battery power available.

[redacted]

Director/Authorised Signatory
TIE LIMITED

[redacted]

Director/Authorised Signatory
PARSONS BRINCKERHOFF LIMITED

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This is the Schedule 16 referred to in the foregoing Agreement between the Client and the SDS Provider

System-wide Non-Functional Requirements

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6 SYSTEM WIDE NON-FUNCTIONAL REQUIREMENTS

6.1 General

This is intended to capture and state those non-functional requirements that are applicable to all elements of the Edinburgh Tram Network. It should therefore be read and applied in conjunction with the other sections of this document relating to the various sub-systems.

6.2 Usability

The Edinburgh Tram Network shall be designed and constructed for left-hand running under line of sight operation.

The maximum speed for the Edinburgh Tram Network shall be 80 km/h.

All vehicles and tram network enclosed premises shall be designated no-smoking environments.

6.2.1 Control Room

Operator workplaces shall be designed and constructed such that they conform to good HF practice.

6.2.2 Environmental Conditions

Equipment may be installed in a number of differing environments depending on location and site conditions. Notwithstanding this, all equipment shall be capable of continuous operation.

The Edinburgh Tram Network shall function in accordance with the Requirements Specification for Overall System & Performance Requirements taking cognisance of factors including electrical interference, dust, vibration, supply voltage variations, radio signal variations, solar radiation, temperature, humidity, salt, mist, wind, precipitation etc. The existence of any of these factors shall not reduce the performance nor shorten the working life of the Edinburgh Tram Network.

Table 6-1: Edinburgh Climate Data shows the average climatic conditions for the region. All equipment shall be suitable for a working life as defined in section 6.2.4 under these conditions, unless otherwise agreed by the reviewing body.

Equipment housings/enclosures and the equipment contained therein shall be capable of operating at a temperature 15^{0}C higher than the upper limit specified in Table **6-1** and at a temperature of 5 ^{0}C lower than the lowest ever recorded as specified in Table **6-1**.

Equipment housings/enclosures, cable routes etc. shall be such that with doors closed, all covers in place and all internal equipment correctly mounted and fully operational, the temperature rise at any free air point shall not vary from ambient by more than 10^{0}C unless otherwise agreed.

All equipment housings/enclosures that contain electronic equipment shall be so equipped to minimise the occurrence of condensation.

6.2.3 Climatic Conditions

Edinburgh (eastern Scotland)

Sunshine (average hours per day)		Temperatures								Precipitation and humidity				Wet days (more than 0.1 mm/0.004 in)	
		Average daily				Highest recorded		Lowest recorded		Relative humidity		Average monthly precipitation			
		minimum		maximum						900	x				
		°C	°F	°C	°F	°C	°F	°C	°F	%		mm	in		
Jan	2	1	34	6	42	14	57	-8	17	84		57	2	17	Jan
Feb	3	1	34	6	43	14	58	-9	15	83		39	2	15	Feb
March	4	2	36	8	46	20	68	-6	21	81		39	2	15	March
April	5	4	39	11	51	22	72	-4	25	75		39	2	14	April
May	6	6	43	14	56	24	76	-1	31	76		54	2	14	May
June	6	9	49	17	62	28	83	3	37	75		47	2	15	June
July	5	11	52	18	65	28	83	6	42	78		83	3	17	July
Aug	4	11	52	18	64	28	82	4	40	80		77	3	16	Aug
Sept	4	9	49	16	60	25	77	1	33	80		57	2	16	Sept
Oct	3	7	44	12	54	20	68	-2	28	82		65	3	17	Oct
Nov	2	4	39	9	48	19	67	-4	24	83		62	2	17	Nov
Dec	1	2	36	7	44	14	58	-7	20	84		57	2	18	Dec

Based on readings for 30 years at 55°55' N, 3°11' W, altitude 134 m/440 ft.

Table 6-1: Edinburgh Climate Data

The size, colour, and location of all trackside equipment cabinets/housings, lighting columns, CCTV columns and the like shall comply with the requirements of the relevant Local Authority Planning Department.

Where used, the size, colour and location of lighting columns, CCTV columns and the like shall comply with the requirements of the relevant Local Authority Planning Department.

6.2.4 Edinburgh Tram Network Life-Cycle

Unless otherwise specified in this Agreement, the Edinburgh Tram Network and its components shall be designed for a working life cycle as defined in **Table 6-2 : System life**

System Element	System Life
Tram	30 years
CCTV	15 years
TVMs	15 years
PHPs	15 years
PIDs	15 years
PA	10 years
Radio communication systems	15 years
Control Room equipment	15 years
Signalling equipment	20 years
OLE	40 years
Track & formation	30 years off street 50 year on street
Points & crossovers	25 years
Buildings	50 years
Bridges & structures	120 years

Table 6-2 : System life

Where the life expectancy may be constrained by the availability of replacement components, it will be acceptable to achieve the design life through the use of a replacement sub-unit using different components provided that such components shall not be detrimental to the operational and performance requirements and uphold the Edinburgh Tram Network safety case. This shall be demonstrated through the approved amendments to the relevant cause consequence analysis.

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6.2.5 Alignment & Gauge

Track form and its alignment shall be designed as an integral component of the Edinburgh Tram Network taking account of the interaction with the tram and its running gear (wheel/rail interface), the need to meet the overall specified ride quality and journey time parameters and Edinburgh Tram Network whole life cost assessment.

6.2.5.1 Horizontal Alignment

The following horizontal alignment criteria shall be assumed:-

[illegible]	[illegible]	[illegible]	[illegible]
H1	Minimum curve radius		
H1.1	Slab track	25m	
H1.3	Ballasted track, main line and unanchored.	150m	Tighter radii can be accommodated if accompanied by proposals to anchor track in an effective way.
			Ride comfort issue. Alternatives of 2 seconds transit time or outer axle rejected.
H3	Absolute minimum length of stralght alignment between reverse curves	10m	
H4	Stralght alignment in front of the platform limit		Dependent on vehicle geometry; to be confirmed once tram selected and DDA doors nominated.
H5	Length of tram stop platform (between tops of ramp)		Will be set at 4m longer than the distance between the outer edges of the outer tram doors, to provide a plus or minus 2m stopping tolerance for the tram.
H7	Minimum horizontal radius in tram stops	Straight	Issues are horizontal gaps between doors and platforms and the risk of collision between tram and platform edge. General note covers point on derogation
H8	Transition curves	clothoid Spiral	
H9	Minimum transition curve length		This is a ride quality and speed issue, covered adequately elsewhere. There may also be constraints from the selected tram, as yet unknown.
H10	Turnout geometry		
H10.1	Crossing design must accommodate curve in turnout		Turnout crossing geometry through which regular scheduled

[illegible]		[illegible]	[illegible]
	direction. Straight legs in turnout curve are not permitted.		moves are made through the turnout leg shall avoid use of straight legs on this leg
	Slab track	4mm/m	Set by tram, but this is not the complete picture as far as "twist" is concerned. The tram will have other limits that relate to combinations of horizontal and vertical geometry.
	Ballasted track		Less than for slab track to allow for maintenance and construction tolerances. To be established by the SDS Provider and agreed with **tie**. See section on tolerances at end of document
C4	Maximum cant gradient		While around 1:300 is likely to be the minimum design figure, certainly for street/slab track, this is another one where the requirements of manufacturers should be canvassed in respect of the present generation of vehicles. A maintenance tolerance (in respect of ballasted track) and an installation tolerance for any track needs to be taken away from what the manufacturers are happy with to get a nominal design figure.

6.2.5.2 Parameters for Comfort

Ref	Parameters for Comfort	Requirement	Comment
C1	Maximum cant deficiency	150 mm	More detailed study required
C2	Maximum cant		
C2.1	running lines	150mm	But check that the applied cant can be applied and maintained for the typical short length curves (is there enough room for the transitions) and will it stay there. Worth looking at concrete-based trackform of some kind for the sharper curves.
C2.2	Platforms	Desirable 0mm Absolute 15mm	Absolute value only to be adopted if there is a need to accommodate cross falls that can not be avoided.
C2.3	switches and crossings	All must lie in the same plane	Princes St/David St turnout will probably have to be on an inclined plane
C5	Maximum rate of change of cant with time	80mm/s	Linked to ride quality and passenger comfort and the tram may also set limits for this.
C6	Maximum jerk (rate of change of lateral acceleration)	$0.4m/s^3$	This doesn't seem unreasonable as an empirical effort; given standing passengers in particular will have more expectation of longitudinal jerk rather than lateral. Potentially big issue with conductors It is agreed that this should be a specific requirement, which could be related to any untransitioned curve and all pointwork, but it needs to be recognised as additive to whatever is specified for ride quality, which it has been assumed is not intended to be addressed in this document.
C7	Maximum vertical acceleration	$0.3m/s^3$	Not considered to be a parameter that is likely to impact on run times. NB there may be issues with the achievable speed being governed by the OLE and its ability to match the profile and the minimum acceptable gradient of contact wire/track.

Parameters for Comfort		Requirement	Comment
C8	Maximum design speed	80km/hr	The alignment should be designed for this speed but tram selected may have a slightly lower top speed.

6.2.5.3 Vertical Alignment

The following vertical alignment criteria shall be assumed (V to be inserted in km/hr):-

Vertical Alignment		Requirement	Comment
V1	Desirable minimum vertical track radius plain line		500m hog or sag seems a reasonable starting point, but this is an item which will be set by the selected tram. It is clear that there are some critical locations in Edinburgh which will challenge whatever limit is set, particularly for 100% low floor cars. We need to be certain about this and the other design criteria being set. Tram suppliers will be provided with the current St Andrew Sq alignment for them to confirm if their tram(s) can use this alignment. A key related issue is the risk of a person being trapped under the front of the tram.
V1.1	Sag (MM/FM quote parabolic curve)	( )	
V1.2	Hog (MM/FM quote parabolic curve)	( )	
	Crest		Desirable infinity, absolute min 5000m
	Dip		Desirable infinity, absolute min 1000m

6.2.5.4 Combined horizontal and vertical geometry

There will be constraints on combinations of vertical and horizontal geometry. These will include:

- Combination of vertical curves and horizontal curves
- Combination of gradients and horizontal curves

6.2.5.5 Gradients.

The following criteria relating to gradient shall be assumed:

Gradient		Requirement	Comment
G1	Maximum gradient		
G1.2	Absolute	8%	Any increase on 8% will exclude 2/3 motored tram s, and would result in a step change in tram costs.
G2	Maximum gradient Tram Stops		
G2.1	Normal	Level	
G2.2	Absolute		Minimise this as gradients impact on run time, and reduce accessibility.
G3	Maximum gradient stabling area and Depot	Level	
			HMRI Part G revised

6.2.5.6 Other features

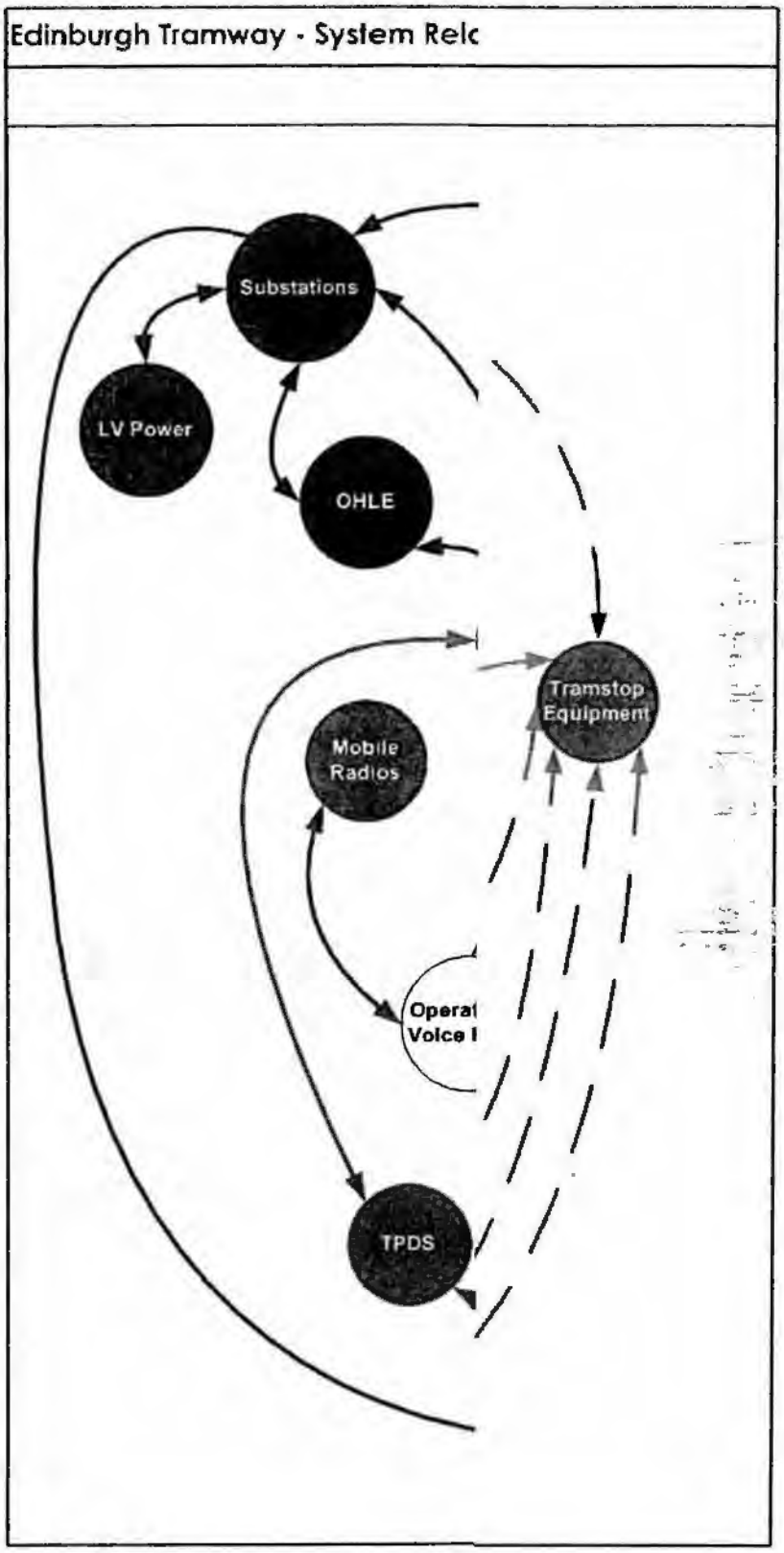
The tolerances on alignment and gauge shall form a coherent and achievable set of tolerances for the Edinburgh Tram Network. Construction and maintenance tolerances shall be separately defined for each parameter. A full set of parameters that will protect the safety and performance of the Edinburgh Tram Network shall be included.

6.2.5.7 Lineside speed signs

The Edinburgh Tram Network shall be signed at speeds that are integer multiples of 5 km/h. Speed signs shall be rationalized in conjunction with the Operator. The signed speeds shall be an input to any run time modelling.

6.3 System/Sub-System Relatio

The following diagram is intended to c



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6.4 Nomenclature

6.4.1 Tramstops and Substations

Substations shall have the third character "E" (for Electricity). Names of Substations shall not be the same as tramstops.

Tramstop acronyms shall avoid having the third letter "E" to avoid potential confusion with substations.

Tramstop and Substation acronyms are set out in the table below.

Tramstops				**Sub-stations**	
Haymarket to Ocean Terminal to Haymarket:		Airport to Haymarket:		All have third character E (for Electricity). This shall be avoided in selecting tramstop acronyms.	
HAY	Haymarket	AIR	Airport	GBE	Gogar Bridge Road
SHP	Shandwick Place	IPR	Ingliston Park and Ride	GDE	Gogar Depot
PSW	Princes Street West	GOG	Gogarburn	BDE	Bankhead Drive
WAB	Waverley Bridge (Proposed)	(DEH)	Depot Halt (Staff Only)	JDE	Jenner's Depository
SAS	St Andrew Square	GYL	Gyle	RRE	Russell Road
PIP	Picardy Place	EDP	Edinburgh Park	HTE	Haymarket Terrace
MDR	McDonald Road	EPS	Edinburgh Park Station	CCE	Coates Crescent
BAS	Balfour Street	SGA	South Gyle Access	CAE	Cathedral
FOW	Foot of the Walk	SRN	Soughton Road North	LWE	Leith Walk
COS	Constitution Street	BAR	Balgreen Road	LDE	Leith Depot
OCD	Ocean Drive	MUR	Murrayfield	ANE	Annfield
OCT	Ocean Terminal	HAY	Haymarket	GRE	Granton Road
NER	Newhaven Road			GME	Granton Mains East
LGR	Lower Granton Road	OTHER NOMINATED LOCATIONS		TRE	Telford Road
GRS	Granton Square				
GRW	Granton Waterfront	ROJ	Roseburn Junction		
CAP	Caroline Park				
WGA	West Granton Access				
CRT	Crewe Toll				
WGH	Western General Hospital				
CRA	Craigleith				
RAD	Ravelston Dykes				
ROS	Roseburn				
OTHER NOMINATED LOCATIONS					
YOP	York Place (crossover)				

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6.4.2 Directions

Line One shall be described as "Inner Circle" for clockwise directions, and "Outer Circle" for anticlockwise directions.

Therefore, AIR to ROJ is "Inbound", and ROJ to AIR is "Outbound".

	Description	Route
I/B	Inbound	Between AIR and ROJ
O/B	Outbound	
I/C	Inner Circle	Line 1
O/C	Outer Circle	

6.4.3 Items of Equipment

Acronym	Meaning
AFC	Automatic Fare Collection
CCTV	Closed Circuit Television
DCCB	Direct Current Circuit Breaker
HCI	Human Computer Interface
HF	Human Factors
HVAC	Heating, Ventilation and Air Conditioning
OHLE	Overhead Line
ORS	Operational Radio System
PA	Public Address
PCC	Point Control Cabinet
PCC	Point Control System
PHC	Point Heating Cabinet
PHP	Passenger Help Point
PID	Passenger Information Display
SCADA	Supervisory Control and Data Acquisition System
TBC	Traction/Brake Controller
TEL	Telephony
TLA	Three letter acronym
TPDS	Tram Position and Detection System
UTC	Urban Traffic Control

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6.4.4 Points

The nomenclature for points shall consist of:

- the three letter acronym for the adjacent tramstop or other location
- the letter "P"
- a sequential number. Even numbers on the Outer Circle and Outbound lines, odd numbers on the Inner Circle and Inbound lines.

Point acronyms are as set out on the Edinburgh Tram Network diagram.

6.4.5 Other equipment

The following nomenclature shall be defined and agreed with **tie**:

- TVMs
- Signals
    - off street
    - on street
- PIDs
- etc

6.4.6 Chainage

There shall be a single "Chainage System Definition Document" that links all of the project's chainage systems together such that the distance between any two points on the whole Edinburgh Tram Network can be easily determined from:

1. The chainage of one point
2. The chainage of the second point, and
3. The Chainage system definition document

The chainage system shall have no two points with the same chainage distance anywhere on the network. This will be achieved as set out in the Edinburgh Tram Network diagram.

This chainage system for Line One shall start at 0.000 km at Ocean Terminal and runs clockwise through SAS, HAY and GRS back to OCT, finishing at about 16.000 km.

The short outbound or easterly route through St Andrew Square along the southern and eastern sides that is not included in the above shall have a separate chainage running from 20.000km to about 20.400 through the section where there is single track.

Line Two chainages shall start at ROJ at a notional 30.000 km and increment to AIR.

Newbridge Spur chainages shall start at 50.000 km at EPS and increment to NEW.

The potential Line 3 shall start at St Andrew Square at a notional 60.000 km and increment to the end of Line 3.

6.4.7 OLE Fixings

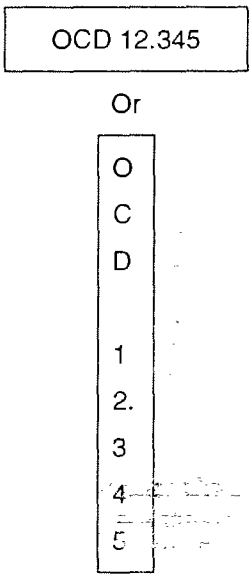
These shall all be uniquely identified with the following information

- The TLA of the tramstop that is closest to the fixing
- Operator's chainage, eg "12.345"

An example of an OLE pole fixing identification plate follows.



Building fixings shall be similarly identified, but the format may be



The ROJ area shall be effectively identified using this system.

6.4.8 Generation of Acronyms

The following process is used to convert names into acronyms:

1. Start with the name that consists of a number of words that is to be converted into an acronym, and a blank acronym of known required length.
2. Take the initial letter of each word in the name and put them together.
3. If this is longer than the required acronym, truncate it to fit
4. If this is shorter than the required acronym, insert the second letter onwards from the first word in the name into the acronym after the first letter in the acronym until the required length is achieved.
5. Check that there are no ambiguities with other acronyms that are already in use. If so, the acronym produced by the above process may be altered.

Examples follow:

Name	**Acronyms**
Foot Of The Walk	FOTW, FOW,FW,F,
Airport	AIRP, AIR,AI,A

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6.5 International

All text shall be in English (UK)

All date formats shall use dd-mmm-yy i.e. 21-Oct-03

Time format shall be hh:mm:ss and use the 24 hour clock i.e. 18:10:36.

All sub-systems shall be configured to use Rugby time as the prime means of timekeeping.

All events and communications, including recorded ones, shall be date and time stamped using Rugby Time.

All recorded public address announcements shall be made using the English Language.

6.6 Data Capture & Retention

The fixed system shall capture all system level and sub-system level events and record them onto hard disk storage in the equipment room of the Depot. Such hard disk shall be capable storing at least 28 days worth of events before overwriting.

All radio and telephone voice communications shall be recorded and stored on hard disk in the equipment room for 28 days before overwriting.

All CCTV images shall be recorded and stored on suitable media in the equipment room for 28 days before overwriting.

The systems shall provide prior to the system automatically overwriting hard disk data in order this data can be written to other media such as CD or DVD.

Data capture shall be defined and actioned such that it supports the management information systems of the Edinburgh Tram Network.

The merits of data recording being done locally and downloaded to a central store out of tram service hours shall be analysed and reported.

6.7 Performance/Reliability

The integration and/or interface between all sub-systems shall enable the Operator to respond to all events that are presented to the Operator via the relevant Operator HCI with no more than 1 second delay.

The Edinburgh Tram Network shall be designed and constructed to operate without unreasonable duress on operations personnel in Normal, Degraded and Abnormal modes.

- ***Normal Mode*** can be defined as meeting the number of tram services as prescribed in the headway/timetable requirements.
- ***Degraded Mode*** can be defined as restricted operations resultant from failure of one or more components of the system.
- ***Abnormal Mode*** can be defined as the occurrence of extreme loading on a part of the system resultant from causes such as major disruption, whether caused through tramway elements or third party interference.

Overall System performance in terms of reliability and availability shall be demonstrated through cause consequence analysis and subsidiary fault tree and Markov analysis.

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The tram fleet shall not suffer a failure requiring a tram to be towed or pushed more often than once per 200000km.

6.7.1 Noise

The Edinburgh Tram Network shall be designed so as not to generate excessive noise pollutions levels. Options for noise mitigation shall be considered if the free-field noise level outside the window of any sensitive receiver exceeds either of the upper values specified in PAN56 0 for noise exposure category A *i.e.*:

1. for daytime noise, $L^{Aeq\ 0700\text{-}2300\ hours}$ 55 dB;

or

2. for night time noise, $L^{Aeq\ 2300\text{-}0700\ hours}$ 45 dB.

Theses parameters shall be reviewed and validated for acceptability and any changes agreed with **tie**.

Where tram noise is predicted to be more than 3dB 0 above either of these thresholds, mitigation measures to reduce the adverse impact of noise will be considered according to the extent to which the pre-existing ambient ($L^{Aeq,\ 1\ hour}$) noise level is increased, as follows:

1. Increase of 3-5 dB - mitigation considered on a case by case basis, and implemented if reasonably practicable and acceptable to affected parties.
2. Increase of greater than 5 dB - mitigation implemented if reasonably practicable and acceptable to affected parties.

6.7.2 Vibration

Trackforms adjacent to sensitive receptor buildings shall be designed using best practicable means to keep within the guideline levels of Vibration Dose Value (VDV) given in BS6472, 1992 below which the probability of adverse comments is low:

- Day (0700-2300 hours) 0.4 $m/s^{1.75}$; an
- Night (2300-0700 hours) 0.13 $m/s^{1.75}$.

Theses parameters shall be reviewed and validated for acceptability and any changes agreed with **tie**.

6.8 Legal

The Edinburgh Tram Network shall comply with all Law.

The Edinburgh Tram Network shall comply with local data protection legislation

The Edinburgh Tram Network shall comply with the prevailing Disability Discrimination Act.

The Edinburgh Tram Network shall comply with Health & Safety at Work Act (1974) at all stages during its life-cycle.

An appropriate quality management system equivalent to ISO 9001 shall be in place throughout the Edinburgh Tram Network life-cycle.

Civil Aviation Authority, Airport Operators Association & General Aviation Awareness Council 'Safeguarding of Aerodromes Advice Note 3' shall apply to those sectors of the Edinburgh Tram Network that interact with air traffic.

All cables and equipment enclosures shall comply with the latest applicable IEC standards.

6.9 Safety

The systems shall provide alarms and indications to users in such a way that does not cause the users undue distractions and/or stress in any mode of operation.

All hazards and risks shall be demonstrated to have been eliminated or mitigated to be ALARP.

The following minimum safety deliverables and documentation shall be provided:

a) Preliminary hazard analysis report

b) Hazard log

c) Safety management plan

d) Hazard identification and risk analysis/assessment documentation

e) Cause consequence analysis

f) Safety assessment & audit reports

g) Phased safety cases constructed using GSN

h) HMRI declaration of no objection that if constructed according to design a certificate of authority/authority to operate would be likely.

Earthing of electronic equipment shall be required to reduce the effects of interference with other equipment on the Edinburgh Tram Network and its neighbours as well as providing adequate personal safety to operations and maintenance staff and Tramway users. Where any conflict arises between these two, personal safety shall always take precedence.

6.10 Security

Authorised access to electronic systems shall be controlled by login(s) and password(s).

Authorised access to appropriate functions of the System and its sub-systems shall be allocated and governed by the users' login and password.

Physical entry access security shall be provided for all remotely located equipment cabinets/housings. This can take the form of key locks or an electronic locking device such as swipe cards.

Appropriate protection shall be provided to both centrally and remotely located equipment to counter unauthorised access and/or vandalism.

6.11 Development

The Edinburgh Tram Network shall be designed, developed and constructed to meet the requirements of the most recent edition of the Railway Safety Principles and Guidance Part 2 Section G "Tramways".

Design and development of the System shall follow the spirit and principles of Engineering Safety Management - Yellow Book 3.

The architecture of the System shall initially be designed and constructed to meet the requirement for Lines 1 and 2. However, the architecture shall contain sufficient room for expansion to cater for the later addition of Line 3 without noticeable degradation of performance.

Design, development and construction shall be undertaken to conform to the Stage Build and Sectorisation shown in Table 6.3.

Table 6.3: Stage Build and Sector Details. It should not be inferred that sectors and stage builds are sequential, indeed design, development and construction shall be undertaken to achieve to optimum end to end project timescale.

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Table 6-3 : Stage Build and Sector Details

Stage Build	Description	Sector		Sub-sector		Criticality	Commissioning Sequence for Trial Running(Line 1&2 and Line 2only)	Commissioning Sequence for Trial Running(Line 1only)	Preliminary Design Approved By	Detailed Design Approved By
ARP	Airport - Gogarburn	ARP1	Airport - Gogarburn (inc)			C	3		28-Feb-06	30-Sep-06
DHY	Depot - Haymarket	DHY1	Gogaburn (exc) - Gyle & Depot (inc)			A1	1		30-Nov-05	30-Mar-06
		DHY2	Gyle (exc) - Edinburgh Park (inc)			C			28-Feb-06	30-Sep-06
		DHY3	Edinburgh Park (exc) - South Gyle Acess (inc)			C	2		28-Feb-06	30-Sep-06
		DHY4	South Gyle Acess (exc) - Soughton Road North (inc)			C			28-Feb-06	30-Sep-06
		DHY5	Soughton Road North (exc) - Murrayfield (exc)	DHY5a	Soughton Road(exc)-Balgreen Road(inc)	B			30-Jan-06	30-May-06
				DHY5b	Balgreen Road(exc)-Murrayfield(exc)				30-Jan-06	30-May-06
		DHY6	Murrayfield (inc) - Haymarket (inc)			A(2)	3		30-Nov-05	30-Mar-06
HOT	Haymarket - Ocean Terminal	HOT1	Haymarket (exc) - St.Andrew Square (inc)	HOT1a	Haymarket(exc)-Shandwick Place(inc)	A(1)	4	3 (section now includes Haymarket Tramstop)	30-Nov-05	30-Mar-06
				HOT1b	Shandwick Place(exc)-Princes St West(inc)					
				HOT1c	Princes St West(exc)-Waverley Bridge(inc)					
				HOT1d	Waverley Bridge(exc)-St.Andrew SQ.(inc)					
		HOT2	St.Andrew SQ.(exc)-Picardy Place(inc)			A(2)	4	3	30-Nov-05	30-Mar-06
		HOT3	Picardy Place (exc) - Foot of the Walk (inc)	HOT3a	Picardy Place(exc)-MacDonald Rd(inc)	A(2)	5	2	30-Nov-05	30-Mar-06
				HOT3b	MacDonald Rd(exc)-Balfour St(inc)					
				HOT3c	Balfour St(exc)-Foot of the Walk(inc)					
		HOT4	Foot of the Walk (exc) - Ocean Drive (inc)	HOT4a	Foot of the Walk(exc)-Constitution St(inc)	A(3)	6	1	30-Nov-05	30-May-06
				HOT4b	Constitution St(exc) Ocean Drive(inc)					

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		HOT5	Ocean Drive (exc) - Ocean Terminal (inc)			A(3)	6	1	30-Nov-05	30-Mar-06
		HOT6	Leith Depot & Connections			D	5	1	30-Mar-06	30-Nov-06
HCT	Haymarket - Crewe Toll	HCT1	Haymarket (exc) - Crewe Toll (inc)	HCT1a	Roseburn Jcl(exc)-Roseburn(inc)	D	4	4	30-Mar-06	30-Nov-06
				HCT1b	Roseburn(exc)-Ravelston Dykes(inc)				30-Mar-06	
				HCT1c	Ravelston Dykes(exc)-Craigleith(inc)				30-Mar-06	
				HCT1d	Craigleith(exc)-W General Hosp-Crewe Toll(inc)				30-Mar-06	
CTO	Crewe Toll - Ocean Terminal	CTO1	Crewe Toll (exc) - Granton Square (inc)	CTO1a	Crewe Toll(exc)-W. Granton(inc)	D	5	5	30-Mar-06	30-Nov-06
				CTO1b	W. Granton(exc)-Caroline Pk(inc)				30-Mar-06	
				CTO1c	Caroline Pk(exc)-Granton Waterfront(inc)				30-Mar-06	
				CTO1d	Granton Waterfront(exc)-Granton Sq.(inc)				30-Mar-06	
		CTO2	Granton Square (exc) - Ocean Terminal (inc)	CTO2a	Sea Wall Survey	A1	6	6	30-Nov-05	28-Feb-07
				CTO2b	Granton Sq.(exc)-Lower Granton Rd	E	6	6	30-Mar-06	
				CTO2c	Lower Granton Rd-Newhaven Rd					
				CTO2d	Newhaven Rd-Ocean Terminal(exc)					
GNB	Gogarburn - New bridge	GNB1	Gogaburn (exc) - Newbridge (inc)			F	7		30-Mar-06	28-Feb-07

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6.12 Implementation

An Edinburgh Tram Network Stage Build shall be available for trial running once all components excluding TVMs have been installed, tested and commissioned.

Testing staff shall have an appropriate level of independence from those staff designing that sub-system.

The system shall have operating instructions for the Edinburgh Tram Network as a whole and all individual sub-systems consolidated into an overall operations manual. This data shall be produced in hard copy form and available as an on-line database available to operations personnel.

Cables shall be clearly identified at each end of the cable connections by labels. Related drawings shall describe the labelling conventions.

Where cables are to be provided, they shall contain sufficient slack to permit reasonable disturbance during maintenance.

An asset register shall be produced in readiness for Infraco to populate with actual equipment data, serial numbers etc. This asset register shall be capable of being tagged to digitised O/S and linked to as built, maintenance etc. drawings and records.

6.13 Maintainability

The system shall have maintenance instructions for the Edinburgh Tram Network as a whole and all individual sub-systems consolidated into an overall maintenance manual. This data shall be produced in hard copy form and available as an on-line database available to maintenance personnel.

Maintenance instructions shall be available for download to remote/portable diagnostics terminals.

Performance, reliability, fault/failure data shall be available that enables analysis for product improvement.

Data shall be presented to maintenance staff such that potential causes of faults/failures are clearly identified.

Hardware components shall be easily accessible and not required specialist equipment for their removal or replacement.

Connectors shall be used which permit fast and easy disconnection and replacement of faulty/failed components.

Maintenance regimes and spares holding levels shall be determined through the fault tree and Markov analysis and ratified by the verification and validation process.

Spares that have potential long lead times shall be identified once the Edinburgh Tram Network architecture has been produced.

The Edinburgh Tram Network shall be designed to facilitate inspection, repairs, maintenance and fault finding without interruption to Edinburgh Tram Network operations and performance.

Maintenance regimes, component replacement programmes and spares holdings shall take due cognisance of the outputs of the cause consequence analysis undertaken.

Initial spares provided shall be sufficient for an operational period of 5 years from the date of Edinburgh Tram Network handover to the Operator. These spares shall include provision for damage and vandalism. The Edinburgh Tram Network design shall be underwritten such that all equipment/system suppliers shall warrant that all

equipment in the design shall be available for the operational period specified earlier and that they shall give the Operator a minimum of 12 months notice where after that period they intend to cease supply of that component.

Equipment housings/enclosures and their contents; i.e. racks etc. shall not exceed 2 metres in height, unless specifically agreed by the reviewing body.

The lowest mounting point, plug-in group or terminal block shall not be less than 400mm above floor level unless specifically agreed by **tie**.

6.14 Training

An indicative training plan for all users of the Edinburgh Tram Network shall be produced.

[redacted]

Director/Authorised Signatory
TIE LIMITED

[redacted]

Director/Authorised Signatory
PARSONS BRINCKERHOFF LIMITED

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This is the Schedule Seventeen referred to in the foregoing Agreement between the Client and the SDS Provider

SCHEDULE SEVENTEEN

AGREEMENT BETWEEN THE SDS PROVIDER AND THE JOINT REVENUE COMMITTEE

TIE00899941_0387



(1) PARSONS BRINCKERHOFF LIMITED
- and -

(2) STEER DAVIES & GLEAVE LIMITED

AGREEMENT

relating to

THE EDINBURGH TRAM NETWORK

AGREEMENT

BETWEEN

(1) **PARSONS BRINCKERHOFF LIMITED** a company incorporated under the Companies Act with registration number 2554514 and having its registered office at Amber Court, William Armstrong Drive, Newcastle Business Park, Newcastle Upon Tyne, NE4 7YQ (the "**SDS Provider**") which expression shall include its permitted assignees.

and

(2) **STEER DAVIES & GLEAVE LIMITED**, a company incorporated under the Companies Act with registration number 01883830 and having its registered office at Barbican House, 26 - 34 Old Street, London, EC1V 9QQ (the "**JRC**") which expression shall include its permitted assignees.

BACKGROUND

(A) **tie** is a wholly owned subsidiary of the City of Edinburgh Council ("the Council") and **tie** is funded directly by the Council for the delivery of projects included in the Council's Local Transport Strategy.

(B) **tie** has appointed the Parties (as hereinafter defined) to provide technical consultancy services to support (a) the design, construction and operation of the Edinburgh Tram Network (as hereinafter defined), and (b) requisite public transportation service integration and revenue forecasting.

(C) Accordingly, the Parties intend in terms of this Agreement to work together to deliver a bespoke transport modelling suite to **tie** for deployment in relation to the Edinburgh Tram Network and its integration into the transport environment in the City of Edinburgh.

IT IS HEREBY AGREED

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement, unless the context otherwise requires:

"Agreement" means this document (as amended from time to time pursuant to Clause 14);

"Confidential Information" means any information which has been designated as confidential by either Party in writing or that ought to be considered as confidential (however it is conveyed or on whatever media it is stored) including information which relates to the business, affairs, trade secrets, properties, assets, trading practices, goods, services, developments, trade secrets, intellectual property rights, know-how, personnel, advisors and suppliers of either Party and all personal data and sensitive personal data within the meaning of the Data Protection Act 1998;

"Edinburgh Tram Network" has the meaning given in the **tie** Appointments;

"FOISA" means the Freedom of Information (Scotland) Act 2002 and any subordinate legislation made under that Act from time to time together with any guidance and/or codes of practice issued by the Scottish Information Commissioner in relation to such legislation;

"Infraco Contract" means the contract or contracts to be entered into or entered into by **tie** for the provision of the Edinburgh Tram Network infrastructure and operating systems;

"Party" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

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"**tie**" means **tie** limited, the wholly owned subsidiary of Edinburgh City Council responsible for the development and delivery of the Edinburgh Tram Network; and

"**tie** Appointment " means the agreement under which each party provides services to **tie**, and **tie** Appointments should be construed accordingly.

1.2 In this Agreement, except where the context otherwise requires:

1.2.1 words importing gender include masculine, feminine and neuter;

1.2.2 the singular includes the plural and vice versa;

1.2.3 a reference to any part, Clause, sub-clause or Schedule is, except where it is expressly stated to the contrary, a reference to such part, Clause or sub-clause of or Schedule to this Agreement;

1.2.4 a reference in any Schedule to any part, paragraph or sub-paragraph is, except where it is expressly stated to the contrary, a reference to such part, paragraph or sub-paragraph of that Schedule (as the case may be);

1.2.5 any reference to this Agreement or to any other document shall include any variation, amendment, or supplement to such document expressly permitted under the terms of this Agreement;

1.2.6 any reference to any enactment, order, regulation or other similar instrument (including any EU instrument) (whether specifically named or not) shall be construed as a reference to the enactment, order, regulation or instrument as amended, replaced, consolidated or re-enacted and shall include any orders, consents, regulations, legally binding codes of practice or subordinate legislation (within the meaning of section 21(1) of the Interpretation Act 1978) made thereunder;

1.2.7 a reference to a person includes individuals, firms, partnerships, bodies corporate, joint ventures, government departments and any organisation capable of suing or being sued and references to any of the same include the others and their successors and assignees and transferees to the extent that such assignment and transfer are expressly permitted under the terms of this Agreement;

1.2.8 headings and the contents list are for convenience of reference only and do not affect the interpretation of this Agreement;

1.2.9 the ejusdem generis rule does not apply and the meaning of general words is not to be restricted by any particular examples preceding or following those general words;

1.2.10 an obligation to do something includes an obligation to procure it to be done;

1.2.11 an obligation not to do something includes an obligation not to wilfully allow it to be done;

1.2.12 the word "including" means "including without limitation"; and

1.2.13 a reference to "approval" or "consent" shall mean consent in writing.

2. TERM OF AGREEMENT

2.1 This Agreement shall come into effect on the last date of execution hereof and shall continue in effect until the date on which the defects liability period for the Infraco Contract is confirmed by **tie** to have ended.

3. COLLABORATIVE WORKING

3.1 The Parties agree as part of their respective mandates pursuant to the relevant **tie** Appointment to collaborate on the development, testing, validation, commissioning and approval of a comprehensive independent hierarchical transport modelling suite ("the SDS-JRC Modelling Suite") as defined and stipulated in the Parties' respective **tie** Appointments.

3.2 The Parties shall plan, execute and deliver the completed and fully functional SDS-JRC Modelling Suite to **tie** on the basis of joint and several liability for its timely and efficient production and its fitness for purpose. The Parties agree to indemnify one another in respect of any loss or damage incurred by reason of a failure to comply with an obligation under this Agreement or under their respective **tie** Appointments arising from or in connection with the design, production or commissioning of the SDS-JRC Modelling Suite.

4. MODEL SPECIFICATION

4.1 The Parties shall prepare a composite specification together with a detailed staged work programme and resourcing plan to submit to **tie** no later than 30 working days after the formal appointment of the JRC. The development, testing and commissioning process shall be resourced by a team selected by the Parties to combine equal contribution of practical know how, market experience and technical specialism. The joint team shall be co located at a location to be mutually agreed between the Parties.

5. INITIAL FORECAST

5.1 The Parties shall deploy the SDS-JRC Modelling Suite to generate a model revenue forecast scenario for the first year of public service operations of the Edinburgh Tram Network and shall obtain **tie's** approval of the resultant forecast.

6. MODEL MAINTENANCE

6.1 Subject to Clause 6.1, the Parties have agreed that they shall be jointly and severally responsible at all times to **tie** in relation to:

6.1.1 the correction of any single or recurring fault or incapacity; and

6.1.2 the regular calibration, updating and maintenance (including upgrades against obsolescence.

6.2 After the date on which **tie** confirms that the Edinburgh Tram Network has completed its defects liability period, the Parties have agreed that JRC shall carry primary responsibility, as between the Parties, with regard to the routine maintenance and guardianship of the SDS-JRC Modelling Suite, in addition to those functions stated above.

7. INTELLECTUAL PROPERTY RIGHTS

7.1 The Parties rights with regard to intellectual property rights (including copyright in design rights or exclusive know how) in the SDS-JRC Modelling Suite and the work

product from the performance of this Agreement shall be vested pursuant to **tie** Appointments.

7.2 The Parties shall be entitled to use the SDS-JRC Modelling Suite under a royalty free license from **tie** granted pursuant to **tie** Appointments.

8. INTEGRITY AND CUSTODY OF THE MODEL

8.1 Neither Party shall make any adjustment or modification to the SDS-JRC Modelling Suite without the prior consent of both the other Party and **tie**. The parties shall discuss and agree with **tie** as to appropriate custody of a master copy final version of the model as approved by **tie.**

9. CONFIDENTIALITY

9.1 Each Party shall treat all Confidential Information belonging to the other Party as confidential and safeguard it accordingly.

9.2 Each Party shall not disclose any Confidential Information belonging to the other Party to any other person without the prior written consent of the other Party, except to **tie** and to such persons and to such extent as may be necessary for the performance of the Agreement or except where disclosure is otherwise permitted by the provisions of this Agreement.

9.3 The provisions of Clauses 9.1 and 9.2 shall not apply to any Confidential Information received by one Party from the other:

9.3.1 which is or becomes public knowledge (otherwise than by breach of this Clause);

9.3.2 which was in the possession of the receiving Party, without restriction as to its disclosure, before receiving it from the disclosing Party;

9.3.3 which is received from a third party who lawfully acquired it and who is under no obligation restricting its disclosure;

9.3.4 is independently developed without access to the Confidential Information; or

9.3.5 which must be disclosed pursuant to a statutory, legal or parliamentary obligation placed upon the Party making the disclosure, including any requirements for disclosure under FOISA.

10. FOISA

10.1 Each Party acknowledges that **tie** is subject to the requirements of FOISA and shall assist and cooperate with the other Party to enable both Parties to comply with any information disclosure requirements to which **tie** directs it is subject under FOISA.

10.2 Each Party shall provide the other Party with a copy of any request from **tie** for information under FOISA in relation to this Agreement and the Parties shall act jointly to furnish a response in the format and within the timescales set out in FOISA.

11. ASSIGNATION

11.1 Neither Party shall assign or otherwise dispose of any interest in, or rights or obligations under this Agreement in whole or in part to any person, save as may be approved in advance in writing by **tie**.

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12. PROJECT RECORDS

12.1 The Parties shall in accordance with Good Industry Practice keep and maintain detailed records regarding the activities in relation to the performance of this agreement and shall keep such records for at least twelve years following expiry or termination of this Agreement.

12.2 The records referred to in Clause 12.1 shall be kept in good order and in such form as to be capable of technical and financial audit.

13. JURISDICTION AND DISPUTE RESOLUTION

13.1 This Agreement, any document completed or to be completed in accordance with its provisions and any matter arising from it or any such document shall be governed by and construed in accordance with Scots law.

13.2 The Parties hereby irrevocably submit to the exclusive jurisdiction of the Court of Session in relation to this Agreement, any such document and any such matter.

13.3 Any difference or dispute arising from or in connection with this Agreement shall be referred to the Parties for resolution pursuant to the process stipulated in the **tie** Appointments.

14. VARIATIONS AND WAIVERS TO BE IN WRITING

14.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought and has been approved in writing by **tie**.

15. WAIVER

15.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

15.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

16. NO PARTNERSHIP OR DILUTION OF DUTIES

16.1 Nothing in this Agreement shall be construed as:

16.1.1 creating a partnership between the Parties; or

16.1.1 diluting in any way the duties owed by each Party under separate agreement with **tie.**

17. NOTICES

17.1 Any notice or notification required or authorised to be given under this Agreement by one Party to the other shall be:

17.1.1 in writing;

TIE00899941_0393

17.1.1 sent by one of the following methods:

17.1.1.1 pre-paid registered or recorded delivery post or facsimile transmission addressed to the Party to which it is given at:

(a) in the case of notices given to the SDS Provider, Parsons Brinckerhoff Limited, Royal Exchange House, 2nd Floor, 100 Queen Street, Glasgow, G1 3DF, fax number 0141 222 6901 attention: David Hutchison, or such other address in the United Kingdom as the SDS Provider may notify the JRC from time to time for that purpose; or

(b) in the case of notices given to the JRC, Steer Davies & Gleave, 28-32 Upper Ground, London, SE1 9PD, fax number 020 7827 9850, attention Steve Hewitt or such other address in the United Kingdom as the JRC may notify the SDS Provider from time to time for that purpose; or

17.1.1.2 facsimile transmission addressed to the SDS Provider or the JRC as appropriate) at a facsimile number notified to the giving Party by the receiving Party for the service of notices under this Agreement from time to time; or

17.1.1.3 personal delivery to the respective addresses of the Parties as specified in clause 17.1.2.1

17.1.2 be deemed duly served:

17.1.2.1 if sent by pre-paid registered or recorded delivery post, 2 clear days after posting; or

17.1.2.2 if sent via facsimile transmission or personal delivery, on the day of issue of the relevant fax confirmation receipt or such personal delivery (as appropriate), unless that day is not a business day in which case it shall be deemed duly served on the next business day thereafter.

18. INVALID TERMS

18.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable

18.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

18.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

19. THIRD PARTY RIGHTS

19.1 Save that **tie** shall be entitled to rely upon the undertakings given by the Parties in this Agreement, any person who is not Party to this Agreement shall have no right to enforce any term of this Agreement.

IN WITNESS WHEREOF these presents consisting of this and the [◆] preceding pages are executed as follows:

TIE00899941_0394

EXECUTED for and on behalf of **PARSONS BRINCKERHOFF LIMITED**

at ◆ on ◆ by

Director/Authorised Signatory: .....

Full Name: .....

Witness: .....

Full Name: .....

Address: .....

EXECUTED for and on behalf of **STEER DAVIES & GLEAVE LIMITED**

at ◆ on ◆ by

[Authorised Signatory]: .....

Full Name: .....

Witness: .....

Full Name: .....

Address: .....

[redacted]

Director/Authorised Signatory

TIE LIMITED

[redacted]

Director/Authorised Signatory

PARSONS BRINCKERHOFF LIMITED



(1) tie

- and -

(2) INFRACO

- and -

(3) PARSONS BRINCKERHOFF LIMITED

NOVATION OF SYSTEM DESIGN SERVICES AGREEMENT

in respect of

EDINBURGH TRAM NETWORK

AGREEMENT

AMONG

(1) **TIE LIMITED** (Company number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ ("**tie**");

(2) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London, EC1A 4EJ, which expression shall include its successors, permitted assignees and transferees and **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens House, Frimley, Camberley, Surrey, GU16 8QD, which expression shall include its successors, permitted assignees and transferees, acting jointly and severally (together the "**Infraco**");

(3) **PARSONS BRINCKERHOFF LIMITED** (company number 2554514) whose registered office is at Amber Court, William Armstrong Drive, Newcastle Business Park, Newcastle Upon Tyne, NE4 7YQ ("**SDS Provider**").

BACKGROUND

A By an agreement in writing dated 19 September 2005 ("**SDS Agreement**") **tie** appointed the SDS Provider to provide system design services in connection with the Edinburgh Tram Network.

B **tie** and Infraco have entered into a contract of even date ('**Infraco Contract**') under which Infraco has been appointed to complete the design and carry out the construction, installation, commissioning and maintenance planning in respect of the Edinburgh Tram Network.

C **tie** and Infraco have agreed, with the consent of the SDS Provider, that the Infraco shall take over the rights and liabilities of the "Client" under the SDS Agreement by novating the SDS Agreement from **tie** to Infraco upon and subject to the terms of this Agreement.

1. DEFINITIONS AND INTERPRETATION

1.1 The definitions given in the recitals to this Agreement apply to this Agreement.

1.2 Clause headings in this Agreement are for the convenience of the parties only and do not affect its interpretation.

1.3 Unless otherwise defined hereunder, where the SDS Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement.

1.4 In this Agreement the following words and expressions shall have the meanings hereby ascribed to them

"**Design Delivery Programme**" has the meaning given in Appendix 1 to this Agreement;

"**Disclosure Statement**" means Appendix, Part 5 (together with all the documents attached to or referred to in it);

"**EAL**" means Edinburgh Airport Limited a subsidiary of BAA plc and the operator of Edinburgh Airport;

"**Employer's Requirements**" has the meaning given in the Infraco Contract;

"**Incentivisation Payment**" means the sum of £1,000,000;

"**Infraco Contract**" has the meaning given in Appendix 1 to this Agreement;

"**Infraco Proposals**" has the meaning given in the Infraco Contract;

"**Issued for Construction Drawings**" has the meaning given in Appendix 1 to this Agreement;

"**SRU**" means the Scottish Rugby Union;

"**Third Party Agreements**" means the Parliamentary Undertakings, Third Party Agreements and other undertakings or commitments entered into at the date of this Agreement by CEC or **tie** in relation to the Edinburgh Tram Network and listed in Appendix Part 6 (in so far as the same have been supplied to the SDS Provider);

"**tie Change Order**" has the meaning given in the Infraco Contract and shall include a confirmation of a Mandatory tie Change and a Notified Departure (as defined in the Infraco Contract);

"**Tram Legislation**" means the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006, which received Royal Assent on 8 May 2006 and 27 April 2006 respectively and which confer on CEC all requisite authorities and statutory powers to procure the construction, operation and maintenance of the Edinburgh Tram Network;

2. RELEASE BY THE SDS PROVIDER OF TIE

2.1 The SDS Provider releases and discharges **tie** from any and all duties, obligations and liabilities owed to the SDS Provider under the SDS Agreement and accepts the liability of the Infraco under the SDS Agreement in lieu of **tie**.

2.2 The Parties acknowledge that the SDS Provider and **tie** shall enter into a separate agreement in respect of certain design services connected to the implementation of utilities diversionary works for the Edinburgh Tram Network and that scope of work is not novated under this Agreement.

3. RELEASE BY TIE OF THE SDS PROVIDER

3.1 **tie** releases and discharges the SDS Provider from the further performance of the SDS Provider's duties and obligations under the SDS Agreement.

4. ACCEPTANCE OF LIABILITY BY THE SDS PROVIDER TO THE INFRACO

4.1 The SDS Provider undertakes to continue to perform all the duties and to discharge all the obligations of the SDS Provider under the SDS Agreement and to be bound by its terms and conditions in every way as if the Infraco was and always had been a party to the SDS Agreement in place of **tie**.

4.2 The SDS Provider warrants and undertakes to the Infraco that:

4.2.1 in respect of the duties and obligations which it has already performed under the SDS Agreement, it has performed those duties and obligations in accordance with the standards of skill and care set out in the SDS Agreement; and

4.2.2 subject to Clause 12.1:

(a) the SDS Provider is not aware having made due and diligent enquiry, of any breaches by **tie** of the SDS Agreement and there is no dispute or claim subsisting nor are there any circumstances existing which might give rise to any dispute or claim relative to the SDS Agreement;

(b) the information set out at Appendix Part 4 (*Design and Deliverable Status*) is true, complete and accurate in all respects and is not misleading;

(c) the Deliverables completed by the SDS Provider to the date of this Agreement and listed in Appendix Part 4:

(A) are in all respects in compliance with the SDS Agreement and, without prejudice to the foregoing generality:

(i) the Tram Legislation;

(ii) all applicable Law and Consents;

(iii) the Parliamentary Undertakings;

(iv) the Environmental Statements, and all other applicable environmental regulations and requirements;

(v) will permit compliance with the Code of Construction Practice; and

(vi) the Third Party Agreements (and in the case of SRU the draft Third Party Agreement);

(B) is so as to enable the Edinburgh Tram Network on completion of construction, testing and commissioning to be sited (and thereafter be operated and maintained)within the limits of deviation under the Tram Legislation save as expressly indicated in the Disclosure Statement,

(d) the design as fully developed pursuant to the SDS Agreement following the date of this Agreement shall continue to meet the requirements of Clause 4.2.2(c)(A) and (B) and on the basis of the standard of reasonable skill and care exercised pursuant to clause 3.2 of the SDS Agreement that

(i) the designs and Deliverables completed prior to the date of this Agreement comply with the Employer's Requirements

(ii) the designs and Deliverables as will be completed after the date of this Agreement will comply with the Employer's Requirements,

provided that in circumstances where compliance with the Employer's Requirements is dependant upon further design development to be undertaken by the Client (and which is out with the Services provided by SDS), the SDS Provider's obligation pursuant to this Clauses 4.2.2(d) shall be limited to having produced or producing designs and Deliverables that are capable of allowing Infraco to develop a design which is compliant with the Employer's Requirements.

(e) save in respect of any Consents which are the responsibility of **tie** in terms of Clause 19 of the Infraco Contract, the Consents listed at Appendix Part 2 (*Consents Programme*) are all the Design Stage Consents which are required to enable the Edinburgh Tram Network to be procured, constructed, installed, tested and commissioned, and thereafter operated and maintained in accordance with the Infraco Contract;

(f) it has received no Client Notice of Change or any other instruction from **tie** to vary any term of the SDS Agreement (whether pursuant to Clause 15 and 29.2 of the SDS Agreement or otherwise) and, subject to Clause 9.1 below, it has agreed no variation, alteration of the SDS Agreement; and

(g) no Change in Law has come into effect or is anticipated to come into effect which would have a material adverse impact on the Deliverables completed or to be completed pursuant to the SDS Agreement

The SDS Provider warrants and undertakes to the Infraco that it shall be liable for any loss or damage suffered or incurred by the Infraco arising out of any negligent act, default or breach by the SDS Provider in the performance of its obligations under the SDS Agreement prior to the date of this Agreement. The SDS Provider shall be liable for such loss or damage notwithstanding that such loss or damage would not have been suffered or incurred by **tie** (or suffered or incurred to the same extent by **tie**) or is different to or arises on a different basis to any loss or damage which would have been suffered or incurred by **tie**.

4.3 The SDS Provider undertakes and warrants to the Infraco that its design is consistent with and delivers the Edinburgh Tram Network runtime set out in the Employers' Requirements , which runtime supersedes that set out in the SDS Agreement.

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4.4 The liability of the SDS Provider to the Infraco pursuant to the SDS Agreement shall not be affected by the Infraco's assumption of liability for design to **tie** pursuant to the Infraco Contract.

4.5 The SDS Provider acknowledges that the Infraco has and shall continue to rely upon all Services carried out by the SDS Provider.

4.6 **tie** warrants that it has received a report from the SDS Provider (annexed at Part B of Appendix Part 7) setting out the misalignments between the Deliverables completed prior to the date of this Agreement and the Employer's Requirements and that it has issued initial instructions (in the form of the letter annexed at Part A of Appendix Part 7) to the SDS Provider in relation to addressing all such misalignments. Upon completion of the work entailed to resolve the misalignments, the SDS Provider confirms to **tie** and the Infraco that such Deliverables shall be consistent with the Employer's Requirements.

4.7 As soon as reasonably practicable, the Parties shall commence and expeditiously conduct a series of meetings to determine the development of the Infraco Proposals and any consequential amendment to the Deliverables (the "**Development Workshops**"). The matters to be determined at the Development Workshops shall be those set out in the report annexed at Part C of Appendix Part 7 (the "**Misalignment Report**"), together with any items identified as "items to be finalised in the SDS/BBS alignment workshops" in Appendix 4 to be dealt with in the following order of priority and objective unless otherwise agreed:

1 Roads and associated drainage and vertical alignment with the objective of minimising the extent of full depth reconstruction for roads thus minimising cost and construction programme duration

2. Structures value engineering, including track fixings to structures with the objective of enabling BBS to realise the Value Engineering savings for the structures identified in Schedules 4 and 30 of the Infraco Contract (Pricing and Infraco Proposals respectively)

3. OLE Design with the objective of identifying and agreeing the actions, responsibilities and programme to enable Infraco to implement their proposals for OLE as identified in the Infraco Proposals

4. Trackform with the objective of completing an integrated design to enable BBS to implement their proposals for trackform

5. Sub-station buildings with the objective of resolving the misalignment between Infraco Proposals and SDS Design with the minimum of changes to accommodate the Infraco Proposals for substations.

The following to be reviewed at the end of the Development Workshop to identify any issues arising from the above items:

1. Earthworks

2. Landscaping

3. OLE Foundations

4. Alignment

5. Site Clearance

6. Tramstops

7. all other items in the Misalignment Report together with any items identified as "items to be finalised in the SDS/BBS alignment workshops" in Appendix 4.

At the Development Workshop, the Parties shall also develop a strategy for co-operation between the SDS Provider and the Infraco to manage design development and the necessary interface between the Infraco's design and the design developed by the SDS Provider.

4.8 The product of the Development Workshops shall be a report signed by each of the Parties to detail the conclusions in respect of each matter and the payments to be made to the SDS provider in respect of the work to be carried out by the SDS Provider as a result of the conclusions set out in the report. Any consequential **tie** Change Orders or instructions shall be appended to such report as and when the same are issued. **tie** shall pay the SDS Provider for the work required for the Development Workshop on an hourly rate basis in accordance with the hourly rates set out in Appendix Part 8 and the SDS Provider agrees that the Infraco shall not be liable to make such payments to the SDS Provider. For the avoidance of doubt, the Infraco and **tie** agree that any amendment to the Deliverables completed prior to the date of this Agreement as set out in this report will be a Mandatory **tie** Change under the Infraco Contract, and a Client Change under the SDS Agreement.

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5. VESTING OF REMEDIES AGAINST SDS PROVIDER

5.1 All rights of action and remedies against the SDS Provider under and pursuant to the SDS Agreement vested in **tie** (as Client) shall from the date of this Agreement vest in the Infraco.

5.2 Subject to Clause 12.1, **tie** warrants to the Infraco that there is no dispute or claim subsisting (save to the extent that the same are fairly disclosed in the Disclosure Statement), nor are there any circumstances existing which might give rise to any dispute or claim by the SDS Provider against **tie** relative to the SDS Agreement.

5.3 **tie** shall indemnify the Infraco against all loss, injury and damage that the Infraco may incur as a consequence of any dispute or claim by the SDS Provider or circumstance referred to in Clause 5.2 above identified in the Disclosure Statement which relates to the SDS Provider and **tie's** dealings under the SDS Agreement prior to the date of this Agreement.

6. ACCEPTANCE OF LIABILITY BY THE INFRACO

6.1 The Infraco undertakes to perform all the duties and to discharge all the obligations of **tie** under the SDS Agreement and to be bound by its terms and conditions in every way as if the Infraco was and always had been a party to the SDS Agreement in place of **tie** and as if all acts and omissions of **tie** under or pursuant to the SDS Agreement prior to the date of this Agreement were the acts and omissions of the Infraco.

6.2 The Infraco undertakes to pay the SDS Provider the amounts set out in Appendix Part 4 in respect of the outstanding work identified in Appendix Part 4 in accordance with the terms of the SDS Agreement.

7. VESTING OF REMEDIES AGAINST TIE

7.1 All rights of action and remedies under or pursuant to the SDS Agreement vested in the SDS Provider shall, save in respect of those sums identified in Clauses 8.1 and 8.8 from the date of this Agreement lie against the Infraco and not **tie**.

7.2 Without prejudice to Clause 4.2.2(a), the SDS Provider waives all right to claim against Infraco in respect of any breach of the SDS Agreement by **tie** prior to the date of this Agreement.

8. ACKNOWLEDGEMENT OF PAYMENT AND INCENTIVE

8.1 The SDS Provider acknowledges that all fees and expenses properly due to the SDS Provider under the SDS Agreement up to the date of this Agreement have been paid by **tie** other than

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any payments which become due under Clause 29.3 of the SDS Agreement or due as a consequence of the further instruction to be issued by **tie** pursuant to Clauses 4.6 or 4.8 to be paid by **tie**.

8.2 **tie** and SDS acknowledge that **tie** has paid SDS in respect of its existing claims for prolongation and SDS confirms to **tie** and the Infraco that it has accepted such payments, when made in full and final settlement of any and all claims of whatever nature existing and/or available to it prior to the date of execution of this Agreement.

8.3 **tie** warrants to Infraco that all fees and expenses properly due to the SDS Provider under the SDS Agreement up to the date of this Agreement have been paid by **tie**.

8.4 The parties agree that Infraco will have no liability in relation to the payments referred to in Clause 8.1 or 8.8.

8.5 **tie** has released the retention bond (in accordance with clause 12.7.4 of the SDS Agreement)

8.6 Subject to Clause 4.2.1, the SDS Provider warrants to the Infraco that Appendix Part 4 contains an accurate status and identification confirmation of all Deliverables produced by the SDS Provider up to the date of this Agreement.

8.7 The parties agree that Appendix Part 4 contains (i) an accurate description of the balance of the Deliverables to be completed; and (ii) the agreed price for completion of the Deliverables.

8.8 **tie** shall pay to the SDS Provider the Incentivisation Payment 14 days after the provision of the last required Issued for Construction Drawing save that the Incentivisation Payment shall be reduced by the sum of £8,928.57 in respect of each occasion that the SDS Provider does not achieve the provision of Issued for Construction Drawings by the dates identified in the Design Delivery Programme save where **tie** and the SDS Provider otherwise agree. No further or other reduction can be made to the Incentivisation Payment whether by abatement set off or counterclaim.

8.9 For the purposes of Clause 8.8 any extension of time granted to the SDS Provider pursuant to Clause 7.5.2 of the SDS Agreement in respect of any Issued for Construction Drawings shall be ignored save where the cause of the entitlement to an extension of time is a circumstance or occurrence entitling the Infraco to an extension of time and that such circumstance or occurrence is a **tie** Change (as defined in the Infraco Contract).

9. AMENDMENT OF SDS AGREEMENT

9.1 **tie**, the SDS Provider and the Infraco agree that the terms of the SDS Agreement shall be and are varied in the manner set out in Appendix Part 1 to this Agreement.

9.2 Subject to Clause 9.1, **tie** warrants to Infraco that it has not issued any Client Notice of Change or any other instruction to the SDS Provider to vary any term of the SDS Agreement (whether pursuant to clause 15 of the SDS Agreement, clause 29.2 of the SDS Agreement or otherwise) and it has agreed no variation, alteration of the SDS Agreement.

10. AFFIRMATION OF SDS AGREEMENT

The terms and conditions of this Agreement represent the entire agreement between the parties relating to the novation of the SDS Agreement and, except as specifically amended by Appendix Part 1 of this Agreement, all the terms and conditions of the SDS Agreement remain in full force and effect.

11. RIGHTS OF THIRD PARTIES

A person who is not party to this Agreement shall have no right to enforce any term of this Agreement. This Clause does not affect any right or remedy of any person which exists or is otherwise available.

12. WARRANTIES

12.1 The warranties set out in Clause 4.2.2(a) to-(g) and Clause 5.2, are subject only to any matter which is fully and fairly disclosed to the Infraco in the Disclosure Statement (with sufficient details to enable the Infraco to identify the nature and scope of the matter disclosed and to make an informed assessment of the matter concerned and its significance to the Infraco and/or the design, construction, installation, testing, commissioning, operation and or maintenance of the Edinburgh Tram Network).

12.2 Save as provided in Clause 12.1 no information of which Infraco has knowledge (actual, constructive or imputed) shall prejudice any claim being made by Infraco under any of the warranties set out in Clauses 4.2, 4.3, 5.2, 8.3, 8.6 and 9.2 (the "**Warranties**") nor shall it affect the amount recoverable under any such claim and neither the rights and remedies of Infraco nor the SDS Provider's or **tie**'s (as the case may be) liability in respect of the Warranties shall be affected by any investigation made by or on behalf of Infraco.

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any event, matter or circumstance which comes to its knowledge which is, or may constitute, a breach of, or which is, or may be, inconsistent with, any of the Warranties given by that Party in this Agreement or the disclosures given by that Party in the Disclosure Statement.

13. LAW AND JURISDICTION

This Agreement shall be governed by and construed in accordance with Scots law and the Scottish Courts shall have jurisdiction with regard to all matters arising under it. This Agreement shall be a "Related Contract" for the purpose of clause 28 of the SDS Agreement and Clause 97 (Dispute Resolution Procedure) of the Infraco Contract.

IN WITNESS WHEREOF these presents on this and the preceding ~~7~~ 10 pages together with the Appendix in ~~8~~ 9 Parts which is annexed hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED** at Edinburgh on ~~13~~ 14 May 2008 by:

Authorised Signatory [redacted]

Full Name WILLIAM GALLAGHER

Witness Signature [redacted]

Full Name STEVEN BELL

Address 13 NEW RAD

LEISMAHAGOW.

EXECUTED for and on behalf of **SIEMENS PLC** at Edinburgh on ~~13~~ 14 May 2008 by:

Authorised Signatory [redacted]

Full Name C. ROTH

Authorised Signatory [redacted]

Full Name M. FLYNN

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EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED** at Edinburgh on 14 May 2008 by:

Director [redacted]

Full Name Richard John Walker

Director [redacted]

Full Name Barry Steve Dalton

EXECUTED for and on behalf of **PARSONS BRINCKERHOFF LIMITED** at Edinburgh on 14 May 2008 by:

Director [redacted]

Full Name Stephen Christopher Reynolds

Witness Signature [redacted]

Full Name Christopher Ian Tatnall

Address 25 Wilton Road

London SW1

This is the Appendix referred to in the foregoing Novation Agreement among tie, Infraco and Parsons Brinkerhoff Limited

APPENDIX PART 1

SCHEDULE OF AMENDMENTS TO THE SDS AGREEMENT

Clause 1 – Definitions and Interpretation

1.1 Amend existing definitions:

Background Information

Insert ", the Client" after "CEC"

Change in Law

Add "(d) any new requirement for any statutory Consent other than a statutory Consent the need for which had been published on 7 August 2007."

Client Change

Add 'and any amendment to the Consents Programme and/or the Design Delivery Programme (other than one necessitated by a breach of this Agreement by the SDS Provider) and any change made to the Employer's Requirements or Infraco Proposals made after the date of the Novation Agreement

Edinburgh Tram Network

Delete "**tie**" and replace with "the Client"

Insolvency Event

(k) delete references to "**tie**" and replace with "the Client" in each place

Delete **Master Project Programme** and replace with Programme

Planned Service Commencement Date means the date specified for service commencement in the Infraco Contract

Programme

Delete the entire definition and replace with "means the Consents Programme and/or the Design Delivery Programme, as the context may require"

Programme Phasing Structure

Delete "**tie**" and replace with "the Client"

1.1 Insert the following new definitions:

Client Designs means designs and information which are being provided by the Client;

Compensation Event has the meaning given in the Infraco Contract;

Consents Programme means the document in Appendix Part 2 to the Novation Agreement as amended or updated from time to time in accordance with this Agreement

Construction Programme means the programme included in Schedule Part 15 of the Infraco Contract and as may be updated in accordance with the terms of the Infraco Contract such programme to contain the Consents Programme, Design Delivery Programme and the construction activities programme.

Design Delivery Programme means the document in Appendix Part 2 to the Novation Agreement as amended or updated from time to time in accordance with this Agreement

Design Management Plan means the document which forms part of Part 14 of the Schedule to the Infraco Contract and has that name;

Design Stage Consents means the Consents (including Consents in respect of Client Designs) listed in Table A below and any further Consents which may be required for the construction, installation, commissioning, completion and opening of the Edinburgh Tram Network as is consistent with, required by or contained within the Services.

Table A

	Consent	Approval Body
Railways and Aviation	HMRI	HMRI
	Network Rail	Network Rail
	Airport/Aviation Consents, including EAL Permissions and EAL Works Data, to the extent that the same are Deliverables under the SDS Agreement.	Edinburgh Airport Limited/BAA/CAA/NATS
Planning	Listed Building Consent	CEC Planning Authority
	Prior Approval	CEC Planning Authority
	Planning Permission	CEC Planning Authority
	Conservation Area Consent	CEC Planning Authority
	Scheduled Monument Consent	Scottish Executive & Historic Scotland
	Advertisement Consent	CEC Planning Authority
Traffic Management	Road Technical Approvals relating to structures, lighting, traffic signals, road markings, safety and geometry and drainage.	CEC Roads Authority
Environment Ecological	Badger Licence	Scottish Natural Heritage
	Otter holt/disturbance licence	Scottish Natural Heritage
	Bat Licence	Scottish Natural Heritage

	Appropriate Assessment	Competent Authority
Drainage **CAR**	CAR General Binding Rules	SEPA
	CAR Registration	SEPA
	CAR Licence	SEPA
	Water/Wastewater Connection	Scottish Water
Construction	Technical Approval	CEC Bridges/CEC Roads
	Building Warrant	CEC Building Standards
Radio	OFCOM licence	OFCOM
Design Consultation	Third Party Design Consultation	Third parties
Undertakings	Parliamentary Undertakings	Parliament and third parties
Agreements	Third Parties approval and consents	Third parties

Infraco Proposals has the meaning given in the Infraco Contract;

Infraco Works has the meaning given in the Infraco Contract

Issued for Construction Drawings means those Deliverables necessary for Infraco to commence construction of the relevant part of the Infraco Works and as shown on the Design Delivery Programme which have been fully approved by all Approval Bodies and in accordance with the Review Procedure;

Novation Agreement means the agreement for novation of the SDS Agreement entered into between **tie**, the Infraco, and the SDS Provider, dated on or about the date of the Infraco Contract

Quality Management System means the quality management system entitled Bilfinger Berger - Siemens (BBS) Consortium, Edinburgh Tram Network Infraco, PROJECT MANAGEMENT PLAN INCLUDING QUALITY PLAN utilised by the Infraco and dated 12 February 2008, as amended from time to time in accordance with the Infraco Contract;

Relief Event has the meaning given in the Infraco Contract

Clause 2 – Term of this Agreement

Delete Clause 2 and substitute therefore:

This Agreement shall come into effect on the last date of execution of this Agreement. The rights and obligations imposed on the SDS Provider to perform the services set out in Schedule 1 (Scope of Service) shall continue (unless expressly provided otherwise in Schedule 1 to this Agreement) until the date on which the SDS Provider is notified by the Client that the Patent Defects Rectification Period (as defined in the Infraco Contract) has expired. For the avoidance of doubt, the liability of the SDS Provider in respect of any breach of this Agreement or negligence in the performance of the Services shall continue in full force and effect notwithstanding any notification by the Client pursuant to this Clause 2.1.

Clause 3 - Duty of Care, Standards and the Services to be Provided

3.3.4 Insert "Employer's Requirements" after "Technical Specifications".

3.3.14 Insert ", the Client, Bilfinger Berger, Siemens" after "the Scottish Executive"

3.10 Delete references to "**tie**" and "**tie** Parties" and replace with references to "the Client" and "Client Parties" respectively.

3.18 Replace "planning supervisor" with "CDM coordinator".

Insert the following new Clauses:

3.28 The SDS Provider is aware and has knowledge of all the terms and conditions of the Infraco Contract and the SDS Provider shall not cause the Infraco to be in breach of the provisions of the Infraco Contract to be observed and performed and complied with by the Infraco in so far as they relate and apply to the Services, and is further aware and has taken and shall continue to take full account of the obligations to be undertaken and the liabilities which may be incurred by the Infraco therein in relation to the Services.

3.29 The SDS Provider acknowledges that any breach by it of this Agreement may result in the Infraco committing breaches of and becoming liable for damages under the Infraco Contract and other contracts made by it in connection with the Infraco Contract and may occasion further loss or expense to the Infraco in connection with the Infraco Contract and such other contracts and all such damage, loss and expense is hereby agreed to be within the contemplation of the Parties as being the probable results of any such breach by the SDS Provider. Subject to Clause 27.6 and 27.7, the SDS Provider shall indemnify the Infraco against all such damage, loss and expense.

3.30 The SDS Provider shall observe, perform and comply with all the provisions of the Infraco Contract (in so far as the same has been supplied to the SDS Provider) on the Infraco's part to be observed, performed and complied with insofar as they relate and apply to the performance of the Services and the SDS Provider shall be liable to the Infraco for:

3.30.1 any breach, non-observance or non-performance for which the SDS Provider is responsible of any of the provisions of the Infraco Contract in so far as they relate and apply to the performance of Services; and

3.30.2 any act or omission for which the SDS Provider is responsible which involves the Infraco in any liability to **tie** and/or the Tram Supplier under the provisions of the Infraco Contract in so far as they relate and apply to the performance of Services; and

3.30.3 any claim, damage, loss or expense due to or resulting from any negligence or breach of duty for which the SDS Provider is responsible.

3.31 Provided that the Client has received the necessary design and other information from the SDS Provider in accordance with the Design Delivery Programme to allow it to develop the Client Designs, the Client shall, as soon as reasonably practicable, provide to the SDS Provider such Client Designs and, save where the SDS Provider has an obligation pursuant to this Agreement to obtain such information or instructions from another party, such other information and instructions as are necessary to enable the SDS Provider to comply with the Consents Programme and/or the Design Delivery Programme.

Clause 4 - Development, Review, Finalisation and Delivery of the Deliverables

4.4 Delete reference to tie in third line and replace with "the Client".

Delete Clause 4.5 and insert the following new Clause 4.5

4.5 The SDS Provider shall submit to the Client's Representative five copies of each Deliverable no later than the date shown in the Design Delivery Programme.

4.6 Delete "submittal programme" and replace with "Design Delivery Programme".

4.8 Delete all after 'Approval Bodies' and add: "the SDS Provider shall amend the Deliverable. Such amendment shall be at the SDS Provider's cost except where such amendment is required in order for the Deliverable to meet the requirements of any Approval Bodies, where such requirements are:

4.8.1 inconsistent with or in addition to the Infraco Proposals or the Employer's Requirements;

4.8.2 not reasonable given the nature of the Approval Body; or

4.8.3 not reasonably foreseeable within the context of the Infraco's Proposals or the Employer's Requirements,

in which case such amendment shall be a Client Change. All such amendments shall be made in accordance with Schedule 9 (*Review Procedure*) and shall ensure that the Deliverable shall satisfy the requirements of this Agreement and any Approval Bodies.

4.11/4.12 Insert "Employer's Requirements" in line 3 after "Technical Specifications"

Insert the following new Clause 4.14:

4.14 In addition to the other requirements of this Clause 4, the SDS Provider shall support the Client as reasonably required in relation to the maintenance and provision of any records, drawings, registers, manuals and/or reports as may be required under the Infraco Contract.

Clause 5 – Consents

Delete Clause 5.1 and substitute therefor:

5.1 The SDS Provider shall (at its own cost and expense):

5.1.1 submit applications which are valid and complete for (and/or for renewal or extension as appropriate of) all Design Stage Consents in accordance with the timetable set out in the Consents Programme and thereafter (subject to Clause 7.5) obtain and maintain in effect all Design Stage Consents;

5.1.2 implement each Design Stage Consent within the period of its validity and in accordance with its terms; and

5.1.3 observe and comply with the terms of each Consent (not being a Design Stage Consent) obtained from time to time in connection with the construction, installation, commissioning, completion and opening of the Edinburgh Tram Network.

Clause 5.2 - Delete "Consents" and replace with "Design Stage Consents".

Delete 5.4 and substitute therefor:

5.4 The SDS Provider shall update the Consents Programme not less than 3 Business Days prior to each Reporting Period End Date, showing progress and identifying any new Consents (whether or not Design Stage Consents) to be obtained. Subject to Clauses 7.5 and 15 no other changes to the Consents Programme shall be permitted without the consent in writing of the Client. The Client shall be entitled to request information in relation to the progress of the application for any such Consent and the Consent itself and the SDS Provider shall provide the same at no cost to the Client.

Insert new Clauses:

5.5 Without prejudice to Clause 5.1.1, the SDS Provider shall inform the Client as soon as practicable after becoming aware that a Design Stage Consent (or its extension and/or renewal) will not be obtained by the programmed date set out in the Consents Programme.

5.6 Where an application for a Design Stage Consent (or its extension and/or renewal) is denied, the SDS Provider shall notify the Client of the reasons given by the Approval Body for declining to issue or renew the Design Stage Consent and shall provide all appropriate supporting documentation to the Client.

5.7 Subject to Clause 5.8 below, failure to obtain a Design Stage Consent from the relevant Approval Body in respect of a design which the SDS Provider is responsible for preparing by the date on which it is shown as required in the Design Delivery or Consents Programme shall not be a breach of this Agreement and shall be a Compensation Event.

5.8 Clause 5.7 shall apply following the inability of the SDS Provider to obtain (or maintain) a Design Stage Consent for which it is responsible and in accordance with the Consents Programme contained in the SDS Novation Agreement, provided that:

5.8.1 the SDS Provider

(i) has complied with clauses 5.5 and 5.6;

(ii) has used reasonable endeavours to afford the Infraco a period of 3 Business Days from notification under Clauses 5.5 or 5.6 to meet with the relevant Approval Body with a view to resolving the situation and supports them by its attendance at such meeting; The SDS Provider acknowledges that **tie** is entitled to attend the meeting

(iii) has acted timeously in order to mitigate the impact of the failure to obtain or renew the Consent;

5.8.2 the SDS Provider has ensured timely provision of adequate required information to the relevant Approval Body in accordance with the Consents Programme, the Design Delivery Programme, the agreed requirements of the Approval Body and the Design Management Plan.

5.8.3 the inability to obtain or renew the Consent is not the result of the SDS Provider reprioritising the Consents Programme and/or the Design Delivery Programme (save where such reprogramming or prioritisation is the direct result of a Client Change, an extension of time pursuant to Clause 7.5, a Relief Event or a Compensation Event) such that the relevant Approval Body has insufficient time or information in which to respond to an altered timescale;

5.8.4 there has been a failure of the relevant Approval Body to respond in accordance with the agreed requirements of the Approval Body and timescales set out in the Design Management Plan or Design Delivery Programme or, if none has been stipulated, any reasonable timescale, provided that this failure has not been caused by inadequate or late submissions by the SDS Provider with regard to other Consents;

5.8.5 the failure to obtain or renew the Consent is not a consequence of a failure of the SDS Provider to perform its obligations under the SDS Agreement in terms of the quality or content of the relevant Deliverables and as required pursuant to the Design Management Plan, the Design Delivery Programme or the Consents Programme and, where relevant, Clause 10 (*Design Development and Finalisation*); or

5.8.6 the failure to obtain or renew a Consent is as a consequence of the quality or content of Client Design.

5.9 For the avoidance of doubt, clause 5.7 shall apply where, and to the extent, that a Consent in respect of a submission for Prior Approval is sought and the relevant Approvals Body

5.9.1 requires changes to design which could not reasonably have been anticipated from the previous formal or informal consultations or communications with the Approvals Body; or

5.9.2 does not deliver the Consent within the period stated in the Consents Programme or such Consents Programme updated in accordance with these terms.

5.10 Clause 5.8.3 shall not apply to a Prior Approval Consent where the Approval Body, acting reasonably, has agreed in writing to a proposal from the SDS Provider to changes in the sequencing, packaging and timescales set out in the Design Management Plan or the Consents Programme, provided that the SDS Provider has provided reasonable advance notice to **tie** and to the Approvals Body including full details of the proposed changes.

Clause 6 – Quality Assurance

6.1 Delete "a quality management system, and comply with such system" and replace with "and comply with the Quality Management System".

6.2 Delete "SDS Provider's quality management system" and replace with "Quality Management System".

Clause 7.1 – Master Project Programme, Programme Phasing Structure and Programme

7.1 Amend to delete reference to "Master Project Programme" and substitute "Programme".

Clause 7.5 - Extensions of Time:

Delete Clause 7.5 and substitute therefor:

7.5.1 If the SDS Provider shall be delayed in the execution of the Services:

7.5.1.1 by any circumstances or occurrence (other than a breach of this Agreement by the SDS Provider) entitling the Infraco to an extension of time for completion or stage completion of the Infraco Contract including, without limitation, any Relief Event or Compensation Event; or

7.5.1.2 by the issuing of a Client Change Order in respect of the Services to which Clause 7.5.1.1 does not apply; or

7.5.1.3 by reason of any other breach by the Client of this Agreement (save to the extent caused or contributed to by breach of this Agreement by the SDS Provider)to the extent not caused or contributed to by breach of the Infraco Contract by tie or any Relief Event or Compensation Event; or

7.5.1.4 by reason of any circumstances to which Clause 5.8.6 applies, irrespective of whether it entitles the Infraco to an extension of time or Compensation Event under the Infraco Contract.

then in any such event the SDS Provider shall forthwith notify the Client of:-

(a) the cause of the delay;

(b) the SDS Provider's estimate of the likely effect of such delay upon the Consents Programme and/or the Design Delivery Programme;

(c) the estimated additional cost that shall be incurred; and

(d) any acceleration measures which the SDS Provider could take to mitigate the effects of such delay and an estimate of the costs thereof

and, in the case of any event listed in Clauses 7.5.1.1 and/or 7.5.1.2, shall include such information as Infraco would be required to provide pursuant to Clause 65.2 of the Infraco Contract in respect of such event and/or circumstance.

7.5.2 Subject to compliance with Clause 7.5.1, the SDS Provider shall, subject to any instruction to accelerate the Services pursuant to Clause 7.5.3, be entitled to such adjustment to the Consents Programme and/or the Design Delivery Programme as may in all circumstances be fair and reasonable in respect of any event or circumstance under Clause 7.5.1, provided always that the SDS Provider's entitlement to an extension of time for any event listed in Clauses 7.5.1.1 and 7.5.1.2 above shall in no circumstances exceed (in respect of such event) the extension of time (if any) to which the Client is entitled for the identical event under the Infraco Contract. An extension of time shall not be granted where the cause of the Services having been delayed, affected or suspended is due to any act, omission, default or breach of the Agreement by the SDS Provider or its employees, agents or servants or any SDS Provider Party.

7.5.3 The Client shall issue a Client Change Order to authorise any agreed acceleration of the Consents Programme and/or the Design Delivery Programme and/or increased costs as a result of delays notified under Clause 7.5.1.

7.5.4 If the Services are delayed in circumstances other than those entitling the SDS Provider to an extension of time as set out in Clause 7.5.1 or as a result of a Force Majeure Event, the SDS Provider shall inform the Client at the earliest opportunity and shall give an estimate of the likely effect upon the Consents Programme and/or the Design Delivery Programme. The SDS Provider at his own expense shall take such acceleration measures as are necessary to achieve the requirements of the Consents Programme and/or the Design Delivery Programme.

7.5.5 The SDS Provider shall not be entitled to and shall be deemed to have irrevocably waived any entitlement to any extension of time unless the SDS Provider has:

7.5.5.1 within 10 Business Days of becoming aware of the circumstances or occurrences which have caused or are likely to cause delay to the SDS Provider in the performance of the Services notified the Client in writing; and

7.5.5.2 within 10 Business Days after such notification submitted by further written notice to the Client detailed particulars of any extension of time to which it may consider itself entitled in order that such submission may be investigated at the time; and

7.5.5.3 wherever applicable, complied with the requirements of any Clause under this Agreement requiring timely notice to be given.

7.5.6 Any notice under 7.5.5.1 or 7.5.5.2 above shall give full particulars to the extent then possible of the cause of the delay and of its probable duration and where appropriate (and that without prejudice to Clause 7.5A)reasonable estimate of any direct and indirect costs likely to result therefrom together with any other relevant details.

7.5A Additional Costs

7.5A.1 In the event that a Compensation Event causes the SDS Provider to incur costs beyond such costs which were reasonably anticipated to be incurred by the SDS Provider but for the occurrence of the Compensation Event (which for these purposes shall include any breach of this Agreement by the Client to the extent caused or contributed to by breach of the Infraco Contract by tie) then without prejudice to Clause 7.5 the SDS Provider shall be entitled to claim costs under this Agreement.

7.5A.2 To claim costs, the SDS Provider must, as soon as practicable, and in any event within 10 Business Days after it first became aware that the Compensation Event had caused or is likely to cause the SDS Provider to incur additional costs:

(a) give to the Client a notice of its claim for costs and full details of the nature of the Compensation Event, the date of occurrence and its likely duration;

(b) include in any notice given under Clause 7.5A.2(a) full details of any costs claimed including:

(i) details of the costs or losses which are not Indirect Losses;

(ii) mitigation measures adopted and why unsuccessful; and

(iii) any acceleration or other measures which the Infraco could take to mitigate the effects of any delay or non-performance and, where applicable, an estimate of the costs thereof;

provided that where a Compensation Event has a continuing effect, such that it is not practicable for SDS Provider to submit full details in accordance with this Clause 7.5A.2 then the SDS Provider shall instead submit to the Client:

(A) a statement to that effect with reasons, together with interim written particulars (including details of the likely consequences of the Compensation Event on the SDS Provider's ability to comply with its obligations under this Agreement and an estimate of the likelihood and likely extent of the delay or non-performance and the costs incurred); and

(B) thereafter, further interim written particulars until the actual costs incurred (if any) are ascertainable, whereupon the SDS Provider shall as soon as reasonably practicable, submit to tie the items referred to in Clause 7.5A.2(b);

(c) demonstrate to the reasonable satisfaction of the Client that:

(i) the SDS Provider and the SDS Provider Parties could not reasonably have avoided such occurrence or consequences by steps which they might reasonably be expected to have taken;

(ii) the Compensation Event is the direct cause of the additional costs; and

(iii) the SDS Provider is using reasonable endeavours to perform its obligations under this Agreement.

7.5A.3 In the event that the SDS Provider has complied with its obligations under Clause 7.5A.2, then the SDS Provider shall be paid the amount of any direct and demonstrable additional cost as may be reasonable in the circumstances of the Compensation Event, provided always that the SDS Provider's entitlement to such costs shall in no circumstances exceed (in respect of such event) a fair and reasonable proportion of the costs (if any) to which the Client is entitled for the identical event under the Infraco Contract. An entitlement to additional costs shall not be granted where the cause of the Compensation Event is due to any act, omission, default or breach of the Agreement by the SDS Provider or its employees, agents or servants or any SDS Provider Party.

7.5A.4 The SDS Provider shall notify the Client if at any time it receives or becomes aware of any further information relating to the Compensation Event, giving details of that information to the extent that such information is new or renders information previously submitted materially inaccurate or misleading.

7.5A.5 If the Parties cannot agree the extent of the extension of time or relief required or the additional costs claimed or the Client disagrees that a Compensation Event has occurred (or as to its consequences) or that the SDS Provider is entitled to any additional costs, either Party may refer the matter for determination in accordance with the Dispute Resolution Procedure.

7.5A.6 The Client shall, in assessing any delay or extension of time or costs for the purpose of Clause 7.5 and/or this Clause 7.5A:

(a) not take into account any event or cause of delay or costs which is caused by any negligence, omission, default, breach of contract or breach of statutory duty of the SDS Provider or any SDS Provider Parties;

(b) take into account an event or cause of delay or costs only if and to the extent that the SDS Provider establishes to the satisfaction of the Client that the SDS Provider has used its reasonable endeavours to adjust the order and sequence in which the SDS Provider proposes to carry out the Services in such a manner as to minimise the effects of the delay in, or if possible to avoid altogether any delay in, the progress of the Services and mitigate the costs.

7.5A.7 The SDS Provider shall not be entitled to and shall be deemed to have irrevocably waived any entitlement to any extension of time and/or additional costs in respect of any failure by the SDS Provider to:

(a) manage the required interface with CEC in so far as this forms part of the Services; or

(b) manage any required interface with any Approval Body and/or third party where consent or approval is required at any stage of the Services; or

(c) identify any instructions which are required from the Client and/or tie in order to progress the Services in accordance with the Consents Programme and/or the Design Delivery Programme,

provided that following the occurrence of a Compensation Event nothing in this Clause 7.5A.7 shall prevent any required interfaces with CEC, any Approval Body and/or third party, or instructions which are required from the Client and/or tie from being taken into account when considering extensions of time in accordance with Clause 7.5 and/or additional costs in accordance with Clause 7.5A.

7.5A.8 Notwithstanding the occurrence of a Compensation Event, the SDS Provider shall continue to carry out the Services unless otherwise agreed in connection with Clause 7.5 and/or this Clause 7.5A.

Clause 9 – Sub-letting and the Appointment of SDS Provider Parties

Delete Clause 9.5.

Clause 11 – Methods of Payment

In Clause 11.6

In line five, replace "eighty per cent (80%)" with "ninety per cent (90%)"

In line nine, after the word "final.", delete the remaining wording and replace with:

"The SDS Provider may make application for payment in respect of the remaining ten per cent (10%) of the total value of the Detailed Design Phase Milestone payment:

11.6.1 in the case of Detailed Design Phase Deliverables which are required to be submitted to CEC for Technical Approval or Prior Approval pursuant to the Design Management Plan, on the date of their submission provided that such submission is made on or before the date of submission required by the Design Delivery Programme; or.

11.6.2 in the case of all other Deliverables (including, without limitation, any Detailed Design Phase Deliverables not submitted on or before the date of submission required by the Design Delivery Programme), following the issue of the Milestone Completion Certificate by the Client in respect of the relevant Detailed Design Phase for the relevant sub-sector or sector (as appropriate)."

Clause 15 - Changes

Insert the following new Clauses 15.18 and 15.19

15.18 Except in relation to a breach of this Agreement by the Client or unless otherwise agreed by the Client in writing, the SDS Provider's entitlement to additional payment or an extension of time for a Permitted Variation shall in no circumstances exceed (in respect of such Permitted Variation) the extension of time (if any) and/or additional payment (if any) to which the Infraco is entitled under the Infraco Contract for the identical Permitted Variation. The SDS Provider's entitlement to such extension of time or additional payment under this Agreement shall in no circumstances exceed that proportion of the Infraco's entitlement to an extension of time or additional payment under the Infraco Contract to which the Infraco becomes entitled in respect of the entitlement claimed by the SDS Provider. An extension of time and/or additional payment shall not be granted where the cause of the Permitted Variation is due to any act, omission, default or breach of the Agreement by the SDS Provider, its employees, agents or servants or any SDS Provider Party.

15.19 Clause 15.18 shall not apply in connection with additional payment due to the SDS Provider for Services relating to Deliverables in respect of 'Identified Value Engineering' or 'Further Value Engineering' (both as defined in Schedule Part 4 of the Infraco Contract) .

Clause 19 - Termination for SDS Provider Default

Delete Clause 19.1.3 and substitute therefore "Clause not used".

Clause 20 - Termination, Abandonment or Suspension of the Services by the Client

Delete Clause 20.1 and substitute therefor:

20.1 In the event that the Infraco Contract is terminated, this Agreement shall terminate. Such termination shall be deemed to have occurred under Clause 20 unless the Infraco Contract is terminated as a result of any circumstances specified in Clause 19 whereupon the provisions of Clause 25.3 shall not apply in such event.

Clause 22 - Termination for Corrupt Gifts and Payments

Delete Clause 22 (Termination for Corrupt Gifts and Payments in its entirety) substitute therefor:

22.1 The SDS Provider or anyone employed by it or acting on its behalf (including any SDS Provider Party) shall not commit any Prohibited Act.

22.2 If the SDS Provider or anyone employed by it or acting on its behalf (including any SDS Provider Party) commits any Prohibited Act, then the Client may terminate this Agreement with immediate effect by giving notice to the SDS Provider.

Clause 27 – Indemnity by SDS Provider, Liability and Sole Remedy

Insert new Clauses:

27.7 If the SDS Provider fails to achieve the provision of Issued for Construction Drawings identified in the Design Delivery Programme by the date set out in the Design Delivery Programme for the release of the Issued for Construction Drawings (or within such longer period as is agreed by the Client), the SDS Provider will pay the Client liquidated damages at the rate of £8,928.57 in respect of each failure.

27.8 The SDS Provider will not be liable to pay liquidated damages:

27.8.1 to the extent that the failure to achieve the release date for Issued for Construction Drawings is the failure of **tie** or the CEC to approve the SDS submission of the design Deliverables within the requisite periods set by the Design Management Plan and/or Design Delivery Programme (as appropriate); or

27.8.2 if and to the extent that the total aggregate liquidated damages under Clause 27.7 in respect of submissions under this Agreement exceeds £1,000,000.

27.9 In the event that it is agreed by the Parties or determined pursuant to Clause 28 (*Dispute Resolution Procedure*) that the Deliverable (including the relevant Issued for Construction Drawings) was not submitted in accordance with the Agreement in terms of packaging, process, or the content or quality was inadequate or insufficient, the limits set out in Clause 27.7 and 27.8 shall not apply and the SDS Provider shall be liable to the full extent under this Agreement.

27.10 The liquidated damages set out in Clause 27.7 are a genuine pre-estimate of losses incurred by the Client resulting from failure by the SDS Provider to achieve the relevant release date

and the Parties shall not seek to challenge the application or recovery of such amounts on the basis of this underlying calculation.

27.11 Notwithstanding the generality of Clause 27.1, the SDS Provider shall indemnify the Client from all loss, costs, claims, damages, expenses and liabilities incurred by the Client pursuant to Clause 77.5 of the Infraco Contract caused by a breach of this Agreement by the SDS Provider in relation to the exercise of powers under the Tram Legislation (in so far as the same are to be carried out by Infraco pursuant to the Infraco Contract) excluding the construction and maintenance activities associated with the Infraco Works.

27.12 Each of the obligations of the SDS Provider under this Agreement shall be interpreted as a separate and independent obligation so that Infraco shall have a separate claim and right of action in respect of every breach of each obligation (including without limitation each failure to comply with Clauses 4.5 and/or 5.1.1).

27.13 The SDS Provider shall not be entitled to any common law rights including (but not limited to) rights to damages or any other rights under contract, delict or otherwise (other than specific implement, interim specific implement, interdict, interim interdict or any action for payment) in relation to any breach of this Agreement by the Client to the extent caused or contributed to by breach by **tie** of the Infraco Contract or any other Compensation Event. The SDS Provider's sole right to an extension of time and/or relief from the performance of its obligations and/or to claim costs in connection with a Compensation Event shall be as set out in Clause 7.5 and 7.5A, respectively.

27.14 The SDS Provider shall not be responsible for the quality or content of Client Design. The SDS Provider shall undertake a general review of Client Design on receipt of the same from the Client, and shall report to the Client with details of any element which is patently inconsistent with the requirements of an Approval Body as applied to design submitted previously.

Clause 28 – Dispute Resolution Procedure

Delete Clause 28 and replace with:

28.1 The Parties agree that this Clause 28 (*Dispute Resolution Procedure*) shall have effect for the resolution of any Dispute.

28.2 Any Dispute shall, in the first instance, be referred to the Internal Resolution Procedure in accordance with Clause 28.10.

28.3 Neither Party shall commence any court proceedings until the procedures in Clauses 28.10 to 28.57A6 have been completed, under exception that Clause 28 (*Dispute Resolution Procedure*) shall not apply so as to prevent either Party seeking an interim order, or interim relief, in the Scottish courts.

28.4 In the event that any court proceedings whatsoever are initiated by either Party against the other, the Parties agree that the Court of Session, Scotland, shall have exclusive jurisdiction.

28.5 Neither Party shall be entitled to suspend the performance of its undisputed obligations under this Agreement merely by reason of the reference of any Dispute to the Dispute Resolution Procedure contained in this Clause 28 (*Dispute Resolution Procedure*).

28.6 Subject to the Client's **tie**'s discretionary rights set out in Clause 28.55 to Clause 28.57.3 to require that a Dispute and a Related Dispute (as defined in Clause 28.55) be dealt with together at an appropriate stage of the Dispute Resolution Procedure, the provisions of this Clause 28 (*Dispute Resolution Procedure*) are mandatory and binding upon the Parties. For the avoidance of doubt nothing in this Schedule 9 shall be intended to disapply section 80(2) and 79(2) of the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006 (together the "**Tram Acts**") respectively.

28.7 Not used

28.8 Where either Party refers a Dispute to the Dispute Resolution Procedure, such Party shall not have waived nor be deemed to have waived any right to pursue or progress such Dispute in the event that such Party fails to observe any time limit or timescale provided for in this Clause 28.

28.9 Not used

Internal Resolution Procedure

28.10 The following procedure is the Internal Resolution Procedure referred to in Clause 28.2:

28.10.1 In the event of any Dispute arising, the SDS Provider's Representative and the Client's Representative shall seek to resolve the Dispute at a meeting to be convened within three Business Days of written notification by either Party to the other that it wishes to

initiate the Internal Resolution Procedure in respect of that Dispute ("Notification"). Such Notification shall be given in accordance with the provisions of Clause 36 (*Notices*) of this Agreement.

28.10.2 If following the meeting referred to in Clause 28.10.1 the Dispute is not resolved or in the event that a meeting has not been convened within 3 Business Days pursuant to Clause 28.10.1, each Party shall, before the expiry of the period of seven Business Days from Notification, serve, in accordance with the provisions of Clause 36 (*Notices*) of this Agreement, a written position paper ("Position Paper") upon the other Party. Each Party's Position Paper shall state in reasonable detail that Party's position and required objectives in relation to the Dispute; any required redress, and, where possible, any comments on the other Party's position.

28.10.3 Upon such service of a Position Paper by the Party initiating or pursuing the Dispute, the Chief Executive (or equivalent) of the SDS Provider and the Chief Executive (or equivalent) of the Client (or their respective deputies in the event of their unavailability) shall seek to resolve the Dispute by meeting in good faith to discuss and negotiate upon the Dispute without recourse to legal or other proceedings.

28.10.4 In the event that resolution of the Dispute is achieved by the Chief Executive (or equivalent) of the SDS Provider and the Chief Executive (or equivalent) of the Client, the resolution shall be reduced to writing and, once it is signed by the duly authorised representatives of both Parties, shall be binding on the Parties.

28.10.5 Unless concluded by a written legally binding agreement, all discussions and negotiations connected with the Dispute shall be conducted in confidence and without prejudice to the rights of the Parties in any future legal or other proceedings. Nor may such matters be produced or relied upon in evidence in any such proceedings.

28.11 In the event that any Dispute is not resolved by the Internal Resolution Procedure within a period of twenty Business Days from Notification (or longer if so agreed by the Parties) then the following provisions of this Clause 28.11 shall apply:

28.11.1 the Chief Executive (or equivalent) of the SDS Provider and the Chief Executive (or equivalent) of the Client (or their respective deputies in the event of their unavailability) shall, within a further period of five Business Days, seek to agree that the Dispute shall be resolved by any one of the following procedures:

28.11.1.1 mediation in accordance with Clauses 28.12 to 28.14; or

28.11.1.2 adjudication in accordance with Clauses 28.15 and 28.54; or

28.11.1.3 litigation before the Court of Session, Scotland, in which event the Summons in any such litigation shall be signeted and served within ten Business Days of the date of expiry of the period of 60 Business Days following the conclusion of the internal resolution procedure under Clause 28.10;

28.11.2 in the event that the Chief Executive (or equivalent) of the SDS Provider and the Chief Executive (or equivalent) of the Client (or their respective deputies in the event of their unavailability) are unable to agree that the Dispute be resolved by one of the procedures described in Clauses 28.11.1.1 to 28.11.1.3, the Party initiating or pursuing the Dispute shall refer the Dispute to mediation (and thereafter adjudication if necessary) in accordance with Clauses 28.12 and 28.14.

Mediation

28.12 The Parties shall attempt in good faith to resolve the Dispute by a procedure of mediation in accordance with the Centre for Effective Dispute Resolution mediation rules or Model Mediation Procedure in force at the commencement of the mediation, (or in the event that the Centre for Effective Dispute Resolution has ceased to exist as at the time of the commencement of the mediation, mediation rules or a model mediation procedure offered by any other body offering commercial mediation services which shall be selected by the Client). In the event that any provision of such mediation rules or model mediation procedure conflicts with any provision of this Clause 28 (*Dispute Resolution Procedure*), the provisions of this Clause 28 (*Dispute Resolution Procedure*) shall take precedence. In the event that any timescales contained in such mediation rules or model mediation procedure conflicts with the timescales referred to in this Clause 28 (*Dispute Resolution Procedure*), the timescales contained in such mediation rules or model mediation procedure shall be amended accordingly such that the timescales referred to in this Clause 28 (*Dispute Resolution Procedure*) shall be adhered to.

28.13 In the event that resolution of the Dispute is achieved in consequence of such mediation procedure, such agreed resolution shall be recorded in writing and, once it is signed by the duly authorised representatives of both Parties, shall be binding on the Parties. Unless concluded by a written legally binding agreement, all discussions and negotiations (including written submissions made and documents produced in relation thereto) connected with the mediation procedure referred to in Clause 28.12 shall be

conducted in confidence and without prejudice to the rights of the Parties in any future legal or other proceedings. Nor may such matters be produced or relied upon in evidence in any such proceedings.

28.14 If any Dispute to which this Clause 28 (*Dispute Resolution Procedure*) relates is not resolved by the mediation procedure referred to in Clauses 28.12 and 28.13 within a period of 30 Business Days from the referral of the Dispute to mediation (or longer if so agreed by the Parties), the mediation procedure shall be terminated and unless the Party initiating or pursuing the Dispute withdraws the Dispute, the Dispute shall within 60 days of the termination of the mediation procedure be referred to adjudication in accordance with Clauses 28.15 to 28.54.

Adjudication

28.15 In the event that either Party refers a Dispute to adjudication in terms of Clause 28.11.1 or 28.14, or exercises a statutory right available to it (if any) under the Housing Grants, Construction and Regeneration Act 1996 to raise adjudication proceedings in relation to "construction operations" (within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996) which are not Authorised Works as defined in the Tram Acts, such adjudication shall be conducted in accordance with Clauses 28.15 to 28.54, wherein any reference to "days" is a reference to calendar days.

Notice of intention to seek adjudication

28.16 Either Party may give written notice (the "**Notice of Adjudication**") of its intention to refer the Dispute to adjudication and the Party giving such notice shall be the "**Referring Party**".

28.17 The Notice of Adjudication shall be given to the other Party and the Party receiving the Notice of Adjudication shall be the "**Responding Party**".

28.18 The Notice of Adjudication shall set out briefly:

28.18.1 the nature and a brief description of the Dispute and of the parties involved;

28.18.2 details of where and when the Dispute has arisen;

28.18.3 the nature of the redress which is sought; and

28.18.4 the names and addresses of the Parties (including the addresses which the Parties have specified for the giving of notices).

28.19 The adjudicator selected to consider the Dispute shall be selected from one of the panels ("**Panels**") appointed by the Parties in accordance with the following:

28.19.1 there shall be three Panels, one in respect of legal matters, ("**Legal Panel**") one in respect of construction and operational matters ("**Construction/Operational Panel**"), and one in respect of financial matters ("**Financial Panel**");

28.19.2 each Panel shall be comprised of at least four members, who are listed in Schedule 10 (*Panels for the Dispute Resolution Procedure*) to this Agreement;

28.19.3 if any member of a Panel resigns or dies or becomes incapax or ill to the extent of being unable to reasonably discharge his duties as a member of the Panel, a replacement shall be appointed by the Parties as soon as practicable. Any such replacement shall be wholly independent of the Client, any Client Party, the SDS Provider, any SDS Provider Party, **tie**, any **tie** Party, City of Edinburgh Council or any Relevant Authority, any Approvals Body, the Tram Supplier or any equipment supplier or any party associated with the Edinburgh Tram Network, and any successor to or subsidiary or parent of any of the aforementioned parties. If the Parties are unable to agree on the identity of such replacement(s), the President or Vice President for the time being of The Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland shall appoint such replacement(s) within thirty days of any application for such appointment by either Party.

28.20 The Referring Party shall at the same time as giving the Notice of Adjudication to the Responding Party, send to each of the members of the relevant Panel a copy of the Notice of Adjudication and a request that each member of the relevant Panel advises both Parties within three days of the date of the Notice of Adjudication as to whether or not he is able and willing to act. The Referring Party shall at their sole discretion be entitled to select which of the Panels is the relevant Panel in light of the subject matter of the Dispute. The Parties shall attempt to agree within two further days as to which one of the members of the relevant Panel who responded indicating that they are able and willing to act shall be requested to act as adjudicator. In the event that such agreement is reached, the Referring Party shall, within a further period of one day, request the member of the relevant Panel upon whom agreement has been reached to act as adjudicator. In the event that such agreement is not reached, the Responding

Party shall, within a further period of two days, select one of the members of the relevant Panel who responded indicating that they are able and willing to act and the Referring Party shall request that member to act as adjudicator.

28.21 If no member of the relevant Panel indicates that he is able and willing to act within three days of receiving a request to act as adjudicator, the Referring Party shall request the President or the Vice President for the time being of The Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland to select a person to act as adjudicator.

28.22 Any person appointed, requested or selected to act as adjudicator in accordance with Clause 28.20, 28.21 and 28.24 paragraphs shall be a natural person acting in his personal capacity. A person appointed, requested or selected to act as an adjudicator shall be wholly independent of the Client, any Client Party, the SDS Provider, any SDS Provider Party, **tie**, any **tie** Party, City of Edinburgh Council or any Relevant Authority, any Approvals Body, the Tram Supplier or any equipment supplier or any party associated with the Edinburgh Tram Network, and any successor to or subsidiary or parent of any of the aforementioned parties.

28.23 The requests referred to in Clause 28.20 shall be accompanied by a copy of the Notice of Adjudication.

28.24 The Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland must communicate the selection of an adjudicator to the Referring Party within three days of receiving a request to do so.

28.25 If the Chartered Institute of Arbitrators (Scottish Branch) or the Institution of Civil Engineers or the Law Society of Scotland fails to comply with Clause 28.24, the Referring Party may:

28.25.1 agree with the other Party to the Dispute to request a specified person to act as adjudicator; or

28.25.2 request any other adjudicator nominating body to select a person to act as adjudicator. An "adjudicator nominating body" shall mean a body (not being a natural person and not being a Party to the Dispute) which holds itself out publicly as a body which will select an adjudicator when requested to do so by a Referring Party.

28.26 The person requested to act as adjudicator in accordance with the provisions of Clause 28.20 or 28.21 shall indicate whether or not he is willing to act within two days of receiving the request.

28.27 Where an adjudicator has been selected and appointed in accordance with Clause 28.20, 28.21 or 28.24, paragraph the Referring Party shall not later than seven days from the date of the Notice of Adjudication refer the Dispute in writing (the "**Referral Notice**") to the adjudicator.

28.28 The Referral Notice shall be accompanied by copies of, or relevant extracts from the Agreement and such other documents as the Referring Party intends to rely upon.

28.29 The Referring Party shall, at the same time as he sends to the adjudicator the documents referred to in Clauses 28.27 and 28.28, send copies of those documents to the Responding Party.

28.30 The adjudicator may, with the consent of the parties to those Disputes, adjudicate at the same time on more than one Dispute under the Agreement.

28.31 The Parties may agree to extend the period within which the adjudicator may reach a decision in relation to all or any of these Disputes.

28.32 An adjudicator may resign at any time on giving notice in writing to the Parties.

28.33 An adjudicator must resign where the Dispute is the same or substantially the same as one which has previously been referred to adjudication, and a decision has been taken in that adjudication.

28.34 Where an adjudicator ceases to act under Clauses 28.32 or 28.33 or dies or becomes incapax or ill to the extent of being unable to reasonably discharge his duties:

28.34.1 the Referring Party may serve a fresh notice in accordance with Clauses 28.16 to 28.19 and shall in accordance with Clauses 28.20 to 28.29 request an adjudicator to act; and

28.34.2 if requested by the new adjudicator, the Parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

28.35 The Parties to a Dispute may at any time agree to revoke the appointment of the adjudicator and in such circumstances the fees and expenses of that adjudicator shall,

subject to Clause 28.36, be determined and payable in accordance with Clauses 28.52 to 28.53.

28.36 Where the revocation of the appointment of the adjudicator is due to the default or misconduct of the adjudicator, the Parties shall not be liable to pay the adjudicator's fees and expenses.

Powers of the Adjudicator

28.37 The adjudicator shall:

28.37.1 act impartially in carrying out his duties and shall do so in accordance with any relevant terms of the Agreement and shall reach his decision in accordance with Scots law; and

28.37.2 avoid incurring unnecessary expense.

28.38 The adjudicator may take the initiative in ascertaining the facts and the law necessary to determine the Dispute, and shall decide on the procedure to be followed in the adjudication. In particular, he may:

28.38.1 request either Party to supply him with such documents as he may reasonably require including, if he so directs, any written statement from either Party supporting or supplementing the Referral and any other documents given under Clauses 28.27 to 28.28;

28.38.2 conduct the adjudication in the English language and decide whether a translation of any document is to be provided and, if so, by whom, by when, and at whose cost;

28.38.3 meet and question either Party and their representatives;

28.38.4 subject to obtaining any necessary consent from a third party or the Parties, make such site visits and inspections as he considers appropriate, whether accompanied by the Parties or not;

28.38.5 subject to obtaining any necessary consent from a third party or the Parties, procure the carrying out of any tests or experiments, and make directions as to the conditions for and responsibility for the cost of the same;

28.38.6 obtain and consider such representations and submissions as he requires, and, provided he has notified the Parties of his intention, appoint experts, assessors or legal advisers;

28.38.7 give directions as to the timetable for the adjudication, any deadlines, or limits as to the length of written documents or oral representations to be complied with; and

28.38.8 issue other directions relating to the conduct of the adjudication.

28.39 The Parties shall comply with any request or direction of the adjudicator in relation to the adjudication.

28.40 If, without showing sufficient cause, a Party fails to comply with any request, direction or timetable of the adjudicator made in accordance with his powers, fails to produce any document or written statement requested by the adjudicator, or in any other way fails to comply with a requirement under these provisions relating to the adjudication, the adjudicator may:

28.40.1 continue the adjudication in the absence of that Party or of the document or written statement requested;

28.40.2 draw such inferences from that failure to comply as may, in the adjudicator's opinion, be justified in the circumstances;

28.40.3 make a decision on the basis of the information before him, attaching such weight as he thinks fit to any evidence submitted to him outside any period he may have requested or directed;

28.40.4 disqualify any part or parts of that Party's submissions affected by the failure to comply; and

28.40.5 grant the other Party proper opportunity to consider and respond to any evidence or representation made late.

28.41 Subject to any agreement between the Parties to the contrary, either Party may be assisted by, or represented by, such advisers or representatives (whether legally qualified or not) as he considers appropriate.

28.42 The adjudicator shall consider any relevant information submitted to him by either Party and shall make available to them any information to be taken into account in reaching his decision.

28.43 The adjudicator and the Parties shall not disclose to any other person any information or document provided in connection with the adjudication which the Party supplying it has indicated is to be treated as confidential, except to the extent that disclosure is required by law or is necessary for the purposes of, or in connection with, the adjudication, or the information is already in the public domain.

Adjudicator's Decision

28.44 Unless otherwise agreed in accordance with paragraph Clause 28.56.1 pr 28.57.1 the adjudicator shall reach his decision not later than:

28.44.1 twenty eight days after the date of the Referral Notice mentioned in Clause 28.25;

28.44.2 forty two days after the date of the Referral if the Referring Party so consents; or

28.44.3 such period exceeding twenty eight days after the Referral Notice as the Parties may, after the giving of that notice, agree.

28.45 Where the adjudicator fails, for any reason, to reach his decision in accordance with Clause 28.44;

28.45.1 either of the Parties to the Dispute may serve a fresh notice in accordance with Clause 28.16 to 28.19 and shall request an adjudicator to act in accordance with Clauses 28.20 to 28.29; and

28.45.2 if requested by the new adjudicator the Parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

28.46 As soon as possible after he has reached a decision, the adjudicator shall deliver a copy of that decision to each of the Parties.

28.47 The adjudicator shall decide the matters in Dispute and may make a decision on different aspects of the Dispute at different times.

28.48 The adjudicator may take into account any other matters which the Parties agree should be within the scope of the adjudication or which are matters under the Agreement which he considers are necessarily connected with the Dispute and, in particular, he may:

28.48.1 open up, review and revise any decision taken or any notice certifying payment given by any person referred to in the Agreement, unless the Agreement states that the decision or notice certifying payment is final and conclusive;

28.48.2 decide that any of the Parties to the Dispute is liable to make a payment under the Agreement (whether in sterling or some other currency) and, subject to the terms of the Agreement, when that payment is due and the final date for payment.

28.49 The adjudicator shall provide written reasons for his decision.

Effect of the Decision

28.50 In his decision, the adjudicator may, if he thinks fit, order either or both of the Parties to comply forthwith with his decision or any part of it. In the absence of any directions by the adjudicator relating to the time for performance of his decision, the Parties shall be required to comply with any decision of the adjudicator immediately on delivery of the decision to the Parties in accordance with Clause 28.46.

28.51 The decision of the adjudicator shall be binding on the Parties, and they shall comply with it, until the Dispute is finally determined by legal proceedings or by agreement between the Parties.

28.52 The adjudicator shall be entitled to the payment of such reasonable amount as he may determine by way of fees and expenses incurred by him and the Parties shall be jointly and severally liable to pay that amount to the adjudicator.

28.53 Without prejudice to the right of the adjudicator to effect recovery from either Party in accordance with Clause 28.52, the adjudicator may by direction determine the apportionment between the parties of liability for his fees and expenses.

28.54 The adjudicator shall not be liable for anything done or omitted in the discharge or purported discharge of his functions as adjudicator unless the act or omission is in bad faith, and any employee or agent of the adjudicator shall be similarly protected from liability.

Related Disputes

28.55 In the event that a Dispute arising under, out of or in connection with this Agreement which in the opinion of the Client relates to a dispute or difference arising out of or in connection with any agreement associated with the Edinburgh Tram Network between

the Client and a third party (a "**Related Contract**") all such disputes or differences being referred to as a "**Related Dispute**", then providing that the Related Contract contains dispute resolution provisions in terms substantially the same as set out in this Clause 28 (*Dispute Resolution Procedure*) (save for necessary changes), the Client may required and direct that the Dispute and the Related Dispute be dealt with together at an appropriate stage of the Dispute Resolution Procedure.

Referral of a Dispute under this Agreement to a Related Adjudicator

28.56 In the event that a Related Dispute has already been referred to the decision of an adjudicator ("**Related Adjudicator**") in accordance with the provisions of the Related Contract, and the Client or the SDS Provider (as the case may be) is of the opinion, acting reasonably, that a Dispute is to be (but has not yet been) referred to adjudication under this Clause 28 (*Dispute Resolution Procedure*), the Client may refer the Dispute or may by notice in writing to the SDS Provider require that the Dispute be referred (as the case may be) to the Related Adjudicator. The Client and the SDS Provider agree that, without fettering or restricting the adjudicator's power and authority in any way, it is their intention that such adjudicator shall, insofar as is relevant, practicable and appropriate, come to the same conclusion as to the facts and apply the same reasoning and analysis in reaching a decision on the Dispute as the adjudicator's conclusions, reasoning and analysis applied by him as Related Adjudicator in the Related Dispute, and:

28.56.1 the adjudicator shall, if practicable, hear the Dispute at the same time as the Related Dispute and shall request such extension of time for producing his decision or award as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The Parties shall agree to such request for an extension of time, except in the event that the Dispute or the Related Dispute relates to "construction operations", which are not Authorised Works, within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the adjudicator);

28.56.2 except in the event that the Dispute or the Related Dispute relates to "construction operations", which are not Authorised Works, within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the adjudicator), the adjudicator shall have power (if so requested by the Client) to make

his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the Parties to the Dispute and the Related Dispute, and to the adjudicator; and

28.56.3 the Client shall procure that, as soon as practicable, the other party or parties to the Related Dispute shall give the SDS Provider copies of the Related Contract, the Referral Notice in the Related Dispute and any other documentation provided to the adjudicator by any party to the Related Dispute.

The Client's request to consolidate a Related Dispute with a Dispute

28.56A1 Where a Related Dispute has been referred to adjudication the Client may by written notice request the adjudicator (copied to the SDS Provider and to the other party to the Related Dispute) to consolidate the Related Dispute with the Dispute with a view to allowing all questions arising out of the Dispute and the Related Dispute to be disposed of in the adjudication. Where the Client requests the adjudicator to consolidate the Dispute and Related Dispute then the Client shall (or may procure that the other party to the Related Dispute shall) as soon as practicable, and in any case within fourteen (14) of the referral of the Dispute to the adjudicator, give to the adjudicator conducting the adjudication under this Agreement and also to the other parties to the Dispute and the Related Dispute the following particulars:

28.56A1.1 a copy of the relevant Related Contract;

28.56A.1.2 a preliminary statement from the Client and/or, as the case may be, the other party to the Related Dispute setting out:

28.56A.1.2.1 the basis and the grounds for consolidation of the Related Dispute and the Dispute;

28.56A.1.2.2 the cases of the parties to the Related Dispute;

28.56A.1.2.3 any relief sought by the parties to the Related Dispute; and

28.56A.1.2.4 a list of any documents served in relation to the Related Dispute.

Any such particulars sent by the Client or the other party to the Related Dispute (as the case may be) to the adjudicator shall be sent at the same time to the SDS Provider and the other party to the Related Dispute (as the case may be)

28.56A.2 On receiving the particulars set out in Clause 28.56A.1 provided that such particulars have been received within fourteen (14) days of the referral of the Dispute to the adjudicator, the adjudicator shall if he considers that the Dispute and the Related Dispute are substantially the same or connected one to the other, immediately request that the parties to the Dispute and the other party to the Related Dispute attend a meeting with the adjudicator with a view to determining whether or not the Dispute and the Related Dispute should be consolidated. If the Adjudicator and all the relevant parties agree, they may hold a telephone conference call instead of a meeting, and in such event references in Clauses 28.56A.3 to 28.56A.5 to a meeting or to attending a meeting, shall mean a telephone conference call and taking part in such a telephone conference call.

28.56A3 The Client shall use its reasonable endeavours to procure that an authorised representative or nominee of the other party to the Related Dispute shall attend the meeting with the adjudicator referred to in Clause 28.56A.2. The Client and the SDS Provider each agree to send an authorised representative or nominee to any meeting of this kind under this Agreement or under a Related Contract, which they may be requested to attend.

28.56A4 At the meeting referred to in Clause 28.56A.2, the Party which has not requested the adjudicator to consolidate the Dispute with the Related Dispute shall, as a preliminary matter, either:

28.56A4.1 confirm to the adjudicator that it accept the proposed consolidation of the Related Dispute with the Dispute; or

28.56A4.2 inform the adjudicator that it does not accept the proposed consolidation of the Related Dispute with the Dispute.

Decision to Consolidate

28.56A5 Where Clause 28.56A4.1 applies, or if the SDS Provider's authorised representative or nominee does not attend the meeting referred to in Clause 28.56A2 above (having received due notice thereof) the adjudicator shall if he considers that the Dispute and the Related Dispute are substantially the same or connected one to the other immediately issue a decision consolidating the Dispute and the Related Dispute and shall have the authority and the power referred to in Clause 28.56A7 below.

28.56A.6 Where Clause 28.56A4.2 above applies, or if the SDS Provider's authorised r representative or nominee attends the meeting referred to in Clause 28.56A2 above but does not confirm to the adjudicator whether or not it accepts or does not accept the proposed consolidation of the Related Dispute with the Dispute, the adjudicator shall issue within one (1) Business Day of the meeting referred to in Clause 28.56A2 above his written decision as to whether or not the Dispute and the Related Dispute are substantially the same or connected. If the adjudicator considers that the Dispute and the Related Dispute are not substantially the same or not connected one to the other, or has failed or is unable to reach a decision within 1 Business Day of the meeting referred to in Clause 28.56A2, the Dispute and the Related Dispute shall not be consolidated. If the adjudicator considers that the Dispute and the Related Dispute are substantially the same or connected one to the other the adjudicator shall immediately issue a decision consolidating the Dispute and the Related Dispute and the adjudicator shall have the authority and the power referred to in Clause 28.56A7 below.

28.56A7 The adjudicator shall have the authority and power to consolidate the Dispute and the Related Dispute and to direct that all procedural and/or evidential matters arising in both the Dispute and the Related Dispute are dealt with in whatever manner the adjudicator considers shall lead to the fair and expeditious resolution of both the Dispute and the Related Dispute and the parties (including the other party to the Related Dispute) shall thereafter abide by and implement such consolidation and any such direction and any decision of the adjudicator. For the foregoing purposes:

28.56A7.1 unless the context otherwise requires, the provisions of the adjudication rules in this Clause 28 shall apply as between the Client and the other party to the Related Dispute, as they apply between the Client and the SDS Provider in relation to the Dispute; and

28.56A7.2 the adjudicator shall have the same authority and powers as if the Related Dispute constituted a dispute or difference between the Client and the SDS Provider.

28.56A8 In the event that the Related Dispute is consolidated with the Dispute, the adjudicator shall reach a decision on the Dispute and the Related Dispute at the same time and in any event within twenty eight (28) days of the earlier of the referral of the Dispute or the referral of the Related Dispute, or such longer period as is agreed by the parties to the Dispute and the Related Dispute after the date that the Related Dispute has been consolidated with the Dispute. The adjudicator shall be entitled to extend the said

period of twenty eight (28) days by up to fourteen (14) days with the consent of the party by whom the Dispute and (where applicable) the Related Dispute were referred.

Referral of a Related Dispute to the Adjudicator

28.57 In the event that a Dispute has already been referred to the decision of an adjudicator, and the Client is of the opinion that a Related Dispute is to be (but has not yet been) referred to adjudication, the Client may refer the Related Dispute to the adjudicator appointed in relation to the Dispute under this Clause 28 (*Dispute Resolution Procedure*). The Client and the SDS Provider agree that, without fettering or restricting the adjudicator's power and authority in any way, it is their intention that the adjudicator shall, insofar as is relevant, practicable and appropriate, come to the same conclusion as to the facts and apply the same reasoning and analysis in reaching a decision on the Related Dispute as the adjudicator's conclusions, reasoning and analysis applied by him as adjudicator in relation to the Dispute under this Agreement. The adjudicator shall:

28.57.1 if practicable, hear the Related Dispute at the same time as the Dispute and shall request such extension of time for producing his decision or award as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The Parties shall agree to such request for an extension of time, except in the event that the Dispute or the Related Dispute relates to "construction operations" which are not Authorised Works within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator).

28.57.2 except in the event that the Dispute or the Related Dispute relates to "construction operations" which are not Authorised Works within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator), the adjudicator shall have power (if so requested by the Client) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the Parties to the Dispute and the Related Dispute, and to the adjudicator; and

28.57.3 as soon as practicable, the Client shall give to the SDS Provider copies of the Related Contract, the Referral Notice in the Related Dispute and any other documentation provided to the adjudicator by any party to the Related Dispute.

Consolidation of a Dispute under this Agreement with a Related Dispute

28.57A1 In the event that, subject to Clause 28.57A3, an adjudicator under a Related Contract ("**Related Adjudicator**"), who is permitted pursuant to the Related Contract to do so, decides that a Dispute under this Agreement be consolidated with a Related Dispute with which the Related Adjudicator is dealing under the Related Contract, then:

28.57A1.1 notwithstanding anything in the adjudication rules in this Schedule 9, with effect from the time of such decision, the adjudicator shall cease to have authority or jurisdiction to determine the Dispute which shall instead be determined by the Related Adjudicator and the appointment of the adjudicator under this Agreement shall cease;

28.57A.1.2 such decision shall be binding on the Client and the SDS Provider and both of them shall acknowledge the appointment of the Related Adjudicator as the adjudicator of the Dispute;

28.57A.1.3 the Client and the SDS Provider shall be jointly liable with the other party to the relevant Related Contract for the Related Adjudicator's reasonable fees and expenses including those reasonable fees and expenses of any specialist consultant or adviser (excluding legal) appointed by the Related Adjudicator in accordance with the adjudication procedure in the Related Agreement, in respect of the period after the date on which the Dispute is consolidated with the Related Dispute pursuant to a decision of the Related Adjudicator;

28.57A1.4 without prejudice to the right of the Related Adjudicator to effect recovery from either party in accordance with Clause 28.57A1.3, the Client and the SDS Provider agree that the Related Adjudicator may by direction determine the apportionment between the parties of liability for his fees and expenses referred to in Clause 28.57A.1.3; and

28.57A.1.5 notwithstanding anything to the contrary a Dispute under this Agreement shall only be consolidated with a Related Dispute, if the

Related Adjudicator receives particulars of the Dispute within fourteen (14) days of the referral of the Related Dispute to the Related Adjudicator under the Related Contract.

28.57A2 Where the Related Adjudicator receives a request under the Related Contract, that a Dispute under this Agreement be consolidated with a Related Dispute with which he is dealing under the Related Agreement, the Client and the SDS Provider acknowledge that the Related Adjudicator may immediately request that they, together with the other party to the Related Dispute, attend a meeting with the Related Adjudicator with a view to determining whether or not the Dispute and the Related Dispute should be consolidated. If the Related Adjudicator and all the relevant parties agree, they may hold a telephone conference call instead of a meeting, and in such an event references in Clauses 28.57A3 to 28.57A5 to a meeting or to attending a meeting shall mean a telephone conference call and taking part in such a telephone conference call.

28.57A3 The Client and the SDS Provider each agree to send an authorised representative or nominee to any meeting of this kind under this Agreement or under a Related Agreement, which they may be requested to attend.

28.57A4 At the meeting referred to in Clause 28.57A2, the Party which has not requested the Related Adjudicator to consolidate the Related Dispute with the Dispute shall, as a preliminary matter, either:

28.57A4.1 confirm to the Related Adjudicator that it accepts the proposed consolidation of the Dispute with the Related Dispute; or

28.57A4.2 inform the Related Adjudicator that it does not accept the proposed consolidation of the Dispute with the Related Dispute.

28.57A5 Where Clause 28.57A4.1 applies, or if the SDS Provider's authorised representative or nominee fails to attend the meeting referred to in Clause 28.57A.2 above (having received due notice thereof), the Related Adjudicator shall if he considers that the Dispute and the Related Dispute are substantially the same or connected one to the other, immediately issue a decision consolidating the Dispute and the Related Dispute and shall have the authority and the power to consolidate the Dispute and the Related Dispute and to direct that all procedural and/or evidential matters arising in both the Dispute and the Related Dispute are consolidated in whatever manner the Related Adjudicator considers shall lead to the fair and expeditious resolution of both the Dispute and the Related Dispute and the parties (including the party to the Related

Dispute) shall thereafter abide by and implement such consolidation and any such direction.

28.57A6 Where Clause 28.57A4.2 applies or if the SDS Provider's authorised representative or nominee attends the meeting referred to in Clause 28.57A.2 but does not confirm to the Related Adjudicator whether or not that the SDS Provider accepts or does not accept the proposed consolidation of the Dispute with the Related Dispute, the Related Adjudicator shall within one (1) Business Day of the meeting referred to in Clause 28.57A.2 issue his written decision as to whether or not the Dispute and the Related Dispute are substantially the same or connected. If the Related Adjudicator considers that the Dispute and the Related Dispute are not substantially the same or not connected one to the other, or has failed or is unable to reach a decision within 1 Business Day of the meeting referred in Clause 28.57A.2, the Dispute and the Related Dispute shall not be consolidated. If the Related Adjudicator considers that the Related Dispute and the Dispute are substantially the same or connected one to the other, the Related Adjudicator shall immediately issue a decision consolidating the Dispute and the Related Dispute and shall have the authority and the power to consolidate the Dispute and the Related Dispute and to direct that all procedural and/or evidential matters arising in both the Dispute and the Related Dispute are consolidated in whatever manner the Related Adjudicator considers shall lead to the fair and expeditious resolution of both the Dispute and the Related Dispute and the parties (including the party to the Related Dispute) shall thereafter abide by and implement such consolidation and any such direction.

Clause 29 – Novation, Collateral Warranty in favour of tie, Funder's Direct Agreement and Agreement between the Joint Revenue Committee and the SDS Provider

Insert new Clause:

29.10 Within 14 days of the execution of the Novation Agreement, the SDS Provider shall use best endeavours to deliver to **tie** a collateral warranty agreement duly executed by Halcrow and the SDS Provider in favour of **tie** substantially in the form set out in Appendix Part 3 to the Novation Agreement.

Clause 30 - Assignation, Changes In Legal Status And Changes In Control

Delete Clause 30.2 and substitute therefor:

30.2 The Client shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

30.2.1 to an assignee permitted in accordance with the terms of the Infraco Contract; or

30.2.2 with the prior written consent of the SDS Provider (such consent not to be unreasonably withheld or delayed).

Clause 32.2.1 – Delete "with full title guarantee"

Schedule 1 – Scope of Services

Amend to include the services set out in Appendix Part 4.

Delete paragraph 3.2.1

Amend paragraph 3.2.2 to include 'prior to the date of the Novation Agreement' after shall.

Amend paragraph 2.1.1 to include after 'all design' in the first line, the words 'other than Client Design',

Schedule 3 – Pricing Schedule – Provisional Additional Work

Delete references to **tie** and **tie Representative** and replace with "Client" and "Client's Representative", respectively.

Schedule 9 – Review Procedure

In paragraphs 1.3 and 1.4 replace "20 Business Days" with "10 Business Days".

In paragraph 3.1.15 replace "prevent Service Commencement" with "would prevent a Certificate of Service Commencement (as defined in the Infraco Contract)".

In paragraph 4.3 insert "and to **tie**" after "Client's Representative".

Insert new sub-clauses:

5.2.7 SEPA;

5.2.8 Historic Scotland;

5.2.9 SNH;

5.2.10 EAL; and

5.2.11 Transport Scotland.

APPENDIX PART 2

CONSENTS PROGRAMME AND DESIGN DELIVERY PROGRAMME

PART A - PROGRAMME ASSUMPTIONS AND CONSTRAINTS

Edinburgh Tram Network

Edinburgh Project Detailed Design Plan - Assumptions & Constraints Report

Doc. Ref: ULE90130-SW-REP-00302 V3

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1 INTRODUCTION

Version 31 of the SDS design Programme was issued to tie on 25 April 2008. This version of the design programme incorporates tie requested amendments and modifications resulting from numerous programme meetings specifically aimed to achieve early release of design to meet the Infraco Construction Programme start dates.

These amendments often require modification of the design processes used by SDS in the development of the design, obtaining of Approvals and Consents and the quality control/review procedures. Some of the measures used to achieve early release of the design are in the control of SDS and others rely upon third parties to achieve the IFC dates.

This is a schedule of the modifications to the PB design process and approvals and consents periods. As shown on V31.

2 SCHEME WIDE

2.1 Approvals

2.1.1 The SDS Detailed Design Programme assumes a CEC Prior Approval period of 40 days for all submissions unless stated.

2.1.2 The SDS Detailed Design Programme assumes a CEC Technical Approval period of 40 days for all submissions unless stated.

2.1.3 The SDS Detailed Design Programme assumes all approvals bodies will not exceed the number of days shown. Should the length of time be extended SDS will not meet the stated IFC dates.

2.1.4 It has been assumed that tie's review period will occur in parallel with approvals once the design is complete. tie reviews will not affect the critical path. This approach has been agreed by tie in order to speed IFC delivery.

2.1.5 Informal Consultation ensures CEC comments are captured prior to formal submission for Prior & Technical Approval. The SDS Detailed Design Programme therefore assumes that SDS should receive minimal or no comments after formal approval period provided that the comments received during the informal consultation period are incorporated into the SDS design.

2.1.6 Approvals and Consents resulting from Third Party Agreements, and other consents (with exception of Network Rail, ScotRail, SEPA and BAA) have been programmed into the Approvals and Consents Tracker linked to the Detailed Design Programme.

2.2 Design Assurance

2.2.1 The SDS Detailed Design Programme assumes Design Assurance Statements are produced on a subsection basis post acceptance of all approvals for the subsection. Formal handover of design between disciplines is an iterative process throughout the development of the Detailed Design. The formal IDC process between the relevant disciplines at the completion of the design will complete the process.

2.3 Surveys

2.3.1 Surveys are planned in order to fill gaps and shortcomings in existing information and will be scheduled in accordance with the critical areas and production of detailed design. These include topographical surveys, ground investigations, photographic & archaeological surveys. Some surveys are dependant on Third Parties, Network Rail, for example, will require land access and method statement approval.

2.4 Power

2.4.1 Support to Stray Current Working Party 5 through 10 are currently on hold. tie have commenced stray current negotiations directly with InfraCo including the convening of a separate SCWP, excluding SDS. A letter has been forwarded to tie clarifying the situation. It is assumed that SDS will do no further work in this area.

2.5 As-Built Drawings

2.5.1 The SDS Provider will provide as-built drawings within 4 weeks of receipt of all necessary information from the Infraco.

3 SECTION 1A

3.1 Tower Place Bridge

3.1.1 Tower Place Bridge is programmed to commence detailed design at risk of the preliminary design not being approved by TAA. This was at ties request (28 March 2008) and adds 5 weeks of risk of abortive work and time delay.

3.1.2 IFC is dependant on procuring water-born surveys.

3.1.3 Tower Place Bridge batch now has to go through full planning approval as it is outside the LOD, therefore the approval duration is 60 days, as shown in V31.

3.1.4 IDC has been unlinked from the subsection IDC as requested by tie. The risk of change coming from the IDC process is therefore with tie.

3.2 Victoria Dock Entrance Bridge

3.2.1 IDC has been unlinked from the subsection IDC as requested by tie. The risk of change coming from the IDC process is therefore with tie.

3.3 Lindsay Road Retaining Wall

3.3.1 Lindsay Road is programmed to commence detailed design at risk of the preliminary design not being approved by TAA. This adds 50 working days of risk of abortive work and time delay.

3.3.2 The SDS Detailed Design Programme assumes CEC will approve the technical submission in 4 weeks, as requested by tie, rather than the standard 8 weeks.

3.3.3 Lindsay Road batch has to go through full planning approval as it is now outside the LOD, therefore the duration has been increased to 60 days, as shown in V31.

3.3.4 IDC has been unlinked from the subsection IDC as requested by tie. The risk of change coming from the IDC process is therefore with tie.

3.4 Newhaven Retaining Wall & Roadway Junction

3.4.1 Newhaven Retaining Wall & Roadway Junction batch has to go through full planning approval as it is now outside the LOD, therefore the approval duration has been increased to 60 days, as shown in V31.

3.5 Batch 1/02a (Bypass):

3.5.1 Batch 1/02a submission is subject to confirmation of requirements from CEC (design & approval).

4 SECTION 1B

4.1 Roads

4.1.1 V31 of the SDS Detailed Design Programme shows a delay in receiving roads technical approval/comments. The SDS programme has assumed comments/approval will be received by 30 May 08.

5 SECTION 1C

5.1 York Place Tramstop & OLE:

5.1.1 The York Place Tramstop & OLE batch has to go through full planning approval as it is now outside the LOD, therefore the duration has been increased to 60 days for a full Planning Application as indicated in V31.

5.2 Roads:

5.2.1 1C Roads has been split into 3 sections under change estimate 336: IC1 London Road to Section 1B start, IC2 London Road to York Place (Picardy Place), IC3 York Place to Section 1D start. The V31 of the SDS design programme has been split to reflect this.

6 SECTION 2A

6.1 Russell Rd Bridge

6.1.1 Updating to comments (& creation of IFC drawings) has been reduced to 5 days from 10 days subject to commercial agreement on LDs as requested by tie (28 March 2008). Should comments be received requiring amendments to Prior Approval/TAA submission then turnaround may not be possible in 5 days.

6.1.2 The SDS Detailed Design Programme assumes CEC will approve the technical addendum submission in 2 weeks rather than the standard 8 weeks (this has been instructed by tie).

6.1.3 SDS has been instructed by tie to issue IFC drawings post TAA agreement although Prior approval and subsection IDC completion is outstanding at this time. This is undertaken at ties risk.

6.1.4 tie has instructed SDS to prepare Issue for Construction (IFC) drawings for Russell Road Bridge to be ready for signature by 23 May 2008 provided that Prior Approval is granted by CEC by that date and provided that the Prior Approval is not granted with conditions that would require changes to those IFC drawings.

6.2 Haymarket Station Viaduct

6.2.1 Updating to comments (& creation of IFC drawings) reduced to 5 days from 10 days subject to commercial agreement on LDs as requested by tie (28 March 2008). Should comments be received requiring amendments to Prior Approval submission then turnaround may not be possible in 5 days.

6.2.2 Prior Approval is to be submitted at ties risk as final RSA comments have not been fully accommodated at time of Prior Approval submission.

6.2.3 The SDS Detailed Design Programme assumes CEC will take batch 2/01 off hold the day after Prior Approval submission (30th April 08).

7 SECTION 3A

7.1 Coltbridge Viaduct

7.1.1 Coltbridge Viaduct now has to go through full Planning Approval, therefore the approval duration has been increased to 60 days, as shown in V31.

8 SECTION 5A

8.1 Murrayfield Stop Retaining Wall

8.1.1 SDS is taking 6 working days risk by progressing design CAT checking in parallel with design.

8.1.2 The SDS Detailed Design Programme assumes CEC will approve the technical submission in 4 weeks, as requested by tie, rather than the standard 8 weeks, due to BBS procurement purposes.

8.2 Batch 5/06:

8.2.1 Updating to comments (& creation of IFC drawings) reduced to 5 days from 10 days subject to commercial agreement on LDs as requested by tie (23 April 2008). Should comments be received requiring amendments to Prior Approval submission then turnaround may not be possible in 5 days.

8.3 Murrayfield Stadium Retaining Wall

8.3.1 As requested by tie (28 March 2008), SDS have split Murrayfield Stadium Retaining Wall from the combined CATIII & Network Rail Approval (with Baird Drive, Balgreen Road Retaining Wall & Murrayfield Training Pitches) in order to accelerate design by 4 weeks. Tie are to ensure Network Rail are comfortable with this approach and will review the design in the specified timescales. There is a risk to SDS that at short notice CATIII check may be not be complete.

8.4 Batch 5/07

8.4.1 Batch 5 / 07 was previously on hold due to ongoing discussions between tie/SRU relating to the Third Party Agreement. SDS acknowledge receipt of the instruction to issue the Prior Approval on the basis of the current SDS design. SDS understand that this does not satisfy the aspirations of both tie and SRU for a redesign of Roseburn Street Viaduct and that under most circumstances that this would result in SRU rejecting the Prior Approval proposals.

8.4.2 SDS will issue the Prior Approval on the 23 May 08 on the basis that tie will negotiate the approval with SRU and issue further instructions at a later date regarding the VE exercise (Roseburn Street Viaduct). At this time SDS will advise tie of any associated change resulting from the VE proposals.

8.4.3 Updating to comments (& creation of IFC drawings) reduced to 5 days from 10 days subject to commercial agreement on LDs as requested by tie (23 April 2008). Should comments be received requiring amendments to Prior Approval submission then turnaround may not be possible in 5 days.

8.5 Baird Drive

8.5.1 Prior to V27 of the SDS Detailed Design Programme, SDS were designing at risk on the detailed design & CATII check, before the PD is approved by tie and TAA. Due to this V29 assumes SDS are working at risk for 15 working days (subject to timely approval). SDS have also undertaken to issue for Prior Approval at risk before the PD TAA is approved and detailed design is complete. This has been done to improve timescales and obtain approvals early. There is a risk to SDS of design change and resubmission for Prior Approval. SDS have also reduced CAT check timescales from 30 days to 10 days to improve the IFC delivery date.

8.6 Balgreen Rd Retaining Wall

8.6.1 Post V27 of the SDS Detailed Design Programme, SDS agreed to relink the programme to bring IFC back to 15 Aug 08, saving Approx 3 weeks. SDS have reduced the NR comment period to 2 weeks from 4 (as they will not comment until TAA is received). SDS prior to V27 issue of the SDS Detailed Design Programme are designing at ties risk on the detailed design & CATII check before the PD is approved by tie and TAA. V27 shows SDS taking at least 15 working days of risk(subject to timely approval). SDS have also undertaken to issue for Prior Approval at risk before the PD is approved and detailed design is complete, to improve timescales and obtain approvals early. There is a risk to SDS of design change and resubmission for Prior Approval, this is done at ties risk.

8.7 Balgreen Road Tram Bridge

8.7.1 Prior to V27 issue SDS were designing at risk on the detailed design & CATII check, before the PD is approved by tie and TAA. Due to this V29+ assumes SDS are working at risk for 35 working days (subject to timely approval). SDS have also undertaken to issue for Prior Approval at risk before the PD TAA is approved and detailed design is complete. This has been done to improve timescales and obtain approvals early. Risk to SDS of design change and resubmission for Prior Approval.

8.8 Balgreen Road NR Access Bridge

8.8.1 IDC has been unlinked from the subsection IDC as requested by tie. The risk of change coming from the IDC process is therefore with tie.

8.8.2 Delivery of the Access bridge is dependant on Network Rail approvals. We have looked at options for the proposed bridge and discussed them with NR. NR agrees the option that re-uses the existing abutments is acceptable in theory but SDS are to submit the back up information to support this before they give their final approval.

Supporting information comprise:

1. Form A

2. Proposed headroom

3. Detailed analysis of the abutments suitability for the retention and reuse of existing substructures within the proposed scheme following the requirements detailed within Railtrack Group Standard GC/RC/5510

The analysis of the abutment requires additional investigation. SDS are programming for trial pitting and probing behind the abutments to prove the thickness and condition of the abutment walls. Initial enquiries with NR indicate possessions will be required even though we are a distance from the running lines.

In the meantime, SDS are pursuing alternative means of obtaining this information, using radar from the front of the abutments from the roadside. Should this be successful SDS will carry out further studies to cover the full height of the abutments and supplement this information with hand dug trial pits behind the abutments.

Key risks out of SDS's control are:

Delays in appointing contractors

Delay in gaining access for the investigation / surveys

The trial holes show the abutments to be worse than expected.

Network Rail do not approve our submission and the design has to be amended.

There is also a risk raised by the preferred contractor in that the client may wish us to guarantee the design life of the existing abutment to 120 years. This would be unusual as network rail themselves do many deck replacements on existing abutments. Hence the importance of obtaining the additional information.

9 SECTION 5B

9.1 Roads

9.1.1 The SDS Detailed Design Programme assumes CEC will approve the technical submission in 4 weeks, as requested by tie, rather than the standard 8 weeks.

9.1.2 The time between completing IDC and issuing for Technical Approval has been reduced from 10 days to 5 days, subject to commercial agreement on LDs, as requested by tie (23 April 2008). This turnaround may not be possible in 5 days.

9.2 South Gyle Access Bridge

9.2.1 Updating to comments (& creation of IFC drawings) has been reduced to 5 days from 10 days subject to commercial agreement on LDs as requested by tie (28 March 2008). Should comments be received requiring amendments to Prior Approval submission then turnaround may not be possible in 5 days.

9.2.2 The SDS Detailed Design Programme assumes CEC will approve the technical submission in 6 weeks rather than the standard 8 weeks as requested by tie.

9.2.3 On 23 April 08 tie instructed SDS to prepare Issue for Construction (IFC) drawings for South Gyle Access Bridge to be ready for signature by 23 May 2008 provided that Prior Approval is granted by CEC by that date and provided that the Prior Approval is not granted with conditions that would require changes to those IFC drawings (as they are being draughted at risk).

9.3 Bankhead Drive Retaining Wall

9.3.1 Updating to comments (& creation of IFC drawings) has been reduced to 5 days from 10 days subject to commercial agreement on LDs at ties request 28 March 2008.

9.4 Carrick Knowe

9.4.1 V27 of the SDS Detailed Design Programme IFC dates were brought forward from V26 (IFC 22 July) to assist with construction start dates as requested by tie. IDC performed in isolation from rest of the subsection. There is a risk of change due to the impact of changes to design of the rest of the sub-section

10 SECTION 5C

10.1 Roads 5C

10.1.1 The SDS Detailed Design Programme assumes CEC will approve the technical submission in 4 weeks, as requested by tie, rather than the standard 8 weeks.

10.1.2 Updating to comments (& creation of IFC drawings) has been reduced to 5 days from 10 days subject to commercial agreement on LDs as requested by tie (23 April 2008). Should comments be received requiring amendments to Prior Approval submission then turnaround may not be possible in 5 days.

10.2 Drainage

10.2.1 The SDS Detailed Design Programme assumes CEC will approve the technical submission in 4 weeks, as requested by tie, rather than the standard 8 weeks.

10.3 Gyle stop Retaining Walls

10.3.1 The SDS Detailed Design Programme assumes CEC will approve the technical submission in 6 weeks rather than the standard 8 weeks as requested by tie.

10.4 A8 Underpass

10.4.1 The SDS Detailed Design Programme assumes CEC will approve the technical submission in 3 weeks rather than the standard 8 weeks at ties request.

10.4.2 The programme has been accelerated at risk from V27 as requested by tie. Design time reduced by 1 week. CATII check at risk as accelerated at risk by 3 weeks. 1 day only allowed for IDC, a reduction from 10 days. The IDC performed standalone, rather than as part of the subsection.

10.4.3 In order to ensure confidence and understanding of the design quickly, a presentation to TAA has been scheduled into the programme once the design is complete.

10.5 Gogarburn Tram Stop

10.5.1 Tie has instructed SDS to break the Gogarburn tramstop out of batch 5/22 to allow the earliest possible production of IFC drawings for the line of route otherwise contained in that batch.

11 SECTION 6

11.1 General

11.1.1 The SDS Detailed Design Programme assumes that the Gogarburn depot site is selected over preference of the Leith depot, and no further development of a design for a depot at Leith is required.

11.1.2 The detailed cladding design and secondary steel detailed design will be undertaken by the contractor depending on final selection of cladding materials.

11.2 Earthworks

11.2.1 Earthworks batch has been split out to allow construction of earthworks in advance of securing approval for the entire depot. CEC approval of this strategy required.

11.3 Drainage

11.3.1 The drainage design has been split out and accelerated as requested by tie. There is a risk of rework/abortive work if amendments are required once the IDC for the entire section has been completed.

11.4 Roads

11.4.1 The SDS Detailed Design Programme shows13 August 08 for IFC as requested by tie. The programme has taken out 9 days between IDC completion and issue to TAA. The programme also assumes there will be no comments and roads team work at risk to compile IFC drawings while waiting for Technical approval. This may not be possible and is subject to commercial agreement on LDs.

11.5 Depot Access Bridge

11.5.1 The IDC has been unlinked from the subsection IDC as requested by tie. The risk of change coming from the IDC process is therefore with tie.

12 SECTION 7A

12.1 Gogarburn Bridge

12.1.1 The SDS Detailed Design Programme assumes CEC will approve the technical submission in 6 weeks rather than the standard 8 weeks as requested by tie.

12.1.2 The IDC has been unlinked from the subsection IDC as requested by tie. The risk of change coming from the IDC process is therefore with tie.

12.2 Gogar Culvert One

12.2.1 The SDS Detailed Design Programme assumes CEC will approve the technical submission in 4 weeks, as requested by tie, rather than the standard 8 weeks.

12.2.2 IDC has been unlinked from the subsection IDC as requested by tie. The risk of change coming from the IDC process is therefore with tie.

12.3 Gogar Culvert Two

12.3.1 The SDS Detailed Design Programme assumes CEC will approve the technical submission in 4 weeks, as requested by tie, rather than the standard 8 weeks.

12.3.2 IDC has been unlinked from the subsection IDC as requested by tie. The risk of change coming from the IDC process is therefore with tie.

12.4 Gogar Culvert Three

12.4.1 The SDS Detailed Design Programme assumes CEC will approve the technical submission in 4 weeks, as requested by tie, rather than the standard 8 weeks.

12.4.2 The IDC has been unlinked from the subsection IDC as requested by tie. The risk of change coming from the IDC process is therefore with tie.

12.5 Gogarburn Retaining Wall One

12.5.1 The SDS Detailed Design Programme assumes CEC will approve the technical submission in 4 weeks, as requested by tie, rather than the standard 8 weeks.

12.5.2 V29 onwards of the SDS Detailed Design Programme assumes SDS will be working at risk for 40 working days by continuing with detailed design before PD approvals have been received.

12.5.3 IDC has been unlinked from the subsection IDC as requested by tie. The risk of change coming from the IDC process is therefore with tie.

12.6 Gogarburn Retaining Wall Two

12.6.1 The SDS Detailed Design Programme assumes CEC will approve the technical submission in 4 weeks, as requested by tie, rather than the standard 8 weeks.

12.6.2 V29 onwards of the SDS Detailed Design Programme assumes SDS will be working at risk for 40 working days by continuing with detailed design before PD approvals.

12.6.3 IDC has been unlinked from the subsection IDC as requested by tie. The risk of change coming from the IDC process is therefore with tie.

PART B - CONSENTS PROGRAMME AND DESIGN DELIVERY PROGRAMME

APPENDIX PART 3

HALCROW COLLATERAL WARRANTY



(1) HALCROW GROUP LIMITED

- and -

(2) tie LIMITED

COLLATERAL WARRANTY

relating to the

PROVISION OF DESIGN SERVICES FOR THE EDINBURGH TRAM NETWORK

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AGREEMENT

BETWEEN

(1) **HALCROW GROUP LIMITED** (Company Number 03415971) whose registered office is at Vineyard House, 44 Brook Green, London, W6 7BY (the "**Consultant**") and

(2) **tie LIMITED** (Company Number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ ("**tie**") which term shall include its successors and permitted assignees).

BACKGROUND

A. By an agreement in writing dated 19 September 2005 (the "**SDS Agreement**"), **tie** appointed Parsons Brinckerhoff Limited (the "**SDS Provider**") to provide system design services in connection with the Edinburgh Tram Network.

B. The SDS Provider appointed the Consultant to provide design services and technical and civil engineering expertise and support (the "**Services**") as the SDS Provider's sub-consultant pursuant to an agreement dated [◆] 2005 (the "**Halcrow/PB Agreement**").

C. It is a term of the SDS Agreement that the SDS Provider shall procure the provision of a Collateral Warranty in favour of **tie** from the Consultant.

IT IS AGREED as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement the following words and expressions have the following meanings, unless the context requires otherwise:

"**Agreement**" means this document (as amended from time to time pursuant to clause 10);

"**Deliverables**" means the Sub-Consultant Deliverables under the Halcrow/PB Agreement, as determined in accordance with Clause 4.1 of the Haclrow/PB Agreement and Schedule 1 (*Scope of Services)* to the Halcrow/PB Agreement;

"Intellectual Property Rights" means any rights in or to any patent, design rights, utility model, trade mark , brand name, service mark , trade name, business name, logo, invention (whether registered or unregistered), domain name, semi-conductor

right, topography right, software design, and/or other materials, source code, copyright, moral right or rights in databases and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or an extension , revival or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the laws of Scotland or of any other jurisdiction.

"**Party**" means each and any of the parties to this Agreement and Parties shall be construed accordingly.

1.2 Unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender include all other genders.

1.2.2 a reference to:

1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a recital, clause or schedule is a reference to a recital, clause or schedule of or to this Agreement.

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation.

1.4 Where a Party comprises two or more persons:

1.4.1 any obligations on the part of that Party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that Party shall include references to each and any of those persons.

1.5 Unless otherwise defined hereunder, where the Halcrow/PB Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement;

1.6 In the case of any unintended and patent conflict between the definition or interpretation of words or expressions in this Agreement and the Halcrow/PB Agreement, the Halcrow/PB Agreement shall prevail save where by express words or where it is apparent from the context that the contrary is intended in this Agreement.

2. STANDARD OF CARE

The Consultant warrants and undertakes to **tie** that:

2.1 it has carried out and shall continue to carry out its Services and other duties and obligations under the Halcrow/PB Agreement subject to and in accordance with the terms thereof; and

2.2 in addition to and without derogation from clause 2.1;

2.2.1 the Consultant warrants to **tie** that, in the performance of the Services and its other obligations under the Halcrow/PB Agreement it has exercised and shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent system design services and technical and civil engineering services provider experienced in performing services similar to the Services in connection with projects of a similar size, scope and complexity to the Edinburgh Tram Network; and

2.2.2 it owes a duty of care to **tie** in carrying out its duties, obligations and scope of services under the Halcrow/PB Agreement in terms of 2.2.1 above.

3. COPYRIGHT LICENCE

3.1 The Consultant hereby grants to **tie** an irrevocable, perpetual, royalty-free and non-exclusive licence to use any and all of its own Intellectual Property Rights contained in the Deliverables as may be necessary for **tie** to use in relation to any projects associated with the Services. This licence shall carry the right to grant sub-licences, and be freely transferable to third parties. The Consultant shall be liable for any claims arising from the use by **tie** of such Intellectual Property Rights only to the extent that they are used by **tie** for the purposes for which they were intended.

3.2 Subject to **tie** paying the Consultant's reasonable photocopying charges, the Consultant shall provide to **tie** a copy of any of the Deliverables as soon as reasonably practicable after receipt by the Consultant of a written request from **tie** to do so.

3.3 The Consultant undertakes to **tie** that the use by **tie** of any of the Deliverables shall not infringe the rights of any third party in relation to the Deliverables.

4. REQUIRED INSURANCES

4.1 The Consultant undertakes that it has maintained and shall maintain during the performance of its obligations under the Halcrow/PB Agreement all insurance cover in accordance with the requirements of the Halcrow/PB Agreement;

As and when reasonably required by tie, the Consultant shall produce for inspection documentary evidence that such insurance is being properly maintained.

4.2 The Consultant shall at times maintain insurance to comply with its obligations to carry insurance cover following completion of the Services.

5. ASSIGNATION

5.1 The Consultant shall not assign, novate or otherwise transfer the whole or any part of this Agreement without the prior written agreement of **tie**.

5.2 Subject to notice being served on the Consultant, **tie** shall be entitled to assign the whole of this Agreement (and any such assignee shall be entitled to assign once only) to any person taking tie's interest in the Edinburgh Tram Network (but not a party to whom **tie** or any assignee may enter into one or more contracts whereupon that party takes responsibility for all or any of the Consultant's performance and/or services) without the consent of the Consultant. No further or other assignations shall be permitted.

5.3 The Consultant undertakes to **tie** not to contend in any legal or court proceedings under this Agreement that any person to whom **tie** assigns or has assigned its rights under this Agreement in accordance with the foregoing provisions of this clause is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that (i) such person is an assignee and not the original contracting party under this Agreement, or (ii) **tie** is named under this Agreement and any intermediate assignee of **tie** escaped loss resulting from such breach by reason of the disposal of its interest in the same.

6. LIABILITY OF THE CONSULTANT

6.1 The responsibility of the Consultant under this Agreement is not to be reduced or in any way released or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by **tie** against a third party.

6.2 Subject to the other provisions of this Agreement, the liability of the Consultant to **tie** is to be determined in all respects in accordance with the terms of the Halcrow/PB Agreement and, in the event of any claim by **tie** under this Agreement, the Consultant shall be entitled to rely upon any defence, right, limitation or exclusion under the Halcrow/PB Agreement as though **tie** were named as Client under it.

6.3 The liability of the Consultant under this Agreement shall be no greater in nature or extent than the liability of the Consultant under the Halcrow/PB Agreement. Further and notwithstanding any similar or other limitations which may be included in the Halcrow/PB Agreement (and therefore upon which the Consultant may rely by virtue of clause 6.2 and this clause 6.3), the total aggregate liability of the Consultant arising under or in connection with this Agreement, whether in contract, delict or howsoever arising shall be limited to £10,000,000 (TEN MILLION POUNDS except in respect of death and personal injury caused by its negligence, or in the case of fraud or fraudulent misrepresentation.

6.4 Further and without prejudice to the foregoing, the aggregate liability of the Consultant arising out of or in connection with this Agreement shall be further limited to that proportion of loss or damage (including interest and costs) suffered by **tie** which is attributable to the Consultant having regard to the contribution to such loss and damage by any other person, and each other person who has contributed to the loss and damage shall conclusively be deemed to have paid to **tie** a sum equivalent to the proportion of the loss and damage which is attributable to its contribution to the same. For the avoidance of doubt, in calculating the SDS Provider's contribution for the purposes of this clause, the SDS Provider's contractual assumption of responsibility for services performed by the Consultant shall not be taken into account.

NOTICES

6.5 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the Party concerned at its address

set out in this Agreement or to such other addresses as may be notified by such Party for the purposes of this clause.

6.6 Any notice given pursuant to this clause, if sent by registered or recorded delivery, is deemed to have been received 48 hours after being posted.

7. RIGHTS OF THIRD PARTIES

7.1 Save as in accordance with clause 5, a person who is not a Party to this Agreement shall have no right to enforce any term of this Agreement save through the operation of clause 5 (*Assignation*).

8. INVALID TERMS

8.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

8.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

8.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

9. VARIATIONS AND WAIVERS TO BE IN WRITING

9.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

10. WAIVER

10.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

10.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent and cumulative.

11. JURISDICTION AND LAW

11.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

11.2 The Parties agree that any dispute in relation to this Agreement shall be conducted in accordance with clause 28 (*Dispute Resolution Procedure*) of the Halcrow/PB Agreement and the provisions of the said clause 28 are deemed to be incorporated mutatis mutandis in respect of this Agreement provided that any reference to "Parties" shall be deemed to refer to **tie** and the Consultant, any reference to "Client" shall be deemed to refer to **tie**.

IN WITNESS WHEREOF these presents on this and the preceding 7 pages are executed as follows:

EXECUTED for and on behalf of **HALCROW PLC**

at

on 2008 by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **tie**

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

APPENDIX PART 4

Design and Deliverable Status

PARSONS BRINCKERHOFF LIMITED

SDS CONTRACT

NOVATION AGREEMENT
Appendix Part 4

14 May 2008

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1 Introduction

This document defines the status of the SDS Agreement between **tie** and SDS at the point of Novation. The report details:-

- The status of deliverables completed to date and remaining to be completed for the currently defined scope of services.
- The requirement for future additional services to be provided by SDS for the management of the Approvals process for the Infraco designs.
- The requirement for future additional Construction Support Services to be provided by SDS to the Infraco.

2 Current Scope of Services

2.1 Overview

The scope of work covered by the SDS Agreement is defined as four Phases of work:-

1. Phase I Requirements Definition
2. Phase II Preliminary Design
3. Phase III Detailed Design
4. Phase IV Construction Support

3 Phase I Status

3.1 Scope of Work

Phase I is complete

4 Phase II Status

4.1 Scope of Work

Phase II is complete

5 Phase III Status

5.1 Scope of Work

5.1.1 Overview

The Deliverables to be produced by SDS for the Edinburgh Tram Network under Phase III of the SDS Agreement can be categorised as Detailed Design packages delivered to the client and submissions presented for Prior and Technical Approvals.

Phase III is not complete. The Phase III scope of work will be completed under the terms of the SDS Agreement.

The following sections provide an analysis of current status for each category of deliverable.

5.1.2 Detailed Design Packages - Status as at 13 May 2008

Total Number of Packages	Total Delivered	Total Remaining to be Delivered
329	296	33

5.1.3 Prior Approvals - Status as at 13 May 2008

Total Number of Prior Approvals	Total Approved	Total Remaining to be Approved
63	22	41

5.1.4 Technical Approvals – Status as at 13 May 2008

Total Number of Technical Approvals	Total Approved	Total Remaining to be Approved
128	30	98

5.2 Changes

The table of rates for provisional additional work to be used for the pricing of changes to scope is as follows:-

Reference	Role	Hourly Rate
GD	Graduate Designer	£55.00
SD	Senior Designer	£78.00
PD	Principal Designer	£95.00

CT	CAD Technician	£38.00
ST	Senior CAD Technician	£49.00
TS	Technical Support	£38.00

5.3 Team Location and Office Accommodation

Office space for the SDS Phase III Team is to be supplied free of charge by tie to SDS for the duration of the involvement of the team

6 Phase IV Status

6.1 Scope of Work

No work has yet been started under Phase IV. The Phase IV scope of work will be completed under the terms of the SDS Agreement.

Office space for the SDS Phase IV Team is to be supplied free of charge by tie to SDS for the duration of the involvement of the team in supporting Infraco.

7 Additional Scope – Siemens Management Services

7.1 General

As a result of the request from tie and Infraco SDS will provide an additional service beyond that required by the SDS Agreement during the construction phase of the project to support Infraco to secure Approvals and Consents for client design (as defined in the SDS agreement).

This will be where Infraco complete the systems design with final component selections and will be primarily,

- OLE systems design,
- Signalling and Comms,
- Passenger Information Displays
- Tram Stop Furniture
- Automatic Fare Collection equipment
- CCTV equipment
- Public Address equipment
- Track Finishes
- Substation building modifications
- System wide security systems
- Depot equipment.

The team will support Infraco with technical and prior approvals and will also support Infraco with their duty to discharge outstanding planning and prior approval conditions scheduled by the Approvals Authorities in the formal responses to the SDS prior approvals applications.

7.2 Responsibilities of the SDS Support team

SDS will provide personnel with experience of the prior and technical approval processes on the Edinburgh Tram Scheme and the procedures employed by City of Edinburgh Council in registering and approving planning, prior approvals and technical approvals. The SDS team will advise Infraco on these procedures and give guidance on obtaining the outstanding approvals and consents. This will include advice on the content and style of applications as required by CEC, the format of documents to be issued, the timescales for processing of applications and the support of these applications during the process of securing the approval.

During the production of the submissions SDS will advise Infraco on the local knowledge that SDS has gained during the formal and informal consultations SDS previously managed by SDS and the history of the development of the design and any likely requirements of the Approvals Bodies. SDS will also review the submissions produced by the Infraco design teams prior to submission by Infraco and advise on any areas likely to cause objection or rejection of the prior or technical approval.

SDS will support Infraco in their informal consultation process with the Approvals Bodies and with the formal process of making the applications with CEC.

7.3 Programme

The SDS Design Support Team will liaise with the Infraco, tie and SDS planners to inform the Infraco Project Planner of the progress of the Client design approvals and consents.

7.4 Design Checks

In reviewing the Client design SDS will advise Infraco of any errors highlighted in the review process that will impact on the approval of the design. SDS will also advise of any errors or quality control issues that are identified during the review but will not be responsible for quality checking of the Client design.

7.5 Reporting

A weekly report (or as otherwise agreed) will be produced to record the issues being addressed by the SDS Design Support Team. This will detail;

- Progress of the prior, technical and planning approvals;
- The number of prior, technical and planning approvals, the number issued for approval, the number approved and the number of informal consultations in progress.
- New Issues Arising,
- Details of the design issue, location, cause (deviation from SDS design/ design error/programme issue etc) status of resolution,
- Status of any Changes instructed to the design by Approvals Bodies to secure the approval and consent (where applicable)
- Status of resolution of ongoing issues

- Design Progress including target completion dates
- Additional support required from Client/tie etc for the resolution of outstanding issues

7.6 Resources

The SDS Design Support Team is as indicated on the resource chart attached, but is nominally three Principal Engineers, one Document Controller/administration person and one CAD technician.
SDS proposes that there is a dedicated engineer for Section 1 of the route, one engineer for Sections 2, 5 and 7 and a further engineer dedicated to supporting SDS in their completion of the design at the depot.

The SDS Design Support Team will report to the Infraco Design Manager. The Infraco Design Manager will be the link with the Client design teams and will be responsible for instructing the Infraco designers in any amendments proposed to the Infraco design at the suggestion/recommendation of the SDS Design Support Team.

The SDS Design Support Team shall lead the negotiations to secure Approvals and Consents for the Infraco related design. The Infraco shall provide all necessary technical support for this process as is required by the SDS Design Support Team.

The SDS Design Support Team will not be responsible for securing the Approvals and Consents for Infraco related design and will perform a supporting and advisory role to Infraco in securing these consents.

7.7 Commercial

The SDS Design Support Team as required above will be a dedicated project team permanently based in Edinburgh. This will be charged and paid by Infraco on a time at contract rates basis (the rates set out in Appendix Part 8 of this Agreement). The team will be nominally as indicated on the organisation chart. This will be flexible in that the team will be increased and decreased to suit project programme demands and as required by Infraco. The team size will be reviewed on a monthly basis and amended as required/agreed.

Additional specialist resources will be made available when requested by Infraco upon request, subject to availability, and this will be charged on a time and expense basis with durations as agreed.

Timesheets will be presented for signature by a nominated Infraco representative for all staff forming part of the Site Support team on a weekly basis and copies made available.

Office space for the SDS Design Support Team is to be supplied free of charge by tie to SDS for the duration of the involvement of the team in supporting Infraco.

Site transport and any specialist equipment required to carry out the above additional services are to be supplied free of charge to SDS by tie.

8 Additional Scope – Construction Support Services

8.1 Design

8.1.1 General

As a result of the request from tie and the Infraco, SDS will provide an additional Design service beyond that required for Phase IV of the Scope of Work during the construction phase of the project of on-site design support. This is intended to provide design clarification to the construction team on site and address technical queries and issue design clarifications as they arise in so far as this is additional to the Services required for Phase IV of the Scope of Work. The aim is to provide on-the-spot design solutions where possible and fast turn around where additional clarification/advice is required in order to minimise disruption to the construction progress. Where required, the SDS design support team will seek clarification from the wider project Design Team and advise on design solutions/requirements. The team will also review the temporary works method statements and confirm that that there is no adverse impact on the SDS permanent works design. The SDS team will review the Inspection and Test Plan with a view to identifying potential programme conflicts and practical problems for implementation.

8.1.2 Drawings

Where reasonably required by an Infraco (with tie's agreement acting reasonably) request for clarification the team will produce design sketches to assist the construction team and these will also be used to inform the as-built drawing production by incorporating the design clarifications where amendments have to be made to the detailed design of the scheme.

8.1.3 Approvals and Consents

Where design produced by the Construction Support Team requires amendment to the design that has been the subject of an Approval or Consent the Construction Design Support Team will advise the Infraco of the likely implications based upon experience prior to the change being made. This consent may be a technical approval from the Technical Approval Authority, a Prior Approval matter from CEC local planning authority or a third party consultee. The Construction Design Support Team will inform the SDS Approvals and Consents Construction Support team of the issues, supply the additional design clarification sketches to support the team in securing the Approval and consent.

8.1.4 Survey

In support of the construction team it may be necessary to undertake additional surveys on site. The Construction Design Support Team, will provide a written scope for the survey required. If it is necessary to procure this survey from sources external to the project the Construction Support team will manage the procurement of the service providing written quotations to enable the surveys to be undertaken in a timely manner.

8.1.5 Confirmation of Verbal Instructions

The Construction Design Support Team will manage the Confirmation of Verbal Instructions (CVI) process that will be introduced to control the on site design support process. Verbal instructions given to or received from the tie or the Infraco construction team on site will be reinforced by the issue of a Confirmation of Verbal Instructions (CVI) for record purposes. The team will also manage a register of these CVIs and record the status of outstanding issues.

8.1.6 Additional Design

The Construction Support Team will manage the Request For Information procedure implemented to track the progress of technical queries. The process will be used to manage the technical questions being asked of the Construction Support Team and the associated responses. In cases where the Construction Design Support Team cannot answer the design query themselves they will seek additional support from the relevant technical design function. This may be the SDS designers or the the Infraco design teams. A Request For Information (RFI) form will be generated clarify the design points. The Construction Design Support Team will liaise with the designers to resolve the design issue and mitigate where possible construction programme delays by prioritising design issues with the design teams. Where additional design is required from the SDS team the Construction Design Support Team will inform the Infraco of the design change and will assist to prepare the relevant change instruction.

8.1.7 Health and Safety

The Construction Support Team will assist the Infraco Contractor with the provision of design information for incorporation into the Health and Safety file in accordance with CDM recommendations.

8.1.8 Programme

The Construction Design Support Team will liaise with the Infraco, tie and SDS planners to inform the project programme of the implication of on site generated design change. This will include additional detailed design time, approval and consent related amendments and impacts on the critical path activities. The Construction Design Support Team will work with the Infraco, tie and the rest of the SDS Construction support team to mitigate construction programme delay through prioritisation of the design amendment responses.

8.1.9 Design Checks

Where design is produced by the Construction Design Support Team as a result of a tie instruction or the Infraco request for clarification that requires checking by the discipline teams e.g. structures, OLE, track etc this process will be managed by the Construction Design Support Team. An assessment of the level of design check required will be made by the Construction Design Support Team and notified in the weekly status report and on the CVI form for the issue.

In pursuance of the general obligations of Infraco and SDS the Construction Support Team will also provide assistance to Infraco by checking that subcontractors, suppliers and the Infraco designs themselves have no adverse impacts on the Permanent Design works and ensure that a suitable level of Infraco Inspection and Testing is incorporated.

8.1.10 As Built Drawings

Where additional design is produced in support of the construction team by the Construction Support Design Team, the SDS design drawings will be updated to reflect the changes in preparation for the production of the As-Built Design Drawings.

8.1.11 Reporting

A weekly report will be produced to record the issues being addressed by the Construction Design Support Team. This will detail;

Critical Issues Summary

- Details of the issue, Location, cause (deviation from SDS design/ design error/programme issue etc) status of resolution, reason for delay in resolution and impact of the delay

New Issues Arising,

- Details of the design issue, Location, cause (deviation from SDS design/ design error/programme issue etc) status of resolution,
- Status of the Change instructions (where applicable
- New RFI s
- Photographic records

Status of resolution of Ongoing issues

- Design Progress including target completion dates
- Approval and Consent progress
- Additional support required from the Infraco/tie etc for the resolution of outstanding issues

RFI Commentary

- Outstanding RFI responses and owners prioritised on the basis of programme delay/importance

- New RFIs
- Updated RFI register

Resources

The Design support team is as indicated on the resource chart attached, but is nominally three Principal Engineers, one CAD technician and administrative support and Project Management.

8.2 Inspection

8.2.1 General

The role of the Inspection Team is to provide an overview of the construction as the work progresses. The aim is to enable SDS to comment upon the construction and the compliance with the SDS design. Inspections will be done by a combination of frequent sampling of the construction works as they progress and for some elements of the works e.g. bridges and more rigorous inspection regime. The inspection teams will be expected to provide a report on the construction works undertaken and work with the Infraco Construction Supervision team to advise of issues that, if not addressed, will result in a non-compliant construction to the SDS design and project specifications. The aim of the team will be to minimise abortive works and provide documentary support to the Infraco Construction Quality Plans and Procedures.

The field inspectors will advise on issues where there are overlapping codes, specification standards, and individual interpretations from architects, engineers and the construction team, and will work in conjunction with the Infraco, tie and the Construction Support Design Team to resolve the construction related issues as they arise in a timely manner to avoid delays as the construction progresses.

The Inspectors will not be responsible for the quality of Construction and will not be expected to approve the construction or elements of the works. The inspectors will, however, be responsible for a review of the documentation produced by the Infraco as part of their quality procedures during construction and comment on the works undertaken against these procedures.

The Inspectors will be expected to report instances where the methods of construction are not as described by the Contractor's method statements, the design drawings, Code of Construction Practise, the design specifications, the Quality Plan etc.

8.2.2 Duties and Responsibilities

The Inspectors will form an integral part of the Infraco construction team. The team will review the construction works as they progress and advise on the compliance with the SDS design as required by the Infraco Construction Quality Plan. The reviews undertaken will include

8.2.3 Ground Investigation

Review of the Infraco GI results for the testing is undertaken and assistance to ensure that the correct are applying the appropriate treatment/mitigation measures required for the trackbed.

- On an ad hoc basis witness the testing and inspection methods to ensure consistency and adherence to the method statement/procedure.

8.2.4 Earthworks

- Checks that the profiles constructed are as indicated on the design drawings
- Checks that the types of reinforced earth materials and installation are in accordance with the SDS design and materials specification.
- Where poor ground is discovered ensure that the correct treatment is used to mitigate to obtain the desired formation quality

8.2.5 Drainage

- Checks that drainage is installed in accordance with designs and specifications for the project.
- Confirm that materials used are in accordance with those specified

8.2.6 Bridges

The inspectors will have a key role in assessing the adherence to the design for the construction of the bridges including;

- pile sizes and locations,
- Testing of concrete being poured on site, methods of testing and adherence to the design requirements,
- Compaction of the concrete and suitable methods,
- Cover to reinforcement prior to concreting,
- In the case of remedial/repair welding processes and procedures, correct paint specifications for anti rust protection, quality of galvanising,
- Inspections will be undertaken to validate that the bridges are constructed using materials that conform to the drawings and specification provided by SDS for the construction.
- Correct reinforcement at correct spacing
- Quality of the finishes achieved on site.

8.2.7 Quality

The Inspection team will not be responsible for ensuring the quality of the construction of the infrastructure and this will remain the responsibility of tie and the Infraco, but will assist with clarification of the design to enable the Infraco to comply with the Construction Quality Plan.

8.2.8 Resources

The team will be as shown on the organisation chart but will in principal consist of three inspectors, one dedicated to bridges, one roads and another architectural issues. The inspectors will be supported by an assistant and a CAD operator and Project Management support.

8.3 Commercial - Fees for Construction Support Services

The Construction Support Team as required above will be a dedicated project team permanently based in Edinburgh. This will be charged on a time at contract rates basis, (the rates set out in Appendix Part 8 of this Agreement). The team will be nominally as indicated on the organisation chart. This will be flexible in that the team will be increased and decreased to suit project programme demands and as required by the Infraco and tie. The team size will be reviewed on a monthly basis and amended as required/agreed.

Additional specialist resources will be made available when requested by the Infraco and tie upon request, subject to availability, and this will be charged on a time and expense basis with durations as agreed.

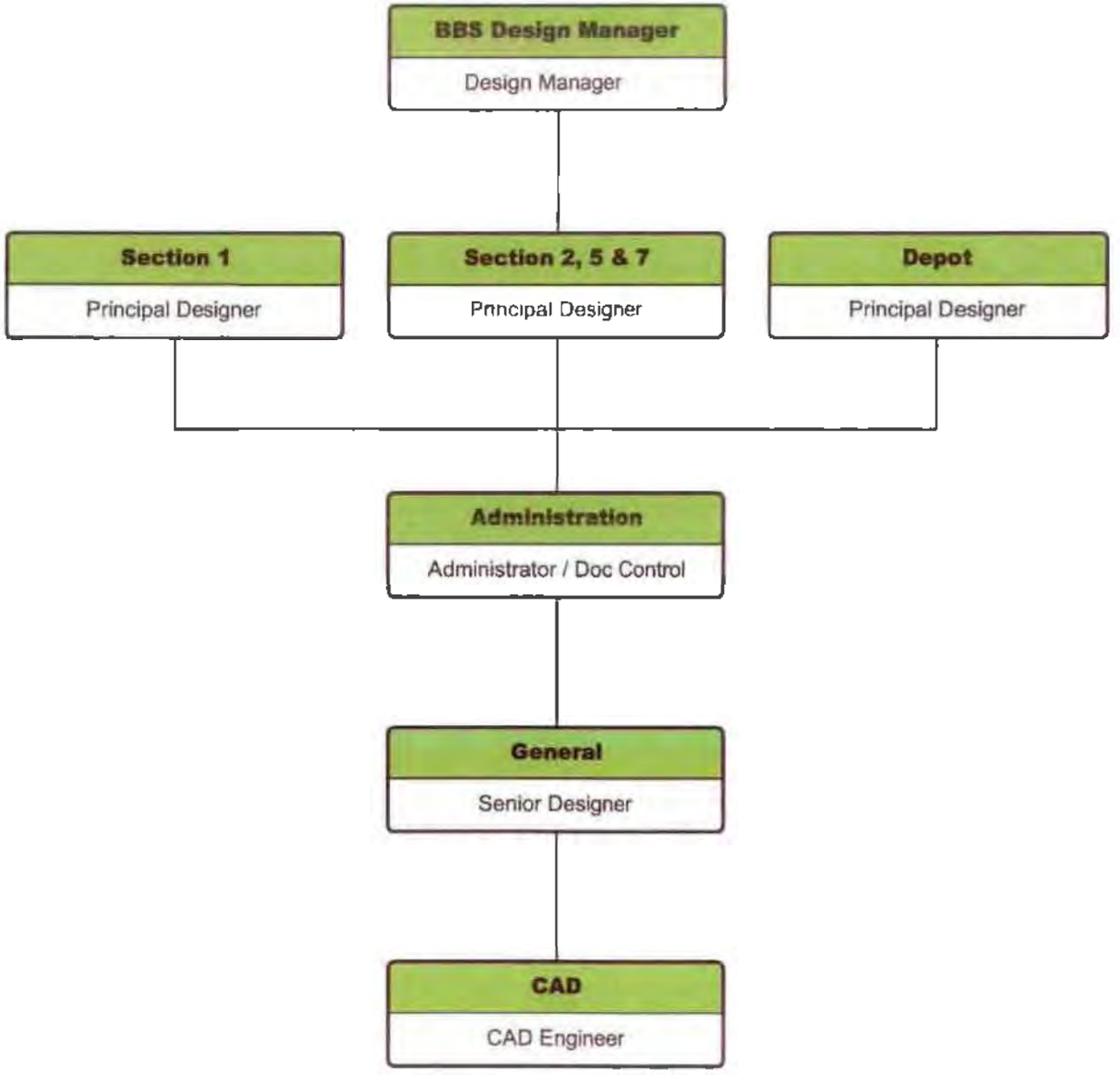
Timesheets will be presented for signature by a nominated Infraco representative for all staff forming part of the Site Support team on a weekly basis and copies made available.

Office space for the SDS Design Support Team is to be supplied free of charge by tie to SDS for the duration of the involvement of the team in supporting Infraco.

Site transport and any specialist equipment required to carry out the above additional services are to be supplied free of charge to SDS by tie.

9 Cost to Complete

Total Contract Sum	**£ 31,906,128.00**	
Certified and Paid to Date	**£ 25,922,313.00**	
Balance to Complete	£ 4,983,815.00	
Detailed Design Deliverables	£ 2,204,792.00	
Construction Support	£ 1,104,023.00	
Extended Construction Support	£ 1,000,000.00	Provisional Sum
Design Support Team	£ 675,000.00	Provisional Sum



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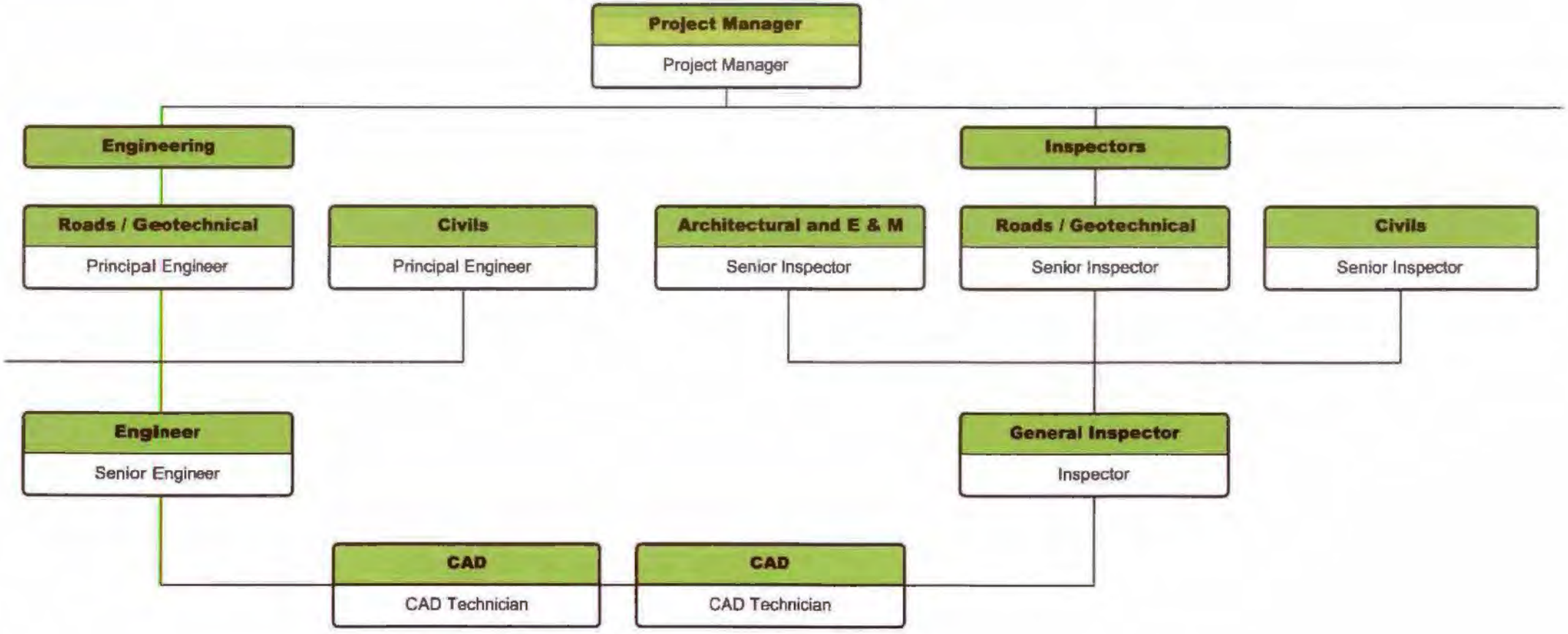
Construction Support Services



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Capability Split

Discipline	Item	Description	BBS	SDS	Comments/ exceptions
Approvals		Identify the powers sought by the bills and how these affect the range of approvals and consents normally required		Yes	
Approvals		Identify the requirements generated through Parliamentary Undertakings and Third Party Agreements		Yes	
Approvals		Identify the requirements of the Tram Design Manual		Yes	
Approvals		Effective communication to the designers of the design constraints imposed by the above		Yes	
Approvals		Facilitate liaison between designers and approving bodies to assist in ensuring that the evolving design is most likely to meet approval and consent requirements		Yes	
Approvals		Examine the evolving design to ensure that approvals and consents arising from the works proposed are identified		Yes	
Approvals		Communicate, with the support of the designers, the design works to the appropriate authorities for the purpose of obtaining consents using the pre-agreed channels identified in the consents protocol		Yes	
Approvals		Provide a mechanism or forum to ensure that potential conflicts between approval and consent requirements and design features are investigated and mitigated		Yes	
Approvals		Manage the consents protocol to ensure the optimum delivery of consents		Yes	
Approvals	**Drainage**	Outfall consents		Yes	
Approvals	**Depot Design**	Planning Process and Approvals		Yes	
Civils	**Bridges**	Murrayfield Viaduct		Yes	
Civils	**Bridges**	Existing Water of Leith Bridge		Yes	
Civils	**Bridges**	Existing Balgreen Road Bridge		Yes	
Civils	**Bridges**	Balgreen Road Bridge		Yes	
Civils	**Bridges**	Soutyh Gyle Access Road Bridge		Yes	
Civils	**Bridges**	A8 Underpass		Yes	

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Civils	**Bridges**	Depot Access Road Bridge		Yes	
Civils	**Bridges**	Gogar Burn Bridge		Yes	
Civils	**Retaining Walls**	Baird Drive Retaining Wall		Yes	
Civils	**Retaining Walls**	Balgreen Road Retaining Wall No. 1		Yes	
Civils	**Retaining Walls**	Balgreen Road Retaining Wall No.2		Yes	
Civils	**Retaining Walls**	Bankhead Drive Retaining Wall (South Gyle Access)		Yes	
Civils	**Retaining Walls**	Gyle Retaining Wall		Yes	
Civils	**Retaining Walls**	Glasgow Road Retaining Wall		Yes	
Civils	**Bridges**	Approval in Principle (AIP)		Yes	
Civils	**Bridges**	Detailed design and approvals		Yes	
Civils	**Bridges**	Structure gauge drawings		Yes	
Civils	**Bridges**	Transition slabs	Yes		With BBS as part of the trackform
Civils	**Retaining Walls**	Approval in Principle (AIP)		Yes	
Civils	**Retaining Walls**	Ravelston Dykes Access Ramp		Yes	

Civils	**Bridges/Ret. Walls**	All contamination assessment / advice / interpretation.		Yes	**As per the SDS Agreement,** The SDS Provider shall be responsible for undertaking and reporting on (inclusive of interpretative analysis) surveys necessary to inform the SDS design of the Edinburgh Tram Network. The resultant analysis and reports from those surveys are to be used to develop the Functional Requirements Specifications and the Technical Specifications and to set base lines against which the impact of the Edinburgh Tram Network can be measured when built. There is no Clause within the SDS Contract stating that SDS will freely and contractually provide "**All contamination assessment / advice / interpretation."The relevant Change Instruction to SDS in accordance with the SDS Contract would be required to provide this additional consultant service.**
Civils	**Power**	Power distribution equipment foundation design		Yes	To be finalised in SDS/BBS alignment workshops
Civils	**OLE**	OLE support foundation design		Yes	To be finalised in SDS/BBS alignment workshops
Civils	**Accommodation Works**	Layout and Details		Yes	
Civils	**Bridges/Ret. Walls**	Review Client's Data for Design Scope		Yes	

Civils	**Bridges/Ret. Walls**	Review of previous factual Interpretive Report where available		Yes	
~~**Civils**~~	~~**Bridges/Ret. Walls**~~	~~Final Geotechnical Interpretive Report~~	-	~~Yes~~	-
~~**Civils**~~	~~**Bridges/Ret. Walls**~~	~~Individual Structures Interpretive Reports~~	-	~~Yes~~	-
Civils	**Bridges/Ret. Walls**	Review and resolve contaminated sites		Yes	If necessary
Civils	**Bridges/Ret. Walls**	Brief for any additional SI required for permanent works design		Yes	BBS to advise following due diligence
Civils	**Bridge**	EARL structure at New Ingliston			
Civils	**Derailment Containment**	Derailment containment as part of structures inc guided busway		Yes	
Civils	**Derailment Containment**	Derailment containment as part of the track form	Yes		Where required
Civils	**Existing Sewers, Drainage or other Utilities under Highways / Tramway**	Investigation and condition survey		Yes	
Civils	**Existing Sewers, Drainage or other Utilities under Highways / Tramway**	Design of any remedial or strengthening measures		Yes	

Civils	**Existing Sewers, Drainage or other Utilities under Highways / Tramway**	Design of any protection measures, bridging slabs or structures		Yes	
Civils	**Existing Sewers, Drainage or other Utilities under Highways / Tramway**	Design of New Side or Top Entries to existing sewers, drainage and the like		Yes	
Civils	**Bridges**	Haymarket Station Viaduct		Yes	
Civils	**Bridges**	Leith Walk Railway Bridge		Yes	
Civils	**Bridges**	Tower Place Bridge		Yes	
Civils	**Bridges**	Victoria Dock Entrance Bridge		Yes	
Civils	**Bridges**	Roseburn Terrace Bridge		Yes	
Civils	**Bridges**	Coltbridge Viaduct		Yes	
Civils	**Bridges**	St George's School Access Bridge		Yes	
Civils	**Bridges**	St George's School Access Footbridge		Yes	
Civils	**Bridges**	Ravelston Dykes Bridge		Yes	
Civils	**Bridges**	Craigleith Drive Bridge		Yes	
Civils	**Bridges**	Holiday Inn Access Bridge		Yes	
Civils	**Bridges**	Queensferry Road Bridge		Yes	
Civils	**Bridges**	Groathill Road South Bridge		Yes	
Civils	**Bridges**	Telford Road Bridge		Yes	
Civils	**Bridges**	Drylaw Drive Bridge		Yes	
Civils	**Bridges**	Crewe Road Gardens Bridge		Yes	
Civils	**Bridges**	Russell Road Bridge		Yes	
Civils	**Bridges**	Carrick Knowe Underbridge		Yes	
Civils	**Bridges**	Existing Saughton Road Bridge		Yes	

Civils	**Bridges**	Existing Broomhouse Road Bridge		Yes	
Civils	**Bridges**	Edinburgh Park Station Bridge		Yes	
Civils	**Retaining Walls**	Rosebum corridor – locations to be confirmed following review of Baseplans and LHMP		Yes	
Civils	**Retaining Walls**	Ferry Road Retaining Wall		Yes	
Civils	**Retaining Walls**	Lindsay Road Retaining Wall		Yes	
Civils	**Retaining Walls**	Russell Road Retaining Wall No. 1		Yes	
Civils	**Retaining Walls**	Russell Road Retaining Wall No. 2		Yes	
Civils	**Retaining Walls**	Haymarket Depot Retaining Wall No. 1		Yes	
Civils	**Retaining Walls**	Haymarket Depot Retaining Wall No. 2		Yes	
Civils	**Retaining Walls**	Haymarket Depot Retaining Wall No. 3		Yes	
Civils	**Retaining Walls**	Gogar Burn Retaining Wall No. 1		Yes	
Civils	**Retaining Walls**	Gogar Burn Retaining Wall No. 2		Yes	
Civils	**Bridges**	Gogar Culvert One		Yes	
Civils	**Bridges**	Gogar Culvert Two		Yes	
Civils	**Bridges**	Approval in Principle (AIP)		Yes	
Civils	**Bridges**	Design and approvals		Yes	
Civils	**Bridges**	Piling Design Loads		Yes	
Civils	**Bridges**	Structure gauge drawings		Yes	
Civils	**Bridges**	Transition slabs+C440	Yes		With BBS as part of trackform
Civils	**Box Culverts**	Approval in Principle (AIP)		Yes	
Civils	**Ret. Walls**	Approval in Principle (AIP)		Yes	
Civils	**New Parapets to Existing Bridges**	Approval in Principle (AIP)		Yes	
Civils	**Bridges/Ret. Walls**	Detailed design and approvals		Yes	
Civils	**Bridges/Ret. Walls**	Review Client's Data for Design Scope		Yes	
Civils	**Bridges/Ret. Walls**	Review of previous factual Interpretive Report where available		Yes	

~~**Civils**~~	~~**Bridges/Ret. Walls**~~	~~Final Geotechnical Interpretive Report~~	-	~~Yes~~	-
Civils	**Bridges/Ret. Walls**	Review and resolve contaminated sites		Yes	
Civils	**Bridges/Ret. Walls**	Ground modelling / ground water modelling requirements.		Yes	
~~**Civils**~~	~~**Bridges/Ret. Walls**~~	~~All contamination assessment / advice / interpretation.~~	-	~~Yes~~	-
Civils	**Existing Structures such as Bridges or Buildings**	Investigation and condition survey		Yes	
Civils	**Existing Structures such as Bridges or Buildings**	Design of any remedial or strengthening measures		Yes	
Civils	**Existing Structures such as Bridges or Buildings**	Design of any protection measures for permanent works		Yes	
Civils	**Existing Structures such as Bridges or Buildings**	Design of any protection measures during construction	Yes		
Civils	**Existing Subways, Culverts, Cellars under Highways / Tramway**	Investigation and condition survey	Yes		Pre construction condition surveys for construction methodology to be BBS scope. SDS has done sufficient surveys to inform the permanent design but not the pre construction survey related to the construction methodology.

Civils	**Existing Subways, Culverts, Cellars under Highways / Tramway**	Design of any remedial or strengthening measures		Yes	
Civils	**Existing Subways, Culverts, Cellars under Highways / Tramway**	Design of any protection measures, bridging slabs or structures		Yes	
Civils	**Bridges/Ret. Walls**	Procure any additional SI required and associated Factual Reports	Yes		
Civils	**Bridges/Ret. Walls**	Detailed design and approvals		Yes	
Civils	**Bridges/Ret. Walls**	Review Client's Data for Design Scope		Yes	
Civils	**Bridges/Ret. Walls**	Review of previous factual Interpretive Report where available		Yes	
~~**Civils**~~	~~**Bridges/Ret. Walls**~~	~~Final Geotechnical Interpretive Report~~	-	~~Yes~~	-
Civils	**Bridges/Ret. Walls**	Brief for any additional SI required		Yes	To be finalised in SDS/BBS alignment workshops
Depot		Depot building layout design, architectural design, landscaping and access roads, car parking, external storage, site security and resolution of environmental matters		Yes	
Depot		Depot yard layout and amenities, lighting and fencing		Yes	

Depot		Depot access control facility (including communications system to control room)		Yes	SDS to take design to performance spec and design power & comms ducting; BBS sub-contractor will do final design of gate itself
Depot		Civil engineering foundations design the depot building C514		Yes	
Depot		Location & design of traction power substation building		Yes	
Depot		Design of traction power substation equipment	Yes		
Depot		Design of site wide drainage and drainage attenuation requirements		Yes	
Depot		Design and location of commucation and security systems facilities - systems	Yes		
Depot		Design and location of communication and security systems facilities - building services		Yes	
Depot		Design of LV power supply - building services		Yes	
Depot		Design of UPS provision (split building / systems)	Yes		
Depot		Cable routing and ducting (external) - layout and design		Yes	
Depot		Workshop plant layouts		Yes	Based on input from information from suppliers & maintainers
Depot		Workshop equipment foundations, power, water, air supplies		Yes	Based on input from information from suppliers & maintainers
Depot		Specification of workshop and yard maintenance equipment	Yes		Definitely not SDS - depends on CAF/BBS split agreement
Depot		Design co-ordination of Structures and Civil Engineering, building services, Roads and Utilities and Architectural disciplines		Yes	
Depot *		Design co-ordination of Track, OLE, Supervisory Control and Comunications, traction Power Distribution, LV transformer	Yes		

Depot		Co-ordination of depot maintenance plant with tram design specification		Yes	
Depot		General Arrangement		Yes	
Depot		Detailed depot workshop Equipment Design including fixings and loadings	Yes		(for Infraco Scope of work)
Depot		Civil, Building and Architectural design and approvals		Yes	
Depot		Suppliers' & Manufacturers' Drawings	Yes		SDS to check
Depot		Space planning including offices, rest area, canteen, locker rooms		Yes	
Depot		Substation civil design (Foundations)		Yes	
Depot		Outline Building M & E Services Design and Performance Specification for Small Power and Lighting, HVAC, Telephones, LAN, Plumbing, Fire Protection, Earthing and Lightning Protection, etc		Yes	
Depot		Outline Design of Yard M & E Services and Performance Specification for LV power distribution, water supply, compressed air, Fire Protection, Earthing, etc		Yes	
Depot		Detailed Design of Yard M & E Services Design such as LV power distribution, water supply, compressed air, Fire Protection, Earthing, etc		Yes	
Depot		Utilities Design to / from Boundary limits		Yes	
Depot		Workshop tools and maintenance/cleaning equipment. Includes equipment in yard area.	Yes		(for Infraco Scope of work)
Depot		Mechanical interlocking for equipment/OLE interfaces	Yes		Requires input from many parties inc SDS, TEL, CAF
Depot		Depot building amenities, waste and drainage facilities		Yes	
Depot		Fire engineering requirements		Yes	
Depot	**Operation Control Centre**	Detailed Room Layout Design		Yes	
Depot	**Operation Control Centre**	Workstation design	Yes		

Environmental	**Archaeology**	Archaelogy Investigations		Yes	
Environmental	**Archaeology**	Identify sites and produce watching brief		Yes	
Environmental	**Survey**	Void Location Survey		Yes	Any additional void location required by BBS trackform choice to be instructed by BBS
Environmental	**Exhumations**	Brief and scope		Yes	
Environmental	**Monuments**	Brief and scope		Yes	
Environmental	**Ecology**	Brief and scope		Yes	
Environmental	**Tree Felling**	Brief and scope		Yes	
Environmental	**Contaminated land**	Brief and scope		Yes	
Environmental	**Exhumations**	Methodology for removal/mitigation	Yes		
Environmental	**Monuments**	Methodology for removal/mitigation	Yes		
Environmental	**Ecology**	Methodology for removal/mitigation	Yes		
Environmental	**Tree Felling**	Methodology for removal/mitigation	Yes		
Environmental	**Contaminated land**	Methodology for removal/mitigation	Yes		
Environmental	**Noise**	Study / Report		Yes	
Environmental	**Noise**	Post construction measurement		Yes	
Environmental	**Noise**	Detailed design for noise mitigation measures		Yes	
Environmental	**Vibration**	Study / Report		Yes	
Environmental	**Vibration**	Detailed design of track form to mitigate vibration	Yes		
Environmental	**Hydrology Survey**	Hydrology Survey		Yes	
Environmental	**Survey**	Survey		Yes	
Environmental		Preparing and updating from time to time the project Environmental Management Plan		Yes	
Environmental		Provision of environmental advice to the designers		Yes	
Environmental		Input into the design requirements tracker		Yes	
Environmental		Input into the approvals and consents tracker		Yes	

Environmental		Specifying the nature and extent of necessary Archaeoligical, Ecological and other Environmental Surveys		Yes	
Environmental		Preparing the applications necessary for Environmental Licenses		Yes	
Environmental		Attendance at design review meetings as appropriate		Yes	
Environmental		Environmental input and advice to the overall drainage design and the layouts to boundary limits		Yes	
Environmental		Drainage/interceptor design, including pumping and balancing ponds		Yes	
Environmental		Overall drainage design and layouts to boundary limits		Yes	
Environmental		Drainage / interceptor design. Includes pumping and balance ponds etc.		Yes	
Geotechnical		Preparation of methodology of rolling programme for inspection & test of ground conditions	Yes		
Geotechnical		Design of a phased ground investigation to delineate and characterise the prevailing geotechnical hazards		Yes	
Geotechnical		Supervision of GI fieldworks and the preparation of laboratory testing schedules		Yes	For scope of design that SDS have produced or have agreed to complete at the point of novation. Changes to the design that result in SDS rework are additional services.
Geotechnical		Preparation of an interpretative report presenting out conclusions and recommendations associated with mitigating the identified geotechnical hazards		Yes	
Geotechnical		Register of embankments and cuttings		Yes	
Geotechnical		Plan layouts of embankments and cuttings on the tram route		Yes	
Geotechnical		Preparation of cross sections of embankments and cuttings demonstrating land clearances		Yes	
Geotechnical		Perparation of cross sections of embankments and cuttings detailing typical construction (excluding foundation details)		Yes	

Geotechnical		Embankment and cutting drainage concept design (excluding track drainage and drainage of remaining off-street areas)		Yes	
Geotechnical		Provision of geotechnical design parameters for structural design		Yes	
Geotechnical		Completing the Scottish trunk roads geotechnical certification process to the satisfaction of Transport Scotland		Yes	
~~**Geotechnical**~~	~~**Earthworks**~~	~~Cut & Fill Analysis (Roseburn Corridor)~~	-	~~Yes~~	-
Landscape Architecture		Brief and scope		Yes	
Landscape Architecture		Detailed design		Yes	
Landscape Architecture		Cross referencing of landscape requirements onto Engineering plans		Yes	
Landscape Architecture	**Landscaping Street Furniture**	Detailed design and approvals		Yes	
Landscape Architecture	**Fencing Works**	Layout and Details		Yes	
Landscape Architecture	**Boundaries**	Fencelines and fences		Yes	
Lighting	**Lighting**	Cycleways and paths		Yes	
Lighting	**Lighting**	Park and Ride facilities		Yes	
Lighting	**Highways / Street Lighting**	Outline design and approval (including foundation design)		Yes	
Lighting	**Highways / Street Lighting**	Detailed design and approvals (including foundation design)		Yes	
Lighting	**Highways / Street Lighting**	Identify Power supplies from existing sources		Yes	
Lighting	**Highways / Street Lighting**	Power supply from new source		Yes	

Lighting	**Highways / Street Lighting**	OLE/Street lighting to accord with lighting design		Yes	
Lighting	**Tramway Lighting**	Outline design and approval		Yes	
Lighting	**Tramway Lighting**	Detailed design and approvals		Yes	
Lighting	**Tramway Lighting**	Power supply		Yes	
OLE	**OLE**	Outline design and approvals		Yes	
OLE	**OLE**	Detailed design - catenary	Yes		To be finalised in SDS/BBS alignment workshops
OLE	**OLE**	Approvals - catenary		Yes	SDS to be instructed to manage this process and all approvals that are not in current SDS scope
OLE	**OLE**	Detailed design - auto tensioned	Yes		To be finalised in SDS/BBS alignment workshops
OLE	**OLE**	Approvals - auto tensioned		Yes	SDS to be instructed to manage this process and all approvals that are not in current SDS scope
OLE	**OLE**	Building Fixing Report including design/approvals (excluding detailed wiring design and detailed building fixings locations)		Yes	To be finalised in SDS/BBS alignment workshops
OLE	**OLE**	Pantograph interface and performance characteristics	Yes		To be finalised in SDS/BBS alignment workshops
OLE	**OLE**	Typical cross sections and detailed cross sections	Yes		To be finalised in SDS/BBS alignment workshops
OLE	**OLE**	Proposal for poles, wiring arrangements and the tensioning equipment	Yes		To be finalised in SDS/BBS alignment workshops
OLE	**OLE**	Technical and performance specification for the OLE	Yes		To be finalised in SDS/BBS alignment workshops
OLE	**OLE**	Proposal for equipment type and method of supporting the equipment along the route, including the wall fixings	Yes		To be finalised in SDS/BBS alignment workshops

OLE	**OLE**	Detailed pole and wall fixing locations (easting and northing coordinates) and the detailed wiring design		Yes	Provided auto-tensioning used in city centre
OLE	**OLE**	Detailed wiring layout design	Yes		To be finalised in SDS/BBS alignment workshops
OLE	**OLE**	Detailed survey work including building fixing location, height and condition; ground condition and pole location surveys		Yes	To be finalised in SDS/BBS alignment workshops
OLE	**OLE**	Depot OLE Design	Yes		To be finalised in SDS/BBS alignment workshops
OLE	**OLE**	Specify forces & moments for masts	Yes		To be finalised in SDS/BBS alignment workshops
OLE	**OLE**	Mast foundations		Yes	To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Substation external and Distribution design and approvals		Yes	To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Substation internal and Distribution design and approvals	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Specify ducting requirements & mast to receive power supply	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Design ducting from substation to specified mast		Yes	To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Substation Civil / Building design		Yes	To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Substation Fencing design		Yes	
Power	**Power Supplies**	Substation Lighting design		Yes	
Power	**Power Supplies**	Earthing and Lightning Protection		Yes	
Power	**Stray Current**	Draft stray current management position paper		Yes	Completed
Power	**Stray Current**	Stray current management going forward	Yes		

Power	**Stray Current**	Typical detail sketches of stray current track slab and structure solutions	Yes		
Power	**Earthing and Bonding**	Outline schematic cabling routing, earthing and bonding arrangements		Yes	To be finalised in SDS/BBS alignment workshops
Power	**Earthing and Bonding**	Draft system earthing policy		Yes	To be finalised in SDS/BBS alignment workshops
Power	**Earthing and Bonding**	Typical detail sketches of earthing and bonding solutions as required		Yes	To be finalised in SDS/BBS alignment workshops
Power	**Earthing and Bonding**	Detail designs of earthing and bonding solutions as required	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Earthing and Bonding**	Selection of specific earthing & bonding components	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Determine traction power distribution equipment and principal component locations	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Specification of traction power equipment and draft typical principal component locations	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Relevant schematics and diagrams showing trackside traction equipment		Yes	To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Review overhead line /cable make-up proposed	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Define overhead line/cable electrical make-up conductor and cable sections and cable materials	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Review traction supply substation positions proposed	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Define traction supply substation positions and rating	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Overhead line/cable make-up and traction supply substation positions input into Traction Power Study	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Review results of traction power study. Revise make-up and traction supply substation positions and ratings as necessary	Yes		To be finalised in SDS/BBS alignment workshops

Power	**Power Supplies**	Track power feeding and sectioning diagrams for main lines and Depot	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Traction supply substation schematic drawings	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Feed track bed electrical stray current control requirements to track discipline	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Feed traction power distribution design information for the depot building and track system within the Depot complex, incorporating isolator interlocking with Depot plant and the items within the general scope above, to the Overhead Line Equipment and Depot disciplines	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Work in conjunction with the Auxiliary Power discipline to specify the optimum method of supplying the Depot services power supply requirements, and feed into the appropriate Specifications		Yes	To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Traction power design report on overhead line/cable electrical make-up, traction supply substation positions, ratings, tram loadings, protection settings, load/fault discrimination, pantograph voltages and rail touch voltages.	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Draft traction supply substation equipment specification for traction supply substation procurement	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Feed overhead line / cable electrical make-up, including parallel support cabling, feeder cabling and feeder and section isoltors, to OLE discipline	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Feed traction power SCADA requirements to Systems and Communicaztions discipline	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Specify to Scottish Power the high and low voltage supply requirements as apporpriate for traction, Depot services and substation building services	Yes		To be finalised in SDS/BBS alignment workshops
Power	**LV supply**	LV supply along route		Yes	
Power	**Switch heating**	Switch heating specification	Yes		To be finalised in SDS/BBS alignment workshops

Power	**Permanent Way**	Points heating	Yes		To be finalised in SDS/BBS alignment workshops
Power	**Earthing and Bonding**	Earthing and bonding design (of furnitire at tram stops)		Yes	
Power	**Power Supplies**	Depot Auxilliary Power Supplies		Yes	BBS to validate once equipment Is known
Power	**Power Supplies**	Depot Traction Power supplies	Yes		
Power	**Power Supplies**	Power distribution equipment foundation design		Yes	To be finalised in SDS/BBS alignment workshops
Power	**Power Supplies**	Depot Substation and Distribution Design	Yes		To be finalised in SDS/BBS alignment workshops
Roads & Utilities	**Register**	Junction register		Yes	
Roads & Utilities		Horizontal layouts of roads and junctions on the tram route including pedestrian crossings according to the agreed base line (i.e. STAG incorporating Parliamentary Agreements and **tie** Change Notifications)		Yes	
Roads & Utilities		Consultation with CEC & tie including preparation of realistic alternative layouts for road and junction horizontal layouts		Yes	
Roads & Utilities		Assessment of the preliminary p-way design		Yes	
Roads & Utilities		Integration of the preliminary p-way design		Yes	
Roads & Utilities		Integration of tramstop positioning where situated on-street		Yes	
Roads & Utilities		Preparation of cross sections along the on-street sections demonstrating available lane widths and permitted clearances		Yes	
Roads & Utilities		Preparation of cross sections detailing typical carriageway construction, footways construction, crossfalls, kerb heights and OLE pole locations (excluding foundation details)		Yes	
Roads & Utilities		Road markings		Yes	
Roads & Utilities		Prelim pedestrian and cycleway requirements for on-street areas and road crossings including Roseburn Corridor		Yes	

Roads & Utilities		Assessment of existing traffic signal controller condition and capability	Yes		To be part of UTC provisional sum
Roads & Utilities		Assessment of existing urban traffic control (and proposed UTMC) system capability	Yes		To be part of UTC provisional sum
Roads & Utilities		Preliminary layout of depot access road		Yes	
Roads & Utilities		Road safety Audit Stage 1		Yes	
Roads & Utilities		Road safety Audit Stage 2		Yes	
Roads & Utilities		Road safety Audit Stage 3	Yes		SDS to support BBS
Roads & Utilities		Determination of the preliminary extent of works by assessment of the preliminary pway vertical alignment against existing ground levels, preliminary vertical design at discrete locations only, and assessment of current road condition		Yes	
Roads & Utilities	**Roads Survey**	Roads Condition Survey	Yes		BBS carrying out under tie change
Roads & Utilities	**TRO**	Preparation of traffic management plan based on preliminary roads design		Yes	
Roads & Utilities	**TRO**	Identification of permanent traffic management measures required along the route		Yes	
Roads & Utilities	**TRO**	Preparation of TRO plans and associated technical schedules for submission to Dundas & Wilson and CEC including revocations		Yes	
Roads & Utilities	**TTRO**	Review and design draft remporary traffic management arrangements on the route necessary for construction		Yes	
Roads & Utilities	**TTRO**	Identify existing and possible temporary traffic diversion routes on the wider road network including modifications required to infrastructure, bus stops, parking and loading.	Yes		
Roads & Utilities	**TTRO**	Consult with bus companies, police, fire department, CEC etc through the TTRO working group	Yes		
Roads & Utilities	**TTRO**	Prepare draft temporary traffic management drawings and TTRO plans and technical schedule for submission to CEC		Yes	
Roads & Utilities	**Utilities**	Define the utility apparatus diversion design parameters		Yes	Not Infraco Scope

Roads & Utilities	**Utilities**	Develop combined utility drawings incorporating the information received from tie and the ground penetrating radar survey		Yes	Not Infraco Scope
Roads & Utilities	**Utilities**	Identification of potential conflicts within 2m of the swept path		Yes	Not Infraco Scope
Roads & Utilities	**Utilities**	Reference each conflict on the plan drawings and recording information on oa schedule		Yes	Not Infraco Scope
Roads & Utilities	**Utilities**	Catagorisation of potential apparatus conflicts within a pre-agreed envelope outside the swept path		Yes	Not Infraco Scope
Roads & Utilities	**Utilities**	Design for utility apparatus diversion or protection within the agreed utility clearance zone (i.e. swept path + 0.45m & 1.2m depth)		Yes	Not Infraco Scope
Roads & Utilities	**Utilities**	Liaise with each utility owner to obtain actual details on size, material and invert level of all identified conflicts and to discuss proposed apparatus diversions or protections		Yes	Not Infraco Scope
Roads & Utilities	**Utilities**	Assess potential future utiliy maintenance work problems (safe working widths and traffic management implications)		Yes	Not Infraco Scope
Roads & Utilities	**Utilities**	Utilities Trial Pits to inform design		Yes	Not Infraco Scope
Roads & Utilities	**Utilities**	Identification of environmental/archaelogical 'hot spots'		Yes	
Roads & Utilities	**Roads Alignment**	Outline Approval		Yes	
Roads & Utilities	**Roads Alignment**	Detailed design and approvals		Yes	
Roads & Utilities	**Highways Junctions**	Outline Approval		Yes	
Roads & Utilities	**Highways Junctions**	Traffic Flows / Priorities -Detailed Design		Yes	
Roads & Utilities	**Highways Junctions**	Traffic Signalling - Staging & Phasing		Yes	
Roads & Utilities	**Highways Junctions**	Traffic Signalling - Detailed Design for Hardware	Yes		

Roads & Utilities	**Highways Junctions**	Traffic Signalling - Capability of Signal Controllers	Yes		
Roads & Utilities	**Highways Junctions**	Traffic Signalling - Analysis & Settings - detailed design	Yes		
Roads & Utilities	**Highways Junctions**	Traffic Signalling - Analysis & Settings - in-service adjustment with trams	Yes		CEC would wish this to be carried out by BBS during the first 6 months of operation - would be a tie change if CEC confirm
Roads & Utilities	**Highways Junctions**	Traffic Signalling - Analysis & Settings - in-service adjustment without trams	Yes		
Roads & Utilities	**Highways Junctions**	Urban Traffic Control (UTC) -Detailed Design and interface between UTC & Signals and definition of required UTC functionality (excluding specification of UTC upgrade where not triggered by introduction of the tram scheme)	Yes		Limited to the Interface, any UTC functionality is not part of Infraco scope
Roads & Utilities	**Highways Junctions**	Urban Traffic Control (UTC) -Detailed Design and interface	Yes		Limited to the road traffic and tram signals
Roads & Utilities	**Highways Junctions**	Detailed junction layout design and approvals		Yes	
Roads & Utilities	**Pavement Design**	Detailed design and approvals		Yes	
Roads & Utilities	**Pavement Design**	Calculation of Residual Design Life for overlaid existing pavements		Yes	
Roads & Utilities	**Safety Fences and Barriers**	Detailed design and approvals		Yes	SDS scope as part of overall track design - does not depend on choice of track form
Roads & Utilities	**Handrails**	Detailed design and approvals		Yes	SDS scope as part of roads design
Roads & Utilities	**Road Furniture excl Traffic Lights**	Detailed design and approvals		Yes	SDS scope as part of roads design

Roads & Utilities	**Traffic Lights**	Location and detailed design and approvals for Hardware, Phasing & Functionality		Yes	
Roads & Utilities	**Traffic Lights**	Power Supply Design	Yes		SDS to design from arrival point of power from supplier to signal
Roads & Utilities	**Traffic Lights**	Cabling and ducting		Yes	
Roads & Utilities	**Tramway Furniture**	Detailed design		Yes	SDS scope as part of tram stop design
Roads & Utilities	**Tramway Furniture**	Power Supply Design	Yes		SDS to design from arrival point of power from supplier to tramstop furniture
Roads & Utilities	**Tramway Furniture**	Cabling and ducting		Yes	
Roads & Utilities	**Road Signs and Markings**	Detailed design and approvals		Yes	
Roads & Utilities	**Footpaths**	Detailed design and approvals		Yes	
Roads & Utilities	**Cycle paths**	Detailed design and approvals		Yes	
Roads & Utilities	**Highways Pedestrian Crossings**	Detailed design and approvals		Yes	
Roads & Utilities	**Non-Tram Ducts / Crossings**	Detailed design and approvals. PB to supply tram related duct requirements and cross sections. Coordination and spatial planning to be undertaken by Halcrow.		Yes	
Roads & Utilities	**Ducts / Crossings**	Detailed design and approvals for traffic signalling.		Yes	

Roads & Utilities	**Ducts / Crossings**	Incorporate / coordinate all ducting on Engineering Plans		Yes	
Roads & Utilities	**Hard Landscaping**	Standard Drawings, Layout Drawings and approvals for surface finishes in highways areas		Yes	
Roads & Utilities	**Hard Landscaping**	Standard Drawings, Layout Drawings and approvals for surface finishes in tramway areas		Yes	
Roads & Utilities	**MX Moss Model**	Review of Client's MX Road Model		Yes	
Roads & Utilities	**MX Moss Model**	Roads Alignment		Yes	
Roads & Utilities	**Earthworks**	Detailed design and approvals (Related to Highways)		Yes	
Roads & Utilities	**Earthworks**	Special drainage details and approvals (Related to Highways)		Yes	
Roads & Utilities	**Earthworks**	Ground improvement / solum design for tram logging (if required)		Yes	
Roads & Utilities	**Existing Utilities**	Utilities Diversion Works design		Yes	
Roads & Utilities	**Existing Utilities**	Design of protection works to existing utilities		Yes	
Roads & Utilities	**Drainage**	Design of all new drainage works associated with highways works		Yes	
Roads & Utilities	**Drainage**	Design of connections of Tramway drainage to highways drainage		Yes	
Roads & Utilities	**Drainage**	Design of connections of new drainage to existing drainage - local connections		Yes	
Roads & Utilities	**Drainage**	Design of connections of new drainage to existing drainage - remote runs to connections		Yes	
Roads & Utilities	**Traffic Management**	Local and wide area		Yes	
Roads & Utilities	**Footway**	Design and approvals for footway along Roseburn Corridor		Yes	
Roads & Utilities	**Earthworks**	Cut & Fill Analysis (on street)		Yes	
Roads & Utilities		Traffic modelling for local and wide-area traffic models		Yes	
Roads & Utilities		Design of sub-station access roads from the existing road layout to the sub station compound but excluding the compound layout		Yes	
Roads & Utilities		Design of Park and Ride facilities		Yes	

Roads & Utilities		Reinstatement / making good car parks (e.g. Airport Hilton Hotel, Morrison's Supermarket at the Gyle and First ScotRail car park at Haymarket)		Yes	
Roads & Utilities		Reinstatement / making good Haymarket Station forecourt including taxi-ranks and bus stop		Yes	
Roads & Utilities		Relocation of major existing on-street infrastructure, inc. listed monuments		Yes	
Roads & Utilities		Drainage surveys to establish existing drainage and invert levels through Roseburn corridor. Co-ordination with CEC		Yes	
Roads & Utilities		Design of drainage · Design of drainage for off-street track sections (e.g. the Roseburn Corridor) including identification of outfalls and obtaining outfall agreements with SEPA		Yes	
Roads & Utilities	**Drainage**	Drainage survey (including invert levels if required) - Roseburn Corridor		Yes	
Run Time	**Runtime modelling**			Yes	
Run Time	**Runtime modelling**	O&TP Simulations used to verify the design concepts of track alignment, tram design, operating principles, traction power network principles, tramstop positioning and design, turnback/terminus facilities		Yes	
Run Time	**Runtime modelling**	Timetable development following agreement of the runtime simulations principles for fleet sizing and layover estimation		Yes	
Run Time	**Runtime modelling**	Simulation of the Track design during Preliminary Design Phase to ensure compliance with the principles of Operation		Yes	
Run Time	**Runtime modelling**	Simulation of the complete Tramway for infrastructure, operations and traction power network design during the detailed design phase to verify the PB detailed design		Yes	
Run Time	**Operating Input**	Review of operational issues affecting infrastructure design e.g. operational speed limits, timetables etc.		Yes	
Supervisory, Control & Communications	**Tram Signalling**	Outline design and approvals		Yes	

Supervisory, Control & Communications	**Tram Signalling**	Detailed design and approvals	Yes		
Supervisory, Control & Communications	**Telecomms, Radio**	Outline design and approvals		Yes	
Supervisory, Control & Communications	**Telecomms, Radio**	Detailed design and approvals	Yes		
Supervisory, Control & Communications	**CCTV Systems**	Outline design and approvals		Yes	CCTV coverage specification by SDS.
Supervisory, Control & Communications	**CCTV Systems**	Detailed design and approvals	Yes		
Supervisory, Control & Communications	**SCADA Systems**	Outline design and approvals		Yes	
Supervisory, Control & Communications	**SCADA Systems**	Detailed design and approvals	Yes		
Supervisory, Control & Communications		Tram position and detection system	Yes		
Supervisory, Control & Communications	**Passenger Info**	Passenger information display system	Yes		
Supervisory, Control & Communications	**Telecomms**	Telephone network	Yes		

Supervisory, Control & Communications	**Passenger Info**	Public address system	Yes		
Supervisory, Control & Communications	**Radio**	Operational radio system	Yes		
Supervisory, Control & Communications	**Passenger Info**	Passenger help/passenger emergency help points system	Yes		
Supervisory, Control & Communications	**CCTV Systems**	Closed circuit television system	Yes		
Supervisory, Control & Communications		Define loop location	Yes		To be finalised in SDS/BBS alignment workshops
Supervisory, Control & Communications		Detailed design of loop equipment and system functionality	Yes		
Supervisory, Control & Communications		Supervisory control and data acquisition	Yes		
Supervisory, Control & Communications		Operational data network	Yes		
Supervisory, Control & Communications		Depot control room - lighting, windows, building services		Yes	
Supervisory, Control & Communications		Depot equipment room	Yes		

Supervisory, Control & Communications	**Radio**	Tramborne supervisory control and communications equipment	Yes		
Supervisory, Control & Communications	**CCTV Systems**	CCTV Design Specification		Yes	Included in technical specification
Supervisory, Control & Communications	**PA System**	PA Acoustic Specification		Yes	Included in technical specification
Supervisory, Control & Communications	**Depot CCTV**	Depot CCTV for operations within Depot	Yes		to be monitored in OCC only
Supervisory, Control & Communications	**Security**	Locations and design of security systems within Depot		Yes	
Supervisory, Control & Communications	**Security**	Locations and design of communication systems within Depot	Yes		
System Assurance		To ensure, and provide a record of, assurance that the ETN has achieved an acceptable level of system safety, reliability, availability and maintainability performance	Yes		
System Assurance		To ensure all ETN requirements are met through a controlled process of Validation & Verification (V&V)	Yes		Working from SDS baseline and system
System Assurance		Occupational Health and Safety	Yes		
System Assurance		Project risk	Yes		
System Assurance		Safety risk during construction	Yes		
System Assurance	**RAM**	Reliability, availability, maintainability studies - definition		Yes	

System Assurance	**RAM**	Reliability, availability, maintainability studies - validate	Yes		
Topographical Survey	**Topographical Survey**	Review Client's Data for Design Purposes		Yes	
Topographical Survey	**Topographical Survey**	Brief for any additional Topographical Survey required		Yes	
Topographical Survey	**Topographical Survey**	Scope for procurement of any additional Topographical Survey required		Yes	
Track	**MX Moss Model**	Review of Client's MX Model		Yes	
Track	**MX Moss Model**	Track Alignment (vertical & horizontal)		Yes	
Track	**MX Moss Model**	Depot track layout		Yes	
Track	**Permanent Way**	Plain Line -Detailed design and approvals		Yes	
Track	**Permanent Way**	S&C - Detailed design and approvals		Yes	
Track	**Permanent Way**	Trackbed civil foundation design and approval		Yes	
Track	**Permanent Way**	Tramway drainage design and approvals (off-street running including Roseburn corridor)		Yes	
Track	**Permanent Way**	Surface finishes in hard landscaped areas - Layout and standard details only in tramway area		Yes	
Track	**Permanent Way**	Point machines, control and indication	Yes		
Track	**Permanent Way**	Typical tramway cross sections		Yes	
Track	**Permanent Way**	Wheel/rail interface study		Yes	
Track	**Permanent Way**	Wheel/rail interface management in ongoing design	Yes		
Track	**Permanent Way**	Assumed design tram vehicle study		Yes	Completed
Track	**Permanent Way**	Structure gauge and clearance		Yes	

Track	**Permanent Way**	Specification of the provision and installation of signs and markers related to speed restrictions; track location, distance and geometry; track-infrastructure spatial relationship; tram vehicle fouling points; safety		Yes	
Track	**Permanent Way**	Tramway categorisation/tramway definitions and extents		Yes	
Track	**Permanent Way**	Trackwork specification	Yes		
Track	**Permanent Way**	Tram vehicle arrestment devices, ie measures to prevent trams running off track at termini	Yes		
Track	**Permanent Way**	Depot track layout with allowance for (but no design of) civil engineering structures (bridges, retaining walls etc) buildings, plant, internal roads, hard standings, car parks, approach tracks and access roads for road vehicles and tram vehicle deliveries.		Yes	
Track	**Permanent Way**	Track alignment - vertical & horizontal		Yes	
Track	**Permanent Way**	Rheda City track form design including rail, chamber elements, rail fastening system, sleepers, cover layer and track supporting layer and the stiffness of that track form	Yes		
Track	**Permanent Way**	Civil engineering design (including drainage) to accommodate the Rheda City trackform		Yes	
Track	**Permanent Way**	Specification of surface treatment for a given CBR		Yes	
Track	**Permanent Way**	Specification of surface finish and/or cover layer		Yes	
Track	**Drainage**	Specification of Drainage of grooved rails and drainage within the trackform (e.g. ballasted & grasstrack)	Yes		
Track	**Permanent Way**	S&C outline design (geometry and components)		Yes	
Track	**Permanent Way**	S&C detailed design components	Yes		
Track	**Drainage**	Design of connections of new drainage to existing drainage - local connections		Yes	
Track	**Drainage**	Design of connections of new drainage to existing drainage - remote runs to connections		Yes	
Track		Specification of switch heating	Yes		
Track		Specify number and size of ducts	Yes		

Track		Ducting layout and details		Yes	
Track		Transition Zones	Yes		
Track		Specify cant limits for track	Yes		
Track		Raods geometry to accommodate track		Yes	
Track		Rail section schedule	Yes		
Track		Schedule of geometry speed restrictions		Yes	
~~**Track**~~	-	~~Input to Bill of Quantities (produced by Corduroy)~~	-	~~Yes~~	~~Completed~~
Track	**S&C equipment**	Point motors, detectors, indicators, controls	Yes		
Track	**Drainage**	Drainage for ballasted track		Yes	
Track	**Permanent Way**	Depot track layout and details		Yes	
Track	**Permanent Way**	Depot track foundation and details		Yes	
Track	**Permanent Way**	Depot track drainage and details		Yes	
Track	**Permanent Way**	Identification of areas sensitive to Noise & Vibration		Yes	
Track	**Permanent Way**	Specification of floating slab (if necessary)	Yes		
Track	**Permanent Way**	Design of floating slab (if necessary)	Yes		
Tram Stops	**Stops**	Haymarket		Yes	
Tram Stops	**Stops**	Shandwick Place		Yes	
Tram Stops	**Stops**	Princes Street		Yes	
Tram Stops	**Stops**	St Andrews Square (South St David St)		Yes	
Tram Stops	**Stops**	St Andrews Square (North St Andrew St)		Yes	
Tram Stops	**Stops**	Picardy Place		Yes	
Tram Stops	**Stops**	McDonald Place		Yes	
Tram Stops	**Stops**	Balfour Street		Yes	
Tram Stops	**Stops**	Foot of the Walk		Yes	
Tram Stops	**Stops**	Constitution Street		Yes	
Tram Stops	**Stops**	Ocean Drive		Yes	
Tram Stops	**Stops**	Ocean Terminal		Yes	
Tram Stops	**Stops**	Newhaven Road		Yes	
Tram Stops	**Stops**	Lower Granton Road		Yes	
Tram Stops	**Stops**	Granton Square		Yes	
Tram Stops	**Stops**	Caroline Park		Yes	

Tram Stops	**Stops**	West Granton Access		Yes	
Tram Stops	**Stops**	Crewe Toll		Yes	
Tram Stops	**Stops**	Western General Hospital (Telford Road)		Yes	
Tram Stops	**Stops**	Graigleith		Yes	
Tram Stops	**Stops**	Ravelston Dykes		Yes	
Tram Stops	**Stops**	Roseburn		Yes	
Tram Stops	**Stops**	Murray field		Yes	
Tram Stops	**Stops**	Balgreen Road		Yes	
Tram Stops	**Stops**	Saughton Road North		Yes	
Tram Stops	**Stops**	South Gyle Access		Yes	
Tram Stops	**Stops**	Edinburgh Park South		Yes	
Tram Stops	**Stops**	Edinburgh Park		Yes	
Tram Stops	**Stops**	Gyle		Yes	
Tram Stops	**Halt**	Depot Halt (Staff only)		Yes	
Tram Stops	**Stops**	Gogarburn		Yes	
Tram Stops	**Stops**	Ingliston Park and Ride		Yes	
Tram Stops	**Stops**	Airport		Yes	
Tram Stops	**Drawings**	Layout Drawings and approvals		Yes	
Tram Stops	**Civils Design**	Detailed civil, structural and architectural design and approvals		Yes	
Tram Stops	**Drawings**	Suppliers' & Manufacturers' Drawings	Yes		BBS as part of procurement of the shelter and stop equipment
~~**Tram Stops**~~	~~**Drawings check**~~	~~Suppliers' and Manufacturers' Drawings Check, Review and Comments~~	~~Yes~~	-	Not needed as a separate activity
Tram Stops		Detailed component selection tram stop furniture	Yes		BBS as part of procurement of the shelter and stop equipment
Tram Stops	**LV Power**	LV Power Supply design		Yes	
Tram Stops	**Passenger Info**	Provision for Passenger Information system		Yes	To be finalised in SDS/BBS alignment workshops
Tram Stops	**Passenger Info**	Component selection Passenger Information system	Yes		BBS as part of procurement of the shelter and stop equipment

Tram Stops	**Passenger Info**	Integrated Fare Collection System		Yes	
Tram Stops		Disability Discrimination Act		Yes	
Tram Stops		Pedestrian Crossings between platforms and access to platforms from public highway.		Yes	
Tram Stops		Platform Design		Yes	
Tram Stops		Platform finishes		Yes	
Tram Stops		Tactile surfacing		Yes	
Tram Stops		Guardrails c/w handrails and tapping rails		Yes	
Tram Stops		Procurement of Shelters based on SDS specification	Yes		BBS as part of procurement of the shelter and stop equipment
Tram Stops		Procurement of Shelter seating based on SDS specification	Yes		BBS as part of procurement of the shelter and stop equipment
Tram Stops		Shelter signage		Yes	
Tram Stops		Shelter drainage		Yes	
Tram Stops		Platform lighting		Yes	
Tram Stops		Platform drainage		Yes	
Tram Stops		Stop names/signage		Yes	
Tram Stops		Emergency lighting (as appropriate)		Yes	
Tram Stops		Stop Equipment cabinet	Yes		BBS - in line with other equipment cabinets
Tram Stops		Cable ducts and draw pits		Yes	
Tram Stops		Procurement of Waste Bins based on SDS specification	Yes		BBS as part of procurement of the shelter and stop equipment
Tram Stops		Internally illuminated logo		Yes	
Tram Stops		Structure to location map		Yes	
Tram Stops		Structure to information maps		Yes	
Tram Stops		Staff toilets		Yes	
Tram Stops		All necessary facilities for the Mobility impaired		Yes	
Tram Stops		Secure Cycle Parking - at limited stops only		Yes	
Tram Stops		Landscaping/roads works		Yes	
Tram Stops		Ducting/cable Layout and details		Yes	

Tram Stops	**Civils**	Access ramps requiring civil engineering or geotechnical design input		Yes	
Tram Stops	**Civils**	Accomodation for but not the design of - CCTV, PA system, Passenger Information Displays, Clocks, Passenger help points, OLE supports		Yes	
Tram Stops	**Civils**	Design of civils to support CCTV, PA system, Passenger Information Displays, Clocks, Passenger help points, OLE supports		Yes	
Tram Stops	**Civils**	Provision within the Tramstop design for the installation of Ticket Vending Machines (TVM), inclusive of foundations, cable ducting (for power, control, indication and alarm cabling) from the TVM to the associated Stop Equipment Cubicles		Yes	
Tram Stops	**Tramstop furniture**	Tramstop furniture footings		Yes	
Tram Stops	**Stop access**	Design of footpath approaches to tramstops		Yes	
Trams	**Tram vehicle**	Performance Specification			
Trams		Review and update of Tram Requirement Specification			
Trams		Review and development of Tram Interface Specification			
Trams		Review of other Requirement Specifications and supporting documents as required			
Trams		Develop Tram delivery plan			
Trams		Develop Tram maintenance plan			
Trams		Develop Tram spares plan			
Trams		Develop Tram life-cycle costing plan			
Trams		Develop Tram design approval/factory inspection/testing witnessing plan			
~~**Trams**~~	-	~~Support to tle InfraCo Milestone and Testing plan~~	~~Yes~~	~~Yes~~	Identified separately in construction support proposal
Trams		Develop Tram Supply Agreement document			
Utilities	**Utilities**	Define the utility apparatus diversion design parameters		Yes	Not Infraco Scope

Utilities	**Utilities**	Develop combined utility drawings incorporating the information received from tie and the ground penetrating radar survey			Not Infraco Scope
Utilities	**Utilities**	Identification of potential conflicts within 2m of the swept path			Not Infraco Scope
Utilities	**Utilities**	Reference each conflict on the plan drawings and recording information on oa schedule			Not Infraco Scope
Utilities	**Utilities**	Catagorisation of potential apparatus conflicts within a pre-agreed envelope outside the swept path			Not Infraco Scope
Utilities	**Utilities**	Preliminary design for utility apparatus diversion or protection			Not Infraco Scope
Utilities	**Utilities**	Liaise with each utility owner to obtain actual details on size, material and invert level of all identified conflicts and to discuss proposed apparatus diversions or protections			Not Infraco Scope
Utilities	**Utilities**	Assess potential future utiliy maintenance work problems (safe working widths and traffic management implications)			Not Infraco Scope
Utilities	**Utilities**	Identification of environmental/archaelogical 'hot spots'.			
Utilities	**Utilities**	Utilities Trail Pits			Not Infraco Scope
	Clearance	Platform edge string - tram clearance		Yes	
	Documentation	Requirement specs for training, ops and maint documentation in respect of Structures and Roads.		Yes	
	Retaining Walls	Retaining walls at Depot		Yes	
	Bridges/Ret. Walls	Ground modelling / ground water modelling requirements.		Yes	
-	~~**Earthworks**~~	~~Cut & Fill Analysis (off street, excl Roseburn Corridor)~~	~~Yes~~	-	~~SDS - as they have carried out this work since this was last circulated~~
	Track support	Track formation design		Yes	
	Base Plans	General Arrangement Drawings (1:500) and approvals		Yes	
	Demolition	Verify extent of demolition works required		Yes	

	Demolition	Demolition Method Statement and Temporary Works designs	Yes		
	Demolition	Design of permanent works to any remaining party walls and the like.		Yes	Only as identified in Infraco Scope
	Drainage	Flow studies of surrounding areas		Yes	
	Drainage	Design of drainage diversion works		Yes	
	Drainage	Design of protection works to existing drainage (including Roseburn Corridor)		Yes	
	EMI / EMC	Study, policy, management		Yes	
	Technology Reviews			Yes	
		Off street furniture including lamp posts		Yes	
		Parking, loading, access review/provision		Yes	
	Noise	Design of mitigation measures		Yes	
	Vibration	Design of mitigation measures		Yes	
	NR Survey	Network Rail Asset Survey		Yes	
	Radio	Radio Survey		Yes	
	Photo Survey	Photographic Survey		Yes	
	EMC	EMC Survey		Yes	Completed
	EMC	EMC Strategy		Yes	Completed
	EMC	EMC Plan	Yes		
	EMC	EMC Testing	Yes		
	Site Clearance	Layout Drawings		Yes	
	Earthing & Bonding	E&B Plan	Yes		
	Earthing & Bonding	E&B Design	Yes		
	Earthing & Bonding	E&B Testing	Yes		

	Safety	System Safety Strategy		Yes	SDS to complete in relation to SDS design then maintained by Infraco until handed to operations
		System Safety Management Plan		Yes	
	RAM	System RAMS Analysis		Yes	
		System RAMS Plan		Yes	
	V&V	System Verification & Validation Plan		Yes	
~~**Construction Support**~~	-	~~Quality assurance of construction of civils to design~~	-	~~Yes~~	-
~~**Construction Support**~~	-	~~Quality assurance of installation of systems to design~~	~~Yes~~	-	-
Construction Support		Additional design to overcome unforeseen ground conditions, utilities etc		Yes	
Construction Support		Additional design and other responses to Contruction Stage TQs		Yes	

APPENDIX PART 5

Disclosure Statement

(with attachments)

Part A - SDS Disclosures

With regard to clause 4.2.2 (a) to (g) of the Agreement the SDS provider confirms the following:

4.2.2 (a) the SDS Provider is not aware having made due and diligent enquiry, of any breaches by **tie** of the SDS Agreement and there is no dispute or claim subsisting nor are there any circumstances existing which might give rise to any dispute or claim relative to the SDS Agreement;

NO DISCLOSURE

4.2.2 (b) the information set out at Appendix Part 4 (*Design and Deliverable Status*) is true, complete and accurate in all respects and is not misleading;

NO DISCLOSURE

4.2.2 (c) the Deliverables completed by the SDS Provider to the date of this Agreement and listed in Appendix Part 4:

(A) are in all respects in compliance with the SDS Agreement and, without prejudice to the foregoing generality:

(i) the Tram Legislation;

NO DISCLOSURE

(ii) all applicable Law and Consents;

NO DISCLOSURE save where the Deliverables completed to date do not comply with the provisions of the Public Realm Design Workbook (other than existing requirements set out in the Tram Design Manual and the City of Edinburgh Council Standards for Streets) referred to in a letter dated 10 April from

CEC to **tie**, a copy of which was provided to the SDS Provider by CEC.

(iii) the Parliamentary Undertakings;

NO DISCLOSURE

(iv) the Environmental Statements, and all other applicable environmental regulations and requirements;

NO DISCLOSURE

(iv) will permit compliance with the Code of Construction Practice; and

NO DISCLOSURE

(vi) the Third Party Agreements (and in the case of SRU the draft Third Party Agreement);

NO DISCLOSURE save that the Deliverables may not comply with the section 75 agreements set out as the eight items under the heading SECTION 75 AGREEMENTS of Appendix Part 6.

(B) is so as to enable the Edinburgh Tram Network on completion of construction, testing and commissioning to be sited (and thereafter be operated and maintained)within the limits of deviation under the Tram Legislation save as expressly indicated in Appendix Part 9,

NO DISCLOSURE

4.2.2 (d) the design as fully developed pursuant to the SDS Agreement following the date of this Agreement shall continue to meet the requirements of Clause 4.2.2(c)(A) and (B) and on the basis of the standard of reasonable skill and care exercised pursuant to clause 3.2 of the SDS Agreement that

(i) the designs and Deliverables completed prior to the date of this Agreement comply with the Employer's Requirements

Upon completion of the work entailed to resolve the misalignments (as referred to in Clause 4.6).

(ii) the designs and Deliverables as will be completed after the date of this Agreement will comply with the Employer's Requirements,

NO DISCLOSURE

provided that in circumstances where compliance with the Employer's Requirements is dependant upon further design development to be undertaken by the Client (and which is out with the Services provided by SDS), the SDS Provider's obligation pursuant to this Clauses 4.2.2(d) shall be limited to having produced or producing designs and Deliverables that are capable of allowing Infraco to develop a design which is compliant with the Employer's Requirements.

4.2.2 (e) save in respect of any Consents which are the responsibility of **tie** in terms of Clause 19 of the Infraco Contract, the Consents listed at Appendix Part 2 (*Consents Programme*) are all the Design Stage Consents which are required to enable the Edinburgh Tram Network to be procured, constructed, installed, tested and commissioned, and thereafter operated and maintained in accordance with the Infraco Contract;

NO DISCLOSURE

4.2.2 (f) it has received no Client Notice of Change or any other instruction from **tie** to vary any term of the SDS Agreement (whether pursuant to Clause 15 and 29.2 of the SDS Agreement or otherwise) and, subject to Clause 9.1 below, it has agreed no variation, alteration of the SDS Agreement; and

NO DISCLOSURE

4.2.2 (g) no Change in Law has come into effect or is anticipated to come into effect which would have a material adverse impact on the Deliverables completed or to be completed pursuant to the SDS Agreement

NO DISCLOSURE

With regard to clause 5.2 of the Agreement the SDS provider confirms the following:

5.2 **tie** warrants to the Infraco that there is no dispute or claim subsisting (save to the extent that the same are fairly disclosed in the Disclosure Statement), nor are there any circumstances existing which might give rise to any dispute or claim by the SDS Provider against **tie** relative to the SDS Agreement

NO DISCLOSURE

Part B - tie Disclosures

In respect of the **tie** warranties under this Agreement (specifically Clause 9.2), **tie** discloses the attached letter in terms of variations to the SDS Agreement for Key Personnel.

Steve Reynolds
Parsons Brinckerhoff,
Edinburgh Tram Network Project,
Citypoint,
65 Haymarket Terrace,
Edinburgh,
EH12 5HD

Our Ref: DEV-COR-812

Date: 2nd October 2007

Dear Steve,

Edinburgh Tram Network
System Design Services (SDS): Key Personnel and Other Staff

Further to discussions at the Critical Issues meeting of 28th Sept 2007, I confirm that the attached list of personnel are those we require (as a minimum) to be retained on the project, dedicated to the production of the design deliverables and until their completion. The list indicates both personnel to be retained at tie offices and also those working on the project but based at other locations.

We note that an updated Organisational Chart is to be issued shortly and it is our expectation that our requirements will be reflected in respect of the attached list of personnel, in compliance with ***Clause 8*** of The Agreement. Can you please let me have, as soon as possible, the Org Chart both as hard copy and pdf.

If you wish to discuss this list please contact me as soon as possible. In any case we might need to discuss the normal locations of those named people.

Yours sincerely

Tony Glazebrook

cc Matthew Crosse, Geoff Gilbert, Steven Bell

tie limited
Verity House, 19 Haymarket Yards, Edinburgh EH12 5BH
tel [redacted] www.tie.net
Registered in Scotland No. 230949 at City Chambers, High Street, Edinburgh EH1 1YJ

ETN

SYSTEM DESIGN SERVICES (SDS)

KEY PERSONNEL and STAFF - DETAILED DESIGN PHASE

Project Management and Engineering Staff

Steve Reynolds (at least 4 days per week) - PD [Edinburgh]

Jason Chandler – PM [Edinburgh]

Chris Mason - Engineering Manager [Edinburgh]

Kate Shudall - Section Design Manager [Edinburgh]

Scott Ney - Section Design Manager [Edinburgh]

Carla Jones - Chief Planner [Edinburgh]

Simon Price - EMC

Chris Lee - System Safety

Martin Conroy - NR liaison

Tom Kelly [Edinburgh]

Bruce Ennion [Edinburgh]

Brian McCrear (Halcrow, MUDFA) [Edinburgh]

Chris Reid (Halcrow, MUDFA) [Edinburgh]

Tony Bishop - Interface Management

Malcolm Curry – System Integration

Tony Goodyear

Engineering Section Heads

Track - Tony Jory

Structures – Colin Walker (Halcrow) and Paul McQuade (PB)

Roads – M Bisset and Jim Guild

Depot & Transslope – Ian Brown

SCC – John Christofferson

Traffic Modelling - Warren Murphy

System Safety – Angus Park

OLE – Farhad Janani

Traction power etc – Dave Pennington

Stray current etc - Les Brunton

MUDFA – David Pluse

APPENDIX PART 6

Third Party Agreements

AGREEMENTS TO BE CONCLUDED

1. Plot 108 - SRU - to be concl.

1.1 Draft Minute of Agreement between The City of Edinburgh Council and Scottish Rugby Union plc.

1.2 Letter to Faber Maunsell from Carl Bro dated 19 December 2005.

2. Stanley Casinos - to be concluded

2.1 Draft Minute of Agreement between The City of Edinburgh Council and Stanley Casinos Limited.

ETL1 AGREEMENTS

3. ADM Milling - Chancelot Mill at Western Harbour

3.1 Minute of Agreement between The City of Edinburgh Council and ADM Milling Limited dated 23 January 2006.

3.2 Associated Documents - objection letter, plan and draft Agreement.

4. BAE System - Selex - Crewe Toll to Drylaw

4.1 Minute of Agreement between The City of Edinburgh Council and Selex Sensors and Airborne Systems Limited dated 20 and 25 January 2006.

4.2 Associated Documents - objection letter, plans, draft Agreement.

5. Crown Estate Commissioners - Lower Granton Rd

5.1 Associated Documentation:

Letter to Alan Menzies, Crown Estate Solicitor, dated 26 March 2004.

Internal emails dated 19 April, 21 and 22 May 2007.

Objection letter.

6. Forth Ports - Constitution St to Granton Harbour

6.1 Minute of Agreement between The City of Edinburgh Council and Forth Ports PLC dated 15 February 2006.

6.2 Associated Documents: Objection Letter, Plans, Code of Construction Practice, draft Agreements.

7. Holyrood-Elphinstone Group - Granton Harbour

7.1 Minute of Agreement between The City of Edinburgh Council and Holyrood Services Limited dated 17 December 2004.

7.2 Associated Documents: Objection Letter, Plan, unsigned agreement.

8. Ocean Terminal - Ocean Dr

8.1 Minute of Agreement between The City of Edinburgh Council and Ocean Terminal Limited dated 10 and 15 February 2006.

8.2 Associated Documents: Objection Letter, Plan, draft agreement, CoCP.

9. Port Greenwich - Secondsite Agreement - West Granton Road

9.1 Minute of Agreement between The City of Edinburgh Council, National Grid Property Holdings Limited, Port Greenwich Limited and WM Morrison Supermarkets Plc, dated 28 February 2006 (not fully executed).

10. Royal Yacht Britannia - Ocean Terminal

10.1 Minute of Agreement between The City of Edinburgh Council and The Royal Yacht Britannia Trust dated 14 and 23 February 2006.

10.2 Associated Documents: Objection Letter, Plan, draft agreement, CoCP.

ETL 1 + 2 AGREEMENTS

11. Caledonian Ale House - Haymarket

11.1 Grant offer to the City of Edinburgh Council for Purchase of The Caledonian Ale House and 27 Roseburn Street dated 26 October 2005.

11.2 Schedule of Condition referred to in the lease between The City of Edinburgh Council and David Elliot.

11.3 Associated Documents: unsigned lease, 2 objection letters , withdrawal letter, completion statement, valuation report.

12. CGM Edinburgh Ltd - Haymarket

12.1 Minute of Agreement between The City of Edinburgh Council and CGM (Edinburgh) Limited with the Consent of the Governor and Company of the Bank of Scotland dated 13 May 2005, 16 May 2005 and 19 May 2005.

12.2 Associated Documents: 2 objection letters, plans 1, 2 and 3A.

13. The Institute of Chartered Accountants Scotland

13.1 Minute of Agreement between The City of Edinburgh Council and The Institute of Chartered Accountants for Scotland dated 27 September 2006 and 23 October 2006. (ETL1)

13.2 Minute of Agreement between The City of Edinburgh Council and The Institute of Charted Accountants for Scotland dated 27 September 2006 and 23 October 2006. (ETL2)

13.3 Associated Documents: assurance letter from **tie** to ICAS dated 11 October 2005, 4 draft agreements (Line 1), 2 draft agreements (Line 2), 6 correspondence letters, 3 objection letters.

14. Kenmore Capital Edinburgh Limited

14.1 Minute of Agreement between The City of Edinburgh Council and Kenmore Capital Edinburgh Limited with the consent of The Governor and Company of the Bank of Scotland unsigned.

14.2 Associated Documents: objection letter, 2 plans, unsigned agreement.

15. Land Securities Trillium

15.1 Minute of Agreement between The City of Edinburgh Council and Trillium (Prime) Property GP Limited and Land Securities Trillium dated 2 September 2005 and 14

September 2005 and registered in the Books of Council and Session on 19 September 2005.

15.2 Associated Documents: route plan, title plan, objection letter, unsigned agreement.

16. Norwich Union Life and Pensions

16.1 Minute of Agreement between The City of Edinburgh Council and Norwich Union Life and Pensions Limited, National Car Parks Limited and George Watt Limited dated 3 May 2007 and 23 May 2007.

16.2 Closure letter and Associated Documents: 2 letters and 1 objection letter.

16.3 Position statement and Associated Documents: 2 withdrawal letters, position statement, objection letter, 3 letters.

17. Trustees of the City Point Unit Trust

17.1 Minute of Agreement between The City of Edinburgh Council and the Trustees of the City Point Unit Trust dated 10 May 2006.

18. Verity Trustees Limited

18.1 Minute of Agreement between The City of Edinburgh Council and the Verity Trustees Limited dated 28 October 2005 and 4 November 2005.

18.2 Associated Documents: email, 4 plans, 2 letters, objection letter, 2 notices of objection, 2 unsigned agreements.

ETL 2 AGREEMENTS

19. BAA Edinburgh Airport

19.1 Minute of Agreement between The City of Edinburgh Council and Edinburgh Airport Limited dated 14 September 2005.

19.2 Associated Documents: meeting note, airport masterplan, combined utilities plan, signed depot plan, signed terminal plan, signed plan, draft minute of agreement, signed agreement, 8 emails, 3 letters, 2 draft letters.

19.3 Licence between The City of Edinburgh Council and Edinburgh Airport Limited dated 28 January and 25 February 2008.

19.4 Agreement to Lease between The City of Edinburgh Council and Edinburgh Airport Limited dated 20 and 25 February 2008.

20. BRB Residuary

20.1 Minute of Agreement between The City of Edinburgh Council and BRB (Residuary) Limited dated 31 January 2006 and 9 February 2006.

20.2 Associated Documents: objection letter (line 1), objection letter (line 2).

21. Clerical Medical Investment Group

21.1 Minute of Agreement between The City of Edinburgh Council and the Clerical Medical Investment Group with the consent of Clerical Medical and General Life Assurance Society dated 2 June 2006 and 14 June 2006.

21.2 Associated Documents: objection letter, letter of closure.

22. FSH Nominees Limited

22.1 Minute of Agreement between The City of Edinburgh Council and FSH Nominees Limited and FSH (Edinburgh) Services Limited and Frogmore Developments Limited and Salmon Harvester Properties Limited dated 25 November 2005 and 2 December 2005 and 6 December 2005.

22.2 Associated Documents: position statement, COCP, Unsigned agreement, plan, email, objection letter.

23. Marshall Food Group Limited (Grampian Country Foods)

23.1 Minute of Agreement between the City of Edinburgh Council and Marshall Food Group Limited dated 14 and 23 September 2005.

23.2 Associated Documents: Recommendation letter, drawing, unsigned agreement, report, objection letter.

24. RJ and JB McLean

24.1 Missives between The City of Edinburgh Council and Roderick James McLean and Julie Bremner McLean dated October 2005.

24.2 Associated Documents: Letter enclosing missives, drawing and objection letter.

25. JPSE Limited (Jenners)

25.1 Minute of Agreement between The City of Edinburgh Council and JPSE Limited dated 18 January 2006 and 27 January 2006.

25.2 Associated Documents: revised - unsigned agreement, plan, unsigned agreement, objection letter, unrevised - unsigned agreement, plan, signed drawing, signed agreement, signed agreement, objection letter.

26. McDonalds Restaurant Limited

26.1 Minute of Agreement between The City of Edinburgh Council and McDonalds Restaurant Limited dated 8 November 2005 and 18 January 2005.

26.2 Associated Documents: letter enclosing agreement, COCP, signed agreement, objection letter.

27. Murrayfield Indoor Sports Club

27.1 Minute of Agreement between The City of Edinburgh Council and George Russell, George Manson, John Small, the trustees of Murrayfield Indoor Sports Club dated 25 October 2005 and 2 November 2005.

27.2 Associated Documents: Drawing, unsigned agreement, objection letter.

28. New Edinburgh Limited

28.1 Minute of Agreement between The City of Edinburgh Council and Edinburgh Park (Management) Limited dated 7 October 2005 and 4 October 2005.

28.2 Associated Documents: Letter from The City of Edinburgh Council to New Edinburgh Limited dated 7 October 2005, plan 1 included within s75 agreement, plan 2 Revision L, Plan 5, 4 signed drawings, signed agreement.

29. New Ingliston Limited

29.1 Minute of Agreement between The City of Edinburgh Council and New Ingliston Limited and Highland Properties Limited dated 8 November 2005 and 9 November 2005.

29.2 Associated Documents: 3 letters, 1 withdrawal letter, 1 letter from planning committee, COCP, 3 plans, unsigned agreement, 2 objection letters, summary report.

30. Trustees of Hanover Property Unit Trust

30.1 Minute of Agreement between The City of Edinburgh Council and Trustees of Hanover Property Unit Trust and RBSI Custody Bank Limited and RBSI Trust Company Limited dated 12 October 2005 and 12 December 2005.

30.2 Associated Documents: drawing, 2 objection letters, report, unsigned agreement.

31. The Royal Highland Agricultural Society of Scotland

31.1 Minute of Agreement between The City of Edinburgh Council and The Royal Highland Agricultural Society of Scotland dated 8 November 2005 and 9 November 2005.

31.2 Associated Documents: 2 comfort letters, objection letter, unsigned agreement, withdrawal letter, plan.

32. Safeway Morrisons - Gyle

32.1 Agreement between The City of Edinburgh Council and Safeway Stores Limited and WM Morrison Supermarkets plc with the consent of Universities Superannuation Scheme Limited dated 13 November 2005, 24 November 2005 and 15 March 2005.

33. Stakis Limited

33.1 Minute of Agreement between The City of Edinburgh Council and Stakis Limited dated 13 September 2005 and 20 September 2005.

33.2 Associated Documents: signed agreement - position statement, 2 letters, signed pages of agreement, 3 signed plans. Unsigned agreement - objection letter, Note of telecom, copy of agreement.

34. UGC Properties Limited

34.1 Minute of Agreement between The City of Edinburgh Council and UGC Properties Limited and Unipart Automotive Limited dated 25 October 2005 and 21 November 2005.

34.2 Associated Documents: reminder letter, 2 objection letters, unsigned agreement, plan.

35. Universities Superannuation Scheme

35.1 Minute of Agreement between The City of Edinburgh Council and Universities Superannuation Scheme Limited with the consent of Safeway Stores Ltd and WM Morrison Supermarkets plc dated 15 November 2005 and 9 December 2005 and 23 December 2005.

35.2 Associated Documents: memorandum, objection letter, design manual, unsigned agreement, plan, COCP.

36. West Craigs Ltd

36.1 Minute of Agreement between The City of Edinburgh Council and Meadowfield Developments Limited dated 25 November 2005 and 28 November 2005.

36.2 Associated Documents: 2 letters, 1 objection letter, unsigned agreement, plan.

ROUTE WIDE AGREEMENTS

37. Adshel

37.1 Minute of Agreement between The City of Edinburgh Council and Adshel Limited dated 27 September 1996 and 15 October 1996.

37.2 Street Furniture Operating Lease between the City of Edinburgh Council and More Group UK Limited dated 3 August 1999 and 2 August 1999.

38. British Transport Police

38.1 Agreement letter between The City of Edinburgh Council and British Transport Police dated 11 November 2005.

38.2 Agreement letter between The City of Edinburgh Council and British Transport Police dated 11 November 2005.

38.3 Associated Documents: 2 objection letters.

39. BT

39.1 Minute of Agreement between The City of Edinburgh Council and British Telecommunications Plc dated 7 February 2006 and 25 January 2006.

39.2 Associated Documents: documental transmittal register.

40. Cable and Wireless

40.1 Minute of Agreement between The City of Edinburgh Council and Cable and Wireless UK dated 5 October 2006.

41. Easynet

41.1 Minute of Agreement between The City of Edinburgh Council and Easynet Telecommunications Limited dated 1 December 2006 and 28 November 2005.

42. Historic Scotland

42.1 Associated Documents: 2 letters, 2 objection letters, protocol.

43. Network Rail

43.1 Minute of Agreement between tie Limited and The City of Edinburgh Council and Network Rail Infrastructure Limited dated 17 June 2005 and 21 June 2005.

43.2 Asset Protection Agreement between tie Limited and The City of Edinburgh Council and Network Rail Infrastructure Limited dated 13 and 14 March 2008.

43.3 Associated Documents: 2 objection letters.

44. NTL Group Limited

44.1 Minute of Agreement between **tie** and The City of Edinburgh Council and NTL Group Limited and NTL National Networks Limited dated 17 October 2005 and 18 October 2005 and 10 October 2005.

44.2 Associated Documents: objection letter.

45. Royal Mail

45.1 Minute of Agreement between The City of Edinburgh Council and Royal Mail Group Plc and Post Office Limited dated 2 March 2006 and 8 February 2006.

45.2 Associated Documents: 2 letters, objection letter.

46. First Scotrail

46.1 Minute of Agreement between The City of Edinburgh Council and tie Limited and The City of Edinburgh Council and First Scotrail Limited dated 1 November 2005 and 27 October 2005.

46.2 Associated Documents: proposal, 4 letters, 2 objection letters.

47. Scottish Water

47.1 Minute of Agreement between tie Limited and The City of Edinburgh Council and Scottish Water dated 20 June, 23 June and 3 August 2005.

47.2 Associated Documents: 2 objection letters, 1 letter.

48. Thus PLC

48.1 Minute of Agreement between tie Limited and The City of Edinburgh Council and Thus Plc dated 7 December 2005 and 1 December 2005.

49. Transco PLC

49.1 Minute of Agreement between tie Limited and The City of Edinburgh Council and Transco Plc and Scottish Gas Networks Limited.

49.2 Side letter dated 7 December 2005.

49.3 Associated Document: 4 objection letters and 1 letter

SECTION 75 AGREEMENTS

50. CAPITAL CITY HOMES - OUT WITH LoD

50.1 Letter enclosing Minute of Agreement between The City of Edinburgh Council and Capital City Homes dated 5 January 2006 and 9 January 2006.

50.2 Letter enclosing Minute of Agreement between The City of Edinburgh Council and Capital City Homes dated 20 January 2006 and 26 January 2006.

50.3 Letter enclosing Minute of Agreement between The City of Edinburgh Council and Capital City Homes dated 7 November 2006 and 11 November 2006.

51. CLYDESIDE INVESTMENT PROPERTIES

51.1 Letter enclosing Minute of Agreement between The City of Edinburgh Council and Clydeside Investment Properties dated 14 November 2005 and 23 November 2005.

52. FORTH PORTS - Granton Harbour

52.1 Minute of Agreement between The City of Edinburgh Council and Forth Ports Plc dated 19 June 2003 and 20 June 2003.

52.2 Minute of Agreement between The City of Edinburgh Council and Forth Ports Plc dated 28 June 2002

53. NEL

53.1 Letter enclosing Minute of Agreement between The City of Edinburgh Council and New Edinburgh Limited and tie Ltd and The Edinburgh Branded Hotel and Leisure LLP with the consent of The Governor and Company of The Bank of Scotland dated 17, 19, 23, 13 August 2005 and 1 and 8 September 2005.

53.2 Letter enclosing Minute of Agreement between The City of Edinburgh Council and New Edinburgh Limited with the consent of The Governor and company of the Bank of Scotland dated 5 December 2006 and 9 January 2006.

54. RBS - GOGAR

54.1 Minute of Agreement between The City of Edinburgh Council and The Royal Bank of Scotland Plc dated 6 November 2002 and 8 November 2002.

54.2 Associated Documents: 5 photos, 9 emails, meeting note, GI Survey Report 1, GI Survey Report 2, GI Survey Report 3, GI Survey Report 4, GI Survey Report 5, Gogarburn Tram Stop Cost Excel 1, Gogarburn Tramstop Costs version 2, draft minute of amendment, RBS-CEC meeting agenda, RBS meeting note, 2 letters to I Turnball, 1 draft letter, 4 plans.

55. SECONDSITE - PORT GREENWICH

55.1 Minute of Agreement between The City of Edinburgh Council Limited and Port Greenwich Limited dated 28 February 2006.

55.2 Associated Documents: 2 objection letters, 2 accompanying drawings, letter to accompany minute of agreement, s75 agreement.

56. SKILLS EXPRESS - OUTWITH LoD

56.1 Letter enclosing Minute of Agreement between The City of Edinburgh Council and Skill Express Limited dated 27 April 2005 and 3 May 2005.

57. TUSCAN DAWN - OUTWITH LoD

57.1 Letter enclosing Minute of Agreement between The City of Edinburgh Council and Tuscan Dawn Limited dated 29 September 2005 and 3 October 2005.

FURTHER AGREEMENTS

58. Marks & Spencer Plc

58.1 Minute of Agreement is in draft form and is not available - terms match the Safeway Stores and WM Morrisons Agreement. Relevant obligations have been flowed down to Schedule 13.

59. Edinburgh and Lothian Badgers Group

59.1 Letter to Patricia Alderson, Edinburgh and Lothian Badgers Group dated 18 November 2005 (ETL 1).

59.2 Letter to Patricia Alderson, Edinburgh and Lothian Badgers Group dated 7 November 2005 (ETL 2).

A. **CLOSURES**

	ETL 1
1.	**CALA MANAGEMENT - CONSTITUTION ST.** Letter to Kevin Whitaker, Cala Management from **tie**, dated 7 September 2005. Letter to Jane Sutherland, PBU from Ledingham Chalmers regarding CALA Management Limited dated 8 September 2005.
2.	**DEWAR, R - NEW ORCHARDFIELD** Letter to Robert Dewar from **tie** dated 3 November 2006.
3.	**S. FRAME - TELFORD DR.** Letter to Simon Frame from **tie** dated 19 March 2007.
4.	NORMAN, DOWNIE & KERR - CONSTITUTION ST. Letter to Jack Kerr, from **tie** dated 14 September 2005.
5.	J. PEARSON, OCEAN DRIVE Letter to Ewan Kennedy, from **tie**, dated 25 August 2005 enclosing letter to J. Pearson, from **tie**, dated 19 August 2005. Letter to Ms. J.H. Pearson from **tie**, dated 17 March 2005 Letter to Judith Pearson from **tie**, dated 21 February 2006. Draft Minute of Agreement, dated 17 May 2005
6.	M. SCOTT, OCEAN DRIVE Letter to Mr. Scott from **tie** dated 2 February 2007.
	ETL 1 + 2
7.	**SCOTTISH ENTERPRISE - HAYMARKET** Letter to Kirsty Ramsay from **tie** dated 15 February 2007

8.	**VERISCOLOUR - CLIFFORD TERRACE** Letter to Bonar Mackenzie dayed 14 September 2005
	ETL 2
9.	**COLLINSON CERAMICS** Letter of Closure from **tie** Limited to Collinson Ceramics dated 19 October 2005.
10.	**CUSTOM PROJECTS LIMITED - ROSEBURN STREET** Draft Minute of Agreement between The City of Edinburgh Council and Customs Projects Limited.
11.	**FRANK EARLEY (PROLAMINATES)** Correspondence with Frank Earley dated 5 April 2007.
12.	**GRAY'S MILL COACHWORKS** Draft Minute of Agreement between The City of Edinburgh Council and Gray's Mill Coachworks.
13.	**D. KAUR** Letters to Davidson Chalmers LLP regarding Dalwinder Kaur dated 21 October and 18 November 2005.
14.	**MRM COACHWORKS** Letter of Closure to Mr. James Gibb from **tie** dated September 2005
15.	**NATIONAL CAR PARKS** Letter of Closure to Mr. Sutherland from **tie** dated 14 November 2005 Draft Minute of Agreement between The City of Edinburgh Council, Norwich Union Life and Pensions Limited, National Car Parks Limited and George Watt Limited.

16. NATS LIMITED Email from Kate Shudall to Elaine Cropley dated 22 January 2007.
17. NCR VANGUARD Letter of Closure from **tie** Limited to Vanguard Rental (UK) Limited dated 11 October 2005.
18. NULAP Letter to NULAP from **tie** dated 23 September 2005.
19. PD LABELS Letter to PD Labels from **tie** date 16 September 2005 Draft Minute of Agreement between The City of Edinburgh Council and PD Labels.
20. TNT EXPRESS Letter to AD Pratt regarding TNT Express Services UK and Ireland dated 10 January 2007.
21. VIKING INTERNATIONAL (T/A STEPGRADE MOTOR ACCESSORIES LIMITED) Letter of Closure from **tie** Limited to Fairhurst Estates Limited in relation to Viking International dated 11 October 2005.

B. COMFORTS AND ASSURANCES

CLG ASSURANCES
Please see separate **tie** summary of CLG Commitments (version 2) dated 24 August 2007 (contained on CD).
1. BAIRD DRIVE CLG
2. CRAIGLEITH CLG
3. DRYLAW TELFORD RESIDENTS
4. ELBG - BADGER GROUP

5.	FRUWCA - ROSEBURN CORRIDOR
6.	**GARSCUBE TERRACE RESIDENTS**
7.	GROATHILL AVENUE RESIDENTS
8.	**LEITH BLG**
9.	**LEITH CLG**
10.	LOWER GRANTON ROAD CLG
11.	**RATHO STATION CLG**
12.	**ROSEBURN BLG**
13.	**ROSEBURN CORRIDOR PUBLIC NOTICE** (in relation to environmental mitigation)
14.	TRINITY STARBANK CLG
15.	**WEST END CLG**
	ETL 1
22.	**ABERCASTLE HOLDINGS - TOWER PLACE** Letter to Mrs Dewar, Burness, in relation to Abercastle Holdings, from **tie** dated 5 November 2007.
23.	**ALEXANDER LATTO** Letter to Derek Latto from **tie** dated 2 September 2005.
24.	**G BARKER** Letter to G Barker dated 11 October 2005.
25.	**BAXTERS** Letter to Mr McLuckie (Baxters Foodservice Ltd) dated 5 November 2007.
26.	**BHS**

	Letter to Biggart Baillie Solicitors regarding BHS Ltd. dated 21 May 2007.
27.	**A BOURNE** Letter to Alison Bourne dated 13 January 2005.
28.	**MR & MRS CAMPBELL** Letter to Mr Ken Robertson dated 5 November 2007.
29.	**J CAMPBELTON** Letter to John Campbelton regarding Plot 30 - Tower Street dated 20 December 2006.
30.	**CARDPOINT** Letter to Sharon Riley (Cardpoint) dated 5 November 2007.
31.	**CAVERSHAM TRADING** Letter to Gillespie MacAndrew WS LLP regarding Caversham Trading Limited dated 10 January 2007.
32.	**CEC (THOMSON G)** Email to Clare Norman and George Duke regarding CEC buildings on Smith Place dated 21 December 2006.
33.	**MR AND MRS CLARKE** Letter to MR M and Ms D Clarke dated 22 April 2005.
34.	**CONELL - GUARINO** Letter to Ms Irene Connel-Guarino regarding Plot 30-Tower Street dated 4 January 2007.
35.	**MS C CONNOR** Email from Elaine Cropley in relation to Caryn Connor dated 25 October 2007, attaching email from Pauline Goldie to Caryn Connor dated 24 October 2007.
36.	**MR AND MRS CRASKE**

Letter to John and Alison Craske dated 24 March 2005.
37. A DEAN Letter to Anthony White and Ann Dean dated 24 March 2005.
38. DEBENHAMS Letter to Biggart Baillie Solicitors regarding Debenhams Plc dated 21 May 2007.
39. MR DEGG Email to Mr Degg regarding Ocean Drive dated 21 December 2006.
40. MR DONAGHUE Letter to Mr D Donaghue dated 24 March 2005 and letter to Mr D Donaghue dated 22 April 2005.
41. F DOUGLAS Letter to Fiona Douglas regarding Plot 30 - Tower Street dated 11 December 2006.
42. KJ DREW Letter to Ms Kristian Jayne Drew dated 5 November 2007.
43. R DRYSDALE Letter to Mr R Drysdale dated 24 March 2005.
44. G DUFF Email to Graham Duff dated 20 April 2005.
45. G&A DUNCAN Letter to George & Audrey Aileen Duncan dated 21 December 2006.
46. EDINBURGH MASONIC CLUB Letter to Walter Sneddon dated 27 January 2005.

47. MS L FLEMING Email from Elaine Cropley dated 25 October 2007, attaching email from Alasdair Sim to Laura Fleming dated 24 October 2007.
48. MRS MEM FORREST Letter to Mrs Forrest dated 22 April 2005.
49. C FOSTER Letter to Christopher Foster dated 3 November 2006.
50. GARLANDS Letter to Gillian Nicoll of Garlands Florists dated 10 July 2007.
51. S GAYNOR - TOWER STREET Email to Sheila Gaynor dated 21 December 2006.
52. F GERMI - ELM ROW Letter to Francesco Germi dated 17 March 2005.
53. MR GHULAM Note of meeting between Andy Dixon, Bob Clarke and Mr Ghulam dated 14 November 2006.
54. G GILBERT - OCEAN DR Letter to Gary Gilbert dated 19 February 2004.
55. AM GILLON Letter to Anne Marie Gillon dated 11 December 2006.
56. L HAGGERTY & L HILL Draft Letter to Ms L Haggerty and Ms L Hill dated 17 March 2005.

57.	**MR HANNAN AND SPENCE** Draft Letter to Ms Spence and Mr Hannan dated 22 April 2005.
58.	**M HETHERINGTON - TOWER STREET** Letter to Leslie Wolfson & Co regarding Murray Hetherington dated 10 January 2007.
59.	**MR AND MRS HUDSON** Draft Letter to Lorna and Nick Hudson dated 11 April 2005.
60.	**E. INNES - CONSTITUTION STREET** Draft Letter to Eric Innes dated 17 March 2005, issued by email on 11 April 2005.
61.	**IRISH LIFE ASSURANCE** Email to Caroline Hood regarding Ocean Point dated 21 December 2006.
62.	**MR AND MRS JOY** Letter to Mr and Mrs Joy dated 3 March 2006.
63.	**MR AND MRS KANE - LEITH WALK** Letter to Mrs Kane dated 10 July 2007
64.	**R KEEN** Letters to Ms Rachel Keen dated 17 March 2005, 15 January 2007 and 29 January 2007.
65.	**MR AND MRS LAIRD - OCEAN WAY** Notes of Meeting between Andy Dixon, Bob Clarke and Mr & Mrs Laird dated 14 February 2007.
66.	**PROF LANG - OCEAN DRIVE** Letter to Professor Margaret Lang dated 21 December 2006.

67.	**LOTHIAN HEALTHCARE - LEITH WALK** Letter to Murray Duncanson, Chief Executive, Lothian Primary Care NHS Trust dated 20 March 2006.
68.	**F&G LOW - OCEAN DRIVE** Letter to Georgia Low dated 19 February 2004 and acknowledgement from Fergus Low dated 11 March 2004.
69.	**MAD JACKS BACK - ELM ROW** Letter to Kate Mackenzie dated 9 July 2007.
70.	**L MARSH - CONSTITUTION STREET** Letter to Lynne Marsh regarding Plot 30 - Tower Street dated 11 December 2006, and email dated 11 December 2006.
71.	**MR MCKEOWN - COLTBRIDGE AVENUE** Email to Brian McKeown dated 2 November 2006.
72.	**C MCLEOD - CRAIGLEITH ROAD** Email to Steve Mitchell regarding Carolyn McLeod dated 12 August 2005.
73.	**L MCNAUGHT - CONSTITUTION STREET** Letter to Mrs Lee-Anne McNaught dated 18 October 2005.
74.	**H & O MILNE** Letter to Odell Milne regarding Wester Coates Terrace dated 5 December 2006. Letter from Odell Milne dated 22 May 2007.
75.	**MR MINTO** Minute of Meeting regarding Mr Minto dated 26 March 2004.

76.	**MR & MRS MURPHY** Letter to Ms Jill Murphy dated 27 July 2005. Letter to Adams Lawyers and Estate Agents dated 1 November 2005. Letter from **tie** Limited to Mr and Mrs Murphy dated 22 December 2005.
77.	**D O'CARROLL** Letter to Derek O'Carroll dated 17 March 2005.
78.	**MR & MRS PARNELL** Draft letter to Karen Hamilton regarding Andrew & Birgitta Parnell.
79.	**MS PEIFFER - TOWER STREET** Letter to Doreen Peiffer regarding Plot 30 - Tower Street dated 8 January 2007.
80.	**MR PENDER** Email to Martin Pender dated 15 March 2005.
81.	**POLICE BOX COFFEE BARS** Letters to Gordon Coutts Thomson dated 20 January 2005 and various "chasers".
82.	**A PRITCHARD** Email to Mr Pritchard, undated.
83.	**F RENNIE** Letter to Mrs F Rennie regarding Plot 30 - Tower Street dated 11 December 2006.
84.	**C ROONEY** Letter to Ms C Rooney dated 24 March 2005.
85.	**N SANTER** Email to Nicki Santer dated 18 October 2007.

86.	**S SCOTLAND** Letter to Miss Samantha Scotland regarding Plot 30 - Tower Street dated 22 January 2007.
87.	**M SCOTT - OCEAN DRIVE** Letter to Marshall Scott regarding Ocean Drive dated 4 January 2007.
88.	**SCOTTISH NATURAL HERITAGE** Letter to Jane Sutherland regarding Scottish Natural Heritage dated 26 August 2005 and letter to Iain Rennick, Scottish Natural Heritage, dated 26 August 2005.
89.	**N SHEEHAN - TOWER STREET** Letter to Natalie Sheehan regarding Plot 20 - 4/6 Constitution Street dated 4 February 2004.
90.	**I SHIRLEY - TIMBER BUSH** Letter to Ian Shirley dated 19 June 2006.
91.	**MRS SMITH - RENNIE'S ISLE** Letter to Mrs Smith dated 5 November 2007.
92.	**C SPROTT - TOWER PLACE** Letter to Ms Sprott dated 20 February 2007.
93.	**N STANSFIELD** Letter to Nick Stansfield dated 10 July 2007.
94.	**P TOSH** Letter to Pamela Tosh and Neil Willett dated 22 April 2005.
95.	**TRADITIONAL BARBERS - LEITH WALK** Letter to Janet Dunbar regarding Traditional Barbers dated 9 July 2007.

96.	**WEL - WEST HARBOUR ROAD** Letter to Colin MacKenzie from Waterfront Edinburgh Limited dated 3 January 2007.
97.	**JB WILKEN** Letter to JB Wilken dated 22 April 2005.
98.	**B WILLIAMS - TOWER STREET** Letter to Gordon D Hamilton regarding Mrs B Williams, Plot 30 - Tower Street dated 22 January 2007.
99.	**YES INDEED** Letter to Mr David Levy of Yes Indeed t/a Dead Sea Spa dated 5 November 2007.
	ETL 1 + 2
100.	**CLOWES DEVELOPMENTS - COATES CRESCENT** Letter to Ms Alison Welsh regarding Clowes Development (Scotland) Ltd. dated 18 December 2006.
101.	**MR CULLEN - BALBIRNIE PLACE** Email to Elaine Cropley regarding telephone call between Geoff Duke and Mr Cullen dated 12 December 2006.
102.	**M DUTHIE - ROSEBURN MALTINGS** Letter to Margaret Duthie dated 21 June 2005.
103.	**EURO - HOSTELS - PRINCES STREET** Email to Ian Curry regarding Euro-Hostels dated 9 December 2005.
104.	**A HARKNESS - ATHOLL PLACE** Letter to Alistair Harkness dated 17 March 2005.

105.	**HAYMARKET YARDS LTD** See Minute of Agreement dated 27 October 2005.
106.	**HODKINSON & MITCHELL - ROSEBURN MALTINGS** Letter to Darren Hodkinson and Jacqueline Mitchell dated 16 September 2005 and email to Darren Hodkinson dated 26 July 2006.
107.	**I MUNRO - BALBIRNIE PLACE** Email to Mr Munro dated 12 July 2005.
108.	**NEW LOOK RETAILERS** Letter to Biggart Baillie Solicitors regarding New Look Retailers Ltd dated 21 May 2007 and email to Anna Veal, New Look dated 22 January 2007.
109.	**H REYNOLDS - BALBIRNIE PLACE** Letter to Miss H. T. Reynolds dated 30 May 2005.
110.	**J ROBERTSON - BALBIRNIE PLACE** Letter to Jane Robertson dated 25 July 2005.
111.	**L SMITH - ROSEBURN MALTINGS** Letter to Lynsey Smith dated 18 October 2005.
112.	**STARBUCKS** Letter to Biggart Baillie Solicitors regarding Starbucks Coofee Company Ltd dated 21 May 2007.
113.	**C SYME - BALBIRNIE PLACE** Letter to Christian Syme dated 7 April 2005.

ETL 2
114. E BALL Letter to Mrs E. J. Ball dated 30 May 2005.
115. D BREWSTER Letter to Mr D Brewster dated 15 October 2003.
116. CHRIS HOLMES CABINET MAKERS Letter to Chris Holmes dated 3 November 2005 attaching Schedule of Undertakings. Meeting between Chris Holmes, Julie Logan and Richard Walker dated 21 September 2005.
117. DAVID FLATMAN LTD Note of telephone call from Lizzie Flatman dated 3 November 2006.
118. A HAMILTON Letter to Mr Hamilton and Ms Sansom dated 17 August 2004 and various.
119. L. McTIGHE Notes of meeting between Geoff Duke, Cliff Hutt, Alasdair Sim and Libby McTighe dated 26 May 2004.
120. ROSEBURN GARAGE Letter to Mr Khalil, Roseburn Motors, dated 21 October 2005 and letter dated 30 September 2005.
121. MR AND MRS SEATH Emails between various in March 2005 in relation to badgers at Gogar Castle. Email from Caroline Stornie to David Milne in relation to Mr and Mrs Seath dated 23 May 2007.

122.	**SERVISAIR** Letter to Jim Shapton, Servisair (UK) Ltd, dated 16 November 2005 enclosing Schedule of Undertakings. Preceding correspondence.
123.	**STAPLES UK RETAIL LTD PLOT** Letter to Richard Smalley dated 21 December 2006.
124.	**J STEVENSON** Letter to Jeffrey Stevenson dated 23 June 2005.
125.	**THAMES RICO - NEWBRIDGE SERVICE STATION** Letter to Sarah MacLeod re Thames Rico, dated 21 April 2006 enclosing letter of comfort and draft Side Agreement.
126.	**P TORRENT** Email to Peter Torrent dated 21 December 2006.
127.	**K WILSON** Letters to K Wilson dated 3 August 2005, 30 March 2005 and 11 October 2005.

C. LICENCES

128.	**EAL** Licence between CEC and Edinburgh Airport Limited (undated version)
129.	**FORTH PORTS** Licence to Occupy by Forth Ports plc in favour of CEC, dated 29 March 2007. Letter from D & W to **tie** dated 3 April 2007 enclosing Forth Ports Licence.
130.	**NIL**

Licence to Occupy by New Ingliston Limited in favour of CEC, dated 21 June 2007 and 22 June 2007.
131. WEST CRAIGS Licence to Occupy by West Craigs Limited in favour of CEC, dated 25 June 2007 and 3 July 2007.

D. UNDERTAKINGS

ETL 1
132. A BOURNE Letter to Mrs A Bourne dated 30 May 2005. Letter to "Resident" dated 16 December 2004. Letter to Mrs Bourne dated 13 January 2005.
133. M CLARKE Letter to Mark Clarke dated 21 February 2006.
134. P CRAIK Letter to Patricia Craik dated 29 June 2005. Letter to P Craik dated 12 January 2005
135. D HARTE - CONSTITUTION STREET Email to Deirdre Harte dated 18 July 2006.
136. J MURPHY Letter to Mr and Mrs Murphy dated 22 December 2005.
137. J PEARSON Letter to Judith Pearson dated 21 February 2006.

138.	**POLICE BOX COFFEE BARS - PICARDY PLACE**
	Letter to Gordon Coutts Thomson dated 20 January 2005 and various "chaser" letters.
139.	**WCTAG - WESTER COATES**
	Letters to Odell Milne dated 21 February 2006.
140.	**WESTERN GENERAL HOSPITAL**
	Letter to Professor James Barbour OBE, NHS Lothian, dated 6 February 2006.
	ETL 2
141.	**BEAUCHAMP INVESTMENTS - RUSSELL ROAD**
	Letter to Tim Mallett dated 11 August 2005.
	Letter to John Lee, ASO Property Services (UK) Ltd, dated 2 May 2007.
	Letter to Joanne Plant, Farningham McCreadie Partnership re Royal Mail Sorting Office, dated 2 May 2007.
	Emails between D & W and tie and tie and David Marwick.
142.	**EDINBURGH LEISURE - CARRICK KNOWE GOLF COURSE**
	Email to Alasdair Dunlop dated 15 January 2007.
143.	**REDPATH MCLEAN - RUSSELL ROAD**
	Email in relation to call with Keith McLean dated 23 March 2007.

APPENDIX PART 7

Part A - Letter of Instruction dated 5 May 2008

Steve Reynolds
Persons Brinckerhoff
Citypoint
65 Haymarket Terrace
Edinburgh
EH12 5HD

Our Ref: PD.CORR.071SB/JS

Date: 5 May 2008

Dear Steve,

Employer's Requirements Alignment Review

tie instructed SDS to carry out reviews of its design against the Employer's Requirements version 3.5a "to identify areas of misalignment included in the SDS scope". SDS delivered its review to **tie** on 16 April.

I wrote to you on 23 April setting out **tie**'s clarifications and instructions following your review of the Employer's Requirements. Since that letter my team has been working with yours to provide some further clarification where that has been necessary and helpful. This letter therefore expands on and supersedes that earlier letter.

SDS has subsequently been instructed to update that review to take account of version 4 of the Employer's Requirements (ERs).

As your review was conducted in parallel with the review of the Infraco proposals it highlighted a number of issues that have been tackled in the exercise to align the SDS design with the Infraco proposals. Those issues are dealt with in a separate letter.

The SDS review also raised comments about a number of areas that are not within the scope of work that SDS still needs to complete. Those comments are rendered redundant by agreement on the scope of work to complete and confirmation of omissions and so are not dealt with in this letter.

This leaves a small number of issues where **tie** needs to clarify issues and/or instruct SDS to change its current design.

Provision of a Standby Generator at the Depot

I can confirm that it is no longer **tie**'s intention to have a permanent diesel standby generator facility (including associated housing) at the depot Instead there should be provision of hard standing for a temporary generator including the necessary service connections.

tie instructs SDS to update its drawings to reflect this situation.

Tram vehicle

SDS has already had a large amount of information about the chosen CAF tram including DKE analysis, loading information for the vehicle and for structures and confirmation of the tram length.

Following finalisation of the Tram Supply Agreement (which will coincide with signature of the Infraco contract and SDS Novation) **tie** will issue SDS with the technical information that accompanies the signed Tram Supply Agreement. Where this contains information not previously released to SDS and

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Direct dial: [redacted]
e-mail:steven.bell@tie.ltd.uk
web www.tie.ltd.uk
Registered in Scotland No. [redacted]

changes. Where there are subsequent changes to that tram vehicle technical information that impact on the Infrastructure design tie will instruct the relevant changes.

Tram Stop Equipment

tie confirms that the tram stop equipment to be included in the design is as set out in the Schedule attached to Scott Ney's e-mail to Neil Renilson of 28 January 2008 at 1346 with the following changes:

- Public Announcement system to be provided at Edinburgh Airport tramstop with the capability of announcements being relayed from the Tram control centre and from the kiosk at Edinburgh Airport
- Cycle parking to be provided at Gogarburn tramstop as part of the detailed design to be undertaken following provision of concept design by the Royal Bank of Scotland
- Ticket machine numbers shall be changed at the following stops:
  - Ingliston Park & Ride to be 6 not 2
  - Shandwick Place to be 6 not 4
  - McDonald Road to be 4 not 2
  - Balfour Street to be 4 not 2

tie instructs SDS to complete its design including the changes set out above. tie recognises that the SDS design to date does not include ticket validators. tie does not instruct the inclusion of validators at this time.

Network diagram – ballasted track at tramstops

SDS has commented that the Network diagram issued by Siemens on 22 February 2008 includes ballasted track within certain tramstops. Following earlier consultations with HMRI and the Independent Competent Person SDS does not consider ballasted track at a tramstop to be acceptable and so the SDS design does not align with the network diagram in that respect. tie considers that this is in all probability an issue caused by the scale of the network diagram. However, for the avoidance of doubt, tie instructs SDS to continue with its existing design without ballasted track at tramstops.

Depot staffing

SDS has sought clarification on the number of staff to be allowed for at the depot. tie confirms that the 361 staff (rising to 403 once Phase 1b is in operation) would be spread across 3 shifts. tie understands that as a result the SDS design is compliant with the ERs.

Crew relief facilities

SDS has sought confirmation of the requirements for crew relief facilities at Ocean Terminal and Edinburgh Airport. At Ocean Terminal tie confirms that it is the intention that crew should use existing facilities within the Ocean Terminal complex.

tie formally withdraws Change Notice CNS109 Rev 1 for Edinburgh Airport Tram Kiosk. Instead tie instructs SDS as follows to align with the ERs:

SDS to design facilities at Edinburgh Airport tram stop as follows:

- CONCOURSE –
  - area within barriers is the "paid area";
  - whole platform and exit area to be barriered to enable ticket checking of all arriving

and departing passengers;
- standing capacity for 100 passengers within paid area;
- 2 closable gates required in barrier at entrance point;
- 2 closable gates required in barrier at exit point

- TRAVEL SHOP/INFORMATION/TICKET OFFICE
  *minimum 12 sq m incorporating –
  - 2 Customer Service hatches;
  - mains power;
  - lighting;
  - heating;
  - communications cabling connections;
  - 1 external access door from within "paid area";
  - 1 internal access door to adjacent staff toilet

- STAFF TOILET
  *additional to 12 sq m Travel Shop –
  - coterminous with Travel Office;
  - single cubicle;
  - wheelchair accessible;
  - wash hand basin;
  - hot and cold water;
  - direct "internal" access door to/from Travel Shop;
  - separate external access door from "paid area"

- TICKET VENDING MACHINES –
  - minimum 3 on exit route (within paid area);
  - minimum 6 on entrance route (outwith paid area)

- TROLLEY PARK –
  - minimum capacity 150 trolleys (stacked)

Design of these facilities (but not track) may extend beyond the Limits of Deviation where necessary up to a nominal 5 metres. This design information is required in the first instance to inform a workshop with BAA to deal with design interfaces and construction methodologies north of Eastfield Road.

Any further change to the SDS design required following that workshop shall be a **tie** change.

Picardy Place

Following further consideration of development opportunities in the Picardy Place area of Edinburgh, City of Edinburgh Council has instructed **tie** to proceed with a variant to the SDS design for a gyratory. I enclose a letter and drawings provided by CEC.

tie instructs SDS to amend its design for Picardy Place in accordance with the CEC letter and drawings with the following further clarifications and instructions arising from further discussions between CEC and stakeholders since their original letter:

- **tie** instructs SDS to incorporate the technical information supplied from TSS to develop the finalised roads design
- **tie** instructs SDS to incorporate the updated bus stop locations at Picardy Place received from TEL

tie instructs SDS urgently to prepare a revised approval plan for Picardy Place that minimises the impact of this change on the production of Issue for Construction drawings for Section 1C. This plan would need to be agreed with tie, BBS and CEC; tie would facilitate the necessary discussions to secure that agreement.

Provision of survey/setting out equipment

tie confirms that, following the recent changes to clause 3.9.3 of the ERs, SDS is required to meet its existing obligation of providing Issue for Construction drawings with setting out information but SDS is not required to provide any survey or setting out equipment – that is the responsibility of Infraco.

Systems branding

tie instructs SDS to continue with its existing design that allows for future branding details to be incorporated once these are confirmed and accepts that incorporation of final branding into SDS design in the future will be a tie change.

Design life

Further to Damian Sharp's letter of 11 March (DES-ADM-1251) on design life and for the avoidance of doubt, tie instructs that no change is required to the SDS design as a result of the relaxation of the design life criteria.

Ingliston Park & Ride

tie instructs SDS to design pedestrian access between Phase 2 of the Ingliston Park & Ride presently under construction and the tram stop in its revised location. tie further instructs SDS to design vehicular and pedestrian access between Phase 2 of the park & ride and the substation building. This design shall allow horizontal latitude for a future turnback halt on the Newbridge line.

Quality management

tie confirms that SDS's existing accreditation to ISO9001 and ISO14001, if maintained, is sufficient compliance with the Quality Management requirements of the ERs. In particular, tie accepts that ISO9004 and ISO10005 – 1995 are not required for the SDS scope of work .

Environmental Management Plan

SDS has expressed concern at the inclusion of a specific sustainability obligation in the ERs which could be interpreted as adding to SDS's existing obligations. SDS already has an obligation to design in accordance with industry good practice which includes consideration of sustainability issues and SDS considers that it has reflected this obligation in its design.

tie accepts that the inclusion of sustainability in Clause 17.3.2 of the ERs as an explicit obligation does not extend SDS's existing obligations to follow industry good practice.

Cabinets

tie clarifies that the use of "cabinets" within Section 19 of the ERs should be read to include what SDS has previously described as "panels" and "cubicles" and the associated housings.

Tramstop platform length

tie has reviewed its specification for platforms in the light of the CAF tram selected by tie and does not instruct any change to the SDS design on these grounds. tie also does not instruct any further validation studies from SDS in relation to the tramstop platform length.

New Technology

tie recognises that SDS has designed the Edinburgh Tram Network taking account of available and proven technology at the time of design development. Where any of the items of equipment that are still to be procured are outwith the technologies for which SDS might reasonably have been expected to allow, tie accepts that any changes to the infrastructure as a result of procurement of new technology would be a tie change.

Standards

Section 8 of the ERs covers standards in general. In addition there are specific references to particular standards throughout the technical sections of the complete document.

Sections 8.1 to 8.3 of the final version of the ERs make clear the obligations of Infraco in delivering the Edinburgh Tram Network as to the use of either nominated standards or, in the event that no specific UK tram standard exists, the requirement to chose an appropriate standard and to justify that choice as being applicable to tramways and to ETN in particular.

The wording of these clauses has been accepted by both BBS and CAF.

There then follows a long list of "Applicable Standards". It is noted that these standards come from a variety of organisations and sources. Orlginally these standards were only within the main body of the technical sections of the earlier versions of the ERs (v1.2 for example). At a later revision they were gathered together in this table for convenience. However they also remain in their original place in the main document. Therefore the original source and selection of these appropriate standards was made by SDS as a deliverable to tie.

This list has exhaustively been discussed with BBS. Initially it was proposed to alter this table to reflect the actual standards contained within the BBS Technical Proposals. This applied in the main to the Systems (Siemens) part of the proposals. However it was agreed that the table should be left substantially as it was but that elsewhere in the systems requirements part of the ERs alternatives would selectively be allowed. This is reflected in the revised text of later sections.

Separately at Section 17.2.6 Infraco is required to abide by the requirements of ROGS in particular for Safety Verification. Our Independent Competent Person has made the selection and justification of standards a prime issue in the assurance of tie's Safety Verification process. This is no different to the approach the HMRI would have taken under the previous legislation. However it will have to be addressed thoroughly.

Therefore when SDS presents its Design Assurance Statements the following must apply:

- SDS are required to list all of the standards from whatever source they have used in the development of their infrastructure design.
- SDS must further justify the choice of each particular standard or any proposed derogations from them as required by section 8 of the ERs v3.6b. This shall include those standards which SDS may have employed specifically to design the interfaces with the several M&E Systems together with the Trackform and the Trams. All of this will form a part of the Safety

Documentation to be provided by SDS as a part of the Inter Disciplinary Checks of the Design Packages.

BBS will be required to do likewise in developing the detailed design of the trackform and M&E Systems from that in their current proposals. CAF are required to do likewise for the tram.

It will be a BBS responsibility to ensure that overall the choice of standards will give the required System Engineering and Integration of the ETN.

If to meet these overall requirements SDS are required to review or change any standards which up to that point they have used then a Change may be appropriate. However, this will depend on SDS demonstrating that their original choice of applied standard was appropriate given their knowledge and instructions at that time.

Yours sincerely,



Steven Bell
Project Director – Edinburgh Tram

Copy to: Damian Sharp, Dennis Murray, Tony Glazebrook, Andy Steel – TSS

APPENDIX PART 7

Part B - SDS Provider's Report on Employer's Requirements dated 18 April 2008

SDS Response to tie request for comments/comparison ER V3.6, V3.5a, 3.6b and the SDS Design & Procurement Documentation.

It is noted that tie have removed a considerable amount of detailed technical information from earlier versions of their document. Such information was originally included to provide readers with clarification in respect of functionality, technical parameters, appearance, operability, etc. Its removal leaves readers to interpret and form opinions as to what is required by tie to provide the Tram service requested. This results in differing interpretations and a number of proposals all of which may be fully compliant with ties generic requirements but differ from each other.

It should also be noted that SDS have provided tie with their recommendations in the form of procurement specifications and drawings all of which have successfully been through the tie review processes during their development and some of which have been used by tie as the basis for their Infraco Procurement Process. Whilst SDS have passed comment and observations on the BBS offer (See SDS report dated 26.03.08) within the limited time made available to them SDS remain of the opinion that the responsibility for the choice of alternatives to their procurement documentatic

SDS remain firmly of the opinion that any change impact to the SDS Detail Design and associated documentation as the result of this tie policy will ne

Note

Sheet numbers on this Review Document refer to sheet numbers in ERv3.1.

SDS note changes in the Sheet Numbers of ER v3.6a and again in ER v3.6b

Readers to refer to ER Clause numbers only.

Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for information and assistance of tie GREEN - Item closed	tie Ref
	7	1.1	Bullet 1 - UTC	To carry out and or manage the design of UTC is outwith our contract. **Non-compliant.** UTC Design outwith SDS works		1
	7	1.1	Bullet 4 - Tram Supply Agreement	Need SDS to review the Tram Supply Agreement (the signed version). Require tie letter re weight/length/width. **Non-compliant**	tie have confirmed with SDS that tie accept responsibility of known or unknown impacts **tie** correspondence awaited 3.6b **tie** deleted 'as a minimum' from opening statement.	3
	7	1.1	Bullet 5 - Operators Scope	Need to see "Operators Scope of Supply as summarised". **Need to review document to assess compliance.** Tie to provide.	SDS awaiting formal issue by tie	4
	7	1.1	Bullet 7 - MUDFA	Not clear if it suggests MUDFA nominated to Infraco. Check ITN.Need to have a precise understanding what this bullet point means. Have BBS qualified their tender offer against MUDFA/Utilities work.	SDS awaiting formal issue by tie"	5
	8	1.1	Bullet 12 - Geographical Section ? Is this defined and what relevance does it have? Is it intended to have Sectional Completion which will necessitate Sectional testing, commissioning, warranty, payment etc	SDS design does not cater for geographical and /or sectional completion. **Non-compliant**	tie have confirmed with SDS that this is a BBS issue and a BBS risk relating to Systems and equipment capability" SDS remain of the opinion this refers to the introduction into service of geographical sections. SDS repeat that they have not catered for geographical or sectional completion in their work and would require additional cost and time to accommodate any implication to their work on this tie requirment.	9
	8	1.2	Bullet 18 - Stakeholder Management	SDS Stakeholder Management closed out after Detail Design workshops	tie have confirmed with SDS that this is a BBS responsibility".	8
	9	1.2	Bullet 1 - Tram Supply Agreement	Tram Agreement not viewed by SDS. **Compliance check to be done prior to signature**	tie confirmed as 2 above - tie risk	10

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for information and assistance of tie GREEN - Item closed	tie Ref
1 Introduction	9	1.2	Bullet 9 - Power Supply	Note no mention of network reinforcing the SP system (or costs).	tie have confirmed this is an Infraco responsibility and not that of SDS. Provisional Sum included by BBS SDS are of the opinion this is the SP Network Reinforcing that is refered to and not the ETN Traction Power Network reinforcing	7
	10	1.2	Bullet 1 - Free Issue Equipment	Note no list of "free issue" agreed equipment between Imfraco/Tram. Needs confirmation	tie have confirmed this is an Infraco responsibility and not that of SDS. BBS/CAF Dialogue ongoing, Impact on Siemens Scope only*.	8
	10	1.2	Bullet 2 - TVMs	Confirm the quantity and location. See comment below.(SDS design is based upon agreed quatntities of TVM's)*.	tie have advised SDS that tie/TEL to make clear and agree with SDS a process for flexing future quantities or specifications. Nothing yet forthcoming	9
	10	1.2	Bullet 12 - Generator	Still mention of Dissel Generator? Change Order to Change drawings. **Non-compliant**	tie to write to SDS confirming the way forward SDS remain confused as to which Generator tie are deleting and in what form and where is the hardstanding to be provided. tie to provide SDS with clear instructions as to their requirement	10
	11	1.2	Bullet 9 - Temp Power Supplies	Temporary power designs not in SDS scope. Note here it only describes "management of" not "design of". So who designs. **Non-compliant**	tie have confirmed with SDS that this is a BBS responsibility* SDS remain confused as to which Power Supplies tie are refering to. Is those required to bring the system into service or the site construction supplies? tie to provide SDS with clear instructions as to their requirement	11
	11	1.3	Paragraph 1 - Phase 1a/1b split	**SDS Non compliant**. Design Change required for Phase 1a/1b design separation. Note item 5 Design Drawings for 1a only to be provided. SDS do not have this. Only 1a/1b combined. Assume SDS do no further design work on Phase 1b from date of Novation and are paid for re-design and documentation of 1a? All design documentation and reports include the Design of Phase 1a & 1b for SDS.	tie to issue change order to SDS defining their requirments* The SDS design continues on the basis of a full 1a/1b construction	12
	11	1.3	Points 2,3,4,5	**Non compliant**. SDS require change order as all designs include designs to be installed as Phase 1a and 1b. Cannot be split as designed. See SDS report on subject.	As 12 above The SDS design continues on the basis of a full 1a/1b construction	13
					SDS note that certain of this Section 2 is incorrectly identified as Section 25 in the headers. SDS note that the Network Diagram - Siemens Issue 22.02.08 - proposes ballasted track within certain tramstops. This would not be acceptable to SDS nor, in the opinion of SDS HMRI or the equivalent. See SDS also letter 02.04.08 which indicates a number of other concerns in respect of this Siemens diagram.	
	19	2.6	Tram length 43.6m?	SDS Non-compliant until instructed on tram length. **Non-compliant** **SDS note that Tram length now quoted by tie as 44.0m**	tie confirmed to SDS that tie are to write to SDS confirming earlier instructions (verbal SDS(Dolan/Ennion) tie (Mathew Crose) at meeting) confirming acceptance of Depot as designed by SDS.*	14
	14	2.2	Sheet 14 - Operational Timetable - in accordance with Section 1 ?	Not defined in Section 1 of ER	SDS note text has ben corrected by tie	15
		General	Traction power Supply Isolators	The original SDS Operational & Performance (Requirement document differs from the ER's in a number of technical areas. An example is Motorised Isolators. **Non-compliant**	tie have confirmed with SDS that tie to write to SDS confirming that tie do not require Motorised Isolators throughout and that SDS will not be impacted as the result of this tie change* Awaited by SDS - tie to issue a letter to enable SDS to close out this item.	16

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for information and assistance of tie GREEN - item closed	tie Ref
2 Ops & Performance	17	2.4	Tramstop Schedule	SDS design for Picardy Place is Centre Platform. **Non-compliant**	SDS note the schedule has been corrected by tie"	17
	18	2.2	Fig 2. Network diagram	**Non-compliant.** Examples= Ocean Terminal track configuration/1a/1b split/Depot entry,.	tie have advised SDS to review BBS/Siemens Network diagram which has subsequently been commented on in the SDS review of the BBS/Siemens bid. SDS have serious concerns in respect of the Siemens proposal to put ballast through Platforms etc. This design aspect is not supported by SDS as previous experience with HMRI has shown acceptance cannot be gained.See also Section 26 trackwork below.	18
	19	2.5	Bullet 3. Staffing	Implies designed for 361 Staff. Across 3 shifts or all at once? SDS not compliant with 403 **Non-compliant**	SDS advised tie are to clarify their requirments in a letter to SDS". awaited.	19
	32	2.15	"Detail In 8"?	What is "detailed in 8"? Note, four comfort stops. Only Haymarket is designed for facilities. **Non-compliant**	Whilst the text has been corrected SDS still await instructions as to ties changed requirments	20
	33	2.16		Change required for tram punctuality measure of 99%. Not as SDS Contract wording. ("not early" changed to "no more than one minute early") **Non-compliant**	tie advised SDS this is a BBS reponsibility and they consider SDS have completed their obligation in this respect. BBS will be obliged to to "reflect the law of physics"	21
			Section 2.16 Sheet 33	Last two paragraphs. How can we design such that it operates "safely and effectively" in all modes when "failures and disruptions to tramway and/or highway" is included. **Non-compliant**	As 21 above	22
			Section 2.19 bullet 3 "Set out in"?	Still not completed. **Non-compliant**	SDS note this has been corrected	23
	9		Phase 1a/1b split	SDS design does not take account of the possible split of Phase 1a & 1b. **Non-compliant**	As 12 above	24
	10		TVMs	SDS do not have the necessary details of the TVM's to incorporate the necssary information into their design at Stops and the Depot. **Non-compliant**	As 12 above	25
	16	Fig 2	Fig 2 - Network Diagram	SDS design is not compliant with the **tie** Network Diagram **Non-compliant** Note non-controlled diagram	As 12 above - See also SDS response in 16 above	26
	19	2.8	2.6 - Stabling of Trams	Stabling of 27 Trams? Initial accomodation of 361. SDS design for 150 with initial accomodation for 100 as instructed. **Non-compliant**	As 12 above	27
	32	2.15	2.15 - Comfort Break Locations	New Comfort Break Locations identified - see also 25.6 Tram Stops - below. **Non-compliant**	tie have advised SDS that their requirments are to be as SDS design" however SDS remain unclear as to ties requirments and await an instruction.	28
	33	2.16	2.16 - Performance Monitoring	Are these Performance Monitoring Locations and if so SDS are non compliant as we have not had this information? **Non-compliant**	tie have confirmed with SDS that this is not an SDS issue and is a BBS obligation" Formal confirmation is awaited..	29
	31	2.12	Electicity consumption linked to run time model.	SDS power simulation runs by SDS only not electricity consumption. **Non-compliant.**	tie have confirmed with SDS that this is not an SDS issue and is a BBS obligation.also that Power Consumption modelling was not part of SDS role"	30
	31	2.12	Update run-time model	3 month frequency update outside SDS Agreement. **Non-compliant**	tie have confirmed with SDS that this is not an SDS issue and is a BBS obligation".	31
	32	2.1.3	Operational allowances	Changed to reflect the 1a/1b split. **Non-compliant.**	tie advised this is to be addressed in a later version" and whilst SDS note this is so SDS still require instructions on ties requirments for 1a & 1b Split.	32

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for information and assistance of tie GREEN - Item closed	tie Ref
	50	3.6.2	1st Para graph - 'using the same' or ' using a similar'. Why not specify the Design approach? - last line 'any' or 'all'	Confirm "similar" not "same".	tie have advised SDS this is to be addressed in a later version* V3.6b wording amended by tie.	
	51	3.6.2	Again reference is made to SDS whereas SDS obligations are in the SDS Agreement which is to be novated. The numerous design activities which the Infraco are to carry out appear to have been disregarded.	Require recognition of Infraco design	Even though it may be covered in the proposed Scope Split SDS remain of the opinion that the design responsibilities of the Infraco should be recognised in this clause. As is stated in V3.6 the SDS design 'approach' shall be set out in SDS Agreement however for the avoidance of doubt SDS can see no reason why the Infraco Design responsibilities should not be clear and unambiguous. *This is an important and urgent item to be agreed/confirmed with tie/SDS/Infraco (Prior to novation):*	
	53	3.6.3	Modelling for Temporary Traffic diversions and Impacts	Not an SDS obligation.	tie have advised SDS that this is not an SDS obligation but that BBS may request SDS to manage/procure modelling which will be the subject of a separate discussion and SDS assume agreement.* SDS consider this can only be progressed by means of a Change Instruction to SDS to carry out any modelling. Full scope to be provided by tie for SDS consideration. SDS note in ER v3.6b that this obligation has been left in and SDS remain of the opinion, as has been verified by tie in thier Email referenced below, this is not an SDS responsibility.	
	42	3.1	Section 3.1- The definitions/descriptions are not the same as SDS Agreement. Clarity is required by tie where differences occur. SDS will not be responsible for claims that BBS definition leads in hierachy when SDS is Novated.	Table 19 contains many abbreviations although headed definitions. **Non-compliant**	tie have confirmed this issue is to be sorted by tie Project Director to the satisfaction of SDS* - As at the date of this report SDS still await clarification. Transdev defined as the Operator does this comply with ROGS which SDS note is not referenced?	
	42	3.1		Approval and Consents, **Non Compliant.** This is an example as the ER's Definitions are not in accordance with SDS Agreement Definitions. Other examples,	As 36 above	
	42	3.1		Operator. (Read Transdev). No ref to TEL as Operator.	As 36 above	
	42	3.1		GSN - Goal Structured Notation In SDS GSN - Global Structured Notation	As 36 above	
	42	3.1		Consents	As 36 above	
	42	3.1		DDA 1995 missing in ER's	As 36 above	
	42	3.1		DKE- Different in content	As 36 above	
	42	3.1		EMC- Electromatic Magnetic Current	As 36 above	
	42	3.1		Environmental Statement	As 36 above	
	42	3.1		JRC	As 36 above	
	42	3.1		Review Procedure	As 36 above	
	42	3.1		Service Commencement date+	As 36 above	
	46	3.5	Submittals Schedule	Not seen by SDS. Cannot sign up to this until viewed/studied. **Non-compliant**	tie have confirmed with SDS that this is not an SDS obligation*. Formal confirmation required	

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for information and assistance of tie GREEN - Item closed	tie Ref
3 General	50	3..6.1	1st bullet point	Co-ordination not the responsibility of SDS. **Non-compliant**	tie have confirmed with SDS that these words do not oblige SDS to coordinate" Formal confirmation required	49
	51	3.6.2	last bullet Point.	Updates to the documents as listed is outwith SDS Scope. **Non-compliant.**	tie have confirmed with SDS that they are only obliged to fulfil their requirements under their contract however Mathew Crosse will review this particular SDS concern" Nothing has been forthcoming. SDS remain concerned at the wording of this sub clause . As BBS are responsible for the 'complete design of the ETN including the achievement of full compliance with the ER's'. SDS assumes this includes the responsibility for the SDS work which forms part of the overall design however tie have already reviewed significant elements of such work and used it for procurement purposes.. Bearing in mind the dilution of the Employers Requirements and the fact that they are now open to numerous interpretations then SDS have a concern that tie may put a different interpretation on what has been considered by them to comply with the ER's. Despite the SDS design and procurement documentation having passed through the quite vigorous tie review procedure comments have already been made by tie that SDS have over-engineered elements their design.	50
	51	3.6.3	SDS obligations	Reference is made to SDS whereas SDS obligations are in the SDS Agreement which is to be novated. The numerous design activities which the Infraco are to carry out appear to have been disregarded. **Non-compliant.**	tie advised this is to be addressed in a later version" however ... PARK pending BBS approval and acceptance of SDS suggested revised wording to these issues SDs remain of the opinion that this issue has not been adequatly addresses even though consideration is being given to theinclusion of a Scope Split document. As was requested by tie, SDS have provided BBS with some proposed revised wording to replace wording in their bid document however the BBS response does not, in the opinion of SDS, provide sufficient protection to ALL parties thus minimising the risk of misunderstandings in the future and impact on the ETN Project.	51
	53	3.6.3	SDS obligations complete.	**Non- compliant.** Modelling for Temporary Traffic diversions. TTRO to be the sole responsibility of BBS. **Non-compliant**	As 35 above	52
				What is meant by 'any new technologies'.? There is much 'new' that the Infraco are to provide as part of their Works. Note	tie advised this is to be addressed in a later version" however SDS note wording remains in v 3.6a. SDS cannot be responsible for theimplications of the introduction of new technology whatsoever form it is and would seek cost and time implcations of any inpact on their works.	53
	49	3.5	Section 3.5 - Errors in bookmark.	Requires completion before signing. Errors in bookmark.	tie advised this is a 'typo' and will be clarified in later version" **Appears V3.6a corrected.**	54
	50	3.6.2	Section 3.6 - Design	Note. "Design" not defined in Contract Definitions.	tie have advised SDS that they are of the opinion this term does not require to be defined" SDS remain of the opinion that the various roles and responsibilities are to be identified, scheduled and agreed between all parties prior to novation.	55
	50	3.6.1	Section 3.6.1. Bullet 1 - Training	Not the same as SDS description. "Taking account of Emp Req". Training plus documents etc. **Non-compliant**	tie have confirmed with SDS that these words do not oblige SDS to 'train' nor provide training deliverables."	56

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - tie information and assistance of tie GREEN - Item closed	tie Ref
	50	3.6.1	Section 3.6.1. Bullet 2 - Power consumption	Our Tram simulation or BBS? We do not have power consumption responsibility. **Non compliant.** Service Performance and power consumption not defined or specified in ER's	As 30 above	57
	50	3.6.1	Section 3.6.1. Bullet 3	**Non-compliant** as there are no technical aspects defined within the ER's. See note at head of table. **Non-compliant**	tie have confirmed with SDS that the SDS design has been based upon the original tie Requirments Specifications. tie have relaxed some of the specifications to allow flexibility for Infraco proposals. In respect of Infraco's design scope Infraco must stand behind the obligations contained within this bullet, but likewise SDS must also underpin their design scope too[1]. SDS remain firmly of the opinion this this is without SDS incurring additional cost or time to their obligations and expect this issue to be defined within the tie proposed Scope Split document and with the inclusion of suitable wording in the ER's yet to be agreed between all parties. Please provide acceptable additional words to Scope Split document	58
	50	3.6.1	Section 3.6.1. Bullet 5 &6	Ensure the total input is provided by Infraco. They HAVE carried out Due Diligence on SDS design. Subject is now closed.	See 58 above Please provide acceptable additional words to Scope Split document	59
		3.8		Buildability Reports	SDS notes these are the responsibility of the Infraco. SDS have a concern as to the implications on their design work. A statement of acceptability is required from BBS (prior to Novation)	
		3.9.3	General	Change in wording between 3.5a and 3.5b	SDS note the change in BBS obligations from the *'provision of survey/setting out services'* to the *'provision of survey/setting out equipment'* SDS confirm with **tie** that thet such 'services' do not form part of their obligations under the terms of their Agreement with **tie** **tie** to acknowledge	
		3.12	General	Training - ER v3.6b	SDS note the reference to the Training responsibilities being contained in Section 40 - Maintenance. As an observation, SDS do not understand where the necessary training is specified to cover the operation of the various elements of the ETN.which SDS would suggest is essntial before the commencement of any form of energisation or operation. SDS arealso aware of and agree with the early tie proposals for the Infraco to be responsible for the maintenace of all elements of the ETN required to be in service during the testing, commissioning and trial running up to the point of the ETN entering commercial service having been proovedby the Infraco to be functioning correctly and to the standard and the requirments of the approving bodies to allow it to enter commercial service.SDS suggest this may not now be the case and seek clarification.	

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for information and assistance of tie GREEN - item closed	tie Ref
	61	3.11	Documentation	As -built, construction and manufacturing drawings will be provided by SDS in accordance with the SDS Agreement. Not manufactured drawings or E&M Drawings by Siemens. **Non-compliant.**	See 34 above SDS are concerned at the suggestion that such documentation should be available 'prior to or on completion of Agreement' SDS are firmly of the opinion it is essential that such documentation is available to all operatives, maintainers and other parties prior to the commencement of any form of operation be it energisation or whatever to ensure such operatives have been fully trained and in possession of the necessary information to carry out their duties.	60
	74	8.3	Standards	SDS have completed design on standards approved by tie. Non-compliant	tie have confirmed with SDS that this requirement relates to Infraco and it is for the Infraco to 'sort out' any variance" SDS remain of the opinion this could involve them in cost and time for which they would require reimbursement. A clarification/confirmation statement to be provided by tie (prior to novation)	61
	74	8.3	The Infraco's Responsibilities' appears somewhat out of context and must surely extend to more than System Integrator?	Total responsibility of Infraco	tie have confirmed with SDS that their comment is noted" SDS do not understand the implication of this tie response/statement and remain firmly of the opinion that the responsibility for System Integrator must be that of the Infraco.	62
	75	8.3.1	Table appears to have been disconected from Sheet 72 which refers to standards.	tie to correct	tie advised this is a 'typo' and will be clarified in later version" Appears to have been corrected in V3.6	63
4 Use of industry Standard Equipment			No comments			64

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for information and assistance of tie GREEN - Item closed	tie Ref
5 System Identity & Branding			New SDS comment 27.03.07.		SDS are concerned at the potential implications of the tie introduction of 'Branding' and their impact on planning approvals in the event ties aspirations do not meet the Planners desires SDS seek sight of the Appendix 1 as referenced in ER v3.6b which identifies that *'the output of the specialist contractor shall be a documemented set of guidelines whih shall incorporated into these Employers requirements as Appendix 1'.* SDS would require a change order from tie covering the implication of all changes to their designs.	66
6 Design Life	65	6	The Infrastructure Systems and Equipments ? If some of the design lives are shorter than the 15 years stipulated as a minimum is the infraco responsible for it's renewal during the 15 Years?	Design life is not as per the SDS Agreement. **~~Non-compliant~~**	tie have confirmed with SDS that tie will write to SDS 'enabling relaxation' of SDS from their specification obligations where they were more onerous at the time of the Agreement than they are today as noe stated in the ER's. SDS have received a letter (tie letter 11.03.08) however SDS seek assurances that any additional costs and time incurred by SDS resulting from changes to drawings and other documentation will be met by tie Letter to tie in place (Prior to novation)	65
	65	6	Table 21	Non-compliant. See CCTV/PID's/Sigs/OLE etc	See 66 above.	67
7 Extensibility	67	7	Various tables	We cannot confirm compliance to ambiguous statements example is "Unclear if included in initial construction or "Ductwork to locations where additional signalling **MIGHT** be provided". **Non-compliant**	tie advised these will be clarified in later version* SDS seek assurances that any additional costs and time incurred by SDS resulting from changes to drawings and other documentation will be meet by tie* Some wording amended in V3.6a i.e. now reads 'allowance in design where additional signals might be provided' Still considered ambiguous.	68
	67	7	Instruction req'e re 1a/1b split	SDS design does not take account of the possible split of Phase 1a & 1b. **Non-compliant**	See 12 above SDs remain confused as to ties requirments as the request is for a full delta design at Roseburn Junction. tie to clarify	69
	70	7	SDS not refining Depot design for single type tram	**Non-compliant**	tie have advised SDS to review wording in subsequent issue of ER Wording deleted in V3.6a	70
	71	7	Ducts minor inconsistancies. See sheet 188, Table 39	**~~SDS design does include for 20% allowance for spares. Non-compliant~~**	20% allowance made in SDS design, which is based upon SDS procurement specification requirements. Any required changes (cost & time) to SDS ductwork requirments (drawings, cross sections etc) would need formal instructions SDS have confirmed with tie* that they are able to achive this 20% allowance based upon thier Infrastructure Design and their Procurement Documentation and not necessarily the BBS proposal. tie to instruct/clarify	71
	68	7	P&R allowance for termination of Phase 3 service has been added to Scope	**Non-compliant**	tie have advised SDS to review wording in subsequent issue of ER* however SDS have not received formal change instuctions to accommodate changes in their design.	72

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for interrogation and assistance of tie GREEN - Item closed	tie Ref
	69	7	Depot - reference to 8 Berths - Incorrect only 4 available other 2 are service roads serving Wheel Lathe/Tram wash & sanding plant.	**Non-compliant**	tie have advised SDS to review wording in susequent issue of ER*. Wording revised in V3.6a	73
8 Standards	72	8.1/8.2	SDS design is particular to BS where stated in the SDS design documentation.	**Non-compliant.** Each European Standard must be reviewed to ensure the correct level of technical compliance with the BS as designed. SDS have a concern at the statement that the standards to be used shall be those applicable before the Effective Date. SDS effective date is 19th Dec 2005	tie have advised SDS that any variance will have to be addressed by BBS- SDS advised Project Director that they are of the opinion this will need be resolved by tie/BBS prior to novation SDS now note that references are made to standards specified in the Agreemenmt. SDS have not had sight of such standards. This item to be closed prior to novation	74
	72	8.1	HMRI versus ROGs	**SDS remain Non-compliant** **SDS also seek clarification as to who are are the relavent parties as defined within ROGS.**	tie confirmed with SDS that a Change Order would be required to accommodate any implications to SDS Works SDS seek clarification.	75
	74	8.3	8.3 bullet point conflicts with 8.2	**Non-compliant. SDS have completed their design prior to Infraco and will not be changing the design on the identification and selection of the Infraco equipment without change instruction**	tie are of the opinion this is 'sorted' however SDS remain of the opinion that this issue falls into the same category as 75 above This item to be closed prior to novation	76
9 Geotechnical	117	9	Geo surveys to inform the design have previously been carried out by SDS.	**Non-compliant with 5th para.** The SDS design cannot facilitate the future nature of geotechs.	tie have suggested some wording revisions including 'reasonably practicle'. SDS have difficulty with such wording as such wording still leads to dispute in as much as it fails to deine in whose opinion it is or is not reasonable*.	77
10 Environmental			No comments			78
11 Surveys			No comments			79
12 Project Management Process			No comments			80

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for information and assistance of tie GREEN - Item closed	tie Ref
13 Permits & Approvals			No comments			G1
14 Human Factors			No comments			G2
15 RAMS			The E&M equipment is supplies by Infraco and the minimum availability percentage achievements need to be verified by BBS	Availability percentages to be confirmed by Infraco	SDS observation for the assistance of tie	83
16 EMC	177	16	The responsibility for the design of the Systems and Equipments i.e. those items which may or may not interfere with Network Rail and other Third Party/Stakeholders lies with the Infraco. It follows that the necessary work to manage the EMC interfaces must be provided by the Infraco suppliers and designers.	Infraco EMC Systems Designer responsibility.	tie have confirmed with SDS that the RAMS figures for BBS Equipments are clearly BBS responsibilities tie advised they are to write to SDS - still awaited by SDS Could be defined in Scope Split?	R4
	177	16.2	Last paragraph	**Non-compliant.** Tie have written the EMC Strategy.	tie have confirmed with SDS that EMC obligations are with BBS *'other than that stated in SDS Agreement'* *SDS believe this to be a contradictory statement and seek ties clarification of EMC responsibilities.* Could be defined in Scope Split?	R5
17 Health, Safety, Quality & Environment	178	17.1	EMC out of context. Tie to amend.	Incomplete statement	Table 4.3 contained in this Section does not correctly reflect the the design responsibilities of the various parties. The Infraco are responsible for many aspects of Design as well as being Design Manager. References are made to ROGS whilst ROGS is not referenced elsewhere in the ER's	R6
	178	17.1	Quality Management	**Non-compliant.** SDS only working to iso 9001 in Agreement.	tie confirmed with SDS that a Change Order would be required to accommodate any implications to SDS Works. No change in v3.6a	R7

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for information and assistance of tie GREEN - item closed	tie Ref
	181	17.2.6	SDS design to HMRI requirement.	SDS not aware of safey verification scheme prepared by tie. Require review/study prior to signature	tie confirmed with SDS that a Change Order would be required to accommodate any implications to SDS Works". No change in V3.6a. Instruction not received.	88
	182	17.3.2	E&AP	SDS are working to their Environmental Management Plan in accordance with Agreement.	SDS are of the opinion tie have added a requirment covering 'sustainability' which is not one of their obligation v3.6 requires BBS to develop the SDS EMPlan to include Sustainability. SDS consider they do not have any involvment in this process.	89
18 Cable & Ducting	188	18.2	SDS are not fully compliant and may also not necessarily be compliant with Infraco interpretaion of Employers Requirements (Drainage).	**Not compliant.** See note at top of table.	tie have advised SDS that tie would write to clarify their requirements" Letter still awaited SDS note that Section 18 has been omitted from v3.5a and 3.6a and, incorrectly in the opinion of SDS, dispersed within the document reference to cable installation appears to now be limited to Traction Cables contained in Section 31. What about AC cables etc	90
	189	18.2	SDS do not use, nor would they recommend the use of cable troughs in non segregated areas as is allowable by ER's.	**Non-compliant**	tie advised this is a 'typo' and will be clarified in later version" A check v3.6 indicates this may have been deleted as the result of relocating the contents of Section 18. SDS observation remains.	91
	187	18.1	18.1 SDS cannot find the cable identification requirements.	? Tie to advise	tie have advised SDS that this issue is not set out anywhere and is considered open" SDS remain of the opinion the very detailed work carried out by them on the subject of cable indetification in association with the operator and the tie technical team should be adopted on the ETN system	92
	190	18.4	essential cable joints.	SDS design attempts to avoid cable jointing.	tie have advised SDS that SDS may have misunderstood this requirement as it relates to maintenance" - SDS are still unable to agree and repeat that their procurment documentation/design attempts to avoid unnecessary cable joints.	93
19 Cabinets	192/193	19	SDS are not fully compliant and may also not necessarily be compliant with Infraco interpretaion of Employers Requirements.	For cabinets read panels or cubicles. (As described in SDS documentation)	tie have advised SDS that they may consider reviewing this issue with BBS" Not actioned SDS believe tie to advise	94
20 Advance Works			No comment		Omitted from v3.6a	95
21 Utilities MUDFA	195		Sheet 195. para 7	The design of MUDFA works within the scope of the SDS Agreement is being carried out by SDS.	tie have advised SDS to review new wording in later version of Ear's as this whole section is to be upreved by tie" SDS are of the opinion the following wording should be included in the first line of paragraph 2 as follows *.... to clear the ground where possible, in compliance with the MUDFA Contract, of utilities ....*	96

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - tie information and assistance required GREEN - Item closed	tie Ref
	195		Sheet 195, para 8	SDS understood that MUDFA works was not to be novated to INFRACO. The statement "Infraco undertakes all utilities……..due to be undertaken by the MUDFA contractor" would suggest otherwise. Clarity is required here for SDS prior to signature.	as 96 above	97
	200		Sheet 200, para 1	SDS require to see the technical submission from INFRACO on utilities. The MUDFA Contract is volumous and covers majority of items for utility diversionary works. The INFRACO ER's is a one page document and a table. Nothing is definitive and SDS would advise tie contractual/legal dept's review this point of note.	As 96 above	98
22 Locks & Key Suiting			No comment			99
23 Testing & Commissioning	216	Fig 7	Figure 7 - Sheet 216 - Incorrectly refers to SDS Provider. The obligations contained in this table should apply to The Infraco inclusive of his Design responsibilities.	Change to Infraco	tie have advised SDS that references to both Infraco and BBS have been removed from a later version of ER* Table 7 removed from v3.6a SDS note the inclusion of wording in Table 46 Sheet 286 - where tie are incorrectly in the opinion of SDS, limiting the acceptability of proposed detail design to that of the SDS deliverables.. As SDS have emphasised the Infraco have the responsibility to carry out the design of the Systems and equipments which sit within the Infrastructure designed by SDS SDS suggest it is of equal importance to tie that it is these Systems and equipments are proved to be compliant.	100
	217	23.2	23.2 - Sheet 217 - Programme & Risk Register. No its not? Its possibly the Testing Programme which should be a sub programme of The Infracos suite of programmes	tie to confirm	tie have advised SDS to review wording in susequent issue of ER REVIEW Needs Project Risk register Text revised however Fig 10 incomplete	101
	219	23.4.2	23.4.2 Sheet 219 - Why exclude CCTV which is the most hungry data transfer item?	tie to amend	tie have advised SDS to review wording in susequent issue of ER REVIEW	102
24 Trams			Tram Supply agreement to be provided to SDS for review.	tie to supply agreement	See item 2 above	103
					Note - V3.6 has this Tramstop Section 25 incorrectly identified in the header as Section 26. Clause 25.4.7 Sheet 367 - Public Address - incorrectly cross references to 35.13.2 - workstation Capabilities. SDS suggest this should be 35.6.1 - PA Clause 25.4.9 Sheet 370 - PHP's - incorrectly cross references to 35.13.2 as above. SDS suggest this should be 35.8:1 SDS note that Ticket Validators are not being sought at Tramstops - SDS seek clarification as Section 36 clearly seeks the provision of Ticket Validators which SDS are not been requested to accomodate. See also TVM's below	
stops	321	25.2	Nominal Tram vehicle up to 43m + 2m overrun - SDS Scope 40m platforms	Non-compliant	See item 2 above As previously advised to tie the SDS Design does not accommodate + or - 2m	104
	324	25.3.2	0	Non-compliant	tie have advised SDS to review wording in susequent issue of ER v3.6a allows for the SDS design however alternatives can be offered.	105

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for information and assistance of tie GREEN - Item closed	tie Ref
25 Tram	326	25.4.2	Glass Roof Shelter - not CEC approved SDS design - avoided on grounds of maintenance	**Non-compliant**	tie have advised SDS to review wording in susequent issue of ER v3.6a the choice of roof material has been deleted.	106
	332	25.6	Toilet & WHB facilities have not been added at Airport/Ocean Terminal/Granton Sq - SDS are aware of Haymarket only.	**Non-compliant**	See Item 28 above	107
26 Track			See email and attachment dated 30/01/08 timed 18.18 hrs Chandler/Crosse.	Criteria contained in V3.1 ER's was superseded on 21/02/07. **Non compliant**	tie are of the opinion SDS should provide justification of their track alignment" No further action from SDS who remain of the opinion the choice of Trackform remains that of tie and the Infraco SDS note v3.6a refers to SDS Surface Finishes Documents ULE90130-SW-DRG-00069, 70, 71 the content of which from their review of the BBS Bid SDS believes are not being complied with.	109
27 Roads & Utilities	362/364	27.5.2/27.7	UTC.	UTC not by SDS	See Item 1 above See also Item 21 above 27.3 references are made to consultation with owners of roads under private ownership during the design process. SDs consider they have completed the necessary consultation sufficient to develpop their design in all areas where they have not been prevented from so doing. 27.5.2 SDS are of the opinion they have consulted with the relavent parties in order to progress their roads design. Any additional work as the result of tie accepting a design or a proposal which differs from that provided by SDS and reviewed by tie can only be progressed via the change control process thus ensuring SDS are not adversly impacted in terms of cost and time. 27.5.2 - SDS are of the opinion any additional work required to be carried out by SDS as the result of the requirments of this clause shall be the subject of the cahnge controlmprocedure to ensure SDS are not adversly impacted in terms of cost and time. 27.9 - SDS seek sight of Schedule 21 (Paragraph 3 refers)	109
	365	27.9	11th bullet point. Obtain actual details.	Where actual records exist. Some SUC records missing.	tie have advised SDS to review new wording in later verison of ER's as this whole section is to be upreviewed by tie" Revised wording added by tie in V3.6a	110
	366	27.9	Missing provision of MUDFA	As-built drawings to acceptable design requirement	tie have advised SDS to review new wording in later verison of ER's as this whole section is to be upreviewed by tie" See Item 21 above This clause says certain utility movements are part of the Infraco Works however elsewhere in this document it says they will be the subject of Change orders	111
28 Structures			Tram weight, width, length.	**Non compliant**	As previous SDS Design of Depot Access Bridge is two structures NOT one as is referenced in Table 60 v3.6a.Sheet 413.	112

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for interruption and assistance of tie GREEN - Item closed	tie Ref
29 Depot	380	29.8	Boundary Fence Concrete footing	~~SDS told to delete hence SDS design non compliant.~~	tie have advised SDS to review wording in susequent issue of ER* SDS note this requirement has now been deleted by tie. tie are now seeking 'a suitably robust security fence' v3.6 which, bearing in mind the presence of ballast within the depot and the ease of its removal to provide access under such fence, SDS remain of the opinion a concrete footing should be provided.	113
	381	29.8	Service Track states Hand wash Windscreen - SDS instructed Automatic End Wash plant as confirmed later in ERV3 hence SDS design non compliant in this respect.	**Non -compliant**	tie have confirmed that they are of the opinion that the SDS design exceeded their requirements.* SDS are only able to refer to the various reviews carried out by tie, their operator and their technical representatives when such facilities where agreed as appropriate to the ETN. v3.6a seeks hand and wash. See also item 115 below Additional/revised SDS detailing may be required to meet this requirement.	114
	381	29.8	Spec for Lothian Bus wash	Specification performance required	tie have advised SDS that the provision of of the tram wash plant is with BBS and that any detailed specific adjustments will be during the procurement of this plant* SDS note that the Tram Wash plant (Item 1.4) is to be provided by the Infraco and SDS seek early builders information (Physical dimensions, loadings, builders works, drainage, power etc) in prder to accomodate this particular plant within their design. Any impact on the SDS works already carried out may be the subject of the Change Control Procedure.	115
	388	29.11	29.11 A staff work point Desk etc added to lobby of Control Room Suite hence SDS design non compliant as this facility is not accomodated.	**Non -compliant**	tie have advised SDS that they are to instruct SDS as to this change in their requirments* Still awaited by SDS	116
	431	29.17.3	Over door heaters now added to workshop, hence SDS design non compliant	**Non -compliant**	tie have advised SDS that they are to instruct SDS as to this change in their requirements* Still awaited by SDS. SDS note that v3.6a states that the provision of such heaters is an option lying with the Infraco. SDS seek clarification.	117
	383	29.9	Bullet 8. Fire extinguishing systems throughout the building	Not part of SDS Design other than Depot equip room. **Non-compliant**	tie have advised SDS that they are to be compliant with the Bldg Regs and that any change to the words will be agreed with BBS and SDS.* SDS remain of the opinion they do comply with the Bldg Regs however their design for Fire Extinguishing Systems is limited to the Depot Equipment Room and NOT throughout the building as tie are now calling for. SDS seek clarification of the new tie v3.6a wording associated with this tie requirement i.e. Extinguishing v Suppression	118
30 Traction Power			SDS Traction Power very detailed design, produced for tie procurement and planning purposes, does not now comply with tie ER V3.1	Manually operated isolators an example. **Non-compliant**	tie have confirmed with SDS that the design responsibility for Traction Power is that of BBS* Whilst SDS acknowledge this assurance the issue of impact on the alterations to the SDS work already carried out needs to be resolved Cabling information has been moved from the now redundant Section 18 Cables and SDS note that tie are now requesting that LV cables and Traction Supply cables are drumed to the maximum to minimise cable joints however this does not apply to 11kV Cables which in fact are probably more joint critical than the remainder..	119
	438	30.2.1	Traction power Supply Isolators	The original SDS Operational & Performance |Requirement document differs from the ER's in a number of technical areas. An example is Motorised Isolators. **Non-compliant**	As 16 above	120
	437 & 442	30.1	Bullet 1 - Tram Traction Substation enclosure ? Is this the enclosure/security fence surrounding the Traction Substation building?	SDS have provided security fencing as part of the SDS design.	tie have advised SDS that BBS design will be to SDS design in these respects* SDS seek clarification of this statement as their review of the BBS Submission indicates otherwise. SDS seek clarification	121

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for information and assistance of tie GREEN - Item closed	tie Ref
	437 & 438	30.1	Bullet 2 - Metering etc is usually the responsibility of the consumer not the construction contractor Whilst provision has to be made for the accommodation and connections for metering are tie asking The Infraco to provide this facility? On what basis does he determine the tariff acceptable to TEL?	**Non-compliant.** SDS make provision for metering and have advised tie that obligation to procure this metering is required. SDS do not specify this from Scottish Power.	tie have confirmed with SDS that tie will ensure appropriate arrangements and responsibilities with BBS and SP and that a Provisional Sum has been included for these purposes. tie suggest detail is to be agreed.SDS note there still appears to be instruction to BBS to arrange for SP to provide the metering'. SDS confirms that such 'detail' has already been the subject of discussions and agreements between tie/SP/SDS and the tie technical advisors and the subject of many minuted meetings which have been copied to all parties. SDS note that such agreements are not being reflected in the tie documentation nor the BBS bid .	122
	438	30.2	Manual - operated track feeder isolators.	Last paragraph - SDS have developed a coordinated protection network between the DC rectifier circuit breaker, AC Rectifier Circuit Breaker and DC Track Feeder Breakers. **Non-compliant**	tie have confirmed with SDS that the BBS approach to electrical protection, although different to that previously developed and reviewed by SDS/SP/tie and their technical advisors, is considered by tie* to be an acceptable coordinated approach* SDS question of this has been approved by SP.	123
	443	30.5	Scottish Power and manual isolators.	Following a series of detailed operational discussions with tie's Operator Transdevtheir technical Advisors and incorporating our own operational experience of other tram systems, the SDS design offers motorised isolators for three principal reasons: 1. To meet tie's aspirations for automated full section isolation & earthing regimes. 2. To meet tie's aspirations for operational flexibility, speed of response to electrical emergencies, and availability of re-configuration options. 3. To ensure that TPS design is highly available and meets tie's aspirations for RAM and FHA. Whilst manual isolators offer a VE approach, they compromise the achievement of these aspirations. If manual isolators are proposed SDS would question the benefit of motorised earthing. The track feeder cb is the point of disconnection not isolation under UK practice. For an earth to be applied the system needs be switched at the isolation point. As the isolation point is considered to be the trackside isolator under accepted UK practice, which is manual under this proposal, the operator would need to be present to effect the isolation hence is in a position to manually apply the earth. To apply a motorised would require a re-definition of typical UK practice to define the track feeder circuit breaker as the point (This may present a difficulty for the HMRI ROGS Competent Person).' **Non-compliant**	tie have confirmed with SDS that the design responsibility is that of BBS and that some drafting inconsistencies have been corrected in the later version of the ER's* tie to confirm with SDS the way tie wish to progress this issue. As previously stated by SDS any impact on SDS designs and documentation to be the subject of instruction from tie.	124
	438	30.1	Provision for 11kV supply to Depot	SDS design includes the requirment for an 11kV supply to the Depot Services transformer not just 'provision for'.	SDS word preference is noted by tie* SDS note that the BBS obligation remains 'provision shall also be made' from which it could be inferred that, even with the addition of the tie wording in Clause 30.2.3 and elsewhere, somebody else will provide the actual supply necessary to power the depo 30.3 Protection still does not refer to the need to comply with the protection requirments discussed and agreed by SDS, tie and ties technical advisors with SP SDS remain concerned that the tie v3.6 ER Clause 30.2.3 still does not reflect the SDS understanding of the SP letter to tie defining the SP requirments for HV Switchgear and protection. SDS remains of the opinion the diluted wording contained in v3.6 could lead to differences of opinions as to who is providing what to whose requirments.	125

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for information and assistance of tie GREEN - Item closed	tie Ref
	441	30.4	Generator	Generator is not now a client requirement. Instruction required to change. **Non-compliant**	See Item 10 above SDS are still not able to fully understand tie requirments in respect of Diesel Emergency Supplies and seek early clarification to enable their Depot Design to progress Clause 30.4 Sheet 584 still refers to the 'separate generator' and cross references to Section 29 - sheet 570 Clause 29.17 - which itself refers to a 'fixed standby generator' SDS remain confused as to ties requirments as tie have informally advised this generator has been removed and a hard standing is to be provided (See Item 10 above and Clause 1.2 - Sheet 17 Bullet 12) SDS seek urgent clarification as to ties requirments and suggest tie establish what BBS have allowed for in their price, as any removal of the permaant Diesel Alternator would include all its associated controls, pipework, exhaust, cooling, cabling, building enclosure and have implications to the LV Switchboard - not insignificant potential savings.	126
31 OLE	467	31.5	Environmental Criteria	Environmental Criteria not part of Ers	tie have advised SDS to review wording in subsequent issue of ER* Wording not changed SDS suggest this is a cross reference to 3.6.4?	127
	469	31.14.2	Parallel feeders/messenger wire	SDS design only parallel feeders **Non-compliant**	tie have confirmed with SDS that they believe this approach by BBS to be more competative and robust then that previously agreed by tie and their technical advisors. SDS would expect to receive costs and time associated with any implication they have to accomodate as the result of this BBS/tie change	128
32 Stray Current			No comment			129
33 Low Voltage Architecture	482		UPS	SDS are non compliant as they have provided for ties requirements in respect of UPS for 3 hours. **Non-compliant**	tie have advised SDS to review wording in subsequent issue of ER **tie** suggest their requirement will reflect SDS proposal.* SDS note that **tie** have put the onus on BBS to determine the necessary duration of the various UPS Systems. SDS seek immediate instructions from **tie** advising SDS of the way forward bearing in mind SDS are required to accommodate the necessary UPS Equipments within their Detail Design of the Infrastructure. SDS to be reimbursed with all additional costs and time implications	130
34 Earthing & Bonding			Compliant	The actual requirements for Earthing and Bonding are shown in the SDS Technical Specifications. As elsewhere, a considerable amount of what is considered by SDS as necessary Technical detail has been removed from the V3.1. It follows that the specific SDS design, whilst being compliant with the requirements **tie** have required in the past may not reflect the principles, proposals and technical solutions now being considered by **tie** and their Infraco.	tie note this comment and refere to Item 65 above. SDS seek clarification as to any impact on their documentation SDS request tie to note that ULE90130-SW-REP-00071 V3 was issued to tie on 30th March 2007. SDS seek clarification of the version issued to BBS and how the BBS proposals differ from the Detail Design E & B accomodation work carried out by SDS to date.	131

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for information and assistance of tie GREEN - Item closed	tie Ref
35 SC&C	489	35.3.2	The only coms link between the TPDS & UTC is for a traffic signal phase request. No allowance has been made in the SDS design for the monitoring, reporting and logging of a failure which at the same time reverts the road traffic signal to priority signalling.	**Non-compliant**	tie have confirmed with SDS that tie design of the SC&C is a BBS responsibility. SDS would seek cost and time in respect of any impact on their design documentation SDS note minor changes to the wording in ER v3.6 however these do not impact on the SDS principle already advised to tie. SDS note however that tie propose to use SCADA for the local control of Substations and SDS have commented that they would not be happy with this use of such technology in their review of the BBS/Siemens Bid Sea SDS document issued to tie. SDS also note the additional statement which appears to relate bandwidth to the number of cameras on the system. (Sheet 650) SDS remain of the opinion that the bandwidth is also a function of the quantity of data being transmitted from each camera in terms of frames per second (camera functionality and picture quality and availability) and this is equally as important as the total number of cameras.	132
	491	35.4	Bus tracker on PIDs not allowed for in SDS design - neither display nor communication.	**Non-compliant**	As 132 above	133
	492	35.4.1	No provision has been made for 'trip numbers' nor 'bus service details'	**Non-compliant.** (Question link provision)		134
	512	35.10.4	PB have proposed TCP/IP communications for Status & faults for much of the Tramstop equipment instead of SCADA as called for by tie*	**Non-compliant**	As 132 above	135
36 Integrated Fare Collection	550	36.1	SDS design allows for a maximum of 2 TVM's per platform	**Non-compliant.** Validators not included as part of SDS design.	As 9 above - SDS note the proposal for a MINIMUM of two TVM's per platform tie to issue Change order to SDS.	136
	550	36.2	ER's Ticket Validators or smart card Validators - both are specified?	**Non-compliant.** Validators not included as part of SDS design.	tie have advised SDS that they will investigate this issue and advise* - nothing forthcoming SDS have not allowed for anyTicket validators in their design. tie* have not quantified the number or dimensions of these items. tie to advise SDS by Change order...	137
	550	36.3	Where are TVM Docking Stations to be located?	SDS advise lobby of Depot Control Room. Tie to confirm.	tie have advised SDS that they will write to SDS instructing them as to their requirments* - nothing forthcoming.	138
	552	36.5.3	System interfaces 36.5.3?	**Non-compliant.** Validators not included as part of SDS design. Equipment onTable 86 not yet part of SDS scope	tie have advised SDS that the IFC interface is an BBS issue and not that of SDS SDS have not allowed for anyTicket validators in their design. **tie** have not quantified the number or dimensions of these items. **tie** to advise SDS by Change order..	139
37 System Integration	554	37.5.1	Management of the design. Should read design.	Within the SDS Agreement SDS are to design (and have designed) the civil and building infrastructure and prepare (and have prepared) Procurement Specifications for the E&M Systems elements of ETN.	As 34 above	140
38	557	38	SDS design process	In accordance with the design as proposed by SDS in accordance with the SDS Agreement. ie the civil and building infrastructure SDS are to prepare (and have prepared) Procurement Specifications for the E&M Systems elements of ETN).	As 34 above	141

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Section	Sheet No	Clause	Issue	Comment	RED - Ongoing - tie Change Order and/or clarification still required. ORANGE - for information and assistance of tie GREEN - Item closed	tie Ref
39 Project Programme	559	39.2	Incorrectly refers to 'Bidders' and "Tenderer's"	tie to correct	tie have advised SDS to review wording in susequent issue of ER Issue closed	142
			reference to PAB Parsons Brinckerhoff rather than SDS?	tie to correct	tie references to Contracting Parties appears to have been deleted - Sheet 770 v3.5a.. SDS wonder how tie are able to determine who is responsible for a particular Programme activity?	143
	624	39.9	Phase refers to SDS Design but nothing for Infraco design, Energisation, Trainng, Testing (Works, Site, Trial Running etc)	tie to correct	tie have advised SDS to review wording in susequent issue of ER* Phase (Sheet 772) now titled Phase Codes (SDS) SDS seek clarification as to what tie are advising. Before Novation.	144
	625	38.1	Again reference to SDS Design but no Infraco Design! No references to other significant WBS activities Procurement, Manufacture, Testing (Works,Site,Trial Running etc) Training, Documentation etc	Coding and phasing to be corrected	tie have advised SDS to review wording in susequent issue of ER SDS still do not see any references to the many other project critical activities other than Construction in what SDS would consider to be part of the necessary WBS SDS still are unable to see any references to Dynamic Tram Testing and commisioning on site (Test Track, power, energisation, training etc).	145
		39.2		Project Programme	Reference is made in the text to delivery being in accordance with the Programme. SDS resquest clarification as to which Programme - is this the Project Programme?	146
	626	39.14	Only SDS Design shown. Lack of recognision that Infraco do design, Tramco do Design. What relevence has Requirments Definition etc to the Infraco?	tie to correct	tie have advised SDS to review wording in susequent issue of ER* SDS see little improvement in the ER V3.6a as the design work to be done by Tramco does not appear to be monitored LBS, WBS,	146
	626	39.14	TTRO's	TTRO's not SDS Scope. Infraco to provide	tie to write* SDS await receipt of this tie letter.	147
40 Maintenance			No comment.		See 59b above	148
				* See tie Project Director (M C) Email to SDS dated 22.02.08 timed at 14.39Hrs in response to SDS comments on v3.1.	SDS await formal confirmation of the contents of this Email as detailed above and the issue of the necessary instructions and change orders from tie to correct the situation.	
				Non compliant - to be interpreted as non-compliant with ER's v3.1, remaining non compliant with v3.6a and v3.6b but compliant with tie/SDS Agreement		

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APPENDIX PART 7

Part C - SDS Provider's Report on Infraco Proposals dated 27 March 2008

Infraco Civils Proposals - PB Commentary

Scope of Work	Information from BBS to SDS	Description of Design completion activities	1A	1B	1C	1D	2A	5A	5B	5C	7A	6	PB Comments
Accommodation Works			x	x	x	x	x	x	x	x	x		
Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design	x	x	x	x	x	x	x	x	x		PB seeks clarification of this statement which is used on many occasions. i.e Which IFC Design has BBS allowed for to construct? Is this the SDS design or some varient which BBS is considering when refering to 'finalising design'
Building (Depot)												x	
Liaison on steelwork design for Depot Building may be required to allow BBS to comply with BAA requirements for notice period to lower crane jibs if BAA require use of the auxiliary runway. Any re-design is unlikely or minimal		Liaise with structural steel subcontractor on design of steelwork, where required, to allow BBS to comply with BAA requirements for notice period to lower crane jibs if BAA require use of the auxiliary runway.										x	BAA risks are assumed to remain with tie
Drainage			x	x	x	x	x	x	x	x	x		
Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design	x	x	x	x	x	x	x	x	x		
Requirements for maximising use of and connection to existing drainage network to be confirmed.		Review and complete design	x	x	x	x	x	x	x	x	x		
Earthworks			x	x	x	x	x	x	x	x	x		
Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Earthworks Design	x	x	x	x	x	x	x	x	x		

Scope of Work	Information from BBS to SDS	Description of Design completion activities	1A	1B	1C	1D	2A	5A	5B	5C	7A	6	PB Comments
Requirements for excavation and filling below Earthworks Outline to be designed and specified and assessment of anticipated formation conditions		Standard Details for treatment of low CBR or Stiffness or Soft Material; excavate and replace with class 6, Lime Modification, Geotextiles	x	x	x	x	x	x	x	x	x		PB has carried out sufficient SI /GI to inform the design. With reference to the Scope Split meetings a rolling programme of SI /GI is to be carried out by BBS. PB will provide a suite of treatments which can be applied when the requirements are established by BBS. Note that this scope of work will be impacted by the lower void spanning capacity of BBS's Trackform offering in comparison with the PB reference design.
		Extent; length, width and depth of areas requiring earthworks below Earthworks Outline	x	x	x	x	x	x	x	x	x		
Formation requirements to be confirmed.		CBR or Stiffness Requirements at Formation for Highways and Track	x	x	x	x	x	x	x	x	x		
Requirements for excavation and disposal of contaminated material, and refilling of void, to be designed and specified.		Extent; length, width and depth of areas requiring earthworks below Earthworks Outline and materials to be used for refilling where required	x	x	x	x	x	x	x	x	x		It is assumed that BBS carries the risk associated with the discovery of contaminated land. It is also assumed that BBS carries the risk associated with Archaeological remains.
Special Geotechnical measures, e.g. embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.		embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.	x			x	x	x	x	x	x		

Scope of Work	Information from BBS to SDS	Description of Design completion activities	1A	1B	1C	1D	2A	5A	5B	5C	7A	6	PB Comments
Design special Geotechnical measures for Gogar Landfill Site. Solution to be dev		Design solution to be developed with BBS Engineers for surcharge embankment with appropriate consolidation period and excavation and replacement in the vicinity of Gogarburn Bridge East Abutment									x		
Geometry			x	x	x	x	x	x	x	x	x		
Horizontal Alignment			x	x	x	x	x	x	x	x	x		
Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design	x	x	x	x	x	x	x	x	x		
Confirmation required that alignment is compatible with CAF Tram DKE and LOD.		Incorporate CAF Tram DKE in Design	x	x	x	x	x	x	x	x	x		Change required to wording. Confirmation required that the CAF Tram is compatible with the alignment.
Landscaping			x	x	x	x	x	x	x	x	x		
Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design	x	x	x	x	x	x	x	x	x		
OLE Foundations			x	x	x	x	x	x	x	x	x		
Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Information from BBS to be issued on OLE poles, including loadings.	Design OLE Foundations	x	x	x	x	x	x	x	x	x		PB is preparing a suite of standard OLE base designs which should cover the requirement
Roads			x	x	x	x	x	x	x	x	x		
Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design	x	x	x	x	x	x	x	x	x		

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Scope of Work	Information from BBS to SDS	Description of Design completion activities	1A	1B	1C	1D	2A	5A	5B	5C	7A	6	PB Comments
Subject to survey, pavement design to be developed and finalised to minimise work scope		Pavement design is to be revised to a plane and re-surface (new regulating and surface course only) when survey information is available and where it confirms the feasability of this design solution Note This activity is an alternative to the Vertical Alignment activity above)	x	x	x	x	x	x	x	x			PB cannot identify where this approach may apply. Clarification sought from tie. Any surveys to be carried out and paid for by BBS.
Further pavement surveys and assessments are required.		GPR and/or Pavement Condition surveys as required by xxxx (above)	x	x	x	x	x	x	x	x			Clarification sought from tie.
Site Clearance			x	x	x	x	x	x	x	x	x		
Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design	x	x		x	x	x	x	x	x		
Design to be completed to IFC status and all design consents and approvals obtained.		Complete Design			x								

Scope of Work	Information from BBS to SDS	Description of Design completion activities	1A	1B	1C	1D	2A	5A	5B	5C	7A	6	PB Comments
Sub-station Buildings			x	x	x	x	x	x	x	x	x		
Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Information on Sub-station equipment to be supplied to SDS by BBS	Complete Design	x	x	x	x	x	x	x	x	x		For the purposes of the Infraco Procurment SDS has provided comprehensive procurement information, including detailed and dimensioned drawings, schematics, wiring diagrams, protection diagrams etc all of which are based upon the many tie/tie technical advisors/Transdev and Scottish Power meetings. All substation equipment performance and functionality has been approved by SP as have the equipment layouts within the associated substations which themselves have progressed through planning. Completion of the Sub-station designs is to be a BBS responsibility
Sytems and Power Cable Ducts			x	x	x	x	x	x	x	x	x		
Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Information on cabling requirements to be supplied to SDS by BBS	Design duct group and spacing to accommodate cabling requirements and incorporate information on drawings	x	x	x	x	x	x	x	x	x		Comprehensive SDS cable duct drawings and layouts have been produced based upon the tie approved SDS design and procurement documentation. The cabling requirements may change dependent upon the BBS proprietary solution. Identification of scope and incorporation on drawings to be BBS responsibility

Infraco Civils Proposals - PB Commentary

Scope of Work	Information from BBS to SDS	Description of Design completion activities	1A	1B	1C	1D	2A	5A	5B	5C	7A	6	PB Comments
Trackform			x	x	x	x	x	x	x	x	x		
Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			x	x	x	x	x	x	x	x	x		All Trackform design and development issues are to be the responsibility of BBS. PB provides the horizontal and vertical alignment design together with Civils infrastructure design outwith the Trackform envelope. All design within the envelope is assumed to be the responsibility of BBS. PB (SDS) will not engage in agreement and iapproval in relation to the BBS Trackform design.
Cross sections required to reflect BBS's selected Track System, including minimum track construction depths (top of rail to formation) with corresponding formation condition requirements.	SDS believe that loadings are required to enable them to complete this Design activity	Incorporate BBS selected Trackform on drawings and confirm minimum track construction depth and corresponding formation condition requirement as Pricing Assumption or at some other depth condition measure to be agreed/approved by SDS, BBS, tie and CEC	x										
				x	x	x	x	x	x	x	x	x	
Tramstops			x	x	x	x	x	x	x	x	x		
Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design	x	x	x	x	x	x	x	x	x		
Vertical Alignment			x	x	x	x	x	x	x	x	x		
Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design	x	x	x	x	x	x	x	x	x		
Revise alignment, where possible and where Programme permits for on-street section to minimise Roads work-scope.		Revise, generally raise, vertical alignment of Track	x										It is assumed that PB will complete the SDS Alignment Design as currently agreed and that any changes which are deemed to be possible will be instructed and paid for when they are identified and agreed

Scope of Work	Information from BBS to SDS	Description of Design completion activities	1A	1B	1C	1D	2A	5A	5B	5C	7A	6	PB Comments
Revise alignment, where possible and where Programme permits to minimise Roads work-scope.		Revise, generally raise, vertical alignment of Track		x	x	x	x						The SDS alignment is designed to accommodate the most economical vertical and horizontal passege of the tram throughout its journey. It should also be noted that any change in the track alignment may impact other aspects of the infrastructure e.g tramstops.
Revised alignment required to facilitate direct fixing of rails to structures and guideway.		Revise, lower, vertical alignment of Track	x						x				Trackform issue - BBS responsibility
Revised alignment required to facilitate direct fixing of rails to structures		Revise, lower, vertical alignment of Track					x	x		x	x		

Scope of Work	Information from BBS to SDS	Description of Design completion activities	1A	1B	1C	1D	2A	5A	5B	5C	7A	6	PB Comments
Structures **Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design**													
W1 Lindsay Road		Complete Design	x										
S16 Victoria Dock Entrance		Complete Design	x										
S17 Tower Place		Complete Design	x										
S18 Leith Walk Railway		Complete Design		x									
W3 Russell Road (Wall) No 1		Complete Design						x					
W4 Russell Road (Wall) No 2		Complete Design						x					
W18 Murrayfield Tramstop (Wall)		Further GI required to inform Design						x					
S21B Murrayfield Stadium (Wall)		Complete Design						x					
S21C Murrayfield Stadium Underpass		Complete Design						x					
S21D Murrayfield Training Pitches		Complete Design						x					
W8 Baird Drive		-						x					
S22 Balgreen Road (A and B)		-						x					
W9 Balgreen Road (Wall)		Complete Design							x				
S26 South Gyle Access Road		Complete Design							x				
W11 Bankhead Drive Tramstop (Wall)		Complete Design							x				
W19 Gyle Tramstop (Wall)		Complete Design								x			
S29 Gogar Burn		Complete Design									x		
S30, 31 and 34 Gogarburn Culverts 1,2 and 3		Complete Design									x		
W14 and 15 Gogarburn Walls 1 and 2		Complete Design									x		

Scope of Work	Information from BBS to SDS	Description of Design completion activities	1A	1B	1C	1D	2A	5A	5B	5C	7A	6	PB Comments
Possible Re-design													
S21A Roseburn Street Viaduct								x					
Possible re-design to reduce scope and cost.		Re-Design to 2 separate single span structures with re-inforced earth walled embankments replacing removed spans											Clarification sought from tie on what has been accepted in relation to this part of the BBS Civils Offer.
Further GI required to confirm foundation design.		Further GI, in conjunction with GI for W18 (see above) to ascertain extent of soft layer											
Re-design required to allow cost efficient fabrication of structural steel.	Appoint steelwork sub-contractor	Liaise with BBS and steelwork sub-contractor and re-design/re-detail accordingly											
S21E Water of Leith								x					
Subject to Programme allowance, redesign pier foundations to improve buildability.		Re-design with 2 No larger dia bored piles (mono-piles), one per column. Design a direct connection to the columns, to be made within the pile casing. Pile casings will be cut off at river bed level											Clarification sought from tie on what has been accepted in relation to this part of the BBS Civils Offer.
Re-design required to allow cost efficient fabrication of structural steel.	Appoint steelwork sub-contractor	Liaise with BBS and steelwork sub-contractor and re-design/re-detail accordingly											
S23 Carrick Knowe									x				
Completed design to have foundations outwith Track Support Zone ?		Review and Revise Design											Clarification sought from tie on what has been accepted in relation to this part of the BBS Civils Offer.

Infraco Civils Proposals - PB Commentary

Scope of Work	Information from BBS to SDS	Description of Design completion activities	1A	1B	1C	1D	2A	5A	5B	5C	7A	6	PB Comments
S27 Edinburgh Park Station Viaduct									x				
Possible re-design to reduce scope and cost		Redesign piers with flared tops and/or crossheads so that pre-cast deck beams can be placed without the need for Temporary Works (temporary beam supports)											Clarification sought from tie on what has been accepted in relation to this part of the BBS Civils Offer.
Completed design to have foundations outwith Track Support Zone		Review and Revise Design											
S28 A8 Underpass										x			
Subject to Programme allowance, re-design to incorporate a more economical piling solution along with further GI to confirm ground water regime.		subject to programme allowance, re-design secant piles as contiguous piles											Clarification sought from tie on what has been accepted in relation to this part of the BBS Civils Offer.
Re-design for BT duct crossing (over structure)		re-design section of underpass to facilitate construction under BT duct											
S19 Haymarket Viaduct							x						
Requirements for a design condition survey of the existing wall.													Clarification sought from tie on what has been accepted in relation to this part of the BBS Civils Offer.
Requirements for special foundations at Pier 4 and Abutment E to be confirmed.													
S20 Russell Road							x						
Possible re-design (subject to programme allowance) of sub-structure to improve buildability													Clarification sought from tie on what has been accepted in relation to this part of the BBS Civils Offer.
S32 Depot Access Bridge (or Depot Access Bridges)												x	

Scope of Work	Information from BBS to SDS	Description of Design completion activities	1A	1B	1C	1D	2A	5A	5B	5C	7A	6	PB Comments
Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Design to be completed from basic information, discussed at meeting on xxxx between BBS and SDS. The DABs are to be 2 separate structures. BBS will work with SDS to develop a cost effective Design											Clarification sought from tie on what has been accepted in relation to this part of the BBS Civils Offer.

APPENDIX PART 8

SDS Hourly Rates

The table of rates for provisional additional work to be used for the pricing of changes to scope is as follows:-

Reference	**Role**	**Hourly Rate**
GD	Graduate Designer	£55.00
SD	Senior Designer	£78.00
PD	Principal Designer	£95.00
CT	CAD Technician	£38.00
ST	Senior CAD Technician	£49.00
TS	Technical Support	£38.00

APPENDIX PART 9

LOD Register

Schedule of Works Outwith the LOD

Section	Description	Reference	Source	Temporary or Permanent
1A	Footway along Lindsay Road adjoing Forth Ports area (to be confirmed)	CR253, ULE90130-01-HRL00001, 2	Roads	Permanent
1A	Lindsay Road - required for lowering of Roadway	CR253, ULE90130-01-HRL00001, 2	Roads	Permanent
1A	Lindsay Road Retaining Wall (revised as part of Forth Ports change - to be confirmed with detailed design)	CR253, ULE90130-01-HRL00001, 2	Structures	Permanent
1A	Realigned Ocean Drive and footpath / cycleway	CR253, ULE90130-01-HRL00002	Roads	Permanent
1A	Connection to Access Drive 1 (as part of Forth Ports change - to be confirmed with detailed design)	CR253, ULE90130-01-HRL00002	Roads	Permanent
1A	Connection to Access Drive 2 (as part of Forth Ports change - to be confirmed with detailed design)	CR253, ULE90130-01-HRL00002	Roads	Permanent
1A	Footpath along Scottish and Southern Substation	CR253, ULE90130-01-HRL00002	Roads	Permanent
1A	Realignment of Bus loop at Cruise Berth	CR253, ULE90130-01-HRL00002	Roads	Permanent
1A	Pavements along revised Ocean Drive (to be confirmed due to Forth Ports change)	CR252, 253 ULE90130-01-HRL00002, 3, 4	Roads	Permanent
1A	Ocean Drive 'bypass' road and associated elements, subject to instruction to proceed with layout agreement with Forth Ports / CEC	CR252, ULE90130-01-HRL00004	Roads	Permanent
1A	Rennies Isle Road markings, kerb line, paving	ULE90130-01-HRL00005	Roads	Permanent
1A	Tower Place Bridge - widen to include footpath (to be confirmed with detailed design)	CR 278, ULE90130-01-HRL00005	Structures	Permanent
1A	Tower Place Bridge - steps, ramp, ancillaries	ULE90130-01-HRL00005	Structures / Accommodation works	Permanent
1A	Stanley Casino Car Park - Road Markings, signage, kerbing, fencing, landscaping (to be finalised)	ULE90130-01-HRL00006, 7	Roads / Accommodation works	Permanent
1A	Pavements along Ocean Drive	ULE90130-01-TAL-00002 to 00006	Roads	Permanent
1A	Ocean Drive / Tower Place Paving	ULE90130-01-HRL00006	Roads	Permanent
1A	Casino Car Park	CR254, ULE90130-01-HRL00007	Roads	Permanent
1A	Constitution Street, Tower Street - Road surface / Markings, signal infrastructure, signage, kerbing	ULE90130-01-TAL-00006	Roads	Permanent
1A	Constitution Street, Baltic Street - Road Markings, signage	ULE90130-01-TAL-00007	Roads	Permanent
1A	Baltic Street - closure of the side street (remedial works, signing)	Comments from CEC walkthrough 31 July (A Conway) / ULE90130-01-TAL-00007	Roads	Permanent
1A	Bernard Street - roadworks to tie into existing condition / CEC project	CR259, ULE90130-01-HRL00007	Roads	Permanent / Temporary
1A	Constitution Street, Bernard Street- Road Markings, signage	ULE90130-01-HRL00007	Roads	Permanent
1A	Constitution Street, Mitchell Street - Road Markings, signage	ULE90130-01-HRL00007	Roads	Permanent
1A	Constitution Street, Maritime Lane - Road Markings, signage	ULE90130-01-HRL00007	Roads	Permanent
1A	Constitution Street, Queen Charlotte Street - Road Markings, signage	ULE90130-01-TAL-00008	Roads	Permanent
1A	Street Lighting Section 1A	ULE90130-01-TAL-00001, 00006 to 00009	Lighting	Permanent
1A	Constitution Street east side north of Queen Charlotte Street, opposite Bernard Street Tramstop - paving	ULE90130-01-HRL00008	Roads	Permanent
1A	Constitution Street, Coatfield Lane - paving	ULE90130-01-HRL00008	Roads	Permanent
1A	Constitution Street, Kirkgate - signage and paving	ULE90130-01-HRL00008	Roads	Permanent
1B	FOTW Junction - Road Markings, kerbing, signage	ULE90130-01-TAL-00010	Roads	Permanent
1B	Great Junction Street - Site clearnace, surfacing	ULE90130-01-HRL00010	Roads	Permanent
1B	Duke Street - Road surfacing	ULE90130-01-HRL00010	Roads	Permanent
1B	Leith Walk, Kirk Street - Road Surfacing	ULE90130-01-HRL00010	Roads	Permanent

Date 27 March 2008

Section	Description	Reference	Source	Temporary or Permanent
1B	Basestation at James Street (Leith Walk area) to provide coverage in and around this area.	HB#40411	SCC	Permanent
1B	Leith Walk, Crown Place - Road Markings, signage	ULE90130-01-TAL-00010	Roads	Permanent
1B	Leith Walk, Cassalbank Street - Road Markings, signage	ULE90130-01-TAL-00010	Roads	Permanent
1B	Leith Walk, Crown Street - Road Markings, signage	ULE90130-01-TAL-00010	Roads	Permanent
1B	Leith Walk, Jane Street - Road Markings, signage	ULE90130-01-TAL-00010	Roads	Permanent
1B	Leith Walk, Manderston Street - Road Markings, signage	ULE90130-01-TAL-00010	Roads	Permanent
1B	Leith Walk, Springfield Street - Road Markings, signage	ULE90130-01-TAL-00011	Roads	Permanent
1B	Leith Walk Depot - within LLAU		Substation	Permanent
1B	Leith Walk, Steads Place - Road markings	ULE90130-01-HRL00011	Roads	Permanent
1B	Leith Walk, Smiths Place - Road Markings, signage	ULE90130-01-TAL-00011	Roads	Permanent
1B	Leith Walk, Lorne Street - Road Markings, signage	ULE90130-01-TAL-00011	Roads	Permanent
1B	Leith Walk, Jameson Place - Road Markings, signage	ULE90130-01-HRL00012	Roads	Permanent
1B	Leith Walk, Balfour Street - Road Markings, signage	ULE90130-01-HRL00011	Roads	Permanent
1B	Leith Walk, Arthur Street - Road Markings, signage	ULE90130-01-TAL-00012	Roads	Permanent
1B	Leith Walk, Dalmaney Street - Road Markings, signage	ULE90130-01-HRL00013	Roads	Permanent
1B	Leith Walk, Iona Street - Road Markings, signage	ULE90130-01-TAL-00012	Roads	Permanent
1B	Leith Walk, Pilrig Street - Road Markings, signage	ULE90130-01-HRL00013	Roads	Permanent
1B	Leith Walk, McDonald Street - Road Markings, signage	ULE90130-01-TAL-00013	Roads	Permanent
1B	Leith Walk, Brunswick Street - Road Markings, signage	ULE90130-01-TAL-00013	Roads	Permanent
1B	Leith Walk, Gayfield Square - Road Markings, signage	ULE90130-01-TAL-00015	Roads	Permanent
1B	Street Lighting Section 1B	ULE90130-01-TAL-00010 00011 and 00013	Lighting	Permanent
1C	Annadale Street - Road Markings	ULE90130-01-HRL00016	Roads	Permanent
1C	London Road - Road Markings, signage	ULE90130-01-TAL-00015	Roads	Permanent
1C	Ancillary works for closure of Blenheim Place on London Road (to be confirmed)	ULE90130-01-TAL-00015	Roads	Permanent
1C	Union Place - road surfacing	ULE90130-01-HRL00016	Roads	Permanent
1C	interfacing with Central Monitoring Facility (CFM) to extend CCTV coverage to/from that location. This connection will be made from Cathedral Sub-station where it will then be transported via 3rd Party Service Provision such as BT	HB#40411	SCC	Permanent
1C	Picardy Place - road surfacing	ULE90130-01-HRL00015, 16	Roads	Permanent
1C	Broughton Street - road markings	ULE90130-01-HRL00016	Roads	Permanent
1C	Cathedral Substation and associated ducting on Elder Street and Cathedral Lane	ULE90130-01-TAL-00016	Substation / Roads	Permanent
1C	Street lighting along York Place	ULE90130-01-TAL-00016 and 00017	Lighting	Permanent
1C	Queen Street - road markings	ULE90130-01-HRL00017	Roads	Permanent
1C	North East Lane- Road markings, site clearance	ULE90130-01-HRL00017	Roads	Permanent
1C	N St Andrew Lane - Road markings, site clearance	ULE90130-01-HRL00017	Roads	Permanent
1C	Clyde Street - Road markings	ULE90130-01-HRL00017	Roads	Permanent
1C	St Andrew Square - Road markings, site clearance, surfacing	ULE90130-01-HRL00018	Roads	Permanent
1C	George Street - Road markings, site clearance	ULE90130-01-HRL00018	Roads	Permanent
1C	Rose Street - Road surfacing	ULE90130-01-HRL00018	Roads	Permanent
1C	Register Street - Road markings	ULE90130-01-HRL00018	Roads	Permanent
1C	Waverley Bridge - Road markings	ULE90130-01-HRL00018	Roads	Permanent
1C	Meuse Lane - Road markings and surfacing	ULE90130-01-HRL00019	Roads	Permanent
1C	Princes Street east of LOD - Road markings	ULE90130-01-HRL00019	Roads	Permanent
1C	Street Lighting Section 1C	ULE90130-01-TAL-00014 00016, to 00020	Lighting	Permanent
1C	Princes Street, Hanover Street - Road Markings, signal infrastructure, signage, kerbing	ULE90130-01-TAL-00019	Roads	Permanent
1C	Princes Street, The Mound - Road markings, signage	ULE90130-01-TAL-00019	Roads	Permanent
1C	Frederick Street Road works, signage (to be finalised with detailed design)	ULE90130-01-TAL-00019, 20	Roads	Permanent

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Section	Description	Reference	Source	Temporary or Permanent
1D	Charlotte Square - south side - Road Signage	HB#71652, ULE90130-01-TAL-00021	Roads	Temporary or Permanent
1D	Charlotte Square junction with South Charlotte Street - Road Signage	HB#71652, ULE90130-01-TAL-00021	Roads	Temporary or Permanent
1D	Princes Street, South Charlotte Street - Road Markings, signal infrastructure, signage, kerbing	ULE90130-01-TAL-00021	Roads	Permanent
1D	Princes Street, Lothian Road - Roadmarkings, signage and kerbing	ULE90130-01-TAL-00022	Roads	Permanent
1D	North side of Princes Street opposite junction with Lothian Road - Road signage	HB#71652	Roads	Permanent
1D	Northern end of Lothian Road - Road Signage	HB#71652	Roads	Temporary or Permanent
1D	Princes Street, Queensferry Street - Road markings, signage, kerbing	ULE90130-01-TAL-00022	Roads	Permanent
1D	Basestation at Edinburgh Castle (an existing radio site that gives coverage to an large portion of the Tram Network for radio coverage and towards any future requirements)	HB#40411	SCC	Permanent
1D	Street Lighting - Section 1D	ULE90130-01-TAL-00021 00023 and 00024	Lighting	Permanent
1D	Canning Street - Road markings, signage, taxi stance	ULE90130-01-TAL-00023	Roads / TRO	Permanent
1D	Atholl Crescent, Canning Street - Road markings, signage	ULE90130-01-HRL00023	Roads	Permanent
1D	Atholl Crescent, Canning Street Lane - Road markings, signage	ULE90130-01-HRL00023	Roads	Permanent
1D	Manor Street - Road markings, signage, signal infrastructure	ULE90130-01-HRL00023	Roads	Permanent
1D	Palmerston Place - Road markings, signage, signal infrastructure	ULE90130-01-HRL00023	Roads	Permanent
1D	Palmerston Place opposite junction with Palmerston Place Lane - Road signage	HB#71652	Roads	Permanent
1D	Palmerston Place at junction with West Maitland Street - Road signage	HB#71652	Roads	Permanent
1D	South end of Manor Place - Road Signage	HB#71653	Roads	Permanent
1D	Atholl Crescent Lane - Road markings	ULE90130-01-TAL-00023	Roads	Permanent
1D	West Maitland Street, Manor Place - Road markings, signage, lighting, signal infrastructure	ULE90130-01-TAL-00023	Roads / Lighting	Permanent
1D	Clifton Terrace, Morrison Street - Road markings, lighting, signage, signal infrastructure	ULE90130-01-TAL-00024	Roads / Lighting	Permanent
1D	Clifton Terrace, Grosvenor Street - Road markings, signage, kerbing	ULE90130-01-TAL-00024	Roads	Permanent
1D	Clifton Terrace, Dalry Road - Road markings, signage	ULE90130-01-TAL-00024	Roads	Permanent
1D	Torphican Place / Palmerston Place to two-way and street lighting	CR258	Roads	Permanent
1D	Torphichen Street - Road markings, signage, signal infrastructure	ULE90130-01-HRL00023	Roads	Permanent
1D	Torphichen Place - street lighting	ULE90130-01-HRL00023	Lighting	Permanent
1D	Morrison Street - Road markings, signage, signal infrastructure	ULE90130-01-HRL00024	Roads	Permanent
1D	Morrison Street close to junction with the Morrison Link - Road signage	HB#71652	Roads	Permanent
1D	Northeast end of Dalry Road - Road signage	HB#71652	Roads	Permanent
1D	Dalry Road (opposite Caledonian Place) - Road signage	HB#71652	Roads	Permanent
1D	Relocation of taxi stances (to be confirmed upon instruction to work outwith LOD)	To be confirmed upon instruction from tie	Roads	Permanent
1D	Approach signing (A8, Dalry Road, Palmerston Place, Lothian Road, South Charlotte Street)	To be confirmed upon instruction from tie	Roads	Permanent
Section Wide	TRO Requirements	To be confirmed upon detailed design	TRO	Permanent
Section Wide	Wider area works (to be finalised upon issuance of VO)	To be confirmed upon instruction from tie	Roads	Permanent
Section Wide	Traffic Calming - Haymarket Area (to be finalised upon issuance of VO)	To be confirmed upon instruction from tie, CR 315	Roads	Permanent

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Section	Description	Reference	Source	Temporary or Permanent
2A	Street Lighting Section 2A	ULE90130-02-OLE-00001	Lighting	Permanent
2A	OLE Section 2A - feed	ULE90130-02-OLE-00002	OLE	Permanent
2A	Drainage connection point at Haymarket Yards (2A-2)	HB# 59917	Ralph Shackleton	Permanent
2A	New access to east of Haymarket Tramstop - road markings and kerb / road works outside LOD within LLAU	02-HRL-00100	Roads	Permanent
2A	Haymarket Terrace north of Citypoint road kerb / markings outside LOD	02-HRL-00100	Roads	Permanent
2A	Haymarket Terrace north of Citypoint road sign outside LOD	02-HRL-00100	Roads	Permanent
2A	Haymarket Terrace north of Citypoint ped signals on north side outside LOD	02-HRL-00501	Roads	Permanent
2A	Haymarket Terrace north of Citypoint Limit of Construction outside LOD	02-HRL-00001	Roads	Permanent
2A	Haymarket Terrace north east Haymarket Tramstop ped signals and pavement on north side outside LOD	02-HRL-00501	Roads	Permanent
2A	Haymarket car park - kerbs / markings outside LOD - within LLAU	02-HRL-00501	Roads	Permanent
2A	Haymarket car park - ducting outside LOD - within LLAU	02-HRL-00801	Roads	Permanent
2A	Road / access south of ICAS Building - road markings and surfacing outside LOD within LLAU	02-HRL-00501 and 00901	Roads	Permanent
2A	Road / access south of ICAS Building -Limit of Construction outside LOD within LLAU	02-HRL-00001	Roads	Permanent
2A	South east of ICAS Building - sign outside LOD	02-HRL-00501	Roads	Permanent
2A	South west end of Haymarket Yards - Limit of Construction outside LOD but within LLAU	02-HRL-00002	Roads	Permanent
2A	South west end of Haymarket Yards - Dropped kerb partly outside LOD but within LLAU	02-HRL-00902	Roads	permanent
2A	West arm of Roseburn Delta Junction - Limit of Construction outside LOD and LLAU	02-HRL-00501	Roads	Permanent
2A	road and retaining wall at the back of Verity House, on NWR land for new access road outwith LoD and LLAU due to NWR Platform zero retaining wall and fencle line encroaching into the LLAU	02-HRL-00002	Roads	Permanent
3A	Street Lighting - Wester Coates Terrace & Easter Drylaw Drive (within LLAU)	ULE90130-03-LTG-00002 and 00009	Lighting	Permanent
3A	Roads - Proposed footpath to Telford Drive (within LLAU)	03-HRL-00909		Permanent
3A	Roads - Roseburn Terrace - Road/ped. crossing markings	03-HRL-00100		Permanent
3A	Roads - Roseburn Terrace - ped. crossing cabling (within LLAU)	03-HRL-00800		Permanent
3A	Landscaping - West of Roseburn Tramstop - proposed landscaping	HB# 51851	LHMP	Permanent
3A	Structures - Coltbridge Viaduct - Proposed cantilevered walkway extends over airspace of LLAU (<1m)			Permanent
3A	Roads - Queensferry Road - Tying in kerbs at south kerb (east side)	03-HRL-00008		Permanent
3A	Roads - Wester Coates Terrace - Road surfacing/sign (within LLAU)	03-HRL-00502 and 00902		Permanent
3A	Substation/Roads - South Groathill Ave Sub - drop kerb	03-HRL-00507		Permanent
3A	Roads - Maidencraig Crescent - New ped. access proposed signage	03-HRL00506		Permanent
3A	Roads - Maidencraig Crescent - New ped. access (within LLAU)	03-HRL00906		Permanent
3A	Landscaping Outwith LOD at Maidencraig Crescent	HB# 51851	LHMP	Permanent
3A	Tramstops - Craigleith Tramstop - tactile paving for stepped ped. access	03-STP-00027		Permanent
3B	Street Lighting - Ferry Rd & West Granton Rd - proposed lighting	ULE90130-03-LTG-00011 and 00014	Lighting	Permanent
3B	Drainage connection point (3B-1)	HB# 59917	Ralph Shackleton	Permanent

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Section	Description	Reference	Source	Temporary or Permanent
3B	Roads - Ferry Road east and west of tramway - junction detector loops	03-HRL-00011		Permanent
3B	Roads - West Granton Road east and west of tramway - junction detector loops	03-HRL-00014 & 00831		Permanent
3B	Substations - Granton Mains East substation (within LLAU)			Permanent
3B	Roads - footpath from West Granton Access to West Pilton March (partially extends into LLAU from LoD)	03-HRL-00014		Permanent
3C	Street Lighting - Lighting column to south side of Waterfront Avenue, East of tram crossing	ULE90130-03-LTG-00016	Lighting	Permanent
3C	Drainage connection point (3C-1)	HB# 59917	Ralph Shackleton	Permanent
3C	Drainage connection point (3C-2)	HB# 59917	Ralph Shackleton	Permanent
3C	Junction 104 - Road markings & kerb re-alignment	03-HRL-00016		Permanent
3C	Roads - Junctions 105-108 - Road markings/HF surfacing, kerb re-alignment ped. crossing & traffic signal detector loops	03-HRL-00016 to 00018		Permanent
3C	Roads - Junctions 105 - Crown re-grading of Waterfront Avenue to both sides of the tramway crossing			Permanent
3C	Roads - Junction 108a (north of) - Road markings, kerb re alignment & traffic signal detector loops	03-HRL-00018 and 00867		Permanent
3C	Roads - Junction 108b (north of) - Road markings, kerb re alignment & traffic signal detector loops	03-HRL-00018 and 00865		Permanent
3C	Tramstops - Caroline Park - landscape tie-in	03-STP-00061		Permanent
3C	Tramstops - Saltire Square - paving tie-in	03-STP-00071		Permanent
3C	Roads - Junction 109 - Kerb line (partially) for stopped-up Oxcraig Street	03-HRL-00018		Permanent
3C	Roads - Oxcraig Street signage	03-HRL-00564		Permanent
3C	Roads - Junctions 110 - Road markings/HF surfacing, re-grading, kerb re-alignment ped. crossing & traffic signal detector loops	03-HRL-00019		Permanent
3C	Substation - Granton View Substation (within LLAU)			Permanent
3A	Landscaping design - west of Rosebum Tramstop (within LLAU)			
3A	Structures - cantilever walkway to west side of Coltbridge Viaduct (in mid-air)			
3A	Landscaping - between Craigleith Tramstop and Maidencraig Crescent/Maidencraig Court			
3A	Roads - Stepped access from Telford Drive to Rosebum Cycle/footway to north of existing substation			
3A	Lighting - erection of lighting column on footpath between Rosebum Corridor/Easter Drylaw Drive (within LLAU)			
3A	Landscaping - Drylaw Recreation ground			
3B	Roads - realignment (vertical/horizontal) of footpath from West Pilton March to West Granton Road (within substation LLAU) where LOD is too narrow.			
3B	Roads - Creation of public space. Extension of footpath design and width beyond LOD into substation LLAU, including design of low level wall at northeast corner of LLAU for Granton Mains East substation.			
3C	Roads - crown regrading of road for short distance beyond LoD at both crossings of Waterfront Avenue			
3C	Spine Road - Tram route crosses Spine Road where LOD is too narrow. New traffic islands, signal heads and road markings outwith LOD			
3C	Roads - installation of traffic signalisation, road markings for 3 no. minor access roads to north side of Waterfront Avenue (Spine Road) and associated pedestrian crossing points			

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Section	Description	Reference	Source	Temporary or Permanent
3C	Roads - installation of pedestrian crossing signalisation at corner of junction of Waterfront Avenue/West Harbour Road and associated pedestrian crossing point tactile paving and kerbing			
3C	Roads - Chestnut Street, road markings			
3C	Roads - installation of traffic signalisation at junction of West Harbour Road/Pickfords entrance and associated pedestrian crossing point tactile paving. Relocation of existing gated access (boundary and accomodation)			
3C	Roads - regrading of southern 50m (approx.) of Middle Pier Road and footways			
3C	Granton Square - bus interchange			
5A	Street Lighting Section 5A	ULE90130-05-LTG-00001 to 00003	Lighting	Permanent
5A	OLE Section 5A - feed	ULE90130-05-OLE-00001	OLE	Permanent
5A	Russell Road and sorting office boundary - Limit of Construction outside of LOD but within LLAU	05-HRL-00002	Roads	Permanent
5A	To east of offices near Haymarket Central Junction - Limit of Construction outside LOD and LLAU	05-HRL-00002	Roads	Permanent
5A	Kerb / road works and Limit of Construction to the south of the Bowling Green outside LOD - most within LLAU	05-HRL-00002	Roads	Permanent
5A	Kerb / road works and Limit of Construction to the north of Murrayfield Tramstop including new footway and ped crossing outside LOD - some within LLAU	05-HRL-00002 800 and 902	Roads	Permanent
5A	**Murrayfield** Temporary- replacement/maintenance of existing Scotrail fence on the outbound platform to be undertaken on the boundary of the LOD.	#70512	Ian Brown	Temporary
5A	Murrayfield Training pitch moves		Ian Brown	Permanent
5A	Turnstiles at Murrayfield Stadium - Accomodation works	ULE90130-05-ACC-00034	Mungo Stacy	Permanent
5B	Street Lighting Section 5B	ULE90130-05-LTG-00009, 00011, 00012, 00014, 00018 and 00019	Lighting	Permanent
5B	**Carrick Knowe** Earthworks north of railway spill outwith LoD as advised by CEC - do not build retaining wall - this is CEC Leisure land.	ULE90130-05-	David Raeside	Permanent
5B	**Saughton:** Permanent - 2 proposed foothpaths are being introduced to provide access to tramstop These are introduced either end of stop southwards to join existing foothpath on Broomhouse Drive.These are completely outside the LOD but there is the need to provide pedestrians access to the tram without having to constrain them to using the access within LOD on Saughton Road North.(see attached PDF). Limit of Construction - 2 Footpaths are being demolished - outside the LOD but within the LLAU.	#70512 05-HRL-00010, 11 and 12	Ian Brown	Permanent
5B	Saughton Tramstop - landscape tie in	05-STP-00027	John Ramsay	Permanent
5B	We are proposing to relocate two bus stops on Bankhead Avenue (opposite South Gyle Access). Current and proposed locations are outside of the LoD. Ie Limit of Construction outside the LOD	ULE90130-05-HRL-00015	Roads	Permanent
5B	Immediately SE of South Gyle Tramstop - Limit of Construction and road markings outside LOD some in LLAU	ULE90130-05-HRL-00015 and 00134	Roads	Permanent
5B	South Gyle Tramstop - associated Pedestrian crossing	05-STP-00036	Roads	Permanent
5B	Bankhead Drive SE of South Gyle Access - Limit of Construction and road works outside LOD	ULE90130-05-HRL-00015 and 00135	Roads	Permanent
5B	Edinburgh Park Station - zone behind outbound platform-interface works with NR land	HB#70467	Ian Brown	Permanent
5B	Edinburgh Park Station Tramstop - paving tie in	05-STP-00048	Ian Brown	Permanent

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Section	Description	Reference	Source	Temporary or Permanent
5B	Edinburgh Park Station - Permanent Works - Remodelled access footpath link to Currys to be constructed outside the LOD but within the LLAU. Limit of Construction outside the LOD some within LLAU	HB #72057 05-HRL-00018	Ian Brown	Permanent
5B	East of Junction 202A - Roadworks / marking / footway relaignment outside LOD	05-HRL-00132 00943	Roads	Permanent
5B	West of Junction 202A - limit of Construction outside the LOD/LLAU	05-HRL-00017	Roads	Permanent
5B	Bollard outside LOD (only just)	05-HRL-00535	Roads	Permanent
5B	Bankhead Drive / Bankhead Avenue Traffic Signals and Associated Ducting outside the LOD some within LLAU.	05-HRL-00834	Roads	Permanent
5B	Bankhead Drive substation - limit of Construction outside the LOD some within LLAU.	05-HRL-00014	Roads	Permanent
5B	Bankhead Drive substation - road realignmentoutside the LOD some within LLAU	05-HRL-00014	Roads	Permanent
5B	Bankhead Drive junction - limit of Construction outside the LOD some within LLAU.	05-HRL-00017	Roads	Permanent
5B	Stenhouse Drive - road markings outside the LOD and LLAU	05-HRL-00009	Roads	Permanent
5B	Stenhouse Drive - pavement works outside the LOD and LLAU	05-HRL-00934 and 00935	Roads	Permanent
5C	Street Lighting Section 5C	ULE90130-05-LTG-00022, 00023, 00025 and 00026	Lighting	Permanent
5C	Edinburgh Park- relocation works to the footpath link ramped structure	HB#70467	Ian Brown	Permanent
5C	Edinburgh Park- Limit of Construction re above relocation works to the footpath link ramped structure	05-HRL-00021	Ian Brown	Permanent
5C	Trees planting outwith LoD at NEL's request north of Lochside ave	HB#70468	Kate Shudall	Permanent
5C	South west of Gyle Tramstop - kerb realignment outside LOD - within LLAU	05-HRL-00563	Roads	Permanent
5C	Gyle Tramstop - landscape tie in	05-STP-00004	Roads	Permanent
5C	South of Gyle Tramstop - ducting outside LOD - some within LLAU	05-HRL-00861	Roads	Permanent
5C	South of junction of Lochside Crescent Lochside Avenue - footway works outside LOD	05-HRL-00962	Roads	Permanent
5C	East of junction 205 - Limit of Construction outside LOD	05-HRL-00023	Roads	Permanent
5C	Northwest of junction 205 - Limit of Construction outside LOD - within LLAU	05-HRL-00023	Roads	Permanent
5C	East end, north side of Lochside Avenue - sign outside LOD	05-HRL-000562	Roads	Permanent
5C	South east and north of Gogarburn Tramstop - Limit of Construction outside LOD some within LLAU	05-HRL-00026	Roads	Permanent
5C	Depot Earthworks - potentially soil nails will be required outwith the LOD - underneath the A8 Underpass - TBC	TBC	David Raeside	Permanent
6	Gogarburn Roundabout - Signage outside LOD some in LLAU	06-HRL-00007	Roads	Permanent
6	Junction 208 Signs outside LOD some in LLAU (in centre of roundabout, depot access and w of junction)	06-HRL-00501	Roads	Permanent
6	Junction 208 - ducting outside LOD but within LLAU	06-HRL-00800	Roads	Permanent
6	Gogarburn Roundabout Safety Barrier, footway works outside LOD but within LLAU	06-HRL-00901	Roads	Permanent
6	Gogarburn Roundabout - Limit of Construction outside LOD but within LLAU	06-HRL-00001	Roads	Permanent
6	Gogarburn Depot - Limit of Construction outside LOD some within LLAU some outside	06-HRL-00002	Roads	Permanent
5C	Constuction work of Gyle tramstop retaining wall to be undertaken outside the LOD.	HB #70741	Andy Groves	Temporary
5C	Drainage connection point (5C-2) on South Gyle Broadway	HB# 59917	Ralph Shackleton	Permanent
5C	Temporary works to construct the A8 Underpass required due to Utility routes and diversions	HB#70402 HB#70403	Paul McQuade	Temporary

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Section	Description	Reference	Source	Temporary or Permanent
5C	Earthworks/construction work to be undertaken outside the LOD (but within the LLAU). This is to remove earth bund on current Gogarburn tramstop location in order to achieve the level which the Pway design has been based on	HB #70741	Ian Brown	Temporary
5C	LOD issue at Gogarburn. Options are highlighted below (refer source for sketches): - ask tie to amend the LOD/LLAU as the present location of the foothpath is the "natural desire line" for pedestrians (Option 1) - ammend the footpath to follow the back of the LOD as shown in Option 2 (although it is not preferred). -get the road moved eastwards and narrow the foothpath (Option 3)	HB #72056	Ian Brown	Permanent
7A	Earthworks may be reguried to go outwith the LOD at the Gogar Landfill site due to extent of contaminted land	TBC	David Raeside	Permanent
7A	Earthworks may be reguried to go outwith the LOD along NIL and FSH land	TBC	David Raeside	Permanent
7A	Street Lighting Section 7A	ULE90130-07-LTG-00007 and 00008	Lighting	Permanent
7A	Any works to outfalls eg headwalls and scour protection, may be outside the LOD since the LOD follows the water line on the West bank.	HB# 59917	Ralph Shackleton	Permanent
7A	Badger fencing along Gogar Farm Access Road	ULE90130-SW-ENV-00038	Kat Dennis (HB#69860)	Permanent
7A	Marking out of badger and otter exclusion areas during construction works	ULE90130-SW-ENV-00037, ULE90130-SW-ENV-00040, ULE90130-SW-ENV-00047	Kat Dennis (HB#69860)	Temporary
7A	Archaeological Investigation Works around Nether Gogar (Church, old mill and pill box sites) as specified in the "Edinburgh Tram: Specification for Archaeological Works Line 2" and drawings ULE90130-07-DRG-00072, ULE90130-07-DRG-00073, and ULE90130-07-DRG-00074. This report has not yet been formally issued to tie but is expected to be finalised by the end of next week following a review by CEC archaeologist John Lawson.	Edinburgh Tram: Specification for Archaeological Works Line 2 and drawings ULE90130-07-DRG-00072, ULE90130-07-DRG-00073, and ULE90130-07-DRG-00074	Kat Dennis (HB#69860)	Temporary
7A	Badger fencing (temporary) across the unfenced section of the A8 south of the Gogar Drain as specified in the parliamentary agreement with the Edinburgh and Lothians Badger Group (subject to agreement with the landowner) - see extract in KD email (HB# 69860).	ELBG Agreement	Kat Dennis (HB#69860)	Temporary
7A	Airport Tramstop - Kiosk and ticketing facility and pedestrian links	CNS109	Ian Brown	Permanent
Line 2	There may be some localised works along the Network rail corridor outwith the LoD between the Tram route and the Network rail lines, although this may be minimal.	HB#70402	Paul McQuade	Temp & Perm
7A	Gogar Farm Access Road - Limit of Construction outside LOD some within LLAU	07-HRL-00003	Roads	Permanent
7A	Gogarburn Tramstop - Limit of Construction outside LOD some within LLAU	07-HRL-00001	Roads	Permanent
7A	Ingliston Park and Ride - Limit of Construction ouside LOD some within LLAU	07-HRL-00007	Roads	Permanent
7A	Hilton Hotel - works to car park (including kerb and marking alterations) outside LOD some within LLAU some outside	07-HRL-00800 / 00507	Roads	Permanent

[redacted]

Director/Authorised Signatory
tie LIMITED

[redacted]

Director/Authorised Signatory
BILFINGER BERGER UK LIMITED

[redacted]

Director/Authorised Signatory
PARSONS BRINCKERHOFF LIMITED

[redacted]

Director/Authorised Signatory
SIEMENS PLC



THIS IS SCHEDULE PART 24 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 24

(1) PARSONS BRINCKERHOFF LIMITED

- and -

(2) TIE LIMITED

- and -

(3) INFRACO

COLLATERAL WARRANTY IN FAVOUR OF TIE FROM THE SDS PROVIDER

relating to

THE PROVISION OF SYSTEM DESIGN SERVICES FOR THE EDINBURGH TRAM NETWORK

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AGREEMENT

BETWEEN

(1) **PARSONS BRINCKERHOFF LIMITED** (Company Number 2554514) whose registered office is at Amber Court, William Armstrong Drive, Newcastle Business Park, Newcastle Upon Tyne, NE4 7YQ ("**SDS Provider**");

(2) **TIE LIMITED** (Company Number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ ("**tie**") which term shall include its successors and permitted assignees); and

(3) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London, EC1A 4EJ, which expression shall include its successors, permitted assignees and transferees and **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens House, Frimley, Camberley, Surrey, GU16 8QD, which expression shall include its successors, permitted assignees and transferees, acting jointly and severally (together the "**Infraco**").

BACKGROUND

A By an agreement in writing dated 19 September 2005 (the "**SDS Agreement**"), **tie** appointed the SDS Provider to provide system design services in connection with the Edinburgh Tram Network.

B **tie** and Infraco have entered into a contract under which Infraco has been appointed to complete the design and carry out the construction, installation, commissioning and maintenance planning in respect of the Edinburgh Tram Network.

C **tie** and Infraco have agreed, with the consent of the SDS Provider, that the Infraco shall take over the rights and liabilities of the "Client" under the SDS Agreement by novating the SDS Agreement from **tie** to Infraco upon and subject to the terms of the Novation Agreement (as hereinafter defined).

E It is a term of the SDS Agreement that the SDS Provider shall enter into this Agreement with **tie** following the execution of the Novation Agreement.

IT IS AGREED as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement the following words and expressions have the following meanings, unless the context requires otherwise:

"**Agreement**" means this document (as amended from time to time pursuant to Clause 15);

"**Deliverables**" means the Functional Requirements Specifications, the Technical Specifications and the items listed in Appendix 3 to Schedule 1 *(Scope of Services)* of the SDS Agreement, the design produced pursuant to the Novation Agreement as set out in Appendix Part 4 to that agreement and any other design SDS produces for the Infraco and all other documents, information, reports, records, diagrams, bills of quantities, manuals, schedules, databases, reinforcement details, photographs, formulae, consultation materials, plans, designs, specifications, drawings (including as-built drawings), details, calculations, transport and other models and simulations, the outputs and reports based on any models, programmes and all other material created and/or provided by the SDS Provider (and/or any SDS Provider Party or any other third party) in the performance of the Services and the SDS Provider's other obligations under the SDS Agreement to the Novation Agreement;

"**Infraco Contract**" means the contract to be entered into or entered into by **tie** with the Infraco in relation to the completion of the design, and carrying out the construction, commissioning and maintenance planning in respect of the Edinburgh Tram Network;

"**Novation Agreement**" means the novation agreement entered into among **tie**, the SDS Provider and the Infraco;

"**Party**" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

"**SDS Agreement**" means the agreement dated 19 September 2005 originally entered into by the SDS Provider and **tie**, which has been novated to the Infraco and the SDS Provider.

1.2 Unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender include all other genders.

1.2.2 a reference to:

1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a recital, clause or schedule is a reference to a recital, clause or schedule of or to this Agreement;

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation; and

1.4 Where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

1.5 Unless otherwise defined hereunder, where the SDS Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement;

1.6 In the case of any unintended conflict between the definition or interpretation of words or expressions in this Agreement and the SDS Agreement, the SDS Agreement shall prevail save where by express words or where it is apparent from the context that the contrary is intended in this Agreement.

2. STANDARD OF CARE

The SDS Provider warrants and undertakes to **tie** that:

2.1 it has carried out and shall carry out its Services and other duties and obligations under the SDS Agreement and the Novation Agreement subject to and in accordance with the terms thereof; and

2.2 in addition to and without derogation from clause **Error! Reference source not found.**;

2.2.1 the SDS Provider warrants to **tie** that, in the production of the Deliverables and in the performance of the Services and its other obligations under the SDS Agreement it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent system design services provider

experienced in performing services similar to the Services in connection with projects of a similar size, scope and complexity; and

2.2.2 it owes a duty of care to **tie** in carrying out its duties and obligations under the SDS Agreement and the Novation Agreement.

3. COPYRIGHT LICENCE

3.1 The SDS Provider hereby grants to **tie** an irrevocable, perpetual, royalty-free and non-exclusive licence to use such Project IPR and SDS Provider IPR as may be necessary for **tie** to use in relation to any projects associated with the Services. This licence shall carry the right to grant sub-licences, and be freely transferable to third parties. The SDS Provider shall be liable for the Project IPR and the SDS Provider IPR only to the extent that it is used for the purposes for which it was intended.

3.2 In so far as ownership of the copyright and any other Intellectual Property Rights in any Deliverable prepared or provided by the SDS Provider in connection with the Edinburgh Tram Network is vested in any person other than the SDS Provider including, without limitation, any SDS Provider Party, the SDS Provider shall procure for **tie** the benefit of such a licence as is referred to in clause **Error! Reference source not found.** for the purposes referred to therein.

3.3 The SDS Provider shall, if so requested at any time, execute such documents and perform such acts (including the grant to **tie** of a licence to use any SDS Provider Software and/or any Third Party Software and/or any Specially Written Software) as may be required fully and effectively to assure to **tie** or any third party the rights referred to in this clause **Error! Reference source not found.**.

3.4 The SDS Provider shall provide to **tie** a copy of any of the Deliverables as soon as reasonably practicable after receipt by the SDS Provider of a written request from **tie** to do so.

3.5 The SDS Provider undertakes to **tie** that the use by **tie** of any of the Deliverables for any purpose provided for in this clause **Error! Reference source not found.** shall not infringe the rights of any third party in relation to the Deliverables.

4. REQUIRED INSURANCES

4.1 The SDS Provider undertakes that:

4.1.1 it has maintained and shall maintain during the performance of its obligations under the SDS Agreement each of the Required Insurances in accordance with the requirements of Clause 17 (*Required Insurances*) and Schedule 6 (*Required Insurances*) of the SDS Agreement;

4.1.2 cover under the professional indemnity insurance is extended to include the SDS Provider's liabilities under this Agreement;

4.1.3 this Agreement has been disclosed to the SDS Provider's current professional indemnity insurers or brokers (as the case may be) and shall be disclosed to any future professional indemnity insurers or brokers providing the insurance required by this Agreement; and

4.1.4 the SDS Provider shall abide by the terms and conditions of insurance and not do or omit to do anything that might prejudice the cover or its right to make a claim.

4.2 As and when required by **tie**, the SDS Provider shall produce for inspection documentary evidence that such insurance is being properly maintained.

4.3 The SDS Provider shall not make any material alteration to the terms of the Required Insurances without **tie's** prior approval which approval shall not be unreasonably withheld. If the insurer makes or attempts to make any material alteration or purports to withdraw cover, or if the SDS Provider is unable to obtain professional indemnity insurance, the SDS Provider shall promptly give notice of this to **tie**.

5. TIE STEP-IN

5.1 The SDS Provider shall not exercise nor seek to exercise any right of determination of the SDS Agreement or the Novation Agreement or to rescind the SDS Agreement or the Novation Agreement by reason of a Client Default or to otherwise discontinue the performance of any of the SDS Provider's obligations in relation to the SDS Agreement or the Novation Agreement by reason of breach on the part of the Infraco (or otherwise) without giving to **tie** not less than 21 days' written notice of its intention to do so and specifying in such notice the grounds for the proposed determination. The SDS Provider shall for the period of any such notice diligently and properly continue to perform the SDS Provider's obligations under the SDS Agreement or the Novation Agreement.

5.2 Any period stipulated in the SDS Agreement or the Novation Agreement for the exercise by the SDS Provider of a right of determination shall nevertheless be extended as may be

necessary to take account of the period of notice required under clause **Error! Reference source not found.**.

5.3 Compliance by the SDS Provider with the provisions of clause **Error! Reference source not found.** shall not be treated as a waiver of any breach on the part of the Infraco giving rise to the right of determination nor otherwise prevent the SDS Provider from exercising its rights after the expiration of the notice unless the right of determination shall have ceased under the provisions of clause **Error! Reference source not found.**.

5.4 The right of the SDS Provider to determine the SDS Agreement or to rescind the SDS Agreement or the Novation Agreement or to discontinue the performance of any of its obligations in relation to the SDS Agreement or the Novation Agreement shall cease if within the period of 21 days referred to in clause **Error! Reference source not found.**, **tie** gives written notice to the SDS Provider:

5.4.1 requiring the SDS Provider to continue with the performance of all its obligations under the SDS Agreement or the Novation Agreement;

5.4.2 acknowledging that **tie** is assuming all the obligations of the Infraco (as "**Client**") under the SDS Agreement or the Novation Agreement; and

5.4.3 undertaking to the SDS Provider to discharge all amounts payable to the SDS Provider under the terms of the SDS Agreement or the Novation Agreement.

5.5 Upon compliance by **tie** with the requirements of clause **Error! Reference source not found.**, the SDS Agreement or the Novation Agreement shall continue in full force and effect as if the right of determination on the part of the SDS Provider had not arisen and in all respects as if the SDS Agreement or the Novation Agreement had been made between **tie** and the SDS Provider to the exclusion of the Infraco.

5.6 Notwithstanding that as between the Infraco and the SDS Provider, the SDS Provider's right of determination of its engagement under the SDS Agreement or the Novation Agreement may not have arisen the provisions of clause **Error! Reference source not found.** shall nevertheless apply if **tie** gives written notice to the SDS Provider and the Infraco to that effect and **tie** complies with the requirements on its part under clause **Error! Reference source not found.**.

5.7 The SDS Provider does not need to be concerned or required to enquire whether, and shall be entitled to assume that, as between the Infraco and **tie**, the circumstances have occurred permitting **tie** to give notice under clause **Error! Reference source not found.**.

5.8 The SDS Provider acting in accordance with the provisions of this clause **Error! Reference source not found.** shall not incur any liability to the Infraco.

5.9 Unless and until **tie** has given notice under this clause **Error! Reference source not found.**:

5.9.1 **tie** has no liability whatsoever to the SDS Provider in respect of amounts payable to the SDS Provider under the SDS Agreement or the Novation Agreement (except in relation to the sums referred to in Clause 8 of this Agreement); and

5.9.2 **tie** has no authority to issue any direction or instruction to the SDS Provider in relation to the performance of the SDS Provider's obligations under the SDS Agreement or the Novation Agreement.

5.10 Without prejudice to the provisions of clauses **Error! Reference source not found.** to **Error! Reference source not found.** inclusive, if prior to the service of any notice under clause **Error! Reference source not found.** the SDS Provider is determined under the SDS Agreement and the Novation Agreement for any reason whatsoever the SDS Provider shall if required in writing so do to by **tie** no later than 12 weeks after the date of such determination forthwith enter into a new agreement with **tie** on the same terms as the SDS Agreement and the Novation Agreement, but with such revisions as **tie** and the SDS Provider may reasonably require to reflect altered circumstances and the fact that it is **tie** and not the Infraco employing the SDS Provider.

6. ASSIGNATION

6.1 The SDS Provider shall not assign, novate or otherwise transfer the whole or any part of this Agreement without the prior written agreement of **tie**.

6.2 **tie** shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

6.2.1 to the Scottish Ministers or any local authority or other body with no worse financial standing than that of **tie** who, as a result of any Change in Law, takes over all or substantially all the functions of **tie**; or

6.2.2 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to the SDS Provider) by **tie** or a person falling within clause 6.2.1; or

6.2.3 to CEC or Transport Edinburgh Limited; or

6.2.4 with the prior written consent of the SDS Provider (such consent not to be unreasonably withheld or delayed).

6.3 The SDS Provider undertakes to **tie** not to contend in any court proceedings under this Agreement that any person to whom **tie** assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this clause is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that **tie** is named under this Agreement or any intermediate assignee of **tie** escaped loss resulting from such breach by reason of the disposal of its interest in the same.

7. LIABILITY OF THE SDS PROVIDER

7.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by law of contract, delict or otherwise.

7.2 The responsibility of the SDS Provider under this Agreement is not to be reduced or in any way released or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by **tie** against a third party.

7.3 The rights and benefits conferred upon **tie** by this Agreement are in addition to any other rights and remedies that **tie** may have against the SDS Provider including (without prejudice to the generality of the foregoing) any remedies in delict.

7.4 Subject to the other provisions of this Agreement, the liability of the SDS Provider to **tie** is to be determined in all respects in accordance with the terms of the SDS Agreement and the Novation Agreement and, in the event of any claim by **tie** under this Agreement, the SDS Provider shall be entitled to rely upon any defence, right, limitation or exclusion under the SDS Agreement or the Novation Agreement as though **tie** were named as Client under it, except that:

7.4.1 **tie** shall not be affected by any subsequent variation of the SDS Agreement which would adversely affect the obligations owed by SDS Provider or the waiver, compromise or withdrawal of any claim made by the Infraco; and

7.4.2 the SDS Provider shall not be entitled to exercise any right of set-off, retention or withholding against **tie** to which the SDS Provider may be entitled as against the Infraco.

7.5 The liability of the SDS Provider under this Agreement shall be no greater in extent than the liability of the SDS Provider under the SDS Agreement.

8. PAYMENT TO THE SDS PROVIDER IN RESPECT OF RETENTIONS AND REDUCTIONS IN THE SCOPE OF SERVICES

8.1 **tie** shall make payment of any sums which have been agreed to be due to the SDS Provider in accordance with Clause 12.7.3 and/or Clause 29.4 of the SDS Agreement, in the amounts and the timescales set out within these said Clauses and such payment shall be deemed to be in full and final settlement of any claims by SDS Provider.

9. ONGOING SCOPE OF SERVICES TO TIE

9.1 The SDS Provider undertakes to **tie** to perform and **tie** agrees to pay for the Services set out in the Schedule on behalf of **tie** as the Client in accordance with the terms of the SDS Agreement, and as if the Novation Agreement had not been entered into and:

9.1.1 in respect of Schedule Part 1 a lump sum of £103,744 is payable, together with any further payment due in respect of changes which will be valued in accordance with the Schedule or in accordance with the estimate for the change; or

9.1.2 in respect of Schedule Parts 2 and 3 at the rates set out in the Schedule,

and the Infraco acknowledges this.

10. CONSENT OF INFRACO

10.1 The Infraco consents to the terms of this Agreement.

11. NOTICES

11.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

11.2 Any notice given pursuant to this clause, if sent by registered or recorded delivery, is deemed to have been received 48 hours after being posted.

12. RIGHTS OF THIRD PARTIES

12.1 A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

13. INVALID TERMS

13.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable

13.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

13.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

14. VARIATIONS AND WAIVERS TO BE IN WRITING

14.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

15. WAIVER

15.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

15.1.1 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

16. JURISDICTION AND LAW

16.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

16.2 The Parties agree that any dispute in relation to this Agreement shall be conducted in accordance with Clause 28 (*Dispute Resolution Procedure*) of the SDS Agreement and the provisions of the said Clause 28 and Schedule 10 (*Panels to the Dispute Resolution Procedure*) are deemed to be incorporated mutatis mutandis in respect of this Agreement provided that any reference to "**Parties**" shall be deemed to refer to **tie** and the SDS Provider, any reference to "**Client**" shall be deemed to refer to **tie**, the reference to "Clause 36" shall mean Clause 11 of this Agreement.

IN WITNESS WHEREOF these presents on this and the preceding 10 pages together with the Schedule in 3 Parts and Appendix in 3 Parts which are annexed hereto are executed as follows:

EXECUTED for and on behalf of **PARSONS BRINCKERHOFF LIMITED**

at

on 2008 by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **TIE LIMITED** at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at

on 2008 by:

Director _____

Full Name _____

Director _____

Full Name _____

EXECUTED for and on behalf of **SIEMENS PLC**

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Authorised Signatory _____

Full Name _____

This is the Schedule referred to in the foregoing collateral warranty among Parsons Brinkerhoff Limited, tie, and the Infraco

SCHEDULE PART 1

SDS SCOPE OF SERVICES FOR TIE

Utilities Diversions

1 The SDS Provider shall provide technical and specialist assistance to **tie** with the management of the advanced utilities diversion programme being carried out under the Multi Utilities Diversion Framework Agreement. As **Appendix A** this shall include:

(a) assessing the need for and acquiring relevant data relating to the presence and location of all buried and above ground utility services;

(b) agreeing the need for and extent of diversions;

(c) undertaking critical design and developing a strategy for all utilities diversions to minimise diversion requirements and out-turn costs;

(d) preparing C4 cost schedules;

(e) activities required to support the utilities diversion process including, but not limited to, traffic management plans/traffic regulation orders (including temporary traffic regulation orders), site meetings and all necessary re-designs;

(f) design re-work/modifications on an as required basis to deal with unidentified diversions;

(g) construction support and on-site attendance at appropriate seniority on an as-required basis;

(h) attendance at all meetings at appropriate seniority on an as-required basis;

(i) production of utilities designs that are complete in all respects including input from statutory utilities, and fully and finally checked and coordinated by PB prior to issue to the contractor under the MUDFA Contract.

SCHEDULE PART 2

SDS SCOPE OF SERVICES FOR TIE

MANHOLES and SEWER WORKS

Utilities Diversions

1 The SDS Provider shall provide technical and specialist assistance to **tie** with the management of the advanced utilities Sewer diversion programme being carried out under the Multi Utilities Diversion Framework Agreement. This work shall be instructed as a change order in accordance with the change process and be in accordance with Clause 15 of the SDS Agreement. The work content is listed in **Appendix B,** this shall include:

(a) assessing the need for and acquiring relevant data relating to the presence and location of all sewers and manholes;

(b) agreeing the need for and extent of sewer diversions;

(c) undertaking critical sewer design and developing a strategy to minimise associated diversion requirements and outturn costs

(d) provide on-site attendance at appropriate seniority on an as-required basis;

(e) provided adequate notice and information (previous minutes, Agenda etc) is provided by tie attendance at meetings at appropriate seniority on an as-required basis until sewer designs are completed.

SCHEDULE PART 3

SDS RETAINED SCOPE OF SERVICES FOR TIE

Utilities Diversions

1. The SDS Provider shall extend the duration of their provision of technical and specialist assistance to **tie** with the management of the advanced utilities diversion programme being carried out under the Multi Utilities Diversion Framework Agreement.

   This work shall be carried out on a time and expense basis in accordance with the table of rates (as **Appendix C**) and shall include:

   (a) assessing the need for and acquiring relevant data relating to the presence and location of all buried and above ground utility services;

   (b) agreeing the need for and extent of diversions;

   (c) undertaking critical design and developing a strategy for all utilities diversions to minimise diversion requirements and out-turn costs;

   (d) preparing C4 cost schedules;

   (e) carry out design re-work/modifications/additional diversion designs on an as required basis to deal with unidentified services in a timely manner to avoid or minimise disruption to the ongoing programme of works;

   (f) Provided adequate notice and information (objective of visit, identification/ clarification of problem etc) is received from tie, provide appropriate on-site attendance on an as-required basis;

   (g) Provided adequate notice and information (Previous Minutes, Agenda etc) is provided by tie attendance at meetings at appropriate seniority on an as-required basis;

   (h) The timely production of utilities designs that are complete in all respects including input from statutory utilities, and fully and finally checked by the relevant utility and coordinated by PB prior to issue to the contractor under the MUDFA Contract

2. Parsons Brinckerhoff. shall provide all technical support (on and off site) required to address any utilities design issues arising from the works under the MUDFA Contract and including resolution by Parsons Brinckerhoff of all technical queries arising from use by the contractor under the MUDFA Contract of Parsons Brinckerhoff design in a proactive manner to minimise

disruption and delays to the progress of the works under the MUDFA Contract and the Edinburgh Tram Network installation works (The Infraco Works).

This work will be carried out on a time and expense basis in accordance with the table of rates (as **Appendix C**).

APPENDIX A

Section	Location Plates	Remarks
1A	plates 1-5	Forth Ports Agreement Drawings (for utility definition) to be instructed by **tie**. Road/kerb detail and alignments to be confirmed from Forth Ports Agreement such that telecomms designs (box details) may be confirmed. VE exercise being carried out by tie Management Team week commencing 6th May 2008. (**tie** to visit Chancelot Mills to agree route of power cables. (Note. These utilities running outside LOD)
1A	plates 6-10	Forth Ports Agreement Drawings (for utility definition) to be instructed by tie. Road/kerb detail and alignments to be confirmed from Forth Ports Agreement such that telecomms designs (box details) may be confirmed. Note. SDS utility IFA Drawings issued to SUC's on 8th Feb 2008. VE exercise being carried out by tie Management Team week commencing 6th May 2008. SDS await revised drawings from tie/Scottish Power.
1A	plates 11-12	Utilities being designed in accordance with bridge designs for Victoria Bridge and Tower Place Bridge. This work being carried out in line with Change CR278 for the bridge re-designs.
2A	plates 1-3	Drawings issued for approval on 14th April 2008. **tie** formal ROR not yet received. SDS working on unofficial ROR. IFC to be issued 17th May 2008.
6A	plates 1	SDS to issue IFC Drawings 7th May 2008
6	Gogar 800 main	SDS to issue IFC Drawings 9th May 2008
		SDS CHANGE ORDER WORK for COMPLETION
1A	plates 14/15	**Change No CR 257. Original diversions carried out by MUDFA on plate 15. As-built drawings for plate 14 & 15 awaited from tie. This holding up the completion of work.**
3A	Full Sub-section	**CR325 SDS is instructed not to seek approvals to these designs. All Phase 1A utility designs to be procured prior to Phase 1B designs.**
3B	Full Sub-section	**CR325 SDS is instructed not to seek approvals to these designs. All Phase 1A utility designs to be procured prior to Phase 1B designs.**
3C	Full Sub-section	**CR325 SDS is instructed not to seek approvals to these designs. All Phase 1A utility designs to be procured prior to Phase 1B designs.**
5C	Edin Parl	CR 305 Edinburgh Park Private Utilities Relocation. Utilities being moved out of tramway path. IFC programmed for 24th May 2008.

APPENDIX B

		MANHOLE/SEWER WORK for COMPLETION
		See SDS letter ref ULE90130-SW-LET-01040 dated 17th April 2008. This letter identifies that the **tie**/MUDFA Sewer Survey Programme should have been complete by 28th February 2008. This survey work is still incomplete which has delayed the SDS delivery of sewer designs. The below programme of work is identified (by section) with proposed dates to completion on the basis of total manhole/sewer information being provided to SDS by 6th May 2008.
1A	Full Sub-section	Forth Ports Agreement Drawings (for utility definition) to be instructed by **tie**. Road/kerb detail and alignments to be confirmed from Forth Ports
1B	Full Sub-section	IFA Drawings issued to SW on 20th March 2008. Approval awaited from SW and **tie**. Commercial issue not allowing SW to approve drawings. Tie to resolve.
1C	Full Sub-section	IFA Drawings to be issued on 20th May 2008.
1D	Full Sub-section	IFA Drawings to be issued on 20th May 2008.
2A	Full Sub-section	IFA Drawings to be issued on 26th May 2008.
5A/5B/5C	Full Section	IFA Drawings to be issued 26th May 2008. Sewer diversion at A8 Underpass IFA to be issued early on 6th May 2008. One section of manhole information detail still info still required from tie for this drawing to be complete.
6	Full Sub-section	IFA Drawings to be issued 26th May 2008.
7A	Full Sub-section	IFA Drawings to be issued 7th June 2008.
3A/3B/3C	Full Section	**CR325 SDS is instructed not to seek approvals to these designs. All Phase 1A utility designs to be procured prior to Phase 1B designs.**

APPENDIX C

The table of rates for Retained Scope of Services for **tie** and the provision of technical and specialist services for utilities

TABLE OF RATES FOR RETAINED SCOPE OF SERVICES		
Reference	**Role**	**Hourly Rate**
GD	Graduate Designer	£55.00
SD	Senior Designer	£78.00
PD	Principal Designer	£95.00
CT	CAD Technician	£38.00
ST	Senior CAD Technician	£49.00
TS	Technical Support	£38.00

……
Director/Authorised Signatory
tie LIMITED

……
Director/Authorised Signatory
BILFINGER BERGER UK LIMITED

……
Director/Authorised Signatory
PARSONS BRINCKERHOFF LIMITED

……
Director/Authorised Signatory
SIEMENS PLC



(1) PARSONS BRINCKERHOFF LIMITED

- and -

(2) TIE LIMITED

- and -

(3) INFRACO

COLLATERAL WARRANTY IN FAVOUR OF TIE FROM THE SDS PROVIDER

relating to

THE PROVISION OF SYSTEM DESIGN SERVICES FOR THE EDINBURGH TRAM NETWORK

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AGREEMENT

BETWEEN

(1) **PARSONS BRINCKERHOFF LIMITED** (Company Number 2554514) whose registered office is at Amber Court, William Armstrong Drive, Newcastle Business Park, Newcastle Upon Tyne, NE4 7YQ ("**SDS Provider**");

(2) **TIE LIMITED** (Company Number SC230949) whose registered office is at City Chambers, High Street, Edinburgh, Midlothian, EH1 1YJ ("**tie**") which term shall include its successors and permitted assignees); and

(3) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London, EC1A 4EJ, which expression shall include its successors, permitted assignees and transferees and **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens House, Frimley, Camberley, Surrey, GU16 8QD, which expression shall include its successors, permitted assignees and transferees, acting jointly and severally (together the "**Infraco**").

BACKGROUND

A By an agreement in writing dated 19 September 2005 (the "**SDS Agreement**"), **tie** appointed the SDS Provider to provide system design services in connection with the Edinburgh Tram Network.

B **tie** and Infraco have entered into a contract under which Infraco has been appointed to complete the design and carry out the construction, installation, commissioning and maintenance planning in respect of the Edinburgh Tram Network.

C **tie** and Infraco have agreed, with the consent of the SDS Provider, that the Infraco shall take over the rights and liabilities of the "Client" under the SDS Agreement by novating the SDS Agreement from **tie** to Infraco upon and subject to the terms of the Novation Agreement (as hereinafter defined).

E It is a term of the SDS Agreement that the SDS Provider shall enter into this Agreement with **tie** following the execution of the Novation Agreement.

CEC02083848_0003

IT IS AGREED as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement the following words and expressions have the following meanings, unless the context requires otherwise:

"**Agreement**" means this document (as amended from time to time pursuant to Clause 15);

"**Deliverables**" means the Functional Requirements Specifieations, the Technical Specifications and the items listed in Appendix 3 to Schedule 1 *(Scope of Services)* of the SDS Agreement, the design produeed pursuant to the Novation Agreement as set out in Appendix Part 4 to that agreement and any other design SDS produces for the Infraco and all other documents, information, reports, records, diagrams, bills of quantities, manuals, schedules, databases, reinforcement details, photographs, formulae, consultation materials, plans, designs, specifications, drawings (including as-built drawings), details, calculations, transport and other models and simulations, the outputs and reports based on any models, programmes and all other material created and/or provided by the SDS Provider (and/or any SDS Provider Party or any other third party) in the performance of the Services and the SDS Provider's other obligations under the SDS Agreement to the Novation Agreement;

"**Infraco Contract**" means the contract to be entered into or entered into by **tie** with the Infraco in relation to the completion of the design, and carrying out the construction, commissioning and maintenance planning in respect of the Edinburgh Tram Network;

"**Novation Agreement**" means the novation agreement entered into among **tie**, the SDS Provider and the Infraco;

"**Party**" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

"**SDS Agreement**" means the agreement dated 19 September 2005 originally entered into by the SDS Provider and **tie**, which has been novated to the Infraco and the SDS Provider.

1.2 Unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender include all other genders.

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1.2.2 a reference to:

1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a recital, clause or schedule is a reference to a recital, clause or schedule of or to this Agreement;

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation; and

1.4 Where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

1.5 Unless otherwise defined hereunder, where the SDS Agreement defines a meaning to any capitalised word or expression used in this Agreement, the same meaning shall be given to it in this Agreement;

1.6 In the case of any unintended conflict between the definition or interpretation of words or expressions in this Agreement and the SDS Agreement, the SDS Agreement shall prevail save where by express words or where it is apparent from the context that the contrary is intended in this Agreement.

2. STANDARD OF CARE

The SDS Provider warrants and undertakes to **tie** that:

2.1 it has carried out and shall carry out its Services and other duties and obligations under the SDS Agreement and the Novation Agreement subject to and in accordance with the terms thereof; and

2.2 in addition to and without derogation from clause 2.1;

2.2.1 the SDS Provider warrants to **tie** that, in the production of the Deliverables and in the performance of the Services and its other obligations under the SDS Agreement it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent system design services provider

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experienced in performing services similar to the Services in connection with projects of a similar size, scope and complexity; and

2.2.2 it owes a duty of care to **tie** in carrying out its duties and obligations under the SDS Agreement and the Novation Agreement.

3. COPYRIGHT LICENCE

3.1 The SDS Provider hereby grants to **tie** an irrevocable, perpetual, royalty-free and non-exclusive licence to use such Project IPR and SDS Provider IPR as may be necessary for **tie** to use in relation to any projects associated with the Services. This licence shall carry the right to grant sub-licences, and be freely transferable to third parties. The SDS Provider shall be liable for the Project IPR and the SDS Provider IPR only to the extent that it is used for the purposes for which it was intended.

3.2 In so far as ownership of the copyright and any other Intellectual Property Rights in any Deliverable prepared or provided by the SDS Provider in connection with the Edinburgh Tram Network is vested in any person other than the SDS Provider including, without limitation, any SDS Provider Party, the SDS Provider shall procure for **tie** the benefit of such a licence as is referred to in clause 3.1 for the purposes referred to therein.

3.3 The SDS Provider shall, if so requested at any time, execute such documents and perform such acts (including the grant to **tie** of a licence to use any SDS Provider Software and/or any Third Party Software and/or any Specially Written Software) as may be required fully and effectively to assure to **tie** or any third party the rights referred to in this clause 3.

3.4 The SDS Provider shall provide to **tie** a copy of any of the Deliverables as soon as reasonably practicable after receipt by the SDS Provider of a written request from **tie** to do so.

3.5 The SDS Provider undertakes to **tie** that the use by **tie** of any of the Deliverables for any purpose provided for in this clause 3 shall not infringe the rights of any third party in relation to the Deliverables.

4. REQUIRED INSURANCES

4.1 The SDS Provider undertakes that:

4.1.1 it has maintained and shall maintain during the performance of its obligations under the SDS Agreement each of the Required Insurances in accordance with the

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requirements of Clause 17 (*Required Insurances*) and Schedule 6 (*Required Insurances*) of the SDS Agreement;

4.1.2 cover under the professional indemnity insurance is extended to include the SDS Provider's liabilities under this Agreement;

4.1.3 this Agreement has been disclosed to the SDS Provider's current professional indemnity insurers or brokers (as the case may be) and shall be disclosed to any future professional indemnity insurers or brokers providing the insurance required by this Agreement; and

4.1.4 the SDS Provider shall abide by the terms and conditions of insurance and not do or omit to do anything that might prejudice the cover or its right to make a claim.

4.2 As and when required by **tie**, the SDS Provider shall produce for inspection documentary evidence that such insurance is being properly maintained.

4.3 The SDS Provider shall not make any material alteration to the terms of the Required Insurances without **tie's** prior approval which approval shall not be unreasonably withheld. If the insurer makes or attempts to make any material alteration or purports to withdraw cover, or if the SDS Provider is unable to obtain professional indemnity insurance, the SDS Provider shall promptly give notice of this to **tie**.

5. TIE STEP-IN

5.1 The SDS Provider shall not exercise nor seek to exercise any right of determination of the SDS Agreement or the Novation Agreement or to rescind the SDS Agreement or the Novation Agreement by reason of a Client Default or to otherwise discontinue the performance of any of the SDS Provider's obligations in relation to the SDS Agreement or the Novation Agreement by reason of breach on the part of the Infraco (or otherwise) without giving to **tie** not less than 21 days' written notice of its intention to do so and specifying in such notice the grounds for the proposed determination. The SDS Provider shall for the period of any such notice diligently and properly continue to perform the SDS Provider's obligations under the SDS Agreement or the Novation Agreement.

5.2 Any period stipulated in the SDS Agreement or the Novation Agreement for the exercise by the SDS Provider of a right of determination shall nevertheless be extended as may be necessary to take account of the period of notice required under clause 5.1.

5.3 Compliance by the SDS Provider with the provisions of clause 5.1 shall not be treated as a waiver of any breach on the part of the Infraco giving rise to the right of determination nor otherwise prevent the SDS Provider from exercising its rights after the expiration of the notice unless the right of determination shall have ceased under the provisions of clause 5.4.

5.4 The right of the SDS Provider to determine the SDS Agreement or to rescind the SDS Agreement or the Novation Agreement or to discontinue the performance of any of its obligations in relation to the SDS Agreement or the Novation Agreement shall cease if within the period of 21 days referred to in clause 5.1, **tie** gives written notice to the SDS Provider:

5.4.1 requiring the SDS Provider to continue with the performance of all its obligations under the SDS Agreement or the Novation Agreement;

5.4.2 acknowledging that **tie** is assuming all the obligations of the Infraco (as "**Client**") under the SDS Agreement or the Novation Agreement; and

5.4.3 undertaking to the SDS Provider to discharge all amounts payable to the SDS Provider under the terms of the SDS Agreement or the Novation Agreement.

5.5 Upon compliance by **tie** with the requirements of clause 5.4, the SDS Agreement or the Novation Agreement shall continue in full force and effect as if the right of determination on the part of the SDS Provider had not arisen and in all respects as if the SDS Agreement or the Novation Agreement had been made between **tie** and the SDS Provider to the exclusion of the Infraco.

5.6 Notwithstanding that as between the Infraco and the SDS Provider, the SDS Provider's right of determination of its engagement under the SDS Agreement or the Novation Agreement may not have arisen the provisions of clause 5.5 shall nevertheless apply if **tie** gives written notice to the SDS Provider and the Infraco to that effect and **tie** complies with the requirements on its part under clause 5.4.

5.7 The SDS Provider does not need to be concerned or required to enquire whether, and shall be entitled to assume that, as between the Infraco and **tie**, the circumstances have occurred permitting **tie** to give notice under clause 5.6.

5.8 The SDS Provider acting in accordance with the provisions of this clause 5 shall not incur any liability to the Infraco.

5.9 Unless and until **tie** has given notice under this clause 5:

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5.9.1 **tie** has no liability whatsoever to the SDS Provider in respect of amounts payable to the SDS Provider under the SDS Agreement or the Novation Agreement (except in relation to the sums referred to in Clause 8 of this Agreement); and

5.9.2 **tie** has no authority to issue any direction or instruction to the SDS Provider in relation to the performance of the SDS Provider's obligations under the SDS Agreement or the Novation Agreement.

5.10 Without prejudice to the provisions of clauses 5.1 to 5.9 inclusive, if prior to the service of any notice under clause 5.4 the SDS Provider is determined under the SDS Agreement and the Novation Agreement for any reason whatsoever the SDS Provider shall if required in writing so do to by **tie** no later than 12 weeks after the date of such determination forthwith enter into a new agreement with **tie** on the same terms as the SDS Agreement and the Novation Agreement, but with such revisions as **tie** and the SDS Provider may reasonably require to reflect altered circumstances and the fact that it is **tie** and not the Infraco employing the SDS Provider.

6. ASSIGNATION

6.1 The SDS Provider shall not assign, novate or otherwise transfer the whole or any part of this Agreement without the prior written agreement of **tie**.

6.2 **tie** shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

6.2.1 to the Scottish Ministers or any local authority or other body with no worse financial standing than that of **tie** who, as a result of any Change in Law, takes over all or substantially all the functions of **tie**; or

6.2.2 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to the SDS Provider) by **tie** or a person falling within clause 6.2.1; or

6.2.3 to CEC or Transport Edinburgh Limited; or

6.2.4 with the prior written consent of the SDS Provider (such consent not to be unreasonably withheld or delayed).

6.3 The SDS Provider undertakes to **tie** not to contend in any court proceedings under this Agreement that any person to whom **tie** assigns or has assigned its rights under this

Agreement or any of them in accordance with the foregoing provisions of this clause is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that **tie** is named under this Agreement or any intermediate assignee of **tie** escaped loss resulting from such breach by reason of the disposal of its interest in the same.

7. LIABILITY OF THE SDS PROVIDER

7.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by law of contract, delict or otherwise.

7.2 The responsibility of the SDS Provider under this Agreement is not to be reduced or in any way released or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by **tie** against a third party.

7.3 The rights and benefits conferred upon **tie** by this Agreement are in addition to any other rights and remedies that **tie** may have against the SDS Provider including (without prejudice to the generality of the foregoing) any remedies in delict.

7.4 Subject to the other provisions of this Agreement, the liability of the SDS Provider to **tie** is to be determined in all respects in accordance with the terms of the SDS Agreement and the Novation Agreement and, in the event of any claim by **tie** under this Agreement, the SDS Provider shall be entitled to rely upon any defence, right, limitation or exclusion under the SDS Agreement or the Novation Agreement as though **tie** were named as Client under it, except that:

7.4.1 **tie** shall not be affected by any subsequent variation of the SDS Agreement which would adversely affect the obligations owed by SDS Provider or the waiver, compromise or withdrawal of any claim made by the Infraco; and

7.4.2 the SDS Provider shall not be entitled to exercise any right of set-off, retention or withholding against **tie** to which the SDS Provider may be entitled as against the Infraco.

7.5 The liability of the SDS Provider under this Agreement shall be no greater in extent than the liability of the SDS Provider under the SDS Agreement.

8. PAYMENT TO THE SDS PROVIDER IN RESPECT OF RETENTIONS AND REDUCTIONS IN THE SCOPE OF SERVICES

8.1 **tie** shall make payment of any sums which have been agreed to be due to the SDS Provider in accordance with Clause 12.7.3 and/or Clause 29.4 of the SDS Agreement, in the amounts and the timescales set out within these said Clauses and such payment shall be deemed to be in full and final settlement of any claims by SDS Provider.

9. ONGOING SCOPE OF SERVICES TO TIE

9.1 The SDS Provider undertakes to **tie** to perform and **tie** agrees to pay for the Services set out in the Schedule on behalf of **tie** as the Client in accordance with the terms of the SDS Agreement, and as if the Novation Agreement had not been entered into and:

9.1.1 in respect of Schedule Part 1 a lump sum of £103,744 is payable, together with any further payment due in respect of changes which will be valued in accordance with the Schedule or in accordance with the estimate for the change; or

9.1.2 in respect of Schedule Parts 2 and 3 at the rates set out in the Schedule,

and the Infraco acknowledges this.

10. CONSENT OF INFRACO

10.1 The Infraco consents to the terms of this Agreement.

11. NOTICES

11.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

11.2 Any notice given pursuant to this clause, if sent by registered or recorded delivery, is deemed to have been received 48 hours after being posted.

12. RIGHTS OF THIRD PARTIES

12.1 A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

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13. INVALID TERMS

13.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable

13.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

13.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

14. VARIATIONS AND WAIVERS TO BE IN WRITING

14.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

15. WAIVER

15.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

15.1.1 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

16. JURISDICTION AND LAW

16.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

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16.2 The Parties agree that any dispute in relation to this Agreement shall be conducted in accordance with Clause 28 (*Dispute Resolution Procedure*) of the SDS Agreement and the provisions of the said Clause 28 and Schedule 10 (*Panels to the Dispute Resolution Procedure*) are deemed to be incorporated mutatis mutandis in respect of this Agreement provided that any reference to "**Parties**" shall be deemed to refer to **tie** and the SDS Provider, any reference to "**Client**" shall be deemed to refer to **tie**, the reference to "Clause 36" shall mean Clause 11 of this Agreement.

IN WITNESS WHEREOF these presents on this and the preceding 10 pages together with the Schedule in 3 Parts and Appendix in 3 Parts which are annexed hereto are executed as follows:

EXECUTED for and on behalf of **PARSONS BRINCKERHOFF LIMITED**

at Edinburgh

on 14th May 2008 by:

Director/Authorised Signatory [redacted]

Full Name STEPHEN CHRISTOPHER REYNOLDS

Witness Signature [redacted]

Full Name CHRISTOPHER IAN ATKINS

Address [redacted] WILTON ROAD, LONDON, SW1.

EXECUTED for and on behalf of **TIE LIMITED** at Edinburgh

on 14th May 2008 by:

Authorised Signatory [redacted]

Full Name WILLIAM CALLAGHER

Witness Signature [redacted]

Full Name ANDREA SUTHERLAND FITCHIE

Address DLA PIPER, RUTLAND SQUARE, EDINBURGH, EH1 2AA

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EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at Edinburgh

on 14th May 2008 by:

Director [redacted]

Full Name GARY STEVE DALTON

Director [redacted]

Full Name [redacted] RICHARD JOHN WALKER

EXECUTED for and on behalf of **SIEMENS PLC**

at EDINBURGH

on 14 MAY 2008 by:

Authorised Signatory [redacted]

Full Name M. FATAM

Authorised Signatory [redacted]

Full Name C. ROTH

This is the Schedule referred to in the foregoing collateral warranty among Parsons Brinkerhoff Limited, tie, and the Infraco

SCHEDULE PART 1

SDS SCOPE OF SERVICES FOR TIE

Utilities Diversions

1 The SDS Provider shall provide technical and specialist assistance to **tie** with the management of the advanced utilities diversion programme being carried out under the Multi Utilities Diversion Framework Agreement. As **Appendix A** this shall include:

(a) assessing the need for and acquiring relevant data relating to the presence and location of all buried and above ground utility services;

(b) agreeing the need for and extent of diversions;

(c) undertaking critical design and developing a strategy for all utilities diversions to minimise diversion requirements and out-turn costs;

(d) preparing C4 cost schedules;

(e) activities required to support the utilities diversion process including, but not limited to, traffic management plans/traffic regulation orders (including temporary traffic regulation orders), site meetings and all necessary re-designs;

(f) design re-work/modifications on an as required basis to deal with unidentified diversions;

(g) construction support and on-site attendance at appropriate seniority on an as-required basis;

(h) attendance at all meetings at appropriate seniority on an as-required basis;

(i) production of utilities designs that are complete in all respects including input from statutory utilities, and fully and finally checked and coordinated by PB prior to issue to the contractor under the MUDFA Contract.

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SCHEDULE PART 2

SDS SCOPE OF SERVICES FOR TIE

MANHOLES and SEWER WORKS

Utilities Diversions

1 The SDS Provider shall provide technical and specialist assistance to **tie** with the management of the advanced utilities Sewer diversion programme being carried out under the Multi Utilities Diversion Framework Agreement. This work shall be instructed as a change order in accordance with the change process and be in accordance with Clause 15 of the SDS Agreement. The work content is listed in **Appendix B,** this shall include:

(a) assessing the need for and acquiring relevant data relating to the presence and location of all sewers and manholes;

(b) agreeing the need for and extent of sewer diversions;

(c) undertaking critical sewer design and developing a strategy to minimise associated diversion requirements and outturn costs

(d) provide on-site attendance at appropriate seniority on an as-required basis;

(e) provided adequate notice and information (previous minutes, Agenda etc) is provided by tie attendance at meetings at appropriate seniority on an as-required basis until sewer designs are completed.

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SCHEDULE PART 3

SDS RETAINED SCOPE OF SERVICES FOR TIE

Utilities Diversions

1. The SDS Provider shall extend the duration of their provision of technical and specialist assistance to **tie** with the management of the advanced utilities diversion programme being carried out under the Multi Utilities Diversion Framework Agreement.

   This work shall be carried out on a time and expense basis in accordance with the table of rates (as **Appendix C**) and shall include:

   (a) assessing the need for and acquiring relevant data relating to the presence and location of all buried and above ground utility services;

   (b) agreeing the need for and extent of diversions;

   (c) undertaking critical design and developing a strategy for all utilities diversions to minimise diversion requirements and out-turn costs;

   (d) preparing C4 cost schedules;

   (e) carry out design re-work/modifications/additional diversion designs on an as required basis to deal with unidentified services in a timely manner to avoid or minimise disruption to the ongoing programme of works;

   (f) Provided adequate notice and information (objective of visit, identification/ clarification of problem etc) is received from tie, provide appropriate on-site attendance on an as-required basis;

   (g) Provided adequate notice and information (Previous Minutes, Agenda etc) is provided by tie attendance at meetings at appropriate seniority on an as-required basis;

   (h) The timely production of utilities designs that are complete in all respects including input from statutory utilities, and fully and finally checked by the relevant utility and coordinated by PB prior to issue to the contractor under the MUDFA Contract

2. Parsons Brinckerhoff. shall provide all technical support (on and off site) required to address any utilities design issues arising from the works under the MUDFA Contract and including resolution by Parsons Brinckerhoff of all technical queries arising from use by the contractor under the MUDFA Contract of Parsons Brinckerhoff design in a proactive manner to

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minimise disruption and delays to the progress of the works under the MUDFA Contract and the Edinburgh Tram Network installation works (The Infraco Works).

This work will be carried out on a time and expense basis in accordance with the table of rates (as **Appendix C**).

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APPENDIX A

Section	Location Plates	Remarks
1A	plates 1-5	Forth Ports Agreement Drawings (for utility definition) to be instructed by tie. Road/kerb detail and alignments to be confirmed from Forth Ports Agreement such that telecomms designs (box details) may be confirmed. VE exercise being carried out by tie Management Team week commencing 6th May 2008. (tie to visit Chancelot Mills to agree route of power cables. (Note. These utilities running outside LOD)
1A	plates 6-10	Forth Ports Agreement Drawings (for utility definition) to be instructed by tie. Road/kerb detail and alignments to be confirmed from Forth Ports Agreement such that telecomms designs (box details) may be confirmed. Note. SDS utility IFA Drawings issued to SUC's on 8th Feb 2008. VE exercise being carried out by tie Management Team week commencing 6th May 2008. SDS await revised drawings from tie/Scottish Power.
1A	plates 11-12	Utilities being designed in accordance with bridge designs for Victoria Bridge and Tower Place Bridge. This work being carried out in line with Change CR278 for the bridge re-designs.
2A	plates 1-3	Drawings issued for approval on 14th April 2008. tie formal ROR not yet received. SDS working on unofficial ROR. IFC to be issued 17th May 2008.
6A	plates 1	SDS to issue IFC Drawings 7th May 2008
6	Gogar 800 main	SDS to issue IFC Drawings 9th May 2008
		SDS CHANGE ORDER WORK for COMPLETION
1A	plates 14/15	**Change No CR 257. Original diversions carried out by MUDFA on plate 15. As-built drawings for plate 14 & 15 awaited from tie. This holding up the completion of work.**
3A	Full Sub-section	**CR325 SDS is instructed not to seek approvals to these designs. All Phase 1A utility designs to be procured prior to Phase 1B designs.**
3B	Full Sub-section	**CR325 SDS is instructed not to seek approvals to these designs. All Phase 1A utility designs to be procured prior to Phase 1B designs.**
3C	Full Sub-section	**CR325 SDS is instructed not to seek approvals to these designs. All Phase 1A utility designs to be procured prior to Phase 1B designs**
5C	Edin Parl	CR 305 Edinburgh Park Private Utilities Relocation. Utilities being moved out of tramway path. IFC programmed for 24th May 2008.

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APPENDIX B

		MANHOLE/SEWER WORK for COMPLETION
		See SDS letter ref ULE90130-SW-LET-01040 dated 17th April 2008. This letter identifies that the **tie**/MUDFA Sewer Survey Programme should have been complete by 28th February 2008. This survey work is still incomplete which has delayed the SDS delivery of sewer designs. The below programme of work is identified (by section) with proposed dates to completion on the basis of total manhole/sewer information being provided to SDS by 6th May 2008.
1A	Full Sub-section	Forth Ports Agreement Drawings (for utility definition) to be instructed by **tie**. Road/kerb detail and alignments to be confirmed from Forth Ports
1B	Full Sub-section	IFA Drawings issued to SW on 20th March 2008. Approval awaited from SW and **tie**. Commercial issue not allowing SW to approve drawings. Tie to resolve.
1C	Full Sub-section	IFA Drawings to be issued on 20th May 2008.
1D	Full Sub-section	IFA Drawings to be issued on 20th May 2008.
2A	Full Sub-section	IFA Drawings to be issued on 26th May 2008.
5A/5B/5C	Full Section	IFA Drawings to be issued 26th May 2008. Sewer diversion at A8 Underpass IFA to be issued early on 6th May 2008. One section of manhole information detail still info still required from tie for this drawing to be complete.
6	Full Sub-section	IFA Drawings to be issued 26th May 2008.
7A	Full Sub-section	IFA Drawings to be issued 7th June 2008.
3A/3B/3C	Full Section	**CR325 SDS is instructed not to seek approvals to these designs. All Phase 1A utility designs to be procured prior to Phase 1B designs.**

APPENDIX C

The table of rates for Retained Scope of Services for **tie** and the provision of technical and specialist services for utilities

TABLE OF RATES FOR RETAINED SCOPE OF SERVICES		
Reference	Role	Hourly Rate
GD	Graduate Designer	£55.00
SD	Senior Designer	£78.00
PD	Principal Designer	£95.00
CT	CAD Technician	£38.00
ST	Senior CAD Technician	£49.00
TS	Technical Support	£38.00

[redacted]
Director/Authorised Signatory
tie LIMITED

[redacted]
Director/Authorised Signatory
BILFINGER BERGER UK LIMITED

[redacted]
Director/Authorised Signatory
PARSONS BRINCKERHOFF LIMITED

[redacted]
Director/Authorised Signatory
SIEMENS PLC

THIS IS SCHEDULE PART 25 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 25

SPARE PARTS

Part A - Infrastructure Spare Parts

SIEMENS

ETN Infraco Maintenance
Initial Spare Parts Package

Initial Spare parts for Traction Power System

Designation	Original Qty.	Qty. revised by Tie	unit	Price/unit in GBP	Total in GBP
PTC thermistor detector NAT=140°C, Trafo Winding Temp Alarm	2	2	pc	98,20	196,40
PTC thermistor detector NAT=160°C, Trafor Winding Temp Trip	2	2	pc	98,20	196,40
PTC thermistor detector NAT=230°C, Trafo Core Temp Trip	2	2	pc	98,20	196,40
Temperature relay, 3 sensor inputs and 3 CO contacts	1	1	pc	728,90	728,90
Cooling rail, 4 mountings SITRAS REC-D, black coated	1	1	pc	208,30	208,30
Heat sink SITRAS REC-D, black coated	2	2	pc	44,30	88,60
Semiconductor fuse 900V/1600A BKN/95	6	6	pc	84,90	509,40
Micro-switch for semiconductor fuse	2	2	pc	8,70	17,40
Capacitor 20µF 2150V MP (metallized-dielectric capacitor)	2	2	pc	65,90	131,80
Rectifier diode, repetitive peak reverse voltage Vrrm=2200V	6	6	pc	131,30	787,80
Vitreous enamel wirewound resistor 3 Ohm, +-10%, WM 110	1	1	pc	54,40	54,40
Vitreous enamel wirewound resistor 3,9k Ohm,+-10%, typ 500	2	2	pc	60,60	121,20
Thermostatic switch (NC) switch off 120°C, switch on >105°C, 10A	2	2	pc	74,30	148,60
Thermostatic switch (NC) switch off 135,5°C, switch on >120°C, 10A	2	2	pc	74,30	148,60
Position switch, open type with normal stroke, slow-action contacts	4	4	pc	45,80	183,20
Diode-module EMG22-DIO4E	1	1	pc	2.314,90	2.314,90
SITRAS DPU96 VD voltage divider, inputs: 1000-2000-4000 V	1	1	pc	177,80	177,80
Simatic C7-635 touch, compact unit	1	1	pc	509,40	509,40
Simatic DP, interface module IM151 basic for ET200S	2	2	pc	11,40	22,80
SIMATIC DP, IM151-7 CPU for ET200S, 48 KB working memory	2	2	pc	6,50	13,00
SIMATIC DP, power module PME for ET200S, DC 24 V	3	3	pc	29,90	89,70
SIMATIC DP, terrminal module TM-P15S23-A1 for ET200S	1	1	pc	108,00	108,00
SIMATIC DP, 5 terminal modules TM-E15S23-01 for ET200S	1	1	pc	146,30	146,30
SIMATIC DP, 5 electron. Modules for ET200S, 4 DI, DC 24V	1	1	pc	153,20	153,20
Optical link module OLM/G11	2	2	pc	346,30	692,60
Optical link module OLM/G12	2	2	pc	411,20	822,40
DP/DP coupler	1	1	pc	277,20	277,20
Isolator	1	1	pc	26,30	26,30
Temperature controller, AC/DC 110-265V 50 / 60 Hz	1	1	pc	13,20	13,20
heater unit with convection for cubicles power 60W	1	1	pc	22,50	22,50
Voltage relay	1	1	pc	217,20	217,20
Digital protective unit SITRAS DPU96 PU, central equipment	1	1	pc	3.162,90	3.162,90
Digital protective unit SITRAS DPU96 FC, contr. section feeder	1	1	pc	832,40	832,40
Digital protective unit SITRAS DPU96 FC, intertripping	1	1	pc	124,90	124,90
Digital protective unit SITRAS DPU96 FC, time synchronisation	1	1	pc	124,90	124,90
Simatic outdoor load power supply PS 305	1	1	pc	215,10	215,10
Plug-in relay, 4 CO contacts, 24V DC, 5A with freewheeling diode/LED	10	10	pc	3,40	34,00
Plug-in relay, 4 CO contacts, 110V DC, 5A with freewheeling diode/LED	5	5	pc	3,40	17,00
Contactor Relay 44E EN50011	3	3	pc	39,70	119,10
Moving coil instrument for DC, class 1,5 for transducer, 0...10 V	1	1	pc	28,10	28,10
Moving coil instrument for DC, class 1,5, +/-10 V, 0..10 V, test voltage 3 kV	3	3	pc	35,00	105,00
Moving coil instrument for DC, class 1,5, for shunt connection 60 mV, 0...90 mV, test voltage 3 kV,	3	3	pc	37,10	111,30
Summator 24VDC, 6 digits, latch fastener, 25Imp/s	3	3	pc	31,10	93,30
High speed DC circuit breaker, 4500 A, rated voltage max. 1 kV	1	1	pc	8.947,80	8.947,80
Mechanical manual emergency tripping,	1	1	pc	99,90	99,90
Change-over disconnector, 2-pole, DC 1200 V	1	1	pc	2.064,50	2.064,50
Disconnector, 2-pole, DC 1200 V, rated current DC 3750 A	1	1	pc	2.064,50	2.064,50
Blocking magnet, type TGN17, for DC operation voltage	1	1	pc	527,30	527,30
Motor drive, size 2	1	1	pc	1.398,50	1.398,50
Auxiliary contact, type ET20, slow-action contact, 2NO	4	4	pc	53,40	213,60
Auxiliary contact, type ETS11	2	2	pc	88,10	176,20
Disconnector, 1-pole, DC 3600 V, rated current DC 5300 A	1	1	pc	1.519,40	1.519,40
Motor drive, size 1C	1	1	pc	1.285,40	1.285,40

Disconnector, 2-pole, DC 3600 V, rated current DC 5300 A	1	1	pc	2.812,60	2.812,60
Resistance, 750 V, 50 Ohm	1	1	pc	114,20	114,20
Shunt 10.000A/60mV	1	1	pc	675,70	675,70
Shunt 6000A/60mV	1	1	pc	393,40	393,40
Wire wound resistance 200 W, 80 Ohm +/- 10%, adjustable	1	1	pc	19,80	19,80
Shunt 1000 A / 150 mV	1	1	pc	79,10	79,10
DC-transducer type VariTrans,	1	1	pc	110,90	110,90
SITRAS DPU96 BA Buffer amplifier	1	1	pc	749,10	749,10
Control cable set, halogen free, flexible, 6x2,5 mm², 41x1,5 mm², on one side with 30-pole plug, length 2320 mm	1	1	set	237,70	237,70
Optical fibre cable with plug, cable connector length 3.5 m	2	2	set	59,90	119,80
Surge arrester in plastic housing for direct-current voltage use	1	1	pc	199,80	199,80
Lamp Oval-luminaire, plastic 1/GLS100W, E27, grey	5	5	pc	8,20	41,00
Power contacts for HSCB (fixed contact)	5	5	pc	224,70	1.123,50
Power contacts for HSCB (moving contact)	5	5	pc	101,50	507,50
Coil for HSCB (complete driving device)	1	1	pc	727,50	727,50
Arc chute for HSCB (type 81)	1	1	pc	1.306,80	1.306,80
SITRAS SCD firing module for short circuiting device	1	1	pc	91,40	91,40
SITRAS DPU96 VD voltage divider, inputs: 1000-2000-4000 V	1	1	pc	141,50	141,50
SIMATIC C7-613, compact unit with 4 line display	1	1	pc	834,80	834,80
SIMATIC Net, CP 342-5	1	1	pc	746,60	746,60
Simatic outdoor load power supply PS 307,	1	1	pc	147,30	147,30
Coupling relay, 2NO+2NC, DC 24 V, 0.7...1.25 x Us, size S00	2	2	pc	15,00	30,00
DC-contactor, list 549, type G800 neg., 1-pole, size C	2	2	pc	2.190,80	4.381,60
Shunt 4000 A / 60 mV	1	1	pc	183,10	183,10
DC-Trancducer IsoAmp	1	1	pc	258,00	258,00
Buffer amplifier VariTrans A26038	1	1	pc	165,10	165,10
Measuring transductor AC / DC 650-2 A2	1	1	pc	216,20	216,20
Thyristor-assemble W1C-circuitry	1	1	pc	2.904,90	2.904,90
DEHNgap B/n	1	1	pc	63,80	63,80
D.C. fuse with trip-indicator,	2	2	pc	19,30	38,60
Total				**GBP**	**52.010,30**

As there is no final design up to now, given price might be changed after design freeze.
The given unit prices are only valid if ordering the complete package.

Initial Spare parts for Overhead Line

Designation	Original Qty.	Qty. revised by Tie	unit	Price/unit in GBP	Total in GBP
Side Wall [SWL] Support	100	100	pc	329,60	32.960,00
Cable Connection for 2 cables	12	12	pc	432,60	5.193,60
Cable Connection for 1 cable	4	4	pc	432,60	1.731,20
contact wire RiS 120	1500	1500	m	15,40	23.100,00
messenger wire BZ II 120	1500	1500	m	17,00	25.500,00
Cu cable 300mm²	1000	500	m	41,00	20.500,00
wheel tension device	2	2	pc	2.032,60	4.065,20
cantilever	6	5	pc	331,20	1.997,90
switch, disconnector motor-operated	1	1	pc	4.140,00	4.140,00
dropper	100	100	pc	4,60	460,00
current connector in catenary	10	10	pc	69,30	693,00
pole	2	2	pc	4.329,20	8.658,40
section insulator arrangement for ms + cw	20	20	pc	849,80	16.976,00
Total			GBP		146.103,50

As there is no final design up to now, given price might be changed after design freeze.
The given unit prices are only valid if ordering the complete package.

Initial Spare parts for SCADA

Designation	Original Qty.	Qty. revised by Tie	unit	Price/unit in GBP	Total in GBP
CCTV CAMERAS STOPS	7	4	pc	2.350,00	9.400,00
CCTV CAMS S/Stns & Depots	2	2	pc	1.168,80	2.337,60
Passenger Help Point	4	2	pc	1.786,10	3.572,20
Passenger HP/PA Master Stn	1	1	pc	12.477,90	12.477,90
Public Address Speakers	10	5	pc	156,00	780,00
I Loops	5	5	pc	505,90	2.529,50
PA Amps	5	5	pc	1.744,30	8.721,50
PIDS	5	5	pc	3.814,40	19.072,00
Transtop SCADA RTU	2	2	lot	8.943,80	17.887,60
OTN Lot	2	1	lot	21.625,70	21.625,70
CCTV Recorder System	1	0	pc	11.701,80	0,00
Operator Workstations	2	2	pc	7.587,80	15.175,60
WStn Screens, Kbrds/Mice etc	2	2	pc	2.529,80	5.059,60
Servers (SCADA, SQL)	2	1	pc	12.646,30	12.646,30
CC LAN Switches, Hubs etc	4	4	pc	1.686,20	6.744,80
Printers	1	1	pc	1.517,80	1.517,80
CCTV LCD 32" Monitors	2	2	pc	1.969,70	3.939,40
Misc Items	1	1	pc	2.107,70	2.107,70
Total			GBP		147.594,00

As there is no final design up to now, given price might be changed after design freeze.
The given unit prices are only valid if ordering the complete package.

Initial Spare parts for Track

Designation	Original Qty.	Qty. revised by Tie	unit	Price/unit in GBP	Total in GBP
Switch of left turnout (left side) for mainline	1	1	pc	8.140,70	8.140,70
Switch of left turnout (right side) for mainline	1	1	pc	8.140,70	8.140,70
Switch of right turnout (left side) for mainline	1	1	pc	8.140,70	8.140,70
Switch of right turnout (right side) for mainline	1	1	pc	8.140,70	8.140,70
Switch of left turnout (left side) for depot	1	1	pc	6.977,70	6.977,70
Switch of left turnout (right side) for depot	1	1	pc	6.977,70	6.977,70
Switch of right turnout (left side) for depot	1	1	pc	6.977,70	6.977,70
Switch of right turnout (right side) for depot	1	1	pc	6.977,70	6.977,70
Grooved rail	1	1	to	1.395,50	1.395,50
Flat bottom rail	1	1	to	1.163,00	1.163,00
Aluminothermic welding portion	50	50	pc	116,30	5.815,00
Rail expansion joint	1	0	pc	17.444,30	0,00
Fastenings slab track	10	10	pc	581,50	5.815,00
Prestressed concrete sleepers with fastenings	50	50	pc	145,40	7.270,00
Specific material for embedded track	50	50	m	186,10	9.305,00
Specific material for green track	50	50	m	162,80	8.140,00
Rail fastening on columns	10	10	pc	581,50	5.815,00
Total			GBP		105.192,10

As there is no final design up to now, given price might be changed after design freeze.
The given unit prices are only valid if ordering the complete package

Initial Spare parts for Signalling

Designation	Original Qty	Qty. revised by Tie	unit	Price/unit in GBP	Total in GBP
IMU 100 antenna with amplifier	8	6	pc	1.372,30	8.233,80
IMU 100, Receiver & Interrogator	4	2	pc	10.751,50	21.503,00
PBC – Point Blocking Circuit Module MC WSK	3	3	pc	2.544,50	7.633,50
Complete Wayside Interlocking Rack Type SPC 300, 230 Vac.	1	1	pc	63.962,40	63.962,40
TFDS onboard unit	2	2	pc	29.073,80	58.147,60
IMU 100, Onboard IMU plug-in module	2	2	pc	6.447,40	12.894,80
IMU 100, Vehicle transmitter antenna	2	2	pc	1.564,20	3.128,40

Initial Spare parts for Communications

Designation	Original Qty	Qty. realised by Tie	Unit	Price/unit in GBP	Total in GBP
Points Machines	4	2	pc	15,861,70	23,723,40
Points Heating	4	2	pc	3,273,90	6,547,80
Points Heating Cabinet	0	1	pc	3,372,30	3,372,30
70-Net/20 UPS system	1	1	pc	29,864,90	29,864,90
PA Computer and Speakers	1	1	pc	1,886,20	1,886,20
Indicator	2	2	pc	1,295,00	2,590,00
Signal	6	2	pc	1,295,00	2,590,00
Streetside Equipment Cabinet	0	1	pc	13,551,10	8,861,10
Power Rack Gate 7kVA UPS system	2	1	pc	14,415,10	14,415,10
Linear 80.1 UPS system	1	1	pc	11,331,70	11,331,70
MFT1527 Recommended Spares	1	1	pc	45,019,50	45,019,50
MFT1527 Line Dropsetter Terminal	1	1	pc	4,144,60	4,144,60
MFT1527 Vehicle Radar	1	1	pc	546,30	546,30
MFT1527 Low profile antenna	2	1	pc	227,80	227,80
MFT1527 Hand portable	7	2	pc	523,10	380,20
MFT1527 Hand portable antenna	7	2	pc	16,20	38,40
MFT1527 Hand portable battery	13	3	pc	78,90	236,70
MFT1527 Hand portable case	7	2	pc	45,50	91,00
MFT1527 8 position charger	1	1	pc	546,30	546,30
Power Lan Gate 7kVA UPS system	1	1	pc	8,326,30	8,326,30
Fibre Optic Cable	3000	100	m	0,30	230,00
HiPath 4000	1	0	pc	57,446,90	0,00
Softpoint	1	1	pc	1,896,20	1,896,20
Focus II Recording Platform	1	1	pc	55,016,00	55,016,00
Total			GBP		256,103,80

As there is no final design up to now, given price might be changed after design needs.
The given unit prices are only valid if ordering a complete package.

Initial Spare parts for the Depot

Description	Original Qty	Qty. revised by TIE	Unit	Price/unit in GBP	Total in GBP
Measuring and testing instruments	1	1	pc		
Spare parts for technical wheelset centre equipment	1	1	pc		
Spare parts for travelling crane 7 to	1	1	pc		
Spare parts for underfloor lifting plan	1	1	pc		
Spare parts for mobile workshop crane 3 tons	1	1	pc		
Spare parts for automatic car washer	1	1	pc		
Spare parts for mobile pantograph for cars	1	1	pc		
Spare parts for valve fitting and sample station	1	2	pc		
Spare parts for window washer filling station	1	1	pc		
Spare parts for vehicles	1	1	pc		
Spare parts for underfloor wheel lathe	1	1	pc		
Spare parts for drilling machines	1	1	pc		
Spare parts for sheet metal bending machine	1	1	pc		
Spare parts for circular saw	1	1	pc		

SIEMENS

ETN Infraco Maintenance
Initial Spare Parts Package

	Price for original qty	Price for revised qty
TPS	[illegible]	[illegible]
CHL	[illegible]	[illegible]
eCAS & Comms	[illegible]	[illegible]
Track	[illegible]	[illegible]
Signalling	[illegible]	[illegible]
Telecoms	[illegible]	[illegible]
Depot	[illegible]	[illegible]
TOTAL	£1,313,002.20	£1,012,089.70

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Part B - Tram Supplier Spare Parts

Item	Description	Assumed no. (per Tram)	Minimun Spares Holding	Price (per unit)	Total price (Minimum Spares Holding x Price per Unit)	Total price (Minimum Spares Holding x Price per Unit)
1	Motor bogie (completo)	3	4	182.118 €	728.473 €	£536.302
2	Trailer bogie (complete)	1	2	135.760 €	271.521 €	£199.894
3	Traction set including :	3	1	466.192 €	466.192 €	£343.210
	IGBT Traction inverter					
	Traction control unit ECON					
	Traction motors					
	Braking resistor					
	High speed circuit breaker					
	Mater controllers			Included above		
4	Gearbox	12	6	24.548 €	147.290 €	£108.435
5	Brake actuator (for motor bogie)	12	6	6.167 €	37.004 €	£27.243
6	Brake actuator (for trailer bogie)	4	2	6.374 €	12.747 €	£9.385
7	Wheel sets (complete, for one motor bogie)	6	6	24.548 €	147.290 €	£108.435
8	Wheel sets (complete, for one trailer bogie)	2	2	32.055 €	64.110 €	£47.198
9	Wheel rims (1 set)	1 set	2	7.912 €	15.824 €	£11.650
10	Emergency coupler	2	2	9.009 €	18.017 €	£13.264
11	Pantograph	1	2	13.232 €	26.465 €	£19.483
12	Battery charger	1	1	19.799 €	19.799 €	£14.576
13	Battery	1	1	6.990 €	6.990 €	£5.146
14	High Voltage control box	3			Included in traction	Included in traction
15	Cab air conditioning unit	2	3	18.110 €	54.329 €	£39.997
16	Saloon heating and ventilation unit	3	2	27.330 €	54.661 €	£40.241
17	Tram control computer	1	1	62.076 €	62.076 €	£45.701
18	Brake pump / Central hidraúlica	4	4	12.278 €	49.114 €	£36.158

Item	Description	Assumed no. (per Tram)	Minimun Spares Holding	Price (per unit)	Total price (Minimum Spares Holding x Price per Unit)	Total price (Minimum Spares Holding x Price per Unit)
19	Brake discs	16	16	2.059 €	32.947 €	£24.255
20	EVENT RECORDER	2	2	19.179 €	38.358 €	£28.239
21	Cab desk panel (without equipment) set	2	2	11.773 €	23.547 €	£17.335
22	Drivers seat	2	2	1.632 €	3.264 €	£2.403
23	Windscreen	2	8	4.186 €	33.489 €	£24.655
24	Door mechanism and leaf (double door)	10	5	10.175 €	50.873 €	£37.453
25	Door mechanism and leaf (single door)	4	2	8.593 €	17.186 €	£12.653
26	Saloon side window 1 set per train	1 set	2	14.872 €	29.743 €	£21.897
27	Body front skirt (2 sets)	2 sets	8	3.257 €	19.541 €	£14.386
28	Body side skirts (2 sets)	2 sets	6	18.030 €	108.182 €	£79.643
29	Passenger seat unit (1 set per tram)	1 set	0	62.165 €	15.541 €	£11.441
30	Passenger seat squab (1 set per tram)	1 set	1	28.648 €	28.648 €	£21.091
31	Handrails (1 set)	1 set	1	13.752 €	6.876 €	£5.062
32	Cameras (1 set)	1 set	1	39.808 €	39.808 €	£29.307
33	Passenger Display unit (interior) (1 set)	1 set	2	25.700 €	51.400 €	£37.840
34	Passenger Display unit (exterior) (1 set)	1 set	2	6.853 €	13.706 €	£10.090
35	Complete Articulation assembly	5	3	22.349 €	67.048 €	£49.360
36	Sanding units (1 set)	1 set	1	10.361 €	10.361 €	£7.628
37	Suspension items (1 set)	1 set	1	27.013 €	27.013 €	£19.887
38	Energy absorption device (2 sets)	2 sets	2	18.394 €	36.788 €	£27.083
39	Flange Lubrication System	1 set	1	1.214 €	1.214 €	£893
40	Cab Front Shell Moulding	2	2	14.468 €	28.935 €	£21.302
41	Under-run Guard	2	2	6.785 €	13.570 €	£9.990
42	Exterior Ligthing Units		2	6.185 €	12.369 €	£9.106

Item	Description	Assumed no. (per Tram)	Minimun Spares Holding	Price (per unit)	Total price (Minimum Spares Holding x Price per Unit)	Total price (Minimum Spares Holding x Price per Unit)
43	Axle End Earthing Brush Units complete		4	3.394 €	13.576 €	£9.994
44	Speed Probes		1	1.885 €	1.885 €	£1.387
45	Roof Equipment Set of cases complete with fittings		0	To be defined	To be defined	To be defined
46	Cab Sun Blind	2	2	128 €	257 €	£189
47	Swan-neck cab microphone		4	342 €	1.368 €	£1.007
48	Electro-magnetic track brake unit complete		4	9.423 €	37.691 €	£27.748
49	Cab door complete with fittings		2	613 €	1.227 €	£903
50	Interior ligthingd coverls)		1	7.387 €	7.387 €	£5.438
51	Pantograph head assembly		6	1.713 €	10.277 €	£7.566
52	Windscreen wiper arms complete		6	429 €	2.571 €	£1.893
53	Cab rear view camera		2	2.833 €	5.665 €	£4.171
	TOTAL				2.974.212 €	£2.189.615

…… ……

Director/Authorised Signatory
TIE LIMITED

Director/Authorised Signatory
[INFRACO]

THIS IS SCHEDULE PART 26 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 26

TIE OBLIGATIONS

No.	Description	Date
1	**tie** shall procure that the 2 storage tanks at Haymarket Depot are removed and the ground reinstated to a condition suitable for the carrying out of the Infraco Works by no later than the date shown in column 3 (Date).	15 October 2008
2	**tie** shall in relation to each building to be demolished as part of the Infraco Works, complete Stage 3 asbestos surveys by no later than the date shown in column 3 (Date).	In relation to each building, 4 weeks prior to the date for commencement of demolition shown on the Programme
3	**tie** shall procure power (the supply of electrical energy) so that it is available by the energisation dates for each Section as shown on the Programme to allow the Infraco to undertake and complete the commissioning of the Edinburgh Tram Network. Power will be supplied via the tram system sub stations and power supply infrastructure provided by Infraco.	Energisation dates shown on the Programme
4	Upon 30 days written notice from Infraco, **tie** shall procure for the Infraco access to and occupation of, for an agreed period (no less than up to issue of Certificate of Service Commencement), the land (previously designated as the Leith tram depot site) and marked in red on the plan included in Schedule Part 31 at sheet 2a, version 5 entitled Ocean Terminal to Casino Square (Ocean Drive) 2 (the "Leith Depot Site"). **tie** shall provide the Infraco with an exclusive sub-license to occupy a substantial area at the Leith Depot Site (and a non-exclusive right to use any other part thereof) upon any reasonable conditions **tie** may wish to impose, including any conditions required by the owner of the Leith Depot Site. In the event any such conditions are more restrictive or more onerous than the requirements of this Agreement the Infraco shall be entitled to any reasonable additional costs or other relief to be evaluated in accordance with Clause 65 (*Compensation Events*). The Infraco shall comply with such conditions during its occupation of the Leith Depot Site and shall vacate that land on expiry or termination of the license leaving it in the same conditions as at entry, removing all plant, equipment and materials used or stored there and taking all reasonable measures to carry out any necessary reinstatement. **tie** gives no undertaking or warranty as to the condition of the Leith Depot Site or its access or their fitness for the Infraco's purposes, nor does **tie** provide any undertaking regarding any extension to the agreed period of access and occupation.	

5	**tie** shall provide office space to the SDS Provider in accordance with paragraphs 5.3, 6.1, 7.7 and 8.3 of Appendix 4 to the SDS Novation Agreement.	

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THIS IS SCHEDULE PART 27 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 27

ASSET PROTECTION AGREEMENT AND BRIDGE AGREEMENT

DLA PIPER

(1) NETWORK RAIL INFRASTRUCTURE LIMITED

- and -

(2) TIE LIMITED

- and -

(3) CITY OF EDINBURGH COUNCIL

ASSET PROTECTION AGREEMENT

relating to

Provisions in respect of the construction of a light rail system known as the "Edinburgh Tram Network"

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AGREEMENT **AMONG**

(1) **NETWORK RAIL INFRASTRUCTURE LIMITED** a company registered in England and Wales (company number 2904587) whose registered office is at 40 Melton Street, London NW1 2EE ("**Network Rail**");

(2) **CITY OF EDINBURGH COUNCIL** the Local Authority for the said City constituted in terms of the Local Government etc. (Scotland) Act 1994 and having its principal offices at City Chambers, High Street, Edinburgh EH1 1YJ ("**CEC**"); and

(3) **tie LIMITED** (company number SC230949) a wholly owned subsidiary of CEC, whose registered office is at City Chambers, High Street, Edinburgh EH1 1YJ ("**tie**") and its successors or assignees;

WHEREAS:

(A) CEC promoted two private bills introduced to the Scottish Parliament on 29 January 2004, Edinburgh Tram (Line One) Bill ("**ETL1 Bill**") and Edinburgh Tram (Line Two) Bill ("**ETL2 Bill**") (collectively, the "**Bills**"). ETL1 Bill received royal assent on 8 May 2006 and ETL2 Bill received royal assent on 27 April 2006, each becoming Edinburgh Tram (Line One) Act 2006 ("**ETL1 Act**") and Edinburgh Tram (Line Two) Act 2006 ("**ETL2 Act**"), respectively (collectively, the "**Tram Acts**"). The tram lines form the proposed Edinburgh Tram Network

(B) **tie** has been appointed by CEC and has delegated authority to act as agent for CEC in respect of the application for legal powers and the procurement of the funding, construction, commissioning, operation and maintenance of the Edinburgh Tram Network. **tie** wishes to procure the design and construction of the Works.

(C) Network Rail is prepared to enter into the arrangements set out in this Agreement so as to facilitate the design and construction of the Works by or on behalf of **tie**.

IT IS AGREED as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement the following words and expressions shall have the following meanings unless the context requires otherwise:

"**Act**" means the Railways Act 1993;

"Adjudication Procedure" means that part of the Dispute Resolution Procedure set out in Schedule Part 9 (*Adjudication Procedure*);

"Affiliate" means in relation to any company:

(a) a company which is either a holding company or a subsidiary of such company; or

(b) a company which is a subsidiary of a holding company of which such company is also a subsidiary

and "holding company" and "subsidiary" shall have the respective meanings given to them in section 736 of the Companies Act 1985;

"Booked" means, in relation to any Possession, the registration of such Possession in Network Rail's Possession Planning System pursuant to Clause 8 (*Programming of Works and Obtaining Possessions*), subject to Network Rail's annual and quarterly planning processes and the other provisions of Part D of the Network Code;

"Bridge Agreements" means any agreement entered into between the Parties (or any of them) in respect of obligations as regards the railway bridges relevant to the Works;

"CDM Regulations" means the Construction (Design and Management) Regulations 2007;

"CEC/tie Cap" means four million five hundred thousand pounds sterling (£4,500,000);

"Checker" has the meaning ascribed to it in the Standards;

"Change in Law" means the coming into effect of:

(a) any Act of Parliament or subordinate legislation, any exercise of the Royal Prerogative or any enforceable community right within the meaning of section 2 of the European Communities Act 1972 (by means of any enactment, revocation, repeal, amendment, alteration or otherwise); or

(b) any applicable judgement of a relevant court of law which creates or changes a binding precedent;

"Change in Standards" means the coming into effect, in respect of each specific element of the Works, after such element of the Works has passed Stage Gate 4, of a Group Standard or of any amendment thereto, or of a Network Rail Standard or of any amendment thereto which, in either case, is related to safety and with which any Contractor is obliged to comply;

"Collateral Warranty" means a warranty from:

(a) the Infraco (as required pursuant to Clause 7.4.2) in favour of Network Rail in the form set out in Schedule Part 5 Part 1 (*Form of Infraco Collateral Warranty*); and/or

(b) each Contractor and Key Sub-Contractor (as required pursuant to Clause 7.4.2) in favour of Network Rail substantially in the form set out in Schedule Part 5 Part 2 (*Form of Collateral Warranty (non Infraco)*);

"Commencement Date" means the last date of execution of this Agreement;

"Competent Authority" means any local, national or supra-national agency, authority, department, inspectorate, minister, ministry, official, court, tribunal or public or statutory person (whether autonomous or not), whether of the United Kingdom or of the European Union, which has, in respect of this Agreement, jurisdiction over either of the Parties, any of the Contractors or the subject matter of this Agreement;

"Completion of the Works" means completion of the Works in accordance with the Works Requirements, the accepted drawings, agreed specification, Variations and design and Network Rail having certified to **tie** to that effect;

"Confidential Information" means, in relation to any Party (**"Provider"**), all information of a confidential nature relating to it or its Affiliates which is supplied by or on behalf of the Provider (whether before or after the Commencement Date), either in writing, orally or in any other form or which is obtained through observations made by the Party receiving such information and includes all analyses, compilations, notes, studies, memoranda and other documents which contain or otherwise reflect or are derived from such information, but excludes information which:

(a) the Provider confirms in writing is not required to be treated as confidential; or

(b) the receiving Party can show was in its possession or known to it (by being in its use or being recorded in its files or computers or other recording media) prior to receipt from the Provider and was not previously acquired by the receiving Party from the Provider under an obligation of confidence; or

(c) was developed by or for the receiving Party at any time independently of this Agreement;

"Contractor" means the Infraco and any person to whom a contract for the whole (or any part) of the design and construction of the Works is let and for whom **tie** or CEC is the employer;

"Contractor's Assurance Case" has the meaning ascribed to that term in Standard RT/LS/P/016;

"Control Period " means the a review period (normally 5 years) to which an access charges review by ORR pursuant to Schedule 4A of the Act relates (the terms "review period" and "access charges review" having the meanings given in said Schedule 4A);

"Defects Liability Period" means the period of 12 months after Completion of the Works;

"Depot Access Agreement" means any access agreement incorporating the Depot Access Conditions;

"Depot Access Conditions" means the National Depot Access Conditions (December Standard Scotland) (as amended from time to time) together with the Supplementary Depot Access Conditions applicable to the relevant depot the subject of the Works or any replacement of the same;

"Depot Change" means the procedure contained in part C of the Depot Access Conditions;

"Design Data" means all drawings, reports, documents, plans, software, formulae, calculations and other data whatsoever in any medium prepared by or on behalf of CEC, or **tie** relating to the design and construction of the Works;

"Direct Costs" means direct costs reasonably incurred by **tie**, Network Rail or CEC in relation to the Edinburgh Tram Network which, for the avoidance of doubt,

includes direct costs (including those arising from relevant Compensation Events (as defined in the Works Contract between **tie** and Infraco)) reasonably incurred in respect of the Works Contracts but excludes any loss of production, loss of profit, loss of revenue, loss of contracts or any indirect or consequential loss and any losses or liabilities under the Works Contracts which arise from provisions thereof not disclosed to Network Rail prior to the Commencement Date (and provided that in the case of direct costs of **tie** and CEC there shall be no double-counting);

"Direction" means any direction, requirement, instruction or rule legally binding on either of the Parties, and includes any modification, extension or replacement of any such direction, requirement, instruction or rule for the time being in force, but shall not include:

(a) the exercise of a discretion under any contract or other obligation binding on the Party in question or the enforcement of any such contract or obligation; or

(b) any direction issued by the ORR pursuant to section 16A of the Act;

"Dispute" means any dispute or difference of whatsoever nature arising under, out of, in connection with or in relation (in any manner whatsoever) to this Agreement;

"Dispute Resolution Procedure" means the procedure referred to in Clause 24 (*Dispute Resolution*);

"Edinburgh Tram Network" means Edinburgh Tram Line 1 and Edinburgh Tram Line 2 (or part thereof) or either of them, as may be amended from time to time together with any modification, line extension, spur, interconnection and any additional line which may be developed and implemented by CEC or by **tie** on instruction from CEC and as authorised by the Tram Acts;

"Environment Plan" has the meaning ascribed to it in International Standard ISO14001;

"Existing Asset Obligation" means any statutory or contractual obligation as at the Commencement Date for Network Rail to carry out works in relation to any land or asset owned by Network Rail;

"Force Majeure Event" means any of the following events (and any circumstance arising as a direct consequence of any of the following events):

(a) an act of the public enemy or terrorists or war (declared or undeclared), threat of war, revolution, riot, insurrection, civil commotion, demonstration or sabotage;

(b) acts of vandalism or accidental damage or destruction of machinery, equipment, track or other infrastructure;

(c) natural disasters or phenomena, including extreme weather or environmental conditions (such as lightning, earthquake, hurricane, storm, fire, flood, drought or accumulation of snow or ice);

(d) nuclear, chemical or biological contamination;

(e) pressure waves caused by devices travelling at supersonic speeds;

(f) discovery of fossils, antiquities or unexploded bombs; and/or

(g) strike or other industrial action which is a single circumstance and which also is a strike or industrial action in sectors of the economy other than the railway industry;

"Freight Access Agreement" means any agreement entered into between Network Rail and an Operator for the movement of freight trains incorporating the Network Code;

"Functional Specification" means the functional specification for the Works as set out in Schedule Part 1 (*Functional Specification*);

"Good Industry Practice" means, in relation to the performance of any activity to which this standard is applied, the exercise of that degree of skill, diligence, prudence and foresight as would reasonably be expected from a skilled and competent person engaged in carrying out works or services of a similar scope, type, nature and complexity to the works or services being carried out, complying with all Legal Requirements and applicable British, European and International standards and published codes of practice;

"Group Standards" means:

(a) technical standards to which railway assets or equipment used on or as part of the Network must conform; and

(b) operating procedures with which the operators of railway assets must comply,

in each case as issued by the Rail Safety and Standards Board Limited and authorised pursuant to the Railway Group Standard Code;

"Infraco" means the infrastructure provider to be appointed or appointed by **tie** in relation to the Edinburgh Tram Network;

"Infrastructure Controller" means a person who controls railway infrastructure (having the meaning given to it in the Railways (Safety Case) Regulations 2000);

"Insolvent" in relation to any Party means:

(a) such Party stopping or suspending or threatening to stop or suspend payment of all or a material part of its debts, or becoming unable to pay its debts, or being deemed unable to pay its debts under section 123(1) or (2) of the Insolvency Act 1986, except that in the interpretation of this paragraph section 123(1) of the Insolvency Act 1986 shall have the effect as if for "£750" there were substituted "£10,000";

(b) any step being taken by any person with a view to the winding up of such Party or any person presenting a winding-up petition which is not dismissed within five Working Days;

(c) a receiver, manager, administrative receiver or administrator being appointed in respect of such Party;

(d) such Party ceasing or threatening to cease to carry on all or a material part of its business, except for the purpose of and followed by a reconstruction, amalgamation, reorganisation, merger or consolidation on terms approved by the other Party before that step is taken (which approval shall not be unreasonably withheld or delayed);

(e) in the case of CEC, being sequestrated under the Bankruptcy (Scotland) Act 1985; or

(f) any event occurring which, under the law of any relevant jurisdiction, has an analogous effect to any of the events listed above;

"Interest Rate" means 2% *per annum* above the base rate from time to time of HSBC Bank plc;

"Interfacing Project" means the Airdrie-Bathgate Railway and Linked Improvements Project, the Edinburgh to Glasgow Electrification Project and any Edinburgh to Glasgow Route Enhancements or maintenance and renewals activities on the Network adjacent to the areas of the Works notified to **tie** by the Commencement Date;

"Key Sub-Contractor" means any Sub-Contractor engaged in the Works in the fields of design, system integration, track installation, testing and commissioning, overhead line installation, ground stabilisation, telecoms and signalling or civils works;

"Land Compensation Limit" means ten thousand pounds sterling (£10,000);

"Land or Noise Claim" means a claim against Network Rail made for common law nuisance or pursuant to the Land Compensation Act 1973 or any regulation made pursuant to that Act (including the Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996) and which is attributable to the carrying out or completion of the Works or the subsequent operation of the completed Works as part of the Railway;

"Lease" means the lease to be entered into between CEC and Network Rail in respect of certain Network Rail Property within parts of the Edinburgh and Glasgow Line between Haymarket and Edinburgh Park for the purposes of the Edinburgh Tram Network ;

"Legal Requirement" means any of the following:

(a) any enactment to the extent that it applies to that Party;

(b) any regulation made by the Council or the Commission of the European Union to the extent that it applies to that Party or a decision taken by the Commission which is binding on that Party to the extent that it is so binding; and

(c) any interpretation of law, or finding, contained in any judgement given by a court or tribunal of competent jurisdiction in respect of which the period for

making an appeal has expired, which requires any legal requirement falling within paragraphs (a) or (b) above to have effect in a way which is different to that in which it previously had effect;

"Losses" means costs, claims, demands, losses, expenses, liabilities, damages or proceedings incurred by the relevant person;

"Mandatory Variation" means any change or variation to the Works Requirements necessitated by:

(a) any Specific Change in Law; and/or

(b) any Change in Standards for safety reasons;

"Minor Modification" means the partial closure of a station which is eligible to be treated as a minor modification in terms of sections 34 and 35 of the Railways Act 2005;

"Necessary Consents" means all approvals, permissions, consents, licences, certificates, registrations and authorisations (whether statutory or otherwise) which are required from time to time for the purposes of carrying out the Works, whether required in order to comply with any Legal Requirement or as a result of any rights of any third party, including the Network Rail Consents, consents in respect of any Regulated Change and any consents required from any third party to enter and remain upon that third party's land;

"Network" means the railway network of which Network Rail is the facility owner (as defined in section 17(6) of the Act);

"Network Code" means the document now known as the Network Code and formerly known as the Railtrack Track Access Conditions 1995;

"Network Licence" means the licence to operate the Network granted to Network Rail pursuant to section 8 of the Act;

"Network Operation Issue" means:

(a) any Safety Critical Event;

(b) any Operational Emergency;

(c) any Legal Requirement;

(d) any Direction of a Competent Authority;

(e) any requirement of the Network Licence;

(f) any contractual commitment of Network Rail existing on or prior to the Commencement Date (including under any Freight Access Agreement); or

(g) any requirement to utilise the original copy held by a Contractor of any relevant approved engineering record, drawing or any other document in respect of the Network, which is immediately necessary to address an issue arising under any of paragraphs (a) to (f) above;

provided that in each case:

(a) Network Rail acts reasonably (but in its sole discretion in respect of its statutory obligations or safety issues);

(b) such issue affects or is affected by the Works; and

(c) in the case of paragraph (f), Network Rail has used its reasonable endeavours to notify **tie** before the Commencement Date as to whether there are any such commitments which are likely to conflict with the Works;

"Network Rail Cap" means two hundred and sixty thousand pounds sterling (£260,000);

"Network Rail Consents" means those consents to be given by Network Rail as set out in part 1 of Schedule Part 4 (*Network Rail approvals, acceptances and consents*);

"Network Rail Costs" has the meaning given to that term in Schedule Part 6 (*Network Rail costs*);

"Network Rail Property" means any property belonging to Network Rail including property forming part of the Network, any railway infrastructure, station, depot, buildings, lands, works, apparatus and equipment belonging to Network Rail or a relevant associated company connected therewith and includes any land held or used by Network Rail, including any servitude or other property interest held or used by

Network Rail for the purposes of such railway, Network, or station, depot, buildings, lands, works, apparatus or equipment;

"Network Rail Requirements" means the Health and Safety Management of Third Party Projects (RT/LS/P/043) as may be updated from time to time, plus the further requirements specified in Schedule Part 3 (*Network Rail requirements*);

"Network Rail Standard" means a standards document (or the equivalent of such document) issued by Network Rail for its own use as amended by Network Rail from time to time in relation to the Network as a whole which applies to the performance of the Works under this Agreement;

"Operating Agreement" means the document to be entered into between Network Rail, CEC, **tie** and others relating to operational procedures to be adopted by the parties thereto in respect of the Network and the Edinburgh Tram Network

"Operational Emergency" means any situation or circumstance which Network Rail reasonably considers requires immediate or urgent action in order to maintain or restore the effective operation of the Network or any part of it;

"Operational Track" means the part of the Railway upon which train services operate in the vicinity of the Works;

"Operator" means an operator of passenger or freight trains which has entered into a Track Access Agreement or Freight Access Agreement (respectively) with Network Rail;

"ORR" means the Office of Rail Regulation established pursuant to section 15(1) of the Railways and Transport Safety Act 2003;

"Payment Period" means the period of up to 28 days (to be notified by Network Rail) commencing on the Commencement Date and each period of 28 days thereafter, provided that the length of the first and last such period in any Network Rail financial year may be varied by up to seven days on reasonable prior notice from Network Rail to **tie**;

"Plans" means the two plans contained in Schedule Part 8;

"Possession" means planned safety arrangements which control or prevent the normal movement of rail traffic on the Network between defined locations and for a pre-defined period (including any speed restriction);

"Possession Plan" means the plan agreed in accordance with Clause 8 (*Programming of Works and Obtaining Possessions*) as revised from time to time in accordance with Clause 8 (*Programming of Works and Obtaining Possessions*);

"PPA Indemnity" means an indemnity under Clause 9(2) or Clause 9(3) of the Protective Provisions Agreement;

"Premises" shall have the meaning given in the Lease;

"Procedures" shall have the meaning given to such term in the Operating Agreement, provided that the operational procedures to be agreed for the purposes of execution of the Operating Agreement under Clause 12.10.1 need only be those upon which agreement is reasonably required for the purposes of trial running of the Edinburgh Tram Network;

"Proposal for Depot Change" has the meaning ascribed to "Proposal for Change" in the Depot Access Conditions;

"Proposal for Station Change" has the meaning ascribed to "Proposal for Change" in the Station Access Conditions;

"Protective Provisions Agreement" means the agreement in respect of the Edinburgh Tram Network among **tie**, CEC and Network Rail dated 17th and 21st June 2005 (as amended by Supplemental Agreement dated on or about the date of this Agreement);

"Quality Plans" means the design quality assurance procedures and the works quality assurance plan, each as referred to in the Standards (subject to Clause 7.2.2.2);

"Railway" means the Network and Network Rail's operation of it;

"Regulated Change" means any Depot Change, Minor Modification and/or Station Change, to the extent each is required in connection with the Works;

"Related Contracts" means in respect of the Edinburgh Tram Network, the agreements entered into or to be entered into in respect of *inter alia* the procurement, delivery, operation and maintenance thereof;

"Relief Event" has the meaning specified in Clause 14.1;

"Rules of the Route" has the meaning set out in the Network Code;

"Safety Case" means Network Rail's safety case, as amended from time to time (as defined in the Railways (Safety Case) Regulations 2000);

"Safety Critical Event" means risk to the health and safety of any individual or risk of damage or destruction to any Network Rail Property, or any incident which may reduce the safety integrity levels of any item of infrastructure;

"Safety Plan" means the documented management system by which the relevant Contractor demonstrates how it will conduct the Works in compliance with the relevant Contractor's Assurance Case and the requirements of this Agreement;

"Schedule" means the schedule in 10 Parts annexed to and forming part of this Agreement;

"Sector" means any one of the sectors A to N forming part of the Works and identified in Schedule Part 1 (*Functional Specification*);

"Sector Completion" means completion of a Sector in accordance with the Works Requirements, the accepted drawings, agreed specification, Variations and design (in each case as applicable to that Sector) and Network Rail having certified to **tie** to that effect;

"Services" means the services to be performed by or on behalf of Network Rail pursuant to this Agreement as set out in Schedule Part 2 (*Services to be provided by Network Rail*);

"Site" means any land forming part of the Network on which Works are to be carried out;

"Specific Change in Law" means any Change in Law which applies expressly to:

(a) the railway industry, a particular section of the railway industry or the provision of services to the railway industry and not to other transport modes or industries including any changes to either Network Rail's Safety Case or **tie**'s safety case or Standards required by any Change in Law; or

(b) the Works or a Contractor and not to other works or other contractors

which in the case of paragraph (a) occurs in respect of each specific element of the Works, after the date that such element of the Works has achieved Stage Gate 4 and in the case of paragraph (b) occurs after the Works Commencement Date, and which in either case is not reasonably foreseeable as at such date;

"Stage Gate 4" means the approval stage reached following Network Rail's Guide to Railway Investment Projects when approval in principle is required, as may be amended from time to time;

"Standards" means Group Standards, Network Rail Standards and any equivalent standards or any standards replacing or superseding any of them;

"Station Access Agreement" means any access agreement incorporating the Station Access Conditions;

"Station Access Conditions" the National Station Access Conditions 1996 (Scotland) (as amended from time to time) together with the supplementary Station Access Conditions applicable to the relevant station, the subject of the Works or any replacement of the same;

"Station Change" means the procedures contained in Parts B and C (as applicable) of the Station Access Conditions;

"Station Works" means that part of the Works (if any) constituting Works to a station which Network Rail requires to be the subject of a lease;

"Sub-Contractor" means any contractor or consultant (including all Key Sub-Contractors) appointed by a Contractor with a third party for the design, construction, or design and construction of the Works or any part thereof;

"Taking into Use" means the act of taking into use of the Works or part thereof by Network Rail, and the taking out of use of other assets by Network Rail on the basis that Network Rail is satisfied that the assets in question have been inspected, tested and commissioned, as applicable, in accordance with the Works Requirements and the requirements set out in Clause 11 (*Completion of the Works and taking into use*) and **"Take Into Use"** and **"Taken Into Use"** shall be construed accordingly;

"Track Access Agreement" means any agreement entered into between Network Rail and an Operator for the movement of passenger trains incorporating the Network Code or any access option in relation to the movement of passenger trains on the Network;

"Tram Acts" has the meaning given to it in Recital (A);

"Variation" means any change or variation to the Works, the Services and/or the Project;

"Working Day" means any day (other than a Saturday or Sunday) on which banks are open for business in Glasgow and Edinburgh;

"Works" means the design and construction of the works described in the Functional Specification;

"Works Commencement Date" means the latest of:

(a) the Commencement Date;

(b) the date upon which all Necessary Consents (subject to any waivers agreed between the Parties) have been obtained;

(c) the date of completion of any preliminary works required to be carried out by CEC pursuant to Clause 3.1;

(d) the date on which all the requirements of Clauses 7.4 (other than Clauses 7.4.3 and 7.4.6 to 7.4.9) and 9.2.1 have been satisfied; and

(e) the date of receipt of evidence confirming that CEC has taken out or has procured that **tie** has taken out the insurances required by Clause 16 (*Insurance*),

and the Parties agree that, for the purposes of paragraph (b) above, the requirement to obtain Necessary Consents in respect of the Regulated Change process is waived to the extent which will enable works commencement in respect of those Sectors which do not form part of the subject matter of the Regulated Change. Such Necessary Consents must be obtained prior to works commencement in respect of those Sectors which are the subject matter of the Regulated Change;

"**Works Contracts**" means the documents which form a contract between **tie** or CEC and a Contractor in respect of the carrying out of the whole (or any part) of the design and construction of the Works;

"**Works Programme**" means the programme for the carrying out and completion of the Works to be approved by Network Rail in accordance with this Agreement; and

"**Works Requirements**" means the specification which sets out a description of the Works, the technical description of the new assets and Network Rail's requirements in respect of the Works, as set out in the document so entitled contained in Part 10 of the Schedule and the documents referred to by reference number therein, as amended from time to time in accordance with this Agreement.

1.2 In this Agreement, unless the context otherwise requires:

1.2.1 references to a statute, treaty or legislative provision or to a provision of it shall be construed, at any particular time, as including a reference to any modification, extension or re-enactment at any time then in force and to all subordinate legislation made from time to time under it;

1.2.2 references to any agreement or document include its Schedules and Schedule Parts and attachments and references to "paragraphs", "Clauses", "recitals" or "Schedules" or "Schedule Parts" are references to such provisions or parts of this Agreement;

1.2.3 references in the singular shall include references in the plural and *vice versa*, words denoting any gender shall include any other gender and words denoting natural persons shall include any other persons;

1.2.4 headings are for ease of reference only and shall not be taken into consideration in the interpretation or construction of this Agreement;

1.2.5 references to an agreement, deed, instrument, licence, code or other document (including this Agreement), or to a provision contained in any of these, shall be construed, at the particular time, as a reference to it as it may then have been amended, varied, supplemented, modified, suspended, assigned or novated;

1.2.6 the words "include" and "including" are to be construed without limitation;

1.2.7 a reference to a "law" includes common or customary law and any constitution, decree, judgment, legislation, order, ordinance, regulation, statute, treaty or other legislative measure (and "lawful" and "unlawful" shall be construed accordingly);

1.2.8 a reference to a **"Party"** means a party to this Agreement and includes its successors in title, permitted assignees and permitted transferees and **"Parties"** shall be construed accordingly;

1.2.9 reference to a "person" includes any person, firm, body corporate, corporation, government, state or agency of a state or any association, trust or partnership (whether or not having separate legal personality) or two or more of the foregoing;

1.2.10 a "regulation" includes any regulation, rule or official directive of any governmental, intergovernmental or supranational body, agency, department or regulatory, self-regulatory or other authority or organisation;

1.2.11 a reference to "writing" includes a facsimile transmission and any means of reproducing words in a tangible and permanently visible form; and

1.2.12 the words in this Agreement shall bear their natural meaning.

1.3 Unless expressly stated to the contrary, any reference in this Agreement to the right of consent, approval or agreement shall be construed such that such consent, approval or agreements shall not be unreasonably delayed or withheld. The Parties acknowledge that:

1.3.1 the withholding or delaying of the giving of consent, approval or agreement by CEC or **tie** under this Agreement which would place Network Rail in breach of the law, the Network Licence or any Standard (subject to Clause 7.2.2.2) would be unreasonable;

1.3.2 nothing in this Agreement shall require Network Rail to give or procure the giving of any consent or approval which would be contrary to the protection, safety and efficient operation of the Railway and the safety of Network Rail Property or persons on or near the Railway; and

1.3.3 notwithstanding any other provision of this Agreement, in performing its obligations and exercising its rights under this Agreement Network Rail shall retain sole discretion in relation to safety issues.

2. REGULATED CHANGE

2.1 Where it is identified that Necessary Consents are required, the Parties shall discuss and agree who is to undertake them.

2.2 Prior to the Works Commencement Date CEC shall provide Network Rail with:

2.2.1 a draft form of application for any Regulated Change which may be required in respect of the Works; and

2.2.2 if relevant, a Proposal for Station Change and/or Depot Change (which for the avoidance of doubt shall make reference to all relevant consequential documentation required in respect of the Works, including any lease(s) of the sites of the Works) which may be required in respect of the Works,

for approval by Network Rail.

2.3 Where CEC is a party to a Track Access Agreement or Station Access Agreement, it shall be responsible for applying for any relevant Regulated Change unless otherwise agreed by Network Rail. If it is agreed that Network Rail shall apply for Regulated Change (or if CEC is not a party to a Track Access Agreement or Station Access Agreement), Network Rail shall administer:

2.3.1 any application for Regulated Change in accordance with the procedure (if any) set out in the Network Code; and

2.3.2 any Proposal for Station Change in accordance with the procedures set out in the Station Access Conditions and any Proposal for Depot Change in accordance with the procedures set out in the Depot Access Conditions,

subject to CEC having provided the documents referred to in Clause 2.2 and necessary supporting information required to enable Network Rail to effectively administer the application or proposal.

2.4 Network Rail shall not object to the Regulated Change in the formal procedure for approval of the same which Network Rail has approved under Clause 2.2.

2.5 Except to the extent that **tie** or CEC incurs Direct Costs as a result of the failure of Network Rail to comply with Clause 5.4, Network Rail shall have no liability whatsoever to **tie** or CEC if approval of the Regulated Change is not granted or is the subject of delay in being granted or for the terms upon which the same may be granted, provided that Network Rail shall be obliged to appeal against any decision in respect of Regulated Change if reasonably requested to do so by CEC.

2.6 CEC shall or shall procure that **tie** shall:

2.6.1 reimburse Network Rail for any Losses reasonably incurred by Network Rail as a result of the implementation of any Regulated Change required in respect of the Works which are quantified prior to the Completion of the Works; and

2.6.2 pay Network Rail an amount equal to Network Rail's reasonable estimate of any such Losses which are not so quantified.

3. GROUND MOVEMENT PRECAUTIONS AND PROTECTIVE WORKS

3.1 Prior to commencing construction of the Works, CEC shall take or procure that **tie** shall take all reasonable measures and carry out such protective works as may be reasonably specified by Network Rail as being necessary (subject to Clause 1.3.3):

3.1.1 to protect the safety and continuity of the Railway;

3.1.2 to protect Network Rail Property and Network Rail's works against instability or physical damage and the Operational Track against distortion arising from anticipated ground movement due to the construction of the Works; and/or

3.1.3 to prevent, address, alleviate or comply with (as applicable) any Network Operation Issue.

3.2 CEC shall or shall procure that **tie** shall select such methods to be used for the execution of the Works as shall minimise ground movement so far as is reasonably

practicable during and after construction of the Works and avoid ground movement which would be anticipated to cause physical damage (other than damage of a superficial nature) to Network Rail Property and Network Rail's works.

3.3 If Network Rail or CEC reasonably apprehends that any ground consolidation works or the working of any mines or minerals is likely to cause damage to the Works or any adjoining Network Rail Property or Network Rail works by reason of subsidence or if such working causes damage to the Works or any such Network Rail Property or works, Network Rail and CEC (or **tie** acting on CEC's behalf) shall notify and consult with each other with a view to agreeing the measures necessary to be taken, before taking any steps to prevent, guard against or make good such damage.

3.4 At any time after the expiry of 15 Working Days of the issue of any notice under Clause 3.3, Network Rail may take such steps to prevent, guard against, limit or make good damage to the Works or Network Rail Property or works as Network Rail considers necessary for the protection and safety of the Railway.

3.5 Notwithstanding Clause 3.3, if Network Rail reasonably considers (subject to Clause 1.3.3) that immediate measures must be taken for the protection and safety of the Railway, it may take such measures without prior consultation with or notice to **tie** or CEC.

3.6 CEC shall or shall procure that **tie** shall reimburse Network Rail in respect of all Losses reasonably incurred by Network Rail in carrying out any measures agreed between Network Rail and CEC or considered necessary by Network Rail in accordance with the preceding provisions of this Clause 3 (*Ground Movement Precautions and Protective Works*) which Network Rail would not otherwise have incurred (unless Clause 13.10.2 applies), provided that neither tie nor CEC shall be liable to Network Rail for such Losses incurred in respect of measures taken under Clause 3.5 where and to the extent that the measures are determined to have not been necessary under the Dispute Resolution Procedure.

4. ACCESS TO THE NETWORK

4.1 Prior to the Works Commencement Date Network Rail shall provide CEC, its agents and employees (including **tie**) with reasonable access to areas of land in which Network Rail has an interest (subject to Clause 4.3 and Clause 4.4) solely for the purpose of:

4.1.1 carrying out site surveys relating to the Works and any protective works referred to in Clause 3.1;

4.1.2 carrying out a condition and defects survey using appropriate Sub-Contractors in respect of those parts of Network Rail Property which will not form part of the Premises (coloured pink on the Plans) in the joint names of CEC, **tie** and Network Rail at the cost of CEC or **tie**; and

4.1.3 the storage of materials on those areas notified by Network Rail to **tie** in writing prior to the Works Commencement Date (as may be varied by Network Rail in its absolute discretion from time to time).

Save as aforesaid neither **tie** nor CEC shall be allowed access to any land belonging to Network Rail for or in connection with the Works prior to the Works Commencement Date (except where **tie** and/or CEC already has access rights under the terms of an existing agreement).

4.2 From the Works Commencement Date until the earliest of:

4.2.1 the Completion of the Works (or in the case of a Sector, Sector Completion);

4.2.2 the date of abandonment of the Works; or

4.2.3 the termination of this Agreement;

Network Rail shall provide CEC, its agents and employees with access to areas of land in which it has an interest (subject to Clause 4.3 and Clause 4.4) for the purpose of carrying out the Works, provided that CEC shall in addition be entitled to continue to take such access for the purposes specified in Clause 11.7 and Clause 12 (*Ongoing Obligations in respect of the Works*).

4.3 The grant of any access by Network Rail is subject to:

4.3.1 CEC (or **tie** on CEC's behalf) first making prior arrangements with Network Rail (approval of such arrangements not to be unreasonably withheld or delayed); and

4.3.2 CEC and **tie** complying with the Network Rail Requirements, any relevant Necessary Consents and any other conditions which Network Rail (acting reasonably, subject to Clauses 1.3.2 and 1.3.3) considers necessary to prevent, address, alleviate or comply with (as applicable) a Network Operation Issue.

4.4 Where any land in which Network Rail has an interest has been leased or licensed to a third party or is the subject of rights held by a third party, neither **tie** nor CEC shall be entitled to access pursuant to this Clause 4 until the written consent of the third party has been obtained by Network Rail (at the cost of CEC and **tie**). Network Rail shall liaise with any such third party with a view to procuring a right of access.

4.5 CEC (or **tie** on CEC's behalf) shall obtain Network Rail's prior written approval as to the nature and quantity of any plant, equipment and materials to be stored on the Network. The storage of such plant, equipment and materials shall be at the sole risk of CEC (and **tie** acting on CEC's behalf) and Network Rail shall have no liability to CEC or **tie** whether under this Agreement, in delict or howsoever arising in respect of any damage, theft or vandalism of such stored plant, equipment and materials. CEC shall or procure that **tie** shall take such security measures as Network Rail considers reasonably necessary to prevent such materials being used to vandalise the Railway.

4.6 Network Rail shall at all times have unlimited access to the land in which it has an interest for the purpose of monitoring the Works or as it may (acting reasonably, subject to Clause 1.3.3) consider necessary to prevent, address, alleviate or comply with (as applicable) a Network Operation Issue.

4.7 In exercising its rights under this Clause 4 Network Rail shall use its reasonable endeavours not to interfere, hinder or obstruct the carrying out of the Works by CEC, **tie**, its agents and employees. In exercising such rights Network Rail shall comply with any relevant safety requirements, rules and regulations in force from time to time as notified to Network Rail by **tie** or CEC.

5. OBLIGATIONS OF NETWORK RAIL

5.1 Network Rail shall at the cost of CEC make available to **tie** (acting on CEC's behalf), within a reasonable time, the data and information (except for data and information which is confidential or commercially sensitive or already in the public domain) which **tie** and/or CEC reasonably requires to carry out the Works. Where Network Rail is required by **tie** (acting on CEC's behalf) to provide **tie** with any information in relation to the design of the Works, it shall do so in good faith and shall notify **tie** of the status of the accuracy and completeness of such information on the date of delivery to the best of Network Rail's knowledge and belief.

5.2 If Network Rail determines subsequent to the date of delivery that such information was inaccurate or incomplete in any material respect, it shall promptly notify **tie** and shall use its reasonable endeavours to make any changes necessary to correct such inaccuracies or incompleteness. Notwithstanding the foregoing or any other provision in this Agreement, Network Rail does not warrant the accuracy or sufficiency of data and information provided to **tie** and/or CEC and **tie** and CEC shall be responsible for verifying the accuracy and assessing the sufficiency of all data and information provided.

5.3 Network Rail shall at the cost of CEC provide the Services to **tie** (acting on behalf of CEC).

5.4 Network Rail shall carry out or procure the carrying out of its obligations and the performance of the Services:

5.4.1 in accordance with Legal Requirements and such other statutory requirements and mandatory standards as may be applicable to the rail industry from time to time (including the Safety Case);

5.4.2 in accordance with the terms of any Necessary Consents;

5.4.3 in a timely, economic and efficient manner, having regard at any particular time to Network Rail's obligations, purposes and duties as operator, renewer, maintainer and developer of the Network;

5.4.4 with that degree of skill, diligence and prudence which should be exercised by a skilled and experienced network operator and owner; and

5.4.5 in accordance with and subject to the terms of this Agreement.

The standards set out in Clauses 5.4.1 to 5.4.5 are in descending order of priority so that in the event of any conflict between two or more of such standards Network Rail's obligation will be to act in accordance with the standard listed higher above.

5.5 If Network Rail becomes aware of any matter which will prevent or impede it from performing the obligations on its part in this Agreement or will prevent or impede **tie** and/or CEC from carrying out the Works, Network Rail shall so notify **tie** promptly and in any event within five Working Days after becoming so aware.

6. NECESSARY CONSENTS AND DESIGN DATA

6.1 Network Rail shall act in good faith and in accordance with its Network Licence and its obligations as Infrastructure Controller and under the Network Code and Station Access Conditions (as appropriate) in considering in a timely manner CEC's applications for the Network Rail Consents. Network Rail shall use its reasonable endeavours to:

6.1.1 obtain or issue (as appropriate) the Network Rail Consents as soon as reasonably practicable; and

6.1.2 liaise with all relevant third parties to ensure, so far as practicable, that the Network Rail Consents are granted on reasonable terms.

Network Rail's obligation to use reasonable endeavours to obtain the Network Rail Consents is conditional upon Network Rail receiving in full the documentation and assistance it may reasonably require from **tie** and/or CEC.

6.2 Subject to the relevant lessee acting in good faith, Network Rail agrees to use its reasonable endeavours to negotiate, agree and (subject to the relevant parties reaching agreement on the terms and conditions) grant any leases of the sites of the relevant part of the Works.

6.3 CEC shall or shall procure that **tie** shall prepare a Works Programme for approval in accordance with Clause 8.2 and shall notify Network Rail not less than 25 Working Days prior to a Design Data submission, in line with the Works Programme, giving sufficient detail of the content of the submission and the amount of documentation to

be included with the submission for Network Rail to determine the resources required to carry out its obligations under this Clause 6.

6.4 On submitting Design Data CEC shall or shall procure that **tie** shall provide a list of the Standards, Legal Requirements and other guidance and codes of practice CEC and/or **tie** has complied with in preparing the Design Data.

6.5 CEC shall or shall procure that **tie** shall submit any further information, data and documents that Network Rail reasonably requires in order to determine whether Network Rail has a basis for raising comments or making objections to any element of Design Data in accordance with Clause 6.8.

6.6 Subject to Clause 6.7, if Network Rail fails to return any Design Data identified as on the Works Programme critical path within 25 Working Days from receipt of such Design Data (or within such longer period as is specified in Network Rail's programme for a complex approval), Network Rail will pay **tie** liquidated damages at the rate of £1,000 for each Working Day thereafter up to (but excluding) the date on which that Design Data is returned to CEC or **tie** (if, and to the extent that, the late return of such Design Data is shown to have delayed Completion of the Works).

6.7 Network Rail will not be liable to pay liquidated damages if:

6.7.1 CEC or **tie** have not complied with Clauses 6.3 to 6.5; or

6.7.2 the Design Data was not submitted in accordance with the detailed procedures and requirements notified by Network Rail to **tie** from time to time.

6.8 Network Rail may approve any element of Design Data subject to the inclusion of comments or withhold approval only if:

6.8.1 Network Rail reasonably believes that the relevant element of Design Data would (on the balance of probabilities) breach any Legal Requirement;

6.8.2 the relevant element of Design Data does not comply with the Functional Specification; and/or

6.8.3 the requirements specified in Clause 7.2.2, the Contractor's Assurance Case and/or contract-specific addendum related thereto are not being complied with;

6.8.4 Network Rail reasonably believes that the implementation of the relevant element of Design Data will result in non-compliance with **tie** or CEC's obligations under Clause 7 (*Obligations of tie/CEC*) and/or Clause 9 (*Carrying out of the Works*) or non-compliance with the Works Programme;

6.8.5 the implementation of the element of Design Data would limit, qualify or override or purport to limit, qualify or override any obligation, right or entitlement of Network Rail which arises by reason of:

6.8.5.1 any Network Licence condition; or

6.8.5.2 the terms and conditions of any Track Access Agreement;

6.8.6 Network Rail reasonably believes that the designs submitted are unlikely to result in the Works carried out in accordance with such designs being Taken Into Use by Network Rail; and/or

6.8.7 insufficient information, data and/or documents have been provided to enable Network Rail to determine whether it has a legitimate basis for commenting or objecting.

6.9 If CEC, or **tie** on CEC's behalf, do not submit such information, data and documents in accordance with Clauses 6.3 to 6.5, Network Rail shall be entitled to comment on the Design Data on the basis of the information, data and documents which have been provided (without prejudice to Clause 6.8).

6.10 If Network Rail raises comments on any element of Design Data on its return or withholds approval of any element of Design Data, it shall state the ground(s) upon which such comments or the withholding of approval are based and shall provide the supporting evidence or other information where appropriate.

6.11 Any element of Design Data which is returned by Network Rail endorsed "Level 1 - Approved, work may proceed" shall be complied with or implemented (as the case may be) by CEC and **tie**. The endorsement "Level 1 - Approved, work may proceed" shall mean that the relevant element of Design Data is technically approved as defined in Group Standard GC/RT5101 and associated Network Rail Company Standard RT/E/P/02009.

6.12 Where Network Rail has endorsed any element of Design Data "Level 2 - Approved with comments, work may proceed subject to inclusion of comments", CEC (or **tie** on CEC's behalf) shall proceed to construct (or proceed to the next level of design of) the part of the Works to which the element of Design Data relates but shall take into account any amendments required by Network Rail in its comments. The means of achieving compliance with Network Rail's comments shall be documented and filed for later retrieval on request by Network Rail.

6.13 Where Network Rail has endorsed any element of Design Data "Level 3 - Not approved with minor comments, resubmit" or "Level 4 - Not approved with major comments, resubmit", neither tie nor CEC shall act upon the Design Data but CEC shall or shall procure that **tie** shall amend the element of Design Data in accordance with Network Rail's comments and resubmit the same to Network Rail. Network Rail (acting reasonably, subject to Clauses 1.3.2 and 1.3.3) shall determine whether the comments on any element of Design Data (taking into account individual comments, or the cumulative number of comments) are major or minor.

6.14 Where Network Rail has endorsed the element of Reviewable Design Data "Level 5 - Technical Approval not required", CEC shall, or shall procure that **tie** shall, submit the next element of Design Data in accordance with the Works Programme.

6.15 Following the return of Design Data, CEC shall, or shall procure that tie shall, amend the design criteria for the Works to take account of any comments properly made by Network Rail in respect of the relevant Works on such submission and submit further Design Data submissions to Network Rail as may be required by Network Rail.

6.16 CEC shall not authorise, and shall procure that **tie** shall not authorise, the commencement of the detailed design of the Works until the Design Data submission has been approved by Network Rail and the Works have been allocated a checking category.

6.17 Notwithstanding any approval, consent, comment or confirmation which Network Rail may be required to provide pursuant to this Agreement, the responsibility for the design and construction of the Works shall remain solely at the risk and cost of CEC (and **tie** acting on CEC's behalf) and Network Rail shall have no liability whatsoever, whether in contract, delict or otherwise for such design and construction or for any errors or omissions contained in the documents relating thereto.

7. OBLIGATIONS OF TIE/CEC

7.1 CEC shall procure, or shall ensure that **tie** shall procure, that each Contractor and Sub-Contractor meets the requirements of Network Rail's Link Up Accreditation for all relevant classes of work to be carried out by that Contractor. If so required by Network Rail at anytime, CEC shall, or shall procure that **tie** shall, demonstrate to Network Rail that such Contractor and/or Sub-Contractor (as the case may be) holds a certificate from Network Rail confirming that the Contractor and/or the Sub-Contractor (as the case may be) has a Contractor's Assurance Case.

7.2 CEC shall, or shall procure that **tie** shall, be responsible for designing and carrying out and completing the Works and shall:

7.2.1 exercise all reasonable skill, care and diligence to be expected of a prudent and competent person experienced and skilled in works of a similar size, scope and complexity as the Works;

7.2.2 design, procure and carry out the Works in accordance with:

7.2.2.1 all Legal Requirements;

7.2.2.2 all Standards, in respect of each specific element of the Works, as at the date that such element of the Works pass Stage Gate 4 and any Change in Standards for safety reasons thereafter (without prejudice to Clause 13.10.1) or such derogations from the Standards as Network Rail and/or the relevant Competent Authority may approve or consent in writing and by expressly referring to it being aware that its approval or consent to the matter in question constitutes a derogation;

7.2.2.3 all other relevant current British, European and international codes and standards;

7.2.2.4 Network Rail's Requirements;

7.2.2.5 all Necessary Consents and so as not to prejudice the renewal of any such Necessary Consents;

7.2.2.6 the requirements of any other consents, permissions, orders and approvals obtained in respect of the Works; and

7.2.2.7 the Safety Case;

7.2.3 design and carry out the Works in accordance with:

7.2.3.1 such other conditions as Network Rail may reasonably consider necessary to prevent, address, alleviate or comply with (as applicable) a Network Operation Issue; and

7.2.3.2 such other conditions as Network Rail may reasonably consider necessary relating to the efficiency, whole life cost and safety of the Works and the Railway;

7.2.4 ensure that the design of the Works is such as to enable construction of the Works in a manner which minimises disruption to the Railway and enables future construction or maintenance to be carried out on the Network constituting the Works (as far as reasonably possible) in a way which minimises costs and disruption to the Network; and

7.2.5 meet with Network Rail as reasonably required during the design and construction of the Works.

7.3 CEC shall, or shall procure that **tie** shall:

7.3.1 prepare a Works Programme for approval in accordance with Clause 8.2;

7.3.2 obtain Network Rail's prior written approval to the appointment of any CDM co-ordinator (as defined in the CDM Regulations), such approval not to be unreasonably withheld or delayed;

7.3.3 not appoint a Contractor to provide design services without obtaining Network Rail's prior written approval, such approval not to be unreasonably withheld or delayed;

7.3.4 prior to commencing the design or construction of the Works, procure that each relevant Contractor produces a Quality Plan, Environmental Plan, and a Safety Plan specific to the Works (as part of the requirements under the Contractor's Assurance Case);

7.3.5 obtain the prior approval of Network Rail (not to be unreasonably withheld or delayed) before appointing a Checker appropriate to the checking category allocated to the Works by CEC (or **tie** on CEC's behalf); and

7.3.6 prepare (in accordance with any requirements which Network Rail may have and at the appropriate times within the design and construction processes) all the documentation required to enable Network Rail to make submissions for the Network Rail Consents and when necessary modify the design or construction processes to ensure that such consent is obtained and provide Network Rail with a copy of all such relevant documents so prepared.

7.4 CEC shall, or shall procure that **tie** shall:

7.4.1 supply drawings relevant to the Works to Network Rail for comment and approval in writing;

7.4.2 procure that each Contractor and, where required by Network Rail, Key Sub-Contractor shall provide Network Rail with a Collateral Warranty for design and construction prior to the Works Commencement Date;

7.4.3 procure the attendance of the Infraco on reasonable notice at all project meetings reasonably required between the Parties;

7.4.4 supply to Network Rail copies of the approved drawings together with supporting design and check certificates and contract documents for Network Rail's use during the carrying out of the Works;

7.4.5 satisfy itself in relation to the existence of any service media in the vicinity of the Works;

7.4.6 in respect of any Sector after Sector Completion, without delay remove from and leave such completed Sector clear of all plant, equipment and materials not reasonably required for the purposes described in Clause 12 (*Ongoing Obligations in respect of the Works*) and maintain the completed Sector in a condition in accordance with this Agreement;

7.4.7 ensure that, during the construction of the Works and thereafter until the date of entry under the Lease (without prejudice to CEC's obligations in respect thereof under the Lease), neither CEC, **tie** nor any Contractor or Sub-Contractor shall

interfere with the availability of suitable access and egress to and from Haymarket Depot for all necessary purposes at all times to the reasonable satisfaction of Network Rail;

7.4.8 not do or allow or permit or suffer anything to be done by CEC, **tie** or any Contractor or Sub-Contractor which would adversely affect the continuous operation of train fuelling equipment and fuel tanks at Haymarket Depot and ensure that during the construction of the Works and thereafter until the date of entry under the Lease (without prejudice to CEC's obligations in respect thereof under the Lease), neither CEC, **tie** nor any Contractor or Sub-Contractor shall interfere with the safe and suitable access to such equipment and fuel tanks for all necessary purposes at all times to the reasonable satisfaction of Network Rail;

7.4.9 ensure that all elements of the Works which relate to new or existing overbridges and underbridges, including footbridges, will comply with the Standards (subject to Clause 7.2.2.2) and the requirements of Her Majesty's Railway Inspectorate; and

7.4.10 carry out prior to the commencement of the Works a condition and defects survey as referred to in Clause 4.1.2 at the cost of CEC or **tie**.

7.5 CEC shall pay and keep Network Rail indemnified against all rates, taxes and all assessments (to the extent that CEC have been able to verify the basis upon which they are assessable) and outgoings at any time from the Commencement Date until the date of entry under the Lease chargeable against the owner or occupier of the areas of land to which Network Rail have provided access pursuant to Clause 4 (*Access to the Network*) while the same are occupied by or on behalf of CEC or **tie** or any Contractor or used pursuant to Clause 12.10;

7.6 Without prejudice to CEC's obligations under the Lease, Network Rail confirms to CEC and **tie** that it shall not (unless by way of a Variation) instruct or require CEC or **tie** to undertake any works in respect of clearing contamination or improving the current state of the land which will form the Premises and other land to be used in carrying out the Works, save to the extent that such works are necessary (a) to deliver the desired functionality in relation to the Edinburgh Tram Network or (b) to clear contamination which arises as a consequence of the carrying out of the Works.

8. PROGRAMMING OF WORKS AND OBTAINING POSSESSIONS

8.1 The Parties shall co-operate as set out in this Clause 8 in the planning and development of a Works Programme, including the utilisation of Possessions to facilitate both the safe and efficient execution of the Works and the safe and efficient operation of the Network.

8.2 Prior to the Works Commencement Date CEC shall or shall procure that **tie** shall submit a detailed programme for such Works for approval in principle by Network Rail. Such programme shall include:

8.2.1 all submission dates for approval of Design Data;

8.2.2 submission dates for work package plans;

8.2.3 an initial proposed Possessions Plan;

8.2.4 details of all survey works;

8.2.5 Works inspection and testing plans;

8.2.6 taking into use and commissioning plans;

8.2.7 details of any Interfacing Projects; and

8.2.8 identification of the critical path activities.

8.3 If a Works Programme is not sufficiently developed prior to the Works Commencement Date for approval, CEC will, or shall procure that **tie** will, as soon as reasonably practicable submit a Works Programme in compliance with Clause 8.2 and Network Rail shall review such Works Programme within 20 Working Days from receipt.

8.4 If Network Rail does not approve the proposed Works Programme or any section of it pursuant to Clause 8.2, CEC shall or shall procure that **tie** shall consult further with Network Rail and submit a revised proposed Works Programme for approval by Network Rail.

8.5 CEC shall or shall procure that **tie** shall consult with Network Rail regarding the availability of Possessions. Network Rail shall notify **tie** on the programming

implications of Possessions required to carry out the Works together with the cost implications of Possessions in respect of compensation and penalty payments rates payable by Network Rail under any relevant Track Access Agreement and/or Freight Access Agreement.

8.6 CEC shall and shall procure that **tie** shall minimise the disruptive possessions requirements in consultation with Network Rail. Once a proposed Possession Plan is established, Network Rail will undertake consultation on behalf of CEC in accordance with Part D of the Network Code to gain approval for the relevant Possessions. Network Rail's obligations under Clauses 8.7 to 8.10 (inclusive) shall be subject at all times to its compliance with its obligations under the Network Code and any relevant Track Access Agreement and/or Freight Access Agreement.

8.7 Network Rail shall use all reasonable endeavours to obtain and make available to CEC the Possessions necessary in order to carry out the Works in accordance with the Works Programme (subject and without prejudice to Network Rail's requirements in respect of the timing of applications therefor).

8.8 For stand-alone disruptive possessions Network Rail shall review the Possessions requirements and, subject to the availability of such Possessions, shall consult with relevant Operators by formally proposing an update or supplement to the Rules of the Route, as appropriate. Following the relevant timescales for consultation and having received no adverse comments from Operators, Network Rail shall enter the Possession in the Possession Planning System and give it a confirmed reference number, and shall add the Possession to the relevant version of the Rules of the Route and subsequently enter it into the confirmed period possession plan.

8.9 For disruptive Possessions linked to an Interfacing Project ("piggy-back" possessions) Network Rail shall establish whether the Possessions already planned for site activities in relation to the Interfacing Project are potentially compatible with the further separate site activities proposed by CEC (provided, for the avoidance of doubt, that if a Possession previously planned in relation to an Interfacing Project is no longer required for such Interfacing Project, but is required for site activities proposed by CEC, CEC shall be liable for the Possessions-Related Costs (as defined in Schedule Part 6) in respect of that Possession).

8.10 Where proposed Possessions are confined to periods when there is no scheduled train service, Network Rail shall enter such Possessions into the Possession Planning System.

8.11 Network Rail shall keep **tie** advised of the progress of the procedures referred to in Clauses 8.8 to 8.10 (inclusive) and in particular shall advise **tie** as soon as reasonably practicable of any objections to the overall programme of Possessions in which any affected Operator persists and in the light of which CEC may wish to revise the Works specification or intended method of working or to revise the Possessions Plan.

8.12 Within 20 Working Days after completion of the consultation on the proposed Possessions Plan, Network Rail shall confirm in writing to **tie**:

8.12.1 that the relevant Possessions have been obtained, whereupon the Possessions Plan shall be deemed to be agreed and the Possessions shall be deemed to be Booked; or

8.12.2 that the relevant Possessions have not been obtained, in which case Network Rail shall furnish **tie** with details where the Possessions Plan and as a consequence the Works Programme or any section of it has not been approved and a supporting analysis (including as to the merits of bringing an appeal), following which CEC (or **tie** on CEC's behalf) shall consult further with Network Rail and submit a revised proposed Works Programme for approval by Network Rail.

8.13 CEC shall, or shall procure that **tie** shall, make the detailed arrangements for the Possessions, their management, interface with Interfacing Projects and the procurement of all necessary resources to facilitate their availability to the Contractor. CEC shall, or shall procure that **tie** shall, attend all relevant planning meetings, including train movements meetings for the approved Possessions.

8.14 **tie** and CEC shall furnish such further details and information in respect of the planning and programming thereof as Network Rail may reasonably require at any time during the carrying out of the Works.

8.15 Network Rail and CEC (or **tie** on CEC's behalf) shall jointly review the approved Works Programme from time to time and shall agree what (if any) action needs to be taken in order to achieve the agreed dates for Possessions and the completion of the Works or any part thereof. If in the reasonable opinion of Network Rail the actual

progress of the Works or any part thereof does not conform to the approved Works Programme or the Booked Possessions dates for the relevant part of the Works are unlikely to be achieved, CEC shall, or shall procure that **tie** shall, (if Network Rail so requires) produce a revised programme (subject to the approval of Network Rail where the revisions are material) in order to achieve the agreed Possession dates and to ensure completion of the Works or the relevant part thereof.

8.16 If:

8.16.1 Network Rail and CEC (or **tie** on behalf of CEC) agree pursuant to Clause 8.15 that the agreed dates for Possessions cannot be achieved; or

8.16.2 Network Rail fails to make available (or cancels) any Possession

CEC (or **tie** on CEC's behalf) shall consult with Network Rail regarding the availability of further Possessions and submit a revised Works Programme for approval. When the relevant Possessions have been obtained, Network Rail shall revise the Possessions Plan accordingly.

8.17 The provisions of Clauses 8.2 to 8.12 (inclusive) shall apply *mutatis mutandis* to any revised programme submitted for approval, provided that CEC and **tie** shall act with expedition in respect of further consultation with Network Rail and the submission of any further revisions.

8.18 CEC and **tie** recognise in relation to any Possessions not forming part of the Possessions Plan that:

8.18.1 the availability of such Possessions is confined to periods when there is no scheduled train service, unless (by exception) longer periods can be made available; and

8.18.2 in the event of any additional Possessions not being available, the Works Programme may require revision.

8.19 Network Rail shall give **tie** as much notice as is reasonably practicable in respect of any cancellation or alteration of any Booked Possession in order to enable CEC, **tie**, and each Contractor to minimise or mitigate any wasted costs. Network Rail shall provide to **tie** the reasons for any cancellation or alteration. If as a result of a

cancellation or alteration of a Possession any additional Possession shall be required, Clause 8.16 shall apply.

8.20 If Network Rail cancels or alters a Booked Possession, Network Rail shall compensate **tie** and/or CEC in accordance with Clause 14 (*Compensation and Relief*).

9. CARRYING OUT OF THE WORKS

9.1 CEC shall not, and shall procure that **tie** shall not, instruct commencement of construction of the Works prior to the Works Commencement Date.

9.2 CEC shall be responsible for construction of the Works at its own risk and cost and shall, or shall procure that **tie** shall:

9.2.1 obtain Network Rail's prior written approval to the Works Programme and method statement for the carrying out and completion of the Works and the movement of materials, plant and equipment on or near the Railway (not to be unreasonably withheld or delayed, save that Network Rail's decision shall be final where its approval is withheld in order to prevent, address, alleviate or comply (as applicable) with a Network Operation Issue);

9.2.2 prior to commencing construction of the Works obtain all Necessary Consents required for the carrying out and Completion of the Works, forward copies of all such approvals to Network Rail and obtain a written acknowledgement of receipt of the same from Network Rail, provided that in the case of the Regulated Change only, CEC shall be entitled to commence construction of the Works which are the subject of the Regulated Change (but without prejudice to the general obligation to obtain the Regulated Change and provided that the Network Rail Consents have first been obtained) if:

9.2.2.1 the application for Regulated Change has been notified to all relevant third parties in accordance with the Network Code and/or Station Access Conditions (as the case may be);

9.2.2.2 all relevant third parties have agreed to the Regulated Change subject to them receiving (where applicable) adequate compensation; and

9.2.2.3 in the case of Station Change only, where a lease of any part of the Works is to be granted to a person other than CEC, then either:

(a) such person or another person has unconditionally and irrevocably agreed in writing to pay Network Rail an additional "Long Term Charge" (as defined in the Station Access Conditions); or

(b) CEC agrees to indemnify Network Rail against all costs of repairing, maintaining, replacing, renewing and operating the Works if and to the extent that Network Rail is unable to recover such costs by virtue of an adjustment to relevant access charges as a consequence of the implementation of an access charges review (as defined in the Act); and

9.2.2.4 the relevant period for objection to the Regulated Change has expired in accordance with the documents described in Clause 9.2.2.1 above;

and (where the application for Regulated Change has been made by CEC) CEC shall provide Network Rail with written evidence of the matters referred to in Clauses 9.2.2.1 to 9.2.2.3 above;

9.2.3 take all steps to ensure that the Works are carried out to minimise disruption to the Railway and any third party using or with an interest in or a right over any part of the Railway or any other land and buildings affected by the Works;

9.2.4 establish and maintain a robust procedure to ensure safe access for all personnel to the Railway in connection with the Works which recognises the existing points of emergency access to the Railway;

9.2.5 submit in writing for Network Rail's approval (such approval not to be unreasonably withheld or delayed) all its proposals for the provision of personnel to supervise possessions or site works;

9.2.6 not interfere (and ensure that no Contractor interferes) with existing points of emergency access to the Network without the prior written agreement of Network Rail;

9.2.7 immediately take all action required by Network Rail pursuant to Clause 10.2;

9.2.8 carry out the Works with all reasonable dispatch at times and in such a way as to minimise insofar as is reasonably practicable any interference with the traffic operating on the Network;

9.2.9 carry out the Works to the satisfaction of Network Rail in respect of the protection, safety and efficient operation of the Railway and the safety of persons on or near the Railway;

9.2.10 superintend the Works and cause the Works to be completed with all reasonable dispatch and in any event by 30 June 2011 as such date may be extended by any delay arising from the breach of contract or negligence of Network Rail;

9.2.11 carry out the Works in accordance with the specifications set out in the Works Requirements and the requirements of any consents, permissions, orders and approvals obtained in respect of the Works;

9.2.12 carry out the Works in a manner which is not likely to be injurious to health or cause damage to property;

9.2.13 arrange with all relevant third parties for any necessary temporary or permanent diversion of any sewers, pipes, cables or other media;

9.2.14 arrange for the relocation to a suitable environment of any flora and fauna which is subject to conservation and which may be affected by the Works;

9.2.15 to the extent that Network Rail (acting reasonably) considers appropriate, during the carrying out of the Works at its own cost and to the satisfaction of Network Rail, temporarily erect fencing to protect Network Rail from trespass and vandalism;

9.2.16 provide for such barriers, watching and lighting of the Works as may be necessary during the carrying out of the Works;

9.2.17 comply with the requirements of Network Rail with regard to Network Rail's signalling arrangements and the prevention of any adverse effects which may be caused by the lighting of the Works;

9.2.18 procure that all materials and goods used in the Works shall be new, of good quality, suitable for their purpose, in compliance with all applicable Standards (subject to Clause 7.2.2.2) and not generally known in the railway industry to be deleterious at the time of incorporation;

9.2.19 give Network Rail reasonable notice in writing of any inspections or testing of the Works by CEC, **tie** or their Contractor and allow Network Rail to attend such inspections, demonstrations or testing;

9.2.20 notify Network Rail in writing once **tie** considers that (a) a Sector has been completed in accordance with the agreed drawings, specification and design (subject to any Variation) in order to enable Network Rail to certify Sector Completion for that Sector, and (b) the Works have been completed in accordance with the agreed drawings, specification and design (subject to any Variation) in order to enable Network Rail to certify Completion of the Works;

9.2.21 take such action during the construction of the Works and the Defects Liability Period as Network Rail may reasonably require to remedy any deficiencies and defects in the Works identified by Network Rail; and

9.2.22 provide Network Rail with such information at such times and in such format as Network Rail reasonably requires about the Works to enable it to populate its asset register.

9.3 For the purposes of the Works under the CDM Regulations **tie** is the sole client (and CEC shall procure that **tie** shall make any election under Regulation 8 of the CDM Regulations to that effect) and shall fulfil all the roles and duties of such including procuring the necessary notification to the Health and Safety Executive under Regulation 21 of the CDM Regulations.

9.4 CEC shall procure that after consulting with Network Rail **tie** shall prepare a "Construction Phase Plan" (as defined in the CDM Regulations) for the Works and submit it to Network Rail. Network Rail shall examine and comment to **tie** on the elements of such Construction Phase Plan relating to works in the Railway environment. CEC shall procure that **tie** shall amend the Construction Phase Plan to take account of any reasonable comments made by Network Rail on the Construction Phase Plan and submit further Construction Phase Plans to Network Rail as necessary.

9.5 CEC shall procure that **tie** shall prepare a relevant data manual (including as-built drawings and such other information as Network Rail may reasonably stipulate) for the Works which shall in due course form part of the "Health and Safety File" as defined in the CDM Regulations. The manual shall be finalised and passed to Network Rail in such format and with such number of copies as Network Rail may reasonably require prior to the Completion of the Works .

9.6 CEC is responsible for the identification of any relationship between the Works and any Interfacing Projects and has a responsibility to mitigate and control such interface as far as reasonably practicable in the interests of economic and efficient network management and operations. Network Rail shall notify **tie** of any relationship of which it is aware between the Works and any Interfacing Projects.

9.7 Where **tie** and/or CEC is unable to fulfil any of its obligations under this Clause 9, Network Rail may take such steps as it reasonably considers appropriate to address the position (subject to giving **tie** reasonable prior notice of its intention to do so) and CEC shall reimburse Network Rail in respect of all resulting Losses.

9.8 If the whole or part of the Works fails to comply in all respects with this Agreement, the Network Rail Requirements or any relevant Standards (subject to Clause 7.2.2.2), CEC shall procure the carrying out of such remedial work of construction or design as may be required so that the Works do so comply. Network Rail may then require CEC to carry out or repeat any demonstrations or tests for the whole or any part of the Works or procure that the same are carried out or repeated.

9.9 During the construction of the Works, if Network Rail so requires, or on Completion of the Works or on Sector Completion and any subsequent repair or remedy of the Works or a Sector (as the case may be) CEC shall, or shall procure that **tie** shall, at its own cost and to the satisfaction of Network Rail, acting reasonably, make good any property of Network Rail which may have been damaged or interfered with and shall remove all surplus material brought on to Network Rail's land by CEC, **tie** or any Contractor.

10. SAFEGUARDING THE RAILWAY

10.1 Network Rail and CEC (or **tie** on CEC's behalf) shall liaise generally on all safety matters arising out of the Works if, and to the extent that, they affect the Railway.

10.2 Notwithstanding any other provision of this Agreement but subject to Clause 14 (*Compensation and Relief*), Network Rail may at any time take whatever action Network Rail (acting reasonably, subject to Clause 1.3.3) considers necessary to prevent, address, alleviate or comply with a Network Operation Issue, including requiring CEC, **tie** and any Contractor to suspend the carrying out of the Works for such period and/or take such measures as Network Rail may require, provided that:

10.2.1 Network Rail's decision to take such action at that time is reasonable, taking into account all relevant circumstances (subject to Clause 1.3.3);

10.2.2 Network Rail shall (if practicable) consult with **tie** prior to taking any such action; and

10.2.3 Network Rail shall in any event notify **tie** as soon as reasonably practicable after taking any such action.

10.3 Network Rail shall notify **tie** of any suspension pursuant to Clause 10.2 as soon as reasonably practicable. Such notification shall contain such relevant information relating to the suspension as is available, including an estimate of the period of suspension. Network Rail shall promptly provide **tie** with any further information it receives or becomes aware of which relates to the suspension and provide an update on the estimate of its duration, and shall notify **tie** as soon as practicable (and in any event within two Working Days) once the Works can be resumed.

10.4 If pursuant to Clause 10.2 Network Rail requires action to be taken by any Contractor, CEC shall procure that **tie** shall upon notification procure that the Contractor responsible for the relevant part of the Works complies with Network Rail's requirements. If **tie** is not immediately available for any reason, Network Rail shall be entitled for the purposes of Clause 10.2 to issue instructions directly to the Contractor and CEC shall procure that **tie** shall procure that any such direct instructions shall be treated as instructions from **tie** under the relevant contract. Network Rail shall supply to **tie** a copy of such instructions as soon as reasonably practicable following their issue.

10.5 Network Rail shall be entitled to take all steps it reasonably considers necessary to ensure that the Operational Track can be effectively used (including removing all or any part of the Works).

10.6 Network Rail and CEC (or **tie** on CEC's behalf) shall with reasonable diligence exchange information and otherwise co-operate with each other so far as it is necessary to enable Network Rail (acting reasonably) to review or revise its safety regime (as may be appropriate) relating to the maintenance, repair, improvement, alteration and operation of the Railway during the construction of the Works and for a period of 12 months thereafter.

11. COMPLETION OF THE WORKS AND TAKING INTO USE

11.1 Network Rail shall be entitled to inspect the Works (including ultrasonic examination of the Operational Track) at any time prior to Taking Into Use of the Works and shall inform **tie** of any areas requiring attention and the level of priority for such work. CEC shall procure the carrying out of such work within the timescales specified in the Standards (subject to Clause 7.2.2.2). If CEC fails to do so, Network Rail shall be entitled to undertake such work itself at CEC's expense and may require CEC and **tie** to cease to use the Works until such work has been completed by Network Rail and paid for by CEC provided that CEC shall be entitled to recover such costs where the measures and/or timescales are determined to have been disproportionate or unnecessary under the Dispute Resolution Procedure.

11.2 The procedures for the Taking Into Use of the Works shall be carried out in accordance with Network Rail Standard RT/D/P/088 (or such other Standard as may from time to time replace it). CEC shall not and shall procure that **tie** shall not bring the Works into use until the Network Rail Consents referred to in paragraph 1 and/or 2 of part 2 of Schedule Part 4 (*Network Rail approvals, acceptances and consents*) have been obtained.

11.3 The Taking Into Use of the Works by Network Rail (but excluding any Operational Track) shall be conditional upon the coming into force of a Regulated Change in respect of the Works in a form approved by Network Rail for the purposes of this Agreement.

11.4 Following receipt of a notification from CEC (or **tie** on CEC's behalf) pursuant to Clause 9.2.20 that all the Works in a particular Sector have been completed and provided that Network Rail is satisfied that the Works in that Sector comply in all respects with this Agreement, the Network Rail Requirements and all relevant Standards (subject to Clause 7.2.2.2), and that all deficiencies, snagging and defects

have been rectified in compliance with Clause 9.2.21, Network Rail shall issue to **tie** a certificate of Sector Completion for that Sector. If Network Rail considers that the whole or any part of the Works in that Sector do not comply as aforesaid, it shall notify **tie** in writing together with full details of its opinion why the certificate of Sector Completion should not be issued.

11.5 Following receipt of a notification from CEC (or **tie** on CEC's behalf) pursuant to Clause 9.2.20 that all the Works have been completed and provided that certificates of Sector Completion have been issued in respect of all Sectors, Network Rail shall issue to **tie** a certificate of Completion of the Works. If Network Rail considers that the whole or any part of the Works do not comply with the Agreement, it shall notify **tie** in writing together with full details of its opinion why the certificate of Completion of the Works should not be issued (provided that Network Rail shall not contend that a Sector or part thereof does not comply as aforesaid where a certificate of Sector Completion has already been issued in respect of that Sector).

11.6 Not used.

11.7 Following Completion of the Works CEC will, or procure that **tie** will, to the extent not already undertaken (notwithstanding that any Works may have been Taken into Use):

11.7.1 within two years (but not less than 18 months) repeat the condition and defects survey required under Clause 7.4.10 in adherence with the access requirements and procedures set out in Clause 4 (*Access to the Network*);

11.7.2 make good any damage caused to Network Rail Property by the carrying out and completion of the Works and shall, subject to intentional alterations arising as a consequence of the Works, reinstate all Network Rail Property so damaged to a condition substantially the same as existed at the Commencement Date (as evidenced by the condition and defects survey required under Clause 7.4.10) as soon as reasonably practicable to the satisfaction of Network Rail; and

11.7.3 carry out and complete all rectification or remedial works which may be necessary as a consequence of CEC, **tie** or any Contractor failing to carry out or complete the Works in accordance with this Agreement. In the event that such rectification or remedial works are not carried out within three months of

Completion of the Works, Network Rail may carry out such works and recover the cost thereof from CEC;

provided that in respect of any part of Network Rail Property which is or forms part of the Premises for the purposes of the Lease, this Clause 11.7 shall not apply after the date of entry under the Lease (without prejudice to CEC's obligations therein).

11.8 Network Rail shall be the Infrastructure Controller in respect of the Works following their Taking Into Use.

11.9 CEC shall not, and shall procure that **tie** shall not, use or operate or permit any third party to use or operate any Operational Track prior to the date the Operational Track is Taken into Use (other than for testing as agreed with Network Rail).

11.10 CEC and **tie** agree and acknowledge that no new track access rights are conferred upon CEC or **tie** as a result of the carrying out or completion of the Works, and that CEC and **tie** are carrying out and constructing the Works at their own risk in the full understanding that the grant of additional access rights and rights of use is subject to the procedures set out in the Act.

12. ONGOING OBLIGATIONS IN RESPECT OF THE WORKS

12.1 Without prejudice to Clauses 12.2 or 12.3, CEC shall at its sole cost and expense procure any repair, maintenance, renewal and replacement the Works and, in the case of those parts of the Works which are to be Taken Into Use, shall do so prior to the date the Works are Taken Into Use.

12.2 If the Works comprise any Operational Track:

12.2.1 Network Rail shall repair, maintain, replace and renew the Operational Track in accordance with the relevant Standards and its obligations under its Network Licence from and including the date that the Operational Track (or such part thereof (as applicable)) is Taken Into Use; and

12.2.2 the Parties intend that the costs and expenses incurred by Network Rail in repairing, maintaining, replacing, renewing and operating any Operational Track shall be payable by CEC to Network Rail pursuant to a supplemental Track Access Agreement to be entered into by the Parties in respect of the Track subject to obtaining the approval of the ORR.

12.3 In respect of any Station Works, the Parties intend that:

12.3.1 subject to the Station Access Conditions, the obligation to repair, maintain, replace and renew the Station Works shall be imposed as obligations on the part of the landlord and the tenant (which in the case of Station Works shall be in accordance with Appendix 4 (entitled "Station - Equipment Inventory") of Annex 1 of the Station Access Conditions as incorporated into the lease of the relevant part of the Works; and

12.3.2 the costs and expenses incurred by Network Rail in performing the obligations on its part as landlord under such lease are to be payable to Network Rail by the tenant under the relevant lease or by the tenant, CEC and/or other Operators by way of an additional "Long Term Charge" (as defined in the Station Access Conditions) in the case of any Station Works.

12.4 Without prejudice to Clause 12.3, Network Rail shall repair, maintain, replace and renew any Station Works in accordance with the Standards and its obligations under its Network Licence from and including the date that any Station Works (or such part thereof (as applicable)) are Taken Into Use until the date of the grant of the lease for the relevant Station Works. Subject to the grant of the lease (or other agreement) for the relevant Station Works, Network Rail agrees with CEC to:

12.4.1 observe and perform the obligations on its part in the lease of the relevant Station Works to repair and maintain the relevant Station Works in accordance with the terms thereof; and

12.4.2 procure that the tenant (if an entity other than CEC or an Affiliate of CEC) of the lease of the relevant Station Works observes and performs the obligations on its part to repair and maintain the relevant Station Works in accordance with the terms thereof.

12.5 In the case of those parts of the Works not constituting Operational Track or Station Works, Network Rail shall repair, maintain, replace and renew such Works in accordance with the relevant Standards and its obligations under its Network Licence from and including the date that such Works (or such part thereof (as applicable)) are Taken Into Use.

12.6 Subject to Clauses 12.2 to 12.5 (inclusive), if in consequence of the construction of the Works or the existence of the Works, Network Rail incurs additional cost and expense in connection with the repair, maintenance, improvement, operation or alteration of the Railway which would not have been incurred but for the construction of the Works or the existence of the Works (**"Additional Expense"**), such Additional Expense shall be paid to Network Rail by CEC in accordance with Clause 18 (*Network Rail Costs and Payments to tie/CEC*) and Schedule Part 6 (*Network Rail Costs*) (except to the extent that:

(a) the Additional Expense is paid for by a third party in the manner contemplated by Clause 12.2.2 or 12.3; or

(b) the Additional Expense is incurred after the end of the Control Period in which the date of Completion of the Works occurs (or, where the Additional Expense relates to a Sector, the date of Sector Completion for that Sector).

12.7 If the existence of the Works results (directly or indirectly) in there being a greater risk of acts of trespass or vandalism occurring on or from the site of the Works or its approaches, for the first 12 months after the date of Taking Into Use CEC shall at its own expense take such preventative and/or defensive action as Network Rail and CEC (or **tie** on CEC's behalf) may agree (such agreement not to be unreasonably withheld) having regard to the incidence and nature of the acts of trespass or vandalism and the cost of such preventative and/or defensive measures.

12.8 In the event of acts of trespass or vandalism occurring on or from the Works or its approaches which endanger safety on the Railway or the safety of Network Rail Property or persons on or near the Railway, Network Rail may take immediate action at the cost of **tie**/CEC to safeguard the Railway and/or such persons and Network Rail in accordance with Clauses 10.2.1 to 10.2.3 of Clause 10.2.

12.9 From the date of Sector Completion of the relevant Sector until (a) in the case of those parts of the Works which are to be Taken into Use, the date that relevant Sector or part thereof is Taken into Use; (b) in the case of those parts of the Works or of Network Rail Property which shall be the subject of any of the Bridge Agreements, the date of execution of the relevant Bridge Agreement (without prejudice thereafter to CEC's obligations under the Bridge Agreement); and (c) in the case of those parts of the Works (if any) which are not to be Taken into Use or form part of the Premises,

the date of Completion of the Works (such parts of the Works or of Network Rail Property being in each case hereinafter referred to as "the Completed Areas"):

12.9.1 CEC shall be responsible for maintaining the Completed Areas in good and substantial order and repair to the reasonable satisfaction of Network Rail and shall secure the Completed Areas against acts of trespass or vandalism;

12.9.2 CEC shall assume all risk and responsibility for loss, or damage to or destruction of the Completed Areas (howsoever caused or arising) and for the costs of rectifying or reinstating such loss, damage or destruction, and shall free and relieve Network Rail of and from all liability which may be sustained as a consequence of such loss, damage or destruction provided that Network Rail shall remain responsible for loss, damage or destruction caused or arising as a result of the acts or omissions of Network Rail of any person for whom Network Rail is responsible;

12.9.3 Network Rail shall provide CEC with such access as may be reasonably required for the purposes of this Clause 12.9, and CEC shall be relieved of its obligations under this Clause 12.9 to the extent that Network Rail does not provide such access.

12.10 In the case of those parts of the Works or of Network Rail Property which shall form the Premises CEC shall, subject to the terms of this Clause 12.10 be entitled to occupy and to use the Premises and that on the same terms and conditions as are contained within the Lease, which shall be deemed to be incorporated herein, mutatis mutandis, save to the following extent:-

12.10.1 the right to occupy and use the Premises shall subsist from:

12.10.1.1 the date of Sector Completion for each Sector in respect of the purposes set out in Clause 12.10.3.1; and

12.10.1.2 the date which is the later of (a) the date of Completion of the Works and (b) the date upon which the Operating Agreement has been executed by all of the parties thereto and the Procedures are agreed between such parties in respect of the purposes set out in Clause 12.10.3.2,

until the date of entry under the Lease; declaring however that if at any time, Network Rail and CEC both agree, acting reasonably, for whatever reason, that the Edinburgh Tram Network will not commence revenue generation, the right to occupy and use the Premises granted hereby shall terminate with immediate effect;

12.10.2 no rent shall be due by CEC in respect of the right to occupy and use the Premises hereby granted.

12.10.3 the right to occupy and to use the Premises hereby granted is for the purposes only of:

12.10.3.1 securing the Premises, reasonable inspection, maintaining, rectification of damage, and rectification of defects arising in relation to a completed Sector; and

12.10.3.2 testing, commissioning and trial running of the passenger tramway within the Edinburgh Tram Network (including driver training),

but for no other purpose whatsoever other than as expressly permitted under this Agreement and in particular, CEC shall have no right to operate or permit the operation of the tramway on the Premises for commercial or revenue generating purposes (save where Network Rail agree in writing that the execution and delivery of an agreement for lease is acceptable to allow such use). Nothing in the foregoing shall be construed as a warranty by Network Rail that the Premises are capable of being used for such permitted use.

12.10.4 CEC shall not be entitled to assign the right to occupy and use the Premises hereby granted to any other party, provided that **tie**, the Infraco and any Sub-Contractor shall be entitled to occupy and use the Premises for the purposes permitted under this Agreement.

12.11 Subject to Network Rail using all reasonable endeavours to mitigate any loss, CEC binds and obliges itself to indemnify and keep Network Rail indemnified from legal liability in respect of all claims and expenses of whatever nature at the instance of third parties (including liability for death or personal injury and liabilities arising out of statutory duty) arising in any way directly or indirectly out of, the state of repair or

condition of, or the existence of any alteration to, or of the occupancy or use of the Premises or the exercise of any of the rights under Clause 12.10 or any act, failure, negligence or omission of CEC or its agents or employees, contractors or operators and from and against all proceedings, costs and demands of whatever nature in respect of such liability or alleged liability.

13. VARIATIONS

13.1 If, prior to Completion of the Works either Network Rail or CEC (or **tie** acting on CEC's behalf) reasonably believes that a Mandatory Variation is required, it shall notify the other Party of that fact, together with full details of the reason why it believes that a Mandatory Variation is required. Within 18 Working Days of the receipt of such written notice, the recipient shall either:

13.1.1 notify the other Party that the recipient agrees such Mandatory Variation is required; or

13.1.2 notify the other Party of any reason why the recipient does not believe such Mandatory Variation is required (and in such case the Party believing that a Mandatory Variation is required may refer the matter to the Dispute Resolution Procedure).

13.2 Following a notice under Clause 13.1.1 or where it has been determined under the Dispute Resolution Procedure that a Mandatory Variation is required:

13.2.1 CEC shall notify, or shall procure that **tie** notifies, Network Rail of the steps that they and the Contractor propose to take to implement the Mandatory Variation and details of any Necessary Consents that must be amended for the Mandatory Variation to be implemented;

13.2.2 within 15 Working Days of CEC's notice under Clause 13.2.1, Network Rail shall either:

13.2.2.1 notify **tie** that it objects to the steps that CEC (or **tie** on CEC's behalf) proposes to take to implement the Mandatory Variation on the grounds that such steps will not comply with the Specific Change in Law or the Change in Standards giving rise to the Mandatory Variation; or

13.2.2.2 notify **tie** that it has no objection to the steps that CEC (or **tie** on CEC's behalf) proposes to take to implement the Mandatory Variation;

13.2.3 Following a notice by Network Rail under Clause 13.2.2.2, Network Rail and CEC (or **tie** on CEC's behalf) shall promptly meet and seek to agree the matters listed in Clauses 13.8.1 to 13.8.4 insofar as they arise from the Mandatory Variation;

13.2.4 Upon agreement or determination of the matters referred to in Clause 13.2.3, Network Rail and CEC (or **tie** on CEC's behalf) shall confirm in writing that they agree to the implementation of the Mandatory Variation in accordance with such agreement or determination (subject to obtaining or amending any Necessary Consents).

13.2.5 Subject to Clauses 13.10 and 14.1.2, CEC shall be responsible for all costs incurred as a consequence of the Mandatory Variation and of implementing the Mandatory Variation.

13.3 Without prejudice to Clause 13.1, at any time prior to the Completion of the Works either Network Rail or CEC (or **tie** acting on CEC's behalf) may issue a request for a Variation (**"Variation Request"**). Where the Party making the request is CEC or **tie** the request shall be issued to Network Rail and where the Party making the request is Network Rail the request shall be issued to **tie**. The Variation Request shall state that the Party making the request will be responsible for funding the Variation, except where Network Rail are making a request which is required in any event in order to deliver the desired functionality in relation to the Edinburgh Tram Network. Any Variation Request may be withdrawn by the requesting Party at any time prior to:

13.3.1 the agreement or determination of all matters set out in Clause 13.8 below; or

13.3.2 if the proposed Variation requires the obtaining of, or an amendment to, any Necessary Consent, the date when the last such Necessary Consent is obtained or amended

whichever shall be later. If the requesting Party is Network Rail and it withdraws a Variation Request, it shall reimburse CEC and/or **tie** for all Direct Costs reasonably and properly incurred by CEC and/or **tie** in relation to the proposed Variation prior to

its withdrawal. If the requesting Party is CEC or **tie** and it withdraws a Variation Request, CEC shall reimburse Network Rail for all Direct Costs reasonably and properly incurred by Network Rail in relation to the proposed Variation prior to its withdrawal.

13.4 **tie** and CEC shall include the following information in any Variation Request that either issues:

13.4.1 the steps that **tie**, CEC, and the relevant Contractor propose to take to implement the proposed Variation; and

13.4.2 details of any Necessary Consent that must be obtained or amended for the proposed Variation to be implemented.

13.5 Any Variations considered by **tie** or CEC (acting reasonably) not to be of a material nature and which are valued at less than £25,000 shall be communicated to Network Rail by a Variation Request in advance of the Variation being effected, and if Network Rail are unable to provide a full and final response to the Variation Request within three Working Days, it may be effected by **tie** or CEC and then retrospective approval given in writing by Network Rail as soon as reasonably practicable thereafter (and if Network Rail retrospectively object to such Variation on the grounds set out in Clause 13.6.1 within 15 Working Days of it being communicated to them, **tie** or CEC shall undertake rectification works to Network Rail's reasonable satisfaction at CEC's cost).

13.6 Subject to Clause 13.5, within 18 Working Days of the receipt of a Variation Request (or such longer period as may be agreed by Network Rail and CEC (or **tie** on CEC's behalf) acting reasonably), the recipient shall either:

13.6.1 where the recipient is CEC or **tie**, notify Network Rail, and where the recipient is Network Rail notify **tie**, that it objects to the proposed Variation on one or more of the following grounds:

13.6.1.1 that the implementation of the Variation:

(a) would infringe any law or existing contractual obligation;

(b) would cause any existing Necessary Consent (which is not capable of modification) to be revoked; or

(c) would require a new Necessary Consent, which the recipient (using all reasonable endeavours) cannot obtain;

13.6.1.2 that the proposed Variation, if implemented, would result in a change to the essential nature of the Works;

13.6.1.3 (in the case of Variations proposed by Network Rail which are not required in any event in order to deliver the desired functionality in relation to the Edinburgh Tram Network) that the proposed Variation, if implemented, would increase the anticipated cost of the Works by more than 2% (unless Network Rail has given an undertaking to meet any additional costs) and/or have a material adverse impact on the timetable for carrying out the Works under this Agreement; or

13.6.1.4 that the information contained in the Variation Request is inadequate to enable the recipient to respond;

13.6.2 where the recipient is CEC or **tie**, notify Network Rail, and where the recipient is Network Rail notify **tie**, that it has no objection in principle to the proposed Variation and give details of any new or modified Necessary Consent for which the recipient is responsible and its reasonable assessment of the date this will be obtained.

13.7 If CEC or **tie** notifies Network Rail in accordance with Clause 13.6.2, it shall within a further 15 Working Days (or such longer period as may be agreed by Network Rail and CEC (or **tie** on CEC's behalf) acting reasonably) notify Network Rail of its estimated Direct Costs in relation to the proposed Variation and the matters referred to in Clause 13.4. If Network Rail notifies **tie** in accordance with Clause 13.6.2, it shall within a further 15 Working Days (or such longer period as may be agreed by Network Rail and CEC (or **tie** on CEC's behalf) acting reasonably) notify **tie** of its estimated Direct Costs in relation to the proposed Variation.

13.8 Following the issue of a notice by a Party pursuant to Clause 13.6.2, Network Rail and CEC (or **tie** on CEC's behalf) shall promptly meet and seek to agree the following matters:

13.8.1 any alteration to the Works Programme (in accordance with Clause 8 (*Programming of Works and Obtaining Possessions*)) and/or the projected date for completion of the Works;

13.8.2 the requirement for any additional Possessions;

13.8.3 the impact on the Direct Costs of CEC, **tie**, affected Contractors and Network Rail in respect of the implementation of the proposed Variation (which may be a positive or negative value); and

13.8.4 the terms of any amendment to the Works Requirements in order to give effect to the Variation and/or the amendment of the as-built drawings and specifications,

provided that such a meeting shall not be required in respect of a Variation under Clause 13.5 unless reasonably requested by Network Rail or CEC (or **tie** on CEC's behalf).

13.9 Upon the agreement or determination of all the matters referred to in Clause 13.8, Network Rail and CEC (or **tie** on CEC's behalf) shall confirm in writing that they agree to the implementation of the Variation in accordance with such agreement or determination (subject to obtaining or amending any Necessary Consents as identified in accordance with Clause 13.4.2 or 13.6.2).

13.10 CEC shall, or shall procure that **tie** shall, reimburse Network Rail for all Direct Costs which Network Rail incurs in connection with any Variation, provided that:

13.10.1 neither **tie** nor CEC shall be liable for any costs which Network Rail incurs in connection with any Mandatory Variation;

13.10.2 neither **tie** nor CEC shall be liable to make any payment in respect of any Variation to the extent that such Variation is necessary due to any Existing Asset Obligation;

13.10.3 if and to the extent that the costs for any part of the Works have already been included in Network Rail's Business Plan (and approved for the Works by or on behalf of Network Rail's Board) for the financial year in which such works are actually carried out (or any earlier financial year), neither **tie** nor CEC shall be liable to make any payment in respect of such part of the Works;

13.10.4 if and to the extent that such costs have already been included in Network Rail's Business Plan (and approved for the Works by or on behalf of Network Rail's Board) for a financial year later than that in which the relevant part of the Works are actually carried out, CEC (or **tie** on CEC's behalf) shall only be liable to pay the financing expenses incurred by Network Rail in respect of such part of the Works, such expenses to be calculated at the Interest Rate for the period from the date such costs are actually incurred up to the first day of the Network Rail financial year in which such costs were forecast to have been incurred;

13.10.5 neither **tie** nor CEC shall be liable in respect of any costs relating to any Variation proposed by Network Rail except where Network Rail can reasonably demonstrate that the Variation is required in order to deliver the desired functionality in relation to the Edinburgh Tram Network or where the costs are otherwise dealt with in accordance with Clause 13.2; and

13.10.6 neither **tie** nor CEC shall be liable in respect of any costs which result from Network Rail failing to comply with Clause 5.4.

13.11 Subject to Clause 13.2, Network Rail shall reimburse **tie** and CEC for all Direct Costs which **tie** or CEC incurs in connection with any Variation proposed by Network Rail which Network Rail cannot, or do not seek to, reasonably demonstrate is required in order to deliver the desired functionality in relation to the Works.

13.12 Where a Variation or Mandatory Variation requires that additional Works are required in respect of a Sector for which Sector Completion has been certified, the Parties shall comply with the procedure set out in Clause 11.4 so that Sector Completion can be certified by Network Rail to be compliant with the Variation or Mandatory Variation;

13.13 If agreement on any matter under this Clause 13 (*Variations*) is not reached within a reasonable period of time, Network Rail or CEC (or **tie** on CEC's behalf) may refer any matter for resolution in accordance with the Dispute Resolution Procedure.

14. COMPENSATION AND RELIEF

14.1 CEC and **tie** shall(without double counting) be:

14.1.1 entitled to claim compensation for additional Direct Costs reasonably incurred by **tie** or CEC as a result of any delay or disruption to the Works Programme to the extent that such delay is a result of any event described under this Clause 14.1 (**"Relief Event"**) (but only to the extent that such additional Direct Costs relate to the Works, and excluding for the avoidance of doubt, any Direct Costs arising as a consequence of any such delay or disruption to the remainder of the Edinburgh Tram Network); and

14.1.2 relieved from their obligation to pay additional Network Rail Costs incurred

if any of the following Relief Events occurs:

(1) Network Rail takes or requires any action to be taken pursuant to Clause 10.2;

(2) any delay to the Works is caused by a Network Operation Issue (or would have been caused in the absence of remedial action taken by CEC or **tie** to avoid any such delay);

(3) any works contractor on any Interfacing Project:

(a) interferes with, hinders or obstructs a Contractor from carrying out the Works in accordance with the Works Programme; or

(b) prevents, hinders or obstructs a Contractor in respect of its access to the Works and/or the Network

provided that CEC and **tie** (to the extent such responsibilities have been delegated to **tie**) has carried out its responsibilities under Clause 9.6 in accordance with Good Industry Practice;

(4) any Booked Possession is cancelled or altered (including as a result of any default by any Operator); or

(5) a Mandatory Variation is implemented in accordance with Clause 13 (*Variations*)

provided that such additional costs exceed £10,000 in aggregate in respect of the relevant Relief Event. Neither CEC nor **tie** shall (in respect of both CEC and **tie** together) be entitled to such compensation or relief to the extent that any delay or cost incurred is due to the negligence, breach or default of either of them, or the breach or default of any Contractor under any Works Contract(and for the avoidance of doubt CEC and **tie** shall be responsible for the negligence, breach or default of each other). In the case of a claim in respect of paragraph (4) which arises out of Network Rail's breach of this Agreement, compensation for Direct Costs shall be included in the calculation of Network Rail's maximum aggregate liability under Clause 19.4. If Network Rail is able to recover compensation from a third party in relation to any of the events described in paragraphs (1) to (5) above, it shall account to **tie** and/or CEC (as appropriate) for all such compensation so received (to the extent that such compensation relates to CEC's or **tie**'s direct costs).

14.2 CEC shall procure that **tie** shall:

14.2.1 as soon as reasonably practicable, and in any event by the Notification Date (as defined below) notify Network Rail of the relevant Relief Event including:

14.2.1.1 details of all Direct Costs claimed by each of CEC and **tie** (including evidence, on an open book basis, of the calculation of the Direct Costs);

14.2.1.2 any relief claimed in respect of each of CEC's and **tie**'s obligations under this Agreement; and

14.2.1.3 a revised Works Programme under Clause 8 (*Programming of Works and Obtaining Possessions*) (if appropriate); and

14.2.2 provide evidence to Network Rail that:

14.2.2.1 the Relief Event was the cause of the Direct Costs and/or any delay in the progress of the Works; and

14.2.2.2 the Direct Costs, time lost and relief from the obligations under this Agreement claimed (as the case may be) could not reasonably be expected to be mitigated or recovered by the affected Contractor and its sub-contractors acting in accordance with Good Industry Practice.

14.3 If CEC fails to give or to procure that Network Rail is given written notice of the claim by CEC and **tie** by the Notification Date, neither **tie** nor CEC shall be entitled to claim compensation or relief in respect of that Relief Event. For the purposes of this Clause 14.3, "**Notification Date**" means the date falling 30 Working Days after:

14.3.1 the relevant Relief Event has caused delay, breach of an obligation under this Agreement and/or caused a Contractor to incur costs; or

14.3.2 (if earlier) the date on which **tie,** CEC or a Contractor becomes aware (or ought reasonably to have become aware) that the Relief Event is likely to have such an effect.

14.4 Subject to Clause 14.3, in respect of each Relief Event the Parties shall agree the Direct Costs and the revised Works Programme on the basis of the details and evidence provided by CEC or **tie** pursuant to Clause 14.2, taking into account the likely effect of delay in the progress of the Works having regard to a reasonable level of ongoing programming contingency.

14.5 Promptly following the agreement (or determination pursuant to the Dispute Resolution Procedure) of the amount of the Direct Costs, CEC shall, or shall procure that **tie** shall, deliver an invoice to Network Rail and Network Rail shall pay that sum to CEC (or to **tie** if directed in writing by CEC) within 30 Working Days. Should any amount not be paid within such period (except any amount determined not to be payable pursuant to the Dispute Resolution Procedure), such amount due shall bear interest thereon at the Interest Rate from and including the due date for payment to and including the date of actual payment.

14.6 Save as set out in Clause 14.2 and without prejudice to Clause 19.5, neither Party shall have any other right or remedy whether under or in connection with this Agreement against the other for any Relief Event.

15. FORCE MAJEURE EVENTS

15.1 Subject to Clauses 15.2 to 15.6, each Party shall be relieved from liability for non-performance of its obligations under this Agreement (other than any obligation to make payment) to the extent that it is not able to perform its obligations under this Agreement by reason of a Force Majeure Event.

15.2 Each Party shall at all times following the occurrence of a Force Majeure Event:

15.2.1 take all reasonable steps to prevent and mitigate the consequences of such an event upon the performance of its obligations under this Agreement, resume performance of its obligations affected by the Force Majeure Event as soon as practicable and use all reasonable endeavours in accordance with Good Industry Practice to remedy its failure to perform; and

15.2.2 not be relieved from liability under this Agreement to the extent that it is not able to perform, or has not in fact performed, its obligations under this Agreement due to any failure to comply with its obligations under Clause 15.2.1.

15.3 On the occurrence of a Force Majeure Event, the affected Party shall (in the case of CEC or **tie**) serve notice on Network Rail or (in the case of Network Rail) serve notice on **tie**, in each case as soon as reasonably practicable and in any event within 10 Working Days of it becoming aware of the relevant Force Majeure Event. Such notification shall give sufficient details to identify the particular event claimed to be a Force Majeure Event and shall contain such relevant information relating to the failure to perform (or delay in performing) as is available, including the date of occurrence of the Force Majeure Event, the effect of the Force Majeure Event on the ability of the affected Party to perform, the action being taken in accordance with Clause 15.2.1 and an estimate of the period of time required to overcome the effects of the Force Majeure Event. The affected Party shall (in the case of CEC or **tie**) provide Network Rail or (in the case of Network Rail) provide **tie** with any further information it receives or becomes aware of which relates to the Force Majeure Event and provide an update on the estimate of the period of time required to overcome its effects.

15.4 The affected Party shall, in the case of CEC or **tie,** notify Network Rail, or, in the case of Network Rail, notify **tie**, as soon as practicable once the performance of its affected obligations can be resumed (performance to continue on the terms existing immediately prior to the occurrence of the Force Majeure Event).

15.5 As soon as practicable following the notification described in Clause 15.3, Network Rail and CEC (or **tie** on CEC's behalf) shall use all reasonable endeavours to agree appropriate terms or modifications to the Works Programme to mitigate the effects of the Force Majeure Event and to facilitate the continued performance of this

Agreement and Clause 8 (*Programming of Works and Obtaining Possessions*) shall apply in respect of any additional Possessions which are consequently agreed.

15.6 If no such terms or modifications are agreed between Network Rail and CEC (or **tie** on CEC's behalf) on or before the date falling three months after the date of the commencement of the Force Majeure Event and such Force Majeure Event is continuing or its effects remain, then Network Rail or CEC (or **tie** on CEC's behalf) may terminate this Agreement with immediate effect by written notice in the case of Network Rail, to **tie** or, in the case of CEC or **tie,** to Network Rail. Upon termination the provisions of Clause 22 (*Consequences of Termination*) shall apply.

16. INSURANCE

16.1 **tie,** on behalf of CEC, shall take out and maintain or procure that the Contractor takes out and maintains a policy of insurance (naming Network Rail as joint insured) for Construction All Risks insurance for the full reinstatement value of the Works together with design works and services (excluding the cost incurred to improve the original material, workmanship, design plan or specification) and shall maintain such policy up to and including the earlier of the date of termination of this Agreement and the date of Completion of the Works.

16.2 **tie,** on behalf of CEC, shall take out and maintain or procure that the Contractor takes out and maintains Professional Indemnity insurance of not less than £5million to cover any one claim and in the aggregate during any one period of insurance (which period shall not be more than one year) against **tie** for any negligent act, error or omission in the carrying out of the Works for a period of 12 years from Completion of the Works provided that such insurance continues to be generally available in the insurance market on commercially reasonable terms. **tie** shall ensure that all Contractors and Sub-Contractors of any tier having a design responsibility for the Works have Professional Indemnity insurance to the same value or a credit rating of no less than BBB by Standard and Poor's or equivalent.

16.3 **tie,** on behalf of CEC, shall take out and maintain or procure that the Contractor takes out and maintains Public Liability insurance (naming Network Rail as a joint insured) of not less than £155 million to cover any loss, cost, expense, liability, action, demand, claim or proceeding under any statute or at common law in respect of personal injury or material damage to any property (and shall include bodily injury,

death, disease, illness, arrest, assault, shock, mental anguish or mental injury, invasion of privacy, libel and slander) (subject to the terms of the policy) and shall maintain such policy up to and including the earlier of the date of termination of this Agreement and the date of entry into the Lease.

16.4 Whenever reasonably requested by Network Rail, CEC shall or procure that **tie** shall provide evidence to the reasonable satisfaction of Network Rail that the insurances referred to in this Clause are being maintained in accordance with provisions of this Clause, and that the credit rating of any relevant Contractor or Sub-Contractor remains equal to or greater than BBB rating by Standard and Poor's or equivalent.

17. NOT USED

18. NETWORK RAIL COSTS AND PAYMENTS TO TIE/CEC

18.1 CEC shall pay, or shall procure that **tie** shall pay, the Network Rail Costs to Network Rail in accordance with this Clause 18 (*Network Rail Costs and Payments to tie/CEC*) and Schedule Part 6 (*Network Rail costs*). The Personnel Costs (as defined in Schedule Part 6 (*Network Rail Costs*)) shall not exceed £850,000 without CEC's prior written consent (or the written consent of **tie** on CEC's behalf), except to the extent that such Personnel Costs relate to any Variation affecting an element of the Works which have passed Stage Gate 4.

18.2 Within 10 Working Days after the end of each Payment Period, Network Rail shall submit an invoice (with an attached breakdown, including any supporting information reasonably requested by **tie**) to **tie** (or to CEC if so requested in writing by **tie**) in respect of the Network Rail Costs and any other sums payable by CEC to Network Rail under this Agreement and relating to the relevant Payment Period. Subject to Clause 18.4 below, CEC shall procure that payment by CEC or by **tie** to Network Rail shall be without set-off, retention, counterclaim, abatement or any other deduction and shall be due 10 Working Days after the date of the invoice, and the final date for payment of that invoice shall be 20 Working Days from the date of the invoice.

18.3 Not later than five Working Days after the due date of the invoice, CEC shall, or shall procure that **tie** shall, give notice to Network Rail stating the amount which CEC (or **tie** on CEC's behalf) proposes to pay and the basis on which that amount is

calculated. Where no such notice is given, the amount to be paid is that stated in the invoice.

18.4 Where CEC (or **tie** on CEC's behalf) intends to withhold payments of any amount claimed by Network Rail in the invoice, notice must be given to Network Rail not later than five Working Days before the final date for payment under Clause 18.2. The notice shall state the amount to be withheld and the grounds for withholding payment.

18.5 Should any amount not be paid by the final date for payment in accordance with Clause 18.2 (except any payment determined not to be payable pursuant to the Dispute Resolution Procedure), such amount due shall bear interest thereon at the Interest Rate from and including the due date for payment to and including the date of actual payment.

18.6 Payment shall be subject to the addition of Value Added Tax at the rate currently in force at the date the application for payment is made if and where applicable on production of a Value Added Tax invoice.

18.7 If CEC is in default over payments of amounts properly due in respect of the Network Rail Costs or other amounts payable to Network Rail under this Agreement, and no notice of intention to withhold such amounts has been given pursuant to Clause 18.4, Network Rail may suspend performance of any or all of the obligations on its part in this Agreement. This right is subject to Network Rail first giving **tie** on behalf of CEC not less than five Working Days' notice of such intention and stating the grounds for suspension. The right to suspend performance shall cease once CEC makes or procures payment of the amount due.

18.8 Save to the extent otherwise expressly provided for in this Agreement, where CEC reasonably considers that it or **tie** is entitled to receive any sums from Network Rail under this Agreement, **tie** shall submit an invoice (with an attached breakdown, including any supporting information reasonably requested by Network Rail) to Network Rail in respect of the such sums payable under this Agreement and relating to the relevant Payment Period. Subject to Clause 18.10 below, payment by Network Rail to **tie** on CEC's behalf shall be without set-off, retention, counterclaim, abatement or any other deduction and shall be due 10 Working Days after the date of

the invoice, and the final date for payment of that invoice shall be 20 Working Days from the date of the invoice.

18.9 Not later than five Working Days after the due date of the invoice, Network Rail shall give notice to **tie** on CEC's behalf stating the amount which Network Rail proposes to pay and the basis on which that amount is calculated. Where no such notice is given, the amount to be paid is that stated in the invoice.

18.10 Where Network Rail intends to withhold payments of any amount claimed by CEC in the invoice, notice must be given to Network Rail to **tie** on CEC's behalf not later than five Working Days before the final date for payment under Clause 18.8. The notice shall state the amount to be withheld and the grounds for withholding payment.

18.11 Should any amount not be paid by the final date for payment in accordance with Clause 18.8 (except any payment determined not to be payable pursuant to the Dispute Resolution Procedure), such amount due shall bear interest thereon at the Interest Rate from and including the due date for payment to and including the date of actual payment.

18.12 Any payment which is properly subject to Value Added Tax shall be subject to the addition of Value Added Tax at the rate currently in force at the date the application for payment is made if and where applicable on production of a Value Added Tax invoice.

19. LIMITATION OF LIABILITY

19.1 Save as otherwise expressly provided in this Agreement, Network Rail shall not be liable to CEC or **tie**, and neither CEC nor **tie** shall be liable to Network Rail in respect of any breach of any of their respective obligations under this Agreement (other than under Clauses 6.6, 19.3, or a failure to make a payment which is otherwise properly due under this Agreement) unless the aggregate amount of all claims for which the respondent would otherwise be liable to the claimant exceeds £10,000.

19.2 Save as set out in Clauses 6.6 and 14 (*Compensation and Relief*), Network Rail shall have no liability to either **tie** or CEC for any costs or delays occasioned by:

19.2.1 the terms of or failure to obtain or receive timely Possessions, Network Rail Consents (save in respect of consents of Network Rail as landlord, to the extent under the control of Network Rail), consents, permissions, orders and approvals;

19.2.2 any reallocation by Network Rail of its resources from performing the Services if Network Rail (acting reasonably, subject to Clause 1.3.3) considers it necessary to prevent, address, alleviate or comply with (as applicable) a Network Operation Issue (provided that, in the case of a Network Operation Issue which falls within limb (f) of the definition thereof and does not fall within any other limb of the definition, the reallocation is required as a result of an emergency arising in respect of that existing contractual commitment); or

19.2.3 any delay in relation to the Works Programme

except to the extent that completion of the Works Programme is delayed by more than 60 calendar days as the result of the negligence of Network Rail or the breach by Network Rail of its obligations under this Agreement.

19.3 In the event of any such delay which is not due to a Relief Event, Network Rail's liability shall be satisfied in full by the payment of liquidated damages by Network Rail to **tie** at the rate of £2,500 per day of delay (only accruing after the period of 60 calendar days has expired). Any damages for delay shall be adjusted to the extent that the relevant delay is caused by the negligence of **tie** or CEC or the breach by **tie** or CEC of their respective obligations under this Agreement (and each of **tie** and CEC shall be responsible for the negligence and breach of the other).

19.4 Without prejudice to Clause 19.2 or 19.3, Network Rail's maximum aggregate liability to both CEC and **tie** together in respect of this Agreement shall not exceed an amount equal to the Network Rail Cap, provided that such limitation shall not apply to:

19.4.1 any liability in respect of death or personal injury resulting from the negligence of Network Rail or any person for whom Network Rail is responsible;

19.4.2 any Losses caused by the fraud or negligence of Network Rail; or

19.4.3 Network Rail's obligation to pay compensation for any Relief Event under Clause 14 (*Compensation and Relief*) except any obligation to pay compensation under Clause 14.1 Paragraph (4) which arises out of Network Rail's breach of this Agreement.

19.5 The Parties agree that damages may not be an adequate remedy for any breach of this Agreement and the Parties shall be entitled to seek the remedy of an injunction or

other equitable relief (without prejudice to Clause 1.3) provided that Network Rail shall not be required to rework any Services where:

19.5.1 Network Rail considers, at its sole discretion, that reworking the Services has potential to conflict with its statutory obligations or undertakings as network operator, including its Safety Case obligations; or

19.5.2 neither **tie** nor CEC has confirmed that it will meet the costs of any rework where such costs exceed Network Rail's limit of liability in Clause 19.4.

19.6 **tie** and CEC's aggregate liability in respect of this Agreement shall not exceed an amount equal to the CEC/**tie** Cap, provided that such limitation shall not apply to:

19.6.1 the payment obligations under Clauses 2.6, 3.6, 9.7, 11.1, 12.6, 13.3, 16 (*Insurance*), 18 (*Network Rail Costs and Payments to tie*) and 22.2 and under Schedule Part 6 (*Network Rail costs*);

19.6.2 the indemnities under Clauses 9.2.2.3, 12.11, 20.1.4 and 20.1.5;

19.6.3 any liability in respect of death or personal injury resulting from the negligence of CEC, **tie**, any Contractor or any person for whom either **tie** or CEC is responsible;

19.6.4 any Losses caused by the fraud or negligence of **tie,** CEC or any Contractor;

19.6.5 any Losses in respect of which **tie** or CEC is entitled to compensation as a result the breach or default of any Contractor under any Works Contract (or would be so entitled but for **tie**'s or CEC's own default) and for these purposes the entitlement of **tie** or CEC to recover shall be deemed not to be affected by this Clause; or

19.6.6 any Losses in respect of which **tie** or CEC is entitled to recovery from its insurers (or would be so entitled but for **tie** or CEC's own default) and for these purposes the entitlement of **tie** to recover shall be deemed not to be affected by this Clause.

19.7 CEC and **tie** shall not be liable in respect of Land and Noise Claims except as set out in Clause 20.1.8 unless:

19.7.1 the Works have been designed by CEC, **tie** or any designer appointed by CEC or **tie** (other than Network Rail); and

19.7.2 such claims arise due to breach by **tie** or CEC of Clause 7.2.

19.8 In no event shall Network Rail, CEC or **tie** be liable to one another for any loss of production, loss of profit, loss of revenue, loss of contracts, liabilities incurred under other agreements or any indirect or consequential loss arising out of or in connection with this Agreement (without prejudice to any express payment or indemnity obligation of any Party under this Agreement).

20. INDEMNITY

20.1 Subject to Clause 19.6 CEC shall indemnify Network Rail and keep Network Rail indemnified against any Losses arising from:

20.1.1 claims against Network Rail by any third party in relation to the carrying out of the Works and/or the subsequent existence and/or operation of the completed Works prior to the date of entry into the Lease (where ownership of the Works is not transferred to Network Rail);

20.1.2 any damage caused to the Network and any consequential effects on the operation of the Network arising as a result of the rights granted to CEC and/or **tie** under this Agreement;

20.1.3 any liability in respect of death or personal injury resulting from the negligence of CEC, **tie**, any Contractor or any person for whom either **tie** or CEC is responsible;

20.1.4 all reasonable costs, charges, and expenses incurred in respect of the effect of electromagnetic interference from the Edinburgh Tram Network on the Network during and after construction of the Works ;

20.1.5 all monies, claims and costs due to be paid by Network Rail to any competent party under the Depot Access Conditions, the Station Access Conditions, any Depot Access Agreement, Station Access Agreement or Track Access

Agreement, the Network Code or the Act arising as a consequence of the Edinburgh Tram Network or the Works (including any claim for compensation by any such party under or arising out of a Regulated Change);

20.1.6 any provisions of this Agreement being, or being alleged to be, void, voidable, unenforceable, invalid or ineffective due to lack of capacity on the part of CEC or **tie**;

20.1.7 CEC or **tie** or any of its employees, agents or sub-contractors infringing or being held to have infringed any intellectual property rights in the course of or in connection with this Agreement; or

20.1.8 any Land or Noise Claim (in the case of claims relating to the Network, only up to the Land Compensation Limit).

In respect of any Losses subject to the indemnity in this Clause 20.1, Network Rail shall take all reasonable steps to prevent, mitigate and restrict the circumstances which have given or may give rise to such Losses.

20.2 Network Rail, upon becoming aware of any claim in respect of which it may be entitled to indemnification under Clause 20.1, shall give written notice to CEC as soon as reasonably practicable, and in any event within 15 Working Days of it reasonably appearing that Network Rail may be entitled to indemnification pursuant to this Clause.

20.3 Subject to Network Rail obtaining the prior written consent of its insurers, CEC shall be entitled to resist any such claim in the name of Network Rail and shall have the right to conduct any defence, dispute, compromise or appeal of such claim or negotiations. Network Rail shall give CEC all reasonable co-operation, access and assistance for the purpose of considering and resisting such claim.

20.4 Where CEC is responsible for conducting any claim pursuant to Clause 20.3, it shall keep Network Rail fully informed and consult with it about the conduct of such claim and shall not pay or settle such claim without the consent of Network Rail, provided that Network Rail shall be entitled to pay or settle any claim on such terms as it in its absolute discretion considers fit without prejudice to any other rights or remedies Network Rail may have if:

20.4.1 CEC fails to notify Network Rail of its intention to dispute any claim within 15 Working Days after receipt of the notice referred to in Clause 20.2;

20.4.2 CEC fails to comply in any material respect with the provisions of this Clause 20; or

20.4.3 Network Rail waives the indemnity contained in this Clause 20 by notice in writing to CEC.

20.5 The obligations of CEC under Clause 20.1:

20.5.1 are, subject to Clause 20.6, in addition to and not in substitution for any other indemnity, guarantee or any security which Network Rail may at any time hold; and

20.5.2 may, subject to Clause 27.8 be enforced by Network Rail at its discretion without first having recourse to any other such indemnity, guarantee or security, without taking any steps or proceedings against CEC or any other person, and without resorting to any other means of payment.

20.6 To the extent that a PPA Indemnity includes Losses which arise prior to the date of entry into the Lease and for which recovery by Network Rail under this Agreement is available (or would be available but for the application of the CEC/**tie** Cap or the exceptions expressly specified in this Agreement), the provisions of this Agreement shall supersede the PPA Indemnity and the PPA Indemnity shall not apply to those Losses; provided that, for the avoidance of doubt, in respect of all Losses which arise on or after the date of entry into the Lease and all Losses for which recovery by Network Rail under this Agreement is not available (other than as a consequence of the application of the CEC/**tie** Cap or the exceptions expressly specified in this Agreement) each PPA Indemnity shall remain in full force and effect.

21. TERMINATION

21.1 In this Clause a **"Customer Termination Event"** means:

21.1.1 a material breach of this Agreement by **tie** or CEC;

21.1.2 CEC (or **tie** on CEC's behalf) failing to obtain any approval or consent required from Network Rail under the terms of this Agreement (save where such approval or consent is expressed not to be unreasonably withheld or delayed and is so withheld or delayed by Network Rail, or where such failure can be remedied by CEC, or where there is an outstanding appeal);

21.1.3 CEC (or **tie** on CEC's behalf) failing to commence construction of the Works within 12 months from the Commencement Date (other than due to the breach by Network Rail of its obligation under Clause 5.4);

21.1.4 abandonment of the whole or any part of the Works by CEC (or **tie** on CEC's behalf) at any time after commencement of the carrying out of the Works for a period of at least 15 Working Days; or

21.1.5 (save in relation to a disputed payment in respect of which a notice of intention to withhold payment has been given pursuant to Clause 18.4) CEC (or **tie** on CEC's behalf) failing to pay Network Rail any sum in excess of £10,000 which is payable to Network Rail under this Agreement.

21.2 In the event of a Customer Termination Event, Network Rail may inform **tie** and CEC by notice (**"First Notice"**) providing full details of the Customer Termination Event. If within 20 Working Days of receipt of the First Notice CEC does not take satisfactory steps to rectify the Customer Termination Event, Network Rail may by a further notice (**"Second Notice"**) terminate this Agreement. Any termination pursuant to the Second Notice shall become effective on a date to be specified therein, not being more than 20 Working Days after the date of service of the Second Notice.

21.3 If the Customer Termination Event is not (in the reasonable opinion of Network Rail) capable of being rectified, Network Rail shall in the First Notice terminate this Agreement without being required to serve a Second Notice, provided that the First Notice shall in such case state that the termination is being made without any further notice being served.

21.4 If CEC or **tie** becomes Insolvent, Network Rail shall be entitled by notice in writing to CEC and **tie** to terminate this Agreement with immediate effect and if Network Rail becomes Insolvent, CEC (or **tie** on CEC's behalf) shall be entitled by notice in writing to Network Rail to terminate this Agreement with immediate effect.

21.5 If there is a material breach of this Agreement by Network Rail, CEC may inform Network Rail by notice ("**First Notice**") providing full details of such breach. If within 20 Working Days of receipt of the First Notice Network Rail does not take satisfactory steps to rectify such breach, CEC may by a further notice ("**Second Notice**") terminate this Agreement. Any termination pursuant to the Second Notice shall become effective on a date to be specified therein, not being more than 20 Working Days after the date of service of the Second Notice.

21.6 If the breach by Network Rail is not (in the reasonable opinion of CEC) capable of being rectified, CEC may in the First Notice terminate this Agreement without being required to serve a Second Notice provided that the First Notice shall in such case state that the termination is being made without any further notice being served.

21.7 If the whole or substantially the whole of the Works is suspended otherwise than:

21.7.1 as a result of a material breach of this Agreement by Network Rail; or

21.7.2 in circumstances where Clause 10.3 or 15.1 applies;

and that suspension continues for an uninterrupted period of three months or in aggregate for a period of six months, Network Rail shall be permitted to give notice to **tie** and CEC of its intention to terminate this Agreement. If the performance of the Works has not been resumed on or before the expiry of 20 Working Days after delivery of such notice, Network Rail shall be permitted to terminate this Agreement with immediate effect by further notice in writing to **tie** and CEC, provided such failure to resume the performance of the Works is not due to the circumstances set out in Clauses 21.7.1 or 21.7.2 above.

22. CONSEQUENCES OF TERMINATION

22.1 Upon termination of this Agreement the obligations of the Parties under this Agreement shall cease except for:

22.1.1 any obligations arising as a result of any antecedent breach of this Agreement or any accrued rights;

22.1.2 any obligation on the part of CEC or **tie** to pay Network Rail any sum payable to it under this Agreement or to indemnify Network Rail and keep Network Rail indemnified pursuant to any indemnity contained in this Agreement; and

22.1.3 Clauses 19 (*Limitation of Liability*), 22 (*Consequences of Termination*) and 23 (*Confidentiality*) along with any other Clauses of or Schedules to this Agreement which are necessary to give effect to them.

22.2 Subject to Clause 22.3, if this Agreement is terminated and the Works (or part thereof) have not been completed, CEC agrees to pay Network Rail within 20 Working Days of demand in writing to **tie** the costs and expenses incurred by Network Rail in removing all plant, equipment and those materials not incorporated into the Works and:

22.2.1 in reinstating or procuring the reinstatement of the Works (or such part or Sector thereof as may be required by Network Rail and which exists as at the date of termination) and the relevant part or parts of the Railway affected by the Works; or

22.2.2 completing the Works in whole or in respect of a Sector or part thereof,

to the extent necessary to make the same safe and/or secure and enable Network Rail to meet its contractual, statutory and Network Licence obligations. If so requested by Network Rail, CEC (or **tie** on CEC's behalf) shall give reasonable assistance to Network Rail in relation to making good the Site. Network Rail shall account to CEC for the value of any unused materials so removed.

22.3 CEC will not be liable to make any payment under Clause 22.2 where termination is due to Network Rail's insolvency under Clause 21.4 or default under Clause 21.5 or a Force Majeure Event under Clause 15.6.

22.4 Save as set out in Clauses 22.1 and 22.2 neither Party shall be entitled to any payment or compensation or other rights or remedies in respect of loss of profits, revenue or goodwill in connection with the termination of this Agreement for any cause whatsoever.

23. CONFIDENTIALITY

23.1 Subject to Clauses 23.2 and 23.5 the Parties shall:

23.1.1 at all times keep all Confidential Information confidential to the Party receiving it and shall not disclose such Confidential Information to any other person; and

23.1.2 procure that its Affiliates and its/their respective officers, employees and agents shall keep confidential and not disclose to any person any Confidential Information

except in the case of disclosure by Network Rail, with **tie**'s prior written consent, and in the case of disclosure by CEC or **tie**, with Network Rail's prior written consent.

23.2 Each Party shall, without the prior written consent of the other Parties, be entitled to disclose Confidential Information:

23.2.1 that is reasonably required by that Party in the performance of its obligations pursuant to this Agreement, including the disclosure of any Confidential Information to any employee, consultant, agent, officer, sub-contractor (of any tier) or adviser to the extent necessary to enable that Party to perform its obligations under this Agreement;

23.2.2 to enable a determination to be made under the Dispute Resolution Procedure;

23.2.3 to its lenders or their professional advisers, any rating agencies, or its insurance advisers but only to the extent reasonably necessary to enable a decision to be taken on the proposal;

23.2.4 to the extent required by the Act or any other applicable Legal Requirement or pursuant to an order of any court of competent jurisdiction, any parliamentary obligation or the rules of any stock exchange or governmental or regulatory authority having the force of law;

23.2.5 to register or record any Necessary Consents and to effect any property registration that may be required;

23.2.6 for the purpose of the examination and certification of any Party's accounts;

23.2.7 in relation to disclosure by Network Rail, in order to fulfil its Network Licence obligations or assist in the planning or execution of other maintenance, renewal or enhancement projects;

23.2.8 to the Health and Safety Executive;

23.2.9 to CEC;

23.2.10 to any Affiliate of either party; or

23.2.11 to the extent it has become available to the public other than as a result of any breach of an obligation of confidence;

provided that any such disclosure is made in good faith.

23.3 Where disclosure is permitted under Clauses 23.2.1, 23.2.3 23.2.9 or 23.2.10, the Party making such disclosure shall ensure that the recipient of the information is subject to the same obligation of confidentiality as that contained in this Agreement.

23.4 Subject to Clauses 23.2.3 to 23.2.8 (inclusive) and 23.2.11, no Party shall make use of any information arising out of the Works issued or provided by or on behalf of another Party in connection with this Agreement otherwise than for the purposes of this Agreement, except with the prior written consent of the Party by whom or on whose behalf the information was provided.

23.5 Nothing in this Clause 23 shall be deemed to prohibit, prevent or hinder, or render either Party liable for, the disclosure of any information by that Party to the ORR, the Parliamentary Commissioner for Administration, a Minister of the Crown, the Scottish Ministers, or any department of the Government of the United Kingdom, the European Commission, Parliament, the Scottish Parliament, the National Assembly of Wales, the Mayor of London, the Greater London Authority or any department or officer of any of them or of information which is otherwise disclosed for the purpose of facilitating the carrying out of its functions.

23.6 The Parties acknowledge that:

23.6.1 pursuant to the provisions of section 1(1) of the Freedom of Information Act 2000 and section 1(1) of the Freedom of Information (Scotland) Act 2002, all regulations made under them, and the Environmental Information Regulations 2004 and the Environmental Information (Scotland) Regulations 2004, and any amendment or re-enactment of any of them issued by the information Commissioner, the Department for Constitutional Affairs, and DEFRA in relation to such legislation (the "**Information Acts**"), any person has a right to request information in any form from any of the other Parties who is or becomes a public authority under the Information Acts (for the purpose of this Clause 23.6 a "**Public Authority**");

23.6.2 a Public Authority has a duty (to the extent required by and subject to any exemptions in the Information Acts) to disclose the information requested and subsequently to communicate it to the person making the request; and

23.6.3 the publication scheme which a Public Authority is required to adopt and maintain under the Information Acts may refer to information relating to the Works or disclosed in tendering for, the negotiation of, or pursuant to this Agreement ("**Project Information**").

23.7 In the event that a Public Authority receives a request under the Information Acts relating to Project Information, it shall comply with such a request in accordance with the Information Acts and any applicable code of practice made thereunder provided that:

23.7.1 the Public Authority shall comply with any such request only if none of the exemptions from disclosure in the Information Acts applies and the other Party shall provide reasonable assistance and co-operation to the Public Authority to enable the Public Authority to comply with such request; and

23.7.2 in the event that a Public Authority is in doubt whether any such exemption applies, it shall inform the other Party of the request as soon as possible and shall consult with the other Party as to the potential application of any exemption;

23.7.3 the Public Authority shall inform the other Party of any Project Information it has disclosed as soon as possible after such disclosure; and

23.7.4 if the request relates to Confidential Information the Public Authority shall, where practicable, consult with the other Party in advance of making any disclosure under the Information Acts and shall, acting reasonably, take due account of all reasonable representations by the other Party that such Confidential Information is exempt information.

23.8 For the purposes of section 43(2) of the Information Act, the Public Authority acknowledges and agrees that the disclosure by it of any commercially sensitive Project Information is likely to prejudice the commercial interests of the Parties.

23.9 If this Agreement is terminated, each Party shall:

23.9.1 return to the others all of the Confidential Information then within its possession or control; or

23.9.2 destroy such Confidential Information using a secure and confidential method of destruction; or

23.9.3 unless reasonably requested to return it, retain such Confidential Information but so that the Party in question shall only be required to return any such information if it can readily identify and locate such information. If a Party elects to retain any such Confidential Information the provisions of this Clause 23 shall remain in full force and effect in relation to such Confidential Information notwithstanding the termination of this Agreement.

23.10 Save as required by law or regulation, no Party shall issue any press release in relation to the matters contemplated by this Agreement without, in the case of issue by Network Rail, the prior written consent of **tie**, and in the case of issue by CEC or **tie**, the prior written consent of Network Rail (such consent in each case not to be unreasonably withheld or delayed) as to both the content and the timing of the issue of the press release.

24. DISPUTE RESOLUTION

24.1 The Parties agree that this Clause 24 (*Dispute Resolution*) shall have effect for the resolution of any Dispute.

24.2 Any Dispute shall, in the first instance, be referred to the internal resolution procedure (the "**Internal Resolution Procedure**") in accordance with Clause 24.5.

24.3 None of the Parties shall commence any court proceedings until the Dispute Resolution Procedure has been completed, under exception that the Dispute Resolution Procedure shall not apply so as to prevent any of the Parties seeking an interim order, or interim relief, in the Scottish courts.

24.4 Subject to CEC's discretionary rights set out in paragraph 1.42 to paragraph 1.44 of Schedule Part 9 require that a Dispute and a Related Dispute (as defined in paragraph 1.42) be dealt with together at an appropriate stage of the Dispute Resolution Procedure, the provisions of this Clause 24 and the Dispute Resolution Procedure are mandatory and binding upon the Parties.

24.5 The following procedure is the Internal Resolution Procedure referred to in Clause 23.2:

24.5.1 in the event of any Dispute arising, the representatives of the Parties shall seek to resolve the Dispute at a meeting to be convened within three Working Days of written notification by one Party to the other Parties to initiate the Internal Resolution Procedure in respect of that Dispute (**"Notification"**);

24.5.2 further meetings may follow the meeting referred to in Clause 24.5.1, but in any event, if the Dispute is not resolved within seven Working Days of Notification, each Party shall, before the expiry of the period of 10 Working Days from Notification, serve a written position paper (**"Position Paper"**) upon the other Parties. Each Party's Position Paper shall state in reasonable detail that Party's position and required objectives in relation to the Dispute, any required redress, and, where possible, any comment on the position of the other Parties;

24.5.3 upon such service of the Position Paper by the Party initiating or pursuing the Dispute, the chief executive of CEC and the Regional Director (Scotland) of Network Rail (or their respective deputies in the event of their unavailability) shall seek to resolve the Dispute by meeting in good faith to discuss and negotiate upon the Dispute without recourse to legal or other proceedings;

24.5.4 in the event that resolution of the Dispute is achieved by the chief executive of CEC and the Regional Director (Scotland) of Network Rail, the resolution shall be reduced to writing and, once it is signed by the duly authorised representatives of the Parties, shall be binding on the Parties.

24.5.5 unless concluded by a written legally binding agreement, all discussions and negotiations connected with the Dispute shall be conducted in confidence and without prejudice to the rights of the Parties to the Dispute in any future legal or other proceedings, nor may such matters be produced or relied upon in evidence in any such proceedings.

24.6 Subject to the provisions of Clause 24.9, in the event that any Dispute is not resolved by the Internal Resolution Procedure within a period of 30 Working Days from Notification (or longer if so agreed by the parties) then the following provisions of this Clause 24.6 shall apply:

24.6.1 the chief executive of CEC and the Regional Director (Scotland) of Network Rail (or their respective deputies in the event of their unavailability) shall, within a further period of five Working Days, seek to agree that the Dispute shall be resolved by any one of the following procedures:

24.6.1.1 adjudication in accordance with the provisions of Schedule Part 9 in which event the Referring Party must give its Notice of Adjudication to the other parties within five Working Days of the date of expiry of the period of 35 Working Days from Notification (or longer if so agreed by the Parties); or

24.6.1.2 litigation before the Court of Session, Scotland, in which event the Summons or Petition in any such litigation shall be signetted and served within 10 Working Days of the date of expiry of the period of 35 Working Days from Notification (or longer if so agreed by the parties to the Dispute).

24.7 Subject to the provisions of Clause 24.9, in the event that the chief executive of CEC and the Regional Director (Scotland) of Network Rail (or their respective deputies in the event of their unavailability) are unable to agree that the Dispute be resolved by the procedures described in Clauses 24.6.1.1 and 24.6.1.2 , the Party initiating or pursuing the Dispute shall refer the Dispute to adjudication in accordance with Schedule Part 9 (*Adjudication Procedure*).

24.8 In the event that a Party refers a Dispute to adjudication, whether in pursuance of the exercise of a statutory right available to it (if any) under the Housing Grants Construction & Regeneration Act 1996 or otherwise, to raise adjudication

proceedings, such adjudication shall be conducted in accordance with the Adjudication Procedure.

24.9 Any Dispute concerning the interpretation of the occurrence of "Safety Critical Event", "Operational Emergency" and/or "efficient operation of the Railway" shall not be subject to the Adjudication Procedure but may be referred to the ORR for determination.

25. NOTICES

25.1 Any notice, objection or communication to be given under this Agreement shall be in writing and shall be duly given if signed by a duly authorised person on behalf of the Party giving such notice, objection or communication and delivered by hand, by first class post or by facsimile transmission to the relevant address or facsimile number set out in Schedule Part 7 (*Notice Details*).

25.2 Any Party shall be entitled to amend in any respect the communication particulars which relate to it and which are set out in Schedule Part 7 (*Notice Details*). Any such amendment shall be made only by notice given to the other Parties in accordance with this Clause 24 (*Dispute Resolution*).

25.3 Notices, objections or communications given under this Agreement shall be deemed to have been received as follows:

25.3.1 if sent by hand or by recorded delivery, at the time of delivery (and for the purpose of this Clause 25 delivery by hand shall include delivery by a reputable firm of couriers);

25.3.2 if sent by prepaid first class post, from and to any place within the United Kingdom, two Working Days after posting unless otherwise proven; and

25.3.3 if sent by facsimile before 5.00pm on a Working Day, upon sending (subject to confirmation of uninterrupted transmission by a transmission report), and in any other case at 9.00pm hours on the first Working Day following the day of transmission.

25.4 If in Schedule Part 7 (*Notice details*) there is specified any person to whom copies of notices shall also be sent the Party serving a notice shall send a copy of the notice in question to such person at the address for serving copies as specified in Schedule Part

7 (*Notice details*). Such copy notice shall be sent at the same time as the original notice.

26. AUTHORITY OF TIE AND CEC'S RESPONSIBILITIES

26.1 CEC and **tie** each warrant to Network Rail that **tie** has full authority to act on behalf of and as agent for CEC for all purposes of this Agreement. Network Rail shall be entitled to treat any act of **tie** in connection with this Agreement as being expressly authorised by CEC and Network Rail will not be required to determine whether any express authority has been given.

26.2 CEC acknowledges and undertakes to Network Rail that **tie** is an agent for CEC and that CEC acts as principal in respect of all acts and omissions of **tie** under or in connection with this Agreement and that, as such principal it is bound by and responsible for and liable to Network Rail for all acts, omissions, negligence, breach of contract or default on the part of **tie** and is responsible as principal for the properand punctual performance of all obligations and liabilities owed to Network Rail under this Agreement, whether stated to be the obligations of CEC or **tie** (including all payment obligations, indemnities and liabilities for breach of contract).

26.3 Without prejudice to the foregoing generality, CEC acknowledges that **tie** has authority to accept notices, certifications or other written communications on its behalf and that any notices, certifications or other written communications made by Network Rail under this Agreement to **tie** shall be treated (except where this Agreement expressly provides otherwise) as valid and effective notices, certifications and/or communications to CEC.

26.4 In enforcing performance of the obligations of either CEC or **tie** under this Agreement, Network Rail shall be entitled to raise proceedings (including under the Dispute Resolution Procedure) against CEC or **tie** without the necessity in each case of Network Rail enquiring as to responsibility between CEC and **tie** for any failure to perform such obligations.

26.5 CEC and **tie** each acknowledge and undertake to Network Rail that payment by Network Rail to either or CEC or **tie** shall be treated as being in full satisfaction and discharge of the claims of both CEC and **tie** to which such payment relates.

26.6 Network Rail acknowledges and undertakes to CEC and **tie** that:

26.6.1 payment to Network Rail under any provision of this Agreement may be made by either CEC or **tie** to Network Rail and shall be treated as being in full satisfaction and discharge of the claims to which such payment relates;

26.6.2 obligations and actions expressed to be for either **tie** or CEC to execute under any provision of this Agreement may be satisfied by either CEC or **tie** and shall be treated as being in full satisfaction and discharge of such obligation as between CEC and **tie**.

27. MISCELLANEOUS

27.1 This Agreement is personal to the Parties and no Party shall assign all or any part of the benefit of, or its rights or benefits under, this Agreement without the prior written consent of the other Parties (not to be unreasonably withheld or delayed) provided that such consent shall not be required in respect of any assignation by any Party to a statutory successor of the rights, obligations and interests of such Party.

27.2 No amendment to or variation of this Agreement shall be effective unless in writing and signed by or on behalf of each Party. No general terms and conditions contained in any purchase order or other document customarily required by any Party in connection with a request for works or services shall be binding on the Parties except to the extent that such a document is signed by or on behalf of the Parties, makes specific reference to this Agreement and specifically amends the terms thereof.

27.3 Nothing in this Agreement confers or purports to confer on a third party who is not a Party to this Agreement any benefits or rights to enforce a term of this Agreement.

27.4 Subject and without prejudice to Clause 26 (*Authority of tie and CEC's responsibilities*), nothing in this Agreement shall create a partnership, association or joint venture or establish a relationship of principal and agent. CEC and **tie** shall not have any authority (unless expressly conferred in writing by virtue of this Agreement or otherwise and not revoked) to bind Network Rail as its agent or otherwise and Network Rail shall not have any authority (unless expressly conferred in writing by virtue of this Agreement or otherwise and not revoked) to bind CEC or **tie** as its agent or otherwise.

27.5 No waiver by any Party of any default or defaults by another in the observance or performance of any of the provisions of this Agreement shall operate or be construed

as a waiver of any other or further default or defaults whether of a like or different character. No failure or delay by any Party in exercising any right, power or privilege under this Agreement shall operate as a waiver thereof nor shall any single or partial exercise by that Party of any right, power or privilege preclude any further exercise thereof or the exercise of any other right, power or privilege.

27.6 If at any time any provision of this Agreement is or becomes illegal, invalid or unenforceable in any respect neither the legality, validity or enforceability of the remaining provisions nor the legality, validity or enforceability of such provisions under the law of any other jurisdiction will, in any way, be affected or impaired and the legality, validity and enforceability of the remainder of this Agreement shall not be affected.

27.7 This Agreement constitutes the entire agreement between the Parties relating to the subject matter of this Agreement and supersedes and extinguishes any prior drafts, undertakings, representations, warranties and arrangements of any nature whether in writing or oral relating to such subject matter except that the Framework Development Agreement dated 30 November 2005, the Protective Provisions Agreement, the Works Contract dated 13 and 24 March 2006, and the Development Services Agreement dated 5 December 2007 already entered into by all or any of the parties and the Framework Agreement dated on or about the date of this Agreement shall, subject to Clause 20.6, each continue in full force and effect.

27.8 Network Rail shall not be entitled to make a claim against CEC or **tie** which would, if successful, constitute double recovery for, or receive double recovery in respect of, any costs or losses for which a claim has previously been raised against either CEC or **tie** under any provision of this Agreement or those agreements referred to in Clause 27.7. Neither **tie** nor CEC, shall be entitled to make a claim against Network Rail which would, if successful, constitute double recovery for, or receive double recovery in respect of, any costs or losses for which a claim has previously been raised by either CEC or **tie** under any provision of this Agreement or those agreements referred to in Clause 27.7.

27.9 Each Party acknowledges that it has not been induced to enter into this Agreement by any representation, warranty or undertaking not expressly incorporated into it.

27.10 This Agreement shall be governed by and construed in accordance with Scots law. Save as expressly provided otherwise the Parties irrevocably agree that the Scottish courts shall have exclusive jurisdiction to settle any Disputes that may arise out of or in connection with this Agreement.

IN WITNESS WHEREOF these presents consisting of this and the preceding 80 pages together with the annexed Schedule are executed as follows:

EXECUTED for and on behalf of **NETWORK RAIL INFRASTRUCTURE LIMITED** at EDINBURGH

on 13TH MARCH 2008 by: [redacted]

Authorised Signatory [redacted]

Full Name [redacted]OWALD WILLIAM McAULAY

Witness Signature [redacted]

Full Name Allan Lawrie Mackenzie

Address Excel House 30 Semple Street

Edinburgh

EXECUTED for and on behalf of **TIE LIMITED** at EDINBURGH

on 13 MARCH 2008 by: [redacted]

Authorised Signatory [redacted]

Full Name WILLIAM GALLAGHER

Witness Signature [redacted]

Full Name ALASDAIR SIM

Address [redacted]

BURNTISLAND FIFE

EXECUTED for and on behalf of **CITY OF EDINBURGH COUNCIL** at

on 14 March 2008 by:

Authorised Signatory [redacted]

Full Name [redacted]

Witness Signature [redacted]

Full Name PHILIP WRIGHT

Address CERLING HOUSE, RUTLAND SQUARE EDINBURGH EH1 2AA

THIS IS THE SCHEDULE REFERRED TO IN THE FOREGOING ASSET PROTECTION AGREEMENT AMONG NETWORK RAIL INFRASTRUCTURE LIMITED, TIE LIMITED AND CITY OF EDINBURGH COUNCIL

SCHEDULE PART 1

Functional specification

1. Description of the works

The Works form part of the construction of the Edinburgh Tram Network running from Leith in the East to Edinburgh Airport in the West.

The Edinburgh Tram Network either runs adjacent to or crosses Network Rail Property in the section of the route from Haymarket Station to Edinburgh Park and at a discrete location to the East at Leith Walk. For the purposes of this Agreement the Works cover that section of the proposed tram route where the works in respect of that route fall within the clearance criteria detailed within Network Rail document "Requirements for Constructional Work On or Near Railway Operational Land" (October 2007).

A brief description of Works is detailed below:

- the construction of a viaduct and alteration of access and car-parking at Haymarket Station.
- Works at Haymarket Depot to alter access routes, car parking and fuelling point location.
- The design and construction of structures (bridges and retaining walls) at various locations along the route as detailed in Section 2 (Scope) below.
- Works to an existing overbridge at Leith Walk.
- The design and construction of the Edinburgh Tram Network on the north side of the East Coast North line from approximately 1 mile 440 yards to 3 miles 340 yards and to the South of the Edinburgh to Glasgow line from approximately 44 miles 130 yards to 42 miles 460 yards.
- System electrical immunisation works (but only where it is expressly agreed by Network Rail that this should form part of the Works).

2. Scope

For the purposes of project control, the Works will be divided into Sectors which will have staggered completion certificates. The main works in each Sector are described below. The tram route itself in relevant Sectors will also be included in the Works where the route falls within the clearance criteria detailed within Network Rail document "Requirements for Constructional Work On or Near Railway Operational Land" (October 2007).

These Sectors and scope of Works are as follows.

Sector A

- **Lineside Fencing**- Provision of new or altered lineside fencing at locations along the tram route where the Edinburgh Tram Network interfaces with the operational railway.

- **Lineside Access Routes**- Provision of new or altered lineside access routes at locations along the tram route where the Edinburgh Tram Network interfaces with the operational railway.

Sector B

- **Haymarket Depot** - The tram route will pass through the Haymarket Train Maintenance Depot, owned by Network Rail and currently leased to First Scotrail. Works will be required within the depot to amend carparking, access and walking routes. Depot Change arrangements will have to be progressed to facilitate this work.

Sector C

- **Haymarket Station Viaduct**- A new viaduct is to be constructed through the existing Haymarket Station carpark to carry the tram West of Haymarket Station. This will require changes to the station carpark, station access and arrangements at the station itself for taxi and other vehicular access. Station Change arrangements will have to be progressed to facilitate this work in consultation with the Train and Freight Operating Companies and other stakeholders.

Sector D

- **Russell Road Bridge-** This bridge carries the proposed tram over existing Russell Road. The bridge does not cross Network Rail Property, but is to be constructed adjacent to the existing Network Rail underbridge at Russell Road.

- **Russell Road Retaining Walls-** 2 No retaining walls will be constructed at Russell Road to the north side of Haymarket depot. The walls themselves are outwith the operational railway track area.

Sector E

- **Murrayfield Tramstop Retaining Wall-** this retaining wall is required to facilitate construction of Murrayfield Tramstop to the West of Haymarket depot.

Sector F

- **Roseburn Street Viaduct-** This bridge carries the proposed tram across Roseburn Street from the West side of Haymarket Depot to the south of Murrayfield Stadium. The bridge is adjacent to the existing Network Rail underbridge at Roseburn Street.

- **Murrayfield Stadium Retaining Walls-** two retaining walls are proposed, one adjacent to Murrayfield stadium and one adjacent to the Murrayfield training pitches. The walls are required to support the proposed tram line adjacent to the stadium and training pitches. The line of the retaining walls runs parallel to the East Coast North and Edinburgh to Glasgow train lines. The west head shunt for Haymarket depot is also affected.

- **Murrayfield Underpass-** A pedestrian underpass is to be constructed at Murrayfield. This underpass is to join up with an existing underpass which passes beneath the operational railway (on the ECN line, approximate mileage 2 miles 260 yards).

Sector G

- **Water of Leith Bridge-** This proposed structure will carry the tram over the Water of Leith and will lie to the north of and run to the existing Network Rail bridge over this waterway.

Sector H

- **Baird Drive Retaining Wall-** A retaining wall is proposed at Baird Drive adjacent the operational railway to the North of the East Coast North line.
- **Balgreen Road Retaining Wall- a** retaining wall adjacent to Balgreen Road is proposed.
- **Balgreen Road Bridge-** A new structure is proposed to carry the tram over Balgreen Road. The structure will be adjacent to and parallel with the existing rail network.
- **Balgreen Road Access Bridge-** The existing Network Rail access bridge will also be re-decked as part of the Works.

Sector I

- **Carrick Knowe Bridge-** This bridge will carry the tram from the North side of the existing railway to the south, crossing both the East Coast Main line North (at approximately 3 miles 340 yards) and the Edinburgh to Glasgow line (at 44 miles 130 yards).

Sector J

- **Saughton Road Underbridge-** modification to existing underbridge will be undertaken
- **Broomhouse Road Underbridge-** modification to existing underbridge will be undertaken.

Sector K

- **South Gyle Access Bridge-** new structure proposed at South Gyle to the East of proposed South Gyle tram stop.
- **Bankhead Drive Retaining Wall-** a new retaining wall is proposed to the North of the tram line at Bankhead Drive/ South Gyle.

Sector L

- **Edinburgh Park Bridge-** This bridge is proposed to carry the tram from the South to the North side of the Edinburgh to Glasgow railway line at approximate mileage 42 miles 460 yards.

Sector M

- **Leith Walk Railway bridge-** This is an existing structure which carries the Powderhall branch of the operational railway. The route of the tram will pass under this bridge.

Sector N

- **Network Rail System Electrical Immunisation-** the work required to mitigate the potential effects to Network Rail infrastructure of electromagnetic interference (EMI) or corrosion due to effects of coupled energy or stray current from the Edinburgh Tram traction system where it is expressly agreed by Network Rail that this work will be carried out by **tie** as part of the Works.

3. Drawings and Specifications

Drawings and specifications relevant to the above scope will be as detailed within the Works Requirements document defined in Clause 1.1 of this Agreement.

4. Programme

Specific programme dates relevant to the above scope will be submitted to Network Rail under clause 8.2 of this Agreement.

SCHEDULE PART 2

Services to be provided by Network Rail

1. Services of the Network Rail project sponsor, project management and associated support staff to support and provide guidance to **tie** during the initial stages of the Works.

2. Arrangement of third party asset management to superintend works on or near the line, including Possessions in line with the agreed Works Programme in compliance with the requirements of Network Rail Company Standard RT/LS/P/043 "Health and Safety Management of Third Party Works".

3. Administration and management of internal Network Rail procedures to consider the applications for the Network Rail Consents.

4. The appointment of a project manager and appropriate supporting resources to liaise with the project management organisation of CEC and **tie**.

5. Review of designs and work package plans with particular reference to protection of the Operational Track.

6. Provision of an agreed level of site management staff to interface with the site staff of **tie** on matters pertinent to Network Rail maintaining adherence to its statutory obligations, industry agreements and access contracts

7. Provision of site safety staff and a site safety consultant to provide safety inspection for the duration of the period of construction of the Works as notified to Network Rail by **tie** to ensure the safety and operation of the Network.

8. Provision of staff to carry out site management activities as and when reasonably required.

9. Appointment of key engineering personnel (including but not limited to a Designated Project Engineer and Project Engineers) for relevant engineering disciplines to undertake duties as and when reasonably required in compliance with applicable legislation, Technical Specifications for Interoperability (as published by the European Rail Agency), Railway Group Standards, Network Rail's Safety Management System and associated company standards and specifications.

10. Provision of asset protection services for the duration of the notified implementation period of the Works.

11. Administration of the Taking into Use procedures.

12. Administration and execution of any necessary Network Rail documentation, including but not limited to alterations to the sectional appendix, instructions to staff both maintenance and operational, or any impacts on unchanged infrastructure due to the proximity of the Edinburgh Tram Network.

13. Any additional design approvals and acceptance relevant to the Works identified under Schedule Part 4.

SCHEDULE PART 3

Network Rail requirements

1. Compliance with the requirements of Network Rail specifications NR/SP/MTC/0056 and NR/SP/MTC/0086 in respect of planning timescales for access to work on Network Rail infrastructure.
2. Compliance with Network Rail publication "Requirements for Constructional Work On or Near Railway Operational Land" (October 2007) in respect of clearances to Network Rail operational property.
3. The areas of Network Rail land that CEC/Tie intends to temporarily occupy during construction of the Works shall be restricted to those highlighted in pink on the Plans.

SCHEDULE PART 4

Network Rail approvals, acceptances and consents

Network Rail shall only be required to issue the approvals, acceptances and consents referred to in this Schedule Part 4 subject to all necessary requirements relating to the same being satisfied in full:

Part 1

Approvals and acceptances to be provided by Network Rail (subject to all necessary requirements for the approvals and/or acceptances being satisfied in full).

1. The approval of form A, form B and, where relevant, forms C and E as defined in Network Rail Company Standard NR/SP/CIV/003 or equivalent document current at the time of execution of this agreement for the following:

   1.1 Structures comprising:

   - Lineside fencing;
   - Lineside Access Routes;
   - Haymarket Station viaduct;
   - Haymarket Station car Park;
   - Russell Road bridge;
   - Russell Road retaining wall 1;
   - Russell Road retaining wall 2;
   - Carrick Knowe bridge;
   - Edinburgh Park bridge;
   - Alteration to Leith Walk railway bridge;
   - Baird Drive retaining wall;
   - Balgreen Road retaining wall;
   - Balgreen Road Bridge
   - Balgreen Road Access Bridge
   - Murrayfield Stadium retaining wall;
   - Murrayfield Training pitches retaining wall;
   - Murrayfield Tramstop Retaining Wall;
   - Roseburn Street Viaduct;
   - Alteration to Murrayfield underpass;
   - Alteration to Balgreen Road bridge;
   - South Gyle Access Bridge;
   - Bankhead Drive Retaining Wall;
   - Alteration to Water of Leith bridge;

   1.2 Embankment Stabilisation works, where relevant.

1.3 As the line through Edinburgh Haymarket station is a conventional TEN, the relevant approval shall also include consideration of the requirements of the applicable Technical Specifications for Interoperability, and the requirements for Form D, where there may be any impact on any Network Rail asset which is subject to planning constraints.

1.4 System electrical immunisation works where it is agreed by Network Rail that this should form part of the Works.

2. Approvals pursuant to Clause 2 of this Agreement.

3. Technical approval of all designs for works which have the potential to change and interface with or export risks to Network Rail's boundaries or infrastructure in accordance with applicable legislation particularly including but not limited to the Tram Acts (as defined in Clause 1.1 of this Agreement), The Health and Safety at Work etc Act 1974 (and the associated ROGS regulations, CDM Regulations and EMC regulations), and construction industry and railway industry best practice.

4. Approval of designs for structures forming part of the Works and any other part of the Works notified to CEC/**tie**.

5. Acceptance of Designer, CDM Co-ordinator, and the Principal Contractor appointed by the client under the CDM Regulations.

6. Approval of Contractor's Construction Phase Plan (as defined in the CDM Regulations).

7. Safety Verification of any alterations to Network Rail infrastructure which arise from this Agreement under its written safety verification scheme in its approved Safety Management System current at the time of execution of this Agreement.

8. Acceptance of work package plans submitted by **tie** for the Works in accordance with Standard RT/LS/P/043.

Part 2

Consents to be obtained by Network Rail (subject to all necessary requirements for the consents being satisfied in full).

1. Confirmation from other duty holders (as defined in the ROGS regulations) operating on Network Rail's network in the vicinity of the Works that they have no concerns arising both under the Network Codes, and also the Duty of Co-Operation, Regulation 22 of ROGS.

2. Provision of landlord's consent.

SCHEDULE PART 5

Part 1: Form of Infraco Collateral Warranty

THIS AGREEMENT

BETWEEN:

(1) **INFRACO** comprising of BILFINGER BERGER UK LIMITED, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London, EC1A 4EJ, and SIEMENS PLC, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir Williams Siemens House, Frimley, Camberley, Surrey, GU16 8QD (the "**Infraco**"); and

(2) **NETWORK RAIL INFRASTRUCTURE LIMITED** registered in England and Wales under company number 2904587 and having its registered office at 40 Melton Street, London NW1 2EE (**"Beneficiary"**).

WHEREAS:

A By an agreement in writing dated **[◆]** (the **"Infraco Contract"**), **tie** Limited (**"tie"**) appointed the Infraco to provide the Infraco Works (as hereinafter defined) in connection with the Edinburgh Tram Network.

B By an agreement in writing dated **[◆]** (the **"APA"**), **tie** agreed with Network Rail to ensure that certain additional terms would apply in respect of the Infraco APA Works (as hereinafter defined) in connection with the Edinburgh Tram Network.

C It is a term of the APA and the Infraco Contract that the Infraco shall enter into this Agreement with Network Rail.

NOW IT IS AGREED AS FOLLOWS:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement (including the recitals), except where the context otherwise requires, the following words and expressions shall have the following meanings:

"Edinburgh Tram Network" means the tramway which is to be designed, constructed and maintained in Edinburgh pursuant to the Infraco Contract in Phase 1a (forming part of Line One and Line Two as described in the Tram Legislation) and, if the Phase 1b option set out in the Infraco Contract is exercised, Phase 1b, or either of them (as may be amended from time to time together with any modification, line extension, spur, interconnection and any additional line which may be instructed), to be constructed in accordance with the Tram Legislation together with all associated works and facilities including all civil engineering and track works, Trams, infrastructure, plant, machinery and equipment installed or used for such tramway;

"Infraco APA Works" means that part of the works and services to be undertaken by the Infraco under the Infraco Contract which constitute the 'Works' as defined in the APA.

"Infraco Works" means the works and services to be undertaken by the Infraco under the Infraco Contract for the purpose of the Edinburgh Tram Network;

"Party" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

"Phase 1a" means Edinburgh Airport to Newhaven (inclusive), together with the Depot at Gogar and the spur at Roseburn Junction;

"Phase 1b" means Roseburn Junction to Granton Square (inclusive);

"Trams" means the tram vehicles to be provided for operation on the Edinburgh Tram Network;

"Tram Legislation" means the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006, and such other legislation relative to the Edinburgh Tram Network as may be enacted from time to time;

1.2 In this Agreement unless the context otherwise requires:

1.2.1 words importing any gender include every gender;

1.2.2 words importing the singular number only include the plural number and *vice versa*;

1.2.3 words importing persons include firms, companies and corporations and *vice versa*;

1.2.4 any reference to any statute (whether or not specifically named) shall include any statutory modification or re-enactment of it for the time being in force and any order, instrument, plan, regulation, permission and direction made or issued under it or under any statute replaced by it or deriving validity from it;

1.2.5 references to Clauses are references to the relevant Clause in this Agreement;

1.2.6 the words "include" and "including" are to be construed without limitation;

1.2.7 where any obligation is undertaken by two or more persons jointly those persons shall be jointly and severally liable in respect of that obligation (and each of Bilfinger Berger UK Limited and Siemens PLC acknowledge and agree that in enforcing performance of the Infraco's obligations under this Agreement or in taking action for breach of such obligations, the Beneficiary shall be entitled to raise proceedings or raise an action against Bilfinger Berger UK Limited and Siemens PLC or either of them jointly and/or severally) ; and

1.2.8 the headings to the Clauses are for convenience only and shall not affect the interpretation of this Agreement.

2. THE INFRACO'S OBLIGATIONS

2.1 The Infraco warrants and undertakes to the Beneficiary:

2.1.1 that in performing the Infraco APA Works it has exercised and will continue to exercise all the skill, care and diligence to be reasonably expected of an appropriately qualified and competent contractor which is experienced in carrying out projects of a similar, scope, nature, complexity and size to the Works;

2.1.2 that it has complied with and will comply with each and all of the obligations, duties and undertakings of the Infraco in relation to the Infraco APA Works under and pursuant to the Infraco Contract;

2.1.3 that it has exercised and will exercise the level of skill, care and diligence specified in clause 2.1.1 to see that on completion the Infraco APA Works will satisfy all performance specifications and requirements contained or referred to in the APA and the Infraco Contract; and

2.1.4 that the Beneficiary shall be deemed to have relied upon the Infraco's skill and judgment in respect of those matters relating to the Infraco APA Works as lie within the scope of the Infraco Contract and that the Infraco owes a duty of care in respect thereof to the Beneficiary (but not more onerous than that owed to **tie** under the Infraco Contract).

3. LIABILITY

3.1 No approvals, comments, instructions, consents, attendance at meetings relating to the Infraco APA Works or advices from the Beneficiary shall in any way relieve the Infraco from its obligations under this Agreement.

3.2 Notwithstanding anything that may be contained elsewhere in this Agreement, the Infraco shall have no greater liability (whether in quantum or in scope) to the Beneficiary than it would have had if the Beneficiary had been named as joint employer under the Infraco Contract (for the purposes of the Infraco APA Works only) provided that, in relying on this clause, the Infraco shall not be entitled to rely on any provision of the Infraco Contract which has not been disclosed to the Beneficiary prior to the date of execution of the APA.

3.3 The Infraco shall be entitled in any action or proceedings by the Beneficiary to rely on any limitation in the Infraco Contract and to raise the equivalent rights in defence of liability (except set-off and counterclaim) as it would have against **tie** under the Infraco Contract (but only to the extent that the provisions in the Infraco Contract which are relied on for such purposes have been disclosed to the Beneficiary prior to the Works Commencement Date (as defined in the APA)); Provided that the liability of the Infraco to the Beneficiary for any breach of the terms of this Agreement shall not be affected or diminished where **tie** have suffered no loss, or a loss different from the Beneficiary, by reason of such breach. The Infraco undertakes to the Beneficiary

not to contend that its liability to the Beneficiary is so affected or diminished, whether in defence of proceedings under this Agreement or otherwise.

3.4 No action or proceedings for any breach of this Agreement shall be commenced against the Infraco after the expiry of 12 years from the date of practical completion of the Infraco APA Works.

3.5 The Infraco shall not be liable to the Beneficiary (save as may be expressly provided under the Infraco Contract) for any delay in completing the Infraco APA Works.

4. INSURANCE

4.1 Except to the extent that **tie** have effected and maintained owner-controlled insurance in respect of the Infraco APA Works, the Infraco has either:

4.1.1 effected and will maintain professional indemnity insurance of not less than £5million to cover any one claim and in the aggregate during one period of insurance (which period shall not be more than one year) against the Infraco for any negligent act, error or omission in the carrying out of the Infraco APA Works for a period of 12 years from the date of the issue of the certificate of practical completion of the Works, provided that such insurance continues to be generally available in the insurance market on commercially reasonable terms; or

4.1.2 has a credit rating of no less than BBB by Standard and Poor's or the equivalent.

4.2 As and when reasonably requested to do so by the Beneficiary, the Infraco shall provide evidence to the reasonable satisfaction of the Beneficiary that the insurances referred to in this Clause are being maintained in accordance with the provisions of this Clause or that the credit rating of the Infraco remains equal to or greater than BBB rating by Standard and Poor's or the equivalent.

5. NOTICES

Any notices to be given under this Agreement shall be either delivered personally or sent by first class recorded delivery post. The address for service of the Beneficiary and of the Infraco shall be as stated in this Agreement or such other address for service as the party to be served may have previously notified in writing to the other party. A notice shall be deemed to have been served as follows:

5.1 if personally delivered, at the time of delivery; or

5.2 if posted, at the expiration of 48 hours after the envelope containing the same was delivered into the custody of the postal authorities.

In proving such service, it shall be sufficient to prove that personal delivery was made or that the envelope containing such notice was properly addressed and delivered into the custody of the postal authorities as a pre-paid first class recorded delivery letter.

6. GENERAL

6.1 The Infraco shall have no claim whatsoever against the Beneficiary in respect of any damage, loss or expense howsoever arising out of or in connection with the Infraco Contract or any amounts due to the Infraco thereunder.

6.2 Subject to written notice being served on the Infraco, the Beneficiary may assign the whole or any part of this Agreement on a maximum of two occasions without the consent of the Infraco and no further assignations shall be permitted. The whole or any part of this Agreement may also be assigned by way of security or charged without the consent of the Infraco to any mortgagee of the Beneficiary or its assignees on any number of occasions.

6.3 Nothing in this Agreement confers or purports to confer on a third party who is not a Party to this Agreement any benefits or rights to enforce a term of this Agreement.

6.4 If for any reason any Clause in this Agreement shall be found to be ineffective inoperable or unenforceable, it shall be severed and deemed to be deleted from this Agreement and in such event the remaining provisions of this Agreement shall continue to have full force and effect.

6.5 This Agreement shall be governed by and construed in accordance with the Scots law and any dispute or difference concerned with its terms shall be referred to the non-exclusive jurisdiction of the Scottish Courts.

IN WITNESS whereof these presents on this and the preceding 6 pages are executed as follows:

EXECUTED for and on behalf of		)
NETWORK RAIL INFRASTRUCTURE		)
LIMITED		)
at		)
on the	day	)
of	2008	)
by		

Director/Authorised Signatory .....

Name (block capitals) .....

Witness .....

Name (block capitals) .....

Address .....

.....

EXECUTED for and on behalf of)
BILFINGER BERGER UK LIMITED)
at)
on the day)
of 2008)
by)

Director/Authorised Signatory .....

Name (block capitals) .....

Witness .....

Name (block capitals) .....

Address .....
.....

EXECUTED for and on behalf of)
SIEMENS PLC)
at)
on the day)
of 2008)
by)

Director/Authorised Signatory .....

Name (block capitals) .....

Witness .....

Name (block capitals) .....

Address .....
.....

Part 2: Form of Collateral Warranty (non-Infraco)

THIS AGREEMENT

BETWEEN:

(1) **[CONTRACTOR/SUB-CONTRACTOR]** (company number [◆]) whose registered office is at [◆] (**"the Contractor"**) and

(2) **NETWORK RAIL INFRASTRUCTURE LIMITED** registered in England and Wales under company number 2904587 and having its registered office at 40 Melton Street, London NW1 2EE (**"Beneficiary"**).

WHEREAS:

A By an agreement in writing dated **[◆]** (the **"Contract"**), **tie** Limited (**"tie"**) appointed the Contractor to provide the Contractor APA Works (as hereinafter defined) in connection with the Edinburgh Tram Network.

B By an agreement in writing dated [◆] (the **"APA"**), **tie** agreed with Network Rail to ensure that certain additional terms would apply in respect of the Contractor APA Works (as hereinafter defined) in connection with the Edinburgh Tram Network.

C It is a term of the APA that the Network Rail may require that the Contractor shall enter into this Agreement with Network Rail.

NOW IT IS AGREED AS FOLLOWS:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement (including the recitals), except where the context otherwise requires, the following words and expressions shall have the following meanings:

"Contractor APA Works" means that part of the works and services to be undertaken by the Contractor under the Contract which constitute a part of the 'Works' as defined in the APA;

"Edinburgh Tram Network" means the tramway which is to be designed, constructed and maintained in Edinburgh in Phase 1a (forming part of Line One and Line Two as described in the Tram Legislation) and, if the Phase 1b option set out in

the Infraco Contract is exercised, Phase 1b, or either of them (as may be amended from time to time together with any modification, line extension, spur, interconnection and any additional line which may be instructed), to be constructed in accordance with the Tram Legislation together with all associated works and facilities including all civil engineering and track works, Trams, infrastructure, plant, machinery and equipment installed or used for such tramway;

"**Party**" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

"**Phase 1a**" means Edinburgh Airport to Newhaven (inclusive), together with the Depot at Gogar and the spur at Roseburn Junction;

"**Phase 1b**" means Roseburn Junction to Granton Square (inclusive);

"**Trams**" means the tram vehicles to be provided for operation on the Edinburgh Tram Network;

"**Tram Legislation**" means the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006, and such other legislation relative to the Edinburgh Tram Network as may be enacted from time to time;

1.2 In this Agreement unless the context otherwise requires:

1.2.1 words importing any gender include every gender;

1.2.2 words importing the singular number only include the plural number and *vice versa*;

1.2.3 words importing persons include firms, companies and corporations and *vice versa*;

1.2.4 any reference to any statute (whether or not specifically named) shall include any statutory modification or re-enactment of it for the time being in force and any order, instrument, plan, regulation, permission and direction made or issued under it or under any statute replaced by it or deriving validity from it;

1.2.5 references to Clauses are references to the relevant Clause in this Agreement;

1.2.6 the words "include" and "including" are to be construed without limitation;

1.2.7 where any obligation is undertaken by two or more persons jointly those persons shall be jointly and severally liable in respect of that obligation; and

1.2.8 the headings to the Clauses are for convenience only and shall not affect the interpretation of this Agreement.

2. THE CONTRACTOR'S OBLIGATIONS

2.1 The Contractor represents, warrants and undertakes to the Beneficiary:

2.1.1 that in performing the Contractor APA Works it has exercised and will continue to exercise all the skill, care and diligence to be reasonably expected of an appropriately qualified and competent contractor which is experienced in carrying out projects of a similar, scope, nature, complexity and size to the Contractor APA Works;

2.1.2 that it has complied with and will comply with each and all of the obligations, duties and undertakings of the Contractor under and pursuant to the Contract;

2.1.3 that on completion the Contractor APA Works will satisfy all performance specifications and requirements contained or referred to in the APA and the Contract; and

2.1.4 that the Beneficiary shall be deemed to have relied upon the Contractor's skill and judgment in respect of those matters relating to the Contractor APA Works as lie within the scope of the Contract and that the Contractor owes a duty of care in respect thereof to the Beneficiary (but not more onerous than that owed to **tie** under the Contract).

3. LIABILITY

3.1 No approvals, comments, instructions, consents, attendance at meetings relating to the Contractor APA Works or advices from the Beneficiary shall in any way relieve the Contractor from its obligations under this Agreement.

3.2 Notwithstanding anything that may be contained elsewhere in this Agreement, the Contractor shall have no greater liability (whether in quantum or in scope) to the Beneficiary than it would have had if the Beneficiary had been named as joint employer under the Contract (for the purposes of the Contractor APA Works only).

3.3 No action or proceedings for any breach of this Agreement shall be commenced against the Contractor after the expiry of 12 years from the date of practical completion of the Contractor APA Works.

4 INSURANCE

4.1 Except to the extent that **tie** have effected and maintained owner-controlled insurance in respect of the Contractor APA Works, the Contractor has effected and will maintain professional indemnity insurance in an amount of £◆million for each and every claim or series of claims arising out of the same event or circumstances in any one period of insurance (which period shall not be more than one year) for a period of 12 years from the date of the issue of the certificate of practical completion of the Works. As and when reasonably requested to do so by the Beneficiary, the Contractor shall produce for inspection documentary evidence that such insurance is being maintained and that payment has been made in respect of all premia due under it.

5. NOTICES

Any notices to be given under this Agreement shall be either delivered personally or sent by first class recorded delivery post. The address for service of the Beneficiary and of the Contractor shall be as stated in this Agreement or such other address for service as the party to be served may have previously notified in writing to the other party. A notice shall be deemed to have been served as follows:

5.1 if personally delivered, at the time of delivery; or

5.2 if posted, at the expiration of 48 hours after the envelope containing the same was delivered into the custody of the postal authorities.

In proving such service, it shall be sufficient to prove that personal delivery was made or that the envelope containing such notice was properly addressed and delivered into the custody of the postal authorities as a pre-paid first class recorded delivery letter.

6. GENERAL

6.1 The Contractor shall have no claim whatsoever against the Beneficiary in respect of any damage, loss or expense howsoever arising out of or in connection with the Contract or any amounts due to the Contractor thereunder.

6.2 The Beneficiary may assign the whole or any part of this Agreement on a maximum of four occasions without the consent of the Contractor. The whole or any part of this Agreement may also be assigned by way of security or charged without the consent of the Contractor to any mortgagee of the Beneficiary or its assignees on any number of occasions.

6.3 Nothing in this Agreement confers or purports to confer on a third party who is not a Party to this Agreement any benefits or rights to enforce a term of this Agreement.

6.4 If for any reason any Clause in this Agreement shall be found to be ineffective inoperable or unenforceable, it shall be severed and deemed to be deleted from this Agreement and in such event the remaining provisions of this Agreement shall continue to have full force and effect.

6.5 This Agreement shall be governed by and construed in accordance with the Scots law and any dispute or difference concerned with its terms shall be referred to the non-exclusive jurisdiction of the Scottish Courts.

IN WITNESS whereof these presents on this and the preceding [4] pages are executed as follows:

EXECUTED for and on behalf of)
NETWORK RAIL INFRASTRUCTURE)
LIMITED)
at)
on the day)
of 2008)
by

Director/Authorised Signatory .....

Name (block capitals) .....

Witness .....

Name (block capitals) .....

Address .....

.....

EXECUTED for and on behalf of		)
[CONTRACTOR]		)
at		)
on the	day	)
of	2008	)
by		)

Director/Authorised Signatory .....

Name (block capitals) .....

Witness .....

Name (block capitals) .....

Address .....

.....

SCHEDULE PART 6

Network Rail costs

1. DEFINITIONS

1.1 The following terms shall have the following meanings when used in this Schedule Part 6:

"Agency Personnel" means those personnel who have entered into a contract for services with Network Rail to provide services in connection with the Works exclusively to Network Rail;

"Agency Costs" means the cost to Network Rail of any Agency Personnel engaged in connection with the Services multiplied by 1.5, plus the properly incurred expenses and disbursements charged to Network Rail by such Agency Personnel;

"Consultants' Costs" means the costs to Network Rail of any consultants or contractors engaged by Network Rail in connection with the observance and performance of its obligations in relation to the Works, plus the properly incurred expenses and disbursements of those consultants or contractors;

"Expenses and Disbursements" means the items referred to in paragraph 2.1;

"Fee" means an amount equal to the Network Rail Fee plus the Industry Risk Fee;

"Hourly Rate" means in respect of each member of Network Rail's Personnel in any particular role band the rate set out in paragraph 3 as the same may be adjusted from time to time in accordance with paragraph 4, which rate will be payable in respect of all worked hours spent by Network Rail's Personnel in connection with the Works;

"Industry Risk Fee" means an amount equal to 2% of Forty five Million pounds sterling (£45,000,000);

"Network Rail Fee" means an amount equal to 10% of the aggregate Agency Costs, Consultants' Costs and Personnel Costs;

"Network Rail Costs" means Agency Costs, Consultants' Costs, Expenses and Disbursements, Fee, Personnel Costs, and Possessions-Related Costs, plus:

(a) costs associated with applying for or as a consequence of any Necessary Consents; and

(b) such other costs, expenses and liabilities which are properly incurred by Network Rail in respect of the performance of Network Rail's obligations in respect of the Works

to the extent that they arise from or are a consequence of the Works;

"Network Rail's Personnel" means any employees and/or officers of Network Rail;

"Personnel Costs" means the sum of the relevant Hourly Rate multiplied by the number of hours spent by each member of Network Rail's Personnel in connection with the performance of Network Rail's duties and obligations in respect of the Works; and

"Possessions-Related Costs" means sums Network Rail will be obliged to pay to any train operator pursuant to Schedules 4 and/or 8 of the relevant Track Access Agreement or, where such train operator is party to a Freight Access Agreement, the equivalent provision of that agreement, including where such sums are payable as a result of any acts or omissions of a Contractor or **tie** or CEC in relation to the Works .

2. PAYMENT OF COSTS

2.1 CEC shall or shall procure that **tie** shall pay or reimburse Network Rail in respect of all Network Rail Costs and additional expenses reasonably and properly incurred by Network Rail in relation to the Works and the Services, including:

2.1.1 printing, reproduction and purchase of documents, drawings, office consumables, maps and records;

2.1.2 travelling expenses as follows:

2.1.2.1 for journeys by train or airplane by all staff - in accordance with Network Rail's then current personnel policies;

2.1.2.2 car hire for business journeys other than home to Network Rail's offices - actual costs;

2.1.2.3 taxi fares - actual costs;

2.1.2.4 additional costs of daily travel costs from Network Rail's offices to the designated project office; and hotel and restaurant bills and other subsistence expenses associated with such travel including costs on temporary assignments to **tie**, in accordance with Network Rail's then current personnel policies;

2.1.3 all costs incurred that are associated with consultants, subcontracts and other outside services and facilities to the extent not included elsewhere within this Schedule Part 6;

2.1.4 training courses specifically for the benefit of the Works;

2.1.5 any VAT chargeable;

2.1.6 all technical, commercial, professional and legal fees, costs and disbursements in connection with the Works;

2.1.7 all legal and other costs, charges, and expenses incurred by Network Rail in connection with the preparation, negotiation and enforcement of any supplemental leases, licences and other documentation entered into by Network Rail and relating to the Works (including this Agreement);

2.1.8 any sums payable by Network Rail pursuant to Conditions G or H of the Network Code where the same arise in connection with the carrying out or completion of the Works or the subsequent operation of the completed Works and arise prior to the end of the Control Period in which the last day of the Defects Liability Period occurs; and

2.1.9 any other disbursements or expenses reasonably and properly incurred by Network Rail in connection with the Works or the Services which are not expressly set forth herein.

2.2 For the avoidance of doubt, and notwithstanding the provisions of paragraph 2.1, **tie** shall not be liable in any circumstances for any costs, expenses or disbursements

incurred by Network Rail as a result of the negligence of Network Rail or arising after the end of the Control Period in which the last day of the Defects Liability Period occurs.

3. HOURLY RATES

Banding	Non London	London
1	£104.94	£107.65
2	£77.16	£79.88
3	£57.41	£60.12
4	£40.12	£42.84
5	£32.10	£34.82
6	£25.30	£28.03
7	£20.99	£23.70
8	£16.67	£19.38

4. ADJUSTMENT OF HOURLY RATES

4.1 Network Rail shall adjust the Hourly Rates from time to time as necessary to reflect actual changes in salary bands and other employment conditions that are made in accordance with Network Rail's personnel policies and salary plans.

4.2 Network Rail shall serve written notice on **tie** setting out any adjustment to the Hourly Rate and indicating the date from which the adjusted Hourly Rate will apply which date shall not be less than 20 Working Days after the date of such notice.

5. REVIEW

As from time to time requested by **tie**, Network Rail shall provide to **tie** reasonable access to and evidence and records of all amounts payable by **tie** under this Schedule Part 6(other than the Hourly Rates), which may be reviewed and audited by or on behalf of **tie**.

SCHEDULE PART 7

Notice details

Network Rail's address for the service of notices is:

Network Rail Infrastructure Limited

40 Melton Street

London NW1 2EE

Tel: 020 7557 8000

Fax: 020 7557 9000

All written notices to be marked:

"URGENT: ATTENTION OF THE SOLICITOR AND COMPANY SECRETARY"

and copied to:

Network Rail Infrastructure Limited

Buchanan House

58 Port Dundas Road

Glasgow G4 0LQ

All written notices to be marked " URGENT: FOR THE ATTENTION OF THE REGIONAL DIRECTOR (SCOTLAND)

The address for service of notices for **tie** is:

City Point, 65 Haymarket Terrace, Edinburgh EH12 5HD

Tel: 0131 622 8300

Fax: 0131 622 8301

All written notices to be marked:

"URGENT: ATTENTION OF TRAM PROJECT DIRECTOR"

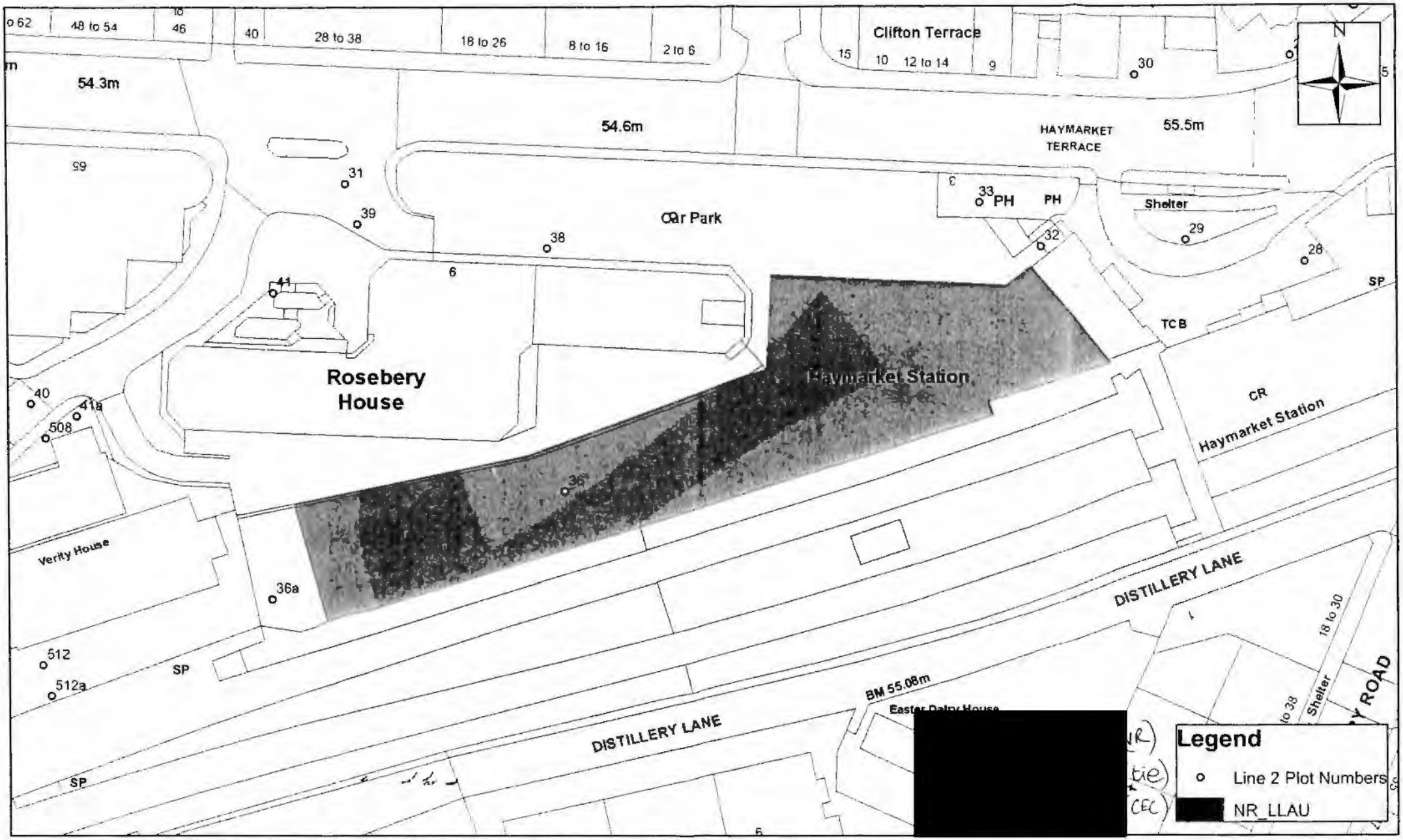
The address for service of notices for CEC is:

Director of City Development, Waverley Court, 4 East Market Street, Edinburgh, EH8 8BG

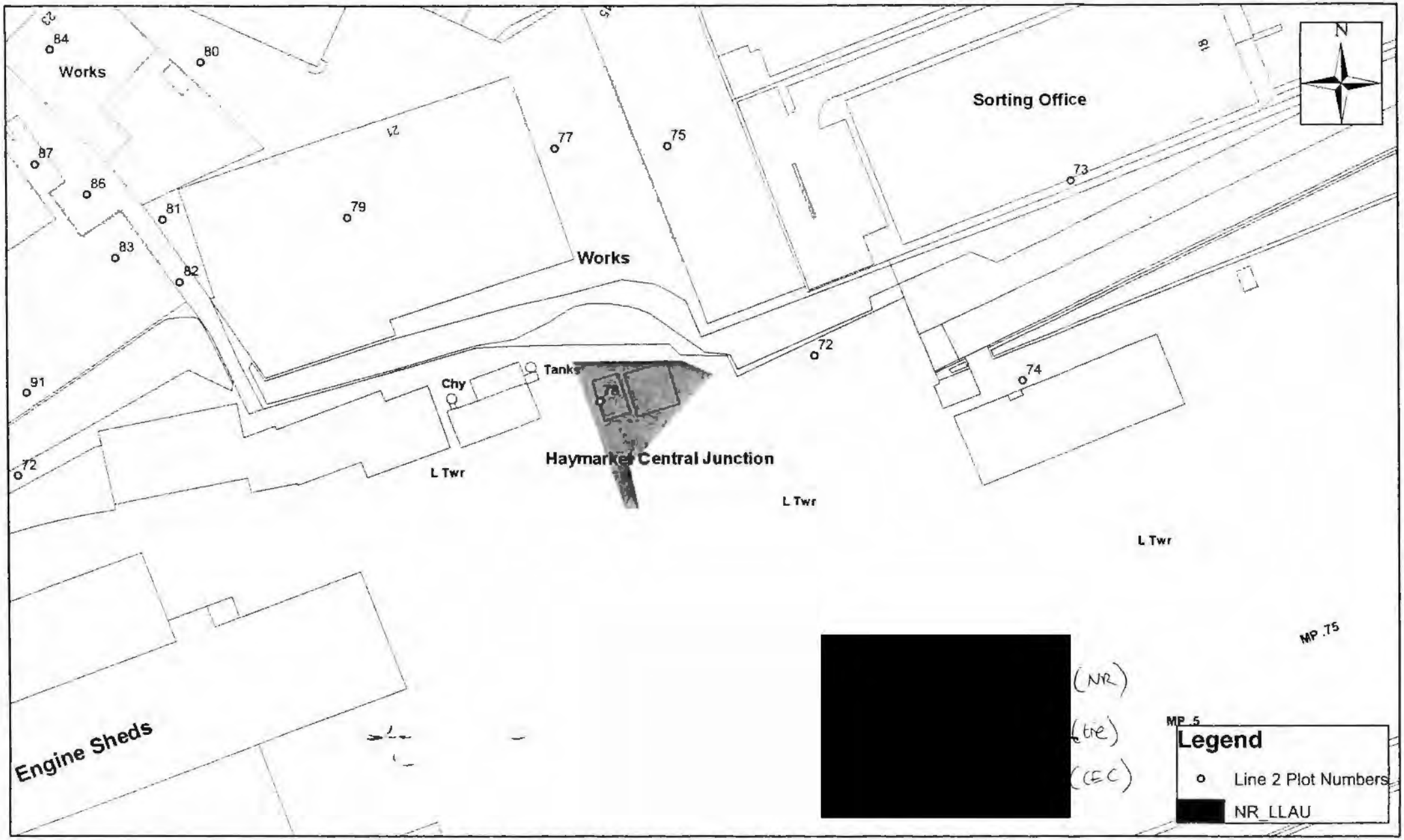
Tel: 0131 529 3595

SCHEDULE PART 8

PLANS



Trams For Edinburgh: NR LLAU Land - Haymarket Station		Date: Jan 08	
0 15 30 60 Meters	© Crown Copyright. All rights reserved, 100023420, 2008	Sheet No: 1@ A4	Trams for Edinburgh ..connecting our city
		Version: 1	



Trams For Edinburgh: NR LLAU Land - Haymarket Depot		Date: Jan 08	
0 15 30 60 Meters	© Crown Copyright. All rights reserved. 100023420. 2008	Sheet No: 2@ A4	**Trams for Edinburgh** ..connecting our capital
		Version: 1	

SCHEDULE PART 10

Works Requirements

as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The parties shall agree to such request for an extension of time except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the parties, all parties to the Related Dispute and the adjudicator) ;

1.44.2 except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the adjudicator), the adjudicator shall have power (if so requested by **tie**) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the parties to the Dispute and the Related Dispute, and to the adjudicator;

1.44.3 as soon as practicable, **tie** shall give to Network Rail copies of the Related Contract, the Referral Notice in the Related Dispute and any other documentation provided to the adjudicator by any party to the Related Dispute.

Dispute is to be (but has not yet been) referred to adjudication under the Dispute Resolution Procedure, **tie** or Network Rail (in the case of Network Rail, subject to Network Rail obtaining the prior consent of **tie**) may refer the Dispute, or **tie** may by notice in writing to the other parties require that the Dispute be referred (as the case may be), to the adjudicator appointed under the Related Contract to decide upon the Related Dispute, and:

1.43.1 the adjudicator shall, if practicable, hear the Dispute at the same time as the Related Dispute and shall request such extension of time for producing his decision or award as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The parties shall agree to such request for an extension of time except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the parties, all parties to the Related Dispute and the adjudicator) ;

1.43.2 except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the parties, all parties to the Related Dispute and the adjudicator), the adjudicator shall have power (if so requested by **tie**) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the parties to the Dispute and the Related Dispute, and to the adjudicator; and

1.43.3 **tie** shall procure that, as soon as practicable, the other party or parties to the Related Dispute shall give the other parties to the Dispute copies of the Related Contract, the Referral Notice in the Related Dispute and any other documentation provided to the adjudicator by any party to the Related Dispute.

1.44 In the event that a Dispute has already been referred to the decision of an adjudicator, and **tie** is of the opinion that a Related Dispute is to be (but has not yet been) referred to adjudication, **tie** may refer the Related Dispute to the adjudicator appointed under the Dispute Resolution Procedure to decide upon the Dispute, and:

1.44.1 the adjudicator shall, if practicable, hear the Related Dispute at the same time as the Dispute and shall request such extension of time for producing his decision or award

1.36 The adjudicator shall provide written reasons for his decision.

1.37 In his decision, the adjudicator may, if he thinks fit, order one or both of the parties (as the case may be) to comply peremptorily with his decision or any part of it. In the absence of any directions by the adjudicator relating to the time for performance of his decision, the parties shall be required to comply with any decision of the adjudicator immediately on delivery of the decision to the parties in accordance with paragraph 1.33.

1.38 The decision of an adjudicator properly appointed in accordance with this Agreement shall be binding on the parties, until the parties decide otherwise or the decision is referred to the courts for final determination.

1.39 The adjudicator shall be entitled to the payment of such reasonable amount as he may determine by way of fees and expenses incurred by him and the parties shall be jointly and severally liable to pay that amount to the adjudicator.

1.40 Without prejudice to the right of the adjudicator to effect recovery from the parties in accordance with paragraph 1.39, the parties to the Dispute shall each be liable to pay an equal share of the adjudicator's fees and expenses.

1.41 The adjudicator shall not be liable for anything done or omitted in the discharge or purported discharge of his functions as adjudicator unless the act or omission is in bad faith, and any employee or agent of the adjudicator shall be similarly protected from liability.

1.42 In the event that a dispute or potential dispute under, or in connection with any of the Related Contracts, has arisen or arises out of substantially the same issues of fact and/or law (as the case may be) as a Dispute under the Agreement (a "**Related Dispute**"), then providing that the Related Contract contains dispute resolution provisions in terms substantially the same as set out in this Dispute Resolution Procedure (save for necessary changes and subject to Clause 1.42A), **tie** may require and direct and Network Rail may (with the prior approval of **tie**) require and direct that the Dispute and the Related Dispute be dealt with together.

1.42A For the purposes of paragraph 1.42 hereof, it is agreed between the parties, that the process for selection and the identity of any adjudicator under a Related Contract, shall be disregarded in determining whether the dispute resolution provisions in a Related Contract are substantially the same as set out in this Dispute Resolution Procedure.

1.43 In the event that a Related Dispute has already been referred to the decision of an adjudicator in accordance with the provisions of the Related Contract, and **tie** is of the opinion that a

or is necessary for the purposes of, or in connection with, the adjudication, or the information is already in the public domain.

1.31 Unless otherwise agreed in accordance with paragraphs 1.43.1 and 1.44.1, the adjudicator shall reach his decision not later than:

1.31.1 twenty eight days after the date of the Referral Notice mentioned in paragraph 1.14;

1.31.2 forty two days after the date of the Referral Notice if the Referring Party so consents; or

1.31.3 such period exceeding twenty eight days after the Referral Notice as the parties may, after the giving of that notice, agree.

1.32 Where the adjudicator fails, for any reason, to reach his decision in accordance with paragraph 1.31:

1.32.1 the other party may serve a fresh notice in accordance with paragraphs 1.5 to 1.7 and shall request an adjudicator to act in accordance with paragraphs 1.8 to 1.13; and

1.32.2 if requested by the new adjudicator the parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

1.33 As soon as possible after he has reached a decision, the adjudicator shall deliver a copy of that decision to each of the parties.

1.34 The adjudicator shall decide the matters in the Dispute and may make a decision on different aspects of the Dispute at different times.

1.35 The adjudicator may take into account any other matters which the parties agree should be within the scope of the adjudication or which are matters under the Agreement which he considers are necessarily connected with the Dispute and, in particular, he may:

1.35.1 open up, review and revise any decision taken or any notice certifying payment given by any person referred to in the Agreement, unless the Agreement states that the decision or notice certifying payment is final and conclusive;

1.35.2 decide that any of the parties to the Dispute is liable to make a payment under the Agreement (whether in sterling or some other currency) and, subject to the terms of the Agreement, when that payment is due and the final date for payment.

1.25.8 issue other directions relating to the conduct of the adjudication.

1.26 The parties shall comply with any request or direction of the adjudicator in relation to the adjudication.

1.27 If, without showing sufficient cause, a party fails to comply with any request, direction or timetable of the adjudicator made in accordance with his powers, fails to produce any document or written statement requested by the adjudicator, or in any other way fails to comply with a requirement under these provisions relating to the adjudication, the adjudicator may:

1.27.1 continue the adjudication in the absence of that party or of the document or written statement requested;

1.27.2 draw such inferences from that failure to comply as may, in the adjudicator's opinion, be justified in the circumstances;

1.27.3 make a decision on the basis of the information before him, attaching such weight as he thinks fit to any evidence submitted to him outside any period he may have requested or directed;

1.27.4 disqualify any part or parts of that party's submissions affected by the failure to comply; and

1.27.5 grant the other party or parties proper opportunity to consider and respond to any evidence or representation made late.

1.28 Subject to any agreement between the parties to the contrary, the other party may be assisted by, or represented by, such advisers or representatives (whether legally qualified or not) as is considered appropriate.

1.29 The adjudicator shall consider any relevant information submitted to him by any of the parties and shall make available to them any information to be taken into account in reaching his decision.

1.30 The adjudicator and the parties shall not disclose to any other person any information or document provided in connection with the adjudication which the party supplying it has indicated is to be treated as confidential, except to the extent that disclosure is required by law

1.23 Where the revocation of the appointment of the adjudicator is due to the default or misconduct of the adjudicator, the parties shall not be liable to pay the adjudicator's fees and expenses.

1.24 The adjudicator shall:

1.24.1 act impartially in carrying out his duties and shall do so in accordance with any relevant terms of the Agreement and shall reach his decision in accordance with Scots law; and

1.24.2 avoid incurring unnecessary expense.

1.25 The adjudicator may take the initiative in ascertaining the facts and the law necessary to determine the Dispute, and shall decide on the procedure to be followed in the adjudication. In particular, he may:

1.25.1 request any of the parties to supply him with such documents as he may reasonably require including, if he so directs, any written statement from any of the other parties supporting or supplementing the Referral Notice and any other documents given under paragraphs 1.14 to 1.16;

1.25.2 conduct the adjudication in the English language and decide whether a translation of any document is to be provided and, if so, by whom, by when, and at whose cost;

1.25.3 meet and question the parties and their representatives;

1.25.4 subject to obtaining any necessary consent from a third party or the parties, make such site visits and inspections as he considers appropriate, whether accompanied by the parties or not;

1.25.5 subject to obtaining any necessary consent from a third party or the parties, procure the carrying out of any tests or experiments, and make directions as to the conditions for and responsibility for the cost of the same;

1.25.6 obtain and consider such representations and submissions as he requires, and, provided he has notified the parties of his intention, appoint experts, assessors or legal advisers;

1.25.7 give directions as to the timetable for the adjudication, any deadlines, or limits as to the length of written documents or oral representations to be complied with; and

1.13 The person requested to act as adjudicator in accordance with the provisions of paragraph 1.8, paragraph 1.11 or paragraph 1.12 above shall indicate whether or not he is willing to act within two days of receiving the request.

1.14 Where an adjudicator has been selected in accordance with paragraph 1.8, 1.11 or 1.12 above, the Referring Party shall, not later than seven days from the date of the Notice of Adjudication, refer the Dispute in writing (the "Referral Notice") to the adjudicator.

1.15 A Referral Notice shall be accompanied by copies of, or relevant extracts from the Agreement and such other documents as the Referring Party intends to rely upon.

1.16 The Referring Party shall, at the same time as he sends to the adjudicator the documents referred to in paragraph 1.14 and paragraph 1.15, send copies of those documents to the Responding Party.

1.17 The adjudicator may, with the consent of the parties to those disputes, adjudicate at the same time on more than one Dispute under the Agreement.

1.18 The parties may agree to extend the period within which the adjudicator may reach a decision in relation to all or any of these Disputes.

1.19 An adjudicator may resign at any time on giving notice in writing to the parties.

1.20 An adjudicator must resign where the Dispute is the same or substantially the same as one which has previously been referred to adjudication, and a decision has been taken in that adjudication.

1.21 Where an adjudicator ceases to act under paragraph 1.19 or 1.20, or dies or becomes incapax or ill to the extent of being unable to reasonably discharge his duties;

1.21.1 the Referring Party may serve a fresh notice in accordance with paragraphs 1.5 to 1.7 and shall in accordance with paragraphs 1.8 to 1.13 request an adjudicator to act; and

1.21.2 if requested by the new adjudicator, the parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

1.22 The parties to a Dispute may at any time agree to revoke the appointment of the adjudicator and in such circumstances the fees and expenses of that adjudicator shall, subject to paragraph 1.23, be determined and payable in accordance with paragraphs 1.39 and 1.40

1.9 The request referred to in paragraph 1.8 above shall be accompanied by a copy of the Notice of Adjudication.

1.10 Any person appointed, requested or selected to act as adjudicator in accordance with paragraph 1.8 above shall be a natural person acting in his personal capacity. A person appointed, requested or selected to act as an adjudicator shall be wholly independent of **tie**, CEC, Network Rail, any Relevant Authority, any Approvals Body, or any party associated with the Edinburgh Tram Network and any successor to or subsidiary or parent of any of the aforementioned parties.

For the purposes of the preceding provisions of this paragraph 1.10:

"**Relevant Authority**" shall mean any court with the relevant jurisdiction and any local authority, national authority or supra national agency, inspectorate, minister, Scottish Executive, body, official or public or statutory person of the government of the United Kingdom or of the European Union and "Relevant Authorities" shall be construed accordingly; and

"**Approvals Body**" means any Relevant Authorities, planning authorities, roads authorities, HMRI, and any other parties who are to issue consents which may be required for the construction, installation, commissioning, completion and opening of the Edinburgh Tram Network.

1.11 The Institution of Civil Engineers must communicate the selection of an adjudicator to the Referring Party within five days of receiving a request to do so.

1.12 Where the Institution of Civil Engineers fails to comply with paragraph 1.11 above, the Referring Party may:

1.12.1 agree with the other parties to the Dispute to request a specified person to act as adjudicator; or

1.12.2 request any other adjudicator nominating body to select a person to act as adjudicator. An "adjudicator nominating body" shall mean a body (not being a natural person and not being a party to the Dispute) which holds itself out publicly as a body which will select an adjudicator when requested to do so by a Referring Party.

SCHEDULE PART 9

Adjudication Procedure

1.1 Not used.

1.2 Not used.

1.3 Not used.

1.4 The courts shall have full power to open up, review and revise any certificate, opinion, decision, instruction, direction, valuation, requisition or notice given or made under this Agreement (unless the Agreement states that any of the foregoing is final and conclusive) and any determination of an adjudicator, including an award as to costs.

1.5 Any party to this Agreement may give written notice (the **"Notice of Adjudication"**) of the intention to refer a Dispute to adjudication and the party giving such notice shall be the "Referring Party" for the purposes of this Agreement.

1.6 The Notice of Adjudication shall be given to the other party to the Dispute and the party receiving the Notice of Adjudication shall each be the "Responding Party"

1.7 The Notice of Adjudication shall set out briefly:

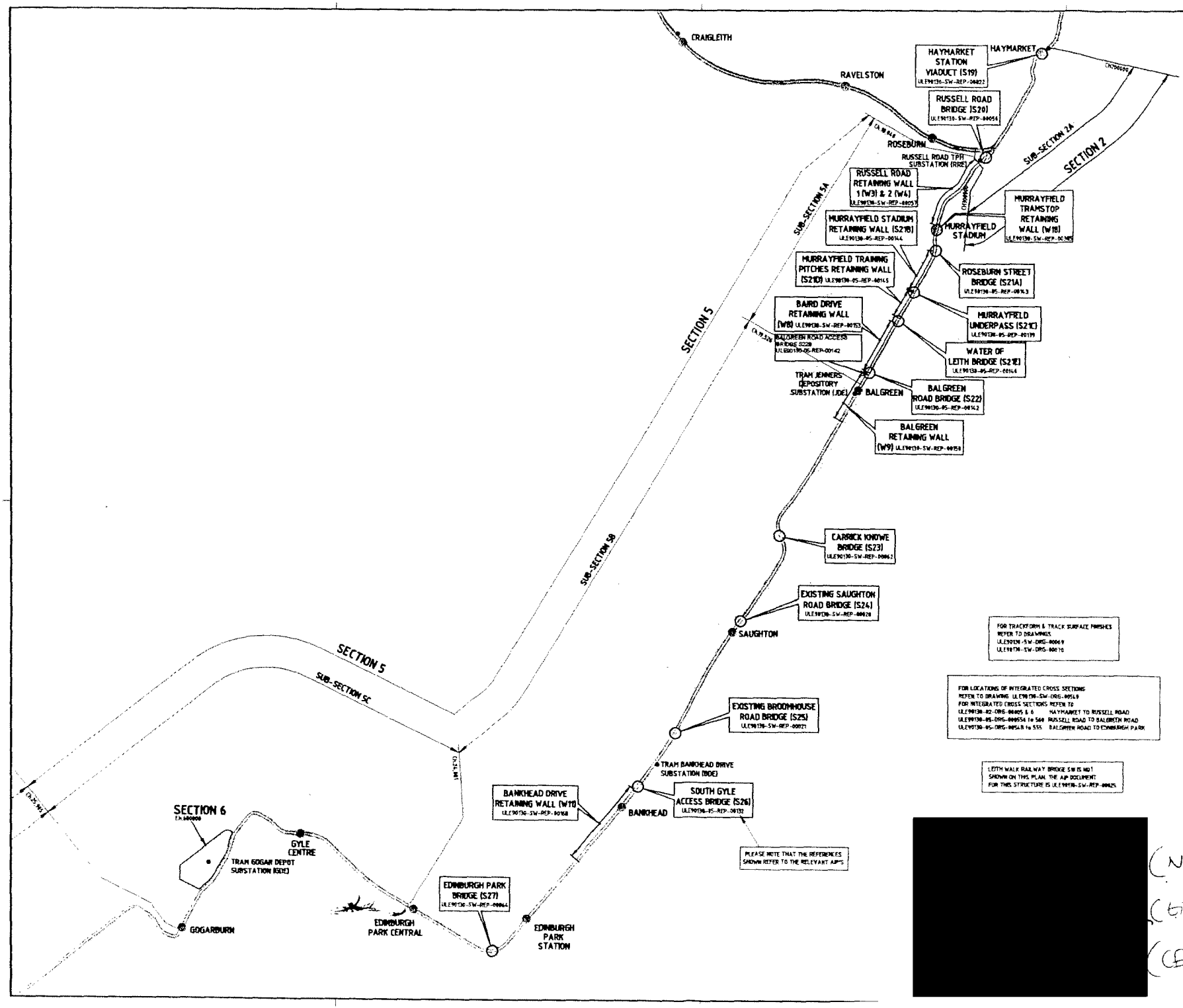
1.7.1 the nature and a brief description of the Dispute and the parties involved;

1.7.2 details of where and when the Dispute has arisen;

1.7.3 the nature of the redress which is sought; and

1.7.4 the names and addresses of the parties (including the addresses which the parties have specified for the giving of notices).

1.8 The adjudicator shall be a person selected and agreed by the parties. In the event that no person has been selected as adjudicator or that none of the persons so selected are able or willing to act or the parties are unable to agree an adjudicator, the Referring Party shall request the President of the Institution of Civil Engineers to select a person to act as adjudicator.



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BRIDGE AGREEMENT

between

NETWORK RAIL INFRASTRUCTURE LIMITED

and

CITY OF EDINBURGH COUNCIL

Relating to:	**A new bridge over the railway at [ ] (being [ ] miles and [ ] chains between [ ] and [ ]**

macROBERTS

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AGREEMENT

between

(1) **NETWORK RAIL INFRASTRUCTURE LIMITED**, incorporated under the Companies Acts (Company No. 2904587) and having its registered office at 40 Melton Street, London NW1 2EE ("**Network Rail**"); and

(2) **CITY OF EDINBURGH COUNCIL**, the local authority for the City of Edinburgh, constituted in terms of the Local Government etc (Scotland) Act 1994 and having is principal administrative offices at City Chambers, High Street, Edinburgh EH1 1YJ ("**the Grantees**")

WHEREAS:

(1) The Grantees wish to design, construct and maintain a Bridge which crosses over and above the Railway Infrastructure at the Location;

(2) Network Rail is prepared to permit the Grantees to design, construct and maintain a Bridge to be known by Network Rail as structure number **[ ] [**and by the Grantees as structure number **[ ]]** over and above the Railway subject to the terms and conditions of this Agreement, which reflects the statutory obligations and framework within which Network Rail is obliged and entitled to operate the Railway; and

(3) Network Rail is prepared to grant to the Grantees (i) a conveyance of parts of Network Rail's land on which parts of the abutments of the Bridge will be erected and (ii) a lease of the airspace over or upon its land for and in connection with the Bridge all upon terms agreed between Network Rail and the Council,

NOW IT IS AGREED by and between the parties hereto as follows:

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement (which comprises this bridge agreement, the Schedule, the Plan and/or other items annexed to this agreement), unless the context otherwise requires:

Approved Drawings means any drawing approved by Network Rail in connection with the Works (in particular drawings submitted under clauses 2.2.2.(f) and 2.2.2.(i);;

Accepted Design means the design for the Works accepted by Network Rail in accordance with clause 2.2.2.(i);

Asset Protection Agreement means the agreement so entitled and entered into between Network Rail and the Grantees of even dates with the dates of this Agreement;

Bridge means the new bridge and associated structures to incorporate and carry the Road over and above the Railway Infrastructure at the Location, the same to be shown on an accurate, as built, plan to be annexed to the Bridge Lease;

Bridge Lease means the lease to be entered into between Network rail and the Grantees referable to the airspace to be occupied by the Bridge and the airspace to the extent of **[ ]** metres above the proposed tramline tracks within the Road the same to be generally in the terms and form of the draft lease annexed subject to such amendments as may be necessary to reflect any amendments or variations of a legal requirement or the updating, replacement, amendment or variation of any Codes of Practice or similar followed by Network Rail occurring in the period between the signing of this Agreement and the Term Commencement Date and to be completed in accordance with the terms of this Agreement.

Certificates for Design and Checking of Structures means certificates, each in such format as Network Rail shall require, in respect of those parts of the Works forming the permanent structure

of the Bridge;

Certificates for Design and Checking of Temporary Works means certificates, each in such format as Network Rail shall require, in respect of Temporary Works;

CDM Regulations means the Construction (Design and Management) Regulations2007;

Competent Authority means any local, national or supra-national agency, authority, department, inspectorate, minister, ministry, official, court, tribunal or public or statutory person (whether autonomous or not) of the United Kingdom or of the European Union, which has, in respect of this Agreement, jurisdiction over or the power to bind any of the parties to, or the subject matter of, this Agreement,

Construction Works Commencement Date means the latest of:

(a) the last date of signing of this Agreement by the parties to it;

(b) grant of any conveyance and/or servitude rights referred to in Recital 3 above, unless the parties agree otherwise in writing;

(c) the date of Network Rail's approvals pursuant to Clause 2.2.3(c) which are necessary to commence the carrying out of the Works;

(d) the provision on site of site safety personnel by the Grantees pursuant to Clause 2.2.1(b);

(e) receipt of evidence confirming that the Grantees have taken out the insurances required by Clause 2.3;

(f) the date on which all Necessary Consents and Network Rail Consents have been obtained which are necessary to commence the construction of the Works; and

(g) the date of Network Rail's approval to the Safety Management System pursuant to Clause 2.2.1.(f);

Contract Documents means the documents each of which form a contract between the Grantees and a third party in respect of the carrying out of the whole (or any part) of the design and construction of the Works;

Contractor means any person or company to whom a contract for the whole (or any part) of the Works is let and for whom the Grantees are the employer;

Costs means "Network Rail Costs" as defined in the Asset Protection Agreement;

Direction means any direction, requirement, instruction or rule legally binding on Network Rail, and includes any modifications, extension or replacement of any such direction, requirement, instruction or rule for the time being in force but shall not include the exercise of a discretion under any contract or other obligation binding on Network Rail or the enforcement of any such contract or obligation;

Escalation Procedure means the "Dispute Resolution Procedure" as defined in the Asset Protection Agreement;

Framework Agreement means the agreement so entitled and entered into between Network Rail and the Grantees of even dates with the dates of this Agreement;

Health and Safety Executive means the executive arm of the Health and Safety Commission which enforces health and safety law under the Health and Safety at Work etc. Act 1974, or any successor body;

Location means the location at which the Bridge is to be constructed, namely at **]** (being at **[ ]** miles and **[ ]** chains between **[ ]** and **[ ]**) **[**as generally shown **[ ]** on the Plan**]**;

Maintenance Contractor means any person or company carrying out the inspection, maintenance, repair or renewal of the Bridge after final completion of the Works on behalf of the Grantees;

Necessary Consents means all approvals, permissions, consents, licences, registrations and authorisations (whether statutory or otherwise to include, without limitation, inoperability regulations) which are required from time to time for the purposes of carrying out the Works whether required in order to comply with any legal requirement or as a result of any rights of any third party,

Network Licence means the licence granted to Network Rail pursuant to Section 8 of Railways Act 1993 (as amended by the Transport Act 2000) and any succeeding or replacement licence;

Network Operator Issues means:

(a) a Safety Critical Event;

(b) an Operational Emergency;

(c) a regulatory requirement or requirement of Network Rail's Network Licence;

(d) a requirement of Scots and/or UK and/or European Community law; and/or

(e) a Direction of a Competent Authority;

Network Rail Approval in Principle Submission means the submission necessary to obtain the approval in principle for the Works in accordance with such procedure and format as is acceptable to Network Rail.

Network Rail Company Standards means a standards document issued by Network Rail for its own use in relation to the Railway as a whole which applies to the performance of the Works under this Agreement;

Network Rail's Estimated Costs means a non-binding estimate of the Costs up to and including final completion of the Works;

Operational Emergency means any situation or circumstance which Network Rail reasonably considers requires immediate or urgent action in order to maintain or restore the effective operation of the Railway Infrastructure or any part of it;

Plan means the plan annexed and signed as relative to this Agreement (which plan is indicative only and not taxative);

Possession means planned safety arrangements, which control or prevent the normal movement of rail traffic on the Railway Infrastructure between defined locations and for a pre-determined period;

Programme means the programme for the carrying out and completion of the Works to be approved by Network Rail in accordance with this Agreement as may be amended by agreement between the parties;

Qualifying Period means any statutory successor of the said City of Edinburgh Council having responsibility for public transport for the area in which the Premises are situated and/or any statutory body established to provide and to assume responsibility for the provision of light rail

passenger or other transport services on the Edinburgh Tram System;

Railway means the Railway Infrastructure, Network Rail's activities in carrying out the operation, maintenance and replacement of the Railway Infrastructure and traffic on the Railway Infrastructure;

Railway Group Standards means technical standards to which railway assets or equipment must conform and operating procedures with which the operators of railway assets must comply;

Railway Infrastructure means Network Rail's infrastructure and operational track including the Station;

Regulator shall have the meaning ascribed to it in Section 1 of the Railways Act 1993 (as amended by the Transport Act 2000);

Road means that part of the Tram Line which will cross over the Railway Infrastructure by means of the Bridge as the same will form part of the Bridge;

Safety Critical Event means an imminent risk:

(a) to the health and safety of any person(s);

(b) of damage or destruction to any Railway Infrastructure; or

(c) any incident which may reduce the safety integrity levels of any item of Railway Infrastructure;

Safe Management System means the management structure and controls through which the Grantees ensures it is capable of understanding Railway related risks and providing or procuring the provision of a safe system of working on or about the Railway;

Schedule means the schedule annexed and signed as relative to and forming part of this Agreement;

Special Requirements means the requirements set out or referred to in a document entitled "Special Requirements in relation to Network Rail" dated **[ ]** or the requirements from time to time substituted therefore and intimated in writing to the Grantee; [Have TIE/CEC seen these]

Standards means Railway Group Standards, Network Rail Company Standards, British and European standards and normal building practice;

Temporary Works means all works of a temporary nature of every kind required for the completion of the Works;

Tender Documents means the documents issued to tenderers by the Grantees in respect of the Works;

Term Commencement Date has the same meaning as ascribed to it in the Framework Agreement;

Track Access Agreement shall have the same meaning as given to access contract under Section 17(6) of the Railways Act 1993 (as amended by the Transport Act 2000);

Tram Line means the new tram line to be formed by the Grantees under and in terms of the Edinburgh Tram (Line **[**Two**]**) Act 2006;

Variation means any alteration or modification of the design, quality or quantity of the Works including:

(a) the addition, omission or substitution of any work; or

(b) the alteration of the kind or standard of any of the materials or goods to be used in the Works;

Value Added Tax means value added tax at the rate or rates applicable from time to time and includes any similar or replacement tax or taxes;

Works means the design and construction of the Bridge and Road including all tasks incidental thereto as more fully described in Part 1 of the Schedule.

1.2 In this Agreement:

1.2.1 the headings of the Clauses shall not affect their interpretation;

1.2.2 references to "Clauses" are references to clauses in this Agreement;

1.2.3 references to statutory provisions shall be construed as references to those provisions as amended or re-enacted, or as their application is modified by other provisions, from time to time;

1.2.4 references to Standards shall be construed as references to the edition or version of those documents, or their replacements, current at the start of the performance of the action to which they refer;

1.2.5 any consent, approval or permission to be issued or granted by Network Rail in terms of this Agreement shall require to be in writing by a person having appropriate authority from Network Rail to do so;

1.2.6 use of the present tense means the relevant time or as the case may be from time to time during the relevant period;

1.2.7 the singular implies the plural and vice versa and the masculine includes the feminine;

1.2.8 references to "Network Rail" and "the Grantees" shall, where permitted and applicable as appropriate, include their respective successors as proprietor of the Railway Infrastructure at the Location and proprietor of the Bridge and Road, respectively; and

1.2.9 to the extent that there may be any inconsistencies between the terms of the Asset Protection Agreement and this Agreement and/or the Bridge Lease, (i) the Asset Protection Agreement shall take precedence until the Term Commencement Date and (ii) the Bridge Lease (and, in consequence, this Agreement which will form an integral part of its terms) shall thereafter take precedence.

2. DUTIES AND OBLIGATIONS OF THE GRANTEES

2.1 Costs and Payment

2.1.1 The Grantees shall pay the Costs but not so that the same costs as are payable by the Grantees in terms of the Asset Protection Agreement shall be payable twice..

2.1.2 Payment of Costs to Network Rail shall be made in accordance with the terms of Clause 18 and Schedule 6 of the Asset Protection Agreement.

2.1.3 Should any payment not be made by the Final Date for Payment then the payment due shall bear interest thereon at the rate of two (2) percent above the base lending rate of the HSBC Bank plc such rate to be determined upon such Final Date for Payment and be payable from such Final Date for Payment to the date of actual payment.

2.1.4 Payments shall be exclusive of Value Added Tax and shall be subject to the addition of Value Added Tax at the rate if and where applicable on production of a Value Added Tax invoice.

2.2 The Works

2.2.1 General:

The Grantees shall be responsible for designing, carrying out and completing the Works and shall carry out the Works in accordance with the whole terms of and in compliance with the Asset Protection Agreement.

2.2.2 Construction of the Works:

The Grantees shall not commence construction of the Works prior to the Construction Works Commencement Date and shall be responsible for construction of the Works which shall be at their own risk and cost and shall be carried out in accordance with the whole terms of and in compliance with the Asset Protection Agreement.

2.2.3 The CDM Regulations:

For the purposes of the Works under the CDM Regulations the terms of Clause 7.3 in the Asset Protection Agreement shall apply.

2.3 Insurance

The Grantees shall comply with or procure compliance with the terms of Clause 16 of the Asset Protection Agreement.

2.4 Use of Network Rail Land

The Grantee, its agents and employees (including **tie**) shall only be permitted access to land in the ownership of Network Rail in accordance with and subject to the terms of the Asset Protection Agreement.

2.5 Bridge Identification Plates and Permanent Fencing

The Grantees shall (on or before substantial completion of the Works) at their own cost:

2.5.1 provide and fix to the Bridge, so as to be readily visible from both the Railway Infrastructure and the Road, numerical identification plates in accordance with details and specifications submitted to the Grantees by Network Rail; and

2.5.2 erect permanent fencing of a type stipulated by Network Rail in positions to be decided by Network Rail acting reasonably.

2.6 New Services

The Grantees shall advise Network Rail on substantial completion of the Works and from time to time afterwards of any proposed new or replacement pipes, cables and other media which are to be laid over and/or within the Bridge to serve the Tram Line and the same may only be laid in the

Road following notification to Network Rail of the Grantees' intention to do so and subject to such reasonable conditions Network Rail may require.;

2.7 Provision of "As Built" Drawings & Information

As soon as reasonable practicable after substantial completion of the Works the Grantees shall provide, for record purposes and free of cost to Network Rail:

(a) a copy of the Health and Safety File;

(b) sets of "As Built" drawings (so endorsed) of the Works in such form as Network Rail may reasonably require; and

(c) such other information including, without limitation, calculations, specifications, documents and computer input and output data, as Network Rail may reasonably require.

2.8 Inspection and Maintenance of the Bridge and Road

2.8.1 On and from final completion of the Works:

(a) the Grantees shall, at their own cost, arrange for the regular inspection of the structure of the Bridge in accordance with (with such adjustments as may be reasonable having regard to the fact that the Bridge is to carry part of the Tram Line and not a public road) the Highways Agency's "Design Manual for Roads and Bridges" as amended from time to time or any procedures substituted therefor, or the latest edition of Railway Group Standards, whichever is the higher standard. A copy of each inspection report and as appropriate an assessment certificate shall be submitted to Network Rail which may, if in its opinion the condition of the Bridge so warrants, at any time require the Grantees to carry out such additional examinations or further investigations as it considers necessary, Provided That where Network Rail's normal inspection procedures require further or more detailed inspection and Network Rail so notifies the Grantees in writing, the Grantees shall carry out such further or more detailed inspection;

(b) the Grantees shall, at their own cost, maintain the Bridge in a good and proper state of repair (to include cleansing, scavenging, removal of obscene graffiti and using reasonable endeavours to remove all other graffiti) and, when necessary, repair and/or renew the Bridge all to the reasonable satisfaction of Network Rail provided that:

(i) the Grantees shall erect temporary fencing to the reasonable satisfaction of Network Rail to protect the Railway Infrastructure from unlawful entry and vandalism during the carrying out of such maintenance, repair and/or renewal;

(ii) the Grantees shall pay for the removal and/or reinstatement of any apparatus or other asset owned by Network Rail necessitated by the carrying out of such maintenance, repair or renewal work; and

(iii) in the event of the Grantees not so maintaining, repairing or renewing the Bridge, Network Rail may (after giving 3 months notice in writing to the Grantees except in case of emergency) carry out such works as Network Rail considers necessary at the proper cost of the Grantees;

(c) in carrying out inspection, maintenance, repair or renewal of or alterations to the Bridge, the Grantees and any Maintenance Contractor shall comply with the

Special Requirements and such other conditions as Network Rail may impose for the protection of rail traffic and the safety of persons working on or near the Railway Infrastructure and shall ensure that the clear headroom and lateral clearances to rail are not reduced (unless agreed by Network Rail for temporary works in carrying out inspection, maintenance, repair or renewal of or alterations to the Bridge);

(d) following maintenance, repair or renewal of or alterations to the Bridge, the Grantees shall arrange for the "as built" drawings provided by the Grantees to Network Rail in accordance with the provisions of Clause 2.7 to be modified;

(e) in the event of a Safety Critical Event or an Operational Emergency (of which Network Rail shall be the sole judge) at the Location of the Bridge, Network Rail may take whatever action it considers necessary to protect the safety of both traffic on the Railway Infrastructure and persons on or near the Railway Infrastructure and shall as soon as possible advise the Grantees of the actions taken; and

(f) the Grantees shall inspect, maintain repair, renew and alter the Road under such conditions as Network Rail may reasonably impose for the protection and safety of the Railway.

2.9 Lighting of the Road, Bridge etc.

The Grantees, in lighting the Road, the Bridge and their environs and in providing illuminated signs, shall comply with such reasonable requirements of Network Rail as may be dictated by the signalling arrangements and other safety requirements of Network Rail and shall use their reasonable endeavours to ensure that any lighting or signs erected by other parties entitled so to do complies with such requirements.

2.10 Restrictions on works on the Road

Except under such conditions as Network Rail may reasonably stipulate, the Grantees shall not, in maintaining the Road, execute or permit to be executed any works that unreasonably raise the level of the surface of the Road or otherwise increase the permanent loading on the superstructure of the Bridge or temporarily or permanently reduce the effective height of the parapets below that shown on the Approved Drawings or any structural works to the Bridge which could give rise to a Safety Critical Event or an Operational Emergency or materially affect the safety and/or efficient operation of the Railway.

2.11 Unauthorised Entry and Vandalism

In the event of acts of unauthorised entry or vandalism occurring on or from the Bridge or its approaches, the Grantees shall at their own cost and within such timescales as shall be agreed between the parties to be reasonably practicable (such agreement not to be unreasonably withheld) having regard to the incidence and nature of the acts of unauthorised entry or vandalism and the cost of such measures, take such preventative or defensive measures as Network Rail may reasonably require Provided That if in the opinion of Network Rail such acts of unauthorised entry or vandalism endanger safety on the Railway Infrastructure or the safety of persons on or near the Railway Infrastructure, Network Rail may at the proper cost of the Grantees take such urgent measures as it considers necessary.

2.12 Future Railway Alterations

If, solely in consequence of the carrying out of the Works and/or the existence of the Bridge, Network Rail incurs additional costs and expenses in connection with the widening or alteration of the Railway Infrastructure on land in the ownership of Network Rail or in connection with the exercise of powers possessed by Network Rail at the latest date of signing of this Agreement, the terms of Clause 12.6 in the Asset Protection Agreement shall apply to and govern payment of

such costs and expenses.

2.13 Mining Subsidence

2.13.1 If Network Rail or the Grantees reasonably apprehend that any ground consolidation works or the working of any mines or minerals is likely to cause damage to the Works or any adjoining Network Rail Property or Network Rail works by reason of subsidence or if such working causes damage to the Works or any such Network Rail Property or works, Network Rail and the Grantees (or **tie** acting on the Grantees' behalf) shall notify and consult with each other with a view to agreeing the measures necessary to be taken, before taking steps to prevent, guard against or make good such damage.

2.13.2 Notwithstanding Clause 2.13.1, if Network Rail reasonably considers that immediate measures must be taken for the protection and safety of the Railway, it may take such measures without prior consultation with or notice to **tie** or the Grantees.

2.13.3 The Grantees shall or shall procure that **tie** shall reimburse Network Rail in respect of all losses reasonably incurred by Network Rail in carrying out any measures agreed between Network Rail and the Grantees or considered necessary by Network Rail in accordance with the preceding provisions of this Clause 2.13 which Network Rail would not otherwise have incurred provided that neither **tie** nor the Grantees shall be liable to Network Rail for such losses incurred in respect of measures taken under Clause 2.13.2 where and to the extent that the measures are determined to have not been necessary under the Escalation Procedure.

3. DUTIES AND RIGHTS OF NETWORK RAIL

3.1 Network Rail shall in relation to the Works comply with the terms of the Asset Protection Agreement including without limitation Clauses 5, 6 and 8 thereof.

3.2 Network Rail may, without payment to the Grantees, on or after completion of the Bridge affix thereto, use, maintain and renew, in such manner so as not to damage the structure of the Bridge nor operation of the tram system apparatus which may be necessary for the purpose of Network Rail's undertaking; Provided That Network Rail shall:

3.2.1 obtain the approval of the Grantees (not to be unreasonably withheld) by giving the Grantees twenty-eight (28) days' notice in writing of its intention to attach apparatus to the Bridge together with details of such apparatus and method of fixing (and failure by the Grantees to respond within this period shall be deemed to constitute acceptance) along with any requirements of the Grantees as to the date and time when the apparatus is to be affixed (which requirements shall be complied with by Network Rail Provided That such requirements shall have been notified to Network Rail within fourteen (14) days of receipt by the Grantees of the notice referred to above) save that in cases of emergency, as shall be decided by Network Rail in its absolute discretion, Network Rail shall notify the Grantees of the intention to attach apparatus as soon as reasonably practicable and comply with any requirements of the Grantees as above so far as are reasonably practicable;

3.2.2 to the reasonable satisfaction of the Grantees make good any damage to the Bridge caused by the affixing, maintenance or removal of the said apparatus, all such work to be commenced within a reasonable time from notification of damage by the Grantees and to be completed within a period not exceeding twenty-eight (28) days from commencement of such works; and

3.2.3 pay the Grantees' costs incurred pursuant to this Clause 3.2.

3.3 If, in the opinion of Network Rail, the Road should be partially or fully closed with immediate effect, as a result of, or in order to prevent the occurrence of, an Operational Emergency or a Safety

Critical Event, Network Rail shall notify the Grantees. The Grantees shall as soon as possible consider such notification on its merits in accordance with their statutory duties (and without in any way limiting the discretion of the Grantees) and immediately thereafter take such steps (if any) as they may consider necessary.

3.4 If, in the opinion of Network Rail for the safety of the Railway, an event of any nature on the Road or the Bridge requires the immediate partial or full closure of the Railway Infrastructure, or the temporary imposition of restrictions on traffic using the Railway Infrastructure, Network Rail shall be entitled to make all necessary arrangements at the cost of the Grantees but that subject always to the terms of Clause 19 in the Asset Protection Agreement.

4. LEASE

Network Rail and the Grantees shall enter into the Bridge Lease as soon as practicable after the as built plan(s) of the Bridge is/are available to annex to it and the Bridge Lease shall be effective from and after the Term Commencement Date.

5. INDEMNITY AND LIMIT OF LIABILITY

5.1 Indemnity

5.1.1 The Grantees shall indemnify Network Rail and keep Network Rail indemnified against any costs, claims, damages, demands, losses, expenses, liabilities or proceedings of whatever kind and howsoever arising from or in connection with (whether directly or indirectly) - the carrying out or the procuring of the carrying out of the Works (but that subject always to the terms of the Asset Protection Agreement including without limitation Clauses 19 and 20 thereof), breach of this Agreement by the Grantees, or the maintenance, repair or renewal and/or usage of the Bridge and/or the Road or the obligations assumed by Network Rail pursuant to this Agreement (referred to together in this Clause 5.1 as "Losses") provided that:

(a) to the extent any such Losses arise from or in connection with (whether directly or indirectly) negligence or breach on the part of Network Rail then the Grantees shall not be under an obligation to indemnify Network Rail against such Losses;

(b) in the event that any such Losses arise from the acts or omissions of any third party not being under the control of or in contract with the Grantees the Grantees shall only be liable to indemnify Network Rail for such Losses so far as they result from or are increased by negligence or breach on the part of the Grantees; and

(c) Network Rail shall take all reasonable steps to prevent, mitigate and restrict the circumstances which have given or may give rise to such Losses.

5.2 Network Rail Limit of Liability

The terms of Clauses 19 of the Asset Management Agreement shall apply mutatis mutandis to the liability of Network Rail to the Grantees pursuant to this Agreement [what about £260K NR cap – is this appropriate?].

6. MISCELLANEOUS

6.1 Ownership/Vesting

Notwithstanding that all or parts of the Bridge and Road may be erected over land owned by Network Rail, ownership of, legal title to and the beneficial interest in the Bridge shall vest in and remain with the said City of Edinburgh Council (or a Qualifying Person), this specifically in

recognition and acceptance by the said City of Edinburgh Council of Network Rail's concern that the ownership and control of and responsibility for the Bridge must remain, for as long as the Bridge shall remain in situ, with the said City of Edinburgh Council or a Qualifying Person, having regard always to the potential impact on the safety, security, continuity and punctuality of the railway which may occur as a result of any failure properly to maintain and control operations on the Bridge as also the potential exposure of Network Rail to costs of remedying any failures in relation to the Bridge on default of the party who owns it.

6.2 Confidentiality

The terms of Clause 23 of the Asset Protection Agreement shall apply mutatis mutandis to this Agreement.

6.3 Third Party Rights

This Agreement is not intended to confer any rights on any third party.

6.4 Variation or Waiver

6.5.1 No modification, variation or amendment of any provision in this Agreement shall be effective unless it is in writing and signed by a duly authorised representative of each party.

6.5.2 No waiver of any breach or default under this Agreement or any of the terms hereof shall be effective unless such waiver is given in writing and has been signed by the party waiving its entitlement.

6.5 Successors and Assignees

6.6.1 This Agreement shall be binding upon and take effect for the benefit of the parties, including their respective legal successors, but strictly subject as hereinafter provided.

6.6.2 This Agreement may not be assigned in whole or in part the by Grantees, but without prejudice to Clause 6.6.4

6.6.3 The Grantees shall not charge this Agreement except with the consent in writing of Network Rail (this not to be unreasonably withheld but having regard always to the pre-requisite that Network Rail will not permit any party to own or control the Bridge other than the said City of Edinburgh Council or subsequent Qualifying Party howsoever the same may arise).

6.6.4 If the Grantees cease to be the local authority responsible for public transport in Edinburgh, the Grantees and Network Rail shall enter into a novation agreement with the relevant Qualifying Party which succeeds the Grantees as such authority. Upon completion of such novation agreement, the Grantees shall be released from all future liability under this Agreement.

6.6.5 Network Rail shall be entitled to assign its interest under this Agreement, subject to the Grantees' consent which will not be unreasonably withheld.

6.6 Severability

If any term or provision of this Agreement is held to be invalid, illegal or unenforceable in whole or in part under any enactment or rule of law or otherwise such term or provision shall to that extent be deemed not to form part of this Agreement but the validity and enforceability of the remainder of this Agreement shall continue in full force and effect.

6.7 Entire Agreement

This Agreement constitutes the entire agreement between the parties relating to the subject matter of this Agreement and supersedes and extinguishes any prior drafts, undertakings, representations, purchase orders, warranties and arrangements of any nature whatsoever whether in writing or oral relating to such subject matter.

6.8 Resolution of Disputes

In the event of a disagreement relating to this Agreement, either Party may at any time invoke the Escalation Procedure (in accordance with its terms) without prejudice to its other rights and obligations

6.9 Notices

6.9.1 Any notice, save for a notice detailed in Clause 6.9.2, to be given under this Agreement shall be in writing and shall be deemed duly given if proven to have been delivered by hand, by recorded delivery or by fax to the recipient, address and fax number set out in [Part 1 of Part 2 of the Schedule] or such other recipient, address or fax number as each party may specify to the others in writing from time to time.

6.9.2 Any notice to be given under Clause 2.1 of this Agreement shall be in writing and shall be deemed duly given if proven to have been delivered by hand, by recorded delivery or by fax to the recipient, address and fax number set out in [Part 2 of Part 2 of the Schedule] or such other recipient, address and fax number as each party may specify to the other in writing from time to time.

6.9.3 Notices sent in accordance with Clauses 6.9.1 or 6.9.2 shall be deemed to have been received three working days after the date of posting or the working day after transmission but only if a transmission report is generated by the sender's fax machine recording a message from the recipient's fax machine confirming that the fax was sent to the number indicated [in Part 2 of the Schedule] and that all pages were successfully transmitted.

6.10 Law

This Agreement shall be governed by and construed between the parties in accordance with Scots law and the parties hereby submit to the exclusive jurisdiction of the Scottish Courts.

6.11 Registration

The Parties consent to the registration of this Agreement for preservation and execution.

IN WITNESS WHEREOF these presents typewritten on this and the **[ ]** preceding pages together with the Schedule, Plan and draft lease annexed are executed by the said Network Rail Infrastructure Limited and the said **[ ]** Council as follows:

SUBSCRIBED for and on behalf of the said NETWORK RAIL INFRASTRUCTURE LIMITED in the presence of the witness signing and whose particulars are as undernoted at **[ ]** on **[ ]** by:-

Authorised Signatory	...…….	Witness..……
Signatory's Name	…….....	Witness Name..…….....
		Witness Address……...
		…….

SUBSCRIBED for and on behalf of the said **[ ]** COUNCIL at **[ ]** on **[ ]** by the person hereunder subscribing, in the presence of the witness subscribing opposite and whose details are set out below:

.....	.....
Signatory (Status)	Witness (Signature)
.....	.....
Signatory (Full Name)	Witness (Full Name)
	.....
	Witness (Address)

This is the Schedule referred to in the foregoing Agreement between Network Rail Infrastructure Limited and City of Edinburgh Council

Schedule

Part 1

Particulars of Works

Those works referable to the planning, design, construction, maintenance and use of the Bridge all as detailed in or provided for by the Asset Protection Agreement.

Part 2

Notice Details

Part 1

(a) Network Rail's address for the service of notices is:

Network Rail Infrastructure Limited
Buchanan House
58 Port Dundas Road
Glasgow
G4 0LQ

Fax: 0141 555 4931

All written notices to be marked:

URGENT: ATTENTION OF THE ROUTE DIRECTOR

(b) The address for service of notices for the Grantees is:

[

]

Fax: **[** **]**

All written notices to be marked:

URGENT: ATTENTION OF **[** **]**

Part 2

(a) Network Rail's address for the service of notices under Clause 2.1 is:

Network Rail Infrastructure Limited
Buchanan House
58 Port Dundas Road
Glasgow
G4 0LQ

Fax: 0141 555 4931

All written notices to be marked:

URGENT: ATTENTION OF THE ROUTE DIRECTOR

(b) The address for service of notices under Clause 2.1 for the Grantees is:

[

]

Fax: **[** **]**

All written notices to be marked:

URGENT: ATTENTION OF **[** **]**

Plan of Location

THIS IS SCHEDULE PART 28 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 28

CERTIFICATES

PART A - NETWORK CERTIFICATE

This document is applicable to the Network Performance Test as envisaged by section 23.16 of the Employer's Requirements and certifies in accordance with Clause 47.3 of this Agreement that the Edinburgh Tram Network has passed the test criteria in section 23.16 of the Employer's Requirements to the satisfaction of **tie's** Representative by meeting or exceeding:

(i) the Punctuality Service Element target in section 2.16 of the Employer's Requirements over twenty-eight days measured in accordance with this Agreement;

(ii) the sub-station and UPS demonstration test in accordance with section 23.16.4 of the Employer's Requirements; and

(iii) the tram changeover test in accordance with section 23.16.5 of the Employer's Requirements.

The necessary test results are listed in Annex 1 to this Certificate including any agreed exclusions that have been applied.

tie's Representative

Signature ……..

Name (in Block Capitals) ……

Original Certificate to be issued to: **tie**
Copies to be issued to: Infraco, the Tram Supplier, the Tram Maintainer and **tie's** Representative

PART B - RELIABILITY CERTIFICATE

This document is applicable to the Network Reliability Test as envisaged by section 23.17 of the Employer's Requirements for ……. and certifies in accordance with Clause 47.4 of this Agreement that this System has passed the test criteria to the satisfaction of **tie's** Representative by meeting or exceeding the Target Value for that System in Table 45 of the Employer's Requirements over the required number of Periods. The necessary test results are listed in Annex 1 to this Certificate including any agreed exclusions that have been applied.

tie's Representative

Signature ……..

Name (in Block Capitals) ……

Original Certificate to be issued to: **tie**

Copies to be issued to: Infraco, the Tram Supplier and the Tram Maintainer and **tie's** Representative

PART C - TRAM RELIABILITY CERTIFICATE

This document is applicable to Tram Number: …… and certifies that it has achieved Reliability as defined in accordance with the Tram Supply Agreement to the satisfaction of the Tram Inspector by operating for two consecutive Reporting Periods in passenger carrying service without being a Tram Maintainer Late Tram and that during the same two Reporting Periods it has travelled a distance in excess of 10,000 kilometres. The necessary test results are listed in Annex 1 to this Certificate including any agreed exclusions that have been applied.

Tram Inspector

Signature ……..

Name (in Block Capitals) ……

Original Certificate to be issued to: **tie**
Copies to be issued to: Infraco, the Tram Supplier, the Tram Maintainer and Tram Inspector



THIS IS SCHEDULE PART 29 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 29

TIE AND CEC POLICIES

A TIE POLICIES

tie Drug and Alcohol Policy – *PS_625_Drugs_and_Alcohol_Policy*

Tram Project Safety Policy Statement – *DEL.HSQE.105_Tram_Safety_Policy*

Tram Quality Policy Statement – *DEL.HSQE.103_Tram_Quality_Policy*

Tram Project Environmental & Sustainability Policy Statement – *DEL.HSQE.101_Tram_Environmental_Policy*

Electromagnetic Compatibility (EMC) Management Policy – *Y170CR1*

Noise and Vibration Policy – *Noise_and_Vibration_March _2006*

B HEALTH AND SAFETY INFORMATION

Health and Safety Information

Appendix A – Health and Safety Issues - *DEL.HSQE.1123*

Appendix B – Register of Insitu Hazard Identification Forms – *HI/01-HI/06, HI/08-HI/37 & HI/39-HI/54*

Appendix C – Health & Safety Information – Infraco - *DEL.HSQE.1122*

Summary of Health and Safety File

Summary_of_Health_and_Safety

Project Safety and Quality Interface

DEL.HSQE.1010

C TRAM DESIGN MANUAL

Edinburgh Tram Design Manual

THIS IS SCHEDULE PART 30 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE 30

INFRACO PROPOSALS

	Bilfinger Berger – Siemens Consortium								
	Edinburgh Tram Network								
	Infraco Proposals – Civil								
1	**Introduction**								
1.1	BBS proposals for Civil Works are the SDS Design, to be developed and finalised to Issued For Construction (IFC) status under the Design Management Plan in Schedule Part 14.								
1.2	The Design is, at present, incomplete or not issued to BBS for some Sections of the Works								
1.3	We refer to the Design Due Diligence Summary Report Rev 2B 18.02.2008, Appendix C								
1.4	The Design will, where possible, be developed and finalised in accordance with Section 3.4, Pricing Assumptions included in Part 4 of the Schedule to the Infraco Contract								
1.5	Part 4 of the Schedule deals with Notified Departures from the Pricing Assumptions								
Appendix A	Document List								
Appendix B	Due Diligence Summary Report Rev 2B 18.02.2008								
Appendix C	Construction Support by SDS								
2	**Requirements for Development and Finalisation of SDS Design**								
2.1	**System Wide**								
				Information from BBS to SDS	Description of Design completion activities				
2.1.1	**Surveys**								
2.1.1.1	Surveys need to be completed to ensure a safe and economic design.				see Sections				
2.1.1.2	Confirm adequacy of existing structures and that as built records and/or valid historical surveys are acceptable.				see Sections				
2.1.1.3	Monitoring requirements need to be defined.				see Sections				
2.2	**Land Made Available**								
2.2.1	Available land is to be identified in drawing and setting out data format.				Available land is to be identified in drawing and setting out data format.				
2.3	**Risks**								
2.3.2	Construction risks related to design are to be identified.				Residual Risk from Design/Designer Hazard Log to be completed for all Design packages				
2.4	**Construction Support**								
	Construction Support by SDS Site Staff				See Appendix C				

	Infraco Proposals and Requirements for Development and Finalisation of SDS Design		
	Section 1A		
		Information from BBS to SDS	**Description of Design completion activities**
1A.1	**Trackform**		
1A.1.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		
1A.1.2	Cross sections required to reflect BBS's selected Track System, including minimum track construction depths (top of rail to formation) with corresponding formation condition requirements.	SDS believe that loadings are required to enable them to complete this Design activity	Incorporate BBS selected Trackform on drawings and confirm minimum track construction depth and corresponding formation condition requirement as Pricing Assumption or at some other depth condition measure to be agreed/approved by SDS, BBS, tie and CEC
1A.2	**Sytems and Power Cable Ducts**		
1A.2.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Information on cabling requirements to be supplied to SDS by BBS	Design duct group and spacing to accommodate cabling requirements and incorporate information on drawings
	Geometry		
1A.3	**Horizontal Alignment**		
1A.3.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design
1A.3.2	Confirmation required that alignment is compatible with CAF Tram DKE and LOD.		Incorporate CAF Tram DKE in Design
1A.4	**Vertical Alignment**		

				Information from BBS to SDS	**Description of Design completion activities**	
1A.4.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1A.4.2	Revise alignment, where possible and where Programme permits for on-street section to minimise Roads work-scope.				Revise, generally raise, vertical alignment of Track	
1A.4.3	Revised alignment required to facilitate direct fixing of rails to structures and guideway.				Revise, lower, vertical alignment of Track	
1A.5	**Tramstops**					
1A.5.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1A.6	**Sub-station Buildings**					
1A.6.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information on Sub-station equipment to be supplied to SDS by BBS	Complete Design	
1A.7	**OLE Foundations**					
1A.7.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information from BBS to be issued on OLE poles, including loadings.	Design OLE Foundations	
1A.8	**Site Clearance**					
1A.8.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1A.9	**Earthworks**					
1A.9.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Earthworks Design	

				Information from BBS to SDS	**Description of Design completion activities**	
1A.9.2	Requirements for excavation and filling below Earthworks Outline to be designed and specified and assessment of anticipated formation conditions				Standard Details for treatment of low CBR or Stiffness or Soft Material; excavate and replace with class 6, Lime Modification, Geotextiles	
1A.9.3					Extent; length, width and depth of areas requiring earthworks below Earthworks Outline	
1A.9.4	Formation requirements to be confirmed.				CBR or Stiffness Requirements at Formation for Highways and Track	
1A.9.5	Requirements for excavation and disposal of contaminated material, and refilling of void, to be designed and specified.				Extent; length, width and depth of areas requiring earthworks below Earthworks Outline and materials to be used for refilling where required	
1A.9.6	Special Geotechnical measures, e.g. embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.				embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.	
1A.10	**Roads**					
1A.10.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	

				Information from BBS to SDS	**Description of Design completion activities**	
1A.10.2	Subject to survey, pavement design to be developed and finalised to minimise work scope				Pavement design is to be revised to a plane and re-surface (new regulating and surface course only) when survey information is available and where it confirms the feasability of this design solution Note This activity is an alternative to the Vertical Alignment activity above)	
1A.10.3	Further pavement surveys and assessments are required.				GPR and/or Pavement Condition surveys as required by 1A.10.2 (above)	
1A.11	**Drainage**					
1A.11.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1A.11.2	Requirements for maximising use of and connection to existing drainage network to be confirmed.				Review and complete design	
1A.12	**Landscaping**					
1A.12.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1A.13	**Accommodation Works**					
1A.13.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
	Structures (Bridges and Walls)					
1A.14	**W1 Lindsay Road**					

				Information from BBS to SDS	**Description of Design completion activities**	
1A.14.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1A.15	**S16 Victoria Dock Entrance**					
1A.15.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1A.16	**S17 Tower Place**					
1A.16.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	

	Infraco Proposals and Requirements for Development and Finalisation of SDS Design		
	Section 1B		
		Information from BBS to SDS	**Description of Design completion activities**
1B.1	**Trackform**		
1B.1.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		
1B.1.2	Cross sections required to reflect BBS's selected Track System, including minimum track construction depths (top of rail to formation) with corresponding formation condition requirements.		Incorporate BBS selected Trackform on drawings and confirm minimum track construction depth and corresponding formation condition requirement as Pricing Assumption or at some other depth condition measure to be agreed/approved by SDS, BBS, tie and CEC
1B.2	**Sytems and Power Cable Ducts**		
1B.2.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Information on cabling requirements to be supplied to SDS by BBS	Design duct group and spacing to accommodate cabling requirements and incorporate information on drawings
	Geometry		
1B.3	**Horizontal Alignment**		
1B.3.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design
1B.3.2	Confirmation required that alignment is compatible with CAF Tram DKE and LOD.		Incorporate CAF Tram DKE in Design
1B.4	**Vertical Alignment**		

				Information from BBS to SDS	**Description of Design completion activities**	
1B.4.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1B.4.2	Revise alignment, where possible and where Programme permits to minimise Roads work-scope.				Revise, generally raise, vertical alignment of Track	
1B.5	**Tramstops**					
1B.5.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1B.6	**Sub-station Buildings**					
1B.6.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information on Sub-station equipment to be supplied to SDS by BBS	Complete Design	
1B.7	**OLE Foundations**					
1B.7.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information from BBS to be issued on OLE poles, including loadings.	Design OLE Foundations	
1B.8	**Site Clearance**					
1B.8.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1B.9	**Earthworks**					
1B.9.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Earthworks Design	

				Information from BBS to SDS	Description of Design completion activities	
1B.9.2	Requirements for excavation and filling below Earthworks Outline to be designed and specified and assessment of anticipated formation conditions				Standard Details for treatment of low CBR or Stiffness or Soft Material; excavate and replace with class 6, Lime Modification, Geotextiles	
1B.9.3					Extent; length, width and depth of areas requiring earthworks below Earthworks Outline	
1B.9.4	Formation requirements to be confirmed.				CBR or Stiffness Requirements at Formation for Highways and Track	
1B.9.5	Requirements for excavation and disposal of contaminated material, and refilling of void, to be designed and specified.				Extent; length, width and depth of areas requiring earthworks below Earthworks Outline and materials to be used for refilling where required	
1B.10	**Roads**					
1B.10.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design					
1B.10.2	Subject to survey, pavement design to be developed and finalised to minimise work scope				Pavement design is to be revised to a plane and re-surface (new regulating and surface course only) when survey information is available and where it confirms the feasability of this design solution Note This activity is an alternative to the Vertical Alignment activity above)	
1B.10.3	Further pavement surveys and assessments are required.				GPR and/or Pavement Condition surveys as required by 1B.10.2 (above)	

				Information from BBS to SDS	**Description of Design completion activities**	
1B.11	**Drainage**					
1B.11.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1B.11.2	Requirements for maximising use of and connection to existing drainage network to be confirmed.				Review and complete design	
1B.12	**Landscaping**					
1B.12.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design					
1B.13	**Accommodation Works**					
1B.13.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
	Structures (Bridges and Walls)					
1B.14	**S18 Leith Walk Railway**					
1B.14.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	

	Infraco Proposals and Requirements for Development and Finalisation of SDS Design		
	Section 1C		
		Information from BBS to SDS	**Description of Design completion activities**
1C.1	**Trackform**		
1C.1.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design
1C.1.2	Cross sections required to reflect BBS's selected Track System, including minimum track construction depths (top of rail to formation) with corresponding formation condition requirements.		Incorporate BBS selected Trackform on drawings and confirm minimum track construction depth and corresponding formation condition requirement as Pricing Assumption or at some other depth condition measure to be agreed/approved by SDS, BBS, tie and CEC
1C.2	**Sytems and Power Cable Ducts**		
1C.2.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Information on cabling requirements to be supplied to SDS by BBS	Design duct group and spacing to accommodate cabling requirements and incorporate information on drawings
	Geometry		
1C.3	**Horizontal Alignment**		
1C.3.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design
1C.3.2	Confirmation required that alignment is compatible with CAF Tram DKE and LOD.		Incorporate CAF Tram DKE in Design
1C.4	**Vertical Alignment**		

	Section 1C		
	Information from BBS to SDS	**Description of Design completion activities**	
1C.4.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Complete Design	
1C.4.2	Revise alignment, where possible and where Programme permits to minimise Roads work-scope.	Revise, generally raise, vertical alignment of Track	
1C.5	**Tramstops**		
1C.5.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Complete Design	
1C.6	**Sub-station Buildings**		
1C.6.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Information on Sub-station equipment to be supplied to SDS by BBS	Complete Design
1C.7	**OLE Foundations**		
1C.7.1	Design to be completed to IFC status and all design consents and approvals obtained.	Information from BBS to be issued on OLE poles, including loadings.	Design OLE Foundations
1C.8	**Site Clearance**		
1C.8.1	Design to be completed to IFC status and all design consents and approvals obtained.		Complete Design
1C.9	**Earthworks**		
1C.9.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Earthworks Design

	Section 1C				
			Information from BBS to SDS	**Description of Design completion activities**	
1C.9.2	Requirements for excavation and filling below Earthworks Outline to be designed and specified and assessment of anticipated formation conditions			Standard Details for treatment of low CBR or Stiffness or Soft Material; excavate and replace with class 6, Lime Modification, Geotextiles	
1C.9.3				Extent; length, width and depth of areas requiring earthworks below Earthworks Outline	
1C.9.4	Formation requirements to be confirmed.			CBR or Stiffness Requirements at Formation for Highways and Track	
1C.9.5	Requirements for excavation and disposal of contaminated material, and refilling of void, to be designed and specified.			Extent; length, width and depth of areas requiring earthworks below Earthworks Outline and materials to be used for refilling where required	
1C.10	**Roads**				
1C.10.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				
1C.10.2	Subject to survey, pavement design to be developed and finalised to minimise work scope			Pavement design is to be revised to a plane and re-surface (new regulating and surface course only) when survey information is available and where it confirms the feasability of this design solution Note This activity is an alternative to the Vertical Alignment activity above)	

	Section 1C		
	Information from BBS to SDS	**Description of Design completion activities**	
1C.10.3	Further pavement surveys and assessments are required.	GPR and/or Pavement Condition surveys as required by 1C.10.2 (above)	
1C.11	**Drainage**		
1C.11.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Complete Design	
1C.11.2	Requirements for maximising use of and connection to existing drainage network to be confirmed.	Review and complete design	
1C.12	**Landscaping**		
1C.12.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Complete Design	
1C.13	**Accommodation Works**		
1C.13.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Complete Design	

	Infraco Proposals and Requirements for Development and Finalisation of SDS Design		
	Section 1D		
		Information from BBS to SDS	**Description of Design completion activities**
1D.1	**Trackform**		
1D.1.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		
1D.1.2	Cross sections required to reflect BBS's selected Track System, including minimum track construction depths (top of rail to formation) with corresponding formation condition requirements.		Incorporate BBS selected Trackform on drawings and confirm minimum track construction depth and corresponding formation condition requirement as Pricing Assumption or at some other depth condition measure to be agreed/approved by SDS, BBS, tie and CEC
1D.2	**Sytems and Power Cable Ducts**		
1D.2.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Information on cabling requirements to be supplied to SDS by BBS	Design duct group and spacing to accommodate cabling requirements and incorporate information on drawings
	Geometry		
1D.3	**Horizontal Alignment**		
1D.3.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design
1D.3.2	Confirmation required that alignment is compatible with CAF Tram DKE and LOD.		Incorporate CAF Tram DKE in Design
1D.4	**Vertical Alignment**		

				Information from BBS to SDS	**Description of Design completion activities**	
1D.4.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1D.4.2	Revise alignment, where possible and where Programme permits to minimise Roads work-scope.				Revise, generally raise, vertical alignment of Track	
1D.5	**Tramstops**					
1D.5.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1D.6	**Sub-station Buildings**					
1D.6.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information on Sub-station equipment to be supplied to SDS by BBS	Complete Design	
1D.7	**OLE Foundations**					
1D.7.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information from BBS to be issued on OLE poles, including loadings.	Design OLE Foundations	
1D.8	**Site Clearance**					
1D.8.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1D.9	**Earthworks**					
1D.9.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Earthworks Design	

				Information from BBS to SDS	**Description of Design completion activities**	
1D.9.2	Requirements for excavation and filling below Earthworks Outline to be designed and specified and assessment of anticipated formation conditions				Standard Details for treatment of low CBR or Stiffness or Soft Material; excavate and replace with class 6, Lime Modification, Geotextiles	
1D.9.3					Extent; length, width and depth of areas requiring earthworks below Earthworks Outline	
1D.9.4	Formation requirements to be confirmed.				CBR or Stiffness Requirements at Formation for Highways and Track	
1D.9.5	Requirements for excavation and disposal of contaminated material, and refilling of void, to be designed and specified.				Extent; length, width and depth of areas requiring earthworks below Earthworks Outline and materials to be used for refilling where required	
1D.9.6	Special Geotechnical measures, e.g. embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.				embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.	
1D.10	**Roads**					
1D.10.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design					

				Information from BBS to SDS	**Description of Design completion activities**	
1D.10.2	Subject to survey, pavement design to be developed and finalised to minimise work scope				Pavement design is to be revised to a plane and re-surface (new regulating and surface course only) when survey information is available and where it confirms the feasability of this design solution Note This activity is an alternative to the Vertical Alignment activity above)	
1D.10.3	Further pavement surveys and assessments are required.				GPR and/or Pavement Condition surveys as required by 1D.10.2 (above)	
1D.11	**Drainage**					
1D.11.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1D.11.2	Requirements for maximising use of and connection to existing drainage network to be confirmed.				Review and complete design	
1D.12	**Landscaping**					
1D.12.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
1D.13	**Accommodation Works**					
1D.13.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	

	Infraco Proposals and Requirements for Development and Finalisation of SDS Design		
	Section 2A		
		Information from BBS to SDS	**Description of Design completion activities**
2A.1	**Trackform**		
2A.1.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		
2A.1.2	Cross sections required to reflect BBS's selected Track System, including minimum track construction depths (top of rail to formation) with corresponding formation condition requirements.		Incorporate BBS selected Trackform on drawings and confirm minimum track construction depth and corresponding formation condition requirement as Pricing Assumption or at some other depth condition measure to be agreed/approved by SDS, BBS, tie and CEC
2A.2	**Sytems and Power Cable Ducts**		
2A.2.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Information on cabling requirements to be supplied to SDS by BBS	Design duct group and spacing to accommodate cabling requirements and incorporate information on drawings
	Geometry		
2A.3	**Horizontal Alignment**		
2A.3.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design
2A.3.2	Confirmation required that alignment is compatible with CAF Tram DKE and LOD.		Incorporate CAF Tram DKE in Design
2A.4	**Vertical Alignment**		

				Information from BBS to SDS	**Description of Design completion activities**	
2A.4.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
2A.4.2	Revise alignment, where possible and where Programme permits to minimise Roads work-scope.				Revise, generally raise, vertical alignment of Track	
2A.4.3	Revised alignment required to facilitate direct fixing of rails to structures				Revise, lower, vertical alignment of Track	
2A.5	**Tramstops**					
2A.5.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
2A.6	**Sub-station Buildings**					
2A.6.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information on Sub-station equipment to be supplied to SDS by BBS	Complete Design	
2A.7	**OLE Foundations**					
2A.7.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information from BBS to be issued on OLE poles, including loadings.	Design OLE Foundations	
2A.8	**Site Clearance**					
2A.8.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
2A.9	**Earthworks**					
2A.9.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Earthworks Design	

				Information from BBS to SDS	**Description of Design completion activities**	
2A.9.2	Requirements for excavation and filling below Earthworks Outline to be designed and specified and assessment of anticipated formation conditions				Standard Details for treatment of low CBR or Stiffness or Soft Material; excavate and replace with class 6, Lime Modification, Geotextiles	
2A.9.3					Extent; length, width and depth of areas requiring earthworks below Earthworks Outline	
2A.9.4	Formation requirements to be confirmed.				CBR or Stiffness Requirements at Formation for Highways and Track	
2A.9.5	Requirements for excavation and disposal of contaminated material, and refilling of void, to be designed and specified.				Extent; length, width and depth of areas requiring earthworks below Earthworks Outline and materials to be used for refilling where required	
2A.9.6	Special Geotechnical measures, e.g. embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.				embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.	
2A.10	**Roads**					
2A.10.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design					

				Information from BBS to SDS	**Description of Design completion activities**	
2A.10.2	Subject to survey, pavement design to be developed and finalised to minimise work scope				Pavement design is to be revised to a plane and re-surface (new regulating and surface course only) when survey information is available and where it confirms the feasability of this design solution Note This activity is an alternative to the Vertical Alignment activity above)	
2A.10.3	Further pavement surveys and assessments are required.				GPR and/or Pavement Condition surveys as required	
2A.11	**Drainage**					
2A.11.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
2A.11.2	Requirements for maximising use of and connection to existing drainage network to be confirmed.				Review and complete design	
2A.12	**Landscaping**					
2A.12.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design					
2A.13	**Accommodation Works**					
2A.13.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
	Structures (Bridges and Walls)					
2A.14	**S19 Haymarket Viaduct**					

				Information from BBS to SDS	**Description of Design completion activities**	
2A.14.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
2A.14.2	Requirements for a design condition survey of the existing wall.				Carry out or complete Condition Survey	
2A.14.3	Requirements for special foundations at Pier 4 and Abutment E to be confirmed.				Review Design	
2A.15	**S20 Russell Road**					
2A.15.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
2A.15.2	Possible re-design (subject to programme allowance) of sub-structure to improve buildability			refer to Appendix B	refer to Appendix B	

	Infraco Proposals and Requirements for Development and Finalisation of SDS Design		
	Section 5A		
		Information from BBS to SDS	**Description of Design completion activities**
5A.1	**Trackform**		
5A.1.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		
5A.1.2	Cross sections required to reflect BBS's selected Track System, including minimum track construction depths (top of rail to formation) with corresponding formation condition requirements.		Incorporate BBS selected Trackform on drawings and confirm minimum track construction depth and corresponding formation condition requirement as Pricing Assumption or at some other depth condition measure to be agreed/approved by SDS, BBS, tie and CEC
5A.2	**Sytems and Power Cable Ducts**		
5A.2.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Information on cabling requirements to be supplied to SDS by BBS	Design duct group and spacing to accommodate cabling requirements and incorporate information on drawings
	Geometry		
5A.3	**Horizontal Alignment**		
5A.3.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design
5A.3.2	Confirmation required that alignment is compatible with CAF Tram DKE and LOD.		Incorporate CAF Tram DKE in Design
5A.4	**Vertical Alignment**		

				Information from BBS to SDS	**Description of Design completion activities**	
5A.4.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5A.4.2	Revised alignment required to facilitate direct fixing of rails to structures				Revise, lower, vertical alignment of Track	
5A.5	**Tramstops**					
5A.5.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5A.6	**Sub-station Buildings**					
5A.6.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information on Sub-station equipment to be supplied to SDS by BBS	Complete Design	
5A.7	**OLE Foundations**					
5A.7.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information from BBS to be issued on OLE poles, including loadings.	Design OLE Foundations	
5A.8	**Site Clearance**					
5A.8.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5A.9	**Earthworks**					
5A.9.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Earthworks Design	

				Information from BBS to SDS	**Description of Design completion activities**	
5A.9.2	Requirements for excavation and filling below Earthworks Outline to be designed and specified and assessment of anticipated formation conditions				Standard Details for treatment of low CBR or Stiffness or Soft Material; excavate and replace with class 6, Lime Modification, Geotextiles	
5A.9.3					Extent; length, width and depth of areas requiring earthworks below Earthworks Outline	
5A.9.4	Formation requirements to be confirmed.				CBR or Stiffness Requirements at Formation for Highways and Track	
5A.9.5	Requirements for excavation and disposal of contaminated material, and refilling of void, to be designed and specified.				Extent; length, width and depth of areas requiring earthworks below Earthworks Outline and materials to be used for refilling where required	
5A.9.6	Special Geotechnical measures, e.g. embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.				embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.	
5A.10	**Roads**					
5A.10.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design					

				Information from BBS to SDS	**Description of Design completion activities**	
5A.10.2	Subject to survey, pavement design to be developed and finalised to minimise work scope				Pavement design is to be revised to a plane and re-surface (new regulating and surface course only) when survey information is available and where it confirms the feasability of this design solution Note This activity is an alternative to the Vertical Alignment activity above)	
5A.10.3	Further pavement surveys and assessments are required.				GPR and/or Pavement Condition surveys as required by xxxx (above)	
5A.11	**Drainage**					
5A.11.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5A.11.2	Requirements for maximising use of and connection to existing drainage network to be confirmed.				Review and complete design	
5A.12	**Landscaping**					
5A.12.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design					
5A.13	**Accommodation Works**					
5A.13.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
	Structures (Bridges and Walls)					
5A.14	**W3 Russell Road (Wall) No 1**					

				Information from BBS to SDS	**Description of Design completion activities**	
5A.14.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5A.15	**W4 Russell Road (Wall) No 2**					
5A.15.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5A.16	**W18 Murrayfield Tramstop (Wall)**					
5A.16.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Further GI required to inform Design	
5A.17	**S21A Roseburn Street Viaduct**					
5A.17.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5A.17.2	Possible re-design to reduce scope and cost.				Re-Design to 2 separate single span structures with re-inforced earth walled embankments replacing removed spans	
5A.17.3	Further GI required to confirm foundation design.				Further GI, in conjunction with GI for W18 (see above) to ascertain extent of soft layer	
5A.17.4	Re-design required to allow cost efficient fabrication of structural steel.			Appoint steelwork sub-contractor	Liaise with BBS and steelwork sub-contractor and re-design/re-detail accordingly	
5A.18	**S21B Murrayfield Stadium (Wall)**					

				Information from BBS to SDS	**Description of Design completion activities**	
5A.18.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5A.19	**S21C Murrayfield Stadium Underpass**					
5A.19.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5A.20	**S21D Murrayfield Training Pitches**					
5A.20.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5A.21	**S21E Water of Leith**					
5A.21.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5A.21.2	Subject to Programme allowance, redesign pier foundations to improve buildability.				Re-design with 2 No larger dia bored piles (mono-piles), one per column. Design a direct connection to the columns, to be made within the pile casing. Pile casings will be cut off at river bed level	
5A.21.3	Re-design required to allow cost efficient fabrication of structural steel.			Appoint steelwork sub-contractor	Liaise with BBS and steelwork sub-contractor and re-design/re-detail accordingly	
5A.22	**W8 Baird Drive**					
5A.22.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design					
5A.23	**S22 Balgreen Road (A and B)**					

				Information from BBS to SDS	**Description of Design completion activities**	
5A.23.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design					

	Infraco Proposals and Requirements for Development and Finalisation of SDS Design		
	Section 5B		
		Information from BBS to SDS	**Description of Design completion activities**
5B.1	**Trackform**		
5B.1.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design
5B.1.2	Cross sections required to reflect BBS's selected Track System, including minimum track construction depths (top of rail to formation) with corresponding formation condition requirements.		Incorporate BBS selected Trackform on drawings and confirm minimum track construction depth and corresponding formation condition requirement as Pricing Assumption or at some other depth condition measure to be agreed/approved by SDS, BBS, tie and CEC
5B.2	**Sytems and Power Cable Ducts**		
5B.2.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Information on cabling requirements to be supplied to SDS by BBS	Design duct group and spacing to accommodate cabling requirements and incorporate information on drawings
	Geometry		
5B.3	**Horizontal Alignment**		
5B.3.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design
5B.3.2	Confirmation required that alignment is compatible with CAF Tram DKE and LOD.		Incorporate CAF Tram DKE in Design
5B.4	**Vertical Alignment**		

				Information from BBS to SDS	**Description of Design completion activities**	
5B.4.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5B.4.2	Revised alignment required to facilitate direct fixing of rails to structures and guideway.				Revise, lower, vertical alignment of Track	
5B.5	**Tramstops**					
5B.5.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5B.6	**Sub-station Buildings**					
5B.6.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information on Sub-station equipment to be supplied to SDS by BBS	Complete Design	
5B.7	**OLE Foundations**					
5B.7.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information from BBS to be issued on OLE poles, including loadings.	Design OLE Foundations	
5B.8	**Site Clearance**					
5B.8.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5B.9	**Earthworks**					
5B.9.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Earthworks Design	

				Information from BBS to SDS	**Description of Design completion activities**	
5B.9.2	Requirements for excavation and filling below Earthworks Outline to be designed and specified and assessment of anticipated formation conditions				Standard Details for treatment of low CBR or Stiffness or Soft Material; excavate and replace with class 6, Lime Modification, Geotextiles	
5B.9.3					Extent; length, width and depth of areas requiring earthworks below Earthworks Outline	
5B.9.4	Formation requirements to be confirmed.				CBR or Stiffness Requirements at Formation for Highways and Track	
5B.9.5	Requirements for excavation and disposal of contaminated material, and refilling of void, to be designed and specified.				Extent; length, width and depth of areas requiring earthworks below Earthworks Outline and materials to be used for refilling where required	
5B.9.6	Special Geotechnical measures, e.g. embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.				embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.	
5B.10	**Roads**					
5B.10.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	

				Information from BBS to SDS	**Description of Design completion activities**	
5B.10.2	Subject to survey, pavement design to be developed and finalised to minimise work scope				Pavement design is to be revised to a plane and re-surface (new regulating and surface course only) when survey information is available and where it confirms the feasability of this design solution Note This activity is an alternative to the Vertical Alignment activity above)	
5B.10.3	Further pavement surveys and assessments are required.				GPR and/or Pavement Condition surveys as required by 5B.10.2 (above)	
5B.11	**Drainage**					
5B.11.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5B.11.2	Requirements for maximising use of and connection to existing drainage network to be confirmed.				Review and complete design	
5B.12	**Landscaping**					
5B.12.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5B.13	**Accommodation Works**					
5B.13.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
	Structures (Bridges and Walls)					
5B.14	**W9 Balgreen Road (Wall)**					

				Information from BBS to SDS	**Description of Design completion activities**	
5B.14.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5B.15	**S23 Carrick Knowe**					
5B.15.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5B.15.2	Completed design to have foundations outwith Track Support Zone ?				Review and Revise Design	
5B.16	**S26 South Gyle Access Road**					
5B.16.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5B.17	**W11 Bankhead Drive Tramstop (Wall)**					
5B.17.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5B.18	**S27 Edinburgh Park Station Viaduct**					
5B.18.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5B.18.2	Possible re-design to reduce scope and cost				Redesign piers with flared tops and/or crossheads so that pre-cast deck beams can be placed without the need for Temporary Works (temporary beam supports)	
5B.18.3	Completed design to have foundations outwith Track Support Zone				Review and Revise Design	

	Infraco Proposals and Requirements for Development and Finalisation of SDS Design		
	Section 5C		
		Information from BBS to SDS	**Description of Design completion activities**
5C.1	**Trackform**		
5C.1.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design
5C.1.2	Cross sections required to reflect BBS's selected Track System, including minimum track construction depths (top of rail to formation) with corresponding formation condition requirements.		Incorporate BBS selected Trackform on drawings and confirm minimum track construction depth and corresponding formation condition requirement as Pricing Assumption or at some other depth condition measure to be agreed/approved by SDS, BBS, tie and CEC
5C.2	**Sytems and Power Cable Ducts**		
5C.2.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Information on cabling requirements to be supplied to SDS by BBS	Design duct group and spacing to accommodate cabling requirements and incorporate information on drawings
	Geometry		
5C.3	**Horizontal Alignment**		
5C.3.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design
5C.3.2	Confirmation required that alignment is compatible with CAF Tram DKE and LOD.		Incorporate CAF Tram DKE in Design
5C.4	**Vertical Alignment**		

				Information from BBS to SDS	**Description of Design completion activities**	
5C.4.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5C.4.2	Revised alignment required to facilitate direct fixing of rails to structures				Revise, lower, vertical alignment of Track	
5C.5	**Tramstops**					
5C.5.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5C.6	**Sub-station Buildings**					
5C.6.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information on Sub-station equipment to be supplied to SDS by BBS	Complete Design	
5C.7	**OLE Foundations**					
5C.7.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information from BBS to be issued on OLE poles, including loadings.	Design OLE Foundations	
5C.8	**Site Clearance**					
5C.8.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5C.9	**Earthworks**					
5C.9.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Earthworks Design	

				Information from BBS to SDS	**Description of Design completion activities**	
5C.9.2	Requirements for excavation and filling below Earthworks Outline to be designed and specified and assessment of anticipated formation conditions				Standard Details for treatment of low CBR or Stiffness or Soft Material; excavate and replace with class 6, Lime Modification, Geotextiles	
5C.9.3					Extent; length, width and depth of areas requiring earthworks below Earthworks Outline	
5C.9.4	Formation requirements to be confirmed.				CBR or Stiffness Requirements at Formation for Highways and Track	
5C.9.5	Requirements for excavation and disposal of contaminated material, and refilling of void, to be designed and specified.				Extent; length, width and depth of areas requiring earthworks below Earthworks Outline and materials to be used for refilling where required	
5C.9.6	Special Geotechnical measures, e.g. embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.				embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.	
5C.10	**Roads**					
5C.10.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design					

				Information from BBS to SDS	**Description of Design completion activities**	
5C.10.2	Subject to survey, pavement design to be developed and finalised to minimise work scope				Pavement design is to be revised to a plane and re-surface (new regulating and surface course only) when survey information is available and where it confirms the feasability of this design solution Note This activity is an alternative to the Vertical Alignment activity above)	
5C.10.3	Further pavement surveys and assessments are required.				GPR and/or Pavement Condition	
5C.11	**Drainage**					
5C.11.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5C.11.2	Requirements for maximising use of and connection to existing drainage network to be confirmed.				Review and complete design	
5C.12	**Landscaping**					
5C.12.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5C.13	**Accommodation Works**					
5C.13.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
	Structures (Bridges and Walls)					
5C.14	**W19 Gyle Tramstop (Wall)**					

				Information from BBS to SDS	**Description of Design completion activities**	
5C.14.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
5C.15	**S28 A8 Underpass**					
5C.15.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design					
5C.15.2	Subject to Programme allowance, re-design to incorporate a more economical piling solution along with further GI to confirm ground water regime.				subject to programme allowance, re-design secant piles as contiguous piles	
5C.15.3	Re-design for BT duct crossing (over structure)				re-design section of underpass to facilitate construction under BT duct	

	Infraco Proposals and Requirements for Development and Finalisation of SDS Design									
	Depot (Section 6)									
				Information from BBS to SDS	**Description of Design completion activities**					
6.1.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design					
6.2	**Building**									
6.2.1	Liaison on steelwork design for Depot Building may be required to allow BBS to comply with BAA requirements for notice period to lower crane jibs if BAA require use of the auxiliary runway. Any re-design is unlikely or minimal				Liaise with structural steel subcontractor on design of steelwork, where required, to allow BBS to comply with BAA requirements for notice period to lower crane jibs if BAA require use of the auxiliary runway.					
6.3	**Trackform**									
6.3.1	Cross sections required to reflect BBS's selected Track System, including minimum track construction depths (top of rail to formation) with corresponding formation condition requirements.									
	Structures (Bridges and Walls)									
6.4	**S32 Depot Access Bridge (or Depot Access Bridges)**									
6.4.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Design to be completed from basic information, discussed at meeting on xxxx between BBS and SDS. The DABs are to be 2 separate structures. BBS will work with SDS to develop a cost effective Design					

	Infraco Proposals and Requirements for Development and Finalisation of SDS Design		
	Section 7A		
		Information from BBS to SDS	**Description of Design completion activities**
7A.1	**Trackform**		
7A.1.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		
7A.1.2	Cross sections required to reflect BBS's selected Track System, including minimum track construction depths (top of rail to formation) with corresponding formation condition requirements.		Incorporate BBS selected Trackform on drawings and confirm minimum track construction depth and corresponding formation condition requirement as Pricing Assumption or at some other depth condition measure to be agreed/approved by SDS, BBS, tie and CEC
7A.2	**Sytems and Power Cable Ducts**		
7A.2.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design	Information on cabling requirements to be supplied to SDS by BBS	Design duct group and spacing to accommodate cabling requirements and incorporate information on drawings
	Geometry		
7A.3	**Horizontal Alignment**		
7A.3.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design		Complete Design
7A.3.2	Confirmation required that alignment is compatible with CAF Tram DKE and LOD.		Incorporate CAF Tram DKE in Design
7A.4	**Vertical Alignment**		

				Information from BBS to SDS	**Description of Design completion activities**	
7A.4.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
7A.4.2	Revised alignment required to facilitate direct fixing of rails to structures				Revise, lower, vertical alignment of Track	
7A.5	**Tramstops**					
7A.5.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
7A.6	**Sub-station Buildings**					
7A.6.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information on Sub-station equipment to be supplied to SDS by BBS	Complete Design	
7A.7	**OLE Foundations**					
7A.7.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design			Information from BBS to be issued on OLE poles, including loadings.	Design OLE Foundations	
7A.8	**Site Clearance**					
7A.8.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
7A.9	**Earthworks**					
7A.9.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Earthworks Design	

				Information from BBS to SDS	Description of Design completion activities	
7A.9.2	Requirements for excavation and filling below Earthworks Outline to be designed and specified and assessment of anticipated formation conditions				Standard Details for treatment of low CBR or Stiffness or Soft Material; excavate and replace with class 6, Lime Modification, Geotextiles	
7A.9.3					Extent; length, width and depth of areas requiring earthworks below Earthworks Outline	
7A.9.4	Formation requirements to be confirmed.				CBR or Stiffness Requirements at Formation for Highways and Track	
7A.9.5	Requirements for excavation and disposal of contaminated material, and refilling of void, to be designed and specified.				Extent; length, width and depth of areas requiring earthworks below Earthworks Outline and materials to be used for refilling where required	
7A.9.6	Special Geotechnical measures, e.g. embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.				embankment slope steepening (by selection of fill type, re-inforced earth) cut slope steepening (by slope drains, buttresses, soil nails) soft ground treatment (by surcharging/consolidation, load transfer platforms) to be designed and specified.	
7A.9.7	Design special Geotechnical measures for Gogar Landfill Site. Solution to be dev				Design solution to be developed with BBS Engineers for surcharge embankment with appropriate consolidation period and excavation and replacement in the vicinity of Gogarburn Bridge East Abutment	

				Information from BBS to SDS	**Description of Design completion activities**	
7A.10	**Roads**					
7A.10.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design					
7A.11	**Drainage**					
7A.11.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
7A.11.2	Requirements for maximising use of and connection to existing drainage network to be confirmed.				Review and complete design	
7A.12	**Landscaping**					
7A.12.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
7A.13	**Accommodation Works**					
7A.13.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
	Structures (Bridges and Walls)					
7A.14	**S29 Gogar Burn**					
7A.14.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
7A.15	**S30, 31 and 34 Gogarburn Culverts 1,2 and 3**					
7A.15.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	
7A.16	**W14 and 15 Gogarburn Walls 1 and 2**					

				Information from BBS to SDS	**Description of Design completion activities**	
7A.16.1	Design to be completed to IFC status, all design consents and approvals obtained and BBS will construct IFC Design				Complete Design	

31st March 2008

Updated Proposal Submission

Edinburgh Tram Network

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BILFINGER BERGER Civil

SIEMENS

31st March 2008

Updated Proposal Submission

Edinburgh Tram Network

Section 1: Overall PM Concept

Part 1 – Programme and Project Execution

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1 Project Management Plan

1.1 Introduction

This document summarises the fundamentals of the BBS Consortium project management system, its approach, key tools and procedures. It explains the general approach for all the organizational units and its implementation through appropriate planning and setting appropriate targets.

When Consortium, BBS (Bilfinger+Berger, Siemens) or BBS Consortium is used in this document or its annexes, it stands only for the E&M part of the Edinburgh Tram Network.

1.2 Customer Requirements

As requested by the Employer's Requirements, the Consortium presents herewith the General Project Management Plan.
The following graphic illustrates how the Employer's requirements will be implemented as part of the project implementation philosophy. The project management system provides the proven approach to achieve the desired results to the complete satisfaction of the Employer.



Figure 1: Management System Cycle

1.3 Project Management Approach

The cornerstone for the Consortium Project Management Approach will be the implementation of the Edinburgh Tram Network Project. The Management System

is Risk-Based, Process-Driven and will integrate the various Management Systems of the Partners and Sub-systems. Thru implementation of an integrated management system, Infraco can integrate the various project management operations within each and every sub-system of the project to better assure implementation of the project requirements and also provide the objective evidence needed to demonstrate compliance.

The process, with a strong Systems Engineering and Systems Integration lead, proves crucial in support of maintaining the integrated operation method for overall mechanical and electrical system engineering and civil engineering. The Management System branches to include processes for design management, interface management, configuration & document control management, construction/installation management, RAMS and RAMS assurance management, requirements management, and information management. The entire process falls under the project Quality Management System (QMS) to ensure effective monitoring, improvement, and compliance.

The structure of the Consortium Project Management has been applied successfully in projects throughout the world. It has proven to be effective and successful in more than 20 projects worldwide. These Projects have been completed on time and within budget and are equally complex projects to the Edinburgh Tram Network Project

The Consortium Management System has proven its capabilities in some of the executed projects to successfully manage the integration and parallel execution of Civil Works and Electrical and Mechanical works to the benefit of the customer. Consequentially, the Consortium will incorporate its experienced project managers, engineers and supervisors into their management team, ensuring a smooth and professional implementation of the project.

Therefore, BBS propose to implement this well-proven Project Management structure also for this Edinburgh Tram Network Project

Table 1 Management Processes lists the management processes which are considered as the basis for the Consortium Management System and which will be described in detail with the Project Procedure Manual, which will be submitted within the first 90 days of the Project Implementation.

Management Process

- Project Organization
- Project Controls
- Project Quality Management
- Environmental Management
- Project Documentation Management
- Project Design & Engineering Management
- Interface Management
- Reliability, Availability, Maintainability
- Project Safety Management
- Testing & Commissioning
- Risk Management
- Project Acceptance Management
- Contract Management
- General Office Management

Table 1 Management Processes

2 Design Management

2.1 Design Management

Please refer to Section 2: Overall Technical Concept; Chapter 1 - System Engineering

3 Risk Management

The objective of the Risk Management is to apply proven management techniques to risk identification and to remove issues of uncertainty from the project. The specific method to achieve this objective is to follow plans and procedures for the purpose of:

- Risk identification
- Risk classification
- Recording of identified risks in the Risk Register and Risk Forms
- A risk prioritisation process
- A risk mitigation process
- A process for reviewing the status of risks and mitigation
- A risk reporting process

The Risk Management applies to all project risks, irrespective of which party suffers the consequences of the risk occurrence.

3.1 Risk Deliverables

The BBS Consortium will establish, manage, develop, maintain, update and distribute the below listed documentation:

- BBS Consortium Risk Management Plan (IRMP)
- BBS Consortium Assumption Register (IAR)
- Risk Register (IRR)
- Risk Progress Report
- Construction Risk Control Report (CRCR)
- Commissioning Risk Control Report

4 Communication Strategy

4.1 Communications Plan

The BBS Consortium will develop a "Communications Plan" and this will be submitted in accordance with the Review Procedure.

The Communications Plan will illustrate how all the communication processes, activities and issues are to be managed, progressed and satisfactorily resolved. The Communications Plan will detail how the BBS Consortium will communicate with Sub-Contractors (including Tramco), the Operator, tie, the MUDFA Contractor, key stakeholders and third parties.

The BBS Consortium will implement all the requirements of the Communications Plan.

The BBS Consortium will liaise with the relevant parties to ensure that the BBS Consortium is copied into all relevant communications that are generated by others, in order to ensure that any relevant construction related issues, such as Temporary Works and practical constraints, are identified and addressed.

4.2 Meetings

The BBS Consortium will work with tie to develop the meetings schedules and requirements for progress reporting throughout the duration of the BBS Consortium Works. The following table provides a minimum of the meetings to be held:

Meetings	Frequency	Chaired by / Minutes taken
Safety Meeting	Weekly	BBS Consortium
Management Review Meetings	Two monthly	tie/BBS Consortium alternately
Project Progress Meetings	Four weekly (Fortnightly prior to site start)	tie
Design and Planning Meetings	Fortnightly	BBS Consortium

Stakeholder & Third Party Meetings	As required	tie
Site Meetings	Weekly	BBS Consortium
Cost Review Meetings	Four weekly	tie

The primary purpose of these meetings will be to enable the BBS Consortium to advise on:

- Any safety issues;
- The current state of the programmed BBS Consortium Works;
- Progress made in the various activities;
- Communication issues;
- Third party issues; and
- Commercial issues (Including Change Control)

The BBS Consortium will propose a comprehensive meetings schedule indicating those meetings which the BBS Consortium will chair and those meetings which the BBS Consortium will attend.

Prior to commencement on site, progress meetings will be held every two weeks. The purpose of these meetings will be to review progress made by all parties, and identify and agree actions required.

The BBS Consortium will provide an agenda, for all meetings to which they are designated as Chair. The BBS Consortium will also provide appropriate documentation in advance of each of the meetings.

5 Consents and Approvals

An Overall Approvals Management Plan for the System will be developed by BBS Consortium liaising with the Operator and tie which will cover at least the following:

- all statutory Necessary Consents to be obtained, identifying in each case the applicable Relevant Authority, the person or body responsible for obtaining the statutory Necessary Consent and the intended date by which such statutory Necessary Consent is to be obtained;
- all third party Necessary Consents to be obtained, identifying in each case the applicable third party, the person or body responsible for obtaining the third party Necessary Consent and the intended date by which the third party Necessary Consent is to be obtained;
- procedures to be used in obtaining statutory Necessary Consents and third party Necessary Consents; and
- procedures for maintaining the Overall Approvals Management Plan.

The BBS Consortium will comply with all aspects of the Overall Approvals Management Plan as may be necessary to implement and maintain the Overall Approvals Management Plan.

The BBS Consortium will develop an Approvals Management Plan capable of incorporation within the Overall Approvals Management Plan and covering at least the following:

- all statutory Necessary Consents to be obtained by the BBS Consortium and the intended date by which such statutory Necessary Consents are to be obtained;
- all third party Necessary Consents to be obtained by the BBS Consortium and the intended date by which such third party Necessary Consents are to be obtained;
- procedures to be used by the BBS Consortium in obtaining statutory Necessary Consents and third party Necessary Consents required in terms of paragraphs (a) and (b)above; and
- procedures for maintaining the Overall Approvals Management Plan.

The BBS Consortium will comply with all aspects of the Approvals Management Plan as may be necessary to implement and maintain the Approvals Management Plan.

The implementation of the SDS contractor into the above mentioned Approval and Consent procedures will be based on the SDS Agreement.

6 Quality Management

6.1 General

Quality management is the state of fulfilment of specified requirements for all products and services. It consists of coordination activities to direct and control an organization with regard to quality standard DIN EN ISO 9001:2000.

6.2 ISO 9001 Quality Management System Certification

Siemens has implemented and maintains a quality management system according to the DIN EN ISO 9000:2000 standards. Please find the Certificate in Annex 2.

All Partners of the Consortium operate under a certified DIN EN ISO 9001:2000 Quality Management System. Design & Implementation, Manufacturing, Construction – Installation, and Testing & Commissioning for the Project will all be done in accordance with the quality requirements of the Project Quality Management System - by certified suppliers.

6.3 Quality Policy

The Consortium Quality Policy states the commitment to become our customer's most valued supplier by providing products and services that meet our customer's requirements.

6.4 Quality Management Approach

The BBS Consortium will undertake the Works fully in compliance with Quality Management processes and procedures referenced in DIN EN ISO 9001:2000 and I DIN EN ISO 14001:2000.

The BBS Consortium will develop a Quality Plan to meet the requirements of DIN EN ISO 9001:2000, and which fully defines all quality aspects of the Works. The Quality Plan will be submitted in accordance with the Review Procedure. The Quality Plan will demonstrate an integrated quality management system relating to the design, construction, testing and commissioning of the system and will show how BBS Consortium and its sub-contractors will comply with the requirements of the Quality Plan.

The BBS Consortium will have all associated documentation readily available for internal review and review by the Regular internal audits will be undertaken by the BBS Consortium to ensure full compliance with DIN EN ISO 9001:2000. The BBS

Consortium will prepare and submit in accordance with the Review Procedure a "Schedule of Internal Audits" for agreement with tie. This will define the planned nature and timing of the internal audits.

Quality control including materials and works on site will also be undertaken.

7 Safety Management on Site

7.1 Policy Statement

The policy statement on safety and loss control is as follows:

The regard for the safety of all employees is an essential prerequisite for the achievement of our objective to provide a quality project and satisfy the needs of our client and the public.

To achieve this objective the management will:

- Actively participate in safety and loss control programs to ensure the involvement of all employees and to stimulate interest to maintain the lowest achievable frequency of injuries and damage that may result from incidents;
- Apply all realistic efforts to prevent injuries, fire, explosions, pollution and conditions that may jeopardize the health of employees or public or damage equipment;
- Ensure that all statutory regulations are complied with.

It is expected of each employee to:

- Have a thorough knowledge of all safety rules and procedures and to adhere to them at all times;
- Actively participate in the promotion of safety, for example, by submitting safety suggestions;

Put safety first at all times.

7.2 Safety Management Plan

The BBS Consortium will submit a Safety Management Plan that is over-arching with regard to safety and defines the management procedures that will be put in place to ensure Health & Safety for the design, construction, testing and commissioning, of the system. The Safety Management Plan will address issues relating to the safety of the Works, staff and third parties, as listed below:

- The plan will detail the approach and all management procedures relating to health and safety for the Edinburgh Tram Network.

- The plan will show how the BBS Consortium will ensure that its sub-contractors apply all relevant health and safety policies and procedures.

- Details of all interfaces associated with safety and the procedures of how these will be managed. Interfaces will include Roads Authorities, Health and Safety Executive; HMRI; Network Rail; Police; Fire and Rescue Services; Ambulance Service, and all applicable Law.

- Proposed Safety Initiatives.

- How the BBS Consortium ensures that a safety culture will be cascaded and enforced throughout the team including its sub-contractors.

- The Emergency procedures which the BBS Consortium will implement.

- Details of how the BBS Consortium will implement Accident & Incident reporting and promotion of an open culture.

- The BBS Consortium Safety Inspection & Safety Tour regime.

- An outline of the BBS Consortium's procedures relating to safety for dealing with Ile's Drugs & Alcohol Policy and procedures and details of the BBS Consortium's own similar policy and procedures.

- Details of any particular safety issues the BBS Consortium considers would be significant and initial mitigation measures.

8 Project Documentation Management

8.1 General

For Control and coordination purposes (e.g. status of submissions, change requests, correspondence tracing, etc.) the role of Documentation Management to support the project has become more and more important during the past. The processes of unique identification, adequate reviewing and documented approval of all documentation as well as a safe management of all correspondence and all changes are key aspects of the documentation management approach.

8.2 Documentation Management Tool

During the execution of the Edinburgh Tram Network Project, an Electronic Document Management Tool (EDM - Tool) will be used for legally binding documents that may contain all kind of documents including correspondence between all parties.

Electronic Document Management Tool fulfils the requirements of the quality management system based on the international standard DIN EN ISO 9001. The processes of unique identification, adequate reviewing and documented approval of all documents as well as a safe management of all correspondence and all changes are supported by the Electronic Document Management Tool.

8.3 Requirements to the Electronic Documentation Management Tool

The Electronic Documentation Management Tool will meet the following requirements:

- Unique Identification of all Project Documents
- Easy Access to the Documents for all Project Partners involved
- Traceability of Document Status

8.4 Submittals Schedule

Within 4 weeks of the Commencement Date the BBS Consortium will provide a schedule identifying all deliverables anticipated under the project, the anticipated date for submission and a summary of the intended scope.

9 Interface Management

9.1 General

The objective of the Interface Management is to identify, describe, clarify, settle and control all interfaces between the project partners and their products or systems as well as with any other party involved in the project. This happens in order to ensure the functionality of the integrated system, to save costs and time caused by uncoordinated work or unnecessary rework.

The purpose of all interface management activity is that:

- The detailed design of each of the co-functioning items contains the necessary information to assure that items, when individually designed and produced or installed will work together, and
- If either item needs to be changed for any reason, its performance, functional or physical attributes, that are involved in the interface, act as constraints on the design change.

The main tasks of the interface management are thus the

- Identification
- Description
- Settlement
- Modification
- Cancellation

of all interfaces.

9.2 Interface Definition

Generally, interfaces are the physical, functional, performance or test boundaries between two (or more) different co-functioning organizations or products, within or outside of the project.

Interfaces within the responsibility of a subsystem (e.g. the construction of the propulsion system) are not managed by the project's interface management but are dealt with separately by the partner responsible for the subsystem.

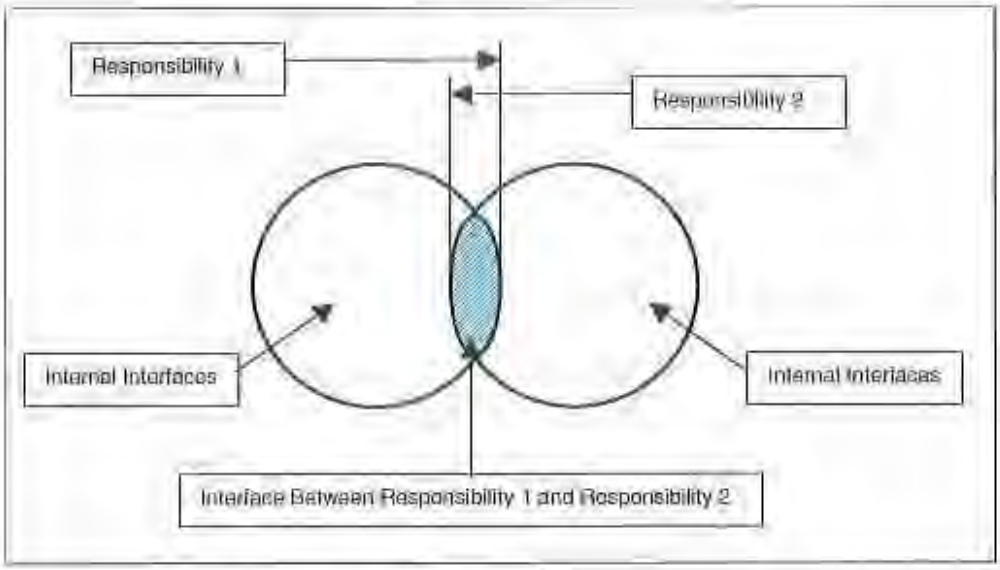

Figure 2: Interface between two Sub-Systems

Interfaces of sub-systems within the consortium are called internal interfaces, interfaces between a sub-system and sub-systems of the client or other entities are called external interfaces.

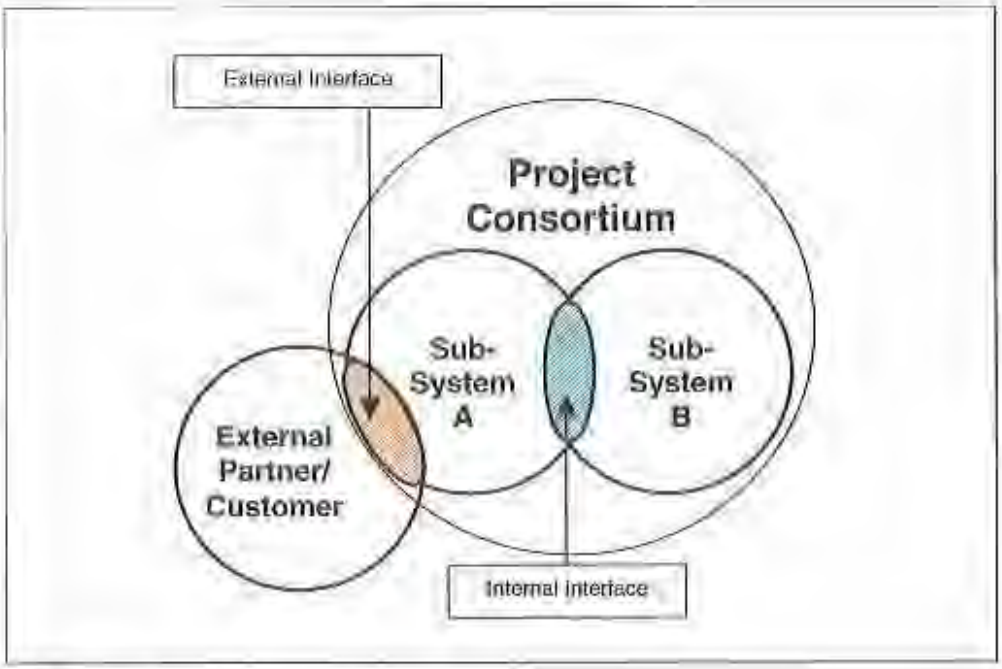

Figure 3: Internal and External Interfaces

9.3 Interface Management Approach

Based on the List of Responsibilities, and with the use of an Interface Identification Log and an Interface Status Form, all interfaces will be identified, documented and tracked. Clear allocations of responsibilities within the identified interface partners and regular interface meetings will form the basis of a proper implementation of the interfaces.

9.4 List of Responsibilities (LoR)

The "List of Responsibilities" (LoR) is one of the fundamental documents for interface management. It clearly regulates the responsibilities for the products to be supplied or services to be rendered, broken down according to the relevant project phases Testing & Commissioning.

9.5 Schematic Interface Overview

For Schematic Interface Overviews, please refer to Annex 3 of this document.

10 Table of Annexes

Annex No	Title
1	Management Manual – Quality, Health & Safety
2	ISO Certificate
3	Interface Schematics

Table 2: Table of Annexes

31st March 2008

Updated Proposal Submission

Edinburgh Tram Network

Section 1: Overall PM Concept

Part 1 – Programme and Project Execution

Annex 1 – Management Manual



Management Manual

Siemens Transportation Systems

Quality

Environment, Health & Safety (EH&S)

SIEMENS

efficient rail solutions



Content

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Siemens Transportation Systems is one of the largest suppliers of railway technology in the world. As a global player, we give railways the competitive edge they need to perform on a world stage by offering products, systems and services that are innovative, economical, reliable and safe. We provide our services over the entire value-added chain from customer to customer: in marketing and sales, development, procurement, project administration, production, assembly, commissioning and after-sales service. We believe that excellent quality and environmental friendly design are an obligation. Through consistent customer alignment, we are expanding our position further and securing our future – in each of the business segments within the railway industry. Thanks to our fields of competence: Automation & Power, Rolling Stock, Turnkey Systems and Integrated Services, we are perfectly positioned to achieve this goal. This is how we can offer efficient, pioneering solutions thus ensuring sustained improvement in our business results – to the complete satisfaction of our customers.



Preface

Thanks to their exceptionally high quality, the products, systems and solutions of the Transportation Systems Group enjoy an excellent reputation. The reliability of our environmentally friendly systems, their safety, long service life and commercial viability are known and acclaimed around the globe. We believe that this brings with it a far-reaching responsibility – to our customers, to our employees and to society as a whole.

The expectations placed on our services are high. We are therefore obliged to ensure and further improve the high quality standard of our products, environment, health & safety (EH&S) procedures through comprehensive management. We consider this to be a key requirement for our common success.

To this end, we have established a comprehensive plan of action encompassing the following:

Quality, environment, health & safety are personal

Everyone has a contribution to make. In this way we will fulfill the expectations of our customers, employees and society.

Quality, environment, health & safety are obligatory

Everyone must adhere to and continually improve the processes.

Quality, environment, health & safety are comprehensive

Everyone contributes to the success of our company through their creativity and commitment.

The management system described in this manual is binding for all managers and employees of Siemens Transportation Systems.



Hans M. Schabert
President of the Transportation Systems Group



Hans-Dieter Bott
Vice President of the Transportation Systems Group



Friedrich Smaxwil
Vice President of the Transportation Systems Group

[redacted]

Erlangen, November 2003



USB00000088_0076

Management System

This manual describes the fundamentals of the Siemens Transportation Systems' management system. It explains the general requirements for all of the organizational units. Group Executive Management promotes the development and implementation of the management system through appropriate planning and setting the appropriate targets. It also includes a controlling process and initiates further development.

The management system is binding for every employee. Its documentation structure is described in the section "Documentation". If permitted exclusions from the requirements of ISO 9001 are required, these must be named, substantiated and documented by the organizational units. Associated companies included in the Transportation Systems organizational chart can have their own independent management systems. The same applies to organizational units whose particular business mandate requires an independent management system.

Regulations

The individual processes, including all operations and procedures, are stipulated in the organizational units as regulations. These exist in a la structured form, preferably in the Intranet but also through other media. They contain important company know-how and are thus intended for internal use only.

Implementation and review

The aim of the management system is to fulfill customer requirements. Furthermore, it complies with the following Standards and Guidelines:

- Quality management system according to ISO 9001
- Environmental management system according to ISO 14001
- Occupational health and safety management according to the ICSCA Industry Guidance on Health and Safety at Work
  (ICSCA – Industry Cooperation on Standards and Conformity Assessment)

The management is responsible for monitoring and reviewing the implementation and efficiency of this system.

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Processes

Management Processes

- Management and Inter-Company Cooperation
- Change Management
- Strategic Planning

Core Process: Project Management



Support Processes

- Business Administration
- Human Resources
- Quality Management
- Strategic Purchasing





USB00000088_0078

Strategic Controlling

Business Review

Installation/ Commis-sioning

Accept-ance Test

Warranty

After-Sales Service

Organization/ Information

Environment Health & Safety Management



Our claim:
Reliable process quality ...

Our management system involves multiple processes. The aim of these processes is to ensure that our products, solutions and services completely fulfill the requirements of all those involved, particularly our customers.

These processes unfold on three, closely interrelated process levels that are closely intermeshed with one another:

- In the **management processes**, the general specifications for the core process are formulated and controlled.
- In the **core process**, all business activities – from product creation and acquisition to hand-over to the customer and after-sales service – are executed in precisely coordinated subprocesses.
- The **support processes** comprise all ancillary activities, such as resource management and documentation. Process analysis and optimization with targeted measurements, intensive analyses and effective measures are a key factor here. This process also includes such tasks as information security, knowledge management, risk management and much, much more.

Process coordinators support the various sub-areas at all three process levels. Every individual process is planned, supervised and documented by these coordinators according to customer- and product-specific criteria.

The operation and effectiveness of the core processes are secured by consequentially applying project management and supported by the use of quality gates. Further, additional elements of quality assurance are integrated in the process as well as environment, health & safety management. Thus the fulfillment of customer requirements and the legal compliance, standards and further regulations is guaranteed. Specifically, this support takes the form of integrated quality assurance, environment, health & safety activities.

Suitable methods have been initiated in the organizational units to control and monitor the core processes, for example, process indicators.

The aim is to make all of the processes stable and transparent and to include customers, partners and suppliers in the best manner possible.

... with integrated activities for environmental protection and safety at work.

Management Processes

Core Process

Support Processes

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Organization

The responsibility and specialist support for quality, environment, health & safety is stipulated in a three level regulation that is applicable for all of Siemens AG.

	Responsibility	Specialist Support
Within the framework of the Siemens AG corporate structure, the Transportation Systems Group is managed independently by Group Executive Management. The organizational chart depicts the relevant division of work. The responsible member of Group Executive Management must specify, and ensure compliance with, the group targets for quality, the environment, health & safety. This person ensures that the management system is further developed and implemented and also works to constantly improve its efficiency. This includes: ■ Giving managers and staff a clear direction and motivating them to work consistently in a customer-oriented manner. The fulfillment of customer requirements and the statutory and official requirements are a priority. ■ Stipulating the management policy with the objective of improving economic value added and increasing customer benefits. ■ Performing regular management reviews to boost the efficiency of the management system and thus to also improve product quality. ■ Securing the availability of suitable resources.	Corporate Executive Committee Siemens AG	Corporate offices: ■ Quality management ■ Environmental protection ■ Occupational Health & Safety
	Group Executive Management	Group coordinators: ■ Quality management ■ EH&S
The management teams of the divisions and those of the operational organizational units stipulate the quality, environment, health & safety goals and the relevant areas of responsibility and authorities. The managers of the organizational units are responsible for the quality of their processes and products and for adherence to environmental, health & safety laws and regulations. They stipulate which measures can improve the quality of the product and the environment and ensure the health and safety of employees in the workplace. In addition, they determine who is responsible for which sub-processes. Every manager is in charge of encouraging employees to work in a health-conscious manner to promote quality and respect for the environment. Furthermore, they must ensure that the knowledge and skills required to this end are imparted to the employees and that the necessary tools and resources are made available to them. The managers of the organizational units are responsible for all activities that impact on quality management and EH&S.	Division presidents, process coordinators, operations managers	Quality managers, environmental protection specialists, safety specialists, company doctors





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Organizational structure
The schematic organizational chart depicts the organizational structure of the Transportation Systems Group. It is described in detail in the latest versions of the organization and work plans. The group's coordinator for Quality Management and EH&S report directly to the Group Executive Management.

Level 1

The group's coordinators for Quality Management and EH&S set out the framework conditions. Their role in this context is to provide information, coordination, advice and supervision. The same applies for all other quality offices, management representatives, environmental protection specialists, safety specialists, safety assistants and company doctors.

All of the named offices support the process and product managers; however this in no way relieves the latter of their relevant responsibility.

Level 2

The quality managers of the divisions and group functions are appointed by the responsible member of Group Executive Management. Their tasks are stipulated in detail. The quality manager reports directly to the manager of the relevant organizational unit and is independent of the other organizational structures.

Quality management representatives for subdivisions and sub project quality managers are appointed according to defined regulations.

The EH&S-specialists are appointed by the site manager and report directly to him/her. Their tasks are set down in the appointment.

Level 3

Business Policy

The corporate principles of Siemens AG shape the attitudes and actions of the entire company and are binding for everyone. They are described in detail in the company guidelines: "Principles of Siemens Quality Management", "Siemens AG's OH&S Management System", "Principles of Environmental Protection and Technical Safety" and "Regulations for Information Security", among others. It is from these guidelines that the Transportation Systems Group has derived the principles for its management system.

Principles
The principles of our business policy in our endeavors to achieve Business Excellence are as follows:
- Achieving the highest level of customer satisfaction and an ongoing trust in our products and services is, in our opinion, one of our core tasks.
- We strive for constructive, long-term and trust-based relationships with all our partners around the globe.
- We want to generate ongoing earnings to secure our future and our activities.
- We encourage the competence, creativity and performance of all our employees.
- We are very conscious of our sustainable development and our social, ecological and economical responsibility.

Targets
Our essential targets are:
- To develop, manufacture and sell high quality, reliable, environmentally friendly and safe products.
- To meet the agreed, but also the expected, requirements of our customers to their complete satisfaction.
- To constantly monitor and optimize the processes on the basis of application specific experiences, in order to achieve the highest customer benefits with simultaneous commercial viability.
- To secure our innovative power through constantly high earnings.
- To ensure the efficient implementation of statutory provisions, guidelines and standards as well as to establish legal compliance to EH&S.
- To effectively incorporate our project partners and suppliers into our processes.
- To reduce costs by avoiding errors.
- For the management executives to act in an exemplary manner; to inform and support their employees and to train them in line with the requirements.
- To protect the life and health of our employees and of third parties.
- To be considerate in our use of natural resources.
- To promote team and group work.

Individual targets have been derived from these principles and have been made binding by a multi-level target agreement process. Measurable and tangible targets are stipulated and pursued particularly in the organizational units.

Strategy
Through the realization of the above-mentioned targets, the Transportation Systems Group is endeavoring to attain a world-class position. To this end, we have developed a corporate strategy that is based on a comprehensive management system.

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Product Quality

Product creation
Product planning and development are customer-oriented and in line with the market. Studies and surveys were performed in advance to ensure this.
In order to fulfill these requirements and to exclude errors from an early stage, preventive quality measures and other techniques are planned and implemented in a targeted fashion. These include: review techniques, failure mode and effects analyses (FMEA), safety and reliability studies, trials/tests (in the laboratory and on the test track), type tests, evaluation of environmental aspects etc.



We leave nothing to chance. Qualified, experienced employees ensure systematic error prevention.
This This procedure is also applied to the engineering/project planning phase.

Production and assembly
Production and assembly are planned intensively, documented in detail in work and test plans and specified for the various processes and operations. Back-up tests, such as screening and system tests, are integrated into reproducible process steps.
Targeted quality assurance measures run through the entire production and assembly process. The functions of all safety- and reliability-relevant components are tested before they are installed.
Agreed customer acceptances are factored in and conducted. EH&S are actively promoted during production and assembly.



Creating Standard Products → Acquisition → Bid → Negotiations/ Contract → Project Planning → Engineering Planning → Procurement → Production

Test Center

Supplier management



We maintain long-term relationships with trusted suppliers, who we think of as partners. They are assessed, evaluated and promoted in a thorough selection and qualification procedure.
The suppliers are generally involved in the development process from an early stage, in order to produce innovative and high-quality products that incorporate the principles of environmental protection.
Joint quality standards are coordinated and stipulated in quality assurance agreements (QAA) and technical documents. The release and acceptance processes are defined on a product-for-product basis.

Commissioning
Vehicles, infrastructure products and turnkey systems, including the integrated or related modules and components, are inspected and tested on the basis of a test plan.
The scope of testing for commissioning encompasses the contractual customer specifications including the requirements defined by official bodies and recognized standards.
The proof of the performance and reliability of a turnkey system is recorded in the documents that are relevant for acceptance.





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This is how we ensure product quality ...

Product Quality

Product requirements are determined, evaluated and contractually stipulated in close contact with the customer. All of the development, engineering and project processing activities are planned on this basis.

From the project specifications (that is, the planning documents or procurement specifications) functional and technical solutions are derived in defined processes and stipulated for realization in specifications (for instance, in the performance specifications). The results are reviewed, verified and validated.

When procuring products, released specifications and other technical documents are issued to qualified suppliers. Defined tests and other suitable measures are used to ensure that the products supplied comply with the procurement specifications.

We plan and implement manufacturing, assembly, commissioning and service under controlled conditions, including targeted monitoring and measuring procedures. State-of-the-art test centers, run by specialists, guarantee these measures. The use of all required supervision and measuring equipment is ensured – as is the use of appropriate calibration and tracking systems.

The procedure described above serves to systematically secure product quality. Preventive measures along with supervisory and testing activities are factored in over the entire value added process and are implemented and documented accordingly. In complex projects especially qualified sub-project managers for quality – as co-pilot of the project manager – combine the quality-related aspects of the project.

Environment, health & safety

Already in the planning phase, we assess and consider the possible impact our products and services will have on people and the environment. In this process, we take the entire life cycle of the products into consideration. We devote particular attention to the promotion of the health of our employees, the prevention of accidents on our construction sites and in our factories as well as to the process- and product-related resource efficiency.

... while adhering to all EH&S standards.



After Sales/Services
Our range of services covers scheduled maintenance, spare parts procurement, training and documentation. These services are also subject to a detailed planning process in order to ensure the individual customer requirements are fulfilled. To this end, quality tools are also deployed for preventive measures as well as when creating products. The results of scheduled maintenance activities are checked using state-of-the-art techniques to ensure the agreed level of availability and safety.
Documentation and training for our customers' drivers and maintenance personnel are significant issues. Highly qualified specialist personnel pass on our know-how and thus ensure a systematic transfer of knowledge to the customer.





The Wildenrath Test Center monitors product quality. Before being handed over to the customer, our products are tested comprehensively.
This internal, certified test center validates the national and international customer and official requirements – from development through to the hand-over to customers. The integrated test center holds all the required national and international licenses, including those from the Federal Railways Office.
An accredited safety assessment center has been established in Braunschweig for rail safety technology.

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Controlling the Management System



6-step improvement program

Improvement

top⁺ is the company-wide improvement program.

top⁺: represents clear goals, concrete measures, unambiguous consequences. This instrument is an improvement system that requires a correspondingly high level of commitment from all managers. It is supported by a 6-step process, a process we will utilize to improve our quality and our standard of EH&S – thus benefiting the customer and strengthening our cost position in the process.

We rely on the commitment of our managers and employees. We therefore encourage and actively use their ideas, suggestions and initiatives. To this end, we have established an employee initiatives management system. This system is used to evaluate all employee suggestions and, if put into practice, a bonus is paid in accordance with internal regulations.



Best Practice

Our aim is to be world class – this is why we have benchmarking. In addition, we also practice Best Practice Sharing. Once the results are evaluated, relevant improvement measures are decided upon and implemented. We assess our success using a targeted realization controlling system.



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Balanced Scorecard
Company management will only achieve excellent results if they make the highest demands: on the development of business policy and strategies, on the choice, deployment and qualifications of employees, on the shaping of partnerships and processes and on the use of resources.
For the purposes of pursuing strategic goals, therefore, targeted key values and measurement points are defined at all levels and represented in the Balanced Scorecards. The change in these variables is regularly monitored by management and, if necessary, corrected through targeted actions.



Siemens Leadership Framework
The Siemens Leadership Framework demonstrates our mutual understanding of excellent management and is binding for all executives. It provides a clear basis for measuring and evaluating management performance, the results of which can be used to formulate concrete measures for promotion and personnel development.
Excellent executives achieve excellent results by mean of their excellent capabilities: namely, to drive, focus, impact and guide.

During controlling, partial targets and measures are permanently aligned towards achieving the overall targets of the company.
The targets are concrete, measurable and agreed and updated periodically in the organizational units.
Management executives pursue, evaluate, improve and report on the degree of fulfillment of these targets.

Target discussions
The fundamental issues of quality, environment, health & safety are, among other issues, stipulated in target agreements (integrated strategy and budget meeting) between the Corporate Executive Committee of Siemens AG and Transportation Systems Group Executive Management. The agreements are implemented in the organizational units.

Self-assessment
The strengths and weaknesses of the processes are worked out and improvement measures are thus derived. The promotion of "best practice" and benchmarking plays a key role in this process.

Management review / audits
The management system for quality, and EH&S are reviewed regularly by management within the organizational units.
Management evaluate their implementation, for example, on the basis of audits, assessments, benchmarks, inspections, self-assessment and reviews.
The necessary improvement measures are then derived from the results and realized; and their efficiency monitored.

Customer satisfaction
We gather customer-related information both actively and passively. This is evaluated and used to determine ways of boosting customer satisfaction.

Thanks to the interaction of all these management instruments and to targeted controlling, we have established a continuous improvement process, which encompasses all levels of our company and is wholly aimed at achieving BUSINESS EXCELLENCE.

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Documentation

Document management
Document management ensures that documents and data are checked, released and/or enforced according to a specific procedure. The same applies to their distribution, archiving, modification or deletion as well as their listing in directories, according to their relevant status.

Principles
Corporate
Guidelines

Level 1
Siemens AG

Siemens AG
The principles of Siemens AG shape our corporate culture.
The company guidelines "Principles of Siemens Quality Management", "Siemens AG's OH&S Management System" and "Principles of Environmental Protection and Technical Safety" set out fundamental statements on targets, organization and the responsibilities of our company.
They serve to further develop and continuously improve the management systems.

TS Management
Manual

Level 2
Group
Siemens
Transportation
Systems

Siemens Transportation Systems Group (TS)
This manual contains general statements on the management system of the Siemens Transportation Systems Group. It is supplemented by process regulations that apply group-wide and detail generally applicable stipulations and the processes of the management system.

Process Regulations

Level 3
Divisions
Group Functions
Sales Regions

Divisions, group functions, sales regions
The management system is documented in a concrete fashion in these units. These regulations describe the individual procedures and processes – if required, down to the employee level.

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Siemens Transportation Systems – The Divisions



TS RA – Rail Automation

- Signaling and control systems
- Interlockings
- Automatic train control systems
- Signaling components
- Telecommunications systems
- Operations control system for maglev trains



TS EL – Electrification

- Contact lines for mass transit and main line services
- Traction power supplies for mass transit and main-line services



TS MT – Mass Transit

- Metro and underground trains
- Suburban rapid transit
- Tramcars
- Light rail transit



TR Trains

- High-speed and InterCity trains
- Commuter and regional trains
- Passenger coaches



TS LM – Locomotives

- Electric locomotives
- Diesel-electric locomotives
- Special-purpose vehicles
- Refurbishment
- Drive and power supply for maglev trains



TS IS – Integrated Services

- Maintenance
- Spare parts
- Documentation and training
- Consultancy
- Diagnostic services



TS TK – Turnkey Systems

- Turnkey systems for mass transit services
- Turnkey systems for main line services

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Siemens AG
Transportation Systems
Group Coordination [illegible]
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Germany

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USB00000088_0088

31st March 2008

Updated Proposal Submission

Edinburgh Tram Network

Section 1: Overall PM Concept

Part 1 – Programme and Project Execution

Annex 2 – ISO Certificate

DET NORSKE VERITAS

CERTIFICATE

DNV ZERTIFIZIERUNG UND UMWELTGUTACHTER GMBH

certifies that the company

Siemens AG
Transportation Systems (TS)

has established
an integrated quality, safety, health and environmental management system
in the units listed on page 2 and 3

in conformity with the standards

ISO 9001 : 2000
ISO 14001 : 2004
OHSAS 18001 : 1999

This Certificate is valid for:

Project Planning, Acquisition, Engineering, Procurement, Production, Assembly, Commissioning and Service of Products, Systems and Services of the fields of Rail Automation, Electrification, Locomotives, Trains, Mass Transit, Bogies,Turnkey Systems and Integrated Services

This Certificate is valid until:
31.12.2009

Certificate-Registration-No.:
CERT-30777-2006-AE-ESN-TGA

Issued in Essen on
12.12.2006

N. Kim
General Manager

Certified by DNV since
19.05.2006

T. Beck
Technical Support

DNV Zertifizierung und Umweltgutachter GmbH, Schmiedingshof 14, 45329 Essen, Germany
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USB00000088_0090

DET NORSKE VERITAS

CERTIFICATE

This certificate is valid for the following units:

Standards: ISO 9001:2000, ISO 14001:2004, OHSAS 18001:1999

TS Executive Board
Head Office EH&S Management System - TS QM and TS SE

D – 38126 Braunschweig, Ackerstraße 22

D – 91052 Erlangen, Werner-von Siemens-Straße 61 / 67

TS Group Functions
Siemens AG Transportation Systems, GT - Group Technology

D – 91052 Erlangen, Werner-von-Siemens-Straße 67

Siemens AG Transportation Systems, OI - Organization, Information Processing

D – 91052 Erlangen, Sieboldstraße 16

Siemens AG Transportation Systems, CS – Central Services

D – 12435 Berlin, Elsenstraße 87-96

D – 38126 Braunschweig, Ackerstraße 22

D – 91052 Erlangen, Werner-von-Siemens-Straße 50

Business Units TS RA - Rail Automation

D – 12435 Berlin, Elsenstraße 87-96

D – 38126 Braunschweig, Ackerstraße 22

Business Units TS EL – Electrification

D – 91052 Erlangen, Mozartstraße 33 b

Business Units TS MT - Mass Transit

D – 91052 Erlangen, Werner-von-Siemens-Straße 61

Siemens Transportation Systems GmbH & CO. KG
A – 1110 Wien, Leberstraße 34

D – 90461 Nürnberg, Katzwanger Straße 150

Business Units TS LM - Locomotives

D – 91052 Erlangen, Werner-von-Siemens-Straße 67

D – 80997 München, Krauss-Maffei-Straße 2

Business Units TS TR –Trains

D – 91052 Erlangen, Werner-von-Siemens-Straße 69

D – 47829 Krefeld-Uerdingen, Duisburger Straße 145

Siemens Transportation Systems GmbH & Co KG
Passenger Coaches
A – 8021 Graz, Eggenberger Straße 31

Siemens Transportation Systems GmbH & Co KG
Passenger Coaches
A – 1110 Wien, Leberstraße 34

Siemens Kolejová vozidla s.r.o. (SKV)
CZ – 155 21 Praha 5, Ringhofferova 115/1

Business Units TS TK - Turnkey Systems

D – 12435 Berlin, Elsenstraße 87-96

Business Units TS IS - Integrated Services

D – 91052 Erlangen, Sieboldstraße 16

D – 38126 Braunschweig, Ackerstraße 22

D – 12435 Berlin, Elsenstraße 87-96

D – 40231 Düsseldorf, Königsberger Straße 100

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DET NORSKE VERITAS

CERTIFICATE

This certificate is valid for the following units:

Standards: ISO 14001:2004, OHSAS 18001:1999

TS Group Functions

Siemens AG Transportation Systems, CS – Central Services

D – 41844 Wegberg-Wildenrath, Friedrich-List-Allee

D – 47289 Krefeld-Uerdingen, Duisburger Straße 145

A – 8020 Graz, Eggenberger Straße 3

A – 1110 Wien, Leberstraße 34

Business Units TS RA - Rail Automation

Siemens Transportation Systems S.A.S.
F – 92542 Châtillon, Le Diagonal - Avenue de la République

Siemens Transportation Systems S.A.S.
F – 59015 Lille, Immeuble Le Plaza, 91 Rue Nationale

messMa GmbH
D – 39167 Irxleben, Am Stadtfeld 8

Siemens Signalling Company Ltd.
CN – 710016 Xi'an, No. 30 Feng Cheng Erlu

Subdivision TS BG - Bogies

Siemens Transportation Systems GmbH & CO. KG
A – 8020 Graz, Eggenberger Straße 31

Business Units TS IS - Integrated Services

D – 41844 Wegberg-Wildenrath, Friedrich-List-Allee

Siemens Transportation Systems, Inc.
Rolling Stock

USA – 95828 CA – Sacramento, 7464 French Road

Siemens Transportation Systems - a division of Siemens plc.
Automation & Power

UK – SW1H 9BP London , 2 Queen Annes Gate Buildings, Dartmouth Street

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31st March 2008

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Edinburgh Tram Network

Section 1: Overall PM Concept

Part 1 – Programme and Project Execution

Annex 3 – Interface Schematics

Edinburgh Tram Network Infraco , Schematic Interface Overview

Glossary, Colour codes and Interface log acronyms

Contractor/Owner/Interface partner	Edinburgh Tram Network Infraco System Bidding Consortium • Bilfinger & Berger • Siemens	Neighbouring/connecting Systems to be integrated Other contracts • Tramco • Tramco maintenance	3rd parties' systems Public services: • Power and utilities supply authorities • Fire brigade, Police • Lothian buses • Banks	Other system/s (if applicable/relevant)
Rolling Stock	RST	RST-E	RST-T	RST-O
Overhead Catenary System	OCL	OCL-E	OCL-T	OCL-O
Traction Power Supply (TPSS)	TPS	TPS-E	TPS-T	TPS-O
SCADA / Power SCADA	SCA	SCA-E	SCA-T	SCA-O
Signalling	SIG	SIG-E	SIG-T	SIG-O
Telecommunication	COM	COM-E	COM-T	COM-O
Automatic Fare Collection	AFC	AFC-E	AFC-T	AFC-O
Depot and Workshop Equipment	DWE	DWE-E	DWE-T	DWE-O
LV Power Supply and Distribution	LVS	LVS-E	LVS-T	LVS-O
Trackwork	TRW	TRW-E	TRW-T	TRW-O
Civil Works	CIV	CIV-E	CIV-T	CIV-O
Building Services	BUS	BUS-E	BUS-T	BUS-O

The Acronyms overcoming the different colour codes will be the basis for the structure for [illegible] Interface between [illegible] and OCL [illegible] RST, OCL-E [illegible]

Note: Number and/or shape of Equipment shown on the schematic interface drawings do not represent the quantity under the [illegible] or layout of equipment to be installed. For detailed information refer to drawings, [illegible] RoQ etc. of the [illegible]

Edinburgh Tram Network Infraco

SCHEMATIC INTERFACE OVERVIEW

SIEMENS

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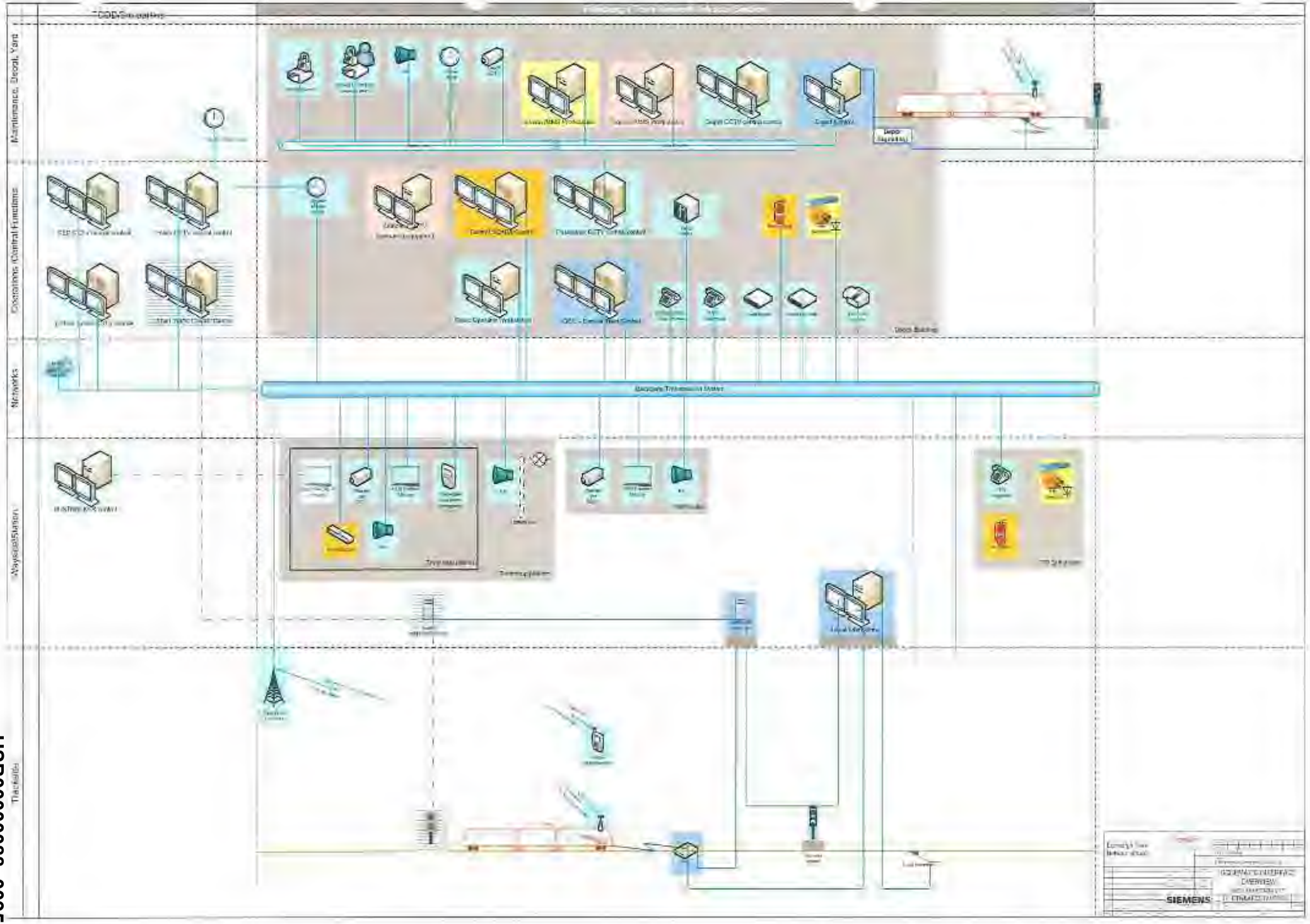

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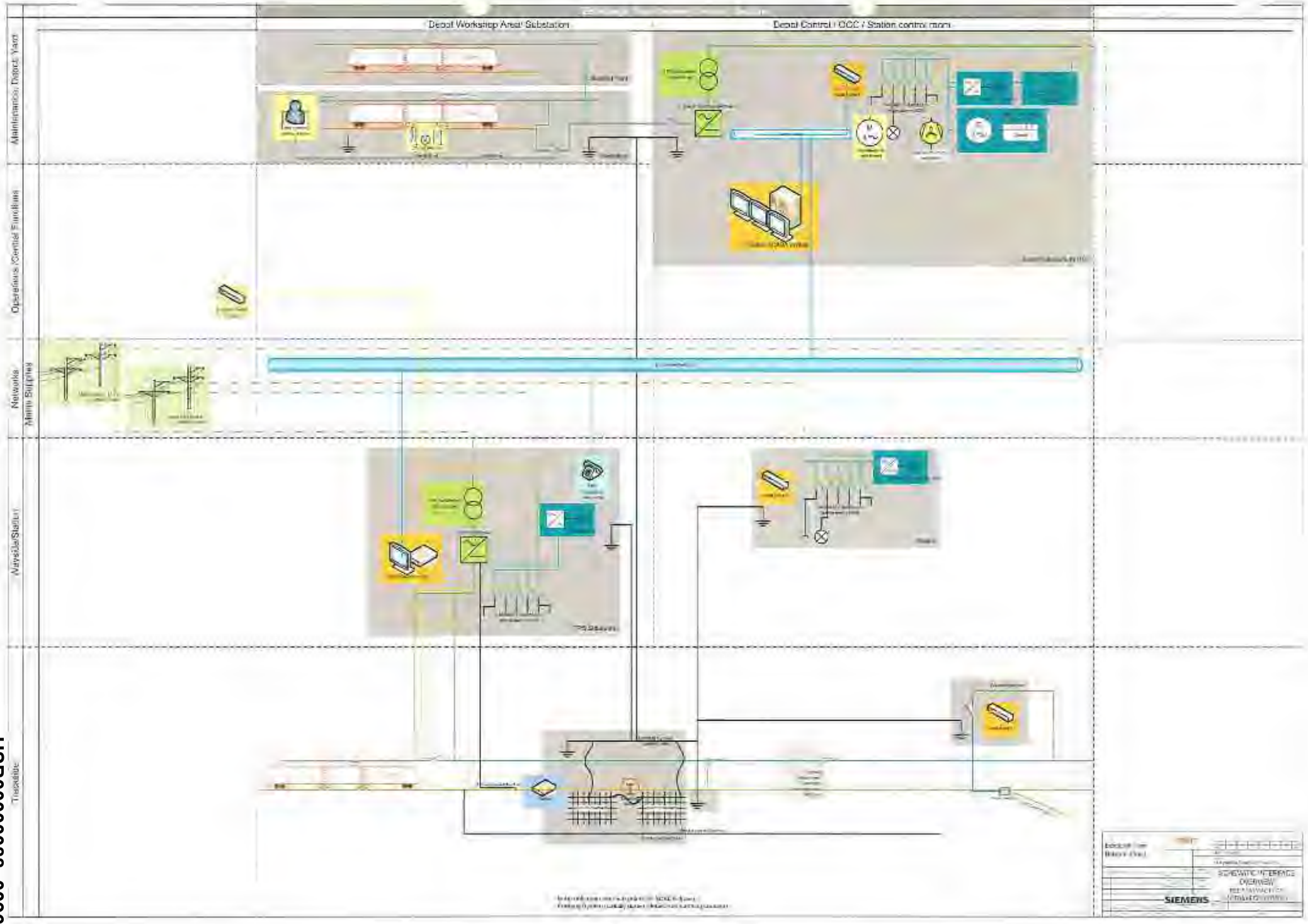

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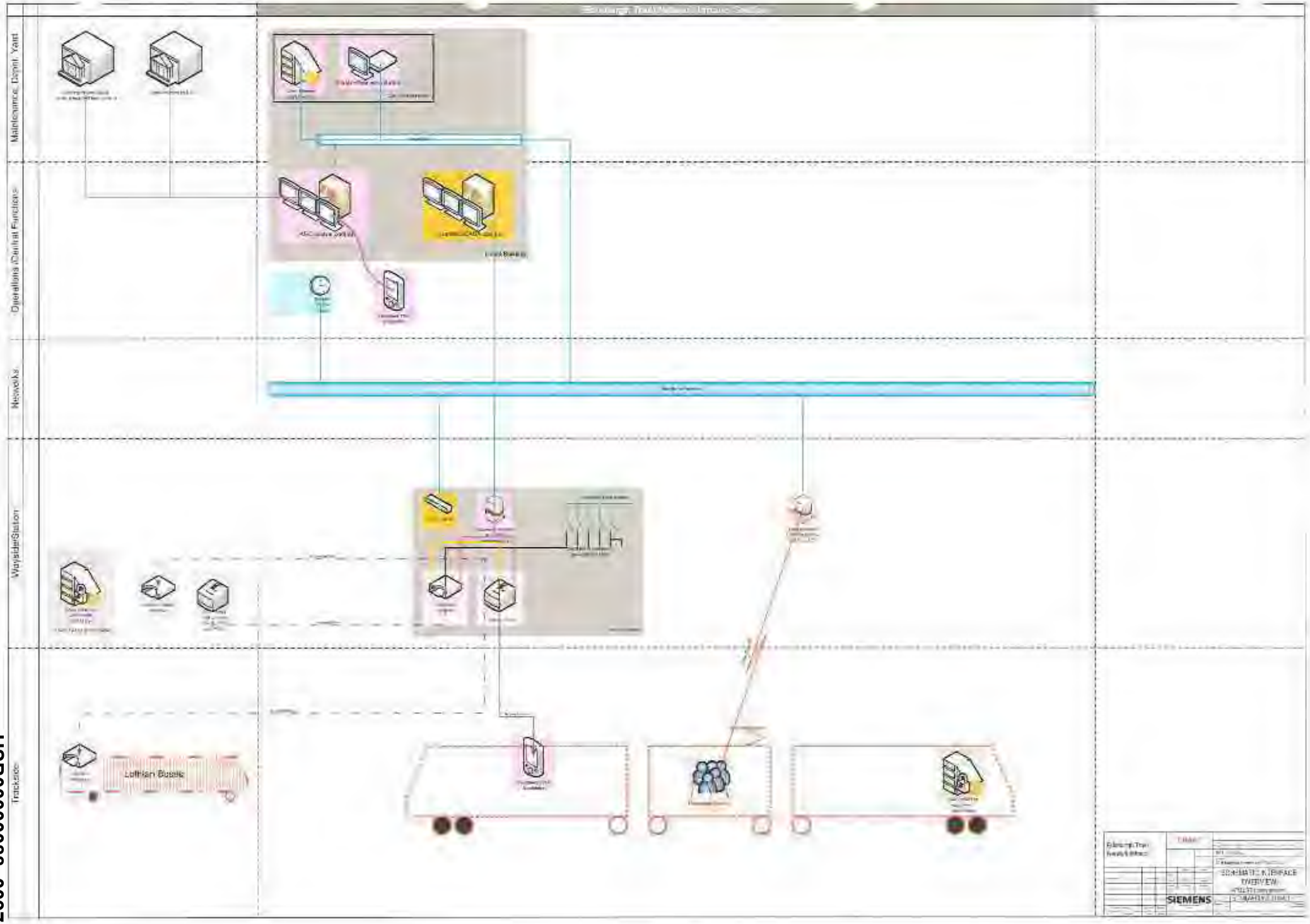

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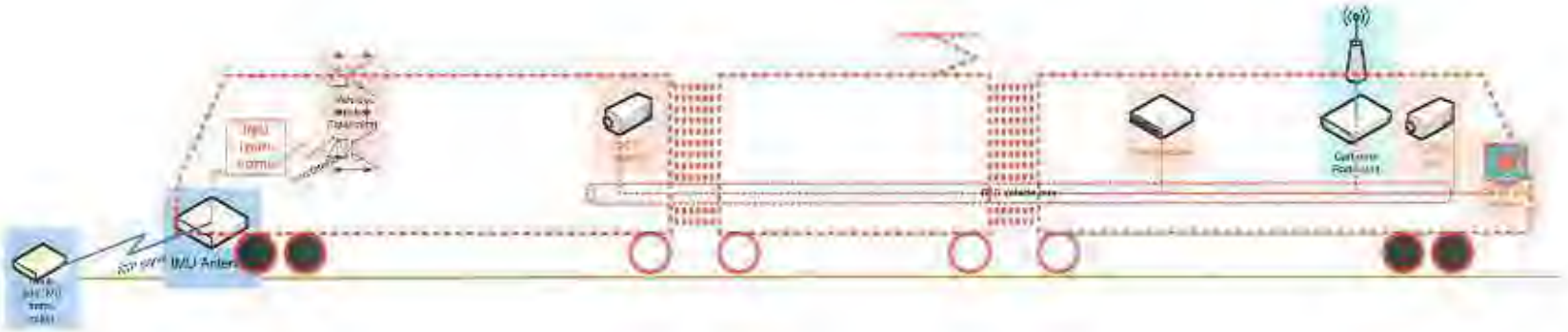

Edinburgh Tram Network (TIE)

DRAFT

NOT TO SCALE

SCHEMATIC INTERFACE OVERVIEW

RST and trainborne systems

ETN&AFD002 078503

SIEMENS

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BILFINGER BERGER
Civil

SIEMENS

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Edinburgh Tram Network

Section 2: Overall Technical Concept

Part 1 – System Engineering

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1 Overall Subject

This document describes the general approach of the System Engineering and the scope of activities for the Edinburgh Tram Network during the Design and the Implementation Phases.

The Infraco will approach the design and submit the necessary deliverables forming the Infraco Deliverables, using the similar processes as defined within the "SDS Provider's Agreement with **tie** (which BBS understands will be novated to BBS under the Infraco Contract and which is included in Volume 7 of the ITN).

One advantage of having a tram system being implemented as a Turnkey Tram System is to have all project phases and activities in one hand - comprising the system configuration and detailed design, the construction of the system, the system commissioning and the integration tests up to the trial run and the training of Operation and Maintenance (O&M) staff of the future Operator.

In this context, the novation of the SDS contract to the Bilfinger&Berger-Siemens Consortium, referred to hereinafter as BBS, and the interface between the two becomes an essential issue for the fulfillment of the BBS contract.



Figure 1 Engineering Model for ETN

It is understood, that the System Design Services has been contracted separately by **tie** to the SDS Provider, and will be novated to BBS after contract award of the ETN Infraco contract to BBS. It is further understood that the scope of the works for

which the SDS Provider is responsible includes but is not limited to their provision of the Infrastructure Detail Design.

The technical project co-ordination and the system configuration to be provided by BBS and the System Engineering does not only comprise the Electrical and Mechanical (E&M) sub-systems but also covers the interfaces with the SDS Detail Infrastructure designs.

2 Proposal for Handling SDS Design Process

The construction, installation and implementation of a totally new transportation system as a Turnkey System is based on a top-down engineering process, which deduces design requirements for the elements of the next lower subsystems from the constraints and requirements to be fulfilled by the appropriate superior level of integration.

It is understood, that for the Edinburgh Tram Network, the Overall System Engineering will form part of the BBS Works.

As a general approach, BBS intends to take the so-called "V-Process" (which is for example described for RAMS in the EN 50126) as guideline to define the interfaces and the procedures to manage their interface with the SDS Provider and all project stakeholders including the Tram Supplier.

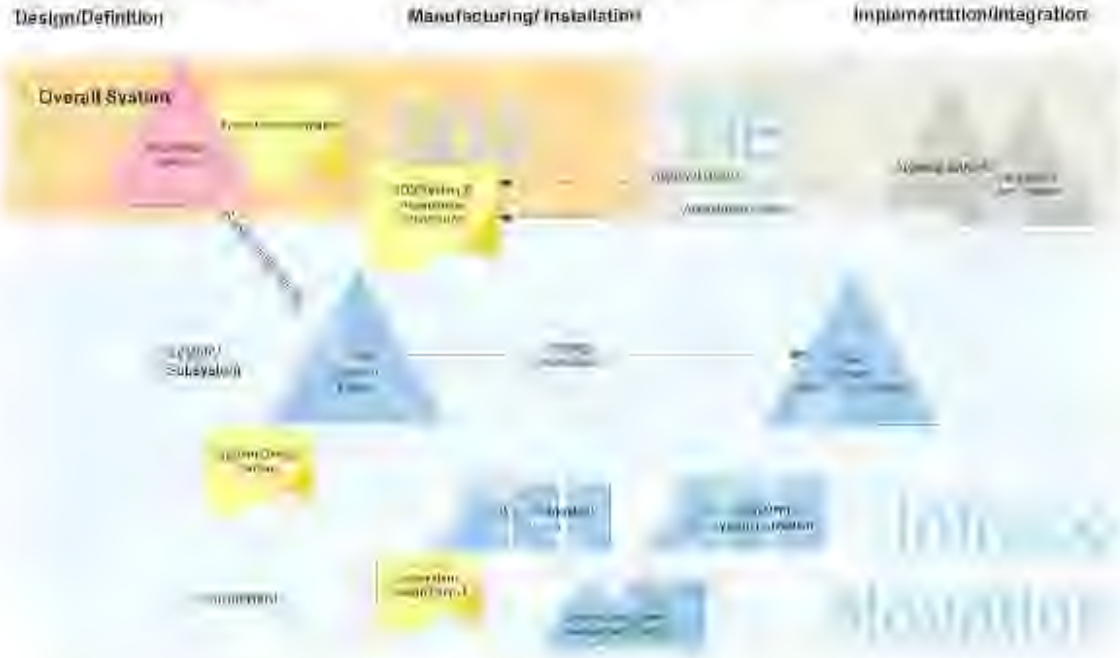

Figure 2 System Engineering Process in relation between tie, SDS and BBS

Arising from this model, BBS identifies a number of interfaces to the SDS design output.

Accordingly BBS will develop their system and subsystem proposals and provide SDS with the timely provision of the necessary information of the BBS proposals to enable SDS to incorporate specific features of the BBS proposals within their SDS Infrastructure detail designs in order to revisit and update them to make the most effective use of the equipments being offered to tie for incorporation within the ETN Network.

As part of their works BBS will produce such test and acceptance plans and procedures and criteria on system level that shall enable BBS to demonstrate to **tie** the compliance of the ETN System to Employer's Requirements. Furthermore, these plans and procedures shall be worked out and agreed to an extent, that enables BBS to perform tests according to these and to apply for acceptance and

approval respectively and that these tests cover all appropriate ETN requirements and functionality as defined in the Employer Requirements.

In the progress of design review of these Test and Acceptance procedures, BBS will also justify the extent of these in relation to the Employer's Requirements and the requirements set out by the relevant authorities.

3 Liaison to Tramco contract

Rolling stock for the ETN will be contracted separately under the Tramco contract. Tramco's vehicles will have to be integrated into the ETN system by BBS.

As the System Design, where he main features of Tramco's rolling stock will have to be defined, shall be managed and carried out by BBS, this definition and integration has to be handled between BBS, SDS and Tramco.

BBS will contribute to this process with the system design reviews mentioned above. Beyond this, BBS expects vehicles to be manufactured, commissioned, tested and approved according to the design agreed defined by **tie**.

Layout and dimensioning of the BBS deliverables depend to a great extent from the characteristics and the parameters of the rolling stock employed for ETN. The current layout included in this bid is based on the parameters and technical issues of Tramco's vehicles as they are currently defined in the Infraco tender documentation. It is understood, that tie will nominate the vehicle supplier after the submission of the BBS bid. Therefore, parameters of the BBS deliverables have to be reviewed after definition of the tram supplier and the release of confirmed technical data of the vehicles.

Details of technical data required for the overall engineering of the system were communicated with tie within the "Tramco / Infraco Matrix" in relation to RT 089. Comments to this matrix were given by BBS as far as required and applicable.

Following the Due Diligence Process BBS will employ a Tram Inspector to be agreed by tie, who shall follow the Tramco design process and be responsible for the trams approval based on the tie specification and the parameters agreed on in the "Tramco / Infraco Matrix"

4 System Concepts

System Engineering activities comprises a set of basic System Concepts which are key documents for the whole engineering process. These concepts shall be elaborated by BBS. BBS suggests to use technical solutions and outline concepts included in this bid as basis thereto (see annexes).

These System Concepts comprise, but are not limited to, the following:

- Operations Concept and Plans,
- RAM Concept (Reliability, Availability, Maintainability),
- System Safety Concept and Plans, Safety Case,
- Concepts for Earthing & Bonding and for EMC (Electromagnetic Compatibility),
- Maintenance Concept and Plans,
- Concept for Interface Management,
- Concept for Commissioning, Testing and Trail Run,
- Training Concept.

5 Approval of SDS Design by BBS

After inclusion of the required details in BBS system and/or subsystem design, this will be forwarded separately or incorporated in the SDS design, as far as applicable, for approval to **tie** and other approving bodies.

6 Installation

6.1 Installation

Delivery and installation plans and proposals will be developed by BBS to identify and assign direct responsibility for all elements of the BBS delivery and installation process. These plans will ensure that all elements of the ETN are correctly manufactured, delivered, installed, inspected, and tested to the level necessary to ensure that equipment, subsystems, and the overall system perform in accordance with the design criteria.

Installation method statements will be developed for all installation work. These method statements typically identify the activities to be performed to ensure equipment is correctly installed and include inspection and testing requirements to verify conformance. Modularised, self-contained equipment assemblies with standardised panel layout, power and signal interfaces, and mounting configurations, will be used to the maximum extent practical to minimise 'custom' site installations. This approach permits the use of many standard drawings and procedures, thereby, significantly reducing the amount of time required for the production and approval of the installation method statements.

Installation method statements will also clearly identify protection requirements, resource and material requirements, and equipment preservation instructions.

7 Commissioning and Testing

The strategy for testing and commissioning is to transfer all subsystems into operational conditions

- step by step based on the logistic sequence,
- in parallel if logistically possible (e.g. installation of telecommunication equipment, commissioning of power supply)
- section by section to have the possibility to test integrated parts of the system as early as possible.

Commissioning phase will start with site testing of different units and/or subsystems within one line section. After successful testing the integration of further subsystems will follow until completion of the whole line section. The specified technical function will be demonstrated for one line section until subsequently performed for the entire system to complete system ready for Trial Run.

Some of these tests may be performed during Trial Run, when the whole System is more reliable

During the different phases the verification takes place by each lot. The verification of the whole system is to be co-ordinated by the System Integration Manager. Parallel to the commissioning process the set up of the Operations and Maintenance Organisation, and the on-site training of the staff has to be finalised. The complexity of the commissioning process with relation to staff training and operation and maintenance of the system will require a clear and strict organisation including the co-operation of all parties involved. Training of operations and maintenance staff partly may be executed during the phases of System Demonstration and/or Trial Run.

Commissioning and testing will comprise the following stages:

- Factory tests
- Installation Tests (Site tests items a and b)
- System integration tests (Site tests items c and d; SIT, SCT)
- Trial Run initial stage, completed with T1 tests
- Trial Run performance ramp up, completed with T2 tests
- Shadow running, completed with T3 tests
- Provisional System Acceptance, Handover and start of revenue service
- First year of revenue service, completed with T4 and T5 tests
- Final System Acceptance

7.1 Testing & Commissioning Process

Validation of the technical contractual requirements / specifications will generally be implemented by testing, whereby other means of validation (e. g. simulations, calculation notes) may also be applied where appropriate to provide confidence about the correctness of the design.

The Testing and Commissioning Process shall be performed by a working group consisting of customer and operator representatives and subsystem suppliers, whereby the following tasks / objectives shall be considered:

Customer Representatives

- Review and comment of Test Program Plan, Test Procedures and other relevant test documents;
- Monitoring of testing methods and procedures;
- Witnessing of tests.

Project Management and Subsystem Representatives

- Elaboration of basic documentation for Testing and Commissioning for the respective subsystem tests and integration tests;
- Planning and performance of progress control of commissioning on basis of the project installation schedule;
- Coordination of on site the testing of subsystem suppliers and other contractors interfacing equipment and installations;
- Performance of maintenance during commissioning phase;
- Supervision of Safety and Security;
- Realisation of Quality Control and Documentation for subsystem and system level;
- Follow up of correction of variances/deviations on subsystem and system level;
- Performance and coordination of System Integration and Demonstration Tests (with support by the subsystem suppliers);
- Submission of relevant testing documentation to the Customers review team.

Operations and Maintenance

- Take over the System as specified in the contract for Revenue Service;
- Performance of operation and maintenance of the system during and after Trail Run Operation;
- Participation in testing, commissioning and start up activities;
- Witnessing of tests and participation on facility inspections;
- Support and assistance the integration and overall system testing with trained and experienced staff.

7.2 Test Planning

The Test Plan is expected to be developed for all test phases on system level, i.e. from the site tests SIT/SCT to T5, by BBS, tie and the relevant authorities. This test plan shall clearly identify all items to be tested to satisfy tie's requirements to provide acceptance to the system and all items required from HMRI or other relevant authorities to grant approval for operation, energization and the like. Test planning shall be completed by the end of the final design.

In addition the Commissioning and Testing Plans shall include but not be limited to the following information:

- Systems/components to be commissioned with its dedicated functional requirements (e.g. definition of parameters),
- Roles and responsibilities, incl. commissioning team organization and schedule for the required support by the operators personnel
- Commissioning process to be followed, incl. commissioning pre-requisites and schedule
- Commissioning report requirements, incl. Progress Reporting and logs.

Subsequent documentation will detail:

- test procedures,
- the approval procedures,
- safety management and related measures,
- the process for managing non – conformances.

7.3 Testing of construction phases 1a and 1b

Factory tests in terms of type and investigation tests will be performed in phase 1a. Routine tests will be performed as stipulated by the applicable standards. Where equipment for phase 1b differs from any reason to phase 1a, type and investigation tests may be repeated if necessary.

Installation tests and System Integration tests as well as trial running will be performed for every phase (1a and 1b) separately and independently. For joining phases 1a and 1b, the testing for the anticipated 56-h-period has to be agreed separately and independently from the following descriptions.

7.4 Factory Tests

Factory tests will be performed by each lot and sub supplier on their own responsibility, but under coordination of BBS's System Engineering. Factory tests may comprise type tests, routine tests or bench tests or a combination of these, as deemed necessary from the supplier and stipulated by the applicable standards.

7.5 Installation Tests

Installation tests, including Subsystem Integration (Site tests items a and b) will be performed mainly by each lot and sub supplier on their own responsibility, yet under coordination of the system engineering. To promote the progress of works, BBS's System Engineering will coordinate system installations and tests such, that subsystems can be completed on certain sections simultaneously. Therewith, these sections can be handed over to System Integration tests section wise as indicated in the BBS Contract (Sections A to F). Furthermore, the coordination will normally aim to give priority to the completion to section close to the depot to have them operative for the first test runs with the vehicles at an early stage.
In case that interfacing components of sub systems are missing in the above process, this has to be covered by operational procedures / instructions. Those instructions and procedures will be adjusted according to the status of the system.

7.6 System Integration Tests

E&M System Integration Test activities will be handled by the BBS's System engineering with support by the lots and sub suppliers.

The System Integration Test shall verify the correct interaction and interfacing of the appropriate subsystem with other interfacing systems and its correct functioning in its environment according to the contractor's offer and to the specification requirements.

The E&M System Integration Tests will start at the SIT level, normally with that interfacing subsystem regarded as the most decisive for the overall functioning of the appropriate subsystem (e.g. SCADA with communication) followed by the other interfacing subsystems until achieving full functionality of the appropriate system.

Completing all System Integration Tests will lead to the SCT level (Site tests item d).

As said before, this System Integration testing can also be split up into dedicated sections of the systems which may then, after passing the SCT level, may be used e.g. for test runs with vehicles with Tramco.

7.7 Trial Run

The Trial Run is the ultimate project phase prior to Shadow running. In the particular case, the Trial run will considered in two stages, the initial stage to achieve full functionality and completed with the T1 test (runtime confirmation). The
second stage will include full driver familiarization and ramp up of the system performance until reaching the system performance as stipulated in the chosen
operational variant (one of the variants set out in the Information release 2007-03
28). The second stage of te Trial run will be concluded with the T2 test (System
Performance).

The staff of the Operator, the "O&M Organisation" will execute the Trial Run as part of the "On-the-Job Training".
During this phase the main activity is also with System Engineering supported by the suppliers including Tramco that are co-ordinated by the Site Management.

The following technical and organizational preconditions shall be fulfilled prior to the start of the Trial Run:

The system has to be commissioned completely. Punch list items are allowed, but all safety relevant requirements and functions need to be fulfilled and the relevant certificates have been issued, respective the Operations Manager took over the system, (exceptions such as completion of AFC or prioritization of traffic lights may be agreed with the Customer)

- The organization of the Operation and Maintenance Company is established.
- Training of Operation staff necessary for the Trial Run operation has been completed the examination is documented accordingly.
- Training on Maintenance staff necessary is completed as far as required for achieve the overall requirements for Trial Run operation.
- Rules & Regulations and procedures required for Trial Run Operation are available
- Coordination of Operation and Maintenance Management with Site Management defined
- The Evaluation Committee (and if required the appropriate sub committees) is founded.

7.8 Shadow Running

The Shadow Running is a final stage, where nearly no tests are performed any more, but where various operational patterns and emergencies can be trained. T3 test will be part of the final stage of shadow running. Within T3 tests, Tramco has to prove that their rolling stock is able to provide a riding comfort level as set out in Tables 8-1 and 8-2 of the Employer's Requirements on track as specified in the BBS contract.

7.9 Revenue Service and Network Performance/Reliability Test

After Provisional Acceptance granted after T3 tests respectively after successful termination of Shadow running, the system will enter into revenue operation. During the first 12 month of revenue service the Network Reliability Test (T5) and the Network Performance Test (T4) will be performed.
The Network Reliability Test (T5) will be performed in a period of 90 consecutive days, whereby the reliability targets for the subsystem as set out in Section 1b /10.3 of the Employer's Requirements will be demonstrated.

The Network Performance Test (T4) will be performed in parallel in a period of 28 consecutive days, whereby special demonstrations - Substation and UPS Demonstration, Tram Change Over as defined in part 1d/ 9.4 ff. of the Employer's Requirements will be performed.

For both tests effects of vandalism, damage or other impacts caused by third parties (e.g. collision of motor vehicles), shall be eliminated from the performance demonstration and neither effect nor deem as interruption of the ongoing demonstration period.

8 Acceptance and Approval

Acceptance and approval are distinguished here as follows:

- Acceptance: certification that the system is conform to the requirements of the customer, discharge of BBS from their contractual obligations
- Approval: certification that the system is conform to legal requirements, standards and the like and that the system is allowed to enter into passenger service

Approval and acceptance shall be given according to clear pass-fail criteria as set out in the test plans worked out by the BBS (see 2).

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Edinburgh Tram Network

Section 2: Overall Technical Concept

Part 1 – System Engineering

Annex 1 – RAMS Concept

BILFINGER BERGER

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1 General

1.1 Purpose

The purpose of the present RAMS Concept is to provide an overview of the RAMS process intended to be performed for BBS scope of supply to provide a safe and reliable transit system.

1.2 Scope

The RAMS Concept describes the tasks and activities of system safety, RAM management and engineering required to identify, evaluate and control hazards, or reduce potential risk to a level acceptable to the Authority.

BBS will approach the RAMS activities as part of the design and submit the necessary deliverables to form the BBS Proposals, using the same processes as defined within the "SDS Provider's Agreement with tie (which is being novated under the Infraco Contract and which is included in Volume 7 of the ITN). Details of the design output from SDS to BBS terms of RAMS activities have to be defined.

This RAMS Concept applies to activities related to the technical safety, and RAM during design, construction/installation, testing and safety certification process until the start of revenue operation.

The following sections provide outline details for
- The general RAMS activities (System Assurance activities) in Section 2.1
- Safety activities in Section 2.2
- Reliability, Availability, Maintainability (RAM) activities in Section 2.3

BBS will perform these RAMS activities in order to provide a safe, reliable, available and maintainable railway system according to the European standard EN 50126.
Site Safety, and Occupational Health and Safety are not part of the RAMS activities outlined in this document.

1.3 RAMS Policy

It is the goal the BBS consortium to provide systems, products and services of appropriate quality that offer maximum benefit to our customers worldwide. RAMS is an integral part of quality, therefore RAMS policy is based on our quality policy.
Reliability, availability, maintainability and safety play an important role in ensuring the specified performance, which justifies the special attention paid to RAMS aspects throughout the project.

1.4 Applicable Documents

The following standard will be used as reference:
EN 50126, Specification & Demonstration of Reliability, Availability, Maintainability & Safety (RAMS) for Railway Applications, September 1999

1.5 Definitions and Abbreviations

Availability: The ability of a product / system to be in a state to perform a required function under given conditions at a given instant of time or over a given time interval assuming that the required external resources are provided.
Hazard: A physical situation with a potential for human injury. (EN 50126)
Maintainability: The probability that a given maintenance action, for an item under given conditions of use can be carried out within a stated time interval when the maintenance is performed under stated conditions and using stated procedures and resources.

RAMS: An acronym meaning Reliability, Availability, Maintainability and Safety.
RAM-Program: A documented set of time scheduled activities, resources and events serving to implement the organizational structure, responsibilities, procedures, activities, capabilities and resources that together ensure that an item will satisfy given RAM-Requirements relevant to a given project or contract.
Reliability is defined as the capacity of a system / component to fulfill it's assigned function under defined conditions for a certain time (IEC 271). That means, reliability is the probability that an item can perform a required function under given conditions for a given time interval expressed in hours (MTBF: Mean Time Between Failure) or kilometers (MKBF: Mean Kilometers Between Failure).
Risk: The probable rate of occurrence of a hazard (expressed in a time interval) causing harm and the degree of severity (expressed in hazard severity levels) of the harm.

Safety: Freedom from unacceptable risk of harm (EN 50126).
Safety-Program: A documented set of time scheduled activities, resources and events serving to implement the organizational structure, responsibilities, procedures, activities, capabilities and resources that together ensure that an item will satisfy given Safety-Requirements relevant to a given project or contract.
The following abbreviations are used:

EN	European Norm
GF	Business domain (GeschaftsFeld)
RAM	Reliability, Availability, and Maintainability
RAMS	Reliability, Availability, Maintainability, and Safety
SAP	System Assurance Plan

1.6 RAMS Aspects of Railway System

This RAMS Concept covers the RAMS aspects of railway systems. The term RAMS represents the core aspects of System Assurance and means:
- Reliability,
- Availability,
- Maintainability, and
- Safety.

System Safety includes the technical safety, the safe system operation, especially the safety of persons, and the safe functioning of the equipment installed.
The attainment of acceptable in-service RAM parameters can only be achieved by meeting ongoing reliability, and availability requirements, by controlling the maintenance activities, and the operational environment.

1.7 Integration of System Suppliers

Specific internal rules and regulations to improve co-ordination, and quality of work of internal system suppliers for mass transit systems will be established. Internal suppliers are obliged to provide their input according to requirements established by the contract, by applicable standards, and the internal regulations fixed in the "GF" process. This "GF" process is developed to provide, beside others a RAMS process according to EN 50126.
Sub-contractors will be integrated in the RAMS process by using sub-system specifications considering the Contract, EN 50126, and project procedures, e.g. for organization, quality management, or documentation.

2 RAMS Process

2.1 General RAMS Activities

2.1.1 RAMS Program (System Assurance Program)

The RAMS program scheduled by BBS comprises activities relating to RAMS aspects of transit systems. RAMS, also known as System Assurance will be ensured by duly performing the RAMS activities outlined below.
The RAMS activities described below represent the RAMS Program including the preparation of a System Assurance Plan (SAP). This System Assurance Plan for the BBS scope of supply details the general RAMS activities work to be carried out by BBS. The plan defines the scope of the RAMS tasks that will be undertaken to achieve a safe and reliable system operation. Details about the documentation of the RAMS activities are provided in section 2.1.4.
The following RAMS aspects will be considered in the SAP:

- RAMS Management Structure
- Scheduled RAMS Activities
- RAMS Documentation
- Reporting
- Reviews
- Quality Management
- Limitation of Scope

2.1.2 RAMS Management Structure

BBS will establish a comprehensive, and effective RAMS management. This includes the controlling of the RAMS activities on overall system, system, and on sub-system level. A hierarchical management structure as shown below will be established. This structure has proven to deliver good results in mass transit turnkey projects.

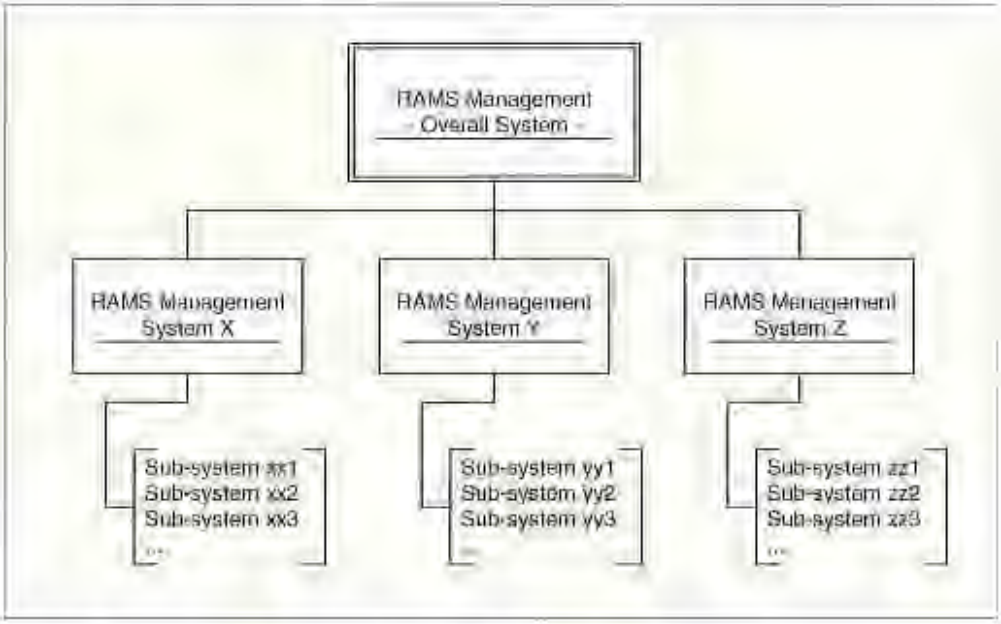

Figure 1: Example for hierarchical RAMS management structure

2.1.3 Scheduled RAMS Activities

A global flowchart of the RAMS activities scheduled in relation to general project phases is given below.

The activities outlined in figure 2 will be detailed in the RAMS documentation according to the specific project phases, and the RAMS requirements established. The activities are scheduled in accordance with EN 50126, and will be tailored to the specific project requirements.

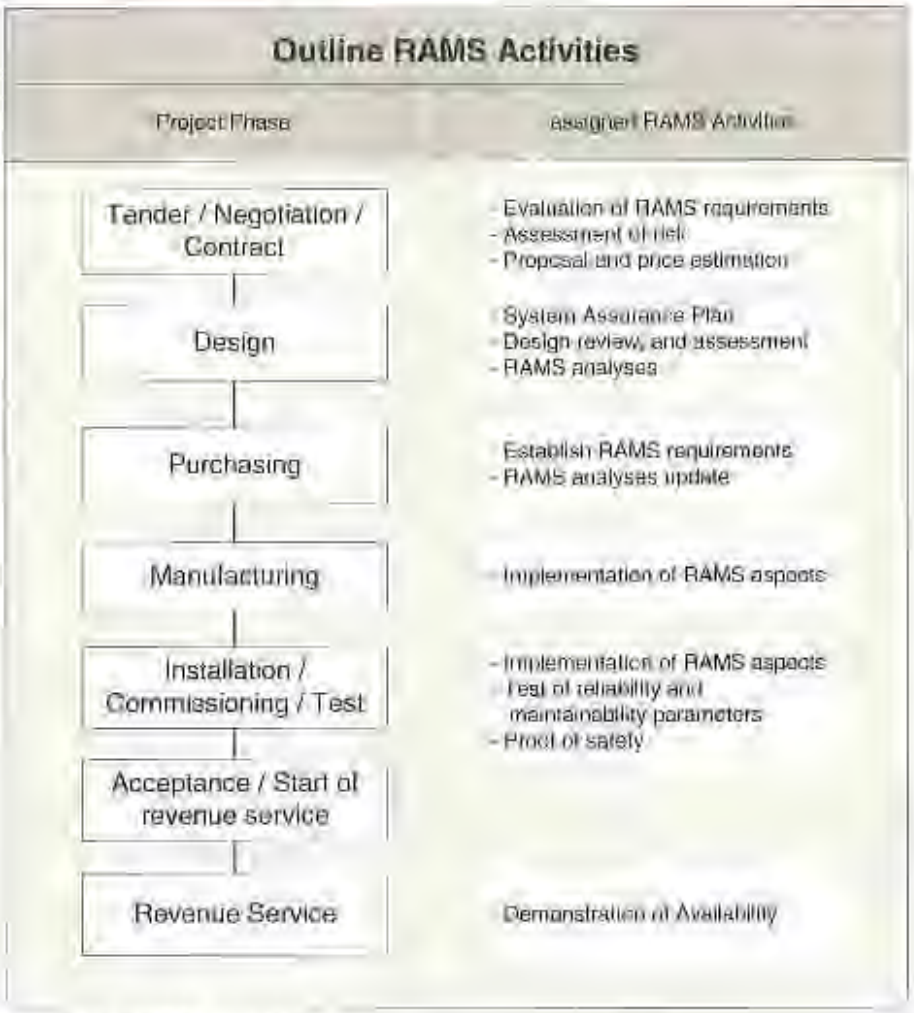

Figure 2.: RAMS activity flowchart

2.1.4 RAMS Documentation

The RAMS Program contains several activities for the RAMS aspects of the project. BBS will document the RAMS activities. Figure 3 shows the documentation structure proposed for system assurance activities on the overall system level.

The System Assurance Plan covers the RAMS related procedures and activities from design phase up to the start of revenue operation of the system. The objective of the System Assurance Plan is to ensure that the approach adopted by BBS for the reliability, availability, maintainability and safety activities will satisfy the requirements established for modern mass transit systems. The System Assurance Plan can contain System RAM Plan, and a System Safety Plan. In this case these documents will provide the details of the RAMS activities.

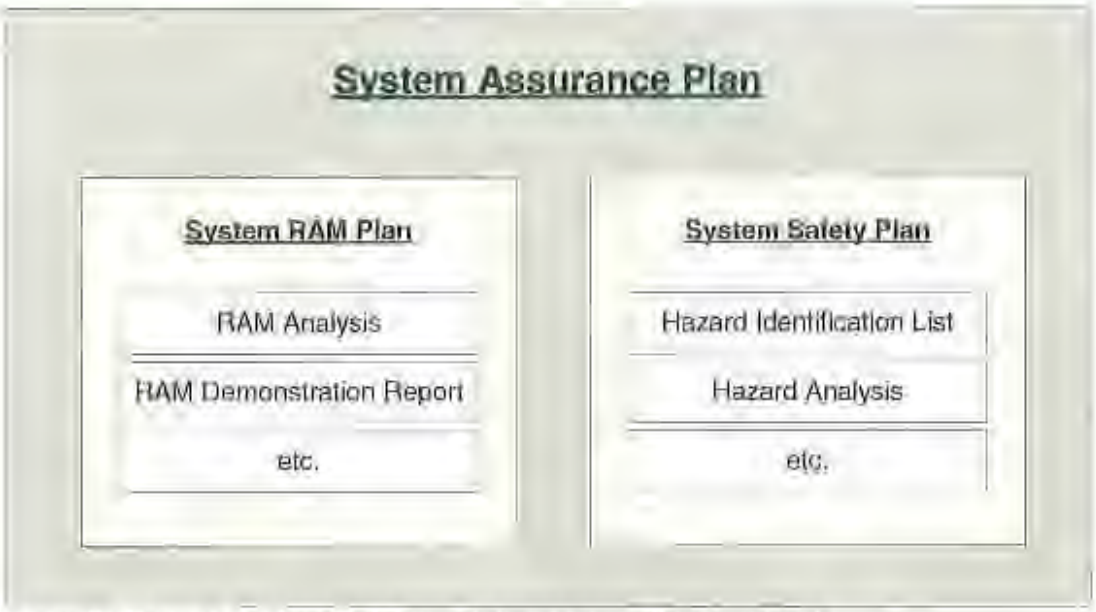

Figure 3.: Example for RAMS documentation on overall system level

A hierarchical documentation structure will be established for the systems RAMS activities. Figure 4 below shows a rough example for the structure of the RAMS documentation. This structure will be extended according to the specific requirements established.

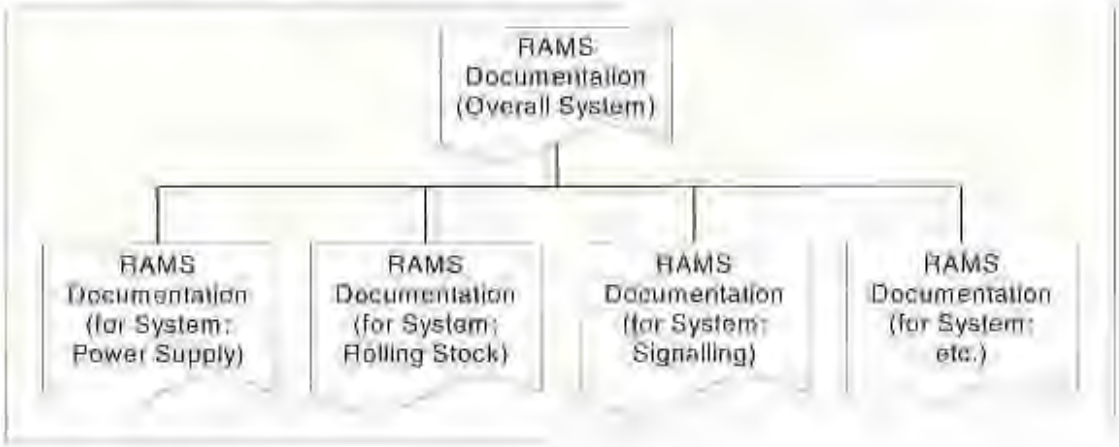

Figure 4.: Example for hierarchical structure of RAMS documentation

2.1.5 Reporting

Reports will be prepared and submitted to the Authority providing information about RAM and Safety analyses, and demonstration tests performed by system suppliers. RAMS activities can be reported for the overall system level as well as for the system level depending on the RAMS requirements established, and the system complexity. Details will be provided in the RAM and Safety plans.
Status reports will be prepared periodically containing information about work progress
BBS will present the status, and results of RAMS activities at least at the end of design period, and commissioning period, if required.

2.1.6 Reviews

Internal reviews of system assurance work will be performed at the end of major design phases.

2.1.7 Quality Management

High product quality is a precondition for successful achievement of the RAMS requirements.
BBS will establish a project Quality Management during the project phases to supervise and control the BBS works as well as the works of the sub system suppliers. The Quality Plan will provide further details.

2.1.8 Limitation of Scope

The following events will not be covered by safety or RAM studies:

Consideration of any malevolent or voluntary action, vandalism or force majeure.
Site Safety, and Occupational Health and Safety.

2.2 System Safety Activities

BBS intend to perform the following safety activities:

- Hazard identification and analysis
- Detailed safety analysis for items identified as safety critical
- Demonstration of safety related functions
- Documentation of safety activities

Generally the safety activities will be performed to provide:

- Evidence of adequate Quality Management,
- Evidence of adequate Safety Management,
- Details of the implementation and results of technical safety analysis and activities,
- Recommendations and restrictions for use of system and / or installation operational and maintenance requirements constraints.

2.2.1 System Safety Objective

The system safety activities will ensure that the policy of BBS is:

- To meet the contract requirements on safety.
- To design, procure and commission the system capable of being operated and maintained at the required safety level which has been identified as result of hazard analysis for this project.

Application of this policy means:

- Safety risks (i.e. likelihood and consequences of hazards) will be reduced, e.g for signalling by designed fail-safety of the employed technology or other protective product features down to a rate considered as being tolerable in accordance with EN 50129

Priority is to provide proven safety so that:

- The requirements on proven safety are met.
- The safety process focuses on adaptations and modifications from generic systems.
- The consistency of the overall safety concept of the project is not undermined by new developments of safety critical items.

BBS will ensure that the safety policy statement from their partners and sub-contractors have equivalent complementary statements that support and comply with this policy.

2.2.2 System Safety Organisation

The safety organization is an integrated part of the system assurance organization outlined in section 2.1.2. BBS will designate a System Safety Manager for the overall system.
System suppliers are responsible for implementation of the Safety policy within their scope of work. They will designate their Safety manager(s)/officer(s) for the application of it.
These managers, and officers will form the Safety Team and they will meet on a regular basis. The System Safety Plan will provide a description of the Safety organization.

2.2.3 System Safety Plan

BBS will prepare a System Safety Plan as part of the SAP or as a separate document (see section 2.1.4).
As a basic guideline of the Safety Program, the System Safety Plan will provide the program elements.
The objective of the Safety Plan is to provide the Authority and BBS with a complete statement of the planned System Safety Program. This program is an element of the transportation project to ensure compliance with the relevant safety requirements established by the authorities and will include the milestones for obtaining approvals from the authorities. BBS will identify, analyze and control all relevant hazards under normal, restricted and emergency conditions following the plan so that the hazards can be eliminated or controlled at levels, considered as being tolerable in accordance with EN 50126.

The System Safety Plan will require that:

- BBS, their partners and main subcontractors will provide their own plans, which will be compatible with their own in-house design safety management practices and consistent with the System Safety Plan.
- BBS, their partners and main subcontractors will provide a detailed management structure document describing and emphasizing the

responsibilities relating to safety management together with the definition of the organization, the roles and responsibilities of the individuals involved.

- BBS, their partners and main subcontractors will have a demonstrably competent and well-trained workforce.

The Safety standard to be complied with is European standard EN 50126. The content of the safety analyses will fulfill the applicable requirements and will be conform to the relevant safety standards.

The Safety Plan is part of the RAMS program, see also section 2.1.4., and covers the following items:

- General system safety requirements, recommendations and criteria
- Overview about the system configuration
- Safety organization and management
- Scheduling of safety activities
- Safety Program activities
- Documentation of safety activities

2.2.4 System Safety Program

The objective of the Safety Program is to demonstrate that the system design and/or its application are likely to achieve the specified safety requirements. The Safety Program will provide the authorities as well as BBS with a complete statement of our proposed methodology for ensuring compliance of the system design with the required safety regulations. The Safety Program will be subject to approval by the Authority.

The Safety Program will include the required documentation of safety related analyses, tests and reports and will be performed on the overall system and sub-system level. Each document that is part of the Safety Program will be submitted to the Authority for approval.

A Time Schedule will be provided to the Authority, which will include the milestones for submission of the safety related documents, and for safety verification and validation procedures.

2.3 System RAM Activities

The RAM activities will be performed as part of the system assurance activities. BBS intend to perform the following RAM activities:

- RAM analysis and prediction
- Detailed analysis for items identified as reliability critical
- Demonstration of reliability, availability, and maintainability if required
- Documentation of RAM activities

2.3.1 System RAM Objective

The RAM activities will ensure that the policy of Contractor is:

- To meet the contract requirements relating to RAM.
- To design, procure and commission a highly available, reliable, and maintainable system.

Application of this policy means:

- Provision of high quality products, and system engineering combined with professional project management.

2.3.2 System RAM Organisation

The RAM organization is an integrated part of the system assurance organization outlined in section 2.1.2. BBS will designate a System RAM Manager for the overall system. One person can take over responsibility of the System RAM Manager and the System Safety Manager.
System suppliers are responsible for implementation of the RAM requirements within their scope of work. They will designate their RAM manager(s)/officer(s) for the application of it. These managers and officers will meet on a regular basis. The System RAM Plan will provide a description of the RAM organization.

2.3.3 System RAM Plan

BBS will prepare a System RAM Plan as part of the SAP or as a separate document (see section 2.1.4).
This plan contains all relevant information about the RAM organization, RAM schedule and RAM activities applicable to the overall system.
The RAM Plan covers the following items:

- General system RAM requirements, recommendations and criteria
- Overview about the system configuration
- RAM organization and management
- Scheduling of RAM activities
- RAM Program activities
- Documentation of RAM activities

2.3.4 System RAM Program

The objective of the RAM Program described in the System RAM Plan is to demonstrate that the system design and/or its application are likely to achieve the specified RAM requirements. The RAM Program will provide the Authorities, as well as BBS with a statement of the methodology proposed for ensuring compliance of the system design with the required RAM targets.
The RAM Program will include the required documentation of analyses, tests and reports. It will be performed on overall system level, and on system level.
A Time Schedule will be provided to the Authority, which will include the milestones for submission of the RAM related documents, and for RAM demonstration if required.

3 RAMS Requirements

The Edinburgh Tram Network shall be made as reliable as practicable by making the subsystems as reliable as practicable, subject to the constraints of cost. Where necessary, the system should be made resilient to single point equipment and cable failure by employing suitable levels of equipment/cable redundancy and duplication.

On equipment or cable failure, systems shall be designed in a safe manner with modes of degradation leaving possibilities to work around. Limited back-up facilities shall be provided to maintain services under specified partial failure conditions.

Defined within chapter 3.5 are the requirements for availability of individual subsystems (each of which is given a definition), and the reliability of individual components of the subsystems (see chapter 3.2)

3.1 Definition of Reliability

The capacity of a system / component to fulfill its assigned function under defined conditions for a certain time (IEC 271).

For the percentage values in clause 3.2 and 3.3 the following calculation should apply:

$R_{Subs} = 100\% * [Nh_{op} - (Nh_{op} / MTBF) * MTTR] / Nh_{op}$
$= 100\% [1 - MTTR / MTBF]$

R_{Subs} – Subsystem-Reliability [%]
Nh_{op} – Operation-hours per year (7300hours = 20hours/day * 365 days)
MTBF – 'Mean Time between Failures'
MTTR – 'Mean Time To Repair (without administration and logistic time)

For all components and subsystems, assume a Mean Time to Repair (MTTR) of 4 hours for the definition of the Reliability-targets. For the demonstration of the Reliability-targets the real MTTR will be taken into account for the estimation of R_{Subs} under consideration of the stipulation made in 3.9 herein.

3.2 Reliability targets for Subsystems

3.2.1 Overhead Line Equipment and Power supply

Component or Subsystem Minimum Reliability
OLE System, where its availability is defined as the probability that in any linear km of the OLE system, trams are not able to operate at the normal operational speed due to defects in the OLE. (this is based on 20hr/day operation and 20 route-km plus depot, about 50 track-km) maintenance by skilled personnel according maintenance manual, operation within specified limits, transient-effect failures and third-party impact will not be taken into account.

99.995% for each km

Component or Subsystem Minimum Reliability

AC circuit breaker, where its reliability is defined as the probability that it either fails to conduct electricity when commanded to be closed. **99.99%**

Transformer / rectifier where its reliability is defined as the probability that it either fails to provide the nominal 750VDC when energized. (coil short circuit neglected) **99.99%**

DC circuit breakers and busbars, where its reliability is defined as the probability that traction power is not available from the DCCB when commanded to be closed, provided that 750 VDC is available at from the rectifier **99.99%**

Transformer / rectifier where its reliability is defined as the probability that it fails to provide the nominal 750VDC when energized by the HV input. (coil short circuit neglected) **99.99%**

Substation battery and charger, where its reliability is defined as the probability that control voltage is not available from the battery at any time during its normal operation, regardless of the state of the incoming LV supply **99.99%**

Substation, where its reliability is defined as the probability that 750VDC voltage is not available for the OLE when the substation is commanded to provide 750VD **99.75%**

3.2.2 Supervisory and Communications Systems

Operational Data Network

Component or Subsystem Minimum Reliability	
ODN node	**99.99%**
Fibre Optic Cabling	**99.99%**
Patch Panels and Connectors	**99.99%**

ODN network, where its Reliability is defined as the probability that any message from a given input to a node reaches its intended destination node correctly and could be transmitted onwards by that node. **99.75%**

Tram Position and Detection System

Component or Subsystem Minimum Reliability	
Transponder (if used)	**99.9%**
Loop Detector	**99.75%**
TPDS Trackside Controller	**99.9%**

TPDS subsystem, where its Reliability is defined as the probability that any given tram has its position detected and passed to the signal controller and to Control Centre operators correctly, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional **99.75%**

Passenger Information Display

Component or Subsystem Minimum Reliability	
Passenger Information Display	**99.9%**
Local Controller (if required)	**99.9%**

PID subsystem, where its Reliability is defined as the probability that the appropriate message is displayed correctly at a given PID, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional **99.75%**

Telephone Network

Component or Subsystem Minimum Reliability	
Telephone Handset	**99.9%**
PABX	**99.99%**

Telephone network, where its Reliability is defined as the probability that any 30 second conversation between a given telephone and another given telephone is heard clearly and completely by the caller and the intended recipient, assuming that the ODN is fully functional. **99.75%**

Public Address System

Component or Subsystem	Minimum Reliability
PA speaker	**99.9%**
PA controller	**99.9%**
Microphone and speaker	**99.9%**

PA subsystem, where its Reliability is defined as the probability that an operator can make an intended announcement clearly at a given platform, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional. **99.75%**

Operational Radio System

Component or Subsystem	Minimum Reliability
Base Station	**99.95%**
Mobile Handset (Tram, Vehicle, or Hand Held)	**99.7%**
Central Switch	**99.99%**

Operational Radio subsystem, where its Reliability is defined as the probability that a 10 second call (voice) or short data message can be received clearly by the intended recipient, assuming that the ODN is fully functional and that the hardware component of the Control Centre workstations is fully functional **99.5%**

Passenger Help / Passenger Emergency Help System

Component or Subsystem	Minimum Reliability
Help / Emergency Help Point	**99.9%**

Help Point subsystem, where its Reliability is defined as the probability that a member of the public can contact the control room operator and can carry out a Help Point conversation lasting 20 seconds, clearly and without interruption, assuming that the ODN is fully functional and that the PABX is fully functional **99.75%**

CCTV System

Component or Subsystem	Minimum Reliability
CCTV camera	**99.95%**
Digital Video Recorder	**99.95%**
CCTV Matrix	**99.95%**

CCTV subsystem, where its Reliability is defined as the probability that an image is displayed correctly and in the specified sequence at the Control Centre, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional **99.75%**

Recording and replay subsystem, where its Reliability is defined as the probability that an image is displayed from any given time in the past (within the recorded period) can be retrieved and displayed correctly, assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional **99.9%**

SCADA System

Component or Subsystem	Minimum Reliability
SCADA RTU (including I/O cards and interface cards)	**99.95%**

SCADA subsystem, where its Reliability is defined as the probability is the lesser of

(a) that an indicator is read correctly at the RTU, transmitted to the SCADA Master Station in the Control Centre, and displayed correctly on any SCADA display that is in use within four seconds; and
(b) that a control is effectively transmitted to an outstation within three (two) seconds assuming that the ODN is fully functional and that the hardware component of the Control Centre servers and workstations is fully functional **99.75%**

Central Control Equipment

Component or Subsystem	**Minimum Reliability**
Servers (if necessary, by use of hardware and software redundancy)	**99.99%**
Workstations	**99.9%**
Printers	**99.5%**
CCTV Matrix Controller	**99.9%**
LAN Switches, Routers and Hubs	**99.99%**

Further reliability targets are stipulated in 3.3 herein.

3.3 Network Reliability tests for Subsystems

The Network Reliability Test (T5) will be performed in a period of 90 consecutive days, whereby the reliability targets for the subsystem as set out in this chapter will be demonstrated.

For this test effects of vandalism, damage or other impacts caused by third parties (e.g. collision of motor vehicles), shall be eliminated from the performance demonstration and neither effect nor deem as interruption of the ongoing demonstration period.

Each specified sub-system has its own specified target detailed in this chapter. The tests will start on the same date (on or after Service
Commencement Date) and as each subsystem is individually demonstrated to meet its contractual target that subsystem reliability test is then considered completed. Network
Reliability Test is only passed when all the sub-systems meet their targets.

The undertaking of the test will essentially be a maintenance function carried out by the Contractor. However, it requires contractor management of the preparation for the Tests with technical support and monitoring by Contractor, (along with representatives from tie during the Test).

The contractor will undertake and pass Network Reliability Test within twelve months after the Service Commencement Date of the whole Edinburgh Tram Network to pass Network Reliability Test.

If any part of the works or part of the ETN fails to pass Network Reliability Test then rectification, repair, modification or reinstatement of that system will be undertaken. The defect correction period on that part of the system or any sub-system which fails the test will be extended a further twelve months beyond the time of rectification, repair or modification. The contractor will propose and undertake the necessary remedial action to achieve acceptance.

tie will be given thirty working days advance notice of the Network Reliability Test plan and fourteen working days written notice of the test commencement date.

TEST	TARGET VALUE
Tram Reliability	see Tramco Supply Agreement.
Hand Held Ticket Vending Machine	dedicated to supplier for Automatic Fare Collection System
Ticket Control System	dedicated to supplier for Automatic Fare Collection System
Passenger Information Display System	as set out in chapter 3.2.2 herein
Passenger Help/Emergency Help Point System	as set out in chapter 3.2.2 herein
On Street Track & Formation	Achieves **99.995%** reliability over six consecutive Periods.
Off Street Track & Formation	Achieves **99.995%** reliability over six consecutive Periods.
Point Machine	Achieves **99.995%** reliability over two consecutive Periods
Traction Switchgear	Achieves **99.995%** reliability over two consecutive Periods.
OLE Equipment Achieves	reliability as set out in chapter 3.2.1 herein over two consecutive Periods.
Bonding & Earthing	No stray current, or 'touch voltage' recording that is within 15% of tolerable target for four consecutive Periods
Operational Radio	Achieves reliability as set out in chapter 3.2.2 over two consecutive Periods.
Operational Data Network	Achieves reliability as set out in chapter 3.2.2over two consecutive Periods.
UTC Interface Achieves	**99.75%** reliability over four consecutive Periods.
Wheel/Rail Interface	No proven instances of Noise and Vibration exceedences have occurred in a six month period
CCTV System	Achieves **99.75%** reliability over two consecutive Periods.
Tram Position Detection System	Achieves **99.75%** reliability over two consecutive Periods.
Traction SCADA System	Achieves **99.75%** reliability over two consecutive Periods.
Tramstop Lighting	Achieves **98.5%** reliability over two consecutive Periods.

General Exclusions and Assumptions
Should the Contractor be able to prove to the reasonable satisfaction of **tie** that any of the reliability tests would have been exceeded by means of one or more of the following exclusions then, in consultation with **tie**, the test results will be amended to discount the effects of such proven Network Reliability Test exclusions.

The Network Reliability Test exclusions and Network Reliability Test assumptions set out in this section relate only to the Network Reliability Test and will not be used or relied upon in any circumstances in any connection with any other test. For the avoidance of doubt, third party vandalism and damage will be included in these tests.

Operator Influences
Defects caused by the Operator's failure to:

- Provide properly trained staff as defined in the DPOFA, exercising an absolute duty of care.

Exclusions
The burden of proof will be on the Contractor to show that such failures of the Operator were caused by reasons for which the Contractor was not responsible and for which the Operator should be properly accountable for by reason of the Operator's default, omission, negligence or breach of statutory duty. The Contractor will develop and agree audit procedures with **tie** and the Operator in respect of the Network Reliability Test exclusions set out in this paragraph.

However, in no event will any allowances or relief or Reliability Network Reliability Test exclusion be granted to the Contractor where any delays or failure to pass Network Reliability Test has been caused or contributed to by:

- Any default, breach or omission of the Contractor;
- Contractor defects; and
- Equipment undergoing modification or rectification by the Contractor.

Realistic long term response times to repair defects will be provided by Contractor during the period of the test. It is assumed that **tie** will procure all electrical power and that a supply is available for the tests. Any failures resulting from inappropriate actions or omissions by the Operator or his contracted staff will be discounted as set out in the DPOFA. For the avoidance of doubt, the impact of third party vandalism and damage will be excluded.

3.4 Monitoring and Reporting of Test Performance

The scoring of faults should be achieved by first reviewing the fault logs and performance reports using them as a filter to establish which faults need to go forward into the review. The review meeting will then be used to discuss and allocate the responsibility of faults under the performance regime.

The review meeting will take place daily where the performance of each system will be reviewed for the previous period. Representatives of Contractor, Tramco, **tie** and the Operator will attend this meeting. Each sub-system will be reviewed and agreement reached on all failures. The meeting will be recorded and the resulting daily report distributed to each party.

3.5 Definition of Availability and its Demonstration

The 'Availability' is defined in general as follow:
The ability of a product to be in a state to perform a required function under given conditions at a given instant of time or over a given time interval assuming that the required external resources are provided. (EN 50126)

The Non-Availability is defined as follow:

Non-Availability = 1 - Availability

Vise versus applies:

Availability = 1 – Non-Availability

The offer of the contractor regarding the Availability/ Non-availability based on the following stipulations:
In general the Availability is depending from the status of the overall system. In the beginning of operation ("burn-in" phase) the availability may be influenced by spurious "early" failures. During this period the availability will grow up to the targeted availability of 99% (long term averaged value) due to replacement of such failed equipment under defects liability. According to common experience this period ends approximately after one year when the system is in the phase of 'normal use' characterized by a stable availability (averaged over the '*given instant of time* or *given time interval*).

'*The ability ... to perform a required function*' is defined over part 1e, 2.6 'Maintenance Strategy'; 'Reactive and Fault Corrective Maintenance' (Table 2-1) of the tender documents.
The ability to perform a required function is no more given when a 'failure halting the operation of the tram network in whole or part thereof' longer than 2h and/or a 'failure impact the punctuality of the tram network' longer than 8h.

'*...a given instant of time or over a given time interval* is depending from the status of the overall system as mentioned above. In the beginning ("burn-in" phase) a fluctuation of the availability is possible. Due to that the '*given instant of time or given time interval* should not be shorter than half a year in this period. In the follow-up period (phase of "normal use") the '*given instant of time* or *given time interval* could be 3 months.

The specific definition of the (overall) Availability is defined as follow:

(overall) Availability = 1- Sum(t_{BDi})/ t_{Cal}

Sum(t_{BDi}) - Sum of time-periods for failure halting the operation of the tram network in whole or part thereof longer than 2h per failure-event over a given time interval (3month) (e.g. a failure-event were a failure halting the operation of the tram network in whole or part thereof for 2,5hours the time-period which has to be taken into account for the availability calculation would be t_{BDi} = 0,5h)

t_{Cal} - Calendar-time of the given time interval

3.6 RAM Apportionment of the overall Availability

The following table gives an overview of the apportionment of 'Non-Availability/ Availability' based on common experiences for modern mass transport systems. This table serves as orientation only. The portion of the subsystems could diverge due to its stochastical character, but this deviations will compensate each other so that the averaged availability of 99.00%' will be reached during the phase of 'normal use'.

general ETN Subsystems	ETN non-availability allocation	ETN Availability (99,0% related)	ETN non-Availability (99,0% related)
Rolling Stock	50,00%	99,500%	0,500%
Signalling	22,50%	99,775%	0,225%
Power Supply	24,00%	99,760%	0,240%
Telecommunication	2,00%	99,980%	0,020%
Trackwork	1,50%	99,985%	0,015%
	100,00%	99,00%	

* long-term averaged value

3.7 Definition and targets for Maintainability

The probability that a given maintenance action for an item under given conditions of use can be carried out within a stated time interval when the maintenance is performed under stated conditions and using stated procedures and resources.

The system and its components will be designed with maintainability in mind. To this end, the following will be observed:

- Particular equipment will be in a redundant configuration, so that a component may be replaced while stand-by equipment takes over its duty
- Equipment will be replaceable if possible as field replaceable units, so that defective components can be replaced without the need to power down the overall piece of equipment
- Equipment, particularly at trackside and stopping points, will be positioned so that where possible it is accessible for maintenance or replacement without the necessity to halt tramway traffic or to close down the stopping point and without the need to use access equipment such as steps.

For all components and subsystems assume a Mean Time to Repair (MTTR) of 4 hours.
Any downtime required for planned maintenance can be discounted from the determination of availability, provided that such maintenance can be reasonably undertaken at a time when the maintenance has no impact on the operation of the system. This will often be during overnight system shut-downs.

3.8 Targets for Maintenance

Response times for reactive and fault correcting maintenance will be based on the potential impact of the incident or failure.

Fault category	Correction Time Limit	Description
1	**1 hour** to attend and make safe. **2 hours** to Breakdown Intervention	Critical issue such as Health & Safety risk, or failure halting the operation of the tram network in whole or part thereof, failure of major system
2	**8 hours**	Failure impacting the punctuality of the tram network, or having potential

3	24 hours	to impact Failure or incident not having immediate impact on network operation, but impacting the service quality
4	1 week	Failure or incident not impacting network operation, nor service quality

A response to other minor event is to be initiated within the time limits detailed as follow:

Fault category	Correction Time Limit
cleaning Fault - Spillages	2 hours
Tramstop cleaning Fault - Offensive Graffiti and fly posting	2 hours
Tramstop cleaning Fault - Graffiti	5 hours
Tramstop cleaning Fault – Other	24 hours
Tramstop lighting Fault	2 days
Tramstop telephone Fault	3 days
Fault causing the lift at Murrayfield Tramstop to be out of operation	6 hours
Tramstop electronic passenger information display Fault	2 days
Tramstop PA system Fault	24 hours
Tramstop CCTV Fault	2 days
Defect, fault or other disrepair that restricts access to all or part of a Tramstop or otherwise interferes with its use	3 days
Defect, fault or disrepair causing a trip hazard at an Tramstop (including unintended changes of floor levels or protrusions from the floor of more than 25mm)	24 hours
Broken glass at an Tramstop	2 hours
Overflowing / damaged gutter at an Tramstop	24 hours
Structural defect, fault or other disrepair at an Tramstop	28 days
Any other defect, fault or other disrepair at a Tramstop (including in relation to shelters, seats, canopies, signage, cycle parking, litter bins and poster cases) but excluding blocked drains, overgrown vegetation and fencing faults.	5 days
Blocked drain other than on a street running section of the Edinburgh Tram Network System	24 hours
Blocked drain on a street running section of the Edinburgh Tram Network System	2 hours
Overgrown vegetation	3 days
Defect, fault or disrepair fencing such that access to the track or buildings and equipment is not prevented	6 hours
Defect, fault or disrepair in respect of a Monitoring Point or any other Electronic monitoring equipment	24 hours
Structural defect, fault or disrepair other than at a Tramstop	28 days
Any other defect, fault or disrepair other than at a Tramstop	2 days

Elements of infrastructure will refurbish and replace before its performance deterioratas below the design, stated tolerances or equipment has become obsolete and/or is incurring disproportionately high maintenance costs. The initial lifecycle replacement plan will be based upon the manufacturer's stated design life, our previous experience, and assumptions on the impact of designed use. Subsequent annual updates will take into account condition and reliability data gathered during the inspection, maintenance and operational use.

In addition to preventive, life cycle and reactive maintenance undertake the:

- Removal of graffiti;
- Repair vandalism and accident damage; and
- Undertake cleaning as detailed in tender documentation

3.9 Limitation of Scope for Availability, Reliability and Maintainability

The following events will not be covered in the estimation of the Availability/Non-availability' or Reliability or Maintainability:

Consideration of any

- malevolent or voluntary action,
- vandalism or force majeure
- third party impact

The consideration of administrative and logistic time for the estimation of the time for 'Breakdown Intervention' used for the availability-calculation and 'Mean Time To Repair' used for the reliability-calculation is excluded.

The maintenance has to be done in general by skilled personnel according maintenance manual, operation within specified limits.

SIEMENS

31st March 2008

Updated Proposal Submission

Edinburgh Tram Network

Section 2: Overall Technical Concept

Part 1 – System Engineering

Annex 2 – Training Support

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1 Training Support

The Bilfinger Berger-Siemens Consortium (BBS) offers in addition to the Suppliers Training on ETN subsystems special Training Support for operations and maintenance staff of the future Operator in an extent of twelve (12) man-months.

This Training Support may cover

- assistance in preparation of the Training Plan, and
- support in operational training on System operations under Regular and Degraded Operations Modes, handling of Emergencies and regarding Recovery Strategies.

Details of this additional support with respect to training scope and scheduling should be discussed and jointly agreed with lie and the future Operator

The Suppliers Training will be performed by each Supplier for the Operator's operations and maintenance staff to be trained at their specific subsystems including

- operating of equipment, and
- execution of preventive and corrective maintenance of the equipment.

It is understood that the Suppliers Training will also cover the training of drivers in operating the tram vehicles. This Drivers Training will be subject to separate contract with the tram supplier (Tramco).

Key aspects of the Suppliers Training will be:

- Handling of equipment and/or trains;
- Fault finding;
- Repair and maintaining of equipment;
- Response to irregularities;
- Safety rules for the respective field of work;
- Handling of protective devices and emergency equipment.

Suppliers Training will mainly be performed as an "on-the-job" training with the required theoretical background. Therefore the most benefit might be derived from a progressive involvement of the trainees in the installation, testing and commissioning of the relevant subsystem, where applicable.

The relevant training documents will be produced by the Suppliers step by step as needed for the different tasks. The Supplier's necessary documentation like the operating and the maintenance manuals of the specific subsystems will be part of the training documents.

BILFINGER BERGER Civil

SIEMENS

31st March 2008

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Section 2: Overall Technical Concept

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Annex 3 – Earthing and Bonding

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1 Scope

The construction of railway installations generally requires a concept for earthing and bonding including provisions for lightning protection as a basic document for the involved parties in the project. This is important particularly for modern systems with high traction currents and the extensive use of electrical energy for many purposes.

The objectives for earthing and bonding are:

- The safety of persons:
The safety of persons is characterised by the value of the touch voltage.
- The protection of installations:
Damage of installations may arise from overheating of conductors, by arcing and by electrical corrosion.
- The intended operation of the system:
For the intended operation of the system the aspect of electromagnetic compatibility (EMC) has to be considered too.

The safety of persons is considered to have the highest priority!

The present Concept deals with all aspects of earthing and bonding of the Edinburgh Tram Network project.

The earthing system described in this concept is a combined system for all purposes:

- Traction Power Supply and Traction Return Circuit
- Service Power Supply of all voltage levels
- Lightning Protection
- EMC appropriate earthing design

Earthing and Bonding form the basis of EMC!

Figure 1-1 shows the relation among EMC, earthing, bonding, and lightning protection.

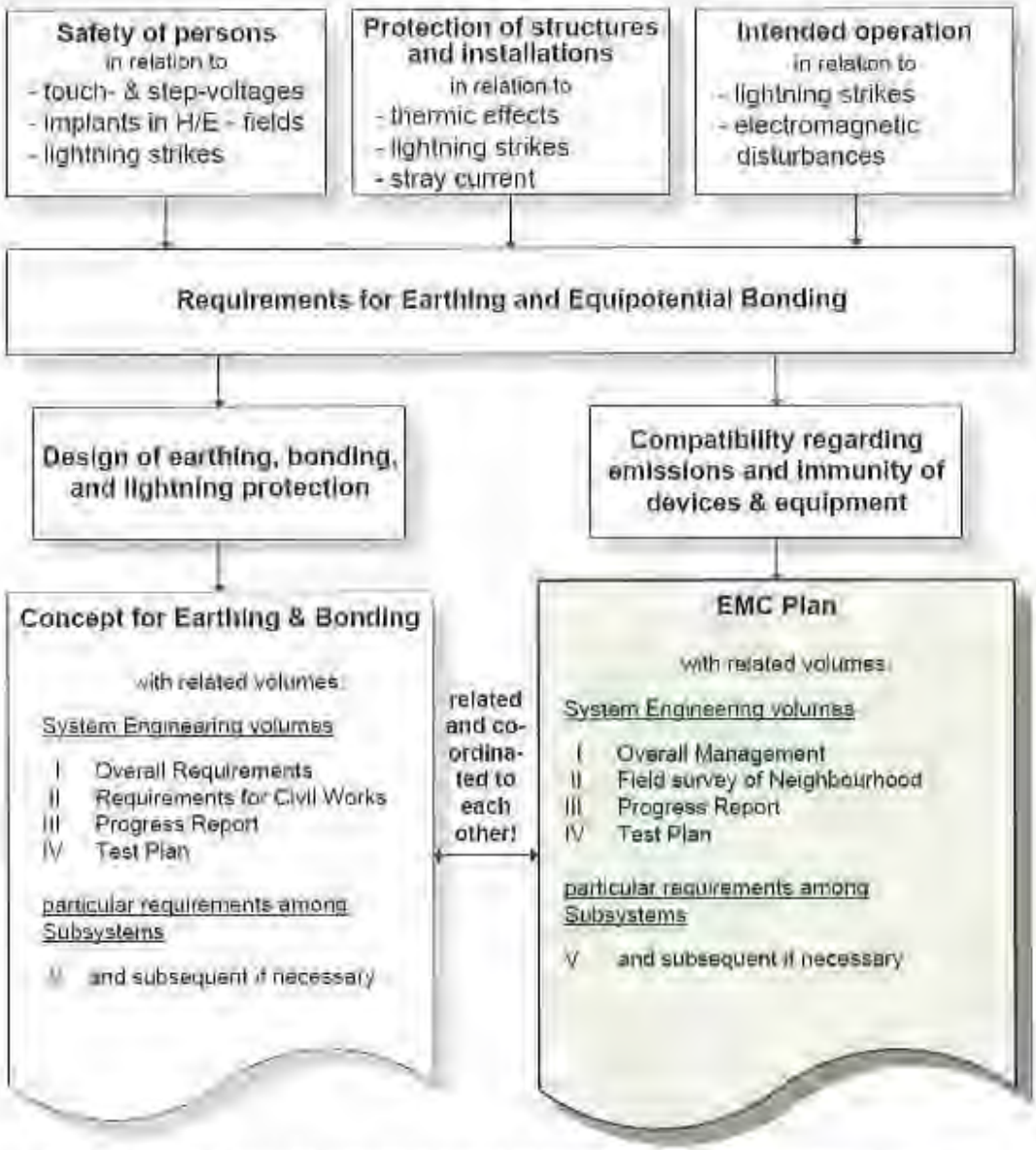
Earthing and Lightning protection are two essential aspects of EMC dealt with in this document, for all other EMC related aspects see the document "EMC plan". (will be subject of the detail planning phase)

To ensure consistent earthing design for the whole project, there is only one Concept for Earthing, Bonding and Lightning Protection of the Edinburgh Tram Network. It describes the structure of the earthing and bonding network, the rules, methods, calculations and materials to be adopted by all subsystems (lots) concerned to fulfil these objectives.

The measures described base on the relevant international and European standards and recommendations.

The return circuit of a DC-railway is not allowed to be connected to earthing systems like pole foundations and building earthing systems. This is to force the main part of the traction return current to flow back to the traction supply substation via the running rails. Nevertheless, the resistance between the running rails and the soil generates a stray current which can cause stray current corrosion in adjacent metallic systems.

Stray current protection measures are therefore a definite necessity in a DC system. They are described in chapter 6.2.5 and in more detail in EN 50122-2.



Notes: The volumes III and IV are collections of required detailed documents according to progress of project.
The numbering of volumes is not in line with their ranking or date of issue, but with systematic considerations.

Figure 1-1 Relation between EMC and E&B

The construction of external LPS and the parts of the earthing systems embedded to concrete are made by Civil Works. This concept provides sketches and descriptions of typical solutions of the earthing measures for the civil structures of the Edinburgh Tram Network (ETN).

This document fulfils the requirements of the Concept for Earthing & Bonding of Volume I, II including the particular requirements of traction power. This document will remain unchanged during the whole project life time. Further reports as mentioned above, Progress Report and Test Plan will be elaborated during project life time.

2 Project Overview

The essential project parameter like line & track configuration, traction & service power supply, headway and so on are named in the invitation of bid.

A summary of key data will be created after start of project.

The use of the term "railway" in this concept considers also the application of the relevant requirements and standards on "railways".

3 Abbreviations and Definitions

3.1 Table of Abbreviations

General Abbreviation	Explanation
AC or a.c.	Alternating Current
CISPR	Comity International Special of perturbations radioelectriques (This is a comity of the IEC.)
DC or d.c.	Direct Current
DIN	Deutsche Industrie-Norm (German Industrial Standards)
E&B	Earthing and Bonding
E&M	Electrical and Mechanical Equipment
EMC	Electromagnetic compatibility
EN	European Standard
H/E	Magnetic / Electrical Field
HV	High Voltage (> 45 kV DC; > 45 kV AC)
IEC	International Electrotechnic Commission of ISO
ITU	International Telecommunication Union (This union is the former CCITT.)
LPS	Lightning Protection System
LV	Low Voltage (<= 1 kV AC; <= 1.5 kV DC)
MEBB	Main Equipotential Bus Bar, sometimes named MET (Main Earthing Terminal)
MV	Medium Voltage (< 1 kV and <= 45 kV AC; < 1.5 kV and <= 45 kV DC)
OCL	Overhead Contact line
PE(N)	Protection Conductor (or combination with Neutral Conductor)
TSS	Traction Supply Substation
VDE	Verband Deutscher Electrotechniker (Germans electrotechnic standardisation organisation)
WHO	World Healthy Organisation

This table will be amended according to the progress of the project if necessary!

3.2 Definitions

For a common understanding of the technical requirements some definitions are essential. Further definitions can be found in the mentioned standards.
List of definitions:

3.2.1. earth [IEC 60050(826)-04-01] 8
3.2.2. structure earth [EN 50122-2] 9
3.2.3. earth electrode [IEC 60050(826)-04-02] 9
3.2.4. foundation earth electrode [IEC 62305-3] 9
3.2.5. equipotential bonding [IEC 60050(826)-04-09] 9
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3.2.8. exposed conductive part [IEC 60050(826)-03-02] 9
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3.2.10 overhead contact line zone and pantograph zone [EN 50122-1] 9
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3.2.12. track return system [EN 50122-1] 10
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3.2.25. Stray current zone [EN 50122-2] 12
3.2.26. Electromagnetic compatibility (EMC) [IEC 60050-161-01-07] 12

3.2.1. earth [IEC 60050(826)-04-01]

The conductive mass of the earth, whose electric potential at any point is conventionally taken as equal to zero.

3.2.2. structure earth [EN 50122-2]

The electrical interconnection of the reinforcing rods of structures, and in the case of other modes of construction, the conductive interconnection of the metallic parts. Examples are reinforced railway structures such as bridges, viaducts and reinforced trackbed.

3.2.3. earth electrode [IEC 60050(826)-04-02]

A conductive part or a group of conductive parts in intimate contact with and providing an electrical connection with earth.

3.2.4. foundation earth electrode [IEC 62305-3]

Reinforcing steel of foundation or additional conductor embedded in the concrete foundation of a structure and used as an earthing electrode

3.2.5. equipotential bonding [IEC 60050(826)-04-09]

Electrical connection putting various exposed conductive parts and extraneous conductive parts at a substantially equal potential.

3.2.6. global earthing system [HD 637 S1]

An earthing system established by the connection of local earthing systems, which ensures that no dangerous touch voltages arise from the near vicinity of these local earthing systems. Global earthing systems reduce the potential increase of the local earthing system by distributing the fault currents. Such a systems performs as a quasi equipotential area.

3.2.7. main earthing terminal [IEC 60050(826)-04-08]

A terminal or bar provided for the connection of protective conductors, including equipotential bonding conductors for functional earthing if any, to the means of earthing.

3.2.8. exposed conductive part [IEC 60050(826)-03-02]

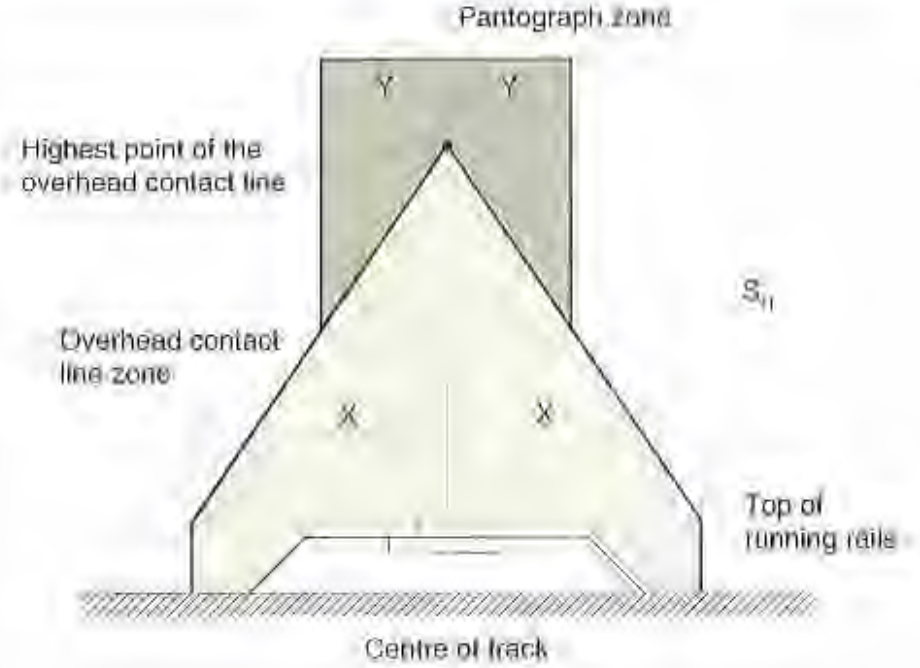
A conductive part of electrical equipment, which can be touched and which is not normally live, but which may become live under fault conditions.
NOTE: A conductive part of electrical equipment which can only become live under fault conditions through an exposed conductive part is not considered to be an exposed conductive part.

3.2.9. extraneous conductive part [IEC 60050(826)-03-03]

A conductive part not forming part of the electrical installation and liable to introduce a potential, generally the earth potential

3.2.10. overhead contact line zone and pantograph zone [EN 50122-1]

Zone whose limits are not exceeded in general, by a broken overhead contact line or a pantograph which is energized, in the event of dewirement or by broken fragments.



3.2.11. return circuit [EN 50122-1]

All conductors which form the intended path for the traction return current and the current under fault conditions.
Note: The conductors may be for example:
- running rails,
- return conductor rails,
- return conductors,
- return cables.

3.2.12. track return system [EN 50122-1]

A system in which the running rails form a part of the return circuit.

3.2.13. rail potential [EN 50122-1]

The voltage occurring under operating conditions when the running rails are utilised for carrying the traction return current or under fault conditions between running rails and earth.

3.2.14. (effective) touch voltage [EN 50122-1]

Voltage under fault conditions between parts when touched simultaneously.
NOTE: The value of the effective touch voltage may be appreciably influenced by the impedance of the person in contact with these parts.
Additional remark: This term is used in this document for operating conditions in the same manner. Depending on conditions on site, touch voltage may be a part of or the total value of the voltage of a touchable part versus earth.

3.2.15. voltage limiting device [EN 50122-1]

A protective device against permanent existence of an inadmissible high touch/accessible voltage.

7 Basic design rules for earthing and bonding of structures

7.1 Basic Principle for Civil Works

Civil works shall bear in mind during design and construction of all civil structures the following main principle:

> The reinforced civil structures generally form the basis for earthing and bonding of an electrified railway system.

Therefore, the earthing conductors embedded in concrete are an essential part of the earthing system of the railway and need careful design and installation.

7.2 Structure earth

All buildings made from reinforced concrete shall have a structure earth including foundation earth electrode. For this purpose, the foundation slab and the walls of the building will get a mesh of earth wires of about 10 by 10 m mesh size.

This mesh may by part of the reinforcement, or made from additional mild steel rods and wire-tied to the reinforcement at least each 40 cm.

The foundation earth electrode shall be located from 5 to 8 cm from the lower concrete surface (see chapter 7.3). For the welding of structure earth see chapter 7.5.

7.3 Embedded Earthing conductors

Earthing conductors for all purposes, including lightning protection, have to be designed according to named standards to withstand mechanical and thermal stress. This also applies to earthing conductors embedded in concrete, which may be part of the reinforcement or additional mild steel rods.

If not otherwise stated, the following cross-sections shall be applied to embedded earthing conductors according to the standards referred above and basing on experience from conventional electrified railway systems.

Material	Minimum cross-section
Steel	200 mm²
Copper	50 mm²

Table 7-1: Minimum cross-sections for concrete-embedded earth conductors

Remark to table:
The minimum cross-section of vertical earthing rods of piles must be 314 mm² or an equivalent round steel with minimum diameter of 20 mm.

Stainless steel of vertical earthing rod must be applied in soil. It must fulfil the following requirements:

Chromium	≧ 16 %
Nickel	≥ 5 %
Molybdenum	≥ 2 %
Carbon	≤ 0,03 %

The cross-section of earthing wires is subject of detail design.
All embedded earthing conductors must be covered by at least 5 cm of concrete for corrosion protection.

Conductors, which are part of an earth electrode or are located within the OCL or pantograph zone, shall not be covered by more than 8 cm of concrete. That is necessary to ensure sufficient contact to the soil or to a broken overhead contact line respectively. The exact locations of these embedded conductors will be subject of detail design.
The down conductors inside of walls have to be connected to the reinforcement at intervals of 400 mm by means of wire wrapping.

7.4 Lightning protection down conductors

According to IEC 62305-3 down conductors must be erected from the roof to the foundation earth in the outer walls of buildings. Large buildings like Main Workshop buildings additionally require down conductors inside the building. Steel columns and reinforced columns should be utilised for this, otherwise additional conductors will be required. That will be subject of detailed design. An earthing terminal should enable the connection of down conductors to the air termination system on the roof surface.

7.5 Welding

Figure 7-1 shows examples for welded connections. The minimum length of two opposite welded seams is 50 mm. To ensure a fully electrical conductive length of 50 mm, a welding length of at least 55 mm is recommended. In case of single side welding a minimum length of the seam of 100 mm is required.

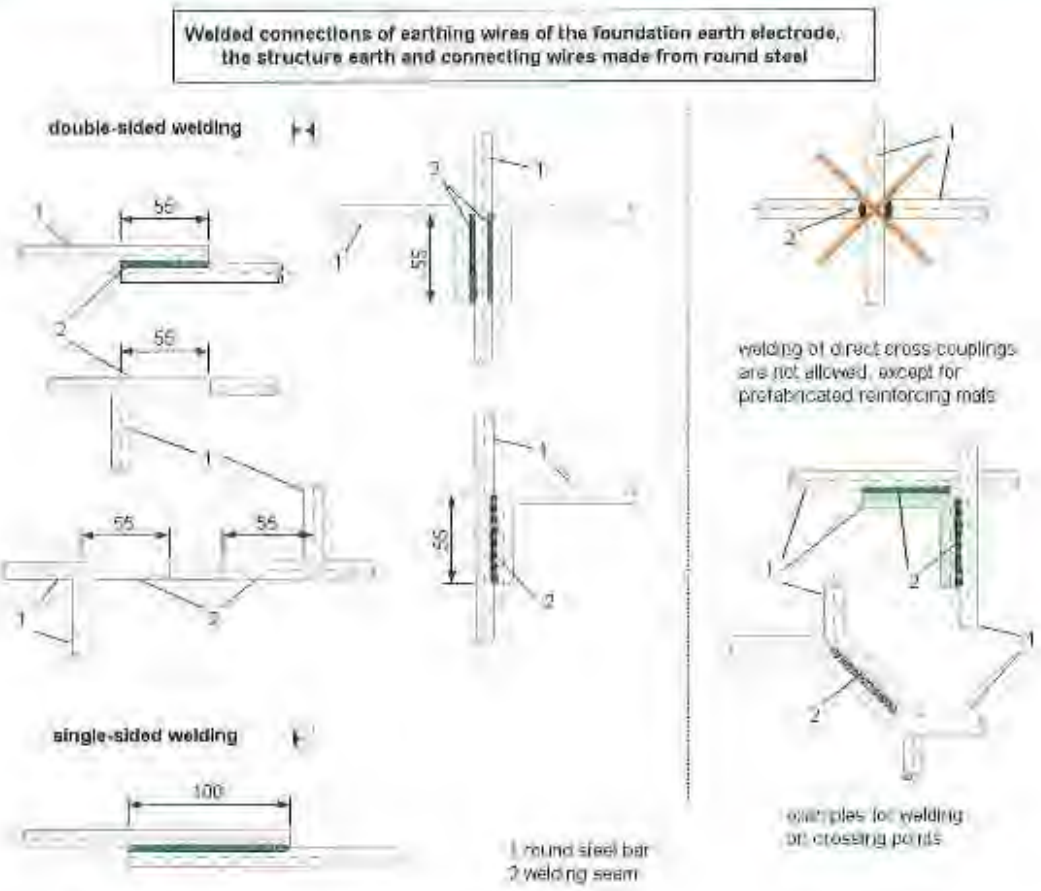


Figure 7-1: Welded earthing connections

7.6 Terminals

Terminals for the connection of embedded parts to other parts of the earthing systems will be required.

Inside of buildings and other closed structures contact tongues made from hot galvanized flat steel or embedded terminals for bolted connections shall be used.

For connections outside of buildings and for open structures embedded terminals for bolted connections made from stainless steel shall be used only. These terminals are furnished with a thread inside for one bolt M16.

Figure 7-2 shows an example of an embedded terminal.

Earthing terminals must be non-corrosive welded to the earthing bars according to the welding requirements above.

The earthing terminals shall be accessible in a height from 30 to 50 cm above concrete floor or final ground level.

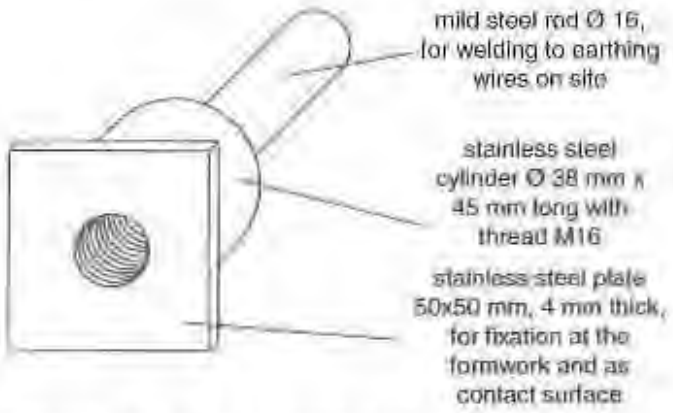


Figure 7-2: Example of embedded terminals

The supplier of terminals must provide a certificate for terminal applying according to threats parameter by short circuits, direct lightning strikes and corrosion by climate.

7.7 Services/ Utilities

Conductive Services and Utilities entering or leaving the railway environment from/to the outside are not allowed to transmit currents or dangerous voltages.

Therefore all such pipes need an insulating joint where they enter a building, which is accessible for tests and maintenance.

According to the requirements of equipotential bonding all metallic utilities and devices must be earthed. Potential equalisation is achieved by

- Direct bonding of all extended metallic installations at their foot points like e.g. escalators, elevators, banisters, air condition pipes
- Direct bonding of all outgoing and incoming metallic installations at the inside of building boundary like e.g. cable armour and pipes of water, gas etc.

For this purpose earthing terminals must be provided for these connections.

The locations of earthing terminals will be defined in the related drawings during detailed design.

Service utilities in parallel to or crossing the tracks, which have applied active corrosion protection, the requirements for separation or additional insulation have to be elaborated in coordination with the owner of the utility.

8 Typical measures for different types of civil structures and its parts

8.1 General note

All the following descriptions and drawings show and explain typical solutions for earthing and bonding measures of structures.

In chapter 10 "Overall Single Line Diagram" is shown an overview of the structure of the earthing system for the whole railway, the main earthing and bonding measures and the responsibilities of the subsystems.

The solutions to be applied for Edinburgh Tram Network are subject of detailed design and may vary in details.

8.2 Trackside structures and installations

8.2.1 Overhead contact line zone and pantograph zone

Figure 8-1 shows the overhead contact line zone and pantograph zone.

Any exposed conductive part within the overhead contact line zone and pantograph zone shall be connected to the structure earth. Conductive structures smaller than 2 m and not supporting or containing electrical equipment, do not need any protective measures. The tendons of pre-stressed reinforcement are excluded from this measure because of usually existing trackbed layers above which are connected the structure earth. These protective provisions avoid non-permissible touch voltages in case of insulator flashovers, short-circuits and other faults which do not occur directly to the running rails.

Care shall be taken at constructional overlaps of the contact line. The overhead contact line zone shall be extended, where the contact and messenger wire are tensed at anchor supports. This has to be considered mainly for wayside running fences and noise walls.

Following measures shall be defined according to related standard and experience in relation to Centre of Track (CoT) and Top of Rail (ToR) to

X = 4 m; Y = 2 m; Z = 2 m.

S_{ll} will be defined in relation to highest point of overhead contact line. When this point cannot be determined, S_{ll} shall be defined to 8 m.

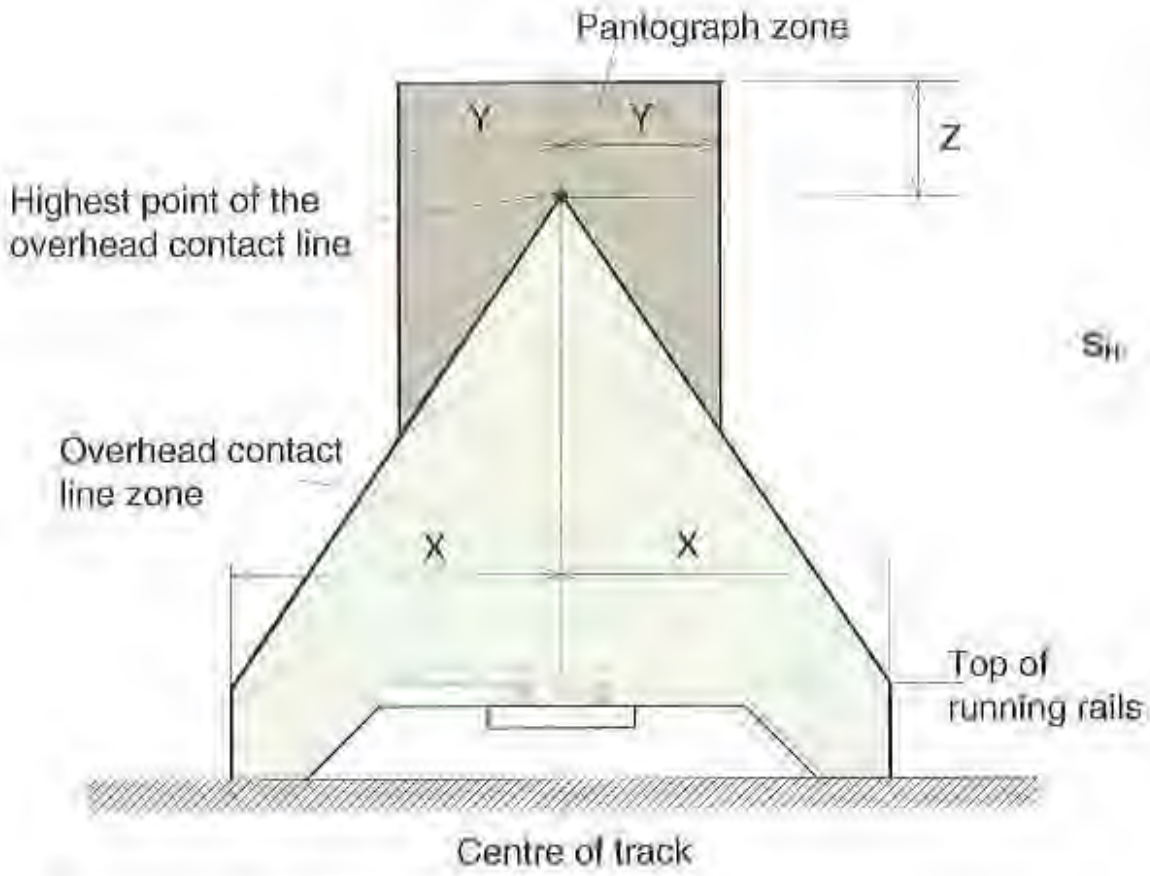


Figure 8-1: OCL zone and pantograph zone

8.2.2 Running rails

The running rails are the return conductors of the DC railway system. Opposite to an AC railway system the running rails of Edinburgh Tram Network are not earthed and shall be not connected with the structure earth, to any earthing conductor or to any part in contact to soil.

8.2.3 Unballasted track

A typical construction of unballasted trackbed for LRT-System is shown in following Figure 8-2.

Poles close to overvoltage protection devices shall be electrically connected to stray current collector for reducing of their earth resistance.

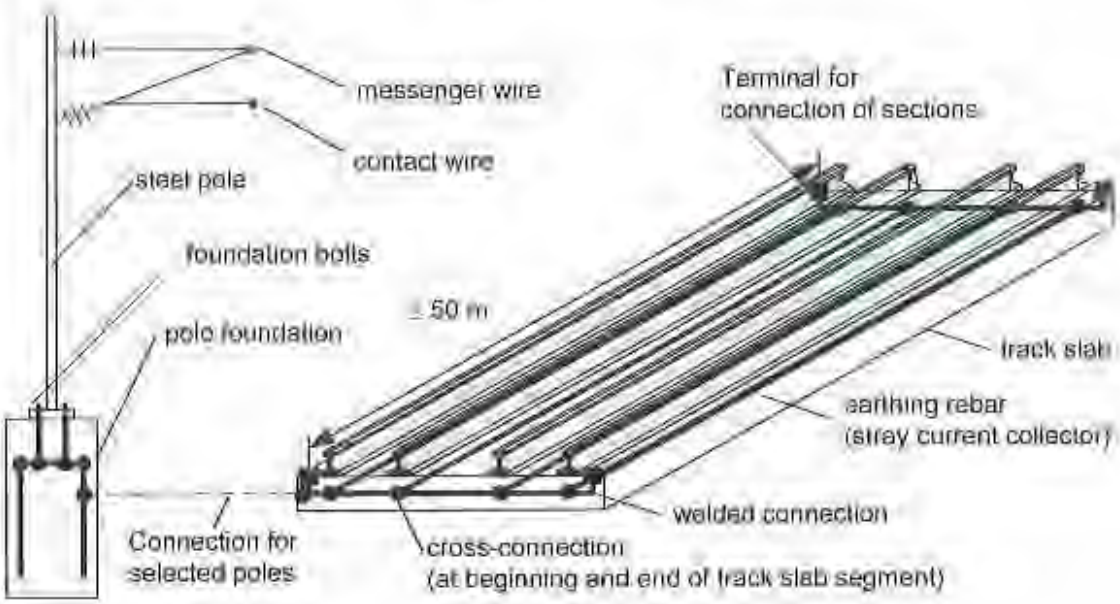


Figure 8-2 Unballasted trackbed with earthing terminal

The single segments of the running rails shall be welded together longitudinally in order to limit the longitudinal resistance of the track installation. If the transverse earthing rebars are installed inside track slab, one earthing terminal at slab side will be sufficient.

The conductance per unit length between the running rail and earth or structure earth shall be low. EN 50122-2 [2] recommends values for the conductance per unit length between running rails and earth or structure earth of a single track for design purposes. The specified values are

- 0.5 S/km for open formation in open air
  (this corresponds to 2 Ω·km)
- 2.5 S/km for closed formation in open air.

The clean initial track shall be tested for finding of possible installation faults e.g. random connection of fixation screw of running rail to reinforcement. Following values are recommended.

- Conductivity G of initial test of track for open formation shall be about $G <= 0.05$ S/km instead of < 0.5 S/km in open air according to EN 50122-2.
- Conductivity G of initial test of track in closed formation shall be about $G <= 1$ S/km instead of < 2.5 S/km in closed formation according to EN 50122-2.

A stray current collector for double track with a minimum crossection of 800 mm² is recommended acoording to experience.

8.2.4 Ballasted Track

Sections of ballasted track with reinforced substructure are treated like unballasted track. In line sections with ballasted track without conductive substructure no longitudinal earthing bars are embedded below the rails. Attention is required to conductive utilities crossing or in parallel to the track.

The conductance of ballasted track is 0.5 S/km for open formation in open air according to EN 50122-2 [2].

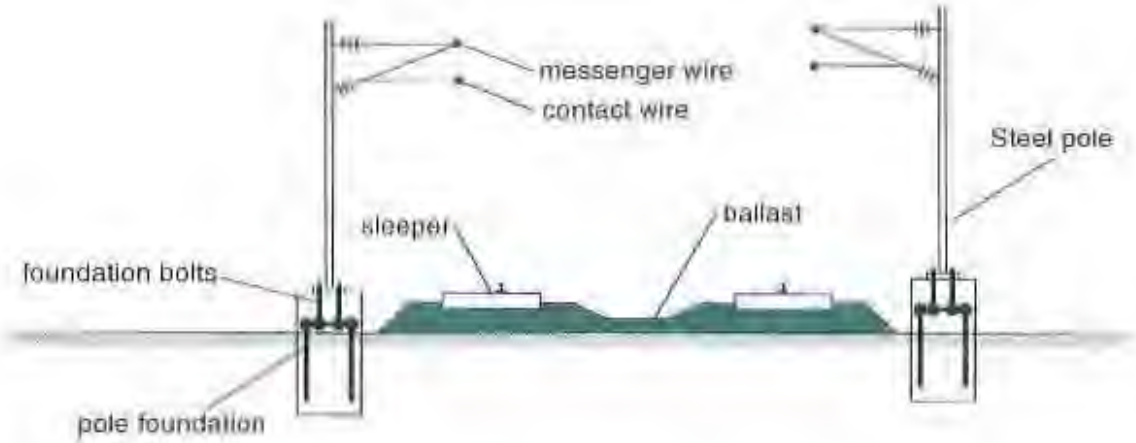


Figure 8-3: Example of ballasted track bed without reinforced substructure

8.2.5 Fences, Noise walls, Railings

Metallic railings, hand rails, noise walls, crash barriers may need to be earthed because of lightning protection. If located inside the overhead line zone they have to be handled according t requirements of EN 50122-1 by responsible party or subsystem (see also chapter 8.2.1).

8.2.6 Platforms/ Stops

The reinforcement of platforms has to be connected to structure earth and forms the local earthing system of the platform. Along the platform edge at least one rod must be continuously welded and bonded to the local earth to ensure switch-off of traction power supply in case of a broken overhead line. All protective wires of electrical installations and all metallic parts on the platform, like poles and handrails, must be connected to the local earthing system.

The voltage between the running rails and the local earthing system must be limited by a voltage limiting device like e.g. a voltage fuse.

The protection of passengers against direct contact to live parts or bridging between electrical equipment (e.g. escalator, ticket vending machine) and train must be settled by clearances according to Figure 8-4.

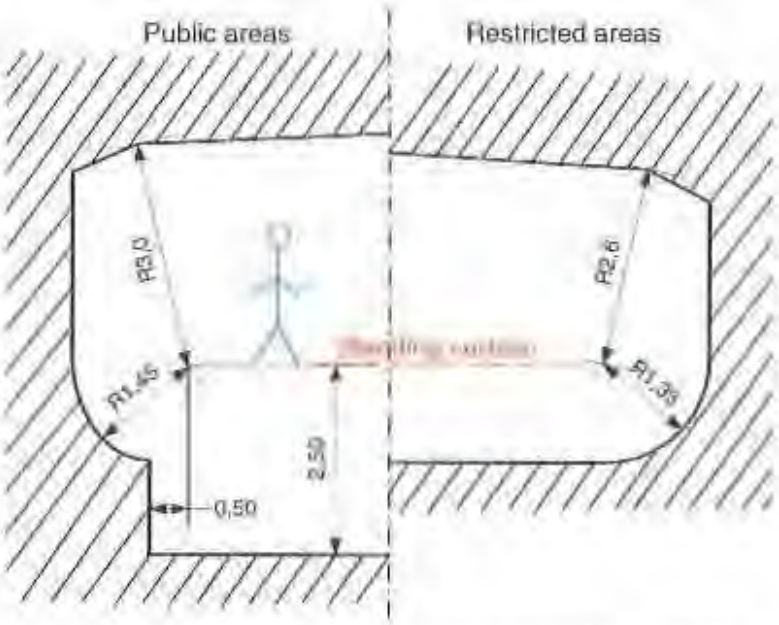


Figure 8-4 Clearances to accessible live parts

All other measures for trackside structures and installations described in the other paragraphs of this chapter 8.2 are valid for platforms too.

8.2.7 Passenger Stations

Station buildings shall be provided with a structure earth as described in chapter 7.2.

The earthing system of DC railways has to be independent from distant earth potential to avoid stray current corrosion problems.

Earthing terminals are necessary for LV power supply rooms, technical rooms and facilities like elevator & escalator.

8.2.8 Viaduct

The reinforcement of the viaduct forms the structure earth of viaduct sections. Therefore the reinforcements of single segments have to be electrically interconnected and the dedicated earthing rebars shall be welded together via cross connections. Figure 8-5 shows the schematic earthing connections of viaducts. The foundations of the piers form the earth electrodes for viaducts. The reinforcement of the foundation shall be electrically connected to the reinforcement of the piers and the viaduct segments.

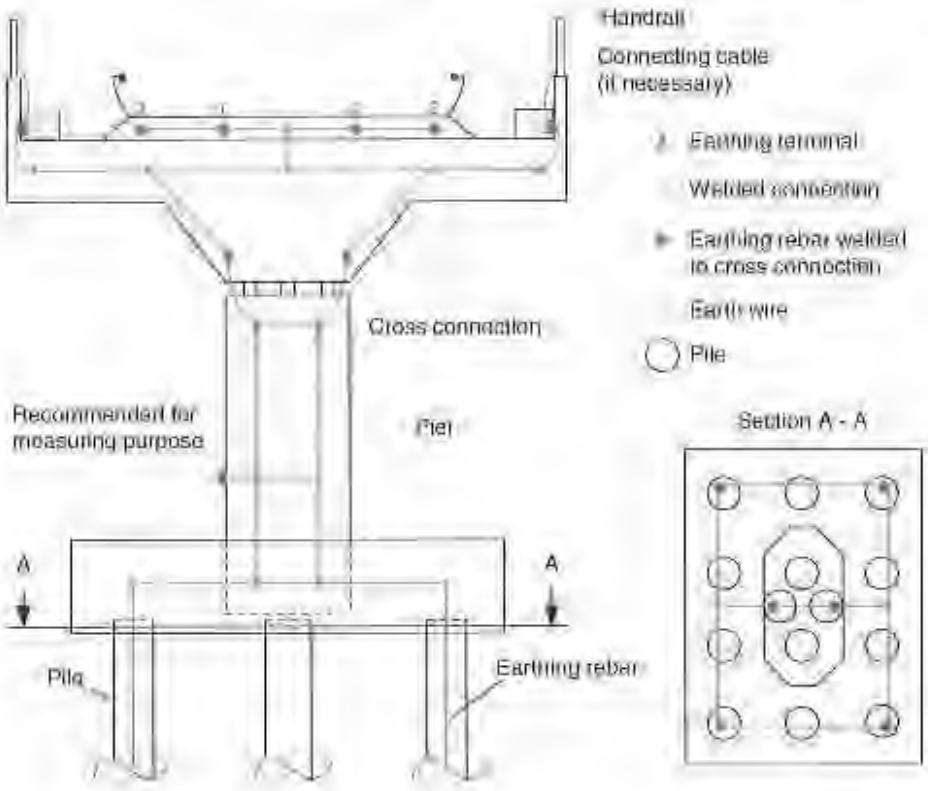


Figure 8-5: Schematic earthing connections for reinforced concrete viaduct

The required number and cross-section of the rebars used for earthing and the earthing wires have to be designed with respect to the maximum earth fault currents of the AC and DC installations on the viaduct and with respect to lightning protection and with respect to the requirements for stray current protection. All three items are subject of detailed design.

Earthing terminals for earthing measurements and bonds are recommended at approximately two metre above ground level of the piers of viaducts and within the cable ducts at the top of the viaduct.

An air termination network must also be erected according to the requirements of LPS [7].

8.2.9 Overbridges

Figure 8-6 shows typical earthing measures for existing overbridges, which are located fully or partly in the OCL and pantograph zone. In general, the same measures apply to new-built overbridges, while there is the chance to implement some of the measures embedded to the concrete.
The voltage between the protective measures of the overbridge and the running rails must be limited by a voltage limiting device.

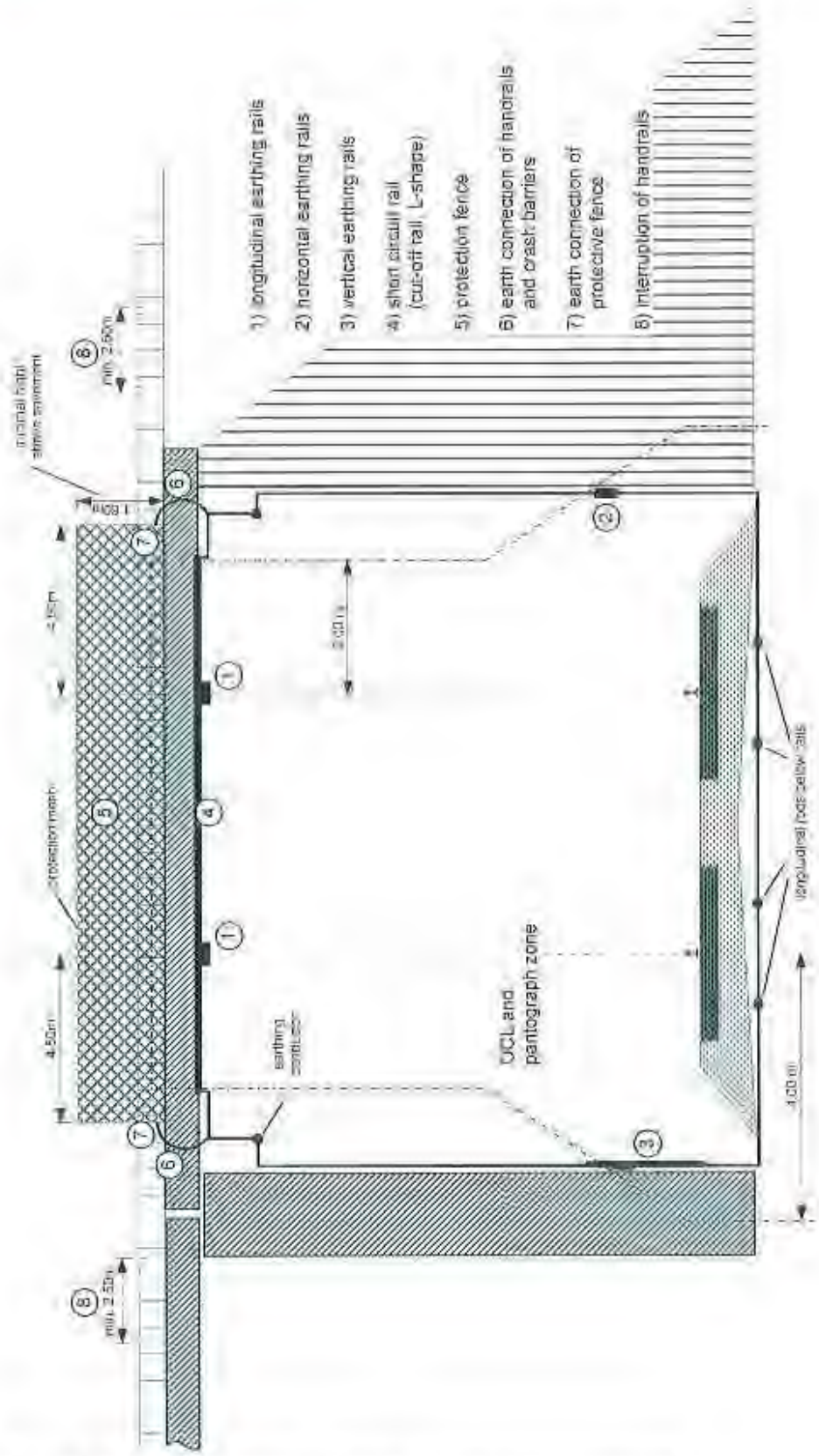


Figure 8-6 Earthing of existing Structures (Typical arrangement)

8.2.10 Low voltage power supply rooms

The traction and service power supply rooms and power substation buildings shall have a foundation earth electrode as specified in section 7.2.

In rooms containing power transformers or switchgear the floor reinforcement shall be used for internal potential grading.

This shall be connected to the foundation earth electrode by welding.

Earthing terminals as described in chapter 7.6 shall be provided near to each corner of the rooms. Additional earthing terminals shall be provided at the outside of the building near to each corner of the building and according to the specification of the power supply subsystem (lot).

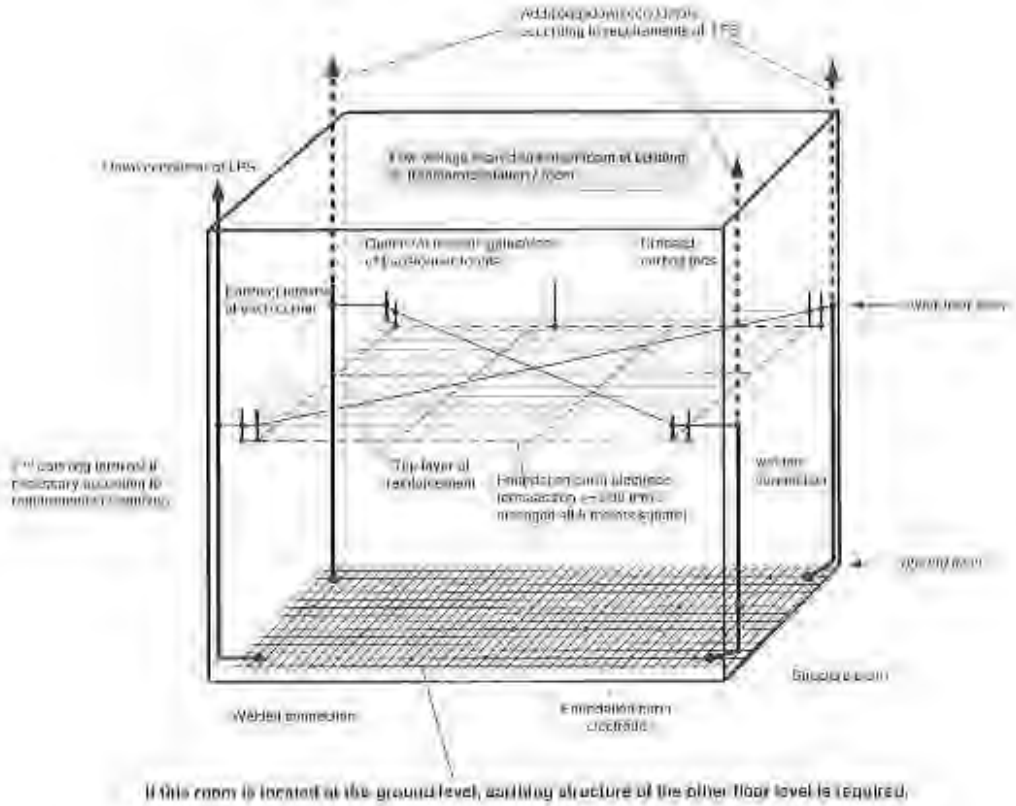


Figure 8-7: Earthing & bonding of low voltage power supply rooms

8.2.11 Technical Rooms

The technical rooms of each subsystem must include at least one earthing terminal about

30 cm above surface of floor level.

The locations of earthing terminals will be defined in the related drawings after detailed design.

The technical rooms of the subsystems signalling and telecommunication must have an arrangement of some earthing terminals according to their specific requirements.

The necessity of separated earth terminals from the foundation earth electrode will be clarified during the detailed design too.

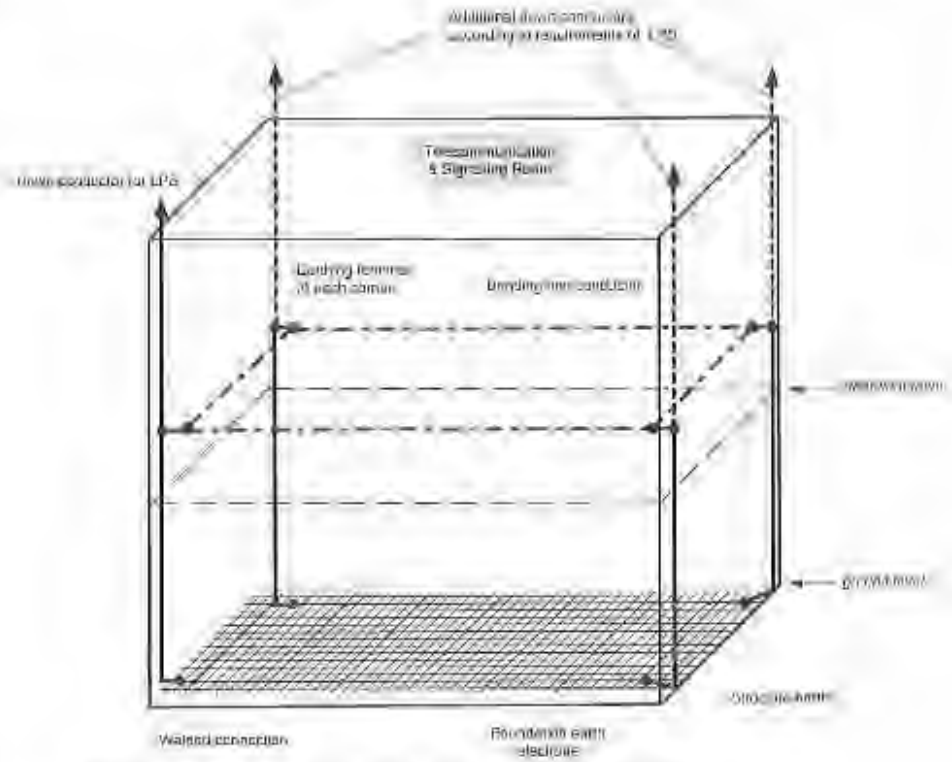


Figure 8-8: Earthing & bonding of technical rooms

8.2.12 Power supply stations

Power supply stations shall as a minimum consider the earthing requirements of chapter 8.2.10. Further requirements for Power Substations will be derived from the studies prepared by the power supply subsystem during the basic design phase.

8.2.13 Depot and workshop area

Depot buildings shall be equipped with a structure earth according chapter 7.2. In the depot and workshop area the return circuit shall be insulated against structure earth similar to the main line.

Potential differences between the structure earth of the workshop area and the return circuit cause restrictions to operation and service activities. Therefore the return circuit and the structure earth shall be connected. The connection between the return circuit and the structure earth shall be made centrally at one point.

In order to avoid non-permissible touch voltages caused by the train operation on the main line and to reduce stray currents the running rails and the structure earth of the depot and workshop area have to be separated from the main line track system and structure and the depot and workshop areas are supplied from separate traction rectifiers.

All individual earthing installations and conductive parts of the depot and workshop area shall be equipotential bonded. The totality of all earthing installations connected to the equipotential bonding conductor forms the structure earth of the depot and workshop area.

Additionally for all major workshop equipment terminals for direct earthing at the structure earth shall be provided like under floor wheel lathe, wheel press, maintenance platform, crane rails etc.

9 Stray Current Monitoring

Generally, the direct measurement of the current flowing through earth, in DC railways known as stray currents, is not possible. Current differential measurements between contact and running rails are complicated to be done, especially if the parallel feeding of substations is used.

The continuous measurement of rail potential, e.g. implemented in substations, is a practical possibility for the assessment of stray current behavior without increasing stray currents.

Taking reference measurements for a functioning system, the actual stray current situation and the rail potentials relating to that are recorded. Afterwards, along the entire line voltage monitoring during operation can be easily performed for comparative purposes.

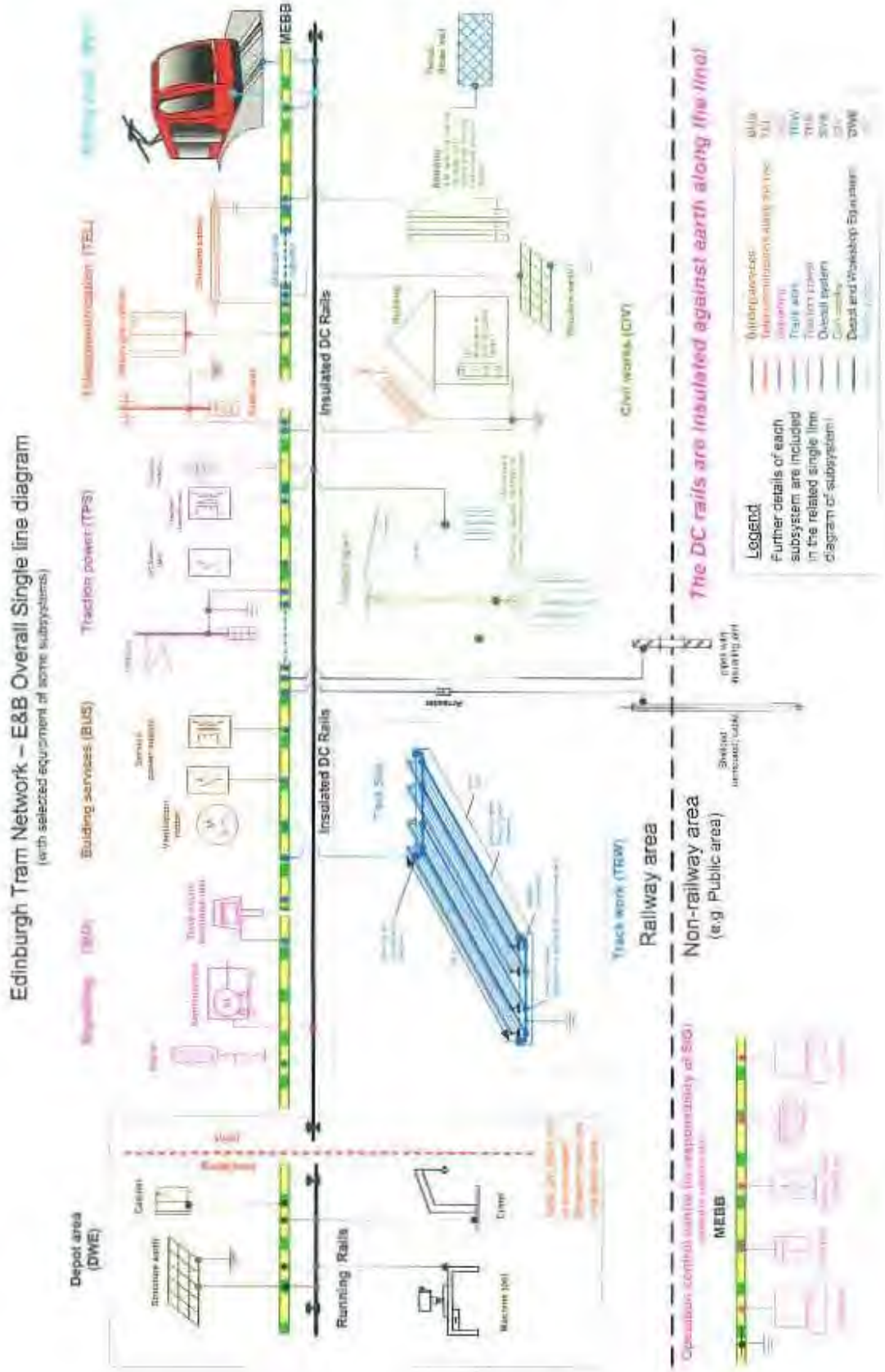
This method does neither affect the current distribution nor the rail potential in the return system. It can be implemented without high costs, because in many cases the required measuring equipment can be installed in the substations. Furthermore the SCADA system must be prepared for the data transfer to the operation control centre (OCC).

The **SITRAS SMS** stray-current monitoring system is used to monitor the track potential of DC railway networks.

This system permits evaluation of the stray-current conditions of the track and the early detection of insulation deficiencies, thus enabling measures to be taken to prevent damage due to stray-current corrosion.

- Continuous monitoring of track potentials during operation
- Automatic location of insulation deficiencies
- Representation, archiving and analysis of track potentials in a central evaluation unit
- Transmission of measured values via the communication network, existing networks can be used
- No interference with stray-current conditions because SITRAS SMS is based on potential measurement.

10 Overall single line diagram



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31st March 2008

Updated Proposal Submission

Edinburgh Tram Network

Section 2: Overall Technical Concept

Part 1 – System Engineering

Annex 4 – Electro Magnetic Compatibility Plan

SIEMENS

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1 Compliance to proposed Electromagnetic Compatibility Management Plan

We will follow the principles outlined in the "Electromagnetic Compatibility Management Plan" ULE90130-SW-SW-SPN-00058V5, the "System Earthing Policy" ULE90130-SW-REP-00071V2 and the "Code of Practice for Stray Current Corrosion Control" ULE90130-SW-REP-00006V2. These documents are in line with appropriate European standards, mainly the EN 50121 and EN 50122 series.

The main principle is to provide one common earthing system for all purposes including electrical safety, lightning protection, stray current protection, EMC aspects and also functional aspects. The earthing system shall apply the meshed design to minimize voltage differences between any points in the system, which improves safety, EMC performance and minimizes stray currents at the same time. The conductive building structure like steelwork and structural reinforcement shall be part of the earthing system.

The whole traction system will be insulated versus earth and building structure, including the running rails and everything connected to the running rails or the return circuit.

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Edinburgh Tram Network

Section 2: Overall Technical Concept

Part 2 – Outline Operation Concept

Commercial In Confidence

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Abbreviations

AC	Alternate Current
AIR	Edinburgh Airport (station)
AFC	Automatic Fare Collection
BAA	British Airport Authority
BAS	Balfour Street (station)
BBS	Bilfinger Berger – Siemens (Consortium)
BDE	Bankhead Drive (substation)
BOOT	Build-Own-Operate-Transfer
CAP	Carroline Park (station)
CCR	Central Control Room
CCTV	Closed Circuit Television
CAE	Cathedral (substation)
CEC	City of Edinburgh Council
CGE	Craigleith (substation)
COM	Communications
COS	Bernard Street (station)
CRT	Crewe Toll (station)
DC	Direct Current
DEH	Depot Halt (staff only)
DKE	Developed Kinematic Envelope
DOP	Degraded Operation Plan
DTS	Digital Transmission System
EARL	Edinburgh Airport Rail Link
E&M	Electrical and Mechanical
EDP	Edinburgh Park Central (station)
EMC	Electro-Magnetic Compatibility
EPS	Edinburgh Park Station
ERQ	Employer's Requirements
ETN	Edinburgh Tram Network
FOW	Foot of the Walk (station)
GDE	Gogar Depot (substation)

GDJ	Gogar Depot Junction
GME	Granton Mains East (substation)
GOG	Gogarburn (station)
GRS	Granton (station)
GRW	Saltire Square (station)
GYL	Gyle Centre (station)
HAY	Haymarket (station)
HMRI	Her Majesty's Railway Inspectorate
HTE	Haymarket Terrace (substation)
IPE	Ingliston Park & Ride (substation)
IPR	Ingliston Park & Ride (station)
IT	Information Technology System
ITN	Invitation to Negatiote
JDE	Jenner's Depository (substation)
JRC	Joint Revenue Committee
LoD	Limits of Deviation
LRT	Light Rail Transit
LRV	Light Rail Vehicle
LSE	Leith Sands (substation)
LTS	Local Transport Strategy
LV	Low Voltage
LWE	Leith Walk (substation)
MDR	McDonald Road (station)
MMI	Man Machine Interface
MOI	Memorandum of Information
MUDFA	Multi-Utilities Diversion Framework Agreement
MUR	Murrayfield Stadium (station)
NER	Newhaven (station)
NSA	St. Andrew Square (station)
O&M	Operation and Maintenance
OCC	Operation Control Centre
OCD	Port of Leith (station)
OCL	Overhead Contact Line

OCT	Ocean Terminal (station)
OLE	Overhead Line Equipment
OM	Regular Operation Mode
OpCon	Operation Concept
ORS	Operational Radio System
PA	Public Address System
PABX	Private Automatic Branch Exchange
PHP	Passenger Help Point
PEHP	Passenger Emergency Help Point
PID	Passenger Information Display
PIP	Picardy Place (station)
PIS	Passenger Information System
PPI	Point Position Indicator
PPP	Public-Private-Partnership
PSW	Princes Street (station)
PVR	Peak Vehicle Requirement
RDA	Roads Demarcation Agreement
ROGS	Railway and Other Guided Transport Systems
ROJ	Roseburn Junction
ROTS	Railway and Other Transport Systems
ROW	Right-of-Way
RRE	Russell Road (substation)
RST	Rolling Stock
RVAR	Rail Vehicle Accessibility Regulation
SCADA	Supervisory Control and Data Acquisition
SCC	Supervisory Control and Communications
SDS	System Design Services
SIG	Signalling
SGA	Bankhead (station)
SHP	Shandwick Place (station)
SRN	Saughton (station)
TCU	Train Control Unit
TEL	Transport Edinburgh Ltd.

tie	Transport Initiates Edinburgh or tie Limited. **tie** is the client for the Edinburgh Tram Network (TN).
TMA	Tram Maintenance Agreement
TOR	Top of Rail
tph	trams per hour (per direction)
TPDS	Tram Position and Detection System
TPS	Traction Power Supply
TPSS	Traction Power Substation
Tramco	Rolling Stock Supplier
Transdev	Transdev Edinburgh Tram Limited (TETL) the Edinburgh Tram Network (ETN) Operator
TRS	Trunk Radio System
TRW	Track Work
TSA	Tram Supply Agreement
TRO	Traffic Regulation Order
TTRO	Temporary Traffic Regulation Order
UPS	Uninterruptible Power Supply
UTC	Urban Traffic Control
WGA	Pilton (station)
YOP	York Place (crossover)

Key Data

Item	Characteristic
Track lengths: Phase 1a Phase 1b total	 approx. 18.8 km approx. 5.5 km approx. 24.3 km
Track configuration	double track
Tramway configuration: integrated on-street segregated on-street off-street	 approx. 25% approx. 5% approx. 70%
Line lengths (from / to station centre): Line 1: Phase 1a: Newhaven – Haymarket Phase 1a+1b: Newhaven – Granton Line 2: Phase 1a+1b: Airport – Ocean Terminal	 7.2 km 13.5 km 17.6 km
Number of Tramstops (network): Phase 1a Phase 1b	31 22 9
Number of Tramstops (line): Line 1: Phase 1a: Newhaven - Haymarket Phase 1a+1b: Newhaven – Granton Square Line 2: Phase 1a+1b: Airport – Ocean Terminal	 12 21 21
Track gauge (Standard Gauge)	1,435 mm
Rail type	UIC 60
Direction of traffic:	Left-hand
Direction Convention: Airport – Ocean Terminal Ocean Terminal - Airport Granton – Haymarket Haymarket - Granton	 Inbound Outbound Inbound Outbound
Maximum gradient, desirable (exceptional)	5% (8%)
Minimum radius on line, desirable (exceptional)	50 m (25 m)

Maximum operating speed: Non street running street running depot	 80 km/h 50 km/h 15 km/h
Station platforms: platform style length minimum width height	 centre and side 43m + 2m stopping tolerance centre: 4m, side: 3m low level
Services Hours	05:15 h (first tram) – 00:45 h (last tram)
Average dwell time at tramstops	25 sec
Headways in peak hours (Standard Scenario): 8&8 trams per hour (tph) Design headway (+50%) 12&12 trams per hour (tph)	 7.5 min (each line) 3.75 min (on common section) 5 min (each line) 2.5 min (on common section)
Layover at terminals: minimum layover time at Airport (at 8 tph)	 4 min or 10% of run time 7.5 min
Operational Journey Time Allowance: Newhaven – Haymarket Ocean Terminal – Airport Newhaven - Granton	 1.5 min 1.5 min 45 sec
Maximum Journey Times (required): Airport – Ocean Terminal Granton – Newhaven Total Run Times: OCT – AIR / AIR - OCT NER – GRS / GRS – NER NER – HAY / HAY - NER Minimum round trip times: OCT – AIR – OCT NER – GRS – NER NER – HAY - NER	 42 min 15 sec 39 min 30 sec 48:50 / 49:40 45:04 / 43:56 29:13 / 29:07 1:50:55 1:37:22 1:06:20
Signalling System	'line-of-sight' operation, tram priority at signal controlled junctions

Fleet Size: Standard Scenario 8&8 trams per hour (tph)	Phase 1a: 27 Phase 1a+1b: 31
Train Mileage (per tram and year) (Standard Scenario 8&8)	Phase 1a: 96,167 km Phase 1a+1b: 105,600 km
Train dimensions: length width height (above TOR, lowered pantograph) floor height (above TOR)	 43.5 m 2.65 m 3.55 m 300 – 400 mm
Train capacity (places): seats standees (at 4 pers/m²) total	 80 190 270
Service brake rate Hazard brake rate	1.2 m/sec² 2.5 m/sec²
Traction Power System	750 V DC, Overhead Line

1 Introduction

Subject of this Outline Operation Concept is the Edinburgh Tram Network (ETN) System. The Operation Concept forms the overall basis for the operation of the proposed Light Rail Transit (LRT) System. The system engineers as well as the separate sub-system suppliers will use the information given in this Concept for the engineering planning of the different systems and sub-systems respectively to consider all kind of daily tram operations.

This Outline Operation Concept does not replace the operation plans or the general rulebook and operational manuals, which have to be developed by the Operator in due course of the project execution.

The descriptions, features and requirements mentioned in this Outline Operation Concept apply to the specifications as laid down in the Invitation to Negotiate (ITN) and the Employer's Requirements issued by the Transport Initiatives Edinburgh (**tie**).

This Outline Operations Concept deals with the requirements for the Standard Tender to design and build the whole Edinburgh Tram Network, generally assuming a tram frequency of

- 8 trams per hour between the Edinburgh Airport and Ocean Terminal and further
- 8 trams per hour between Granton and Newhaven.

2 System Lines and Phasing

The Edinburgh Tram Network is being developed under the Edinburgh Tram Acts as a two line system comprising:

- Line 1:
A north Edinburgh loop connecting the city centre with Leith, Newhaven and Granton and passing through the Waterfront Development Area. The route will run from Haymarket along the former Roseburn railway corridor, along the shore front to Ocean Terminal Shopping Centre and onwards to Leith returning to the city centre via Leith Walk. The route through the city centre will be via Princes Street.

- Line 2:
The line starts at the shore front at Ocean Terminal, will run to Haymarket and follows a western corridor from the city centre to Gyle, Edinburgh Park and the Airport. A future spur will lead to Newbridge. The preferred corridor approximately follows the main Edinburgh – Glasgow railway line between Haymarket and the new station at Edinburgh Park, then heads north west to the Gyle, Gogarburn and the Airport respectively Newbridge. Most part of the route along the western corridor will be fully segregated from other traffic.

Transport Scotland and CEC have developed a prioritisation of separable phases from the two line system, as outlined below:

- Phase 1a: Newhaven to Edinburgh Airport
- Phase 1b: Roseburn to Granton
- Phase 2: Granton to Newhaven
- Phase 3: Ingliston to Newbridge North

The Edinburgh Tram Network relates to construction works for Phase 1a and Phase 1b only.

Future Phase 2 will close the loop for Line 1 along the sea front between Newhaven and Granton including provision of Lower Granton Road stop.

Future Phase 3 will extent Line 2 operation from Ingliston Park & Ride to Newbridge North.

Furthermore there are plans to add a Line 3 section starting from the junction of Princes Street/South St. Andrew Street to Royal Infirmary.

The track lengths of the Edinburgh Tram Network are:

- Phase 1a: approx. 18.8 km
- Phase 1b: approx. 5.5 km

Figure 1 shows the line configuration for Phase 1a and Phase 1a+1b.

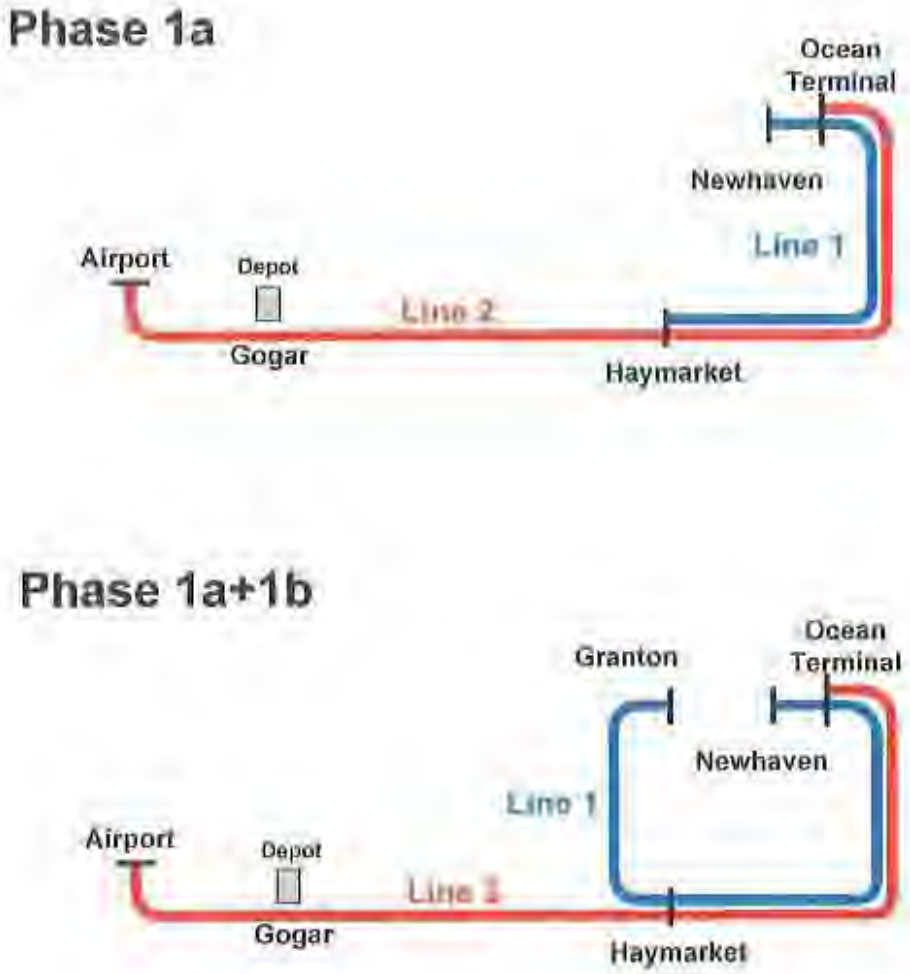


Figure 1: Line Configuration (Phases 1a and 1b)

The line lengths and the number of tramstops for Phases 1a and 1b are shown in the following table. The line lengths are valid from centre to centre of terminal:

Line	from terminal to terminal	Line length	No of tramstops	average stop distance
Line 1:				
Phase 1a	NER – HAY	7.2 km	12	655 m
Phase 1a+1b	NER – GRS	13.5 km	21	675 m
Line 2:				
Phase 1a+1b	AIR – OCT	17.6 km	21	880 m

Table 1: Line lengths and number of tramstops per line

The ETN will operate as a 'line-of-sight' tramway with tram priority at signal controlled junctions (see Track Layout).

The route in the city from Newhaven to Haymarket and from West Granton Access to Granton Square runs mainly on-street with varying degrees of segregation. The Roseburn corridor is a segregated off-street alignment, shared with a combined footpath and cycleway. Most of the route between Haymarket and the Airport is segregated from road traffic.

The Depot will be located at Gogar adjacent to Line 2. The Depot will be part of Phase 1a construction.

3 Ridership

Information on system ridership (passengers per day and/or hour) and/or maximum link loads (passengers per hour, direction) are not given.

It is assumed that all Transport–Modelling and patronage and revenue forecasts will be performed by the SDS-JRC Modelling Suite. BBS will address relevant requirements as defined from the SDS Agreement with **tie**.

The line capacity is determined by the given headways of the Standard Tender Service Scenario 8&8 and the capacity of the proposed 43m trams.

4 Tramstops

The Edinburgh Tram Network (Phase 1a+1b) comprises a total of 31 tramstops (stations), thereof 22 for Phase 1a and 9 tramstops for Phase 1b as shown in Table 2. An additional halt for staff only will be located at Gogar Depot.

Transport Interchanges to other transit modes will be provided at

- Edinburgh Airport
- Ingliston Park & Ride
- Edinburgh Park Station
- Haymarket
- St. Andrews Square
- Foot of the Walk
- Crew Toll

All tramstops are equipped with low level platforms. The platform height will match the requirements of the tram to ensure level access in accordance with RVAR (Rail Vehicle Accessibility Regulation).

Platforms will be long enough to cater for nominal 43m long trams. A stopping tolerance of +/- 2m will be allowed for in the platform length. Side platforms will have a minimum width of 3m, island platforms 4m.

Each platform will contain facilities to provide the passengers with weather protection in the form of a canopy or shelter.

Each shelter will include the following components:

- Passenger Help Point
- Passenger Emergency Call Point
- Braille assistance
- Lighting
- Information Panel
- System Logo and Stop Name
- Perch rail/seat

- Advertising panel

No	ID	Tramstop (Station)	Platform Style
		Phase 1a	
1	AIR	Edinburgh Airport	1 centre
2	IPR	Ingliston Park & Ride	2 side
3	GOG	Gogarburn	2 side
	DEH	Depot Halt (staff only)	2 side
4	GYL	Gyle Centre	2 side
5	EDP	Edinburgh Park Central	2 side
6	EPS	Edinburgh Park Station	2 side
7	SGA	Bankhead	2 side
8	SRN	Saughton	2 side
9	BAR	Balgreen	2 side
10	MUR	Murrayfield Stadium	2 side
11	HAY	Haymarket	2 side
12	SHP	Shandwick Place	1 centre
13	PSW	Princess Street	1 centre
14	SAS	St. Andrew Square	1 centre
15	PIP	Picardy Place	2 side
16	MDR	McDonald Road	1 centre
17	BAS	Balfour Street	1 centre
18	FOW	Foot of the Walk	2 side
19	COS	Bernard Street	1 centre
20	OCD	Port of Leith	1 centre
21	OCT	Ocean Terminal	1 centre, 1 side
22	NER	Newhaven	2 side
		Phase 1b	
23	GRS	Granton	1 centre
24	GRW	Saltire Square	2 side
25	CAP	Caroline Park	2 side
26	WGA	West Pilton	2 side
27	CRT	Crewe Toll	2 side
28	WGH	Telford Road	2 side
29	CRA	Craigleith	2 side
30	RAD	Ravelston	2 side
31	ROS	Roseburn	2 side

Table 2: Tramstops: Locations, Platform Style, Interchanges

Closed Circuit Television (CCTV) will be provided on each platform to enable coloured pictures to be displayed at the Control Room and other CCTV monitoring authorities.

Loudspeakers (Public Address) will be provided at each lighting pole location and within the shelter to enable passengers to receive audio messages.

Bench seats will be positioned on each platform and within each shelter a perch rail/seat.

Ticket Vending Machines (TVM) and/or ticket validators will be located within or adjacent to the shelters. Ticketing equipment is not within the scope of BBS Consortium.

5 Network Diagram and Track Design

The Network Diagram (Schematic Track Layout) is shown in Annex 1. The actual track layout includes 44 turnouts (without Depot area), automatic and manual operated (see Track Layout).

The whole Edinburgh Tram Network will consist of double track. Track gauge is 1,435 mm. The maximum operating speed will be 80 km/h.

Minimum desirable horizontal radius on running lines and in depot will be 50m, in exceptional cases 25m on running lines and 20m in depot.

Maximum desirable gradient value is 5%, exceptional limited value 8%.

The network differ various track categories as (% of total track length)

- Integrated on-street tramways (25%)
- Segregated on-street tramways (5%)
- Off-street tramways (70%)

The design of the network will allow services to be turned back at the locations detailed in the following table:

ID	Turnback Locations
EPS	Edinburgh Park Station
HAY	Haymarket Yards
SHP	Shandwick Place
YOP	York Place
FOW	Foot of the Walk (Leith Walk)
OCT	Ocean Terminal
CRT	Crewe Toll

Table 3: Turnback Locations (crossovers)

The turnback facilities will allow special maintenance working at certain times of the year and individual services when sections of the System will be closed for example for Hogmanay, the Edinburgh festival and other special events and festivals.

Trams are also allowed to be turned back at Gogar Depot. The facility to allow this will be provided. An additional siding is located at Haymarket (HAY) for turnback.

The terminals Edinburgh Airport (AIR), Newhaven (NER) and Granton (GRS) are arranged with double-crossovers in front. Ocean Terminal (OCT) includes an additional (third) track for reversing of Line 2 trams.

At Edinburgh Airport (AIR), Ocean Terminal (OCT), Granton (GRS) and Haymarket (HAY) facilities will be provided for driver comfort breaks. In addition, crew change facilities will be provided at the Depot Halt (DEH) and at Haymarket (HAY).

6 Operating Hours, Service Patterns and Frequencies

The Edinburgh Tram Network will support a daily service, all year around. The time period between the last tram returning to the Depot at night and the first tram leaving the Depot in the morning is anticipated with 4hrs 30 min. The operating hours are anticipated between 05:15 and 00:45.

The proposed service patterns for the Lines 1 and 2 are based on the headway scenario for the Standard Tender. Figures are to be understand as 'trams per hour' (tph) per direction:

- Standard Scenario: 8 & 8 tph (7.5min & 7.5min)

This Standard Scenario gives 16 tph (3.75min) on the common line section in the city between Ocean Terminal and Haymarket.

Trams will be co-ordinated between OCT and HAY to give an even service pattern.

The service scenario is based on following assumptions and conditions.

- Edinburgh Airport service tram frequency is ramped up/down from Ocean Terminal. Granton (Phase 1a & 1b) or Haymarket (Phase 1a only) service tram frequency is ramped down up/down from Newhaven.
- Trams going into service between Gogar Depot and Ocean Terminal/Newhaven will run 'in service' from the Gyle (first tram Gyle to Ocean Terminal approx. 05:15 Monday through Saturday).
- Haymarket or Granton service trams going 'out of service' running between Haymarket and Gogar Depot will run 'in service' as far as Gyle.
- Edinburgh Airport service trams going out of service will run 'in service' from Ocean Terminal to Edinburgh Airport with a short 'dead run' from Edinburgh Airport to Gogar Depot.
- Service proposals are based on the requirement to always have a tram present at the Airport tramstop.
- The period of time between the last tram returning to the Depot at night and the first tram leaving the Depot in the morning is about 4hrs 30min. Consequently the maintenance window will allow work on the System Infrastructure for about 3hrs 45min, depending on location each night and allowing time for the implementation and withdrawal of isolations.

The network will be future proofed with the trams per hour increased by 50% throughout, resulting in:

- Standard Scenario: 12&12 tph (5min & 5min)

These increased frequencies result in 24 tph (2.5min) on the common section in the city between Ocean Terminal and Haymarket.

7 Speeds and Times

The maximum operating speeds will be:

- Non-street running: 80 km/h
- Street running: 50 km/h
- Depot: 15 km/h

The average dwell time at tramstops is 25 sec.

The following times stated are derived from Employer's Requirements. A runtime simulation will be carried out by BBS Consortium to demonstrate and confirm the required end-to-end journey times.

The required maximum journey times for the ETN, quoted as operational journey time including dwell times of 25 sec at each tramstop will be as follows.

- Phase 1a Airport to Ocean Terminal 42 min 15 sec
- Phase 1b Granton to Newhaven 39 min 30 sec

An operational allowance will be added to the developed runtime to ensure a robust operable timetable is constructed:

- Operational journey time allowance:
  Newhaven to Haymarket 1.5 min
  Ocean Terminal to Airport 1.5 min
  Newhaven to Granton 45 sec

- Layover:
  4min minimum or 10% of timetabled runtime, whichever is greater
  Exception. At the Airport tramstop a tram is required to always be present.

The Depot halt at Gogar will be the location where drivers changeover.

BBS Consortium will continue to develop and refine the runtime model as the design progresses and provide updated reports demonstration that the maximum run times (journey times) can be achieved. BBS will also prepare a model for electricity consumption linked to the run time model.

The following Table 4 shows the results of preliminary calculations of the minimum round trip times as obtained from the revised Employer's Requirements, Part 2 Operations and Performance:

Time Elements	Line 1 Phase 1b		Line 2 Phase 1a+1b	
	NER-GRS	GRS-NER	OCT-AIR	AIR-OCT
Runtime	00:45:04	00:43:56	00:48:50	00:49:40
Minimum layover time 8 & 8 tph	NER 00:04:15 GRS 00:04:07 Total 00:08:22		OCT 00:04:55 AIR 00:07:30 Total 00:12:25	
Minimum round tip time 8 & 8 tph	01:37:22		01:50:55	

Time Elements	Line 1 Phase 1a	
	NER-HAY	HAY-NER
Runtime	00:29:13	00:29:07
Minimum layover time 8 & 8 tph	NER 00:04:00 HAY 00:04:00 Total 00:08:00	
Minimum round tip time 8 & 8 tph	01:06:20	

Table 4: Round Trip Times for Lines 1 and 2 – Standard Scenario 8&8 (refer to Employer's Requirements Part 2 Operations and Performance, Section 2.7 1.3)

8 Fleet Size and Mileage

Based on the minimum round trip times determined above the Peak Vehicle Requirement (PVR) and the total tram fleet size has been calculated as follows (refer to Employer's Requirements, Part 2, Section 2.7.2):

Standard Scenario 8 & 8	Line 1 Phase 1a NER-HAY	Line 1 Phase 1b NER-GRS	Line 2 Phase 1a+1b OCT - AIR
Headway	7.5 min	7.5 min	7.5 min
Trams per hour (tph)	8	8	8
Minimum round trip time	01:06:20	01:37:22	01:50:55
Actual round trip time needed to provide required headway	1:07:30	1:37:30	1:52:30
Peak number of trams	9	13	15
	Phase 1a	**Phase 1b**	
Peak Vehicle Requirement (PVR)	24	28	
O&M reserve	3	3	
Total tram fleet	27	31	

Table 5: Fleet Size for Phase 1a and 1b – Standard Scenario 8 & 8

The total size includes the necessary O&M reserve for standby, maintenance, repair and training. The proposed O&M reserve is 3 trams.

The trams are required to have a minimum mileage of at least 100,000 km per year.

According ERQ the annual mileage based on the proposed service patterns has been calculated as follows. 'Empty running' to and from the depot is included:

- Standard Scenario 8 & 8:
  Phase 1a: 96,167 tram km per year
  Phase 1a+1b: 105,600 tram km per year

9 ETN Sub-Systems

9.1 Trams

The delivery of trams is subject of the Rolling Stock Supplier (Tramco) and not within the scope of the BBS Consortium.

The trams will be articulated in order to negotiate the track alignment. They will be fully bi-directional and capable of being driven from either end. They will have doors on both sides. They will be capable of being operated by one person.

Normal service trams will comprise on vehicle, but trams will be capable of running coupled together for the purpose of one tram recovering another failed tram from any point on the System. An emergency coupler will be provided at each end of each tram. It will be used only for hauling or propelling a defective tram. An empty tram will be capable of both hauling and propelling another empty tram.

The length of a tram unit will be approx. 43m. The tram body will be a nominal width of 2.65m.

According the Employer's Requirement the passenger capacity (places) of the tram will be:

- Seated: 80
- Standees: 190 (at 4 pers/m²)
- Total: 270

The trams will be capable of being operated continuously for twenty hours in each day.

The tram will have

- a maximum operating speed of 80km/h,
- a minimum operating capability of at least 100,000 km per year,
- a maximum axle load at AW5 loading (standees at 8 persons/m²) of 12 tonnes,
- a minimum of 66% adhesive weight on motored axles.

The tram will be equipped with at least 4 pairs of bi-parting sliding-plug doors on each side of the vehicle for the passenger saloon. The minimum clearance width will be 1,300 mm.

The trams will be fitted with equipment to automatically indicate their position to and communicate with the Operation Control Centre (OCC). A voice radio system will be permanently available between the driver and the OCC.

Rear-views will be provided by CCTV equipment. Automatic, audible announcements for destination and stops will be made by means of a digital voice announcement system.

The tram will be fitted with six external destination displays, one at each end above the cab and two on each side. Internal saloon displays will be used to show information concerning the next stop. They will also display the local time, and should also be able to display public service information.

Passenger alarm devices will also be located in the saloon area. Theses devices will allow communication with the driver.

The driver's cabs will be air-conditioned.

9.2 Supervisory Control and Communications

9.2.1 Tram Position and Detection System

The Tram Position and Detection System (TPDS) will monitor the efficient and effective movement and overall regulation of trams running on the Edinburgh Tram Network. TPDS will include both tram borne and trackside equipments.

Each tram driver will be responsible for safe operation using 'line-of-sight' principles, with the TPDS identifying and setting the correct route ahead of the tram and providing tram regulation and monitoring facilities to Control Room Staff.

The TPDS will collect in real time the following information from each tram for transmission to the Control Centre:

- Tram number,
- Tram run number,
- Tram destination,
- Driver staff identity number,
- Driver duty number,
- Tram in service / out of service.

The TPDS will provide a number of functions which will include:

- Tram identification,
- Tram position on network (outside depot),
- Tram progress monitoring,
- Route setting,
- Processing of manual and automatic 'Tram ready to start' and advance signal demand requests from trams.
- Permit tram to safely transverse tram/road crossings,
- Provide controlled entry to and exit from the depot facilities.

On the approach of a tram to each tramstop and at the termini, where scheduled departure time will also be displayed, the TPDS will provide updates to the Passenger Information Display system, via the Tram Management System.

The driver of each tram will enter the details of journeys for the particular tram for his entire operating day into the tram on-board computer at the commencement of service. Any change to these data e.g. as result of an incident affecting the service will be initiated by the driver.

Tramway signal heads will be positioned at all signal controlled Track and Road Junctions and Pedestrian Crossings to allow optimum sighting for the tram driver.

Tramway signal heads will indicate the acceptance of the signal demand by the system to the tram drivers.

At all signal controlled tram and road junctions there will be an interface installed between the TPDS and the Urban Traffic Control (UTC) System.

All tram signals at signaled controlled tram and road junctions will be driven directly by the UTC System controller, and not by the Tram Position and Detection System.

The TPDS/UTC System interface will implement an agreed Tram Priority at each signal controlled junction.

Each TPDS/UTC System interface will incorporate the facility for the initiation of a 'tram proceed signal in the event of either tram detection failure or local UTC System interface failure. This facility will be capable of being requested at all times by the Control Room Staff.

All interface configuration between the Urban Traffic Control System (UTC) and BBS Tram Position and Detection System (TPDS) will be subject to further revision and verification.

9.2.2 Passenger Information Display System

Each tramstop platform will be equipped with a real time Passenger Information Display System (PIDS) that will be connected to the Control Centre by the Operational Data Network.

Passenger Information Displays will also be provided at the following locations:

- Park & Ride facility,
- Edinburgh Airport,
- Ocean Terminal shopping Centre,
- Haymarket Railway Station.

Each Passenger Information Display will show variable messages including the destination and time to arrival (in minutes) of the next three tram service arrivals, or arrivals within the next 30 minutes, which ever is the less at the particular platform.

9.2.3 Telephone Network

The Edinburgh Tram Network (ETN) will be provided with a Telephone Network that will provide two-way voice communication between staff at fixed locations through the ETN and be integrated with Passenger Help / Passenger Emergency Help Points at tramstops.

The main operator interface with the Telephone Network will be provided by an integrated workstation at each Control Room staff position.

The Telephone Network will include all Private Automatic Branch Exchange (PABX) equipment, all necessary interfaces, configuration of the system elements, the connecting cables and management and diagnostic facilities.

The Telephone Network will provide voice communication to external agencies including the emergency services and the urban traffic controllers.

9.2.4 Public Address System

Loudspeakers and Audio Loops located at each tramstop platform will form part of the ETN Public Address (PA) System. The Operational Data Network will connect amplifiers/controllers to the Control Centre. Public Address facilities will also be provided at Park & Ride facilities.

9.2.5 Operational Radio System

An Operational Radio System (ORS) will provide two-way communication enabling voice and data exchanges between the Control Room staff and:

- Drivers on board individual trams, group of trams and/or all trams,
- Drivers of road and other support vehicles for the ETN,
- Individually or in groups with other mobile ETN operations staff using hand portable equipment along the Network and in the Depot

The main operator interface with the ORS will be provided by workstations installed in the Control Room (for Control Room staff), and tram mounted mobiles (for tram crews), road vehicle mounted mobiles and portable equipment for other mobile staff.

9.2.6 Passenger Help / Passenger Emergency Help Points

Each tramstop platform will be equipped with at least one Passenger Help / Passenger Emergency Help Point that will be connected to the Control Centre by the Operational Data Network.

Each Passenger Help / Passenger Emergency Help Point will be sited so that it is visible by the CCTV camera.

Additional Passenger Help / Passenger Emergency Help Points will be provided, as a minimum, at Park & Ride facilities.

9.2.7 Closed Circuit Television

The Edinburgh Tram Network will be provided with a digital colour Closed Circuit Television System (CCTV).

The tram CCTV system will interface to the City of Edinburgh Council (CEC) citywide CCTV system.

Each tramstop platform will be equipped with at least one CCTV camera that will be connected to the Control Centre by the Operational Data Network.

Additional CCTV cameras will be provided to give full coverage of Park & Ride facilities.

The Edinburgh Tram Network Depot complex will be equipped with a dedicated digital CCTV System as part of the Depot Security System.

All CCTV cameras will be provided with pan, zoom and tilt facilities both automatically within preset limits and under manual control, and be programmed to

zoom in on the Passenger Help / Passenger Emergency Help Point when they are used, and to the Ticket Vending Machine when an alarm is initiated.

9.2.8 Supervisory Control and Data Acquisition

A Supervisory Control and Data Acquisition (SCADA) System will be provided primarily to provide controls, status indications, alarm indications for the Traction Power System and log significant events.

In addition, the SCADA system will provide, as a minimum, indication and control of auxiliary systems and services at tramstops (e.g. Ticket Vending Machines and Ticket Validators) and trackside.

The current status of the Traction Power System as presented by the SCADA system will be available as a display to the Control Room staff at all times.

9.2.9 Operational Data Network

The Operational Data Network will provide the communications 'backbone' between tramstops, substations, other remote equipments and the Depot and will convey data for a variety of applications including

- Tram Positioning, Routing and Detection System,
- Passenger Information Displays,
- Telephone Network,
- Public Address,
- Operational Radio Network (optional),
- Passenger Help / Passenger Emergency Help Points,
- Closed Circuit Television,
- Point Control and Indication,
- Point Heating Control and Indication,
- Supervisory Control and Data Acquisition,
- Ticket Vending Machines.

9.2.10 Control Centre

The Central Control Room (CCR) is the local point for the control and operation of the Edinburgh Tram Network. The Control Room will be located in the first floor of the Depot building.

The Control Room comprises a number of workstations, at which Control Room staff control or retrieve data from the System. The operator interface will be designed to carry out control functions in an ergonomically efficient manner.

The CCR Workstations will provide indication and control of auxiliary systems and services as follows:

- Tram Position and Detection System status and alarms,
- Operation of Passenger Help / Passenger Emergency Help Point System,
- Traction Power System,
- 'No-break' power supply status and alarms,
- Communications Systems status and alarms

- Communications network management,
- Ticket Vending Machines and Validator alarm indications,
- Closed Circuit Television,
- Video / Closed Circuit Television image printing,
- System Plant / Services status indications and alarm,
- Supervisory Control and Data Acquisition System,
- Operational Radio System,
- Emergency Telephones,
- Performance Monitoring System,
- Central data recording and storage,
- Central time,
- Security,
- Intruder alarms,
- Passenger Information Display management,
- Public Address announcements, volume level control and indications,
- Fire Alarm System.

Directly below the Control Room is the Equipment Room, which will accommodate the majority of the main subsystems from which the control system is constructed.

The Control Room will be designed to provide sufficient and effective area for the following operations personnel:

- Operations (Duty) Manager:
The Operations Manager will be responsible for overall control of the Edinburgh Tram Network and the safety of its operation.
The Operations Manager will also be required to be present to 'book' tram-crew on and off duty.

- Operations (Shift) Controller:
The Operations Controller is responsible for the minute by minute operation of the Edinburgh Tram Network ensuring service perturbations risks are minimized and tram-crew are aware of the current state of the Edinburgh Tram Network.

- Operations Information & Security Supervisor:
The Information & Security Supervisor provides support to the Operations Manager and the Operations Controller by monitoring the positions of trams, monitoring and editing of Passenger Information Displays, monitoring of CCTV and Passenger Help / Passenger Emergency Help Points. This post will also take the primary role in ensuring passenger information and security.

- Operational Support:
The Control Room will also need to allow for the provision of support post to the Information & Security Supervisor under certain perturbed situations.

Detailed descriptions of the Control Room Staff workplaces are contained in the Employer's Requirements, Part 3i, Section 3.

9.3 Traction Power

The provision of Traction Power will be derived from a number of suitably located Traction substations distributed around the Edinburgh Tram Network (ETN).

The trams will operate with 750 V DC overhead power supply.

Twelve traction substations (eleven plus Depot) will be provided:

No	ID	Substations
Phase 1a		
1	LSE	Leith Sands Substation
2	LWE	Leith Walk Substation
3	CAE	Chathedral Substation
4	HTE	Haymarket Terrace Substation
5	RRE	Russell Road Substation
6	JDE	Jenner's Depository Substation
7	BDE	Bankhead Drive Substation
8	GDE	Gogar Depot Substation
9	IPE	Ingliston Park & Ride Substation
Phase 1b		
10	CGE	Craigleith Substation
11	GME	Granton Mains East Substation
12	GRE	Granton Road Substation

Table 6: ETN Traction Substations

The 11 kV feed to each substation will be derived from and form part of the local Distribution Network Provider (Scottish Power) Network ring with a dedicated ring main unit or switchboard feeding the ETN rectifier of the traction substation.

Equipment located within the substations and the remote motorized isolators will be controlled and monitored over a SCADA system.

The 11 kV incoming supply to all traction substations will be able to be individually tripped by the System Controller located in the CCR via SCADA and by staff locally by means of a dedicated push button to be located in each substation lobby.

The Overhead Line Equipment (OLE) will also be able to be tripped in either direction by the System Controller from the CCR via SCADA.

The OLE will also be able to be tripped locally in both directions simultaneously by means of an emergency push button located in each substation lobby.

9.4 Depot

The Depot, located at Gogar, will provide maintenance and stabling facilities for the entire fleet of trams operating on the initial network, and the infrastructure. It will also contain the administration and management offices, including Operations and Control Centre (OCC).

The Depot layout will accommodate a minimum of 35 trams of 43.6m length. The stabling facility will accommodate a minimum of 31 trams.

The Depot building will include the main tram workshop, other workshops, stores, management, administration, operations and maintenance offices and staff welfare facilities and the Control Room for the complete Edinburgh Tram Network.

The building workshop will accommodate a minimum of two tram maintenance roads, a wheel lathe road and a further tram service road.

The Depot will be provided with the appropriate electricity supplies including 440V/415V for individual items of workshop equipment both inside and outside the building, 230V for internal domestic use and 110V for small tools.

Detailed description of the Depot and Workshop equipment are contained in the Employer's Requirements.

10 Regular Operations

10.1 Principles of Operation

The ETN System shall be operated according to 'line-of-sight' principles with tramway signalling provided at tramway crossings where appropriate.

For the operational scenarios it is assumed, that a pre-emption is installed at all signalled traffic junctions giving trams priority over public traffic.

Point Position Indicators (PPI) will be provided adjacent to all facing points so as to assist the driver in determining the position of the points.

10.2 Tram Driving

The tram driver, who will be the only operational staff present on the vehicle, shall observe safe tram operation. He shall be fully trained and examined before being passed as qualified for the role of driver. The Duty Roster based on the relevant operating day shall inform the tram driver about his actual shift and the service duties. The tram running number shall determine route and timetable to be run.

All drivers shall start their working time at the Gogar Depot or at pre-determined locations (e.g. terminals). When reporting for duty at the Depot, the driver shall receive information about the location of the tram from the Tram Crew Supervisor. He also shall be given special information about the daily operation.

Starting duty at the Depot tram drivers shall report to the Engineering Controller that the tram is ready for departure. When the driver has received orders to depart from the Depot, he shall proceed from the stabling area via the transfer track on the line (transition area).

Tram drivers starting duty have to ensure to be informed about special service conditions. They shall contact the Operations Controller in the event of any conditions deviating from Regular Operation.

During operation the tram drivers shall observe the tracks, potential obstacles and the selection of the correct route. The latter to be supported by the wayside signals and Point Position Indicators. He shall pay attention to public traffic especially cruising in shared traffic corridors and at signalled traffic junctions.

Beneath the parameters determined by the alignment or the operational regulations the general running speed shall be defined by the line side visibility. The tram driver shall stop the tram accurately at the proposed boarding and alighting zones at platforms. He shall operate the doors and decide when the vehicle is ready for departure. Before and during departure the tram driver has to observe the platform areas via the tram borne CCTV.

The tram driver shall be responsible for passenger announcements via the onboard Public Address System. In situations deviating from Regular Operations the tram driver shall report to the Operations Controller and support passengers as far as applicable.

When returning from main line operation, the tram driver enters the transfer track in front of the Depot area. Informed via tram radio about the proposed stabling track the driver shall handle the route setting manually as required and proceed into the Depot. The driver shall stable the vehicle at the defined stabling position, check the vehicle on damages or failures for report to the Tram Crew Supervisor and sign off.

10.3 Operation on the Line

After passing the loops in the transition area to line or at dead end sections of the line the tram routes will be requested automatically according to the trip number. A cyclic data transmission will take place between the OCC and the onboard units, where the relevant static data like the numbers of the tram, the line, the trip, the car and the driver number will be combined with the dynamic data like the relevant location of the tram.

The provided interlocking system will ensure an release of the route selected by the tram identification after successful check, route setting and finally interlocking of the requested route.

Via the onboard information system the data will be transferred to the onboard information transmission unit. Here the data will be converted subsequently into route setting orders transmitted to the trackside information transmission equipment. This will include a safeguard of the chosen route and the information of passengers.

10.4 Timetables

The timetables of the ETN System will be determined by the basic system data and the passenger forecast and shall contain all data required for the expedient tram operation in Regular Operations.

The base of all timetable planning will be the graphical timetable, which is presented by means of ascending and descending time-distance-paths. It is showing all scheduled and proposed tram runs – even out of service runs - during the daily operating hours and constitutes the base for planned tram runs in Regular Operations and steps for Degraded Operations.

10.4.1 Working Timetables

As extract of the graphical timetable the working plans or schedules shall be provided for the use of operational staff only. Most of them will be elaborated in tabular form and contain all necessary information and data of every tram run, e.g. tram number, starting of turnaround, departure and arrival time.

The **Rolling Stock Diagrams** will be the basis for the service planning of the tram units and give details of when trams leave and return to the Depot. Derived from the graphical timetable, it shows service and maintenance times, periods of immobilisation and operations reserve standby times of each train unit.

The **Drivers Duty Rosters** will give full details about signing on and off times, meal reliefs and details of the journeys to be worked. They will be derived from the service times and the graphical timetable. Combined with the round trip data the

Duty roster displays the train driver's daily tasks. It will indicate the beginning and end of the driver's service time, trains to be operated, the round trips to be carried out etc. They will also indicate where reliefs are to be taken or drivers changed over.

The **Stabling Plan** will list all regular movements in the stabling area of Depot. Derived from the rolling stock roster, the Stabling Plan will help to co-ordinate the maintenance work, track occupation and shunting movements.

The **Servicing and Maintenance Schedule** will determine - in contrast to the stabling plan - the components of shunting movements in the Depot area. All maintenance tasks have to be planned and represented in the servicing and maintenance schedule. Under these conditions the occupation of the separate maintenance equipment, e.g. washing plant, underfloor wheel lathe, will be scheduled as far as applicable.

10.4.2 Public Timetables

The Public Timetables as an additional extract of the graphical timetable will be the commercial offer of the ETN System prepared for passenger utilisation. They shall be easy to use and to provide quick reference.

Additionally the ETN System will be equipped with line diagrams showing the line direction and stations indicating the interchange facilities with other public transport systems available. The line diagram will be displayed abundantly on the station platforms and inside of trains.

11 Depot Operations

11.1 General

The Depot will be provided and equipped for the required daily Revenue Service. Trams shall be fed into service from stabling at the necessary rate to meet the operating timetable. As mentioned above the Depot's operational service plans will be derived from this timetable.

Beneath the general function of stabling and cleaning of vehicles, the Workshop will provide facilities for the functions required for the handling of the Maintenance Concept, which will include the testing, repair by exchange of components, storage of parts and supplies, systems control and administration.

11.2 Tram movements within the Depot area

Movements within the Depot area shall be under direction and supervision of the Engineering Controller and generally be authorised via radio communication. Tram drivers will be responsible for the safe movement of their vehicle having regard to all the other activities within this area.

Generally trams shall be driven on-sight with a maximum speed of 15 km/h. Points shall be manually or spring operated. With reference to the reduced speed points within this area are generally not equipped with PPI (Point Position Indicators).

11.3 Leaving / Entering the Depot

Generally Movements into and out of the Depot will be agreed between the Operation and Engineering Controllers.

Trams ready for service will be parked in the Stabling Area either by tram drivers after previous service or by the maintainer after adequate attention.

Drivers signing on for service in the Depot will be instructed by the Tram Crew Supervisor for picking up a designated tram. The actual timetable or an abstract like a Duty Card will inform the tram driver about departure time and routing.

After preparation of duty the driver will require the permission for depart from the Engineering Controller. The tram will then leave the Depot and move onto the transfer track to join the main line tram services.

Trams returning from service will have scheduled movements within the Depot area indicated in the Duty Roster and Vehicle Diagram. The arrival time, routing and stabling location will be pre-determined with any last-minute change given to the driver via tram radio.

11.4 Cleaning Trams

Cleaning of trams shall be executed at the proposed areas, whereby the internal cleaning shall be done whilst the trams are parked in the Stabling Area.

The cleaning will be handled according to a schedule provided by the Operator.

12 Degraded Operations

12.1 Strategies for Service Disruptions

Degraded Operations may result from the failure of one of the system components, crush loaded trams, extreme meteorological conditions, or other external influences on the ETN System. The effects of the failure can be very different.

'Planned' Degraded Operations will also occur when sections of the ETN System will be closed to allow for example Hogmanay, the Edinburgh Festival and other special events and festivals.

The System and the separate sub-systems will be designed to minimise the effects on services in cases of Degraded Operations. Usually, only the combination of more than one failure of the sub-systems will reduce the quality of services due to redundancy of major sub-systems components.

The Operator shall attempt to minimise the effect of any service disruptions. The nature of the ETN network will offer a great flexibility in dealing with service disruptions. The sectioning of the power supply shall be designed to keep operational flexibility even during Degraded Operations.

The actual strategy to be adopted in the case of service disruption will depend upon the location of the disruption and an estimate of how long it will take to be cleared. Minor disruptions will be accommodated within the Tram Regulation process. Longer or more major disruptions may involve a significant re-casting of service. If there are any significant gaps or if the service is interrupted in a particular section of the line for a longer period of time, bus replacement services shall be provided.

12.2 Performance Monitoring System Capability

The whole ETN System will be supervised from the Operation Control Centre (OCC). All tram movements on the System will be automatically logged at key positions. Print outs from this monitoring equipment will be available for analysis any time after the event. In real-time terms specified levels of deviation from the timetable will come up on the screen in the Control Room to draw attention to the fact that a tram is running early or late. The Operations Controller may then take whatever action is considered appropriate to restore punctuality.

The ETN System's internal priority rules for trams shall be developed prior to operations and shall be influenced by the public traffic interfacing arrangements and the tram priority.

12.3 Failure Management

In preparation of the System Performance and Failure Management Analysis the operation design shall allow alternative operation which can be made available. The System shall be designed to support the use of alternatives, including the reversal of operating direction at certain pre-determined locations or breaking points on the lines at turnback locations. These steps shall minimise the impact on passenger service. For this purpose a Degraded Operation Plan (DOP) has to be established by the Operator as a part of the overall operation plan.

The DOP shall have to detail the most effective ways of returning the System to Regular Operations following faults, which are disruptive to passenger service. The plan shall not only consider alternative modes of operation, but also manual intervention that may be required prior to, or in association with, the alternative mode of operation to be employed.

Provisions have to be considered for dealing with system irregularities and accidents with the fixed installations and by the definition of strict procedures to be followed, whereby an effective communication between the Control Room and tram drivers will be essential. Plans of action have to be worked out and should be rehearsed regularly.

12.4 Recovery Strategies

Safety, security and convenience of customers shall be the prime objective of the System design. The duties of the individual members of staff shall be explained in detail in the DOP and the related manuals to be prepared by the Operator.

The objective shall be to minimise the impacts of failures on the whole network and service. Where the service has gone adrift from the timetable, steps will be taken to get the service back to this timetable as quickly as possible. The main target of the recovery strategies shall be to recover normal operation as soon as possible and as far as applicable.

12.5 Stalled Trams

The principal method for recovery of a stalled tram will be the pushing of the broken down tram by the following tram. The tram drivers shall receive instructions from the Operations Controller via radio communication. As far as applicable both the defective and the pushing tram shall move to the next platform where passengers of both trams will be able to disembark.

Considering the total length of both trams two stops of the coupled units will be required for this procedure. Due to the fact that the actual design of the alignment does not provide sidings, the defective tram has to be pushed 'out of service' to the nearest terminal or directly into the Depot.

This procedure will cause a disruption of service due to the fact that both trams may have to pass several tram stops 'out of service' resulting in a confusion of passengers waiting at platforms. Therefore special attention has to be paid to passengers while trams passing the platforms. In the event that the broken down tram, now stabled at one of the Terminals, cannot be repaired locally by the maintenance crew, this vehicle will be transferred to the Depot when the service time is finished.

Generally all operations will take place under the permanent co-ordination of the two tram drivers and the Operations Controller, whereby passengers shall be informed by using the onboard public address system. The detailed procedure will depend on the available communication facilities and the real failure of the stalled tram. Effects on the coupling procedure of both trams caused by the detailed failure and characteristic of line sections shall be explained in the DOP.

12.6 Disembarking of Passengers on Line

Generally, in cases of trams on the line being unable to proceed, where tram drivers must try to keep clear road junctions, the disembarking of a stalled tram on the open line is unavoidable. This might be required in event of loss of primary power supply or any kind of degraded situations, where the tram is unable or not allowed to move.

Since such special type of disembarking will be an extreme measure, the decision shall be made in co-operation between Operations Controller and tram driver, who has to pay special attention to the traffic situation for ensuring the safety of passengers.

To carry out a controlled disembarking of passengers from a disabled tram the following principles shall be observed:

- passengers shall be informed about the situation by the tram driver at all times;
- passengers shall leave the tram on the opposite side to the adjacent track;
- passengers have to be instructed and supported by the tram driver;
- the tram driver will be responsible for the safe disembarking of passengers;
- when the disembarking is caused by a catenary failure near the tram, passengers shall only be allowed to leave the tram after confirmation of power cut by the Engineering Controller.

12.7 Blocked Lines

Should a failure, obstruction, accident or any other exceptional cause stop a tram, the Operations Controller shall immediately inform all trams in the relevant section. The tracks of the relevant line section shall be blocked as far as applicable. With reference to the DOP the required procedures shall be applied.

At least the following tasks will be carried out by the Operations Controller:

- stop of all trams in the relevant section;
- switch-off of traction power if required;
- information of other operational staff and the Operations Manager as required;
- giving necessary instructions.

13 Sub-System Failures

13.1 Signaling

Failures of the remote route settings can be handled by tram drivers by operating points separately via the onboard information transmission equipment. As final redundancy an operating lever for the turnouts will provided on one of the driver cabs of each tram.

13.2 Catenary Failures

In any situation of mechanical disturbances of the catenary the affected section has to be blocked for operations to avoid further damages with possibly more serious impacts on service. The DOP has to be applied as far as applicable

For the handling of simple catenary failures earthing poles shall be provided onboard of the maintenance vehicles and in the Depot area.

13.3 Electrical Failures

Electrical failures include short-circuits on line and in tram stops will cause the feeding energy to be cut off automatically at the Traction Power Substation (TPSS), while the restoring into operating function has to be done manually. In the event of electrical failures the line section has to be blocked by applying the DOP as mentioned above.

13.4 Traction Power Failures

The design of the traction power supply system, its distribution to the ETN network and the track feeding and sectioning arrangements shall be such as to minimise the effects of any traction power failure. The system shall be able to work without impacts on the operational headway of the ETN System even during outage of any one of the traction substations. Tracks shall be feed separately with traction power - with reference to the track layout at least in segregated corridors - where a bi-directional operation of trams in degraded situations will be feasible.

In the event of a traction power failure the Operations Controller, in conjunction with the Engineering Controller, must assess the situation immediately and put in place the appropriate procedure due to the DOP. The nature, extent and location of the failure will affect the OCC's detailed response, whereby the containment of the effects on service and quick rectification shall be key issues.

13.5 Telecommunications Failures

The tram radio principally is provided for communication between the Operations Controller and tram drivers. If the tram radio fails, the communication shall be maintained by use of mobile phones. As under regular operating conditions, the driver may continue the scheduled journey so that these failures will have no further influence on the service. In the Depot area drivers may also use the provided PABX system.

13.6 Rolling Stock Failures

13.6.1 Door Failures

The following door failures shall to be considered:

- failure to open or close doors,
- failure to lock doors,
- failure to indicate status of doors.

The driver shall lock the defective door and inform the Operations Controller, who shall decide in co-operation with the Engineering Controller when the tram shall be taken out of service for repair.

These failures may result in a decrease of transport capacity and affect passenger convenience.

13.6.2 Communication Failures

When a failure of the public address system on the tram occurs, the tram driver shall operate the tram and the tram borne facilities like doors at tram stops under utmost caution. The tram may, however, continue the scheduled service until relieved by a reserve tram or instructed otherwise.

Generally a tram will be equipped with tram radio sets, each one in one of the driver cab's. In the event that the total radio communication fails, driver's will be able to inform the Operations Controller using mobile phones and continue service as under normal conditions.

13.6.3 Brakes

In the event of a mal-function of the braking system the driver shall inform the Operations Controller immediately and analyse the situation. In the event of a failure of the electric brake the tram can be stopped using mechanical brake only. If the tram driver can restore the brakes to normal, he may continue the scheduled turnaround. Otherwise the tram will have to be taken out of service.

13.6.4 External Lights

Failures of a tram head or tail lights will not affect the safety of passengers and require the tram to be taken out of service, but should be reported to the Control Room. Effects on other public traffic partners shall be considered in detail. A complete failure of the external lights shall require the tram to be taken out of service immediately.

13.6.5 Bogie

The following failures shall be considered:

- Wheel flats
- Hot boxes
- Brake rigging defect
- Broken axles, bogie frames, springs, hangers, etc.

In case of wheel flats, the tram driver shall check the failure and decide whether the tram may continue in service with full or restricted speed, or shall be withdrawn from service.

Due to the fact that failures of the running gear always bear an operating risk the tram driver shall stop the tram immediately and report to the Control Room. If the tram can be moved safely passengers shall disembark at the next platform. In case the tram cannot be moved under any circumstances, the procedure for disembarking of passengers on the line shall be applied.

The Operations Controller shall decide in co-operation with the Engineering Controller in which way the disabled tram will be transferred to the Depot or a temporary stabling.

13.7 Track Failures

Regular track inspections and maintenance will prevent track failures and their effects on operations. In some cases, rail fractures or other impacts on rail sections may cause a temporary speed restriction until rectification.

In the event that a temporary obstruction of a line section might be required the procedures determined in the DOP shall be applied.

14 Emergencies

14.1 General

Emergency calls may be made to the Control Room from tram or by staff by radio or mobile phone. The Operations Controller supported by the Engineering Controller and the Tram Crew Supervisor shall be responsible for taking quickly first appropriate emergency measures.

In the event of an emergency the safety of passengers shall be of utmost priority. In some events the blocking of both tracks of the affected line section might be required.

Decisions and actions of the Operations Controller will depend on information available from the scene. Especially here the Operations Controller will require the support of the tram divers and the Tram Crew Supervisor for clarification of circumstances and the effects on tramway operation.

Based on the available information the Operations Controller shall decided what action to take, including the involvement of the Emergency Services and the Operations Manager.

14.2 Internal Emergency Response

The Internal Emergency Response shall be organised by the Operator in such a way that every member of staff will have defined duties in the event of incidents, accidents and emergencies. Pre-arranged emergency plans, regulations and other necessary documents shall be prepared and distributed.

The Operations Controller shall assume the responsibility for the emergency response and call internal relief services in the event of incidents or emergencies. Until the Operations Manager or the Tram Crew Supervisor take over the responsibility at site the Operations Controller shall supervise and co-ordinate all activities.

The provided telecommunications facilities will allow immediate communication between the operations staff. Personnel on trams on the line, and other operational staff, will be informed via the radio communications system.

In emergency situations on board of trams, an emergency brake indication system shall inform the driver about the passengers request for an emergency braking, which shall allow the tram driver to decide where to stop the tram.

14.3 Liaison with External Emergency Services

In preparation for accidents, fire alarms or any other dangerous incidents, the Operator shall establish an External Emergency Plan. The Operations Controller shall alert the external emergency services and shall co-ordinate the activities until the Operations Manager will take over the responsibility.

The Emergency Services will be:

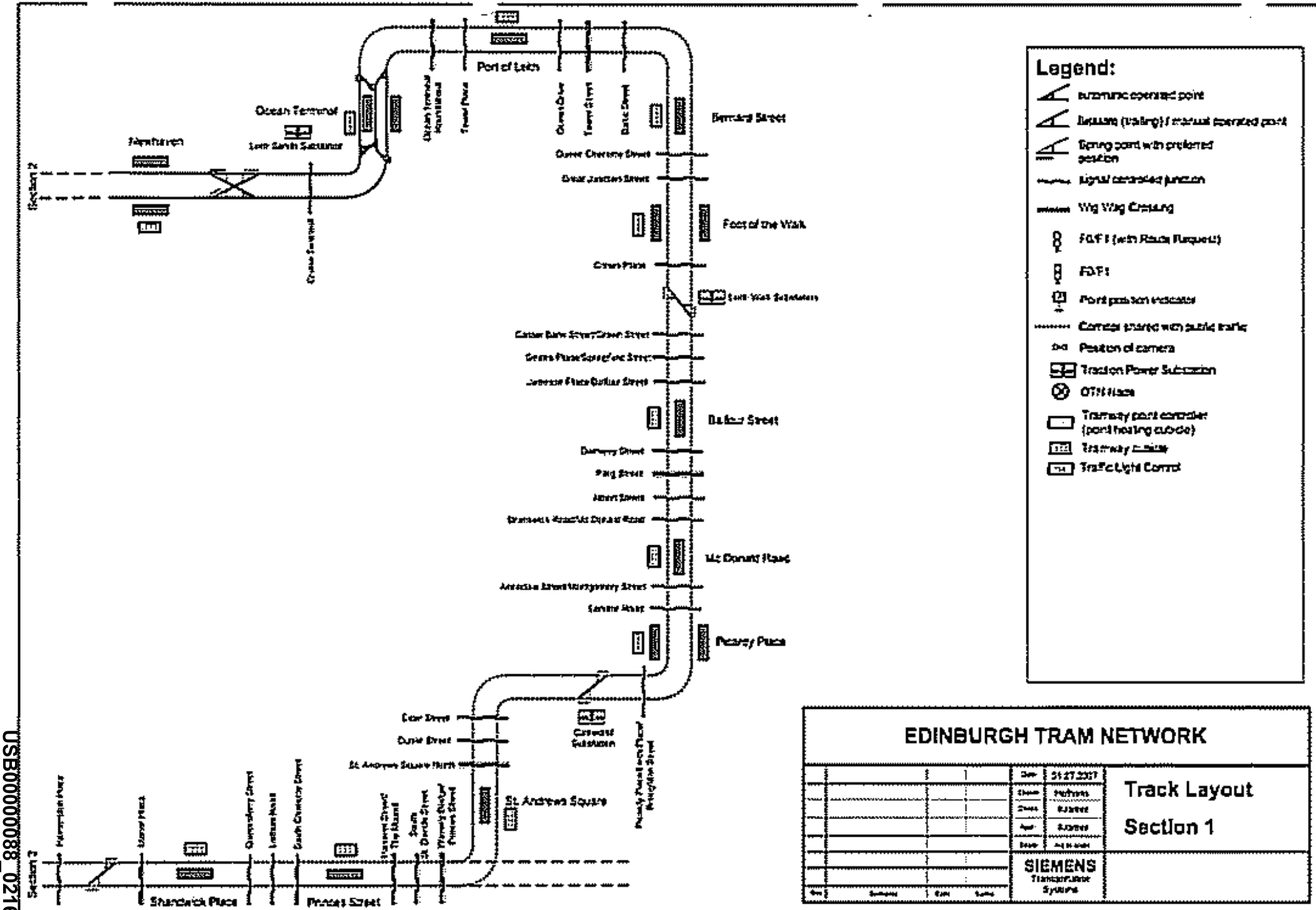
- Fire and rescue services

- Police
- Ambulance services

However, it will also be necessary to have pre-planned arrangements with the power supplier, and road authority.

When operations are disrupted as a result of external factors such as an incident at a road junction, the Operations Controller shall liaise with the responsible agency and decide which action is to be taken. In any of these incidents a checklist prepared by the Operator will give the required support. This list shall contain information about operational measures, influences on or off the system and necessary communications.

Annex 1 Track Layout



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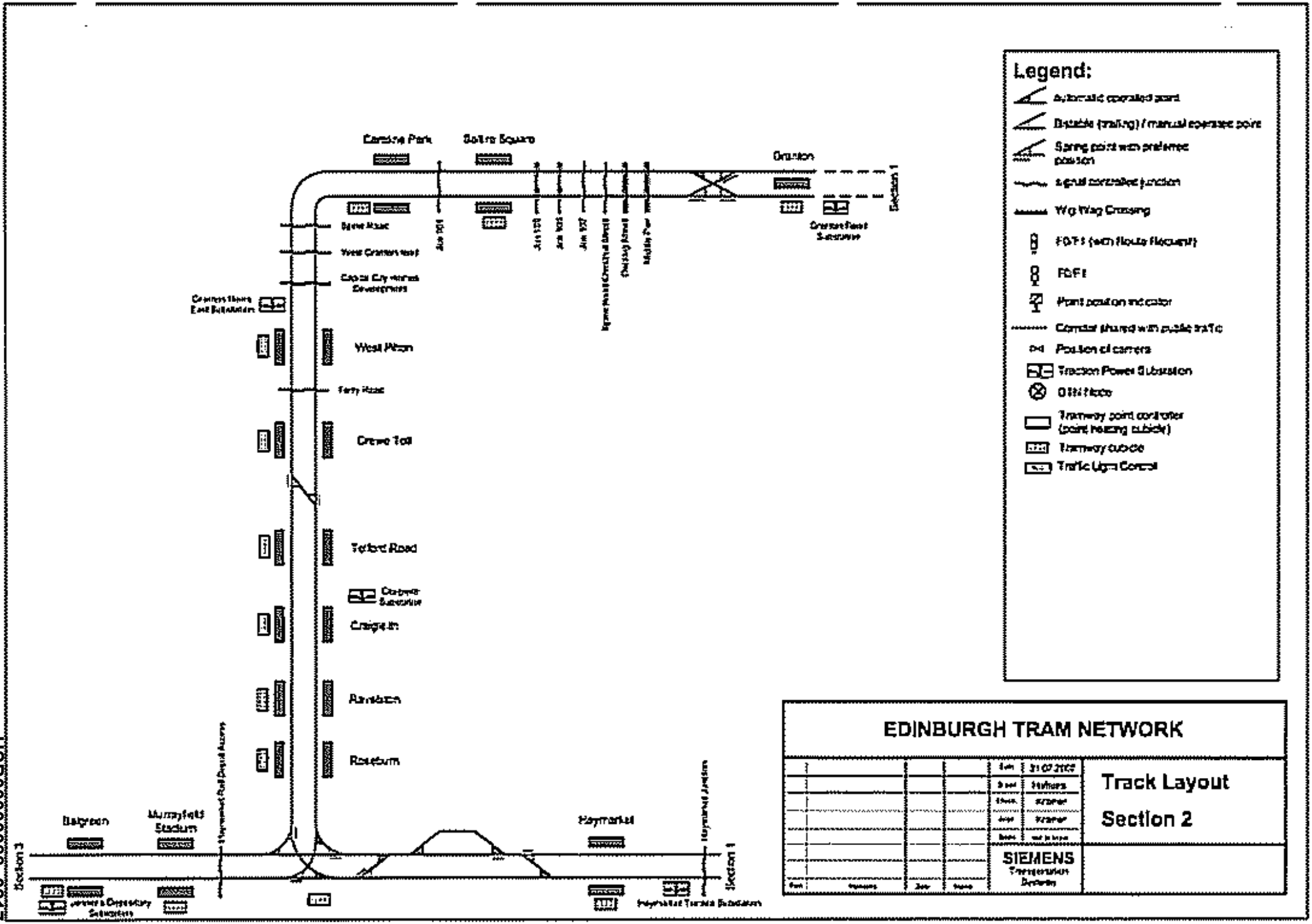

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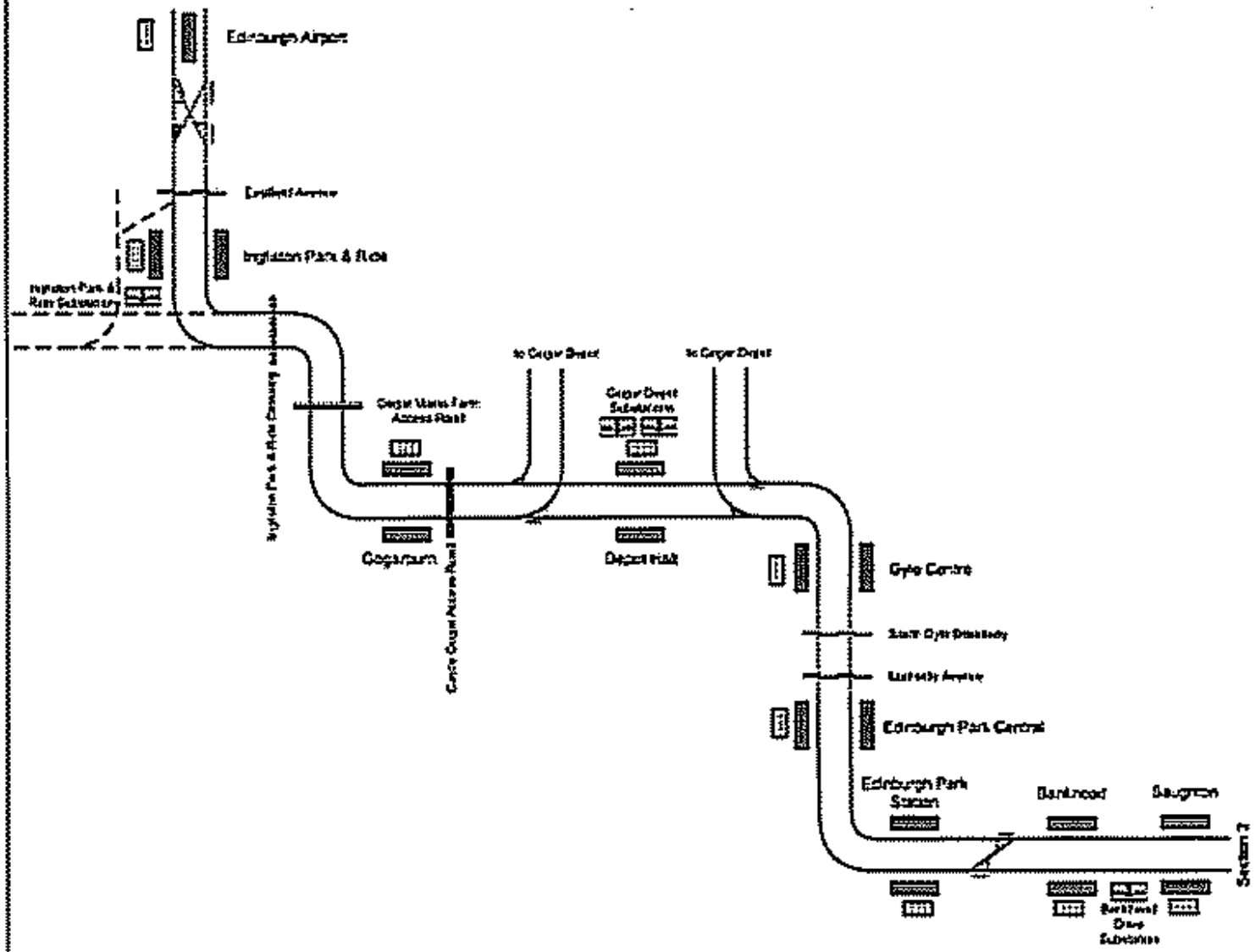

Legend:

- automatic operated point
- Facultative (trailing) / manual operated point
- Spring point with preferred position
- signal controlled junction
- Wig Wag Crossing
- FOFT (with Route Request)
- FOFT
- Point position indicator
- Corridor shared with public traffic
- Position of camera
- Traction Power Substation
- OHW Node
- Tramway point controller (point heating cubicle)
- Tramway cubicle
- Traffic Light Control

EDINBURGH TRAM NETWORK

Track Layout

Section 3

SIEMENS
Transportation Systems

USB0000088_0218

BILFINGER BERGER
Civil

SIEMENS

31st March 2008 Submission

Edinburgh Tram Network

Section 3: Technical Descriptions

Part 1 – Trackwork Superstructure

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1 Introduction

This Document is prepared to provide an overview of the principles of the Design of the Trackwork Superstructure proposed for the Edinburgh Tram Network project.

2 General

The track will be of an economical design which reflects economy of use and maintenance in providing all the functionality required by tie.

The design, implementation and operation of the works will be in accordance with the functional and performance standards and limits specified in this document.

The following standards and regulations will be used:

- ISO International Organization for Standardisation
- UIC International Union of Railway
- EN European Standards
- VDV Verband Deutscher Verkehrsbetriebe (Association of German Transport Services)
- DIN (Deutsche Industrienorm – German Industry Norm)

Local specific requirements, practical and efficient will be observed.

2.1 Trackforms

Various trackforms are required to suit the different domains in which the track lies along the route and in the Depot and sidings. The different trackforms provided will comprise, but not necessarily be limited to:

- Street running track (System Rheda City);
- Grass track (System Rheda City);
- Direct fixation track (single fastening points);
- Ballasted track; and
- Special trackforms in the depot or at tramstops.

2.2 Track Alignment

The line comprises

- the tracks as shown in the ETN Track Layout_20080222 ,
- the stabling tracks and workshop tracks within the depot area as given in drawing ULE90130-06-DEP-00001 Version 7.

Due consideration shall be given to sight lines and clearances to existing infrastructure, in accordance with the Railway Safety Principles and Guidance and with the requirements of the developed kinematical envelope.

In all cases implemented solution shall take due cognizance of the interface with the party responsible for the Rolling Stock.

Track Alignment and Geometry criteria are contained in tables 1-1 to 1-18 (see Employer's Requirements, chapter "Track, Track Alignment and Geometry").

The tolerances in respect to the acceptance of the tracks will be in line with Trackwork Specification ULE90130-SW-SPN-00050 V3.

3 Track, Technical Description

The trackwork shall take account of the interaction with the tram and its running gear (wheel / rail interface), the need to meet the specified track installation and maintenance acceptance criteria and whole life cost assessment, reliability, availability maintainability, safety, operational, maintenance and spares requirements.

Track shall be a standard tramway track with steel rails set to standard gauge (1.435m).

Earthing will follow the overall earthing philosophy as layed down in the systems Earthing & Bonding Concept.

In order to minimise stray current, the rail insulation versus earth has to be of high quality.

The rail to earth resistance is defined as given in EN 50122-2.

The conductance per unit length between the running rail and earth or structure earth shall be low.

EN 50122-2 recommends values for the conductance per unit length between running rails and earth or structure earth of a single track for design purposes. The specified values are

- 0.5 S/km for open formation in open air (this corresponds to 2 W·km),
- 2.5 S/km for closed formation in open air.

The clean initial track shall be tested for finding of possible installation faults e.g. random connection of fixation screw of running rail to reinforcement. Following values are recommended:

- Conductivity G of initial test of single track shall be about G <= 0.1 S/km instead of < 0.5 S/km in open air according to EN 50122-2.
- Conductivity G of initial test of single track shall be about G <= 1 S/km instead of < 2.5 S/km in closed formation according to EN 50122-2.

Thus additional mats or collector bars in embedded trackforms for stray current protection are not necessary.

3.1 Trackforms

3.1.1 Embedded Track

On shared rights of way a safe passage of road vehicles and pedestrians has to be guaranteed, slab track with grooved rail, embedded in the road pavement will be applied.

The advantages of trams in local traffic, such as economy and environmental friendliness have always been recognised. In a period of increased environmental awareness appropriate vibration damping, track bedding and optimising compatibility between permanent way design and the vehicles deployed are of major importance.

In this respect the requirements of the Noise & Vibration Policy (Edinburgh Tram Network Operations) shall be the basis for the design of the track forms.

The embedded track constructions are characterized by dependences of the track layout. For the warranty of a high track quality and reliability, the installation of a slab track system is recommendable, such as RHEDA CITY.

RHEDA CITY System is optimized, modifiable and customized ballastless track system for different boundary alignment conditions. As an example for using on an embankment, in tunnel sections or integrated into existing traffic flows like buses or cars, RHEDA CITY could be adapted for all alignment specifications and can be covered with various layers like asphalt, concrete, grass vegetation or paving material.

Typical requirements and specifications for tram tracks, fulfilled by RHEDA CITY are:

- Simple and transparent system structure
- Modifiability and adaptability for different track requirements
- Elastic support of the rails
- Durability of quality
- Flawless of the track parameters: gauge and track geometry
- Low maintenance
- High availability and increased service life

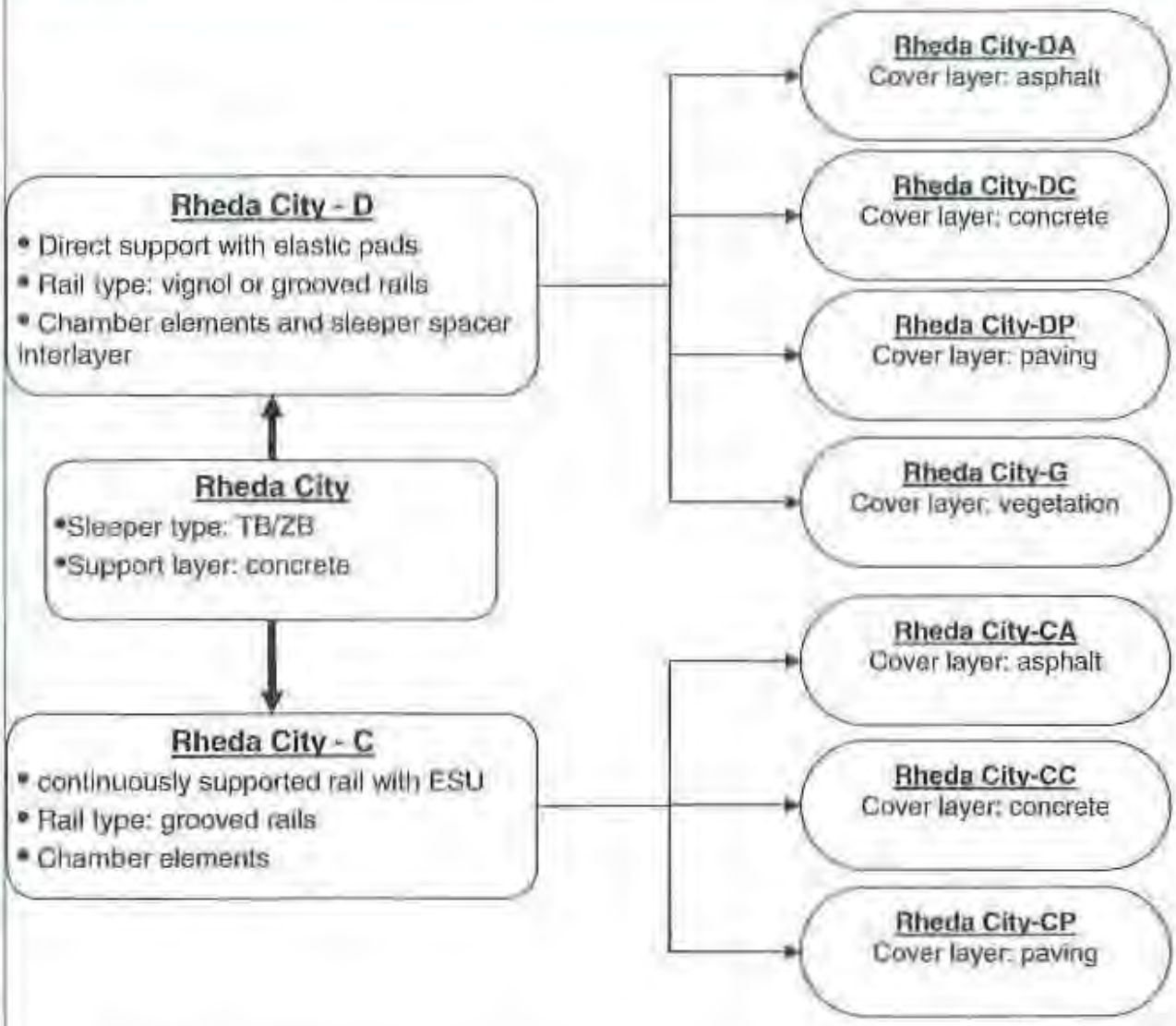
- Electrical insulation of the rails against stray currents
- Minimization of structure-born noise
- Components shall be recyclable.

3.1.1.1 Classification of the RHEDA CITY family

RHEDA CITY is characterized by a simple structural technology: modified bi-block sleepers are installed and guarantee a precise track gauge at the same time.

3.1.1.2 System structure

RHEDA CITY system consists of modified concrete bi-block sleepers concreted into place with lattice girders, to form a monolithic concrete track-supporting layer. The result here, depending on the track model, is either a system of elastic point support, or alternative a continuously elastically supported track. Means basically there exists two different basic approaches of RHEDA CITY systems: rail support on discrete supporting points „RHEDA CITY-D" (D = Discrete Supported Rail) and continuously supported rails „RHEDA CITY-C" (C = Continuous Supported Rail). Both construction principles will be described in detail:



Primary function of the slab track system is a safe transfer of the loads due to the track vehicles and road traffic into the sub-soil. In consequence of the rail deflection the loading cases will distributed on supporting points (RHEDA CITY -D) or onto the area of the bottom of the rails (RHEDA CITY -C). In the case of using supporting points, the vertical deflection of the rail is feasible by using of defined elastic rail pads. In the latter case of a continuously support system, by using of an elastically rail flange sheathing (ESU). The sleepers function as a connection between the rail fasteners and the supporting layer.

On straight lines will be implemented the Rheda City C-type, while on curves with a radius less than 100 m Rheda City D-type will be used.

For Green Track Rheda City G-type will be used.

The thickness of the concrete slab containing the sleepers will be 23 cm for Edinburgh Tram resulting in a total dimension of 40 cm from top of rail to formation. The deformation or stiffness modulus at formation will be in

off street sections E_{v2} (stiffness) = 80 MN/m² and in on street section E_{v2} (stiffness) = 120 MN/m².

3.1.1.3 RHEDA CITY -C

In the present case that the rail is not mounted on a specific number of supporting points, but consistent on the total track length, this system is defined as a continuously supported rail. Hereby the sleeper takes over the function of a temporary tie rod during the track installation. For this kind of support, instead of the spring coefficient, the bedding modulus is the characteristic parameter for the design of the slab track. The sleeper intervals are set within 1.5 m. For an easier re-railing in curves < 100 m RHEDA CITY-D with sleeper intervals of 0.75 m. will be installed.

Due to the fact that the joint between the rail and the road surface will be critical, special attention will be paid to the specific requirements.



Picture: continuously supported rail



1 grooved rail
2 rail joint sealing compound
3 chamber elements a) outside b) inside
4 gauge and clamping profile, incl. ESU
5 adjustment bolts
6 caps (optional)
7 cover layer
8 sleeper type TB/ZB
9 concrete supporting layer
10) intermediate layer (if applicable)

Picture: cross section RHEDA CITY –C, embedded in ESU

3.1.1.4 RHEDA CITY -D

In the present case of a discrete supporting rail, the rails will punctually fix over the range of the sleepers. Generally the sleeper interval is set to 0.75 m. The deflection of the rails results on the stiffness of the used elastic pads (Zw). As a characteristic parameter, the spring stiffness of the elastic pads under the rails is defined.



Picture: discrete supporting points (green marks)



1 grooved rail
2 rail joint sealing compound
3 chamber elements a) outside b) inside
4 rail fastening system K-W25 incl. Zw
5 adjustment bolts
6 caps (optional)
7 cover layer
8 sleeper type TB/ZB
9 concrete supporting layer
10 intermediate layer (if applicable)

Picture: cross section RHEDA CITY –D, supported on elastic rail pads Zw

3.1.1.5 Grass Track (Rheda City – G)

The picture below shows a typically core cross section for green tracks. Because of the system components (chamber elements, fleece and elastically supported pads between the sleepers) the direct contact of the cover material (e.g. humus) and the rails is prevented. This includes also an effective electrical isolation against stray currents. Fleece (membrane) will be applied across the total double track formation.

Longitudinal reinforcement will not be applied.

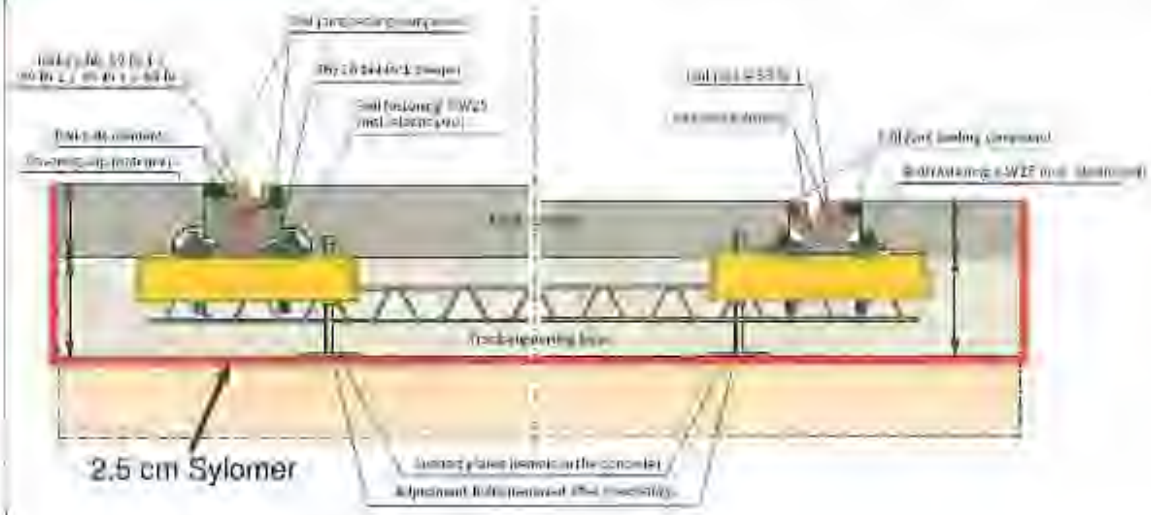


1 vignol rail
2 rail fasteners a) W14 b) eZw
3 chamber elements a) outside b) inside
4 sleeper type TB/ZB
5 intermediate layer (if applicable)
6 concrete supporting layer
7 vegetation cover layer (e.g. grass)
8 adjustment bolts
9 elastically supported pads between the sleeper
10 fleece (if applicable)
11 longitudinal reinforcement (if applicable)

Picture: cross section RHEDA CITY–G

3.1.1.6 Floating Slab (Rheda City)

As a measure to mitigate significant noise impacts for residents and other noise sensitive receivers in the vicinity of the routes, a floating slab construction could be applied. Noise sensitive receivers like dwellings, schools, libraries, hospitals, theatres and concert halls, and places of worship currently bordering the route are not yet defined and has not been included in this proposal. However it should be noted that a minimum length of an installation will be around 120 meters.
An appropriate stiffness characteristic will be determined for each installation.



3.1.1.7 Installation sequence (Rheda City)

The basically construction steps for the system Rheda City will described in the following in detail. In all system variants, the system construction will be done in top-down. By this construction method the top of the rail is used as a reference point for the surveying and installation of the track components. In a result, inadvertent tolerances during the construction of the single layers got no effect to the exactness of the gauge and the positioning of the track.

The track slab will be installed as a cast concrete slab in one construction step with a thickness of 23 cm instead of 25 cm for the project Edinburgh with rail type Ri59. This reduction is possible when concrete with a strength category of C30/37 will be used. Because of the designed track, generally the track slab should not drop below the width of 240 cm. In the case of crowded clearances it is possible to modify the measurements of the slab track. Only in this case, a constructive reinforcement on the slab track sides is recommendable.

1. Checking the substructure supplied by the civil contractor

   This will be done by testing the formation, examining the survey-data and a visual and physical inspection of the provided substructure. The relevant value of E_{v2} (stiffness) is subject to the final development of the track design and confirmation by the SDS before commencing of works.

2. Positioning of the bi-block sleepers

   The bi-block sleepers will be laid in the given intervals on the ready installed frost protection layer.

3. Assembling of the elastic rail flange sheathing (ESU)

   The rails will be fit in with the elastic rail flange sheathing.

4. Installation of the rails

After this, the rails are laid in the middle of the sleeper support.

5. Installation of the chamber elements

The chamber elements are pushed in or glued in manually or with pneumatic machines into the rail chambers.

6. Track adjustment and surveying

For the rough track adjustment the adjustment bolts are to be screw down to shifting the track into the exact vertical position. The track position will be monitored with normally reflectors and Tachymeter. The final adjustment will be done by use of the adjustment screws to the data of the surveying. After reaching the exact position the track must be fixed by using of different solutions.

7. Performing a final survey on the track and checking if all requirements are met with a formal acceptance of this part of the superstructure

8. Concreting of the track slab

The concrete will be poured in and vibrated step by step for each sleeper panel. After reaching the required strength in the concrete slab, the covering or rail service can start.

9. Finish the installation by covering the slab track with various layers like asphalt, concrete, grass vegetation or paving material.

10. Handover of documents regarding this piece of track.

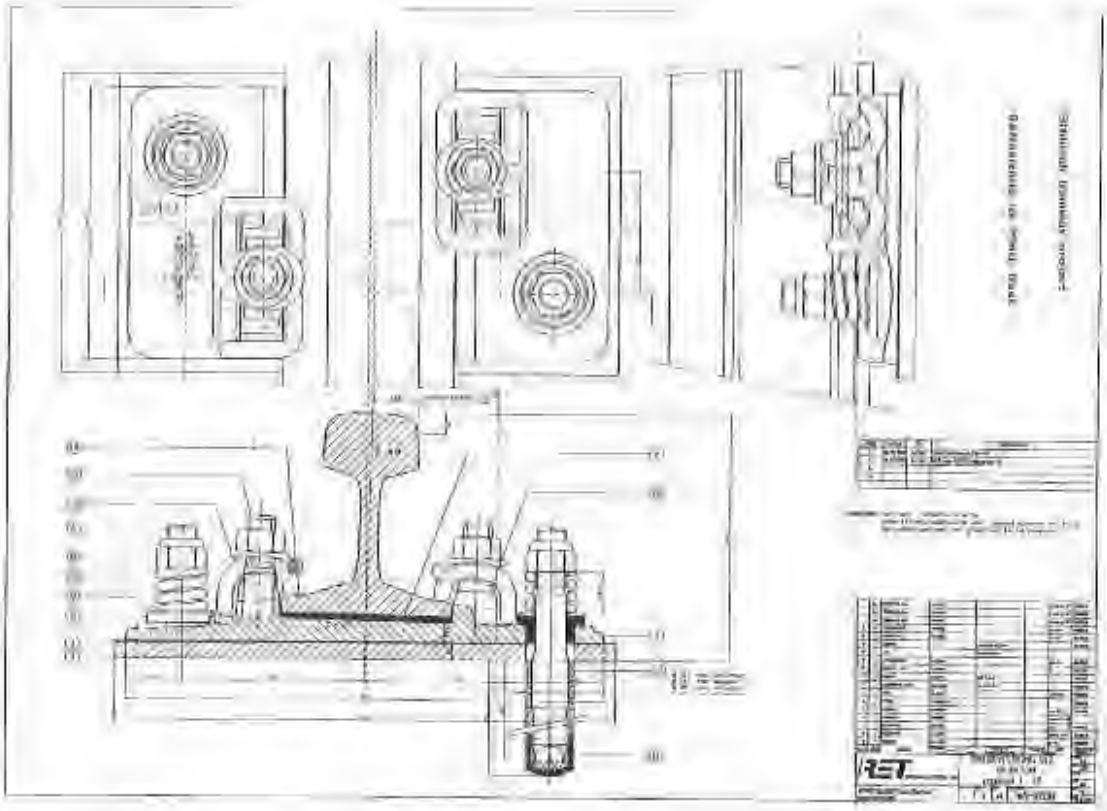
3.1.2 Direct Fixation Track

The track sections on structures shall be constructed as a non-ballasted system.

Ribbed base plates will be placed directly to the structure at all sections with exposed rails as mentioned in the drawings mentioned under "2.2 Track Alignment".

The existing guided bus way is assumed to be capable for a Tram system in terms of alignment, tolerances and bearing capacity. Adjustments in terms of grouting of the structure at it's surface may become necessary to meet the alignment criteria. The selection of grouting material will be subject to approval. It is assumed that coring of fixings into the guided bus way concrete is possible.

Additionally, an up-stand projection shall be incorporated as guard during derailment. This up-stand will be incorporated in the body of the structure.



Fixing for slab tracks

In addition to the characteristics of the VOSSLOH tension clamps like:

Permanent continuous clamping of the rail

Tilting (rotation) protection

Simple distressing and replaceability of rails,

some further features are significant for the fastening system:

- Rail movements caused by pressure from the moving wheels are elastically cushioned such that reduction of both, transmission of vibration to the concrete and structure borne noise to the foundations of adjacent buildings can be mitigated.

  Gauge and cross level regulations of the rail can be adjusted to height and laterally to the requirements during the installation.

For the DC traction power system, the track needs to be electrically insulated. The steel parts of the track will be separated from the concrete by installation of insulating Bush Fbus and elastomeric pads with insulation shims. No additional insulator between tension clamps and rail foot is necessary.

The shown system may be changed or adopted due to the findings made during the design phases, but will have equivalent features. As a result of these design activities and the cost efficiency, fastening systems by Pandrol or other suppliers may be used.

Installation sequence:

1. Checking the substructure supplied by the civil contractor. This will be done by examining the survey-data and a visual and physical inspection of the provided substructure. Special care is to be taken in checking the height of the concrete where the base plates are to be mounted.

2. Formal acceptance of (parts) of the substructure.

3. Checking if all measurements have been taken to ensure a safe working-environment.

4. Constructing slab-track. The main steps in this are:
   a. Determining the exact location of the anchors;
   b. Drilling holes for the anchors;
   c. Glueing the anchors and mounting the baseplates while checking the gauge and the alignment;
   d. Welding the rails;
   e. Mounting the rails on to the baseplates;
   f. Finetuning the rail-height by using metal plates under the baseplate (if necessary).

5. Performing a survey on the track and checking if all requirements are met.

6. Handover of documents regarding this piece of track.

7. Formal acceptance of this part of the superstructure.

3.1.3 Ballasted Track

The ballasted track is the most simple and in terms of initial costs most effective type of super-structure.

The ballasted track is a proven technology and it is commonly used in major railway systems world-wide. The tracks are installed on sleepers so as to keep the rails at the correct distance apart (the gauge) and to support the weight of trains. The sleepers conventionally are made of wood or pre-stressed concrete. The sleepers are placed in a layer of ballast.

Ballast is provided to give support, load transfer and drainage to the track and thereby keep water away from the rails and sleepers. Ballast must support the weight of the track and the considerable cyclic loading of passing trains. Ballast is made up of hard rocks and should be rough in shape to improve the locking of stones.



Figure: Example for Ballasted Track

3.1.3.1 Ballast

The wheel of the vehicle transmits horizontal and vertical loads towards the track. Additionally longitudinal loads resulting from the continuously welded rails come into account due to changes of the air-temperature. All these loads are transmitted via the rails and the sleepers to the ballast layer. The ballast transfers these loads via the sub-ballast layer (made of sand) to the sub-structure. In order to achieve a good transmission of the operational loads to the sub-structure, the thickness of the ballast should be as high as possible. For urban traffic a thickness of 20 cm (measured under the sleeper at the not canted rail) is the minimum value. This is to avoid an addition of the pressure transmitted by two adjacent sleepers. The following aspects are crucial to assure a track of high quality:

- quality of ballast
- installation procedure
- homogeneity of ballast.

A tamping of the ballast in layers with modern tamping machines will cause a higher stability of the track.

The ballast material is made of broken and sieved natural rock and has to fulfil the requirements as follow:

weather resistance (proven with freeze/thaw-test)

durability (proven in drum mill)

- resistance against pressure (proven by compression or impact tests)
- no contents of organic materials, clay etc.
- shape of the stones shall be cubically and sharp-edged

The ballast used will be according European standards and will meet the requirements of a Tram system.

3.1.3.2 Sleepers and Fastenings

Pre-stressed mono-block concrete sleepers form the support for the ballasted track.

The sleeper carries both the loads of the vehicle and keeps the right gauge. It has to transfer the loads transmitted by the rail into the ballast and must have sufficient contact surface in order to avoid an overstress at the formation.

It transmits the

- horizontal forces resulting from the rolling of the vehicle rectangular to the track
- centrifugal forces in curves
- longitudinal breaking and accelerating forces
- longitudinal and buckling forces due to temperature caused stresses and strains of the continuously welded rails

The forces rectangular to the track will be taken by the typical shape of the sleeper. This ability is called breadth displacement resistance.

The sleepers are used on ballasted track and designed for load characteristics consistent with the design of the passenger and service vehicles and with the performance requirements of the system.



Figure: Example of Concrete Sleepers

The pre-stressed mono-block sleepers have a length of 2.400 mm or 2.600 mm. Four or more pre-stressing tendons will effect the tension. The reinforcement will be located uniformly. Every tendon shall be loaded with an equal force.

The surface supporting the rail will be inclined towards the track axis. As rail fixation the Vossloh W14 fastening is an appropriate solution. Plastic dowels will assure the connection of the fastenings to the sleeper. The dowels will not be canted or distorted and are removable.

The shown system may be changed or adopted due to the findings made during the design phases, but will have equivalent features. As a result of these design activities and the cost efficiency, fastening systems by Pandrol or other suppliers may be used.



Figure: Fastening for Concrete Sleeper

The rail fastening is an elastic system, which is capable of attenuation of rail borne vibrations. This consists of two parts:

- the elastomeric pad,
- the elastic fastening.

The rail rests directly on the concrete sleeper with only a plastic pad in between. The position of the rail is fixed by plastic angled guide plates. Positive permanent tightening between rail and sleeper is achieved by using tension clamps. Sleeper screws are inserted in plastic dowels, which have been preassembled while fabricated into the concrete sleeper.

3.1.3.3 Wooden Sleepers and Fastenings

Wooden sleepers and ballasted track is also a common combination in track-laying. These sleepers are hardwood-made (e.g. oak) and capable for recreation, when worn-out. The sleepers are impregnated against rottenness and parasitic infestation.

Wooden sleepers may be applied only at sections with turnouts or other special track components.



Wooden Sleepers

The sleepers will be designed for load characteristics consistent with the design of the passenger and service vehicles and with the performance requirements of the system. For increasing the horizontal track stability, sleeper anchors can be used.

The fastening system ensures permanent tension by means of elastic spring clips. All fastening components are already preassembled onto the sleeper, so the complete sleeper can be laid mechanically.

For quick replacement of the rail, tension clamps are easy to remove in preassembled position.



The shown system may be changed or adopted due to the findings made during the design phases, but will have equivalent features. As a result of these design activities and the cost efficiency, fastening systems by Pandrol or other suppliers may be used.

3.1.3.4 Ballast Track Methodology

1. Checking the sub layer of ballast supplied by the civil contractor. This will be done by examining the survey-data on excavation and -after filling and compacting, including a visual and physical inspection of the provided ballast layer.
2. Formal acceptance of (parts) of the substructure.
3. Checking if all measurements have been taken to ensure a safe working-environment
4. Constructing ballast-track. The main steps in this are:
    a. Building the turnouts;
    b. Putting the sleepers in position;
    c. Mounting the rail;
    d. Welding of the rail;
    e. Tamping the track.
5. Performing a survey on the track and turnouts and checking if all requirements are met.
6. Handover of documents regarding this piece of track.
7. Formal acceptance of this part of the superstructure.

3.1.3.5 Road Crossings

According to document ULE90130-SW-SPN-00050 V3, three at-grade crossings with panels are required. These panels will cover the ballast with a non electrically conductive material.

3.1.3.6 Re-railment platforms

In the depot area 9 turnouts and 1 crossing are foreseen with wooden flush finish for re-railment purposes.

3.1.4 Special Trackforms

For the tracks inside the workshops, special trackwork systems are required. Embedded track systems are foreseen for areas in which trains as well as cars, forklifts or similar vehicles shall be able to cross or pedestrians shall be able to walk safe. Some areas of the workshop are equipped with pits in order to enable access under the trains.

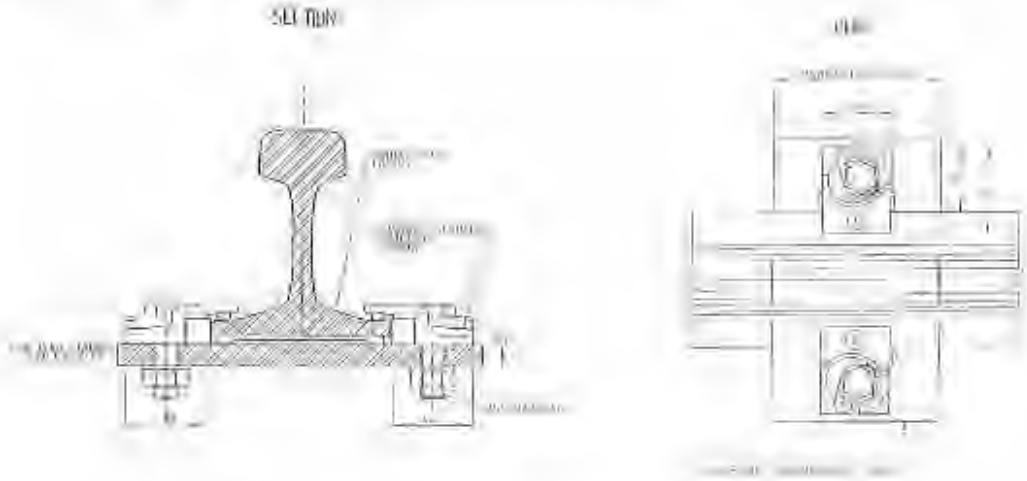
Special solutions, e. g. for the train washing plant, will be defined during the detailed design of the trackwork.

Embedded Tracks

The embedded tracks will be constructed in the workshop area. They will be incorporated in a reinforced concrete floor base. The rails will be installed in a rectangular recess in the floor base and casted in with grout.

Pit Tracks

Inside the pits the rails will be installed on columns or aprons (steel or concrete). For this purpose, special fastenings will be used.



Example for special fastenings on columns/aprons

3.2 Rails

The maximum length of the rails will be 18.00 m.

Flat bottom rails with a radius of less then 100.00 m and grooved rails with a radius of less than 500 m shall be pre-curved in factory or on site.

All welds will be alumino-thermic welds and tested ultrasonically. Particular attention will be given to the dressing of the weld area. Track in depot will be fishplated.

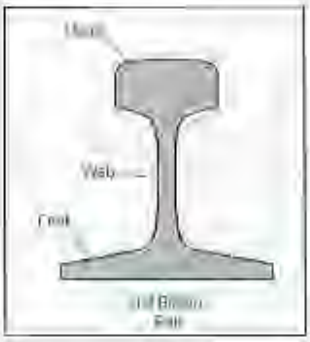
The standard rail in embedded track is of type 60R2 as stated in 3.2.2. All rails in ballasted tracks, plinth tracks, green tracks and in the depot and storage yard will be of type S 49E1.

All rails will be of a hardness of 700, except turnouts and crossings. These rails will be of a hardness of 900.

Guard rails will be applied over 200 m of the line adjacent to steep embankment alongside Murrayfield Stadium as required in document ULE90130-SW-SCH-00085 V1.

3.2.1 Standard Flat Bottom Rails 49 E1

The standard form of rail used around the world is the "flat bottom" rail. It has a wide base or "foot" and narrower top or "head".

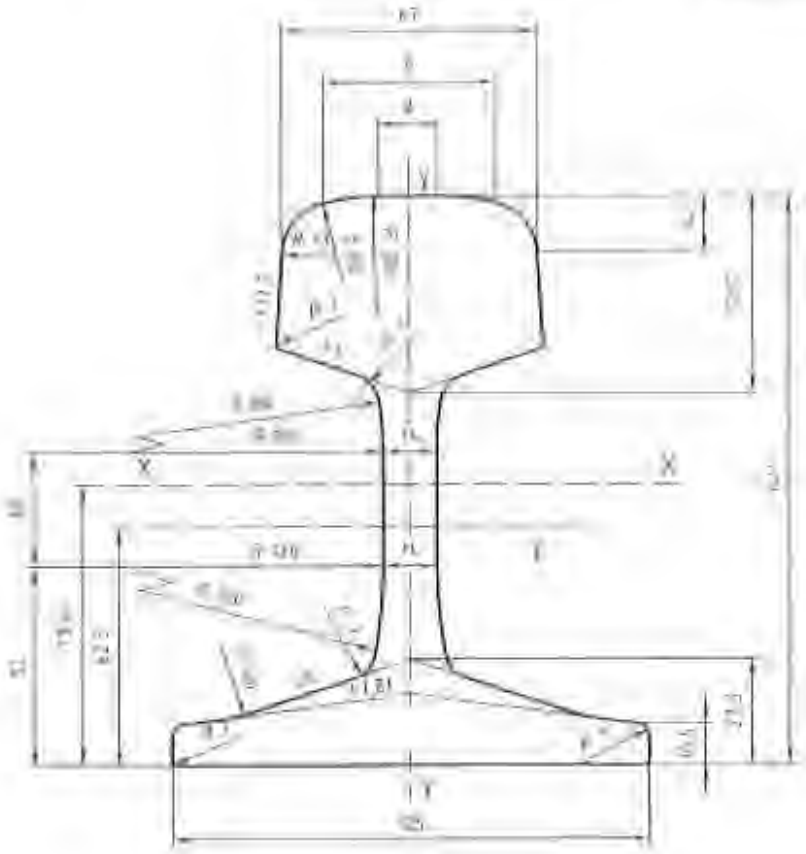


Rails are named according their weight per meter (for instance 49 E 1 = app. 49 kg/m).

During the manufacturing process the rails were rolled. In modern rolling mills the rails will be rolled in lengths of up to 120 m. For a better transport the rails after rolling are cut into pieces of 18 m or longer.

The standard EN 13674-1 is valid for the supply of the rails.

Dimensions in millimetres



Key

1 Centre line of branding

Cross-sectional area	62,92	cm^2
Mass per metre	49,39	kg/m
Moment of inertia x-x axis	1318	cm^4
Section modulus - Head	240,7	cm^3
Section modulus - Base	247,8	cm^3
Moment of inertia y-y axis	319,1	cm^4
Section modulus y-y axis	51,0	cm^3

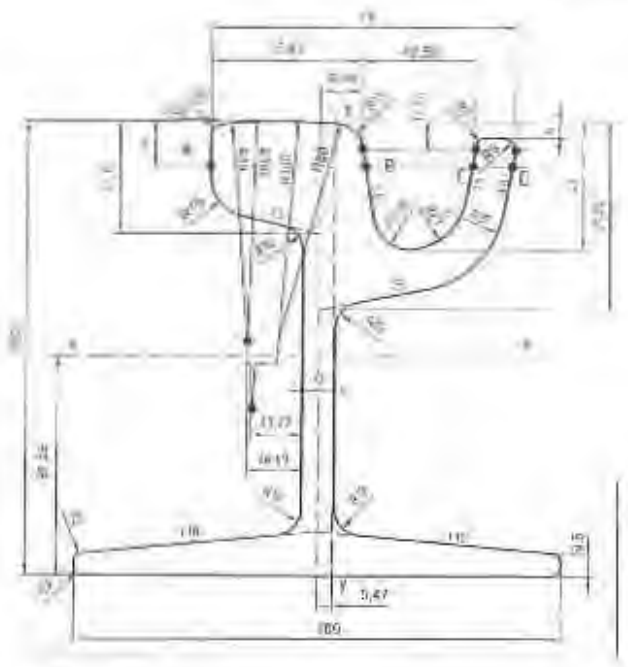
Indicative dimensions: A = 15,267 mm
B = 46,335 mm

Figure: Rail Profile 49 E 1

3.2.2 Grooved Rail 60 R2

In the embedded track sections the 60R2 grooved rail is proposed to be used. The design is based on European standards. The rail head section matches the 49E1 rail head section.

The further development of the wheel/rail interface study will define where local modification of the rail to a wider groove (59R2) might be required.

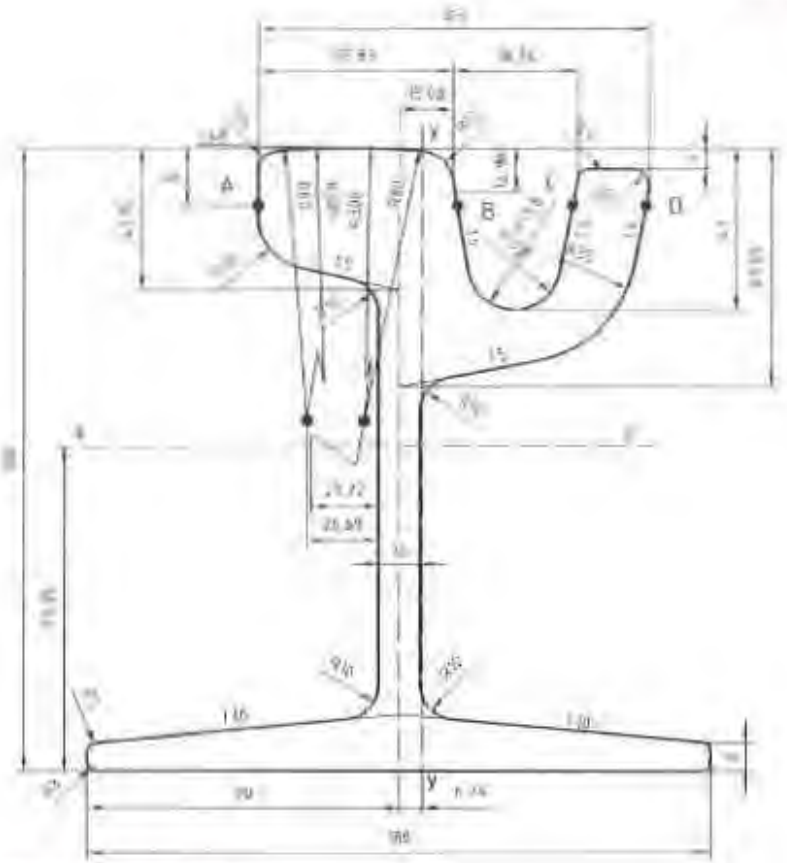


H	AB	BC	CD
0	54,40	44,52	13,57
19	54,57	42,88	14,06
14	56,09	42,11	14,39

Cross sectional area: 74,07 cm²
Linear mass: 58,14 kg/m
Moment of inertia I_x: 3210,8 cm⁴
Moment of inertia I_y: 75,2 cm⁴
Section modulus W_x: 350,5 cm³
Section modulus $W_{x'}$: 353,1 cm³
Section modulus W_y: 94,7 cm³
Section modulus $W_{y'}$: 103,6 cm³

Figure: Rail Profile 59R2

Maße in Millimeter



R	AB	BC	CD
9	54,49	38,34	19,75
10	54,97	37,70	20,24
14	56,00	36,00	20,57

Querschnittsfläche: 76,11 cm²
Längenbezogene Masse: 59,75 kg/m
Trägheitsmoment I_x: 3 298,1 cm⁴
Trägheitsmoment I_y: 922,1 cm⁴
Widerstandsmoment W_x: 353,5 cm³
Widerstandsmoment W_{xo}: 360,6 cm³
Widerstandsmoment W_y: 95,1 cm³
Widerstandsmoment W_{yo}: 110,5 cm³

Figure: Rail Profile 60R2

3.3 Turnouts and crossings

The turnouts and crossings applied for the LRT Edinburgh project are used to allow dividing a track into a diverting position to connect two routes or to provide changeover and crossing facilities for the rolling stock.

A typical turnout consists of the following components (please note Fig. hereto):

turnout switch section (1);

straight stock rail (1.1);

curved stock rail (1.2);

curved switch rail (1.3);

straight switch rail (1.4);

intermediate section (2);

straight intermediate rail (2.1) and (2.3);

curved intermediate rail (2.2) and (2.4);

frog section (3);

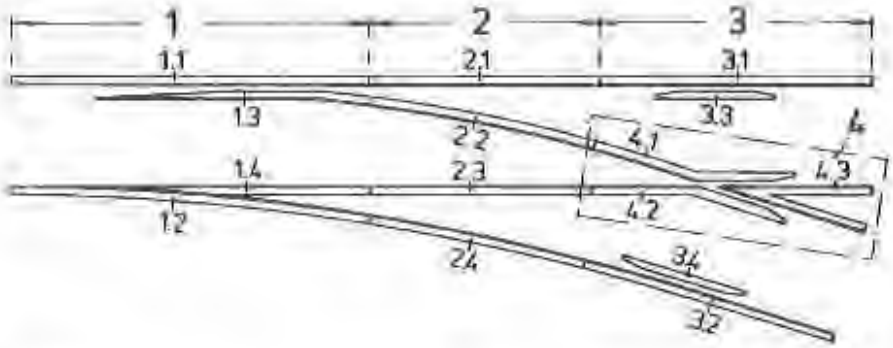
running rails opposite check rails (3.1) and (3.2);

check rails (3.3) and (3.4);

frog (4);

wing rails (4.1) and (4.2);

diamond (4.3).



For further information regarding turnouts please refer to Annexes 1(TS070015) and 2 (VAE_GRtumouts_en).

Definition of turnout types required – suitable for tamway operation!!

Scope of Supply

The scope of supply include switch and stock rail assemblies, frog, check rails, intermediate and closure rails, plates and fastening material.

Marking

To ease installation on site the turnout components that belong together are marked with paint and a particular turnout number before they are shipped. They are packed and supplied in suitable lots.

Storage

The switch devices as well as all other bundles shall be stored on a dry and level area. Parts should be supported by suitable wooden posts.

Radii and Geometry

The types and the geometry of the turnouts will be as given in the document ULE90130-SW-SCH-00072, V2 "Switches and Crossings Schedule" as far as applicable.

3.4 Expansion Joints

Expansion joints are structural elements enabling a compensation of rail length to be performed. Expansion joints are usually placed on the transition zone between bridge structure and embankment. They have to take up the longitudinal movement of the bridge (extension by temperature) without causing too high a compressive strain in the rails. Therefore, the slip resistance selected is lower than the resistance of the sleepers to the longitudinal displacement avoiding the occurrence of plastic deformations. Switch blade and stock rail are shifted against each other in the expansion joints.

Manufacture drawings, prepared by the contractor, shall contain all the dimensions by taking the track gauge of rails 1,435 mm.

The requirement and the location for expansion and / or isolation joints will be defined during design stage.

3.5 Continuous Welded Rails

The welding of the rail to form a continuous welded track reduces the dynamic forces exerted on the permanent way and the cars. The alumino-thermic welding technique shall be used in this project:

First a casting mould is fixed around both rail ends. In a crucible, the chemical reaction of iron oxide and aluminium powder yields fusible

thermite steel that is poured into the casting form, welding the rails together. Different alloying elements are added to the thermite portion that make the characteristics of the butt comply with modern qualitative demands.

For the welding process the appropriate UIC standard and the technical description within the tender documents have to be considered.

3.6 Track Ends

At the end of tracks sand pits will be installed that prevent vehicles from moving beyond a designated point.

Rail Stops

Where buffer stops cannot be placed outside the workshop area rail stops will be provided.

Bill of Quantities

Track material

Cons. Number	Description	Unit	Quantity
200020	Flat Bottom Rails 49 E1	m	46,588
200030	Grooved Rails 60/59 R2	m	33,028
200040	Turnouts (main line)	pcs	33
200050	Turnouts (depot)	pcs	28
200070	Rail expansion joints	pcs	49
200100	Crossings	pcs	4
200110	Buffer stops	pcs	0
200140	Rail fastenings for plinth track	m	7,577
200170	Pre-stressed concrete sleepers incl. fastenings	m	12,023
200180	Ballast	ton	23,700
200230	Specific material for embedded track	m	13,422
200240	Specific material for Tramstop	m	2,332
200250	Specific material for Grass track	m	3,564
200270	Rail fastenings for cast-in track in depot	m	760
200280	Rail fastening on columns in depot	m	130
200290	Transition rails	pcs	60
390010	Insulation Joints (as given in ULE90130-SW-SCH-00085 V1)	pcs	14
390020	Signing (every 100 m a simple plate)	ls	Incl.
390040	ACO-drain every 60 m in embedded track	pcs	275

390050	Water boxes in grass track	pcs	0
390060	Grouting at guided bus way	m	2,800
390070	Guard rails	m	400
390090	Road crossings	pcs	3
390100	Point bars as required in ER V. 3.3 under 26.10.1	pcs	70
390110	Adequate rerailment facilities for turnouts in depot area (for 9 turnouts and 1 crossing)	ls	1
390120	Isolated rail joints (as given in ULE90130-SW-SCH-00085 V1)	pcs	0

TECHNICAL DESCRIPTION

TURNOUTS 49E1

Gauge [mm]: 1435

Rail Cant: No inclination

laid on: wooden sleepers

Rail profiles

Rail Profile: 49E1 (S49)

Switch Rail Profile: 49E1A1 (Zu 2-49)

Check Rail Profile: 33C1 (UIC33)

Quality of material

Stock Rails: R260 (900A)

Switch Rails: R260 (900A)

Running Rails: R260 (900A)

Check Rail: R260 (900A)

Crossing - Closure Rails: R260 (900A)

Crossing - Wing Rails: R260 (900A)

Set of Spring Rail Switches "ZV-FSCH"

Description

A set of spring rail switches consists of switches made from the special asymmetrical or symmetrical switch rail profiles. They are forged at the heel end (forging) to match the standard rail profile and are electrically flash-butt welded to the adjoining standard rail. The weld is located in the moveable part of the switch and is secured with safety fishplates. The standard rails can be provided with a foot relief to reduce the setting forces.

One set of spring rail switches consists of:

a) Two finished stock rails, made from the Vignol rail profile (standard rail profile). The stock rails are machined in the switch-stock rail contact area, all holes are provided and deburred.
b) Two finished spring rail switches, made from the switch rail profile and welded to the standard rail. The switch profile is forged at the heel end to the Vignol rail profile. The forged area is machined so that it matches the Vignol rail profile. The forged switch profile is welded to the standard rail using electrical resistance welding and the weld is secured by 2-hole fishplates. The spring rail switches are machined on the running surface and the contact surface of the rail head and foot, bent and set and adjusted to the stock rails. If to be provided, the holes for the switch attachments are drilled in the rail foot or web.
c) The switch supports, adjusted to the stock rails and the spring rail switches, are mounted on the stock rails. In the case of outside supports, they are fitted and mounted on the stock rails.
d) The anti-creep device.

The complete and half sets of spring rail switches "ZV-FSCH" and "HZV-FSCH" are ready for installation and

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are delivered pre-assembled. If required, locks are fitted and supplied as well. If the set of switches of a single turnout is mounted on sleepers with plates, it is possible to deliver the switches completely mounted on the sleepers. If sets of switches are delivered without sleepers or if only half sets of switches are supplied, the switch is delivered bundled together with the corresponding and adjusted stock rail so as to prevent them from damage during transport and to avoid any confusion.

It is not recommended to exchange individual stock rails or switches without re-adjusting them to each other.

Advantages

- Well proven and cost effective design
- Low setting forces
- High wear and tear reserves
- Suitable for medium to high speeds
- Suitable for medium axle loads/annual loads
- For high demands on position stability and creep resistance
- Use of an elastic rail fastening is possible

Technical Characteristics

- The forged area is subjected to a heat treatment to prevent the formation of soft spots:
  - All switch rails > 63.14 kg/m, corresponds to profile 49E1A1 (Zu 2-49), in material grade R260 (900A) are normalized to guarantee a uniform hardness gradient
  - All switch rails </= 63.14 kg/m, corresponds to profile 49E1A1 (Zu 2-49), are normalized only after agreement
  - All head-hardened switch rails are treated in accordance with the material specification to guarantee a uniform hardness gradient

- For used switch rail profile and rail material grades see chapter 'Profiles' and 'Materials' and/or commercial offer

Quality Inspection

- Visual and geometry checks
- Penetration test: Flash-butt weld, forged area
- Hardness test: Forged area and heat affected zone for head-hardened switch rails

Common Built-up Crossing "EHZ COMPACT 1400"

Description

The crossing vee is machined from a rolled slab made of tempered steel. This makes it possible to use a homogeneous material (without welds) with a corresponding strength in the transition area.
The length of the crossing vee depends on the rail profile and the geometry of the crossing. The welding joint between crossing vee and closure rails is in any case in the area where the wheel overrun of wing rail/crossing vee is completed. Distance blocks are welded onto the crossing vee.
The closure rails are machined from rolled rail profiles. They are welded together in the area of the head and foot and connected to the crossing vee by means of flash-butt welding.
The wing rails are also made from rolled rail profiles, machined and bolted to the welded crossing vee by means of distance blocks.
All distance blocks are machined and adjusted to the support areas of the closure and wing rails during final assembly. This guarantees on the one hand an exact position of the distance blocks and on the other hand adherence to the required flangeway tolerances.

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Advantages

- Design possible for all types, like
  - common crossings
  - obtuse crossings
  - multiple and special crossings
- Excellent elasticity because of bolted design
  Therefore, optimal integration into the elastic behaviour of the track
- No special appliances and patterns required
  Therefore, economical even for small quantities
- Extension of service life by built-up welding in the track
- "Bending" of the assembled crossing at a later stage possible
  Therefore perfectly suitable for all types of curved turnouts
- Guaranteed interchangeability
- Can be thermit welded into the track
- Through tempering of the crossing vee a high yield point is achieved with at the same time sufficient elongation and thus high wear resistance is obtained in the wheel overrunning area with the typical dynamic compression stress

Technical Characteristics

Materials:

- Rails: Please refer to chapter 'Materials' and/or the commercial offer
- Crossing vee: 51CrV4 according to EN material no. 1.8159
  Tempered to tensile strength (elongation min. 8%) 1200 – 1400 N/mm²

Quality Inspection

- Visual and geometry checks
- Penetration test: Flash-butt weld, welding seams
- Hardness test: Crossing vee

Bolting of the Crossing "High-Tensile"

Description

This type of bolting is used for durably connecting the main components (wing rail, crossing vee, closure rail, guard rail and joggled rail) of common, obtuse and multiple built-up crossings.

The components are connected to each other by means of high-tensile metric bolts (property class 8.8 or 10.9) and hexagon nuts. In order to make sure that the seat of the rail head and the hexagon nut is level, special shims are used. These shims have a special form in the contact area of the rail web so that the best possible contact surface is achieved. Possible settling loss can thus be kept to a minimum. To achieve the rectangular contact of the head of the bolt and the nut, hardened spherical disks and ball sockets are used. They guarantee a 100% rectangular contact area of the head of the bolt and the nut. Self-locking nuts are used to make sure that the bolt does not get loose.

Advantages

- Secure and durable connection because of high pre-tension force
- Easy to re-tighten the bolting during operation, if necessary. Specified tightening torque has to be considered
- Bolting can be used various times (e.g. if single components of the crossing are exchanged)

Technical Characteristics

- Bolts: Property class 8.8 or 10.9

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TECHNICAL DESCRIPTION

TURNOUTS 49E1

Rail Fastening
Superstructure VOSSLOH SKL 12 (Tension Clamp)

Description

For the fastening of turnout components on ribbed base-plates "SKL 12" tension clamps from VOSSLOH are used. The clamps guarantee a lasting clamping of the turnout components on the ribbed base-plates. Ribbed base-plates for turnouts are preferably made from rolled ribbed web material or from flat steel with welded-on rib cams. Tilting movements of the rails are resiliently absorbed by the middle bend of the tension clamp. The achieved creep resistance and torsion resistance fulfill the demands made on a continuously welded track (CEN EN 13481).

The tension clamps can be used with or without elastic pads between the turnout components and the plates. The defined mounting position guarantees the full tensioning force of the tension clamps for different rail profiles and pads of different sizes. A plastic deformation of the spring arms is not possible. The fastening needs no maintenance.

Preferred application of the "SKL 12" tension clamp from the point of view of turnouts:

- Universal clamp: approx. 13 kN tensioning force at approx. 14.5 mm spring deflection
- Torsion stability during mounting
- Suitable in the fishplated area
- Pre-assembly possible
- Large construction length sometimes inconvenient

If only limited space is available within the turnout, welded-on stop faces or specific clips are used according to the definition in the layout plan.

The tension clamp is fastened on the ribbed base-plate with T-bolt, double spring washer and nut. At the beginning of the tension, both torsion spring arms rest on the rail foot. When the T-bolt is tightened, the middle bend is lead to the rail foot. The optimal mounting condition is reached when the middle bend is max. 2 mm away from the rail foot. The necessary torque moment is approximately 180 - 200 Nm.

Tension clamps with special functions:
Tension clamps which allow the sliding of turnout components, e.g. rail expansion joints, are designed with less tensioning force. At the moment, a type called "SKL 12B" is available. These tension clamps secure the longitudinal guidance of the components and prevent tilting under the load of the wheel.

Advantages

- Good creep- and torsion resistance for use in the continuously welded track
- Durable elastic clamping
- High tilting stability through middle bend
- Long service life
- Low space requirement

Technical Characteristics

- The tension clamps are supplied with corrosion protection
- For clamp material see chapter 'Materials' and/or commercial offer (spring steel according to manufacturer's specification)
- For design attributes see VOSSLOH brochure

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Quality Inspection

- Test certificate 2.2 according to EN 10204 of the manufacturer

Stock Rail Supports
Inner Stock Rail Fastening "IBAV-VAE"

Description

For the fastening of rails, spring elements are frequently used. For turnouts, slide chairs are mounted on the inside of the stock rails, on which the switches slide. In the area of these slide chairs, conventional spring elements can not be used. This system represents a device for the flexible fastening of stock rails in the slide chair area.

Structure:
The slide chair has a tunnel-shaped recess into which the long plate-like spring element is loosely inserted towards the stock rail. A stop face is welded onto the base-plate and this stop face interacts with the end of the spring elements facing away from the stock rail and secures this spring element even in case of vibrations. Once the spring element is in its final position, a clamping wedge is hammered into a diagonal hole in the slide chair. In this way, the middle part of the spring element is clamped down and the stock rail is flexibly held down. The holding-down force corresponds to the one of a standard spring element.

Mounting:
After the spring element has been placed in the recess, the wedge is hammered into the diagonal hole of the slide chair by blows on the rectangular head. A square shoulder on the wedge limits how far it can be hammered into the hole. With a simple disassembly tool the wedge can be removed again.

Advantages

- Good creep and twist resistance for the use in continuously welded track
- Permanent elastic fastening of the stock rail
- High stability
- Long service life
- Low space requirement
- Maintenance free
- The shape of the elements makes incorrect installation impossible

Technical Characteristics

- Welded construction made from rolled steel

Quality Inspection

- Visual and geometry checks

Fastening of Check Rails
Arrangement of Check Rail 33C1 (UIC54)
Check-Rail Chair in Block Construction

Description

The check rail guides the axles of the vehicles in such a way that they can not enter the wrong flangeway and do not touch the front area of the point of the crossing and damage it. To be able to fulfill its function the check rail is positioned in such a way that the parallel flangeway lies opposite the unguided part of the crossing. It is absolutely necessary that the defined check gauge (the distance between running edge of the crossing and

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guiding edge of the check rail in the parallel flangeway) be complied.

The check rail is made from the rolled profile 33C1 (UIC33), which is machined in the area of the entry and the check end flare. The check-rail chair is made as a stable welded construction (block construction). The fastening of the running rails depends on the specific requirements. The check rail rests on the check-rail chair and is fastened with screws. For a correct adjustment of the check-rail flangeway and the check gauge, shims can be positioned between check-rail chair and check rail. Maximum possible compensation 13 mm.

Advantages

- Easy to mount, check-rail chair with check rail is not directly connected to the running rails
- The check-rail flangeway is easy to adjust and therefore also the check gauge by inserting shims in case of wear
- The worn check rail can be exchanged without manipulation of the running rail

Technical Characteristics

Materials:

- For check rail profile see chapter 'Materials' and/or commercial offer
- Check-rail chair: min. S275, tensile strength of 430 N/mm²

Quality Inspection

- Visual and geometry checks

Wooden Bearers "Oak" (H)

Description

Turnouts, diamond crossings and other layouts can be laid on wooden bearers. The bearers secure the gauge and geometry of the layout and transfer the loads of the railway traffic to the ground, preferably the ballast bed. In addition, they secure the position stability of the layout through their resistance to longitudinal and transverse displacements. Moreover, the excellent elasticity of wood is very compatible with a ballast bed.

Turnout bearers are made from hardwood according to UIC 863 resp. EN 13145. The bearers can be treated as per the "Rüping" method with wood preservative, type WEI C, with a content of Benzo (A) pyrene below 50 ppm. The average absorption quantity of oak bearers is approx. 45 kg/m³.

The processing of bearers takes place under ISO 9001-2000 controlled processes. The bearers are drilled just prior to the fastening of the plates. The diameter and depth of the pocket hole are adjusted to the used coach-screws. This guarantees optimal retaining force and electrical insulation.

VAE is certified to ISO 14000. Therefore, we mainly use wood from sustainably cultivated forests. The used preservation agent emits the lowest possible volatile substances, so-called VOC. Biocide concentration is also minimized with at the same time highest possible protection against dry rot.

Advantages

- Good damping behaviour
- Good compatibility with ballast
- Long service life
- Economical for single piece and small batch production
- Recyclable

Technical Characteristics

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- Oak (Quercus robur, petraea, pubescens): 850 - 900 kg/m³
- Cross section and form according to UIC 863 cl. 2.3.2, see also chapter 'Materials' and/or commercial offer
- Impregnation, see 'Description' and chapter 'Materials' and/or commercial offer
- Braced ends
- Length increments: 0.2 m (or according to agreement)

SAFETY PRECAUTIONS:
As far as the handling of treated bearers and wood is concerned:

- Care must be taken that gloves are used (type/quality generally contained in the safety sheet of the preservation agent).
- When treated bearers are cut or processed in a manner that creates dust, care should be taken that dust-proof protective masks and eye protection (glasses) are worn.
- National regulations concerning the wear of working clothes (a company cleaning service may be required) and possible demands for the storage of civilian and working clothes in separate lockers, etc. are to be observed (there exist no standardised regulations, but the aspect of civil law relating to the passing on of pollutants via clothing must be fully accounted for).

Quality Inspection

- According to UIC 863, for fresh-cut bearers
- According to EN 13145 and Technical Terms of Supply No. TL001 of VAE for bearers finished in the turnout plant

Scope of supply

- switch device
- build up crossing
- check rails
- running and intermediate rails
- all base plates incl. Fastening material
- all wooden sleepers up to the use standard sleepers

The scope of supply does not include

- switch machine
- locking device
- fishplates incl. Bolts

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WAR.05

VAE

VAE BASICS
PRODUCTS
ENGINEERING
QUALITY

LAYOUTS, TURNOUTS AND TURNOUT COMPONENTS
Setting Devices
Electronic Systems
Special Trackworks Components
Intelligent Turnout Systems, Logistics

Vignole
GROOVED RAILS



Grooved Rail Turnouts

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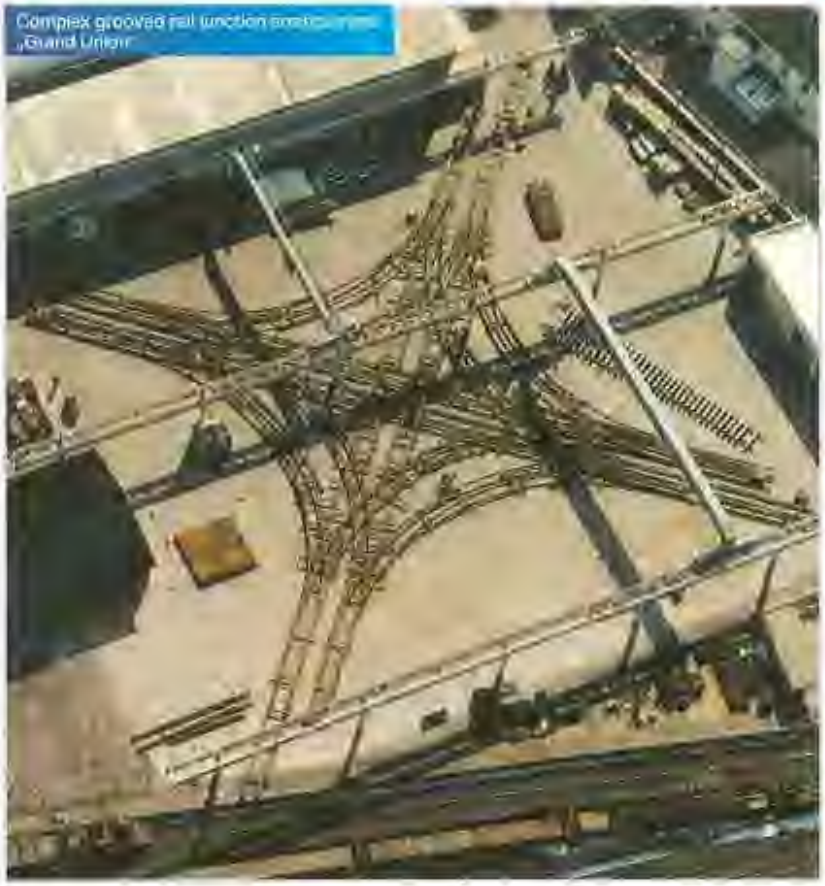
Product Range



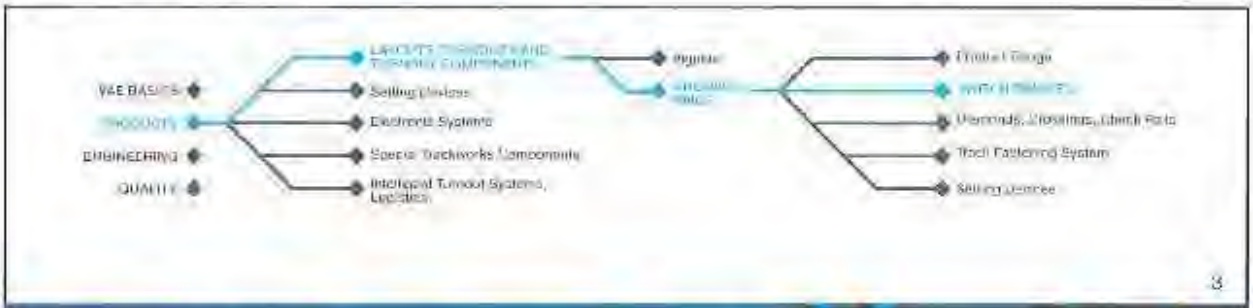
Complex grooved rail junction construction „Grand Union"

Product Range

- Single turnouts
- Similar and contraflexure turnouts
- Equal split turnouts
- Interlaced switch devices
- Diamond crossings
- Single and double slips
- Expansion joints
- Ramp crossing turnouts
- Track panels
- Twin tracks
- Double track junctions
- Fixed hull switches
- Complex layouts
- Switch machines

VAE has vast experience in the design and manufacture of grooved rail turnouts, diamonds and complete layouts as well as switch machines complying to international standards or specific customer requirements. For all applications and required gauges. In addition to standard grooved rail sections we also design for low sections like RI 53.





Grooved rail switch devices

VAE



Grooved rail switch devices for light rail / tram systems consist of two sets, connected by tie rods. Standard geometries have radii of 20, 25, 50, 100 and 150 m. Special designs are also possible.



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4

Grooved rail switch devices

VAE

Low-section flexible switches



Types

flat bed design

Switch section with flash-butt welded grooved rail
Switch section fastened by a wedge

deep bed design

Switch made from an asymmetrical switch section which is not fastened to a continuous sliding plate but is placed on individual sliding chairs
Switch section fastened by a wedge

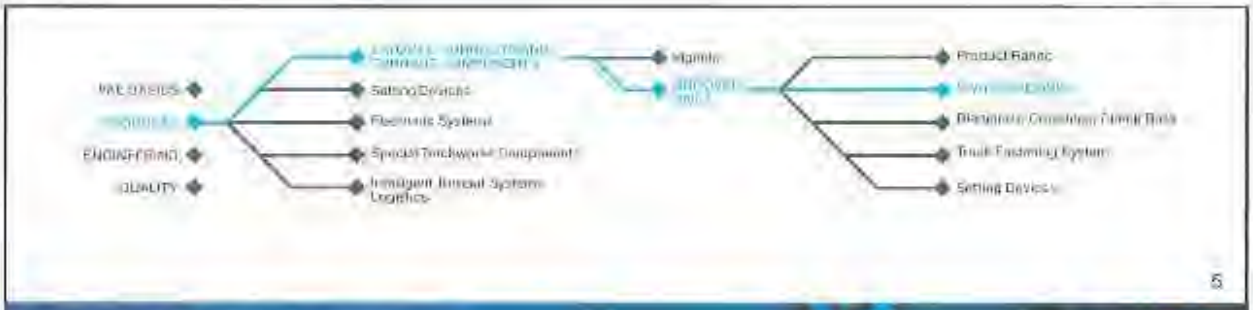
Spring rail switches with wedge fastening



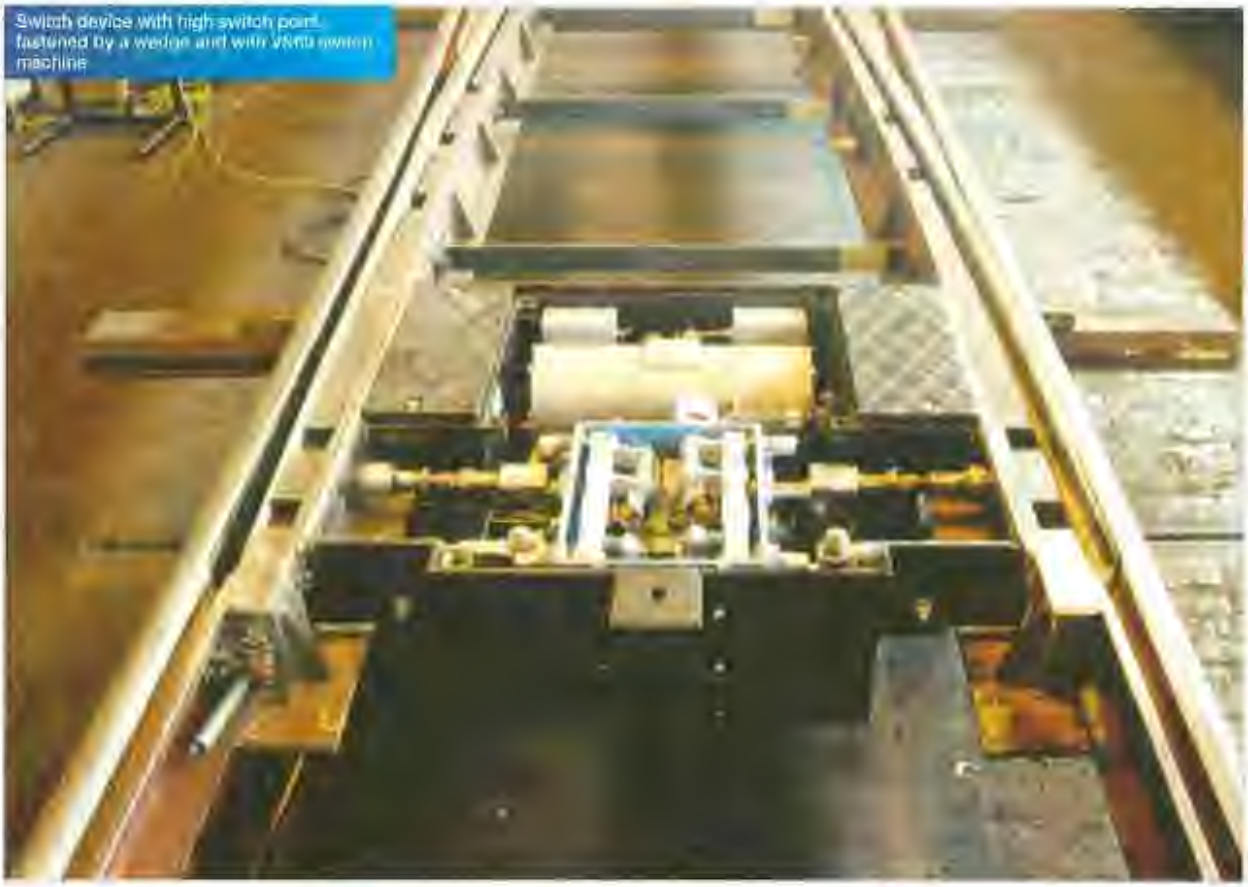
Advantages

Wedge fastening

- [illegible]



Grooved rail switch devices



Switch device with high switch point, fastened by a wedge and with VAE switch machine

Technical characteristics

Material grades of switches

S700 naturally hard (CEN:220) or with hardfacing at the running surface and/or the guiding surface

S900 naturally hard (CEN:260) or heat-treated

High-manganese steel, naturally hard

HSH (Head Special Hardened, CEN:350 HT), HSHM, HSHL

Advantages

Switch devices in deep bed design

- Longer intervals between cleaning are possible due to optimized design with regard to rolling



Diamonds, Crossings, Check Rails



Check Rails

- Depending on the crossing design, the check rails are manufactured either with shallow or deep grooves.
- Special RI 60 VK or VKD 180/105 sections are used with grooved rails RI 60 or RI 59 in case of shallow grooves.
- In case of deep grooves, the UIC33 check-rail profile is used for adjustable check rails and full-head profiles with machined grooves for the non-adjustable version.

Technical characteristics

Material grades of crossing blocks

S800 naturally hard (CEN 220) or with hardfacing on critical areas
S900 naturally hard (CEN 260) or heat-treated
High-manganese steel of natural hardness or explosion-hardened

Material grades of check rails

S800 naturally hard (CEN:220) or with hardfacing on critical areas
or tempered VKD 180/105 also possible

Crossings for grooved rail turnouts for light rail / tram systems with shallow or deep grooves, depending on wheel sets, grooves and crossing angle conditions.

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Diamonds, Crossings, Check Rails





Types

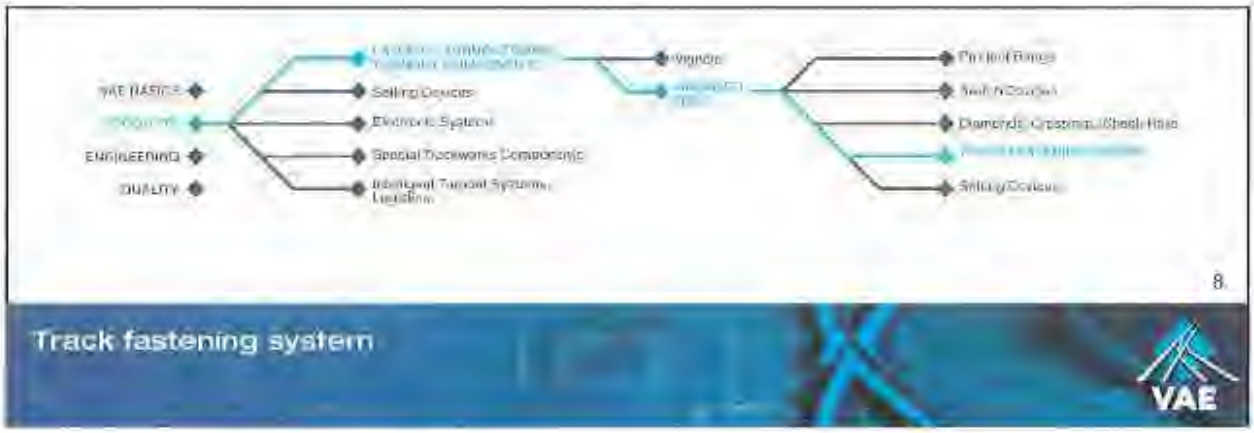
For smaller crossing angles

a forged or rolled block with welded-on full-head rails is used. For crossings subjected to highest loads a design with welded manganese or with a manganese insert is offered.

High-manganese steel is characterized by its excellent resistance against stress typical of crossings.

For larger crossing angles

a design consisting of welded block rails or full-head rails is used.



Track fastening system

In acordance with the specific demand, VAE's grooved rail turnouts are suited for laying on concrete slab with tie rods or for laying on wooden or concrete sleepers.

Turnout – laying in a slab



Grooved rail switch device on concrete sleepers



Grooved rail switch device on wooden sleepers



Grooved rail switch device on concrete slab



Grooved rail switch device on concrete slab



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31st March 2008

Updated Proposal Submission

Edinburgh Tram Network

Section 3: Technical Descriptions

Part 2 – Depot Workshop Equipment

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Depot and Workshop Equipment – Alternative Offer

1 Introduction

1.1 Document Scope

This Document is prepared to provide an introduction in the principles of the Depot Layout proposed at Gogar site for the Edinburgh Tram Network project and the functional relations and dependencies during Depot operation and Maintenance activities for the E&M part.

When BBS Consortium (BBS) is used in this document (or its Annexes), it stands only for the E&M part of the Edinburgh Tram Network."

Furthermore this document describes and defines the preliminary basic scope of maintenance equipment required for the maintenance of BBS scope to be provided for this Project adapted for the initial needs of the system. Deviations to the basic offer and to the Employer's requirements are marked. The indicated alterations will ensure the functionality of the system maintenance as well.

1.1.1 Compliance

This document is prepared to provide compliance with the Invitation to Negotiate (ITN) and the Employer's Requirements regarding Depot facility equipment aspects, as not indicated otherwise, and functional requirements to maintain the system.

2 General

The Depot will be of an economical design which reflects economy of use and maintenance in providing all the functionality required by tie.

The Depot will combine high levels of reliability and performance and will provide the operator and the maintainers with the facilities to operate, service, repair and maintain a completely reliable passenger service.

The Depot (also called Maintenance Facility) includes the following features that have been described in the ITN:

Main maintenance building with the main tram workshop, other workshops, stores, management, administration, operations and maintenance offices and staff welfare facilities (support accommodation) and the control room for the complete Edinburgh Tram Network.

- Car washing section to handle Trams
- Sanding facility with sand container to service Trams
- Stabling area for vehicle fleet

2.1 The Site

The proposed site in Gogar will be assumed as the location for the erection of the depot.

The Depot layout provided with the ITN documents will be the base for the future design works and the technical proposal is based in general on this layout.

Special design requirements, resulting on constraints imposed upon the Depot design by the Civil Aviation Authority due to the proximity of the Emergency Runway of Edinburgh International Airport or on factors and restrictions to be accommodated in the construction of the Depot that will necessitate detailed discussions with the aviation authorities, are not considered yet.

A separate building/area for the preparation works of larger line equipment (rails, catenary equipment etc.) required for corrective maintenance purposes as well as for storage of larger line side maintenance equipment should be considered in the next design steps.

Furthermore design requirements, resulting on the final tram car design have to be evaluated in the future design stages and the layout has to be adapted accordingly.

2.2 Access

Road access from the A8 Gogar roundabout link road will provide both entry for normal Depot operations traffic and also for delivery and egress of trams up to nominal 43,6 m in length with the minimum of impact on other facilities.

2.3 Maintenance Facility Equipment

The maintenance facility equipment is state of the art facility equipment with regards to industrial building design as well as the most current technology and equipment for maintenance and repair systems for E&M part and cleaning, wheel re-profiling, sand filling and lifting of Tram Cars featured by:

- energy performance/efficiency/conservation for materials and equipment
- water quantity and sewage treatment
- quality controls
- minimizing environmental impacts
- general environmental protection

3 Maintenance Facilities – Conceptual Design Overview

3.1 General

The configuration of the depot and the equipments contained therein will minimise disturbance to neighbors.

The Depot will be secure and be provided with security systems as appropriate.

3.2 Description and Location of Facilities

The depot has to fulfill the following main functions:

- Inspection and Maintenance of Trams
- Stabling of Trams
- Shunting of Trams
- Cleaning of Trams
- Testing of Vehicles after repair and major overhauls during a re-commissioning
- Inspection and Maintenance of Railway Electrification system
- Inspection and Maintenance of Communication system
- Inspection and Maintenance of Signalling and Controlling system
- Inspection and Maintenance of Trackwork
- Inspection and Maintenance of Infrastructure

To assure the reliability and availability of equipment, the depot as well as the workshop is designed and equipped to meet the maintenance requirements of rolling stock and the other systems.

The maintenance facility design shall incorporate special tools and equipment required to consistently achieve the required preventive and corrective maintenance tasks within the cycle times required to meet the fleet availability for service.

The basic preconditions for this design are:

- the rolling stock maintenance requirements and technical details
- the system maintenance concept
- the system design
- the system emergency concept
- the system safety concept

3.2.1 Maintenance Yard & Facilities

The general arrangements for Maintenance Yard and Facilities are given in the corresponding layout ULE90130-06-DEP-00001, Rev.6. The area will readily accommodate the initial fleet of 27 Tram cars.

The Yard area is arranged in such a way that the Trams when entering and leaving the Yard will be able to do so over the two inbound and outbound tracks connected with the mainline.

For the future phase the stabling has to be built according drawing to stable in total 36 Tram cars.

This arrangement provides maximal flexibility for shunting operation and minimizes delays while putting the Trams in and out operation on the main track.

The take in and take out of Trams to/from the Yard will be arranged by switch-combinations from the main track, so that every Tram at any time in each direction can enter or leave the Yard without blocking the operation on the main track.

All Trams, which leave the line (first priority), will be controlled from this point by the Depot Controller.

All Trams will enter via the inbound tracks for entering the different locations according to the operating and maintenance requirements. The Depot controller will distribute the Trams to the stabling yard or passing the stabling yard to the tracks for inspection and light maintenance, heavy maintenance, washing and internal cleaning/sanding.

The exit of the Yard is given via the Yard lead track from the stabling area, from the washing plant and from the inspection and maintenance tracks.

The maintenance yard and facilities will be designed to provide sufficient storage space for the initial Tram fleet of 27 43,6m-tram cars, and a planned extension possibility to 36 tram cars. In addition, the yard will have a maintenance building to maintain both the Tram fleet and wayside equipment. Accordingly the yard and facilities will be built for:

- Servicing and maintaining the fleet of 27 Trams. (initial phase)
- Stabling for up to 27 Trams
- Two inbound and two outbound to the mainline for the Tram fleet
- Storage yard, maintenance building, washing plant, sanding facility, underfloor wheel lathe
- Access roads, guard house, parking area for 150 cars (automobiles) and with provisions for expansion of the parking areas to accommodate the future expanded system
- Fencing, paved walkways and gate.

3.2.2 Workshop Area

- The wash plant will be located inside a shelter (track 4) limiting the inside operating conditions to a minimum temperature of 0°C, allowing the equipment to operate effectively even when the ambient outside temperatures reaches temperature conditions of minus 5°C. The facility will

be provided with suitable devices to remove excess moisture from the washed vehicles.

- The Wheel Lathe track (track 3) with a length of approx. two Tram cars (2 working positions), a central position for the Wheel Lath and on one working position equipped with a Gantry structures for access to the tram roof area from both sides and with middle- and side pits. The other working position of this track is designed as a floor leveled area. The track will be equipped with traction power interlocked with lathe operation.

- Maintenance track A, (track 2), (through tracks with each 2 working positions) with a Gantry structures for access to the tram roof area from both sides and with middle- and side pits on one working position and a tram car lifting system on the other working position. A bridge crane of 6.3 t capacity covers this area.

- Maintenance track B (track 1) with middle pits on one working position. A bridge crane of 6.3 t capacity covers this area. On this track also painting preparation and painting of Trams can be performed.

- Shops for auxiliary works and storage area

- Areas for technical system components, administration, social and staff welfare facilities

3.2.3 Yard Area

- Infrastructure Maintenance/Auxiliary Vehicle Area and open storage area (Track 7 and 20)

- Stabling Tracks, Initial (Track 8 to 14) with future extension (track 15 and 16). Between the stabling roads, access paths alternately 1m and 2m wide with service points to provide facilities for Tram cleaning and minor maintenance on the 2m width will be arranged.

- Depot lead track (access and test) (Track 1)

- Boundary Fence;

- Lighting External;

- Storage External;

- Road Access;

- Parking

- Fire Emergency Access;

- Lorry turning space; and

- Lorry access to skip for wheel lathe swarf, for sand delivery etc.

3.2.4 Maintenance Administration Building

- Office entrance vestibule
- Drivers reception area and dispatch
- Control Room, Equipment Room
- Offices, training room, meeting room and workstations
- Staff welfare facilities
- Technical rooms

The above mentioned areas will be arranged in order to guarantee an optimum operation of the depot without any obstructions. The track layout will be adapted in accordance with the maintenance throughput rate during off peak and night operations.

Access to the depot area and to the workshops for on-road vehicles are ensured by roads. Material for the workshop area can be provided by trucks and access for emergency cases is given.

3.2.5 Maintenance Tracks

The workshop is designed for inspections, heavy and light maintenance and repair works, exchange of larger components and for complete overhauls also on the roof area of Trams.

Tracks 3a and 2a are designed with central pit and with side pits plus roof working platform.

Track 2b designed for lifting of LRVs and changing of bogies.

Track 1a (with central pit) designed for lifting of LRVs and changing of bogies by mobile lifting jacks (option, not part of the scope).

Dismantled bogies from the vehicles shall be moved directly to the enclosed bogie repair area first by crane and then over rail.

An overhead crane 6.3 t for heavy transport work e.g. bogies, A/C units, containers etc. covers the area of track 1 and track 2.

3.2.6 Underfloor Wheel Lathe (UWL) track

The performance range of the wheel lathe is to check of the wheel profiles and the re-profiling of these wheels with a minimum waste of material to reach the recommended tolerances of wheel diameters within the reference values.

The under floor wheel lathe is positioned in a central position on track 3.

An additional mobile crane or jib crane 2 t for heavy transport work of axles and machine components shall be used.

Track section 3a is designed with central pit and with side pits plus roof working platform equipped with OCL interlocking and safety barriers.

For safety reasons a mechanical interlocking system between platform and OCL will ensure that when the OCL is under voltage the platform is not accessible, only when the OCL voltage is turned off will access to the platform be permitted.

Track section 3b is designed as a floor levelled track.

Track 3 can be used for Inspection and Light Maintenance tasks when the UWL is not used.

3.2.7 Painting and Painting Preparation

Painting and Painting Preparation can be done either on track 1b or on track 3b.

3.2.8 Sanding and Exterior Washing Facility Area

This track will be used for washing the exterior of the Trams.

Therefore this place is designed as a washing hall and equipped with a drive-through washing plant. The washing hall is constructed in the length of approx. one vehicle.

The train washing facility consists of washing brushes and detergent archs at fixed locations and with blow –down dryer. For front and rear washing a special brush unit will be provided. Front and rear washing can be only performed when the tram is stopped at a predefined position. Washing mode can be selected with or without front and rear washing.

A water treatment plant for recycling of the wash water and water tanks will be provided. The recycled water can be re-used during following washing processes.

The Trams will drive through the washing facility by their own power.

Closed to the entrance of the washing hall (outside) a drained Tram Wash Apron will be provided to clean the bogies by means of a moveable high pressure cleaner (Tramco scope).

Furthermore this track will be used for sanding of trains. Therefore a Tram sanding system shall be provided on this track. Near the sanding track a sand storage silo shall be provided (Tramco scope).

3.2.9 Workshops for Auxiliary Works

These workshops will be provided for maintenance, repair and inspection of components of the trains and infrastructure and will be located within the workshop adjacent to track 1.

The following areas will be foreseen:

- Infrastructure Workshop

- Dirty Workshop
- Clean Workshop
- Battery Room
- Equipment & Communications Room

The shops will be equipped with facilities and machines necessary to perform the maintenance works specified.

Equipment such as forklifts will be used for transportation purposes within the depot area.

Storage areas will be:

- Storage for heavy parts
- Storage for small parts
- Rolling Stock material
- Consumables/Spares

3.2.10 Areas for Special Functions

In the depot and workshop area technical rooms for building and services will be provided.

These rooms are mainly arranged within the maintenance/operation administration area of the building but depending on the required size and technical requirements to be covered, it is possible that a provision of separate technical buildings will become necessary.

3.2.11 Infrastructure Maintenance/Service Vehicle Area

This area of the maintenance building will be used for stabling of service vehicles and infrastructure components and is designed with a terminating track.

3.3 Preliminary Schedule of the Maintenance Equipment.

3.3.1 Subsystem Description

The following section describes the sub-system Depot and Workshop Equipment.

The scope of works will comprise the engineering, co-ordination, preparation of layout's, testing at factory, supply of materials and transportation to site, documentation, installation, commissioning and training of the equipment specified for the maintenance services.

Special tools and equipment solely dedicated for preventive and corrective maintenance works on single tram components should be provided within the Tramco supply. The initial spare part stock for the first years of operation as well as the special tools required for the BBS scope of supply and not contemplated in the employer's requirements are to be considered in the maintenance scope.

This subsystem is based on the following guidelines:

- Best and most efficient maintenance practice
- Reduction of the running costs
- Lower investment for maintenance and the required equipment
- Reduction of maintenance manpower capacity

The concept is, that all of the maintenance work, which can reasonably be subcontracted will be outsourced under a maintenance contract.

The remaining works will be done by Maintenance Company to be established for the LRT System.

All maintenance activities will be described in the maintenance concept. The workshop building is integrated in the depot and adapted to the requirements of the operational and maintenance concept. The main purpose of the workshop is to service, maintain and repair the components of the rolling stock system and the system components.

Therefore the indication of the rolling stock maintenance requirements and technical details are an essential part for all design activities regarding layout and arrangements within the depot area.

These works includes:

Type of Maintenance and Repair Works	
Type of Maintenance	**Works**
Preventive Maintenance	regular service routine inspection scheduled preventive maintenance overhaul works
Corrective Maintenance	trouble shooting non-scheduled maintenance

Type of Maintenance and Repair Works	
Type of Maintenance	**Works**
Repair	trouble shooting non-scheduled maintenance component repair

3.3.2 Codes and Standards

3.3.2.1 General

The design, implementation and operation of the works will be in accordance with the functional and performance standards and limits specified in this document.

The following standards and regulations will be used:

- ISO International Organization for Standardisation
- IEC International Electromechanical Commission
- UIC International Union of Railway
- EN European Standards
- GS Predicate for trailed Safety
- UVV German Law for the Safety of Devices and the German Regulations for Accident Prevention and Storage of Dangerous Goods
- VDE Verband deutscher Elektrotechniker (Association of German Electrical Technicians)
- VDV Verband Deutscher Verkehrsbetriebe (Association of German Transport Services)
- DIN (Deutsche Industrienorm – German Industry Norm)

  Local specific requirements, practical and efficient will be observed

3.3.2.2 Reference List

The following list gives a reference about used standards for essential equipment.

Underfloor wheel lathe

- Machine 98/37/CE

- Low Voltage electrical equipment 72/23/CEE, EN 60204-1
- Electro-magnetic compatibility 89/336/CEE
- Safety specification CEE 89/342
- Noise level CEE 86/188m
- Pressurized equipment 97/23/CE

Overhead Cranes

- BS, FEM Section IX
- AWS D14.1 Code for Welding
- DIN 18800,Page 7 Construction for Quality of Welding
- DIN 15018, Page 2 Crane design and construction
- DIN 8563, Page 3 welding classes standards
- DIN 15401 Single Hooks
- DIN 15404 Certification of Hooks
- IEC 60204-32
- VDE 0113
- VDE 0100
- IEC Recommendations 24-1, 34-5 and 72-1
- Motor selection on Swedish norm IKH 6.30.01
- All motors are approved by the CSA
- ISO/DIS 6336/II-6336/V (DIN 51150)

Electronic Equipment

- DIN EN 61010 Safety regulations for electrical measuring, control and Laboratory devices
- VDE 0100 Erection of power installations with rated voltages below 1000 V
- VDE 0700-1 Safety of electrical devices
- UVV VBG-4 Protection regulations for accidents, Electrical plants

Washing Plant

- DIN 24446 Security of machines and vehicle washing plants
- Safety regulations for vehicle washing plants from Central Organization of Employer's liability insurance, Ref.-No. ZH 1/543.
- Guidelines for spraying equipment from Central Organization of Employer's liability insurance, Ref.-No. ZH 1/406.
- EC-machine guidelines dated June 14, 1989 (89/392 EWG) - 9th decree to equipment security regulation; EC-guideline for Electromagnetic pollution control dated May 03,1989 (89/336/EWG), EC-guideline for Low voltage control dated February, 19 1973 and July 22, 1993 (93/68/EWG)
- Actual guidelines for accident protection
- Guidelines of the Deutsche Bahn AG (German Federal Railway) including internal regulations of the DB AG

Service Vehicles

- EN 60529 Protection class
- ISO 3864-1 Graphic symbols
- UIC 505-1 Railway vehicles-gauges
- UIC 510-2 Roller profile for railway vehicles
- UIC 533 Earthing of metallic parts
- DIN 20021-2 High pressure hoses
- DIN EN 6700 Welding of railway vehicles
- EN 50121-3-2 Electromagnetic compatibility/rail application
- 98/37 EG EC-directive for declaration of conformity of machines
- EURO III European emissions standards
- EU reg. 79/157/EU incl. 96/29/EU European regulation for exterior noise dampening
- EU reg. ECE-29 European regulation for cabin construction
- EG 94/20 European prescription for trailer couplers
- VDE 0879, part 1 and 2, DIN EN 55012 Regulations for electronic emissions for vehicles

3.3.3 Machines, Tools and Equipment

The functional areas as well as the auxiliary areas will be equipped with facilities and machines necessary for the maintenance and repair of the Trams and system components.

3.3.3.1 Bill of Quantity BBS

The following list gives an overview about the maintenance facility equipment supplied under BBS contract.

	Description	Required / Provided Qty	Comments
1	Set of Measuring Tools for Trackwork (hand tools)	1	Track Measurement Equipment (ER pos. 9.5)
2	Set of Catenary Tools	1	Stagger gauge, Stray current Tester (ER pos. 8.2)
3	Bridge Crane, 63 kN Maintenance Area	1	Workshop Crane (ER pos.2.4)
4	Tram lifting system	1	(ER pos.2.2)
5	Set of Lifting Attachment for the E&M part	1	Craneage (ER pos.2.12 / 2.13)
6	Set of general Lifting Attachment for the E&M part	1	Craneage (ER pos. 2.12 / 2.13)
7	Drive through Tram Washing Plant with fix mounted brushes	1	• Spray Bay to be within a shelter • Be complete with end wash facilities • To be suitable for operation at zero degrees centigrade and above (ER pos.1.4)
8	Ultrasonic cleaning bath for the E&M part	1	Parts washer (ER pos.1.6)
9	Fixed high-level Access Platforms	2	To access tram roof and pantograph with end gates for tram length (ER pos.2.3)
10	Shelving Pallet System	1	Stores, Shelving (ER pos.3.1)
11	Shelving Two Tier System	1	Shelving (ER pos.3.4)
12	Tool Distribution	1	Shelving (ER pos.3.4)
13	Set of Work Benches	1	Depot Furnishing (ER pos.3.5)
14	Set of workshop stools	1	Depot Furnishing (ER pos.3.6)
15	Set of special Racks (e.g. for door, window, AC-unit)	1	Shelving (ER pos.3.4)
16	Security Storage Cupboard	2	COSHH cupboard (ER pos.3.7)
17	Set of Ladders	1	Infrastructure tools (ER pos.5.1)
18	Set of Steel cabinet wardrobe, lockable	1	Cupboards (ER pos.3.6)

	Description	Required / Provided Qty	Comments
19	Demountable conductor wire maintenance man basket (>=2 man) for Road/Rail vehicle	1	(ER pos.10.1)
20	Road/Rail,, self-propelled two way vehicle with crane 6t and platform for approx. 6 t payload	1	Road/Rail type (ER pos.10.1) Able to transport the re-railing equipment mentioned below; Alternative reduced payload
	Remark: Snow plough and winch attachable to the above mentioned vehicle included.		
21	Rail groove cleaning equipment	1	Vacuum cleaner mountable on Road/Rail vehicle as defined under No 20 (ER pos.1.5)
22	Rail/road trailer incl. OLE siccors working platform	1	Road/rail trailer (ER pos.10.3)
23	Mini Bus	0	Other road vehicles (ER pos.10.,2)
24	Pick-up	1	Other road vehicles (ER pos.10.,2), not required for maintenance. Operator demands not considered
25	Fork lift truck, 30 kN	1	Fork lift truck (ER pos.2.9)
26	Set hand guided mobile transport equipment for the E&M part	1	Pallet truck + Hand trolleys (ER pos.2.10 / 2.11)
27	Set waste container for the E&M part	1	
28	Underfloor Wheel Lathe with swarf removal	1	UWL (ER pos.4.3)
29	Power Hacksaw	1	Machine tools (ER pos.4.5)
30	Hydraulic Press	1	Machine tools (ER pos.4.5)
31	Double Ended Grinding Machine	1	Machine tools (ER pos.4.5)
32	Column Drilling Machine, 30 mm with bits	1	Machine tools (ER pos.4.5)
33	Turning Machine, 1000 mm	1	Machine tools (ER pos.4.5)
34	Tools for Fibre glass work	1	Machine tools (ER pos.4.5)
35	Sheet Metal Bending Machine	1	Machine tools (ER pos.4.5)
36	Hand Lever Shear	1	Machine tools (ER pos.4.5)
37	Set of Trackwork Tools (Hand Tools)	1	Small tools (ER pos.9.2 – 9.4)

	Description	Required / Provided Qty	Comments
38	Rail Grinding Equipment	1	Mobile Rail Grinding equipment (E'sR pos.9.1)
39	Set of Portable Electrical tools for the E&M part	1	Hand & Mobile tools (ER pos.5.1 – 5.2)
40	Set of Portable Compressed Air Tools for the E&M part	1	Hand & Mobile tools (ER pos.5.1 – 5.2)
41	Set of Mechanical Tools for the E&M part	1	Hand & Mobile tools (ER pos.5.1 – 5.2)
42	Set of electrical Tool for the E&M part	1	Hand & Mobile tools (ER pos.5.1 – 5.2)
43	Set of Tool Trolley for the E&M part	1	Hand & Mobile tools (ER pos.5.1 – 5.2)
44	OA welding equipment (autogenously)	1	Ferrous welding equipment (ER pos.6.1)
45	Electr. Welding	1	Ferrous welding equipment (ER pos.6.1)
46	Arc Welding kit	1	Ferrous welding equipment (ER pos.6.1)
47	MIG Welder	1	Aluminium welding equipment (ER pos.6.2)
48	Fume extractor, portable	1	Welding equipment (ER pos.6.1 / 6.2)
49	Welding Table	1	Welding equipment (ER pos.6.1 / 6.2)
50	Set of Welding Screens	1	Welding equipment (ER's pos.6.1 / 6.2)
51	Set of standard welding accessories	1	Welding equipment (ER pos.6.1 / 6.2)
52	Set of lighting equipment	1	Temporary Lighting stands / equipment (ER pos 9.4)
53	Mobile Generators	1	Generator (E'sR pos 9.4)
54	Set of safety equipment for the E&M part	1	Hand & Mobile tools (ER pos.5.1 – 5.2)
55	Pressure washer	1	ER 1.3

Table 1: Depot and Workshop Maintenance Equipment supplied under BBS contract

3.4 Draft Specification of major Workshop Equipment

3.4.1 Compressed Air System

The compressed air system consists of compressor plant , a piping system and the connection points at the workshop. The general pressure provided will be 7,5 bar.

To reduce the noise level the compressor is located in a separate compressor room at the workshop.

3.4.2 Vehicle Lifting System

The fixed Vehicle Lifting System is located at track 2 b of the Workshop Building.

It will be used for lifting one tram vehicle consisting of 4 bogies for maintenance- and repair works as well revision and overhaul.

After positioning of the vehicle on the track, the operator starts the lifting process with the 4 platforms. For safety reasons flashing lights will be installed on both sides of the track. These are for indicating the lifting sequence.

The lifting height has been chosen with a maximum of 1,6 m ToR to get mainly upright working positions on the tram vehicle. If the vehicle is at the preferred height, the car body supports can be positioned manually.

To change one bogie each platform can be operated separately.

This bogie can be pushed out by hand on track below the lifted vehicle.

A new bogie can be moved from the Bogie Repair area to the respective position in the same way.

After assembling the vehicle will be lowered to the floor and can drive out of the workshop.

The drive system of each lifting platform is mounted in an under floor pit to provide a floor leveled lifting system. The platforms will be operated via central control board and monitored by means of a PLC to assure a synchronous lifting of the tram.

The system is designed to deal with a load of 15 ton per platform or a fully functional, unladen tram vehicle with a load of 60t (AW01).



Example

3.4.3 Tram Washing Plant

The Tram Washing Plant is located at track 4 b with its main parts washing hall incl. drainage, control room and sump tank.

The washing plant is a single direction water / detergent system for automatic washing of the sides of single trams and the also for washing of the driver cab ends.

The principle design is a drive-through washing plant with fixed installed detergent and water spraying arches and rotating application brushes. The tram drives by its one power through the plant.

The train washing plant will be capable of allowing trains to pass through the plant in either direction without the washing sequence taking place at the full 'restricted manual' operating speed.

To avoid wetting of under frame equipment, no water or chemical solution will be sprayed below the lower edge of the car body.

The brushes will be arranged for easy replacement, preferably in sectional units, such that should one section be subject to more wear than another, the whole brush does not need to be discarded.

Washing plant operation will stop automatically after a pre-set time-delay if trains remain stationary within the plant.

A water recirculation and recycling system will be provided to minimise the water consumption. Water from the washing process and the rinsing process will be collected in underground sumps, recycled and re-used for pre-wet and other appropriate functions.

Facilities for manual rinsing will be provided if necessary, to avoid damage to train bodies from the applied cleaning chemical, in the event of a power failure.

The train washer shall be equipped with a water recycle system which shall neutralize, remove solids and filter the water automatically. The PH level of the processed water and all effluent discharge to the sanitary sewer will be monitored.

The effluent to the sanitary sewer shall also be processed through an oil water separator.

The train washing plant will allow for different wash modes and the equipment provided will comprise the following main components:

- One (1) pair pre wet spraying stands
- One (1) pair detergent application brushes for sides
- One (1) pair water wash brushes for sides
- One (1) swivel brush for Tram front/rear washing
- One (1) pair final rinse stands
- Pre-wet pump and detergent solution / water wash pump
- Detergent metering pump
- Rinse pump
- Storage tanks
- Water reclamation system
- Driver indication entry lights
- Auto start up / shut down system
- Electrical control panel

The equipment supply will include system installation details including foundation, water supply, drainage and entry light requirements.

TECHNICAL DATA

LRV speed through wash plant	max. 3km/h
Number of vertical (side) brushes	4
Number of front/rear brushes	2
Water tank Capacity	approx.2000 litre
Wash plant Overall Size	50000 mm long X 8000 mm wide (through brush section)
Maximum Height	approx. 6000 mm (to top of rail)
Pump House Size	approx. 7000 mm X 5000 mm
Electrical Supply	400 Volts, 3 phase, 50 Hz
Water supply	approx. 4 bar max.

The complete system will be controlled via PLC.

The bogies can be cleaned at the tram wash apron outside of the washing hall by high pressure cleaner.

3.4.4 Underfloor Wheel Lathe

The Underfloor Wheel Lathe used to re-profile the wheels of the tram is situated at track 3 b in pit with rails running on top.

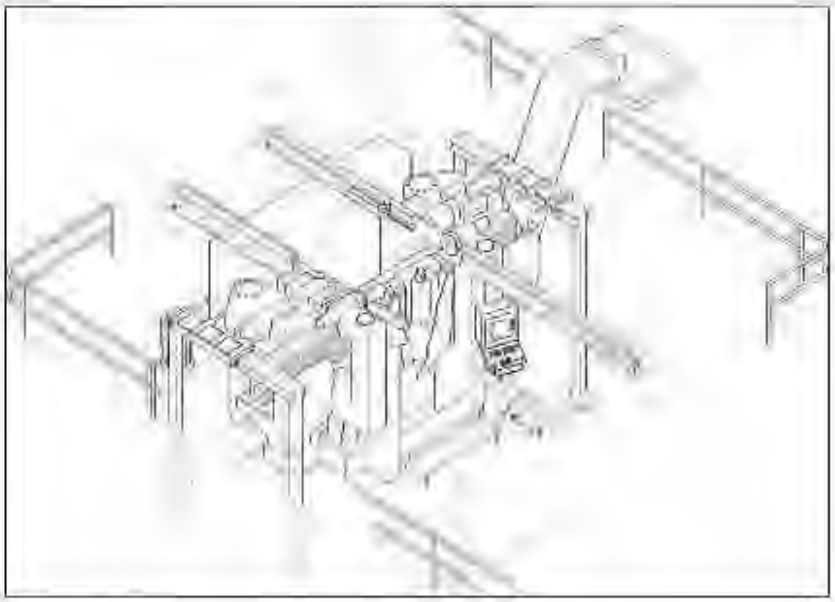
An Overhead line above the track provides the power to move the tram in and out themselves. During the re-profiling process of the wheels the tram will be moved by means of an electrical shunting vehicle to achieve the accurate positioning of the tram.

Once the tram is proper positioned above the machine the wheel will be support the rail removed and the axle or bogie clamped. After the wheel is measured the turning process starts to re-profile the wheel (one axle will machined at once). The whole process will be controlled via a special Numeric Control with integrated PLC.

The main parts of the machine are:

- moveable rails with connection to the standard rails used in the workshop
- machine with drive wheels, cutting tools, control, measuring unit etc.
- Downholder, to clamp the axle during cutting
- Chip container incl. conveyer

Principle sketch of a lathe on pit:



3.4.5 Rail Road Conductor Wire Vehicle with crane

The Conductor Wire vehicle will be a two ways rail /road vehicle based on a standard road truck e.g. Mercedes Benz Unimog U 400. This truck can carry up to 3 persons at the cabin during work on road and rail.

In addition to the standard truck this vehicle will equipped with:

1. Rail guiding system

Track guiding wheels fixed on swivel arms

The swivel arms are moved by hydraulic piston, controlled from the cabin

Hydraulic and mechanical lock of track guiding axles during road mode

Steering lock during rail mode

2. Crane and platform

Hydraulic crane type is fitted at the rear end

The crane is of at least 6 m/t class and has got a hydraulic reach of approx. 4 m

4 outriggers providing the required stability during crane works.

Furthermore a loading platform to transport equipment will be provided with the admissible payload given by the basic vehicle design.

3. Demountable conductor wire maintenance basket

To do the installation and maintenance works for the Overhead line

Able to carry the load of 2 persons.

The turning and lifting function can be operated from the platform.

BILFINGER BERGER Civil

SIEMENS

31st March 2008 Submission

Edinburgh Tram Network

Section 3: Technical Descriptions

Part 3 – Railway Electrification

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1 Railway Electrification

When BBS or BBS Consortium is used in this document (or its Annexes), it stands only for the E&M part of the Edinburgh Tram Network. All information regarding phase 1b) (Russel Road Junction to Granton Square) within this document are for information, only. This current proposal is for phase 1a), which is the tram line from Edinburgh Airport via Russel Road Junction to Newhaven. As far as design considerations are concerned, phase 1b) operation was also taken into account that phase 1a) can be considered as stand alone. As far as OLE extension is concerned, at the connections between phase 1a) and future extension to phase 1b), regarding poles of phase 1a) will be considered as appropriate to be able the attach phase 1b) without the need of replacing (as far as pole function and static is concerned). No further extension to phase 1b) is needed for phase 1a), since OLE of phase 1b) can be attached to phase 1a) within in couple of night shifts where no operation of phase 1a) can be allowed. Phase 1b)-poles closest to phase 1a) are estimated to be at least 10m from phase 1a). Therefore, to make pole foundations for these poles later on, when phase 1a) is already finished, should not be an issue.

1.1 Introduction

This document describes the technical system parameter, solutions proposed as well as the scope and services for design, manufacturing, installation, commissioning, documentation, operation and maintenance training and trial run for the railway electrification system (REL) composed of the intergrated systems traction power supply (TPS) and overhead line equipment (OLE).

1.2 Referenced documents:

[1]	"Employer's Requirements", document number PRO-INFRACO-1399; Rev. 4, In particular Part 31 for OLE and Part 30 for TPS
[2]	"System Wide – Section 1, 2 and 3; 750V DC Power; Feeding and Sectioning Diagram (8 sheets)"; document number ULE90130-SW-OLE-00007, Rev. 3
[3]	"System Wide – Electrification Demarcation Diagram", document number ULE90130-SW-OLE-00010; Rev. 2
[4]	Invitation to Negotiate ("ITN") for the Procurement of the Infraco for the Edinburgh Tram Network – Information Release – Infraco ITN and Appendices – 30 March 2007
[5]	"Edinburgh Tram – Tram Technical Information Submitted Data" "UKPB1-#52162-v9-Tram_Technical_Information.DOC; received 2007-11-28
[6]	Note on OLE clearances dec07 v03.doc; received 2007-12-13
[7]	refer to appendix 8.3.11

1.3 System Outline

1.3.1 Operational Concept

The proposed REL system will be capable to work with operational scenarios described in [4], which can be summarized as follows:

1. Scenario:

8 TPH Airport to Ocean Terminal + 8 TPH Haymarket to Newhaven

2. Scenario:

10 TPH Airport to Ocean Terminal + 5 TPH Haymarket to Newhaven

In both scenarios Haymarket could also be replaced by Granton Square (supposed phase 1b (= Sections C + D, from Haymarket to Granton Square) is also put in operation).

An additional 50% increase of the number of trams per hour travelling on the Edinburgh tram network can be handled by the REL system in peak hours for 2 hours time. This would lead in the most frequented sections to up to 24 TPH (this equals a calculated average headway of only 2.5 min, which can be considered as very little for a LRT system). For more details, refer to revised traction study (8.3.1).

1.3.2 Vehicle and other traction simulation input data

Systemengineering work performed for this proposal is based on input data provided by tie . Compared to information provided with tender documents, these data were updated and completed by tie (e.g. vehicle data, topografical data, speed limits).For details on input data used for simulation refer to attached "Network calculation with train simulation", appendix 8.3.1.

Different input data may lead to different requirements for the REL system or parts of it (e.g. traction transformer power ratings, cable cross sections). Siemens also assumes, that the vehicle can meet the required timetable with the overhead voltage shown in simuation results (e.g. minimum overhead line voltage for worst case scenario: (8+8)TPH+50% plus substation outage is given in appendix 8.3.1). In case the used input data changes, the network calculation needs to be redone. With the outcomes it can be determined, if a modified REL system needs to be offered by Siemens.

1.3.3 Environmental Conditions

Altitude	
Height above sea level	0-200 m
Temperature and Humidity	
Absolute Maximum Temperature outside	43 °C
Absolute Minimum Temperature outside	-13 °C
Maximum average daily temperature outside	18 °C
Minimum average daily temperature outside	1 °C
Relative humidity outside	75 % - 84 %
Maximum long term temperature indoor	30°C

Maximum peak temperature indoor	40°C
Wind	
Mean wind speed	4.6 m/s
Maximum speed	19.5 m/s
Design wind speed (exposed route)	40 m/s
Design wind speed (normal route)	30 m/s
Rainfall	
Average monthly precipitation	39 mm – 83 mm
Wet days per month (> 0.1 mm)	14 - 18
Wet days per year (> 0.1 mm)	191

1.4 Scope of Supply

At this stage of the project, system defining information, like ratings, cable cross sections, number of cables in parallel, conductor material, components used, etc. may be subject to change, although they do reflect the current status of design activities and the general concept offered will remain unchanged. The functional parameters given in [1] and specified in this document will be met by the system offered. Further design optimization is one goal of the detailed design phase, which will be performed in an early phase of project execution.

1.5 Standards Compliance

In general the REL system follows European Standards currently valid, which in many cases, have also been issued as BS EN standards in the last years.

EN 50128 and EN 50129 are not valid for REL system and cannot be used for REL system. European Standard EN 50126[1] will be followed for REL as far as RAMS is concerned.

1.5.1 Standards for Overhead Line Equipment System

Standard	Title
DIN EN 50119 Draft (07.06) EN 500119 (01.06)	Railway Applications – Fixed Installations – Electric Traction Overhead Contact Lines
DIN EN 50122-1 (12.97) EN 50122-1 (06.97)	Railway Applications – Fixed Installations; Part 1: Protective Provisions Relating to Electrical Safety and

[1] Specification and Demonstration of Reliability, Availability, Maintainability and Safety for Railway Applications, September 1999

	Earthing
DIN EN 50124-1 (04.06) EN 50124-1 (03.01) +A1 +A2	Railway Applications – Insulation Co-ordination; Part 1: Basic Requirements; Clear-ances and Creepage Distances for All Electrical and Electronic Equipment
DIN EN 50149 (10.01) EN 50149 (03.01)	Railway Applications – Fixed Installations – Electric Traction; Copper and Copper Alloy Grooved Contact Wires
DIN EN 50152-1 (07.98) New Draft (08.06) EN 50152-1 (06.97) Draft (03.06)	Railway Applications – Fixed Installations – Particular Requirements for AC Switch-gears
DIN EN 50152-2 (03.98) New Draft (08.06) EN 50152-2 (06.97) Draft (08.06)	Railway Applications – Fixed Installations – Particular Requirements for AC Switch-gears; Part 2: Single-Phase Disconnectors, Earthing Switches and Switches with Um > 1 kV
DIN EN 50163 (05.9) EN 50163 (11.04)	Railway Applications – Supply Voltages of Traction Systems
DIN EN 60383-1 (05.97) (DIN VDE 0446 T1) EN 60383-1 (11.96) +A11 (10.99)	Insulators for Overhead Lines with a Nominal Voltage Above 1 kV; Part 1: Ceramic or Glass Insulator Units for AC Systems; Definitions, Test Methods and Acceptance Criteria. Note: also applies to insulators in DC contact lines.
DIN EN 60865-1 (11.94) EN 60865-1 (12.93)	Short-Circuit Currents – Calculation of Effects; Part 1: Definitions and Calculation Methods
DIN EN 50122-1:1997-12-01	Railway Applications; Special Provisions for Fixed Installations
DIN VDE 0141 (01.00)	Earthing System for Special Power Installations for Nominal Voltages Above 1 kV
DIN EN 50122-2:1999-05-01 DIN EN 50162:2005-05-01	Protection Against Corrosion Due to Stray Currents of DC Installations
DIN EN 50341-3-4:2002-03-01 DIN EN 50341-1:2002-03-01 DIN EN 50423-1:2005-05-01 DIN EN 50423-3-4:2005-05-01	Planning and Design of Overhead Power Lines with Rated Voltages Above 1 kV
DIN VDE 0216 (02.86)	Fittings for Overhead Contact Line and Conductor Rail Equipment; Static Mechan-ical Behaviour, Requirements and Testing
DIN VDE 0228 Part 3 (09.88)	Proceedings in the Case of Interference on Telecommunication Installations by Electric Power Installations, Interference by AC Traction Systems

DIN VDE 0228 Part 4 (12.87)	Proceedings in the Case of Interference on Telecommunication Installations by Electric Power Installations, Interference by DC Traction Systems
DIN VDE 0100 (05.73)	Regulations for the Erection of High-Tension Installations with Rated Voltages up to 1000 V
DIN VDE 0446 Part 2 (03.71)	Regulations for Insulators for Overhead Power Lines, Overhead Equipment and Telecommunication Lines; Regulations for Insulators for High-Tension Overhead Lines and Overhead Equipment up to 1000 V as well as Telecommunication Overhead Lines
DIN VDE 0446 Part 3 (05.73)	Regulations for Insulators for Overhead Power Lines, Overhead Equipment and Telecommunication Lines; Regulations for Fittings Permanently Connected to the Insulators
DIN 43138 (09.80)	Flexible Cables for Overhead Equipment and Return Current
DIN 43156 (03.78)	Electric Traction; Conductor Rail, Dimensions and Characteristics
DIN 43167 Part 1 (12.87)	Rod-Type Insulator for Overhead Contact Lines for Operating Voltages up to 1000 V AC and 1500 V DC; Assembly
DIN 43167 Part 2 (12.87)	Rod-Type Insulator for Overhead Contact Lines for Operating Voltages up to 1000 V AC and DC 1500 V; Caps, U-Bolts and Hook Bolt
DIN 43167 Part 3 (12.87)	Rod-Type Insulator for Overhead Contact Lines for Operating Voltages up to 1000 V AC DC 1500 V; Insulator
DIN 48201	Cables
DIN 46217 (06.78)	Notch Connectors for High-Tension Contact Wires and Rail Overhead Equipment
DIN EN ISO 9001	Quality Management System
BO Strab	Directive for the Construction and Operation of Tram Systems

Table 1: List of Standards for OLE

1.5.2 Standards for Traction Power Supply System

Erection of Electrical Installations	
EN 50110-1:2004	Operation of electrical installations
EN 50110-2:1996	Operation of electrical installations (national annexes)
Rectifier Transformer	
EN 50329:2003	Railway applications - Fixed installations - Traction transformers
IEC 60076-1, Edition 2.1:2000	Power transformators - Part 1: General
IEC 60076-2:1993	Power transformers - Part 3: Insulation levels, dielectric

	tests and external clearances in air
IEC 60076-3:2000	Power transformers - Part 3: Insulation levels, dielectric tests and external clearances in air
IEC 60076-8:1997	Power transformers - Application guide
EN 60146-1-3:1993	Semiconductor convertors; general requirements and line commutated convertors; part 1-3: transformers and reactors
Rectifier	
EN 60146-1-1:1993 EN 60146-1-1/A1:1997	Semiconductor convertors; general requirements and line commutated convertors; part 1-1: specifications of basic requirements
IEC 60146-1-2:1991	Semiconductor convertors; general requirements and line commutated convertors; part 1-2: application guide
EN 50327:2003	Railway applications - Fixed installations - Harmonization of the rated values for converter groups and type test on converter groups
EN 50328:2003	Railway applications - Fixed installations - Electronic power converters for substations
EN 50124-1:2001 EN 50124-1/A1: 2003 EN 50124-1/A2: 2005	Railway applications – Insulation coordination – Part 1: Basic requirements, Clearances and creepage distances for all electrical and electronic equipment
IEC 60971:1989	Semiconductor convertors - Identification code for convertor connections
DC Switchgear	
EN 50123-1:2003	Railway applications - Fixed installations; D.C. switchgear - Part 1: General
EN 50123-2:2003	Railway applications - Fixed installations; D.C. switchgear - Part 2: D.C. circuit breaker
EN 50123-3:2003	Railway applications - Fixed installations; D.C. switchgear - Part 3: Indoor D.C. disconnectors
EN 50123-6:2003	Railway applications - Fixed installations; D.C. switchgear - Part 6: D.C. switchgear assemblies
EN 60439-1:1999 EN 60439-1/A1: 2004	Low-voltage switchgear and controlgear assemblies - Part 1: Type-tested and partially type-tested assemblies
IEC 60947-3, Edition 2.2: 2005	Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units
EN 50124-1:2001 EN 50124-1/A1: 2003	Railway applications - Insulation coordination - Part 1: Basic requirements; Clearances and creepage distances

EN 50124-1/A2: 2005	for all electrical and electronic equipment
Power and Control Cables	
HD 603 S1:1994 HD 603 S1/A1:1997 HD 603 S1/A2:2003	Distribution cables of rated voltage 0,6/1 kV
HD 620 S1:1996 HD 620 S1/A1:2001 HD 620 S1/A2:2003	Distribution cables with extruded insulation for rated voltages from 3,6/6 (7,2) kV to 20,8/36 (42) kV
HD 627 S1:1996 HD 627 S1/A1:2000 HD 627 S1/A2:2005	Power cables - Multicore and multipair cable for installation above and below ground
Earthing and Bonding	
EN 50122-1:1998	Railway applications - Fixed installations - Protective provisions relating to electrical safety and earthing
EN 50122-2:1999	Railway applications - Fixed installations - Protective provisions against the effects of stray currents caused by d.c. traction systems
HD 637 S1:1999	Power installations exceeding 1 kV a.c.
HD 60364-4-41:2007	Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock
Electromagnetic Compatibility	
BS EN 50121-1:2006	Railway applications - Electromagnetic compatibility - Part 1: General
BS EN 50121-5:2006	Railway applications - Electromagnetic compatibility - Part 5: Emission and immunity of fixed power supply installations and apparatus

Table 2: List of Standards for TPS

2 System Design

The aim of system design activities for this proposal was to propose an appropriate REL system considering the functional requirements described in tender documents. As a system designer, we did not follow all technical details to be able to propose a cost effective system, meeting the customer requirements e.g. as far as function and operation is concerned.

Therefore system design activities have been performed by Siemens for this proposal. Attached excerpt of traction study shows exemplary results of first simulations. These are to be considered as preliminary. A more detailed simulation will be performed as part of the detailed design phase. Results will be used for further definition of electrical equipment, like transformer ratings, cable cross-sections, number of cables used in parallel etc..

Some examples deviating from design described in detail in referenced tender documents ([1], [2]) with no effects on required system function are listed as follows:

1. No technical or operational need or advantage for building the (future) Russel Road Substation (initially to be provided as a track paralleling hut without DNO supply) was identified. Power supply is not and will not be in future (taking the information given in ERs into account) an issue at all in this part of the line (other substations are closer to full designed transformer rating than the ones adjacent to Russel Road). As far OLE sectioning is concerned no special building is required, too. We suggest not to build Russel Road substation/ track paralleling hut at all.

2. The reinforcement cable between GRE- and LSE-Substation as shown in tender document ULE90130-SW-OLE-00007, Rev. 3, sheet 1 of 3, is not needed at this point. This reinforcement cable should be designed and installed as appropriate when section 4 (delivery phase 2) will be realized in future. We suggest not to use a reinforcement cable between GRE- and LSE-substation for delivery phase 1 (phases 1a and 1b).

3. In part 3g/ chapter 3.3 of [1] it was asked to provide isolator enclosures for feeder and bypass isolators. For a LRT system as described in the tender documents we suggest to use section isolators mounted on OLE poles. This is common practice and proven design. The installation process is easier and more cost effective and special section pillars will not be needed at all. We suggest to install isolators located in substations in the OCS coupler room (refer to appendix 8.3.6) and to mount wayside isolators on OLE poles, outside City Center from Haymarket to Edinburgh Airport. However, in City Center from Haymarket to Newhaven section isolators will be located in trackside cabinets.

4. Cross sections and number of cables in parallel for power cables (e.g. DC-feeder cables or track paralleling reinforcement cables) are selected according to technical need, based on simulation results.

However, first simulation results (refer to 1.3.2) and further investigations proved the adequateness (regarding e.g. minimal OCS voltage (>500V), rail potential

(<60V, for very short times, in one location in one worst case scenario the rail potential is slighly above 60V; this can be handled with minor optimisation, for details refer also to appendix 8.3.1), current carrying capacity of cables and contact line, power rating of components (e.g. transformers, switchgear) offered) of following (refer also to appendix 8.3.1):

a) parallel reinforcement cable (where single trolley wire is proposed):

1 pc. 1 x 400mm^2 Cu for the line

or

1 messenger wire 120mm^2 (where catenary system is proposed)

b) feeder cable (substation to line)

2 pcs. 1 x 400mm^2 Cu in parallel

c) return cable (line to substation)

2 pcs. 1 x 400mm^2 Cu in parallel

d) 1 contact wire, 120 mm^2, copper

e) track bonds every 500m; rail bonds every 250m

f) type of rail

59-type rail in City Center (Newhaven to Haymarket)

49-type rail on Airport Link (Haymarket to Edinburgh Airport)

Items a) to e) also reflect the content of the proposal. Other componet ratings derived from this study are given in other locations of this document (e.g. transformer rating). With reference [5], we received first, not confirmed CAF vehicle data. Thereafter, tie provided a complete set of input data to be used for a revised traction study to reevaluate the adequateness of the REL system proposed. Both, input data provided by tie and used for the traction power network simulation as well as the simulation results itself are given in appendix 8.3.1.

5. Interface between substation control and SCADA system databus via databus system rather than a hard wired interface cubicle.

Our proposal is based on the described suggestions. However, in case tie wants to insist on the original described system in the examples listed above, solutions can certainly be offered by Siemens.

More details regarding the offered REL system can be found in the following chapters.

2.1 Substation Control, Monitoring and Protection

As Substation Control System Sitras® SCS with Sitras® PRO is part of this proposal. Attachment 8.3.5 provides an overview about the substation control system and protection concept offered for ETN.

The central substation-control unit will be realized by a PLC (Simatic S7 635 touch, or similar) and does collect, evaluate and distribute all relevant substation control and protection data both substation internal as well as to SCADA system. It will also interface the medium voltage level protection unit from Scottish Power, to be able to trip their "consumer circuit breaker" for protecting tie's substation equipment. In addition some protection parameters will be provided from Siemens to Scottish Power for adequate protection of rectifier and DC-unit in project execution phase. Intertrip and Frame Fault Protection (FFP) are also functions realized in the substation-control unit. For more conceptual information on FFP, please refer to attachment 8.3.3.

The hard-wired emergency trip signal will also be read into this central substation control unit, which initiates the tripping of overhead line feeder circuit breaker (refer also to "tripping functions" listed below). Industry type relays will be used for the hard wired emergency tripping line (refer also to appendix 8.3.2).

For 2nd-level protection, each substation-controller is connected via a multi-core pilot wire to the adjacent substation-control units. In case there is a short circuit on the overhead line, the SCS central unit detecting this short circuit first will trip the relevant adjacent substation via this hard wired connection.

Since we propose not to install a separate RTU with a hard wired interface between substation control and the substation node of SCADA system, the battery charger-, intruder alarm- and fire detection-status message will also be read into the central substation control unit and routed through the substation control system via substation node and SCADA to the central control room for information of the operator. For these status messages, substation control unit acts like a signal forwarding unit, only.

Protection functions for the feeders will be covered by Sitras® PRO unit. One of those units is located in each feeder panel.

For protection of persons characteristics defined in EN 50122-1 will be followed by Sitras® SCD, connecting the return line to earth (refer to chapter 4.3.2 and to single line in appendix 8.3.2) if rail potential limit is reached.

Substation feeder isolators and the bypass isolator will be controlled by the Simatic ET 200S units.

All these devices belonging to the substation control system do exchange relevant data using Profibus DP databus system. The interface to overall SCADA system is physically the local substation OTN node. The SCS central unit and SCADAs substation OTN node are connected via a databus interface using Ethernet TCP/IP or Modbus RTU (or similar).

Following protection functions can be implemented using Sitras® PRO DC protective unit:

- Overcurrent protection I_{max} and $I_{max\ rev}$
- Current step protection ΔI
- Current rise protection (di/dt)
- Independent definite-time overcurrent time protection I DMT and I DMT $_{rev}$
- Undervoltage protection V_{min}
- Overvoltage protection V_{max}
- Monitoring of line voltage
- Impedance protection
- Circuit breaker failure protection (trip of higher level circuit breaker)

Tripping functions for staff provided:

1. System Controller, located in control room, can trip 11 kV supply of each substation individually via SCADA.

2. Staff can trip 11 kV supply locally by means of a push button located in substations lobby of each substation, which is read into the central substation control unit.

3. System controller, located in control room, can trip 750 V overhead line in either direction starting from one substation via SCADA.

4. System controller, located in control room, can trip 750 V overhead line in both directions via hard wired mass trip line. The signal will be read into the central substation control unit and tripping of DC feeder circuit breakers will be initiated. DC-feeders of all substations of one group will be tripped by pushing the relevant push button. Substations are clustered into two groups.

5. Staff can trip 750 V overhead line in both directions simultaneously by means of a push button located in substations lobby of each substation, which is read into the central substation control unit.

6. System controller, located in control room, can trip 750 V overhead line section between two adjacent traction substations via SCADA. In addition to the control signals transmitted via SCADA to the substation control systems, the DC feeders of relevant adjacent substations can be tripped using the intertrip pilot wires.

In addition to the listed tripping functions, this proposal is based on, as clarified with tie in meeting on 2007-11-27, feeder and bypass isolator functions as described in appendix 8.3.10. In the depot wayside switches are offered to be manually operated, only.

2.2 EMC, Earthing & Bonding

For system wide EMC and Earthing & Bonding concept, please refer to Folder 3, Part 1 of 2, Section 2, Annex 3 and Annex 4.

3 Overhead Line (OHL)

3.1 OHL System Description – Design

The contractor will design the complete system using the standards, parameters and layouts detailed in this documentation and the technical drawings given in tender documents as listed in appendix 8.3.11.

The OHL equipment is suitable for supplying current to pantographs mounted on the roof of the trains without any significant loss of contact and the resultant sparking, at all speeds up to 80 km/h under the operating conditions given in this documentation is within acceptable limits.

The OHL system has been pre-designed as trolley type without messenger wire and one contact wire per track from Newhaven to Russel Road Junction. A parallel bypass cable laying in the earth will be used. In this part of the line, the design tender drawings as listed in appendix 8.3.11 have been followed for this proposal (bill of quantity). The given design was considered being apropriate for autotensiong solution, which is offered with this proposal. Fixed tensioning solution could also be offered for this part of the line. More considerations regarding contact wire-panto contact quality, panto and contact wire wear/ impact on maintenance, ensuring that contact wire remains under all operational condition within the specified working range and disadvantages due to increased, if not even unacceptable sag needs to be made on this issue. To find an acceptable solution will probably, beyond other modifications, lead into an increased number of poles, and modified pole locations in some areas, compared with the design shown on tender drawings. Increased tensioning forces may help to limit the maximum sag, but needs also further considerations, e.g. as far as contact wire safety (worn condition) and statics of mounting parts (like pull offs) and poles are concerned.

From Russell road junction to the Edinburgh Airport as well as from Russel Road Junction to Granton Square the OHL system has been pre-designed as catenary system with both one single contact wire and one single messenger wire. For this part of the line, the design in tender drawings as listed in appendix 8.3.11 have been used as a basis. Bill of quantities, like number of poles and related equipment has been reduced/ adjusted to use the cost advantages provided by using a catenary rather than an autotrolley system with buried parallel reinforcement cable.

The OHLE shall be prefered auto tensioned along the whole line and depot.

Building fixings will be used where applicable and technically possible. Where building fixings cannot be applied poles shall be used at lines and depot to install OHL supports (cantilevers, cross or head spans and other OHL equipment). Cross spans will be used especially in the city centres, double track cantilevers mostly used in narrow curves, where location of centre poles is not possible.

Consequently, the OHL of the system will have to be designed taking into account different circumstances with priority in individual areas.

The contact wire is staggered to even out the pantograph wear.

According to the simulations carried out and described in the Traction Study a cross section of 120 mm^2 for contact wire has been found necessary to transfer the traction power during scheduled service.

The material type (copper or aluminium), the cross section and the number of cables (one or two) of the bypass cable will be defined during a later stage.

The messenger wire will have a cross section of 120 mm², material is copper.

In principle the layout design follows the tender (refer to appendix 8.3.11), especially in areas with building fixings, since changes might have a major impact on design and consent process performed by tie. The same applies for the whole City Center (Haymarket to Newhaven), where the number and locations of poles and related equipment follows tender drawings as per appendix 8.3.11. Based on these requirements, the proposed design was modified to an autotensioning system to cope with e.g. the given pole distances and environmental requirements (in particular min/max temperature) as well as to provide state-of-the art technique with low maintenance needs.

3.1.1 Design for main line, city loop from Newhaven to Granton Square

For the portion of the City Loop from Newhaven to Russel Road Junction an auto-tensioned contact wire system will be installed for the main line. On the supports the contact wires are supported by bridle suspensions at cross wires or cantilevers. Single cantilevers are preferably mounted at the masts, which should be located between the tracks of the double-track section. For the city loop building fixings will be the preffered solution, wherever possible. The parallel bypass cable will be connected via Y-joints to the contact wire and also both contact wires will be connected to each other in appropriate distances. The exact distances will be defined according to the traction study during the basic design phase.

3.1.2 Design for main line, from Russell Road Junction to Edinburgh Airport

For the Overhead Line System outside the city centre a catenary system with one contact wire and one meesnger wire has been foreseen. The huge advantage of this solution is the possibility of direct connection between contact wire, which is the connection to the pantograph and the messenger wire. The long and often connection from cables laying in the earth to the contact wire could be saved. And in addition the span length from support to support could be enlarged, because the system with contact wire and messenger wire has a bigger mechanical stability. However, the bill of quantities for this proposal is based on tender drawings as listed in appendix 8.3.11 adjusted to use the cost advantages provided by using a catenary rather than an autotrolley system.

3.1.3 Design for the Depot area

An tensioned trolley system with one contact wire will be installed in the Stabling Yard and in the Workshop Building.

The contact wire will be tensioned by spring terminations or wheel tensioning devices respectively fixed terminated where applicable.

The cross section of the contact wire will be calculated during basic design phase. Nevertheless it will be not more than 120 mm².

In the workshop a movable conductor rail will be installed on two tracks. One track will be 55 meter and a second track will be 110 meter length.

A locking device for the switches in the workshop is considered. The purpose is to interlock OLE sectioning disconnectors in workshop with high level access platform, movable conductor rail and craneage. The integration of these disconnectors, which will be mounted close by overhead contact wire at workshop building wall, into an overall interlocking concept will be supported by using padlocks.

3.1.4 Requirements for the OHL-System to Earthing

DC railway installations require an earthing and return current system to satisfy the requirements for safety of persons and for protective provisions against the effects of stray currents.

The earthing measures which affect civil works and all participants for the electrification, especially power supply and overhead line system will be coordinated in the overall earthing concept.

The insulation of the running rails is the main parameter for reducing stray currents. Therefore, all exposed conductive parts which are not insulated from earth shall be connected to earth and shall not be directly bonded to the running rails. The support structures of OHL need not to be connected to the running rails via voltage-limiting devices if the insulation of the overhead contact line has been doubled or reinforced.

3.1.5 Building Fixings

The requirement in the tender to use building fixings preferably instead of poles to support OHL equipment wherever it is possible have been considered. The design of building fixings follows the tender, since changes might have a major impact on design and consent process performed by Tie. It is assumed that all necessary permissions from house owners will be available if the contract comes into force and that those will be handled by Tie or others, not Siemens.

The feasibility for using of defined buildings (tender documents) for fixation of building fixings from static point of view will be verified by Tie or others, not by Siemens taking design requirements from Siemens REL into account. Legal permissions (e.g. building fixing agreement) will be handled by Tie or others.

3.1.6 Abnormal load routes

Abnormal load routes and contact wire heights are now in accordance with [6].

3.1.7 Protection of poles

Protection of poles against corrosion has been taken into account. OHL poles will be galvanized and painted. Cable arrangements e.g. for infeed purposes will be carried inside the poles to protect them against outer influences.

3.1.8 Overhead Line under Bridges

OHL equipment will either be fixed under bridges by means of special elastic supports (where necessary) or passed through without direct fixing to the bridge structure if neighboured poles can be used to support them.

The overall earthing concept will consider earthing conductors to be installed under bridges to react against an increase of the bridge potential in case of unintended touch with traction voltage (e.g. in case of faults, where derailed pantograph or broken OHL wire could get in touch with the bridge). Insulating plates shall be installed, if additionally necessary, to protect the bridge structure during those circumstances.

However, it will be part of the interface clarification during implementation of the project to coordinate those details considering local conditions.

3.1.9 Interface to OHL Foundation and Buildings

In general, poles will be mounted on block foundations by means of anchor bolts. The anchor bolts are welded to the reinforcement of the concrete and thus are used for the earthing of the poles.

Foundations of poles will be constructed by the civil work partner according to the design requirements of REL.

3.2 Description of Overhead Line Equipment (OHLE)

3.2.1 Cantilever, cross span and head span arrangements

The OHL system is supported and registered by means of single pole mast mounted cantilevers, back to back and 2 tracks cantilevers, cross span wires and in few cases by head spans. Under overpasses, the system is supported by modified supports (e.g. elastic supports) attached to the structure roof or wall. In the workshop the system is attached to the building structure, in the depot area outside the workshop the OHL mounted via head spans on poles.

The contact wires will be supported by means of bridle suspension at cantilevers or cross spans.

3.2.2 Cross Span Support

Where the localisation does not allow the use of cantilevers, especially in the city centres cross spans will be utilised. Where it is possible the span wire is fixed to a building anchor, otherwise it is installed between poles.

3.2.3 Span Wires

It is proposed at this stage that Bz-wires will be utilised for span wire purpose. The cross section will be determined according to the load requirement and safety

factor to be applied. The design will establish some standard cross-sections most probably BZ II 35 mm², 50 mm² and 70 mm² in order to minimise the amount of spare part and fittings variety. To serve the overall insulation philosophy of the OHL all terminations of span wires will be double insulated.

3.2.4 Contact Wire Supports

The contact wire in shared track areas will be supported by a so called delta suspension with a synthetic bridle wire (type MINOROC). This serves already as the first insulation level. The contact wire will be clamped at both ends of the bridle wire with a spacing of approximately 2.5 m between.

The delta suspension wires will be made up of MINOROC wires. These wires consist of a high tensile polyester fibre core covered with an extruded outer sheath made of Polyamide in black colour. This wire design has been employed in similar OHL projects for more than 10 years with an extremely satisfactory performance. The outer sheath avoids any negative influence caused by UV radiation ensuring that the performance data of the wire remains unchanged over the service period. The termination ends of the MINOROC wire will be equipped with crimp connectors specially dimensioned to suit the MINOROC wire requirements.

The arrangement of the delta suspension will accommodate the full range of contact wire movement caused by temperature changes. This will be achieved by the hinged cantilever support or the pulley arrangement in cross span arrangements. The delta suspension design provides a flexible support of the contact wire avoiding hard spots at the support, which would reduce the lifetime of the contact wire.

From Russell Road Junction to Edinburgh Airport a overhead line system with both, simple contact and simple catenary wire will be considered. This so called catenary system will be carry out with droppers made of Bz (e.g. 25 mm²).

3.2.5 Pull Off Arrangement

These arrangements are employed between regular supports to provide a contact wire pull off at light curves or in transition areas of the track to take the heavy radial load of the contact wire and place the contact wire appropriately within the limits specified above the track. Often a conventional OHL support will not be required at such locations and during the layout design it may be decided to employ such a pull-off arrangement instead.

3.2.6 Tubes and OHL Fittings

We propose to utilise aluminium tubes with natural finish to make up the cantilever frame. The fittings will be made of hot dip galvanised malleable cast iron. All components employed for the system will be standard components having a long and reliable service record already.

In the area near the water, from Granton Square to Caroline Park and from Newhaven to Ocean Drive, stainless steel tubes could be used for the cantilever material. However, as discussed and agreed on with tie, also near the water, material as defined in the previous paragraph will be provided.

Contact wire clamps will be of the parallel groove bolted design ensuring the correct fixation of the contact wire even if that is in fully worn condition.

Turnbuckles will be employed at those locations which may need some adjustment during their service life. Keeping this requirement in mind these locations will be finally decided on in the detailed design stage. For the moment at least the terminations of cross span wires, anchoring wires and guy wires will be equipped with turnbuckles.

As an option fully insulated cantilevers made of GPR tubes could be offered. If such solution is favoured the offer has to be revised, because such solution is not part of our offer.

3.2.7 Isolators

Isolators will be used only in the depot area. Manually operated isolators will be operated by means of a permanently mounted handle connected to the isolator by tube or similar arrangement.

The feeding, coupling and switching of the main track is realized within the substations by adequate coupling equipment. Only the so called section isolators for coupling in longitudinal direction will be installed directly on the top of the poles outside City Center from Haymarket to Edinburgh Airport. However, in City Center from Haymarket to Newhaven section isolators will be located in trackside cabinets. A preliminary sketch of a cabinet is given in appendix 8.3.9.

A window, which may allow a view to disconnector, to check the position without opening the cabinet door is not planned. This may be subject to vandalism. In addition, disconnecting and earthing the contact line e.g. for maintenance purpose will happen rather seldom. However, the five safety rules needs to be followed in any case, thus e.g. the contact line needs to be earthed using an earthing gear in any case. This is a more obvious indication of contact line status which is in accordance with the five safety rules. That is also the reason, why we do not recommend and did not allow for section isolators with dedicated earthing function.

Further clarification led to the result, that tie insists on three position switches with earthing function. These will be provided. The description in appendix 8.3.10 describes two position switches. This is to be disregarded from now on therein.

Further information regarding the proposed functions of the offered isolators are given in appendix 8.3.10.

3.2.8 Insulators

For the open section insulators will be used in the terminations and in the cantilever. Except for the synthetic rope employed in the delta type suspension no flexible insulators will be used in the OHL.

Standard design insulators, which are proven in similar installations will be utilised.

3.2.9 Section Insulators

The design of the section insulators will avoid any negative effect on the reliable operation of the assembly which may be caused by any torque in the contact wire. The section insulator as well permits the full travelling speed in both directions.

3.2.10 Jumper Connections

Jumper connections to the contact wire will be required at feeding locations, overlap arrangements and crossovers. The jumpers will be arranged as to avoid hard spots on the contact wire, which otherwise would create potential safety hazards due to the increased contact wire wear.

One possibility of reducing the negative effect of these jumper connections would be to locate them as close to the suspension as possible. This arrangement would eliminate the negative effect of the weight additionally imposed on to the contact wire.

3.2.11 Poles

In principle the following pole types are the preffered types for a tram system:

Preferred solutions (variants not in order):
- Variant 01: H-beam steel poles (no longer considered for ETN, except for depot, where H-beams may remain an option)
- Variant 02: Round steel poles
- Variant 03: Round steel poles (2-stepped)
- Variant 04: Round steel poles (3-stepped)

Alternative solutions (variants not in order):
- Variant 05: Conical tapered column poles
- Variant 06: Hexagonal tapered column poles
- Variant 07: Octagonal tapered column poles

Due to the fact, that the visual impact is very important in the Edinburgh City Centre, we considered there three stepped round steel poles. Also for the area from Russel Road to the Edinburgh Airport we considered three stepped round steel poles. For the depot three stepped round steel poles or H-beam poles will be used, depending on the detailed static calculations, which will be carried out during the basic design phase.

All poles are welded to a base plate incorporating holes for easy attachment on to the mast foundations. The variety of pole diameters will be limited as far as reasonable due to the tension applied to it. All feeding poles will have cable access by means of an embedded conduit to the centre of the pole.

Pole lengths are considered between approx. 7.5 and 9.5m. Diameters at the pole base are estimated between approx. 280 and 470mm. This large variation is due to different pole types (function, system, forces and moments applied) and is dependent on further design evaluation in basic design phase.

SDS reference design shows a high number of pole variants for both stepped and tapered poles. Our offer consideres stepped poles for the complete line. For this

proposal, the number of pole variants was reduced to a minimum as technically required.

3.2.12 Tensioning

Contact wires will be auto-tensioned to give nominally constant tension over the entire operating temperature range of the equipment.

The automatically tensioned wires will be tensioned by the following forces:

contact wire	12 kN
Messenger wire, where applicable	12 kN

Tension lengths of max. 1500 m will be equipped with tensioning device at both ends. Weight type tensioning devices will be installed with a ratio of 1 : 3.

Short tension lengths which do not carry through current, e. g. crossovers, may be tensioned by means other than weights, e. g. springs, but the characteristics of these devices proposed are such that satisfying operation of the system is obtained over the full working temperature range.

3.2.13 Rail and Track bonding

Rails shall be bonded with connections rail to rail and connections track to track.

Depending on the Detailed Traction Study, which will be carried out during the basic design phase the rail bonds and track bonds will be installed in the required distances.

3.2.14 Tie Back Anchors

The proposed design includes tie back anchors. It was based on tender drawings as per appendix 8.3.11, which also considers tie back anchors. Alternative solutions with no tie back anchors could also be offered. Where tie back anchors are used anti climbing measures will be considered.

3.2.15 Combined Poles

OLE Poles, combined with street lights will be considered in this proposal where shown as per SDS design as of November 2007.

3.2.16 Contact Wire Height: Railway Safety Publication 2

In BBS former proposal, a contact wire height of 5.6m was considered. In above mentioned "Guidance on Tramways", refer to following excerpt, two requirement are found with impact on contact wire height/ design.

Excerpt:

...

180 *The design of the overhead line supports should aim to minimise the vulnerability of each support to damage. The loss of any one support (eg as a result of a line loosening a building fixing or of a pole being struck and damaged by a road vehicle) may release tension in the overhead line system but the design should allow other supports to*

prevent live equipment from sagging below 5200 mm above the highway. Off highway, it may sag lower provided that it remains out of reach of pedestrians. Connections between the pole and the contact wire should be mechanically weaker than the contact wire system itself to ensure that if a pole is damaged, the connection will break before the live equipment is dragged down.

3.2.16.1 "5,2 m" – Requirement

The proposed design in City Center (shared tracks) was revised to comply with this requirement.

For off highway sections, where catenary system is offered (refer to chapter 3.1 and 3.1.2), it is assumed that pedestrians do not have access to general parts of the line. Where crossings are, the situation is different. However, it is noted, that reference [6] considers 4m as minimum contact wire hight. It is also noted, that EN50122-1 asks for 3m in public areas and 2,6 in non-public areas in normal situation. During design phase, this subject will be investigated further. If necessary, outcomes could be further evaluated in a risk assessment.

3.2.16.2 "Support Weaker than Contact Wire" – Requirement

The "Support Weaker than Contact Wire" – Requirement cannot be met by BBS. As discussed in meeting with tie on 2007-12-05, it is also believed by tie that this requirement does not need to be demonstrated. However, compliance to this requirement is excluded from this proposal.

3.3 OHL Assembly Drawings in the annex

Number of drawing package: UK4-Z1100-0201 (32 pages).

Page	Title	Date
1	Cross section cross span (wall anchor)	16.03.2007
2	Cross section with single track cantilevers	16.03.2007
3	Cross section with two track cantilevers	16.03.2007
4	Manufacturing and installation tolerances for OHL Equipment	16.03.2007
5	Simple contact wire system simple cantilever with steady arm on center pole	27.03.2007
6	Simple contact wire system simple cantilever with steady arm on side pole	27.03.2007

7	Single contact wire system under bridges, with elastic supports	16.03.2007
8	Simple contact wire system simple cantilever with steady arm for two tracks on side pole	27.03.2007
9	Simple contact wire system cross span pole ploe with bridle-pulley- suspension for two tracks	27.03.2007
10	Examples for Foundations	16.03.2007
11	Return conductor connection at rail cable distribution cabinet with cable connector	27.03.2007
12	Exampel of return cable connection at segregate tracks	16.03.2007
13	Exampel of return cable connection at embedded tracks	16.03.2007
14	Track and rail current connection for two tracks	27.03.2007
15	Principle arrangement of track and rail bounds for embedded track	16.03.2007
16	Current connector	16.03.2007
17	Simple contact wire system sectioning for simple cantilever at swichtable with disconnector for one pole	27.03.2007
18	Terminations for contact wire/s or catenary system	16.03.2007
19	Flexible termination at pole for contact wire with spring	27.03.2007
20	Fixed termination for single contact wire	27.03.2007
21	Fixed termination for catenary system with cable roll	27.03.2007
22	Building fixing for multiple fixation	27.03.2007
23	Building fixing arrangements	27.03.2007

24	Fixing accessories arrangements for contact wire poles	16.03.2007
25	Fixing accessories arrangements for contact wire poles	27.03.2007
26	Fixing for double cantilever at steel pole	27.03.2007
27	Overvoltage protection for pole intallation	27.03.2007
28	Single (Trolley-type) contact line system, tension length with overlap	27.03.2007
29	Overlap contact wire system with single contact wire	16.03.2007
30	Overlap catenary system with messenger wire and contact wire	27.03.2007
31	Simple contact wire system with bridle-and-pulley suspension	27.03.2007
32	Cantenary system with cantilever suspension	27.03.2007

4 Traction Power Supply

The traction power system for LRT Edinburgh is basically located in the substation buildings. Sketches showing first possible layouts are attached (cross reference to appendix 8.3.6). The therein shown "substation incoming circuit breaker" is included in this proposal. However, BBS still does not have a full picture regarding different types and layouts of substation buildings for ETN. The BBS proposal is based on two different substation layouts as attached to be used for all substations except depot substation (which will be integrated in depot buildings). Contrete buildings are planned for substation buildings.

	Substations	Nomenclature
	Phase 1a	
1	Leith Sands Substation[2]	LSE
2	Leith Walk Substation	LWE
3	Cathedral Substation	CAE
4	Haymarket Terrace Substation	HTE
-	Russell Road Substation[3]	RRE
5	Jenner's Depository Substation	JDE
6	Bankhead Drive Substation	BDE
7	Gogar Depot Substation	GDE
8	Ingleston Park and Ride Substation[4]	IPE
	Phase 1b	
9	Craigleith Substation[5]	CGE
10	Granton Mains East Substation	GME
11	Granton Road Substation[6]	GRE

Table 3: Substation Abbreviations

The locations of the substations are considered to be given by tie and to be fixed, although some unbalances in terms of power loads from traction line exist. These can and will be handled with an appropriate customized design which may lead to specific requirements and solutions in different sections of the network (e.g. power ratings and cable cross sections). The proposed system is more defined following and in subsequent chapters.

Basically, Table 3 provides an overview about the number of substations; each substation contains components and switchgear as shown in substation

[2] in some tender documents/ tender drawings named as „Tram North Leith Sands Substation (NLE)"

[3] no need for this (possible future) substation identified; therfore not part of Siemens' proposal; refer also to page 11 item 1

[4] in some tender documents/ tender drawings named as „Tram Eastfield Road Substation (EHE)

[5] in some tender documents/ tender drawings named as „Tram South Groathill Avenue Substation (SGE)"

[6] in some tender documents/ tender drawings named as „Tram Granton View Substation (GVE)"

single line which is part of appendix 8.3.2. From there, a bill of quantities, reflecting the proposed system, can be derived.

4.1 Medium Voltage Level/ Interface to DNO

Medium voltage level is 11kV for Edinburgh tram network. As described in the tender documents, medium voltage connections between the substations are, or will be realized by Scottish Power (=local DNO in Edinburgh) and is therefore not considered whithin the scope of this proposal. The requested separate "SP Compartment" for Scottish Power gear, like MV-switchgear, metering unit, etc. will be provided in substations (refer to substation layout sketches). The Scottish Power Room was enlarged in attached layout, as advised by tie in meeting on 2007-11-13 to a size of 4mx4m.

For the interface of MV-level switchgear to the rectifier and DC-unit, also as far as scope of supply is concerned, different scenarios may apply:

1. Scenario

All SP Compartment contents (e.g. RMU MV switchgear, metering, protection, "SP Consumer Circuit Breaker") are in Scottish Powers' scope of supply. Siemens will provide control cables and required parameters to enable Scottish Power to adjust their protection unit in an agreed on and appropriate way (e.g. that the SP Consumer CB can be tripped by Siemens' control system for protection of rectifier transformer).

2. Scenario

For most possible independability from Scottish Power in terms of technical intefaces, Siemens could provide tie's own MV switchgear, which would comprise basically one incoming and one outgoing feeder for each substation together with an own MV protection unit. In contrast to the 1. scenario, this would not have a (wired) connection to Scottish Power's protection system (although technical clarification and mutual line tuning with Scottish Power would still be important). On the other hand, the two mentioned additional feeders are technically pure not needed and are therefore leading to extra costs (for e.g. switchgear, protection unit, room).

3. Scenario

Except the MV cables entering the substation building, everything could be considered within Siemens' scope of supply. Meaning even Scottish Powers' incoming feeder, the "SP Consumer Circuit Breaker", Scottish Powers' MV protection unit, Scottish Powers metering. Although this scenario seems to be the most comfortable solution for tie, it is certainly not the most cost effective e.g. as far as interface clarifications are concerned. Furthermore, DNOs usually have their preferred switchgear, metering and protection units, etc.. That is why we suggest, that these units should remain in SPs scope of supply (design, procurement, installation and testing).

As being instructed by tie in meeting on 2007-11-13 one 11 kV circuit breaker is to be considered per substation in addition to Scottish Power 11kV switchgear. This applies also for substation in depot for both, depot and mainline, not for auxiliary

power transformer in depot (total of two AC circuit breakers in depot substation). Thus for this proposal, the second scenario was considered.
Solutions for scenarios 1 and 3 could also be offered. For scenario 3, first interface clarifications (e.g. technical meetings with Scottish Power) would be required before.

However, appendix 8.3.12 provides more information regarding the 11kV switchgear, offered.

4.2 Rectifier Unit

The rectifier unit basically comprises the dry type cast-resin rectifier transformer and the 12-pulse rectifier itself.

Differing from the arrangement shown in the tender documents, the rectifier is arranged in one cubicle row together with the panels of the DC switchgear. The transformer will be located in the vicinity of the rectifier, keeping the AC cable connections from the transformer to the rectifier short. The diodes will be equipped with fuses, disconnecting a single diode which has lost its blocking ability. The fuses have contacts which indicate activation to the control system. Hence it is not necessary to immediately disconnect the rectifier unit in case of a single diode failure.

The base load resistor and RC-snubber-circuit are designed short-circuit proof and therefore need no fuse.

4.2.1 Rectifier Transformer

The rectifier transformers are of cast resin type for indoor installation with two primary and two secondary windings. The HV windings are made of single foil-type aluminum coils wound with high quality double-layer insulating foil and potted with an epoxy resin/ powered quartz mixture under vacuum at a high temperature or alternatively made from copper coils (depending on manufacturers standard.
The core is made of grain-oriented low loss electro-laminations insulated on both sides. Limbs and yokes will be shaped and assembled with a minimum of core bolts. Lamination will be joined, compressed and braced to minimise stray loss and noise. The core will be carefully assembled and rigidly clamped to insure adequate laminations during shipment and operation.

The core is protected against corrosion by varnish. The insulating materials used are flame-resistant and self-extinguishing.

The transformers are free of partial discharges at least up to app. 2 times the rated voltage and they are resistant to short circuits and impulse proof like oil-filled transformers acc. to IEC 60076.

The rectifier transformer are designed to produce a 6 phase secondary AC-system with a phase shift of 30° in order to produce with the connected diode bridge a sound 12 pulse DC system.

For attainment of the overload conditions according to IEC 60146, class VI, the transformer will be rated for 2h-overload 150% or 1min overload 300%.

Each transformer will be equipped with temperature sensors for alarm and for tripping.

Technical Data:

Type	cast-resin acc. IEC 60076 Part 11
Environmental Class	E2
Climatic Class	C2
Fire Behaviour Class	F1
Installation	indoor
Max. Ambient Temperature	40°C
Cooling System	AN
Type of Duty	IEC 60146, class VI
Rated power	1330 kVA
Rated Power LV1	665 kVA
Rated Power LV2	665 kVA
Rated voltage HV	11 kV
Rated voltage LV 1 / 2	0.293 / 0.293 kV
No. of phase	3
Frequency	50 Hz
Vector group	Dy5Dd0
Primary taps	+/- 2 x 2.5 %
Tap links	no load
Insulation level Primary	LI 75 kV / AC 28 kV
Insulation level Secondary	AC 10 kV
Impedance voltage (approx.)	uk 6 %
Temperature rise	95 K
Insulation class	F
No-load losses (P0)	6500 W
Load losses at 75 °C	17500 W
Outer dimensions (HxWxL) mm	2000 x 1000 x 1760 mm (LxWxH)
Weight (approx.)	3950 kg

4.2.2 Rectifier

The traction supply rectifier is naturally cooled consisting of two three-phase bridges connected in series, forming the 12 pulse rectifier.

Each rectifier is fitted into a cubicle with an uplifted top for natural ventilation. It will be installed by means of non-tracking insulating supports. Venting slots are provided in the lower half of the front doors.

Effective ventilation is ensured by using special mitered aluminum heat sinks to cool the silicon disc-type diodes. The parallel high-capacity diodes are arranged one above the other. They are hermetically sealed between the cooling bar and heat sink by means of plastic barriers. The diode fuses are mounted on the horizontal DC busbars and are electrically connected to the heat sinks via flexible connectors. Micro switches with NO or NC potential free contacts are inserted in

the top heat sink and will generate an alarm signal. A combined RC and base load circuit is integrated into the cabinet on a separate support.

The rectifier is suitable for free-standing installation with cable entry from the bottom.

The rectifiers convert alternating current into direct current. They are employed for supply of electric power to the overhead contact line of electrified railway systems (traction network).

The rectifiers are mounted in a frame made of steel profile and are designed for fixed installation in closed electrical operating areas. The outer walls of the switchgear panels consist of sheet steel.

The rectifier is a non-controlled, three-phase bridge circuit of 12-pulse design. The main components for rectification are high-power silicon disk-type diodes. The units are air cooled employing natural convection. Fans are not required.The rectifier is devoid of moving parts. No logic or closed-loop controller electronics are employed. The rectifier is mounted on insulated stripes.

Covering is attached to the frame, with the exception of the roof and floor:

- To the front side: Door.
- At the sides: Side walls or partition walls (where a number of cubicles are to be mounted side by side)
- At the rear. Rear wall

The lower part of front doors and rear wall are provided with ventilation slits. The doors can be opened and locked by means of a switchgear key (double key bit). The key is removable.

Six sectional heat sink busbars are vertically installed in the frame. The six AC connections are welded to these busbars. The connections are routed upwards. The individual diodes are attached to the sectional heat sink busbars. One side of each diode lies on the sectional heat sink busbar, while on the other side a dedicated heat sink is attached to the diode.

The diode is pressed between the sectional heat sink busbar and the dedicated heat sink by means of a leaf spring.

In addition to their cooling function, the heat sink busbars and the dedicated heat sinks are also employed for conduction of the electric current.

A fuse mounted on a horizontal busbar is connected to each dedicated heat sink by means of two flexible stranded copper conductors. Each busbar is provided with a connection lug, which represents the common plus or minus connection. These DC connections are connected via cables with the incoming and return-line panel of the DC-switchgear.

All electrical components (diodes and fuses) can be changed from the front. Thus, it is possible to mount the units in a back-to-wall position to provide optimum device installation.

The rectifier is designed according to the listed International Standards.
The function of a traction diode rectifier in a DC substation is to convert the three-phase voltage from the transformer into DC voltage for the overheadline traction network.

The rectifiers are designed as an air self-cooling type (convection), uncontrolled diode rectifier comprising of two three-phase bridge interconnection arrangements in series forming the 12-pulse output voltage.

Mechanical Design

All components are installed in a sheet metal cabinet and are easily accessible from the front. The rectifier is designed for indoor installation and can be fitted with the back to the wall. The front is provided with a door.

The air inlet is through cooling slits in the lower one-third of the rear panel and front door. The cabinet roof is IP21 (grid on the roof).

Equipment

The rectifier cabinet contains two three-phase bridge circuits connected in series to form a 12-pulse circuit.

It will be designed in such a manner, that with one parallel diode out of service the rectifier will be capable to carry the rated load of operating current.

Disc-type diodes with ceramic housing are used. The diodes are clamped between aluminium heatsinks with a black surface finish to achieve a better heat transfer resistance. For better accessibility, the heatsinks on the front are designed as individual heatsinks for each diode whereas the rear side is cooled by a cooling bar which has the length of several diodes and thus provides high mechanical stability. Each diode is provided with a fuse which disconnects it if it looses its blocking ability. A group signal (potential-free contact) is provided at the terminal strip of the rectifier for evaluation purposes.

Two group signals with the following 2-stage status:
1. Stage: 1 diode in a bridge arm failed.
2. Stage: 2 diodes in a bridge arm failed.

The group signals will be connected to the annunciation unit, installed in the DC switchgear.

Base load resistors and a DC-side RC-snubber-circuit provide protection against internal overvoltages (caused by commutation) and against external switching overvoltages.

External short-circuit

Protection of the rectifier against external short-circuits will be carried out by Scottish Powers consumer circuit breaker of the 11 kV rectifier transformer feeder in conjunction with a thermal / overcurrent time relay (provided by Scottish Power).

This concept and the corresponding design of the component itself enables the rectifier to carry a DC-side busbar short-circuit until the HSCB in the Incoming Feeder panel opens.

4.3 DC 750 V Switchgear

The DC switchgear will be a Sitras® DSG system, consisting of a combined incoming and return current panel (as discussed and agreed on with tie in meeting on 2007-11-27), two (three for depot) line feeder circuit breaker panels.
The combined incoming and return current panel uses disconnectors, one each for the incoming and the return line. Both devices can be integrated into one panel to save room in substations refer to appendices 8.3.2 and 8.3.6.
For more information on Sitras® DSG, refer to appendix 8.3.7.

4.3.1 DC rectifier and feeder circuit breakers

In each section feeder panel, one HSCB will be located.

HSCBs (high-speed circuit breakers) are mounted on trucks as draw-out units. Each section feeder panel includes the HSCB with arc chute, the line testing device and the associated components necessary for a smooth and effective operation of the switchgear.

The circuit-breaker panels are erected in a standard profile section construction and clad with steel panel walls. They closed off at the front by two lockable steel panel doors. The upper door leads to the partitioned-off low voltage compartment in the upper part of the panel and the lower one gives access to the switchgear truck. The lower door is able to be closed in any defined truck position.

Each circuit-breaker panel consist of a stationary part and a switchgear truck

Stationary part

The stationary part consist of a standard sectional construction and partitions. The busbars with the isolating mating contacts are installed in this part. Furthermore, the mechanical parts for locking the withdrawal movement, the truck guide bars and the truck grounding bar as well as the devices at traction voltage (test contactor, test resistor, isolating amplifier) are provided here. The test circuit is completely isolated from the traction voltage when the truck is withdrawn.

Current or voltage indicators, alarm indications and Softbuttons will be realized with Sitras PRO displays. In the upper lockable steel panel door remote/local selector switches. The control devices are behind this in a low-voltage recess.

Switchgear truck

The switchgear truck is moveable and operable. It is capable of being withdrawn without the use of tools or other aids.

The switchgear truck frame is made from the same standard sectional construction as the stationary part. The DC high-speed circuit breaker with its self-coupling

isolating contacts to the busbar is installed in the central section on the switchgear truck.

The switchgear truck is equipped with a safe withdrawal and locking device. In the operating and isolated/test positions the switchgear truck is completely located behind the closed lower door.

Limit switches on the interlock lever, switch-OFF / disconnect the breaker before unlocking and releasing the draw-out unit. The breaker cannot be switched ON / connected, unless it is in connected or disconnected position. A mech. pin indicator is protrude from the panel in the isolated/test position.

The high-speed circuit breaker has been developed especially for use in DC traction systems. It provides highest protection of the DC circuit in conjunction with the integrated digital protection and control equipment SITRAS PRO, which provides inter alia the following functions:

- detecting near and distance short circuits by way of current variation (di/dt)
- individual adjustments of tripping characteristic
- thermal monitoring of the OLE and the DC power cables
- memory functions
- display with function keys

After the circuit breaker has tripped, the DC line is tested by a line testing device, to determine whether the fault has been cleared or not. If the fault is cleared, the breaker will be re-closed automatically. If the fault is permanent, the auto-reclosure unit will lock the circuit breaker after an adjustable time has elapsed.

4.3.2 Short Circuit Device – Sitras® SCD

The short-circuiting device Sitras® SCD is installed for personnel safety reasons and to ensure the voltage limitation between running rails and structure earth. This equipment assures that inadmissible touch potential as specified in EN 50122-1 cannot happen.

If the voltage exceeds the limits, the running rails will be connected to the structure earth. For safety reasons, such a device is located in each traction substation. Each device is interfaced to the SCADA system for remote monitoring, control and annunciation.

4.3.3 OCS coupling switchgear

OCS coupling switchgear consists of one panel for the two feeder isolators and one panel for the bypass isolator.

Behind the lower steel panel door the disconnectors and the busbars are mounted. In the upper steel panel door group-alarm indicating lamps, remote/local selector switches and illuminated pushbuttons / indicating lamps as well as a mimic diagram will be located, in case of motor operated devices. The control devices will be situated behind this inside the low-voltage rece

4.3.3.1 DC feeder isolators

Two manually operated disconnectors (rated current: 1900A) with earth position will be used.. Further details on isolators are described in appendix 8.3.10.

4.3.3.2 DC bypass isolators

One motor driven single-pole load break swith (rated current: 2000A) with emergency hand operation will be located in the lower compartment.

Two illuminated pushbuttons, the local/remote selector switch and group alarm indicator will be mounted on the door of the top compartment, the related control and protective equipment inside the upper compartment.

4.4 Low Voltage Power in Substations

4.4.1 Low Voltage Power Supply

For all low voltage loads within a substation, Scottish Powers 230V/ 50Hz low voltage supply will be used. An extra low voltage supply transformers per substations fed by 11 kV medium voltage does not seem to be required and is therefore not part of this proposal.

4.4.2 Battery & Charger

Please refer to Section 3, Chapter 4 "Signalling, SCADA and Communication".

4.5 Stray Current

In order to minimise stray current, the rail insulation versus earth has to be of high quality. Recommended values for conductance to earth can be taken from EN50122-2, section 6.1.1.

As the quality of insulation deceases over the time, caused by ageing of insulation material and pollution, it is highly recommended set initial resistance at least five times as high as given in EN50122-2. This means:
0.1 S/km (10 Ohms*km) for open formation (e.g. ballast track)
0.5 S/km (2 Ohms*km) for closed formation (e.g. embedded in street surface)
0.02 S/km (50 Ohms*km) for tunnel or viaduct sections or similar track bedding

Adequate isolation will be monitored by Siemens Stray Current Monitoring System. A stray current collector cable as shown in [3] will not be needed is not part of this proposal.

A stray current monitoring system will be provided to monitor the potential between running rail and structure earth along the line. The degree of insulation is equivalent to the mitigation against DC stray currents.

The Sitras® SMS stray current monitoring system will be used to monitor the track potential. The stray current monitoring system permits evaluation of stray current

conditions of the track and the early detection of insulation deficiencies, thus enabling measures to be taken to prevent damage due to stray current corrosion. The continuous measurement of rail potential, e.g. implemented in substations, is a practical possibility for the assessment of stray current behavior without increasing stray currents.

Taking reference measurements for a functioning system, the actual stray current situation and the rail potentials relating to that are recorded. Afterwards, along the entire line voltage monitoring during operation can be easily performed for comparative purposes.

This method does neither affect the current distribution nor the rail potential in the return system.

The **SITRAS SMS** stray-current monitoring system is used to monitor the track potential of DC railway networks.
This system permits evaluation of the stray-current conditions of the track and the early detection of insulation deficiencies, thus enabling measures to be taken to prevent damage due to stray-current corrosion.

- Continuous monitoring of track potentials during operation
- Automatic location of insulation deficiencies
- Representation, archiving and analysis of track potentials in a central evaluation unit
- Transmission of measured values via the communication network, existing networks can be used
- No interference with stray-current conditions because SITRAS SMS is based on potential measurement.

The measured values are transmitted from the sensors to the central evaluation unit via OTN.

4.6 Traction Power Supply for the Depot

The traction power for the depot shall be supplied separately from the main lines in order to ensure the specific requirements of the Depot supply and those for the main lines in respect of the different earthing concepts for the running rails.

For auxiliary 400 V AC supply for the depot, one auxiliary 11kV/ 400V transformer is part of this proposal. The interface to Scottish Powers 11kV switchgear follows the same concept as described in chapter 4.1.

Besides the fact, that this auxiliary transformer is a regular 3-phase/ 3-phase transformer and not a rectifier transformer with two secondary winding with a phase shift of 30°, the general parameters are similar to the rectifier transformers described in chapter 4.2.1, rated power is taken from tender documents with 800kVA. This transformer is considered to be procured from the free market.

4.7 Cables

Power and control cables will be manufactured and tested in accordance with the related european standards as described in the subsections below. Cross-section and number of cables are dimensioned based on the results of the simulations described in the traction study and may be subject to change during detailed design phase.

4.7.1 Medium Voltage AC Cables

Halogene-free single core cables with stranded copper conductor, XLPE insulation, copper wire screen and PE outer sheath will be used.

Type of cable	2XS2Y 1 x ...RM/.. 6/10 (12) kV
Standard	HD 620 S1 Section 5C and IEC 60502-2
Conductor	circular stranded plain annealed copper in accordance with IEC 60228, class 2
Conductor screening	halogen-free extruded semi-conductive XLPE
Insulation	halogen-free dry-cured XLPE
Insulation screening	halogen-free extruded semi-conductive XLPE
Semi-conductive tape	A halogen-free semi-conductive tape will be applied for embedding the copper screen and ensuring the electrical contact between insulation screen and copper screen
Metallic screen	copper wires with copper contact helix
Outer sheath	extruded black halogen-free PE compound

Conductor screen, insulation and insulation screening will be applied simultaneously in a triple extrusion process.

Similar cables with aluminum conductor and similar electrical parameters may be used instead of the described copper cables.

4.7.2 DC Traction Power Supply Cables

Halogene-free single core cables with stranded copper conductor, XLPE insulation and PE outer sheath will be used.

Type of cable	2X2Y 1 x 400 RM 0.6/1 (1.2) kV
Standard	HD 603 S1 Section 5G and IEC 60502-1
Conductor	circular stranded plain annealed copper in accordance with IEC 60228, class 2
Insulation	halogen-free dry-cured XLPE
Outer sheath	extruded black halogen-free PE compound

Similar cables with aluminum conductor and similar electrical parameters may be used instead of the described copper cables.

4.7.3 Emergency Trip Pilot Wires

Halogene-free multi core cables with solid copper conductor, XLPE insulation and PE outer sheath will be used.

Type of cable	2X2Y 1 x RM 0.6/1 (1.2) kV

Standard	HD 627 S1 Section 4H and IEC 60502-1
Conductor class 2	circular solid copper in accordance with IEC 60228,
Insulation	halogen-free dry-cured XLPE
Outer sheath	extruded black halogen-free PE compound

5 Training

Training will be provided for the client's staff for the maintenance and operating of the railway electrification system and its components. Training will be based on the "Train the Trainer" principle.

The language of the training will be English. The persons who will be trained shall be skilled and qualified.

The training program will consist of both, classroom and practical training. The training will take place at site in Edinburgh.

The duration of training for the TPS System will be 3 weeks as a maximum. The number of persons will be limited to 6 students.

The duration of training for the OLE System will be 3 weeks as a maximum. The number of persons will be limited to 6 students.

In addition to the afore mentioned training, "training on the job" for key personnel can be arranged by participating and doing the installation as well as the commissioning work on own expenses. The "training on the job" will be finalized during system integration.

6 Documentation

The co-operation of designated Contractors is generally required in the planning and installation of the Transportation Systems. The documents delivered within the Contractor's scope of supply will be in accordance to DIN VDE standards; their quality and execution will comply with the manufacturer's quality standards. The documents that are required for the works of the Power Supply System must be made available according to the milestones of the detailed works schedule.

The documentation structure of the Power Supply System will be subdivided in a hierarchical order presenting the information for service, operation and maintenance in the form of:

- General Documentation
- Station Documentation

The **General Documentation** shall present an overview of the Power Supply System and contains system wide information such as

- Designation System
- Symbol List

- Overall System Single Lines and sectionalizing diagrams
- Information concerning interconnections and inter-tripping between stations

The **Station Documentation** shows details of the equipment like

- Equipment arrangement drawings
- Station single lines
- Circuit manuals and electrical schematics
- Cable lists

6.1 Operating and Maintenance Manuals

The General Documentation shall also serve as a support to the Operating and Maintenance (O&M) Manual.

The project specific O&M manual as well as standard equipment documentation, such as manufacturer's literature or brochures, which serves as additional information to the O&M manuals, shall be in English.

6.2 Quantity of submissions, drawings and manuals

Drawings and documents submitted for approvals shall be of 3 paper copies and one electronic version as a maximum.

As-Built drawings derived from the detailed installation design drawings shall be provided as a maximum with

- two copies in the same size as the original working copy
- one set electronic version

The As-Built drawings will be combined to the final documentation and will be handed over after the Temporary Acceptance of the Railway Electrification System. The final documentation shall not be subject of any approval procedure.

Software documentation is limited to the user manual only

Computer Software

The software to be used for this project shall be identical for each and every party working on the project. Software used shall not be limited to the following proposed Software:

- MS - WINDOWS
- MS - OFFICE
- PRIMAVERA or MS - PROJECT
- DESIGNER

- VISIO

Final version and software to be used shall be determined and mutually agreed.

Drawing Standards

All drawings shall be in accordance with the DIN VDE respectively IEC regulations. Most of the drawings shall be electrical circuit diagrams that are grouped to circuit manuals for each component. The circuit diagrams shall be part of the electrical documentation showing the wiring and the arrangement of the electrical equipment within a cubicle and the interconnection between the cubicles.

They shall comply with the standards mentioned above.

These standards lay down the layout of drawings, the lettering, and the documentation and designation system.

CAE/CAD Systems

In general all drawings for TPS System, besides the drawings for detailed installation design, shall be produced by the CAE (Computer Aided Engineering) System ELCAD, which is the Contractor's standard system for preparing electrical schematics. This system is qualified to produce this kind of drawings according to the IEC standard. The symbols used by the system shall be stored in separate libraries and shall comply with the relevant IEC standard.

ELCAD drawings can also be converted to DXF files, which can be read by the AutoCAD software, but it is not intended to prepare CAD files in AutoCAD format, because the system features are not available in AutoCAD. Converted files in AutoCAD are only graphic symbols like lines, numbers and characters without any function and layer information.

Software and Hardware supply of any CAE/CAD system is not included in this scope of supply.

However, for preparation of supplementary documents (lists, descriptions, schematics, etc.) the MS-Office package can be used as tool. PDF-files shall be accepted if manufacture's standard literature is not available in any other format.

Paper size

Paper sizes in the ISO "A" series shall be used for all drawings. The manuals shall be A4 or A3, arrangement drawings up to a maximum size of A1.

ISO"A" series	sheet [mm]	size border [mm]
A4	210 x 297	200 x 287
A3	297 x 420	287 x 410
A2	420 x 594	410 x 584
A1	594 x 841	584 x 831

Language

All documents including shall be written in English language.

Equipment identification

All major equipment will be labeled with nameplates in English. Cable lists with important information will be provided. Individual wires are only marked at outgoing terminals. Internal cubicle wiring will be performed as per the manufacturer's standard and may not be labeled.

6.3 Approvals by the Client or his representatives

The following documents will be prepared and submitted to the Client (reviewable design data) according to progress of the design:

- DC Traction Study
- DC Short Circuit Study
- Single line diagrams of substations
- Layout of the Traction Supply Substations on typical basis
- Circuit diagrams and terminal lists of main components (e.g. transformer, cubicles)
- Cable lists
- Maintenance manuals
- Training documents

Submissions with specification of the equipment will be prepared as described above. Therefore, these documents will be elaborated in close co-operation with the Client and based on the information of the other partners. They will be presented to the Client for approval and will then be the basis for the project planning.

In particular it shall be emphasized that the project schedule dates depend on the approval of the Client being made in time. For technical clarifications the Client shall, if necessary, provide information at short notice.

Design documents shall be forwarded by the Client (where necessary) after their approval to any third party to be involved so that the approval period of time is limited as much as possible.

If any documents submitted have not been answered in writing within a certain period of days (not jet defined) after submission it shall be deemed as approved by all parties involved.

7 Testing and Commissioning

The proposed testing and inspection is given to optimize the testing and commissioning phase with respect to schedule, time duration and resources and to ensure a sufficient cross-check of the contractual requirements with reasonable effort.

A test plan for testing and commissioning of items whose installation and construction are described in this document will be prepared regarding contractor scope of supply. The plan will include:

- Scheduling of testing
- Tests to be carried out

The test equipment and staff necessary for appropriate testing and commissioning of the railway electrification system will be provided.

7.1 Type and Routine Tests

The contractor's equipment is type tested and test certificates will be available for type testing performed in the manufacturer's factories or external institutes.

Any execution of additional type tests or repetition of tests is not included and will be charged extra.

Short circuit tests, if required for specific equipment, are already covered by type tests and additional short circuit tests or repetition of these tests is not included and will be charged extra.

Routine tests and factory acceptance tests will be carried out for all main components on the basis of the test plan to be submitted and approved. Routine tests will be carried out at the location of manufacture and they may exemplarily be witnessed by the client or his representative (travel expenditure and accommodation at his own cost).

Only factory assembled equipment (e.g. switchgear) will be subject to factory acceptance tests. For components (e.g. current or voltage transformers , etc.) the routine test certificates of the respective suppliers shall be sufficient. Those tests will be carried out in the manufacturer's test-field.

7.2 Commissioning and Integrated Tests

During the commissioning work, the site tests according to the manufacturer's recommendation will be performed. The manufacturer's standard site test forms shall be used.

After the commissioning of the Railway Electrification System tests will be carried out for the acceptance of the system. Those tests will be performed under the observation of the client. Therefore the client provide personnel at short notice which is authorized to sign the acceptance certificates.

Tests that refer to the integration of the subsystem after the completion of a location or section shall be witnessed by responsible persons regarding the railway electrification system, to follow up the tests and to sign the certificates accordingly.

8 Appendices

8.1 Glossary

AC	Alternating Current
ACR	AC Rectifier Circuit Breaker (= Scottish Power Consumer Circuit Breaker)
BS	British Standard
C	Capacitor
CB	Circuit Breaker
DC	Direct Current
DNO	Distribution Network Operator (for Edinburgh Tram: Scottish Power)
EMC	Electromagnetic Compatibility
EN	European Norm
ETN	Edinburgh Tram Network
FFP	Frame Fault Protection
HSCB	High Speed Circuit Breaker
LRT	Light Rail Transit
LV	Low Voltage
MV	Medium Voltage (for LRT Edinburgh: 11 kV)
NC	Normally Closed
NO	Normally Opened
OHL	Overhead Line System
OLE	Overhead Line Equipment
OTN	Open Transport Network
PLC	Programmable Logic Controller
R	Resistor
REL	Railway Electrification
RMU	Ring Main Unit
SCADA	Supervisory Control And Data Acquisition
SCD	Short Circuit Device
SCS	Substation Control System
SMS	Stray Current Monitoring System
SP	Scottish Power (local DNO)
TPH	Trams Per Hour
TPS	Traction Power Supply

8.2 OHL – Appendices

8.2.1 Assembly Drawings OHL (Bid Phase), 32 pages

8.3 TPS – Appendices

8.3.1 Excerpt - Traction Study

8.3.1.1 Report – Traction Study

8.3.1.2 Spreadsheet – Input Data

8.3.2 Single Lines (Overall and Substation)

8.3.3 Frame Fault Protection Slides

8.3.4 Stray Current Monitoring Slides

8.3.5 Traction Substation Control – Conceptual Overview

8.3.6 Substation Room Layouts

8.3.7 DC Switchgear Sitras® DSG

8.3.8 Short Circuit Device – Sitras® SCD

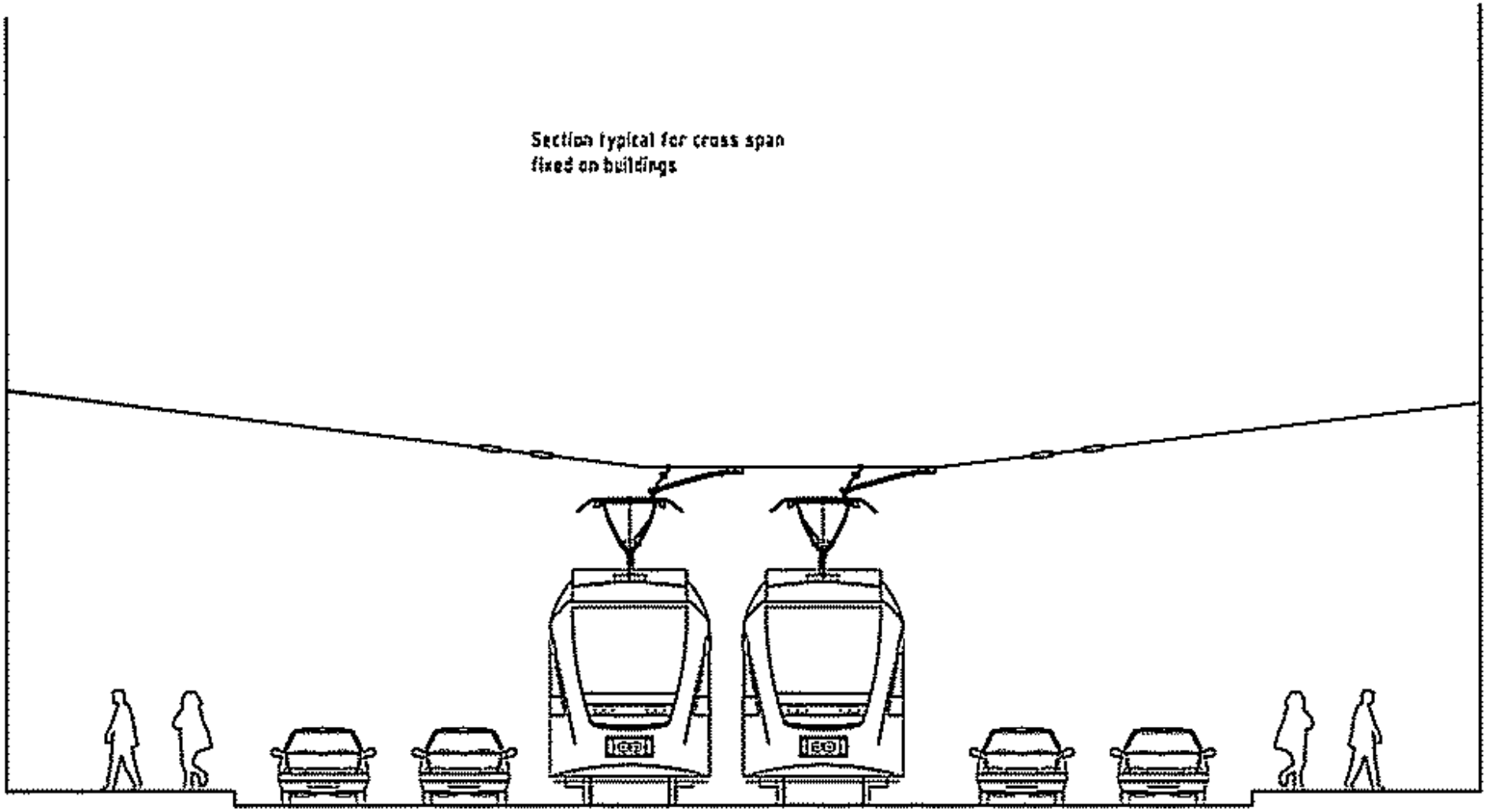
8.3.9 Trackside Cabinet – preliminary Sketch

8.3.10 Feeder and Bypass Isolators – Description of Function in proposed REL-System

8.3.11 List of SDS OLE drawings used for proposed OLE Design

8.3.12 11kV Medium Voltage Switchgear

Section typical for cross span
fixed on buildings



LRT EDINBURGH

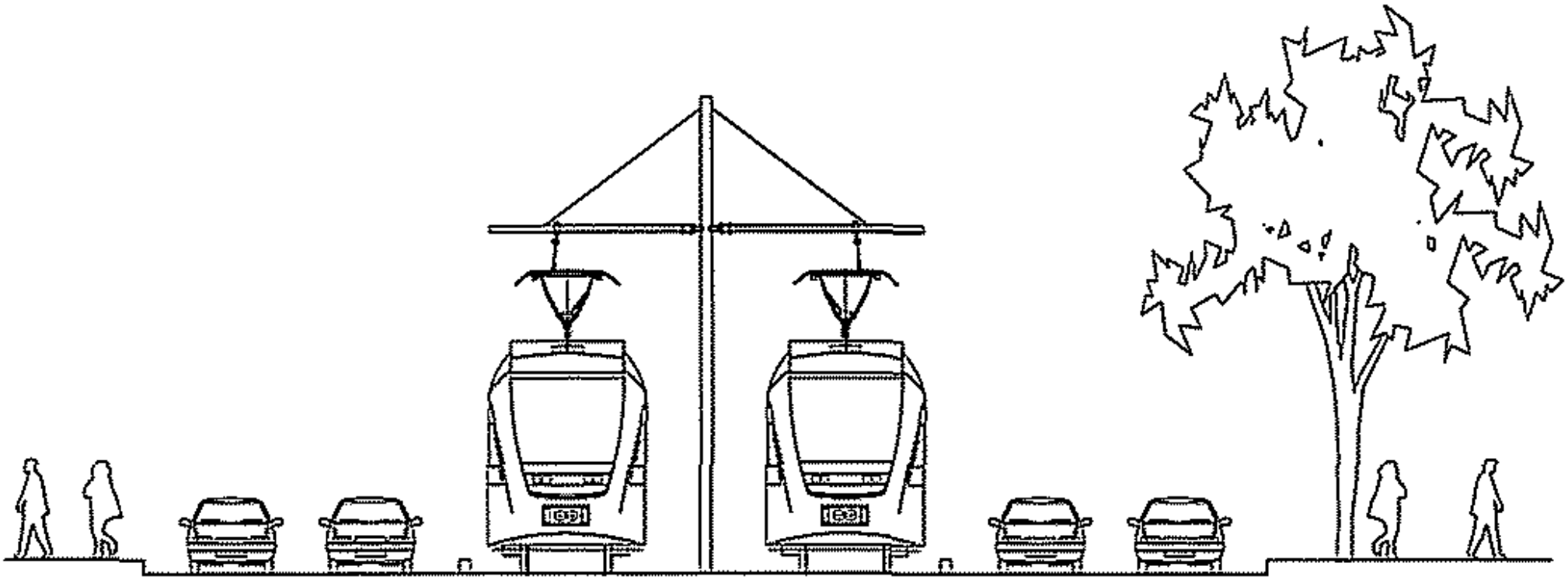
Assembly Drawings Ord. (Bid Phase)

Cross section
cross span (wall anchor)

SIEMENS

USB0000000_0331

Section typical for centre pole
with back to back cantilevers



LRT EDINBURGH

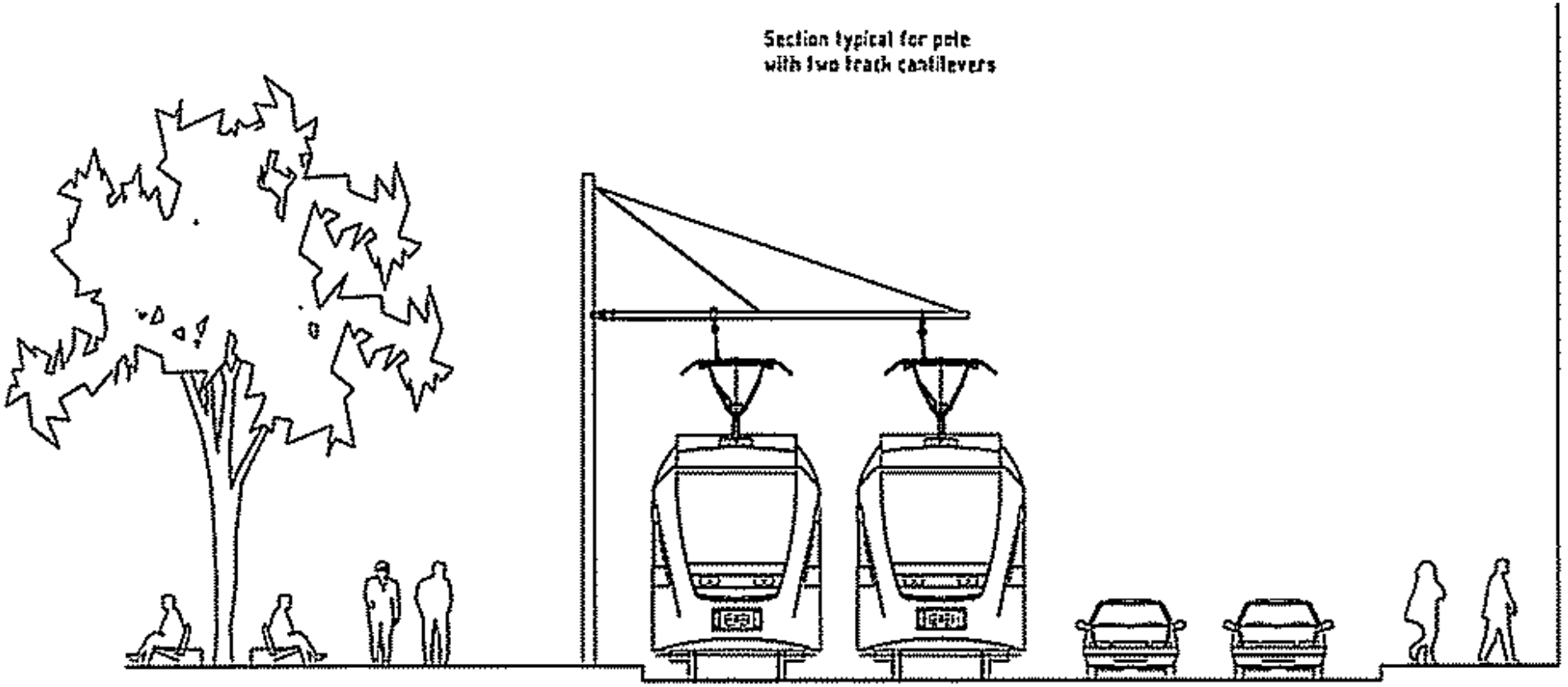
Assembly Drawings CAD (Bid Phase)

Cross section
with single track cantilevers

SIEMENS

USB0000000888_0332

Section typical for pole
with two track cantilevers



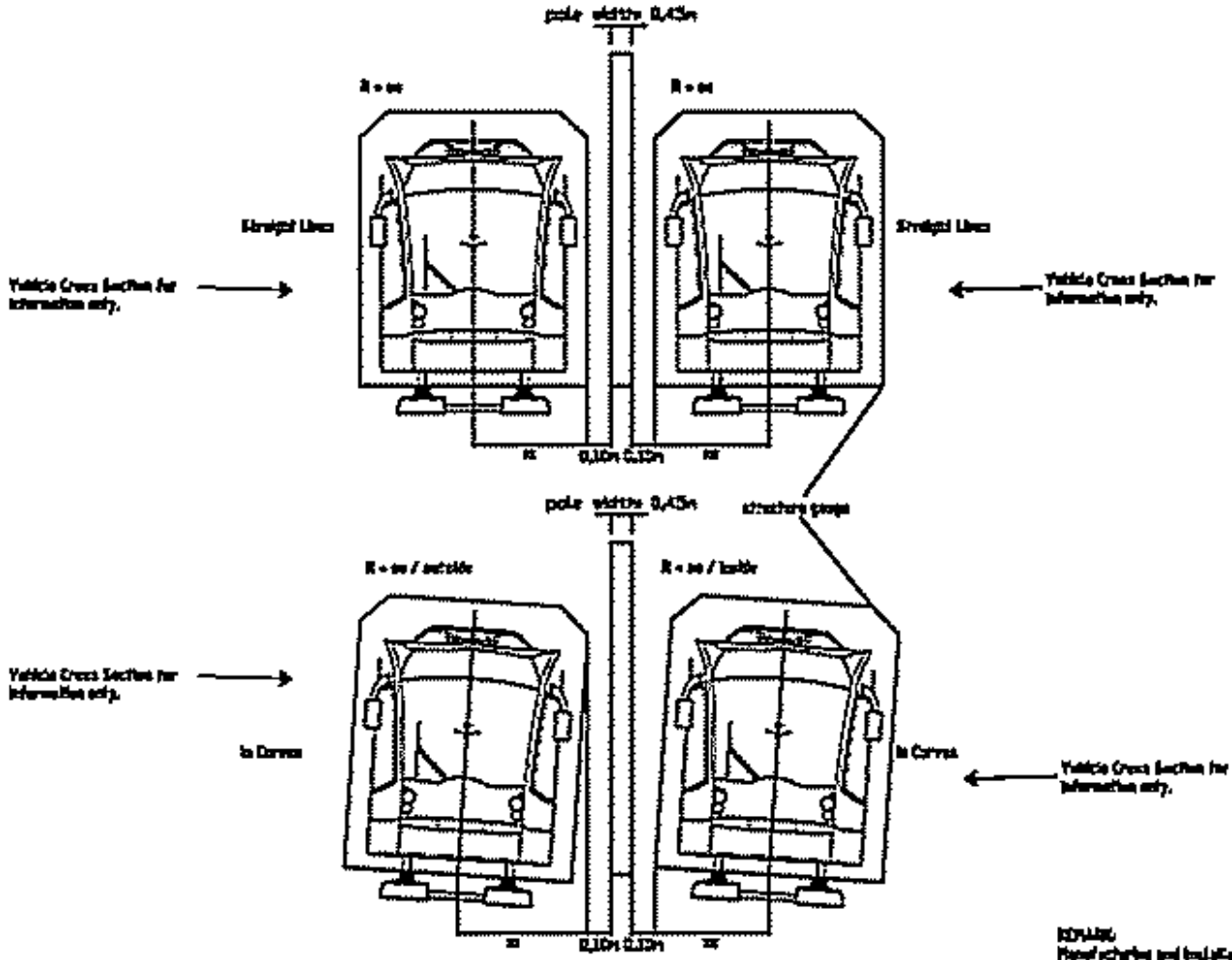
LRT EDINBURGH

Assembly Drawings Ctd. (Bid Phase)

Cross section
with two track cantilevers

SIEMENS

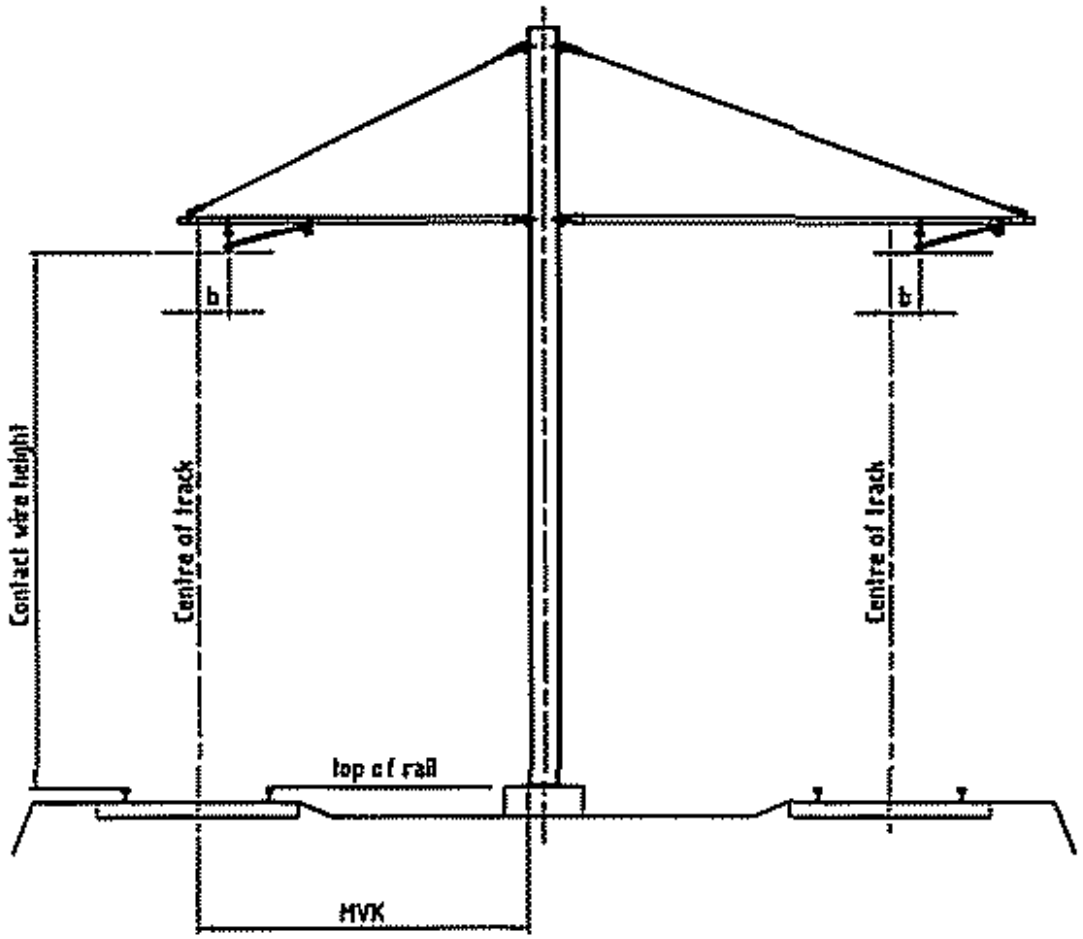
USB0000088_0233



EXPLANATION:
Manufacturing and installation tolerances to be considered for definition of distances between tracks and structure gauge.
Not applicable for depot area, will be defined during detailed design.

LAT EDINBURGH	Assembly Drawings OHL (Bid Phase)	
	Manufacturing and installation tolerances for OHL Equipment	
SIEMENS	UKA -21113-0231	

USB00000088_0234



MVK = distance track centerline
to face of pole
b = stagger of contact wire

LRT EDINBURGH

Scale: none | Size: A4

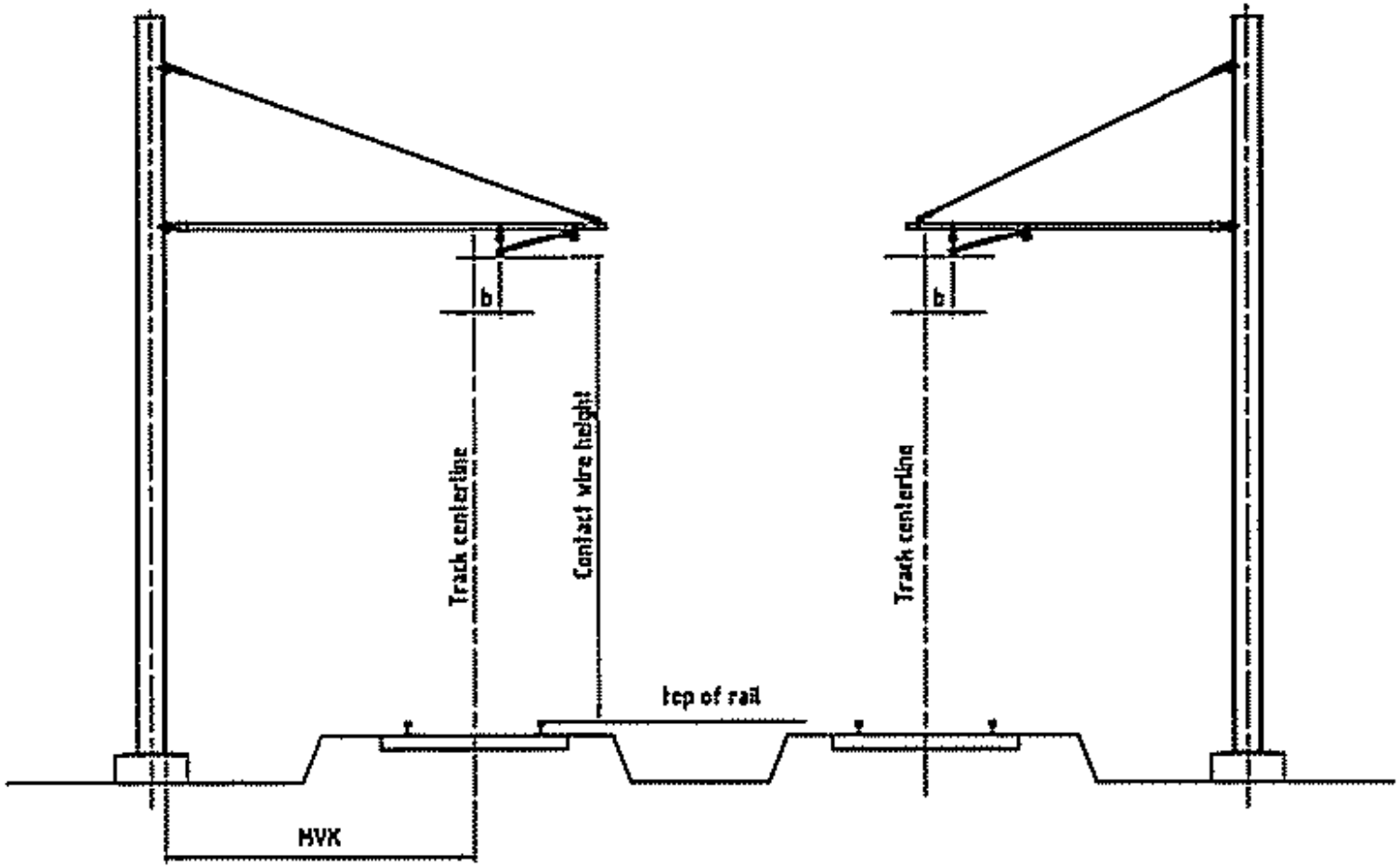
Assembly Drawings DHL (Bid Phase)

Simple contact wire system simple cantilever
with steady arm on center pole

SIEMENS

UKA -2100-0231

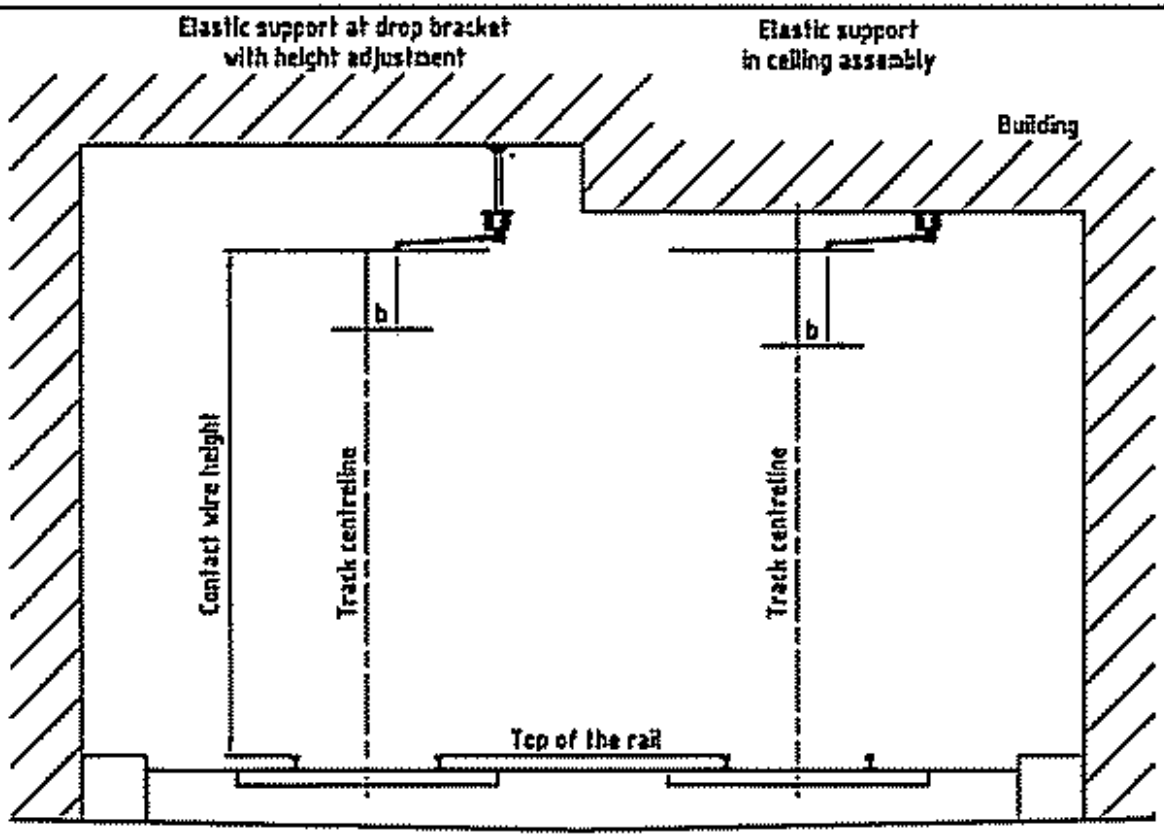
USB00000088_0335



MVK = distance track centerline
to face of pole
b = stagger contact wire

LRT EDINBURGH	Scale: none Size: A4
	Assembly Drawings Ctrl, Bid Phase1
	Simple contact wire system simple cantilever with steady arm on side pole
SIEMENS	UK4 - [illegible]

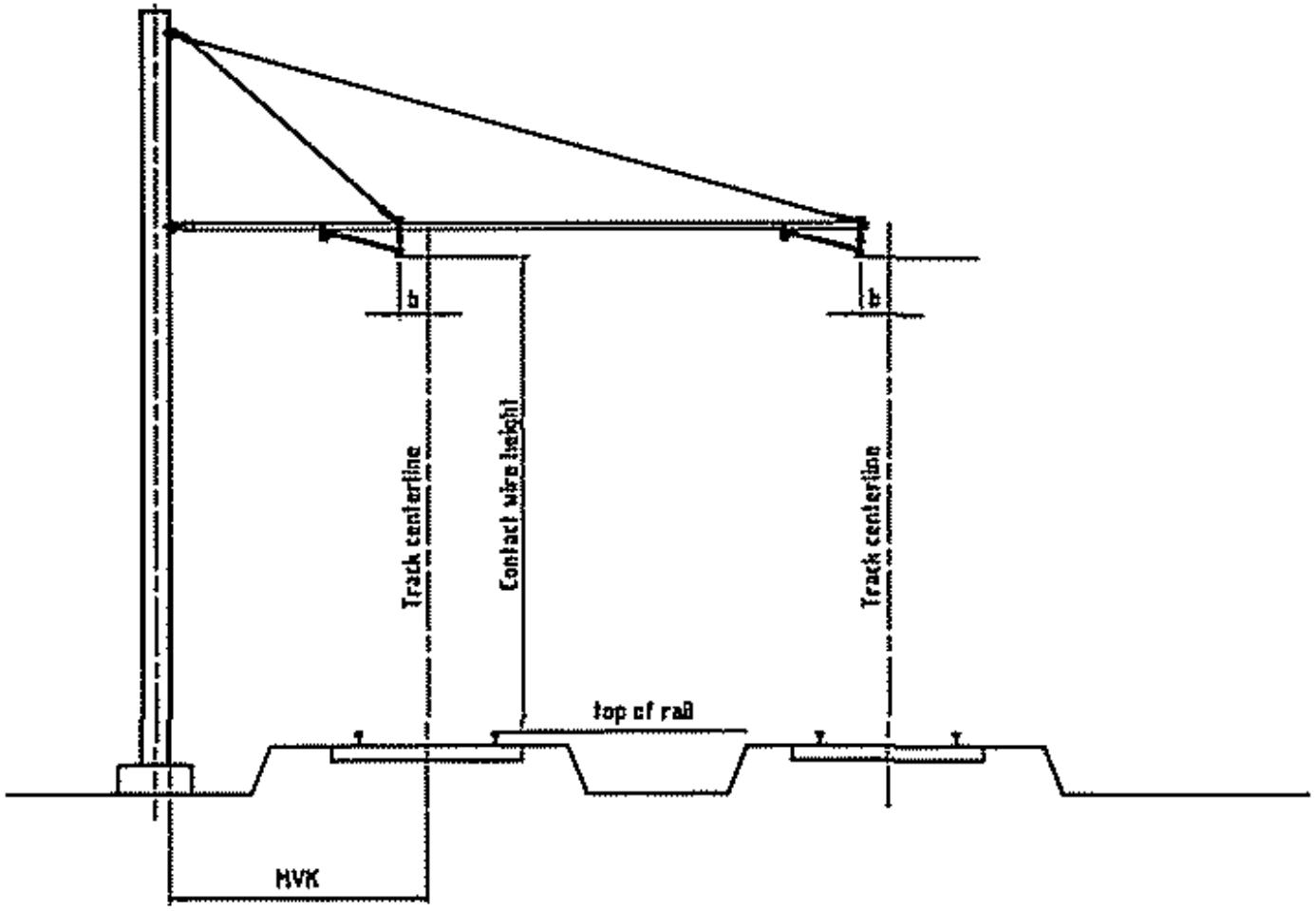
USB00000088_0336



b = contact wire stagger

LRT EDINBURGH	Scale: none Size: A4
	Assembly Drawings CHL (Bid Phase)
	Single contact wire system under bridges, with elastic supports
SIEMENS	UKA-ZT03-0331

USB00000088_0337



MVK = distance track centerline
to face of pole
b = stagger of contact wire

LRT EDINBURGH

Scale: none | Size: A1

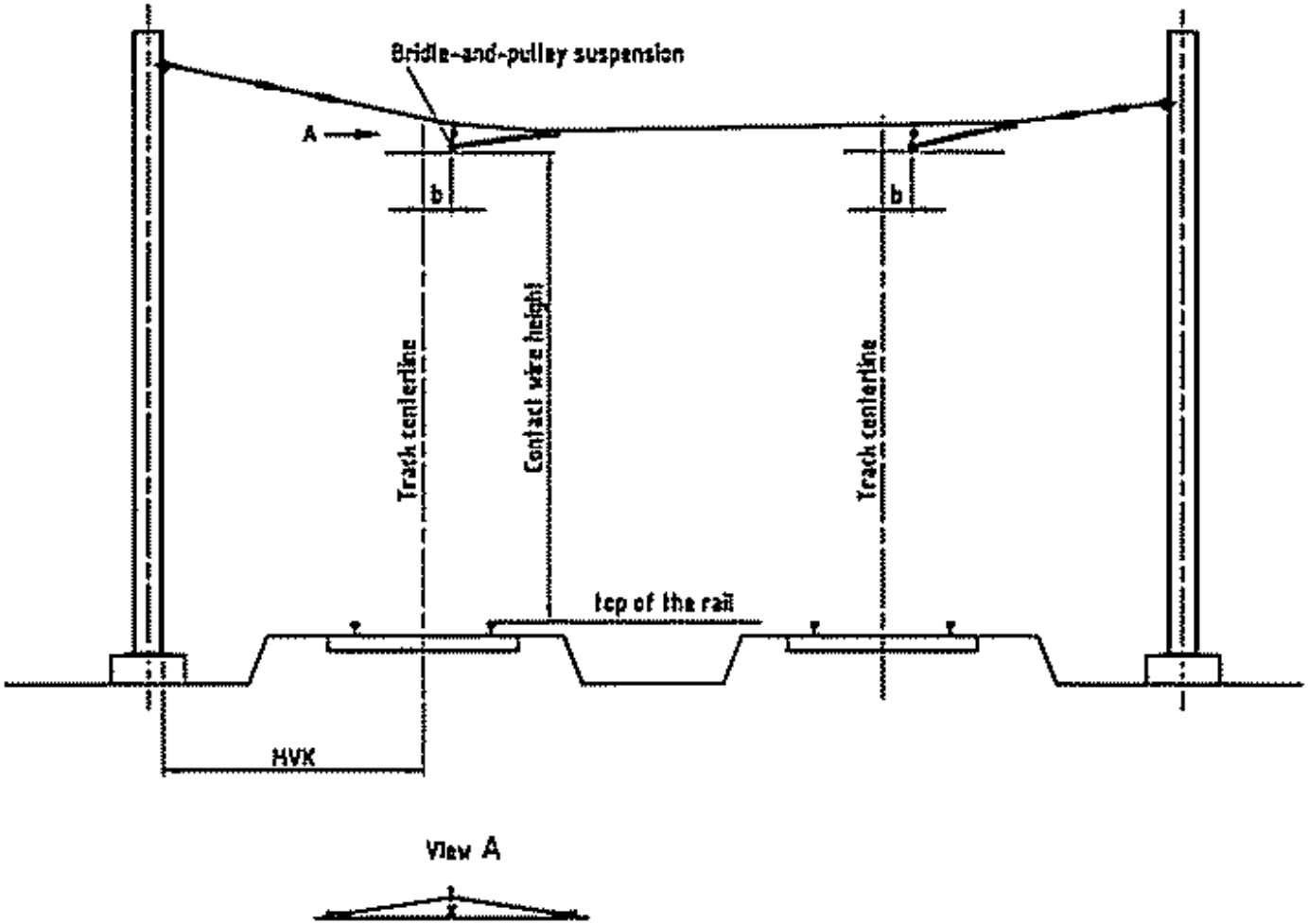
Assembly Drawings Ord. (Bid Phase)

Simple contact wire system simple cantilever
with steady arm for two tracks on side pole

SIEMENS

UKA -21100-0291

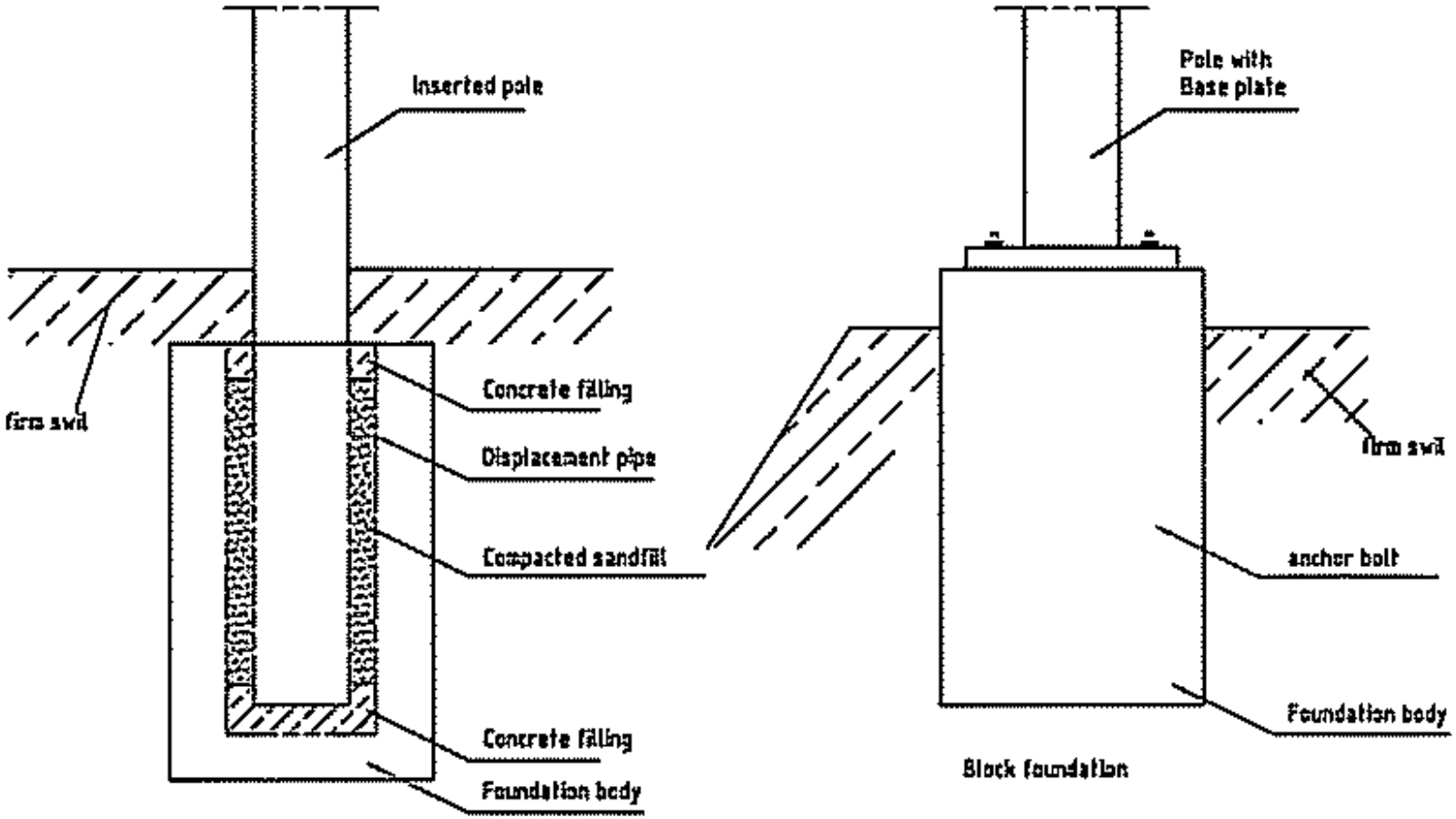
USB00000088_0338



MVK = distance track centerline
to face of pole
b = contact wire stagger

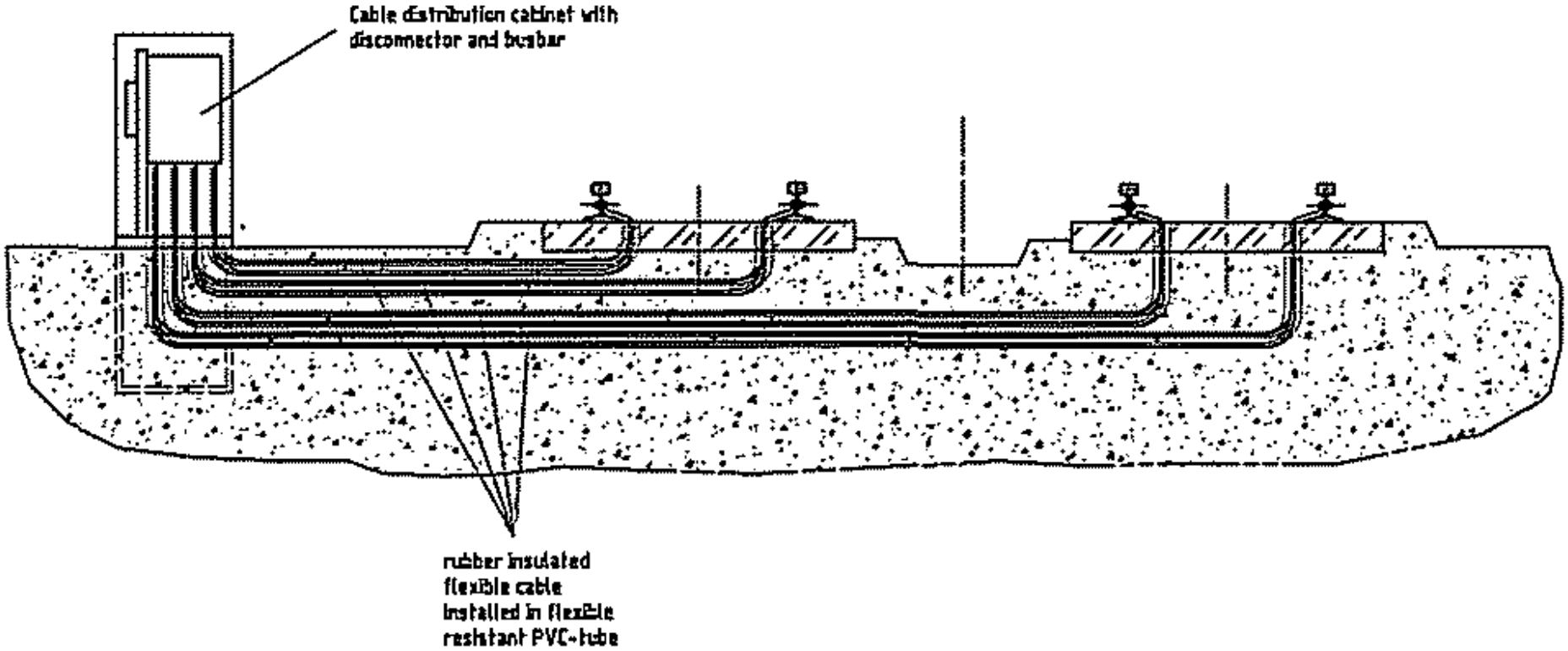
LRT EDINBURGH	Scale: none / Size: A1
	Assembly Drawings Ctrl. (Bid Phase)
	Simple contact wire system cross span pole ploe with bridle-pulley- suspension for two tracks
SIEMENS	UKA -Z1100-0221

USB00000088_0339



LAT EDINBURGH	Scale: none / Size: A4
	Assembly Drawings Ort. (Bid Phase)
	Examples for Foundations
SIEMENS	UKA - Z100-0201

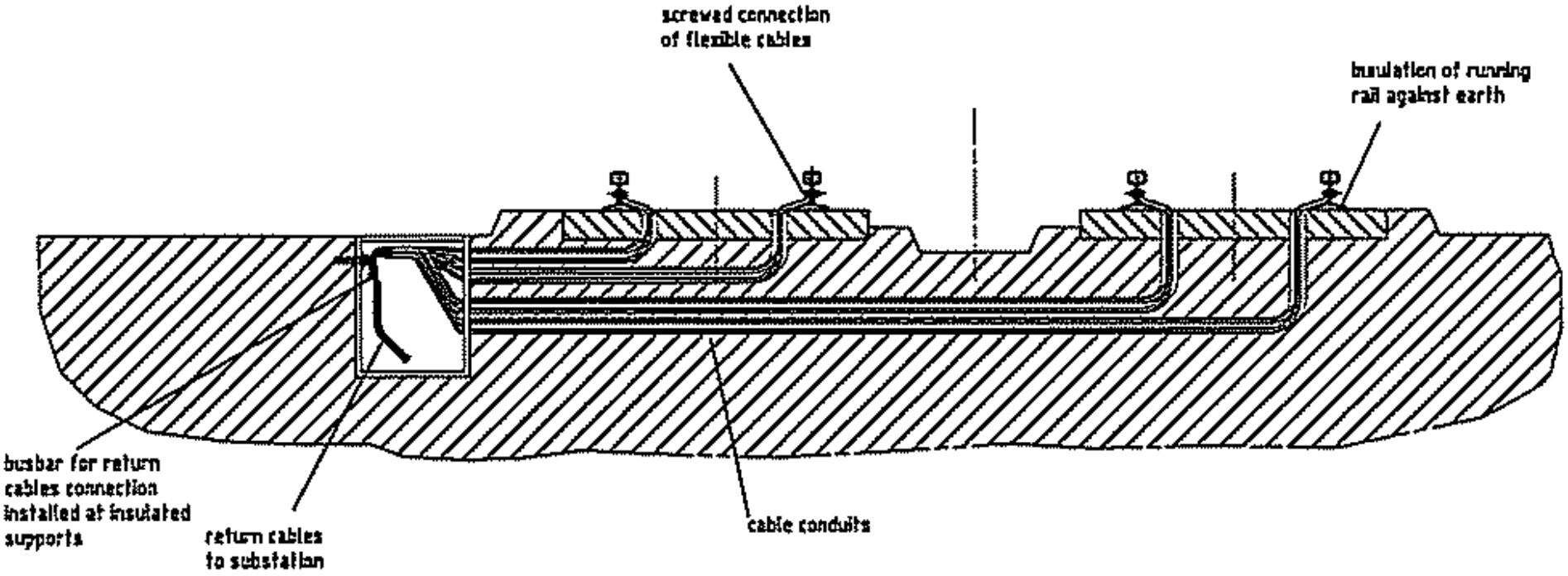
USB00000088_0340



The exactly arrangement of the return conductor connection depending on plant design in relation of the local conditions

LRT EDINBURGH	Assembly Drawings Civil (Bid Phase)
	Return conductor connection at rail cable distribution cabinet with cable connector
SIEMENS	

USB00000088_0344

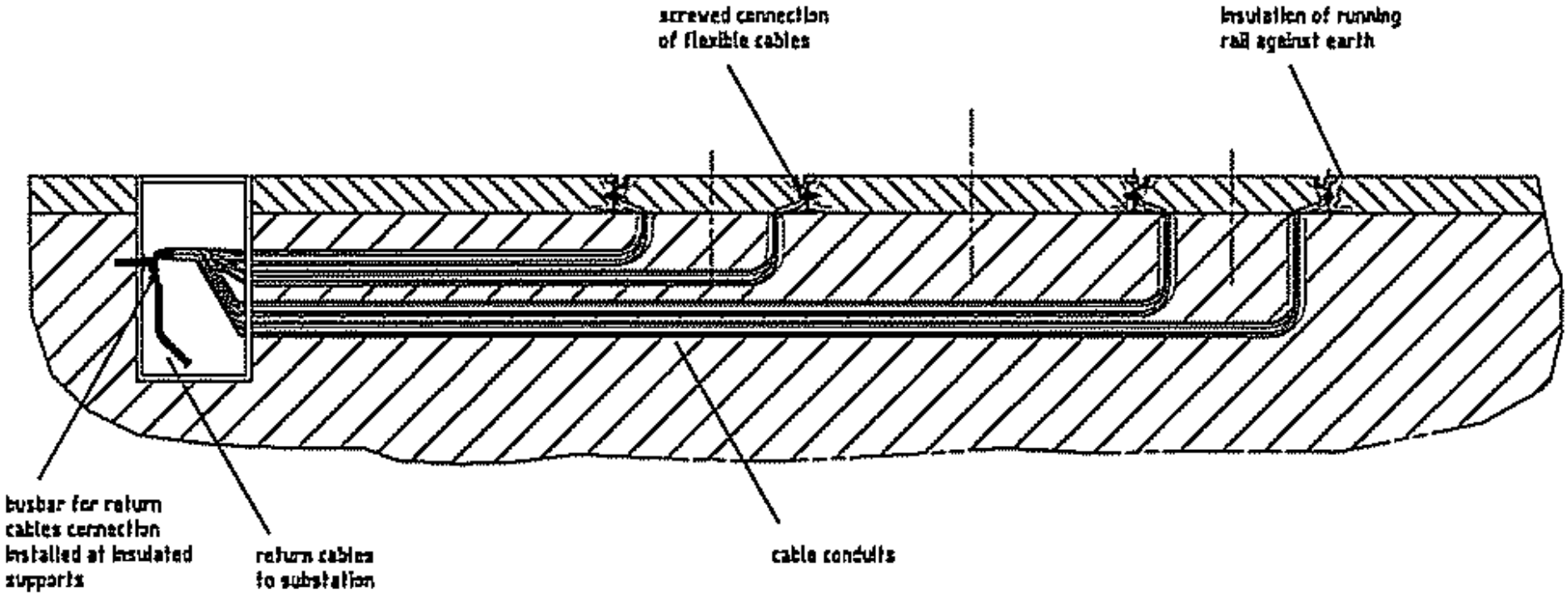


applicable at traction substation

Exact arrangement of the return conductor connection depending on Track work design related to local conditions

LRT EDINBURGH	Size: A1	
	Example of return cable connection at segregate tracks	
SIEMENS		

UGB0000000000_0342

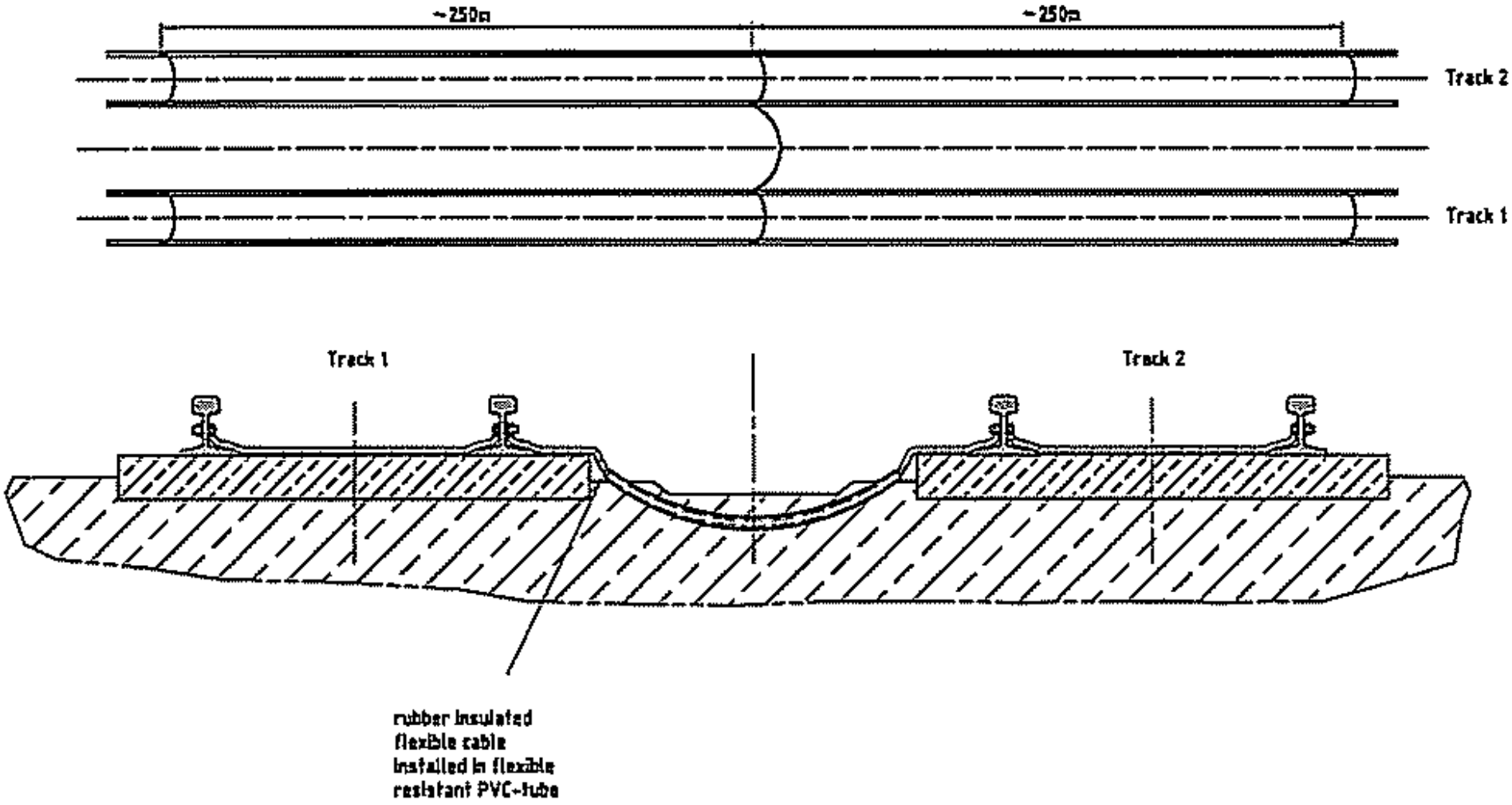


applicable at traction substation

Exact arrangement of the return conductor connection depending on Track work design related to local conditions

LRT EDINBURGH	Scale: none / Size: A4
	Assembly Drawings OHL (Bid Phase)
	Exempel of return cable connection at embedded tracks
	UK4 - [illegible]

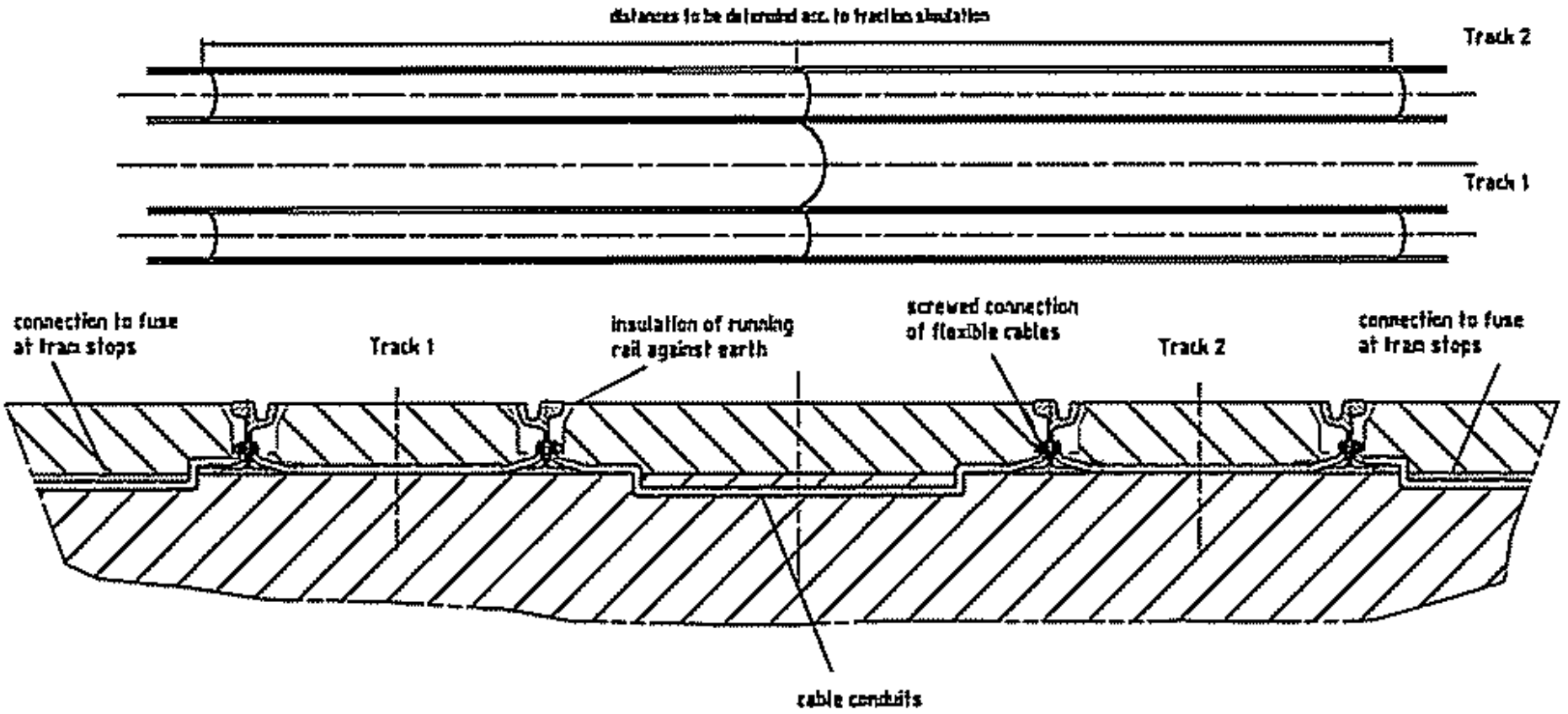
USB00000088_0343



The arrangement of the track and rail current connectors depended on the plant configuration especially in relation with insulated track sections.

LRT EDINBURGH	Scale: none Size: A4
	Assembly Drawings Ctrl. (Bid Phase)
	Track and rail current connection for two tracks
SIEMENS	UK4 -2100-4231

USB00000088_0344



Exact arrangement of the track and rail bounds
depending on Track work dealing related to local condition

applicable at tram stops

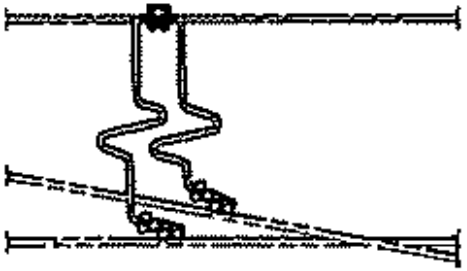
LRT EDINBURGH	Scale: none / Size: A1
	Assembly Drawings (NL Bid Phase)
	Principle arrangement of track and rail bounds for embedded track
SIEMENS	UK4-2100-[illegible]

USB00000088_0345

Current connector
contact wire-contact wire
between two single contact wires



Current cocnector
contact wire-messenger wire-contact wire
between catenary line and single contact wire



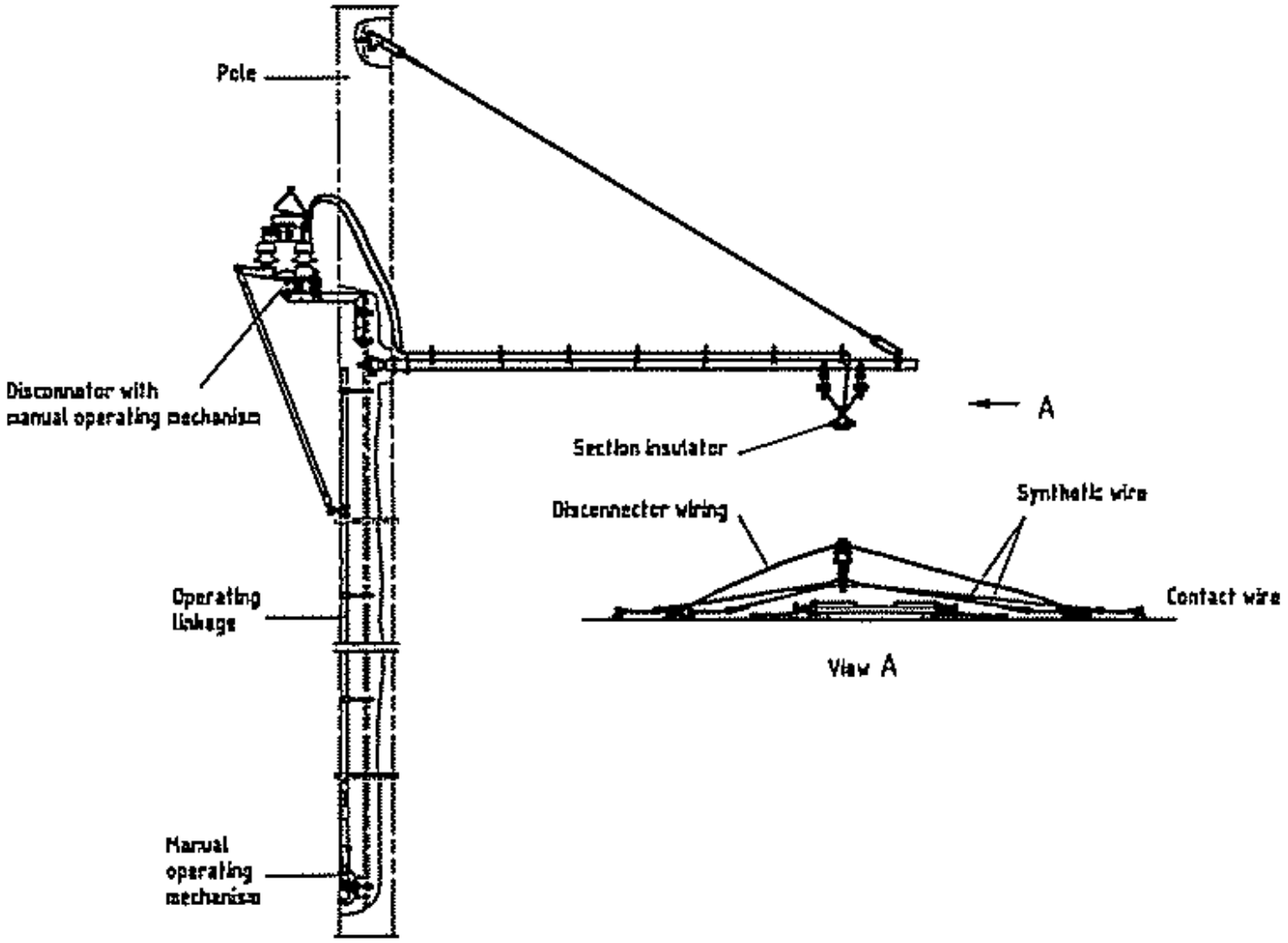
Wire connector:
E-copper 120mm² flexible

The arrangements of the current connectors depended on the contact line system configuration

Double arrangement current connectors a vailable

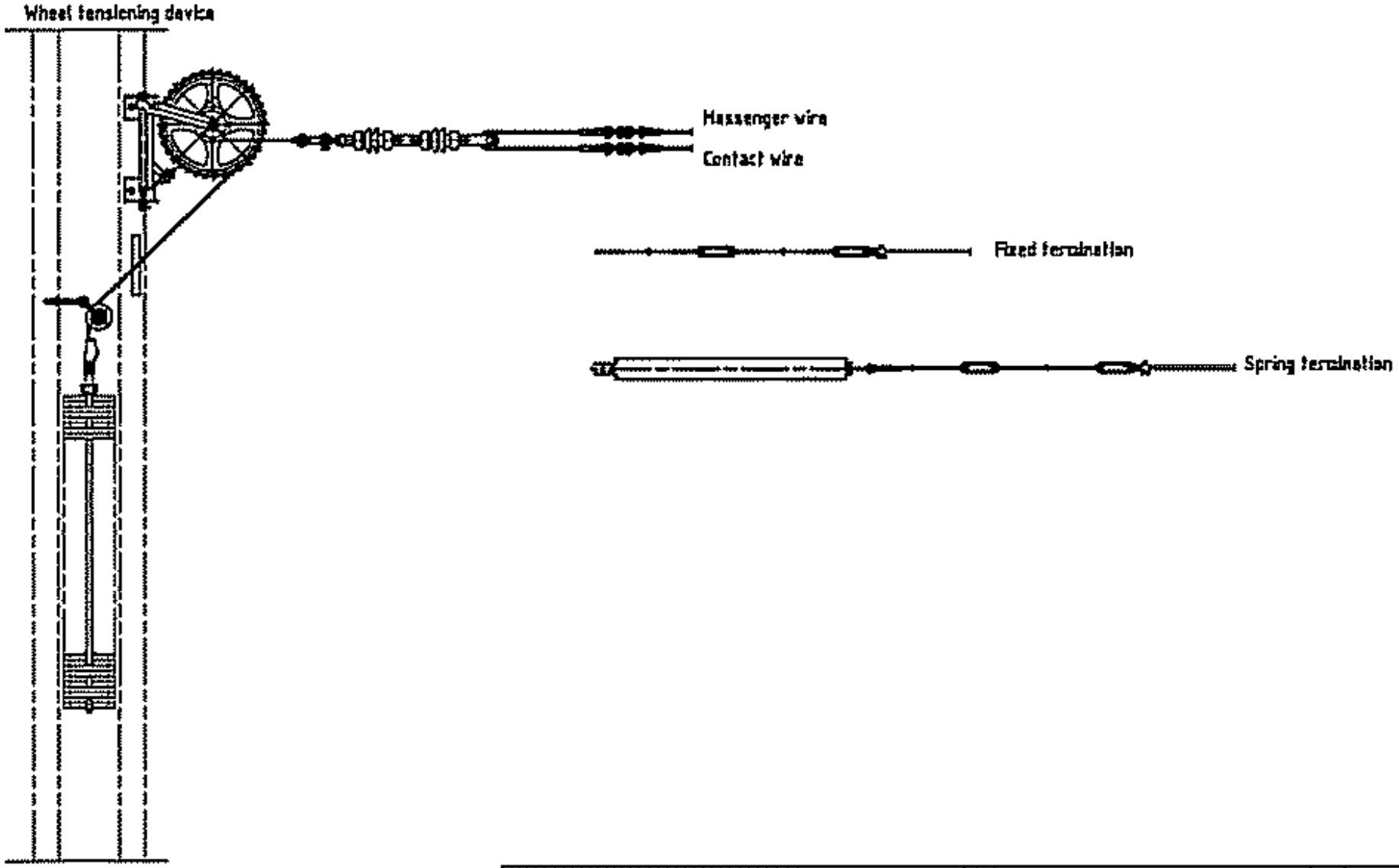
LAT EDINBURGH	Scale: none	Size: A1	
	Assembly Drawings CHL (Bid Phase)		
	Current connector		
SIEMENS	UKA-21103-0201		

USB00000088_0346



LRT EDINBURGH	Scale: none / Size: A4
	Assembly Drawings CHL (Bid Phase)
	Simple contact wire system sectioning for simple cantilever at swichtable with disconnector for one pole
SIEMENS	UKA - [illegible]

USB00000088_0347



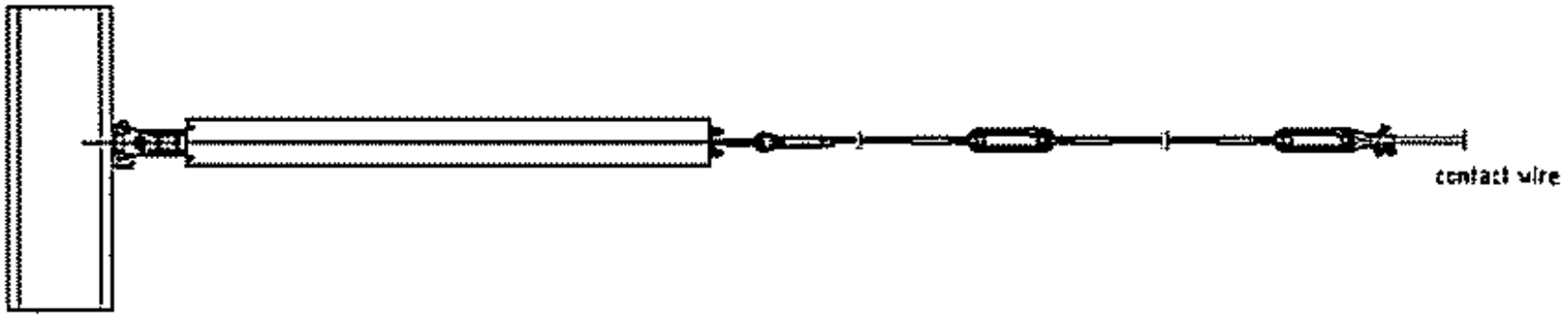
LRT EDINBURGH

Assembly Drawings (Int. Bid Phase)

Terminations for contact wire/s or catenary system

SIEMENS

USB00000088_0348

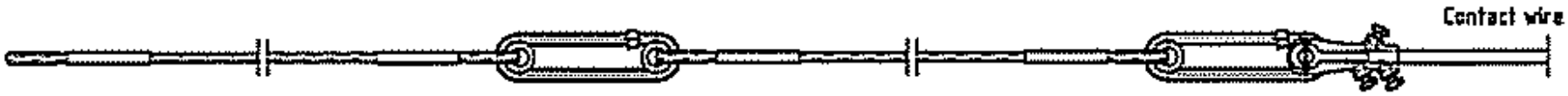


EDINBURGH

Flexible termination at pole for contact wire with spring

SIEMENS

USB0000088_0349



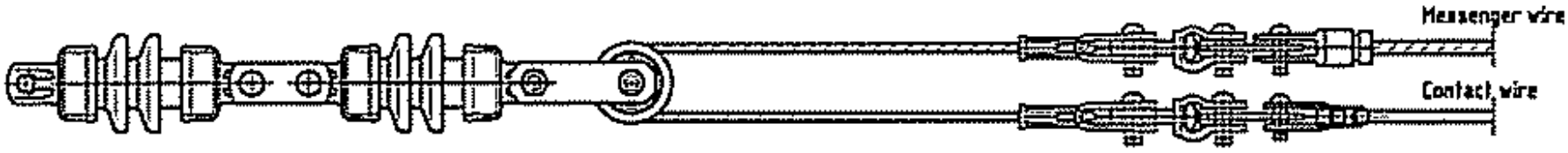
LAT EDINBURGH

Assembly Drawings Ord. (Old Phase)

Fixed termination for single contact wire

SIEMENS

USB0000088_0350

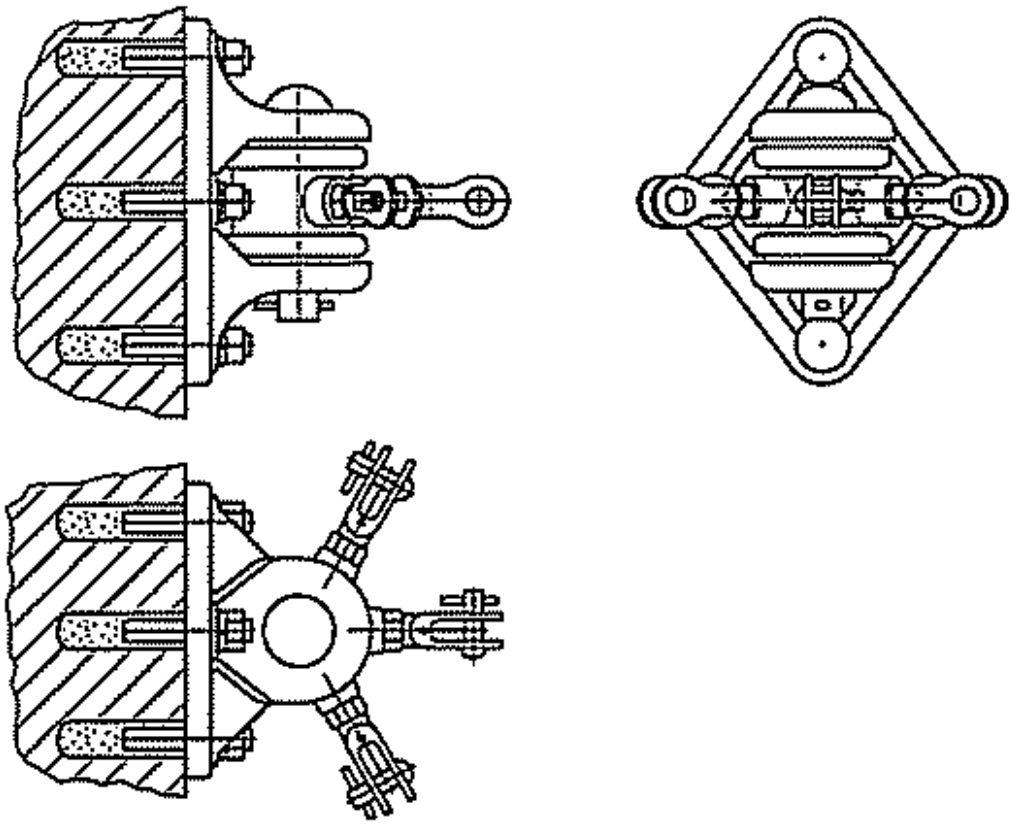


LRT EDINBURGH

Assembly Drawings CHL (Bid Phase)

Fixed termination for catenary system with cable roll

SIEMENS



LRT EDINBURGH

Scale: none | Size: A4

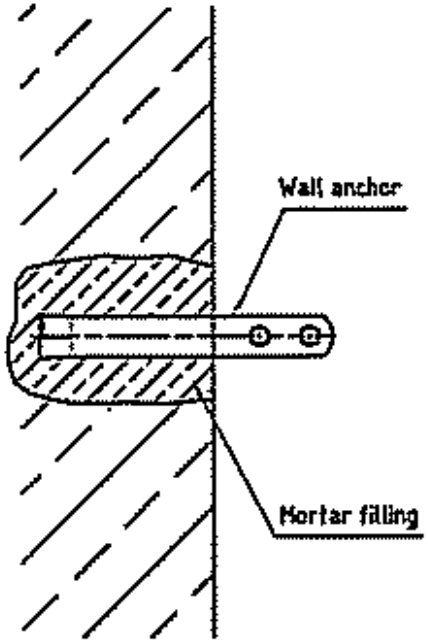
Assembly Drawings CHL 3rd Phase

Building fixing for multiple fixation

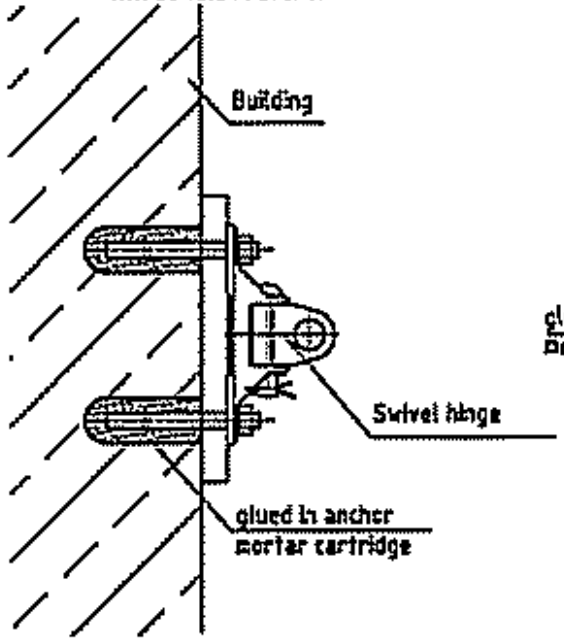
SIEMENS

UKA -2100-0201

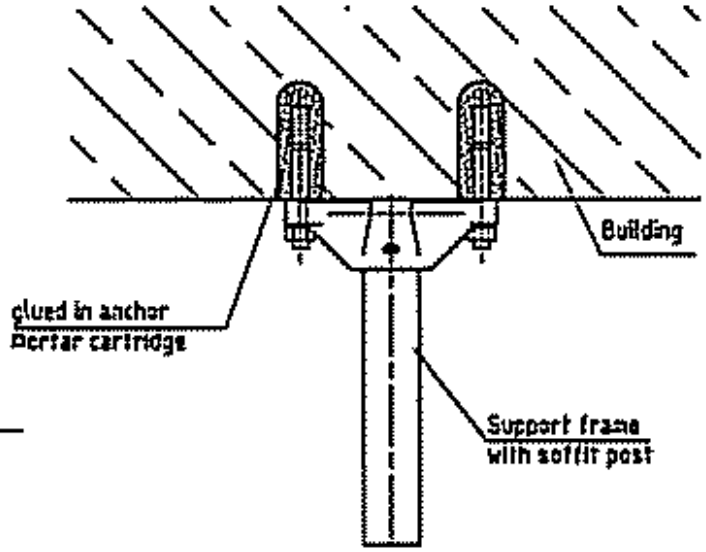
Wall anchor in mortar filling



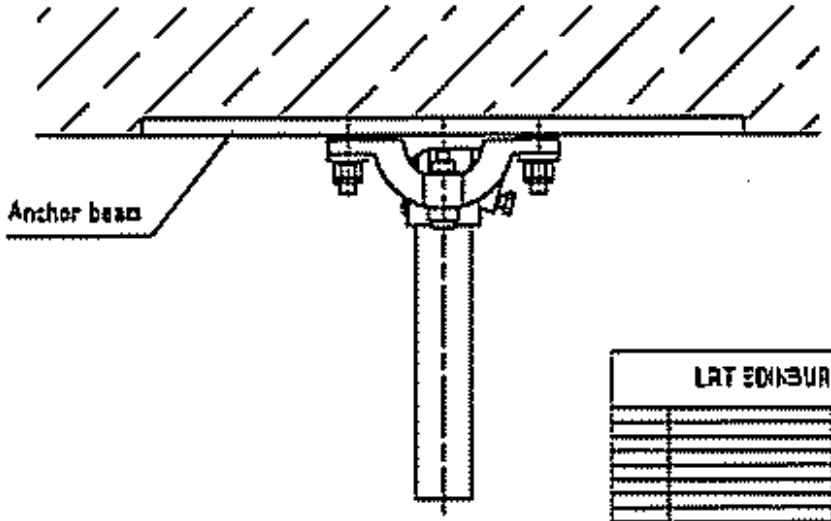
swivel hinge, bracket arrangement with doweld in anchor



Support frame with doweld in anchor

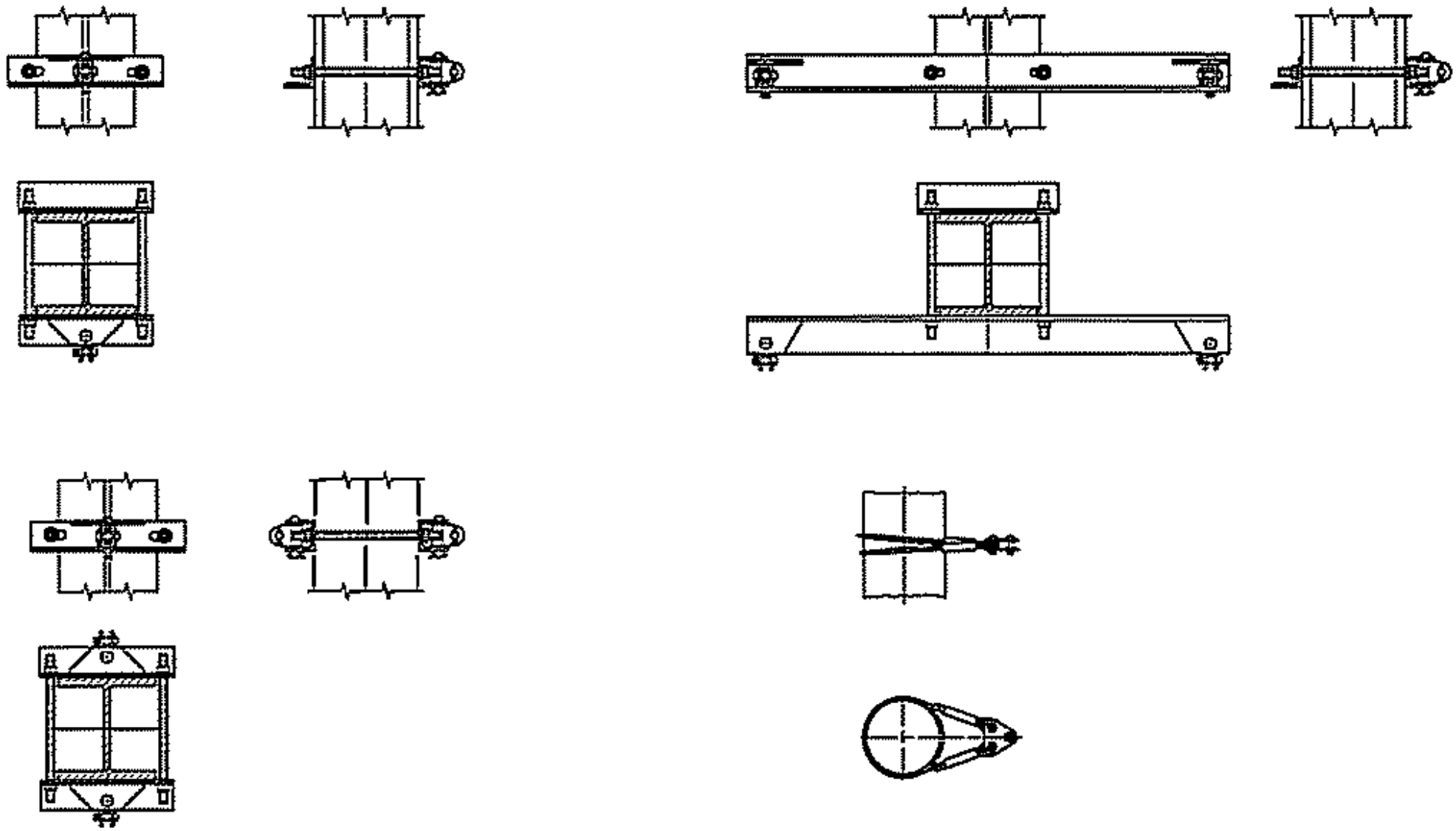


adjustable support frame at anchor beam



LAT EDINBURGH	Scale: none	Size: A3
	Assembly Drawings CAD, Old Pressel	
	Building fixing arrangements	
SIEMENS	UKA -Z1100-0251	

USB0000088_0353



LRT EDINBURGH

Scale: none | Size: A4

Assembly Drawings CHL (Bid Phase)

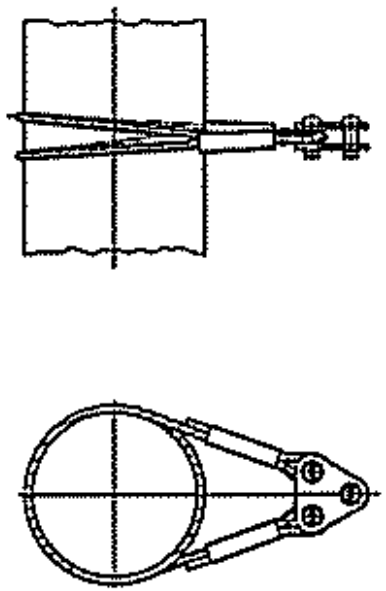
Fixing accessories arrangements for contact wire poles

SIEMENS

UKA-ZT00-0201

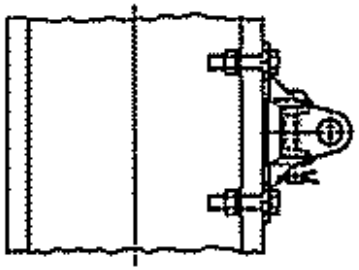
USB00000088_0354

Fixed termination
with pole cable loop
- tubular poles -

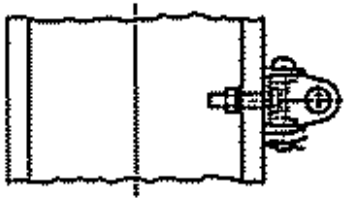


Swivel hinge
bracket arrangement, screwed
- HE/Square poles -

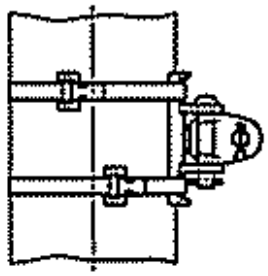
Bolts in vertical configuration



Bolts in horizontal configuration



Swivel hinge
bracket arrangement
with punch-lock band fastening
- round poles -



LRT EDINBURGH

Scale none | Size A4

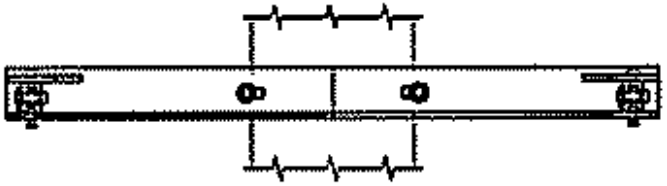
Assembly Drawings CHL (Bid Phase)

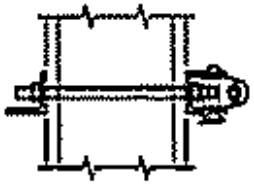
Fixing accessories arrangements for contact wire poles

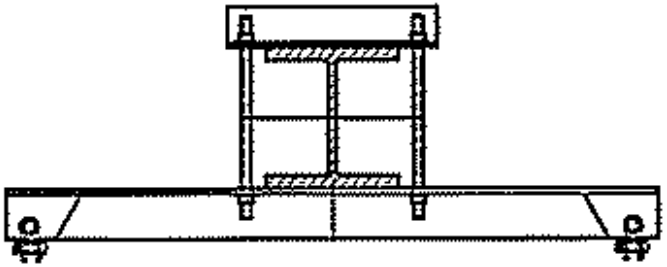
SIEMENS

UKA -Z1100-0201

USB00000088_0355







LRT EDINBURGH	Scale: none	1	Size: A4
	Assembly Drawings Ont. Bid Phase		
	Fixing for double cantilever at steel pole		
SIEMENS	UKA -21103-0231		N

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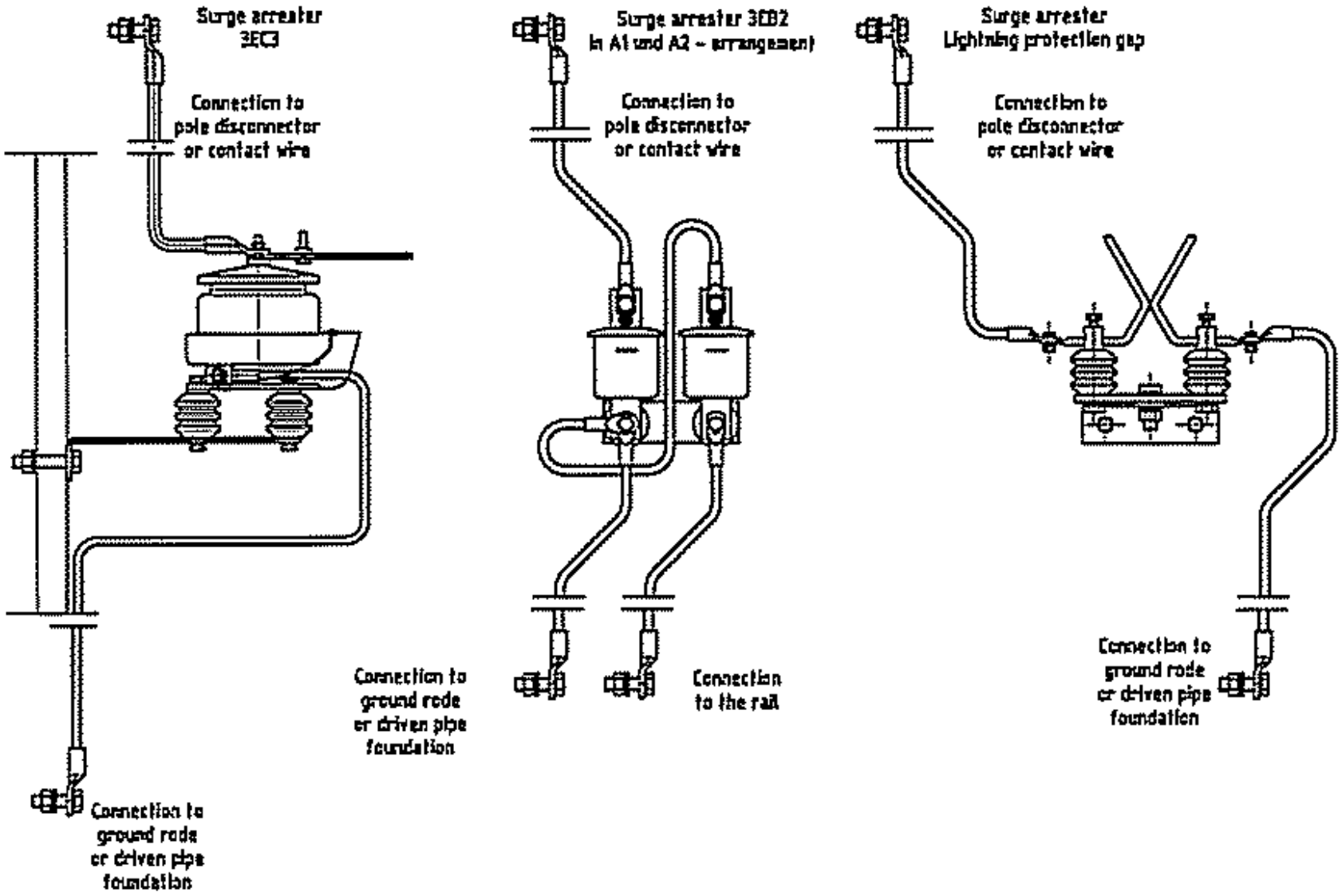


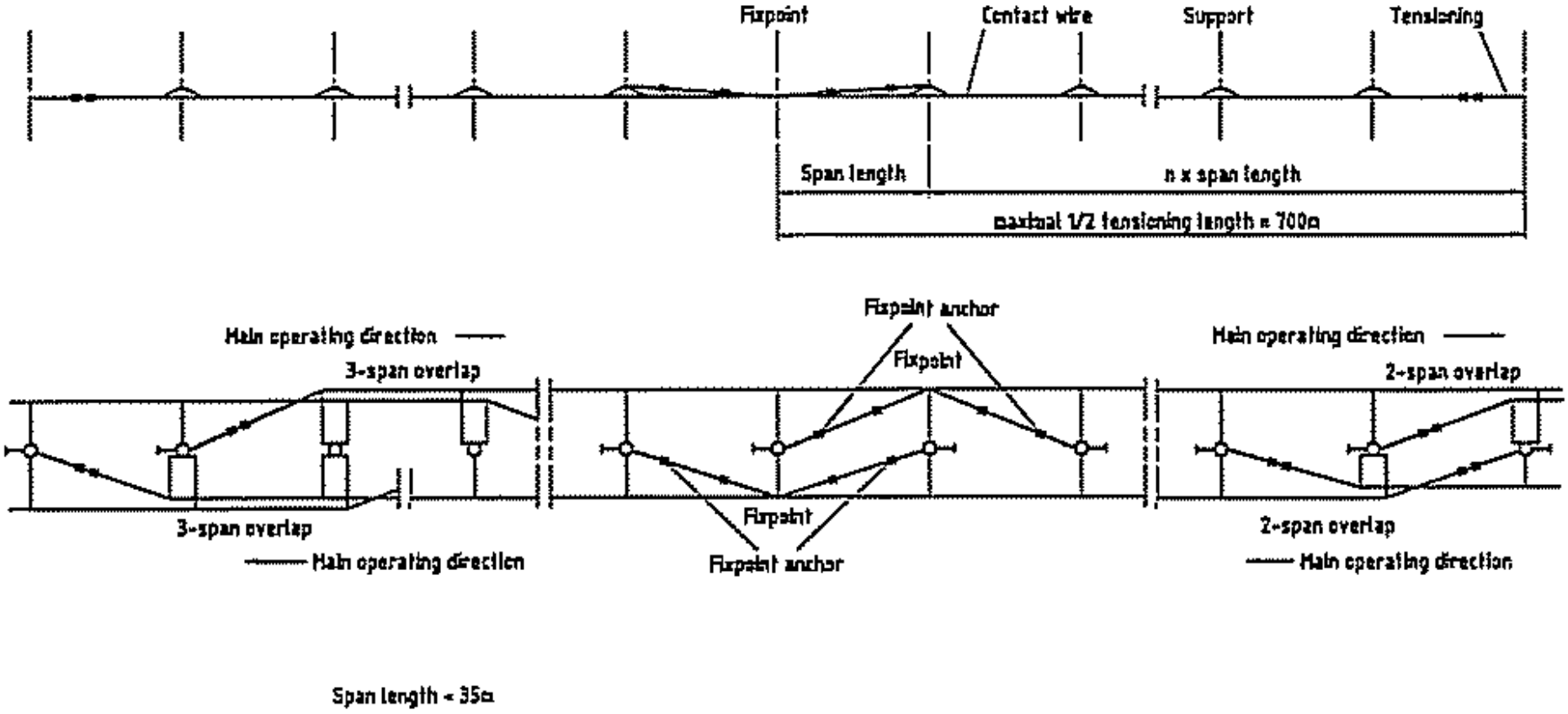
LRT EDINBURGH

Scale: none | Size: A4

Assembly Drawings OHL (Bid Phase)

Overvoltage protection for pole intallation

UKA -Z100-0701



LRT EDINBURGH

SIEMENS

Assembly Drawings CHL 13d Phase1

Single (Trolley-type) contact line system, tension length with overlap

UKA -21103-0201

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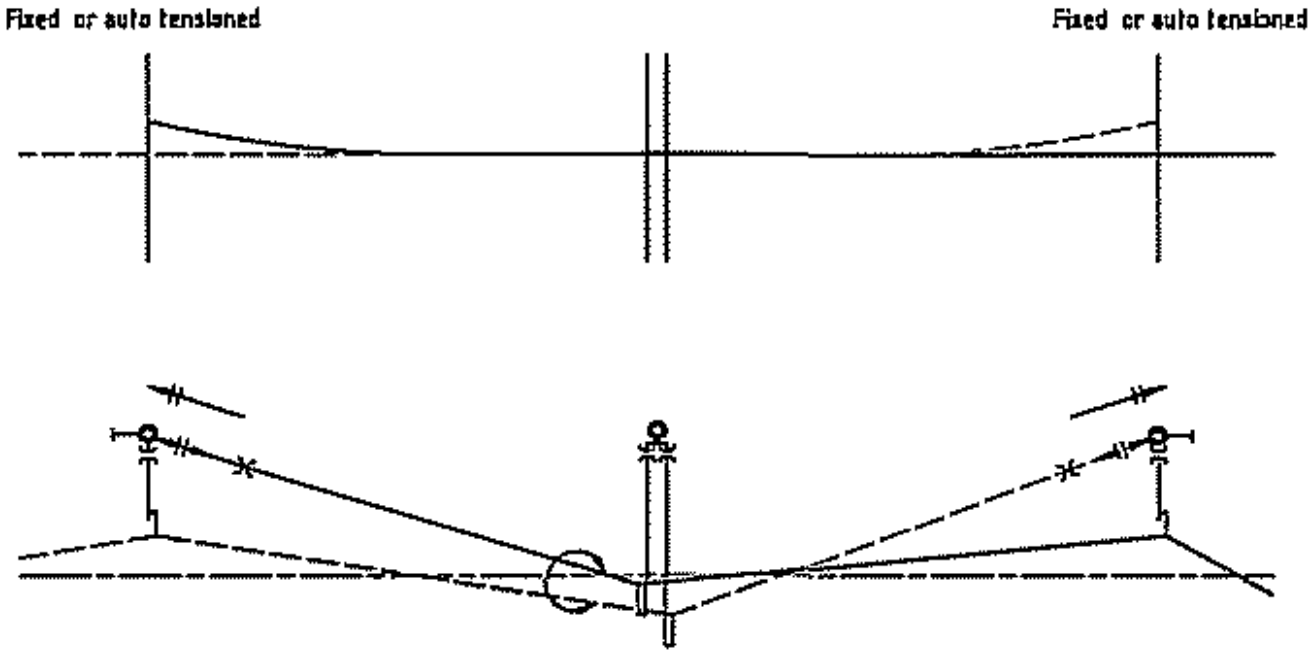


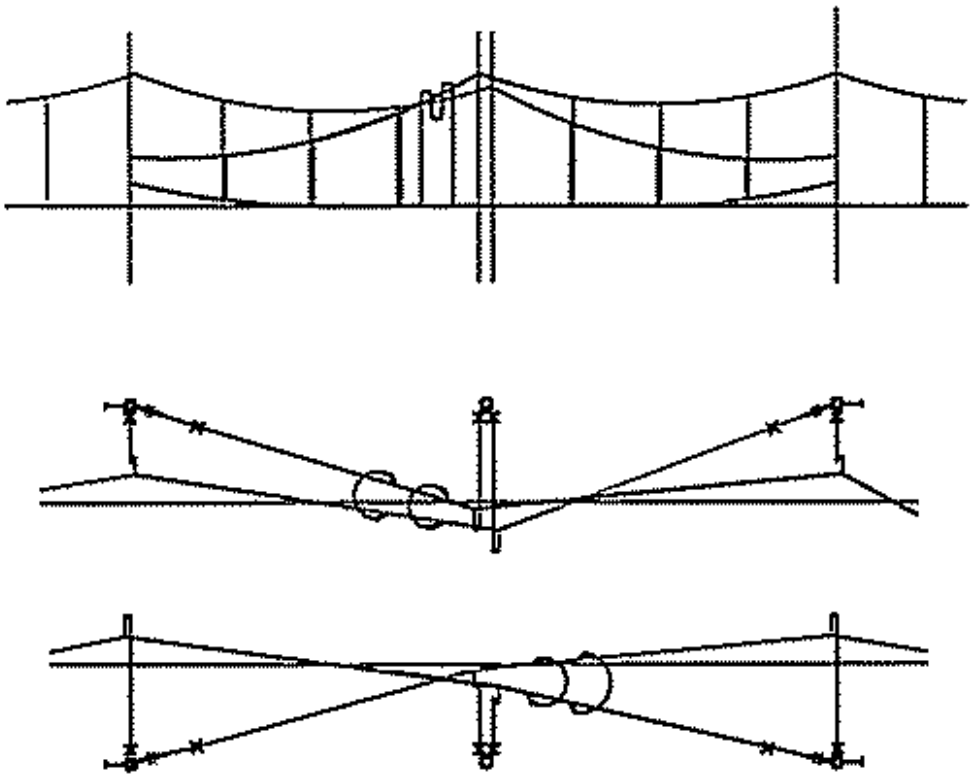
LRT EDINBURGH

Assembly Drawings GHL (Bid Phase)

Overlap contact wire system
with single contact wire

SIEMENS

USB00000088_0359



LRT EDINBURGH

Assembly Drawings OHL Electrified

Overlap catenary system
with messenger wire and contact wire

SIEMENS

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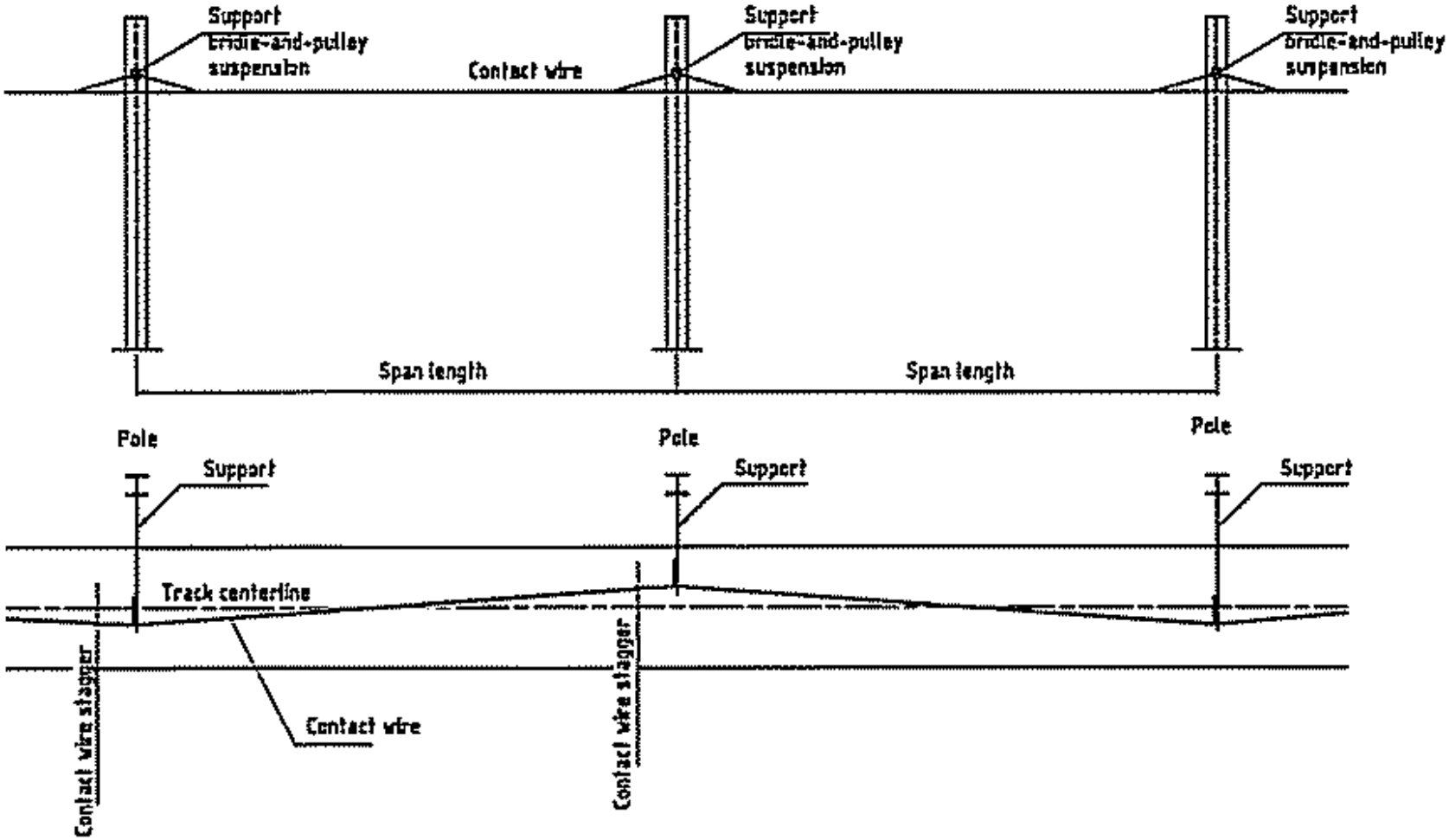

Characteristics:
contact wire tensioned
span length < 35m

LRT EDINBURGH	Scale: none Size: A4
	Assembly Drawings OHL (3d Phase)
	Simple contact wire system with bridle-and-pulley suspension
SIEMENS	UKA -2110-0221

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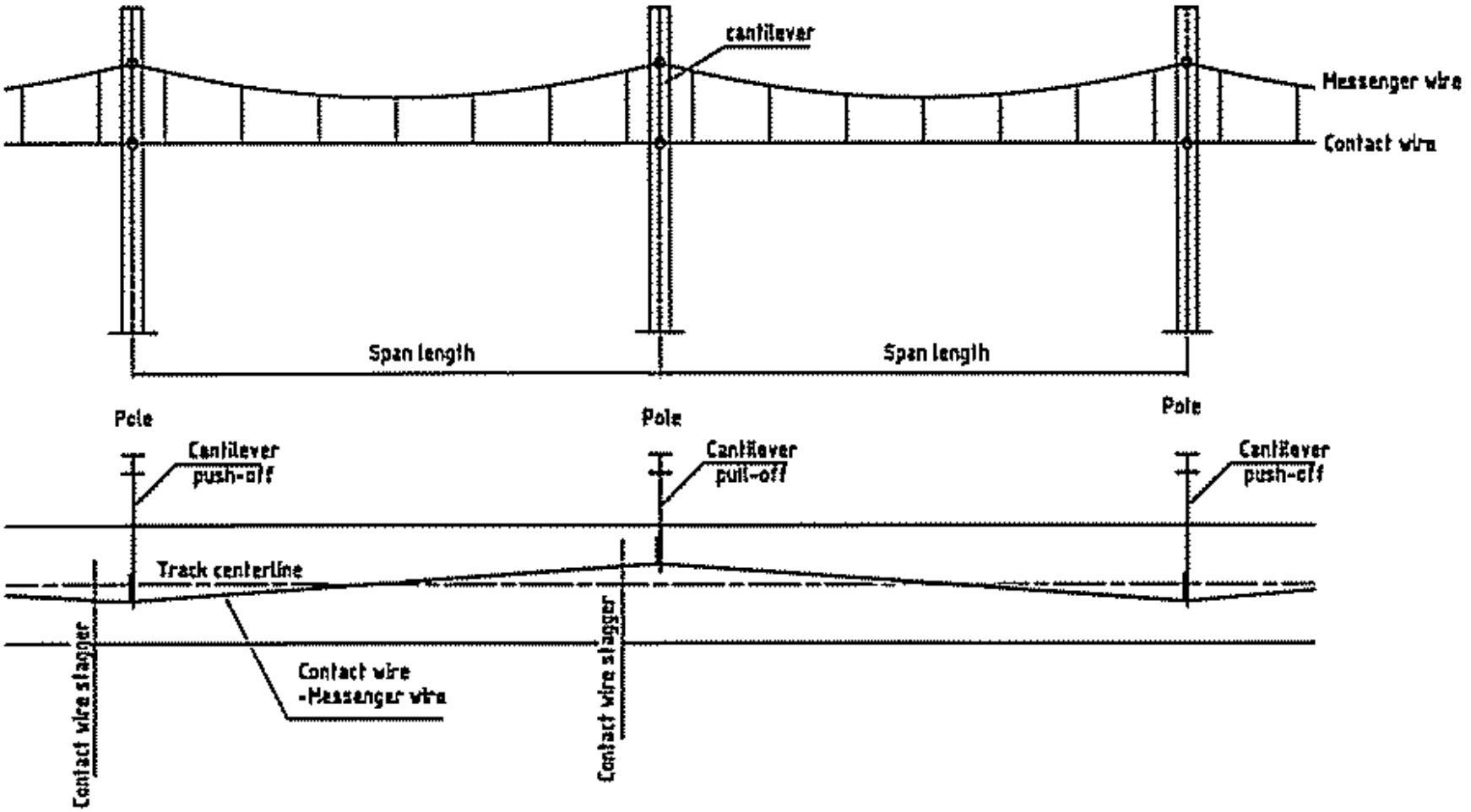

Characteristics:
contact wire + messenger wire tensioned

LRT EDINBURGH	Scale: none / Size: A4
	Assembly Drawings Ont. (Bid Phase)
	Cantenary system with cantilever suspension
SIEMENS	LM4 - 2100-0231

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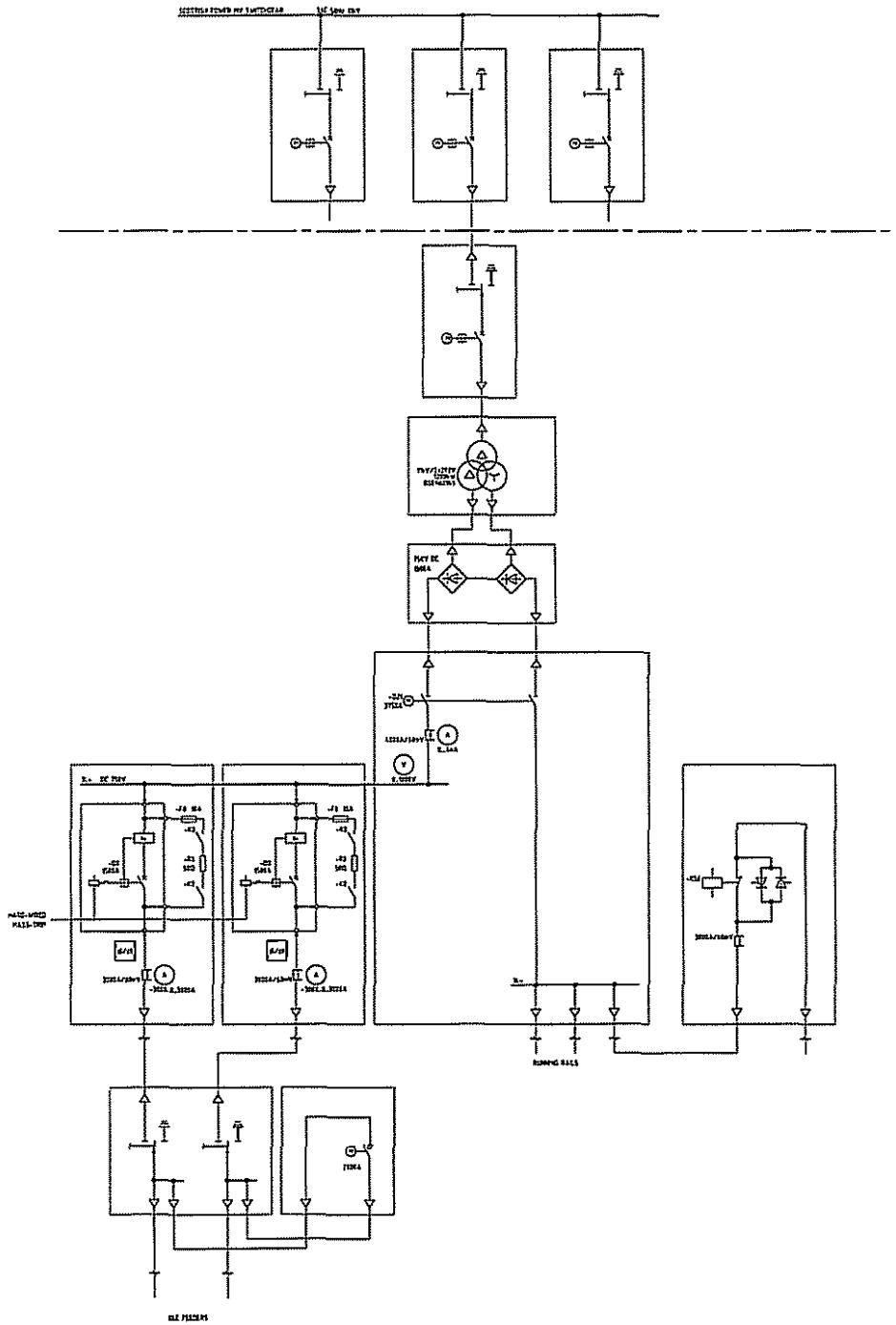

EDINBURGH LRT

DC SUBSTATION

SINGLE LINE

SIEMENS

OVERVIEW DIAGRAM

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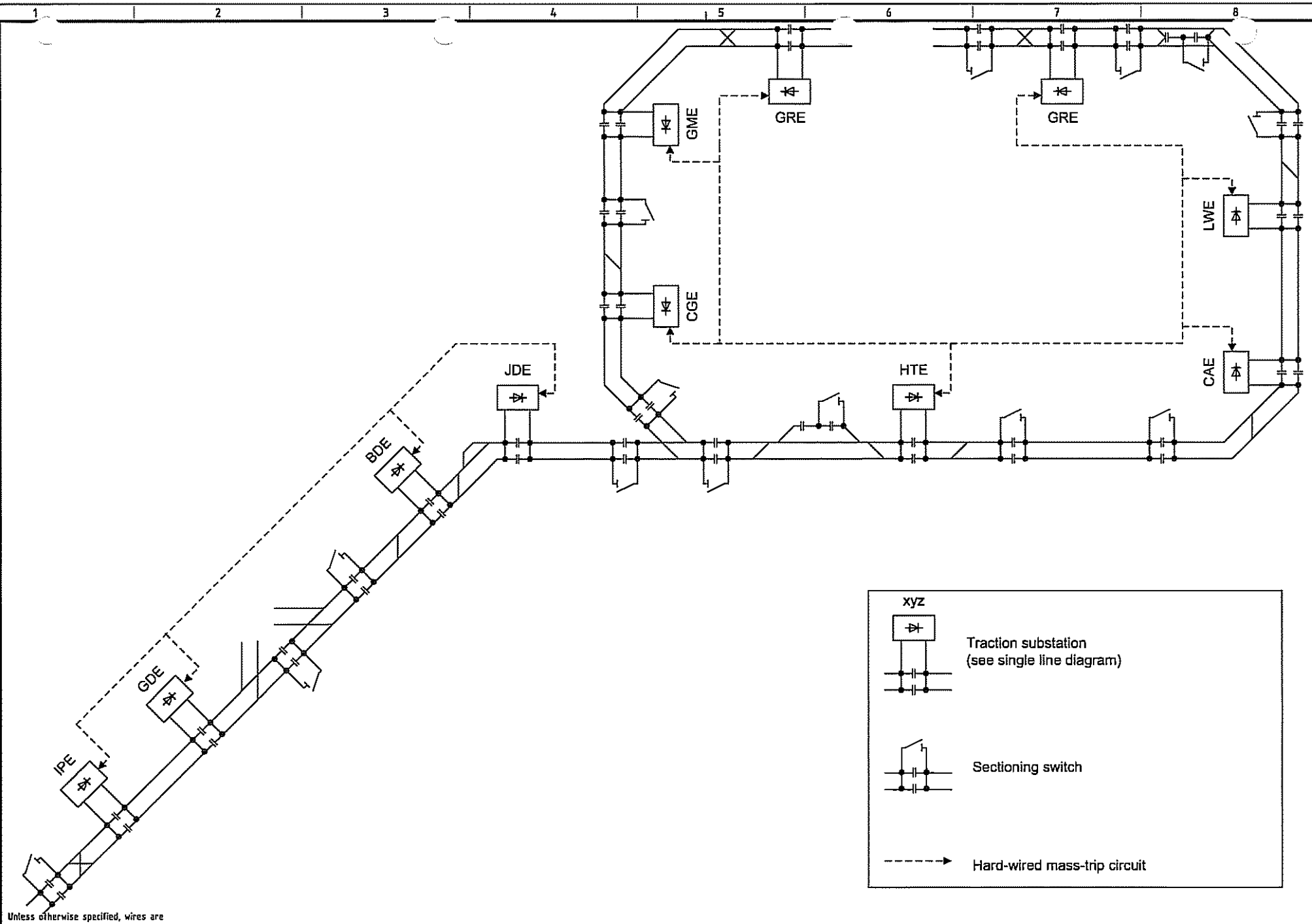

Unless otherwise specified, wires are

Rev.	Remarks	Date	Name						
				Date	23.03.07	EDINBURGH LRT	SIEMENS	LINE OVERVIEW	B =AA00 BE2
				Drawn	Butzke				
				Check.	Herrmann	DC SUBSTATION			Sheet 2-
				Appr.	Müller	Orig./Repl.f./Repl.by		OVERVIEW DIAGRAM	(1) A52811-Exxxx-S000

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PROJECT: Edinburgh LRT
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Symbol library 2: 2_PTD60617
Symbol library 3:
Symbol library 4:

ELCAD-Version V.7.12
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Translate file B: C_FB_EN, 05-08-23
Translate file C:

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ɟer Berger – Siemens Consortium

Edinburgh Tram Network

Construction Support by SDS

Scope

1 Inspection and Monitoring of the Construction Works

1.1 Inspect and Monitor to satisfy SDS that Infraco are complying with the Project Quality Plan PQP
1.2 Inspect and Monitor to satisfy SDS that Construction is being carried out in accordance with the Design and the Employers Requirements
1.3 Certify that Construction has been carried out in accordance with the Design and the Employers Requirements (see Appendix A – Construction Certificate)
1.4 Agree Inspection and Test Plan with Infraco
1.5 Review Test and Inspection results where such results confirm Design assumptions.

2 Technical Queries (TQs)

2.1 Respond to Infraco Type 2 TQs i.e. those raised by the Construction Staff and issue of Designer's Clarifications (DCs) as appropriate
2.2 Incorporate DC information in revised Drawings and other Design Information

3 Temporary Works and Method Statements

3.1 Review Infraco Temporary Works Design to confirm that it has no adverse effect on the Permanent Works
3.2 Review Infraco Method Statements to confirm that their implementation will achieve Construction of the Permanent Works in accordance with the Design and that their requirements for Inspection and Test are incorporated therein

4 Sub-contractors/suppliers and Siemens Design

4.1 Check that Sub-contractors, Suppliers and Siemens Designs have no adverse affect on the Permanent Works and are co-ordinated with same

5 Quality Assurance

5.1 Raise Non Conformance Reports, as required by Infraco PQP
5.2 Agree corrective actions in respect of 4.1
5.3 Sign off completed corrective actions

6 H&S File

6.1 Prepare Design information for inclusion in H&S File

Resources

The exact resource requirements and durations of same to carry out the above are to be agreed with tie, BBS and the SDS designer taking into account the design scope in the SDS Novation Agreement and the obligations of the Infraco Contract.

To be Agreed.

Personnel

To be Agreed as above

Office Space and Equipment

Office space requirements within the Main Infraco Project Office or Satellite Offices (to be agreed)

Site Vehicles

To be Agreed as above

Appendix A – Construction Certificate

Revised Maintenance Proposal, based on BAFO Submission

Edinburgh Tram Network

Folder 1– Section 3

Maintenance

Part 1 - Maintenance Proposal

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1 General

The submitted offer is based on applied maintenance procedures that are either prescribed by law in Germany (e.g. BO Strab or its guidelines), recommended in guidelines or publications of VDV (Verband deutscher Verkehrsbetriebe) or in DIN/EN standards or have been defined on the basis of corresponding experience. This offer is also based on the ROGS and relevant Railway Group Standards and law in Scotland.

Maintenance is described in DIN 31051 and comprises the sub processes of service (slowing down of the usage of existing wear reserve), inspection (determination of actual condition) as well as repair and improvement (restoration or improvement of reference condition):

This offer is based on the following documents:

- employer's requirements, chapter 40, Maintenance Version [3.1.1]; dated 3rd January 2008
- Infraco Agreement and Schedules which are currently being finalised to address the remaining maintenance issues as identified on the list (to be accomplished by Jan 10, 2008) Proposed BBS system design submitted [December 12, 2007]

This offer contains the (periodic) measures of preventative maintenance (service and inspection) as well as the measures of corrective maintenance that may become necessary.

The pricing schedules have been prepared on the basis of:

a) no synergies of overhead with Tram Maintainer, and
b) with assumed synergies (shared utilisation of staff)

and in all cases with no mark-up on the tram maintenance price.

2 Integrated maintenance plan

2.1 Introduction

The Infraco Maintainer will be responsible for the execution of the infrastructure maintenance in conjunction with the operation plan. The maintenance will be carried out on the basis of the maintenance documentation of the individual systems and components. Furthermore the Infraco Maintainer has taken assumptions out of experiences with other projects.

The objective of this proposal is to provide a maintenance scheme that can ensure high reliability and availability of the Edinburgh Tram Network Infrastructure.

The maintenance scheme is based on a pre-designed system, including the announced subsystems. This proposal includes 10 years of maintenance period commencing with revenue service of phase 1a of the ETN.

2.2 Maintenance plan

The Infraco Maintainer will develop a maintenance plan identifying activities, resources, timing and frequency of maintenance activities to be carried out and the circumstances in which maintenance intervention will be necessary. The maintenance plan shall also schedule the protocols, standards and records to be retained in respect of each system.

The maintenance plan will include:

- A programme of activities
- Maintenance requirements matrix
- development of the maintenance organisation and engineering support;
- safety management;
- maintenance procedures;
- strategies for dealing with reactive maintenance activities including details of response and restoration times and recovery plans;
- duties and responsibilities;
- scheduling of preventative (planned) maintenance activities;
- Corrective Maintenance Reporting
- human resources required
- recruitment, training, and competency management of maintenance resources
- quality assurance, quality control and testing;
- spare parts and consumable stores and reorder scheme (including minimum stock levels, supplier details and reorder lead times);

- tools, special tools and plant equipment
- health and safety of staff;
- data recording and trend analysis;
- design fault identification and correction activities; and
- Documentation and reporting,
- Details of required insurances.

The Maintenance Plan will be approved by the client, prior to operational service.

2.3 Maintenance Activities

The Infraco maintainer will undertake two types of maintenance, the major activity being preventative maintenance, and corrective maintenance (faulting) being the other smaller type. The mix of these types will be optimized to ensure availability of the system to the required level through the contracted duration.

2.3.1 Preventative Maintenance

Preventative maintenance (PM) is a program in which wear, tear, and change are anticipated and continuous corrective actions are taken to ensure peak efficiency and minimize deterioration. PM involves a planned and controlled program of systematic inspection, adjustment, lubrication, and replacement of components, as well as performance testing and analysis.

The result of a successful PM program extends the life of the facilities and equipment, and minimizes unscheduled downtime that causes major problems. It ensures that equipment is operating properly, and reduces unscheduled breakdowns to a minimum.

The PM program will be produced utilizing our extensive experience in other projects. This program will allow for the maintenance intervals to be variable within certain constraints to ensure that the highest possible Reliability and Availability can be maintained (see Figure 1). This will also enable the workload for our maintenance teams to be balanced to ensure a cost effective maintenance solution.

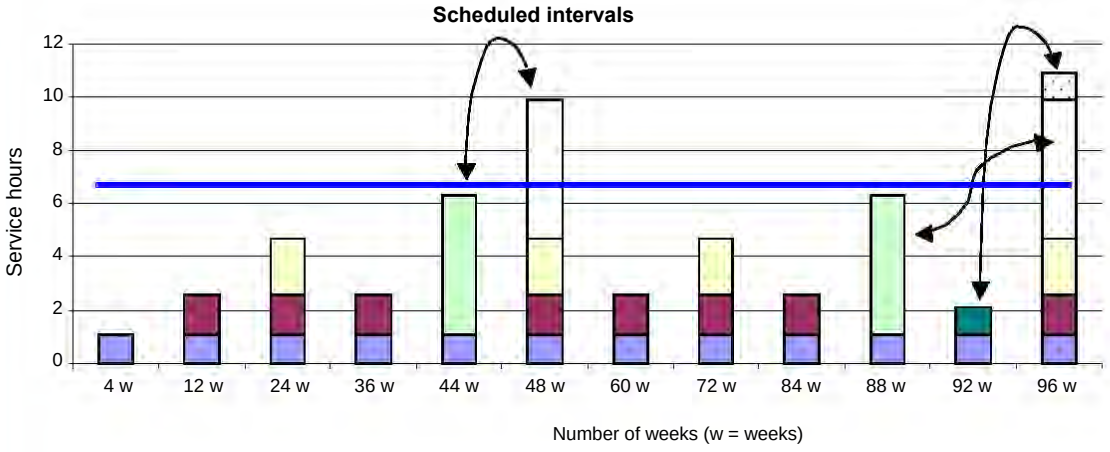

Figure 1 – Example of Maintenance Schedule

2.3.2 Corrective Maintenance

The application of an effective preventative maintenance program will not remove the need of corrective maintenance.

Corrective maintenance consists of the action(s) taken to restore a failed system to operational Service. This will usually involve replacing or repairing a component that is responsible for the failure of the overall system. The objective of corrective maintenance is to restore the system to satisfactory operation within the shortest possible time. Corrective maintenance will be carried out in three steps:

Diagnosis of the problem

The technician will locate the failed parts or otherwise satisfactorily assess the cause of the system failure.

Repair and/or replacement of faulty component(s)

Once the cause of system failure has been determined, action must be taken to address the cause, usually by replacing or repairing the components that caused the system to fail.

Verification of the repair action

Once the components in question have been repaired or replaced, the maintenance technician must verify that the system is again successfully operating.

Repeat and "No Fault Found (NFF)" incidents

The management of repeat faults will be undertaken as part of the duties of the Performance Engineer (PE). The PE will monitor the system faults through the MMS and when it becomes apparent that repeat failure (same location or equipment type), an investigation plan will be implemented to identify the cause of the repeat failure. Once the cause of the failure has been established an action plan will be prepared and implemented to eradicate the issue.

The PE will also be responsible where NFF incidents are occurring, this will be dealt with in exactly the same manner as repeat faults.

Where necessary support will be requested from OEM's to assist in the activities outlined above.

Understanding the cause of a failure is essential and will be recorded and analysed. This analysis will used to make any changes (if required) to our preventative maintenance program or procedures.

2.4 Safety Standards

There are two important aspects of safety standards in maintenance regime:

- safety standards, which are directly related to personal safety, and
- safety procedures, which are assigned to job/tasks.

Concerning the personal safety of the workers, the European Railway Standard (UIC) combined with the Rules and Regulations that apply in UK will be adopted.

The safety procedures will be developed according to UK regulations and industry standards. These standards will be applied within the Infraco maintenance documentation.

2.5 Quality Assurance

The Infraco Maintainer will define and establish Quality Assurance and Control Procedures for the maintenance of the Infrastructure Systems which comply with EN ISO 9000 Quality Standards. The Infraco Maintainer is certified according to EN ISO 9001, which succeeded the EN ISO 9002 in 2000 (please find attached certificate). The maintenance work will be executed in compliance with the EN ISO 9001 standard.

The implementation of a QA/QC - Regime and the certification through external auditors require the designation of a SQE Manager, who will be directly responsible to the Maintenance Manager of the Infraco Maintainer. The SQE Manager will be responsible for implementing and maintaining the quality regime within the Organisation.

2.6 Communication between Operator and Infraco

Communication between the Infraco Maintainer and Operator is essential to ensure that the maintenance plans and schedules are effective and do not adversely effect Operator's ability to deliver the passenger service.

A meeting shall be held on an agreed timetable to ensure that coordination of maintenance and operational activities is achieved. This shall discuss and agree any issues or activities related to or influencing the tram system, including but not limited to the Infraco maintainer, Tramco maintainer and Operator.

3 Basis for calculation

3.1 Edinburgh Tram Network System Criteria

This proposal is based on the following configuration. Changes, modifications or extensions to this configuration will lead to changes of the price. Maintenance activities on the systems components will be performed exclusively by the Infraco Maintainer.

The Maintenance offer is based on the following system criteria:

- Maintenance period: 10 years, Start of Maintenance: January 2011 (start of revenue service for phase 1a)
- Number of vehicles: 31 Tram sets
- Length of sections A&B&C 18.455 m (Phase 1a)
- Length of sections D&E 5.980 m (Phase 1b)
- Depot at Gogar
- Tram schedules (timetables) as described in the Employer's Requirements

3.2 Working and Service Time

The Infraco maintenance works will be executed on basis of the following information:

- Service Time: Joint teams of Civil Works and E'&M maintenance, covering daily maintenance period from 06:01 to 22:00, Monday to Sunday
- Response time: 06:01 to 22:00, 15 minutes response time
  22:01 to 06:00, 60 minutes response time (one person being on-call)
- 3 mixed teams of 5 respectively 4 people (full time) will cover all preventative and corrective maintenance tasks for the mainline and the depot system.
- Activities that require to be undertaken in non-traffic hours will be planned to make best advantage of staff's time. The staff required to undertake these works, will be rostered from the 3 mixed teams.
- Normal working days (for additional chargeable work): Monday to Friday
- For Public Holidays and times when service levels are reduced it is intended to undertake any intrusive works that are required, these works will only be undertaken after consultation with the Operator.
- Civil defects, landscaping and specialised civil inspections will be undertaken as required by personnel sourced outside of this maintenance organisation.
- 1 caretaker will be provided for Gogar depot only.
- The preventative tasks for Infrastructure will be performed during dayshift.
- Tram Network operating hours per day: 19 h 30, starting 5:00 a.m.

- Minimum non traffic hours per night 4h 30

3.3 Maintenance project planning

The maintenance concept for the Edinburgh Tram Network will be implemented in stages according to the overall system implementation. The responsibility for the systems remains with the Infraco design and construction team until the handover to the Infraco maintenance team (start revenue services Phase 1a).

During the commissioning and trial running phase, maintenance will be undertaken in line with the maintenance plan by the Infraco Maintainer. This will allow the maintenance plans and procedures to be tested and verified that the planned maintenance meets the needs of the Edinburgh Tram Network. This will be undertaken by a day shift team only during this phase (2 shifts are planned during the last month prior to commencement date).

The maintenance activities will commence with start of Revenue Service Phase for the defined scope and will run throughout the 10 years contract period.

3.3.1 Mobilisation phase

Prior to the commissioning and up until commencement of Revenue Service the Infraco Maintainer will build up the maintenance organisation. (see section 5)

3.3.2 Maintenance phase

During the 10 years maintenance period, the Infraco Maintainer will provide maintenance to the system implemented under the responsibility of the Infraco.

This includes planning, implementation and execution of preventative and corrective maintenance managed by a professional maintenance organisation. Sufficient and qualified staff will be hired, trained and managed by experienced personnel under the full and sole responsibility of the Infraco Maintainer. The components and materials required for the execution of the maintenance shall be supplied supported by a professional procurement. Storage area as well as storage management will be organized in cooperation with the Tramco.

3.4 Standards and Regulations

The maintenance will be executed following the guidelines of the following standards and regulations such as:

- International standards (International Electrotechnical Commission - IEC)
- European standards

The most important standards for the maintenance of the system are as follow at the date of bid submission:

Table 1: Standards and Regulations	
Standard	Description
EN 8402	Quality, Reliability and Safety
EN 13306	Definitions of Maintenance
EN13816	German Version of Transportation and Service
EN 50126	Reliability, Availability, Maintainability (RAM)
DIN 31051 (2003/06)	Basics of Maintenance
ISO 9004	Quality Management and Quality System Elements - Guidelines
ISO 14001	Environmental
BoStrab (German Ordinance of the Construction and Operation of Rail Systems for Light-Rail Transit)	English translation of German version

It should be noted that standards will be frozen upon the award of the Infraco Agreement.

All changes of existing standards as well as mandatory standards that are issued after contract award that are required to be adhered to will be reviewed and assessed. Any impact to execution of the program as well as any financial implications will be brought to the attention of TIE. Prior to adoption of the revised standards TIE will instruct its use.

It will also be necessary for any new standards to be implemented by Infraco Maintainer to be understood by the Tramco Maintainer and Operator. This will ensure they are aware of any implications of their operations.

4 Scope and Conditions of Supplies and Services

4.1 Scope of Provisions, Supplies and Services

The following supplies and services are included and executed during the contract period by the Infraco Maintainer for the systems:

- Maintenance Management
- Maintenance Plan
- Maintenance Schedules
- Quality Assurance Plan
- Health & Safety Assurance Plan
- Performance Concept
- Procurement Plan
- Provision of maintenance staff
- Training of maintenance staff
- Inspections (function-, safety and maintenance-related)
- Corrective and preventative maintenance
- Repair of components
- Revisions, Renewals and Overhauls of components / on component level (within planned preventative maintenance for 10 years of maintenance)
- Maintenance Management System (IT-based)
- Jobs descriptions based on documentation and maintenance manuals from suppliers
- Procurement and Logistics for required spare parts and material (preventative and corrective, planned overhauls and revisions if any) in cooperation with System deliveries and in cooperation with the operator
- Lubricants
- Return management of failed parts
- Hand tools for maintenance workers

4.2 Services provided by others

As part of the contractual documentation the following parties will also provide services to ensure the operation of the Edinburgh Tram Network.

These services will be provided by:

- Tramco/Tramco Maintainer
- Operator
- City of Edinburgh Council (CEC)

The activities they shall undertake are detailed in *Edinburgh Tram – Infrastructure Equipment Responsibilities Allocation*

This includes but is not limited to:

- Maintenance coordination between Operator, CEC, Infraco Maintainer, Tramco Maintainer and others
- Repair of damages due to vandalism, graffiti, theft, derailments, external influences and force majeure; Repair of damages due to improper handling or operation of the systems. However, in the event that the Infraco Maintainer has caused and is responsible for a damage, as a result of action or inaction, the Infraco Maintainer will bear the costs for rectifying the defect. *
- Subsystem replacements (i.e. after end of design life)
- Cosmetic repairs *

* These services and supplies can be provided by the Infraco Maintainer on the basis of individual task orders, to be agreed upon based on this agreement. A list of menu-priced tasks will be submitted, discussed and agreed between the TIE and the Infraco prior to contract award (appendix 5).

4.3 Assumptions and Prerequisites

Supplies and Services as described in this proposal shall be delivered considering the following premises:

1. 3rd party systems and infrastructure of Edinburgh Tram Network (i.e. not provided by Infraco as part of Infraco works) have to be properly designed and installed as to the requirements stated in the tender. Failures resulting from deviations to these requirements will not be covered by the Infraco Maintainer.
2. Services which are currently excluded from the scope of the Infraco Maintainer shall be performed under responsibility of the Operator, CEC or others.
3. Maintenance activities shall be undertaken from Gogar depot, that means Gogar depot will be the organisational centre of the Infraco maintenance activities. Maintenance staff will be sent out for preventative as well as corrective maintenance from there. No outbased depots are planned
4. All facilities (depot, stores, staff rooms, offices incl. IT- and Communications infrastructure, electricity connections, water supply, sanitary rooms etc) and equipment (depot equipment and machines, workshop equipment, test equipment), service vehicles (incl. road/rail vehicles, cranes etc) required for the professional execution of the maintenance of the systems will be provided to the Infraco Maintainer in time, in sufficient dimensions and conditions. It is assumed that all facilities and materials as referred to above are in best conditions and ready for use. The Infraco Maintainer does not assume any responsibility for the provision of electricity, water supply and wastewater disposal.
5. The Maintainer will be granted full and unlimited access subject to agreed possessions if effecting the Transport Service to all facilities and equipment needed to perform the maintenance services (i.e. entire Tramway System

including the related technical plant rooms, equipment and the workshop area as well as the initial stock). This will include access to an operational store.

6. Insurances of buildings, stores and the installed tramway-system infrastructure will not be covered by the Infraco Maintainer. The Infraco is however responsible for the deductible amount in connection with insurance claims that are Infraco's responsibility.
7. The operation of the infrastructure systems by Operator shall only be performed by personnel that are qualified and trained for this purpose.
8. Cost for repair of damages due to vandalism, graffiti, theft, derailments, accidents, external influences and force major, are not covered by Infraco. If support by the Infraco Maintainer is needed, this will be invoiced separately, subject to change mechanism in the Infraco Agreement. In such cases as mentioned above TIE and the Infraco Maintainer will mutually agree on temporary relief from the performance measurement regime.
9. Changes to the Systems in terms of modifications, extensions, adaptations and down-sizing will have to be considered in a review and possible modification of the maintenance price.
10. The Maintainer is not responsible for communication with: Fire Fighting, Emergency medical services, Police or other state or local authorities in cases of accidents, derailments or vandalism.
11. The Maintainer is not responsible for the supply of financial reports or statistical reports for governmental organisations or local authorities (except legal obligations).
12. All appropriate matters in relation to human resources of the Infraco Maintainer will be managed under the full and sole responsibility of the Infraco Maintainer.
13. All matters concerning safety and security for the Tramway System beyond Infraco's obligations related to the infrastructure maintenance will be undertaken by Operator. The Infraco Maintainer will support Operator in this duty
14. As a technical solution for the Edinburgh Tram Network has yet to be fully defined the scope of maintenance is based on the information available to date. The maintenance proposal will have to be reviewed in line with the final technical solution to ensure compliance. An example of this is our assumption that the trams will not be supplied with *"real bogies"* (based on the available information).
15. We anticipate and recommend that a tower road rail vehicle is provided. This has not been calculated by the Infraco Maintainer.
16. All items provided by TIE or Operator are assumed to be free of charge to the Infraco Maintainer
17. The exchange of brushes for the wash plant, detergent for the wash plant, removal of swarf from the wheel lathe are excluded
18. The contractual obligations under the maintenance part of the Infraco Agreement regarding the execution of regular preventative and corrective maintenance works shall commence with start of revenue service of the entire Edinburgh Tram Network. Required maintenance prior to start revenue service (degraded maintenance) will be executed under the responsibility of the Infraco construction team Delays not caused by Infraco will be assessed and shall be subject to the change mechanism in the Infraco Agreement if applicable.

5 Organisation

5.1 Schedule for Recruiting, Training and Qualifying

The recruiting of the maintenance employees will be performed in advance of the training schedule. The Infraco Maintainer intends to recruit the necessary key personnel from the suppliers or construction companies of Edinburgh Tram Network project. Other personnel will be chosen in accordance with the job requirements and levels of qualification.

This recruitment will be scheduled prior to the commencement of commissioning. This will be limited to key positions

5.2 Personnel organisation

Personnel requirements have been determined based on experience gained from previous projects and considering the following factors:

- Equipment usage forecasts
- Equipment quantities
- Equipment reliability's
- Diagnosis, removal and replacement times
- Response times due to geographical dispersion
- Corrective Maintenance tasks
- Preventative maintenance tasks and frequencies
- Necessary coverage period
- Overhead for weekends, vacations, holidays, continuous training, sick leave and administration

The organisation charts show (See appendix 1) the structure of the maintenance organisation. The proposed organisation covers the specified response time between 06:01 and 22:00 as well as the reduced service availability from 22:01 to 06:00.

The leader of the maintenance organisation made up by BBS will be the Project Manager. The Project Manager will be responsible for all issues related to infrastructure maintenance.

The Commercial manager will be a significant role within the maintenance organisation providing the commercial and administrative support required by modern maintenance organisations. He is the coordinator of the accompanying measures of the maintenance activities and requirements.

The E&M maintenance organisation is built around the E&M – Manager and the Team Leaders in order to optimise staffing levels and to limit associated labour costs. The E&M – Manager will be the contact for the operator during daily operation. The maintenance activities will be controlled and managed by the Team Leaders. Teams will consist of specialised electrical, mechanical and civil technicians. The E&M maintenance teams will be available as stated under para 3.2. The personnel will be prepared to carry out preventative maintenance activities according to the maintenance plan and undertake corrective maintenance when required.

A civil manager is responsible for the organisation of the civil maintenance activities. The civil maintenance activities like civil defects, landscaping and cleaning will be undertaken as required by personnel sourced outside of this maintenance organisation

and will be controlled and managed by the civil manager, who will also be the contact for the operator during daily operation.

5.3 Job descriptions

5.3.1 Project Manager

The Project Manager shall be responsible for directing and coordinating the activities within the maintenance organisation. Having full authority to speak and act on behalf of the Maintenance Consortium. The Project Manager will schedule and attend meetings with TIE and Operator designated representatives in order to share information, assess the performance of the maintenance services, and discuss any problems, service changes, relations, security and any other issues.

The Project Manager is the contact to TIE and Operator working in close relationship towards the common goals of the organisation.

5.3.2 Commercial Manager

The Commercial Manager is the coordinator of the accompanying measures of the maintenance activities and requirements. Responsible for establishing procedures and work processes which lead to the timely and efficient provision of personnel resources, materials and information to support system maintenance. Furthermore, he will be responsible for carrying out the administrative functions.

5.3.3 E&M Manager

The E&M Manager is responsible for the operational maintenance work and will report directly to the Project Manager. He will also coordinate the infrastructure maintenance activities with the tram maintenance and the civil maintenance.

His duties and responsibilities also include:

- The management and supervision of the leaders of the 3 combined teams
- Scheduling maintenance activities in accordance to the planning defined by the MMS and the Maintenance Planner.
- Allocating appropriate resources for unscheduled interventions according to the technical needs and prioritisation of maintenance tasks
- Verify that equipment installation meets the operational needs of the organisation.
- Assist in development of standard maintenance programs, safety procedures and work rules for start-up and revenue operations.
- Cooperation with Procurement & Logistic and the Operator to assure that adequate spare parts, tools and other necessary equipment is on hand to support revenue operations.

5.3.4 SQE- / Performance Engineer

As part of the Infraco organisation we have allowed for a combined SQE- / Performance Engineer.

The role of the Safety, Quality and Environment Engineer (SQE) is the direct responsibility for the matters relating to system and workplace safety throughout the organisation including:

- Safety orientation and training
- Safety audits and inspections
- Accident/incident reporting and investigation of the equipment
- Environmental issues

Furthermore the Safety, Quality and Environment Engineer (SQE) has the responsibility for enforcing the quality assurance program establishing the following relationships:

- The quality organisation will maintain close working relationships with the project elements to enlist their commitment in achieving quality program objectives.
- Interface with his counterparts of the organisation to coordinate quality program implementation and resolve issues related to it.
- Actively participant in program status reviews, presenting the status of the quality program and major issues,

as well as the responsibility for implementing comprehensive Quality Assurance and Quality Control procedures for the maintenance of the Infrastructure Systems which go along with EN ISO 9000 Quality Standards and as well as the authority to maintain the highest quality levels throughout the project execution.

The SQE Manager will be responsible for initial and regular training programs.

The role of the Performance Engineer is the direct responsibility for ensuring that the infrastructure system performance is in line with the requirements of TIE. Additionally the performance engineer will monitor the response times in line with the performance requirements of the contract. This role will also monitor the performance of the system along with the maintenance team and identify any performance improvements through maintenance activities.

The SQE- / Performance engineer shall report to the Project Manager

5.3.5 Maintenance Planner

The Maintenance Planner is responsible for the planning and scheduling of the maintenance works. This comprises the preventative maintenance tasks for infrastructure maintenance. The tool to be used is the MMS software. The planning of the preventative tasks will be coordinated with the operator.

The Maintenance Planner shall report to the Project Manager.

5.3.6 Civil Manager

The Civil manager reports directly to the Project Manager.

The Civil manager will ensure that civil faulting and maintenance is undertaken in line with the maintenance plan.

His duties and responsibilities include:

- The management and supervision of the workers and other staff required to perform maintenance tasks.
- Administration of maintenance history for their technical responsibility (Fault Reporting and Monitoring) by updating the MMS-System.

- Scheduling maintenance activities in accordance to the planning defined by the MMS and the Maintenance Planner.
- Allocating appropriate resources for unscheduled interventions according to the technical needs and prioritisation of maintenance tasks
- Verify that equipment installation meets the operational needs of the organisation.
- Assist in development of standard maintenance programs, safety procedures and work rules for start-up and revenue operations.
- Cooperation with Procurement & Logistic and the Operator to assure that adequate spare parts, tools and other necessary equipment is on hand to support revenue operations.

6 Maintenance of Infrastructure System

6.1 Scope of the Maintenance

The Infraco Maintainer will be responsible for the maintenance of the infrastructure systems delivered and installed under the responsibility of the Infraco. The following systems will be maintained according to the Maintenance Plan of the manufacturer:

- Depot Equipment
- Traction Power Supply
- Overhead Contact Line System
- SCADA
- Signalling System
- Telecommunication System
- Security Systems
- Track, Civil and Buildings

6.2 Maintenance Activities

6.2.1 Electrical and Mechanical

6.2.1.1 Traction Power

As a result of the maintenance analyses, a schedule for preventative maintenance will be established for the delivered traction power system (with regard to the scope of supply). This section describes the reliability-oriented inspection and maintenance work for each major component as well as the maintenance intervals and the down times for the operations. The maintenance tables also specify the required level of preventative maintenance.

The works will be carried out in fixed intervals as shown in the maintenance plans (appendix 2). The purpose of this table is to enable the customer to gain an understanding of what the Maintenance organisation intends to do regarding the maintenance of traction power systems.

The Traction-power system consists of 2 groups:

- Power supply and distribution
- Catenary system

Traction Power - Preventative Maintenance Programs

Inspections

The inspection comprises the measures to be performed to determine and evaluate the actual state of technical equipment within the scope of supply of Edinburgh Tram Network. The inspection covers the following activities:

- Function-related,
- Safety-related, and

- Maintenance-related activities.

Service technicians carry out inspections on mechanical, electrical and electronic plants in accordance with the working schedules. The results are documented and evaluated. During inspection, service technicians carry out minor maintenance work immediately. If the scope of the required work is larger they will undertake the necessary maintenance measures for keep the equipment in available state.

Preventative maintenance

The preventative maintenance covers all measures necessary for keeping the technical equipment or plant in the required state. According to specified working schedules, the periodic maintenance tasks are carried out on mechanical and electrical plant. The results are recorded and evaluated. Based on the experience gathered with a growing number of maintenance activities and documented results, it will be possible to make statements on the condition and wear behaviour of parts and systems.

During preventative maintenance tasks small parts such as mounting parts, indication / pilot lamps, etc. are replaced. Only components, which either might have a safety impact or are heavily corroded or no longer meet functional requirements due to other damage, will be replaced.

The preventative maintenance includes:

Inspection (visual checks)

Inspections are required from time to time. Usually, the work will be carried out in fixed intervals. Inspection intervals depend on the type of equipment and the possible damage. The parts have to be inspected with the following criteria:

- Damage (fracture, scorching, change of colour, etc.)
- Dirt, corrosion
- Missing equipment (earthing devices, indicator shields, etc.)

Preventative maintenance

Preventative maintenance will be performed normally from Monday to Friday either during operating hours or at non-operating time during night.

Functional tests (Checking)

- Switchboards
- Low-voltage supply with batteries
- Catenary system
    a. Masts
    b. Droppers
    c. Catenary
    d. Isolators
    e. Expansion
    f. Joints
- Earthing system
- Wear points (abrasion)
- Cleaning of the TEL/SCADA technical equipment

Measures that become necessary due to improper use, faulty operation, accident damages and other external effects, force majeure, vandalism, alterations and extensions, etc. are excluded in so far as these are not due to the actions or omissions of Infraco. Such works are handled as non-contractual performance, and therefore are separately charged and invoiced according to the change mechanism in the Infraco Agreement.

Corrective Maintenance

The corrective (unscheduled) maintenance work covers the activities for restoring the required state (not original) of technical equipment in a plant/line. Unscheduled maintenance works are carried out to remedy spontaneously occurring operating faults, which will interrupt service operation.

These tasks cannot be planned. Immediately after the maintenance staff have received a trouble message that a fault will interrupt service operation, the measures necessary to quickly restore service operation will be taken (according to our repair strategy). Effective coordination and execution of repair works as well as provision of spare parts form the basis for a quick and economical form of unscheduled maintenance.

Measures that become necessary due to improper use, faulty operation, external effects, force majeure, vandalism, are handled as non-contractual performance, and therefore they are separately charged and invoiced.

Specialized and Heavy Maintenance Equipment

The special equipment required for the execution of the maintenance tasks on the traction system will be either included in the scope of the depot equipment by the Infraco or within the scope of the Infraco Maintainer (besides the equipment mentioned under para 4.3 item 5) before the start of the maintenance service.

Special equipment for the maintenance tasks will remain in the depot for the execution of the different maintenance activities over the contract period and will be part of the Handover procedure by the Maintenance organization after the 10 years of maintenance contract has finished.

6.2.1.2 Train Control and Signals

Preventative and Corrective Maintenance analysis

As a result of the maintenance analyses, a schedule for preventative maintenance will be established for the train control and indoor/outdoor signalling-systems. This section describes the reliability-oriented inspection and maintenance work for each major component as well as the maintenance intervals and the down times for the operations. The maintenance tables also specify the required amount of preventative maintenance. Please refer to the maintenance plans (appendix 2).

Preventive Maintenance Programs

Inspections

The inspection comprises the measures to be performed to determine and evaluate the actual state of technical equipment within the scope of supply of Edinburgh Tram Network. The inspection covers:

- Function-related,
- Safety-related, and
- Maintenance-related activities.

According to working schedules coordinated and suitable intervals, service technicians carry out inspections on mechanical, electrical and electronic plants. Results are documented and evaluated. During inspection, service technicians perform the minor maintenance tasks immediately that they can do by using their tools. If the scope of necessary work is larger, they will undertake necessary maintenance measure required for keeping the equipment in an available state.

According to specified working schedules and intervals preventative maintenance work is carried out on mechanical and electrical facilities. Results are recorded and evaluated. Based on the experience gathered with a growing number of maintenance activities and documented results, it will be possible to make statements on the condition and wear behaviour of parts and systems.

During preventative maintenance activities inexpensive small parts such as mounting parts, indication / pilot lamps, etc. will be replaced. Major wear parts as well as incidentals and operating materials, such as inking ribbons, incl. printing paper, and batteries are exchanged or supplemented. Minor repair tasks are performed during maintenance.

These tasks can be scheduled for the maintenance of components at site or in the workshop. Type and scope of works as well as available spare parts are decisive criteria when determining the most economical form of maintenance becoming necessary due to natural wear.

The preventative maintenance includes:

Inspections (visual checks) are required from time to time. Usually, the work will be carried out in fixed intervals. Inspection intervals depend on the type of equipment and the possible damage. The parts have to be inspected with the following criteria:

- Damage (fracture, scorching, change of colour, etc.)
- Dirt, corrosion
- Missing equipment (earthing devices, indicator shields, etc.)

Preventative maintenance will be performed normally from Monday to Friday either during operating hours or at non-operating time during night.

Functional tests (Checking, measuring, adjusting)

- Indoor equipment (electronic interlocking including peripheries)
- Operation control
- UPS (power supply system)
- Point Machines
- Point Lock Checking Device, Point Position Checking Device
- Signals (track- and road-signals)

Cleaning of the control and signals technical equipment

Measures that become necessary due to improper use, faulty operation, external effects, force majeure, vandalism, alterations and extensions, etc. are excluded. Such works are handled as non-contractual performance, and therefore are separately charged and invoiced.

Corrective Maintenance

The corrective (unscheduled) maintenance work covers the activities for restoring the required state (not original) of technical equipment in a plant/line. Unscheduled

maintenance tasks are carried out to remedy spontaneously occurring operating faults that will interrupt service operation.

These tasks cannot be planned. Immediately after our maintenance staff has received any trouble message, appropriate measures necessary for quickly eliminating the trouble will be taken (according to maintenance strategies previously fixed). Good coordination and execution of repair works as well as provision of spare parts form the basis for a quick and economical form of unscheduled maintenance are essential.

Measures that become necessary due to improper use, faulty operation, external effects, force majeure, vandalism, are handled as non-contractual performance, and therefore they are separately charged and invoiced.

Specialized and Heavy Maintenance Equipment

Necessary special equipment for the execution of the maintenance tasks on the train control and signals will be delivered as scope of the depot equipment or with start of the maintenance service.

Special equipment for the maintenance tasks will remain at the depot for the execution of the different maintenance activities over the contract period.

6.2.1.3 Communications Systems

The installations under this heading do not only comprise the means for verbal communications such as telephones or radio, but also different alarm systems, operational monitoring systems PIS- and CCTV-system, etc.

Preventative and Corrective Maintenance analysis

As a result of the maintenance analyses, a schedule for preventative maintenance will be established for the communications systems. This section describes the reliability-oriented inspection and maintenance work for each major component as well as the maintenance intervals and the down times for the operations. The maintenance tables also specify the required amount of preventative maintenance. Please refer to the maintenance plans (appendix 2).

Maintenance and repair work will partially be executed in places where the equipment is installed and partially be executed in the electronics workshop. The detailed maintenance planning will include detailed instructions for the maintenance of the communication subsystems. However, the imposed maintenance concept requires a permanent observation of the telecommunications system in order to prevent casual/accidental faults of components as far as possible.

Preventive Maintenance Programs

Inspections

The inspection comprises the measures to be performed to determine and evaluate the actual state of technical equipment within the scope of supply of Edinburgh Tram Network. The inspection covers:

- Function-related,
- Safety-related, and
- Maintenance-related activities.

The large variety of the equipment involved makes it difficult to establish fixed periods for maintenance purposes and inspections. The recommendations of the manufacturers and the usage of the different systems are the basis on which maintenance programs will be developed and later adjusted in accordance to operational experience.

According to working schedules coordinated and suitable intervals, service technicians carry out inspections on mechanical, electrical and electronic plants. Results are documented and evaluated. During inspection, service technicians perform the minor maintenance tasks immediately that they can do by using their tools. If the scope of necessary work is larger, they will undertake necessary maintenance measure required for keeping the equipment in an available state.

Preventative Maintenance

According to specified working schedules and intervals preventative maintenance work is carried out on mechanical and electrical facilities. Results are recorded and evaluated. Based on the experience gathered with a growing number of maintenance activities and documented results, it will be possible to make statements on the condition and wear behaviour of parts and systems.

During preventative maintenance activities inexpensive small parts such as mounting parts, indication / pilot lamps, etc. will be replaced. Major wear parts as well as incidentals and operating materials, such as inking ribbons, incl. printing paper, and batteries are exchanged or supplemented. Minor repair tasks are performed during maintenance.

These tasks can be scheduled for the maintenance of components at site or in the workshop. Type and scope of works as well as available spare parts are decisive criteria when determining the most economical form of maintenance becoming necessary due to natural wear.

The preventative maintenance includes:

Inspection (visual checks) required from time to time. Inspection intervals depend on the type of equipment and the possible damage. The parts have to be inspected with the following criteria:

- Damage (fracture, scorching, change of colour, etc.)
- Dirt, corrosion
- Missing equipment (earthing devices, indicator shields, etc.)

Preventative maintenance Preventative maintenance will be performed normally from Monday to Friday during operating hours.

Functional tests (Checking, measuring, adjusting)

- CCTV
- Public address
- OTN
- Telephone

Cleaning of the communications systems equipment

Measures that become necessary due to improper use, faulty operation, external effects, force majeure, vandalism, alterations and extensions, etc. are excluded. Such works are handled as non-contractual performance, and therefore are separately charged and invoiced.

Corrective Maintenance

The reliability of telecommunications is a precondition to the working of the initial system according to the agreed quality standards. A high degree of availability will be achieved through adequate provision of telecommunications. The repair philosophy is based on faulty units being replaced. The telecommunications equipment is mainly

designed in a modular way. Repair will normally be performed by replacement of individual units. Faulty equipment is returned to the electronics workshop for investigation and possible repair. Selected faulty equipment shall be returned to the supplier for repair on request.

The corrective (unscheduled) maintenance work covers the activities for restoring the required state (not original) of technical equipment in a plant/line. Unscheduled maintenance tasks are carried out to remedy spontaneously occurring operating faults that will interrupt service operation.

These tasks cannot be planned. Immediately after our maintenance staff has received any trouble message, appropriate measures necessary for quickly eliminating the trouble will be taken (according to maintenance strategies previously fixed). Good coordination and execution of repair works as well as provision of spare parts form the basis for a quick and economical form of unscheduled maintenance are essential.

The equipment for CCTV and Public Address System needs a permanent control but generally only minor corrective maintenance tasks (mainly in case of vandalism or sabotage).Measures that become necessary due to improper use, faulty operation, external effects, force majeure, vandalism, are handled as non-contractual performance, and therefore they are separately charged and invoiced.

6.2.1.4 Track Works

Preventative and Corrective Maintenance analysis

As a result of the maintenance analyses, a schedule for preventative maintenance will be established for the delivered track system incl. Roadbed and track, fencings (in regard with the scope of supply). All scheduled activities will be planned in regard to the requirements of a high available system. This section describes the reliability-oriented inspection and maintenance work for each major component as well as the maintenance intervals and the down times for the operations. The maintenance tables also specify the required level of preventative maintenance.

Preventative Maintenance Programs

Inspections

The inspection comprises the measures to be performed to determine and evaluate the actual state of technical equipment within the scope of supply of Edinburgh Tram Network. The inspection covers:

- Function-related,
- Safety-related, and
- Maintenance-related activities.

According to working schedules coordinated and suitable intervals, service technicians carry out inspections on track as necessary. Results are documented and evaluated. During inspection, service technicians perform the minor maintenance tasks immediately that they can do by using their tools. If the scope of necessary work is larger, they will undertake necessary maintenance measure required for keeping the equipment in an available state.

Preventative Maintenance

Preventative maintenance on track covers all measures necessary for keeping the technical equipment of the track in the required and secure state. According to specified working schedules and intervals maintenance works are carried out on mechanical facilities. Results are recorded and evaluated. Based on the growing

number of maintenance works and the results gained from that the ability to make statements on the condition and wear behaviour is increasing.

During preventative maintenance work, inexpensive small parts such as screws will be replaced.. Repair tasks are carried out during maintenance.

The preventative maintenance includes:

Inspection (visual checks) required regularly. The parts have to be inspected with the following criteria:

- Damage (fracture, scorching, change of colour, etc.)
- Dirt, corrosion
- Missing equipment

Preventative maintenance work for all track facilities and the rail bed

- Grinding or alignment of rail joints
- Gauging, shimming and alignment of track and switches
- Surfacing of rails in short track sections and turnouts by grinding, welding, etc.
- Checking of rail welding, exchange of defective welds or defective sections of rails
- Measures and preventative maintenance for rail flaw, abrasion and rail profile
- Preventative activities for drainage-system
- Checking and adjustment

Preventative maintenance will be performed normally from Monday to Friday either during operating hours or at non-operating time during night.

Functional tests (Checking, measuring, adjusting)

Cleaning of the track equipment

Measures that become necessary due to improper use, faulty operation, external effects, force majeure, vandalism, alterations and extensions, etc. are excluded. Such works are handled as non-contractual performance, and therefore are separately charged and invoiced.

Corrective Maintenance

The corrective (unscheduled) maintenance work covers the activities for restoring the required state (not original) of technical equipment in a plant/line. Unscheduled maintenance tasks are carried out to remedy spontaneously occurring operating faults that will interrupt service operation.

These tasks cannot be planned. Immediately after our maintenance staff has received any trouble message, appropriate measures necessary for quickly eliminating the trouble will be taken (according to maintenance strategies previously fixed). Good coordination and execution of repair works as well as provision of spare parts form the basis for a quick and economical form of unscheduled maintenance are essential.

Measures that become necessary due to improper use, faulty operation, external effects, force majeure, vandalism, are handled as non-contractual performance, and therefore they are separately charged and invoiced.

Specialized and Heavy Maintenance Equipment

Special equipment required for the execution of the maintenance tasks on the track work will be delivered as part of the depot equipment and will remain at the depot for the execution of the different maintenance activities during the 10 years maintenance period.

In addition, as we are of the opinion that the vehicles which are within the depot scope of supply are not sufficient to reach the availability criteria requested, the Infraco Maintainer will include in his scope

- Emergency vehicle including emergency generator, welding equipment, manual grinding equipment, crane and high-pressure cleaning equipment.

6.2.2 Civil

A Defects Correction team comprising four operatives, equipped with a van/pickup, a compressor, an excavator with driver and access scaffold will execute the maintenance activities. The operatives will be skilled in various building/construction disciplines thus giving the capability to handle the vast majority of works that may arise.

The van/pickup will be fully equipped with the necessary tools and supplies to prepare and repair the vast majority of agreed defects.

This team will operate for approximately 12 weeks per year for the first three years and approximately four weeks per year for the next seven years. This will be at the operational requirements of the Infraco Maintainer

A Caretaker will be located at the Gogar Depot. He will be equipped with the necessary tools and supplies for the maintenance of the fabric of the Gogar Depot, for which the Infraco is responsible.

Three full time operatives are integrated into the 3 joint maintenance teams for maintaining the constructed fabric of the Edinburgh Tram System, for which the Infraco is responsible. They will be fully equipped with the necessary tools and supplies to carry out the majority of maintenance requirements.

A maintenance gang for maintaining the landscaping element of the Edinburgh Tram System, for which the Infraco is responsible, will be employed on a seasonal basis.

The gang will comprise three operatives (of whom one will be a landscaping specialist), a van/pickup, and landscape maintenance equipment.

This seasonal gang will operate for a total of two months per annum.

Specialists will be called up as required.

6.3 Maintenance Escalation

In the event that the Edinburgh Infraco teams are unable to clear an issue or incident, arrangements have been made for the escalation of the issue in the first instance to the technical support teams based in the UK, these are provided by the individual organisations or suppliers. Should further support be required, support from the product houses of the suppliers in there home countries has been arranged. This escalation will be managed in the first instance by the E&M Manger, however if further support is required this will be managed by the Project Manager. Any escalation will be recorded on the MMS system and will be monitored to ensure any pre agreed response times.

As part of the Infraco Maintenance process and procedures a detailed procedure will be provided to ensure maintenance and incident escalation is clearly defined.

7 Maintenance of the Rolling Stock

The maintenance of the rolling stock is not included in the proposal and the price of the Infraco Maintainer.
However, the proposal is based on the assumption that Infraco and Tramco will form a consortium to jointly provide the maintenance services to tie.

8 Performance Management

The Infrastructure Maintenance Performance shall be measured against the Performance Targets. The results of the evaluation of fulfilment of those targets can be used for the calculation of performance /reductions and bonuses, if applicable.

The detailed concept for respective application of performance/reductions and bonuses is defined in the ["Schedules to the Infrastructure Agreement" dated 01. Nov 2006 (incl. our comments)[.

Prior to contract award the above mentioned concept needs to be agreed between tie and Infraco.

9 Maintenance Management System (MMS)

9.1 MMS - modular components

The MMS is a tool for ensuring efficiency, consistent high quality Maintenance activities. The MMS is a comprehensive modular tool developed to meet the requirements of maintaining rail infrastructure systems.

The MMS consists of the following modular components with related functionalities:

- Vehicle and Asset Information Management and Serial Tracking,
- Maintenance Planning (scheduling) Operations and Incident Management,
- Work Order Management: Distribution, tracking and control of Preventative and corrective maintenance activities,
- Tracking statistics on the performance of repairs and other maintenance actions,
- Fault and Incidents reports and analysis,
- Maintenance history and archive
- Materials and spare parts management,
- Cost Control of the maintenance activities,
- Allows set up of parent-and-child component hierarchies.

Appendix 3 – MMS presentation

9.2 Application of the MMS

The MMS allows the preventative maintenance activities to be planned and work orders generated, distributed and tracked. This is made possible by access to a comprehensive product structures, analysis and history of systems in service. As more data is captured asset relationships can be monitored, controlled and analysed.

Any work orders for unplanned works (corrective maintenance), following fault notification can be dispatched and tracked.

As the MMS allows the monitoring of equipment on a modular basis it is possible for the life of a product to be monitored, capturing the history and type of events that occur during a products life and the effort expended upon its preventative and corrective maintenance. This information will allow the maintenance regime for products to be changed to ensure the optimum performance of individual types of products through there lifecycles.

Reports can be raised from a standard menu or new reports can be created to meet the user's requirements. A quarterly report will be generated by the system. This report will provide details of all the preventative and corrective maintenance activities carried out.

The MMS supports management of personal and their skill (competence profile). Furthermore the maintenance plan is managed with the instructions and their required competence profile (skill). All maintenance tasks can be planned, distributed and controlled regarding their required competence profiles.

The MMS is a key part of the stores management process providing a traceable and auditable history of all materials. This will ensure that a minimum stock holding is always held.

This is not limited to materials and will also be applied to specialist tools and equipment used to maintain the Edinburgh Tram Network.

The MMS will also assist in the purchasing of equipment and consumables, ensuring that when stocks are replenished that orders are tracked.

The purpose of utilising an integrated maintenance management system is to ensure that the maintenance of the system is provided on time to the correct quality using the correct materials.

10 Training

10.1 Overview

The proposed courses provide maintenance personnel the level training required to perform their activities. The preliminary training plan describes the initial training for Infrastructure maintenance staff for the Edinburgh Tram Network

The main aims of this training program are:

- enable the maintenance staff to maintain a safe and reliable system
- to ensure continuous learning and development

The training will be supported by a continuous professional development (CPD) programme.

10.1.1 Training Plan description

The objectives of the training process are to enable the maintenance staff dedicated to the Edinburgh Tram Network to benefit from the Maintainer experiences from former projects.

The proposal is based on the 'train the trainers' model: A qualified trainer trains key instructors, which will train the personnel of the maintenance staff from the Maintainer

- Step 1 of the training courses: The Maintainer will provide training for the key instructors. They will participate in theoretical courses and on the job activities during the implementation of the project.
- Step 2 of the training courses: at the end of step 1, the instructors will train newly engaged staff.

The 'train the trainers' process provides advantages for the organisation of the maintenance team:

- high educated maintenance staff for the life time of contract
- the instructors acquire technical expertise enabling them to better understand the complexity of the system
- high efficiency in preparing the training courses

The instructors are qualified for the future training of new personnel. In the following chapters, only the maintenance issues will be addressed.

Course Module	Duration in days	Number of trainings
Onsite Classroom Training		
MAT CR ON1 Management In this module management will be trained in running infrastructure maintenance skills.		
Duration in days	5	
Number of trainings		1
Subtotal	5	
MAT CR ON2 Supervisors (Infrastructure) In this module supervisors will be trained in handling infrastructure equipmentthe		
Duration in days	10	
Number of trainings		1
Subtotal	10	
MAT CR ON3 Maintenance staff (Infrastructure) This training is subdivided into a couple of modules, which depend on the detailed training plan. The maintenance staff will be trained for executive maintenance works.		
Duration in days	10	
Number of trainings		1
Subtotal	10	
MAT CR ON4 Heavy Duty (Infrastructure) This training is subdivided into a couple of modules, which depend on the detailed training plan. The heavy duty driver staff will be trained for emergency works.		
Duration in days	5	
Number of trainings		1
Subtotal	5	
Total duration of training	30	

10.2 Initial training for instructors

10.2.1 General organisation

The instructors will receive an initial theoretical and practical training according to their future responsibilities. After this initial training, they will improve their skills by carrying out on-the-job training during the implementation of the project.

This training will be organised by the Maintainer. The Maintainer coordinates the training courses with the construction team and the trainers of the different sub-systems.

10.2.2 Training plan

The detailed training plan will describe at least:

- the goal of each course
- the breakdown of each course into units
- the contents of the program of each unit and its duration
- the profile of participants and the prerequisites
- the equipment required and the course material corresponding to each unit
- the overall schedule of training

The maintenance core training courses are focussed on:

- Overview of the Tramway infrastructure system
- Telecommunication systems
- Power supply
- Track-work
- Depot and workshop equipment

The training courses will also focus on maintenance of specific equipment such as access management system, fire fighting, smoke detection etc. These courses will be performed by the suppliers. The modules will be specified in the training plan at a later stage.

10.3 Initial training for maintenance team

Before the start of the revenue service, trainers of the maintenance staff will train the technicians and workers. This initial training will be organised under the overall training plan and managed by a responsible Trainer of the project team for Infraco. The Trainer is responsible for the organisation, the compatibility of the courses with the project schedule.

The training part for management and organisation level has a scope of 2 weeks. The category of participants should have maintenance manager level. The training part for maintenance personal for infrastructure has a scope of 5 weeks. The category of participants should have engineers, electricians and mechanics.

The maximal number of participants for each course is 10 trainees. Each course will be performed max. twice. At the end of each training course, multiple choice type tests will

be used to assess the ability of the candidates to carry out their tasks and to transfer their skills to other employees.

11 Appendices

11.1 Appendix 1 : Organisational Structure

11.2 Appendix 2: Maintenance Plans

The maintenance plans are a preview of the work to be expected for scheduled maintenance from the manufacturer's perspective. As a rule, however, the design of the maintenance intervals and contents must focus on the actual performance of the wear parts and consumables in the respective operating environment of the systems. This means that the maintenance plans that are defined at the beginning of the revenue service is only of a preliminary nature. They will be adapted by the Infraco maintainer upon approval by the client to the specific service requirements and general conditions in the course of running and maintaining the system. Possible adjustments should be discussed on a regular basis between the client and the Infraco maintainer.

11.3 Appendix 3 : MMS

11.4 Appendix 4 : Vandalism Repair Items

Notwithstanding that we have excluded physical vandal damage as part of the scope of any maintenance contract. We are aware that vandal damage is a problem that will need to be addressed on the entire Edinburgh Tram Network.

We also recognise that the nature of the maintenance contract puts the maintainer in the ideal position to identify and carry out these repairs.

Consequently we list below a selection of items that might be the subject of vandal damage.

	Unit	indicative Prices
1. Replace pane in tram-stop shelter	no	975,00 £
2. Replace litter bin	no	818,00 £
3. Replace platform lighting column	no	2.250,00 £
4. Replace pedestrian guardrail	no	217,00 £
5. Replace street lighting column	no	2.625,00 £
6. Replace Metal Benching	no	2.163,00 £
7. Replace Security Fencing	no	113,00 £
8. Replace Complete tram-stop Shelter (8 meters)	no	22.635,00 £
9. Replace CCTV Camera	no	2.611,00 £
10. Replace PIS Indicator Panel	no	4.264,00 £
11. Replace Loudspeaker	no	417,00 £
12. Replace Electrical Cabinet	no	22.074,00 £
13. Replace Signal	no	2.609,00 £
14. Replace Point Indicator	no	2.314,00 £
15. Replace Points Heating	no	10.293,00 £
16. Replace Point Machine	no	19.260,00 £
17. Replace Passenger Help Points	no	1.971,00 £
18. Replace Advertising Panel		

The above list is not exhaustive and is provided for indicative reasons. We would welcome the opportunity to discuss this matter with you.

PROJECT	SECTION	FOLDER	DWG NO	STR ID	REV NO	DRAWING NAME	STATUS	COMMENTS
ULE-90130	1	ACC	1		1	Newhaven Road To Haymarket(Sub-Seciton 1A)	Issued for External Approval	Works are under Provisional Sum
ULE-90130	1	ACC	2		1	Newhaven Road To Haymarket(Sub-Seciton 1A)	Issued for External Approval	Works are under Provisional Sum
ULE-90130	1	ACC	3		1	Newhaven Road To Haymarket(Sub-Seciton 1A)	Issued for External Approval	Works are under Provisional Sum
ULE-90130	1	ACC	6		1	Newhaven Road to Haymarket,Section 1A	Issued for External Approval	Works are under Provisional Sum
ULE-90130	1	ACC	7		1	Newhaven Road to Haymarket,Section 1A	Issued for External Approval	Works are under Provisional Sum
ULE-90130	1	ACC	10		1	Newhaven Road to Haymarket Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	1	ACC	11		1	Newhaven Road to Haymarket Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	1	ACC	12		1	Newhaven Road to Haymarket Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	1	ACC	13		1	Newhaven Road to Haymarket Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	1	ACC	14		1	Newhaven Road to Haymarket Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	1	ACC	15		1	Newhaven Road to Haymarket Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	1	ACC	16		1	Newhaven Road to Haymarket Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	1	ACC	18		1	Newhaven Road to Haymarket Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	1	ACC	24		1	Newhaven Road to Haymarket Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	2	ACC	1		1	Haymarket to Roseburn Junction	Issued for External Approval	Works are under Provisional Sum
ULE-90130	2	ACC	2		1	Haymarket to Roseburn Junction	Issued for External Approval	Works are under Provisional Sum
ULE-90130	2	ACC	3		1	Haymarket to Roseburn Junction	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	1		1	Murrayfield Rugby Stadium - Location Plan	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	2		1	Murrayfield Rugby Stadium - Site Plan	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	3		1	Murrayfield Stadium - Floor Plan	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	4		1	Murrayfield Stadium - Elevation B & Sec A-A	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	5		1	Murrayfield Stadium Site Plan	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	6		1	Murrayfield Stadium Ground & First Floor	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	7		1	Murrayfield Stadium Elevators & Sec A-A	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	8		1	Murrayfield Stadium Turnstile Area	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	9		1	Murrayfield Stadium New Access & Car Park	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	10		1	Roseburn Junction to Gogarburn Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	11		1	Roseburn Junction to Gogarburn Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	12		1	Roseburn Junction to Gogarburn Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	13		1	Roseburn Junction to Gogarburn Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	14		1	Roseburn Junction to Gogarburn Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	15		1	Roseburn Junction to Gogarburn Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	16		1	Roseburn Junction to Gogarburn Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	17		1	Roseburn Junction to Gogarburn Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	18		1	Roseburn Junction to Gogarburn Boundary	Issued for External Approval	Works are under Provisional Sum
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ULE-90130	5	ACC	20		1	Roseburn Junction to Gogarburn Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	21		1	Roseburn Junction to Gogarburn Drainage Pipe	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	22		1	Roseburn Junction to Gogarburn Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	23		1	Roseburn Junction to Gogarburn Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	24		1	Roseburn Junction to Gogarburn Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	25		1	Roseburn Junction to Gogarburn Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	26		1	Roseburn Junction to Gogarburn Boundary	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	32		2	Murrayfield Stadium Accomodation Works Clubhouse Proposed Ground & First Floor Plans	Issued for External Approval	Works are under Provisional Sum
ULE-90130	5	ACC	33		2	Murrayfield Stadium Accomodation Works Clubhouse Proposed Elevations & Section A-A	Issued for External Approval	Works are under Provisional Sum
ULE-90130	6	ACC	1		*	Gogar Depot Boundary and Accommodation Works Sheet 1 of 2	Issued for External Approval	Works are under Provisional Sum
ULE-90130	6	ACC	2		*	Gogar Depot Boundary and Accommodation Works Sheet 2 of 2	Issued for External Approval	Works are under Provisional Sum
ULE-90130	7	ACC	1		1	Gogarburn to Edinburgh Airport,SubSection7A	Issued for External Approval	Works are under Provisional Sum
ULE-90130	7	ACC	2		1	Gogarburn to Edinburgh Airport,SubSection7A	Issued for External Approval	Works are under Provisional Sum
ULE-90130	7	ACC	3		1	Gogarburn to Edinburgh Airport,SubSection7A	Issued for External Approval	Works are under Provisional Sum
ULE-90130	7	ACC	4		1	Gogarburn to Edinburgh Airport,SubSection7A	Issued for External Approval	Works are under Provisional Sum
ULE-90130	7	ACC	5		1	Gogarburn to Edinburgh Airport,SubSection7A	Issued for External Approval	Works are under Provisional Sum
ULE-90130	7	ACC	6		1	Gogarburn to Edinburgh Airport,SubSection7A	Issued for External Approval	Works are under Provisional Sum
ULE-90130	7	ACC	7		1	Gogarburn to Edinburgh Airport,SubSection7A	Issued for External Approval	Works are under Provisional Sum
ULE-90130	7	ACC	8		2	Gogarburn to Edinburgh Airport,SubSection7A	Issued for External Approval	Works are under Provisional Sum
ULE-90130	7	ACC	9		1	Gogarburn to Edinburgh Airport,SubSection7A	Issued for External Approval	Works are under Provisional Sum
ULE-90130	1	BRG	1	S16	D	Victoria Dock	For Tender Purposes Only	
ULE-90130	1	BRG	2	S16	A	Victoria Dock	For Tender Purposes Only	
ULE-90130	1	BRG	62	S17	D	Tower Place Bridge	For Tender Purposes Only	
ULE-90130	1	BRG	64	S17	A	Tower Place Bridge	For Tender Purposes Only	
ULE-90130	1	BRG	65	S17	A	Tower Place Bridge	For Tender Purposes Only	
ULE-90130	1	BRG	121	S18	C	Leith Walk Railway	For Tender Purposes Only	
ULE-90130	1	BRG	122	S18	A	Leith Walk Railway	Preliminary Design	
ULE-90130	2	BRG	3	S19	3	Haymarket Station Viaduct	Issued for External Approval	
ULE-90130	2	BRG	4	S19	4	Haymarket Station Viaduct	Issued for External Approval	

PROJECT	SECTION	FOLDER	DWG NO	STR ID	REV NO	DRAWING NAME	STATUS	COMMENTS
ULE-90130	2	BRG	5	S19	3	Haymarket Station Viaduct	Issued for External Approval	
ULE-90130	2	BRG	6	S19	3	Haymarket Station Viaduct	Issued for External Approval	
ULE-90130	2	BRG	7	S19	3	Haymarket Station Viaduct	Issued for External Approval	
ULE-90130	2	BRG	8	S19	3	Haymarket Station Viaduct	Issued for External Approval	
ULE-90130	2	BRG	9	S19	3	Haymarket Station Viaduct	Issued for External Approval	
ULE-90130	2	BRG	10	S19	3	Haymarket Station Viaduct	Issued for External Approval	
ULE-90130	2	BRG	11	S19	3	Haymarket Station Viaduct	Issued for External Approval	
ULE-90130	2	BRG	12	S19	1	Haymarket Street Viaduct	Issued for External Approval	
ULE-90130	2	BRG	17	S19	3	Haymarket Station Viaduct	Issued for External Approval	
ULE-90130	2	BRG	18	S19	1	Haymarket Street Viaduct	Issued for External Approval	
ULE-90130	2	BRG	19	S19	1	Haymarket Street Viaduct	Issued for External Approval	
ULE-90130	2	BRG	20	S19	1	Haymarket Street Viaduct	Issued for External Approval	
ULE-90130	2	BRG	21	S19	1	Haymarket Street Viaduct	Issued for External Approval	
ULE-90130	2	BRG	22	S19	1	Haymarket Street Viaduct	Issued for External Approval	
ULE-90130	2	BRG	23	S19	1	Haymarket Street Viaduct	Issued for External Approval	
ULE-90130	2	BRG	24	S19	1	Haymarket Street Viaduct	Issued for External Approval	
ULE-90130	2	BRG	25	S19	1	Haymarket Street Viaduct	Issued for External Approval	
ULE-90130	2	BRG	26	S19	1	Haymarket Street Viaduct	Issued for External Approval	
ULE-90130	2	BRG	27	S19	1	Haymarket Street Viaduct	Issued for External Approval	
ULE-90130	2	BRG	28	S19	1	Haymarket Street Viaduct	Issued for External Approval	
ULE-90130	2	BRG	29	S19	1	Haymarket Street Viaduct	Issued for External Approval	
ULE-90130	2	BRG	30	S19	1	Haymarket Street Viaduct	Issued for External Approval	
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ULE-90130	5	BRG	2	S20	4	Russell Road	For Tender Purposes Only	
ULE-90130	5	BRG	4	S20	3	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	5	S20	3	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	6	S20	3	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	7	S20	3	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	8	S20	3	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	9	S20	3	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	10	S20	3	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	11	S20	3	Russell Road Underbridge	For Tender Purposes Only	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	12	S20	2	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	13	S20	3	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	14	S20	4	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
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ULE-90130	5	BRG	16	S20	1	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	17	S20	1	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	18	S20	1	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	19	S20	1	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	20	S20	1	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	21	S20	1	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	22	S20	1	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	23	S20	1	Russell Road Underbridge	Issued for External Approval	Information taken from disc 2. No info in network.
ULE-90130	5	BRG	61	S21A	6	Roseburn Street Viaduct	For Tender Purposes Only	
ULE-90130	5	BRG	62	S21A	5	Roseburn Street Viaduct	For Tender Purposes Only	
ULE-90130	5	BRG	63	S21A	1	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	64	S21A	3	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	65	S21A	3	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	66	S21A	4	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	67	S21A	4	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	68	S21A	4	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	69	S21A	4	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	70	S21A	4	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	71	S21A	2	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	72	S21A	2	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	73	S21A	2	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	74	S21A	2	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	75	S21A	2	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	76	S21A	5	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	77	S21A	5	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	78	S21A	2	Roseburn Street Viaduct	Issued for External Approval	

PROJECT	SECTION	FOLDER	DWG NO	STR ID	REV NO	DRAWING NAME	STATUS	COMMENTS
ULE-90130	5	BRG	79	S21A	2	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	80	S21A	5	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	81	S21A	3	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	82	S21A	2	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	83	S21A	2	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	84	S21A	1	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	85	S21A	1	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	86	S21A	1	Roseburn Street Viaduct	Issued for External Approval	
ULE-90130	5	BRG	161	S22	1	Balgreen	Draft	
ULE-90130	5	BRG	221	S23	C	Carrick Knowe Underbridge	For Tender Purposes Only	
ULE-90130	5	BRG	226	S23	2	Carrick Knowe Underbridge Structure	Issued for External Approval	
ULE-90130	5	BRG	227	S23	2	Carrick Knowe Underbridge Structure	Issued for External Approval	
ULE-90130	5	BRG	281	S24	1	Saughton (As Built)	For Tender Purposes Only	
ULE-90130	5	BRG	341	S25	A	Broomhouse (As Built)	For Tender Purposes Only	
ULE-90130	5	BRG	401	S26	1	South Gyle Access	Issued for Tender Purposes Only	
ULE-90130	5	BRG	402	S26	2	South Gyle Access	For Tender Purposes Only	
ULE-90130	5	BRG	403	S26	2	South Gyle Access	For Tender Purposes Only	
ULE-90130	5	BRG	420	S26	1	Roseburn Junction to Gogarburn	For Tender Purposes Only	
ULE-90130	5	BRG	421	S26	2	Extg GA	For Tender Purposes Only	
ULE-90130	5	BRG	423	S26	2	Roseburn Junction to Gogarburn Structure S26 South Gyle Access Bridge Proposed GA Sheet 1 of 2	For Tender Purposes Only	
ULE-90130	5	BRG	424	S26	2	Roseburn Junction to Gogarburn Structure S26 South Gyle Access Bridge Proposed GA Sheet 2 of 2	For Tender Purposes Only	
ULE-90130	5	BRG	425	S26	2	Roseburn Junction to Gogarburn Structure S26 South Gyle Access Bridge Sequence of Constuction	For Tender Purposes Only	
ULE-90130	5	BRG	426	S26	1	Roseburn Junction to Gogarburn Structure S26 South Gyle Access Bridge Setting Out Details	For Tender Purposes Only	
ULE-90130	5	BRG	427	S26	1	Roseburn Junction to Gogarburn Structure S26 South Gyle Access Bridge Substructure General Arrangement	For Tender Purposes Only	
ULE-90130	5	BRG	428	S26	2	Roseburn Junction to Gogarburn Structure S26 South Gyle Access Bridge Pile Details	For Tender Purposes Only	
ULE-90130	5	BRG	429	S26	2	Roseburn Junction to Gogarburn Structure S26 South Gyle Access Bridge Steel Column Details	For Tender Purposes Only	
ULE-90130	5	BRG	430	S26	1	Roseburn Junction to Gogarburn Structure S26 South Gyle Access Bridge Reinforced Earth Details 1 of 2	Issued for External Review	
ULE-90130	5	BRG	431	S26	1	Roseburn Junction to Gogarburn Structure S26 South Gyle Access Bridge Reinforced Earth Details 2 of 2	Issued for External Review	
ULE-90130	5	BRG	432	S26	2	Roseburn Junction to Gogarburn Structure S26 South Gyle Access Bridge Deck General Arrangement	For Tender Purposes Only	
ULE-90130	5	BRG	433	S26	1	Roseburn Junction to Gogarburn Structure S26 South Gyle Access Bridge Bar Schedule	NO STATUS	
ULE-90130	5	BRG	434	S26	2	Roseburn Junction to Gogarburn Structure S26 South Gyle Access Bridge Deck Reinforcement	For Tender Purposes Only	
ULE-90130	5	BRG	435	S26	1	Roseburn Junction to Gogarburn Structure S26 South Gyle Access Bridge Diaphragm Reinforcement	For Tender Purposes Only	
ULE-90130	5	BRG	436	S26	1	Roseburn Junction to Gogarburn Structure S26 South Gyle Access Bridge Run on Slabs GA and RC Details	For Tender Purposes Only	
ULE-90130	5	BRG	437	S26	2	Roseburn Junction to gogarburn Structure S26 South Gyle Access Bridge Parapet & Fencing Detail	For Tender Purposes Only	
ULE-90130	5	BRG	468	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	469	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	470	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	471	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	472	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	473	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	474	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	475	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	476	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	477	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	478	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	479	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	480	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
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ULE-90130	5	BRG	482	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	483	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	484	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	485	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	486	S27		Edinburgh Park Station Bridge Structure S27	Issued for External Approval	No revision number
ULE-90130	5	BRG	487	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	488	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	489	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	490	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	491	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	492	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	493	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	494	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number

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ULE-90130	5	BRG	495	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	496	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	497	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	498	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	500	S27		Edinburgh Park Station Bridge Structure S27 U12 Precast Beams Hole Setting Out Details	Issued for Information	No revision number
ULE-90130	5	BRG	501	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	502	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	503	S27		Edinburgh Park Station Bridge Structure S27	Issued for Information	No revision number
ULE-90130	5	BRG	521	S28	3	A8 Underpass	For Tender Purposes Only	
ULE-90130	5	BRG	522	S28	2	A8 Underpass	For Tender Purposes Only	
ULE-90130	5	BRG	523	S28	2	Traffic Management	For Tender Purposes Only	
ULE-90130	5	BRG	524	S28	2	Traffic Management	For Tender Purposes Only	
ULE-90130	5	BRG	525	S28	2	Traffic Management	For Tender Purposes Only	
ULE-90130	5	BRG	526	S28	2	Traffic Management	For Tender Purposes Only	
ULE-90130	5	BRG	527	S28	2	Traffic Management	For Tender Purposes Only	
ULE-90130	5	BRG	528	S28	2	Traffic Management	For Tender Purposes Only	
ULE-90130	5	BRG	529	S28	2	Traffic Management	For Tender Purposes Only	
ULE-90130	5	BRG	530	S28	3	Construction Sequence	For Tender Purposes Only	
ULE-90130	5	BRG	531	S28	3	Construction Sequence	For Tender Purposes Only	
ULE-90130	5	BRG	532	S28	3	Existing Services	For Tender Purposes Only	
ULE-90130	5	BRG	560	S28	1	South Portal GA	For Tender Purposes Only	
ULE-90130	5	BRG	630	S32	5	Depot Access GA 1 of 2	For Tender Purposes Only	
ULE-90130	5	BRG	631	S32	5	Depot Access GA 2 of 2	For Tender Purposes Only	
ULE-90130	5	BRG	681	S21C		Murrayfield Stadium Underpass	For Tender Purposes Only	
ULE-90130	5	BRG	682	S21C	1	Roseburn Junction to Gogarburn	Issued for External Approval	
ULE-90130	5	BRG	683	S21C	2	Murrayfield Stadium Underpass	Issued for External Approval	
ULE-90130	5	BRG	684	S21C	3	Murrayfield Stadium Underpass	Issued for External Approval	
ULE-90130	5	BRG	684	S21C	1	Murrayfield Stadium Underpass	Issued for External Approval	
ULE-90130	5	BRG	685	S21C	2	Murrayfield Stadium Underpass	Issued for External Approval	
ULE-90130	5	BRG	686	S21C	1	Murrayfield Stadium Underpass	Issued for External Approval	
ULE-90130	5	BRG	741	S21E	4	Water of Leith	For Comment	
ULE-90130	5	BRG	751	S21E	1	Structure S21E Water of Leith Bridge General Arrangement	For Tender Purposes Only	
ULE-90130	5	BRG	755	S21E	1	Water of Leith	For Tender Purposes Only	
ULE-90130	5	BRG	759	S21E	2	Structure S21E - Water of Leith Bridge Steelwork Details Sheet 2 of 2	Issued for External Approval	
ULE-90130	5	BRG	760	S21E	2	Structure S21E - Water of Leith Bridge Steelwork Details Sheet 2 of 2	Issued for External Approval	
ULE-90130	5	BRG	761	S21E	2	Structure S21E - Water of Leith Bridge Deck Concrete Outline Sheet 1 of 2	Issued for External Approval	
ULE-90130	5	BRG	762	S21E	2	Structure S21E - Water of Leith Bridge Deck Concrete Outline Sheet 2 of 2	Issued for External Approval	
ULE-90130	5	BRG	763	S21E	1	Structure S21E - Water of Leith Bridge Deck RC Details Sheet 1 of 2	Issued for External Approval	
ULE-90130	5	BRG	764	S21E	1	Structure S21E - Water of Leith Bridge Deck RC Details Sheet 2 of 2	Issued for External Approval	
ULE-90130	7	BRG	20	S29	2A	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 Drawing Schedule	For Tender Purposes Only	
ULE-90130	7	BRG	21	S29	2B	Gogarburn to Edinburgh Airport, Gogar Burn Bridge Structure S29, General Arrangement 1 of 2	Issued for External Approval	
ULE-90130	7	BRG	22	S29	2B	Gogarburn to Edinburgh Airport, Gogar Burn Bridge Structure S29, General Arrangement 2 of	Issued for External Approval	
ULE-90130	7	BRG	23	S29	2A	Gogarburn to Edinburgh Airport, Gogar Burn Bridge Structure S29, Setting Out Details	For Tender Purposes Only	
ULE-90130	7	BRG	24	S29	2A	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 Substructure General Arrangement	For Tender Purposes Only	
ULE-90130	7	BRG	25	S29	(-)	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 Piles Details	Draft	
ULE-90130	7	BRG	26	S29	A1	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 Pile cap reinforcement	Draft	
ULE-90130	7	BRG	27	S29	1A	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 Column and Capping Beam Reinforcement	Draft	
ULE-90130	7	BRG	28	S29	1A	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 West Abutment Reinforced Earth GA Sheet 1 of 2	Issued for External Approval	
ULE-90130	7	BRG	29	S29	1A	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 West Abutment Reinforced Earth GA Sheet 2 of 2	Issued for External Approval	*Drawings received but not in Drawing List*
ULE-90130	7	BRG	30	S29	2A	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 Deck General Arrangement	For Tender Purposes Only	
ULE-90130	7	BRG	31	S29	2A	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 Precast Pre-stressed TY Beams	For Tender Purposes Only	
ULE-90130	7	BRG	32	S29	2A	Gogarburn to Edinburgh Airport Gogarburn Structure S29 Precast Pre-stressed TYE Beams	For Tender Purposes Only	
ULE-90130	7	BRG	33	S29	1A	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 Diaphragm Reinforcement	Draft	
ULE-90130	7	BRG	34	S29	1A	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 Deck Slab Reinforcement	Draft	
ULE-90130	7	BRG	35	S29	1A	Gogarburn to Edinburgh Airport Gogarburn Bridge Struccture S29 Run on Slab General Arrangement	Draft	
ULE-90130	7	BRG	36	S29	1A	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 Parapet and Fencing Details	Draft	
ULE-90130	7	BRG	37	S29	2A	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 Parapet Ground Beam Outline	For Tender Purposes Only	
ULE-90130	7	BRG	38	S29	1A	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 Parapet Ground Beam Reinforcement	Draft	
ULE-90130	7	BRG	39	S29	1	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 Watercourse Protection Works	For Tender Purposes Only	
ULE-90130	7	BRG	40	S29	1A	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 East Abutment Reinforced Earth GA	Issued for External Approval	
ULE-90130	7	BRG	41	S29	1A	Gogarburn to Edinburgh Airport Gogarburn Bridge Structure S29 Run on Slabs Reinforcement	Draft	

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ULE-90130	7	BRG	42	S29	1A	Gogarburn to Edinburgh Airport Gogarburn Bridge	Issued for External Approval	
ULE-90130	7	BRG	43	S29	1	Gogarburn to Edinburgh Airport Reinforced Earth Details		
ULE-90130	7	BRG	64	S30,31,34	1	S30, S31 & S34 Culverts	Issued for External Approval	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	65	S30,31,34		Gogarburn Culverts General Arrangements	Issued for External Approval	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	66	S30,31,34		Gogarburn Culverts General Arrangements	Issued for External Approval	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	67	S30,31,34		Gogarburn Culverts General Arrangements	Issued for External Approval	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	68	S30,31,34		Gogarburn Culverts General Arrangements	Issued for External Approval	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	69	S30,31,34		Gogarburn Culverts Culvert No. 1 Concrete Outlines	Issued for External Approval	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	70	S30,31,34		Gogarburn Culverts Culvert No. 1 Concrete Outlines	Issued for External Approval	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	71	S30,31,34	2	Gogarburn Culverts Culvert No. 3 Concrete Outlines	Issued for External Approval	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	72	S30,31,34	1	Gogarburn Culverts Culvert No. 1 RC Details - Box Culvert Sections Sheet 1	Issued for External Approval	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	73	S30,31,34	1	Gogarburn Culverts Culvert No. 1 RC Details - Box Culvert Sections Sheet 2	Issued for External Approval	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	74	S30,31,34	1	Gogarburn Culverts Culvert No. 2 RC Details - Box Culvert Sections Sheet 1	Issued for External Approval	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	75	S30,31,34	1	Gogarburn Culverts Culvert No. 2 RC Details - Box Culvert Sections Sheet 2	Issued for External Approval	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	76	S30,31,34	1	Gogarburn Culverts Culvert No. 3 RC Details - Box Culvert Sections Sheet 1	Issued for External Approval	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	77	S30,31,34	1	Gogarburn Culverts Culvert No. 3 RC Details - Box Culvert Sections Sheet 2	Issued for External Approval	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	78	S30,31,34	1	Gogarburn Culverts Culvert No. 1 Headwalls RC Details	Issued for External Approval	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	79	S30,31,34	1	Gogarburn Culverts Culvert No. 2 Headwalls RC Details	*Missing Drawing*	*sent TQ for revisions and clarifications……*
ULE-90130	7	BRG	80	S30,31,34	1	Gogarburn Culverts Culverts No.3 Headwalls RC Details	Issued for External Approval	
ULE-90130	SW	CND	2		6	Kerbing Details	Issued for External Approval	
ULE-90130	SW	CND	3		2	Signal Head Types	Issued for External Approval	
ULE-90130	SW	CND	4		2	Kerbing Details	Issued for External Approval	
ULE-90130	SW	CND	5		1	Step Details	External Approval	*No drawing status stamped*
ULE-90130	SW	CND	7		1	Timber Kick Detail	Issued for External Approval	
ULE-90130	SW	CND	8		1	Peestrian Handrail Details	Issued for External Approval	
ULE-90130	SW	CND	9		1	Pedestrian Handrail Details,Section 3A	Issued for External Approval	
ULE-90130	SW	CND	16			Construction Detail Typical Substation Access Details	Issued for Internal Review	
ULE-90130	6	DEP	1		7	Gogar Depot Proposed Maintenance & Stabling Layout Site Plan	For External Approval	
ULE-90130	6	DEP	2		7	Gogar Depot Proposed Maintenance & Stabling Layout Site Plan	For External Approval	
ULE-90130	6	DEP	3		7	Gogar Depot Proposed Maintenance & Stabling Layout Site Plan	For External Approval	
ULE-90130	6	DEP	4		7	Gogar Depot Proposed Maintenance & Stabling Layout Site Plan	For External Approval	
ULE-90130	6	DEP	5		7	Gogar - First Floor Layout	For External Approval	
ULE-90130	6	DEP	6		6	Gogar Depot Proposed Maintenance & Stabling Layout Site Plan	For External Approval	
ULE-90130	6	DEP	7		6	Gogar Depot Proposed Maintenance & Stabling Layout Site Plan	For External Approval	
ULE-90130	6	DEP	8		6	Gogar Depot Proposed Maintenance & Stabling Layout Site Plan	For External Approval	
ULE-90130	6	DEP	9		7	Gogar Depot Proposed Maintenance & Stabling Layout Site Plan	For External Approval	
ULE-90130	6	DEP	10		7	Gogar Depot Proposed Maintenance & Stabling Layout Site Plan	For External Approval	
ULE-90130	6	DEP	12		7	Gogar Depot Proposed Maintenance & Stabling Layout Site Plan	For External Approval	
ULE-90130	6	DEP	13		00	Standard Electrical Services Details	For Internal Review	
ULE-90130	6	DEP	14		7	Gogar Depot Proposed Maintenance & Stabling Layout Site Plan	For External Approval	
ULE-90130	6	DEP	17		6	Gogar Depot Depot & Office Building Roof Plan Layout	For External Approval	
ULE-90130	6	DEP	18		1	Gogar Depot Depot & Office Building Ground Floor Layout Plan Ceiling Layout	For External Approval	
ULE-90130	6	DEP	19		1	Gogar Depot Depot & Office Building First Floor Layout Plan Ceiling Layout	For External Approval	
ULE-90130	6	DEP	21		1	Gogar Depot Depot & Office Building Wall & Column Casing Plan Details	For External Approval	
ULE-90130	6	DEP	23		1	Gogar Depot Depot & Office Building Wall Elevation & Sections Internal & External Details	For External Approval	
ULE-90130	6	DEP	27		1	Gogar Depot Office Building Male WC, Showers & Locker Room Ground Floor Details	For External Approval	
ULE-90130	6	DEP	28		1	Gogar Depot Office Building Female & Accessilbe Toilet First Floor Details	For External Approval	
ULE-90130	6	DEP	30		1	Gogar Depot Office Building Public & Staff Entrance Canopy Details	For External Approval	
ULE-90130	6	DEP	32		1	Gogar Depot Depot & Office Buidling Ground Floor Fire Strategy Plan	For External Approval	
ULE-90130	6	DEP	33		1	Gogar Depot Depot & Office Building First Floor Fire Strategy Plan	For External Approval	
ULE-90130	6	DEP	34		1	Gogar Depot Depot & Office Building General Arrangement Layout Fire Strategy Plan	For External Approval	
ULE-90130	6	DEP	35		1	Gogar Depot Depot & Office Building Ground Floor Layout Plan Schedule of Finishes	For External Approval	
ULE-90130	6	DEP	36		1	Gogar Depot Depot & Office Building First Floor Layout Plan Schedule of Finishes	For External Approval	
ULE-90130	6	DEP	37		1	Gogar Depot Office Building Ground Floor Plan Door & Window Layout	For External Approval	
ULE-90130	6	DEP	38		1	Gogar Depot Office Building First Floor Plan Door & Window Layout	For External Approval	
ULE-90130	6	DEP	39		1	Gogar Depot Depot Building Workshop Area Floor Plan Door Layout	For External Approval	
ULE-90130	6	DEP	40		1	Gogar Depot Depot & Office Building Door Schedule Ground Floor	For External Approval	
ULE-90130	6	DEP	41		1	Gogar Depot Office Building Door Schedule First Floor	For External Approval	
ULE-90130	6	DEP	60		1	Gogar Depot Depot & Office Building Power Energy Centre Building Ground Floor Layout Plan	For External Approval	
ULE-90130	6	DEP	61		1	Gogar Depot Depot & Office Building Power Energy Centre Building Reflected Ceiling & Roof Layout Plans	For External Approval	
ULE-90130	6	DEP	62		1	Gogar Depot Depot & Office Building Power Energy Centre Elevations	For External Approval	

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ULE-90130	6	DEP	63		1	Gogar Depot Depot & Office Building Power Energy Centre Building Section A-A & Details	For External Approval	
ULE-90130	6	DEP	67		1	Gogar Depot Depot & Office Building Sub-Station Building Ground Floor Layout Plans	For External Approval	
ULE-90130	6	DEP	68		1	Gogar Depot Depot & Office Building Sub-Station Building Reflected Ceiling & Roof Layout Plans	For External Approval	
ULE-90130	6	DEP	70		1	Gogar Depot Depot & Office Building Sub-Station Bulding Section A-A & Details	For External Approval	
ULE-90130	6	DEP	75		2	Gogar Depot Depot Equipment & Communications Room Arrangement Ground Floor Layout Plan	For External Approval	
ULE-90130	6	DEP	80		2	Gogar Depot Control Room Arrangement First Floor Layout Plan	For External Approval	
ULE-90130	6	DEP	101		4	Section 6 Depot Foundation Layout Sheet 1 of 2	For External Approval	
ULE-90130	6	DEP	102		4	Section 6 Depot Foundation Layout Sheet 2 of 2	For External Approval	
ULE-90130	6	DEP	103		4	Section 6 Depot Ground Floor Slab Layout Sheet 1 of 2	For External Approval	
ULE-90130	6	DEP	104		4	Section 6 Depot Ground Floor Slab Layout Sheet 2 of 2	For External Approval	
ULE-90130	6	DEP	106		4	Gogar - Ground Floor Steel Layout	For Tender Purposes Only	
ULE-90130	6	DEP	107		4	Section 6 Depot First Floor Steel Layout Sheet 1 of 2	For External Approval	
ULE-90130	6	DEP	108		4	Gogar - First Floor Steel Layout	For External Approval	
ULE-90130	6	DEP	110		4	Section 6 Depot Roof Level Steel Layout Sheet 1 of 2	For External Approval	
ULE-90130	6	DEP	111		4	Section 6 Depot Roof Level Steel Layout Sheet 2 of 2	For External Approval	
ULE-90130	6	DEP	115		2	Section 6 Depot Steel Frame Sections Sheet 1	For External Approval	
ULE-90130	6	DEP	116		1	Section 6 Depot Steel Frame Sections Sheet 2	For External Approval	
ULE-90130	6	DEP	122		1	Depot & Office Building Base Plate Details	For External Approval	
ULE-90130	6	DEP	160		1	Gogar Depot Depot & Office Building Power Energy Centre Foundation Layout	For External Approval	
ULE-90130	6	DEP	161		1	Gogar Depot Depot & Office Building Power Energy Centre Lower Roof Layout	For External Approval	
ULE-90130	6	DEP	162		1	Gogar Depot Depot & Office Building Power Energy Centre Upper Roof Layout	For External Approval	
ULE-90130	6	DEP	165		1	Gogar Depot Depot & Office Building Power Energy Centre Upper Roof Layout	For External Approval	
ULE-90130	6	DEP	170		1	Gogar Depot Depot & Office Building Power Energy Centre Sections	For External Approval	
ULE-90130	6	DEP	171		1	Gogar Depot Depot & Office Building Sub-Station Building Foundation Layout	For External Approval	
ULE-90130	6	DEP	175		1	Gogar Depot Depot & Office Building Sub-Station Sections	For External Approval	
ULE-90130	6	DEP	201		4	Gogar - Electrical Symbols	For External Approval	
ULE-90130	6	DEP	202		4	Gogar -External Lighting	For External Approval	
ULE-90130	6	DEP	203		4	Gogar -External Lighting	For External Approval	
ULE-90130	6	DEP	204		4	Gogar - Electrical Lighting Layout	For External Approval	
ULE-90130	6	DEP	205		4	Gogar - Electrical Small Power	For External Approval	
ULE-90130	6	DEP	206		4	Gogar - Electrical Small Power	For External Approval	
ULE-90130	6	DEP	207		4	Gogar - Fire Alarm & Security	For External Approval	
ULE-90130	6	DEP	208		4	Gogar - Fire Alarm & Security	For External Approval	
ULE-90130	6	DEP	209		4	Gogar - Electrical Containment	For External Approval	
ULE-90130	6	DEP	210		4	Gogar - Electrical Containment	For External Approval	
ULE-90130	6	DEP	231		4	Gogar - Electrical LV Power	For External Approval	
ULE-90130	6	DEP	232		4	Gogar -Electrical Fire Alarm	For External Approval	
ULE-90130	6	DEP	233		4	Gogar - Electrical Earthing System	For External Approval	
ULE-90130	6	DEP	234		1	Gogar Depot Lighting Protection System	For External Approval	
ULE-90130	6	DEP	239		1	Gogar Depot External Electrical Services Layout Sheet 1 of 2	For External Approval	
ULE-90130	6	DEP	240		-	Gogar Depot External Electrical Services Layout Sheet 2 of 2	For External Approval	
ULE-90130	6	DEP	242		1	Gogar Depot Depot & Office Building Ground Floor Level Lighting Layout Sheet 1 of 2	For External Approval	
ULE-90130	6	DEP	243		1	Gogar Depot Depot & Office Building Ground Floor Level Lighting Layout Sheet 2 of 2	For External Approval	
ULE-90130	6	DEP	244		1	Gogar Depot Depot & Office Building First Floor Level Lighting Layout	For External Approval	
ULE-90130	6	DEP	245		1	Gogar Depot Depot & Office Building Ground Floor Level Small Power & Date Layout Sheet 1 of 2	For External Approval	
ULE-90130	6	DEP	246		1	Gogar Depot Depot & Office Building Ground Floor Level Small Power & Date Layout Sheet 2 of 2	For External Approval	
ULE-90130	6	DEP	247		1	Gogar Depot Depot & Office Building Sub-Station Sections	For External Approval	
ULE-90130	6	DEP	248		1	Gogar Depot Depot & Office Building Ground Floor Fire Alarm & Security Layout Sheet 1 of 2	For External Approval	
ULE-90130	6	DEP	249		1	Gogar Depot Depot & Office Building Ground Floor Fire Alarm & Security Layout Sheet 2 of 2	For External Approval	
ULE-90130	6	DEP	250		1	Gogar Depot Depot & Office Building First Floor Fire Alarm & Security Layout	For External Approval	
ULE-90130	6	DEP	251		1	Gogar Depot Depot & Office Building First Floor Level Containment Layout	For External Approval	
ULE-90130	6	DEP	252		1	Gogar Depot Depot & Office Building Ground Floor Level Containment Layout Sheet 1 of 2	For External Approval	
ULE-90130	6	DEP	253		1	Gogar Depot Depot & Office Building Ground Floor Level Containment Layout Sheet 2 of 2	For External Approval	
ULE-90130	6	DEP	254		1	Gogar Depot Depot Substsation Building Electrical Services Layout	For External Approval	
ULE-90130	6	DEP	255		1	Gogar Depot Power Energy Centre Building Electrical Services Layout	For External Approval	
ULE-90130	6	DEP	256		1	Gogar Depot Depot Equipment & Communicatins Room Arrangement Elecrical Services Layout	For External Approval	
ULE-90130	6	DEP	257		1	Gogar Depot Supervisory Control Centre First Floor Electrical Services Layout	For External Approval	
ULE-90130	6	DEP	258		1	Gogar Depot Workshop Electrical Services & Sections Layout	For External Approval	
ULE-90130	6	DEP	260		1	Gogar Depot External Lighting Electrical & Services Layout Sheet 1 of 2	For External Approval	
ULE-90130	6	DEP	261		1	Gogar Depot External Lighting Electrical & Services Layout Sheet 2 of 2	For External Approval	
ULE-90130	6	DEP	301		4	Gogar Depot Depot & Office Building Ventilation & Air Cooling Ground Floor	For External Approval	

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ULE-90130	6	DEP	302		4	Gogar Depot Depot & Office Building Ventilation & Air Cooling First Floor	For External Approval	
ULE-90130	6	DEP	303		4	Gogar Depot Depot & Office Building LPHW Radiator & Radiant Heating Layout Ground Floor	For External Approval	
ULE-90130	6	DEP	304		4	Gogar Depot Depot & Office Building LPHW Radiator Heating First Floor	For External Approval	
ULE-90130	6	DEP	305		4	Gogar	For Tender Purposes Only	
ULE-90130	6	DEP	306		3	Gogar	For Tender Purposes Only	
ULE-90130	6	DEP	307		1	Gogar Depot Depot & Office Building Power Energy Centre	For External Approval	
ULE-90130	6	DEP	330		3	Gogar	For Tender Purposes Only	
ULE-90130	6	DEP	331		3	Gogar	For Tender Purposes Only	
ULE-90130	6	DEP	332		3	Gogar	For Tender Purposes Only	
ULE-90130	6	DEP	401		4	Gogar Depot Depot & Office Building	For External Approval	
ULE-90130	6	DEP	402		4	Gogar Depot Depot & Office Building	For External Approval	
ULE-90130	6	DEP	403		4	Gogar Depot Depot & Office Building	For External Approval	
ULE-90130	6	DEP	430		4	Gogar Depot Depot & Office Building	For External Approval	
ULE-90130	6	DEP	450		4	Gogar Depot Depot & Office Building	For External Approval	
ULE90130	1	DNE	10		2	Newhaven to Haymarket Drainage Plan-Section 1B	Issued for External Review	
ULE90130	1	DNE	11		2	Newhaven to Haymarket Drainage Plan-Section 1B	Issued for External Review	
ULE90130	1	DNE	12		2	Newhaven to Haymarket Drainage Plan-Section 1B	Issued for External Review	
ULE90130	1	DNE	13		2	Newhaven to Haymarket Drainage Plan-Section 1B	Issued for External Review	
ULE90130	1	DNE	21		1	Newhaven to Haymarket,Section 1D	Issued for External Review	
ULE90130	1	DNE	22		1	Newhaven to Haymarket,Section 1D	Issued for External Review	
ULE90130	1	DNE	23		1	Newhaven Road to Haymarket	Issued for External Review	
ULE90130	1	DNE	24		1	Newhaven Road to Haymarket	Issued for External Review	
ULE90130	1	DNE	26		1	Newhaven to Haymarket,Section 1D	For External Approval	
ULE90130	2	DNE	1		2	Haymarket to Roseburn Junction	Issued for External Review	
ULE90130	2	DNE	2		3	Haymarket to Roseburn Junction	Issued for External Review	
ULE90130	2	DNE	3		3	Haymarket to Roseburn Junction	Issued for External Review	
ULE90130	5	DNE	1		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5A	Issued for External Review	
ULE90130	5	DNE	2		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5A	Issued for External Review	
ULE90130	5	DNE	3		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5A	Issued for External Review	
ULE90130	5	DNE	4		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5A	Issued for External Review	
ULE90130	5	DNE	5		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5A	Issued for External Review	
ULE90130	5	DNE	6		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5B	Issued for External Review	
ULE90130	5	DNE	7		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5B	Issued for External Review	
ULE90130	5	DNE	8		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5B	Issued for External Review	
ULE90130	5	DNE	9		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5B	Issued for External Review	
ULE90130	5	DNE	10		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5B	Issued for External Review	
ULE90130	5	DNE	11		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5B	Issued for External Review	
ULE90130	5	DNE	12		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5B	Issued for External Review	
ULE90130	5	DNE	13		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5B	Issued for External Review	
ULE90130	5	DNE	14		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5B	Issued for External Review	
ULE90130	5	DNE	15		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5B	Issued for External Review	
ULE-90130	5	DNE	16		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5B	Issued for External Review	
ULE90130	5	DNE	17		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5B	Issued for External Review	
ULE90130	5	DNE	18		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5B	Issued for External Review	
ULE90130	5	DNE	19		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5B	Issued for External Review	
ULE90130	5	DNE	20		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5B	Issued for External Review	
ULE90130	5	DNE	21		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5C	Issued for External Review	
ULE90130	5	DNE	22		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5C	Issued for External Review	
ULE90130	5	DNE	23		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5C	Issued for External Review	
ULE90130	5	DNE	24		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5C	Issued for External Review	
ULE90130	5	DNE	25		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5C	Issued for External Review	
ULE90130	5	DNE	26		2	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 5C	Issued for External Review	
ULE-90130	6	DNE	1		1	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 6	Issued for External Review	
ULE-90130	6	DNE	2		1	Roseburn Junction to Gogarburn Drainage Plan - Sub-section 6	Issued for External Review	
ULE-90130	7	DNE	1		2	Gogarburn to Edinburgh Airport Drainage Plan - Sub-section 7A	Issued for External Review	
ULE-90130	7	DNE	2		*	Gogarburn to Edinburgh Airport Drainage Plan - Sub-section 7A	NO STATUS	
ULE-90130	7	DNE	3		*	Gogarburn to Edinburgh Airport Drainage Plan - Sub-section 7A	NO STATUS	
ULE-90130	7	DNE	4		*	Gogarburn to Edinburgh Airport Drainage Plan - Sub-section 7A	NO STATUS	
ULE-90130	7	DNE	5		*	Gogarburn to Edinburgh Airport Drainage Plan - Sub-section 7A	NO STATUS	
ULE-90130	7	DNE	6		*	Gogarburn to Edinburgh Airport Drainage Plan - Sub-section 7A	NO STATUS	
ULE-90130	7	DNE	7		*	Gogarburn to Edinburgh Airport Drainage Plan - Sub-section 7A	NO STATUS	

PROJECT	SECTION	FOLDER	DWG NO	STR ID	REV NO	DRAWING NAME	STATUS	COMMENTS
ULE-90130	7	DNE	8		*	Gogarburn to Edinburgh Airport Drainage Plan - Sub-section 7A	NO STATUS	
ULE-90130	7	DNE	9		*	Gogarburn to Edinburgh Airport Drainage Plan - Sub-section 7A	NO STATUS	
ULE-90130	7	DNE	10		A	Gogarburn to Edinburgh Airport Drainage Plan and Long Section Sheet 1 of 9 Minimum drainage inverts	For Information Only	
ULE-90130	7	DNE	11		A	Gogarburn to Edinburgh Airport Drainage Plan and Long Section Sheet 2 of 9 Minimum drainage inverts	For Information Only	
ULE-90130	7	DNE	12		A	Gogarburn to Edinburgh Airport Drainage Plan and Long Section Sheet 3 of 9 Minimum drainage inverts	For Information Only	
ULE90130	7	DNE	13		A	Gogarburn to Edinburgh Airport Drainage Plan and Long Section Sheet 4 of 9 Minimum drainage inverts	For Information Only	
ULE90130	7	DNE	14		A	Gogarburn to Edinburgh Airport Drainage Plan and Long Section Sheet 5 of 9 Minimum drainage inverts	For Information Only	
ULE90130	7	DNE	15		A	Gogarburn to Edinburgh Airport Drainage Plan and Long Section Sheet 6 of 9 Minimum drainage inverts	For Information Only	
ULE90130	7	DNE	16		A	Gogarburn to Edinburgh Airport Drainage Plan and Long Section Sheet 7 of 9 Minimum drainage inverts	For Information Only	
ULE90130	7	DNE	17		A	Gogarburn to Edinburgh Airport Drainage Plan and Long Section Sheet 8 of 9 Minimum drainage inverts	For Information Only	
ULE90130	7	DNE	18		A	Gogarburn to Edinburgh Airport Drainage Plan and Long Section Sheet 9 of 9 Minimum drainage inverts	For Information Only	
ULE90130	SW	DNE	53		2	Brick and Precast Concrete Catchpits Sheet 1 of 3	Issued for External Review	
ULE90130	SW	DNE	54		2	Brick and Precast Concrete Manholes Sheet 2 of 3	Issued for External Review	
ULE90130	SW	DNE	55		2	Manhole and Catchipt standard Details Sheet 3 of 3	Issued for External Review	
ULE90130	SW	DNE	56		2	Concrete Headwalls	Issued for External Review	
ULE90130	SW	DNE	57		2	Rodding Eye & Street Gully Standard Details	Issued for External Review	
ULE90130	SW	DNE	58		2	Typical Hydro-Brake chamber with integral weir wall	Issued for External Review	
ULE90130	SW	DNE	59		2	Typical pipe and french drain construction details	Issued for External Review	
ULE-90130	1	DRG	9		1	Newhaven Road to Haymarket, Leith Walk	For Information Only	
ULE-90130	1	DRG	10		1	Newhaven Road to Haymarket, Leith Walk	For Information Only	
ULE-90130	1	DRG	11		1	Newhaven Road to Haymarket, Leith Walk	For Information Only	
ULE-90130	1	DRG	12		1	Newhaven Road to Haymarket, Leith Walk	For Information Only	
ULE-90130	1	DRG	13		1	Newhaven Road to Haymarket, Leith Walk	For Information Only	
ULE-90130	1	DRG	14		1	Newhaven Road to Haymarket, Leith Walk	For Information Only	
ULE-90130	1	DRG	43		1	Newhaven Road to Haymarket,	For Information Only	
ULE-90130	1	DRG	179		1	Newhaven to Haymarket,Subsection 1A/!b	Issued for External Approval	
ULE-90130	1	DRG	180		1	Newhaven to Haymarket,Subsection 1A/!b	Issued for External Approval	
ULE-90130	1	DRG	184		1	Newhaven to Haymarket,subsection 1C/1D	Issued for External Approval	
ULE-90130	1	DRG	185		1	Newhaven to Haymarket,Subsection 1A/!b	Issued for External Approval	
ULE-90130	1	DRG	186		1	Newhaven to Haymarket,Subsection 1A/!b	Issued for External Approval	
ULE-90130	1	DRG	216		1	Due Diligence Update	Draft - Design in Progress	
ULE-90130	1	DRG	217		1	Due Diligence Update	Draft - Design in Progress	
ULE-90130	1	DRG	219		1	Roads Design Status,Section 1C	For Information Only	
ULE-90130	1	DRG	220		1	Roads Design Status,Section 1C	For Information Only	
ULE-90130	1	DRG	221		1	Roads Design Status,Section 1C	For Information Only	
ULE-90130	2	DRG	5		1	Haymarket to Roseburn Junction Integrated Cross Sections Sub-Section 2A Sheet 1 of 2	Issued for External Approval	
ULE-90130	2	DRG	6		1	Haymarket to Roseburn Junction Integrated Cross Sections Sub-Section 2A Sheet 2 of 2	Issued for External Approval	
ULE-90130	5	DRG	197		2	Roseburn Junction to Gogarburn	Issued for External Review	
ULE-90130	5	DRG	198		2	Roseburn Junction to Gogarburn	Issued for External Review	
ULE-90130	5	DRG	199		2	Roseburn Junction to Gogarburn	Issued for External Review	
ULE-90130	5	DRG	200		2	Roseburn Junction to Gogarburn	Issued for External Review	
ULE-90130	5	DRG	201		2	Roseburn Junction to Gogarburn	Issued for External Review	
ULE-90130	5	DRG	202		2	Roseburn Junction to Gogarburn	Issued for External Review	
ULE-90130	5	DRG	203		2	Roseburn Junction to Gogarburn	Issued for External Review	
ULE-90130	5	DRG	204		2	Roseburn Junction to Gogarburn	Issued for External Review	
ULE-90130	5	DRG	205		2	Roseburn Junction to Gogarburn	Issued for External Review	
ULE-90130	5	DRG	206		2	Roseburn Junction to Gogarburn	Issued for External Review	
ULE-90130	5	DRG	207			Roseburn Junction to Gogarburn	Issued for External Review	
ULE-90130	5	DRG	214		1	Roseburn Junction to Gogarburn	For Information Only	
ULE-90130	5	DRG	217		1	Roseburn Junction to Gogarburn	For Information Only	
ULE-90130	5	DRG	218		1	Roseburn Junction to Gogarburn	For Information Only	
ULE-90130	5	DRG	224		1	Roseburn to Gogarburn Murrayfield Training Pitches	For Information Only	
ULE-90130	5	DRG	227		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5C Sheet 1 of 5	Issued for External Approval	
ULE-90130	5	DRG	228		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5C	Issued for External Approval	
ULE-90130	5	DRG	545		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5C (Sheet 3 of 5)	Issued for External Approval	
ULE-90130	5	DRG	546		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5C (Sheet 4 of 5)	Issued for External Approval	
ULE-90130	5	DRG	547		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5C (Sheet 5 of 5)	Issued for External Approval	
ULE-90130	5	DRG	548		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5B Sheet 1 of 8	Issued for External Approval	
ULE-90130	5	DRG	549		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5B Sheet 2 of 8	Issued for External Approval	
ULE-90130	5	DRG	550		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5B Sheet 3 of 8	Issued for External Approval	
ULE-90130	5	DRG	551		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5B Sheet 4 of 8	Issued for External Approval	

PROJECT	SECTION	FOLDER	DWG NO	STR ID	REV NO	DRAWING NAME	STATUS	COMMENTS
ULE-90130	5	DRG	552		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5B	Issued for External Approval	
ULE-90130	5	DRG	553		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5B	Issued for External Approval	
ULE-90130	5	DRG	554		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5B	Issued for External Approval	
ULE-90130	5	DRG	555		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5B	Issued for External Approval	
ULE-90130	5	DRG	556		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5A	Issued for External Approval	
ULE-90130	5	DRG	557		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5A	Issued for External Approval	
ULE-90130	5	DRG	558		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5A	Issued for External Approval	
ULE-90130	5	DRG	559		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5A	Issued for External Approval	
ULE-90130	5	DRG	560		1	Roseburn Junction to Gogarburn Integrated Cross Sections Sub-Section 5A	Issued for External Approval	
ULE-90130	6	DRG	1		1	Gogar Depot	For Information Only	
ULE-90130	7	DRG	68		1	Gogarburn to Edinburgh Airport	Issued for External Review	
ULE-90130	7	DRG	70		2	Gogarburn to Edinburgh Airport -Future Provision for NIL Stop Location	For Information Only	
ULE-90130	7	DRG	102		1	Gogarburn to Edinburgh Airport Integrated Cross Section Sub-Section 7A Sheet 1 of 5	Issued for External Approval	
ULE-90130	7	DRG	103		1	Gogarburn to Edinburgh Airport Integrated Cross Section Sub-Section 7A Sheet 2 of 5	Issued for External Approval	
ULE-90130	7	DRG	104		1	Gogarburn to Edinburgh Airport Integrated Cross Section Sub-Section 7A Sheet 3 of 5	Issued for External Approval	
ULE-90130	SW	DRG	31		7	Typical Tramway Cross Sections	Issued for External Approval	
ULE-90130	SW	DRG	32		7	Typical Tramway Cross Sections	Issued for External Approval	
ULE-90130	SW	DRG	33		7	Typical Tramway Cross Sections	Issued for External Approval	
ULE-90130	SW	DRG	34		7	Typical Tramway Cross Sections	Issued for External Approval	
ULE-90130	SW	DRG	56		3	System Wide Structure Gauge	Issued for External Approval	
ULE-90130	SW	DRG	57		2	Structure Gauge	Issued for External Approval	
ULE-90130	SW	DRG	59		3	Typical Tramway Cross Sections	Issued for External Approval	
ULE-90130	SW	DRG	69		3	Surface finishes	Issued for External Approval	
ULE-90130	SW	DRG	70		3	Surface finishes	Issued for External Approval	
ULE-90130	SW	DRG	71		3	Surface finishes	Issued for External Approval	
ULE-90130	SW	DRG	72		3	Typical Tramway Cross Sections	Issued for External Approval	
ULE-90130	SW	DRG	73		3	Typical Tramway Cross Sections	Issued for External Approval	
ULE-90130	SW	DRG	74		3	Typical Tramway Cross Sections	Issued for External Approval	
ULE-90130	SW	DRG	76		4	Section 5 & 7 Route Plan	Issued for External Approval	
ULE-90130	SW	DRG	77		1	System Wide Standard Turnout Geometry	For Information Only	
ULE-90130	SW	DRG	454		13	System Wide Line 1 Project Status	For Information Only	
ULE-90130	SW	DRG	455		13	System Wide Line 1 Project Status	For Information Only	
ULE-90130	SW	DRG	461		3	System Wide Guard Rail Installation of Ballasted Track	Issued for External Approval	
ULE-90130	SW	DRG	475		1	South Gyle Tram Stop	Issued for External Review	
ULE-90130	SW	DRG	548		1	Line 1 Integrated Cross Section Location Overview	Issued for External Approval	
ULE-90130	SW	DRG	549		1	Line 2 Integrated Cross Section Location Overview	Issued for External Approval	
ULE-90130	SW	DRG	572		1	System Wide S & C Layout Plans (Drawing 1 of 4)	Issued for External Approval	
ULE-90130	SW	DRG	573		1	System Wide S & C Layout Plans (Drawing 2 of 4)	Issued for External Approval	
ULE-90130	SW	DRG	574		1	System Wide S & C Layout Plans (Drawing 3 of 4)	Issued for External Approval	
ULE-90130	SW	DRG	575		1	System Wide S & C Layout Plans (Drawing 4 of 4)	Issued for External Approval	
ULE-90130	SW	DRG	580		1	Trackform Reference Design Grass Track In-Situ Concrete In-Situ Rail Beam	Issued for External Approval	
ULE-90130	SW-SW	TRK-DRG	23		5	Route Plan: Proposed Tramway	Issued for External Approval	
ULE-90130	SW-SW	TRK-DRG	27		5	System Wide Section/Sub-Section Overview (Sheet 1 of 2)	For Information Only	
ULE-90130	SW-SW	TRK-DRG	28		6	System Wide Section/Sub-Section Overview (Sheet 2 of 2)	For Information Only	
ULE-90130	1	HRL	1		B	Section 1A	Issued for External Approval	
ULE-90130	1	HRL	2		B	Section 1A	Issued for External Approval	
ULE-90130	1	HRL	3		B	Section 1A	Issued for External Approval	
ULE-90130	1	HRL	4		B	Section 1A	Issued for External Approval	
ULE-90130	1	HRL	5		B	Roads Design Section 1A Sheet 5 of 24	Issued for External Approval	
ULE-90130	1	HRL	6		B	Roads Design Section 1A Sheet 6 of 24	Issued for External Approval	
ULE-90130	1	HRL	7		B	Roads Design Section 1A Sheet 7 of 24	Issued for External Approval	
ULE-90130	1	HRL	8		B	Roads Design Section 1A Sheet 8 of 24	Issued for External Approval	
ULE-90130	1	HRL	9		3	Roads Design Section 1A Sheet 9 of 24	Issued for External Approval	
ULE-90130	1	HRL	10		4	Section 1B	Issued for External Approval	
ULE-90130	1	HRL	11		4	Section 1B	Issued for External Approval	
ULE-90130	1	HRL	12		4	Section 1B	Issued for External Approval	
ULE-90130	1	HRL	13		4	Roads Design Section 1B	Issued for External Approval	
ULE-90130	1	HRL	14		4	Newhaven Road to Haymarket Section 1B	Issued for External Approval	
ULE-90130	1	HRL	15		3	Section 1C	Issued for External Approval	
ULE-90130	1	HRL	16		3	Section 1C	Issued for External Approval	
ULE-90130	1	HRL	17		3	Section 1C	Issued for External Approval	

PROJECT	SECTION	FOLDER	DWG NO	STR ID	REV NO	DRAWING NAME	STATUS	COMMENTS
ULE-90130	1	HRL	18		3	Section 1C	Issued for External Approval	
ULE-90130	1	HRL	19		3	Section 1C	Issued for External Approval	
ULE-90130	1	HRL	20		3	Roads Design Section 1C	Issued for External Approval	
ULE-90130	1	HRL	21		4	Newhaven to Haymarket,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	22		4	Roads Design Section 1D	Issued for External Approval	
ULE-90130	1	HRL	23		4	Roads Design Section 1D	Issued for External Approval	
ULE-90130	1	HRL	24		4	Roads Design Section 1D	Issued for External Approval	
ULE-90130	1	HRL	74		1	Parking Layby Section 1B	For Approval	
ULE-90130	1	HRL	75		1	Parking Layby and Cycle Lane	For Approval	
ULE-90130	1	HRL	76		1	Typical Cross Section ,Section 1B	For Approval	
ULE-90130	1	HRL	77		1	Foot of the Walk Section 1B	For Approval	
ULE-90130	1	HRL	78		1	Typical Cross Section,Section1D	For Approval	
ULE-90130	1	HRL	79		1	Typical Cross Section,Section1D	For Approval	
ULE-90130	1	HRL	79		1	Typical Cross Section,Section 1D	For Approval	
ULE-90130	1	HRL	80		1	Newhaven Road to Haymarket Lighting Layout Plans Sheet 10 of 24	For Approval	
ULE-90130	1	HRL	81		1	Newhaven Road to Haymarket Lighting Layout Plans Sheet 10 of 24	For External Approval	
ULE-90130	1	HRL	82		1	Newhaven Road to Haymarket Lighting Layout Plans Sheet 10 of 24	For External Approval	
ULE-90130	1	HRL	83		1	Newhaven Road to Haymarket Lighting Layout Plans Sheet 10 of 24	For External Approval	
ULE-90130	1	HRL	151		6	St Andrew Square Road Design	For External Approval	
ULE-90130	1	HRL	152		1	St Andrew Square Road Design	For Information Only	
ULE-90130	1	HRL	153		1	St Andrew Square Road Design	For Information Only	
ULE-90130	1	HRL	154		1	St Andrew Square Road Design	For Information Only	
ULE-90130	1	HRL	155		1	St Andrew Square Road Design	For Information Only	
ULE-90130	1	HRL	210		1	New Haven Road to Haymarket	Issued for External Approval	
ULE-90130	1	HRL	211		1	Newhaven Road to Haymarket Section 1B	Issued for External Approval	
ULE-90130	1	HRL	212		1	Newhaven Road to Haymarket Section 1B	Issued for External Approval	
ULE-90130	1	HRL	213		1	Newhaven Road to Haymarket Section 1B	Issued for External Approval	
ULE-90130	1	HRL	214		1	Newhaven Road to Haymarket Site Clearance Section 1B Sheet 14 of 24	Issued for External Approval	
ULE-90130	1	HRL	221		1	Newhaven to Haymarket,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	222		1	Newhaven to Haymarket,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	223		1	Newhaven to Haymarket,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	224		1	Newhaven to Haymarket,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	225		1	Road Design & Site Clearance,St Andrew Sq	Issued for External Approval	
ULE-90130	1	HRL	410		1	New Haven Road to Haymarket,Section 1B	Issued for External Approval	
ULE-90130	1	HRL	411		1	New Haven Road to Haymarket,Section 1B	Issued for External Approval	
ULE-90130	1	HRL	412		1	New Haven Road to Haymarket,Section 1B	Issued for External Approval	
ULE-90130	1	HRL	413		1	New Haven Road to Haymarket,Section 1B	Issued for External Approval	
ULE-90130	1	HRL	414		1	New Haven Road to Haymarket,Section 1B	Issued for External Approval	
ULE-90130	1	HRL	421		1	Newhaven to Haymarket,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	422		1	Newhaven to Haymarket,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	423		1	Newhaven to Haymarket,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	424		1	Newhaven to Haymarket,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	544		2	St Andrews Sqaure	For Information Only	*Infraco Proposals are based on the 21 No Drawings highlighted below
ULE-90130	1	HRL	545		*	St Andrews Square Road Design Traffic Signals Ducting Dwg St. David's St Sheet 17 & 18 of 24*	Sketch	Marked Up Drawing Received on 24.07.2007 as dwg ULE90130-01-HRL-000148, PB Internal Version no. -
ULE-90130	1	HRL	701		*	Newhaven to Haymarket Pavement Design Dwgs Sec 1A Sheet 1 of 24*	For Public Meeting	Marked Up Drawing Received on 24.07.2007, PB Internal Version no. 4A
ULE-90130	1	HRL	702		*	Newhaven to Haymarket Pavement Design Dwgs Sec 1A Sheet 2 of 24*	For Public Meeting	Marked Up Drawing Received on 24.07.2007, PB Internal Version no. 3
ULE-90130	1	HRL	705		*	Newhaven to Haymarket Pavement Design Dwgs Sec 1A Sheet 5 of 24*	For Public Meeting	Marked Up Drawing Received on 24.07.2007, PB Internal Version no. 3
ULE-90130	1	HRL	706		*	Newhaven to Haymarket Pavement Design Dwgs Sec 1A Sheet 6 of 24*	For Public Meeting	Marked Up Drawing Received on 24.07.2007, PB Internal Version no. 3
ULE-90130	1	HRL	707		*	Newhaven to Haymarket Pavement Design Dwgs Sec 1A Sheet 7 of 24*	For Public Meeting	Marked Up Drawing Received on 24.07.2007, PB Internal Version no. 3
ULE-90130	1	HRL	708		*	Newhaven to Haymarket Pavement Design Dwgs Sec 1A Sheet 8 of 24*	For Public Meeting	Marked Up Drawing Received on 24.07.2007, PB Internal Version no. -
ULE-90130	1	HRL	709		*	Newhaven to Haymarket Pavement Design Dwgs Sec 1A Sheet 9 of 24*	For Public Meeting	Marked Up Drawing Received on 24.07.2007, PB Internal Version no. 6
ULE-90130	1	HRL	710		*	Newhaven to Haymarket Pavement Design Dwgs Sec 1B Sheet 10 of 24*	For Public Meeting	Marked Up Drawing Received on 24.07.2007, PB Internal Version no. -
ULE-90130	1	HRL	711		*	Newhaven to Haymarket Pavement Design Dwgs Sec 1B Sheet 11 of 24*	For Public Meeting	Marked Up Drawing Received on 24.07.2007, PB Internal Version no. -
ULE-90130	1	HRL	712		*	Newhaven to Haymarket Pavement Design Dwgs Sec 1B Sheet 12 of 24*	Issued for External Approval	Marked Up Drawing Received on 24.07.2007 as dwg ULE90130-01-TAL-00012, PB Internal Version no. 4
ULE-90130	1	HRL	713		4	Newhaven to Haymarket Pavement Design Dwgs Sec 1B Sheet 13 of 24*	For Public Meeting	Marked Up Drawing Received on 24.07.2007, PB Internal Version no. 3
ULE-90130	1	HRL	714		2	Newhaven to Haymarket Pavement Design Dwgs Sec 1C Sheet 14 of 24*	For Tender Purposes Only	Marked Up Drawing Received on 24.07.2007 as dwg ULE90130-01-HRL-00014, PB Internal Version no. -
ULE-90130	1	HRL	715		*	Newhaven to Haymarket Pavement Design Dwgs Sec 1C Sheet 15 of 24*	For Public Meeting	Marked Up Drawing Received on 24.07.2007, PB Internal Version no. 4
ULE-90130	1	HRL	716		*	Newhaven to Haymarket Pavement Design Dwgs Sec 1C Sheet 16 of 24*	For Public Meeting	Marked Up Drawing Received on 24.07.2007, PB Internal Version no. 4
ULE-90130	1	HRL	719		2	Newhaven to Haymarket Pavement Design Dwgs Sec 1C Sheet 19 of 24*	For Tender Purposes Only	Marked Up Drawing Received on 24.07.2007 as dwg ULE90130-01-HRL-00019, PB Internal Version no. -
ULE-90130	1	HRL	720		2	Newhaven to Haymarket Pavement Design Dwgs Sec 1C Sheet 20 of 24*	For Tender Purposes Only	Marked Up Drawing Received on 24.07.2007 as dwg ULE90130-01-HRL-00020, PB Internal Version no. -
ULE-90130	1	HRL	721		2	Newhaven to Haymarket Pavement Design Dwgs Sec 1D Sheet 21 of 24*	For Tender Purposes Only	Marked Up Drawing Received on 24.07.2007 as dwg ULE90130-01-HRL-00021, PB Internal Version no. -

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ULE-90130	1	HRL	722		2	Newhaven to Haymarket Pavement Design Dwgs Sec 1D Sheet 22 of 24*	For Tender Purposes Only	Marked Up Drawing Received on 24.07.2007 as dwg ULE90130-01-HRL-00022, PB Internal Version no. -
ULE-90130	1	HRL	723		*	Newhaven to Haymarket Pavement Design Dwgs Sec 1D Sheet 23 of 24*	For Public Meeting	Marked Up Drawing Received on 24.07.2007, PB Internal Version no. 1
ULE-90130	1	HRL	724		*	Newhaven to Haymarket Pavement Design Dwgs Sec 1D Sheet 24 of 24*	For Public Meeting	Marked Up Drawing Received on 24.07.2007, PB Internal Version no. 1
ULE-90130	1	HRL	725		2	Road Design,Kerbs,Footways and Paved Areas,Section 1D	For External Approval	
ULE-90130	1	HRL	1110		1	Road Design,Footways and Paved Areas	External Approval	
ULE-90130	1	HRL	1111		1	Road Design,Footways and Paved Areas	External Approval	
ULE-90130	1	HRL	1112		1	Road Design,Footways and Paved Areas	External Approval	
ULE-90130	1	HRL	1113		1	Road Design,Footways and Paved Areas	External Approval	
ULE-90130	1	HRL	1114		1	Road Design,Footways and Paved Areas,Section 1B	External Approval	
ULE-90130	1	HRL	1121		1	Road Design,Kerbs,Footways and Paved Areas,Section 1D	External Approval	
ULE-90130	1	HRL	1122		1	Road Design,Kerbs,Footways and Paved Areas,Section 1D	External Approval	
ULE-90130	1	HRL	1123		1	Road Design,Kerbs,Footways and Paved Areas,Section 1D	External Approval	
ULE-90130	1	HRL	1125		1	Road Design,Kerbs,Footways and Paved Areas,Section 1D	For External Approval	
ULE-90130	1	HRL	1130		1	Road Design,Kerbs,Footways and Paved Areas,Section 1D	External Approval	
ULE-90130	1	HRL	1131		3	Road Design,Kerbs,Footways and Paved Areas,Section 1D	External Approval	
ULE-90130	1	HRL	1132		1	Road Design Raised Table Construction Standard Details	External Approval	
ULE-90130	1	HRL	1133		1	Road Design Raised Table Construction Standard Details	External Approval	
ULE-90130	1	HRL	1210		1	Newhaven Road to Haymarket Section 1B	Issued for External Approval	
ULE-90130	1	HRL	1211		1	Newhaven Road to Haymarket Section 1B	Issued for External Approval	
ULE-90130	1	HRL	1212		1	Newhaven Road to Haymarket Section 1B	Issued for External Approval	
ULE-90130	1	HRL	1213		1	Newhaven Road to Haymarket Section 1B	Issued for External Approval	
ULE-90130	1	HRL	1214		1	Newhaven Road to Haymarket Section 1B	Issued for External Approval	
ULE-90130	1	HRL	1221		1	Newhaven to Haymarket,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	1222		1	Newhaven to Haymarket,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	1223		1	Newhaven to Haymarket,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	1224		1	Newhaven to Haymarket,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	1225		4	St Andrew Square Road Design	For External Approval	
ULE-90130	1	HRL	1250		6	St Andrew Square Road Design	For External Approval	
ULE-90130	1	HRL	1250		6	St Andrews Square Road Design Road Marking	For Information Only	
ULE-90130	1	HRL	1251		1	St Andrew Square Road Design Road Markings St David Street	For Information Only	
ULE-90130	1	HRL	1252		1	St Andrew Square Road Design Traffic Signs St David Street	For Information Only	
ULE-90130	1	HRL	1270		1	Newhaven Road to Haymarket Section 1B	Issued for External Approval	
ULE-90130	1	HRL	1271		1	Newhaven Road to Haymarket Section 1B	Issued for External Approval	
ULE-90130	1	HRL	1272		1	Newhaven Road to Haymarket Section 1B	Issued for External Approval	
ULE-90130	1	HRL	1273		1	Newhaven Road to Haymarket Section 1B	Issued for External Approval	
ULE-90130	1	HRL	1274		1	Newhaven Road To Haymarket Pavement Surface Colour 1B Sheet 14 of 24	Issued for External Approval	
ULE-90130	1	HRL	1281		1	Pavement Surface Colour,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	1282		1	Pavement Surface Colour,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	1283		1	Newhaven Road to Haymarket	Issued for External Approval	
ULE-90130	1	HRL	1284		1	Newhaven Road to Haymarket,Section 1D	Issued for External Approval	
ULE-90130	1	HRL	1285		1	Newhaven Road to Haymarket Pavement Surface Colour St. Andrew Square	For External Approval	
ULE-90130	2	HRL	1		0	Roseburn Junction to Granton Square - Section 3A	Draft	
ULE-90130	2	HRL	2			Haymarket to Roseburn Junction - Section 2A	Draft	
ULE-90130	2	HRL	3		4	Haymarket to Roseburn Junction - Section 2A	Issued for External Approval	
ULE-90130	2	HRL	100		2	Haymarket to Roseburn Junction - Section 2A	Issued for External Approval	
ULE-90130	2	HRL	101		3	Haymarket to Roseburn Junction - Section 2A	Issued for External Approval	
ULE-90130	2	HRL	200		3	Typical Cross Section Subsection 2A	Issued for External Approval	
ULE-90130	2	HRL	501		2	Haymarket to Roseburn Junction - Section 2A	Issued for External Approval	
ULE-90130	2	HRL	502		2	Haymarket to Roseburn Junction - Section 2A	Issued for External Approval	
ULE-90130	2	HRL	503		2	Haymarket to Roseburn Jucntion Traffic Signs and Road Marking Section 2A	Issued for External Approval	
ULE-90130	2	HRL	800		1	Haymarket to Roseburn Junction - Section 2A	Issued for External Approval	
ULE-90130	2	HRL	801		1	Haymarket to Roseburn Junction - Section 2A	Issued for External Approval	
ULE-90130	2	HRL	901		1	Haymarket to Roseburn Junction - Section 2A	Issued for External Approval	
ULE-90130	2	HRL	902		1	Haymarket to Roseburn Junction - Section 2A	Issued for External Approval	
ULE-90130	2	HRL	903		3	Haymarket to Roseburn Junction - Section 2A	Issued for External Approval	
ULE-90130	2	HRL	1001		1	Construction Details Kerbing Details	Issued for External Approval	
ULE-90130	2	HRL	1002		1	Construction Details Signal Head Types	Issued for External Approval	
ULE-90130	5	HRL	1		3	Roseburn Junction to Gogarburn Road Scheme Layout Plans Section 5A	Issued for External Approval	
ULE-90130	5	HRL	2		2	Roseburn Junction to Gogaburn - Section 5A	Issued for External Approval	
ULE-90130	5	HRL	3		2	Roseburn Junction to Gogaburn - Section 5A	Issued for External Approval	
ULE-90130	5	HRL	4		2	Roseburn Junction to Gogarburn Road Scheme Layout Plans Section 5A	Issued for External Approval	

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ULE-90130	5	HRL	5		3	Roseburn Junction to Gogaburn - Section 5A	Issued for External Approval	
ULE-90130	5	HRL	6		3	Roseburn Junction to Gogaburn - Section 5B	Issued for External Approval	
ULE-90130	5	HRL	7		2	Roseburn Junction to Gogaburn - Section 5B	Issued for External Approval	
ULE-90130	5	HRL	8		2	Roseburn Junction to Gogaburn - Section 5B	Issued for External Approval	
ULE-90130	5	HRL	9		3	Roseburn Junction to Gogaburn - Section 5B	Issued for External Approval	
ULE-90130	5	HRL	10		2	Roseburn Junction to Gogarburn Road Scheme Layout Plans Section 5B	Issued for External Approval	
ULE-90130	5	HRL	11		1	Roseburn Junction to Gogarburn Road Scheme Layout Plans Section 5B	Issued for External Approval	
ULE-90130	5	HRL	12		1	Roseburn Junction to Gogarburn Road Scheme Layout Plans Section 5B	Issued for External Approval	
ULE-90130	5	HRL	13		1	Roseburn Junction to Gogarburn Road Scheme Layout Plans Section 5B	Issued for External Approval	
ULE-90130	5	HRL	14		2	Roseburn Junction to Gogarburn Road Scheme Layout Plans Section 5B	Issued for External Approval	
ULE-90130	5	HRL	15		2	Roseburn Junction to Gogarburn Road Scheme Layout Plans Section 5B	Issued for External Approval	
ULE-90130	5	HRL	16		1	Roseburn Junction to Gogarburn Road Scheme Layout Plans Section 5B	Issued for External Approval	
ULE-90130	5	HRL	17		2	Roseburn Junction to Gogarburn Road Scheme Layout Plans Section 5B	Issued for External Approval	
ULE-90130	5	HRL	18		4	Roseburn Junction to Gogarburn Road Scheme Layout Plans Section 5B	Issued for External Approval	
ULE-90130	5	HRL	19		1	Roseburn Junction to Gogarburn Road Scheme Layout Plans Section 5B	Issued for External Approval	
ULE-90130	5	HRL	20		1	Roseburn Junction to Gogarburn Road Scheme Layout Plans Section 5B	Issued for External Approval	
ULE-90130	5	HRL	21		2	Roseburn Junction to Gogaburn - Section 5C	Issued for External Approval	
ULE-90130	5	HRL	22		2	Roseburn Junction to Gogaburn - Section 5C	Issued for External Approval	
ULE-90130	5	HRL	23		2	Roseburn Junction to Gogaburn - Section 5C	Issued for External Approval	
ULE-90130	5	HRL	24		2	Roseburn Junction to Gogaburn - Section 5C	Issued for External Approval	
ULE-90130	5	HRL	25		2	Roseburn Junction to Gogaburn - Section 5C	Issued for External Approval	
ULE-90130	5	HRL	26		3	Roseburn Junction to Gogaburn - Section 5C	Issued for External Approval	
ULE-90130	5	HRL	100		2	Roseburn Junction to Gogarburn Road Junction and Crossing Layouts Section 5A	Issued for External Approval	
ULE-90130	5	HRL	102		2	Roseburn Junction to Gogarburn Road Junction and Crossing Layouts Section 5A	Issued for External Approval	
ULE-90130	5	HRL	160		2	Roseburn Junction to Gogaburn - Section 5C	Issued for External Approval	
ULE-90130	5	HRL	161		2	Roseburn Junction to Gogaburn - Section 5C	Issued for External Approval	
ULE-90130	5	HRL	201		2	Roseburn Junction to Gogarburn Road Junction and Crossing Layouts Section 5A	Issued for External Approval	
ULE-90130	5	HRL	203		2	Roseburn Junction to Gogarburn Road Junction and Crossing Layouts Section 5A	Issued for External Approval	
ULE-90130	5	HRL	230		1	Typical Cross Section Subsection 5B	Issued for External Approval	
ULE-90130	5	HRL	260		2	Typical Cross Section Subsection 5C	Issued for External Approval	
ULE-90130	5	HRL	261		2	Typical Cross Section Subsection 5C	Issued for External Approval	
ULE-90130	5	HRL	262		2	Typical Cross Section Subsection 5C	Issued for External Approval	
ULE-90130	5	HRL	263		2	Typical Cross Section Subsection 5C	Issued for External Approval	
ULE-90130	5	HRL	264		2	Typical Cross Section Subsection 5C	Issued for External Approval	
ULE-90130	5	HRL	501		2	Roseburn Junction to Gogarburn Traffic Signs and Road Markings Section 5A	Issued for External Approval	
ULE-90130	5	HRL	502		2	Roseburn Junction to Gogarburn Traffic Signs and Road Markings Section 5A	Issued for External Approval	
ULE-90130	5	HRL	561		2	Roseburn Junction to Gogarburn	Issued for External Approval	
ULE-90130	5	HRL	562		2	Roseburn Junction to Gogarburn - Section 5C	Issued for External Approval	
ULE-90130	5	HRL	563		2	Roseburn Junction to Gogarburn - Section 5C	Issued for External Approval	
ULE-90130	5	HRL	566		2	Roseburn Junction to Gogarburn - Section 5C	Issued for External Approval	
ULE-90130	5	HRL	800		2	Roseburn Junction to Gogarburn Traffic Signal Ducting Section 5A	Issued for External Approval	
ULE-90130	5	HRL	802		2	Roseburn Junction to Gogarburn Traffic Signal Ducting Section 5A	Issued for External Approval	
ULE-90130	5	HRL	860		2	Roseburn Junction to Gogarburn Traffic Signal Ducting Section 5C	Issued for External Approval	
ULE-90130	5	HRL	861		2	Roseburn Junction to Gogarburn - Section 5C	Issued for External Approval	
ULE-90130	5	HRL	901		2	Roseburn Junction to Gogarburn Kerbs, Footways and Paved Areas Section 5A	Issued for External Approval	
ULE-90130	5	HRL	902		2	Roseburn Junction to Gogarburn Kerbs, Footways and Paved Areas Section 5A	Issued for External Approval	
ULE-90130	5	HRL	961		2	Roseburn Junction to Gogarburn - Section 5C	Issued for External Approval	
ULE-90130	5	HRL	962		2	Roseburn Junction to Gogarburn - Section 5C	Issued for External Approval	
ULE-90130	5	HRL	963		2	Roseburn Junction to Gogarburn - Section 5C	Issued for External Approval	
ULE-90130	5	HRL	966		2	Roseburn Junction to Gogarburn - Section 5C	Issued for External Approval	
ULE-90130	6	HRL	1		3	Gogar Depot Road Scheme Layout Plans Section 6	Issued for External Approval	
ULE-90130	6	HRL	2		3	Gogar Depot Road Scheme Layout Plans Section 6	Issued for External Approval	
ULE-90130	6	HRL	100		2	Gogar Depot Road Junction & Crossing layout	Issued for External Approval	
ULE-90130	6	HRL	201		2	Typical Cross Section	Issued for External Approval	
ULE-90130	6	HRL	202		2	Typical Cross Section 6 Gogar Depot	Issued for External Approval	
ULE-90130	6	HRL	501		2	Gogar Depot Traffic Signs and Road Markings Section 6	Issued for External Approval	
ULE-90130	6	HRL	502		2	Gogar Depot Traffic Signs and Road Markings Section 6	Issued for External Approval	
ULE-90130	6	HRL	503		1	Gogar Depot Traffic Signs and Road Markings Section 6	Issued for External Approval	
ULE-90130	6	HRL	601		1	Road Long Section Section 6 Depot Access Road	Issued for External Approval	
ULE-90130	6	HRL	800		2	Gogar Depot Traffic Signal Ducting Section 6 Junction 208	Issued for External Approval	
ULE-90130	6	HRL	901		2	Gogar Depot Kerbs, Footways and paved areas Section 6	Issued for External Approval	

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ULE-90130	6	HRL	902		2	Gogar Depot Kerbs, Footways and paved areas Section 6	Issued for External Approval	
ULE-90130	7	HRL	1		2	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	HRL	2		2	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	HRL	3		3	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	HRL	4		2	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	HRL	5		2	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	HRL	6		2	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	HRL	7		2	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	HRL	8		3	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	HRL	9		2	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	HRL	201		2	Typical Cross Section - Section 7A	Issued for External Approval	
ULE-90130	7	HRL	503		2	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	HRL	507		2	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	HRL	508		2	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	HRL	800		1	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	HRL	903		2	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	HRL	907		2	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	2	LDS	1		2	Section 2A	Issued for External Approval	
ULE-90130	2	LDS	2		1	Section 2A	Issued for External Approval	
ULE-90130	2	LDS	3		2	Section 2A	Issued for External Approval	
ULE-90130	5	LDS	6		2	Soft Landscape Plan Section 5B	Issued for External Approval	
ULE-90130	5	LDS	7		2	Soft Landscape Plan Section 5B	Issued for External Approval	
ULE-90130	5	LDS	8		2	Soft Landscape Plan Section 5B	Issued for External Approval	
ULE-90130	5	LDS	9		2	Soft Landscape Plan Section 5B	Issued for External Approval	
ULE-90130	5	LDS	10		2	Soft Landscape Plan Section 5B	Issued for External Approval	
ULE-90130	5	LDS	11		2	Soft Landscape Plan Section 5B	Issued for External Approval	
ULE-90130	5	LDS	12		2	Soft Landscape Plan Section 5B	Issued for External Approval	
ULE-90130	5	LDS	13		2	Soft Landscape Plan Section 5B	Issued for External Approval	
ULE-90130	5	LDS	14		2	Soft Landscape Plan Section 5B	Issued for External Approval	
ULE-90130	5	LDS	15		2	Soft Landscape Plan Section 5B	Issued for External Approval	
ULE-90130	5	LDS	16		2	Soft Landscape Plan Section 5B	Issued for External Approval	
ULE-90130	5	LDS	17		1	Soft Landscape Plan Section 5B	Issued for External Approval	
ULE-90130	5	LDS	18		2	Soft Landscape Plan Section 5B	Issued for External Approval	
ULE-90130	5	LDS	19		2	Soft Landscape Plan Section 5B	Issued for External Approval	
ULE-90130	5	LDS	20		2	Soft Landscape Plan Section 5B	Issued for External Approval	
ULE-90130	5	LDS	21		4	Soft Landscape Plan Section 5B	Draft	
ULE-90130	5	LDS	22		3	Soft Landscape Plan Section 5B	Draft	
ULE-90130	5	LDS	23		3	Soft Landscape Plan Section 5B	Draft	
ULE-90130	5	LDS	24		2	Soft Landscape Plan Section 5B	Draft	
ULE-90130	5	LDS	25		2	Soft Landscape Plan Section 5B	Draft	
ULE-90130	5	LDS	26		2	Soft Landscape Plan Section 5B	Draft	
ULE-90130	1	LTG	10		2	Newhaven Road to Haymarket Lighting Layout Plans Sheet 10 of 24	Issued for External Approval	
ULE-90130	1	LTG	11		2	Newhaven Road to Haymarket Lighting Layout Plans Sheet 10 of 24	Issued for External Approval	
ULE-90130	1	LTG	12		2	Newhaven Road to Haymarket Lighting Layout Plans Sheet 10 of 24	Issued for External Approval	
ULE-90130	1	LTG	13		2	Newhaven Road to Haymarket Lighting Layout Plans Sheet 10 of 24	Issued for External Approval	
ULE-90130	1	LTG	17		1	Newhaven road to Haymarket,Lighting Layout Plans	Issued for Internal Review	
ULE-90130	1	LTG	18		1	Newhaven road to Haymarket,Lighting Layout Plans	Issued for Internal Review	
ULE-90130	1	LTG	21		2	Newhaven Road to Haymarket Lighting Layout Plans Sheet 21 of 24	Issued for External Approval	
ULE-90130	1	LTG	22		2	Newhaven Road to Haymarket Lighting Layout Plans Sheet 22 of 24	Issued for External Approval	
ULE-90130	1	LTG	23		2	Newhaven Road to Haymarket Lighting Layout Plans Sheet 23 of 24	Issued for External Approval	
ULE-90130	1	LTG	24		2	Newhaven Road to Haymarket Lighting Layout Plans Sheet 24 of 24	Issued for External Approval	
ULE-90130	2	LTG	1		2	Haymarket to Roseburn Junction	Issued for External Approval	
ULE-90130	2	LTG	2		2	Haymarket to Roseburn Junction	Issued for External Approval	
ULE-90130	2	LTG	3		2	Haymarket to Roseburn Junction	Issued for External Approval	
ULE-90130	5	LTG	1		2	Roseburn Junction to Gogarburn - Section 5A	Issued for External Approval	
ULE-90130	5	LTG	2		2	Roseburn Junction to Gogarburn - Section 5A	Issued for External Approval	
ULE-90130	5	LTG	3		2	Roseburn Junction to Gogarburn - Section 5A	Issued for External Approval	
ULE-90130	5	LTG	4		2	Roseburn Junction to Gogarburn - Section 5A	Issued for External Approval	
ULE-90130	5	LTG	5		2	Roseburn Junction to Gogarburn - Section 5A	Issued for External Approval	
ULE-90130	5	LTG	6		2	Roseburn Junction to Gogarburn Lighting Layout plans	Issued for External Approval	
ULE-90130	5	LTG	7		2	Roseburn Junction to Gogarburn Lighting Layout plans	Issued for External Approval	

PROJECT	SECTION	FOLDER	DWG NO	STR ID	REV NO	DRAWING NAME	STATUS	COMMENTS
ULE-90130	5	LTG	8		2	Roseburn Junction to Gogarburn Lighting Layout plans	Issued for External Approval	
ULE-90130	5	LTG	9		2	Roseburn Junction to Gogarburn	Issued for External Approval	
ULE-90130	5	LTG	10		2	Roseburn Junction to Gogarburn	Issued for External Approval	
ULE-90130	5	LTG	11		2	Roseburn Junction to Gogarburn Lighting Layout plans	Issued for External Approval	
ULE-90130	5	LTG	12		2	Roseburn Junction to Gogarburn Lighting Layout plans	Issued for External Approval	
ULE-90130	5	LTG	13		2	Roseburn Junction to Gogarburn Lighting Layout plans	Issued for External Approval	
ULE-90130	5	LTG	14		2	Roseburn Junction to Gogarburn Lighting Layout plans	Issued for External Approval	
ULE-90130	5	LTG	15		2	Roseburn Junction to Gogarburn Lighting Layout plans	Issued for External Approval	
ULE-90130	5	LTG	16		2	Roseburn Junction to Gogarburn Lighting Layout plans	Issued for External Approval	
ULE-90130	5	LTG	17		2	Roseburn Junction to Gogarburn Lighting Layout plans	Issued for External Approval	
ULE-90130	5	LTG	18		2	Roseburn Junction to Gogarburn Lighting Layout plans	Issued for External Approval	
ULE-90130	5	LTG	19		2	Roseburn Junction to Gogarburn Lighting Layout plans	Issued for External Approval	
ULE-90130	5	LTG	20		2	Roseburn Junction to Gogarburn Lighting Layout plans	Issued for External Approval	
ULE-90130	5	LTG	21		2	Roseburn Junction to Gogarburn	External Approval	
ULE-90130	5	LTG	22		2	Roseburn Junction to Gogarburn	External Approval	
ULE-90130	5	LTG	23		2	Roseburn Junction to Gogarburn	External Approval	
ULE-90130	5	LTG	24		2	Roseburn Junction to Gogarburn	External Approval	
ULE-90130	5	LTG	25		2	Roseburn Junction to Gogarburn	External Approval	
ULE-90130	5	LTG	26		2	Roseburn Junction to Gogarburn	External Approval	
ULE-90130	6	LTG	1		2	Gogar Depot Lighting Layout Plans Section 6A Sheet 1 of 2	Issued for External Approval	
ULE-90130	6	LTG	2		2	Gogar Depot Lighting Layout Plans Section 6A Sheet 2 of 2	Issued for External Approval	
ULE-90130	7	LTG	7		1	Gogarburn to Edinburgh Airport Lighting Layout Plans Section 7A	Issued for External Approval	
ULE-90130	7	LTG	8		1	Gogarburn to Edinburgh Airport Lighting Layout Plans Section 7A	Issued for External Approval	
ULE-90130	7	LTG	9		1	Roseburn Junction to Gogarburn Lighting Layout plans	Issued for External Approval	
ULE-90130	1	OLE	5		3	Haymarket to Newhaven Outline OLE Layout Plan Chainage 102450 to 10300 Sheet 5 of 13	Issued for External Approval	
ULE-90130	1	OLE	6		3	Haymarket to Newhaven Outline OLE Layout Plan Chainage 110300 to 110950 Sheet 6 of 13	Issued for External Approval	
ULE-90130	1	OLE	7		3	Haymarket to Newhaven Outline OLE Layout Plan Chainage 110950 to 120300 Sheet 7 of 13	Issued for External Approval	
ULE-90130	1	OLE	8		3	Haymarket to Newhaven Outline OLE Layout Plan Chainage 120300 to 120900 Sheet 8 of 13	Issued for External Approval	
ULE-90130	1	OLE	9		3	Haymarket to Newhaven Outline OLE Layout Plan Chainage 120900 to 121200 Sheet 9 of 13	Issued for External Approval	
ULE-90130	1	OLE	10		3	Haymarket to Newhaven Outline OLE Layout Plan Chainage 121200 to 121500 Sheet 10 of 13	Issued for External Approval	
ULE-90130	1	OLE	11		3	Haymarket to Newhaven Outline OLE Layout Plan Chainage 121500 to 130000 Sheet 11 of 13	Issued for External Approval	
ULE-90130	1	OLE	12		2	Haymarket to Newhaven Outline OLE Layout Plan Chainage 130000 to 130630 Sheet 12 of 13	For Tender Purposes Only	
ULE-90130	1	OLE	13		3	Haymarket to Newhaven Outline OLE Layout Plan Chainage 130630 to 200000 Sheet 13 of 13	Issued for External Approval	
ULE-90130	2	OLE	1		3	Haymarket to Roseburn Junction Outline OLE	Issued for External Approval	
ULE-90130	2	OLE	2		3	Haymarket to Roseburn Junction Outline OLE	Issued for External Approval	
ULE-90130	5	OLE	1		4	Roseburn Junction to Gogarburn Outline OLE Layout Plan Change	Issued for External Approval	
ULE-90130	5	OLE	2		4	Roseburn Junction to Gogarburn Outline OLE Layout Plan Change	Issued for External Approval	
ULE-90130	5	OLE	3		4	Roseburn Junction to Gogarburn Outline OLE Layout Plan Change	Issued for External Approval	
ULE-90130	5	OLE	4		4	Roseburn Junction to Gogarburn Outline OLE Layout Plan Change	Issued for External Approval	
ULE-90130	5	OLE	5		4	Roseburn Junction to Gogarburn Outline OLE Layout Plan Change	Issued for External Approval	
ULE-90130	5	OLE	6		4	Roseburn Junction to Gogarburn Outline OLE Layout Plan Change	Issued for External Approval	
ULE-90130	5	OLE	7		4	Roseburn Junction to Gogarburn Outline OLE Layout Plan Change	Issued for External Approval	
ULE-90130	5	OLE	8		4	Roseburn Junction to Gogarburn Outline OLE Layout Plan Change	Issued for External Approval	
ULE-90130	5	OLE	9		4	Roseburn Junction to Gogarburn Outline OLE Layout Plan Change	Issued for External Approval	
ULE-90130	5	OLE	10		4	Roseburn Junction to Gogarburn Outline OLE Layout Plan Change	Issued for External Approval	
ULE-90130	5	OLE	11		4	Roseburn Junction to Gogarburn Outline OLE Layout Plan Change	Issued for External Approval	
ULE-90130	5	OLE	12		4	Roseburn Junction to Gogarburn Outline OLE Layout Plan Change	Issued for External Approval	
ULE-90130	5	OLE	13		4	Roseburn Junction to Gogarburn Outline OLE Layout Plan Change	Issued for External Approval	
ULE-90130	6	OLE	1		4	Gogar Depot Outline OLE Layout Plan Sheet 1 of 3	Issued for External Approval	
ULE-90130	6	OLE	2		2	Gogar Depot Outline OLE Layout Plan Sheet 2 of 3	Issued for External Approval	
ULE-90130	6	OLE	3		2	Gogar Depot Outline OLE Layout Plan Sheet 3 of 3	Issued for External Approval	
ULE-90130	7	OLE	1		4	Roseburn to Edinburgh Airport Outline	Issued for External Approval	
ULE-90130	7	OLE	2		4	Roseburn to Edinburgh Airport Outline	Issued for External Approval	
ULE-90130	7	OLE	3		4	Roseburn to Edinburgh Airport Outline	Issued for External Approval	
ULE-90130	7	OLE	4		4	Roseburn to Edinburgh Airport Outline	Issued for External Approval	
ULE-90130	7	OLE	5		4	Roseburn to Edinburgh Airport Outline	Issued for External Approval	
ULE-90130	SW	OLE	7		6	System Wide - Section 1, 2 and 3	Issued for External Approval	
ULE-90130	SW	OLE	8		6	System Wide - Sections 5 and 7	Issued for External Approval	
ULE-90130	SW	OLE	9		6	Gogar Depot - Section 6	Issued for External Approval	
ULE-90130	1	RTW	1	W1	A	Lindsay Road	For Tender Purposes Only	
ULE-90130	1	RTW	2	W1	A	Lindsay Road	For Tender Purposes Only	

PROJECT	SECTION	FOLDER	DWG NO	STR ID	REV NO	DRAWING NAME	STATUS	COMMENTS
ULE-90130	5	RTW	1	W3&W4	*	W3 & 4 Russell Road	Preliminary Design	
ULE-90130	5	RTW	2	W3&W4	*	W3 & 4 Russell Road	Preliminary Design	
ULE-90130	5	RTW	3	W3&W4	B	W3 & 4 Russell Road	For Tender Purposes Only	
ULE-90130	5	RTW	4	W3&W4	C	W3 & 4 Russell Road	For Tender Purposes Only	
ULE-90130	5	RTW	5	W3&W4	*	W3 & 4 Russell Road	For Tender Purposes Only	
ULE-90130	5	RTW	11	W3&W4	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	12	W3&W4	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	13	W3&W4	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	14	W3	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	15	W3	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	16	W3A	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	17	W3A	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	18	W3	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	19	W3B	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	20	W3B	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	21	W3B	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	22	W3B	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	23	W3B	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	24	W3B	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	25	W3C	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	26	W3C	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	27	W3C	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	28	W3	1	Russell Road Retaining Wall One	Issued for External Approval	
ULE-90130	5	RTW	29	W4A	1	Russell Road Retaining Wall Two Structure W4 Drawing Scheduel	Issued for External Approval	
ULE-90130	5	RTW	30	W4A	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	31	W4A	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	32	W4A	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	33	W4A	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	34	W4A	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	35	W4A	1	Russell Road Retaining Wall Two Structure W4A Setting Out Details	Issued for External Approval	
ULE-90130	5	RTW	36	W4A	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	37	W4A	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	38	W4A	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	39	W4A	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	40	W4B	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	41	W4B	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	42	W4B	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	43	W4B	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	45	W4C	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	46	W4C	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	47	W4C	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	48	W4C	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	49	W4C	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	50	W4D	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	51	W4D	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	52	W4D	1	Russell Road Retaining Wall Two Structure W4D Concrete Outlines and Setting out Sheet 2 of 3	Issued for External Approval	
ULE-90130	5	RTW	53	W4D	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	54	W4D	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	55	W4D	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	56	W3&W4	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	57	W3	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	58	W4	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	59	W4	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	60	W3&W4	1	Russell Road Retaining Wall Two	Issued for External Approval	
ULE-90130	5	RTW	161	W3&W4	1	Russell Road Retaining Wall Two	Draft	Drawing taken from Disc 2. Not found in Network.
ULE-90130	5	RTW	201	W8	1	W8 (Balgreen to Water of Leith) / Baird Drive	Issued for Tender Purposes Only	
ULE-90130	5	RTW	202	W8	1	W8 (Balgreen to Water of Leith) / Baird Drive	For Tender Purposes Only	
ULE-90130	5	RTW	241	W9	*	W9 Balgreen Road (West of Balgreen Rd)	Draft	
ULE-90130	5	RTW	242	W9	*	W9 Balgreen Road (West of Balgreen Rd)	Draft	
ULE-90130	5	RTW	321	W11	1	Roseburn Junction to Gogarburn	Issued for Tender Purposes Only	
ULE-90130	5	RTW	322	W11	2	Roseburn Junction to Gogarburn	Issued for Tender Purposes Only	

PROJECT	SECTION	FOLDER	DWG NO	STR ID	REV NO	DRAWING NAME	STATUS	COMMENTS
ULE-90130	5	RTW	362	W19	1	GA 1 of 3	For Tender Purposes Only	
ULE-90130	5	RTW	363	W19	1	2 of 3	For Tender Purposes Only	
ULE-90130	5	RTW	364	W19	1	3 of 3	For Tender Purposes Only	
ULE-90130	5	RTW	399	W19	1	Roseburn Junction to Gogarburn	Draft	
ULE-90130	5	RTW	400	W19		Gyle Tram Stop	For Tender Purposes Only	
ULE-90130	5	RTW	445	S21B	*	Roseburn Junction to Gogarburn Structure S21B Murrayfield Stadium Retaining Wall Murrayfield Stadium Underpass GA	For Tender Purposes Only	
ULE-90130	5	RTW	446	S21B	*	Roseburn Junction to Gogarburn Structure S21B Murrayfield Stadium Retaining Wall	For Tender Purposes Only	
ULE-90130	5	RTW	447	S21B	*	Roseburn Junction to Gogarburn Structure S21B Cross Section Sheet 2 of 2	For Tender Purposes Only	
ULE-90130	5	RTW	448	S21B	*	Roseburn Junction to Gogarburn	Draft	
ULE-90130	5	RTW	449	S21B	*	Roseburn Junction to Gogarburn Structure S21B Murrayfield Stadium Retaining Wall Reinforced Earthwork Details	Issued for External Approval	
ULE-90130	5	RTW	481	S21D	3	S21D Murrayfield Training Pitches	For Tender Purposes Only	
ULE-90130	5	RTW	521	W16	2	W16 A8 Retaining Wall	Issued for External Approval	
ULE-90130	5	RTW	522	W16	2	W16 A8 Retaining Wall	Issued for External Approval	
ULE-90130	5	RTW	561	W18	*	W18 Murrayfield Tramstop	For Tender Purposes Only	
ULE-90130	5	RTW	562	W18	2	W18 Murrayfield Tramstop	Issued for External Approval	
ULE-90130	5	RTW	563	W18		Roseburn Junction to Gogarburn Murrayfield Tramstop Retaining Wall Sheet ?? of 40	Draft	
ULE-90130	5	RTW	564	W18		Roseburn Junction to Gogarburn Murrayfield Tramstop Retaining Wall Sheet 03 of 40	Draft	
ULE-90130	5	RTW	565	W18		Roseburn Junction to Gogarburn Murrayfield Tramstop Retaining Wall Bank Seat General Arrangement 1 of 2	Draft	
ULE-90130	5	RTW	566	W18		Roseburn Junction to Gogarburn Murrayfield Tramstop Retaining Wall Bank Seat General Arrangement 2 of 2	Draft	
ULE-90130	5	RTW	567	W18		Roseburn Junction to Gogarburn Murrayfield Tramstop Retaining Wall South West Access Steps Wall	Draft	
ULE-90130	5	RTW	568	W18		Roseburn Junction to Gogarburn Murrayfield Tramstop Retaining Wall South Main Stairs Wall	Draft	
ULE-90130	5	RTW	569	W18		Roseburn Junction to Gogarburn Murrayfield Tramstop Retaining Wall North Main Stairs Wall	Draft	
ULE-90130	7	RTW	1	S14	3	Gogarburn Retaining Walls	For Tender Purposes Only	
ULE-90130	7	RTW	2	S14	3	Gogarburn Retaining Walls	For Tender Purposes Only	
ULE-90130	7	RTW	3	W14	3	W14 Gogarburn	For Tender Purposes Only	
ULE-90130	7	RTW	4	W14	3	W14 Gogarburn	For Tender Purposes Only	
ULE-90130	7	RTW	5	W14	B	W14 Gogarburn	For Tender Purposes Only	
ULE-90130	7	RTW	6	W14	2	W14 Gogarburn	For Tender Purposes Only	
ULE-90130	7	RTW	7	W14	2	W14 Gogarburn	For Tender Purposes Only	
ULE-90130	7	RTW	8	W14	2	W14 Gogarburn	For Tender Purposes Only	
ULE-90130	7	RTW	9	W14	2	W14 Gogarburn	For Tender Purposes Only	
ULE-90130	5	RTW	11	W3	1	Russell Road Retaining Wall One Structure W3 Drawing Schedule	Issued for External Approval	
ULE-90130	5	SCH	8		2	Drainage Schedule Section 5A	Issue for External Approval	*Drawings received but not in Drawing List*
ULE-90130	5	SCH	9		2	Drainage Schedule Section 5B	Issue for External Approval	*Drawings received but not in Drawing List*
ULE-90130	5	SCH	10		2	Drainage Schedule Section 5C	Issue for External Approval	*Drawings received but not in Drawing List*
ULE-90130	2	SCL	1		1	Haymarket to Roseburn Junction -Section 2A	Issued for External Approval	
ULE-90130	2	SCL	2		1	Haymarket to Roseburn Junction -Section 2A	Issued for External Approval	
ULE-90130	2	SCL	3		1	Haymarket to Roseburn Junction -Section 2A	Issued for External Approval	
ULE-90130	5	SCL	1		1	Roseburn Junction to Gogarburn -Section 5A	Issued for External Approval	
ULE-90130	5	SCL	2		1	Roseburn Junction to Gogarburn -Section 5A	Issued for External Approval	
ULE-90130	5	SCL	3		1	Roseburn Junction to Gogarburn -Section 5A	Issued for External Approval	
ULE-90130	5	SCL	4		1	Roseburn Junction to Gogarburn -Section 5A	Issued for External Approval	
ULE-90130	5	SCL	5		1	Roseburn Junction to Gogarburn -Section 5A	Issued for External Approval	
ULE-90130	5	SCL	21		1	Roseburn Junction to Gogarburn -Section 5C	Issued for External Approval	
ULE-90130	5	SCL	22		1	Roseburn Junction to Gogarburn -Section 5C	Issued for External Review	
ULE-90130	5	SCL	23		1	Roseburn Junction to Gogarburn -Section 5C	Issued for External Approval	
ULE-90130	5	SCL	24		1	Roseburn Junction to Gogarburn -Section 5C	Issued for External Approval	
ULE-90130	5	SCL	25		1	Roseburn Junction to Gogarburn -Section 5C	Issued for External Approval	
ULE-90130	5	SCL	26		1	Roseburn Junction to Gogarburn -Section 5C	Issued for External Approval	
ULE-90130	7	SCL	1		1	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	SCL	2		1	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	SCL	3		1	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	SCL	4		1	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	SCL	5		1	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	SCL	6		1	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	SCL	7		1	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	SCL	8		1	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	7	SCL	9		1	Gogarburn to Edinburgh Airport - Section 7A	Issued for External Approval	
ULE-90130	1	STP	2		4	Newhaven Road to Haymarket - Newhaven	For Tender Purposes Only	
ULE-90130	1	STP	12		2	Newhaven Road to Haymarket - Ocean Terminal	For Tender Purposes Only	
ULE-90130	1	STP	22		2	Newhaven Road to Haymarket - Ocean Drive	For Tender Purposes Only	

PROJECT	SECTION	FOLDER	DWG NO	STR ID	REV NO	DRAWING NAME	STATUS	COMMENTS
ULE-90130	1	STP	32		2	Newhaven Road to Haymarket - Constitution Streeet	For Tender Purposes Only	
ULE-90130	1	STP	33		2	Newhaven Road to Haymarket - Constitution Streeet	For Tender Purposes Only	
ULE-90130	1	STP	42		4	Newhaven Road to Haymarket - Foot of the Walk	Issued for External Approval	
ULE-90130	1	STP	52		4	Newhaven Road to Haymarket - Balfour Street	Issued for External Approval	
ULE-90130	1	STP	53		1	Newhaven Road to Haymarket Balfour Street Location Plan	Issued for External Approval	
ULE-90130	1	STP	62		4	Newhaven Road to Haymarket - Macdonald Road	Issued for External Approval	
ULE-90130	1	STP	63		1	Newhaven Road to Haymarket,McDonald Rd Tramstop	Issued for External Approval	
ULE-90130	1	STP	72		3	Newhaven Road to Haymarket - Picardy Place	Issued for External Approval	
ULE-90130	1	STP	82		2	Newhaven Road to Haymarket - St Andrews Square	For Tender Purposes Only	
ULE-90130	1	STP	92		3	Newhaven Road to Haymarket - St Andrews Square	Issued for External Approval	
ULE-90130	1	STP	93		1	Newhaven Road to Haymarket - St Andrews Square	Issued for Tender Purposes Only	
ULE-90130	1	STP	102		3	Newhaven Road to Haymarket - Princes Street	Issued for External Approval	
ULE-90130	1	STP	112		3	Newhaven Road to Haymarket - Shandwick Place	Issued for External Approval	
ULE-90130	1	STP	124		1	Newhaven Road to Haymarket - Haymarket	Issued for External Approval	
ULE-90130	1	STP	125		1	Newhaven Road to Haymarket - Haymarket	Issued for External Approval	
ULE-90130	1	STP	126		1	Newhaven Road to Haymarket - Exemplar Tram Stop	Issued for External Approval	
ULE-90130	1	STP	127		1	Newhaven Road to Haymarket - Haymarket	Issued for External Approval	
ULE-90130	1	STP	128		1	Newhaven Road to Haymarket - Haymarket	Issued for External Approval	
ULE-90130	1	STP	129		1	Newhaven Road to Haymarket - Haymarket	Issued for External Approval	
ULE-90130	5	STP	2		1	Roseburn Junction to Gogarburn - Murrayfield	Issued for External Approval	
ULE-90130	5	STP	3		1	Roseburn Junction to Gogarburn - Murrayfield	Issued for External Approval	
ULE-90130	5	STP	4		1	Roseburn Junction to Gogarburn - Murrayfield	Issued for External Approval	
ULE-90130	5	STP	5		1	Roseburn Junction to Gogarburn - Murrayfield	Issued for External Approval	
ULE-90130	5	STP	6		1	Roseburn Junction to Gogarburn - Exemplar Tram Stop	Issued for External Approval	
ULE-90130	5	STP	7		1	Roseburn Junction to Gogarburn - Murrayfield	Issued for External Approval	
ULE-90130	5	STP	27		1	Roseburn Junction to Gogarburn,Section 03	Issued for External Approval	
ULE-90130	5	STP	30		1	Roseburn Junction to Gogarburn,	Issued for External Approval	
ULE-90130	5	STP	31		2	South Gyle	Issued for External Approval	
ULE-90130	5	STP	38		1	Roseburn Junction to Gogarburn,Section 03	Issued for External Approval	
ULE-90130	5	STP	39		1	Roseburn Junction to Gogarburn,Section 03	Issued for External Approval	
ULE-90130	5	STP	48		1	Roseburn Junction to Gogarburn,	Issued for External Approval	
ULE-90130	5	STP	49		1	Roseburn Junction to Gogarburn,	Issued for External Approval	
ULE-90130	5	STP	50		1	Roseburn Junction to Gogarburn,	Issued for External Approval	
ULE-90130	5	STP	54		1	Roseburn Junction to Gogarburn Edinburgh Park Tramstop	Draft	Drawings received but not in Drawing List
ULE-90130	5	STP	56		2	Roseburn Junction to Gogarburn Edinburgh Park Tramstop	Issued for External Approval	Drawings received but not in Drawing List
ULE-90130	5	STP	58		1	Roseburn Junction to Gogarburn,	Issued for External Approval	
ULE-90130	5	STP	59		1	Roseburn Junction to Gogarburn,	Issued for External Approval	
ULE-90130	5	STP	62		1	Roseburn Junction to Gogarburn - Gyle	Issued for External Approval	
ULE-90130	5	STP	63		1	Roseburn Junction to Gogarburn - Gyle	Issued for External Approval	
ULE-90130	5	STP	64		1	Roseburn Junction to Gogarburn - Gyle	Issued for External Approval	
ULE-90130	5	STP	65		1	Roseburn Junction to Gogarburn - Gyle	Issued for External Approval	
ULE-90130	5	STP	72		1	Roseburn Junction to Gogarburn,	Issued for External Approval	
ULE-90130	5	STP	73		1	Roseburn Junction to Gogarburn,	Issued for External Approval	
ULE-90130	5	STP	74		1	Roseburn Junction to Gogaraburn Murrayfield Tramstop Engineering Detailed Design Inbound Platform Wall	Issued for External Approval	
ULE-90130	5	STP	75		1	Roseburn Junction to Gogarburn,	Issued for External Approval	
ULE-90130	5	STP	76		1	Roseburn Junction to Gogaraburn Murrayfield Tramstop Engineering Detailed Design South West Access Steps	Issued for External Approval	
ULE-90130	5	STP	77		1	Roseburn Junction to Gogarburn,	Issued for External Approval	
ULE-90130	5	STP	78		1	Roseburn Junction to Gogarburn,	Issued for External Approval	
ULE-90130	5	STP	79		1	Roseburn Junction to Gogarburn,	Issued for External Approval	
ULE-90130	5	STP	80		1	Roseburn Junction to Gogarburn,	Issued for External Approval	
ULE-90130	5	STP	81		1	Roseburn Junction to Gogaraburn Murrayfield Tramstop Engineering Detailed Design Lift Roof Section and Canopy Plans	Issued for External Approval	
ULE-90130	5	STP	83		1	Roseburn Junction to Gogarburn,	Issued for External Approval	
ULE-90130	5	STP	85		1	Roseburn Junction to Gogarburn,	Issued for External Approval	Drawings received but not in Drawing List
ULE-90130	7	STP	1		2	Gogarburn	For Tender Purposes Only	
ULE-90130	7	STP	7		1	Gogarburn to Edinburgh Airport	Issued for External Approval	
ULE-90130	7	STP	8		1	Gogarburn to Edinburgh Airport	Issued for External Approval	
ULE-90130	7	STP	9		1	Roseburn Junction to Gogarburn,	Issued for External Approval	
ULE-90130	7	STP	11		2	Ingliston	For Tender Purposes Only	
ULE-90130	7	STP	21		2	Edinburgh Airport	For Tender Purposes Only	
ULE-90130	SW	STP	1		5	Exemplar Stop - Central Platform Arrangement	For Information Only	
ULE-90130	SW	STP	2		6	Exemplar Stop - Side Platform Arrangement	Issued for External Approval	

PROJECT	SECTION	FOLDER	DWG NO	STR ID	REV NO	DRAWING NAME	STATUS	COMMENTS
ULE-90130	SW	STP	8		1	System Wide Exemplar Tram Stop	Issued for External Approval	
ULE-90130	SW	STP	9		1	System Wide Exemplar Tram Stop	Issued for External Approval	
ULE-90130	SW	STP	10		1	System Wide Exemplar Tram Stop	Issued for External Approval	
ULE-90130	SW	STP	11		1	System Wide Exemplar Tram Stop	Issued for External Approval	
ULE-90130	SW	STP	13		1	System Wide Exemplar Tram Stop	Issued for External Approval	
ULE-90130	SW	STP	14		1	System Wide Exemplar Tram Stop	Issued for External Approval	
ULE-90130	SW	STP	15		1	System Wide Exemplar Tram Stop	Issued for External Approval	
ULE-90130	SW	STP	16		1	System Wide Exemplar Tram Stop	Issued for External Approval	
ULE-90130	SW	STP	17		1	System Wide Exemplar Tram Stop	Issued for External Approval	
ULE-90130	SW	STP	18		1	System Wide Exemplar Tram Stop	Issued for External Approval	
ULE-90130	SW	STP	19		1	System Wide Exemplar Tram Stop	Issued for External Approval	
ULE-90130	SW	STP	20		1	System Wide Exemplar Tram Stop	Issued for External Approval	Drawings received but not in Drawing List
ULE-90130	1	SUB	1		3	Newhaven Road to Haymarket -Leith Sands	For Tender Purposes Only	
ULE-90130	1	SUB	2		4	Newhaven Road to Haymarket -Leith Sands	For Tender Purposes Only	
ULE-90130	1	SUB	4		1	Newhaven Road to Haymarket Tram North Leith Sands (NLE) Substation General Arrangement	Issued for External Review	
ULE-90130	1	SUB	5		1	Newhaven Road to Haymarket Tram North Leith Sands (NLE) Substation Elevations and Sections	Issued for External Review	
ULE-90130	1	SUB	16		4	Newhaven Road to Haymarket - Leith Walk	For Tender Purposes Only	
ULE-90130	1	SUB	17		4	Newhaven Road to Haymarket - Leith Walk	For Tender Purposes Only	
ULE-90130	1	SUB	31		3	Newhaven Road to Haymarket - Cathedral	For Tender Purposes Only	
ULE-90130	1	SUB	32		3	Newhaven Road to Haymarket - Cathedral	For Tender Purposes Only	
ULE-90130	2	SUB	1		5	Haymarket to Roseburn Junction - Haymarket	For Tender Purposes Only	
ULE-90130	2	SUB	2		4	Haymarket to Roseburn Junction - Haymarket	For Tender Purposes Only	
ULE-90130	2	SUB	3		4	Haymarket to Roseburn Junction - Haymarket	For Tender Purposes Only	
ULE-90130	2	SUB	4		*	Haymarket to Roseburn Junction - Russell Road	Issued for External Approval	
ULE-90130	2	SUB	5		*	Haymarket to Roseburn Junction - Russell Road	Issued for External Approval	
ULE-90130	2	SUB	16		4	Haymarket to Roseburn Junction - Russell Road	For Tender Purposes Only	
ULE-90130	2	SUB	17		4	Haymarket to Roseburn Junction - Roseburn Delta	For Tender Purposes Only	
ULE-90130	2	SUB	18		*	Haymarket to Roseburn Junction	Issued for External Approval	
ULE-90130	2	SUB	19		*	Haymarket to Roseburn Junction	Issued for External Approval	
ULE-90130	2	SUB	20		*	Haymarket to Roseburn Junction	Issued for External Approval	
ULE-90130	2	SUB	21		*	Haymarket to Roseburn Junction	Issued for External Approval	
ULE-90130	5	SUB	3		4	Roseburn Junction to Gogarburn - Jenners Depository	For Tender Purposes Only	
ULE-90130	5	SUB	4		4	Roseburn Junction to Gogarburn - Jenners Depository	For Tender Purposes Only	
ULE-90130	5	SUB	18		4	Roseburn Junction to Gogarburn - Bankhead Drive	For Tender Purposes Only	
ULE-90130	5	SUB	19		4	Roseburn Junction to Gogarburn - Bankhead Drive	For Tender Purposes Only	
ULE-90130	7	SUB	1		4	Ingliston P & R	For Tender Purposes Only	
ULE-90130	7	SUB	2		4	Ingliston P & R	For Tender Purposes Only	
ULE-90130	1	TAL	1		4	Newhaven Road to Haymarket Subsection 1A	Issued for External Approval	
ULE-90130	1	TAL	2		3	Newhaven Road to Haymarket Subsection 1A	Issued for External Approval	
ULE-90130	1	TAL	3		3	Newhaven Road to Haymarket Subsection 1A	Issued for External Approval	
ULE-90130	1	TAL	4		3	Newhaven Road to Haymarket Subsection 1A	Issued for External Approval	
ULE-90130	1	TAL	5		4	Newhaven Road to Haymarket Subsection 1A	Issued for External Approval	
ULE-90130	1	TAL	6		4	Newhaven Road to Haymarket Subsection 1A	Issued for External Approval	
ULE-90130	1	TAL	7		4	Newhaven Road to Haymarket Subsection 1A	Issued for External Approval	
ULE-90130	1	TAL	8		4	Newhaven Road to Haymarket Subsection 1A	Issued for External Approval	
ULE-90130	1	TAL	9		6	Newhaven Road to Haymarket Subsection 1A	Issued for External Approval	
ULE-90130	1	TAL	10		5	Newhaven Road to Haymarket Subsection 1B	Issued for External Approval	
ULE-90130	1	TAL	11		5	Newhaven Road to Haymarket Subsection 1B	Issued for External Approval	
ULE-90130	1	TAL	12		5	Newhaven Road to Haymarket Subsection 1B	Issued for External Approval	
ULE-90130	1	TAL	13		4	Newhaven Road to Haymarket Subsection 1B	Issued for External Approval	
ULE-90130	1	TAL	14		5	Newhaven Road to Haymarket Subsection 1C	Issued for External Approval	
ULE-90130	1	TAL	15		5	Newhaven Road to Haymarket Subsection 1C	Issued for External Approval	
ULE-90130	1	TAL	16		5	Newhaven Road to Haymarket Subsection 1C	Issued for External Approval	
ULE-90130	1	TAL	17		5	Newhaven Road to Haymarket Subsection 1C	Issued for External Approval	
ULE-90130	1	TAL	18		5	Newhaven Road to Haymarket Subsection 1C	Issued for External Approval	
ULE-90130	1	TAL	19		5	Newhaven Road to Haymarket Subsection 1C	Issued for External Approval	
ULE-90130	1	TAL	20		5	Newhaven Road to Haymarket Subsection 1C	Issued for External Approval	
ULE-90130	1	TAL	21		5	Newhaven Road to Haymarket Subsection 1D	Issued for External Approval	
ULE-90130	1	TAL	22		3	Newhaven Road to Haymarket Subsection 1D	Issued for External Approval	
ULE-90130	1	TAL	23		5	Newhaven Road to Haymarket Subsection 1D	Issued for External Approval	
ULE-90130	1	TAL	24		5	Newhaven Road to Haymarket Subsection 1D	Issued for External Approval	

PROJECT	SECTION	FOLDER	DWG NO	STR ID	REV NO	DRAWING NAME	STATUS	COMMENTS
ULE-90130	2	TAL	1		3	Haymarket to Roseburn Junction Subsection 2A	Issued for External Approval	
ULE-90130	2	TAL	2		3	Haymarket to Roseburn Junction Subsection 2A	Issued for External Approval	
ULE-90130	2	TAL	3		3	Haymarket to Roseburn Junction Subsection 2A	Issued for External Approval	
ULE-90130	5	TAL	1		3	Roseburn Junction to Gogarburn Subsection 5A	Issued for External Approval	
ULE-90130	5	TAL	2		3	Roseburn Junction to Gogarburn Subsection 5A	Issued for External Approval	
ULE-90130	5	TAL	3		3	Roseburn Junction to Gogarburn Subsection 5A	Issued for External Approval	
ULE-90130	5	TAL	4		3	Roseburn Junction to Gogarburn Subsection 5A	Issued for External Approval	
ULE-90130	5	TAL	5		3	Roseburn Junction to Gogarburn Subsection 5A	Issued for External Approval	
ULE-90130	5	TAL	6		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TAL	7		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TAL	8		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TAL	9		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TAL	10		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TAL	11		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TAL	12		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TAL	13		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TAL	14		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TAL	15		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TAL	16		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TAL	17		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TAL	18		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TAL	19		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TAL	20		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TAL	21		3	Roseburn Junction to Gogarburn Subsection 5C	Issued for External Approval	
ULE-90130	5	TAL	22		3	Roseburn Junction to Gogarburn Subsection 5C	Issued for External Approval	
ULE-90130	5	TAL	23		3	Roseburn Junction to Gogarburn Subsection 5C	Issued for External Approval	
ULE-90130	5	TAL	24		3	Roseburn Junction to Gogarburn Subsection 5C	Issued for External Approval	
ULE-90130	5	TAL	25		3	Roseburn Junction to Gogarburn Subsection 5C	Issued for External Approval	
ULE-90130	5	TAL	26		3	Roseburn Junction to Gogarburn Subsection 5C	Issued for External Approval	
ULE-90130	6	TAL	1		3	Gogar Depot	Issued for External Approval	
ULE-90130	6	TAL	2		2	Gogar Depot	Issued for External Approval	
ULE-90130	7	TAL	1		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	7	TAL	2		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	7	TAL	3		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	7	TAL	4		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	7	TAL	5		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	7	TAL	6		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	7	TAL	7		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	7	TAL	8		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	7	TAL	9		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	1	TMG	27		1	Leith Walk/Great Junction Street	Issued for External Approval	
ULE-90130	1	TMG	28		1	Leith Walk/Manderston Street,Section 1B	Issued for External Approval	
ULE-90130	1	TMG	29		1	Leith Walk/Springfield Street	Issued for External Approval	
ULE-90130	1	TMG	30		1	Leith Walk/Balfour Stop North Junction,Section 1B	Issued for External Approval	
ULE-90130	1	TMG	31		1	Leith Walk/Dalmeny Street,Section 1B	Issued for External Approval	
ULE-90130	1	TMG	32		1	Leith Walk/Pilrig Street Jucntion and Crossing Section 1B Junction 20	Issued for External Approval	
ULE-90130	1	TMG	33		1	Leith Walk/Macdonald Road Jucntion and Crossing Section 1B Junction 21	Issued for External Approval	
ULE-90130	1	TMG	34		1	Leith Walk/Macdonald Road Jucntion and Crossing Section 1B Jucntion 21	Issued for External Approval	
ULE-90130	1	TMG	35		1	Leith Walk/Macdonald Stop South Junction and Crossing Section 1B Junction 22	Issued for External Approval	
ULE-90130	1	TMG	36		1	Leith Walk/Manderston Street Traffaic Signal Ducting Seciton 1B Junciton 16	Issued for External Approval	
ULE-90130	1	TMG	37		1	Leith Walk/Springfield Street Traffic Signal Ducting Seciton 1B Junction 17	Issued for External Approval	
ULE-90130	1	TMG	38		1	Leith Walk/Balfour Stop North Traffic Signal Ducting Section 1B Junction 18	Issued for External Approval	
ULE-90130	1	TMG	39		1	Leith Walk/Dalmeny Street Traffic Signal Ducting,Section 1B	Issued for External Approval	
ULE-90130	1	TMG	40		1	Leith Walk/Pilrig Street.Traffic Signal Ducting,Section 1B	Issued for External Approval	
ULE-90130	1	TMG	41		1	Leith Walk/MacDonald Road Traffic Signal Ducting	Issued for External Approval	
ULE-90130	1	TMG	42		1	Leith Walk/MacDonald Stop South,Section 1B	Issued for External Approval	
ULE-90130	1	TMG	43		1	Shandwick Place Tram Stops	Issued for External Approval	
ULE-90130	1	TMG	44		1	manor Place/Shandwick Place Jucntion and Crossing Section 1D Junction 45	Issued for External Approval	
ULE-90130	1	TMG	45		1	Palmerston Place/Torphichen Street Junction and Crossing Section 1D Junction 46	Issued for External Approval	
ULE-90130	1	TMG	46		1	Morrison Street/Torhpichen Place Junction and Crossing Section 1D Junction 47	Issued for External Approval	
ULE-90130	1	TMG	47		1	Haymarket Junction Junction and Crossing Section 1D Junction 48	Issued for External Approval	

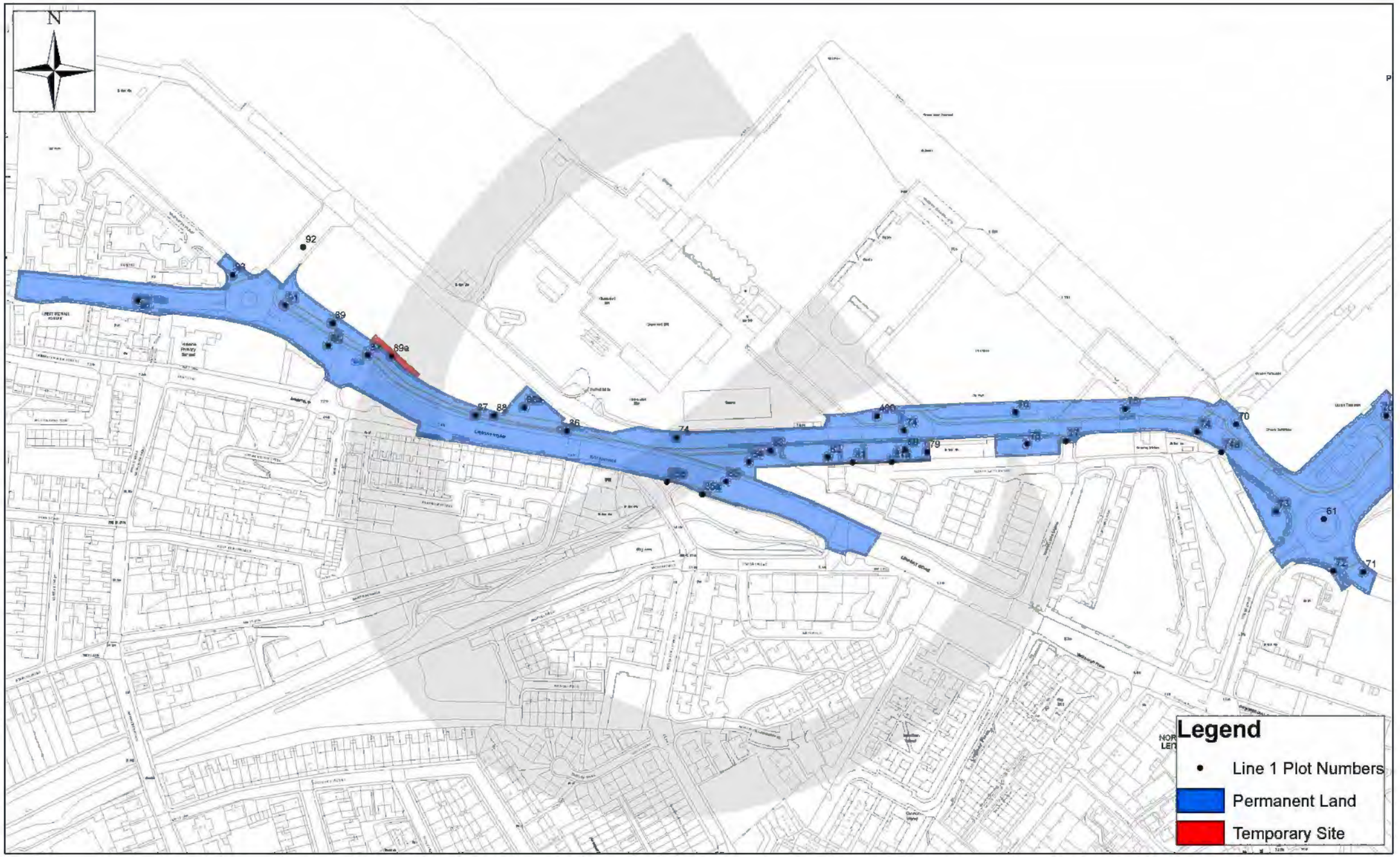
PROJECT	SECTION	FOLDER	DWG NO	STR ID	REV NO	DRAWING NAME	STATUS	COMMENTS
ULE-90130	1	TMG	50		1	North St Andrew St/St Andrew Square Traffic Signal Ducting Section 1C Junction 29	Issued for External Approval	
ULE-90130	1	TMG	51		1	South St Andrew St/St Andrew Square Traffic Signal Ducting Seciton 1C Junction 30	Issued for External Approval	
ULE-90130	1	TMG	52		1	South St Andrew ST/Princes St Traffic Signal Ducting Section 1C Junction 31	Issued for External Approval	
ULE-90130	1	TMG	53		1	South St David St/Princes Street Traffic Signal Ducting Section 1C Junction 32	Issued for External Approval	
ULE-90130	1	TMG	54		1	South St David St/St Andrew Square Traffic Signal Ducting Section 1C Junction 33	Issued for External Approval	
ULE-90130	1	TMG	55		1	St David St/George St Traffic Signal Ducting Section 1C Junction 34	Issued for External Approval	
ULE-90130	1	TMG	56		1	North St David St/St Andrew Square Traffic Signal Ducting Section 1C Junction 35	Issued for External Approval	
ULE-90130	1	TMG	57		1	North St David St/Queen St Traffic Signal Ducting Section 1C Junction 36	Issued for External Approval	
ULE-90130	1	TMG	60		1	Lothian Road/Princes Street Traffic Signal Ducting Section 1D Junction 41	Issued for External Approval	
ULE-90130	1	TMG	61		1	Queensferry Street/Princes Street Section 1D	Issued for External Approval	
ULE-90130	1	TMG	62		1	Shandwick Place Puffin Crossing Section 1D	Issued for External Approval	
ULE-90130	1	TMG	63		1	Shandwick Place Traffic Tramstop	Issued for External Approval	
ULE-90130	1	TMG	64		1	Manor Place/Shandwick Place	Issued for External Approval	
ULE-90130	1	TMG	65		1	Palmerston Place/Torphichen Street Section 1D	Issued for External Approval	
ULE-90130	1	TMG	66		1	Morrison Street/Torphichen Place Section 1D	Issued for External Approval	
ULE-90130	1	TMG	67		1	Haymarket Junction Traffic Signal Ducting,Section 1D	Issued for External Approval	
ULE-90130	1	TVA	1		4	Newhaven Road to Haymarket Subsection 1A	Issued for External Approval	
ULE-90130	1	TVA	2		3	Newhaven Road to Haymarket Subsection 1A	Issued for External Approval	
ULE-90130	1	TVA	3		3	Newhaven Road to Haymarket Subsection 1A	Issued for External Approval	
ULE-90130	1	TVA	4		3	Newhaven Road to Haymarket Subsection 1A	Issued for External Approval	
ULE-90130	1	TVA	5		4	Newhaven Road to Haymarket Subsection 1A	Issued for External Approval	
ULE-90130	1	TVA	6		4	Newhaven Road to Haymarket Subsection 1A	Issued for External Approval	
ULE-90130	1	TVA	7		4	Track Vertical Alignment Sheet 7 of 24	Issued for External Approval	
ULE-90130	1	TVA	8		4	Track Vertical Alignment Sheet 8 of 24	Issued for External Approval	
ULE-90130	1	TVA	9		6	Track Vertical Alignment Sheet 9 of 24	Issued for External Approval	
ULE-90130	1	TVA	10		5	Newhaven Road to Haymarket Subsection 1B	Issued for External Approval	
ULE-90130	1	TVA	11		5	Newhaven Road to Haymarket Subsection 1B	Issued for External Approval	
ULE-90130	1	TVA	12		5	Newhaven Road to Haymarket Subsection 1B	Issued for External Approval	
ULE-90130	1	TVA	13		4	Newhaven Road to Haymarket Subsection 1B	Issued for External Approval	
ULE-90130	1	TVA	14		5	Newhaven Road to Haymarket Subsection 1C	Issued for External Approval	
ULE-90130	1	TVA	15		5	Newhaven Road to Haymarket Subsection 1C	Issued for External Approval	
ULE-90130	1	TVA	16		5	Newhaven Road to Haymarket Subsection 1C	Issued for External Approval	
ULE-90130	1	TVA	17		5	Newhaven Road to Haymarket Subsection 1C	Issued for External Approval	
ULE-90130	1	TVA	18		5	Newhaven Road to Haymarket Subsection 1C	Issued for External Approval	
ULE-90130	1	TVA	19		5	Newhaven Road to Haymarket Subsection 1C	Issued for External Approval	
ULE-90130	1	TVA	20		5	Newhaven Road to Haymarket Subsection 1C	Issued for External Approval	
ULE-90130	1	TVA	21		5	Newhaven Road to Haymarket Subsection 1D	Issued for External Approval	
ULE-90130	1	TVA	22		3	Newhaven Road to Haymarket Subsection 1D	Issued for External Approval	
ULE-90130	1	TVA	23		5	Newhaven Road to Haymarket Subsection 1D	Issued for External Approval	
ULE-90130	1	TVA	24		5	Newhaven Road to Haymarket Subsection 1D	Issued for External Approval	
ULE-90130	2	TVA	1		3	Haymarket to Roseburn Junction Subsection 2A	Issued for External Approval	
ULE-90130	2	TVA	2		3	Haymarket to Roseburn Junction Subsection 2A	Issued for External Approval	
ULE-90130	2	TVA	3		3	Haymarket to Roseburn Junction Subsection 2A	Issued for External Approval	
ULE-90130	2	TVA	4		3	Haymarket to Roseburn Junction Subsection 2A	Issued for External Approval	
ULE-90130	2	TVA	5		1	Haymarket to Roseburn Junction Subsection 2A	Issued for External Approval	
ULE-90130	5	TVA	1		3	Roseburn Junction to Gogarburn Subsection 5A	Issued for External Approval	
ULE-90130	5	TVA	2		3	Roseburn Junction to Gogarburn Subsection 5A	Issued for External Approval	
ULE-90130	5	TVA	3		3	Roseburn Junction to Gogarburn Subsection 5A	Issued for External Approval	
ULE-90130	5	TVA	4		3	Roseburn Junction to Gogarburn Subsection 5A	Issued for External Approval	
ULE-90130	5	TVA	5		3	Roseburn Junction to Gogarburn Subsection 5A	Issued for External Approval	
ULE-90130	5	TVA	6		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TVA	7		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TVA	8		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TVA	9		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TVA	10		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TVA	11		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TVA	12		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TVA	13		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TVA	14		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TVA	15		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TVA	16		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	

PROJECT	SECTION	FOLDER	DWG NO	STR ID	REV NO	DRAWING NAME	STATUS	COMMENTS
ULE-90130	5	TVA	17		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TVA	18		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TVA	19		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TVA	20		3	Roseburn Junction to Gogarburn Subsection 5B	Issued for External Approval	
ULE-90130	5	TVA	21		3	Roseburn Junction to Gogarburn Subsection 5C	Issued for External Approval	
ULE-90130	5	TVA	22		3	Roseburn Junction to Gogarburn Subsection 5C	Issued for External Approval	
ULE-90130	5	TVA	23		3	Roseburn Junction to Gogarburn Subsection 5C	Issued for External Approval	
ULE-90130	5	TVA	24		3	Roseburn Junction to Gogarburn Subsection 5C	Issued for External Approval	
ULE-90130	5	TVA	25		3	Roseburn Junction to Gogarburn Subsection 5C	Issued for External Approval	
ULE-90130	5	TVA	26		3	Roseburn Junction to Gogarburn Subsection 5C	Issued for External Approval	
ULE-90130	6	TVA	1		3	Gogar Depot Track Vertical Alignment Sheet 1 of 4 (Section 6)	Issued for External Approval	
ULE-90130	6	TVA	2		3	Gogar Depot Track Vertical Alignment Sheet 2 of 4 (Section 6)	Issued for External Approval	
ULE-90130	6	TVA	3		1	Gogar Depot Track Vertical Alignment Sheet 3 of 4 (Section 6)	Issued for External Approval	
ULE-90130	6	TVA	4		1	Gogar Depot Track Vertical Alignment Sheet 4 of 4 (Section 6)	Issued for External Approval	
ULE-90130	7	TVA	1		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	7	TVA	2		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	7	TVA	3		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	7	TVA	4		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	7	TVA	5		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	7	TVA	6		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	7	TVA	7		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	
ULE-90130	7	TVA	8		3	Gogarburn to Edinburgh Airport Subsection 7A	Issued for External Approval	

THIS IS SCHEDULE PART 31 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 31

DRAWINGS



USB00000104_0001

Trams For Edinburgh: Land Available to INFRACO - Newhaven to Ocean Terminal

0 75 150 300 Meters

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Date: Apr 08

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Version: 3

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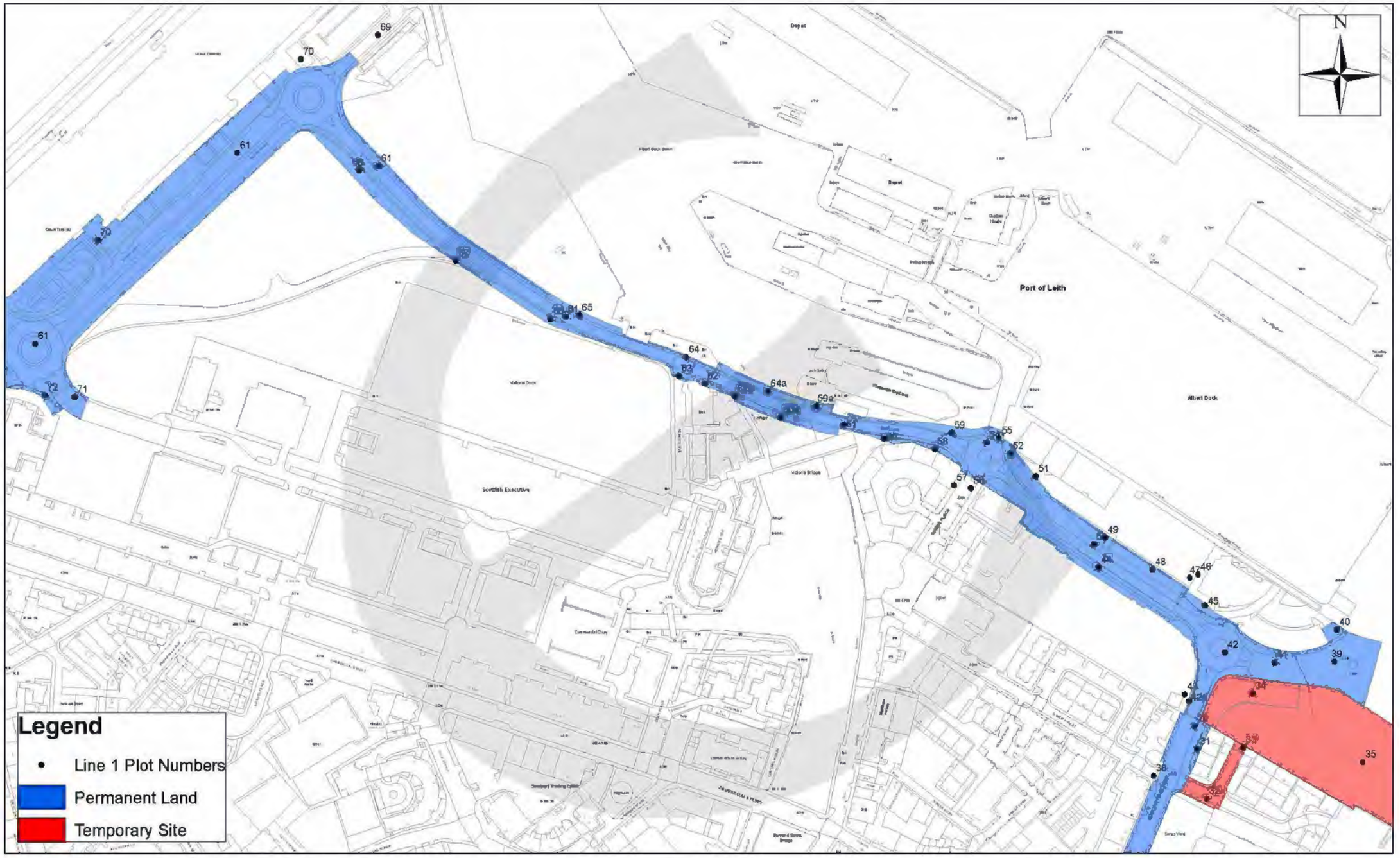

USB00000108_0001

Trams For Edinburgh: Land Available to INFRACO - Ocean Terminal to Casino Square (Ocean Drive)

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0 75 150 300 Meters

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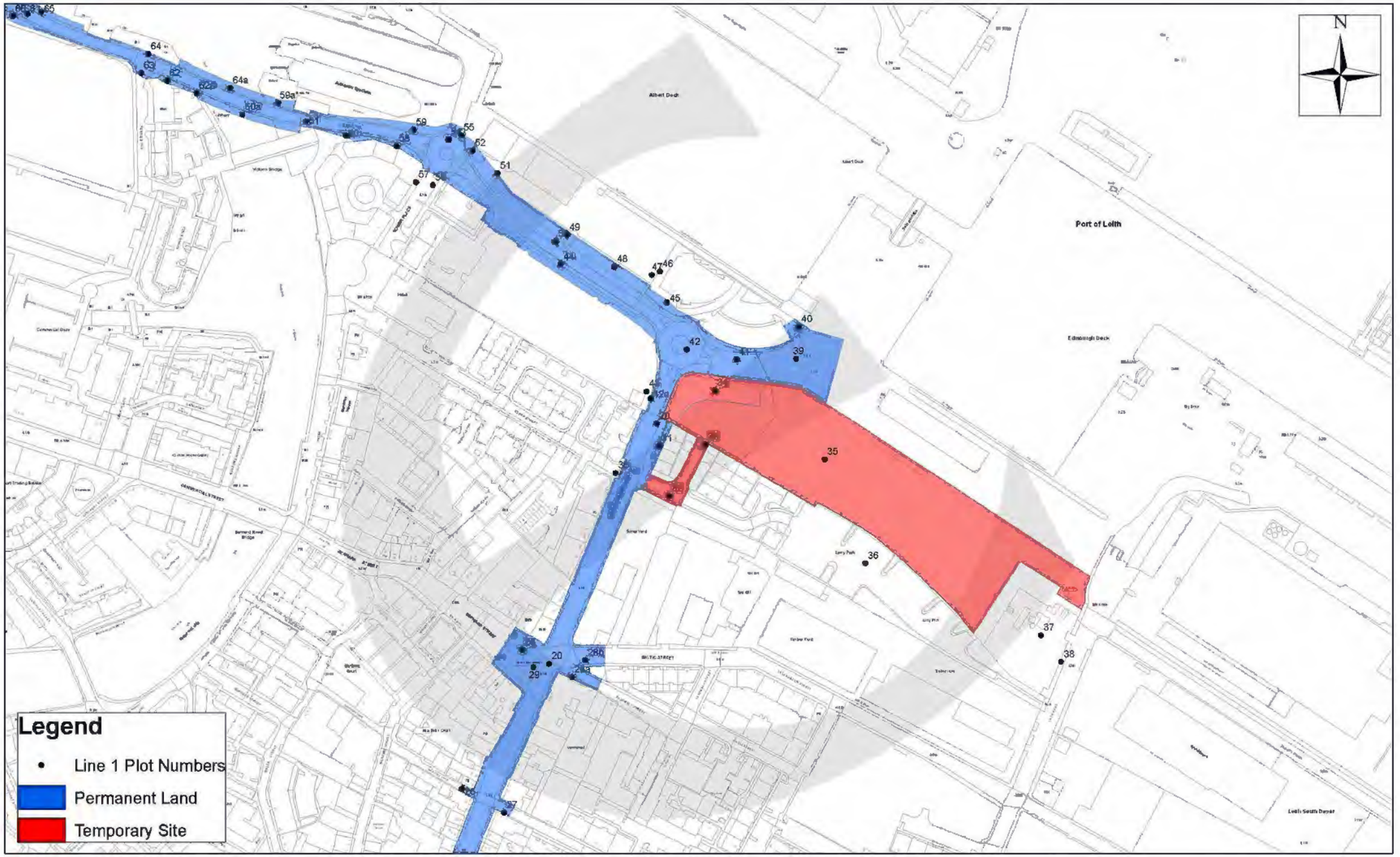

USB00000109_0001

Trams For Edinburgh: Land Available to INFRACO - Ocean Terminal to Casino Square (Ocean Drive) 2

Date: Apr 08

0 75 150 300 Meters

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Version: 5

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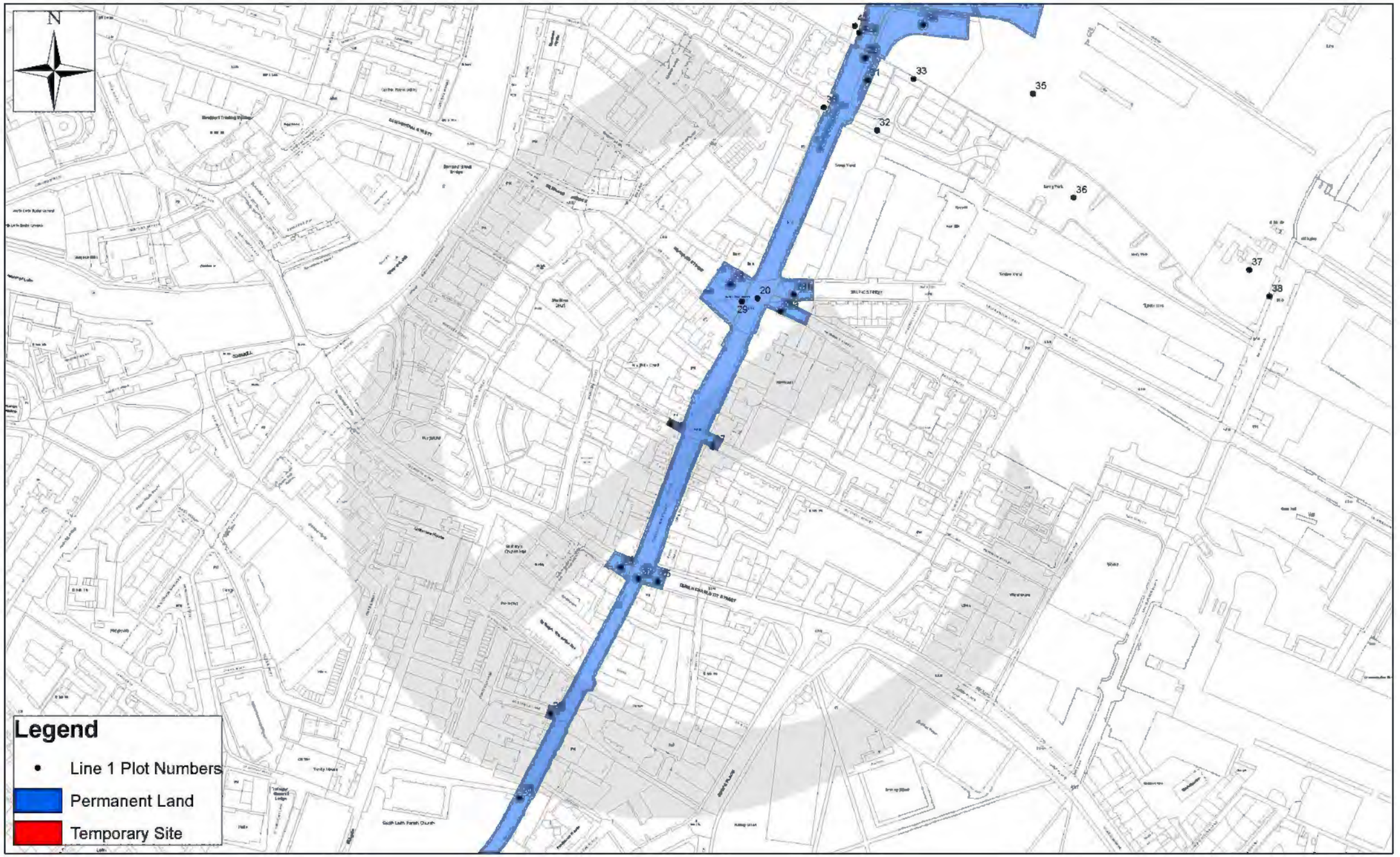

USB00000093_0001

Trams For Edinburgh: Land Available to INFRACO - Casino Square (Ocean Drive) to Links Lane (Constitution St)

Date: Apr 08

0 75 150 300 Meters

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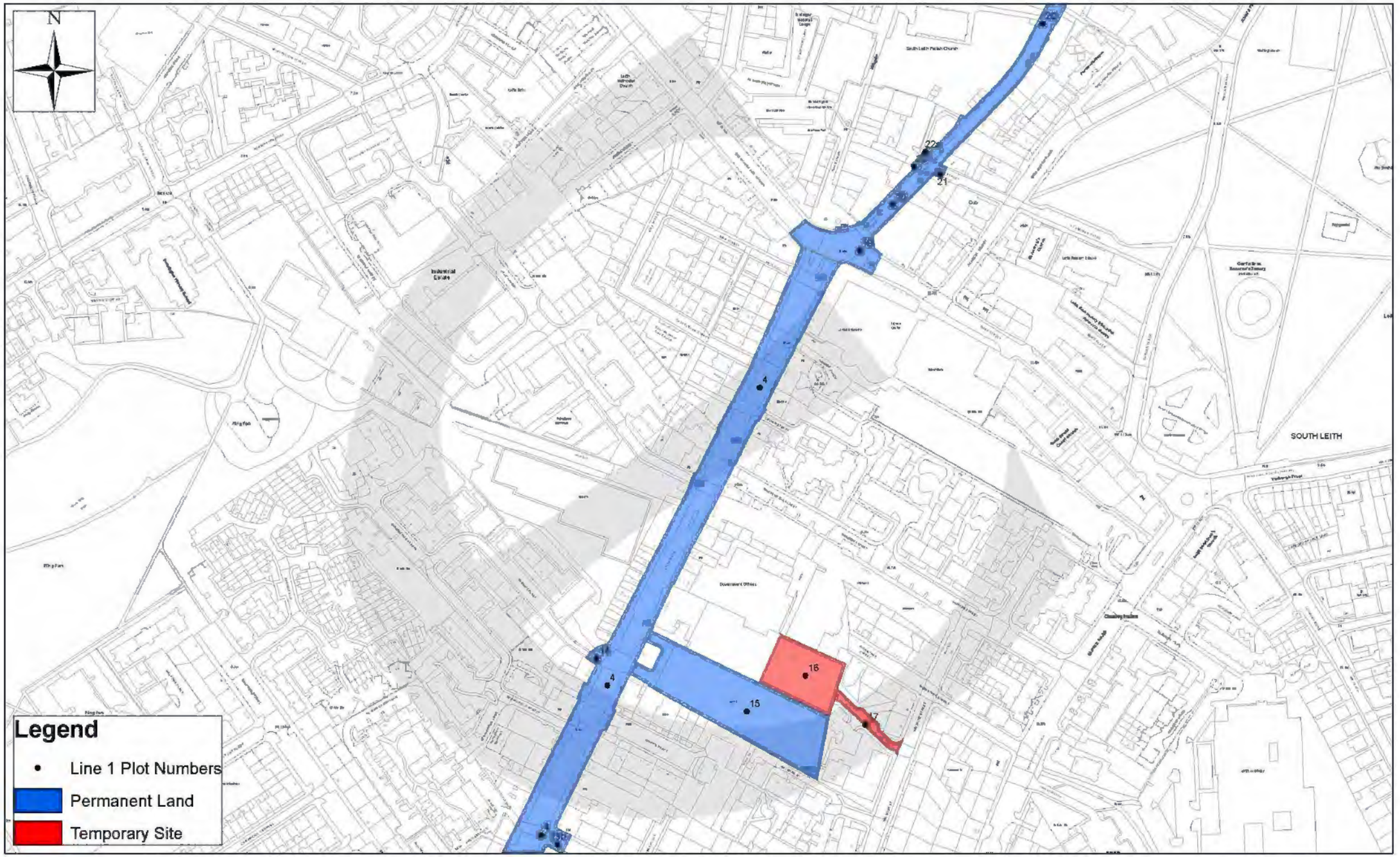

USB00000100_0001

Trams For Edinburgh: Land Available to INFRACO - Links Lane (Constitution St) to New Orchardfield (Leith Wlk)

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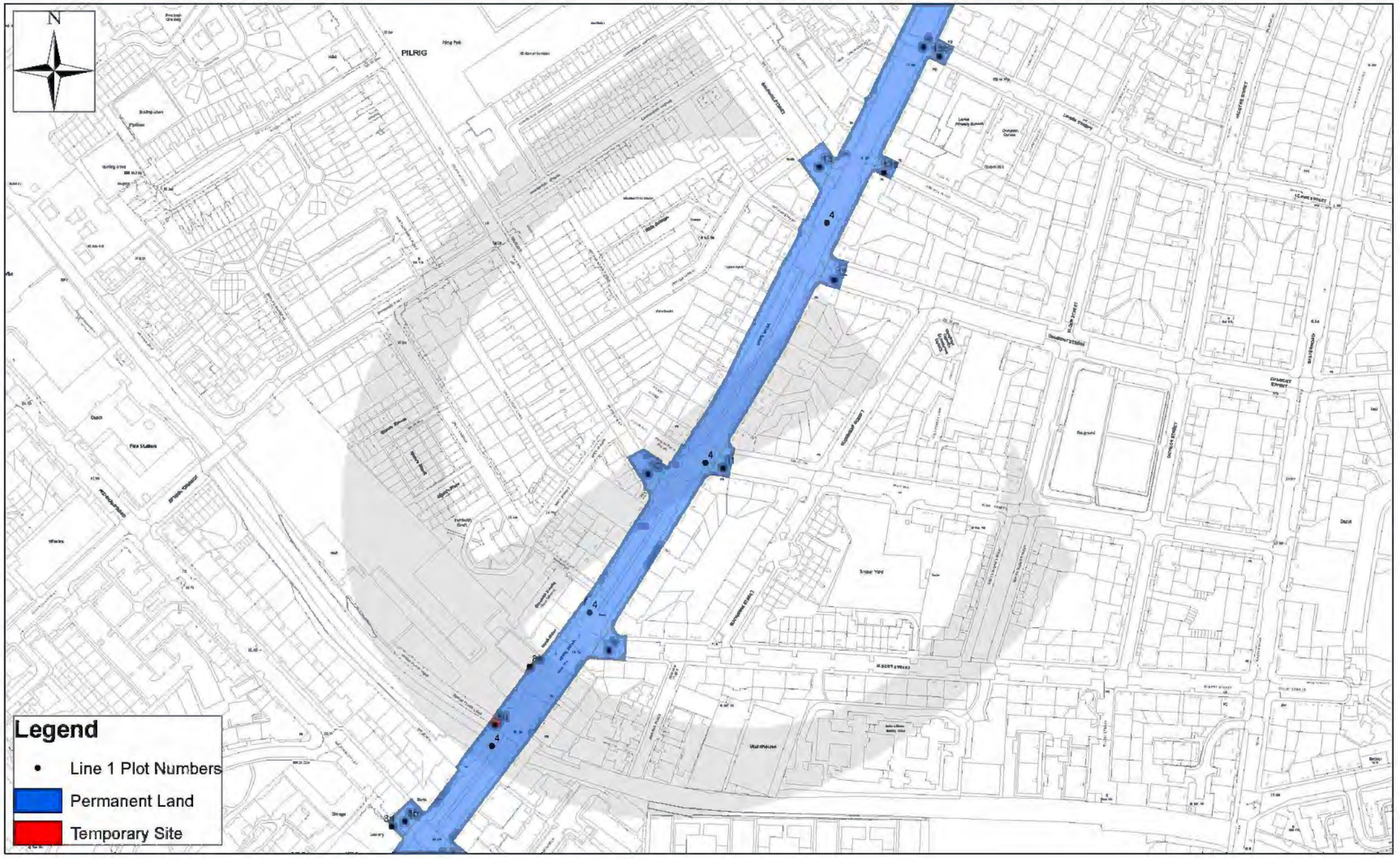

USB00000103_0001

Trams For Edinburgh: Land Available to INFRACO - New Orchardfield to Croall Place (Leith Wlk)

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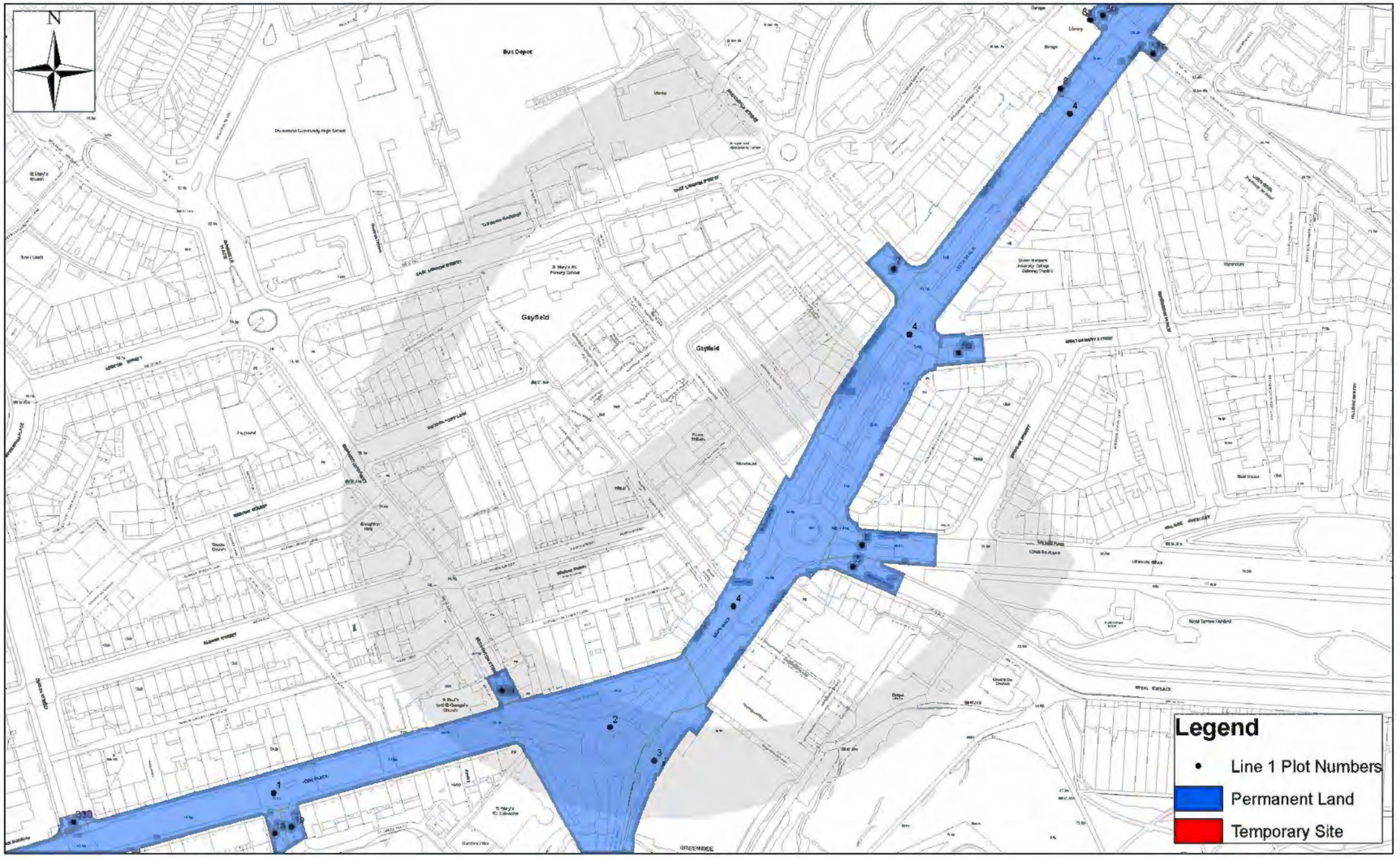

USB00000094_0001

Trams For Edinburgh: Land Available to INFRACO - Croall Place (Leith Wlk) to Picardy Place

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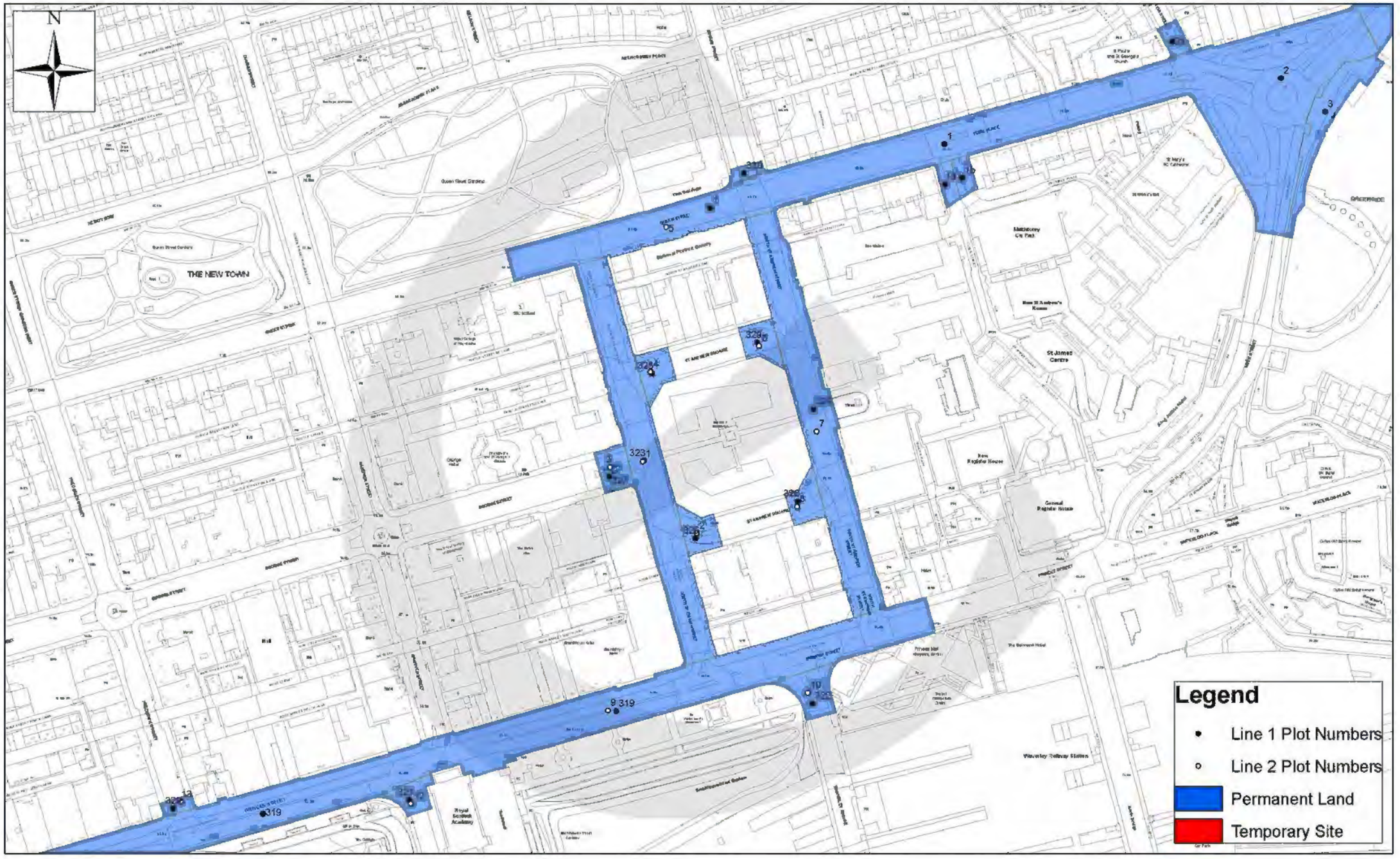

USB00000105_0001

Trams For Edinburgh: Land Available to INFRACO - Picardy Place to Frederick Street (Princes St)

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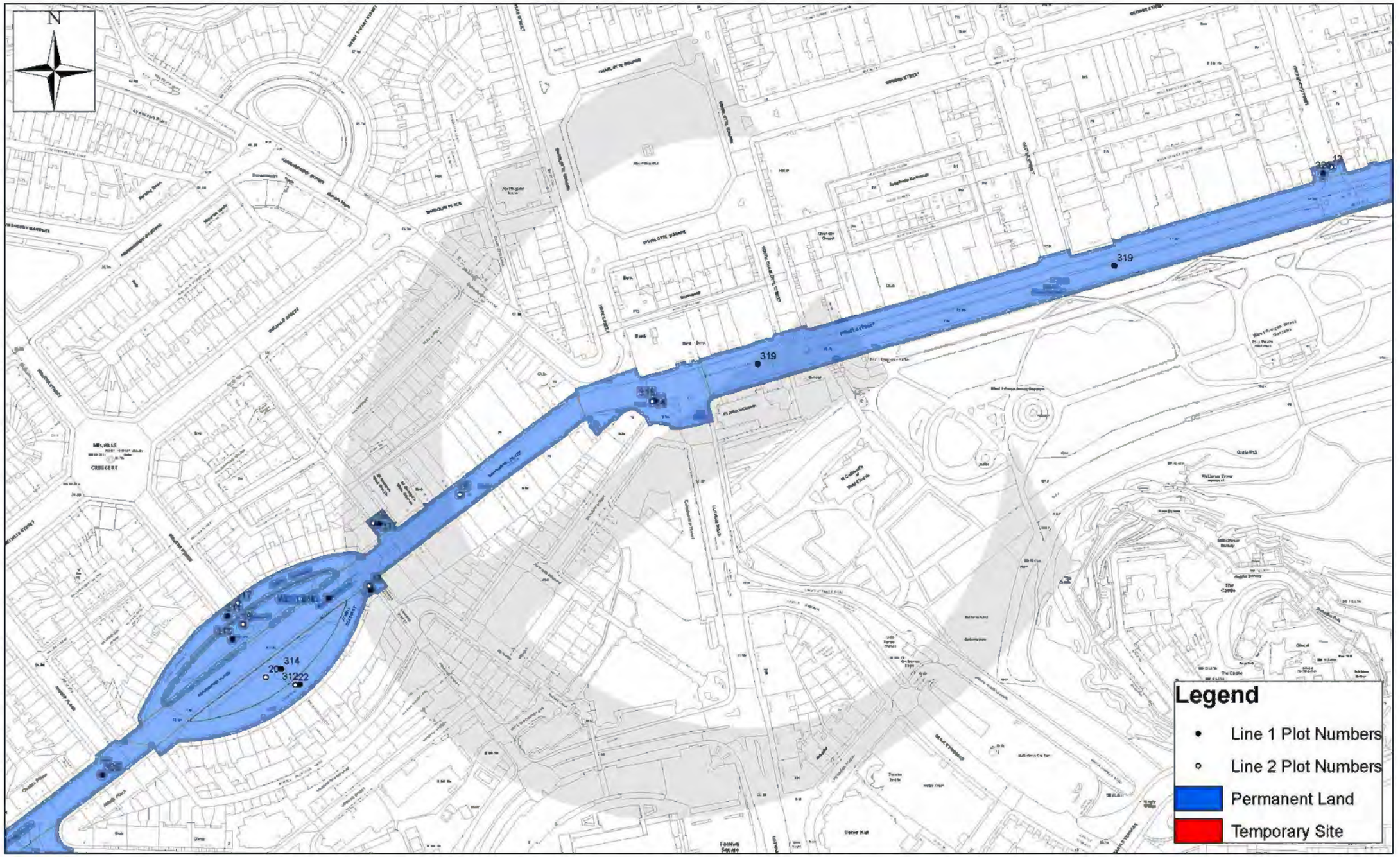

USB00000096_0001

Trams For Edinburgh: Land Available to INFRACO - Frederick Street (Princes St) to Shandwick Place

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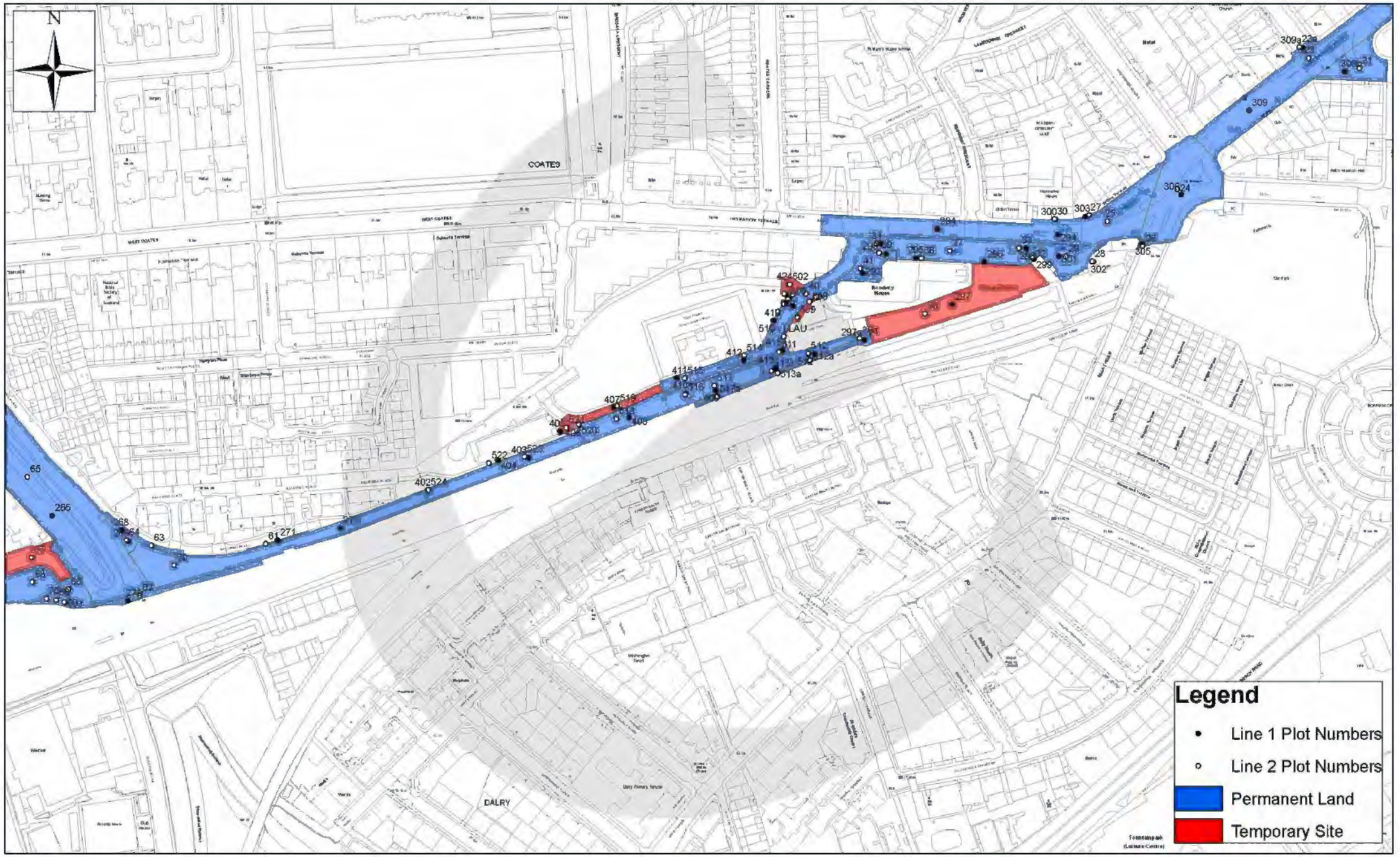

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Trams For Edinburgh: Land Available to INFRACO - Shandwick Place to Haymarket Yards

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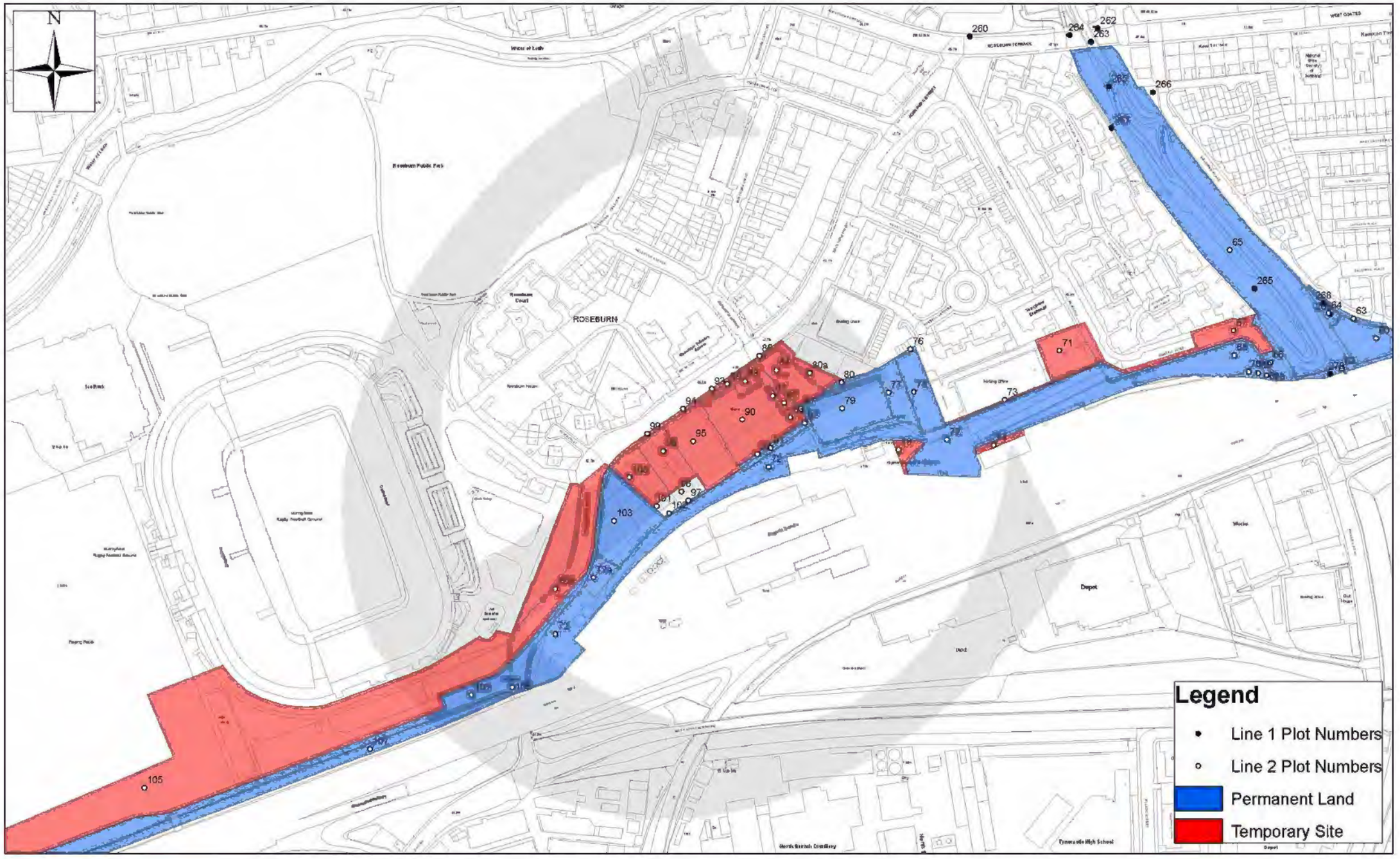

USB0000099_0001

Trams For Edinburgh: Land Available to INFRACO - Haymarket Yards to Murrayfield

0 75 150 300 Meters

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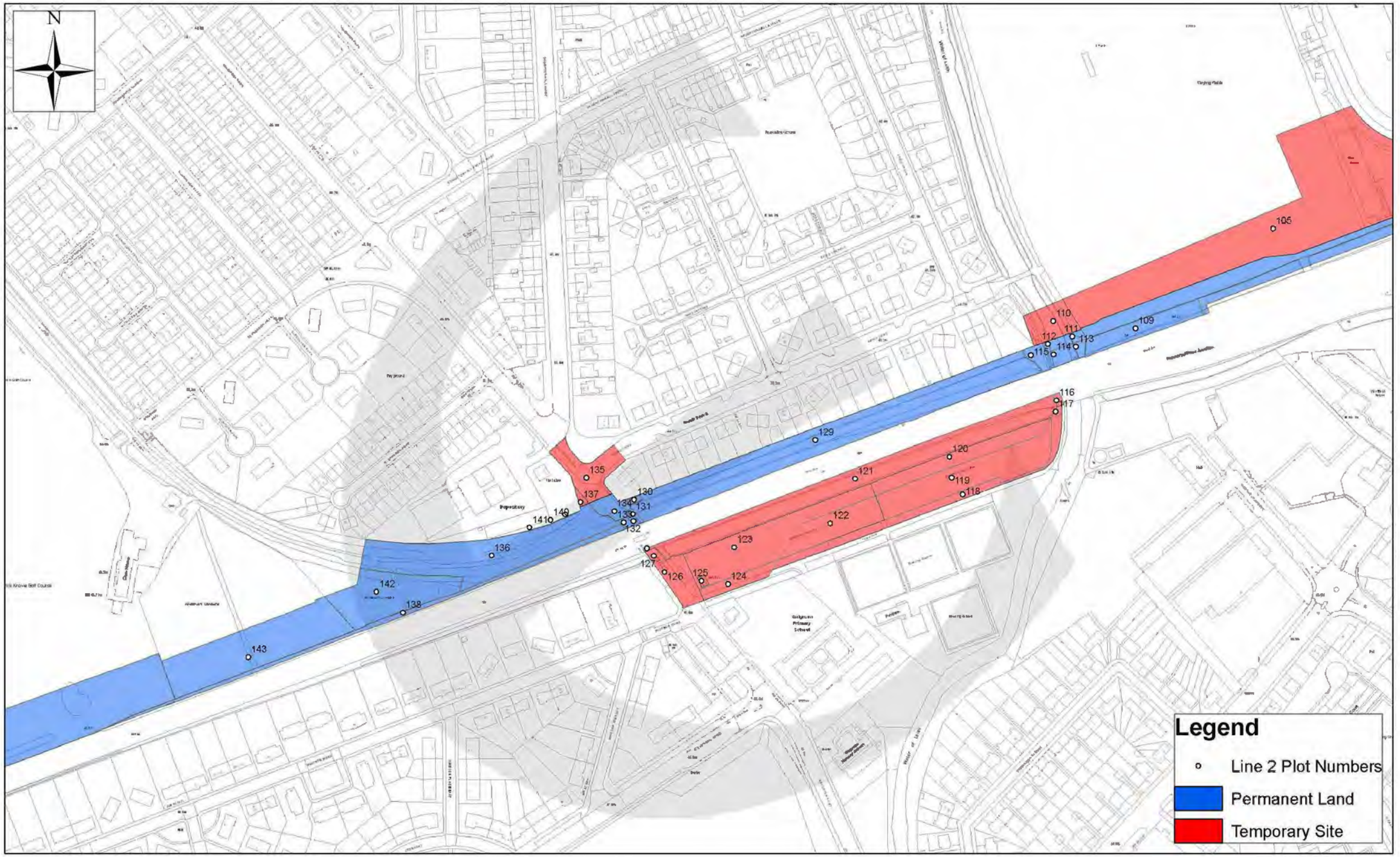

USB00000102_0001

Trams For Edinburgh: Land Available to INFRACO - Murrayfield to Carrick Knowe Golf Course

0 75 150 300 Meters

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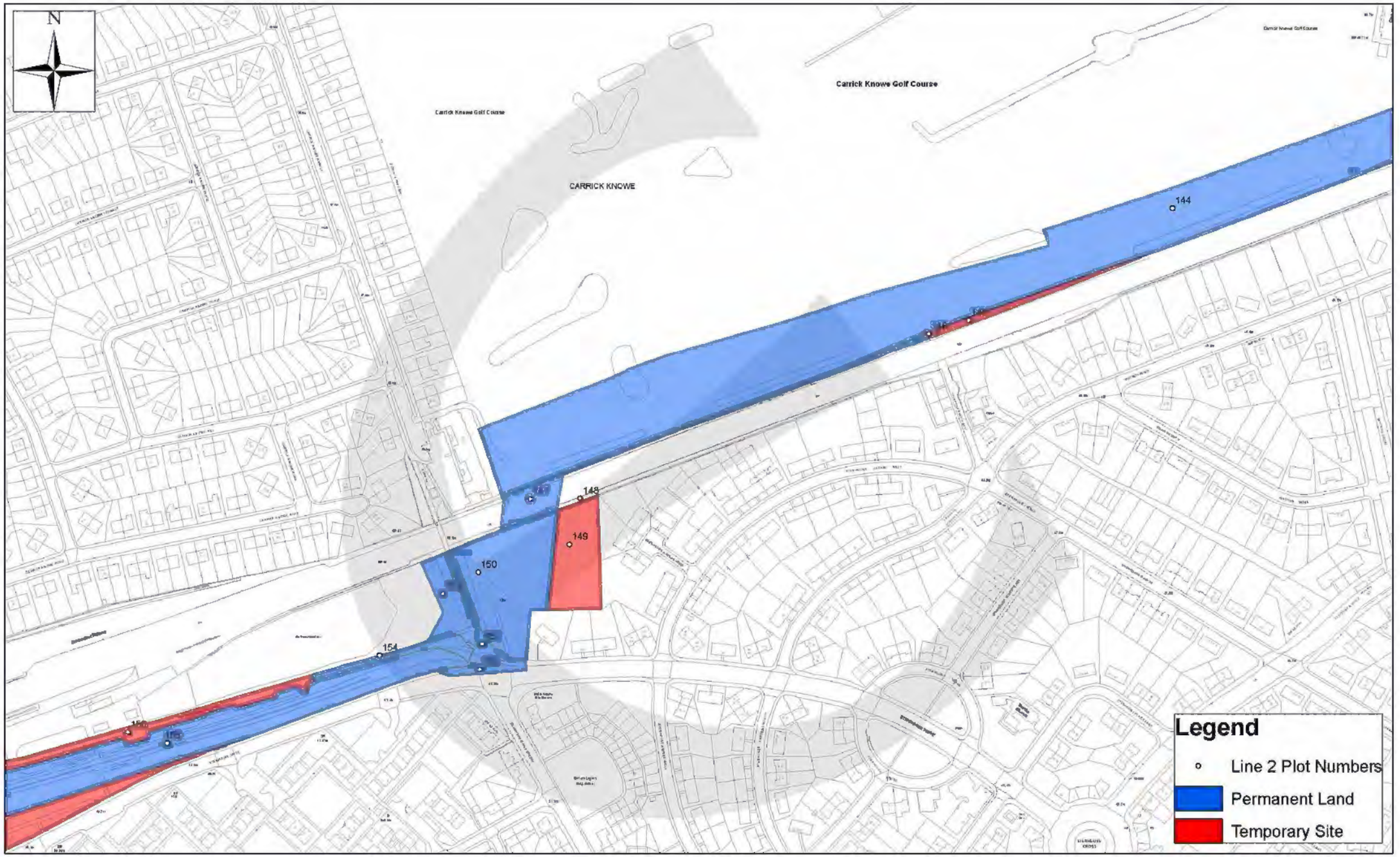

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Trams For Edinburgh: Land Available to INFRACO - Carrick Knowe Golf Course to Stenhouse Drive

Date: Apr 08

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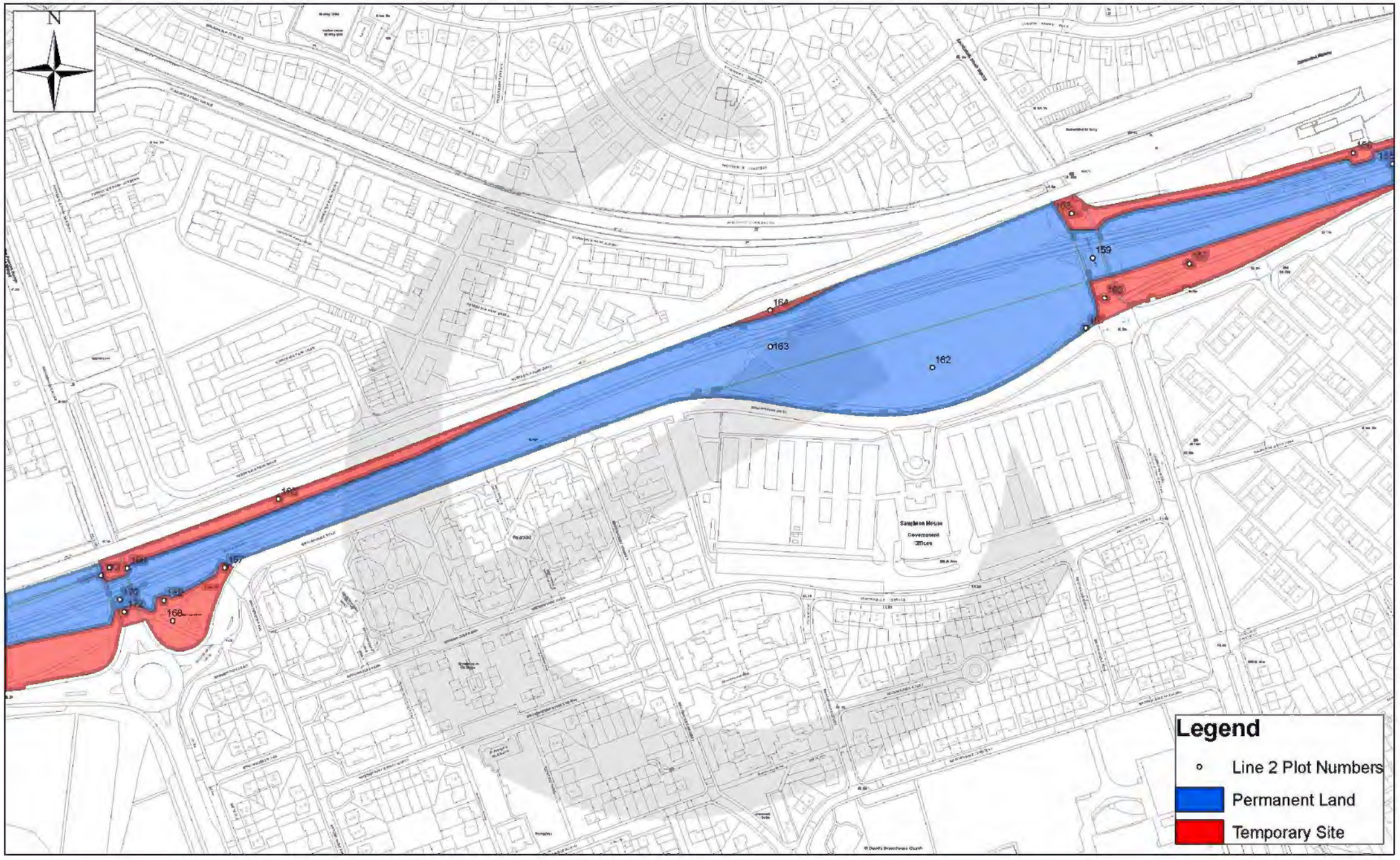

USB00000107_0001

Trams For Edinburgh: Land Available to INFRACO - Stenhouse Drive to Broomhouse Drive

0 75 150 300 Meters

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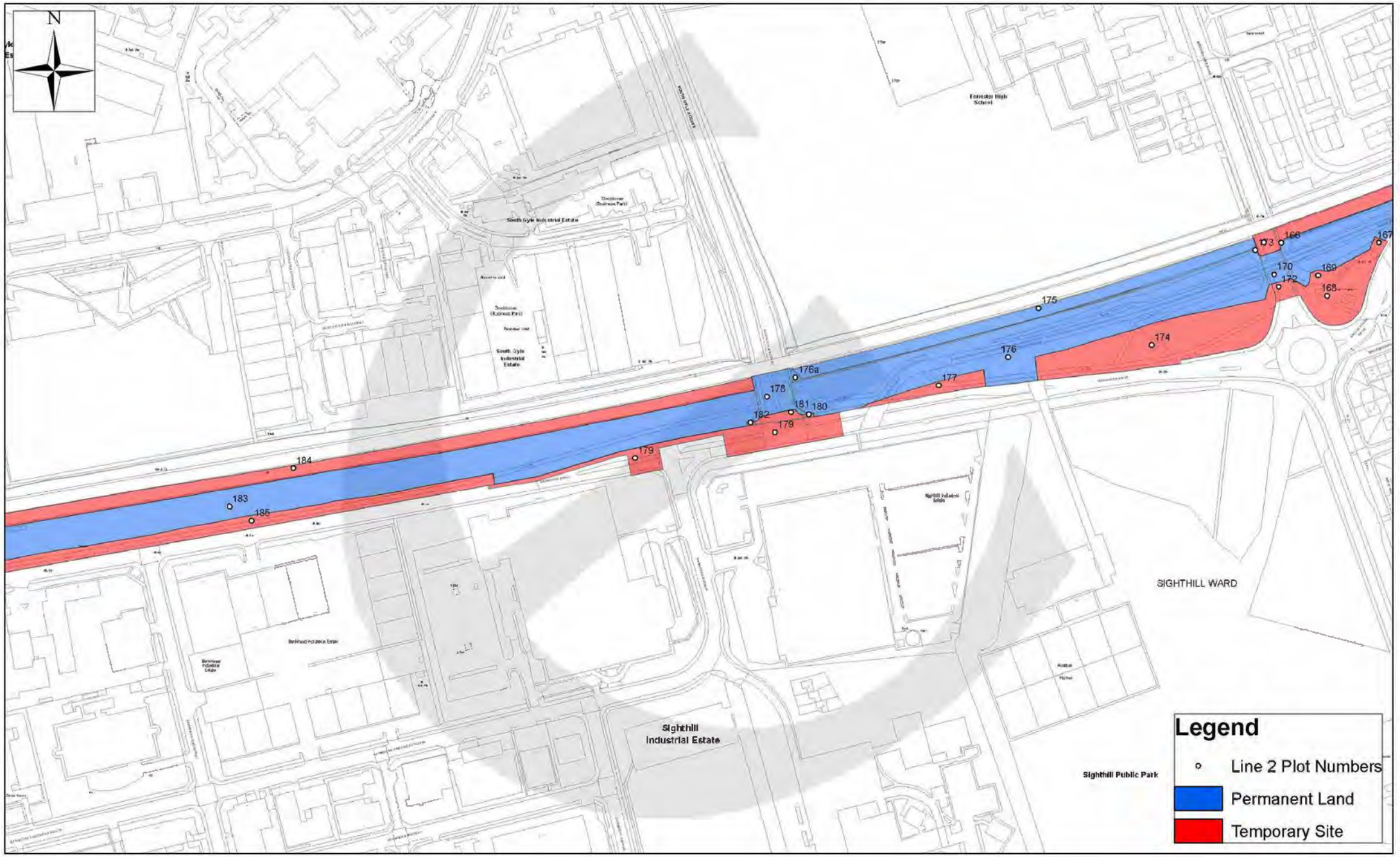

USB00000091_0001

Trams For Edinburgh: Land Available to INFRACO - Broomhouse Drive to Bankhead Drive

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Trams For Edinburgh: Land Available to INFRACO - Bankhead Drive to Edinburgh Park

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Trams For Edinburgh: Land Available to INFRACO - Edinburgh Park to Lochside Avenue

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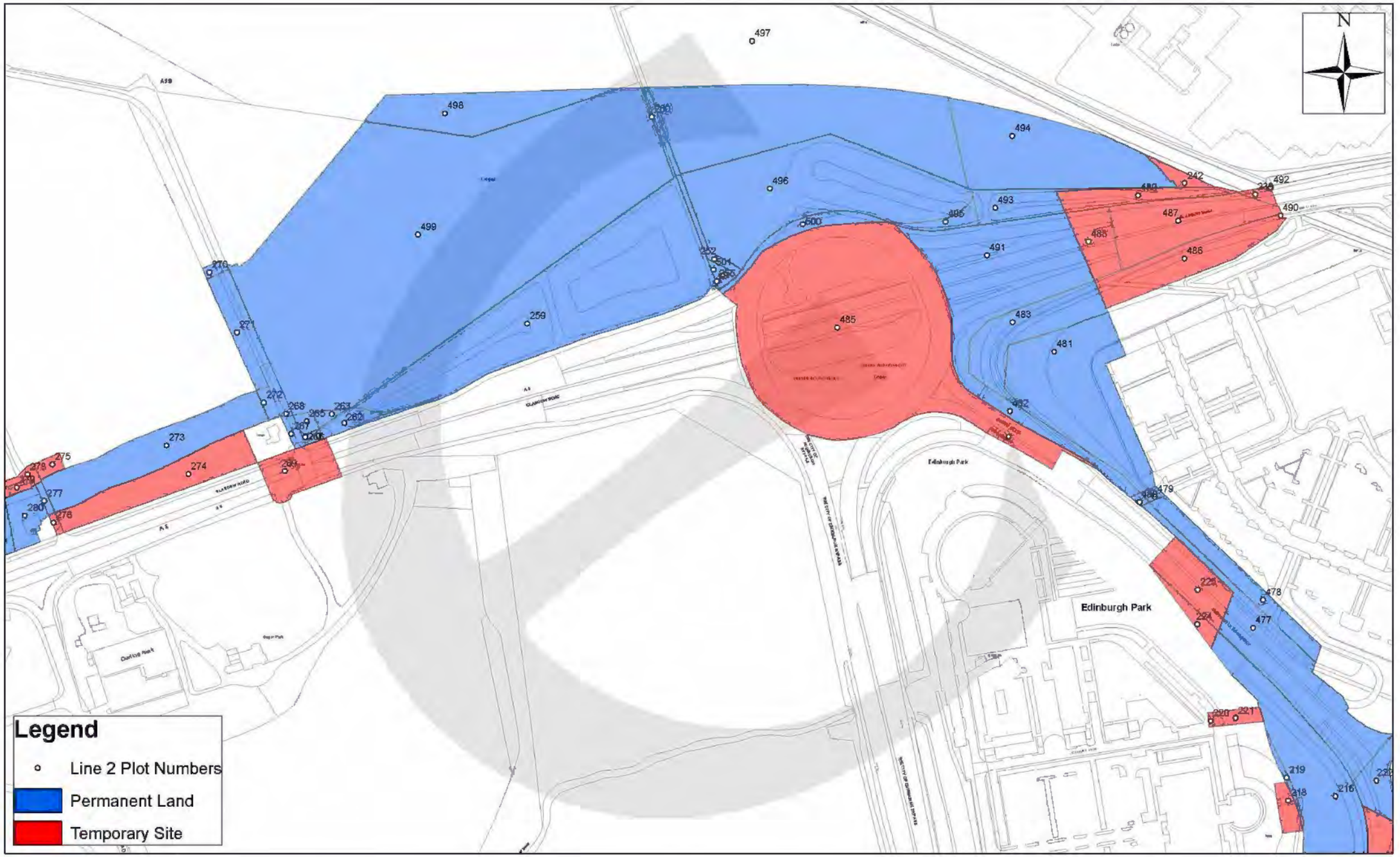

USB0000101_0001

Trams For Edinburgh: Land Available to INFRACO - Lochside Avenue to Glasgow Road

0 75 150 300 Meters

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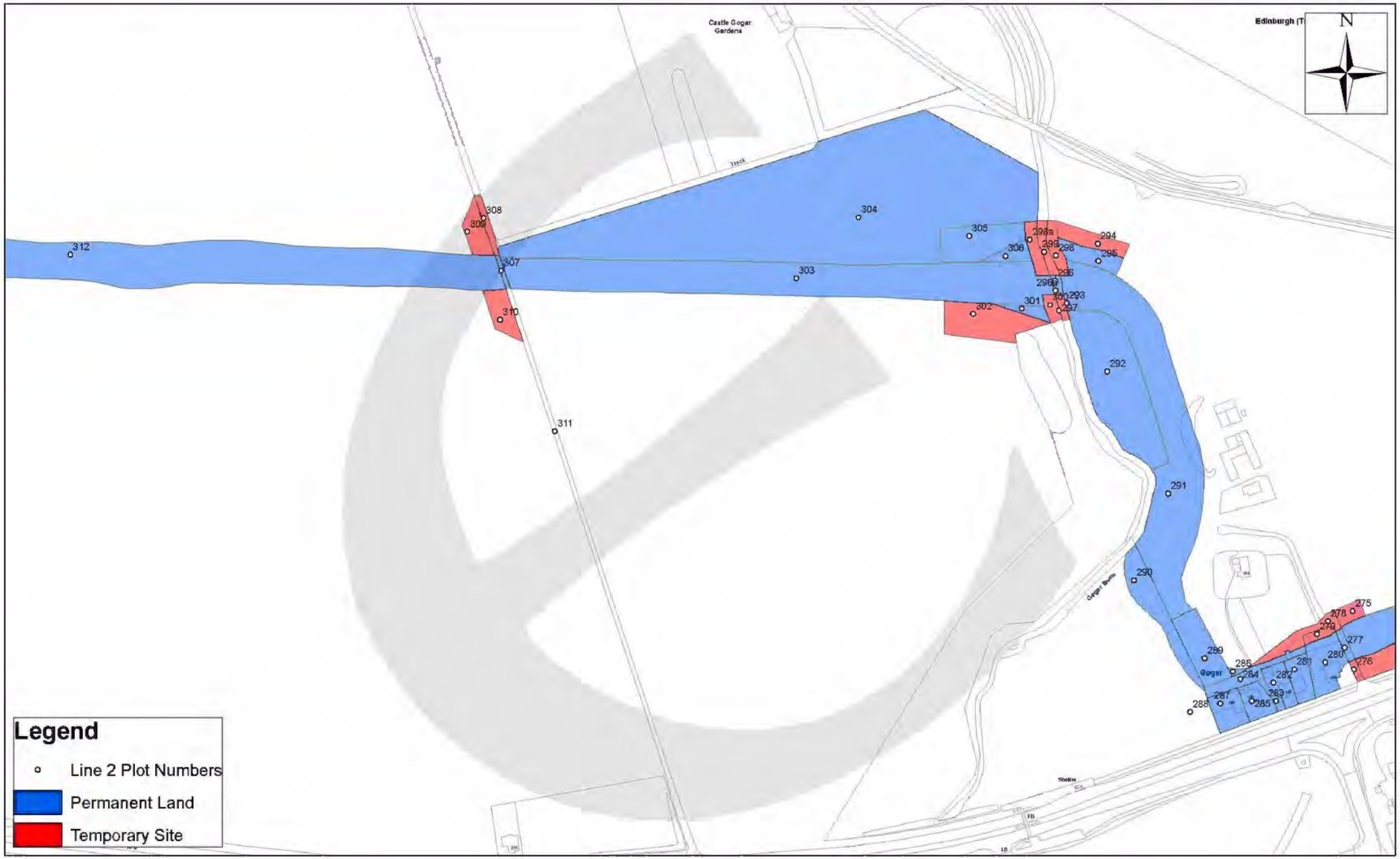

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Trams For Edinburgh: Land Available to INFRACO - Glasgow Road to Gogar Farm Access

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Trams For Edinburgh: Land Available to INFRACO - Gogar Farm Access to Ingliston P & R

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Trams For Edinburgh: Land Available to INFRACO - Ingliston P & R to Edinburgh Airport

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Version: 4

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Trams For Edinburgh: Land Available to INFRACO - Edinburgh Airport

Date: Apr 08

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THIS IS SCHEDULE PART 32 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 32

DEPOT LICENCE

1. In accordance with Clause 24 (*Use of the Depot*) of this Agreement **tie** grants to the Infraco a licence to occupy and use the Depot on a non-exclusive basis on the terms set out below:

   1.1 subject to the Infraco complying with the undertakings set out in paragraph 2 below, the Infraco shall have the right during the Term to enter into, remain in and occupy those parts of the Depot within the area shaded yellow on the Depot Plan in yellow in respect of the Tram Maintenance Services and the unshaded areas within the curtillage of the building on the Depot Plan in respect of the Infrastructure Maintenance Services for the purposes of carrying out and performing the Infraco Works and other obligations assumed by the Infraco in accordance with this Agreement including those offices and facilities shaded yellow on the Depot Plan in connection with the performance of such Infraco Works and other obligations; and

   1.2 **tie** and the Infraco agree that:

      1.2.1 the right to occupy granted pursuant to paragraph 1.1 above shall terminate on the earlier of the Termination Date or the Expiry Date;

      1.2.2 the Infraco's occupation of the Depot will be as a sub-licensee only and shall confer on the Infraco no greater interest than that of sub-licensee and in particular the sub-licence granted by paragraph 1.1 above shall not create a relationship of landlord and tenant;

      1.2.3 the benefit of the sub-licence granted by paragraph 1.1 above is personal to the Infraco, its contractors and sub-contractors and its and/or their work persons, servants and agents and is not assignable and the rights given in paragraph 1.1 above may only be exercised by the Infraco, its contractors and sub-contractors of any tier and its and/or their work persons, servants and agents.

2. The Infraco agrees and undertakes to **tie** that it shall (and shall procure that its sub-contractors shall):

   2.1 carry out the Infraco Works with the minimum disruption to neighbouring properties to the Depot;

2.2 use the Depot only for, and to the extent necessary for, the purposes of carrying out and performing the Infraco Works;

2.3 keep the Depot as clean and tidy as practicable and not make any physical alterations thereto;

2.4 provide cleaning, maintenance and access control services as required under Appendix 2 of this Licence;

2.5 provide security services until the Service Commencement Date;

2.6 not display any signs or notices at the Depot without the prior written consent of **tie**, (such consent to be at the **tie**'s absolute discretion);

2.7 upon termination of the licence, make good any damage which the Infraco has caused to the Depot (fair wear and tear excepted) and remove all equipment and apparatus which it has brought into the Depot; and

2.8 not cause unreasonable interference to the other users of the Depot.

3. The Infraco acknowledges that the Operator shall have responsibility for the co-ordination of health and safety issues at the Depot and the Infraco hereby agrees to comply with any instruction from the Operator in relation to health and safety issues at the Depot.

EXECUTED for and on behalf of **[INFRACO]**
at
on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

USB00000060_0003

APPENDIX 1

DEPOT PLAN



USB00000060_0004

APPENDIX 2

DEPOT RESPONSIBILITIES ALLOCATION MATRIX

See Schedule Part 2 (Employer's Requirements) Section 40 – Table 83 and Table 89

THIS IS SCHEDULE PART 33 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 33

BUILDING FIXING AGREEMENT

between

(1) [◆]

and

(2) [◆]

and

(3) TIE LIMITED

and

(4) CITY OF EDINBURGH COUNCIL

relating to

the affixing of building fixing apparatus in respect of the Edinburgh Tram Network

upon

[insert Building address]

AGREEMENT

AMONG

(1) ◆ ("**Building Owner**"); and

(2) ◆ ("**Infraco**"); hereinafter referred to as "Infraco" which expression shall include its successors and assignees in terms of the Infraco Contract; and

(3) **tie LIMITED,** a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh EH1 1YJ (hereinafter referred to as "**tie**"**,** which expression shall include its successors, permitted assignees and transferees as CEC's agent in respect of the Edinburgh Tram Network); and

(4) **THE CITY OF EDINBURGH COUNCIL,** constituted under the Local Government Etc. (Scotland) Act 1994 and having its principal office formerly at Council Headquarters, Wellington Court, Waterloo Place, Edinburgh, EH1 3EG and now at City Chambers, High Street, Edinburgh, EH1 3YJ (hereinafter referred to as "**CEC**"**,** which expression shall include its statutory successors as authorised undertaker under the Tram Legislation)

BACKGROUND

(A) CEC is empowered by Section 16 of each Act comprising the Tram Legislation to affix Apparatus to any building or structure as required in connection with the Edinburgh Tram Network subject to obtaining the consent of the owner (or failing that, the consent of the sheriff as appropriate);

(B) **tie** is a wholly owned subsidiary of CEC and act as CEC's authorised agent in procuring the design, construction, installation, commissioning, maintenance and of the Edinburgh Tram Network;

(C) **tie** has by virtue of the Infraco Contract appointed the Infraco to, subject to the terms of the Infraco Contract, inter alia design, construct and maintain the Edinburgh Tram Network and affix Apparatus to relevant buildings or structures;

(C) The Building Owner is the heritable proprietor of the Building and has agreed to allow the Infraco to affix Apparatus to the Building, to allow the Apparatus to remain affixed to and supported by the Building and to occupy air space taken up by such Apparatus upon the terms set out below.

1. DEFINITIONS

1.1 In this Agreement, the following terms shall, unless the context otherwise requires, have the following meanings:

"**Agreement**" means this building fixing agreement and any written amendment thereto all as entered into between the parties hereto;

"**Apparatus**" means all and any brackets, cables, wires, insulators and other apparatus required to be affixed to the Building pursuant to the carrying out of the Infraco Works, and requiring to remain in place following completion of the Infraco Works to facilitate the effective operation of the tram such Apparatus being more particularly described in the Appendix to this Agreement;

"**Apparatus Ancillary Works**" means all works necessary to inspect, fix, use, maintain, repair, alter, protect, enlarge, renew, reinstate, replace, remove or dismantle the Apparatus from time to time;

"**Apparatus Attachment Works**" means all works necessary for the attachment of the Apparatus to the Building;

"**Building**" means [*details of the Building Owner's property*] shown for the purpose of identification only on the attached plan;

"**Consents**" means without limitation, all permissions, consents, approvals, non objections, certificates, permits, licences, agreements, statutory agreements and authorisations, Planning Permissions, temporary traffic regulation orders, building control approvals, building warrants, and all other necessary consents and agreements whether required by Law or the Tram Legislation or under contract;

"**Edinburgh Tram Network**" means the tramway which is authorised by the Tram Legislation;

"**Infraco Contract**" means the agreement dated [◆] 2008 between **tie** and the Infraco;

"**Infraco Works**" means all works carried out by the Infraco pursuant to the Infraco Contract, and in particular the attaching of apparatus to support OLE for the Edinburgh Tram Network and the regular maintenance of such apparatus;

"**OLE**" means the overhead lines forming part of the Edinburgh Tram Network;

"**Planning Permission**" means any planning permission, planning approval, approval of reserved matters, listed building consent and/or conservation areas consent;

"**Repairs Notice**" means a written notice specifying:

(a) the anticipated commencement date for the Repair Works provided always that this shall be at least three months after the date on which the notice is served in order that the Infraco can make alternative arrangements to ensure that the Edinburgh Tram Network can continue to operate;

(b) the anticipated completion date for the Repair Works;

(c) the nature and extent of the Repair Works; and

(d) those parts of the Apparatus which, in the reasonable opinion of the Building Owner, are required to be temporarily removed to enable the Repair Works to be effected;

"**Repair Works**" means any works of repair or redecoration intended to be carried out to the Building by the Building Owner which reasonably requires the temporary removal of the Apparatus to enable such works to be carried out;

"**Redevelopment Notice**" means a written notice specifying:

(a) the anticipated commencement date for the Redevelopment Works provided always that this shall be not less than three months after the date on which the notice is served in order that the Infraco can make alternative arrangements to ensure that the Edinburgh Tram Network can continue to operate;

(b) the anticipated completion date for the Redevelopment Works;

(c) the nature and extent of the Redevelopment Works; and

(d) those parts of the Apparatus which, in the reasonable opinion of the Building Owner, are required to be temporarily removed to enable the Redevelopment Works to be effected;

"**Redevelopment Works**" means works by the Building Owner to reconstruct, demolish or undertake major structural works which reasonably require the removal of the Apparatus from the Building; and

"**Tram Legislation**" means the Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006 which received Royal Assent on 8 May 2006 and 27 April 2006.

2. THE GRANT

The Building Owner hereby:

2.1 grants to the Infraco, its agents, contractors, workmen and others employed or authorised by the Infraco the right to enter in and onto the Building (together with any necessary equipment including scaffolding) in order to:

2.1.1 survey the Building and ascertain its suitability for the Apparatus Attachment Works and (as ancillary thereto) the right to examine all available drawings and information relating to the structure and condition of the Building which are in the possession or control of the Building Owner; and

2.1.2 carry out and complete the Apparatus Attachment Works;

2.2 grants to the Infraco the right to carry out and complete the Apparatus Ancillary Works at all reasonable times and upon not less than 14 days notice; and

2.3 grants to the Infraco the right, notwithstanding the terms of Clause 2.2 to enter the Building at any time without giving notice in the case of emergency in order to carry out any works to the Apparatus authorised by this Agreement.

3. THE OBLIGATIONS OF THE INFRACO

3.1 In the exercise of the rights granted by Clause 2.1 above, the Infraco shall at all times:

(a) comply with the terms of all necessary Consents for the Apparatus Attachment Works and shall further comply with the provisions of the Tram Legislation and all other applicable legislation governing the exercise of such rights;

(b) carry out the Apparatus Attachment Works to the Building in a good and workmanlike manner and at its own expense;

(c) carry out all Apparatus Attachment Works in such a way as to use reasonable endeavours to minimise interference and inconvenience to the Building Owner; and

(d) make good any damage caused to the Building by the Apparatus Attachment Works so far as reasonably practicable provided always that the Infraco shall not be required to make good any damage which is caused by or results from general deterioration or wear and tear to the Building which is not solely attributable to the Apparatus Attachment Works.

3.2 In the exercise of the rights granted by Clause 2.2 above, the Infraco shall at all times:

3.2.1 (subject to the Building Owner complying with its obligations under Clause 5 below) keep and maintain the Apparatus in good and safe working order and shall comply with all relevant health and safety legislation;

3.2.2 carry out all Apparatus Ancillary Works in such a manner as to use reasonable endeavours to minimise interference and inconvenience to the Building Owner;

3.2.3 make good any damage caused to the Building in the course of carrying out the Apparatus Ancillary Works so far as reasonably practicable provided always that the Infraco shall not be required to make good any damage which is caused by or results from general deterioration or wear and tear to the Building which is not solely attributable to the Apparatus Ancillary Works.

4. CEC INDEMNITY AND BUILDING OWNER'S REMEDIES

4.1 Subject to Clause 5 below, CEC hereby undertakes to the Building Owner to keep the Building Owner indemnified from and against any loss, damage, actions, claims, demands or liability suffered by the Building Owner and directly arising out of damage or destruction of the Building directly caused by the negligence of the Infraco.

4.2 The Building Owner accepts and agrees that Clause 4.1 shall be shall be in lieu of any and all remedies which the Building Owner shall be or become entitled to against the Infraco.

4.3 Any rights, obligations and liabilities as between the Infraco, **tie** and CEC shall be dealt with in accordance with in accordance with the Infraco Contract.

5. THE BUILDING OWNER'S OBLIGATIONS

5.1 The Building Owner hereby undertakes to CEC and separately undertakes to each of **tie** and the Infraco that the Building Owner will not either personally or by way of authorising,

causing, enabling or inviting third parties (including by way of illustration but not limitation tenants, sub-tenants, agents, contractors, sub-contractors, employees, maintenance persons and the like) to touch or otherwise damage or interfere with the Apparatus whilst it remains attached to the Building.

5.2 The Building Owner hereby accepts that neither the Infraco nor **tie** nor CEC shall be liable or responsible for loss, damage or injury caused or suffered by any person or property which arises as a result of a breach of the undertaking in Clause 5.1.

6. REPAIR WORKS

In the event that the Building Owner intends to carry out Repair Works:

6.1 the Building Owner shall serve a Repairs Notice on **tie**, the Infraco and CEC;

6.2 the Building Owner will carry out the Repair Works as expeditiously as possible;

6.3 the Infraco shall, subject to Clause 6.4 prior to the expiry of the notice period specified in the Repairs Notice (which, for the avoidance of doubt, will not be less than three months), remove such parts of the Apparatus as are specified in the Repairs Notice;

6.4 the Infraco shall be entitled, as required, to support the OLE at that location by erecting a temporary pole provided that the Infraco has obtained necessary Consents in relation thereto which the Infraco shall use reasonable endeavours to obtain as expeditiously as possible. The Infraco's obligations under Clause 6.3 shall not apply unless and until such Consents have been granted;

6.5 the Building Owner shall immediately upon completion of the Repair Works in respect of which the Repairs Notice was served notify the Infraco and CEC and shall afford the Infraco such rights and facilities as are required to remove the temporary pole and reinstate the Apparatus removed under this Clause 6;

6.6 service of a Repairs Notice shall amount to a temporary modification of the provisions of this Agreement only and shall not terminate or prejudice the continuing effect of this Agreement; and

6.7 the Building Owner undertakes that in the event that the Building Owner serves a Repairs Notice upon the Infraco, **tie** and CEC in accordance with Clause 6.1, it or any third party acting on the Building Owner's behalf will not make any objection to the erection of a

temporary pole or other means of support for the OLE necessitated by the temporary removal of the Apparatus from the Building.

7. REDEVELOPMENT WORKS

7.1 In the event that the Building Owner:

7.1.1 intends to carry out Redevelopments Works; and

7.1.2 has obtained all necessary Planning Permissions and other Consents for those Redevelopment Works;

the Building Owner shall serve a Redevelopment Notice upon the Infraco, **tie** and CEC, enclosing copies and details of such necessary Planning Permissions and other Consents.

7.2 The Infraco shall subject to Clause 7.3 prior to the expiry of the notice period given in the Redevelopment Notice (which, for the avoidance of doubt, will not be less than three months), remove the Apparatus from the Building.

7.3 The Infraco shall be entitled as required to support the OLE at that location by erecting a temporary pole provided that Infraco has obtained the necessary Consents in relation thereto which the Infraco shall use reasonable endeavours to obtain as expeditiously as possible. The Infraco's obligations under Clause 7.2 shall not apply unless and until such Consents have been granted.

7.4 The Building Owner shall carry out the Redevelopment Works as expeditiously as possible and shall, immediately upon completion of the Redevelopment Works in respect of which the Redevelopment Notice was served, notify the Infraco, **tie** and CEC and shall afford the Infraco such rights and facilities as are required to remove the temporary pole and to reinstate the Apparatus removed under this Clause 7.

7.5 Service of the Redevelopment Notice shall amount to a temporary modification of the provisions of this Agreement only and shall not terminate or prejudice the continuing effect of this Agreement.

7.6 The Building Owner undertakes that in the event that the Building Owner serves a Redevelopment Notice upon the Infraco, **tie** and CEC in accordance with Clause 7.1, it or any third party acting on the Building Owner's behalf will not make any objection to the erection

of a temporary pole or other means of support for the OHLE necessitated by the temporary removal of the Apparatus from the Building.

8. HERITABLE CREDITORS AND OTHERS

The Building Owner hereby warrants that it is the heritable proprietor of the Building (or its part of the Building) and that it has obtained all relevant Consents relating to the Building (or its part of the Building) from any heritable creditor or other parties with an interest in the Building (or relevant part thereof) at the date of the Building Owner's execution of this Agreement.

9. NOTICES

All notices in relation to this Agreement shall be sent by recorded delivery or delivered by hand to the parties at their respective addresses given above or as otherwise notified to each other from time to time in writing.

10. STEP-IN

10.1 From the date of termination, disposal or expiry of the Infraco Contract, CEC shall undertake the rights and obligations of the Infraco in relation to this Agreement.

10.2 From the date of termination, disposal or expiry of the Infraco Contract referred to under Clause 10.1, this Agreement shall continue and:

10.2.1 the Building Owner shall, where it owes obligations to the Infraco under this Agreement, owe such obligations to CEC; and

10.2.2 CEC shall assume the rights and obligations of the Infraco under this Agreement, but without prejudice to any liability of the Infraco or CEC to the Building Owner arising prior to the date of the termination, disposal or expiry of the Infraco Contract referred to under Clause 10.1.

11. ASSIGNATION

11.1 Neither the Infraco nor the Building Owner may assign, novate or otherwise transfer the whole of any part of the Agreement without the prior written agreement of the other parties to the this Agreement (not to be unreasonably withheld or delayed).

11.2 Both **tie** and CEC may assign, novate or transfer their part in this Agreement, with such assignation, novation or transfer becoming effective on notice being issued to the other parties to this Agreement in accordance with its terms.

12. ALIENATION BY BUILDING OWNER

In the event of the Building Owner alienating (whether by sale, lease or otherwise) its interest in the Building, in whole or in part, it shall:

12.1 Take the person to whom such whole or part interest is alienated bound (and that expressly for the benefit of the Infraco, tie and CEC) to enter into an agreement with the Infraco, tie and CEC in terms mutatis mutandis with the terms of this Agreement; and

12.2 Immediately notify the Infraco, **tie** and CEC of the nature and extent of such alienation and the name and address of the person to whom such alienation has been made.

13. VARIATIONS

No variation or alteration of any of the provisions of this Agreement shall be effective unless it is in writing and signed by all parties to this Agreement.

14. THIRD PARTY RIGHTS

Subject to any other express provisions of this Agreement, a person who is not a party to this Agreement shall have no right to enforce any term of this Agreement. There shall not be created by this Agreement a jus quaesitum tertio in favour of any party whatsoever.

15. APPLICABLE LAW

15.1 This Agreement and any matters arising from this Agreement shall be governed by and construed in accordance with Scots Law.

15.2 The parties hereto irrevocably submit to the exclusive jurisdiction of the Scottish Courts in relation to this Agreement and any matters arising from this Agreement.

IN WITNESS WHEREOF

THIS IS SCHEDULE PART 34 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 34

(1) tie LIMITED

- and -

(2) BILFINGER BERGER (UK) LIMITED

- and -

(3) SIEMENS plc

- and -

(4) [TRAM INSPECTOR]

APPOINTMENT OF TRAM INSPECTOR

RELATING TO THE EDINBURGH TRAM NETWORK

AGREEMENT

BETWEEN

(1) **tie LIMITED** a company registered in Scotland under company number SC230949 whose registered office is at City Chambers, High Street, Edinburgh, Midlothian EH1 1YL ("**tie**") and which expression shall include its successors and permitted assignees;

(2) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London EC1A 4EJ which expression shall include its successors, permitted assignees and transferees; and

(3) **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens Square, Frimley, Camberley, Surrey GU16 8QD which expression shall include its successors, permitted assignees and transferees,

(Bilfinger Berger UK Limited and Siemens Plc together "**the Infraco**" and each separately an "**Infraco Member**"); and

(4) [◆] a company registered in [◆] under company number [◆] whose registered office is at [◆] ("**Tram Inspector**") or such other person duly appointed pursuant to the terms of this Agreement.

BACKGROUND

A **tie** has appointed the Tram Supplier for the provision of tram vehicles on the terms of the Tram Supply Agreement.

B **tie** has appointed the Infraco to be responsible for the carrying out and/or managing a comprehensive turnkey contract including the design, construction, installation, commissioning, tram procurement, system integration, infrastructure maintenance, tram maintenance and supply of related equipment and materials, trams and related infrastructure in relation to the Edinburgh Tram Network.

C The terms of the Tram Supply Agreement require the appointment of a Tram Inspector for certification purposes.

D Accordingly, **tie**, the Infraco and the Tram Inspector have agreed to enter into this Agreement for the purposes of setting out the terms upon which the Tram Inspector is appointed.

IT IS AGREED AS FOLLOWS:

1. DEFINITIONS AND INTERPRETATION

"**Agreement**" means Clauses 1 to 17 (inclusive) together with the Schedules all as may be amended from time to time in accordance with this Agreement;

"**Certificate**" means a Certificate of Tram Delivery, Certificate of Tram Commissioning, Tram Commissioning Type Test Certificate, Tram Rejection Notice, Factory Acceptance Type Test Certificate and Factory Acceptance Routine Test Certificate, each as defined in the Tram Supply Agreement;

"**Director**" means the person named in Schedule 1 or such replacement person appointed in accordance with clause 4.2;

"**Documents**" means all technical information (whether or not stored in computer systems), drawings, models, bills of quantities, specifications, schedules, details, plans, programmes, budgets, reports, calculations or other documents whatsoever provided or to be provided by the Tram Inspector in connection with the Edinburgh Tram Network;

"**Edinburgh Tram Parties**" means any of **tie**, the Infraco, SDS Provider, Tram Supplier, Tram Maintainer, and any contractors, agents, sub-contractors, professional advisers or consultants engaged by such parties to perform, facilitate or assist with the performance of any design, works, supplies, services and activities to be performed for the purposes of the Edinburgh Tram Network and its or their sub-contractors of any tier and its or their directors, officers, employees and workmen in relation to the Edinburgh Tram Network and "**Edinburgh Tram Party**" shall be construed accordingly;

"**Fee**" means the amounts stated in Clause 5 payable to the Tram Inspector in consideration of the performance of the Tram Inspection Services;

"**Final Date for Payment**" has the meaning ascribed to it in clause 5.4;

"**Infraco Contract**" means the agreement and schedules (including any variation or replacement of such agreement from time to time) entered into between **tie** and the Infraco or the operation and maintenance of the Edinburgh Tram Network;

"**Party**" means a party to this Agreement and "Parties" shall be construed accordingly;

"**Schedules**" means Schedule 1, Schedule 2 and Schedule 3 as the same may be amended from time to time in accordance with the terms of this Agreement;

"**Statutory Requirements**" means the requirements of any present or future legislation as apply from time to time in respect of the works and/or the services and/or any other obligations of the Tram Inspector under this Agreement;

"**Tram Inspection Services**" means the services to be performed by the Tram Inspector in connection with the Edinburgh Tram Network as set out in the body of this Agreement;

"**Trams**" means the Trams to be designed, manufactured, engineered, fitted out, equipped, installed and delivered by the Tram Supplier in accordance with the Tram Supply Agreement;

"**Tram Supplier**" means the party contracted under the Tram Supply Agreement to design, manufacture, engineer, supply, test, commission, deliver and provide an initial fleet of 27 Trams for the Edinburgh Tram Network.

"**Tram Supply Agreement**" means the agreement entered into between **tie** and the Tram Supplier for the supply of Trams for the Edinburgh Tram Network;

"**Works**" means the works to be performed by the Infraco in accordance with the Infraco Contract;

1.1 The clause headings in this Agreement are for the convenience of the Parties only and do not affect its interpretation.

1.2 Words importing the singular meaning include the plural meaning and vice versa.

1.3 Words denoting the masculine gender include the feminine and neuter genders and words denoting natural persons include corporations and firms and all such words shall be construed interchangeably in that manner.

1.4 Reference in this Agreement to a clause or Schedule or Appendix are to a clause or Schedule or Appendix of this Agreement unless otherwise specified.

1.5 Reference in this Agreement to any statute or statutory instrument includes and refers to any statutory amendment or re-enactment thereof from time to time and for the time being in force.

1.6 Terms used in this Agreement that are defined in the Tram Supply Agreement shall have the respective meanings given to them in the Tram Supply Agreement save where otherwise expressly defined herein.

2. APPOINTMENT OF TRAM INSPECTOR

2.1 **tie** and the Infraco hereby appoint and the Tram Inspector hereby agrees to perform the Tram Inspection Services.

2.2 **tie** and the Infraco shall act in good faith towards the Tram Inspector at all times.

2.3 The Tram Inspector shall perform the Tram Inspection Services which shall consist of all services and obligations to be carried out by the Tram Inspector pursuant to the Tram Supply Agreement.

2.4 Without prejudice to the other provisions of this clause 2, the role of the Tram Inspector in relation to the Tram Supply Agreement shall be, without limitation, to:

2.4.1 inspect the Trams, component parts of Trams and the method of manufacture of the Trams and component parts of Trams before they are despatched to the Depot pursuant to clauses 28.3 of the Tram Supply Agreement;

2.4.2 review quality control reports produced by the Tram Supplier in accordance with 28.2.3 of the Tram Supply Agreement;

2.4.3 issue Factory Acceptance Type Test Certificates and Factory Acceptance Routine Test Certificates for each Tram pursuant to clause 28.4 and 28.5 of the Tram Supply Agreement;

2.4.4 issue a Certificate of Tram Delivery in accordance with the provisions of clause 30.3.2 of the Tram Supply Agreement;

2.4.5 issue a Tram Rejection Notice where necessary pursuant to the provisions of clauses 28.6, 31.10 and 32.1 of the Tram Supply Agreement;

2.4.6 attend the Site Commissioning Type Tests pursuant to clause 31.9 of the Tram Supply Agreement;

2.4.7 attend the Site Commissioning Routine Tests pursuant to clause 31.7.2 of the Tram Supply Agreement;

2.4.8 issue the Certificate of Tram Commissioning in accordance with the provisions of clause 31.8 of the Tram Supply Agreement;

2.4.9 issue a Tram Commissioning Type Test Certificate in accordance with the provisions of clause 31.9 of the Tram Supply Agreement;

2.4.10 consider and if appropriate approve any rectification plan under clause 32.2, 32.3, 32.3.3 and 31.10 and issue a Certificate of Tram Commissioning where appropriate;

2.4.11 review Potential Relief Event Notices in accordance with clause 47.1 of the Tram Supply Agreement.

3. TRAM INSPECTOR'S DUTIES

3.1 The Tram Inspector shall perform, and has performed to the extent work has been carried out prior to the execution of this Agreement, the Tram Inspection Services fully and faithfully upon and subject to the provisions of this Agreement and the Tram Inspector acknowledges that **tie** and the Infraco are relying and will continue to rely on the professional skill and care of the Tram Inspector in the performance of the Tram Inspection Services and that he owes a duty of care to each of **tie** and the Infraco in relation thereto.

3.2 Where, in the performance of the Tram Inspection Services, the Tram Inspector is required to exercise a discretion as between the Counterparties and/or any third party, the Tram Inspector shall at all times act objectively and impartially and shall in no circumstances place the interests of any one party above those of any other party including any third party. The Tram Inspector shall act in good faith.

3.3 Where, in the performance of the Tram Inspection Services, the Tram Inspector seeks or is obliged to seek the approval or agreement of **tie** or the Infraco to any matter or issue, the giving or confirming of the same shall not in any way derogate from the Tram Inspector's obligations under this Agreement nor diminish any liability on his part for breach of such obligations and no enquiry, inspection, comment, consent, decision or instruction at any time made or given by or on behalf of **tie** or the Infraco shall operate to exclude or limit the obligations of the Tram Inspector to exercise all the skill care and diligence required by this clause or to comply with the obligations contained in this Agreement.

3.4 The Tram Inspector warrants to **tie** and the Infraco jointly and severally that it has exercised and will continue to exercise, in the performance of the Tram Inspection Services and all its duties hereunder, all the reasonable skill, care, diligence, prudence and foresight as may reasonably be expected of a suitably qualified and competent professional Tram Inspector rendering the Tram Inspection Services and experienced in projects of a similar size, scope and complexity as the Edinburgh Tram Network.

3.5 The Tram Inspector further warrants to **tie** and the Infraco severally that in the provision of the Tram Inspection Services he will comply with all Statutory Requirements and, without limiting the generality of the foregoing, have due and proper regard to:

3.5.1 the Construction (Design and Management) Regulations 2007; and

3.5.2 the approved code of practice "Managing Construction for Health & Safety" produced by the Health & Safety Executive as amended from time to time

and shall comply with directions, instructions or requests relating to or in pursuance of the same given or made by **tie**.

3.6 **tie** and the Infraco shall procure that the Tram Inspector has immediate access to the necessary sites as he may reasonably require for the purposes of carrying out the Tram Inspection Services and all purposes ancillary or related to this Agreement.

3.7 In the performance of the Tram Inspection Services the Tram Inspector shall have full regard to any relevant requirements and/or obligations of the Tram Supply Agreement copies or relevant extracts of which the Tram Inspector acknowledges it has received and shall perform the Tram Inspection Services in such manner and at such times that no act, omission or default of the Tram Inspector in relation thereto shall constitute or cause any breach by **tie** and/or the Tram Supplier of any such requirements and/or obligations.

3.8 Without prejudice to clause 3.7 the Tram Inspector shall:

3.8.1 liaise and co-operate with **tie** and the Infraco and provide each of them with all such information in relation to the Edinburgh Tram Network as they may from time to time reasonably require promptly and in good time so as not to delay or disrupt the progress of the Edinburgh Tram Network or cause **tie** and the Infraco to be in breach of any of their respective obligations under the Tram Supply Agreement;

3.8.2 in particular subject to clause 3.8.4 but without limitation, in determining whether to issue a Certificate, the Tram Inspector shall take account of the requirements of the Tram Supply Agreement in respect of certification of the Trams;

3.8.3 give to **tie** and the Infraco (as appropriate) not less than 2 Business Days prior notice of his intention to issue any Certificate (or such shorter period as set out in the Tram Supply Agreement);

3.8.4 have due regard to any written representations made to him by either **tie** and/or the Tram Supplier, (the Party making the representation having previously sent the others a copy), in respect of any matter connected with the Tram Supply Agreement, provided that nothing in clause 3.7 shall in any way fetter the discretion of the Tram Inspector (acting in accordance with the requirements of the Tram Supply Agreement and his obligations under this Agreement) as to whether any Certificate should properly be issued; and

3.8.5 provide copies of any Certificate to **tie** and the Infraco forthwith upon their issue.

3.9 The decision of the Tram Inspector with respect to the issue of a Certificate, and any matters referred to in the other clauses of the Tram Supply Agreement listed in the Tram Inspection Services shall be final and binding subject only to the terms of the Tram Supply Agreement.

3.10 The Tram Inspector acknowledges that nothing contained in this Agreement shall detract from or prejudice his liability in delict to **tie** or the Infraco.

3.11 The Tram Inspector shall only be liable under this Agreement in respect of claims whether made in contract or in delict which are notified in writing to the Tram Inspector before the expiration of the later of twelve years from the date on which the last professional service is performed by the Tram Inspector under the terms of this Agreement or twelve years from such earlier date if this Agreement is to be terminated in accordance with its provisions.

3.12 The Tram Inspector shall not make or purport to make any alteration or addition to or omission from the design of the Edinburgh Tram Network (including, without limitation, the setting of performance standards) or issue any instruction or direction to any Edinburgh Tram Party, sub-contractor or professional consultant employed or engaged in connection with the Edinburgh Tram Network or consent or agree to any waiver or release of any obligation of any Edinburgh Tram Party or **tie** under the Tram Supply Agreement or of any professional consultant employed or engaged by any Edinburgh Tram Party, in connection with the Edinburgh Tram Network and hereby undertakes to perform all its duties under this Agreement in accordance with

the requirements and objectives of **tie** and the Infraco as set out in the Tram Supply Agreement.

3.13 **tie** may, by notice given by **tie**, and consented to by the Tram Supplier and the Infraco, to the Tram Inspector suspend the activities of the Tram Inspector for a period previously agreed or determined by **tie** and the Tram Supplier and Infraco which may be for a period not exceeding 6 consecutive months without giving rise to rights of termination to each Party.

4. TRAM INSPECTOR'S PERSONNEL

4.1 The Tram Inspector shall forthwith appoint the Director to direct and control the overall performance by the Tram Inspector of the Tram Inspection Services and act as the primary contact and liaison with **tie** and the Infraco. Such person or any replacement approved by **tie** and the Infraco pursuant to clause 4.2 from time to time shall have full authority to act on behalf of the Tram Inspector for all purposes in connection with this Agreement.

4.2 The Tram Inspector shall not replace the Director nor any person approved by **tie** and the Infraco pursuant to this clause 4 without the prior written approval of **tie** and the Infraco (which approval shall not be unreasonably withheld or delayed) as to the fact and identity of such replacement and if such approval is given the identity of the replacement must be previously approved in writing by **tie** and the Infraco.

5. REMUNERATION

5.1 In full consideration of performance of the Tram Inspection Services in accordance with this Agreement, **tie** shall pay by instalments to the Tram Inspector the Fee in accordance with this clause 5 and, for the avoidance of doubt, payment thereof shall constitute full reimbursement to the Tram Inspector of all costs, losses, expenses, overheads or profits suffered, incurred or earner, as the case may be, by the Tram Inspector in respect of the performance of its obligations under this Agreement, whenever they are performed.

5.2 The Tram Inspector may submit an invoice for payment of an instalment to **tie** at the address set out in clause 16.1 (*Notices*) and marked for the attention of the person identified in clause 16.1 on or after the occurrence of the event(s) as reasonably agreed by **tie** and the Infraco. The Fee is inclusive of all disbursements, including inter alia, travel, photocopying and printing, accommodation, save as expressly

provided in Schedule 3 but exclusive of any applicable Value Added Tax at the rate from time to time in force which shall be additionally payable by **tie**, together with the appropriate Fee.

5.3 Any sum properly included in an invoice submitted under and in accordance with this clause 5 shall become due on the date 30 days after the end of the month following the month in which the invoice is received by **tie**.

5.4 The final date for the making of any payment of any sum due pursuant to this Agreement shall be 28 days after the sum becomes due under the terms of this Agreement ("**the Final Date for Payment**"). Subject to clause 5.5, **tie** may (without prejudice to any other right or remedy which **tie** or the Infraco may have under or arising from or pursuant to this Agreement, any other agreement or statute, at common law or otherwise) deduct or withhold from any money otherwise due to the Tram Inspector under or pursuant to this Agreement any sum or sums for which the Tram Inspector is liable to **tie** or the Infraco under, arising from or pursuant to this Agreement or statute or at common law.

5.5 Not later than five days after the date on which any sum becomes due or would have become due to the Tram Inspector pursuant to this Agreement if:

5.5.1 the Tram Inspector had carried out its obligations under this Agreement; and

5.5.2 no set-off or abatement was permitted by reference to any sum claimed,

tie shall give notice to the Tram Inspector specifying the amount (if any) of the payment made or proposed to be made and the basis on which that amount is calculated.

5.6 If **tie** intends to withhold payment of any sum due to the Tram Inspector under this Agreement pursuant to clause 5.4, **tie** shall give the Tram Inspector notice not later than seven days prior to the Final Date for Payment specifying:

5.6.1 the amount proposed to be withheld and the ground for withholding payment; or

5.6.2 if there is more than one ground, each ground and the amount attributable to it.

5.7 **tie** shall pay to the Tram Inspector upon receipt of a valid vat invoice, the total amount of Value Added Tax at the rate from time to time in force properly chargeable by the Tram Inspector on the supply by the Tram Inspector of any goods or services under this Agreement.

6. PROFESSIONAL INDEMNITY INSURANCE

6.1 Without prejudice to his other obligations under this Agreement or otherwise at law, the Tram Inspector confirms that it has professional indemnity insurance and shall maintain professional indemnity insurance with reputable insurers or underwriters carrying on business within the European Union from the commencement of Tram Inspection Services and for a period expiring no earlier than twelve (12) years after the completion of the Tram Inspection Services and notwithstanding the termination for any reason of the Tram Inspector's engagement under this Agreement, shall maintain such professional indemnity insurance to cover each and every claim or series of claims consequent upon or attributable to the same cause or original source which he may incur under this Agreement, with a limit of indemnity of not less than ten million pounds (£10,000,000) in respect of each and every claim or series of claims as aforesaid, provided always that such insurance continues to be available to it in the European Union insurance market upon reasonable terms and at commercially reasonable premium rates and (for the avoidance of doubt) provided further that payment of any increased or additional premiums required by insurers by reason of the Tram Inspector's own claims record or other acts omission matters or things peculiar to the Tram Inspector will be deemed to be within the Tram Inspector's obligation.

6.2 As and when he is reasonably required to do so, the Tram Inspector shall produce for inspection by **tie** or the Infraco documentary evidence that the insurance required by clause 6.1 is being properly maintained subject to the same not constituting a breach of the terms of such insurance.

6.3 The Tram Inspector shall forthwith notify **tie** and the Infraco if the insurance required by clause 6.1 ceases to be available upon reasonable terms and at commercially reasonable premium rates or if for any other reason the Tram Inspector is unable to continue to maintain such insurance or if they become aware that such insurance may cease to be available and (in this event) shall take all such steps as may be required by **tie** in order to obtain alternative insurance and shall in any event continue to maintain

insurance upon such terms and with such a limit of indemnity as may then be available to it.

6.4 The Tram Inspector shall not compromise, settle or waive any claim which he may have under such insurance in respect of any professional liability which he may incur under this Agreement without the prior written consent of **tie** and the Infraco.

7. CONFIDENTIALITY

7.1 The Tram Inspector shall not, at all times during the period of his engagement hereunder (save in the proper course of his duties or as may be required by law or any regulatory authority) and at any time after its expiry or termination for any reason, disclose to any person nor otherwise make use of any confidential information (including, but without limitation, information relating to methods and techniques of construction for the Edinburgh Tram Network and financial information relating to the Edinburgh Tram Network) of which he has or may in the course of his engagement hereunder become aware relating to the Edinburgh Tram Network, **tie**, the Infraco or otherwise, nor shall he disclose to any person whatsoever (save as aforesaid or to his insurance or professional advisers) anything contained in this Agreement, without the prior written consent of **tie** and the Infraco.

7.2 The Tram Inspector shall comply with its obligations under the Data Protection Act 1998 and other applicable legal requirements in respect of such data.

8. ASSIGNATION AND SUB-LETTING

8.1 The Tram Inspector shall not assign this Agreement or any part thereof nor any right arising hereunder to any person without the prior written consent of **tie** and the Infraco and only then on terms expressly approved in writing by **tie** and the Infraco and subject to the Tram Inspector's obligations under this Agreement remaining in full force and effect.

8.2 The Tram Inspector shall not without the prior written consent of **tie** and the Infraco as to the identity and terms of appointment of any sub-consultant sub-contract the performance of any of the Tram Inspection Services and where **tie** and the Infraco give consent to the Tram Inspector sub-contracting any of its duties pursuant to this clause 8.2:

8.2.1 the Tram Inspector shall be responsible for the breaches acts omissions negligence and/or other default of any sub-consultant its agents or employees

appointed by the Tram Inspector as fully as if they were the breaches, acts, omissions, negligence and/or other defaults of the Tram Inspector its agents or employees and such sub-contracting shall not modify release diminish or in any way effect the liabilities and/or obligations of the Tram Inspector under this Agreement and/or at law or otherwise; and

8.2.2 the remuneration payable to the Tram Inspector in accordance with clause 5 shall not be increased by any amount payable to the Tram Inspector or its sub-consultants; and

8.2.3 the Tram Inspector shall procure from any sub-consultant engaged by the Tram Inspector for the performance of the Tram Inspection Services a collateral warranty in the form, set out in Schedule 2 in favour of **tie** and the Infraco.

8.3 **tie** and the Infraco may at any time assign, charge or transfer their respective interests in this Agreement to any person upon notice to the Tram Inspector.

9. TERMINATION OF TRAM INSPECTOR ENGAGEMENT BY TIE

9.1 In the event of a material breach by the Tram Inspector of his obligations under this Agreement which he either fails to remedy or continues, within 14 working days from receipt of written notice **tie** specifying the breach and requiring its remedy, **tie** or the Infraco (with the consent of **tie** such consent not to be unreasonably withheld or delayed) may then on, or within 10 days from the expiry of that 14 day period by a further written notice to the Tram Inspector terminate the Tram Inspector's engagement under this Agreement. Such termination shall take effect on the date of receipt of such further notice.

9.2 Alternatively, **tie** may give 20 working days written notice to the Tram Inspector of their intention to bring to an end the performance of any divisible part of the Tram Inspection Services. The termination of such part of the Tram Inspection Services shall take effect on the date of receipt by the Tram Inspector of a further written notice confirming such termination. The Tram Inspector shall have no right of objection.

10. TERMINATION OF TRAM INSPECTOR'S ENGAGEMENT BY TRAM INSPECTOR

In the event of a material breach by any one or more of **tie** or the Infraco of its or their obligations under this Agreement which it or they, as appropriate, shall fail to remedy within

28 days from receipt of written notice from the Tram Inspector (such notice to be copied simultaneously to the other Party) specifying the breach and requiring its remedy, the Tram Inspector may then on, or within 10 days from, the expiry of that 28 days by a further notice to **tie** and the Infraco forthwith terminate his engagement under this Agreement. Such termination shall take effect on the date of receipt of such further notice.

11. CONSEQUENCES OF TERMINATION OF TRAM INSPECTOR'S ENGAGEMENT

11.1 Upon any termination of the Tram Inspector's engagement under clause 9 or clause 10, the Tram Inspector shall be relieved of his obligation to continue with the performance of the Tram Inspection Services and shall take immediate steps to bring to an end the Tram Inspection Services in an orderly manner but with all reasonable speed, economy and with due regard to the ongoing obligations and responsibilities of the other parties and shall within 14 days deliver to **tie** and the Infraco copies of all Documents, reports, photographs, minutes of meetings and other documents prepared or in the course of preparation by the Tram Inspector in connection with the Edinburgh Tram Network and (in the event that a replacement firm has been appointed to complete the performance of the Tram Inspection Services) shall co-operate fully with such replacement to the extent that it is reasonable to do so.

11.2 Upon any termination of the Tram Inspector's engagement howsoever arising, **tie** or the Infraco shall not be liable to the Tram Inspector for any loss of profit, loss of contracts or other consequential costs, losses and/or expenses arising out of or in connection with such termination.

11.3 Termination of the Tram Inspector's engagement howsoever arising shall be without prejudice to the rights and remedies of any Party in relation to any negligence, omission or default of any other Party prior to such termination.

11.4 The provisions of this Agreement shall continue to bind the Parties insofar as and for as long as may be necessary to give effect to their respective rights and obligations hereunder.

12. VARIATION, WAIVER AND ENTIRE AGREEMENT

12.1 All additions, amendments and variations to this Agreement shall be binding only if in writing and signed by the duly authorised representative of each Party.

12.2 No waiver by any Party of any default or defaults by any other Party in the performance of any of the provisions of this Agreement shall operate or be construed

as a waiver of any other or further default or defaults whether of a like or different character.

12.3 This Agreement supersedes any previous agreement or arrangement between the Parties in respect of the Tram Inspection Services (whether oral or written) and represents the entire agreement between the parties in relation thereto.

12.4 Notwithstanding the date of this Agreement, it shall have effect as if it had been executed upon the actual commencement of the Tram Inspection Services by the Tram Inspector.

12.5 Subject to any other express provision of this Agreement, a person who is not Party to this Agreement shall have no right to enforce any term of this Agreement.

13. DOCUMENTS

13.1 Copyright in the Documents shall remain vested in the Tram Inspector and subject thereto, the Tram Inspector hereby grants to **tie** and the Infraco an irrevocable non-exclusive royalty free licence (for the avoidance of doubt such licence to remain in full force and effect notwithstanding determination of the Tram Inspector's appointment for whatever reason or any dispute hereunder) to copy and use the Documents and to reproduce the information, programmes and schedules contained in the Documents for all purposes related to the Edinburgh Tram Network including but without limitation, to the construction completion reconstruction alteration extension maintenance letting promotion advertisement reinstatement use and repair of the Edinburgh Tram Network or **tie** or the Infraco interests in it and **tie** and the Infraco shall be entitled to grant sub-licences on terms equivalent to the provision of this clause 13.1 and **tie** or the Infraco's licence and such sub-licence shall be transferable to the other without charge.

13.2 The Tram Inspector shall provide to **tie** or the Infraco within 14 Working Days of any written request and subject to payment of its reasonable costs, in such manner and form as is reasonably requested, such additional copies of all or any of the Documents as are reasonably required by **tie** or the Infraco beyond those required for the construction and completion of the Edinburgh Tram Network and shall provide such additional information and co-operation as is reasonably required in connection with the same.

13.3 Where any rights are vested in the Tram Inspector by virtue of Chapter IV (Moral Rights) of Part 1 of the Copyright Designs and Patents Act 1988 the Tram Inspector hereby irrevocably waives any such rights in relation to the Edinburgh Tram Network or any part thereof and to any Documents and shall obtain a written waiver from its employees from time to time of any rights that may have in respect of the same.

14. CUMULATIVE RIGHTS AND ENFORCEMENT

14.1 Any rights and remedies provided for in this Agreement whether in favour of **tie**, the Infraco, or the Tram Inspector are cumulative and in addition to any further rights or remedies which may otherwise be available to those Parties.

14.2 The duties and obligations of the Tram Inspector arising under or in connection with this Agreement arise to **tie** and the Infraco jointly and severally and **tie** and the Infraco may accordingly enforce the provisions hereof and pursue the prospective rights hereunder in their own name, whether separately or with each other.

14.3 **tie** and the Infraco covenant with each other that they will not waive any rights, remedies or entitlements or take any other action under this Agreement that would or might reasonably be expected to adversely affect the rights, remedies or entitlements of the other Party without the other Party's prior written consent, such consent not to be unreasonably withheld or delayed.

15. SEVERANCE

If any provision of this Agreement shall be declared invalid, unenforceable or illegal, such invalidity, unenforceability or illegality shall not prejudice or affect the validity, enforceability or legality of the remaining provisions of this Agreement.

16. NOTICES

16.1 Any demand, notice or other communication given in connection with or required by this Agreement shall be made in writing (entirely in the English language) and shall be delivered to, or sent by pre-paid first class post to, the recipient at its registered office or its address stated in this Agreement (or such other address as may be notified in writing from time to time) or sent by facsimile transmission to, for each Party, the facsimile number set out below, and unless otherwise expressly stated in this Agreement marked for the attention of the person set out below:

16.1.1 in the case of **tie**:

16.1.1.1 facsimile *[NUMBER];*

16.1.1.2 for attention of: [*Representative*]

16.1.2 in the case of the Infraco:

16.1.2.1 facsimile *[NUMBER];*

16.1.2.2 for attention of: [*Representative*]

16.1.3 in the case of the Tram Inspector:

16.1.3.1 facsimile *[NUMBER];*

16.1.3.2 for attention of: [*Representative*]

16.2 Any such demand, notice or communication shall be deemed to have been duly served:

16.2.1 if delivered by hand, when left at the proper address for service; or

16.2.2 if given or made by pre-paid first class post, 2 Working Days after being posted; or

16.2.3 if sent by facsimile, on the day of transmission provided that a confirmatory copy is on the same day that the facsimile is transmitted, sent by pre-paid first class post in the manner provided for in this clause 16.2,

provided in each case that if the time of such deemed service is either after 4.00 pm on a working Day or on a day other than a Business Day service shall be deemed to occur instead at 10.00 am on the next following Business Day.

17. GOVERNING LAW AND JURISDICTION

17.1 This Agreement, any document completed or to be completed in accordance with its provisions and any matter arising from it or any other such document shall be governed by and construed in accordance with the laws of Scotland.

17.2 The Parties hereby irrevocably submit to the exclusive jurisdiction of the Court of Session in relation to this Agreement, any such document and any such matter.

IN WITNESS WHEREOF these presents on this and the preceding [◆] pages together with Schedules 1 to 3 (inclusive) which are annexed and signed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TIE LIMITED** at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED**

at

on 2008 by:

Director _____

Full Name _____

Director _____

Full Name _____

EXECUTED for and on behalf of **SIEMENS PLC** at

on 2008 by:

Authorised Signatory _____

Full Name _____

Authorised Signatory _____

Full Name _____

EXECUTED for and on behalf of

[TRAM INSPECTOR] at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

SCHEDULE 1

Director: [ ]
TEL:
FAX:
EMAIL:
MOBILE:

USB00000058_0021

SCHEDULE 2

Form of Collateral Warranty

[ ]
(the "Sub-Consultant")

and

[TIE/INFRACO]
(the "Beneficiary")

SUB-CONSULTANT'S COLLATERAL WARRANTY
relating to the provision of Tram Inspector Services in respect of the
EDINBURGH TRAM NETWORK

AGREEMENT

BETWEEN:

(1) [ ]
(the "**Sub-Consultant**"); and

(2) **[TIE/INFRACO]** whose registered office is at [ ] (the "**Beneficiary**")

BACKGROUND:

(A) By Agreement in writing made [date] (the "**Appointment**") the Beneficiary jointly with [the other party] has employed [◆] ("**the Tram Inspector**") to undertake certification and other services (the "**Tram Inspection Services**") in connection with the detailed design, construction, commissioning, operation and maintenance of a light rail system known as the Edinburgh Tram Network ("**Project**")

(B) By Agreement in writing between the Tram Inspector and the Sub-Consultant dated 2001 (the "**Sub-Appointment**") the Sub-Consultant has agreed to provide [◆] services in connection with the Tram Inspection Services.

(C) At the request of the Tram Inspector the Sub-Consultant has agreed to enter into this Agreement with the Beneficiary on the terms herein contained.

IT IS AGREED AS FOLLOWS:

1. DUTY OF CARE

1.1 The Sub-Consultant warrants to the Beneficiary that it has carried out and will carry out the duties and obligations on its part to be performed under and in connection with the Sub-Appointment and that in performing the same the Sub-Consultant has exercised and shall continue to exercise all reasonable professional skill, care, diligence, foresight and prudence to be expected of a properly qualified and competent [architect/structural engineer/quantity surveyor/other professional] experienced in carrying out the duties and services of the type comprised in the Sub-Appointment for projects of a similar size, type, scope and complexity to the Edinburgh Tram Network PROVIDED THAT the duty of care owed by the Sub-Consultant to the Beneficiary shall be no greater than the duty of care owed by the Sub-Consultant to the Tram Inspector under the terms of the Sub-Appointment (for this purpose not taking into account any variation in the terms of the Sub-Appointment or waiver of any breach

thereof which might operate to reduce or diminish the liability to the Beneficiary under this Agreement without the Beneficiary's prior written consent).

1.2 No enquiry, inspection, comment, consent, decision or instruction at any time made or given by/or behalf of the Beneficiary shall operate to prejudice or diminish the obligations of the Sub-Consultant to the Beneficiary.

2. PROFESSIONAL INDEMNITY INSURANCE

2.1 The Sub-Consultant warrants that it maintains professional indemnity insurance covering its obligations under this Agreement with a limit of indemnity of not less than £10 million for each and every claim or series of claims. The Sub-Consultant undertakes to maintain such insurance with reputable insurers carrying on business in the European Union at all times until 12 years from the date of completion of services provided by the Sub-Consultant set out above in paragraph B (or if sooner 12 years after the termination of the employment of the Sub-Consultant under the Sub-Appointment) provided such insurance is available on commercially acceptable terms and at commercially acceptable rates and (for the avoidance of doubt) provided further that payment of any increased or additional premiums required by insurers by reason of the Sub-Consultant's own claims record or other acts omissions matter or things peculiar to the Sub-Consultant will be deemed to be within the Sub-Consultant's obligation. The Sub-Consultant shall as soon as practicable inform the Beneficiary if such insurance ceases to be available on commercially acceptable terms and rates in order that the Sub-Consultant and the Beneficiary can discuss means of best protecting their respective positions and in the meantime the Sub-Consultant shall maintain such professional indemnity insurance cover as is available to it (if any) on commercially acceptable terms and rates.

2.2 When reasonably requested by the Beneficiary the Sub-Consultant will provide (but not in any way which would breach any term of the insurance policy then in force) documentary evidence that the insurance required hereunder is being maintained.

2.3 The Sub-Consultant shall forthwith notify the Beneficiary if the insurance required by clause 2 ceases to be available upon reasonable terms and at commercially reasonable premium rates or if for any other reason the Sub-Consultant is unable to continue to maintain such insurance or if they become aware that such insurance may cease to be available and (in this event) shall take all such steps as may be required by **tie** in order to obtain alternative insurance and shall in any event continue to maintain

insurance upon such terms and with such a limit of indemnity as may then be available to it.

2.4 The Sub-Consultant shall not compromise, settle or waive any claim which he may have under such insurance in respect of any professional liability which he may incur under this Agreement without the prior written consent of the Beneficiary.

3. ASSIGNATION

3.1 The Sub-Consultant shall not assign, novate or otherwise transfer the whole or any part of the Agreement without the prior written agreement of the Beneficiary.

3.2 The Beneficiary shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

[[*Include where the Beneficiary is* ***tie*****]**

[3.2.1 to the Scottish Ministers, TEL, the City of Edinburgh Council or any local authority or other body with no worse financial standing than that of the Beneficiary who takes over all or substantially all the functions of the Beneficiary; or

3.2.2 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form acceptable to the Sub-Consultant acting reasonably) by the Beneficiary or a person falling within clause 3.2.1; or

3.2.3 with the prior written consent of the Sub-Consultant (such consent not to be unreasonably withheld or delayed) to any person not covered by clauses 3.2.1 or 3.2.2.**]**

OR

[[*Include where the Beneficiary is an other party***]**

3.2.1 without the consent of the Sub-Consultant to any person provided that no more than two such assignations will be permitted. Any assignations by the Beneficiary to a subsidiary or associated company of the Beneficiary or a member of the same group of companies will not count as an assignation;

3.2.2 with the prior written consent of the Sub-Consultant (such consent not to be unreasonably withheld or delayed).**]]**

3.3 The Sub-Consultant undertakes to the Beneficiary not to contend in any court proceedings under this Agreement that any person to whom the Beneficiary assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this clause is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that the Beneficiary is named under this Agreement or any intermediate assignee of the Beneficiary escaped loss resulting from such breach by reason of the disposal of its interest in the same.

4. COPYRIGHT

4.1 Copyright in the Documents shall remain vested in the Sub-Consultant and subject thereto, the Sub-Consultant hereby grants to the Beneficiary an irrevocable non-exclusive royalty free licence (for the avoidance of doubt such licence to remain in full force and effect notwithstanding determination of the Sub-Consultant appointment for whatever reason or any dispute hereunder) to copy and use the Documents and to reproduce the information, programmes and schedules contained in the Documents for all purposes related to the Edinburgh Tram Network including but without limitation to the construction completion reconstruction alteration extension maintenance letting promotion advertisement reinstatement use and repair of the Edinburgh Tram Network or the Beneficiary in it and the Beneficiary entitled to grant sub-licences on terms equivalent to the provision of this clause 4.1 and the Beneficiary such sub-licence shall be transferable without charge.

4.2 The Sub-Consultant shall provide to the Beneficiary within 14 working days of any written request and subject to payment of its reasonable costs, in such manner and form as is reasonably requested, such additional copies of all or any of the Documents as are reasonably required by the Beneficiary beyond those required for the construction and completion of the Edinburgh Tram Network and shall provide such additional information and co-operation as is reasonably required in connection with the same.

4.3 Where any rights are vested in the Sub-Consultant by virtue of Chapter IV (Moral Rights) of Part 1 of the Copyright Designs and Patents Act 1988 the Sub-Consultant hereby irrevocably waives any such rights in relation to the Edinburgh Tram Network

or any part thereof and to any Documents and shall obtain a written waiver from its employees from time to time of any rights that may have in respect of the same.

5. LIABILITY OF THE SUB-CONSULTANT

5.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by the law of contract, delict or otherwise.

5.2 The responsibility of the Sub-Consultant under this Agreement is not to be reduced or in any way released or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by the Beneficiary against a third party.

5.3 The rights and benefits conferred upon the Beneficiary by this Agreement are in addition to any other rights and remedies that the Beneficiary may have against the Sub-Consultant including (without prejudice to the generality of the foregoing) any remedies in delict.

5.4 Subject to the other provisions of this Agreement, the liability of the Sub-Consultant to the Beneficiary is to be determined in all respects in accordance with the terms of the Sub-Appointment and, in the event of any claim by the Beneficiary under this Agreement, the Sub-Consultant shall be entitled to rely upon any defence, right, limitation or exclusion under the Sub-Appointment as though the Beneficiary were named as the Tram Inspector under it, except that:

5.4.1 the Beneficiary shall not be affected by any subsequent variation of the Sub-Appointment which would adversely affect the obligations owed by the Sub-Consultant or the waiver, compromise or withdrawal of any claim made by the Tram Inspector; and

5.4.2 the Sub-Consultant shall not be entitled to exercise any right of set-off, retention or withholding against the beneficiary to which the Sub-Consultant may be entitled against the Tram Inspector.

6. NOTICES

6.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

6.2 Any notice given pursuant to this clause, if sent by special or recorded delivery, is deemed to have been received on proof of delivery.

7. INVALID TERMS

7.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

7.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

7.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

8. VARIATIONS AND WAIVERS TO BE IN WRITING

8.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

9. WAIVER

9.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

9.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

10. GOVERNING LAW

This Agreement, any document completed or to be completed in accordance with its provisions and any matter arising from it or any other such document shall be governed by and construed in accordance with Scots Law. The Parties hereby irrevocably submit to the exclusive jurisdiction of the Court of Session in relation to this Agreement, any such document and any such matter.

11. THIRD PARTY RIGHTS

A person who is not party to this Agreement shall have no right to enforce any term of this Agreement.

IN WITNESS WHEREOF:

EXECUTED for and on behalf of **[SUB-CONSULTANT]**

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **[TIE/INFRACO]**

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

SCHEDULE 3

Fee

[DN: to set out basis of fee payable]



THIS IS SCHEDULE PART 35 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 35

REPORTING PERIOD END DATES

PERIOD END DATES (all Saturdays except 31st March)

(subject to confirmation)

CONSTRUCTION PERIOD						
	2007/08	**2008/09**	**2009/10**	**2010/11**	**2011/12**	**2012/13**
1	28/04/2007	26/04/2008	02/05/2009	01/05/2010	30/04/2011	28/04/2012
2	26/05/2007	24/05/2008	30/05/2009	29/05/2010	28/05/2011	26/05/2012
3	23/06/2007	21/06/2008	27/06/2009	26/06/2010	25/06/2011	23/06/2012
4	21/07/2007	19/07/2008	25/07/2009	24/07/2010	23/07/2011	21/07/2012
5	18/08/2007	16/08/2008	22/08/2009	21/08/2010	20/08/2011	-
6	15/09/2007	13/09/2008	19/09/2009	18/09/2010	17/09/2011	-
7	13/10/2007	11/10/2008	17/10/2009	16/10/2010	15/10/2011	-
8	10/11/2007	08/11/2008	14/11/2009	13/11/2010	12/11/2011	-
9	08/12/2007	06/12/2008	12/12/2009	11/12/2010	10/12/2011	-
10	05/01/2008	03/01/2009	09/01/2010	08/01/2011	07/01/2012	-
11	02/02/2008	31/01/2009	06/02/2010	05/02/2011	04/02/2012	-
12	01/03/2008	28/02/2009	02/03/2010	05/03/2011	03/03/2012	-
13	31/03/2008	31/03/2009	31/03/2010	31/03/2011	31/03/2012	-

SERVICE PERIOD					
	2012/13	**2013/14**	**2014/15**	**2015/16**	**2016/17**
1	-	27/04/2013	26/04/2014	02/05/2015	30/04/2016
2	-	25/05/2013	24/05/2014	30/05/2015	28/05/2016
3	-	22/06/2013	21/06/2014	27/06/2015	25/06/2016
4	-	20/07/2013	19/07/2014	25/07/2015	23/07/2016
5	18/08/2012	17/08/2013	16/08/2014	22/08/2015	20/08/2016
6	15/09/2012	14/09/2013	13/09/2014	19/09/2015	17/09/2016
7	13/10/2012	12/10/2013	11/10/2014	17/10/2015	15/10/2016
8	10/11/2012	09/11/2013	08/11/2014	14/11/2015	12/11/2016
9	08/12/2012	07/12/2013	06/12/2014	12/12/2015	10/12/2016
10	05/01/2013	04/01/2014	03/01/2015	09/01/2016	07/01/2017

SERVICE PERIOD					
11	02/02/2013	01/02/2014	31/01/2015	06/02/2016	04/02/2017
12	02/03/2013	01/03/2014	28/02/2015	05/03/2016	04/03/2017
13	31/03/2013	29/03/2014	31/03/2015	31/03/2016	31/03/2017

	2017 / 18	**2018 / 19**	**2019 / 20**	**2020 / 21**	**2021 / 22**
1	29/04/2017	28/04/2018	27/04/2019	02/05/2020	01/05/20
2	27/05/2017	26/05/2018	25/06/2019	30/05/2020	29/05/2021
3	24/06/2017	23/06/2018	22/06/2019	27/06/2020	26/06/2021
4	22/07/2017	21/07/2018	20/07/2019	25/07/2020	24/07/2021
5	19/08/2017	18/08/2018	17/08/2019	22/08/2020	21/08/2021
6	16/09/2017	15/09/2018	14/09/2019	19/09/2020	18/09/2021
7	14/10/2017	13/10/2018	12/10/2019	17/10/2020	16/10/2021
8	11/11/2017	10/11/2018	09/11/2019	14/11/2020	13/11/2021
9	09/12/2017	08/12/2018	07/12/2019	12/12/2020	11/12/2021
10	06/01/2018	05/01/2019	04/01/2020	09/01/2021	08/01/2022
11	03/02/2018	02/02/2019	01/02/2020	06/02/2021	05/02/2022
12	03/03/2018	02/03/2019	29/02/2020	06/03/2021	05/03/2022
13	31/03/2018	31/03/2019	31/03/2020	31/03/2021	31/03/2022

	2022 / 23	**2023 / 24**	**2024 / 25**	**2025 / 26**	**2026 / 27**
1	30/04/2022	29/02/2023	27/04/2024	26/04/2025	02/05/2026
2	28/05/2022	27/05/2023	25/05/2024	24/05/2025	30/05/2026
3	25/06/2022	24/06/2023	22/06/2024	21/06/2025	27/06/2026
4	23/07/2022	22/07/2023	20/07/2024	19/07/2025	25/07/2026
5	20/08/2022	19/08/2023	17/08/2024	16/08/2025	22/08/2026
6	17/09/2022	16/09/2023	14/09/2024	13/09/2025	19/09/2026
7	15/10/2022	14/10/2023	12/10/2024	11/10/2025	17/10/2026
8	12/11/2022	11/11/2023	09/11/2024	08/11/2025	14/11/2026
9	10/12/2022	09/12/2023	07/12/2024	06/12/2025	12/12/2026
10	07/01/2023	06/01/2024	04/01/2025	03/01/2025	09/01/2027
11	04/02/2023	03/02/2024	01/02/2025	31/01/2026	06/02/2027
12	04/03/2022	02/03/2024	01/03/2025	28/02/2026	06/03/2027
13	31/03/2022	31/03/2024	31/03/2025	31/03/2026	31/03/2027

Notes

- The later dates are provisional and may change over time. The detailed dates will be made available to the Infraco on an annual basis.
- The Reporting Periods run each year from 1st April to 31st March.
- Period One (P1) starts the first of April and generally finishes on the 4th Saturday following that date.
- Period Two (P2) starts on the next day (generally the 4th Sunday) and finishes on the 4th Saturday from that date.
- Periods Three through to Period Twelve follow at four weekly intervals.
- Period Thirteen starts the Sunday after the end Saturday of P12 and generally finishes on 31st March.
- Occasionally, perhaps once every seven years, Transport Scotland may dictate that a one week Period Fourteen may be required. If so Infraco will not be required to provide any additional reporting but amendments to payment arrangements may be made.

THIS IS SCHEDULE PART 36 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

TUPE INFORMATION

1. The number of staff who are TUPE Employees.

2. In relation to each employee who falls within the scope of paragraph 1 above:

   2.1 the employee's age (so that pension entitlements can be calculated and provided for) and whether such employee is within or outside any group pension scheme; and

   2.2 the employee's salary, length of service, contractual period of notice, any pay settlement covering future dates which has already been agreed by the Infraco and any redundancy entitlement.

3. Information relating to or connected with the other terms and conditions of the contracts of employment with employees falling within the scope of paragraph 1 above including details of:

   3.1 terms incorporated from any collective agreement;

   3.2 so far as the Infraco should reasonably be aware any outstanding liability for past breaches of such contracts;

   3.3 so far as the Infraco should reasonably be aware any outstanding statutory liability (for example, any claim under non-discrimination legislation); and

   3.4 so far as the Infraco should reasonably be aware any other outstanding liability required to be met by any successor infrastructure maintenance contractor if its tender is accepted.

4. Such other information as **tie** may reasonably require in relation to TUPE Employees in order to enable **tie** to comply with its obligations under the TUPE Regulations.

THIS IS SCHEDULE PART 37 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 37

PHASE 1B OPTION

In this Schedule Part 37, the following words and expressions shall have the meaning ascribed to them.

"**Phase 1b Bid Price**" means the price for Phase 1b identified in the Infraco's submission dated 7 August 2007, as updated by letter from the Infraco to **tie** dated 14 September 2007 and as supported by the correspondence between the Parties between the August tender submission and the date of this letter.

"**Phase 1b Bid Programme**" means the programme for Phase 1b set out in the Infraco's submission dated 7 August 2007, as updated by letter from the Infraco to **tie** dated 14 September 2007 and as supported by the correspondence between the Parties between the August tender submission and the date of this letter.

1. **tie** shall not later than 31 October 2008 (or such later date as may be agreed between the Parties) notify the Infraco whether, in principle, it proposes to proceed with Phase 1b. For the avoidance of doubt, this "in principle" notification shall not be a **tie** Change or a Notified Departure.

2. On receipt of a notification in accordance with paragraph 1 above, the Infraco shall commence technical and legal due diligence in relation to the Phase 1b Works including, without prejudice to the foregoing generality, in relation to:

   (a) the Employer's Requirements for Phase 1b;

   (b) the relationship between the Phase 1b Works and any relevant third party agreements disclosed to Infraco by **tie** prior to the issue of the notification;

   (c) the nature and extent of the Permanent Land and Temporary Sites available for Phase 1b based on information disclosed by **tie** prior to the issue of the notification;

   (d) the design already undertaken by the SDS Provider in relation to Phase 1b and the extent of services, if any, still to be provided by the SDS Provider (from the date of the issue of a tie Change instructing Phase 1b) in relation to the design of Phase 1b;

   (e) the Design and Construction and Maintenance Stage Consents that will be required in relation to Phase 1b; and

(f) the nature and extent of amendments that Infraco considers may be required to the Infraco Contract, having regard to the conditions and qualifications attached to the Phase 1b Bid Price and the Phase 1b Bid Programme.

3. On conclusion of the technical and legal due diligence referred to in paragraph 2 above (which the Infraco shall use reasonable endeavours to complete within 12 weeks of the date of notification), the Infraco shall prepare and submit to **tie** the following (the "**Phase 1b Proposal**):

(a) a Minute of Amendment indicating the amendments that the Infraco considers will be required to the Infraco Contract including without prejudice to the foregoing generality:

(i) amendments to reflect the risk allocation between the Parties in relation to Phase 1b to the extent that such risk allocation requires amendment (i) to reflect the conditions and qualifications attached to the Phase 1b Bid Price and/or Phase 1b Bid Programme, or (ii) arising from the nature of the Phase 1b works (i.e. the condition of structures);

(ii) any additional pricing assumptions applicable to Phase 1b;

(b) draft Infraco Proposals in relation to Phase 1b;

(c) an updated programme for Phase 1b (including the programme for Consents, the programming assumptions and the Phase 1b Works programme) which shall be based on the Phase 1b Bid Programme;

(d) the proposed fixed price for Phase 1b (on the assumption that the Phase 1b Works commence on 6 July 2009); and

(e) a report identifying the differences between (c) and (d) above and the Phase 1b Bid Price and the Phase 1b Bid Programme.

4. The Parties shall use reasonable endeavours to agree the content of the Phase 1b Proposal by 31 March 2009. The Phase 1b Proposal as so agreed shall form the basis of the Estimate provided by the Infraco in the event that **tie** issues a **tie** Change instructing the Phase 1b Works.

5. On the issue of a **tie** Change instructing the Phase 1b Works, **tie** shall pay to the Infraco such demonstrable costs as the Infraco shall have reasonably incurred in performing its obligations in this Schedule Part 37.

6. The Infraco shall use reasonable endeavours to cooperate with any party that **tie** appoints to implement Phase 1b, in particular with regard to technical interfaces.

7. If **tie** does not proceed with Phase 1b or **tie** does proceed but the Infraco has produced an Estimate pursuant to paragraph 4 which **tie** has rejected unreasonably then:

   (a) the Infraco shall be compensated for its work in the procurement period on Phase 1b by a payment of £3,200,000 (three million two hundred thousand pounds) (such amount is currently contained in the Phase 1b Bid Price); and

   (b) **tie** shall make such payment within 30 days of the date set out at paragraph 3(d) above, namely 6 July 2009 unless the parties otherwise agree, against a valid VAT invoice submitted by the Infraco.

8. In the event that **tie** and the Infraco subsequently agree to recommence negotiations on a Phase 1b Proposal (price, programme, scope and terms) and **tie** instructs a **tie** Change pursuant to paragraph 5, the £3,200,000 (three million two hundred thousand pounds) paid by **tie** to the Infraco will be discounted from the final price paid by **tie** to the Infraco for Phase 1b.

THIS IS SCHEDULE PART 38 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 38

APPROVED SUPPLIERS AND SUB-CONTRACTORS (AND TRADES)

PART I - APPROVED SUB-CONTRACTORS

Section 1A

- Designers
- OHLE Installers
- System Integrators
- Trackwork Supplier Installers
- Major Civils Works Contractors
- Piling Contractors
- Ground Stabilisation Specialists
- Specialist Telecoms/Signalling Suppliers
- Testing and Commissioning Specialists
- E+M Installers

Provided that:

1. the categories suppliers referred to in this Section 1A shall exclude any:

   (a) supplier that is a subsidiary or associated company of Siemens plc or Siemens AG for so long as such supplier remains a subsidiary, affiliate or associated company of Siemens plc or Siemens AG;

   (b) supplier of generic or commodity material or goods; and

   (c) supplier employed under a labour only contract.

2. Major Civil Works Contractors means civil engineering works contractors who are engaged by the Infraco with responsibility for the majority of civil engineering elements of any section of Phase 1a (other than obligations of the SDS Provider).

PART II - INFRACO PROVISIONS TO BE INCLUDED IN KEY SUB-CONTRACTS

The following provisions of Clause 7 (Duty of Care and General Obligations in Relation to the Infraco Works) - 7.3.6, 7.3.7, 7.3.8, 7.5.3

Clause 9 (Title)

Clause 27 (Removal of Infraco's Employees)

Clause 30.3 (Safety and Security)

Clause 49.1 (Non-Removal of Materials and Contractor's Equipment)

Clause 92 (Termination for Corrupt Gifts and Fraud)

Clause 97 (Dispute Resolution Procedure)

Clause 115 (Discrimination)

THIS IS SCHEDULE PART 39 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

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SCHEDULE PART 39

TRAM SUPPLY AGREEMENT AND TRAM MAINTENANCE AGREEMENT OBLIGATIONS

1. In accordance with Clause 8.7 of the Agreement, the Infraco shall procure that the Tram Supplier complies with the following obligations under the Tram Supply Agreement:

15. DESIGN DEVELOPMENT

15.1 The Tram Supplier shall develop and finalise the Deliverables in accordance with this Agreement, and the Client shall be entitled to review the Deliverables (which shall include any amendment to any submitted item) in accordance with Schedule 9 (*Review Procedure*).

15.2 The Tram Supplier shall submit the design of any changes and any other Deliverables associated with any Permitted Variations to the Client's Representative for review pursuant to Schedule 9 (*Review Procedure*).

15.3 The Tram Supplier shall allow the Client's Representative, at any reasonable time, a reasonable opportunity to view any Deliverable at any stage of development, and this opportunity shall be made available to the Client's Representative as soon as reasonably practicable following receipt of any written request from the Client's Representative. Where electronic versions of the Deliverables are available, the Tram Supplier shall upload such Deliverables (including any drawings comprised within the Deliverables) on the extranet established and maintained by the Client as soon as practicable.

15.4 The Tram Supplier shall provide the Deliverables in accordance with the Deliverables Programme set out in part 5 of Schedule 4 (*Programme*).

15.5 During the preparation of the Deliverables, the Client and/or the Client's Representative shall at its discretion but acting reasonably be entitled to call for a meeting to discuss the development of any Deliverable, and the Tram Supplier shall give due consideration to any comments made by the Client or the Client's Representative at any such meetings. As soon as reasonably practicable following any such meeting, the Tram Supplier will prepare and circulate to those attending the meeting, a report listing the Deliverables discussed and any comments made at such meeting.

15.6 If it should be found that the Deliverables do not fulfil the requirements of this Agreement or the needs of any Approval Bodies, the Tram Supplier shall at its own expense amend the Deliverable. Such amendment shall be made in accordance with Schedule 9 (*Review*

Procedure) and such amendment and rectification shall ensure that the Deliverable shall satisfy the requirements of this Agreement and any Approval Bodies.

15.7 The Tram Supplier shall provide the Client with all Deliverables in accordance with the terms of this Agreement and where no timescale for provision of such Deliverables is specified in the Deliverables Programme, such Deliverables shall be provided to the Client as soon as reasonably practicable. The Tram Supplier shall provide to the Client three copies of the agreed Deliverables in hard copy form and one copy in an agreed soft copy form (as appropriate to the format of the Deliverables).

15.8 The Tram Supplier accepts all risks arising from any conflicts, ambiguities, discrepancies, errors or omissions that subsequently appear within or between any of the Tram Requirements Specification and any of the other Deliverables, and the Tram Supplier shall not be entitled to make any claim against the Client for an extension of time, payment or otherwise in respect of any such conflicts, ambiguities, discrepancies, errors or omissions.

15.9 The Tram Supplier shall within 10 Business Days notify the Client upon becoming aware of any conflicts, ambiguities, discrepancies, errors or omissions within or between any of the Tram Requirements Specification, and any of the other Deliverables. Where there are any conflicts, ambiguities, discrepancies, errors or omissions, the Tram Supplier shall provide with any such notification its proposals for resolving such conflicts, ambiguities, discrepancies, errors or omissions in compliance with this Agreement. Such proposals could include the suggestion that no action is required. The Tram Supplier shall proceed with its proposals to resolve any such conflicts, ambiguities, discrepancies, errors or omissions as soon as reasonably practicable. If the proposal from the Tram Supplier is that no action is required or the Client does not agree with the action proposed by the Tram Supplier, the Client may notify the Tram Supplier, within 10 Business Days of the Tram Supplier's notice, to resolve any conflicts, ambiguities, discrepancies, errors or omissions in a different manner (which notification shall be binding on the Tram Supplier).

22. ADDITIONAL TRAMS

22.1 The Client may, by providing the Tram Supplier with a written notice or notices, order Additional Trams with related Spare Parts and Special Tools ("**Additional Trams Order**") from the Tram Supplier on the following terms:

22.1.1 if the Client places an Additional Trams Order or Orders for a maximum total of 4 Additional Trams before 17 months have expired from the date of execution of this

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Agreement, then the price for such Additional Trams Order or Orders shall be as set out in Schedule 19 (*Additional Trams*);

22.1.2 if the Client places an Additional Trams Order or Orders for a maximum total of 8 Additional Trams (including any Additional Trams ordered under Clause 22.1) after 17 months have expired from the date of execution of this Agreement, then the price and indexation mechanism for such Additional Trams Order or Orders which is set out in Schedule 19 (*Additional Trams)* shall be applied.

22.2 Any necessary changes to this Agreement arising out of any Additional Trams Orders shall be agreed by the Parties (both acting reasonably and in good faith).

23. MOCK-UP

23.1 Mock-Up

23.1.1 The Tram Supplier shall prepare a mock-up of the Tram in accordance with this Clause 23 (*Mock Up*). The Tram Supplier has a target date for completion of the mock-up as shown in part 1 of Schedule 4 (*Tram Manufacturing and Delivery Programme)*, and recognises and acknowledges the need for its participation in the process of reviewing and commenting upon the mock-up to be carried out expeditiously and regularly as the design and fabrication of the mock-up proceeds. The Client and **tie** will be invited (and will be expected) to make periodic inspections at the premises where the mock-up is being fabricated during construction of the mock-up and, subject to the following terms of this Clause 23 (*Mock-Up*), to make comments. Upon completion of the mock-up, the Client and **tie** shall be invited to make further inspections and meetings will be held to discuss and resolve the Client's and **tie's** comments upon the final presentation of the mock-up, provided that no new comments shall be made after the expiry of 20 Business days from the date upon which the Tram Supplier notifies the Client and **tie** that the mock-up is complete.

23.1.2 The mock-up shall be prepared in accordance with the requirements of section 2 of the Tram Requirements Specification. The mock-up will be used to demonstrate, subject to the provisions of this Clause 23 (*Mock-Up*):

23.1.2.1 compliance with the Tram Employer's Requirements;

23.1.2.2 compliance with the Rail Vehicle Accessibility Regulations 1998 (as amended from time to time) and Railway Safety Publication 2;

23.1.2.3 cab and saloon interior and external styling, livery design and provision of advertising space;

23.1.2.4 interior layout, including:

(i) seat spacing, dimensions and design;

(ii) wheelchair positions;

(iii) aisle widths;

(iv) window arrangement;

(v) luggage racks;

(vi) hand rails;

23.1.2.5 cab interior and controls layout;

23.1.2.6 passenger information displays; and

23.1.2.7 passenger emergency communication units.

23.2 Client's rights to comment and approve

23.2.1 The Client's and/or **tie's** rights to make comments upon and approve the mock-up shall be subject to the time limits set out in Clause 23.1 above, and to the following further provisions.

23.2.2 The Client and/or **tie** shall act reasonably in approving the mock-up, and shall not unreasonably disapprove any aspect of the design which is materially similar to that contained in the relevant drawings and colour renderings listed or described in Schedule 23 (*Tram Supplier's Proposals)*. Without prejudice to this, the Client may not require any changes in respect of the following:

23.2.2.1 overall vehicle dimensions (length, width, height);

23.2.2.2 heating, ventilation and air conditioning air distribution system;

23.2.2.3 door sizes;

23.2.2.4 any dimension which would change the Developed Kinematic Envelope and in particular the length of the Tram nose.

The Client and/or **tie** shall not require any changes to the Trams which will prevent or make materially more difficult compliance with the Disability Discrimination Act 1995, the Rail Vehicle Accessibility Regulations 1998 (as amended), or any other Legislation.

23.2.3 The Client and/or **tie** may require reasonable changes in respect of exterior cab styling (provided due consideration has been given to the Developed Kinematic Envelope, passenger compartment, viewing angles and the like and that such changes shall not impact upon the structural design of the Tram seating arrangement, handrail location, seat selection, interior and exterior colour schemes).

23.2.4 Notwithstanding anything else in this Clause 23.2, the Client and/or **tie** may not require changes which would materially change the intent of the Employer's Requirements unless such change is instructed as a Client Change under Clause 20 (*Changes*).

23.2.5 The approval by the Client or the Tram Inspector of the mock-up shall not in any way relieve the Tram Supplier of any of its obligations under this Agreement.

23.3 Design finalisation and use of mock-up for display purposes

23.3.1 Upon such completion, the Tram Supplier shall incorporate the agreed design changes into the final design of the Tram, and shall make such changes to the mock-up as are required to reflect the agreed changes.

23.3.2 The Tram Supplier shall, provided it no longer reasonably requires the mock-up for the purposes of finalisation of the design of the Tram, make the mock-up available to **tie**, upon reasonable notice by **tie** to the Tram Supplier, for the purposes of display to the public at a venue in Edinburgh selected by **tie** and thereafter at a site to be jointly agreed and secured by the Parties.

34. SPARES AND SPECIAL TOOLS

34.1 The Tram Supplier shall deliver to the Client on or before the Tram Maintenance Commencement Date at the Depot:

34.1.1 the Spare Parts set out in Part 4 of Schedule 2 (*Employer's Requirements*); and

34.1.2 the Special Tools set out in Part 5 of Schedule 2 (*Employer's Requirements*).

34.2 The Tram Supplier shall provide to the Client as soon as reasonably practicable and in any event within 12 months of the Commencement Date a list of all first tier Sub-contractors used by or intended to be used by it to obtain, manufacture and supply Spare Parts and Special Tools. The extent of first tier Sub-contractors shall be agreed by the Client and the Tram Supplier and in reaching such agreement, the Client shall be entitled to ask the Tram Supplier for details of those Sub-contractors who are not listed.

34.3 For a period of 30 years following the Tram Maintenance Commencement Date the Tram Supplier shall (at the price and within the delivery timescales set out for each Special Tool or Spare Part in Parts 4 and 5 (respectively) of Schedule 2 (*Employer's Requirements)*) continue to make available to the Client, **tie** and/or the Tram Maintainer, Spare Parts and Special Tools as may reasonably be required to operate the Trams and maintain them.

34.4 If the Tram Supplier cannot provide a Spare Part and/or a Special Tool at the price or within the delivery timescale specified then the Client, and/or **tie** (or the Tram Maintainer acting on **tie's** behalf) shall be entitled to use the rights granted to it pursuant to Clause 51 (*Copyright and Intellectual Property*) in relation to the relevant Spare Parts and/or Special Tools to either manufacture such Spare Part and/or Special Tool itself or appoint a third party to do so. Any dispute arising out of this Clause 34.4 shall be resolved in accordance with the Dispute Resolution Procedure.

34.5 The purchase price for the Spare Parts and Special Tools provided pursuant to Clause 34.1 shall be payable by the Client as part of the Aggregate Tram Price in accordance with the Milestone Payment Schedule. The detailed list of Spare Parts is contained in part 4 of Schedule 2 (*Employer's Requirements)*, and the detailed list of Special Tools is contained in part 5 of Schedule 2 (*Employer's Requirements)*.

34.6 If any Spare Part or Special Tool is reasonably considered by the Client or **tie** to be defective or otherwise fails to meet the Required Standards within two years of delivery then provided that the Client (upon becoming aware of such situation) promptly notifies the Tram Supplier in writing of that fact and either (at the cost of the Tram Supplier):

34.6.1 makes such Spare Part reasonably available for collection by the Tram Supplier; or

34.6.2 returns such Spare Part to the Tram Supplier,

the Tram Supplier shall replace or modify (as appropriate) such Spare Part or Special Tool within 30 days of the notification (or such other period as the parties may agree acting reasonably and taking into account the nature of the relevant Spare Part or Special Tool),

failing which the Aggregate Tram Price shall be reduced or (if the Aggregate Tram Price has already been paid) a rebate payment made within 10 days thereafter of an amount equal to the value of such Spare Part or Special Tool.

36. WARRANTY REGIME

36.1 Subject to the provisions of this Clause 36 (*Warranty Regime*), the Tram Supplier warrants that:

36.1.1 each Tram shall be free from Tram Defects during the Primary Tram Warranty Period;

36.1.2 all Paint and Finishes shall be free from Paint and Finish Defects during the Paint and Finish Warranty Period;

36.1.3 all Extended Tram Warranty Parts shall be free from Extended Tram Warranty Defects during the Extended Tram Warranty Period; and

36.1.4 the fleet of Trams shall be free from Fleet Tram Defects during the Fleet Tram Defect Period,

each a **"Warranty"** and together the **"Warranties"**.

36.2 If the Client claims that there is a Tram Defect, an Extended Tram Warranty Defect, a Paint and Finish Defect and/or a Fleet Tram Defect:

36.2.1 the Client:

36.2.1.1 shall, subject to Clause 36.2.1.3 promptly send to the Tram Supplier a notice (**"Defect Notice"**) detailing and identifying:

(a) the type of defect as a Tram Defect, a Fleet Tram Defect, a Paint and Finish Defect and/or an Extended Tram Warranty Defect (each an **"Identified Defect"** and together the **"Identified Defects"**); and

(b) when it expects to make the Tram available to the Tram Supplier for rectification;

36.2.1.2 shall, if it submits a Defect Notice, provide the Tram Supplier with all records reasonably requested by the Tram Supplier in writing and which are reasonably necessary to enable the Tram Supplier to carry out its obligations under Clause 36.2.2; and

36.2.1.3 may, if the Tram Supplier does not diligently investigate and rectify the Identified Defect in accordance with Clause 36.2.2, carry out the rectification work or appoint a suitably qualified and insured third party to carry out the rectification work (including giving such warranty as is appropriate without prejudice to the continuation of any Warranty) and without prejudice to its other rights and remedies recover its reasonable costs of so doing from the Tram Supplier; and

36.2.2 upon the delivery of the Defect Notice, the Tram Supplier shall:

36.2.2.1 promptly, diligently and carefully investigate and search for the cause of the Identified Defect;

36.2.2.2 immediately notify the Client and the Tram Maintainer where it appears to the Tram Supplier that the Tram is unlikely to be available for a period of more than four hours;

36.2.2.3 subject to Clause 0, promptly propose a rectification plan (**"Rectification Plan"**) and a rectification period (**"Rectification Period"**) (which may be extended by agreement of the parties) to be approved by the Client (such approval not to be unreasonably withheld or delayed); and

32.2.2.4 in accordance with the approved Rectification Plan:

(a) remedy the Identified Defect; and

(b) in respect of Fleet Tram Defects, execute all works of repair or rectification to ensure that the relevant Fleet Tram Defect is corrected and that such Fleet Tram Defect is not present in the Trams already delivered or to be delivered.

36.3 If the Tram Supplier fails to rectify an Identified Defect in accordance with Clause 36.2.2.3, the Client may itself carry out the rectification work or appoint a third party to carry out the rectification work and without prejudice to its other rights and remedies under this Agreement (including the full benefit of any Warranty under this Clause 36 (*Warranty Regime*)), recover the costs of so doing as a debt due from the Tram Supplier.

36.4 If the Client does not approve the Rectification Plan proposed by the Tram Supplier in accordance with Clause 36.2.2.3, then a Dispute shall be deemed to have occurred and the Client and the Tram Supplier shall resolve the Dispute in accordance with the Dispute

Resolution Procedure, provided that before submitting to the Dispute Resolution Procedure, the Client reserves the right to appoint a qualified third party to perform or itself perform the relevant rectification work, with the party who is responsible for paying the costs of the rectification works being decided as part of the resolution of the Dispute pursuant to the Dispute Resolution Procedure.

36.5 If having rectified an Identified Defect, the Tram Supplier considers that the Client did not have the right to require it to rectify an Identified Defect under Warranty and/or it was not entitled to recover all or some of its costs incurred in rectifying an Identified Defect because:

36.5.1 the Identified Defect was in fact outside the scope of the Warranty or the Warranty Period applicable to the Identified Defect;

36.5.2 the Client did not comply in all material respects with the relevant obligations pursuant to Clause 36.2.1.2;

36.5.3 the Identified Defect was caused by the Tram Maintainer or Operator respectively not maintaining or operating the Trams in accordance with the relevant parts of the Tram Documentation;

36.5.4 the infrastructure of the Edinburgh Tram Network not being maintained in accordance with Good Industry Practice;

36.5.5 there was a material change in the operating conditions (as specified in the Tram Requirements Specification and/or the Tram Employer's Requirements) of the Tram the subject of the Identified Defect;

36.5.6 an accident had occurred involving the Tram the subject of the Identified Defect (excluding those accidents which arise out of or in connection with the inadequacy of the training provided by the Tram Supplier and/or the inadequacy of the Tram Documentation or the occurrence of the Identified Defect);

36.5.7 the Identified Defect is caused by a clear act of vandalism; and/or

36.5.8 in relation to an Extended Tram Warranty Defect, such defect had been caused by modifications to the Extended Tram Warranty Part identified as defective which had not been approved by the Tram Supplier (excluding such modifications that were required by Law or by this Agreement and/or had been performed by the Tram Supplier or by a third party pursuant to Clauses 0 or 0),

then the Tram Supplier shall notify the Client of such reason and a Dispute shall be deemed to have occurred and the Tram Supplier and the Client shall resolve the Dispute in accordance with the Dispute Resolution Procedure.

36.6 If any part, component or system of a Tram is repaired, rebuilt or replaced under Warranty then it shall have applied to it the appropriate full Primary Warranty Tram Period, Extended Tram Warranty Period, Paint and Finish Warranty Period and/or Fleet Tram Defect Period (as appropriate to the repaired, rebuilt or replaced part, component or system).

36.7 Following the submission of a Defect Notice, if a Tram is taken out of service for rectification under Warranty pursuant to this Clause 36 (*Warranty Regime*), the Warranties given in respect of that Tram and all Warranties applicable to all relevant systems, section, parts, components, or equipment incorporated in or supplied with such Tram shall continue until:

36.7.1 the rectification has been completed in accordance with the approved rectification plan or has otherwise been rectified by the Client and/or its Sub-contractors;

36.7.2 any necessary consents have been obtained to enable such Tram to resume Passenger Services; and

36.7.3 the Tram has been returned to the Client for use in Passenger Services,

and thereafter for a period (in respect of each Warranty) equal to the unexpired portion of each Warranty at the date of the Defect Notice.

28. PRE-DELIVERY INSPECTIONS AND FACTORY ACCEPTANCE TESTS

28.1 The Tram Supplier acknowledges and agrees that **tie**, the Client and the Tram Inspector shall be involved in inspecting the Trams at various stages of the manufacturing process.

28.2 The Tram Supplier shall:

28.2.1 supply to the Client and **tie** photographs in a suitable digital format setting out each key stage of the Tram build process;

28.2.2 deliver the Trams to the delivery point designated by the Client in the Depot in accordance with the Tram Manufacturing and Delivery Programme;

28.2.3 notify the Tram Inspector and the Client's Representative of the expected delivery date not less than 30 days prior to such delivery date and provide the Tram Inspector

and the Client's Representative with a quality control report before transporting any Tram to the Depot;

28.2.4 allow the Tram Inspector to inspect each Tram before it leaves the Tram Supplier's premises to be transported to the Depot; and

28.2.5 not transport a Tram to the Depot until the Tram Inspector has issued the Factory Acceptance Type Test Certificate and a Factory Acceptance Routine Test Certificate in respect of the Tram to be despatched and the Tram Supplier has confirmed with the Client that the Depot is ready to accept delivery of the Tram

28.3 The Tram Inspector shall inspect and the Tram Supplier shall provide all assistance requested by the Tram Inspector to enable it to so inspect:

28.3.1 each Tram before it is despatched to the Depot in accordance with the Factory Acceptance Routine Tests; and

28.3.2 specified Tram or Trams (identified in the Factory Acceptance Type Tests) before they are despatched to the Depot in accordance with the Factory Acceptance Type Tests.

28.4 The Factory Acceptance Type Test Certificate shall not be issued in respect of any Tram until all of the Factory Acceptance Type Tests have in the reasonable opinion of the Tram Inspector been satisfactorily completed.

28.5 A Factory Acceptance Routine Test Certificate shall not be issued in respect of any Tram until:

28.4.1 the Factory Acceptance Type Test Certificate has been issued; and

28.4.2 the Factory Acceptance Routine Tests in respect of that Tram have in the reasonable opinion of the Tram Inspector been satisfactorily completed.

28.6 If, in the reasonable opinion of the Tram Inspector, either the Factory Acceptance Routine Test and/or the Factory Acceptance Type Tests have not been satisfactorily completed, the Tram Inspector may issue a Tram Rejection Notice, identifying the Testing Failures and the Tram Supplier shall propose a rectification plan and period for rectification for agreement by the Tram Inspector (such agreement not to be unreasonably withheld or delayed).

28.7 Once the Tram Supplier has (at its own cost) rectified the failures identified in the Tram Rejection Notice in accordance with the rectification plan and within the rectification period,

the Tram Supplier shall resubmit the Tram for inspection in accordance with the relevant Factory Acceptance Tests and the process set out in Clauses 28.3 to 28.7 shall continue until the Tram Inspector issues a Factory Acceptance Type Test Certificate and/or a Factory Acceptance Routine Test Certificate.

28.8 Notwithstanding any other provision of this Clause 28 (*Pre-Delivery Inspections and Factory Acceptance Tests*), once the Tram Inspector has issued a Factory Acceptance Type Test Certificate:

28.8.1 no further Factory Acceptance Type Tests shall be conducted (unless any one or more of such tests are also Factory Acceptance Routine Tests); and

28.8.2 there shall be no further requirement for the Tram Supplier to obtain a Factory Acceptance Type Test Certificate in respect of any further Tram

29. DELIVERY

29.1 The Tram Supplier shall:

29.1.1 deliver the Trams to the point of delivery designated by the Client at the Depot;

29.1.2 use every reasonable means available to it in delivering the Trams pursuant to Clause 29.1.1, to prevent any of the roads or bridges communicating with or en route to the Depot being subjected to extraordinary traffic within the meaning of applicable legislation and specifically the Roads (Scotland) Act 1984 (as amended) by any traffic of the Tram Supplier or any Tram Supplier Party;

29.1.3 be responsible for the costs associated with the strengthening of any bridges or altering or improving any road communicating with or on route to the Depot to facilitate the movement and delivery of the Trams to the Depot;

29.1.4 be solely responsible for unloading the Trams at the point of delivery;

29.1.5 indemnify the Client and keep the Client indemnified against any and all Losses suffered or incurred by the Client arising out of or in connection with the movement and delivery of the Trams to the Depot, the unloading, loading or other removal or storage of that Tram at the point of delivery; and

29.1.6 be responsible for obtaining such export and import licences and other consents in relation to the Trams as are from time to time required and, if required by the Client

will make those licences and consents available to the Client prior to the relevant shipment.

29.1.7 if, notwithstanding Clause 29.1.2, any damage occurs to any bridge or road communicating with or on the route to the Depot arising from the transport of the Trams, notify the Client's Representative as soon as the Tram Supplier becomes aware of such damage or as soon as the Tram Supplier receives any claim from the authority entitled to make such claim. For the avoidance of doubt, the Client shall not be liable for any costs charges or expenses in respect thereof in relation thereto.

29.2 In relation to all Tram delivery dates set out in the Tram Manufacturing and Delivery Programme, time shall be of the essence (save in circumstances where an extension of time is granted pursuant to the express terms of this Agreement).

30. TRAM DELIVERY TESTS AND CERTIFICATION

30.1 Tram Delivery Tests shall be conducted by the Tram Supplier on all Trams on delivery (or as soon as reasonably practicable thereafter) to the Depot and witnessed by the Tram Inspector.

30.2 The Certificate of Tram Delivery in respect of any Tram shall not be issued before:

30.2.1 all Tram Documentation has been received in accordance with the Tram Documentation Delivery Programme;

30.2.2 all of the Tram Delivery Tests in respect of that Tram have been satisfactorily completed;

30.2.3 the Tram Inspector is satisfied that the Tram conforms with the Tram Requirements Specification and all other requirements of this Agreement; and

30.2.4 in respect of the twenty seventh Certificate of Tram Delivery only, the Reliability Bond has been put in place in accordance with Clause 44 (*Bonds and Collateral Warranty*);

(together, the **"Tram Delivery Requirements"**).

30.3 If the Tram fails to meet the Tram Delivery Requirements then the Tram Inspector shall issue a Tram Rejection Notice, identifying the Testing Failures and the Tram Supplier shall propose a rectification plan and period for rectification for agreement by the Tram Inspector (such agreement not to be unreasonably withheld or delayed). Once the Tram Supplier has rectified the failures identified in the Tram Rejection Notice in accordance with the rectification plan

and within the rectification period, the Tram Supplier shall resubmit the Tram to be tested in accordance with the Tram Delivery Tests and the process set out in this Clause 30 (*Tram Delivery Tests and Certification*) shall be repeated until the Tram Inspector issues a Certificate of Tram Delivery in respect of the rejected Tram.

30.4 The Tram Inspector shall have the right to require the Tram Supplier to repeat any Tram Delivery Test if:

30.4.1 the Tram Supplier has been unable to provide to the Tram Inspector such written evidence, details or other information as the Tram Inspector may reasonably require to evidence that the Tram Delivery Tests have been properly conducted and that the conditions for the issue of a Certificate of Tram Delivery set out in this Clause 30 (*Tram Delivery Tests and Certification*) are satisfied; or

30.4.2 the Tram Inspector is not reasonably satisfied that:

30.4.2.1 any part of the Tram Delivery Test has been or is being conducted properly; or

following any part of the Tram Delivery Test having been conducted, a Tram, in any respect, satisfies the conditions for the issue of such a Certificate of Tram Delivery.

31. TRAINING, COMMISSIONING, TESTING AND CERTIFICATION

31.1 The Tram Supplier, the Client, **tie** and the Operator shall within 12 months of the Commencement Date (each party acting reasonably and in good faith) agree the Training Programme and the detailed implementation of the Training Programme. The Tram Supplier shall implement the Training Programme in accordance with this Clause 31 (*Training, Commissioning, Testing and Certification*) and the terms of the Training Programme.

31.2 The Tram Supplier acknowledges that **tie** shall procure that on the date falling no later than two weeks prior to the date on which the first Tram is scheduled for delivery the Operator shall provide 4 drivers (in each case appropriately qualified) ready to commence the Training Programme and once trained participate in the Tram Delivery Tests and Tram Commissioning Tests. The Tram Supplier further acknowledges that **tie** shall procure that on the date on which the first Tram has been issued with a Certificate of Tram Delivery there are a further 2 drivers and 10 maintenance staff (in each case appropriately qualified) ready to commence the Training Programme and, if required, once trained participate in the Tram Delivery Tests and Tram Commissioning Tests.

31.3 The Client shall procure that, for the purposes of the Tram Commissioning Tests the following are made available to the Tram Supplier:

31.3.1 the Depot (to the extent necessary for the Tram Commissioning Tests); and

31.3.2 the Test Track, power supplies and other facilities, as required to meet the Tram Manufacturing and Delivery Programme;

31.4 The Tram Supplier acknowledges that **tie** shall procure reasonable assistance from the Operator in relation to the provision of operational staff, including drivers, (subject to appropriate training by the Tram Supplier pursuant to Clause 31.2);

31.5 The Tram Supplier and the Client shall, and the Client shall procure that all other relevant Client Parties shall, observe all reasonable requirements of the Operator (as may be notified in writing by **tie** to the Client) during the carrying out of the Tram Commissioning Tests, to use reasonable endeavours to:

31.5.1 preserve health and safety;

31.5.2 protect the Trams against damage; and

31.5.3 avoid unnecessary disruption to the Operator's operations;

31.6 The Tram Supplier shall make available throughout the Tram Commissioning Tests qualified staff to:

31.6.1 conduct, supervise and record the results of all the Tram Commissioning Tests; and;

31.6.2 respond to all reasonable enquiries about the condition or performance of the Trams and the major systems, sections, apparatus, equipment, components, internal seating, fixtures and fittings and devices, system configuration, modification status and software version control including all structural, electrical, hydraulic and other major components and assemblies and to rectify any failures of the same;

31.7 Subject to the provision by the Client and **tie** of the requisite operational facilities and staff:

31.7.1 the Tram Supplier shall conduct the Site Commissioning Type Tests and the Client shall conduct the System Integration Type Tests on the first Tram; and

31.7.2 the Tram Supplier shall conduct the Site Commissioning Routine Tests and the Client shall conduct the System Integration Routine Tests on every Tram.

31.8 Subject to Clause 31.12, the Certificate of Tram Commissioning in respect of a Tram shall not be issued before:

31.8.1 all Tram Documentation has been received in accordance with the Tram Documentation Delivery Programme;

31.8.2 all of the Tram Commissioning Routine Tests in respect of that Tram have been satisfactorily completed; and

31.8.3 the Tram Inspector is satisfied that the Tram is in accordance with the terms of the Tram Requirements Specification and all other requirements of this Agreement,

(together the **"Tram Commissioning Requirements"**).

31.9 The Tram Inspector shall issue a certificate ("**Tram Commissioning Type Test Certificate**") when the specified number of Trams (identified in the Tram Commissioning Type Tests) in the reasonable opinion of the Tram Inspector have completed and passed the Tram commissioning type tests ("**Tram Commissioning Type Tests**") as detailed in section 23 of the Tram Employer's Requirements. Notwithstanding any other provisions of this Clause 31 (*Training, Commissioning, Testing and Certification*) no Certificate of Tram Commissioning shall be issued in respect of any Tram until the Tram Supplier has been issued with a Tram Commissioning Type Test Certificate.

31.10 If a Tram does not meet the Tram Commissioning Requirements to the reasonable satisfaction of the Tram Inspector then the Tram Inspector may issue a Tram Rejection Notice, identifying the Testing Failures and the Tram Supplier shall propose a rectification plan and period for rectification for agreement by the Tram Inspector (such agreement not to be unreasonably withheld or delayed). Once the Tram Supplier has (at its own cost) rectified the failures identified in the Tram Rejection Notice in accordance with the rectification plan and within the rectification period, the Tram Supplier shall resubmit the Tram to be commissioned in accordance with the relevant Tram Commissioning Routine Tests and/or Tram Commissioning Type Tests and the process set out in this Clause 31 (*Training, Commissioning, Testing and Certification*) shall be repeated until the Tram Inspector issues a Certificate of Tram Commissioning.

31.11 The Tram Inspector shall have the right to require the Tram Supplier to repeat any Routine Test and/or Type Test if:

31.11.1 the Tram Supplier has been unable to provide to the Tram Inspector such written evidence, details or other information as the Tram Inspector may reasonably require to

evidence that the Tram Commissioning Routine Tests and/or Tram Commissioning Type Tests have been properly conducted and that the conditions for the issue of a Certificate of Tram Commissioning set out in this Clause 31 (*Training, Commissioning, Testing and Certification*) are satisfied; or

31.11.2 the Tram Inspector is not reasonably satisfied that:

31.11.2.1 any part of the Tram Commissioning Routine Test and/or Tram Commissioning Type Test has been or is being conducted properly; or

31.11.2.2 following any part of the Tram Commissioning Routine Test and/or Tram Commissioning Type Test having been conducted, a Tram, in any respect, satisfies the conditions for the issue of such a Certificate of Tram Commissioning.

31.12 Notwithstanding any other provision of this Clause 31 (*Training, Commissioning, Testing and Certification*) once the Tram Supplier has been issued with a Tram Commissioning Type Test Certificate no further Tram Commissioning Type Tests shall be conducted (unless any one or more of such Tram Commissioning Type Tests are also Tram Commissioning Routine Tests);

31.13 Following the issue of the first Certificate of Tram Commissioning, the Tram issued with such a certificate shall be weighed in accordance with part 2 of Schedule 5 (*Payments*).

32. REPEATED TESTING AND COMMISSIONING FAILURES

32.1 If at any time four or more Trams have been issued with a Tram Rejection Notice then, unless the Tram Supplier can demonstrate to the reasonable satisfaction of the Client that the causes of such notices have been rectified, the Client may issue a written notice to the Tram Supplier setting out the fact that four or more Trams have been issued with a Tram Rejection Notice and requesting that the Tram Supplier submits a remedy plan in relation to such failure ("**Repeated Failure Notice**") and until such remedy plan is implemented in accordance with this Clause 32 (*Repeated Testing and Commissioning Failures*):

32.1.1 the Tram Inspector shall not issue any further Certificates of Tram Commissioning;

32.1.2 notwithstanding any other provision of this Agreement, the Client shall not be under any obligation to pay any sums due to the Tram Supplier in relation to which:

32.1.2.1an invoice has been raised but not yet paid; or

32.1.2.2the Tram Supplier subsequently raises an invoice;

32.1.3 the Client shall not be under any obligation to accept delivery of further Trams and the Tram Supplier shall pay Liquidated Damages where applicable in accordance with Clause 41 (*Liability, Indemnities, Retention and Liquidated Damages*).

32.2 Upon receipt of a Repeated Failure Notice, the Tram Supplier shall promptly propose a remedy plan for agreement by the Tram Inspector, the Client's Representative and **tie's** Representative (such agreement not to be unreasonably withheld or delayed) ("**Repeated Failure Remedy Plan**").

32.3 If the Tram Inspector, the Client's Representative and **tie's** Representative agree the Repeated Failure Remedy Plan, the Tram Supplier shall promptly implement, at its own cost and expense, the Repeated Failure Remedy Plan. Provided that the Repeated Failure Remedy Plan has been implemented to the reasonable satisfaction of the Tram Inspector, the Client's Representative and **tie's** Representative:

32.3.1 the Client shall accept delivery of those Trams awaiting to be dispatched to the Depot subject to Clause 0 (*Pre-Delivery Inspections and Factory Acceptance Tests*) and in accordance with Clause 0 (*Delivery*),

32.3.2 the Client shall within 30 days pay all sums due to the Tram Supplier in respect of those invoices raised before the date of the Repeated Failure Notice (save for invoices which are the subject of genuine dispute other than pursuant to Clause 32.1.2); and

32.3.3 the Tram Inspector shall issue a Certificate of Tram Commissioning in respect of those Trams which have passed the relevant tests as a result of the Tram Supplier implementing the Repeated Failure Remedy Plan.

32.4 If the Tram Inspector, the Client's Representative and **tie's** Representative do not agree the Repeated Failure Remedy Plan, the provisions of Clauses 32.1.1 to 32.1.3 shall continue to apply until the date on which an alternative remedy plan is agreed by the Tram Inspector, the Client's Representative and **tie's** Representative (such agreement not to be unreasonably withheld or delayed) and successfully implemented by the Tram Supplier to the reasonable satisfaction of the Tram Inspector, the Client's Representative and **tie's** Representative whereupon the provisions of Clause 32.3 shall apply.

32.5 If the Tram Supplier fails to implement any agreed Repeated Failure Remedy Plan in accordance with its terms then the provisions of Clauses 32.1.1 to 32.1.3 shall continue to apply until the date on which the Tram Supplier implements such Repeated Failure Remedy

Plan to the reasonable satisfaction of the Tram Inspector, the Client's Representative and **tie's** Representative whereupon the provisions of Clause 32.3 shall apply.

32.6 The Tram Supplier shall not be entitled to any extensions of time to comply with any Milestone or Agreed Delivery Date, as a result of the occurrence of a failure in accordance with this Clause 32 (*Repeated Testing and Commissioning Failures*).

32.7 Any disputes which arise between the Tram Supplier and the Client's Representative shall be resolved in accordance with the Dispute Resolution Procedure.

The Client Representative, if requested by the Client, **tie** and any **tie** Party shall be entitled to attend and witness the carrying out of inspections and tests to be performed by the Tram Inspector pursuant to Clauses 28 (*Pre-Delivery Inspections and Factory Acceptance Tests*) to 32 (*Repeated Testing and Commissioning Failures*) (inclusive).

33. TRAM DOCUMENTATION

33.1 The Tram Supplier shall provide to the Client the Tram Documentation in accordance with the Tram Documentation Delivery Programme. The Tram Documentation shall be subject to approval by the Client.

33.2 The Tram Supplier shall until the expiry of the last of:

33.2.1 the Primary Tram Warranty Period in respect of all aspects of the Trams which are not Paint or Finishes or Extended Tram Warranty Parts;

33.2.2 the Paint and Finish Warranty Period in respect of the Paint and Finishes; and

33.2.3 the Extended Tram Warranty Period in respect of the Extended Tram Warranty Parts,

keep the Tram Documentation (held on all media on which such Tram Documentation has been supplied to the Client) current and up to date with (and shall promptly inform the Client of) any changes due to alterations to the Trams made, or authorised, by the Tram Supplier, availability of parts and components, identified faults in existing procedures or other relevant circumstances covered under the relevant warranty provided that the Tram Supplier shall in respect of a defect first identified during any Warranty Period, update the Tram Documentation upon a solution being found notwithstanding that the relevant Warranty Period may have elapsed. If an Identified Defect is notified to the Tram Supplier under a Warranty and is repaired by the Tram Supplier under Warranty, the Tram Supplier shall, as part of the repair process, update the Tram Documentation in relation to the Identified Defect repaired.

The Tram Supplier shall update the Tram Documentation upon any changes introduced by the Tram Supplier, which arise as a result of an Client Change or which result from a Change in Law.

33.3 Without prejudice to Clause 33.2, the Tram Supplier shall as soon as reasonably practicable and in any event within 28 days of the occurrence of any relevant event referred to in this Clause 33.3, update the Tram Documentation (held on all media on which such Tram Documentation has been supplied to the Client):

33.3.1 if the Tram Requirements Specification is amended after a Certificate of Tram Commissioning is issued in respect of a Tram;

33.3.2 in the event that at any time during the term of this Agreement there are product wide changes to the Trams and for the purposes of this Clause 33.3.2, "product wide changes" shall mean changes made to a Tram or a component or part of a Tram as a result of a modification to a tram, component or part of a tram by the Tram Supplier that has been applied to the Trams; or

33.3.3 where reasonably requested by the Client:

33.3.3.1 during the period from the date on which the first Tram delivered is issued with a Certificate of Tram Commissioning until the date on which the last Tram to be issued with a Certificate of Tram Commissioning is issued with a Certificate of Tram Commissioning; and

33.3.3.2 once the last Tram to be issued with a Certificate of Tram Commissioning is issued with a Certificate of Tram Commissioning, during a period of no more than 9 months from the date on which such Certificate of Tram Commissioning is issued.

33.4 The Tram Supplier shall ensure that the Tram Documentation shall:

33.4.1 be complete and of good legible quality, in the English Language;

33.4.2 contain all necessary drawings and all drawings shall set out:

33.4.2.1 equipment title;

33.4.2.2 unique document number;

33.4.2.3 number of pages;

33.4.2.4 revision number, date of revision and content of any revision (where applicable);

33.4.2.5 originator, checker and authorised signature; and

33.4.2.6 (where larger than A3 size) be capable of being photo reduced to A3 size without loss of clarity; and

33.4.3 wherever practicable, be provided both in hard copy and electronic media and all electronic media shall:

33.4.3.1 be provided in suitable Microsoft Office or Adobe Acrobat format (which shall, for the avoidance of doubt, be easily printable and electronically copiable); and

33.4.3.2 shall be delivered virus checked in accordance with Good Industry Practice.

33.5 Such of the Tram Documentation, including that Tram Documentation referred to in Clause 33.3, that relates exclusively to Software shall, as soon as reasonably practicable and in any event within 25 Business Days of the Software having been updated, be deposited by the Tram Supplier as escrow material in accordance with the Escrow Agreement. The Client shall have equivalent access rights to the material as to the Tram Documentation save only that the Client shall only have access to said escrow material in the circumstances set out in the Escrow Agreement.

51. COPYRIGHT AND INTELLECTUAL PROPERTY

51.1 All Tram Supplier IPR shall continue to be owned by the Tram Supplier.

51.2 The Tram Supplier hereby:

51.2.1 assigns by way of future assignation to the Client with full title guarantee the Project IPR which is created by it and shall procure that Project IPR created by any Tram Supplier Party is also so assigned, for all of the residue of the term of such rights and all renewals or extensions thereof and together with all accrued causes of action in respect thereof;

51.2.2 grants to the Client a non-exclusive perpetual irrevocable royalty free licence to use such Tram Supplier IPR as may be necessary for the Client to use in relation to the Tram Supplier's scope of supply and having regard to the operating, maintaining and

repairing of the Edinburgh Tram Network, and including any and all Intellectual Property Rights which subsist at any time in:

51.2.2.1 the Tram Documentation;

51.2.2.2 the Trams; and

51.2.2.3 Spare Parts and/or Special Tools.

For clarity, nothing within this sub-clause shall permit the Client to use Tram Supplier IPR for any commercial or tendering purposes (except by CEC, TEL or **tie** Limited in connection with the extension or expansion of the infrastructure of the Edinburgh Tram Network). Such Tram Supplier IPR shall not, without the express written consent of the Tram Supplier, be used, copied or disclosed in whole or in part by the Client other than for the purposes outlined in this Clause 51.2.2;

51.2.3 grants to the Client, with the prior written consent of the Tram Supplier (such consent not to be unreasonably withheld or delayed) the right to grant non-exclusive non-assignable sub-licences to third parties for such lengths of time as the Client may reasonably require and otherwise on the same terms as the licence granted to the Client pursuant to Clause 51.2.2 above, to use the Tram Supplier IPR referred to in that Clause (other than in relation to Third Party Software in respect of which the Tram Supplier shall use its reasonable endeavours to obtain the grant of a license to use such Software in so far as is necessary or desirable for such third party to use such Tram Supplier IPR in relation to any projects associated with the Tram Works including in relation to any extension or expansion of the Edinburgh Tram Network;

51.3 The Tram Supplier shall promptly deliver to the Client copies of all Tram Supplier IPR licensed to the Client pursuant to this Clause 51 (*Copyright and Intellectual Property*).

51.4 For the avoidance of doubt, the persons to whom the Client may grant sub-licences pursuant to Clause 51.2.3 shall include:

51.4.1 **tie** and any **tie** Party;

51.4.2 any Client Party;

51.4.3 the Operator and any party other than the Operator providing support to **tie** in relation to the System;

51.4.4 the SDS Provider;

51.4.5 the Tram Maintainer;

51.4.6 CEC and Transport Edinburgh Limited with the prior written consent of the Tram Supplier such consent not to be unreasonably withheld

51.4.7 any assignee or transferee under this Agreement;

51.4.8 any party providing maintenance in respect of the Edinburgh Tram Network.

51.5 The Client hereby grants to the Tram Supplier a non-exclusive revocable royalty free licence for the duration of this Agreement to use such Project IPR as is owned by it as may be necessary for the Tram Supplier to use solely and exclusively for the purpose of performing the Tram Works.

51.6 The copyright of this Agreement and any data or software supplied to the Tram Supplier by the Client, shall remain solely with the Client.

51.7 The Tram Supplier shall at any time and from time to time hereafter at the request of the Client execute all such documents and do all such further acts as may be required in order to vest the rights referred to in Clause 51.2.1 in the Client.

51.8 The Tram Supplier waives any and all moral rights held or to be held by the Tram Supplier in the Deliverables and Project IPR and shall use best endeavours that all of the Tram Supplier Parties who are authors of the whole or any part of the Project IPR waive and abandon in writing all moral rights.

51.9 The Tram Supplier agrees that all rights in the Project IPR shall remain the property of the Client and the Tram Supplier shall retain no rights in the Project IPR beyond the licence granted in Clause 51.5. The Tram Supplier shall be entitled to use such Project IPR only on the terms set out herein and solely for the purpose of the performance of the Tram Works. In particular, otherwise as permitted in this Agreement herein, the Tram Supplier shall not disclose, assign, sub-license, lease, rent or otherwise dispose of the Project IPR.

51.10 The Client shall be entitled to use the rights granted to it pursuant to Clause 51.2 (and to sub-license to third parties such rights) to perform its obligations and exercise its rights and allow all Client Parties to perform their obligations and exercise their rights in respect of the Project, such performance of rights and exercise of obligations to include:

51.10.1 carrying out any necessary completion of the design, manufacture, construction and commissioning of any Trams and each part thereof;

51.10.2 carrying out any and all work in relation to the design and construction, testing and operation of the System;

51.10.3 carrying out all and any necessary maintenance, repairs and work including work to rectify any faults with the Spare Parts and Special Tools or breach of the Warranties and to modify them to comply with any Law or other mandatory requirements or otherwise;

51.10.4 making copies of using and reproducing in any format the Tram Documentation and all other documents which the Tram Supplier is required to deliver in accordance with this Agreement for the purposes of maintenance and repair of the Trams and/or the maintenance of the Spare Parts and Special Tools but only such copies as may be reasonably necessary to achieve such purpose; and

51.10.5 enabling and allowing relevant third parties to perform their obligations in respect of the Project.

51.11 For the purposes of this Clause 51 (*Copyright and Intellectual Property*), "use" shall include the acts of copying, modifying, adapting and translating the material in question and/or incorporating them with other materials and the term "the right to use" shall be construed accordingly.

51.12 The Tram Supplier:

51.12.1 hereby grants to the Client, free of charge, an irrevocable, perpetual, non-exclusive and transferable (but only to any assignee or transferee of any rights or benefits under this Agreement or upon or at any time following termination or expiry of this Agreement) a licence (carrying the right to grant sub-licences) to use the Intellectual Property Rights which are or become at any time during the Term vested in the Tram Supplier to the same extent as the Tram Supplier has acquired such rights; and

51.12.2 shall in respect of any of the Intellectual Property Rights which the Tram Supplier is not entitled to license to the Client pursuant to Clause 51.2, use its best endeavours to procure the grant of a licence from the owners of such Intellectual Property Rights in favour of the Client in substantially the same terms as the licence set forth in Clause 51.2.

51.13 The Client shall not exercise any of the rights licensed to it pursuant to this Clause 51 (*Copyright and Intellectual Property*) to design, construct, manufacture or commission or

have designed, constructed, manufactured or commissioned any of the Trams or any part thereof unless and until:

51.13.1 the Client and the Tram Supplier cannot agree a price and/or delivery time in relation to a Spare Part or Special Tool pursuant to Clause 34.3; and/or

51.13.2 there occurs a Tram Supplier Default;

51.14 The Client shall not be entitled to adapt, reverse engineer, decompile, disassemble and/or modify the Tram Supplier Software in whole or in part except:

51.14.1 as permitted by Law; and

51.14.2 to the extent that such action is legitimately required for the purposes of integrating the operation of the Tram Supplier Software with the operation of other software or systems used by the Client or any of the Client Parties on the Edinburgh Tram Network.

51.15 All payments and royalties payable in one sum or by instalments or otherwise in connection with Intellectual Property Rights used by the Tram Supplier in connection with or to enable the Tram Supplier to carry out the Project or licensed to the Client shall be deemed to be included in the Aggregate Tram Price and shall be paid by the Tram Supplier to those to whom they may be due or payable.

51.16 Where a claim or proceeding is made or brought against the Client or its permitted licensees which arises out of the infringement of any Intellectual Property Rights in any materials provided by the Tram Supplier or any Tram Supplier Party to the Client then the Tram Supplier shall indemnify and keep the Client indemnified on demand at all times from and against all Indemnified Liabilities arising in connection with such claim or proceedings.

51.17 The provisions of this Clause 51 (*Copyright and Intellectual Property*) shall apply during the continuance of this Agreement and after its termination howsoever arising, and immediately following termination howsoever arising, the Tram Supplier shall provide the Client with:

51.17.1 a copy of the Object Code on media that is reasonably acceptable to the Client; and

51.17.2 a copy of all documentation, manuals and other technical information relating to the Software that is reasonably required by the Client;

51.18 The Tram Supplier shall not reproduce or publish any document or matter relating to the Tram Works or this Agreement, either alone or in association with any other body or person, without the prior written consent of the Client.

51.19 Software

51.19.1 In designing and creating Tram Supplier Software forming part of the Deliverables, the Tram Supplier shall ensure (and the Tram Inspector shall audit):

51.19.1.1 that orderly auditable records of the progress of the development of the Tram Supplier Software from the functional requirements to the final code are maintained, and that regular verification and testing occurs at each stage of the design process;

51.19.1.2 that it shall produce, during the development of the Tram Supplier Software comprehensive and accurate documentation including specifications, cause and effect charts and flowcharts are produced;

51.19.1.3 that the documentation, access rights, details of configuration software and the like produced in accordance with Clause 51.19.1.1, is such as to enable an appropriately qualified independent auditor (who is not involved in the original design) to:

(i) relate the Tram Supplier Software to the performance of the relevant equipment under normal and fault conditions;

(ii) to verify its compliance with the functional requirements of that equipment; and

(iii) to operate and reconfigure the Tram Supplier Software without the assistance of the Infraco; and

51.19.1.4 that the Tram Supplier Software is designed, developed and documented following an industry-recognised standard (and where no particular standard is required by the Upgrade Works Specifications or Central SCADA Works Specifications (as such terms are used in the Employer's Requirements)), using recognised quality control methods.

51.19.2 Subject to the terms of any Third Party Software Licence, the Tram Supplier shall to a reasonable extent, create or provide:

51.19.2.1 coding and documentation, in machine readable form, of the final structure of the Tram Supplier Software, and of the intermediate stages leading to it (i.e. source and object codes); and

51.19.2.2 where the Client so instructs, usable copies of any ancillary computer programs used to generate the code (such as compilers) provided that the Client meet the costs of any additional Third Party Software Licence.

51.19.3 Where the Tram Supplier is required to provide Tram Supplier Software as part of a Deliverable under this Agreement it shall, within thirty (30) days of acceptance of the Tram Supplier Software by the Client place, or shall procure the placement of, a copy of the source code of the Tram Supplier Software in escrow with the NCC Group of Manchester Technology Centre, Oxford Road, Manchester ("**NCC**") or such other escrow agent as the Parties may agree. The Parties shall enter into NCC's standard escrow agreement (provided that, in the case of Third Party Software, the Tram Supplier shall procure that the owner of such software enters into such escrow agreement) for a single licensee (or if no such agreement exists, the appropriate standard agreement as stipulated by NCC). The cost of such source code deposit (including all renewal costs) shall be payable by the Client.

Technical Library

51.20 The Tram Supplier shall;

51.20.1 as soon as reasonably practicable shall cooperate with the Client in the establishment by the Client of a secure, virtual electronic site for the storage of Deliverables other than the source code (the "**Technical Library**"). Such electronic site shall be capable of being accessed through a standard web browser. At the Client's request, the Tram Supplier will in addition also cooperate with the Client in delivering and managing documents to establish a physical site with paper copies of the Technical Library;

51.20.2 as and when Deliverables (other than the source code) are produced or updated from time to time:

51.20.2.1 where such Deliverables are produced or updated by the Tram Supplier, promptly ensure that a copy of those Deliverables or its updated version is placed in the Technical Library;

51.20.2.2 where such Deliverables are produced or updated by any sub-contractor of the Tram Supplier, as soon as reasonably practical ensure that a

copy of those Deliverables or their updated version(s) are placed in the Technical Library;

51.20.2.3 establish an index, in a format approved by the Client, of all Deliverables deposited in the Technical Library from time to time and update that index whenever any such Deliverables are deposited in the Technical Library;

51.20.2.4 deliver one copy of the index and each update established under Clause 51.20.2.3 to the Client; and

51.20.2.5 permit the Client (or its nominee) to have access to the Technical Library from time to time during normal business hours, and following reasonable notice from the Client (or its nominee) to the Tram Supplier, for the purpose only of auditing its contents against the current catalogue.

51.21 Within three Business Days of the earlier of the release of the Reliability Bond or the termination of this Agreement, the Tram Supplier shall hand over the Technical Library, and the secure access to it, to the Client and the Tram Supplier's obligations in relation to the further maintenance of the Technical Library shall cease. Should an audit of the contents of the Technical Library against the current catalogue reveal that the index does not contain details of categories or types of Deliverables which should be contained within the Technical Library, the Client may request and the Tram Supplier grants access to the Client to the Technical Library from time to time during business hours in order to audit the contents of the Technical Library to determine whether such categories and types of Deliverables are in fact contained within the Technical Library. Any such request shall be made with reasonable notice and shall indicate with reasonable clarity the technical information or the type of Deliverable which is required for review.

2. In accordance with Clause 8.7 of the Agreement, the Infraco shall procure that the Tram Maintainer complies with the following obligations under the Tram Maintenance Agreement:

50. COPYRIGHT AND INTELLECTUAL PROPERTY

50.1 All Tram Maintainer IPR shall continue to be owned by the Tram Maintainer.

50.2 The Tram Maintainer hereby:

50.2.1 assigns by way of future assignation to the Client with full title guarantee the Project IPR which is created by it and shall procure that Project IPR created by any Tram Maintainer Party is also so assigned, for all of the residue of the term of such rights and all renewals or extensions thereof and together with all accrued causes of action in respect thereof;

50.2.2 grants to the Client a non-exclusive perpetual irrevocable royalty free licence to use such Tram Maintainer IPR as may be necessary for the Client to use in relation to the Tram Maintainer's scope of services and having regard to the operating, maintaining and repairing of the Edinburgh Tram Network, and including any and all Intellectual Property Rights which subsist at any time in:

50.2.1 the Tram Documentation;

50.2.2 the Trams; and

50.2.3 Spare Parts and/or Special Tools.

For clarity, nothing within this sub-clause shall permit the Client to use Tram Maintainer IPR for any commercial or tendering purposes (except by CEC, TEL or **tie** in connection with any extension or expansion of the infrastructure of the Edinburgh Tram Network). Such Tram Maintainer IPR shall not, without the express written consent of the Tram Maintainer, be used, copied or disclosed in whole or in part by the Client other than for the purposes outlined in this Clause 50.2.2; and

50.2.3 grants to the Client, with the prior written consent of the Tram Maintainer (such consent not to be unreasonably withheld or delayed) the right to grant non-exclusive non-assignable sub-licences to third parties for such lengths of time as the Client may reasonably require and otherwise on the same terms as the licence granted to the Client pursuant to Clause 50.2.2, to use the Tram Maintainer IPR referred to in that Clause (other than in relation to Third Party Software in so far as is necessary or

desirable for such third party to use such Tram Maintainer IPR in relation to any projects associated with the Tram Works including in relation to any extension or expansion of the Edinburgh Tram Network).

50.3 The Tram Maintainer shall promptly deliver to the Client copies of all Tram Maintainer IPR licensed to the Client pursuant to this Clause 50 (*Copyright and Intellectual Property*).

50.4 For the avoidance of doubt, the persons to whom the Client may grant sub-licences pursuant to Clause 50.2.3 shall include:

50.4.1 **tie** and any **tie** Party;

50.4.2 any Client Party;

50.4.3 the Operator and any party other than the Operator providing support to **tie** in relation to the System;

50.4.4 the SDS Provider;

50.4.5 the Tram Maintainer;

50.4.6 CEC and Transport Edinburgh Limited with the prior written consent of the Tram Maintainer (such consent not to be unreasonably withheld or delayed);

50.4.7 any assignee or transferee under this Agreement; and

50.4.8 any party providing maintenance in respect of the Edinburgh Tram Network.

50.5 The Client hereby grants to the Tram Maintainer a non-exclusive revocable royalty free licence for the duration of this Agreement to use such Project IPR as is owned by it as may be necessary for the Tram Maintainer to use solely and exclusively for the purpose of performing the Tram Works.

50.6 The copyright of this Agreement and any data or software supplied to the Tram Maintainer by the Client, shall remain solely with the Client.

50.7 The Tram Maintainer shall at any time and from time to time hereafter at the request of the Client execute all such documents and do all such further acts as may be required in order to vest the rights referred to in Clause 50.2.1 in the Client.

50.8 The Tram Maintainer waives any and all moral rights held or to be held by the Tram Maintainer in the Deliverables and Project IPR and shall use best endeavours to ensure that all

of the Tram Maintainer Parties who are authors of the whole or any part of the Project IPR waive and abandon in writing all moral rights.

50.9 The Tram Maintainer agrees that all rights in the Project IPR shall remain the property of the Client and the Tram Maintainer shall retain no rights in the Project IPR beyond the licence granted in Clause 50.5. The Tram Maintainer shall be entitled to use such Project IPR only on the terms set out herein and solely for the purpose of the performance of the Tram Works. In particular, otherwise as permitted in this Agreement herein, the Tram Maintainer shall not disclose, assign, sub-license, lease, rent or otherwise dispose of the Project IPR.

50.10 The Client shall be entitled to use the rights granted to it pursuant to Clause 50.2 (and to sub-license to third parties such rights) to perform its obligations and exercise its rights and allow all Client Parties to perform their obligations and exercise their rights in respect of the Project, such performance of rights and exercise of obligations to include:

50.10.1 carrying out any necessary completion of the design, manufacture, construction and commissioning of any Trams and each part thereof;

50.10.2 carrying out any and all work in relation to the design and construction, testing and operation of the System;

50.10.3 carrying out all and any necessary maintenance, repairs and work including to work to rectify any faults with the Spare Parts and Special Tools or breach of the Warranties (as defined in the Tram Supply Agreement) and to modify them to comply with any Law or other mandatory requirements or otherwise;

50.10.4 making copies of using and reproducing in any format the Tram Documentation and all other documents which the Tram Maintainer is required to deliver in accordance with this Agreement for the purposes of maintenance and repair of the Trams and/or the maintenance of the Spare Parts and Special Tools but only such copies as may be reasonably necessary to achieve such purpose; and

50.10.5 enabling and allowing relevant third parties to perform their obligations in respect of the Project.

50.11 For the purposes of this Clause 50 (*Copyright and Intellectual Property*), "use" shall include the acts of copying, modifying, adapting and translating the material in question and/or incorporating them with other materials and the term "the right to use" shall be construed accordingly.

50.12 The Tram Maintainer:

50.12.1 hereby grants to the Client, free of charge, an irrevocable, perpetual, non-exclusive and transferable (but only to any assignee or transferee of any rights or benefits under this Agreement or upon or at any time following termination or expiry of this Agreement) licence (carrying the right to grant sub-licences) to use the Intellectual Property Rights which are or become at any time during the Term vested in the Tram Maintainer to the same extent as the Tram Maintainer has acquired such rights; and

50.12.2 shall in respect of any of the Intellectual Property Rights which the Tram Maintainer is not entitled to license to the Client pursuant to Clause 50.2, use its best endeavours to procure the grant of a licence from the owners of such Intellectual Property Rights in favour of the Client in substantially the same terms as the licence set forth in Clause 50.2.

50.13 The Client shall not exercise any of the rights licensed to it pursuant to this Clause 50 (*Copyright and Intellectual Property*) to design, construct, manufacture or commission or have designed, constructed, manufactured or commissioned any of the Trams or any part thereof unless and until:

50.13.1 the Client and the Tram Maintainer cannot agree a price and/or delivery time in relation to a Spare Part or Special Tool pursuant to Clause 34.3 of the Tram Supply Agreement (Spares and Special Tools); and/or

50.13.2 there occurs a Tram Maintainer Default.

50.14 The Client shall not be entitled to adapt, reverse engineer, decompile, disassemble and/or modify the Tram Maintainer Software in whole or in part except:

50.14.1 as permitted by Law; and

50.14.2 to the extent that such action is legitimately required for the purposes of integrating the operation of the Tram Maintainer Software with the operation of other software or systems used by the Client or any of the Client Parties on the Edinburgh Tram Network.

50.15 All payments and royalties payable in one sum or by instalments or otherwise in connection with Intellectual Property Rights used by the Tram Maintainer in connection with or to enable the Tram Maintainer to carry out the Project or licensed to the Client shall be deemed to be

included in the Services Payment and shall be paid by the Tram Maintainer to those to whom they may be due or payable.

50.16 Where a claim or proceeding is made or brought against the Client or its permitted licensees which arises out of the infringement of any Intellectual Property Rights in any materials provided by the Tram Maintainer or any Tram Maintainer Party to the Client then the Tram Maintainer shall indemnify and keep the Client indemnified on demand at all times from and against all Indemnified Liabilities arising in connection with such claim or proceedings.

50.17 The provisions of this Clause 50 (*Copyright and Intellectual Property*) shall apply during the continuance of this Agreement and after its termination howsoever arising, and immediately following termination howsoever arising, the Tram Maintainer shall provide the Client with:

50.17.1 a copy of the Object Code on media that is reasonably acceptable to the Client; and

50.17.2 a copy of all documentation, manuals and other technical information relating to the Software that is reasonably required by the Client.

50.18 The Tram Maintainer shall not reproduce or publish any document or matter relating to the Tram Works or this Agreement, either alone or in association with any other body or person, without the prior written consent of the Client.

Software

50.19 In designing and creating Tram Maintainer Software forming part of the Deliverables, the Tram Maintainer shall ensure and the Tram Inspector shall audit:

50.19.1 that orderly auditable records of the progress of the development of the Tram Maintainer Software from the functional requirements to the final code are maintained, and that regular verification and testing occurs at each stage of the design process;

50.19.2 that it shall produce, during the development of the Tram Maintainer Software comprehensive and accurate documentation including specifications, cause and effect charts and flowcharts are produced;

50.19.3 that the documentation, access rights, details of configuration software and the like produced in accordance with Clause 50.19.1, is such as to enable an appropriately qualified independent auditor (who is not involved in the original design) to:

(a) relate the Tram Maintainer Software to the performance of the relevant equipment under normal and fault conditions;

(b) to verify its compliance with the functional requirements of that equipment; and

(c) to operate and reconfigure the Tram Maintainer Software without the assistance of the Infraco; and

50.19.4 that the Tram Maintainer Software is designed, developed and documented following an industry-recognised standard, using recognised quality control methods.

50.20 Subject to the terms of any Third Party Software Licence, the Tram Maintainer shall to a reasonable extent, create or provide:

50.20.1 coding and documentation, in machine readable form, of the final structure of the Tram Maintainer Software, and of the intermediate stages leading to it (i.e. source and object codes); and

50.20.2 where the Client so instructs, usable copies of any ancillary computer programs used to generate the code (such as compilers) provided that the Client meets the costs of any additional Third Party Software Licence.

50.21 Where the Tram Maintainer is required to provide Tram Maintainer Software as part of a Deliverable under this Agreement it shall, within thirty (30) days of acceptance of the Tram Maintainer Software by **tie** place, or shall procure the placement of, a copy of the source code of the Tram Maintainer Software in escrow with the NCC Group of Manchester Technology Centre, Oxford Road, Manchester ("**NCC**") or such other escrow agent as the Parties may agree. The Parties shall enter into NCC's standard escrow agreement in the form included in Schedule 8 of the Tram Supply Agreement (provided that, in the case of Third Party Software, the Tram Maintainer shall procure that the owner of such software enters into such Escrow Agreement) for a single licensee (or if no such agreement exists, the appropriate standard agreement as stipulated by NCC). The cost of such source code deposit (including all renewal costs) shall be payable by the Client.

Technical Library

50.22 The Tram Maintainer shall:

50.22.1 as soon as reasonably practicable, cooperate with the Client in the establishment by the Client of a secure, virtual electronic site for the storage of Deliverables other than the source code (the "**Technical Library**"). Such electronic site shall be capable of being accessed through a standard web browser. At the Client's request, the Tram Maintainer will in addition also cooperate with the Client in delivering and managing documents to establish a physical site with paper copies of the Technical Library; and

50.22.2 as and when Deliverables (other than the source code) are produced or updated from time to time:

50.22.2.1 where such Deliverables are produced or updated by the Tram Maintainer, promptly ensure that a copy of those Deliverables or its updated version is placed in the Technical Library;

50.22.2.2 where such Deliverables are produced or updated by any subcontractor of the Tram Maintainer, as soon as reasonably practical ensure that a copy of those Deliverables or their updated version(s) are placed in the Technical Library;

50.22.2.3 establish an index, in a format approved by the Client, of all Deliverables deposited in the Technical Library from time to time and update that index whenever any such Deliverables are deposited in the Technical Library;

50.22.2.4 deliver one copy of the index and each update established under Clause 50.22.2.3 to the Client; and

50.22.2.5 permit the Client (or its nominee) to have access to the Technical Library from time to time during normal business hours, and following reasonable notice from the Client (or its nominee) to the Tram Maintainer, for the purpose only of auditing its contents against the current catalogue.

50.23 Within three Business Days of the earlier of the release of the Reliability Bond pursuant to Clause 44.3 of the Tram Supply Agreement or the termination of this Agreement, the Tram Maintainer shall hand over the Technical Library, and the secure access to it, to the Client and

the Tram Maintainer's obligations in relation to the further maintenance of the Technical Library shall cease. Should an audit of the contents of the Technical Library against the current catalogue reveal that the index does not contain details of categories or types of Deliverables which should be contained within the Technical Library, the Client may request, and the Tram Maintainer grants, access to the Technical Library from time to time during business hours in order to audit the contents of the Technical Library to determine whether such categories and types of Deliverables are in fact contained within the Technical Library. Any such request shall be made with reasonable notice and shall indicate with reasonable clarity the technical information or the type of Deliverable which is required for review.

THIS IS SCHEDULE PART 40 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 40

ENVIRONMENTAL AND HEALTH AND SAFETY
KEY PERFORMANCE INDICATORS

Key Performance Indicator	**Target**
Enforcement Notices	Zero
Fatalities	Zero
RIDDOR Accidents	Accident Frequency Rate: 0.25 for 2008/2009 0.25 for 2009/2010 0.24 for 2010/2011
Incidents (Health, Safety and Environmental)	Initial notification to **tie** within 24 hours. Submission of formal investigation reports by agreed date.
Incident Report Recommendations	Closed as per agreed dates (none overdue)
Infraco Audits Planned v. Actual	90% of plan
Infraco Site Inspections Planned v. Actual	90% of plan
Non-conformances (raised by **tie**)	Closed as per agreed dates (none overdue)
tie Audit Findings (Major and Minor)	Closed as per agreed dates (none overdue)
Code of Construction Practice	Zero unauthorised breaches

THIS IS SCHEDULE PART 41 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 41

GROUND CONDITIONS AND UTILITIES INFORMATION

PART A - SCHEDULE OF KNOWN GROUND CONDITIONS

Reflects contents of CD ULE90130-SW-DTF-01990 Issued to INFRACO Aug 07

Name		Description	Date Modified	Document Date
"Report on Ground Investigation at Edinburgh Airport Rail Link" v1-Draft_Report_EARL_Ground_Investigation_Undertaken_by_SDS.pdf		Report	07/08/07	18/12/06
"Network Rail Ground Investigation – Preliminary Information" v1-Network_Rail_Ground_Investigation_-_Preliminary_Informati.pdf		Report	07/08/07	27/02/07
Ground Investigation Report Norwest Holst V1		Report	29/09/06	29/09/06
	"Preliminary Ground Investigation Information" Preliminary Ground Investigation Information v1.pdf	Report	29/09/06	29/09/06
	Appendix A GI Logs 1.pdf	Part of report	29/09/06	
	Appendix A GI Logs 2.pdf	Part of report	29/09/06	
	Appendix A GI Logs 3.pdf	Part of report	29/09/06	
	Appendix A GI Logs 4.pdf	Part of report	29/09/06	
	Phase 1 Ground Investigation Layout Plan Sheets 1 to 41.pdf	Part of report	29/09/06	
Ground Investigation Report Norwest Holst V2				
	"Preliminary Ground Investigation Information" Infraco ITN - Prelim GI Information v2 formatted. pdf	Report	25/10/06	25/10/06
Norwest Holst Factual Report Issue 2 V1				
	"Report on a Ground Investigation Edinburgh Tram Network Project Line 1" Report 1 of 3.pdf	Report	27/02/07	23/01/07
	"Report on a Ground Investigation Edinburgh Tram Network Project Line 2, Volume 1" Report 1 of 3.pdf	Report	27/02/07	31/01/07
	"Report on a Ground Investigation Edinburgh Tram Network Project Line 2, Volume 1" Report 1 of 3.pdf	Report	27/02/07	31/01/07
	"Ground Investigation Final Layout Plan Sheet 1 of 41" ULE90130-SW-GEO-00091.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 2 of 41" ULE90130-SW-GEO-00092.pdf	Drawing	27/02/07	11/01/07

Name		Description	Date Modified	Document Date
	"Ground Investigation Final Layout Plan Sheet 3 of 41" ULE90130-SW-GEO-00093.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 4 of 41" ULE90130-SW-GEO-00094.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 5 of 41" ULE90130-SW-GEO-00095.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 6 of 41" ULE90130-SW-GEO-00096.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 7 of 41" ULE90130-SW-GEO-00097.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 8 of 41" ULE90130-SW-GEO-00098.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 9 of 41" ULE90130-SW-GEO-00099.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 10 of 41" ULE90130-SW-GEO-00100.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 11 of 41" ULE90130-SW-GEO-00101.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 12 of 41" ULE90130-SW-GEO-00102.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 13 of 41" ULE90130-SW-GEO-00103.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 14 of 41" ULE90130-SW-GEO-00104.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 15 of 41" ULE90130-SW-GEO-00105.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 16 of 41" ULE90130-SW-GEO-00106.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 17 of 41" ULE90130-SW-GEO-00107.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 18 of 41" ULE90130-SW-GEO-00108.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 19 of 41" ULE90130-SW-GEO-00109.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 20 of 41" ULE90130-SW-GEO-00110.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 21 of 41" ULE90130-SW-GEO-00111.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 22 of 41" ULE90130-SW-GEO-00112.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 23 of 41" ULE90130-SW-GEO-00113.pdf	Drawing	27/02/07	11/01/07

Name		Description	Date Modified	Document Date
	"Ground Investigation Final Layout Plan Sheet 24 of 41" ULE90130-SW-GEO-00114.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 25 of 41" ULE90130-SW-GEO-00115.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 26 of 41" ULE90130-SW-GEO-00116.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 27 of 41" ULE90130-SW-GEO-00117.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 28 of 41" ULE90130-SW-GEO-00118.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 29 of 41" ULE90130-SW-GEO-00119.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 30 of 41" ULE90130-SW-GEO-00120.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 31 of 41" ULE90130-SW-GEO-00121.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 32 of 41" ULE90130-SW-GEO-00122.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 33 of 41" ULE90130-SW-GEO-00123.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 34 of 41" ULE90130-SW-GEO-00124.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 35 of 41" ULE90130-SW-GEO-00125.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 36 of 41" ULE90130-SW-GEO-00126.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 37 of 41" ULE90130-SW-GEO-00127.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 38 of 41" ULE90130-SW-GEO-00128.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 39 of 41" ULE90130-SW-GEO-00129.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 40 of 41" ULE90130-SW-GEO-00130.pdf	Drawing	27/02/07	11/01/07
	"Ground Investigation Final Layout Plan Sheet 41 of 41" ULE90130-SW-GEO-00131.pdf	Drawing	27/02/07	11/01/07

Ground Condition Information

F14480 - Tram Line 1 Vol 1 - "Report on a Ground Investigation at Edinburgh Tram Line 1 - Volume 1 of 3"

F14480 - Tram Line 1 Vol 2 - "Report on a Ground Investigation at Edinburgh Tram Line 1 - Volume 2 of 3"

F14480 - Tram Line 1 Vol 3 - "Report on a Ground Investigation at Edinburgh Tram Line 1 - Volume 3 of 3"

F14480 - FINAL L2 Vol1. - "Report on a Ground Investigation at Edinburgh Tram Line 2 - Volume 1 of 4"

F14480 - FINAL L2 Vol2. - "Report on a Ground Investigation at Edinburgh Tram Line 2 - Volume 2 of 4"

F14480 - FINAL L2 Vol3. - "Report on a Ground Investigation at Edinburgh Tram Line 2 - Volume 3 of 4"

F14480 - FINAL L2 Vol4. - "Report on a Ground Investigation at Edinburgh Tram Line 2 - Volume 4 of 4"

ULE90130-SW-REP-00499 - "Summarising Geotechnical Report - Volume 1 of 2"

PART B - SCHEDULE OF KNOWN UTILITIES INFORMATION
(SDS ISSUE FOR APPROVAL DRAWINGS)

IFA DOCUMENTATION

Section 1A Plates 6 – 10

Document no.	*Revision no.*	*Comments*
ULE90130-01-UTL-00006	3	
ULE90130-01-UTL-00106	3	
ULE90130-01-UTL-00206	4	
ULE90130-01-UTL-00306	3	
ULE90130-01-UTL-00406		awaiting sewer drawing
ULE90130-01-UTL-00506	3	
ULE90130-01-UTL-00706	3	
ULE90130-01-UTL-00806	3	
ULE90130-01-UTL-00906	3	
ULE90130-01-UTL-01706	3	
ULE90130-01-UTL-00007	3	
ULE90130-01-UTL-00107	3	
ULE90130-01-UTL-00207	4	
ULE90130-01-UTL-00307	3	
ULE90130-01-UTL-00407		awaiting sewer drawing
ULE90130-01-UTL-00507	3	
ULE90130-01-UTL-00707	3	
ULE90130-01-UTL-00807	3	
ULE90130-01-UTL-00907	3	
ULE90130-01-UTL-01707	3	
ULE90130-01-UTL-00008	3	
ULE90130-01-UTL-00108	3	
ULE90130-01-UTL-00208	4	

ULE90130-01-UTL-00308	3	
ULE90130-01-UTL-00408		awaiting sewer drawing
ULE90130-01-UTL-00508	3	
ULE90130-01-UTL-00708	3	
ULE90130-01-UTL-00808	3	
ULE90130-01-UTL-00908	3	
ULE90130-01-UTL-01708	3	
ULE90130-01-UTL-00009	3	
ULE90130-01-UTL-00109	3	
ULE90130-01-UTL-00209	4	
ULE90130-01-UTL-00309	3	
ULE90130-01-UTL-00409		awaiting sewer drawing
ULE90130-01-UTL-00509	3	
ULE90130-01-UTL-00709	3	
ULE90130-01-UTL-00809	3	
ULE90130-01-UTL-00909	3	
ULE90130-01-UTL-01709	3	
ULE90130-01-UTL-00010	3	
ULE90130-01-UTL-00110	3	
ULE90130-01-UTL-00210	4	
ULE90130-01-UTL-00310	3	
ULE90130-01-UTL-00410		awaiting sewer drawing
ULE90130-01-UTL-00510	3	
ULE90130-01-UTL-00710	3	
ULE90130-01-UTL-00810	3	
ULE90130-01-UTL-00910	3	
ULE90130-01-UTL-01710	3	

ULE90130-01-CAL-00103 (SGN)	3	
ULE90130-01-CAL-00104 (SP)	4	
ULE90130-01-CAL-00105 (SW Clean)	3	
(Sewer)		awaiting sewer schedule
ULE90130-01-CAL-00107 (BT)	3	
ULE90130-01-CAL-00108 (VM)	3	
ULE90130-01-CAL-00109 (C&W)	3	
ULE90130-01-CAL-00110 (Thus)	3	
ULE90130-01-CAL-00111 (Forth Ports)	3	

Section 1A Plates 13 – 15

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00013	3	
ULE90130-01-UTL-00113	3	
ULE90130-01-UTL-00213	3	
ULE90130-01-UTL-00313	3	
ULE90130-01-UTL-00413		awaiting sewer drawing
ULE90130-01-UTL-00513	3	
ULE90130-01-UTL-00713	3	
ULE90130-01-UTL-00813	3	
ULE90130-01-UTL-00913	3	
ULE90130-01-UTL-01613	3	
ULE90130-01-UTL-01713	3	
ULE90130-01-UTL-00014	3	

ULE90130-01-UTL-00114	3	
ULE90130-01-UTL-00214	3	
ULE90130-01-UTL-00314	3	
ULE90130-01-UTL-00414		awaiting sewer drawing
ULE90130-01-UTL-00514	3	
ULE90130-01-UTL-00714	3	
ULE90130-01-UTL-00814	3	
ULE90130-01-UTL-00914	3	
ULE90130-01-UTL-01614	3	
ULE90130-01-UTL-01714	3	
ULE90130-01-UTL-00015	3	
ULE90130-01-UTL-00115	3	
ULE90130-01-UTL-00215	3	
ULE90130-01-UTL-00315	3	
ULE90130-01-UTL-00415		awaiting sewer drawing
ULE90130-01-UTL-00515	3	
ULE90130-01-UTL-00715	3	
ULE90130-01-UTL-00815	3	
ULE90130-01-UTL-00915	3	
ULE90130-01-UTL-01615	3	
ULE90130-01-UTL-01715	3	
Conflict Spreadsheet (13-15) SGN	3	
Conflict Spreadsheet (13-15) SP	3	
Conflict Spreadsheet (13-15) SW Clean	3	
Conflict Spreadsheet (13-15) Sewer		awaiting sewer schedule

Conflict Spreadsheet (13-15) BT	3	
Conflict Spreadsheet (13-15) VM	3	
Conflict Spreadsheet (13-15) C&W	3	
Conflict Spreadsheet (13-15) Thus	3	
Conflict Spreadsheet (13-15) Fourth Ports	3	

Section 1A Plates 16 – 21

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00016	4	
ULE90130-01-UTL-00116	4	
ULE90130-01-UTL-00216	4	
ULE90130-01-UTL-00316	4	
ULE90130-01-UTL-00416		awaiting sewer drawing
ULE90130-01-UTL-00516	4	
ULE90130-01-UTL-00716	4	
ULE90130-01-UTL-00816	4	
ULE90130-01-UTL-00916	4	
ULE90130-01-UTL-01616		no IFA documents
ULE90130-01-UTL-00017	4	
ULE90130-01-UTL-00117	4	
ULE90130-01-UTL-00217	4	
ULE90130-01-UTL-00317	4	
ULE90130-01-UTL-00417		awaiting sewer drawing
ULE90130-01-UTL-00517	4	
ULE90130-01-UTL-00717	4	

ULE90130-01-UTL-00817	4	
ULE90130-01-UTL-00917	4	
ULE90130-01-UTL-01617		no IFA documents
ULE90130-01-UTL-00018	4	
ULE90130-01-UTL-00118	4	
ULE90130-01-UTL-00218	4	
ULE90130-01-UTL-00318	4	
ULE90130-01-UTL-00418		awaiting sewer drawing
ULE90130-01-UTL-00518	4	
ULE90130-01-UTL-00718	4	
ULE90130-01-UTL-00818	4	
ULE90130-01-UTL-00918	4	
ULE90130-01-UTL-01618		no IFA documents
ULE90130-01-UTL-00019	4	
ULE90130-01-UTL-00119	4	
ULE90130-01-UTL-00219	4	
ULE90130-01-UTL-00319	4	
ULE90130-01-UTL-00419		awaiting sewer drawing
ULE90130-01-UTL-00519	4	
ULE90130-01-UTL-00719	4	
ULE90130-01-UTL-00819	4	
ULE90130-01-UTL-00919	4	
ULE90130-01-UTL-01619		no IFA documents
ULE90130-01-UTL-00020	4	
ULE90130-01-UTL-00120	4	
ULE90130-01-UTL-00220	4	
ULE90130-01-UTL-00320	4	

ULE90130-01-UTL-00420		awaiting sewer drawing
ULE90130-01-UTL-00520	4	
ULE90130-01-UTL-00720	4	
ULE90130-01-UTL-00820	4	
ULE90130-01-UTL-00920	4	
ULE90130-01-UTL-01620		no IFA documents
ULE90130-01-UTL-00021	4	
ULE90130-01-UTL-00121	4	
ULE90130-01-UTL-00221	4	
ULE90130-01-UTL-00321	4	
ULE90130-01-UTL-00421		awaiting sewer drawing
ULE90130-01-UTL-00521	4	
ULE90130-01-UTL-00721	4	
ULE90130-01-UTL-00821	4	
ULE90130-01-UTL-00921	4	
ULE90130-01-UTL-01621		no IFA documents
ULE90130-01-CAL-00028 SGN	4	
ULE90130-01-CAL-00029 SP	4	
ULE90130-01-CAL-00030 SW Clean	4	
Conflict Spreadsheet Sewer		awaiting sewer schedule
ULE90130-01-CAL-00032 BT	4	
ULE90130-01-CAL-00033 VM	4	
ULE90130-01-CAL-00034 C&W	4	
ULE90130-01-CAL-00035 Thus	4	

Section 1B Plates 22 – 26

Document no.	*Revision no.*	*Comments*
ULE90130-01-UTL-00022	8	
ULE90130-01-UTL-00122	4	
ULE90130-01-UTL-00222	4	
ULE90130-01-UTL-00322	4	
ULE90130-01-UTL-00422	4	
ULE90130-01-UTL-00522	4	
ULE90130-01-UTL-00722	4	
ULE90130-01-UTL-00822	4	
ULE90130-01-UTL-00922	4	
ULE90130-01-UTL-01622	4	
ULE90130-01-UTL-00023	6	
ULE90130-01-UTL-00123	4	
ULE90130-01-UTL-00223	4	
ULE90130-01-UTL-00323	4	
ULE90130-01-UTL-00423	4	
ULE90130-01-UTL-00523	4	
ULE90130-01-UTL-00723	4	
ULE90130-01-UTL-00823	4	
ULE90130-01-UTL-00923	4	
ULE90130-01-UTL-01623	4	
ULE90130-01-UTL-00024	6	
ULE90130-01-UTL-00124	4	
ULE90130-01-UTL-00224	4	
ULE90130-01-UTL-00324	4	
ULE90130-01-UTL-00424	4	

ULE90130-01-UTL-00524	4	
ULE90130-01-UTL-00724	4	
ULE90130-01-UTL-00824	4	
ULE90130-01-UTL-00924	4	
ULE90130-01-UTL-01624	4	
ULE90130-01-UTL-00025	6	
ULE90130-01-UTL-00125	4	
ULE90130-01-UTL-00225	4	
ULE90130-01-UTL-00325	4	
ULE90130-01-UTL-00425	4	
ULE90130-01-UTL-00525	4	
ULE90130-01-UTL-00725	4	
ULE90130-01-UTL-00825	4	
ULE90130-01-UTL-00925	4	
ULE90130-01-UTL-01625	4	
ULE90130-01-UTL-00026	6	
ULE90130-01-UTL-00126	4	
ULE90130-01-UTL-00226	4	
ULE90130-01-UTL-00326	4	
ULE90130-01-UTL-00426	4	
ULE90130-01-UTL-00526	4	
ULE90130-01-UTL-00726	4	
ULE90130-01-UTL-00826	4	
ULE90130-01-UTL-00926	4	
ULE90130-01-UTL-01626	4	
ULE90130-01-UTL-02101	1	
ULE90130-01-UTL-02102	1	

ULE90130-01-UTL-02103	1	
ULE90130-01-UTL-02104	1	
ULE90130-01-UTL-02105	1	
ULE90130-01-UTL-02106	1	
ULE90130-01-CAL-00036 SGN	4	
ULE90130-01-CAL-00037 SP	4	
ULE90130-01-CAL-00038 SWClean	4	
ULE90130-01-CAL-00039 Sewer	4	
ULE90130-01-CAL-00040 BT	4	
ULE90130-01-CAL-00041 VM	4	
ULE90130-01-CAL-00042 C&W	4	
ULE90130-01-CAL-00043 Thus	4	

Section 1B Plates 27 – 31

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00027	9	
ULE90130-01-UTL-00127	4	
ULE90130-01-UTL-00227	4	
ULE90130-01-UTL-00327	4	
ULE90130-01-UTL-00427	4	
ULE90130-01-UTL-00527	4	
ULE90130-01-UTL-00727	4	
ULE90130-01-UTL-00827	4	
ULE90130-01-UTL-00927	4	

ULE90130-01-UTL-01627		no IFA documents
ULE90130-01-UTL-00028	9	
ULE90130-01-UTL-00128	4	
ULE90130-01-UTL-00228	4	
ULE90130-01-UTL-00328	4	
ULE90130-01-UTL-00428	4	
ULE90130-01-UTL-00528	4	
ULE90130-01-UTL-00728	4	
ULE90130-01-UTL-00828	4	
ULE90130-01-UTL-00928	4	
ULE90130-01-UTL-01628		no IFA documents
ULE90130-01-UTL-00029	9	
ULE90130-01-UTL-00129	4	
ULE90130-01-UTL-00229	4	
ULE90130-01-UTL-00329	4	
ULE90130-01-UTL-00429	4	
ULE90130-01-UTL-00529	4	
ULE90130-01-UTL-00729	4	
ULE90130-01-UTL-00829	4	
ULE90130-01-UTL-00929	4	
ULE90130-01-UTL-01629		no IFA documents
ULE90130-01-UTL-00030	9	
ULE90130-01-UTL-00130	4	
ULE90130-01-UTL-00230	4	
ULE90130-01-UTL-00330	4	
ULE90130-01-UTL-00430	4	
ULE90130-01-UTL-00530	4	

ULE90130-01-UTL-00730	4	
ULE90130-01-UTL-00830	4	
ULE90130-01-UTL-00930	4	
ULE90130-01-UTL-01630		no IFA documents
ULE90130-01-UTL-00031	9	
ULE90130-01-UTL-00131	4	
ULE90130-01-UTL-00231	4	
ULE90130-01-UTL-00331	4	
ULE90130-01-UTL-00431	4	
ULE90130-01-UTL-00531	4	
ULE90130-01-UTL-00731	4	
ULE90130-01-UTL-00831	4	
ULE90130-01-UTL-00931	4	
ULE90130-01-UTL-01631		no IFA documents
ULE90130-01-UTL-00082	1	
ULE90130-01-UTL-00259	1	
ULE90130-01-UTL-02107	1	
ULE90130-01-UTL-02108	1	
ULE90130-01-UTL-02109	1	
ULE90130-01-CAL-00044 SGN	4	
ULE90130-01-CAL-00047 SP	4	
ULE90130-01-CAL-00046 SW		no IFA documents
ULE90130-01-CAL-00047 Sewer	4	
ULE90130-01-CAL-00048 BT	4	
ULE90130-01-CAL-00049 VM	4	

ULE90130-01-CAL-00050 C&W	4	
ULE90130-01-CAL-00051 Thus	4	

Section 1C Plates 32 – 38

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00032	3	
ULE90130-01-UTL-00132	3	
ULE90130-01-UTL-00232	4	
ULE90130-01-UTL-00332	3	
ULE90130-01-UTL-00432		awaiting sewer drawing
ULE90130-01-UTL-00532	3	
ULE90130-01-UTL-00732	3	
ULE90130-01-UTL-00832	3	
ULE90130-01-UTL-00932	3	
ULE90130-01-UTL-00033	3	
ULE90130-01-UTL-00133	3	
ULE90130-01-UTL-00233	4	
ULE90130-01-UTL-00333	3	
ULE90130-01-UTL-00433		awaiting sewer drawing
ULE90130-01-UTL-00533	3	
ULE90130-01-UTL-00733	3	
ULE90130-01-UTL-00833	3	
ULE90130-01-UTL-00933	3	
ULE90130-01-UTL-00034	3	
ULE90130-01-UTL-00134	3	
ULE90130-01-UTL-00234	4	

ULE90130-01-UTL-00334	3	
ULE90130-01-UTL-00434		awaiting sewer drawing
ULE90130-01-UTL-00534	3	
ULE90130-01-UTL-00734	3	
ULE90130-01-UTL-00834	3	
ULE90130-01-UTL-00934	3	
ULE90130-01-UTL-00035	3	
ULE90130-01-UTL-00135	3	
ULE90130-01-UTL-00235	4	
ULE90130-01-UTL-00335	3	
ULE90130-01-UTL-00435		awaiting sewer drawing
ULE90130-01-UTL-00535	3	
ULE90130-01-UTL-00735	3	
ULE90130-01-UTL-00835	3	
ULE90130-01-UTL-00935	3	
ULE90130-01-UTL-00036	3	
ULE90130-01-UTL-00136	3	
ULE90130-01-UTL-00236	4	
ULE90130-01-UTL-00336	3	
ULE90130-01-UTL-00436		awaiting sewer drawing
ULE90130-01-UTL-00536	3	
ULE90130-01-UTL-00736	3	
ULE90130-01-UTL-00836	3	
ULE90130-01-UTL-00936	3	
ULE90130-01-UTL-00037	3	
ULE90130-01-UTL-00137	3	
ULE90130-01-UTL-00237	4	

ULE90130-01-UTL-00337	3	
ULE90130-01-UTL-00437		awaiting sewer drawing
ULE90130-01-UTL-00537	3	
ULE90130-01-UTL-00737	3	
ULE90130-01-UTL-00837	3	
ULE90130-01-UTL-00937	3	
ULE90130-01-UTL-00038	3	
ULE90130-01-UTL-00138	3	
ULE90130-01-UTL-00238	4	
ULE90130-01-UTL-00338	3	
ULE90130-01-UTL-00438		awaiting sewer drawing
ULE90130-01-UTL-00538	3	
ULE90130-01-UTL-00738	3	
ULE90130-01-UTL-00838	3	
ULE90130-01-UTL-00938	3	
ULE90130-01-CAL-00052 SGN	4	
ULE90130-01-CAL-00053 SP	5	
ULE90130-01-CAL-00054 SW	5	
ULE90130-01-CAL-00056 BT	4	
ULE90130-01-CAL-00057 VM	4	
ULE90130-01-CAL-00058 C&W	3	
ULE90130-01-CAL-00059 Thus	4	
ULE90130-01-UTL-00093	3	
ULE90130-01-UTL-00094	3	

ULE90130-01-UTL-00095	2	
ULE90130-01-UTL-00096	2	
ULE90130-01-UTL-00097	2	
ULE90130-01-UTL-00098	2	

Section 1C Plates 39 – 41

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00039	3	
ULE90130-01-UTL-00139	3	
ULE90130-01-UTL-00239	3	
ULE90130-01-UTL-00339	3	
ULE90130-01-UTL-00439		awaiting sewer drawing
ULE90130-01-UTL-00539	3	
ULE90130-01-UTL-00739	3	
ULE90130-01-UTL-00839	3	
ULE90130-01-UTL-00939	3	
ULE90130-01-UTL-01639		no IFA documents
ULE90130-01-UTL-00040	3	
ULE90130-01-UTL-00140	3	
ULE90130-01-UTL-00240	3	
ULE90130-01-UTL-00340	3	
ULE90130-01-UTL-00440		awaiting sewer drawing
ULE90130-01-UTL-00540	3	
ULE90130-01-UTL-00740	3	
ULE90130-01-UTL-00840	3	
ULE90130-01-UTL-00940	3	
ULE90130-01-UTL-01640		no IFA documents

ULE90130-01-UTL-00041	3	
ULE90130-01-UTL-00141	3	
ULE90130-01-UTL-00241	3	
ULE90130-01-UTL-00341	3	
ULE90130-01-UTL-00441		awaiting sewer drawing
ULE90130-01-UTL-00541	3	
ULE90130-01-UTL-00741	3	
ULE90130-01-UTL-00841	3	
ULE90130-01-UTL-00941	3	
ULE90130-01-UTL-01641		no IFA documents
ULE90130-01-UTL-00959	1	new Thus diversion dwg
ULE90130-01-CAL-00060 SGN	3	
ULE90130-01-CAL-00061 SP	3	
ULE90130-01-CAL-00062 SW	3	
ULE90130-01-CAL-00064 BT	3	
ULE90130-01-CAL-00065 VM	3	
ULE90130-01-CAL-00066 C&W	3	
ULE90130-01-CAL-00067 Thus	3	
ULE90130-01-CAL-00121 Thus	1	new Thus diversion sch
ULE90130-01-DRA-00012		no IFA documents

Section 1C Plates 42 – 44

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00042		no IFA documents

ULE90130-01-UTL-00142	4	
ULE90130-01-UTL-00242	4	
ULE90130-01-UTL-00342	4	
ULE90130-01-UTL-00442		
ULE90130-01-UTL-00542	4	
ULE90130-01-UTL-00742	4	
ULE90130-01-UTL-00842	4	
ULE90130-01-UTL-00942	4	
ULE90130-01-UTL-01643		
ULE90130-01-UTL-00043		no IFA documents
ULE90130-01-UTL-00143	4	
ULE90130-01-UTL-00243	4	
ULE90130-01-UTL-00343	4	
ULE90130-01-UTL-00443		
ULE90130-01-UTL-00543	4	
ULE90130-01-UTL-00743	4	
ULE90130-01-UTL-00843	4	
ULE90130-01-UTL-00943	4	
ULE90130-01-UTL-01644		
ULE90130-01-UTL-00044		no IFA documents
ULE90130-01-UTL-00144	4	
ULE90130-01-UTL-00244	4	
ULE90130-01-UTL-00344	4	
ULE90130-01-UTL-00444		
ULE90130-01-UTL-00544	4	
ULE90130-01-UTL-00744	4	
ULE90130-01-UTL-00844	4	

ULE90130-01-UTL-00944	4	
ULE90130-01-UTL-01644		awaiting sewer drawing
ULE90130-01-CAL-00069 SGN	4	
ULE90130-01-CAL-00070 SP	4	
ULE90130-01-CAL-00071 SW	4	
ULE90130-01-CAL-00073 BT	4	
ULE90130-01-CAL-00074 VM	4	
ULE90130-01-CAL-00075 C&W	4	
ULE90130-01-CAL-00076 Thus	4	

Section 1C Plates 45 – 48

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00045	2	
ULE90130-01-UTL-00145	2	
ULE90130-01-UTL-00245	2	
ULE90130-01-UTL-00345	2	
ULE90130-01-UTL-00445		awaiting sewer drawing
ULE90130-01-UTL-00545	2	
ULE90130-01-UTL-00745	2	
ULE90130-01-UTL-00845	2	
ULE90130-01-UTL-00945	2	
ULE90130-01-UTL-01645		no IFA document
ULE90130-01-UTL-00046	2	
ULE90130-01-UTL-00146	2	

ULE90130-01-UTL-00246	2	
ULE90130-01-UTL-00346	2	
ULE90130-01-UTL-00446		awaiting sewer drawing
ULE90130-01-UTL-00546	2	
ULE90130-01-UTL-00746	2	
ULE90130-01-UTL-00846	2	
ULE90130-01-UTL-00946	2	
ULE90130-01-UTL-01646		no IFA document
ULE90130-01-UTL-00047	2	
ULE90130-01-UTL-00147	2	
ULE90130-01-UTL-00247	2	
ULE90130-01-UTL-00347	2	
ULE90130-01-UTL-00447		awaiting sewer drawing
ULE90130-01-UTL-00547	2	
ULE90130-01-UTL-00747	2	
ULE90130-01-UTL-00847	2	
ULE90130-01-UTL-00947	2	
ULE90130-01-UTL-01647		no IFA document
ULE90130-01-UTL-00048	2	
ULE90130-01-UTL-00148	2	
ULE90130-01-UTL-00248	2	
ULE90130-01-UTL-00348	2	
ULE90130-01-UTL-00448		awaiting sewer drawing
ULE90130-01-UTL-00548	2	
ULE90130-01-UTL-00748	2	
ULE90130-01-UTL-00848	2	
ULE90130-01-UTL-00948	2	

ULE90130-01-UTL-01648		no IFA document
ULE90130-01-CAL-00078 SGN	2	
ULE90130-01-CAL-00079 SP	2	
ULE90130-01-CAL-00080 SW	2	
sewer schedule		awaiting sewer schedule
ULE90130-01-CAL-00082 BT	2	
ULE90130-01-CAL-00083 VM	2	
ULE90130-01-CAL-00084 C&W	2	
ULE90130-01-CAL-00085 Thus	2	
ULE90130-01-DRA-00014		no IFA document

Section 1D Plates 49 – 51

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00049	3	
ULE90130-01-UTL-00149	3	
ULE90130-01-UTL-00249	3	
ULE90130-01-UTL-00349	3	
ULE90130-01-UTL-00449		awaiting sewer drawing
ULE90130-01-UTL-00549	3	
ULE90130-01-UTL-00749	3	
ULE90130-01-UTL-00849	3	
ULE90130-01-UTL-00949	3	
ULE90130-01-UTL-01649		no IFA documents
ULE90130-01-UTL-00050	3	

ULE90130-01-UTL-00150	3	
ULE90130-01-UTL-00250	3	
ULE90130-01-UTL-00350	3	
ULE90130-01-UTL-00450		awaiting sewer drawing
ULE90130-01-UTL-00550	3	
ULE90130-01-UTL-00750	3	
ULE90130-01-UTL-00850	3	
ULE90130-01-UTL-00950	3	
ULE90130-01-UTL-01650		no IFA documents
ULE90130-01-UTL-00051	3	
ULE90130-01-UTL-00151	3	
ULE90130-01-UTL-00251	3	
ULE90130-01-UTL-00351	3	
ULE90130-01-UTL-00451		awaiting sewer drawing
ULE90130-01-UTL-00551	3	
ULE90130-01-UTL-00751	3	
ULE90130-01-UTL-00851	3	
ULE90130-01-UTL-00951	3	
ULE90130-01-UTL-01651		no IFA documents
ULE90130-01-CAL-00086 SGN	3	
ULE90130-01-CAL-00087 SP	3	
ULE90130-01-CAL-00088 SW	3	
sewer schedule		awaiting sewer schedule
ULE90130-01-CAL-00090 BT	3	
ULE90130-01-CAL-00091 VM	3	

ULE90130-01-CAL-00092 C&W	3	
ULE90130-01-CAL-00093 Thus	3	

Section 1D Plates 52 – 56

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00052	3	
ULE90130-01-UTL-00152	3	
ULE90130-01-UTL-00252	3	
ULE90130-01-UTL-00352	3	
ULE90130-01-UTL-00452		awaiting sewer drawing
ULE90130-01-UTL-00552	3	
ULE90130-01-UTL-00752	3	
ULE90130-01-UTL-00852	3	
ULE90130-01-UTL-00952	3	
ULE90130-01-UTL-01652		no IFA documents
ULE90130-01-UTL-00053	3	
ULE90130-01-UTL-00153	3	
ULE90130-01-UTL-00253	3	
ULE90130-01-UTL-00353	3	
ULE90130-01-UTL-00453		awaiting sewer drawing
ULE90130-01-UTL-00553	3	
ULE90130-01-UTL-00753	3	
ULE90130-01-UTL-00853	3	
ULE90130-01-UTL-00953	3	
ULE90130-01-UTL-01653		no IFA documents
ULE90130-01-UTL-00054	3	

ULE90130-01-UTL-00154	3	
ULE90130-01-UTL-00254	3	
ULE90130-01-UTL-00354	3	
ULE90130-01-UTL-00454		awaiting sewer drawing
ULE90130-01-UTL-00554	3	
ULE90130-01-UTL-00754	3	
ULE90130-01-UTL-00854	3	
ULE90130-01-UTL-00954	3	
ULE90130-01-UTL-01654		no IFA documents
ULE90130-01-UTL-00055	3	
ULE90130-01-UTL-00155	3	
ULE90130-01-UTL-00255	3	
ULE90130-01-UTL-00355	3	
ULE90130-01-UTL-00455		awaiting sewer drawing
ULE90130-01-UTL-00555	3	
ULE90130-01-UTL-00755	3	
ULE90130-01-UTL-00855	3	
ULE90130-01-UTL-00955	3	
ULE90130-01-UTL-01655		no IFA documents
ULE90130-01-UTL-00056	3	
ULE90130-01-UTL-00156	3	
ULE90130-01-UTL-00256	3	
ULE90130-01-UTL-00356	3	
ULE90130-01-UTL-00456		awaiting sewer drawing
ULE90130-01-UTL-00556	3	
ULE90130-01-UTL-00756	3	
ULE90130-01-UTL-00856	3	

ULE90130-01-UTL-00956	3	
ULE90130-01-UTL-01656		no IFA documents
ULE90130-01-CAL-00101 SGN	3	
ULE90130-01-CAL-00094 SP	3	
ULE90130-01-CAL-00095 SW	3	
sewer schedule		awaiting sewer schedule
ULE90130-01-CAL-00097 BT	3	
ULE90130-01-CAL-00098 VM	3	
ULE90130-01-CAL-00099 C&W	3	
ULE90130-01-CAL-00100 Thus	3	

Section 5A Plates 1 – 3

Document no.	***Revision no.***	***Comments***
ULE90130-05-UTL-00001		no IFA documents
ULE90130-05-UTL-00101	2	
ULE90130-05-UTL-00201	2	
ULE90130-05-UTL-00301	6	
ULE90130-05-UTL-00401		awaiting sewer drawing
ULE90130-05-UTL-00501		no IFA documents
ULE90130-05-UTL-00701	2	
ULE90130-05-UTL-00801	2	
ULE90130-05-UTL-00901		no IFA documents
ULE90130-05-UTL-01401		no IFA documents
ULE90130-05-UTL-00002		no IFA documents

ULE90130-05-UTL-00102	2	
ULE90130-05-UTL-00202	2	
ULE90130-05-UTL-00302	8	
ULE90130-05-UTL-00402		awaiting sewer drawing
ULE90130-05-UTL-00502		no IFA documents
ULE90130-05-UTL-00702	2	
ULE90130-05-UTL-00802	2	
ULE90130-05-UTL-00902		no IFA documents
ULE90130-05-UTL-01402		no IFA documents
ULE90130-05-UTL-00003		no IFA documents
ULE90130-05-UTL-00103	2	
ULE90130-05-UTL-00203	2	
ULE90130-05-UTL-00303	5	
ULE90130-05-UTL-00403		awaiting sewer drawing
ULE90130-05-UTL-00503		no IFA documents
ULE90130-05-UTL-00703	2	
ULE90130-05-UTL-00803	2	
ULE90130-05-UTL-00903		no IFA documents
ULE90130-05-UTL-01403		no IFA documents
ULE90130-05-UTL-00028		no IFA documents
ULE90130-05-UTL-00029		no IFA documents
ULE90130-05-UTL-00041		no IFA documents
ULE90130-05-UTL-00042		no IFA documents
ULE90130-05-UTL-00043		no IFA documents
Conflict Spreadsheet (1-3) SGN	2	
Conflict Spreadsheet (1-3) SP	2	
SW Clean schedule		no IFA documents

Sewer schedule		no IFA documents
Conflict Spreadsheet (1-3) BT	2	
Conflict Spreadsheet (1-3) VM	2	
Conflict Spreadsheet (1-3) C&W	2	
Thus schedule		no IFA documents

Section 5A Plates 4 – 5

Document no.	***Revision no.***	***Comments***
ULE90130-05-UTL-00004		no IFA documents
ULE90130-05-UTL-00104		no IFA documents
ULE90130-05-UTL-00204		no IFA documents
ULE90130-05-UTL-00304	3	
ULE90130-05-UTL-00404		awaiting sewer drawing
ULE90130-05-UTL-00504		no IFA documents
ULE90130-05-UTL-00704		no IFA documents
ULE90130-05-UTL-00804		no IFA documents
ULE90130-05-UTL-00904		no IFA documents
ULE90130-05-UTL-00005		no IFA documents
ULE90130-05-UTL-00105		no IFA documents
ULE90130-05-UTL-00205		no IFA documents
ULE90130-05-UTL-00305	3	
ULE90130-05-UTL-00405		awaiting sewer drawing
ULE90130-05-UTL-00505		no IFA documents
ULE90130-05-UTL-00705		no IFA documents
ULE90130-05-UTL-00805		no IFA documents
ULE90130-05-UTL-00905		no IFA documents

SGN schedule		no IFA documents
ULE90130-05-CAL-00012 SW	1	
ULE90130-05-CAL-00017 SP		no IFA documents
Sewer schedule		awaiting sewer schedule
BT schedule		no IFA documents
VM sechdule		no IFA documents
C&W schedule		no IFA documents
Thus schedule		no IFA documents

Section 5B Plates 6 – 13

Document no.	***Revision no.***	***Comments***
ULE90130-05-UTL-00006		no IFA documents
ULE90130-05-UTL-00106	2	
ULE90130-05-UTL-00206	2	
ULE90130-05-UTL-00306	2	
ULE90130-05-UTL-00406		awaiting sewer documents
ULE90130-05-UTL-00506		no IFA documents
ULE90130-05-UTL-00706		no IFA documents
ULE90130-05-UTL-00806	2	
ULE90130-05-UTL-00906		no IFA documents
ULE90130-05-UTL-00007		no IFA documents
ULE90130-05-UTL-00107	2	
ULE90130-05-UTL-00207	2	
ULE90130-05-UTL-00307	2	
ULE90130-05-UTL-00407		awaiting sewer documents
ULE90130-05-UTL-00507		no IFA documents
ULE90130-05-UTL-00707		no IFA documents

ULE90130-05-UTL-00807	2	
ULE90130-05-UTL-00907		no IFA documents
ULE90130-05-UTL-00008		no IFA documents
ULE90130-05-UTL-00108	2	
ULE90130-05-UTL-00208	2	
ULE90130-05-UTL-00308	2	
ULE90130-05-UTL-00408		awaiting sewer documents
ULE90130-05-UTL-00508		no IFA documents
ULE90130-05-UTL-00708		no IFA documents
ULE90130-05-UTL-00808	2	
ULE90130-05-UTL-00908		no IFA documents
ULE90130-05-UTL-00009		no IFA documents
ULE90130-05-UTL-00109	2	
ULE90130-05-UTL-00209	2	
ULE90130-05-UTL-00309	2	
ULE90130-05-UTL-00409		awaiting sewer documents
ULE90130-05-UTL-00509		no IFA documents
ULE90130-05-UTL-00709		no IFA documents
ULE90130-05-UTL-00809	2	
ULE90130-05-UTL-00909		no IFA documents
ULE90130-05-UTL-00010		no IFA documents
ULE90130-05-UTL-00110	2	
ULE90130-05-UTL-00210	2	
ULE90130-05-UTL-00310	2	
ULE90130-05-UTL-00410		awaiting sewer documents
ULE90130-05-UTL-00510		no IFA documents
ULE90130-05-UTL-00710		no IFA documents

ULE90130-05-UTL-00810	2	
ULE90130-05-UTL-00910		no IFA documents
ULE90130-05-UTL-00011		no IFA documents
ULE90130-05-UTL-00111	2	
ULE90130-05-UTL-00211	2	
ULE90130-05-UTL-00311	2	
ULE90130-05-UTL-00411		awaiting sewer documents
ULE90130-05-UTL-00511		no IFA documents
ULE90130-05-UTL-00711		no IFA documents
ULE90130-05-UTL-00811	2	
ULE90130-05-UTL-00911		no IFA documents
ULE90130-05-UTL-00012		no IFA documents
ULE90130-05-UTL-00112	2	
ULE90130-05-UTL-00212	2	
ULE90130-05-UTL-00312	2	
ULE90130-05-UTL-00412		awaiting sewer documents
ULE90130-05-UTL-00512		no IFA documents
ULE90130-05-UTL-00712		no IFA documents
ULE90130-05-UTL-00812	2	
ULE90130-05-UTL-00912		no IFA documents
ULE90130-05-UTL-00013		no IFA documents
ULE90130-05-UTL-00113	2	
ULE90130-05-UTL-00213	2	
ULE90130-05-UTL-00313	2	
ULE90130-05-UTL-00413		awaiting sewer documents
ULE90130-05-UTL-00513		no IFA documents
ULE90130-05-UTL-00713		no IFA documents

ULE90130-05-UTL-00813	2	
ULE90130-05-UTL-00913		no IFA documents
SGN schedule		no IFA documents
ULE90130-05-CAL-00014 SP		no IFA documents
SW Clean schedule		no IFA documents
Sewer schedule		awaiting sewer documents
BT schedule		no IFA documents
VM schedule		no IFA documents
ULE90130-05-CAL-00013 C&W		no IFA documents
Thus schedule		no IFA documents
ULE90130-05-UTL-00046		no IFA documents
ULE90130-05-UTL-00047		no IFA documents
ULE90130-05-UTL-00048		no IFA documents
ULE90130-05-UTL-00049		no IFA documents
ULE90130-05-UTL-00050		no IFA documents
ULE90130-05-UTL-00051		no IFA documents
ULE90130-05-UTL-00052		no IFA documents
ULE90130-05-UTL-00053		no IFA documents

Section 5B Plates 14 – 20

Document no.	***Revision no.***	***Comments***
ULE90130-05-UTL-00014		no IFA documents
ULE90130-05-UTL-00114	3	
ULE90130-05-UTL-00214		no IFA documents
ULE90130-05-UTL-00314	3	
ULE90130-05-UTL-00414		awaiting sewer documents
ULE90130-05-UTL-00514	3	

ULE90130-05-UTL-00714	3	
ULE90130-05-UTL-00814	3	Reference Drawing
ULE90130-05-UTL-00914	2	
ULE90130-05-UTL-00015		no IFA documents
ULE90130-05-UTL-00115	3	
ULE90130-05-UTL-00215		no IFA documents
ULE90130-05-UTL-00315	7	
ULE90130-05-UTL-00415		awaiting sewer documents
ULE90130-05-UTL-00515	3	
ULE90130-05-UTL-00715	4	
ULE90130-05-UTL-00815	4	Reference Drawing
ULE90130-05-UTL-00915	3	
ULE90130-05-UTL-00016		no IFA documents
ULE90130-05-UTL-00116	2	
ULE90130-05-UTL-00216		no IFA documents
ULE90130-05-UTL-00316		no IFA documents
ULE90130-05-UTL-00416		awaiting sewer documents
ULE90130-05-UTL-00516	3	
ULE90130-05-UTL-00716	3	
ULE90130-05-UTL-00816	3	Reference Drawing
ULE90130-05-UTL-00916	2	
ULE90130-05-UTL-00017		no IFA documents
ULE90130-05-UTL-00117	2	
ULE90130-05-UTL-00217		no IFA documents
ULE90130-05-UTL-00317		no IFA documents
ULE90130-05-UTL-00417		awaiting sewer documents
ULE90130-05-UTL-00517	3	

ULE90130-05-UTL-00717	3	
ULE90130-05-UTL-00817	3	Reference Drawing
ULE90130-05-UTL-00917	2	
ULE90130-05-UTL-00018		no IFA documents
ULE90130-05-UTL-00118	3	
ULE90130-05-UTL-00218		no IFA documents
ULE90130-05-UTL-00318		no IFA documents
ULE90130-05-UTL-00418		awaiting sewer documents
ULE90130-05-UTL-00518	3	
ULE90130-05-UTL-00718	4	
ULE90130-05-UTL-00818	5	Reference Drawing
ULE90130-05-UTL-00918	3	
ULE90130-05-UTL-00019		no IFA documents
ULE90130-05-UTL-00119	3	
ULE90130-05-UTL-00219		no IFA documents
ULE90130-05-UTL-00319		no IFA documents
ULE90130-05-UTL-00419		awaiting sewer documents
ULE90130-05-UTL-00519	3	
ULE90130-05-UTL-00719	3	
ULE90130-05-UTL-00819	3	Reference Drawing
ULE90130-05-UTL-00919	2	
ULE90130-05-UTL-00020		no IFA documents
ULE90130-05-UTL-00120	2	
ULE90130-05-UTL-00220		no IFA documents
ULE90130-05-UTL-00320		no IFA documents
ULE90130-05-UTL-00420		awaiting sewer documents
ULE90130-05-UTL-00520	3	

ULE90130-05-UTL-00720	4	
ULE90130-05-UTL-00820	4	Reference Drawing
ULE90130-05-UTL-00920	3	
ULE90130-05-UTL-00054		no IFA documents
ULE90130-05-UTL-00055		no IFA documents
ULE90130-05-UTL-00056		no IFA documents
ULE90130-05-UTL-00057		no IFA documents
ULE90130-05-UTL-00058	2	
ULE90130-05-UTL-00060		no IFA documents
ULE90130-05-CAL-00009 (BT)		no IFA documents
ULE90130-05-CAL-00016 (VM)	1	
ULE90130-05-CAL-00015 (THUS)	1	
ULE90130-05-CAL-00018 (C & W)		no IFA documents
ULE90130-05-CAL-00019 (SW Clean)		no IFA documents
sewer schedule		awaiting sewer documents
ULE90130-05-CAL-00020 (SP)		no IFA documents
ULE90130-05-CAL-00023 (SGN)		no IFA documents
Diversion Schedule (C&W)	X	Reference Schedule
Diversion Schedule (SW Clean)	X	Reference Schedule
Diversion Schedule (SP)	X	Reference Schedule

Section 5C Plates 21 – 26

Document no.	***Revision no.***	***Comments***

ULE90130-05-UTL-00021	4	
ULE90130-05-UTL-00121	2	
ULE90130-05-UTL-00221	2	
ULE90130-05-UTL-00321	2	
ULE90130-05-UTL-00421		awaiting sewer documents
ULE90130-05-UTL-00521	2	
ULE90130-05-UTL-00721	3	
ULE90130-05-UTL-00821	4	
ULE90130-05-UTL-00921	2	
ULE90130-05-UTL-01021	1	
ULE90130-05-UTL-00022		no IFA documents
ULE90130-05-UTL-00122	3	
ULE90130-05-UTL-00222	3	
ULE90130-05-UTL-00322	4	
ULE90130-05-UTL-00422		awaiting sewer documents
ULE90130-05-UTL-00522	3	
ULE90130-05-UTL-00722	4	
ULE90130-05-UTL-00822	3	
ULE90130-05-UTL-00922	2	
ULE90130-05-UTL-01022	2	
ULE90130-05-UTL-00023		no IFA documents
ULE90130-05-UTL-00123	2	
ULE90130-05-UTL-00223	3	
ULE90130-05-UTL-00323	3	
ULE90130-05-UTL-00423		awaiting sewer documents
ULE90130-05-UTL-00523	2	
ULE90130-05-UTL-00723	3	

ULE90130-05-UTL-00823	4	
ULE90130-05-UTL-00923	4	
ULE90130-05-UTL-01023	3	
ULE90130-05-UTL-00024		no IFA documents
ULE90130-05-UTL-00124	3	
ULE90130-05-UTL-00224	4	
ULE90130-05-UTL-00324	4	
ULE90130-05-UTL-00424		awaiting sewer documents
ULE90130-05-UTL-00524	4	
ULE90130-05-UTL-00724	3	
ULE90130-05-UTL-00824	4	
ULE90130-05-UTL-00924	4	
ULE90130-05-UTL-01024	3	
ULE90130-05-UTL-00025	4	
ULE90130-05-UTL-00125	3	
ULE90130-05-UTL-00225	3	
ULE90130-05-UTL-00325	4	
ULE90130-05-UTL-00425		awaiting sewer documents
ULE90130-05-UTL-00525	3	
ULE90130-05-UTL-00725	3	
ULE90130-05-UTL-00825	4	
ULE90130-05-UTL-00925	3	
ULE90130-05-UTL-01025	2	
ULE90130-05-UTL-00026	4	
ULE90130-05-UTL-00126	3	
ULE90130-05-UTL-00226	2	
ULE90130-05-UTL-00326	4	

ULE90130-05-UTL-00426		awaiting sewer documents
ULE90130-05-UTL-00526	4	
ULE90130-05-UTL-00726	2	
ULE90130-05-UTL-00826	3	
ULE90130-05-UTL-00926	2	
ULE90130-05-UTL-01026	2	
ULE90130-05-UTL-00062	4	
ULE90130-05-UTL-00063	2	
ULE90130-05-UTL-00064	2	
ULE90130-05-UTL-00070	1	
ULE90130-05-UTL-00071	1	
ULE90130-05-UTL-00072	1	
ULE90130-05-CAL-00026 (EasyNET)	1	
ULE90130-05-CAL-00027 (SGN)	1	
ULE90130-05-CAL-00028 (SP)	1	
ULE90130-05-CAL-00029 (SWC)	1	
sewer schedule		awaiting sewer documents
ULE90130-05-CAL-00030 (BT)	1	
ULE90130-05-CAL-00031 (C & W)	1	
ULE90130-05-CAL-00032 (Thus)	1	
ULE90130-05-CAL-00033 (VM)	1	
ULE90130-05-CAL-00034 (Private Utilities)	1	

Section 6A Plates 1 – 2

Document no.	*Revision no.*	*Comments*
ULE90130-06-UTL-00001	3	
ULE90130-06-UTL-00101		no IFA documents
ULE90130-06-UTL-00201	3	
ULE90130-06-UTL-00301	3	
ULE90130-06-UTL-00401		awaiting sewer documents
ULE90130-06-UTL-00501		no IFA documents
ULE90130-06-UTL-00601		no IFA documents
ULE90130-06-UTL-00701		no IFA documents
ULE90130-06-UTL-00801	6	
ULE90130-06-UTL-00901	3	
SGN schedule		no IFA documents
ULE90130-06-CAL-00001 (SP)	2	
ULE90130-06-CAL-00002 (Thus)	1	
ULE90130-06-CAL-00003 (C&W)	2	
ULE90130-06-CAL-00004 (SWC)	2	
sewer schedule		no IFA documents
BT schedule		no IFA documents
VM schedule		no IFA documents

Gogar 800mm

Document no.	*Revision no.*	*Comments*
ULE90130-06-DRG-00006	2	
ULE90130-06-DRG-	2	

00007		
ULE90130-06-DRG-00008	1	Discussion drawing
ULE90130-06-DRG-00009	1	Discussion drawing
ULE90130-06-DRG-00010	2	
ULE90130-06-DRG-00011	2	
ULE90130-06-DRG-00626	2	
ULE90130-06-DRG-00627	1	
ULE90130-06-SCH-00002	x	Thrust Block Schedule
ULE90130-06-SPN-00003	x	Online Materials Specification Gogar Depot
NORWEST HOLST Report	1	on a Ground Investiagtion at Line 2

General – Standard Details

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTH-00015	X	Reference Drawing (received from Thus)
ULE90130-01-UTH-00025	x	Reference Drawing (received from Thus)
ULE90130-01-UTH-00006	X	Reference Drawing (received from Thus)
ULE90130-01-UTL-00033	3	Reference Drawing (received from Thus)
ULE90130-01-UTL-00035	3	Reference Drawing (received from Thus)
ULE90130-SW-UTL-00008		no IFA documents
ULE90130-SW-UTL-00009		no IFA documents

ULE90130-SW-UTL-00010		no IFA documents
ULE90130-SW-UTL-00016		no IFA documents
ULE90130-SW-UTL-00013	1	SW Foul - Standard Details, Jetting Eye
ULE90130-SW-UTL-00017	1	SW Foul - New Box Section Manhole
ULE90130-SW-UTL-00018	1	SW Foul - Box Section Manhole Intergration with Existing Manhole
DKE Coordinates1B 22-27	x	
DKE Coordinates1C 42-44	x	
DKE Coordinates 1D 49-56	x	
DKE Coordinates 5B 14-20	x	

IFC DOCUMENTATION

Section 1A Plates 6 – 10

No IFC documents have been received.

Section 1A Plates 13 – 15

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00013	5	
ULE90130-01-UTL-00113	5	
ULE90130-01-UTL-00213	5	
ULE90130-01-UTL-00313	5	
ULE90130-01-UTL-00413		no IFC documents yet
ULE90130-01-UTL-00513	5	
ULE90130-01-UTL-00713	5	
ULE90130-01-UTL-00813	5	
ULE90130-01-UTL-00913	5	

ULE90130-01-UTL-01613	3	
ULE90130-01-UTL-01713	5	
ULE90130-01-UTL-00014	5	
ULE90130-01-UTL-00114	5	
ULE90130-01-UTL-00214	5	
ULE90130-01-UTL-00314	5	
ULE90130-01-UTL-00414		no IFC documents yet
ULE90130-01-UTL-00514	5	
ULE90130-01-UTL-00714	5	
ULE90130-01-UTL-00814	5	
ULE90130-01-UTL-00914	5	
ULE90130-01-UTL-01614	3	
ULE90130-01-UTL-01714	5	
ULE90130-01-UTL-00015	5	
ULE90130-01-UTL-00115	5	
ULE90130-01-UTL-00215	5	
ULE90130-01-UTL-00315	5	
ULE90130-01-UTL-00415		no IFC documents yet
ULE90130-01-UTL-00515	5	
ULE90130-01-UTL-00715	5	
ULE90130-01-UTL-00815	5	
ULE90130-01-UTL-00915	5	
ULE90130-01-UTL-01615	3	
ULE90130-01-UTL-01715	5	
Conflict Spreadsheet (13-15) SGN	5	
Conflict Spreadsheet (13-15) SP	5	

Conflict Spreadsheet (13-15) SW Clean	5	
Conflict Spreadsheet (13-15) Sewer		no IFC documents yet
Conflict Spreadsheet (13-15) BT	5	
Conflict Spreadsheet (13-15) VM	5	
Conflict Spreadsheet (13-15) C&W	5	
Conflict Spreadsheet (13-15) Thus	5	
Conflict Spreadsheet (13-15) Fourth Ports	5	

Section 1A Plates 16 – 21

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00016	6	
ULE90130-01-UTL-00116	6	
ULE90130-01-UTL-00216	5	
ULE90130-01-UTL-00316	5	
ULE90130-01-UTL-00416		no IFC documents yet
ULE90130-01-UTL-00516	5	
ULE90130-01-UTL-00716	5	
ULE90130-01-UTL-00816	5	
ULE90130-01-UTL-00916	5	
ULE90130-01-UTL-01616	3	
ULE90130-01-UTL-00017	6	
ULE90130-01-UTL-00117	6	
ULE90130-01-UTL-00217	5	
ULE90130-01-UTL-00317	5	

ULE90130-01-UTL-00417		no IFC documents yet
ULE90130-01-UTL-00517	5	
ULE90130-01-UTL-00717	5	
ULE90130-01-UTL-00817	5	
ULE90130-01-UTL-00917	5	
ULE90130-01-UTL-01617	3	
ULE90130-01-UTL-00018	6	
ULE90130-01-UTL-00118	6	
ULE90130-01-UTL-00218	5	
ULE90130-01-UTL-00318	5	
ULE90130-01-UTL-00418		no IFC documents yet
ULE90130-01-UTL-00518	5	
ULE90130-01-UTL-00718	5	
ULE90130-01-UTL-00818	5	
ULE90130-01-UTL-00918	5	
ULE90130-01-UTL-01618	3	
ULE90130-01-UTL-00019	6	
ULE90130-01-UTL-00119	6	
ULE90130-01-UTL-00219	5	
ULE90130-01-UTL-00319	5	
ULE90130-01-UTL-00419		no IFC documents yet
ULE90130-01-UTL-00519	5	
ULE90130-01-UTL-00719	5	
ULE90130-01-UTL-00819	5	
ULE90130-01-UTL-00919	5	
ULE90130-01-UTL-01619	3	
ULE90130-01-UTL-00020	6	

ULE90130-01-UTL-00120	6	
ULE90130-01-UTL-00220	5	
ULE90130-01-UTL-00320	5	
ULE90130-01-UTL-00420		no IFC documents yet
ULE90130-01-UTL-00520	5	
ULE90130-01-UTL-00720	5	
ULE90130-01-UTL-00820	5	
ULE90130-01-UTL-00920	5	
ULE90130-01-UTL-01620	3	
ULE90130-01-UTL-00021	6	
ULE90130-01-UTL-00121	6	
ULE90130-01-UTL-00221	5	
ULE90130-01-UTL-00321	5	
ULE90130-01-UTL-00421		no IFC documents yet
ULE90130-01-UTL-00521	5	
ULE90130-01-UTL-00721	5	
ULE90130-01-UTL-00821	5	
ULE90130-01-UTL-00921	5	
ULE90130-01-UTL-01621	3	
ULE90130-01-CAL-00028 SGN	6	
ULE90130-01-CAL-00029 SP	5	
ULE90130-01-CAL-00030 SW Clean	5	
Conflict Spreadsheet Sewer		no IFC documents yet
ULE90130-01-CAL-00032 BT	4	
ULE90130-01-CAL-00033 VM	5	

ULE90130-01-CAL-00034 C&W	5	
ULE90130-01-CAL-00035 Thus	5	

Section 1B Plates 22 – 26

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00022	7	
ULE90130-01-UTL-00122	7	
ULE90130-01-UTL-00222	5	
ULE90130-01-UTL-00322	6	
ULE90130-01-UTL-00422		no IFC documents yet
ULE90130-01-UTL-00522	5	
ULE90130-01-UTL-00722	6	
ULE90130-01-UTL-00822	5	
ULE90130-01-UTL-00922	5	
ULE90130-01-UTL-01622	3	
ULE90130-01-UTL-00023	5	
ULE90130-01-UTL-00123	5	
ULE90130-01-UTL-00223	5	
ULE90130-01-UTL-00323	5	
ULE90130-01-UTL-00423		no IFC documents yet
ULE90130-01-UTL-00523	5	
ULE90130-01-UTL-00723	6	
ULE90130-01-UTL-00823	5	
ULE90130-01-UTL-00923	5	
ULE90130-01-UTL-01623	3	
ULE90130-01-UTL-00024	5	

ULE90130-01-UTL-00124	5	
ULE90130-01-UTL-00224	5	
ULE90130-01-UTL-00324	5	
ULE90130-01-UTL-00424		no IFC documents yet
ULE90130-01-UTL-00524	5	
ULE90130-01-UTL-00724	6	
ULE90130-01-UTL-00824	5	
ULE90130-01-UTL-00924	5	
ULE90130-01-UTL-01624	3	
ULE90130-01-UTL-00025	5	
ULE90130-01-UTL-00125	5	
ULE90130-01-UTL-00225	5	
ULE90130-01-UTL-00325	5	
ULE90130-01-UTL-00425		no IFC documents yet
ULE90130-01-UTL-00525	5	
ULE90130-01-UTL-00725	6	
ULE90130-01-UTL-00825	5	
ULE90130-01-UTL-00925	5	
ULE90130-01-UTL-01625	3	
ULE90130-01-UTL-00026	5	
ULE90130-01-UTL-00126	5	
ULE90130-01-UTL-00226	5	
ULE90130-01-UTL-00326	5	
ULE90130-01-UTL-00426		no IFC documents yet
ULE90130-01-UTL-00526	5	
ULE90130-01-UTL-00726	6	
ULE90130-01-UTL-00826	5	

ULE90130-01-UTL-00926	5	
ULE90130-01-UTL-01626	3	
ULE90130-01-UTL-02101		Cross Sections at Manholes requiring Diversios no IFC documents yet
ULE90130-01-UTL-02102		
ULE90130-01-UTL-02103		
ULE90130-01-UTL-02104		
ULE90130-01-UTL-02105		
ULE90130-01-UTL-02106		
ULE90130-01-CAL-00036 SGN	7	
ULE90130-01-CAL-00037 SP	5	
ULE90130-01-CAL-00038 SWClean	6	
ULE90130-01-CAL-00039 Sewer		no IFC documents yet
ULE90130-01-CAL-00040 BT	5	
ULE90130-01-CAL-00041 VM	6	
ULE90130-01-CAL-00042 C&W	5	
ULE90130-01-CAL-00043 Thus	5	

Section 1B Plates 27 – 31

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00027	8	
ULE90130-01-UTL-00127	8	
ULE90130-01-UTL-00227	5	
ULE90130-01-UTL-00327	10	
ULE90130-01-UTL-00427		no IFC documents yet

ULE90130-01-UTL-00527	5	
ULE90130-01-UTL-00727	5	
ULE90130-01-UTL-00827	5	
ULE90130-01-UTL-00927	5	
ULE90130-01-UTL-01627	3	
ULE90130-01-UTL-00028	8	
ULE90130-01-UTL-00128	8	
ULE90130-01-UTL-00228	5	
ULE90130-01-UTL-00328	10	
ULE90130-01-UTL-00428		no IFC documents yet
ULE90130-01-UTL-00528	5	
ULE90130-01-UTL-00728	5	
ULE90130-01-UTL-00828	5	
ULE90130-01-UTL-00928	5	
ULE90130-01-UTL-01628	3	
ULE90130-01-UTL-00029	8	
ULE90130-01-UTL-00129	8	
ULE90130-01-UTL-00229	5	
ULE90130-01-UTL-00329	10	
ULE90130-01-UTL-00429		no IFC documents yet
ULE90130-01-UTL-00529	5	
ULE90130-01-UTL-00729	5	
ULE90130-01-UTL-00829	5	
ULE90130-01-UTL-00929	5	
ULE90130-01-UTL-01629	3	
ULE90130-01-UTL-00030	8	
ULE90130-01-UTL-00130	8	

ULE90130-01-UTL-00230	5	
ULE90130-01-UTL-00330	10	
ULE90130-01-UTL-00430		no IFC documents yet
ULE90130-01-UTL-00530	5	
ULE90130-01-UTL-00730	5	
ULE90130-01-UTL-00830	5	
ULE90130-01-UTL-00930	5	
ULE90130-01-UTL-01630	3	
ULE90130-01-UTL-00031	8	
ULE90130-01-UTL-00131	8	
ULE90130-01-UTL-00231	5	
ULE90130-01-UTL-00331	10	
ULE90130-01-UTL-00431		no IFC documents yet
ULE90130-01-UTL-00531	5	
ULE90130-01-UTL-00731	5	
ULE90130-01-UTL-00831	5	
ULE90130-01-UTL-00931	5	
ULE90130-01-UTL-01631	3	
ULE90130-01-UTL-00082	2	
ULE90130-01-UTL-00259		no IFC documents yet
ULE90130-01-UTL-02107		no IFC documents yet
ULE90130-01-UTL-02108		no IFC documents yet
ULE90130-01-UTL-02109		no IFC documents yet
ULE90130-01-CAL-00044 SGN	8	
ULE90130-01-CAL-00047 SP	5	
ULE90130-01-CAL-00046 SW	10	

ULE90130-01-CAL-00047 Sewer		no IFC documents yet
ULE90130-01-CAL-00048 BT	5	
ULE90130-01-CAL-00049 VM	5	
ULE90130-01-CAL-00050 C&W	5	
ULE90130-01-CAL-00051 Thus	5	
ULE90130-01-DRA-00006	2	

Section 1C Plates 32 – 38

no information available

Section 1C Plates 39 – 41

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00039	4	
ULE90130-01-UTL-00139	4	
ULE90130-01-UTL-00239	5	
ULE90130-01-UTL-00339	5	
ULE90130-01-UTL-00439		no IFC documents yet
ULE90130-01-UTL-00539	4	
ULE90130-01-UTL-00739	4	
ULE90130-01-UTL-00839	4	
ULE90130-01-UTL-00939	4	
ULE90130-01-UTL-01639	3	
ULE90130-01-UTL-00040	4	
ULE90130-01-UTL-00140	4	
ULE90130-01-UTL-00240	4	

ULE90130-01-UTL-00340	5	
ULE90130-01-UTL-00440		no IFC documents yet
ULE90130-01-UTL-00540	4	
ULE90130-01-UTL-00740	4	
ULE90130-01-UTL-00840	4	
ULE90130-01-UTL-00940	4	
ULE90130-01-UTL-01640	3	
ULE90130-01-UTL-00041	4	
ULE90130-01-UTL-00141	4	
ULE90130-01-UTL-00241	5	
ULE90130-01-UTL-00341	5	
ULE90130-01-UTL-00441		no IFC documents yet
ULE90130-01-UTL-00541	4	
ULE90130-01-UTL-00741	4	
ULE90130-01-UTL-00841	4	
ULE90130-01-UTL-00941	4	
ULE90130-01-UTL-01641	3	
ULE90130-01-UTL-00959		no IFC documents yet
ULE90130-01-CAL-00060 SGN	4	
ULE90130-01-CAL-00061 SP	5	
ULE90130-01-CAL-00062 SW	5	
ULE90130-01-CAL-00064 BT	4	
ULE90130-01-CAL-00065 VM	4	
ULE90130-01-CAL-00066 C&W	4	
ULE90130-01-CAL-00067	4	

Thus		
ULE90130-01-CAL-00121 Thus		no IFC documents yet
ULE90130-01-DRA-00012	-	

Section 1C Plates 42 – 44

Document no.	*Revision no.*	*Comments*
ULE90130-01-UTL-00042	6	
ULE90130-01-UTL-00142	5	
ULE90130-01-UTL-00242	5	
ULE90130-01-UTL-00342	6	
ULE90130-01-UTL-00442		no IFC documents yet
ULE90130-01-UTL-00542	5	
ULE90130-01-UTL-00742	5	
ULE90130-01-UTL-00842	5	
ULE90130-01-UTL-00942	5	
ULE90130-01-UTL-01643	3	
ULE90130-01-UTL-00043	6	
ULE90130-01-UTL-00143	5	
ULE90130-01-UTL-00243	5	
ULE90130-01-UTL-00343	6	
ULE90130-01-UTL-00443		no IFC documents yet
ULE90130-01-UTL-00543	5	
ULE90130-01-UTL-00743	5	
ULE90130-01-UTL-00843	5	
ULE90130-01-UTL-00943	5	
ULE90130-01-UTL-01644	3	
ULE90130-01-UTL-00044	6	
ULE90130-01-UTL-00144	5	
ULE90130-01-UTL-00244	5	
ULE90130-01-UTL-00344	6	

ULE90130-01-UTL-00444		no IFC documents yet
ULE90130-01-UTL-00544	5	
ULE90130-01-UTL-00744	5	
ULE90130-01-UTL-00844	5	
ULE90130-01-UTL-00944	5	
ULE90130-01-UTL-01644	3	
ULE90130-01-CAL-00069 SGN	5	
ULE90130-01-CAL-00070 SP	5	
ULE90130-01-CAL-00071 SW	6	
ULE90130-01-CAL-00073 BT	5	
ULE90130-01-CAL-00074 VM	5	
ULE90130-01-CAL-00075 C&W	5	
ULE90130-01-CAL-00076 Thus	5	

Section 1C Plates 45 – 48

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00045	3	
ULE90130-01-UTL-00145	3	
ULE90130-01-UTL-00245	3	
ULE90130-01-UTL-00345	3	
ULE90130-01-UTL-00445		no IFC documents yet
ULE90130-01-UTL-00545	3	
ULE90130-01-UTL-00745	3	
ULE90130-01-UTL-00845	3	

ULE90130-01-UTL-00945	3	
ULE90130-01-UTL-01645	3	
ULE90130-01-UTL-00046	3	
ULE90130-01-UTL-00146	3	
ULE90130-01-UTL-00246	3	
ULE90130-01-UTL-00346	3	
ULE90130-01-UTL-00446		no IFC documents yet
ULE90130-01-UTL-00546	3	
ULE90130-01-UTL-00746	3	
ULE90130-01-UTL-00846	3	
ULE90130-01-UTL-00946	3	
ULE90130-01-UTL-01646	3	
ULE90130-01-UTL-00047	3	
ULE90130-01-UTL-00147	3	
ULE90130-01-UTL-00247	3	
ULE90130-01-UTL-00347	3	
ULE90130-01-UTL-00447		no IFC documents yet
ULE90130-01-UTL-00547	3	
ULE90130-01-UTL-00747	3	
ULE90130-01-UTL-00847	3	
ULE90130-01-UTL-00947	3	
ULE90130-01-UTL-01647	3	
ULE90130-01-UTL-00048	3	
ULE90130-01-UTL-00148	3	
ULE90130-01-UTL-00248	3	
ULE90130-01-UTL-00348	3	
ULE90130-01-UTL-00448		no IFC documents yet

ULE90130-01-UTL-00548	3	
ULE90130-01-UTL-00748	3	
ULE90130-01-UTL-00848	3	
ULE90130-01-UTL-00948	3	
ULE90130-01-UTL-01648	3	
ULE90130-01-CAL-00078 SGN	3	
ULE90130-01-CAL-00079 SP	3	
ULE90130-01-CAL-00080 SW	3	
sewer schedule		no IFC documents yet
ULE90130-01-CAL-00082 BT	3	
ULE90130-01-CAL-00083 VM	3	
ULE90130-01-CAL-00084 C&W	3	
ULE90130-01-CAL-00085 Thus	3	
ULE90130-01-DRA-00014	3	

Section 1D Plates 49 – 51

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTL-00049	4	
ULE90130-01-UTL-00149	4	
ULE90130-01-UTL-00249	4	
ULE90130-01-UTL-00349	4	
ULE90130-01-UTL-00449		no IFC documents yet
ULE90130-01-UTL-00549	4	
ULE90130-01-UTL-00749	4	

ULE90130-01-UTL-00849	4	
ULE90130-01-UTL-00949	4	
ULE90130-01-UTL-01649	3	
ULE90130-01-UTL-00050	4	
ULE90130-01-UTL-00150	4	
ULE90130-01-UTL-00250	4	
ULE90130-01-UTL-00350	4	
ULE90130-01-UTL-00450		no IFC documents yet
ULE90130-01-UTL-00550	4	
ULE90130-01-UTL-00750	4	
ULE90130-01-UTL-00850	4	
ULE90130-01-UTL-00950	4	
ULE90130-01-UTL-01650	3	
ULE90130-01-UTL-00051	4	
ULE90130-01-UTL-00151	4	
ULE90130-01-UTL-00251	4	
ULE90130-01-UTL-00351	4	
ULE90130-01-UTL-00451		no IFC documents yet
ULE90130-01-UTL-00551	4	
ULE90130-01-UTL-00751	4	
ULE90130-01-UTL-00851	4	
ULE90130-01-UTL-00951	4	
ULE90130-01-UTL-01651	3	
ULE90130-01-CAL-00086 SGN	4	
ULE90130-01-CAL-00087 SP	4	
ULE90130-01-CAL-00088 SW	4	

sewer schedule		no IFC documents yet
ULE90130-01-CAL-00090 BT	4	
ULE90130-01-CAL-00091 VM	4	
ULE90130-01-CAL-00092 C&W	4	
ULE90130-01-CAL-00093 Thus	4	

Section 1D Plates 52 – 56

Document no.	*Revision no.*	*Comments*
ULE90130-01-UTL-00052	4	
ULE90130-01-UTL-00152	5	
ULE90130-01-UTL-00252	4	
ULE90130-01-UTL-00352	4	
ULE90130-01-UTL-00452		no IFC documents yet
ULE90130-01-UTL-00552	4	
ULE90130-01-UTL-00752	4	
ULE90130-01-UTL-00852	4	
ULE90130-01-UTL-00952	4	
ULE90130-01-UTL-01652	3	
ULE90130-01-UTL-00053	4	
ULE90130-01-UTL-00153	5	
ULE90130-01-UTL-00253	4	
ULE90130-01-UTL-00353	4	
ULE90130-01-UTL-00453		no IFC documents yet
ULE90130-01-UTL-00553	4	
ULE90130-01-UTL-00753	4	
ULE90130-01-UTL-00853	4	
ULE90130-01-UTL-00953	4	
ULE90130-01-UTL-01653	3	
ULE90130-01-UTL-00054	4	
ULE90130-01-UTL-00154	5	
ULE90130-01-UTL-00254	4	
ULE90130-01-UTL-00354	4	

ULE90130-01-UTL-00454		no IFC documents yet
ULE90130-01-UTL-00554	4	
ULE90130-01-UTL-00754	4	
ULE90130-01-UTL-00854	4	
ULE90130-01-UTL-00954	4	
ULE90130-01-UTL-01654	3	
ULE90130-01-UTL-00055	4	
ULE90130-01-UTL-00155	6	
ULE90130-01-UTL-00255	4	
ULE90130-01-UTL-00355	4	
ULE90130-01-UTL-00455		no IFC documents yet
ULE90130-01-UTL-00555	4	
ULE90130-01-UTL-00755	4	
ULE90130-01-UTL-00855	4	
ULE90130-01-UTL-00955	4	
ULE90130-01-UTL-01655	3	
ULE90130-01-UTL-00056	4	
ULE90130-01-UTL-00156	5	
ULE90130-01-UTL-00256	4	
ULE90130-01-UTL-00356	4	
ULE90130-01-UTL-00456		no IFC documents yet
ULE90130-01-UTL-00556	4	
ULE90130-01-UTL-00756	4	
ULE90130-01-UTL-00856	4	
ULE90130-01-UTL-00956	4	
ULE90130-01-UTL-01656	3	
ULE90130-01-CAL-00101 SGN	5	

ULE90130-01-CAL-00094 SP	3	
ULE90130-01-CAL-00095 SW	3	
sewer schedule		no IFC documents yet
ULE90130-01-CAL-00097 BT	4	
ULE90130-01-CAL-00098 VM	4	
ULE90130-01-CAL-00099 C&W	4	
ULE90130-01-CAL-00100 Thus	4	

Section 5A Plates 1 – 3

Document no.	***Revision no.***	***Comments***
ULE90130-05-UTL-00001		no IFC documents yet
ULE90130-05-UTL-00101	5	
ULE90130-05-UTL-00201	5	
ULE90130-05-UTL-00301	5	
ULE90130-05-UTL-00401		no IFC documents yet
ULE90130-05-UTL-00501	4	
ULE90130-05-UTL-00701	5	
ULE90130-05-UTL-00801	6	
ULE90130-05-UTL-00901		no IFC documents yet
ULE90130-05-UTL-01401		no IFC documents yet
ULE90130-05-UTL-00002		no IFC documents yet
ULE90130-05-UTL-00102	4	
ULE90130-05-UTL-00202	6	
ULE90130-05-UTL-00302	6	
ULE90130-05-UTL-00402		no IFC documents yet

ULE90130-05-UTL-00502	3	
ULE90130-05-UTL-00702	4	
ULE90130-05-UTL-00802	7	
ULE90130-05-UTL-00902		no IFC documents yet
ULE90130-05-UTL-01402		no IFC documents yet
ULE90130-05-UTL-00003		no IFC documents yet
ULE90130-05-UTL-00103	5	
ULE90130-05-UTL-00203	5	
ULE90130-05-UTL-00303	4	
ULE90130-05-UTL-00403		no IFC documents yet
ULE90130-05-UTL-00503	4	
ULE90130-05-UTL-00703	6	
ULE90130-05-UTL-00803	4	
ULE90130-05-UTL-00903		no IFC documents yet
ULE90130-05-UTL-01403		no IFC documents yet
ULE90130-05-UTL-00028	1	
ULE90130-05-UTL-00029	1	
ULE90130-05-UTL-00041	3	
ULE90130-05-UTL-00042	4	
ULE90130-05-UTL-00043	5	
Conflict Spreadsheet (1-3) SGN	X	
Conflict Spreadsheet (1-3) SP	X	
SW Clean schedule		no IFC documents yet
Sewer schedule		no IFC documents yet
Conflict Spreadsheet (1-3) BT	X	
Conflict Spreadsheet (1-3) VM	X	

Conflict Spreadsheet (1-3) C&W	X	
Thus schedule		no IFC documents yet

Section 5A Plates 4 – 5

Document no.	*Revision no.*	*Comments*
ULE90130-05-UTL-00004		no IFC documents yet
ULE90130-05-UTL-00104		no IFC documents yet
ULE90130-05-UTL-00204	5	
ULE90130-05-UTL-00304		no IFC documents yet
ULE90130-05-UTL-00404		no IFC documents yet
ULE90130-05-UTL-00504		no IFC documents yet
ULE90130-05-UTL-00704		no IFC documents yet
ULE90130-05-UTL-00804		no IFC documents yet
ULE90130-05-UTL-00904		no IFC documents yet
ULE90130-05-UTL-00005		no IFC documents yet
ULE90130-05-UTL-00105		no IFC documents yet
ULE90130-05-UTL-00205	5	
ULE90130-05-UTL-00305		no IFC documents yet
ULE90130-05-UTL-00405		no IFC documents yet
ULE90130-05-UTL-00505		no IFC documents yet
ULE90130-05-UTL-00705		no IFC documents yet
ULE90130-05-UTL-00805		no IFC documents yet
ULE90130-05-UTL-00905		no IFC documents yet
SGN schedule		no IFC documents yet
ULE90130-05-CAL-00012 SW		no IFC documents yet
ULE90130-05-CAL-00017 SP	1	
Sewer schedule		no IFC documents yet
BT schedule		no IFC documents yet
VM sechdule		no IFC documents yet
C&W schedule		no IFC documents yet

Thus schedule		no IFC documents yet
ULE90130-05-UTL-00044	2	
ULE90130-05-UTL-00045	2	

Section 5B Plates 6 – 13

Document no.	***Revision no.***	***Comments***
ULE90130-05-UTL-00006		no IFC documents yet
ULE90130-05-UTL-00106	3	
ULE90130-05-UTL-00206	5	
ULE90130-05-UTL-00306	4	
ULE90130-05-UTL-00406		no IFC documents yet
ULE90130-05-UTL-00506		no IFC documents yet
ULE90130-05-UTL-00706		no IFC documents yet
ULE90130-05-UTL-00806	5	
ULE90130-05-UTL-00906		no IFC documents yet
ULE90130-05-UTL-00007		no IFC documents yet
ULE90130-05-UTL-00107	3	
ULE90130-05-UTL-00207	5	
ULE90130-05-UTL-00307	4	
ULE90130-05-UTL-00407		no IFC documents yet
ULE90130-05-UTL-00507		no IFC documents yet
ULE90130-05-UTL-00707		no IFC documents yet
ULE90130-05-UTL-00807	4	
ULE90130-05-UTL-00907		no IFC documents yet
ULE90130-05-UTL-00008		no IFC documents yet
ULE90130-05-UTL-00108	3	
ULE90130-05-UTL-00208	5	

ULE90130-05-UTL-00308	4	
ULE90130-05-UTL-00408		no IFC documents yet
ULE90130-05-UTL-00508		no IFC documents yet
ULE90130-05-UTL-00708		no IFC documents yet
ULE90130-05-UTL-00808	4	
ULE90130-05-UTL-00908		no IFC documents yet
ULE90130-05-UTL-00009		no IFC documents yet
ULE90130-05-UTL-00109	3	
ULE90130-05-UTL-00209	7	
ULE90130-05-UTL-00309	4	
ULE90130-05-UTL-00409		no IFC documents yet
ULE90130-05-UTL-00509		no IFC documents yet
ULE90130-05-UTL-00709		no IFC documents yet
ULE90130-05-UTL-00809	7	
ULE90130-05-UTL-00909		no IFC documents yet
ULE90130-05-UTL-00010		no IFC documents yet
ULE90130-05-UTL-00110	3	
ULE90130-05-UTL-00210	7	
ULE90130-05-UTL-00310	4	
ULE90130-05-UTL-00410		no IFC documents yet
ULE90130-05-UTL-00510		no IFC documents yet
ULE90130-05-UTL-00710		no IFC documents yet
ULE90130-05-UTL-00810	4	
ULE90130-05-UTL-00910		no IFC documents yet
ULE90130-05-UTL-00011		no IFC documents yet
ULE90130-05-UTL-00111	4	
ULE90130-05-UTL-00211	6	

ULE90130-05-UTL-00311	4	
ULE90130-05-UTL-00411		no IFC documents yet
ULE90130-05-UTL-00511		no IFC documents yet
ULE90130-05-UTL-00711		no IFC documents yet
ULE90130-05-UTL-00811	4	
ULE90130-05-UTL-00911		no IFC documents yet
ULE90130-05-UTL-00012		no IFC documents yet
ULE90130-05-UTL-00112	3	
ULE90130-05-UTL-00212	5	
ULE90130-05-UTL-00312	4	
ULE90130-05-UTL-00412		no IFC documents yet
ULE90130-05-UTL-00512		no IFC documents yet
ULE90130-05-UTL-00712		no IFC documents yet
ULE90130-05-UTL-00812	4	
ULE90130-05-UTL-00912		no IFC documents yet
ULE90130-05-UTL-00013		no IFC documents yet
ULE90130-05-UTL-00113	3	
ULE90130-05-UTL-00213	7	
ULE90130-05-UTL-00313	4	
ULE90130-05-UTL-00413		no IFC documents yet
ULE90130-05-UTL-00513		no IFC documents yet
ULE90130-05-UTL-00713		no IFC documents yet
ULE90130-05-UTL-00813	4	
ULE90130-05-UTL-00913		no IFC documents yet
SGN schedule		no IFC documents yet
ULE90130-05-CAL-00014 SP	1	
SW Clean schedule		no IFC documents yet

Sewer schedule		no IFC documents yet
BT schedule		no IFC documents yet
VM schedule		no IFC documents yet
ULE90130-05-CAL-00013 C&W	1	
Thus schedule		no IFC documents yet
ULE90130-05-UTL-00046	4	Issue for information
ULE90130-05-UTL-00047	1	Issue for information
ULE90130-05-UTL-00048	4	Issue for information
ULE90130-05-UTL-00049	4	Issue for information
ULE90130-05-UTL-00050	4	Issue for information
ULE90130-05-UTL-00051	4	Issue for information
ULE90130-05-UTL-00052	1	Issue for information
ULE90130-05-UTL-00053	4	Issue for information

Section 5B Plates 14 – 20

Document no.	***Revision no.***	***Comments***
ULE90130-05-UTL-00014		no IFC documents yet
ULE90130-05-UTL-00114		no IFC documents yet
ULE90130-05-UTL-00214	4	
ULE90130-05-UTL-00314	3	
ULE90130-05-UTL-00414		no IFC documents yet
ULE90130-05-UTL-00514		no IFC documents yet
ULE90130-05-UTL-00714		no IFC documents yet
ULE90130-05-UTL-00814		no IFC documents yet
ULE90130-05-UTL-00914		no IFC documents yet
ULE90130-05-UTL-00015		no IFC documents yet
ULE90130-05-UTL-00115		no IFC documents yet

ULE90130-05-UTL-00215	4	
ULE90130-05-UTL-00315	7	
ULE90130-05-UTL-00415		no IFC documents yet
ULE90130-05-UTL-00515	5	
ULE90130-05-UTL-00715	5	
ULE90130-05-UTL-00815	5	
ULE90130-05-UTL-00915	4	
ULE90130-05-UTL-00016		no IFC documents yet
ULE90130-05-UTL-00116		no IFC documents yet
ULE90130-05-UTL-00216	4	
ULE90130-05-UTL-00316	4	
ULE90130-05-UTL-00416		no IFC documents yet
ULE90130-05-UTL-00516		no IFC documents yet
ULE90130-05-UTL-00716		no IFC documents yet
ULE90130-05-UTL-00816		no IFC documents yet
ULE90130-05-UTL-00916		no IFC documents yet
ULE90130-05-UTL-00017		no IFC documents yet
ULE90130-05-UTL-00117		no IFC documents yet
ULE90130-05-UTL-00217	5	
ULE90130-05-UTL-00317	4	
ULE90130-05-UTL-00417		no IFC documents yet
ULE90130-05-UTL-00517		no IFC documents yet
ULE90130-05-UTL-00717		no IFC documents yet
ULE90130-05-UTL-00817		no IFC documents yet
ULE90130-05-UTL-00917		no IFC documents yet
ULE90130-05-UTL-00018		no IFC documents yet
ULE90130-05-UTL-00118	4	

ULE90130-05-UTL-00218	5	
ULE90130-05-UTL-00318	4	
ULE90130-05-UTL-00418		no IFC documents yet
ULE90130-05-UTL-00518		no IFC documents yet
ULE90130-05-UTL-00718	5	
ULE90130-05-UTL-00818	5	
ULE90130-05-UTL-00918	4	
ULE90130-05-UTL-00019	3	
ULE90130-05-UTL-00119	4	
ULE90130-05-UTL-00219	3	
ULE90130-05-UTL-00319	4	
ULE90130-05-UTL-00419		no IFC documents yet
ULE90130-05-UTL-00519		no IFC documents yet
ULE90130-05-UTL-00719		no IFC documents yet
ULE90130-05-UTL-00819		no IFC documents yet
ULE90130-05-UTL-00919		no IFC documents yet
ULE90130-05-UTL-00020		no IFC documents yet
ULE90130-05-UTL-00120		no IFC documents yet
ULE90130-05-UTL-00220	4	
ULE90130-05-UTL-00320	4	
ULE90130-05-UTL-00420		no IFC documents yet
ULE90130-05-UTL-00520	5	
ULE90130-05-UTL-00720	5	
ULE90130-05-UTL-00820	4	
ULE90130-05-UTL-00920	4	
ULE90130-05-UTL-00054	2	
ULE90130-05-UTL-00055	3	

ULE90130-05-UTL-00056	2	
ULE90130-05-UTL-00057	2	
ULE90130-05-UTL-00058	2	
ULE90130-05-UTL-00060	2	
ULE90130-05-CAL-00009 (BT)	2	
ULE90130-05-CAL-00016 (VM)	2	
ULE90130-05-CAL-00015 (THUS)	3	
ULE90130-05-CAL-00018 (C & W)	1	
ULE90130-05-CAL-00019 (SW Clean)	1	
sewer schedule		
ULE90130-05-CAL-00020 (SP)	1	
ULE90130-05-CAL-00023 (SGN)	1	

Section 5C Plates 21 – 26

Document no.	***Revision no.***	***Comments***
ULE90130-05-UTL-00021	4	
ULE90130-05-UTL-00121	4	
ULE90130-05-UTL-00221	4	
ULE90130-05-UTL-00321	4	
ULE90130-05-UTL-00421		no IFC documents yet
ULE90130-05-UTL-00521	4	
ULE90130-05-UTL-00721	5	
ULE90130-05-UTL-00821	6	
ULE90130-05-UTL-00921	4	

ULE90130-05-UTL-01021	3	
ULE90130-05-UTL-00022		no IFC documents yet
ULE90130-05-UTL-00122	5	
ULE90130-05-UTL-00222	5	
ULE90130-05-UTL-00322	5	
ULE90130-05-UTL-00422		no IFC documents yet
ULE90130-05-UTL-00522	5	
ULE90130-05-UTL-00722	6	
ULE90130-05-UTL-00822	5	
ULE90130-05-UTL-00922	4	
ULE90130-05-UTL-01022	4	
ULE90130-05-UTL-00023		no IFC documents yet
ULE90130-05-UTL-00123	4	
ULE90130-05-UTL-00223	5	
ULE90130-05-UTL-00323	5	
ULE90130-05-UTL-00423		no IFC documents yet
ULE90130-05-UTL-00523	4	
ULE90130-05-UTL-00723	5	
ULE90130-05-UTL-00823	6	
ULE90130-05-UTL-00923	6	
ULE90130-05-UTL-01023	5	
ULE90130-05-UTL-00024		no IFC documents yet
ULE90130-05-UTL-00124	5	
ULE90130-05-UTL-00224	6	
ULE90130-05-UTL-00324	6	
ULE90130-05-UTL-00424		no IFC documents yet
ULE90130-05-UTL-00524	6	

ULE90130-05-UTL-00724	5	
ULE90130-05-UTL-00824	6	
ULE90130-05-UTL-00924	6	
ULE90130-05-UTL-01024	5	
ULE90130-05-UTL-00025	4	
ULE90130-05-UTL-00125	5	
ULE90130-05-UTL-00225	5	
ULE90130-05-UTL-00325	6	
ULE90130-05-UTL-00425		no IFC documents yet
ULE90130-05-UTL-00525	5	
ULE90130-05-UTL-00725	5	
ULE90130-05-UTL-00825	6	
ULE90130-05-UTL-00925	5	
ULE90130-05-UTL-01025	4	
ULE90130-05-UTL-00026	4	
ULE90130-05-UTL-00126	5	
ULE90130-05-UTL-00226	4	
ULE90130-05-UTL-00326	6	
ULE90130-05-UTL-00426		no IFC documents yet
ULE90130-05-UTL-00526	6	
ULE90130-05-UTL-00726	5	
ULE90130-05-UTL-00826	5	
ULE90130-05-UTL-00926	4	
ULE90130-05-UTL-01026	4	
ULE90130-05-UTL-00062	5	
ULE90130-05-UTL-00063	4	
ULE90130-05-UTL-00064	4	

ULE90130-05-UTL-00070		no IFC documents yet
ULE90130-05-UTL-00071		no IFC documents yet
ULE90130-05-UTL-00072		no IFC documents yet
ULE90130-05-CAL-00026 (EasyNET)	4	
ULE90130-05-CAL-00027 (SGN)	3	
ULE90130-05-CAL-00028 (SP)	4	
ULE90130-05-CAL-00029 (SWC)	3	
sewer schedule		no IFC documents yet
ULE90130-05-CAL-00030 (BT)	5	
ULE90130-05-CAL-00031 (C & W)	4	
ULE90130-05-CAL-00032 (Thus)	3	
ULE90130-05-CAL-00033 (VM)	4	
ULE90130-05-CAL-00034 (Private Utilities)		no IFC documents yet

Section 6A Plates 1 – 2

No IFC documents have been received.

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No IFC documents have been received.

General – Standard Details

Document no.	***Revision no.***	***Comments***
ULE90130-01-UTH-00015		Reference Drawing (received from Thus)
ULE90130-01-UTH-00025		Reference Drawing (received from Thus)

ULE90130-01-UTH-00006		Reference Drawing (received from Thus)
ULE90130-01-UTL-00033		Reference Drawing (received from Thus)
ULE90130-01-UTL-00035		Reference Drawing (received from Thus)
ULE90130-SW-UTL-00008	2	SW Standard Details
ULE90130-SW-UTL-00009	3	
ULE90130-SW-UTL-00010	2	
ULE90130-SW-UTL-00016	3	
ULE90130-SW-UTL-00013		SW Foul - Standard Details, Jetting Eye
ULE90130-SW-UTL-00017		SW Foul - New Box Section Manhole
ULE90130-SW-UTL-00018		SW Foul - Box Section Manhole Intergration with Existing Manhole
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DKE Coordinates1C 42-44		
DKE Coordinates 1D 49-56		
DKE Coordinates 5B 14-20		

THIS IS SCHEDULE PART 42 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 42

DEVELOPMENT PARTNERING AND OPERATING FRANCHISE AGREEMENT



(1) TRANSPORT INITIATIVES EDINBURGH LIMITED

- and -

(2) TRANSDEV EDINBURGH TRAM LIMITED

DEVELOPMENT PARTNERING AND OPERATING FRANCHISE AGREEMENT relating to the EDINBURGH TRAM NETWORK

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DEVELOPMENT PARTNERING AND OPERATING FRANCHISE AGREEMENT

BETWEEN

(1) **TRANSPORT INITIATIVES EDINBURGH LIMITED** a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh, EH1 1YJ (**"tie"**); and

(2) **TRANSDEV EDINBURGH TRAM LIMITED** a company incorporated in Scotland under number SC267598 and having its registered office at Level 2, Saltire Court, 20 Castle Terrace, Edinburgh EH1 2ET (the **"Operator"**).

WHEREAS

A **tie** requires project development assistance and services for the subsequent commissioning and operation of a light rapid transit system in Edinburgh, known as the Edinburgh Tram Network .

B Pursuant to a notice published in the Official Journal of the European Communities on 11 June 2003 with reference 2003/S 110-099040, **tie** invited expressions of interest from appropriately qualified parties for the development and subsequent operation of the System.

C By competitive procurement process, conducted in accordance with law, **tie** has selected the Operator to support promotion of the Scottish Private Bills through the Scottish Parliament and to develop (under partnering arrangements with **tie**) and operate the System subject to the terms and conditions of this Agreement applicable to each phase of the Project.

D It is acknowledged that this Agreement aims to achieve a project vision (the "Project Vision") for the Edinburgh Tram Network. This Project Vision involves the development of a System which will stand favourable comparison with the best in Europe. The quality of the System and the Transport Services provided will be appropriate to Edinburgh's status and role as a European capital city and its city centre's designation as a World Heritage Site. The System will integrate as far as possible with other transport modes to serve the existing fabric of the City of Edinburgh, and promote appropriate development and social inclusion.

It is intended that this goal be achieved in a spirit of partnership, utilising modern design methods and standards.

PART I - PRELIMINARY MATTERS

NOW THEREFORE IT IS AGREED AS FOLLOWS:

1. DEFINITIONS AND INTERPRETATION

Schedule 1 (*Definitions and Interpretation*) to this Agreement shall govern all matters concerning definitions and interpretation.

2. TERM OF AGREEMENT

2.1 This Agreement shall come into effect on the Effective Date and shall continue in effect until the earlier of:

2.1.1 the Expiry Date; and

2.1.2 the Termination Date.

2.2 **tie** may serve a notice on the Operator not less than 180 days before the fifteenth anniversary of the Effective Date requiring an extension of the Term of this Agreement for a period of up to five years commencing from the original Expiry Date. If **tie** serves such a notice under this Clause 2.2, the original Expiry Date shall be extended to such date as may be specified in such notice, and with effect from the day after the fifteenth anniversary of the Effective Date, in consideration of the continued grant to the Operator of the right to operate the Transport Services, the Operator shall continue to perform its obligations under the terms of this Agreement.

2.3 **tie** may serve a notice on the Operator not less than 90 days before the fifteenth anniversary of the Effective Date proposing an extension of the Term of this Agreement, on such terms, and until such date, as **tie** may specify in such notice. If **tie** serves such a notice under this Clause 2.3:

2.3.1 **tie** and the Operator will negotiate in good faith in relation to:

(a) the terms of this Agreement to apply with effect from the day after the fifteenth anniversary of the Effective Date; and

(b) the period of the extension to the Term of this Agreement; and

2.3.2 if **tie** and the Operator agree the matters referred to in Clause 2.3.1 prior to the date when this Agreement would otherwise have expired, the original Expiry Date shall be extended to such date as may be agreed between **tie** and the Operator, and with effect from the day after the fifteenth anniversary of the Effective Date, in consideration of the continued grant to the Operator of the right to operate the Transport Services, the Operator shall perform its obligations under the terms of this Agreement as amended pursuant to this Clause 2.3.

2.4 The date specified by **tie** in a notice under Clause 2.2 or the date agreed between the Operator and **tie** pursuant to Clause 2.3 shall not be less than 30 days after the date which was the original Expiry Date before service of such notice nor more than 20 years after the Effective Date.

2.5 It shall be a condition precedent to the effectiveness of this Agreement that **tie** shall have received written confirmation that the Scottish Executive has confirmed an appropriate level of funding.

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PART II - DEVELOPMENT PHASE

3. PROJECT PARTNERING APPROACH

3.1 The Parties agree to work in mutual cooperation to fulfil their agreed roles and responsibilities and apply their expertise in relation to the Project to achieve the Project Development Objectives in accordance with the terms of this Agreement.

3.2 **tie** and the Operator shall procure that each **tie** Party and each Operator Party (as appropriate) shall work in accordance with the principles set out in Clause 3.1 above.

3.3 Subject to Clause 3.4 each Party (**"First Party"**) undertakes to co-operate with the other (**"Second Party"**) in order to facilitate the performance of this Agreement and in particular will:

3.3.1 approach all pricing, estimating and budgeting functions on a collaborative and Open Book Basis;

3.3.2 use reasonable endeavours to avoid unnecessary complaints, disputes and claims against or with the Second Party;

3.3.3 comply with the provisions of the Dispute Resolution Procedure in relation to any such complaints, disputes and claims with or against the Second Party;

3.3.4 not interfere with the rights of the Second Party in performing its obligations under this Agreement, nor in any other way hinder or prevent the Second Party from performing those obligations or from enjoying the benefits of its rights; and

3.3.5 take reasonable steps to mitigate any foreseeable losses and liabilities of the Second Party which are likely to arise out of any failure by the First Party to take any of the steps referred to in Clauses 3.3.2 to 3.3.4 (inclusive).

3.4 Nothing in Clause 3.3 shall:

3.4.1 interfere with the right of each of the Parties to arrange its affairs in whatever manner it considers fit (in compliance with Law) in order to exercise its rights and perform its obligations under this Agreement (in compliance with Law) and, in the case of **tie**, its duties and functions as a wholly owned subsidiary of CEC; or

3.4.2 relieve either Party from any obligation contained in this Agreement or from any obligation to pay any debt due and payable under this Agreement.

3.5 Senior representatives from the Parties shall meet on a quarterly basis (or as may be otherwise agreed by the Parties) to review:

3.5.1 any matters outwith the Operator's control and not caused by an Operator Default or other breach of the Agreement by the Operator which have adversely affected or may adversely affect:

(a) the achievement of the Project Development Objectives;

(b) the performance of the System;

(c) the Operator's ability to perform its obligations in terms of the Agreement;

(d) the generation of revenue; and/or

(e) the maintenance of the Operator's costs within the Capped Fees, the Fixed Costs, the Target Costs for Project Phase C2 or the Target Operating Costs (as appropriate); and

3.5.2 any proposals from either Party to:

(a) maximise revenue;

(b) minimise costs; and/or

(c) optimise the performance of the System.

3.6 Either Party may propose measures to address the matters set out in Clause 3.5.1 and a determination of what measures (if any) should be undertaken by the Operator and/or **tie** to address such matters shall be considered in accordance with and subject to each Party's existing rights, obligations and the existing contractual mechanisms under this Agreement including but not restricted to the rights, obligations and contractual mechanisms set out in Clause 22 *(Relief Events)*, Clause 23 *(Performance and Financial Adjustments)*, Clause 24 ***(tie** Changes)*, Clause 25 *(Operator Changes)*, Clause 26 *(Roads Changes)* and Clause 27 *(Qualifying Change in Law)* of the Operating Appendix.

3.7 Any proposal from either Party in terms of Clause 3.5.2 shall be reviewed in accordance with Clause 24 *(**tie** Changes)* or Clause 25 *(Operator Changes)* of the Operating Appendix (as appropriate).

4. THE PROJECT DEVELOPMENT SERVICES

4.1 The Operator shall assist **tie** with the promotion of the Project and the achievement of the Project Development Objectives by providing the Project Development Services during Project Phase A, Project Phase B and Project Phase C in relation to each Line in accordance with:

4.1.1 Schedule 2 (*Project Development Output Specification*); and

4.1.2 the requirements and directions of **tie** from time to time in accordance with the terms of this Agreement.

4.2 The Operator shall (each as a distinct and separate obligation) perform the Project Development Services and its other obligations under this Agreement:

4.2.1 in accordance with the terms of this Agreement;

4.2.2 in accordance with Good Industry Practice from time to time for the activity concerned;

4.2.3 in such manner so as not wilfully to detract from the image and reputation of **tie**, CEC or the Project;

4.2.4 in accordance with all applicable Law governing the provision of the Project Development Services and the element of the Project Development Objectives which those Project Development Services are directed towards achieving;

4.2.5 in a manner that is not likely to be injurious to persons or property;

4.2.6 in a manner consistent with the Project Development Objectives;

4.2.7 in a timely and efficient manner and in accordance with the Partnering Methodology and Programme, and Project Programme and otherwise as directed by **tie** in accordance with the terms of this Agreement; and

4.2.8 using the Key Personnel and such other Project Development Staff as may be approved by **tie** for that type of work; and

4.2.9 save as **tie** may have directed to the contrary.

4.3 The Operator shall, and shall procure that the Operator Parties shall, participate in such publicity, forums and meetings as are considered by **tie** to be reasonably required to garner support of all sections of the Edinburgh populace for the Project.

4.4 The Operator must comply at all times with Law, in particular the provisions of the Health & Safety At Work etc Act 1974 ("HS Act") and the CDM Regulations insofar as they affect the Operator's obligations under this Agreement and without prejudice to the generality of the foregoing:

4.4.1 where for the purposes of the Project, the Operator is a "designer" as defined in the CDM Regulations, the Operator shall comply with the obligations of a designer under the CDM Regulations;

4.4.2 the Operator shall co-operate fully with the planning supervisor and the principal contractor appointed under the CDM Regulations;

4.4.3 the Operator shall allocate adequate resources to enable it to comply with its obligations in this Agreement and the CDM Regulations;

4.4.4 the Operator shall co-operate with all other persons involved in the Project as designers to consider the prevention of risk and protection of persons who may be exposed to risks; and

4.4.5 the Operator must not by any act or omission do anything that would cause **tie** to be prosecuted under the HS Act.

5. PROJECT TEAM AND KEY PERSONNEL

5.1 The Operator and **tie** shall agree from time to time the structure of the joint team (comprising representatives of **tie**, the **tie** Advisers and the Project Development Staff) which shall be the forum for partnering, liaison, co-operation and coordination of the Project.

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5.2 The Operator shall ensure that:

5.2.1 the Key Personnel shall be available for meetings in Edinburgh at such times as **tie** may, in its sole discretion, direct; and

5.2.2 in addition to the Key Personnel, there shall at all times be a sufficient number of staff (including all relevant grades of supervisory staff) available for the provision of the Project Development Services in accordance with the Project Development Output Specification. This obligation shall include ensuring that there are sufficient Project Development Staff to cover periods of holiday, sickness and other absences and anticipated and actual peaks in servicing **tie**'s requirements for the Project Development Services.

5.3 The Operator shall locate Project Development Staff at such locations as the Operator considers convenient for the Project, provided that:

5.3.1 the Operator acknowledges that pursuant to Clause 15 *(Project Development Costs)*, it will not be entitled to any reimbursement from **tie** during Project Phases A, B and C1 in excess of any sum included in the Core Staff Fixed Rates and/or the Non-Core Staff Fixed Rates of the Project in relation to the travel of any person to or from Edinburgh, or for the accommodation or subsistence of any person visiting Edinburgh;

5.3.2 pursuant to Clause 5.2.1, **tie** will require the Operator to make the Key Personnel available for meetings in Edinburgh at such times as **tie** may, in its sole discretion, direct; and

5.3.3 pursuant to Clause 6.8, the Operator Project Manager shall be required to be located in Edinburgh during Project Phase C2 and Project Phase D.

5.4 The Operator shall ensure that the Project Development Staff referred to in Clause 5.2.2 shall:

5.4.1 have the level of skill and experience appropriate (i) to the tasks and Project Development Objectives to which such staff are allocated and (ii) the standards to be achieved pursuant to this Agreement; and

5.4.2 receive such training and supervision as is necessary to ensure the proper performance of this Agreement and compliance with all health and safety

rules, procedures and requirements. All training shall be in accordance with the Training Plan once that plan has been agreed between **tie** and the Operator pursuant to the Project Development Output Specification.

5.5 The Operator shall ensure that the Key Personnel have day to day responsibility for the implementation of the Project Development Services and that each of them performs the role in relation to the Project specified against his or her name in the Project Development and Operating Costs.

5.6 The Operator shall ensure that:

5.6.1 there are no changes to the Key Personnel without **tie**'s prior written consent (such consent not to be unreasonably withheld or delayed in the case of a change necessitated by sickness or reasonable annual, maternity, paternity or compassionate leave or where one of the Key Personnel's employment ceases) and that any replacement persons shall be of at least equivalent status and ability to the person whom they replace; and

5.6.2 all other Project Development Staff shall be available in accordance with the requirements set out in the Partnering Methodology and Programme.

5.7 The Operator shall use all reasonable endeavours to ensure the continuity of the personnel assigned to perform the Project Development Services and shall select Key Personnel having careful regard to those persons' existing work load and other planned commitments.

5.8 If **tie** gives the Operator notice that any member of the Project Development Staff should be removed from involvement in the Project Development Services, the Operator shall immediately comply with such notice.

5.9 The Operator shall (and shall procure that the Operator Parties shall) comply with all relevant statutory health and safety requirements in respect of Project Development Staff, and any rules, regulations and any safety and security instructions from the **tie** Project Manager.

5.10 During Project Phases A, B and C1, **tie** shall provide office accommodation for the Project Development Staff within **tie's** own offices. If such accommodation is not available within **tie's** own offices, **tie** shall require the Operator to find alternative accommodation as soon as reasonably practicable and such requirement shall be

considered in accordance with Clause 24 (*tie Changes*) and Clause 23 (*Performance and Financial Adjustments*) of the Operating Appendix.

6. MANAGEMENT OF THE PROJECT

6.1 **tie** shall appoint a project manager (**"tie Project Manager"**) by notice in writing to the Operator who (subject to Clause 6.12) will:

6.1.1 be responsible for managing the day to day conduct of the Project during Project Phases A, B, C and D;

6.1.2 be responsible for the day to day direction of the tasks to be performed by the Operator during Project Phases A, B, C and D;

6.1.3 exercise the functions and powers of **tie** in relation to the Project which are identified in this Agreement as functions or powers to be carried out by him/her (including during Project Phase D);

6.1.4 exercise such other functions and powers of **tie** under this Agreement as **tie** may notify to the Operator from time to time (including during Project Phase D); and

6.1.5 be the primary point of contact for the Operator with **tie** (including during Project Phase D);

and the Operator shall observe, and shall procure that the Project Development Staff observe, all reasonable directions of the **tie** Project Manager in relation to the Project.

6.2 The **tie** Project Manager shall be entitled at any time, by notice in writing to the Operator, to authorise any other persons to exercise the functions and powers of **tie** delegated to him pursuant to Clause 6.1, either generally or specifically. Until further notice from **tie**, any act of any such person shall, for the purposes of this Agreement, constitute an act of the **tie** Project Manager and all references to the "**tie** Project Manager" in this Agreement (apart from this Clause 6) shall be taken as references to such person so far as they concern matters within the scope of such person's authority.

6.3 **tie** may by notice in writing to the Operator change the identity of the **tie** Project Manager. **tie** shall (as far as reasonably practicable) consult with the Operator prior

to the appointment of any replacement for the **tie** Project Manager, taking account of the need for liaison and continuity in respect of the Project. Such change shall have effect on the date specified in the written notice.

6.4 During any period when a **tie** Project Manager has not been appointed (or when the **tie** Project Manager is unable through illness, incapacity or any other reason whatsoever to carry out or exercise his functions under this Agreement), **tie** shall carry out the functions which would otherwise be performed by the **tie** Project Manager.

6.5 No decision, act or omission of **tie**, the **tie** Project Manager or any **tie** Party shall, except as otherwise expressly provided in this Agreement:

6.5.1 in any way relieve or absolve the Operator from, modify, or act as a waiver or personal bar of, any liability, responsibility, obligation or duty under this Agreement;

6.5.2 in the absence of an express written instruction or authorisation issued by **tie** under Clause 24 (***tie** Changes*) of the Operating Appendix, constitute or authorise a **tie** Change; or

6.5.3 be construed as restricting or binding **tie** in any way save with regard to the specific project matters to which it relates.

6.6 Except as previously notified in writing before such act or omission by **tie** to the Operator, the Operator and the Operator Project Manager shall be entitled to treat any act or omission of the **tie** Project Manager which is authorised by this Agreement as being expressly authorised by **tie** and the Operator and the Operator Project Manager shall not be required to determine whether an express authority has in fact been given.

6.7 The Operator shall appoint a project manager (**"Operator Project Manager"**) who shall:

6.7.1 act as the principal point of contact for **tie**, the **tie** Project Manager and the **tie** Advisers in relation to all matters related to the Project;

6.7.2 have full authority to act on behalf of the Operator for all purposes of this Agreement;

6.7.3 manage and co-ordinate the provision of the Project Development Services by the Project Development Staff and the integration of provision of the Project Development Services with the tasks being performed by **tie**'s internal team and the **tie** Advisers; and

6.7.4 liase with the **tie** Project Manager in relation to the matters referred to in Clause 6.12 including, without limitation, the scope of the Project Development Services to be carried out from time to time.

6.8 During Project Phase C2 and Project Phase D, the Operator Project Manager shall be:

6.8.1 located in Edinburgh; and

6.8.2 engaged on the Project full time.

6.9 Except as previously notified in writing before such act or omission by the Operator to **tie**, **tie** and the **tie** Project Manager shall be entitled to treat any act or omission of the Operator Project Manager in connection with this Agreement as being expressly authorised by the Operator, and **tie** and the **tie** Project Manager shall not be required to determine whether any express authority has in fact been given.

6.10 The Operator may by written notice to **tie** change the identity of the Operator Project Manager. Where the Operator wishes to do so it shall by written notice to **tie** propose a substitute for approval, taking account of the need for liaison and continuity in respect of the Project and the Project Phase when the change is proposed. Such appointment shall be subject to the prior written approval of **tie** (not to be unreasonably withheld or delayed).

6.11 The Operator shall also nominate a deputy to the Operator Project Manager. During any period when the Operator Project Manager is unable through illness, incapacity or any other reason whatsoever to carry out or exercise his functions under this Agreement, such deputy shall carry out the functions which would otherwise be performed by the Operator Project Manager.

6.12 Major decisions in relation to the Project Development Objectives during all Project Phases, will be taken by **tie**, such decisions to include:

6.12.1 the terms on which all Necessary Consents are applied for and the manner in which any proceedings necessary to obtain such Necessary Consents are

conducted (including the terms of all applications and notices and evidence to be presented in support of such applications and of any commitments and undertakings to be given in the course of such proceedings), always provided that this Clause 6.12.1 shall not apply to any Operator Necessary Consent. In relation to the Operator Necessary Consents, the Operator shall be solely responsible for determining the terms on which such Operator Necessary Consents are applied for and the manner in which any proceedings necessary to obtain such Operator Necessary Consents are conducted;

6.12.2 the terms on which public sector funding and local contributions for the Project (or any part of it) are applied for or agreed and the manner in which any proceedings necessary to obtain such funding are conducted;

6.12.3 the terms offered, or to be agreed with regard to all third party agreements, commitments and undertakings proposed to be entered into in respect of any Line before the Service Commencement Date in respect of the Line to which such agreement or undertaking relates;

6.12.4 the land or rights over land to be acquired for the purposes of the Project (other than offices or temporary work sites required by the Operator) and the manner and terms of such acquisition;

6.12.5 any application or representation or agreement or arrangement with any public authority, roads authority or highway authority, including CEC, Network Rail, statutory undertakers or other public or regulatory body in relation to the Project;

6.12.6 any change to the Partnering Methodology and Programme, Project Programme, Affordability Limits or Operating Appendix; and

6.12.7 the scope of the Project Development Services to be provided by the Operator from time to time, and all other matters specified in Clause 15 *(Project Development Costs)*.

6.13 Save as directed in writing by **tie** or the **tie** Project Manager, the Operator shall not, and shall procure that the Operator Parties shall not, have any discussions or dealings with any person:

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6.13.1 from whom any Necessary Consent (other than any Operator Necessary Consents) or public sector funding is sought, in relation to such Necessary Consent or funding or otherwise relating to any aspect of the Project which is not in the public domain;

6.13.2 whose land is or may be required for the purposes of the Project, in relation to such land or otherwise relating to any aspect of the Project which is not in the public domain;

6.13.3 who has objected to the Project or a proposed Scottish Private Bill, in relation to the undertakings or commitments which might be offered to him/her, or any other matter relating to any aspect of the Project which is not in the public domain; or

6.13.4 with or to whom any commitment or undertaking may need to be given or agreement entered into to facilitate the Project, in relation to any such commitment or undertaking, or otherwise relating to any aspect of the Project which is not in the public domain;

6.13.5 who may seek compensation in respect of nuisance, injurious affection, use of his/her land, loss of benefit from his/her land in relation to such compensation or otherwise relating to any aspects of the Project which are not in the public domain; or

6.13.6 who is a member of CEC or any employee of **tie** who is not part of a project team referred to in Clause 5.1, in relation to any aspect of the Project not in the public domain; or

6.13.7 who is involved in any venture or undertaking similar to the Project which may be in competition with the Project as regards resourcing capacity or funding availability.

7. QUALITY ASSURANCE

7.1 The Operator shall procure that all aspects of the Project Development Services are the subject of quality management systems at all times.

7.2 The quality management systems referred to in Clause 7.1 above shall be reflected in appropriate quality plans which shall:

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7.2.1 for the period from the Effective Date until the agreement of the Quality Management Plan between **tie** and the Operator during Project Phase B (pursuant to Schedule 2 (*Project Development Output Specification*), reflect the Operator's outline quality management plan set out in the Inception Report;

7.2.2 be set out in the Quality Management Plan when agreed between the Operator and **tie**; and

7.2.3 in any event, be consistent with BS EN ISO 9001:2000 or any equivalent standard which is generally recognised as having replaced it.

7.3 The Operator shall appoint (or shall procure the appointment of) a Quality Manager as soon as reasonably practicable following the Effective Date. The identity of the Quality Manager (and any replacement) shall be subject to the approval of the **tie** Project Manager (such approval not to be unreasonably withheld or delayed).

7.4 During Project Phases A to C, the Quality Manager may (without limitation) be the Operator Project Manager or one of the Key Personnel. During Project Phase D in respect of any Line, the identity of the Quality Manager shall comply with the requirements of Clause 14 *(Quality Assurance)* of the Operating Appendix.

7.5 During all Project Phases, the Quality Manager shall:

7.5.1 ensure the effective operation of the quality systems described in this Clause 7 *(Quality Assurance)* or Clause 14 *(Quality Assurance)* of the Operating Appendix (as appropriate);

7.5.2 audit the quality systems at regular intervals and report the findings of such audit to the **tie** Project Manager;

7.5.3 review all quality systems at intervals agreed with the **tie** Project Manager to ensure their continued suitability and effectiveness;

7.5.4 liase with the **tie** Project Manager on all matters relating to quality management; and

7.5.5 report to the Operator in relation to the matters mentioned in Clauses 7.5.1 to 7.5.4 (inclusive).

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8. OPERATOR'S PERFORMANCE SECURITY

8.1 Not less than 7 days after the Operator requests the issue of the first Certificate of Service Commencement by **tie** pursuant to Clause 3.1 *(Satisfaction of Requirements for Service Commencement)* of the Operating Appendix the Operator shall provide to **tie** a Performance Bond in the form of Schedule 14 (*Performance Bond*) to this Agreement and issued by a surety acceptable to **tie**.

8.2 The performance bond shall be for an amount of £5,000,000 (Five Millions Pounds Sterling) and shall be callable by **tie** on demand. The parties shall review the amount secured by the Performance Bond (i) at the commencement of Phase C2 for each subsequent Line or Network Expansion following the first Line in operation; and (ii) on the third anniversary of Full Service Commencement and annually thereafter. Any amendment required by **tie** to the amount secured by the Performance Bond shall be considered in accordance with Clause 24 (*tie Changes*) and Clause 23 (*Performance and Financial Adjustments*) of the Operating Appendix.

8.3 In the event the credit rating of the surety is downgraded to A- or a lower rating by Standard & Poors, **tie** shall be entitled to request the Operator to procure a substitute performance bond on identical terms from a surety acceptable to **tie**.

8.4 In the event that **tie** has made a demand on the Performance Bond and the costs, expenses, liabilities, loss of profits and damages incurred by **tie** as a result of:

8.4.1 the circumstances in respect of which the Performance Bond was called;

8.4.2 the procurement of a replacement operator;

8.4.3 **tie** operating the System at greater cost than the operation of the System by the Operator; and

8.4.4 the costs of maintaining the Performance Bond in previous years which have already been reimbursed to the Operator;

are less than the amount called under the Performance Bond and paid to **tie**, **tie** shall reimburse the Operator such amount as **tie** determines by reconciliation represents any surplus. Any such reconciliation shall be carried out by **tie** no earlier than 6 months and no later than 2 years from the date of payment under the Performance

Bond. For the avoidance of doubt, **tie** shall not be liable to the Operator for any interest in respect of surplus reimbursed, subject to Clause 8.5 below.

8.5 **tie** shall notify the Operator when the reconciliation has been carried out pursuant to Clause 8.4 and **tie** shall pay any surplus to the Operator within 30 days of such notification. The Parties agree that **tie**'s calculation of the Bonded Costs shall be binding and not subject to challenge or dispute by the Operator under any circumstances. Reimbursement of the surplus under this Clause 8.5 shall carry interest at the Default Interest Rate from the due date of payment until payment occurs.

9. SPECIAL EVENTS

To the extent that there are any Special Events during Project Phase C2 in respect of any Line that may affect the performance of the Project Development Services, **tie** and the Operator shall comply with the provisions of Clause 8 (*Special Events*) of the Operating Appendix.

10. AMENDMENTS TO THE OPERATING APPENDIX, THE OPERATOR FINANCIAL MODEL AND THE OPERATING OUTPUT SPECIFICATION, AND THE SETTING OF FIXED COSTS AND RATES

10.1 **tie** acknowledges that the Operator has agreed:

10.1.1 the Operator Financial Model as at the Effective Date; and

10.1.2 the terms of the Operating Appendix;

on the basis of the Base Case Assumptions and the Law as at the Effective Date;

10.2 Subject to Clause 10.6, in accordance with the Project Development Output Specification, during Project Phase A and B in respect of a Line, **tie** and the Operator shall review and agree any appropriate amendments to the Operating Appendix and/or the Operator Financial Model and/or the Operating Output Specification as a result of any Base Case Assumptions becoming Inappropriate Base Case Assumptions, or as a result of a Change in Law.

10.3 If pursuant to Clause 10.2, amendments are requested by the Operator to the Operating Appendix, the Base Case Assumptions, the Financial Proposals, the Operator Financial Model, the Project Development and Operating Costs and/or the

Operating Output Specification during Project Phases A or B, the Operator and **tie** shall discuss, and seek to agree the relevant changes which will leave the Operator in No Better and No Worse a position than it would have been in had (i) the relevant Base Case Assumption not become an Inappropriate Base Case Assumption or (ii) the relevant Change in Law not occurred.

10.4 To the extent that there are any further developments to the Project during Project Phase C and/or Project Phase D which either the Operator or **tie** consider require amendment to the Base Case Assumptions, the Financial Proposals, the Operator Financial Model, the Project Development and Operating Costs, the terms of the Operating Appendix, and/or the Operating Output Specification such amendments shall be considered by the Operator and **tie** in accordance with Clause 23 *(Performance and Financial Adjustments)* and Clause 24 (***tie** Changes*) or Clause 25 (*Operator Changes*) in the Operating Appendix.

10.5 If **tie** and the Operator are unable to agree:

10.5.1 whether any of the Base Case Assumptions is an Inappropriate Base Case Assumption; or

10.5.2 whether a Change in Law has occurred; or

10.5.3 what amendments to the Operating Appendix, the Base Case Assumptions, the Financial Proposals, the Operator Financial Model, the Project Development and Operating Costs and/or the Operating Output Specification pursuant to Clause 10.3 would leave the Operator in No Better and No Worse a position,

then either Party may refer the disagreement to the Dispute Resolution Procedure.

10.6 The Category One Fixed Costs, the Category Five Fixed Costs, the Core Staff Fixed Rates and the Non-Core Staff Fixed Rates are set as at the Effective Date and shall not be subject to adjustment pursuant to Clause 10.2 except in relation to any Changes in Law.

10.7 The unit cost in respect of any Category Two Fixed Costs shall be set as at the Effective Date and the total cost of any Category Two Fixed Costs shall be set by reference to the Base Case Assumptions by the end of Project Phase B in accordance with this Clause 10 (*Amendments to the Operating Appendix, the Operator Financial*

Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates) in the same way as the Target Operating Costs shall be set at the end of Project Phase B.

10.8 The Category Three Fixed Costs shall be set by agreement between **tie** and the Operator by the end of Project Phase C1 in accordance with the procedure set out in Part A of Schedule 17 (*Setting of Fixed Costs*).

10.9 The Category Four Fixed Costs shall be set by agreement between **tie** and the Operator by the end of Project Phase C2 in accordance with the procedure set out in Part B of Schedule 17 (*Setting of Fixed Costs*).

10.10 **tie** and the Operator may agree from time to time to treat other costs or rates payable in accordance with this Agreement as fixed costs or fixed rates. These additional fixed costs or fixed rates may be treated as fixed costs or fixed rates within one of the already defined categories of costs or rates, and set accordingly, or may be treated otherwise and set in a manner agreed by **tie** and the Operator.

10.11 Fixed Costs shall not be treated as Target Operating Costs or Target Costs for Project Phase C2, and if the actual costs for an item which is a Fixed Cost exceed the amount stated in the Project Development and Operating Costs (as Indexed), then **tie** shall not be liable to make payment to the Operator in respect of any excess above the Fixed Costs in accordance with this Agreement. Notwithstanding the actual costs for an item which is a Fixed Cost may be less than the amount stated in the Project Development and Operating Costs, **tie** shall be liable to pay the relevant Fixed Cost to the Operator in accordance with this Agreement.

10.12 All information on the actual costs associated with any Fixed Costs or Fixed Rates shall be made available to **tie** on an Open Book Basis.

10.13 All Fixed Costs and Fixed Rates which are applicable during Project Phase D (except for the Category Five Fixed Costs and any costs which the Parties agree are to be paid by **tie** to the Operator on a one-off basis) shall be subject to reset in accordance with Clause 21 (*Reset of the Fixed Costs, the Target Operating Costs and the Target Revenue*) of the Operating Appendix.

10.14 At the start of each Year, **tie** and the Operator shall agree a profile for the payment of Fixed Costs, Profit Element and Target Operating Costs, and the payment of any

Fixed Costs, Profit Element and any Target Operating Costs shall be made by **tie** to the Operator in accordance with the agreed profile. The agreed profile shall take account of the following matters (where relevant):

10.14.1 one-off annual payments:

10.14.2 amounts spread evenly over set periods;

10.14.3 amounts which will vary seasonally or otherwise;

10.14.4 fluctuations in service levels including bank holidays;

10.14.5 one-off payments; and

10.14.6 any methodology to be agreed by the Parties.

10.15 Either Party may refer any Dispute about the categorisation or setting of Fixed Costs or Fixed Rates to the Dispute Resolution Procedure.

10.16 The Operator shall update the Operator Financial Model in the following circumstances:

10.16.1 after the Target Costs for Project Phase C2, the Target Operating Costs and the Category Two Fixed Costs have been set in accordance with this Clause 10 (*Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates);*

10.16.2 after the Category Three Fixed Costs have been set in accordance with this Clause 10 (*Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)*;

10.16.3 after the Category Four Fixed Costs have been set in accordance with this Clause 10 (*Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)*;

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10.16.4 on each Reset Decision Date or following agreement or determination of reset pursuant to Clause 21 (*Reset of the Fixed Costs, the Target Operating Costs and the Target Revenue)* ;

10.16.5 after the setting or adjustment of Target Revenues by the Joint Revenue Committee;

10.16.6 after any financial adjustment pursuant to Clause 20 *(Adjustment of Fixed Costs, Target Operating Costs and Target Revenues)* of the Operating Appendix; and

10.16.7 as may be otherwise agreed by **tie** and the Operator.

10.17 When the Operator Financial Model is updated in the circumstances set out in Clause 10.16, any update shall be subject to **tie's** approval (such approval not to be unreasonably withheld). The updating of the Operator Financial Model shall be done on an Open Book Basis, and the Operator shall also respond as soon as reasonably practicable to any reasonable request from **tie** to provide any information associated with the Operator Financial Model on an Open Book Basis. If required, the Operator shall also update the Financial Proposals and the Project Development and Operating Costs at the same time as updating the Operator Financial Model.

10.18 The Operator shall supply to **tie** an electronic copy of any updated Base Case Assumptions, Operator Financial Model, Financial Proposals and Project Development and Operating Costs within 10 Business Days of **tie's** approval in accordance with Clause 10.17.

10.19 During Project Phases A to C1, when the Operator Financial Model is updated in the circumstances set out in Clause 10.16, the costs of such updating by the Operator shall be paid by **tie** to the Operator on the basis of the Non-Core Staff Fixed Rates and in accordance with Clause 15 *(Project Development Costs).* During Project Phases C2 to D, when the Operator Financial Model is updated in the circumstances set out in Clause 10.16, the costs of such updating by the Operator shall be paid by **tie** to the Operator on the basis of actual costs agreed on the basis of an estimate provided by the Operator to **tie**. During each Project Phase, the Operator shall minimise as far as reasonably practicable, the costs associated with the updating of the Operator Financial Model.

11. NETWORK EXPANSIONS

11.1 **tie** and the Operator will keep opportunities for Network Expansion under review throughout the Term, consistent with the objectives of the Integrated Transport Initiative and any other relevant public transport initiatives of CEC or **tie** from time to time.

11.2 From time to time during the Term, **tie** may propose to the Operator a Network Expansion for development. To the extent that **tie** requests assistance from the Operator in relation to the development of such Network Expansion:

11.2.1 the Operator will provide Project Development Services during the development of that Network Expansion, and the provisions of this Agreement and the Project Development Output Specification shall apply to the development of that Network Expansion as if it were a Line; and

11.2.2 the terms of payment for the Network Expansion in respect of Project Development Services and Project Operations shall be the same as those set out in this Agreement. Following **tie**'s request pursuant to Clause 11.2 above, the Operator shall present for **tie**'s approval its proposals for capped fees for the Development Phase for the Network Expansion and the relevant workstreams in the Project Development Output Specification.

11.3 If **tie** and the Operator are unable to agree the fees for the Project Development Services in respect of any Network Expansion pursuant to Clause 11.2.2 , **tie** may withdraw its request for the Operator to provide the Project Development Services and **tie** may continue with the development of such Network Expansion, either by itself or in conjunction with third parties.

11.4 Whether or not **tie** requests the Operator to provide Project Development Services in relation to a proposed Network Expansion:

11.4.1 the Operator shall provide access to such information, documents and records as may be reasonably requested by **tie** or the **tie** Advisers in relation to the development of the proposed Network Expansion, and the provisions of Clause 48 (*Information and Audit Access*) shall apply (mutatis mutandis) to such access;

11.4.2 **tie** and the Operator will negotiate in good faith in relation to agreeing:

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(i) the Target Costs for Project Phase C2 (*Testing and Commissioning*) and any Fixed Costs relative to Project Phase C2 for the Network Expansion;

(ii) the Interim Target Operating Costs, Interim Fixed Costs and the Interim Target Revenues for the System including such Network Expansion (if it is proposed that there be a time interval between the Service Commencement Date and the Full Service Commencement Date for such Network Expansion);

(iii) the Target Operating Costs, the Target Revenues and any Fixed Costs for the System including such Network Expansion;

(iv) amendments to the Operating Output Specification, the Operating Method Statements (and the Operating Appendix to the extent necessary) to take effect from the Service Commencement Date of the Network Expansion; and

(v) any other amendments to this Agreement that are necessary in respect of the Network Expansion,

on the basis that the Operator should be in a No Better and No Worse position following the implementation and Service Commencement of the Network Expansion. **tie** and the Operator shall have regard to, but not be bound by, the costing assumptions prepared by the Operator which are set out in Schedule 19 *(Additional Costing Assumptions).*

11.5 To the extent that **tie** and the Operator are unable to agree the matters listed in Clause 11.4.2 by the end of Project Phase B for the Network Expansion (or the equivalent stage of development if the Operator is not providing the Project Development Services), **tie** shall be entitled to terminate this Agreement pursuant to Clause 31.5.

PART III - OPERATIONS PHASE

12. TRANSITION TO PROJECT PHASE D

12.1 The Operating Appendix shall come into effect in accordance with its terms and this Agreement (including such Operating Appendix) will govern the performance of the Project Operations for each of the Lines and/or any Network Expansion.

12.2 The Service Commencement Date (and the Full Service Commencement Date, if different) for each Line or Network Expansion shall be determined in accordance with the Project Programme, the terms of the Project Development Output Specification and the Operating Output Specification.

13. EDINBURGH TRAM NETWORK INTEGRATION

13.1 The Operator shall be responsible for maintaining and implementing the System Integration Plan, and shall liase with the Infrastructure Provider(s) accordingly.

13.2 The Operator shall exercise such management authority (in respect of the performance of the System Integration Plan) pursuant to **tie**'s rights under the Infrastructure Delivery Agreements as **tie** may direct from time to time in accordance with Clause 11 (*Operation and Maintenance Procedures*) of the Operating Appendix.

13.3 During the Term, the Operator shall remain responsible for maintaining and implementing the Service Integration Plan, including maintaining arrangements with other local transport providers which ensure the integration of the Edinburgh Tram Network with other local public transport for the benefit of passengers and the realisation of the objectives of the Integrated Transport Initiative, the Project Vision and **tie**'s other transportation objectives. This responsibility extends to any adjustment to arrangements required to respond to incremental expansion of the Core Network, including regulatory approvals.

13.4 In the event that the Operator is unable to sustain the arrangements put in place to achieve integration in relation to the Core Network in accordance with the Service Integration Plan, the Operator shall report the reasons to **tie** and the Parties shall consult in order to explore solutions. If no solution is available to the Operator after a period of 60 days, **tie** may terminate this Agreement pursuant to Clause 37.1.1.

14. PERSONNEL ISSUES

14.1 The Operator shall at all times during the Term (including the Development Phase):

14.1.1 follow recruitment good practice to ensure that appropriately high quality staff are engaged, suitable for the posts to be filled, taking into account the level of responsibility involved;

14.1.2 procure that there are set up and maintained by the Operator and all contractors with whom the Operator contracts in respect of the Project, personnel policies and procedures covering all relevant matters (including discipline, grievance, benefits, equal opportunities and health and safety). The Operator shall procure that the terms and the implementation of such policies and procedures comply with Law (which for the purposes of this Clause 14.1.2 shall exclude Guidance which only **tie** or a public sector body and not the Operator is bound to comply with) and Good Industry Practice, and that such policies and procedures are approved by the relevant authorised party within the Operator and are published in appropriate media and that copies of such policies and procedures (and any revisions and amendments to them) are issued to **tie** as soon as reasonably practicable after production;

14.1.3 provide, and shall procure that all contractors with whom the Operator contracts in respect of the Project provide, to **tie** upon request written details of their respective management organisations;

14.1.4 not (and the Operator shall insert a clause to this effect in each contract with contractors with whom the Operator contracts in respect of the Project) unlawfully discriminate within the meaning and scope of the provisions of the Equal Pay Act 1970, the Sex Discrimination Act 1975, the Race Relations Act 1976, the Disability Discrimination Act 1995, the Employment Equality (Sexual Orientation) Regulations 2003 and the Employment Equality (Religion or Belief) Regulations 2003; and

14.1.5 have in place and implement appropriate equal opportunities and equality policies and comply with all applicable Law (which for the purposes of this Clause 14.1.5 shall exclude Guidance which only **tie** or a public sector body and not the Operator is bound to comply with) regarding employment of or recruitment of the Operator's employees.

14.2 The Operator shall during Project Phase C2 and Project Phase D:

14.2.1 comply with paragraph 7 of Schedule 4 (*Operating Output Specification*) to the Operating Appendix in relation to personnel issues; and

14.2.2 comply with the Training Plan.

14.3 In accordance with Clause 5.4.2, the Operator shall comply with the Training Plan during Project Phase B once that plan has been agreed between **tie** and the Operator pursuant to the Project Development Output Specification.

14.4 During Project Phase C2 or Project Phase D, the **tie** Project Manager (acting properly and reasonably) may notify the Operator in writing if any employee of the Operator or any Operator Party (in accordance with the terms and conditions of employment of the employee concerned) misconducts himself or is incompetent or negligent in his duties or whose conduct in relation to the Project Operations is considered by the **tie** Project Manager to be undesirable and/or not in accordance with the Operator's obligations under this Agreement. **tie** shall co-operate with any disciplinary proceedings instigated by the Operator and shall be advised in writing by the Operator of the outcome in respect of such notification.

14.5 During Project Phase C2 or Project Phase D, if **tie**, acting fairly and having reasonable grounds to believe that a member of the Project Operations Staff:

14.5.1 has been or is under the influence of alcohol or drugs whilst performing any duties in connection with the Project Operations; or

14.5.2 has been convicted of any offence concerning sexual offences on children, theft, corruption or fraud; or

14.5.3 has, in the case of a Tram driver, been convicted of any offence involving alcohol or drugs,

requires the Operator (by notice in writing) to do so, the Operator shall (or shall procure that the relevant Operator Party shall) at the Operator's cost, immediately remove such employee from the Project Operations. Such employee may only be returned to the Project Operations if the matter or matters referred to in Clauses 14.5.1, 14.5.2 and/or 14.5.3 which is/are the subject of **tie's** reasonable grounds is/are established to be incorrect.

PART IV - FINANCIAL PROVISIONS

15A. INDEXATION

15A.1 Indexation shall be applied on an annual basis on 1 April of each year to the costs set out in Clauses 15A.2 and 15A.3 below.

15A.2 The following costs shall be Indexed:

15A.2.1 Target Costs for Project Phase C2;

15A.2.2 Target Operating Costs;

15A.2.3 Interim Target Costs;

15A.2.4 Profit Element;

15A.2.5 any amount which is expressed to be "Indexed" in this Agreement; and

15A.2.6 any other amount which is agreed by the Parties to be Indexed.

15A.3 The following costs shall be Indexed at Premium:

15A.3.1 Fixed Costs;

15A.3.2 Interim Fixed Costs;

15A.3.3 Fixed Rates;

15A.3.4 any amount which is expressed to be "Indexed at Premium" in this Agreement; and

15A.3.5 any other amount which is agreed by the Parties to be Indexed at Premium.

15. PROJECT DEVELOPMENT COSTS

15.1 During the Development Phase of this Agreement, the **tie** Project Manager and the Operator Project Manager shall meet:

(a) no later than 7 days before the end of each Quarter during Project Phases A, B and C1 to agree the provision of Project Development Services by the Operator's Core Team for the forthcoming Quarter; and

(b) no later than 7 days before the end of each month during Project Phases A, B and C1 to agree the provision of Project Development Services by the Operator's Non-Core Staff , and

(c) no later than 7 days before the end of each month during Project Phase C2 to agree the provision of Project Development Services during Project Phase C2

to:

15.1.1 review the partnering tasks required in the next Quarter or (as appropriate) month ;

15.1.2 specify the Project Development Services required from the Operator which will be provided by the Operator's Core Team to perform or assist in the performance of those partnering tasks. **tie** shall determine whether or not such Project Development Services fall outwith the Project Development Services to be provided by the Operator's Core Team within the relevant Capped Fee. If it is agreed that such Project Development Services would fall outwith this Capped Fee, then if **tie** still require these Project Development Services, **tie** shall require the Operator's Core Team to perform these additional Project Development Services as if these Project Development Services were being provided by the Operator's Non-Core Staff. Any additional Project Development Services required on this basis shall be specified in accordance with Clause 15.1.3 and budgeted on a monthly basis in accordance with Clause 15.1.5;

15.1.3 specify the Project Development Services required from the Operator which will be provided by the Operator's Non-Core Staff to perform or assist in the performance of those partnering tasks;

15.1.4 agree amendments to the Partnering Methodology and Programme setting out the plan and timetable for the performance of those tasks;

15.1.5 agree a forward budget for such month or Quarter (as appropriate) in respect of the services specified by **tie** pursuant to Clauses 15.1.2 and 15.1.3 for the

Project Development Costs to be incurred by the Operator in performing those tasks, and such budget shall also include any agreed Profiled Fixed Costs and any agreed Profiled Profit Element (where appropriate); and

15.1.6 review progress on delivery of Project Development Services against programme and agreed budget during the immediately preceding month or Quarter (as appropriate) .

provided that:

15.1.7 if any of the matters referred to in Clauses 15.1.1 to 15.1.5 cannot be so agreed, either Party may refer the matter to the Dispute Resolution Procedure;

15.1.8 **tie** shall not be required to reimburse the Operator at more than the Core Staff Fixed Rates and the Non-Core Staff Fixed Rates in respect of the Operator's Core Team and the Operator's Non-Core Staff for the services to be provided pursuant to Clauses 15.1.2 and 15.1.3, notwithstanding that any Operator Party who makes Operator's Non-Core Staff available to the Operator for the purpose of the Project may make a greater charge to the Operator and, for the avoidance of doubt, no such greater charge shall be included within the Project Development Costs;

15.1.9 **tie** shall not be required to make any reimbursement for Project Development Costs in excess of that provided for in a budget agreed pursuant to Clause 15.1.5 unless and until (and to the extent only that) any such excess is approved by the **tie** Project Manager;

15.1.10 during Project Phases A, B and C1, **tie** shall not be required to reimburse the Operator for the travel of any person to or from Edinburgh, or for the accommodation or subsistence of any person visiting Edinburgh in excess of any sum included in the Core Staff Fixed Rates or the Non-Core Staff Fixed Rates ;

15.1.11 **tie** shall not be required to reimburse the Operator for any costs or expenses incurred or time spent by the Operator or any Operator Party in relation to the negotiation or the procurement, preparation or negotiation of contracts or arrangements with third parties engaged by the Operator and, for the

avoidance of doubt, no such charge shall be included within the Project Development Costs; and

15.1.12 any specific Project Development Services to be provided by the Operator in relation to the support for the parliamentary process relating to the Scottish Private Bills shall be agreed on the basis of the Fixed Non-Core Staff Rates, budgeted, invoiced (quarterly) and paid for in accordance with this Clause 15 (*Project Development Costs*).

15.2 In accordance with **tie's** requirements pursuant to Clause 15.1.3, the Operator shall supply the Operator's Non-Core Staff provided that the Operator shall be obliged to provide Operator's Non-Core Staff who are employed by an Operator Party only if the required Operator's Non-Core Staff are available and can perform the required Project Development Services in accordance with the Partnering Methodology and Programme or otherwise in accordance with any timescale required by **tie** and/or the **tie** Project Manager.

15.3 The Operator shall submit to the **tie** Project Manager no later than 14 days after the end of each Quarter in respect of Project Development Services provided by the Operator's Core Team or no later than 14 days after the end of each month in respect of Project Development Services provided by the Operator's Non-Core Staff an application for payment in respect of the Project Development Costs and the Fixed Costs claimed for that Quarter or month (as appropriate) . Such application for payment shall set out the following details:

15.3.1 the total Project Development Costs incurred by the Operator and/or budgeted for that Quarter or month (as appropriate) in accordance with Clause 15.1.5;

15.3.2 a breakdown of those Project Development Costs by activity and by Line (where practicable);

15.3.3 a breakdown of those Project Development Costs between Project Development Costs relative to the Operator's Core Team and Project Development Costs relative to the Operator's Non-Core Staff;

15.3.4 the timesheets of each member of the Operator's Non-Core Staff engaged in performing the Project Development Services, certified as true and accurate by that person; and

15.3.5 a breakdown of the Fixed Costs claimed by the Operator together with a breakdown of the actual costs of any Fixed Costs incurred.

15.4 **tie** shall procure that the **tie** Project Manager shall, subject to any clarifications as are in **tie**'s opinion (acting properly and reasonably) necessary and subject to Clauses 10.11, 15.1.8, 15.1.9, 15.1.10, 15.1.11 and 15.13, certify by notice in writing to the Operator that part of the Project Development Costs and the Fixed Costs claimed in the application for payment approved by **tie** which approval shall include the sums stated in the budget for the relevant month or Quarter agreed in accordance with Clause 15.1.5 and give reasons why any part of the Project Development Costs and the Fixed Costs claimed in the application for payment has not been so approved and certified no later than 30 days after the date on which such application for payment is received by **tie** (the "Due Date for Payment"). **tie** shall not be liable to pay to the Operator any Project Development Costs contained in any budget agreed in accordance with Clause 15.1.5 to the extent that the Operator has not provided any of the Project Development Services. **tie** shall pay to the Operator the Project Development Costs contained in any budget agreed in accordance with Clause 15.1.5 where and to the extent **tie** instruct the Operator not to provide such Project Development Services.

15.5 Within 5 Business Days of receiving a notice from **tie** pursuant to Clause 15.4 certifying part or all of the Project Development Costs and the Fixed Costs claimed in the relevant application for payment, the Operator shall issue an invoice (substantially in the form of Schedule 13 (*Form of Operator's Invoice*) to **tie** for ninety percent (90%) of such certified Project Development Costs and Fixed Costs . **tie** shall retain ten percent (10%) of such certified Project Development Costs (the "Retention").

15.6 **tie** shall pay any invoice submitted in accordance with Clause 15.5 within 30 days of the Due Date for Payment calculated in accordance with Clause 15.4 (the "Final Date for Payment").

15.7 Within 5 Business Days of the issue of a PPCN by **tie** (in respect of the relevant Project Phase for the relevant Line), the Operator shall submit to the **tie** Project Manager the final application for payment in respect of the Project Development Costs and the Fixed Costs claimed for the relevant Project Phase for the relevant Line. Such application for payment shall set out details listed in Clauses 15.3.1 to 15.3.4.

15.8 **tie** shall procure that the **tie** Project Manager shall, subject to any clarifications as are in **tie**'s opinion (acting properly and reasonably) necessary and subject to Clauses 10.11, 15.1.8, 15.1.9, 15.1.10, 15.1.11 and 15.13, certify by notice in writing to the Operator that part of the Project Development Costs and the Fixed Costs claimed in the final application for payment approved by **tie** which certification shall include the budget for the relevant month or Quarter agreed in accordance with Clause 15.1.5 in respect of the Project Development Services required from the Operator which were to be provided by the Operator's Core Team and give reasons why any part of the Project Development Costs and the Fixed Costs claimed in the final application for payment has not been so approved and certified no later than 30 days after the date on which such application for payment is received by **tie** (the "Due Date for Payment").

15.9 Within 5 Business Days of receiving a notice from **tie** pursuant to Clause 15.8 certifying part or all of the Project Developments Costs and the Fixed Costs claimed in the final application for payment, the Operator shall issue an invoice to **tie** for one hundred percent (100%) of such certified Project Development Costs and Fixed Costs and, subject to Clause 15.11, for one hundred percent (100%) of each Retention retained in accordance with Clause 15.5.

15.10 **tie** shall pay the invoice submitted in accordance with Clause 15.9 within 30 days of the Due Date for Payment calculated in accordance with Clause 15.8 (the "Final Date for Payment").

15.11 In respect of Project Phase A, if **tie** issues a PPCN at a time when the Royal Assent to the Scottish Private Bill for the relevant Line has not yet been obtained, the Retention in respect of any specific Project Development Services provided pursuant to Clause 15.1.12 shall not be invoiced by the Operator until following the date of the giving of Royal Assent to the Scottish Private Bill for the relevant Line. **tie** shall pay the invoice submitted in accordance with this Clause 15.11 within 30 days of its receipt by **tie**.

15.12 The Operator may refer any Dispute about Project Development Costs and/or Fixed Costs which have not been certified by **tie** to the Dispute Resolution Procedure. If it is determined pursuant to the Dispute Resolution Procedure that the whole or part of any disputed amount should be paid by **tie** to the Operator, the Operator shall raise an invoice in respect of such determined amount and payment shall be made by **tie** to the Operator not less than 7 days from the date of receipt of such invoice by **tie** or the date which, apart from the Dispute would have been the Final Date for Payment calculated in accordance with Clause 15.6 or Clause 15.8 (as appropriate), whichever date is later.

15.13 Fees payable in respect of the Project Development Services provided by the Operator's Core Team during Project Phases A, B and C1 are Capped Fees subject to the following provisions of this Clause 15.13. Under no circumstances (absent **tie**'s express agreement) shall **tie** be liable to pay the Operator any amount with respect to any Project Phase for the Project Development Services provided by the Operator's Core Team, in excess of the amount of the relevant Capped Fee notwithstanding that tasks may remain outstanding in order for completion of Project Development Services in any Project Phase to be achieved to **tie**'s satisfaction provided always that if Project Phases A, B or C1 are extended beyond the dates set out in the Project Programme and/or the Partnering Methodology and Programme, and this extension is not due to the Operator's breach of this Agreement, the **tie** Project Manager shall meet with the Operator Project Manager to agree a budget for any further Project Development Services which are required from the Operator and which will be provided by the members of the Operator's Core Team and/or the Operator's Non-Core Staff, as if all members of the Operator's Core Team and the Operator's Non-Core Staff were Operator's Non-Core Staff.. The provisions of this Clause 15 shall apply to these Project Development Services as if the Project Development Services had been specified in accordance with Clause 15.1.3.

15.14 The Operator shall notify **tie** immediately if the Operator believes that the Operator's Core Team cannot carry out the Project Development Services in accordance with the timescales set out in the Partnering Methodology and Programme or otherwise in accordance with any requirements of **tie** or the **tie** Project Manager.

15.15 The Parties may agree to suspend provision of the Project Development Services at any time for any period up to a maximum of 12 months or such longer period as the Parties may agree. In the event of any such suspension, the Parties shall agree the

reasonable costs of such suspension, the terms for payment of such costs and the procedure for recommencement of the provision of the Project Development Services at the end of any agreed period of any suspension.

16. PAYMENTS FOR THE PROJECT DEVELOPMENT SERVICES

16.1 In consideration of the performance by the Operator of the Project Development Services in accordance with the terms of this Agreement, **tie**:

16.1.1 shall make the payments to the Operator specified in Clause 15 (*Project Development Costs*) and Clause 17 (*Payment during Project Phase C2*); and

16.1.2 subject to the terms of this Agreement, grants to the Operator, with effect from the Service Commencement Date in respect of each Line, the exclusive right to operate such Line in accordance with the terms and for the period set out in the Operating Appendix.

16.2 The Operator's only entitlement to payment from **tie** in respect of the performance of the Project Development Services shall be as expressly provided in this Agreement.

17. PAYMENT DURING PROJECT PHASE C2

17.1 The Operator shall submit to the **tie** Project Manager an application for payment no later than 7 days after the end of each month in respect of the Fixed Costs for the month just ended, the actual costs for any Target Costs for Project Phase C2 for the month just ended, any other actual costs agreed with **tie** and the Profit Element claimed for that month in respect of the Project Development Services carried out in Project Phase C2 for the relevant Line. Each application for payment shall set out the full detail of expenditure incurred and the monthly budget forecast agreed pursuant to Clause 15.1.5. The application for payment shall also include a breakdown of the Fixed Costs claimed by the Operator together with a breakdown of the actual costs of any Fixed Costs incurred.

17.2 **tie** shall procure that the **tie** Project Manager shall, subject to any clarifications as are in **tie**'s opinion (acting properly and reasonably) necessary and subject to Clauses 10.11, 17.10 and 17.11, certify by notice in writing to the Operator that part of the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and Profit Element claimed in the application for payment which is approved by **tie** by reference to the agreed budget and give reasons

why any part of the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and Profit Element has not been so approved and certified no later than 30 days after the date on which such application for payment is received by **tie** (the "Due Date for Payment").

17.3 Within 5 Business Days of receiving a notice from **tie** pursuant to Clause 17.2 certifying part or all of the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and the Profit Element claimed in the relevant application for payment, the Operator shall issue an invoice to **tie** for ninety percent (90%) of such certified Fixed Costs, the actual costs for any Target Costs for Project Phase C2, and any other actual costs agreed with **tie** and ninety percent (90%) of the certified Profit Element. **tie** shall retain ten percent (10%) of the certified Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and ten percent (10%) of the certified Profit Element (the "Retention").

17.4 **tie** shall pay any invoice submitted in accordance with Clause 17.3 within 30 days of the Due Date for Payment calculated in accordance with Clause 17.2 (the "Final Date for Payment"); and

17.5 Within 5 Business Days of the issue by **tie** of a PPCN in respect of the Project Phase C2 for the relevant Line, the Operator shall submit to the **tie** Project Manager the final application for payment in respect of the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and Profit Element claimed for Project Phase C2. Such application for payment shall set out the information required in Clause 17.1.

17.6 **tie** shall procure that the **tie** Project Manager shall, subject to any clarifications as are in **tie**'s opinion (acting properly and reasonably) necessary and subject to Clauses 10.11, 17.10 and 17.11, certify by notice in writing to the Operator that part of the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and Profit Element claimed in the final application for payment which is approved by **tie** and give reasons why any part of the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and Profit Element claimed in the final application for payment has not been so approved and certified no later than 30 days after the date on which such application for payment is received by **tie** (the "Due Date for Payment"). The final

amount certified by **tie** shall take into account a reconciliation of cost overrun or savings, as the case may be, calculated in accordance with Clause 17.11.

17.7 Within 5 Business Days of receiving a notice from **tie** pursuant to Clause 17.6 certifying part or all of the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and Profit Element claimed in the final application for payment, the Operator shall issue an invoice to **tie** for one hundred percent (100%) of such certified Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and Profit Element and for one hundred percent (100%) of each Retention retained in accordance with Clause 17.3.

17.8 **tie** shall pay the invoice submitted in accordance with Clause 17.7 within 30 days of the Due Date for Payment calculated in accordance with Clause 17.6 (the "Final Date for Payment").

17.9 The Operator may refer any Dispute about the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and/or Profit Element which have not been certified to the Dispute Resolution Procedure. If it is determined pursuant to the Dispute Resolution Procedure that the whole or part of any disputed amount should be paid by **tie** to the Operator, the Operator shall raise an invoice in respect of the determined amount and payment shall be made by **tie** to the Operator not less than 7 days from the date of receipt of such invoice by **tie** or the date which, apart from the Dispute would have been the Final Date for Payment calculated in accordance with Clause 17.4 or Clause 17.8 (as appropriate), whichever date is later.

17.10 **tie** shall not be required to reimburse the Operator for any amount not agreed in the relevant monthly budget for Project Phase C2.

17.11 To the extent that the Operator's actual costs, in respect of which Target Costs for Project Phase C2 have been allocated, for Project Development Services carried out during Project Phase C2 (i) exceed the Target Costs for Project Phase C2, **tie** shall certify (subject to a 10% retention to be released upon issue of the PPCN for Project Phase C2) a contribution of twenty percent (20%) of the undisputed amount of any such excess, up to a ceiling for such excess of ten percent (10%) of the Target Costs for Project Phase C2; or (ii) represents a saving against the Target Costs for Project

Phase C2, the Operator shall be entitled to a share of fifty percent (50%) of any such saving.

17.12 In the event that the Operator becomes aware of circumstances that may involve the completion of Project Phase C2 either being delayed or requiring expenditure in excess of Target Costs for Project Phase C2 and the Fixed Costs (excluding the Category Five Fixed Costs) claimed for Project Phase C2, the Operator shall notify **tie** forthwith.

18. PAYMENT DURING THE SERVICE PERIOD

18.1 The payment provisions at Clause 19 (*Payments to the Operator*) in the Operating Appendix will apply to payments during the Service Period.

19. METHOD AND CURRENCY OF PAYMENT

19.1 Subject to Clauses 19.3 and 19.4, all payments under this Agreement shall be made in pounds sterling by electronic transfer of funds to the bank account of the recipient (located in the United Kingdom) specified in the relevant invoice, quoting the invoice number against which payment is made, provided that in respect of payments pursuant to Clause 18.2 of the Operating Appendix (as regards Operating Revenues collected or received by the Operator):

19.1.1 all such Operating Revenues shall be paid directly into the bank account nominated by **tie**; and

19.1.2 the Operator shall supply statements summarising such payments in accordance with Clause 18 (*Payment of Operating Revenue to **tie***) of the Operating Appendix

19.2 If either Party (acting in good faith) disputes the amount of all or any part of a payment due under this Agreement, the undisputed amount of such payment shall be paid in accordance with Clause 19.1 and the provisions of this Clause 19.2 shall apply in respect of the disputed part only. The Parties shall resolve the Dispute in accordance with Clause 42 (*Dispute Resolution Procedure*). Following resolution of the Dispute, any amount agreed or determined to have been payable shall be paid forthwith together with interest on such amount calculated in accordance with Clause 20 (*Interest*).

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19.3 If the United Kingdom becomes a Participating Member State and to the extent that EMU Legislation provides that an amount denominated in the National Currency Unit of a Participating Member State and payable within that Participating Member State may be paid either in the Euro unit or in that National Currency Unit, each Party shall be entitled to pay any such amount either in the equivalent Euro unit (at the prevailing rate of exchange given by the Bank of England on the last Business Day prior to the due date pursuant to this Agreement for such payment) or in pounds sterling during such period as the relevant EMU Legislation permits.

19.4 On expiry of such period as referred to in Clause 19.3 above, the Parties shall discharge their payment obligations to one another by payment in Euros and all liabilities, amounts (whether outstanding or payable in the future) and calculations expressed in pounds sterling in this Agreement shall be converted or amended (as the case may be) automatically to the equivalent amount in Euros at the exchange rate provided pursuant to the relevant EMU Legislation.

20. INTEREST

20.1 Each Party shall be entitled, without prejudice to any other right or remedy (excluding any right under the Late Payment of Commercial Debts (Interest) Act 1998), to receive interest on any payment not duly made pursuant to the terms of this Agreement on the due date calculated from day to day at a rate per annum equal to the Default Interest Rate from the day after the date on which payment was due up to and including the date of payment. The Parties agree that the entitlement to interest pursuant to this Clause 20 (*Interest*) constitutes a "substantial remedy" for the purposes of section 9 of the Late Payment of Commercial Debts (Interest) Act 1998.

21. SET-OFF

21.1 The Operator shall not be entitled to retain or set off any amount owed to it by **tie** against any amount due to **tie** by it.

21.2 **tie** may retain or set off any amount owed to it by the Operator which has fallen due and payable against any amount due from **tie** to the Operator by specifying the amount(s) to be set off or retained and the ground(s) for set off or retention in the notice in writing to be issued by **tie** to the Operator on or before any Due Date for Payment or by **tie** issuing to the Operator a Notice of Intention to Withhold Payment not less than five Business Days before any Final Date for Payment.

21.3 If the retention or set-off of any amount referred to in Clause 21.1 is disputed, then any undisputed part of that amount shall be retained or set off and the following provisions of this Clause 21.3 shall apply in respect of the disputed part only. The Parties shall use all reasonable endeavours to resolve the dispute in question but, if they fail so to resolve it, either Party may refer the matter to the Disputes Resolution Procedure. Following resolution of the dispute, any amount agreed or determined to have been payable shall be paid not later than 7 days from the date of resolution of the Dispute or the date which, apart from the Dispute would have been the final date for payment (whichever is earlier), together with interest on such amount calculated in accordance with Clause 20 (*Interest*).

22. VAT

22.1 All amounts specified in this Agreement are exclusive of VAT.

22.2 If any supply made under this Agreement is or becomes chargeable to VAT then the person receiving the supply (**"Recipient"**) shall in addition pay the person making the supply (**"Supplier"**) the amount of that VAT against receipt by the Recipient from the Supplier of a valid and correct VAT invoice in respect of that supply.

22.3 Where, under this Agreement, any amount is calculated by reference to any sum which has been or will be incurred by any person, the amount shall include any VAT in respect of that sum only to the extent that such VAT is not and will not be recoverable as input tax by that person, save where such VAT is irrecoverable by reason of that person's negligence, error or omission.

22.4 The Operator shall provide to **tie** any information reasonably requested (including pursuant to Clause 48 (*Information and audit access*) in connection with the amount of VAT chargeable in relation to any supply made, payment made or reimbursed in accordance with this Agreement and payable by the Operator. To the extent **tie** suffers any Losses through irrecoverable VAT as a consequence of inaccurate or inadequate VAT related documentation provided by the Operator or a delay in the provision of such documentation, the Operator shall reimburse **tie** in respect of any such Losses.

22.5 **tie** shall not be liable to pay the Operator any irrecoverable VAT incurred by the Operator through his own oversight or omission, in particular with regard to VAT assessment of payments made pursuant to the Pain Gain Share Mechanism (set out at

paragraphs 18 to 21 of Schedule 3 to the Operating Appendix), the KPI Regime or VAI calculation.

22.6 For the avoidance of doubt, a change in the rates of VAT during the Term shall not be treated as a Qualifying Change in Law but VAT shall be applied to any invoice submitted in accordance with this Agreement and shall be payable at the rate which is current as at the date of any such invoice.

23. TAXATION

23.1 Subject to Clause 22 (*VAT*) and Clauses 23.2 to 23.4 below, the Operator shall pay all Tax whatsoever whether parliamentary, local or otherwise which are payable in respect of (i) any rights or interests enjoyed by the Operator under this Agreement during any Project Phase and (ii) the income (other than the Patronage Revenue collected by the Operator as agent for **tie** and remitted to **tie** pursuant to Clause 18 (*Payment of Operating Revenue to **tie***) of the Operating Appendix) or profits generated by the Project Operations or the Tram Business. With the exception of rates in respect of the business use or occupation of premises to perform its obligations under this Agreement (which the Operator shall be entitled to include in the Operating Costs), all other payments made as described under this provision shall be for the Operator's account.

23.2 In the event the Operator is notified or otherwise becomes aware of the first Rateable Value to be assigned to the System (or of any subsequent re-evaluation) it shall promptly notify **tie**. If **tie** wishes to appeal, **tie** shall notify the Operator of its intention and the Operator shall co-operate with and provide all reasonable assistance in the prosecution of the appeal, including the provision of relevant documentation, accounts and financial and technical information, the availability of relevant managers and other material evidence reasonably required by **tie**.

23.3 **tie** shall indemnify the Operator against any demand made in respect of the Rateable Value of the System and the Operator shall be entitled to 30% of the financial benefit of any reduction in the Rateable Value of the System resulting from any appeal made under Clause 23.2 above. The Operator shall indemnify **tie** in relation to any failure to retain, keep or produce proper and complete records which adversely affects **tie**'s ability to pursue such appeal.

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23.4 For the avoidance of doubt, no amount shall be included in the Target Operating Costs or the Fixed Costs in respect of the Rateable Value of the System, and any payment by **tie** pursuant to the indemnity in Clause 23.3 shall be made separately from the Payment Mechanism.

23.5 To the extent that an Infrastructure Provider is assessed as liable in respect of the Rateable Value of the System and **tie** wishes to appeal, **tie** shall notify the Operator of its intention and the Operator shall co-operate with such appeal in accordance with Clause 23.2.

24. MITIGATION AND COST MANAGEMENT

24.1 The Operator shall (and shall procure that each Operator Party shall) take all reasonable steps to manage, minimise and mitigate:

24.1.1 all Project Development Costs during Project Phases A, B and C1, and actual costs for the Project Development Services carried out during Project Phase C2 ; and

24.1.2 the adverse effects of any Base Case Assumption proving to be an Inappropriate Base Case Assumption.

24.2 At all times during the Term, each Party shall take all reasonable steps to minimise and mitigate any loss for which that Party is entitled to bring a claim against the other Party pursuant to this Agreement.

24.3 Without prejudice to Clause 24.2, the Operator shall (and shall procure that its Operator Parties shall) take all reasonable steps to minimise the adverse effects of any Relief Event (including by seeking damages from third parties or other remedies where proceedings would have a reasonable chance of success and would not be economically imprudent having regard to the likely level of damages or the nature of the remedies and the estimated cost or duration of the proceedings).

PART V - WARRANTIES, INDEMNITIES AND LIABILITY

25. WARRANTIES

25.1 The Operator hereby represents, warrants and undertakes to **tie** that:

25.1.1 none of the Operator, the Operator Parties or any of their respective representatives or Affiliates or professional advisers or employees or anyone acting on behalf of any of them have committed any Prohibited Act;

25.1.2 all information which has been given by any of the Operator, the Operator Parties or any of their respective representatives or Affiliates or advisers or employees or anyone acting on behalf of any of them to any member, officer, employee or adviser of **tie** was, when given true, complete and accurate in all material respects and there is no fact or matter not disclosed in writing to **tie** which:

25.1.2.1 renders any such information untrue, inaccurate or misleading; or

25.1.2.2 might, if disclosed, adversely affect the decision of anyone considering whether or not to contract with the Operator;

25.1.3 the Operator:

25.1.3.1 is duly incorporated under the law of Scotland and has the power to own its own assets and carry on its own business; and

25.1.3.2 has full power and authority to enter into and perform this Agreement which constitutes a valid and binding obligation on the Operator in accordance with its terms; and

25.1.3.3 will not, by performing its obligations under this Agreement, be in breach of any undertaking to any third party or of any applicable law so as to have a material adverse effect on its ability to discharge its obligations under this Agreement;

25.1.4 the Operator, the Operator's immediate parent company and TRANSDEV plc is not involved in any dispute with HM Inland Revenue, HM Customs & Excise, the European Commission, the OFT, or any other fiscal or regulatory

authority in any jurisdiction concerning any matter which could materially and adversely affect the business of the Operator or the Project in any way;

25.1.5 the Operator does not use any processes and is not engaged in any activities which involve the misuse of any confidential or proprietary information belonging to any third party;

25.1.6 no claim is presently being assessed and no litigation, arbitration or proceeding is in progress or, to the best of the knowledge and belief of the Operator pending or threatened, against the Operator or any of its management or assets which might have an adverse effect on the ability of the Operator to perform the obligations in this Agreement or the Operating Appendix;

25.1.7 the Operator's use and the use by **tie** of the Project Development Services and any materials provided to it as part of the Project Development Services has not infringed and shall not infringe any third party's Intellectual Property Rights;

25.1.8 there has been no material adverse change to the financial condition the Operator's immediate parent company and TRANSDEV plc since the audited accounts for the financial year 2003 including any matter resulting in a downgrade of the Operator's immediate parent company's and TRANSDEV plc's credit rating with any commercially acknowledged independent rating agency reporting the transport sector; and

25.1.9 the performance of the Project Development Services does not create any situation in which a conflict of interest arises for the Operator.

25.2 Each of the warranties, representations and undertakings given under Clauses 25.1.1 to 25.1.9 shall be construed as a separate and independent warranty, representation and undertaking and shall not be limited or restricted by reference to or inference from any other terms of this Agreement.

25.3 The Operator shall immediately disclose in writing to **tie** any event or circumstance which may arise or become known to it after the Effective Date which is materially inconsistent with any of the warranties, representations or undertakings given under

Clauses 25.1.1 to 25.1.9 or which has or is likely to have a material adverse effect on the Project.

25.4 The warranties, representations or undertakings given under Clauses 25.1.1 to 25.1.9 shall be repeated by the Operator (save that Clause 25.1.8 shall apply to the Operator and to the Operator's immediate parent company and TRANSDEV plc the reference in Clause 25.1.8 to audited accounts shall refer to the latest set of the audited accounts issued by the Operator, the Operator's immediate parent company and TRANSDEV plc) at the commencement of Project Phase C2 for each Line or Network Expansion.

25.5 **tie** does not give any warranty or undertaking as to the completeness, currency, accuracy or fitness for any purpose of any of the Background Information and, subject to the express provisions of this Agreement, neither **tie**, the **tie** Advisers nor any of its or their employees shall be liable to the Operator in contract, delict (including breach of statutory duty), or otherwise as a result of:

25.5.1 any inaccuracy, omission, unfitness for any purpose or inadequacy of any kind whatsoever in the Background Information; nor

25.5.2 any failure to make available to the Operator any materials, documents, drawings, plans or other information relating to the Project;

provided that nothing in this Clause 25.5 shall exclude any liability in respect of any statements made or information provided fraudulently.

26. REQUIRED INSURANCES

26.1 The Operator shall, at its own cost, procure that each of the Required Insurances is taken out and comes into effect on the earlier of:

26.1.1 the relevant date specified in each "Period of Insurance" set out in Schedule 10 (*Required Insurances*); and

26.1.2 the date on which the Operator is first required by Law to have in place such insurance in connection with the Project Development Services and the Project Operations,

and shall maintain the Required Insurances in full force and effect until the later of:

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26.1.3 the relevant date specified in each "Period of Insurance" set out in Schedule 10 (*Required Insurances*); and

26.1.4 the last date on which the Operator is required by Law to have in place such insurance in connection with the Project Development Services and the Project Operations.

26.2 The Operator shall procure that all Required Insurances shall:

26.2.1 be maintained in accordance with Schedule 10 (*Required Insurances*); and

26.2.2 be placed at all times with insurers confirmed in writing as acceptable by **tie** (such written acceptance not to be unreasonably withheld or delayed).

26.3 **tie** may ask the Operator to take out and maintain any insurance from time to time in the joint names of **tie,** the Operator and, if required, any other party agreed between the Parties or become a joint named insured (the "Joint Names Insurance"). If Joint Names Insurance is required, the terms of this Clause 26 including the provisions which are stated to apply to the "Required Insurances" shall apply with any appropriate adjustment to be agreed between the Parties as a **tie** Change. The Operator shall procure that any Joint Names Insurance shall:

26.3.1 contain a provision that **tie** is named as a co-insured party;

26.3.2 provide that any Joint Names Insurance shall continue in effect and unaltered for the benefit of the insured parties for at least 90 days after written notice by registered mail of any cancellation (including non-renewal), change, modification or lapse for any reason;

26.3.3 contain a provision that requires the insurer to send copies of all notices of cancellation or alteration or suspension or any other notices given under or in relation to the policy to **tie** promptly upon receiving any notices of cancellation or alteration or suspension or any other notices;

26.3.4 contain a provision that a notice of a claim given to the insurer by **tie** or the Operator under the policy shall, in the absence of manifest error, be accepted by the insurer as valid notification of a claim in respect of the interests of all insured parties;

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26.3.5 contain a provision to the effect (on the basis of non-vitiation/severability) that all the provisions of any the Joint Names Insurance shall operate as if there were a separate policy in effect (save in respect of the sums insured, limits of liability and excesses/deductibles which shall be at the levels stated) for each named insured and that non-compliance with any policy term, condition or warranty and/or misrepresentation of material information by the Operator or any other co-insured will not affect the rights and/or interests of **tie** under any policies effected as Joint Names Insurance;

26.4 The Operator shall ensure that each of its insurance brokers (who shall be approved by **tie**, such approval not to be unreasonably withheld or delayed) gives **tie** as soon as reasonably practicable after any policy of Required Insurance is taken out, replaced or renewed, a letter of undertaking in the form set out in Part 2 of Schedule 10 (*Required Insurances*).

26.5 The Operator shall:

26.5.1 procure that the professional indemnity insurance and the third party liability insurance which is to be maintained by the Operator in accordance with Schedule 10 (*Required Insurances*) contains a waiver of subrogation against **tie** as required in Schedule 10 (*Required Insurances*) save in respect of fraud or deliberate non-disclosure; and

26.5.2 where the Operator is obliged to effect any Required Insurances, not bring any claim or action against **tie** (or any **tie** Party) in respect of any loss or damage in circumstances where and to the extent that the Operator could recover such loss or damage under such insurance (whether or not such insurance has in fact been effected or, if effected, has been vitiated as a result of any act or omission of the Operator (or any Operator Party), including but not limited to non-disclosure or under-insurance), provided that, to avoid doubt, this Clause 26.5.2 shall not by itself prevent the Operator from claiming against **tie** (or any **tie** Party) in respect of a breach of this Agreement by **tie** or any **tie** Party for any loss or damage not covered because of the level of deductibles under such insurance permitted by this Agreement or to the extent such loss or damage exceeds the greater of the insurance placed or the maximum of such insurance required under Schedule 10 (*Required Insurances*).

26.6 The Operator shall not take any action or fail to take any reasonable action or (insofar as it is reasonably within its power) permit or allow others to take or fail to take any action (including failure to disclose any fact) as a result of which any of the Required Insurances may be rendered void, voidable, unenforceable or suspended or impaired in whole or in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

26.7 Not less than 30 days prior to the expiry or amendment of any of the Required Insurances, the Operator shall submit to **tie** a request for approval from **tie** of the insurer and the principal terms and conditions of such insurance policy in respect of any material change or revision to such terms and conditions or change in identity of such insurer, such approval not to be unreasonably withheld or delayed.

26.8 The Operator shall supply **tie** with copies of every policy document, insurance certificate and renewal certificate relating to any Joint Names Insurance (or such other evidence of insurances as may be reasonably required by **tie**) and documentary evidence to the effect that the Required Insurances (other than any Joint Third Names Insurance) have been taken out and are being maintained as soon as it is available but in any event no later than 7 days (in respect of certificates) and 60 days (in respect of policies) after the inception of the relevant policies, together with evidence of payment of the premiums and any periodic renewal certificates. If the Operator defaults in insuring or continuing to maintain the Required Insurances subject to Clause 27 *(Uninsurable Risks),* **tie** may insure against any risk in respect of which such default has occurred and recover any premiums from the Operator as a debt immediately due and payable.

26.9 The supply to **tie** of any insurance policy or insurance certificate or renewal certificate or other evidence of compliance with this Clause 26 (*Required Insurances)* shall not imply, or be taken as, acceptance by **tie** that:

26.9.1 the extent of insurance cover is sufficient and its terms are satisfactory; or

26.9.2 in respect of any risks not insured against, insurable interests or parties not insured, an acceptance by **tie** that the same were Uninsurable.

26.10 Neither failure to comply nor full compliance with the provisions of this Clause 26 (*Required Insurances*) and Clause 27 (*Uninsurable Risks*) shall relieve the Operator of its liabilities and obligations under this Agreement.

26.11 The Operator shall apply any proceeds of any policies of insurance maintained in accordance with Schedule 10 (*Required Insurances*) in satisfaction of the claim, demand, proceeding or liability in respect of which such proceeds are payable (unless already paid direct to the third party or employee by the insurer).

26.12 The Operator shall inform **tie** in writing as soon as reasonably practicable after it receives a claim or becomes aware of the occurrence of any event that may give rise to a claim under any Joint Names Insurance and will ensure that **tie** is kept fully informed of subsequent action and developments concerning the claim; such written information shall not be required in relation to any claim of less than £50,000 (Indexed). The Operator shall take such steps as are necessary or appropriate to ensure that each Operator Party, in respect of any event or claim of a like nature arising out of or relating to the operation or responsibility of the Operator Party, takes in relation to the Operator like action to that which the Operator is required to take under this Clause 26.12 in relation to **tie**, and shall inform **tie** promptly of information thus received from any Operator Party.

26.13 Notwithstanding, and without prejudice to, any other provision hereof (but subject always to Clause 28 (*Indemnity*)), the Operator undertakes to the extent it has the right to do so under the relevant policy that it will not (and that each of the Operator Parties to the extent each respectively has the right to do so under the relevant policy will not) settle any Joint Names Insurance claim above £50,000 (Indexed) without the prior written agreement of **tie** (such agreement not to be unreasonably withheld or delayed).

26.14 The Operator undertakes with **tie** in relation to the Required Insurances:

26.14.1 to comply with all requirements of the insurers; and

26.14.2 to give notice to **tie** immediately upon the happening of any event which will adversely affect any policy of insurance effected in accordance with this Clause 26 (*Required Insurances*), including the downgrading of the credit rating to A- by Standard & Poors of any party providing any of the Required Insurances.

26.15 In the event that the Operator considers that the requirements of Clause 26.14.1, or 26.15.2 may conflict with any other Clause herein, the Operator shall immediately notify **tie** in writing.

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26.16 The Required Insurances shall be reviewed before the commencement of a new Project Phase, and/or on an annual basis and/or as otherwise agreed between **tie** and the Operator by **tie** , with the support and assistance of the Operator, to ensure that the Required Insurances continue to offer value for money to **tie. tie** retains the right to require the Operator to amend the Required Insurances throughout the Term as it may reasonably require to reflect changes in the circumstances surrounding this Agreement or to effect changes which will offer better value for money to **tie**. Any such amendment shall be considered in accordance with Clause 24 (***tie** changes*) and Clause 23 (*Performance and Financial Adjustments*).

26.17 Following expiry or termination of this Agreement, **tie** shall continue to pay the Operator the agreed amount for any Required Insurances which the Operator is required in terms of this Agreement to maintain beyond the date of expiry or termination of this Agreement. **tie** shall notify the Operator if **tie** does not want the Operator to continue maintaining any such Required Insurances following expiry or termination of this Agreement.

26.18 The Operator shall having regard to the knowledge skill and care of a competent operator, if required by **tie**, advise **tie** with regard to the selection of appropriate insurances for Project Phase C and Project Phase D.

26.19 **tie** shall take out or procure that such insurances as **tie** considers to be appropriate in relation to the construction, maintenance and operation of the System are taken out and maintained during Project Phase C and Project Phase D. The Operator agrees that the Operator shall take out any such insurances if required to do so by **tie**, and any such requirement on the Operator shall be considered in accordance with Clause 24 (***tie** Changes*) and Clause 23 (*Performance and Financial Adjustments*) .

26.20 The Parties agree that appropriate amendments shall be made to this Agreement to reflect the insurances which are taken out or not taken out in terms of Clause 26.19.

26.21 The Operator shall be liable for claims made under the third party insurance to be taken out as a Joint Names Insurance or otherwise in respect of the Project Operations during Project Phase D, which are less than the level of stated deductibles in Schedule 10 *(Required Insurances)* as at the Effective Date relative to such insurance.

27. UNINSURABLE RISKS

27.1 Nothing in this Agreement shall oblige the Operator to take out insurance in respect of a risk or matter which is Uninsurable.

27.2 Immediately after the Operator becomes aware that a Compliance Critical Risk is Uninsurable, then:

27.2.1 the Operator shall notify **tie**; and

27.2.2 if both Parties agree or it is determined in accordance with the Dispute Resolution Procedure (on the referral of either Party) that the risk or matter is Uninsurable and that its being Uninsurable is not caused by the actions or omissions of the Operator or an Operator Party;

then the Parties shall meet to discuss the means by which the risk or matter should be managed, mitigated or controlled (including considering the use of self-insurance by either Party and/or insurance through a captive insurer in any jurisdiction).

27.3 At the meeting referred in Clause 27.2, either Party may propose:

27.3.1 any necessary change in the Project Development Services or Project Operations;

27.3.2 whether any amendments are required to the terms of the Agreement including any required adjustment to the Capped Fees, Fixed Costs (excluding the Category Five Fixed Costs) , Target Costs for Project Phase C2, Target Operating Costs or the Target Revenue; and

27.3.3 whether relief from compliance with obligations is required, as a result of the risk or matter becoming Uninsurable.

27.4 If the requirements of Clause 27.2 are satisfied but the Parties cannot agree as to how to manage, mitigate or control the risk or matter then, for the period during which the relevant Compliance Critical Risk is Uninsurable:

27.4.1 to the extent that the Operator is prevented or otherwise hindered from performing the Project Development Services or the Project Operations in the manner required by this Agreement:

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27.4.1.1 the Operator shall be relieved from such performance and shall not be liable to **tie** for failure so to perform provided it continues to perform the remainder of the Project Development Services or the Project Operations as best as it is reasonably able to; and

27.4.1.2 during Project Phase C2 and Project Phase D, the Target Costs for Project Phase C2 or Target Operating Costs or the Fixed Costs (excluding the Category Five Fixed Costs) as the case may be shall be reduced by an amount which reflects the net cost savings made as a result of restricted Project Development Services or restricted Project Operations and Target Revenues shall be adjusted to reflect the impact of restricted Project Operations on Patronage Revenue. If the Operator determines not to reduce its operating establishment or cost base to reflect restricted Project Operations but to maintain this at the level necessary for normal Project Operations, **tie** shall not be obliged to pay the marginal Fixed Costs or Operating Costs relating to such establishment or cost base.

27.4.2 **tie** shall have the option to be exercised by notice in writing at any time in the period during which such Compliance Critical Risk is Uninsurable (provided that **tie** shall, if such period continues for more than 180 days, be deemed to have exercised such option on the 181st day) to terminate this Agreement forthwith.

28. INDEMNITY

28.1 The Operator shall, subject to Clause 28.2, indemnify **tie** and keep **tie** indemnified on demand at all times from and against all Indemnified Liabilities which arise out of, or in consequence of, or in connection with any breach of this Agreement by the Operator, any non-performance or delay in performance of the Operator's obligations under this Agreement or any breach of statutory duty by the Operator (or any Operator Party).

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28.2 The Operator's liability to indemnify **tie** under Clause 28.1 does not extend to any Indemnified Liabilities to the extent that:

28.2.1 they are caused by the negligent acts or negligent omissions of **tie** or any **tie** Party; or

28.2.2 they are caused by the breach by **tie** of its obligations under this Agreement (save where and to the extent such breach occurs by reason of the Operator's or any Operator Party's breach or negligence); or

28.2.3 they arise as a direct result of the Operator acting on specific written instructions issued by **tie** or the **tie** Project Manager (excluding any instruction to comply with the terms of this Agreement (or any part of it)) provided that, prior to acting on such instruction, the Operator:

28.2.3.1 notifies the **tie** Project Manager of the risk of the relevant Indemnified Liability occurring as a result of acting on the instruction; and

28.2.3.2 does not then act on the instruction until it receives written confirmation from the **tie** Project Manager that it should do so.

For the avoidance of doubt neither instructions issued pursuant to Clause 24 (***tie*** *Changes*) of the Operating Appendix and Clause 25 (*Operator Changes*) of the Operating Appendix shall constitute specific written instructions for the purposes of this provision.

28.3 Any amount paid by the Operator to **tie** pursuant to this Clause 28 (*Indemnity*) shall be excluded from the calculation of the Operating Costs.

29. CONDUCT OF CLAIMS

Subject always to the requirements of the Required Insurances:

29.1 If **tie** receives any notice, demand, letter or other document concerning any claim from which it appears that **tie** is or may become entitled to indemnification under this Agreement ("Claim"), **tie** shall notify the Operator as soon as reasonably practicable and shall supply a copy of the relevant Claim to the Operator.

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29.2 Where it appears that **tie** is, or may become, entitled to indemnification from the Operator in respect of the liability arising out of the act or omission which is the subject of the Claim, the Operator shall take conduct of any defence, dispute, compromise or appeal of the Claim and of any incidental negotiations and shall be entitled to resist the Claim in the name of **tie** and **tie** will give the Operator all reasonable co-operation, access and assistance for the purposes of considering and resisting such Claim.

29.3 In relation to any Claim subject to Clause 29.2:

29.3.1 the Operator shall keep **tie** fully informed and consult with it about material elements of the conduct of the Claim;

29.3.2 the Operator shall not bring the name of **tie** into disrepute; and

29.3.3 the Operator shall not pay or settle such Claims without the prior written consent of **tie**, such consent not to be unreasonably withheld or delayed.

29.4 **tie** shall be free to take steps in the proceedings, pay or settle any Claim on such terms as it thinks fit (and without prejudice to its rights and remedies under this Agreement) if the Operator fails to notify **tie** of its intention to conduct the relevant Claim within 20 Business Days of the notice from **tie** under Clause 29.1 above or the Operator notifies **tie** that it does not intend to take conduct of the Claim.

29.5 **tie** shall be free at any time to give notice to the Operator that it is retaining or taking over (as the case may be) the conduct of any defence, dispute, compromise or appeal of any Claim (or of any incidental negotiations) to which Clause 29.2 applies. On receipt of such notice the Operator shall promptly take all steps necessary to transfer the conduct of such claim to **tie** and shall provide to **tie** all reasonable co-operation, access and assistance for the purposes of considering and resisting such Claim. If **tie** gives any notice pursuant to this Clause 29.5, then the Operator shall be released from any liability under the relevant indemnity in respect of such Claim. **tie** shall keep the Operator reasonably informed as to the progress and status of any such Claim until such Claim is settled, withdrawn, discontinued or otherwise disposed of.

29.6 If, in controlling and contesting any Claim, **tie** takes or fails to take any action in relation to such Claim which it might reasonably be expected to take or not take (as the case may be) which terminates or reduces any entitlement of the Operator to

recover any part of the Claim from any insurer under any of the Required Insurances, the liability of the Operator to indemnify **tie** in respect of such Claim shall be reduced by an amount equal to such part or as the case may be the amount of the reduction thereof (except in the case where **tie** could not reasonably have been expected to have known that the Operator's entitlement could be so terminated or reduced).

29.7 If the Operator pays to **tie** an amount in respect of an indemnity and **tie** subsequently recovers (whether by payment, discount, credit, saving, relief, other benefit or otherwise) a sum which is directly referable to the fact, matter, event or circumstances giving rise to the Claim, **tie** shall forthwith repay to the Operator whichever is the lesser of:

29.7.1 an amount equal to the sum recovered (or the value of the saving or benefit obtained) less any out-of-pocket costs and expenses properly incurred by **tie** in recovering the same; and

29.7.2 the amount paid to **tie** by the Operator in respect of the Claim under the relevant indemnity;

provided that there shall be no obligation on **tie** to pursue such recovery and that the Operator is repaid only to the extent that the amount of such recovery aggregated with any sum recovered from the Operator exceeds any loss sustained by **tie** in respect of the Claim.

30. LIABILITY AND SOLE REMEDY

30.1 Subject to Clause 30.3, the Parties acknowledge and agree that the only rights available to them to terminate this Agreement are those expressly set out in this Agreement and that neither Party shall be entitled to exercise a right to terminate or rescind or accept the repudiation of this Agreement under any other right whether arising in common law or statute or otherwise howsoever (other than for fraud or a fraudulent misrepresentation).

30.2 The Parties further acknowledge and agree that the express rights provided in this Agreement in relation to termination and the calculation and payment of amounts due following such termination are exclusive and are in place of (and not cumulative with) any other rights or remedies which might arise as a consequence of such termination. The Parties hereby waive all other rights and remedies arising from such

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termination, whether express or implied, arising by common law (including in delict), by statute or otherwise howsoever provided that nothing in this Clause 30.2 shall exclude the right of the Parties to claim remedies expressly conferred on them by this Agreement.

30.3 Nothing in this Agreement shall exclude or limit the liability:

30.3.1 of either Party for:

30.3.1.1 death or personal injury caused by that Party's negligence or the negligence of anyone for whom that Party is vicariously liable;

30.3.1.2 fraud or fraudulent misrepresentation; or

30.3.1.3 any breach of warranty given as to valid and marketable title, freedom from unduly onerous burdens and conditions or entitlement to possession by action of prescription; or

30.3.2 of the Operator, for any breach of this Agreement or any delict (including negligence) or other liability arising prior to termination of this Agreement;

provided that nothing in this Clause 30.3 shall confer on either Party rights or remedies that they would not otherwise have.

30.4 Subject to Clause 30.3, neither party shall be entitled to claim damages for breach of this Agreement, in delict (including negligence), breach of statutory duty or on any other basis whatsoever to the extent that such damages claimed by that Party are for Indirect Losses suffered by that Party provided that for the avoidance of doubt, nothing in this Clause 30.4 shall affect either Party's liability to the other Party, whether under any indemnity, under Clause 29.6 or otherwise, in respect of any claim, action, proceedings or demand against such other Party by a third party in connection with Indirect Loss suffered.

30.5 The Operator shall not be relieved or excused of any responsibility, liability or obligation under this Agreement by the appointment of any Operator Party. The Operator shall, as between itself and **tie**, be responsible for the selection, pricing, performance, acts, defaults, omissions, breaches, delict and offences of all the Operator Parties. All references in this Agreement to any act, default, omission,

breach, delict or offence of the Operator shall be construed to include any such act, default, omission, breach or delict of any Operator Party.

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PART VI - TERMINATION

31. TERMINATION DURING DEVELOPMENT PHASE

31.1 During Project Phase A, Project Phase B and Project Phase C1 in respect of any Line, **tie** may terminate this Agreement, either:

31.1.1 in whole, if no Line has reached Project Phase C2 or Project Phase D at the time of such termination;

31.1.2 in part, for such Lines where project development is still in Project Phase A, Project Phase B or Project Phase C1; or

31.1.3 in part, if the Scottish Private Bill in respect of a Line is not enacted;

such termination to be by way of **tie** providing at least 30 days notice in writing to the Operator at any time.

31.2 During Project Phase A and Project Phase B in respect of Line 1 or Line 2, **tie** may terminate this Agreement in whole or in part, if there is a material increase or alteration to the costs of the Project or the liabilities and risks to **tie** beyond those which **tie** considers (i) can be managed within Affordability Limits or (ii) are reasonable and prudent to retain, such termination to be by way of **tie** providing at least 30 days notice in writing to the Operator at any time.

31.3 If **tie** serves notice to terminate this Agreement in respect of one or more Lines ("**Terminated Lines**") pursuant to Clause 31.1.2, and **tie** chooses to continue development of any of such Terminated Lines, either by itself or in conjunction with any third party, **tie** shall discuss with the Operator in good faith, at the stage of development of such Terminated Line equivalent to Project Phase B:

31.3.1 the Target Costs for Project Phase C2 for such Terminated Line;

31.3.2 the Interim Target Operating Costs, Interim Fixed Costs and the Interim Target Revenues for the System including such Terminated Line (if it is proposed that there be a time interval between the Service Commencement Date and the Full Service Commencement Date for such Terminated Line);

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31.3.3 the Target Operating Costs, any adjustments to the Fixed Costs (excluding the Category Five Fixed Costs) and the Target Revenues for the System including such Terminated Line;

31.3.4 amendments to the Operating Output Specification, the Operating Method Statements (and the Operating Appendix to the extent necessary) to take effect from the Service Commencement Date of such Terminated Line; and

31.3.5 any other aspect of the terms of this Agreement to be amended to reflect the Operator's rights and obligations in respect of such Terminated Line (or the System including such Terminated Line);

on the basis that the Operator should be in a No Better and No Worse position following the implementation and Service Commencement of the Terminated Line provided that **tie** shall not be liable to pay the Operator any sum which the Operator has included in its Profit Element with respect to such Terminated Line.

31.4 If **tie** and the Operator are unable to agree on the matters referred to in Clause 31.3, then the termination rights in Clause 31.5 will apply.

31.5 Notwithstanding that one or more Lines may be in Project Phase C2 or Project Phase D, if **tie** and the Operator are unable to agree:

31.5.1 the Fixed Costs and/or the Target Costs for Project Phase C2 for any proposed new Line or Network Expansion;

31.5.2 Interim Target Operating Costs, Interim Fixed Costs and Interim Target Revenues for the System including any proposed new Line or Network Expansion;

31.5.3 the Target Revenues and Target Operating Costs and/or Fixed Costs for Project Phase D for the System including any proposed new Line or Network Expansion;

31.5.4 amendments to the Operating Output Specification, the Operating Method Statements (and the Operating Appendix to the extent necessary) to take effect from the Service Commencement Date of any proposed new Line or Network Expansion; or

31.5.5 any other aspect of the contractual terms to apply in respect of Project Phase C2 or Project Phase D in respect of such Line or Network Expansion (or the System including such proposed new Line)

then **tie** shall be entitled to serve notice on the Operator to terminate this Agreement as a whole, such notice to take effect:

(a) at the commencement of Project Phase C2 for such proposed new Line; or

(b) at such other time as **tie** may specify prior to the expiry of the Term, being not less than 30 days after the date of the notice.

31.6 In the event that in **tie**'s opinion delay in completion of Project Phase C2 for any Line (irrespective of the reason) indicates that there is no reasonable prospect of Project Phase D commencing within six months of the Planned Service Commencement Date, **tie** shall be entitled to terminate this Agreement in respect of such Line by serving notice which shall take effect after 30 days.

32. TERMINATION ON TIE DEFAULT OR AT OPERATOR OPTION

32.1 If a **tie** Default has occurred and the Operator wishes to terminate this Agreement, the Operator must serve a Termination Notice on **tie** within 30 days of becoming aware of the **tie** Default. Failure to do so shall be a waiver of the right to terminate.

32.2 The Operator shall specify in the Termination Notice the type of **tie** Default which has occurred entitling the Operator to terminate.

32.3 Provided the Operator has complied with Clauses 32.1 and 32.2, this Agreement will terminate on the day falling 60 days after the date on which **tie** receives the Termination Notice, unless **tie** rectifies the **tie** Default within 45 days of receipt of the Termination Notice.

32.4 The Operator shall not be entitled to, and shall not purport to, terminate this Agreement or accept any repudiation of this Agreement, except as expressly provided in this Clause 32 (*Termination on **tie** Default or at Operator Option*).

33. PERSISTENT BREACH

33.1 If a breach by the Operator of any of its obligations under this Agreement has occurred more than once then **tie** may serve a notice (**"Persistent Breach Notice"**) on the Operator:

33.1.1 specifying that it is a Persistent Breach Notice;

33.1.2 giving reasonable details of the breach; and

33.1.3 stating that such breach is a breach which, if it recurs frequently or continues, may result in a termination of this Agreement.

33.2 If, following service of such a Persistent Breach Notice, the breach specified has continued or occurred more than once after the date falling 30 days after the date of service of the Persistent Breach Notice and before the date falling 365 days after the date of service of such notice, then **tie** may serve another notice (**"Final Persistent Breach Notice"**) on the Operator:

33.2.1 specifying that it is a Final Persistent Breach Notice;

33.2.2 stating that the breach specified has been the subject of a prior Persistent Breach Notice within the period of 365 days prior to the date of service of the Final Persistent Breach Notice; and

33.2.3 stating that if such failure is not remedied within 7 days or is remedied and occurs once or more within the 180 day period after the date of service of the Final Persistent Breach Notice, this Agreement may be terminated.

34. TERMINATION ON OPERATOR DEFAULT

34.1 If an Operator Default has occurred and **tie** wishes to terminate this Agreement, it must serve a Termination Notice on the Operator.

34.2 Such Termination Notice must specify:

34.2.1 the type and nature of Operator Default that has occurred, giving reasonable details; and

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34.2.2 that this Agreement will terminate on the day falling 60 days after the date on which the Operator receives the Termination Notice, unless, if (in the opinion of **tie)** the Operator Default is remediable, and the Operator puts forward a rectification programme acceptable to **tie** within 30 days or rectifies the Operator Default no later than 15 days before the 60 days above elapses.

34.3 If the Operator either rectifies the Operator Default (if remediable) within the time period specified in such Termination Notice or implements in accordance with its terms, the rectification programme approved in writing by **tie**, the Termination Notice will be deemed to be revoked and this Agreement will continue.

34.4 If the Operator fails to rectify the Operator Default within the time period specified in such Termination Notice, this Agreement will terminate on the date falling 60 days after the date of service of the Termination Notice pursuant to Clause 34.1.

34.5 If the Operator fails to implement, in accordance with its terms, any rectification programme approved in writing by **tie**, this Agreement will terminate on the date of such failure.

34.6 The Operator shall reimburse **tie** for all reasonable costs incurred by **tie** in exercising any of its rights under this Clause 34 (*Termination on Operator Default*) (including any relevant increased administrative expenses), and, for the avoidance of doubt, any such costs reimbursed shall be excluded from the calculation of Operating Costs for the purposes of any calculation pursuant to Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) to the Operating Appendix.

34.7 **tie** shall not exercise, or purport to exercise, any right to terminate this Agreement except as expressly set out in this Agreement. The rights of **tie** (to terminate or otherwise) under this Clause 34 (*Termination on Operator Default*) are in addition (and without prejudice) to any other right which **tie** may have to claim the amount of loss or damage suffered by **tie** on account of the acts or omissions of the Operator (or to take any action, including seeking an order for specific implement, other than termination of this Agreement).

34.8 The Operator shall immediately notify **tie** of

34.8.1 any resolution or decision by the board of directors of the Operator or a decision by any director of the Operator to seek legal or financial advice pertaining to the solvency of the Operator; and

34.8.2 any presentation of any petition for the purpose of winding up the Operator or any petition for an administration order.

35. TERMINATION BY REASON OF FORCE MAJEURE

35.1 Neither Party shall be entitled to bring a claim for a breach of obligations under this Agreement by the other Party or incur any liability to the other Party for any losses or damages incurred by that other Party or create grounds for termination of the whole or a part of this Agreement (save in so far as expressly provided by Clause 35.5) to the extent that a Force Majeure Event occurs and such party is directly prevented from carrying out such obligations by that Force Majeure Event or the direct consequences thereof.

35.2 If a Force Majeure Event occurs as described in Clause 35.1 the Operator shall be relieved from deductions under the KPI Regime to the extent that the Force Majeure Event or the direct consequences thereof adversely affect the performance by the Operator of its obligations under this Agreement and the parties shall in good faith seek to agree equitable adjustments of a permanent or temporary nature to the Payment Mechanism and provisions regarding Target Costs for Project Phase C2 or Target Operating Costs or Fixed Costs (excluding the Category Five Fixed Costs) or Target Revenues to the extent that the Force Majeure Event or the direct consequences thereof adversely affect the performance by the Operator of its obligations under this Agreement .

35.3 On the occurrence of a Force Majeure Event, the Affected Party shall notify the other Party as soon as reasonably practicable, specifying details of the Force Majeure Event and providing evidence of its effect on the obligations of the Affected Party and any action proposed to remove or mitigate its effect.

35.4 The Parties shall at all times following the occurrence of a Force Majeure Event use all reasonable endeavours to prevent and mitigate the effects of any delay to the Project or interruption of Transport Services and the Operator shall at all times during which a Force Majeure Event is subsisting take all steps in accordance with Good Industry Practice to overcome or minimise the consequences of the Force Majeure

Event. **tie** shall continue to meet the Project Development Costs and/or the Operating Costs (adjusted to take account of any disrupted, extended or restricted Project Operations) for the System for a period of 30 days following notification of a Force Majeure Event or such longer period as **tie** may agree.

35.5 If the terms or measures to remove the effect of the Force Majeure Event cannot be agreed on or before the date falling 30 days after the date of the commencement of the Force Majeure Event or by the end of such longer period as **tie** may have agreed in accordance with Clause 35.4 or otherwise, or such Force Majeure Event is continuing or its consequence remains such that the Affected Party is unable to comply with all or a material part of its obligations under this Agreement for a period of more than 30 days after the date of the commencement of the Force Majeure Event or by the end of such longer period as **tie** may have agreed in accordance with Clause 35.4 or otherwise , either Party shall have the option to terminate this Agreement by written notice to the other.

35.6 The Affected Party shall notify the other Party as soon as reasonably practicable after the Force Majeure Event ceases and/or no longer causes the Affected Party to be unable to comply with its obligations under this Agreement. Following such notification, unless otherwise agreed by **tie,** this Agreement shall continue to be performed on the terms existing immediately prior to the occurrence of the Force Majeure Event.

36. TERMINATION FOR CORRUPT GIFTS AND FRAUD

36.1 If the Operator, or any Operator Party or any of their respective representatives, or Affiliates or professional advisers or employees or anyone acting on behalf of any of them, commits any Prohibited Act, then **tie** shall be entitled to act in accordance with Clauses 36.2 to 36.7.

36.2 If a Prohibited Act is committed by the Operator or by an employee of the Operator or any Affiliate not acting independently of the Operator, then **tie** may terminate this Agreement by giving notice to the Operator.

36.3 If a Prohibited Act is committed by an employee of the Operator acting independently of the Operator, then **tie** may give notice to the Operator of termination and this Agreement will terminate, unless within 30 days of receipt of such notice the Operator terminates the employee's employment and (if necessary)

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procures the performance of the relevant part of the Project Operations or the Project Development Services by another person.

36.4 If a Prohibited Act is committed by an Operator Party not acting independently of the Operator, then **tie** may give notice to the Operator of termination and this Agreement will terminate, unless within 30 days of receipt of such notice the Operator terminates the relevant Operator Party and procures the performance of the relevant part of the Project Operations or the Project Development Services by another person.

36.5 If a Prohibited Act is committed by an Operator Party acting independently of the Operator, then **tie** may give notice to the Operator of termination and this Agreement will terminate, unless within 30 days of receipt of such notice the Operator terminates the Operator Party's employment and (if necessary) procures the performance of the relevant part of the Project Operations or the Project Development Services by another person.

36.6 If a Prohibited Act is committed by any other person specified in Clause 36.1 but not specified in Clauses 36.2 to 36.4, then **tie** may give notice to the Operator of termination and this Agreement will terminate unless within 30 days of receipt of such notice, the Operator procures the termination of such person's employment and of the appointment of their employer in relation to the Project (where not employed by the Operator or an Operator Party) and (if necessary) procures the performance of the relevant part of the Project Operations or Project Development Services by another person.

36.7 Any notice of termination under this Clause 36 (*Termination for Corrupt Gifts and Fraud*) shall specify:

36.7.1 the nature of the Prohibited Act;

36.7.2 the identity of the person whom **tie** believe has committed the Prohibited Act; and

36.7.3 the date on which this Agreement will terminate, in accordance with the applicable provision of this Clause 36 (*Termination for Corrupt Gifts and Fraud*).

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37. VOLUNTARY TERMINATION BY TIE

37.1 **tie** may terminate this Agreement upon 60 days written notice to the Operator and without liability for any termination payment (but without prejudice to the provisions of Clause 39 (*Compensation on Termination*)) at the following stages of the Project:

37.1.1 at any time if the circumstances in Clause 13.4 have arisen;

37.1.2 except in the first three years of operation following the issue of the first Certificate of Service Commencement, at any other time during the Service Period if there is an Operating Deficit in 6 Reporting Periods out of any rolling period of 12 months;

37.1.3 during Project Phase D, notwithstanding any referral to or decision in terms of the Dispute Resolution Procedure, in the event that the Parties are unable to agree adjustments to the Fixed Costs, Target Operating Costs and Target Revenues or other elements of Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) of the Operating Appendix sought by **tie** following reset carried out pursuant to Clause 21 (*Reset of the Fixed Costs, the Target Operating Costs and the Target Revenue)* of the Operating Appendix.

37.2 This Agreement will terminate on the date falling 60 days after the date of service of the notice referred to in Clause 37.1.

38. EXPIRY

38.1 Subject to Clause 2 (*Term of Agreement*), this Agreement shall terminate automatically on the expiry of the Term unless it shall have been terminated earlier in accordance with the provisions of this Agreement. The Operator shall not be entitled to any compensation for termination of this Agreement on expiry of the Term and shall make arrangements for the orderly transfer and release to **tie** or its designated agent of all assets, rights and benefits used for the Project Operations by the Operator so as to safeguard efficient and continuous provision of the Transport Services during transition.

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39. COMPENSATION ON TERMINATION

39.1 No compensation shall be payable by **tie** to the Operator for termination of this Agreement whether under contract, delict (including negligence), breach of (or compliance with) statutory duty, restitution or otherwise but without prejudice to:

39.1.1 any antecedent liability of **tie** that arose prior to the Termination Date (but not from the termination itself except if pursuant to Clause 32 (*Termination on **tie** Default or at Operator Option*);

39.1.2 any liability arising in respect of any breach by **tie** of its obligations under Clause 40 (*Effect of Termination*) which arises or continues after the Termination Date;

39.1.3 any entitlement of the Operator to Vision Achievement Incentive payment in the event of a termination (a) for **tie** Default; or (b) for failure to agree matters resulting in termination pursuant to Clause 31.5; or (c) a termination for Force Majeure, or (d) Clause 37 (*Voluntary Termination by **tie***) (except for Clause 37.1.1); or

39.1.4 payment by **tie** to the Operator of any demobilisation costs which have been demonstrably and reasonably incurred by the Operator in the event of a termination in respect of:

(a) failure to agree Network Expansion pursuant to Clause 11.5;

(b) Uninsurable Risk occurring pursuant to Clause 27.4;

(c) Clauses 31.1, 31.2, 31.4 or 31.5;

(d) **tie** Default pursuant to Clause 32 *(Termination on **tie** Default or at Operator option);*or

(e) voluntary termination pursuant to Clause 37 *(Voluntary Termination by **tie**).*

The Operator shall use all reasonable endeavours to minimise and mitigate any such demobilisation costs and **tie** shall not be liable to pay the Operator for such demobilisation costs to the extent that the Operator has failed to minimise or mitigate such demobilisation costs or to the extent that such

demobilisation costs have arisen out of the Operator's breach of this Agreement or any negligent act or omission by the Operator.

39.2 Subject to Clause 39.1, the Operator shall not have any other right or remedy against **tie** on termination or expiry of this Agreement.

40. EFFECT OF TERMINATION

40.1 Notwithstanding any provision of this Agreement, on service of a Termination Notice, this Agreement shall only terminate in accordance with the provisions of this Clause 40 (*Effect of Termination*).

40.2 Subject to any exercise by **tie** of its rights to perform, or to procure a third party to perform, the obligations of the Operator, the Parties shall continue to perform their obligations under this Agreement, notwithstanding the giving of any notice of default or breach or Termination Notice, until the termination of this Agreement becomes effective.

40.3 To the extent that the termination of this Agreement occurs during Project Phase C2 or Project Phase D, the provisions of Clause 28 (*Transition on termination or expiry*) of the Operating Appendix shall apply.

40.4 To the extent that the termination of this Agreement occurs during Project Phase A, Project Phase B, or Project Phase C1, the provisions of Clause 28 (*Transition on termination or expiry*) of the Operating Appendix shall apply to the extent relevant.

40.5 Within 60 days of termination of this Agreement, **tie** shall pay to the Operator:

40.5.1 any undisputed sums due from **tie** to the Operator pursuant to Clause 15 (*Project Development Costs*), Clause 17 (*Payment During Project Phase* C2) and/or Schedule 3 *(Project Phase D Payment Mechanism and KPI Regime)* subject to any appropriate pain/gain share reconciliation;

40.5.2 any entitlement of the Operator to Vision Achievement Incentive payment pursuant to Clause 39.1.3 calculated in accordance with Schedule 3 *(Project Phase D Payment Mechanism and KPI Regime)*; and

40.5.3 any entitlement to demobilisation costs pursuant to Clause 39.1.4.

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40.6 Within 60 days of termination of this Agreement, the Operator shall pay to **tie** any sums due from the Operator to **tie** pursuant to this Agreement including any sum due to **tie** following any appropriate pain/gain share reconciliation or any sums due pursuant to Clause 34.6.

40.7 Either Party may refer any Dispute about disputed sums pursuant to Clause 15 (*Project Development Costs*), Clause 17 (*Payment during Project Phase C2*) and/or Schedule 3 *(Project Phase D Payment Mechanism and KPI Regime)* to the Dispute Resolution Procedure. If it is determined pursuant to the Dispute Resolution Procedure that the whole or part of any disputed amount is due to either **tie** or the Operator, **tie** or the Operator (as appropriate) shall raise an invoice in respect of such determined amount and payment shall be made by the relevant Party within 60 days of the receipt of such invoice.

40.8 The following Clauses shall survive termination of this Agreement:

40.8.1 Clauses 1 (*Definitions and Interpretation*), 8 (*Operator's Performance Security*), 19 (*Method and Currency of Payment*), 20 (*Interest*), 21 (*Set-off*), 22 (*VAT*), 23 (*Taxation*), 24 (*Mitigation and Cost Management*), 26 (*Required Insurances*), 28 (*Indemnity*), 29 (*Conduct of Claims*), 30 (*Liability and Sole Remedy*), 38 *(Expiry)*, 39 (*Compensation on termination or expiry*) and Clauses 40 (*Effect of termination*) to 59 (*Maladministration Complaints*) inclusive and Schedule 7 (*Dispute Resolution Procedure*), and such other provisions as are expressed to survive termination of this Agreement; and

40.8.2 in the Operating Appendix, Clause 28 (*Transition on Termination or Expiry*), and such other provisions as are expressed to survive termination of this Agreement.

40.8.3 For the avoidance of doubt, upon expiry of the Term or any termination of this Agreement (for whatever cause) any accrued rights or obligations to which **tie** may be entitled or be subject to before such date shall remain in full force and effect.

41. PERSONNEL ISSUES ON TERMINATION

41.1 In the event that TUPE and/or the Acquired Rights Directive or any other Legislation governing the rights and obligations of employees or their employers or any person to

whom they are to transfer their employment applies or will apply on the Expiry Date or the Termination Date such that the contracts of employment of the Project Operations Staff and or/ Project Development Staff engaged at such date (**"Transferring Project Staff"**), or any of them, shall be transferred from the Operator or a relevant Operator Party to **tie** or a Successor Operator to perform some or all of the Project Development Services or Project Operations or any activities equivalent to a relevant part of the Project Operations, the provisions of Clauses 41.2 to 41.8 shall apply.

41.2 The Parties shall comply with their respective obligations under TUPE and the Acquired Rights Directive or as otherwise may be required by Law in respect of the transfer of the Transferring Project Staff on the Expiry Date or Termination Date (as the case may be) (**"Transfer Date"**).

41.3 The Operator shall (and shall procure that each relevant Operator Party shall) indemnify **tie** and keep **tie** indemnified on demand at all times from and against all Employment Liabilities which **tie** may suffer or incur which relate to or arise in respect of (whether directly or indirectly):

41.3.1 any Transferring Project Staff in respect of or in any way relating to any period up to and including the Transfer Date; and

41.3.2 any person employed or engaged, or formerly employed or engaged, by the Operator or any Operator Party (other than any Transferring Project Staff) for which it may be alleged that **tie** are liable by virtue of the operation of this Agreement and/or TUPE and/or the Acquired Rights Directive.

41.4 The Operator shall (and shall procure that each relevant Operator Party shall) indemnify the Successor Operator and keep the Successor Operator indemnified on demand at all times from and against all Employment Liabilities which the Successor Operator may suffer or incur which relate to or arise in respect of (whether directly or indirectly):

41.4.1 any Transferring Project Staff in respect of or in any way relating to any period up to and including the Transfer Date; and

41.4.2 any person employed or engaged, or formerly employed or engaged, by the Operator or any Operator Party (other than any Transferring Project Staff)

for which it may be alleged that the Successor Operator is liable by virtue of the operation of this Agreement and/or TUPE and/or the Acquired Rights Directive.

41.5 The Parties acknowledge that it is their intention that the benefit of Clauses 41.4, 41.7, 41.8 and 41.9 (inclusive) shall be assigned to the Successor Operator at the absolute discretion of **tie** and the Operator shall do, and agrees to procure that each relevant Operator Party shall do, all acts and things that **tie** deems reasonably necessary to give effect to such assignment including execution of all documents required.

41.6 **tie** shall procure that the Successor Operator shall assume the outstanding obligations of the Operator and/or each relevant Operator Party in respect of the untaken holiday entitlements and unpaid holiday remuneration of the Transferring Project Staff accrued up to the Transfer Date and, in consideration, the Operator shall pay, or shall procure that each relevant Operator Party shall pay, to the Successor Operator within 30 days of the Transfer Date (as the case may be), the full amount necessary to enable the Successor Operator to meet the costs of providing such accrued holiday entitlements and remuneration as at Transfer Date.

41.7 The Operator shall, and the Operator shall procure that each relevant Operator Party shall, prior to the transfer of the employment of any Transferring Project Staff pursuant to TUPE and the Acquired Rights Directive, comply with all of their respective obligations to inform and consult with appropriate representatives (as such term is defined in regulation 10 of TUPE) of affected Project Operations Staff and Project Development Staff and shall carry out such provision of information to, or consultation with, such representatives as is required of them by Law.

41.8 The Operator shall, and the Operator shall procure that each relevant Operator Party shall, indemnify and keep **tie** and the Successor Operator indemnified on demand at all times in respect of all Employment Liabilities arising out of any failure of the Operator and/or any Operator Party to comply fully with their respective obligations pursuant to Clause 41.7, save where, and to the extent only that, failure to do so is attributable to the default or failure on the part of **tie** or a Successor Operator to provide relevant information to the Operator or the relevant Operator Party (as the case may be) as is required of **tie** or the Successor Operator by Law.

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41.9 Following the service of a Termination Notice or at any time in the 365 days before the Expiry Date, the Operator shall not, and shall procure that each Operator Party shall not, without the prior written consent of **tie** (which consent shall not be unreasonably withheld or delayed), carry out any of the following:

41.9.1 the termination of the employment or engagement of any Project Operations Staff or Project Development Staff;

41.9.2 the alteration or change (or the making of any promise to alter or change) in any way any terms and conditions of employment, or terms of engagement, of any Project Operations Staff or Project Development Staff (whether with or without the consent of any such Project Operations Staff or Project Development Staff (as appropriate)) other than in order to give effect to wage or salary awards which are in line with those offered generally for similar status individuals within the relevant employer's workforce or as is required by Law;

41.9.3 the recruitment of any employees, self-employed consultants or other personnel to perform any of the Project Operations or Project Development Services (except as a replacement for any Project Operations Staff or Project Development Staff whose employment is terminated and where the replacement is recruited on terms which are not materially better than the terms of the Project Operations Staff or Project Development Staff member being replaced); and

41.9.4 the re-assignment of any of the Project Operations Staff or Project Development Staff to or from duties connected with the Project Operations or the Project Development Services.

41.10 Following the service of a Termination Notice or at any time in the 730 days before the Expiry Date, within 30 days of a written request from **tie**, the Operator shall, or the Operator shall procure that each Operator Party shall, provide to **tie** such information concerning the Project Operations Staff and Project Development Staff as **tie** shall reasonably stipulate (**"Staffing Information"**) including:

41.10.1 the number of Project Operations Staff and Project Development Staff;

41.10.2 their status as employees, self-employment contractors, agency workers or otherwise;

41.10.3 their ages, dates of commencement of employment or engagement and gender;

41.10.4 their relevant contractual notice periods and any other terms relating to termination of employment, including redundancy procedures and contractual redundancy payment schemes;

41.10.5 the wages, salaries, profit sharing, incentive and bonus arrangements applicable to them;

41.10.6 details of other employment related benefits, including (without limitation) medical insurance, life assurance, pension or other retirement benefit schemes, share option schemes and company car schemes applicable to them;

41.10.7 any outstanding or potential contractual, statutory or other liabilities in respect of such individuals (including in respect of personal injury claims);

41.10.8 details of any such individuals on long-term sickness absence, maternity or parental leave; and

41.10.9 copies of all relevant documents and materials relating to such information, including copies of relevant contracts of employment.

41.11 The Operator expressly consents, and shall procure that each Operator Party and all Project Operations Staff and Project Development Staff shall consent, to any Staffing Information being provided to third parties, including a Successor Operator or any prospective Successor Operator, subject to such third party agreeing to respect the confidentiality of the Staffing Information, and only to use such Staffing Information for the purposes for which it was provided.

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PART VII - MISCELLANEOUS PROVISIONS

42. DISPUTE RESOLUTION PROCEDURE

The Parties agree that Schedule 7 (*Dispute Resolution Procedure*) shall have effect for the resolution of any differences or disputes between the Parties arising under, out of or in relation to, this Agreement, save for matters expressly reserved to some other jurisdiction pursuant to any provision of the Scottish Private Bills.

43. ASSIGNATION, SUB-CONTRACTING AND CHANGES IN CONTROL

43.1 The Operator shall not, without the prior written consent of **tie**,

43.1.1 assign, transfer or otherwise dispose of any interest in, or right or obligation under, this Agreement; or

43.1.2 sub-contract any of its obligations under this Agreement without the prior written consent of **tie** (such consent not to be unreasonably withheld or delayed).

43.2 **tie** shall not assign or otherwise dispose of any interest in, or rights or obligations under this Agreement in whole or in part to any person, save:

43.2.1 to the Scottish Ministers or any local authority or other body with no worse financial standing than that of **tie** who, as a result of any Change in Law, takes over all or substantially all the functions of **tie**; or

43.2.2 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to the Operator) by **tie** or a person falling within Clause 43.2.1; or

43.2.3 with the prior written consent of the Operator (such consent not to be unreasonably withheld or delayed).

43.3 **tie** shall be entitled to novate the entirety of this Agreement to any nominee which is an entity established by CEC and/or established in accordance with Legislation for the purposes of managing the implementation of service integration between tram operations and publicly owned bus operations in Edinburgh. If the Agreement is to be novated pursuant to this Clause 43.3, **tie** and the Operator shall agree a

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shareholder's agreement confirming **tie**'s (or its relevant nominee's) participation in the Operator together with associated rights.

43.4 Subject to Clause 43.5 prior to the expiry of thirty six (36) months following the Service Commencement Date for the first Line to become operational, the Operator shall procure that no Change of Control of the Operator (or any company of which the Operator is a subsidiary) shall take place without the prior written approval of **tie**.

43.5 If applicable, Clause 43.4 shall not apply to a Change of Control resulting from the sale of any shares in the Operator held by any Third Party Shareholder.

43.6 The Operator shall inform the **tie** Project Manager as soon as reasonably practicable and, in any event, within five Business Days of any Change of Control of the Operator.

44. SECURITY INTERESTS

44.1 The Operator shall not create or agree to create any Security Interest over the System or any part of the System or over this Agreement.

44.2 The Operator shall not dispose of any right in respect of or interest in any asset used in the Project Operations or relating to the System if to do so would have a material adverse effect upon either the Project or the position of **tie** under this Agreement, whether or not this Agreement has terminated or expired provided always that restrictions in this Clause shall not apply in the case of:

44.2.1 disposals of redundant or obsolete assets not required for the operation of the System; or

44.2.2 disposals of property or assets where such property or assets are replaced by other property or assets comparable or superior as to type and function.

45. INFORMATION AND CONFIDENTIALITY

45.1 The Parties shall keep confidential all matters relating to this Agreement and the Project and, save as provided in Clause 45.3, shall not disclose any such matters to any third parties.

45.2 Each Party shall use all reasonable endeavours to procure that their respective employees and any other person to whom they disclose information pursuant to

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Clauses 45.3.1, 45.3.3, 45.3.6 and 45.3.7 shall comply with this Clause 45 (*Information and Confidentiality*) as if they were parties to this Agreement.

45.3 Clause 45.1 shall not apply to:

45.3.1 any disclosure of information that is reasonably required by the Parties in order to carry out the Project Development Objectives and perform their obligations and exercise their rights under this Agreement;

45.3.2 any matter which a Party can demonstrate is already generally available and in the public domain otherwise than as a result of a breach of this Clause 45 (*Information and Confidentiality*);

45.3.3 disclosure to enable a determination to be made under the Dispute Resolution Procedure, subject always to that disclosure being restricted to parties directly involved in the process ;

45.3.4 any disclosure which is required by any Law, any parliamentary obligation or the rules of any stock exchange or governmental or regulatory authority having the force of law;

45.3.5 any disclosure of information which is already lawfully in the possession of the receiving party, prior to its disclosure by the disclosing party;

45.3.6 any provision of information to the professional advisers or insurance advisers of either Party;

45.3.7 where it is proposed that a person should or may provide funds (whether directly or indirectly and whether by loan, equity participation or otherwise) to the Operator to enable it to carry out its obligations under the Agreement, any provision of information to that person but only to the extent reasonably necessary to enable a decision to be taken on the proposal;

45.3.8 any disclosure by **tie** of information relating to the design, construction, operation and maintenance of the System and such other information as may be reasonably required for the purpose of conducting a due diligence exercise to any proposed Successor Operator, its advisers, should **tie** decide to retender the Project Operations or any part of them;

45.3.9 any registration of information in respect of the Necessary Consents and any property registration required;

45.3.10 any disclosure of information by **tie** to CEC, Partnerships UK Limited, any department, office or agency of the Scottish Executive or the UK government;

45.3.11 any disclosure by **tie** of any document related to this Agreement and which the Operator has agreed with **tie** contains no Commercially Sensitive Information (such agreement not to be unreasonably withheld or delayed);

45.3.12 any disclosure for the purpose of:

45.3.12.1 the examination and certification of **tie**'s or the Operator's accounts; or

45.3.12.2 any examination (pursuant to applicable Law) of the economy, efficiency and effectiveness with which **tie** has used their resources or funding made available for the Project; and

45.3.13 any disclosure by **tie** of any information (except for information which has been designated as Commercially Sensitive Information) as may be reasonably required for the purpose of appointing and working with any Infrastructure Provider;

45.4 Any public relations material, press releases, public presentations or conference engagements in relation to the Project planned by the Operator require **tie**'s prior written approval during the Term.

46. INTELLECTUAL PROPERTY RIGHTS

46.1 All Operator IPR shall continue to be owned by the Operator.

46.2 The Operator hereby:

46.2.1 assigns by way of future assignment to **tie** with full title guarantee the Project IPR which is created by it and shall procure that Project IPR created by any Operator Party is also so assigned, for all the residue of the term of such

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rights and all renewals or extensions thereof and together with all accrued causes of action in respect thereof;

46.2.2 grants to **tie** a non-exclusive perpetual irrevocable royalty free licence to use such Operator IPR as may be necessary for **tie** to use solely in relation to the Project and any Network Expansion and for no other purpose;

46.2.3 grants to **tie** the right to grant non-exclusive non-assignable sub-licences to third party contractors for such lengths of time as **tie** may reasonably require and otherwise on the same terms as the licence granted to **tie** pursuant to Clause 46.2.2 above, to use the Operator IPR referred to in that Clause in so far as is necessary or desirable for such third party contractor to use such Operator IPR solely in relation to work connected with the Project and any Network Expansion.

46.3 For the avoidance of doubt, the persons to whom **tie** may grant sub-licences pursuant to Clause 46.2.3 above shall include:

46.3.1 any Infrastructure Provider and its contractors for purposes connected with the performance of any Infrastructure Delivery Agreement;

46.3.2 any party other than the Operator providing support to **tie** in relation to the development of any Network Expansion;

46.3.3 any party other than the Operator engaged in the provision of Transport Services on the System; and

46.3.4 any assignee or transferee under this Agreement.

46.4 **tie** hereby:

46.4.1 grants to the Operator a non-exclusive revocable royalty free licence for the Term to use such Project IPR as is owned by it as may be necessary for the Operator to use solely and exclusively for the purpose of meeting its obligations under this Agreement (including the Operating Appendix and for no other purpose); and

46.4.2 grants to the Operator the right to grant non-exclusive non-assignable sub-licences to the Operator Parties on the same terms as the licence granted to

the Operator pursuant to Clause 46.4.1 above to use the Project IPR referred to in that Clause in so far as is necessary or desirable for such Operator Parties to use such Project IPR, solely and exclusively for the purpose of performing their obligations in relation to the Project.

46.5 The Operator shall at any time and from time to time hereafter at the request of **tie** execute all such documents and do all such further acts as may be required in order to vest the rights referred to in Clause 46.2.1 in **tie**.

46.6 The Operator waives any and all moral rights held or to be held by the Operator in the Project Data and the Project IPR and shall procure that all of the Operator Parties who are authors of the whole or any part of the Project Data or the Project IPR waive and abandon in writing all moral rights.

46.7 The Operator agrees that all rights in the Project IPR shall remain the property of **tie** and the Operator shall retain no rights in the Project IPR beyond the licence granted in Clause 46.4.1 above. The Operator shall be entitled to use such Project IPR only on the terms set out herein and solely for the purpose of the Project. In particular, otherwise as permitted in this Agreement herein, the Operator shall not (and shall procure that its sub-licensees pursuant to Clause 46.4.2 shall not) disclose, assign, sub-licence, lease, rent or otherwise dispose of the Project IPR.

46.8 To the extent that any of the Project Data are generated by or maintained on a computer or similar system, the Operator shall use all reasonable endeavours to procure for the benefit of **tie**, at no charge or at the lowest reasonable fee, the grant of a licence or sub-licence for any relevant Third Party Software on the same terms as the Operator Software is licensed to **tie,** to enable **tie** or its nominee to access and otherwise use (subject to the payment by **tie** of the relevant fee, if any) such Project Data in connection with the Project. As an alternative, the Operator may provide such Project Data in a format which may be read by software generally available at reasonable prices in the market at the relevant time or in hard copy format.

46.9 The Operator shall, within thirty (30) days of any upgrade or update to the Operator Software and/or Specially Written Software and/or Third Party Software, for the Term:

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46.9.1 deposit a copy of the Operator Software and/or Specially Written Software with the Escrow Agent under the terms and conditions of the Escrow Agreement; and

46.9.2 use all reasonable endeavours to procure the deposit of a copy of all the Third Party Software with the Escrow Agent and under the terms and conditions of the Escrow Agreement, or with another person under terms that are materially the same as the Escrow Agreement, and in either case for the benefit of **tie**.

46.10 The Operator shall comply with the terms of the Escrow Agreement, or any other like agreement in respect of the Third Party Software under Clause 46.9.2 for the duration of this Agreement.

46.11 Any costs relating to the Escrow Agreement, including any costs relating to the registration of any Operator Software, Specially Written Software and Third Party Software, and any renewal costs charged from time to time by the Escrow Agent, shall be the sole responsibility of the Operator.

46.12 The Operator shall ensure the back-up and storage in safe custody of the Project Data in accordance with Good Industry Practice. Without prejudice to this obligation, the Operator shall submit to the **tie** Project Manager for approval its proposals for the back-up and storage in safe custody of the Project Data and **tie** shall be entitled to object if the same is not in accordance with Good Industry Practice. The Operator shall comply, and shall cause all the Operator Parties to comply, with all such proposals to which the **tie** Project Manager has given his or her approval. The Operator may vary its procedures for such back-up and storage subject to submitting its proposals for change to the **tie** Project Manager, who shall be entitled to object on the basis set out above.

46.13 Where a claim or proceeding is made or brought against **tie** or its permitted licensees which arises out of the infringement of any Intellectual Property Rights in any Project Data or other materials provided by the Operator or any Operator Party to **tie** then, unless such infringement has arisen out of the use of any Intellectual Property Rights by **tie** in breach of this Agreement, the Operator shall indemnify and keep **tie** indemnified on demand at all times from and against all Indemnified Liabilities arising in connection with such claim or proceedings.

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46.14 For the purposes of this Clause 46 (*Intellectual Property Rights*), "use" shall include the acts of copying, modifying, adapting and translating the material in question and/or incorporating them with other materials and the term "the right to use" shall be construed accordingly.

46.15 The provisions of this Clause 46 (*Intellectual Property Rights*) shall apply during the continuance of this Agreement and after its termination howsoever arising, and immediately following termination howsoever arising, the Operator shall provide **tie** with:

46.15.1 a copy of the object code for the Third Party Software and the Operator Software on media that is reasonably acceptable to **tie**;

46.15.2 a copy of the source code for the Specially Written Software on media that is reasonably acceptable to **tie**; and

46.15.3 a copy of all documentation, manuals and other technical information relating to the Third Party Software, the Specially Written Software and the Operator Software that is reasonably required by **tie** to operate, manage and support the Third Party Software, the Specially Written Software and the Operator Software.

47. DATA PROTECTION

47.1 For the purpose of the following Clauses, the term "personal data" shall have the meaning given to it in the Data Protection Act 1998.

47.2 The Operator shall, in relation to any personal data in respect of which it is either the "data controller" or the "data processor" for the purposes of the Data Protection Act 1998, comply with the obligations of a "data controller" under the provisions of the seventh data protection principle as set out in Schedule 1 of that Act. In addition, the Operator:

47.2.1 shall have at all material times (and shall use its best endeavours to procure that all Operator Parties have or will have at all material times) the appropriate technical and organisational measures in place against unauthorised or unlawful processing of personal data and against accidental loss or destruction of, or damage to, personal data held or processed by it;

47.2.2 shall (and shall use its best endeavours to procure that the Operator Parties shall) take at all material times, all reasonable steps to ensure the integrity of any of its staff with access to personal data processed in connection with the Project;

47.2.3 shall act only on the instructions of **tie** in relation to the processing of any personal data in respect of which **tie** is the "data controller" for the purposes of that Act;

47.2.4 shall only obtain, hold, process, use, store and disclose such personal data as is necessary to perform its obligations under this Agreement; and

47.2.5 shall allow **tie** access to any relevant premises on reasonable notice to inspect its procedures referred to in Clause 47.2.1.

48. INFORMATION AND AUDIT ACCESS

48.1 The Operator shall in accordance with Good Industry Practice keep and maintain:

48.1.1 detailed records regarding the Project Development Services and its activities in relation to the Project;

48.1.2 all Project Data;

48.1.3 detailed records regarding the Project Operations, including details of ticket sales, Patronage Revenue receipts and breakdowns of Operating Costs; and

48.1.4 all invoices, timesheets and expense claims for which it has sought or is seeking reimbursement under the provisions of this Agreement;

and shall keep such records for at least twelve years following expiry or termination of this Agreement.

48.2 The records referred to in Clause 48.1 shall be kept in good order and in such form as to be capable of audit (including by electronic means) by the **tie** Project Manager or any other third party. The Operator shall make such records available for inspection by or on behalf of **tie** and the **tie** Project Manager at all reasonable times.

48.3 The Operator shall provide to the **tie** Project Manager and **tie**'s auditors all information, documents, records and the like in the possession of, or available to, the

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Operator (and to this end the Operator shall use all reasonable endeavours to procure that all such items in the possession of the Operator Parties shall be available to it) as may be reasonably requested by the **tie** Project Manager for any purpose in connection with the Project or this Agreement.

48.4 The Operator shall provide and shall procure that the Operator Parties shall provide such information, data records, and assistance as **tie** may reasonably require from time to time, including to enable **tie** and CEC to meet its obligations to provide reports and returns pursuant to Law, directions and guidance applicable to the passenger transport sector and audit.

48.5 The Operator shall comply, as its own cost, with any request by **tie** in respect of the recording, storage, keeping, disclosure, organisation, use, processing, dissemination, deletion or destruction of any records, data or information obtained by the Operator as a result of carrying out the Transport Services or any other obligation under this Agreement.

48.6 **tie** shall provide to the Operator (subject to reasonable notice and relevant undertaking as to costs) such information within its possession or control with respect to the Project as the Operator may reasonably request to enable it to perform its obligations under this Agreement, provided that **tie** shall have no obligation to provide information with respect to which it is subject to an obligation of confidentiality (whether under any Law, at contract or otherwise).

48.7 The provisions of this Clause 48 (*Information and Audit Access*) shall apply during the continuance of this Agreement and after its expiry or termination howsoever arising.

49. ENTIRE AGREEMENT

49.1 The Operator acknowledges and confirms that it has, by carrying out such due diligence and other investigations as any Operator acting in accordance with Good Industry Practice would do, satisfied itself fully as to the veracity, accuracy, reasonableness, scope, materiality, currency (where applicable) and completeness of all the Background Information.

49.2 Except where expressly provided otherwise in this Agreement, this Agreement constitutes the entire agreement between the Parties in connection with its subject

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matter and supersedes all prior representations, communications, negotiations and understandings concerning the subject matter of this Agreement.

49.3 Each of the Parties confirms to the other that it has neither been induced to enter into this Agreement in reliance on, nor has it made, any representation or warranty except those contained or referred to in this Agreement.

49.4 Any representations or warranties other than those contained or referred to in this Agreement are superseded and extinguished by this Agreement.

49.5 Each Party irrevocably and unconditionally waives all rights and remedies which it might otherwise have had in relation to any representations or warranties other than those contained or referred to in this Agreement.

49.6 Each Party irrevocably and unconditionally waives any right it may have to rescind this Agreement on the grounds that any representation or warranty (whether contained or referred to in this Agreement or not) constitutes a misrepresentation.

49.7 Nothing in this Clause 49 (*Entire Agreement*) shall affect the liability of either Party in respect of fraud or fraudulent misrepresentation.

50. FURTHER ASSURANCE

50.1 Each Party shall at the reasonable request and cost of the other (save where either in satisfaction of an Operator Condition Precedent or where it is expressly provided that the cost of such act or execution shall be for that Party's account) do any act or execute any document that may be necessary to give full effect to this Agreement.

51. JURISDICTION

51.1 This Agreement, any document completed or to be completed in accordance with its provisions and any matter arising from it or any such document shall be governed by and construed in accordance with Scots law.

51.2 Subject to Clause 42 (*Dispute Resolution Procedure*), the Parties hereby irrevocably submit to the exclusive jurisdiction of the Court of Session in relation to this Agreement, any such document and any such matter.

52. VARIATIONS AND WAIVERS TO BE IN WRITING

No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

53. WAIVER AND CUMULATIVE REMEDIES

53.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement will operate as a waiver of it or of any other right or remedy nor will any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

53.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

54. NO PARTNERSHIP OR AGENCY

54.1 Nothing in this Agreement shall be construed as creating a partnership between **tie** and the Operator.

54.2 The Operator shall not (and shall procure that the Operator Parties shall not) act or purport to act as agent for **tie** in relation to any matter. The Operator shall not be entitled to bind **tie** in any way or to create any liability or cause of action against **tie** and shall not hold itself out (and shall procure that no Operator Party shall hold itself out) as having any such authority or power, provided always that this Clause 54.2 shall be without prejudice to:

54.2.1 Clause 17 (*Collection of Fare Revenue*) of the Operating Appendix, pursuant to which the Operator is authorised to enter into contracts of carriage with passengers, and to collect Patronage Revenue, as agent for **tie**; and

54.2.2 Clause 13 (*Edinburgh Tram Network Integration*) of this Agreement and Clause 11 (*Operation and Maintenance Procedures*) of the Operating Appendix, pursuant to which **tie** may delegate to the Operator the exercise of some of **tie**'s contractual rights under the Infrastructure Delivery Agreement(s).

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55. NOTICES

55.1 Any notice or notification required or authorised to be given under this Agreement by one Party to the other shall be:

55.1.1 in writing;

55.1.2 sent by one of the following methods:

55.1.2.1 pre-paid registered or recorded delivery post or facsimile transmission addressed to the Party to which it is given at:

(a) in the case of notices given to **tie**: Transport Initiatives Edinburgh Limited, 91 Hanover Street, Edinburgh, EH2 1JD fax number 0131 718 4271, attention: A. Macaulay Esq., Projects Director, or such other address in the United Kingdom as **tie** may notify the Operator from time to time for that purpose; or

(b) in the case of notices given to the Operator, TRANSDEV Edinburgh Tram Limited, 91 Hanover Street, Edinburgh, EH2 1JD, attention D. Humphrey Esq. or such other address in the United Kingdom as the Operator may notify **tie** from time to time for that purpose; or

55.1.2.2 facsimile transmission addressed to the **tie** Project Manager or the Operator Project Manager (as appropriate) at a facsimile number notified to the giving Party by the receiving Party for the service of notices under this Agreement from time to time; or

55.1.2.3 personal delivery into the hands of:

(a) in the case of notices given to **tie**, the **tie** Project Manager; or

(b) in the case of notices given to the Operator, the Operator Project Manager

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55.1.3 be deemed duly served:

55.1.3.1 if sent by pre-paid registered or recorded delivery post, 2 clear Business Days after posting; or

55.1.3.2 if sent via facsimile transmission or personal delivery, on the day of issue of the relevant fax confirmation receipt or such personal delivery (as appropriate), unless that day is not a Business Day in which case it shall be deemed duly served on the next Business Day thereafter.

56. INVALID TERMS

56.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

56.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

56.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

57. THIRD PARTIES RIGHTS

57.1 Save as provided in Clause 57.2, a person who is not party to this Agreement shall have no right to enforce any term of this Agreement.

57.2 The **tie** Advisers and CEC shall have the benefit of the terms of Clause 25.5.

58. HUMAN RIGHTS ACT

58.1 Insofar as and to the extent that the Operator is deemed to be acting as a public authority for the purposes of the Human Rights Act 1998, any claim asserted or proceedings commenced against **tie** arising from a negligent act or negligent omission by the Operator or breach by the Operator of its obligations under this Agreement shall, for the purposes of Clause 28 (*Indemnity*), be treated as an Indemnified Liability.

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59. MALADMINISTRATION COMPLAINTS

59.1 The Operator shall provide such reasonable assistance (including the provision of witnesses) as **tie** may reasonably request (having regard to the Transport Services, in particular as to the timing, duration and number of witnesses) in connection with any audit process or judicial review of **tie**'s involvement in the Project or the Project generally.

IN WITNESS WHEREOF these presents consisting of this and the 87 preceding pages together with Schedules 1 to 19 (inclusive) and the Operating Appendix together with Schedules 1 to 6 (inclusive) which are annexed and signed as relative hereto are executed as follows:

EXECUTED for and on behalf of **TRANSPORT INITIATIVES EDINBURGH LIMITED**

at Edinburgh on 14 May 2004 by

~~Director~~/Authorised Signatory: …[redacted]

Full Name: …MICHAEL WILLIAM DAVIS HOWELL

Witness: …..[redacted]

Full Name: …SHARON FITZGERALD

Address: …c/o DCA, RUTLAND SQUARE, EDINBURGH

EXECUTED for and on behalf of **TRANSDEV EDINBURGH TRAM LIMITED**

at Edinburgh on 14 May 2004 by

~~Director~~/Authorised Signatory: ……[redacted]……..

Full Name: ……JOEL LEBRETON……..

Witness: …[redacted]……..

Full Name: ……David Humphreys……..

Address: …[redacted]

Ealing W5 [redacted]

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SCHEDULE 1

Definitions and Interpretation

1. In this Agreement, unless the context otherwise requires:

"Acquired Rights Directive" means the European Council Directive 77/187/EEC on the approximation of laws of European Union member states relating to the safeguarding of employees' rights in the event of transfers of undertakings, businesses or parts of undertakings or businesses;

"Additional System Surplus" has the meaning given to it in paragraph 23.1 of Schedule 3 to the Operating Appendix *(Project Phase D Payment Mechanism and KPI Regime)*;

"Affected Party" means a Party that is unable to comply with all or a material part of its obligations under this Agreement as a direct result of a Force Majeure Event;

"Affiliate" means in relation to any organisation:

(a) any person having any shares in or membership of that organisation, whether directly, through nominees or through shares in or membership of any other person; and

(b) any person in which that organisation holds shares or of which that organisation is a member whether directly, through nominees or through shares in or membership of any other person;

"Affordability Limits" means such financial limits as may be advised by **tie** to the Operator from time to time in relation to the affordability of the Project or any part of it;

"Agreement" means the main body of this document, together with its Schedules and Operating Appendix, (as amended from time to time pursuant to Clause 52 (*Variations and Waivers to be in Writing*);

"Annual Service Report" means the report to be provided by the Operator pursuant to Clause 16 (*Best Value and Project Phase D Benchmarking*) of the Operating Appendix;

"Approvals Management Plan" means the plan referred to in paragraph 26.8 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance the terms of this Agreement;

"Assets" means all assets and rights to enable **tie** or another operator to own, operate and maintain the System and take over the Project Operations in accordance with this Agreement, including:

(a) any equipment;

(b) any books and records (including the Operating and Maintenance Manual, health and safety manuals and other know-how);

(c) any spare parts, tools and other assets (together with any warranties in respect of assets being transferred);

(d) any revenues and any other contractual rights; and

(e) any Intellectual Property,

but excluding any assets and rights in respect of which **tie** is full, legal and beneficial owner;

"Average Individual KPI Performance" has the meaning given to it in paragraph 23.5 of Schedule 3 to the Operating Appendix *(Project Phase D Payment Mechanism and KPI Regime)*;

"Average KPI Performance" has the meaning given to it in paragraph 23.4 of Schedule 3 to the Operating Appendix *(Project Phase D Payment Mechanism and KPI Regime)*;

"Background Information" means all and any materials, documents, drawings, plans or other information in paper, electronic or any other form, relating in any way to the Project and the Private Bills (and the parliamentary process) and made available to the Operator by **tie**, CEC and/or any of their respective members, officers, agents and/or advisers in connection with the Project and/or the negotiation and/or preparation of this Agreement or during the process of competitive bidding which preceded such negotiation and preparation;

"Base Case RPIX" means RPIX as at 1 January 2003 equal to 177.1;

"Base Case Assumptions" means the assumptions set out in Schedule 18 *(Base Case Assumptions)* as may be agreed to be amended from time to time in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* or following a **tie** Change in accordance with Clause 24 *(**tie** Changes)* or following an Operator Change in accordance with Clause 25 *(Operator Changes)*;

"Best Value Improvement Plans" means the plan referred to in Clause 16 (*Best Value and Project Phase D Benchmarking*) of the Operating Appendix;

"Bid Conditions" means the bid conditions included in Schedule 11 (*Bid* Conditions) to this Agreement and signed by the parties;

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"Bonded Costs" means the costs, expenses, liabilities, loss of profits and damages incurred by **tie** as a result of the matters listed in Clauses 8.4.1, 8.4.2, 8.4.3 and 8.4.4 of this Agreement;

"Business Day" means any day other than a Saturday, Sunday or Edinburgh Holiday;

"Capped Fee" means subject to Clause 15.13, the relevant cap as set out in the Financial Proposals;

"Category Five Fixed Costs" means the costs numbered "5" in the tables included in the Base Case Assumptions, which are set in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* at a level in accordance with the Project Development and Operating Costs, and such other costs as **tie** and the Operator may agree from time to time should be treated as "Category Five Fixed Costs". All Category Five Fixed Costs shall be Indexed at Premium;

"Category Four Fixed Costs" means the costs numbered "4" in the tables included in the Base Case Assumptions, which are set in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* at a level in accordance with the Project Development and Operating Costs, and such other costs as **tie** and the Operator may agree from time to time should be treated as "Category Four Fixed Costs" All Category Four Fixed Costs shall be Indexed at Premium;

"Category One Fixed Costs" means the costs numbered "1" in the tables included in the Base Case Assumptions, which are set in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* at a level in accordance with the Project Development and Operating Costs, and such other costs as **tie** and the Operator may agree from time to time should be treated as "Category One Fixed Costs". All Category One Fixed Costs shall be Indexed at Premium;

"Category Three Fixed Costs" means the costs numbered "3" in the tables included in the Base Case Assumptions, which are set in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* at a level in accordance with the Project Development and Operating Costs, and such other costs as **tie** and the Operator may agree from time to time should be treated as "Category Three Fixed Costs". All Category Three Fixed Costs shall be Indexed at Premium;

"Category Two Fixed Costs" means the costs numbered "2" in the tables included in the Base Case Assumptions, which are set in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs*

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and Rates) at a level in accordance with the Project Development and Operating Costs, and such other costs as **tie** and the Operator may agree from time to time should be treated as "Category Two Fixed Costs" All Category Two Fixed Costs shall be Indexed at Premium;

"CDM Regulations" means the Construction (Design and Management) Regulations 1994 (SI 1994/3140);

"CEC" means the City of Edinburgh Council and its successors and assignees whomsoever;

"CEC Fares Policy" means any policy developed and applied by CEC concerning the level and/or structure of ticket pricing for the Edinburgh Tram Network;

"CEC UTC System" means the system of electronically operated signals managed by CEC to control traffic movements on the streets and roads in the City of Edinburgh in which the System will be installed, and for the avoidance of doubt, includes any such electronically operated signals which operate on a stand alone basis provided that to the extent that the System serves areas outside Edinburgh from time to time, references to "CEC UTC System" shall be deemed to apply to UTC systems operated in such areas to the extent appropriate in the context;

"Certificate of Full Service Commencement" means, in relation to a Line, the certificate of Full Service Commencement to be issued by **tie** in accordance with Clause 4.5 of the Operating Appendix or Clause 3.6 of the Operating Appendix (as appropriate) in respect of that Line;

"Certificate of Service Commencement" means, in relation to a Line, the certificate of Service Commencement to be issued by **tie** in accordance with Clause 3.4 of the Operating Appendix in respect of that Line;

"Change in Law" means the coming into effect after the Effective Date of:

(a) Legislation, other than any Legislation which on the Effective Date has been published:

(i) in a draft Bill (to have effect in Scotland) as part of a Scottish Executive or United Kingdom Government consultation paper;

(ii) in a Bill;

(iii) in draft subordinate Legislation within the meaning of section 21(1) of the Interpretation Act 1978; or

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(iv) as a draft directive or a draft regulation in the Official Journal of the European Communities; or

(b) any applicable judgment of a relevant court of law which changes a binding precedent;

"Change of Control" means any sale or disposal of any legal, beneficial or equitable interest in any or all of the share capital of a corporation or the control over the exercise of voting rights in a corporation or the control over the right to appoint or remove directors of a corporation;

"Claim" has the meaning given in Clause 29.1;

"Code of Construction Practice" means the code which has been developed in conjunction with all relevant local authorities with regard to environmental and safety aspects affecting the interests of local businesses, the general public and the surroundings in the vicinity of the Construction Works. The Code will apply to both the Construction Works and any Infrastructure Provider Maintenance;

"Commercially Sensitive Information" means this Agreement (unless otherwise agreed by the Parties), any information relating to detailed costings and funding of the Project and/or any other information which is agreed to be or is identified at the time of issue as being commercially sensitive;

"Compliance Critical Risk" means a risk or matter the Operator is obliged to insure against and which the failure of the Operator to carry any of the Required Insurances would prevent the Operator from lawfully performing the Project Development Services or the Project Operations in whole or in substantial part in the manner required by this Agreement;

Concessionary Travel Scheme" means:

(i) in respect of Edinburgh, East Lothian and Midlothian, the concessionary travel scheme known as "Concessionary Travel - Arrangements from 30 September 2002 for residents of The City of Edinburgh, East Lothian and Midlothian Councils"; and

(ii) in respect of West Lothian, the concessionary travel scheme known as "West Lothian Concessionary Travel Scheme";

or any successor to either of such schemes nominated by **tie**;

"Construction Panel" has the meaning given to it in paragraph 5.4 of Schedule 7 *(Dispute Resolution Procedure)*;

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"Construction Works" means the infrastructure construction and installation works as part of the works to be carried out by any Infrastructure Provider;

"Control Centre" means the control centre for the control of the System to be provided by the Infrastructure Provider(s) and operated by the Operator pursuant to this Agreement;

"Core Network" means Line 1, Line 2 and Line 3 or any of them;

"Core Staff Fixed Rates" means the costs numbered "9" in the tables included in the Base Case Assumptions, which are set in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* at a level in accordance with Table 1 of the Project Development and Operating Costs, and such other rates as **tie** and the Operator may agree from time to time to be treated as Core Staff Fixed Rates. All Core Staff Fixed Rates shall be Indexed at Premium;

"Default Interest Rate" means the interest rate per annum equivalent to two percent above the base rate of the Bank of England current on the date on which the relevant payment first becomes overdue adjusted to reflect any changes to the rate during the period over which the payment remains overdue;

"Depot(s)" means the facilities for:

(a) the stabling, servicing, cleaning and/or maintenance of Trams and/or elements of infrastructure: and/or

(b) accommodation for operational and maintenance staff;

"Design Manual" means the design manual to be developed by the **tie** Advisers during Project Phases A and B, with input from the Operator pursuant to the Project Development Output Specification, as such Design Manual is amended during Project Phases A and B, and otherwise from time to time in accordance with this Agreement ;

"Development Assumptions" means those assumptions made by **tie** or the **tie** Advisers, in relation to the development of the System, and potential revenues and costs, and as such Development Assumptions may be modified at **tie's** option pursuant to Schedule 2 (*Project Development Output Specification*) during Project Phase A and Project Phase B in relation to each Line;

"Development Phase" means in respect of each Line: Project Phase A, Project Phase B and Project Phase C in respect of such Line;

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"Dispute" means any dispute, difference or unresolved claim between the Parties in connection with or arising from this Agreement;

"Dispute Resolution Procedure" means the procedure set out in Clause 42 (*Dispute Resolution Procedure*) and Schedule 7 (*Dispute Resolution Procedure*);

"Document Management Plan" means the plan referred to in paragraph 26.10 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance the terms of this Agreement;

"Due Date for Payment" means the dates calculated in accordance with Clauses 15.4, 15.8, 17.2 and 17.6 as appropriate;

"Edinburgh" means the geographical area of the unitary authority of the City of Edinburgh Council as at the Effective Date and any other geographical area which comes within the area of responsibility of CEC at any time during the Term, provided that to the extent that the System serves areas outside Edinburgh from time to time, references to "Edinburgh" shall be deemed to apply to such areas to the extent appropriate in the context;

"Edinburgh Holiday" means any day which is a public holiday recognised by the CEC;

"Edinburgh Tram Network" means the Core Network together with any Network Expansion and Line extensions that may be required by **tie** from time to time during the Term;

"Effective Date" shall mean the date on which **tie** notifies the Operator in writing that the condition precedent stipulated in Clause 2.5 has been satisfied;

"Emergency Services" means Lothian and Borders Police, Lothian and Borders Fire Brigade, Scottish Ambulance Services and HM Coastguard;

"Employment Liabilities" means any award, loss, fine, compensation, damages order, payment made by way of settlement, costs and expenses (including legal costs on an indemnity basis) properly incurred in connection with a claim made by or in respect of any of the Project Development Staff or Project Operations Staff (including a claim made by a trade union, a governmental or statutory body or local authority or commission), and also including the costs of any investigation by the Equal Opportunities Commission, the Commission for Racial Equality or the Disability Rights Commission, and of costs of implementing any requirements that may arise from any such investigation;

"EMU" means Economic and Monetary Union as contemplated in the Treaty of European Union;

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"EMU Legislation" means legislative measures of the European Council for the introduction of, changeover to or operation of a single or unified European currency (whether known as the Euro or otherwise), being in part the implementation of the third stage of EMU;

"Enabling Legislation" means such Legislation, in the form of Scottish Private Bills, Acts or otherwise, as gives permanent authority to CEC and to **tie** to finance, build, commission, operate, maintain and decommission the Edinburgh Tram Network;

"Environmental and Sustainability Management Plan" means the plan referred to in paragraph 26.13 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

"Environmental Statement" means the environmental statements supporting each of the Scottish Private Bills;

"Escrow Agent" means the agent to be agreed between **tie** and the Operator in the event that any Operator Software and/or Specially Written Software and/or Third Party Software is upgraded or updated, and deposited in accordance with Clause 46.9;

"Escrow Agreement" means the agreement to be agreed between **tie** and the Operator in the event that any Operator Software and/or Specially Written Software and/or Third Party Software is upgraded or updated, and deposited in accordance with Clause 46.9;

"Estimate" means the estimate to be provided by the Operator pursuant to Clause 24.3 of the Operating Appendix;

"Euro" means the single currency of Participating Member States of the European Union;

"Euro Compliant" has the meaning given in Clause 9.10 of the Operating Appendix;

"Expiry Date" means, subject to **tie**'s right to extend the Expiry Date pursuant to Clause 2.2 or any agreement between **tie** and the Operator (pursuant to Clause 2.3), 02.00 hours on the date which is the fifteenth anniversary of the Effective Date;

"Fares" means the prices being charged from time to time by the Operator for journeys on the System;

"Final Date for Payment" means the dates calculated in accordance with Clauses 15.6, 15.10, 17.4 and 17.8 as appropriate;

"Final Persistent Breach Notice" means a notice served by **tie** pursuant to Clause 33.2;

"Financial Panel" has the meaning given to it in paragraph 5.4 of Schedule 7 *(Dispute Resolution Procedure)*;

"Financial Proposals" means the financial proposals presented by the Operator and approved by **tie** and agreed at the Effective Date as Schedule 4 (*Financial Proposals*) to this Agreement as may be adjusted from time to time in accordance with this Agreement or otherwise by agreement between **tie** and the Operator;

"First Party" has the meaning given in Clause 3.3;

"Fixed Costs" means the Category One Fixed Costs, the Category Two Fixed Costs, the Category Three Fixed Costs, the Category Four Fixed Costs, the Category Five Fixed Costs, and any other costs which **tie** and the Operator may agree from time to time should be treated as "fixed costs" whether within one of the already defined categories of costs or otherwise Indexed at Premium provided that where there is a time interval between the Service Commencement Date and the Full Service Commencement Date for a Line, the Fixed Costs for the System (including such Line) for such period shall be the Interim Fixed Costs;

"Fixed Rates" means the Core Staff Fixed Rates, the Non-Core Staff Fixed Rates and/or any other rates which **tie** and the Operator may agree from time to time should be treated as "fixed rates" whether within one of the already defined categories of rates or otherwise as Indexed at Premium;

"Force Majeure Event" means the occurrence after the Effective Date of:

(a) war, civil war, armed conflict or terrorism; or

(b) nuclear, chemical or biological contamination unless the source or cause of the contamination is the result of actions of the Operator; or

(c) pressure waves caused by devices travelling at supersonic speeds.

"Full Service" has the meaning given in Clause 8.7 of the Operating Appendix;

"Full Service Commencement" means, in respect of any Line, the provision of the full level of the Transport Services in respect of that Line as specified in the Operating Output Specification;

"Full Service Commencement Date" means, in respect of each Line, the date specified in the Certificate of Full Service Commencement in respect of that Line;

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"Full Service Day" means pursuant to the terms of Clause 8 (*Special Events*) of the Operating Appendix, a day falling during the Service Period in respect of which **tie** have given prior written notice to the Operator requiring the Operator to provide a Full Service over all or part of the System;

"Good Industry Practice" means using standards, practices, methods and procedures conforming to the Law and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably be expected from a large, reputable, professionally qualified, competent and skilled organisation experienced in carrying out activities of a similar nature, scope and complexity to those comprised in the Project Development Services, the Project and the Project Operations and seeking in good faith to comply with its contractual obligations and all duties owed by it;

"Guidance" means any applicable guidance, direction or determination issued by any regulatory body with which **tie** and/or the Operator is bound to comply;

"Handback Package" means the information referred to in Clause 28 (*Transition on Termination or Expiry*) of the Operating Appendix, as updated by the Operator from time to time in accordance with the provisions of that Clause;

"Headway" means, in relation to the Transport Services, the period in minutes and whole seconds between a Tram and the subsequent Tram either departing from an Originating Tramstop or a Headway Measurement Tramstop;

"Headway Measurement Tramstop" means any Tramstop so designed by agreement between the Operator and **tie**;

"Health and Safety Plan" means the plan referred to in paragraph 26.6 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance the terms of this Agreement;

"Helpdesk" has the meaning given to it in Clause 12.2 of the Operating Appendix;

"HMRI" means Her Majesty's Railway Inspectorate (or any successor authority);

"HS Act" has the meaning given to it in Clause 4.4;

"Inappropriate Base Case Assumption" means any Base Case Assumption which is agreed or determined in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* to be

(a) outwith any threshold set within the relevant Base Case Assumption or,

(b) where there is no stated threshold within the Base Case Assumption, any such Base Case Assumption which is incorrect to a material extent following the further development of the Project pursuant to this Agreement;

"Inception Report" means the report to be submitted by the Operator to **tie** pursuant to paragraph 5.5.6 of Schedule 2 (*Project Development Output Specification*), setting out details of the Operator's proposals for the Partnering Methodology and Programme;

"Incident Management Plan" means the plan referred to in paragraph 26.11 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

"Indemnified Liabilities" means actions, claims, (including third party claims) demands, proceedings, losses, damages, liabilities, costs and expenses (including reasonable legal fees and expert witness fees);

"Indexed" means in relation to an amount, that amount to be multiplied by the value of RPIX at the Point of Indexation, divided by the Base Case RPIX to generate a percentage movement;

"Indexed at Premium" means in relation to an amount, that amount to be multiplied by a factor calculated as the value of RPIX at the Point of Indexation, divided by Base Case RPIX to generate a percentage movement, with a further 0.5% added to this percentage movement;

"Indirect Loss" means any business interruption, loss of profits, loss of business, loss of business opportunity, loss of or damage to or corruption of data or loss of management time or time of other employees;

"Infrastructure and Equipment" means in respect of each Line, all infrastructure and equipment to be made available for the operation of the System in respect of that Line, including:

(i) track, power, signalling and communications equipment;

(ii) Tramstops;

(iii) Depot(s);

(iv) the Control Centre;

(v) Trams; and

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(vi) CCTV and ticket vending machines.

"Infrastructure and Equipment Output Specification" means, in respect of each Line, the output specification contained in the Infrastructure Delivery Agreement in respect of that Line;

"Infrastructure Delivery Agreement (IDA)" means, in respect of each Line (or Network Expansion), the agreement to be entered into between **tie** and the Infrastructure Provider for that Line (or Network Expansion) in respect of (inter alia) the delivery and maintenance of the Infrastructure and Equipment for that Line or Network Expansion;

"Infrastructure Provider" means any party with whom **tie** concludes an Infrastructure Delivery Agreement,

"Infrastructure Provider Maintenance" means all maintenance of the System other than the Operator Maintenance;

"Initial Fares" means the fares set by the Operator in accordance with the CEC Fares Policy and notified to the public no less than 60 days in advance of Service Commencement;

"Initial Response" has the meaning given in paragraph 26.5.5 of Schedule 2 (*Project Development Output Specification*);

"Insolvency Event" means any of the following events:

(a) the Operator is unable to pay its debts as they fall due or is insolvent or admits in writing inability to pay its debts as they fall due;

(b) the Operator suspends for a period of two months making payments on all or any class of its debts or a moratorium is declared by the Operator in respect of its indebtedness;

(c) the Operator ceases business or announces an intention to do so;

(d) the following are entered into:

(i) a voluntary arrangement (other than a solvent one) for a composition of debts of the Operator;

(ii) a scheme of arrangement in respect of the Operator pursuant to the Insolvency Act 1986 or the Companies Act 1985; or

(iii) a material composition or arrangement other than a solvent one with the Operator's creditors;

(e) either of the following:

(i) the winding-up of the Operator (including passing a shareholders' resolution or the presentation of a petition by the Operator for the purpose of winding up the Operator); or

(ii) its administration (including where an application is made by the Operator, or petition is presented by the Operator for or any meeting of its directors or members resolves to make an application for an administration order);

(f) an order for the winding-up or administration of the Operator is made;

(g) any liquidator, judicial custodian, receiver, administrative receiver, administrator or the like is appointed in respect of the Operator or any material part of the Operator's assets;

(h) possession is taken of, or any execution or other process (other than on the dependence or inhibition) is levied or enforced upon, any material part of the property (whether real or personal) of the Operator by or on behalf of any creditor or encumbrancer of the Operator; or

(i) anything analogous to any of the events mentioned in paragraphs (a) to (h) above occurs in relation to the Operator under the law of any relevant jurisdiction;

"Integrated Transport Initiative" means CEC's transportation enhancement and investment programme approved in principle by the Scottish Executive as set out in the report prepared by **tie** entitled 'A Vision for Edinburgh' dated 2nd September 2002 and known as the Integrated Transport Initiative for South East and Central Scotland (encompassing the Edinburgh Tram Network as a major core project) which is currently being managed and procured by **tie** on behalf of CEC;

"Intellectual Property Rights" means any rights in or to any patent, petty patent, copyright, sui generis database right, design right, utility model, trade mark, brand name, service mark, trade name, business name, internet domain name, business get-up, trade dress, chip topography right, know how or confidential information and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or for an extension, revival or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the law of England or of any other jurisdiction;

"Interim Fixed Costs" means, where there is a time interval between the Service Commencement Date and the Full Service Commencement Date for a Line, the Fixed Costs for the System including such Line for such period Such Interim Fixed Costs shall be Indexed at Premium;

"Interim Target Operating Costs" means, where there is a time interval between the Service Commencement Date and the Full Service Commencement Date for a Line, the Target Operating Costs for the System including such Line for such period. Such Interim Target Operating Costs shall be Indexed;

"Interim Target Revenues" means, where there is a time interval between the Service Commencement Date and the Full Service Commencement Date for a Line, the Target Revenues for the System including such Line for such period;

"Internal Dispute Resolution" means the procedure set out in paragraph 2 of Schedule 7 (*Dispute Resolution Procedure*);

"Joint Names Insurance" has the meaning given in Clause 26.3;

"Joint Revenue Committee" means the committee to be established by **tie** in accordance with Clause 20 *(Adjustment of Fixed Costs, Target Operating Costs and Target Revenues)*, of the Operating Appendix;

"Key Performance Indicators" means those performance indicators described in Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) to the Operating Appendix, as such Key Performance Indicators may be amended from time to time in accordance with this Agreement;

"Key Personnel" means those Project Development Staff specified as such in Schedule 3 (*Key Personnel*);

"KPI Customer Satisfaction Survey" means the customer satisfaction surveys to be carried out by or on behalf of **tie** each Reporting Period for the purposes of the KPI Regime;

"KPI Monitoring Report" means the report included with the Service Quality Report;

"KPI Regime" means the regime for deductions from the KPI Regime Profit Element depending on the Operator's performance against the Key Performance Indicators, as set out in Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) to the Operating Appendix;

"KPI Regime Profit Element" shall mean the Profit Element multiplied by a factor of 1.1;

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"KPI Warning Notice" means the notice served by tie in accordance with paragraphs 13, 14 and/or 15 of Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) on the Operator following service of a major KPI Beach Notice;

"Law" means:

(a) any applicable Legislation;

(b) any applicable Guidance; and

(c) any applicable judgment of a relevant court of Law which is a binding precedent,

in each case in force in Scotland;

"Legal Panel" has the meaning given to it in paragraph 5.4 of Schedule 7 *(Dispute Resolution Procedure)*;

"Legislation" means any Act or instruments of the Scottish Parliament or the United Kingdom Parliament (where in force in Scotland) or subordinate legislation within the meaning of section 21(1) of the Interpretation Act 1978, any exercise of the Royal Prerogative, and any enforceable community right within the meaning of section 2 of the European Communities Act 1972, in each case with respect to Scotland;

"Line" means each of Line 1 (or part thereof), Line 2 (or part thereof) and any Network Expansion agreed pursuant to Clause 11 *(Network Expansion)* (or part thereof);

"Line 1" means a loop through north Edinburgh connecting Edinburgh city centre with Leith, Newhaven, Granton, Roseburn and Haymarket and passing through the Waterfront Development Area, as such route may be further developed and/or amended during Project Phase A or Project Phase B in respect of Line 1;

"Line 2" means a western line from Edinburgh city centre to Edinburgh Park, the Gyle, Gogarburn and Edinburgh Airport / Newbridge, with possible extensions to Livingston and South Queensferry, as such route may be further developed and/or amended during Project Phase A or Project Phase B in respect of Line 2;

"Line 3" means a proposed south-eastern line from Edinburgh city centre to Cameron Toll, the New Royal Infirmary, Craigmillar, Fort Kinnaird and Newcraighall with a possible extension to Musselburgh, as such route may be further developed and/or amended during Project Phase A or Project Phase B in respect of Line 3;

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"Local Authority" has the meaning given it under Section 235(1) of the Local Government (Scotland) Act 1973;

"Local Services" shall have the meaning given by section 2 of the Transport Act 1985;

"Local Transport Strategy (LTS)" means CEC's plans and priorities for the development of an integrated transport policy within Edinburgh, designed to serve the people of Edinburgh in a way which is consistent with the Scottish Executive's overall sustainable development objectives, and as such LTS is amended by CEC from time to time;

"Long-Term Roads Change" means a Relevant Roads Change which persists for more than 3 months but is not permanent;

"Losses" means all damages, losses, liabilities, costs, expenses (including legal and other professional charges and expenses) and charges whether arising under statute, contract or at common law or in connection with judgments, proceedings or demands;

"Maintenance Plan" means the plan referred to in paragraph 26.5 of Schedule 2 (*Project Development Output Specification*) in relation to the Operator Maintenance of the Infrastructure and the Equipment, as such plan is modified from time to time in accordance with the terms of this Agreement;

"Major KPI Breach Notice" has the meaning given in paragraph 13 of Schedule 3 to the Operating Appendix (*Project Phase D Payment Mechanism and KPI Regime*);

"Marketing Plan" means the plan referred to in paragraph 26.15 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

"Mobilisation Certificate" means the certificate to be issued by **tie** pursuant to paragraph 38.3 of Schedule 2 (*Project Development Output Specification*);

"National Currency Unit" means the unit of currency (other than a Euro unit) of a Participating Member State;

"Necessary Consents" means without limitation all permissions, consents, approvals, non objections, certificates, permits, licences, statutory agreements and authorisations, required by Law , and all necessary consents and agreements from any third parties or Relevant Authority, any Planning Permission, building fixing agreement, building control approval, consent from Network Rail, consent

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from HMRI (whether by simple application or by ongoing approval process), needed to plan, commence, carry out or complete (i) the Construction Works, or (ii) the Project Operations in accordance with this Agreement;

"**Network Effects Study**" means the study commissioned by **tie** to determine the effects on costs and revenues of operating all the Lines together as a single network, and referred to in paragraph 5.1 of Schedule 2 (*Project Development Output Specification*);

"Network Expansion" means expansion beyond Line 1 (as defined at the end of Project Phase B) and Line 2 (as defined at the end of Project Phase B) , and any further light rail system connecting either with or within the System or with any other light rail system which connects with the System;

"Network Rail" means Network Rail Limited (company number 4402220) and any Affiliate or any successors to any part of its assets and/or undertakings which is relevant to the performance of the Project Operations;

"No Better and No Worse" shall be construed by reference to the Operator's:

(a) rights, anticipated receipts, duties and liabilities under or arising pursuant to performance of this Agreement; and

(b) ability to perform its obligations and exercise its rights under the Agreement;

so as to ensure that:

(c) the ability of the Operator to meet the requirement of the Operating Appendix is not adversely affected or improved as a consequence of the Relevant Event;

(d) the ability of the Operator to achieve Target Costs for Project Phase C2, Target Operating Costs and Target Revenues is not materially adversely affected or materially improved; and

(e) the ability of the Operator to continue to perform its obligations in terms of this Agreement in respect of the Fixed Costs is not materially adversely affected or materially improved;

and any reference in this Agreement to leaving the Operator in "No Better and No Worse position" shall be construed accordingly.

"Non-Core Staff Fixed Rates" means the costs numbered "8" in the tables included in the Base Case Assumptions, which are set in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs*

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and Rates) at a level in accordance with Table 1 of the Project Development and Operating Costs, and such other rates as **tie** and the Operator may agree from time to time to be treated as Non-Core Staff Fixed Rates. All Non-Core Staff Fixed Rates shall be Indexed at Premium;

"Notice of Adjudication" has the meaning given to it in paragraph 5.1 of Schedule 7 *(Dispute Resolution Procedure)*;

"Notice of Intention to Withhold Payment" means a notice specifying the amount to be withheld and the ground for withholding payment, or if there is more than one ground, each ground and the amount attributable to it;

"Notification" has the meaning given to it in paragraph 2.1 of Schedule 7 (*Dispute Resolution Procedure*);

"OFT" means the Office of Fair Trading or its successor entity;

"One Ticket" means the through ticketing scheme currently operated by SESTRAN Travelticket Limited or any successor to such scheme nominated by **tie**;

"Open Book Basis" means the availability and disclosure (consistent with operation of Clause 48 (*Information and Audit Access*)) of all underlying data and calculations used by the Operator to create and justify costings and financial analysis presented to **tie** during all Project Phases;

"Operating and Maintenance Manual" means a manual setting out the procedures for operating and maintaining the System in sufficient detail to enable **tie** or a Successor Operator to operate and maintain the System to the same standards as those required of the Operator under this Agreement;

"Operating Appendix" means Appendix 1 to this Agreement in relation to (inter alia) the operation of the Transport Services on the System as amended from time to time pursuant to this Agreement;

"Operating Costs" means the actual operating costs incurred by the Operator in a Reporting Period ;

"Operating Deficit" means Operating Costs exceed Operating Revenues in respect of a Reporting Period;

"Operating Effective Date" means the date that **tie** notifies the Operator that each of the Operator Conditions Precedent (with the exception of any Operator Conditions Precedent that have been expressly waived by **tie** in writing) have been satisfied in accordance with Schedule 1 *(Conditions Precedent)* to the Operating Appendix;

"Operating Method Statements" means the method of performing the Project Operations (and, to the extent relevant, the Project Development Services) developed by the Operator and **tie** pursuant to the Project Development Output Specification, and as amended from time to time in accordance with:

(a) the Project Development Output Specification in relation to each additional Line or Network Expansion on which the Operator is to provide the Transport Services in accordance with this Agreement; or

(b) Schedule 9 (*Review Procedure*);

"Operating Output Specification" means **tie**'s requirements as regards the Project Operations to be performed by the Operator during the Service Period, as set out in Schedule 4 (*Operating Output Specification*) to the Operating Appendix, and developed by **tie** and the Operator pursuant to the Project Development Output Specification, and as varied from time to time in accordance with:

(a) this Agreement in relation to each additional Line or Network Expansion on which the Operator is to provide the Transport Services in accordance with this Agreement; or

(b) Clause 52 (*Variations and Waivers to be in Writing*) and Clauses 23 (Performance and Financial Adjustments), 24 (**tie** Changes) and 25 (Operator Changes) of the Operating Appendix;

"Operating Revenues" means the revenues collected by the Operator in the operation of the System, including all Patronage Revenue but, for the avoidance of doubt, excluding any amounts paid by **tie** to the Operator pursuant to this Agreement;

"Operations Management Plan" means the plan referred to in paragraph 26.2 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

"Operations Panel" has the meaning given to it in paragraph 5.4 of Schedule 7 *(Dispute Resolution Procedure)*;

"Operator Change" means a change in the Project Operations proposed by the Operator during Project Phase C or Project Phase D and which **tie** accepts pursuant to Clause 25 (*Operator Changes*) of the Operating Appendix;

"Operator Conditions Precedent" means the conditions specified in Schedule 1 (*Conditions Precedent*) to the Operating Appendix;

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"Operator Default" means one of the following events:

(a) a breach by the Operator of any of its material obligations under this Agreement;

(b) Not used;

(c) an Insolvency Event save where caused directly by **tie** being in breach of its obligations under this Agreement;

(d) the Operator commits any breach of Clause 43 (*Assignation, Sub-Contracting and Changes in Control*);

(e) the Operator abandons the Project Development Services or the Project Operations (or a material part of them) at any time and in this context 'abandon' shall mean:

(i) during the Development Phase, a failure to deploy the level of agreed resources which results in substantial failure to provide the Project Development Services for a period exceeding 5 Business Days save as may be agreed from time to time;

(ii) during the Service Period, if no Transport Services are provided on the System (or a material part of it), for a period exceeding 5 consecutive days, by reason (in whole or material part) of any industrial dispute directly affecting the Operator which causes a breach by the Operator of its obligations under this Agreement or for a period exceeding 2 consecutive days, by reason (in whole or material part) of any matter other than an industrial dispute directly affecting the Operator which constitutes breach by the Operator of its obligations under this Agreement;

(f) the Service Commencement Date for a Line is not achieved on or before the date falling three months after the Planned Service Commencement Date as same may be amended for that Line, to the extent that the reason for such delay is caused by a breach by the Operator of any of its obligations under this Agreement ;

(g) after the issue of a Major KPI Breach Notice, the issue of a second such notice at any time during the 13 Reporting Periods following the issue of the Major KPI Breach Notice;

(h) a breach by the Operator of its obligations to take out and maintain the Required Insurances in accordance with the terms of this Agreement; or

(i) except in the first three years of operation following the issue of the first Certificate of Services Commencement, if the Operating Costs exceed the Target Operating Costs and any

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Fixed Costs at any other time during the Service Period in 6 Reporting Periods out of any rolling period of 12 months; and

(j) under performance as stipulated by paragraph 15 of Schedule 3 *(Project Phase D Payment Mechanism and KPI Regime)* of the Operating Appendix.

"Operator Financial Model" means the financial model presented by the Operator and approved by **tie** and agreed at the Effective Date as Schedule 5 (*Operator Financial Model*) to this Agreement as may be adjusted from time to time in accordance with this Agreement or otherwise by agreement between **tie** and the Operator;

"Operator IPR" means:

(a) all Intellectual Property Rights (including Intellectual Property Rights in relation to the Operator Software) which the Operator can demonstrate by documentary evidence were already existing and owned by or licensed to the Operator prior to the Effective Date; and

(b) any modifications or developments of any of the rights listed in paragraph (a) above or the Project Operations and which are generic in nature and not specific to the Project;

"Operator Maintenance" means the maintenance of the System to be carried out by the Operator and as outlined in paragraph 26.5 of the Project Development Output Specification;

"Operator Necessary Consents" means:

(i) any Necessary Consents from HMRI for the provision by the Operator of the Transport Services; and

(ii) any Necessary Consents which the Operator is required to obtain which are specified in the Approvals Management Plan; and

(iii) such other Necessary Consents which the Operator is required to obtain that **tie** may from time to time specify by notice to the Operator,

"Operator Notice of Change" means a notice served by the Operator pursuant to Clause 25 (*Operator Changes*) of the Operating Appendix;

"Operator Party" means each and any of the Operator's agents and contractors and its or their subcontractors (of any tier) and its or their directors, officers and employees in relation to the Project and **"Operator Parties"** shall be construed accordingly;

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"Operator Project Manager" shall have the meaning given to it in Clause 6.7;

"Operator Snagging Matters" means minor failures by the Operator to comply with either (i) **tie** Completion Requirements or (ii) the Operating Output Specification where such minor failures and their rectification:

(a) would not materially impair provision of the Transport Services by the Operator or the use and enjoyment of the System or Transport Services by the Operator or members of the public; and

(b) would not cause any material cost, nuisance, hindrance or annoyance to any person;

"Operator Software" means programs, the Intellectual Property Rights in which are (a) owned by the Operator; and (b) used by the Operator to carry out its obligations under this Agreement;

"Operator's Core Team" means those members of the Operator's core team set out in the Base Case Assumptions and the Project Development and Operating Costs, and such substitutes as may be agreed from time to time;

"Operator's Non-Core Staff" means those members of the Operator's non-core staff set out in the Base Case Assumptions and the Project Development and Operating Costs, and such substitutes as may be agreed from time to time;

"Originating Tramstop" means the Tramstop where a Tram is scheduled in the Timetable to begin its service journey and will be the same point at which Tram departure times will be measured;

"Outline Service Integration Plan" means the plan prepared by the Operator and set out in Schedule 16 (*Outline Service Integration Plan*) which shall be developed by the Operator in accordance with this Agreement;

"Overall Approvals Management Plan" means that plan to be developed by **tie** and **tie's** advisers referred to in paragraph 26.8 of Schedule 2 (*Project Development Output Specification*) to this Agreement;

"Pain/Gain Share Period" means a period of, in continuous alternating fashion during Project Phase D, six consecutive Reporting Periods and then seven Reporting Periods provided that:

(i) the first Pain/Gain Share Period shall commence on the Service Commencement Date of the first Line to become operational;

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(ii) each Pain/Gain Share Period shall start on the day following the last day of the preceding such period; and

(iii) the last Pain/Gain Share Period shall end on the date of termination or expiry of this Agreement;

"Panels" has the meaning given to it in paragraph 5.4 of Schedule 7 *(Dispute Resolution Procedure)*;

"Participating Member State" means each state so described in any EMU Legislation;

"Partnering Methodology and Programme" means the programme for the development of the Project during Project Phase A, Project Phase B and Project Phase C in respect of each Line, and the methodology for such development, as agreed between **tie** and the Operator pursuant to paragraph 5.5.6 of the Project Development Output Specification (taking account of the Inception Report), as such Partnering Methodology and Programme is amended from time to time pursuant to this Agreement;

"Party" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

"Patronage Revenue" means all revenue collected by the Operator from fares levied in respect of passengers (including Penalty Fares collected by the Operator), and including revenue collected by and reimbursements to the Operator payable under any Concessionary Travel Scheme, One Ticket and any other through ticketing, fare sharing or similar scheme in which the System participates from time to time with other public transport services;

"Payment Mechanism" means the payment mechanism as set out in Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) to the Operating Appendix;

"Penalty Fare" means a penalty fare payable in accordance with the provisions of the Scottish Private Bill as enacted or any other applicable Legislation by a passenger on a Tram who fails to produce a valid fare ticket or general travel authority when requested to do so by the Operator;

"Performance Bond" means an 'on demand' bond provided by the Operator and issued by a surety acceptable to **tie** and in the form of that set out in Schedule 14 (*Performance Bond*);

"Performance Indicators" means those performance indicators referred to in paragraph 25 of the Project Development Output Specification;

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"Performance Monitoring Regime" means the detailed regime (as may be amended from time to time in accordance with an agreed **tie** Change or agreed Operator Change or as may be otherwise amended in accordance with the Agreement) produced by the Operator and **tie** pursuant to paragraph 25 of the Project Development Output Specification setting out how the Operator will monitor its compliance with the Operating Output Specification and its obligations under this Agreement in a way which will enable (i) the Operator to produce the Service Quality Reports; (ii) **tie** to satisfy itself as to the level of the Operator's compliance with the Operating Output Specification and other relevant obligations under this Agreement; and (iii) the Parties to perform their respective responsibilities pursuant to and as described in Clause 16 (*Best Value and Project Phase D Benchmarking*) of the Operating Appendix;

"Permanent Roads Change" means a Relevant Roads Change which is permanent;

"Persistent Breach Notice" means a notice served by **tie** pursuant to Clause 33 (*Persistent Breach*);

"Personal Loss" means any personal injury or death, illness, disability, shock, mental anguish, injury or trauma to any person (including one of the Parties);

"Planned Service Commencement Date" means, in respect of any Line, the date fixed by the Project Programme by which Service Commencement in respect of that Line is planned to occur;

"Planning Permission" means planning permission, listed building consent, conservation areas consent and/or other consent or approval reasonably required from time to time for construction and/or installation and/or operation of the System (including for any Variation);

"Point of Indexation" shall be January each year to be applied annually as of 1st April each year;

"Position Paper" has the meaning given to it in paragraph 2.2 of Schedule 7 *(Dispute Resolution Procedure)*;

"PPCN" means a Project Phase Completion Notice;

"Pre-Mobilisation Certificate" means the certificate to be issued by **tie** pursuant to paragraph 38.1 of Schedule 2 (*Project Development Output Specification*);

"Profiled Fixed Costs" means the Fixed Costs as profiled in accordance with Clause 10.14;

"Profiled Profit Element" means the Profit Element as profiled in accordance with Clause 10.14;

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"Profiled Target Operating Costs" means the Target Operating Costs as profiled in accordance with Clause 10.14;

"Profiled Target Revenue" means the Target Revenue as profiled in accordance with Clause 20.7 *(Adjustment of Fixed Costs, Target Operating Costs and Target Revenues)* of the Operating Appendix;

"Profit Element" means, as the context admits (i) the Operator's profit element for Project Phase C2 which shall be Indexed and (ii) the Operator's profit element during Project Phase D which shall be Indexed, both as set out in the Financial Proposals;

"Prohibited Act" means:

(a) offering, giving or agreeing to give to the Scottish Executive, CEC, **tie**, or any **tie** Party or any other public body or any person owned or employed by any of them any gift or consideration of any kind as an inducement or reward:

(i) for doing or not doing (or for having done or not having done) any act in relation to the obtaining or performance of this Agreement; or

(ii) for showing or not showing favour or disfavour to any person in relation to this Agreement;

(b) paying commission or agreeing to pay commission to any person in connection with the award of this Agreement;

(c) committing any offence:

(i) under the Prevention of Corruption Acts 1889-1916 or section 68(2) of the Local Government (Scotland) Act 1973;

(ii) under any Law creating offences in respect of fraudulent acts; or

(iii) at common law in respect of fraudulent acts in relation to this Agreement or any other relevant agreement with the Scottish Executive, **tie**, CEC or any other public body; or

(d) defrauding or attempting to defraud or conspiring to defraud the Scottish Executive, **tie** or any other public body;

"Project" means **tie**'s proposal to obtain relevant statutory powers, land and other rights and consents for, and to procure the design, development, construction, operation, maintenance, expansion and funding of, the Edinburgh Tram Network;

"Project Data" means all drawings, reports, documents, plans, photographs, formulae, calculations, data, equipment and materials:

(a) relating to the design, construction, testing, commissioning, completion, operation, funding, maintenance and/or expansion of the Edinburgh Tram Network and/or System and/or Project; and/or

(b) brought into existence in the course of tendering for the Project and/or performing, and/or used in connection with the performance of, the Project Development Services;

"Project Development and Operating Costs" means the costs and other information presented by the Operator and approved by **tie** and agreed at the Effective Date as Schedule 6 (*Project Development and Operating Costs*) to this Agreement, as may be adjusted from time to time in accordance with this Agreement or otherwise by agreement between **tie** and the Operator;

"Project Development Costs" means, in respect of Project Phase A, Project Phase B and Project Phase C1:

(a) in respect of the Operator's Core Team the amount of budgeted time (subject to Clause 15.4) during that period in the provision of the Project Development Services by persons within the Operator's Core Team multiplied by the Core Staff Fixed Rates ; and

(b) in respect of each member of the Operator's Non-Core Staff involved in the provision of the Project Development Services in accordance with Clause 15 (*Project Development Costs*), the amount of time spent during that period in the provision of the Project Development Services by such additional staff members multiplied by the Non-Core Staff Fixed Rates;

"Project Development Objectives" means the objectives of **tie** and the Operator set out in paragraph 2 of Schedule 2 (*Project Development Output Specification*) during Project Phase A, Project Phase B and Project Phase C in respect of each Line, including the facilitation of the achievement of the Project Vision during Project Phase D;

"Project Development Output Specification" means **tie**'s requirements as regards the services and works to be provided by the Operator during Project Phases A, B and C as set out at Schedule 2

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(*Project Development Output Specification*), as varied from time to time in accordance with this Agreement;

"Project Development Services" means the services to be provided by the Operator to **tie** pursuant to this Agreement in respect of any Line or Network Expansion, as described in Clause 4 (*The Project Development Services*);

"Project Development Staff" means any employees, contractors or other personnel engaged by the Operator or any Operator Party from time to time in the provision of the Project Development Services, the identity of all such persons to be notified to **tie** and approved by **tie** in accordance with Clause 4.2.8;

"Project IPR" means all Intellectual Property Rights in the Project Data and the Specially Written Software and any other Intellectual Property Rights created in the performance of the Project Development Services and/or the delivery of the Project, which are specific in nature to the Project;

"Project Operations" means the performance of:

i) the Transport Services on the System (including the operation of the Control Centre);

ii) the Operator Maintenance of the System; and

iii) all other obligations of the Operator under this Agreement from time to time;

in each case, subject to Variations;

"Project Operations Staff" means any employees, contractors or other personnel engaged by the Operator or any Operator Party from time to time in the provision of the Project Operations;

"Project Phase" means Project Phase A, Project Phase B, Project Phase C and/or Project Phase D as appropriate;

"Project Phase A" means the phase of the Project in respect of a Line described in paragraphs 4 to 14 of the Project Development Output Specification;

"Project Phase B" means the phase of the Project in respect of a Line described in paragraphs 15 to 31 of the Project Development Output Specification;

"Project Phase C" means the phase of the Project in respect of a Line described in paragraphs 32 to 44 of the Project Development Output Specification;

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"Project Phase C1" means the phase of the Project in respect of a Line described in paragraphs 35 to 38 of the Project Development Output Specification;

"Project Phase C2" means the phase of the Project in respect of a Line described in paragraphs 39 to 44 of the Project Development Output Specification;

"Project Phase Completion Notice" or **"PPCN"** means, in respect of each Line, the notice issued by **tie** on the date of:

(a) for Project Phase A, the grant of Royal Assent to the relevant Scottish Private Bill;

(b) for Project Phase B, the award by **tie** of an IDA for the first Line (or part thereof) authorised by a Scottish Private Bill;

(c) for Project Phase C1, the issue by **tie** of the Mobilisation Certificate pursuant to paragraph 38.3 of the Project Development Output Specification;

(d) for Project Phase C2, Full Service Commencement; or

in each case, or as otherwise determined by **tie**;

"Project Phase D" means the phase of the Project in respect of any Line after the Service Commencement Date for such Line;

"Project Programme" means the programme set out in Schedule 8 (*Project Programme*) (as amended from time to time in accordance with this Agreement);

"Project Return" means the return for each relevant Project Phase set out in the Financial Proposals;

"Project Vision" means **tie**'s and CEC's vision for the Project as set out at Recital D of this Agreement;

"Property Loss" means any loss of or damage to any property, real or personal, of any person (including one of the Parties);

"Public Liaison and Media Plan" means the plan referred to in paragraph 26.16 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

"Qualifying Change in Law" means a Change in Law which comes into effect during Project Phase C or Project Phase D which involves additional Project Development Costs, Operating Costs and/or

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necessitates amendment of this Agreement and/or the Project Operations and, in each case, which was not reasonably foreseeable prior to the issue of the PPCN for Project Phase B for the relevant Line (excluding any change to any Concessionary Travel Scheme or any through ticketing, fare sharing or similar scheme);

"Quality Management Plan" means the plan referred to in paragraph 26.9 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance the terms of this Agreement;

"Quality Manager" means the person to be appointed by the Operator pursuant to Clause 7.3 of this Agreement or Clause 14.2 of the Operating Appendix (as appropriate);

"Quarter" means each period in any year:

(a) beginning on 1 April and ending on 30 June;

(b) beginning on 1 July and ending 30 September;

(c) beginning on 1 October and ending on 31 December; and

(d) beginning on 1 January and ending on 31 March;

in each case, to the extent only that such period falls during the Term of this Agreement, provided that the first Quarter will commence on the Effective Date and end on 30 June 2004, and the final Quarter will end on the final day of each Project Phase C1;

"RA 1984" means the Roads (Scotland) Act 1984;

"Rateable Value" means the rateable value assigned annually to the System by the Scottish Ministers or Relevant Authority;

"Referral Notice" has the meaning given to it in paragraph 5.12 of Schedule 7 *(Dispute Resolution Procedure)*;

"Referring Party" has the meaning given to it in paragraph 5.1 of Schedule 7 *(Dispute Resolution Procedure)*;

"Related Contracts" has the meaning given to it in paragraph 6.1 of Schedule 7 *(Dispute Resolution Procedure)*;

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"Related Dispute" has the meaning given to it in paragraph 6.1 of Schedule 7 *(Dispute Resolution Procedure)*;

"Relevant Authority" means any court with the relevant jurisdiction and any local authority, national authority or supra national agency, inspectorate, minister, Scottish Executive, body, official or public or statutory person of the government of the United Kingdom or of the European Union;

"Relevant Event" means a **tie** Change, a Qualifying Change in Law or a Permanent Roads Change;

"Relevant Roads Change" means the occurrence at any time during Project Phase C2 or Project Phase D of :

(a) works by or on behalf of CEC or any Roads Authority resulting, once completed, in a physical change to the road layout affecting the operation of the System;

(b) a change to the permitted uses of the road as a result of the making, revocation or variation of a traffic regulation order by CEC or other Roads Authority, excluding any traffic regulation order made, revoked or varied at the request of any third party consequential to any works carried out by that third party;

(c) a decision by CEC or other Roads Authority to alter or cease providing the priorities given by the CEC UTC System to Trams over other classes of vehicle from those priorities agreed between **tie** and the Operator during Project Phase A or Project Phase B in respect of the relevant Line; or

(d) the carrying out of works to Roads or the carrying out of works to the CEC UTC System;

(e) a delay after the Service Commencement Date by CEC or other Roads Authority in bringing into operation the priorities to be given by the CEC UTC System to Trams over other classes of vehicle in accordance with the agreement reached between **tie** and the Operator in respect of UTC priorities during Project Phase A or Project Phase B in respect of the relevant Line;

in each case affecting the passage of Trams or the provision of the Transport Services and directly resulting in failure by the Operator to meet the Operating Output Specification;

"Relief Event" means (save to the extent any of the following events arise as a result of any act or omission of the Operator and/or an Operator Party):

(a) at any time on or after the Effective Date:

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(i) fire, explosion, lightning, tempest, flood, bursting or overflowing of water tanks, apparatus or pipes, ionising radiation (to the extent it does not constitute a Force Majeure Event), earthquakes, riots or civil commotion;

(ii) failure by any statutory undertaker, utility company, or other like body to carry out works or provide services;

(iii) any accidental loss of or damage to a material part of the System;

(iv) any failure or shortage of power or fuel;

(v) any blockade or embargo which does not constitute a Force Majeure Event; or

(vi) any official or unofficial strike, lockout, go-slow or other industrial dispute and generally affecting the public transport industry in Scotland or a significant part thereof;

(b) at any time during the Service Period or during Project Phase C2 the exercise by CEC or a Roads Authority of any authority to close or restrict roads or streets pursuant to their powers under the Road Traffic Regulation (Special Events) Act 1994 or other Legislation;

where such occurrence materially and adversely affects the Operator's performance of its obligations in the operation of the System.

"Reporting Period" means a period of 28 days provided that:

(i) the first such period during the Term shall commence on the Service Commencement Date of the first Line to become operational;

(ii) the first such period in the Term may be varied by up to 7 days by notice from **tie** to the Operator;

(iii) each such period shall start on the day following the last day of the preceding such period; and

(iv) the last such period during the Term shall end on the Expiry Date or termination of this Agreement;

"Required Insurances" means the insurances set out in Part 1 of Schedule 10 (*Required Insurances*) and such other insurances as the Operator itself may be required from time to time to maintain by Law

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or may be required from time to time by **tie** as a **tie** Change to take out and maintain in respect of the Project Development Services and Project Operations;

"Reset Decision Date" has the meaning given to it under Clause 21 (*Reset of the Fixed Costs, the Target Operating Costs and the Target Revenue*) of the Operating Appendix;

"Responding Party" has the meaning given to it in paragraph 5.2 of Schedule 7 *(Dispute Resolution Procedure)*;

"Retention" means the sums calculated in accordance with Clauses 15.5 and 17.3 as appropriate;

"Revenue Foregone" shall mean the Patronage Revenue foregone by the Operator by reason of passengers being permitted to travel pursuant to the Concessionary Travel Scheme instead of purchasing the normal appropriate ticket, the amount of such Patronage Revenue foregone being calculated in accordance with the terms and conditions of such Concessionary Travel Scheme;

"Review Procedure" means the procedure set out in Schedule 9 (*Review Procedure*);

"Roads" has the meaning given to it in the RA 1984;

"Roads Authority" has the meaning given it under RA 1984 and, where appropriate, shall include any parties responsible for private roads;

"RPIX" means the general index of retail prices for all items excluding mortgage interest payments (Office of National Statistics: Series Identifier: CHMK) as published or any replacement thereof or, in the event such index ceases to exist, such other similar index as the Parties shall agree from time to time (or, if the Parties cannot so agree, as determined under the Disputes Resolution Procedure on the referral of either Party) provided that, if the basis of computation of such index shall have changed between the two relevant months, any official reconciliation between the two bases of computation published by a United Kingdom government department shall be binding on the Parties and, in the absence of such official reconciliation, such adjustment shall be made to the figure of such index for the second of those months to make it correspond as nearly as possible to the method of computation for the first of those months and such adjusted figure shall be considered for the purpose of this Agreement to the exclusion of the actual published figure;

"Scottish Private Bill(s)" means the enabling legislation promoted by **tie** and/or CEC pursuant to the relevant Scottish Parliamentary process granting the permanent legal authority to fund, construct, operate and maintain the Edinburgh Tram Network;

"Second Party" shall have the meaning given in Clause 3.3;

"Security Interest" means any mortgage, pledge, lien, hypothecation, security interest or other charge or incumbrance or any other agreement or arrangement having substantially the same economic effect and includes any Security as defined in section 248(b) of the Insolvency Act 1986;

"Security Management Plan" means the plan referred to in paragraph 26.14 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

"Service Commencement" means, in respect of each Line or Network Expansion, the commencement of the Transport Services on such Line or Network Expansion;

"Service Commencement Date" means, in respect of each Line or Network Expansion, the date specified in the Certificate of Service Commencement in respect of that Line or Network Expansion;

"Service Integration Plan" means the plan referred to in paragraph 12 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance the terms of this Agreement;

"Service Period" means the period:

(a) in respect of any Line or Network Expansion, from (and including) the Service Commencement Date in respect of that Line or Network Expansion;

(b) until (and including) the earlier of the Expiry Date and the Termination Date;

"Service Quality Report" means the report to be submitted by the Operator pursuant to Clause 12 (*Service Performance and Quality Monitoring*) of the Operating Appendix in the form developed and containing the information agreed by the Parties in accordance with the Project Development Output Specification and the Operating Output Specification;

"Shareholders" means any person from time to time holding share capital in the Operator;

"Snagging Notice" means the notice to be issued by **tie** to the Operator, which shall specify Operator Snagging Matters;

"Special Event" means any event:

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(i) notified by **tie** to the Operator pursuant to Clause 8 (*Special Events*) of the Operating Appendix which will, or may, affect the Project Operations; or

(ii) notified by the Operator to **tie** pursuant to Clause 8 (*Special Events*) of the Operating Appendix which the Operator considers requires an amendment to the Project Operations (including, without limitation, the Timetable), and which **tie** agrees;

"Special Event Notice" means a notice to be given by (i) **tie** to the Operator or (ii) the Operator to **tie**, in either case pursuant to the terms of Clause 8 (*Special Events*) of the Operating Appendix;

"Special Event Plan" means a plan to be produced by the Operator and forwarded to **tie** pursuant to the terms of Clause 8.3 (*Special Events*) of the Operating Appendix;

"Specially Written Software" means programs which are written by or on behalf of the Operator specifically to enable the Operator to carry out its obligations under this Agreement;

"STAG II Approval" means approval under part II of the Scottish Transport Appraisal Guidance (as such guidance may be amended from time to time);

"Staffing Information" has the meaning given to it in Clause 41.10;

"Submitted Item" has the meaning given to it in paragraph 1.2 of Schedule 9 (*Review Procedure*);

"Successor Operator" means any person notified by **tie** to the Operator as having been, or intended to be, appointed to operate and/or maintain the System following termination or expiry of this Agreement;

"System" means the light rail transit system to be developed pursuant to this Agreement and the Trams, Infrastructure and Equipment, plant, machinery, apparatus, equipment, furniture, street furniture and facilities, track, station and Tramstop structures and platforms, Depots , Control Centre, electrical sub-stations, overhead line equipment (including bases and poles, building fixings, catenaries and wiring), closed circuit television system, signalling system and spares and consumables and offices and office furniture and office equipment in such offices and other items to be provided in accordance with the Operating Appendix or used by the Operator to perform its obligations under the Operating Appendix;

"System Integration Plan" means the plan referred to in paragraph 26.17 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

"System Land" is the land:

(a) on which the Project Operations are carried out;

(b) which is maintained by the Infrastructure Provider(s); and/or

(c) which is impacted upon as a result of the Project Operations or the provision of the Transport Services;

"Systems Assurance Plan" means the plan referred to in paragraph 26.12 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

"Target Costs for Project Phase C2" means the target costs numbered "6" in the tables included in the Base Case Assumptions and such other costs as **tie** and the Operator may agree from time to time should be treated as "Target Costs for Project Phase C2"; which are estimated to be expended in regard to the performance of the Project Development Services to conclusion of Project Phase C2 as developed during Project Phase A from the Base Case Assumptions, the Financial Proposals, the Operator Financial Model and the Project Development and Operating Costs, and agreed by the Parties prior to the completion of Project Phase B which shall be Indexed and may otherwise be adjusted from time to time in accordance with this Agreement ;

"Target Operating Costs" means the annual target costs numbered "6" in the tables included in the Base Case Assumptions and such other costs as **tie** and the Operator may agree from time to time should be treated as "Target Operating Costs"; which are estimated to be incurred by the Operator during Project Phase D as developed from the Base Case Assumptions, the Financial Proposals, the Operator Financial Model and the Project Development and Operating Costs, and agreed by the Parties prior to completion of Project Phase B which shall be Indexed and may otherwise be adjusted from time to time in accordance with this Agreement provided that where there is a time interval between the Service Commencement Date and the Full Service Commencement Date for a Line, the Target Operating Costs for the System (including such Line) for such period shall be the Interim Target Operating Costs;

"Target Revenues" means the annual target revenues estimated to be generated by operation of the System (as collected by the Operator) as set by the Joint Revenue Committee to be included in the Financial Proposals and the Operator Financial Model and as may be adjusted from time to time in accordance with this Agreement provided that where there is a time interval between the Service

Commencement Date and the Full Service Commencement Date for a Line, the Target Revenues for the System (including such Line) for such period shall be the Interim Target Revenues;

"Tax" means any kind of tax, duty, levy, imposition, assessment or other charge (other than VAT) whether or not similar to any in force at the Effective Date and whether imposed by a local, governmental authority or other Relevant Authority in the United Kingdom or elsewhere;

"Temporary Roads Change" means a Relevant Roads Change which persists for less than 3 months;

"Term" means the period from (and including) the Effective Date until (and including) the earlier of the Expiry Date and the Termination Date;

"Terminated Line" shall have the meaning given to it in Clause 31.3;

"Termination Date" means 02.00 hours on any date of early termination of this Agreement;

"Termination Notice" means a notice to terminate this Agreement served by either Party in accordance with the terms of this Agreement;

"Testing and Commissioning Plan" means the plan referred to in paragraph 37 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance the terms of this Agreement;

"Third Party Shareholder" means such party nominated by the Operator and approved by **tie:**

"Third Party Software" means programs, the Intellectual Property Rights in which are (a) owned by a third party and (b) used by the Operator to carry out its obligations under this Agreement;

"tie Actual System Surplus" has the meaning given to it in paragraph 23.3 of Schedule 3 to the Operating Appendix *(Project Phase D Payment Mechanism and KPI Regime)*;

"tie Advisers" means the advisers appointed by **tie** in relation to the Edinburgh Tram Network;

"tie Change" means:

(a) a change in the Project Operations proposed by **tie** during Project Phases C1, C2 or Project Phase D;

(b) a truncation of Line 1 and/or Line 2 and/or Line 3 from what was anticipated to form part of the Core Network during any Project Phase;

(c) a change to the Required Insurances during any Project Phase;

(d) a change to the number of Depots (including a change from one to two depots) during any Project Phase;

(e) a **tie** discretionary item numbered "7" in the tables included in the Base Case Assumptions during any Project Phase; and

(f) during any Project Phase, any other change stated to be a **tie** Change in accordance with this Agreement or proposed by **tie** in accordance with this Agreement, which is stated to be considered or treated as a **tie** Change;

which the Operator is obliged to implement under Clause 24 (***tie*** *Changes*) of the Operating Appendix;

"tie Completion Requirements" means the requirements set out in Schedule 2 (***tie*** *Completion Requirements*) to the Operating Appendix;

"tie Customer Satisfaction Survey" means the customer satisfaction survey produced annually (or with such other frequency as may be agreed between the Operator and **tie**) in accordance with Clause 16.4 of the Operating Appendix;

"tie Default" means one of the following events:

(a) an expropriation, sequestration or requisition of a material part of the System and/or shares in the Operator by **tie** or any Relevant Authority;

(b) a failure by **tie** to make payment of any amount of money exceeding £200,000 (Indexed) that is due and payable by **tie** to the Operator under this Agreement, where that amount fell due and payable two (or more) Reporting Periods prior to the date of service of the Termination Notice;

(c) a breach by **tie** of its obligations under this Agreement which substantially frustrates or renders it impossible for the Operator to perform its obligations under this Agreement for a continuous period of 90 days during Project Phases A, B, C and/or D; or

(d) a breach by **tie** of Clause 43 (*Assignation, Sub-Contracting and Changes in Control*);

"tie Full Service Notice" means a notice to be given by **tie** to the Operator pursuant to the terms of Clause 8.7 of the Operating Appendix;

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"tie Inspectors" means the inspectors appointed by **tie** for the purposes set out in Clause 17.3 of the Operating Appendix;.

"tie Notice of Change" means a notice served by **tie** pursuant to Clause 24.1 of the Operating Appendix, setting out the matters specified in Clause 24.2 of the Operating Appendix;

"tie Party" means the **tie** Advisers or any of **tie**'s agents, contractors and sub-contractors of any tier and its or their directors, officers and employees but excluding the Operator, any Operator Party and statutory undertakers and utilities;

"tie Project Manager" shall have the meaning given to it in Clause 6.1;

"tie Target System Surplus" has the meaning given to it in paragraph 23.2 of Schedule 3 to the Operating Appendix *(Project Phase D Payment Mechanism and KPI Regime)*;

"Timetable" means:

i) subject to paragraph (ii), the timetable of all Transport Services to be run on the System, such Timetable to be agreed between **tie** and the Operator during Project Phase C2, and amended from time to time in accordance with this Agreement;

ii) in respect of any day when a Special Event Plan is in effect, the revised Timetable specified in such Special Event Plan, if different to the Timetable referred to in paragraph (i) or if an unscheduled Special Event such Timetable as the Operator can reasonably provide;

"Training Plan" means the plan referred to in paragraph 26.7 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance the terms of this Agreement;

"Tram" means any vehicle (whether or not used for the carriage of passengers) carried on flanged wheels along the rails of a Tramway;

"Tram Business" means the business of providing the Project Operations;

"Tramstop" means the places (including termini) at which fare paying passengers are permitted to board and/or leave Trams;

"Tramway" means a system of transport used wholly or mainly for the carriage of passengers and employing parallel rails which provide support and guidance for vehicles carried on flanged wheels;

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"Transfer Date" has the meaning given to it in Clause 41.2;

"Transferring Project Staff" has the meaning given to it in Clause 41.1;

"Transport Services" means the public passenger transport services to be provided by the Operator on the System (or any part thereof) in accordance with the Operating Appendix;

"Treaty of European Union" means the Treaty of Rome of 25 March 1957, as amended by the Single European Act 1986 and the Maastricht Treaty (which was signed at Maastricht on 7 February 1992 and came into force on 1 November 1993), as amended from time to time;

"Trial Run Validation Plan" means the plan referred to in paragraph 26.4 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance the terms of this Agreement;

"TUPE" means the Transfer of Undertakings (Protection of Employment) Regulations 1981;

"Underperformance Points" means points allocated for poor performance in accordance with the model to be developed by the parties during Project Phases A and B into Schedule 12 (*Performance Scoring*) ;

"Uninsurable" means that:

(a) insurance is not available to the Operator in respect of the Project in the European insurance market with reputable insurers of good standing in respect of that matter; or

(b) the insurance premium payable for insuring that matter is at such a level that such matter is not generally being insured against in the European insurance market with reputable insurers of good standing;

"UTC" means the urban traffic control systems and monitoring functions operated by CEC or other Roads Authority (as appropriate);

"VAI" means Vision Achievement Incentive;

"Variation" means a **tie** Change or an Operator Change;

"VAT" means any value added taxes;

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"Vision Achievement Incentive" means the incentive payment for sustained superior performance of Project Operations over a Vision Period as calculated in accordance with Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) of the Operating Appendix;

"Vision Period" has the meaning given to it in paragraph 23.6 of Schedule 3 *(Project Phase D Payment Mechanism and KPI Regime)* to the Operating Appendix;

"Year" means each period beginning on 1 April and ending on the following 31 March, where any part of such period is during the Term.

2. In this Agreement, except where the context otherwise requires:

2.1 words importing gender include masculine, feminine and neuter;

2.2 the singular includes the plural and vice versa;

2.3 a reference to any part, Clause, sub-clause or Schedule is, except where it is expressly stated to the contrary, a reference to such part, Clause or sub-clause of or Schedule to this Agreement;

2.4 a reference in any Schedule to any part, paragraph or sub-paragraph is, except where it is expressly stated to the contrary, a reference to such part, paragraph or sub-paragraph of that Schedule (as the case may be);

2.5 for the avoidance of doubt, any reference to this Agreement shall be interpreted as including the Operating Appendix;

2.6 any reference to this Agreement or to any other document shall include any variation, amendment, or supplement to such document expressly permitted under the terms of this Agreement;

2.7 any reference to any enactment, order, regulation or other similar instrument (including any EU instrument) (whether specifically named or not) shall be construed as a reference to the enactment, order, regulation or instrument as amended, replaced, consolidated or re-enacted and shall include any orders, consents, regulations, legally binding codes of practice or subordinate legislation (within the meaning of section 21(1) of the Interpretation Act 1978) made thereunder;

2.8 a reference to a person includes individuals, firms, partnerships, bodies corporate, joint ventures, government departments and any organisation capable of suing or

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being sued and references to any of the same include the others and their successors and assignees and transferees to the extent that such assignment and transfer are expressly permitted under the terms of this Agreement;

2.9 headings and the contents list are for convenience of reference only and do not affect the interpretation of this Agreement;

2.10 the ejusdem generis rule does not apply and the meaning of general words is not to be restricted by any particular examples preceding or following those general words;

2.11 a reference to a time of day is a reference to the time in Scotland;

2.12 subject to the restrictions imposed by this Agreement on subcontracting, an obligation to do something includes an obligation to procure it to be done;

2.13 an obligation not to do something includes an obligation not to wilfully allow it to be done;

2.14 the word "including" means "including without limitation"; and

2.15 a reference to "consent" shall mean consent in writing.

3. This Agreement shall be interpreted and construed as a whole provided that in the event of any inconsistency or conflict between the main body of this Agreement and/or the Schedules and/or the appendices, then:

3.1 the main body and the Operating Appendix shall prevail to the extent of any such conflict or inconsistency over the Schedules; and

3.2 **tie** and the Operator shall agree which of the Schedules shall prevail to the extent of any such conflict or inconsistency between the Schedules.

[redacted]

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

.....[redacted].....

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

This is Schedule 2 referred to in the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 2

Project Development Output Specification

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1. OVERALL SYSTEM REQUIREMENTS

1.1 The System shall be an electrically powered light rail system using Trams to carry passengers and may include all or any of the following Lines:

1.1.1 Line 1;

1.1.2 Line 2;

1.1.3 Line 3; and

1.1.4 any Network Expansion

1.2 **tie**'s overall requirements of the System are that it shall facilitate the achievement of the Project Vision and be:

1.2.1 safe and secure;

1.2.2 reliable;

1.2.3 attractive;

1.2.4 delivered within the Affordability Limits;

1.2.5 affordable for passengers;

1.2.6 efficient;

1.2.7 environmentally acceptable;

1.2.8 sustainable;

1.2.9 easy for passengers to use;

1.2.10 accessible to all including mobility impaired passengers;

1.2.11 able to provide a minimum level of service specified by **tie**;

1.2.12 able to support the policy, planning and system aspirational objectives of the City of Edinburgh Council;

1.2.13 integrated with other transport modes;

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1.2.14 capable of Network Expansions; and

1.2.15 able to project a System wide high quality brand image.

1.3 **tie** requires that operation of the System shall reflect a high standard of presentation and public image and that the System shall be operated efficiently with minimum disturbance to the public and minimum delay to passengers.

1.4 All aspects of the operation of the System shall take account of the need to react safely and quickly to emergencies.

1.5 The System shall incorporate such staffing, surveillance and alarm equipment as is appropriate to ensure the safety of the public, especially lone and mobility impaired travellers.

1.6 **tie** requires that the System shall be capable of responding to any Network Expansion and increased ridership resulting from such Network Expansion without adverse impact on quality.

1.7 The System shall be constructed, maintained and operated in accordance with Good Industry Practice at all times and in accordance with the Law.

2. PROJECT DEVELOPMENT OBJECTIVES

The objectives of **tie** and the Operator during Project Phase A, Project Phase B and Project Phase C in respect of each Line shall be to:

2.1 develop a System that complies with the requirements set out in paragraph 1 above;

2.2 promote the Enabling Legislation for each Line through the Scottish Private Bill parliamentary process;

2.3 procure all Necessary Consents, all works, Trams, Infrastructure and Equipment, services and supplies and to secure all funding and insurance required for the design, construction, funding, operation and maintenance of the Core Network:

2.3.1 in accordance with the Partnering Methodology and Programme, and the Project Programme;

2.3.2 in accordance with the terms of the Agreement including this Project Development Output Specification, the Operating Appendix, the Operating Output Specification,

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the Operating Method Statements, the Environmental Statements for each Line and the Design Manual, as amended from time to time in accordance with this Agreement;

2.3.3 within the Affordability Limits;

2.3.4 in relation to the Operator's operating expenditure, at no greater aggregate cost to **tie** than as projected in the Operator Financial Model; and

2.3.5 in accordance with the Law and Good Industry Practice;

2.4 develop the technical definition of the Project including, without limitation, the Infrastructure and Equipment Output Specification for the procurement of Infrastructure and Equipment for each Line, and in particular:

2.4.1 to jointly review the technical work carried out by the **tie** Advisers for Line 1, Line 2 and Line 3 prior and subsequent to the Effective Date;

2.4.2 where necessary to refine the Operator's forecasts of operating expenditure as set out in the Operator Financial Model;

2.4.3 to identify network effects through co-operation with the **tie** Advisers carrying out the Network Effects Study;

2.4.4 to carry out work required to achieve the integration of the Project with existing transport operators in Edinburgh;

2.4.5 to engage with relevant regulatory authorities regarding Project Phase D for each Line;

2.4.6 to examine innovative contractual arrangements for the interface between operation and maintenance of the Core Network;

2.4.7 to ensure that System design and operational methods take into account Good Industry Practice with regard to urban traffic control;

2.4.8 to validate the demand / revenue forecasts produced by the **tie** Advisers; and

2.4.9 to ensure System and network integration.

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2.5 develop and implement the terms of coordination arrangements with local bus operators regarding bus-tram integration, including integrated ticketing, and to ensure that such arrangements comply with the Law;

2.6 to develop and refine the Target Costs for Project Phase C2 and the Target Operating Costs in accordance with paragraph 7 below; and

2.7 to assist the Joint Revenue Committee to set the Target Revenues.

3. DELIVERY OF INFRASTRUCTURE AND EQUIPMENT

3.1 Subject to the passage of the Enabling Legislation referred to in relation to Project Phase A in respect of the relevant Line, the satisfaction of the **tie** Affordability Limits, the successful development of the Infrastructure and Equipment Output Specification pursuant to Project Phase B, and any termination rights of either Party under this Agreement, **tie** shall procure the Infrastructure and Equipment for each Line through one or more Infrastructure Providers.

3.2 In relation to the design of the System, **tie** is committed to the provision of a System which is, as far as possible, in harmony with its surroundings. Central Edinburgh is designated as a World Heritage Site and it is essential that intrusion is minimised and that opportunities for enhancement are realised. The quality of the Infrastructure and Equipment design and construction is a critical factor in achieving this objective.

3.3 A Design Manual is under development by CEC, **tie** and the **tie** Advisers which will consider, amongst other factors, the following:

3.3.1 power provision and its means of support:

- preference to fix to buildings;
- lightweight support systems, minimising visual impact;
- multi-function support systems to combine overhead line equipment with street lighting or signing;
- design of masts;
- location and spacing of masts;

- use of central supports on two-line sections;
- ground fixings; and
- screening by landscape.

3.3.2 Station design:

- location in relation to passenger convenience and existing features and buildings;
- quality of structural design to realise all necessary functions (shelter, seating, information systems, security needs, etc) in a simple structure;
- choice of materials and finishes;
- maintenance issues;
- signage and street furniture;
- access;
- colour schemes; and
- advertising.

3.3.3 Track layouts:

- choice of surface materials to distinguish primary uses;
- opportunities for urban enhancement;
- use of grass-ballasted track;
- treatment of level changes; and
- use of landscape/planting to minimise impact.

3.4 Whilst providing advice related to Infrastructure and Equipment Output Specification during Project Phase A or Project Phase B, or at any other time during the Term, the Operator shall at all times take into consideration the objectives of the Design Manual and its underlying

purpose. The Operator shall, where appropriate, from time to time recommend for consideration by **tie** and the **tie** Advisers amendments or additions to the Design Manual.

3.5 Similarly, when developing the Operating Method Statements for the System, the Operator shall endeavour to minimise any adverse impact of the System on the general quality of life in Edinburgh whilst maintaining Transport Services of the requisite quality and reliability.

3.6 As regards advertising on the System, pursuant to Clause 15 (*Advertising*) of the Operating Appendix, there shall be no advertising permitted on or in any of the Trams and/or the Tramstops nor at any other location on the System. These instructions will also be encompassed within the Design Manual in respect of advertising and graphic design at Tramstops and on Trams. The Design Manual will reflect **tie**'s policies and requirements current during Project Phase A and Project Phase B. Such policies may be subject to amendment at any time after Project Phase B pursuant to Clause 24 (***tie** Changes*) or Clause 25 (*Operator Changes*) of the Operating Appendix.

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PROJECT PHASE A

Development

4. INTRODUCTION

4.1 The primary objective of **tie**, the **tie** Advisers and the Operator during Project Phase A in respect of any Line shall be to promote the Enabling Legislation for that Line through the Scottish Private Bill parliamentary process.

4.2 The Project Development Services to be provided by the Operator during Project Phase A in respect of each Line are intended to coincide with the other activities of **tie** directed towards promoting the Enabling Legislation for that Line through the Scottish Private Bill parliamentary process.

4.3 As at the Effective Date, it is possible that:

4.3.1 the Enabling Legislation for each Line will be promoted separately, on a sequential basis, through the Scottish Private Bill parliamentary process; or

4.3.2 the Enabling Legislation for two of the Lines will be promoted together through the Scottish Private Bill parliamentary process, with the other Line being promoted separately.

4.4 Whichever option described in paragraph 4.3 is chosen by **tie**:

4.4.1 the **tie** Advisers will prepare, with support from the Operator to the extent requested by **tie**, technical and financial information in respect of each Line separately or in any combination of Lines, in support of the promotion of the Enabling Legislation;

4.4.2 the Transport Services on the System will be operated by a single operator with incremental expansion of the System as relevant approvals and funding are obtained; and

4.4.3 part only or combination of parts of the Lines may be authorised.

5. PROJECT DEVELOPMENT ACTIVITIES DURING PROJECT PHASE A

5.1 **tie** has commissioned individual studies by the **tie** Advisers to investigate each of the Lines comprised in the Core Network. Each of these studies considers each Line in isolation. **tie** has also commissioned a study to determine the effects on costs and revenues of operating

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all the Lines together as a single network ("**Network Effects Study**"). These studies have provided, or will provide, documentation to support the promotion of the Enabling Legislation for each Line through the Scottish Private Bill parliamentary process including:

5.1.1 plans and sections;

5.1.2 a book of reference;

5.1.3 an estimate of the operating costs and revenue for each Line (on a stand alone basis), based upon the Development Assumptions;

5.1.4 estimates of the network effects for operating costs and revenues for different combination of Lines, based upon the Development Assumptions;

5.1.5 an estimate of the capital costs for each Line; and

5.1.6 relevant documentation to obtain STAG II Approval.

5.2 In support of the primary objective for Project Phase A set out in paragraph 4.1 above, the Operator will be expected, during Project Phase A in respect of each Line, to comply with the requirements of paragraphs 5.3 to 5.6 below.

5.3 The Operator shall co-operate with **tie,** the **tie** Advisers and the Joint Revenue Committee in relation to the development and/or refinement of:

5.3.1 the items listed in paragraphs 5.1.1 to 5.1.6 above;

5.3.2 preliminary Target Costs for Project Phase C2, preliminary Target Operating Costs and preliminary Target Revenues;

5.3.3 the Development Assumptions;

5.3.4 the Infrastructure and Equipment Output Specification for the relevant Line;

5.3.5 the Operating Output Specification;

5.3.6 liaison with City of Edinburgh Council, other public transport operators and third parties;

5.3.7 the Network Effects Study; and

5.3.8 the Partnering Methodology and Programme and the Project Programme.

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5.4 If so required by **tie**, the Operator shall advise upon any operational issues or assumptions which may be queried during the passage of the Enabling Legislation for each Line through the Scottish Private Bill parliamentary process. This may include, without limitation:

5.4.1 provision of oral or written expert evidence during the committee hearings and process; and

5.4.2 participation in the management of any objections to, or petitions against implementation of the System and the Transport Services, including the drafting of responses.

5.5 Without prejudice to paragraphs 5.3 and 5.4, the Operator shall:

5.5.1 review **tie**'s financial model and business case and make recommendations as to how the Project can be delivered and funded within the Affordability Limits (or so as to minimise any excess above such Affordability Limits);

5.5.2 provide support to **tie** and the **tie** Advisers in respect of the production and refinement of technical, operating and maintenance designs, specifications and programmes for each Line including system specifications, technical drawings, land plans, sections and other detailed design work required to apply for the Scottish Private Bill(s) and related ancillary statutory authority to implement the Project;

5.5.3 provide support to **tie** and the **tie** Advisers in respect of the preparation of any applications, notices, designs, statements and relevant factual or technical evidence and all other procedures to obtain the Scottish Private Bill(s) and any other Necessary Consents required for the Project;

5.5.4 provide support to **tie** and the **tie** Advisers in respect of discussions and negotiations and the conclusion of any undertakings, agreements or other commitments with third parties as may be necessary or desirable to remove any objections to the Project or to secure the grant of any Necessary Consents or otherwise facilitate the construction, installation, operation and maintenance of any of the proposed Lines in the Core Network. Such third parties may include, in particular (i) owners or occupiers of land required for or potentially affected by the Project, (ii) Network Rail and statutory undertakers and (iii) key stakeholders or influencers;

5.5.5 provide assistance to **tie** in negotiating developer or other local contributions to the Project;

5.5.6 provide an Inception Report to **tie** within 60 days of the Effective Date based on the outline partnering methodology and programme prepared by the Operator during the tender process leading to the execution of this Agreement, and **tie** and the Operator shall agree the Partnering Methodology and Programme taking account of such Inception Report; and

5.5.7 provide support to **tie** and the **tie** Advisers in respect of the development of the programme for works required in connection with the construction and installation of any Line and the co-ordination of such works with any roads, utility, development or other works or projects in the vicinity of that Line;

5.6 The extent of the support and assistance to be provided by the Operator in respect of each of the matters set out in paragraphs 5.3 to 5.5 above will be determined from time to time by **tie**.

6. OPERATOR'S PROJECT DEVELOPMENT RESOURCES DURING PROJECT PHASE A

In addition to the Operator's Project Manager appointed pursuant to Clause 6.7 of the Agreement, the Operator's Core Team shall include the resources set out in the Project Development and Operating Costs during Project Phase A:

7. DEVELOPMENT OF PRELIMINARY TARGET OPERATING COSTS, PRELIMINARY TARGET REVENUES, PRELIMINARY TARGET COSTS FOR PROJECT PHASE C2, FIXED COSTS AND DEVELOPMENT ASSUMPTIONS

7.1 The starting point for the development of the preliminary Target Costs for Project Phase C2, the preliminary Target Operating Costs, the Fixed Costs (excluding the Category One Fixed Costs and the Category Five Fixed Costs) and preliminary Target Revenues will be:

7.1.1 the information in the Financial Proposals, the Operator Financial Model, the Project Development and Operating Costs, in relation to (i) the costs for Project Phase C2, and (ii) operating costs for Phase D, and the indicative revenue forecasts prepared by the Joint Revenue Committee; and

7.1.2 the Development Assumptions prepared by the **tie** Advisers.

7.2 **tie**, the **tie** Advisers, and the Operator shall work together in good faith to:

7.2.1 review (and agree any changes to) the Development Assumptions and any methods for calculating the Target Costs for Project Phase C2, the Target Operating Costs, , the Fixed Costs (excluding the Category One Fixed Costs and the Category Five Fixed Costs) where not otherwise agreed and the setting of the Target Revenues by the Joint Revenue Committee; and

7.2.2 develop the Operator Financial Model, the Target Costs for Project Phase C2, the Target Operating Costs and the Fixed Costs (excluding the Category One Fixed Costs and the Category Five Fixed Costs)

7.3 The review and development of the Development Assumptions, the Target Costs for Project Phase C2, the Target Operating Costs and the Fixed Costs (excluding the Category One Fixed Costs and the Category Five Fixed Costs) pursuant to paragraph 7.2 shall take account of any developments agreed between **tie** and the Operator at the relevant time in relation to, without limitation:

7.3.1 the Operating Output Specification; and

7.3.2 the Infrastructure and Equipment Output Specification in respect of each Line.

7.4 The Operator and **tie** shall agree all the major principles in the Development Assumptions by the end of Project Phase A, provided that **tie** and the Operator acknowledge that further minor amendments to the Development Assumptions may be required in Project Phase B as discussed below. Without limitation, the major principles for the purposes of this paragraph 7.4 shall include:

7.4.1 those matters listed in paragraphs 9.1.1 to 9.1.13 below; and

7.4.2 the patronage forecast model prepared by the Joint Revenue Committee and used by the **tie** Advisers, and the principal inputs and assumptions used in such model.

7.5 The Operator and **tie** shall also agree the preliminary Target Costs for Project Phase C2, and the preliminary Target Operating Costs by the end of Project Phase A. The only changes between such preliminary targets, and the final targets to be agreed by the end of Project Phase B shall be those changes resulting from amendments to the Operating Output Specification and Infrastructure and Equipment Output Specification during Project Phase B.

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7.6 All changes to the Financial Proposals, the Operator Financial Model, the Project Development and Operating Costs, the Target Costs for Project Phase C2, and the Target Operating Costs to be discussed by **tie** and the Operator pursuant to this paragraph 7 shall be developed such that the Operator shall be in No Better and No Worse position as a result of the relevant change.

8. DEVELOPMENT OF THE INFRASTRUCTURE AND EQUIPMENT OUTPUT SPECIFICATION

8.1 Prior to the date of this Agreement, or at the commencement of Project Phase A in respect of each Line, the **tie** Advisers will provide to the Operator an outline Infrastructure and Equipment Output Specification for that Line. This outline Infrastructure and Equipment Output Specification will take into account, where necessary and appropriate, the requirements of the Design Manual, which are intended to include, without limitation, proposals in relation to:

8.1.1 operations and Control Centre and stabling facilities;

8.1.2 power supply;

8.1.3 command, control and communications including System Control and Data Acquisition (SCADA) and signalling;

8.1.4 turn-round facilities;

8.1.5 lay-over provision;

8.1.6 vehicles and fleet size;

8.1.7 stop facilities (including ease of physical access between the System and other transport modes wherever interchange opportunities are available);

8.1.8 park-and-ride facilities;

8.1.9 ticket sales points;

8.1.10 public information provisions;

8.1.11 UTC equipment and its compatibility with CEC installations including potential road user charging equipment;

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8.1.12 whole-life costs;

8.1.13 security installations; and

8.1.14 capital costs;

8.2 **tie** requires a high standard of reliability in the operation of the Transport Services. Accordingly the Operator shall work together with **tie** and the **tie** Advisers to develop the Infrastructure and Equipment Output Specification in respect of each Line starting from the outline Infrastructure and Equipment Output Specification referred to in paragraph 8.1 and observing the provisions of the Design Manual, to ensure that the Infrastructure and Equipment to be provided pursuant to each Infrastructure Delivery Agreement shall enable the achievement of a high standard of reliability in operation of the Transport Services.

8.3 In carrying out the development under paragraph 8.2, the Operator, **tie** and the **tie** Advisers will use reliability analyses which utilise wherever possible historical operating data from similar equipment.

8.4 The **tie** Advisers will also provide to the Operator draft plans indicating the land required for the construction and/or operation of each Line.

8.5 The Operator will provide comments and support to **tie** and/or the **tie** Advisers in relation to:

8.5.1 the outline Infrastructure and Equipment Output Specification in respect of any Line referred to in paragraph 8.1, and any subsequent drafts of the Infrastructure and Equipment Output Specification developed pursuant to paragraph 8.2; and

8.5.2 the land identified for the Project, in particular the siting of Depots and stabling facilities

taking into account particularly the Operator's reasonable operation requirements to deliver the Operating Output Specification during Project Phase D in respect of the relevant Line.

8.6 The Operator will provide an initial review and comments pursuant to paragraph 8.5 within 60 days of commencement of Project Phase A in respect of the relevant Line, and will provide further reviews and comments in a timely manner throughout Project Phase A.

9. REFINEMENT OF THE OPERATING OUTPUT SPECIFICATION

9.1 The Operator and **tie** may agree amendments to the Operating Output Specification for Project Phase D in respect of each Line. Such amendments shall include any amendments resulting from the refinement of the operating assumptions made by the **tie** Advisers (following comments from the Operator) in respect of at least the following in relation to each Line or combination of Lines:

9.1.1 service patterns and route km;

9.1.2 timetabling;

9.1.3 Tram frequencies;

9.1.4 journey times;

9.1.5 Tram priority at junctions;

9.1.6 carrying capacities;

9.1.7 fleet size;

9.1.8 highway interface / UTC priority;

9.1.9 service integration;

9.1.10 fare structure;

9.1.11 demand, patronage and revenues;

9.1.12 maintenance regimes; and

9.1.13 Operating Costs.

9.2 The amendments to the Operating Output Specification shall take account of, without limitation:

9.2.1 developments arising from the promotion of the Enabling Legislation for the relevant Line through the Scottish Private Bill parliamentary process; and

9.2.2 the development of the Infrastructure and Equipment Output Specification for the relevant Line pursuant to paragraph 8.

9.3 The Operator will provide an initial review and comments pursuant to paragraph 9.1 above within 60 days of commencement of Project Phase A in respect of the relevant Line, and will provide further reviews and comments in a timely manner throughout Project Phase A.

9.4 **tie** and the Operator shall also have preliminary discussions regarding the development of the KPI Regime, taking into account any agreed amendments to the Operating Output Specification. The issues for development as regards the KPI Regime are as set out in paragraph 24 below.

10. NETWORK EFFECTS

10.1 As referred to in paragraph 5.1 above, **tie** has commissioned the **tie** Advisers to conduct the Network Effects Study to investigate the changes in Operating Costs, Operating Revenues and other benefits which would result from operating the Core Network (or combinations of two of the Lines) as a single system rather than as separate Lines. To the extent that this study is still in progress during Project Phase A in respect of any Line, the Operator shall work in conjunction with the study team of the **tie** Advisers and prior to the end of Project Phase A shall review, agree and endorse the major principles of the Development Assumptions made by the **tie** Advisors in respect of the network effects from the operation of two or three of the Lines as a network.

10.2 The review to be carried out by the Operator of the network effects will take into account the reviews to be carried out by the Operator pursuant to paragraphs 8 and 9 for the individual Lines as outlined above and without limitation will cover:

10.2.1 any increase in Operating Revenues resulting from enhanced passenger journey opportunities made possible by the operation of the Lines as part of a network; and

10.2.2 any reduction in Operating Costs as a result of synergies made possible by the operation of the Lines as part of a network.

11. LIAISON WITH CITY OF EDINBURGH COUNCIL AND OTHERS

11.1 The Operator shall, in consultation with **tie**, manage arrangements and reach agreements with CEC and others (including police and emergency services) with respect to any operational aspects of the interface with roads, railways or properties in the proximity of the System, including:

11.1.1 safety in operations;

11.1.2 impact of and response to System failures, breakdowns, etc.;

11.1.3 interface with Network Rail and train operators;

11.1.4 design and construction of on-street Tramway;

11.1.5 actions consequential on obstruction of the System resulting in disruption to the Transport Services;

11.1.6 maintenance of shared facilities including roadway, pavement, verges, etc.

11.1.7 maintenance of road/tram signals; and

11.1.8 access arrangements

and such arrangements and agreements shall be subject to approval by **tie** and shall be incorporated into the Operations Management Plan to be developed in Project Phase B and Project Phase C.

12. LIAISON WITH OTHER PUBLIC TRANSPORT OPERATORS

12.1 The Operator shall keep itself fully informed of the policies, strategies and plans being promoted and implemented by CEC and any other relevant Local Authority in respect of transport and their integration with other policies such as health, safety and environment.

12.2 Taking account of the policies, strategies and plans being referred to in paragraph 12.1, the Operator will engage with other transport operators including but not exclusively bus operators, Scotrail and other train operators and British Airports Authority, with the objective of maximising use of public transport and increasing mode transfer from the private car. The operators of any park-and-ride facilities near but not directly related to the Tram operations should also be consulted.

12.3 Building upon the discussions with other public transport operators conducted by the Operator prior to the Effective Date, the Outline Service Integration Plan and the discussions with other transport operators pursuant to paragraph 12.2, the Operator shall develop the Service Integration Plan through which the Transport Services will complement and dovetail with other public transport services in Edinburgh and any areas outside Edinburgh served by the Transport Services. This process shall, whenever possible, include appropriate agreements with transport operators to support these objectives.

12.4 Matters to be addressed by the Service Integration Plan will cover, but not exclusively, the following:

12.4.1 operating timetable;

12.4.2 hours of operation;

12.4.3 journey times;

12.4.4 service integration (the Tram System as part of a wider public transport system);

12.4.5 competition;

12.4.6 Special Events planning;

12.4.7 interchange facilities;

12.4.8 ticketing arrangements;

12.4.9 maintenance of shared facilities; and

12.4.10 incident management and provision of alternative service

12.5 The Service Integration Plan shall be based on the following principles:

12.5.1 ease of physical access between the System and other transport modes shall be facilitated wherever interchange opportunities are available;

12.5.2 wherever practicable, publicity, particularly timetable and fares information shall be presented in a common format by the Operator and other public transport operators;

12.5.3 wherever practicable, public transport operators shall be required to advertise other operators' services within their timetables where these form a complementary element of the local public transport network; and

12.5.4 subject to compliance with the Law, the Operator shall use its best endeavours to implement, with other public transport operators, and in a manner consistent with CEC's transport strategies, timetable coordination measures. These may include coordination of feeder buses and train services with the Transport Services and late night or last Tram services departing from Haymarket or Waverley stops providing advertised connections from arriving main line services.

12.6 In relation to the ticketing arrangements referred to in paragraph 12.4.8 above, the Operator shall develop and agree with **tie** and other public transport operators measures for promoting integrated ticketing (through One Ticket or its successor ticket nominated by **tie**);

12.7 The Service Integration Plan shall be regularly refined as the System is further developed during Project Phases B, C and D. Any amendments to the Service Integration Plan during Project Phase C or Project Phase D shall be subject to Schedule 9 (*Review Procedure*).

12.8 The Operator shall assist and co-operate with the Joint Revenue Committee in the modelling of any impacts on revenue in the development of the Service Integration Plan.

13. INTEGRATION COMPLIANT WITH LAW

13.1 The Operator shall be responsible for ensuring that its plans for and agreements with operators to deliver integration of the Transport Services with bus and train operations in Edinburgh in accordance with the Service Integration Plan (as amended from time to time) are compliant with Law, including competition law.

13.2 The Operator shall keep **tie** informed from time to time of all actions being taken by the Operator to ensure compliance with paragraph 13.1, including the views of regulatory authorities and the provision of copies of any legal advice obtained by the Operator in relation to the impact of competition law on the proposed Service Integration Plan.

14. GATEWAY FROM PROJECT PHASE A TO PROJECT PHASE B

14.1 Subject to paragraph 14.2, the Operator will notify **tie** when the Operator considers that it has completed each of the tasks to be carried out pursuant to Project Phase A in respect of a Line and that all matters to be agreed during Project Phase A have been agreed between the Operator and **tie**. If **tie** agrees that all of such tasks have been completed and/or relevant matters agreed, **tie** shall notify the Operator that Project Phase B shall commence in respect of that Line.

14.2 **tie** and the Operator acknowledge that the parliamentary process in relation to the Scottish Private Bill(s) (including obtaining Royal Assent to the Scottish Private Bills(s)) may take considerably longer than the other tasks to be carried out pursuant to Project Phase A in respect of a Line. Accordingly, the Operator may give notice to **tie** pursuant to paragraph 14.1 when the Operator considers that:

14.2.1 each of the tasks to be carried out pursuant to Project Phase A in respect of the relevant Line has been completed (other than obtaining the Royal Assent to the Scottish Private Bills(s)) and that all matters to be agreed during Project Phase A have been agreed between the Operator and **tie**; and

14.2.2 the progress of the parliamentary process in relation to the Scottish Private Bill(s) is such that it is reasonable (having regard to the Project Programme) to commence the Project Development Services under Project Phase B.

14.3 If following a notice under paragraph 14.2, **tie** agrees that (i) all of such tasks have been completed (other than obtaining the Royal Assent to the Scottish Private Bills(s)) and/or relevant matters agreed, and (ii) it is reasonable (having regard to the Project Programme) to commence the Project Development Services under Project Phase B:

14.3.1 **tie** shall notify the Operator that Project Phase B shall commence in respect of that Line by issuing a PPCN; and

14.3.2 the Operator shall continue to provide the Project Phase A Project Development Services in respect of support for the parliamentary process in relation to the Scottish Private Bill(s) until the Royal Assent to such bill(s) is obtained.

14.4 Following a notice from the Operator pursuant to paragraph 14.1 or 14.2, to the extent that **tie** considers that any relevant task has not been completed by the Operator and/or relevant matter agreed, **tie** will notify the Operator accordingly, including details of the further activities to be carried out by the Operator in order to complete such task.

14.5 During Project Phase A , **tie** may, in its sole discretion, give two weeks notice to the Operator that Project Phase B shall commence in respect of any Line, and in such circumstances:

14.5.1 **tie** may direct that some or all of the Project Phase B Project Development Services shall be commenced; and

14.5.2 the Operator shall continue to provide the Project Phase A Project Development Services in respect of that Line until (i) the relevant tasks have been completed, and (ii) all matters to be agreed during Project Phase A have been agreed between the Operator and **tie**, or until **tie** otherwise directs.

PROJECT PHASE B

Procurement of the Infrastructure and Equipment

15. INTRODUCTION

The primary objectives of **tie**, the **tie** Advisers and the Operator during Project Phase B in respect of any Line shall be to:

15.1 finalise the Infrastructure and Equipment Output Specification in respect of that Line;

15.2 conduct a competition to appoint the Infrastructure Provider, including the execution of the Infrastructure Delivery Agreement, in respect of that Line;

15.3 agree:

15.3.1 the Operating Output Specification for Project Phase D in respect of that Line (such Operating Output Specification for Project Phase D to also relate to the operation of that Line as a network with any Line already operational at the relevant time);

15.3.2 the Target Costs for Project Phase C2 in respect of that Line; and

15.3.3 the Target Operating Costs to take effect at the commencement of Project Phase D in respect of that Line.

15.4 agree any other amendments to the Operating Appendix consequential on the terms of the Infrastructure and Equipment Output Specification and the Infrastructure Delivery Agreement in respect of that Line;

15.5 obtain final funding approval from the Scottish Executive in respect of that Line and conclude any contracts for the provision of funding by CEC local development contributions; and

15.6 co-operate with and assist **tie**, the **tie** Advisers and the Joint Revenue Committee in relation to the development and/or refinement of the patronage forecast model and the setting of Target Revenue

16. PROJECT DEVELOPMENT ACTIVITIES DURING PROJECT PHASE B

16.1 In support of the primary objectives for Project Phase B set out in paragraph 15 above, the Operator will be expected, during Project Phase B in respect of each Line, to comply with the requirements of paragraphs 16.2 to 16.4 below.

16.2 The Operator shall co-operate with **tie** and the **tie** Advisers in support of the primary objectives for Project Phase B set out in paragraph 15 above, including in relation to:

16.2.1 any refinements to the Development Assumptions agreed between the Operator and **tie** in Project Phase A, and the agreement of any such refinements;

16.2.2 the further development and subsequent finalisation of the Infrastructure and Equipment Output Specification and the terms of the IDA for the relevant Line;

16.2.3 the procurement process in relation to the IDA for the relevant Line, including the evaluation of bids and the subsequent appointment of the Infrastructure Provider for the relevant Line;

16.2.4 the further development and subsequent agreement of the Operating Output Specification;

16.2.5 the further development and subsequent agreement of the Target Costs for Project Phase C2; and

16.2.6 the further development and subsequent agreement of the Target Operating Costs.

16.3 Without prejudice to paragraphs 16.2, the Operator shall:

16.3.1 review **tie**'s financial model and business case and make recommendations as to how the Project can be delivered and funded within the Affordability Limit (or so as to minimise any excess above such Affordability Limit);

16.3.2 provide support to **tie** and the **tie** Advisers in respect of the preparation of any applications, notices, designs, statements and relevant factual or technical evidence and all other procedures to obtain any Necessary Consents required for the Project;

16.3.3 provide support to **tie** and the **tie** Advisers in respect of discussions and negotiations and the conclusion of any undertakings, agreements or other commitments with third parties as may be necessary or desirable to remove any objections to the

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Project or to secure the grant of any Necessary Consents or otherwise facilitate the construction, installation, operation and maintenance of any of the proposed Lines in the Core Network. Such third parties may include, in particular (i) owners or occupiers of land required for or potentially affected by the Project, (ii) Network Rail and statutory undertakers, (iii) key stakeholders or influencers;

16.3.4 provide assistance to **tie** in negotiating developer or other local contributions to the Project;

16.3.5 provide support to **tie** and the **tie** Advisers in respect of the development of the programme for works required in connection with the construction and installation of any Line and the co-ordination of such works with any roads, utility, development or other works or projects in the vicinity of that Line; and

16.3.6 provide support to **tie** and the **tie** advisers in respect of the commissioning by **tie** of a system operational model of a form and extent to be agreed. The Operator shall provide all information related to Project Operations to facilitate specification and execution of such model

16.4 The extent of the support and assistance to be provided by the Operator in respect of each of the matters set out in paragraph 16.2 or 16.3 will be determined from time to time by **tie**.

16.5 Further to paragraph 16.3.6 above, **tie** shall procure a system operational model and complimentary software with jointly named licensees that shall:

16.5.1 simulate the Tram and the infrastructure to provide "laws of physics" run time estimates;

16.5.2 simulate the operation of a Timetable with simulated perturbations; and

16.5.3 have the capacity to provide vehicle and driver scheduling, driver rostering and Timetable production.

16.6 If **tie** is unable to provide such a licence in accordance with Clause 16.5, and unless **tie** can otherwise procure that the data and software necessary shall be made available to the Operator, the Operator shall be requirement to procure such system operational model and complimentary software. Such requirement shall be a **tie** Change and shall be considered in accordance with Clause 24 (*tie Changes*) and Clause 23 (*Performance and Financial Adjustments*) of the Operating Appendix.

17. OPERATOR'S PROJECT DEVELOPMENT RESOURCES DURING PROJECT PHASE B

In addition to the Operator Project Manager appointed pursuant to Clause 6.7, the Operator's Core Team shall include the following resources set out in the Project Development and Operating Costs during Project Phase B.

18. DEVELOPMENT OF THE INFRASTRUCTURE AND EQUIPMENT OUTPUT SPECIFICATION

18.1 The Operator, **tie** and the **tie** Advisers shall continue the development of the Infrastructure and Equipment Output Specification in respect of the relevant Line, based on the work carried out during Project Phase A pursuant to paragraph 8 above. As in Project Phase A, the provisions of the Design Manual shall be observed as a means of ensuring that System delivery shall be to the requisite quality.

18.2 As referred to in paragraph 15 above, the Infrastructure and Equipment Output Specification for the relevant Line must be finalised during Project Phase B for that Line.

18.3 Final decisions on the Infrastructure and Equipment Output Specification will be made by **tie**, although the Operator will be expected to participate actively in discussions related to the function, performance and quality of items to be specified, taking into account such matters as reliability and whole life costs. Such items will include, for example:

18.3.1 alignment (sight lines; safety aspects; crossovers and turnbacks);

18.3.2 wheel/rail interface issues, especially those which relate to safety, operability and overall System performance;

18.3.3 vehicle design (internal layout; provisions for mobility impaired (including any accessibility Legislation), cycles, prams/pushchairs; communications within vehicle);

18.3.4 vehicle performance and dynamics;

18.3.5 noise;

18.3.6 Tramstop design (provisions for mobility impaired, including requirements of Disability Discrimination Act 1995) including overall layout and provision of passenger facilities;

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18.3.7 materials (Tramstops; vehicle interiors; anti-vandal);

18.3.8 Control Centre (size; layout; equipment);

18.3.9 customer Helpdesk;

18.3.10 staff facilities (size; detailed requirements);

18.3.11 public address system;

18.3.12 lighting;

18.3.13 communications systems;

18.3.14 Depot and stabling facilities including equipment provision;

18.3.15 routine maintenance and the equipment necessary to undertake it; and

18.3.16 ticketing systems, integration and revenue collection, including ensuring that:

(a) the fare revenue collection systems have no adverse impact on dwell times of Trams at Tramstops, do not cause undue delay to passengers and that tickets are not sold or validated by Tram drivers; and

(b) any ticket vending facilities are easy to use by all passengers including unassisted wheelchair users;

18.3.17 Any proposals to use smartcards for ticketing (and any connections to any regional smartcard scheme);

18.3.18 ticket validation systems;

18.3.19 security of the System (CCTV, security lighting, emergency call systems);

18.3.20 passenger information systems; and

18.3.21 inspection and testing.

18.4 In addition, the Operator will also actively participate in development of the IDA documentation to include infrastructure elements to facilitate the Operator's future management of the following:

18.4.1 statutory and third party interface, including road, rail and utilities;

18.4.2 environmental management; and

18.4.3 System integration

19. DEVELOPMENT OF THE TERMS OF THE INFRASTRUCTURE DELIVERY AGREEMENT AND TENDER DOCUMENTATION

19.1 The Operator shall provide such input as **tie** may reasonably require in relation to the development of the terms of the Infrastructure Delivery Agreement and tender documentation in respect of the relevant Line. Without limitation, **tie** shall invite comments from the Operator in respect of the following terms of the Infrastructure Delivery Agreement:

19.1.1 the acceptance tests for the Infrastructure and Equipment (including the extent to which **tie** will delegate responsibility to the Operator for carrying out such acceptance tests);

19.1.2 reliability tests;

19.1.3 the ongoing maintenance obligations of the Infrastructure Provider;

19.1.4 performance regimes and the output of the Infrastructure and Equipment needed to support them;

19.1.5 integration with other Lines;

19.1.6 Roads interface;

19.1.7 warranty and latent defects content and periods;

19.1.8 as-builts, maintenance manuals and spares;

19.1.9 environment management; and

19.1.10 safety.

19.2 In relation to the ongoing maintenance obligations of the Infrastructure Provider, the Operator shall provide such input as **tie** may reasonably require in relation to the development of the Maintenance Plan (including the details of any possession of any Line

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required for track maintenance), having regard to the effect of such possession on the Timetable, the Fixed Costs (excluding the Category Five Fixed Costs), the Target Revenues and Target Operating Costs.

20. INFRASTRUCTURE TENDER EVALUATION AND NEGOTIATION OF INFRASTRUCTURE DELIVERY AGREEMENT

20.1 The Operator shall provide such input as **tie** may reasonably require in relation to the evaluation of tenders received from prospective Infrastructure Providers, and the negotiation of the terms of the Infrastructure Delivery Agreement.

20.2 **tie** will disclose to the Operator such elements of the tenders received from prospective Infrastructure Providers as are necessary to enable the Operator to provide input pursuant to paragraph 20.1. To the extent that additional confidentiality undertakings are required from the Operator in connection with such disclosure (including without limitation, undertakings by the Operator direct to the prospective Infrastructure Providers), the Operator and **tie** will discuss such requirements in good faith.

21. AMENDMENTS TO THE OPERATING APPENDIX DURING PROJECT PHASE B

21.1 As stated in Clause 10 (*Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* **tie** acknowledges that the Operator has agreed (i) the Operator Financial Model as at Effective Date and (ii) the terms of the Operating Appendix on the basis of the Base Case Assumptions and the Law as at the Effective Date.

21.2 During Project Phase B in respect of each Line, the Operator and **tie** shall develop and then agree:

21.2.1 any amendments to the Operating Output Specification in respect of such Line or on the System in accordance with paragraph 22;

21.2.2 amendments to the Operating Appendix, the Base Case Assumptions, the Financial Proposals, the Operator Financial Model, the Project Development and Operating Costs, and/or the Operating Output Specification in accordance with paragraph 23, including:

a) the Target Costs for Project Phase C2;

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b) the Target Operating Costs to apply in the Operating Appendix from the Service Commencement Date in respect of such Line; and

c) the Fixed Costs (except for the Category One Fixed Costs and the Category Five Fixed Costs)

21.2.3 refinements to the KPI Regime set out in the Operating Appendix to apply from the Service Commencement Date in respect of such Line in accordance with paragraph 24;

21.2.4 refinements to the Performance Monitoring Regime set out in the Operating Appendix to apply from the Service Commencement Date in respect of such Line or impact on the System in accordance with paragraph 25;

21.2.5 the Operating Method Statements in accordance with paragraph 26 based on the outlines for the Operating Method Statements prepared by the Operator during the tender process leading to the execution of this Agreement; and

21.2.6 any other changes to the Operating Appendix in accordance with the mechanism in Clause 10 (*Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* of the Agreement;

and all such changes shall be developed on the basis that the Operator shall be in No Better and No Worse position as a result of the relevant change.

21.3 Any changes to the Operating Appendix (including the Target Costs for Project Phase C2, the Target Operating Costs and the Fixed Costs (except for Category One Fixed Costs and Category Five Fixed Costs)) as a result of all developments during Project Phases A and B in respect of a Line shall be agreed before the date of execution of the Infrastructure Delivery Agreement in respect of that Line.

22. AMENDMENTS TO THE OPERATING OUTPUT SPECIFICATION

22.1 The Operator, **tie** and the **tie** Advisers shall continue the refinement of the Operating Output Specification for Project Phase D, based on the work carried out during Project Phase A pursuant to paragraph 9 above.

22.2 As referred to in paragraph 15 above, the Operating Output Specification for Project Phase D for each Line shall be finalised during Project Phase B for that Line, provided that such Operating Output Specification shall also relate to the operation of that Line as a network with any Line already operational at the relevant time.

22.3 Any amendments to the Operating Output Specification shall be agreed in writing between the Operator and **tie** and shall take account of, without limitation, the development of the terms of:

22.3.1 the Infrastructure and Equipment Output Specification pursuant to paragraph 18;

22.3.2 the Infrastructure Delivery Agreement and tender documentation pursuant to paragraph 19; and

22.3.3 the Transport Services regime, including hours of operation, Tram frequencies and operating pattern.

23. DEVELOPMENT OF THE OPERATOR FINANCIAL MODEL (INCLUDING THE TARGET COSTS FOR PROJECT PHASE C2, AND THE TARGET OPERATING COSTS)

23.1 The Operator, **tie** and the **tie** Advisers shall continue the development of the Operator Financial Model (including the Target Costs for Project Phase C2, and the Target Operating Costs) based on the work carried out during Project Phase A pursuant to paragraph 7 above.

23.2 To the extent that any refinements of the Development Assumptions are necessary during Project Phase B, such refinements shall be agreed between **tie** and the Operator and shall be taken into account for the purposes of the development of the Operator Financial Model pursuant to paragraph 23.1.

23.3 **tie** and the Operator acknowledge that:

23.3.1 amendments to the Operating Output Specification;

23.3.2 amendments to the KPI Regime;

23.3.3 amendments to the Performance Monitoring Regime;

23.3.4 the terms of the Operating Method Statements;

23.3.5 the terms on which Necessary Consents are procured;

23.3.6 the terms of the Infrastructure Delivery Agreement (including the Infrastructure and Equipment Output Specification) in respect of each Line; and

23.3.7 other changes during the development of the Project during Project Phases A and B;

may mean that some of the Base Case Assumptions are Inappropriate Base Case Assumptions.

23.4 Subject to Clause 10.6 of the Agreement, to the extent that any of the Base Case Assumptions prove to be Inappropriate Base Case Assumptions, **tie** and the Operator shall discuss and seek to agree amendments to the Operating Appendix, the Financial Proposals, Base Case Assumptions, the Operator Financial Model, the Project Development and Operating Costs, and/or the Operating Output Specification in accordance with the mechanism described in Clause 10 (*Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* of the Agreement.

23.5 The amendments to the Target Operating Costs, and/or Fixed Costs (except for the Category One Fixed Costs and the Category Five Fixed Costs) shall take into account:

23.5.1 any possession of a Line required for track maintenance; and

23.5.2 any planned roads maintenance.

23.6 Without prejudice to paragraphs 23.1 to 23.4, the Operator will in addition periodically review and recommend adjustments to **tie**'s business case, economic model and risk management plan to reflect events and developments during the course of Project Phase B.

24. DEVELOPMENT OF THE KPI REGIME

24.1 The KPI Regime shall be directly linked to the Operator's performance of the following Key Performance Indicators:

24.1.1 Headway/timetable/service reliability;

24.1.2 first and last Tram;

24.1.3 customer survey;

24.1.4 security;

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24.1.5 cleanliness of Tram interiors and stops;

24.1.6 information and signage; and

24.1.7 revenue generation and protection.

24.2 The Operator shall, in conjunction with **tie** and the **tie** Advisors, develop the KPI Regime to apply during Project Phase D (including any changes to the Key Performance Indicators and/or the relevant benchmarks) to the extent appropriate to take account of the developments to the Project during Project Phases A, B and C, all such refinements to be agreed between the Operator and **tie**.

24.3 The Operator shall develop methods to monitor the performance and quality of the Transport Services and the Project Operations during Project Phase D against the Key Performance Indicators, such methods to be acceptable to **tie**. Wherever possible and practicable, performance shall be monitored electronically. The Operator shall be responsible for all electronic monitoring equipment and for ensuring that **tie** receives direct Service Quality Reports, in form and format to be agreed.

24.4 Where performance against a Key Performance Indicator cannot be electronically monitored or it is not practicable to do so, actual performance shall be measured in accordance with the following:

24.4.1 **tie** Inspectors will inspect Tramstops and/or the Transport Services and assess the level of performance against the relevant Key Performance Indicator; and

24.4.2 in each Reporting Period, **tie** will inspect such number of Tramstops and Transport Services as **tie** may consider appropriate.

24.5 Target benchmark performance levels shall be agreed for each Key Performance Indicator. Underperformance Points shall be deducted based on levels of performance in Project Phase D below the target benchmark, subject to an agreed scoring system to be developed during Project Phase B. Deductions from the KPI Regime Profit Element for each Reporting Period shall be directly linked to the number of Underperformance Points scored.

24.6 **tie** will notify the Operator following the end of each Reporting Period (within such time period as may be agreed between **tie** and the Operator) where performance in that Reporting Period against a Key Performance Indicator is below the target benchmark, whether such performance is measured:

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24.6.1 electronically;

24.6.2 by the **tie** Inspectors; or

24.6.3 by some other monitoring method agreed between **tie** and the Operator pursuant to paragraph 24.4.

24.7 The Headway or Timetable Key Performance Indicator relates to the operation of the Transport Services against the service intervals or clock times in the Timetable, as measured at agreed monitoring points. Where the scheduled service interval is 10 minutes or less, monitoring will be carried out against scheduled Headway. Where the actual service interval exceeds the relevant service interval in the Timetable by 2 minutes or more Underperformance Points shall be awarded. Such Underperformance Points shall increase with interval deficiency. Where the scheduled service interval exceeds 10 minutes, trams shall be monitored against scheduled clock departure times. Where the actual departure time is more than one minute earlier or more than two minutes later than the scheduled departure time, Underperformance Points shall be awarded, the number of points awarded increasing in the event of greater discrepancy from scheduled departure time.

24.8 The first and last Tram Key Performance Indicator relates to the punctuality of the first and last passenger services, on each service route. Underperformance Points shall be allocated for each occasion when either:

24.8.1 no passenger service which completes its journey over the length of a service route, stopping at every stop on that service route, departs the relevant Originating Tramstop within 2 minutes of the time scheduled in the Timetable for the first passenger service of the day for that service route; or

24.8.2 no passenger service which completes its journey over the length of a service route, stopping at every stop on that service route, departs the relevant Originating Tramstop within 2 minutes of the time scheduled in the Timetable for the last passenger service of the day for that service route.

24.9 The Key Performance Indicator for cleanliness of Tram interiors and stops shall be developed to reflect the Operator's obligations in respect of Operator Maintenance and shall be measured against a number of service elements, such as:

24.9.1 cleaning of shelters, seating and waiting rooms;

24.9.2 cleaning of poster cases and signage;

24.9.3 cleaning of lifts and escalators (if any);

24.9.4 cleaning of stairs and footbridges;

24.9.5 cleaning of platforms;

24.9.6 cleaning of tram system car parks;

24.9.7 cleaning of cycle parking facilities;

24.9.8 cleaning of ticket vending machines;

24.9.9 cleaning of public and staff telephones;

24.9.10 cleaning of Tram interior; and

24.9.11 reporting of items requiring attention by the Infrastructure Provider.

24.10 The Key Performance Indicator for information and signage will be developed to ensure that sufficient information is consistently provided to make passenger journeys easy. This will also reflect the objectives of the Marketing Plan and Public Liaison and Media Plan, and shall include at least the following:

24.10.1 currency and availability of timetable and fares information;

24.10.2 provision of advance information on planned disruptions to the Transport Services, such as maintenance works and Special Events;

24.10.3 range of outlets providing information;

24.10.4 manning of the Helpdesk and response times to (i) calls from "help points" on Tramstops and (ii) telephone calls to the Helpdesk; and

24.10.5 quality of information announced through public address system.

24.11 The Key Performance Indicator for security will be developed to reflect the objectives of the Security Management Plan and to promote a high level of security at all times. This will include at least the following:

24.11.1 response times by the Operator to security incidents;

24.11.2 presence of the Operator's staff at locations relevant to personal security on the System;

24.11.3 reporting of security equipment failures and management of their rectification; and

24.11.4 third party interface co-ordination and co-operation.

24.12 The Key Performance Indicator for customer survey shall be measured by means of passenger questionnaire surveys undertaken by **tie**. A minimum agreed sample size of completed questionnaires shall be undertaken during each Reporting Period. The survey shall be designed to be statistically robust and representative of the network, of its users and of actual day-to-day performance. Each question shall be allocated a score (e.g. between 1 and 10; where a score of 1 represents a very bad view, scores of 5 and 6 indicate the customer is neither dissatisfied or satisfied and a score of 10 indicates a very satisfied customer). Any score below an agreed minimum shall qualify for Underperformance Points. Questions to be included in the survey shall be agreed between **tie** and the Operator. Typical questions might be:

24.12.1 "For the tram journey currently being undertaken, how well do you think it performed in…

- Arriving when you expected it to;
- Offering a clean and pleasant vehicle;
- Being easy to board;
- Providing you with a seat;
- Making you feel perfectly safe and at ease;
- Providing a fast journey;
- Telling you which station is next;
- Telling you about service disruptions; and
- Telling you where you can change to buses and trains;

24.12.2 Thinking of the Tramstop at which you boarded the Tram, how did it perform in…

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- Making you feel perfectly safe and at ease;
- Keeping you informed of any problems;
- Being clean and well maintained;
- Being well lit; and
- Telling you when the next tram is due."

24.13 The Key Performance Indicator for revenue generation and protection relates to the number of people travelling on the system with a valid ticket and will be developed to ensure a high level of compliance at all times. Measurement (in addition to Operator methodology) shall include spot checks by the monitoring inspectors. An agreed minimum number of inspections shall be undertaken each monitoring period and will include checks of at least the following:

24.13.1 availability of facilities for purchasing tickets;

24.13.2 availability of full range of tickets;

24.13.3 administration of refund procedures; and

24.13.4 numbers of passengers travelling with a valid ticket.

25. DEVELOPMENT OF THE PERFORMANCE MONITORING REGIME AND THE PERFORMANCE INDICATORS

25.1 The Operator shall, in conjunction with **tie** and the **tie** Advisors, refine the Performance Indicators (including the benchmarks) that will monitor and measure the overall performance of the System during Project Phase D. Such refinements shall take account of the developments to the Project during Project Phases A and B and all such refinements shall be agreed between the Operator and **tie**.

25.2 The Performance Indicators shall cover the following disciplines:

25.2.1 safety & environment;

25.2.2 operations; and

25.2.3 maintenance

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25.3 Each discipline may include the following components and unless otherwise agreed will be attributable to the Operator, the Infrastructure Provider or both, as indicated below. Automatic monitoring techniques shall be adopted for the Performance Monitoring Regime except where the Operator can demonstrate that this is not practicable. Where the responsibility for monitoring Performance Indicators does not lie solely with the Operator, the Operator shall be responsible for receiving relevant data from all other concerned parties, for reviewing the completeness of the data, for collation of data from all sources and for reporting to **tie**.

25.4 Safety & Environment Performance Indicators

25.4.1 Operator + Infrastructure Provider

- staff fatalities, accidents or injuries;
- derailments;
- planned general environmental inspections;
- staff competencies (safety critical);
- drugs & alcohol compliance;
- environmental audits (carried out and outstanding);
- maintenance corrective action reports (including track closures);
- staff working time exceedances;
- staff hours lost through sickness; and
- staff turnover

25.4.2 Operator

- fatalities, accidents or injuries to members of the public;
- passenger fatalities, accidents or injuries;
- collisions involving trams and other vehicles;

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- SPASs (severe and / or technical);
- incidents of speeding;
- near misses (public or vehicles);
- instances of crime/vandalism; and
- malicious acts

25.4.3 Infrastructure Provider

- Line closure (maintenance) irregularities;

25.5 Operations Performance Indicators

25.5.1 Operator + Infrastructure Provider

- Cancellations due to Operator and/or Infrastructure Provider;

25.5.2 Operator

- service regularity;
- service punctuality;
- service availability;
- number of operational incidents by type and severity;
- service delay/disruption by type/location/minutes delay;
- overcrowding and operational hindrance; and
- journey times over key stages;

25.5.3 Infrastructure Provider

- fleet reliability;
- fleet failure by type and frequency;
- Infrastructure and Equipment / System availability; and

- critical failures: System/AC/DC traction equipment;

25.6 Maintenance Performance Indicators

25.6.1 Operator + Infrastructure Provider

- temporary speed restrictions;
- incident response (response to failures);
- System failures (signalling, information, communications);
- signalling failures; and
- removal of graffiti;

25.6.2 Operator

- cleanliness at stops and in vehicles;

25.6.3 Infrastructure Provider

- route availability;
- broken or defective rails;
- incident response (rectification);
- signalling system equipment maintenance against plan;
- track asset equipment maintenance against plan;
- overhead line equipment maintenance against plan;
- structures, buildings (including Tramstop & Depot) maintenance against plan; and
- overhead line failure.

26. DEVELOPMENT OF OPERATING METHOD STATEMENTS

26.1 Content of the Operating Method Statement

26.1.1 Using as a basis the information prepared by the Operator during the tender process leading to the execution of this Agreement, the Operator shall develop, in consultation with the **tie** Advisers, and where necessary in conjunction with others, Operating Method Statements covering its duties and obligations during commissioning (Project Phase C) and operations (Project Phase D).

26.1.2 The minimum requirements for the Operating Method Statements are that it shall encompass the following components:

- Operations Management Plan;
- Service Integration Plan;
- Trial Run Validation Plan;
- Maintenance Plan (Operator Maintenance);
- Health and Safety Plan;
- Training Plan;
- Approvals Management Plan;
- Quality Management Plan;
- Document Management Plan;
- Incident Management Plan;
- Systems Assurance Plan;
- Testing and Commissioning Plan;
- Environmental and Sustainability Management Plan;
- Security Management Plan;
- Marketing Plan;

- Public Liaison and Media Plan; and

- System Integration Plan.

26.1.3 The minimum coverage of each of the above plans is provided in the following paragraphs. The terms of the Operating Method Statements shall be subject to **tie**'s approval prior to the end of Project Phase B.

26.1.4 It is recognised that during Project Phase B, the scheme may not be developed to the extent that all of these plans can be finalised. However, scheme definition will have advanced sufficiently for the plans to be prepared in some detail and sufficiently to identify staff structure and any costs associated with implementation of the plans. These costs will be taken into account when agreeing the Target Operating Costs and any adjustments to the Fixed Costs (excluding the Category One Fixed Costs and the Category Five Fixed Costs) pursuant to paragraph 23 and/or the setting of the Target Revenues by the Joint Revenue Committee.

26.1.5 Any amendment to the Operating Method Statements during Project Phase C or thereafter shall be subject to the approval of **tie** pursuant to Schedule 9 (*Review Procedure*) and to the extent that any such amendment will affect the operating costs or revenues during Project Phase D, the Target Operating Costs, Fixed Costs (other than the Category Five Fixed Costs) and/or Target Revenues may be amended in accordance with the Variation procedure.

26.2 Operations Management Plan

26.2.1 The Operator shall produce operations management documents covering rules, procedures and actions to be observed in Project Phase D, including incident management. These documents shall describe the rules to be followed by personnel in the course of their duties, whether site based or mobile and when undertaking operational and maintenance activities. The Operator shall ensure that the Operations Management Plan shall where appropriate encompass the requirement of other more detailed plans within the Operating Method Statements (e.g. with respect to training or Health and Safety). These documents shall cover the following situations:

- normal unperturbed operations for the System;

- arrangements for staff training and competence assessment of all Operator Parties engaged in the operation of the System, including the core competencies applicable to all staff and/or Operator Parties engaged in the Project Operations;

- procedures for managing disruption to the System, however caused;

- disaster recovery procedures and during accidents and emergencies;

- management of alternative transport when required;

- revenue collection;

- the process for integration of Lines 1, 2 and 3 to form common operational procedures;

- operational performance benchmarking, monitoring and reporting;

- provision of appropriate technical resources to investigate, develop and implement solutions to operational problems;

- complaints management;

- the monitoring, review and amendment where necessary of third party interface agreements including in particular road, rail and utility interfaces; and

- feedback of corrective actions into the operational procedures.

26.3 Service Integration Plan

The Operator shall continue to develop, in association with other public transport operators, a Service Integration Plan as described in paragraph 12 above in relation to Project Phase A. The plan shall take account of any developments in planning or transportation matters, or any change in policies of **tie** or CEC which might affect service integration and public transport provision.

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26.4 Trial Run Validation Plan

26.4.1 The Operator shall prepare a trial run validation plan which shall include but not be limited to the following activities in respect of each stage of introduction and the System as a whole:

- the simulated introduction of Equipment failure at times unknown to the personnel operating the System;
- the staged introduction of misbehaving passengers at times unknown to the personnel operating the System;
- the staged introduction of large crowds of passengers at times unknown to the personnel operating the System;
- the simulation of a fire with subsequent emergency evacuation of passengers;
- the simulated introduction of operating staff illness;
- the simulated introduction of external influences such as power supply failure, leaves on track, ice and snow conditions, road traffic accidents or other line obstructions;
- the quality management activities necessary to ensure proper performance of tests and reporting;
- the safety management activities necessary to ensure that safety is not jeopardised by the trial running validation activities;
- other requirements that may be specified by HMRI; and
- where necessary the participation of the emergency services and other authorities.

26.4.2 The Operator shall further develop the Trial Run Validation Plan in conjunction with the Infrastructure Provider during Project Phase C pursuant to paragraph 34.

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26.5 Maintenance Plan

26.5.1 The Operator shall develop, in consultation with the **tie** Advisers, the Maintenance Plan.

26.5.2 The Maintenance Plan shall require that the Operator shall carry out the Operator Maintenance with the objective of ensuring that the functionality of all Equipment and elements used in providing the Transport Services (and other Project Operations) is maintained and that the visual and physical appearance of the System does not deteriorate through the build up of litter, dirt, debris, detritus, industrial or bodily fluids.

26.5.3 Operator Maintenance, and the required frequency of such maintenance, shall be as follows:

- cleaning of all Tramstops, access ways and car parks operated under the auspices of **tie** so as to ensure they are clean and free from all litter, dirt, debris, detritus, industrial and bodily fluids; such cleaning to be carried out not less than daily;

- emptying of all litter bins at Tramstops or on the Trams daily or as regularly as necessary to prevent them from becoming full;

- promptly remove any observed or reported rubbish and debris at the Tramstops or on Trams likely to create a risk of fire or other dangers; and

- regularly remove any observed or reported litter on Trams throughout each day so as to maintain a reasonably clean travelling environment for passengers. This obligation shall also relate to the cleaning up of observed or reported fluids of any type on the Trams.

26.5.4 Operator Maintenance shall also include the carrying out of the initial response to a failure of, damage to or other incident occurring on the System which:

(a) is not specifically identified in paragraph 26.5.3 as the Operator's responsibility to resolve; but

b) actually or, in the Operator's reasonable opinion, potentially interrupts or delays the Transport Services.

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26.5.5 The initial response referred to in paragraph 26.5.4 ("Initial Response") includes the following activities:

(a) initial reporting of the occurrence of a failure, damage or other incident to the relevant Infrastructure Provider including (if appropriate) request for urgent maintenance or repair;

(b) to the extent necessary, attendance at the site of the occurrence of the Operator's operations and/or maintenance staff to assess the cause of the problem;

(c) determination of the appropriate course of action;

(d) where possible and safe and within the capabilities immediately available to the Operator, rectification of the problem by the Operator;

(e) where possible and safe and within the Operator's immediately available capabilities, implementation of temporary repairs; and

(f) implementation of measures to overcome and/or mitigate the disruption to Transport Services.

26.5.6 The Initial Response will not include the performance of permanent repairs except where these are of a minor or trivial nature.

26.5.7 In relation to any requirement for an Initial Response, the Operator shall initiate a response to an incident requiring an Initial Response within 15 minutes of the earlier of:-

(a) the Operator identifying that such incident has occurred; and

(b) an Infrastructure Provider or **tie** notifying the Operator of such incident; and

(c) any other third party notifying the Operator of such incident through the Helpdesk or otherwise.

26.5.8 Without prejudice to paragraph 26.5.7, the Operator shall, acting reasonably, have complete discretion regarding the manner in which it undertakes the Initial Response including any action which it chooses to take to mitigate disruption to Transport Services.

26.5.9 **tie** confirms that the Operator shall have no liability to **tie** or any Infrastructure Provider for any liability, damages or loss suffered by **tie** or any Infrastructure Provider, including in relation to:

(a) any loss of availability payment by an Infrastructure Provider; or

(b) any payment of any availability payment by **tie** to an Infrastructure Provider in respect of any period when the System was not fully available

arising from the Operator's response to the requirement to undertake an Initial Response unless (and to the extent that) the Operator's action in undertaking or failing to respond to the requirement for such Initial Response were:-

(i) in breach of its undertakings in paragraph 26.5.7; or

(ii) negligent.

26.5.10 Notification to Infrastructure Provider

(a) Except where the relevant Infrastructure Provider has notified the Operator in accordance with Clause 34.2.1, the Operator shall notify the relevant Infrastructure Provider by telephone or radio (as appropriate) immediately following a report to the Control Centre or Helpdesk of the occurrence of a failure, damage or other incident requiring an Initial Response.

(b) Representatives of the relevant Infrastructure Provider shall be entitled to attend the site of the incident in order to consult on the appropriate measures to be taken to restore normal Transport Services and to observe any actions taken by the Operator.

(c) As soon as possible following the incident, the Operator shall issue a written report to the relevant Infrastructure Provider describing the incident, its cause (so far as known), its duration, its location, the actions taken and any follow up actions required.

26.5.11 The Maintenance Plan shall state that in carrying out its maintenance obligations, the Operator shall use all reasonable endeavours to minimise:

- disruption to Transport Services;

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- impairment of access to Transport Services by passengers whose mobility is in any way impaired; and
- the environmental impact of carrying out such obligations.

26.6 Health and Safety Plan

26.6.1 The Operator shall develop a Health and Safety Plan which shall satisfy all relevant Law and shall cover as a minimum the following:

(a) approach to setting and verification of safety standards;

(b) management control, monitoring and implementation of corrective action in respect of health and safety;

(c) benchmarking, monitoring, control and reporting of health and safety related incidents including near misses;

(d) the confidential reporting system required to be established and maintained;

(e) arrangements for ensuring security and safety of staff and the public;

(f) Operator Parties' health and safety scrutiny arrangements;

(g) approach to discharge of responsibilities under the CDM Regulations;

(h) approach to human factors and ergonomics; and

(i) drug and alcohol policy.

26.6.2 **tie** and the Operator shall ensure (in consultation with the **tie** Advisers) that by the end of Project Phase B in respect of any Line, the Health and Safety Plan is properly integrated with the health and safety plan of the Infrastructure Provider for that Line.

26.7 Training Plan

26.7.1 The Operator shall develop a Training Plan to ensure the competencies of all staff and Operator Parties (and their staff) engaged in the operation of the System. The implementation of the Training Plan shall be the direct responsibility of the Operator's managing director. An essential element of the Training Plan is that all

staff and Operator Parties (and their staff) receive safety training prior to undertaking any duties related to operation of the System.

26.7.2 The Training Plan shall include as a minimum, the following:

- induction training for all staff which not only embraces the policies and organisation of the Operator but also the safety culture of a public transport system;
- health and safety policy and procedure training for all staff including staff employed by any Operator Party;
- technical training for drivers, controllers or technical/operations staff to the standards as established by HMRI, such training to ensure the safe and competent operation of all Trams and Infrastructure and Equipment;
- incident management procedures for operational and support staff;
- cross training in order to ensure flexibility of working by staff and full understanding of the duties of others;
- staff development and re-training programmes;
- training log for each employee and employee of any Operator Party;
- the quality of all training and re-training should meet all health and safety requirements with specific emphasis to that required by the HMRI; and
- as a general principle employees should only by required to carry out tasks for which they have been trained.

26.7.3 The Training Plan shall comprise a comprehensive training programme for both Project Phase C (commissioning) and Project Phase D (operational). As regards training in Project Phase C, the Operator shall ensure that such training courses are coordinated with the commissioning of the System to ensure that trainees derive maximum benefit from progressive involvement.

26.8 Overall Approvals Management Plan and Approvals Management Plan

26.8.1 An Overall Approvals Management Plan for the System shall be developed by **tie** and **tie**'s Advisers, which shall cover at least the following:

(a) all statutory Necessary Consents to be obtained, identifying in each case the applicable Relevant Authority, the person or body responsible for obtaining the statutory Necessary Consent, and the intended date by which such statutory Necessary Consent is to be obtained;

(b) all third party Necessary Consents to be obtained, identifying in each case the applicable third party, the person or body responsible for obtaining the third party Necessary Consent, and the intended date by which the third party Necessary Consent is to be obtained;

(c) procedures to be used in obtaining statutory Necessary Consents and third party Necessary Consents; and

(d) procedures for maintaining the Overall Approvals Management Plan.

26.8.2 The Operator shall comply with all aspects of the Overall Approvals Management Plan as may be necessary to implement and maintain the Overall Approvals Management Plan.

26.8.3 The Operator shall develop an Approvals Management Plan capable of incorporation within the Overall Approvals Management Plan and covering at least the following:

(a) all statutory Necessary Consents to be obtained by the Operator and the intended date by which such statutory Necessary Consents are to be obtained;

(b) all third party Necessary Consents to be obtained, by the Operator and the intended date by which such third party Necessary Consents are to be obtained;

(c) procedures to be used by the Operator in obtaining statutory Necessary Consents and third party Necessary Consents required in terms of paragraphs (a) and (b) above; and

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(d) procedures for maintaining the Overall Approvals Management Plan.

26.8.4 The Operator shall comply with all aspects of the Approvals Management Plan as may be necessary to implement and maintain the Approvals Management Plan.

26.9 Quality Management Plan

26.9.1 The Operator shall develop a Quality Management Plan which shall satisfy the requirements of the Operator's independent auditor and shall encompass at least the following:

- quality management and control procedures (including those of Operator Parties engaged in the Project Operations);
- internal and external quality audit programme; and
- change management procedures.

26.9.2 The Quality Management Plan shall comply with BS EN ISO 9001:2000 or equivalent and the Operator shall subject the system described in the Quality Management Plan to regular independent audits at the Operator's own cost. Copies of the audit reports shall be provided to **tie** on request.

26.10 Document Management Plan

The Operator shall develop a Document Management Plan which shall cover at least the following:

26.10.1 procedures for documentation control (including in relation to the issue of documents to **tie** or CEC); and

26.10.2 a schedule of documents to be prepared by, for or on behalf of the Operator in carrying out the mobilisation, commissioning and operation of the System, including details as to their purpose, distribution, document hierarchy and intended issue date (such schedule to be updated in the event of change).

26.11 Incident Management Plan

26.11.1 The Incident Management Plan to be developed by the Operator shall consider at least the following possible events and shall develop procedures to be followed should they occur:

- road traffic accident;
- crowd control;
- signalling failure (local or system wide);
- power failure;
- Tram breakdown;
- service obstruction;
- passenger emergency (e.g. heart attack);
- fire;
- criminal or hooligan behaviour; and
- driver illness.

26.11.2 Where appropriate and necessary the Incident Management Plan should be developed in conjunction with the HMRI, CEC, Police, Emergency Services, and Network Rail and should include options for the provision of alternative rail or bus services during periods of closure of all or part of the System.

26.12 Systems Assurance Plan

The Operator shall develop a Systems Assurance Plan which shall incorporate as a minimum the following:

26.12.1 System assurance organisation and key personnel;

26.12.2 responsibilities for delivering the Systems Assurance Plan;

26.12.3 procedures for monitoring and controlling all Operator Parties;

26.12.4 details of the integration of systems assurance analysis with design and construction, including:

- decision making process;
- management of unacceptable risks;
- action management;
- management of programme deviations;

26.12.5 targets to be met (including in relation to the reliability of the Transport Services);

26.12.6 systems assurance programme;

26.12.7 techniques and methods to be employed;

26.12.8 outline of systems assurance demonstration plan;

26.12.9 procedures for the collection, analysis, correction and documentation of failures (FRACAS – Failure Reporting and Corrective Action System); and

26.12.10internal audit programme, techniques and procedures.

26.13 Environmental and Sustainability Management Plan

The Operator, in conjunction with **tie** and the **tie** Advisers, shall develop an Environmental and Sustainability Management Plan which shall comply with all relevant Legislation and shall cover as a minimum the following:

26.13.1 environmental management system (EMS) including the consolidation of all existing Environmental Statements (lodged to support the parliamentary process), obligations and undertakings into a unified EMS for the Edinburgh tram system;

26.13.2 environmental management procedures;

26.13.3 purchasing policy and arrangements regarding the future availability and sustainability of materials together with their potential performance, taking due account of the whole life cost implications of using such materials; and

26.13.4 benchmarking, sustainability and delivering continuous improvement.

26.14 Security Management Plan

26.14.1 The Operator shall develop a Security Management Plan including appropriate security measures utilising the Infrastructure and Equipment provided through the Infrastructure Provider, which shall encompass at least the following:

(a) passenger and staff personal security arrangements;

(b) the provision of appropriate levels of illumination (including the avoidance of dark corners) at, and on the approaches to, Tramstops;

(c) arrangements for working with third parties to effectively control and reduce security risks to passengers and staff when on or about the Edinburgh Tram Network;

(d) benchmarking, monitoring, control and reporting of security related incidents;

(e) management, control, monitoring and implementation of corrective action in respect of personal security.

(f) application of technology in safeguarding passenger and staff security.

(g) passenger 'help points' at Tramstops linked to the Control Centre and to video recording; and

(h) application of CCTV surveillance covering platform areas and facilities, ticket vending machines, 'help points', park and ride sites, Tram interiors, and also to areas outside those specifically required to be covered within these requirements.

26.14.2 In addition, the Operator shall provide appropriate security measures to complement the above which must at least include consultation with and consideration of the recommendations of all relevant police authorities and forces (including Lothian and Borders Police and/or British Transport Police) for preventative uniformed patrols on the System, for responses to incidents/accidents and for joint crime-prevention initiatives in schools, youth clubs and in the local community;

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26.15 Marketing Plan

The Operator shall develop a Marketing Plan based on the information prepared by the Operator during the tender process leading to the execution of this Agreement which shall encompass, without limitation:

26.15.1 ticket sales arrangements, including from outlets other than Tramstops or on the Trams;

26.15.2 promotion to passengers of the integrated public transport services offered by the Operator and other operators;

26.15.3 marketing and public relations in respect of the Transport Services generally;

26.15.4 advertising of the Transport Services (provided that any promotion of the Transport Services at Tramstops or on the Trams shall comply with **tie**'s restrictions in relation to advertising); and

26.15.5 local community relationships, possibly to include open days.

26.16 Public Liaison and Media Plan

In conjunction with **tie**, the Operator shall develop, maintain and implement a Public Liaison and Media Plan which shall contain as a minimum the following:

26.16.1 arrangements for the provision of support to **tie**'s and CEC's public liaison team;

26.16.2 information centre(s) to be provided and location;

26.16.3 information and newsletters proposed to be publicly issued on a regular, periodic or occasional basis;

26.16.4 proposed procedures for notifying affected members of the public or other third parties of planned work comprised in the maintenance of the Edinburgh Tram Network;

26.16.5 proposals to maintain/build up support for the Edinburgh Tram Network;

26.16.6 proposals for informing the public as to the role of the Operator and the Infrastructure Provider;

26.16.7 procedures for replying to queries or complaints from the public;

26.16.8 plans for public information meetings;

26.16.9 procedures for the regular production of press releases;

26.16.10proposals for the provision of information at local level; and

26.16.11proposals for website information and co-ordination with the **tie** tram website.

26.17 System Integration Plan

26.17.1 The Operator shall develop a Systems Integration Plan to be implemented when necessary for each occasion when a change is made to the operating network, whether complete opening of a partially operational Line, the addition of a new Line to the Core Network, or the opening of an extension to any Line.

26.17.2 The plan shall cover proposals for integration of Transport Services, information systems and ticketing. In conjunction with Infrastructure Providers (during Project Phase C) the Operator shall include within the plan proposals for the testing and commissioning of the new Infrastructure and Equipment whilst maintaining operational Transport Services on the existing network. Any interruption of Transport Services in order to achieve System Integration under paragraph 26.17.1 above shall not last longer than one Business Day. The plan shall also address any changes in the maintenance regime arising from the additional Transport Services.

27. PLANNING SUPERVISOR

27.1 Duties as planning supervisor under the requirements of the CDM Regulations are currently undertaken by the **tie** Advisors for technical, operational and environmental matters for each Line.

28. SAFETY MANAGEMENT SYSTEM DEVELOPMENT

28.1 The Operator shall develop, to the satisfaction of **tie**, HMRI and other concerned authorities, a generic safety management system for the commissioning and operation of the System to the level necessary to ensure that relevant safety requirements are included in the tender documentation for the Infrastructure Delivery Agreement.

28.2 The generic safety management system shall be capable of development to a full and final version prior to commencement of commissioning of the System during Project Phase C.

28.3 The preliminary work on the safety management system will include the production of a safety justification framework document that will indicate the likely format and some of the detail of the eventual safety case that the Operator will be required to present to, and gain approval from, HMRI

28.4 The framework document will be drafted in consultation with the HMRI and other relevant bodies. It is expected to embrace the following subject areas:

28.4.1 description of the operation: Introductory section giving general description of the System, identification of safety responsibilities and reporting mechanisms;

28.4.2 arrangements during initial access to the Lines: Organisation and management of working staff, safety, emergency arrangements, identification of staff, insurance, safety audit, arrangements for keeping and distributing records;

28.4.3 arrangements for testing and staff training: Organisation and management of staff, safety arrangements including staff working on the Tramway, emergency arrangements, identification of staff, insurance, fault analysis, safety audit, arrangements for keeping and distributing records;

28.4.4 infrastructure management: Track, speed limits, public crossings (surface and bridges), fencing, Tramstop infrastructure, monitoring and reporting systems;

28.4.5 Tram operating arrangements: Operating arrangements including route knowledge, signalling etc., fitness and training of staff, certification of staff, Tram preparation, defect and breakdown procedures, communications, control of access to driving cabs, shunting arrangements;

28.4.6 Tramstop arrangements: Operating arrangements, crowd control, emergency planning, access for contractors, control of access and vandalism, security;

28.4.7 Tram maintenance arrangements: Engineering and operational acceptance of Tram vehicles, competence of staff engaged on maintenance, quality assurance, technical audit, monitoring, reporting of defects, procedure for imposing operating restrictions, acceptance of Trams for the Transport Services;

28.4.8 infrastructure maintenance: Inspection procedures, accreditation, control and monitoring, reporting procedures, emergency arrangements, communications, signage and warnings in the operating environment;

28.4.9 Interfaces with other organisations: Liaison with Emergency Services, HMRI, and highways authorities;

28.4.10 risk assessment: Assessment of the risks associated with all aspects of the Project Operations including groups of people most at risk, severity of failure event and likelihood of event occurring;

28.4.11 Health & Safety Policy: Policy statement, monitoring arrangements, alcohol and drugs policy including testing and disciplinary action; and

28.4.12 Code of Practice for working on or near the Line

29. PASSENGER'S CHARTER

29.1 The Operator shall, in conjunction with **tie**, prepare a passengers' charter in plain language to take effect from the Service Commencement Date for each Line.

29.2 It is intended that elements of the charter shall include:

29.2.1 a statement of the Operator's intentions;

29.2.2 standards of service covering punctuality, availability and reliability;

29.2.3 level of provision and service for passengers with respect to, for example, telephone enquiries and services, provision for passengers with disabilities, bicycles and luggage;

29.2.4 method of dealing with service disruptions;

29.2.5 compensation arrangements in the event of service disruption or below-standard performance;

29.2.6 contact details for comments and complaints;

29.2.7 response times; and

29.2.8 method of dealing with passengers.

29.3 It is also intended that the charter will contain information on the following matters:

29.3.1 interchange facilities;

29.3.2 service integration details (rail, air, bus and Park-and-Ride);

29.3.3 Timetable information display locations;

29.3.4 policy on planned disruption of service;

29.3.5 available guides and maps;

29.3.6 passenger information systems;

29.3.7 safety and security arrangements;

29.3.8 guidance to passengers (personal stereos, mobile telephones, animal carriage, litter, disabled or mobility impaired passengers);

29.3.9 ticket types, purchase and availability;

29.3.10 service standards;

29.3.11 vehicle and stop standards;

29.3.12 maintenance commitment;

29.3.13 complaints procedure; and

29.3.14 fault reporting procedure.

30. FINAL FUNDING APPROVAL

The Operator shall support **tie**'s applications for final funding approvals and contracts for the provision of funding for the Project by the Scottish Executive, CEC local development contributions or any other source of project funding (other than the Operator and the Operator Parties).

31. GATEWAY FROM PROJECT PHASE B TO PROJECT PHASE C

31.1 The Operator will notify **tie** when the Operator considers that it has completed each of the tasks to be carried out pursuant to Project Phase B in respect of a Line and that all matters to

be agreed during Project Phase B have been agreed between the Operator and **tie**. Without limitation, the Operator will not serve such notice until:

31.1.1 the agreement between **tie** and the Operator of:

(a) the Target Costs for Project Phase C2 in respect of that Line;

(b) (if there is to be a time interval between the Service Commencement Date and the Full Service Commencement Date in respect of that Line), the Interim Target Operating Costs and the Interim Fixed Costs for such period; and

(c) the Target Operating Costs and Fixed Costs (except for those Fixed Costs which have already been set) to take effect from the Full Service Commencement Date in respect of that Line;

31.1.2 the execution of the Infrastructure Delivery Agreement in respect of that Line by the relevant Infrastructure Provider; and

31.1.3 the setting of Interim Target Revenues (if there is to be a time interval between the Service Commencement Date and the Full Service Commencement Date in respect of that Line), or Target Revenues by the Joint Revenue Committee.

31.2 If **tie** agrees that all of such tasks have been completed and/or relevant matters agreed, **tie** shall notify the Operator that Project Phase C shall commence in respect of that Line.

31.3 To the extent that **tie** considers that any such task has not been completed by the Operator and/or relevant matter agreed, **tie** will notify the Operator accordingly, including details of the further activities to be carried out by the Operator in order to complete such task.

31.4 To the extent that some but not all of the Project Phase B tasks have been completed and/or relevant matters agreed, **tie** may, in its sole discretion, notify the Operator that Project Phase C shall commence in respect of that Line and issue a PPCN, and in such circumstances:

31.4.1 **tie** may direct that some or all of the Project Phase C Project Development Services shall be commenced; and

31.4.2 the Operator shall continue to provide the Project Phase B Project Development Services until (i) the relevant tasks have been completed, and (ii) all matters to be

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agreed during Project Phase B have been agreed between the Operator and **tie**, or until **tie** otherwise directs.

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PROJECT PHASE C

Design, Build and Commissioning

32. INTRODUCTION

32.1 The primary objectives of **tie**, the **tie** Advisers and the Operator during Project Phase C in respect of any Line shall be to:

32.1.1 project manage the delivery of the Infrastructure and Equipment in respect of that Line pursuant to the Infrastructure Delivery Agreement for that Line including, without limitation, in respect of:

(a) the detailed design of the Infrastructure and Equipment;

(b) the building of the Infrastructure and Equipment; and

(c) the testing and commissioning of the Infrastructure and Equipment, including the integration of the Infrastructure and Equipment with that in respect of any other Line;

32.1.2 prepare for Project Phase D, including the recruitment and training of staff; and

32.1.3 continue to revise the Operating Method Statements and their component plans.

32.2 The Operator shall work together with **tie** and the **tie** Advisers during Project Phase C to carry out the functions referred to in the following paragraphs to ensure that the Infrastructure and Equipment to be provided pursuant to each Infrastructure Delivery Agreement shall enable the achievement of a high standard of reliability in the operation of the Transport Services.

32.3 Project Phase C shall be split into 2 parts, Project Phase C1 and Project Phase C2.

32.4 Some of the Project Development Services to be provided by the Operator during Project Phase C shall be provided throughout Project Phase C; others shall be provided only during Project Phase C1 or Project Phase C2, as appropriate. Paragraph 33 provides further details.

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33. PROJECT DEVELOPMENT ACTIVITIES DURING PROJECT PHASE C

33.1 In support of the primary objectives for Project Phase C set out in paragraph 32 above, the Operator shall, during Project Phase C in respect of each Line, comply with the requirements of paragraph 33.2 below.

33.2 The principal obligations of the Operator during Project Phase C1 are:

33.2.1 to advise and support **tie** upon aspects of the detailed design and construction of the Infrastructure and Equipment; and

33.2.2 to advise **tie** in the project management of the delivery of the Infrastructure and Equipment;

33.2.3 to prepare and plan for the commissioning and testing process to be carried out in Project Phase C2, without limitation by developing a Testing and Commissioning Plan in conjunction with the Infrastructure Provider, **tie** and the **tie** Advisers; and

33.2.4 in conjunction with **tie** and the **tie** Advisers, to commence the commissioning and testing process in relation to the Infrastructure and Equipment (including both factory and site acceptance tests).

33.3 The principal obligations of the Operator during Project Phase C2 are:

33.3.1 to recruit, employ and train staff for Project Phase C2 (*Commissioning and Testing*) and Project Phase D (*Operations*); and

33.3.2 in conjunction with tie and tie's Advisers, to complete the commissioning and testing process in relation to the Infrastructure and Equipment (including any factory and site acceptance tests not carried out in Phase C1).

33.4 Throughout Project Phase C, the Operator shall:

33.4.1 continue to maintain up to date, and revise as necessary, the Operating Method Statements;

33.4.2 continue to revise the Service Integration Plan together with other public transport operators;

33.4.3 manage and supervise the obtaining of all Operator Necessary Consents for the System, to the extent not already obtained during Project Phase A or Project Phase B; and

33.4.4 comply with any relevant Necessary Consents forming part of the Overall Approvals Management Plan.

33.5 All activities referred to in this paragraph 33 shall be carried out in accordance with the relevant plans in the Operating Method Statements.

34. FURTHER DEVELOPMENT OF THE OPERATING METHOD STATEMENTS

34.1 Using as a basis the Operating Method Statements prepared in accordance with this Project Development Output Specification during Project Phase B, the Operator shall further develop and keep up to date the plans within the Operating Method Statements during Project Phase C, in consultation with **tie** and/or the Infrastructure Provider and/or any other relevant third parties to the extent appropriate.

34.2 Without limitation to paragraph 34.1, the Operator shall further develop in consultation with the relevant Infrastructure Provider(s):

34.2.1 the Testing and Commissioning Plan;

34.2.2 the Trial Run Validation Plan;

34.2.3 the Maintenance Plan. To the extent that **tie** has requested the Operator to manage the performance by an Infrastructure Provider of its obligations under the relevant IDA, the Maintenance Plan shall be extended to cover the management of such maintenance;

34.2.4 the Incident Management Plan, such development to also be in consultation with HMRI, CEC, the Emergency Services, and Network Rail; and

34.2.5 the System Integration Plan.

34.3 Any changes to the Operating Method Statements during Project Phase C:

34.3.1 shall be subject to the consent of **tie** pursuant to Schedule 9 (*Review Procedure*); and

34.3.2 shall not result in any amendment to the Fixed Costs, Target Operating Costs or the Target Revenues, or any other terms of the Operating Appendix, unless otherwise provided for in this Agreement or expressly agreed by **tie**.

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PROJECT PHASE C1

35. OPERATOR'S PROJECT DEVELOPMENT RESOURCES DURING PROJECT PHASE C1

In addition to the Operator Project Manager appointed pursuant to Clause 6.7, the Operator 's Core Team shall include the resources set out in the Project Development and Operating Costs during Project Phase C1.

36. OPERATOR'S ROLE DURING CONSTRUCTION

36.1 **tie** intends to establish a joint project management team at the beginning of Project Phase C to oversee delivery of the Infrastructure and Equipment for the System, comprising staff from **tie**, the **tie** Advisors and the Operator.

36.2 The IDA signed during Project Phase B will be concluded directly between **tie** and one or more Infrastructure Providers. **tie** intends to use the joint project management team to administer and engineer the IDA(s) through delegated powers. The Operator shall provide one or more representatives to the joint project management team, as may be required by **tie**, to ensure that the best advice is available to **tie** on all relevant aspects of the scheme, primarily related to operational issues.

36.3 The project management team will:

36.3.1 observe and report on the acceptability of proposed designs against the Design Manual and the Infrastructure and Equipment Output Specification and the ability of the proposals to meet operational objectives;

36.3.2 observe and report on the quality of Infrastructure and Equipment provision and installation and its compliance with the Infrastructure and Equipment Output Specification;

36.3.3 monitor progress of provision and installation;

36.3.4 certify progress to **tie** for payment purposes; and

36.3.5 audit compliance with the Code of Construction Practice.

37. TESTING AND COMMISSIONING PLAN

In conjunction with the Infrastructure Provider in respect of the relevant Line, and by agreement with **tie** and the **tie** Advisers, the Operator shall develop a Testing and Commissioning Plan in respect of

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that Line, such plan to be finalised and agreed by the Operator and **tie** prior to the commencement of Project Phase C2 for such Line. This plan shall encompass at least the following:

37.1 programme and sequence for all testing and commissioning;

37.2 procedures for factory acceptance testing;

37.3 proposed pre-operational tests;

37.4 proposed soak testing of passenger interface equipment or elsewhere as agreed;

"Passenger Interface Equipment" shall comprise dynamic visual displays, public address systems and the like located Tramstops or on board Tram vehicles.

37.5 control and monitoring processes for the progression of the testing and commissioning programme;

37.6 method for reporting on completed testing and commissioning;

37.7 testing and commissioning documentation control procedures;

37.8 process for managing non-conformances and re-testing;

37.9 management of safety during testing and commissioning (including the training of staff and contingency provisions);

37.10 recruitment and training of Project Operations Staff to be coordinated with the commissioning of each Line and the subsequent commencement of the Transport Services on such Line; and

37.11 process for the acceptance for operational purposes of the Infrastructure and Equipment from the Infrastructure Provider to the Operator.

38. GATEWAY FROM PROJECT PHASE C1 TO PROJECT PHASE C2

38.1 **tie** will issue a certificate to the Operator ("**Pre-Mobilisation Certificate**") to authorise mobilisation of those key staff required to initiate preparations (including but not exclusively planning and limited recruitment) for operational capability on the anticipated date for opening of the Line.

38.2 The Pre-Mobilisation Certificate for a Line shall be issued at a time to be agreed between **tie**, the Operator and the Infrastructure Provider(s) based upon the then current progress towards Planned

Service Commencement Date for the Line in accordance with the Project Programme and in sufficient time to permit an orderly process of staff recruitment.

38.3 **tie** will issue a certificate to the Operator ("**Mobilisation Certificate**") when it considers that the Operator should proceed to commence full mobilisation of all necessary operational staff and the other activities pursuant to Project Phase C2.

38.4 The Mobilisation Certificate for a Line will be issued not less than nine months prior to the Planned Service Commencement Date for the Line in accordance with the Project Programme.

PROJECT PHASE C2

39. OPERATOR'S PROJECT DEVELOPMENT RESOURCES DURING PROJECT PHASE C2

39.1 In addition to the Operator Project Manager appointed pursuant to Clause 6.7, the Operator shall devise and provide a suitable management structure to deliver:

39.1.1 the Project Development Services during Project Phase C2; and

39.1.2 to prepare to the deliver the Transport Services (together with any other Project Operations) during Project Phase D,

such management structure to be subject to the approval of **tie**, such approval not to be unreasonably withheld or delayed.

39.2 The Operator's management structure will be headed by the Operator Project Manager who will be assisted by experienced managers in all relevant disciplines, to include, as a minimum, operations, finance, quality assurance, human resources, marketing and safety.

39.3 The management structure plan devised pursuant to paragraph 39.2 may be amended during the progress of developments during Project Phase C2 to align with development of the System and its operations, such amendments to be subject to the approval of **tie**, such approval not to be unreasonably withheld or delayed.

39.4 The management structure plan shall define roles and responsibilities covering all aspects of the operation of the System including operations, maintenance, safety, customer services, public liaison, training and recruitment.

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40. OPERATOR'S ROLE DURING TESTING AND COMMISSIONING

40.1 In addition to continued participation in the joint project management team as outlined in paragraph 39 above, the Operator shall also take specific responsibility for management of the testing and commissioning process, such responsibilities to be carried out in accordance with the Testing and Commissioning Plan.

40.2 The responsibilities of the Operator in relation to management of the testing and commissioning process shall include:

40.2.1 observation if necessary and appropriate of any factory acceptance tests on Equipment to be provided;

40.2.2 attendance and certification of site acceptance tests on Infrastructure and/or Equipment not completed within Project Phase C1, if necessary and appropriate;

40.2.3 coordinating the obtaining of all Necessary Consents for commissioning and public operation and complying with those which are relevant to the Operator;

40.2.4 appointment and training of staff necessary for operation and maintenance of the System in public operation; and

40.2.5 ensuring that all relevant operational subcontracts are in place and that appropriate subcontractor staff training programmes are implemented.

41. MOBILISATION OF STAFF FOR PROJECT PHASE C2 AND PROJECT PHASE D

41.1 The Operator shall comply with the provisions of Clause 14 (*Personnel Issues*) of the Agreement in relation to appointing staff to operate and maintain the System.

41.2 The Operator shall safeguard efficient engagement on Project Phase D of the Project through sufficiency and timeliness of staff mobilisation at all levels.

41.3 The Operator shall create a manual describing the roles of each member of the Project Operations Staff and providing specific instructions for the proper performance of their duties. The Operator shall maintain and keep such manual up to date throughout Project Phase C2 and Project Phase D. The Operator shall provide to the **tie** Project Manager a copy of such manual (and each successive update) as soon as reasonably practicable after its production.

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42. STAFF TRAINING

The Operator shall comply with the terms of the Training Plan in relation to the training of all staff during Project Phase C and, without limitation, the Operator shall:

42.1 arrange for the necessary specialised training to ensure the competence of staff engaged in the provision of the Transport Services in relation to the operation of equipment, rapid fault finding and in the repair and maintenance of equipment provided; and

42.2 ensure that such training courses are coordinated with the commissioning of the System to ensure that trainees derive maximum benefit from progressive involvement.

43. MARKETING, PROMOTIONAL PUBLIC LIAISON AND MEDIA ACTIVITIES

The Operator shall comply with the terms of the Marketing Plan and the Public Liaison and Media Plan during Project Phase C.

44. CONSUMABLES, MATERIALS AND EQUIPMENT

The Operator shall comply with the provisions of paragraph 14 of the Operating Output Specification during Project Phase C2.

[redacted].

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

.....[redacted].....

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

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This is Schedule 3 referred to in the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 3

Key Personnel

The Key Personnel listed below shall be as identified in the Project Development and Operating Costs, and/or as may be notified by the Operator to **tie** in accordance with this Agreement or otherwise.

1. ***Project Director***
2. ***General Manager***
3. ***Technical Engineer***
4. ***Senior Commercial Manager***
5. ***Operations Manager***
6. ***Operator Project Manager***
7. ***Deputy Operator Project Manager***
8. ***Quality Manager***

[redacted]

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

[redacted]

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899943_0205

This is Schedule 4 referred to in the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 4

Financial Proposals

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Schedule 4												
Financial Proposals												
Caps	**Nominal**											
Network Phase A & B Cap	1,655,680											
Network Phase C1 Cap	2,269,468											
Target Costs for Project Phase C2	**Real**											
	1-Apr-03											
Network	3,269,650											
Line 1	2,200,691											
Line 2	2,209,268											
Profit Element Project Phase C2	**Real**											
	1-Apr-03											
	TOTAL	**28-Feb-09**	**31-Mar-09**	**30-Apr-09**	**31-May-09**	**30-Jun-09**	**31-Jul-09**	**31-Aug-09**	**30-Sep-09**	**31-Oct-09**		
Network	331,789	13,983	13,983	12,522	39,002	46,161	39,915	43,298	44,642	78,283		

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Line 1	219,549	13,006	13,006	11,569	24,275	30,919	24,819	27,480	28,271	46,204		
Line 2	220,449	13,008	13,008	11,572	24,772	31,403	25,226	27,887	28,554	45,019		
Profit Element Project Phase D	**Real**											
	1-Apr-03											
	TOTAL	**31-Mar-10**	**31-Mar-11**	**31-Mar-12**	**31-Mar-13**	**31-Mar-14**	**31-Mar-15**	**31-Mar-16**	**31-Mar-17**	**31-Mar-18**	**31-Mar-19**	**31-Mar-20**
Network	6,154,598	257,305	636,534	637,276	637,651	637,839	638,029	638,222	638,420	638,621	638,824	155,879
Line 1	3,874,806	160,555	400,956	401,301	401,493	401,606	401,722	401,841	401,966	402,094	402,224	99,048
Line 2	3,733,165	154,556	386,451	386,790	386,945	387,006	387,067	387,128	387,189	387,250	387,311	95,470
Project Return												
Project Phases A-C1	20.0%											
Project Phases C2- D	10.5%											

[redacted].....

Director/Authorised Signatory
Transport Initiatives Edinburgh Limited

[redacted]

Director/~~Authorised Signatory~~
TRANSDEV Edinburgh Tram Limited

SCHEDULE 5

Operator Financial Model

The Operator Financial Model is contained in the CD signed as relative hereto.

[redacted]..... [redacted]

Director/Authorised Signatory
Transport Initiatives Edinburgh Limited

Director/~~Authorised Signatory~~
TRANSDEV Edinburgh Tram Limited

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This is Schedule 6 referred to in the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 6

Project Development and Operating Costs

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Table 1

Phase A				
Staff Member	**At Cost Rate £/day** 1-Apr-03	**Project Return** 20%	**Project Return Adjusted £/day** 1-Apr-03	**Core?**
General Manager (GM)	639 £/day		766 £/day	Core
Technical Engineer (TE)	559 £/day		671 £/day	Core
Snr Commercial Manager	1,050 £/day		1,260 £/day	Core
Transportation Consultant	910 £/day		1,092 £/day	Non Core
David Humphrey (DH)	718 £/day		862 £/day	Core
Assistant	137 £/day		164 £/day	Core
Network Rail Expert	910 £/day		1,092 £/day	Non Core
Daniel Danman	948 £/day		1,138 £/day	Non Core
Operations Manager	248 £/day		298 £/day	Core
Christian Buisson	1,305 £/day		1,566 £/day	Non Core
Engineering Manger	248 £/day		298 £/day	Core
Legal Advisor	1,400 £/day		1,680 £/day	Non Core
Financial Modelling Consultant	2,100 £/day		2,520 £/day	Non Core

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Phase B				
Staff Member	**At Cost Rate £/day** 1-Apr-03	**Project Return** 20%	**Project Return Adjusted £/day**	**Core?**
General Manager (GM)	639 £/day		766 £/day	Core
Technical Engineer (TE - Jim Harris)	559 £/day		671 £/day	Core
Operations Manager	248 £/day		298 £/day	Core
Safety & Standards Manager	217 £/day		261 £/day	Core
David Humphrey	718 £/day		862 £/day	Core
Engineering Manager	248 £/day		298 £/day	Core
Assistant	137 £/day		164 £/day	Core
Snr Commercial Manager	1,050 £/day		1,260 £/day	Core
Technical Support Engineer (TSE)	186 £/day		224 £/day	Core
Transamo Director	1,305 £/day		1,566 £/day	Non Core
Transportation Consultant	910 £/day		1,092 £/day	Non Core
Legal Advisor	1,400 £/day		1,680 £/day	Non Core
Planning Supervisor	630 £/day		756 £/day	Non Core
Financial Modelling Consultant	2,100 £/day		2,520 £/day	Non Core

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Phase C1				
Staff Member	**At Cost Rate £/day** 1-Apr-03	**Project Return** 20%	**Project Return Adjusted £/day**	**Core?**
General Manager (GM)	639 £/day		766 £/day	Core
Technical Engineer (TE)	559 £/day		671 £/day	Core
Operations Manager	248 £/day		298 £/day	Core
Safety & Standards Manager	217 £/day		261 £/day	Core
Test Engineer 1	600 £/day		720 £/day	Core
Test Engineer 2	600 £/day		720 £/day	Core
Technical Support Engineer (TSE)	186 £/day		224 £/day	Core
Engineering Manager	248 £/day		298 £/day	Core
Assistant	137 £/day		164 £/day	Core
Snr Commercial Manager	1,050 £/day		1,260 £/day	Core
Operations Assistant	87 £/day		104 £/day	Core
Finance Manager	248 £/day		298 £/day	Core
Accounts Assistant 1	124 £/day		149 £/day	Core
Accounts Assistant 2	124 £/day		149 £/day	Core
Transamo Director	1,305 £/day		1,566 £/day	Non Core
Legal Advisor	1,400 £/day		1,680 £/day	Non Core
David Humphrey	630 £/day		756 £/day	Non Core

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Financial Modelling Consultant	2,100 £/day		2,520 £/day	Non Core

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Other Items Phases A-C1	Annual sum 01-Apr-03	Project Return 20%	Project Return Adjusted £/year
Insurance			
Employers Liability	3,000		3,600
Professional Indemnity	90,000		108,000
Third Party	5,250		6,300
Management Fee	10,000		12,000

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ANTICIPATED JOB TITLE		NUMBER	At Cost (SPV) Rate	Profit Margin	TIE Rate Excluding Profit Margin	TIE Rate Excluding Profit Margin	ANNUAL TIE COST	MOBILISATION PHASE C2 PERIOD REQUIRED PRIOR TO FULL OPERATION	TOTAL TIE COST C2	OPERATIONAL PHASE D TOTAL TIE ANNUAL COST
	Scenario		k£/year		k£/year	£/month	£	MONTHS	£	£
CORPORATE MANAGEMENT										
General Manager	Standard	1	148 k£/year	0.0%	148 k£/year	12,330 £/mth	147,960	9	110,970	147,960
Operations Manager	Standard	1	59 k£/year	0.0%	59 k£/year	4,950 £/mth	59,400	9	44,550	59,400
Commercial Manager	Standard	1	52 k£/year	0.0%	52 k£/year	4,363 £/mth	52,350	9	39,263	52,350
Part-time Test Engineer	Standard	1	173 k£/year		173 k£/year	14,400 £/mth	n/a	2	28,800	
OPERATIONS										
Duty Managers	Standard	11	31 k£/year	0.0%	31 k£/year	2,603 £/mth	343,530	9	257,648	343,530
Operations Supervisor	Standard	7	23 k£/year	0.0%	23 k£/year	1,952 £/mth	163,961	9	122,971	163,961
Operations Assistant	Standard	1	18 k£/year	0.0%	18 k£/year	1,518 £/mth	18,218	9	13,664	18,218
Drivers	Standard	48	22 k£/year	0.0%	22 k£/year	1,843 £/mth	1,061,808	6	530,904	1,061,808
Engineering Manager	Standard	1	59 k£/year	0.0%	59 k£/year	4,950 £/mth	59,400	9	44,550	59,400
Vehicle Engineer	Standard	1	42 k£/year	0.0%	42 k£/year	3,525 £/mth	42,300	9	31,725	42,300
Infrastructure Engineer	Standard	2	42 k£/year	0.0%	42 k£/year	3,525 £/mth	84,600	9	63,450	84,600
Safety and Standards Manager	Standard	1	52 k£/year	0.0%	52 k£/year	4,363 £/mth	52,350	9	39,263	52,350
Performance Regime Manager	Standard	1	49 k£/year	0.0%	49 k£/year	4,113 £/mth	49,350	9	37,013	49,350
Clerk	Standard	1	31 k£/year	0.0%	31 k£/year	2,585 £/mth	31,020	9	23,265	31,020
FINANCE										
Finance Manager	Standard	1	56 k£/year	0.0%	56 k£/year	4,700 £/mth	56,400	9	42,300	56,400
Accounts Assistant	Standard	2	28 k£/year	0.0%	28 k£/year	2,350 £/mth	56,400	9	42,300	56,400

TIE00899943_0216

COMMERCIAL										
Marketing Manager	Standard	1	29 k£/year	0.0%	29 k£/year	2,417 £/mth	29,000	6	14,500	29,000
Temp Cust Service - First 6 months of Phase D	Standard	10	147 k£/year	0.0%	147 k£/year	12,259 £/mth	n/a	1	122,588	
ADMINISTRATION										
Secretaries	Standard	1	31 k£/year	0.0%	31 k£/year	2,585 £/mth	31,020	9	23,265	31,020
Admin. Staff	Standard	1	21 k£/year	0.0%	21 k£/year	1,763 £/mth	21,150	6	10,575	21,150
Debt Recovery Staff	Standard	2	28 k£/year	0.0%	28 k£/year	2,333 £/mth	56,000	6	28,000	56,000
REVENUE PROTECTION STAFF										
Customer Service	Standard	24	22 k£/year	0.0%	22 k£/year	1,843 £/mth	530,904	1	44,242	530,904
Security Staff	Standard	4	28 k£/year	0.0%	28 k£/year	2,350 £/mth	112,800	1	9,400	112,800
Cashiers	Standard	2	21 k£/year	0.0%	21 k£/year	1,763 £/mth	42,300	1	3,525	42,300
Revenue Protection Manager	Standard	1	45 k£/year	0.0%	45 k£/year	3,750 £/mth	45,000	9	33,750	45,000
TOTAL									**1,762,478**	**3,147,221**

TIE00899943_0217

3a Line 2

ANTICIPATED JOB TITLE		NUMBER	At Cost (SPV) Rate	Profit Margin	TIE Rate Excluding Profit Margin	TIE Rate Excluding Profit Margin	ANNUAL TIE COST	MOBILISATION PHASE C2 PERIOD REQUIRED PRIOR TO FULL OPERATION	TOTAL TIE COST C2	OPERATIONAL PHASE D TOTAL TIE ANNUAL COST
	Scenario		k£/year		k£/year	£/month	£	MONTHS	£	£
CORPORATE MANAGEMENT										
General Manager	Standard	1	148 k£/year	0.0%	148 k£/year	12,330 £/mth	147,960	9	110,970	147,960
Operations Manager	Standard	1	59 k£/year	0.0%	59 k£/year	4,950 £/mth	59,400	9	44,550	59,400
Commercial Manager	Standard	1	52 k£/year	0.0%	52 k£/year	4,363 £/mth	52,350	9	39,263	52,350
Part-time Test Engineer	Standard	1	173 k£/year		173 k£/year	14,400 £/mth	n/a	2	28,800	
OPERATIONS										
Duty Managers	Standard	11	31 k£/year	0.0%	31 k£/year	2,603 £/mth	343,530	9	257,648	343,530
Operations Supervisor	Standard	7	23 k£/year	0.0%	23 k£/year	1,952 £/mth	163,961	9	122,971	163,961
Operations Assistant	Standard	1	18 k£/year	0.0%	18 k£/year	1,518 £/mth	18,218	9	13,664	18,218
Drivers	Standard	53	22 k£/year	0.0%	22 k£/year	1,843 £/mth	1,172,413	6	586,207	1,172,413
Engineering Manager	Standard	1	59 k£/year	0.0%	59 k£/year	4,950 £/mth	59,400	9	44,550	59,400
Vehicle Engineer	Standard	1	42 k£/year	0.0%	42 k£/year	3,525 £/mth	42,300	9	31,725	42,300
Infrastructure Engineer	Standard	2	42 k£/year	0.0%	42 k£/year	3,525 £/mth	84,600	9	63,450	84,600
Safety and Standards Manager	Standard	1	52 k£/year	0.0%	52 k£/year	4,363 £/mth	52,350	9	39,263	52,350
Performance Regime Manager	Standard	1	49 k£/year	0.0%	49 k£/year	4,113 £/mth	49,350	9	37,013	49,350
Clerk	Standard	1	31 k£/year	0.0%	31 k£/year	2,585 £/mth	31,020	9	23,265	31,020
FINANCE										
Finance Manager	Standard	1	56 k£/year	0.0%	56 k£/year	4,700 £/mth	56,400	9	42,300	56,400
Accounts Assistant	Standard	2	28 k£/year	0.0%	28 k£/year	2,350 £/mth	56,400	9	42,300	56,400

TIE00899943_0218

COMMERCIAL										
Marketing Manager	Standard	1	29 k£/year	0.0%	29 k£/year	2,417 £/mth	29,000	6	14,500	29,000
Temp Cust Service - First 6 months of Phase D	Standard	10	147 k£/year	0.0%	147 k£/year	12,259 £/mth	n/a	1	122,588	
ADMINISTRATION										
Secretaries	Standard	1	31 k£/year	0.0%	31 k£/year	2,585 £/mth	31,020	9	23,265	31,020
Admin. Staff	Standard	1	21 k£/year	0.0%	21 k£/year	1,763 £/mth	21,150	6	10,575	21,150
Debt Recovery Staff	Standard	2	28 k£/year	0.0%	28 k£/year	2,333 £/mth	56,000	6	28,000	56,000
REVENUE PROTECTION STAFF										
Customer Service	Standard	16	22 k£/year	0.0%	22 k£/year	1,843 £/mth	353,936	1	29,495	353,936
Security Staff	Standard	4	28 k£/year	0.0%	28 k£/year	2,350 £/mth	112,800	1	9,400	112,800
Cashiers	Standard	2	21 k£/year	0.0%	21 k£/year	1,763 £/mth	42,300	1	3,525	42,300
Revenue Protection Manager	Standard	1	45 k£/year	0.0%	45 k£/year	3,750 £/mth	45,000	9	33,750	45,000
TOTAL									**1,803,033**	**3,080,858**

TIE00899943_0219

3a Network

ANTICIPATED JOB TITLE		NUMBER	At Cost (SPV) Rate	Profit Margin	TIE Rate Excluding Profit Margin	TIE Rate Excluding Profit Margin	ANNUAL TIE COST	MOBILISATION PHASE C2 PERIOD REQUIRED PRIOR TO FULL OPERATION	TOTAL TIE COST C2	OPERATIONAL PHASE D TOTAL TIE ANNUAL COST
	Scenario		k£/year		k£/year	£/month	£	MONTHS	£	£
CORPORATE MANAGEMENT										
General Manager	Standard	1	148 k£/year	0.0%	148 k£/year	12,330 £/mth	147,960	9	110,970	147,960
Operations Manager	Standard	1	59 k£/year	0.0%	59 k£/year	4,950 £/mth	59,400	9	44,550	59,400
Commercial Manager	Standard	1	52 k£/year	0.0%	52 k£/year	4,363 £/mth	52,350	9	39,263	52,350
Part-time Test Engineer	Standard	1	173 k£/year		173 k£/year	14,400 £/mth	n/a	2	28,800	
OPERATIONS										
Duty Managers	Standard	11	31 k£/year	0.0%	31 k£/year	2,603 £/mth	343,530	9	257,648	343,530
Operations Supervisor	Standard	9	23 k£/year	0.0%	23 k£/year	1,952 £/mth	210,807	9	158,105	210,807
Operations Assistant	Standard	1	18 k£/year	0.0%	18 k£/year	1,518 £/mth	18,218	9	13,664	18,218
Drivers	Standard	106	22 k£/year	0.0%	22 k£/year	1,843 £/mth	2,344,826	6	1,172,413	2,344,826
Engineering Manager	Standard	1	59 k£/year	0.0%	59 k£/year	4,950 £/mth	59,400	9	44,550	59,400
Vehicle Engineer	Standard	1	42 k£/year	0.0%	42 k£/year	3,525 £/mth	42,300	9	31,725	42,300
Infrastructure Engineer	Standard	3	42 k£/year	0.0%	42 k£/year	3,525 £/mth	126,900	9	95,175	126,900
Safety and Standards Manager	Standard	1	52 k£/year	0.0%	52 k£/year	4,363 £/mth	52,350	9	39,263	52,350
Performance Regime Manager	Standard	1	49 k£/year	0.0%	49 k£/year	4,113 £/mth	49,350	9	37,013	49,350
Clerk	Standard	1	31 k£/year	0.0%	31 k£/year	2,585 £/mth	31,020	9	23,265	31,020

TIE00899943_0220

FINANCE										
Finance Manager	Standard	1	56 k£/year	0.0%	56 k£/year	4,700 £/mth	56,400	9	42,300	56,400
Accounts Assistant	Standard	2	28 k£/year	0.0%	28 k£/year	2,350 £/mth	56,400	9	42,300	56,400
COMMERCIAL										
Marketing Manager	Standard	1	29 k£/year	0.0%	29 k£/year	2,417 £/mth	29,000	6	14,500	29,000
Temp Cust Service - First 6 months of Phase D	Standard	20	147 k£/year	0.0%	147 k£/year	12,259 £/mth	n/a	1	245,175	
ADMINISTRATION										
Secretaries	Standard	1	31 k£/year	0.0%	31 k£/year	2,585 £/mth	31,020	9	23,265	31,020
Admin. Staff	Standard	2	21 k£/year	0.0%	21 k£/year	1,763 £/mth	42,300	6	21,150	42,300
Debt Recovery Staff	Standard	4	28 k£/year	0.0%	28 k£/year	2,333 £/mth	112,000	6	56,000	112,000
REVENUE PROTECTION STAFF										
Customer Service	Standard	36	22 k£/year	0.0%	22 k£/year	1,843 £/mth	796,356	1	66,363	796,356
Security Staff	Standard	7	28 k£/year	0.0%	28 k£/year	2,350 £/mth	197,400	1	16,450	197,400
Cashiers	Standard	2	21 k£/year	0.0%	21 k£/year	1,763 £/mth	42,300	1	3,525	42,300
Revenue Protection Manager	Standard	1	45 k£/year	0.0%	45 k£/year	3,750 £/mth	45,000	9	33,750	45,000
TOTAL									**2,661,180**	**4,946,587**

TIE00899943_0221

3b Phase C2 Line 1

PHASE C2		MOBILISATION PHASE C2		Profit Margin			
		PERIOD REQUIRED PRIOR TO FULL OPERATION	At Cost (SPV) Annual Rate		TIE Annual Rate	TIE Monthly Cost	TOTAL TIE COST PHASE C2
	Scenario	MONTHS	k£/year		k£/year	£/month	£
Travel, Hotels, etc.	Standard	6	5 k£/year	0.0%	5 k£/year	439 £/mth	2,636
External Training & Welfare	Standard	6	32 k£/year	0.0%	32 k£/year	2,626 £/mth	15,758
Office machinery rentals	Standard	6	6 k£/year	0.0%	6 k£/year	505 £/mth	3,030
Consumables & subscriptions	Standard	6	5 k£/year	0.0%	5 k£/year	455 £/mth	2,727
Health, Safety & Environmental costs	Standard	6	3 k£/year	0.0%	3 k£/year	250 £/mth	1,500
Legal Advice	Standard	9	5 k£/year	0.0%	5 k£/year	417 £/mth	3,750
Telephone expenses	Standard	6	22 k£/year	0.0%	22 k£/year	1,869 £/mth	11,212
Finance support	Standard	6	10 k£/year	0.0%	10 k£/year	833 £/mth	5,000
Uniforms	Standard	6	30 k£/year	0.0%	30 k£/year	2,458 £/mth	14,750
Recruitment	Standard	6	5 k£/year	0.0%	5 k£/year	455 £/mth	2,727
Medical examinations	Standard	6	7 k£/year	0.0%	7 k£/year	606 £/mth	3,636
Ticket Stock	Standard	6	5 k£/year	0.0%	5 k£/year	455 £/mth	2,727
Passenger information (Timetables etc.)	Standard	2	20 k£/year	0.0%	20 k£/year	1,667 £/mth	3,333
Launch Costs	Standard	3	320 k£/year	0.0%	320 k£/year	26,667 £/mth	80,000
Market Research	Standard	2	20 k£/year	0.0%	20 k£/year	1,667 £/mth	3,333
Training materials	Standard	6	2 k£/year	0.0%	2 k£/year	202 £/mth	1,212
Audit & Investors in People	Standard	6	5 k£/year	0.0%	5 k£/year	455 £/mth	2,727
Road vehicle costs 1	Standard	6	16 k£/year	0.0%	16 k£/year	1,333 £/mth	8,000
Maintenance IT system support	Standard	6	8 k£/year	0.0%	8 k£/year	707 £/mth	4,242
Other Power & Gas	Standard	6	36 k£/year	0.0%	36 k£/year	2,980 £/mth	17,879
Water & Sewerage	Standard	6	7 k£/year	0.0%	7 k£/year	606 £/mth	3,636
Tram cleaning	Standard	4	65 k£/year	0.0%	65 k£/year	5,455 £/mth	21,818
Tramstop and infrastructure cleaning	Standard	2	55 k£/year	0.0%	55 k£/year	4,596 £/mth	9,192
Provision of helpdesk	Standard	6	20 k£/year	0.0%	20 k£/year	1,667 £/mth	10,000

TIE00899943_0222

Accidental Damage --> standard	Standard	6	26 k£/year	0.0%	26 k£/year	2,200 £/mth	13,200
Accidental Damage --> risk element	Standard	6	14 k£/year	0.0%	14 k£/year	1,144 £/mth	6,865
Vanadalisation Damage --> standard	Standard	6	44 k£/year	0.0%	44 k£/year	3,652 £/mth	21,910
Vanadalisation Damage --> risk element	Standard	6	22 k£/year	0.0%	22 k£/year	1,848 £/mth	11,085
Grafitti Damage --> standard	Standard	6	18 k£/year	0.0%	18 k£/year	1,496 £/mth	8,975
Grafitti Damage --> risk element	Standard	6	10 k£/year	0.0%	10 k£/year	792 £/mth	4,750
One-off purchase of software	Standard	9	13 k£/year	0.0%	13 k£/year	1,111 £/mth	10,000

TIE00899943_0223

Other Items Phase C2	Annual sum 01-Apr-03	Project Return 10.5%	Project Return Adjusted £/year 01-Apr-03
Insurance			
Employers Liability: base	3,000		3,315
Employers Liability additional staff (per person)	50		55.25
Professional Indemnity	53,000		58,565
Third Party	5,250		5,801
Management Fee	80,000		88,400

TIE00899943_0224

3b Phase C2 Line 2

PHASE C2		MOBILISATION PHASE C2		Profit Margin			
		PERIOD REQUIRED PRIOR TO FULL OPERATION	At Cost (SPV) Annual Rate		TIE Annual Rate	TIE Monthly Cost	TOTAL TIE COST PHASE C2
	Scenario	MONTHS	k£/year		k£/year	£/month	£
Travel, Hotels, etc.	Standard	6	4 k£/year	0.0%	4 k£/year	366 £/mth	2,197
External Training & Welfare	Standard	6	26 k£/year	0.0%	26 k£/year	2,189 £/mth	13,131
Office machinery rentals	Standard	6	5 k£/year	0.0%	5 k£/year	421 £/mth	2,525
Consumables & subscriptions	Standard	6	5 k£/year	0.0%	5 k£/year	379 £/mth	2,273
Health, Safety & Environmental costs	Standard	6	3 k£/year	0.0%	3 k£/year	253 £/mth	1,515
Legal Advice	Standard	9	5 k£/year	0.0%	5 k£/year	417 £/mth	3,750
Telephone expenses	Standard	6	19 k£/year	0.0%	19 k£/year	1,557 £/mth	9,343
Finance support	Standard	6	9 k£/year	0.0%	9 k£/year	758 £/mth	4,545
Uniforms	Standard	6	29 k£/year	0.0%	29 k£/year	2,396 £/mth	14,375
Recruitment	Standard	6	5 k£/year	0.0%	5 k£/year	379 £/mth	2,273
Medical examinations	Standard	6	6 k£/year	0.0%	6 k£/year	505 £/mth	3,030
Ticket Stock	Standard	6	5 k£/year	0.0%	5 k£/year	379 £/mth	2,273
Passenger information (Timetables etc.)	Standard	2	17 k£/year	0.0%	17 k£/year	1,431 £/mth	2,862
Launch Costs	Standard	3	320 k£/year	0.0%	320 k£/year	26,667 £/mth	80,000
Market Research	Standard	2	17 k£/year	0.0%	17 k£/year	1,431 £/mth	2,862
Training materials	Standard	6	2 k£/year	0.0%	2 k£/year	168 £/mth	1,010
Audit & Investors in People	Standard	6	5 k£/year	0.0%	5 k£/year	379 £/mth	2,273
Road vehicle costs 1	Standard	6	16 k£/year	0.0%	16 k£/year	1,333 £/mth	8,000
Maintenance IT system support	Standard	6	7 k£/year	0.0%	7 k£/year	589 £/mth	3,535
Other Power & Gas	Standard	6	30 k£/year	0.0%	30 k£/year	2,483 £/mth	14,899
Water & Sewerage	Standard	6	6 k£/year	0.0%	6 k£/year	505 £/mth	3,030
Tram cleaning	Standard	4	55 k£/year	0.0%	55 k£/year	4,545 £/mth	18,182
Tramstop and infrastructure cleaning	Standard	2	46 k£/year	0.0%	46 k£/year	3,830 £/mth	7,660
Provision of helpdesk	Standard	6	17 k£/year	0.0%	17 k£/year	1,431 £/mth	8,586

TIE00899943_0225

Accidental Damage --> standard	Standard	6	22 k£/year	0.0%	22 k£/year	1,833 £/mth	11,000
Accidental Damage --> risk element	Standard	6	11 k£/year	0.0%	11 k£/year	953 £/mth	5,720
Vanadalisation Damage --> standard	Standard	6	37 k£/year	0.0%	37 k£/year	3,043 £/mth	18,255
Vanadalisation Damage --> risk element	Standard	6	18 k£/year	0.0%	18 k£/year	1,540 £/mth	9,240
Grafitti Damage --> standard	Standard	6	15 k£/year	0.0%	15 k£/year	1,247 £/mth	7,480
Grafitti Damage --> risk element	Standard	6	8 k£/year	0.0%	8 k£/year	660 £/mth	3,960
One-off purchase of software	Standard	9	13 k£/year	0.0%	13 k£/year	1,111 £/mth	10,000

TIE00899943_0226

Other Items Phase C2	Annual sum 01-Apr-03	Project Return 10.5%	Project Return Adjusted £/year 01-Apr-03
Insurance			
Employers Liability: base	3,000		3,315
Employers Liability additional staff (per person)	50		55.25
Professional Indemnity	53,000		58,565
Third Party	5,250		5,801
Management Fee	80,000		88,400

TIE00899943_0227

3b Phase C2 Network

PHASE C2	MOBILISATION PHASE C2		Profit Margin	TIE Annual Rate	TIE Monthly Cost Excluding Profit Margin	TOTAL TIE COST PHASE C2
	PERIOD REQUIRED PRIOR TO FULL OPERATION	At Cost (SPV) Annual Rate		Excluding Profit Margin		
	MONTHS	k£/year		k£/year	£/month	£
Travel, Hotels, etc.	6	9 k£/year	0.0%	9 k£/year	725 £/mth	4,350
External Training & Welfare	6	52 k£/year	0.0%	52 k£/year	4,333 £/mth	26,000
Office machinery rentals	6	10 k£/year	0.0%	10 k£/year	833 £/mth	5,000
Consumables & subscriptions	6	9 k£/year	0.0%	9 k£/year	750 £/mth	4,500
Health, Safety & Environmental costs	6	6 k£/year	0.0%	6 k£/year	500 £/mth	3,000
Legal Advice	9	5 k£/year	0.0%	5 k£/year	417 £/mth	3,750
Telephone expenses	6	37 k£/year	0.0%	37 k£/year	3,083 £/mth	18,500
Finance support	6	18 k£/year	0.0%	18 k£/year	1,500 £/mth	9,000
Uniforms	6	51 k£/year	0.0%	51 k£/year	4,271 £/mth	25,625
Recruitment	6	9 k£/year	0.0%	9 k£/year	750 £/mth	4,500
Medical examinations	6	12 k£/year	0.0%	12 k£/year	1,000 £/mth	6,000
Ticket Stock	6	9 k£/year	0.0%	9 k£/year	750 £/mth	4,500
Passenger information (Timetables etc.)	2	34 k£/year	0.0%	34 k£/year	2,833 £/mth	5,667
Launch Costs	3	400 k£/year	0.0%	400 k£/year	33,333 £/mth	100,000
Market Research	2	34 k£/year	0.0%	34 k£/year	2,833 £/mth	5,667
Training materials	6	4 k£/year	0.0%	4 k£/year	333 £/mth	2,000
Audit & Investors in People	6	9 k£/year	0.0%	9 k£/year	750 £/mth	4,500
Road vehicle costs 1	6	29 k£/year	0.0%	29 k£/year	2,417 £/mth	14,500
Maintenance IT system support	6	14 k£/year	0.0%	14 k£/year	1,167 £/mth	7,000
Other Power & Gas	6	59 k£/year	0.0%	59 k£/year	4,917 £/mth	29,500
Water & Sewerage	6	12 k£/year	0.0%	12 k£/year	1,000 £/mth	6,000
Tram cleaning	4	108 k£/year	0.0%	108 k£/year	9,000 £/mth	36,000
Tramstop and infrastructure cleaning	2	91 k£/year	0.0%	91 k£/year	7,583 £/mth	15,167
Provision of helpdesk	6	34 k£/year	0.0%	34 k£/year	2,833 £/mth	17,000

TIE00899943_0228

Accidental Damage --> standard	6	44 k£/year	0.0%	44 k£/year	3,629 £/mth	21,775
Accidental Damage --> risk element	6	23 k£/year	0.0%	23 k£/year	1,888 £/mth	11,325
Vanadalisation Damage --> standard	6	72 k£/year	0.0%	72 k£/year	6,025 £/mth	36,150
Vanadalisation Damage --> risk element	6	37 k£/year	0.0%	37 k£/year	3,049 £/mth	18,295
Grafitti Damage --> standard	6	30 k£/year	0.0%	30 k£/year	2,468 £/mth	14,810
Grafitti Damage --> risk element	6	16 k£/year	0.0%	16 k£/year	1,307 £/mth	7,840
One-off purchase of software	9	13 k£/year	0.0%	13 k£/year	1,111 £/mth	10,000

TIE00899943_0229

Other Items Phase C2	Annual sum 01-Apr-03	Project Return 10.5%	Project Return Adjusted £/year 01-Apr-03
Insurance			
Employers Liability: base	3,000		3,315
Employers Liability additional staff (per person)	50		55.25
Professional Indemnity	53,000		58,565
Third Party	5,250		5,801
Management Fee	80,000		88,400

TIE00899943_0230

3b Phase D Line 1

PHASE D		At Cost (SPV) Annual Rate	Profit Margin	TOTAL TIE ANNUAL COST PHASE D	OPERATIONAL PHASE D MONTHLY TIE COST
	Scenario	k£/year		k£/year	£/month
Travel, Hotels, etc.	Standard	5 k£/year	0.0%	5 k£/year	439 £/mth
External Training & Welfare	Standard	32 k£/year	0.0%	32 k£/year	2,626 £/mth
Cash collecting & counting	Standard	19 k£/year	0.0%	19 k£/year	1,616 £/mth
Office machinery rentals	Standard	6 k£/year	0.0%	6 k£/year	505 £/mth
Consumables & subscriptions	Standard	5 k£/year	0.0%	5 k£/year	455 £/mth
Health, Safety & Environmental costs	Standard	3 k£/year	0.0%	3 k£/year	250 £/mth
Legal Advice	Standard	5 k£/year	0.0%	5 k£/year	417 £/mth
Telephone expenses	Standard	22 k£/year	0.0%	22 k£/year	1,869 £/mth
Finance support	Standard	10 k£/year	0.0%	10 k£/year	833 £/mth
Uniforms	Standard	27 k£/year	0.0%	27 k£/year	2,250 £/mth
Recruitment	Standard	5 k£/year	0.0%	5 k£/year	455 £/mth
Medical examinations	Standard	7 k£/year	0.0%	7 k£/year	606 £/mth
Ticket Stock	Standard	5 k£/year	0.0%	5 k£/year	455 £/mth
Substitute Buses	Standard	18 k£/year	0.0%	18 k£/year	1,496 £/mth
Passenger information (Timetables etc.)	Standard	20 k£/year	0.0%	20 k£/year	1,667 £/mth
Advertising & Marketing Costs	Standard	60 k£/year	0.0%	60 k£/year	5,000 £/mth
Market Research	Standard	20 k£/year	0.0%	20 k£/year	1,667 £/mth
Training materials	Standard	2 k£/year	0.0%	2 k£/year	202 £/mth
Audit & Investors in People	Standard	5 k£/year	0.0%	5 k£/year	455 £/mth
Performance Monitoring Surveys	Standard	9 k£/year	0.0%	9 k£/year	750 £/mth
Road vehicle costs 1	Standard	16 k£/year	0.0%	16 k£/year	1,333 £/mth
Maintenance IT system support	Standard	8 k£/year	0.0%	8 k£/year	707 £/mth
Other Power & Gas	Standard	36 k£/year	0.0%	36 k£/year	2,980 £/mth
Water & Sewerage	Standard	7 k£/year	0.0%	7 k£/year	606 £/mth
Tram cleaning	Standard	65 k£/year	0.0%	65 k£/year	5,455 £/mth

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Tramstop and infrastructure cleaning	Standard	55 k£/year	0.0%	55 k£/year	4,596 £/mth
Provision of helpdesk	Standard	20 k£/year	0.0%	20 k£/year	1,667 £/mth
Accidental Damage --> standard	Standard	26 k£/year	0.0%	26 k£/year	2,200 £/mth
Accidental Damage --> risk element	Standard	14 k£/year	0.0%	14 k£/year	1,144 £/mth
Vanadalisation Damage --> standard	Standard	44 k£/year	0.0%	44 k£/year	3,652 £/mth
Vanadalisation Damage --> risk element	Standard	22 k£/year	0.0%	22 k£/year	1,848 £/mth
Grafitti Damage --> standard	Standard	18 k£/year	0.0%	18 k£/year	1,496 £/mth
Grafitti Damage --> risk element	Standard	10 k£/year	0.0%	10 k£/year	792 £/mth
Miscellaneous costs	Standard	5 k£/year	0.0%	5 k£/year	455 £/mth

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Other Items Phase D	Annual sum 01-Apr-03	Project Return 10.5%	Project Return Adjusted £/year 01-Apr-03
Insurance			
Employers Liability: base	3,000		3,315
Employers Liability additional staff (per person)	50		55.25
Professional Indemnity	53,000		58,565
Third Party:	0		0
RTA	2,500		2,762.5
Claims per month	3		3
Claims successful	40%		40%
Adjustment factor	75%		75%
Injuries	1,250		1,381.25
Claims	1.5 claims/ million passenger journeys		1.5 claims/ million passenger journeys
Claims successful	40%		40%
Management Fee	60,000		66,300
Bond 1% of £5million	50,000		55,250
Bank Charges	0.5% passenger revenue		0.5525% passenger revenue

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3b Phase D Line 2

PHASE D		At Cost (SPV) Annual Rate	Profit Margin	TOTAL TIE ANNUAL COST PHASE D	OPERATIONAL PHASE D MONTHLY TIE COST
	Scenario	k£/year		k£/year	£/month
Travel, Hotels, etc.	Standard	4 k£/year	0.0%	4 k£/year	366 £/mth
External Training & Welfare	Standard	26 k£/year	0.0%	26 k£/year	2,189 £/mth
Cash collecting & counting	Standard	16 k£/year	0.0%	16 k£/year	1,347 £/mth
Office machinery rentals	Standard	5 k£/year	0.0%	5 k£/year	421 £/mth
Consumables & subscriptions	Standard	5 k£/year	0.0%	5 k£/year	379 £/mth
Health, Safety & Environmental costs	Standard	3 k£/year	0.0%	3 k£/year	253 £/mth
Legal Advice	Standard	5 k£/year	0.0%	5 k£/year	417 £/mth
Telephone expenses	Standard	19 k£/year	0.0%	19 k£/year	1,557 £/mth
Finance support	Standard	9 k£/year	0.0%	9 k£/year	758 £/mth
Uniforms	Standard	26 k£/year	0.0%	26 k£/year	2,188 £/mth
Recruitment	Standard	5 k£/year	0.0%	5 k£/year	379 £/mth
Medical examinations	Standard	6 k£/year	0.0%	6 k£/year	505 £/mth
Ticket Stock	Standard	5 k£/year	0.0%	5 k£/year	379 £/mth
Substitute Buses	Standard	15 k£/year	0.0%	15 k£/year	1,247 £/mth
Passenger information (Timetables etc.)	Standard	17 k£/year	0.0%	17 k£/year	1,431 £/mth
Advertising & Marketing Costs	Standard	50 k£/year	0.0%	50 k£/year	4,167 £/mth
Market Research	Standard	17 k£/year	0.0%	17 k£/year	1,431 £/mth
Training materials	Standard	2 k£/year	0.0%	2 k£/year	168 £/mth
Audit & Investors in People	Standard	5 k£/year	0.0%	5 k£/year	379 £/mth
Performance Monitoring Surveys	Standard	8 k£/year	0.0%	8 k£/year	673 £/mth
Road vehicle costs 1	Standard	16 k£/year	0.0%	16 k£/year	1,333 £/mth
Maintenance IT system support	Standard	7 k£/year	0.0%	7 k£/year	589 £/mth
Other Power & Gas	Standard	30 k£/year	0.0%	30 k£/year	2,483 £/mth
Water & Sewerage	Standard	6 k£/year	0.0%	6 k£/year	505 £/mth
Tram cleaning	Standard	55 k£/year	0.0%	55 k£/year	4,545 £/mth

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Tramstop and infrastructure cleaning	Standard	46 k£/year	0.0%	46 k£/year	3,830 £/mth
Provision of helpdesk	Standard	17 k£/year	0.0%	17 k£/year	1,431 £/mth
Accidental Damage --> standard	Standard	22 k£/year	0.0%	22 k£/year	1,833 £/mth
Accidental Damage --> risk element	Standard	11 k£/year	0.0%	11 k£/year	953 £/mth
Vanadalisation Damage --> standard	Standard	37 k£/year	0.0%	37 k£/year	3,043 £/mth
Vanadalisation Damage --> risk element	Standard	18 k£/year	0.0%	18 k£/year	1,540 £/mth
Grafitti Damage --> standard	Standard	15 k£/year	0.0%	15 k£/year	1,247 £/mth
Grafitti Damage --> risk element	Standard	8 k£/year	0.0%	8 k£/year	660 £/mth
Miscellaneous costs	Standard	5 k£/year	0.0%	5 k£/year	379 £/mth

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Other Items Phase D	Annual sum 01-Apr-03	Project Return 10.5%	Project Return Adjusted £/year 01-Apr-03
Insurance			
Employers Liability: base	3,000		3,315
Employers Liability additional staff (per person)	50		55.25
Professional Indemnity	53,000		58,565
Third Party:	0		0
RTA	2,500		2,762.5
Claims per month	2		2
Claims successful	40%		40%
Adjustment factor	75%		75%
Injuries	1,250		1,381.25
Claims	1.5 claims/ million passenger journeys		1.5 claims/ million passenger journeys
Claims successful	40%		40%
Management Fee	60,000		66,300
Bond 1% of £5million	50,000		55,250
Bank Charges	0.5% passenger revenue		0.5525% passenger revenue

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3b Phase D Network

PHASE D	At Cost (SPV) Annual Rate	Profit Margin	TOTAL TIE ANNUAL COST PHASE D Excluding Profit Margin	OPERATIONAL PHASE D MONTHLY TIE COST Excluding Profit Margin
	k£/year		k£/year	£/month
Travel, Hotels, etc.	9 k£/year	0.0%	9 k£/year	725 £/mth
External Training & Welfare	52 k£/year	0.0%	52 k£/year	4,333 £/mth
Cash collecting & counting	32 k£/year	0.0%	32 k£/year	2,667 £/mth
Office machinery rentals	10 k£/year	0.0%	10 k£/year	833 £/mth
Consumables & subscriptions	9 k£/year	0.0%	9 k£/year	750 £/mth
Health, Safety & Environmental costs	6 k£/year	0.0%	6 k£/year	500 £/mth
Legal Advice	5 k£/year	0.0%	5 k£/year	417 £/mth
Telephone expenses	37 k£/year	0.0%	37 k£/year	3,083 £/mth
Finance support	18 k£/year	0.0%	18 k£/year	1,500 £/mth
Uniforms	46 k£/year	0.0%	46 k£/year	3,854 £/mth
Recruitment	9 k£/year	0.0%	9 k£/year	750 £/mth
Medical examinations	12 k£/year	0.0%	12 k£/year	1,000 £/mth
Ticket Stock	9 k£/year	0.0%	9 k£/year	750 £/mth
Substitute Buses	30 k£/year	0.0%	30 k£/year	2,468 £/mth
Passenger information (Timetables etc.)	34 k£/year	0.0%	34 k£/year	2,833 £/mth
Advertising & Marketing Costs	100 k£/year	0.0%	100 k£/year	8,333 £/mth
Market Research	34 k£/year	0.0%	34 k£/year	2,833 £/mth
Training materials	4 k£/year	0.0%	4 k£/year	333 £/mth
Audit & Investors in People	9 k£/year	0.0%	9 k£/year	750 £/mth
Performance Monitoring Surveys	16 k£/year	0.0%	16 k£/year	1,333 £/mth
Road vehicle costs 1	29 k£/year	0.0%	29 k£/year	2,417 £/mth
Maintenance IT system support	14 k£/year	0.0%	14 k£/year	1,167 £/mth
Other Power & Gas	59 k£/year	0.0%	59 k£/year	4,917 £/mth
Water & Sewerage	12 k£/year	0.0%	12 k£/year	1,000 £/mth
Tram cleaning	108 k£/year	0.0%	108 k£/year	9,000 £/mth

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Tramstop and infrastructure cleaning	91 k£/year	0.0%	91 k£/year	7,583 £/mth
Provision of helpdesk	34 k£/year	0.0%	34 k£/year	2,833 £/mth
Accidental Damage --> standard	44 k£/year	0.0%	44 k£/year	3,629 £/mth
Accidental Damage --> risk element	23 k£/year	0.0%	23 k£/year	1,888 £/mth
Vanadalisation Damage --> standard	72 k£/year	0.0%	72 k£/year	6,025 £/mth
Vanadalisation Damage --> risk element	37 k£/year	0.0%	37 k£/year	3,049 £/mth
Grafitti Damage --> standard	30 k£/year	0.0%	30 k£/year	2,468 £/mth
Grafitti Damage --> risk element	16 k£/year	0.0%	16 k£/year	1,307 £/mth
Miscellaneous costs	9 k£/year	0.0%	9 k£/year	750 £/mth

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Other Items Phase D	Annual sum 01-Apr-03	Project Return 10.5%	Project Return Adjusted £/year 01-Apr-03
Insurance			
Employers Liability: base	3,000		3,315
Employers Liability additional staff (per person)	50		55.25
Professional Indemnity	53,000		58,565
Third Party:	0		0
RTA	2,500		2,762.5
Claims per month	4		4
Claims successful	40%		40%
Adjustment factor	75%		75%
Injuries	1,250		1,381.25
Claims	1.5 claims/ million passenger journeys		1.5 claims/ million passenger journeys
Claims successful	40%		40%
Management Fee	60,000		66,300
Bond 1% of £5million	50,000		55,250
Bank Charges	0.5% passenger revenue		0.5525% passenger revenue

[redacted]

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Director/Authorised Signatory
Transport Initiatives Edinburgh Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

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SCHEDULE 7

Dispute Resolution Procedure

1. DISPUTE RESOLUTION PROCEDURE

1.1 Any Dispute shall be dealt with in accordance with the procedures contained in this Schedule 7.

1.2 Any Dispute shall, in the first instance, be referred to the **Internal Resolution Procedure** in accordance with paragraph 2 below.

1.3 Save as expressly provided for:

1.3.1 in paragraph 3 in respect of Disputes arising during Project Phases A or B (under exception of Disputes arising under or in relation to Clause 10.5 of the Agreement); and

1.3.2 in paragraph 4 in relation to Disputes arising during Project Phases C or D, or arising under or in relation to Clause 10.5 of the Agreement during any Project Phase;

neither Party shall commence any court proceedings until the procedures in paragraphs 2 - 6 as appropriate of this Schedule 7 have been completed, under exception that the provisions of this Schedule 7 shall not apply so as to prevent either Party seeking an interim order, or interim relief, in the Scottish courts.

1.4 The provisions of this Schedule 7 shall not apply to matters expressly reserved to some other jurisdiction pursuant to the Scottish Private Bill(s).

1.5 In the event that any court proceedings whatsoever are initiated by either Party against the other, the Parties agree that the Court of Session, Scotland, shall have exclusive jurisdiction.

1.6 Neither Party shall be entitled to suspend the performance of its undisputed obligations under this Agreement merely by reason of the reference of any Dispute to the Dispute Resolution Procedure contained in this Schedule 7.

1.7 Subject to **tie**'s discretionary rights set out in paragraph 6 to require that a Dispute and a Related Dispute (as defined in paragraph 6) be dealt with together at an appropriate

stage of the Dispute Resolution Procedure, the provisions of this Schedule 7 are mandatory and binding upon the Parties.

1.8 Unless a Party refers a Dispute to the Dispute Resolution Procedure contained in this Schedule 7 within three months of the date on which the event, matter or situation giving rise to the Dispute first occurred, such Party shall be deemed to have irrevocably waived any right to refer such Dispute to the Dispute Resolution Procedure contained in this Schedule 7, under exception that if such Party was not aware, and could not with reasonable diligence have been aware, that such event, matter or situation had occurred, this paragraph 1.8 shall have effect as if for the reference herein to the date on which such event, matter or situation occurred, there was substituted a reference to the date when such Party first became, or could with reasonable diligence have become, aware that such event, matter or situation had occurred. This paragraph 1.8 is without prejudice to the right of either Party to raise in defence to any Dispute any defence (including, without prejudice to the foregoing generality, any defence of retention, compensation or set-off) which would otherwise be available to it.

1.9 Except in relation to the matters provided for in paragraph 5 ("*Adjudication*"), and subject to the provisions of paragraph 1.10, in the event that either Party pursues any Dispute under the Dispute Resolution Procedure contained in this Schedule 7, and in the event that such Party fails to observe any time limit or timescale provided for in this Schedule 7 in relation to the pursuit or progression of such Dispute, such Party shall, immediately upon such failure occurring, be deemed to have irrevocably waived any right to pursue or progress such Dispute any further. In that event, such Party shall be deemed to have elected not to have referred such Dispute or to have withdrawn such Dispute from the Dispute Resolution Procedure contained in this Schedule 7 and shall be deemed to have irrevocably waived any right to refer the same or substantially the same Dispute to the Dispute Resolution Procedure contained in this Schedule 7 and shall be liable for payment of the whole fees incurred by any mediator or adjudicator who has acted in respect of such Dispute. This paragraph 1.9 is without prejudice to the rights of either Party to raise in defence to any Dispute any defence (including, without prejudice to the foregoing generality, any defence of retention, compensation or set-off) which would otherwise be available to it.

1.10 Notwithstanding the provisions of paragraph 1.9, in the event that a Party who pursues any Dispute under the Dispute Resolution Procedure contained in this

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Schedule 7 fails to observe any time limit or timescale provided for in this Schedule 7 in relation to the pursuit or progression of the Dispute, the other Party may elect to waive such failure, in which event the time limit or timescale to which such failure relates shall be extended at the discretion of such other Party and the Dispute shall progress in accordance with the Dispute Resolution Procedure contained in this Schedule 7, subject that all other time limits and timescales provided for in this Schedule 7 which are affected by such extension shall be deemed to have been extended to give effect to such extension of the time limit or timescale to which such failure relates.

2. The following procedure is the Internal Resolution Procedure referred to in paragraph 1:

2.1 In the event of any Dispute arising, the Operator Project Manager and the **tie** Project Manager shall seek to resolve the Dispute at a meeting to be convened within three Business Days of written notification by either Party to the other that it wishes to initiate the Internal Resolution Procedure in respect of that Dispute (**"Notification"**). Such Notification shall be given in accordance with the provisions of Clause 55 (*Notices*) of the Agreement.

2.2 Further meetings may follow the meeting referred to in paragraph 2.1, but in any event, if the Dispute is not resolved within seven Business Days of Notification, each Party shall, before the expiry of the period of ten Business Days from Notification, serve, in accordance with the provisions of Clause 55 (*"Notices"*) of the Agreement, a written position paper (**"Position Paper"**) upon the other Party. Each Party's Position Paper shall state in reasonable detail that Party's position and required objectives in relation to the Dispute; any required redress, and, where possible, any comments on the other Party's position.

2.3 Upon such service of a Position Paper by the Party initiating or pursuing the Dispute, the Chairman of the Operator's immediate parent company and the Chief Executive of **tie** (or their respective deputies in the event of their unavailability) shall seek to resolve the Dispute by meeting in good faith to discuss and negotiate upon the Dispute without recourse to legal or other proceedings.

2.4 In the event that resolution of the Dispute is achieved by the Chairman of the Operator's immediate parent company and the Chief Executive of **tie** , the resolution shall be reduced to writing and, once it is signed by the duly authorised representatives of both Parties, shall be binding on the Parties.

2.5 Unless concluded by a written legally binding agreement, all discussions and negotiations connected with the Dispute shall be conducted in confidence and without prejudice to the rights of the Parties in any future legal or other proceedings. Nor may such matters be produced or relied upon in evidence in any such proceedings.

3. In the event that any Dispute arising during Project Phases A or B (under exception of Disputes arising under or in relation to Clause 10.5 of the Agreement) is not resolved by the Internal Resolution Procedure within a period of thirty Business Days from notification (or longer if so agreed by the Parties), such a Dispute shall be litigated before the Court of Session, Scotland, unless the Dispute is withdrawn by the Party initiating or pursuing the Dispute. The summons or petition in any such litigation shall be signetted and served within ten Business Days of the date of expiry of the period of thirty Business Days from notification (or longer if so agreed by the Parties).

4. In the event that any Dispute arising during Project Phases C or D, or arising under or in relation to Clause 10.5 of the Agreement during any Project Phase, is not resolved by the Internal Resolution Procedure within a period of thirty Business Days from notification (or longer if so agreed by the Parties) then the following provisions of this paragraph 4 shall apply;

4.1 The Chairman of the Operator's immediate parent company and the Chief Executive of **tie** (or their respective deputies in the event of their unavailability) shall, within a further period of five Business Days, seek to agree that the Dispute shall be resolved by any one of the following procedures:-

4.1.1 mediation in accordance with paragraphs 4.2 to 4.4; or

4.1.2 adjudication in accordance with paragraph 5, in which event the Referring Party must give its Notice of Adjudication to the other Party within five Business Days of the date of expiry of the period of thirty-five Business Days from Notification (or longer if so agreed by the Parties); or

4.1.3 litigation before the Court of Session, Scotland, in which event the Summons or Petition in any such litigation shall be signetted and served within ten Business Days of the date of expiry of the period of thirty-five Business Days from Notification (or longer if so agreed by the Parties).

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In the event that the Chairman of the Operator's immediate parent company and the Chief Executive of **tie** (or their respective deputies in the event of their unavailability) are unable to agree that the Dispute be resolved by the procedures described in paragraphs 4.1.1 to 4.1.3, the Party initiating or pursuing the Dispute shall refer the Dispute to mediation (and thereafter, adjudication if necessary) in accordance with paragraphs 4.2 to 4.4.

4.2 The Parties shall attempt in good faith to resolve the Dispute by a procedure of mediation in accordance with the Centre for Effective Dispute Resolution mediation rules or Model Mediation Procedure in force at the commencement of the mediation, (or in the event that the Centre for Effective Dispute Resolution has ceased to exist as at the time of the commencement of the mediation, mediation rules or a model mediation procedure offered by any other body offering commercial mediation services which shall be selected by **tie**), which procedure shall be commenced within five Business Days of the date of expiry of the period of thirty-five Business Days from Notification (or longer if so agreed by the Parties). In the event that any provision of such mediation rules or model mediation procedure conflicts with any provision of this Schedule 7, the provision of this Schedule 7 shall take precedence. In the event that any timescales contained in such mediation rules or model mediation procedure conflicts with the timescales referred to in this Schedule 7, the timescales contained in such mediation rules or model mediation procedure shall be amended accordingly such that the timescales referred to in this Schedule 7 shall be adhered to;

4.3 In the event that resolution of the Dispute is achieved in consequence of such mediation procedure, such resolution shall be reduced to writing and, once it is signed by the duly authorised representatives of both Parties, shall be binding on the Parties. Unless concluded by a written legally binding agreement, all discussions and negotiations connected with the mediation procedure referred to in paragraph 4.2 shall be conducted in confidence and without prejudice to the rights of the Parties in any future legal or other proceedings. Nor may such matters be produced or relied upon in evidence in any such proceedings.

4.4 If any Dispute to which this paragraph 4 relates is not resolved by the mediation procedure referred to in paragraph 4.2 within a period of 55 Business Days from Notification (or longer if so agreed by the Parties), the mediation procedure shall be terminated and, unless the Party initiating or pursuing the Dispute withdraws the

Dispute, the Dispute shall, within a further 5 Business Days, be referred to adjudication in accordance with paragraph 5.

5. ADJUDICATION

In the event that either Party refers a Dispute to adjudication in terms of paragraphs 4.1 or 4.4, or exercises a statutory right available to it (if any) under the Housing Grants Regeneration and Construction Act 1996 to raise adjudication proceedings, such adjudication shall be conducted in accordance with the following conditions. In this paragraph 5, reference to "days" is a reference to calendar days.

Notice of intention to seek adjudication

5.1 Either Party may give written notice (the **"Notice of Adjudication"**) of his intention to refer the Dispute to adjudication and the Party giving such notice shall be the **"Referring Party"**.

5.2 The Notice of Adjudication shall be given to the other Party and the Party receiving the Notice of Adjudication shall be the **"Responding Party"**.

5.3 The notice of adjudication shall set out briefly:

5.3.1 the nature and a brief description of the Dispute and of the parties involved;

5.3.2 details of where and when the Dispute has arisen;

5.3.3 the nature of the redress which is sought; and

5.3.4 the names and addresses of the Parties (including the addresses which the Parties have specified for the giving of notices).

5.4 The adjudicator selected to consider the Dispute shall be selected from one of the panels (**"Panels"**) appointed by the Parties in accordance with the following:

5.4.1 There shall be four Panels, one in respect of legal matters, ("Legal Panel") one in respect of construction matters and construction/operation interface matters (**"Construction Panel"**), one in respect of operational and maintenance matters (**"Operations Panel"**) and one in respect of financial matters (**"Financial Panel"**).

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5.4.2 Each Panel shall be comprised of at least four members, who are listed in Schedule 15 (Panels for the Dispute Resolution Procedure) to the Agreement.

5.4.3 If any member of a Panel resigns or dies or becomes incapax or ill to the extent of being unable to reasonably discharge his duties as a member of the Panel, a replacement shall be appointed by the Parties as soon as practicable. Any such replacement shall be wholly independent of **tie**, the **tie** Advisors, any **tie** Party, CEC or any Relevant Authority associated with the Edinburgh Tram Network, Network Rail, the Operator, the Operator Parties, any Affiliate of the Operator, any Infrastructure Provider, any Affiliate, sub-contractor or other party connected to any Infrastructure Provider, any of the major competitors of any Infrastructure Provider or the Operator, any supplier of Trams or equipment appointed in respect of the Project, any Affiliate, sub-contractor or other party connected to any supplier of Trams or equipment appointed in respect of the Project, and any successor to or subsidiary or parent of any of the aforementioned parties. If the Parties are unable to agree on the identity of such replacement(s), the President for the time being of the Royal Institution of Chartered Surveyors in Scotland or the Institution of Civil Engineers shall appoint such replacement(s) within thirty days of any application for such appointment by either Party.

5.5 The Referring Party shall at the same time as giving the Notice of Adjudication to the Responding Party, send to each of the members of the relevant Panel a copy of the Notice of Adjudication and a request that each member of the relevant Panel advises both Parties within three days as to whether or not he is able and willing to act. The Parties shall attempt to agree within two further days as to which one of the members of the relevant Panel who responded indicating that they are able and willing to act shall be requested to act as adjudicator. In the event that such agreement is reached, the Referring Party shall, within a further period of one day, request the member of the relevant Panel upon whom agreement has been reached to act as adjudicator. In the event that such agreement is not reached, the Responding Party shall, within a further period of two days, select one of the members of the relevant Panel who responded indicating that they are able and willing to act and the Referring Party shall request that member to act as adjudicator.

5.6 If no member of the relevant Panel indicates that he is able and willing to act within three days of receiving a request to act as adjudicator, the Referring Party shall

request the Royal Institution of Chartered Surveyors in Scotland or the Institution of Civil Engineers to select a person to act as adjudicator.

5.7 The requests referred to in paragraphs 5.6 and 5.9 shall be accompanied by a copy of the Notice of Adjudication.

5.8 Any person appointed, requested or selected to act as adjudicator in accordance with paragraphs 5.5, 5.6 and 5.9 shall be a natural person acting in his personal capacity. A person appointed, requested or selected to act as an adjudicator shall be wholly independent of **tie**, the **tie** Advisors, the **tie** Inspectors, any **tie** Party, CEC or any Relevant Authority associated with the Edinburgh Tram Network, Network Rail, the Operator, the Operator Parties, any Affiliate of the Operator, any Infrastructure Provider, any Affiliate, sub-contractor or other party connected to any Infrastructure Provider, any of the major competitors of any Infrastructure Provider or the Operator, any supplier of Trams or equipment appointed in respect of the Project, any Affiliate, sub-contractor or other party connected to any supplier of Trams or equipment appointed in respect of the Project, and any successor to or subsidiary or parent of any of the aforementioned parties.

5.9 The Royal Institution of Chartered Surveyors in Scotland or the Institution of Civil Engineers must communicate the selection of an adjudicator to the Referring Party within three days of receiving a request to do so.

5.10 Where the Royal Institution of Chartered Surveyors in Scotland or the Institution of Civil Engineers fails to comply with paragraph 5.9, the referring Party may:

5.10.1 agree with the other Party to the Dispute to request a specified person to act as adjudicator; or

5.10.2 request any other adjudicator nominating body to select a person to act as adjudicator. An "adjudicator nominating body" shall mean a body (not being a natural person and not being a Party to the Dispute) which holds itself out publicly as a body which will select an adjudicator when requested to do by a Referring Party.

5.11 The person requested to act as adjudicator in accordance with the provisions of paragraph 5.5 or 5.6 shall indicate whether or not he is willing to act within two days of receiving the request.

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5.12 Where an adjudicator has been selected in accordance with paragraphs 5.5, 5.6 or 5.9, the Referring Party shall, not later than seven days from the date of the Notice of Adjudication, refer the Dispute in writing the ("**Referral Notice**") to the adjudicator.

5.13 A Referral Notice shall be accompanied by copies of, or relevant extracts from the Agreement and such other documents as the Referring Party intends to rely upon.

5.14 The Referring Party shall, at the same time as he sends to the adjudicator the documents referred to in paragraphs 5.12 and 5.13, send copies of those documents to the Responding Party.

5.15 The adjudicator may, with the consent of the Parties to those Disputes, adjudicate at the same time on more than one Dispute under the Agreement.

5.16 The Parties may agree to extend the period within which the adjudicator may reach a decision in relation to all or any of these Disputes.

5.17 An adjudicator may resign at any time on giving notice in writing to the Parties.

5.18 An adjudicator must resign where the Dispute is the same or substantially the same as one which has previously been referred to adjudication, and a decision has been taken in that adjudication.

5.19 Where an adjudicator ceases to act under paragraph 5.17 or 5.18, or dies or becomes incapax or ill to the extent of being unable to reasonably discharge his duties;

5.19.1 the Referring Party may serve a fresh notice in accordance with paragraphs 5.1 to 5.4 and shall in accordance with paragraphs 5.5 to 5.14 request an adjudicator to act; and

5.19.2 if requested by the new adjudicator, the Parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

5.20 The Parties to a Dispute may at any time agree to revoke the appointment of the adjudicator and in such circumstances the fees and expenses of that adjudicator shall, subject to paragraph 5.21, be determined and payable in accordance with paragraphs 5.37 and 5.38.

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5.21 Where the revocation of the appointment of the adjudicator is due to the default or misconduct of the adjudicator, the Parties shall not be liable to pay the adjudicator's fees and expenses.

Powers of the adjudicator

5.22 The adjudicator shall:

5.22.1 act impartially in carrying out his duties and shall do so in accordance with any relevant terms of the Agreement and shall reach his decision in accordance with Scottish law; and

5.22.2 avoid incurring unnecessary expense.

5.23 The adjudicator may take the initiative in ascertaining the facts and the law necessary to determine the Dispute, and shall decide on the procedure to be followed in the adjudication. In particular, he may

5.23.1 request either Party to supply him with such documents as he may reasonably require including, if he so directs, any written statement from either Party supporting or supplementing the Referral Notice and any other documents given under paragraphs 5.12 to 5.14;

5.23.2 conduct the adjudication in the English language and decide whether a translation of any document is to be provided and, if so, by whom, by when, and at whose cost ;

5.23.3 meet and question either Party and their representatives;

5.23.4 subject to obtaining any necessary consent from a third party or the Parties, make such site visits and inspections as he considers appropriate, whether accompanied by the Parties or not;

5.23.5 subject to obtaining any necessary consent from a third party or the Parties, procure the carrying out of any tests or experiments, and make directions as to the conditions for and responsibility for the cost of the same;

5.23.6 obtain and consider such representations and submissions as he requires, and, provided he has notified the Parties of his intention, appoint experts, assessors or legal advisers;

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5.23.7 give directions as to the timetable for the adjudication, any deadlines, or limits as to the length of written documents or oral representations to be complied with; and

5.23.8 issue other directions relating to the conduct of the adjudication.

5.24 The Parties shall comply with any request or direction of the adjudicator in relation to the adjudication.

5.25 If, without showing sufficient cause, a Party fails to comply with any request, direction or timetable of the adjudicator made in accordance with his powers, fails to produce any document or written statement requested by the adjudicator, or in any other way fails to comply with a requirement under these provisions relating to the adjudication, the adjudicator may:

5.25.1 continue the adjudication in the absence of that Party or of the document or written statement requested;

5.25.2 draw such inferences from that failure to comply as may, in the adjudicator's opinion, be justified in the circumstances;

5.25.3 make a decision on the basis of the information before him, attaching such weight as he thinks fit to any evidence submitted to him outside any period he may have requested or directed;

5.25.4 disqualify any part or parts of that Party's submissions affected by the failure to comply; and

5.25.5 grant the other Party proper opportunity to consider and respond to any evidence or representation made late.

5.26 Subject to any agreement between the Parties to the contrary, either Party may be assisted by, or represented by, such advisers or representatives (whether legally qualified or not) as he considers appropriate.

5.27 The adjudicator shall consider any relevant information submitted to him by either Party and shall make available to them any information to be taken into account in reaching his decision.

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5.28 The adjudicator and the Parties shall not disclose to any other person any information or document provided in connection with the adjudication which the Party supplying it has indicated is to be treated as confidential, except to the extent that disclosure is necessary for the purposes of, or in connection with, the adjudication, or the information is already in the public domain.

Adjudicator's decision

5.29 Unless otherwise agreed in accordance with paragraphs 6.2.1 or 6.3.1, the adjudicator shall reach his decision not later than:

5.29.1 twenty eight days after the date of the Referral Notice mentioned in paragraph 5.12;

5.29.2 forty two days after the date of the Referral Notice if the Referring Party so consents; or

5.29.3 such period exceeding twenty eight days after the Referral Notice as the Parties may, after the giving of that notice, agree.

5.30 Where the adjudicator fails, for any reason, to reach his decision in accordance with paragraph 5.29

5.30.1 either of the Parties to the Dispute may serve a fresh notice in accordance with paragraphs 5.1 to 5.4 and shall request an adjudicator to act in accordance with paragraphs 5.5 to 5.14; and

5.30.2 if requested by the new adjudicator the Parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

5.31 As soon as possible after he has reached a decision, the adjudicator shall deliver a copy of that decision to each of the Parties.

5.32 The adjudicator shall decide the matters in Dispute and may make a decision on different aspects of the Dispute at different times.

5.33 The adjudicator may take into account any other matters which the Parties agree should be within the scope of the adjudication or which are matters under the Agreement which he considers are necessarily connected with the Dispute and, in particular, he may

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5.33.1 open up, review and revise any decision taken or any notice certifying payment given by any person referred to in the Agreement, unless the Agreement states that the decision or notice certifying payment is final and conclusive;

5.33.2 decide that any of the Parties to the Dispute is liable to make a payment under the Agreement (whether in sterling or some other currency) and, subject to the terms of the Agreement, when that payment is due and the final date for payment;

5.34 The adjudicator shall provide written reasons for his decision.

Effects of the decision

5.35 In his decision, the adjudicator may, if he thinks fit, order either or both of the Parties to comply peremptorily with his decision or any part of it. In the absence of any directions by the adjudicator relating to the time for performance of his decision, the Parties shall be required to comply with any decision of the adjudicator immediately on delivery of the decision to the Parties in accordance with paragraph 5.31.

5.36 The decision of the adjudicator shall be binding on the Parties, and they shall comply with it, until the Dispute is finally determined by legal proceedings or by agreement between the Parties.

5.37 The adjudicator shall be entitled to the payment of such reasonable amount as he may determine by way of fees and expenses incurred by him and the Parties shall be jointly and severally liable to pay that amount to the adjudicator.

5.38 Without prejudice to the right of the adjudicator to effect recovery from either Party in accordance with paragraph 5.37, the Parties shall each be liable to pay one-half share of the adjudicator's fees and expenses.

5.39 The adjudicator shall not be liable for anything done or omitted in the discharge or purported discharge of his functions as adjudicator unless the act or omission is in bad faith, and any employee or agent of the adjudicator shall be similarly protected from liability.

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6. RELATED DISPUTES

6.1 Notwithstanding the terms of paragraphs 1.2, 1.3, 1.7, 1.8, 1.9 and 1.10, in the event that a dispute or potential dispute under, or in connection with any of the Infrastructure Delivery Agreements (referred to in this paragraph 6 as ("**Related Contracts**"), has arisen or arises out of substantially the same issues of fact and/or law (as the case may be) as a Dispute under the Agreement (a "**Related Dispute**"), then providing that the Related Contract contains dispute resolution provisions in terms substantially the same as set out in this Schedule 7 (Dispute Resolution Procedure) (save for necessary changes), **tie** may require and direct that the Dispute and the Related Dispute be dealt with together at an appropriate stage of the Dispute Resolution Procedure.

6.2 In the event that a Related Dispute has already been referred to the decision of an adjudicator in accordance with the provisions of the Related Contract, and **tie** is of the opinion that a Dispute is to be (but has not yet been) referred to adjudication under this Schedule 7, **tie** may refer the Dispute, or may by notice in writing to the Operator require that the Dispute be referred (as the case may be) to the adjudicator appointed under the Related Contract to decide upon the Related Dispute, and:-

6.2.1 the adjudicator shall, if practicable, hear the Dispute at the same time as the Related Dispute and shall request such extension of time for producing his decision or award as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The Parties shall agree to such request for an extension of time, except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator);

6.2.2 except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator), the adjudicator shall have power (if so requested by **tie**) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the

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joining of one or more defenders or third parties or conjoining actions were applicable to the Parties to the Dispute and the Related Dispute, and to the adjudicator.

6.2.3 **tie** shall procure that, as soon as practicable, the other party or parties to the Related Dispute shall give the Operator copies of the Related Contract, the Referral Notice in the Related Dispute and any other documentation provided to the adjudicator by any party to the Related Dispute.

6.3 In the event that a Dispute has already been referred to the decision of an adjudicator, and **tie** is of the opinion that a Related Dispute is to be (but has not yet been) referred to adjudication, **tie** may refer the Related Dispute to the adjudicator appointed under this Schedule 7 to decide upon the Dispute, and:

6.3.1 the Adjudicator shall, if practicable, hear the Related Dispute at the same time as the Dispute and shall request such extension of time for producing his decision or award as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The Parties shall agree to such request for an extension of time, except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator).

6.3.2 except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator), the adjudicator shall have power (if so requested by **tie**) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the Parties to the Dispute and the Related Dispute, and to the adjudicator.

6.3.3 as soon as practicable, **tie** shall give to the Operator copies of the Related Contract, the Referral Notice in the Related Dispute and any other

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documentation provided to the adjudicator by any party to the Related Dispute.

[redacted]

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

[redacted]

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

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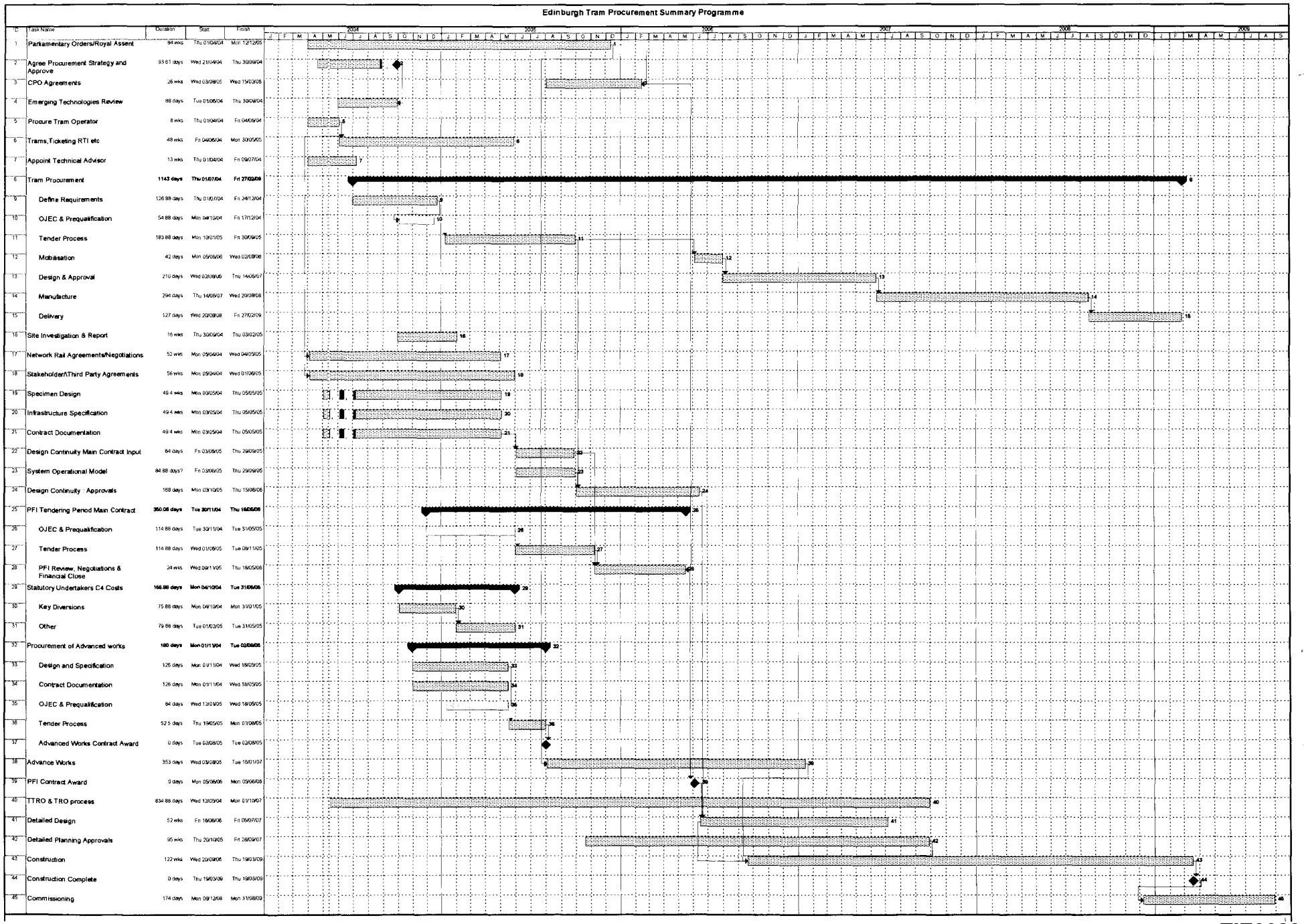
SCHEDULE 8

Project Programme

1. The following programme is **tie**'s best estimate of the Project Programme as at the Effective Date. Lines may be introduced incrementally, in stages or independently.

2. The Project Programme will be developed in accordance with the terms of this Agreement and in accordance with the development of the strategy for the procurement of the Infrastructure Delivery Agreement and other associated agreements.



ID	Task Name	Duration	Start	Finish
1	Parliamentary Orders/Royal Assent	94 wks	Thu 01/04/04	Mon 12/12/05
2	Agree Procurement Strategy and Approve	93.61 days	Wed 21/04/04	Thu 30/09/04
3	CPO Agreements	26 wks	Wed 03/08/05	Wed 15/02/06
4	Emerging Technologies Review	88 days	Tue 01/06/04	Thu 30/09/04
5	Procure Tram Operator	8 wks	Thu 01/04/04	Fri 04/06/04
6	Trams,Ticketing RTI etc	48 wks	Fri 04/06/04	Mon 30/05/05
7	Appoint Technical Advisor	13 wks	Thu 01/04/04	Fri 09/07/04
8	Tram Procurement	**1143 days**	**Thu 01/07/04**	**Fri 27/02/09**
9	Define Requirements	126.88 days	Thu 01/07/04	Fri 24/12/04
10	OJEC & Prequalification	54.88 days	Mon 04/10/04	Fri 17/12/04
11	Tender Process	183.88 days	Mon 10/01/05	Fri 30/09/05
12	Mobilisation	42 days	Mon 05/06/06	Wed 02/08/06
13	Design & Approval	210 days	Wed 02/08/06	Thu 14/06/07
14	Manufacture	294 days	Thu 14/06/07	Wed 29/08/08
15	Delivery	127 days	Wed 29/08/08	Fri 27/02/09
16	Site Investigation & Report	16 wks	Thu 30/09/04	Thu 03/02/05
17	Network Rail Agreements/Negotiations	52 wks	Mon 05/04/04	Wed 04/05/05
18	Stakeholder/Third Party Agreements	56 wks	Mon 05/04/04	Wed 01/06/05
19	Specimen Design	49.4 wks	Mon 03/05/04	Thu 05/05/05
20	Infrastructure Specification	49.4 wks	Mon 03/05/04	Thu 05/05/05
21	Contract Documentation	49.4 wks	Mon 03/05/04	Thu 05/05/05
22	Design Continuity Main Contract Input	84 days	Fri 03/06/05	Thu 29/09/05
23	System Operational Model	84.88 days?	Fri 03/06/05	Thu 29/09/05
24	Design Continuity / Approvals	168 days	Mon 03/10/05	Thu 15/06/06
25	PFI Tendering Period Main Contract	**350.06 days**	**Tue 30/11/04**	**Thu 18/05/06**
26	OJEC & Prequalification	114.88 days	Tue 30/11/04	Tue 31/05/05
27	Tender Process	114.88 days	Wed 01/06/05	Tue 08/11/05
28	PFI Review, Negotiations & Financial Close	24 wks	Wed 09/11/05	Thu 18/05/06
29	Statutory Undertakers C4 Costs	**166.88 days**	**Mon 04/10/04**	**Tue 31/05/05**
30	Key Diversions	75.88 days	Mon 04/10/04	Mon 31/01/05
31	Other	79.88 days	Tue 01/02/05	Tue 31/05/05
32	Procurement of Advanced works	**160 days**	**Mon 01/11/04**	**Tue 02/08/05**
33	Design and Specification	126 days	Mon 01/11/04	Wed 18/05/05
34	Contract Documentation	126 days	Mon 01/11/04	Wed 18/05/05
35	OJEC & Prequalification	84 days	Wed 12/01/05	Wed 18/05/05
36	Tender Process	52.5 days	Thu 19/05/05	Mon 01/08/05
37	Advanced Works Contract Award	0 days	Tue 02/08/05	Tue 02/08/05
38	Advance Works	353 days	Wed 03/08/05	Tue 16/01/07
39	PFI Contract Award	0 days	Mon 05/06/06	Mon 05/06/06
40	TTRO & TRO process	834.88 days	Wed 12/05/04	Mon 01/10/07
41	Detailed Design	52 wks	Fri 16/06/06	Fri 06/07/07
42	Detailed Planning Approvals	95 wks	Thu 20/10/05	Fri 28/09/07
43	Construction	122 wks	Wed 20/09/06	Thu 19/03/09
44	Construction Complete	0 days	Thu 19/03/09	Thu 19/03/09
45	Commissioning	174 days	Mon 09/12/08	Mon 31/08/09

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SCHEDULE 9

Review Procedure

1. Introduction

1.1 The provisions of this Schedule 9 (*Review Procedure*) shall apply whenever any item, document or course of action is required to be reviewed, approved or otherwise processed in accordance with Schedule 9 (*Review Procedure*).

1.2 Each submission by the Operator to **tie** under the Review Procedure shall be accompanied by a copy of the proposed document (in appropriate agreed format) to be reviewed or a statement of the proposed course of action (the entire contents of a submission being referred to as a **"Submitted Item"**). In relation to each Submitted Item, as soon as reasonably possible, the **tie** Project Manager shall return one copy of the relevant Submitted Item to the Operator endorsed "no objection", "clarification required" or "objection" as appropriate.

1.3 If the **tie** Project Manager makes an objection to any Submitted Item he shall state the ground upon which such objection is based but, for the avoidance of doubt, the **tie** Project Manager shall be entitled to make comments on any Submitted Item on any grounds as he sees fit.

1.4 Without limitation to paragraph 1.3, the **tie** Project Manager may object to any proposed change to the Operating Method Statements (or any part of them) on the grounds that the performance of the Project Operations in accordance with the proposed revision or substitution would, in **tie**'s opinion, be:

1.4.1 materially inferior to the performance of the Project Operations in accordance with the Operating Method Statements prior to such proposed revision or substitution; or

1.4.2 be materially less likely to achieve compliance with the requirements of the Operating Output Specification.

2. Further Information

The Operator shall submit any further or other information, data and documents that the **tie** Project Manager reasonably requires pursuant to paragraph 1.3 to act in accordance with this

Schedule 9 (*Review Procedure*). If the Operator does not submit any such information, data and documents, the **tie** Project Manager shall be entitled to object to the Submitted Item:

2.1 on the basis of the information, data and documents which have been provided; or

2.2 on the grounds that insufficient information, data and documents have been provided to enable **tie** to act in accordance with this Schedule 9 (*Review Procedure*).

3. Effect of Review

3.1 Any Submitted Item which is returned by the **tie** Project Manager endorsed "no objection" shall be complied with and implemented by the Operator.

3.2 If the **tie** Project Manager returns the Submitted Item to the Operator endorsed "objection", the Operator shall comply with such Submitted Item after amendment in accordance with the objection.

4. Disclaimer

No review, objection, comment or silence by **tie** shall operate to (i) exclude or limit the Operator's obligations or liabilities under this Agreement (or **tie**'s rights under this Agreement) or (ii) bind **tie** with any express or implied obligations, duties or liabilities with respect to the Submitted Item.

5. Documentation Management

5.1 The Operator shall issue four copies (in appropriate agreed format) of all Submitted Items to **tie** and compile and maintain a register of the date and contents of the submission of all Submitted Items.

5.2 The Operator shall compile and maintain a register of the date of receipt and content of all Submitted Items that are returned by the **tie** Project Manager.

6. Variations

6.1 No review, objection or comment or any failure to make objection or comment under this Schedule 9 (*Review Procedure*) shall constitute a **tie** Change.

6.2 If, having received comments from the **tie** Project Manager, the Operator considers that compliance with those comments would amount to a **tie** Change, the Operator shall, before complying with the comments, notify **tie** of the same and, if it is agreed

by the Parties or determined pursuant to the Dispute Resolution Procedure that a Variation would arise if the comments were complied with, **tie** may, if it wishes, proceed with the matter in accordance with Clause 23 (Performance and Financial Adjustments) and Clause 24 (***tie** Changes*) of the Operating Appendix.

6.3 Any failure by the Operator to notify **tie** that it considers compliance with any comments of the **tie** Project Manager would amount to a **tie** Change shall constitute an irrevocable acceptance by the Operator that any compliance with **tie**'s comments shall be without amendment to the Fixed Costs, the Target Costs for Project Phase C2, Target Operating Costs or Target Revenues and without any extension of time or other relief.

[redacted]

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

.....[redacted].....

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

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This is Schedule 10 referred to in the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 10

Required Insurances

PART 1 - Required Insurances

1. PROFESSIONAL INDEMNITY INSURANCE

Insured Party: The Operator

Coverage: During Project Phases A, B and C, the legal liability of the Operator as a result of negligent act, error, or omission in the performance of its professional activities and duties in connection with the Project Development Services in respect of each Line.

Limit of Indemnity: Minimum £10,000,000 any one claim

Period of Insurance From the Effective Date for twelve months and thereafter each further twelve month period until 12 years from the issue of the last PPCN for Project Phase C2

Extensions: The insurance must include the following minimum extensions:

1. Mitigation costs.
2. Including coverage for the benefit of the Operator in respect of the activities of any Operator Party who provides any Project Development Services
3. Waiver of subrogation rights against tie during Project Phases A, B and C.

Maximum Permitted Deductible: £25,000 each and every claim.

2. THIRD PARTY LIABILITY INSURANCE (INCLUDING MOTOR VEHICLE LIABILITY)

Insured Parties: During Project Phases A, B and C2, the Operator.

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Coverage: During Project Phases A, B, and C , the legal liability of the Operator for death, injury, illness, disease contracted by third party persons or loss of or damage to property arising out of or in connection with the Project Development Services in respect of each Line.

Limit of Indemnity: Unlimited as to the number of occurrences in each 12 month period in respect of death or injury to persons on highway sections of the Project. For all other occurrences, a minimum of £5,000,000 any one occurrence during Project Phases A, B and C (unlimited as to number of occurrences in the Period of Insurance stated below) in respect of third liability and £50,000,000 any one occurrence and in the aggregate in any one 12 month period of insurance in respect of products liability.

Period of Insurance: From the Effective Date for twelve months and thereafter each further twelve month period until the end of Project Phase C2.

Minimum Extensions: The insurance must include the following minimum extensions:

1. Worldwide jurisdiction.
2. Contractual liability.
3. Cross liabilities.
4. Costs and expenses in addition to limit of indemnity.
5. Financial loss (minimum limit of indemnity to be agreed and extension to take effect during Project Phases C2 and D only, if instructed as a **tie** Change).
6. Interference, trespass, loss of amenities, nuisance and obstruction.
7. Liability in respect of any agreement with Network Rail with regard to operations on, over or near the existing rail network (terms of extension to be agreed with **tie** once the terms of any Network Rail Agreements are known and extension shall take effect if instructed as a **tie** Change)
8. Sudden and accidental pollution and contamination.
9. Contingent motor liability.
10. Business activities extended to include the provision and management of canteen, sports, social and welfare activities, sponsorships, medical, dental, nursing, fire, first-aid, ambulance and security services, work by an employee for any fellow employee, participation in exhibitions, ownership and maintenance of own premises or property.
11. Indemnity to principal

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12. Health and Safety at Work Etc. Act 1974 – legal costs and expenses in defending a prosecution brought under sections 2-8 of the Act.

13. Consumer Protection Act 1987 – legal costs and expenses in defending a criminal prosecution brought under Part II of the Act.

14. Data Protection Act 1998 – compensation in respect of damage and distress under sections 22 and 23 of the Act and defence costs in relation to section 19 of the Act.

15. Conflict of Interest – where conflict between the Insured and an employee, separate representation to be arranged for each party.

16. Motor tool of trade risk.

17. Liability for damage to leasehold premises.

18. Waiver of subrogation rights against **tie** during Project Phases A, B and C.

Maximum Permitted Deductible: £25,000 each and every loss in respect of property damage claims
Nil excess for bodily injury claims.

3. EMPLOYERS LIABILITY INSURANCE

Insured Party: The Operator

Coverage: During Project Phases A, B, C and D, the legal liability of the Operator for death, injury, illness, disease contracted by employees of the Operator caused by or arising out of or in connection with the Project Development Services or the Project Operations in respect of each Line.

Limit of Indemnity: Minimum limit of indemnity of £10,000,000 any one occurrence or series of occurrences arising from one original cause or event.

Period of Insurance: From the Effective Date for twelve months and thereafter each further twelve month period until the earlier of the Expiry Date or the Termination Date.

Extensions: The insurance must include the following minimum extensions:

1. Contractual liability.

2. Cross liabilities.

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3. Business activities extend to include the provision and management of canteen, sports, social and welfare activities, sponsorships, medical, dental, nursing, fire, first-aid, ambulance and security services, work by an employee for any fellow employee, participation in exhibitions, ownership and maintenance of own premises of property.

4. Costs and expenses in addition to the limit of indemnity.

5. Indemnity to principal.

6. Health and Safety at Work Etc. Act 1974 – legal costs and expenses in defending a prosecution brought under sections 2-8 of the Act.

7. Consumer Protection Act 1987 – legal costs and expenses in defending a criminal prosecution brought under Part II of the Act.

8. Data Protection Act 1998 – compensation in respect of damage and distress under sections 22 and 23 of the Act and defence costs in relation to section 19 of the Act.

9. Conflict of Interest – where conflict between the Operator and an employee, separate representation to be arranged for each party.

10. Employees' business liability.

11. Unsatisfied court judgements.

12. Compensation for court attendance.

13. Contingent Liability arising out of the transfer of employees under TUPE.

Maximum Permitted Deductible: Nil

4. **Other Insurances**: Any other insurances that are required by Law of the Operator itself.

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PART 2 - Form of Brokers Letter of Undertaking

To: Transport Initiatives Edinburgh Ltd ("**tie**")

Dear Sirs

We confirm in our capacity as Insurance Brokers that the Required Insurances specified in Clause 26 (*Required Insurances*) and Schedule 10 *(Required Insurances)* of the Development Partnering and Operating Franchise Agreement (the "DPOF Agreement") dated ◆ between (◆) (the "Operator") and **tie** as defined therein are, as at the date hereof, in effect in respect of the risks set out in the attached cover notes.

We have arranged the Required Insurances on the basis of the information and instructions given by the Operator. We have not made any particular or special enquiries regarding the Required Insurances beyond those that we would normally make in the ordinary course of arranging the insurances on behalf of our insurance broking clients.

The confirmations set out in this letter are given by reference to our state of knowledge at the date hereof.

Pursuant to instructions received from the Operator and in consideration of the Operator approving, and **tie** confirming its approval of our appointment or continuing appointment as brokers to the Operator in connection with the Required Insurances covered by this letter, we hereby undertake in respect of the interests of the Operator and **tie** in the Required Insurances referred to in the attached cover notes:

1. to use reasonable endeavours to have endorsed on each and every policy evidencing the Required Insurances when the same is issued, endorsements substantially in the form set out in Clause 26 (*Required Insurances*) of the Agreement;

2. to ensure that all proceeds for the Required Insurances received by us from the insurers shall be applied in accordance with Clause 26.11 of the DPOF Agreement.

3. to advise **tie** :

   3.1 promptly after receiving notice of any insurer's cancellation or suspension of any of the Required Insurances or receiving notice of the intended cancellation or suspension of any of the Required Insurances;

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3.2 promptly upon our receipt from the Operator of any notice of any changes proposed to be made to the Required Insurances which, if effected, would result in a material reduction in limits or coverage (including in respect of extensions of cover) or in an increase in deductibles, exclusions or exceptions;

3.3 of any default in the payment of any premium for any of the Required Insurances;

3.4 at least 20 days prior to the expiry of any of the Required Insurances if we have not received written renewal instructions from the Operator or if we receive written instructions to renew, to advise **tie** of the details thereof; and

3.5 on receipt of notice of any act or omission of the Operator or any Operator Party which will invalidate or render unenforceable in whole or in part, any of the Required Insurances;

4. no later than 7 days (in respect of certificates) and as soon as reasonably practicable in respect of policies and other documents, to supply you and/or your insurance advisors (or your or their authorised representative) copies of all placing slips, certificates, cover notes, renewal receipts and confirmations of renewal and payment of premiums and all policy documents in respect of the Required Insurances, or upon request, to make available to you the originals of any or all such documents held by us;

5. to disclose to the insurers any fact, change of circumstance or occurrence is material to the risks insured against under the Required Insurances;

6. to treat as confidential all information in relation to the Required Insurances supplied to us by the Operator or any Operator Party or **tie** and not to disclose, without the written consent of **tie**, such information to any third party other than the insurers under the Required Insurances, unless required to do so by law or any regulatory authority; and

7. to notify **tie** at least 30 days prior to our ceasing to act as brokers to the Operator, unless impracticable because of circumstances beyond our control, in which case we shall notify **tie** as soon as reasonably practicable upon becoming aware that we shall cease, or have ceased, so to act.

Where insurers wish any of the Required Insurances to be cancelled for reasons of non-payment of premium, we will request those insurers to give you a reasonable opportunity of paying such amounts outstanding before issuing notice of cancellation on behalf of such insurers.

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The above undertakings are given subject to our continuing appointment for the time being as insurance brokers to the Operator in relation to the Required Insurances concerned and the monitoring and handling of claims in relation to the Operator, and our obligations set out in this letter shall automatically cease upon termination of our appointment.

For the avoidance of doubt all undertakings and other confirmations given in this letter relate solely to the Required Insurances. They do not apply to any other insurances and nothing in this letter should be taken as providing any undertakings or confirmations in relation to any other such insurance that ought to have been placed or may at some future date be placed by other brokers.

This letter is given by us on the instructions of the Operator and with the Operator's full knowledge and consent as to its terms as evidenced by the Operator's signature below.

This letter shall be governed by and shall be construed in accordance with Scots Law and any dispute as to its terms shall be submitted to the exclusive jurisdiction of the courts of Scotland.

Yours faithfully

.....
For and on behalf of (Insurance Broker)

.....
For and on behalf of (The Operator)

[ ]

[redacted]..... .....[redacted].....

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899943_0267

This is Schedule 11 referred to in the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 11

Schedule Not Used

[redacted]

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

[redacted]

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

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SCHEDULE 12

Performance Scoring

[This Schedule will be developed during Project Phases A - C, in accordance with Project Development Output Specification paragraphs 24 and 25]

[redacted]..... .....[redacted].....

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

This is Schedule 13 referred to in the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 13

Form of Operator's Invoice

[to be developed during Project Phase A]

[redacted]..... .....[redacted].....

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899943_0270

This is Schedule 14 referred to in the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 14

Performance Bond

(1) ◆ [SURETY]

- in favour of -

(2) tie

PERFORMANCE BOND

TIE00899943_0271

PERFORMANCE BOND

BETWEEN

(1) ◆ , a company incorporated in ◆ under company number [◆] whose registered office is at ◆ (**"the Surety"**); and

(2) **TRANSPORT INITIATIVES EDINBURGH LIMITED**, a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh EH1 1YJ (**"tie"**)

WHEREAS

A. **tie** entered into a Development Partnering and Operating Franchise Agreement (hereinafter referred to as the **"DPOF Agreement"**) dated ◆ with ◆ (the **"Operator"**) to give project development assistance and services for commissioning and operation of a light rapid transit system in Edinburgh known as the Edinburgh Tram Network.

B. Clause 8 (*Operator's Performance Security*) of the DPOF Agreement obliges the Operator to deliver to **tie** an unconditional irrevocable Performance Bond on the conditions and in the form set out in Schedule 14 (*Performance Bond*) to the DPOF Agreement, issued by a surety acceptable to **tie** and callable subject only to written notification by **tie**.

C. In consideration of your accepting our obligations set out below in discharge of the Operator's undertaking to provide a performance bond under Clause 8 (*Operator's Performance Security)* of the DPOF Agreement, we, [*Name and address of Surety to be inserted*] hereby irrevocably and unconditionally agree and undertake to pay to you a sum not exceeding ◆ POUNDS (£◆) (the **"Bonded Amount"**) and accordingly covenant with you and agree as follows:

1. Upon our receipt of a demand or demands (**"Demand Notice"**) from you certifying that you have issued a notice to the Operator stating that an Operator Default has occurred, and without being entitled or obliged to make any enquiry or proof or contestation or further conditions on you (or the Operator) and without the need for you to take any legal action against or to obtain the consent of the Operator and without any right of set-off, abatement or counterclaim, we shall forthwith pay to you the amount or amounts specified in such Demand Notice(s) in immediately available funds by electronic transfer to the account nominated in

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the Demand Notice, not exceeding in aggregate the Bonded Amount; it being confirmed that you may make as many separate demands hereunder as you think fit. You shall not be obliged to exercise any other right or remedy you may have before making a demand under this Performance Bond.

2. A Demand Notice received from you in accordance with paragraph 1 above shall be conclusive evidence of our liability to pay to you and of the amount of the sum or sums which we are liable to pay. Our obligation to make payment under this Performance Bond shall be a primary, independent and absolute obligation and we shall not be entitled to delay or withhold payment for any reason. Our obligation hereunder shall not be affected by any act, omission, matter or thing which, but for this provision, might operate to release or otherwise exonerate us from the obligations hereunder in whole or in part, including without limitation and whether or not known to us or to you:

2.1 any time or waiver granted to you or to the Operator;

2.2 the taking, variation, compromise, renewal or release of or the refusal or neglect to perfect or to enforce any rights, remedies or securities against you or the Operator;

2.3 any legal limitation, disability or incapacity relating to you or the Operator;

2.4 any variation of or amendment to the DPOF Agreement (or related documentation) or the works or services to be performed thereunder or any other document or security so that references to the DPOF Agreement in this Performance Bond shall include each such variation and amendment;

2.5 any unenforceability, invalidity or frustration of any rights or obligations of you or the Operator under the DPOF Agreement or any other document or security; and

2.6 any other fact, circumstance, provision of statute or rule of law which might, were our liability to be secondary rather than primary, entitle us to be released or discharged in whole or in part from our undertaking.

3. Until such time as **tie** has recovered all amounts due to it under or in connection with the DPOF Agreement, we shall not, without the prior written consent of **tie**, in respect of any payment made or liability under this Performance Bond, claim, rank or vote as a creditor in the liquidation of the Operator in competition with **tie**, or enforce any security over the assets of the Operator in respect of any such payment or liability in competition with **tie**, but this

Clause 3 shall not limit or restrict the exercise or enforcement by us of our rights against any other person after payment in full of the Bonded Amount.

4. We shall hold in trust any sums recovered by us contrary to the provisions of Clause 3:

   4.1 to pay to **tie** in full the unrecovered balance of any damages or other sums due from the Operator to **tie** under or in connection with the DPOF Agreement, to the extent set out in Clause 3; and

   4.2 subject thereto, for our benefit.

5. **tie** shall be entitled to enforce the provisions of Clauses 3 and 4 only so far as required to keep itself or to put itself in the position it would occupy if we had no rights of recourse against the Operator or its assets in respect of any payment made or liability arising under this Performance Bond, but no further; and any consent required of **tie** under Clause 3 above shall not be refused or delayed unreasonably.

6. Our liability under this Performance Bond shall not be affected or reduced by the insolvency of the Operator or its liquidation, receivership or other like temporary or permanent status.

7. **tie** shall be at liberty to compromise, release, waive or neglect any security as they see fit, without impairment of their rights under this Performance Bond.

8. This Performance Bond shall cease to have effect 90 days after the earlier of the Expiry Date or the Termination Date of the DPOF Agreement, save in connection with any Demand Notice issued to us in writing prior to the expiry of the said period of 90 days.

9. **tie** shall be entitled to assign this Performance Bond without our consent.

10. Any notice to be served under this Performance Bond must be in writing and must be delivered by hand or by registered post or recorded delivery at [*enter branch and address*]. Service shall take effect, if given by hand, on the date of delivery. If given by post, it shall take effect two days after posting, excluding Saturdays, Sundays and statutory holidays.

11. This Performance Bond shall be governed by and construed in accordance with the Laws of Scotland and we hereby agree to submit to the exclusive jurisdiction of the Court of Session over any claim arising out of this Performance Bond.

12. A person who is not a party to this Performance Bond shall have no right to enforce any of the terms of this Performance Bond.

13. In this Performance Bond:

13.1 the words and expressions have the same meanings as in the DPOF Agreement and we shall be deemed to have full knowledge of the terms and conditions of the DPOF Agreement;

13.2 "person" includes any firm and any entity having legal capacity; and

13.3 the definitions given in the recitals apply to the rest of this Performance Bond:

IN WITNESS WHEREOF

[redacted]

~~**Director**~~**/Authorised Signatory**
Transport Initiatives Edinburgh Limited

[redacted]

~~**Director**~~**/Authorised Signatory**
TRANSDEV Edinburgh Tram Limited

TIE00899943_0275

This is Schedule 15 referred to in the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 15

Panels for the Dispute Resolution Procedure

ENGINEERING / OPERATIONAL

Alan Wilson
[redacted]
Chesterfield
DERBYSHIRE
S42[redacted]

Peter Chapman
Somersby House
Stokesheath Road
OXSHOTT
SURREY KT22 0PS

Tony Canham
[redacted]
Thorpe St Andrew
NORWICH
NR7[redacted]

Guy Cottam
[redacted]
Upper Limpley Stoke
BATH
BA3[redacted]

FINANCIAL

Nigel Lowe
Nigel Lowe Consulting Limited
27 Old Gloucester Street
LONDON
WC1N 3XX

John Hunter
Hunter Consulting
Commercial Centre
Stirling Enterprise Park
STIRLING
FK7 7BF

Bryan Porter
[redacted]
Newton Mearns
GLASGOW
G77 [redacted]

Eric Mouzer
[redacted]
Edgebaston
BIRMINGHAM
B11 [redacted]

LEGAL

Gordon Reid, QC
[redacted]
By St Andrews
FIFE
KY15 [redacted]

Robert Howie, QC
[redacted]
EDINBURGH
EH9 [redacted]

Lord Dervaird (Prof. John Murray QC)
[redacted]
EDINBURGH
EH3 [redacted]

Gordon Coutts, QC
[redacted]
EDINBURGH
EH3 [redacted]

Angus Glennie, QC
[redacted]
Oxton
Lauder
BERWICKSHIRE
TD2 [redacted]

[redacted].....

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

.....[redacted].....

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

SCHEDULE 16

Outline Service Integration Plan

Edinburgh Tram Network

The purpose of this document is to state and reconfirm the commitment made the Operator in relation to Service Integration.

This document contains reference to the Operator's primary commitments to the development of the Service Integration Plan and includes those matters in relation to which the parties have agreed the objectives for performance of the Operator's obligations regarding Service Integration during each Project Phase.

1. The Operator shall comply with in particular Clauses 6, 7, 8 and 9 of the Operating Appendix.

2. The Operator shall comply with the Project Development Output Specification ("PDOS") requirements and specifically:

   2.1 Paragraph 12 requiring the Operator to:

      2.1.1 be fully conversant with the policies and strategies of CEC and other local authorities on transport and integration with other policies such as health, safety and environment;

      2.1.2 engage with other transport operators (bus, train, airport) to maximise public transport usage and transfer from cars;

      2.1.3 engage with park-and-ride facility managers proximate to the System;

      2.1.4 develop a Service Integration Plan in accordance with PDOS to address, not exclusively:

         - operating timetable;
         - hours of operation;
         - journey times;
         - integration of System as part of the wider public transport service;

- competing transport modes;

2.1.5 forward plan for Special Events in accordance with clause 9 (*Special Events*) of this Agreement and Clause 8 (*Special Events*) of the Operating Appendix;

2.1.6 contribute to the optimal layout and design (to include signage, lighting and weather protection) of interchange facilities to maximise ease of access for mode transfer;

2.1.7 ticket sales and ticketing arrangements to incentivise customer pre-payment. the Operator shall develop and agree with **tie** and other public transport operators measures for promoting integrated ticketing (through One Ticket or its successor scheme nominated by **tie**), through tickets, multi-journey tickets, bus and tram saver tickets, unlimited travel period tickets and pre-paid fares; investigation of congestion charging payment to cover travel by tram also;

2.1.8 maintenance of shared facilities with other operators;

2.1.9 incident management and provision of alternative service to ensure that passengers can continue journeys reliably during planned engineering or maintenance works and closures or restrictions in service operation or failure of due to unexpected incidents;

2.1.10 wherever practicable, passenger information presentation (particularly timetable and fares information) in a common format by the Operator and other public transport operators and the advertising of other operators' services where these form a complementary element of the local public transport network;

2.1.11 subject to compliance with the Law, best endeavours implementation (in a manner consistent with CEC's transport strategies) of timetable coordination measures. This may include coordination of feeder buses and train services with the Transport Services and late night or last Tram services at Edinburgh Park, Haymarket Station or Waverley Station stops providing advertised connections to and from main line services;

2.1.12 the planning for and provision of appropriate feeder bus services to tram/bus/rail/private car interchanges, termini or stops agreed with **tie**. Such feeder service frequency to be controlled and co-ordinated with tram arrivals

and departures through appropriate communication method (real time information sharing between bus and tram), tramway mimic board for bus operators and bus location screen in tram control room and vehicle location techniques;

2.1.13 the provision of real time information at all Tramstops, interchange facilities and key information points (at a minimum Help Desk/s, Airport Terminal, Waverley Station, Haymarket Station, Edinburgh Park and Ocean Terminal) and the provision of service timetables and fares information by leaflets onboard trams;

2.1.14 the location of help points for passengers on Tramstops and co-location of Help Desk facilities and lost property with other transport operators (in particular, Lothian Buses and First Scotland East) and the use of advertised websites; and

2.1.15 the application of control room communication facilities for bus - tram operational co-ordination ("hot" telephone links between control rooms and reciprocal vehicle location information).

2.1.16 the active promotion of interchange between tram and bus in relation to all public transport operators; the study of interchanges to include: West End, Haymarket Station, Roseburn Terrace, Crewe Toll, Ocean Terminal, Leith Walk, Balgreen Road, Broomhouse Road/South Gyle Access, Gyle Centre, Edinburgh Park Station and Ingliston Park and Ride.

2.1.17 provide CEC and any other relevant body with details of provisions that the Operator recommends for incorporation into tenders for bus services that will be operating in Phase D.

3.

3.1 The Service Integration Plan shall be regularly refined by the Operator as the System is further developed during Project Phases B, C and D. Any amendments to the Service Integration Plan during Project Phase C or Project Phase D shall be subject to Schedule 9 (*Review Procedure*).

3.2 the Operator shall be responsible for ensuring that its plans for and agreements with other transport operators to deliver integration of the Transport Services with bus,

train and park-and-ride operations in Edinburgh in accordance with the Service Integration Plan (as amended from time to time) are compliant with Law, including competition law.

3.3 The Operator shall keep **tie** informed from time to time of all actions being taken by the Operator to ensure compliance with the above paragraph, including the views of regulatory authorities and the provision of copies of any legal advice obtained by the Operator in relation to the impact of competition law on the proposed Service Integration Plan.

3.4 The Operator will be required to give input on the development of the Fares Policy and adopt the Fares Policy by the end of Project Phase B for Project Phase D. Matters on which the Operator shall make proposals to **tie** shall include:

3.4.1 ticket range and user group;

3.4.2 fares levels and differentials throughout the day and week;

3.4.3 special event pricing and travel incentives such as unlimited period travel;

3.4.4 ticket integration and pricing

3.4.5 revenue sharing principles between transport modes for integrated ticketing;

3.4.6 pricing differentials between transport modes;

3.4.7 fares zoning and relative pricing;

3.4.8 penalty fares structure and relativity to normal fares;

3.4.9 minimisation of fare evasion.

3.5 The Operator hereby confirms participation of tram operations in the relevant Concessionary Travel Scheme (or its successor scheme).

4. The Operator has concluded the arrangements (or is seeking to conclude the same) with other operators as are appended to this document and agrees to secure these or to develop these into binding and enforceable agreements enjoying regulatory clearance within the timescale shown in each case.

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Heads of Terms with Lothian Buses plc Agreed and signed on January 20 2004 *The Operator agrees to convert these commitments into a formal and binding agreement by no later than end of Phase C1.*
Draft Heads of Terms with First Edinburgh *The Operator is pursuing closure no later than Effective Date* The Operator agrees to convert these commitments into a formal and binding agreement by no later than end of Phase C1.
Ticketing Agreements included in HOTs with Lothian Buses plc and in the draft HOTs currently with First Edinburgh. The Operator agrees to develop these ticketing commitments (with these two bus operators and other transport operators) into formal and binding commitments prior to the end of Project Phase B.
Real time information sharing agreements The Operator agrees to secure such agreements with all relevant parties prior to the end of Project Phase B.
Heads of Terms with other transport operators and commercial parties The Operator intention is to utilise similar HOTs as those for Lothian Buses plc and First Edinburgh with other transport operator

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parties. The Operator agrees to secure HOTs no later than the end of Project Phase B for development into formal and binding agreements no later than the end of Project Phase C1.

5. The Operator agrees to support and contribute to the establishment of a corporate framework to achieve public transport integration in Edinburgh, with the primary objectives of maximisation of mode transfer from private car to public transport and service integration between tram, bus, rail and park and ride such support and contribution to include appropriate engagement with Edinburgh public transport operators and relevant regulatory authorities.

[redacted].....

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

[redacted].....

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

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SCHEDULE 17

Setting of Fixed Costs

Part A Setting of Category Three Fixed Costs during Project Phase C1 and setting of the salaries of drivers at reset

In setting the Category Three Fixed Costs in respect of drivers' salaries to an external market value and resetting drivers' salaries pursuant to Clause 21 (*Reset of the Fixed Costs, Target Operating Costs and the Target Revenue)* of the Operating Appendix. to an external market value, the salaries of the following staff will be pegged to that of the drivers' salary, in the same ratios as in the Operator Financial Model. For ease of reference these ratios are shown below:

Role	Salary Ratio
Duty Managers	141.2%
Operations Supervisor	105.9%
Drivers	100.0%
Customer Service	100.0%
Temporary Customer Service	95.0%
Operations Assistant	82.4%

The total drivers' cost is obtained by multiplying the number of drivers by the individual driver's rate.

The salary figures in the Operator Financial Model are derived from a predicted salary plus:

- 10% for overtime and bonus, notionally 5% for each;
- 10.8% for national insurance; and
- 11.2% in respect of a non-contributory employee pension, assumes 100% take up of pension rights.

The Operator confirms that the number of drivers can be regarded as a fixed cost affected only by changes in service definition as defined in the paper "Tram Drivers 20Feb04".

The individual driver's rate as quoted in the the Operator's bid will be set and reset using the process set out below.

Such a review is necessary to ensure that drivers' rates correctly reflect the contemporary labour market in Edinburgh so that sufficient staff are recruited for the start of passenger service.

The drivers' target salary will be set using the following process.. It will take place during Project Phase C1, and will be completed three months before the start of Project Phase C2, when the first member of staff whose target salary will be set by this process starts work.

This process shall be conducted by **tie** and the Operator, taking into consideration the following elements:

1. the unemployment rate in Edinburgh

2. bus driver rates from local companies such as Lothian Bus and First Edinburgh.

3. Rates of similar jobs (e.g. delivery/distribution services) in Edinburgh

When considering the rates, this review will take into account the terms (hours, benefits, pension etc.) and working conditions attached to the staff positions.

This process shall then be repeated at each three yearly reset pursuant to Clause 21 *(Reset of the Fixed Costs, Target Operating Costs and the Target Revenue)* of the Operating Appendix.
For reference purposes, the following data may be referred to during the process:

Lothian bus drivers' rate as from 28/3/04, £330.74 per week.

First rate, £7.50 per hour.

Unemployment, May 2003, an extract from http://www.parliament.uk/commons/lib/research/rp2003/rp03-055.pdf on 29 March 2004:

Parliamentary Constituency	**Party**	**Claimants**			**Rate**		
		Male	**Female**	**All**	**Male**	**Female**	**All**
Edinburgh Central	LAB	1,117	339	1,456	4.1%	1.5%	3.0%
Edinburgh East & Musselburgh	LAB	953	251	1,204	4.3%	1.4%	3.0%
Edinburgh North & Leith	LAB	1,357	384	1,741	6.0%	2.1%	4.3%
Edinburgh Pentlands	LAB	880	290	1,170	3.8%	1.6%	2.9%

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Edinburgh South	LAB	700	223	923	3.5%	1.3%	2.5%
Edinburgh West	LD	771	221	992	3.5%	1.3%	2.5%

At the end of Project Phase C2, a review as to the level of take up on pension rights will be undertaken. The assumed 100% take up level will be adjusted to the actual percentage take up level at the commencement of Project Phase D.

Part B Setting of Category Four Fixed Costs

The costings for "Bank Charges", "Cash collecting & counting" "Security Staff" and "Cashiers" will be set in Project Phase C2, at about 6 months prior to Service Commencement of the first Line to become operational as part of setting the package of costs for Category Four Fixed Costs. This setting of Category Four Costs will be based on actual prices from potential suppliers through competitive tender and updated prices for carrying out this work in house.

[redacted].....

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

.....[redacted].....

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899943_0286

This is Schedule 18 referred to in the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 18

Base Case Assumptions

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Base Case Assumptions

Contents:

1. Introduction
2. Cost Categorisation
3. General Assumptions
4. Operating Costs, Project Phases C2 and D
5. Staff, Project Phases A to D

1. Introduction

The Base Case Assumptions (BCAs) are predicated on the cost categorisation as outlined below. References to Line 1, Line 2 and the Network refer to the scope of the Project as at the Effective Date.

These BCAs assume that the System will be operated from one Depot.

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2. Cost Categorisation

Cost Category	
1	Fixed at Effective Date
2	Fixed at end of Project Phase B (unit cost fixed at Effective Date)
3	Fixed before the end of Project Phase C1, as set out in Schedule 17 *(Setting of Fixed Costs)*
4	Fixed before the end of Project Phase C2, as set out in Schedule 17 *(Setting of Fixed Costs)*
5	Fixed at Effective Date and not reset
6	Target Operating Cost and/or Target Cost for Project Phase C2
7	**tie** "discretionary" items not fixed and not subject to pain/gain share, will be instructed as a **tie** Change if such items are required by **tie**.
8	During Project Phases A-C1, Non Core Staff Fixed Rates, called off basis at **tie**'s discretion.
9	During Project Phases A-C1, Core Staff Fixed Rates.

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3. General Assumptions

Item	Model reference	Comments	Scope Clarification	Cost Category	Base Case Assumptions
Project Phase A	Other Inputs, row 28				Network Pessimistic Line 1 & 2 starts on 17/05/2004, ends on 31/05/2006. Network Optimistic Line 1 & 2 starts on 17/05/2004, ends on 31/10/2005.
Project Phase B	Other Inputs, row 29				Network Pessimistic Line 1 & 2 starts on 01/07/2004, ends on 31/10/2006. Network Optimistic Line 1 & 2 starts on 01/07/2004, ends on 31/10/2005.
Project Phase C1	Other Inputs, row 30				Network Pessimistic Line 1 & 2 starts on 01/11/2006, ends on 31/01/2009. Network Optimistic Line 1 & 2 starts on 01/11/2005, ends on 31/01/2009.

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Item	Model reference	Comments	Scope Clarification	Cost Category	Base Case Assumptions
Project Phase C2	Other Inputs, row 31	Some costs associated with setting up the Project Operations are within Project Phase C1 in the Operator Financial Model. This includes part of General Manager, Operations Manager, Safety and Standards Manager and Assistant			Starts on 01/02/2009, ends on 31/10/2009
Project Phase D	Other Inputs, row 32				Starts on 01/11/2009, ends on 16/05/2019
Programme and date adjustments					Dates and durations in these Base Case Assumptions will be amended by written agreement with **tie**.

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Item	Model reference	Comments	Scope Clarification	Cost Category	Base Case Assumptions
Provision of staff during Project Phases A, B, C1 and C2 (insofar as staff time is spent on development work)					The Operator will make available and **tie** will pay for staff as shown in the Base Case Assumptions for each cost line where appropriate in accordance with the terms of this Agreement. **tie** will be invoiced for the number of half days worked by the staff concerned. This will be based on a pragmatic approach, with the time charged rounded to the nearest half day. The Operator Financial Model was developed on the basis on 7 hour days, but the Operator's Core Team will be working for similar durations to the rest of **tie**'s team. This is because the Operator's Core Team must be an integral part of **tie**'s team. It is expected that the average working day will be longer that 7 hours, and this average longer day would be charged as a whole day, not as a 7 hour day plus additional time.
RPIX	Other Inputs, row 252				Currently assumed to be 2.50%
KPI regime	n/a				The staffing assumptions within this document and in the associated Operator Financial Model support the KPI regime as envisaged and discussed with tie on Thursday 5 Feb 2004. These discussions are documented in the "Performance Regime - Notes of Technical meeting at DLA offices 5 Feb 04.doc" (See Part A of this Schedule)

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Item	Model reference	Comments	Scope Clarification	Cost Category	Base Case Assumptions
Costs		These have been built up from the following sources: 1 Actual emerging costs on Sheffield Supertram, Manchester Metrolink and Nottingham Express Transit Systems, 2 Operational costs on other tram systems operated by the Operator, and 3 The specific environment in Edinburgh			N/a
Staff rates	Tables 1 & 2, column Entitled "At cost Rate £/day"	These are shown within the Operator Financial Model on a daily rate basis for Project Phases A to C1 inclusive.			n/a
Project Return	Other Inputs, D65				Project Phases A to C1 is 20% C2 and D 10.5%.

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Item	Model reference	Comments	Scope Clarification	Cost Category	Base Case Assumptions
Retention	Other Inputs, E50				10%
Office Accommodation	Other Inputs, row 100			N/A	During Project Phases A to C1, **tie** will provide office space. At the start of Project Phase C2, accommodation for all staff will be ready and available in the Depot.
Management Fees	other inputs, row 86			5	Project Phase A to C1, £10k/yr Project Phase C2, £80k/yr Project Phase D, £60k/yr
Performance Bond	other inputs, row 128			1	Project Phase D bond level set at £5.0 Million un-indexed , cost of the bond is 1% per annum of bonded amount
Employer Liability Insurance	other inputs, row 168			1	
Public Liability Insurance	other inputs, row 179			1	Excludes Public Liability for the System and its operation. In Project Phase D, no Public Liability Insurance premium is costed in Operator Financial Model, but deductible claims are included.

TIE00899943_0295

Item	Model reference	Comments	Scope Clarification	Cost Category	Base Case Assumptions
Public Liability Insurance - Costs of Claims and Deductibles	Semi calcs Row 103-104			6	An allowance has been made for the cost of claims and deductibles based on the Required Insurances as set out in Schedule 10. Road Traffic Accidents Average claim £2,500 Claims per month: Line 1, 3, Line 2, 2, Network, 4. Claim success rate, 40% Personal Injuries: Average claim £1,250 Claim rate per million passenger journeys, 1.5 Claim success rate, 40% The number of personal injury claims is calculated as = passenger revenue / average fare * claim rate Note that the average fare has been assumed as Line 1 = £0.93, Line 2 = £1.20 and the Network is to be agreed
Professional Indemnity Insurance	other inputs, row 174			1	

TIE00899943_0296

Item	Model reference	Comments	Scope Clarification	Cost Category	Base Case Assumptions
Bank Charges	other inputs, row 208	Fee per passenger revenue		4	0.5% of passenger revenue. All passenger revenue is assumed to be cash for the purposes of this assumption. Base assumption on revenue is in STAG.
Tools and equipment					It is assumed that others will provide a full initial supply of such items as points bars and keys that will be needed by the Operator's operations staff to access and operate defective equipment.
Maintenance response					The Operator's bid is on the basis that a third party will provide a timely and effective maintenance response, so the Operator does not need any tools.
Tram related items					The Operator assumes that all tram related items that may be considered as consumables such as screen wash, lubricants, OTMR memory cards, fire extinguishers, tyres and pantograph carbons are provided as part of the Infrastructure Provider Maintenance at no cost to the Operator.
Purchase of capital items					**tie**/Infrastructure Provider purchase all capital items that are not specifically identified in these assumptions

TIE00899943_0297

4. Operating Costs, C2 and D

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Travel, Hotels, etc.	97		Includes corporate hospitality and sundry minor expenses for visits to the Edinburgh system by others. Senior managers' expenses are included in their rates.	1	
External Training & Welfare	98		Includes First Aid, "Train the Trainer" and other staff development training courses, procured externally. Also includes miscellaneous welfare expenditure.	1	
Cash collecting & counting	99		This is based on the Operator carrying the work out in-house. It may be more cost effective to contract this out.	4	1 security van at £15k/year plus 1 cash counting machine @ £4k per year for either line 1 or line 2, giving a total of £19k/yr. For the Network, an additional road vehicle is needed, giving a total of £34k/yr.

TIE00899943_0298

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Office machinery rentals	100			1	Telephone and IT system provided by the Infrastructure Provider free of charge Lease of two photocopiers, fax, and other sundry office equipment.
Consumables & subscriptions	101			1	Stationery, postage, etc and necessary industry periodicals Includes the ongoing replacement of keys etc.
Health, Safety & Environmental costs	102			1	HMRI ongoing costs at £1.5k, external audit fees and other registration fees.
Legal Advice	103	£5k/yr	Employment matters, advice on byelaw issues, Competition Act and general ongoing legal issues.	1	Excludes legal advice on revenue recovery.

TIE00899943_0299

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Telephone expenses	104	Actual emerging BT telephone costs at NET are about £3000 per month, plus £400 per month for 13 mobile telephones, say £3400 per month overall. These bills include the infrastructure maintenance function at NET, and are during a period of high activity leading up to opening. The steady state costs are likely to be less in the long term due to future competitive sourcing of telephony and less intense use of the telephone once the System is open. Translating this to the steady state operation of the Network in Edinburgh with a larger operation, but no infrastructure maintenance justifies the prices in the Operator Financial Model as being the same as for NTC now.		1	Includes provision of mobile telephones and call charges for senior and on call staff.

TIE00899943_0300

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Finance support	106			1	Includes external senior finance advice and audit fees. Includes payroll administration, outsourced
Uniforms	107			2	Cost per person is fixed at £250 per uniformed employee per year. The following staff are, for the purpose of this calculation only, deemed to be not uniformed: • Part time test engineer(0) • Performance Regime Manager (1), • Performance Manager (1) • Clerk (1) • Finance Manager (1) • Accounts Assistant (2) • Debt Recovery Staff (4) • Cashiers (2) This is a total of 12 for the Network. Similarly this is 10 for Line 1 and 10 for Line 2, due to the changes in the number of Debt Recovery staff.
Recruitment	109		Recruitment advertisements in local and/or national press and other recruitment activities such as open days etc.	1	

TIE00899943_0301

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Medical examinations	110		Initial and ongoing employment medicals, plus costs of administering random drink/drug tests	1	
Ticket Stock	111		The actual number of tickets needed obviously varies with the number of passengers and the type of tickets used.	1	Assumes paper and card tickets only. 26m in length/roll 70mm wide paper 10,000 rolls = £6750 with security single colour printing 10 cm average length per ticket. 1 roll gives 26000/100 = 260 tickets 10,000 rolls is 2,600,000 tickets £9k will provide 3.45 million tickets per year. Excludes smartcards and magnetic stripe tickets.
Substitute Buses	112			6	

TIE00899943_0302

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Passenger information (Timetables etc.)	113			7	If required, will be instructed as a **tie** Change. Timetables at tramstops plus printed timetables issued at help points Pocket Timetables: 170,000 timetable leaflets at £12k for the batch, 2 batches per year= £24k for the Network. Tramstop information for the Network: One size A0 timetable poster plus 2 A3 inserts or equivalent per platform every 6 months. Assume 36 tramstops, 72 platforms, so 144 sets per year at £65 per poster is £9k per year. One other identical A1 poster every 3 months at each tramstop is 4*36=144 posters per year. At £250 for each print run, the annual cost is £1k. For the tramstops this is £10k per year. For tramstops and timetables, this is £34k per year overall.
Advertising & Marketing Costs	114			7	If required, will be instructed as a **tie** Change. Covers costs of advertising and marketing the System. Also includes the costs of compensating customers as a result of customer complaints

TIE00899943_0303

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Launch Costs	115		This is a budget for a full scale launch	7	If required, will be instructed as a **tie** Change. This is equivalent to a one off cost of £100k in C2 only
Market Research	116			7	If required, will be instructed as a **tie** Change. Excludes revenue apportionment surveys
Training materials	117		Includes classroom consumable equipment, training videos where needed (e.g. driver's view of the route)	1	
Audit & Investors in People	118			1	Includes non-financial external audits and IIP award and ongoing fees
Performance Monitoring Surveys	119			1	All official externally provided performance monitoring surveys are carried out by **tie**. Duty managers carry out internal audits of performance, and will "shadow" tie's surveys where appropriate. Excludes revenue apportionment surveys. Small amount included to enable some independent surveys to be carried by the Operator.
Road vehicle costs 1	126			1	One additional vehicle if two Depots. Vehicles are costed at £7.25kpa each.

TIE00899943_0304

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Maintenance IT system support	128			1	Ongoing enhancements and changes to the office computer network. Office computer system, some 30 PCs plus software (Microsoft Office Professional or equivalent & Anti virus), cabling, internet access, configuration and printers is part of scope of the Infrastructure Provider. Maintenance and ongoing renewal of this is included in the Infrastructure Provider's scope. Provision of accounting, tram crew scheduling (see "One-off purchase of software") and maintenance management software is provided by the Operator.
Other Power & Gas	130	Emerging gas bills at NET are about £4k for 3 months to 12 Dec 03. The following 3 months are likely to be more, say £6k due to colder weather. Annual costs are likely to be about £15k.		1	Supply of gas to the Depot, assumed used to provide heating Excludes all electricity.

TIE00899943_0305

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Water & Sewerage	131	Emerging costs are not available for NET as yet. Metrolink annual water costs were £10k in 1996. Adjusting for inflation, this is about £12k in 2003, also for 26 trams. This is the same as for the Network.		2	Varies linearly with fleet size: Line 1, 14 trams Line 2, 12 trams Network, 26 trams Charges associated with the Depot. Includes disposal of tram wash effluent.
Tram cleaning	147		Tram Cleaning: Network: Based on outsourcing. The price is for a Manager plus 2 team leaders plus 4 operatives. This gives 3 people on duty each night (plus the manager). Lines 1 and 2 reduced prorata by fleet size.	2	Varies linearly with fleet size: Line 1, 14 trams Line 2, 12 trams Network, 26 trams This provides nightly, monthly and 6 monthly tram cleans, including nose end cleaning. Assumes that tram drivers drive trams through wash.

TIE00899943_0306

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Tramstop and infrastructure cleaning	148			1	Includes litter picking from trams. For Line 1: Team leader £15k plus 3 Cleaners at £10k each gives staff costs of £45k. Plus van £5k, plus materials £5k gives total of £55k This gives cover of one person on duty for most of the operational time. Line 2: As for line 1, but one less cleaner to reflect smaller workload Network: Team leader £15k plus 6 Cleaners at £10k each gives staff costs of £75k. Plus van £5k, plus materials £10k gives total of £90k This gives cover of one person on duty for most of the operational time Assumes that Tramstops are similar to NET in size, layout and equipment content

TIE00899943_0307

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Provision of helpdesk	149			7	If required, will be instructed as a **tie** Change. Varies with the number of help desk locations provided. We assume that 5 will be provided for the network; costs will vary with the number of help desk locations provided, and the eventual prices quoted by Lothian Buses plc and First Scotland East Limited.
Accidental Damage --> standard	150			6	Varies linearly with fleet size: Line 1, 14 trams. Line 2, 12 trams. Network, 26 trams Assumes a System that is similar to STAG.
Accidental Damage --> risk element	151			6	Varies linearly with fleet size: Line 1, 14 trams. Line 2, 12 trams. Network, 26 trams. Assumes a System that is similar to STAG.

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Vandal Damage --> standard	153			6	Varies linearly with fleet size: Line 1, 14 trams. Line 2, 12 trams. Network, 26 trams. Assumes a System that is similar to STAG.
Vandal Damage --> risk element	154			6	Varies linearly with fleet size:Line 1, 14 trams. Line 2, 12 trams. Network, 26 trams Assumes a System that is similar to STAG.
Graffiti Damage --> standard	156			6	Varies linearly with fleet size: Line 1, 14 trams. Line 2, 12 trams. Network, 26 trams. Assumes a System that is similar to STAG.

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Graffiti Damage --> risk element	157			6	Varies linearly with fleet size: Line 1, 14 trams. Line 2, 12 trams. Network, 26 trams Assumes a System that is similar to STAG.
One-off purchase of software	159	Equivalent to a one off cost of £10k	Tram scheduling and driver rostering package	1	Assumes **tie** have commissioned the System Operational Model during Project Phase B upon which the scheduling and rostering package will be based.See paragraphs 16.3.6, 16.5 and 16.6 of the Project Development Output Specification.
Miscellaneous costs	161			1	These are other costs not covered elsewhere, and sand is included. Sand is based on £30/Tonne at the local quarry, £200 per 20 Tonne delivery, giving delivered to site cost of £40/Tonne. Usage rate of 7 Tonne per tram per year. Fleet size of 26 trams This is £40*7*26= £7820/yr for the Network.

TIE00899943_0310

5. Staff, Project Phases A to D

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
Salaries									The salary figures in the Operator Financial Model are derived from a predicted salary plus: 10% for overtime and bonus, notionally 5% for each. 10.8% for national insurance 10.2% in respect of a non-contributory employee pension, assumes 100% take up of pension rights. A 10% contingency / expenses has already been included in relation to staff whose salaries are not subject to the mechanism as set out in Schedule 17 *(Setting of Fixed Costs).*

TIE00899943_0311

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
David Humphrey	Project Director	17 May 2004	End of Oct 05	Core	(See BCA)	n/a		9	Full time (billed to tie at 4 days per week) from 17 May 04 to 31 August 04, 2 days per week September 04, 2 days per month October 04 until end of October 05.
Andy Wood	General Manager	17 May 2004	End of Project Phase D	Core	(See BCA)	n/a		9 during Project Phases A to C1 1 during Project Phases C2 and D	2 days per week May 04, 2 days per week June, 2 days per week July, 3 days per week August, 4 days per week September 04 onwards to end of Project Phase C1
Jim Harries	Technical Engineer	17 May 2004	End of Project Phase C1	Core	(See BCA)	n/a		9	3.5 days/wk, then 4 days/wk from Nov 06
	Senior Commercial Manager	Start of July 2004	End Project Phase C1	Core	(See BCA)	n/a		9	approx 1 day/week July 4 to Dec 04, about 2 days/wk Jan 05 to Oct 05, about 2 days/month Nov 05 to end of Project Phase C1

TIE00899943_0312

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Secretary/ Assistant	17 May 2004	End of Project Phase D	Core	Yes	60		9 during Project Phases A to C1 1 during Project Phases C2 and D	
	Transportation Consultant	17 May 2004	End of Project Phase B	Non Core	(See BCA)	n/a	Patronage/revenue forecasting validation.	8	Project Phase A, 30 days Project Phase B, 20 days Project Phase C1, zero
	Network Rail Expert	see comments	End of Project Phase A	Non Core	(See BCA)	n/a		8	Project Phase A, 5 days per week for 26 weeks
Daniel Daman	Public Consultation Assistance	N/A	End of Project Phase A	Non Core	(See BCA)	n/a		8	40 days in Project Phase A only
Christian Buisson (Project Phase A only)	Transamo Director	N/A	End of Project Phase C1	Non Core	(See BCA)	n/a		8	5 days in Project Phase A. From Project Phase B onwards, named person TBC Project Phase B 4 days Project Phase C1 5 days/yr = 16.25 days

TIE00899943_0313

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Operations Manager	Nov 05	End of Project Phase D	Core	Yes	18		9 during Project Phases B to C1 1 during Project Phases C2 and D	227 days/yr
	Engineering Manager	Nov 05	End of Project Phase D	Core	Yes	31		9 during Project Phases B to C1 1 during Project Phases C2 and D	227 days/yr
	Safety & Standards Manager	Nov 06	End of Project Phase D	Core	Yes	34		9 during Project Phase C1 1 during Project Phases C2 and D	227 days/yr

TIE00899943_0314

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Legal Adviser	start of Project Phase A	End of Project Phase D	Non Core	(See BCA)	n/a		8	Continuing legal support for e.g. OFT submissions. Project Phase A, 7 days Project Phase B, 3 days Project Phase C1, 10 days For Project Phase C2, see "Operating Expenses, Project Phases C2 and D"
	Financial Modelling consultant	Start of Project Phase A	End of Project Phase C1	NonCore	(See BCA)	n/a	Further iterations of the Operator Financial Model will need to be undertaken.	8	Fee to be agreed with tie. Based on about 3 days per remodelling and 2 remodelling per year.
	Technical Support Engineer	Aug 04	End of April 06	Core	(See BCA)	n/a		9	4 days/wk until end Oct 05, then 2 days/week Support for Technical Engineer in detail design review, testing and commissioning programmes, including documentation and control.
	Test Engineers 1 and 2	Dec 07 and Aug 08	In Project Phase C2 as Operator Financial Model	Core	(See BCA)	21		9 during Project Phase C1 1 during Project Phase C2	Additionally, in Operator Financial Model, table 3A, 2 months of Test Engineer is included.

TIE00899943_0315

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Operations Assistant	3 months prior to Project Phase C2	End of Project Phase D	Core	Yes	27		3	
	Finance Manager	12 months prior to Project Phase C2	End of Project Phase D	Core	Yes	49		9 during Project Phases C1 1 during Project Phases C2 and D	
	Accounts Assistants 1 and 2	10 months prior to Project Phase C2	End of Project Phase D	Core	Yes	50		9 during Project Phase C1 1 during Project Phases C2 and D	
	Commercial Manager	Start of Project Phase C2	End of Project Phase D	Core	Yes	19		1	

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Duty Managers	Start of Project Phase C2	End of Project Phase D	Core	Yes	25		3	Provide 24/7 cover in the Control Centre, plus mobile incident response, security response (also provided by customer service staff), supervision and audit on the System. During pre-operations, provide driver and other operations training Assumes one Control Centre for the System, even if there is more than one Depot
	Operations Supervisors	Start of Project Phase C2	End of Project Phase D	Core	Yes	26		3	Provide 24/7 cover in the Control Centre to support duty manager in customer information (PA, cctv, help point response, routine radio contact with trams and booking staff on and off duty.) During pre-operations, provide driver and other operations training Assumes there is only one control room for the System, even if there is more than one Depot. If there is a second Depot, then an additional 6 people are needed to provide supervision at the second Depot

TIE00899943_0317

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Drivers	6 months before start of Project Phase D	End of Project Phase D	Core	Yes	29		3	As set out in the paper "Tram Drivers 20Feb04". (See Parts D and E of this Schedule) The start date assumption is for financial modelling purposes. In practice, the employment of drivers will be progressive, and will be a function of the system delivery, commissioning and completion programme. This is still to be defined. The recruitment profile may support the Infrastructure Provider's need for tram drivers, but this will need to be reviewed once the degree of testing required is established and the detailed commissioning programme can be considered.

TIE00899943_0318

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
									Determination of tram drivers' salaries in the Operator Financial Model Lothian bus driver rate on 28 March 2004 was £330.74 per week, thus £17,246 pa. RPIX for March 2004 was 182.5, and March 2003 was 178.7 Lothian bus driver rate adjusted by RPIX to 1 April 2003 prices is £17,246*178.7/182.5=£16,887 This gives the salary for drivers as Base salary £16887 Bonus/overtime 10% £1689 NI + pension 21% £3546 Total annual cost £22121 This cost is factored according to the ratios set out in Schedule 17 *(Setting of Fixed Costs)* to determine the costs for the other staff who are in Cost Category 3.
	Vehicle Engineer	Project Phase C2	End of Project Phase D	Core	Yes	32 & 35		1	

TIE00899943_0319

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Infrastructure Engineer	Project Phase C2	End of Project Phase D	Core	Yes	33 & 37		1	
	Performance Regime Manager	Project Phase C2	End of Project Phase D	Core	Yes	41 & 42		1	Manages performance regime deductions primarily with the Infrastructure Provider, where the Operator expects that the allocation of responsibility for performance failures between the Operator and the Infrastructure Provider will require a full time resource.
	Storeman	Project Phase C2	End of Project Phase D	Core	Yes	43		1	
	Clerk	Project Phase C2	End of Project Phase D	Core	Yes	45	To support the engineering team	1	
	Marketing Manager	3 months after start of Project Phase C2	End of Project Phase D	Core	Yes	54		1	
	Admin. Staff	3 months after start of Project Phase C2	End of Project Phase D	Core	Yes	61	General admin and office support for the whole	1	

TIE00899943_0320

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Customer Service	1 month prior to Project Phase D	End of Project Phase D	Core	Yes	72		3	Full details of staff numbers are set out in the document "Revenue Protection 23 Feb 04". (See Parts B and C of this Schedule). For ease of reference, some key features follow: Line 1, 24 staff Line 2, 16 staff Network, 36 staff. Based on 20% ticket inspection rate, 3 checks/hr, 2 staff/tram Salary is same as for drivers.

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Temporary Customer service	1 month prior to start of Project Phase D	6 months after start of Project Phase D	Core	Temporary fulltime	55		3	Full details of the assumptions are set out in the document "Revenue Protection 23 Feb 04". (See Parts B and C of this Schedule). Cost varies directly with the number of staff and the duration, at **tie**'s discretion. The salary will be 5% below the drivers' salary. 20 temporary customer services staff for 6 months at start of Project Phase D, for the Network, or 10 for either Line. 1 month to train them at end of C2 In addition to the full time customer services staff, additional staff will be deployed during the first 6 months after opening. The costs of this temporary resource are included in the Operator Financial Model for Project Phase C2, table 3A.
	Temporary Customer service (continued)								Note that the costs associated with their employment in Project Phase D are shown in Project Phase C2. This is due to the difficulties in modeling a staff resource that changes during Project Phase D. The costs are correct, but the allocation between Project Phases and the timing is not.

TIE00899943_0322

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Security Staff (cash Collection only)	1 month before Project Phase D	End of Project Phase D	Core		73	To collect cash from ticket machines and bring it to the Depot for counting, then to deliver the cash to the bank.	4	Staffing for Lines 1, 2 and network based upon 20 minutes per stop including travel time, number of stops and ticket machines per STAG, then rounded to nearest whole person on 7 day per week roster. Will be outsourced after competitive tenders if better value for money.
	Cashiers	1 months before Project Phase D	End of Project Phase D	Core		74		4	To count the cash from the ticket machines and from customer service staff
	Debt Recovery Staff	3 months after start of Project Phase C2	End of Project Phase D	Core		62	These people support the customer service staff and operate the debt recovery process up to and including prosecutions	1	
	Revenue Protection Manager	Start of Project Phase C2	End of Project Phase D	Core		75	To manage the revenue protection and minimise lost revenue.	1	

Part A Performance Regime - Notes of Technical Meeting at DLA Offices 5 February 2004

Present

Jim Harries
David Hand
Doug Blenkey
Ian Kendall

1.	**KPI – punctuality**
	Agreed that there could be different penalties at different times of day, e.g. greater weighting off peak than during peaks, as it is generally easier to control the service off peak
2.	Agreed to measure adherence to timetable at headways greater than 10 minutes, and to measure headways at timetabled headways below or equal to 10 minutes. Adherence to headways would be OK if actual headways are less than timetabled headways plus an allowance. No penalties for short headways!
3.	All data gathered and reported automatically, generating daily exception report. Summary figures only to be transferred into the daily reports. Operations Assistant is the Operator's resource for this task.
4.	JH introduced the concept of being able to bank some allowance for "bad days" and being able to roll this over from one month to the next. Ian believes that this is covered by being able to carve out the bad disruptions from the overall performance counting. Concept still open to be discussed later.
5.	IK sought a service recovery time after an incident. Post meeting, TRANSDEV suggests: 1. If trams not turned or diverted, the end to end run time 2. If trams turned or diverted, this time multiplied by 2.5
6.	Fit trams could be fitted with an indicator to show the driver if he is early or late, as fitted to some buses? TRANSDEV pointed out need for Rugby clocks in trams and everywhere in the system.
7.	Weighting of first/last tram as proposed is too high – eg on line 2, there are 200 trips/day earning 25% of the performance, and the 1% of these that are the first/last ones would earn 15%. Agreed to reassess the weightings of the indicators later.
8.	**Revenue Protection KPIs** Measure ticket machine availability, availability of full range of tickets through sales points elsewhere, customer surveys and complaints. Customer complaints are closed out by the Operator's Marketing Manager.
9.	**Passenger Information KPI** Check tramstop signage and posted information weekly at each tramstop against spec and drawings. To be done by roving Duty manager. Tie may audit. Ticklists lead to performance indicator. Consider NET concept of if reported and rectified within a period, then no penalty. Performance of PID system monitored automatically as on NET. Use customer surveys and complaints also for KPI.
10.	**Graffiti removal** Proposed as on NET - % of reported removed within timescale.
11.	**Revenue Protection KPIs** Proposal agreed was to measure customer service staff "time in the field" against the plan. Agreed that other PIs for revenue protection can act as perverse incentives. Further discussion needed.
12.	**Revenue Protection Incentives** Tie would like CS staff to be incentivised by bonus – eg for every £15 penalty fare actually paid, CS staff get £1 bonus. Further discussions needed

TIE00899943_0324

13.	**Revenue Protection Management Information** Agreed totally open book, with • % passengers without valid ticket • % of these sold a ticket and % issued with penalty fare (+ % of those that got away!) • % of penalty fares paid on the spot • % of penalty fares within [ ] weeks • % prosecuted • Data on results of prosecutions
14.	**Cleaning KPI** Measure what the cleaners have signed off as clean compared with what is required. Audit by Duty Manager – each stop checked weekly but at random. This audit checks standards against the contract, results to be shared with tie. Tie expects us to fire the cleaning contractor quickly if they are not performing.
15.	**Security KPIs** Apart from the availability of PIDs, CCTV, PA and help points, all were struggling to suggest what can be sensibly measured without perverse incentives. Needs further discussion. Tie promote a proactive response to incidents, by security staff or others. TRANSDEV suggested monitoring trends or absolutes in the customer surveys on passenger perception of security.

Ends

TIE00899943_0325

Part B Revenue Protection 8 March 2004

This paper set out TRANSDEV's strategy on revenue protection for Lines 1 and 2. The strategy is supported by data drawn from other systems. A concluding section on the possible provision of placing a customer service member of staff on all trams is included.
The calculations that support this document are in a separate spreadsheet called "Revenue Protection 08 Mar 04"

Background
The overall evasion rate has been set at 5% in the modelling carried out for tie by their consultants. TRANSDEV believes that this is slightly optimistic, based on information obtained from other tram systems. TRANSDEV proposes a rigorous revenue protection and enforcement regime to protect the revenue base for the system.

Preferred Philosophy
The system will have ticket vending machines located at tramstops, and period passes and other integrated tickets will also be valid on the system. Revenue protection will be carried out by a team of Customer Service staff. They will implement random checks on the validity of tickets by a variety processes including spot checks on trams and station blocks at tramstops. This team will also provide a response to security incidents as directed by the Duty Manager in the Control Room, assist in crowd control at special events, and provide customer service during periods of disruption.

When passengers are unable to present a valid ticket, the customer services staff will make a judgement about the intent of the passenger to avoid payment. They may sell a valid ticket or issue a Penalty Fare. Payment of the penalty fares will be enforced to the extent that the overall long term balance of revenue against the cost of collection is maximised.

There are particular issues associated with revenue recovery where passengers are travelling on concessionary or free tickets. Data on these is likely to need to be collected by survey, and the proposed revenue collection staff would be able to carry out survey work as part of their ticket checking role.

Fare Evasion
Under this type of revenue protection regime, fare evasion rates on systems are difficult to measure accurately. The Metrolink enforcement regime is rigorous, and their evasion rate is internally identified as between 4% and 11%. The revenue protection staff find about 4%, and about twice this on station blocks. It is TRANSDEV's view that the real fare evasion rate is likely to be about 8%. This figure is likely to be appropriate for use in Edinburgh system modelling work developed to predict fare evasion and revenue protection costs.

Penalty Fare recovery

Issuing Penalty Fares
Rigorous and effective recovery of penalty fares is essential. If this is not carried out, it will soon become known that buying tickets to travel on the system is an unnecessary expense. It is vital to the long term revenue base of the system that random ticket inspection is backed up by rigorous recovery of penalty fares. A dedicated team for recovering penalty fares can also support the customer services staff on the system in providing electoral role checks in order to validate the identity of information provided by people who are issued with penalty fares. To some extent, this support can also be

provided by the operations supervisors in the control room. This proposal assumes that most identity checks will be carried out by the customer services staff who will carry with them mobile computing that can be used to interrogate the necessary databases. It is assumed that it will only be necessary to contact a central depot based support resource on rare occasions, and consequently no marginal cost has been attached the operations supervisors to carry out this function. It is assumed that the operations supervisors in the control room will be able to carry out this task as par of their duties.

Payment of Penalty Fares

Information on how Metrolink manages penalty fares follows. Metrolink carries 13,000,000 passengers per year and issues about 1200 penalty fares each month, or 300 a week. This is a rate of 1.1% of passengers. About 10% of penalty fares are paid on the spot and about 40% are paid without recourse to legal action within 21 days. The remaining 50% are passed to a dedicated debt recovery team at Metrolink, processing 150 per week through prosecutions. About 85% of prosecutions are successful. Court and Metrolink administration costs are generally covered by the award of costs and fines by the court against the offenders.
TRANSDEV propose a similar arrangement for Edinburgh in this document.

Debt Recovery Resources

A dedicated team is proposed to manage and administer the recovery of unpaid penalty fares. The proposed number of people in this team is shown in the Excel worksheet titled "Staff numbers" in the file "Revenue Protection". This team will be supported by a database system that will have the following functions:

1. Record details of all penalty fares issued
2. Control the workflow of the process to recover the fares
3. Issue standard letters to the recipients of penalty fares
4. Record the payment of penalty fares
5. Support the prosecution of offenders
6. Identify repeat offenders
7. Provide management information

Ticket checking – Determination of resource levels

The resource needed to establish the checking of tickets is established below, and the core calculations are within the associated Excel spreadsheet. The model below assesses how many passengers can be checked by a team of two customer service staff. Once this has been established, the number of staff needed to check 10% and 20% of tickets is established scaling.
It is assumed that a team of two customer services staff will be able to check a tram every 20 minutes on average. During off peak periods, the staff will be waiting for the next tram for longer than during peak periods. During peak times, checking a full tram every 20 minutes will be challenging but achievable, provided that the estimate of workload in this paper for processing those who do not have valid tickets is sound.

In the analysis below, the word "trip" is used for

- a tram movement that is one complete circuit of the loop of line 1 in one direction only, and
- a tram movement that is between the City and the Airport on the Airport line

The analysis considers the percentage of trips that the team of two can check. This is not the same as the percentage of passengers, because checking a trip at a random point in the journey will not check all passengers who travel on the trip. Some will have already left the tram, and others have not boarded it yet. The proportion of passengers checked on the trip relates to the average journey length. If all passengers travel the full length of the trip, then the checking will be 100%. If they only travel

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for half the length of the trip, then, on average, half of the passengers will be checked. The proportion of passengers checked is approximately equal to the average length of the journey divided by the length of the trip. The proportions used in the model are explained below for each line:

1. Line 1. Because the route is circular, the average length journeys will be less than half the length of the loop. This calculation assumes that the average length of journeys is a third of the length of the loop. Consequently the multiplying ratio used is 3.
2. Line 2, Airport. It is assumed that on average, the passengers travel over 2/3 of the end to end length of the route. This means that the ratio is used is 1.5.
3. Line 2, Newbridge Shuttle. A different approach to the shuttle is used, and this is explained below.

Newbridge shuttle

The end to end run time is 10 minutes, and 3 trams provide the peak service. The relatively light passenger loadings on this route mean that one pair of inspectors who are continuously on duty can check all passengers on one tram that is providing part of this service. This is 1/3 of the peak passengers when there are 3 trams in service, and half of the off peak passengers when there are two trams in the service. This gives an overall checking rate of about 40%, and would require about 10 people to cover the operating hours and including allowance for holidays and so on.
To achieve an inspection rate of 10%, the 10 people can be reduced by the ratio of 40% to 10%, giving 2.5 people.

Most passengers are expected to travel further on the Airport route, and consequently they will be subject to a further random check. This means that checking on the Newbridge shuttle can be reduced whilst maintaining the overall checking rate. A further factor of about 2 is used to reflect this, so the 2.5 people can be reduced to about 1. For a system wide 20% check, this would double to 2 people.

Please refer to the separate Excel file called Revenue Protection, worksheet "Staff numbers".

Network staff numbers

There will be some economies of scale for the Network. These are

1. The number of staff needed to achieve the ticket inspection rates for the Network will be less than the sum of the number of staff needed for Line 1 and Line 2. This is mainly due to passengers whose journeys start on one Line and finish on the other line. Their tickets do not need to be checked twice as the checking rate is on a per journey, not a per line basis.
2. Other ecomomies of scale, of a less significant nature exist due to more efficient working with a larger group of staff

A percentage reduction factor has been included in the calculations to reflect this economy of scale, and it is stated in section of the spreadsheet headed "NETWORK".

Security

The time that the Customer services staff will need to spend on security incidents is addressed by adding an additional 2 members of staff to all options. These people are called "Customer Service (security)" in the associated spreadsheet, and they are included in the "Staff Summary" section.

Cost of employing Customer Services Staff

The task is relatively stressful due to potential confrontation with passengers. The role is often used as a promotional step to tram driver on other systems, and this promotes a large turnover of staff in the customer service role.
TRANSDEV intends that the customer service staff's initial salary will be 5% below that of the drivers. Although this will be above the market rate for the role, it will control staff turnover and

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allow the employment of quality staff. All Customer Service Staff will ultimately be trained as drivers and will then become entitled to the rate of pay for drivers. Consequentially the financial model sets the salary for the Customer Services staff to be the same as for the drivers. Drivers will also be trained in the Customer Service role.
The salary for the temporary Customer Services Staff is set out in the section headed "Temporary Customer Service Staff" below.

Equipment Required
The revenue protection staff will require the following equipment:

1. Secure and reliable communication with the control room to enable an appropriate response to a threatening or abusive incident.
2. Secure communications to enable electoral roll and other checks on identities – this could be hand held computers
3. Penalty fare documentation
4. Survey data capture equipment

Most of the above tasks can currently be carried out by mobile computers, and TRANSDEV envisage that this will be the most cost effective solution. Outline costs for the provision of this equipment are presented in the associated Excel worksheet. TRANSDEV assume that all of this equipment will be provided by Infrastructure Company.

Station Blocks
In order to establish an effective and rapid station block during peak hours, the experience of Metrolink is that about 8 customer service staff are needed, plus an additional 2 for verification of identity checks. The proposed number of staff would be able to support station blocks adequately unless the Line 2 only option is selected with a 10% checking rate. In this case, a further analysis of the options would be needed, to include using part time to replace full time staff and consequently allow more people on duty for station blocks at the expense of reduced staff levels at other times.
The operator's staff will not have the powers to detain people on the highway. Station blocks can only be carried out at tramstops that are on the highway by controlled entry and exit at each tram door. A large number of customer services staff is needed if the tram is not to be delayed.

Setting the Penalty Fare
The price of the Penalty Fare is a compromise between

1. A reasonable amount in the perception of the public – too much and the public and media will not support the concept
2. Small enough to be reasonably recoverable from the majority of passengers
3. Large enough to act as a deterrent
4. A round number (e.g. £20)
5. Not subject to frequent change due to inflation or changes in revenue protection policy
6. A discounted price for payment on the spot is a useful incentive

The deterrent aspect can be expressed in analytical terms, and many people will either consciously or unconsciously carry out this analysis.

The penalty fare will act as a deterrent if the normal fare for the journey is less than the penalty fare times the chance of being checked.

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A fare of £1 and a checking rate of 10% would equate to a penalty fare of at least £10.

It is TRANSDEV's view that a penalty fare of £30 would be an appropriate starting point, with a discount to £15 if paid on the spot. This price should be able to be held for several years from the start of operations.

Temporary Customer Service Staff

TRANSDEV have included a group of temporary Customer services staff to provided enhanced customer service and revenue protection for a period of 6 months at the start of Phase D. An allowance of 1 month has been included for training them at the end of Phase C2, and they are retained for a further 6 months from the start of Phase D. This group will work as an integral part of the Customer Service team. They will provide a high profile regime to new users of the system that will ensure that fare avoidance is rigorously controlled from the start of the system.

TRANSDEV have included 20 temporary staff to support the opening of the Network, and 10 for Line 1 or Line 2.

It is assumed tat the temporary staff will not require any equipment to perform their role. It is assumed that the equipment provided for the permanent staff will suffice during the period that they are deployed.

Most of the costs for these people should be included in Phase D of the financial model. However, the Tango financial model is not configured to support changes to the base costs during Phase D, and consequently all of the costs associated with the temporary staff have been have been shown in the last month of Phase C2. Row 55 of Table 3A in the model contains these costs.

Strategy Development after opening

Experience on other systems is that it is easy to allow fare evasion to increase, and hard to bring the system back under control and force evasion rates down. Consequently a rigorous initial approach that can be gently scaled down later is the recommended strategy. This also brings the following advantages:

1. A relatively large number of customer service staff available to support the opening of each stage in the opening of the system will enhance the attractiveness of the system to new users and encourage the initial revenue growth.
2. Their presence in the long term will help to provide enhanced security of passengers on the system, both real and perceived
3. They will provide a useful response to disruptions and incidents when required
4. Once the system has opened, some initial turnover of operational staff is anticipated. The customer services staff can be given opportunities to fill these vacancies and they will act as a useful buffer resource to allow longer term staff resource planning to be developed once the real operation of the system becomes known

Costs

The outline costs associated with this proposal are outlined in the second worksheet in the associated Excel file named "Revenue Protection", worksheet "Costs".

TRANSDEV assume that hardware and software needed to support the Customer Service Staff will be provided by the Infrastructure Company.

Placing a customer service member of staff on all trams

This is not the initial strategy that is outlined in this paper. It is an option that may follow once tie has set its initial strategy. The option would provide the equivalent of a conductor, but with a significantly

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enhanced customer service role. The on board member of staff will be able to sell tickets, but this would probably be at higher prices than at ticket machines at tramstops to provide an incentive for pre purchase of tickets. The prime role will include checking all tickets, and customer care. Secondary roles would be incident response and crowd management at events. Experience at Sheffield was that revenue increased by 9% as a result of the presence of conductors. This was due to reduced fare evasion and an increased sense of passenger security leading to patronage growth. The number of people in the separate security staff group could also be reduced with this option.

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Line 1

Day	Days /wk	frequency per hr	Duration hr	Trips per day	Trips per wk
Weekday	5	8	12	192	960
Weekday	5	4	7	56	280
Saturday	1	8	9	144	144
Saturday	1	4	10	80	80
Sunday	1	4	16	128	128
				Total trips per week	1592

two members of staff can check 21 journeys in a shift	
In a working week they can check	105 journeys/week
per person, this is	52.5 journeys/person/week
Allowing for holidays and sickness this is	43.75 journeys/person/week
ratio of length trip to average length of journey (see text above)	3
The percentage of passengers that one member of staff can check is	0.92%
The number of staff needed to check 10% of passengers is	11
The number of staff needed to check 20% of passengers is	22

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LINE 2

Airport

Day	Days /wk	frequency per hr	Duration hr	Trips per day	Trips per wk
Weekday	5	6	20	240	1200
Weekend	2	6	20.5	246	492
				Total trips per week	1692

two members of staff can check 21 journeys in a shift	
In a working week they can check	105 journeys/week
per person, this is	52.5 journeys/person/week
Allowing for holidays and sickness this is	43.75 journeys/person/week
ratio of length trip to average length of journey (see text above)	1.5
The percentage of passengers that one member of staff can check is	1.72%
The number of staff needed to check 10% of passengers is	6
The number of staff needed to check 20% of passengers is	12

Newbridge

The following numbers are derived in the text above	
The number of staff needed to check 10% of passengers is	1
The number of staff needed to check 20% of passengers is	2

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NETWORK

economies of scale, see text above 8%

Staff Summary

10% Checking rate	Line 1	Line 2		Network
		Airport	Newbridge	
Customer Service Staff	11	6	1	17
Customer Service Staff (security)	2	2		2
Total Customer Service Staff	**13**	**9**		**19**
Debt recovery	2	2		4
Manager	1	1		1
Total	29	21		43

20% Checking rate	Line 1	Line 2		Network
		Line 2	Newbridge	
Customer Service Staff	22	12	2	34
Customer Service Staff (security)	2	2		2
Total Customer Service Staff	**24**	**16**		**36**
Debt recovery	2	2		4
Manager	1	1		1
Total	27	19		41

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Staff numbers are given in the previous worksheet

Annual or initial	heading	detail	tie rate	units	remarks
Annual costs	Staff Costs	Customer Service Staff	26 k£/year	per person	same as driver rate in Tango models
		Debt recovery	23 k£/year	per person	same as admin rate in Tango models
		Manager	32 k£/year	per person	same as Marketing Manager rate in Tango models
		unproductive time	excluded		This relates to staff our staff who are required to attend court
	Consultancy	Legal costs	25 k£/year	per line	estimated
	IT	Support and system upgrades	10 k£/year	fixed	estimated
	IT provision	Mobile computing	1 k£/year	per person	Includes set up, and replacement, ongoing development
	Court	Fines imposed by court	excluded		
		Costs awarded by court	excluded		
		Court fees	excluded		
Initial Costs	IT	Central system	50k£	fixed	includes central hardware and software development

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Part D Tram Drivers 20 February 2004 and Tram Driver Staff Calculator

In this paper TRANSDEV explains the method used to predict the number of drivers in the bid, and how these assumptions have been refined with the benefit of the further information from the STAG reports for the two lines.
The way in which the required number of drivers may change in the future is defined. The run times are one factor that could cause such a change.
The assumptions in this paper are based on the information in the STAG reports.
This paper also defines the assumptions made that support the driver training during phase C2.
This paper should be read in conjunction with the associated spreadsheet that carries out all of the associated calculations. This is the file called "Driver Staff Calculator 11Feb04.xls".

Methodology used in the bid
The information available for the bid provided peak vehicle requirements for each line. These are 12 trams for Line 1 and 10 trams for Line 2. Information on the proposed off peak service and the durations of peak and off peak services was not available. The TRANSDEV bid assumed that the service patterns required for Edinburgh would have reduced levels of service in the inter-peak period, and further reductions in the evening peak. Consequently the number of drivers required for Edinburgh could be derived from standard scheduling benchmarking for such service profiles.

Revised Methodology
The STAG reports for lines 1 and 2 give some further details of the envisaged off peak services and durations. The number of trams required to be in service at any time is known to a much greater degree of certainty than during the bidding process. The attached calculation builds up the required number of drivers from the service patterns. A detailed explanation of how the model works is below.

Uncertainties within the attached calculations
An uncertainty remains within the attached calculation. The peak and off peak timings for the Newbridge shuttle have been assumed. TRANSDEV have made assumptions about this in the attached model that echo the peak service durations on Line 1. Because the difference between the peak and off peak services on the Newbridge is only one tram, the impact of these assumptions should be low. TRANSDEV have identified this assumption as a base case assumption.

Changes in service patterns
A change in service pattern is usually made at point in the route, usually a terminus, and the changed service pattern moves along the route with the trams and arrives at the other end of the route later, the delay in the propagation of the changed service pattern being equal to the run time. TRANSDEV have assumed that the service patterns given in the STAG reports define the minimum service frequencies on all parts of the route concerned in each time band.

For example, the service pattern for Line 1 is given in STAG page C-10 and this shows a change of 4 trams per hour to 8 trams per hour at 07:00 on weekdays. It is TRANSDEV's assumption that tie require 8 trams per hour operating on all parts of the route from 07:00. In order to achieve this, the additional 6 trams that are needed to provide the more frequent service must all be in the correct positions at 07:00. These positions will be uniformly spread around the route. If all of these additional trams are injected into the service by leaving the depot and travelling around the loop in the same direction that they needed in service, then on average each tram will have to travel half of the distance around the loop in order to reach the correct starting point. This is 45/2 or 22.5 minutes. However, some trams will have the choice of travelling either more than half way around the loop or setting out in the opposite direction and then using a crossover to reach the correct position to enter service. Any tram that moves into position by using a crossover will slightly reduce the 22.5 minutes average figure, so the model uses 20 minutes or 0.33 hours for this purpose. This number is in the table "Time

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to add or remove a tram from the service" in the "Productivity" worksheet of the spreadsheet model. This value is used to calculate the driving time under the "Positioning of trams" heading for each line.

At a change in service pattern where there is a reduction in service, the same allowance in terms of tram positioning time will be required to remove the trams from service. This in included in the model under the "Positioning of trams" heading for each line.

The Airport service is assumed to be served from the Gogar depot, which is almost at the Airport end of the route. Additional trams required in the eastbound direction will travel into position from the depot. The maximum time for this will be about 25 minutes, and the minimum will be zero. An average time of 25/2=12 minutes is appropriate for this move. For trams that need to be positioned westbound on the route, the positions of crossovers influences the time taken for this move. To reach towards the City end of the route, trams will have to travel to St Andrew Square, turn in the loop, and return. It is assumed that other trams will be able to use a crossover positioned about half way between Gogar and the City. This gives an average positioning time of 28 minutes for westbound trams. The average for both east and westbound trams is (12.5+28)/2= 20 minutes. This number is in the table "Time to add or remove a tram from the service" in the "Productivity" worksheet of the spreadsheet model.

The Newbridge shuttle has Gogar depot at one end of the line. The run time of 9:07 means that an average positioning time from the depot will be about 10 minutes. This is 0.17 hours, and this figure is in the table "Time to add or remove a tram from the service" in the "Productivity" worksheet of the spreadsheet model.

Separate calculations are given for both the Line 2 services being served from the Leith Depot and from oar Depot. Similarly the Line 1 services are shown being served from either Leith or Gogar depots. The Network is also shown served from either Leith or Gogar depots. In each case, the associated times for positioning trams between the depot and the route are shown in the "Time to add or remove a tram from the service" columns of the tables.

Depot Location

The choice of Depot location(s) will impact on the resource required in several complex ways. The model shows all realistic combinations of routes and depots, but does not show the effect of a main depot plus a separate stabling depot. If the Network is operated from a two separate depots, then the model will need to be recast once the appropriate split of workload between the two depots is established. Some tram positioning time will be saved, but there will also be the need to duplicate some resources. The overall effect has not been established, but could be modelled in a similar way once the options are understood better.

Explanation of the model

The model consists of six worksheets. Please refer to the worksheet for Line 1 first. This calculates the number of driving hours needed each week to support the declared service pattern. Particular points to note are:

1. The week is divided into sets of rows that relate to days with the same service pattern. In addition to the service pattern rows, the row towards the bottom of the worksheet relates to the provision of drivers who are on duty overnight. These drivers will prepare all of the trams for the following day's service, and position trams as required for both maintenance and cleaning purposes. TRANSDEV have assumed that a tram can be prepared for service by a single driver. This validity of this assumption will depend on the tram design. For example, it may not be possible to check that the brake lights or fog lights are working on some designs of tram with only one person.

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2. Hours are calculated in two groups as shown on the column headings. These are "Trams in service" and "Tram positioning". "Trams in service" relates to passenger carrying services. "Tram positioning" is the resource needed to drive trams from the depot to where they are needed to start service. Each row in the table calculates the change in the number of trams from the previous service and allows a time to position these trams. The positioning times used for each tram are drawn from the "Productivity" worksheet, please see below.
3. The three totals from the bottom of the "Line 1" worksheet are used in the summary sheet
4. A separate calculation in carried out for the operation of Line 1 from Gogar depot. The effect of tram positioning time when operating from a depot that is not on the route concerned is included. These times are drawn from the "Time to add or remove a tram from the service" table in the "Productivity" sheet. The time needed to transfer drivers between the depot and a remote route is not included here. This is addressed as part of the productivity factor. Please see later in the "Productivity sheet".

The "Airport" and "Newbridge" worksheets" follow the same logic as the "Line 1" worksheet.

The "Productivity" worksheet serves several purposes listed below:

1. The basic assumptions about the necessary allowance for holidays, training and sickness are declared. Holiday entitlement and the length of the working week are included. This leads to a key ratio or multiplier that is used in the summary sheet to make the appropriate allowance for holidays and sickness. This allowance also includes for staff turnover by including a period of time for each new driver to be trained. This period of time is spread over the average time that a driver is expected to work as a driver.
2. The "Time to add or remove a tram from the service" is used in the calculations for each line as explained above
3. The "rostering efficiency" section considers an average driver's shift and the necessary activities that are not driving. An allowance to include for parts of duties that will not align with the shifts is included. The rostering efficiencies are used in the summary sheet, please see later.
4. Where drivers have to book on at the depot and then travel as a passenger to relieve another driver, and/or travel beck as a passenger at the end of their shift, this travelling time is calculated in the "Correction factor for drivers who have to travel between the depot and a remote line to relieve others" table.
5. A separate column is used for the rostering efficiency where drivers have to travel as a passenger between the depot and the route concerned. It is assumed that drivers on the Airport Line have meal breaks at the Airport and that they do not travel back to the depot during their break, and that drivers on Line 1 have a break at a mess room that is provided on Line 1. Ocean Terminal is a possible location for this.

The "Summary" sheet calculates the number of drivers required for each route and line.

1. The final numbers of drivers are rounded to the nearest whole number, and a row is included at the bottom of the summary table to show the number of drivers that was submitted in the bid.
2. The model provides cover for sickness and leave, and this is done on by considering the total requirements over a full year. On a minute to minute basis, the driver resource will not exactly balance the requirements. There is a small allowance in the financial model for overtime for the drivers. This overtime will provide the additional cover needed during periods of high leave and sickness. It will also provide the necessary cover for special events.

Commentary on the number of drivers required

The summary table shows the results of the calculations and the number of drivers required. Comments on the results for each line follow:

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1. Line 1 shows a reduction in the number of drivers needed when compared with the bid. The further detail from the STAG report has resulted in this change.
2. Line 2 shows an increase in the number of drivers. This results from to the longer daily duration of service and extended peak service that is shown in the STAG report for Line 2, together with splitting Line 2, none of which were incorporated in the bid.
3. Network shows an increase in the number of drivers needed, a function of splitting Line 2 and operating both sections remotely from Leith depot.

Further refinement

The number of drivers for the system will be continually refined during phase A and beyond. A complete scheduling exercise will establish the appropriate turns of duty and the number of drivers needed to support the system. This task is an ongoing operating requirement. TRANSDEV's bid incorporates the cost a vehicle and crew scheduling software package. Pre-operations iterations of schedules, as well as the scheduling of ongoing operations, will be carried out on an open book basis to give tie visibility of changes to drivers' costs.

The effects of run time

The run time of the system is not yet defined. The estimates in the STAG reports are brought into question in the separate paper titled "Run Time Review" that TRANSDEV sent to tie on 30 January.
The actual run time achieved on the system will be affected by a wide range of factors, and will not be known with certainty until the system is commissioned.
Variations from the STAG estimates will affect the number of drivers (beyond say +/- 2%, a variance which is a function of scheduling in reality compared to forward estimates) if either

1. the number of trams has to change in order to maintain the timetable parameters, or
2. the timetable parameters (start and finish time, duration and/or level of peak/off peak/evening/weekend services) have to be changed.

On Line 1 the estimated run time of 41 minutes can vary up to 45 minutes or down to 37.5 minutes without unduly affecting the driver numbers. At either ends of these two extremes, decisions on the number of trams and level of timetable will have to be made.

Summary

1. The model shows changes in the number of drivers from the bid. The summary follows. The Tango financial model is being amended to show the following changes:

	Line 1	Line 2	Network
Number of drivers	**48**	**53**	**106**
Predicted number of drivers from bid	53	44	97
Change from bid	-5	9	9

2. Future reductions in the number of drivers will probably be achieved for Line 2 by refining how the service changes during each day. All of the peak services are probably not needed for the full periods of time that are included in the models. Likewise the assumptions about the initial ramp up and final ramp down of the services can also be refined.
3. Future reductions for Line 1 are unlikely to be achievable without significant reductions in service pattern and/or frequency. There may be scope at little or no additional driver cost for extending the daytime frequency a bit longer, or operating 8 trams per hour up to 1900, 6 trams per hour 1900-2100 before stepping down to the evening frequency of 4 trams per hour.
4. Depot locations and their use will affect the number of drivers, but the driver cost savings will have to be balanced against the additional overhead costs (capital, staffing, and running costs) of a second depot. The saving of drivers is likely to be more than outweighed, by a considerable margin, by the additional costs of a second depot.

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Base Case Assumptions related to the number of drivers

These follow in summary as described above:

1. Service patterns, number of peak vehicles, timetable pattern and frequencies are as described in this paper and the associated spreadsheet
2. Peak and off peak service durations on the Newbridge shuttle service is as assumed by TRANSDEV in the attached model
3. Separate depots are used for Lines 1 and 2 at Leith and Gogar respectively if the Network is not built.
4. Leith Depot is used for the whole Network, but the model also considers using Gogar Depot for the Network. The model can be used to assess other permutations of depots and lines.
5. Trams can be prepared for service by a single driver
6. Salary, overtime, holiday and sickness levels for drivers are as set out in this paper
7. Driver numbers are as set out in the above summary. Note that driver number will change with two depots.
8. The sensitivity on run times for Line One is that variations within 38 minutes minimum and 45 minutes maximum round trip times will vary driver numbers by no more than ±3%; outside those parameters, peak vehicle numbers will change and driver numbers will vary pro-rata to the number of peak vehicles, ±5% to the nearest whole number above, assuming no change to the service frequency or pattern.
9. For Line Two, the parameters are (airport service) 21 minutes minimum and 27 minutes maximum single journey time, with the same variation ratios applying. For the Newbridge shuttle, the parameters are 6 mins and 13 mins.
10. If the Network expands, the methodology set out above will still apply

Base Case Assumptions related to driver training during Phase C2

The following assumptions apply:

1. there is a 13 week shadow running period prior to start of passenger service, prior to which sufficient drivers to operate the opening service timetable will have been trained;
2. the phasing of the infrastructure will enable driver training to be completed in eight weeks per driver;
3. drivers will be employed in tranches of twelve at a time, on a rolling two weekly basis;
4. that there will be a failure/drop-out rate of 5% during the training period;
5. that instructor training will take three weeks (in addition to the driver training content), and will be able to start eight weeks before the start of the driver training period (1 December 2008 on the timescale issued on 04/02/04);
6. the tram delivery and commissioning programme, together with infrastructure programme will provide either (i) 12 fully serviceable trams and the infrastructure continuously available for 16 hours per day, or (ii) 24 fully serviceable trams and the infrastructure continuously available for 8 hours per day throughout the training period to support the driver training.

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Number of Tram Drivers

This spreadsheet supports the Microsoft Word document called "Number of Tram Drivers 11Feb04". The Word document explains how this spreadsheet operates.

Line 1 from Leith Depot

								Trams in service			Positioning trams			Total
Day	Days per week	Period	From	To	Duration	Duration	Service Frequency	Trams in service	Tram hours /day in service	Tram hours /week in service	Change in no. of trams in service	Tram positioning hours /day	Tram positioning hours /week	Tram hours /week
					(h:m:s)	(hrs)	(trams/hr)	(No.)	(hrs/day)	(hrs/wk)	(No.)	(hrs/day)	(hrs/wk)	(hrs)
Monday - Friday	5	early morning	5:00:00	7:00:00	2:00:00	2.00	4	6	12	60	6	2	10	70
	5	AM peak	7:00:00	9:30:00	2:30:00	2.50	8	12	30	150	6	2	10	160
	5	Inter-peak	9:30:00	16:30:00	7:00:00	7.00	8	12	84	420	0	0	0	420
	5	PM peak	16:30:00	19:00:00	2:30:00	2.50	8	12	30	150	0	0	0	150
	5	evening	19:00:00	24:00:00	5:00:00	5.00	4	6	30	150	-6	2	10	160
	5	overnight	24:00:00	29:00:00	5:00:00	5.00	0	0	0	0	-6	2	10	10
		Total				**24.00**			**186.00**	**930.00**		**8.00**	**40.00**	**970**
Saturday	1	early	5:00:00	9:00:00	4:00:00	4.00	4	6	24	24	6	2	2	26
	1	shopping hours	9:00:00	18:00:00	9:00:00	9.00	8	12	108	108	6	2	2	110
	1	evening	18:00:00	24:00:00	6:00:00	6.00	4	6	36	36	-6	2	2	38
	1	overnight	24:00:00	29:00:00	5:00:00	5.00	0	0	0	0	-6	2	2	2
		Total				**24.00**			**168.00**	**168.00**		**8.00**	**8.00**	**176.00**
Sunday	1	early	8:00:00	10:00:00	2:00:00	2.00	4	6	12	12	6	2	2	14
	1	daytime	10:00:00	18:00:00	8:00:00	8.00	4	6	48	48	0	0	0	48
	1	evening	18:00:00	24:00:00	6:00:00	6.00	4	6	36	36	0	0	0	36
	1	overnight	24:00:00	32:00:00	8:00:00	8.00	0	0	0	0	-6	2	2	2
		Total				**24.00**			**96.00**	**96.00**		**4.00**	**4.00**	**100.00**

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All	7	Overnight tram movement and preparation	22:00:00	30:00:00	8:00:00	8.00		1				8	56	56
Total										**1194.00**			**108.00**	**1302.00**

TIE00899943_0343

Line 1 from Gogar Depot

								Trams in service			Positioning trams			Total
Day	**Days per week**	**Period**	**From**	**To**	**Duration**	**Duration**	**Service Frequency**	**Trams in service**	**Tram hours /day in service**	**Tram hours /week in service**	**Change in no. of trams in service**	**Tram positioning hours /day**	**Tram positioning hours /week**	**Tram hours /week**
					(h:m:s)	(hrs)	(trams/hr)	(No.)	(hrs/day)	(hrs/wk)	(No.)	(hrs/day)	(hrs/wk)	(hrs)
Monday - Friday	5	early morning	5:00:00	7:00:00	2:00:00	2.00	4	6	12	60	6	4.5	22.5	82.5
	5	AM peak	7:00:00	9:30:00	2:30:00	2.50	8	12	30	150	6	4.5	22.5	172.5
	5	Inter-peak	9:30:00	16:30:00	7:00:00	7.00	8	12	84	420	0	0	0	420
	5	PM peak	16:30:00	19:00:00	2:30:00	2.50	8	12	30	150	0	0	0	150
	5	evening	19:00:00	24:00:00	5:00:00	5.00	4	6	30	150	-6	4.5	22.5	172.5
	5	overnight	24:00:00	29:00:00	5:00:00	5.00	0	0	0	0	-6	4.5	22.5	22.5
		Total				**24.00**			**186.00**	**930.00**		**18.00**	**90.00**	**1020**
Saturday	1	early	5:00:00	9:00:00	4:00:00	4.00	4	6	24	24	6	4.5	4.5	28.5
	1	shopping hours	9:00:00	18:00:00	9:00:00	9.00	8	12	108	108	6	4.5	4.5	112.5
	1	evening	18:00:00	24:00:00	6:00:00	6.00	4	6	36	36	-6	4.5	4.5	40.5
	1	overnight	24:00:00	29:00:00	5:00:00	5.00	0	0	0	0	-6	4.5	4.5	4.5
		Total				**24.00**			**168.00**	**168.00**		**18.00**	**18.00**	**186.00**
Sunday	1	early	8:00:00	10:00:00	2:00:00	2.00	4	6	12	12	6	4.5	4.5	16.5
	1	daytime	10:00:00	18:00:00	8:00:00	8.00	4	6	48	48	0	0	0	48
	1	evening	18:00:00	24:00:00	6:00:00	6.00	4	6	36	36	0	0	0	36
	1	overnight	24:00:00	32:00:00	8:00:00	8.00	0	0	0	0	-6	4.5	4.5	4.5
		Total				**24.00**			**96.00**	**96.00**		**9.00**	**9.00**	**105.00**
All	7	Overnight tram movement and preparation	22:00:00	30:00:00	8:00:00	8.00		1				8	56	56

TIE00899943_0344

Total										**1194.00**			**173.00**	**1367.00**

TIE00899943_0345

Airport from Gogar Depot

								Trams in service			Positioning trams			Total
Day	**Days per week**	**Period**	**From**	**To**	**Duration**	**Duration**	**Service Frequency**	**Trams in service**	**Tram hours /day in service**	**Tram hours /week in service**	**Change in no. of trams in service**	**Tram positioning hours /day**	**Tram positioning hours /week**	**Tram hours /week**
					(h:m:s)	**(hrs)**	**(trams/hr)**	**(No.)**	**(hrs/day)**	**(hrs/wk)**	**(No.)**	**(hrs/day)**	**(hrs/wk)**	**(hrs)**
Monday - Friday	5	Peak	4:30:00	24:30:00	20:00:00	20.00	6	7	140	700	7	2.33	11.67	711.67
	5	overnight	24:30:00	28:30:00	4:00:00	4.00	0	0	0	0	-7	2.33	11.67	11.67
		Total				**24.00**			**140.00**	**700.00**		**4.67**	**23.33**	**723.33**
Weekend	2	Peak	4:30:00	25:00:00	20:30:00	20.50	6	7	143.5	287	7	2.33	4.67	291.67
	2	overnight	25:00:00	28:30:00	3:30:00	3.50	0	0	0	0	-7	2.33	4.67	4.67
		Total				**24.00**			**143.50**	**287.00**		**4.67**	**9.33**	**296.33**
All	7	Overnight tram movement and preparation	22:00:00	30:00:00	8:00:00	8.00		1				8.00	56.00	56.00
Total										**987.00**			**88.67**	**1075.67**

TIE00899943_0346

Airport from Leith Depot

								Trams in service			Positioning trams			Total
Day	**Days per week**	**Period**	**From**	**To**	**Duration**	**Duration**	**Service Frequency**	**Trams in service**	**Tram hours /day in service**	**Tram hours /week in service**	**Change in no. of trams in service**	**Tram positioning hours /day**	**Tram positioning hours /week**	**Tram hours /week**
					(h:m:s)	**(hrs)**	**(trams/hr)**	**(No.)**	**(hrs/day)**	**(hrs/wk)**	**(No.)**	**(hrs/day)**	**(hrs/wk)**	**(hrs)**
Monday - Friday	5	Peak	4:30:00	24:30:00	20:00:00	20.00	6	7	140	700	7	4.32	21.58	721.58
	5	overnight	24:30:00	28:30:00	4:00:00	4.00	0	0	0	0	-7	4.32	21.58	21.58
		Total				**24.00**			**140.00**	**700.00**		**8.63**	**43.17**	**743.17**
Weekend	2	Peak	4:30:00	25:00:00	20:30:00	20.50	6	7	143.5	287	7	4.32	8.63	295.63
	2	overnight	25:00:00	28:30:00	3:30:00	3.50	0	0	0	0	-7	4.32	8.63	8.63
		Total				**24.00**			**143.50**	**287.00**		**8.63**	**17.27**	**304.27**
All	7	Overnight tram movement and preparation	22:00:00	30:00:00	8:00:00	8.00		1				8.00	56.00	56.00
Total										**987.00**			**116.43**	**1103.43**

TIE00899943_0347

Newbridge from Gogar Depot

								Trams in service			Positioning trams			Total
Day	Days per week	Period	From	To	Duration	Duration	Service Frequency	Trams in service	Tram hours /day in service	Tram hours /week in service	Change in no. of trams in service	Tram positioning hours /day	Tram positioning hours /week	Tram hours /week
					(h:m:s)	(hrs)	(trams/hr)	(No.)	(hrs/day)	(hrs/wk)	(No.)	(hrs/day)	(hrs/wk)	(hrs)
Monday - Friday	5	early morning	5:30:00	7:00:00	1:30:00	1.50	3	2	3	15	2	0.33	1.67	16.67
	5	AM peak	7:00:00	9:30:00	2:30:00	2.50	6	3	7.5	37.5	1	0.17	0.83	38.33
	5	Inter-peak	9:30:00	16:30:00	7:00:00	7.00	6	3	21	105	0	0.00	0.00	105.00
	5	PM peak	16:30:00	19:00:00	2:30:00	2.50	6	3	7.5	37.5	0	0.00	0.00	37.50
	5	evening	19:00:00	24:30:00	5:30:00	5.50	3	2	11	55	-1	0.17	0.83	55.83
	5	overnight	24:30:00	29:30:00	5:00:00	5.00	0	0	0	0	-2	0.33	1.67	1.67
		Total				**24.00**			**50.00**	**250.00**		**1.00**	**5.00**	**255.00**
Saturday	1	early	5:30:00	9:00:00	3:30:00	3.50	3	2	7	7	2	0.33	0.33	7.33
	1	shopping hours	9:00:00	18:00:00	9:00:00	9.00	6	3	27	27	1	0.17	0.17	27.17
	1	evening	18:00:00	25:00:00	7:00:00	7.00	3	2	14	14	-1	0.17	0.17	14.17
	1	overnight	25:00:00	29:30:00	4:30:00	4.50	0	0	0	0	-2	0.33	0.33	0.33
		Total				**24.00**			**48.00**	**48.00**		**1.00**	**1.00**	**49.00**
Sunday	1	early	5:30:00	10:00:00	4:30:00	4.50	3	2	9	9	2	0.33	0.33	9.33
	1	daytime	10:00:00	18:00:00	8:00:00	8.00	3	2	16	16	0	0.00	0.00	16.00
	1	evening	18:00:00	25:00:00	7:00:00	7.00	3	2	14	14	0	0.00	0.00	14.00
	1	overnight	25:00:00	29:30:00	4:30:00	4.50	0		0	0	-2	0.33	0.33	0.33
		Total				**24.00**			**39.00**	**39.00**		**0.67**	**0.67**	**39.67**
All	7	Overnight tram movement and preparation	22:00:00	30:00:00	8:00:00	8.00		0				0.00	0.00	0.00

TIE00899943_0348

Total										**337.00**			**6.67**	**343.67**

Newbridge from Leith Depot

								Trams in service			Positioning trams			Total
Day	**Days per week**	**Period**	**From**	**To**	**Duration**	**Duration**	**Service Frequency**	**Trams in service**	**Tram hours /day in service**	**Tram hours /week in service**	**Change in no. of trams in service**	**Tram positioning hours /day**	**Tram positioning hours /week**	**Tram hours /week**
					(h:m:s)	(hrs)	(trams/hr)	(No.)	(hrs/day)	(hrs/wk)	(No.)	(hrs/day)	(hrs/wk)	(hrs)
Monday - Friday	5	early morning	5:30:00	7:00:00	1:30:00	1.50	3	2	3	15	2	1.57	7.83	22.83
	5	AM peak	7:00:00	9:30:00	2:30:00	2.50	6	3	7.5	37.5	1	0.78	3.92	41.42
	5	Inter-peak	9:30:00	16:30:00	7:00:00	7.00	6	3	21	105	0	0.00	0.00	105.00
	5	PM peak	16:30:00	19:00:00	2:30:00	2.50	6	3	7.5	37.5	0	0.00	0.00	37.50
	5	evening	19:00:00	24:30:00	5:30:00	5.50	3	2	11	55	-1	0.78	3.92	58.92
	5	overnight	24:30:00	29:30:00	5:00:00	5.00	0	0	0	0	-2	1.57	7.83	7.83
		Total				**24.00**			**50.00**	**250.00**		**4.70**	**23.50**	**273.50**
Saturday	1	early	5:30:00	9:00:00	3:30:00	3.50	3	2	7	7	2	1.57	1.57	8.57
	1	shopping hours	9:00:00	18:00:00	9:00:00	9.00	6	3	27	27	1	0.78	0.78	27.78
	1	evening	18:00:00	25:00:00	7:00:00	7.00	3	2	14	14	-1	0.78	0.78	14.78
	1	overnight	25:00:00	29:30:00	4:30:00	4.50	0	0	0	0	-2	1.57	1.57	1.57
		Total				**24.00**			**48.00**	**48.00**		**4.70**	**4.70**	**52.70**
Sunday	1	early	5:30:00	10:00:00	4:30:00	4.50	3	2	9	9	2	1.57	1.57	10.57
	1	daytime	10:00:00	18:00:00	8:00:00	8.00	3	2	16	16	0	0.00	0.00	16.00
	1	evening	18:00:00	25:00:00	7:00:00	7.00	3	2	14	14	0	0.00	0.00	14.00
	1	overnight	25:00:00	29:30:00	4:30:00	4.50	0		0	0	-2	1.57	1.57	1.57
		Total				**24.00**			**39.00**	**39.00**		**3.13**	**3.13**	**42.13**
All	7	Overnight tram movement and preparation	22:00:00	30:00:00	8:00:00	8.00		0				0.00	0.00	0.00

TIE00899943_0350

Total										**337.00**			**31.33**	**368.33**

Summary

	Units	Line 1 from Leith Depot	Line 1 from Gogar Depot	Line 2 from Gogar Depot			Line 2 from Leith Depot			Network from Leith Depot	Network from Gogar Depot
				Airport	Newbridge	Total	Airport	Newbridge	Total		
Driving trams in service	hrs/week	1194.00	1194.00	987.00	337.00	1324.00	987.00	337.00	1324.00	2518.00	2518.00
Positioning trams	hrs/week	108.00	173.00	88.67	6.67	95.33	116.43	31.33	147.77	255.77	268.33
Total driving time	hrs/week	1302.00	1367.00	1075.67	343.67	1419.33	1103.43	368.33	1471.77	2773.77	2786.33
Theoretical number of shifts	/week	166.92	175.26	137.91	44.06		141.47	47.22			
rostering efficiency	%	85.42%	80.36%	85.42%	85.42%		80.61%	76.60%			
number of shifts required	/week	195.42	218.08	161.45	51.58		175.50	61.65			
Drivers before allowance for holidays etc		39.08	43.62	32.29	10.32		35.10	12.33			
Ratio to allow for holidays and sickness etc		1.23	1.23	1.23	1.23		1.23	1.23			
theoretical number of drivers		48.12	53.70	39.76	12.70		43.22	15.18			
number of drivers		**48**	**54**	**40**	**13**	**53**	**43**	**15**	**58**	**106**	**107**

Predicted number of drivers from bid		53	n/a	n/a	n/a	44	n/a	n/a	n/a	97	97
Change from bid		-5	n/a	n/a	n/a	9	n/a	n/a	n/a	9	10

Productivity

Allowance for holidays, sickness training etc

Average length of employment, yrs =	5
Duration of initial training, working days =	40
Average initial training per year, days =	8

days/year =	365.25
holidays =	25
bank holidays =	8
sickness =	5
ongoing training =	3
initial training from above=	8
total weekdays paid but not worked=	49
days in weekends =	104.36
days paid =	260.89
days worked =	211.89
Ratio =	**1.231**

Length of working week, hours =	39
Average length of working day, hours =	7.8

Time to add or remove a tram from the service (hrs)

Depot

	Leith	Gogar	units
Line 1	0.33	0.75	hours
Airport	0.62	0.33	hours
Newbridge	0.78	0.17	hours

Rostering efficiency

Route	All	Airport	Newbridge	Line 1
Dept	Adjacent	Leith	Leith	Gogar
Average paid shift length	08:00	08:00	08:00	
book on	00:10	00:10	00:10	
walk to stop and reach tram	00:05	00:16	00:26	
walk from stop or dispose of tram	00:05	00:05	00:05	
Unpaid meal break	00:00	00:00	00:00	
walk to stop and reach tram	00:05	00:05	00:05	
dispose and book off	00:05	00:16	00:26	
Lost time due to rostering inefficiencies	00:40	00:40	00:40	
Total lost time	01:10	01:33	01:52	
Time for driving	06:50	06:26	06:07	
Efficiency	85.42%	80.61%	76.60%	

Correction factor for drivers who have to travel between the depot and a remote line to relieve others
Mon-Fri only: it is assumed that the same factor can be applied to Weekends

Route	Airport	Newbridge	Line 1
Depot	Leith	Leith	Gogar
Off peak trams	7	2	6
Peak only trams	0	1	6
Peaks/day	2	2	2
peak tram positioning moves included in model	0	4	24
off peak tram positioning moves included in model	14	4	12
total tram positioning moves included in model	14	8	36

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driver shifts/off peak tram	3	3	3
off preak tram driver shifts	21	6	18
off peak tram driver positioning moves	42	12	36
off peak driver only positioning moves	28	8	24
total driver positioning moves	42	16	60
proportion of driver positioning moves that are not included in tram positioning moves	0.67	0.50	0.40
times in mins from depot to line			
running time from depot to route	12	37	25
mean waiting time for next tram on route	5	5	6
total	17	42	31
total (mins)	00:17	00:42	00:30
Applying correction factor from above (mins)	00:11	00:21	00:12
from route to depot			
mean waiting time for next tram to depot	6	6	5
running time from depot to route	12	37	25
total	18	43	30
total (mins)	00:17	00:42	00:30
Applying correction factor from above (mins)	00:11	00:21	00:12

Data from Tango financial models v3

This data is only for reference purposes

Route	No of drivers
line 1	53
line 2	44
network	97

Michael D Howell ..... ~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

..... ~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

SCHEDULE 19

Additional Costing Assumptions

Cost Item	Line 3
Travel, Hotels, etc.	Line 3 requires 50% increment
External Training & Welfare	Line 3: varies linearly with increased number of staff for Line 3 at £500 per person.
Cash collecting & counting	Line 3 requires additional van only
Office machinery rentals	No increment for Line 3
Consumables & subscriptions	30 % increase for Line 3
Health, Safety & Environmental costs	Line 3 30% increment
Legal Advice	Line 3, no increment.
Telephone expenses	30 % increase for Line 3
Finance support	30 % increase for Line 3
Uniforms	Logic for Network applies to Line 3
Recruitment	Line 3: 50% increase
Medical examinations	Line 3: pro rata for increased number of staff required for Line 3
Substitute Buses	Line 3: 50% increase
Passenger information (Timetables etc.)	Line 3: prorata for additional tramstops in Line 3
Training materials	Line 3: 30% increase
Audit & Investors in People	Line 3: 30% increase
Performance Monitoring Surveys	Line 3: 30% increase
Road vehicle costs 1	One additional vehicle for Line 3. Vehicles are costed at £7.25kpa each.
Maintenance IT system support	Line 3: 20% increase

Name	Role	Base Case Assumptions
David Humphrey	Project Director	50% additional time required for Line 3 et seq each.
Andy Wood	General Manager	System operates a fleet of no more than 50 Trams; thereafter job regrading and salary review required.
Jim Harries	Technical Engineer	System operates a fleet of no more than 50 Trams; thereafter additional time and/or additional technical support required.
	Senior Commercial Manager	System operates a fleet of no more than 50 Trams; thereafter additional time and/or additional technical support required.
	Secretary/ Assistant	System operates a fleet of no more than 50 Trams, at which point the cost of the role will need to be reviewed
	Operations Manager	System operates a fleet of no more than 50 Trams, at which point the cost of the role will need to be reviewed
	Engineering Manager	System operates a fleet of no more than 50 Trams, at which point the cost of the role will need to be reviewed
	Safety & Standards Manager	System operates a fleet of no more than 50 Trams, at which point the cost of the role will need to be reviewed
	Legal Adviser	To be called off at tie's discretion. If Fleet size increases to more than 30 Trams, then costs increase linearly with fleet size above this point
	Financial Modelling consultant	Line 3 will require a complete re-run of model.
	Technical Support Engineer	A further Line will increase the input/cost by 50%.
	Operations Assistant	Fleet size not more than 30 Trams. At this point two people will be needed in this role up to 100 Trams
	Finance Manager	Fleet size not more than 50 Trams. Salary will then need to be reviewed
	Accounts Assistants 1 and 2	Fleet size not more than 30 Trams. At this point one additional person is needed for every 20 Trams in the fleet
	Commercial Manager	Fleet size not more than 50 Trams. Salary will then need to be reviewed
	Duty Managers	These will operate a system of up to 50 Trams. More may be needed for an even larger fleet. Assumes one Control Centre for the System, even if there is more than one Depot

Name	Role	Base Case Assumptions
	Operations Supervisors	Any Network Expansion will require up to an additional 5 people. These will operate a System of up to 50 Trams. More may be needed for an even larger fleet. Assumes there is only one Control Centre for the System, even if there is more than one Depot. If there is a second Depot, then an additional 6 people are needed to provide supervision at the second Depot
	Drivers	As set out in the paper "Tram Drivers 20Feb04".
	Vehicle Engineer	Will require an additional assistant and a salary increase of 10% if there are more than 30 Trams in the fleet.
	Infrastructure Engineer	Will require an additional assistant and a salary increase of 10% if the System is more than 10% longer than the Network.
	Performance Regime Manager	Fixed up to a fleet total of 50; thereafter, a clerical assistant will be needed.
	Storeman	Further storeman needed for Line 3.
	Performance Manager	Fixed up to a fleet total of 50; thereafter, a clerical assistant will be needed.
	Clerk	Fixed up to a fleet total of 30, after which a further clerk will be required
	Marketing Manager	Fixed up to a fleet total of 50; thereafter a salary review required.
	Admin. Staff	Additional post required for Line 3.
	Customer Service	Full details of staff numbers are set out in the document "Revenue Protection 23 Feb 04 Staffing for Line 3 to be based on same methodology
	Temporary Customer service	Full details of the assumptions are set out in the document "Revenue Protection 23 Feb 04". Cost varies directly with the number of staff and the duration, at **tie's** discretion. For Line 3, 10 people on the same basis are proposed to support the opening of Line 3 The salary will be 5% below the drivers' salary.
	Security Staff (cash Collection only)	Same methodology to be applied for Line 3 et seq. Will be outsourced after competitive tenders if better value for money.
	Cashiers	Fixed up to a fleet total of 30, thereafter a further cashier will be required.

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Name	Role	Base Case Assumptions
	Debt Recovery Staff	Line 3, 2 additional staff.
	Revenue Protection Manager	Fixed up to fleet total of 50; thereafter regrading of job and/or additional assistance required.

[redacted].....

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

.....[redacted].....

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

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This is the Operating Appendix referred to in the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

APPENDIX 1

OPERATING APPENDIX RELATING TO THE EDINBURGH TRAM NETWORK

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PART I - PRELIMINARY MATTERS

1. DEFINITIONS AND INTERPRETATION

Terms and expressions defined in Schedule 1 *(Definitions and Interpretation)* of the Agreement will have the same meanings in this Appendix.

2. CONDITIONS PRECEDENT

2.1 The obligations of the Parties under this Appendix shall be conditional upon the occurrence of the Operating Effective Date, save for the provisions listed in Clauses 2.1.1 to 2.1.2 below which shall have effect as from the Effective Date:

2.1.1 the provisions of this part I (*Preliminary Matters*); and

2.1.2 Clause 23 (*Performance and Financial Adjustments*), Clause 24 (***tie*** *Changes*) Clause 25 (*Operator Changes*) and Clause 28 (*Transition on Termination or* Expiry) of this Appendix;

2.2 **tie** may by notice in writing to the Operator (without the consent of the Operator) waive satisfaction of some or all of the Operator Conditions Precedent.

2.3 On the date that each of the Operator Conditions Precedent (with the exception of any Operator Conditions Precedent that have been expressly waived by **tie** in writing) have in **tie**'s opinion been satisfied, **tie** shall notify the Operator of the same.

2.4 The Operator shall use its reasonable endeavours to satisfy or procure the satisfaction of the Operator Conditions Precedent prior to the date scheduled for the Operating Effective Date in the Project Programme.

2.5 Following notification by **tie** pursuant to Clause 2.3 of this Appendix, the Operator shall notify a date (being as soon as reasonably possible) when it intends to commence providing the Transport Services on the relevant Line, such date to be subject to the approval of **tie**, such approval not to be unreasonably withheld or delayed.

3. SATISFACTION OF REQUIREMENTS FOR SERVICE COMMENCEMENT

3.1 The Operator shall give the **tie** Project Manager not less than 20 Business Days' notice of the date upon which the Operator considers that Service Commencement in respect of a Line (or part of a Line) can been achieved so that the tests to be undertaken in accordance with the **tie** Completion Requirements may be carried out.

3.2 The **tie** Project Manager shall be entitled to inspect the System in operation on the date or dates reasonably specified by the Operator in accordance with this Clause 3 *(Satisfaction of Requirements for Service Commencement)*, and to attend any of the tests to be carried out. The Operator shall procure that such of the Project Operations Staff and Project Development Staff as **tie** may reasonably request shall accompany the **tie** Project Manager on any such inspection.

3.3 The **tie** Project Manager shall, within 7 Business Days of any inspection made pursuant to Clause 3.2 above, notify the Operator of any outstanding matters (including the repetition of any of the tests which are required to be carried out and passed in accordance with the **tie** Completion Requirements) which must be attended to before Service Commencement can occur in respect of the relevant Line (or part of such Line) in accordance with this Appendix. The Operator shall attend to all such matters and shall, if necessary, give **tie** further notices in accordance with Clause 3.1 above (but dealing only with matters raised in **tie's** notification under this Clause 3.3) so that the procedures in Clauses 3.1 and 3.2 above and this Clause 3.3 are repeated as often as may be necessary to ensure that all outstanding matters in relation to the **tie** Completion Requirements are attended to.

3.4 **tie** shall, when it is satisfied that Service Commencement can occur in accordance with this Appendix, issue a Certificate of Service Commencement to that effect stating the date upon which Service Commencement can occur. To the extent that Service Commencement is to be in relation to part of a Line, the Certificate of Service Commencement shall also specify details of the relevant part of such Line.

3.5 Where the Certificate of Service Commencement is issued in relation to part of a Line:

3.5.1 the provisions of this Appendix relating to Project Phase D (including Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime)* shall

apply to that part of the Line in respect of which the Certificate of Service Commencement has been issued; and

3.5.2 the provisions of the Agreement relating to Project Phase C2 shall continue to apply to the remaining part of such Line.

3.6 Where it has been agreed between the Parties that Service Commencement and Full Service Commencement shall occur at the same time, the Certificate of Service Commencement shall be deemed to be also a Certificate of Full Service Commencement.

3.7 **tie** may issue the Certificate of Service Commencement, notwithstanding that there are Operator Snagging Matters. Where there are Operator Snagging Matters, **tie** shall, within 7 Business Days of the date of issue of the Certificate of Service Commencement, issue a Snagging Notice which shall specify the Operator Snagging Matters.

3.8 Following the issue of a Snagging Notice and in consultation with the **tie** Project Manager and in such manner as to cause as little disruption to the provision of the Transport Services by the Operator and to the use and enjoyment of the System and Transport Services by the public (and as little general inconvenience) as reasonably practicable, the Operator shall rectify or shall procure rectification of each Operator Snagging Matter within such time as is reasonably practicable after the service of the Snagging Notice.

3.9 The issue of the Certificate of Service Commencement shall in no way affect the obligations of the Operator under the Agreement.

3.10 For the avoidance of doubt, the issue of any Certificate of Service Commencement pursuant to Clause 3.4 above shall be conditional upon **tie** being satisfied that all Necessary Consents in relation to the Project Operations for the relevant Line have been obtained, are in full force and effect and are unconditional.

3.11 In the event that the Operator is dissatisfied with the decision of **tie**, the provisions of Clause 42 (*Dispute Resolution Procedure*) of the Agreement shall apply and pending resolution of the matter in accordance with Schedule 7 (*Dispute Resolution Procedure*) of the Agreement, the provisions of Clause 17 (*Payment during Project Phase C2*) of the Agreement shall continue to apply.

3.12 From the Service Commencement Date of the first Line to become operational until the earlier of the Expiry Date or termination of this Agreement, **tie** shall provide all electrical power to the System. The Operator shall assist **tie** in the procurement of contracts for the provision of such electrical power. Such contracts should offer value for money to **tie** and the Operator shall continue to assist **tie,** as required, to ensure that such contracts continue to offer value for money to **tie.**

4. SATISFACTION OF REQUIREMENTS FOR FULL SERVICE COMMENCEMENT

4.1 To the extent that the Parties have agreed that there will be a time interval between the Service Commencement Date and the Full Service Commencement Date in respect of a Line, the following provisions of this Clause 4 *(Satisfaction of Requirements for Full Service Commencement)* will apply. Without limitation, such an interval may occur where **tie** issues a Certificate of Service Commencement pursuant to Clause 3.4 above in relation to only part of a Line.

4.2 The Operator shall give the **tie** Project Manager not less than 20 Business Days' notice of the date upon which the Operator considers that Full Service Commencement in respect of a Line can been achieved so that the tests to be undertaken in accordance with the relevant **tie** Completion Requirements may be carried out.

4.3 The **tie** Project Manager shall be entitled to inspect the System in operation on the date or dates reasonably specified by the Operator in accordance with this Clause 4 *(Satisfaction of Requirements for Full Service Commencement)*, and to attend any of the tests to be carried out. The Operator shall procure that such of the Project Operations Staff and Project Development Staff as **tie** may reasonably request shall accompany the **tie** Project Manager on any such inspection.

4.4 The **tie** Project Manager shall, within 7 Business Days of any inspection made pursuant to Clause 4.3 above, notify the Operator of any outstanding matters (including the repetition of any of the tests which are required to be carried out and passed in accordance with the relevant **tie** Completion Requirements) which must be attended to before Full Service Commencement can be considered to have occurred in respect of the relevant Line in accordance with this Appendix. The Operator shall attend to all such matters and shall, if necessary, give **tie** further notices in accordance with Clause 4.2 above (but dealing only with matters raised in **tie's**

notification under this Clause 4.4) so that the procedures in Clauses 4.2 and 4.3 above and this Clause 4.4 are repeated as often as may be necessary to ensure that all outstanding matters in relation to the **tie** Completion Requirements are attended to.

4.5 **tie** shall, when it is satisfied that Full Service Commencement can occur in accordance with this Appendix, issue a Certificate of Full Service Commencement to that effect stating the date upon which Full Service Commencement can occur.

PART II: PROJECT OPERATIONS

5. THE TRANSPORT SERVICES

5.1 Throughout the Service Period in respect of each Line, the Operator shall provide the Transport Services (and all other Project Operations):

5.1.1 in accordance with the Agreement;

5.1.2 in accordance with the Operating Method Statements;

5.1.3 in accordance with the Operating Output Specification;

5.1.4 in accordance with all applicable Law and Necessary Consents (and so as not to prejudice the renewal of any such Necessary Consents); and

5.1.5 in compliance with the Environmental Statement.

5.2 To the extent that the Parties have agreed that there will be a time interval between the Service Commencement Date and the Full Service Commencement Date in respect of any Line, the Parties acknowledge that the Operating Output Specification shall specify a reduced level of requirement in respect of that period, as compared with the period following the Full Service Commencement Date.

5.3 To avoid doubt, the obligations in Clauses 5.1.1, 5.1.2, 5.1.3, 5.1.4 and 5.1.5 above are independent obligations. For example:

5.3.1 the fact that the Operator has provided the Transport Services in accordance with the Operating Method Statements shall not be a defence to an allegation that the Operator has not satisfied the Operating Output Specification; and

5.3.2 the fact that the Operator has provided the Transport Services in accordance with the Operating Output Specification shall not be a defence to an allegation that the Operator has not satisfied the Operating Method Statements.

5.4 Without prejudice to Clauses 5.1 and 5.3 above, if it should be found that the Operating Method Statements do not fulfil the Operating Output Specification, the Operator shall amend the Operating Method Statements. Such amendment shall be made in accordance with Schedule 9 (*Review Procedure*) of the Agreement and shall ensure that the Operating Method Statements shall satisfy the Operating Output Specification.

5.5 The Operator may at any time submit to the **tie** Project Manager in accordance with Schedule 9 (*Review Procedure*) of the Agreement proposals for amendments to or substitution of the Operating Method Statements or any part of them. If **tie** makes no comment on such proposed amendment or substitution (on the grounds set out in Schedule 9 (*Review Procedure*) of the Agreement), then the Operating Method Statements as so amended or substituted shall be the Operating Method Statements for the purposes of this Appendix, subject to any further amendment or substitution to which there has been no comment in accordance with Schedule 9 (*Review Procedure*) of the Agreement.

5.6 The Operator shall not be entitled to implement or procure the implementation of any amendment to the Operating Method Statements unless it is entitled to proceed with such implementation pursuant to Schedule 9 (*Review Procedure*) of the Agreement.

5.7 An amendment to or substitution for the Operating Method Statements pursuant to Clauses 5.4 or 5.5 above shall not be a **tie** Change and shall not entitle the Operator to:

5.7.1 any adjustment to the Target Operating Costs, Fixed Costs, Target Revenues or Profit Element; or

5.7.2 any relief from the performance of its obligations under the Agreement.

6. TRANSPORT SERVICES TIMETABLE

6.1 In accordance with the terms of the Project Development Output Specification, the Timetable shall be agreed between the Operator and the **tie** Project Manager not less

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than 60 days (unless otherwise agreed in writing by **tie**) prior to the Planned Service Commencement Date in respect of a Line.

6.2 Subject to Clause 8 (*Special Events*) of this Appendix, the Operator shall not be entitled to alter the Timetable unless:

6.2.1 any such alteration complies with the Operating Output Specification; and

6.2.2 the Operator provides a copy of the proposed alterations to the **tie** Project Manager for **tie's** approval at least 56 days (unless otherwise agreed in writing by **tie**) before the proposed alteration is to take effect.

6.3 The Operator shall not implement any Timetable for the provision of Transport Services on the System or alteration of any such Timetable without the prior written consent of the **tie** Project Manager.

7. PUBLICATION OF INFORMATION RELATING TO THE SYSTEM

The Operator shall comply with the requirements of the Public Liaison and Media Plan, including in relation to:

7.1 the display of information at Tramstops; and

7.2 the availability of paper copies of the Timetable.

8. SPECIAL EVENTS

8.1 Where at any time during the Term:

8.1.1 a Special Event is scheduled to take place which in the opinion of **tie** will, or may, affect the Project Operations, **tie** shall give notice in writing to the Operator of such Special Event;

8.1.2 an event is scheduled to take place which the Operator considers requires an amendment to the Project Operations (including, the Timetable), the Operator shall give notice in writing to **tie** of such event together with details of its proposed amendments to the Project Operations in accordance with Clause 8.2 or Clause 8.11 (as appropriate). To the extent that **tie** agrees that such event should give rise to an amendment to the Project Operations, such

event shall be a Special Event for the purposes of this Clause 8 *(Special Events)*.

8.2 Any Special Event Notice given by either Party pursuant to Clause 8.1 above shall:

8.2.1 be given as far in advance as is reasonably practicable, but in any event at least one month prior to the date of commencement of the relevant Special Event;

8.2.2 set out the following details (whichever are relevant) in relation to Special Event:

8.2.2.1 the date(s), time(s) and duration of the event;

8.2.2.2 the route(s) of the event;

8.2.2.3 those parts of the System likely to be affected by the event and the likely effects;

8.2.2.4 any modifications or restrictions which the Party serving the Special Event Notice considers should be placed upon the Project Operations (including an amendment to the Timetable) and the relevant time periods for such restrictions; and

8.2.2.5 any requirement for an increase in the provision of the Transport Services before, during and/or after the period of Special Event;

8.3 The Operator shall, within two weeks after (i) the date of the Special Event Notice (if served by **tie**); or (ii) the date on which **tie** agrees that the event specified in a Special Event Notice served by the Operator is a Special Event, forward to **tie** a plan (**"Special Event Plan"**) in respect of the relevant Special Event which plan shall include the Operator's reasoned and detailed proposals in relation to:

8.3.1 any modifications to or restrictions to be placed upon the Project Operations (including the Timetable):

(a) in the period immediately prior to the commencement of the Special Event; and/or

(b) during the period of the Special Event; and/or

(c) in the period immediately following the end of the Special Event;

8.3.2 any required increase in the Project Operations (including the Timetable) during the periods listed in Clause 8.3.1 above;

8.3.3 any third party interests which may be adversely affected by the Special Event Plan and the involvement of the Emergency Services; and

8.3.4 the estimated costs arising out of the Special Event (the **"Special Event Estimate"**)

8.4 Following receipt by **tie** of the Special Event Plan, the Parties (acting reasonably) shall:

8.4.1 liaise fully and frequently with each other in order to agree any relevant arrangements in respect of the Special Event (including any amendments to the Timetable). Following such liaison, **tie** shall have the final authority to determine any modifications or restrictions in respect of the Project Operations (including the Timetable) as a result of the Special Event Plan; and

8.4.2 the Parties shall discuss and agree the Special Event Estimate. If the Special Event Estimate is expected to exceed £10,000 (Indexed) and it is practicable for the Operator to do so, **tie** may require the Operator to seek and evaluate competitive tenders. The Operator shall, as soon as reasonably practicable, and, in any event not more than 14 days after seeking any competitive tenders, update the Special Event Estimate accordingly.

8.5 The Operator, following consultation with **tie**, will undertake appropriate action to ensure public safety in respect of any Special Events which affect Project Operations. The Operator Project Manager will attend any Special Event planning meetings, comprising also members of organisations and representatives from the Emergency Services involved in planning for Special Events.

8.6 The Operator shall use all reasonable endeavours to:

8.6.1 mitigate any increase or maximise any saving in the Operating Costs likely to be incurred as a result of a Special Event; and

8.6.2 mitigate any reduction or maximise any increase to the Operating Revenues likely to be received as a result of a Special Event.

8.7 On no more than ten occasions in any calendar year during the Service Period, **tie** may give notice in writing to the Operator (**"tie Full Service Notice"**) requiring the Operator to provide a full peak period service (**"Full Service"**) for a Full Service Day over all or part of the System.

8.8 Any notice given by **tie** pursuant to Clause 8.7 above shall:

8.8.1 be given at least three months prior to the date of the relevant Full Service Day;

8.8.2 set out the following details in relation to the relevant Full Service Day:

8.8.2.1 the date and the reason for the request;

8.8.2.2 whether **tie** requires Full Service over all or part of the System and (where relevant) the relevant parts of the System; and

8.8.2.3 any other modifications or restrictions which **tie** consider should be placed upon the Full Service for the duration of the Full Service Day.

8.9 **tie** may serve a **tie** Full Service Notice upon the Operator in respect of any Special Event, but subject always to the limitation in Clause 8.7 above concerning the number of occasions in any calendar year during the Service Period upon which **tie** may serve such notice.

8.10 In respect of any day in respect of which (i) **tie** and the Operator have agreed to amend the Timetable for the period before, during and/or after a Special Event, or (ii) **tie** has served a **tie** Full Service Notice upon the Operator the Operator shall publicise details of the relevant change to the Timetable in accordance with the Public Liaison and Media Plan.

8.11 Where at any time during the Services Period it is agreed by **tie** that the procedure for agreeing a Special Event set out in Clauses 8.2, 8.3 and 8.4 cannot be followed in accordance with the said Clauses, the Operator shall recommend to **tie** what steps need to be taken to facilitate such Special Event (including as far as reasonably

practicable, the preparation of a Special Event Plan). The Operator shall also give a Special Event Estimate.

8.12 tie shall pay the actual costs of any agreed Special Event to the Operator in accordance with Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) to the Operating Appendix.

9. FARE SETTING AND PARTICIPATION IN INTEGRATED TICKETING SCHEME

9.1 The Initial Fares (including details of fares zones) shall be as developed during Project Phases A, B and C1. All increases in Fares during the Service Period shall be in accordance with the Fares structure developed during Project Phases A, B and C1 and the prevailing CEC Fares Policy.

9.2 The Operator shall comply with the CEC Fares Policy in relation to the Fares for the Transport Services. Any amendments to the CEC Fares Policy requiring a change to the Fares shall be a **tie** Change in accordance with Clause 24 (***tie** Changes)* of this Appendix.

9.3 **tie** shall establish a consultation process whereby the Operator shall be given reasonable opportunity, in advance of any amendments being made to the CEC Fares Policy, to comment upon any proposed amendments to the CEC Fares Policy and meet with **tie** and other key decision makers (if **tie** is able arrange such meeting) to discuss any proposed amendments to the CEC Fares Policy.

9.4 The Operator shall implement the Service Integration Plan in relation to an integrated ticketing scheme for the System, together with other public transport providers in Edinburgh and South East Scotland, which will be compatible with One Ticket.

9.5 The Operator shall participate in the Concessionary Travel Scheme in accordance with all terms and conditions which apply to such Scheme from time to time. The Parties acknowledge that the Target Revenues shall take account of any material adverse impact on the level of revenue collected by the Operator as a result of the Operator's participation in the Concessionary Travel Scheme, except to the extent that such material adverse impact is already mitigated under the terms and conditions of the Concessionary Travel Scheme. The Operator shall fully participate in the Concessionary Travel Scheme (or any superseding scheme) in accordance with the

terms and conditions of such Scheme and shall ensure that its participation in the same is in accordance with the applicable Law.

9.6 The Operator shall ensure that persons entitled to travel at concessionary fares or at no cost under the Concessionary Travel Scheme are able to do so without inconvenience on the System at all times.

9.7 The Operator shall be responsible for the availability (and acceptable form and content) of any information, data necessary to permit calculation of Revenue Foregone (by reason of being a participant in the Concessionary Travel Scheme).

9.8 Any dispute between the Parties arising from or in connection with the Operator's participation in the Concessionary Travel Scheme shall be referred to the Dispute Resolution Procedure pursuant to Clause 42 (*Dispute Resolution*) of the Agreement, notwithstanding any provision to the contrary contained in the terms and conditions of the Concessionary Travel Scheme.

9.9 The Operator shall ensure that:

9.9.1 the System (including all fare collection equipment) and Project Operations are or will be Euro Compliant before the introduction of the single European currency in the United Kingdom and Project Operations will not be affected by the introduction of the single European currency in the United Kingdom;

9.9.2 the Operator's own internal systems and procedures are or will be Euro Compliant before the introduction of the single European currency in the United Kingdom and the continuity of supply of the Project Operations will not be affected by the introduction of the single European currency in the United Kingdom; and

9.9.3 the System (including all fare collection equipment) and Project Operations shall at all times throughout the Term be compliant with all Law applicable in relation to the Euro in the United Kingdom, including the rules on conversion, triangulation and rounding set out in EU Regulation Number 1103/97 and any subsequent or similar regulations or Laws.

provided that to the extent that the Infrastructure Provider(s) are responsible for fare collection equipment, such Infrastructure Provider(s) shall be responsible for ensuring that the fare collection equipment complies with the requirements of this Clause 9.9.

9.10 For the purposes of Clause 9.9 above **"Euro Compliant"** means that (i) the introduction of the Euro within the United Kingdom or any part thereof shall not affect the performance or functionality of any relevant items nor cause such items to malfunction, end abruptly, provide invalid results or adversely affect business, and (ii) all currency reliant and currency related functions (including all calculations concerning financial data) of any relevant items to enable the introduction and operation of the Euro, and (iii) in particular (but without limitation) each and every relevant item shall, to the extent it performs or relies upon currency related functions (including all calculations concerning financial data):

9.10.1 be able to perform all such functions in both the national currency of the United Kingdom and in Euros;

9.10.2 during any transition phase applicable to the United Kingdom, be able to deal with the dual denominations of the Euro and national currency of the United Kingdom;

9.10.3 recognise, accept, display and print all the Euro currency symbols and alphanumeric codes which may be adopted by any government and other European Union body in relation to the Euro;

9.10.4 incorporate protocols for dealing with rounding and currency conversion;

9.10.5 recognise data expressed in, and express any output data in, the national currency of the United Kingdom and the Euro; and

9.10.6 permit the input of data in Euros and display an outcome in Euros where such data, supporting **tie**'s normal business practices, operates in Euros and/or the national currency in the UK.

10. SYSTEM BYELAWS AND REGULATIONS UNDER THE PUBLIC PASSENGER VEHICLES ACT 1981

10.1 **tie** shall:

10.1.1 if it considers necessary for the regulation of conduct of passengers or lost property in respect of the System, give effect to such regulations made (or having effect as if made) under section 25 or 60(1)(k) of the Public

Passenger Vehicles Act 1981 as it considers appropriate as if Trams were public service vehicles used in the provision of Local Services; and

10.1.2 subject to the confirmation of the Scottish Ministers (if required), if **tie** considers it necessary for the regulation of the use, or operation of, or travel on, the System or the maintenance of order on the System or on facilities provided in connection with the System, request CEC to make byelaws regulating such matters.

10.2 The Operator shall be responsible for the enforcement of all regulations and byelaws referred to in Clause 10.1 above including the prosecution of offences thereunder.

10.3 **tie** shall consult with the Operator when considering the matters referred to in Clause 10.1 above.

10.4 The Operator shall propose draft regulations and draft byelaws to **tie** as the Operator considers are necessary for the regulation of the use, or operation of, or travel on, the System or the maintenance of order on the System or on facilities provided in connection with the System,

10.5 For the avoidance of doubt, the provisions of Clauses 10.1 and 10.3 above shall not apply to any penalty fare regime and the Operator shall be entitled to request **tie** to approach CEC (subject to the confirmation of the Scottish Ministers) to make such orders as may be appropriate in relation to a penalty fare regime and prescribing the amount of penalty fares as the Operator and **tie** may consider appropriate.

11. OPERATION AND MAINTENANCE PROCEDURES

11.1 The Operator shall be responsible for Operator Maintenance of the System and in relation to such maintenance, the Operator shall comply with the Maintenance Plan.

11.2 The Infrastructure Provider shall be responsible for all Infrastructure Provider Maintenance. The Operator and **tie** agree to work in mutual cooperation to ensure that the Infrastructure Provider performs such maintenance in accordance with the terms of the relevant IDA with a view to ensuring that the System as a whole and each part of it are continuously available.

11.3 **tie** and the Operator may agree from time to time the extent to which the exercise of **tie**'s contractual rights under the IDA are delegated to the Operator.

11.4 The Operator shall work together with the Infrastructure Provider, both through the exercise of contractual rights delegated to the Operator pursuant to Clause 11.3 above and generally, with the intention that the Transport Services be delivered in accordance with the Operating Output Specification without interruption for maintenance purposes. Without limitation:

11.4.1 the Operator shall promptly notify the relevant Infrastructure Provider of any requirement for Infrastructure Provider Maintenance of which the Operator becomes aware; and

11.4.2 the Operator shall co-operate with the Infrastructure Provider in relation to the planning of Infrastructure Provider Maintenance .

11.5 If, at any time, it appears to the Operator likely that any planned maintenance to be carried out by the Operator or by any Infrastructure Provider will necessitate interruption to or restriction of the Transport Services on the System, the Operator shall:

11.5.1 notify **tie** not less than four weeks prior to such planned interruption to or restriction of the Transport Services, and take all reasonable steps to notify passengers as soon as reasonably practicable in advance of the carrying out of such planned maintenance, of the nature of such work and the likely disruption to the Transport Services; and

11.5.2 take all steps which are reasonably practicable to minimise the adverse consequences of such work to passengers, such steps to include an alternative means of transportation being in service where the Transport Services will not be provided in accordance with the Operating Output Specification for a continuous period of 1 hour or more.

11.6 In the event of any unplanned maintenance or repair works to be carried out by the Operator or any Infrastructure Provider as a result of a system failure, breakdown or an emergency, the Operator shall:

11.6.1 notify **tie** as soon as possible of the nature of such work and the likely disruption to the Transport Services;

11.6.2 take all reasonable steps to notify passengers as soon as reasonably practicable of the nature of such work and the likely disruption to the

Transport Services, and where possible such notification shall be in advance of the carrying out of such work; and

11.6.3 take all steps which are reasonably practicable to minimise the adverse consequences of such work to passengers. Where the Operator considers that such work will result in the Transport Services not being provided in accordance with the Operating Output Specification for a continuous period of 2 hours or more, such steps shall include an alternative means of transportation being in service as soon as reasonably practicable. For the purposes of this Clause 11.6.3, the Parties acknowledge that it will generally be reasonably practicable for the Operator to arrange for an alternative means of transportation to be in service within 90 minutes of becoming aware of the requirement for it.

12. SERVICE PERFORMANCE AND QUALITY MONITORING

12.1 The Operator shall comply with the provisions of the KPI Regime and the Performance Monitoring Regime and shall send such representatives as **tie** may reasonably require to a monthly performance meeting convened on notice by **tie** and such other meetings as **tie** may reasonably require from time to time to discuss the performance by the Operator of the Project Operations in accordance with the Agreement.

12.2 The Operator shall throughout the Service Period provide a helpdesk (**"Helpdesk"**) accessible to the public and third parties in person at a central Edinburgh location and by use of a freephone or local call rate number, e-mail address and postal address (such number, e-mail address and postal address to be published by the Operator at each Tramstop and on each Tram). The Helpdesk shall accurately record all communications and calls made to it. The Operator shall ensure throughout the Service Period that the Helpdesk is responsible for dealing with enquiries from the public with regard to lost property. The Operator shall store such lost property for such reasonable period agreed with **tie**.

Service Quality Report

12.3 The Operator shall submit a Service Quality Report to **tie** no later than three Business Days following the end of each Reporting Period. Such report shall contain the KPI Monitoring Report referred to at paragraph 8 of Schedule 3 (*Project Phase D*

Payment Mechanism and KPI Regime) to this Appendix and, in a form to be agreed with the **tie** Project Manager, data showing consolidated Operating Revenues and Operating Costs. For the avoidance of doubt, **tie** shall not be obliged to process any invoice submitted by the Operator during Phase D in the absence of the Service Quality Report pertaining to the relevant Reporting Period. The Operator shall be responsible for ensuring that the data contained in the Service Quality Report is generated automatically and, to the extent practicable, electronically.

12.4 In addition to the Service Quality Reports to be submitted by the Operator pursuant to Clause 12.3 above, the Operator shall prepare and submit to **tie** an Annual Service Report on or about 31 March in each year during the Service Period in accordance with Clause 16.5 of this Appendix.

PART III: GENERAL OBLIGATIONS

13. GENERAL STANDARDS

13.1 The Operator shall (each as a distinct and separate obligation):

13.1.1 perform the Transport Services and the Project Operations:

13.1.1.1 in accordance with the requirements of Clause 5 (*Transport Services*) of this Appendix

13.1.1.2 in accordance with Good Industry Practice from time to time with regard to the activity concerned;

13.1.1.3 in such manner so as not wilfully to detract from the image and reputation of **tie** CEC;

13.1.1.4 in a manner that shall ensure that the safety of persons working on, using, or in contact with the System shall not be compromised;

13.1.1.5 in accordance with the Environmental Statement, and the mitigation measures contained in it; and

13.1.1.6 in accordance with the Scottish Private Bill(s) and all ancillary regulations once enacted;

13.1.2 implement, in accordance with paragraph 6 of Schedule 4 (*Operating Output Specification*) to the Operating Appendix, all component plans which constitute the Operating Method Statement as there have been developed under paragraph 26 of the Project Development Output Specification;

13.1.3 enforce a comprehensive no smoking, no alcohol and no abuse of drugs or other substances policy for the System;

13.1.4 implement a process of continuous improvement to facilitate the continuous operation of the System during and following the end of the Term;

13.1.5 procure that records of tickets sales (including tickets granted under concessionary arrangements) are collated and retained and made available to the **tie** Project Manager on request;

13.1.6 procure that regular liaison meetings are held during the Service Period to enable all aspects of Project Operations to be discussed in accordance with Clause 6 (*Management of the Project*) of the Agreement; and

13.1.7 ensure that its senior managers and those of the Operator Parties receive disability equality training.

13.2 The Operator shall throughout the conduct of the Project Operations have full regard for the safety of all persons on the System Land (whether lawfully or not) in accordance with Good Industry Practice, to avoid risk to such persons.

14. QUALITY ASSURANCE

14.1 The Operator shall procure that all aspects of the Project Operations are carried out in accordance with the quality management systems set out in the Quality Management Plan.

14.2 The Operator shall appoint (or shall procure the appointment of) a Quality Manager with effect from the Operating Effective Date (if not already appointed prior to such date), who shall not be directly involved in the day-to-day performance of the Project Operations. The identity of the Quality Manager (and any replacement) shall be

subject to the approval of the **tie** Project Manager (such approval not to be unreasonably withheld or delayed). Without limitation, the Operator shall ensure that the terms and conditions of employment of the Quality Manager shall require him to comply with the requirements of Clause 7.5 (*Quality Assurance*) of the Agreement.

14.3 The **tie** Project Manager may, at his discretion, carry out audits of the Operator's quality system (including the Quality Management Plan and any quality manuals and procedures) at approximate intervals of 12 months during the Service Period and may carry out other periodic monitoring, spot checks and auditing of the Operator's quality management systems and the other quality systems referred to in this Clause 14 (*Quality Assurance*). The Operator shall procure that the **tie** Project Manager shall have a like right in respect of each Operator Party. The Operator shall co-operate and shall procure that any Operator Party co-operates with the **tie** Project Manager including providing him with all access, assistance, information and documentation which he reasonably requires in connection with his rights under this Clause 14 *(Quality Assurance)*.

14.4 If, following any monitoring, spot check or audit undertaken pursuant to Clause 14.3 above, it is discovered that the Operator has failed, and/or that the Operator (on the balance of probabilities) will fail, to comply with the Agreement, **tie** may (without prejudice to any other right or remedy available to it) by notice to the Operator:

14.4.1 increase the level of its monitoring of the Operator until such time as the Operator shall have demonstrated to the satisfaction of **tie** that it is capable of performing and will perform all its obligations under the Agreement, in which case the Operator shall compensate **tie** for any reasonable additional costs incurred by **tie** as a result of such increased monitoring; and/or

14.4.2 require the Operator to undertake such steps as **tie**, acting reasonably, considers necessary to ensure compliance with the Agreement provided that:

i) such a requirement shall not result in any amendment to the Target Operating Costs or the Fixed Costs; and

ii) if the Operator does not agree that such steps are necessary for such purposes, it may refer the matter for determination under the Dispute Resolution Procedure and shall not be obliged to take such steps until the matter has been so determined.

15. ADVERTISING

There shall be no advertising permitted on or in any of the Trams and/or the Tramstops or at any other location on the System.

16. BEST VALUE AND PROJECT PHASE D BENCHMARKING

16.1 The Operator shall, throughout the Term and to the extent consistent with its obligations under the Agreement, make arrangements to secure continuous improvement in the way in which Project Operations are conducted having regard to the Project Vision and, a combination of economy, efficiency and effectiveness.

16.2 The Operator agrees to undertake (or refrain from undertaking) such actions as **tie** shall reasonably request:

16.2.1 supporting and assisting **tie** (in compliance with Clause 48 (*Information and Audit Access*) of the Agreement) in preparing best value performance plans and conducting best value reviews in relation to Project Operations;

16.2.2 complying with requests for information, data or other assistance made by **tie** in pursuance of its best value assessment; and

16.2.3 complying with all requests by **tie** to procure the attendance of specific officers or employees of the Operator or Operator Parties at any **tie** meetings at which Project Operations are to be discussed (but not, otherwise in exceptional circumstances, more than three times in any one year).

16.3 The Parties acknowledge that **tie** may prepare best value performance plans and conduct a best value review in conjunction with the reset of the Target Operating Costs, Fixed Costs (excluding the Category Five Fixed Costs) and Target Revenues pursuant to Clause 21 (*Reset of the Fixed Costs Target Operating Costs and the Target Revenues*) of this Appendix.

16.4 In addition to the KPI Customer Satisfaction Surveys, **tie** may undertake an annual customer satisfaction survey (**"tie Customer Satisfaction Survey"**) in order to:

16.4.1 assess satisfaction among the public and passengers with Project Operations and, in particular, with the quality, efficiency and effectiveness of the Transport Services;

16.4.2 complement preparation of the Annual Service Report; and

16.4.3 monitor compliance by the Operator with its obligations including its management of systems availability and maintenance;

and the Operator shall provide reasonable assistance to enable the Operator to undertake the **tie** Customer Satisfaction Survey.

16.5 NOT USED

16.6 Without prejudice to any other provision in the Agreement (and no later than two Reporting Periods prior to the end of any year in which reset will take place in accordance with Clause 21 (*Reset of the Fixed Costs, Target Operating Costs and the Target Revenue)* of this Appendix and in other years within one Reporting Period of the year end) the Operator shall, at its own cost, provide a written report (the **"Annual Service Report"**) which shall review the quality and performance of the Transport Services and the performance of all Project Operations measured during the relevant period and show the key issues to be addressed going forward, including customer feedback, operational issues and Transport Services improvement proposals. The customer feedback shall include the results of the KPI Customer Satisfaction Surveys and the results of any **tie** Customer Satisfaction Survey carried out pursuant to Clause 16.4 above. The Operator shall upon written request promptly provide supporting information to verify and audit the information and other material contained in the Annual Service Report.

16.7 **tie** may make comments on and/or objections and specify omissions in the supporting information or the Annual Service Report and in such case shall provide the Operator with written comments and/or objections within 30 Business Days of receipt. In the absence of such **tie** comments or objections, the supporting information (or the Annual Service Report) shall be deemed to have been accepted by **tie**.

16.8 The Operator shall, within 30 Business Days of receipt of **tie** comments and/or objections, make revisions having regard to such comments and/or objections and resubmit the information and report to **tie**. If the information and reports cannot be agreed by the Parties then the matter will be determined in accordance with the Dispute Resolution Procedure.

16.9 If, in **tie**'s reasonable opinion, the provision and performance of Project Operations or delivery of the Transport Services (or any part of them) could be more effective, efficient and economic having regard to the Annual Service Report and the **tie** Customer Satisfaction Survey, then **tie** may serve a **tie** Notice of Change pursuant to Clause 24 (***tie** Changes*) of this Appendix stating the desired nature and timing of the changes to the provision or performance of Project Operations or delivery of the Transport Services (or the relevant part thereof).

16.10 The Operator shall, in conjunction with **tie**, develop Best Value Improvement Plans setting out mutually agreed tasks between the Operator and **tie** to improve the delivery of the Transport Services and demonstrate continuous improvement in the Transport Services and the achievement of the Project Vision and wider Project objectives within the Integrated Transport Initiative for Edinburgh and South East Scotland.

16.11 The preparation of Best Value Improvement Plans will take into account the conclusions from the Annual Service Report and the **tie** Customer Satisfaction Surveys.

PART VI: FINANCIAL MATTERS

17. COLLECTION OF FARE REVENUE

17.1 Without prejudice to the general applicability of Clause 54 (*No Partnership or Agency*) of the Agreement, the Operator is authorised by **tie** to enter into contracts of carriage with passengers using the Transport Services as agent for **tie**. The terms and conditions of such contracts of carriage shall be as determined by the Operator and **tie** during Project Phase A and Project Phase B, and as amended from time to time in accordance with the terms of the Agreement. The Operator shall issue tickets and collect fares as agent for **tie** in accordance with the terms of the Agreement, and shall pass all Patronage Revenue collected or received (including any Penalty Fares) to **tie** in accordance with Clause 18 (*Payment of Operating Revenue to **tie***) of this Appendix. For the avoidance of doubt, the Operator shall have no rights in the Patronage Revenue collected.

17.2 In operating the Transport Services, the Operator shall, and shall ensure that all Operator Parties shall, comply with the Operating Method Statements in relation to the issue of tickets and the collection of Fares, including:

17.2.1 charging all passengers the correct Fares for their journey and issuing such passengers with the corresponding ticket; and

17.2.2 checking that all tickets and other passes held by passengers are valid for the journey being taken.

17.3 The Operator shall allow the **tie** Inspectors to board any Trams providing the Transport Services at any time for the purpose of:

17.3.1 checking that the Operator and all Operator Parties are complying with the terms of the Agreement;

17.3.2 monitoring the Operator's performance for the purpose of the KPI Regime and the Performance Monitoring Regime;

17.3.3 carrying out any KPI Customer Satisfaction Survey;

17.3.4 carrying out any **tie** Customer Satisfaction Survey or other customer satisfaction survey; and

17.3.5 checking the Operator's records in relation to passenger numbers and fares collected or received by the Operator.

17.4 The Operator shall ensure that all Operator Parties comply with any reasonable instructions given to them by the **tie** Inspectors in accordance with the terms of the Agreement, provided that any such instruction by the **tie** Inspectors shall in no circumstances result in liability for **tie** or excuse the Operator from performance of its obligations pursuant to the Agreement.

18. PAYMENT OF OPERATING REVENUE TO TIE

18.1 The Operator shall pay to **tie** all Operating Revenues collected or received by the Operator and shall report daily to **tie** on the Operating Revenues for the previous Business Day or days in the case of an Edinburgh Holiday or a Sunday.

18.2 All Operating Revenues collected by the Operator shall be paid into such bank account as may be nominated by **tie** from time to time, such payments to be made each Business Day. In the event the Operator is unable to pay Operating Revenues into the nominated bank account, the Operator shall ensure that the collected funds are safeguarded properly pending their delivery to the nominated bank (including adequate insurance against loss or theft) and are remitted to the bank account the next following Business Day.

18.3 Within 2 Business Days of the end of each Reporting Period, the Operator shall prepare and deliver to the **tie** Project Manager a statement setting out full details of the amounts paid by the Operator to **tie** pursuant to Clause 18.1 above during such Reporting Period.

19. PAYMENTS TO THE OPERATOR

19.1 Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) of this Appendix shall apply in respect of any Line with effect from the Service Commencement Date for such Line.

19.2 The Operator's only entitlement to payment from **tie** in respect of the performance of the Project Operations shall be as expressly provided in this Appendix.

20. ADJUSTMENT OF FIXED COSTS, TARGET OPERATING COSTS AND TARGET REVENUES

20.1 The circumstances under which the Target Operating Costs, Fixed Costs (excluding the Category Five Fixed Costs) and Target Revenues may be adjusted during Project Phases C and D shall be limited to:

20.1.1 Qualifying Change in Law and Permanent Roads Change; or

20.1.2 Long Term Roads Change (in respect of Target Operating Costs and/or Fixed Costs); or

20.1.3 **tie** Change or Operator Change; or

20.1.4 the reset of the Target Operating Costs, Fixed Costs and the Target Revenues pursuant to Clause 21 (*Reset of the Fixed Costs Target Operating Costs and the Target Revenue)* of this Appendix.

in each case where there is or will be a material effect on the Operator's ability to achieve the Target Operating Costs or Target Revenues and/or a material effect on the Operator's ability to continue to perform its obligations in terms of this Agreement in respect of the Fixed Costs and to the extent any adverse effect cannot be addressed by reasonable mitigation measures.

20.2 **tie** shall establish a Joint Revenue Committee to:

20.2.1 set Target Revenues during Project Phase B and adjust the Target Revenues in the circumstances set out in Clause 20.1 of this Operating Appendix where agreed or determined in accordance with the appropriate provisions of this Agreement;

20.2.2 assess, revise (where appropriate) and agree forward estimates for the revenue which could be generated from the operation of each Line and the operation of the Core Network; and

20.2.3 review proposals for the maximisation of revenue from the operation of the System.

20.3 **tie** shall procure that the Joint Revenue Committee shall meet:

20.3.1 during Project Phase B in advance of the setting of Target Revenues;

20.3.2 in advance of each reset to be carried out in accordance with Clause 21 (*Reset of the Fixed Costs, Target Operating Costs and the Target Revenue*);

20.3.3 in advance of each review of CEC Fares Policy; and

20.3.4 from time to time at **tie's** request.

20.4 **tie** and the Operator agree than an additional revenue consultant should be appointed to join the Joint Revenue Committee. **tie** shall appoint such revenue consultant and the Operator shall assist in the procurement, evaluation and appointment of such revenue consultant. The terms of the engagement of the revenue consultant will be determined by **tie**.

20.5 Both **tie** and the Operator agree that the briefing to the members of the Joint Revenue Committee shall be in such terms so as to require the Joint Revenue Committee to arrive at an agreed estimate of revenue.

20.6 Both **tie** and the Operator agree that they shall not raise any Dispute with regard to agreed estimates of revenue prepared by the Joint Revenue Committee in accordance with this Clause 20 *(Adjustment of Fixed Costs, Target Operating Costs and Target Revenues),* to the Dispute Resolution Procedure.

20.7 The Joint Revenue Committee shall be required in terms of the briefing given under Clause 20.5 above, to prepare a profile of Target Revenues for each Year during Project Phase D. Such profile shall refer to how revenues may vary seasonally and in accordance with fluctuations in service levels including bank holidays.

21. RESET OF THE FIXED COSTS, TARGET OPERATING COSTS AND THE TARGET REVENUE

21.1 Either Party may notify the other no later than six Reporting Periods prior to a Reset Decision Date of their intention to request operation of this Clause 21 *(Reset of the Fixed Costs, Target Operating Costs and the Target Revenue)* and shall provide to the other Party a detailed submission in support of that request within 30 days of such notification.

21.2 No later than three Reporting Periods prior to the third anniversary of the Service Commencement Date of the first Line (and each following third anniversary, in each case a **"Reset Decision Date"**) in respect of which the Operator provided the Transport Services, **tie** and the Operator shall review:

21.2.1 the Operating Costs incurred by the Operator in the previous 3 years, and compare such costs to the Target Operating Costs and the Fixed Costs;

21.2.2 the Operating Revenues generated by the System in the previous 3 years, and compare such revenue to the Target Revenue;

21.2.3 the performance of the Operator under all aspects of the Performance Monitoring Regime and the Operator's Project Return;

21.2.4 the contents of the most recent Annual Service Report;

21.2.5 the results of the **tie** Customer Satisfaction Surveys and KPI Customer Satisfaction Surveys; and

21.2.6 any Best Value Improvement Plans produced pursuant to Clause 16.10 of this Appendix

21.3 Following such review which shall expressly take into account the Project Return, the Base Case Assumptions, Part A of Schedule 17 *(Setting of Fixed Costs) in respect of drivers' salaries and benefits and other related salaries and benefits,* and the positions stated in the Financial Proposals, the Operator Financial Model and the Project Development and Operating Costs, the Parties may agree to revise the Payment Mechanism, the Fixed Costs (except for the Category Five Fixed Costs), the Target Operating Costs and /or the Target Revenues (including, if relevant, the applicable pain/gain sharing structure and/or the KPI Regime). Where the Parties agree to revise this Appendix by resetting any of the matters listed in this Clause 21.3 (or otherwise) all other rights and obligations under the Agreement shall remain unchanged.

21.4 If the Parties are unable to agree revisions to the Payment Mechanism, Fixed Costs (excluding the Category Five Fixed Costs) , Target Operating Costs and /or Target Revenues and/or KPI Regime prior to the anniversary referred to in Clause 21.2 above (or 21.5 below as the case may be), either Party may refer the Dispute to the Dispute Resolution Procedure provided always that **tie** shall be entitled to serve notice to terminate pursuant to Clause 37 *(Voluntary Termination by **tie**)* of the Agreement.

21.5 The Operator and **tie** shall carry out further reviews in accordance with Clauses 21.1 to 21.4 above no later than three Reporting Periods prior to the following Reset Decision Dates:

21.5.1 the sixth anniversary;

21.5.2 the ninth anniversary;

21.5.3 the twelfth anniversary

of the Service Commencement Date of the first Line in respect of which the Operator provided the Transport Services.

22. RELIEF EVENTS

22.1 If and to the extent that a Relief Event:

22.1.1 is the direct cause of a delay in achievement of Service Commencement or Full Service Commencement in respect of any Line; and/or

22.1.2 materially and adversely affects the ability of the Operator to perform any of its obligations under the Agreement;

then the Operator shall be entitled to apply for an extension of time and/or relief from any rights of **tie** arising under Clause 34 of the Agreement (*Termination on Operator Default*).

22.2 To obtain such extension or relief, the Operator must:

22.2.1 as soon as practicable, and in any event within 14 days after it became aware that the Relief Event has caused or is likely to cause delay or adversely affect the ability of the Operator to perform its other obligations, give to **tie** a notice of its claim for relief, including full details of the nature of the Relief Event, the date of occurrence and its likely duration;

22.2.2 within 7 days of receipt by **tie** of the notice referred to in Clause 22.2.1 above, give full details of the relief and/or extension claimed; and

22.2.3 demonstrate to the reasonable satisfaction of **tie** that:

22.2.3.1 the Operator and the Operator Parties could not have avoided the occurrence or consequences of the relevant Relief Event by steps which they might reasonably be expected to have taken, without incurring substantial expenditure;

22.2.3.2 the Relief Event directly caused the delay and/or the need for relief;

22.2.3.3 the time lost and/or relief needed could not reasonably be expected to be mitigated or recovered by the Operator acting in accordance with Good Industry Practice, without incurring substantial expenditure; and

22.2.3.4 the Operator is using best endeavours to perform its obligations under the Agreement.

22.3 In the event that the Operator has complied with its obligations under Clause 22.2 above and **tie** is reasonably satisfied as to the matters specified in Clause 22.2.3 above, then:

22.3.1 the Planned Service Commencement Date shall be postponed by such time as shall be reasonable for such a Relief Event, taking into account the likely effect of delay; and

22.3.2 **tie** shall not be entitled to exercise rights to terminate the Agreement under Clause 34 (*Termination on Operator Default*) of the Agreement or Clause 33 (*Persistent Breach*) of the Agreement as a result of failure by the Operator to comply with its obligations to the extent that compliance is prevented by the Relief Event.

22.4 Nothing in Clause 22.3 above shall affect any entitlement to award Underperformance Points against the Operator for the purposes of operation of the KPI Regime (excluding the issue of a Major KPI Breach Notice) during the period in which the Relief Event is subsisting.

22.5 In the event that information required by Clause 22.2 above is provided after the dates referred to in that Clause, then the Operator shall not be entitled to any relief.

22.6 The Operator shall notify **tie** if at any time it receives or becomes aware of any further information relating to the Relief Event, giving details of that information to the extent that such information is new or renders information previously submitted materially inaccurate or misleading.

22.7 If the Parties cannot agree the extent of the relief required, or **tie** disagree that a Relief Event has occurred or that the Operator is entitled to any extension of time and/or relief, either Party may refer the matter for determination in accordance with the Dispute Resolution Procedure.

PART VII: VARIATIONS AND CHANGES IN LAW

23. PERFORMANCE AND FINANCIAL ADJUSTMENTS

23.1 Where the Operator may be entitled to an adjustment as a result of a Relevant Event to (i) the Operating Output Specification, (ii) the Target Costs for Project Phase C2, (iii) the Target Operating Costs, (iv) the Fixed Costs (excluding the Category Five Fixed Costs) , and/or (v) the Target Revenues, the provisions of this Clause 23.1 shall apply:

23.1.1 The Operator shall demonstrate the actual and/or projected impact of the Relevant Event and propose any amendments to the Operating Output Specification designed to mitigate and/or eliminate that impact. Any necessary amendments as a result of or consequence of the Relevant Event to the Operating Output Specification, the Base Case Assumptions, the Target Costs for Project Phase C2, the Target Operating Costs, the Fixed Costs (excluding the Category Five Fixed Costs) and/or the Target Revenues (as appropriate) shall be agreed, or in the absence of agreement determined, on the reference of either Party, pursuant to the Dispute Resolution Procedure so that:

(i) the projected performance of the Operator against the Operating Output Specification (as measured by the KPI Regime) is No Better and No Worse than the average performance of the Operator against the Operating Output Specification (as measured or to be measured by the KPI Regime) in the 12 months immediately preceding the first Reporting Period in which the Relevant Event has effect ignoring for these purposes any failure to meet the requirements of the Operating Output Specification arising by virtue of that Relevant Event;

(ii) in determining any amendments to the Operating Output Specification, due regard shall be had to the positions set out in the Financial Proposals, the Operator Financial Model, the Project Development and Operating Costs, and in particular the Base Case Assumptions.

23.2 Where a Permanent Roads Change occurs which is beneficial to the Operator, **tie** shall be entitled to require an adjustment to the Operating Output Specification, the Target Costs for Project Phase C2, the Target Operating Costs, the Fixed Costs (excluding the Category Five Fixed Costs) and/or the Target Revenues, as the case may be, in accordance with this Clause 23 (*Performance and Financial Adjustments*) to reflect the beneficial effects of such Permanent Roads Change .

23.3 The Profit Element shall be set at the Effective Date and shall be Indexed throughout the Term of this Agreement, and shall not be otherwise adjusted except in the following circumstances:

23.3.1 in the case of a **tie** Change which involves Network Expansion or a material alteration in the scope of Project Operations such that it is reasonable to project (using the provisions of Clauses 24.3 to 24.5) a change in excess of 25% in either annual Operating Costs or annual Operating Revenues;

23.3.2 in the case of a **tie** Change, during the relevant Project Phase A or Project Phase B, which relates to a truncation of Line 1 and/or Line 2 and/or Line 3 from what was anticipated to form part of the Core Network but which does not amount to a change in excess of 25% in either annual Operating Costs or annual Operating Revenues, the Profit Element shall be reduced on a pro-rated basis to reflect the proportionate reduction in Target Operating Costs, Target Costs for Project Phase C2 and/or Fixed Costs (excluding the Category Five Fixed Costs) ;

23.3.3 in the case of a **tie** Change to any of the Required Insurances, the Profit Element shall be adjusted by applying the Project Return for the relevant Project Phase to the relevant Target Operating Costs, the relevant Target Costs for Project Phase C2 and/or the relevant Fixed Costs to calculate the profit element applicable to the relevant Required Insurance and then using such calculation to make the appropriate increase or decrease to the Profit Element;

23.3.4 in the case of a **tie** Change where **tie** takes out and maintains any of the Required Insurances itself or agrees to pay the actual costs of any of the Required Insurances to the Operator rather than make payment to the Operator on a fixed or target basis, then no Profit Element shall be payable

by **tie** to the Operator in respect of any such Required Insurances and if any Profit Element is paid to the Operator by **tie** in relation to any such Required Insurances, then the relevant part of the Profit Element shall be adjusted accordingly by applying the Project Return for the relevant Project Phase to the relevant Target Operating Costs, the relevant Target Costs for Project Phase C2 and/or the relevant Fixed Costs to calculate the profit element applicable to the relevant Required Insurance and then using such calculation to make the appropriate increase or decrease to the Profit Element; and

23.3.5 in the case of a **tie** Change in accordance with paragraph 16.6 of Schedule 2 *(Project Development Output Specification)*, a sum of 10.5% of the actual costs of such **tie** Change shall be added to the Profit Element.,

24. tie CHANGES

24.1 Unless expressly stated in this Agreement or as may otherwise be agreed by the Parties, **tie** Changes shall be dealt with in accordance with this Clause 24 ***(tie Changes)***. If **tie** requires a **tie** Change, it must serve a **tie** Notice of Change on the Operator.

24.2 A **tie** Notice of Change shall:

24.2.1 set out the proposed **tie** Change required in sufficient detail to enable the Operator to calculate and provide the Estimate in accordance with Clause 24.3 below;

24.2.2 require the Operator to provide **tie** within 21 days of receipt of the **tie** Notice of Change with an Estimate; and

24.2.3 set out whether **tie** wishes to pay for any proposed **tie** Change on the basis of target costs, fixed costs or actual costs.

24.3 As soon as is reasonably practicable, and in any event within 21 days after having received a **tie** Notice of Change, the Operator shall deliver to **tie** the Estimate. The Estimate shall include the opinion of the Operator (acting reasonably) on:

24.3.1 whether relief from compliance with any of its obligations is required (including the obligations of the Operator to achieve Service Commencement by the Planned Service Commencement Date and to meet the requirements

of the Operating Output Specification or the Project Development Output Specification), during or as a result of the implementation of the proposed **tie** Change;

24.3.2 any impact on the performance of the Project Operations and/or the Project Development Services;

24.3.3 any amendment (including an amendment to the Target Costs for Project Phase C2, the Target Operating Costs, the Fixed Costs (excluding the Category Five Fixed Costs) and/or the Target Revenue) required to the Agreement as a result of the implementation of the proposed **tie** Change, calculated in accordance with Clause 23 (*Performance and Financial Adjustments*) of this Appendix;

24.3.4 any Necessary Consents which are required as a result of the implementation of the proposed **tie** Change;

24.3.5 the proposed method of certification of any aspects of the Project Operations or the Project Development Services required by the proposed **tie** Change; and

24.3.6 the estimated actual costs of the proposed **tie** Change.

24.4 The Operator shall include in the Estimate evidence demonstrating that:

24.4.1 the Operator has used all reasonable endeavours to minimise, and procure that the Operator Parties minimise (including by the use of competitive quotes) any increase in costs and to maximise, and procure that the Operator Parties maximise, any reduction of costs;

24.4.2 the Operator has, to the extent reasonably practicable, sought competitive quotes from persons other than the Operator Parties in pursuance of its obligation under Clause 24.4.1 above;

24.4.3 the proposed **tie** Change will be implemented in the most cost-effective manner, including showing that when such expenditure is incurred, Changes in Law that are foreseeable at that time have been taken into account by the Operator; and

24.4.4 any expenditure that has been avoided, which was anticipated to be incurred and any likely increase in Patronage Revenue as a result of the proposed **tie** Change, has been taken into account in the proposed amendments to the Target Operating Costs, Target Costs for Project Phase C2, the Fixed Costs and/or Target Revenue included in the Estimate.

24.5 If the Operator does not intend to use its own resources to implement any proposed **tie** Change , it shall:

24.5.1 demonstrate that it is appropriate to subcontract the implementation of such **tie** Change; and

24.5.2 comply with Good Industry Practice with the objective of ensuring that it obtains best value for money (taking into account all relevant circumstances including, in particular, the requirement that the Operator should be left in No Better and No Worse position as a result of the implementation of the proposed **tie** Change) when procuring any work, services, supplies, materials or equipment required in relation to the proposed **tie** Change .

24.6 As soon as reasonably practicable after **tie** receives the Estimate, the Parties shall discuss and agree the issues set out in the Estimate. From such discussions **tie** may modify the **tie** Notice of Change, and (if the estimated increase in the Target Costs for Project Phase C2, the Target Operating Costs and/or Fixed Costs (excluding the Category Five Fixed Costs) in respect of the proposed **tie** Change is expected to exceed £10,000 (Indexed) and it is practicable for the Operator to do so) **tie** may require the Operator to seek and evaluate competitive tenders. In each case the Operator shall, as soon as practicable, and in any event not more than 14 days after receipt of such modification, notify **tie** of any consequential changes to the Estimate.

24.7 If the Parties cannot agree on the contents of the Estimate, then either Party may refer the Estimate for determination in accordance with the Dispute Resolution Procedure provided that the Operator shall not be obliged to implement any proposed **tie** Change where:

24.7.1 **tie** does not have the legal power or capacity to require the implementation of such proposed **tie** Change; or

24.7.2 implementation of such proposed **tie** Change would:

24.7.2.1 be contrary to Law;

24.7.2.2 not be technically feasible;

24.7.2.3 result in the risk of liability for Property Loss and/or Personal Loss in respect of any part of the System being Uninsurable;

24.7.2.4 cause any existing Necessary Consent (which is not reasonably likely, on the balance of probabilities, to be capable of modification) to be revoked;

24.7.2.5 require a new Necessary Consent or an amendment to a Necessary Consent which having used best endeavours to obtain in accordance with Clause 24.10 below, the Operator is unable to obtain within a time frame appropriate (in the reasonable opinion of **tie**) to the implementation of the proposed **tie** Change; or

24.7.2.6 substantially and materially affect the Operator's ability to perform the Project Operations or the Project Development Services such that it substantially and materially increases the probability of (a) a substantial non- compliance by the Operator with the Operating Output Specification or the Project Development Output Specification; or (b) termination of the Agreement as a result of Operator Default.

24.8 As soon as reasonably practicable after the contents of the Estimate have been agreed or determined pursuant to the Dispute Resolution Procedure **tie** shall:

24.8.1 confirm in writing the Estimate (as modified); or

24.8.2 withdraw the **tie** Notice of Change.

24.9 If **tie** do not confirm in writing the Estimate (with or without modification) within 30 days of the contents of the Estimate having been agreed or determined pursuant to 24.7, then the **tie** Notice of Change shall be deemed to have been withdrawn.

24.10 If it shall be necessary to obtain or amend any Necessary Consent in respect of a proposed **tie** Change, then the Operator shall use best endeavours to obtain such Necessary Consent or amendment.

25. OPERATOR CHANGES

25.1 The Operator shall have the right to propose changes and, in this regard, shall keep the Project Operations under review with a view to identifying ways in which the performance of the Project Operations can be improved, having regard to the Project Vision, a combination of economy, efficiency and effectiveness and the needs of passengers using the System. If the Operator wishes to introduce a change in the Project Operations or is required to do so by a third party (other than by an Infrastructure Provider as a consequence of a change to the Infrastructure and Equipment Output Specification to which Clause 24.1 above shall apply) it must serve an Operator Notice of Change on **tie**.

25.2 The Operator Notice of Change must:

25.2.1 set out the proposed change in the Project Operations in sufficient detail to enable **tie** to evaluate it in full;

25.2.2 specify the Operator's reasons for proposing the change;

25.2.3 request **tie** to consult with the Operator with a view to deciding whether to agree to the change and, if so, what consequential changes **tie** require as a result;

25.2.4 indicate the time period proposed for implementation of the change;

25.2.5 indicate any implications of the change;

25.2.6 indicate, in particular, whether a variation to the Target Costs for Project Phase C2, the Target Operating Costs, the Fixed Costs (excluding the Category Five Fixed Costs) and/or the Target Revenues is proposed (and, if so, give a detailed cost estimate of such proposed variation); and

25.2.7 indicate if there are any dates by which a decision by **tie** is critical.

25.3 **tie** shall evaluate the Operator's proposed change in good faith, taking into account all relevant issues, including whether:

25.3.1 a change in the Target Costs for Project Phase C2, Target Operating Costs, and/or the Target Revenue, or to the Operator's ability to achieve them and/or a change in the Fixed Costs (excluding the Category Five Fixed Costs) or the Operator's ability to continue to perform its obligations in terms of this Agreement in respect of these Fixed Costs (excluding the Category Five Fixed Costs) and to the extent any adverse effect cannot be addressed by reasonable mitigation measures will occur;

25.3.2 the proposed change would affect the quality of the Project Operations or the likelihood of successful delivery of the Project Operations;

25.3.3 the change will interfere with the relationship of **tie** with third parties;

25.3.4 the proposed change materially affects the risks or costs to which **tie** are exposed; or

25.3.5 the proposed change affects the Base Case Assumptions and the positions set out in the Financial Proposals, the Operator Financial Model and the Project Development and Operating Costs..

25.4 As soon as reasonably practicable after receiving the Operator Notice of Change, the Parties shall meet and discuss the matter referred to in it. During their discussions, **tie** may propose modifications or accept or object to the Operator Notice of Change.

25.5 If **tie** give written notice of no objection to the Operator Notice of Change, (with or without modification), the relevant Operator Change shall be implemented by the Operator within the period specified in the Operator Notice of Change.

25.6 If **tie** object to the Operator Notice of Change, they shall not be obliged to give their reasons for such a rejection.

25.7 Unless **tie**'s acceptance specifically agrees to a change in the Target Costs for Project Phase C2, Target Operating Costs, the Fixed Costs and/or the Target Revenue, there shall be no change to such targets or fixed costs as a result of a change in the Project Operations proposed by the Operator.

25.8 **tie** shall be free to object pursuant to Schedule 9 (*Review Procedure*) of the Agreement to any Operator Change to the Project Operations proposed by the Operator, except if required in order to conform to a Change in Law. The costs of

introducing a change in Project Operations resulting from a Qualifying Change in Law shall be dealt with in accordance with Clause 27 (*Qualifying Change in Law*) of this Appendix.

26. ROADS CHANGES

26.1 A Permanent Roads Change shall be treated as a **tie** Change for the purposes of the Agreement and the Parties shall use all reasonable endeavours to agree:

26.1.1 adjustments to the Target Costs for Project Phase C2, the Target Operating Costs, the Fixed Costs (excluding the Category Five Fixed Costs) and/or the Target Revenues (where appropriate);

26.1.2 amendments to the Operating Output Specification (including the Timetable); and

26.1.3 a permanent and commensurate recalibration of the KPI Regime.

in accordance with Clause 23 (*Performance and Financial Adjustments*) of this Appendix

26.2 As soon as reasonably practicable after the issues referred to in Clause 26.1 above have been agreed between the Parties or determined pursuant to the Dispute Resolution Procedure, **tie** shall give a **tie** Notice of Change and the provisions of Clause 24 (***tie** Changes*) of this Appendix shall apply except that the Operator shall be obliged to implement the change in all circumstances except to the extent that such change falls within any of Clause 24.7.2.1, 24.7.2.2, 24.7.2.3 and 24.7.2.4 of the Operating Appendix.

26.3 A Long-Term Roads Change shall not be treated as a **tie** Change. However, in respect of the period of a Long-Term Roads Change, the Parties shall use all reasonable endeavours to agree:

26.3.1 adjustments to the Target Costs for Project Phase C2, the Target Operating Costs and/or the Fixed Costs (where appropriate excluding the Category Five Fixed Costs) but not the Target Revenues;

26.3.2 amendments to the Operating Output Specification (including the Timetable) and/or Agreement; and

26.3.3 a commensurate recalibration of the KPI Regime.

26.4 A Temporary Roads Change shall not be treated as a **tie** Change. However, in respect of the period of the Temporary Roads Change:

26.4.1 the Parties shall use all reasonable endeavours to agree a revised Timetable taking account of the impact of the Temporary Roads Change; and

26.4.2 the Operator's performance for the purposes of the KPI Regime relating to Headway and first and last trams shall be measured by reference to such revised Timetable for the duration of the Temporary Roads Change.

26.5 The Operator shall maintain and make available to **tie** for inspection at all reasonable times, detailed daily records of Patronage Revenue for the System and such other records and documents as may reasonably be required to evidence the Operator's entitlements under this Clause 26 (*Roads Changes*).

26.6 When adjustment to the Operating Output Specification is required in accordance with the provisions of this Clause 26 (*Roads Changes*), it shall be carried out in accordance with Clause 23 (*Performance and Financial Adjustments*) of this Appendix.

27. QUALIFYING CHANGE IN LAW

27.1 If a Qualifying Change in Law occurs or is to occur, then either Party may write to the other to express an opinion on its likely effects, giving details of its opinion of:

27.1.1 any necessary change in the Project Operations;

27.1.2 whether any changes are required to the terms of the Agreement to deal with the Qualifying Change in Law, including any required amendment to the KPI Regime, the Target Costs for Project Phase C2, the Target Operating Costs, the Fixed Costs (excluding the Category Five Fixed Costs) and/or the Target Revenues calculated in accordance with Clause 23 (*Performance and Financial Adjustments*) of this Appendix; and

27.1.3 whether relief from compliance with obligations is required, as a result of the Qualifying Change in Law;

in each case giving in full detail the procedure for implementing the Qualifying Change in Law.

27.2 As soon as reasonably practicable after receipt of any notice from either Party under Clause 27.1 above, the Parties shall discuss and agree the issues referred to in Clause 27.1 above and any ways in which the Operator can mitigate the effect of the Qualifying Change of Law and the Operator shall:

27.2.1 provide evidence to **tie** that the Operator has used and will continue to use all reasonable endeavours (including where appropriate and practicable the use of competitive quotes) to oblige Operator Parties to minimise any increase in costs and maximise any reduction in costs;

27.2.2 demonstrate that the relevant changes will be implemented in the most cost-effective manner, including showing that when expenditure will be incurred or has been incurred, foreseeable Changes in Law at that time will be taken into account by the Operator;

27.2.3 give evidence as to how the Qualifying Change in Law has affected operating revenues and costs for any similar businesses to the Project; and

27.2.4 demonstrate that any expenditure that has been avoided, which was anticipated in terms of the Target Operating Costs, the Target Costs for Project Phase C2 and/or the Fixed Costs (excluding the Category Five Fixed Costs) to be incurred (whether to replace or maintain assets affected by the Qualifying Change in Law or otherwise), has been taken into account in the amount of the change to the Target Operating Costs, the Target Costs for Project Phase C2 and/or the Fixed Costs (excluding the Category Five Fixed Costs) which in its opinion is required under Clause 27.1.2 above.

27.3 As soon as reasonably practicable after the issues referred to in Clause 27.1 above have been agreed between the Parties or determined pursuant to the Dispute Resolution Procedure, **tie** shall give a **tie** Notice of Change and the provisions of Clause 24 (***tie** Changes*) of this Appendix shall apply except that:

27.3.1 the Operator shall be obliged to implement the change in all circumstances except to the extent that such change both:

27.3.1.1 falls within any of Clauses 24.7.2.1, 24.7.2.2, 24.7.2.3 and 24.7.2.4 of this Appendix; and

27.3.1.2 is not necessary to implement the Qualifying Change in Law; and

27.3.2 **tie** shall confirm the Estimate pursuant to Clause 24.8.1 above once it has been agreed or determined pursuant to the Dispute Resolution Procedure.

PART VIII: TERMINATION AND EXPIRY

28. TRANSITION ON TERMINATION OR EXPIRY

28.1 On the Expiry Date or upon termination, the Operator shall provide to **tie** the following information and assistance (**"Handback Package"**), which shall be current in all respects:

28.1.1 a list of managers involved in managing the Tram Business or any material element of the Project Operations showing name, work telephone number, role and responsibilities;

28.1.2 a list of all contracts, agreements, permits, licences, Necessary Consents or other documents which are material to the operation of the Tram Business or which have a value in excess of £5,000 showing (as appropriate) the contract account number, name, address and telephone number of counter parties, contract price, value, term, and notice period for termination or expiry date;

28.1.3 a list of all computer systems and software used for the maintenance of the business together with a description of the systems and master passwords where applicable, as well as a commitment to give any reasonable practical instruction or basic training for competent use of the computer systems and software;

28.1.4 the names and addresses of all insurers providing the Required Insurances along with the applicable policy numbers and other references;

28.1.5 a letter, in a form reasonably satisfactory to **tie**, authorising **tie** and its agents to request and to receive from the relevant insurers details of all claims paid or outstanding under the Required Insurances;

28.1.6 full particulars of all employees engaged in the provision of the Project Operations including:

28.1.6.1 employee, name and the date on which continuity of employment began;

28.1.6.2 the terms and conditions of employment of each such person;

28.1.6.3 all payments, benefits or changes to terms and conditions of employment promised to any such person;

28.1.6.4 any agreements or arrangements with any trade union or association of trade unions or organisation or body of employees including elected representatives which represent any such employees;

28.1.6.5 particulars of any strikes or industrial action taken by such employees; and

28.1.6.6 details of any pension or death in service scheme in which such employees participate, the benefits provided by such schemes, the rate of employer and employee contributions and other terms applicable to such schemes.

28.2 **tie** shall not disclose the terms of the Handback Package to any third party, other than:

28.2.1 to the extent in the public domain, or as required by the law or in the course of conducting, prosecuting or defending any adjudication, arbitration, court or tribunal proceedings, or following a Termination Notice; or

28.2.2 for the purpose of seeking offers from third parties for the provision of any of the Project Development Services, Project Operations or like services following the termination or expiry of this Agreement; or

28.2.3 to a Successor Operator or its appointed subcontractors for the purpose of ensuring or assisting with continuity of the Project Operations following termination or expiry of this Agreement.

28.3 The Operator shall maintain and manage the business of providing the Project Operations with the intent that **tie** or any Successor Operator would be able to take over that business and secure continuity of the Project Operations on a going concern basis at any time following a Termination Notice.

28.4 Accordingly, following the service of a Termination Notice or in the six month period preceding any anticipated termination or expiry of this Agreement, the Operator shall (and shall procure that the Operator Parties shall):

28.4.1 take all reasonable steps and co-operate fully with **tie** and any Successor Operator so that continuation of the Project Operations after such termination or expiry is achieved with the minimum of disruption and so as to prevent or mitigate any inconvenience or risk to health or safety of the employees of **tie** and members of the public;

28.4.2 liaise with **tie** and any Successor Operator and provide reasonable assistance and advice concerning the Project Operations and their transfer to **tie** or to such Successor Operator;

28.4.3 allow **tie** and any Successor Operator access (at reasonable times and on reasonable notice) to each part of the System;

28.4.4 provide to **tie** and to any Successor Operator such information concerning the System and the Project Operations which is reasonably required for the efficient transfer of responsibility for performance of the Project Operations;

28.4.5 allow, or procure that the Operator Party shall allow, **tie** and any Successor Operator such access to any employees engaged by the Operator or such Operator Party in the provision of the Project Operations or the Project Development Services as **tie** or such Successor Operator shall reasonably require for the purpose of informing and consulting with such employees over the terms and conditions on which their employment will be transferred (to the extent this is the case) to **tie** or any Successor Operator or sub-contractor engaged by the Successor Operator; and

28.4.6 on request, make the Handback Package available to **tie** or any Successor Operator without charge or restriction.

28.5 The Operator shall use best endeavours to facilitate the transfer of responsibility for the Project Operations to a Successor Operator or to **tie**, as the case may be, and the Operator shall take no action at any time which is calculated or intended to prejudice or frustrate or make more difficult such transfer. In particular, but without limitation to the generality of the foregoing, the Operator shall, during the final 12 months of the Term (where this expires by effluxion of time) or during the period following service of a Termination Notice, and whilst the same remains outstanding, not without the prior written consent of **tie** (which shall not be unreasonably withheld or delayed), make any material changes in the range of tickets and passes available for

Transport Services on the System, reduce the purchase price of any such tickets or passes, rezone stops so as to alter fare structure or alter One Ticket involvement where such changes or price reductions would not otherwise reasonably be made by the Operator in the ordinary course of its business of operating the System and acting in accordance with Good Industry Practice

28.6 The Operator acknowledges that all the Assets have been funded by **tie**. Accordingly the Operator:

28.6.1 shall handover the Assets to **tie** or, if so directed, a Successor Operator, such handover to be in a timely and orderly fashion so as to preserve the technical and commercial integrity and goodwill and value of the System and to enable an efficient handover of Project Operations; and

28.6.2 shall not be entitled to any payment or benefit in respect of the handover and any relinquishment of licence to use the Assets or perform Project Operations.

28.7 **tie** may request to purchase any assets owned by the Operator which have been used in the performance of the Project Operations or used in relation to the System. If the Parties agree a fair market value for any such assets, **tie** shall pay the agreed sum to the Operator and the Operator shall deliver such assets to **tie** as soon as reasonably practicable.

[redacted]...

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

.....[redacted].....

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

This is Schedule 1 referred to in the Operating Appendix annexed to the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 1

Conditions Precedent

1. Completion by the Operator of all requirements included within Project Phase A, Project Phase B and Project Phase C in respect of the Line which is intended to be the first Line on which the Transport Services are to be provided, other than in respect of Project Development Services included within Project Phase C2 which the Operator shall be required to provide in order to fulfil the requirements of Clause 2.5 and Clause 3 or Clause 4 of the Operating Appendix, shall be a condition precedent to the Operating Effective Date.

2. In addition, delivery by the Operator to **tie** in form and substance satisfactory to **tie** (acting reasonably) of the documents listed in paragraph 2.1 and the other matters listed in this paragraph 2 shall be condition precedent to the Operating Effective Date. Where listed as a duly certified copy, the document shall be certified by the company secretary of the Operator as being a true copy, in full force and effect at a date no later than the Operating Effective Date:

   2.1 a copy, duly certified, of minutes of a meeting of the board of directors of the Operator evidencing a resolution of the board of directors approving any amendments to this Operating Appendix and the Operating Output Specification since the Effective Date of the Agreement;

   2.2 evidence :

      2.2.1 that the Required Insurances are in full force and effect and that the relevant policies comply with the requirements of the Agreement; and

      2.2.2 of the current credit ratings of the Insurers and that these ratings are not below a credit rating to A- by Standard & Poors; and.

      2.2.3 that revenue collection and safekeeping procedures which comply with the requirements of the Agreement are in place.

   2.3 confirmation (in the form of a letter of acceptance from the proposed surety) that the Operator is taking out a Performance Bond pursuant to Clause 8 (*Operator's Performance Security*) of the Agreement.

[redacted]....

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

[redacted].

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

This is Schedule 2 referred to in the Operating Appendix annexed to the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 2

tie Completion Requirements

[*These requirements are to be developed between the Parties during Project Phase A and Project Phase B. Different* ***tie*** *Completion Requirements will be required depending on whether:*

- *there is to be a gap between Service Commencement and Full Service Commencement; or*
- *Full Service Commencement is to occur on the day on which the Line is first opened to fare paying passengers*]

Any changes to ***tie's*** *Completion Requirements during Project Phases C1 or C2 shall be proposed as a* ***tie*** *Change or an Operator Change as appropriate.*

[redacted]...

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

[redacted].....

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

This is Schedule 3 referred to in the Operating Appendix annexed to the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 3

Project Phase D Payment Mechanism and KPI Regime

Payment during Project Phase D

1. The Operator shall be entitled to submit applications for payment to **tie** during Project Phase D within five days of the end of each Reporting Period and following submission to **tie** of the Service Quality Report pursuant to Clause 12 (*Service Performance and Quality Monitoring*) of this Appendix. Applications for payment shall be for the Profiled Target Operating Costs for the Reporting Period just ended, the Profiled Fixed Costs for the Reporting Period just ended, the actual costs of any agreed Special Event, any other actual costs provided for under this Agreement or agreed in accordance with this Agreement and the Profiled Profit Element for the Reporting Period just ended. The Operator shall also submit a detailed breakdown with each application for payment showing the Operating Costs for the relevant Reporting Period.

2. Each application for payment submitted by the Operator pursuant to paragraph 1 of this Schedule shall take into account performance deductions calculated by the Operator in accordance with the KPI Regime set out at paragraphs 7 to 17 below.

3. **tie** shall procure that the **tie** Project Manager shall, subject to any clarifications as are in **tie's** opinion (acting properly and reasonably) necessary, and subject to paragraph 2 above and Clause 10.11, certify by notice in writing to the Operator that part of the Target Operating Costs, Fixed Costs, the actual costs of any agreed Special Event, any other actual costs provided for under this Agreement or agreed in accordance with this Agreement and Profit Element claimed in the relevant application for payment which is approved by **tie** and give reasons why any part of the Target Operating Costs, the Fixed Costs, the actual costs of any agreed Special Event, any other actual costs provided for under this Agreement or agreed in accordance with this Agreement and Profit Element, and deductions calculated by the Operator in accordance with the KPI Regime have not been so approved and certified no later than 10 days after the date on which such application for payment is received by **tie**.

4. Within 5 Business Days of receiving a notice from **tie** pursuant to paragraph 3 of this Schedule certifying part or all of the Target Operating Costs, the Fixed Costs, the actual costs of any agreed Special Event, any other actual costs provided for under this Agreement or agreed in accordance with this Agreement and Profit Element claimed in the relevant

application for payment, and the deductions in accordance with the KPI Regime, the Operator shall issue an invoice to **tie** for the certified Target Operating Costs, Fixed Costs, the actual costs of any agreed Special Event , any other actual costs provided for under this Agreement or agreed in accordance with this Agreement and Profit Element. Invoices shall be substantially in the form of Schedule 6 (*Form of Invoice for Project Phase D*) to this Appendix.

5. **tie** shall pay any invoice submitted in accordance with paragraph 4 of this Schedule within 30 days of receipt of the relevant invoice.

6. The Operator may refer any Dispute about the Target Operating Costs, Fixed Costs, the actual costs of any agreed Special Event, any other actual costs provided for under this Agreement or agreed in accordance with this Agreement or Profit Element, and/or deductions in accordance with the KPI Regime which have not been certified and/or deductions certified, to the Dispute Resolution Procedure. If it is determined pursuant to the Dispute Resolution Procedure that the whole or any part of any disputed amount should be paid by **tie** to the Operator, then payment shall be made by **tie** to the Operator within 30 days of the receipt by **tie** of an invoice in respect of the determined amount from the Operator.

Operation of the KPI Regime

7. The Operator shall continually monitor performance and service quality against the Key Performance Indicators shown in Table 1 to this Schedule.

8. The performance and service quality monitoring undertaken by the Operator shall be in accordance with requirements set out at and developed in accordance with paragraphs 24 and 25 of Schedule 2 (Project Development Output Specification) of the Agreement and shall be produced in the form of a composite KPI Monitoring Report included in the Service Quality Report submitted to **tie** for each Reporting Period no later than three Business Days following the end of the Reporting Period and in advance of submission of the Operator's application for payment for that Reporting Period. In the event that such Service Quality Report is not provided in a timely fashion in a previously agreed format or is unsatisfactory in a material respect in **tie's** opinion (acting properly and reasonably), **tie** shall not be obliged to review any application for payment relying upon such report until the defects in it are corrected to **tie's** satisfaction and **tie** has had a reasonable opportunity to review the resubmitted report.

9. **tie** shall conduct the periodic inspections and surveys stipulated under paragraphs 24 and 25 of Schedule 2 (Project Development Output Specification) of the Agreement in relation to

system cleanliness, revenue protection and customer satisfaction, as well as spot checks on other selected Performance Indicators and report on these matters on a regular basis to the Operator.

10. The Operator shall be responsible for assessing the KPI Monitoring Report and the results of the inspections and surveys under paragraph 9 above and shall allocate Underperformance Points against failure to meet the performance standards set by the Agreement, in accordance with Schedule 12 (*Performance Scoring*) to the Agreement. The Operator shall then calculate the applicable percentage deduction for the Reporting Period for application to the KPI Regime Profit Element and show this in the relevant application for payment.

11. The KPI Regime Profit Element shall be apportioned into seven financial components set individually against each KPI in accordance with the relevant weighting. The amount attributable to each KPI is shown in Column 5 of Table 1 to this Schedule.

12. Any deductions imposed in respect of underperformance shall be cumulative. For Example: performance below 85% will attract a cumulative 100% deduction on any KPI. Underperformance will attract the full percentage deduction, irrespective of where such Underperformance sits within the applicable range shown in Table 1 to this Schedule.

13. In the event that the Operator incurs aggregated deductions in respect of underperformance ("Underperformance Threshold") which equal or exceed thirty percent (30%) of the KPI Regime Profit Element during any Reporting Period, **tie** shall be entitled to issue a notice (**"Major KPI Breach Notice"**) requesting the Operator to deliver a plan (" KPI Rectification Plan") setting out detailed measures to remedy the matters specified by **tie** in such notice. If, in **tie**'s opinion, the KPI Rectification Plan is:

    13.1 inadequate; or

    13.2 no material improvement in performance is achieved by the Operator during the next Reporting Period (whether or not the KPI Rectification Plan was satisfactory to **tie**) and aggregated deductions remain equal to or above the Underperformance Threshold;

the Operator shall be obliged to apply a multiplier of 1.25 to the aggregated value of deductions for that Reporting Period (which calculation shall be shown in the relevant invoice) and **tie** shall issue a KPI Warning Notice.

14. If, for the next Reporting Period following issue by **tie** of a KPI Warning Notice, underperformance deductions remain at or above the Underperformance Threshold or no acceptable KPI Rectification Plan has been submitted, the Operator shall be obliged to apply a multiplier of 1.5 to the aggregated value of deductions for that Reporting Period (which calculation shall be shown in the relevant invoice). **tie** shall be entitled to issue a second KPI Warning Notice, requiring material improvement and production and delivery of a KPI Rectification Plan.

15. In the event that for a fourth and consecutive Reporting Period, underperformance deductions remain at or above the Underperformance Threshold or no acceptable KPI Rectification Plan has been submitted, the Operator shall be obliged to apply a multiplier of 2 to the aggregated value of deductions for that Reporting Period (which calculation shall be shown in the relevant invoice), until such time as performance improves. Underperformance deductions above the Underperformance Threshold without improvement for six consecutive Reporting Periods shall constitute an Operator Default.

16. In the event that underperformance by the Operator results in a second Major KPI Breach Notice within 12 months of the first such notice, this shall constitute an Operator Default.

17. The Parties acknowledge that all deductions under the KPI Regime will be a genuine pre estimate of loss incurred by the System and by **tie** as a result of the operational under-performance and that no legal challenge or review may be made to their application on the basis that the deductions (either initial or pursuant to paragraphs 7 to 16 above are unenforceable or unreasonable penalties or do not represent properly calculable heads of damages.

18. **Pain-Gain Share Mechanism**

18.1 The parties have agreed to apply a mechanic to share proportionately in revenue and cost generated by the Edinburgh Tram Network operations on the following basis:

18.1.1 The mechanic shall be applied by **tie** to the aggregate Operating Revenues and the aggregate Operating Costs in respect of which Target Operating Costs have been allocated at the end of each Pain/Gain Share Period.

18.1.2 The calculation shall be carried out by **tie** using the applications for payment and data submitted by the Operator with regard to Operating Costs and Operating Revenue collection over the immediately preceding Pain/Gain

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Share Period and verified by **tie** audit on the basis of Clause 48 (*Information and audit access)* of the Agreement.

18.1.3 The calculation exercise shall be completed by **tie** no later than 60 days following the end of the each Pain/Gain Share Period.

18.1.4 The calculation shall compare the aggregate Operating Revenues over the relevant Pain/Gain Share Period to the Profiled Target Revenues and the aggregate Operating Costs in respect of which Target Operating Costs have been allocated in the relevant Pain/Gain Share Period to the Profiled Target Operating Costs.

18.2 In the event that **tie** determines through calculation that the aggregate Operating Revenues over the relevant period:

18.2.1 have exceeded Profiled Target Revenues, the Parties shall be entitled to a share in that surplus as follows:

18.2.1.1 **tie** share: seventy per cent (70%)

18.2.1.2 Operator share: thirty per cent (30%)

18.2.2 did not achieve Profiled Target Revenues, the Parties shall contribute to the deficit as follows:

18.2.2.1 **tie** contribution : 70 per cent (70%)

18.2.2.2 Operator contribution: 30 per cent (30%)

18.3 In the event that **tie** determines that Operating Costs in respect of which Target Operating Costs have been allocated over the relevant period:

18.3.1 have exceeded Profiled Target Operating Costs the parties shall contribute to the deficit as follows:

18.3.1.1 **tie** contribution: twenty per cent (20%)

18.3.1.2 Operator contribution: eighty per cent (80%)

18.3.2 have achieved savings against Profiled Target Operating Costs, the parties shall be entitled to a share in the savings as follows:

18.3.2.1 **tie** share: fifty per cent (50%)

18.3.2.2 Operator share: fifty per cent (50%)

18.4 The Pain Gain share mechanic shall operate in relation to Operating Costs (except for Fixed Costs and any actual costs which are to be paid or agreed to be paid in accordance with this Agreement) and Operating Revenues and separately from the KPI Regime.

19. The calculations set out in paragraph 18 above shall be reconciled by **tie** to produce an aggregate net result. In the event that the result is positive number in the Operator's favour, **tie** shall notify the Operator, give details of the relevant calculations and reconciliation and state the net pain/gain share balance. The Operator shall then submit an invoice substantially in the form of Schedule 6 *(Form of Invoice for Project Phase D)* to this Appendix to **tie** and **tie** shall make payment within 30 days of receipt of the invoice. If the result is a negative number representing an amount owed to **tie**, **tie** shall submit an invoice to the Operator and be entitled to receive reimbursement from the Operator within 30 days of the Operator's receipt of the invoice or by operation of set off from the Operator's monthly invoices until such time such amount is extinguished. Any amount outstanding to the credit of **tie** shall be treated as debt due and payable to **tie** by the Operator. For the avoidance of doubt, set off by **tie** shall in all cases be in addition to any performance deductions being applied pursuant to the KPI Regime.

20. To the extent any VAI payment is to be made to the Operator pursuant to paragraph 23 to 29 below, **tie** shall be entitled to set off any amounts outstanding under paragraph 19 above in full against such VAI payment.

21. In the event of expiry of the Term or an early termination, **tie** shall be expressly entitled to carry out the calculation under paragraph 18 above on a pro rated basis and the provisions of paragraphs 18, 19 and 20 above shall continue to apply, save that any amount due and payable to **tie** shall be paid by the Operator to **tie** within 30 days of written demand by **tie**.

22. The Operator may refer any Dispute concerning any determination, calculation or reconciliation by **tie** in accordance with paragraphs 18, 19 and/or 21, to the Dispute Resolution Procedure. If it is determined pursuant to the Dispute Resolution Procedure that the whole or any part of any disputed amount should be paid to the Operator or to **tie** (as appropriate), then payment shall be made by the appropriate party to the other within 30 days of the receipt of an invoice in respect of the determined amount. Any costs incurred by the

Operator in auditing any determination, calculation or reconciliation which is the subject of a Dispute under this Paragraph 22 shall be at the Operator's own cost.

23. VISION ACHIEVEMENT INCENTIVE ("VAI")

For the purposes of this section:

23.1 **"Additional System Surplus"** means:

tie Actual System Surplus over the Vision Period less **tie** Target System Surplus over the Vision Period.

23.2 **"tie Target System Surplus"** means:

Target Revenues over the Vision Period less the sum of Target Operating Costs, Fixed Costs and Profit Element over the Vision Period.

23.3 **"tie Actual System Surplus"** means:

over the Vision Period:

(i) Operating Revenue less the sum of Profit Element, Target Operating Costs and Fixed Costs; then

(ii) add Operating Revenue Pain Share payments made by the Operator to **tie** pursuant to paragraphs 18 to 21 above; then

(iii) deduct any Operating Revenue Gain Share payments by **tie** to the Operator pursuant to paragraphs 18 to 21 above; then

(iv) add any Operating Cost Gain Share payments by the Operator to **tie** pursuant to paragraphs 18 to 21 above;

(v) deduct any Operating Cost Pain Share payments by **tie** to the Operator pursuant to paragraphs 18 to 21 above.

23.4 **"Average Individual KPI Performance"** means, in respect of each Key Performance Indicator, the average performance in respect of such Key Performance Indicator during the relevant Vision Period;

23.5 **"Average KPI Performance"** means, in respect of a Vision Period, the level of performance calculated in accordance with paragraph 25 below;

23.6 **"Vision Period"** means:

23.6.1 the period from Service Commencement to the date closest to the third anniversary of such date being the end of a Reporting Period and a Reset Decision Date; and

23.6.2 each subsequent 3 year period commencing on the day after the end of the previous Vision Period, and ending on the last day of a Reporting Period closest to a Reset Decision Date, provided that the last Vision Period shall terminate on the expiry or earlier termination of the Agreement.

24. The Operator shall be entitled to the Vision Achievement Incentive in respect of a Vision Period if:

24.1 **tie** Actual System Surplus exceeds the **tie** Target System Surplus for such Vision Period;

24.2 the Average KPI Performance for the Vision Period is 90% or more; and

24.3 no Average Individual KPI Performance for the Vision Period is less than 85%

25. The Average KPI Performance for a Vision Period shall be the average of:

25.1 the Average Individual KPI Performance for such Vision Period for each Key Performance Indicator;

25.2 weighted in accordance with the weightings set out in Table 1 of this Schedule.

26. The Average Individual KPI Performance for a Vision Period for each Key Performance Indicator shall be calculated as follows:

26.1 the sum of the individual KPI Performances over each Reporting Period in the Vision Period divided by the number of Reporting Periods.

27. If the Operator is entitled pursuant to paragraph 24 above to a Vision Achievement Incentive in respect of a Vision Period:

27.1 the amount of such Vision Achievement Incentive payment shall be equal to half of the Additional System Surplus in respect of such Vision Period (but without any entitlement to interest); and

27.2 such payment shall be made within 60 days of the end of the Vision Period and **tie** shall provide to the Operator details of the calculation of the amount of such payment.

28. In respect of a Vision Period which terminates on the expiry or earlier termination of the Agreement:

28.1 A Vision Achievement Incentive may be payable on a pro rated basis in accordance with the above provisions on the expiry of the Agreement or earlier termination pursuant to (a) Clause 31.4 for failure to agree matters resulting in a termination, or (b) Clause 32 (*Termination on **tie** Default or at Operator Option*), or (c) Clause 37 (*Voluntary termination by **tie***), (except for Clause 37.1.1), or (d) Clause 35 *(Termination for Force Majeure);* and

28.2 No Vision Achievement Incentive shall be payable in respect of such Vision Period where the Agreement terminates for any other reason, and the Operator shall have no entitlement to any Additional System Surplus.

29. **tie** shall be responsible for all VAI calculations.. For the avoidance of doubt, the calculation and effect of KPI Regime deductions shall have no bearing on the calculation of VAI entitlement.

30. The operation of paragraphs 23 to 29 shall not come into effect if Operating Revenues are less than Target Revenues over the relevant Vision Period.

TABLE 1 - KPI REGIME

KEY PERFORMANCE INDICATOR	Weight	Performance Range	Deduction	KPI Profit Element
Headway	25%	100% to 98%	0%	£ [◆]
		<98% to 95%	10%	
		<95% to 90%	20%	
		<90% to 85%	30%	
		<85%	40%	
First and last tram	15%	100% to 98%	0%	
		<98% to 95%	10%	£ [◆]
		<95% to 90%	20%	
		<90% to 85%	30%	
		<85%	40%	
Customer Survey	10%	100% to 98%	0%	
		<98% to 95%	10%	£ [◆]
		<95% to 90%	20%	
		<90% to 85%	30%	
		<85%	40%	
Security	10%	<100% to 98%	2%	£ [◆]
		<98% to 95%	8%	
		<95% to 90%	20%	
		<90% to 85%	30%	
		<85%	40%	
Cleanliness of tram interiors and stops	10%	100% to 98%	0%	
		<98% to 95%	10%	£ [◆]
		<95% to 90%	20%	
		<90% to 85%	30%	
		<85%	40%	
Information & signage	10%	100% to 98%	0%	
		<98% to 95%	10%	£ [◆]
		<95% to 90%	20%	
		<90% to 85%	30%	
		<85%	40%	
Revenue generation and protection	20%	100% to 98%	0%	
		<98% to 95%	10%	£ [◆]
		<95% to 90%	20%	
		<90% to 85%	30%	
		<85%	40%	

[redacted].

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

[redacted].

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

This is Schedule 4 referred to in the Operating Appendix annexed to the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 4

Operating Output Specification

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1. OVERALL SYSTEM REQUIREMENTS

1.1 The System shall be an electrically powered light rail system using Trams to carry passengers and may include all or any of the following Lines (or any parts thereof):

1.1.1 Line 1;

1.1.2 Line 2;

1.1.3 Line 3; and

1.1.4 Network Expansions

1.2 **tie**'s overall requirements of the System are that it shall achieve and sustain the Project Vision and be:

1.2.1 Safe and secure;

1.2.2 Reliable;

1.2.3 Attractive;

1.2.4 Delivered within the Affordability Limits;

1.2.5 Affordable for passengers;

1.2.6 Efficient;

1.2.7 Environmentally acceptable;

1.2.8 Sustainable;

1.2.9 Easy for passengers to use;

1.2.10 Accessible to all including mobility impaired passengers;

1.2.11 Able to provide a minimum level of service specified by **tie**;

1.2.12 Able to support the local transport strategy, policies, planning and system aspirational objectives of the City of Edinburgh Council;

1.2.13 Integrated with other transport modes;

1.2.14 Capable of Network Expansions; and

1.2.15 Able to project a system wide high quality brand image.

1.3 **tie** requires that operation of the System shall reflect a high standard of presentation and public image to match the City of Edinburgh's status as a World Heritage Site and that the System shall be operated efficiently with minimum disturbance to the public and minimum delay to passengers.

1.4 All aspects of the operation of the System shall take account of the need to react safely and quickly to emergencies.

1.5 The System shall incorporate such staffing, surveillance and alarm equipment as is appropriate to ensure the safety of the public, especially lone and mobility impaired travellers.

1.6 **tie** requires that the System shall be capable of responding to Network Expansion and resultant increased ridership without adverse impact on quality.

1.7 The System shall be constructed, maintained and operated at all times in accordance with Good Industry Practice, the Necessary Consents and the Law.

2. PROJECT OPERATIONAL OBJECTIVES

The objectives of **tie** and the Operator during the Service Period shall be to ensure that:

2.1 the System complies with the requirements set out in paragraph 0 above;

2.2 the System is operated in accordance with the terms of this Agreement, including this Operating Output Specification, the Operating Method Statement, the Environmental Statement and the Design Manual, as amended from time to time in accordance with the Agreement;

2.3 the System is operated in accordance with Law and Good Industry Practice; and

2.4 the operation of the System is integrated with existing transport operators in Edinburgh, in accordance with the Service Integration Plan developed under the terms of this Agreement.

2.5 The primary objectives of **tie**, the **tie** Advisers and the Operator during the Service Period in respect of any Line shall be to:

2.5.1 procure the performance of the Project Operations in accordance with this Operating Output Specification and the Operating Method Statements;

2.5.2 manage the provision of Infrastructure Provider Maintenance of the System;

2.5.3 develop and procure any Network Expansion and to encourage growth in patronage; and

2.5.4 sustain the highest level of system performance at all times.

2.6 The detail of this Operating Output Specification shall be developed by the Operator, **tie** and the **tie** Advisers pursuant to the terms of the Project Development Output Specification and the Agreement.

2.7 The following paragraphs set out **tie**'s intentions as at the Effective Date in relation to the requirements of the Operating Output Specification.

3. OPERATIONAL REQUIREMENTS

Introduction

3.1 Part of the Project Development Objectives is to optimise route service patterns and frequencies. It is therefore not possible to define the precise requirements for the Transport Services at the Effective Date.

3.2 The development of the Operating Output Specification in relation to the Transport Services will take into account and develop the Development Assumptions made during Project Phases A and B to accommodate the possible phased introduction of the Transport Services on the System.

3.3 The following paragraphs outline the expected operational parameters.

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4. TRANSPORT SERVICE REQUIREMENTS

4.1 Days of Operation

The Transport Services shall be provided by the Operator on all Lines on every day of the year. On Edinburgh Holidays, the Operator shall provide Transport Services at least as frequent as it would normally provide on a Sunday.

4.2 Journey times

4.2.1 During Project Phases A, B and C, the Operator shall develop and agree with **tie** and the **tie** Advisers the maximum journey times between locations on the Lines and/or Core Network which shall not be exceeded by Trams in either direction.

4.2.2 The Operator shall also agree the planned journey times, layover times, allowances for dwell times and allowances for recovery times in planning the Timetable. When necessary, the Timetable shall be reviewed (in accordance with Clause 6 (*Transport Services Timetable*) of the Operating Appendix and, if so agreed with **tie**, adjusted and in such circumstances, the Operator shall provide a copy thereof and each successive update thereof to **tie**.

4.3 Service Levels and Patterns

4.3.1 Pursuant to paragraph 9 of the Project Development Output Specification, with effect from the Service Commencement Date in respect of each Line or part thereof, the Operator shall provide the minimum number of tram services per hour specified in the agreed operating pattern.

4.3.2 The Operator shall ensure that the intervals in the Timetable between tram services from each Tramstop for the same destination shall be equal within any time bands established for differing tram frequencies.

4.3.3 The Operator shall ensure that tram services call at all Tramstops when operating in public service, except at the beginning and end of each Tram's duty cycle when short workings may be operated.

4.3.4 If at any time during the Service Period (under normal operating conditions excluding Special Events) the level of the Transport Services set out above is

insufficient to accommodate the actual passenger demand and appropriate operating passenger densities, the Operator and **tie** will meet to discuss whether and how to jointly procure sufficient additional capacity to ensure that passenger demand can be accommodated at such appropriate operating passenger densities.

4.3.5 Transport Services to be provided during Special Events shall be subject to periodic agreement between **tie** and the Operator, taking into account anticipated patronage and route availability and dealt with under Clause 8 (*Special Events*) of the Operating Appendix.

4.4 Operating Hours

4.4.1 Unless otherwise agreed by **tie** during Project Phases A, B or C, of this Agreement, with effect from the Service Commencement Date in respect of each Line, the Operator shall ensure that the departure of:

- The first tram service for each route specified in Table **1** below shall be no later than the times specified in that table; and that
- The last tram service for each route specified in Table **1** below shall be no earlier than the time specified in the table.

Table 1 : First and Last Scheduled Departure Times

	Monday to Friday		*Saturday*		*Sunday*	
	First depart	*Last depart*	*First depart*	*Last depart*	*First depart*	*Last depart*
From Airport, to City Centre	*05.10*	*23.40*	*05.10*	*23.40*	*05.10*	*23.50*
From Leith to City Centre via Leith Walk	*05.00*	*24.00*	*05.00*	*24.00*	*07.00*	*24.00*
From Leith to City Centre via Granton	*05.00*	*24.00*	*05.00*	*24.00*	*07.00*	*24.00*

From City Centre to Airport	*04.30*	*24.00*	*04.30*	*01.00*	*04.30*	*24.30*
From City Centre to Leith via Leith Walk	*05.00*	*24.00*	*05.00*	*24.00*	*07.00*	*24.00*
From City Centre to Leith via Granton	*05.00*	*24.00*	*05.00*	*24.00*	*07.00*	*24.00*

4.5 Availability, Reliability, Punctuality and Regularity of the Transport Services

The Operator shall monitor those Performance Indicators related to Transport Services delivery for each Line by methods to be agreed with **tie** and shall report to **tie** on those Performance Indicators in the Service Quality Report rendered pursuant to Clause 12 (*Service Performance and Quality Monitoring*) of the Operating Appendix. Any remedial action necessary to achieve requisite performance levels, or where appropriate any adjustment of the performance levels, shall be subject to agreement of **tie** as set out in the KPI Regime.

5. SERVICE INTEGRATION

5.1 The Operator shall be responsible for refining and implementing the Service Integration Plan in conjunction with other public transport operators and in conformity with CEC's local transport strategy. All amendments to the Service Integration Plan shall be subject to **tie**'s approval in accordance with Schedule 9 (*Review Procedure*).

5.2 The Operator shall be responsible for ensuring that the Service Integration Plan (including any amendments to it) shall be to the satisfaction of the OFT. Subject to any necessary exemptions and clearances from the OFT and from any other relevant regulatory authority, the Operator shall implement, with other transport operators, and in a manner consistent with the LTS and CEC transport strategies, timetable coordination measures.

5.3 The Operator shall on each Tram show information related to connecting public transport timetables and shall provide maps of local public transport services at all transport interchange points forming part of the system.

5.4 Publicity, particularly Timetable and fares information, shall be presented in a common format and, wherever practicable, the Operator shall advertise other transport operators' services within their Timetables where these form a complementary element of the local public transport network. Timetable information shall be provided to Traveline Scotland or any successor with adequate notice being given of any proposed service alterations

6. OPERATING METHOD STATEMENT

6.1 The Operator shall implement and maintain up-to-date all component plans which constitute the Operating Method Statements and as developed under paragraph 26 of the Project Development Output Specification. Changes proposed by the Operator to any of the these plans shall be agreed with and approved by **tie** prior to implementation.

7. STAFF

7.1 At all times during the Service Period, the Operator shall ensure that:

7.1.1 there shall be a sufficient number of staff (including the Key Personnel and all relevant grades of supervisory staff) engaged in the provision of the Project Operations with the level of skill and experience appropriate to the tasks to which such staff are allocated and the standards which are required to be achieved pursuant to this Agreement. To avoid doubt, this obligation shall include ensuring that there are sufficient staff to cover periods of holiday, sickness and other absences and anticipated and actual peaks in demand for the Service;

7.1.2 all staff receive adequate training for their roles in accordance with the Training Plan to ensure the proper performance of this Agreement and compliance with all health and safety rules, procedures and requirements. Such training must be supplemented by continuing development;

7.1.3 The Operator shall, within 60 days of Operating Effective Date, present to **tie** for approval a programme of actions necessary to obtain an appropriate 'business excellence' certification such as 'Investors In People' and shall implement that programme accordingly.

7.1.4 The Operator shall have in place and implement appropriate equal opportunities and equality policies and comply with Law regarding employment.

7.2 The Operator shall procure that the **tie** Project Manager shall upon reasonable notice have access to all material details in respect of all employees of the Operator and any Operator Party engaged in the performance of the Project Operations including numbers and categories of staff employed to perform the Project Operations and including in respect of each such employee:

7.2.1 details of qualifications;

7.2.2 details of training undertaken by the employee;

7.2.3 disciplinary record; and

7.2.4 criminal record (excluding convictions considered to be spent under the Rehabilitation of Offenders Act 1974).

7.3 The Operator shall (and shall procure that any Operator Party shall) inform local employment and training organisations and any other employment and/or training organisations operating in Edinburgh of any staff vacancies in connection with the Project Operations before advertising the vacancies.

8. REPORTING

8.1 The Operator shall supply the following information to **tie** in the form of Service Quality Reports in accordance with Clause 12 of the Operating Appendix and at other such times and in such form (including Annual Service Reports) as **tie** may reasonably require:-

8.1.1 Patronage information and revenue collection data in consolidated format;

8.1.2 Operating Revenues and Operating Costs;

8.1.3 Fare tables for concessionary fare and multi-modal ticket reimbursement;

8.1.4 Reliability and punctuality records;

8.1.5 Quality assurance certificates in accordance with the Quality Management Plan;

8.1.6 Company accounts;

8.1.7 Failure information; and

8.1.8 Any information necessary for **tie** to audit the achievement or otherwise of Key Performance Indicators and other Performance Indicators.

8.2 **tie** shall also have the right to commission or undertake passenger surveys, including face-to-face interviews, to determine usage and other information.

8.3 The Operator shall, where necessary, collate and report on information received from Infrastructure Providers relevant to reporting upon the operation of the System.

9. INFORMATION FOR THE PUBLIC

9.1 The Operator shall display information as instructed by **tie** at each Tramstop at all times throughout the Service Period:

9.1.1 accurate information relating to the scheduled times and Headways of all Trams in service arriving at and departing from that Tramstop, provided that for any period when the scheduled Headway is less than 10 minutes, the Operator need only provide information in relation to the duration of such Headway;

9.1.2 real time information about Transport Services at all Tramstops including the anticipated time of departure from that Tramstop of the next Tram and the destination of such Trams;

9.1.3 details of the first and last Tram at each such Tramstop for each day; and

9.1.4 accurate information relating to the fares which apply to all journeys from that Tramstop, including that related to modes other than tram.

9.2 The Operator shall make paper copies of the Timetable available (free of charge) upon request from members of the public at the locations specified in Schedule 5 (*Information Locations*) to the Operating Appendix and shall display copies of the Timetable at those locations and at any bus or railway station or other passenger

interchange as reasonably requested by **tie** from time to time and subject to the approval of such third parties as may be necessary. If the Operator makes any change to the Timetable (to the extent that such changes are permitted under this Agreement) the Operator shall make copies of the revised Timetable available at the above locations at least 30 days prior to its implementation.

9.3 The Operator shall use its best endeavours (including any steps reasonably requested by **tie** from time to time) to inform potential users of the System on at least 7 prior days' notice if:

9.3.1 it will be unable to operate any Transport Services in accordance with the Timetable; or

9.3.2 it will be providing additional or modified Transport Services in connection with Special Events,

and shall notify potential users of the System at the same time of any revised Timetable or travelling arrangements.

9.4 The Operator shall:

9.4.1 immediately inform **tie** of any material disruption of the Transport Services and any mitigating action taken or to be taken so that this information can be widely circulated; and

9.4.2 at any interchange location, Tram ticket or enquiry office provide information about other public transport operators' services;

9.4.3 when requested by **tie**, provide information about its current operations and future proposals in a form agreed with **tie** to facilitate the provision of public information;

9.5 The Operator shall comply with the Public Liaison and Media Plan and co-operate with **tie** and provide such information and assistance as **tie** may reasonably require from time to time in the provision of information to the travelling public regarding public passenger transport services in Edinburgh.

10. PASSENGER'S CHARTER

10.1 Pursuant to paragraph 29 of the Project Development Output Specification, the Operator shall produce, publish and maintain in force and comply with throughout the Service Period, and update from time to time, a passengers' charter outlining the expectations which passengers may have of the Transport Services on the System and a procedure for passenger complaints, such charter to be subject to the prior written approval of **tie** (such approval not to be unreasonably withheld or delayed).

11. CONTROL CENTRE

11.1 The Operator shall be responsible for ensuring that staffing and consumables are provided on a 24/7 basis for operation of the Control Centre and for interface management between Tram operations and System infrastructure and vehicle availability and maintenance.

11.2 The Operator shall at all times at the Control Centre man a priority telephone facility (with dedicated handsets and direct lines) for external communications to the emergency services, regional electricity control and other key parties.

11.3 The Operator shall automatically and continuously log at the Control Centre Tram movements so as to provide for day-to-day performance monitoring and incident and fault inquiry and also for periodic off-line evaluation of service quality and compliance with this Operating Output Specification.

12. OPERATOR MAINTENANCE RESPONSIBILITIES

12.1 The Operator shall be responsible for implementing the Maintenance Plan.

13. MANAGEMENT OF INFRASTRUCTURE PROVIDER MAINTENANCE

13.1 The Operator shall be responsible for managing the implementation of System Maintenance by the Infrastructure Provider(s).

14. CONSUMABLES, MATERIALS AND EQUIPMENT

14.1 The Operator shall ensure that the goods, equipment, consumables and materials used by it or any Sub-Contractor in connection with the provision of any of the Project Operations (each as a distinct and separate obligation) are:

14.1.1 of satisfactory quality;

14.1.2 maintained and stored in a safe, serviceable and clean condition in accordance with Good Industry Practice;

14.1.3 of the type specified in this Operating Output Specification or as agreed during the development of the Operating Method Statements; and

14.1.4 in compliance with Law and Necessary Consents,

and shall, as soon as reasonably practicable after receiving a request from the **tie** Project Manager, supply to the **tie** Project Manager evidence to demonstrate its compliance with this paragraph 14.1.

14.2 The Operator shall be responsible for and shall procure that sufficient stocks and continuous supply of goods, spares, consumables, equipment and materials are available at all times in order to comply with its obligations under this Agreement.

14.3 The Operator shall not install, keep or use in or on the Site any materials, equipment or apparatus, the installation, keeping or use of which is likely to cause (or in fact causes):

14.3.1 material damage to the System;

14.3.2 environmental contamination or the generation, accumulation or migration of any hazardous substance in an unlawful manner whether within or outside the Site (or the soil, air or water surrounding it); or

14.3.3 health or safety risk to the public or its own staff;

and shall use all reasonable endeavours to ensure (by directions to staff and otherwise) that all consumables, materials, equipment or apparatus in or on the System Land are stored, operated and used in accordance with the Environmental Statement and so as to minimise noise and vibration (through the relevant medium) likely to cause damage, annoyance or disturbance and prevent environmental contamination or the unlawful generation or migration of any hazardous substance.

14.4 Without prejudice to the generality of its obligations under this Agreement, the Operator shall:

14.4.1 procure that all hazardous materials and equipment used or stored on the Site shall be kept in accordance with Good Industry Practice, properly and securely labelled and stored, under appropriate supervision and used only by appropriately trained and competent staff; and

14.4.2 use all practicable and reasonable means to:

14.4.2.1 prevent and counteract the unlawful emission or theft of any hazardous substance;

14.4.2.2 avoid the unlawful discharge into any conducting media serving or passing through, under or over the Site of any hazardous substance;

14.4.2.3 prevent the unlawful generation, accumulation or migration of any hazardous substance at or from the Site; and

14.4.2.4 prevent any environmental claims arising or any circumstances arising likely to result in any environmental claims.

15. REVENUE GENERATION AND PROTECTION

The Operator shall implement a system and/or methods (including in transit inspection) as agreed with **tie** from time to time to check that passengers are in possession of a valid ticket or tickets for journeys that are taken and to ensure that ticketless or other fraudulent travel is deterred.

15.1 The Operator shall link its fare collection system to the OneTicket scheme currently in operation.

15.2 The Operator shall participate in OneTicket and enter into appropriate contracts with the scheme operator for this purpose. The Operator shall ensure that its fare collection and inspection system provides a link into any regional smartcard system for the provision of transaction and validation data, and receipt of hotlists and action lists amongst other data.

15.3 The Operator shall ensure that its smartcard equipment is compatible with OneTicket and acceptable to the operator of any regional smartcard scheme. The Operator shall provide and maintain the equipment necessary for participation in this scheme.

15.4 The Operator shall ensure that its smartcard equipment includes auto-top up and the full range of charge to account facilities as may be implemented in the regional scheme to facilitate cashless payment.

15.5 The Operator shall ensure that its smartcard system facilitates the validation of all smartcards used for travel either on or off Tram equipment.

16. PARK AND RIDE FACILITIES

16.1 Introduction

As at the date of this Agreement, there is no firm commitment by ***tie*** *to construct and/or operate any Park-and-Ride facilities as part of the Edinburgh Tram Network. There are no current plans for* ***tie*** *to provide such facilities on Lines One and Two, but outline plans for Line Three include for a possible location which is suitable for Park-and-Ride facilities. Even if* ***tie*** *should proceed with construction of park-and ride in this location, it is uncertain how this will be procured or by whom it would be operated. In the event that operation of any Park-and-Ride facility should become a part of this Agreement, the following shall apply:*

16.2 Car Park operation

Measures (such as combined fee parking and travel) shall be introduced by the Operator at the Park and Ride Sites to positively encourage car users to use the System.

16.3 Security

16.3.1 The Operator shall operate a CCTV system covering each Tramstop, facilities provided (including ticket machines, shelters, buildings and other structures) and the whole of the car park and footpaths at all park and ride sites.

16.3.2 The Operator shall ensure that each such park & ride facility and its management regime shall satisfy any requirements for a secured car park scheme as may be set out in the Design Manual.

17. SYSTEM OPERATING ENVIRONMENT AND LANDSCAPE

In carrying out the Project Operations, the Operator shall comply with such parts of the Design Manual as are mandated in this Operating Output Specification and shall give due consideration to the contents of the Design Manual as a whole.

17.1 Environmental Plan and Policy Statement

17.1.1 The Operator shall comply with the Design Manual.

17.1.2 The Operator shall implement the Environmental and Sustainability Management Plan in relation to the Operator Maintenance.

17.1.3 The Environmental and Sustainability Management Plan shall be in accordance with best environmental practice, validated by independent audit and in compliance with ISO 14001 (or equivalent). Following commissioning of the System, the Operator shall carry out an annual audit of such plan.

17.2 Operational Noise and Vibration

The Operator shall take all reasonable steps to minimise operational noise (including from public address systems and audible passenger boarding signals), vibration, emissions or other disturbance during the Term which might result in interference with and/or nuisance to the public and to nearby properties, in particular at night or with respect to buildings and structures with sensitive equipment and ensure that operation of the System complies with the requirements of the Design Manual and the Environmental Statement.

18. SYSTEM QUALITY PROTECTION

The Operator shall be responsible during the Term for continual assessment of System quality protection through the provision of advice to **tie**, in particular on the introduction of technology upgrades and replacement and on the general whole life performance of the System, including Assets used by the Operator.

[redacted].....

~~Director~~/Authorised Signatory

Transport Initiatives Edinburgh Limited

[redacted].

~~Director~~/Authorised Signatory

TRANSDEV Edinburgh Tram Limited

This is Schedule 5 referred to in the Operating Appendix annexed to the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 5

Information Locations

[To be developed by the Operator and **tie**]

[redacted]

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

[redacted]

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

This is Schedule 6 referred to in the Operating Appendix annexed to the foregoing Development Partnering and Operating Franchise Agreement between Transport Initiatives Edinburgh Limited and TRANSDEV Edinburgh Tram Limited dated 14 May 2004

SCHEDULE 6

Form of Invoice for Project Phase D

[to be developed during Project Phase A]

[redacted]

~~Director~~/Authorised Signatory
Transport Initiatives Edinburgh Limited

[redacted]

~~Director~~/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

David Humphrey
Project Director
Transdev Edinburgh Tram Limited
Level 2
Saltire Court
20 Castle Terrace
Edinburgh
EH1 2ET

Our Ref: 06.05.06A/MH/JRM

Date: 14th May 2004

Dear Mr Humphrey

Appointment of Operator for the Development Partnering and Operating Franchise ("DPOF") Agreement relating to the Edinburgh Tram Network

Drafting on Interface Issues between the Infrastructure Provider, any Vehicle and Equipment Suppliers and the Operator, and Insurances during Project Phases C and D

Transport Initiatives Edinburgh Limited ("tie")

1. Interface Issues

It is acknowledged by **tie** that the works to be carried out by any infrastructure provider or providers and the supplier of any vehicles and equipment in relation to the Edinburgh Tram Network will potentially impact on the provision of the Project Development Services and/or the Project Operations by the Operator appointed by **tie** under the terms of the DPOF Agreement. Given that the procurement strategy and the contractual structure for the procurement of infrastructure, vehicles and equipment is still to be fully determined by **tie** and approved by CEC, it is agreed by **tie** and Transdev that it is not currently possible to draft appropriate provisions to address any such potential impacts with any degree of certainty prior to the execution of the DPOF Agreement by **tie** and the successful CARP candidate.

It is, therefore, agreed by **tie** and Transdev that during Project Phases A and B, if Transdev is appointed as Operator, appropriate amendments to the DPOF Agreement to address such potential impacts will be agreed by **tie** and Transdev (both parties acting reasonably and in good faith). In addition to or as an alternative to such amendments, **tie** and Transdev (both parties acting reasonably and in good faith) may agree to and draft the terms of an appropriate standalone direct agreement or interface agreement with the infrastructure provider or providers and/or the vehicle and equipment suppliers.

The terms of any agreed amendments to the DPOF Agreement and/or any direct agreement/interface agreement will seek to give the Operator appropriate relief to the extent the Operator experiences demonstrable increased costs caused by the works to be carried out by any infrastructure provider or providers and the supplier of any vehicles and equipment and such is covered by liquidated damages within the relevant contract. Relief will not be available to the Operator to the extent the Operator is in breach of the DPOF Agreement or where the Operator has itself contributed to or been responsible for any adverse impact on the Project Development Services and/or Project Operations. Relief in the form of an extension to the Term of the DPOF Agreement will not be available to the Operator.

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Examples of potential impacts on the Operator where relief may be appropriate:

- delays in completion of the construction works, delivery of the trams or supply of any material equipment could lead to payment of additional costs to the Operator and relief from the provisions in Clause 17 of the DPOF Agreement which deal with the reconciliation of costs overruns and savings, no payment for sums in excess of the agreed monthly budget, and no payment above 10% of the Target Costs for Project Phase C2 and relief from the provisions in Schedule 3 *(Project Phase D Payment Mechanism and KPI Regime)* of the Operating Appendix which deal with the reconciliation of cost overruns and savings;

- latent defects in the infrastructure or system installation works could result in payment of additional costs to the Operator;

- defects in the trams or equipment (which is material to the operation of the System) could result in payment of additional costs to the Operator;

- a failure in the interface between any elements of the System could result in payment of additional costs to the Operator; and

- contractor snagging could result in payment of additional costs to the Operator.

In addition to the payment of associated costs to the Operator, and relief from the provisions in Clause 17 of the DPOF Agreement and the provisions in Schedule 3 *(Project Phase D Payment Mechanism and KPI Regime)* as stated above, other reliefs available to the Operator could include:

- relief from default where breach of the DPOF Agreement by the Operator is caused by failure by any infrastructure provider or providers, or the suppliers of any vehicles and equipment;

- relief from the operation of the KPI Regime where failure in the Operator's performance is caused by failure by any infrastructure provider or providers, or the suppliers of any vehicles and equipment; and

- relief from provision of the Timetable and agreement of an amended Timetable where there is an adverse impact on the Operator carrying out the Project Operations caused by failure by any infrastructure provider or providers, or the suppliers of any vehicles and equipment.

The terms of any agreed amendments to the DPOF Agreement and/or any direct agreement/interface agreement will also seek to facilitate co-operation and consultation between the Operator and any infrastructure provider or providers, and the suppliers of any vehicles and equipment, with regard to the at least the following issues:

- design input;

- input on technical requirements;

- input on safety issues;

- lifecycle issues;

- input on operational issues;

- commissioning issues (including the possible provision of a sub-contract or alternative contractual mechanism to any of the infrastructure providers with regard to the provision of commissioning services by the Operator);

- promotion of partnering;

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- development of the Infrastructure and Equipment Output Specification;
- programme;
- intellectual property issues; and
- resolution of related disputes.

For the avoidance of any doubt, although the Operator will have an active involvement with **tie** in the development of the procurement strategy for the appointment of any infrastructure provider or providers, and the suppliers of any vehicles and equipment, the style of procurement, its programme, contractual structure and the identity of tenderers and the selection of the contractor and suppliers will be at the absolute discretion of **tie.**

2. Insurance Issues

In terms of Clause 26.18 of the DPOF Agreement, it has been stated that the Operator will provide advice to **tie** on the selection of appropriate insurances for Project Phases C and D. It is further stated in Clause 26.19 that **tie** will take out or procure that such insurances as **tie** considers to be appropriate in relation to the construction, maintenance and operation of the System are taken out. The Operator will take out any such insurances if required to do so by **tie.**

tie acknowledges that if certain insurances in relation to the construction, maintenance and operation of the system are not taken out and maintained, there may be a potential impact on the provision of the Project Development Services and/or the Project Operations by the Operator. In the event that certain insurances with such a potential impact are not or cannot be taken out, **tie** and the Operator (both acting reasonably and in good faith) will discuss how best to deal with any potential impact and whether amendments to the terms of the DPOF Agreement are required.

For the avoidance of doubt, the final decision on which insurances will be taken out and maintained during Project Phases C and D will be at **tie**'s absolute discretion.

Yours sincerely

[redacted]

Michael Howell
Chief Executive

We hereby acknowledge and accept the terms of the above letter.

For and on behalf of Transdev Edinburgh Tram Limited

[redacted]

.....

David Humphrey

.....

14 May 2007 ..... Date

(1) tie LIMITED

- and -

(2) TRANSDEV EDINBURGH TRAM LIMITED

MINUTE OF VARIATION

relating to the

EDINBURGH TRAM NETWORK

20 December 2007

MINUTE OF VARIATION

BETWEEN

(1) **tie LIMITED** a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh, EH1 1YJ (**"tie"**); and

(2) **TRANSDEV EDINBURGH TRAM LIMITED** a company incorporated in Scotland under number SC267598 and having its registered office at Level 2, Saltire Court, 20 Castle Terrace, Edinburgh EH1 2ET (the **"Operator"**).

IT IS AGREED AS FOLLOWS:

1. Transport Initiatives Edinburgh Limited (now **tie** Limited) and the Operator executed a Development Partnering and Operating Franchise Agreement on 14 May 2004 (the **"DPOFA"**).

2. **tie** and the Operator have agreed to amend the DPOFA and substitute therefor a revised Development Partnering and Operating Franchise Agreement of even date herewith (the **"Revised DPOFA"**).

3. **tie** and the Operator have still to agree the matters listed in this Clause 3. **tie** and the Operator have agreed to act reasonably and in good faith in respect of resolving these matters and amending the Revised DPOFA in respect of these matters:

   3.1 **Financial Proposals (Schedule 4 to the Revised DPOFA)** – the Financial Proposals shall be adjusted (as appropriate) in accordance with the Revised DPOFA;

   3.2 **KPI Regime (Schedule 3 to the Operating Appendix of the Revised DPOFA)** – The KPI Regime described in Schedule 3 to the Operating Appendix is to be agreed by **tie** and the Operator (both acting reasonably and in good faith), based on the principles set out in Attachment A to this Minute of Variation. **tie** and the Operator (both acting reasonably and in good faith) shall agree to a timescale for completing this; and

   3.3 **Schedule 5 - Operator Financial Model** – The Operator Financial Model shall be amended to reflect the adjustments agreed between **tie** and the Operator in the Revised DPOFA and to reflect the validation of these numbers for consistency and accuracy.

4. The Revised DPOFA shall be effective from 20 December 2007.

5. This Minute of Variation, any document completed or to be completed in accordance with its provisions and any matter arising from it or any such document shall be governed by and construed in accordance with Scots law.

TIE00899944_0002

This is Attachment A referred to in the foregoing Minute of Variation between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

KPI Regime – to be based upon the draft DPOFA KPI Regime Payment Mechanism exchanged between the **tie** and the Operator on the 19th December 2007 and to be agreed in accordance with the following principles:

- The net effect of the application of the KPI Regime is such that a good operator should be capable of achieving no or de minimus deductions;
- The regime/calibration shall be reviewed after 12 months to adjust if not reflecting these principles (assuming good operator);
- The operator fee at risk of deductions should be a maximum of 10 % as aggregate deductions;
- The regime should not create any perverse incentives to provide good Transport Services;
- The regime shall take into account that Relief Events shall be reflected in the definition of Excusing Causes and Operator Late Trams;
- The KPI Regime shall in defining Excusing Causes and Operator Late Trams address such items as insured or insured events/damage.
- and where relevant Industry Standard Guidance shall be reflected in the Regime

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899944_0003



(1) tie LIMITED

- and -

(2) TRANSDEV EDINBURGH TRAM LIMITED

DEVELOPMENT PARTNERING AND OPERATING FRANCHISE AGREEMENT

relating to the

EDINBURGH TRAM NETWORK

Revised Version - 20 December 2007

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DEVELOPMENT PARTNERING AND OPERATING FRANCHISE AGREEMENT

BETWEEN

(1) **tie LIMITED** a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh, EH1 1YJ (**"tie"**); and

(2) **TRANSDEV EDINBURGH TRAM LIMITED** a company incorporated in Scotland under number SC267598 and having its registered office at Level 2, Saltire Court, 20 Castle Terrace, Edinburgh EH1 2ET (the **"Operator"**).

WHEREAS

A **tie** requires project development assistance and services for the subsequent commissioning and operation of a light rapid transit system in Edinburgh, known as the Edinburgh Tram Network .

B Pursuant to a notice published in the Official Journal of the European Communities on 11 June 2003 with reference 2003/S 110-099040, **tie** invited expressions of interest from appropriately qualified parties for the development and subsequent operation of the System.

C By a competitive procurement process, conducted in accordance with law, **tie** has selected the Operator to support promotion of the Scottish Private Bills through the Scottish Parliament and to develop (under partnering arrangements with **tie**) and operate the System subject to the terms and conditions of this Agreement applicable to each phase of the Project.

D It is acknowledged that this Agreement aims to achieve a project vision (the "Project Vision") for the Edinburgh Tram Network. This Project Vision involves the development of a System which will stand favourable comparison with the best in Europe. The quality of the System and the Transport Services provided will be appropriate to Edinburgh's status and role as a European capital city and its city centre's designation as a World Heritage Site. The System will integrate as far as possible with other transport modes to serve the existing fabric of the City of Edinburgh, and promote appropriate development and social inclusion.

It is intended that this goal be achieved in a spirit of partnership, utilising modern design methods and standards.

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PART I - PRELIMINARY MATTERS

NOW THEREFORE IT IS AGREED AS FOLLOWS:

1. DEFINITIONS AND INTERPRETATION

1.1 Schedule 1 (*Definitions and Interpretation*) to this Agreement shall govern all matters concerning definitions and interpretation.

2. TERM OF AGREEMENT

2.1 This Agreement shall come into effect on the Effective Date and shall continue in effect until the earlier of:

2.1.1 the Expiry Date; and

2.1.2 the Termination Date.

2.2 **tie** may serve a notice on the Operator not less than 180 days before the fifteenth anniversary of the Effective Date requiring an extension of the Term of this Agreement for a period of up to five years commencing from the original Expiry Date. If **tie** serves such a notice under this Clause 2.2, the original Expiry Date shall be extended to such date as may be specified in such notice, and with effect from the day after the fifteenth anniversary of the Effective Date, in consideration of the continued grant to the Operator of the right to operate the Transport Services, the Operator shall continue to perform its obligations under the terms of this Agreement.

2.3 **tie** may serve a notice on the Operator not less than 90 days before the fifteenth anniversary of the Effective Date proposing an extension of the Term of this Agreement, on such terms, and until such date, as **tie** may specify in such notice. If **tie** serves such a notice under this Clause 2.3:

2.3.1 **tie** and the Operator will negotiate in good faith in relation to:

(a) the terms of this Agreement to apply with effect from the day after the fifteenth anniversary of the Effective Date; and

(b) the period of the extension to the Term of this Agreement; and

2.3.2 if **tie** and the Operator agree the matters referred to in Clause 2.3.1 prior to the date when this Agreement would otherwise have expired, the original Expiry

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Date shall be extended to such date as may be agreed between **tie** and the Operator, and with effect from the day after the fifteenth anniversary of the Effective Date, in consideration of the continued grant to the Operator of the right to operate the Transport Services, the Operator shall perform its obligations under the terms of this Agreement as amended pursuant to this Clause 2.3.

2.4 The date specified by **tie** in a notice under Clause 2.2 or the date agreed between the Operator and **tie** pursuant to Clause 2.3 shall not be less than 30 days after the date which was the original Expiry Date before service of such notice nor more than 20 years after the Effective Date.

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PART II - DEVELOPMENT PHASE

3. PROJECT PARTNERING APPROACH

3.1 The Parties agree to work in mutual cooperation to fulfil their agreed roles and responsibilities and apply their expertise in relation to the Project to achieve the Project Development Objectives in accordance with the terms of this Agreement.

3.2 **tie** and the Operator shall procure that each **tie** Party and each Operator Party (as appropriate) shall work in accordance with the principles set out in Clause 3.1 above.

3.3 Subject to Clause 3.4 each Party (**"First Party"**) undertakes to co-operate with the other (**"Second Party"**) in order to facilitate the performance of this Agreement and in particular will:

3.3.1 approach all pricing, estimating and budgeting functions on a collaborative and Open Book Basis;

3.3.2 use reasonable endeavours to avoid unnecessary complaints, disputes and claims against or with the Second Party;

3.3.3 comply with the provisions of the Dispute Resolution Procedure in relation to any such complaints, disputes and claims with or against the Second Party;

3.3.4 not interfere with the rights of the Second Party in performing its obligations under this Agreement, nor in any other way hinder or prevent the Second Party from performing those obligations or from enjoying the benefits of its rights; and

3.3.5 take reasonable steps to mitigate any foreseeable losses and liabilities of the Second Party which are likely to arise out of any failure by the First Party to take any of the steps referred to in Clauses 3.3.2 to 3.3.4 (inclusive).

3.4 Nothing in Clause 3.3 shall:

3.4.1 interfere with the right of each of the Parties to arrange its affairs in whatever manner it considers fit (in compliance with Law) in order to exercise its rights and perform its obligations under this Agreement (in compliance with Law) and, in the case of **tie**, its duties and functions as a wholly owned subsidiary of CEC; or

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3.4.2 relieve either Party from any obligation contained in this Agreement or from any obligation to pay any debt due and payable under this Agreement.

3.5 Senior representatives from the Parties shall meet on a quarterly basis (or as may be otherwise agreed by the Parties) to review:

3.5.1 any matters outwith the Operator's control and not caused by an Operator Default or other breach of the Agreement by the Operator which have adversely affected or may adversely affect:

(a) the achievement of the Project Development Objectives;

(b) the performance of the System;

(c) the Operator's ability to perform its obligations in terms of the Agreement;

(d) the generation of revenue; and/or

(e) the maintenance of the Operator's costs within the Capped Fees, the Fixed Costs, the Target Costs for Project Phase C2 or the Target Operating Costs (as appropriate); and

3.5.2 any proposals from either Party to:

(a) maximise revenue;

(b) minimise costs; and/or

(c) optimise the performance of the System.

3.6 Either Party may propose measures to address the matters set out in Clause 3.5.1 and a determination of what measures (if any) should be undertaken by the Operator and/or tie to address such matters shall be considered in accordance with and subject to each Party's existing rights, obligations and the existing contractual mechanisms under this Agreement including but not restricted to the rights, obligations and contractual mechanisms set out in Clause 22 *(Relief Events)*, Clause 23 *(Performance and Financial Adjustments)*, Clause 24 *(tie Changes)*, Clause 25 *(Operator Changes)*, Clause 26 *(Roads Changes)* and Clause 27 *(Qualifying Change in Law)* of the Operating Appendix.

TIE00899944_0014

3.7 Any proposal from either Party in terms of Clause 3.5.2 shall be reviewed in accordance with Clause 24 *(**tie** Changes)* or Clause 25 *(Operator Changes)* of the Operating Appendix (as appropriate).

4. THE PROJECT DEVELOPMENT SERVICES

4.1 The Operator shall assist **tie** with the promotion of the Project and the achievement of the Project Development Objectives by providing the Project Development Services during Project Phase A, Project Phase B and Project Phase C in relation to each Line and/or Phase (as appropriate) in accordance with:

4.1.1 Schedule 2 (*Project Development Output Specification*); and

4.1.2 the requirements and directions of **tie** from time to time in accordance with the terms of this Agreement.

4.2 The Operator shall (each as a distinct and separate obligation) perform the Project Development Services and its other obligations under this Agreement:

4.2.1 in accordance with the terms of this Agreement;

4.2.2 in accordance with Good Industry Practice from time to time for the activity concerned;

4.2.3 in such manner so as not wilfully to detract from the image and reputation of **tie**, CEC or the Project;

4.2.4 in accordance with all applicable Law governing the provision of the Project Development Services and the element of the Project Development Objectives which those Project Development Services are directed towards achieving;

4.2.5 to the extent applicable to the Project Development Services, in accordance with the Code of Construction Practice and the Code of Maintenance Practice;

4.2.6 in a manner that is not likely to be injurious to persons or property;

4.2.7 in a manner consistent with the Project Development Objectives;

4.2.8 in a timely and efficient manner and in accordance with the Partnering Methodology and Programme, and Project Programme and otherwise as directed by **tie** in accordance with the terms of this Agreement; and

4.2.9 using the Key Personnel and such other Project Development Staff as may be approved by **tie** for that type of work; and

4.2.10 save as **tie** may have directed to the contrary.

4.3 The Operator shall, and shall procure that the Operator Parties shall, participate in such publicity, forums and meetings as are considered by **tie** to be reasonably required to garner support of all sections of the Edinburgh populace for the Project.

4.4 The Operator must comply at all times with Law, in particular the provisions of the Health & Safety At Work etc Act 1974 ("HS Act") and the CDM Regulations insofar as they affect the Operator's obligations under this Agreement and without prejudice to the generality of the foregoing:

4.4.1 where for the purposes of the Project, the Operator is a "designer" as defined in the CDM Regulations, the Operator shall comply with the obligations of a designer under the CDM Regulations;

4.4.2 the Operator shall co-operate fully with the planning supervisor and the principal contractor appointed under the CDM Regulations;

4.4.3 the Operator shall allocate adequate resources to enable it to comply with its obligations in this Agreement and the CDM Regulations;

4.4.4 the Operator shall co-operate with all other persons involved in the Project as designers to consider the prevention of risk and protection of persons who may be exposed to risks; and

4.4.5 the Operator must not by any act or omission do anything that would cause **tie** to be prosecuted under the HS Act.

4.5 Notwithstanding the provisions of Clause 4.4 the Parties have agreed that **tie** shall appoint the Competent Person (as such term used in this Clause is defined in ROGS) pursuant to ROGS for the Project. If the Operator is obliged at Law to appoint a Competent Person from commencement of Project Phase D or if the Project Safety Committee or **tie** direct the Operator to appoint a Competent Person then such shall be deemed to be a **tie** Change. If the Operator is obliged at Law or directed as a **tie** Change to appoint a Competent Person then the Operator and **tie** shall seek to agree in good faith (a) whether the Competent Person appointed by tie pursuant to Clause 12.12.2 could be appointed or the appointment transferred; (b) the basis for payment

of the Competent Person and whether the obligation to pay the Competent Person could be undertaken by **tie** in substitution for the Operator. **tie** shall, acting reasonably, have the right to approve such Competent Person and **tie** shall act reasonably in declining the approval of such Competent Person in circumstances including the remuneration of such Competent Person or a lack of ability to assign the proposed contract with such Competent Person to **tie** or other appropriate party (in the case of an appointment of a Competent Person by the Operator).

5. PROJECT TEAM AND KEY PERSONNEL

5.1 The Operator and **tie** shall agree from time to time the structure of the joint team (comprising representatives of **tie**, the **tie** Advisers and the Project Development Staff) which shall be the forum for partnering, liaison, co-operation and coordination of the Project.

5.2 The Operator shall ensure that:

5.2.1 the Key Personnel shall be available for meetings in Edinburgh at such times as **tie** may, in its sole discretion, direct; and

5.2.2 in addition to the Key Personnel, there shall at all times be a sufficient number of staff (including all relevant grades of supervisory staff) available for the provision of the Project Development Services in accordance with the Project Development Output Specification. This obligation shall include ensuring that there are sufficient Project Development Staff to cover periods of holiday, sickness and other absences and anticipated and actual peaks in servicing **tie**'s requirements for the Project Development Services.

5.3 The Operator shall locate Project Development Staff at such locations as the Operator considers convenient for the Project, provided that:

5.3.1 the Operator acknowledges that pursuant to Clause 16 *(Project Development Costs)*, it will not be entitled to any reimbursement from **tie** during Project Phases A, B, C and D in excess of any sum included in the Core Staff Fixed Rates and/or the Non-Core Staff Fixed Rates of the Project in relation to the travel of any person to or from Edinburgh and/or within the United Kingdom, or for the accommodation or subsistence of any person within the United Kingdom and/or elsewhere but the Operator shall be entitled to

reimbursement from **tie** in relation to travel costs outwith the United Kingdom;

5.3.2 pursuant to Clause 5.2.1, **tie** will require the Operator to make the Key Personnel available for meetings in Edinburgh at such times as **tie** may, in its sole discretion, direct; and

5.3.3 pursuant to Clause 6.8, the Operator Project Manager shall be required to be located in Edinburgh during Project Phase C2 and Project Phase D.

5.4 The Operator shall ensure that the Project Development Staff referred to in Clause 5.2.2 shall:

5.4.1 have the level of skill and experience appropriate (i) to undertake the tasks and Project Development Objectives to which such staff are allocated and (ii) the standards to be achieved pursuant to this Agreement; and

5.4.2 receive such training and supervision as is necessary to ensure the proper performance of this Agreement and compliance with all health and safety rules, procedures and requirements. All training shall be in accordance with the Recruitment and Training Plan once that plan has been agreed between **tie** and the Operator pursuant to the Project Development Output Specification.

5.5 The Operator shall ensure that the Key Personnel have day to day responsibility for the implementation of the Project Development Services and that each of them performs the role in relation to the Project specified against his or her name in the Project Development and Operating Costs.

5.6 The Operator shall ensure that:

5.6.1 there are no changes to the Key Personnel without **tie**'s prior written consent (such consent not to be unreasonably withheld or delayed in the case of a change necessitated by sickness or reasonable annual, maternity, paternity or compassionate leave or where one of the Key Personnel's employment ceases) and that any replacement persons shall be of at least equivalent status and ability to the person whom they replace; and

5.6.2 all other Project Development Staff shall be available in accordance with the requirements set out in the Partnering Methodology and Programme.

5.7 The Operator shall use all reasonable endeavours to ensure the continuity of the personnel assigned to perform the Project Development Services and shall select Key Personnel having careful regard to those persons' existing work load and other planned commitments.

5.8 If **tie** gives the Operator notice that any member of the Project Development Staff should be removed from involvement in the Project Development Services, the Operator shall immediately comply with such notice.

5.9 The Operator shall (and shall procure that the Operator Parties shall) comply with all relevant statutory health and safety requirements in respect of Project Development Staff, and any rules, regulations and any safety and security instructions from the **tie** Project Manager.

5.10 During Project Phases A, B and C1, **tie** shall provide office accommodation for the Project Development Staff within **tie's** own offices. If such accommodation is not available within **tie's** own offices, **tie** shall require the Operator to find alternative accommodation as soon as reasonably practicable and such requirement shall be considered in accordance with Clause 24 (*tie Changes*) and Clause 23 (*Performance and Financial Adjustments*) of the Operating Appendix.

6. MANAGEMENT OF THE PROJECT

6.1 **tie** shall appoint a project manager (**"tie Project Manager"**) by notice in writing to the Operator who (subject to Clause 6.12) will:

6.1.1 be responsible for managing the day to day conduct of the Project during Project Phases A, B, C and D;

6.1.2 be responsible for the day to day direction of the tasks to be performed by the Operator during Project Phases A, B, C and D;

6.1.3 exercise the functions and powers of **tie** in relation to the Project which are identified in this Agreement as functions or powers to be carried out by him/her (including during Project Phase D);

6.1.4 exercise such other functions and powers of **tie** under this Agreement as **tie** may notify to the Operator from time to time (including during Project Phase D); and

6.1.5 be the primary point of contact for the Operator with **tie** (including during Project Phase D);

and the Operator shall observe, and shall procure that the Project Development Staff observe, all reasonable directions of the **tie** Project Manager in relation to the Project.

6.2 The **tie** Project Manager shall be entitled at any time, by notice in writing to the Operator, to authorise any other persons to exercise the functions and powers of **tie** delegated to him pursuant to Clause 6.1, either generally or specifically. Until further notice from **tie**, any act of any such person shall, for the purposes of this Agreement, constitute an act of the **tie** Project Manager and all references to the "**tie** Project Manager" in this Agreement (apart from this Clause 6) shall be taken as references to such person so far as they concern matters within the scope of such person's authority.

6.3 **tie** may by notice in writing to the Operator change the identity of the **tie** Project Manager. **tie** shall (as far as reasonably practicable) consult with the Operator prior to the appointment of any replacement for the **tie** Project Manager, taking account of the need for liaison and continuity in respect of the Project. Such change shall have effect on the date specified in the written notice.

6.4 During any period when a **tie** Project Manager has not been appointed (or when the **tie** Project Manager is unable through illness, incapacity or any other reason whatsoever to carry out or exercise his functions under this Agreement), **tie** shall carry out the functions which would otherwise be performed by the **tie** Project Manager.

6.5 No decision, act or omission of **tie**, the **tie** Project Manager or any **tie** Party shall, except as otherwise expressly provided in this Agreement:

6.5.1 in any way relieve or absolve the Operator from, modify, or act as a waiver or personal bar of, any liability, responsibility, obligation or duty under this Agreement;

6.5.2 in the absence of an express written instruction or authorisation issued by **tie** under Clause 24 (*tie Changes*) of the Operating Appendix, constitute or authorise a **tie** Change; or

6.5.3 be construed as restricting or binding **tie** in any way save with regard to the specific project matters to which it relates.

6.6 Except as previously notified in writing before such act or omission by **tie** to the Operator, the Operator and the Operator Project Manager shall be entitled to treat any act or omission of the **tie** Project Manager which is authorised by this Agreement as being expressly authorised by **tie** and the Operator and the Operator Project Manager shall not be required to determine whether an express authority has in fact been given.

6.7 The Operator shall appoint a project manager (**"Operator Project Manager"**) who shall:

6.7.1 act as the principal point of contact for **tie**, the **tie** Project Manager and the **tie** Advisers in relation to all matters related to the Project;

6.7.2 have full authority to act on behalf of the Operator for all purposes of this Agreement;

6.7.3 manage and co-ordinate the provision of the Project Development Services by the Project Development Staff and the integration of provision of the Project Development Services with the tasks being performed by **tie**'s internal team and the **tie** Advisers; and

6.7.4 liaise with the **tie** Project Manager in relation to the matters referred to in Clause 6.12 including, without limitation, the scope of the Project Development Services to be carried out from time to time.

6.8 During Project Phase C2 and Project Phase D, the Operator Project Manager shall be:

6.8.1 located in Edinburgh; and

6.8.2 engaged on the Project full time.

6.9 Except as previously notified in writing before such act or omission by the Operator to **tie**, **tie** and the **tie** Project Manager shall be entitled to treat any act or omission of the Operator Project Manager in connection with this Agreement as being expressly authorised by the Operator, and **tie** and the **tie** Project Manager shall not be required to determine whether any express authority has in fact been given.

6.10 The Operator may by written notice to **tie** change the identity of the Operator Project Manager. Where the Operator wishes to do so it shall by written notice to **tie** propose a substitute for approval, taking account of the need for liaison and continuity in respect of the Project and the Project Phase when the change is proposed. Such

appointment shall be subject to the prior written approval of **tie** (not to be unreasonably withheld or delayed).

6.11 The Operator shall also nominate a deputy to the Operator Project Manager. During any period when the Operator Project Manager is unable through illness, incapacity or any other reason whatsoever to carry out or exercise his functions under this Agreement, such deputy shall carry out the functions which would otherwise be performed by the Operator Project Manager.

6.12 Major decisions in relation to the Project Development Objectives during all Project Phases, will be taken by **tie**, such decisions to include:

6.12.1 the terms on which all Necessary Consents are applied for and the manner in which any proceedings necessary to obtain such Necessary Consents are conducted (including the terms of all applications and notices and evidence to be presented in support of such applications and of any commitments and undertakings to be given in the course of such proceedings), always provided that this Clause 6.12.1 shall not apply to any Operator Necessary Consent. In relation to the Operator Necessary Consents, the Operator shall be solely responsible for determining the terms on which such Operator Necessary Consents are applied for and the manner in which any proceedings necessary to obtain such Operator Necessary Consents are conducted;

6.12.2 the terms on which public sector funding and local contributions for the Project (or any part of it) are applied for or agreed and the manner in which any proceedings necessary to obtain such funding are conducted;

6.12.3 the terms offered, or to be agreed with regard to all third party agreements, commitments and undertakings proposed to be entered into in respect of any Phase before the Service Commencement Date in respect of the Phase to which such agreement or undertaking relates;

6.12.4 the land or rights over land to be acquired for the purposes of the Project (other than offices or temporary work sites required by the Operator) and the manner and terms of such acquisition;

6.12.5 any application or representation or agreement or arrangement with any public authority, roads authority or highway authority, including CEC,

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and to the Operator's immediate parent company and TRANSDEV plc the reference in Clause 26.1.8 to audited accounts shall refer to the latest set of the audited accounts issued by the Operator, the Operator's immediate parent company and TRANSDEV plc) at the commencement of Project Phase C2 for each Phase or Network Expansion.

26.5 **tie** does not give any warranty or undertaking as to the completeness, currency, accuracy or fitness for any purpose of any of the Background Information and, subject to the express provisions of this Agreement, neither **tie**, the **tie** Advisers nor any of its or their employees shall be liable to the Operator in contract, delict (including breach of statutory duty), or otherwise as a result of:

26.5.1 any inaccuracy, omission, unfitness for any purpose or inadequacy of any kind whatsoever in the Background Information; nor

26.5.2 any failure to make available to the Operator any materials, documents, drawings, plans or other information relating to the Project;

provided that nothing in this Clause 26.5 shall exclude any liability in respect of any statements made or information provided fraudulently.

27. INSURANCES

Required Insurances and Joint Names Insurance

27.1 The Operator shall, at its own cost, procure that each of the Required Insurances is taken out and comes into effect on the earlier of:

27.1.1 the relevant date specified in each "Period of Insurance" set out in Schedule 10 (*Insurances*); and

27.1.2 the date on which the Operator is first required by Law to have in place such insurance in connection with the Project Development Services and the Project Operations,

and shall maintain the Required Insurances in full force and effect until the later of:

27.1.3 the relevant date specified in each "Period of Insurance" set out in Schedule 10 (*Insurances*); and

27.1.4 the last date on which the Operator is required by Law to have in place such insurance in connection with the Project Development Services and the Project Operations.

27.2 The Operator shall procure that all Required Insurances shall:

27.2.1 be maintained in accordance with Schedule 10 (*Insurances*); and

27.2.2 be placed at all times with insurers authorised to carry out insurance business within the European Union (unless there is a legal requirement for any of the Required Insurances to be placed with insurers authorised to carry out insurance business in the United Kingdom) and confirmed in writing as acceptable by **tie** (such written acceptance not to be unreasonably withheld or delayed).

27.3 **tie** may ask the Operator to take out and maintain any insurance from time to time in the joint names of **tie**, the Operator and, if required, any other party agreed between the Parties to become a joint named insured (the "Joint Names Insurance") as a **tie** Change. If Joint Names Insurance is required, the terms of this Clause 27 including the provisions which are stated to apply to the "Required Insurances" shall apply with any appropriate adjustment to be agreed between the Parties as a **tie** Change. The Operator shall procure that any Joint Names Insurance shall:

27.3.1 contain a provision that **tie**, and/or any other party reasonably requested by **tie**, is named as a co-insured party;

27.3.2 provide that any Joint Names Insurance shall continue in effect and unaltered for the benefit of the insured parties for at least 90 days after written notice by registered mail of any cancellation (including non-renewal), change, modification or lapse for any reason;

27.3.3 contain a provision that requires the insurer to send copies of all notices of cancellation or alteration or suspension or any other notices given under or in relation to the policy to **tie** promptly upon receiving any notices of cancellation or alteration or suspension or any other notices;

27.3.4 contain a provision that a notice of a claim given to the insurer by **tie** or the Operator under the policy shall, in the absence of manifest error, be accepted by the insurer as valid notification of a claim in respect of the interests of all insured parties;

27.3.5 contain a provision to the effect (on the basis of non-vitiation/severability) that all the provisions of any Joint Names Insurance shall operate as if there were a separate policy in effect (save in respect of the sums insured, limits of liability and excesses/deductibles which shall be at the levels stated) for each named insured and that non-compliance with any policy term, condition or warranty and/or misrepresentation of material information by the Operator or any other co-insured will not affect the rights and/or interests of **tie** under any policies effected as Joint Names Insurance; and

27.3.6 ensure that, in so far as within the control of the Operator, the Joint Names Insurances are primary and shall not be brought into contribution with any other policy or policies effected by or on behalf of any of the insured parties.

27.4 The Operator shall ensure that each of its insurance brokers (who shall be approved by **tie**, such approval not to be unreasonably withheld or delayed) gives **tie** as soon as reasonably practicable after any policy of Required Insurance is taken out, replaced or renewed, a letter of undertaking in the form set out in Part 2 of Schedule 10 (*Insurances*).

27.5 The Operator shall:

27.5.1 procure that the employer's liability insurance[1] and the third party liability insurance which is to be maintained by the Operator in accordance with Schedule 10 (*Insurances*) contains a waiver of subrogation against **tie** as required in Schedule 10 (*Insurances*) save in respect of fraud or deliberate non-disclosure; and

27.5.2 where the Operator is obliged to effect any Required Insurances, not bring any claim or action against **tie** (or any **tie** Party) in respect of any loss or damage in circumstances where and to the extent that the Operator could recover such loss or damage under such insurance (whether or not such insurance has in fact been effected or, if effected, has been vitiated as a result of any act or omission of the Operator (or any Operator Party), including but not limited to non-disclosure or under-insurance in accordance with the level stated in Schedule 10 (*Insurances*), provided that, to avoid doubt, this Clause 27.5.2 shall not by itself prevent the Operator from claiming against **tie** (or any **tie**

[1] To be confirmed by TETL's brokers.

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Party) in respect of a breach of this Agreement by **tie** or any **tie** Party for any loss or damage not covered because of the level of deductibles under such insurance permitted by this Agreement or to the extent such loss or damage exceeds the greater of the insurance placed or the maximum of such insurance required under Schedule 10 (*Insurances*).

27.6 The Operator shall not take any action or fail to take any reasonable action or (insofar as it is reasonably within its power) permit or allow others to take or fail to take any action (including failure to disclose any fact) as a result of which any of the Required Insurances may be rendered void, voidable, unenforceable or suspended or impaired in whole or in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

27.7 Not less than 30 days prior to the expiry or amendment of any of the Required Insurances, the Operator shall submit to **tie** a request for approval from **tie** of the insurer and the principal terms and conditions of such insurance policy in respect of any material change or revision to such terms and conditions or change in identity of such insurer, such approval not to be unreasonably withheld or delayed.

27.8 The Operator shall supply **tie** with copies of every policy document, insurance certificate and renewal certificate relating to any Joint Names Insurance (or such other evidence of insurances as may be reasonably required by **tie**) and documentary evidence such as insurance certificates to the effect that the Required Insurances (other than any Joint Names Insurance) have been taken out and are being maintained as soon as it is available but in any event no later than 7 days (in respect of certificates) and 60 days (in respect of policies) after the inception of the relevant policies, together with evidence of payment of the premiums and any periodic renewal certificates. If the Operator defaults in insuring or continuing to maintain the Required Insurances subject to Clause 28 *(Uninsurable Risks)*, **tie** may insure against any risk in respect of which such default has occurred and recover any premiums from the Operator as a debt immediately due and payable.

27.9 The supply to **tie** of any insurance policy or insurance certificate or renewal certificate or other evidence of compliance with this Clause 27 *(Insurances)* shall not imply, or be taken as, acceptance by **tie** that:

27.9.1 the extent of insurance cover is sufficient and its terms are satisfactory; or

27.9.2 in respect of any risks not insured against, insurable interests or parties not insured, an acceptance by **tie** that the same were Uninsurable.

27.10 Neither failure to comply nor full compliance with the provisions of this Clause 27 (*Insurances*) and Clause 28 (*Uninsurable Risks*) shall relieve the Operator of its liabilities and obligations under this Agreement.

27.11 The Operator shall apply any proceeds of any of the Required Insurances maintained in accordance with Schedule 10 (*Insurances*) in satisfaction of the claim, demand, proceeding or liability in respect of which such proceeds are payable (unless already paid direct to the third party or employee by the insurer).

27.12 The Operator shall inform **tie** in writing as soon as reasonably practicable after it receives a claim or becomes aware of the occurrence of any event that may give rise to a claim under any Joint Names Insurance and will ensure that **tie** is kept fully informed of subsequent action and developments concerning the claim; such written information shall not be required in relation to any claim of less than £50,000 (Indexed). The Operator shall take such steps as are necessary or appropriate to ensure that each Operator Party, in respect of any event or claim of a like nature arising out of or relating to the operation or responsibility of the Operator Party, takes in relation to the Operator like action to that which the Operator is required to take under this Clause 27.12 in relation to **tie**, and shall inform **tie** promptly of information thus received from any Operator Party.

27.13 Notwithstanding, and without prejudice to, any other provision hereof, the Operator undertakes to the extent it has the right to do so under the relevant policy that it will not (and that each of the Operator Parties to the extent each respectively has the right to do so under the relevant policy will not) settle any Joint Names Insurance claim above £50,000 (Indexed) without the prior written agreement of **tie** (such agreement not to be unreasonably withheld or delayed).

27.14 The Operator undertakes with **tie** in relation to the Required Insurances:

27.14.1 to comply with all requirements of the insurers; and

27.14.2 to give notice to **tie** immediately upon the happening of any event which will adversely affect any policy of insurance effected in accordance with this Clause 27 (*Insurances*), including the downgrading of the credit rating to

BBB by Standard & Poors of any party providing any of the Required Insurances.

27.15 In the event that the Operator considers that the requirements of Clause 27.14.1 may conflict with any other Clause herein, the Operator shall immediately notify **tie** in writing.

27.16 The Required Insurances shall be reviewed before the commencement of a new Project Phase, and/or on an annual basis and/or as otherwise agreed between **tie** and the Operator by **tie,** with the support and assistance of the Operator, to ensure that the Required Insurances continue to offer value for money to **tie. tie** retains the right to require the Operator to amend the Required Insurances throughout the Term as it may reasonably require to reflect changes in the circumstances surrounding this Agreement or to effect changes which will offer better value for money to **tie.** Any such amendment shall be considered in accordance with Clause 24 (*tie Changes*) and Clause 23 (*Performance and Financial Adjustments*) of the Operating Appendix.

27.17 Following expiry or termination of this Agreement, **tie** shall continue to pay the Operator the agreed amount for any Required Insurances which the Operator is required in terms of this Agreement to maintain beyond the date of expiry or termination of this Agreement. **tie** shall notify the Operator if **tie** does not want the Operator to continue maintaining any such Required Insurances following expiry or termination of this Agreement.

27.18 The Operator shall be liable for claims made under the third party liability insurance to be taken out as a Joint Names Insurance in respect of the Project Operations during Project Phase D, which are less than the agreed level of deductibles as stated in section 2 of Part 3 of Schedule 10 (Insurances) relative to such insurance and subject to the Base Case Assumptions.

OCIP Insurances

27.19 **tie** shall (at **tie's** cost) take out and maintain or procure that the OCIP Insurances in relation to the construction, maintenance and operation of the System are taken out and maintained during Project Phase C and Project Phase D all in accordance with the terms and provisions of Part 3 of Schedule 10 (*Insurances*). The Operator acknowledges as at the DPOFA Variation Date that **tie** has placed the OCIP

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Insurances for the construction phase of the Edinburgh Tram Network on 23 July 2007. Notwithstanding the dates/periods referred to in Part 3 of Schedule 10 (*Insurances*), the obligation to maintain/extend/renew the OCIP Insurances during the "Construction Phase" as described in Part 3 of Schedule 10 (*Insurances*) shall subsist until the Service Commencement Date and thereafter the obligation to maintain/extend/renew the OCIP Insurances during the "Operational Phase" as described in Part 3 of Schedule 10 (*Insurances*) shall subsist from the Service Commencement Date. **tie** shall provide confirmation sufficiently far in advance to the Operator that the OCIP Insurances during the "Operational Phase" as described in Part 3 of Schedule 10 (*Insurances*) shall be in place in accordance with this Clause 27.19.

27.20 **tie** shall procure that the Operator is included as an insured in the relevant sections of the OCIP Insurances as described in part 3 of Schedule 10 *(Insurances)* as Operator or Transdev Edinburgh Tram Limited.

27.21 The Operator shall, having regard to the knowledge skill and care of a competent operator, if required by **tie**, disclose all material facts, assist **tie** with the completion of proposal forms and provide any further relevant information which is required by insurers in relation to OCIP Insurances, any Joint Names Insurance and any insurances to be taken out by **tie**.. From time to time, the Required Insurances and any Joint Names Insurances shall be reviewed by the Operator with the skill and care of an Operator and by **tie** in order to ensure these policies are fully compatible with the OCIP Insurances, any Joint Names Insurances and any insurances to be taken out by **tie** in relation to Edinburgh Tram Network. Where the Operator or **tie** identifies either a scope of cover or premium level issue regarding interaction or overlap of coverage, the Operator or **tie** shall report this to the other in order that **tie** can assess how best to place insurance.

27.22 **tie** shall procure that the OCIP Insurances shall:

27.22.1 provide that each of the OCIP Insurances shall continue in effect and unaltered for the benefit of the insured parties for at least 30 days after written notice by registered mail of any cancellation (including non-renewal), change, modification or lapse for any reason;

27.22.2 contain a provision to the effect (on the basis of non-vitiation/severability) that all the provisions of the OCIP Insurances shall operate as if there were a separate policy in effect (save in respect of the sums insured, limits of liability and excesses/deductibles which shall be at the levels stated) for each named

insured and that non-compliance with any policy term, condition or warranty and/or misrepresentation of material information by **tie** or any other co-insured will not affect the rights and/or interests of the Operator under any policies effected as OCIP Insurances;

27.22.3 ensure that, in so far as within the control of **tie**, the OCIP Insurances are primary and shall not be brought into contribution with any other policy or policies effected by or on behalf of any of the insured parties; and

27.22.4 contain a provision that a notice of a claim given to the insurer by **tie** or the Operator under the policy shall, in the absence of manifest error, be accepted by the insurer as valid notification of a claim in respect of the interests of the Operator.

27.23 **tie** shall supply the Operator with copies of every policy document, insurance certificate and renewal certificate relating to each of the OCIP Insurances (or such other evidence of insurances as may be reasonably required by the Operator) as soon as any such copies are available but in any event no later than 14 days (in respect of certificates) and 60 days (in respect of policies) after the inception of the relevant policies, together with evidence of payment of the premiums and any periodic renewal certificates and any notices of cancellation or alteration or suspension or any other notices given under or in relation to the OCIP Insurances which are relevant to the Project Development Services or the Project Operations or to the Operator, shall be supplied by **tie** to the Operator as soon as reasonably practicable. In any event such evidence in respect of each of the OCIP Insurances as may be required to enable the Operator to commence Transport Operations or to commence other activities for which evidence of such insurance being in place is a prerequisite under Law shall be supplied by **tie** to the Operator in advance of such commencement.

27.24 **tie** undertakes with the Operator in relation to the OCIP Insurances:

27.24.1 to comply with all requirements of the insurers; and

27.24.2 to give notice to the Operator as soon as **tie** becomes aware of the occurrence of any event which will adversely affect the OCIP Insurances as it relates to the Project Development Services or the Project Operations or to the Operator, including the downgrading of the credit rating to BBB or lower by Standard & Poors of any party providing any of the OCIP Insurances.

27.25 Any change, renewal or extension to the OCIP Insurances (which shall include the requirements of the insurers with whom the OCIP Insurances are placed) or failure or inability to maintain, renew or extend in accordance with this Clause 27 (*Insurances*) which has an effect on the interests of the Operator shall be deemed to be a **tie** Change and considered in accordance with Clause 24 (***tie** Changes*) and Clause 23 (*Performance and Financial Adjustments*) of the Operating Appendix.

27.26 Throughout the Term, the Operator agrees to comply with the requirements of the insurers with whom the OCIP Insurances are placed in so far as such requirements have been notified by **tie** to the Operator in sufficient time to enable compliance.

27.27 The Operator agrees that it will intimate to **tie** any act, occurrence or failure which (a) relates to the interests of the Operator or (b) any claim notified by a third party to the Operator, and which:

27.27.1 leads to any claim made or notice of potential claim being made under the OCIP Insurances; or

27.27.2 renders any of the OCIP Insurances void, voidable, unenforceable, suspended or impaired in whole or in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

27.28 **tie** agrees that it will intimate to the Operator any act, occurrence or failure which relates to the interests of the Operator, and which:

27.28.1 leads to any claim made or notice of potential claim being made under the OCIP Insurances; or

27.28.2 renders any of the OCIP Insurances void, voidable, unenforceable, suspended or impaired in whole or in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

27.29 The Operator shall not take any action or fail to take any reasonable action or (insofar as it is reasonably within its power) permit or allow others to take or fail to take any action (in either case including failure to disclose any material fact) as a result of which any of the OCIP Insurances may be rendered void, voidable, unenforceable, suspended or impaired in whole or in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

27.30 **tie** shall not take any action or fail to take any reasonable action or (insofar as it is reasonably within its power) permit or allow others to take or fail to take any action (in either case including failure to disclose any material fact) as a result of which any of the OCIP Insurances may be rendered void, voidable, unenforceable, suspended or impaired in whole or in part or which may otherwise render any sum paid out under any relevant policy repayable in whole or in part.

27.31 The Operator shall bear all excesses and deductibles payable in respect of claims made under the OCIP Insurances subject to the level and basis of the excesses and deductibles stated in Part 3 of Schedule 10 (*Insurances*), to the extent that such claim is due to the act or omission of the Operator or where the Operator or any Operator Party is otherwise liable for such claim in terms of this Agreement.

27.32 Without prejudice to any other provision of this Agreement, the Operator undertakes, to the extent it has the right to do so under the relevant policy, that it will not (and that each of the Operator Parties to the extent each respectively has the right to do so under the relevant policy will not) settle any OCIP Insurance claim above £50,000 (as Indexed) without the prior written agreement of **tie** (such agreement not to be unreasonably withheld or delayed).

27.33 **tie** shall, where **tie** is obliged to effect any OCIP Insurances, not bring any claim or action against the Operator (or any Operator Party) in respect of any Indemnified Liabilities in circumstances where and to the extent that **tie** could recover such Indemnified Liabilities under such OCIP Insurances (whether or not such OCIP Insurances have in fact been effected or, if effected, have been vitiated as a result of any act or omission of **tie** (or any **tie** Party), including but not limited to non-disclosure or under-insurance in accordance with the level stated in Schedule 10 (*Insurances*), provided that, to avoid doubt, this Clause 27.33 shall not by itself prevent **tie** from claiming any Indemnified Liabilities from the Operator (or any Operator Party) in respect of:

27.33.1 a breach of this Agreement by the Operator or any Operator Party for any Indemnified Liabilities not covered because of the level of deductibles set out in Part 3 of Schedule 10 (*Insurances*) under such OCIP Insurances or to the extent such Indemnified Liabilities exceed the greater of the OCIP Insurances placed or the maximum of such OCIP Insurances in each case required under Schedule 10 (*Insurances*); or

27.33.2 where the Indemnified Liabilities are not recoverable under the OCIP Insurances due to a breach by the Operator of this Clause 27 (*Insurances*).

27.34 **tie** shall apply any proceeds of any OCIP Insurances maintained in accordance with Part 3 of Schedule 10 (*Insurances*) in satisfaction of the claim, demand, proceeding or liability in respect of which such proceeds are payable (unless already paid direct to the third party or employee by the insurer).

27.35 Notwithstanding, and without prejudice to, any other provision hereof, **tie** undertakes to the extent it has the right to do so under the relevant policy that it will not (and that each of the **tie** Parties to the extent each respectively has the right to do so under the relevant policy will not) settle any OCIP Insurance claim above £50,000 (Indexed) in so far as any such settlement relates to:

27.35.1 the legitimate interests of the Operator; or

27.35.2 matters for which the Operator has any liability;

without the prior written agreement of the Operator acting reasonably and in good faith.

28. UNINSURABLE RISKS

28.1 Nothing in this Agreement shall oblige the Operator to take out insurance in respect of a risk or matter which is Uninsurable.

28.2 Immediately after the Operator becomes aware that a Compliance Critical Risk is Uninsurable, then:

28.2.1 the Operator shall notify **tie**; and

28.2.2 if both Parties agree or it is determined in accordance with the Dispute Resolution Procedure (on the referral of either Party) that the risk or matter is Uninsurable and that its being Uninsurable is not caused by the actions or omissions of the Operator or an Operator Party;

then the Parties shall meet to discuss the means by which the risk or matter should be managed, mitigated or controlled (including considering the use of self-insurance by either Party and/or insurance through a captive insurer in any jurisdiction).

28.3 At the meeting referred in Clause 28.2, either Party may propose:

28.3.1 any necessary change in the Project Development Services or Project Operations;

28.3.2 whether any amendments are required to the terms of the Agreement including any required adjustment to the Capped Fees, Fixed Costs (excluding the Category Five Fixed Costs), Target Costs for Project Phase C2, Target Operating Costs or Target Patronage; and

28.3.3 whether relief from compliance with obligations is required, as a result of the risk or matter becoming Uninsurable.

28.4 If the requirements of Clause 28.2 are satisfied but the Parties cannot agree as to how to manage, mitigate or control the risk or matter then, for the period during which the relevant Compliance Critical Risk is Uninsurable:

28.4.1 to the extent that the Operator is prevented or otherwise hindered from performing the Project Development Services or the Project Operations in the manner required by this Agreement:

28.4.1.1 the Operator shall be relieved from such performance and shall not be liable to tie for failure so to perform provided it continues to perform the remainder of the Project Development Services or the Project Operations as best as it is reasonably able to; and

28.4.1.2 during Project Phase C2 and Project Phase D, the Target Costs for Project Phase C2 or Target Operating Costs or the Fixed Costs (excluding the Category Five Fixed Costs) as the case may be shall be reduced by an amount which reflects the net cost savings made as a result of restricted Project Development Services or restricted Project Operations and Target Patronage shall be adjusted to reflect the impact of restricted Project Operations on Patronage Revenue. If the Operator determines not to reduce its operating establishment or cost base to reflect restricted Project Operations but to maintain this at the level necessary for normal Project Operations, tie shall not be obliged to pay the marginal Fixed Costs or Operating Costs relating to such establishment or cost base.

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28.4.2 **tie** shall have the option to be exercised by notice in writing at any time in the period during which such Compliance Critical Risk is Uninsurable (provided that **tie** shall, if such period continues for more than 180 days, be deemed to have exercised such option on the 181st day) to terminate this Agreement forthwith.

29. INDEMNITY

29.1 The Operator shall, subject to Clause 29.2, indemnify **tie** and keep **tie** indemnified on demand at all times from and against all Indemnified Liabilities (including any claims made against **tie** under the IDA by the Infrastructure Provider) which arise out of, or in consequence of, or in connection with any breach of this Agreement by the Operator, any non-performance or delay in performance of the Operator's obligations under this Agreement or any breach of statutory duty by the Operator (or any Operator Party) save to the extent the Operator is to be excused or given relief in respect of such breach and non-performance or delay under the express provisions of this Agreement. The Operator was aware when the Operator entered into this Agreement that **tie** would enter into the IDA in respect of the Infrastructure and Equipment.

29.2 The Operator's liability to indemnify **tie** under Clause 29.1 does not extend to any Indemnified Liabilities to the extent that:

29.2.1 they are caused by the negligent acts or negligent omissions of **tie** or any **tie** Party; or

29.2.2 they are caused by the breach by **tie** of its obligations under this Agreement (save where and to the extent such breach occurs by reason of the Operator's or any Operator Party's breach or negligence); or

29.2.3 they arise as a direct result of the Operator acting on specific written instructions issued by **tie** or the **tie** Project Manager (excluding any instruction to comply with the terms of this Agreement (or any part of it)) provided that, prior to acting on such instruction, the Operator:

29.2.3.1 notifies the **tie** Project Manager of the risk of the relevant Indemnified Liability occurring as a result of acting on the instruction; and

29.2.3.2 does not then act on the instruction until it receives written confirmation from the **tie** Project Manager that it should do so.

For the avoidance of doubt neither instructions issued pursuant to Clause 24 (*tie Changes*) of the Operating Appendix and Clause 25 (*Operator Changes*) of the Operating Appendix shall constitute specific written instructions for the purposes of this provision.

29.3 Any amount paid by the Operator to **tie** pursuant to this Clause 29 (*Indemnity*) shall be excluded from the calculation of the Operating Costs.

29.4 Any claim or action against the Operator in respect of any Indemnified Liabilities pursuant to this Clause 29 (*Indemnity*) is subject to Clause 27.33.

30. CONDUCT OF CLAIMS

Subject always to the requirements of the Required Insurances, and in the instance of claims against the Operator, the Joint Names Insurances and the OCIP Insurances:

30.1 If **tie** receives any notice, demand, letter or other document concerning any claim from which it appears that **tie** is or may become entitled to indemnification under this Agreement ("Claim"), **tie** shall notify the Operator as soon as reasonably practicable and shall supply a copy of the relevant Claim to the Operator.

30.2 Where it appears that **tie** is, or may become, entitled to indemnification from the Operator in respect of the liability arising out of the act or omission which is the subject of the Claim, and where required in writing by **tie**, the Operator shall take conduct of any defence, dispute, compromise or appeal of the Claim and of any incidental negotiations and shall be entitled to resist the Claim in the name of **tie** and **tie** will give the Operator all reasonable co-operation, access and assistance for the purposes of considering and resisting such Claim.

30.3 In relation to any Claim subject to Clause 30.2:

30.3.1 the Operator shall keep **tie** fully informed and consult with it about material elements of the conduct of the Claim;

30.3.2 the Operator shall not bring the name of **tie** into disrepute; and

30.3.3 the Operator shall not pay or settle such Claims without the prior written consent of **tie**, such consent not to be unreasonably withheld or delayed.

30.4 **tie** shall be free to take steps in the proceedings, pay or settle any Claim on such terms as it thinks fit (and without prejudice to its rights and remedies under this Agreement)

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if the Operator fails to notify **tie** of its intention to conduct the relevant Claim within 20 Business Days of the notice from **tie** under Clause 30.1 above or the Operator notifies **tie** that it does not intend to take conduct of the Claim.

30.5 **tie** shall be free at any time to give notice to the Operator that it is retaining or taking over (as the case may be) the conduct of any defence, dispute, compromise or appeal of any Claim (or of any incidental negotiations) to which Clause 30.2 applies. On receipt of such notice the Operator shall promptly take all steps necessary to transfer the conduct of such claim to **tie** and shall provide to **tie** all reasonable co-operation, access and assistance for the purposes of considering and resisting such Claim. If **tie** gives any notice pursuant to this Clause 30.5, then the Operator shall be released from any liability under the relevant indemnity in respect of such Claim. **tie** shall keep the Operator reasonably informed as to the progress and status of any such Claim until such Claim is settled, withdrawn, discontinued or otherwise disposed of.

30.6 If, in controlling and contesting any Claim, **tie** takes or fails to take any action in relation to such Claim which it might reasonably be expected to take or not take (as the case may be) which terminates or reduces any entitlement of the Operator to recover any part of the Claim from any insurer under any of the Required Insurances, Joint Names Insurances or OCIP Insurances, the liability of the Operator to indemnify **tie** in respect of such Claim shall be reduced by an amount equal to such part or as the case may be the amount of the reduction thereof (except in the case where **tie** could not reasonably have been expected to have known that the Operator's entitlement could be so terminated or reduced).

30.7 If the Operator pays to **tie** an amount in respect of an indemnity and **tie** subsequently recovers (whether by payment, discount, credit, saving, relief, other benefit or otherwise) a sum which is directly referable to the fact, matter, event or circumstances giving rise to the Claim, **tie** shall forthwith repay to the Operator whichever is the lesser of:

30.7.1 an amount equal to the sum recovered (or the value of the saving or benefit obtained) less any out-of-pocket costs and expenses properly incurred by **tie** in recovering the same; and

30.7.2 the amount paid to **tie** by the Operator in respect of the Claim under the relevant indemnity;

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provided that there shall be no obligation on **tie** to pursue such recovery and that the Operator is repaid only to the extent that the amount of such recovery aggregated with any sum recovered from the Operator exceeds any loss sustained by **tie** in respect of the Claim.

31. LIABILITY AND SOLE REMEDY

31.1 Subject to Clause 31.3, the Parties acknowledge and agree that the only rights available to them to terminate this Agreement are those expressly set out in this Agreement and that neither Party shall be entitled to exercise a right to terminate or rescind or accept the repudiation of this Agreement under any other right whether arising in common law or statute or otherwise howsoever (other than for fraud or a fraudulent misrepresentation).

31.2 The Parties further acknowledge and agree that the express rights provided in this Agreement in relation to termination and the calculation and payment of amounts due following such termination are exclusive and are in place of (and not cumulative with) any other rights or remedies which might arise as a consequence of such termination. The Parties hereby waive all other rights and remedies arising from such termination, whether express or implied, arising by common law (including in delict), by statute or otherwise howsoever provided that nothing in this Clause 31.2 shall exclude the right of the Parties to claim remedies expressly conferred on them by this Agreement.

31.3 Nothing in this Agreement shall exclude or limit the liability:

31.3.1 of either Party for:

31.3.1.1 death or personal injury caused by that Party's negligence or the negligence of anyone for whom that Party is vicariously liable;

31.3.1.2 fraud or fraudulent misrepresentation; or

31.3.1.3 any breach of warranty given as to valid and marketable title, freedom from unduly onerous burdens and conditions or entitlement to possession by action of prescription; or

31.3.2 of the Operator subject to Clause 31.4 and the limitations in Clause 27 (*Insurances*) and 29 (*Indemnity*) (, for any breach of this Agreement or any delict (including negligence) or other liability arising prior to termination of this Agreement;

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provided that nothing in this Clause 31.3 shall confer on either Party rights or remedies that they would not otherwise have.

31.4 Subject to Clause 31.3.1, neither party shall be entitled to claim damages for breach of this Agreement, in delict (including negligence), breach of statutory duty or on any other basis whatsoever to the extent that such damages claimed by that Party are for Indirect Losses suffered by that Party provided that for the avoidance of doubt, nothing in this Clause 31.4 shall affect either Party's liability to the other Party, whether under any indemnity, under Clause 30.6 or otherwise, in respect of any claim, action, proceedings or demand against such other Party by a third party in connection with Indirect Loss suffered.

31.5 The Operator shall not be relieved or excused of any responsibility, liability or obligation under this Agreement by the appointment of any Operator Party. The Operator shall, as between itself and **tie**, be responsible for the selection, pricing, performance, acts, defaults, omissions, breaches, delict and offences of all the Operator Parties. All references in this Agreement to any act, default, omission, breach, delict or offence of the Operator shall be construed to include any such act, default, omission, breach or delict of any Operator Party.

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PART VI - TERMINATION

32. TERMINATION DURING DEVELOPMENT PHASE

32.1 During Project Phase A, Project Phase B and Project Phase C1 in respect of any Phase, **tie** may terminate this Agreement, either:

32.1.1 in whole, if no Phase has reached Project Phase C2 or Project Phase D at the time of such termination; or

32.1.2 in part, for such Phases where project development is still in Project Phase A, Project Phase B or Project Phase C1;

such termination to be by way of **tie** providing at least 30 days notice in writing to the Operator at any time.

32.2 During Project Phase A and Project Phase B in respect of Line 1 or Line 2 or Phase (as appropriate), **tie** may terminate this Agreement in whole or in part, if there is a material increase or alteration to the costs of the Project or the liabilities and risks to **tie** beyond those which **tie** considers (i) can be managed within Affordability Limits or (ii) are reasonable and prudent to retain, such termination to be by way of **tie** providing at least 30 days notice in writing to the Operator at any time.

32.3 If **tie** serves notice to terminate this Agreement in respect of one or more Phases ("**Terminated Phases**") pursuant to Clause 32.1.2, and **tie** chooses to continue development of any of such Terminated Phases, either by itself or in conjunction with any third party, **tie** shall discuss with the Operator in good faith, at the stage of development of such Terminated Phase equivalent to Project Phase B:

32.3.1 the Target Costs for Project Phase C2 for such Terminated Phase;

32.3.2 the Interim Target Operating Costs, Interim Fixed Costs and the Interim Target Patronage for the System including such Terminated Phase (if it is proposed that there be a time interval between the Service Commencement Date and the Full Service Commencement Date for such Terminated Phase);

32.3.3 the Target Operating Costs, any adjustments to the Fixed Costs (excluding the Category Five Fixed Costs) and the Target Patronage for the System including such Terminated Phase;

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32.3.4 amendments to the Operating Output Specification, the Operating Method Statements (and the Operating Appendix to the extent necessary) to take effect from the Service Commencement Date of such Terminated Phase; and

32.3.5 any other aspect of the terms of this Agreement to be amended to reflect the Operator's rights and obligations in respect of such Terminated Phase (or the System including such Terminated Phase);

on the basis that the Operator should be in a No Better and No Worse position following the implementation and Service Commencement of the Terminated Phase provided that **tie** shall not be liable to pay the Operator any sum which the Operator has included in its Profit Element with respect to such Terminated Phase.

32.4 If **tie** and the Operator are unable to agree on the matters referred to in Clause 32.3, then the termination rights in Clause 32.5 will apply.

32.5 Notwithstanding that one or more Lines may be in Project Phase C2 or Project Phase D, if **tie** and the Operator are unable to agree:

32.5.1 the Fixed Costs and/or the Target Costs for Project Phase C2 for any proposed new Line or Network Expansion;

32.5.2 Interim Target Operating Costs, Interim Fixed Costs and Interim Target Patronage for the System including any proposed new Line or Network Expansion;

32.5.3 the Target Patronage and Target Operating Costs and/or Fixed Costs for Project Phase D for the System including any proposed new Line or Network Expansion;

32.5.4 amendments to the Operating Output Specification, the Operating Method Statements (and the Operating Appendix to the extent necessary) to take effect from the Service Commencement Date of any proposed new Line or Network Expansion; or

32.5.5 any other aspect of the contractual terms to apply in respect of Project Phase C2 or Project Phase D in respect of such Line or Network Expansion (or the System including such proposed new Line)

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then **tie** shall be entitled to serve notice on the Operator to terminate this Agreement as a whole, such notice to take effect:

(a) at the commencement of Project Phase C2 for such proposed new Line; or

(b) at such other time as **tie** may specify prior to the expiry of the Term, being not less than 30 days after the date of the notice.

32.6 In the event that in **tie**'s opinion delay in completion of Project Phase C2 for any Phase (irrespective of the reason) indicates that there is no reasonable prospect of Project Phase D commencing within six months of the Planned Service Commencement Date, **tie** shall be entitled to terminate this Agreement in respect of such Phase by serving notice which shall take effect after 30 days.

33. TERMINATION ON TIE DEFAULT OR AT OPERATOR OPTION

33.1 If a **tie** Default has occurred and the Operator wishes to terminate this Agreement, the Operator must serve a Termination Notice on **tie** within 30 days of becoming aware of the **tie** Default. Failure to do so shall be a waiver of the right to terminate.

33.2 The Operator shall specify in the Termination Notice the type of **tie** Default which has occurred entitling the Operator to terminate.

33.3 Provided the Operator has complied with Clauses 33.1 and 33.2, this Agreement will terminate on the day falling 60 days after the date on which **tie** receives the Termination Notice, unless **tie** rectifies the **tie** Default within 45 days of receipt of the Termination Notice.

33.4 The Operator shall not be entitled to, and shall not purport to, terminate this Agreement or accept any repudiation of this Agreement, except as expressly provided in this Clause 33 (*Termination on **tie** Default or at Operator Option*).

34. PERSISTENT BREACH

34.1 If a breach by the Operator of any of its obligations under this Agreement has occurred more than once then **tie** may serve a notice (**"Persistent Breach Notice"**) on the Operator:

34.1.1 specifying that it is a Persistent Breach Notice;

34.1.2 giving reasonable details of the breach; and

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34.1.3 stating that such breach is a breach which, if it recurs frequently or continues, may result in a termination of this Agreement.

34.2 If, following service of such a Persistent Breach Notice, the breach specified has continued or occurred more than once after the date falling 30 days after the date of service of the Persistent Breach Notice and before the date falling 365 days after the date of service of such notice, then **tie** may serve another notice (**"Final Persistent Breach Notice"**) on the Operator:

34.2.1 specifying that it is a Final Persistent Breach Notice;

34.2.2 stating that the breach specified has been the subject of a prior Persistent Breach Notice within the period of 365 days prior to the date of service of the Final Persistent Breach Notice; and

34.2.3 stating that if such failure is not remedied within 7 days or is remedied and occurs once or more within the 180 day period after the date of service of the Final Persistent Breach Notice, this Agreement may be terminated.

35. TERMINATION ON OPERATOR DEFAULT

35.1 If an Operator Default has occurred and **tie** wishes to terminate this Agreement, it must serve a Termination Notice on the Operator.

35.2 Such Termination Notice must specify:

35.2.1 the type and nature of Operator Default that has occurred, giving reasonable details; and

35.2.2 that this Agreement will terminate on the day falling 60 days after the date on which the Operator receives the Termination Notice, unless, if (in the opinion of **tie**) the Operator Default is remediable, and the Operator puts forward a rectification programme acceptable to **tie** within 30 days or rectifies the Operator Default no later than 15 days before the 60 days above elapses.

35.3 If the Operator either rectifies the Operator Default (if remediable) within the time period specified in such Termination Notice or implements in accordance with its terms, the rectification programme approved in writing by **tie**, the Termination Notice will be deemed to be revoked and this Agreement will continue.

35.4 If the Operator fails to rectify the Operator Default within the time period specified in such Termination Notice, this Agreement will terminate on the date falling 60 days after the date of service of the Termination Notice pursuant to Clause 35.1.

35.5 If the Operator fails to implement, in accordance with its terms, any rectification programme approved in writing by **tie**, this Agreement will terminate on the date of such failure.

35.6 The Operator shall reimburse **tie** for all reasonable costs incurred by **tie** in exercising any of its rights under this Clause 35 (*Termination on Operator Default*) (including any relevant increased administrative expenses), and, for the avoidance of doubt, any such costs reimbursed shall be excluded from the calculation of Operating Costs for the purposes of any calculation pursuant to Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) to the Operating Appendix.

35.7 **tie** shall not exercise, or purport to exercise, any right to terminate this Agreement except as expressly set out in this Agreement. The rights of **tie** (to terminate or otherwise) under this Clause 35 (*Termination on Operator Default*) are in addition (and without prejudice) to any other right which **tie** may have to claim the amount of loss or damage suffered by **tie** on account of the acts or omissions of the Operator (or to take any action, including seeking an order for specific implement, other than termination of this Agreement).

35.8 The Operator shall immediately notify **tie** of

35.8.1 any resolution or decision by the board of directors of the Operator or a decision by any director of the Operator to seek legal or financial advice pertaining to the solvency of the Operator; and

35.8.2 any presentation of any petition for the purpose of winding up the Operator or any petition for an administration order.

36. TERMINATION BY REASON OF FORCE MAJEURE

36.1 Neither Party shall be entitled to bring a claim for a breach of obligations under this Agreement by the other Party or incur any liability to the other Party for any losses or damages incurred by that other Party or create grounds for termination of the whole or a part of this Agreement (save in so far as expressly provided by Clause 36.5) to the extent that a Force Majeure Event occurs and such party is directly prevented from

carrying out such obligations by that Force Majeure Event or the direct consequences thereof.

36.2 If a Force Majeure Event occurs as described in Clause 36.1 the Operator shall be relieved from deductions under the KPI Regime to the extent that the Force Majeure Event or the direct consequences thereof adversely affect the performance by the Operator of its obligations under this Agreement and the parties shall in good faith seek to agree equitable adjustments of a permanent or temporary nature to the Payment Mechanism and provisions regarding Target Costs for Project Phase C2 or Target Operating Costs or Fixed Costs (excluding the Category Five Fixed Costs) or Target Patronage to the extent that the Force Majeure Event or the direct consequences thereof adversely affect the performance by the Operator of its obligations under this Agreement .

36.3 On the occurrence of a Force Majeure Event, the Affected Party shall notify the other Party as soon as reasonably practicable, specifying details of the Force Majeure Event and providing evidence of its effect on the obligations of the Affected Party and any action proposed to remove or mitigate its effect.

36.4 The Parties shall at all times following the occurrence of a Force Majeure Event use all reasonable endeavours to prevent and mitigate the effects of any delay to the Project or interruption of Transport Services and the Operator shall at all times during which a Force Majeure Event is subsisting take all steps in accordance with Good Industry Practice to overcome or minimise the consequences of the Force Majeure Event. **tie** shall continue to meet the Project Development Costs and/or the Operating Costs (adjusted to take account of any disrupted, extended or restricted Project Operations) for the System for a period of 30 days following notification of a Force Majeure Event or such longer period as **tie** may agree.

36.5 If the terms or measures to remove the effect of the Force Majeure Event cannot be agreed on or before the date falling 30 days after the date of the commencement of the Force Majeure Event or by the end of such longer period as **tie** may have agreed in accordance with Clause 36.4 or otherwise, or such Force Majeure Event is continuing or its consequence remains such that the Affected Party is unable to comply with all or a material part of its obligations under this Agreement for a period of more than 30 days after the date of the commencement of the Force Majeure Event or by the end of such longer period as **tie** may have agreed in accordance with Clause 36.4 or

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otherwise , either Party shall have the option to terminate this Agreement by written notice to the other.

36.6 The Affected Party shall notify the other Party as soon as reasonably practicable after the Force Majeure Event ceases and/or no longer causes the Affected Party to be unable to comply with its obligations under this Agreement. Following such notification, unless otherwise agreed by **tie,** this Agreement shall continue to be performed on the terms existing immediately prior to the occurrence of the Force Majeure Event.

37. TERMINATION FOR CORRUPT GIFTS AND FRAUD

37.1 If the Operator, or any Operator Party or any of their respective representatives, or Affiliates or professional advisers or employees or anyone acting on behalf of any of them, commits any Prohibited Act, then **tie** shall be entitled to act in accordance with Clauses 37.2 to 37.7.

37.2 If a Prohibited Act is committed by the Operator or by an employee of the Operator or any Affiliate not acting independently of the Operator, then **tie** may terminate this Agreement by giving notice to the Operator.

37.3 If a Prohibited Act is committed by an employee of the Operator acting independently of the Operator, then **tie** may give notice to the Operator of termination and this Agreement will terminate, unless within 30 days of receipt of such notice the Operator terminates the employee's employment and (if necessary) procures the performance of the relevant part of the Project Operations or the Project Development Services by another person.

37.4 If a Prohibited Act is committed by an Operator Party not acting independently of the Operator, then **tie** may give notice to the Operator of termination and this Agreement will terminate, unless within 30 days of receipt of such notice the Operator terminates the relevant Operator Party and procures the performance of the relevant part of the Project Operations or the Project Development Services by another person.

37.5 If a Prohibited Act is committed by an Operator Party acting independently of the Operator, then **tie** may give notice to the Operator of termination and this Agreement will terminate, unless within 30 days of receipt of such notice the Operator terminates the Operator Party's employment and (if necessary) procures the performance of the

relevant part of the Project Operations or the Project Development Services by another person.

37.6 If a Prohibited Act is committed by any other person specified in Clause 37.1 but not specified in Clauses 37.2 to 37.4, then **tie** may give notice to the Operator of termination and this Agreement will terminate unless within 30 days of receipt of such notice, the Operator procures the termination of such person's employment and of the appointment of their employer in relation to the Project (where not employed by the Operator or an Operator Party) and (if necessary) procures the performance of the relevant part of the Project Operations or Project Development Services by another person.

37.7 Any notice of termination under this Clause 37 (*Termination for Corrupt Gifts and Fraud*) shall specify:

37.7.1 the nature of the Prohibited Act;

37.7.2 the identity of the person whom **tie** believe has committed the Prohibited Act; and

37.7.3 the date on which this Agreement will terminate, in accordance with the applicable provision of this Clause 37 (*Termination for Corrupt Gifts and Fraud*).

38. VOLUNTARY TERMINATION BY TIE

38.1 **tie** may terminate this Agreement upon 60 days written notice to the Operator and without liability for any termination payment (but without prejudice to the provisions of Clause 40 (*Compensation on Termination*)) at the following stages of the Project:

38.1.1 except in the first three years of operation following the issue of the first Certificate of Service Commencement, at any other time during the Service Period if there is an Operating Deficit in 6 Reporting Periods out of any rolling period of 12 months;

38.1.2 during Project Phase D, notwithstanding any referral to or decision in terms of the Dispute Resolution Procedure, in the event that the Parties are unable to agree adjustments to the Fixed Costs, Target Operating Costs and Target Patronage or other elements of Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) of the Operating Appendix sought by **tie**

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following reset carried out pursuant to Clause 21 (*Reset of the Fixed Costs, the Target Operating Costs and the Target Patronage)* of the Operating Appendix.

38.2 This Agreement will terminate on the date falling 60 days after the date of service of the notice referred to in Clause 38.1.

39. EXPIRY

39.1 Subject to Clause 2 (*Term of Agreement*), this Agreement shall terminate automatically on the expiry of the Term unless it shall have been terminated earlier in accordance with the provisions of this Agreement. The Operator shall not be entitled to any compensation for termination of this Agreement on expiry of the Term and shall make arrangements for the orderly transfer and release to **tie** or its designated agent of all assets, rights and benefits used for the Project Operations by the Operator so as to safeguard efficient and continuous provision of the Transport Services during transition.

40. COMPENSATION ON TERMINATION

40.1 No compensation shall be payable by **tie** to the Operator for termination of this Agreement whether under contract, delict (including negligence), breach of (or compliance with) statutory duty, restitution or otherwise but without prejudice to:

40.1.1 any antecedent liability of **tie** that arose prior to the Termination Date (but not from the termination itself except if pursuant to Clause 33 (*Termination on **tie** Default or at Operator Option*);

40.1.2 any liability arising in respect of any breach by **tie** of its obligations under Clause 41 (*Effect of Termination*) which arises or continues after the Termination Date; or

40.1.3 payment by **tie** to the Operator of any demobilisation costs which have been demonstrably and reasonably incurred by the Operator in the event of a termination in respect of:

(a) failure to agree Network Expansion pursuant to Clause 11.5;

(b) Uninsurable Risk occurring pursuant to Clause 28.4;

(c) Clauses 32.1, 32.2, 32.4 or 32.5;

(d) **tie** Default pursuant to Clause 33 *(Termination on tie Default or at Operator option);* or

(e) voluntary termination pursuant to Clause 38 *(Voluntary Termination by tie).*

The Operator shall use all reasonable endeavours to minimise and mitigate any such demobilisation costs and **tie** shall not be liable to pay the Operator for such demobilisation costs to the extent that the Operator has failed to minimise or mitigate such demobilisation costs or to the extent that such demobilisation costs have arisen out of the Operator's breach of this Agreement or any negligent act or omission by the Operator.

40.2 Subject to Clause 40.1, the Operator shall not have any other right or remedy against **tie** on termination or expiry of this Agreement.

41. EFFECT OF TERMINATION

41.1 Notwithstanding any provision of this Agreement, on service of a Termination Notice, this Agreement shall only terminate in accordance with the provisions of this Clause 41 (*Effect of Termination*).

41.2 Subject to any exercise by **tie** of its rights to perform, or to procure a third party to perform, the obligations of the Operator, the Parties shall continue to perform their obligations under this Agreement, notwithstanding the giving of any notice of default or breach or Termination Notice, until the termination of this Agreement becomes effective.

41.3 To the extent that the termination of this Agreement occurs during Project Phase C2 or Project Phase D, the provisions of Clause 28 (*Transition on termination or expiry*) of the Operating Appendix shall apply.

41.4 To the extent that the termination of this Agreement occurs during Project Phase A, Project Phase B, or Project Phase C1, the provisions of Clause 28 (*Transition on termination or expiry*) of the Operating Appendix shall apply to the extent relevant.

41.5 Within 60 days of termination of this Agreement, **tie** shall pay to the Operator:

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41.5.1 any undisputed sums due from **tie** to the Operator pursuant to Clause 16 (*Project Development Costs*), Clause 18 (*Payment During Project Phase* C2) and/or Schedule 3 *(Project Phase D Payment Mechanism and KPI Regime)* of the Operating Appendix subject to any appropriate pain/gain share reconciliation; and

41.5.2 any entitlement to demobilisation costs pursuant to Clause 40.1.3.

41.6 Within 60 days of termination of this Agreement, the Operator shall pay to **tie** any sums due from the Operator to **tie** pursuant to this Agreement including any sum due to **tie** following any appropriate pain/gain share reconciliation or any sums due pursuant to Clause 35.6.

41.7 Either Party may refer any Dispute about disputed sums pursuant to Clause 16 (*Project Development Costs*), Clause 18 (*Payment during Project Phase C2*) and/or Schedule 3 *(Project Phase D Payment Mechanism and KPI Regime)*of the Operating Appendix to the Dispute Resolution Procedure. If it is determined pursuant to the Dispute Resolution Procedure that the whole or part of any disputed amount is due to either **tie** or the Operator, **tie** or the Operator (as appropriate) shall raise an invoice in respect of such determined amount and payment shall be made by the relevant Party within 60 days of the receipt of such invoice.

41.8 The following Clauses shall survive termination of this Agreement:

41.8.1 Clauses 1 (*Definitions and Interpretation*), 8 (*Operator's Performance Security*), 20 (*Method and Currency of Payment*), 21 (*Interest*), 22 (*Set-off*), 23 (*VAT*), 24 (*Taxation*), 25 (*Mitigation and Cost Management*), 27 (*Insurances*), 29 (*Indemnity*), 30 (*Conduct of Claims*), 31 (*Liability and Sole Remedy*), 39 *(Expiry)*, 40 (*Compensation on termination or expiry*) and Clauses 41 (*Effect of termination*) to 60 (*Maladministration Complaints*) inclusive and Schedule 7 (*Dispute Resolution Procedure*), and such other provisions as are expressed to survive termination of this Agreement; and

41.8.2 in the Operating Appendix, Clause 28 (*Transition on Termination or Expiry*), and such other provisions as are expressed to survive termination of this Agreement.

41.8.3 For the avoidance of doubt, upon expiry of the Term or any termination of this Agreement (for whatever cause) any accrued rights or obligations to

which **tie** may be entitled or be subject to before such date shall remain in full force and effect.

42. PERSONNEL ISSUES ON TERMINATION

42.1 In the event that TUPE and/or the Acquired Rights Directive or any other Legislation governing the rights and obligations of employees or their employers or any person to whom they are to transfer their employment applies or will apply on the Expiry Date or the Termination Date such that the contracts of employment of the Project Operations Staff and or/ Project Development Staff engaged at such date (**"Transferring Project Staff"**), or any of them, shall be transferred from the Operator or a relevant Operator Party to **tie** or a Successor Operator to perform some or all of the Project Development Services or Project Operations or any activities equivalent to a relevant part of the Project Operations, the provisions of Clauses 42.2 to 42.9 shall apply.

42.2 The Parties shall comply with their respective obligations under TUPE and the Acquired Rights Directive or as otherwise may be required by Law in respect of the transfer of the Transferring Project Staff on the Expiry Date or Termination Date (as the case may be) (**"Transfer Date"**).

42.3 The Operator shall (and shall procure that each relevant Operator Party shall) indemnify **tie** and keep **tie** indemnified on demand at all times from and against all Employment Liabilities which **tie** may suffer or incur which relate to or arise in respect of (whether directly or indirectly):

42.3.1 any Transferring Project Staff in respect of or in any way relating to any period up to and including the Transfer Date; and

42.3.2 any person employed or engaged, or formerly employed or engaged, by the Operator or any Operator Party (other than any Transferring Project Staff) for which it may be alleged that **tie** are liable by virtue of the operation of this Agreement and/or TUPE and/or the Acquired Rights Directive.

42.4 The Operator shall (and shall procure that each relevant Operator Party shall) indemnify the Successor Operator and keep the Successor Operator indemnified on demand at all times from and against all Employment Liabilities which the Successor Operator may suffer or incur which relate to or arise in respect of (whether directly or indirectly):

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42.4.1 any Transferring Project Staff in respect of or in any way relating to any period up to and including the Transfer Date; and

42.4.2 any person employed or engaged, or formerly employed or engaged, by the Operator or any Operator Party (other than any Transferring Project Staff) for which it may be alleged that the Successor Operator is liable by virtue of the operation of this Agreement and/or TUPE and/or the Acquired Rights Directive.

42.5 The Parties acknowledge that it is their intention that the benefit of Clauses 42.4, 42.7, 42.8, 42.9, and 42.10 (inclusive) shall be assigned to the Successor Operator at the absolute discretion of **tie** and the Operator shall do, and agrees to procure that each relevant Operator Party shall do, all acts and things that **tie** deems reasonably necessary to give effect to such assignment including execution of all documents required.

42.6 tie shall procure that the Successor Operator shall assume the outstanding obligations of the Operator and/or each relevant Operator Party in respect of the untaken holiday entitlements and unpaid holiday remuneration of the Transferring Project Staff accrued up to the Transfer Date and, in consideration, the Operator shall pay, or shall procure that each relevant Operator Party shall pay, to the Successor Operator within 30 days of the Transfer Date (as the case may be), the full amount necessary to enable the Successor Operator to meet the costs of providing such accrued holiday entitlements and remuneration as at Transfer Date.

42.7 The Operator shall, and the Operator shall procure that each relevant Operator Party shall, prior to the transfer of the employment of any Transferring Project Staff pursuant to TUPE and the Acquired Rights Directive, comply with all of their respective obligations to inform and consult with appropriate representatives (as such term is defined in regulation 13 of TUPE) of affected Project Operations Staff and Project Development Staff and shall carry out such provision of information to, or consultation with, such representatives as is required of them by Law.

42.8 The Operator shall, and the Operator shall procure that each relevant Operator Party shall, prior to the transfer of the employment of any Transferring Project Staff pursuant to TUPE and the Acquired Rights Directive, comply with their obligations to provide Employee Liability Information (as such term is defined in Regulation 11 of TUPE and in terms of the timescale referred to in that regulation) in respect of

Transferring Project Staff and carry out the provision of information until the Termination Date or Expiry Date as appropriate.

42.9 The Operator shall, and the Operator shall procure that each relevant Operator Party shall, indemnify and keep **tie** and the Successor Operator indemnified on demand at all times in respect of all Employment Liabilities arising out of any failure of the Operator and/or any Operator Party to comply fully with their respective obligations pursuant to Clause 42.7, save where, and to the extent only that, failure to do so is attributable to the default or failure on the part of **tie** or a Successor Operator to provide relevant information to the Operator or the relevant Operator Party (as the case may be) as is required of **tie** or the Successor Operator by Law.

42.10 Following the service of a Termination Notice or at any time in the 365 days before the Expiry Date, the Operator shall not, and shall procure that each Operator Party shall not, without the prior written consent of **tie** (which consent shall not be unreasonably withheld or delayed), carry out any of the following:

42.10.1 the termination of the employment or engagement of any Project Operations Staff or Project Development Staff;

42.10.2 the alteration or change (or the making of any promise to alter or change) in any way any terms and conditions of employment, or terms of engagement, of any Project Operations Staff or Project Development Staff (whether with or without the consent of any such Project Operations Staff or Project Development Staff (as appropriate)) other than in order to give effect to wage or salary awards which are in line with those offered generally for similar status individuals within the relevant employer's workforce or as is required by Law;

42.10.3 the recruitment of any employees, self-employed consultants or other personnel to perform any of the Project Operations or Project Development Services (except as a replacement for any Project Operations Staff or Project Development Staff whose employment is terminated and where the replacement is recruited on terms which are not materially better than the terms of the Project Operations Staff or Project Development Staff member being replaced); and

42.10.4 the re-assignment of any of the Project Operations Staff or Project Development Staff to or from duties connected with the Project Operations or the Project Development Services.

42.11 Following the service of a Termination Notice or at any time in the 730 days before the Expiry Date, within 30 days of a written request from **tie**, the Operator shall, or the Operator shall procure that each Operator Party shall, provide to **tie** such information concerning the Project Operations Staff and Project Development Staff as **tie** shall reasonably stipulate (**"Staffing Information"**) including:

42.11.1 the number of Project Operations Staff and Project Development Staff;

42.11.2 their status as employees, self-employment contractors, agency workers or otherwise;

42.11.3 dates of commencement of employment or engagement and gender;

42.11.4 their relevant contractual notice periods and any other terms relating to termination of employment, including redundancy procedures and contractual redundancy payment schemes;

42.11.5 the wages, salaries, profit sharing, incentive and bonus arrangements applicable to them;

42.11.6 details of other employment related benefits, including (without limitation) medical insurance, life assurance, pension or other retirement benefit schemes, share option schemes and company car schemes applicable to them;

42.11.7 any outstanding or potential contractual, statutory or other liabilities in respect of such individuals (including in respect of personal injury claims);

42.11.8 details of any such individuals on long-term sickness absence, maternity or parental leave; and

42.11.9 copies of all relevant documents and materials relating to such information, including copies of relevant contracts of employment.

42.12 The Operator expressly consents, and shall procure that each Operator Party and all Project Operations Staff and Project Development Staff shall consent, to any Staffing Information being provided to third parties, including a Successor Operator or any prospective Successor Operator, subject to such third party agreeing to respect the

confidentiality of the Staffing Information, and only to use such Staffing Information for the purposes for which it was provided.

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PART VII - MISCELLANEOUS PROVISIONS

43. DISPUTE RESOLUTION PROCEDURE

The Parties agree that Schedule 7 (*Dispute Resolution Procedure*) shall have effect for the resolution of any differences or disputes between the Parties arising under, out of or in relation to, this Agreement, save for matters expressly reserved to some other jurisdiction pursuant to any provision of the Tram Legislation.

44. ASSIGNATION, SUB-CONTRACTING AND CHANGES IN CONTROL

44.1 The Operator shall not, without the prior written consent of **tie**,

44.1.1 assign, transfer or otherwise dispose of any interest in, or right or obligation under, this Agreement; or

44.1.2 sub-contract any of its obligations under this Agreement without the prior written consent of **tie** (such consent not to be unreasonably withheld or delayed).

44.2 **tie** shall not assign, novate or otherwise dispose of any interest in, or rights or obligations under this Agreement in whole or in part to any person, save:

44.2.1 to the relevant Scottish Minister, TEL, Transport Scotland or CEC or to any local authority or other public body where such local authority or other public body has no worse financial standing than that of **tie** and who, as a result of any Change in Law, such local authority or other public body has taken over all or substantially all the functions of **tie**; or

44.2.2 to any other person whose obligations under this Agreement are unconditionally and irrevocably guaranteed (in a form reasonably acceptable to the Operator) by **tie** or a person falling within Clause 44.2.1; or

44.2.3 with the prior written consent of the Operator (such consent not to be unreasonably withheld or delayed).

44.3 Subject to Clause 44.4 prior to the expiry of thirty six (36) months following the Service Commencement Date for the first Phase to become operational, the Operator shall procure that no Change of Control of the Operator (or any company of which the Operator is a subsidiary) shall take place without the prior written approval of **tie**.

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44.4 If applicable, Clause 44.3 shall not apply to a Change of Control resulting from the sale of any shares in the Operator held by any Third Party Shareholder.

44.5 The Operator shall inform the **tie** Project Manager as soon as reasonably practicable and, in any event, within five Business Days of any Change of Control of the Operator.

45. SECURITY INTERESTS

45.1 The Operator shall not create or agree to create any Security Interest over the System or any part of the System or over this Agreement.

45.2 The Operator shall not dispose of any right in respect of or interest in any asset used in the Project Operations or relating to the System if to do so would have a material adverse effect upon either the Project or the position of **tie** under this Agreement, whether or not this Agreement has terminated or expired provided always that restrictions in this Clause shall not apply in the case of:

45.2.1 disposals of redundant or obsolete assets not required for the operation of the System; or

45.2.2 disposals of property or assets where such property or assets are replaced by other property or assets comparable or superior as to type and function.

46. INFORMATION AND CONFIDENTIALITY

46.1 The Parties shall keep confidential all matters relating to this Agreement and the Project and, save as provided in Clause 46.3, shall not disclose any such matters to any third parties.

46.2 Each Party shall use all reasonable endeavours to procure that their respective employees and any other person to whom they disclose information pursuant to Clauses 46.3.1, 46.3.3, 46.3.6 and 46.3.7 shall comply with this Clause 46 (*Information and Confidentiality*) as if they were parties to this Agreement.

46.3 Clause 46.1 shall not apply to:

46.3.1 any disclosure of information that is reasonably required by the Parties in order to carry out the Project Development Objectives and perform their obligations and exercise their rights under this Agreement;

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46.3.2 any matter which a Party can demonstrate is already generally available and in the public domain otherwise than as a result of a breach of this Clause 46 (*Information and Confidentiality*);

46.3.3 disclosure to enable a determination to be made under the Dispute Resolution Procedure, subject always to that disclosure being restricted to parties directly involved in the process ;

46.3.4 any disclosure which is required by any Law, any parliamentary obligation or the rules of any stock exchange or governmental or regulatory authority having the force of law;

46.3.5 any disclosure of information which is already lawfully in the possession of the receiving party, prior to its disclosure by the disclosing party;

46.3.6 any provision of information to the professional advisers or insurance advisers of either Party;

46.3.7 where it is proposed that a person should or may provide funds (whether directly or indirectly and whether by loan, equity participation or otherwise) to the Operator to enable it to carry out its obligations under the Agreement, any provision of information to that person but only to the extent reasonably necessary to enable a decision to be taken on the proposal;

46.3.8 any disclosure by **tie** of information relating to the design, construction, operation and maintenance of the System and such other information as may be reasonably required for the purpose of conducting a due diligence exercise to any proposed Successor Operator, its advisers, should **tie** decide to retender the Project Operations or any part of them;

46.3.9 any registration of information in respect of the Necessary Consents and any property registration required;

46.3.10 any disclosure of information by **tie** to CEC, Partnerships UK Limited, any department, office or agency of the Scottish Executive or the UK government;

46.3.11 any disclosure by **tie** of any document related to this Agreement and which the Operator has agreed with **tie** contains no Commercially Sensitive Information (such agreement not to be unreasonably withheld or delayed);

46.3.12 any disclosure for the purpose of:

46.3.12.1 the examination and certification of **tie**'s or the Operator's accounts; or

46.3.12.2 any examination (pursuant to applicable Law) of the economy, efficiency and effectiveness with which **tie** has used their resources or funding made available for the Project; and

46.3.13 any disclosure by **tie** of any information (except for information which has been designated as Commercially Sensitive Information) as may be reasonably required for the purpose of appointing and working with any Infrastructure Provider;

46.4 Any public relations material, press releases, public presentations or conference engagements in relation to the Project planned by the Operator require **tie**'s prior written approval during the Term.

47. INTELLECTUAL PROPERTY RIGHTS

47.1 All Operator IPR shall continue to be owned by the Operator.

47.2 The Operator hereby:

47.2.1 assigns by way of future assignment to **tie** with full title guarantee the Project IPR which is created by it and shall procure that Project IPR created by any Operator Party is also so assigned, for all the residue of the term of such rights and all renewals or extensions thereof and together with all accrued causes of action in respect thereof;

47.2.2 grants to **tie** a non-exclusive perpetual irrevocable royalty free licence to use such Operator IPR as may be necessary for **tie** to use solely in relation to the Project and any Network Expansion and for no other purpose;

47.2.3 grants to **tie** the right to grant non-exclusive non-assignable sub-licences to third party contractors for such lengths of time as **tie** may reasonably require and otherwise on the same terms as the licence granted to **tie** pursuant to Clause 47.2.2 above, to use the Operator IPR referred to in that Clause in so far as is necessary or desirable for such third party contractor to use such

Operator IPR solely in relation to work connected with the Project and any Network Expansion.

47.3 For the avoidance of doubt, the persons to whom **tie** may grant sub-licences pursuant to Clause 47.2.3 above shall include:

47.3.1 any Infrastructure Provider and its contractors for purposes connected with the performance of any Infrastructure Delivery Agreement;

47.3.2 any party other than the Operator providing support to **tie** in relation to the development of any Network Expansion;

47.3.3 any party other than the Operator engaged in the provision of Transport Services on the System; and

47.3.4 any assignee or transferee under this Agreement.

47.4 **tie** hereby:

47.4.1 grants to the Operator a non-exclusive revocable royalty free licence for the Term to use such Project IPR as is owned by it as may be necessary for the Operator to use solely and exclusively for the purpose of meeting its obligations under this Agreement (including the Operating Appendix and for no other purpose); and

47.4.2 grants to the Operator the right to grant non-exclusive non-assignable sub-licences to the Operator Parties on the same terms as the licence granted to the Operator pursuant to Clause 47.4.1 above to use the Project IPR referred to in that Clause in so far as is necessary or desirable for such Operator Parties to use such Project IPR, solely and exclusively for the purpose of performing their obligations in relation to the Project.

47.5 The Operator shall at any time and from time to time hereafter at the request of **tie** execute all such documents and do all such further acts as may be required in order to vest the rights referred to in Clause 47.2.1 in **tie**.

47.6 The Operator waives any and all moral rights held or to be held by the Operator in the Project Data and the Project IPR and shall procure that all of the Operator Parties who are authors of the whole or any part of the Project Data or the Project IPR waive and abandon in writing all moral rights.

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47.7 The Operator agrees that all rights in the Project IPR shall remain the property of **tie** and the Operator shall retain no rights in the Project IPR beyond the licence granted in Clause 47.4.1 above. The Operator shall be entitled to use such Project IPR only on the terms set out herein and solely for the purpose of the Project. In particular, otherwise as permitted in this Agreement herein, the Operator shall not (and shall procure that its sub-licensees pursuant to Clause 47.4.2 shall not) disclose, assign, sub-licence, lease, rent or otherwise dispose of the Project IPR.

47.8 To the extent that any of the Project Data are generated by or maintained on a computer or similar system, the Operator shall use all reasonable endeavours to procure for the benefit of **tie**, at no charge or at the lowest reasonable fee, the grant of a licence or sub-licence for any relevant Third Party Software on the same terms as the Operator Software is licensed to **tie**, to enable **tie** or its nominee to access and otherwise use (subject to the payment by **tie** of the relevant fee, if any) such Project Data in connection with the Project. As an alternative, the Operator may provide such Project Data in a format which may be read by software generally available at reasonable prices in the market at the relevant time or in hard copy format.

47.9 The Operator shall, within thirty (30) days of any upgrade or update to the Operator Software and/or Specially Written Software and/or Third Party Software, for the Term:

47.9.1 deposit a copy of the Operator Software and/or Specially Written Software with the Escrow Agent under the terms and conditions of the Escrow Agreement; and

47.9.2 use all reasonable endeavours to procure the deposit of a copy of all the Third Party Software with the Escrow Agent and under the terms and conditions of the Escrow Agreement, or with another person under terms that are materially the same as the Escrow Agreement, and in either case for the benefit of **tie**.

47.10 The Operator shall comply with the terms of the Escrow Agreement, or any other like agreement in respect of the Third Party Software under Clause 47.9.2 for the duration of this Agreement.

47.11 Any costs relating to the Escrow Agreement, including any costs relating to the registration of any Operator Software, Specially Written Software and Third Party Software, and any renewal costs charged from time to time by the Escrow Agent, shall be the sole responsibility of the Operator.

47.12 The Operator shall ensure the back-up and storage in safe custody of the Project Data in accordance with Good Industry Practice. Without prejudice to this obligation, the Operator shall submit to the **tie** Project Manager for approval its proposals for the back-up and storage in safe custody of the Project Data and **tie** shall be entitled to object if the same is not in accordance with Good Industry Practice. The Operator shall comply, and shall cause all the Operator Parties to comply, with all such proposals to which the **tie** Project Manager has given his or her approval. The Operator may vary its procedures for such back-up and storage subject to submitting its proposals for change to the **tie** Project Manager, who shall be entitled to object on the basis set out above.

47.13 Where a claim or proceeding is made or brought against **tie** or its permitted licensees which arises out of the infringement of any Intellectual Property Rights in any Project Data or other materials provided by the Operator or any Operator Party to **tie** then, unless such infringement has arisen out of the use of any Intellectual Property Rights by **tie** in breach of this Agreement, the Operator shall indemnify and keep **tie** indemnified on demand at all times from and against all Indemnified Liabilities arising in connection with such claim or proceedings.

47.14 For the purposes of this Clause 47 (*Intellectual Property Rights*), "use" shall include the acts of copying, modifying, adapting and translating the material in question and/or incorporating them with other materials and the term "the right to use" shall be construed accordingly.

47.15 The provisions of this Clause 47 (*Intellectual Property Rights*) shall apply during the continuance of this Agreement and after its termination howsoever arising, and immediately following termination howsoever arising, the Operator shall provide **tie** with:

47.15.1 a copy of the object code for the Third Party Software and the Operator Software on media that is reasonably acceptable to **tie**;

47.15.2 a copy of the source code for the Specially Written Software on media that is reasonably acceptable to **tie**; and

47.15.3 a copy of all documentation, manuals and other technical information relating to the Third Party Software, the Specially Written Software and the Operator Software that is reasonably required by **tie** to operate, manage and support the

Third Party Software, the Specially Written Software and the Operator Software.

48. DATA PROTECTION

48.1 For the purpose of the following Clauses, the term "personal data" shall have the meaning given to it in the Data Protection Act 1998.

48.2 The Operator shall, in relation to any personal data in respect of which it is either the "data controller" or the "data processor" for the purposes of the Data Protection Act 1998, comply with the obligations of a "data controller" under the provisions of the seventh data protection principle as set out in Schedule 1 of that Act. In addition, the Operator:

48.2.1 shall have at all material times (and shall use its best endeavours to procure that all Operator Parties have or will have at all material times) the appropriate technical and organisational measures in place against unauthorised or unlawful processing of personal data and against accidental loss or destruction of, or damage to, personal data held or processed by it;

48.2.2 shall (and shall use its best endeavours to procure that the Operator Parties shall) take at all material times, all reasonable steps to ensure the integrity of any of its staff with access to personal data processed in connection with the Project;

48.2.3 shall act only on the instructions of **tie** in relation to the processing of any personal data in respect of which **tie** is the "data controller" for the purposes of that Act;

48.2.4 shall only obtain, hold, process, use, store and disclose such personal data as is necessary to perform its obligations under this Agreement; and

48.2.5 shall allow **tie** access to any relevant premises on reasonable notice to inspect its procedures referred to in Clause 48.2.1.

49. INFORMATION AND AUDIT ACCESS

49.1 The Operator shall in accordance with Good Industry Practice keep and maintain:

49.1.1 detailed records regarding the Project Development Services and its activities in relation to the Project;

49.1.2 all Project Data;

49.1.3 detailed records regarding the Project Operations, including details of ticket sales by the Operator, Patronage Revenue receipts by the Operator and breakdowns of Operating Costs; and

49.1.4 all invoices, timesheets and expense claims for which it has sought or is seeking reimbursement under the provisions of this Agreement;

and shall keep such records for at least twelve years following expiry or termination of this Agreement.

49.2 The records referred to in Clause 49.1 shall be kept in good order and in such form as to be capable of audit (including by electronic means) by the **tie** Project Manager or any other third party. The Operator shall make such records available for inspection by or on behalf of **tie** and the **tie** Project Manager at all reasonable times.

49.3 The Operator shall provide to the **tie** Project Manager and **tie**'s auditors all information, documents, records and the like in the possession of, or available to, the Operator (and to this end the Operator shall use all reasonable endeavours to procure that all such items in the possession of the Operator Parties shall be available to it) as may be reasonably requested by the **tie** Project Manager for any purpose in connection with the Project or this Agreement.

49.4 The Operator shall provide and shall procure that the Operator Parties shall provide such information, data records, and assistance as **tie** may reasonably require from time to time, including to enable **tie** and CEC to meet its obligations to provide reports and returns pursuant to Law, directions and guidance applicable to the passenger transport sector and audit.

49.5 The Operator shall comply, as its own cost, with any request by **tie** in respect of the recording, storage, keeping, disclosure, organisation, use, processing, dissemination, deletion or destruction of any records, data or information obtained by the Operator as a result of carrying out the Transport Services or any other obligation under this Agreement.

49.6 **tie** shall provide to the Operator (subject to reasonable notice and relevant undertaking as to costs) such information within its possession or control with respect to the Project as the Operator may reasonably request to enable it to perform its obligations under this Agreement, provided that tie shall have no obligation to provide

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information with respect to which it is subject to an obligation of confidentiality (whether under any Law, at contract or otherwise).

49.7 The provisions of this Clause 49 (*Information and Audit Access*) shall apply during the continuance of this Agreement and after its expiry or termination howsoever arising.

50. ENTIRE AGREEMENT

50.1 The Operator acknowledges and confirms that it has, by carrying out such due diligence and other investigations as any Operator acting in accordance with Good Industry Practice would do, satisfied itself fully as to the veracity, accuracy, reasonableness, scope, materiality, currency (where applicable) and completeness of all the Background Information.

50.2 Except where expressly provided otherwise in this Agreement, this Agreement constitutes the entire agreement between the Parties in connection with its subject matter and supersedes all prior representations, communications, negotiations and understandings concerning the subject matter of this Agreement.

50.3 Each of the Parties confirms to the other that it has neither been induced to enter into this Agreement in reliance on, nor has it made, any representation or warranty except those contained or referred to in this Agreement.

50.4 Any representations or warranties other than those contained or referred to in this Agreement are superseded and extinguished by this Agreement.

50.5 Each Party irrevocably and unconditionally waives all rights and remedies which it might otherwise have had in relation to any representations or warranties other than those contained or referred to in this Agreement.

50.6 Each Party irrevocably and unconditionally waives any right it may have to rescind this Agreement on the grounds that any representation or warranty (whether contained or referred to in this Agreement or not) constitutes a misrepresentation.

50.7 Nothing in this Clause 50 (*Entire Agreement*) shall affect the liability of either Party in respect of fraud or fraudulent misrepresentation.

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51. FURTHER ASSURANCE

51.1 Each Party shall at the reasonable request and cost of the other (save where either in satisfaction of an Operator Condition Precedent or where it is expressly provided that the cost of such act or execution shall be for that Party's account) do any act or execute any document that may be necessary to give full effect to this Agreement.

52. JURISDICTION

52.1 This Agreement, any document completed or to be completed in accordance with its provisions and any matter arising from it or any such document shall be governed by and construed in accordance with Scots law.

52.2 Subject to Clause 43 (*Dispute Resolution Procedure*), the Parties hereby irrevocably submit to the exclusive jurisdiction of the Court of Session in relation to this Agreement, any such document and any such matter.

53. VARIATIONS AND WAIVERS TO BE IN WRITING

No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

54. WAIVER AND CUMULATIVE REMEDIES

54.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement will operate as a waiver of it or of any other right or remedy nor will any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

54.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

55. NO PARTNERSHIP OR AGENCY

55.1 Nothing in this Agreement shall be construed as creating a partnership between tie and the Operator.

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55.2 The Operator shall not (and shall procure that the Operator Parties shall not) act or purport to act as agent for **tie** in relation to any matter. The Operator shall not be entitled to bind **tie** in any way or to create any liability or cause of action against **tie** and shall not hold itself out (and shall procure that no Operator Party shall hold itself out) as having any such authority or power, provided always that this Clause 55.2 shall be without prejudice to:

55.2.1 Clause 17 (*Collection of Fare Revenue*) of the Operating Appendix, pursuant to which the Operator is authorised to enter into contracts of carriage with passengers, and to collect Patronage Revenue, as agent for **tie**; and

55.2.2 Clause 14 (*Edinburgh Tram Network Integration*) of this Agreement and Clause 11 (*Operation and Maintenance Procedures*) of the Operating Appendix, pursuant to which **tie** may delegate to the Operator the exercise of some of **tie**'s contractual rights under the Infrastructure Delivery Agreement(s).

56. NOTICES

56.1 Any notice or notification required or authorised to be given under this Agreement by one Party to the other shall be:

56.1.1 in writing;

56.1.2 sent by one of the following methods:

56.1.2.1 pre-paid registered or recorded delivery post or facsimile transmission addressed to the Party to which it is given at:

(a) in the case of notices given to **tie**: **tie** Limited, Citypoint, 65 Haymarket Terrace, Edinburgh EH12 5HD, fax number 0131 622 8301 attention: , **tie** Tram Projects Director, or such other address in the United Kingdom as **tie** may notify the Operator from time to time for that purpose; or

(b) in the case of notices given to the Operator, TRANSDEV Edinburgh Tram Limited, Citypoint, 65 Haymarket Terrace, Edinburgh EH12 5HD, attention Operator's Representative or such other address in the United Kingdom as the Operator may notify **tie** from time to time for that purpose; or

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56.1.2.2 facsimile transmission addressed to the **tie** Project Manager or the Operator Project Manager (as appropriate) at a facsimile number notified to the giving Party by the receiving Party for the service of notices under this Agreement from time to time; or

56.1.2.3 personal delivery into the hands of:

(a) in the case of notices given to **tie**, the **tie** Project Manager; or

(b) in the case of notices given to the Operator, the Operator Project Manager

56.1.2.4 e-mail (but not to be used in respect of Termination Notices and Persistent Breach Notices) to:

(a) in the case of notices given to **tie**, **tie**'s Representative; or

(b) in the case of notices given to the Operator, the Operator's Representative.

56.1.3 be deemed duly served:

56.1.3.1 if sent by pre-paid registered or recorded delivery post, 2 clear Business Days after posting; or

56.1.3.2 if sent via facsimile transmission or personal delivery, on the day of issue of the relevant fax confirmation receipt or such personal delivery (as appropriate), unless that day is not a Business Day in which case it shall be deemed duly served on the next Business Day thereafter; or

56.1.3.3 if sent by e-mail, on the day a positive read receipt or delivery confirmation is issued unless that day is not a Business Day in which case it shall be deemed duly served on the next Business Day thereafter.

57. INVALID TERMS

57.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

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57.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

57.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

58. THIRD PARTIES RIGHTS

58.1 Save as provided in Clause 58.2, a person who is not party to this Agreement shall have no right to enforce any term of this Agreement.

58.2 The **tie** Advisers and CEC shall have the benefit of the terms of Clause 26.5.

59. HUMAN RIGHTS ACT

59.1 Insofar as and to the extent that the Operator is deemed to be acting as a public authority for the purposes of the Human Rights Act 1998, any claim asserted or proceedings commenced against **tie** arising from a negligent act or negligent omission by the Operator or breach by the Operator of its obligations under this Agreement shall, for the purposes of Clause 29 (*Indemnity*), be treated as an Indemnified Liability.

60. MALADMINISTRATION COMPLAINTS

60.1 The Operator shall provide such reasonable assistance (including the provision of witnesses) as **tie** may reasonably request (having regard to the Transport Services, in particular as to the timing, duration and number of witnesses) in connection with any audit process or judicial review of **tie**'s involvement in the Project or the Project generally.

IN WITNESS WHEREOF these presents consisting of this and the ~~87~~ 105 preceding pages together with Schedules 1 to 19 (inclusive) and the Operating Appendix together with Schedules 1 to 4 (inclusive) which are annexed and signed as relative hereto are executed as follows:

EXECUTED for and on behalf of **tie LIMITED** at Edinburgh on 20 December 2007 by

Director/Authorised Signatory: [redacted]

Full Name: WILLIAM GALLAGHER

Witness: [redacted]

Full Name: STUART STOBIE

Address: [redacted] Edinburgh, EH13 [redacted]

EXECUTED for and on behalf of **TRANSDEV EDINBURGH TRAM LIMITED** at London on 19 December 2007 by

Director/Authorised Signatory: [redacted]

Full Name: COLIN STEERS

Witness: [redacted]

Full Name: THEO VAUD

Address: [redacted] LONDON EC2V [redacted]

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This is Schedule 1 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 1

Definitions and Interpretation

1. In this Agreement, unless the context otherwise requires:

"Acquired Rights Directive" means the European Council Directive 77/187/EEC on the approximation of laws of European Union member states relating to the safeguarding of employees' rights in the event of transfers of undertakings, businesses or parts of undertakings or businesses;

"Actual Tram Patronage (boarders)" means the patronage figures for the Edinburgh Tram Network derived from the automatic passenger counting equipment installed as part of the System or such other mechanism as may be agreed by both Parties acting reasonably;

"Affected Party" means a Party that is unable to comply with all or a material part of its obligations under this Agreement as a direct result of a Force Majeure Event;

"Affiliate" means in relation to any organisation:

(a) any person having any shares in or membership of that organisation, whether directly, through nominees or through shares in or membership of any other person; and

(b) any person in which that organisation holds shares or of which that organisation is a member whether directly, through nominees or through shares in or membership of any other person;

"Affordability Limits" means such financial limits as may be advised by **tie** to the Operator from time to time in relation to the affordability of the Project or any part of it;

"Agreement" means the main body of this document, together with its Schedules and Operating Appendix, (as amended from time to time pursuant to Clause 53 (*Variations and Waivers to be in Writing*);

"Annual Service Report" means the report to be provided by the Operator pursuant to Clause 16 (*Best Value and Project Phase D Benchmarking*) of the Operating Appendix;

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"Approvals Management Plan" means the plan referred to in paragraph 26.8 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance the terms of this Agreement;

"Assets" means all assets and rights to enable **tie, CEC** or another operator to own, operate and maintain the System and take over the Project Operations in accordance with this Agreement, including:

(a) any equipment, plant, furniture, hardware and software (software being subject to the provisions in Clause 47 (*Intellectual Property Rights*)) and excluding Operator IPR;

(b) any books and records (including the Operating and Maintenance Manual, health and safety manuals and other know-how);

(c) any spare parts, tools and other assets (together with any warranties in respect of assets being transferred);

(d) any revenues and any other contractual rights; and

(e) any Intellectual Property,

but excluding any assets and rights in respect of which **tie** or CEC is full, legal and beneficial owner;

"Background Information" means all and any materials, documents, drawings, plans or other information in paper, electronic or any other form, relating in any way to the Project and the Private Bills (and the parliamentary process) and made available to the Operator by **tie**, CEC and/or any of their respective members, officers, agents and/or advisers in connection with the Project and/or the negotiation and/or preparation of this Agreement or during the process of competitive bidding which preceded such negotiation and preparation;

"Base Case RPIX" means RPIX as at 1 January 2003 equal to 177.1;

"Base Case Assumptions" means the assumptions set out in Schedule 18 *(Base Case Assumptions)* as may be agreed to be amended from time to time in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* or following a **tie** Change in accordance with Clause 24 *(tie Changes)* of the Operating Appendix or following an Operator Change in accordance with Clause 25 *(Operator Changes)* of the Operating Appendix;

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"Best Value Improvement Plans" means the plan referred to in Clause 16 (*Best Value and Project Phase D Benchmarking*) of the Operating Appendix;

"Bonded Costs" means the costs, expenses, liabilities, loss of profits and damages incurred by **tie** as a result of the matters listed in Clauses 8.5.1, 8.5.2, 8.5.3 and 8.5.4 of this Agreement;

"Business Day" means any day other than a Saturday, Sunday or Edinburgh Holiday;

"Capped Fee" means subject to Clause 16.13, the relevant cap as set out in the Financial Proposals;

"Category Five Fixed Costs" means the costs numbered "5" in the tables included in the Base Case Assumptions, which are set in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* at a level in accordance with the Project Development and Operating Costs, and such other costs as **tie** and the Operator may agree from time to time should be treated as "Category Five Fixed Costs". All Category Five Fixed Costs shall be Indexed at Premium;

"Category Four Fixed Costs" means the costs numbered "4" in the tables included in the Base Case Assumptions, which are set in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* at a level in accordance with the Project Development and Operating Costs, and such other costs as **tie** and the Operator may agree from time to time should be treated as "Category Four Fixed Costs" All Category Four Fixed Costs shall be Indexed at Premium;

"Category One Fixed Costs" means the costs numbered "1" in the tables included in the Base Case Assumptions, which are set in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* at a level in accordance with the Project Development and Operating Costs, and such other costs as **tie** and the Operator may agree from time to time should be treated as "Category One Fixed Costs". All Category One Fixed Costs shall be Indexed at Premium;

"Category Three Fixed Costs" means the costs numbered "3" in the tables included in the Base Case Assumptions, which are set in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification,*

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and the Setting of Fixed Costs and Rates) at a level in accordance with the Project Development and Operating Costs, and such other costs as **tie** and the Operator may agree from time to time should be treated as "Category Three Fixed Costs". All Category Three Fixed Costs shall be Indexed at Premium;

"Category Two Fixed Costs" means the costs numbered "2" in the tables included in the Base Case Assumptions, which are set in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* at a level in accordance with the Project Development and Operating Costs, and such other costs as **tie** and the Operator may agree from time to time should be treated as "Category Two Fixed Costs" All Category Two Fixed Costs shall be Indexed at Premium;

"CDM Regulations" means the Construction (Design and Management) Regulations 1994 (SI 1994/3140);

"CEC" means the City of Edinburgh Council and its successors and assignees whomsoever;

"CEC UTC System" means the system of electronically operated signals managed by CEC to control traffic movements on the streets and roads in the City of Edinburgh in which the System will be installed, and for the avoidance of doubt, includes any such electronically operated signals which operate on a stand alone basis provided that to the extent that the System serves areas outside Edinburgh from time to time, references to "CEC UTC System" shall be deemed to apply to UTC systems operated in such areas to the extent appropriate in the context;

"Certificate of Full Service Commencement" means, in relation to a Phase, the certificate of Full Service Commencement to be issued by **tie** in accordance with Clause 4.5 of the Operating Appendix or Clause 3.6 of the Operating Appendix (as appropriate) in respect of that Phase;

"Certificate of Service Commencement" means, in relation to a Phase, the certificate of Service Commencement to be issued by **tie** in accordance with Clause 3.4 of the Operating Appendix in respect of that Phase;

"Change in Law" means the coming into effect after the DPOFA Variation Date of:

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(a) Legislation, other than any Legislation which on the DPOFA Variation Date has been published:

(i) in a draft Bill (to have effect in Scotland) as part of a Scottish Executive or United Kingdom Government consultation paper;

(ii) in a Bill;

(iii) in draft subordinate Legislation within the meaning of section 21(1) of the Interpretation Act 1978; or

(iv) as a draft directive or a draft regulation in the Official Journal of the European Communities; or

(b) any applicable judgment of a relevant court of law which changes a binding precedent;

"Change of Control" means any sale or disposal of any legal, beneficial or equitable interest in any or all of the share capital of a corporation or the control over the exercise of voting rights in a corporation or the control over the right to appoint or remove directors of a corporation;

"Claim" has the meaning given in Clause 30.1;

"Code of Construction Practice" means the code dated 19 December 2007 and provided to the Operator for review prior to the date hereof which has been developed in conjunction with all relevant local authorities with regard to environmental and safety aspects affecting the interests of local businesses, the general public and the surroundings in the vicinity of the Construction Works, as maybe amended from time to time (as a **tie** Change in accordance with Clause 24 (*tie Changes*) of the Operating Appendix) and notified to the Operator. The Code will apply to the Construction Works;

"Code of Maintenance Practice" means the code dated 19 December 2007 and provided to the Operator for review prior to the date hereof which has been developed by **tie** with regard to environmental and safety aspects affecting the interests of local businesses, the general public and the surroundings in the vicinity of the Edinburgh Tram Network, as maybe amended from time to time (as a **tie** Change in accordance with Clause 24 (*tie Changes*) of the Operating Appendix) and notified to the Operator. The Code will apply to the operation and maintenance of the Edinburgh Tram Network;

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"Commercially Sensitive Information" means this Agreement (unless otherwise agreed by the Parties), any information relating to detailed costings and funding of the Project and/or any other information which is agreed to be or is identified at the time of issue as being commercially sensitive;

"Competent Person" the competent person to be appointed in accordance with ROGS and Clause 12.12 from time to time;

"Compliance Critical Risk" means a risk or matter the Operator is obliged to insure against pursuant to Part 1 of Schedule 10 (*Insurances*) and which the failure of the Operator to carry any of the Required Insurances would prevent the Operator from lawfully performing the Project Development Services or the Project Operations in whole or in substantial part in the manner required by this Agreement;

Concessionary Travel Scheme" means:

(i) in respect of Edinburgh, East Lothian and Midlothian, the concessionary travel scheme known as "Concessionary Travel - Arrangements from 30 September 2002 for residents of The City of Edinburgh, East Lothian and Midlothian Councils"; and

(ii) in respect of West Lothian, the concessionary travel scheme known as "West Lothian Concessionary Travel Scheme";

or any successor to either of such schemes nominated by **tie**;

"Construction Panel" has the meaning given to it in paragraph 5.4 of Schedule 7 *(Dispute Resolution Procedure)*;

"Construction Works" means the infrastructure construction and installation works as part of the works to be carried out by any Infrastructure Provider;

"Control Centre" means the control centre for the control of the System to be provided by the Infrastructure Provider(s) and operated by the Operator pursuant to this Agreement;

"Core Staff Fixed Rates" means the costs numbered "9" in the tables included in the Base Case Assumptions, which are set in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* at a level in accordance with Table 1 of the Project Development and Operating Costs, and such other rates as **tie** and the Operator may agree

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Network Rail, statutory undertakers or other public or regulatory body in relation to the Project;

6.12.6 any change to the Partnering Methodology and Programme, Project Programme, Affordability Limits or Operating Appendix; and

6.12.7 the scope of the Project Development Services to be provided by the Operator from time to time, and all other matters specified in Clause 16 *(Project Development Costs)*.

6.13 Save as directed in writing by **tie** or the **tie** Project Manager, the Operator shall not, and shall procure that the Operator Parties shall not, have any discussions or dealings with any person:

6.13.1 from whom any Necessary Consent (other than any Operator Necessary Consents) or public sector funding is sought, in relation to such Necessary Consent or funding or otherwise relating to any aspect of the Project which is not in the public domain;

6.13.2 whose land is or may be required for the purposes of the Project, in relation to such land or otherwise relating to any aspect of the Project which is not in the public domain;

6.13.3 who has objected to the Project or a proposed Scottish Private Bill, in relation to the undertakings or commitments which might be offered to him/her, or any other matter relating to any aspect of the Project which is not in the public domain; or

6.13.4 with or to whom any commitment or undertaking may need to be given or agreement entered into to facilitate the Project, in relation to any such commitment or undertaking, or otherwise relating to any aspect of the Project which is not in the public domain. For the avoidance of doubt, this Clause 6.13.4 shall not apply to any commitment or undertaking between the Operator and any Operator Party in relation to the delivery of the Project Development Services or the Transport Services;

6.13.5 who may seek compensation in respect of nuisance, injurious affection, use of his/her land, loss of benefit from his/her land in relation to such compensation or otherwise relating to any aspects of the Project which are not in the public domain; or

6.13.6 who is a member of CEC or any employee of **tie** who is not part of a project team referred to in Clause 5.1, in relation to any aspect of the Project not in the public domain; or

6.13.7 who is involved in any venture or undertaking similar to the Project which may be in competition with the Project as regards resourcing capacity or funding availability.

7. QUALITY ASSURANCE

7.1 The Operator shall procure that all aspects of the Project Development Services are the subject of quality management systems at all times.

7.2 The quality management systems referred to in Clause 7.1 above shall be reflected in appropriate quality plans which shall:

7.2.1 for the period from the Effective Date until the agreement of the Quality Management Plan between **tie** and the Operator during Project Phase B (pursuant to Schedule 2 (*Project Development Output Specification*), reflect the Operator's outline quality management plan set out in the Inception Report;

7.2.2 be set out in the Quality Management Plan when agreed between the Operator and **tie**; and

7.2.3 in any event, be consistent with BS EN ISO 9001:2000 or any equivalent standard which is generally recognised as having replaced it.

7.3 The Operator shall appoint (or shall procure the appointment of) a Quality Manager as soon as reasonably practicable following the Effective Date. The identity of the Quality Manager (and any replacement) shall be subject to the approval of the **tie** Project Manager (such approval not to be unreasonably withheld or delayed).

7.4 During Project Phases A to C, the Quality Manager may (without limitation) be the Operator Project Manager or one of the Key Personnel. During Project Phase D in respect of any Phase, the identity of the Quality Manager shall comply with the requirements of Clause 14 *(Quality Assurance)* of the Operating Appendix.

7.5 During all Project Phases, the Quality Manager shall:

7.5.1 ensure the effective operation of the quality systems described in this Clause 7 *(Quality Assurance)* or Clause 14 *(Quality Assurance)* of the Operating Appendix (as appropriate);

7.5.2 audit the quality systems at regular intervals and report the findings of such audit to the **tie** Project Manager;

7.5.3 review all quality systems at intervals agreed with the **tie** Project Manager to ensure their continued suitability and effectiveness;

7.5.4 liaise with the **tie** Project Manager on all matters relating to quality management; and

7.5.5 report to the Operator in relation to the matters mentioned in Clauses 7.5.1 to 7.5.4 (inclusive).

8. OPERATOR'S PERFORMANCE SECURITY

8.1 Prior to the issue of a Mobilisation Certificate by **tie** in accordance with paragraph 41.3 of Schedule 2 (Project Development Output Specification), the Operator shall provide to **tie** a Performance Bond in the form of Schedule 14 (*Performance Bond*) to this Agreement and issued by a surety acceptable to **tie**.

8.2 The performance bond shall be for an amount of £10,000,000 (Ten Million Pounds Sterling) and shall be callable by **tie** on demand. The parties shall review the amount secured by the Performance Bond on the third anniversary of Full Service Commencement and annually thereafter. Any amendment required by **tie** to the amount secured by the Performance Bond shall be considered in accordance with Clause 24 (***tie** Changes*) and Clause 23 (*Performance and Financial Adjustments*) of the Operating Appendix.

8.3 **tie** shall only be entitled to issue a demand notice to the surety in order to make a claim under the Performance Bond if **tie** has:

8.3.1 provided the Surety in good faith with a written statement (the **"Prior Written Notice"**) which identifies the Operator Default; and

8.3.2 where such Operator Default is remediable, gives the Operator fifteen Business Days' (following receipt by the Operator of a copy of the Prior Written Notice) to rectify the Operator Default; and

8.3.3 the Operator has failed to rectify the Operator Default.

8.4 In the event the credit rating of the surety is downgraded to A- or a lower rating by Standard & Poors, **tie** shall be entitled to request the Operator to procure a substitute performance bond on identical terms from a surety acceptable to **tie**.

8.5 In the event that **tie** has made a demand on the Performance Bond and the costs, expenses, liabilities, loss of profits and damages incurred by **tie** as a result of:

8.5.1 the circumstances in respect of which the Performance Bond was called;

8.5.2 if applicable, the procurement of a replacement operator;

8.5.3 **tie** operating the System at greater cost than the operation of the System by the Operator; and

8.5.4 the costs of maintaining the Performance Bond in the preceding 5 years which have already been reimbursed to the Operator;

are less than the amount called under the Performance Bond and paid to **tie**, **tie** shall reimburse the Operator such amount as **tie** determines by reconciliation represents any surplus. Any such reconciliation shall be carried out by **tie** no earlier than 6 months and no later than 2 years from the date of payment under the Performance Bond. For the avoidance of doubt, **tie** shall not be liable to the Operator for any interest in respect of surplus reimbursed, subject to Clause 8.6 below.

8.6 **tie** shall notify the Operator when the reconciliation has been carried out pursuant to Clause 8.5 and **tie** shall pay any surplus to the Operator within 30 days of such notification. The Parties agree that **tie**'s calculation of the Bonded Costs shall be binding and not subject to challenge or dispute by the Operator under any circumstances. Reimbursement of the surplus under this Clause 8.6 shall carry interest at the Default Interest Rate from the due date of payment until payment occurs.

9. SPECIAL EVENTS

To the extent that there are any Special Events during Project Phase C2 in respect of any Phase that may affect the performance of the Project Development Services, **tie** and the Operator shall comply with the provisions of Clause 8 (*Special Events*) of the Operating Appendix.

10. AMENDMENTS TO THE OPERATING APPENDIX, THE OPERATOR FINANCIAL MODEL AND THE OPERATING OUTPUT SPECIFICATION, AND THE SETTING OF FIXED COSTS AND RATES

10.1 **tie** acknowledges that the Operator has agreed:

10.1.1 the Operator Financial Model as at the DPOFA Variation Date; and

10.1.2 the terms of the Operating Appendix;

on the basis of the Base Case Assumptions and the Law as at the DPOFA Variation Date;

10.2 Subject to Clause 10.6, in accordance with the Project Development Output Specification, during Project Phase A and B in respect of a Line and/or Phase, **tie** and the Operator shall review and agree any appropriate amendments to the Operating Appendix and/or the Operator Financial Model and/or the Operating Output Specification as a result of any Base Case Assumptions becoming Inappropriate Base Case Assumptions, or as a result of a Change in Law.

10.3 If pursuant to Clause 10.2, amendments are requested by the Operator to the Operating Appendix, the Base Case Assumptions, the Financial Proposals, the Operator Financial Model, the Project Development and Operating Costs and/or the Operating Output Specification during Project Phases A or B, the Operator and **tie** shall discuss, and seek to agree the relevant changes which will leave the Operator in No Better and No Worse a position than it would have been in had (i) the relevant Base Case Assumption not become an Inappropriate Base Case Assumption or (ii) the relevant Change in Law not occurred.

10.4 Without prejudice to the provisions of Clause 12 (*Interface with the Infrastructure Provider*), to the extent that there are any further developments to the Project during Project Phase C and/or Project Phase D which either the Operator or **tie** consider require amendment to the Base Case Assumptions, the Financial Proposals, the Operator Financial Model, the Project Development and Operating Costs, the terms of the Operating Appendix, and/or the Operating Output Specification such amendments shall be considered by the Operator and **tie** in accordance with Clause 23 *(Performance and Financial Adjustments)* and Clause 24 (***tie** Changes*) or Clause 25 (*Operator Changes*) in the Operating Appendix.

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10.5 If **tie** and the Operator are unable to agree:

10.5.1 whether any of the Base Case Assumptions is or has become an Inappropriate Base Case Assumption at any point during the Term; or

10.5.2 whether a Change in Law has occurred; or

10.5.3 what amendments to the Operating Appendix, the Base Case Assumptions, the Financial Proposals, the Operator Financial Model, the Project Development and Operating Costs and/or the Operating Output Specification pursuant to Clause 10.3 would leave the Operator in No Better and No Worse a position,

then either Party may refer the disagreement to the Dispute Resolution Procedure.

10.6 The Category One Fixed Costs, the Category Five Fixed Costs, the Core Staff Fixed Rates and the Non-Core Staff Fixed Rates are set as at the the DPOFA Variation Date and shall not be subject to adjustment pursuant to Clause 10.2 except in relation to any Changes in Law.

10.7 The unit cost in respect of any Category Two Fixed Costs shall be set as at the Effective Date and the total cost of any Category Two Fixed Costs shall be set by reference to the Base Case Assumptions by the end of Project Phase B in accordance with this Clause 10 (*Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates*) in the same way as the Target Operating Costs shall be set at the end of Project Phase B.

10.8 The Category Three Fixed Costs shall be set by agreement between **tie** and the Operator by the end of Project Phase C1 in accordance with the procedure set out in Part A of Schedule 17 (*Setting of Fixed Costs*).

10.9 The Category Four Fixed Costs shall be set by agreement between **tie** and the Operator by the end of Project Phase C2 in accordance with the procedure set out in Part B of Schedule 17 (*Setting of Fixed Costs*).

10.10 **tie** and the Operator may agree from time to time to treat other costs or rates payable in accordance with this Agreement as fixed costs or fixed rates. These additional fixed costs or fixed rates may be treated as fixed costs or fixed rates within one of the

already defined categories of costs or rates, and set accordingly, or may be treated otherwise and set in a manner agreed by **tie** and the Operator.

10.11 Fixed Costs shall not be treated as Target Operating Costs or Target Costs for Project Phase C2, and if the actual costs for an item which is a Fixed Cost exceed the amount stated in the Project Development and Operating Costs (as Indexed), then **tie** shall not be liable to make payment to the Operator in respect of any excess above the Fixed Costs in accordance with this Agreement save as otherwise provided in Clause 12 (*Interface with the Infrastructure Provider*). Notwithstanding the actual costs for an item which is a Fixed Cost may be less than the amount stated in the Project Development and Operating Costs, **tie** shall be liable to pay the relevant Fixed Cost to the Operator in accordance with this Agreement.

10.12 All information on the actual costs associated with any Fixed Costs or Fixed Rates shall be made available to **tie** on an Open Book Basis.

10.13 All Fixed Costs and Fixed Rates which are applicable during Project Phase D (except for the Category Five Fixed Costs and any costs which the Parties agree are to be paid by **tie** to the Operator on a one-off basis) shall be subject to reset in accordance with Clause 21 (*Reset of the Fixed Costs, the Target Operating Costs and the Target Patronage*) of the Operating Appendix.

10.14 At the start of each Year, **tie** and the Operator shall agree a profile for the payment of Fixed Costs, Profit Element and Target Operating Costs, and the payment of any Fixed Costs, Profit Element and any Target Operating Costs shall be made by **tie** to the Operator in accordance with the agreed profile. The agreed profile shall take account of the following matters (where relevant):

10.14.1 one-off annual payments:

10.14.2 amounts spread evenly over set periods;

10.14.3 amounts which will vary seasonally or otherwise;

10.14.4 fluctuations in service levels including bank holidays;

10.14.5 one-off payments; and

10.14.6 any methodology to be agreed by the Parties.

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10.15 Either Party may refer any Dispute about the categorisation or setting of Fixed Costs or Fixed Rates to the Dispute Resolution Procedure.

10.16 The Operator shall update the Operator Financial Model in the following circumstances:

10.16.1 after the Target Costs for Project Phase C2, the Target Operating Costs and the Category Two Fixed Costs have been set in accordance with this Clause 10 (*Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates);*

10.16.2 after the Category Three Fixed Costs have been set in accordance with this Clause 10 (*Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)*;

10.16.3 after the Category Four Fixed Costs have been set in accordance with this Clause 10 (*Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)*;

10.16.4 on each Reset Decision Date or following agreement or determination of reset pursuant to Clause 21 (*Reset of the Fixed Costs, the Target Operating Costs and the Target Patronage)* of the Operating Appendix;

10.16.5 after the setting or adjustment of Target Patronage by the Joint Revenue Committee;

10.16.6 after any financial adjustment pursuant to Clause 20 *(Adjustment of Fixed Costs, Target Operating Costs and Target Patronage)* of the Operating Appendix; and

10.16.7 as may be otherwise agreed by **tie** and the Operator.

10.17 When the Operator Financial Model is updated in the circumstances set out in Clause 10.16, any update shall be subject to **tie's** approval (such approval not to be unreasonably withheld). The updating of the Operator Financial Model shall be done on an Open Book Basis, and the Operator shall also respond as soon as reasonably practicable to any reasonable request from **tie** to provide any information associated

with the Operator Financial Model on an Open Book Basis. If required, the Operator shall also update the Financial Proposals and the Project Development and Operating Costs at the same time as updating the Operator Financial Model.

10.18 The Operator shall supply to **tie** an electronic copy of any updated Base Case Assumptions, Operator Financial Model, Financial Proposals and Project Development and Operating Costs within 10 Business Days of **tie's** approval in accordance with Clause 10.17.

10.19 During Project Phases A to C1, when the Operator Financial Model is updated in the circumstances set out in Clause 10.16, the costs of such updating by the Operator shall be paid by **tie** to the Operator on the basis of the Non-Core Staff Fixed Rates and in accordance with Clause 16 *(Project Development Costs)*. During Project Phases C2 to D, when the Operator Financial Model is updated in the circumstances set out in Clause 10.16, the costs of such updating by the Operator shall be paid by **tie** to the Operator on the basis of actual costs agreed on the basis of an estimate provided by the Operator to **tie**. During each Project Phase, the Operator shall minimise as far as reasonably practicable, the costs associated with the updating of the Operator Financial Model.

11. NETWORK EXPANSIONS AND PHASE 1B

11.1 **tie** and the Operator will keep opportunities for Network Expansion under review throughout the Term, consistent with the objectives of the Integrated Transport Initiative and any other relevant public transport initiatives of CEC, TEL or **tie** from time to time.

11.2 From time to time during the Term, **tie** may propose to the Operator a Network Expansion for development. To the extent that **tie** requests assistance from the Operator in relation to the development of such Network Expansion:

11.2.1 the Operator will provide Project Development Services during the development of that Network Expansion, and the provisions of this Agreement and the Project Development Output Specification shall apply to the development of that Network Expansion as if it were a Line or Phase (as appropriate); and

11.2.2 the terms of payment for the Network Expansion in respect of Project Development Services and Project Operations shall be the same as those set

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out in this Agreement. Following **tie**'s request pursuant to Clause 11.2 above, the Operator shall present for **tie**'s approval its proposals for capped fees for the Development Phase for the Network Expansion and the relevant workstreams in the Project Development Output Specification.

11.3 If **tie** and the Operator are unable to agree the fees for the Project Development Services in respect of any Network Expansion pursuant to Clause 11.2.2 , **tie** may withdraw its request for the Operator to provide the Project Development Services and **tie** may continue with the development of such Network Expansion, either by itself or in conjunction with third parties.

11.4 Whether or not **tie** requests the Operator to provide Project Development Services in relation to a proposed Network Expansion:

11.4.1 the Operator shall provide access to such information, documents and records as may be reasonably requested by **tie** or the **tie** Advisers in relation to the development of the proposed Network Expansion, and the provisions of Clause 49 (*Information and Audit Access*) shall apply (mutatis mutandis) to such access;

11.4.2 **tie** and the Operator will negotiate in good faith in relation to agreeing:

(i) the Target Costs for Project Phase C2 (*Testing and Commissioning*) and any Fixed Costs relative to Project Phase C2 for the Network Expansion;

(ii) the Interim Target Operating Costs, Interim Fixed Costs and the Interim Target Patronage for the System including such Network Expansion (if it is proposed that there be a time interval between the Service Commencement Date and the Full Service Commencement Date for such Network Expansion);

(iii) the Target Operating Costs, the Target Patronage and any Fixed Costs for the System including such Network Expansion;

(iv) amendments to the Operating Output Specification, the Operating Method Statements (and the Operating Appendix to the extent necessary) to take effect from the Service Commencement Date of the Network Expansion; and

(v) any other amendments to this Agreement that are necessary in respect of the Network Expansion,

on the basis that the Operator should be in a No Better and No Worse position following the implementation and Service Commencement of the Network Expansion. **tie** and the Operator shall have regard to, but not be bound by, the costing assumptions prepared by the Operator which are set out in Schedule 19 *(Additional Costing Assumptions)*.

11.5 To the extent that **tie** and the Operator are unable to agree the matters listed in Clause 11.4.2 by the end of Project Phase B for the Network Expansion (or the equivalent stage of development if the Operator is not providing the Project Development Services), **tie** shall be entitled to terminate this Agreement pursuant to Clause 32.5.

11.6 The Operator acknowledges that **tie** may, by providing the Operator with a written notice such notice to be issued sufficiently far in advance to enable the Operator to be able to do so (and in any event sufficiently far in advance of the minimum period required for recruitment), instruct that the Transport Services are to be performed by the Operator in respect of Phase 1b. If so instructed by **tie**, the Operator shall perform the Transport Services in respect of Phase 1b and, subject to Clauses 11.7 and 11.8, the provisions of this Agreement shall apply to the Transport Services to be performed in respect of Phase 1b.

11.7 In the event that **tie** gives the instruction to the Operator to carry out the Transport Services in respect of Phase 1b under Clause 11.6, the provisions set out in Schedules 4 (*Financial Proposals*), 5 (*Operator Financial Model*), and 6 (*Project Development and Operating Costs*) of this Agreement, and schedule 4 (*Operating Output Specification*) of the Operating Appendix, which refer to the Transport Services being combined for Phase 1a and Phase 1b shall come into force and be substituted for the equivalent provisions in respect of Phase 1a only and this Agreement shall be amended as set out in such provisions.

11.8 For the avoidance of doubt, in the event that **tie** gives the instruction to the Operator to carry out the Transport Services in respect of Phase 1b under Clause 11.6,:

11.8.1 such Transport Services shall not include any requirement to repeat any of the tasks described in Schedule 2 (*Project Development Output Specification*) which are described as being part of Project Phase A; and

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11.8.2 such instruction shall not be treated as a **tie** Change unless any of the Base Case Assumptions relative to such instruction are or have become Inappropriate Base Case Assumptions.

11.9 Any ambiguities or discrepancies in the Agreement that arise as a result of the notice to proceed to provide the Transport Services in respect of Phase 1b shall be resolved by **tie** and the Operator (both acting reasonably and in good faith).

12. INTERFACE WITH THE INFRASTRUCTURE PROVIDER

12.1 Wherever in this Clause 12 (*Interface with the Infrastructure Provider*) a Party is required to make any determination or to exercise its discretion by the giving of decisions, instructions, opinions or consents or to express satisfaction or approval or otherwise take any action, that Party shall exercise such discretion fairly and reasonably (save where it is stated that such Party is to have absolute discretion), and having regard to all the circumstances.

12.2 In the event that any of the events or circumstances defined as Infraco Events occur and to the extent that the Operator can demonstrate to **tie's** reasonable satisfaction that there has been a resultant demonstrable adverse effect on the Operator's ability to perform and/or the cost to perform any of the Project Development Services or the Project Operations, then the Operator shall be entitled to relief and/or compensation on the basis set out in this Clause 12 (*Interface with the Infrastructure Provider*).

12.3 Upon the occurrence of an Infraco Event, the Operator shall be entitled to:

12.3.1 reimbursement of additional costs and expenses directly attributable to the prolongation or significant disruption of Project Phase C1 and/or Project Phase C2 through:

12.3.1.1 appropriate adjustment of the Capped Fee applicable to delivery of Project Development Services during Project Phase C1; and

12.3.1.2 inclusion of any additional costs and expenses suffered or incurred during Project Phase C2 as actual Target Costs for Project Phase C2 and/or other costs and expenses for Project Phase C2 pursuant to Clause 18 (*Payment during Project Phase C2*), and in particular, subject to Clause 18.12, Category 3 Fixed Costs and the Target Costs for Project Phase C2 shall be adjusted by the appropriate amount.

12.3.2 reimbursement of demonstrable additional costs and expenses directly attributable to an Infraco Event, which costs and expenses have been suffered or incurred during Project Phase D and the Target Operating Costs shall be adjusted by the appropriate amount.

12.3.3 reimbursement of demonstrable additional costs and expenses directly attributable to (i) the carrying out by the Infrastructure Provider of any remedial or rectification works on the System to correct defects in Infrastructure and Equipment, (ii) any abortive work or services carried out by the Operator which require reworking or repetition and (iii) supplemental operating functions or maintenance required from the Operator as a result of material defects in the Infrastructure and Equipment or material failings in the Infrastructure Provider provision of services pursuant to the IDA.

provided always that any reimbursement under this Clause 12.3 shall be subject to Clause 12.4.

12.4 The reimbursement of any demonstrable additional costs and expenses sought under this Clause 12 (*Interface with the Infrastructure Provider*) by the Operator shall be:

12.4.1 reasonably reduced to the extent that the Operator has predominantly caused or materially contributed to the occurrence of the Infraco Event ;

12.4.2 reasonably reduced to the extent that the Operator has not carried out mitigation measures in accordance with Clause 12.16;

12.4.3 subject to an aggregate weekly limit of:

12.4.3.1 prior to the completion of Section A - £8,900;

12.4.3.2 following completion of Section A or commencement of training by the Operator in the following Section B and prior to completion of Section B - £15,500;

12.4.3.3 following completion of Section B or commencement of training by the Operator in the following Section C and prior to completion of Section C - £36,900;

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12.4.3.4 following completion of Section C or commencement of training by the Operator in the following Section D and prior to completion of Section D - £70,000;

12.4.3.5 following completion of Section D and during Project Phase D - £129,800;

Provided always that if the works are not carried out in the sequence of (first) Section A, (second) Section B, (third) Section C and (fourth) Section D, then, as appropriate, the Parties (both acting reasonably) agree to adjust the weekly limits stated in Clauses 12.4.3.1, 12.4.3.2, 12.4.3.3, 12.4.3.4 and 12.4.3.5 and both Parties agree that in making any adjustment that they shall, as appropriate, have regard to the weekly limits which have already been agreed; and

12.4.4 subject to the provision to **tie** of reasonable supporting documentation and reasonable proof of expenditure of such costs and expenses by the Operator.

12.5 Where the direct effects of the Infraco Event occur during Project Phase D, the Operator:

12.5.1 shall adhere to performance as regards provision of Transport Services in accordance with the Timetable, save as may be impracticable or as may be expressly agreed otherwise with **tie** as regards any degraded service;

12.5.2 shall be subject to the application of any KPI Regime Profit Element deductions pursuant to Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) of the Operating Appendix, save to the extent that the Operator's deficient performance has been a direct result of the relevant Infraco Event.

12.5.3 shall be responsible:

12.5.3.1 for notifying **tie**, and copying such notification to the Infrastructure Provider as soon as practicable (and in any case no later than 2 hours after being on notice of the Infraco Event) of the likely severity and duration of any deficient or non compliant performance of Project Operations (in particular degraded Transport Services not in accordance with the Timetable);

12.5.3.2 recording the effect of the Infraco Event and its duration and providing **tie** with an accurate and comprehensive report in agreed form within five (5) Business Days of the occurrence following which **tie** shall determine based on the report, promptly and acting reasonably, the extent and duration of relief granted to the Operator subject to the right of the Operator (acting reasonably and in good faith) to refer such determination to the Dispute Resolution Procedure;

12.5.4 shall be entitled to reimbursement of demonstrable additional costs and expenses incurred in responding to and mitigating the effect of the Infraco Event.

12.6 Upon the occurrence of an Infraco Event, the Operator shall be under a continuing obligation to report promptly to the Infrastructure Provider and to **tie** any incident, matter or operational irregularity which may indicate the existence of a System defect which, in the Operator's reasonable opinion, is likely to or will materially and adversely affect Project Operations, in particular so as to:

12.6.1 prevent or interfere with the provision of Transport Services;

12.6.2 increase Operating Costs or prevent savings of the same;

12.6.3 require the Operator to undertake altered or new functions;

12.6.4 require a temporary or permanent change to the Transport Services or Project Operations;

12.6.5 impact upon Operator Maintenance or, to the extent known by the Operator and reasonably practicable, the System whole life costs, or Infrastructure Provider maintenance.

12.7 **No Termination Trigger**

12.7.1 If the occurrence of an Infraco Event is the direct cause of the Operator being in breach of this Agreement, then such breach:

12.7.1.1 shall not be treated as an Operator Default, shall not count towards any calculation of an Operator Default and shall not entitle **tie** to

serve any notice to the Operator under the terms of Clause 35 (*Termination on Operator Default*);

12.7.1.2 shall not entitle **tie** to serve any notice to the Operator under the terms of Clause 34 (*Persistent Breach*); and

12.7.2 shall not entitle **tie** to call upon the Performance Bond;

provided always that where the Operator is otherwise in breach of this Agreement and such breach is not the direct result of an Infraco Event, then **tie** shall, (where entitled in accordance with the other provisions of this Agreement), be entitled to terminate this Agreement and/or call upon the Performance Bond in accordance with the terms of this Agreement and the Performance Bond regardless of whether such breach is concurrent or not with the occurrence of the Infraco Event.

12.8 **Project Programme Revision**

12.8.1 Following the occurrence of an Infraco Event, the Operator shall provide **tie** with a revised Partnering Methodology and Programme within 7 days (or such longer period as may be agreed by both Parties acting reasonably) of notifying **tie** and shall support **tie** in updating the Project Programme which Project Programme shall be adjusted (as appropriate) to address the occurrence of the Infraco Event and consequences thereof.

12.8.2 The revised Project Programme will show the effect of the relevant Infraco Event and how the remedial measures taken by the Operator pursuant to Clause 12.16 will assist and/or retrieve delay so as far as practicable having regard to the Operator's resources to safeguard programme milestones, or detail the delay and mitigation measures by **tie**, the Operator or the Infrastructure Provider.

12.8.3 **tie** shall and shall procure the counterparties to the IDA each co-operate and provide such information and assistance as the Operator shall reasonably require in connection with this Clause 12.8 and the updated and revised Project Programme and Partnering Methodology and Programme.

12.9 **Infraco Snagging List**

12.9.1 **tie** shall provide a draft of the Infraco Snagging List as soon as reasonably practicable and updated drafts as appropriate to the Operator prior to the start

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of Shadow Running in accordance with the Project Programme together with any Infrastructure Provider's proposals for completion and/or rectification which are available. **tie** shall then provide the Operator with a final list of the Infraco Snagging List and any updated Infrastructure Provider's proposals for completion and/or rectification within 2 Business Days of the start of Shadow Running.

12.9.2 Both Parties acting reasonably shall agree a remedial programme for the items on the Infraco Snagging List within 5 Business Days of the receipt of such draft Infraco Snagging List and shall agree (both Parties acting reasonably) adjustments to such remedial programme to reflect any updates to the draft Infraco Snagging List. As part of agreeing such remedial programme, the Operator shall identify any items on the Infraco Snagging List which may reasonably be expected to result in an Infraco Event if not rectified by the relevant Infrastructure Provider in accordance with the agreed remedial programme.

12.9.3 The Operator shall be responsible for reporting to **tie** any other snagging or incomplete items of which the Operator becomes aware, and whether such snagging or incomplete items may reasonably be expected to result in an Infraco Event which items shall be added (where appropriate) to the Infraco Snagging List. Both Parties acting reasonably shall then agree an adjustment to the remedial programme agreed in accordance with Clause 12.9.2.

12.9.4 In providing the report under Clause 12.9.3 and agreeing the remedial programme under Clause 12.9.2, the Operator shall take account of the effect of any Operator Snagging Matters.

12.9.5 **tie** and the Operator shall agree upon any temporary modification to or relaxation in the provision of Transport Services in accordance with the Timetable and any appropriate temporary adjustment to the application or calibration of the KPI Regime as set out in Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) to the Operating Appendix to reflect any System performance irregularity or any other adverse consequences caused by items on the Infraco Snagging List or as a consequence of the remediation of any items on the Infraco Snagging List provided that any adjustment to the calibration or application of the KPI Regime shall take into account the extent to which:

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12.9.5.1 the Operator has not acted in accordance with the remedial programme agreed in accordance with Clause 12.9.2 save to the extent caused by **tie** or a **tie** Party; and/or

12.9.5.2 the Operator has otherwise breached the terms of this Agreement save to the extent caused by **tie** or a **tie** Party and such breach directly results in delay to such remedial programme.

12.9.6 Where any Infraco Snagging List activity by the Infrastructure Provider creates additional workload or support from the Operator, then any reasonable, direct and demonstrable costs and expenses associated with such additional workload or support shall be paid by **tie** to the Operator.

12.10 **Design Input and Technical Requirements under the IDA**

12.10.1 The Operator shall be entitled to comment upon the design of the System at the agreed stages of development set out in the Project Programme in order that the Infrastructure Provider is in a position to take account of such comments which **tie** shall pass to the Infrastructure Provider when refining the final design and when ensuring System integration.

12.10.2 The Operator shall be entitled to review the Infrastructure Provider responses to the technical requirements for the System and shall provide **tie** promptly with the outcome of such review.

12.10.3 **tie** shall ensure that the Operator is provided with such documentation as agreed by **tie** and the Operator in accordance with the Partnering Methodology and Programme to enable the Operator to fulfil such duties and **tie** shall take due and proper account of the Operator's comments. **tie** shall notify the Operator of those comments which are not accepted or not adhered to and/or implemented.

12.10.4 **tie** shall make available to the Operator a copy of the final version of such documentation referred to in Clause 12.10.3.

12.11 **IDA Change**

12.11.1 The Operator shall respond with comments ("**IDA Change Response**") within 5 Business Days of being notified of any proposed variation under the IDA which notice shall state clearly as the subject matter "IDA Change

Response – Urgent". If, on receipt of such notification, the Operator considers (acting reasonably) that (i) the IDA Change Response required is too complex to be completed or (ii) having regard to the number of other IDA Change Responses which have been submitted and/or are being prepared by the Operator, having regard to the Operator's resources and other obligations, a proper response cannot reasonably be completed; in each case and returned to **tie** within 5 Business Days, then the Operator shall, as soon as reasonably practicable and no later than 2 Business Days after receipt of such notification, deliver to **tie** a request for a reasonable extended period of time for return of the IDA Change Response, such extended period to be agreed by the Parties, both acting reasonably.

12.11.2 In the event that the IDA Change Response requires a modification to the proposed variation in order to avoid or mitigate the occurrence of or impact of an Infraco Event on the Operator or any adverse effects on the ability of the Operator to perform the Project Development Services and/or the Project Operations, the Operator shall provide **tie** and the Infrastructure Provider with a written report within 10 Business Days of the date of receipt of the IDA Change Response, setting out how the proposed variation under the IDA will cause the occurrence of or impact upon an Infraco Event or will affect the Project Development Services during Project Phase C1 and/or C2 and/or Project Operations during Project Phase D.

12.11.3 **tie** shall review the IDA Change Response pursuant to Schedule 9 (*Review Procedure*) and if **tie** is satisfied that modification to the proposed variation under the IDA is required to address any issue arising from the IDA Change Response, **tie** may instruct such modification under the variation provisions in the IDA.

12.11.4 If and to the extent that the Operator can demonstrate to the reasonable satisfaction of **tie** (who shall act reasonably) that the following matters directly and adversely affect the Project Operations or the Transport Services and are not minor matters:

12.11.4.1 where **tie** has not taken into account the proper and reasonable comments of the Operator acting in accordance with Good Industry Practice in respect of the Infrastructure and Equipment Output Specification, the IDA in so far as it

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affects the Transport Services or the proposals of the Infrastructure Provider(s) or an IDA Change response or report under Clause 12.11.2 or the Infrastructure Provider Maintenance in so far as it affects the Transport Services; or

12.11.4.2 where the Infrastructure and Equipment Output Specification, the IDA so far as it affects the Transport Services or the Infrastructure and Equipment to be delivered pursuant to an IDA or the Infrastructure Provider Maintenance (i) is changed, (ii) or to the extent never given to the Operator to comment on under Clauses 12.10, 12.11 or 12.11.4 without the Operator being given a proper and reasonable opportunity to comment on the change or the relevant part thereof;

then the Operator and **tie** shall discuss the matter in good faith and **tie** shall determine (acting reasonably) whether **tie** wishes to change the Project Operations or the Transport Services as a result (and the same shall be a **tie** Change) or if and to the extent that **tie** does not wish to make a **tie** Change, the Operator shall be entitled to an Operator Change to address the issues and pending implementation of either a **tie** Change or an Operator Change, then the Operator shall not be in breach of this Agreement and shall not be subject to the application of any KPI Regime Profit Element deductions pursuant to Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) of the Operating Appendix as a direct result of the circumstances set out in this Clause 12.11.4 (but to that extent only and no more).

12.11.5 Failure by the Operator to respond as stipulated or as otherwise agreed under Clause 12.11.1 shall be a bar to any claim for relief or compensation.

12.12 **Safety**

12.12.1 The Operator shall provide a suitably qualified and competent representative for the Project Safety Committee who shall be responsible for the Operator's participation in and technical contribution to the Project Safety Committee's output and discharge of its responsibilities. **tie** shall give prior notice of all meetings of the Project Safety Committee together with any agenda (where available) and any papers (where available) to the Operator in order to allow the Operator to participate. **tie** shall circulate any minutes (where available) after any such meetings.

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12.12.2 The Operator acknowledges that **tie** has chosen to follow the ROGS' route for approval of the System and that, subject to Clause 12.12.3, **tie** shall appoint the "Competent Person" as may be required from time to time.

12.12.3 In advance of making any appointment of a competent person, **tie** shall liaise with the Operator and shall take due cognisance of comments from the Operator in relation to such competent person provided that such comments are reasonable.

12.12.4 To the extent relevant or appropriate to the Project Development Services or Project Operations, **tie** shall, and shall procure that each **tie** Party, complies with Law (including ROGS) and shall provide such information and/or documentation and reasonable assistance to the Operator as the Operator requests acting in accordance with Good Industry Practice in order to enable the Operator to discharge its safety obligations and duties in accordance with this Agreement.

12.13 **Operational Interface and Operator Mobilisation**

12.13.1 The day-to-day operation of the System to the extent handed over in accordance with the Project Programme and Shadow Running Validation Plan shall be the responsibility of the Operator from the start of Shadow Running as set out in the Project Programme. In operating the System, the Operator shall give due regard to the proper and reasonable views and technical advice of the Infrastructure Provider regarding the operational deployment and integration of the various components of the System. The Operator shall notify **tie** of any such views which would necessitate an amendment to the Project Development Services and/or the Project Operations. If **tie** agrees that any amendment to the Project Development Services and/or the Project Operations is required, such amendment shall be deemed to be a **tie** Change pursuant to Clause 24 (*tie Changes*) of the Operating Appendix. If the Operator does not agree with tie's decision, the Operator may refer such decision to the Dispute Resolution Procedure for determination.

12.14 **Testing and Commissioning and Trial Running**

12.14.1 The Operator shall ensure that it works closely and effectively with the Infrastructure Provider in the performance of the Operator's obligations pursuant to paragraphs 34.2.3, 34.2.4 and 34.3, and paragraphs 35.1, 35.2 and

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paragraph 38 (*Testing and Commissioning Plan*), paragraph 41 (*Gateway from Project Phase C1 to Project Phase C2*), paragraph 43 (*Operator's Role During Testing and Commissioning*) of Schedule 2 (*Project Development Output Specification*).

12.14.2 In the event that as a direct consequence of the Infrastructure Provider failure or delay, the Operator is unable to progress with or is hindered in the performance of the Operator's obligations set out in Clause 12.14.1 above, the Operator shall notify **tie** in writing as soon as practicable stating the reasons and the action required in order to remedy the situation.

12.14.3 Following any Infraco Event, the Operator shall be entitled to reimbursement by **tie** of all reasonable and demonstrable additional costs and expenses from an extension of or significant disruption of the commissioning and Shadow Running provided in respect of delay to the Shadow Running period such period is delayed by more than one day (such one day to be allowed is an aggregate period notwithstanding any number of delays to the Shadow Running period) and incurred directly as a result of a requirement upon the Infrastructure Provider to re-test, re-trial or re-commission any part of the System.

12.15 **Partnering**

12.15.1 The Operator shall use reasonable endeavours to co-operate and communicate collaboratively with the Infrastructure Provider and the Infrastructure Provider Parties at all times from the date of their respective appointment in order to:

12.15.1.1 maintain the highest standards achievable with regard to the provision of the Transport Services;

12.15.1.2 minimise the interruption to Transport Services caused by any Infraco Event, Operator Default or **tie** Default;

12.15.1.3 safeguard proper performance of the Project Development Services, the Project Operations and, by the Infrastructure Provider, of the Infrastructure Provider obligations under the IDA;

12.15.1.4 mutually support adherence to the Project Programme and all related project delivery timelines and programmes and to share on a systematic basis Project Data and key information connected with such adherence;

12.15.1.5 report promptly to one another any proposed change which is likely to or will have a material impact on the performance of any obligations owed to **tie** by either party during design, construction, operation or maintenance of the System and inform **tie** regarding measures proposed to avoid or mitigate such impact; and

12.15.1.6 agree and implement whenever appropriate measures to minimise the likelihood of disputes or claims.

12.15.2 **tie** shall also use reasonable endeavours to co-operate, communicate and collaborate with the Operator, the Infrastructure Provider and the Infrastructure Provider Parties at all times in respect of such matters.

12.16 **Duty to Mitigate**

12.16.1 The Operator shall take all reasonably practicable measures to mitigate any Infraco Event from materially adversely affecting the proper performance of the Project Development Services and the Project Operations, including reasonably practicable measures which may be advisable in order to mitigate the risk of any reoccurrence all in so far as within the Project Development Services and/or Project Operations and/or appropriate for an Operator exercising Good Industry Practice;

12.16.2 As soon as reasonably practicable (or as specifically provided for in this Agreement) after becoming aware that an Infraco Event is likely to have or has had a material adverse impact on the Operator's ability to perform any of its obligations under this Agreement, the Operator shall notify **tie** and the Infrastructure Provider. **tie** shall arrange a meeting with the Operator, the Infrastructure Provider and **tie's** Representative to discuss and agree a plan for corrective measures necessary to address the situation and to permit the Operator to resume unrestricted (or the best, if restricted, level of) performance of Project Operations within the shortest practicable time period. It shall be the Operator's responsibility to obtain **tie's** prior consent (such

consent not to be unreasonably withheld or delayed) to, and to seek the support of, the Infrastructure Provider for the use of any corrective measures taken by the Operator, whether temporary or permanent.

12.17 **No Extension of Term for Infraco Event**

12.17.1 In the event that an Infraco Event causes delay in the issue by **tie** of the Certificate of Full Service Commencement or Certificate of Service Commencement pursuant to Clause 3 of the Operating Appendix, the Operator shall not be entitled to any extension of the Expiry Date.

12.17.2 For the avoidance of doubt, the provisions of Clause 22 (*Relief Events*) of the Operating Appendix shall not apply to Infraco Events but without prejudice to the provision of Clause 12.7.

12.18 **Infrastructure & Equipment**

12.18.1 If the Operator can demonstrate to **tie's** reasonable satisfaction (**tie** shall act reasonably) that:

12.18.1.1 the Operator cannot provide the Transport Services or Project Operations in accordance with this Agreement and/or cannot reasonably practicably comply with an instruction/direction of **tie** under this Agreement which **tie** is entitled to give and having regard to the Operator's resources and competencies; and

12.18.1.2 this is directly caused by the Infrastructure and Equipment; and

12.18.1.3 this is not an Infraco Event; and

12.18.1.4 the Operator is acting reasonably in accordance with Good Industry Practice and any adjustments to the Infrastructure and Equipment which might remove or alleviate the issue are not adjustments that the Operator ought to make as part of the Transport Services acting reasonably in accordance with Good Industry Practice and having regard to the Operator's resources and competencies;

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then the Operator shall not be in breach of this Agreement and shall not be subject to the application of any KPI Regime Profit Element deductions pursuant to Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) of the Operating Appendix in respect of the circumstances set out in this Clause 12.18, provided that to the extent the Operator should, exercising Good Industry Practice and having regard to all relevant circumstances, have identified the issue during Project Phase B and/or Project Phase C and did not, then, the Operator shall not be entitled to relief from the Operator's obligations or the application of any such KPI Regime Profit Element deductions to that extent.

12.19 **Collection and/or Provision of Information and Data**

12.19.1 The Operator's obligations in this Agreement to collect and/or process/provide information and/or data to **tie** shall be limited to what is reasonably practicable using the Infrastructure and Equipment and to the extent that the information/data is collected by or held by others and not the Operator, or to the extent provided to the Operator pursuant to the Service Integration Plan.

12.20 **Infrastructure Provider**

12.20.1 **tie** shall notify the Operator of the identity and address/place for service of notices upon the Infrastructure Provider and of any change in such details form time to time.

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PART III - OPERATIONS PHASE

13. TRANSITION TO PROJECT PHASE D

13.1 The Operating Appendix shall come into effect in accordance with its terms and this Agreement (including such Operating Appendix) will govern the performance of the Project Operations for each of the Phases and/or any Network Expansion.

13.2 The Service Commencement Date (and the Full Service Commencement Date, if different) for each Phase or Network Expansion shall be determined in accordance with the Project Programme, the terms of the Project Development Output Specification and the Operating Output Specification.

14. EDINBURGH TRAM NETWORK INTEGRATION

14.1 The Operator shall be responsible for maintaining and implementing the System Integration Plan, and shall liaise with the Infrastructure Provider(s) accordingly.

14.2 The Operator shall exercise such management authority (in respect of the performance of the System Integration Plan) pursuant to **tie**'s rights under the Infrastructure Delivery Agreements as **tie** may direct from time to time in accordance with Clause 11 (*Operation and Maintenance Procedures*) of the Operating Appendix.

14.3 During the Term, the Operator shall remain responsible for supporting maintenance and implementation of the Service Integration Plan, to support the integration of the Edinburgh Tram Network with other local public transport for the benefit of passengers and the realisation of the objectives of the Integrated Transport Initiative, the Project Vision and **tie**'s and TEL's other transportation objectives.

15. PERSONNEL ISSUES

15.1 The Operator shall at all times during the Term (including the Development Phase):

15.1.1 follow recruitment good practice to ensure that appropriately high quality staff are engaged, suitable for the posts to be filled, taking into account the level of responsibility involved;

15.1.2 procure that there are set up and maintained by the Operator and all contractors with whom the Operator contracts in respect of the Project, personnel policies and procedures covering all relevant matters (including discipline, grievance, benefits, equal opportunities and health and safety).

The Operator shall procure that the terms and the implementation of such policies and procedures comply with Law (which for the purposes of this Clause 15.1.2 shall exclude Guidance which only **tie** or a public sector body and not the Operator is bound to comply with) and Good Industry Practice, and that such policies and procedures are approved by the relevant authorised party within the Operator and are prepared in appropriate editable electronic media and paper copy and that an electronic and a reasonable number of paper copies as agreed between **tie** and the Operator (both acting reasonably) of such policies and procedures (and any revisions and amendments to them) are issued to **tie** as soon as reasonably practicable after production;

15.1.3 provide, and shall procure that all contractors with whom the Operator contracts in respect of the Project provide, to **tie** upon request written details of their respective management organisations;

15.1.4 not (and the Operator shall insert a clause to this effect in each contract with contractors with whom the Operator contracts in respect of the Project) unlawfully discriminate within the meaning and scope of the provisions of the Equal Pay Act 1970, the Sex Discrimination Act 1975, the Race Relations Act 1976, the Disability Discrimination Act 1995, the Employment Rights Act 1996, the Working Time Regulations 1998, the Part-Time Workers (Prevention of Less Favourable Treatment) Regulations 2000, the Fixed Term Employees (Prevention of Less Favourable Treatment) Regulations 2002, the Employment Equality (Sexual Orientation) Regulations 2003, the Employment Equality (Religion or Belief) Regulations 2003 and the Employment Equality (Age) Regulations 2006; and

15.1.5 have in place and implement appropriate equal opportunities and equality policies and comply with all applicable Law (which for the purposes of this Clause 15.1.5 shall exclude Guidance which only **tie** or a public sector body and not the Operator is bound to comply with) regarding employment of or recruitment of the Operator's employees.

15.2 The Operator shall during Project Phase C2 and Project Phase D:

15.2.1 comply with paragraph 7 of Schedule 4 (*Operating Output Specification*) to the Operating Appendix in relation to personnel issues; and

15.2.2 comply with the Recruitment and Training Plan.

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15.3 In accordance with Clause 5.4.2, the Operator shall comply with the Recruitment and Training Plan during Project Phase B once that plan has been agreed between **tie** and the Operator pursuant to the Project Development Output Specification.

15.4 During Project Phase C2 or Project Phase D, the **tie** Project Manager (acting properly and reasonably) may notify the Operator in writing if any employee of the Operator or any Operator Party (in accordance with the terms and conditions of employment of the employee concerned) misconducts himself or is incompetent or negligent in his duties or whose conduct in relation to the Project Operations is considered by the **tie** Project Manager to be undesirable and/or not in accordance with the Operator's obligations under this Agreement. **tie** shall co-operate with any disciplinary proceedings instigated by the Operator and shall be advised in writing by the Operator of the outcome in respect of such notification.

15.5 During Project Phase C2 or Project Phase D, if **tie**, acting fairly and having reasonable grounds to believe that a member of the Project Operations Staff:

15.5.1 has been or is under the influence of alcohol or drugs whilst performing any duties in connection with the Project Operations; or

15.5.2 has been convicted of any offence concerning sexual offences on children, theft, corruption or fraud; or

15.5.3 has, in the case of a Tram driver, been convicted of any offence involving alcohol or drugs,

requires the Operator (by notice in writing) to do so, the Operator shall (or shall procure that the relevant Operator Party shall) at the Operator's cost, immediately remove such employee from the Project Operations. Such employee may only be returned to the Project Operations if the matter or matters referred to in Clauses 15.5.1, 15.5.2 and/or 15.5.3 which is/are the subject of **tie**'s reasonable grounds is/are established to be incorrect.

PART IV - FINANCIAL PROVISIONS

15A. INDEXATION

15A.1 Indexation shall be applied on an annual basis on 1 April of each year to the costs set out in Clauses 15A.2 and 15A.3 below.

15A.2 The following costs shall be Indexed:

15A.2.1 Target Costs for Project Phase C2;

15A.2.2 Target Operating Costs;

15A.2.3 Interim Target Costs;

15A.2.4 Profit Element;

15A.2.5 any amount which is expressed to be "Indexed" in this Agreement; and

15A.2.6 any other amount which is agreed by the Parties to be Indexed.

15A.3 The following costs shall be Indexed at Premium:

15A.3.1 Fixed Costs;

15A.3.2 Interim Fixed Costs;

15A.3.3 Fixed Rates;

15A.3.4 any amount which is expressed to be "Indexed at Premium" in this Agreement; and

15A.3.5 any other amount which is agreed by the Parties to be Indexed at Premium.

16. PROJECT DEVELOPMENT COSTS

16.1 During the Development Phase of this Agreement, the **tie** Project Manager and the Operator Project Manager shall meet:

(a) no later than 7 days before the end of each Quarter during Project Phases A, B and C1 to agree the provision of Project Development Services by the Operator's Core Team for the forthcoming Quarter; and

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(b) no later than 7 days before the end of each month during Project Phases A, B and C1 to agree the provision of Project Development Services by the Operator's Non-Core Staff, and

(c) no later than 7 days before the end of each month during Project Phase C2 to agree the provision of Project Development Services during Project Phase C2

to:

16.1.1 review the partnering tasks required in the next Quarter or (as appropriate) month ;

16.1.2 specify the Project Development Services required from the Operator which will be provided by the Operator's Core Team to perform or assist in the performance of those partnering tasks. **tie** shall determine whether or not such Project Development Services fall outwith the Project Development Services to be provided by the Operator's Core Team within the relevant Capped Fee. If it is agreed that such Project Development Services would fall outwith this Capped Fee, then if **tie** still require these Project Development Services, **tie** shall require the Operator's Core Team to perform these additional Project Development Services as if these Project Development Services were being provided by the Operator's Non-Core Staff. Any additional Project Development Services required on this basis shall be specified in accordance with Clause 16.1.3 and budgeted on a monthly basis in accordance with Clause 16.1.5;

16.1.3 specify the Project Development Services required from the Operator which will be provided by the Operator's Non-Core Staff to perform or assist in the performance of those partnering tasks;

16.1.4 agree amendments to the Partnering Methodology and Programme setting out the plan and timetable for the performance of those tasks;

16.1.5 agree a forward budget for such month or Quarter (as appropriate) in respect of the services specified by **tie** pursuant to Clauses 16.1.2 and 16.1.3 for the Project Development Costs to be incurred by the Operator in performing those tasks, and such budget shall also include any agreed Profiled Fixed Costs and any agreed Profiled Profit Element (where appropriate); and

16.1.6 review progress on delivery of Project Development Services against programme and agreed budget during the immediately preceding month or Quarter (as appropriate) .

provided that:

16.1.7 if any of the matters referred to in Clauses 16.1.1 to 16.1.5 cannot be so agreed, either Party may refer the matter to the Dispute Resolution Procedure;

16.1.8 **tie** shall not be required to reimburse the Operator at more than the Core Staff Fixed Rates and the Non-Core Staff Fixed Rates in respect of the Operator's Core Team and the Operator's Non-Core Staff for the services to be provided pursuant to Clauses 16.1.2 and 16.1.3, notwithstanding that any Operator Party who makes Operator's Non-Core Staff available to the Operator for the purpose of the Project may make a greater charge to the Operator and, for the avoidance of doubt, no such greater charge shall be included within the Project Development Costs;

16.1.9 **tie** shall not be required to make any reimbursement for Project Development Costs in excess of that provided for in a budget agreed pursuant to Clause 16.1.5 unless and until (and to the extent only that) any such excess is approved by the **tie** Project Manager;

16.1.10 during Project Phases A, B, C and D, **tie** shall not be required to reimburse the Operator for the travel of any person to or from Edinburgh and/or within the United Kingdom, or for the accommodation or subsistence of any person within the United Kingdom and/or elsewhere in excess of any sum included in the Core Staff Fixed Rates or the Non-Core Staff Fixed Rates but the Operator shall be entitled to reimbursement from **tie** in relation to travel costs outwith the United Kingdom;

16.1.11 **tie** shall not be required to reimburse the Operator for any costs or expenses incurred or time spent by the Operator or any Operator Party in relation to the negotiation or the procurement, preparation or negotiation of contracts or arrangements with third parties engaged by the Operator and, for the avoidance of doubt, no such charge shall be included within the Project Development Costs; and

16.1.12 any specific Project Development Services to be provided by the Operator in relation to the support for the parliamentary process relating to the Scottish Private Bills shall be agreed on the basis of the Fixed Non-Core Staff Rates, budgeted, invoiced (quarterly) and paid for in accordance with this Clause 16 (*Project Development Costs*).

16.2 In accordance with **tie's** requirements pursuant to Clause 16.1.3, the Operator shall supply the Operator's Non-Core Staff provided that the Operator shall be obliged to provide Operator's Non-Core Staff who are employed by an Operator Party only if the required Operator's Non-Core Staff are available and can perform the required Project Development Services in accordance with the Partnering Methodology and Programme or otherwise in accordance with any timescale required by **tie** and/or the **tie** Project Manager.

16.3 The Operator shall submit to the **tie** Project Manager no later than 14 days after the end of each Quarter in respect of Project Development Services provided by the Operator's Core Team or no later than 14 days after the end of each month in respect of Project Development Services provided by the Operator's Non-Core Staff an application for payment in respect of the Project Development Costs and the Fixed Costs claimed for that Quarter or month (as appropriate). Such application for payment shall set out the following details:

16.3.1 the total Project Development Costs incurred by the Operator and/or budgeted for that Quarter or month (as appropriate) in accordance with Clause 16.1.5;

16.3.2 a breakdown of those Project Development Costs by activity and by Line or Phase (where practicable and appropriate);

16.3.3 a breakdown of those Project Development Costs between Project Development Costs relative to the Operator's Core Team and Project Development Costs relative to the Operator's Non-Core Staff;

16.3.4 the timesheets of each member of the Operator's Non-Core Staff engaged in performing the Project Development Services, certified as true and accurate by that person; and

16.3.5 a breakdown of the Fixed Costs claimed by the Operator together with a breakdown of the actual costs of any Fixed Costs incurred.

16.4 **tie** shall procure that the **tie** Project Manager shall, subject to any clarifications as are in **tie**'s opinion (acting properly and reasonably) necessary and subject to Clauses 10.11, 16.1.8, 16.1.9, 16.1.10, 16.1.11 and 16.13, certify by notice in writing to the Operator that part of the Project Development Costs and the Fixed Costs claimed in the application for payment approved by **tie** which approval shall include the sums stated in the budget for the relevant month or Quarter agreed in accordance with Clause 16.1.5 and give reasons why any part of the Project Development Costs and the Fixed Costs claimed in the application for payment has not been so approved and certified no later than 30 days after the date on which such application for payment is received by **tie** (the **"Due Date for Payment"**). **tie** shall not be liable to pay to the Operator any Project Development Costs contained in any budget agreed in accordance with Clause 16.1.5 to the extent that the Operator has not provided any of the Project Development Services. **tie** shall pay to the Operator the Project Development Costs contained in any budget agreed in accordance with Clause 16.1.5 where and to the extent **tie** instruct the Operator not to provide such Project Development Services.

16.5 Within 5 Business Days of receiving a notice from **tie** pursuant to Clause 16.4 certifying part or all of the Project Development Costs and the Fixed Costs claimed in the relevant application for payment, the Operator shall issue an invoice (in the form agreed between the Parties) to **tie** for ninety percent (90%) of such certified Project Development Costs and Fixed Costs. **tie** shall retain ten percent (10%) of such certified Project Development Costs (the **"Retention"**).

16.6 **tie** shall pay any invoice submitted in accordance with Clause 16.5 within 30 days of the Due Date for Payment calculated in accordance with Clause 16.4 (the **"Final Date for Payment"**).

16.7 Within 5 Business Days of the issue of a PPCN by **tie** (in respect of the relevant Project Phase for the relevant Line or Phase (as appropriate)), the Operator shall submit to the **tie** Project Manager the final application for payment in respect of the Project Development Costs and the Fixed Costs claimed for the relevant Project Phase for the relevant Line or Phase (as appropriate). Such application for payment shall set out details listed in Clauses 16.3.1 to 16.3.4.

16.8 **tie** shall procure that the **tie** Project Manager shall, subject to any clarifications as are in **tie**'s opinion (acting properly and reasonably) necessary and subject to Clauses 10.11, 16.1.8, 16.1.9, 16.1.10, 16.1.11 and 16.13, certify by notice in writing to the

Operator that part of the Project Development Costs and the Fixed Costs claimed in the final application for payment approved by **tie** which certification shall include the budget for the relevant month or Quarter agreed in accordance with Clause 16.1.5 in respect of the Project Development Services required from the Operator which were to be provided by the Operator's Core Team and give reasons why any part of the Project Development Costs and the Fixed Costs claimed in the final application for payment has not been so approved and certified no later than 30 days after the date on which such application for payment is received by **tie** (the **"Due Date for Payment"**).

16.9 Within 5 Business Days of receiving a notice from **tie** pursuant to Clause 16.8 certifying part or all of the Project Developments Costs and the Fixed Costs claimed in the final application for payment, the Operator shall issue an invoice to **tie** for one hundred percent (100%) of such certified Project Development Costs and Fixed Costs and, subject to Clause 16.11, for one hundred percent (100%) of each Retention retained in accordance with Clause 16.5.

16.10 **tie** shall pay the invoice submitted in accordance with Clause 16.9 within 30 days of the Due Date for Payment calculated in accordance with Clause 16.8 (the **"Final Date for Payment"**).

16.11 In respect of Project Phase A, if **tie** issues a PPCN at a time when the Royal Assent to the Scottish Private Bill for the relevant Line has not yet been obtained, the Retention in respect of any specific Project Development Services provided pursuant to Clause 16.1.12 shall not be invoiced by the Operator until following the date of the giving of Royal Assent to the Scottish Private Bill for the relevant Line. **tie** shall pay the invoice submitted in accordance with this Clause 16.11 within 30 days of its receipt by **tie**.

16.12 The Operator may refer any Dispute about Project Development Costs and/or Fixed Costs which have not been certified by **tie** to the Dispute Resolution Procedure. If it is determined pursuant to the Dispute Resolution Procedure that the whole or part of any disputed amount should be paid by **tie** to the Operator, the Operator shall raise an invoice in respect of such determined amount and payment shall be made by **tie** to the Operator not less than 7 days from the date of receipt of such invoice by **tie** or the date which, apart from the Dispute would have been the Final Date for Payment calculated in accordance with Clause 16.6 or Clause 16.8 (as appropriate), whichever date is later.

16.13 Fees payable in respect of the Project Development Services provided by the Operator's Core Team during Project Phases A, B and C1 are Capped Fees subject to the following provisions of this Clause 16.13. Under no circumstances (absent **tie**'s express agreement) shall **tie** be liable to pay the Operator any amount with respect to any Project Phase for the Project Development Services provided by the Operator's Core Team, in excess of the amount of the relevant Capped Fee notwithstanding that tasks may remain outstanding in order for completion of Project Development Services in any Project Phase to be achieved to **tie**'s satisfaction provided always that if Project Phases A, B or C1 are extended beyond the dates set out in the Project Programme and/or the Partnering Methodology and Programme, and this extension is not due to the Operator's breach of this Agreement, the **tie** Project Manager shall meet with the Operator Project Manager to agree a budget for any further Project Development Services which are required from the Operator and which will be provided by the members of the Operator's Core Team and/or the Operator's Non-Core Staff, as if all members of the Operator's Core Team and the Operator's Non-Core Staff were Operator's Non-Core Staff.. The provisions of this Clause 16 shall apply to these Project Development Services as if the Project Development Services had been specified in accordance with Clause 16.1.3.

16.14 The Operator shall notify **tie** immediately if the Operator believes that the Operator's Core Team cannot carry out the Project Development Services in accordance with the timescales set out in the Partnering Methodology and Programme or otherwise in accordance with any requirements of **tie** or the **tie** Project Manager.

16.15 The Parties may agree to suspend provision of the Project Development Services at any time for any period up to a maximum of 12 months or such longer period as the Parties may agree. In the event of any such suspension, the Parties shall agree the reasonable costs of such suspension, the terms for payment of such costs and the procedure for recommencement of the provision of the Project Development Services at the end of any agreed period of any suspension.

17. PAYMENTS FOR THE PROJECT DEVELOPMENT SERVICES

17.1 In consideration of the performance by the Operator of the Project Development Services in accordance with the terms of this Agreement, **tie**:

17.1.1 shall make the payments to the Operator specified in Clause 16 (*Project Development Costs*) and Clause 18 (*Payment during Project Phase C2*); and

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17.1.2 subject to the terms of this Agreement, grants to the Operator, with effect from the Service Commencement Date in respect of each Phase, the exclusive right to operate such Phase in accordance with the terms and for the period set out in the Operating Appendix.

17.2 The Operator's only entitlement to payment from **tie** in respect of the performance of the Project Development Services shall be as expressly provided in this Agreement.

18. PAYMENT DURING PROJECT PHASE C2

18.1 The Operator shall submit to the **tie** Project Manager an application for payment no later than 7 days after the end of each month in respect of the Fixed Costs for the month just ended, the actual costs for any Target Costs for Project Phase C2 for the month just ended, any other actual costs agreed with **tie** and the Profit Element claimed for that month in respect of the Project Development Services carried out in Project Phase C2 for the relevant Phase. Each application for payment shall set out the full detail of expenditure incurred and the monthly budget forecast agreed pursuant to Clause 16.1.5 . The application for payment shall also include a breakdown of the Fixed Costs claimed by the Operator together with a breakdown of the actual costs of any Fixed Costs incurred.

18.2 **tie** shall procure that the **tie** Project Manager shall, subject to any clarifications as are in **tie**'s opinion (acting properly and reasonably) necessary and subject to Clauses 10.11, 18.10 and 18.11, certify by notice in writing to the Operator that part of the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and Profit Element claimed in the application for payment which is approved by **tie** by reference to the agreed budget and give reasons why any part of the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and Profit Element has not been so approved and certified no later than 30 days after the date on which such application for payment is received by **tie** (the **"Due Date for Payment"**).

18.3 Within 5 Business Days of receiving a notice from **tie** pursuant to Clause 18.2 certifying part or all of the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and the Profit Element claimed in the relevant application for payment, the Operator shall issue an invoice to **tie** for ninety percent (90%) of such certified Fixed Costs, the actual costs for any Target Costs for Project Phase C2, and any other actual costs agreed with **tie** and ninety percent (90%) of the certified Profit Element. **tie** shall retain ten percent (10%)

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of the certified Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and ten percent (10%) of the certified Profit Element (the **"Retention"**).

18.4 **tie** shall pay any invoice submitted in accordance with Clause 18.3 within 30 days of the Due Date for Payment calculated in accordance with Clause 18.2 (the **"Final Date for Payment"**); and

18.5 Within 5 Business Days of the issue by **tie** of a PPCN in respect of the Project Phase C2 for the relevant Phase, the Operator shall submit to the **tie** Project Manager the final application for payment in respect of the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and Profit Element claimed for Project Phase C2. Such application for payment shall set out the information required in Clause 18.1.

18.6 **tie** shall procure that the **tie** Project Manager shall, subject to any clarifications as are in **tie**'s opinion (acting properly and reasonably) necessary and subject to Clauses 10.11, 18.10 and 18.11, certify by notice in writing to the Operator that part of the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and Profit Element claimed in the final application for payment which is approved by **tie** and give reasons why any part of the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and Profit Element claimed in the final application for payment has not been so approved and certified no later than 30 days after the date on which such application for payment is received by **tie** (the "Due Date for Payment"). The final amount certified by **tie** shall take into account a reconciliation of cost overrun or savings, as the case may be, calculated in accordance with Clause 18.11.

18.7 Within 5 Business Days of receiving a notice from **tie** pursuant to Clause 18.6 certifying part or all of the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and Profit Element claimed in the final application for payment, the Operator shall issue an invoice to **tie** for one hundred percent (100%) of such certified Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and Profit Element and for one hundred percent (100%) of each Retention retained in accordance with Clause 18.3.

18.8 **tie** shall pay the invoice submitted in accordance with Clause 18.7 within 30 days of the Due Date for Payment calculated in accordance with Clause 18.6 (the "**Final Date for Payment**").

18.9 The Operator may refer any Dispute about the Fixed Costs, the actual costs for any Target Costs for Project Phase C2, any other actual costs agreed with **tie** and/or Profit Element which have not been certified to the Dispute Resolution Procedure. If it is determined pursuant to the Dispute Resolution Procedure that the whole or part of any disputed amount should be paid by **tie** to the Operator, the Operator shall raise an invoice in respect of the determined amount and payment shall be made by **tie** to the Operator not less than 7 days from the date of receipt of such invoice by **tie** or the date which, apart from the Dispute would have been the Final Date for Payment calculated in accordance with Clause 18.4 or Clause 18.8 (as appropriate), whichever date is later.

18.10 Subject to the provisions of Clause 12 (*Interface with the Infrastructure Provider*), **tie** shall not be required to reimburse the Operator for any amount not agreed in the relevant monthly budget for Project Phase C2.

18.11 To the extent that the Operator's actual costs, in respect of which Target Costs for Project Phase C2 have been allocated, for Project Development Services carried out during Project Phase C2 (i) exceed the Target Costs for Project Phase C2 as adjusted by all additional costs and expenses to which the Operator is entitled pursuant to Clause 12.3, **tie** shall certify (subject to a 10% retention to be released upon issue of the PPCN for Project Phase C2) a contribution of twenty percent (20%) of the undisputed amount of any such excess, up to a ceiling for such excess of ten percent (10%) of the Target Costs for Project Phase C2 as adjusted by all additional costs and expenses to which the Operator is entitled pursuant to Clause 12.3; or (ii) represents a saving against the Target Costs for Project Phase C2 as adjusted by all additional costs and expenses to which the Operator is entitled pursuant to Clause 12.3, the Operator shall be entitled to a share of fifty percent (50%) of any such saving.

18.12 In the event that the Operator becomes aware of circumstances that may involve the completion of Project Phase C2 either being delayed or requiring expenditure in excess of Target Costs for Project Phase C2 and the Fixed Costs (excluding the Category Five Fixed Costs) claimed for Project Phase C2, the Operator shall notify **tie** forthwith.

19. PAYMENT DURING THE SERVICE PERIOD

19.1 The payment provisions at Clause 19 (*Payments to the Operator*) in the Operating Appendix will apply to payments during the Service Period.

20. METHOD AND CURRENCY OF PAYMENT

20.1 Subject to Clauses 20.3 and 20.4, all payments under this Agreement shall be made in pounds sterling by electronic transfer of funds to the bank account of the recipient (located in the United Kingdom) specified in the relevant invoice, quoting the invoice number against which payment is made, provided that in respect of payments pursuant to Clause 18.2 of the Operating Appendix (as regards Operating Revenues collected or received by the Operator):

20.1.1 all such Operating Revenues shall be paid directly into the bank account nominated by **tie**; and

20.1.2 the Operator shall supply statements summarising such payments in accordance with Clause 18 (*Payment of Operating Revenue to **tie***) of the Operating Appendix

20.2 If either Party (acting in good faith) disputes the amount of all or any part of a payment due under this Agreement, the undisputed amount of such payment shall be paid in accordance with Clause 20.1 and the provisions of this Clause 20.2 shall apply in respect of the disputed part only. The Parties shall resolve the Dispute in accordance with Clause 43 (*Dispute Resolution Procedure*). Following resolution of the Dispute, any amount agreed or determined to have been payable shall be paid forthwith together with interest on such amount calculated in accordance with Clause 21 (*Interest*).

20.3 If the United Kingdom becomes a Participating Member State and to the extent that EMU Legislation provides that an amount denominated in the National Currency Unit of a Participating Member State and payable within that Participating Member State may be paid either in the Euro unit or in that National Currency Unit, each Party shall be entitled to pay any such amount either in the equivalent Euro unit (at the prevailing rate of exchange given by the Bank of England on the last Business Day prior to the due date pursuant to this Agreement for such payment) or in pounds sterling during such period as the relevant EMU Legislation permits.

20.4 On expiry of such period as referred to in Clause 20.3 above, the Parties shall discharge their payment obligations to one another by payment in Euros and all liabilities, amounts (whether outstanding or payable in the future) and calculations expressed in pounds sterling in this Agreement shall be converted or amended (as the case may be) automatically to the equivalent amount in Euros at the exchange rate provided pursuant to the relevant EMU Legislation.

21. INTEREST

21.1 Each Party shall be entitled, without prejudice to any other right or remedy (excluding any right under the Late Payment of Commercial Debts (Interest) Act 1998), to receive interest on any payment not duly made pursuant to the terms of this Agreement on the due date calculated from day to day at a rate per annum equal to the Default Interest Rate from the day after the date on which payment was due up to and including the date of payment. The Parties agree that the entitlement to interest pursuant to this Clause 21 (*Interest*) constitutes a "substantial remedy" for the purposes of section 9 of the Late Payment of Commercial Debts (Interest) Act 1998.

22. SET-OFF

22.1 The Operator shall not be entitled to retain or set off any amount owed to it by **tie** against any amount due to **tie** by it.

22.2 **tie** may retain or set off any amount owed to it by the Operator which has fallen due and payable against any amount due from **tie** to the Operator by specifying the amount(s) to be set off or retained and the ground(s) for set off or retention in the notice in writing to be issued by **tie** to the Operator on or before any Due Date for Payment or by **tie** issuing to the Operator a Notice of Intention to Withhold Payment not less than five Business Days before any Final Date for Payment.

22.3 If the retention or set-off of any amount referred to in Clause 22.1 is disputed, then any undisputed part of that amount shall be retained or set off and the following provisions of this Clause 22.3 shall apply in respect of the disputed part only. The Parties shall use all reasonable endeavours to resolve the dispute in question but, if they fail so to resolve it, either Party may refer the matter to the Disputes Resolution Procedure. Following resolution of the dispute, any amount agreed or determined to have been payable shall be paid not later than 7 days from the date of resolution of the Dispute or the date which, apart from the Dispute would have been the final date for

payment (whichever is earlier), together with interest on such amount calculated in accordance with Clause 21 (*Interest*).

23. VAT

23.1 All amounts specified in this Agreement are exclusive of VAT.

23.2 If any supply made under this Agreement is or becomes chargeable to VAT then the person receiving the supply (**"Recipient"**) shall in addition pay the person making the supply (**"Supplier"**) the amount of that VAT against receipt by the Recipient from the Supplier of a valid and correct VAT invoice in respect of that supply.

23.3 Where, under this Agreement, any amount is calculated by reference to any sum which has been or will be incurred by any person, the amount shall include any VAT in respect of that sum only to the extent that such VAT is not and will not be recoverable as input tax by that person, save where such VAT is irrecoverable by reason of that person's negligence, error or omission.

23.4 The Operator shall provide to **tie** any information reasonably requested (including pursuant to Clause 49 (*Information and audit access*) in connection with the amount of VAT chargeable in relation to any supply made, payment made or reimbursed in accordance with this Agreement and payable by the Operator. To the extent **tie** suffers any Losses through irrecoverable VAT as a consequence of inaccurate or inadequate VAT related documentation provided by the Operator or a delay in the provision of such documentation, the Operator shall reimburse **tie** in respect of any such Losses.

23.5 **tie** shall not be liable to pay the Operator any irrecoverable VAT incurred by the Operator through his own oversight or omission, in particular with regard to VAT assessment of payments made pursuant to the Pain Gain Share Mechanism (set out at paragraphs 18 to 21 of Schedule 3 to the Operating Appendix) or the KPI Regime.

23.6 For the avoidance of doubt, a change in the rates of VAT during the Term shall not be treated as a Qualifying Change in Law but VAT shall be applied to any invoice submitted in accordance with this Agreement and shall be payable at the rate which is current as at the date of any such invoice.

24. TAXATION

24.1 Subject to Clause 23 (*VAT*) and Clauses 24.2 to 24.4 below, the Operator shall pay all Tax whatsoever whether parliamentary, local or otherwise which are payable in respect of (i) any rights or interests enjoyed by the Operator under this Agreement during any Project Phase and (ii) the income (other than the Operating Revenue collected by the Operator as agent for **tie** and remitted to **tie** pursuant to Clause 18 (*Payment of Operating Revenue to tie*) of the Operating Appendix) or profits generated by the Project Operations or the Tram Business. With the exception of rates in respect of the business use or occupation of premises to perform its obligations under this Agreement (which the Operator shall be entitled to include in the Operating Costs), all other payments made as described under this provision shall be for the Operator's account.

24.2 In the event the Operator is notified or otherwise becomes aware of the first Rateable Value to be assigned to the System (or of any subsequent re-evaluation) it shall promptly notify **tie**. If **tie** wishes to appeal, **tie** shall notify the Operator of its intention and the Operator shall co-operate with and provide all reasonable assistance in the prosecution of the appeal, including the provision of relevant documentation, accounts and financial and technical information, the availability of relevant managers and other material evidence reasonably required by **tie**.

24.3 **tie** shall indemnify the Operator against any demand made in respect of the Rateable Value of the System and the Operator shall be entitled to 30% of the financial benefit of any reduction in the Rateable Value of the System resulting from any appeal made under Clause 24.2 above. The Operator shall indemnify **tie** in relation to any failure to retain, keep or produce proper and complete records which adversely affects **tie**'s ability to pursue such appeal.

24.4 For the avoidance of doubt, no amount shall be included in the Target Operating Costs or the Fixed Costs in respect of the Rateable Value of the System, and any payment by **tie** pursuant to the indemnity in Clause 24.3 shall be made separately from the Payment Mechanism.

24.5 To the extent that an Infrastructure Provider is assessed as liable in respect of the Rateable Value of the System and **tie** wishes to appeal, **tie** shall notify the Operator of its intention and the Operator shall co-operate with such appeal in accordance with Clause 24.2.

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25. MITIGATION AND COST MANAGEMENT

25.1 The Operator shall (and shall procure that each Operator Party shall) take all reasonable steps to manage, minimise and mitigate:

25.1.1 all Project Development Costs during Project Phases A, B and C1, and actual costs for the Project Development Services carried out during Project Phase C2 ; and

25.1.2 the adverse effects of any Base Case Assumption proving to be an Inappropriate Base Case Assumption.

25.2 At all times during the Term, each Party shall take all reasonable steps to minimise and mitigate any loss for which that Party is entitled to bring a claim against the other Party pursuant to this Agreement.

25.3 Without prejudice to Clause 25.2, the Operator shall (and shall procure that its Operator Parties shall) take all reasonable steps to minimise the adverse effects of any Relief Event (including by seeking damages from third parties or other remedies where proceedings would have a reasonable chance of success and would not be economically imprudent having regard to the likely level of damages or the nature of the remedies and the estimated cost or duration of the proceedings).

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PART V - WARRANTIES, INDEMNITIES AND LIABILITY

26. WARRANTIES

26.1 The Operator hereby represents, warrants and undertakes to **tie** that:

26.1.1 none of the Operator, the Operator Parties or any of their respective representatives or Affiliates or professional advisers or employees or anyone acting on behalf of any of them have committed any Prohibited Act;

26.1.2 all information which has been given by any of the Operator, the Operator Parties or any of their respective representatives or Affiliates or advisers or employees or anyone acting on behalf of any of them to any member, officer, employee or adviser of **tie** was, when given true, complete and accurate in all material respects and there is no fact or matter not disclosed in writing to **tie** which:

26.1.2.1 renders any such information untrue, inaccurate or misleading; or

26.1.2.2 might, if disclosed, adversely affect the decision of anyone considering whether or not to contract with the Operator;

26.1.3 the Operator:

26.1.3.1 is duly incorporated under the law of Scotland and has the power to own its own assets and carry on its own business; and

26.1.3.2 has full power and authority to enter into and perform this Agreement which constitutes a valid and binding obligation on the Operator in accordance with its terms; and

26.1.3.3 will not, by performing its obligations under this Agreement, be in breach of any undertaking to any third party or of any applicable law so as to have a material adverse effect on its ability to discharge its obligations under this Agreement;

26.1.4 the Operator, the Operator's immediate parent company and TRANSDEV plc is not involved in any dispute with HM Inland Revenue, HM Customs & Excise, the European Commission, the OFT, or any other fiscal or regulatory authority in any jurisdiction concerning any matter which could materially and adversely affect the business of the Operator or the Project in any way;

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26.1.5 the Operator does not use any processes and is not engaged in any activities which involve the misuse of any confidential or proprietary information belonging to any third party;

26.1.6 no claim is presently being assessed and no litigation, arbitration or proceeding is in progress or, to the best of the knowledge and belief of the Operator pending or threatened, against the Operator or any of its management or assets which might have an adverse effect on the ability of the Operator to perform the obligations in this Agreement or the Operating Appendix;

26.1.7 the Operator's use and the use by **tie** of the Project Development Services and any materials provided to it as part of the Project Development Services has not infringed and shall not infringe any third party's Intellectual Property Rights;

26.1.8 there has been no material adverse change to the financial condition the Operator's immediate parent company and TRANSDEV plc since the audited accounts for the financial year 2003 including any matter resulting in a downgrade of the Operator's immediate parent company's and TRANSDEV plc's credit rating with any commercially acknowledged independent rating agency reporting the transport sector; and

26.1.9 the performance of the Project Development Services does not create any situation in which a conflict of interest arises for the Operator.

26.2 Each of the warranties, representations and undertakings given under Clauses 26.1.1 to 26.1.9 shall be construed as a separate and independent warranty, representation and undertaking and shall not be limited or restricted by reference to or inference from any other terms of this Agreement.

26.3 The Operator shall immediately disclose in writing to **tie** any event or circumstance which may arise or become known to it after the Effective Date which is materially inconsistent with any of the warranties, representations or undertakings given under Clauses 26.1.1 to 26.1.9 or which has or is likely to have a material adverse effect on the Project.

26.4 The warranties, representations or undertakings given under Clauses 26.1.1 to 26.1.9 shall be repeated by the Operator (save that Clause 26.1.8 shall apply to the Operator

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from time to time to be treated as Core Staff Fixed Rates. All Core Staff Fixed Rates shall be Indexed at Premium;

"Default Interest Rate" means the interest rate per annum equivalent to two percent above the base rate of the Bank of England current on the date on which the relevant payment first becomes overdue adjusted to reflect any changes to the rate during the period over which the payment remains overdue;

"Depot(s)" means the facilities for:

(a) the stabling, servicing, cleaning and/or maintenance of Trams and/or elements of infrastructure; and/or

(b) accommodation for operational and maintenance staff;

"Design Manual" means the design manual to be developed by the **tie** Advisers during Project Phases A and B, with input from the Operator pursuant to the Project Development Output Specification, as such Design Manual is amended during Project Phases A and B, and otherwise from time to time in accordance with this Agreement ;

"Development Assumptions" means those assumptions made by **tie** or the **tie** Advisers, in relation to the development of the System, and potential revenues and costs, and as such Development Assumptions may be modified at **tie's** option pursuant to Schedule 2 (*Project Development Output Specification*) during Project Phase A and Project Phase B in relation to each Line or Phase (as appropriate);

"Development Phase" means in respect of each Line or Phase (as appropriate);: Project Phase A, Project Phase B and Project Phase C in respect of such Line or Phase (as appropriate);;

"Dispute" means any dispute, difference or unresolved claim between the Parties in connection with or arising from this Agreement;

"Dispute Resolution Procedure" means the procedure set out in Clause 43 (*Dispute Resolution Procedure*) and Schedule 7 (*Dispute Resolution Procedure*);

"Document Management Plan" means the plan referred to in paragraph 26.10 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance the terms of this Agreement;

"DPOFA Variation Date" means 20 December 2007;

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"Due Date for Payment" means the dates calculated in accordance with Clauses 16.4, 16.8, 18.2 and 18.6 as appropriate;

"Edinburgh" means the geographical area of the unitary authority of the City of Edinburgh Council as at the Effective Date and any other geographical area which comes within the area of responsibility of CEC at any time during the Term, provided that to the extent that the System serves areas outside Edinburgh from time to time, references to "Edinburgh" shall be deemed to apply to such areas to the extent appropriate in the context;

"Edinburgh Holiday" means any day which is a public holiday recognised by the CEC;

"Edinburgh Tram Network" means any part of Phase 1a of the tramway which is to be designed, constructed, maintained and operated in Edinburgh (forming part of Line 1 and Line 2 as described in the Tram Legislation) as may be amended from time to time, together with Phase 1b, any Network Expansion, modification, line extension, spur, interconnection and any additional line which may be instructed by **tie** in accordance with the provisions of this Agreement;

"Edqual Indicator" has the meaning given in Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) of the Operating Appendix;

"Effective Date" shall mean 28 June 2004;

"Electricity Usage Forecast" has the meaning given in Clause 3.13.1 of the Operating Appendix and includes such forecast as may be amended from time to time in accordance with Clause 3.13 of the Operating Appendix;

"Emergency Services" means Lothian and Borders Police, Lothian and Borders Fire Brigade, Scottish Ambulance Services and HM Coastguard;

"Employment Liabilities" means any award, loss, fine, compensation, damages order, payment made by way of settlement, costs and expenses (including legal costs on an indemnity basis) properly incurred in connection with a claim made by or in respect of any of the Project Development Staff or Project Operations Staff (including a claim made by a trade union, a governmental or statutory body or local authority or commission), and also including the costs of any investigation by the Equal Opportunities Commission, the Commission for Racial Equality or the Disability Rights Commission, and of costs of implementing any requirements that may arise from any such investigation;

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"EMU" means Economic and Monetary Union as contemplated in the Treaty of European Union;

"EMU Legislation" means legislative measures of the European Council for the introduction of, changeover to or operation of a single or unified European currency (whether known as the Euro or otherwise), being in part the implementation of the third stage of EMU;

"Enabling Legislation" means such Legislation, in the form of Scottish Private Bills, Acts or otherwise, as gives permanent authority to CEC and to **tie** to finance, build, commission, operate, maintain and decommission the Edinburgh Tram Network;

"Environmental and Sustainability Management Plan" means the plan referred to in paragraph 26.13 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

"Environmental Statement" means the environmental statements supporting each of the Scottish Private Bills;

"Escrow Agent" means the agent to be agreed between **tie** and the Operator in the event that any Operator Software and/or Specially Written Software and/or Third Party Software is upgraded or updated, and deposited in accordance with Clause 47.9;

"Escrow Agreement" means the agreement to be agreed between **tie** and the Operator in the event that any Operator Software and/or Specially Written Software and/or Third Party Software is upgraded or updated, and deposited in accordance with Clause 47.9;

"Estimate" means the estimate to be provided by the Operator pursuant to Clause 24.3 of the Operating Appendix;

"Euro" means the single currency of Participating Member States of the European Union;

"Euro Compliant" has the meaning given in Clause 9.10 of the Operating Appendix;

"Expiry Date" means, subject to **tie**'s right to extend the Expiry Date pursuant to Clause 2.2 or any agreement between **tie** and the Operator (pursuant to Clause 2.3), 02.00 hours on the date which is the fifteenth anniversary of the Effective Date;

"Fares" means the prices being charged from time to time for journeys on the System;

"Final Date for Payment" means the dates calculated in accordance with Clauses 16.6, 16.10, 18.4 and 18.8 as appropriate;

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"Final Persistent Breach Notice" means a notice served by **tie** pursuant to Clause 34.2;

"Financial Panel" has the meaning given to it in paragraph 5.4 of Schedule 7 *(Dispute Resolution Procedure)*;

"Financial Proposals" means the financial proposals presented by the Operator and approved by **tie** and agreed at the DPOFA Variation Date as Schedule 4 (*Financial Proposals*) to this Agreement as may be adjusted from time to time in accordance with this Agreement or otherwise by agreement between **tie** and the Operator;

"First Party" has the meaning given in Clause 3.3;

"First Tram" means a timetabled Tram that is the first to operate in passenger service on any route in each direction on any day;

"Fixed Costs" means the Category One Fixed Costs, the Category Two Fixed Costs, the Category Three Fixed Costs, the Category Four Fixed Costs, the Category Five Fixed Costs, and any other costs which **tie** and the Operator may agree from time to time should be treated as "fixed costs" whether within one of the already defined categories of costs or otherwise. Indexed at Premium provided that where there is a time interval between the Service Commencement Date and the Full Service Commencement Date for a Phase, the Fixed Costs for the System (including such Phase) for such period shall be the Interim Fixed Costs;

"Fixed Rates" means the Core Staff Fixed Rates, the Non-Core Staff Fixed Rates and/or any other rates which **tie** and the Operator may agree from time to time should be treated as "fixed rates" whether within one of the already defined categories of rates or otherwise as Indexed at Premium;

"Force Majeure Event" means the occurrence after the Effective Date of:

(a) war, civil war, armed conflict or terrorism; or

(b) nuclear, chemical or biological contamination unless the source or cause of the contamination is the result of actions of the Operator; or

(c) pressure waves caused by devices travelling at supersonic speeds.

"Full Service" has the meaning given in Clause 8.7 of the Operating Appendix;

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"Full Service Commencement" means, in respect of any Phase, the provision of the full level of the Transport Services in respect of that Phase as specified in the Operating Output Specification;

"Full Service Commencement Date" means, in respect of each Phase, the date specified in the Certificate of Full Service Commencement in respect of that Phase;

"Full Service Day" means pursuant to the terms of Clause 8 (*Special Events*) of the Operating Appendix, a day falling during the Service Period in respect of which **tie** have given prior written notice to the Operator requiring the Operator to provide a Full Service over all or part of the System;

"Good Industry Practice" means using standards, practices, methods and procedures conforming to the Law and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably be expected from a large, reputable, professionally qualified, competent and skilled organisation experienced in carrying out activities of a similar nature, scope and complexity to those comprised in the Project Development Services and the Project Operations and seeking in good faith to comply with its contractual obligations and all duties owed by it;

"Guidance" means any applicable guidance, direction or determination issued by any regulatory body with which **tie** and/or the Operator is bound to comply;

"Handback Package" means the information referred to in Clause 28 (*Transition on Termination or Expiry*) of the Operating Appendix, as updated by the Operator from time to time in accordance with the provisions of that Clause;

"Headway" means, in relation to the Transport Services, the period in minutes and whole seconds between a Tram and the subsequent Tram either departing from an Originating Tramstop or a Headway Measurement Tramstop;

"Headway Measurement Tramstop" means any Tramstop so designed by agreement between the Operator and **tie**;

"Helpdesk" has the meaning given to it in Clause 12.2 of the Operating Appendix;

"HMRI" means Her Majesty's Railway Inspectorate (or any successor authority);

"HS Act" has the meaning given to it in Clause 4.4;

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"Inappropriate Base Case Assumption" means any Base Case Assumption which is agreed or determined in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* to be:

(a) outwith any threshold set within the relevant Base Case Assumption or,

(b) where there is no stated threshold within the Base Case Assumption, any such Base Case Assumption which is incorrect to a material extent following the further development of the Project pursuant to this Agreement;

"Inception Report" means the report to be submitted by the Operator to **tie** pursuant to paragraph 5.5.6 of Schedule 2 (*Project Development Output Specification*), setting out details of the Operator's proposals for the Partnering Methodology and Programme;

"Incident Management Plan" means the plan referred to in paragraph 26.11 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

"Indemnified Liabilities" means actions, claims, (including third party claims) demands, proceedings, losses, damages, liabilities, costs and expenses (including reasonable legal fees and expert witness fees);

"Indexed" means in relation to an amount, that amount to be multiplied by the value of RPIX at the Point of Indexation, divided by the Base Case RPIX to generate a percentage movement;

"Indexed at Premium" means in relation to an amount, that amount to be multiplied by a factor calculated as the value of RPIX at the Point of Indexation, divided by Base Case RPIX to generate a percentage movement, with a further 0.5% added to this percentage movement;

"Indirect Loss" means any business interruption, loss of profits, loss of business, loss of business opportunity, loss of or damage to or corruption of data or loss of management time or time of other employees;

"Infraco Event" means

(a) any delay or significant disruption against agreed milestone or programme dates for the delivery, testing or installation or making available in accordance with the Project Programme of Infrastructure and Equipment and any related services and supplies including the Project Programme;

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(b) any delay or significant disruption in the execution of Infrastructure Maintenance Obligations and Tram Maintenance Obligations and/or response to any request from the Operator to assist in relation to unforeseen damage to, obstruction on or interference with the System caused by third party or weather conditions;

(c) any defect or fault in the Infrastructure and Equipment or the Works (whether apparent or latent), including the requirement for unscheduled remedial works, repairs or replacement of defective components or any failure or omission in the provision of Infrastructure Provider services pursuant to the IDA;

(d) any defect or fault in overall System integration, (whether deriving from deficient interface between any components of the System or a combination of such components); or

(e) failure by an Infrastructure Provider to materially comply with the Code of Construction Practice or Code of Maintenance Practice.

"Infraco Snagging List" means the list of defects or outstanding and/or incomplete items in the Infrastructure and Equipment to be provided to the Operator pursuant to Clause 12.9.1;

"Infrastructure and Equipment" means in respect of each Phase, all infrastructure and equipment and all other elements of the System to be made available for the operation of the System in respect of that Phase, including:

(a) track, power, signalling and communications equipment and related information technology (IT);

(b) Tramstops;

(c) Depot(s);

(d) the Control Centre;

(e) Trams;

(f) CCTV and hand-held ticket vending machines; and

(g) asset management system.

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"Infrastructure and Equipment Output Specification" means, in respect of each Phase, the output specification contained in the Infrastructure Delivery Agreement in respect of that Phase;

"Infrastructure Delivery Agreement" means, in respect of each Phase (or Network Expansion), the agreement to be entered into between **tie** and the Infrastructure Provider for that Phase, part Phase or Network Expansion in respect of (inter alia) the delivery and/or maintenance of the Infrastructure and Equipment for that Phase, part Phase or Network Expansion (and "IDA" shall be interpreted accordingly);

"Infrastructure Provider" means any party with whom **tie** concludes an Infrastructure Delivery Agreement, which party for the purposes of this Agreement shall be fully responsible for all Infrastructure Provider Parties

"Infrastructure Provider Maintenance" means all maintenance of the System other than the Operator Maintenance;

"Infrastructure Provider Party" means each and any of the Infrastructure Provider's agents and contractors (including TramCo) and its or their subcontractors (of any tier) and its or their directors, officers and employees in relation to the Project and **" Infrastructure Provider Parties"** shall be construed accordingly;

"Initial Fares" means the fares charged in accordance with the TEL Fares Policy and notified to the public no less than 60 days in advance of Service Commencement;

"Initial Response" has the meaning given in paragraph 26.5.5 of Schedule 2 (*Project Development Output Specification*);

"Insolvency Event" means any of the following events:

(a) the Operator is unable to pay its debts as they fall due or is insolvent or admits in writing inability to pay its debts as they fall due;

(b) the Operator suspends for a period of two months making payments on all or any class of its debts or a moratorium is declared by the Operator in respect of its indebtedness;

(c) the Operator ceases business or announces an intention to do so;

(d) the following are entered into:

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(i) a voluntary arrangement (other than a solvent one) for a composition of debts of the Operator;

(ii) a scheme of arrangement in respect of the Operator pursuant to the Insolvency Act 1986 or the Companies Act 1985; or

(iii) a material composition or arrangement other than a solvent one with the Operator's creditors;

(e) either of the following:

(i) the winding-up of the Operator (including passing a shareholders' resolution or the presentation of a petition by the Operator for the purpose of winding up the Operator); or

(ii) its administration (including where an application is made by the Operator, or petition is presented by the Operator for or any meeting of its directors or members resolves to make an application for an administration order);

(f) an order for the winding-up or administration of the Operator is made;

(g) any liquidator, judicial custodian, receiver, administrative receiver, administrator or the like is appointed in respect of the Operator or any material part of the Operator's assets;

(h) possession is taken of, or any execution or other process (other than on the dependence or inhibition) is levied or enforced upon, any material part of the property (whether real or personal) of the Operator by or on behalf of any creditor or encumbrancer of the Operator; or

(i) anything analogous to any of the events mentioned in paragraphs (a) to (h) above occurs in relation to the Operator under the law of any relevant jurisdiction;

"Integrated Management System" or **"IMS"** has the meaning given in paragraph 26.1 of Schedule 2 (*Project Development Output Specification*);

"Integrated Transport Initiative" means CEC's transportation enhancement and investment programme approved in principle by the Scottish Executive as set out in the report prepared by **tie** entitled 'A Vision for Edinburgh' dated 2nd September 2002 and known as the Integrated Transport Initiative for South East and Central Scotland (encompassing the

Edinburgh Tram Network as a major core project) which is currently being managed and procured by **tie** on behalf of CEC;

"Intellectual Property Rights" means any rights in or to any patent, petty patent, copyright, sui generis database right, design right, utility model, trade mark, brand name, service mark, trade name, business name, internet domain name, business get-up, trade dress, chip topography right, know how or confidential information and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or for an extension, revival or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the law of England or of any other jurisdiction;

"Interim Fixed Costs" means, where there is a time interval between the Service Commencement Date and the Full Service Commencement Date for a Phase, the Fixed Costs for the System including such Phase for such period Such Interim Fixed Costs shall be Indexed at Premium;

"Interim Target Operating Costs" means, where there is a time interval between the Service Commencement Date and the Full Service Commencement Date for a Phase, the Target Operating Costs for the System including such Phase for such period. Such Interim Target Operating Costs shall be Indexed;

"Interim Target Patronage" means, where there is a time interval between the Service Commencement Date and the Full Service Commencement Date for a Phase, the Target Patronage for the System including such Phase for such period;

"Internal Dispute Resolution" means the procedure set out in paragraph 2 of Schedule 7 (*Dispute Resolution Procedure*);

"Joint Names Insurance" has the meaning given in Clause 27.3;

"Joint Revenue Committee" means the committee to be established by **tie** in accordance with Clause 20 *(Adjustment of Fixed Costs, Target Operating Costs and Target Patronage)*, of the Operating Appendix;

"Key Performance Indicators" means those performance indicators described in Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) to the Operating Appendix, as such Key Performance Indicators may be amended from time to time in accordance with this Agreement;

"Key Personnel" means those Project Development Staff specified as such in Schedule 3 (*Key Personnel*);

"KPI Monitoring Report" means the report included with the Service Quality Report;

"KPI Regime" means the regime for deductions from the KPI Regime Profit Element depending on the Operator's performance against the Key Performance Indicators, as set out in Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) to the Operating Appendix;

"KPI Regime Profit Element" shall mean the Profit Element multiplied by a factor of 1.1;

"KPI Warning Notice" means the notice served by tie in accordance with paragraphs 13, 14 and/or 15 of Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) on the Operator following service of a Major KPI Beach Notice;

"Last Tram" means each of the timetabled Trams which are the last to operate in passenger service on each route in each direction prior to the Edinburgh Tram Network shutting down for the night;

"Late Tram" has the meaning given in Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) of the Operating Appendix;

"Law" means:

(a) any applicable Legislation;

(b) any applicable Guidance; and

(c) any applicable judgment of a relevant court of Law which is a binding precedent,

in each case in force in Scotland;

"Legal Panel" has the meaning given to it in paragraph 5.4 of Schedule 7 *(Dispute Resolution Procedure)*;

"Legislation" means any Act or instruments of the Scottish Parliament or the United Kingdom Parliament (where in force in Scotland) or subordinate legislation within the meaning of section 21(1) of the Interpretation Act 1978, any exercise of the Royal Prerogative, and any enforceable community right within the meaning of section 2 of the European Communities Act 1972, in each case with respect to Scotland;

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"Line" means each of Line 1 (or part thereof), Line 2 (or part thereof) and any Network Expansion agreed pursuant to Clause 11 *(Network Expansion)* (or part thereof);

"Line 1" means the tramway works as authorised by the Edinburgh Tram (Line One) Act 2006;

"Line 2" means the tramway works as authorised by the Edinburgh Train (Line Two) Act 2006;

"Line 3" means a proposed south-eastern line from Edinburgh city centre to Cameron Toll, the New Royal Infirmary, Craigmillar, Fort Kinnaird and Newcraighall with a possible extension to Musselburgh, as such route may be further developed and/or amended during Project Phase A or Project Phase B in respect of Line 3;

"Local Authority" has the meaning given it under Section 235(1) of the Local Government (Scotland) Act 1973;

"Local Services" shall have the meaning given by section 2 of the Transport Act 1985;

"Local Transport Strategy (LTS)" means CEC's plans and priorities for the development of an integrated transport policy within Edinburgh, designed to serve the people of Edinburgh in a way which is consistent with the Scottish Executive's overall sustainable development objectives, and as such LTS is amended by CEC from time to time;

"Long-Term Roads Change" means a Relevant Roads Change which persists for more than 3 months but is not permanent;

"Losses" means all damages, losses, liabilities, costs, expenses (including legal and other professional charges and expenses) and charges whether arising under statute, contract or at common law or in connection with judgments, proceedings or demands;

"Major KPI Breach Notice" has the meaning given in paragraph 13 of Schedule 3 to the Operating Appendix (*Project Phase D Payment Mechanism and KPI Regime*);

"Marketing Plan" means the plan referred to in paragraph 26.15 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

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"Minimum Profit Element" means £450,000 (as Indexed);

"Mobilisation Certificate" means the certificate to be issued by **tie** pursuant to paragraph 41.3 of Schedule 2 (*Project Development Output Specification*);

"Mobilisation Services" means the activities performed by the Operator in accordance with this Agreement during Project Phase C2 to support the testing and commissioning of the System as described in paragraph 48 of Schedule 2 (Project Development Output Specification);

"National Currency Unit" means the unit of currency (other than a Euro unit) of a Participating Member State;

"Necessary Consents" means without limitation all permissions, consents, approvals, non objections, certificates, permits, licences, statutory agreements and authorisations, required by Law , and all necessary consents and agreements from any third parties or Relevant Authority, any Planning Permission, building fixing agreement, building control approval, consent from Network Rail, consent from HMRI (whether by simple application or by ongoing approval process), needed to plan, commence, carry out or complete (i) the Construction Works, or (ii) the Project Operations in accordance with this Agreement;

"Network Effects Study" means the study commissioned by **tie** to determine the effects on costs and revenues of operating all the Lines together as a single network, and referred to in paragraph 5.1 of Schedule 2 (*Project Development Output Specification*);

"Network Expansion" means expansion beyond Phase 1a and Phase 1b, which could include any further light rail system connecting either with or within the System or with any other light rail system which connects with the System;

"Network Rail" means Network Rail Limited (company number 4402220) and any Affiliate or any successors to any part of its assets and/or undertakings which is relevant to the performance of the Project Operations;

"No Better and No Worse" shall be construed by reference to the Operator's:

(a) rights, anticipated receipts, duties and liabilities under or arising pursuant to performance of this Agreement; and

(b) ability to perform its obligations and exercise its rights under the Agreement;

so as to ensure that:

(c) the ability of the Operator to meet the requirement of the Operating Appendix is not adversely affected or improved as a consequence of the Relevant Event;

(d) the ability of the Operator to achieve Target Costs for Project Phase C2, Target Operating Costs and Target Patronage is not materially adversely affected or materially improved; and

(e) the ability of the Operator to continue to perform its obligations in terms of this Agreement in respect of the Fixed Costs is not materially adversely affected or materially improved;

and any reference in this Agreement to leaving the Operator in "No Better and No Worse position" shall be construed accordingly;

"Noise and Vibration Policy" means the policy going by that name and referred to in the Tram Legislation;

"Non-Core Staff Fixed Rates" means the costs numbered "8" in the tables included in the Base Case Assumptions, which are set in accordance with Clause 10 *(Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* at a level in accordance with Table 1 of the Project Development and Operating Costs, and such other rates as **tie** and the Operator may agree from time to time to be treated as Non-Core Staff Fixed Rates. All Non-Core Staff Fixed Rates shall be Indexed at Premium;

"Notice of Adjudication" has the meaning given to it in paragraph 5.1 of Schedule 7 *(Dispute Resolution Procedure)*;

"Notice of Intention to Withhold Payment" means a notice specifying the amount to be withheld and the ground for withholding payment, or if there is more than one ground, each ground and the amount attributable to it;

"Notification" has the meaning given to it in paragraph 2.1 of Schedule 7 (*Dispute Resolution Procedure*);

"OCIP Insurances" means the insurances referred to in Clause 27 (*Insurances*) and set out in part 3 of Schedule 10 (*Insurances*) which may as a **tie** Change be amended, extended, renewed or supplemented/complemented by other insurances and notified (as required) to the Operator from time to time in accordance with Clause 27;

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"OFT" means the Office of Fair Trading or its successor entity;

"One Ticket" means the through ticketing scheme currently operated by SESTRAN Travelticket Limited or any successor to such scheme nominated by **tie**;

"Open Book Basis" means the availability and disclosure (consistent with operation of Clause 49 (*Information and Audit Access*)) of all underlying data and calculations used by the Operator to create and justify costings and financial analysis presented to **tie** during all Project Phases;

"Operating and Maintenance Manual" means a manual setting out the procedures for operating and maintaining the System in sufficient detail to enable **tie** or a Successor Operator to operate and maintain the System to the same standards as those required of the Operator under this Agreement;

"Operating Appendix" means Appendix 1 to this Agreement in relation to (inter alia) the operation of the Transport Services on the System as amended from time to time pursuant to this Agreement;

"Operating Costs" means the actual operating costs incurred by the Operator in a Reporting Period ;

"Operating Deficit" means Operating Costs exceed Operating Revenues in respect of a Reporting Period;

"Operating Effective Date" means the date that **tie** notifies the Operator that each of the Operator Conditions Precedent (with the exception of any Operator Conditions Precedent that have been expressly waived by **tie** in writing) have been satisfied in accordance with Schedule 1 *(Conditions Precedent)* to the Operating Appendix;

"Operating Method Statements" means the method of performing the Project Operations (and, to the extent relevant, the Project Development Services) developed by the Operator and **tie** pursuant to the Project Development Output Specification, and as amended from time to time in accordance with:

(a) the Project Development Output Specification in relation to each additional Line or Phase (as appropriate), or Network Expansion on which the Operator is to provide the Transport Services in accordance with this Agreement; or

(b) Schedule 9 (*Review Procedure*);

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"Operating Output Specification" means **tie**'s requirements as regards the Project Operations to be performed by the Operator during the Service Period, as set out in Schedule 4 (*Operating Output Specification*) to the Operating Appendix, and developed by **tie** and the Operator pursuant to the Project Development Output Specification, and as varied from time to time in accordance with:

(a) this Agreement in relation to each additional Line or Phase (as appropriate), or Network Expansion on which the Operator is to provide the Transport Services in accordance with this Agreement; or

(b) Clause 53 (*Variations and Waivers to be in Writing*) and Clauses 23 (*Performance and Financial Adjustments*), 24 (***tie** Changes*) and 25 (*Operator Changes*) of the Operating Appendix;

"Operating Revenues" means the revenues collected from the operation of the System, including all Patronage Revenue but, for the avoidance of doubt, excluding any amounts paid by **tie** to the Operator pursuant to this Agreement;

"Operations Management Plan" means the plan referred to in paragraph 26.2 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

"Operations Panel" has the meaning given to it in paragraph 5.4 of Schedule 7 *(Dispute Resolution Procedure)*;

"Operator Change" means a change in the Project Operations proposed by the Operator during Project Phase C or Project Phase D and which **tie** accepts pursuant to Clause 25 (*Operator Changes*) of the Operating Appendix;

"Operator Conditions Precedent" means the conditions specified in Schedule 1 (*Conditions Precedent*) to the Operating Appendix;

"Operator Default" means one of the following events:

(a) a breach by the Operator of any of its material obligations under this Agreement;

(b) failure to comply with the Service Integration Plan;

(c) failure to provide the resources to support Mobilisation Services in accordance with the Recruitment and Training Plan and the Project Programme;

(d) an Insolvency Event save where caused directly by **tie** being in breach of its obligations under this Agreement;

(e) the Operator commits any breach of Clause 44 (*Assignation, Sub-Contracting and Changes in Control*);

(f) the Operator abandons the Project Development Services or the Project Operations (or a material part of them) at any time and in this context 'abandon' shall mean:

(i) during the Development Phase, a failure to deploy the level of agreed resources which results in substantial failure to provide the Project Development Services for a period exceeding 5 Business Days save as may be agreed from time to time;

(ii) during the Service Period, if no Transport Services are provided on the System (or a material part of it), for a period exceeding 5 consecutive days, by reason (in whole or material part) of any industrial dispute directly affecting the Operator which causes a breach by the Operator of its obligations under this Agreement or for a period exceeding 2 consecutive days, by reason (in whole or material part) of any matter other than an industrial dispute directly affecting the Operator which constitutes breach by the Operator of its obligations under this Agreement;

(g) the Service Commencement Date for a Phase is not achieved on or before the date falling three months after the Planned Service Commencement Date as same may be amended for that Phase, to the extent that the reason for such delay is caused by a breach by the Operator of any of its obligations under this Agreement ;

(h) after the issue of a Major KPI Breach Notice, the issue of a second such notice at any time during the 13 Reporting Periods following the issue of the Major KPI Breach Notice;

(i) a breach by the Operator of its obligations to take out and maintain the Required Insurances in accordance with the terms of this Agreement; or

(j) except in the first three years of operation following the issue of the first Certificate of Services Commencement, if the Operating Costs exceed the Target Operating Costs and any Fixed Costs at any other time during the Service Period in 6 Reporting Periods out of any rolling period of 12 months; and

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(k) under performance as stipulated by paragraph 15 of Schedule 3 *(Project Phase D Payment Mechanism and KPI Regime)* of the Operating Appendix.

"Operator Equipment and Software" has the meaning given in Clause 9.11 of the Operating Appendix;

"Operator Financial Model" means the financial model presented by the Operator and approved by **tie** and agreed as of the DPOFA Variation Date as Schedule 5 (*Operator Financial Model*) to this Agreement as may be adjusted from time to time in accordance with this Agreement or otherwise by agreement between **tie** and the Operator;

"Operator IPR" means:

(a) all Intellectual Property Rights (including Intellectual Property Rights in relation to the Operator Software) which the Operator can demonstrate by documentary evidence were already existing and owned by or licensed to the Operator prior to the Effective Date; and

(b) any modifications or developments of any of the rights listed in paragraph (a) above or the Project Operations and which are generic in nature and not specific to the Project;

"Operator Maintenance" means such maintenance of the System to be carried out by the Operator as outlined in paragraphs 26.5.3 and 26.5.4 of the Project Development Output Specification;

"Operator Maintenance Plan" means the plan referred to in paragraph 26.5 of Schedule 2 (*Project Development Output Specification*) in relation to the Operator Maintenance of the Infrastructure and Equipment, as such plan is modified from time to time in accordance with the terms of this Agreement;

"Operator Necessary Consents" means:

(a) any Necessary Consents from HMRI and/or Competent Person for the provision by the Operator of the Transport Services; and

(b) any Necessary Consents which the Operator is required to obtain which are specified in the Approvals Management Plan; and

(c) such other Necessary Consents which the Operator is required to obtain that **tie** may from time to time specify by notice to the Operator,

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"Operator Notice of Change" means a notice served by the Operator pursuant to Clause 25 (*Operator Changes*) of the Operating Appendix;

"Operator Party" means each and any of the Operator's agents and contractors and its or their subcontractors (of any tier) and its or their directors, officers and employees in relation to the Project and **"Operator Parties"** shall be construed accordingly;

"Operator Project Manager" shall have the meaning given to it in Clause 6.7;

"Operator Snagging Matters" means minor failures by the Operator to comply with either (i) **tie** Completion Requirements or (ii) the Operating Output Specification where such minor failures and their rectification:

(a) would not materially impair provision of the Transport Services by the Operator or the use and enjoyment of the System or Transport Services by the Operator or members of the public; and

(b) would not cause any material (i) cost, (ii) nuisance, (iii) hindrance or (iv) annoyance to any person;

"Operator Software" means programs, the Intellectual Property Rights in which are (a) owned by the Operator; and (b) used by the Operator to carry out its obligations under this Agreement;

"Operator's Core Team" means those members of the Operator's core team set out in the Base Case Assumptions and the Project Development and Operating Costs, and such substitutes as may be agreed from time to time;

"Operator's Non-Core Staff" means those members of the Operator's non-core staff set out in the Base Case Assumptions and the Project Development and Operating Costs, and such substitutes as may be agreed from time to time;

"Originating Tramstop" means the Tramstop where a Tram is scheduled in the Timetable to begin its service journey and will be a Monitoring Point (as defined in Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) of the Operating Appendix;

"Overall Approvals Management Plan" means that plan to be developed by **tie** and **tie's** advisers referred to in paragraph 26.8 of Schedule 2 (*Project Development Output Specification*) to this Agreement;

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"Pain/Gain Share Period" means a period of, in continuous alternating fashion during Project Phase D, six consecutive Reporting Periods and then seven Reporting Periods provided that:

(a) the first Pain/Gain Share Period shall commence on the Service Commencement Date of the first Phase to become operational;

(b) each Pain/Gain Share Period shall start on the day following the last day of the preceding such period; and

(c) the last Pain/Gain Share Period shall end on the date of termination or expiry of this Agreement;

"Panels" has the meaning given to it in paragraph 5.4 of Schedule 7 *(Dispute Resolution Procedure)*;

"Participating Member State" means each state so described in any EMU Legislation;

"Partnering Methodology and Programme" means the programme for the development of the Project during Project Phase A, Project Phase B and Project Phase C in respect of each Phase, and the methodology for such development, as agreed between **tie** and the Operator pursuant to paragraph 5.5.6 of the Project Development Output Specification (taking account of the Inception Report), as such Partnering Methodology and Programme is amended from time to time pursuant to this Agreement;

"Party" means each and any of the parties to this Agreement and Parties shall be construed accordingly;

"Patronage Revenue" means all revenue collected by the Operator from fares levied on-board Trams in respect of passengers;

"Payment Mechanism" means the payment mechanism as set out in Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) to the Operating Appendix;

"Performance Bond" means an 'on demand' bond provided by the Operator and issued by a surety acceptable to **tie** and in the form of that set out in Schedule 14 (*Performance Bond*);

"Performance Indicators" means those performance indicators referred to in paragraph 25 of the Project Development Output Specification;

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"Performance Monitoring Regime" means the detailed regime (as may be amended from time to time in accordance with an agreed **tie** Change or agreed Operator Change or as may be otherwise amended in accordance with the Agreement) produced by the Operator and **tie** pursuant to paragraph 25 of the Project Development Output Specification setting out how the Operator will monitor its compliance with the Operating Output Specification and its obligations under this Agreement in a way which will enable (i) the Operator to produce the Service Quality Reports; (ii) **tie** to satisfy itself as to the level of the Operator's compliance with the Operating Output Specification and other relevant obligations under this Agreement; and (iii) the Parties to perform their respective responsibilities pursuant to and as described in Clause 16 (*Best Value and Project Phase D Benchmarking*) of the Operating Appendix;

"Performance Points" means points allocated for good/poor performance in accordance with Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) of the Operating Appendix;

"Permanent Roads Change" means a Relevant Roads Change which is permanent;

"Persistent Breach Notice" means a notice served by **tie** pursuant to Clause 34 (*Persistent Breach*);

"Personal Loss" means any personal injury or death, illness, disability, shock, mental anguish, injury or trauma to any person (including one of the Parties);

"Phase" means each of Phase 1a (or part thereof), Phase 1b (or part thereof) and/or any Network Expansion agreed pursuant to Clause 11 *(Network Expansion)* (or part thereof);

"Phase 1a" means the section of Line 1 from Newhaven to Roseburn Junction and the section of Line 2 from Roseburn Junction to the Airport;

"Phase 1b" means the section of Line 1 from Roseburn Junction to Granton Square;

"Planned Service Commencement Date" means, in respect of any Phase thereof, the date fixed by the Project Programme by which Service Commencement in respect of that Phase is planned to occur;

"Planning Permission" means planning permission, listed building consent, conservation areas consent and/or other consent or approval reasonably required from time to time for construction and/or installation and/or operation of the System (including for any Variation);

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"Point of Indexation" shall be January each year to be applied annually as of 1st April each year;

"Position Paper" has the meaning given to it in paragraph 2.2 of Schedule 7 *(Dispute Resolution Procedure)*;

"PPCN" means a Project Phase Completion Notice;

"Pre-Mobilisation Certificate" means the certificate to be issued by **tie** pursuant to paragraph 41.1 of Schedule 2 (*Project Development Output Specification*);

"Profiled Fixed Costs" means the Fixed Costs as profiled in accordance with Clause 10.14;

"Profiled Profit Element" means the Profit Element as profiled in accordance with Clause 10.14;

"Profiled Target Operating Costs" means the Target Operating Costs as profiled in accordance with Clause 10.14;

"Profiled Target Patronage (boarders)" means the Target Patronage as profiled in accordance with Clause 20.7 *(Adjustment of Fixed Costs, Target Operating Costs and Target Patronage)* of the Operating Appendix;

"Profit Element" means, as the context admits (i) the Operator's profit element for Project Phase C2 which shall be Indexed and (ii) the Operator's profit element during Project Phase D which shall be Indexed, both as set out in the Financial Proposals;

"Prohibited Act" means:

(a) offering, giving or agreeing to give to the Scottish Executive, CEC, **tie**, or any **tie** Party or any other public body or any person owned or employed by any of them any gift or consideration of any kind as an inducement or reward:

  (i) for doing or not doing (or for having done or not having done) any act in relation to the obtaining or performance of this Agreement; or

  (ii) for showing or not showing favour or disfavour to any person in relation to this Agreement;

(b) paying commission or agreeing to pay commission to any person in connection with the award of this Agreement;

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(c) committing any offence:

(i) under the Prevention of Corruption Acts 1889-1916 or section 68(2) of the Local Government (Scotland) Act 1973;

(ii) under any Law creating offences in respect of fraudulent acts; or

(iii) at common law in respect of fraudulent acts in relation to this Agreement or any other relevant agreement with the Scottish Executive, **tie**, CEC or any other public body; or

(d) defrauding or attempting to defraud or conspiring to defraud the Scottish Executive, **tie** or any other public body;

"Project" means **tie**'s proposal to obtain relevant statutory powers, land and other rights and consents for, and to procure the design, development, construction, operation, maintenance, expansion and funding of, the Edinburgh Tram Network;

"Project Data" means all drawings, reports, documents, plans, photographs, formulae, calculations, data, equipment and materials:

(a) relating to the design, construction, testing, commissioning, completion, operation, funding, maintenance and/or expansion of the Edinburgh Tram Network and/or System and/or Project; and/or

(b) brought into existence in the course of tendering for the Project and/or performing, and/or used in connection with the performance of, the Project Development Services;

"Project Development and Operating Costs" means the costs and other information presented by the Operator and approved by **tie** and agreed at the DPOFA Variation Date as Schedule 6 (*Project Development and Operating Costs*) to this Agreement, as may be adjusted from time to time in accordance with this Agreement or otherwise by agreement between **tie** and the Operator;

"Project Development Costs" means, in respect of Project Phase A, Project Phase B and Project Phase C1:

(a) in respect of the Operator's Core Team the amount of budgeted time (subject to Clause 16.4) during that period in the provision of the Project Development Services by persons within the Operator's Core Team multiplied by the Core Staff Fixed Rates ; and

(b) in respect of each member of the Operator's Non-Core Staff involved in the provision of the Project Development Services in accordance with Clause 16 (*Project Development Costs*), the amount of time spent during that period in the provision of the Project Development Services by such additional staff members multiplied by the Non-Core Staff Fixed Rates;

"Project Development Objectives" means the objectives of **tie** and the Operator set out in paragraph 2 of Schedule 2 (*Project Development Output Specification*) during Project Phase A, Project Phase B and Project Phase C in respect of each Phase, including the facilitation of the achievement of the Project Vision during Project Phase D;

"Project Development Output Specification" means **tie**'s requirements as regards the services and works to be provided by the Operator during Project Phases A, B and C as set out at Schedule 2 (*Project Development Output Specification*), as varied from time to time in accordance with this Agreement;

"Project Development Services" means the services to be provided by the Operator to **tie** pursuant to this Agreement in respect of any Phase or Network Expansion, as described in Clause 4 (*The Project Development Services*) and supplemented by Schedule 2 (*Project Development Output Specification*);

"Project Development Staff" means any employees, contractors or other personnel engaged by the Operator or any Operator Party from time to time in the provision of the Project Development Services, the identity of all such persons to be notified to **tie** and approved by **tie** in accordance with Clause 4.2.9;

"Project IPR" means all Intellectual Property Rights in the Project Data and the Specially Written Software and any other Intellectual Property Rights created in the performance of the Project Development Services and/or the delivery of the Project, which are specific in nature to the Project;

"Project Operations" means the performance of:

(a) the Transport Services on the System (including the operation of the Control Centre);

(b) the Operator Maintenance; and

(c) all other obligations of the Operator under this Agreement performed during Project Phase D from time to time;

in each case, subject to Variations;

"Project Operations Staff" means any employees, contractors or other personnel engaged by the Operator or any Operator Party from time to time in the provision of the Project Operations;

"Project Phase" means Project Phase A, Project Phase B, Project Phase C and/or Project Phase D as appropriate;

"Project Phase A" means the phase of the Project in respect of a Phase described in paragraphs 4 to 14 of the Project Development Output Specification;

"Project Phase B" means the phase of the Project in respect of a Phase described in paragraphs 15 to 31 of the Project Development Output Specification;

"Project Phase C" means the phase of the Project in respect of a Phase described in paragraphs 33 to 47 of the Project Development Output Specification;

"Project Phase C1" means the phase of the Project in respect of a Phase described in paragraphs 36 to 40 of the Project Development Output Specification;

"Project Phase C2" means the phase of the Project in respect of a Phase described in paragraphs 42 to 47 of the Project Development Output Specification;

"Project Phase Completion Notice" or **"PPCN"** means, in respect of each Phase, the notice issued by **tie** on the date of:

(a) for Project Phase A, the grant of Royal Assent to the relevant Scottish Private Bill;

(b) for Project Phase B, the award by **tie** of an IDA for the first Phase (or part thereof) authorised by a Scottish Private Bill;

(c) for Project Phase C1, the issue by **tie** of the Mobilisation Certificate pursuant to paragraph 41.3 of the Project Development Output Specification;

(d) for Project Phase C2, Full Service Commencement; or

in each case, or as otherwise determined by **tie**;

"Project Phase D" means the phase of the Project in respect of any Phase after the Service Commencement Date for such Phase;

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"Project Programme" means the programme set out in Schedule 8 (*Project Programme*) which has been developed by **tie** with input from the Infrastructure Provider and the Operator as amended from time to time as a **tie** Change notified to the Operator in accordance with Clause 24 (***tie** Changes*) of the Operating Appendix;

"Project Return" means the return for each relevant Project Phase set out in the Financial Proposals;

"Project Safety Committee" means the committee which shall include **tie**, the Operator, TEL, CEC (Roads), and the Infrastructure Provider;

"Project Vision" means **tie**'s and CEC's vision for the Project as set out at Recital D of this Agreement;

"Property Loss" means any loss of or damage to any property, real or personal, of any person (including one of the Parties);

"Public Liaison and Media Plan" means the plan referred to in paragraph 26.16 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

"Punctuality Service Element" has the meaning given in Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) of the Operating Appendix;

"Qualifying Change in Law" means a Change in Law which comes into effect during Project Phase C or Project Phase D which involves additional Project Development Costs, Operating Costs and/or necessitates amendment of this Agreement and/or the Project Operations and, in each case, which was not reasonably foreseeable prior to the issue of the PPCN for Project Phase B for the relevant Phase;

"Quality Management Plan" means the plan referred to in paragraph 26.9 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance the terms of this Agreement;

"Quality Manager" means the person to be appointed by the Operator pursuant to Clause 7.3 of this Agreement or Clause 14.2 of the Operating Appendix (as appropriate);

"Quarter" means each period in any year:

(a) beginning on 1 April and ending on 30 June;

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(b) beginning on 1 July and ending 30 September;

(c) beginning on 1 October and ending on 31 December; and

(d) beginning on 1 January and ending on 31 March;

in each case, to the extent only that such period falls during the Term of this Agreement, provided that the first Quarter will commence on the Effective Date and end on 30 June 2004, and the final Quarter will end on the final day of each Project Phase C1;

"RA 1984" means the Roads (Scotland) Act 1984;

"Rateable Value" means the rateable value assigned annually to the System by the Scottish Ministers or Relevant Authority;

"Recruitment and Training Plan" means the plan referred to in paragraph 26.7 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance the terms of this Agreement;

"Referral Notice" has the meaning given to it in paragraph 5.12 of Schedule 7 *(Dispute Resolution Procedure)*;

"Referring Party" has the meaning given to it in paragraph 5.1 of Schedule 7 *(Dispute Resolution Procedure)*;

"Related Contracts" has the meaning given to it in paragraph 6.1 of Schedule 7 *(Dispute Resolution Procedure)*;

"Related Dispute" has the meaning given to it in paragraph 6.1 of Schedule 7 *(Dispute Resolution Procedure)*;

"Relevant Authority" means any court with the relevant jurisdiction and any local authority, national authority or supra national agency, inspectorate, minister, Scottish Executive, body, official or public or statutory person of the government of the United Kingdom or of the European Union;

"Relevant Event" means a **tie** Change, a Qualifying Change in Law or a Permanent Roads Change;

"Relevant Roads Change means the occurrence at any time during Project Phase C2 or Project Phase D of :

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(a) works by or on behalf of CEC or any Roads Authority resulting, once completed, in a physical change to the road layout affecting the operation of the System;

(b) a change to the permitted uses of the road as a result of the making, revocation or variation of a traffic regulation order by CEC or other Roads Authority, excluding any traffic regulation order made, revoked or varied at the request of any third party consequential to any works carried out by that third party;

(c) a decision by CEC or other Roads Authority to alter or cease providing the priorities given by the CEC UTC System to Trams over other classes of vehicle from those priorities agreed between **tie** and the Operator during Project Phase B or Project Phase C1 in respect of the relevant Phase; or

(d) the carrying out of works to Roads or the carrying out of works to the CEC UTC System;

(e) a delay after the Service Commencement Date by CEC or other Roads Authority in bringing into operation the priorities to be given by the CEC UTC System to Trams over other classes of vehicle in accordance with the agreement reached between **tie** and the Operator in respect of UTC priorities during Project Phase B or Project Phase C1 in respect of the relevant Phase;

in each case affecting the passage of Trams or the provision of the Transport Services and directly resulting in failure by the Operator to meet the Operating Output Specification;

"Relief Event" means (save to the extent any of the following events arise as a result of any act or omission of the Operator and/or an Operator Party):

(a) at any time on or after the Effective Date:

(i) fire, explosion, lightning, tempest, flood, bursting or overflowing of water tanks, apparatus or pipes, ionising radiation (to the extent it does not constitute a Force Majeure Event), earthquakes, riots or civil commotion;

(ii) failure by any statutory undertaker, utility company, or other like body to carry out works or provide services;

(iii) any accidental loss of or damage to a material part of the System;

(iv) any failure or shortage of power or fuel;

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(v) any blockade or embargo which does not constitute a Force Majeure Event; or

(vi) any official or unofficial strike, lockout, go-slow or other industrial dispute and generally affecting the public transport industry in Scotland or a significant part thereof;

(b) at any time during the Service Period or during Project Phase C2 the exercise by CEC or a Roads Authority of any authority to close or restrict roads or streets pursuant to their powers under the Road Traffic Regulation (Special Events) Act 1994 or other Legislation;

where such occurrence materially and adversely affects the Operator's performance of its obligations in the operation of the System.

"Reporting Period" means a period of 28 days provided that:

(a) the first such period during the Term shall commence on the Service Commencement Date of the first Phase to become operational;

(b) the first such period in the Term may be varied by up to 7 days by notice from **tie** to the Operator;

(c) each such period shall start on the day following the last day of the preceding such period; and

(d) the last such period during the Term shall end on the Expiry Date or termination of this Agreement;

"Required Insurances" means the insurances set out in Part 1 of Schedule 10 (*Insurances*) and such other insurances as the Operator itself may be required from time to time to maintain by Law (save to the extent provided under OCIP Insurances) or may be required from time to time by tie as a tie Change to take out and maintain in respect of the Project Development Services and Project Operations;

"Reset Decision Date" has the meaning given to it under Clause 21 (*Reset of the Fixed Costs, the Target Operating Costs and the Target Patronage*) of the Operating Appendix;

"Responding Party" has the meaning given to it in paragraph 5.2 of Schedule 7 *(Dispute Resolution Procedure)*;

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"Retention" means the sums calculated in accordance with Clauses 16.5 and 18.3 as appropriate;

"Review Procedure" means the procedure set out in Schedule 9 (*Review Procedure*);

"Roads" has the meaning given to it in the RA 1984;

"Roads Authority" has the meaning given it under RA 1984 and, where appropriate, shall include any parties responsible for private roads;

"ROGS" means the Railways and Other Guided Transport Systems (Safety) Regulation 2006;

"RPIX" means the general index of retail prices for all items excluding mortgage interest payments (Office of National Statistics: Series Identifier: CHMK) as published or any replacement thereof or, in the event such index ceases to exist, such other similar index as the Parties shall agree from time to time (or, if the Parties cannot so agree, as determined under the Disputes Resolution Procedure on the referral of either Party) provided that, if the basis of computation of such index shall have changed between the two relevant months, any official reconciliation between the two bases of computation published by a United Kingdom government department shall be binding on the Parties and, in the absence of such official reconciliation, such adjustment shall be made to the figure of such index for the second of those months to make it correspond as nearly as possible to the method of computation for the first of those months and such adjusted figure shall be considered for the purpose of this Agreement to the exclusion of the actual published figure;

"Safety Management System Plan" means the plan referred to in paragraph 26.6 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance the terms of this Agreement;

"Scottish Private Bill(s)" means the enabling legislation promoted by **tie** and/or CEC pursuant to the relevant Scottish Parliamentary process granting the permanent legal authority to fund, construct, operate and maintain the Edinburgh Tram Network;

"Second Party" shall have the meaning given in Clause 3.3;

"Section A" means completion of Gogar Depot (including energization) and the first tram delivered to site and assembled;

"Section B" means completion of Test Track (including energization), assumed as Depot to Airport, and 5 trams in total delivered to site, assembled with the first tram to have completed

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the Tram Type Test and the other 4 to have completed the Site Acceptance Test (ref. part 1c Employers Requirements);

"Section C" means completion of remainder of Phase 1a to Newhaven including energization and the spur or delta at Roseburn Junction;

"Section D" means Shadow Running completed and commencement of revenue service approval obtained;

"Security Interest" means any mortgage, pledge, lien, hypothecation, security interest or other charge or encumbrance or any other agreement or arrangement having substantially the same economic effect and includes any Security as defined in section 248(b) of the Insolvency Act 1986;

"Security Management Plan" means the plan referred to in paragraph 26.14 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

"Service Commencement" means, in respect of each Phase or Network Expansion, the commencement of the Transport Services on such Phase or Network Expansion;

"Service Commencement Date" means, in respect of each Phase or Network Expansion, the date specified in the Certificate of Service Commencement in respect of that Phase or Network Expansion;

"Service Integration Plan" means the plan being developed by Transport Edinburgh Limited with the support of the Operator in conjunction with others to achieve integration of the Transport Services and the System with all modes of public transportation operating within the City of Edinburgh, as such plan may be amended from time to time as a **tie** Change and notified to the Operator in accordance with Clause 24 (***tie** Changes*) of the Operating Appendix;

"Service Period" means the period:

(a) in respect of any Phase or Network Expansion, from (and including) the Service Commencement Date in respect of that Phase or Network Expansion;

(b) until (and including) the earlier of the Expiry Date and the Termination Date;

"Service Quality Report" means the report to be submitted by the Operator pursuant to Clause 12 (*Service Performance and Quality Monitoring*) of the Operating Appendix in the

form developed and containing the information agreed by the Parties in accordance with the Project Development Output Specification and the Operating Output Specification;

"Shadow Run Validation Plan" means the plan referred to in paragraph 26.4 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance the terms of this Agreement;

"Shadow Running" means the period after the Edinburgh Tram Network has been handed over to the Operator after successful completion of the T2 system acceptance tests as defined in the Operating Output Specification and as indicated on the Project Programme unless at **tie's** discretion it instructs the Operator to commence shadow running despite any of the T2 system acceptance tests not being completed successfully provided that the Competent Person has expressed no material concerns;

"Shareholders" means any person from time to time holding share capital in the Operator;

"Snagging Notice" means the notice to be issued by **tie** to the Operator, which shall specify Operator Snagging Matters;

"Special Event" means any event:

(a) notified by **tie** to the Operator pursuant to Clause 8 (*Special Events*) of the Operating Appendix which will, or may, affect the Project Operations; or

(b) notified by the Operator to **tie** pursuant to Clause 8 (*Special Events*) of the Operating Appendix which the Operator considers requires an amendment to the Project Operations (including, without limitation, the Timetable), and which **tie** agrees;

"Special Event Notice" means a notice to be given by (i) **tie** to the Operator or (ii) the Operator to **tie**, in either case pursuant to the terms of Clause 8 (*Special Events*) of the Operating Appendix;

"Special Event Plan" means a plan to be produced by the Operator and forwarded to **tie** pursuant to the terms of Clause 8.3 (*Special Events*) of the Operating Appendix;

"Specially Written Software" means programs which are written by or on behalf of the Operator specifically to enable the Operator to carry out its obligations under this Agreement;

"STAG II Approval" means approval under part II of the Scottish Transport Appraisal Guidance (as such guidance may be amended from time to time);

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"Staffing Information" has the meaning given to it in Clause 42.11;

"Submitted Item" has the meaning given to it in paragraph 1.2 of Schedule 9 (*Review Procedure*);

"Successor Operator" means any person notified by **tie** to the Operator as having been, or intended to be, appointed to operate and/or maintain the System following termination or expiry of this Agreement;

"System" means the light rail transit system to be developed pursuant to this Agreement and the Trams, Infrastructure and Equipment, plant, machinery, apparatus, equipment, furniture, street furniture and facilities, track, station and Tramstop structures and platforms, Depots , Control Centre, electrical sub-stations, overhead line equipment (including bases and poles, building fixings, catenaries and wiring), closed circuit television system, signalling system and spares and consumables and offices and office furniture and office equipment in such offices and other items to be provided in accordance with the Operating Appendix or used by the Operator to perform its obligations under the Operating Appendix;

"System Acceptance Tests" means the series of tests included in the employer's requirements set out within the IDA, which will be used to demonstrate that the Infrastructure and Equipment have been successfully delivered to enable delivery of the Transport Services in accordance with this Agreement;

"System Integration Plan" means the plan referred to in paragraph 26.17 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

"System Land" is the land:

(a) on which the Project Operations are carried out;

(b) which is maintained by the Infrastructure Provider(s); and/or

(c) which is impacted upon as a result of the Project Operations or the provision of the Transport Services;

"Systems Assurance Plan" means the plan referred to in paragraph 26.12 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance with the terms of this Agreement;

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"Target Costs for Project Phase C2" means the target costs numbered "6" in the tables included in the Base Case Assumptions and such other costs as **tie** and the Operator may agree from time to time should be treated as "Target Costs for Project Phase C2"; which are estimated to be expended in regard to the performance of the Project Development Services to conclusion of Project Phase C2 as developed during Project Phase A from the Base Case Assumptions, the Financial Proposals, the Operator Financial Model and the Project Development and Operating Costs, and agreed by the Parties prior to the completion of Project Phase B which shall be Indexed and may otherwise be adjusted from time to time in accordance with this Agreement;

"Target Operating Costs" means the annual target costs numbered "6" in the tables included in the Base Case Assumptions and such other costs as **tie** and the Operator may agree from time to time should be treated as "Target Operating Costs"; which are estimated to be incurred by the Operator during Project Phase D as developed from the Base Case Assumptions, the Financial Proposals, the Operator Financial Model and the Project Development and Operating Costs, and agreed by the Parties prior to completion of Project Phase B which shall be Indexed and may otherwise be adjusted from time to time in accordance with this Agreement provided that where there is a time interval between the Service Commencement Date and the Full Service Commencement Date for a Phase, the Target Operating Costs for the System (including such Phase) for such period shall be the Interim Target Operating Costs;

"Target Patronage" means the annual target number of boarders of the System as set by the Joint Revenue Committee to be included in the Financial Proposals and the Operator Financial Model and as may be adjusted from time to time in accordance with this Agreement provided that where there is a time interval between the Service Commencement Date and the Full Service Commencement Date for a Phase, the Target Patronage for the System (including such Phase) for such period shall be the Interim Target Patronage;

"Tax" means any kind of tax, duty, levy, imposition, assessment or other charge (other than VAT) whether or not similar to any in force at the Effective Date and whether imposed by a local, governmental authority or other Relevant Authority in the United Kingdom or elsewhere;

"TEL" or **"Transport Edinburgh Limited"** or means Transport Edinburgh Limited a company incorporated under the Companies Act with registered number SC269639 and having its registered office at 55 Annandale Street, Edinburgh, EH7 4AZ;

"TEL Fares Policy" means any policy developed and applied by TEL concerning the level and/or structure of ticket pricing for the Edinburgh Tram Network;

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"Temporary Roads Change" means a Relevant Roads Change which persists for less than 3 months;

"Term" means the period from (and including) the Effective Date until (and including) the earlier of the Expiry Date and the Termination Date;

"Terminated Phase" shall have the meaning given to it in Clause 32.3;

"Termination Date" means 02.00 hours on any date of early termination of this Agreement;

"Termination Notice" means a notice to terminate this Agreement served by either Party in accordance with the terms of this Agreement;

"Testing and Commissioning Plan" means the plan referred to in paragraph 37 of Schedule 2 (*Project Development Output Specification*), as such plan is modified from time to time in accordance the terms of this Agreement;

"Third Party Shareholder" means such party nominated by the Operator and approved by **tie:**

"Third Party Software" means programs, the Intellectual Property Rights in which are (a) owned by a third party and (b) used by the Operator to carry out its obligations under this Agreement;

"tie Advisers" means the advisers appointed by **tie** in relation to the Edinburgh Tram Network;

"tie Change" means:

(a) a change in the Project Operations proposed by **tie** during Project Phases C1, C2 or Project Phase D;

(b) a truncation of Line 1 and/or Line 2 and/or Line 3 from what was anticipated to form part of the Edinburgh Tram Network during any Project Phase;

(c) a change to the Required Insurances and/or the OCIP Insurances during any Project Phase;

(d) a change to the number of Depots (including a change from one to two depots) during any Project Phase;

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(e) a **tie** discretionary item numbered "7" in the tables included in the Base Case Assumptions during any Project Phase;

(f) during any Project Phase, any other change stated to be a **tie** Change in accordance with this Agreement or proposed by **tie** in accordance with this Agreement, which is stated to be considered or treated as a **tie** Change;

(g) a change to the Project Programme from the version as at the DPOFA Variation Date save to the extent that such change and the consequences of such change have been agreed or determined pursuant to the provisions of Clause 12 (*Interface with the Infrastructure Provider*); and

(h) a change to the Code of Construction Practice and/or the Code of Maintenance Practice

which the Operator is obliged to implement under Clause 24 (***tie** Changes*) of the Operating Appendix;

"tie Completion Requirements" means the requirements set out in Schedule 2 (***tie** Completion Requirements*) to the Operating Appendix;

"tie Customer Satisfaction Survey" means the customer satisfaction survey produced annually (or with such frequency as may be determined by **tie**) in accordance with Clause 16.4 of the Operating Appendix;

"tie Default" means one of the following events:

(a) an expropriation, sequestration or requisition of a material part of the System and/or shares in the Operator by **tie** or any Relevant Authority;

(b) a failure by **tie** to make payment of any amount of money exceeding £200,000 (Indexed) that is due and payable by **tie** to the Operator under this Agreement, where that amount fell due and payable two (or more) Reporting Periods prior to the date of service of the Termination Notice;

(c) a breach by **tie** of its obligations under this Agreement which substantially frustrates or renders it impossible for the Operator to perform its obligations under this Agreement for a continuous period of 90 days during Project Phases A, B, C and/or D; or

(d) a breach by **tie** of Clause 44 (*Assignation, Sub-Contracting and Changes in Control*);

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"tie Full Service Notice" means a notice to be given by **tie** to the Operator pursuant to the terms of Clause 8.7 of the Operating Appendix;

"tie Inspectors" means the inspectors appointed by **tie** for the purposes set out in Clause 17.3 of the Operating Appendix;.

"tie Notice of Change" means a notice served by **tie** pursuant to Clause 24.1 of the Operating Appendix, setting out the matters specified in Clause 24.2 of the Operating Appendix;

"tie Party" means the **tie** Advisers or any of **tie**'s agents, contractors and sub-contractors of any tier and its or their directors, officers and employees but excluding the Operator, any Operator Party and statutory undertakers and utilities;

"tie Project Manager" shall have the meaning given to it in Clause 6.1;

"Timetable" means:

(a) subject to paragraph (ii), the timetable of all Transport Services to be run on the System, such Timetable to be agreed between **tie** and the Operator during Project Phase C2, and amended from time to time in accordance with this Agreement;

(b) in respect of any day when a Special Event Plan is in effect, the revised Timetable specified in such Special Event Plan, if different to the Timetable referred to in paragraph (i) or if an unscheduled Special Event such Timetable as the Operator can reasonably provide;

"Tram" means any vehicle (whether or not used for the carriage of passengers) carried on flanged wheels along the rails of a Tramway;

"Tram Business" means the business of providing the Project Operations;

"TramCo" means, as the context permits, either or both of the supplier or maintenance provider of the Trams for the Edinburgh Tram Network;

"Tram Legislation" means the Edinburgh Tram (Line One) Act 2005 and the Edinburgh Tram (Line Two) Act 2005, which received Royal Assent on 8 May 2006 and 27 April 2006 respectively and which confer on CEC all requisite authorities and statutory powers to procure the construction, operation and maintenance of Line 1 and Line 2;

"Tramstop" means the places (including termini) at which fare paying passengers are permitted to board and/or leave Trams;

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"Tramway" means a system of transport used wholly or mainly for the carriage of passengers and employing parallel rails which provide support and guidance for vehicles carried on flanged wheels;

"Transfer Date" has the meaning given to it in Clause 42.2;

"Transferring Project Staff" has the meaning given to it in Clause 42.1;

"Transport Scotland" means an agency within the Scottish Executive Enterprise, Transport and Lifelong Learning Department which was established in January 2006 and having its principal office at Buchanan House, 58 Port Dundas Road, Glasgow, H4 0HF;

"Transport Services" means the public passenger transport services to be provided by the Operator on the System (or any part thereof) in accordance with the Operating Appendix;

"Treaty of European Union" means the Treaty of Rome of 25 March 1957, as amended by the Single European Act 1986 and the Maastricht Treaty (which was signed at Maastricht on 7 February 1992 and came into force on 1 November 1993), as amended from time to time;

"TUPE" means the Transfer of Undertakings (Protection of Employment) Regulations 2006;

"Uninsurable" means that:

(a) insurance is not available to the Operator in respect of the Project in the European insurance market with reputable insurers of good standing in respect of that matter; or

(b) the insurance premium payable for insuring that matter is at such a level that such matter is not generally being insured against in the European insurance market with reputable insurers of good standing;

"UTC" means the urban traffic control systems and monitoring functions operated by CEC or other Roads Authority (as appropriate);

"Variation" means a **tie** Change or an Operator Change;

"VAT" means any value added taxes;

"Year" means each period beginning on 1 April and ending on the following 31 March, where any part of such period is during the Term.

2. In this Agreement, except where the context otherwise requires:

2.1 words importing gender include masculine, feminine and neuter;

2.2 the singular includes the plural and vice versa;

2.3 a reference to any part, Clause, sub-clause or Schedule is, except where it is expressly stated to the contrary, a reference to such part, Clause or sub-clause of or Schedule to this Agreement;

2.4 a reference in any Schedule to any part, paragraph or sub-paragraph is, except where it is expressly stated to the contrary, a reference to such part, paragraph or sub-paragraph of that Schedule (as the case may be);

2.5 for the avoidance of doubt, any reference to this Agreement shall be interpreted as including the Operating Appendix;

2.6 any reference to this Agreement or to any other document shall include any variation, amendment, or supplement to such document expressly permitted under the terms of this Agreement;

2.7 any reference to any enactment, order, regulation or other similar instrument (including any EU instrument) (whether specifically named or not) shall be construed as a reference to the enactment, order, regulation or instrument as amended, replaced, consolidated or re-enacted and shall include any orders, consents, regulations, legally binding codes of practice or subordinate legislation (within the meaning of section 21(1) of the Interpretation Act 1978) made thereunder;

2.8 a reference to a person includes individuals, firms, partnerships, bodies corporate, joint ventures, government departments and any organisation capable of suing or being sued and references to any of the same include the others and their successors and assignees and transferees to the extent that such assignment and transfer are expressly permitted under the terms of this Agreement;

2.9 headings and the contents list are for convenience of reference only and do not affect the interpretation of this Agreement;

2.10 the ejusdem generis rule does not apply and the meaning of general words is not to be restricted by any particular examples preceding or following those general words;

2.11 a reference to a time of day is a reference to the time in Scotland;

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2.12 subject to the restrictions imposed by this Agreement on subcontracting, an obligation to do something includes an obligation to procure it to be done;

2.13 an obligation not to do something includes an obligation not to wilfully allow it to be done;

2.14 the word "including" means "including without limitation"; and

2.15 a reference to "consent" shall mean consent in writing.

3. This Agreement shall be interpreted and construed as a whole provided that in the event of any inconsistency or conflict between the main body of this Agreement and/or the Schedules and/or the appendices, then:

3.1 the main body and the Operating Appendix shall prevail to the extent of any such conflict or inconsistency over the Schedules; and

3.2 **tie** and the Operator shall agree which of the Schedules shall prevail to the extent of any such conflict or inconsistency between the Schedules.

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

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This is Schedule 2 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 2

Project Development Output Specification

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1. OVERALL SYSTEM REQUIREMENTS

1.1 The System shall be an electrically powered light rail system using Trams to carry passengers and may include all or any of the following Lines and/or Phases (as appropriate):

1.1.1 Phase 1a;

1.1.2 Phase 1b;

1.1.3 Line 1;

1.1.4 Line 2;

1.1.5 Line 3; and

1.1.6 any Network Expansion

1.2 **tie**'s overall requirements of the System are that it shall facilitate the achievement of the Project Vision and be:

1.2.1 safe and secure;

1.2.2 reliable;

1.2.3 attractive;

1.2.4 delivered within the Affordability Limits;

1.2.5 affordable for passengers;

1.2.6 efficient;

1.2.7 environmentally acceptable;

1.2.8 sustainable;

1.2.9 easy for passengers to use;

1.2.10 accessible to all including mobility impaired passengers;

1.2.11 able to provide a minimum level of service specified in the Operating Output Specification;

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1.2.12 able to support the policy, planning and system aspirational objectives of the City of Edinburgh Council and TEL;

1.2.13 integrated with other transport modes;

1.2.14 capable of Network Expansions; and

1.2.15 able to project a System wide high quality brand image.

1.3 **tie** requires that operation of the System shall reflect a high standard of presentation and public image and that the System shall be operated efficiently with minimum disturbance to the public and minimum delay to passengers.

1.4 All aspects of the operation of the System shall take account of the need to react safely and quickly to emergencies.

1.5 The System shall incorporate such staffing, surveillance and alarm equipment as is appropriate to ensure the safety of the public, especially lone and mobility impaired travellers.

1.6 **tie** requires that the System shall be capable of responding to any Network Expansion and increased ridership resulting from such Network Expansion without adverse impact on quality.

1.7 The System shall be constructed, maintained and operated in accordance with Good Industry Practice at all times and in accordance with the Law.

2. PROJECT DEVELOPMENT OBJECTIVES

The objectives of **tie** and the Operator during Project Phase A, Project Phase B and Project Phase C in respect of each Line and/or Phase (as appropriate) shall be to:

2.1 develop a System that complies with the requirements set out in paragraph 1 above;

2.2 promote the Enabling Legislation for each Line through the Scottish Private Bill parliamentary process;

2.3 procure all Necessary Consents, all works, Trams, Infrastructure and Equipment, services and supplies and to secure all funding and insurance required for the design, construction, funding, operation and maintenance of the Edinburgh Tram Network:

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2.3.1 in accordance with the Partnering Methodology and Programme, and the Project Programme;

2.3.2 in accordance with the terms of the Agreement including this Project Development Output Specification, the Operating Appendix, the Operating Output Specification, the Operating Method Statements, the Environmental Statements for each Line and/or Phase (as appropriate), and the Design Manual, as amended from time to time in accordance with this Agreement;

2.3.3 within the Affordability Limits;

2.3.4 in relation to the Operator's operating expenditure, at no greater aggregate cost to **tie** than as projected in the Operator Financial Model; and

2.3.5 in accordance with the Law and Good Industry Practice;

2.4 develop the technical definition of the Project including, without limitation, the Infrastructure and Equipment Output Specification for the procurement of Infrastructure and Equipment for each Line and/or Phase (as appropriate), and in particular:

2.4.1 to jointly review the technical work carried out by the **tie** Advisers for Line 1, Line 2 and Line 3 prior and subsequent to the Effective Date;

2.4.2 where necessary to refine the Operator's forecasts of operating expenditure as set out in the Operator Financial Model;

2.4.3 to identify network effects through co-operation with the **tie** Advisers carrying out the Network Effects Study;

2.4.4 to support TEL in carrying out work required to achieve the integration of the Project with existing transport operators in Edinburgh;

2.4.5 to engage with relevant regulatory authorities regarding Project Phase D for each Line and/or Phase (as appropriate);

2.4.6 to examine innovative contractual arrangements for the interface between operation and maintenance of the Edinburgh Tram Network;

2.4.7 to ensure that System design and operational methods take into account Good Industry Practice with regard to urban traffic control;

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2.4.8 to review the demand / revenue forecasts produced by the **tie** Advisers; and

2.4.9 to ensure System and network integration.

2.5 support the development by TEL of coordination arrangements with local bus operators regarding bus-tram integration, including integrated ticketing;

2.6 to develop and refine the Target Costs for Project Phase C2 and the Target Operating Costs in accordance with paragraph 7 below; and

2.7 to assist the Joint Revenue Committee to set the Target Patronage.

3. DELIVERY OF INFRASTRUCTURE AND EQUIPMENT

3.1 Subject to the passage of the Enabling Legislation referred to in relation to Project Phase A in respect of the relevant Line, the satisfaction of the **tie** Affordability Limits, the successful development of the Infrastructure and Equipment Output Specification pursuant to Project Phase B, and any termination rights of either Party under this Agreement, **tie** shall procure the Infrastructure and Equipment for each Line and/or Phase (as appropriate), through one or more Infrastructure Providers.

3.2 In relation to the design of the System, **tie** is committed to the provision of a System which is, as far as possible, in harmony with its surroundings. Central Edinburgh is designated as a World Heritage Site and it is essential that intrusion is minimised and that opportunities for enhancement are realised. The quality of the Infrastructure and Equipment design and construction is a critical factor in achieving this objective.

3.3 A Design Manual is under development by CEC, **tie** and the **tie** Advisers which will consider, amongst other factors, the following:

3.3.1 power provision and its means of support:

- preference to fix to buildings;
- lightweight support systems, minimising visual impact;
- multi-function support systems to combine overhead line equipment with street lighting or signing;
- design of masts;
- location and spacing of masts;

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- use of central supports on two-line sections;
- ground fixings; and
- screening by landscape.

3.3.2 Station design:

- location in relation to passenger convenience and existing features and buildings;
- quality of structural design to realise all necessary functions (shelter, seating, information systems, security needs, etc) in a simple structure;
- choice of materials and finishes;
- maintenance issues;
- signage and street furniture;
- access;
- colour schemes; and
- advertising.

3.3.3 Track layouts:

- choice of surface materials to distinguish primary uses;
- opportunities for urban enhancement;
- use of grass-ballasted track;
- treatment of level changes; and
- use of landscape/planting to minimise impact.

3.4 Whilst providing advice related to Infrastructure and Equipment Output Specification during Project Phase A or Project Phase B, or at any other time during the Term, the Operator shall at all times take into consideration the objectives of the Design Manual and its underlying purpose. The Operator shall, where appropriate, from time to time

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recommend for consideration by **tie** and the **tie** Advisers amendments or additions to the Design Manual.

3.5 Similarly, when developing the Operating Method Statements for the System, the Operator shall endeavour to minimise any adverse impact of the System on the general quality of life in Edinburgh whilst maintaining Transport Services of the requisite quality and reliability.

3.6 As regards advertising on the System, pursuant to Clause 15 (*Advertising*) of the Operating Appendix, there shall be no Operator advertising permitted on or in any of the Trams and/or the Tramstops nor at any other location on the System save that recognition of the corporate identity of the Operator shall be permitted (a) in appropriate tram specific publications issued by **tie**; (b) on paper letterhead; and (c) within the interior of the Trams, subject to the Operator proposing such Operator recognition under (a), (b) or (c) to **tie**, and **tie** agreeing to any such proposals (such agreement to be at **tie's** absolute discretion). Instructions will also be encompassed within the Design Manual in respect of advertising and graphic design at Tramstops and on Trams. The Design Manual will reflect **tie**'s policies and requirements as at the DPOFA Variation Date Such policies may be subject to amendment pursuant to Clause 24 (*tie Changes*) or Clause 25 (*Operator Changes*) of the Operating Appendix.

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PROJECT PHASE A

Development

4. INTRODUCTION

4.1 The primary objective of **tie**, the **tie** Advisers and the Operator during Project Phase A in respect of any Line shall be to promote the Enabling Legislation for that Line through the Scottish Private Bill parliamentary process.

4.2 The Project Development Services to be provided by the Operator during Project Phase A in respect of each Line are intended to coincide with the other activities of **tie** directed towards promoting the Enabling Legislation for that Line through the Scottish Private Bill parliamentary process.

4.3 As at the Effective Date, it is possible that:

4.3.1 the Enabling Legislation for each Line will be promoted separately, on a sequential basis, through the Scottish Private Bill parliamentary process; or

4.3.2 the Enabling Legislation for two of the Lines will be promoted together through the Scottish Private Bill parliamentary process, with the other Line being promoted separately.

4.4 Whichever option described in paragraph 4.3 is chosen by **tie**:

4.4.1 the **tie** Advisers will prepare, with support from the Operator to the extent requested by **tie**, technical and financial information in respect of each Line separately or in any combination of Lines, in support of the promotion of the Enabling Legislation;

4.4.2 the Transport Services on the System will be operated by a single operator with incremental expansion of the System as relevant approvals and funding are obtained; and

4.4.3 part only or combination of parts of the Lines may be authorised.

5. PROJECT DEVELOPMENT ACTIVITIES DURING PROJECT PHASE A

5.1 **tie** has commissioned individual studies by the **tie** Advisers to investigate each of the Lines comprised in the Edinburgh Tram Network. Each of these studies considers

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each Line in isolation. **tie** has also commissioned a study to determine the effects on costs and revenues of operating all the Lines together as a single network ("**Network Effects Study**"). These studies have provided, or will provide, documentation to support the promotion of the Enabling Legislation for each Line through the Scottish Private Bill parliamentary process including:

5.1.1 plans and sections;

5.1.2 a book of reference;

5.1.3 an estimate of the operating costs and revenue for each Line (on a stand alone basis), based upon the Development Assumptions;

5.1.4 estimates of the network effects for operating costs and revenues for different combination of Lines, based upon the Development Assumptions;

5.1.5 an estimate of the capital costs for each Line; and

5.1.6 relevant documentation to obtain STAG II Approval.

5.2 In support of the primary objective for Project Phase A set out in paragraph 4.1 above, the Operator will be expected, during Project Phase A in respect of each Line, to comply with the requirements of paragraphs 5.3 to 5.6 below.

5.3 The Operator shall co-operate with **tie**, the **tie** Advisers and the Joint Revenue Committee in relation to the development and/or refinement of:

5.3.1 the items listed in paragraphs 5.1.1 to 5.1.6 above;

5.3.2 preliminary Target Costs for Project Phase C2, preliminary Target Operating Costs and preliminary Target Patronage;

5.3.3 the Development Assumptions;

5.3.4 the Infrastructure and Equipment Output Specification for the relevant Line and/or Phase (as appropriate);

5.3.5 the Operating Output Specification;

5.3.6 liaison with City of Edinburgh Council, TEL and third parties;

5.3.7 the Network Effects Study; and

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5.3.8 the Partnering Methodology and Programme and the Project Programme.

5.4 If so required by **tie**, the Operator shall advise upon any operational issues or assumptions which may be queried during the passage of the Enabling Legislation for each Line through the Scottish Private Bill parliamentary process. This may include, without limitation:

5.4.1 provision of oral or written expert evidence during the committee hearings and process; and

5.4.2 participation in the management of any objections to, or petitions against implementation of the System and the Transport Services, including the drafting of responses.

5.5 Without prejudice to paragraphs 5.3 and 5.4, the Operator shall:

5.5.1 review **tie**'s financial model and business case and make recommendations as to how the Project can be delivered and funded within the Affordability Limits (or so as to minimise any excess above such Affordability Limits);

5.5.2 provide support to **tie** and the **tie** Advisers in respect of the production and refinement of technical, operating and maintenance designs, specifications and programmes for each Line including system specifications, technical drawings, land plans, sections and other detailed design work required to apply for the Scottish Private Bill(s) and related ancillary statutory authority to implement the Project;

5.5.3 provide support to **tie** and the **tie** Advisers in respect of the preparation of any applications, notices, designs, statements and relevant factual or technical evidence and all other procedures to obtain the Scottish Private Bill(s) and any other Necessary Consents required for the Project;

5.5.4 provide support to **tie** and the **tie** Advisers in respect of discussions and negotiations and the conclusion of any undertakings, agreements or other commitments with third parties as may be necessary or desirable to remove any objections to the Project or to secure the grant of any Necessary Consents or otherwise facilitate the construction, installation, operation and maintenance of any of the proposed Lines and/or Phases (as appropriate) in the Edinburgh Tram Network. Such third parties may include, in particular (i) owners or occupiers of land required for or potentially affected by the

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Project, (ii) Network Rail and statutory undertakers and (iii) key stakeholders or influencers;

5.5.5 provide assistance to **tie** in negotiating developer or other local contributions to the Project;

5.5.6 provide an Inception Report to **tie** within 60 days of the Effective Date based on the outline partnering methodology and programme prepared by the Operator during the tender process leading to the execution of this Agreement, and **tie** and the Operator shall agree the Partnering Methodology and Programme taking account of such Inception Report; and

5.5.7 provide support to **tie** and the **tie** Advisers in respect of the development of the programme for works required in connection with the construction and installation of any Line and/or Phase (as appropriate), and the co-ordination of such works with any roads, utility, development or other works or projects in the vicinity of that Line and/or Phase (as appropriate);

5.6 The extent of the support and assistance to be provided by the Operator in respect of each of the matters set out in paragraphs 5.3 to 5.5 above will be determined from time to time by **tie**.

6. OPERATOR'S PROJECT DEVELOPMENT RESOURCES DURING PROJECT PHASE A

In addition to the Operator's Project Manager appointed pursuant to Clause 6.7 of the Agreement, the Operator's Core Team shall include the resources set out in the Project Development and Operating Costs during Project Phase A.

7. DEVELOPMENT OF PRELIMINARY TARGET OPERATING COSTS, PRELIMINARY TARGET PATRONAGE, PRELIMINARY TARGET COSTS FOR PROJECT PHASE C2, FIXED COSTS AND DEVELOPMENT ASSUMPTIONS

7.1 The starting point for the development of the preliminary Target Costs for Project Phase C2, the preliminary Target Operating Costs, the Fixed Costs (excluding the Category One Fixed Costs and the Category Five Fixed Costs) and preliminary Target Patronage will be:

7.1.1 the information in the Financial Proposals, the Operator Financial Model, the Project Development and Operating Costs, in relation to (i) the costs for

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Project Phase C2, and (ii) operating costs for Phase D, and the indicative patronage forecasts prepared by the Joint Revenue Committee; and

7.1.2 the Development Assumptions prepared by the **tie** Advisers.

7.2 **tie**, the **tie** Advisers, and the Operator shall work together in good faith to:

7.2.1 review (and agree any changes to) the Development Assumptions and any methods for calculating the Target Costs for Project Phase C2, the Target Operating Costs, , the Fixed Costs (excluding the Category One Fixed Costs and the Category Five Fixed Costs) where not otherwise agreed and the setting of the Target Patronage by the Joint Revenue Committee; and

7.2.2 develop the Operator Financial Model, the Target Costs for Project Phase C2, the Target Operating Costs and the Fixed Costs (excluding the Category One Fixed Costs and the Category Five Fixed Costs)

7.3 The review and development of the Development Assumptions, the Target Costs for Project Phase C2, the Target Operating Costs and the Fixed Costs (excluding the Category One Fixed Costs and the Category Five Fixed Costs) pursuant to paragraph 7.2 shall take account of any developments agreed between **tie** and the Operator at the relevant time in relation to, without limitation:

7.3.1 the Operating Output Specification; and

7.3.2 the Infrastructure and Equipment Output Specification in respect of each Line and/or Phase (as appropriate).

7.4 The Operator and **tie** shall agree all the major principles in the Development Assumptions by the end of Project Phase B, provided that **tie** and the Operator acknowledge that further minor amendments to the Development Assumptions may be required in Project Phase C1 as discussed below. Without limitation, the major principles for the purposes of this paragraph 7.4 shall include:

7.4.1 those matters listed in paragraphs 9.1.1 to 9.1.13 below; and

7.4.2 the patronage forecast model prepared by the Joint Revenue Committee and used by the **tie** Advisers, and the principal inputs and assumptions used in such model.

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7.5 The Operator and **tie** shall also agree the preliminary Target Costs for Project Phase C2, and the preliminary Target Operating Costs by the end of Project Phase A. The only changes between such preliminary targets, and the final targets to be agreed by the end of Project Phase B shall be those changes resulting from amendments to the Operating Output Specification and Infrastructure and Equipment Output Specification during Project Phase B.

7.6 All changes to the Financial Proposals, the Operator Financial Model, the Project Development and Operating Costs, the Target Costs for Project Phase C2, and the Target Operating Costs to be discussed by **tie** and the Operator pursuant to this paragraph 7 shall be developed such that the Operator shall be in No Better and No Worse position as a result of the relevant change.

8. DEVELOPMENT OF THE INFRASTRUCTURE AND EQUIPMENT OUTPUT SPECIFICATION

8.1 Prior to the date of this Agreement, or at the commencement of Project Phase A in respect of each Line and/or Phase (as appropriate), the **tie** Advisers will provide to the Operator an outline Infrastructure and Equipment Output Specification for that Line and/or Phase (as appropriate). This outline Infrastructure and Equipment Output Specification will take into account, where necessary and appropriate, the requirements of the Design Manual, which are intended to include, without limitation, proposals in relation to:

8.1.1 operations and Control Centre and stabling facilities;

8.1.2 power supply;

8.1.3 command, control and communications including System Control and Data Acquisition (SCADA) and signalling;

8.1.4 turn-round facilities;

8.1.5 lay-over provision;

8.1.6 vehicles and fleet size;

8.1.7 stop facilities (including ease of physical access between the System and other transport modes wherever interchange opportunities are available);

8.1.8 park-and-ride facilities;

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8.1.9 ticket sales points;

8.1.10 public information provisions;

8.1.11 UTC equipment and its compatibility with CEC installations including potential road user charging equipment;

8.1.12 whole-life costs;

8.1.13 security installations; and

8.1.14 capital costs.

8.2 **tie** requires a high standard of reliability in the operation of the Transport Services. Accordingly the Operator shall work together with **tie** and the **tie** Advisers to develop the Infrastructure and Equipment Output Specification in respect of each Line and/or Phase (as appropriate), starting from the outline Infrastructure and Equipment Output Specification referred to in paragraph 8.1 and observing the provisions of the Design Manual, to ensure that the Infrastructure and Equipment to be provided pursuant to each Infrastructure Delivery Agreement shall enable the achievement of a high standard of reliability in operation of the Transport Services.

8.3 In carrying out the development under paragraph 8.2, the Operator, **tie** and the **tie** Advisers will use reliability analyses which utilise wherever possible historical operating data from similar equipment.

8.4 The **tie** Advisers will also provide to the Operator draft plans indicating the land required for the construction and/or operation of each Line and/or Phase (as appropriate).

8.5 The Operator will provide comments and support to **tie** and/or the **tie** Advisers in relation to:

8.5.1 the outline Infrastructure and Equipment Output Specification in respect of any Line and/or Phase (as appropriate) referred to in paragraph 8.1, and any subsequent drafts of the Infrastructure and Equipment Output Specification developed pursuant to paragraph 8.2; and

8.5.2 the land identified for the Project, in particular the siting of Depots and stabling facilities

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taking into account particularly the Operator's reasonable operational requirements to deliver the Operating Output Specification during Project Phase D in respect of the relevant Line and/or Phase (as appropriate).

8.6 The Operator will provide an initial review and comments pursuant to paragraph 8.5 within 60 days of commencement of Project Phase A in respect of the relevant Line, and will provide further reviews and comments in a timely manner throughout Project Phase A.

9. REFINEMENT OF THE OPERATING OUTPUT SPECIFICATION

9.1 The Operator and **tie** may agree amendments to the Operating Output Specification for Project Phase D in respect of each Line and/or Phase (as appropriate). Such amendments shall include any amendments resulting from the refinement of the operating assumptions made by the **tie** Advisers (following comments from the Operator) in respect of at least the following in relation to each Line and/or Phase (as appropriate), or combination of Lines and/or Phases (as appropriate):

9.1.1 service patterns and route km;

9.1.2 timetabling;

9.1.3 Tram frequencies;

9.1.4 journey times;

9.1.5 Tram priority at junctions;

9.1.6 carrying capacities;

9.1.7 fleet size;

9.1.8 highway interface / UTC priority;

9.1.9 service integration;

9.1.10 fare structure;

9.1.11 demand and patronage;

9.1.12 maintenance regimes; and

9.1.13 Operating Costs.

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9.2 The amendments to the Operating Output Specification shall take account of, without limitation:

9.2.1 developments arising from the promotion of the Enabling Legislation for the relevant Line through the Scottish Private Bill parliamentary process; and

9.2.2 the development of the Infrastructure and Equipment Output Specification for the relevant Line and/or Phase (as appropriate) pursuant to paragraph 8.

9.3 The Operator will provide an initial review and comments pursuant to paragraph 9.1 above within 60 days of commencement of Project Phase A in respect of the relevant Line, and will provide further reviews and comments in a timely manner throughout Project Phase A.

9.4 **tie** and the Operator shall also have preliminary discussions regarding the development of the KPI Regime, taking into account any agreed amendments to the Operating Output Specification. The issues for development as regards the KPI Regime are as set out in paragraph 24 below.

10. NETWORK EFFECTS

10.1 As referred to in paragraph 5.1 above, **tie** has commissioned the **tie** Advisers to conduct the Network Effects Study to investigate the changes in Operating Costs, Operating Revenues and other benefits which would result from operating the Edinburgh Tram Network (or combinations of two of the Lines) as a single system rather than as separate Lines. To the extent that this study is still in progress during Project Phase A in respect of any Line, the Operator shall work in conjunction with the study team of the tie Advisers and prior to the end of Project Phase A shall review, agree and endorse the major principles of the Development Assumptions made by the **tie** Advisors in respect of the network effects from the operation of two or three of the Lines as a network.

10.2 The review to be carried out by the Operator of the network effects will take into account the reviews to be carried out by the Operator pursuant to paragraphs 8 and 9 for the individual Lines as outlined above and without limitation will cover:

10.2.1 any increase in Operating Revenues resulting from enhanced passenger journey opportunities made possible by the operation of the Lines as part of a network; and

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10.2.2 any reduction in Operating Costs as a result of synergies made possible by the operation of the Lines as part of a network.

11. LIAISON WITH CITY OF EDINBURGH COUNCIL AND OTHERS

11.1 The Operator shall, in consultation with **tie**, manage arrangements and reach agreements with CEC and others (including police and emergency services) with respect to any operational aspects of the interface with roads, railways or properties in the proximity of the System, including:

11.1.1 safety in operations;

11.1.2 impact of and response to System failures, breakdowns, etc.;

11.1.3 interface with Network Rail and train operators but not in relation to Service Integration Plan matters;

11.1.4 design and construction of on-street Tramway;

11.1.5 actions consequential on obstruction of the System resulting in disruption to the Transport Services;

11.1.6 maintenance of shared facilities including roadway, pavement, verges, etc.

11.1.7 maintenance of road/tram signals; and

11.1.8 access arrangements;

and such arrangements and agreements shall be subject to approval by **tie** and shall be incorporated into the Operations Management Plan to be developed in Project Phase B and Project Phase C.

12. SERVICE INTEGRATION PLAN

12.1 The Operator shall keep itself fully informed of the policies, strategies and plans being promoted and implemented by TEL, CEC and any other relevant Local Authority in respect of transport and their integration with other policies such as health, safety and environment.

12.2 Taking account of the policies, strategies and plans being referred to in paragraph 12.1, the Operator shall support engagement by **tie** and TEL with other transport operators including but not exclusively bus operators, Scotrail and other

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train operators and British Airports Authority, with the objective of maximising use of public transport and increasing mode transfer from the private car. The Operator shall also support engagement by **tie** and TEL with the operators of any park-and-ride facilities near but not directly related to the Tram operations.

12.3 Building upon any discussions with other public transport operators pursuant to paragraph 12.2, the Operator shall support the development of the Service Integration Plan by **tie** and TEL through which the Transport Services will complement and dovetail with other public transport services in Edinburgh and any areas outside Edinburgh served by the Transport Services. This process shall, whenever possible, include appropriate agreements between TEL with other transport operators (as appropriate) to support these objectives.

12.4 Matters to be addressed by the Service Integration Plan will cover, but not exclusively, the following:

12.4.1 operating timetable;

12.4.2 hours of operation;

12.4.3 journey times;

12.4.4 service integration (the Tram System as part of a wider public transport system);

12.4.5 competition;

12.4.6 Special Events planning;

12.4.7 interchange facilities;

12.4.8 ticketing arrangements;

12.4.9 maintenance of shared facilities; and

12.4.10 incident management and provision of alternative service

12.5 The Service Integration Plan shall be based on the following principles:

12.5.1 ease of physical access between the System and other transport modes shall be facilitated wherever interchange opportunities are available; and

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12.5.2 wherever practicable, publicity, particularly Timetable and fares information shall be presented in a common format and the Operator agrees to the inclusion of any relevant information regarding the Transport Services (provided by the Operator) in such common format.

12.6 The Operator shall use its best endeavours, in a manner compliant with Law, consistent with the Service Integration Plan, and consistent with the Operator's obligations (including as to resources and personnel, and build up of the same) to support measures to achieve Timetable coordination with other operators' services. These may include coordination of feeder buses and train services with the Transport Services and late night or last Tram services departing from Haymarket or Waverley stops providing advertised connections from arriving main line services.

12.7 **tie** shall establish a consultation process whereby the Operator shall be given reasonable opportunity, in respect of the development of the Service Integration Plan during Project Phase B, Project Phase C and Project Phase D, to comment upon the Service Integration Plan. **tie** shall meet with the Operator to discuss the development of the Service Integration Plan. **tie** shall use reasonable endeavours to procure that other key decision makers also meet with the Operator to discuss the development of the Service Integration Plan.

12.8 In relation to the ticketing arrangements referred to in paragraph 12.4.8 above, the Operator shall support TEL in the development with other public transport operators of measures for promoting integrated ticketing (through One Ticket or its successor ticket nominated by **tie**).

12.9 The Operator shall assist and co-operate with the Joint Revenue Committee in the modelling of any impacts on patronage in the development of the Service Integration Plan.

13. INTEGRATION COMPLIANT WITH THE SERVICE INTEGRATION PLAN

13.1 The Operator shall be responsible, subject to the provisions of paragraph 12.6, for ensuring that its support for delivery of integrated Transport Services with bus and train operations in Edinburgh is in accordance with the Service Integration Plan (as amended from time to time).

13.2 The Operator shall keep **tie** informed from time to time of all actions being taken by the Operator to ensure compliance with paragraph 13.1.

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14. GATEWAY FROM PROJECT PHASE A TO PROJECT PHASE B

14.1 Subject to paragraph 14.2, the Operator will notify **tie** when the Operator considers that it has completed each of the tasks to be carried out pursuant to Project Phase A in respect of a Line and that all matters to be agreed during Project Phase A have been agreed between the Operator and **tie**. If **tie** agrees that all of such tasks have been completed and/or relevant matters agreed, **tie** shall notify the Operator that Project Phase B shall commence in respect of that Line.

14.2 **tie** and the Operator acknowledge that the parliamentary process in relation to the Scottish Private Bill(s) (including obtaining Royal Assent to the Scottish Private Bills(s)) may take considerably longer than the other tasks to be carried out pursuant to Project Phase A in respect of a Line. Accordingly, the Operator may give notice to **tie** pursuant to paragraph 14.1 when the Operator considers that:

14.2.1 each of the tasks to be carried out pursuant to Project Phase A in respect of the relevant Line has been completed (other than obtaining the Royal Assent to the Scottish Private Bills(s)) and that all matters to be agreed during Project Phase A have been agreed between the Operator and **tie**; and

14.2.2 the progress of the parliamentary process in relation to the Scottish Private Bill(s) is such that it is reasonable (having regard to the Project Programme) to commence the Project Development Services under Project Phase B.

14.3 If following a notice under paragraph 14.2, **tie** agrees that (i) all of such tasks have been completed (other than obtaining the Royal Assent to the Scottish Private Bills(s)) and/or relevant matters agreed, and (ii) it is reasonable (having regard to the Project Programme) to commence the Project Development Services under Project Phase B:

14.3.1 **tie** shall notify the Operator that Project Phase B shall commence in respect of that Line by issuing a PPCN; and

14.3.2 the Operator shall continue to provide the Project Phase A Project Development Services in respect of support for the parliamentary process in relation to the Scottish Private Bill(s) until the Royal Assent to such bill(s) is obtained.

14.4 Following a notice from the Operator pursuant to paragraph 14.1 or 14.2, to the extent that **tie** considers that any relevant task has not been completed by the Operator and/or

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relevant matter agreed, **tie** will notify the Operator accordingly, including details of the further activities to be carried out by the Operator in order to complete such task.

14.5 During Project Phase A, **tie** may, in its sole discretion, give two weeks notice to the Operator that Project Phase B shall commence in respect of any Line, and in such circumstances:

14.5.1 **tie** may direct that some or all of the Project Phase B Project Development Services shall be commenced; and

14.5.2 the Operator shall continue to provide the Project Phase A Project Development Services in respect of that Line until (i) the relevant tasks have been completed, and (ii) all matters to be agreed during Project Phase A have been agreed between the Operator and **tie**, or until **tie** otherwise directs.

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PROJECT PHASE B

Procurement of the Infrastructure and Equipment

15. INTRODUCTION

The primary objectives of **tie**, the **tie** Advisers and the Operator during Project Phase B in respect of any Phase shall be to:

15.1 finalise the Infrastructure and Equipment Output Specification in respect of that Phase;

15.2 conduct a competition to appoint the Infrastructure Provider, including the execution of the Infrastructure Delivery Agreement, in respect of that Phase;

15.3 agree:

15.3.1 the Operating Output Specification for Project Phase D in respect of that Phase (such Operating Output Specification for Project Phase D to also relate to the operation of that Phase as a network with any Phase already operational at the relevant time);

15.3.2 the Target Costs for Project Phase C2 in respect of that Phase; and

15.3.3 the Target Operating Costs to take effect at the commencement of Project Phase D in respect of that Phase.

15.4 agree any other amendments to the Operating Appendix consequential on the terms of the Infrastructure and Equipment Output Specification and the Infrastructure Delivery Agreement in respect of that Phase;

15.5 obtain final funding approval from the Scottish Executive in respect of that Phase and conclude any contracts for the provision of funding by CEC local development contributions; and

15.6 co-operate with and assist **tie**, the **tie** Advisers and the Joint Revenue Committee in relation to the development and/or refinement of the patronage forecast model and the setting of Target Patronage.

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16. PROJECT DEVELOPMENT ACTIVITIES DURING PROJECT PHASE B

16.1 In support of the primary objectives for Project Phase B set out in paragraph 15 above, the Operator will be expected, during Project Phase B in respect of each Phase, to comply with the requirements of paragraphs 16.2 to 16.4 below.

16.2 The Operator shall co-operate with **tie** and the **tie** Advisers in support of the primary objectives for Project Phase B set out in paragraph 15 above, including in relation to:

16.2.1 any refinements to the Development Assumptions agreed between the Operator and **tie** in Project Phase A, and the agreement of any such refinements;

16.2.2 the further development and subsequent finalisation of the Infrastructure and Equipment Output Specification and the terms of the IDA for the relevant Phase;

16.2.3 the procurement process in relation to the IDA for the relevant Phase , including the evaluation of bids and the subsequent appointment of the Infrastructure Provider for the relevant Phase;

16.2.4 the further development and subsequent agreement of the Operating Output Specification;

16.2.5 the further development and subsequent agreement of the Target Costs for Project Phase C2; and

16.2.6 the further development and subsequent agreement of the Target Operating Costs.

16.3 Without prejudice to paragraphs 16.2, the Operator shall:

16.3.1 review **tie**'s financial model and business case and make recommendations as to how the Project can be delivered and funded within the Affordability Limit (or so as to minimise any excess above such Affordability Limit);

16.3.2 provide support to **tie** and the **tie** Advisers in respect of the preparation of any applications, notices, designs, statements and relevant factual or technical evidence and all other procedures to obtain any Necessary Consents required for the Project;

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16.3.3 provide support to **tie** and the **tie** Advisers in respect of discussions and negotiations and the conclusion of any undertakings, agreements or other commitments with third parties as may be necessary or desirable to remove any objections to the Project or to secure the grant of any Necessary Consents or otherwise facilitate the construction, installation, operation and maintenance of any of the proposed Phases in the Edinburgh Tram Network. Such third parties may include, in particular (i) owners or occupiers of land required for or potentially affected by the Project, (ii) Network Rail and statutory undertakers, (iii) key stakeholders or influencers;

16.3.4 provide assistance to **tie** in negotiating developer or other local contributions to the Project;

16.3.5 provide support to **tie** and the **tie** Advisers in respect of the development of the programme for works required in connection with the construction and installation of any Phase and the co-ordination of such works with any roads, utility, development or other works or projects in the vicinity of that Phase; and

16.3.6 provide support to **tie** and the **tie** advisers in respect of the commissioning by **tie** of a system operational model of a form and extent to be agreed. The Operator shall provide all information related to Project Operations to facilitate specification and execution of such model.

16.4 The extent of the support and assistance to be provided by the Operator in respect of each of the matters set out in paragraph 16.2 or 16.3 will be determined from time to time by **tie**.

16.5 Further to paragraph 16.3.6 above, **tie** shall procure or provide the output from a system operational model and complimentary software that shall in respect of the System only:

16.5.1 simulate the Tram and the infrastructure to provide "laws of physics" run time estimates;

16.5.2 simulate the operation of a Timetable with simulated perturbations;

16.5.3 have the capacity to provide standalone vehicle and driver scheduling, driver rostering and Timetable production; and

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16.5.4 the driver scheduling and driver rostering shall be kept confidential by **tie** and the Operator, and **tie** shall procure that TEL shall also keep such scheduling and rostering confidential with security and password protection provisions, so that, if there is a shared system or others have access, the Operator can use the software in a secure environment without **tie** or others having access to the development by the Operator of sensitivity analyses of driver scheduling and driver rostering.

16.6 If **tie** is unable to provide the Operator with an entitlement without cost to access and use such model software in accordance with paragraph 16.5 and unless **tie** can otherwise procure that the data and software necessary shall be made available to the Operator, the Operator shall be required to procure such system operational model and complementary software. Such requirement shall be a **tie** Change and shall be considered in accordance with Clause 24 (*tie Changes*) and Clause 23 (*Performance and Financial Adjustments*) of the Operating Appendix.

17. OPERATOR'S PROJECT DEVELOPMENT RESOURCES DURING PROJECT PHASE B

In addition to the Operator Project Manager appointed pursuant to Clause 6.7, the Operator's Core Team shall include the following resources set out in the Project Development and Operating Costs during Project Phase B.

18. DEVELOPMENT OF THE INFRASTRUCTURE AND EQUIPMENT OUTPUT SPECIFICATION

18.1 The Operator, **tie** and the **tie** Advisers shall continue the development of the Infrastructure and Equipment Output Specification in respect of the relevant Phase, based on the work carried out during Project Phase A pursuant to paragraph 8 above. As in Project Phase A, the provisions of the Design Manual shall be observed as a means of ensuring that System delivery shall be to the requisite quality.

18.2 As referred to in paragraph 15 above, the Infrastructure and Equipment Output Specification for the relevant Phase must be finalised during Project Phase B for that Phase.

18.3 Final decisions on the Infrastructure and Equipment Output Specification will be made by **tie**, although the Operator will be expected to participate actively in discussions related to the function, performance and quality of items to be specified,

taking into account such matters as reliability and whole life costs. Such items will include, for example:

18.3.1 alignment (sight lines; safety aspects; crossovers and turnbacks);

18.3.2 wheel/rail interface issues, especially those which relate to safety, operability and overall System performance;

18.3.3 vehicle design (internal layout; provisions for mobility impaired (including any accessibility Legislation), cycles, prams/pushchairs; communications within vehicle);

18.3.4 vehicle performance and dynamics;

18.3.5 noise;

18.3.6 Tramstop design (provisions for mobility impaired, including requirements of Disability Discrimination Act 1995) including overall layout and provision of passenger facilities;

18.3.7 materials (Tramstops; vehicle interiors; anti-vandal);

18.3.8 Control Centre (size; layout; equipment);

18.3.9 customer Helpdesk;

18.3.10 staff facilities (size; detailed requirements);

18.3.11 public address system;

18.3.12 lighting;

18.3.13 communications systems;

18.3.14 Depot and stabling facilities including equipment provision;

18.3.15 routine maintenance and the equipment necessary to undertake it;

18.3.16 ticketing systems, integration and revenue collection, including ensuring that:

(a) the fare revenue collection systems have no adverse impact on dwell times of Trams at Tramstops, do not cause undue delay to passengers and that tickets are not sold or validated by Tram drivers; and

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(b) any ticket vending facilities are easy to use by all passengers including unassisted wheelchair users;

18.3.17 Any proposals to use smartcards for ticketing (and any connections to any regional smartcard scheme);

18.3.18 ticket validation systems;

18.3.19 security of the System (CCTV, security lighting, emergency call systems);

18.3.20 passenger information systems; and

18.3.21 inspection and testing.

18.4 In addition, the Operator will also actively participate in development of the IDA documentation to include infrastructure elements to facilitate the Operator's future management of the following:

18.4.1 statutory and third party interface, including road, rail and utilities;

18.4.2 environmental management; and

18.4.3 System integration

19. DEVELOPMENT OF THE TERMS OF THE INFRASTRUCTURE DELIVERY AGREEMENT AND TENDER DOCUMENTATION

19.1 The Operator shall provide such input as **tie** may reasonably require in relation to the development of the terms of the Infrastructure Delivery Agreement and tender documentation in respect of the relevant Phase. Without limitation, **tie** shall invite comments from the Operator in respect of the following terms of the Infrastructure Delivery Agreement:

19.1.1 the acceptance tests for the Infrastructure and Equipment (including the extent to which **tie** will delegate responsibility to the Operator for carrying out such acceptance tests);

19.1.2 reliability tests;

19.1.3 the ongoing maintenance obligations of the Infrastructure Provider;

19.1.4 performance regimes and the output of the Infrastructure and Equipment needed to support them;

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19.1.5 integration with other Phases;

19.1.6 Roads interface;

19.1.7 warranty and latent defects content and periods;

19.1.8 as-builts, maintenance manuals and spares;

19.1.9 environment management; and

19.1.10 safety.

19.2 In relation to the ongoing maintenance obligations of the Infrastructure Provider, the Operator shall provide such input as **tie** may reasonably require in relation to the development of the Infrastructure Maintenance Plan (including the details of any possession of any Phase required for track maintenance), having regard to the effect of such possession on the Timetable, the Fixed Costs (excluding the Category Five Fixed Costs), the Target Patronage and Target Operating Costs.

20. INFRASTRUCTURE TENDER EVALUATION AND NEGOTIATION OF INFRASTRUCTURE DELIVERY AGREEMENT

20.1 The Operator shall provide such input as **tie** may reasonably require in relation to the evaluation of tenders received from prospective Infrastructure Providers, and the negotiation of the terms of the Infrastructure Delivery Agreement.

20.2 **tie** will disclose to the Operator such elements of the tenders received from prospective Infrastructure Providers as are necessary to enable the Operator to provide input pursuant to paragraph 20.1. To the extent that additional confidentiality undertakings are required from the Operator in connection with such disclosure (including without limitation, undertakings by the Operator direct to the prospective Infrastructure Providers), the Operator and **tie** will discuss such requirements in good faith.

21. AMENDMENTS TO THE OPERATING APPENDIX DURING PROJECT PHASE B

21.1 As stated in Clause 10 (*Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* of the Agreement **tie** acknowledges that the Operator has agreed (i) the Operator Financial Model as at the DPOFA Variation Date and (ii) the terms

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of the Operating Appendix on the basis of the Base Case Assumptions and the Law as at the DPOFA Variation Date .

21.2 During Project Phase B in respect of each Phase, the Operator and tie shall develop and then agree:

21.2.1 any amendments to the Operating Output Specification in respect of such Phase or on the System in accordance with paragraph 22;

21.2.2 amendments to the Operating Appendix, the Base Case Assumptions, the Financial Proposals, the Operator Financial Model, the Project Development and Operating Costs, and/or the Operating Output Specification in accordance with paragraph 23, including:

a) the Target Costs for Project Phase C2;

b) the Target Operating Costs to apply in the Operating Appendix from the Service Commencement Date in respect of such Phase and

c) the Fixed Costs (except for the Category One Fixed Costs and the Category Five Fixed Costs)

21.2.3 amendments to the KPI Regime set out in the Operating Appendix to apply from the Service Commencement Date in respect of such Phase in accordance with paragraph 24;

21.2.4 amendments to the Performance Monitoring Regime set out in the Operating Appendix to apply from the Service Commencement Date in respect of such Phase or impact on the System in accordance with paragraph 25;

21.2.5 the Operating Method Statements in accordance with paragraph 26 based on the outlines for the Operating Method Statements prepared by the Operator during the tender process leading to the execution of this Agreement; and

21.2.6 any other changes to the Operating Appendix in accordance with the mechanism in Clause 10 (*Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* of the Agreement;

and all such changes shall be developed on the basis that the Operator shall be in No Better and No Worse position as a result of the relevant change.

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21.3 Any changes to the Operating Appendix (including the Target Costs for Project Phase C2, the Target Operating Costs and the Fixed Costs (except for Category One Fixed Costs and Category Five Fixed Costs)) as a result of all developments during Project Phases A and B in respect of a Phase shall be agreed before the date of execution of the Infrastructure Delivery Agreement in respect of that Phase.

22. AMENDMENTS TO THE OPERATING OUTPUT SPECIFICATION

22.1 The Operator, **tie** and the **tie** Advisers shall continue the refinement of the Operating Output Specification for Project Phase D, based on the work carried out during Project Phase A pursuant to paragraph 9 above.

22.2 As referred to in paragraph 15 above, the Operating Output Specification for Project Phase D for each Phase shall be finalised during Project Phase B for that Phase, provided that such Operating Output Specification shall also relate to the operation of that Phase as a network with any Phase already operational at the relevant time.

22.3 Any amendments to the Operating Output Specification shall be agreed in writing between the Operator and **tie** and shall take account of, without limitation, the development of the terms of:

22.3.1 the Infrastructure and Equipment Output Specification pursuant to paragraph 18;

22.3.2 the Infrastructure Delivery Agreement and tender documentation pursuant to paragraph 19; and

22.3.3 the Transport Services regime, including hours of operation, Tram frequencies and operating pattern.

23. DEVELOPMENT OF THE OPERATOR FINANCIAL MODEL (INCLUDING THE TARGET COSTS FOR PROJECT PHASE C2, AND THE TARGET OPERATING COSTS)

23.1 The Operator, **tie** and the **tie** Advisers shall continue the development of the Operator Financial Model (including the Target Costs for Project Phase C2, and the Target Operating Costs) based on the work carried out during Project Phase A pursuant to paragraph 7 above.

23.2 To the extent that any refinements of the Development Assumptions are necessary during Project Phase B, such refinements shall be agreed between **tie** and the Operator

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and shall be taken into account for the purposes of the development of the Operator Financial Model pursuant to paragraph 23.1.

23.3 **tie** and the Operator acknowledge that:

23.3.1 amendments to the Operating Output Specification;

23.3.2 amendments to the KPI Regime;

23.3.3 amendments to the Performance Monitoring Regime;

23.3.4 the terms of the Operating Method Statements;

23.3.5 the terms on which Necessary Consents are procured;

23.3.6 the terms of the Infrastructure Delivery Agreement (including the Infrastructure and Equipment Output Specification) in respect of each Phase; and

23.3.7 other changes during the development of the Project during Project Phases A and B;

may mean that some of the Base Case Assumptions are Inappropriate Base Case Assumptions.

23.4 Subject to Clause 10.6 of the Agreement, to the extent that any of the Base Case Assumptions prove to be Inappropriate Base Case Assumptions, **tie** and the Operator shall discuss and seek to agree amendments to the Operating Appendix, the Financial Proposals, Base Case Assumptions, the Operator Financial Model, the Project Development and Operating Costs, and/or the Operating Output Specification in accordance with the mechanism described in Clause 10 (*Amendments to the Operating Appendix, the Operator Financial Model and the Operating Output Specification, and the Setting of Fixed Costs and Rates)* of the Agreement.

23.5 The amendments to the Target Operating Costs, and/or Fixed Costs (except for the Category One Fixed Costs and the Category Five Fixed Costs) shall take into account:

23.5.1 any possession of a Phase required for track maintenance; and

23.5.2 any planned roads maintenance.

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23.6 Without prejudice to paragraphs 23.1 to 23.4, the Operator will in addition periodically review and recommend adjustments to **tie**'s business case, economic model and risk management plan to reflect events and developments during the course of Project Phase B.

24. DEVELOPMENT OF THE KPI REGIME

24.1 The KPI Regime shall be directly linked to the Operator's performance of the following Key Performance Indicators:

24.1.1 Punctuality Service Element (including the First Tram and the Last Tram);

24.1.2 Edqual Indicator for cleanliness, information provision (including signage) and responses to alarms and information requests;

24.1.3 -response times for the correction of service deficiencies; and

24.1.4 revenue protection.

24.2 The Operator shall, in conjunction with **tie** and the **tie** Advisors, develop the KPI Regime to apply during Project Phase D (including any changes to the Key Performance Indicators and/or the relevant benchmarks) to the extent appropriate to take account of the developments to the Project during Project Phases A, B and C, all such refinements to be agreed between the Operator and **tie**.

24.3 The Operator shall develop methods to monitor the performance and quality of the Transport Services and the Project Operations during Project Phase D against the Key Performance Indicators, such methods to be acceptable to **tie**. Wherever possible and practicable, performance shall be monitored electronically. The Operator shall be responsible for all processing and analysis of such performance using, where possible and practicable, the electronic monitoring equipment in order to ensure that **tie** receives direct Service Quality Reports and supporting data in form and format to be agreed.

24.4 Where performance against a Key Performance Indicator cannot be electronically monitored or it is not practicable to do so, actual performance shall be measured in accordance with the following:

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24.4.1 **tie** Inspectors will assess in good faith Trams, Tramstops and/or the Transport Services and assess the level of performance against the relevant Key Performance Indicator; and

24.4.2 in each Reporting Period, **tie** will inspect such number of Tramstops and Transport Services as **tie** may acting reasonably consider appropriate.

24.5 Target benchmark performance levels shall be agreed for each Key Performance Indicator. Performance Points shall be allocated based on levels of performance in Project Phase D above or below the target benchmark, subject to an agreed scoring system detailed in Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime)* of the Operating Appendix, as developed during Project Phase B. Deductions from the KPI Regime Profit Element for each Reporting Period shall be directly linked to the number of Performance Points scored.

24.6 **tie** will notify the Operator following the end of each Reporting Period (within such time period as may be agreed between **tie** and the Operator) where performance in that Reporting Period against a Key Performance Indicator is above or below the target benchmark, whether such performance is measured:

24.6.1 electronically;

24.6.2 by the **tie** Inspectors; or

24.6.3 by some other monitoring method agreed between **tie** and the Operator pursuant to paragraph 24.4.

24.7 The Punctuality Service Element relates to the operation of the Transport Services against the service intervals or clock times in the Timetable, as measured at agreed monitoring points. Where the scheduled service interval is 10 minutes or less, monitoring will be carried out against scheduled Headway. Where the actual service interval exceeds the relevant service interval in the Timetable by 2 minutes or more a Late Tram shall be awarded. Where the scheduled service interval exceeds 10 minutes, trams shall be monitored against scheduled clock departure times. Where the actual departure time is more than one minute earlier or more than two minutes later than the scheduled departure time, a Late Tram shall be awarded.

24.8 The Punctuality Service Element relates also to the punctuality of the first and last passenger services, on each service route. First or Last Late Trams shall be allocated for each occasion when either:

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24.8.1 no passenger service which completes its journey over the length of a service route, stopping at every stop on that service route, departs the relevant Originating Tramstop within 2 minutes of the time scheduled in the Timetable for the first passenger service of the day for that service route; or

24.8.2 no passenger service which completes its journey over the length of a service route, stopping at every stop on that service route, departs the relevant Originating Tramstop within 2 minutes of the time scheduled in the Timetable for the last passenger service of the day for that service route.

24.9 The Edqual Indicator for cleanliness of Tram interiors and stops shall be developed to reflect the Operator's obligations in respect of Operator Maintenance and shall be measured against a number of service elements, such as:

24.9.1 cleaning of shelters, seating and waiting rooms;

24.9.2 cleaning of poster cases and signage;

24.9.3 cleaning of lifts and escalators (if any);

24.9.4 cleaning of stairs and footbridges;

24.9.5 cleaning of platforms;

24.9.6 cleaning of tram system car parks;

24.9.7 cleaning of cycle parking facilities;

24.9.8 cleaning of ticket vending machines;

24.9.9 cleaning of public and staff telephones;

24.9.10 cleaning of Tram interior; and

24.9.11 reporting of items requiring attention by the Infrastructure Provider.

24.10 The Edqual Indicator for information requests will be developed to ensure that sufficient information is consistently provided to make passenger journeys easy. This will also reflect the objectives of the Marketing Plan and Public Liaison and Media Plan, and shall include at least the following:

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24.10.1 provision of advance information on planned disruptions to the Transport Services, such as maintenance works and Special Events;

24.10.2 response times to calls from "help points" on Tramstops and

24.10.3 quality of information announced through public address system.

24.11 From time to time **tie** shall undertake a customer survey by means of passenger questionnaire. **tie** shall allow the Operator a reasonable opportunity, in respect of the development of the questionnaire, to comment upon such questionnaire. **tie** shall meet with the Operator to discuss such comments and **tie** shall take due account of these comments provided that such comments are reasonable.

24.12 The Key Performance Indicator for revenue protection relates to the number of people travelling on the System with a valid ticket and will be developed to ensure a high level of compliance at all times. Measurement (in addition to Operator methodology) shall include spot checks by the monitoring inspectors. An agreed minimum number of inspections shall be undertaken each monitoring period and will include checks of at least the following:

24.12.1 availability of facilities for purchasing tickets;

24.12.2 availability of full range of tickets; and

24.12.3 numbers of passengers travelling with a valid ticket and the ticket type used.

25. DEVELOPMENT OF THE PERFORMANCE MONITORING REGIME AND THE PERFORMANCE INDICATORS

25.1 The Operator shall, in conjunction with **tie** and the **tie** Advisors, refine the Performance Indicators (including the benchmarks) that will monitor and measure the overall performance of the System during Project Phase D. Such refinements shall take account of the developments to the Project during Project Phases A and B and all such refinements shall be agreed between the Operator and **tie**.

25.2 The Performance Indicators shall cover the following disciplines:

25.2.1 safety & environment;

25.2.2 operations; and

25.2.3 maintenance

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25.3 Each discipline may include the following components and unless otherwise agreed will be attributable to the Operator, the Infrastructure Provider or both, as indicated below. Automatic monitoring techniques shall be adopted for the Performance Monitoring Regime except where the Operator can demonstrate that this is not practicable. Where the responsibility for monitoring Performance Indicators does not lie solely with the Operator, the Operator shall be responsible for receiving relevant data from all other concerned parties, for reviewing the completeness of the data, for collation of data from all sources and for reporting to **tie**.

25.4 Safety & Environment Performance Indicators

25.4.1 Operator + Infrastructure Provider

- staff fatalities, accidents or injuries;
- derailments;
- planned general environmental inspections;
- staff competencies (safety critical);
- drugs & alcohol compliance;
- environmental audits (carried out and outstanding);
- maintenance corrective action reports (including track closures);
- staff working time exceedances;
- staff hours lost through sickness; and
- staff turnover

25.4.2 Operator

- fatalities, accidents or injuries to members of the public;
- passenger fatalities, accidents or injuries;
- collisions involving trams and other vehicles;
- SPASs (severe and / or technical);

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- incidents of speeding;
- near misses (public or vehicles);
- instances of crime/vandalism; and
- malicious acts

25.4.3 Infrastructure Provider

- Phase and/or Line (as appropriate) closure (maintenance) irregularities;

25.5 Operations Performance Indicators

25.5.1 Operator + Infrastructure Provider

- Cancellations due to Operator and/or Infrastructure Provider;

25.5.2 Operator

- service regularity;
- service punctuality;
- service availability;
- number of operational incidents by type and severity;
- service delay/disruption by type/location/minutes delay;
- overcrowding and operational hindrance; and
- journey times over key stages;

25.5.3 Infrastructure Provider

- fleet reliability;
- fleet failure by type and frequency;
- Infrastructure and Equipment / System availability; and
- critical failures: System/AC/DC traction equipment;

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25.6 Maintenance Performance Indicators

25.6.1 Operator + Infrastructure Provider

- temporary speed restrictions;
- incident response (response to failures);
- System failures (signalling, information, communications);
- signalling failures; and
- removal of graffiti;

25.6.2 Operator

- cleanliness at stops and in vehicles;

25.6.3 Infrastructure Provider

- route availability;
- broken or defective rails;
- incident response (rectification);
- signalling system equipment maintenance against plan;
- track asset equipment maintenance against plan;
- overhead line equipment maintenance against plan;
- structures, buildings (including Tramstop & Depot) maintenance against plan; and
- overhead line failure.

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26. DEVELOPMENT OF OPERATING METHOD STATEMENTS

26.1 The content of the Operating Method Statements shall be co-ordinated and formed by the Operator into an integrated management system (**"Integrated Management System"**) which shall comply with ISO 9001:2000 or equivalent:

26.1.1 Using as a basis the information prepared by the Operator during the tender process leading to the execution of this Agreement, the Operator shall develop, in consultation with the **tie** Advisers, and where necessary in conjunction with others, Operating Method Statements covering its duties and obligations during commissioning (Project Phase C) and operations (Project Phase D).

26.1.2 The minimum requirements for the Operating Method Statements are that it shall encompass the following components:

- Management plan;
- Operations Management Plan;
- Shadow Run Validation Plan;
- Operator Maintenance Plan;
- Safety Management System Plan;
- Recruitment and Training Plan;
- Organisation and Job Descriptions Plan;
- Approvals Management Plan;
- Quality Management Plan;
- Document Management Plan;
- Incident Management Plan;
- Systems Assurance Plan;
- Testing and Commissioning Plan;

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- Environmental and Sustainability Management Plan;
- Security Management Plan;
- Marketing Plan;
- Public Liaison and Media Plan; and
- System Integration Plan.

26.1.3 The minimum coverage of each of the above plans is provided in the following paragraphs. The terms of the Operating Method Statements shall be subject to **tie**'s approval (**tie** acting reasonably) prior to the end of Project Phase B.

26.1.4 It is recognised that during Project Phase B, the scheme may not be developed to the extent that all of these plans can be finalised. However, scheme definition will have advanced sufficiently for the plans to be prepared in some detail and sufficiently to identify staff structure and any costs associated with implementation of the plans. These costs will be taken into account when agreeing the Target Operating Costs and any adjustments to the Fixed Costs (excluding the Category One Fixed Costs and the Category Five Fixed Costs) pursuant to paragraph 23 and/or the setting of the Target Patronage by the Joint Revenue Committee.

26.1.5 Any amendment to the Operating Method Statements during Project Phase C or thereafter shall be subject to the approval of **tie** pursuant to Schedule 9 (*Review Procedure*) and to the extent that any such amendment will affect the operating costs or revenues during Project Phase D, the Target Operating Costs, Fixed Costs (other than the Category Five Fixed Costs) and/or Target Patronage may be amended in accordance with the Variation procedure.

26.2 Operations Management Plan

26.2.1 The Operator shall produce operations management documents covering rules, procedures and actions to be observed in Project Phase D, including incident management. These documents shall describe the rules to be followed by personnel in the course of their duties, whether site based or mobile and when undertaking operational and maintenance activities. The Operator shall ensure that the Operations Management Plan shall where

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appropriate encompass the requirement of other more detailed plans within the Operating Method Statements (e.g. with respect to training or Health and Safety). These documents shall cover the following situations:

- normal unperturbed operations for the System;
- arrangements for staff training and competence assessment of all Operator Parties engaged in the operation of the System, including the core competencies applicable to all staff and/or Operator Parties engaged in the Project Operations;
- procedures for managing disruption to the System, however caused;
- disaster recovery procedures and during accidents and emergencies;
- management of alternative transport when required;
- revenue collection;
- the process for integration of the Phases to form common operational procedures;
- operational performance benchmarking, monitoring and reporting;
- provision of appropriate technical resources to investigate, develop and implement solutions to operational problems;
- complaints management;
- the monitoring, review and amendment where necessary of third party interface agreements including in particular road, rail and utility interfaces; and
- feedback of corrective actions into the operational procedures.

26.3 Service Integration Plan

The Operator shall support the development of the Service Integration Plan. Such support shall take account of any developments in planning or transportation matters, or any change in policies of tie, TEL or CEC which might affect service integration

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and public transport provision to the extent that these developments and changes are made known to the Operator.

26.4 Shadow Run Validation Plan

26.4.1 The Operator shall prepare a shadow run validation plan (**"Shadow Run Validation Plan"**) which shall include but not be limited to the following activities in respect of each stage of introduction and the System as a whole:

- the simulated introduction of Infrastructure and Equipment failure at times unknown to the personnel operating the System;
- the staged introduction of misbehaving passengers at times unknown to the personnel operating the System;
- the staged introduction of large crowds of passengers at times unknown to the personnel operating the System;
- the simulation of a fire with subsequent emergency evacuation of passengers;
- the simulated introduction of operating staff illness;
- the simulated introduction of external influences such as power supply failure, leaves on track, ice and snow conditions, road traffic accidents or other line obstructions;
- the quality management activities necessary to ensure proper performance of tests and reporting;
- the safety management activities necessary to ensure that safety is not jeopardised by the shadow running validation activities;
- other requirements that may be specified by HMRI; and
- where necessary the participation of the emergency services and other authorities.

26.4.2 The Operator shall further develop the Shadow Run Validation Plan in conjunction with the Infrastructure Provider during Project Phase C pursuant to paragraph 35.

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26.5 Operator Maintenance Plan

26.5.1 The Operator shall develop, in consultation with the tie Advisers, the Operator Maintenance Plan.

26.5.2 The Operator Maintenance Plan shall require that the Operator shall carry out the Operator Maintenance with the objective of ensuring that the functionality of all Infrastructure and Equipment and elements used in providing the Transport Services (and other Project Operations) is maintained and that the visual and physical appearance of the System does not deteriorate through the build up of litter, dirt, debris, detritus, industrial or bodily fluids.

26.5.3 Operator Maintenance, and the required frequency of such maintenance, shall be as follows:

- cleaning of all Tramstops, access ways and the Depot car park so as to ensure they are clean and free from all litter, dirt, debris, detritus, industrial and bodily fluids; such cleaning to be carried out not less than daily or as may be otherwise agreed by the Parties (both acting reasonably);

- emptying of all litter bins at Tramstops or on the Trams daily or as regularly as necessary to prevent them from becoming full;

- promptly remove any observed or reported rubbish and debris at the Tramstops or on Trams likely to create a risk of fire or other dangers;

- regularly remove any observed or reported litter on Trams throughout each day so as to maintain a reasonably clean travelling environment for passengers. This obligation shall also relate to the cleaning up of observed or reported fluids of any type on the Trams;

- cleaning of the track areas adjacent to the platform faces on the off-street sections of the Edinburgh Tram Network so as to ensure such areas are clean and free from all litter, dirt, debris, detritus, industrial and bodily fluids; such cleaning to be carried out not less than daily or as may be otherwise agreed by the Parties (both acting reasonably); and

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- cleaning of the parts of the Depot for which the Operator is either the main user or which are shared and this shall include offices, Control Room, messing facilities, Operator locker rooms, car parking at the Depot and Depot entrances, so as to ensure such parts are clean and free from all litter, dirt, debris, detritus, industrial and bodily fluids; such cleaning to be carried out not less than daily or as may be otherwise agreed by the Parties (both acting reasonably).

26.5.4 Operator Maintenance shall also include the carrying out of the initial response to a failure of, damage to or other incident occurring on the System which:

(a) is not specifically identified in paragraph 26.5.3 as the Operator's responsibility to resolve; but

(b) actually or, in the Operator's reasonable opinion, potentially interrupts or delays the Transport Services.

26.5.5 The initial response referred to in paragraph 26.5.4 (**"Initial Response"**) includes the following activities:

(a) initial reporting of the occurrence of a failure, damage or other incident to the Operator's best estimate of the relevant Infrastructure Provider including (if appropriate) request for urgent maintenance or repair;

(b) to the extent necessary, attendance at the site of the occurrence of the Operator's operations and/or maintenance staff to assess the cause of the problem;

(c) determination of the appropriate course of action;

(d) where possible and safe and within the capabilities immediately available to the Operator, rectification of the problem by the Operator;

(e) where possible and safe and within the Operator's immediately available capabilities, implementation of temporary repairs; and

(f) implementation of measures to overcome and/or mitigate the disruption to Transport Services.

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26.5.6 The Initial Response will not include the performance of permanent repairs except where these are of a minor or trivial nature.

26.5.7 In relation to any requirement for an Initial Response, the Operator shall initiate a response to an incident requiring an Initial Response within 15 minutes of the earlier of:-

(a) the Operator identifying that such incident has occurred; and

(b) an Infrastructure Provider or **tie** notifying the Operator of such incident; and

(c) any other third party notifying the Operator of such incident through the Control Room or otherwise.

26.5.8 Without prejudice to paragraph 26.5.7, the Operator shall, acting reasonably, have complete discretion regarding the manner in which it undertakes the Initial Response including any action which it chooses to take to mitigate disruption to Transport Services.

26.5.9 **tie** confirms that the Operator shall have no liability to **tie** or any Infrastructure Provider for any liability, damages or loss suffered by **tie** or any Infrastructure Provider, including in relation to:

(a) any loss of availability payment by an Infrastructure Provider; or

(b) any payment of any availability payment by **tie** to an Infrastructure Provider in respect of any period when the System was not fully available

arising from the Operator's response to the requirement to undertake an Initial Response unless (and to the extent that) the Operator's action in undertaking or failing to respond to the requirement for such Initial Response were:-

(i) in breach of its undertakings in paragraph 26.5.7; or

(ii) negligent.

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26.5.10 Notification to Infrastructure Provider

(a) Except where the relevant Infrastructure Provider has notified the Operator, the Operator shall notify the Infrastructure Provider whom the Operator considers to be relevant by telephone or radio (as appropriate) immediately following a report to the Control Centre of the occurrence of a failure, damage or other incident requiring an Initial Response.

(b) Representatives of the relevant Infrastructure Provider shall be entitled to attend the site of the incident in order to consult on the appropriate measures to be taken to restore normal Transport Services and to observe any actions taken by the Operator.

(c) As soon as possible following the incident, the Operator shall issue a written report to the Infrastructure Provider whom the Operator considers to be relevant describing the incident, its cause (so far as known), its duration, its location, the actions taken and any follow up actions required.

26.5.11 The Operator Maintenance Plan shall state that in carrying out the Operator Maintenance, the Operator shall use all reasonable endeavours to minimise:

- disruption to Transport Services;
- impairment of access to Transport Services by passengers whose mobility is in any way impaired; and
- the environmental impact of carrying out such obligations.

26.6 Safety Management System Plan

26.6.1 The Operator shall develop a Safety Management System Plan which shall satisfy all relevant Law and shall cover as a minimum the following:

(a) approach to setting and verification of safety standards;

(b) management control, monitoring and implementation of corrective action in respect of health and safety;

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(c) benchmarking, monitoring, control and reporting of health and safety related incidents including near misses;

(d) the confidential reporting system required to be established and maintained;

(e) arrangements for ensuring security and safety of staff and the public;

(f) Operator Parties' health and safety scrutiny arrangements;

(g) approach to discharge of responsibilities under the CDM Regulations;

(h) approach to human factors and ergonomics; and

(i) drug and alcohol policy.

26.6.2 **tie** and the Operator shall ensure (in consultation with the **tie** Advisers) that by the end of Project Phase C1 in respect of any Phase, the Safety Management System Plan is properly integrated with the safety management system plan of the Infrastructure Provider for that Phase.

26.7 Recruitment and Training Plan

26.7.1 The Operator shall develop a Recruitment and Training Plan to ensure the competencies of all staff and Operator Parties (and their staff) engaged in the operation of the System. The implementation of the Recruitment and Training Plan shall be the direct responsibility of the Operator's managing director. An essential element of the Recruitment and Training Plan is that all staff and Operator Parties (and their staff) receive safety training prior to undertaking any duties related to operation of the System.

26.7.2 The Recruitment and Training Plan shall include as a minimum, the following:

- a recruitment strategy and selection process;
- induction training for all staff which not only embraces the policies and organisation of the Operator but also the safety culture of a public transport system;

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- health and safety policy and procedure training for all staff including staff employed by any Operator Party;
- technical training for drivers, controllers or technical/operations staff to the standards as established by HMRI, such training to ensure the safe and competent operation of all Trams and Infrastructure and Equipment;
- incident management procedures for operational and support staff;
- cross training in order to ensure flexibility of working by staff and full understanding of the duties of others;
- staff development and re-training programmes;
- training log for each employee and employee of any Operator Party;
- competence assessment and certification;
- the quality of all training and re-training should meet all health and safety requirements with specific emphasis to that required by the HMRI; and
- as a general principle employees should only by required to carry out tasks for which they have been trained.

26.7.3 The Recruitment and Training Plan shall comprise a comprehensive recruitment, training and certification programme for both Project Phase C (commissioning) and Project Phase D (operational). As regards training in Project Phase C, the Operator shall ensure as far as practicable that such training courses are coordinated with the commissioning of the System to ensure that trainees derive maximum benefit from progressive involvement.

26.7.4 The Recruitment and Training Plan shall include the Operator's proposals for emergency services familiarisation, frontagers and adjacent building owners familiarisation and operator rules and procedures for other contractors providing services in respect of the Edinburgh Tram Network.

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26.7.5 The Operator shall produce a base training materials requirement specification which shall be subject to tie's approval and shall be annexed to the Recruitment and Training Plan.

26.8 Overall Approvals Management Plan and Approvals Management Plan

26.8.1 An Overall Approvals Management Plan for the System shall be developed by tie and tie's Advisers, which shall cover at least the following:

(a) all statutory Necessary Consents to be obtained, identifying in each case the applicable Relevant Authority, the person or body responsible for obtaining the statutory Necessary Consent, and the intended date by which such statutory Necessary Consent is to be obtained;

(b) all third party Necessary Consents to be obtained, identifying in each case the applicable third party, the person or body responsible for obtaining the third party Necessary Consent, and the intended date by which the third party Necessary Consent is to be obtained;

(c) procedures to be used in obtaining statutory Necessary Consents and third party Necessary Consents; and

(d) procedures for maintaining the Overall Approvals Management Plan.

26.8.2 The Operator shall comply with all aspects of the Overall Approvals Management Plan as may be necessary to implement and maintain the Overall Approvals Management Plan.

26.8.3 The Operator shall develop an Approvals Management Plan capable of incorporation within the Overall Approvals Management Plan and covering at least the following:

(a) all statutory Necessary Consents to be obtained by the Operator and the intended date by which such statutory Necessary Consents are to be obtained;

(b) all third party Necessary Consents to be obtained, by the Operator and the intended date by which such third party Necessary Consents are to be obtained;

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(c) procedures to be used by the Operator in obtaining statutory Necessary Consents and third party Necessary Consents required in terms of paragraphs (a) and (b) above; and

(d) procedures for maintaining the Overall Approvals Management Plan.

26.8.4 The Operator shall comply with all aspects of the Approvals Management Plan as may be necessary to implement and maintain the Approvals Management Plan.

26.9 Quality Management Plan

26.9.1 The Operator shall develop a Quality Management Plan which shall satisfy the requirements of the Operator's independent auditor and shall encompass at least the following:

- quality management and control procedures (including those of Operator Parties engaged in the Project Operations);
- internal and external quality audit programme; and
- change management procedures.

26.9.2 The Quality Management Plan shall comply with BS EN ISO 9001:2000 or equivalent and the Operator shall subject the system described in the Quality Management Plan to regular independent audits at the Operator's own cost. Copies of the audit reports shall be provided to tie on request.

26.10 Document Management Plan

The Operator shall develop a Document Management Plan which shall cover at least the following:

26.10.1 procedures for documentation control (including in relation to the issue of documents to **tie**); and

26.10.2 a schedule of documents to be prepared by, for or on behalf of the Operator in carrying out the mobilisation, commissioning and operation of the System, including details as to their purpose, distribution, document hierarchy and intended issue date (such schedule to be updated in the event of variation).

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26.11 Incident Management Plan

26.11.1 The Incident Management Plan to be developed by the Operator shall consider at least the following possible events and shall develop procedures to be followed should they occur:

- road traffic accident;
- crowd control;
- signalling failure (local or system wide);
- power failure;
- Tram breakdown;
- service obstruction;
- passenger emergency (e.g. heart attack);
- fire;
- criminal or hooligan behaviour; and
- driver illness.

26.11.2 Where appropriate and necessary the Incident Management Plan should be developed in conjunction with the HMRI, CEC, Police, Emergency Services, and Network Rail and should include options for the provision of alternative rail or bus services during periods of closure of all or part of the System.

26.12 Systems Assurance Plan

The Operator shall develop a Systems Assurance Plan which shall incorporate as a minimum the following:

26.12.1 System assurance organisation and key personnel;

26.12.2 responsibilities for delivering the Systems Assurance Plan;

26.12.3 procedures for monitoring and controlling all Operator Parties;

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26.12.4 details of the integration of systems assurance analysis with design and construction, including:

- decision making process;
- management of unacceptable risks;
- action management;
- management of programme deviations;

26.12.5 targets to be met (including in relation to the reliability of the Transport Services);

26.12.6 systems assurance programme;

26.12.7 techniques and methods to be employed;

26.12.8 outline of systems assurance demonstration plan;

26.12.9 procedures for the collection, analysis, correction and documentation of failures (FRACAS – Failure Reporting and Corrective Action System); and

26.12.10 internal audit programme, techniques and procedures.

26.13 Environmental and Sustainability Management Plan

The Operator, in conjunction with tie and the tie Advisers, shall develop an Environmental and Sustainability Management Plan which shall comply with all relevant Legislation, be based on ISO 14000 and shall cover as a minimum the following:

26.13.1 environmental management system (EMS) including the consolidation of all existing Environmental Statements (lodged to support the parliamentary process), obligations and undertakings into a unified EMS for the Edinburgh tram system;

26.13.2 environmental management procedures;

26.13.3 purchasing policy and arrangements regarding the future availability and sustainability of materials together with their potential performance, taking due account of the whole life cost implications of using such materials; and

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26.13.4 benchmarking, sustainability and delivering continuous improvement.

26.14 Security Management Plan

26.14.1 The Operator shall develop a Security Management Plan including appropriate security measures utilising the Infrastructure and Equipment provided through the Infrastructure Provider, which shall encompass at least the following:

(a) passenger and staff personal security arrangements;

(b) the provision of appropriate levels of illumination (including the avoidance of dark corners) at, and on the approaches to, Tramstops;

(c) arrangements for working with third parties to effectively control and reduce security risks to passengers and staff when on or about the Edinburgh Tram Network;

(d) benchmarking, monitoring, control and reporting of security related incidents;

(e) management, control, monitoring and implementation of corrective action in respect of personal security.

(f) application of technology in safeguarding passenger and staff security.

(g) passenger 'help points' at Tramstops linked to the Control Centre and to video recording; and

(h) application of CCTV surveillance covering platform areas and facilities, ticket vending machines, 'help points', park and ride sites, Tram interiors, and also to areas outside those specifically required to be covered within these requirements.

26.14.2 In addition, the Operator shall provide appropriate security measures to complement the above which must at least include consultation with and consideration of the recommendations of all relevant police authorities and forces (including Lothian and Borders Police and/or British Transport Police) for preventative uniformed patrols on the System, for responses to incidents/accidents and for joint crime-prevention initiatives in schools, youth clubs and in the local community;

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26.15 Marketing Plan

The Operator shall support the development by **tie** of a Marketing Plan having regard to development of the Services Integration Plan by **tie** which shall encompass, without limitation:

26.15.1 marketing and public relations in respect of the Transport Services generally;

26.15.2 advertising of the Transport Services; and

26.15.3 local community relationships, possibly to include open days.

26.16 Public Liaison and Media Plan

In conjunction with **tie**, the Operator shall develop, maintain and implement a Public Liaison and Media Plan which shall contain as a minimum the following:

26.16.1 arrangements for the provision of support to **tie**'s and CEC's public liaison team;

26.16.2 information and newsletters proposed to be publicly issued on a regular, periodic or occasional basis;

26.16.3 proposed procedures for notifying affected members of the public or other third parties of planned work comprised in the maintenance of the Edinburgh Tram Network;

26.16.4 proposals to maintain/build up support for the Edinburgh Tram Network;

26.16.5 proposals for informing the public as to the role of the Operator and the Infrastructure Provider;

26.16.6 procedures for replying to queries or complaints from the public;

26.16.7 plans for public information meetings;

26.16.8 procedures for the regular production of press releases;

26.16.9 proposals for the provision of information at local level; and

26.16.10 proposals for website information and co-ordination with the **tie** tram website.

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26.17 System Integration Plan

26.17.1 The Operator shall support the development of a Systems Integration Plan to be implemented when necessary for each occasion when a variation is made to the operating network, whether complete opening of a partially operational Phase, the addition of a new Line to the Edinburgh Tram Network, or the opening of an extension to any Line and/or Phase (as appropriate).

26.17.2 In conjunction with Infrastructure Providers (during Project Phase C) the Operator shall include within the plan proposals for the testing and commissioning of the new Infrastructure and Equipment whilst maintaining operational Transport Services on the existing network. Any interruption of Transport Services in order to achieve System Integration under paragraph 26.17.1 above shall not last longer than one Business Day. The plan shall also address any changes in the maintenance regime arising from the additional Transport Services.

27. PLANNING SUPERVISOR

27.1 Duties as planning supervisor under the requirements of the CDM Regulations are currently undertaken by the tie Advisors for technical, operational and environmental matters for each Phase.

28. SAFETY MANAGEMENT SYSTEM DEVELOPMENT

28.1 The Operator shall develop, to the satisfaction of tie, HMRI and other concerned authorities, a generic safety management system for the commissioning and operation of the System to the level necessary to ensure that relevant safety requirements are included in the tender documentation for the Infrastructure Delivery Agreement.

28.2 The generic safety management system shall be capable of development to a full and final version prior to commencement of commissioning of the System during Project Phase C.

28.3 The preliminary work on the safety management system will include the production of a safety justification framework document that will indicate the likely format and some of the detail of the eventual case for safety that the Operator will be required to present to, and gain approval from, HMRI

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28.4 The framework document will be drafted in consultation with the HMRI and other relevant bodies. It is expected to embrace the following subject areas:

28.4.1 description of the operation: Introductory section giving general description of the System, identification of safety responsibilities and reporting mechanisms;

28.4.2 arrangements during initial access to the Edinburgh Tram Network: Organisation and management of working staff, safety, emergency arrangements, identification of staff, insurance, safety audit, arrangements for keeping and distributing records;

28.4.3 arrangements for testing and staff training: Organisation and management of staff, safety arrangements including staff working on the Tramway, emergency arrangements, identification of staff, insurance, fault analysis, safety audit, arrangements for keeping and distributing records;

28.4.4 infrastructure management: Track, speed limits, public crossings (surface and bridges), fencing, Tramstop infrastructure, monitoring and reporting systems;

28.4.5 Tram operating arrangements: Operating arrangements including route knowledge, signalling etc., fitness and training of staff, certification of staff, Tram preparation, defect and breakdown procedures, communications, control of access to driving cabs, shunting arrangements;

28.4.6 Tramstop arrangements: Operating arrangements, crowd control, emergency planning, access for contractors, control of access and vandalism, security;

28.4.7 Tram maintenance arrangements: Engineering and operational acceptance of Tram vehicles, competence of staff engaged on maintenance, quality assurance, technical audit, monitoring, reporting of defects, procedure for imposing operating restrictions, acceptance of Trams for the Transport Services;

28.4.8 infrastructure maintenance: Inspection procedures, accreditation, control and monitoring, reporting procedures, emergency arrangements, communications, signage and warnings in the operating environment;

28.4.9 Interfaces with other organisations: Liaison with Emergency Services, HMRI, and highways authorities;

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28.4.10 risk assessment: Assessment of the risks associated with all aspects of the Project Operations including groups of people most at risk, severity of failure event and likelihood of event occurring;

28.4.11 Health & Safety Policy: Policy statement, monitoring arrangements, alcohol and drugs policy including testing and disciplinary action; and

28.4.12 Code of Practice for working on or near the Edinburgh Tram Network

29. PASSENGER'S CHARTER

29.1 The Operator shall, in conjunction with **tie**, prepare a passengers' charter in plain language to take effect from the Service Commencement Date for each Phase.

29.2 It is intended that elements of the charter shall include:

29.2.1 a statement of the Operator's intentions;

29.2.2 standards of service covering punctuality, availability and reliability;

29.2.3 level of provision and service for passengers with respect to, for example, telephone enquiries and services, provision for passengers with disabilities, bicycles and luggage;

29.2.4 method of dealing with service disruptions;

29.2.5 compensation arrangements in the event of service disruption or below-standard performance;

29.2.6 contact details for comments and complaints;

29.2.7 response times; and

29.2.8 method of dealing with passengers.

29.3 It is also intended that the charter will contain information on the following matters:

29.3.1 interchange facilities;

29.3.2 service integration details (rail, air, bus and Park-and-Ride);

29.3.3 Timetable information display locations;

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29.3.4 policy on planned disruption of service;

29.3.5 available guides and maps;

29.3.6 passenger information systems;

29.3.7 safety and security arrangements;

29.3.8 guidance to passengers (personal stereos, mobile telephones, animal carriage, litter, disabled or mobility impaired passengers);

29.3.9 ticket types, purchase and availability;

29.3.10 service standards;

29.3.11 vehicle and stop standards;

29.3.12 maintenance commitment;

29.3.13 complaints procedure; and

29.3.14 fault reporting procedure.

30. FINAL FUNDING APPROVAL

The Operator shall support **tie**'s applications for final funding approvals and contracts for the provision of funding for the Project by the Scottish Executive, CEC local development contributions or any other source of project funding (other than the Operator and the Operator Parties).

31. DEVELOPMENT OF TEL FARES POLICY

31.1 The Operator shall be required to give input on the development of the TEL Fares Policy and adopt the TEL Fares Policy for Project Phase D. This shall include input to the proposals for:

31.1.1 ticket range and user group;

31.1.2 special event pricing and travel incentives such as unlimited period travel;

31.1.3 ticket integration;

31.1.4 fares zoning;

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31.1.5 premium on-board tram fares structure and relativity to normal fares; and

31.1.6 minimisation of fare evasion.

32. GATEWAY FROM PROJECT PHASE B TO PROJECT PHASE C

32.1 The Operator will notify **tie** when the Operator considers that it has completed each of the tasks to be carried out pursuant to Project Phase B in respect of a Phase and that all matters to be agreed during Project Phase B have been agreed between the Operator and **tie**. Without limitation, the Operator will not serve such notice until:

32.1.1 the agreement between **tie** and the Operator of:

(a) the Target Costs for Project Phase C2 in respect of that Phase;

(b) (if there is to be a time interval between the Service Commencement Date and the Full Service Commencement Date in respect of that Phase), the Interim Target Operating Costs and the Interim Fixed Costs for such period; and

(c) the Target Operating Costs and Fixed Costs (except for those Fixed Costs which have already been set) to take effect from the Full Service Commencement Date in respect of that Phase;

32.1.2 the execution of the Infrastructure Delivery Agreement in respect of that Phase by the relevant Infrastructure Provider; and

32.1.3 the setting of Interim Target Patronage (if there is to be a time interval between the Service Commencement Date and the Full Service Commencement Date in respect of that Phase), or Target Patronage by the Joint Revenue Committee.

32.2 If **tie** agrees that all of such tasks have been completed and/or relevant matters agreed, **tie** shall notify the Operator that Project Phase C shall commence in respect of that Phase.

32.3 To the extent that **tie** considers that any such task has not been completed by the Operator and/or relevant matter agreed, **tie** will notify the Operator accordingly, including details of the further activities to be carried out by the Operator in order to complete such task.

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32.4 To the extent that some but not all of the Project Phase B tasks have been completed and/or relevant matters agreed, **tie** may, in its sole discretion, notify the Operator that Project Phase C shall commence in respect of that Phase and issue a PPCN, and in such circumstances:

32.4.1 **tie** may direct that some or all of the Project Phase C Project Development Services shall be commenced; and

32.4.2 the Operator shall continue to provide the Project Phase B Project Development Services until (i) the relevant tasks have been completed, and (ii) all matters to be agreed during Project Phase B have been agreed between the Operator and **tie**, or until **tie** otherwise directs.

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PROJECT PHASE C

Design, Build and Commissioning

33. INTRODUCTION

33.1 The primary objectives of **tie**, the **tie** Advisers and the Operator during Project Phase C in respect of any Phase shall be to:

33.1.1 project manage the delivery of the Infrastructure and Equipment in respect of that Phase pursuant to the Infrastructure Delivery Agreement for that Phase including, without limitation, in respect of:

(a) the detailed design of the Infrastructure and Equipment;

(b) the building of the Infrastructure and Equipment; and

(c) the testing and commissioning of the Infrastructure and Equipment, including the integration of the Infrastructure and Equipment with that in respect of any other Phase;

33.1.2 prepare for Project Phase D, including the recruitment and training of staff; and

33.1.3 continue to revise the Operating Method Statements and their component plans.

33.2 The Operator shall work together with **tie** and the **tie** Advisers during Project Phase C to carry out the functions referred to in the following paragraphs to ensure that the Infrastructure and Equipment to be provided pursuant to each Infrastructure Delivery Agreement shall enable the achievement of a high standard of reliability in the operation of the Transport Services.

33.3 Project Phase C shall be split into 2 parts, Project Phase C1 and Project Phase C2.

33.4 Some of the Project Development Services to be provided by the Operator during Project Phase C shall be provided throughout Project Phase C; others shall be provided only during Project Phase C1 or Project Phase C2, as appropriate. Paragraph 34 provides further details.

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34. PROJECT DEVELOPMENT ACTIVITIES DURING PROJECT PHASE C

34.1 In support of the primary objectives for Project Phase C set out in paragraph 33 above, the Operator shall, during Project Phase C in respect of each Phase, comply with the requirements of paragraph 34.2 below.

34.2 The principal obligations of the Operator during Project Phase C1 are:

34.2.1 to advise and support **tie** upon aspects of the detailed design and construction of the Infrastructure and Equipment; and

34.2.2 to advise **tie** in the project management of the delivery of the Infrastructure and Equipment;

34.2.3 to prepare and plan for the commissioning and testing process to be carried out in Project Phase C2, without limitation by developing a Testing and Commissioning Plan in conjunction with the Infrastructure Provider, **tie** and the **tie** Advisers; and

34.2.4 in conjunction with **tie** and the **tie** Advisers, to commence the commissioning and testing process in relation to the Infrastructure and Equipment (including both factory and site acceptance tests).

34.3 The principal obligations of the Operator during Project Phase C2 are:

34.3.1 to recruit, employ and train staff for Project Phase C2 (*Commissioning and Testing*) and Project Phase D (*Operations*); and

34.3.2 in conjunction with tie and tie's Advisers, to complete the commissioning and testing process in relation to the Infrastructure and Equipment (including any factory and site acceptance tests not carried out in Phase C1).

34.4 Throughout Project Phase C, the Operator shall:

34.4.1 continue to maintain up to date, and revise as necessary, the Operating Method Statements;

34.4.2 continue to provide support with regard to any proposed revisions to the Service Integration Plan;

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34.4.3 manage and supervise the obtaining of all Operator Necessary Consents for the System, to the extent not already obtained during Project Phase A or Project Phase B; and

34.4.4 comply with any relevant Necessary Consents forming part of the Overall Approvals Management Plan.

34.5 All activities referred to in this paragraph 34 shall be carried out in accordance with the relevant plans in the Operating Method Statements.

35. FURTHER DEVELOPMENT OF THE OPERATING METHOD STATEMENTS

35.1 Using as a basis the Operating Method Statements prepared in accordance with this Project Development Output Specification during Project Phase B, the Operator shall further develop and keep up to date the plans within the Operating Method Statements during Project Phase C, in consultation with **tie** and/or the Infrastructure Provider and/or any other relevant third parties to the extent appropriate.

35.2 Without limitation to paragraph 35.1, the Operator shall further develop in consultation with the relevant Infrastructure Provider(s):

35.2.1 the Testing and Commissioning Plan;

35.2.2 the Shadow Run Validation Plan;

35.2.3 the Operator Maintenance Plan. To the extent that **tie** has requested the Operator to manage the performance by an Infrastructure Provider of its obligations under the relevant IDA, the Operator Maintenance Plan shall be extended to cover the management of such maintenance;

35.2.4 the Incident Management Plan, such development to also be in consultation with HMRI, CEC, the Emergency Services, and Network Rail;

35.2.5 the System Integration Plan; and

35.2.6 the Recruitment and Training Plan.

35.3 Any changes to the Operating Method Statements during Project Phase C:

35.3.1 shall be subject to the consent of **tie** pursuant to Schedule 9 (*Review Procedure*); and

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35.3.2 shall not result in any amendment to the Fixed Costs, Target Operating Costs or the Target Patronage, or any other terms of the Operating Appendix, unless otherwise provided for in this Agreement or expressly agreed by **tie**.

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PROJECT PHASE C1

36. OPERATOR'S PROJECT DEVELOPMENT RESOURCES DURING PROJECT PHASE C1

In addition to the Operator Project Manager appointed pursuant to Clause 6.7, the Operator 's Core Team shall include the resources set out in the Project Development and Operating Costs during Project Phase C1.

37. OPERATOR'S ROLE DURING CONSTRUCTION

37.1 **tie** intends to establish a joint project management team at the beginning of Project Phase C to oversee delivery of the Infrastructure and Equipment for the System, comprising staff from **tie**, the **tie** Advisors and the Operator.

37.2 The IDA signed during Project Phase B will be concluded directly between **tie** and one or more Infrastructure Providers. **tie** intends to use the joint project management team to administer and engineer the IDA(s) through delegated powers. The Operator shall provide one or more representatives to the joint project management team, as may be required by **tie**, to ensure that the best advice is available to **tie** on all relevant aspects of the scheme, primarily related to operational issues.

37.3 The project management team will:

37.3.1 observe and report on the acceptability of proposed designs against the Design Manual and the Infrastructure and Equipment Output Specification and the ability of the proposals to meet operational objectives;

37.3.2 observe and report on the quality of Infrastructure and Equipment provision and installation and its compliance with the Infrastructure and Equipment Output Specification;

37.3.3 monitor progress of provision and installation;

37.3.4 certify progress to **tie** for payment purposes; and

37.3.5 audit compliance with the Code of Construction Practice.

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38. TESTING AND COMMISSIONING PLAN

In conjunction with the Infrastructure Provider in respect of the relevant Phase, and by agreement with **tie** and the **tie** Advisers, the Operator shall develop a Testing and Commissioning Plan in respect of that Phase, such plan to be finalised and agreed by the Operator and **tie** prior to the commencement of Project Phase C2 for such Phase. This plan shall encompass at least the following:

38.1 programme and sequence for all testing and commissioning;

38.2 procedures for factory acceptance testing;

38.3 proposed pre-operational tests;

38.4 proposed soak testing of passenger interface equipment or elsewhere as agreed;

"Passenger Interface Equipment" shall comprise dynamic visual displays, public address systems and the like located Tramstops or on board Tram vehicles.

38.5 control and monitoring processes for the progression of the testing and commissioning programme;

38.6 method for reporting on completed testing and commissioning;

38.7 testing and commissioning documentation control procedures;

38.8 process for managing non-conformances and re-testing;

38.9 management of safety during testing and commissioning (including the training of staff and contingency provisions);

38.10 recruitment and training of Project Operations Staff to be coordinated with the commissioning of each Phase and the subsequent commencement of the Transport Services on such Phase; and

38.11 process for the acceptance for operational purposes of the Infrastructure and Equipment from the Infrastructure Provider to the Operator.

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39. DEVELOPMENT OF TEL FARES POLICY

39.1 The Operator shall be required to give updated input on the development of the TEL Fares Policy and adopt the TEL Fares Policy by the end of Project Phase C for Project Phase D.

40. PRE-MOBILISATION SERVICES

40.1 By the relevant date shown in the Project Programme, the Operator shall provide a breakdown (within an update to the Quality Management Plan) of the self-certification regime that will be established in relation to the training programme that is to be instituted by the Operator in relation to its own staff;

40.2 By the relevant date shown in the Project Programme, the Operator shall provide (within an update to the Recruitment and Training Plan) a statement of:

40.2.1 the level of competence that will be required of each type and level of Operator staff member; and

40.2.2 how such competence will be ascertained and certified in detail (including any certification to be carried out by any external body) in respect of (a) passenger operations and (b) supporting test and commissioning activities.

40.3 By the relevant date shown in the Project Programme, the Operator shall provide **tie** with a copy of the Operator's proposed recruitment programme for (a) passenger operations and (b) supporting test and commissioning activities.

40.4 By the relevant date shown in the Project Programme, the Operator shall provide **tie** with a copy of the Operator's proposed training programme for (a) passenger operations and (b) supporting test and commissioning activities (within an update to the Recruitment and Training Plan).

40.5 The Operator shall provide all input reasonably required by **tie** in respect of the development of the Approvals Management Plan, Testing and Commissioning Plan, Shadow Running Validation Plan and Systems Integration Plan being developed by the Infrastructure Provider.

40.6 The Operator shall consult with **tie** or (if so requested by **tie**) the Infrastructure Provider in respect of the development of the Operator Maintenance Plan and the Incident Management Plan pursuant to this Agreement. The Operator shall also

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consult with **tie** or (if so requested by **tie**) the Infrastructure Provider, with a view towards ensuring that the safety management system plans to be developed by the Infrastructure Provider and the Operator are integrated;

40.7 Provided **tie** has supplied to the Operator relevant and appropriate base training materials to the Operator, the Operator shall develop training courses and all relevant documentation required to provide the levels of training required under this Agreement to staff of the Operator. The relevance and appropriateness of the base training materials shall be assessed against the base training materials requirement specification to be produced by the Operator and annexed to the Recruitment and Training Plan.

40.8 The Operator shall train its staff for both commissioning and operation in accordance with the requirements of Clause 5.4 of this Agreement, so as to ensure that there are sufficient, subject to the resource cap at different phases, appropriately trained and qualified staff to carry out the Testing and Commissioning Plan as directed by **tie** in accordance with the Project Programme. Without prejudice to the foregoing generality, the Operator shall ensure that its staff will undergo necessary specialised training in relation to the operation of equipment and, in accordance with the Operator Maintenance Plan, rapid fault finding and first line repair of equipment provided. The Operator shall also ensure that such training is co-ordinated with the Project Programme for commissioning of the System.

40.9 The Operator shall pro-actively prepare for provision of the Mobilisation Services, including proposing and planning of (a) all necessary desk top and real world exercises; and (b) shadow running to achieve Operator Necessary Consents.

40.10 The Operator shall have the right to attend factory acceptance and site acceptance tests, and **tie** shall use reasonable endeavours to procure that the Operator is given both prior notice and the requisite access rights in respect of such attendance. The Operator shall attend factory acceptance tests and site acceptance tests (as appropriate) for Trams, plant, machinery or equipment on being given reasonable notice by **tie** during Project Phase C1.

40.11 The Operator shall provide all input reasonably necessary in relation to the development of the Operating Method Statements to be developed by the Operator and the Infrastructure Provider in relation to the Edinburgh Tram Network. The Infrastructure Provider shall be entitled to request the input of the Operator only

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insofar as it relates to the Transport Services or the operation of the Edinburgh Tram Network;

40.12 By the relevant date shown in the Project Programme, the Operator shall provide to **tie** details of the persons who will perform the Mobilisation Services and specifically those persons who require to be trained by the Infrastructure Provider in relation to the Edinburgh Tram Network, including:

40.12.1 the roles and responsibilities and details of the qualifications and experience of such persons;

40.12.2 details of the training plan for each person or group of persons to be undertaken prior to being competent to perform the Mobilisation Services;

40.12.3 details of the assessment and accreditation of those persons which are to be provided by the Operator.

40.13 By the relevant date shown in the Project Programme, the Operator shall deliver a project management plan, detailing the manner in which the provision of the Pre-Mobilisation Services and the Mobilisation Services will be managed, including a clear indication of the persons who have responsibility for interface with all relevant parties, including the Infrastructure Provider and HMRI.

40.14 By the relevant date shown in the Project Programme, the Operator shall provide details of the training courses to be provided by the Operator for training the Infrastructure Provider staff as required pursuant to the Mobilisation Services within an update to the Recruitment and Training Plan. When the training courses have been approved by **tie**, the dates for the training courses shall be incorporated into the Project Programme.

40.15 The Operator shall provide as is practicable all input required by the Infrastructure Provider (as notified to the Operator by **tie**) in respect of the development of the Infrastructure Maintenance Plan pursuant to the IDA, provided that the Operator shall only be obliged to provide such input to the extent that the same relates to the Operator's obligations in respect of Project Operations.under this Agreement

40.16 The Operator shall obtain all Operator Necessary Consents which require to be obtained prior to the commencement of the Mobilisation Services in accordance with the Approvals Management Plan.

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41. GATEWAY FROM PROJECT PHASE C1 TO PROJECT PHASE C2

41.1 **tie** will issue a certificate to the Operator ("**Pre-Mobilisation Certificate**") to authorise mobilisation of those key staff required in accordance with the Project Programme to initiate preparations (including but not exclusively planning and limited recruitment) for operational capability on the anticipated date for opening of the Phase.

41.2 The Pre-Mobilisation Certificate for a Phase shall be issued at a time to be agreed between **tie**, the Operator and the Infrastructure Provider(s) based upon the then current progress towards Planned Service Commencement Date for the Phase in accordance with the Project Programme and in sufficient time to permit an orderly process of staff recruitment in accordance with the Project Programme. For the avoidance of doubt, sufficient time for recruitment in accordance with the Project Programme and Recruitment and Training Plan will be three and one half Reporting Periods before the staff are required to be available for training.

41.3 Subject to paragraph 41.5, **tie** will issue a certificate to the Operator ("**Mobilisation Certificate**") when it considers that the Operator should proceed to commence full mobilisation of all necessary operational staff and the other activities pursuant to Project Phase C2.

41.4 Subject to paragraph 41.5, the Mobilisation Certificate for a Phase will be issued not less than nine months prior to the Planned Service Commencement Date for the Phase in accordance with the Project Programme.

41.5 **tie** shall not issue a Mobilisation Certificate unless the Operator has provided to **tie** a Performance Bond in the form of Schedule 14 (*Performance Bond*) to this Agreement and issued by a surety acceptable to **tie**.

PROJECT PHASE C2

42. OPERATOR'S PROJECT DEVELOPMENT RESOURCES DURING PROJECT PHASE C2

42.1 In addition to the Operator Project Manager appointed pursuant to Clause 6.7, the Operator shall devise and provide a suitable management structure to deliver:

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42.1.1 the Project Development Services during Project Phase C2; and

42.1.2 to prepare to the deliver the Transport Services (together with any other Project Operations) during Project Phase D,

such management structure to be subject to the approval of **tie**, such approval not to be unreasonably withheld or delayed.

42.2 The Operator's management structure will be headed by the Operator Project Manager who will be assisted by experienced managers in all relevant disciplines, to include, as a minimum, operations, finance, quality assurance, human resources, marketing and safety.

42.3 The management structure plan devised pursuant to paragraph 42.2 may be amended during the progress of developments during Project Phase C2 to align with development of the System and its operations, such amendments to be subject to the approval of **tie**, such approval not to be unreasonably withheld or delayed.

42.4 The management structure plan shall define roles and responsibilities covering all aspects of the operation of the System including operations, maintenance, safety, customer services, public liaison, training and recruitment.

43. OPERATOR'S ROLE DURING TESTING AND COMMISSIONING

43.1 In addition to continued participation in the joint project management team as outlined in paragraph 37 above, the Operator shall also take specific responsibility for operational management of the testing and commissioning process, such responsibilities to be carried out in accordance with the Testing and Commissioning Plan and subject to compliance by others with the Project Programme..

43.2 The responsibilities of the Operator in relation to operational management of the testing and commissioning process shall include:

43.2.1 observation if necessary and appropriate witnessing of any factory acceptance tests on Infrastructure and Equipment to be provided;

43.2.2 attendance and certification of site acceptance tests on Infrastructure and Equipment not completed within Project Phase C1, if necessary and appropriate;

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43.2.3 coordinating the obtaining of all Necessary Consents for commissioning and public operation and complying with those which are relevant to the Operator;

43.2.4 appointment and training of operational staff necessary for operation and maintenance of the System in public operation; and

43.2.5 ensuring that all relevant operational subcontracts are in place and that appropriate subcontractor staff training programmes are implemented.

44. MOBILISATION OF STAFF FOR PROJECT PHASE C2 AND PROJECT PHASE D

44.1 The Operator shall comply with the provisions of Clause 15 (*Personnel Issues*) of the Agreement in relation to appointing staff to operate and maintain the System.

44.2 The Operator shall, in accordance with the Project Programme, safeguard efficient engagement on Project Phase C2 and D of the Project through sufficiency and timeliness of staff mobilisation at all levels.

44.3 The Operator shall create a manual describing the roles of each member of the Project Operations Staff and providing specific instructions for the proper performance of their duties. The Operator shall maintain and keep such manual up to date throughout Project Phase C2 and Project Phase D. The Operator shall provide to the tie Project Manager a copy of such manual (and each successive update) as soon as reasonably practicable after its production.

45. STAFF TRAINING

45.1 The Operator shall comply with the terms of the Recruitment and Training Plan in relation to the recruitment and training of all staff during Project Phase C2 and D in accordance with the Project Programme and, without limitation, the Operator shall:

45.1.1 arrange for the necessary specialised training to ensure the competence of staff engaged in the provision of the Transport Services in relation to the operation of equipment, rapid fault finding and in the repair and maintenance of equipment provided within initial response scope; and

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45.1.2 ensure that such training courses are coordinated with the commissioning of the System to ensure that trainees derive maximum benefit from progressive involvement as far as practicable.

46. MARKETING, PROMOTIONAL PUBLIC LIAISON AND MEDIA ACTIVITIES

46.1 The Operator shall comply with the terms of the Marketing Plan and the Public Liaison and Media Plan during Project Phase C.

47. CONSUMABLES, MATERIALS AND EQUIPMENT

47.1 The Operator shall comply with the provisions of paragraph 14 of the Operating Output Specification during Project Phase C2.

47.2 **tie** shall provide all power required during Project Phase C in accordance with the Project Programme.

48. MOBILISATION SERVICES

48.1 The Operator shall provide appropriate training for such of the Infrastructure Provider's staff as **tie** may reasonably require on the following matters:

48.1.1 safety procedures to be observed and complied with while working on the Edinburgh Tram Network following sectional energisation in accordance with the Project Programme; and

48.1.2 movement of trams during the commissioning and operation of the Edinburgh Tram Network.

48.2 Insofar as it has not been possible to train the Operator's staff as part of the Pre-Mobilisation Services, the Operator shall provide all training necessary in accordance with the approved Recruitment and Training Plan to enable such staff to perform the Mobilisation Services including the System Acceptance Tests.

48.3 The Operator shall provide such courses, documentation and materials in respect of the training of the Operator's staff as may be required to achieve all necessary Approvals and Consents.

48.4 The Operator shall propose familiarisation plans and carry out the relevant familiarisation of contractors, shop, office and tenement proprietors who may be affected at any time by the operation of the Edinburgh Tram Network in accordance

with Good Industry Practice in relation to potential hazards of such operation and shall demonstrate to the reasonable satisfaction of tie that such persons have been offered such familiarisation as practicable by the Operator using reasonable endeavours;

48.5 The Operator shall provide: :

48.5.1 drivers trained and experienced in driving the Trams;

48.5.2 fully trained control room staff in so far as commissioning of the Edinburgh Tram Network permits; and

48.5.3 competent persons to undertake isolations via the Control Centre of the Edinburgh Tram Network;

in accordance with the Project Programme.

48.6 From the relevant date shown in the Project Programme, the Operator shall perform the following operating activities:

48.6.1 provide 24 hour, 7 day a week staff cover in the Control Room to ensure:

48.6.1.1 security and surveillance equipment is being monitored and recorded as appropriate;

48.6.1.2 carry out emergency and planned isolations from the Control Room;

48.6.1.3 provide communications services with third parties, the public, emergency services and operations and maintenance staff as procedures require;

48.6.1.4 initiate and terminate tram operations according to the agreed timetable or test schedule;

48.6.1.5 monitor and regulate tram movements according to the agreed working timetable or test schedule; and

48.6.1.6 issue and receive "Possessions" of the Edinburgh Tram Network or part thereof as procedures may require.

48.6.2 provide Operator Maintenance;

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48.6.3 provide sufficient drivers in accordance with the Project Programme to facilitate all planned commissioning, System Acceptance Tests, and Shadow Running;

48.6.4 provide sufficient drivers in accordance with the Project Programme and the Recruitment and Training Plan to fulfil the requirements of the Shadow Run Validation Plan; and

48.6.5 provide all recording and monitoring services as required by Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) of the Operating Appendix as required from time to time by **tie**;

all as set out in the Operating Method Statements, progressively as the Edinburgh Tram Network, or parts thereof, is energised. The Operator shall maintain, for **tie**'s inspection, full details of all work undertaken pursuant to this paragraph.

48.7 The Operator shall carry out commissioning and Shadow Running and all relevant Mobilisation Services in accordance with:

48.7.1 the Project Programme;

48.7.2 the Operating Method Statements; and

48.7.3 to the extent practicable, each of the following plans as developed by Infrastructure Provider pursuant to the IDA (with the assistance of the Operator);

48.7.3.1 the Infrastructure Provider's Approvals Management Plan;

48.7.3.2 the Infrastructure Provider's Testing and Commissioning Plan; and

48.7.3.3 the Infrastructure Provider's System Integration Plan.

48.8 The Operator shall provide such documentation and other required assistance as shall be required by HMRI, Network Rail, **tie** and any other Relevant Authority to demonstrate the Operator's capability in its capacity as operator of the Edinburgh Tram Network to undertake Operator Maintenance and emergency procedures in relation to Project Operations.

48.9 The Operator shall provide the Infrastructure Provider and any other party reasonably requested by **tie**, working and Acceptance Test time tables, information for pre-

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recorded announcements and platform indicator display messages and such other data and information as may be practicable and necessary for the Operator and Infrastructure Provider to carry out any tests, Shadow Running, demonstrations to HMRI, and emergency exercises within the Project Operations that are required in relation to the completion tests to be carried out under the IDA in respect of the Edinburgh Tram Network or any part thereof;

48.10 The Operator shall pro-actively engage with the Infrastructure Provider in relation to:

48.10.1 the creation and development of operational procedures;

48.10.2 development and finalisation of the Case for Safety in relation to tram movement and power energisation and power isolation; and

48.10.3 operational safety management.

48.11 The Operator shall provide all personal protective clothing, uniforms as appropriate and equipment which may be required by the Operator for performance of the Mobilisation Services.

48.12 The Operator shall provide all non-specialist equipment required by its own staff for performance of the Mobilisation Services, including *inter alia* hand lamps, mobile telephones, notebooks, computers, software and first aid kits.

48.13 The Operator shall provide all transport required by its staff in respect of Mobilisation Services.

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

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This is Schedule 3 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 3

Key Personnel

The Key Personnel listed below shall be as identified in the Project Development and Operating Costs, and/or as may be notified by the Operator to **tie** in accordance with this Agreement or otherwise.

1. ***Project Director***
2. ***General Manager***
3. ***Technical Engineer***
4. ***Senior Commercial Manager***
5. ***Operations Manager***
6. ***Operator Project Manager***
7. ***Deputy Operator Project Manager***
8. ***Quality Manager***

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899944_0241

This is Schedule 4 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 4

Financial Proposals

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This is Schedule 5 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 5

Operator Financial Model

To be provided in accordance with the Minute of Variation dated 19 and 20 December 2007, which has been agreed by the Parties.

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899944_0243

This is Schedule 6 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 6

Project Development and Operating Costs

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This is Schedule 7 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 7

Dispute Resolution Procedure

1. DISPUTE RESOLUTION PROCEDURE

1.1 Any Dispute shall be dealt with in accordance with the procedures contained in this Schedule 7.

1.2 Any Dispute shall, in the first instance, be referred to the **Internal Resolution Procedure** in accordance with paragraph 2 below.

1.3 Save as expressly provided for:

1.3.1 in paragraph 3 in respect of Disputes arising during Project Phases A or B (under exception of Disputes arising under or in relation to Clause 10.5 of the Agreement); and

1.3.2 in paragraph 4 in relation to Disputes arising during Project Phases C or D, or arising under or in relation to Clause 10.5 of the Agreement during any Project Phase;

neither Party shall commence any court proceedings until the procedures in paragraphs 2 - 6 as appropriate of this Schedule 7 have been completed, under exception that the provisions of this Schedule 7 shall not apply so as to prevent either Party seeking an interim order, or interim relief, in the Scottish courts.

1.4 The provisions of this Schedule 7 shall not apply to matters expressly reserved to some other jurisdiction pursuant to the Scottish Private Bill(s).

1.5 In the event that any court proceedings whatsoever are initiated by either Party against the other, the Parties agree that the Court of Session, Scotland, shall have exclusive jurisdiction.

1.6 Neither Party shall be entitled to suspend the performance of its undisputed obligations under this Agreement merely by reason of the reference of any Dispute to the Dispute Resolution Procedure contained in this Schedule 7.

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1.7 Subject to **tie**'s discretionary rights set out in paragraph 6 to require that a Dispute and a Related Dispute (as defined in paragraph 6) be dealt with together at an appropriate stage of the Dispute Resolution Procedure, the provisions of this Schedule 7 are mandatory and binding upon the Parties.

1.8 Unless a Party refers a Dispute to the Dispute Resolution Procedure contained in this Schedule 7 within three months of the date on which the event, matter or situation giving rise to the Dispute first occurred, such Party shall be deemed to have irrevocably waived any right to refer such Dispute to the Dispute Resolution Procedure contained in this Schedule 7, under exception that if such Party was not aware, and could not with reasonable diligence have been aware, that such event, matter or situation had occurred, this paragraph 1.8 shall have effect as if for the reference herein to the date on which such event, matter or situation occurred, there was substituted a reference to the date when such Party first became, or could with reasonable diligence have become, aware that such event, matter or situation had occurred. This paragraph 1.8 is without prejudice to the right of either Party to raise in defence to any Dispute any defence (including, without prejudice to the foregoing generality, any defence of retention, compensation or set-off) which would otherwise be available to it.

1.9 Except in relation to the matters provided for in paragraph 5 ("*Adjudication*"), and subject to the provisions of paragraph 1.10, in the event that either Party pursues any Dispute under the Dispute Resolution Procedure contained in this Schedule 7, and in the event that such Party fails to observe any time limit or timescale provided for in this Schedule 7 in relation to the pursuit or progression of such Dispute, such Party shall, immediately upon such failure occurring, be deemed to have irrevocably waived any right to pursue or progress such Dispute any further. In that event, such Party shall be deemed to have elected not to have referred such Dispute or to have withdrawn such Dispute from the Dispute Resolution Procedure contained in this Schedule 7 and shall be deemed to have irrevocably waived any right to refer the same or substantially the same Dispute to the Dispute Resolution Procedure contained in this Schedule 7 and shall be liable for payment of the whole fees incurred by any mediator or adjudicator who has acted in respect of such Dispute. This paragraph 1.9 is without prejudice to the rights of either Party to raise in defence to any Dispute any defence (including, without prejudice to the foregoing generality, any defence of retention, compensation or set-off) which would otherwise be available to it.

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1.10 Notwithstanding the provisions of paragraph 1.9, in the event that a Party who pursues any Dispute under the Dispute Resolution Procedure contained in this Schedule 7 fails to observe any time limit or timescale provided for in this Schedule 7 in relation to the pursuit or progression of the Dispute, the other Party may elect to waive such failure, in which event the time limit or timescale to which such failure relates shall be extended at the discretion of such other Party and the Dispute shall progress in accordance with the Dispute Resolution Procedure contained in this Schedule 7, subject that all other time limits and timescales provided for in this Schedule 7 which are affected by such extension shall be deemed to have been extended to give effect to such extension of the time limit or timescale to which such failure relates.

2. The following procedure is the Internal Resolution Procedure referred to in paragraph 1:

2.1 In the event of any Dispute arising, the Operator Project Manager and the **tie** Project Manager shall seek to resolve the Dispute at a meeting to be convened within three Business Days of written notification by either Party to the other that it wishes to initiate the Internal Resolution Procedure in respect of that Dispute (**"Notification"**). Such Notification shall be given in accordance with the provisions of Clause 56 (*Notices*) of the Agreement.

2.2 Further meetings may follow the meeting referred to in paragraph 2.1, but in any event, if the Dispute is not resolved within seven Business Days of Notification, each Party shall, before the expiry of the period of ten Business Days from Notification, serve, in accordance with the provisions of Clause 56 (*Notices*") of the Agreement, a written position paper (**"Position Paper"**) upon the other Party. Each Party's Position Paper shall state in reasonable detail that Party's position and required objectives in relation to the Dispute; any required redress, and, where possible, any comments on the other Party's position.

2.3 Upon such service of a Position Paper by the Party initiating or pursuing the Dispute, the Chairman of the Operator's immediate parent company and the Chief Executive of **tie** (or their respective deputies in the event of their unavailability) shall seek to resolve the Dispute by meeting in good faith to discuss and negotiate upon the Dispute without recourse to legal or other proceedings.

2.4 In the event that resolution of the Dispute is achieved by the Chairman of the Operator's immediate parent company and the Chief Executive of **tie** , the resolution shall be reduced to writing and, once it is signed by the duly authorised representatives of both Parties, shall be binding on the Parties.

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2.5 Unless concluded by a written legally binding agreement, all discussions and negotiations connected with the Dispute shall be conducted in confidence and without prejudice to the rights of the Parties in any future legal or other proceedings. Nor may such matters be produced or relied upon in evidence in any such proceedings.

3. In the event that any Dispute arising during Project Phases A or B (under exception of Disputes arising under or in relation to Clause 10.5 of the Agreement) is not resolved by the Internal Resolution Procedure within a period of thirty Business Days from notification (or longer if so agreed by the Parties), such a Dispute shall be litigated before the Court of Session, Scotland, unless the Dispute is withdrawn by the Party initiating or pursuing the Dispute. The summons or petition in any such litigation shall be signetted and served within ten Business Days of the date of expiry of the period of thirty Business Days from notification (or longer if so agreed by the Parties).

4. In the event that any Dispute arising during Project Phases C or D, or arising under or in relation to Clause 10.5 of the Agreement during any Project Phase, is not resolved by the Internal Resolution Procedure within a period of thirty Business Days from notification (or longer if so agreed by the Parties) then the following provisions of this paragraph 4 shall apply;

4.1 The Chairman of the Operator's immediate parent company and the Chief Executive of **tie** (or their respective deputies in the event of their unavailability) shall, within a further period of five Business Days, seek to agree that the Dispute shall be resolved by any one of the following procedures:-

4.1.1 mediation in accordance with paragraphs 4.2 to 4.4; or

4.1.2 adjudication in accordance with paragraph 5, in which event the Referring Party must give its Notice of Adjudication to the other Party within five Business Days of the date of expiry of the period of thirty-five Business Days from Notification (or longer if so agreed by the Parties); or

4.1.3 litigation before the Court of Session, Scotland, in which event the Summons or Petition in any such litigation shall be signetted and served within ten Business Days of the date of expiry of the period of thirty-five Business Days from Notification (or longer if so agreed by the Parties).

In the event that the Chairman of the Operator's immediate parent company and the Chief Executive of **tie** (or their respective deputies in the event of their unavailability)

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are unable to agree that the Dispute be resolved by the procedures described in paragraphs 4.1.1 to 4.1.3, the Party initiating or pursuing the Dispute shall refer the Dispute to mediation (and thereafter, adjudication if necessary) in accordance with paragraphs 4.2 to 4.4.

4.2 The Parties shall attempt in good faith to resolve the Dispute by a procedure of mediation in accordance with the Centre for Effective Dispute Resolution mediation rules or Model Mediation Procedure in force at the commencement of the mediation, (or in the event that the Centre for Effective Dispute Resolution has ceased to exist as at the time of the commencement of the mediation, mediation rules or a model mediation procedure offered by any other body offering commercial mediation services which shall be selected by tie), which procedure shall be commenced within five Business Days of the date of expiry of the period of thirty-five Business Days from Notification (or longer if so agreed by the Parties). In the event that any provision of such mediation rules or model mediation procedure conflicts with any provision of this Schedule 7, the provision of this Schedule 7 shall take precedence. In the event that any timescales contained in such mediation rules or model mediation procedure conflicts with the timescales referred to in this Schedule 7, the timescales contained in such mediation rules or model mediation procedure shall be amended accordingly such that the timescales referred to in this Schedule 7 shall be adhered to;

4.3 In the event that resolution of the Dispute is achieved in consequence of such mediation procedure, such resolution shall be reduced to writing and, once it is signed by the duly authorised representatives of both Parties, shall be binding on the Parties. Unless concluded by a written legally binding agreement, all discussions and negotiations connected with the mediation procedure referred to in paragraph 4.2 shall be conducted in confidence and without prejudice to the rights of the Parties in any future legal or other proceedings. Nor may such matters be produced or relied upon in evidence in any such proceedings.

4.4 If any Dispute to which this paragraph 4 relates is not resolved by the mediation procedure referred to in paragraph 4.2 within a period of 55 Business Days from Notification (or longer if so agreed by the Parties), the mediation procedure shall be terminated and, unless the Party initiating or pursuing the Dispute withdraws the Dispute, the Dispute shall, within a further 5 Business Days, be referred to adjudication in accordance with paragraph 5.

5. ADJUDICATION

In the event that either Party refers a Dispute to adjudication in terms of paragraphs 4.1 or 4.4, or exercises a statutory right available to it (if any) under the Housing Grants Regeneration and Construction Act 1996 to raise adjudication proceedings, such adjudication shall be conducted in accordance with the following conditions. In this paragraph 5, reference to "days" is a reference to calendar days.

Notice of intention to seek adjudication

5.1 Either Party may give written notice (the **"Notice of Adjudication"**) of his intention to refer the Dispute to adjudication and the Party giving such notice shall be the **"Referring Party"**.

5.2 The Notice of Adjudication shall be given to the other Party and the Party receiving the Notice of Adjudication shall be the **"Responding Party"**.

5.3 The notice of adjudication shall set out briefly:

5.3.1 the nature and a brief description of the Dispute and of the parties involved;

5.3.2 details of where and when the Dispute has arisen;

5.3.3 the nature of the redress which is sought; and

5.3.4 the names and addresses of the Parties (including the addresses which the Parties have specified for the giving of notices).

5.4 The adjudicator selected to consider the Dispute shall be selected from one of the panels (**"Panels"**) appointed by the Parties in accordance with the following:

5.4.1 There shall be four Panels, one in respect of legal matters, ("Legal Panel") one in respect of construction matters and construction/operation interface matters (**"Construction Panel"**), one in respect of operational and maintenance matters (**"Operations Panel"**) and one in respect of financial matters (**"Financial Panel"**).

5.4.2 Each Panel shall be comprised of at least four members, who are listed in Schedule 15 (Panels for the Dispute Resolution Procedure) to the Agreement.

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5.4.3 If any member of a Panel resigns or dies or becomes incapax or ill to the extent of being unable to reasonably discharge his duties as a member of the Panel, a replacement shall be appointed by the Parties as soon as practicable. Any such replacement shall be wholly independent of **tie**, the **tie** Advisors, any **tie** Party, CEC or any Relevant Authority associated with the Edinburgh Tram Network, Network Rail, the Operator, the Operator Parties, any Affiliate of the Operator, any Infrastructure Provider, any Affiliate, sub-contractor or other party connected to any Infrastructure Provider, any of the major competitors of any Infrastructure Provider or the Operator, any supplier of Trams or equipment appointed in respect of the Project, any Affiliate, sub-contractor or other party connected to any supplier of Trams or equipment appointed in respect of the Project, and any successor to or subsidiary or parent of any of the aforementioned parties. If the Parties are unable to agree on the identity of such replacement(s), the President for the time being of the Royal Institution of Chartered Surveyors in Scotland or the Institution of Civil Engineers shall appoint such replacement(s) within thirty days of any application for such appointment by either Party.

5.5 The Referring Party shall at the same time as giving the Notice of Adjudication to the Responding Party, send to each of the members of the relevant Panel a copy of the Notice of Adjudication and a request that each member of the relevant Panel advises both Parties within three days as to whether or not he is able and willing to act. The Parties shall attempt to agree within two further days as to which one of the members of the relevant Panel who responded indicating that they are able and willing to act shall be requested to act as adjudicator. In the event that such agreement is reached, the Referring Party shall, within a further period of one day, request the member of the relevant Panel upon whom agreement has been reached to act as adjudicator. In the event that such agreement is not reached, the Responding Party shall, within a further period of two days, select one of the members of the relevant Panel who responded indicating that they are able and willing to act and the Referring Party shall request that member to act as adjudicator.

5.6 If no member of the relevant Panel indicates that he is able and willing to act within three days of receiving a request to act as adjudicator, the Referring Party shall request the Royal Institution of Chartered Surveyors in Scotland or the Institution of Civil Engineers to select a person to act as adjudicator.

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5.7 The requests referred to in paragraphs 5.6 and 5.9 shall be accompanied by a copy of the Notice of Adjudication.

5.8 Any person appointed, requested or selected to act as adjudicator in accordance with paragraphs 5.5, 5.6 and 5.9 shall be a natural person acting in his personal capacity. A person appointed, requested or selected to act as an adjudicator shall be wholly independent of **tie**, the **tie** Advisors, the **tie** Inspectors, any **tie** Party, CEC or any Relevant Authority associated with the Edinburgh Tram Network, Network Rail, the Operator, the Operator Parties, any Affiliate of the Operator, any Infrastructure Provider, any Affiliate, sub-contractor or other party connected to any Infrastructure Provider, any of the major competitors of any Infrastructure Provider or the Operator, any supplier of Trams or equipment appointed in respect of the Project, any Affiliate, sub-contractor or other party connected to any supplier of Trams or equipment appointed in respect of the Project, and any successor to or subsidiary or parent of any of the aforementioned parties.

5.9 The Royal Institution of Chartered Surveyors in Scotland or the Institution of Civil Engineers must communicate the selection of an adjudicator to the Referring Party within three days of receiving a request to do so.

5.10 Where the Royal Institution of Chartered Surveyors in Scotland or the Institution of Civil Engineers fails to comply with paragraph 5.9, the referring Party may:

5.10.1 agree with the other Party to the Dispute to request a specified person to act as adjudicator; or

5.10.2 request any other adjudicator nominating body to select a person to act as adjudicator. An "adjudicator nominating body" shall mean a body (not being a natural person and not being a Party to the Dispute) which holds itself out publicly as a body which will select an adjudicator when requested to do by a Referring Party.

5.11 The person requested to act as adjudicator in accordance with the provisions of paragraph 5.5 or 5.6 shall indicate whether or not he is willing to act within two days of receiving the request.

5.12 Where an adjudicator has been selected in accordance with paragraphs 5.5, 5.6 or 5.9, the Referring Party shall, not later than seven days from the date of the Notice of Adjudication, refer the Dispute in writing the (**"Referral Notice"**) to the adjudicator.

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5.13 A Referral Notice shall be accompanied by copies of, or relevant extracts from the Agreement and such other documents as the Referring Party intends to rely upon.

5.14 The Referring Party shall, at the same time as he sends to the adjudicator the documents referred to in paragraphs 5.12 and 5.13, send copies of those documents to the Responding Party.

5.15 The adjudicator may, with the consent of the Parties to those Disputes, adjudicate at the same time on more than one Dispute under the Agreement.

5.16 The Parties may agree to extend the period within which the adjudicator may reach a decision in relation to all or any of these Disputes.

5.17 An adjudicator may resign at any time on giving notice in writing to the Parties.

5.18 An adjudicator must resign where the Dispute is the same or substantially the same as one which has previously been referred to adjudication, and a decision has been taken in that adjudication.

5.19 Where an adjudicator ceases to act under paragraph 5.17 or 5.18, or dies or becomes incapax or ill to the extent of being unable to reasonably discharge his duties;

5.19.1 the Referring Party may serve a fresh notice in accordance with paragraphs 5.1 to 5.4 and shall in accordance with paragraphs 5.5 to 5.14 request an adjudicator to act; and

5.19.2 if requested by the new adjudicator, the Parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

5.20 The Parties to a Dispute may at any time agree to revoke the appointment of the adjudicator and in such circumstances the fees and expenses of that adjudicator shall, subject to paragraph 5.21, be determined and payable in accordance with paragraphs 5.37 and 5.38.

5.21 Where the revocation of the appointment of the adjudicator is due to the default or misconduct of the adjudicator, the Parties shall not be liable to pay the adjudicator's fees and expenses.

Powers of the adjudicator

5.22 The adjudicator shall:

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5.22.1 act impartially in carrying out his duties and shall do so in accordance with any relevant terms of the Agreement and shall reach his decision in accordance with Scottish law; and

5.22.2 avoid incurring unnecessary expense.

5.23 The adjudicator may take the initiative in ascertaining the facts and the law necessary to determine the Dispute, and shall decide on the procedure to be followed in the adjudication. In particular, he may

5.23.1 request either Party to supply him with such documents as he may reasonably require including, if he so directs, any written statement from either Party supporting or supplementing the Referral Notice and any other documents given under paragraphs 5.12 to 5.14;

5.23.2 conduct the adjudication in the English language and decide whether a translation of any document is to be provided and, if so, by whom, by when, and at whose cost ;

5.23.3 meet and question either Party and their representatives;

5.23.4 subject to obtaining any necessary consent from a third party or the Parties, make such site visits and inspections as he considers appropriate, whether accompanied by the Parties or not;

5.23.5 subject to obtaining any necessary consent from a third party or the Parties, procure the carrying out of any tests or experiments, and make directions as to the conditions for and responsibility for the cost of the same;

5.23.6 obtain and consider such representations and submissions as he requires, and, provided he has notified the Parties of his intention, appoint experts, assessors or legal advisers;

5.23.7 give directions as to the timetable for the adjudication, any deadlines, or limits as to the length of written documents or oral representations to be complied with; and

5.23.8 issue other directions relating to the conduct of the adjudication.

5.24 The Parties shall comply with any request or direction of the adjudicator in relation to the adjudication.

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5.25 If, without showing sufficient cause, a Party fails to comply with any request, direction or timetable of the adjudicator made in accordance with his powers, fails to produce any document or written statement requested by the adjudicator, or in any other way fails to comply with a requirement under these provisions relating to the adjudication, the adjudicator may:

5.25.1 continue the adjudication in the absence of that Party or of the document or written statement requested;

5.25.2 draw such inferences from that failure to comply as may, in the adjudicator's opinion, be justified in the circumstances;

5.25.3 make a decision on the basis of the information before him, attaching such weight as he thinks fit to any evidence submitted to him outside any period he may have requested or directed;

5.25.4 disqualify any part or parts of that Party's submissions affected by the failure to comply; and

5.25.5 grant the other Party proper opportunity to consider and respond to any evidence or representation made late.

5.26 Subject to any agreement between the Parties to the contrary, either Party may be assisted by, or represented by, such advisers or representatives (whether legally qualified or not) as he considers appropriate.

5.27 The adjudicator shall consider any relevant information submitted to him by either Party and shall make available to them any information to be taken into account in reaching his decision.

5.28 The adjudicator and the Parties shall not disclose to any other person any information or document provided in connection with the adjudication which the Party supplying it has indicated is to be treated as confidential, except to the extent that disclosure is necessary for the purposes of, or in connection with, the adjudication, or the information is already in the public domain.

Adjudicator's decision

5.29 Unless otherwise agreed in accordance with paragraphs 6.2.1 or 6.3.1, the adjudicator shall reach his decision not later than:

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5.29.1 twenty eight days after the date of the Referral Notice mentioned in paragraph 5.12;

5.29.2 forty two days after the date of the Referral Notice if the Referring Party so consents; or

5.29.3 such period exceeding twenty eight days after the Referral Notice as the Parties may, after the giving of that notice, agree.

5.30 Where the adjudicator fails, for any reason, to reach his decision in accordance with paragraph 5.29

5.30.1 either of the Parties to the Dispute may serve a fresh notice in accordance with paragraphs 5.1 to 5.4 and shall request an adjudicator to act in accordance with paragraphs 5.5 to 5.14; and

5.30.2 if requested by the new adjudicator the Parties shall supply him with copies of all documents which they had made available to the previous adjudicator.

5.31 As soon as possible after he has reached a decision, the adjudicator shall deliver a copy of that decision to each of the Parties.

5.32 The adjudicator shall decide the matters in Dispute and may make a decision on different aspects of the Dispute at different times.

5.33 The adjudicator may take into account any other matters which the Parties agree should be within the scope of the adjudication or which are matters under the Agreement which he considers are necessarily connected with the Dispute and, in particular, he may

5.33.1 open up, review and revise any decision taken or any notice certifying payment given by any person referred to in the Agreement, unless the Agreement states that the decision or notice certifying payment is final and conclusive;

5.33.2 decide that any of the Parties to the Dispute is liable to make a payment under the Agreement (whether in sterling or some other currency) and, subject to the terms of the Agreement, when that payment is due and the final date for payment;

5.34 The adjudicator shall provide written reasons for his decision.

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Effects of the decision

5.35 In his decision, the adjudicator may, if he thinks fit, order either or both of the Parties to comply peremptorily with his decision or any part of it. In the absence of any directions by the adjudicator relating to the time for performance of his decision, the Parties shall be required to comply with any decision of the adjudicator immediately on delivery of the decision to the Parties in accordance with paragraph 5.31.

5.36 The decision of the adjudicator shall be binding on the Parties, and they shall comply with it, until the Dispute is finally determined by legal proceedings or by agreement between the Parties.

5.37 The adjudicator shall be entitled to the payment of such reasonable amount as he may determine by way of fees and expenses incurred by him and the Parties shall be jointly and severally liable to pay that amount to the adjudicator.

5.38 Without prejudice to the right of the adjudicator to effect recovery from either Party in accordance with paragraph 5.37, the Parties shall each be liable to pay one-half share of the adjudicator's fees and expenses.

5.39 The adjudicator shall not be liable for anything done or omitted in the discharge or purported discharge of his functions as adjudicator unless the act or omission is in bad faith, and any employee or agent of the adjudicator shall be similarly protected from liability.

6. RELATED DISPUTES

6.1 Notwithstanding the terms of paragraphs 1.2, 1.3, 1.7, 1.8, 1.9 and 1.10, in the event that a dispute or potential dispute under, or in connection with any of the Infrastructure Delivery Agreements (referred to in this paragraph 6 as ("**Related Contracts**"), has arisen or arises out of substantially the same issues of fact and/or law (as the case may be) as a Dispute under the Agreement (a "**Related Dispute**"), then providing that the Related Contract contains dispute resolution provisions in terms substantially the same as set out in this Schedule 7 (Dispute Resolution Procedure) (save for necessary changes), **tie** may require and direct that the Dispute and the Related Dispute be dealt with together at an appropriate stage of the Dispute Resolution Procedure.

6.2 In the event that a Related Dispute has already been referred to the decision of an adjudicator in accordance with the provisions of the Related Contract, and **tie** is of the

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opinion that a Dispute is to be (but has not yet been) referred to adjudication under this Schedule 7, **tie** may refer the Dispute, or may by notice in writing to the Operator require that the Dispute be referred (as the case may be) to the adjudicator appointed under the Related Contract to decide upon the Related Dispute, and:-

6.2.1 the adjudicator shall, if practicable, hear the Dispute at the same time as the Related Dispute and shall request such extension of time for producing his decision or award as he may require in order to reach a decision in respect of each of the Dispute and the Related Dispute at the same time. The Parties shall agree to such request for an extension of time, except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator);

6.2.2 except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator), the adjudicator shall have power (if so requested by **tie**) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the Parties to the Dispute and the Related Dispute, and to the adjudicator.

6.2.3 **tie** shall procure that, as soon as practicable, the other party or parties to the Related Dispute shall give the Operator copies of the Related Contract, the Referral Notice in the Related Dispute and any other documentation provided to the adjudicator by any party to the Related Dispute.

6.3 In the event that a Dispute has already been referred to the decision of an adjudicator, and **tie** is of the opinion that a Related Dispute is to be (but has not yet been) referred to adjudication, **tie** may refer the Related Dispute to the adjudicator appointed under this Schedule 7 to decide upon the Dispute, and:

6.3.1 the Adjudicator shall, if practicable, hear the Related Dispute at the same time as the Dispute and shall request such extension of time for producing his decision or award as he may require in order to reach a decision in respect of

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each of the Dispute and the Related Dispute at the same time. The Parties shall agree to such request for an extension of time, except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator).

6.3.2 except in the event that the Dispute or the Related Dispute relates to "construction operations" within the meaning ascribed to that term by the Housing Grants, Construction and Regeneration Act 1996 (if applicable) (unless otherwise agreed by the Parties, all parties to the Related Dispute and the Adjudicator), the adjudicator shall have power (if so requested by **tie**) to make his decisions or awards in the Dispute and the Related Dispute in such a manner as if the rules applicable in the Court of Session, Scotland as to the joining of one or more defenders or third parties or conjoining actions were applicable to the Parties to the Dispute and the Related Dispute, and to the adjudicator.

6.3.3 as soon as practicable, **tie** shall give to the Operator copies of the Related Contract, the Referral Notice in the Related Dispute and any other documentation provided to the adjudicator by any party to the Related Dispute.

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

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This is Schedule 8 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 8

Project Programme

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This is Schedule 9 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 198December 2007

SCHEDULE 9

Review Procedure

1. Introduction

1.1 The provisions of this Schedule 9 (*Review Procedure*) shall apply whenever any item, document or course of action is required to be reviewed, approved or otherwise processed in accordance with Schedule 9 (*Review Procedure*).

1.2 Each submission by the Operator to **tie** under the Review Procedure shall be accompanied by a copy of the proposed document (in appropriate agreed format) to be reviewed or a statement of the proposed course of action (the entire contents of a submission being referred to as a "**Submitted Item**"). In relation to each Submitted Item, as soon as reasonably possible, the **tie** Project Manager shall return one copy of the relevant Submitted Item to the Operator endorsed "no objection", "clarification required" or "objection" as appropriate.

1.3 If the **tie** Project Manager makes an objection to any Submitted Item he shall state the ground upon which such objection is based but, for the avoidance of doubt, the **tie** Project Manager shall be entitled to make comments on any Submitted Item on any grounds as he sees fit.

1.4 Without limitation to paragraph 1.3, the **tie** Project Manager may object to any proposed change to the Operating Method Statements (or any part of them) on the grounds that the performance of the Project Operations in accordance with the proposed revision or substitution would, in **tie**'s opinion, be:

1.4.1 materially inferior to the performance of the Project Operations in accordance with the Operating Method Statements prior to such proposed revision or substitution; or

1.4.2 be materially less likely to achieve compliance with the requirements of the Operating Output Specification.

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2. Further Information

The Operator shall submit any further or other information, data and documents that the **tie** Project Manager reasonably requires pursuant to paragraph 1.3 to act in accordance with this Schedule 9 (*Review Procedure*). If the Operator does not submit any such information, data and documents, the **tie** Project Manager shall be entitled to object to the Submitted Item:

2.1 on the basis of the information, data and documents which have been provided; or

2.2 on the grounds that insufficient information, data and documents have been provided to enable **tie** to act in accordance with this Schedule 9 (*Review Procedure*).

3. Effect of Review

3.1 Any Submitted Item which is returned by the **tie** Project Manager endorsed "no objection" shall be complied with and implemented by the Operator.

3.2 If the **tie** Project Manager returns the Submitted Item to the Operator endorsed "objection", the Operator shall comply with such Submitted Item after amendment in accordance with the objection.

4. Disclaimer

No review, objection, comment or silence by **tie** shall operate to (i) exclude or limit the Operator's obligations or liabilities under this Agreement (or **tie**'s rights under this Agreement) or (ii) bind **tie** with any express or implied obligations, duties or liabilities with respect to the Submitted Item.

5. Documentation Management

5.1 The Operator shall issue four copies (in appropriate agreed format) of all Submitted Items to **tie** and compile and maintain a register of the date and contents of the submission of all Submitted Items.

5.2 The Operator shall compile and maintain a register of the date of receipt and content of all Submitted Items that are returned by the **tie** Project Manager.

6. Variations

6.1 No review, objection or comment or any failure to make objection or comment under this Schedule 9 (*Review Procedure*) shall constitute a **tie** Change.

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6.2 If, having received comments from the **tie** Project Manager, the Operator considers that compliance with those comments would amount to a **tie** Change, the Operator shall, before complying with the comments, notify **tie** of the same and, if it is agreed by the Parties or determined pursuant to the Dispute Resolution Procedure that a Variation would arise if the comments were complied with, **tie** may, if it wishes, proceed with the matter in accordance with Clause 23 (*Performance and Financial Adjustments*) and Clause 24 (*tie Changes*) of the Operating Appendix.

6.3 Any failure by the Operator to notify **tie** that it considers compliance with any comments of the **tie** Project Manager would amount to a **tie** Change shall constitute an irrevocable acceptance by the Operator that any compliance with **tie**'s comments shall be without amendment to the Fixed Costs, the Target Costs for Project Phase C2, Target Operating Costs or Target Patronage and without any extension of time or other relief.

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

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This is Schedule 10 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 10

Insurances

PART 1 - Required Insurances

1. THIRD PARTY LIABILITY INSURANCE (INCLUDING MOTOR VEHICLE LIABILITY)

Insured Parties: During Project Phases A and B, the Operator.

Coverage: During Project Phases A and B, the legal liability of the Operator for death, injury, illness, disease contracted by third party persons or loss of or damage to property arising out of or in connection with the Project Development Services in respect of each Phase.

Limit of Indemnity: Unlimited in respect of each occurrence and as to the number of occurrences in each 12 month period in respect of death or injury to persons on highway sections of the Project. For all other occurrences, a minimum of £5,000,000 any one occurrence during Project Phases A and B (unlimited as to number of occurrences in the Period of Insurance stated below) in respect of third liability and £50,000,000 any one occurrence and in the aggregate in any one 12 month period of insurance in respect of products liability.

Period of Insurance: From the Effective Date for twelve months and thereafter each further twelve month period until the end of Project Phase B.

Minimum Extensions: The insurance must include the following minimum extensions:

1. Worldwide jurisdiction.
2. Contractual liability.
3. Cross liabilities.
4. Costs and expenses in addition to limit of indemnity.
5. Interference, trespass, loss of amenities, nuisance and obstruction.
6. Liability in respect of any agreement with Network Rail with regard to operations on, over or near the existing rail network (terms of extension to be agreed with tie once the terms of any Network Rail Agreements are known and extension shall take effect if instructed as a tie Change)

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7. Sudden and accidental pollution and contamination.

8. Contingent motor liability.

9. Business activities extended to include the provision and management of canteen, sports, social and welfare activities, sponsorships, medical, dental, nursing, fire, first-aid, ambulance and security services, work by an employee for any fellow employee, participation in exhibitions, ownership and maintenance of own premises or property.

10. Indemnity to principal

11. Health and Safety at Work Etc. Act 1974 – legal costs and expenses in defending a prosecution brought under sections 2-8 of the Act.

12. Consumer Protection Act 1987 – legal costs and expenses in defending a criminal prosecution brought under Part II of the Act.

13. Data Protection Act 1998 – compensation in respect of damage and distress under sections 22 and 23 of the Act and defence costs in relation to section 19 of the Act.

14. Conflict of Interest – where conflict between the Insured and an employee, separate representation to be arranged for each party.

15. Motor tool of trade risk.

16. Liability for damage to leasehold premises.

17. Waiver of subrogation rights against tie during Project Phases A and B.

Maximum Permitted Deductible: £25,000 each and every loss in respect of property damage claims
Nil excess for bodily injury claims.

2. EMPLOYERS LIABILITY INSURANCE

Insured Party: The Operator

Coverage: During Project Phases A, B, C and D, the legal liability of the Operator for death, injury, illness, disease contracted by employees of the Operator caused by or arising out of or in connection with the Project Development Services or the Project Operations in respect of each Phase.

Limit of Indemnity: Minimum limit of indemnity of £10,000,000 any one occurrence or series of occurrences arising from one original cause or event.

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Period of Insurance: From the Effective Date for twelve months and thereafter each further twelve month period until the earlier of the Expiry Date or the Termination Date.

Extensions: The insurance must include the following minimum extensions:

1. Contractual liability.
2. Business activities extend to include the provision and management of canteen, sports, social and welfare activities, sponsorships, medical, dental, nursing, fire, first-aid, ambulance and security services, work by an employee for any fellow employee, participation in exhibitions, ownership and maintenance of own premises of property.
3. Indemnity to principal.
4. Health and Safety at Work Etc. Act 1974 – legal costs and expenses in defending a prosecution brought under sections 2-8 of the Act.
5. Consumer Protection Act 1987 – legal costs and expenses in defending a criminal prosecution brought under Part II of the Act.
6. Data Protection Act 1998 – compensation in respect of damage and distress under sections 22 and 23 of the Act and defence costs in relation to section 19 of the Act.
7. Conflict of Interest – where conflict between the Operator and an employee, separate representation to be arranged for each party.
8. Employees' business liability.
9. Unsatisfied court judgements.
10. Compensation for court attendance.
11. Contingent Liability arising out of the transfer of employees under TUPE.
12. Waiver of subrogation rights against tie
13. Definition of employee to include as a minimum persons under a contract of service or apprenticeship, labour only subcontractors, self-employed persons, labour masters or persons supplied by them, operators and drivers of hired in plant
14. Inclusion of directors, officers, partners and employees as Insured Parties

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Maximum Permitted Deductible:	Nil or such other deductible as may be agreed by **tie**

3. CONTRACTOR'S PLANT

Insured Party:	The Operator
Coverage:	"All risks " of loss or destruction of or damage to the Property Insured by any cause not excluded Property Insured Constructional plant, tools and equipment of any kind including site huts, temporary buildings and their contents the property of any Insured Party or for which they are responsible
Limit of Liability	The value of the plant, tools and equipment
Period of Insurance:	From the commencement of Project Phase C for 12 months and thereafter each further twelve month period until expiry or earlier date of termination of this Agreement.
Minimum Extensions	The insurance must include the following minimum extensions: Property in transit other than mechanically-propelled plant in transit under its own power Recovery of immobilised plant Negligent breakdown of hired-in plant Continuing hire charges
Exclusions	Any exclusion of breakdown or explosion of own plant must not apply to loss or damage to any other property
Maximum Permitted Deductible:	GBP 25,000

4. COMPREHENSIVE MOTOR INSURANCE

Insured Party:	The Operator and **tie**
Coverage:	Comprehensive in respect of loss or damage to Own Vehicles. Legal Liability for death, injury, illness or disease or loss of or damage to Third Party Property.
Limit of Liability	Own Damage - Market Value/Cost of Repairs Third Party: Bodily Injury - Unlimited. Property Damage by Cars £20,000,000 any one occurrence Property Damage by Commercial Vehicles £5,000,000 any one occurrence unlimited during the Period of Insurance
Period of Insurance:	From the commencement of Project Phase C for 12 months and thereafter each further twelve month period until expiry or earlier date of termination of this Agreement.
Minimum Extensions	The insurance must include the following minimum extensions: Contingent motor liability Passenger indemnity and negligence of passengers

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	Occasional business use by employees
	Unauthorised movement
	Indemnity to principals
	Unauthorised use by employees
	Road risk of plant
Maximum Permitted Deductible:	GBP 25,000 in respect of own damage
	GBP NIL in respect of third party liability

5. DIRECTORS' & OFFICERS' LIABILITY

Insured Party:	The Operator (Insured Organisation)
	The Directors and Officers of The Operator (insured Persons)
Coverage:	A – Directors' & Officers' Liability
	To pay on behalf of each Insured Person the loss to the extent they are not indemnified by the Insured Organisation
	B – Corporate Reimbursement
	To pay on behalf of the Insured Organisation the loss to the extent the Insured Organisation has indemnified the Insured Person
Limit of Liability	GBP 10,000,000 any once occurrence and in the aggregate during any twelve month Period of Insurance.
Period of Insurance:	From the Effective Date for twelve months and thereafter each further twelve month period until expiry or earlier date of termination of this Agreement.
Minimum Extensions	The insurance must include the following minimum extensions:
	Defence costs in respect of pollution and contamination
	Outside directorships
	Provision for run-off cover and extended claim reporting period on expiry
	Bilateral discovery period
Exclusions	No insured versus insured exclusion in respect of claims outside the United States of America
	Bodily injury and property damage – "for" language to be used
Maximum Permitted Deductible:	A - GBP NIL in respect of Directors' & Officers' liability
	B - GBP 25,000 in respect of Corporate Reimbursement

6. CRIME

Insured Party:	The Operator and any subcontractor
Coverage:	To pay financial loss suffered by the Insured Parties first discovered during the Period of Insurance and resulting from loss or theft of money, property or securities (owned by the Insured Parties or for which they are responsible) by any Employee or securities fraud, computer fraud or funds transfer fraud committed by any person.
	Cover is to include loss of money, property or securities committed by any person in respect of the following situations –

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	- robbery - burglary - money, property or securities in transit or whilst away from any premises or site of the Insured Parties
Limit of Liability	TO BE AGREED
Period of Insurance:	From the Effective Date for twelve months and thereafter each further twelve month period until expiry or earlier date of termination of this Agreement.
Minimum Extensions	The insurance must include the following minimum extensions: Investigation expenses Claims mitigation costs Defence costs Computer clean-up costs Electronic funds transfer Provision for discovery period following expiry

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PART 2 - Form of Brokers Letter of Undertaking

To: Transport Initiatives Edinburgh Ltd ("**tie**")

Dear Sirs

We confirm in our capacity as Insurance Brokers that the Required Insurances specified in Clause 27 (*Insurances*) and Schedule 10 *(Insurances)* of the Development Partnering and Operating Franchise Agreement (the "DPOF Agreement") dated ◆ between (◆) (the "Operator") and **tie** as defined therein are, as at the date hereof, in effect in respect of the risks set out in the attached cover notes.

We have arranged the Required Insurances on the basis of the information and instructions given by the Operator. We have not made any particular or special enquiries regarding the Required Insurances beyond those that we would normally make in the ordinary course of arranging the insurances on behalf of our insurance broking clients.

The confirmations set out in this letter are given by reference to our state of knowledge at the date hereof.

Pursuant to instructions received from the Operator and in consideration of the Operator approving, and **tie** confirming its approval of our appointment or continuing appointment as brokers to the Operator in connection with the Required Insurances covered by this letter, we hereby undertake in respect of the interests of the Operator and **tie** in the Required Insurances referred to in the attached cover notes:

1. to use reasonable endeavours to have endorsed on each and every policy evidencing the Required Insurances when the same is issued, endorsements substantially in the form set out in Clause 27 (*Insurances*) of the Agreement;

2. to ensure that all proceeds for the Required Insurances received by us from the insurers shall be applied in accordance with Clause 27.11 of the DPOF Agreement.

3. to advise **tie** :

   3.1 promptly after receiving notice of any insurer's cancellation or suspension of any of the Required Insurances or receiving notice of the intended cancellation or suspension of any of the Required Insurances;

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3.2 promptly upon our receipt from the Operator of any notice of any changes proposed to be made to the Required Insurances which, if effected, would result in a material reduction in limits or coverage (including in respect of extensions of cover) or in an increase in deductibles, exclusions or exceptions;

3.3 of any default in the payment of any premium for any of the Required Insurances;

3.4 at least 20 days prior to the expiry of any of the Required Insurances if we have not received written renewal instructions from the Operator or if we receive written instructions to renew, to advise **tie** of the details thereof; and

3.5 on receipt of notice of any act or omission of the Operator or any Operator Party which will invalidate or render unenforceable in whole or in part, any of the Required Insurances;

4. no later than 7 days (in respect of certificates) and as soon as reasonably practicable in respect of policies and other documents, to supply you and/or your insurance advisors (or your or their authorised representative) copies of all placing slips, certificates, cover notes, renewal receipts and confirmations of renewal and payment of premiums and all policy documents in respect of the Required Insurances, or upon request, to make available to you the originals of any or all such documents held by us;

5. to disclose to the insurers any fact, change of circumstance or occurrence is material to the risks insured against under the Required Insurances;

6. to treat as confidential all information in relation to the Required Insurances supplied to us by the Operator or any Operator Party or **tie** and not to disclose, without the written consent of **tie**, such information to any third party other than the insurers under the Required Insurances, unless required to do so by law or any regulatory authority; and

7. to notify **tie** at least 30 days prior to our ceasing to act as brokers to the Operator, unless impracticable because of circumstances beyond our control, in which case we shall notify **tie** as soon as reasonably practicable upon becoming aware that we shall cease, or have ceased, so to act.

Where insurers wish any of the Required Insurances to be cancelled for reasons of non-payment of premium, we will request those insurers to give you a reasonable opportunity of paying such amounts outstanding before issuing notice of cancellation on behalf of such insurers.

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The above undertakings are given subject to our continuing appointment for the time being as insurance brokers to the Operator in relation to the Required Insurances concerned and the monitoring and handling of claims in relation to the Operator, and our obligations set out in this letter shall automatically cease upon termination of our appointment.

For the avoidance of doubt all undertakings and other confirmations given in this letter relate solely to the Required Insurances. They do not apply to any other insurances and nothing in this letter should be taken as providing any undertakings or confirmations in relation to any other such insurance that ought to have been placed or may at some future date be placed by other brokers.

This letter is given by us on the instructions of the Operator and with the Operator's full knowledge and consent as to its terms as evidenced by the Operator's signature below.

This letter shall be governed by and shall be construed in accordance with Scots Law and any dispute as to its terms shall be submitted to the exclusive jurisdiction of the courts of Scotland.

Yours faithfully

.....
For and on behalf of (Insurance Broker)

.....
For and on behalf of (The Operator)

[ ]

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PART 3 - OCIP

[PLEASE NOTE THESE TERMS ARE DRAFT INDICATION OF THE SCOPE OF COVER AND ANY ALTERATION IN THE SCOPE OF COVER INDICATED AND/OR COMPLETION OF MISSING INFORMATION/MATTERS STATED TO BE AGREED/CLARIFIED/UNDER REVIEW SHALL BE A TIE CHANGE PURSUANT TO CLAUSE 27]

CONSTRUCTION PHASE

CONSTRUCTION OCIP SUMMARY – 7th AUGUST 2007

INSURED: **Sections 1 – CAR (Lot One) and 2 – TPL (Lot Three)**

(i) **tie** Limited as Principal

(ii) The Main Contractors as declared under the MUDFA, Infraco and Tramco contracts (Tram Supply and Tram Maintenance)

(iii) Trade Contractors, Co-contractors and/or Sub-Contractors of any tier and any other Contractors including Advance Works Contractors and the maintenance contractors

(iv) Architects and/or Engineers and/or Suppliers and/or Consultants not forming part of (ii) or (iii) above as regards their on-site activities only

(v) Local authorities and utility providers including private utility owners as required

(vi) Transdev Edinburgh Tram Limited

(vii) Transport Edinburgh Limited (TEL)

(viii) Any other party having an insurable interest (and not mentioned above) to the extent that the Insured (i) is required by contract or agreement to provide insurance to such parties

(ix) The Scottish Ministers/Scottish Executive, Transport Scotland and City of Edinburgh Council

Section 3 (Lot Two) - DSU

Insured (i) and (vii) above,

each for their respective rights and interests.

PERIOD: From: 23rd July 2007
including all testing, commissioning and trial running periods

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To: 31st July 2010

plus the balance of the maintenance/defects liability period thereafter

All dates inclusive at Local Standard Time.

INTEREST: All work including design, engineering, procurement, demolition, fabrication, construction, erection, installation, testing, commissioning (including trial running of trams) and defects maintenance in connection with the contract or work forming the Edinburgh Tram Network including all ancillary and associated works and activities related therewith of whatsoever nature.

Section 1 – Construction All Risks

All contract works whether permanent or temporary and all installations and preparatory and auxiliary and ancillary works and all other property or equipment including the plant, the materials, temporary buildings including those on loan, camps and contents, and all other goods, all facilities (including drawings, designs, specifications and plans to be provided and work to be done by the Contractor relating to the service, design, supply, erection, installation, testing, setting to work and commissioning of the Project together with all other property or goods the property of the Insured or for which they may be responsible for incorporation or use in connection with the Project
Plant, equipment, temporary buildings, camps and contents owned, leased or hired by the contractors (insured sub (ii), (iii) and (iv) are excluded
See Conditions for cover in respect of drawings, designs, specifications and plans – covered under "plans and documents"

Section 2 – Third Party Liability

To indemnify the Insured against all sums (including claimants' costs and expenses) arising out of:

(a) death or bodily injury to or illness or disease or psychiatric damage suffered by any person, invasion of privacy, wrongful arrest, libel and slander
(b) loss or damage to physical property;
(c) obstruction, loss of amenities, nuisance, trespass, stoppage of traffic, infringement of any easement or right of air, light, water or way or any like cause

happening or consequent upon a cause occurring during the Period of Insurance and arising out of or in connection with the contract or work.

Section 3 – Delayed Start Up

To indemnify the Insured (i) and (vii) against loss of anticipated gross revenue/increased costs or working following an indemnifiable loss under Section 1

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SUMS INSURED/LIMITS OF INDEMNITY:	**Section 1 – Construction All Risks** Estimated Contract Value £341.9M for 1a Infraco and MUDFA and Tramco (split commercially sensitive during current procurements). Cover for MUDFA applies in respect 1a and 1b areas). **Section 2 – Third Party Liability** £100,000,000 any one occurrence £100,000,000 any one occurrence and in the aggregate in respect of products liability £100,000,000 any one occurrence and in the aggregate in respect of pollution or contamination Unlimited liability for bodily injury as required under Road Traffic Acts **Section 3 – Delayed Start Up** To cover loss of revenue resulting from delay in commencement of passenger operations caused by insured damage to the Property Insured under Section 1 Maximum indemnity period 24 months
EXCESS:	**Section 1 Construction All Risks** £20,000 each and every occurrence and/or series of occurrences increasing to £40,000 each and every occurrence in respect of storm, tempest, flood, earthquake, water damage, subsidence, collapse, landslip, frost and claims arising out of maintenance or testing and commissioning activities £250,000 each and every occurrence in respect of LEG 3 (design) claims **Section 2 Third Party Liability** £10,000 each and every occurrence and/or series of occurrences in respect of property damage and bodily injury **Section 3 Delayed Start Up** 60 days aggregate time excess
TERRITORIAL LIMITS:	Anywhere in the European Union (including inland transits and transits by ro/ro ferries and off-site storage) but worldwide excluding the USA/Canada in respect of Section 2

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CONDITIONS: **Section 1 Construction All Risks**

- Full (Guarantee) maintenance for first 12 months, followed by 12 months extended maintenance
- Defective design, materials and/or workmanship LEG 3
- Professional fees clause
- Debris removal clause
- 72 hour clause – storm, tempest, flood, earthquake, riot, civil commotion
- Principal supplied materials clause
- Automatic increase clause (25%)
- Expediting expenses
- Public, Local Authorities and European Union reinstatement clause
- Preventive measures clause/minimisation of loss
- Waiver of subrogation
- Munitions clause
- Terrorism to full value – via Pool Re
- Plans and documents including computer records
- Marine 50/50 clause
- Payments on account
- Temporary repairs
- Automatic reinstatement of sum insured at additional premium to be agreed but not exceeding pro-rata and nil for losses not exceeding £1,000,000
- Non-vitiation/non-invalidation and severability of interest clauses
- Off-site storage
- Transit by road, rail or sea (roll on/roll off ferries only) including during loading/unloading, transhipments and storage en route
- Property at specified suppliers' premises – damage by fire, lightning, explosion or aircraft only covered
- Undamaged foundations clause
- Testing and Commissioning of the Works
- Testing, commissioning and trial running of trams for passenger service
- Recovery of immobilised plant
- Negligent breakdown of hired-in plant
- Continuing hire charges
- Existing property and principal's property as required
- Buildings due for demolition

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Section 2 Third Party Liability

- Contractual liability
- Claimants' and defence costs and expenses in addition to the Limit of Indemnity
- Cross liabilities clause
- Indemnity to Principals
- Unauthorised movement of vehicles
- Inclusion of directors, officers and employees as insured parties
- Waiver of subrogation
- Non-invalidation/non-vitiation clauses
- Testing and Commissioning of the Works
- Testing and trial running for passenger service
- Motor Contingent Liability – limited to Great Britain, Northern Ireland, the Channel Islands, the Isle of Man
- Defective Premises Act Clause.
- Data Protection Act Defence Costs.
- Compensation for Court Attendance
- Sudden and Accidental Pollution Clause.
- Health and Safety at Work
- Munitions of War Clause.
- Consumer Protection Act
- Food Safety Act

Liability in respect of any agreement with Network Rail with regard to operations on, over or near the existing rail network (terms of extension to be agreed with **tie** once the terms of any Network Rail Agreements are known (currently limit of £155 million) and extension shall take effect if instructed as a **tie** Change)

Section 3 Delayed Start Up

- premises of specified suppliers where materials/plant/equipment for incorporation into the works is in the process of manufacture or being stored - damage by fire, lightning, explosion or aircraft only covered
- prevention of access
- damage to the supply of water, gas, electricity or telecommunications systems to any site
- delay caused by damage to the Insured Property during transit by road, rail or sea(roll on/roll off ferries only) including during loading/unloading, transhipments and storage en route
- terrorism to full value – via Pool Re
- non-vitiation/non-invalidation and severability of interest clauses
- off-site storage
- waiver of subrogation rights between insured parties
- Including consequential losses arising from loss or damage to Constructional Plant and Equipment
- Professional Fees

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PRINCIPAL EXCLUSIONS:

Section 1 – Construction All Risks

- Consequential loss
- Wear and tear and corrosion but not consequent damage
- Inventory losses
- Claims deductibles
- Acts of fraud or theft committed by employees
- Building contractors and sub contractors plants, tools and equipment
- Liquidated damages
- War, invasion, acts of foreign enemies, hostilities, civil war, rebellion, revolution, insurrection or military or usurped power
- Nuclear risks
- Sonic bangs
- Design Exclusion LEG 3
- aircraft or marine vessels
- vehicles licensed for road use other than tool of trade risk
- money
- tyres by the application of brakes, punctures, cuts or bursts
- suspension of work in excess of three months
- normal upkeep or normal making good
- electronic data exclusion – cover limited to physical damage caused by fire, explosion, collision, derailment
- piling exclusions and restrictions
- pre-existing defects in respect of existing structures

Section 2 – Third Party Liability

- Employers' Liability
- Liability arising out of the use of, ownership or possession of any motor vehicle in circumstances where the Road Traffic Acts require compulsory insurance or security. The exclusion does not apply to trams whilst undergoing testing, commissioning and trial running
- Liability arising out of the use of, ownership or possession of any aircraft or waterborne craft
- Asbestos exclusion
- Liquidated damages
- Fines, penalties, punitive or exemplary damages
- War, invasion, acts of foreign enemies, hostilities (whether declared or not), civil war, rebellion, revolution, insurrection of military or usurped power.
- Nuclear risks
- Seepage, pollution or contamination unless caused by sudden, unintended and unexpected happening.
- Professional indemnity, but not excluding personal or bodily injury or damage to tangible property.
- Liability arising out of performance warranties
- Property belonging to the Insured or in their care, custody or control
- Repairing or making good faulty, defective or incorrect workmanship, design or specification, materials, goods or other property supplied or installed or erected
- Excluding use of explosives or extent of cover to be agreed
- Product recall, product guarantee
- Terrorism

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PRINCIPAL EXCLUSIONS:

Section 3 – Delay in Start Up

- Public authority delay
- Rectification of defects
- Non-availability of funds
- Modifications
- Costs incurred to reduce delay during Claims Deductible period
- suspension, lapse or cancellation of licence after commencement of operations

OPERATIONAL PHASE

INSURED:

Sections 1 (Lots Four and Five) and 2 (Lot Six)

i. **tie** Limited

ii. The INFRACO Maintainer and TRAMCO Maintainer

iii. The Co-contractors and/or Sub-Contractors of any tier including the maintenance contractors

iv. Transdev Edinburgh Tram Limited as operator

v. Local authorities and utility providers as required

vi. Transport Edinburgh Limited (TEL)

vii. Any other party having an insurable interest (and not mentioned above) to the extent that the Insured (i) is required by contract or agreement to provide insurance to such parties

viii. The Scottish Ministers/Scottish Executive, Transport Scotland and City of Edinburgh Council

ix. Network Rail

each for their respective rights and interests.

PERIOD:

From a date to be agreed to follow expiry of Construction Phase

Extensions in Period automatically covered at additional premium to be agreed but not exceeding pro-rata

INTEREST:

The operation and maintenance of the ETN including all ancillary and associated works and activities related therewith of whatsoever nature.

Section 1 – Material Damage & Business Interruption

All risks of loss or destruction of or damage to the Insured Property by any cause not excluded including resulting Business Interruption

Section 2 – Third Party Liability

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To indemnify the Insured against all sums (including claimants' costs and expenses) arising out of:

(a) death or bodily injury to or illness or disease or psychiatric damage suffered by any person;
(b) loss or damage to property;
(c) obstruction, interference, loss of amenities, negligence, nuisance, trespass, stoppage of traffic, infringement of any easement or right of air, light, water or way or any like cause

happening or consequent upon a cause occurring during the Period of Insurance and arising out of or in connection with the Project

SUMS INSURED/LIMITS OF INDEMNITY:

Section 1 – Material Damage/Business Interruption

Material Damage

Reinstatement value of the Property Insured

Business Interruption

The basis of cover is under review and will be clarified during the negotiation process. Alternatives under consideration are potential lost revenue to operator or contractual payments for which the principal is responsible due to delay"

Increased costs of working plus additional increased costs of working

Maximum indemnity period - 12 months

Section 2 – Third Party Liability

£100,000,000 any one occurrence
£100,000,000 any one occurrence and in the aggregate in respect of products liability
£100,000,000 any one occurrence and in the aggregate in respect of pollution or contamination
Unlimited liability for bodily injury as required under the Road Traffic Acts

EXCESS:

Section 1 Material Damage & Business Interruption

Material Damage

£50,000 each and every occurrence and/or series of occurrences increasing to
£250,000 each and every occurrence in respect of overhead power cables and associated supporting structures
£500,000 each and every occurrence in respect of tram breakdown and track subsidence cover

Business Interruption

14 days or £50,000 each and every occurrence whichever is the greater

Section 2 Third Party Liability

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£10,000 each and every occurrence and/or series of occurrences in respect of property damage

TERRITORIAL LIMITS: Anywhere in the United Kingdom (including inland transits and off-site storage) but worldwide in respect of Section 2

CONDITIONS:

Section 1 Material Damage/Business Interruption

- professional fees including surveyors', consulting engineers' and legal fees
- removal of debris
- temporary repairs and expediting expenses
- automatic reinstatement of sum insured

- local authority clause including European Union, railway inspectorate or Health and Safety Executive
- off-site storage
- property at supplier's premises
- waiver of subrogation between insured parties
- non-invalidation and non-vitiation
- severability of interest
- tram breakdown and track subsidence – limit £2M in the aggregate during the Period of Insurance
- track subsidence
- driver/operator error
- 72 hour clause
- reinstatement basis of settlement
- suppliers extension
- utilities extension
- denial of access
- notifiable diseases, food and drink poisoning, defective sanitation
- property hired in
- temporary loan
- capital additions

- trace and access
- metered water and fire extinguishing media
- replacement locks
- machinery breakdown
- damage to landscaped area by emergency services
- clearance of drains
- temporary removal
- plans and documents
- minimisation of loss
- escalation
- buildings for demolition
- computer data
- reinstatement basis of settlement
- BI suppliers and utilities
- alternative accommodation

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Section 2 Third Party Liability

- Consumer Protection Act or Health and Safety at Work Act Prosecution Defence Costs
- Food Safety Act
- Defective Premises Act
- Data Protection Act
- Motor Contingent Liability
- Movement of Obstructing Vehicles
- Compensation for Court Attendance
- Employees' and Visitors' Effects
- Indemnity to Principal

- Professional Visits Worldwide
- Leased and Rented Premises
- Servicing of Vehicles
- Libel and Slander

- waiver of subrogation between insured parties
- contractual liability clause

- non invalidation-non-vitiation clause
- severability of interests clause
- munitions of war
- Liability in respect of any agreement with Network Rail with regard to operations on, over or near the existing rail network (terms of extension to be agreed with **tie** once the terms of any Network Rail Agreements are known (currently limit of £155 million) and extension shall take effect if instructed as a **tie** Change)

PRINCIPAL EXCLUSIONS:

Section 1 – Material Damage & Business Interruption

- Fines or penalties
- Motor vehicles (other than trams), water craft
- Wear and tear and corrosion but not resulting damage
- Inventory losses
- Deductible
- Change in water table, temperature
- Collapse or cracking of buildings
- Date recognition
- Fraud or theft by employees
- Normal bedding down of structures
- Machinery and computer breakdown
- Track subsidence, heave, sinkage or misalignment unless caused by fire, lightning, earthquake, storm, tempest, explosion and water damage
- Damage to excavations
- War, invasion, acts of foreign enemies, hostilities (whether declared or not), civil war, rebellion, revolution, insurrection of military or usurped power.
- Nuclear risks
- Seepage, pollution or contamination unless caused by defined perils.
- Sonic boom

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Section 2 – Third Party Liability

- Employers' Liability
- Liability arising out of the use of, ownership or possession of any motor vehicle other than trams or plant as a tool of trade
- Liability arising out of the use of, ownership or possession of any aircraft or waterborne craft
- Asbestos exclusion
- Liquidated damages
- Fines, penalties, punitive or exemplary damages
- War, invasion, acts of foreign enemies, hostilities (whether declared or not), civil war, rebellion, revolution, insurrection of military or usurped power.
- Nuclear risks
- Seepage, pollution or contamination unless caused by sudden, unintended and unexpected happening.
- Professional indemnity, but not excluding personal or bodily injury or damage to tangible property.
- The cost of making good loss of or damage to property
- Medical malpractice

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899944_0283

This is Schedule 11 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 11

Schedule Not Used

[redacted]

Director/Authorised Signatory
tie Limited

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Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899944_0284

This is Schedule 12 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 12

SCHEDULE NOT USED

[redacted]

Director/Authorised Signatory
tie Limited

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Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899944_0285

This is Schedule 13 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 13

SCHEDULE NOT USED

[redacted]

Director/Authorised Signatory
tie Limited

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Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899944_0286

This is Schedule 14 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 14

Performance Bond

(1) ◆ [SURETY]

- in favour of -

(2) tie

PERFORMANCE BOND

TIE00899944_0287

PERFORMANCE BOND

BETWEEN

(1) ◆ , a company incorporated in ◆ under company number [◆] whose registered office is at ◆ ("**the Surety**"); and

(2) **TIE LIMITED**, a company incorporated in Scotland under number SC230949 and having its registered office at City Chambers, High Street, Edinburgh EH1 1YJ ("**tie**")

WHEREAS

A. **tie** entered into a Development Partnering and Operating Franchise Agreement (hereinafter referred to as the "**DPOF Agreement**") dated 14 May 2004 with Transdev Edinburgh Tram Limited (the "**Operator**") (as amended by the Minute of Variation dated [◆] between **tie** and the Operator to give project development assistance and services for commissioning and operation of a light rapid transit system in Edinburgh known as the Edinburgh Tram Network.

B. Clause 8 (*Operator's Performance Security*) of the DPOF Agreement obliges the Operator to deliver to **tie** an unconditional irrevocable Performance Bond on the conditions and in the form set out in Schedule 14 (*Performance Bond*) to the DPOF Agreement, issued by a surety acceptable to **tie** and callable subject only to written notification by **tie**.

C. This Performance Bond is conditional on the issue of the Mobilisation Certificate by **tie** to the Operator under the terms of the DPOF Agreement.

D. In consideration of your accepting our obligations set out below in discharge of the Operator's undertaking to provide a performance bond under Clause 8 (*Operator's Performance Security)* of the DPOF Agreement, we, [*Name and address of Surety to be inserted*] hereby irrevocably and unconditionally agree and undertake to pay to you a sum not exceeding TEN MILLION POUNDS (£10,000,000) (the "**Bonded Amount**") and accordingly covenant with you and agree as follows:

1. Upon our receipt of a demand or demands ("**Demand Notice**") from you certifying that you have issued a notice to the Operator stating that an Operator Default has occurred, and without being entitled or obliged to make any enquiry or proof or contestation or further conditions on you (or the Operator) and without the need for you to take any legal action against or to obtain the consent of the Operator and without any right of set-off, abatement or counterclaim, we

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shall forthwith pay to you the amount or amounts specified in such Demand Notice(s) in immediately available funds by electronic transfer to the account nominated in the Demand Notice, not exceeding in aggregate the Bonded Amount; it being confirmed that you may make as many separate demands hereunder as you think fit. You shall not be obliged to exercise any other right or remedy you may have before making a demand under this Performance Bond.

2. A Demand Notice received from you in accordance with paragraph 1 above and 3 below shall be conclusive evidence of our liability to pay to you and of the amount of the sum or sums which we are liable to pay. Our obligation to make payment under this Performance Bond shall be a primary, independent and absolute obligation and we shall not be entitled to delay or withhold payment for any reason. Our obligation hereunder shall not be affected by any act, omission, matter or thing which, but for this provision, might operate to release or otherwise exonerate us from the obligations hereunder in whole or in part, including without limitation and whether or not known to us or to you:

2.1 any time or waiver granted to you or to the Operator;

2.2 the taking, variation, compromise, renewal or release of or the refusal or neglect to perfect or to enforce any rights, remedies or securities against you or the Operator;

2.3 any legal limitation, disability or incapacity relating to you or the Operator;

2.4 any variation of or amendment to the DPOF Agreement (or related documentation) or the works or services to be performed thereunder or any other document or security so that references to the DPOF Agreement in this Performance Bond shall include each such variation and amendment;

2.5 any unenforceability, invalidity or frustration of any rights or obligations of you or the Operator under the DPOF Agreement or any other document or security; and

2.6 any other fact, circumstance, provision of statute or rule of law which might, were our liability to be secondary rather than primary, entitle us to be released or discharged in whole or in part from our undertaking.

3. **tie** shall only be entitled to issue a Demand Notice to make a claim under this Performance Bond if it has:

TIE00899944_0289

3.1 provided the Surety in good faith with a written statement (the **"Prior Written Notice"**) which identifies the Operator's default; and

3.2 gives the Operator fifteen Business Days' (following receipt by the Operator of a copy of the Prior Written Notice) to rectify its performance; and

3.3 the Operator has failed to rectify its performance.

3. Until such time as **tie** has recovered all amounts due to it under or in connection with the DPOF Agreement, we shall not, without the prior written consent of **tie**, in respect of any payment made or liability under this Performance Bond, claim, rank or vote as a creditor in the liquidation of the Operator in competition with **tie**, or enforce any security over the assets of the Operator in respect of any such payment or liability in competition with **tie**, but this Clause 3 shall not limit or restrict the exercise or enforcement by us of our rights against any other person after payment in full of the Bonded Amount.

4. We shall hold in trust any sums recovered by us contrary to the provisions of Clause 3:

4.1 to pay to **tie** in full the unrecovered balance of any damages or other sums due from the Operator to **tie** under or in connection with the DPOF Agreement, to the extent set out in Clause 3; and

4.2 subject thereto, for our benefit.

5. **tie** shall be entitled to enforce the provisions of Clauses 3 and 4 only so far as required to keep itself or to put itself in the position it would occupy if we had no rights of recourse against the Operator or its assets in respect of any payment made or liability arising under this Performance Bond, but no further; and any consent required of **tie** under Clause 3 above shall not be refused or delayed unreasonably.

6. Our liability under this Performance Bond shall not be affected or reduced by the insolvency of the Operator or its liquidation, receivership or other like temporary or permanent status.

7. **tie** shall be at liberty to compromise, release, waive or neglect any security as they see fit, without impairment of their rights under this Performance Bond.

8. This Performance Bond shall cease to have effect 90 days after the earlier of the Expiry Date or the Termination Date of the DPOF Agreement, save in connection with any Demand Notice issued to us in writing prior to the expiry of the said period of 90 days.

9. **tie** shall be entitled to assign this Performance Bond without our consent.

10. Any notice to be served under this Performance Bond must be in writing and must be delivered by hand or by registered post or recorded delivery at [*enter branch and address*]. Service shall take effect, if given by hand, on the date of delivery. If given by post, it shall take effect two days after posting, excluding Saturdays, Sundays and statutory holidays.

11. This Performance Bond shall be governed by and construed in accordance with the Laws of Scotland and we hereby agree to submit to the exclusive jurisdiction of the Court of Session over any claim arising out of this Performance Bond.

12. A person who is not a party to this Performance Bond shall have no right to enforce any of the terms of this Performance Bond.

13. In this Performance Bond:

13.1 the words and expressions have the same meanings as in the DPOF Agreement and we shall be deemed to have full knowledge of the terms and conditions of the DPOF Agreement;

13.2 "person" includes any firm and any entity having legal capacity; and

13.3 the definitions given in the recitals apply to the rest of this Performance Bond:

IN WITNESS WHEREOF

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899944_0291

This is Schedule 15 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 15

Panels for the Dispute Resolution Procedure

ENGINEERING / OPERATIONAL	FINANCIAL	LEGAL
Alan Wilson [redacted] DERBYSHIRE [redacted]	**Nigel Lowe** Nigel Lowe Consulting Limited 27 Old Gloucester Street LONDON WC1N 3XX	**Gordon Reid, QC** [redacted] FIFE [redacted]
Peter Chapman [redacted] OXSHOTT SURREY [redacted]	**John Hunter** Hunter Consulting Commercial Centre Stirling Enterprise Park STIRLING FK7 7BF	**Robert Howie, QC** [redacted] EDINBURGH [redacted]
Tony Canham [redacted] Thorpe St Andrew NORWICH [redacted]	**Bryan Porter** [redacted] GLASGOW [redacted]	**Gordon Coutts, QC** [redacted] EDINBURGH [redacted]
Guy Cottam [redacted] BATH [redacted]	**Eric Mouzer** [redacted] Edgebaston BIRMINGHAM [redacted]	**Lord Dervaird (Prof. John Murray QC)** [redacted] EDINBURGH [redacted]

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899944_0292

This is Schedule 16 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 16

SCHEDULE NOT USED

[redacted]

Director/Authorised Signatory
tie Limited

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Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899944_0293

This is Schedule 17 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 17

Setting of Fixed Costs

Part A - Setting of Category Three Fixed Costs during Project Phase C1 and setting of the salaries of drivers at reset

In setting the Category Three Fixed Costs in respect of drivers' salaries to an external market value and resetting drivers' salaries pursuant to Clause 21 (*Reset of the Fixed Costs, Target Operating Costs and the Target Patronage)* of the Operating Appendix. to an external market value, the salaries of the following staff will be pegged to that of the drivers' salary, in the same ratios as in the Operator Financial Model. For ease of reference these ratios are shown below:

Role	Salary Ratio
Duty Managers	141.2%
Operations Supervisor	105.9%
Drivers	100.0%
Customer Service	100.0%
Temporary Customer Service	95.0%
Operations Assistant	82.4%
Inspectors	82.4%

The total drivers' cost is obtained by multiplying the number of drivers by the individual driver's rate.

The salary figures in the Operator Financial Model are derived from a predicted salary plus:

- 10% for overtime and bonus, notionally 5% for each;
- 10.8% for national insurance; and
- 6% stakeholder Pension in respect of a non-contributory employee pension, assumes 100% take up of pension rights.

The Operator confirms that the number of drivers can be regarded as a fixed cost affected only by changes in service definition as defined in the paper "Tram Drivers 20Feb04".

The individual driver's rate as quoted in the Operator's bid will be set and reset using the process set out below.

Such a review is necessary to ensure that drivers' rates correctly reflect the contemporary labour market in Edinburgh so that sufficient staff are recruited for the start of passenger service.

The drivers' target salary will be set using the following process.. It will take place during Project Phase C1, and will be completed three and one half Reporting Periods before the start of Project Phase C2, when the first member of staff whose target salary will be set by this process starts work.

This process shall be conducted by **tie** and the Operator, taking into consideration the following elements:

1. the unemployment rate in Edinburgh

2. bus driver rates from local companies such as Lothian Bus and First Edinburgh.

3. Rates of similar jobs (e.g. delivery/distribution services) in Edinburgh

When considering the rates, this review will take into account the terms (hours, benefits, pension etc.) and working conditions attached to the staff positions.

This process shall then be repeated at each three yearly reset pursuant to Clause 21 *(Reset of the Fixed Costs, Target Operating Costs and the Target Patronage)* of the Operating Appendix.
For reference purposes, the following data may be referred to during the process:

Lothian bus drivers' rate as from 28/3/04, £330.74 per week.

First rate, £7.50 per hour.

Unemployment, May 2003, an extract from
http://www.parliament.uk/commons/lib/research/rp2003/rp03-055.pdf on 29 March 2004:

Parliamentary Constituency	Party	Claimants			Rate		
		Male	Female	All	Male	Female	All
Edinburgh Central	LAB	1,117	339	1,456	4.1%	1.5%	3.0%
Edinburgh East & Musselburgh	LAB	953	251	1,204	4.3%	1.4%	3.0%
Edinburgh North & Leith	LAB	1,357	384	1,741	6.0%	2.1%	4.3%
Edinburgh Pentlands	LAB	880	290	1,170	3.8%	1.6%	2.9%
Edinburgh South	LAB	700	223	923	3.5%	1.3%	2.5%
Edinburgh West	LD	771	221	992	3.5%	1.3%	2.5%

At the end of Project Phase C2, a review as to the level of take up on pension rights will be undertaken. The assumed 100% take up level will be adjusted to the actual percentage take up level at the commencement of Project Phase D.

Part B Setting of Number of Drivers, Inspectors and Insurances

The costings for "Number of Drivers", "Number of Inspectors" and " Insurances" will be reviewed and finally set before the start of Project Phase C2 prior to Service Commencement of the first Phase to become operational. In respect of the "Number of Drivers" and the "Number of Inspectors", the setting of Costs will be based on actual rosters derived from the tram schedule.

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899944_0295

TIE00899944_0296

This is Schedule 18 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 18

Base Case Assumptions

Contents:

1. Introduction
2. Cost Categorisation
3. General Assumptions
4. Operating Costs, Project Phases C2 and D
5. Staff, Project Phases A to D

1. Introduction

The Base Case Assumptions (BCAs) are predicated on the cost categorisation as outlined below. References to Line 1, Line 2 and the Network refer to the scope of the Project as at the Effective Date.

These BCAs assume that the System will be operated from one Depot.

2. Cost Categorisation

Cost Category	
1	Fixed at Effective Date
2	Fixed at end of Project Phase B (unit cost fixed at Effective Date)
3	Fixed before the end of Project Phase C1, as set out in Schedule 17 *(Setting of Fixed Costs)*
4	Fixed before the end of Project Phase C2, as set out in Schedule 17 *(Setting of Fixed Costs)*
5	Fixed at Effective Date and not reset
6	Target Operating Cost and/or Target Cost for Project Phase C2
7	tie "discretionary" items not fixed and not subject to pain/gain share, will be instructed as a tie Change if such items are required by tie.
8	During Project Phases A-C1, Non Core Staff Fixed Rates, called off basis at tie's discretion.
9	During Project Phases A-C1, Core Staff Fixed Rates.

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3. General Assumptions

Item	Model reference	Comments	Scope Clarification	Cost Category	Base Case Assumptions
Driver Training					All training of drivers (and training of driver trainers) shall be assumed to be carried out within the UK.
Project Phase A	Other Inputs, row 28				In accordance with the Project Programme.
Project Phase B	Other Inputs, row 29				In accordance with the Project Programme.
Project Phase C1	Other Inputs, row 30				In accordance with the Project Programme.
Project Phase C2	Other Inputs, row 31	Some costs associated with setting up the Project Operations are within Project Phase C1 in the Operator Financial Model. This includes part of General Manager, Operations Manager, Safety and Standards Manager and Assistant			In accordance with the Project Programme
Project Phase D	Other Inputs, row 32				In accordance with the Project Programme, ends on 16/05/2019
Programme and date adjustments					Dates and durations in these Base Case Assumptions will be amended by written agreement with tie.

TIE00899944_0298

Item	Model reference	Comments	Scope Clarification	Cost Category	Base Case Assumptions
Provision of staff during Project Phases A, B, C1 and C2 (insofar as staff time is spent on development work)					The Operator will make available and tie will pay for staff as shown in the Base Case Assumptions for each cost line where appropriate in accordance with the terms of this Agreement. **tie** will be invoiced for the number of half days worked by the staff concerned. This will be based on a pragmatic approach, with the time charged rounded to the nearest half day. The Operator Financial Model was developed on the basis on 7 hour days, but the Operator's Core Team will be working for similar durations to the rest of **tie**'s team. This is because the Operator's Core Team must be an integral part of **tie**'s team. It is expected that the average working day will be longer that 7 hours, and this average longer day would be charged as a whole day, not as a 7 hour day plus additional time.
RPIX	Other Inputs, row 252				Currently assumed to be 2.50%
KPI regime	n/a				The staffing assumptions within this document and in the associated Operator Financial Model support the KPI regime as envisaged and discussed with tie.

TIE00899944_0299

Item	Model reference	Comments	Scope Clarification	Cost Category	Base Case Assumptions
Costs		These have been built up from the following sources: 1 Actual emerging costs on Sheffield Supertram, Manchester Metrolink and Nottingham Express Transit Systems, 2 Operational costs on other tram systems operated by the Operator, and 3 The specific environment in Edinburgh			N/a
Staff rates	Tables 1 & 2, column Entitled "At cost Rate £/day"	These are shown within the Operator Financial Model on a daily rate basis for Project Phases A to C1 inclusive.			n/a
Project Return	Other Inputs, D65				Project Phases A to C1 is 20% C2 and D 6.7%.
Retention	Other Inputs, E50				10%
Office Accommodation	Other Inputs, row 100			N/A	During Project Phases A to C1, tie will provide office space. At the start of Project Phase C2, accommodation for all staff will be ready and available in the Depot.

TIE00899944_0300

Item	Model reference	Comments	Scope Clarification	Cost Category	Base Case Assumptions
Management Fees	other inputs, row 86			5	Project Phase A to C1, £10k/yr Project Phase C2, £80k/yr Project Phase D, £60k/yr
Performance Bond	other inputs, row 128			1	Project Phase C2 & D bond level set at £10.0 Million un-indexed , cost of the bond is 1% per annum of bonded amount
Employer Liability Insurance	other inputs, row 168			1	
Public Liability Insurance	other inputs, row 179			1	Excludes Public Liability for the System and its operation. In Project Phase D, no Public Liability Insurance premium is costed in Operator Financial Model, but deductible claims are included.

TIE00899944_0301

Item	Model reference	Comments	Scope Clarification	Cost Category	Base Case Assumptions
Public Liability Insurance - Costs of Claims and Deductibles	Semi calcs Row 103-104			6	An allowance has been made for the cost of claims and deductibles based on the Required Insurances as set out in Schedule 10. Road Traffic Accidents Average claim £2,500 Claims per month: Line 1, 3, Line 2, 2, Network, 4. Claim success rate, 40% Personal Injuries: Average claim £1,250 Claim rate per million passenger journeys, 1.5 Claim success rate, 40% The number of personal injury claims is calculated as = passenger revenue / average fare * claim rate Note that the average fare has been assumed as Line 1 = £0.93, Line 2 = £1.20 and the Network is to be agreed
Professional Indemnity Insurance	other inputs, row 174			1	
Bank Charges	other inputs, row 208			4	. A fixed price for banking services has been included.

TIE00899944_0302

Item	Model reference	Comments	Scope Clarification	Cost Category	Base Case Assumptions
Tools and equipment					It is assumed that others will provide a full initial supply of such items as points bars and keys that will be needed by the Operator's operations staff to access and operate defective equipment.
Maintenance response					The Operator's bid is on the basis that a third party will provide a timely and effective maintenance response, so the Operator does not need any tools.
Tram related items					The Operator assumes that all tram related items that may be considered as consumables such as screen wash, lubricants, OTMR memory cards, fire extinguishers, tyres and pantograph carbons are provided as part of the Infrastructure Provider Maintenance at no cost to the Operator.
Purchase of capital items					tie/Infrastructure Provider purchase all capital items that are not specifically identified in these assumptions

TIE00899944_0303

4. Operating Costs, C2 and D

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Travel, Hotels, etc.	97		Includes corporate hospitality and sundry minor expenses for visits to the Edinburgh system by others. Senior managers' expenses are included in their rates.	1	
External Training & Welfare	98		Includes First Aid, "Train the Trainer" and other staff development training courses, procured externally. Also includes miscellaneous welfare expenditure.	1	
Cash collecting & counting	99		TEL to undertake.	4	
Office machinery rentals	100			1	Telephone and IT system provided by the Infrastructure Provider free of charge Lease of two photocopiers, fax, and other sundry office equipment.
Consumables & subscriptions	101			1	Stationery, postage, etc and necessary industry periodicals Includes the ongoing replacement of keys etc.

TIE00899944_0304

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Health, Safety & Environmental costs	102			1	, external audit fees and other registration fees.
Legal Advice	103	£5k/yr pro-rata increased for the revised number of staff.	Employment matters, advice on byelaw issues, Competition Act and general ongoing legal issues.	1	Excludes legal advice on revenue recovery.
Telephone expenses	104	Actual emerging BT telephone costs at NET are about £3000 per month, plus £400 per month for 13 mobile telephones, say £3400 per month overall. These bills include the infrastructure maintenance function at NET, and are during a period of high activity leading up to opening. The steady state costs are likely to be less in the long term due to future competitive sourcing of telephony and less intense use of the telephone once the System is open. Translating this to the steady state operation of the Network in Edinburgh with a larger operation, but no infrastructure maintenance justifies the prices in the Operator Financial Model as being the same as for NTC now. Pro-rata increased for the revised number of staff.		1	Includes provision of mobile telephones and call charges for senior and on call staff.

TIE00899944_0305

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Finance support	106			1	Includes external senior finance advice and audit fees. Includes payroll administration, outsourced
Uniforms	107			2	Cost per person is fixed at £250 per uniformed employee per year. A total of 14 staff are not uniformed for the Network.
Recruitment	109		Recruitment advertisements in local and/or national press and other recruitment activities such as open days etc.	1	
Medical examinations	110		Initial and ongoing employment medicals, plus costs of administering random drink/drug tests	1	
Ticket Stock	111		The actual number of tickets needed obviously varies with the number of passengers and the type of tickets used. TEL to provide ticket stock	1	Assumes paper and card tickets only. 26m in length/roll 70mm wide paper 10,000 rolls = £6750 with security single colour printing 10 cm average length per ticket. 1 roll gives 26000/100 = 260 tickets 10,000 rolls is 2,600,000 tickets £9k will provide 3.45 million tickets per year. Excludes smartcards and magnetic stripe tickets.
Substitute Buses	112			6	

TIE00899944_0306

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Passenger information (Timetables etc.)	113		TEL to provide.	7	If required, will be instructed as a tie Change. Timetables at tramstops plus printed timetables issued at help points Pocket Timetables: 170,000 timetable leaflets at £12k for the batch, 2 batches per year= £24k for the Network. Tramstop information for the Network: One size A0 timetable poster plus 2 A3 inserts or equivalent per platform every 6 months. Assume 36 tramstops, 72 platforms, so 144 sets per year at £65 per poster is £9k per year. One other identical A1 poster every 3 months at each tramstop is 4*36=144 posters per year. At £250 for each print run, the annual cost is £1k. For the tramstops this is £10k per year. For tramstops and timetables, this is £34k per year overall.
Advertising & Marketing Costs	114		TEL will undertake.	7	If required, will be instructed as a tie Change. Covers costs of advertising and marketing the System. Also includes the costs of compensating customers as a result of customer complaints

TIE00899944_0307

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Launch Costs	115		TEL will undertake.	7	If required, will be instructed as a tie Change. This is equivalent to a one off cost of £100k in C2 only
Market Research	116		TEL will undertake.	7	If required, will be instructed as a tie Change. Excludes revenue apportionment surveys
Training materials	117		Includes classroom consumable equipment, training videos where needed (e.g. driver's view of the route)	1	
Audit & Investors in People	118			1	Includes non-financial external audits and IIP award and ongoing fees
Performance Monitoring Surveys	119		TEL will undertake.	1	All official externally provided performance monitoring surveys are carried out by tie. Duty managers carry out internal audits of performance, and will "shadow" tie's surveys where appropriate. Excludes revenue apportionment surveys. Small amount included to enable some independent surveys to be carried by the Operator.
Road vehicle costs 1	126			1	One additional vehicle if two Depots. Vehicles are costed at £7.25kpa each.

TIE00899944_0308

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Maintenance IT system support	128			1	Ongoing enhancements and changes to the office computer network. Office computer system, some 30 PCs plus software (Microsoft Office Professional or equivalent & Anti virus), cabling, internet access, configuration and printers is part of scope of the Infrastructure Provider. Maintenance and ongoing renewal of this is included in the Infrastructure Provider's scope. Provision of accounting, tram crew scheduling (see "One-off purchase of software") and maintenance management software is provided by the Operator.
Other Power & Gas	130	Emerging gas bills at NET are about £4k for 3 months to 12 Dec 03. The following 3 months are likely to be more, say £6k due to colder weather. Annual costs are likely to be about £15k.		1	Supply of gas to the Depot, assumed used to provide heating Excludes all electricity.

TIE00899944_0309

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Water & Sewerage	131	Emerging costs are not available for NET as yet. Metrolink annual water costs were £10k in 1996. Adjusting for inflation, this is about £12k in 2003, also for 26 trams. This is the same as for the Network.		2	Varies linearly with fleet size: Line 1, 14 trams Line 2, 12 trams Network, 26 trams Scaled according to fleet size. Charges associated with the Depot. Includes disposal of tram wash effluent.
Tram cleaning	147		Tram Cleaning: Network: Based on outsourcing. The price is for a Manager plus 2 team leaders plus 4 operatives. This gives 3 people on duty each night (plus the manager). Lines 1 and 2 reduced prorata by fleet size.	2	Varies linearly with fleet size: Line 1, 14 trams Line 2, 12 trams Network, 26 trams Scaled according to fleet size. This provides nightly, monthly and 6 monthly tram cleans, including nose end cleaning. Assumes that tram drivers drive trams through wash.

TIE00899944_0310

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Tramstop and infrastructure cleaning	148			1	Includes litter picking from trams. For Line 1: Team leader £15k plus 3 Cleaners at £10k each gives staff costs of £45k. Plus van £5k, plus materials £5k gives total of £55k This gives cover of one person on duty for most of the operational time. Line 2: As for line 1, but one less cleaner to reflect smaller workload Network: Team leader £15k plus 6 Cleaners at £10k each gives staff costs of £75k. Plus van £5k, plus materials £10k gives total of £90k Pro-rata for number of tram stops. This gives cover of one person on duty for most of the operational time Assumes that Tramstops are similar to NET in size, layout and equipment content

TIE00899944_0311

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Provision of helpdesk	149		TEL to undertake.	7	If required, will be instructed as a **tie** Change. Varies with the number of help desk locations provided. We assume that 5 will be provided for the network; costs will vary with the number of help desk locations provided, and the eventual prices quoted by Lothian Buses plc and First Scotland East Limited.
Accidental Damage --> standard	150			6	Varies linearly with fleet size: Line 1, 14 trams. Line 2, 12 trams. Network, 26 trams Pro-rata on fleet size. Assumes a System that is similar to STAG.
Accidental Damage --> risk element	151			6	Varies linearly with fleet size: Line 1, 14 trams. Line 2, 12 trams. Pro-rata on fleet size. Network, 26 trams. Assumes a System that is similar to STAG.

TIE00899944_0312

Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Vandal Damage --> standard	153			6	Varies linearly with fleet size: Line 1, 14 trams. Line 2, 12 trams. Network, 26 trams. Pro-rata on fleet size. Assumes a System that is similar to STAG.
Vandal Damage --> risk element	154			6	Varies linearly with fleet size:Line 1, 14 trams. Line 2, 12 trams. Network, 26 trams Pro-rata on fleet size. Assumes a System that is similar to STAG.
Graffiti Damage --> standard	156			6	Varies linearly with fleet size: Line 1, 14 trams. Line 2, 12 trams. Network, 26 trams. Pro-rata on fleet size. Assumes a System that is similar to STAG.

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Cost Item	Row number	Comments	scope clarification	Cost Category	Base Case Assumptions
Graffiti Damage --> risk element	157			6	Varies linearly with fleet size: Line 1, 14 trams. Line 2, 12 trams. Network, 26 trams Assumes a System that is similar to STAG.
One-off purchase of software	159	Equivalent to a one off cost of £10k	Tram scheduling and driver rostering package	1	Assumes tie have commissioned the System Operational Model during Project Phase B upon which the scheduling and rostering package will be based.See paragraphs 16.3.6, 16.5 and 16.6 of the Project Development Output Specification.
Miscellaneous costs	161			1	These are other costs not covered elsewhere, and sand is included. Sand is based on £30/Tonne at the local quarry, £200 per 20 Tonne delivery, giving delivered to site cost of £40/Tonne. Usage rate of 7 Tonne per tram per year. Fleet size of 26 trams This is £40*7*26= £7820/yr for the Network.

TIE00899944_0314

5. Staff, Project Phases A to D

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
Salaries									The salary figures in the Operator Financial Model are derived from a predicted salary plus: 10% for overtime and bonus, notionally 5% for each. 10.8% for national insurance 6% in respect of a non-contributory employee pension, assumes 100% take up of pension rights. A 10% contingency / expenses has already been included in relation to staff whose salaries are not subject to the mechanism as set out in Schedule 17 *(Setting of Fixed Costs)*.
	Project Director	17 May 2004	End of Oct 05	Core	(See BCA)	n/a		9	Full time (billed to tie at 4 days per week) from 17 May 04 to 31 August 04, 2 days per week September 04, 2 days per month October 04 until end of October 05.

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Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	General Manager	17 May 2004	End of Project Phase D	Core	(See BCA)	n/a		9 during Project Phases A to C1 1 during Project Phases C2 and D	2 days per week May 04, 2 days per week June, 2 days per week July, 3 days per week August, 4 days per week September 04 onwards to end of Project Phase C1
Jim Harries	Technical Engineer	17 May 2004	End of Project Phase C1	Core	(See BCA)	n/a		9	3.5 days/wk, then 4 days/wk from Nov 06
	Senior Commercial Manager	Start of July 2004	End Project Phase C1	Core	(See BCA)	n/a		9	approx 1 day/week July 4 to Dec 04, about 2 days/wk Jan 05 to Oct 05, about 2 days/month Nov 05 to end of Project Phase C1

TIE00899944_0316

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Secretary/ Assistant	17 May 2004	End of Project Phase D	Core	Yes	60		9 during Project Phases A to C1 1 during Project Phases C2 and D	
	Transportation Consultant	17 May 2004	End of Project Phase B	Non Core	(See BCA)	n/a	Patronage/revenue forecasting validation.	8	Project Phase A, 30 days Project Phase B, 20 days Project Phase C1, zero
	Network Rail Expert	see comments	End of Project Phase A	Non Core	(See BCA)	n/a		8	Project Phase A, 5 days per week for 26 weeks
Daniel Daman	Public Consultation Assistance	N/A	End of Project Phase A	Non Core	(See BCA)	n/a		8	40 days in Project Phase A only
Christian Buisson (Project Phase A only)	Transamo Director	N/A	End of Project Phase C1	Non Core	(See BCA)	n/a		8	5 days in Project Phase A. From Project Phase B onwards, named person TBC Project Phase B 4 days Project Phase C1 5 days/yr = 16.25 days

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Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Operations Manager	Nov 05	End of Project Phase D	Core	Yes	18		9 during Project Phases B to C1 1 during Project Phases C2 and D	227 days/yr
	Engineering Manager	Nov 05	End of Project Phase D	Core	Yes	31		9 during Project Phases B to C1 1 during Project Phases C2 and D	227 days/yr
	Safety & Standards Manager	Nov 06	End of Project Phase D	Core	Yes	34		9 during Project Phase C1 1 during Project Phases C2 and D	227 days/yr

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Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Legal Adviser	start of Project Phase A	End of Project Phase D	Non Core	(See BCA)	n/a		8	Continuing legal support for e.g. OFT submissions. Project Phase A, 7 days Project Phase B, 3 days Project Phase C1, 10 days For Project Phase C2, see "Operating Expenses, Project Phases C2 and D"
	Financial Modelling consultant	Start of Project Phase A	End of Project Phase C1	NonCore	(See BCA)	n/a	Further iterations of the Operator Financial Model will need to be undertaken.	8	Fee to be agreed with tie. Based on about 3 days per remodelling and 2 remodelling per year.
	Technical Support Engineer	Aug 04	End of April 06	Core	(See BCA)	n/a		9	4 days/wk until end Oct 05, then 2 days/week Support for Technical Engineer in detail design review, testing and commissioning programmes, including documentation and control.
	Test Engineers 1 and 2	Dec 07 and Aug 08	In Project Phase C2 as Operator Financial Model	Core	(See BCA)	21		9 during Project Phase C1 1 during Project Phase C2	Additionally, in Operator Financial Model, table 3A, 2 months of Test Engineer is included.
	Operations Assistant	3 months prior to Project Phase C2	End of Project Phase D	Core	Yes	27		3	

TIE00899944_0319

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Finance Manager	12 months prior to Project Phase C2	End of Project Phase D	Core	Yes	49		9 during Project Phases C1 1 during Project Phases C2 and D	
	Accounts Assistants 1 and 2	10 months prior to Project Phase C2	End of Project Phase D	Core	Yes	50		9 during Project Phase C1 1 during Project Phases C2 and D	
	Commercial Manager	Start of Project Phase C2	End of Project Phase D	Core	Yes	19		1	Deleted
	Duty Managers	Start of Project Phase C2	End of Project Phase D	Core	Yes	25		3	Provide 24/7 cover in the Control Centre, plus mobile incident response, security response (also provided by customer service staff), supervision and audit on the System. During pre-operations, provide driver and other operations training Assumes one Control Centre for the System, even if there is more than one Depot

TIE00899944_0320

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Operations Supervisors	Start of Project Phase C2	End of Project Phase D	Core	Yes	26		3	Provide 24/7 cover in the Control Centre to support duty manager in customer information (PA, cctv, help point response, routine radio contact with trams and booking staff on and off duty.) During pre-operations, provide driver and other operations training Assumes there is only one control room for the System, even if there is more than one Depot. If there is a second Depot, then an additional 6 people are needed to provide supervision at the second Depot
	Drivers	6 months before start of Project Phase D	End of Project Phase D	Core	Yes	29		3	As set out in the paper "Tram Drivers 20Feb04". (See Parts D and E of this Schedule) The start date assumption is for financial modelling purposes. In practice, the employment of drivers will be progressive, and will be a function of the system delivery, commissioning and completion programme. This is still to be defined. The recruitment profile may support the Infrastructure Provider's need for tram drivers, but this will need to be reviewed once the degree of testing required is established and the detailed commissioning programme can be considered.

TIE00899944_0321

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
									Determination of tram drivers' salaries in the Operator Financial Model Lothian bus driver rate on 28 March 2004 was £330.74 per week, thus £17,246 pa. RPIX for March 2004 was 182.5, and March 2003 was 178.7 Lothian bus driver rate adjusted by RPIX to 1 April 2003 prices is £17,246*178.7/182.5=£16,887 This gives the salary for drivers as Base salary £16887 Bonus/overtime 10% £1689 NI + pension 21% £3546 Total annual cost £22121 This cost is factored according to the ratios set out in Schedule 17 *(Setting of Fixed Costs)* to determine the costs for the other staff who are in Cost Category 3.

TIE00899944_0322

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Assistant Engineering Manager	Project Phase C2	End of Project Phase D	Core	Yes	32 & 35		1	
	Infrastructure Engineer	Project Phase C2	End of Project Phase D	Core	Yes	33 & 37		1	Deleted
	Performance Analyst	Project Phase C2	End of Project Phase D	Core	Yes	41 & 42		1	Manages performance regime deductions primarily with the Infrastructure Provider, where the Operator expects that the allocation of responsibility for performance failures between the Operator and the Infrastructure Provider will require a full time resource.
	Storeman	Project Phase C2	End of Project Phase D	Core	Yes	43		1	
	HR Manager	Project Phase C2	End of Project Phase D	Core	Yes	45	To support the management team	1	
	Marketing Manager	3 months after start of Project Phase C2	End of Project Phase D	Core	Yes	54		1	Deleted
	Admin. Staff	3 months after start of Project Phase C2	End of Project Phase D	Core	Yes	61	General admin and office support for the whole	1	

TIE00899944_0323

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Customer Service	1 month prior to Project Phase D	End of Project Phase D	Core	Yes	72		3	Deleted and replaced with Inspectors
	Temporary Customer service	1 month prior to start of Project Phase D	6 months after start of Project Phase D	Core	Temporary fulltime	55		3	Full details of the assumptions are set out in the document "Revenue Protection 23 Feb 04". (See Parts B and C of this Schedule). Cost varies directly with the number of staff and the duration, at **tie**'s discretion. The salary will be 5% below the drivers' salary. 20 temporary customer services staff for 6 months at start of Project Phase D, for the Network, or 10 for either Line. 1 month to train them at end of C2 In addition to the full time customer services staff, additional staff will be deployed during the first 6 months after opening. The costs of this temporary resource are included in the Operator Financial Model for Project Phase C2, table 3A.

Name	Role	Start Date	End Date	Core ?	Full Time	Row Number	scope clarification	Cost Category	Base Case Assumptions
	Temporary Customer service (continued)								Note that the costs associated with their employment in Project Phase D are shown in Project Phase C2. This is due to the difficulties in modeling a staff resource that changes during Project Phase D. The costs are correct, but the allocation between Project Phases and the timing is not.
	Security Staff (cash Collection only)	1 month before Project Phase D	End of Project Phase D	Core		73	To collect cash from ticket machines and bring it to the Depot for counting, then to deliver the cash to the bank.	4	TEL will undertake.
	Cashiers	1 months before Project Phase D	End of Project Phase D	Core		74		4	TEL will undertake.
	Debt Recovery Staff	3 months after start of Project Phase C2	End of Project Phase D	Core		62	These people support the customer service staff and operate the debt recovery process up to and including prosecutions	1	TEL will undertake.
	Inspector Supervisor	Start of Project Phase C2	End of Project Phase D	Core		75	To manage the Inspectors and minimise lost revenue.	1	

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Part D Tram Drivers

Base Calculation	Nottingham	Edinburgh (P.1a)	Edinburgh (Net)	
Service Hours				
Tram Hours / week	1176	2200	2950	
Number of weeks / year affected	52	52	52	
Tram Hours / year	61148.53	114400	153400	
Rostering Efficiency (%)	80	82.5	85	
Crew per tram	1	1	1	
Tram Crew rostered hours required for Tram Hours	76436	138667	180471	
Working Week (Hours)	39	39	39	
Average Working Day (Hours)	7.8	7.8	7.8	
Initial Training Duration (Days)	35	35	35	
Average Employment (Years)	5	5	5	
Initial Driver Training Days per year	7	7	7	
Days expected Sick (days / year)	12	12	12	
Refresher Training days per person per year	2	2	2	
Days Annual Leave (days / year)	33	33	33	(25 + 8 days bank holiday, worked)
Rosterable Hours per tram crew (Hours / year)	1607	1607	1607	
Night Drivers (depot)	-	2	2	
Tram Crew Required	**48**	**88**	**114**	

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899944_0326

This is Schedule 19 referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 19

Additional Costing Assumptions

Non-staff costs will be assessed and treated in accordance with the Operator Financial Model.

Name	Role	Base Case Assumptions
	Project Director	50% additional time required for Line 3 et seq each.
	General Manager	System operates a fleet of no more than 50 Trams; thereafter job regrading and salary review required.
Jim Harries	Technical Engineer	System operates a fleet of no more than 50 Trams; thereafter additional time and/or additional technical support required.
	Senior Commercial Manager	System operates a fleet of no more than 50 Trams; thereafter additional time and/or additional technical support required.
	Secretary/ Assistant	System operates a fleet of no more than 50 Trams, at which point the cost of the role will need to be reviewed .
	Operations Manager	System operates a fleet of no more than 50 Trams, at which point the cost of the role will need to be reviewed
	Engineering Manager	The Infrastructure Provider will undertake this role.
	Safety & Standards Manager	System operates a fleet of no more than 50 Trams, at which point the cost of the role will need to be reviewed
	Legal Adviser	To be called off at tie's discretion. If Fleet size increases to more than 35 Trams, then costs increase linearly with fleet size above this point
	Financial Modelling consultant	Line 3 will require a complete re-run of model.
	Technical Support Engineer	A further Line will increase the input/cost by 50%.
	Operations Assistant	Fleet size not more than 35 Trams. At this point two people will be needed in this role up to 100 Trams
	Finance Manager	Fleet size not more than 50 Trams. Salary will then need to be reviewed
	Accounts Assistants 1 and 2	Fleet size not more than 35 Trams. At this point one additional person is needed for every 20 Trams in the fleet
	Commercial Manager	TEL will undertake this role.
	Duty Managers	These will operate a system of up to 50 Trams. More may be needed for an even larger fleet. Assumes one Control Centre for the System, even if there is more than one Depot

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Name	Role	Base Case Assumptions
	Operations Supervisors	Any Network Expansion will require up to an additional 5 people. These will operate a System of up to 50 Trams. More may be needed for an even larger fleet. Assumes there is only one Control Centre for the System, even if there is more than one Depot. If there is a second Depot, then an additional 6 people are needed to provide supervision at the second Depot
	Drivers	As calculated from the Hatus rostering.
	Vehicle Engineer	Will require an additional assistant and a salary increase of 10% if there are more than 35 Trams in the fleet.
	Infrastructure Engineer	Will require an additional assistant and a salary increase of 10% if the System is more than 10% longer than the Network.
	Performance Regime Manager	Fixed up to a fleet total of 50; thereafter, a clerical assistant will be needed.
	Storeman	Infrastructure Provider responsibility.
	Performance Manager	Fixed up to a fleet total of 50; thereafter, a clerical assistant will be needed.
	Clerk	Fixed up to a fleet total of 35, after which a further clerk will be required
	Marketing Manager	TEL to undertake.
	Admin. Staff	Additional post required for Line 3.
	Customer Service	Based on an Inspector for every tram in service.
	Temporary Customer service	TEL to undertake
	Security Staff (cash Collection only)	TEL to undertake
	Cashiers	TEL to undertake.
	Debt Recovery Staff	TEL to undertake.
	Revenue Protection Manager	Fixed up to fleet total of 50; thereafter regrading of job and/or additional assistance required.

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899944_0328

This is the Operating Appendix referred to in the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

APPENDIX 1

OPERATING APPENDIX RELATING TO THE EDINBURGH TRAM NETWORK

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PART I - PRELIMINARY MATTERS

1. DEFINITIONS AND INTERPRETATION

Terms and expressions defined in Schedule 1 *(Definitions and Interpretation)* of the Agreement will have the same meanings in this Appendix.

2. CONDITIONS PRECEDENT

2.1 The obligations of the Parties under this Appendix shall be conditional upon the occurrence of the Operating Effective Date, save for the provisions listed in Clauses 2.1.1 to 2.1.3 below which shall have effect as from the Effective Date:

2.1.1 the provisions of this part I (*Preliminary Matters*);

2.1.2 Clause 23 (*Performance and Financial Adjustments*), Clause 24 (*tie Changes*) Clause 25 (*Operator Changes*) and Clause 28 (*Transition on Termination or* Expiry) of this Appendix; and

2.1.3 Clause 8 (*Special Events*) of this Appendix, if applicable, pursuant to Clause 9 (*Special Events*) of the Agreement.

2.2 **tie** may by notice in writing to the Operator (without the consent of the Operator) waive satisfaction of some or all of the Operator Conditions Precedent.

2.3 On the date that each of the Operator Conditions Precedent (with the exception of any Operator Conditions Precedent that have been expressly waived by **tie** in writing) have in **tie**'s opinion been satisfied, **tie** shall notify the Operator of the same.

2.4 The Operator shall use its reasonable endeavours to satisfy or procure the satisfaction of the Operator Conditions Precedent prior to the date scheduled for the Operating Effective Date in the Project Programme.

2.5 Following notification by **tie** pursuant to Clause 2.3 of this Appendix, the Operator shall notify a date (being as soon as reasonably possible) when it intends to commence providing the Transport Services on the relevant Phase, such date to be subject to the approval of **tie**, such approval not to be unreasonably withheld or delayed.

3. SATISFACTION OF REQUIREMENTS FOR SERVICE COMMENCEMENT

3.1 The Operator shall give the **tie** Project Manager not less than 20 Business Days' notice of the date upon which the Operator considers that Service Commencement in respect of a Phase (or part of a Phase) can been achieved so that the tests to be undertaken in accordance with the **tie** Completion Requirements may be carried out.

3.2 The **tie** Project Manager shall be entitled to inspect the System in operation on the date or dates reasonably specified by the Operator in accordance with this Clause 3 *(Satisfaction of Requirements for Service Commencement)*, and to attend any of the tests to be carried out. The Operator shall procure that such of the Project Operations Staff and Project Development Staff as **tie** may reasonably request shall accompany the **tie** Project Manager on any such inspection.

3.3 The **tie** Project Manager shall, within 7 Business Days of any inspection made pursuant to Clause 3.2 above, notify the Operator of any outstanding matters (including the repetition of any of the tests which are required to be carried out and passed in accordance with the **tie** Completion Requirements) which must be attended to before Service Commencement can occur in respect of the relevant Phase (or part of such Phase) in accordance with this Appendix. The Operator shall attend to all such matters and shall, if necessary, give **tie** further notices in accordance with Clause 3.1 above (but dealing only with matters raised in **tie's** notification under this Clause 3.3) so that the procedures in Clauses 3.1 and 3.2 above and this Clause 3.3 are repeated as often as may be necessary to ensure that all outstanding matters in relation to the **tie** Completion Requirements are attended to.

3.4 **tie** shall, when it is satisfied that Service Commencement can occur in accordance with this Appendix, issue a Certificate of Service Commencement to that effect stating the date upon which Service Commencement can occur. To the extent that Service Commencement is to be in relation to part of a Phase, the Certificate of Service Commencement shall also specify details of the relevant part of such Phase.

3.5 Where the Certificate of Service Commencement is issued in relation to part of a Phase:

3.5.1 the provisions of this Appendix relating to Project Phase D (including Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime)* shall apply to that part of the Phase in respect of which the Certificate of Service Commencement has been issued; and

3.5.2 the provisions of the Agreement relating to Project Phase C2 shall continue to apply to the remaining part of such Phase.

3.6 Where it has been agreed between the Parties that Service Commencement and Full Service Commencement shall occur at the same time, the Certificate of Service Commencement shall be deemed to be also a Certificate of Full Service Commencement.

3.7 **tie** may issue the Certificate of Service Commencement, notwithstanding that there are Operator Snagging Matters. Where there are Operator Snagging Matters, **tie** shall, within 7 Business Days of the date of issue of the Certificate of Service Commencement, issue a Snagging Notice which shall specify the Operator Snagging Matters.

3.8 Following the issue of a Snagging Notice and in consultation with the **tie** Project Manager and in such manner as to cause as little disruption to the provision of the Transport Services by the Operator and to the use and enjoyment of the System and Transport Services by the public (and as little general inconvenience) as reasonably practicable, the Operator shall rectify or shall procure rectification of each Operator Snagging Matter within such time as is reasonably practicable after the service of the Snagging Notice.

3.9 The issue of the Certificate of Service Commencement shall in no way affect the obligations of the Operator under the Agreement.

3.10 For the avoidance of doubt, the issue of any Certificate of Service Commencement pursuant to Clause 3.4 above shall, save as may be expressly agreed otherwise (both Parties acting reasonably) be conditional upon **tie** being satisfied that all Necessary Consents in relation to the Project Operations for the relevant Phase have been obtained, are in full force and effect and are unconditional.

3.11 In the event that the Operator is dissatisfied with the decision of **tie**, the provisions of Clause 43 (*Dispute Resolution Procedure*) of the Agreement shall apply and pending resolution of the matter in accordance with Schedule 7 (*Dispute Resolution Procedure*) of the Agreement, the provisions of Clause 18 (*Payment during Project Phase C2*) of the Agreement shall continue to apply.

3.12 From the Service Commencement Date of the first Phase to become operational until the earlier of the Expiry Date or termination of this Agreement, **tie** shall provide all

electrical power to the System. The Operator shall assist **tie** in the procurement of contracts for the provision of such electrical power. Such contracts should offer value for money to **tie** and the Operator shall continue to assist **tie,** as required, to ensure that such contracts continue to offer value for money to **tie.**

3.13 Electrical Power Incentivisation Mechanism

3.13.1 For the first 13 Reporting Periods after Full Service Commencement, the Operator and **tie** shall monitor electricity usage across the System and electricity supply tariffs in order to agree an electricity usage forecast for the subsequent 13 Reporting Periods (the "**Electricity Usage Forecast**") and the seasonality profile. At the beginning of each subsequent 13 Reporting Periods a revised Electricity Usage Forecast using the agreed seasonality profile shall be agreed by the Operator and **tie.**

3.13.2 Any savings or additional costs arising above or below the difference between actual electricity usage and the Electricity Usage Forecast shall be shared equally between the Operator and **tie,** and a payment to/from the Operator shall be calculated using the average price per KWH over the 13 Reporting Periods.

3.13.3 In the event that the number of tram kilometres run to achieve the Timetable are permanently changed or Network Expansion occurs, then the incentivisation regime will be determined for the part year prior to such change or Network Expansion (as appropriate). A new Electricity Usage Forecast shall be agreed between the Operator and **tie** after 6 Reporting Periods of experience with the new Timetable using the immediately preceding agreed seasonality profile.

3.13.4 **tie** shall disclose information on the electricity consumption of the Edinburgh Tram Network (including seasonality rates) on an open book basis and in good faith.

4. SATISFACTION OF REQUIREMENTS FOR FULL SERVICE COMMENCEMENT

4.1 To the extent that the Parties have agreed that there will be a time interval between the Service Commencement Date and the Full Service Commencement Date in respect of a Phase, the following provisions of this Clause 4 *(Satisfaction of Requirements for Full Service Commencement)* will apply. Without limitation, such an interval may

occur where **tie** issues a Certificate of Service Commencement pursuant to Clause 3.4 above in relation to only part of a Phase.

4.2 The Operator shall give the **tie** Project Manager not less than 20 Business Days' notice of the date upon which the Operator considers that Full Service Commencement in respect of a Phase can been achieved so that the tests to be undertaken in accordance with the relevant **tie** Completion Requirements may be carried out.

4.3 The **tie** Project Manager shall be entitled to inspect the System in operation on the date or dates reasonably specified by the Operator in accordance with this Clause 4 *(Satisfaction of Requirements for Full Service Commencement)*, and to attend any of the tests to be carried out. The Operator shall procure that such of the Project Operations Staff and Project Development Staff as **tie** may reasonably request shall accompany the **tie** Project Manager on any such inspection.

4.4 The **tie** Project Manager shall, within 7 Business Days of any inspection made pursuant to Clause 4.3 above, notify the Operator of any outstanding matters (including the repetition of any of the tests which are required to be carried out and passed in accordance with the relevant **tie** Completion Requirements) which must be attended to before Full Service Commencement can be considered to have occurred in respect of the relevant Phase in accordance with this Appendix. The Operator shall attend to all such matters and shall, if necessary, give **tie** further notices in accordance with Clause 4.2 above (but dealing only with matters raised in **tie's** notification under this Clause 4.4) so that the procedures in Clauses 4.2 and 4.3 above and this Clause 4.4 are repeated as often as may be necessary to ensure that all outstanding matters in relation to the **tie** Completion Requirements are attended to.

4.5 **tie** shall, when it is satisfied that Full Service Commencement can occur in accordance with this Appendix, issue a Certificate of Full Service Commencement to that effect stating the date upon which Full Service Commencement can occur.

PART II: PROJECT OPERATIONS

5. THE TRANSPORT SERVICES

5.1 Throughout the Service Period in respect of each Phase, the Operator shall provide the Transport Services (and all other Project Operations):

5.1.1 in accordance with the Agreement;

5.1.2 in accordance with the Operating Method Statements;

5.1.3 in accordance with the Operating Output Specification;

5.1.4 in accordance with all applicable Law and Necessary Consents (and so as not to prejudice the renewal of any such Necessary Consents);

5.1.5 in compliance with the Environmental Statement.

5.2 To the extent that the Parties have agreed that there will be a time interval between the Service Commencement Date and the Full Service Commencement Date in respect of any Phase, the Parties acknowledge that the Operating Output Specification shall specify a reduced level of requirement in respect of that period, as compared with the period following the Full Service Commencement Date.

5.3 To avoid doubt, the obligations in Clauses 5.1.1, 5.1.2, 5.1.3, 5.1.4 and 5.1.5 above are independent obligations. For example:

5.3.1 the fact that the Operator has provided the Transport Services in accordance with the Operating Method Statements shall not be a defence to an allegation that the Operator has not satisfied the Operating Output Specification; and

5.3.2 the fact that the Operator has provided the Transport Services in accordance with the Operating Output Specification shall not be a defence to an allegation that the Operator has not satisfied the Operating Method Statements.

5.4 Without prejudice to Clauses 5.1 and 5.3 above, if it should be found that the Operating Method Statements do not fulfil the Operating Output Specification, the Operator shall amend the Operating Method Statements. Such amendment shall be made in accordance with Schedule 9 (*Review Procedure*) of the Agreement and shall ensure that the Operating Method Statements shall satisfy the Operating Output Specification.

5.5 The Operator may at any time submit to the tie Project Manager in accordance with Schedule 9 (*Review Procedure*) of the Agreement proposals for amendments to or substitution of the Operating Method Statements or any part of them. If tie makes no comment on such proposed amendment or substitution (on the grounds set out in Schedule 9 (*Review Procedure*) of the Agreement), then the Operating Method Statements as so amended or substituted shall be the Operating Method Statements for

the purposes of this Appendix, subject to any further amendment or substitution to which there has been no comment in accordance with Schedule 9 (*Review Procedure*) of the Agreement.

5.6 The Operator shall not be entitled to implement or procure the implementation of any amendment to the Operating Method Statements unless it is entitled to proceed with such implementation pursuant to Schedule 9 (*Review Procedure*) of the Agreement.

5.7 An amendment to or substitution for the Operating Method Statements pursuant to Clauses 5.4 or 5.5 above shall not be a **tie** Change and shall not entitle the Operator to:

5.7.1 any adjustment to the Target Operating Costs, Fixed Costs, Target Patronage or Profit Element; or

5.7.2 any relief from the performance of its obligations under the Agreement.

6. TRANSPORT SERVICES TIMETABLE

6.1 In accordance with the terms of the Project Development Output Specification, the Timetable shall be agreed between the Operator and the **tie** Project Manager not less than 60 Business Days (unless otherwise agreed in writing by **tie**) prior to the Planned Service Commencement Date in respect of a Phase.

6.2 Subject to Clause 8 (*Special Events*) of this Appendix, the Operator shall not be entitled to alter the Timetable unless:

6.2.1 any such alteration complies with the Operating Output Specification; and

6.2.2 the Operator provides a copy of the proposed alterations to the **tie** Project Manager for **tie's** approval at least 56 days (unless otherwise agreed in writing by **tie**) before the proposed alteration is to take effect.

6.3 The Operator shall not implement any Timetable for the provision of Transport Services on the System or alteration of any such Timetable without the prior written consent of the **tie** Project Manager.

7. PUBLICATION OF INFORMATION RELATING TO THE SYSTEM

The Operator shall comply with the requirements of the Public Liaison and Media Plan, including in relation to:

7.1 the display of information at Tramstops; and

7.2 the availability of paper copies of the Timetable.

8. SPECIAL EVENTS

8.1 Where at any time during the Term:

8.1.1 a Special Event is scheduled to take place which in the opinion of **tie** will, or may, affect the Project Operations, **tie** shall give notice in writing to the Operator of such Special Event;

8.1.2 an event is scheduled to take place which the Operator considers requires an amendment to the Project Operations (including, the Timetable), the Operator shall give notice in writing to **tie** of such event together with details of its proposed amendments to the Project Operations in accordance with Clause 8.2 or Clause 8.11 (as appropriate). To the extent that **tie** agrees that such event should give rise to an amendment to the Project Operations, such event shall be a Special Event for the purposes of this Clause 8 *(Special Events)*.

8.2 Any Special Event Notice given by either Party pursuant to Clause 8.1 above shall:

8.2.1 be given as far in advance as is reasonably practicable, but in any event at least one month prior to the date of commencement of the relevant Special Event unless such event is scheduled at shorter notice or is rescheduled or unscheduled;

8.2.2 set out the following details (whichever are relevant) in relation to Special Event:

8.2.2.1 the date(s), time(s) and duration of the event;

8.2.2.2 the route(s) of the event;

8.2.2.3 those parts of the System likely to be affected by the event and the likely effects;

8.2.2.4 any modifications or restrictions which the Party serving the Special Event Notice considers should be placed upon the Project Operations

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(including an amendment to the Timetable) and the relevant time periods for such restrictions; and

8.2.2.5 any requirement for an increase in the provision of the Transport Services before, during and/or after the period of Special Event;

8.3 The Operator shall, within two weeks after (i) the date of the Special Event Notice (if served by **tie**); or (ii) the date on which **tie** agrees that the event specified in a Special Event Notice served by the Operator is a Special Event, forward to **tie** a plan (**"Special Event Plan"**) in respect of the relevant Special Event which plan shall include the Operator's reasoned and detailed proposals in relation to:

8.3.1 any modifications to or restrictions to be placed upon the Project Operations (including the Timetable):

(a) in the period immediately prior to the commencement of the Special Event; and/or

(b) during the period of the Special Event; and/or

(c) in the period immediately following the end of the Special Event;

8.3.2 any required increase in the Project Operations (including the Timetable) during the periods listed in Clause 8.3.1 above;

8.3.3 any third party interests which may be adversely affected by the Special Event Plan and the involvement of the Emergency Services; and

8.3.4 the estimated costs arising out of the Special Event (the **"Special Event Estimate"**)

8.4 Following receipt by **tie** of the Special Event Plan, the Parties (acting reasonably) shall:

8.4.1 liaise fully and frequently with each other in order to agree any relevant arrangements in respect of the Special Event (including any amendments to the Timetable). Following such liaison, **tie** shall have the final authority to determine any modifications or restrictions in respect of the Project Operations (including the Timetable) as a result of the Special Event Plan; and

8.4.2 the Parties shall discuss and agree the Special Event Estimate. If the Special Event Estimate is expected to exceed £10,000 (Indexed) and it is practicable for the Operator to do so, **tie** may require the Operator to seek and evaluate competitive tenders. The Operator shall, as soon as reasonably practicable, and, in any event not more than 14 days after seeking any competitive tenders, update the Special Event Estimate accordingly.

8.5 The Operator, following consultation with **tie**, will undertake appropriate action to ensure public safety in respect of any Special Events which affect Project Operations. The Operator Project Manager will attend any Special Event planning meetings, comprising also members of organisations and representatives from the Emergency Services involved in planning for Special Events.

8.6 The Operator shall use all reasonable endeavours to:

8.6.1 mitigate any increase or maximise any saving in the Operating Costs likely to be incurred as a result of a Special Event; and

8.6.2 mitigate any reduction or maximise any increase to the Operating Revenues likely to be received as a result of a Special Event.

8.7 On no more than ten occasions in any calendar year during the Service Period, **tie** may give notice in writing to the Operator (**"tie Full Service Notice"**) requiring the Operator to provide a full peak period service (**"Full Service"**) for a Full Service Day over all or part of the System.

8.8 Any notice given by **tie** pursuant to Clause 8.7 above shall:

8.8.1 be given at least three months prior to the date of the relevant Full Service Day or less if practicable and agreed by the Parties;

8.8.2 set out the following details in relation to the relevant Full Service Day:

8.8.2.1 the date and the reason for the request;

8.8.2.2 whether **tie** requires Full Service over all or part of the System and (where relevant) the relevant parts of the System; and

8.8.2.3 any other modifications or restrictions which **tie** consider should be placed upon the Full Service for the duration of the Full Service Day.

8.9 **tie** may serve a **tie** Full Service Notice upon the Operator in respect of any Special Event, but subject always to the limitation in Clause 8.7 above concerning the number of occasions in any calendar year during the Service Period upon which **tie** may serve such notice.

8.10 In respect of any day in respect of which (i) **tie** and the Operator have agreed to amend the Timetable for the period before, during and/or after a Special Event, or (ii) **tie** has served a **tie** Full Service Notice upon the Operator the Operator shall publicise details of the relevant change to the Timetable in accordance with the Public Liaison and Media Plan.

8.11 Where at any time during the Services Period it is agreed by **tie** that the procedure for agreeing a Special Event set out in Clauses 8.2, 8.3 and 8.4 cannot be followed in accordance with the said Clauses, the Operator shall recommend to **tie** what steps need to be taken to facilitate such Special Event (including as far as reasonably practicable, the preparation of a Special Event Plan). The Operator shall also give a Special Event Estimate.

8.12 tie shall pay the actual costs of any agreed Special Event to the Operator in accordance with Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) to the Operating Appendix.

9. FARE SETTING, PARTICIPATION IN INTEGRATED TICKETING SCHEME AND DEVELOPMENT OF THE SERVICE INTEGRATION PLAN

9.1 The Initial Fares (including details of fares zones) shall be as developed during Project Phases A, B and C1. All increases in Fares during the Service Period shall be in accordance with the Fares structure developed during Project Phases A, B and C1 and the prevailing TEL Fares Policy.

9.2 The Operator shall comply with the TEL Fares Policy in relation to the Fares for the Transport Services. Any amendments to the TEL Fares Policy requiring a change to the Fares shall be a **tie** Change in accordance with Clause 24 (***tie** Changes)* of this Appendix.

9.3 **tie** shall establish a consultation process whereby the Operator shall be given reasonable opportunity, in advance of any amendments being made to the TEL Fares Policy, to comment upon any proposed amendments to the TEL Fares Policy and meet with **tie** and other key decision makers (if **tie** is able to arrange such meeting) to discuss any proposed amendments to the TEL Fares Policy.

9.4 The Operator shall comply with the Service Integration Plan in relation to an integrated ticketing scheme for the System.

9.5 The Operator shall be given reasonable opportunity, in advance of any amendments being made to the Service Integration Plan during Project Phase D, to comment upon any proposed amendments to the Service Integration Plan. **tie** shall meet with the Operator to discuss the development of the Service Integration Plan. **tie** shall use reasonable endeavours to procure that other key decision makers also meet with the Operator to discuss the development of the Service Integration Plan.

9.6 Any development or amendment to the Service Integration Plan requiring a change to the Project Operations shall be a **tie** Change in accordance with Clause 24 *(tie Changes)* of this Appendix.

9.7 The Operator shall in respect of the Transport Services only undertake the responsibilities of **tie** which are required under the Concessionary Travel Scheme (or any subsequent scheme) in respect of the Transport Services only in accordance with all terms and conditions which apply to such Scheme from time to time as practicably. The Parties acknowledge that the Target Patronage shall take account of any material adverse impact on the level of Patronage as a result of the Edinburgh Tram Network's participation in the Concessionary Travel Scheme, except to the extent that such material adverse impact is already mitigated under the terms and conditions of the Concessionary Travel Scheme.

9.8 The Operator shall ensure that persons entitled to travel at concessionary fares or at no cost under the Concessionary Travel Scheme are able to do so without inconvenience on the System at all times.

9.9 The Operator shall subject to Clause 9.11 of this Appendix and Clause 12.19 of the Agreement be responsible for the availability (and acceptable form and content) of any ticket type usage information necessary to permit calculation of reimbursement under the Concessionary Travel Scheme).

9.10 Any dispute between the Parties arising from or in connection with the Concessionary Travel Scheme shall be referred to the Dispute Resolution Procedure pursuant to Clause 43 (*Dispute Resolution Procedure*) of the Agreement, notwithstanding any provision to the contrary contained in the terms and conditions of the Concessionary Travel Scheme.

9.11 To the extent that the Operator provides any equipment and software (the "**Operator Equipment and Software**"), the Operator shall ensure that:

9.11.1 the Operator Equipment and Software are or will be Euro Compliant before the introduction of the single European currency in the United Kingdom and Project Operations will not be affected by the introduction of the single European currency in the United Kingdom;

9.11.2 the Operator's own internal systems and procedures are or will be Euro Compliant before the introduction of the single European currency in the United Kingdom and the continuity of supply of the Project Operations will not be affected by the introduction of the single European currency in the United Kingdom; and

9.11.3 the Operator Equipment and Software shall at all times throughout the Term be compliant with all Law applicable in relation to the Euro in the United Kingdom, including the rules on conversion, triangulation and rounding set out in EU Regulation Number 1103/97 and any subsequent or similar regulations or Laws.

9.12 For the purposes of Clause 9.11 above "**Euro Compliant**" means that (i) the introduction of the Euro within the United Kingdom or any part thereof shall not affect the performance or functionality of any relevant items nor cause such items to malfunction, end abruptly, provide invalid results or adversely affect business, and (ii) all currency reliant and currency related functions (including all calculations concerning financial data) of any relevant items to enable the introduction and operation of the Euro, and (iii) in particular (but without limitation) each and every relevant item shall, to the extent it performs or relies upon currency related functions (including all calculations concerning financial data):

9.12.1 be able to perform all such functions in both the national currency of the United Kingdom and in Euros;

9.12.2 during any transition phase applicable to the United Kingdom, be able to deal with the dual denominations of the Euro and national currency of the United Kingdom;

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9.12.3 recognise, accept, display and print all the Euro currency symbols and alphanumeric codes which may be adopted by any government and other European Union body in relation to the Euro;

9.12.4 incorporate protocols for dealing with rounding and currency conversion;

9.12.5 recognise data expressed in, and express any output data in, the national currency of the United Kingdom and the Euro; and

9.12.6 permit the input of data in Euros and display an outcome in Euros where such data, supporting **tie**'s normal business practices, operates in Euros and/or the national currency in the UK.

10. SYSTEM BYELAWS AND REGULATIONS UNDER THE PUBLIC PASSENGER VEHICLES ACT 1981

10.1 **tie** shall:

10.1.1 if it considers necessary for the regulation of conduct of passengers or lost property in respect of the System, give effect to such regulations made (or having effect as if made) under section 25 or 60(1)(k) of the Public Passenger Vehicles Act 1981 as it considers appropriate as if Trams were public service vehicles used in the provision of Local Services; and

10.1.2 subject to the confirmation of the Scottish Ministers (if required), if **tie** considers it necessary for the regulation of the use, or operation of, or travel on, the System or the maintenance of order on the System or on facilities provided in connection with the System, request CEC to make byelaws regulating such matters.

10.2 The Operator shall be responsible for the enforcement of all regulations and byelaws referred to in Clause 10.1 above including the prosecution of offences thereunder.

10.3 **tie** shall consult with the Operator when considering the matters referred to in Clause 10.1 above.

10.4 The Operator shall propose draft regulations and draft byelaws to **tie** as the Operator considers are necessary for the regulation of the use, or operation of, or travel on, the System or the maintenance of order on the System or on facilities provided in connection with the System,

11. OPERATION AND MAINTENANCE PROCEDURES

11.1 The Operator shall be responsible for Operator Maintenance and in relation to such maintenance, the Operator shall comply with the Operator Maintenance Plan.

11.2 The Infrastructure Provider shall be responsible for all Infrastructure Provider Maintenance. The Operator and **tie** agree to work in mutual cooperation to ensure that the Infrastructure Provider performs such maintenance in accordance with the terms of the relevant IDA with a view to ensuring that the System as a whole and each part of it are continuously available.

11.3 **tie** and the Operator may agree from time to time the extent to which the exercise of **tie**'s contractual rights under the IDA are delegated to the Operator.

11.4 The Operator shall work together with the Infrastructure Provider, both through the exercise of contractual rights delegated to the Operator pursuant to Clause 11.3 above and generally, with the intention that the Transport Services be delivered in accordance with the Operating Output Specification without interruption for maintenance purposes. Without limitation:

11.4.1 the Operator shall promptly notify the relevant Infrastructure Provider of any requirement for Infrastructure Provider Maintenance of which the Operator becomes aware; and

11.4.2 the Operator shall co-operate with the Infrastructure Provider in relation to the planning of Infrastructure Provider Maintenance .

11.5 If, at any time, it appears to the Operator likely that any planned maintenance to be carried out by the Operator or by any Infrastructure Provider will necessitate interruption to or restriction of the Transport Services on the System, the Operator shall:

11.5.1 notify **tie** not less than four weeks prior to such planned interruption to or restriction of the Transport Services if practicable, having regard to the Operator becoming aware of the same, and take all reasonable steps to notify passengers as soon as reasonably practicable in advance of the carrying out of such planned maintenance, of the nature of such work and the likely disruption to the Transport Services; and

11.5.2 take all steps which are reasonably practicable to minimise the adverse consequences of such work to passengers, such steps to include an alternative means of transportation being in service where the Transport Services will not be provided in accordance with the Operating Output Specification for a continuous period of 1 hour or more.

11.6 In the event of any unplanned maintenance or repair works to be carried out by the Operator or any Infrastructure Provider as a result of a system failure, breakdown or an emergency, the Operator shall:

11.6.1 notify **tie** as soon as possible of the nature of such work and the likely disruption to the Transport Services;

11.6.2 take all reasonable steps to notify passengers as soon as reasonably practicable of the nature of such work and the likely disruption to the Transport Services, and where possible such notification shall be in advance of the carrying out of such work; and

11.6.3 take all steps which are reasonably practicable to minimise the adverse consequences of such work to passengers. Where the Operator considers that such work will result in the Transport Services not being provided in accordance with the Operating Output Specification for a continuous period of 2 hours or more, such steps shall include an alternative means of transportation being in service as soon as reasonably practicable. For the purposes of this Clause 11.6.3, the Parties acknowledge that it will generally be reasonably practicable for the Operator to arrange for an alternative means of transportation to be in service within 90 minutes of becoming aware of the requirement for it.

12. SERVICE PERFORMANCE AND QUALITY MONITORING

12.1 The Operator shall comply with the provisions of the KPI Regime and the Performance Monitoring Regime and shall send such representatives as **tie** may reasonably require to a monthly performance meeting convened on notice by **tie** and such other meetings as **tie** may reasonably require from time to time to discuss the performance by the Operator of the Project Operations in accordance with the Agreement.

12.2 **tie** shall procure that throughout the Service Period a helpdesk (**"Helpdesk"**) accessible to the public and third parties in person at a central Edinburgh location and by use of a freephone or local call rate number, e-mail address and postal address (such number, e-mail address and postal address to be published by the Operator at each Tramstop and on each Tram) is provided. The Helpdesk shall accurately record all communications and calls made to it. **tie** shall procure that throughout the Service Period the Helpdesk or other appropriate facility is responsible for dealing with enquiries from the public with regard to lost property. The Operator shall deliver to the Helpdesk at a central Edinburgh location notified by **tie** such lost property from the Edinburgh Tram Network within 24 hours of discovery, tagged with where, when it was found and an estimated approximate item value.

Service Quality Report

12.3 The Operator shall submit a Service Quality Report to **tie** no later than three Business Days following the end of each Reporting Period. Such report shall contain the KPI Monitoring Report referred to at paragraph 8 of Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) to this Appendix and, in a form to be agreed with the **tie** Project Manager, data showing consolidated Actual Tram Patronage (boarders) and Operating Costs. For the avoidance of doubt, **tie** shall not be obliged to process any invoice submitted by the Operator during Phase D in the absence of the Service Quality Report pertaining to the relevant Reporting Period. The Operator shall (subject to Clause 9.11 of this Operating Appendix and Clause 12.19 of the Agreement) be responsible for ensuring that the data contained in the Service Quality Report is generated automatically and, to the extent practicable, electronically.

12.4 In addition to the Service Quality Reports to be submitted by the Operator pursuant to Clause 12.3 above, the Operator shall prepare and submit to **tie** an Annual Service Report on or about 31 March in each year during the Service Period in accordance with Clause 16.5 of this Appendix.

PART III: GENERAL OBLIGATIONS

13. GENERAL STANDARDS

13.1 The Operator shall (each as a distinct and separate obligation):

13.1.1 perform the Transport Services and the Project Operations:

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13.1.1.1 in accordance with the requirements of Clause 5 (*The Transport Services*) of this Appendix

13.1.1.2 in accordance with Good Industry Practice from time to time with regard to the activity concerned;

13.1.1.3 in such manner so as not wilfully to detract from the image and reputation of tie and/or CEC;

13.1.1.4 in a manner that shall ensure that the safety of persons working on, using, or in contact with the System shall not be compromised;

13.1.2 to the extent applicable to the Transport Services and the Project Operations, in accordance with the Code of Construction Practice and the Code of Maintenance Practice; and

13.1.2.1 in accordance with the Environmental Statement, and the mitigation measures contained in it; and

13.1.2.2 in accordance with the Scottish Private Bill(s) and all ancillary regulations once enacted;

13.1.3 implement, in accordance with paragraph 6 of Schedule 4 (*Operating Output Specification*) to the Operating Appendix, all component plans which constitute the Operating Method Statement as developed under paragraph 26 of the Project Development Output Specification;

13.1.4 enforce a comprehensive no smoking, no alcohol and no abuse of drugs or other substances policy for the System;

13.1.5 implement a process of continuous improvement to facilitate the continuous operation of the System during the Term;

13.1.6 procure that records of tickets sales and usage of ticket types on the Edinburgh Tram Network (including tickets granted under concessionary arrangements) are collated subject to Clause 9.11 of this Operating Appendix and Clause 12.19 of the Agreement and retained and made available to the tie Project Manager on request;

13.1.7 procure that regular liaison meetings are held during the Service Period to enable all aspects of Project Operations to be discussed in accordance with Clause 6 (*Management of the Project*) of the Agreement; and

13.1.8 ensure that its senior managers and those of the Operator Parties receive disability equality training.

13.2 The Operator shall throughout the conduct of the Project Operations have full regard for the safety of all persons on the System Land (whether lawfully or not) in accordance with Good Industry Practice, to avoid risk to such persons.

14. QUALITY ASSURANCE

14.1 The Operator shall procure that all aspects of the Project Operations are carried out in accordance with the quality management systems set out in the Quality Management Plan.

14.2 The Operator shall appoint (or shall procure the appointment of) a Quality Manager with effect from the Operating Effective Date (if not already appointed prior to such date), who shall not be directly involved in the day-to-day performance of the Project Operations. The identity of the Quality Manager (and any replacement) shall be subject to the approval of the **tie** Project Manager (such approval not to be unreasonably withheld or delayed). Without limitation, the Operator shall ensure that the terms and conditions of employment of the Quality Manager shall require him to comply with the requirements of Clause 7.5 of the Agreement.

14.3 The **tie** Project Manager may, at his discretion, carry out audits of the Operator's quality system (including the Quality Management Plan and any quality manuals and procedures) at approximate intervals of 12 months during the Service Period and may carry out other periodic monitoring, spot checks and auditing of the Operator's quality management systems and the other quality systems referred to in this Clause 14 (*Quality Assurance*). The Operator shall procure that the **tie** Project Manager shall have a like right in respect of each Operator Party. The Operator shall co-operate and shall procure that any Operator Party co-operates with the **tie** Project Manager including providing him with all access, assistance, information and documentation which he reasonably requires in connection with his rights under this Clause 14 *(Quality Assurance)*.

14.4 If, following any monitoring, spot check or audit undertaken pursuant to Clause 14.3 above, it is discovered that the Operator has failed, and/or that the Operator (on the balance of probabilities) will fail, to comply with the Agreement, **tie** may (without prejudice to any other right or remedy available to it) by notice to the Operator:

14.4.1 increase the level of its monitoring of the Operator until such time as the Operator shall have demonstrated to the satisfaction of **tie** that it is capable of performing and will perform all its obligations under the Agreement, in which case the Operator shall compensate **tie** for any reasonable additional costs incurred by **tie** as a result of such increased monitoring; and/or

14.4.2 require the Operator to undertake such steps as **tie**, acting reasonably, considers necessary to ensure compliance with the Agreement provided that:

i) such a requirement shall not result in any amendment to the Target Operating Costs or the Fixed Costs; and

ii) if the Operator does not agree that such steps are necessary for such purposes, it may refer the matter for determination under the Dispute Resolution Procedure and shall not be obliged to take such steps until the matter has been so determined.

15. ADVERTISING

There shall be no Operator advertising permitted on or in any of the Trams and/or the Tramstops or at any other location on the System save that recognition of the corporate identity of the Operator shall be permitted (a) in appropriate tram specific publications issued by **tie** or others; (b) on paper letterhead; and (c) within the interior of the Trams, subject to the Operator proposing such Operator recognition under (a), (b) or (c) to **tie**, and **tie** agreeing to any such proposals (such agreement to be at **tie's** absolute discretion).

16. BEST VALUE AND PROJECT PHASE D BENCHMARKING

16.1 The Operator shall, throughout the Term and to the extent consistent with its obligations under the Agreement, make arrangements to secure continuous improvement in the way in which Project Operations are conducted having regard to the Project Vision and, a combination of economy, efficiency and effectiveness.

16.2 The Operator agrees to undertake (or refrain from undertaking) such actions as **tie** shall reasonably request:

16.2.1 supporting and assisting **tie** (in compliance with Clause 49 (*Information and Audit Access*) of the Agreement) in preparing best value performance plans and conducting best value reviews in relation to Project Operations;

16.2.2 complying with requests for information, data or other assistance made by **tie** in pursuance of its best value assessment; and

16.2.3 complying with all requests by **tie** to procure the attendance of specific officers or employees of the Operator or Operator Parties at any **tie** meetings at which Project Operations are to be discussed (but not, otherwise in exceptional circumstances, more than three times in any one year).

16.3 The Parties acknowledge that **tie** may prepare best value performance plans and conduct a best value review in conjunction with the reset of the Target Operating Costs, Fixed Costs (excluding the Category Five Fixed Costs) and Target Patronage pursuant to Clause 21 (*Reset of the Fixed Costs, Target Operating Costs and the Target Patronage*) of this Appendix.

16.4 **tie** may undertake an annual or other frequency customer satisfaction survey ("**tie Customer Satisfaction Survey**") in order to:

16.4.1 assess satisfaction among the public and passengers with Project Operations and, in particular, with the quality, efficiency and effectiveness of the Transport Services;

16.4.2 complement preparation of the Annual Service Report; and

16.4.3 monitor compliance by the Operator with its obligations including its management of systems availability and maintenance;

and the Operator shall provide reasonable assistance to enable **tie** to undertake the **tie** Customer Satisfaction Survey and **tie** shall provide the results of each such survey to the Operator in so far as each such survey is relevant to the performance of the Project Operations by the Operator.

16.5 The **tie** Customer Satisfaction Survey shall be carried out by means of passenger questionnaire. **tie** shall allow the Operator a reasonable prior opportunity, in respect of the development of each questionnaire, to comment upon each such questionnaire. **tie** shall meet with the Operator to discuss such comments and **tie** shall take due account of these comments provided that such comments are reasonable

16.6 Without prejudice to any other provision in the Agreement (and no later than two Reporting Periods prior to the end of any year in which reset will take place in accordance with Clause 21 (*Reset of the Fixed Costs, Target Operating Costs and the Target Patronage)* of this Appendix and in other years within one Reporting Period of the year end) the Operator shall, at its own cost, provide a written report (the **"Annual Service Report"**) which shall review the quality and performance of the Transport Services and the performance of all Project Operations measured during the relevant period and show the key issues to be addressed going forward, including customer feedback, operational issues and Transport Services improvement proposals. The customer feedback shall include the results of any **tie** Customer Satisfaction Survey carried out pursuant to Clause 16.4 above. The Operator shall upon written request promptly provide supporting information to verify and audit the information and other material contained in the Annual Service Report.

16.7 **tie** may make comments on and/or objections and specify omissions in the supporting information or the Annual Service Report and in such case shall provide the Operator with written comments and/or objections within 30 Business Days of receipt. In the absence of such **tie** comments or objections, the supporting information (or the Annual Service Report) shall be deemed to have been accepted by **tie**.

16.8 The Operator shall, within 30 Business Days of receipt of **tie** comments and/or objections, make revisions having regard to such comments and/or objections and resubmit the information and report to **tie**. If the information and reports cannot be agreed by the Parties then the matter will be determined in accordance with the Dispute Resolution Procedure.

16.9 If, in **tie**'s reasonable opinion, the provision and performance of Project Operations or delivery of the Transport Services (or any part of them) could be more effective, efficient and economic having regard to the Annual Service Report and the **tie** Customer Satisfaction Survey, then **tie** may serve a **tie** Notice of Change pursuant to Clause 24 (*tie Changes*) of this Appendix stating the desired nature and timing of the

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changes to the provision or performance of Project Operations or delivery of the Transport Services (or the relevant part thereof).

16.10 The Operator shall, in conjunction with **tie**, develop Best Value Improvement Plans setting out mutually agreed tasks between the Operator and **tie** to improve the delivery of the Transport Services and demonstrate continuous improvement in the Transport Services and the achievement of the Project Vision and wider Project objectives within the Integrated Transport Initiative for Edinburgh and South East Scotland.

16.11 The preparation of Best Value Improvement Plans will take into account the conclusions from the Annual Service Report and any **tie** Customer Satisfaction Surveys that have been undertaken and reported to the Operator.

PART VI: FINANCIAL MATTERS

17. COLLECTION OF FARE REVENUE

17.1 Without prejudice to the general applicability of Clause 55 (*No Partnership or Agency*) of the Agreement, the Operator is authorised by **tie** to enter into contracts of carriage with passengers using the Transport Services as agent for **tie**. The terms and conditions of such contracts of carriage shall be as determined by the Operator and **tie** during Project Phase A and Project Phase B, and as amended from time to time in accordance with the terms of the Agreement. The Operator shall issue tickets and collect fares as agent for **tie** in accordance with the terms of the Agreement, and shall pass all Patronage Revenue collected or received to **tie** in accordance with Clause 18 (*Payment of Operating Revenue to tie)* of this Appendix. For the avoidance of doubt, the Operator shall have no rights in the Patronage Revenue collected.

17.2 In operating the Transport Services, the Operator shall, and shall ensure that all Operator Parties shall, comply with the Operating Method Statements in relation to the issue of tickets and the collection of Fares, including:

17.2.1 charging all passengers the correct Fares for their journey and issuing such passengers with the corresponding ticket; and

17.2.2 checking that all tickets and other passes held by passengers are valid for the journey being taken.

17.3 The Operator shall allow the **tie** Inspectors to board any Trams providing the Transport Services at any time for the purpose of:

17.3.1 checking that the Operator and all Operator Parties are complying with the terms of the Agreement;

17.3.2 monitoring the Operator's performance for the purpose of the KPI Regime and the Performance Monitoring Regime;

17.3.3 carrying out any **tie** Customer Satisfaction Survey; and

17.3.4 checking the Operator's records in relation to passenger numbers and fares collected or received by the Operator.

17.4 The Operator shall ensure that all Operator Parties comply with any reasonable instructions given to them by the **tie** Inspectors in accordance with the terms of the Agreement, provided that any such instruction by the **tie** Inspectors shall in no circumstances result in liability for **tie** or excuse the Operator from performance of its obligations pursuant to the Agreement.

18. PAYMENT OF OPERATING REVENUE TO TIE

18.1 The Operator shall pay to **tie** all Operating Revenues collected or received by the Operator and shall report daily to **tie** on the Operating Revenues for the previous Business Day or days in the case of an Edinburgh Holiday or a Sunday.

18.2 All Operating Revenues collected by the Operator shall be paid into such bank account as may be nominated by **tie** from time to time, such payments to be made each Business Day. In the event the Operator is unable to pay Operating Revenues into the nominated bank account, the Operator shall ensure that the collected funds are safeguarded properly pending their delivery to the nominated bank (including adequate insurance against loss or theft) and are remitted to the bank account the next following Business Day.

18.3 Within 2 Business Days of the end of each Reporting Period, the Operator shall prepare and deliver to the **tie** Project Manager a statement setting out full details of the amounts paid by the Operator to **tie** pursuant to Clause 18.1 above during such Reporting Period.

19. PAYMENTS TO THE OPERATOR

19.1 Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) of this Appendix shall apply in respect of any Phase with effect from the Service Commencement Date for such Phase.

19.2 The Operator's only entitlement to payment from **tie** in respect of the performance of the Project Operations shall be as expressly provided in this Appendix and Clause 12 (*Interface with the Infrastructure Provider*) of the Agreement.

20. ADJUSTMENT OF FIXED COSTS, TARGET OPERATING COSTS AND TARGET PATRONAGE

20.1 The circumstances under which the Target Operating Costs, Fixed Costs (excluding the Category Five Fixed Costs) and Target Patronage may be adjusted during Project Phases C and D shall be limited to:

20.1.1 Qualifying Change in Law and Permanent Roads Change; or

20.1.2 Long Term Roads Change (in respect of Target Operating Costs and/or Fixed Costs); or

20.1.3 **tie** Change or Operator Change; or

20.1.4 the reset of the Target Operating Costs, Fixed Costs and the Target Patronage pursuant to Clause 21 (*Reset of the Fixed Costs Target Operating Costs and the Target Patronage)* of this Appendix; or

20.1.5 the circumstances described in Clause 12.3

in each case where there is or will be a material effect on the Operator's ability to achieve the Target Operating Costs or Target Patronage and/or a material effect on the Operator's ability to continue to perform its obligations in terms of this Agreement in respect of the Fixed Costs and to the extent any adverse effect cannot be addressed by reasonable mitigation measures. The foregoing is without prejudice to the provisions of Clauses 10.4, 10.5, 10.8 and 10.9 of the Agreement.

20.2 **tie** shall establish a Joint Revenue Committee to:

20.2.1 set Target Patronage during Project Phase B and adjust the Target Patronage in the circumstances set out in Clause 20.1 of this Operating Appendix where

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agreed or determined in accordance with the appropriate provisions of this Agreement;

20.2.2 assess, revise (where appropriate) and agree forward estimates for the patronage which could be attracted from the operation of each Phase and the operation of the Edinburgh Tram Network; and

20.2.3 review proposals for the maximisation of revenue from the operation of the System.

20.3 **tie** shall procure that the Joint Revenue Committee shall meet:

20.3.1 during Project Phase B in advance of the setting of Target Patronage;

20.3.2 in advance of each reset to be carried out in accordance with Clause 21 (*Reset of the Fixed Costs, Target Operating Costs and the Target Patronage*);

20.3.3 in advance of each review of TEL Fares Policy; and

20.3.4 from time to time at **tie's** request.

20.4 **tie** and the Operator may agree that an additional patronage consultant should be appointed to join the Joint Revenue Committee. **tie** shall appoint such patronage consultant and the Operator shall assist in the procurement, evaluation and appointment of such patronage consultant. The terms of the engagement of the patronage consultant will be determined by **tie**.

20.5 Both **tie** and the Operator agree that the briefing to the members of the Joint Revenue Committee shall be in such terms so as to require the Joint Revenue Committee to arrive at an agreed estimate of patronage.

20.6 Both **tie** and the Operator agree that they shall not raise any Dispute with regard to agreed estimates of patronage prepared by the Joint Revenue Committee in accordance with this Clause 20 *(Adjustment of Fixed Costs, Target Operating Costs and Target Patronage)*, to the Dispute Resolution Procedure.

20.7 The Joint Revenue Committee shall be required in terms of the briefing given under Clause 20.5 above, to prepare a profile of Target Patronage for each Year during Project Phase D. Such profile shall refer to how revenues may vary seasonally and in accordance with fluctuations in service levels including bank holidays.

21. RESET OF THE FIXED COSTS, TARGET OPERATING COSTS AND THE TARGET PATRONAGE

21.1 Either Party may notify the other no later than six Reporting Periods prior to a Reset Decision Date of their intention to request operation of this Clause 21 *(Reset of the Fixed Costs, Target Operating Costs and the Target Patronage)* and shall provide to the other Party a detailed submission in support of that request within 30 days of such notification.

21.2 No later than three Reporting Periods prior to the third anniversary of the Service Commencement Date of the first Phase (and each following third anniversary, in each case a **"Reset Decision Date"**) in respect of which the Operator provided the Transport Services, **tie** and the Operator shall review:

21.2.1 the Operating Costs incurred by the Operator in the previous 3 years, and compare such costs to the Target Operating Costs and the Fixed Costs;

21.2.2 the Actual Tram Patronage (boarders) generated by the System in the previous 3 years, and compare such patronage to the Target Patronage;

21.2.3 the performance of the Operator under all aspects of the Performance Monitoring Regime and the Operator's Project Return;

21.2.4 the contents of the most recent Annual Service Report;

21.2.5 the results of any **tie** Customer Satisfaction Surveys undertaken; and

21.2.6 any Best Value Improvement Plans produced pursuant to Clause 16.10 of this Appendix

21.3 Following such review which shall expressly take into account the Project Return, the Base Case Assumptions, Part A of Schedule 17 *(Setting of Fixed Costs)* in respect of drivers' salaries and benefits and other related salaries and benefits, and the positions stated in the Financial Proposals, the Operator Financial Model and the Project Development and Operating Costs, the Parties may agree to revise the Payment Mechanism, the Fixed Costs (except for the Category Five Fixed Costs), the Target Operating Costs and /or the Target Patronage (including, if relevant, the applicable pain/gain sharing structure and/or the KPI Regime). Where the Parties agree to revise this Appendix by resetting any of the matters listed in this Clause 21.3 (or otherwise) all other rights and obligations under the Agreement shall remain unchanged.

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21.4 If the Parties are unable to agree revisions to the Payment Mechanism, Fixed Costs (excluding the Category Five Fixed Costs) , Target Operating Costs and /or Target Patronage and/or KPI Regime prior to the anniversary referred to in Clause 21.2 above (or 21.5 below as the case may be), either Party may refer the Dispute to the Dispute Resolution Procedure provided always that **tie** shall be entitled to serve notice to terminate pursuant to Clause 38 *(Voluntary Termination by tie)* of the Agreement.

21.5 The Operator and **tie** shall carry out further reviews in accordance with Clauses 21.1 to 21.4 above no later than three Reporting Periods prior to the following Reset Decision Dates:

21.5.1 the sixth anniversary;

21.5.2 the ninth anniversary;

21.5.3 the twelfth anniversary

of the Service Commencement Date of the first Phase in respect of which the Operator provided the Transport Services.

22. RELIEF EVENTS

22.1 If and to the extent that a Relief Event:

22.1.1 is the direct cause of a delay in achievement of Service Commencement or Full Service Commencement in respect of any Phase; and/or

22.1.2 materially and adversely affects the ability of the Operator to perform any of its obligations under the Agreement;

then the Operator shall be entitled to apply for an extension of time and/or relief from any rights of **tie** arising under Clause 35 of the Agreement *(Termination on Operator Default)*.

22.2 To obtain such extension or relief, the Operator must:

22.2.1 as soon as practicable, and in any event within 14 days after it became aware that the Relief Event has caused or is likely to cause delay or adversely affect the ability of the Operator to perform its other obligations, give to **tie** a notice of its claim for relief, including full details of the nature of the Relief Event, the date of occurrence and its likely duration;

22.2.2 within 7 days of receipt by **tie** of the notice referred to in Clause 22.2.1 above, give full details of the relief and/or extension claimed; and

22.2.3 demonstrate to the reasonable satisfaction of **tie** that:

22.2.3.1 the Operator and the Operator Parties could not have avoided the occurrence or consequences of the relevant Relief Event by steps which they might reasonably be expected to have taken, without incurring substantial expenditure;

22.2.3.2 the Relief Event directly caused the delay and/or the need for relief;

22.2.3.3 the time lost and/or relief needed could not reasonably be expected to be mitigated or recovered by the Operator acting in accordance with Good Industry Practice, without incurring substantial expenditure; and

22.2.3.4 the Operator is using best endeavours to perform its obligations under the Agreement.

22.3 In the event that the Operator has complied with its obligations under Clause 22.2 above and **tie** is reasonably satisfied as to the matters specified in Clause 22.2.3 above, then:

22.3.1 the Planned Service Commencement Date shall be postponed by such time as shall be reasonable for such a Relief Event, taking into account the likely effect of delay; and

22.3.2 **tie** shall not be entitled to exercise rights to terminate the Agreement under Clause 35 (*Termination on Operator Default*) of the Agreement or Clause 34 (*Persistent Breach*) of the Agreement as a result of failure by the Operator to comply with its obligations to the extent that compliance is prevented by the Relief Event.

22.4 Nothing in Clause 22.3 above shall affect any entitlement to award Performance Points to the Operator for the purposes of operation of the KPI Regime (excluding the issue of a Major KPI Breach Notice) during the period in which the Relief Event is subsisting.

22.5 In the event that information required by Clause 22.2 above is provided after the dates referred to in that Clause, then the Operator shall not be entitled to any relief.

22.6 The Operator shall notify **tie** if at any time it receives or becomes aware of any further information relating to the Relief Event, giving details of that information to the extent that such information is new or renders information previously submitted materially inaccurate or misleading.

22.7 If the Parties cannot agree the extent of the relief required, or **tie** disagrees that a Relief Event has occurred or that the Operator is entitled to any extension of time and/or relief, either Party may refer the matter for determination in accordance with the Dispute Resolution Procedure.

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PART VII: VARIATIONS AND CHANGES IN LAW

23. PERFORMANCE AND FINANCIAL ADJUSTMENTS

23.1 Where the Operator may be entitled to an adjustment as a result of a Relevant Event to (i) the Operating Output Specification, (ii) the Target Costs for Project Phase C2, (iii) the Target Operating Costs, (iv) the Fixed Costs (excluding the Category Five Fixed Costs) , and/or (v) the Target Patronage, the provisions of this Clause 23.1 shall apply:

23.1.1 The Operator shall demonstrate the actual and/or projected impact of the Relevant Event and propose any amendments to the Operating Output Specification designed to mitigate and/or eliminate that impact. Any necessary amendments as a result of or consequence of the Relevant Event to the Operating Output Specification, the Base Case Assumptions, the Target Costs for Project Phase C2, the Target Operating Costs, the Fixed Costs (excluding the Category Five Fixed Costs) and/or the Target Patronage (as appropriate) shall be agreed, or in the absence of agreement determined, on the reference of either Party, pursuant to the Dispute Resolution Procedure so that:

(i) the projected performance of the Operator against the Operating Output Specification (as measured by the KPI Regime) is No Better and No Worse than the average performance of the Operator against the Operating Output Specification (as measured or to be measured by the KPI Regime) in the 13 Reporting Periods immediately preceding the first Reporting Period in which the Relevant Event has effect ignoring for these purposes any failure to meet the requirements of the Operating Output Specification arising by virtue of that Relevant Event;

(ii) in determining any amendments to the Operating Output Specification, due regard shall be had to the positions set out in the Financial Proposals, the Operator Financial Model, the Project Development and Operating Costs, and in particular the Base Case Assumptions.

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23.2 Where a Permanent Roads Change occurs which is beneficial to the Operator, **tie** shall be entitled to require an adjustment to the Operating Output Specification, the Target Costs for Project Phase C2, the Target Operating Costs, the Fixed Costs (excluding the Category Five Fixed Costs) and/or the Target Patronage, as the case may be, in accordance with this Clause 23 (*Performance and Financial Adjustments*) to reflect the beneficial effects of such Permanent Roads Change .

23.3 The Profit Element shall be set at the DPOFA Variation Date and shall be Indexed throughout the Term of this Agreement, and shall not be otherwise adjusted except in the following circumstances:

23.3.1 in the case of a **tie** Change which involves Network Expansion or a material alteration in the scope of Project Operations such that it is reasonable to project (using the provisions of Clauses 24.3 to 24.5) a change in excess of 25% in either annual Operating Costs or annual Actual Tram Patronage (boarders) provided always that such reduction shall not reduce the Profit Element payable to the Operator in accordance with this Agreement to a level below the Minimum Profit Element;

23.3.2 in the case of a **tie** Change, which relates to a truncation of Phase 1a (6 and 12 trams per hours), Phase 1a (8 and 16 trams per hour) and/or Phase 1a plus Phase 1b (8 and 16 trams per hour) from what was anticipated at the DPOFA Variation Date to form part of the Edinburgh Tram Network but which does not amount to a change in excess of 25% in either annual Operating Costs or annual Actual Tram Patronage (boarders), the Profit Element shall be reduced on a pro-rated basis to reflect the proportionate reduction in Target Operating Costs, Target Costs for Project Phase C2 and/or Fixed Costs (excluding the Category Five Fixed Costs) provided always that such reduction shall not reduce the Profit Element payable to the Operator in accordance with this Agreement to a level below the Minimum Profit Element;

23.3.3 in the case of a **tie** Change to any of the Required Insurances, the Profit Element shall be adjusted by applying the Project Return for the relevant Project Phase to the relevant Target Operating Costs, the relevant Target Costs for Project Phase C2 and/or the relevant Fixed Costs relative to the required Insurances subject to the **tie** Change to calculate the profit element applicable to the relevant Required Insurance and then using such calculation

to make the appropriate increase or decrease to the Profit Element provided always that

23.3.3.1 if there is any increase to the Profit Element, the Operator shall be paid whichever is the greater of the Minimum Profit Element or the Profit Element (as adjusted in accordance with Clause 23.3.3); and

23.3.3.2 any decrease shall not reduce the Profit Element payable to the Operator in accordance with this Agreement to a level below the Minimum Profit Element.

23.3.4 in the case of a **tie** Change where **tie** takes out and maintains any of the Required Insurances itself or agrees to pay the actual costs of any of the Required Insurances to the Operator rather than make payment to the Operator on a fixed or target basis, then no Profit Element shall be payable by **tie** to the Operator in respect of any such Required Insurances and if any Profit Element is paid to the Operator by **tie** in relation to any such Required Insurances, then the relevant part of the Profit Element shall be adjusted accordingly by applying the Project Return for the relevant Project Phase to the relevant Target Operating Costs, the relevant Target Costs for Project Phase C2 and/or the relevant Fixed Costs to calculate the profit element applicable to the relevant Required Insurance and then using such calculation to make the appropriate increase or decrease to the Profit Element provided always that

23.3.4.1 if there is any increase to the Profit Element, the Operator shall be paid whichever is the greater of the Minimum Profit Element or the Profit Element (as adjusted in accordance with Clause 23.3.4); and

23.3.4.2 any decrease shall not reduce the Profit Element payable to the Operator in accordance with this Agreement to a level below the Minimum Profit Element

23.3.5 in the case of a **tie** Change in accordance with paragraph 16.6 of Schedule 2 *(Project Development Output Specification)*, a sum of 6.7% of the actual costs of such **tie** Change shall be added to the Profit Element provided always that the Operator shall be paid whichever is the greater of the

Minimum Profit Element or the Profit Element (as adjusted in accordance with this Clause 23.3.5); .

24. tie CHANGES

24.1 Unless expressly stated in this Agreement or as may otherwise be agreed by the Parties, **tie** Changes shall be dealt with in accordance with this Clause 24 (*tie Changes)*. If **tie** requires a **tie** Change, it must serve a **tie** Notice of Change on the Operator. If a deemed **tie** Change or in this Agreement, a matter is stated to be treated as a **tie** Change, then **tie** shall issue a **tie** Notice of Change.

24.2 A **tie** Notice of Change shall:

24.2.1 set out the proposed **tie** Change required in sufficient detail to enable the Operator to calculate and provide the Estimate in accordance with Clause 24.3 below;

24.2.2 require the Operator to provide **tie** within 21 days of receipt of the **tie** Notice of Change with an Estimate; and

24.2.3 set out whether **tie** wishes to pay for any proposed **tie** Change on the basis of target costs, fixed costs or actual costs.

24.3 As soon as is reasonably practicable, and in any event within 21 days after having received a **tie** Notice of Change, the Operator shall deliver to **tie** the Estimate. The Estimate shall include the opinion of the Operator (acting reasonably) on:

24.3.1 whether relief from compliance with any of its obligations is required (including the obligations of the Operator to achieve Service Commencement by the Planned Service Commencement Date and to meet the requirements of the Operating Output Specification or the Project Development Output Specification), during or as a result of the implementation of the proposed **tie** Change;

24.3.2 any impact on the performance of the Project Operations and/or the Project Development Services;

24.3.3 any amendment (including an amendment to the Target Costs for Project Phase C2, the Target Operating Costs, the Fixed Costs (excluding the Category Five Fixed Costs) and/or the Target Patronage) required to the

Agreement as a result of the implementation of the proposed **tie** Change, calculated in accordance with Clause 23 (*Performance and Financial Adjustments*) of this Appendix and the Base Case Assumptions (if appropriate);

24.3.4 any Necessary Consents which are required as a result of the implementation of the proposed **tie** Change;

24.3.5 the proposed method of certification of any aspects of the Project Operations or the Project Development Services required by the proposed **tie** Change; and

24.3.6 the estimated actual costs of the proposed **tie** Change.

24.4 The Operator shall include in the Estimate evidence demonstrating that:

24.4.1 the Operator has used all reasonable endeavours to minimise, and procure that the Operator Parties minimise (including by the use of competitive quotes) any increase in costs and to maximise, and procure that the Operator Parties maximise, any reduction of costs;

24.4.2 the Operator has, to the extent reasonably practicable, sought competitive quotes from persons other than the Operator Parties in pursuance of its obligation under Clause 24.4.1 above;

24.4.3 the proposed **tie** Change will be implemented in the most cost-effective manner, including showing that when such expenditure is incurred, Changes in Law that are foreseeable at that time have been taken into account by the Operator; and

24.4.4 any expenditure that has been avoided, which was anticipated to be incurred and any likely increase in Actual Tram Patronage Boarders as a result of the proposed **tie** Change, has been taken into account in the proposed amendments to the Target Operating Costs, Target Costs for Project Phase C2, the Fixed Costs and/or Target Patronage included in the Estimate.

24.5 If the Operator does not intend to use its own resources to implement any proposed **tie** Change , it shall:

24.5.1 demonstrate that it is appropriate to subcontract the implementation of such **tie** Change; and

24.5.2 comply with Good Industry Practice with the objective of ensuring that it obtains best value for money (taking into account all relevant circumstances including, in particular, the requirement that the Operator should be left in No Better and No Worse position as a result of the implementation of the proposed **tie** Change) when procuring any work, services, supplies, materials or equipment required in relation to the proposed **tie** Change .

24.6 As soon as reasonably practicable after **tie** receives the Estimate, the Parties shall discuss and agree the issues set out in the Estimate. From such discussions **tie** may modify the **tie** Notice of Change, and (if the estimated increase in the Target Costs for Project Phase C2, the Target Operating Costs and/or Fixed Costs (excluding the Category Five Fixed Costs) in respect of the proposed **tie** Change is expected to exceed £10,000 (Indexed) and it is practicable for the Operator to do so) **tie** may require the Operator to seek and evaluate competitive tenders. In each case the Operator shall, as soon as practicable, and in any event not more than 14 days after receipt of such modification, notify **tie** of any consequential changes to the Estimate.

24.7 If the Parties cannot agree on the contents of the Estimate, then either Party may refer the Estimate for determination in accordance with the Dispute Resolution Procedure provided that the Operator shall not be obliged to implement any proposed **tie** Change where:

24.7.1 **tie** does not have the legal power or capacity to require the implementation of such proposed **tie** Change; or

24.7.2 implementation of such proposed **tie** Change would:

24.7.2.1 be contrary to Law;

24.7.2.2 not be technically feasible;

24.7.2.3 result in the risk of liability for Property Loss and/or Personal Loss in respect of any part of the System being Uninsurable;

24.7.2.4 cause any existing Necessary Consent (which is not reasonably likely, on the balance of probabilities, to be capable of modification) to be revoked;

24.7.2.5 require a new Necessary Consent or an amendment to a Necessary Consent which having used best endeavours to obtain in accordance with Clause 24.10 below, the Operator is unable to obtain within a time frame appropriate (in the reasonable opinion of **tie**) to the implementation of the proposed **tie** Change; or

24.7.2.6 substantially and materially affect the Operator's ability to perform the Project Operations or the Project Development Services such that it substantially and materially increases the probability of (a) a substantial non- compliance by the Operator with the Operating Output Specification or the Project Development Output Specification; or (b) termination of the Agreement as a result of Operator Default.

24.8 As soon as reasonably practicable after the contents of the Estimate have been agreed or determined pursuant to the Dispute Resolution Procedure **tie** shall:

24.8.1 confirm in writing the Estimate (as modified); or

24.8.2 subject to Clause 24.11, withdraw the **tie** Notice of Change.

24.9 Subject to Clause 24.11, if **tie** do not confirm in writing the Estimate (with or without modification) within 30 days of the contents of the Estimate having been agreed or determined pursuant to 24.7, then the **tie** Notice of Change shall be deemed to have been withdrawn.

24.10 If it shall be necessary to obtain or amend any Necessary Consent in respect of a proposed **tie** Change, then the Operator shall use best endeavours to obtain such Necessary Consent or amendment.

"Compliance Critical Risk" means

(a) in the context of Clause 28 (Uninsurable Risks), a risk or matter the Operator is obliged to insure against pursuant to Part 1 of Schedule 10 (*Insurances*) and which the failure of the Operator to carry any of the Required Insurances would prevent the Operator from lawfully performing the Project Development Services or the Project Operations in whole or in substantial part in the manner required by this Agreement; or

(b) in the context of Clause 24 (**tie** Changes), a risk or matter which would (i) prevent the Operator from lawfully performing the Project Development Services or the Project Operations in whole or in substantial part in the manner required by this Agreement and/or (ii) cause the Operator to breach the terms of this Agreement;

(c) in the context of tie Changes, with reference to Clause 27.25, if the OCIP Insurance or OCIP insurance requirements do change as a matter of fact and/or tie do not renew, extend or maintain in force the OCIP Insurances in accordance with clause 27. For the purposes of the definition of "Compliance Critical Risk", business interruption insurance shall be excluded from the definition of "OCIP Insurances".

24.11 Subject to Clause 27 (*Qualifying Change in Law*), if the **tie** Notice of Change relates to a Compliance Critical Risk, then:

24.11.1 the Operator shall notify **tie**; and

24.11.2 if both Parties agree or it is determined in accordance with the Dispute Resolution Procedure (on the referral of either Party) that the risk or matter is a Compliance Critical Risk which is not caused by the actions or omissions of the Operator or an Operator Party;

then the Parties shall meet to discuss the means by which the risk or matter should be managed, mitigated or controlled.

24.12 At the meeting referred in Clause 24.11, either Party may propose:

24.12.1 any necessary change in the Project Development Services or Project Operations;

24.12.2 whether any amendments are required to the terms of the Agreement including any required adjustment to the Capped Fees, Fixed Costs (excluding the Category Five Fixed Costs), Target Costs for Project Phase C2, Target Operating Costs or Target Patronage; and

24.12.3 whether relief from compliance with any obligations affected by the Compliance Critical Risk is required and/or relief for the KPI Regime

24.13 If the requirements of Clause 24.12 are satisfied but the Parties cannot agree as to how to manage, mitigate or control the risk or matter or direct consequences thereof then,

for the period during which the relevant Compliance Critical Risk (or consequences thereof) subsists:

24.13.1 to the extent that the Operator is prevented or otherwise hindered from performing the Project Development Services or the Project Operations in the manner required by this Agreement and/or the costs or risk of so doing or seeking to do so are reasonably and demonstrably increased:

24.13.1.1 the Operator shall be relieved from such performance and shall not be liable to **tie** for failure so to perform provided it continues to perform the remainder of the Project Development Services or the Project Operations as best as it is reasonably able to without incurring additional costs for which it would not otherwise be reimbursed or to avoid additional risks for which the Operator would otherwise be liable for; and

24.13.1.2 during Project Phase C2 and Project Phase D, the Target Costs for Project Phase C2 or Target Operating Costs or the Fixed Costs as the case may be shall be adjusted by an equitable amount as agreed by the Parties acting reasonably and in good faith which reflects the reasonable and demonstrable impact of the matter in question (including net cost savings made as a result of restricted Project Development Services or restricted Project Operations) and Target Patronage shall be adjusted to reflect the impact (including of restricted Project Operations on Patronage Revenue). If the Operator determines not to reduce its operating establishment or cost base to reflect restricted Project Operations after the expiry of a reasonable period but to maintain this at the level necessary for normal Project Operations, **tie** shall not be obliged to pay the marginal Fixed Costs or Operating Costs relating to such establishment or cost base but (a) any required increase in operating establishment or cost base to reflect removal or adjustment of restricted Project Operations thereafter shall require a tie Change; (b) the Project Operations and

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provisions of this Agreement shall be adjusted to reflect such restricted position.

24.14 **tie** shall have the option to be exercised by notice in writing at any time in the period during which such Compliance Critical Risk subsists (provided that **tie** shall, if such period continues for more than 180 days, be deemed to have exercised such option on the 181st day) to terminate this Agreement forthwith provided always that the Parties agree that before such option is exercised or is deemed to have been exercised, the Parties (both acting reasonably and in good faith) shall have attempted to resolve the consequences of the Compliance Critical Risk by reference to the Dispute Resolution Procedure (excluding reference to court) and/or by considering whether an alternative **tie** Change could be proposed by **tie**.

25. OPERATOR CHANGES

25.1 The Operator shall have the right to propose changes and, in this regard, shall keep the Project Operations under review with a view to identifying ways in which the performance of the Project Operations can be improved, having regard to the Project Vision, a combination of economy, efficiency and effectiveness and the needs of passengers using the System. If the Operator wishes to introduce a change in the Project Operations or is required to do so by a third party (other than by an Infrastructure Provider as a consequence of a change to the Infrastructure and Equipment Output Specification to which Clause 24.1 above shall apply) it must serve an Operator Notice of Change on **tie**.

25.2 The Operator Notice of Change must:

25.2.1 set out the proposed change in the Project Operations in sufficient detail to enable **tie** to evaluate it in full;

25.2.2 specify the Operator's reasons for proposing the change;

25.2.3 request **tie** to consult with the Operator with a view to deciding whether to agree to the change and, if so, what consequential changes **tie** require as a result;

25.2.4 indicate the time period proposed for implementation of the change;

25.2.5 indicate any implications of the change;

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25.2.6 indicate, in particular, whether a variation to the Target Costs for Project Phase C2, the Target Operating Costs, the Fixed Costs (excluding the Category Five Fixed Costs) and/or the Target Patronage is proposed (and, if so, give a detailed cost estimate of such proposed variation); and

25.2.7 indicate if there are any dates by which a decision by **tie** is critical.

25.3 **tie** shall evaluate the Operator's proposed change in good faith, taking into account all relevant issues, including whether:

25.3.1 a change in the Target Costs for Project Phase C2, Target Operating Costs, and/or the Target Patronage, or to the Operator's ability to achieve them and/or a change in the Fixed Costs (excluding the Category Five Fixed Costs) or the Operator's ability to continue to perform its obligations in terms of this Agreement in respect of these Fixed Costs (excluding the Category Five Fixed Costs) and to the extent any adverse effect cannot be addressed by reasonable mitigation measures will occur;

25.3.2 the proposed change would affect the quality of the Project Operations or the likelihood of successful delivery of the Project Operations;

25.3.3 the change will interfere with the relationship of **tie** with third parties;

25.3.4 the proposed change materially affects the risks or costs to which **tie** are exposed; or

25.3.5 the proposed change affects the Base Case Assumptions and the positions set out in the Financial Proposals, the Operator Financial Model and the Project Development and Operating Costs..

25.4 As soon as reasonably practicable after receiving the Operator Notice of Change, the Parties shall meet and discuss the matter referred to in it. During their discussions, **tie** may propose modifications or accept or object to the Operator Notice of Change.

25.5 If **tie** give written notice of no objection to the Operator Notice of Change, (with or without modification), the relevant Operator Change shall be implemented by the Operator within the period specified in the Operator Notice of Change.

25.6 If **tie** object to the Operator Notice of Change, they shall not be obliged to give their reasons for such a rejection.

25.7 Unless **tie**'s acceptance specifically agrees to a change in the Target Costs for Project Phase C2, Target Operating Costs, the Fixed Costs and/or the Target Patronage, there shall be no change to such targets or fixed costs as a result of a change in the Project Operations proposed by the Operator.

25.8 **tie** shall be free to object pursuant to Schedule 9 (*Review Procedure*) of the Agreement to any Operator Change to the Project Operations proposed by the Operator, except if required in order to conform to a Change in Law. The costs of introducing a change in Project Operations resulting from a Qualifying Change in Law shall be dealt with in accordance with Clause 27 (*Qualifying Change in Law*) of this Appendix.

25.9 Subject to Clause 25.8, if the Operator Notice of Change is pursuant to Clause 12.11.4 and involves a Compliance Critical Risk, then the provisions of Clause 24.11 shall apply to such Operator Notice of Change as if it was a **tie** Notice of Change.

26. ROADS CHANGES

26.1 A Permanent Roads Change shall be treated as a **tie** Change for the purposes of the Agreement and the Parties shall use all reasonable endeavours to agree:

26.1.1 adjustments to the Target Costs for Project Phase C2, the Target Operating Costs, the Fixed Costs (excluding the Category Five Fixed Costs) and/or the Target Patronage (where appropriate);

26.1.2 amendments to the Operating Output Specification (including the Timetable); and

26.1.3 a permanent and commensurate recalibration of the KPI Regime.

in accordance with Clause 23 (*Performance and Financial Adjustments*) of this Appendix

26.2 As soon as reasonably practicable after the issues referred to in Clause 26.1 above have been agreed between the Parties or determined pursuant to the Dispute Resolution Procedure, **tie** shall give a **tie** Notice of Change and the provisions of Clause 24 (***tie** Changes*) of this Appendix shall apply except that the Operator shall be obliged to implement the change in all circumstances except to the extent that such change falls within any of Clause 24.7.2.1, 24.7.2.2, 24.7.2.3 and 24.7.2.4 of this Appendix.

26.3 A Long-Term Roads Change shall not be treated as a **tie** Change. However, in respect of the period of a Long-Term Roads Change, the Parties shall use all reasonable endeavours to agree:

26.3.1 adjustments to the Target Costs for Project Phase C2, the Target Operating Costs and/or the Fixed Costs (where appropriate excluding the Category Five Fixed Costs) but not the Target Patronages;

26.3.2 amendments to the Operating Output Specification (including the Timetable) and/or Agreement; and

26.3.3 a commensurate recalibration of the KPI Regime.

26.4 A Temporary Roads Change shall not be treated as a **tie** Change. However, in respect of the period of the Temporary Roads Change:

26.4.1 the Parties shall use all reasonable endeavours to agree a revised Timetable taking account of the impact of the Temporary Roads Change; and

26.4.2 the Operator's performance for the purposes of the KPI Regime relating to Punctuality including first and last trams shall be measured by reference to such revised Timetable for the duration of the Temporary Roads Change.

26.5 Subject to Clause 9.11 of this Appendix and Clause 12.19 of the Agreement, in respect of any information which is held electronically, the Operator shall maintain and make available to **tie** for inspection at all reasonable times, detailed daily records of Actual Tram Patronage (boarders) for the System subject to receipt of information and such other records and documents as may reasonably be required to evidence the Operator's entitlements under this Clause 26 (*Roads Changes*).

26.6 When adjustment to the Operating Output Specification is required in accordance with the provisions of this Clause 26 (*Roads Changes*), it shall be carried out in accordance with Clause 23 (*Performance and Financial Adjustments*) of this Appendix.

27. QUALIFYING CHANGE IN LAW

27.1 If a Qualifying Change in Law occurs or is to occur, then either Party may write to the other to express an opinion on its likely effects, giving details of its opinion of:

27.1.1 any necessary change in the Project Operations;

27.1.2 whether any changes are required to the terms of the Agreement to deal with the Qualifying Change in Law, including any required amendment to the KPI Regime, the Target Costs for Project Phase C2, the Target Operating Costs, the Fixed Costs (excluding the Category Five Fixed Costs) and/or the Target Patronage calculated in accordance with Clause 23 (*Performance and Financial Adjustments*) of this Appendix; and

27.1.3 whether relief from compliance with obligations is required, as a result of the Qualifying Change in Law;

in each case giving in full detail the procedure for implementing the Qualifying Change in Law.

27.2 As soon as reasonably practicable after receipt of any notice from either Party under Clause 27.1 above, the Parties shall discuss and agree the issues referred to in Clause 27.1 above and any ways in which the Operator can mitigate the effect of the Qualifying Change of Law and the Operator shall:

27.2.1 provide evidence to **tie** that the Operator has used and will continue to use all reasonable endeavours (including where appropriate and practicable the use of competitive quotes) to oblige Operator Parties to minimise any increase in costs and maximise any reduction in costs;

27.2.2 demonstrate that the relevant changes will be implemented in the most cost-effective manner, including showing that when expenditure will be incurred or has been incurred, foreseeable Changes in Law at that time will be taken into account by the Operator;

27.2.3 give evidence as to how the Qualifying Change in Law has affected Actual Tram Patronage (boarders); and

27.2.4 demonstrate that any expenditure that has been avoided, which was anticipated in terms of the Target Operating Costs, the Target Costs for Project Phase C2 and/or the Fixed Costs (excluding the Category Five Fixed Costs) to be incurred (whether to replace or maintain assets affected by the Qualifying Change in Law or otherwise), has been taken into account in the amount of the change to the Target Operating Costs, the Target Costs for Project Phase C2 and/or the Fixed Costs (excluding the Category Five Fixed Costs) which in its opinion is required under Clause 27.1.2 above.

27.3 As soon as reasonably practicable after the issues referred to in Clause 27.1 above have been agreed between the Parties or determined pursuant to the Dispute Resolution Procedure, **tie** shall give a **tie** Notice of Change and the provisions of Clause 24 (***tie Changes***) of this Appendix shall apply except that:

27.3.1 the Operator shall be obliged to implement the change in all circumstances except to the extent that such change both:

27.3.1.1 falls within any of Clauses 24.7.2.1, 24.7.2.2, 24.7.2.3 and 24.7.2.4 of this Appendix; and

27.3.1.2 is not necessary to implement the Qualifying Change in Law; and

27.3.2 **tie** shall confirm the Estimate pursuant to Clause 24.8.1 above once it has been agreed or determined pursuant to the Dispute Resolution Procedure.

PART VIII: TERMINATION AND EXPIRY

28. TRANSITION ON TERMINATION OR EXPIRY

28.1 12 months before the Expiry Date and, again as updated, on the Expiry Date, or upon termination, the Operator shall provide to **tie** the following information and assistance (**"Handback Package"**), which shall be current in all respects:

28.1.1 a list of managers involved in managing the Tram Business or any material element of the Project Operations showing name, work telephone number, role and responsibilities;

28.1.2 a list of all contracts, agreements, permits, licences, Necessary Consents or other documents which are material to the operation of the Tram Business or which have a value in excess of £5,000 showing (as appropriate) the contract account number, name, address and telephone number of counter parties, contract price, value, term, and notice period for termination or expiry date;

28.1.3 a list of all computer systems and software used for the maintenance of the business together with a description of the systems and master passwords where applicable, as well as a commitment to give any reasonable practical instruction or basic training for competent use of the computer systems and software;

28.1.4 the names and addresses of all insurers providing the Required Insurances along with the applicable policy numbers and other references;

28.1.5 a letter, in a form reasonably satisfactory to **tie**, authorising **tie** and its agents to request and to receive from the relevant insurers details of all claims paid or outstanding under the Required Insurances;

28.1.6 full particulars of all employees engaged in the provision of the Project Operations including:

28.1.6.1 employee, name and the date on which continuity of employment began;

28.1.6.2 the terms and conditions of employment of each such person;

28.1.6.3 all payments, benefits or changes to terms and conditions of employment promised to any such person;

28.1.6.4 any agreements or arrangements with any trade union or association of trade unions or organisation or body of employees including elected representatives which represent any such employees;

28.1.6.5 particulars of any strikes or industrial action taken by such employees; and

28.1.6.6 details of any pension or death in service scheme in which such employees participate, the benefits provided by such schemes, the rate of employer and employee contributions and other terms applicable to such schemes.

28.2 **tie** shall not disclose the terms of the Handback Package to any third party, other than:

28.2.1 to the extent in the public domain, or as required by the law or in the course of conducting, prosecuting or defending any adjudication, arbitration, court or tribunal proceedings; or

28.2.2 for the purpose of seeking offers from third parties for the provision of any of the Project Development Services, Project Operations or like services following the termination or expiry of this Agreement; or

28.2.3 to a Successor Operator or its appointed subcontractors for the purpose of ensuring or assisting with continuity of the Project Operations following termination or expiry of this Agreement.

28.3 The Operator shall maintain and manage the business of providing the Project Operations with the intent that **tie** or any Successor Operator would be able to take over that business and secure continuity of the Project Operations on a going concern basis at any time following a Termination Notice.

28.4 Accordingly, following the service of a Termination Notice or in the twelve month period preceding any anticipated termination or expiry of this Agreement, the Operator shall (and shall procure that the Operator Parties shall):

28.4.1 take all reasonable steps and co-operate fully with **tie** and any Successor Operator so that continuation of the Project Operations after such termination or expiry is achieved with the minimum of disruption and so as to prevent or mitigate inconvenience or any risk to health or safety of the employees of **tie** and members of the public;

28.4.2 liaise with **tie** and any Successor Operator and provide reasonable assistance and advice concerning the Project Operations and their transfer to **tie** or to such Successor Operator;

28.4.3 allow **tie** and any Successor Operator access (at reasonable times and on reasonable notice) to each part of the System;

28.4.4 provide to **tie** and to any Successor Operator such information concerning the System and the Project Operations which is reasonably required for the efficient transfer of responsibility for performance of the Project Operations;

28.4.5 allow, or procure that the Operator Party shall allow, **tie** and any Successor Operator such access to any employees engaged by the Operator or such Operator Party in the provision of the Project Operations or the Project Development Services as **tie** or such Successor Operator shall reasonably require for the purpose of informing and consulting with such employees over the terms and conditions on which their employment will be transferred (to the extent this is the case) to **tie** or any Successor Operator or sub-contractor engaged by the Successor Operator; and

28.4.6 on request, make the Handback Package available to **tie** or any Successor Operator without charge or restriction.

28.5 The Operator shall use best endeavours to facilitate the transfer of responsibility for the Project Operations to a Successor Operator or to **tie**, as the case may be, and the Operator shall take no action at any time which is calculated or intended to prejudice or frustrate or make more difficult such transfer. In particular, but without limitation to the generality of the foregoing, the Operator shall, during the final 12 months of the Term (where this expires by effluxion of time) or during the period following service of a Termination Notice, and whilst the same remains outstanding, not without the prior written consent of **tie** (which shall not be unreasonably withheld or delayed), make any material changes in the Transport Services on the System, which would not otherwise reasonably be made by the Operator in the ordinary course of its business of operating the System and acting in accordance with Good Industry Practice

28.6 The Operator acknowledges that all the Assets have been funded by **tie**. Accordingly the Operator:

28.6.1 shall handover the Assets to **tie** or, if so directed, a Successor Operator, such handover to be in a timely and orderly fashion so as to preserve the technical and commercial integrity and goodwill and value of the System and to enable an efficient handover of Project Operations; and

28.6.2 shall not be entitled to any payment or benefit in respect of the handover and any relinquishment of licence to use the Assets or perform Project Operations.

28.7 **tie** may request to purchase any assets owned by the Operator which have been used in the performance of the Project Operations or used in relation to the System. If the Parties agree a fair market value for any such assets, **tie** shall pay the agreed sum to the Operator and the Operator shall deliver such assets to **tie** as soon as reasonably practicable.

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899944_0380

This is Schedule 1 referred to in the Operating Appendix annexed to the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 1

Conditions Precedent

1. Completion by the Operator of all requirements included within Project Phase B and Project Phase C in respect of the Phase which is intended to be the first Phase on which the Transport Services are to be provided, other than in respect of Project Development Services included within Project Phase C2 which the Operator shall be required to provide in order to fulfil the requirements of Clause 2.5 and Clause 3 or Clause 4 of the Operating Appendix, shall be a condition precedent to the Operating Effective Date.

2. In addition, delivery by the Operator to **tie** in form and substance satisfactory to **tie** (acting reasonably) of the documents listed in paragraph 2.1 and the other matters listed in this paragraph 2 shall be condition precedent to the Operating Effective Date. Where listed as a duly certified copy, the document shall be certified by the company secretary of the Operator as being a true copy, in full force and effect at a date no later than the Operating Effective Date:

   2.1 a copy, duly certified, of minutes of a meeting of the board of directors of the Operator evidencing a resolution of the board of directors approving any amendments to this Operating Appendix and the Operating Output Specification since the DPOFA Variation Date of the Agreement; and

   2.2 evidence :

      2.2.1 that the Required Insurances are in full force and effect and that the relevant policies comply with the requirements of the Agreement; and

      2.2.2 of the current credit ratings of the Insurers and that these ratings are not below a credit rating to A- by Standard & Poors; and

      2.2.3 the revenue collection and safekeeping procedures which comply with the requirements of the Agreement are in place.

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

.....

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

This is Schedule 2 referred to in the Operating Appendix annexed to the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 2

tie Completion Requirements

[*These requirements are to be developed between the Parties prior to the end of Project Phase C1. . Different* ***tie*** *Completion Requirements will be required depending on whether:*

- *there is to be a gap between Service Commencement and Full Service Commencement; or*
- *Full Service Commencement is to occur on the day on which the Phase is first opened to fare paying passengers*]

Any changes to ***tie's*** *Completion Requirements during Project Phase C2 shall be proposed as a* ***tie*** *Change or an Operator Change as appropriate.*

[redacted]

Director/Authorised Signatory
tie Limited

[redacted].....

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

TIE00899944_0382

This is Schedule 3 referred to in the Operating Appendix annexed to the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 3

Project Phase D Payment Mechanism and KPI Regime

Payment during Project Phase D

1. The Operator shall be entitled to submit applications for payment to **tie** during Project Phase D within five days of the end of each Reporting Period and following submission to **tie** of the Service Quality Report pursuant to Clause 12 (*Service Performance and Quality Monitoring*) of this Appendix. Applications for payment shall be for the Profiled Target Operating Costs for the Reporting Period just ended, the Profiled Fixed Costs for the Reporting Period just ended, the actual costs of any agreed Special Event, any other actual costs provided for under this Agreement or agreed in accordance with this Agreement and the Profiled Profit Element for the Reporting Period just ended. The Operator shall also submit a detailed breakdown with each application for payment showing the Operating Costs for the relevant Reporting Period.

2. Each application for payment submitted by the Operator pursuant to paragraph 1 of this Schedule shall take into account performance deductions calculated by the Operator in accordance with the KPI Regime set out at paragraphs 7 to 17 below.

3. **tie** shall procure that the **tie** Project Manager shall, subject to any clarifications as are in **tie's** opinion (acting properly and reasonably) necessary, and subject to paragraph 2 above and Clause 10.11 of the Agreement, certify by notice in writing to the Operator that part of the Target Operating Costs, Fixed Costs, the actual costs of any agreed Special Event, any other actual costs provided for under this Agreement or agreed in accordance with this Agreement and Profit Element claimed in the relevant application for payment which is approved by **tie** and give reasons why any part of the Target Operating Costs, the Fixed Costs, the actual costs of any agreed Special Event, any other actual costs provided for under this Agreement or agreed in accordance with this Agreement and Profit Element, and deductions calculated by the Operator in accordance with the KPI Regime have not been so approved and certified no later than 10 days after the date on which such application for payment is received by **tie**.

4. Within 5 Business Days of receiving a notice from **tie** pursuant to paragraph 3 of this Schedule certifying part or all of the Target Operating Costs, the Fixed Costs, the actual costs of any agreed Special Event, any other actual costs provided for under this Agreement or

agreed in accordance with this Agreement and Profit Element claimed in the relevant application for payment, and the deductions in accordance with the KPI Regime, the Operator shall issue an invoice to **tie** for the certified Target Operating Costs, Fixed Costs, the actual costs of any agreed Special Event , any other actual costs provided for under this Agreement or agreed in accordance with this Agreement and Profit Element. Invoices shall be in the form agreed between the Parties.

5. **tie** shall pay any invoice submitted in accordance with paragraph 4 of this Schedule within 30 days of receipt of the relevant invoice.

6. The Operator may refer any Dispute about the Target Operating Costs, Fixed Costs, the actual costs of any agreed Special Event, any other actual costs provided for under this Agreement or agreed in accordance with this Agreement or Profit Element, and/or deductions in accordance with the KPI Regime which have not been certified and/or deductions certified, to the Dispute Resolution Procedure. If it is determined pursuant to the Dispute Resolution Procedure that the whole or any part of any disputed amount should be paid by **tie** to the Operator, then payment shall be made by **tie** to the Operator within 30 days of the receipt by tie of an invoice in respect of the determined amount from the Operator.

7. Notwithstanding any other provision of the Agreement or this Appendix, during Project Phase D, **tie** shall not be required to reimburse the Operator for the travel of any person to or from Edinburgh and/or within the United Kingdom, or for the accommodation or subsistence of any person within the United Kingdom and/or elsewhere but the Operator shall be entitled to reimbursement from **tie** in relation to travel costs outwith the United Kingdom.

Operation of the KPI Regime

8. The Operator shall continually monitor performance and service quality against the Key Performance Indicators shown in Table 1 to this Schedule.

9. The performance and service quality monitoring undertaken by the Operator shall be in accordance with requirements set out at and developed in accordance with paragraphs 24 and 25 of Schedule 2 (*Project Development Output Specification*) of the Agreement and shall be produced in the form of a composite KPI Monitoring Report included in the Service Quality Report submitted to **tie** for each Reporting Period no later than three Business Days following the end of the Reporting Period and in advance of submission of the Operator's application for payment for that Reporting Period. In the event that such Service Quality Report is not provided in a timely fashion in a previously agreed format or is unsatisfactory in a material respect in **tie's** opinion (acting properly and reasonably), **tie** shall not be obliged to review any

application for payment relying upon such report until the defects in it are corrected to **tie**'s satisfaction and **tie** has had a reasonable opportunity to review the resubmitted report.

10. **tie** shall conduct the periodic inspections and surveys stipulated under paragraphs 24 and 25 of Schedule 2 (*Project Development Output Specification*) of the Agreement in relation to Operator Maintenance, revenue protection and customer satisfaction, as well as spot checks on other selected Performance Indicators and report on these matters on a regular basis to the Operator.

11. The Operator shall be responsible for assessing the KPI Monitoring Report and the results of the inspections and surveys under paragraph 9 above and shall allocate Performance Points against meeting the performance standards set by the Agreement, in accordance with this Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*). The Operator shall then calculate the applicable percentage deduction for the Reporting Period for application to the KPI Regime Profit Element and show this in the relevant application for payment.

12. The KPI Regime Profit Element shall be apportioned into seven financial components set individually against each KPI in accordance with the relevant weighting. The amount attributable to each KPI is shown in Column 5 of Table 1 to this Schedule.

13. Any deductions imposed in respect of underperformance shall be cumulative. For Example: performance below 85% will attract a cumulative 100% deduction on any KPI. Underperformance will attract the full percentage deduction, irrespective of where such Underperformance sits within the applicable range shown in Table 1 to this Schedule.

14. In the event that the Operator incurs aggregated deductions in respect of underperformance ("Underperformance Threshold") which equal or exceed thirty percent (30%) of the KPI Regime Profit Element during any Reporting Period, **tie** shall be entitled to issue a notice ("**Major KPI Breach Notice**") requesting the Operator to deliver a plan (" KPI Rectification Plan") setting out detailed measures to remedy the matters specified by **tie** in such notice. If, in **tie**'s opinion, the KPI Rectification Plan is:

    14.1 inadequate; or

    14.2 no material improvement in performance is achieved by the Operator during the next Reporting Period (whether or not the KPI Rectification Plan was satisfactory to **tie**) and aggregated net deductions remain equal to or above the Underperformance Threshold;

the Operator shall be obliged to apply a multiplier of 1.25 to the aggregated value of net deductions for that Reporting Period (which calculation shall be shown in the relevant invoice) and **tie** shall issue a KPI Warning Notice.

15. If, for the next Reporting Period following issue by **tie** of a KPI Warning Notice, underperformance deductions remain at or above the Underperformance Threshold or no acceptable KPI Rectification Plan has been submitted, the Operator shall be obliged to apply a multiplier of 1.5 to the aggregated value of deductions for that Reporting Period (which calculation shall be shown in the relevant invoice). **tie** shall be entitled to issue a second KPI Warning Notice, requiring material improvement and production and delivery of a KPI Rectification Plan.

16. In the event that for a fourth and consecutive Reporting Period, underperformance deductions remain at or above the Underperformance Threshold or no acceptable KPI Rectification Plan has been submitted, the Operator shall be obliged to apply a multiplier of 2 to the aggregated value of deductions for that Reporting Period (which calculation shall be shown in the relevant invoice), until such time as performance improves. Underperformance deductions above the Underperformance Threshold without improvement for six consecutive Reporting Periods shall constitute an Operator Default.

17. In the event that underperformance by the Operator results in a second Major KPI Breach Notice within 12 months of the first such notice, this shall constitute an Operator Default.

18. The Parties acknowledge that all deductions under the KPI Regime will be a genuine pre estimate of loss incurred by the System and by **tie** as a result of the operational under-performance and that no legal challenge or review may be made to their application on the basis that the deductions (either initial or pursuant to paragraphs 7 to 16 above are unenforceable or unreasonable penalties or do not represent properly calculable heads of damages.)

19. **Pain-Gain Share Mechanism**

19.1 The parties have agreed to apply a mechanic to share proportionately in patronage growth and cost generated by the Edinburgh Tram Network operations on the following basis:

19.1.1 The mechanic shall be applied by **tie** to the aggregate Actual Tram Patronage (boarders) and the aggregate Operating Costs in respect of which Target

Operating Costs have been allocated at the end of each Pain/Gain Share Period.

19.1.2 The calculation shall be carried out by **tie** using the applications for payment and data submitted by the Operator with regard to Operating Costs and Actual Tram Patronage (boarders) over the immediately preceding Pain/Gain Share Period and verified by **tie** audit on the basis of Clause 49 (*Information and Audit Access)* of the Agreement.

19.1.3 The calculation exercise shall be completed by **tie** no later than 60 days following the end of the each Pain/Gain Share Period.

19.1.4 The calculation shall compare the aggregate Actual Tram Patronage (boarders) over the relevant Pain/Gain Share Period to the Profiled Target Patronage and the aggregate Operating Costs in respect of which Target Operating Costs have been allocated in the relevant Pain/Gain Share Period to the Profiled Target Operating Costs.

19.2 In the event that **tie** determines, acting reasonably, through calculation that the aggregate Actual Tram Patronage (boarders) over the relevant period:

19.2.1 have exceeded Profiled Target Patronage (boarders), the Parties shall be entitled to a share in that surplus as follows:

19.2.1.1 **tie** share: ninety eight and one half per cent (98.5%)

19.2.1.2 Operator share: one and one half per cent (1.5%)

19.2.2 did not achieve Profiled Target Patronage (boarders), the Parties shall contribute to the deficit as follows:

19.2.2.1 **tie** contribution : ninety eight and one half per cent (98.5%)

19.2.2.2 Operator contribution: one and one half per cent (1.5%)

19.3 In the event that **tie,** acting reasonably, determines that Operating Costs in respect of which Target Operating Costs have been allocated over the relevant period:

19.3.1 have exceeded Profiled Target Operating Costs the parties shall contribute to the deficit as follows:

19.3.1.1 **tie** contribution: twenty per cent (20%)

19.3.1.2 Operator contribution: eighty per cent (80%)

19.3.2 have achieved savings against Profiled Target Operating Costs, the parties shall be entitled to a share in the savings as follows:

19.3.2.1 **tie** share: fifty per cent (50%)

19.3.2.2 Operator share: fifty per cent (50%)

19.4 The Pain Gain share mechanic shall operate in relation to Operating Costs (except for Fixed Costs and any actual costs which are to be paid or agreed to be paid in accordance with this Agreement) and Actual Tram Patronage (boarders) and separately from the KPI Regime.

20. The calculations set out in paragraph 18 above shall be reconciled by **tie** to produce an aggregate net result. In the event that the result is positive number in the Operator's favour, **tie** shall notify the Operator, give details of the relevant calculations and reconciliation and state the net pain/gain share balance. The Operator shall then submit an invoice substantially in the form of Schedule 6 *(Form of Invoice for Project Phase D)* to this Appendix to **tie** and **tie** shall make payment within 30 days of receipt of the invoice. If the result is a negative number representing an amount owed to **tie**, **tie** shall submit an invoice to the Operator and be entitled to receive reimbursement from the Operator within 30 days of the Operator's receipt of the invoice or by operation of set off from the Operator's monthly invoices until such time such amount is extinguished. Any amount outstanding to the credit of **tie** shall be treated as debt due and payable to **tie** by the Operator. For the avoidance of doubt, set off by **tie** shall in all cases be in addition to any performance deductions being applied pursuant to the KPI Regime.

21. Not used

22. In the event of expiry of the Term or an early termination, **tie** shall be expressly entitled to carry out the calculation under paragraph 18 above on a pro rated basis and the provisions of paragraphs 18, 19 and 20 above shall continue to apply, save that any amount due and payable to **tie** shall be paid by the Operator to **tie** within 30 days of written demand by **tie**.

23. The Operator may refer any Dispute concerning any determination, calculation or reconciliation by **tie** in accordance with paragraphs 18, 19 and/or 21, to the Dispute Resolution Procedure. If it is determined pursuant to the Dispute Resolution Procedure that the whole or any part of any disputed amount should be paid to the Operator or to **tie** (as

appropriate), then payment shall be made by the appropriate party to the other within 30 days of the receipt of an invoice in respect of the determined amount. Any costs incurred by the Operator in auditing any determination, calculation or reconciliation which is the subject of a Dispute under this paragraph 22 shall be at the Operator's own cost unless the **tie** calculation or reconciliation is wrong in which case it shall be paid by **tie** to the Operator.

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

This is Schedule 4 referred to in the Operating Appendix annexed to the foregoing Development Partnering and Operating Franchise Agreement between tie Limited and TRANSDEV Edinburgh Tram Limited dated 19 and 20 December 2007

SCHEDULE 4

Operating Output Specification

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1. OVERALL SYSTEM REQUIREMENTS

1.1 The System shall be an electrically powered light rail system using Trams to carry passengers and may include all or any of the following Lines and/or Phases (or any parts thereof):

1.1.1 Phase 1a;

1.1.2 Phase 1b;

1.1.3 Line 1;

1.1.4 Line 2;

1.1.5 Line 3; and

1.1.6 Network Expansions

1.2 **tie**'s overall requirements of the System are that it shall achieve and sustain the Project Vision and be:

1.2.1 Safe and secure;

1.2.2 Reliable;

1.2.3 Attractive;

1.2.4 Delivered within the Affordability Limits;

1.2.5 Affordable for passengers;

1.2.6 Efficient;

1.2.7 Environmentally acceptable;

1.2.8 Sustainable;

1.2.9 Easy for passengers to use;

1.2.10 Accessible to all including mobility impaired passengers;

1.2.11 Able to provide a minimum level of service specified by the Operating Output Specification;

1.2.12 Able to support the local transport strategy, policies, planning and system aspirational objectives of the City of Edinburgh Council and TEL;

1.2.13 Integrated with other transport modes;

1.2.14 Capable of Network Expansions; and

1.2.15 Able to project a TEL bus and tram network wide high quality brand image.

1.3 **tie** requires that operation of the System shall reflect a high standard of presentation and public image to match the City of Edinburgh's status as a World Heritage Site and that the System shall be operated efficiently with minimum disturbance to the public and minimum delay to passengers.

1.4 All aspects of the operation of the System shall take account of the need to react safely and quickly to emergencies.

1.5 The System shall incorporate such staffing, surveillance and alarm equipment as is appropriate to ensure the safety of the public, especially lone and mobility impaired travellers.

1.6 **tie** requires that the System shall be capable of responding to Network Expansion and resultant increased ridership without adverse impact on quality.

1.7 The System shall be constructed, maintained and operated at all times in accordance with Good Industry Practice, the Necessary Consents and the Law.

2. PROJECT OPERATIONAL OBJECTIVES

The objectives of **tie** and the Operator during the Service Period shall be to ensure that:

2.1 the System complies with the requirements set out in paragraph 1 above;

2.2 the System is operated in accordance with the terms of this Agreement, including this Operating Output Specification, the Operating Method Statement, the Environmental Statement and the Design Manual, as amended from time to time in accordance with the Agreement;

2.3 the System is operated in accordance with Law and Good Industry Practice; and

2.4 the operation of the System is integrated with existing transport operators in Edinburgh, in accordance with the Service Integration Plan.

2.5 The primary objectives of **tie**, the **tie** Advisers and the Operator during the Service Period in respect of any Phase shall be to:

2.5.1 procure the performance of the Project Operations in accordance with this Operating Output Specification and the Operating Method Statements;

2.5.2 manage the provision of Infrastructure Provider Maintenance of the System;

2.5.3 develop and procure any Network Expansion and to encourage growth in patronage; and

2.5.4 sustain the highest level of system performance at all times.

2.6 The detail of this Operating Output Specification shall be developed by the Operator, **tie** and the **tie** Advisers pursuant to the terms of the Project Development Output Specification and the Agreement.

2.7 The following paragraphs set out **tie**'s intentions as at the DPOFA Variation Date in relation to the requirements of the Operating Output Specification.

3. OPERATIONAL REQUIREMENTS

Introduction

3.1 Part of the Project Development Objectives is to optimise route service patterns and frequencies. It is therefore not possible to define the precise requirements for the Transport Services at the DPOFA Variation Date .

3.2 The development of the Operating Output Specification in relation to the Transport Services will take into account and develop the Development Assumptions made during Project Phases A and B to accommodate the possible phased introduction of the Transport Services on the System.

3.3 The following paragraphs outline the expected operational parameters.

4. TRANSPORT SERVICE REQUIREMENTS

4.1 Days of Operation

The Transport Services shall be provided by the Operator on the Edinburgh Tram Network on 364 days of the year. On Edinburgh Holidays, the Operator shall provide Transport Services at least as frequent as it would normally provide on a Sunday.

4.2 Journey times

4.2.1 During Project Phases A, B and C, the Operator shall develop and agree with **tie** and the **tie** Advisers the maximum journey times between locations on the Phases and/or Edinburgh Tram Network which shall not be exceeded by Trams in either direction.

4.2.2 The Operator shall also agree the planned journey times, layover times, allowances for dwell times and allowances for recovery times in planning the Timetable. When necessary, the Timetable shall be reviewed (in accordance with Clause 6 (*Transport Services Timetable*) of the Operating Appendix and, if so agreed with **tie**, adjusted and in such circumstances, the Operator shall provide a copy thereof and each successive update thereof to **tie**.

4.3 Service Levels and Patterns

4.3.1 Pursuant to paragraph 9 of the Project Development Output Specification, with effect from the Service Commencement Date in respect of each Phase or part thereof, the Operator shall provide the minimum number of tram services per hour specified in the agreed operating pattern.

4.3.2 The Operator shall ensure that the intervals in the Timetable between tram services from each Tramstop for the same destination shall be equal within any time bands established for differing tram frequencies unless otherwise agreed in writing by **tie** and in accordance with Schedule 3 (*Project Phase D Payment Mechanism and KPI Regime*) to the Operating Appendix..

4.3.3 The Operator shall ensure that tram services call at all Tramstops when operating in public service, except at the beginning and end of each Tram's duty cycle when short workings may be operated unless otherwise agreed in writing by **tie**.

4.3.4 If at any time during the Service Period (under normal operating conditions excluding Special Events) the level of the Transport Services set out above is insufficient to accommodate the actual passenger demand and appropriate operating passenger densities, the Operator and **tie** will meet to discuss whether and how to jointly procure sufficient additional capacity to ensure that passenger demand can be accommodated at such appropriate operating passenger densities.

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4.3.5 Transport Services to be provided during Special Events shall be subject to periodic agreement between tie and the Operator, taking into account anticipated patronage and route availability and dealt with under Clause 8 (*Special Events*) of the Operating Appendix.

4.4 Operating Hours

4.4.1 Unless otherwise agreed by tie during Project Phases A, B or C, of this Agreement, with effect from the Service Commencement Date in respect of each Phase, the Operator shall ensure that the departure of:

- The first tram service for each route specified in Table 1 below shall be no later than the times specified in that table; and that
- The last tram service for each route specified in Table 1 below shall be no earlier than the time specified in the table.

Table 1 : First and Last Scheduled Departure Times

6 & 6 Tram per Hour Scenario

		Monday - Friday (trams per hour)					
Networking / Phasing	Service Frequency commencing at:	First tram 06:00	06:45	07:00	07:20	23:15	23:59
1a	Airport to Ocean Terminal	0	6	6	6	6a	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6	[redacted]		6a	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6b	0
1b	Newhaven to Granton	6	6			6c	0

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Networking / Phasing	Service Frequency commencing at:	Saturday (trams per hour)					
		First tram					
		06:00	06:45	07:45	17:30	23:15	23:30
1a	Airport to Ocean Terminal	6	6	6	6	6a	6
1b	Ocean Terminal to Airport	6	6	6	6	6	6
2a	Haymarket to Newhaven	6	6	6	6	6	6
2b	Newhaven to Haymarket	6	6	6	6	6	6
3a	Airport to Ocean Terminal	6	6			6a	6
3b	Ocean Terminal to Airport	6	6			6	6
4a	Granton to Newhaven	6	6			6b	6
4b	Newhaven to Granton	6	6			6c	6

Networking / Phasing	Service Frequency commencing at:	Sunday (trams per hour)					
		First tram					
		07:00	08:45	09:30	17:30	23:15	23:30
1a	Airport to Ocean Terminal	6	6	6	6	6a	6
1b	Ocean Terminal to Airport	6	6	6	6	6	6
2a	Haymarket to Newhaven	6	6	6	6	6	6
2b	Newhaven to Haymarket	6	6	6	6	6	6
3a	Airport to Ocean Terminal	6	6			6a	6
3b	Ocean Terminal to Airport	6	6			6	6
4a	Granton to Newhaven	6	6			6b	6
4b	Newhaven to Granton	6	6			6c	6

Notes:
a) from approx 23:15 trams run from Airport - City Centre only
b) from approx 23:15 trams run from Granton - City Centre only

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c) from approx 23:15 Granton trams run from Newhaven - Haymarket continuing in service on TL2 to Gyle
Note: The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Table 1: First and last tram services and frequencies for 6 & 6 tram per hour scenario

8 & 8 Tram per Hour Scenario

Networking (Phasing) andService Frequency commencing at:		Monday - Friday (trams per hour)										
		06:00	06:45	07:00	07:20	07:45	09:45	15:45	19:00	19:20	19:45	23:15
1a	Airport to Ocean Terminal	0	8	8	8				8	8		8a
1a	Ocean Terminal to Airport	8	8	8	8				8	8		8
1a	Haymarket to Newhaven	0		8	8				8	8		
1a	Newhaven to Haymarket	0		0	8				8	8d		
1b	Airport to Ocean Terminal	0	8	8		8			8		8	8a
1b	Ocean Terminal to Airport	8	8	8		8			8		8	8
1b	Granton to Haymarket	0	4	4		8	8	8	8		4	4 b
1b	Haymarket to Granton	4	4	8		8	8	8	8		4	4c

Networking (Phasing) andService Frequency commencing at:		[illegible]										
		[illegible]										
1a	Airport to Ocean Terminal	[illegible]										
1a	Ocean Terminal to Airport	[illegible]										
1a	Haymarket to Newhaven	[illegible]										

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1a	Newhaven to Haymarket	

1b	Airport to Ocean Terminal	
1b	Ocean Terminal to Airport	
1b	Granton to Haymarket	
1b	Haymarket to Granton	

Networking (Phasing) andService Frequency commencing at:

1a	Airport to Ocean Terminal	
1a	Ocean Terminal to Airport	
1a	Haymarket to Newhaven	
1a	Newhaven to Haymarket	

1b	Airport to Ocean Terminal	
1b	Ocean Terminal to Airport	
1b	Granton to Haymarket	
1b	Haymarket to Granton	

Notes:
a) from approx 23:15 trams run from Airport - St Andrew Sq only
b) from approx 23:15 trams run from Granton - St Andrew Sq only
c) from approx 23:15 Granton trams run from Newhaven - Haymarket continuing in service on to Gyle
d) from approx 19:20 (18:50 Saturdays and 18:20 Sundays) Haymarket trams running from Newhaven - Haymarket continue in service to Gyle

Note: The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

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Table 2: First and last tram services and frequencies for 8 & 8 tram per hour scenario

4.5 Availability, Reliability, Punctuality and Regularity of the Transport Services

The Operator shall monitor those Performance Indicators related to Transport Services delivery for each Phase by methods to be agreed with **tie** and shall report to **tie** on those Performance Indicators in the Service Quality Report rendered pursuant to Clause 12 (*Service Performance and Quality Monitoring*) of the Operating Appendix. Any remedial action necessary to achieve requisite performance levels, or where appropriate any adjustment of the performance levels, shall be subject to agreement of **tie** as set out in the KPI Regime.

5. SERVICE INTEGRATION

5.1 The Operator shall support the refinement and adjustment of the Service Integration Plan in conjunction with **tie,** TEL, other public transport operators and in conformity with CEC's local transport strategy.

5.2 The Operator shall implement the Service Integration Plan in so far as it directly relates to Transport Services to achieve timetable coordination measures (as appropriate and as far as reasonably practicable) and in accordance with the Operator's other obligations.

5.3 The Operator shall on each Tram show information received from **tie** and/or TEL related to connecting public transport timetables.

5.4 Subject to Clause 12.19 of the Agreement, publicity, particularly Timetable and fares information, shall be presented in a common format provided by **tie.** Timetable information shall be provided to Traveline Scotland or any successor notified by **tie** with adequate notice being given of any proposed service alterations

6. OPERATING METHOD STATEMENT

6.1 The Operator shall implement and maintain up-to-date all component plans which constitute the Operating Method Statements and as developed under paragraph 26 of the Project Development Output Specification. Changes proposed by the Operator to any of the these plans shall be agreed with and approved by **tie** prior to implementation.

7. STAFF

7.1 At all times during the Service Period, the Operator shall ensure that:

7.1.1 there shall be a sufficient number of staff (including the Key Personnel and all relevant grades of supervisory staff) engaged in the provision of the Project Operations with the level of skill and experience appropriate to the tasks to which such staff are allocated and the standards which are required to be achieved pursuant to this Agreement. To avoid doubt, this obligation shall include ensuring that there are sufficient staff to cover periods of holiday, sickness and other absences and anticipated and actual peaks in demand for the Service;

7.1.2 all staff receive adequate training for their roles in accordance with the Recruitment and Training Plan to ensure the proper performance of this Agreement and compliance with all health and safety rules, procedures and requirements. Such training must be supplemented by continuing development;

7.1.3 The Operator shall, within 60 days of Operating Effective Date, present to **tie** for approval a programme of actions necessary to obtain an appropriate 'business excellence' certification such as 'Investors In People' and shall implement that programme accordingly.

7.1.4 The Operator shall have in place and implement appropriate equal opportunities and equality policies and comply with Law regarding employment.

7.2 The Operator shall procure that the **tie** Project Manager shall upon reasonable notice have access to all material details in respect of all employees of the Operator and any Operator Party engaged in the performance of the Project Operations including numbers and categories of staff employed to perform the Project Operations and including in respect of each such employee:

7.2.1 details of qualifications;

7.2.2 details of training undertaken by the employee;

7.2.3 disciplinary record; and

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7.2.4 criminal record (excluding convictions considered to be spent under the Rehabilitation of Offenders Act 1974).

7.3 The Operator shall (and shall procure that any Operator Party shall) inform local employment and training organisations and any other employment and/or training organisations operating in Edinburgh of any staff vacancies in connection with the Project Operations before advertising the vacancies.

8. REPORTING

8.1 Subject to the provisions of Clause 12.19 of the Agreement, the Operator shall supply the following information to **tie** in the form of Service Quality Reports in accordance with Clause 12 (*Service Performance and Quality Monitoring)* of the Operating Appendix and at other such times and in such form (including Annual Service Reports) as **tie** may reasonably require:-

8.1.1 Patronage information in the form of Actual Tram Patronage (boarders) and on-board tram revenue collection and ticket checking data in consolidated format;

8.1.2 Operating Costs;

8.1.3 Data for concessionary fare and multi-modal ticket type usage in conjunction with paragraph 8.1.1;

8.1.4 Reliability and punctuality records;

8.1.5 Quality assurance certificates in accordance with the Quality Management Plan;

8.1.6 Company accounts;

8.1.7 Failure information; and

8.1.8 Any information necessary for **tie** to audit the achievement or otherwise of Key Performance Indicators and other Performance Indicators.

8.2 **tie** shall also have the right in accordance with Clause 16.5 of the Operating Appendix to commission or undertake passenger surveys, including face-to-face interviews, to determine usage and other information.

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8.3 The Operator shall, where necessary, collate and report on information received from Infrastructure Providers relevant to reporting upon the operation of the System.

9. INFORMATION FOR THE PUBLIC

9.1 Subject to the provisions of Clause 12.19 of the Agreement, the Operator shall display information as instructed and provided by **tie** at each Tramstop at all times throughout the Service Period:

9.1.1 accurate information relating to the scheduled times and Headways of all Trams in service arriving at and departing from that Tramstop, provided that for any period when the scheduled Headway is less than 10 minutes, the Operator need only provide information in relation to the duration of such Headway;

9.1.2 real time information about Transport Services at all Tramstops including the anticipated time of departure from that Tramstop of the next Tram and interchange buses and the destination of such Trams or interchange buses, as the system can display; and

9.1.3 details of the first and last Tram at each such Tramstop for each day.

9.2 **tie** shall provide paper copies of the Timetable to the Operator and the Operator shall make these copies available (free of charge) to members of the public following any request. **tie** shall display copies of the Timetable at Tramstops and at any bus or railway station or other passenger interchange from time to time and subject to the approval of such third parties as may be necessary. If the Operator makes any change to the Timetable (to the extent that such changes are permitted under this Agreement) the Operator shall make copies of the revised Timetable available to **tie** and TEL at least 30 days prior to implementation of the planned changes to the Timetable.

9.3 The Operator shall use its best endeavours (including any steps reasonably requested by **tie** from time to time) to inform potential users of the System on at least 7 prior days' notice if:

9.3.1 it will be unable to operate any Transport Services in accordance with the Timetable; or

9.3.2 it will be providing additional or modified Transport Services in connection with Special Events,

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and shall notify potential users of the System at the same time of any revised Timetable or travelling arrangements.

9.4 The Operator shall:

9.4.1 immediately inform **tie** of any material disruption of the Transport Services and any mitigating action taken or to be taken so that this information can be widely circulated; and

9.4.2 when requested by **tie**, provide information about its current operations and future proposals in a form agreed with **tie** to facilitate the provision of public information;

9.5 The Operator shall comply with the Public Liaison and Media Plan and co-operate with **tie** and provide such information and assistance as **tie** may reasonably require from time to time in the provision of information to the travelling public regarding public passenger transport services in Edinburgh.

10. PASSENGER'S CHARTER

10.1 Pursuant to paragraph 29 of the (*Project Development Output Specification*), the Operator shall produce, publish and maintain in force and comply with throughout the Service Period, and update from time to time, the approved passengers' charter outlining the expectations which passengers may have of the Transport Services on the System and a procedure for passenger complaints, such charter to be subject to the prior written approval of **tie** (such approval not to be unreasonably withheld or delayed).

11. CONTROL CENTRE

11.1 The Operator shall be responsible for ensuring that staffing and consumables for the Operator are provided on a 24/7 basis for operation of the Control Centre and for interface management between Tram operations and System infrastructure and vehicle availability and maintenance.

11.2 The Operator shall at all times at the Control Centre man a priority telephone facility (with dedicated handsets and direct lines) for external communications to the emergency services, regional electricity control and other key parties.

11.3 The Operator shall automatically and continuously log at the Control Centre Tram movements so as to provide for day-to-day performance monitoring and incident and fault inquiry and also for periodic off-line evaluation of service quality and compliance with this Operating Output Specification.

12. OPERATOR MAINTENANCE RESPONSIBILITIES

12.1 The Operator shall be responsible for implementing the Operator Maintenance Plan.

13. MANAGEMENT OF INFRASTRUCTURE PROVIDER MAINTENANCE

13.1 The Operator shall be responsible for managing the implementation of System Maintenance by the Infrastructure Provider(s).

14. CONSUMABLES, MATERIALS AND EQUIPMENT

14.1 The Operator shall ensure that the goods, equipment, consumables and materials to be provided by the Operator and used by it or any Sub-Contractor in connection with the provision of any of the Project Operations (each as a distinct and separate obligation) are:

14.1.1 of satisfactory quality;

14.1.2 maintained and stored in a safe, serviceable and clean condition in accordance with Good Industry Practice;

14.1.3 of the type specified in this Operating Output Specification or as agreed during the development of the Operating Method Statements; and

14.1.4 in compliance with Law and Necessary Consents,

and shall, as soon as reasonably practicable after receiving a request from the **tie** Project Manager, supply to the **tie** Project Manager reasonable evidence to demonstrate its compliance with this paragraph 14.1 in so far as practicable.

14.2 The Operator shall be responsible for and shall procure that sufficient stocks and continuous supply of goods, spares, consumables, equipment and materials to be provided by the Operator are available at all times in order to comply with its obligations under this Agreement.

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14.3 The Operator shall not install, keep or use in or on the Site any materials, equipment or apparatus, the installation, keeping or use of which is likely to cause (or in fact causes):

14.3.1 material damage to the System;

14.3.2 environmental contamination or the generation, accumulation or migration of any hazardous substance in an unlawful manner whether within or outside the Site (or the soil, air or water surrounding it); or

14.3.3 health or safety risk to the public or its own staff;

and shall use all reasonable endeavours to ensure (by directions to staff and otherwise) that all consumables, materials, equipment or apparatus to be provided by the Operator in or on the System Land are stored, operated and used in accordance with the Environmental Statement and so as to minimise noise and vibration (through the relevant medium) likely to cause damage, annoyance or disturbance and prevent environmental contamination or the unlawful generation or migration of any hazardous substance.

14.4 Without prejudice to the generality of its obligations under this Agreement, the Operator shall:

14.4.1 procure that all hazardous materials and equipment used or stored by the Operator on the Site shall be kept in accordance with Good Industry Practice, properly and securely labelled and stored, under appropriate supervision and used only by appropriately trained and competent staff; and

14.4.2 use all practicable and reasonable means to:

14.4.2.1 prevent and counteract the unlawful emission or theft of such hazardous substance;

14.4.2.2 avoid the unlawful discharge into any conducting media serving or passing through, under or over the Site of such hazardous substance;

14.4.2.3 prevent the unlawful generation, accumulation or migration of such hazardous substance at or from the Site; and

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14.4.2.4 prevent any environmental claims arising or any circumstances arising likely to result in any environmental claims.

15. REVENUE PROTECTION

The Operator shall implement in transit inspection of tickets on every Tram in operation on the Edinburgh Tram Network and other methods as agreed with **tie** from time to time to check that passengers are in possession of a valid ticket or tickets for journeys that are taken and to ensure that ticketless or other fraudulent travel is deterred.

15.1 If required by **tie** in the Service Integration Plan, the Operator shall as practicable link its fare collection system to the OneTicket scheme currently in operation.

15.2 The Operator shall as practicable ensure that its on-board inspectors check and record smartcards: (a) for the provision of transaction and validation data ;and (b) to take action to confiscate the smartcard in the event that it is on a hot list as provided by **tie** to the Operator.

16. PARK AND RIDE FACILITIES

16.1 Security

16.1.1 The Operator shall if monitored by the Control Room and a CCTV system is provided operate a CCTV system covering each Tramstop, facilities provided (including ticket machines, shelters, buildings and other structures) and the whole of the car park and footpaths at all park and ride sites.

16.1.2 The Operator shall, if monitored by the Control Room and a CCTV system is provided, respond appropriately to any incidents at the park and ride sites.

17. SYSTEM OPERATING ENVIRONMENT AND LANDSCAPE

In carrying out the Project Operations, the Operator shall comply with such parts of the Design Manual as are mandated in this Operating Output Specification and shall give due consideration to the contents of the Design Manual as a whole.

17.1 Environmental Plan and Policy Statement

17.1.1 The Operator shall comply with the Design Manual.

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17.1.2 The Operator shall implement the Environmental and Sustainability Management Plan in relation to the Operator Maintenance.

17.1.3 The Environmental and Sustainability Management Plan shall be in accordance with best environmental practice, validated by independent audit and in compliance with ISO 14001 (or equivalent). Following commissioning of the System, the Operator shall carry out an annual audit of such plan.

17.2 Operational Noise and Vibration

The Operator shall take all reasonable steps to minimise operational noise (including from public address systems and audible passenger boarding signals), vibration, emissions or other disturbance during the Term which might result in interference with and/or nuisance to the public and to nearby properties, in particular at night or with respect to buildings and structures with sensitive equipment and ensure that operation of the System complies as far as reasonably practicable having regard to the Infrastructure and Equipment with the requirements of the Design Manual, the Environmental Statement, the Code of Maintenance Practice and the Noise and Vibration Policy.

18. SYSTEM QUALITY PROTECTION

The Operator shall be responsible during the Term for continual assessment of System quality protection through the provision of advice to **tie**, in particular on the introduction of technology upgrades and replacement and on the general whole life performance of the System, including Assets used by the Operator in conjunction with the Infrastructure Provider.

.....	.....
Director/Authorised Signatory **tie Limited**	**Director/Authorised Signatory** **TRANSDEV Edinburgh Tram Limited**

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17.1.2 The Operator shall implement the Environmental and Sustainability Management Plan in relation to the Operator Maintenance.

17.1.3 The Environmental and Sustainability Management Plan shall be in accordance with best environmental practice, validated by independent audit and in compliance with ISO 14001 (or equivalent). Following commissioning of the System, the Operator shall carry out an annual audit of such plan.

17.2 Operational Noise and Vibration

The Operator shall take all reasonable steps to minimise operational noise (including from public address systems and audible passenger boarding signals), vibration, emissions or other disturbance during the Term which might result in interference with and/or nuisance to the public and to nearby properties, in particular at night or with respect to buildings and structures with sensitive equipment and ensure that operation of the System complies as far as reasonably practicable having regard to the Infrastructure and Equipment with the requirements of the Design Manual, the Environmental Statement, the Code of Maintenance Practice and the Noise and Vibration Policy.

18. SYSTEM QUALITY PROTECTION

The Operator shall be responsible during the Term for continual assessment of System quality protection through the provision of advice to tie, in particular on the introduction of technology upgrades and replacement and on the general whole life performance of the System, including Assets used by the Operator in conjunction with the Infrastructure Provider.

[redacted]

Director/Authorised Signatory
tie Limited

[redacted]

Director/Authorised Signatory
TRANSDEV Edinburgh Tram Limited

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THIS IS SCHEDULE PART 43 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 43

RESERVE ACCOUNT

1. Bilfinger Berger UK Limited, on behalf of the Infraco, shall establish a Reserve Account within 30 days of the Effective Date, such account to be established and maintained with a bank acceptable to **tie** at the cost of the Infraco and to be operated only for the purposes set out in this Schedule Part 43.

2. The Reserve Account shall be funded by the Infraco up to the maximum agreed level, THREE MILLION POUNDS (£3,000,000), by the date of issue of the Certificate of Service Commencement. The Infraco shall demonstrate the level of funding maintained in the reserve account at quarterly intervals to **tie**.

3. In the event that:

   3.1 a claim is brought against or a liability is incurred by **tie** or the Indemnified Parties for uninsured third party economic consequential loss prior to the issue of the Reliability Certificate which arises as a consequence of the Infraco's performance or non performance of the Infraco Works (including as described under Clause 77.1.1 or 77.1.2) which would have been recoverable from Infraco pursuant to Clause 77 (*Indemnity by Infraco, Liability and Sole Remedy*) but for the provisions of Clause 77.8, **tie** shall be entitled to set off (as a debt), in accordance with Clause 69.2 against any payment due to the Infraco pursuant to this Agreement (but if there are no such payments due to the Infraco, to recover as a debt), any payment made by **tie** or the Indemnified Parties in respect of such claims or liability incurred up to a maximum in aggregate of THREE MILLION POUNDS (£3,000,000) less the aggregate of any payments made by Infraco to which paragraph 3.2.2 applies as at the date **tie** is entitled to set off pursuant to this paragraph 3.1;

   3.2 the Infraco has properly made any payment in respect of a claim made against it by or liability incurred to a third party for uninsured economic consequential loss which has arisen as a consequence of the Infraco's performance or non performance of the Infraco Works (and has notified **tie** prior to making such payment):

      3.2.1 in the case where the aggregate of: (i) such payment (or part of such payment), (ii) amounts set off by **tie** pursuant to paragraph 3.1; and (iii) payments previously made by the Infraco (to which this paragraph 3.2 applies), exceeds THREE MILLION POUNDS (£3,000,000), then **tie** shall

reimburse to Infraco within 30 Business Days the lesser of the amount which equals: (i) the amount by which the aggregate exceeds THREE MILLION POUNDS (£3,000,000) and (ii) the payment made by Infraco to which this paragraph 3.2 applies; or

3.2.2 in the case where the aggregate of: (i) such payment, (ii) amounts set off (or recovered) by **tie** pursuant to paragraph 3.1 and (iii) payments previously made by Infraco to which paragraph 3.2 applies, is less than THREE MILLION POUNDS (£3,000,000), then such payment (or part thereof) shall be taken into account when calculating the amount **tie** is entitled to set off (or recover) pursuant to paragraph 3.1 and the Infraco shall be entitled to be reimbursed from the Reserve Account and **tie** shall have no liability to reimburse the Infraco.

4. Without the prior written consent of the Parties, the Reserve Account shall not be used for any purpose other than as stipulated in this Schedule Part 43 (*Reserve Account*). For the avoidance of doubt, all obligations of Bilfinger Berger UK Limited pursuant to this Schedule Part 43 shall be owed to **tie** on a joint and several basis on behalf of the Infraco.

5. For the avoidance of doubt, any amounts set off or recovered from Infraco by **tie** as a debt due or to which paragraph 3.2.2 applies shall be included in the aggregate liability of Infraco under this Agreement for the purposes of Clause 77.7.



THIS IS SCHEDULE PART 44 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

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SCHEDULE PART 44

EAL WORKS

1. DEFINITIONS AND INTERPRETATION

1.1 In this Schedule Part 44 *(EAL Works)*, save as otherwise expressly stated or as the context otherwise requires:

1.1.1 "**2005 Agreement**" means the agreement between EAL and CEC in relation to the Tram Project dated 14 September 2005;

1.1.2 "**Abandoned**" means, in respect of the EAL Works, that they have not been materially progressed once started for a period of more than 18 consecutive months;

1.1.3 "**Act**" means the Edinburgh Tram (Line Two) Act 2006;

1.1.4 "**Aerodrome Safeguarding Guidance**" means the policies, advice notes and guidance listed in Appendix 9 to this Schedule Part 44 *(EAL Works)*;

1.1.5 "**Agreed EAL Works Data**" means all Reviewable EAL Works Data, issued or re-issued by the Infraco pursuant to Appendix 3 to this Schedule Part 44 *(EAL Works)* and to which **tie** has not objected pursuant to this Appendix;

1.1.6 "**Airport Regulations**" means all laws and regulations affecting airports and aerodromes as they apply to and/or affect EAL and/or Edinburgh Airport including:

1.1.6.1 any regulations issued by the Civil Aviation Authority or NATS Limited;

1.1.6.2 any airport bye-laws and regulations to the extent relating to safety, security and airport operational matters (including radio communications, staff checks and the materials and plant policy) as notified to the Infraco by EAL and/or **tie**;

1.1.6.3 Department for Transport aviation security regulations;

1.1.6.4 any policies of EAL in respect of health and safety and security matters, as notified by EAL and/or **tie** to the Infraco; and

1.1.6.5 the EAL Site Rules,

all as may be amended from time to time.

1.1.7 "**Authorised Tramway**" has the meaning given to it in the Act;

1.1.8 "**Burnside Drawing**" means drawing number 38602TEDD_219_300 annexed and signed as relative hereto;

1.1.9 "**Burnside Land**" means any land which EAL and **tie**, acting reasonably, agree is required in connection with the carrying out of the Burnside Road Re-alignment Works and which is within the area shown marked "Burnside Licensed Land" and shown in the plan included in Appendix 1 to this Schedule Part 44 *(EAL Works);*

1.1.10 "**Burnside Road Re-alignment Works**" means the works specified and described in outline on the Burnside Drawing and as further specified in and pursuant to paragraph 4 of Appendix 5 to this Schedule Part 44 *(EAL Works)*;

1.1.11 "**Draft Drawdown Information**" means a draft of the drawdown information which the Infraco intends to submit pursuant to this Schedule Part 44 *(EAL Works)*;

1.1.12 "**Drawdown Information Requirements**" means the schedule of information in the form set out in Appendix 2 to this Schedule Part 44 *(EAL Works)*, to be completed by the Infraco, as appropriate which will be used by **tie** in respect of applying for each Drawdown Notice;

1.1.13 "**Drawdown Notice**" means a notice submitted by **tie** to EAL for the purpose of securing access to the Licensed Land;

1.1.14 "**EAL Construction Programme**" means the Infraco's construction programme in so far as it relates to the EAL Works (which shall include its programme as regards the commissioning of, and trial operations and the commencement of passenger services on, the Authorised Tramway at Edinburgh Airport) as it may be amended and updated from time to time;

1.1.15 "**EAL Emergency Procedures Protocol**" means the protocol set out in Appendix 7 to this Schedule Part 44 *(EAL Works)*, as it may be amended from time to time;

1.1.16 "**EAL Lease Force Majeure**" means fire, explosion, aircraft crash, legal challenge pursuant to an enforceable court order, industrial action, storm, earthquake, lightning, riot, war, civil commotion or terrorism;

1.1.17 "**EAL Licence Force Majeure**" means fire, explosion, aircraft crash, storm, earthquake, lightning, unforeseeable ground conditions, riot, war, civil commotion or terrorism;

1.1.18 "**EAL Regulator**" means any of the following: Civil Aviation Authority, NATS Limited or the Department for Transport acting in their respective capacities under the Airport Regulations and/or where the context requires the Department for Transport, the Scottish Ministers, Transport Scotland and/or the Office of Rail Regulation and/or HMRI acting in their respective capacities under the Light Railway Regulations;

1.1.19 "**EAL Site**" means, as the context requires, the Licensed Land, the Leased Land and any additional areas of ground at Edinburgh Airport used by the Infraco (with the consent of EAL and **tie**) in connection with the EAL Works;

1.1.20 "**EAL Site Rules**" means the EAL site rules, policies and procedures applicable to Edinburgh Airport listed in Appendix 6 to this Schedule Part 44 (*EAL Works)*, and those rules, policies and procedures as they may be updated from time to time and notified to the Infraco;

1.1.21 "**EAL Works**" means any works authorised by the Act on or affecting the EAL Site (including construction and maintenance activities) and including the Burnside Road Re-alignment Works;

1.1.22 "**EAL Works Data**" means Draft Drawdowns and:

1.1.22.1 all calculations, designs, design information, specifications, plans, design and construction programmes (other than proprietary computer programs), drawings, planning application submissions, graphs, sketches, models, engineering and other forms of data of a materially relevant nature in whatever medium; and

1.1.22.2 all construction methodologies, plans, procedures and method statements,

in both cases which the Infraco is required to produce or otherwise produces in connection with the EAL Works or the EAL Site;

1.1.23 "**Edinburgh Airport**" means Edinburgh Airport, Edinburgh, registered in the Land Register of Scotland under Title Number MID97007;

1.1.24 "**Emergency**" means an event causing or, in the reasonable opinion of a Party and/or EAL, threatening to cause death or injury to any individual, or material damage to property;

1.1.25 "**Leased Land**" means the land comprising the Plot numbers listed as such in Appendix 1 to this Schedule Part 44 *(EAL Works)*, which is marked as "Leased Land" and shown in the plan included in Appendix 1 to this Schedule Part 44 *(EAL Works)*;

1.1.26 "**Licensed Land**" means the Leased Land (but will not include the Leased Land after execution of the EAL Lease), the Temporary Land (marked as "Licensed Land" and shown in the plan included in Appendix 1 to this Schedule Part 44 *(EAL Works))*, and the Burnside Land (marked as "Burnside Licensed Land" and shown in the plan included in Appendix 1 to this Schedule Part 44 *(EAL Works)*);

1.1.27 "**Light Rail Regulations**" means all laws and regulations affecting the operation of tramways and light railways in the United Kingdom;

1.1.28 "**Permitted Use**" means:

1.1.28.1 constructing the EAL Works including any necessary surveys, investigations, enabling works, commissioning and testing of the EAL Works;

1.1.28.2 to the extent consistent with Clause 1.1.28.1, in respect of a particular Phase, for the purposes set out in the relevant Drawdown Notice;

1.1.28.3 maintaining the Edinburgh Tram Network in accordance with the Agreement; or

1.1.28.4 use of the EAL Site for a tram stop (together with associated plant, machinery, apparatus and equipment) and the operation of regular daily passenger services to and from Edinburgh Airport on operational trams when Edinburgh Airport is open;

1.1.29 "**Phase**" means any part of the Licensed Land in respect of which a Drawdown Notice has been validly issued and is in effect;

1.1.30 "**Pro-forma Objection**" means the pro-forma of the objection to be used by **tie** pursuant to paragraph 5.3 of Appendix 3 to this Schedule Part 44 *(EAL Works)*, and which is set out in Appendix 4 to this Schedule Part 44 *(EAL Works)*;

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1.1.31 "**Restoration Works**" means any element of the EAL Works which relates to the Restoration of Assets;

1.1.32 "**Reviewable EAL Works Data**" (or "**REWD**") has the meaning given to it in Appendix 3 to this Schedule Part 44 *(EAL Works)*;

1.1.33 "**Stated Vacation Date**" means, in relation to a Phase, the date on which the Infraco will vacate that Phase as specified in the relevant Drawdown Notice;

1.1.34 "**Temporary Land**" means the land forming part of the Site comprising the Plot numbers listed as such in Appendix 1 to this Schedule Part 44 *(EAL Works)*, marked as "Licensed Land" and shown in the plan included in Appendix 1 to this Schedule Part 44 *(EAL Works)*;

1.1.35 "**Tram Project**" means the project to construct and operate the Authorised Tramway;

1.1.36 "**Vacation Date**" means, in respect of a Phase, the earlier of:

1.1.36.1 the Stated Vacation Date; and

1.1.36.2 the date on which the Infraco no longer reasonably requires the Phase for the purposes specified in the relevant Drawdown Notice; and

1.2 In this Schedule Part 44 *(EAL Works)*, unless the context otherwise specifies or requires, an obligation on the Infraco to "**Restore**" an "**Asset**" shall be interpreted and applied as follows (with "Restored" and "Restoration" being interpreted accordingly):

1.2.1 the following definitions will apply:

1.2.1.1 "**Asset**" means a facility or an asset or part of a facility or part of an asset at the EAL Site (including all structures, buildings, utilities, roads, aircraft stands, helipads, taxi ways, car parks and transport links);

1.2.1.2 "**Existing Asset**" means an Asset which is to be displaced (permanently or on a temporary basis) as a result of the Tram Project, and:

(a) which is used by EAL and/or;

(b) which is leased or licensed by EAL as landlord or licensor to any third party; and/or

(c) in respect of which EAL shares possession with any third party

1.2.1.3 "**New Asset**" means an Asset as Restored pursuant to this Schedule Part 44 (*EAL Works)*; and

1.2.1.4 "**Applicable Laws**" means all applicable laws, consents, approvals and technical standards at the time an Asset is Restored.

1.2.2 an obligation on the Infraco to "**Restore**" an Asset shall mean:

1.2.2.1 an obligation to Re-instate that Asset; or

1.2.2.2 if that is not reasonably practicable, or if it is agreed by EAL and **tie**, **tie** notifies the Infraco to Re-provide that Asset.

1.2.3 an obligation to "**Re-instate**" an Asset is to:

1.2.3.1 provide, where no reasonable alternative to the continuous use of the Asset exists, a temporary replacement for the displaced Existing Asset which complies with all Applicable Laws and is sufficient to allow EAL an equivalent level of use of its Assets generally as it enjoyed prior to such displacement; and

1.2.3.2 at the end of the period of displacement to re-instate the Existing Asset in its original location such that the New Asset is to at least the standard, condition, quality and capacity of the Existing Asset prior to its being affected by the Tram Project, and so that the New Asset complies with all Applicable Laws.

1.2.4 the obligation to "**Re-provide**" an Asset is to re-provide an Existing Asset in a location to be agreed by EAL and **tie,** (both acting reasonably) so that the New Asset is of at least the standard, condition, quality and capacity of the Existing Asset immediately prior to its being affected by the Tram Project, and so that the New Asset complies with all Applicable Laws.

1.3 The expression "**adverse impact upon Edinburgh Airport**" means "an adverse impact on the safe, efficient and/or secure operation of Edinburgh Airport, and any material adverse impact (taking into account the nature and size of the EAL Works) on the operations of Edinburgh Airport generally".

2. INTERRELATIONSHIP BETWEEN THE EAL LICENCE AND THE EAL LEASE

2.1 The Infraco shall carry out the EAL Works in accordance with this Schedule Part 44 (*EAL Works)* and the other relevant provisions of the Agreement.

2.2 The Infraco acknowledges that parts of the EAL Site (and the associated EAL Works including the Burnside Road Re-alignment Works) will be subject to the terms of the EAL Licence only, and that other parts of the EAL Site (and the associated EAL Works) will initially be subject to the terms of the EAL Licence but that once the EAL Lease has been executed by EAL and CEC, such parts of the EAL Site shall become subject to the terms of the EAL Lease.

2.3 The Infraco further acknowledges that it is intended that the EAL Lease will be executed prior to the construction of the main works for the Authorised Tramway. **tie** shall notify the Infraco when the EAL Lease is effective.

2.4 The provisions in the EAL Lease and EAL Licence with which the Infraco must comply have been included in this Schedule Part 44 *(EAL Works).*

2.5 The Leased Land and the Licensed Land are shown on plans included in Appendix 1 to this Schedule Part 44 *(EAL Works).*

2.6 As a Drawdown Notice in respect of EAL Works on any part of the Leased Land is not required, the Infraco shall not be required to submit any Drawdown Information in respect of any part of the Leased Land, and clause 4 of this Schedule Part 44 *(EAL Works)* shall not apply in this circumstance.

2.7 The Infraco shall submit a Drawdown Information in respect of EAL Works on the Licensed Land, and clause 4 of this Schedule Part 44 *(EAL Works)* shall apply in this circumstance.

3. DEVELOPMENT RIGHTS AND OBLIGATIONS

3.1 The Infraco is bound as follows:

3.1.1 to use the EAL Site only for the Permitted Use;

3.1.2 notwithstanding clause 3.1.1 of Schedule Part 44 *(EAL Works)*:

3.1.2.1 to exercise its rights in relation to the Temporary Land on a temporary basis only, and only for the purposes listed in respect of each Plot number in Appendix 1 to this Schedule Part 44 *(EAL Works)*; and

3.1.2.2 to exercise its rights in relation to the Burnside Land on a temporary basis only, and only for the purposes of the Burnside Road Re-alignment Works;

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3.1.3 to use all reasonable endeavours to keep the EAL Site safe and secure so as to prevent unauthorised access to any part of the EAL Site during the period when the Infraco is carrying out and completing the EAL Works;

3.1.4 not to do or permit or omit to do anything which has an adverse impact upon Edinburgh Airport without prejudice to the statutory obligations of CEC in terms of the Act provided that carrying out the EAL Works in accordance with this Agreement shall not be a breach of this clause 3.1.4;

3.1.5 to protect the legitimate interests of EAL to safeguard the safe and efficient operation of Edinburgh Airport provided that carrying out the EAL Works in accordance with this Agreement shall not be a breach of this clause 3.1.5;

3.1.6 not to undertake any works on the EAL Site without the consent of **tie** and EAL other than EAL Works carried out in accordance with Agreed EAL Works Data; and

3.1.7 to comply at all times with Good Industry Practice in respect of carrying out and completing the EAL Works.

3.2 Following 48 hours' notice in writing (or forthwith in the case of an emergency), the Infraco shall permit EAL access to enter the EAL Site:

3.2.1 for any purpose related to:

3.2.1.1 the exercise of any right conferred on or reserved to EAL; or

3.2.1.2 the fulfilment of any obligation incumbent on EAL,

in each case under the EAL Licence, the EAL Lease or the 2005 Agreement;

3.2.2 to carry out any works to the Phase or to EAL's adjoining property;

3.2.3 to effect safeguarding measures to protect property or persons from the effects of any Emergency or to effect measures to remedy, mitigate or address the effects of the Emergency; or

3.2.4 to inspect the EAL Site and to investigate any right of the nature of servitude, wayleave, privilege or encroachment.

3.3 The Infraco hereby acknowledges that EAL has not warranted the EAL Site or any part of it as being fit for purpose.

3.4 The Infraco will produce to **tie** and EAL upon reasonable notice all documents, information and other such evidence as **tie** may reasonably require in order to satisfy itself that the Infraco has complied with the whole provisions of this Schedule Part 44 (*EAL Works).*

3.5 The Infraco shall comply with and shall not breach the title conditions relating to the EAL Site specified in the title deeds or title sheet of the EAL Site in so far as such title conditions have been notified to the Infraco. Any new title conditions which are notified to the Infraco shall be treated as a Mandatory **tie** Change.

3.6 The Infraco shall not use the EAL Site for any offensive, noisy or noxious trade, business or occupation nor for any illegal or immoral purpose nor for any purpose or in any way which may be or tend to become a nuisance or disturbance to EAL, their tenants, owners or occupiers of any neighbouring properties nor for any use which could constitute a hazard to health or cause harm to the environment or case any undue noise or vibrations causing nuisance or disturbance to the use of Edinburgh Airport and/or surrounding land provided that for the avoidance of doubt that using the EAL Site for the Permitted Use shall not per se be a breach of the foregoing obligations provided that the Infraco shall act in accordance with Good Industry Practice and comply with all applicable Law.

4. DRAWDOWN INFORMATION, DRAWDOWN NOTICE AND EAL LICENCE - LICENSED LAND ONLY

4.1 Not less than 25 Business Days prior to its intention to occupy any part of the Licensed Land in accordance with the Programme, the Infraco will provide to **tie** Drawdown Information with accompanying coloured plans indicating the land to be occupied.

4.2 Drawdown Information submitted by the Infraco must:

4.2.1 be fully completed;

4.2.2 include Agreed EAL Works Data;

4.2.3 not include land which is:

4.2.3.1 is outwith the Licensed Land;

4.2.3.2 is land in respect of which vacant possession has occurred pursuant to the EAL Lease;

4.2.3.3 is a Phase or part of a Phase; or

4.2.4 refer to plans forming part of the Drawdown Information are extracts from the Plans.

4.3 The Infraco acknowledges that **tie** is required to submit each Drawdown Notice to EAL for approval. **tie** will without delay notify the Infraco in writing when the Drawdown Notice is confirmed as valid or invalid by EAL

4.4 The Infraco acknowledges that a Drawdown Notice will not be approved by EAL if the Infraco has not executed a collateral warranty in the form set out in Appendix 8 to this Schedule Part 44 *(EAL Works)* in accordance with the Infraco's obligations under Clause 74.10 of this Agreement.

4.5 On receipt of an acknowledgement that a Drawdown Notice is valid the Infraco shall be:

4.5.1 granted with effect from the commencement date specified in the Drawdown Notice a sub-licence to occupy the Licensed Land subject to the Drawdown Notice until the Vacation Date, subject to the terms of this Schedule Part 44 *(EAL Works)*; and

4.5.2 entitled to take access to such Licensed Land and to use it for the Permitted Use as set out in the Drawdown Notice, from the commencement date specified in the Drawdown Notice.

4.6 Subject to clause 3.2 of Schedule Part 44 *(EAL Works)*, the sub-licence to occupy granted to the Infraco in respect of any Phase shall be exclusive:

4.6.1 unless any part of any Phase is not a fenced work-site; or

4.6.2 unless any part of any Phase is a road; or

4.6.3 EAL is not able to grant exclusive occupation,

in which case the sub-licence in respect of such Phase (or part of a Phase) shall be non-exclusive and shall be subject to the rights of EAL, **tie** and all other persons authorised or permitted by EAL, **tie** or by Law.

4.7 For clarity, it is acknowledged by the Parties that it is envisaged that there will be a number of Drawdown Notices submitted for short term occupation of Phases to allow the Infraco to carry out enabling and advance works and surveys and such like.

5. VACATION OF A PHASE - LICENSED LAND ONLY

5.1 The Infraco shall vacate each Phase on the Vacation Date and shall not be entitled to occupy that Phase after the Vacation Date (unless it is the subject of a further Drawdown Notice).

5.2 If the Infraco no longer reasonably requires any part of any Phase for the purposes specified in the relevant Drawdown Notice, the Infraco shall vacate that part of the Phase, and shall not be entitled to occupy that part of the Phase after that date (unless it is the subject of a further Drawdown Notice).

5.3 The Infraco will act reasonably in considering any proposals made by **tie** and/or EAL for the management and reduction in size of Phases and the resultant vacation of parts of Phases pursuant to clause 5.2 of Schedule Part 44 *(EAL Works)*.

6. EXTENSION OF TIME IN RESPECT OF A PHASE - LICENSED LAND ONLY

6.1 If the Infraco requires to occupy any Phase beyond the Stated Vacation Date it will submit a written notice to **tie** requesting an extension, propose a revised vacation date, and provide justifications for that extension.

6.2 **tie** shall request EAL to consider the request for an extension and **tie** will endeavour to agree with EAL a new Stated Vacation Date.

6.3 The failure of EAL and **tie** to reach agreement pursuant to clause 6.2 of Schedule Part 44 *(EAL Works)* shall not prevent the Infraco from submitting further Drawdown Information in respect of the same area of Licensed Land pursuant to this Schedule Part 44 *(EAL Works)*.

6.4 If the Infraco submits Drawdown Information to **tie** in the circumstances described in clause 6.3 of Schedule Part 44 *(EAL Works)* the 25 Business Day requirement in clauses 4.1 of Schedule Part 44 *(EAL Works)* will not apply to that Drawdown Information, but it must otherwise be valid in accordance with clause 4.2 of Schedule Part 44 *(EAL Works)*.

7. OBLIGATIONS ON VACATION

7.1 By no later than the Vacation Date in respect of a Phase and on completion of any part of the EAL Works on the Leased Land in accordance with the Agreement, the Infraco will:

7.1.1 remove all personnel, equipment, temporary works materials, waste and rubbish from the relevant Phase or the relevant part of the Leased Land;

7.1.2 leave the Phase or the relevant part of the Leased Land together with all additions and improvements made thereto vacant and clear, and in such state of repair and condition and in all such other respects as shall be consistent with due performance by the Infraco of the obligations undertaken by the Infraco pursuant to this Schedule Part 44 *(EAL Works)* and the Agreement;

7.1.3 be responsible for the Restoration of all Assets on the relevant Phase or on the relevant part of the Leased Land; and

7.1.4 to the extent not addressed pursuant to the Restoration of Assets on the relevant Phase or on the relevant part of the Leased Land, be responsible for the re-instatement of the Phase or the relevant part of the Leased Land (and any adjoining land to the extent affected by the EAL Works carried out on the Phase or on the relevant part of the Leased Land) without betterment but at least to the standard, condition and quality of that land prior to the occupation of the Phase or the relevant part of the Leased Land by the Infraco pursuant to this Schedule Part 44 *(EAL Works)*, including:

7.1.4.1 the rectification of all physical damage; and

7.1.4.2 the remediation of all contamination and harm to the environment caused by those EAL Works,

all to the reasonable satisfaction of **tie** and EAL.

7.2 If any part of a Phase or part of the Leased Land has been vacated pursuant to clause 5.2 of Schedule Part 44 *(EAL Works)*, the obligations in clauses 7.1.1 to 7.1.4 of Schedule Part 44 *(EAL Works)* will apply as regards that part.

7.3 The Infraco will notify **tie** upon vacation of each Phase in writing or part of the Leased Land.

7.4 The occurrence of a Vacation Date in respect of a Phase or a part of the Leased Land will not affect the obligations of the Infraco to comply with the obligations in clauses 7.1.1 to 7.1.4 of Schedule Part 44 *(EAL Works)* in respect of the land which comprised the Phase or part of the Leased Land.

8. TERMINATION

8.1 The Infraco acknowledges that both EAL and **tie** are entitled to terminate the EAL Licence with immediate effect by notice in writing if the Act is repealed. In this instance any right to

occupy any Phase in favour of the Infraco under this Schedule Part 44 (*EAL Works)* will terminate automatically.

8.2 The Infraco further acknowledges that EAL will be entitled to terminate the EAL Licence with immediate effect by notice in writing at any time after the date falling three months after the commencement of passenger services to and from Edinburgh Airport on the Authorised Tramway.

8.3 The Infraco acknowledges that EAL will be entitled to terminate the EAL Licence with immediate effect by notice in writing (and consequently the Infraco's right to occupy) if:

8.3.1 the EAL Works are Abandoned (unless as a result of damage or destruction caused by EAL Licence Force Majeure which means that additional EAL Permissions are required by the Infraco to progress the EAL Works); or

8.3.2 if the EAL Works are Abandoned as a result of damage or destruction caused by EAL Licence Force Majeure which means that additional EAL Permissions are required by the Infraco to progress the EAL Works; and

8.3.2.1 the Infraco does not demonstrate to the reasonable satisfaction of EAL that it is using its reasonable endeavours to pursue and obtain those EAL Permissions in circumstances where the Infraco is obliged under this Agreement to obtain EAL Permissions; or

8.3.2.2 the EAL Works are not materially progressed within 9 months of those EAL Permissions being obtained.

8.4 The date on which the Infraco's right to occupy any Licensed Land terminates will be deemed to be the Vacation Date for all Phases.

8.5 If the Infraco's right to occupy the Licensed Land is terminated this will not affect any rights or liabilities of the Parties accrued under it prior to or arising pursuant to its termination.

8.6 The Infraco acknowledges that EAL will be entitled to terminate the EAL Lease by 90 days' written notice if:

8.6.1 the Leased Land ceases to be used for the Permitted Use for any period of more than 12 continuous months (subject to the terms of clause 8.7 of Schedule Part 44 (*EAL Works)* in any period of 24 successive months (discounting any period (1) where the cessation is a result of EAL Lease Force Majeure (provided that such EAL Lease

Force Majeure does not exceed 36 continuous months) or (2) for repair, maintenance renewal or reinstatement of Tram Line Two); or

8.6.2 **tie** has never operated or has ceased to operate the operations on the EAL Site for longer than 36 months due to EAL Lease Force Majeure.

8.7 For the purposes of calculating such period of 12 continuous months referred to in clause 8.6.1 of Schedule Part 44 *(EAL Works)*, no account shall be taken of any interruption of periods of time when the Leased Land is not used for the Lease Permitted Use if, but for such interruption, a period of 12 continuous months during which the Leased Land was not used for the Lease Permitted Use within a period of 24 successive months would have expired and such interruption is identified as designated or intended to frustrate the proper operation of clause 8.6.1 of Schedule Part 44 *(EAL Works)*.

9. SUB-LICENCE

9.1 The Infraco may not sub-licence its right to occupy any Phase or any part of the Leased Land to any other person.

APPENDIX 1

SECTION 1 - TEMPORARY LAND PLOT NUMBERS

Nature of Occupation Rights	Power Description Specified in the Act and Description	Plot Numbers
Intermittent temporary occupation	Schedule 7 Working Site and Access	334, 336, 339, 340, 341, 342, 343, 346, 347 and 348

SECTION 2 – LEASED LAND PLOT NUMBERS

328, 330, 331, 332, 333, 335, 337, 338, 345, 349, 350, 351, 352, 353, 360 and 498.

SECTION 3 - EAL PLANS

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[redacted]

Trams For Edinburgh: EAL Licence/Lease Step Down Plan 1

0 75 150 300 Meters

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Trams for Edinburgh

tie



[redacted]

Trams For Edinburgh: EAL Licence/Lease Step Down Plan 2

0 75 150 300 Meters

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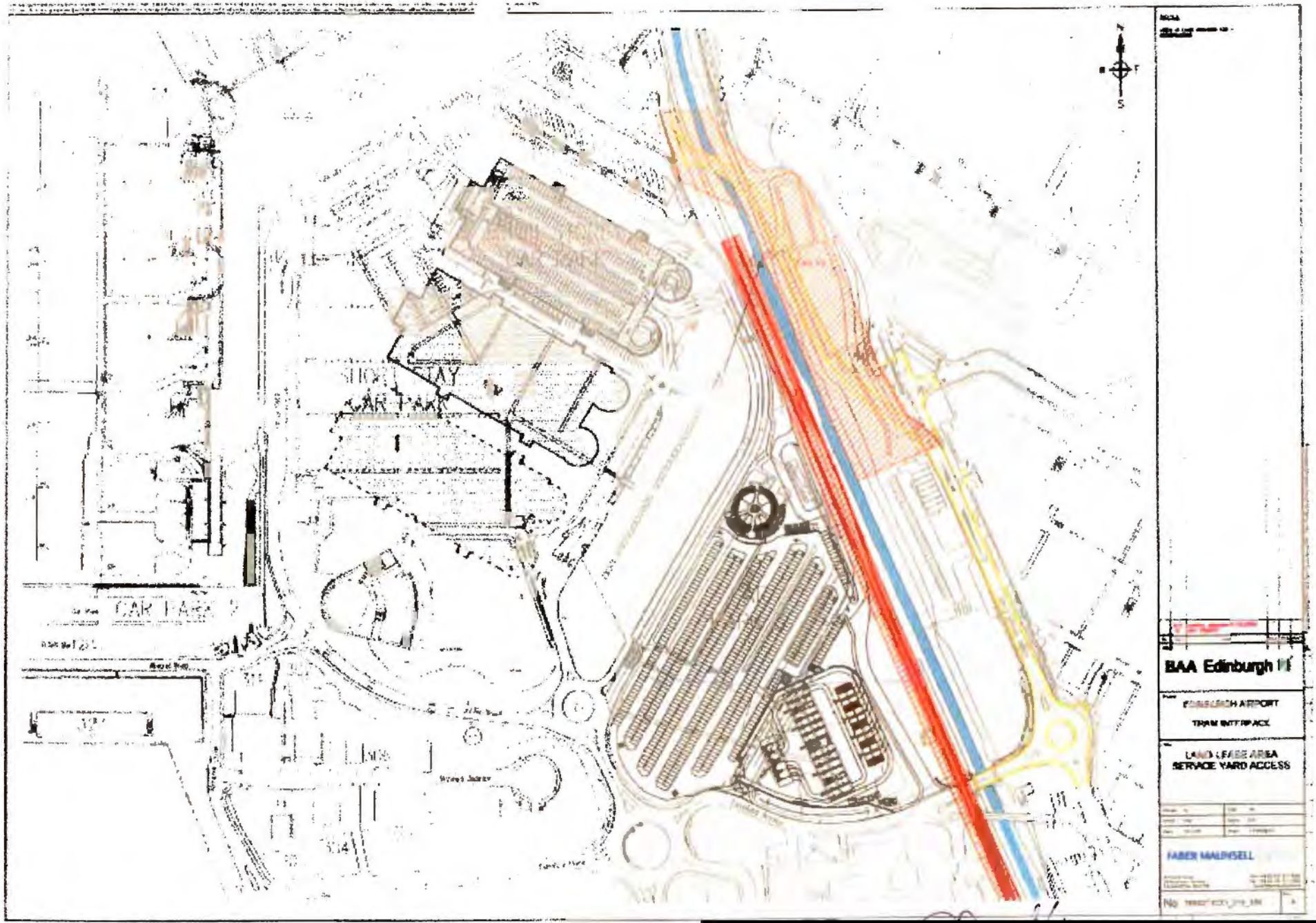
Trams for Edinburgh



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APPENDIX 2

Pro-Forma Drawdown Information

tie Limited
[◆]

Dear Sirs

THE EDINBURGH TRAM PROJECT
EDINBURGH AIRPORT
DRAWDOWN INFORMATION - EAL WORKS

We refer to the Agreement between **tie** Limited and [◆] dated [◆] (the "**Agreement**"). Terms used in this notice have meanings given to them in the Agreement.

Pursuant to clause 4 of Schedule Part 44 *(EAL Works)* to the Agreement, we give you notice of an intention to occupy under the Agreement the area(s) of Licensed Land shown coloured ## on the plan annexed and signed as relative hereto ("**Phase**") and undertake as follows:

1. Our occupation of the Phase shall be governed by Schedule Part 44 *(EAL Works)* to the Agreement and the other relevant provisions of the Agreement.

2. We will commence occupation of the Phase on [date].

3. The Stated Vacation Date in relation to the Phase will be [date].

4. This Drawdown Information is consistent with the following Agreed EAL Works Data with reference ##.

5. The purposes for which we require to occupy the Phase are set out in [reference to Agreed EAL Works Data or annex to this letter].

6. We have executed a collateral warranty in favour of EAL in respect of the EAL Works to be carried out on the Phase as required by the Agreement.

7. Additional information as relevant on a case by case basis.

[To be signed for and on behalf of the Infraco.]

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APPENDIX 3

Protocol for review of tram works data

1. Purpose

This Appendix 3 sets out a protocol for the development and review of EAL Works Data.

2. Reviewable EAL Works Data

2.1 Upon the reasonable request from time to time of **tie**, the Infraco will provide **tie** and EAL with a schedule describing and programming the different elements of the EAL Works in relation to which EAL Works Data will be or has already been prepared.

2.2 The Infraco acknowledges that within 28 days of receipt of the schedule referred to in paragraph 2.1 of this Appendix 3, EAL will indicate to **tie**, by reference to that schedule, the elements of the EAL Works in relation to which it wishes to review the EAL Works Data.

2.3 The EAL Works Data from time to time which relate to the elements of the EAL Works which EAL has indicated it wishes to review and all Draft Drawdown Information shall be the "**Reviewable EAL Works Data**" or "**REWD**";

2.4 The Parties and EAL will agree, acting reasonably, a programme for the submission of REWD to EAL.

3. Review of REWD

3.1 Subject to paragraph 2.4 of this Appendix, the Infraco will send to **tie** for review in accordance with the protocol set out in this Appendix 3:

3.1.1 Draft Drawdown Information, as far as possible in advance of the period of occupation to which they relate; and

3.1.2 2 copies of all other REWD, as soon as reasonably practical after receipt of any notification from EAL to **tie** as referred to in paragraph 2.2 of this Appendix 3.

3.2 The Infraco acknowledges that EAL will be entitled to review the REWD on the terms outlined herein (and may appoint, acting reasonably, a third party to review the REWD on its behalf);

3.3 The Infraco shall not commence any element of the EAL Works until all REWD related to that element of the EAL Works has been reviewed by EAL (such review to be completed as soon

as reasonably practical), and no objection has been raised by EAL within 30 days following receipt of the relevant REWD, or any objection has been dealt with in accordance with paragraph 4 of this Appendix 3;

3.4 **tie** shall notify the Infraco immediately upon completion of the review by EAL of any REWD and formally confirm, where appropriate, that EAL has no objection to such REWD;

4. EAL Works relating to REWD

4.1 The Infraco shall not commence any element of the EAL Works which relates to REWD which is the subject of an objection until:

4.1.1 such objection has been withdrawn; or

4.1.2 the REWD which is the subject of such objection has been amended and reviewed by EAL and no further objections have been raised within 30 days of receiving the amended REWD.

5. Objection

5.1 The Infraco acknowledges that EAL shall not be entitled to raise any objection to any REWD that relates to the applicability of Light Rail Regulations.

5.2 Other than REWD which relates to or may impact on:

5.2.1 stray current;

5.2.2 the location and finishings of the tram stop at Edinburgh Airport;

5.2.3 signage at the tram stop at Edinburgh Airport;

5.2.4 the integration of the tram stop at Edinburgh Airport into any co-ordinated public transport hub at Edinburgh Airport and/or corridor to Edinburgh Airport terminal building;

5.2.5 ticketing machines and facilities at Edinburgh Airport (including those proposed to be located within the co-ordinated transport hub outside the terminal building);

5.2.6 the tram crossing at Eastfield Road;

5.2.7 the Burnside Road Re-alignment Works;

5.2.8 radio frequency communications; and/or

5.2.9 bird control,

EAL shall not be entitled to raise any objection to any REWD other than on the grounds of the potential for an adverse impact upon Edinburgh Airport or on the grounds of compliance with the Aerodrome Safeguarding Guidance.

5.3 The Infraco acknowledges that when raising an objection pursuant to the protocol set out in this Appendix 3, EAL shall use the Pro-forma Objection (in Appendix 4 to Schedule Part 44 *(EAL Works)*), set out the grounds to substantiate its objection and provide such information, documents and material as to enable its objection to be considered and indicate in full those matters which need to be addressed in order to enable EAL to withdraw its objection.

5.4 The Infraco acknowledges that EAL will act reasonably both in indicating the elements of the EAL Works in relation to which it wishes to review the EAL Works Data and in raising any objections and in considering whether to remove any objection.

6. Dispute

If EAL raises an objection, and EAL, **tie** and the Infraco cannot agree how to resolve that objection within 21 days of the date on which the objection is raised, any of EAL, **tie** or the Infraco may refer the matter to dispute resolution.

7. Changes to REWD

Subject to the provisions of clause 6 of Schedule Part 44 *(EAL Works)* as to extension of time, any material changes to the EAL Works Data in respect of REWD will be provided for approval to **tie** by the Infraco as soon as reasonably practicable, and the protocol set out in this Appendix 3 will apply in relation to that change.

8. Limit on EAL's liability

The Infraco acknowledges that EAL shall not have any liability in connection with the making of any comment or objection by EAL pursuant to this Appendix 3 (or any failure to do so) other than to the extent that any liability for death or personal injury arises due to EAL's negligence.

APPENDIX 4

Pro-forma tram review objection

REVIEWABLE EAL WORKS DATA:	
DATE OF RECEIPT OF REVIEWABLE EAL WORKS DATA:	
EAL OBJECTION:	
GROUNDS FOR EAL OBJECTION:	
MATTERS TO BE ADDRESSED TO REMOVE EAL OBJECTION:	
INFORMATION / DOCUMENTS / MATERIAL PROVIDED TO ENABLE EAL OBJECTION TO BE CONSIDERED:	

Signed: .....

Dated: .....

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APPENDIX 5

Development rights and obligations

1. Construction programme

1.1 The Infraco will provide **tie** with a copy of the EAL Construction Programme:

1.1.1 as soon as reasonably practicable and in any event within 2 Business Days of a request by **tie**; and

1.1.2 when it is subject to any material change.

1.2 The Infraco shall carry out all elements of the EAL Works which are scheduled in the EAL Construction Programme in accordance with the EAL Construction Programme.

2. Telecommunications Equipment

2.1 To the extent such matters are not or will not be dealt with in Agreed EAL Works Data, the Infraco will consult with **tie** and EAL in relation to any equipment which it proposes to use in relation to the EAL Works with a view to ensuring that such equipment does not have an adverse impact on EAL's radio, telecommunications or other airport operational equipment.

2.2 If following such consultation EAL determines that such equipment will have an adverse impact on EAL's radio, telecommunications or other airport operational equipment, the Infraco will not install or operate such equipment and ensure it is not installed or operated by any Infraco Party in relation to the EAL Works.

2.3 The Infraco shall not install or permit the installation of any transmitting or receiving communications equipment (including masts) other than as may be required for the Permitted Use.

3. Site meetings and Inspections

The Infraco acknowledges that EAL shall be entitled, without the requirement for notice, to attend all site meetings and works inspection meetings between **tie**, the Infraco and any Infraco Party which relate to the EAL Works. The proceedings and outputs of such meetings shall not be vitiated by reason of the non-attendance of EAL. EAL may nominate an appropriate third party to attend on its behalf.

4. Burnside Road Re-alignment Works

4.1 The Burnside Road Re-alignment Works shall form part of the EAL Works. The Infraco will be responsible for the design and construction of the Burnside Road Re-alignment Works. The Burnside Road Re-alignment Works will involve the upgrading of existing road infrastructure to be incorporated into the realignment.

4.2 The construction of the Burnside Road Re-alignment Works will not be commenced until the EAL Works Data relating to such works constitute Agreed EAL Works Data.

4.3 Until the Burnside Road Re-alignment Works have been completed by the Infraco to the reasonable satisfaction of EAL and **tie**, the Infraco will not:

4.3.1 close, stop up, alter or divert Burnside Road, whether permanently or temporarily; or

4.3.2 carry out any other works which may adversely affect Burnside Road.

4.4 The Infraco will ensure that the design and construction of the Burnside Road Re-alignment Works ensures the provision of the re-aligned road and bridges sufficient to accommodate the movement of 20 tonne heavy goods vehicles along its entire length. Subject to paragraph 4.5 of this Appendix 5, the re-aligned road and bridges shall be two-lane.

4.5 The new bridge over the Gogar Burn to be constructed by the Infraco as part of the Burnside Road Re-alignment Works:

4.5.1 may be a temporary Bailey bridge type of structure with a design life of not less than 20 years;

4.5.2 may be designed for traffic light controlled single file traffic only;

4.5.3 must not adversely affect or impair the flood defences maintained in relation to the Gogar Burn; and

4.5.4 must include a pedestrian walkway on at least one side of the bridge.

4.6 The element of the Burnside Road Re-alignment Works involving the removal of the footbridge across the Gogar Burn (marked "A" on the Burnside Drawing) will not be carried out until the remainder of the Burnside Road Re-alignment Works has been completed by the Infraco to the reasonable satisfaction of EAL and **tie**.

4.7 If no EAL Works will be carried out which close, stop up, alter or divert Burnside Road, whether permanently or temporarily, or which otherwise may adversely affect Burnside Road, the Infraco will not be obliged to carry out the Burnside Road Re-alignment Works.

4.8 The Infraco shall not:

4.8.1 close, stop up, alter or divert Burnside Road, whether permanently or temporarily; or

4.8.2 carry out any EAL Works which may adversely affect Burnside Road.

5. Site rules and security

5.1 Subject to paragraph 6.2 below, the Infraco shall comply with all relevant EAL Site Rules.

5.2 In the case of an Emergency, the EAL Site Rules which relate to security and access procedures need not be complied with by the Infraco, **tie** and/or EAL to the extent that this is not reasonably practicable or to the extent that compliance would materially aggravate the Emergency.

5.3 The provisions of Appendix 5 of Schedule Part 44 (*EAL Works)* will take precedence over the EAL Site Rules relating to aerodrome safeguarding (with the reference MDD 07/05) to the extent that there is any inconsistency.

6. Compliance

6.1 The Infraco will comply with all the lawful requirements of any notice which may be served upon any of the Infraco, **tie** or EAL in relation to the EAL Works by any public, local or statutory authority or any EAL Regulator.

6.2 The Infraco will execute the EAL Works in such a manner as any EAL Regulator may lawfully direct and will (in the absence of any practicable and economic alternative acceptable to the relevant EAL Regulator) execute additional works if a EAL Regulator so directs.

6.3 The Infraco will not do (or fail to do) any act or thing which would:

6.3.1 cause (or might reasonably be expected to cause) **tie** and/or EAL to be in breach of any permits, licences, consents, approvals or permissions; or

6.3.2 render **tie** and/or EAL liable to pay any penalty imposed by or to bear any expense incurred under any applicable Law, direction, requirement or notice.

6.4 If any activities of the Infraco in connection with the EAL Works cause EAL to be in breach of the Airport Regulations, EAL and/or **tie** shall be entitled to require that the Infraco cease those activities on the EAL Works until the breach is remedied (if the breach is capable of remedy by such cessation of the EAL Works).

6.5 The Infraco acknowledges that, in order for the Infraco to construct the EAL Works, EAL may need to obtain the approval of EAL's Regulators on certain matters, and the Infraco acknowledges that:

6.5.1 the method of seeking such approvals shall be decided on a case by case basis by EAL and **tie**;

6.5.2 EAL and/or **tie** will facilitate appropriate contact between the Infraco and EAL's Regulators (if appropriate); and

6.5.3 in obtaining such approvals, each of **tie**, the Infraco and EAL will act reasonably at all times.

7. Aerodrome safeguarding

7.1 The Infraco will comply with the Aerodrome Safeguarding Guidance in relation to the design and construction of the EAL Works.

7.2 All EAL Works Data will, where relevant, indicate how the Aerodrome Safeguarding Guidance has been taken into account, interpreted and complied with.

8. Hazard management

8.1 Other than as set out in Agreed EAL Works Data, the Infraco will not:

8.1.1 knowingly bring onto any part of the EAL Site anything which is or may become dangerous, offensive, radioactive or explosive; or

8.1.2 carry on or do any hazardous trade or act

8.1.2.1 which **tie** and/or EAL consider represents a risk to health and safety and security; or

8.1.2.2 in consequence of which EAL's insurances, the Required Insurances, the OCIP Insurances or any Additional Insurances could be vitiated or prejudiced or

made void or voidable in whole or in part, or whereby the insurers may decline to cover any of the risks insured.

8.2 If the Infraco is in breach of this paragraph 8, **tie** and/or EAL are entitled (but not bound) to remove such substances or take such steps as they require to terminate the breach and the Infraco shall pay to **tie** and/or EAL the costs properly incurred by **tie** and/or EAL forthwith on demand.

9. Use of the EAL Site

9.1 The Infraco, in relation to any part of the EAL Site:

9.1.1 will not affix or exhibit any placard, poster, signboard or other advertisement or directional signage without the prior written consent of EAL and **tie**;

9.1.2 will not erect any construction accommodation or site offices or similar without the prior written consent of EAL and **tie** as to the design and location of such accommodation or offices within a Phase;

9.1.3 will keep all of its construction accommodation, plant and equipment and all of its materials in a clean and tidy condition free of graffiti and fly posting at all times;

9.1.4 will not at any time to occupy, impede or obstruct the airspace above the levels shown on drawing reference GA0/E01/75 as issued by **tie** to the Infraco (as that drawing may be updated from time to time and notified to the Infraco) temporarily or permanently whether by erections, cranes, antennae, equipment, personnel, accommodation or otherwise without the prior written consent of **tie** and EAL;

9.1.5 will operate cranes in accordance with British Standard 7121 or such other standard as may replace that standard or as EAL and **tie** acting reasonably in the interests of the safe and efficient operation of Edinburgh Airport may require from time to time;

9.1.6 will not permit any cranes or other equipment or personnel to extend at any time (temporarily or otherwise) outwith the boundaries of the Phases or the Leased Land (as appropriate) from time to time without the prior written consent of EAL and **tie**;

9.1.7 will erect secure perimeter fences around all work sites where this is appropriate;

9.1.8 will ensure that any photographs or video recordings made of Edinburgh Airport by the Infraco or any Infraco Party are used solely in connection with the monitoring and assessment of the EAL Works and the EAL Site and are not published or used for any

other purpose without the prior written consent of EAL and **tie** and will ensure that such photographs or video recordings are returned to EAL and **tie** upon conclusion of such monitoring and assessment;

9.1.9 will not permit any lighting or illumination other than at the times and in the manner approved by EAL and **tie**;

9.1.10 will not obstruct, overload or in any way adversely affect the operation of any drainage, sewerage, power, plumbing, heating, ventilation, alarm, fire fighting or fire control system utilised (whether exclusively or otherwise) by EAL or situated within the EAL Site or serving (whether exclusively or otherwise) the EAL Site or Edinburgh Airport;

9.1.11 will not use any part of the EAL Site for any sale by auction or for any exhibition or public meeting;

9.1.12 will not use any part of the EAL Site as a residence for any person;

9.1.13 will not impede at any time access and egress of EAL, its customers, tenants or any other party authorised by EAL or **tie** to and from Edinburgh Airport;

9.1.14 will not place or keep on the EAL Site any articles in such position or in such quantity or otherwise in such manner as to overload or cause damage to or be likely to overload or cause damage to the EAL Site or any subjects common to the EAL Site and other property;

9.1.15 will provide support for the adjacent, supra-adjacent and sub-adjacent land and will not withdraw support for the adjacent, supra-adjacent and sub-adjacent land; and

9.1.16 will not cause damage (including damage caused directly or indirectly by stray electrical current) to Edinburgh Airport or adjoining land and to make good any such damage forthwith on request and if the Infraco fails to make good such damage forthwith **tie** and/or EAL shall be entitled to make good such damage and the Infraco shall be bound to pay to **tie** and/or EAL the properly incurred costs of making good such damage.

9.2 Subject to paragraph 9.3 of this Appendix 5 the Infraco will not connect into, use or rely on any utilities (including electricity, gas and water) at Edinburgh Airport and used by EAL, unless such connection, use or reliance:

9.2.1 constitutes Agreed EAL: Works Data; or

9.2.2 has been approved in writing in advance by EAL and **tie**.

9.3 The Infraco may connect into, use and rely on the foul water and storm water utility infrastructure used by EAL at Edinburgh Airport, but for runoff water only.

10. Environmental Matters

10.1 The Infraco will not, in respect of the EAL Site:

10.1.1 release or discharge into any environmental medium (namely, air, water (including without limitation, ground water, pipes and sewers) and land) any substance that is, or in such quantities or concentrations as are, capable of causing harm to the health of man or any other living organism supported by the environment;

10.1.2 keep, treat, deposit or dispose of any controlled, special, hazardous, toxic, dangerous or radioactive waste, or any other substance which may produce concentrations or accumulations of noxious gases or noxious liquids in such quantities or concentrations as are capable of causing harm to the health of man or any other living organism supported by the environment; or

10.1.3 do (or fail to do) any act or thing which would cause (or might reasonably be expected to cause) EAL and/or **tie** to be in breach of any permits, licences, consents, approvals or permissions which relate to environmental matters.

11. EAL Emergency procedures protocol

11.1 The Infraco will comply with the EAL Emergency Procedures Protocol, and will ensure that each Infraco Party so complies.

11.2 The Infraco shall provide **tie** with the names and contact details of the Infraco and any Infraco Parties as may be reasonably required by **tie**, in relation to the EAL Emergency Procedures Protocol.

11.3 The Infraco will notify **tie** if it requires to update the names and contact details for the Infraco or any Infraco Party within the EAL Emergency Procedures Protocol.

12. Notification

12.1 The Infraco will notify **tie** and EAL forthwith of:

12.1.1 the receipt by it or any Infraco Party of any notice, order, requisition or direction (or proposal for a notice, order, requisition or direction to be made or given) affecting the EAL Site and, if so requested by **tie** and/or EAL, will deliver a copy of such notice, order, requisition or direction to **tie** and/or EAL (as appropriate); and

12.2 any damage to the EAL Site or any defect which could give rise to a duty on **tie** and/or EAL or on any other person having an interest in the EAL Site. The Infraco will notify **tie,** as soon as it becomes aware, of any damage to the EAL Site or any defect in the EAL Site which could give rise to a duty on **tie** or EAL or any other person having an interest in the EAL Site.

13. Surveys and Reinstatement

13.1 The Infraco will:

13.1.1 carry out, in accordance with Good Industry Practice, condition, environmental and defect surveys and settlement assessments of Edinburgh Airport to the extent affected by the EAL Works, including roads to be used by construction traffic, prior to any EAL Works being carried out, and to report the methodologies and results of those surveys and assessments to **tie** and EAL, as soon as available;

13.1.2 carry out such surveys and assessments after the EAL Works have been completed in accordance with Good Industry Practice; and

13.1.3 be responsible on the completion of the EAL Works (including upon the abandonment of the EAL Works) for:

13.1.3.1 the Restoration of all Assets; and

13.1.3.2 to the extent not addressed pursuant to the Restoration of Assets, the re-instatement of land affected by the EAL Works without betterment but at least to the standard, condition and quality of that land prior to the carrying out of the EAL Works, including:

13.1.3.2.1 the rectification of all physical damage; and

13.1.3.2.2 the remediation of all contamination and harm to the environment caused by the EAL Works,

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all to the reasonable satisfaction of **tie** and EAL and by reference to the surveys and assessments, where appropriate.

14. Heave and Settlement

14.1 The Infraco will:

14.1.1 ensure that the EAL Works do not adversely affect the adjacent land or structural integrity of any infrastructure and buildings on land or in the adjacent, supra-adjacent or sub-adjacent land or airspace above the EAL Site;

14.1.2 ensure that there is no heave or settlement which adversely affects the adjacent land or structural integrity of any infrastructure and buildings on land adjacent, supra-adjacent or sub-adjacent to the EAL Site or the Gogar Burn;

14.1.3 ensure that the EAL Works do not adversely affect the Gogar Burn or cause it to flood; and

14.1.4 carry out any preventative measures which are required to ensure that there is no risk to public safety or damage to property in relation to the EAL Works.

14.2 Without prejudice to **tie's** other rights and remedies, the Infraco will rectify any failure to comply with the obligations contained in paragraph 14.1 of this Appendix 5 at the Infraco's cost.

15. Restoration of Assets

15.1 The Infraco will ensure that:

15.1.1 all Existing Assets are Restored;

15.1.2 all Restoration takes place at such time and in such manner so as to ensure that EAL are at no time deprived of the use of Assets;

15.1.3 all New Assets are appropriately protected from damage and/or interference which may result from the EAL Works; and

15.1.4 without prejudice to the obligation of the Infraco to Restore roads and transport links, the Infraco acknowledges that EAL is at all times afforded unimpeded access to the relevant Existing Assets prior to their Restoration and to the relevant New Assets (including in each case vehicular access to their location).

15.2 All electricity substations at the EAL Site which may need to be Re-provided as a result of the EAL Works shall, without prejudice to paragraph 15 of this Appendix 5, be Re-provided by the Infraco (together with all associated cables, plant and equipment) and will be fully commissioned to the reasonable satisfaction of **tie** and EAL prior to the commencement of any other EAL Works in or around or above the location of each of those substations, associated cables, plant or equipment.

15.3 Without prejudice to paragraph 15.1 of this Appendix 5, in relation to all utilities (including power, telecommunications, gas and potable and foul water) at the EAL Site which may be affected by the EAL Works, the Infraco will ensure:

15.3.1 there is no interruption of supply (or disposal, in the case of foul water) other than in each case a planned interruption agreed to by **tie** and EAL);

15.3.2 that any such utilities are

15.3.2.1 protected; or

15.3.2.2 Re-provided (with the relevant New Assets fully commissioned),

to the reasonable satisfaction of **tie** and EAL prior to the commencement of any other EAL Works in or around the location of the relevant Existing Assets.

16. Maintenance of Works

16.1 The Infraco will keep, maintain, repair, renew and reinstate the EAL Works to the extent they have been carried out and completed in good order and good working condition in accordance with the Agreement unless EAL takes over any part of the EAL Works pursuant to paragraph 18 of this Appendix 5 any Asset which has been Restored in relation to Restoration Works.

17. Flood Protection

17.1 The Infraco shall at all times maintain adequate flood protection measures and defences at the EAL Site so that the EAL Works do not increase the risk of flooding at the EAL Site, which measures and defences shall be at least to the standard of those maintained by EAL prior to the commencement of the EAL Works.

18. EAL Works relating to the Restoration of Assets

18.1 The Infraco will notify **tie** and EAL of the date on which the Infraco considers (acting reasonably) that any Restoration Works will be complete, and will do so not less than 10

Business Days prior to such date. In such notice the Infraco will specify the times and dates of any scheduled tests or inspections of the Restoration Works, and (acting reasonably) the times and dates during which **tie** and/or EAL may itself elect to inspect and/or test the relevant Restoration Works.

18.2 Following the receipt of the notice referred to in paragraph 18.1 of this Appendix 5, **tie** and/or EAL shall be entitled to:

18.2.1 inspect and/or test the relevant Restoration Works on the dates and at the times specified by the Infraco in the notice; and

18.2.2 to attend any of the tests or other inspections on completion, without prejudice to the generality of paragraph 3 of this Appendix 5.

18.3 If **tie** and/or EAL, following the inspection or testing (or attendance at other tests or inspections) considers acting reasonably, that any Restoration Works are not complete, **tie** and/or EAL shall within 5 Business Days notify the Infraco of any matters which **tie** and/or EAL considers to be outstanding and are required to be attended to before the Restoration Works can be considered to be complete, including the repetition of any of the tests. The Infraco shall attend to such matters as soon as reasonably practicable and shall issue to EAL and **tie** a further notice pursuant to paragraph 18.1 of this Appendix 5.

18.4 The procedures in paragraphs 18.1 to 18.3 of this Appendix 5 may be repeated as often as may be necessary to ensure that all matters which EAL and **tie** reasonably considers to be outstanding in relation to the Restoration Works are attended to.

18.5 On the completion of Restoration Works the Infraco shall hand over and EAL shall take over the Assets which have been Restored as part of those Restoration Works. As soon as reasonably practicably following completion, and in any event within 10 Business Days of completion, the Infraco will provide to each of EAL and **tie** a copy of the as-built specifications, together with all drawings relating to the Restoration Works and the appropriate section of any health and safety file, together with any operations and maintenance manuals and commissioning documents.

18.6 From the date on which EAL takes over any Asset which has been Restored until the anniversary of that date, the Infraco shall be responsible for the prompt remediation, to the reasonable satisfaction of EAL and **tie**, of any defects in the relevant Restoration Works or Asset. During such defects period **tie** shall itself have the right to remedy any defect if the Infraco fails to:

18.6.1 commence the remedy of the relevant defect within 30 days of a **tie** notification of that defect; or

18.6.2 progress the remedy of the relevant defect in a reasonable manner; or

18.6.3 complete the remedy of the relevant defect within a reasonable period.

19. As built drawings

19.1 After the completion of the EAL Works the Infraco will forthwith deliver to **tie**, two complete sets of as-built drawings and final design specifications relative to the EAL Works (or any part of such drawings or specifications which may be requested).

19.2 The Infraco warrants to EAL for the benefit of EAL the as-built drawings which relate to any element of the EAL Works which relate to the restoration of assets at the EAL Site, but otherwise any as-built drawings delivered to EAL will be without warranty from the Infraco to EAL.

20. Car Parking

If the Infraco or any Infraco Party utilises EAL's parking facilities, the Infraco shall procure that it shall comply with EAL's and the parking facilities licensed operator's regulations and requirements at all times.

21. **EAL Artefacts**

21.1 All fossils, antiquities, and other objects having artistic, historic or monetary value and human remains which may be discovered on or at the EAL Site ("**EAL Artefacts**") as a consequence of or in connection with the EAL Works shall become or remain, upon discovery, the property of EAL.

21.2 The Infraco will notify **tie** and EAL, without delay, if any EAL Artefacts are discovered, and, if **tie** and/or EAL so request, shall handover to EAL any such EAL Artefacts.

21.3 The Infraco's obligations in paragraph 21 are subject in each case to the requirements of applicable Law.

APPENDIX 6

EAL Site Rules

1. BAA Security Notice

Title	Reference No.	Date
Identity pass application procedures – All BAA airports	GSN 02/01/2007/10	24 January 2007

2. Managing Director's Directives

Title	Reference No.	Date
Environmental pollution control	MDD 12/02	20 September 2002
Control of all radio installations	MDD 14/02	31 July 2002
Wearing high visibility clothing and heavy protection	MDD 02/04	17 March 2006
The dangerous substances and explosives atmospheres regulations 2002	MDD 04/05	01 February 2005
Procedure for the approval of temporary obstructions (cranes and/or other equipment) at, or around, Edinburgh Airport	MDD 06/05	29 March 2005
Aerodrome safeguarding: Guidelines to those responsible for the development or construction activities on, and in the vicinity of, Edinburgh Airport	MDD 07/05	29 March 2005
Oil and chemical storage and the prevention of contamination of water courses and surrounding land areas	MDD 12/05	08 April 2005

Title	Reference No.	Date
Perimeter Fence: 3 metre clear zone	MDD 07/06	12 May 2006
Presentation and display of identity cards	MDD 08/06	12 May 2006
Provision of fire precautions and evacuation training by airport fire service	MDD 11/06	01 June 2006
Escort arrangements temporary pass holders	MDD 12/06	26 June 2006
Spillage response	MDD 01/07	11 January 2007

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3. Engineering Instructions

Title	Reference No.	Date
Service clearance	552/02	June 2004
Use and Storage of LPG and HFL	504	October 2004
Personal protective equipment	514/04	November 2004

4. Safety Leadership Team Directives

Title	Date
Acetylene restrictions	Undated

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APPENDIX 7

EAL Emergency Procedures Protocol

1. Scope

1.1 This Appendix 7 defines the reporting and liaison procedures to be followed by the Infraco and the Infraco Parties in the following circumstances:

1.1.1 the occurrence of any **Emergency** or **Reportable Incident** resulting from or associated with the construction of the EAL Works; and

1.1.2 the occurrence of any **Emergency** or **Reportable Incident** occurring elsewhere within Edinburgh Airport which in the opinion of EAL and/or **tie** affects or may affect the EAL Works or anyone engaged on the construction of the EAL Works.

1.2 This Appendix 7 also specifies procedures for contingency planning and training in preparation for any of the incidents listed in paragraph 1.1 of this Appendix 7.

1.3 This Appendix 7 is not intended to define procedures to be followed by the Infraco and the Infraco Parties for the avoidance and/or management of **Emergencies**, but specifies requirements to be included in all such procedures relating to compliance with this Appendix 7.

2. Definitions

2.1 In this protocol, the terms listed in Annex 1 to this Appendix 7 shall have the meanings ascribed to them in that Annex. For ease of reading, the terms which have particular definitions are used in bold.

2.2 Other terms used in this Appendix 7 have the meanings given to them in this Part 44 (*EAL Works*) of the Schedule or the Agreement, unless the context otherwise requires or a different definition is given in Annex 1.

3. Key Personnel Contact Details

3.1 The contact details to be used for the implementation of this protocol are contained in Annex 2 to this Appendix 7.

3.2 Annex 2 to this Appendix 7, as it is updated from time to time, also details the key personnel posts within EAL, the **tie** and the Infraco which are referred to in this Appendix 7, and specifies other contact points.

3.3 EAL, **tie** and the Infraco will each keep Annex 2 to this Appendix 7 updated at all times, and each will notify the others of changes which require to be made, without delay.

4. Action required in an Emergency or after a Reportable Incident

4.1 Action to be taken in an Emergency occurring on the Work Site

4.1.1 The Infraco shall introduce its own safety procedures for actions to be taken in an **Emergency** anywhere on the **Work Site**. Such procedures must include a requirement:

4.1.1.1 to inform the **Site Emergencies Hotline** operator as soon as reasonably practicable;

4.1.1.2 immediately to inform the **Airport Control Centre**, the **EAL Representative** and **tie's** Representative; and

4.1.1.3 to inform the **Airport Control Centre**,the **EAL Representative** and **tie's** Representative as soon as reasonably practicable once the **Emergency** no longer exists.

4.1.2 The Infraco shall comply with and shall procure that the Infraco Parties shall comply with the protocols and safety procedures referred to and developed as a result of this Appendix 7.

4.2 Action to be taken in respect of Reportable Incidents on the Work Site

4.2.1 All reports of **Reportable Incidents** occurring on the **Work Site** shall within 24 hours be copied tothe **Infraco's Safety Manager** and **tie's Safety Manager**, together with a statement of actions taken or proposed to avoid recurrence.

4.2.2 **Infraco's Safety Manager** shall keep a log of all **Reportable Incidents** occurring on the **Work Site** and shall provide a monthly report to **tie's** Safety Manager and to the **EAL's Safety Compliance Manager**.

4.3 Action to be taken in an Emergency occurring elsewhere within Edinburgh Airport but outside the Work Site

4.3.1 The Infraco acknowledges that **EAL** will have their own safety procedures for actions to be taken in an **Emergency** occurring elsewhere within Edinburgh Airport but outside the **Work Site**. Such procedures shall include a requirement:

4.3.1.1 to inform the **Airport Control Centre** as soon as reasonably practicable;

4.3.1.2 where the **Emergency** may affect the safety of persons or the safe continuation of construction activities on the **Work Site**, immediately to inform the **Site Emergencies Hotline** operator;

4.3.1.3 to inform the **Airport Control Centre** once the **Emergency** no longer exists; and

4.3.1.4 if the **Emergency** has been notified to the **Site Emergencies Hotline**, in compliance with paragraph 4.3.1.2, to inform the **Site Emergencies Hotline** operator as soon as reasonably practicable that the **Emergency** no longer exists.

5. Procedures for evacuation

5.1 Procedures for Work Site evacuation

5.1.1 Within 2 months of the Commencement Date, the Infraco will draft for approval by **tie** and EAL procedures for the evacuation and reoccupation of Work Sites.

5.1.2 When the procedures are agreed between the Infraco, EAL, and **tie** (and each party will act reasonably in so doing) they will be included in this Appendix 7 by agreeing a change to this Appendix 7.

5.2 Procedures for airport evacuation

As soon as reasonably practicable, **tie** shall notify the Infraco of EAL's procedures relevant to the EAL Works for the evacuation and reoccupation of Edinburgh Airport.

6. Infraco's Emergency plans

6.1 Emergency plans shall be prepared, kept available and communicated to all those on the **Work Site** by the Infraco. Such plans may contain the entire text of this Appendix 7, or as a

minimum a summary of its contents and a copy of key personnel contact details (in Annex 2 of this Appendix 7).

6.2 All changes to the names or contact details of the key personnel of the Infraco shall be communicated in writing without delay to the **EAL Representative** and **tie's** Representative.

6.3 The Infraco's emergency plans shall include the following:

6.3.1 the establishment and maintenance of a **Site Emergencies Hotline**, manned at all times while construction activities are in progress anywhere on the **Work Site**.

6.3.2 provisions for regular checking and updating of the key **EAL Personnel** contact details, which shall be done no less frequently than monthly.

6.3.3 the training of staff on emergency procedures including **Work Site** and airport evacuation. Arrangements for training on airport evacuation shall be co-ordinated with **EAL's Safety Compliance Manager**.

6.4 The Infraco acknowledges that if, from time to time, there is more than one contractor working on the EAL Site, only a single **Site Emergencies Hotline** will be established and maintained, and the Infraco will co-operate with every other contractor on the EAL Site in this regard.

Annex 1 to Appendix 7 (Emergency Procedures Protocol)

1. Defined Terms

1.1 In this Appendix 7:

"**Airport Control Centre**" as listed in Annex 2 to this Appendix 7;

"**EAL's Personnel**" as listed in Annex 2 to this Appendix 7;

"**EAL Representative**" means the individual nominated by EAL as notified to the Infraco from time to time;

"**EAL's Safety Compliance Manager**" as listed in Annex 2 to this Appendix 7;

"**Emergency**" means an event causing or, in the reasonable opinion of **tie** and/or EAL, threatening to cause death or injury to any individual, or material damage to property;

"**Infraco's Safety Manager**" as listed in Annex 2 to this Appendix 7;

"**Reportable Incident**" means an incident reportable under RIDDOR (the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995);

"**Site Emergencies Hotline**" as listed in Annex 2 to this Appendix 7;

"**tie's Safety Manager**" as listed in Annex 2 to this Appendix 7; and

"**Work Site**" means any area of ground at Edinburgh Airport which is from time to time used by, leased, licensed to or under the control of CEC, **tie** and/or the Infraco in connection with the EAL Works.

Annex 2 to Appendix 7 (Emergency Procedures Protocol)

Contact Details

Title	Name(s)	Phone Numbers			Email address
		office	mobile	home	
Emergency phone lines	Airport Control Centre	0131 344 3222			
	Site Emergencies Hotline		----------	----------	
EAL personnel					
EAL Representative	Stuart White	0131 344 3506	07785 556247		stuart_white@baa.com
Safety Compliance Manager	Fiona Birkinshaw	0131 344 3660	07795 645163		fiona_birkinshaw@baa.com
tie's personnel					
tie's Representative	to be advised				
tie's Safety Manager	to be advised				
Infraco personnel					
Project Manager					
Safety Manager					

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APPENDIX 8

Form of Collateral Warranty

AGREEMENT

BETWEEN

(1) **BILFINGER BERGER UK LIMITED**, a company incorporated in England and Wales under number 02418086 and having its registered office at 150 Aldersgate Street, London, EC1A 4EJ, which expression shall include its successors, permitted assignees and transferees and **SIEMENS PLC**, a company incorporated in England and Wales under number 00727817 and having its registered office at Faraday House, Sir William Siemens House, Frimley, Camberley, Surrey, GU16 8QD, which expression shall include its successors, permitted assignees and transferees, ("**Tram Contractor**"); and

(2) **EDINBURGH AIRPORT LIMITED**, (company number SC096623) whose registered office is at St Andrew's Drive, Glasgow Airport, Paisley PA3 2SW ("**EAL**") which expression shall include its successors and permitted assignees.

BACKGROUND

A By an agreement in writing dated [◆] ("**Tram Main Works Agreement**"), **tie** Limited (as hereinafter defined) appointed the Tram Contractor to provide the Works (as hereinafter defined) in connection with the Edinburgh Tram Project.

B It is a term of the Tram Main Works Agreement that the Tram Contractor shall enter into this Agreement with the Beneficiary.

IT IS AGREED as follows:

1. Definitions and interpretation

In this Agreement:

1.1 the following words and expressions have the following meanings, unless the context requires otherwise:

"**Act**" means the Edinburgh Tram (Line Two) Act 2006;

"**Agreement**" means this document (as amended from time to time pursuant to clause 11);

"**Deliverables**" means all documents, information, reports, diagrams, pricing schedules, records, method statements, risk assessments, manuals, schedules, databases, reinforcement details, photographs, formulae, plans, designs, specifications, drawings (including as-built drawings), details, calculations, analysis, operation and maintenance manuals, software, data, data configuration designs, tools and details, software protocols, source and object codes, transport and other models and simulations, the outputs and reports based on any models, programmes and all other material created and/or provided by the Tram Contractor (and/or any Tram Contractor Party or any other third party) in relation to the Tram Main Works Agreement required to deliver the Works;

"**EAL Group**" means the group of companies comprising EAL and its holding companies and the subsidiaries of such holding companies (including any subsidiaries of EAL) (as such terms are defined in the Companies Acts);

"**Edinburgh Tram Project**" means the project to construct and operate the Authorised Tramway (as defined in the Act);

"**Good Industry Practice**" means using standards, practices, methods and procedures conforming to law and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably be expected from a large, reputable, professionally qualified, competent and skilled organisation experienced in carrying out activities of a similar nature, scope and complexity to those comprised in the Works, and seeking in good faith to comply with its contractual obligations and all duties owed by it;

"**Intellectual Property Rights**" means any rights in or to any patent, design right, utility model, trade mark, brand name, service mark, trade name, business name, logo, invention (whether registered or unregistered), domain name, semi-conductor right, topography right, software designs and/or other materials, source code, copyright, moral right, know-how, or rights in databases and any other rights in respect of any industrial or intellectual property, whether capable of being registered or not, including all rights to apply for any of the foregoing rights or for an extension, revival or renewal of any of the foregoing rights and any similar or analogous rights to any of the above, whether arising or granted under the law of Scotland or of any other jurisdiction;

"**Liability Cap**" means as defined under the Tram Main Works Agreement;

"**Party**" means each and any of the parties to this Agreement and "**Parties**" shall be construed accordingly;

"**Project IPR**" means any Intellectual Property Rights arising out of, used in or created to implement the Works and to produce Deliverables (including the Specially Written Software, any asset management system and/or Works programming system) and for the extension of the Edinburgh Tram Network in accordance with the Tram Main Works Agreement but excluding any Tram Contractor IPR contained in the Deliverables;

"**Site**" means those areas of ground at Edinburgh Airport used (with the consent of EAL) in connection with the Works;

"**Required Insurances**" means the Required Insurances required under the Tram Main Works Agreement, which shall include professional indemnity insurance of not less than £10,000,000.00 on an each and every claim basis and in the aggregate during each twelve month period of insurance (subject to one reinstatement of the limit of indemnity for each twelve month period of insurance in the case of Bilfinger Berger UK Limited) so long as such professional indemnity insurance may be obtained in the European Union insurance market at commercially reasonable rates and on commercially reasonable terms to contractors of the same status as at the effective date of the Tram Contractor;

"**Statutory Requirements**" means all general or local Acts of Parliament and the regulations and Bye-laws of any local or other statutory authority which may be applicable to the Works, together with any accompanying code of practice or guidance, and the rules and regulations of all public bodies and companies whose property or rights are or may be affected in any way by the Works;

"**tie Limited**" means **tie** Limited, incorporated under the Companies Acts (Company Number SC230949) in Scotland and having its registered office at City Chambers, High Street, Edinburgh, EH1 1YJ;

"**Tram Contractor IPR**" means:

(a) all Intellectual Property Rights in the Deliverables (including Intellectual Property Rights in relation to the Tram Contractor Software) which were already existing and owned by, or licensed to, the Tram Contractor prior to the Effective Date;

(b) any modifications or developments of any of the Intellectual Property Rights referred to in paragraph (a) above which are generic in nature and not specific to the carry out of the Works; and

(c) all Intellectual Property Rights in tram signalling systems, communications systems, SCADA systems and system integration programmes, methodologies or software.

"**Works**" means any works authorised by the Act on or affecting the Site and to be undertaken by the Tram Contractor under the Tram Main Works Agreement; and

1.2 unless the context requires otherwise:

1.2.1 words importing:

1.2.1.1 the singular include the plural and vice versa; and

1.2.1.2 one gender include all other genders.

1.2.2 a reference to:

1.2.2.1 persons includes firms, companies, corporations, partnerships, trusts, authorities and other incorporated and/or unincorporated bodies; and

1.2.2.2 a clause is a reference to a clause in this Agreement.

1.3 The list of contents and clause headings in this Agreement are included for convenience only and do not affect its interpretation.

1.4 Where a party comprises two or more persons:

1.4.1 any obligations on the part of that party contained or implied in this agreement are deemed to be joint and several obligations on the part of those persons; and

1.4.2 references to that party shall include references to each and any of those persons.

1.5 Any capitalised terms not defined above shall have the meaning accorded to them pursuant to the Tram Main Works Agreement.

2. Standard of care

2.1 The Tram Contractor warrants and undertakes to the Beneficiary that it has carried out and shall carry out the Works and its other duties and obligations under the Tram Main Works Agreement subject to and in accordance with the terms thereof.

2.2 In addition to and without derogation from clause 2.1, the Tram Contractor warrants to the Beneficiary that:

2.2.1 in the performance of the Works and its other obligations under the Tram Main Works Agreement it shall exercise a reasonable level of professional skill, care and diligence to be expected of a properly qualified and competent contractor experienced in

carrying out works and services similar to the Works in connection with projects of a similar size, scope and complexity;

2.2.2 any design produced by the Tram Contractor will satisfy in every respect any relevant performance specification or any requirement included or referred to in the Tram Main Works Agreement and will be suitable in every respect for the purposes included in the Tram Main Works Agreement; and

2.2.3 any design produced by the Tram Contractor will fully comply with Statutory Requirements.

2.3 The Tram Contractor shall owe a duty of care to the Beneficiary in carrying out its duties and obligations under the Tram Main Works Agreement.

3. Materials

3.1 The Tram Contractor warrants to the Beneficiary that it has not and shall not use in relation to the Works any materials which at the time of use:

3.1.1 are known to be deleterious in the particular circumstances in which they are used (either to health and safety or to the durability of the Works); or

3.1.2 contravene any relevant standard or code of practice issued from time to time by the BSI Group or under a European directive relating to standards; or

3.1.3 do not accord with the guidelines contained in the edition of the publication "Good Practice in Selection of Construction Materials" (Ove Arup & Partners) current at the date of specification of use; or

3.1.4 contravene Good Industry Practice.

4. Copyright licence

4.1 The Beneficiary and the Tram Contractor acknowledge that under the terms of the Tram Main Works Agreement, the Tram Contractor has assigned to **tie** Limited, with full title guarantee the Project IPR which is created by the Tram Contractor and used by it to carry out its obligations under the Tram Main Works Agreement.

4.2 The Beneficiary and the Tram Contractor acknowledge that under the terms of the Tram Main Works Agreement the Tram Contractor has granted to **tie** Limited a non-exclusive perpetual irrevocable royalty free licence to use such Tram Contractor IPR which is contained in the

Deliverables as may be necessary for **tie** Limited to use in relation to the Works and the Maintenance Services and any extension of the Edinburgh Tram Network and undertakes to procure for **tie** Limited a licence on the same terms as above in respect of any Project IPR created by the Infraco Parties.

4.3 The Beneficiary and the Tram Contractor acknowledge that under the terms of the Tram Main Works Agreement the Tram Contractor grants to **tie** Limited, with the prior written consent of the Tram Contractor such consent not to be unreasonably withheld, the right to grant non-exclusive non-assignable sub-licences to third parties for such periods of time as **tie** Limited may reasonably require and otherwise on the same terms as the licence granted to **tie** Limited as described in Clause 4.2 above, to use the Tram Contractor IPR referred to in Clause 4.2 (other than in relation to Third Party Software and commercially available software which is subject to the provisions of Clause 102.9 of the Tram Main Works Agreement) in so far as is necessary or desirable for such third party to use such Tram Contractor IPR in relation to the Works for the Edinburgh Tram Network, the Maintenance Services and any extension of the Edinburgh Tram Network. The Tram Contractor hereby consents to the grant of such non-exclusive non-assignable sub-licence by **tie** Limited to the Beneficiary if **tie** Limited so requires for the period of time as **tie** Limited may reasonable require.

4.4 The Tram Contractor shall, if so requested at any time, execute such documents and perform such acts as may be required fully and effectively to assure to the Beneficiary the rights referred to in this Clause 4.

4.5 The Tram Contractor shall provide to the Beneficiary (at the Beneficiary's cost) a copy of any of the Deliverables as soon as reasonably practicable after receipt by the Tram Contractor of a written request from the Beneficiary to do so.

5. Required insurances

5.1 The Tram Contractor undertakes that:

5.1.1 cover under the Required Insurances (and the Additional Insurances, if any) is extended to include the Tram Contractor's liabilities under this Agreement, to the extent that the Tram Contractor is obliged to maintain such insurances under the Tram Main Works Agreement;

5.1.2 this Agreement has been disclosed to the Tram Contractor's current insurers or brokers (as the case may be) and shall be disclosed to any future insurers or brokers providing the insurance required by this Agreement; and

5.1.3 the Tram Contractor shall abide by the terms and conditions of the Required Insurances and the OCIP Insurances and shall use all reasonable endeavours not to do or omit to do anything that might prejudice the respective cover or rights to make a claim.

5.2 As and when reasonably required by the Beneficiary, the Tram Contractor shall produce for inspection documentary evidence that such insurance is being properly maintained.

5.3 If the insurer makes or attempts to make any material alteration or purports to withdraw the Tram Contractor's cover under the Required Insurances or the Additional Insurances (if any), or if the Tram Contractor is unable to obtain insurance for any other reason whatsoever, the Tram Contractor shall promptly give notice of this to the Beneficiary.

6. Assignation

6.1 The Tram Contractor shall not assign, novate or otherwise transfer the whole or any part of this Agreement without the prior written agreement of the Beneficiary which will not be unreasonably withheld or delayed in respect of:

6.1.1 an assignation, novation or transfer of the whole of this Agreement to any person to which the whole of the Tram Main Works Agreement has been assigned, novated or otherwise transferred; or

6.1.2 an assignation, novation or transfer of any part of this Agreement to any person to which the relevant and equivalent part of the Tram Main Works Agreement has been assigned, novated or otherwise transferred.

6.2 Subject to notice being served on the Tram Contractor and on **tie** Limited, the Beneficiary shall be entitled to assign, novate or otherwise transfer the whole or any part of this Agreement:

6.2.1 without the consent of the Tram Contractor to any person provided that no more than two such assignations will be permitted. Any assignations by the Beneficiary to a subsidiary or associated company of the Beneficiary or a member of the same group of companies will not count as an assignation;

6.2.2 with the prior written consent of the Tram Contractor (such consent not to be unreasonably withheld or delayed).

6.3 The Tram Contractor undertakes to the Beneficiary not to contend in any court proceedings under this Agreement that any person to whom the Beneficiary assigns or has assigned its rights under this Agreement or any of them in accordance with the foregoing provisions of this Clause 6 is to be precluded from recovering any loss resulting from any breach of this Agreement (whenever happening) by reason that such person is an assignee and not the original contracting party under this Agreement or by reason that the Beneficiary is named under this Agreement or any intermediate assignee of the Beneficiary escaped loss resulting from such breach by reason of the disposal of its interest in the same.

7. Liability of the Tram Contractor

7.1 No provision of this Agreement is intended to exclude any obligation or liability which would otherwise be implied whether by the law of contract, delict or otherwise.

7.2 The responsibility of the Tram Contractor under this Agreement is not to be reduced or in any way released or limited by any enquiry or inspection by or on behalf of any person notwithstanding that such enquiry or inspection may give rise to a claim by the Beneficiary against a third party.

7.3 The rights and benefits conferred upon the Beneficiary by this Agreement are in addition to any other rights and remedies that the Beneficiary may have against the Tram Contractor including (without prejudice to the generality of the foregoing) any remedies in delict.

7.4 Subject to the other provisions of this Agreement, the liability of the Tram Contractor to the Beneficiary is to be determined in all respects in accordance with the terms of the Tram Main Works Agreement and, in the event of any claim by the Beneficiary under this Agreement, the Tram Contractor shall be entitled to rely upon any defence, right, limitation or exclusion under the Tram Main Works Agreement as though the Beneficiary were named as **tie** Limited under it, except that:

7.4.1 the Beneficiary shall not be affected by any subsequent variation of the Tram Main Works Agreement which would adversely affect the obligations owed by the Tram Contractor or the waiver, compromise or withdrawal of any claim made by **tie** Limited; and

7.4.2 the Tram Contractor shall not be entitled to exercise any right of set-off, retention or withholding against the Beneficiary to which the Tram Contractor may be entitled against **tie** Limited.

7.5 The Tram Contractor shall not be liable to the Beneficiary for any delay in achieving the issue of any Certificate of Sectional Completion, Milestone Completion Certificate, the Network Certificate, Certificate of Tram Commissioning, the Certificate of Service Commencement and/or the Reliability Certificate.

7.6 Without prejudice to Clause 7.4:

7.6.1 the Beneficiary acknowledges and agrees that the Tram Contractor shall have no liability to the Beneficiary under this Agreement to the extent that such liability would result in the total aggregate liability of the Tram Contractor in connection with the Edinburgh Tram Network exceeding the relevant Liability Cap; and

7.6.2 the Tram Contractor shall have no liability to the Beneficiary under this Agreement in respect of any latent defects in the Works following expiry of the period of 12 years from the earlier to occur of the date of issue of the Reliability Certificate and the date of termination of the Tram Main Works Agreement.

8. Notices

8.1 Any notice required to be given under this Agreement is to be hand delivered or sent by prepaid registered or recorded delivery post to the party concerned at its address set out in this Agreement or to such other addresses as may be notified by such party for the purposes of this clause.

8.2 Any notice given pursuant to this Clause, if sent by recorded delivery, shall be deemed to have been received upon proof of delivery.

9. Rights of third parties

9.1 A person who is not a party to this Agreement shall have no right to enforce any term of this Agreement.

10. Invalid terms

10.1 If any term of this Agreement shall be held to any extent to be invalid, unlawful or unenforceable:

10.1.1 that term shall to that extent be deemed not to form part of this Agreement; and

10.1.2 the validity and enforceability of the remainder of this Agreement shall not be affected.

11. Variations and waivers to be in writing

11.1 No variation, alteration or waiver of any of the provisions of this Agreement shall be effective unless it is in writing and signed by or on behalf of the Party against which the enforcement of such variation, alteration or waiver is sought.

12. Waiver

12.1 Save where expressly stated, no failure or delay by either Party to exercise any right or remedy in connection with this Agreement shall operate as a waiver of it or of any other right or remedy nor shall any single or partial exercise preclude any further exercise of the same, or of some other right or remedy. A waiver of any breach of this Agreement shall not be deemed to be a waiver of any subsequent breach.

12.2 The Parties' rights and remedies under this Agreement are, except where provided otherwise in this Agreement, independent, cumulative and do not operate to exclude one another or any rights or remedies provided by law.

13. Jurisdiction and law

13.1 This Agreement is governed by and is to be construed according to Scots law and the Scottish courts shall have jurisdiction in relation to all matters arising under it.

IN WITNESS WHEREOF these presents on this and the preceding [◆] pages are executed as follows:

EXECUTED for and on behalf of **BILFINGER BERGER UK LIMITED** at

on 2008 by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **SIEMENS PLC**

at

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on 2008 by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

EXECUTED for and on behalf of **EDINBURGH AIRPORT LIMITED**

at

on 2008 by:

Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

ACKNOWLEDGED for and on behalf of **TIE LIMITED**

at

on 2008 by:

Director/Authorised Signatory _____

Full Name _____

Witness Signature _____

Full Name _____

Address _____

_____

APPENDIX 9

Aerodrome Safeguarding

Aerodrome Safeguarding Guidance comprises the following documents:

1. CAP 168 : Licensing of Aerodromes
2. CAP 680 : Aerodrome Bird Control
3. CAA Safeguarding of Aerodromes Advice Note 1 (Safeguarding - An Overview)
4. CAA Safeguarding of Aerodromes Advice Note 2 (Lighting near Aerodromes)
5. CAA Safeguarding of Aerodromes Advice Note 3 (Potential Bird Hazards from Amenity Landscaping and Building Design
6. CAA Safeguarding of Aerodromes Advice Note 4 (Cranes and Other Construction Issues)
7. CAA Safeguarding of Aerodromes Advice Note 5 (Potential Bird Hazards from Landfill Sites)
8. BAA Safeguarding of Aerodromes Advice Note 6 (Pre-Application Advice)
9. BAA Standard Conditions for Aerodrome Safeguarding
10. Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas)(Scotland) Direction 2003 (SEDD Circular 2/2003)

[redacted]

Director/Authorised Signatory

BILFINGER BERGER UK LIMITED

[redacted]

Director/Authorised Signatory

SIEMENS PLC

[redacted]

Director/Authorised Sig[redacted]

tie LIMITED

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